

Volume 1

HIGH PERFORMANCE TOOLING SOLUTIONS



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MEGA Micro Chuck

Ultra slim design eliminates any interference.



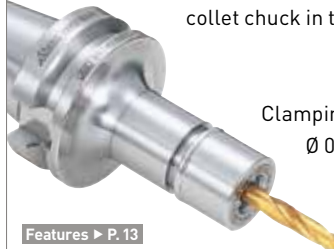
Clamping Range:
Ø 0.45 - Ø 8.05

Features ▶ P. 12

BBT shank	A2
DV shank	A32
HSK shank	A50/70/75
Cylindrical shank	A84
BIG CAPTO shank	A111
For N/C Lathe	A126

MEGA New Baby Chuck

Most reliable high precision collet chuck in the world.



Clamping Range:
Ø 0.25 - Ø 20

Features ▶ P. 13

BBT shank	A4
BDV shank	A33
HSK shank	A52/72/76
Cylindrical shank	A85
BIG CAPTO shank	A112

MEGA E Chuck

Original and exclusive design for small endmilling.



Clamping Range:
Ø 3 - Ø 12

Features ▶ P. 14

BBT shank	A6
BDV shank	A35
HSK shank	A55/77
BIG CAPTO shank	A115

MEGA Double Power Chuck

Specialist for heavy-duty cutting.



Clamping Range:
Ø 16 - Ø 50

Features ▶ P. 15

BBT shank	A8
BDV shank	A36
HSK shank	A56/78
BIG CAPTO shank	A116

New Baby Chuck

High precision collet chuck for various applications.



Clamping Range:
Ø 0.25 - Ø 20

Features ▶ P. 16

BT shank	A11
DV shank	A38
HSK shank	A59
Cylindrical shank	A86
For N/C Lathe	A126

New Hi-Power Milling Chuck

Reliable milling chuck with slim design.



Clamping Range:
Ø 16 - Ø 42

Features ▶ P. 17

BBT shank	A13
DV shank	A41
HSK shank	A61
Cylindrical shank	A87
BIG CAPTO shank	A119

MEGA Perfect Grip

Unique design anti pulling out cutter milling chuck.



Clamping Range:
Ø 16 - Ø 32

Features ▶ P. 18

BBT shank	A10
DV shank	A37
HSK shank	A58

Hydraulic Chuck

Various design with outstanding repeatability.



Clamping Range:
Ø 3 - Ø 32

Features ▶ P. 20

BBT shank	A15
HSK shank	A63/74
Cylindrical shank	A87
BIG CAPTO shank	A118

MEGA ER Grip

High precision ER collet chuck.



Clamping Range:
Ø 1.9 - Ø 20

Features ▶ P. 21

DV shank	A40
HSK shank	A60
For N/C Lathe	A128

Shrink Chuck

Shrink fit solution with BIG-PLUS interface.



Clamping Range:
Ø 4 - Ø 32

BBT shank A20
BDV shank A42

Face Mill Arbor

Eliminates chatter for smoother finish.



BBT shank A22
BDV shank A44
HSK shank A66
BIG CAPTO shank A121

Smart Damper for Milling

Unique modular damping face mill arbor.



Features ▶ P. 19

BBT shank A23
BDV shank A45
HSK shank A67

Side Lock Holder



Clamping Range:
Ø 6 - Ø 50

BBT shank A24
BDV shank A43
BIG CAPTO shank A109

MEGA Synchro Tapping Holder

Improves thread quality and tool life.



Tapping Range:
M1 - M36

Features ▶ P. 22/23

BBT shank A26
DV shank A46
HSK shank A68
Cylindrical shank A88
BIG CAPTO shank A120
For N/C Lathe A130

Dyna Test

Precision measuring tools of the highest quality for machine tool maintenance.



Features ▶ P. 28

BBT shank A29
BDV shank A47
HSK shank A80
BIG CAPTO shank A123

Millturn Tooling HSK

Unique modular turning system.



Modular turning tools A92
Rotary tool holders A50

Millturn Tooling BIG CAPTO

Modular turning tools and high precision rotary tool holders.



Modular turning tools A100
Rotary tool holders A111

N/C Lathe Tooling

For improved efficiency and reliability of production on NC lathe.



For N/C Lathe A126

Fullcut Mill

FCM and FCR type
Super smooth cutting
with low cutting force.



Features ▶ P. 24/25

- | | |
|-----------------|----------|
| FCR mono block | A188 |
| FCR cylindrical | A189 |
| Contact Grip | A191/204 |
| FCM mono block | A197 |
| FCM cylindrical | A200 |
| FCM arbor | A208 |

Speed Finisher

High speed cutter for
incredibly smooth
surface finish.



Features ▶ P. 26

- | | |
|----------------|------|
| Speed Finisher | A210 |
|----------------|------|

Surface Mill

Unique design
face mill cutter.



- | | |
|--------------|------|
| Surface Mill | A212 |
|--------------|------|

C-Cutter Mini

Ultra high feed
chamfer mill.



Features ▶ P. 27

- | | |
|--------------------------|------|
| Multi insert chamfering | A213 |
| Single insert chamfering | A214 |
| Bolt hole chamfering | A215 |

C-Cutter

Extensive chamfering range.



- | | |
|----------------|------|
| Standrad type | A218 |
| Universal type | A218 |

R-Cutter

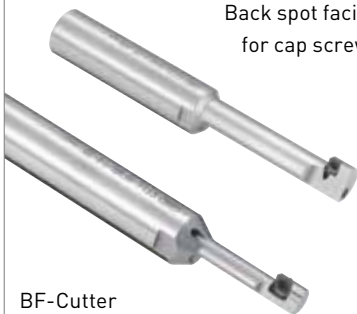
Automated R-chamfering.



- | | |
|---------------------------|------|
| Front and back chamfering | A220 |
| Front chamfering | A221 |

BF-Cutter

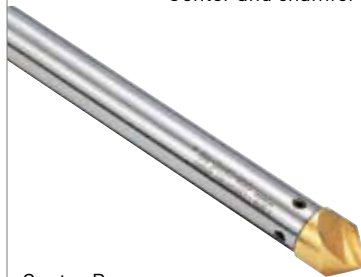
Back spot facing tool
for cap screw hole.



- | | |
|-----------|------|
| BF-Cutter | A222 |
|-----------|------|

Center Boy

Center and chamfer in one.



- | | |
|------------|------|
| Center Boy | A223 |
|------------|------|

Clamping Device

Tooling Mate
For 7/24 taper tools.



Kombi Grip
For HSK and BIG CAPTO.



- | | |
|--------------|------|
| Tooling Mate | A169 |
| Kombi Grip | A169 |

Base Master Series

Tool offset sensor.



- | | |
|--------|------|
| BM-50 | A181 |
| BM-50G | A181 |
| BM-50M | A181 |
| BM-50R | A182 |
| BMM-20 | A182 |

Alignment Tool for ATC Arm

For maintenance of machine tool spindle.



- | | |
|--------------------|------|
| ATC Alignment tool | A184 |
|--------------------|------|

Level Master

2-axis simultaneous detection leveler.

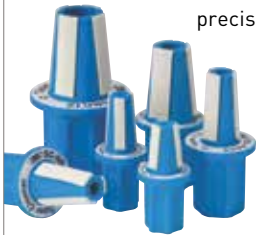


Features ▶ P. 28

- | | |
|--------------|------|
| Level Master | A186 |
|--------------|------|

Cleaner

Maintain accuracy of high precision collet chucks.



- | | |
|-------------------|------|
| α Taper Cleaner | A170 |
| α Wiper Cleaner | A170 |
| α Tooling Cleaner | A171 |
| Spindle Cleaner | A171 |

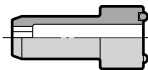
Pull Stud Bolt/Coolant Pipe

Pull Stud Bolt



Coolant Pipe

For HSK form A and E.



- | | |
|------------------|------|
| Coolant Pipe | A81 |
| Pull Stud Bolt | A174 |
| Pull Stud Wrench | A175 |

Modular Components

CKN components for lightweight tools.



Features ▶ P. 30

- | | |
|------------------------|-----|
| Shanks | B6 |
| Reductions, Extensions | B14 |

Twin-Cutter Boring Heads

SW: Perfect roughing.



Features ▶ P. 38

- | | |
|-------------------------|-----|
| SW, series 319 | B27 |
| TW, series 315 | B36 |
| MW | B35 |
| Indexable insert drills | B23 |

Precision Boring Heads EWD

EWD for highest precision and performance.



Features ▶ P. 33

- | | |
|-----------------|--------|
| EWD, series 112 | B40/50 |
| EWD, series 310 | B58 |

Precision Boring Heads EWN/EWB

EWN 04-7: The smallest boring head in the world.



Features ▶ P. 32

- | | |
|--------------------|-----------|
| EWN, series 112 | B41/51/55 |
| EWN, series 310 | B60 |
| EWB, series 112 | B40/50 |
| EWB, series 310 | B64 |
| EWB AL, series 310 | B65 |
| EWB UP, series 310 | B66 |

Smart Damper for Boring

EWD Smart Damper, a combination of the most advanced technologies.



Features ▶ P.37

- EWD Smart Damper B59
- Smart Damper shanks B13
- Smart Damper extension B15

Large Diameter Boring Tools

Lightweight tools
Ø 200 - 3 000 mm.

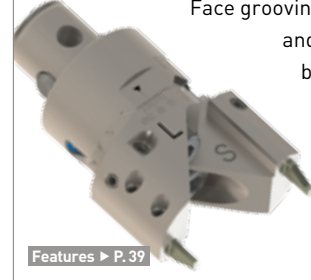


Features ▶ P.40

- Series 318, Ø 200 - 620 B71
- Series 318, Ø 620 - 3 000 B78

Special Boring Applications

Face grooving with single and twin-cutter boring heads.



Features ▶ P.39

- Face grooving B92
- Pin turning B88
- Slot milling cutters B96
- Chamfering mills B98

Precision Boring Heads BIG CAPTO

Precision boring heads with BIG CAPTO interface.



- EWN/EWBD, series 310 B110
- EWD/EWN, series 112 B108

Indexable Inserts

Specially selected inserts for boring operations.



Features ▶ P.43

- Indexable inserts B120-B148
- Boring cutters B149

Angle Head

Eliminates multiple set up.

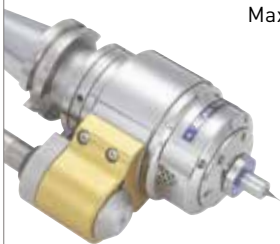


Features ▶ P.44

- New Baby Chuck type C6
- Compact type C10
- Small Bore type C12
- Build-Up type C14
- HMC type C17
- Universal type C18

Air Turbine Spindle

Max. 120 000 min⁻¹



Features ▶ P.45

- Center through type C24/25
- Side through type C26/27

High Spindle

4, 5, 6 times speed increaser.



Features ▶ P.46

- GTG type C32
- GTX type C33

Hi-Jet Holder

Coolant delivery to cutting edge.



Features ▶ P.47

- New Baby Chuck type C36
- Milling Chuck type C37
- Side Lock type C38

The original simultaneous taper and flange fit spindle system for 7/24 taper

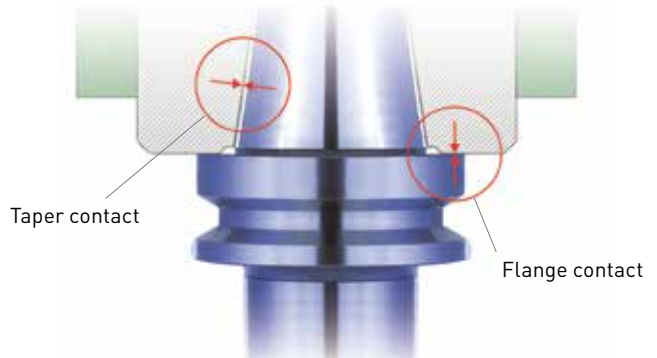


The BIG-PLUS spindle system exceeds all other interface concepts thanks to simultaneous taper and face contact between machine spindle and tool holder. Furthermore the system offers full interchangeability with existing machines and tool holders.

In a first step a taper contact is resulting during entering the tool into the machine spindle. Due to the pull-in force the tool taper expands the spindle in the elastic range. The tool is pulled further into the spindle until the tool flange reaches the surface of the spindle nose.

Advantages

- Improved surface finish & dimensional accuracy
- Extended tool life
- Prevention of fretting corrosion caused by heavy cutting
- Improvement of ATC repeatability
- Elimination of Z-axial movement at high speeds
- Improved roundness of boring operation



Basic concept

The BIG-PLUS Spindle System is based on the most current available standards in JIS B6339 and DIN 69871.

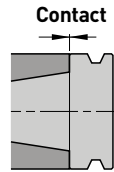
A conventional steep taper tool holder is supported on a reference diameter called the gauge face. On the contrary, a BIG-PLUS tool holder is supported on the flange face, which brings remarkable improvement to rigidity.

	Conventional	BIG-PLUS
BT50	Ø 69.85	Ø 100
BT40	Ø 44.45	Ø 63
BT30	Ø 31.75	Ø 46

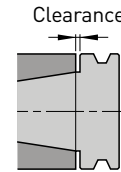
Perfect interchangeability

BIG-PLUS tool holders can be used on existing standard machine spindles. Existing standard tool holders can also be used on BIG-PLUS spindles. In this case, simultaneous contact cannot be attained.

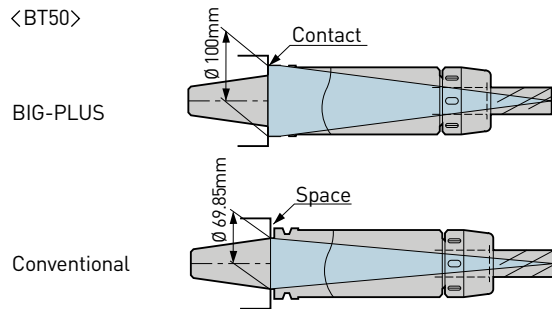
BIG-PLUS Spindle + BIG-PLUS Holder



Conventional Spindle + BIG-PLUS Holder

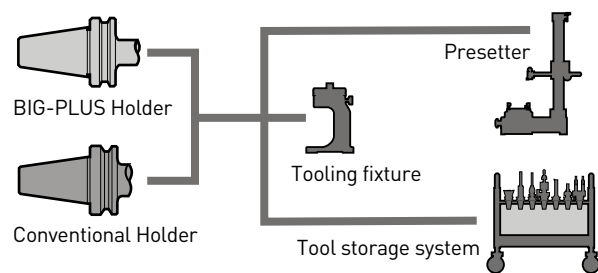


Increased contact diameter (example of BT)



Although other simultaneous contact systems require exclusive new accessories, the BIG-PLUS Spindle uses existing accessories such as a presetter and tool holder fixture as it is based on a conventional steep taper shank. Further, it is not necessary to modify tool magazines and ATC devices of existing machines.

Existing accessories utilized



Note:

BIG-PLUS tools are available as BBT or BDV in page A2 - A47 and A188 - A207.

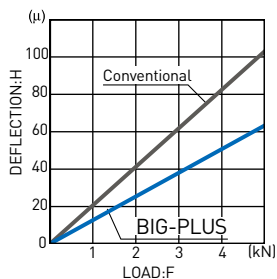
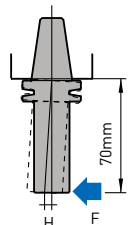


Minimized deflection for maximum machining, accuracy and superior finish

With BIG-PLUS simultaneous contact, machining rigidity is greatly enhanced due to the larger contact diameter of the tool holder flange face. This larger face contact combined with the taper contact works together to resist deflection. With less deflection, greater machining accuracy and superior finish can be achieved.

Comparison of deflection

BT40



Deflection of machine spindle is included. Vertical machine was used for the test.

Face milling application



BIG-PLUS



Standard

Machine tool: #40 (horizontal machining center)
 Cutter: Face milling Ø 125 (6 cutting edges)
 Work material: A2017 Duralumin
 Cutting depth: 2.4 mm

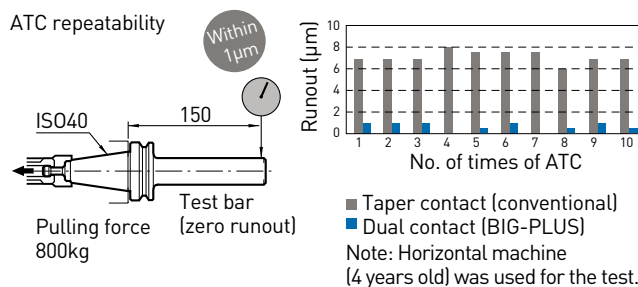
Caution

BIG-PLUS machine spindle are produced under strict quality control with BIG-PLUS master gauge. To maximize the spindle performance and extend spindle life, please use the original BIG-PLUS tool holders with BIG-PLUS trade mark.

Improvement of ATC repeatability

The BIG-PLUS System assures the highest precision location of the toolholder in the spindle when using the ATC for loading tools, as a result of the dual contact which precisely positions the toolholder within 1 micron.

ATC repeatability



Strict gauge control

BIG-PLUS spindles produced by the licensed machine or spindle builders are strictly controlled in dimensions by the BIG original master gauge. Only the BIG-PLUS trademarked tool holders can achieve the optimal performance fully and safely.

Gauges for machine spindle

Master Gauge



ID chip is embedded in the Master Gauge and records the calibration data

Measuring equipment



Master Arbor



HSK tooling system

Selected materials and strict control of dimensional accuracy for the optimum quality. Wide range of standard holders to meet all production requirements.

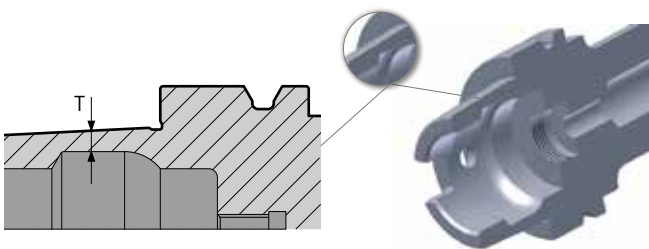


Premium material selection

Since HSK is a hollow taper shank, the material has a critical role for optimum performance. BIG uses carefully selected high grade alloy steels. Particularly, BIG uses die steel materials for HSK 40 and smaller where the cross section of shank taper is very thin.

Drive key form

HSK Shanks according to Form A are designed to carry out torque transmission by the round shaped key-way at the end of the taper. Because of the importance of this round shaped geometry, BIG provides finishing of this feature after heat treatment.



HSK Size	25	32	40	50	63	100
T	1.09	1.25	1.92	2.60	3.47	5.17

HSK turning tools

HSK-T63 / T100 (ISO 12164-3)

Unique modular type of turning system offer various solution for turning applications.

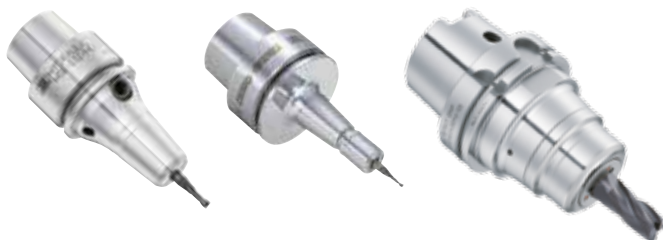
Great variety of HSK

Following HSK types are standardized to offer the best possible solution. Other types are also available upon request.

HSK-A32/A40/A50/A63/A100/A125

HSK-E25/E32/E40/E50

HSK-F63



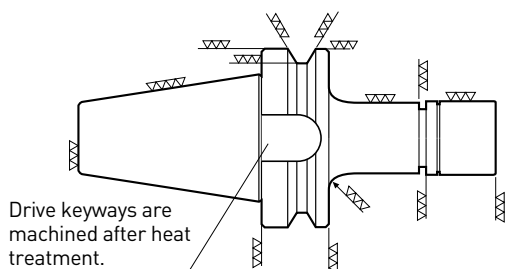
MEGA Chuck Series

Wide variety of collets and chuck bodies to cover all high speed ultra precision machining applications.



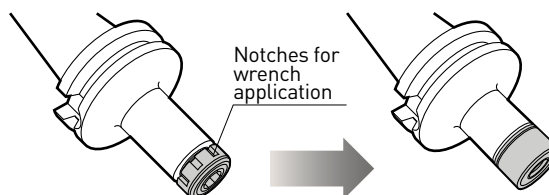
Precision ground and balanced for high speed machining

MEGA CHUCKS are micro mirror ground finished on all surfaces to assure perfect concentricity for high speed machining. The drive keyway is machined after heat treatment.



Notch-free design MEGA NUT prevents vibration and reduces noise

Vibration at high speeds is eliminated with the use of notch free designed nuts, which offer superior balance and concentricity. This ideal nut design not only reduces whistling noise and splattering coolant, but also assures increased strength of the nut itself.



Easy and firm clamping by the MEGA Wrench

The unique MEGA Wrench has a one way clutch system with roller bearings and a ratchet function which is capable of safely and evenly applying force to the entire nut periphery.



Perfect quality control



All tools are marked with serial no. as a proof of a high quality and good traceability. 100% tools are inspected its quality to guarantee high performance.

4 chuck types for different high speed machining requirements

MEGA Micro Chuck

For micro drills and end mills
Clamping range
Ø 0.45 - Ø 8.05 mm



MEGA New Baby Chuck

For carbide drills, reamers and end mills
Clamping range
Ø 0.25 - Ø 20 mm



MEGA E Chuck

For end mills and reamers
Clamping range
Ø 3 - Ø 12 mm



MEGA Double Power Chuck

For end mills
Clamping range
Ø 16 - Ø 42 mm



MEGA Micro Chuck

Extremely slim design of body and nut provides superior balance and concentricity and is ideal for reaching into confined areas.



- max. 40 000 min⁻¹
- Clamping range: Ø 0.45 - Ø 8.05
- 0.1 mm increments for higher precision



Nut diameter 10, 12, 14 & 18mm, extremely slim design

Slim design avoids interference. Ideal for small mold making combining high speed and high precision capability.



Ø 10 mm
3S type

High concentricity

100% concentricity inspection. Within 1 µm at nose is guaranteed.



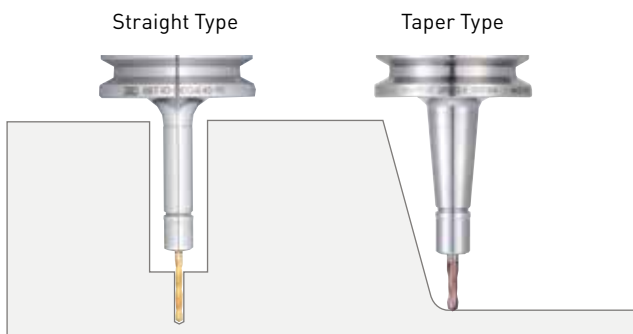
High precision Micro Collet

Three versions are available

Straight Type: where access is restricted

Taper Type: for increased rigidity

Cylindrical Shank Type: for increased versatility



Collet concentricity

Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 µm	Within 3 µm

Efficient coolant supply



Sealing nut for MEGA6S and MEGA8S brings various solution for micro machining such as high pressure coolant supply and dust proof.

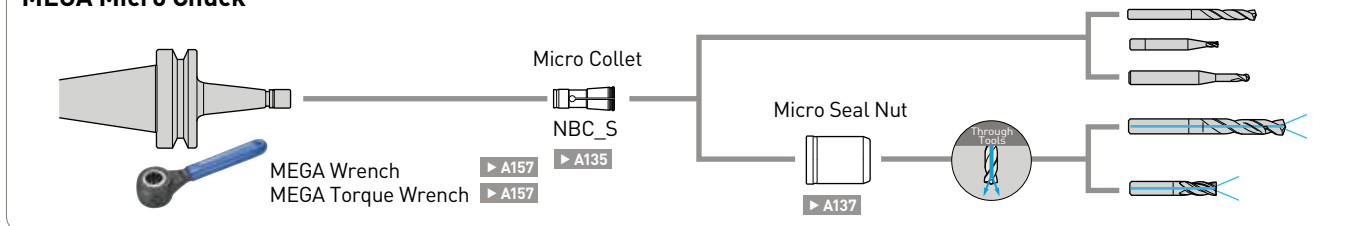


Cylindrical Shank Type

Flexible tool layout, for tighter and deeper area



MEGA Micro Chuck



MEGA New Baby Chuck

High speed design, offered in six different size collet series, utilizes ultra precision New Baby Collets which guarantee a runout at the collet nose of less than 1 micron.



- max. 40 000 min⁻¹
- Clamping range: Ø 0.25 - Ø 20



High precision collet, close to submicron

100% inspection to guarantee accuracy. Material, production, heat treatment, everything is selected for precision.



High precision NBC Collet

Collet concentricity

Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 µm	Within 3 µm

2 way coolant supply

Sealed collet nut MEGA Perfect Seal

- Standard NBC Collet is used
- High dust resistance
- Max. coolant pressure 7 MPa



Through Tools
Tools with holes



Jet Through
Tools without holes

Various collet and nut selection

Various type of collet and nut can bring the best solution for your demand.

NBC Standard
For general



NBC-E collet
For end mill



FONBC collet
For coolant-through tools



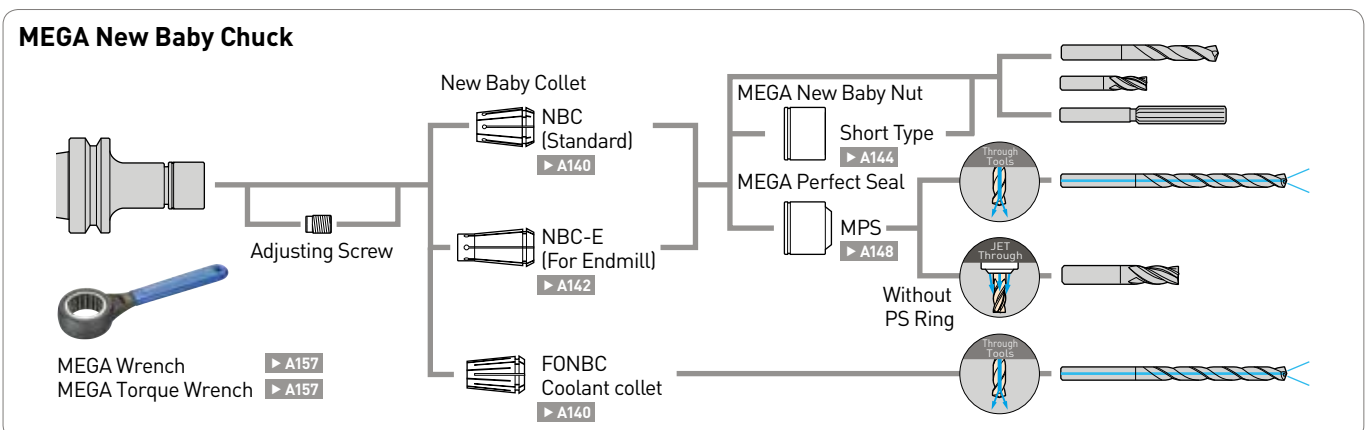
MGN nut
For high speed



MPS nut
For efficient coolant supply

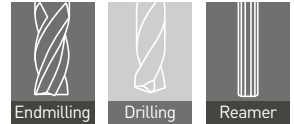


MEGA New Baby Chuck



MEGA E Chuck

Collet chuck designed exclusively for endmilling up to \varnothing 12 mm with high concentricity and rigidity.



- max. 40 000 min⁻¹
- Clamping range: \varnothing 3 - \varnothing 12



High concentricity

100% inspection to guarantee accuracy within 1 μ m runout at collet nose.

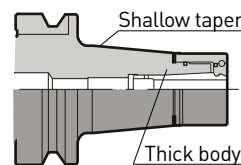


High precision MEGA E Collet

Collet concentricity

Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 μ m	Within 3 μ m

Substantial and tapered body design



Thick body eliminates chatter and deflection. Tapered extension provides the rigidity to prevent vibration.

Slit-through coolant

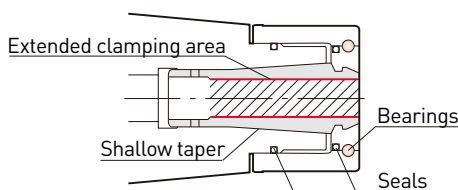
Coolant is reliably directed to cutting surface through slits in the collet. Tool life is extended together with improved surface finish as a result of smooth chip evacuation.

- Max. coolant pressure 7 MPa



High grip collet

Gripping force is an important element for endmilling with a collet chuck. The long gripping length of the collet in the MEGA E series provides a powerful gripping force. The shallower taper of the collet improves concentricity in order to achieve better surface finishes and longer cutting tool life.



For coolant-through tools

Sealed collet nut to supply coolant reliably through cutting tool.

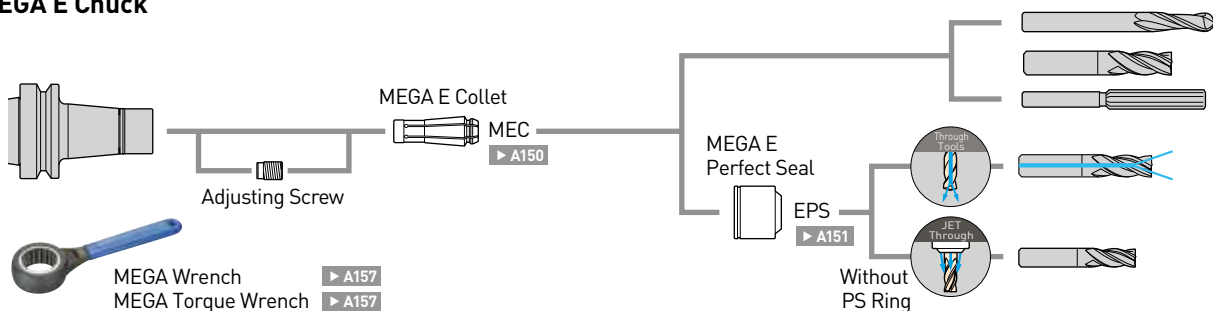


MEGA E Perfect Seal



Ideal for burnishing drills and reamers due to extended gripping length.

MEGA E Chuck



MEGA Double Power Chuck

Flange contacting nut and simultaneous taper & flange contact assure highest rigidity.



- max. 30 000 min⁻¹
- Clamping range: Ø 16 - Ø 32
- Ideal for solid machines



Stabilizing contact between flange and nut provides exceptional rigidity

The expanded contact diameter of the nut of the MEGA Double Power Chuck to the flange provides the highest rigidity as if the chuck and nut were one solid piece. This superior rigidity assures heavier duty machining without chatter.



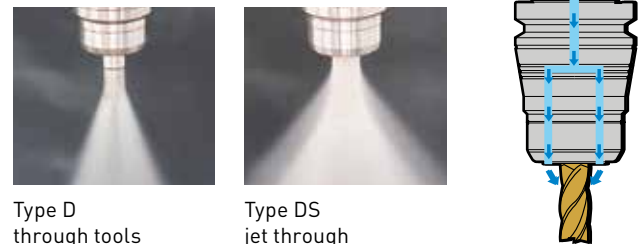
Released

Tightened

Secure coolant supply

Two types are designed for the most effective coolant supply.

- Improved surface finish
- Extended tool life
- Smoother chip evacuation
- Cooling & lubrication of tools



Type D through tools

Type DS jet through

Cutting conditions

Coated carbide endmill Ø32, 4-flutes Workpiece: SS400 (JIS) V282 m/min S2,800min ⁻¹ F1 120 mm/min	BBT50-MEGA32D-105	Other manufacturer (L = 90)
	Radial d = 14 mm Power 15.2KW	Radial d = 9.5mm Power 9.2 KW

Various type of straight collets are available.

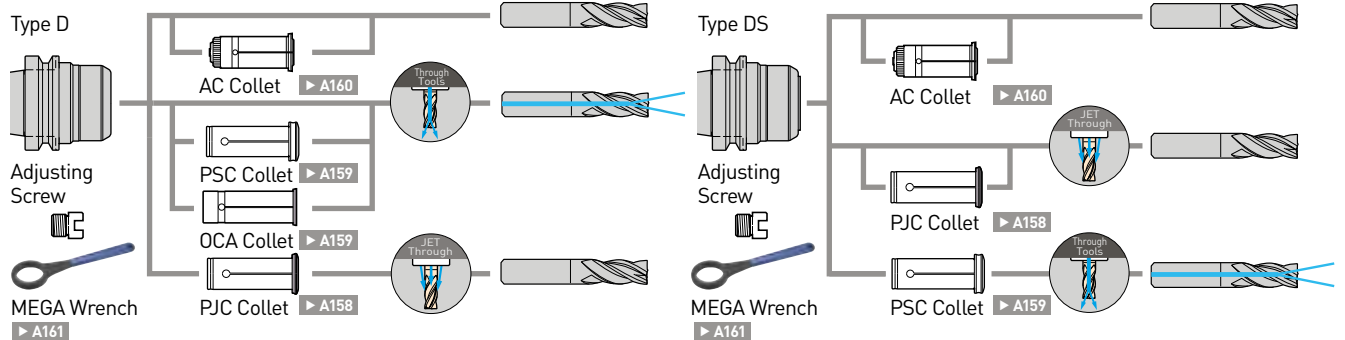
For jet through
PJC collet

For through tools
PSC collet

For through tools
OCA collet



MEGA Double Power Chuck



New Baby Chuck

New Baby Chuck is capable of achieving high spindle speeds as required for drilling and end milling with smaller diameter cutting tools.

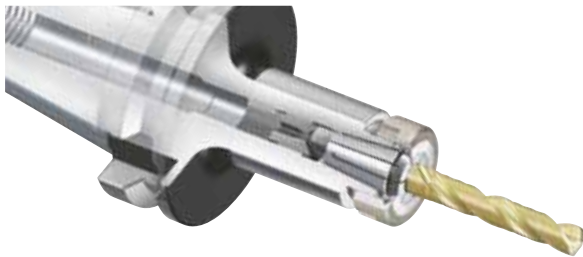


- Clamping range: \varnothing 0.25 - \varnothing 20



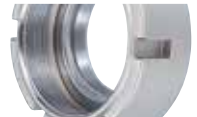
Ideal combination of taper angle and collet projection length

New Baby Chuck satisfies all requirements for accuracy, clamping force and clamping range, by utilizing the ideal 12° taper angle.



The nut is a key to achieve the highest precision of a collet

- Since the threads greatly influences accuracy, they are finished after heat treatment. Therefore, bad influence from clamping action is eliminated, which enhance clamping performance.
- A nut incorporates a thrust bearing with steel balls that prevents stress to a collet and allows a smooth clamping force to a collet.



High concentricity



Each collet is inspected and double checked to meet maximum runout tolerance permitted.

For high pressure coolant supply

- Standard NBC Collet is used.
- High dust resistance
- Max. coolant pressure 7 MPa



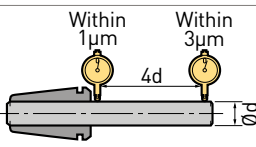
Through Tools
Tools with holes



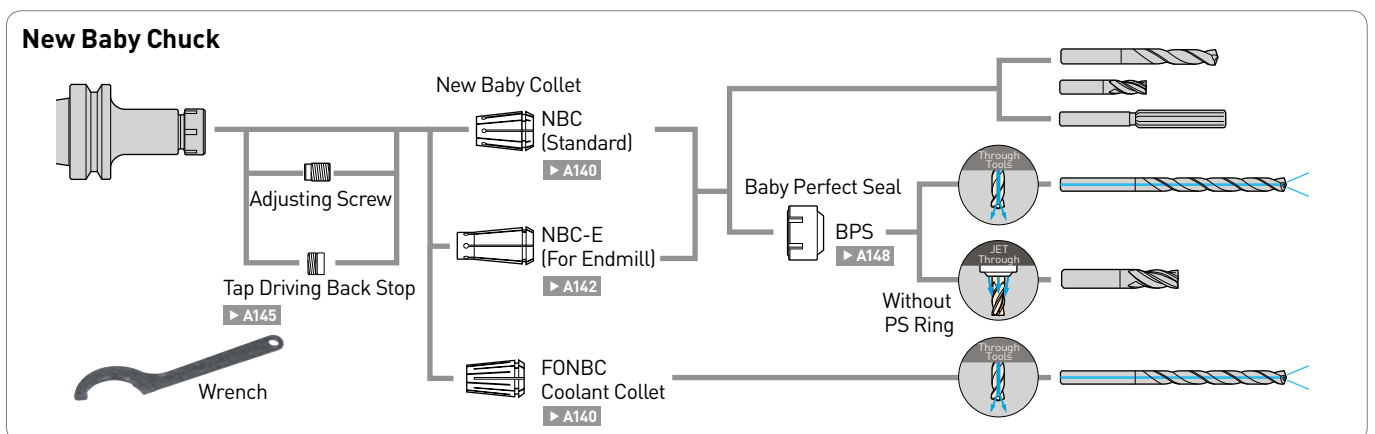
Jet Through
Tools without holes

Collet concentricity

Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 μ m	Within 3 μ m



New Baby Chuck



New Hi-Power Milling Chuck

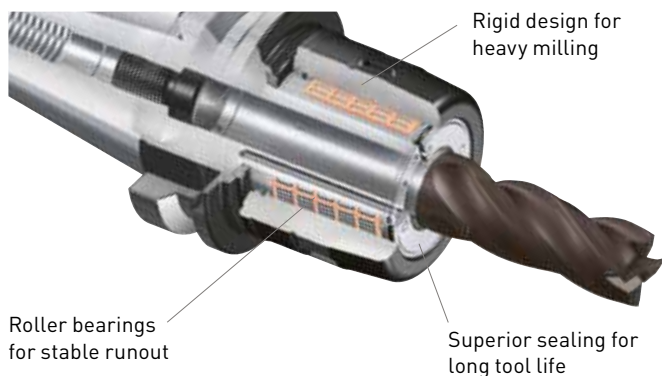
New Hi-Power Milling Chuck combines the high accuracy with high torque capability and rigidity.



- Clamping range: $\varnothing 12 - \varnothing 42$

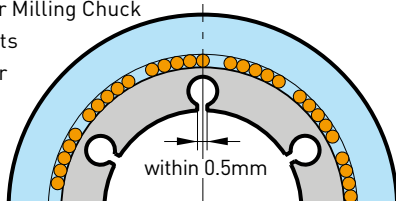


High rigidity design for heavy cutting



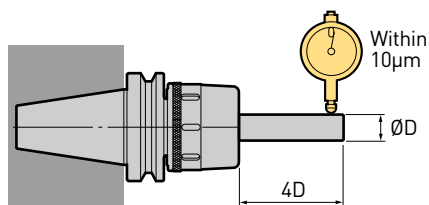
Secure and reliable slit design

The annular section needs to be substantial in order to provide rigidity but retain the ability to collapse in order to provide sufficient grip. The section of the Hi-Power Milling Chuck has combined holes and slits at regular intervals in order to combine both requirements.



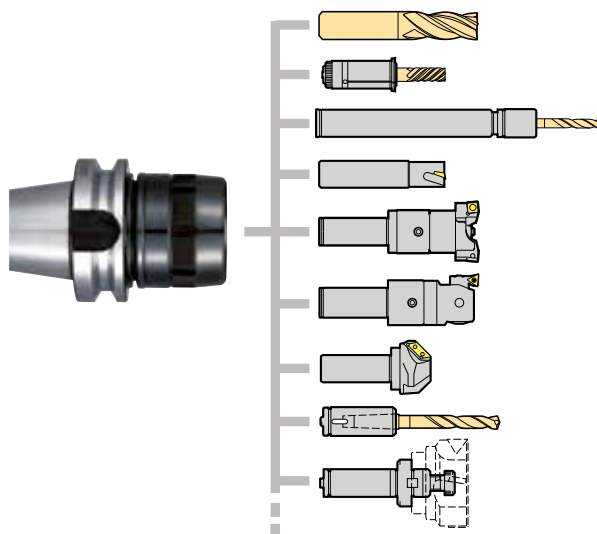
Precise concentricity

Concentricity is assured by the integral design and clamping by mechanical compression of the annular section by the rolling bearing system. All models are inspected and double checked to meet maximum runout tolerance permitted. (within $10\mu\text{m}$ at $4D$).



Basic tool for various applications

New Hi-Power Milling Chuck is a good basic tool. Not only for milling tool, but also for boring tools, chamfering tools and various applications.

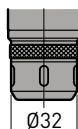


HMC12J type

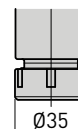
Super slim design milling chuck with peripheral coolant supply function is also available.



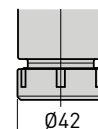
HMC12J



NBS13



NBS16



MEGA Perfect Grip

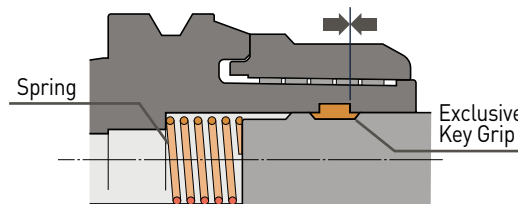
Features 100% security against pulling out the cutting tool under any torque load.

- High accuracy and fully concentric clamping
- Accepts industry standard Weldon flat milling cutters
- No special grinding of milling cutter required
- Flood jet-through coolant



Non-Pullout mechanism

The Key Grip engages in the groove of the chuck body to ensure no tool pullout.

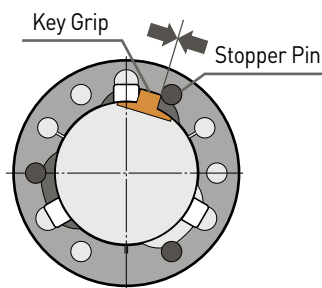


Simple, easy handling with secure clamping

1. Place the exclusive key grip into the Weldon flat of the end mill shank.
2. Insert the end mill with the key grip in alignment with one of the three key grip grooves inside the milling chuck.
3. Rotate the end mill approximately 20° clockwise until the key grip stops securely against the stopper pin.
4. Finish clamping the tool until the clamping nut contacts the positive stop of the chuck body.

Non-Slip mechanism

The Key Grip maintains contact with the stopper pin to prevent any slip under high torque.



Flood jet-through coolant

The key grip grooves provide channels for high volume coolant to the cutter. Effective end milling of HRSA's requires a high volume of coolant to the cutting edge to dissipate heat and aid in the removal of chips.



Perfect contact between flange and nut

The expanded contact diameter of the nut of the MEGA Perfect Grip to the flange provides the highest rigidity.





Smart Damper for Face Mill

Unique dynamic damping system eliminates vibration for higher productivity.

- Built-in damping system
- Center through coolant supply

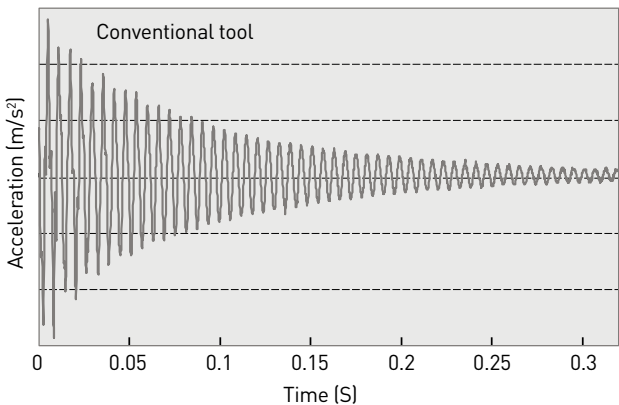
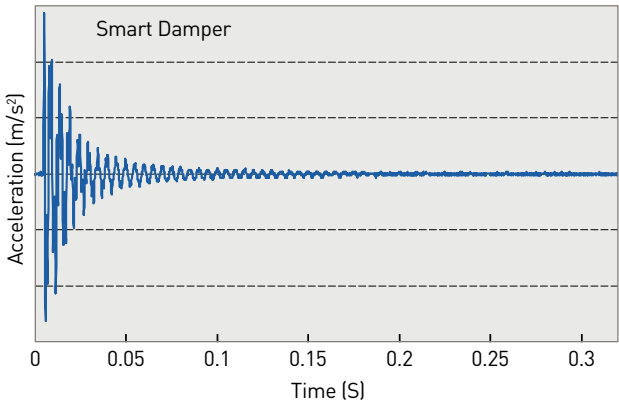


Damping mechanism

Smart Damper incorporates unique damping mechanism functioning both counter and friction dampers. Patent-pending counter weight maximizes effect of the friction damper. Vibration is absorbed effectively and higher machining accuracy is achieved.

Comparison of oscillatory waveforms

Smart Damper incorporates a unique counter force damping mechanism by friction dampers. Vibration is absorbed effectively and higher machining accuracy is achieved.



Maximizes potential of cutters for the highest productivity

- For FMH22 and FMH27
- Modular design provides versatility
- Center through coolant

Face Mill Arbor Type FMH

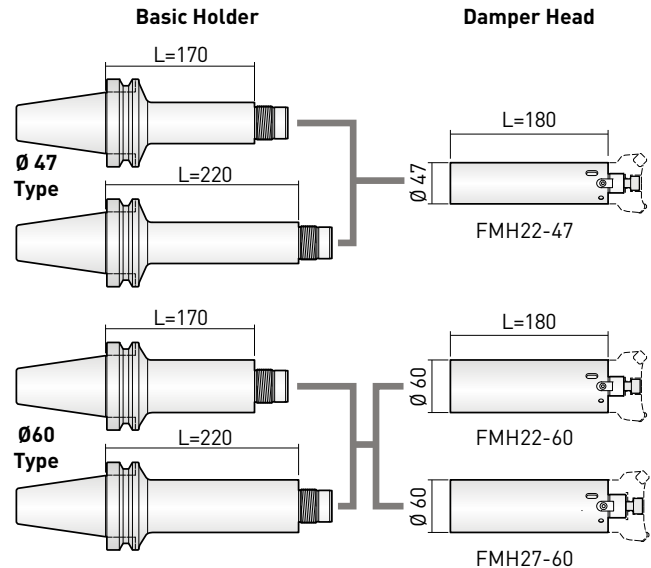


Face milling of C55 with high feed cutter

Holder	Radial depth of cut (mm)				Condition
	5	10	20	30	
Standard Holder	○	X	X		 V=90m/min Fz=1.0/tooth Ap=2.0mm Overhang=347mm
Smart Damper	○	○	○		

Smart Damper achieves 6x deeper depth of cut.

Combinations (Example of BBT50)

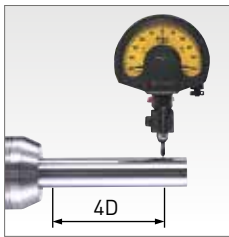


Hydraulic Chuck

Ultra precision hydraulic clamping chuck holder with various additional features.



Runout accuracy less than 3 µm



High precision runout accuracy less than 3µm at 4d improves the workpiece surface finish and extends tool life.

Various selection of Hydraulic Chuck

The Hydraulic Chucks come in a variety of design and function to cover specific demands within high precision application.

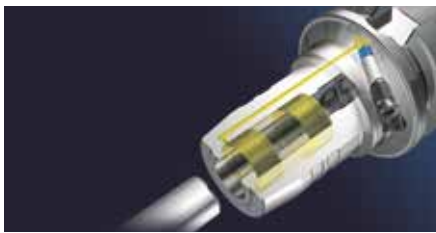
- Slim and high speed
- Slim design available from Ø 3 mm
- Jet-through coolant supply



Super Slim Type

Integral sleeve construction

Compared with the traditional two-part construction sealed with O-rings, BIG KAISER Hydraulic Chucks are long lasting and maintenance free. Also the rigidity is greatly improved by the short projection length and dual pressure points.



Super compact and high speed
(max. 45 000 min⁻¹)



Cylindrical shank
with coolant-through

Easy clamping with 1 wrench



The cutting tool can be clamped or unclamped easily and securely with just 1 wrench. Extremely good repeatability and runout accuracy are guaranteed.

Jet-through coolant supply (max. 30 000 min⁻¹)



Coolant to cutting
tool periphery

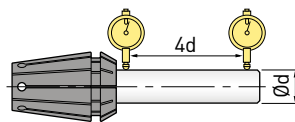
MEGA ER Grip

High precision collet, nut and body that outperforms standard ER systems. Reliable and stable runout accuracy will also tremendously contribute to improving machining capability and cost reduction.



The ER collet with the best runout accuracy in the world

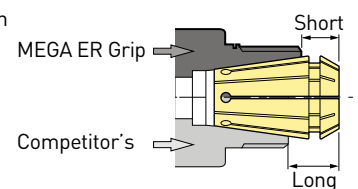
Measurement standards:
In accordance with
DIN6499 and ISO15488



Clamping Range	DIN / ISO		MEGA ER
	Class 1	Class 2	
Ø 2 - Ø 10	10 µm	15 µm	Within 3 µm
Ø 10 - Ø 20	15 µm	20 µm	

High rigidity body that increases the contact area of the collet

By increasing the contact length of the internal taper of chuck bodies, the undesired overhang of the collet is reduced. This modification of the standard improves 3 of the most important requirements for the collet chuck, rigidity, runout accuracy and clamping force. (Conventional DIN collets can also be used.)



Variety of nut selection

Two type of ER nut as well as sealing nut offer the most suitable solution for your demand. These nut can also be used for conventional ER chuck models.

MEGA ER Nut MEGA ER Solid Nut MEGA Perfect Seal



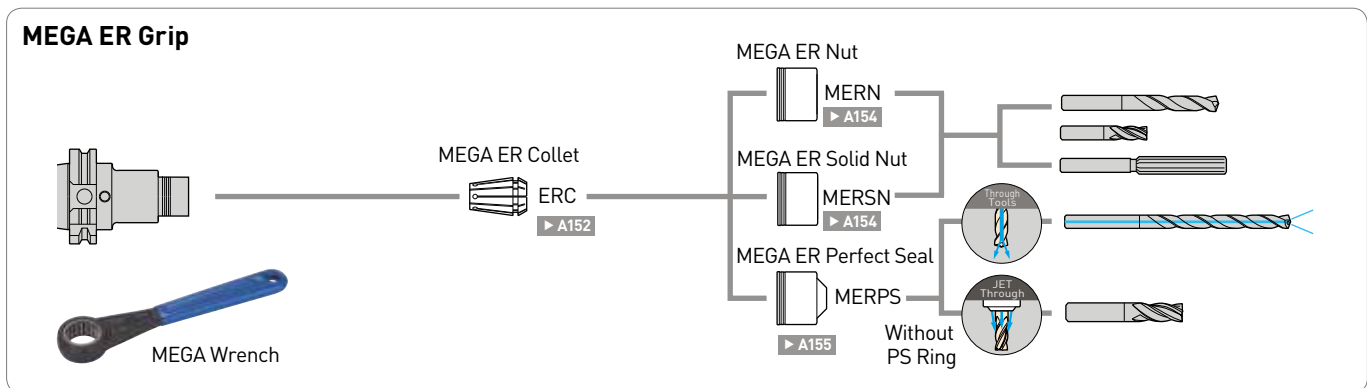
2 way coolant supply

Sealed nut MEGA Perfect Seal offers 2-coolant solutions.



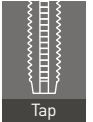
Through Tools
Tools with holes

Jet Through
Tools without holes



MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



- Tapping range: M1 - M36



39 body models and 188 Tap Holder models are available

New large tap series achieves the max. M36. An extensive variety of bodies suitable for many spindle types. Short, middle & long Tap Holders are standardized to cover between M2 and M36. The slim design avoids interference.



Secure drive system

Body and Tap Holder are fixed with a drive key in the rotation direction as well as the square of the tap.



Tool periphery
Coolant is supplied through slits of the Tap Holder.



Through tool
Coolant is supplied through both the tool and the slits of Tap Holder.

Coolant through center capability for all models

Coolant is supplied both through the tool and to the tool periphery simultaneously.



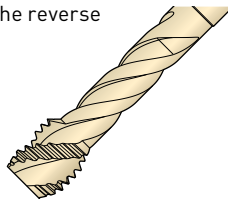
MEGA Synchro Tapping Holder compensates for synchronization errors with any type of tap

Minimized thrust load to both the tap and workpiece improves thread quality and tap life.

Load to tap – spiral tap

Spiral grooves on spiral tap cause loading in the reverse direction, similar to an end mill.

- M6 P1
- V: 20 m/min (1060 min⁻¹)
- Measured by Kistler dynamometer

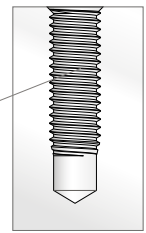


Comparison of surface finish

Tapping of exotic materials tends to cause a compressed burr on the thread surface. BIG KAISER MEGA Synchro compensates for synchronization errors and minimizes cutting load.

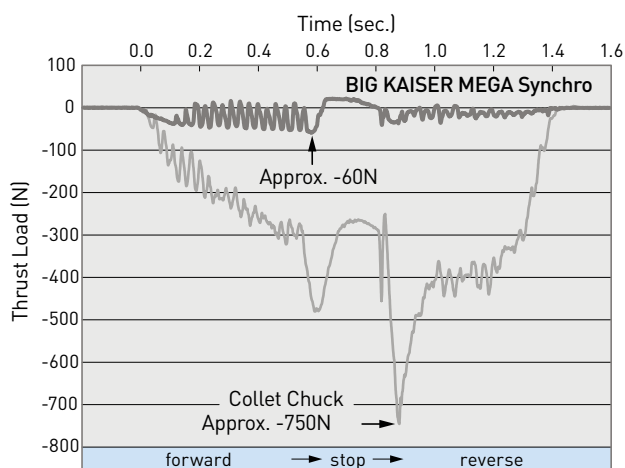
Spiral tap

M5 P0.8 Material : SNCM420(41CrNiMo2)



Collet chuck

MEGA Synchro

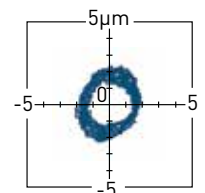


Result

MEGA Synchro reduces load to approx. 60N. This is less than 1/10th of the load compared to a collet chuck. Approx. 750N of reversal load is applied to a tap held with a collet chuck.

For small tap MGT3 (M1 - M3)

Eliminated synchronization errors and minimized dynamic runout. Plotted position of a test bar (at 16 mm distance on 4 mm diameter).



For large tap MGT36 (M22 - M36)

Smooth tapping for large tapping.



Fullcut Mill Type FCR/FCM

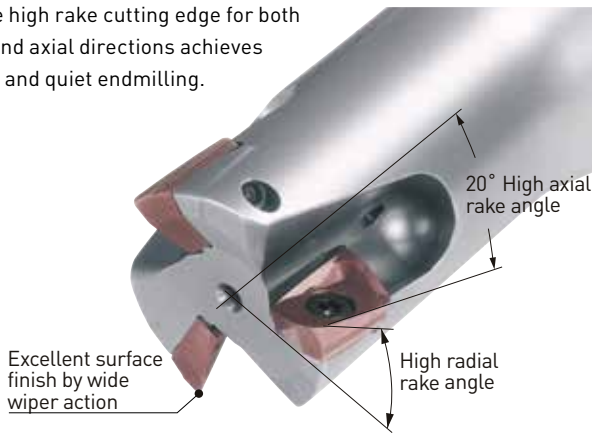
Indexable insert endmills with both excellent sharpness and toughness, achieving the performance of solid endmills.

- Cutter Dia.: $\varnothing 12 - \varnothing 100$



Sharp cutting edge by both high radial and axial rake angles

Positive high rake cutting edge for both radial and axial directions achieves smooth and quiet endmilling.



Amazing cutting performance, brought by integral and face contact body

Integral style with taper shank and flange contact with the machine spindle provides higher precision and rigidity thus achieving cutting conditions only otherwise available on larger machines.

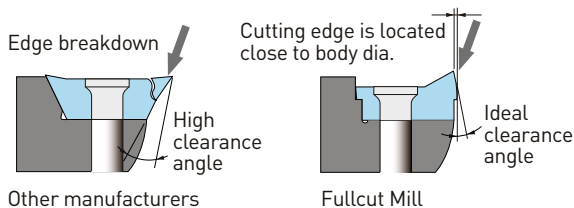
BBT and BDV type



HSK type



Strong cutting edge reduces edge chipping



Contact Grip

- Threaded coupling with taper and face contact
- Resistant to chatter due to the dual contact connection
- FCM or FCR heads can be installed on the base holder



Amazing cutting performance even on #40 taper machine

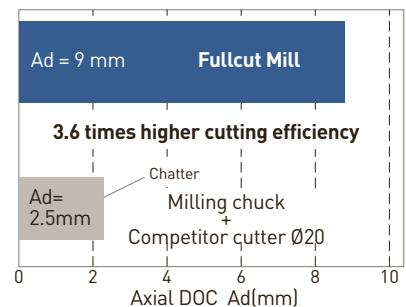
Comparison of axial DOC between integral type with face contact and straight shank type. 3.6 times higher cutting performance than other manufacturer.

Cutting condition

Machine: BBT40 (BIG-PLUS)
 Slot milling: 20 mm
 Work material: C50 (S50C)
 Spindle speed: 2400 min⁻¹
 Speed: V = 150 m/min
 Feed: 0.12 mm/tooth



Excellent surface



Fullcut Mill Type FCR

Unique inserts designed for ramping make multi-functional cutting possible.

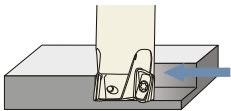
- Ramping and helical milling cutter
- Cutter Dia.: $\varnothing 16 - \varnothing 33$

Higher rigidity with integral body with dual contact system.

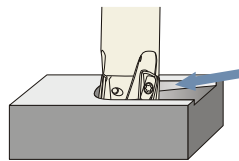
BBT and BDV Type HSK Type Cylindrical Shank Type



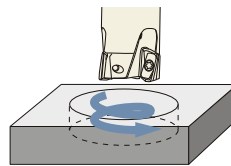
Shoulder Milling



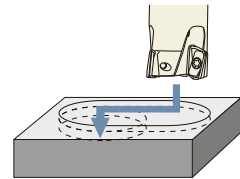
Ramping



Helical Milling



Peck-drilling



Fullcut Mill Type FCM

The indexable endmill that combines sharpness and rigidity has no match.

- Square Shoulder and slot milling cutter
- Cutter Dia.: $\varnothing 12 - \varnothing 100$

A variety of shanks including simultaneous fit with integral body.

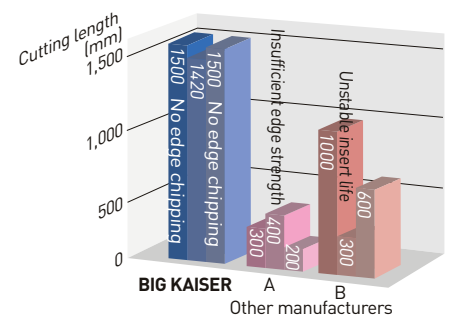
BBT and BDV Type HSK Type Cylindrical Shank Type Arbor Type



Tough cutting edge of Fullcut Mill is proven



An evaluation of cutting length/life as measured when machining the most arduous workpiece by milling over a continuous series of holes. This is the condition most likely to cause edge chipping.

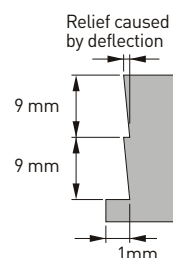


Finishing with indexable endmill - Why not?

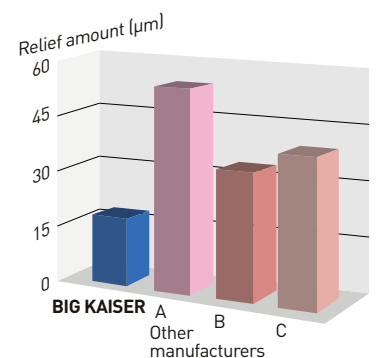


Insert with the minimum nose radius of 0.2mm and superb squareness to achieve high precision end milling comparable with solid carbide tools.

Work material: SUS304
 Vertical M/C: No. 40
 Cutter dia.: $\varnothing 25$ mm
 Feed: 0.12 mm/tooth



Squareness is influenced by the cutting parameters, work materials, rigidity of machine and workpiece, etc.



Speed Finisher

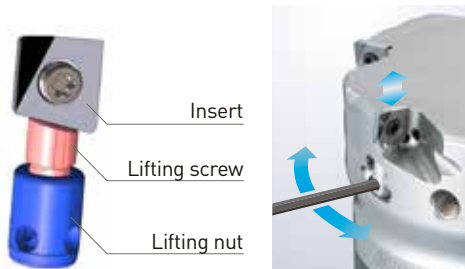
Amazing improvement of surface finish at high speed cutting.
 RZ = 0.55 μm with aluminum die casting ADC12
 RZ = 0.67 μm with gray cast iron FC250

- Diameter: \varnothing 50, \varnothing 63, \varnothing 80, \varnothing 100, \varnothing 125



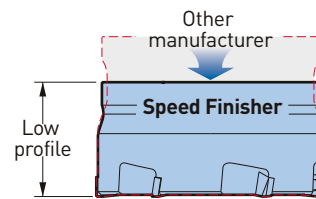
Quick adjustment of cutting edge height

After clamping the insert, lifting screw lifts up the insert directly by revolving the lifting nut from its side. Simple construction aids easy adjusting operation. Fine pitch thread of the lifting screw ensures precise adjustment.



Lightweight & high rigidity

Low-profile cutter body enhances rigidity, minimizes vibration and distortion, leading to the minimized height difference of the machined surface. Lighter weight resulted from reduced mass aids performance on small machine tools such as BT30 spindle.



PL Presetter

Exclusive PL Presetter shortens the setup time further up to 15 sec./insert while avoiding chipping of the cutting edge.

- Necessity of cutting edge presetting



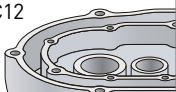
Secure coolant supply to the cutting edges

Coolant is supplied to the cutting edge directly in combination with the Face Mill Arbor type FMH. Especially effective to avoid built-up edges when cutting aluminum and possible re-cutting of the swarf.



Application example

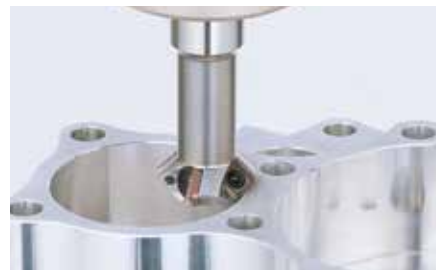
(Cutter diameter: \varnothing 80)

Workpiece	Conditions	Surface roughness	Height difference	No. of Workpiece	Result
Crankcase ADC12 	Cutting speed: 4 000 m/min Spindle speed: 15 900 min ⁻¹ Feed rate: 9 550 mm/min Depth of cut: 2.5 mm	Ra=0.08 μm Rz=0.55 μm	Within 1 μm	24 000	Rough and finish processes are combined in a single operation.

C-Cutter Mini

Compact design with 4 inserts and small cutting diameter. High performance chamfer cutter to achieve ultra high feed rate by reducing the cutting diameter to the lowest limit.

- For multi-functional cutting: chamfering, back chamfering and face milling



4 Inserts, small diameter and new coating achieve triple effect

1. Superb design. Ultra high feed by 4 Inserts.

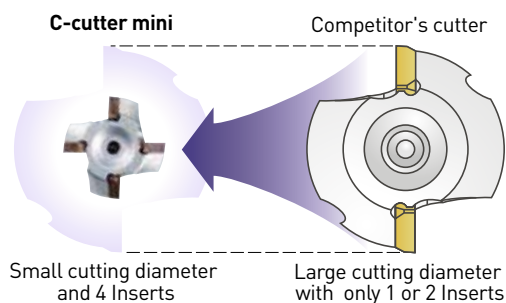
Compared with 1 or 2 inserts per cutter, a 4 insert cutter multiplies feed rate.

2. Increased spindle speed by ultra compact diameter

A smaller tool diameter means faster spindle speeds.

3. Latest coating (ACP200) increases the cutting speed.

Wear resistant multi layer PVD coating increases the cutting speed.



Considerably improved

$$\text{Feed rate} = \text{Spindle speed} \times \text{Feed per tooth} \times \text{Number of teeth}$$

UP UP UP

$$\text{Spindle speed} = \frac{\text{Cutting speed}}{\pi \times \text{Cutting diameter}} \text{ Small dia.}$$

UP

World smallest hex insert

Highly-efficient back chamfering from 6 mm starting hole diameter. 3-corner insert saves cost.

Inscribed circle Ø 3.97



Versatility of the insert

Sharp cutting edge of C-Cutter mini insert make superior surface finish. The same insert can be used with BIG's original design face mill arbor, Surface Mill.



New series for starting hole for tapping are available from M8 to M20 range

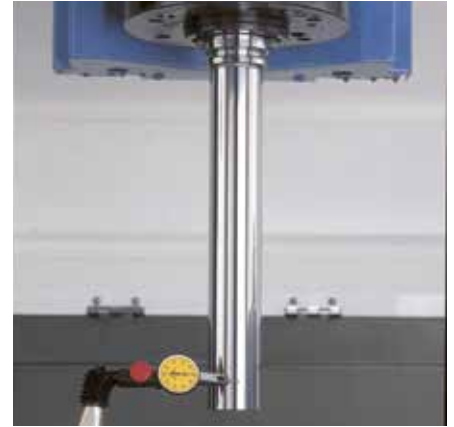


Surface Mill Rz = 1.42

Material = C50
 V = 200 m/min
 Fz = 0.2 mm/min
 Ap = 3
 Ad = 75

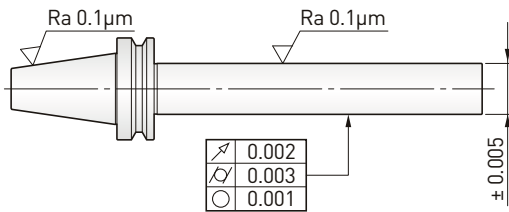
Dyna Test

Precision measuring tools of the highest quality for machine tool maintenance.



Precision standard of BIG KAISER Test Arbors

BIG KAISER provides high quality test bars, produced under a strict quality control system.



Runout	0.002 mm
Roundness	0.001 mm
Cylindricity	0.003 mm
Roughness	Ra: 0.1 μm
Diameter tol.	± 0.005 mm

Aluminum case

An aluminum case is provided to protect and store the test bars. (Some models are provided in a wooden box.)



Calibration certificate and traceability system

BIG KAISER can offer a calibration certificate with traceability on request as per ISO9000 requirements.

Level Master

2-axis simultaneous detection leveler. LED displays level conditions for both axis simultaneously. LED and buzzer indication when leveling is complete.



- LED lamp + beep sound
- Simultaneous 2-axis detection saves the extra time & cost of using 2 levelers.



2-Level mode selection is available

High Mode

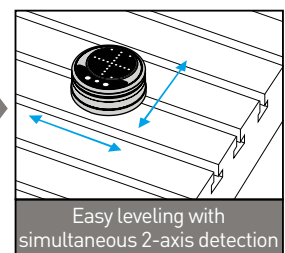
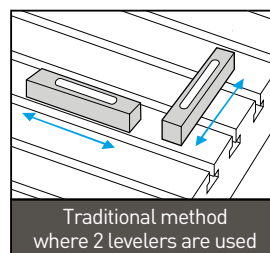
when the required level condition is within 0.01mm/1m

Low Mode

when the required level condition is within 0.1mm/1m

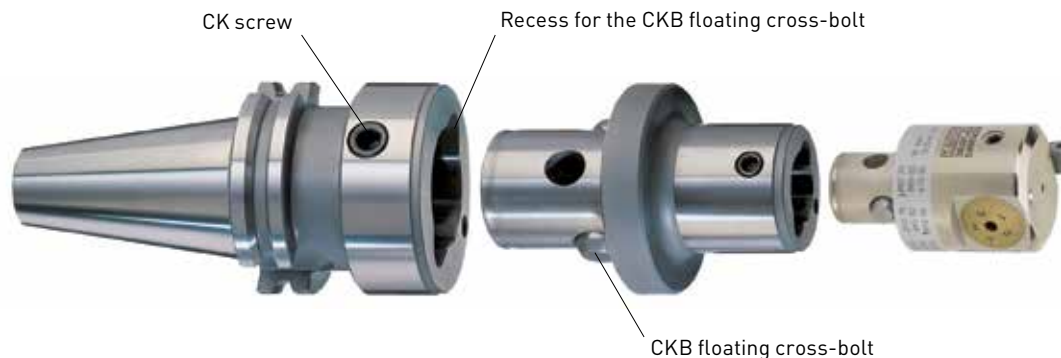
LED (blue) & buzzer are simultaneously activated

Simultaneous 2-axis detection



CK, CKB, CKS, CKN: Various connections - one system

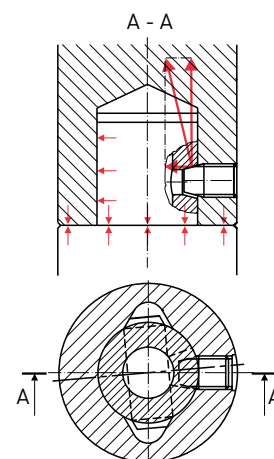
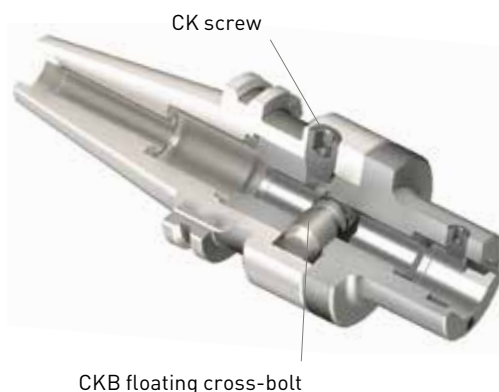
Based on a cylindrical connection with radial locking screw, the world-famous modular precision tool system KAISER CK has continuously been improved over the years, and has adapted to customer's needs and the increases in machine tool performance. Compatibility to existing tools has always been a requirement for newer designs. This means that all KAISER connections are almost 100% compatible, and all the components are kept in stock.



CKB connection: highly efficient and easy to handle

The modular components are clamped with the lateral locking screw (CK-screw). The floating cross bolt is automatically centred in the trapezoid-shaped recesses in the mating part and ensures an absolutely uniform distribution of the torque forces.

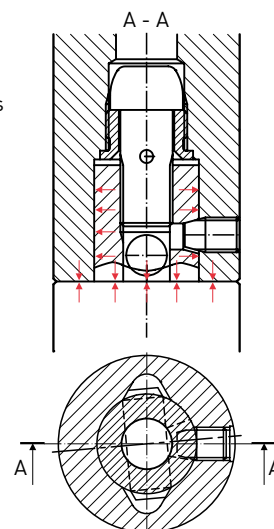
- Simple, efficient operation -no special equipments or tools needed
- Maximum rigidity due to high preloading forces and large contact surfaces
- Precise cutting edge location even when using several adapters
- High interchange accuracy, maximum radial change error is 0.002 mm



CKS connection: for heavy duty cutting with long tools

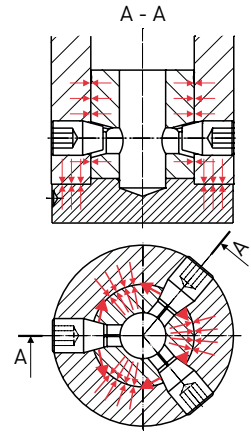
The modular components of the CKS connection are additionally clamped together by means of an axial tension screw. Tightening the tension screw creates an enormous preloading force on the bearing surfaces of the components which results in an extremely rigid tool connection. The only difference when compared to CKB components is that CKS components such as shanks, reductions and extensions contain an additional thread and a recess to allow the installation of the thread bushing and tension screw.

Clamping of the components with the tension screw is required only for extreme cutting conditions. Therefore, the CKS components are supplied without tension screw and thread bushing. These parts must be ordered separately and assembled by the customer.



CKN connection: for lightweight and high performance tools

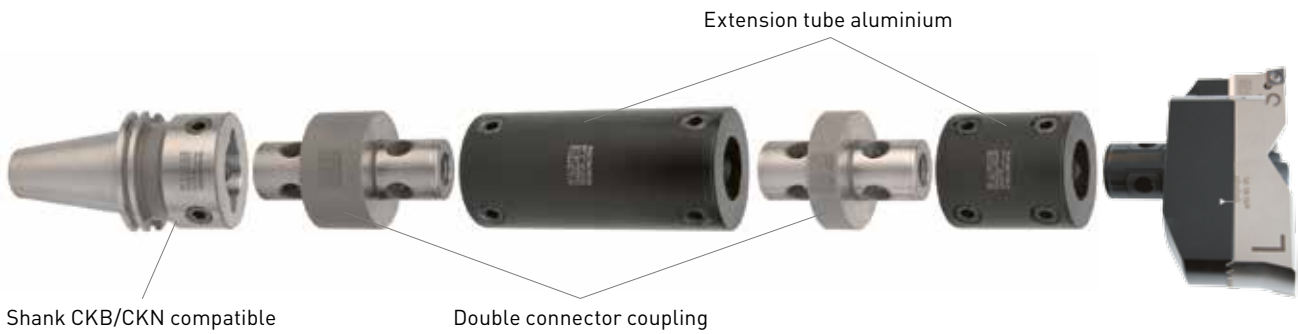
Based on a 3-screw-connection and a male pilot with 3 partial slits, the CKN connection is designed for lightweight- and high performance tools. The main components for the lightweight program are double connector couplings made of steel and extension tubes made of aluminium. The high performance program for enhanced radial stiffness is entirely made of steel components.



CKN connection: Lightweight program

The newly developed double connector coupling enables the use of aluminium extension tubes which result in a considerable weight reduction for larger tools. The torque transmission from the aluminium tube to the connector made of steel over three screws guarantees no reduction of cutting performance in comparison to tool combinations made of steel only.

CKN: the strongest tool connection for lightweight tools



CKN connection: High performance program

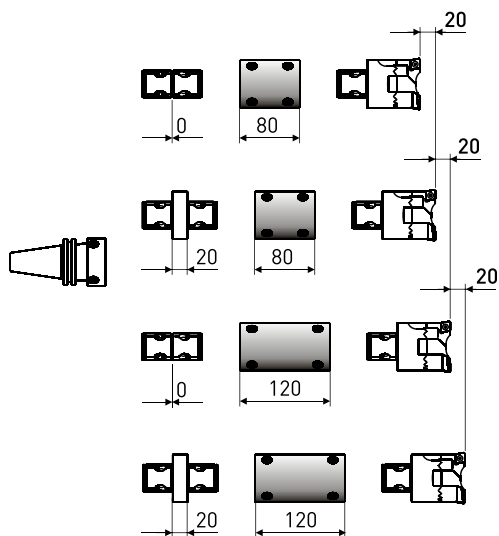
Tool combinations made of steel components, offer highest bending resistance for heavy duty milling with long tools.



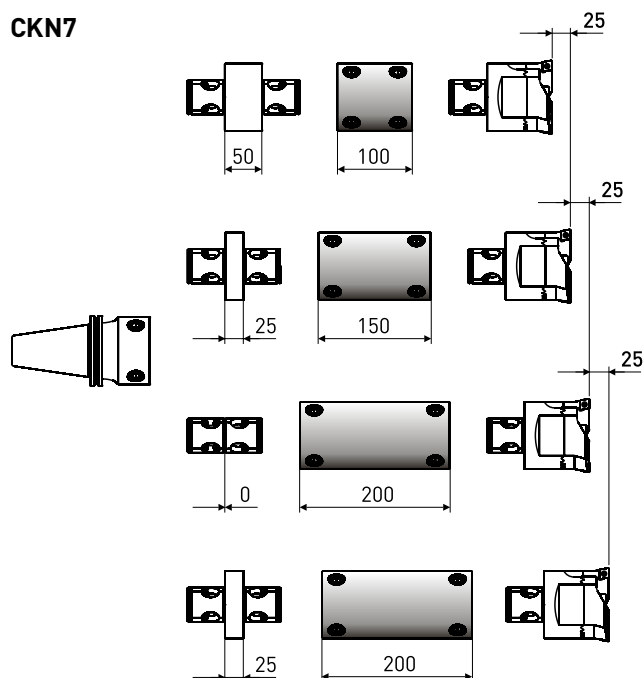
Optimized tool lengths

A few millimeters difference in tool lengths can determine whether a boring operation will be successful or not. The CKN components are made with a very fine length graduation of 20 mm for CKN6 and 25 mm for CKN7.

CKN6



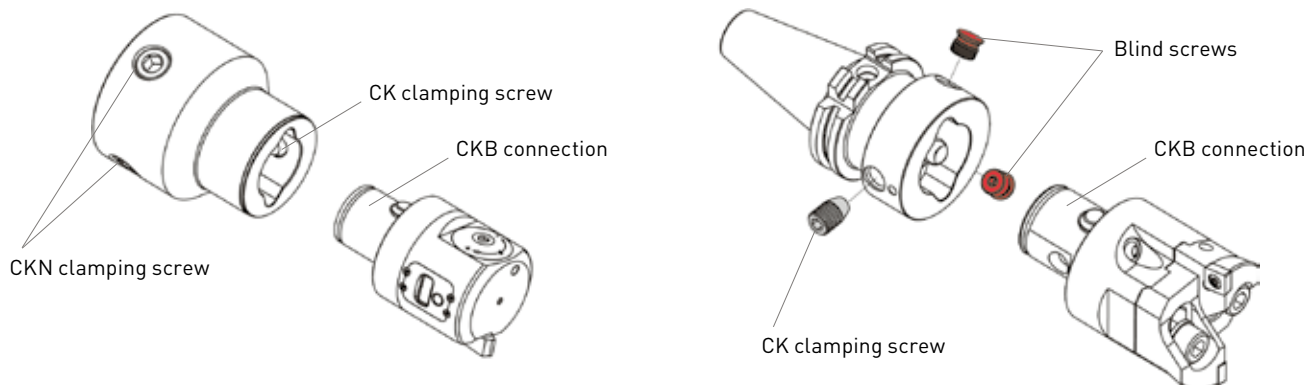
CKN7



- Double connector coupling made of steel and aluminium extensions for the transmission of high torques
- Weight reductions up to 50% and equal cutting performance, compared to tool combinations made of steel
- Reduced weight allows easier handling and eliminates manual tool change in many cases
- Max. rigidity of the tool connection due to high clamping force and expansion of the slotted tool connector
- Vibration damping due to the use of different materials

Compatibility CKN - CKB

For compatibility reasons, the CKN shanks will be delivered with only one CK screw and two blind screws assembled. For CKN assemblies, the remaining two CK screws will be supplied with the mating component having the male CKN connection.



EWN, Series 112

Precision boring heads with centric boring bars in modular and integral execution for accurate, high performance boring operations.

Same accessories for precision boring heads EWN and EWD, series 112.

Ø 0.4 - 152mm



EWN 2-50XL



EWN 2-32

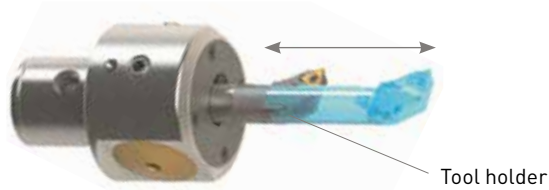
EWN 04-22

EWN 04-15

EWN 04-7

Variable tool length adjustment of the tool holder

Best cutting results are only reachable if the tool holder is as short as possible. The EWN features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.



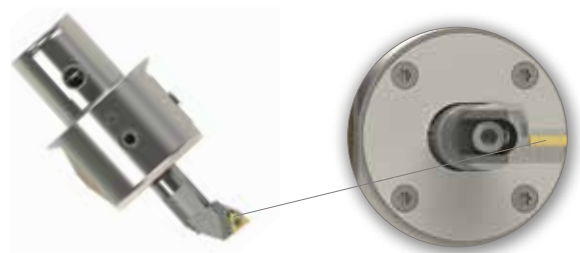
Tool holder

Large dial disc for a parallax-free reading

Thanks to the use of a vernier, diameter adjustments of 0.001 mm can be executed precisely.

Fine balanced when tool carrier is set in center position

Tool holders made of carbide with adjustable insert holders permit diameter setting on the insert holder. The heavy tool holder remains in the center position and does not create any imbalance. The imbalance created by the insert holder is in most cases insignificant.



Many integral executions available

In addition to the boring heads with CK-connection integral executions of the EWN 2-50XL are available for SK, HSK, BT and BIG CAPTO spindles.

EWN 2-50XL: Huge boring range with just one tool

Additional boring range with side mounted insert holders from Ø 80 - 152 mm.

Ø 2 - 54 mm

Ø 54 - 80 mm

Ø 80 - 152 mm



EWD, Series 112

Precision boring heads EWD with digital display and direct electronic measuring system on the tool carrier, feature absolute setting accuracy. The boring heads are designed for ultra precise boring operations in the range from \varnothing 2-80 mm with highest spindle speeds.

Same accessories for precision boring heads EWD and EWN, series 112.

\varnothing 2 - 80mm



EWD 2-54



EWD 2-32

Body protection grade: IP 69K

The high quality coating of the tool body ensures a complete protection against corrosion. The built in electronic is safe from dust and high pressure spray water according to the protection category IP69K.

Digital display with a resolution of 0,001 mm \varnothing

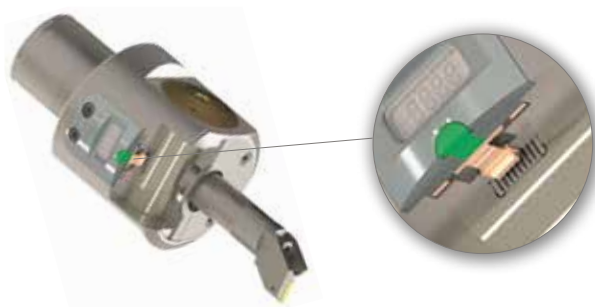


Automatic switch off function which always stores the last displayed value and integrated power management for optimized battery life.

With one single button for the functions "on" and "reset"

Electronic components – made by BIG KAISER

All electronic components are entirely developed and manufactured in the electronic lab of BIG KAISER in Switzerland. Before shipping, every digital boring head is calibrated and tested separately.



Integral execution available

EWD 2-54 x HSK-A63

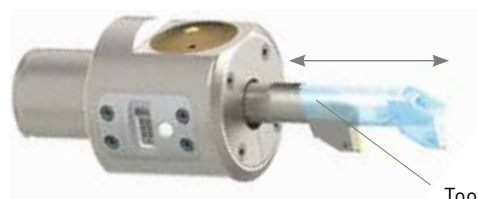


n max.: 20 000 U/min

Tool carrier in center position allows n max. of 20 000 r.p.m. due to minimized imbalance.

Variable length adjustment of the tool holder

Best cutting results are only reachable if the tool holder is as short as possible. The EWD features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.



EWN, Series 310

The precision boring heads EWN series 310 cover a range of $\varnothing 20 - 203$ mm with only 7 precision boring heads. Due to the optimized balance over the whole adjustment range, cutting speeds up to 1200 m/min are permitted.

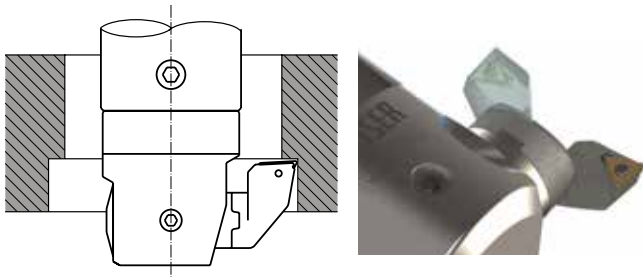
Precision boring heads EWN and EWD, series 310 feature equal boring ranges and body dimensions and allow the use of the same accessories.

$\varnothing 20 - 203$ mm



Back boring

Insert holder can be mounted in opposite direction for an easy changeover to back boring.



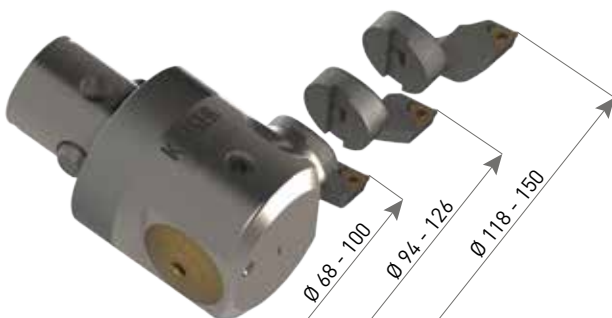
Versatile tool

Insert holders for many types of inserts (TP/TC, CC with different angles) as well as accessories for face grooving are available.



Large boring range

Every EWN series 310 has a large work range due to three different insert holders. For example: The EWN 68 can manufacture a diameter range from $\varnothing 68$ to 150 mm.



Suitable with pin turning system

Precision boring heads EWN/EWD series 310 are suitable for pin turning applications in the diameter range $\varnothing 16 - 2856$ mm. There are two different pin turning systems available.

$\varnothing 16 - 120$ mm

$\varnothing 49 - 2856$ mm



EWD, Series 310

The boring heads EWD series 310 with digital technology combine all advantages of the analogue boring heads EWN. Thanks to the large display with a resolution of 0.001 mm \emptyset bores with extremely tight tolerances can be machined.

Precision boring heads EWD and EWN, series 310 feature equal boring ranges and body dimensions and allow the use of the same accessories.

\emptyset 41 - 203mm



Digital display with a resolution of 0,001 mm \emptyset



Automatic switch off function which always stores the last displayed value and integrated power management for an optimized battery life.

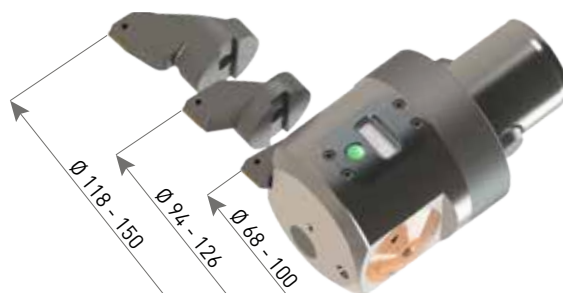
With one single button for the functions "on" and "reset"

Body protection grade: IP 69K

The high quality coating of the tool body ensures a complete protection against corrosion. The built in electronic is safe from dust and high pressure spray water according to the protection category IP69K.

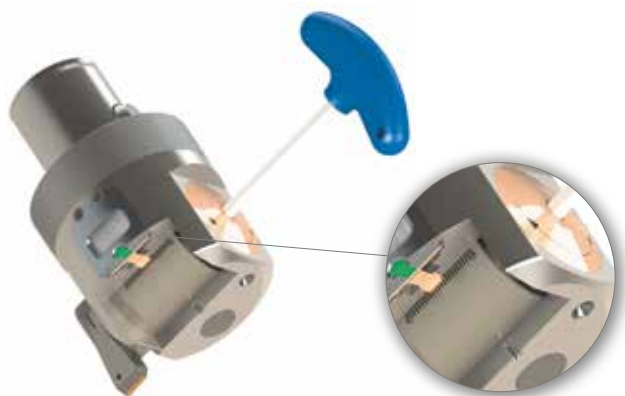
Large boring range

Every EWD series 310 has a large work range due to three different insert holders. For example: The EWD 68 can manufacture a diameter range from \emptyset 68 to 150 mm.



Direct measuring diameter allows corrections in both directions

With a direct electronic measuring system on the tool carrier and a resolution of 0.001 mm \emptyset , the precision boring heads EWD series 310 enable diameter corrections with an unmatched accuracy.



EWB, Series 310/112

The precision balancing of the EWB 310 occurs automatically by the adjustment of the diameter. The EWB series 112 is precisely balanceable via a balancing ring. To balance the whole tool combination there are prebalanced shanks and components available. Even at max. speeds, balanced tools guarantee vibration-free boring, resulting in increased productivity and highest precision.

up to 2 000 m/min



Ready to work

The EWB boring heads will be delivered with assembled insert holder.

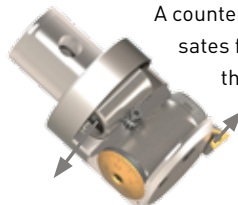
Aluminium executions available

The precision boring heads EWB-AL are made of high tensile aluminium with hard coating. Together with reductions and extensions made in the same way, the weight for long and large diameter tool combinations is reduced by more than 50%. This means that weight problems during ATC and handling are eliminated.



Self balancing mechanism

A counterweight built into the boring head compensates for the imbalance caused by the movement of the tool carrier.



EWB 2-50



EWB 2-32

Precisely balanceable

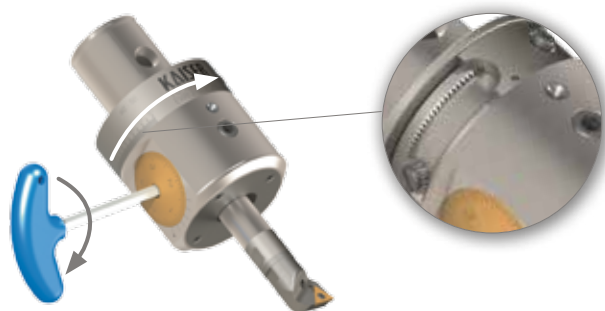
The EWB 2-50 boring head has an integrated balancing mechanism. The imbalance of the boring head is compensated by a unique manually adjustable balancing ring.

Variable length adjustment of the tool holder

Best cutting results are only reachable if the tool holder is as short as possible. The EWB features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.

Boring bars made of carbide

For optimized cutting results dedicated boring bars made of carbide are available.



Smart Damper

The Smart Damper with its dynamic damping system eliminates vibration and is the key to higher productivity. It provides quiet and vibration-free boring or milling with long tools resulting in better surface finish and higher metal removal rates.

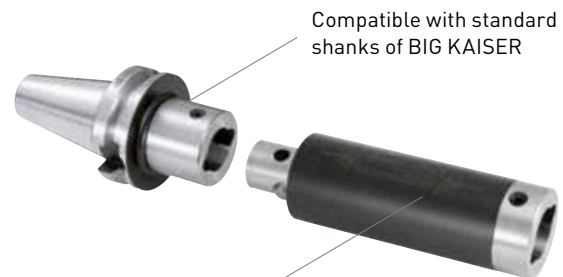


Type 1: EWD Smart Damper

Integrated design of Smart Damper system and EWD precision boring head shorten the distance from damper and cutting edge, which is the source of vibration, so higher damping effects minimizes chattering or vibration.

Type 2: CKB Smart Damper extension

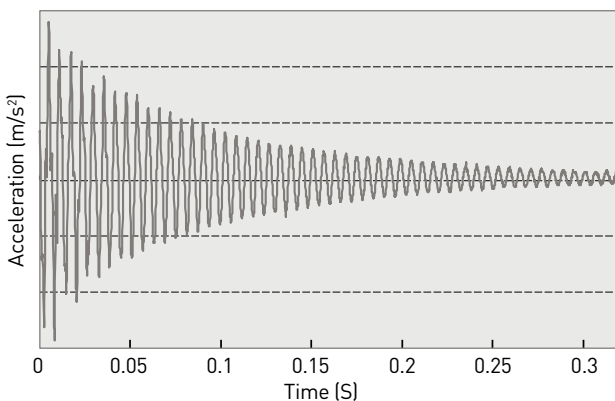
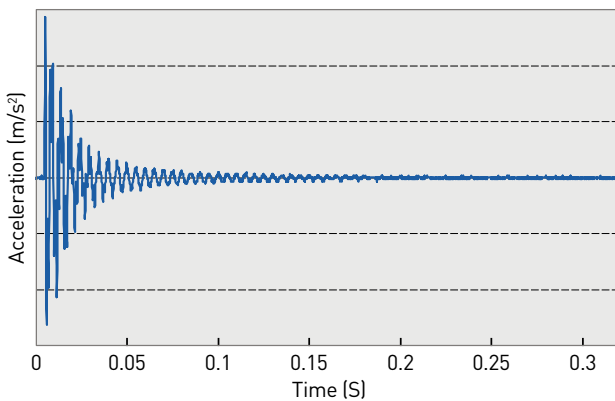
Especially for critical applications with long tool combinations. The Smart Damper extension is available with the system sizes CKB4, CKB5 and CKB6.



CKB Smart Damper extension

Comparison of oscillatory waveforms

Smart Damper incorporates a unique counter force damping mechanism by friction dampers. Patent-pending system maximizes effect of the friction damper. Vibration is absorbed effectively and higher machining accuracy is achieved.



Type 3: Smart Damper basic holder

There are six different Smart Damper basic holders for machine tools with DIN 69871, BT and HSK available. All executions feature center through coolant supply.

DIN 69871 Form AD (BIG-PLUS)

MAS 403, BT (BIG-PLUS)



DIN 69893, HSK-A



SW, Series 319

The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance.

Ø 20 - 203mm

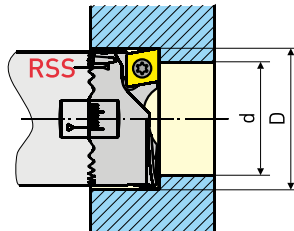


Roughing methods

1. RSS Rotationally symmetrical roughing

Symmetrical cutting is the most common arrangement used for twin cutter heads. Specially suitable for small to medium stock removal (up to 10% of the final bore diameter) with high feed rates.

Insert holders type CC, SC, SD and WC.

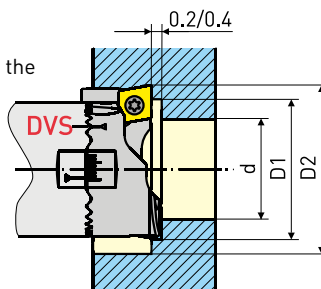


Boring Head	d	D
SW 32	38	42
SW 41	45	50
SW 68	90	100

2. DVS Double offset roughing

Diameter and height offset cutters allow the removal of twice the stock (20% of the final bore diameter) with half the feed rate but excellent chip control.

Insert holders type CC.

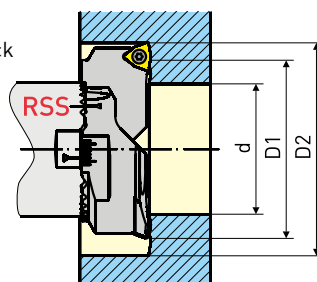


Boring Head	d	D1	D2
SW 25	28	31.5	35
SW 53	60	67.5	75
SW 100	110	125	140
SW 100	110	125	140

3. VPS Full profile roughing

Heavily offset cutter arrangement in diameter for largest stock removal (up to 40 % of the final diameter) with surprisingly low power requirement. Due to the use of inserts type WC, the boring head functions like an adjustable insert drill for roughing.

Insert holders type WC.



Boring Head	d	D1	D2
SW 41	38	52	62
SW 53	45	63	75
SW 68	67	90	110

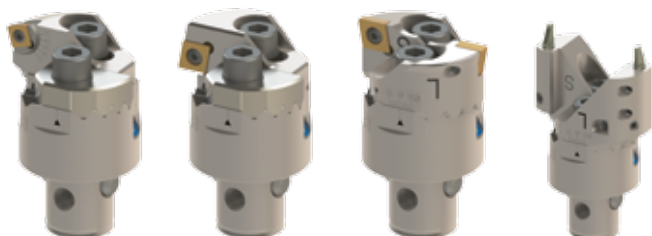
SW AL: Aluminium executions available



The twin-cutter boring heads SW AL of BIG KAISER set new standards for high performance roughing. The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance. Moreover it is more economical than circular interpolation milling when you have to execute deep bores. The twin-cutter boring heads are available in the sizes from SW 68 AL up to SW 148 AL.

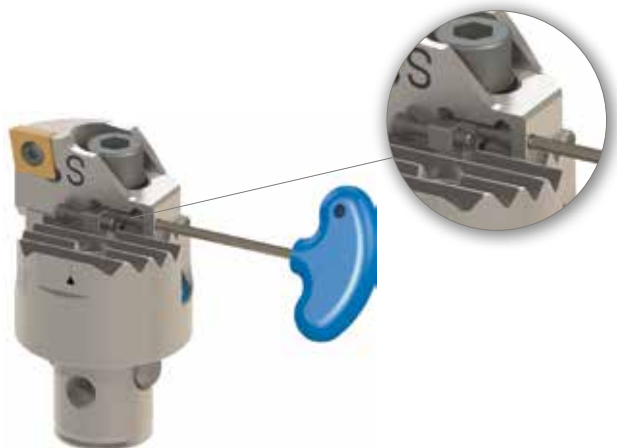
Accessories for different applications

On the same body insert holders for back boring, chamfering or face grooving can be mounted.



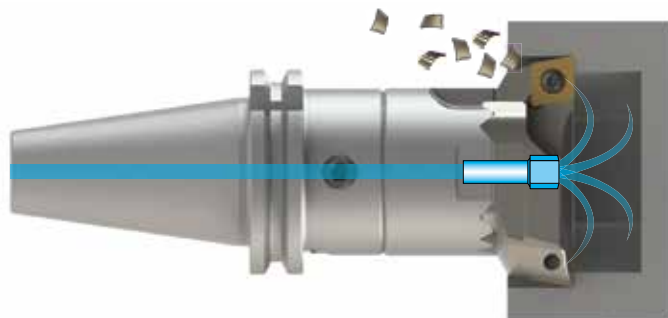
Precise presetting

Presetting of the tool diameter and length without presetter thanks to fixed tool length and diameter scale.



SW AC: Blind hole roughing

The special execution AC of the twin-cutter boring head SW features frontal coolant exit. The coolant blows out / flushes out the chips from blind holes. The best results can be reached when air blow is used. The twin-cutter boring heads for blind hole roughing are available in the sizes from SW 41 AC up to SW 98 AC. The insert holders remain unmodified.

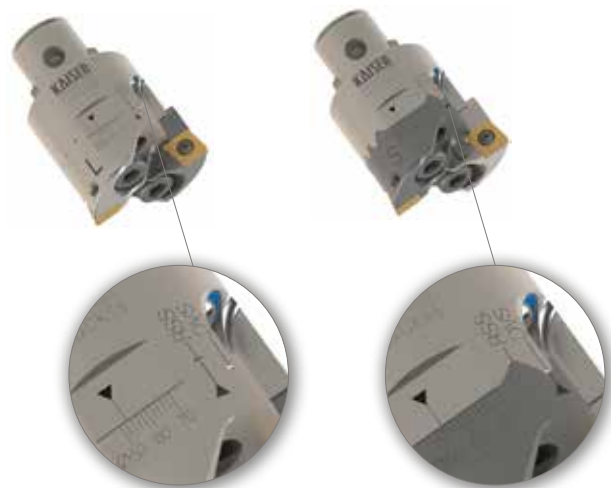


RSS/DVS: Simply switch insert holders

A tool body with supports for insert holders of different heights, and insert holders of different lengths, provide an unmatched versatility to the new roughing tool. Without changing any components and without length adjustment, two different roughing methods, the rotationally-symmetrical-roughing (RSS) and the double offset roughing (DVS), can be executed.

RSS

DVS



Series 318

The series 318 is based on aluminum extension slides of different lengths, which support a variety of aluminum and steel components for roughing and finishing tool assemblies. The mounting components are pinned to fit onto specific locations on the slides, and secured with steel bolts. The precise positioning of the components on the slide along with incremental adjustment scales for insert holders permit diameter and length setting without a tool presetter.

Ø 200 - 620mm



SK40 and HSK-A63 up to 340 mm

Even on machines with smaller spindles the series 318 can be operated.



Versatile system

Series 318 is for various applications such as roughing, finishing, pin turning, and face grooving.

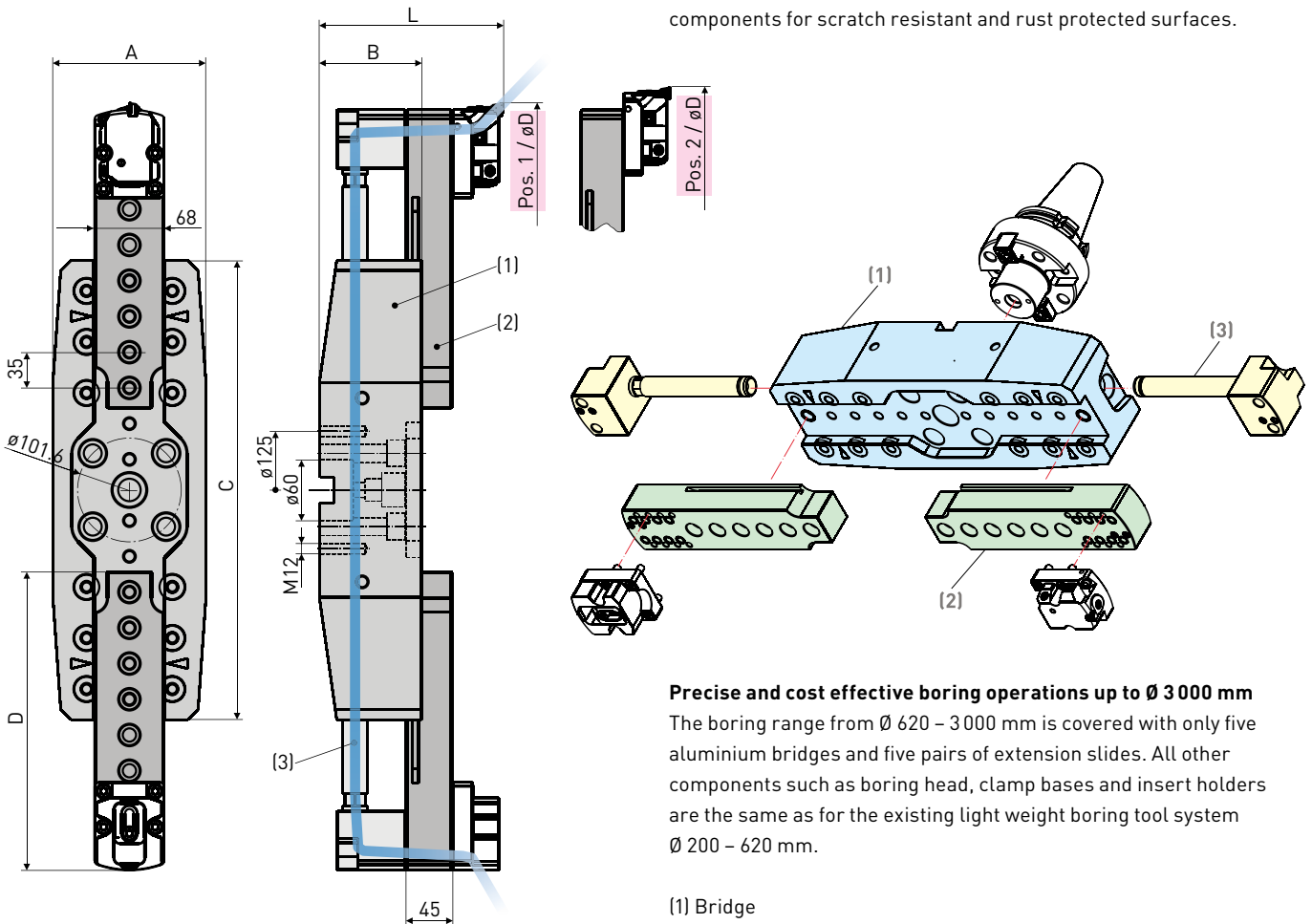


Ø 620 - 3 000mm



Innovative construction

Coolant supply through all components directly to the cutting edge.
High strength and hard coated aluminium, and nickel coated steel components for scratch resistant and rust protected surfaces.



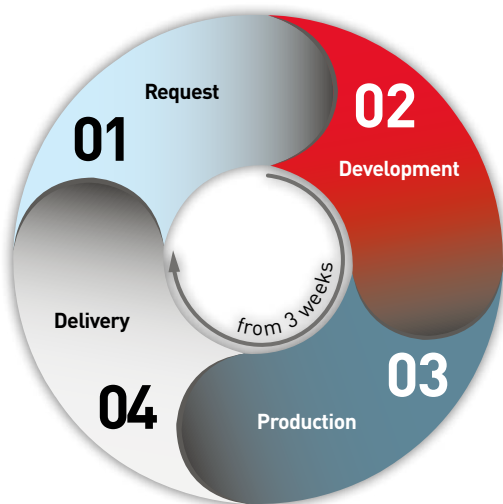
Precise and cost effective boring operations up to Ø 3 000 mm

The boring range from Ø 620 – 3 000 mm is covered with only five aluminium bridges and five pairs of extension slides. All other components such as boring head, clamp bases and insert holders are the same as for the existing light weight boring tool system Ø 200 – 620 mm.

- (1) Bridge
- (2) Extension slide
- (3) Coolant supply

BIG KAISER Special Tools

You need an insert holder or a shank in a special execution for your BIG KAISER boring head? No problem: the newly established BIG KAISER task force will quickly and professionally deal with your request.



01 Request

Our in-house sales department will process your requests immediately. Within only 24h, you will receive an offer perfectly tailor-made for you.

02 Development

Immediately after you have confirmed your purchase order, our developers of the special tool department will take care of your order.

03 Production

The professional manufacturing of your special tools is guaranteed. For this, we also have a separate department.

04 Delivery

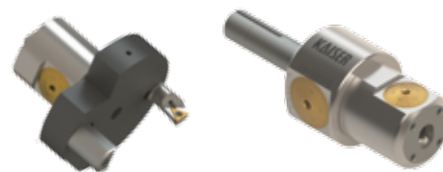
The tools will be shipped already in three weeks after receiving purchase order. Our in-house sales department will service you from the request to the delivery.

Your advantages

- Offer in 24h
- Delivery from 3 weeks
- Competent advice from our experienced team

Tool combinations

- Pin turning tool with fine tuning for the specific application
- Positioning tool for boring with fine tuning in X-Y direction



Insert holders

- Roughing with free insert selection for the SW twin-cutter boring heads
- Insert holder in any shape and size for the EWN/EWD precision boring heads
- For contouring, chamfering or pin turning



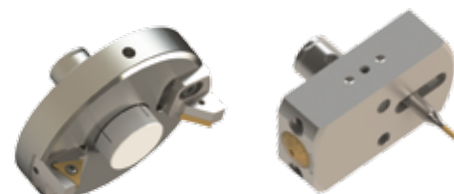
Tools for several diameters

- Roughing tool with fixed insert pockets and cartridges. Thanks to CKB connection, the tool is independent of a spindle system
- Finishing tool with BIG KAISER adjustment cartridges
Adjustment precision: 0.01mm Ø



Boring heads

- PCB chamfering knife with downholder
- Fine adjustable boring head with CK1 clamping and large boring range Ø 12-36 mm



Insert Development

The customer shall reach the best possible results in terms of performance, precision and cost efficiency for all boring operations with BIG KAISER twin cutter and precision boring tools. Therefore, not only outstanding boring tools are required, but also inserts, specially designed for boring, which fulfil the highest demands.



«The selection of the indexable insert is decisive for the machining process and reduces production costs.»

Ralph Stadelmann, Head R&D BIG KAISER

Aim of BIG KAISER

BIG KAISER invests every year several hundred hours in development and tests of new inserts. New geometries will be defined, coatings tested and different substrates evaluated, often also in co-operation with carbide- and coolant manufacturers.

Criteria	Workpiece Material	Machining Process	Cutting Condition
To be considered	Material group Crystalline structure	Roughing Finishing Bore diameter Depth of cut (ap)	Interrupted cut Continuous cut Depth of cut Precision HSC Workpiece chucking Rigidity of tool
With effect on	Substrate of cutting material Coating	Shape of insert Size of insert	Cutting edge geometry Nose radius Rake and relief angle Chip breaker ground or sintered Circumference ground or sintered
Target	Indexable inserts for perfect chip control, maximum tool life and minimized costs		

The results of the developments and tests are shown in the BIG KAISER cutting data table. In their, you'll find the most suitable inserts for the variety of workpiece materials and machining processes in relation to the tool configuration. The table shows precise cutting data for all applications.



Work piece material	Boring depth X [mm]	Roughing SW 41							Finishing EWN/EWD/EWB 41					
		Inserts		Vc m/min	RSS		DVS		Inserts	Vc m/min	Allow.		Feed mm/U	
		Order No.	R		Allow.	fn mm/Ø	Allow.	Feed mm/U			Std. val.	Max.		
Steel < 450 N/mm ²	80	654.950	0.8	240	6.00	0.50	10.00	0.25	655.334	0.8	450	0.2	2.5	0.14
	115	654.940A	0.4	240	5.50	0.45	9.00	0.25	655.324	0.4	280	0.2	2.0	0.10
	140	654.940A	0.4	170	5.00	0.45	8.50	0.25	655.324	0.4	180	0.2	2.0	0.10

Example cutting date tables. How to get? For a printed copy please contact your local BIG KAISER agent.

Angle Head

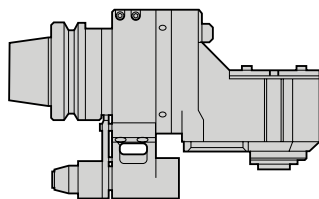
Angle Heads eliminate multiple set-ups, combine vertical, horizontal and angular operations on one machine. One original set-up saves time, speeds production and guarantees accuracy.

- Max. 6 000 min⁻¹
- Coolant-through from the locating pin

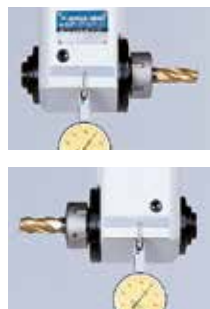


Compact design assures rigidity

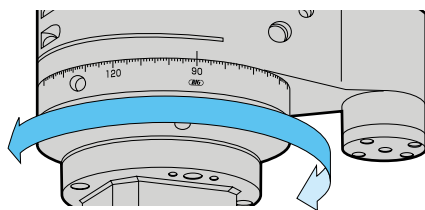
Overhang is minimized for added rigidity and strength. As a result, the projection length with cutting tool is shorter, which reduces the overall load on the Angle Head and thus improves the unit's cutting capability. The minimized overhang helps to eliminate interference with the ATC and adjacent storage pockets in the tool magazine. High Rigidity S-type, which has a steel housing and a stronger locating pin assembly, is also available.



Cutter head adjustable 360°



Reference faces are provided on both sides of all heads for easier setting of a cutter direction.



Unique coolant jacket



Jacket allows coolant coming through the stop block to be efficiently directed to the tool cutting edge while simultaneously cooling the Angle Head. Newly introduced OAG type supplies coolant through the cutting tool.

Innovative sealing method



The advanced non-contact sealing method prevents coolant and particle contamination better than any other sealing method.

Superior quality components



For smooth and powerful operation and to minimize noise and vibration, all Angle Heads are equipped with hardened and ground chrome-nickel steel spiral bevel gears, super precision hardened and ground spindles, and high precision angular contact ball bearing.

Various executions of Angle Head

More types are available to offer the best solution for your demand.

AG90 NBS type



AG90 Build-Up type



AGU type



Small bore type



Air Turbine Spindle

High-speed micro-machining can be done on a normal machining center, eliminating the need of an expensive high-speed machine.

- max. 120 000 min⁻¹

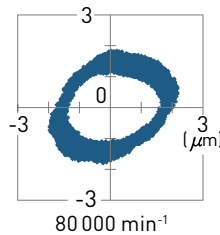


Dynamic runout accuracy

Most problems associated with micro-machining are caused by poor dynamic runout of a machine spindle. We have established a runout measuring system that can detect spindle movement during rotation at high speed and achieved the best dynamic runout accuracy.

- Improved machining accuracy
- Superior surface finish
- Extended tool life

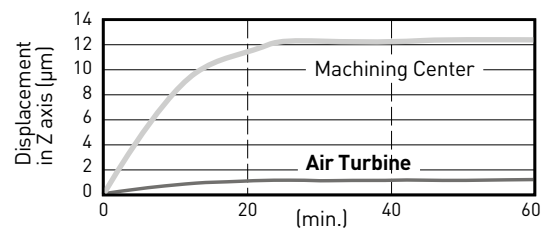
Plotted position of a test bar at the max. spindle speed (see image on the right).



Minimal thermal displacement

Air turbine drive prevents thermal expansion of the spindle, which is essential for high accuracy micro-machining.

Axial displacement compared to operating time

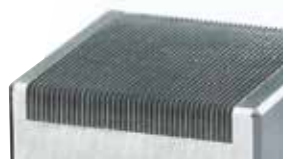
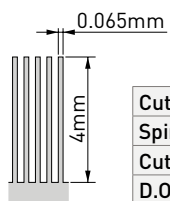


Application examples

RBX7

Aluminum A2017

Outstanding runout accuracy permits perfect thin wall cutting.



Cutter	Ø 0.5 mm rib-endmill
Spindle Speed	70 000 min ⁻¹
Cutting Feed	1500 mm/min
D.O.C	ap = 0.02 mm

Automatic tool change



ATC type is available by supplying air via a stop block to enhance productivity with unmanned operation.

3 types of Air Turbine Spindle

RBX5 = 50 000 min⁻¹

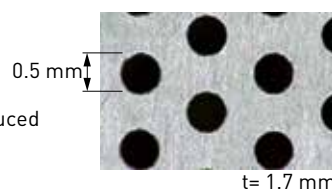
RBX7 = 80 000 min⁻¹

RBX12 = 120 000 min⁻¹

RBX5

Stainless steel SUS303

Tool life is doubled with over 1200 holes and cutting time is reduced to 1/3.



Cutter	Ø 0.5 mm solid drill
Spindle Speed	40 000 min ⁻¹
Cutting Feed	20 mm/min
Peck	0.01 mm

Application Range	RBX5	RBX7	RBX12	
Drill	Ø < 0.1 mm	△	△	○
	Ø 0.1 - 0.3 mm	○	○	⊙
	Ø 0.3 - 0.5 mm	○	⊙	○
	Ø 0.5 - 1.0 mm	⊙	○	△
	Ø 1.0 - 1.5 mm	△	x	x
End Mill	Ø < 0.5 mm	○	⊙	⊙
	Ø 0.1 - 1.0 mm	⊙	⊙	△
	Ø 1.0 - 1.5 mm	⊙	△	x
Jig Grinding	⊙	⊙	○	

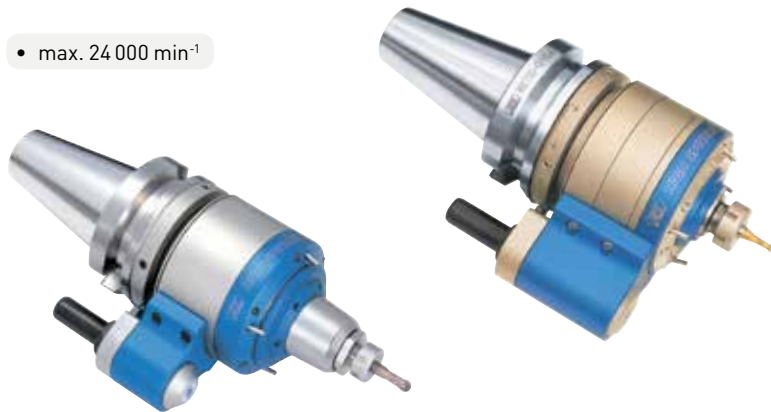
○ Optimum
△ Dependent upon cutting conditions

○ Acceptable
x Not recommended for use

High Spindle

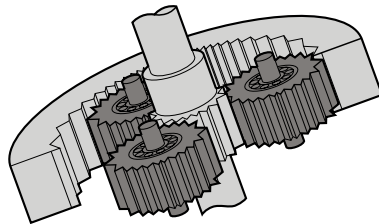
Precision speed increaser tool improves drilling and end-milling performance on existing machines by multiplying the spindle speed by 4, 5, or 6 times.

- max. 24 000 min⁻¹



Reinforced gear driving system

The planetary gears, which have been constantly upgraded since the development of the first „High Spindle” back in 1970, achieves smooth operation with minimal heat generation and high torque transmission.



Reduce load to machine spindle

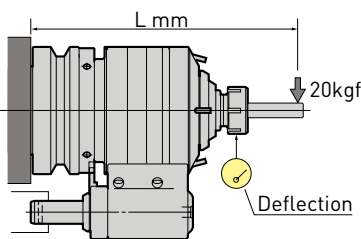
Continuous use at high spindle speeds will reduce the life of a machine spindle due to the excessive load to the motor and bearings. The High Spindle reduces this load and greatly extends the life of a costly machine spindle.

Multi-directional coolant supply

Universal Coolant Nozzles are capable of being adjusted to suit the length of cutting tool. Thus, the maximum coolant delivery to the cutting edge is assured.

Rigidity increased 1.7 times

Larger diameter body and spindle with double angular contact bearings and reinforced locating pin assembly greatly increase rigidity.



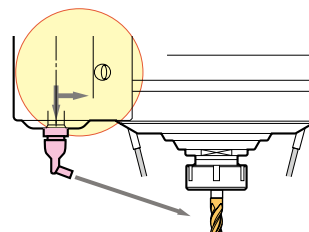
Note: High Spindle can be operated without coolant running through the housing.



Model	L	Deflection	Comparison
BBT40-GTG5-10-140-65	200	36 µm	58 % less
BBT50-GTG6-10-158-80	220	25 µm	78 % less
BBT50-GTG4-16-177-80	240	11 µm	93 % less

Pinpoint coolant jet for shorter cutting tools

A 1/8 pipe tap thread is provided in the High Spindle so that various types of customer supplied coolant-jet nozzles can be utilized which will provide pinpoint delivery to the cutting edge of short tools (BDV/ BBT taper models only).



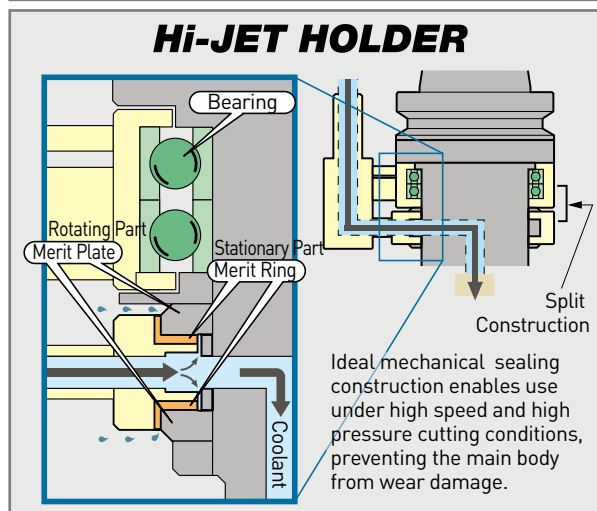
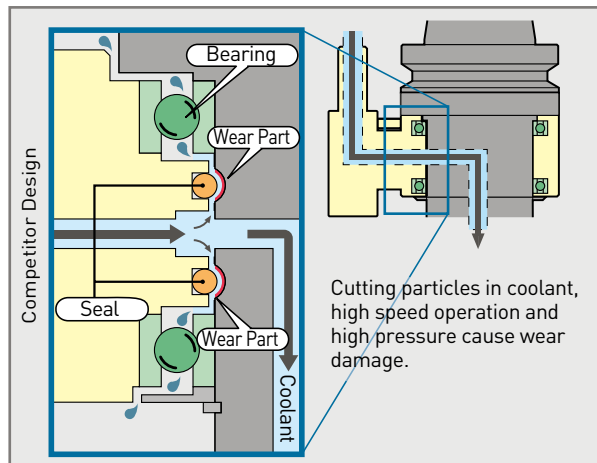
Hi-Jet Holder

Easy maintenance coolant feed holder.

- max. 10 000 min⁻¹
- Max. 2 MPa coolant

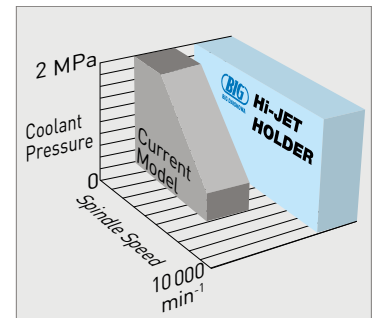


Non-contact seal design eliminates wear damage to body



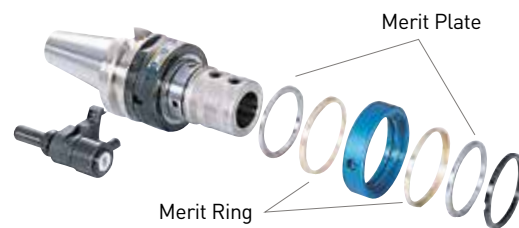
Suitable for small dia. cutters due to high speed and pressure

Small diameter cutters require high spindle speeds to maintain high cutting speed and high coolant pressure due to their small dia. coolant holes. The Hi-Jet Holder accepts even smaller diameter shanks, providing high spindle speeds (max. 10 000 min⁻¹) and high coolant pressures (max. 2 MPa).



Easy maintenance by replacement of wear parts

Easily replaceable merit sets consist of merit plates, merit rings and O-rings.

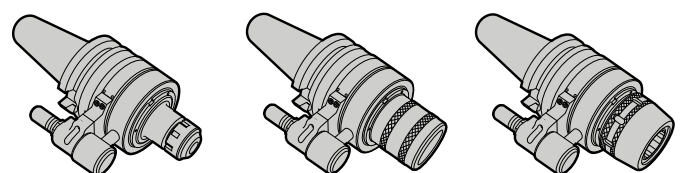


Hi-Jet Holder series

New Baby Chuck type

Side Lock type

Milling Chuck type



BBT/BT Shank

MEGA Micro Chuck	2 - 3
MEGA New Baby Chuck	4 - 6
MEGA E Chuck	7
MEGA Double Power Chuck	8 - 9
MEGA Perfect Grip	10
New Baby Chucks	11 - 12
New Hi-Power Milling Chuck	13 - 14
Hydraulic Chuck	15 - 19
Shrink Chuck	20 - 21
Face Mill Arbor FMH	22
Smart Damper	23
Side Lock Holder	24 - 25
Side Cutter Arbor	25
MEGA Synchro Tapping Holder	26 - 27
Morse Taper Holder	28
Dyna Test	29
Cleaner	29

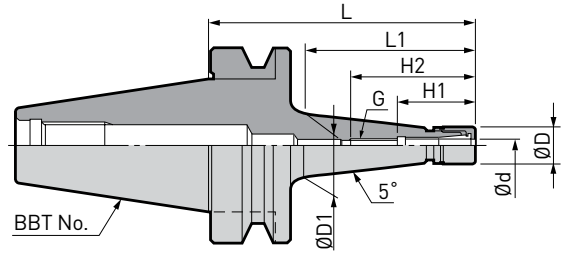


MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

A.1

- max. 40 000 min⁻¹
- Clamping range: Ø 0.45 - Ø 8.05
- Coolant-through hole



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Ød	ØD	ØD1	L	L1	H1	H2	G	max. min ⁻¹	Collet Model	Nut Model	Weight (kg)	Order No.	
BBT30-MEGA3S - 45T	0.45 - 3.25	10	11.5	45	20	22	38	M4 P0.7	40 000	NBC3S-□	MGN3S	0.42	969.209	
- 75T			15.7	75	48							0.45	969.210	
- 90T			18.3	90	63							0.48	969.211	
-MEGA4S - 75T	0.45 - 4.05	12	17.4	75	48	26.5	47	M5 P0.8	40 000	NBC4S-□	MGN4S	0.47	969.214	
- 90T			20.0	90	63				35 000			0.50	969.215	
-MEGA6S - 60T	0.45 - 6.05	14	16.3	60	33	28.5	49	M7 P0.75	40 000	NBC6S-□	MGN6S	0.45	969.218	
- 75T			18.9	75	48							0.47	969.319	
- 90T			21.6	90	63							35 000	0.51	969.220
-105T			24.2	105	78							30 000	0.56	969.221
-120T			26.8	120	93							25 000	0.62	969.222
-MEGA8S - 75T	2.95 - 8.05	18	22.7	75	48	31	50.5	M9 P0.75	40 000	NBC8S-□	MGN8S	0.51	803.597	
-105T			28.0	105	78				30 000			0.62	803.598	
BBT40-MEGA3S - 90T	0.45 - 3.25	10	17.5	90	58	22	38	M4 P0.7	28 000	NBC3S-□	MGN3S	1.1	969.322	
-120T			22.7	120	88				22 000			1.2	969.323	
-MEGA4S - 60T	0.45 - 4.05	12	13.9	60	28	26.5	47	M5 P0.8	35 000	NBC4S-□	MGN4S	1.0	969.324	
- 90T			19.1	90	58				28 000			1.1	969.326	
-120T			24.4	120	88				22 000			1.2	969.328	
-MEGA6S - 60T	0.45 - 6.05	14	15.4	60	28	28.5	49	M7 P0.75	35 000	NBC6S-□	MGN6S	1.1	969.330	
- 75T			18.0	75	43				32 000			1.1	969.331	
- 90T			20.7	90	58				28 000			1.1	969.332	
-105T			23.3	105	73				25 000			1.1	969.333	
-120T			25.9	120	88				22 000			1.2	969.334	
-135T			28.6	135	103				20 000			1.3	969.335	
-MEGA8S - 90T	2.95 - 8.05	18	24.5	90	58	31	50.5	M9 P0.75	30 000	NBC8S-□	MGN8S	1.2	801.720	
-120T			29.7	120	88				22 000			1.2	803.601	

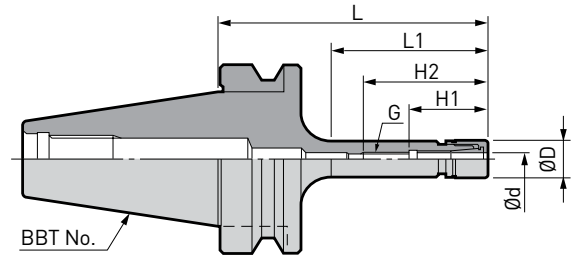
1. MEGA nut is included.

Spare Parts			Accessories							
MEGA Nut			MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		Taper Cleaner	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-□	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-□	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-□	MGN6S-PS□	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-□	MGN8S-PS□	NBB8S	805.802	SC-NBC8S	805.827

MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

- max. 40 000 min⁻¹
- Clamping range: Ø 0.45 - Ø 8.05
- Coolant-through hole



A.1

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Ød	ØD	L	L1	H1	H2	G	max. min ⁻¹	Collet Model	Nut Model	Weight (kg)	Order No.	
BBT30-MEGA6S - 90	0.45 - 6.05	14	90	62	28.5	49	M7 P0.75	40 000	NBC6S-□	MGN6S	0.47	969.504	
-105			105	73							0.49	800.058	
-MEGA8S - 90	2.95 - 8.05	18	90	60	31	50.5	M9 P0.75	35 000	NBC8S-□	MGN8S	0.51	803.608	
BBT40-MEGA4S - 90	0.45 - 4.05	12	90	53	26.5	47	M5 P0.8	35 000	NBC4S-□	MGN4S	1.0	969.506	
-MEGA6S - 90	0.45 - 6.05	14			28.5	49	M7 P0.75		NBC6S-□	MGN6S	1.0	969.508	
-MEGA8S - 90	2.95 - 8.05	18			55	31	50.5	M9 P0.75	30 000	NBC8S-□	MGN8S	1.1	803.599

1. MEGA nut is included.

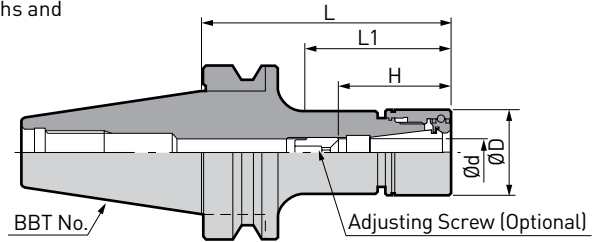
Spare Parts			Accessories							
MEGA Nut			MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		Taper Cleaner	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-□	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-□	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-□	MGN6S-PS□	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-□	MGN8S-PS□	NBB8S	805.802	SC-NBC8S	805.827

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

A.1

- max. 40 000 min⁻¹
- Clamping range: Ø 0.25 - Ø 20
- Coolant-through hole



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Ød	ØD	L	L1	H	max. min ⁻¹	Collet Model	Nut Model	Weight (kg)	Order No.
BBT30-MEGA6N - 60	0.25 - 6	20	60	32	23 - 43	40 000	NBC 6-□	MGN6	0.47	969.509
- 75			75	47		35 000			0.5	969.341
- 90			90	62		30 000			0.53	969.510
-MEGA8N - 60	0.5 - 8	25	60	34	26 - 45	40 000	NBC 8-□	MGN8	0.51	969.511
- 75			75	49		35 000			0.56	969.344
- 90			90	64		30 000			0.61	969.512
-MEGA10N - 60	1.5 - 10	30	60	34	38 - 48	40 000	NBC10-□	MGN10	0.54	969.513
- 75			75	49		30 000			0.61	969.347
- 90			90	64		25 000			0.68	969.534
-105			105	79		18 000			0.75	969.348
-MEGA13N - 60	2.5 - 13	35	60	34	44 - 63	40 000	NBC13-□	MGN13	0.57	969.516
- 75			75	49		30 000			0.67	969.349
- 90			90	64		25 000			0.77	968.517
-105			105	79		18 000			0.87	969.350
-120			120	94		15 000			0.97	969.518
-MEGA16N - 60	2.5 - 16	42	60	37	48 - 63	35 000	NBC16-□	MGN16	0.61	969.519
- 75			75	52	25 000	0.75			969.351	
- 90			90	67	20 000	0.89			969.520	
-MEGA20N - 60 *	2.5 - 20	46	60	-	51	30 000	NBC20-□	MGN20	0.64	969.521
- 75			75	-	20 000	0.78			969.353	
- 90			90	-	15 000	0.93			969.522	
-105			105	-	13 000	1.08			969.354	

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw cannot be used with BBT30-MEGA20N-60. "H" is the max. tool shank length that can be inserted into this model.

Spare Parts			Accessories										
MEGA Nut			MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw			Rubber	
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.		
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-□	MPS6-□	NBA6B	M7	12	2	961.527		
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-□	MPS8-□	NBA8B	M9	13	2.5	961.550		
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-□	MPS10-□	NBA10B	M11	16	3	961.572		
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-□	MPS13-□	NBA13B	M14	20	4	961.598		
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-□	MPS16-□	NBA16B	M18	20	4	961.632		
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-□	MPS20-□	NBA20B	M21	20	4	961.680		

BIG-PLUS tools can be used in machining centers with conventional spindles.

For BBT50, refer to the following page.

Model	Ød	ØD	L	L1	H	max. min ⁻¹	Collet Model	Nut Model	Weight (kg)	Order No.
BBT40 -MEGA6N - 60	0.25 - 6	20	60	27	23 - 43	35 000	NBC6-□	MGN6	1.0	969.523
- 75			75	38					1.1	969.361
- 90			90	53					1.1	969.524
-105			105	68		20 000			1.2	969.362
-120			120	83					1.2	969.363
-135			135	98					1.2	969.525
-165			165	128		14 000			1.2	969.526
-200			200	163		9 000			1.3	969.527
-MEGA8N - 60			0.5 - 8	25		60			27	26 - 45
- 75	75	38			1.1	969.364				
- 90	90	53			1.1	969.529				
-105	105	68			20 000	1.2	969.365			
-120	120	83				1.2	969.366			
-135	135	98				1.3	969.530			
-165	165	128			14 000	1.3	969.531			
-200	200	163			9 000	1.4	969.532			
-MEGA10N - 60	1.5 - 10	30			60	27	38 - 48	35 000	NBC10-□	
- 75			75	38	1.2	969.367				
- 90			90	53	1.2	969.514				
-105			105	68	20 000	1.3		969.368		
-120			120	83		1.4		969.369		
-135			135	98		1.4		969.535		
-165			165	128	15 000	1.5		969.536		
-200			200	163	10 000	1.7		969.537		
-MEGA13N - 60			2.5 - 13	35	60	31		44 - 63		35 000
- 75	75	40			1.2	969.370				
- 90	90	55			1.3	969.539				
-105	105	70			20 000	1.4	969.371			
-120	120	85				1.5	969.372			
-135	135	100				1.6	969.540			
-165	165	130			15 000	1.8	969.541			
-200	200	165			10 000	2.0	969.542			
-MEGA16N - 60	2.5 - 16	42			60	31	48 - 68		30 000	NBC16-□
- 75			75	40	1.3	969.373				
- 90			90	55	1.4	969.544				
-105			105	70	20 000	1.6		969.374		
-120			120	85		1.7		969.375		
-135			135	100		1.8		969.545		
-165			165	130	15 000	2.0		969.546		
-200			200	165	10 000	2.3		969.547		
-MEGA20N - 60			2.5 - 20	46	60	31		51 - 68	30 000	
- 75	75	42			1.3	969.376				
- 90	90	57			1.4	969.549				
-105	105	72			20 000	1.6	969.377			
-120	120	87				1.8	969.378			
-135	135	102				1.9	969.550			
-165	165	132			15 000	2.1	969.551			
-200	200	167			10 000	2.5	969.552			

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.

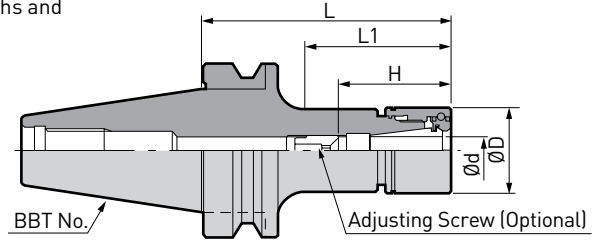
A.1

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

A.1

- max. 20 000 min⁻¹
- Clamping range: Ø 0.25 - Ø 20
- Coolant-through hole



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Ød	ØD	L	L1	H	max. min ⁻¹	Collet Model	Nut Model	Weight (kg)	Order No.
BBT50-MEGA6N - 90	0.25 - 6	20	90	37	23 - 43	20 000	NBC 6-□	MGN6	3.7	969.553
-120			120	67					3.8	969.554
-165			165	112					3.9	969.555
-200			200	147					4.0	969.556
-MEGA8N - 90	0.5 - 8	25	90	42	26 - 45	20 000	NBC 8-□	MGN8	3.8	969.557
-120			120	67					3.9	969.558
-165			165	112					4.1	969.559
-200			200	147					4.2	969.560
-MEGA10N - 90	1.5 - 10	30	90	42	38 - 48	20 000	NBC10-□	MGN10	3.9	969.561
-120			120	67					4.0	969.562
-165			165	112					4.3	969.563
-200			200	147					4.7	969.564
-250			250	197					4.7	969.565
-300	300	247	5.0	969.566						
-MEGA13N - 90	2.5 - 13	35	90	42	44 - 63	18 000	NBC13-□	MGN13	4.0	969.567
-120			120	67					4.2	969.568
-165			165	112					4.5	969.569
-200			200	147					4.7	969.570
-250			250	197					5.0	969.571
-300	300	247	5.3	969.572						
-MEGA16N - 90	2.5 - 16	42	90	42	48 - 68	17 000	NBC16-□	MGN16	4.2	969.574
-120			120	72					4.4	969.575
-165			165	117					4.8	969.576
-200			200	152					5.1	969.577
-250	250	202	5.5	969.578						
-MEGA20N - 75	2.5 - 20	46	75	31	51 - 68	16 000	NBC20-□	MGN20	4.1	969.579
- 90			90	42					4.2	969.580
-120			120	72					4.5	969.581
-165			165	117					4.9	969.582
-200			200	152					5.3	969.583
-250	250	202	5.7	969.584						

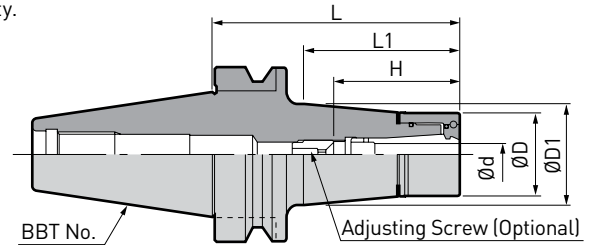
1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.

Spare Parts			Accessories										
MEGA Nut			MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw			Rubber	
Model	Order No.		Model	Order No.	Model	Model	Model	G	L	B	Order No.		
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-□	MPS6-□	NBA6B	M7	12	2	961.527		
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-□	MPS8-□	NBA8B	M9	13	2.5	961.550		
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-□	MPS10-□	NBA10B	M11	16	3	961.570		
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-□	MPS13-□	NBA13B	M14	20	4	961.598		
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-□	MPS16-□	NBA16B	M18	20	4	961.632		
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-□	MPS20-□	NBA20B	M21	20	4	961.680		

MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

- max. 40 000 min⁻¹
- Clamping range: Ø 3 - Ø 12
- Coolant-through hole



A.1

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Ød	ØD	ØD1	L	L1	H	max. min ⁻¹	Collet Model	Nut Model	Weight (kg)	Order No.		
BBT30-MEGA6E - 75	3 - 6	25	29.9	75	50	37 - 45	35 000	MEC6-□	MEN 6	0.62	968.167		
-MEGA8E - 50	3 - 8	30	30.4	50	25	42 - 51	40 000	MEC8-□	MEN 8	0.53	968.170		
- 75			34.6	75	50		35 000			0.68	968.171		
-MEGA10E - 50	3 - 10	35	35.3	50	25	48 - 58	39 000	MEC10-□	MEN10	0.57	968.174		
- 75			39.7	75	51		35 000			0.77	968.175		
-MEGA13E - 50	3 - 12	42	42.5	50	27	50 - 58	38 000	MEC13-□	MEN13	0.61	968.178		
- 75				75	52					34 000	0.86	968.179	
- 90				90	67					50 - 60	25 000	1.01	968.180
-105				105	82							1.17	968.181
BBT40-MEGA6E - 60	3 - 6	25	26.2	60	28	37 - 45	30 000	MEC6-□	MEN 6	1.08	968.183		
- 90			31.3	90	58					1.21	968.185		
-135			39	135	103					1.53	968.188		
-MEGA8E - 60	3 - 8	30	31	60	28	42 - 48	30 000	MEC8-□	MEN 8	1.13	968.191		
- 90			36	90	58					42 - 51	27 000	1.30	968.193
-135			43.9	135	103							1.76	968.196
-MEGA10E - 60	3 - 10	35	36	60	29	48 - 58	30 000	MEC10-□	MEN10	1.23	968.199		
- 90			40.9	90	58					27 000	1.46	968.201	
-135			48.8	135	103						1.98	968.204	
-MEGA13E - 60	3 - 12	42	42.7	60	29	50 - 60	30 000	MEC13-□	MEN13	1.29	968.207		
- 75			45	75	43					1.45	968.208		
- 90			48	90	59					1.63	968.209		
-105			50.6	105	75					29 000	1.84	968.210	
-120			53.4	120	91						2.07	968.211	
-135			56	135	106					26 000	2.34	968.212	
-165			57.5	165	137					22 000	2.80	968.213	
-200			62.4	200	173					16 000	3.61	968.214	
BBT50-MEGA6E -120			3 - 6	25	35.6							37 - 45	
-MEGA8E -120	3 - 8	30	40.4	120	77	42 - 51	20 000	MEC 8-□	MEN 8	4.1	968.221		
-MEGA10E -120	3 - 10	35	45.4			48 - 58		MEC10-□	MEN10	4.2	968.225		
-MEGA13E - 90	3 - 12	42	46.5	90	47	50 - 60	18 000	MEC13-□	MEN13	4.0	968.228		
-120			52	120	77					4.4	968.229		
-165			59	165	121					16 000	5.2	968.230	

1. MEGA E nut is included.
2. "H" indicates the adjustment length with an adjusting screw.

Spare Parts			Accessories												
MEGA E Chuck	Model	Order No.	MEGA Wrench	Model	Order No.	MEGA E Collet	Model	MEGA E Perfect Seal	Model	Adjusting Screw	Model	G	L	B	Order No.
	MEGA6E	MEN6	968.461	MGR25	969.456	MEC6-□	EPS6-□	NBA6B	M7	12	2	961.527			
	MEGA8E	MEN8	968.462	MGR30	969.458	MEC8-□	EPS8-□	NBA8B	M9	13	2.5	961.550			
	MEGA10E	MEN10	968.463	MGR35	969.460	MEC10-□	EPS10-□	NBA10B	M14	16	3	961.572			
	MEGA13E	MEN13	968.464	MGR42	969.462	MEC13-□	EPS13-□	NBA13B	M18	20	4	961.598			

MEGA Double Power Chuck Type D

Close to integral rigidity and precision of a solid tool holder. Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and type DS to feed coolant to cutting tool periphery.

A.1

- max. 30 000 min⁻¹
- Clamping range: Ø 16 - Ø 32
- Coolant-through hole

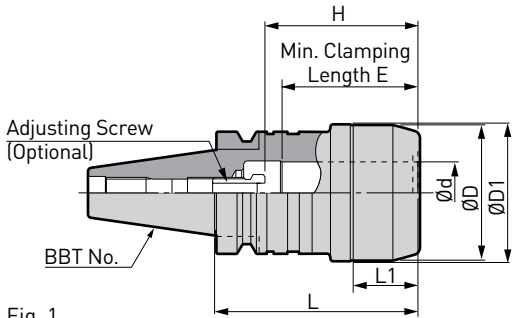


Fig. 1

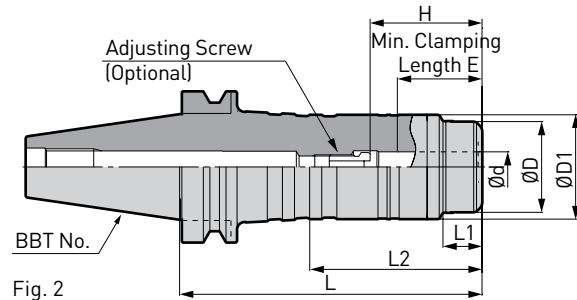



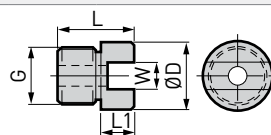
Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	Ød	ØD	ØD1	L	L1	L2	H	E	max. min ⁻¹	Weight (kg)	Order No.		
BBT40 -MEGA16D - 75A	2	16	42	53	75	25	38	71	55	30 000	1.5	801.711		
					105						2.1	801.730		
		20	50	55	75	34	44	69 - 79	56		1.6	803.148		
					105						2.0	803.116		
-MEGA25D - 75A	1	25	62	63	75	39	-	73 - 83	57	27 000	2.0	801.731		
					105						2.3	803.198		
		32	70	71	90	33	-	71 - 81	64		2.1	803.199		
					105						2.4	803.131		
-MEGA32D - 90A				135						22 000	3.1	803.135		
BBT50 -MEGA20D -105	2	20	60	69	105	25	36	69 - 79	56	20 000	5.1	969.593		
					105						5.4	969.595		
		25	70	77	135	32	45	76 - 86	65		6.5	969.596		
	165				7.6						968.033			
	-MEGA32D -105	2	32	80	86	105	39	54	78 - 95		71	20 000	5.4	969.597
						165						15 000	8.5	968.037
-200					200		129				12 000	9.9	968.038	

1. Wrench is to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. As a back stop for cutting tools for the MEGA16D models, a commercially available hex socket head screw can be used.

For Straight Collet ▶ A158

Accessories									
		MEGA Wrench		Adjusting Screw					
									
MEGA Double Power Chuck	Model	Order No.	Model	ØD	L	L1	G	W	Order No.
BBT30 -MEGA16DS	MGR46L	969.465L	-	-	-	-	-	-	-
-MEGA20DS	MGR50L	969.464L	HMA-16	19	27	6	M16P1.5	8	962.311
BBT40 -MEGA16D/DS	MGR42L	969.462L	-	-	-	-	-	-	-
-MEGA20D/DS	MGR50L	969.464L	HMA-M16	19	27	6	M16P1.5	8	962.311
-MEGA25D/DS	MGR62L	969.469L							
-MEGA32D/DS	MGR70L	969.470L							
BBT50 -MEGA16DS	MGR46L	969.465L	-	-	-	-	-	-	-
-MEGA20D/DS	MGR60L	969.468L	HMA-M16	19	27	6	M16P1.5	8	962.311
-MEGA25D/DS	MGR70L	969.470L							
-MEGA32D/DS	MGR80L	969.471L							

MEGA Double Power Chuck Type DS

Close to integral rigidity and precision of a solid tool holder. Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.



A.1

- max. 30 000 min⁻¹
- Clamping range: Ø 16 - Ø 32
- Coolant to cutting tool periphery

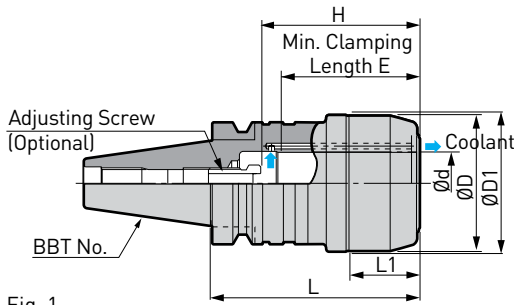


Fig. 1

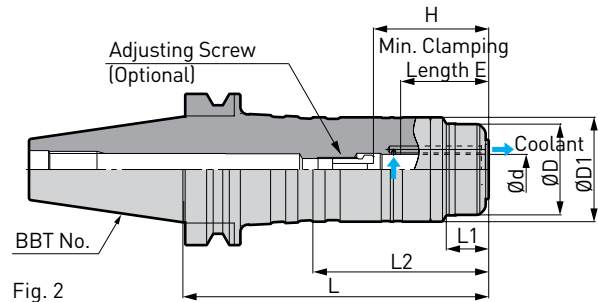


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	Ød	ØD	ØD1	L	L1	L2	H	E	max. min ⁻¹	Weight (kg)	Order No.	
BBT30 -MEGA16DS - 60	1	16	46	47	62.5	28	-	64	52	30 000	0.76	978.030	
-MEGA20DS- 65		20	50	51	67.5	33	-	62		25 000	0.82	978.184	
BBT40 -MEGA16DS - 75A	2	16	42	53	77	27	40	73	57	30 000	1.5	801.712	
-105A					107					25 000	2.1	803.149	
-135A					137					22 000	2.7	803.117	
-165A					167					22 000	3.3	803.200	
-MEGA20DS- 75A		20	50	55	77	36	46	71 - 81	58	30 000	1.6	803.150	
-105A					107					25 000	2.0	803.118	
-135A	137	25 000	2.6	803.132									
-165A	167	22 000	3.2	803.161									
-MEGA25DS- 75A	1	25	62	63	77	41	-	75 - 85	59	27 000	2.0	803.119	
-105A					107			26 000		2.3	801.713		
-135A					137			24 000		3.0	803.162		
-165A					167			21 000		3.7	803.136		
-MEGA32DS- 90A	1	32	70	71	92	35	-	73 - 83	66	26 000	2.1	803.202	
-105A					107			22 000		3.1	803.137		
-135A					137			16 000		3.7	803.163		
-165A					167			16 000		3.7	803.163		
BBT50 -MEGA16DS -105	2	16	46	55	107.5	26	36	73	52	21 000	4.6	968.708	
-135					137.5					19 000	5.2	968.076	
-165					167.5					19 000	5.7	968.077	
-MEGA20DS-105		20	60	69	107.5	28	38	71 - 81	58	20 000	5.1	968.709	
-135					137.5					19 000	6.0	968.710	
-165					167.5					17 000	6.8	968.080	
-MEGA25DS-105		25	70	77	107.5	34	47	78 - 88	67	20 000	5.4	968.711	
-135					137.5					19 000	6.5	968.712	
-165					167.5					17 000	7.6	968.083	
-MEGA32DS- 90		2	32	80	86	94.5	42	57	80 - 97	73	20 000	4.8	968.086
-105						107.5					18 000	5.4	968.713
-135						137.5					15 000	7.0	968.714
-165	167.5					15 000					8.5	968.087	
-200	202.4					12 000					9.9	968.088	

1. Wrench is to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. As a back stop for cutting tools for the MEGA16DS models, a commercially available hex socket head screw can be used.

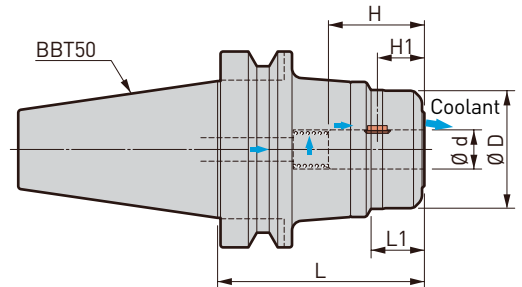
For Straight Collet ▶ A158

MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.

A.1

- Clamping range: $\varnothing 16 - \varnothing 32$
- Coolant to cutting tool periphery



BIG-PLUS tools can be used in machining centers with conventional spindles.

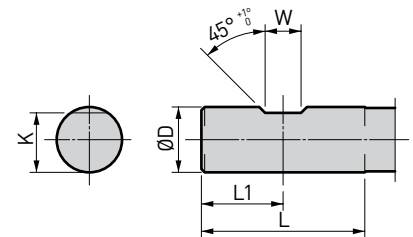
Model	$\varnothing d$	$\varnothing D$	L	L1	H	H1	MEGA Wrench	Weight (kg)	Order No.
BBT50-MEGA16DPG -105	16	46	105	24	47	23	MGR46L	4.6	805.449
			165					5.8	805.450
-MEGA20DPG -105	20	60	105	27	49	24	MGR60L	5.1	805.451
			165					6.9	805.452
-MEGA25DPG -105	25	70	105	33	55	23	MGR70L	5.4	805.453
			165					7.7	805.454
-MEGA32DPG -105	32	80	105	41	59	23	MGR80L	5.6	805.455
			165					8.4	805.456

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.

Weldon Shank Standards

(DIN1835-1)

The following standard shank is required for MEGA Perfect Grip.



$\varnothing D$	L	L1	W	K
Nominal	Tolerance		Nominal	Tolerance
16	h6	48	24	10
20		50	25	11
25		56	32	12
32		60	36	14
				+0.05 0
				14.2
				18.2
				23
				30

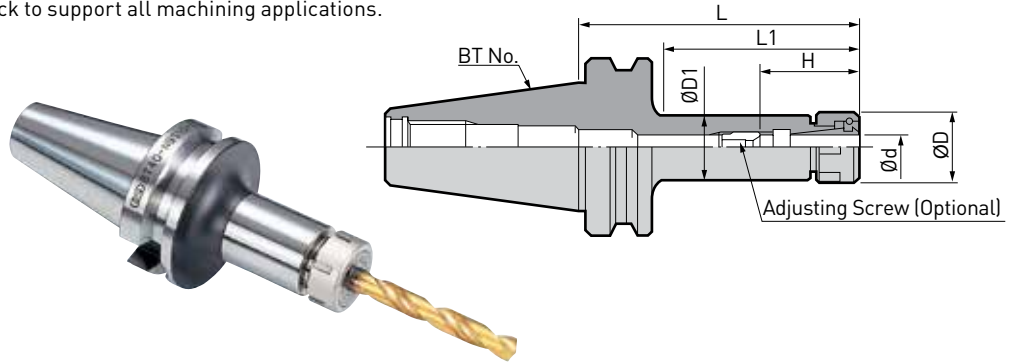
Spare Parts				Accessories			
Key Grip		Spring		MEGA Wrench			
MEGA Perfect Grip	Model	Order No.	Model	Order No.	Model	Order No.	
MEGA16DPG	PKG16-2P	805.492	PSP1519	805.496	MGR46L	969.465L	
MEGA20DPG	PKG20-2P	805.493	PSP1823	805.497	MGR60L	969.468L	
MEGA25DPG	PKG25-2P	805.494	PSP2420	805.498	MGR70L	969.470L	
MEGA32DPG	PKG32-2P	805.495	PSP3128	805.499	MGR80L	969.471L	

1. Key grip is available in a package of 2 pcs.
2. As key grip is a consumable item, it is recommended to replace on a regular basis.

New Baby Chuck

The original high precision collet chuck to support all machining applications.

- max. 20 000 min⁻¹
- Clamping range: Ø 0.25 - Ø 20
- Coolant-through hole



A.1

For BT50, refer to the following pages.

Model	Ød	ØD	ØD1	L	L1	H	Collet Model	Nut Model	Weight (kg)	Order No.
BT30 -NBS6 - 60	0.25 - 6	20	19.5	60	32	20 - 40	NBC6-□	NBN6	0.44	961.917
				90	62				0.51	961.918
-NBS8 - 60	0.5 - 8	25	24.5	60	33	23 - 42	NBC8-□	NBN8	0.46	961.919
				90	63				0.55	961.920
-NBS10 - 60	1.5 - 10	30	29.5	60	34	35 - 45	NBC10-□	NBN10	0.51	961.921
				90	64				0.66	961.922
-NBS13 - 60	2.5 - 13	35	34.5	60	34	41 - 60	NBC13-□	NBN13	0.5	961.923
				90	64				0.72	961.924
-NBS16 - 60	2.5 - 16	42	41.5	60	37	45 - 65	NBC16-□	NBN16	0.53	961.925
				90	67				0.81	961.926
-NBS20 - 60	2.5 - 20	46	45.5	60	38	48 - 58	NBC20-□	NBN20	0.55	961.915
				90	68				0.9	961.916
				120	98				1.26	800.029
BT40 -NBS6 - 90	0.25 - 6	20	19.5	90	53	20 - 40	NBC6-□	NBN6	1.2	961.932
				135	98				1.3	961.933
-NBS8 - 90	0.5 - 8	25	24.5	90	53	23 - 42	NBC8-□	NBN8	1.2	961.935
				135	98				1.3	961.936
-NBS10 - 90	1.5 - 10	30	29.5	90	53	35 - 45	NBC10-□	NBN10	1.2	961.938
				135	98				1.5	961.939
-NBS13 - 90	2.5 - 13	35	34.5	90	55	41 - 60	NBC13-□	NBN13	1.4	961.941
				135	100				1.7	961.942
-NBS16 - 90	2.5 - 16	42	41.5	90	55	45 - 65	NBC16-□	NBN16	1.5	961.944
				135	100				1.9	961.945
-NBS20 - 60	2.5 - 20	46	45.5	60	28	48 - 65	NBC20-□	NBN20	1.2	961.946
				90	57				1.5	961.947
				135	102				2.1	961.948
				165	132				2.5	961.959

1. New baby nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Max. 20 000 min⁻¹ is valid for L = 60 and 90 mm.

For Tap Driving Back Stop ▶ A145

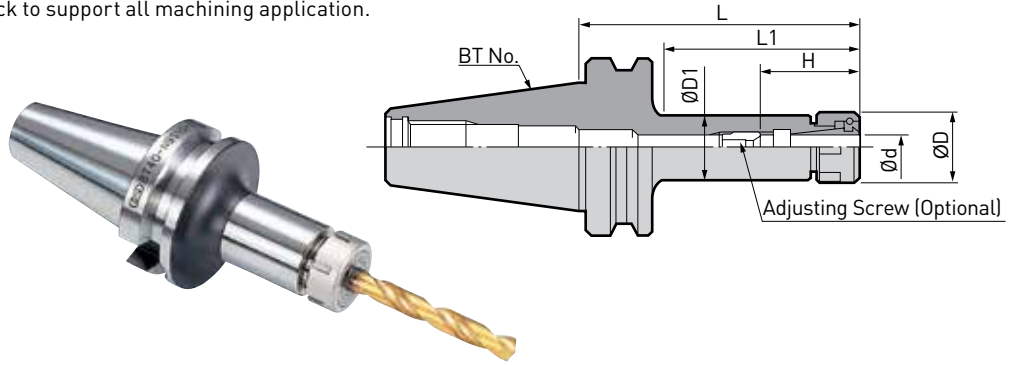
Spare Parts			Accessories									
New Baby Nut			Wrench		NBC Collet		Baby Perfect Seal		Adjusting Screw		Rubber	
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.	
	NBS6	NBN6 961.526	NBK6	961.525	NBC6-□	BPS6-□	NBA6B	M7	12	2	961.527	
	NBS8	NBN8 961.549	NBK8	961.548	NBC8-□	BPS8-□	NBA8B	M9	13	2.5	961.550	
	NBS10	NBN10 961.571	NBK10	961.570	NBC10-□	BPS10-□	NBA10B	M11	16	3	961.572	
	NBS13	NBN13 961.597	NBK13	961.596	NBC13-□	BPS13-□	NBA13B	M14	20	4	961.598	
	NBS16	NBN16 961.631	NBK16	961.630	NBC16-□	BPS16-□	NBA16B	M18	20	4	961.632	
	NBS20	NBN20 961.679	NBK20	961.678	NBC20-□	BPS20-□	NBA20B	M21	20	4	961.680	

New Baby Chuck

The original high precision collet chuck to support all machining application.

A.1

- Clamping range: \varnothing 0.25 - \varnothing 20
- Coolant-through hole



Model		Ød	ØD	ØD1	L	L1	H	Collet Model	Nut Model	Weight (kg)	Order No.
BT50 -NBS6	-120	0.25 - 6	20	19.5	120	67	20 - 40	NBC6-□	NBN6	4.0	961.962
	-165				165	112				4.1	961.963
	-200				200	147				4.2	961.964
-NBS8	-120	0.5 - 8	25	24.5	120	67	23 - 42	NBC8-□	NBN8	4.1	961.966
	-165				165	112				4.2	961.967
-NBS10	-120	1.5 - 10	30	29.5	120	67	35 - 45	NBC10-□	NBN10	4.1	961.970
	-165				165	112				4.4	961.971
	-200				200	147				4.6	961.972
-NBS13	-120	2.5 - 13	35	34.5	120	67	41 - 60	NBC13-□	NBN13	4.4	961.976
	-165				165	112				4.7	961.977
	-200				200	147				5.0	961.978
-NBS16	-120	2.5 - 16	42	41.5	120	72	45 - 65	NBC16-□	NBN16	4.4	961.983
	-165				165	117				4.8	961.984
	-200				200	152				5.2	961.985
-NBS20	- 90	2.5 - 20	46	45.5	90	42	48 - 65	NBC20-□	NBN20	4.2	961.988
	-120				120	72				4.5	961.989
	-165				165	117				4.9	961.990
	-200				200	152				5.3	961.991
	-250 *				250	202				5.9	961.992

1. New baby nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Coolant-through hole is not available

For Tap Driving Back Stop ▶ A145

Spare Parts			Accessories									
	New Baby Nut		Wrench		NBC Collet		Baby Perfect Seal		Adjusting Screw		Rubber	
					▶ A138		▶ A148					
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.	
NBS6	NBN6	961.526	NBK6	961.525	NBC6-□	BPS6-□	NBA6B	M7	12	2	961.527	
NBS8	NBN8	961.549	NBK8	961.548	NBC8-□	BPS8-□	NBA8B	M9	13	2.5	961.550	
NBS10	NBN10	961.571	NBK10	961.570	NBC10-□	BPS10-□	NBA10B	M11	16	3	961.572	
NBS13	NBN13	961.597	NBK13	961.596	NBC13-□	BPS13-□	NBA13B	M14	20	4	961.598	
NBS16	NBN16	961.631	NBK16	961.630	NBC16-□	BPS16-□	NBA16B	M18	20	4	961.632	
NBS20	NBN20	961.679	NBK20	961.678	NBC20-□	BPS20-□	NBA20B	M21	20	4	961.680	

New Hi-Power Milling Chuck Type S

The original design of slit structure supports heavy and finish end milling with high power and precision.

- Clamping range: $\varnothing 16 - \varnothing 32$
- Coolant-through hole

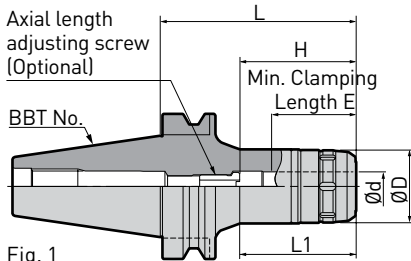


Fig. 1

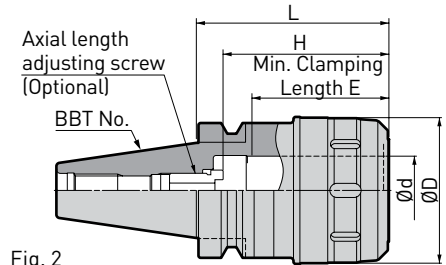


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	Ød	ØD	L	L1	H	E	Wrench	Weight (kg)	Order No.				
BBT30 -HMC16S - 70 *	1	16	43	70	47	71	55	FK45-50L	0.7	964.101S				
-HMC20S - 75	2	20	50	75	-	56 - 66	56		0.9	964.102S				
-HMC25S - 90		25	55	90	-	64 - 74	57	1.2	964.103S					
-HMC32S - 105		32	62	105	-	70 - 80	58	1.5	978.181S					
BBT40 -HMC16S - 75 *		1	16	43	75	45	71	55	FK45-50L	1.3	964.190S			
-120 *	120				90	1.8				800.144				
-HMC20S - 75	75				46	1.4				964.191S				
-105	20		50	105	75	69 - 79	56	1.9		964.194S				
-120				120	90	2.1	964.196S							
-HMC25S - 75				75	47	1.5	964.192S							
-105	25		59	105	77	73 - 83	57	FK58-62L	2.1	964.195S				
-135				135	107	2.8	800.146							
-HMC32S - 90				90	-	71 - 81	64	FK68-75L	2.0	978.279S				
-105	105		-	79 - 89	2.3	800.147								
-135	135		-	-	3.0	800.148								
BBT50 -HMC16S - 105 *	1		16	43	105	57	71	55	FK45-50L	4.2	800.278			
-135 *		135			80	4.6				800.279				
-165 *		165			100	5.0				800.280				
-HMC20S - 105		105			57	4.3				800.282				
-135		20			50	135				80	69 - 79	56	4.8	800.283
-165						165				100	5.4	800.284		
-HMC25S - 105			105	57		4.5	800.287							
-135		25	59	135	87	76 - 86	57	FK58-62L		5.2	800.288			
-165				165	105	5.9	800.289							
-HMC32S - 105				105	64	4.6	800.291							
-135		32	68	135	89	88 - 98	72	FK68-75L		5.4	800.292			
-165				165	105	6.4	800.293							

1. Wrench and axial adjusting screw are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. * As a back stop for cutting tools for the HMC16S models, a commercially available hex socket head screw can be used.

For Straight Collet ▶ A158

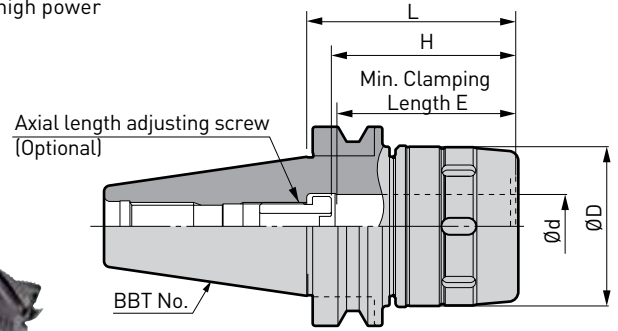
Accessories									
		Wrench		Adjusting Screw					
New Hi-Power Milling Chuck	Model	Order No.	Model	ØD	L	L1	G	W	Order No.
BBT30/40/50 -HMC16S	FK45-50L	801.037	-	-	-	-	-	-	-
	-HMC20S		HMA-M16	19	27	6	M16P1.5	8	962.311
BBT30 -HMC25S	FK52-55	962.294	HMA-M16	19	27	6	M16P1.5	8	962.311
	-HMC32S	FK58-62L	801.038	HMA-M16S				10	962.312
BBT40/50 -HMC25S	FK58-62L	801.038	HMA-M16	19	27	6	M16P1.5	8	962.311
	-HMC32S	FK68-75L	801.039	HMA-M16S				10	962.312

New Hi-Power Milling Chuck Standard

The original design of slit structure supports heavy and finish end milling with high power and precision.

A.1

- Clamping range: $\varnothing 20 - \varnothing 42$
- Coolant-through hole



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	$\varnothing d$	$\varnothing D$	L	H	E	Wrench	Weight (kg)	Order No.
BBT50 -HMC20	-105	20	60	105	69 - 79	56	4.7	964.221
	-135			135				
-HMC25	-105	25	62	105	74 - 84	65	4.6	964.225
	-135			135				
-HMC32	-105 *	32	80	105	78 - 95	71	5.2	964.228
	-135 *			135				
-HMC42	-105 *	42	99	105	93 - 105	73	6.0	964.233
	-135 *			135				

1. Wrench and axial adjusting screw are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Vibration reduction screw is included. [HMC32 = 88 / HMC42 = 91] insertion length are required for activation.

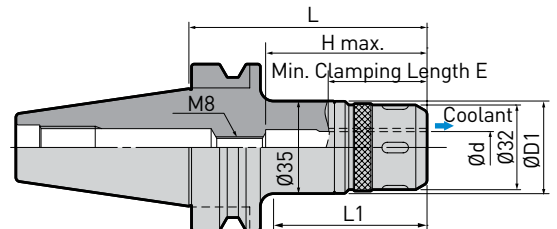
For Straight Collet ▶ A158

Accessories											
			Wrench		Adjusting Screw						
New Hi-Power Milling Chuck			Model	Order No.	Model	$\varnothing D$	L	L1	G	W	Order No.
BBT50	-HMC20	FK58-62	962.291	HMA-M16	19	27	6	M16P1.5	8	8	962.311
	-HMC25									10	962.312
	-HMC32	FK80-90	962.292	HMA-M16S	30	36	9.5	M24P1.5	10	962.313	
	-HMC42	FK92-100	962.293	HMA-M24	30	36	9.5	M24P1.5	10	962.313	

New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant.

- Clamping range: $\varnothing 12$
- Coolant to cutting tool periphery



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	$\varnothing d$	$\varnothing D1$	L	L1	H max.	E	Wrench	Weight (kg)	Order No.	
BBT30 -HMC12J - 60	12	35	60	38	65	43	NBK13	0.58	805.814	
BBT40 -HMC12J - 90			90	63				1.4	805.815	
			-120	120				70	1.6	805.816
BBT50 -HMC12J -105			-105	105				67	4.0	805.817
			-135	135				70	4.3	805.818
			-165	165				90	4.7	805.819

1. Wrench is to be ordered separately if required.

For Straight Collet ▶ A158

For Wrench ▶ A161

Hydraulic Chuck Super Slim

Ultra precise hydraulic chuck with extremely slim design.

- Clamping range: $\varnothing 3 - \varnothing 12$
- Coolant-through hole



A.1

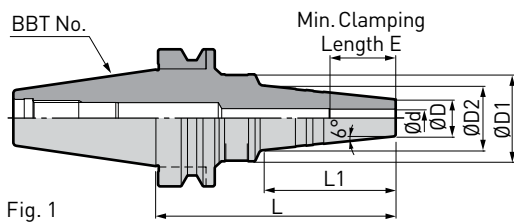


Fig. 1

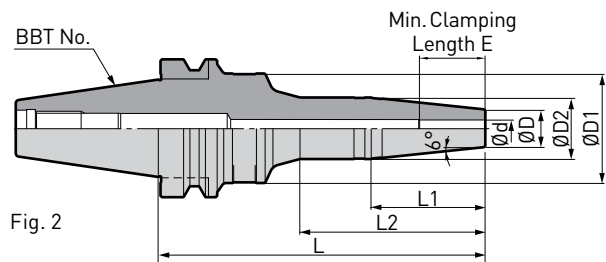


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	$\varnothing d$	$\varnothing D$	$\varnothing D1$	$\varnothing D2$	L	L1	L2	E	Weight (kg)	Order No.	
BBT30 -HDC3S - 90	1	3	14	42	25	90	50	-	16	0.65	805.462	
		-HDC4S - 60		4	46	20	60		28	19	0.51	803.053
		- 90		5	42	25	90		50	22	0.65	805.820
		-HDC5S - 90		6	28	25				25	0.65	803.054
		-HDC6S - 90	8	17	44	30	90		50	31	0.65	803.055
		-HDC8S - 90	10	19	46	32				33	0.7	803.051
		-HDC10S - 90	12	21	36	0.72				803.052		
		-HDC12S - 90										
BBT40 -HDC3S - 90	1	3	14	38	24	90	44	-	16	1.3	805.463	
		-HDC4S - 60		4	19	60	22		19	1.2	803.060	
		- 90		24	90	45	19		1.3	803.061		
	-135	2	4	44	26	135	57	84	1.4	805.464		
	-HDC6S -110	1	6	38	27	110	60	-	25	1.3	803.062	
	-150	2	48	26	150	57	85	25	1.6	803.063		
	-HDC8S -110	1	8	40	30	110	60	-	31	1.4	803.064	
	-150	2	50	28	150	52	85	31	1.7	803.065		
	-HDC10S -110	1	10	42	32	110	60	-	33	1.4	803.056	
	-150	2	50	30	150	52	85	33	1.7	803.057		
	-HDC12S -110	1	12	44	34	110	60	-	36	1.4	803.058	
	-150	2	50	32	150	52	85	36	1.8	803.059		
BBT50 -HDC6S -150	2	6	14	52	26	150	57	83	25	4.2	803.068	
				56	200	100	4.6	805.822				
		8		54	28	150	83	31	4.3	803.069		
				58	200	100	4.7	805.823				
		10		56	30	150	83	33	4.3	803.066		
				60	200	100	4.8	805.824				
	12	58	32	150	83	36	4.4	803.067				
		62	200	100	4.8	805.825						

1. Adjusting screw and straight collet can not be used.

For Inner Bore Cleaner ▶ A170

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

Hydraulic Chuck Jet Through

Coolant or oil-mist is supplied to cutting edge securely. Exert maximum performance to high-precision operation at 5-axis machining.



A.1

- Clamping range: $\varnothing 4 - \varnothing 32$
- Coolant to cutting tool periphery

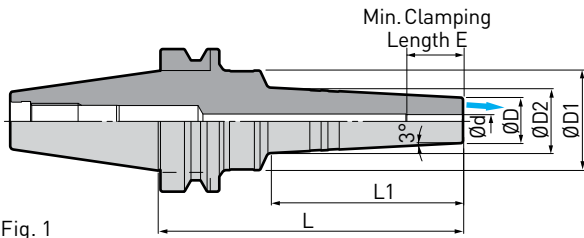


Fig. 1

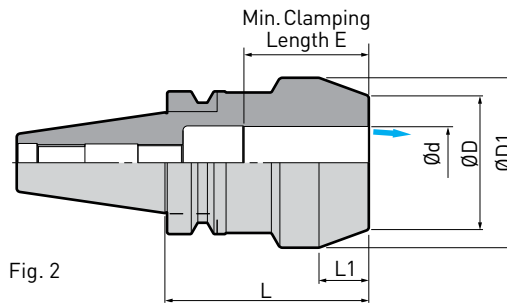


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	$\varnothing d$	$\varnothing D$	$\varnothing D1$	$\varnothing D2$	L	L1	E	Weight (kg)	Order No.	
BBT30 -HDC4J - 60	1	4	20	46	23	60	28	19	0.54	805.077	
-HDC6J - 90		6		26	25			0.69	805.078		
-HDC8J - 90		8		28	31			0.71	805.079		
-HDC10J - 90		10	24	44	30		90	50	33	0.74	805.080
-HDC12J - 90		12	26	46	32				36	0.76	805.081
-HDC16J - 90		16	34	46	40				43	0.86	805.480
-HDC20J - 90		20	38	52	43					0.96	805.481
BBT40 -HDC4J - 90	1	4	20	38	25	90	45	19	1.3	805.082	
-135				44	30				135	85	1.5
-HDC6J - 90		6		38	25		90	45	25	1.3	805.083
-135				44	29					135	85
-HDC8J - 90		8	22	40	27		90	45	31	1.3	805.085
-135				46	31					135	85
-HDC10J - 90		10	24	42	29		90	45	33	1.3	805.087
-135				48	33					135	85
-HDC12J - 90		12	26	44	31		90	45	36	1.3	805.089
-135				50	35					135	85
-HDC16J - 90		16	34	46	40		90	46	43	1.4	805.482
-135				50	44					135	89
-HDC20J - 90		20	38	48	44		90	47	43	1.5	805.484
-135				53	48					135	90
-HDC25J - 90	25	51	63	56	90	41	49	1.9	805.677		
-HDC32J - 90			75	-				90	20	56	2.3
BBT50 -HDC6J - 120	1	6	20	48	26	120	55	25	4.1	805.091	
-HDC8J - 120		8		22	50			28	31	4.1	805.092
-HDC10J - 120		10		24	52			30	33	4.2	805.093
-HDC12J - 120		12	26	54	32		36	4.2	805.094		
-HDC16J - 120		16	34	58	41			4.4	805.486		
-HDC20J - 120		20	38	62	45		56	43	4.5	805.487	
-HDC25J - 120		25	48	70	58			59	49	5.2	805.679
-HDC32J - 120		32	58	78	67		60	56	5.6	805.680	

1. Adjusting screw and straight collet cannot be used.

2. Straight collet can be used for HDC16J or bigger $\varnothing d$ size models.

For Straight Collet ▶ A158

For Inner Bore Cleaner ▶ A170

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

Hydraulic Chuck Standard

For high precision machining in Automotive, Aerospace, Medical and Die & Mold.

- Clamping range: $\varnothing 6 - \varnothing 31$
- Coolant-through hole

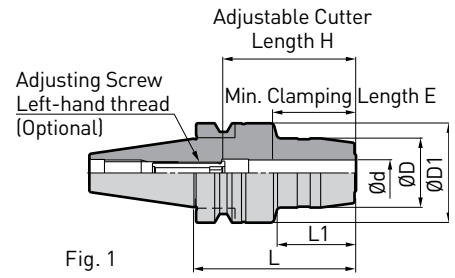


Fig. 1

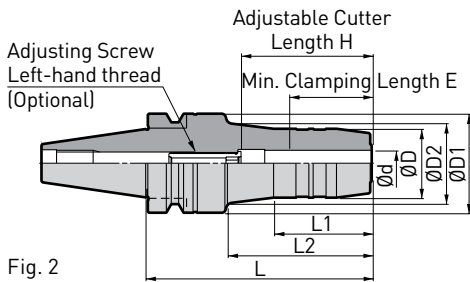


Fig. 2

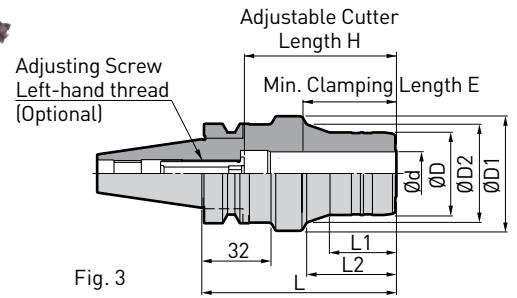


Fig. 3

BIG-PLUS tools can be used in machining centers with conventional spindles.

For BBT40/50, refer to the following pages.

Model	Fig.	$\varnothing d$	$\varnothing D$	$\varnothing D1$	$\varnothing D2$	L	L1	L2	H	E	Adjusting Screw (optional)	Weight (kg)	Order No.
BBT30 -HDC6 - 45	1	6	30	46	-	45	7	-	35 - 50	28	HDA6-05020	0.61	978.071
			26		31	105	43	72	28 - 50		HDA6-05032	0.67	978.034
-HDC6 - 75	2	6	26	31	105	43	72	28 - 50	28	HDA6-05032	0.82	978.073	
-HDC8 - 45	1	8	32	46	-	45	7	-	35 - 50	28	HDA8-06020	0.61	978.075
			28		-	75	41	-	28 - 50		HDA8-06032	0.69	978.076
-HDC8 - 75	2	8	28	33	105	44	72	28 - 50	28	HDA8-06032	0.84	978.078	
-HDC10 - 45	1	10	34	46	-	45	7	-	45 - 55	33	HDA10-08015	0.60	978.080
			30		-	75	36	-	33 - 55		HDA10-08032	0.74	978.081
-HDC10 - 75	2	10	30	36	105	45	66	33 - 55	33	HDA10-08032	0.91	978.083	
-HDC12 - 45	1	12	36	46	-	45	7	-	55 - 60	38	HDA12-10010	0.58	978.085
			32		-	75	36	-	38 - 60		HDA12-10032	0.75	978.086
-HDC12 - 75	2	12	32	38	105	45	67	38 - 60	38	HDA12-10032	0.94	978.088	
-HDC16 - 45**	1	16	42	46	-	45	7	-	70	43	-	0.55	978.092
			38		-	75	35	-	43 - 70		HDA16-12030	0.77	978.025
-HDC16 - 75	2	16	38	-	105	47	-	43 - 70	43	HDA16-12037	1.06	805.550	
-HDC20 - 60*	3	20	38	46	53	60	-	14	43 - 54	43	HDA16-12030	0.77	978.095
			38		46	75	16	26	46 - 70		HDA16-12030	0.85	978.038
-HDC20 - 75	2	20	38	46	105	40	-	43 - 70	43	HDA16-12037	1.02	805.551	
-HDC20 - 105	2	20	38	46	105	40	-	43 - 70	43	HDA16-12037	1.02	805.551	
-HDC25 - 105	3	25	55	63	-	105	44	-	52 - 80	62	HDA25-16039	1.60	978.097

1. Straight collet (reduction sleeve) is available.
2. * Straight collet can not be used with BBT30-HDC20-60.
3. ** Adjusting screw can not be used with BBT30-HDC16-45.

For Straight Collet ▶ A158

For Inner Bore Cleaner ▶ A170

For Adjusting Screw ▶ A168

Hydraulic Chuck Standard

A.1

- Clamping range: $\varnothing 6 - \varnothing 31$
- Coolant-through hole

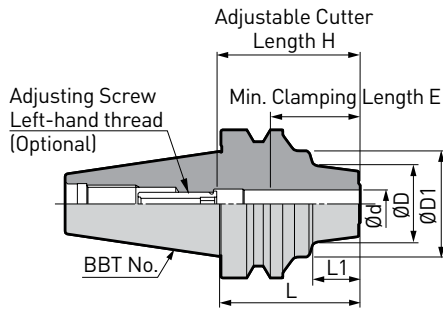


Fig. 1

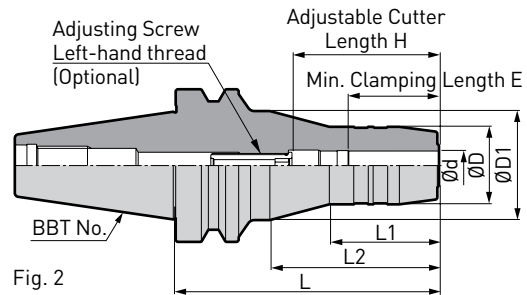


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	Ød	ØD	ØD1	L	L1	L2	H	E	Adjusting Screw (optional)	Weight (kg)	Order No.			
BBT40 -HDC6 - 60	1	6	27	45	60	19	-	28 - 50	28	HDA6-05032	1.2	800.131			
- 90			90		50	1.4	978.343								
-110			110		44	70	1.5				800.128				
-HDC8 - 90	2	8	26	45	90	44	50	33 - 55	33	HDA8-06032	1.4	978.192			
-HDC10 - 60			31		60		20				-	1.2	800.088		
- 90	2	10	30	45	90	45	50	38 - 60	38	HDA10-08032	1.4	978.027			
-110			110		45		70				1.5	800.085			
-HDC12 - 60			33		60		20				-	1.2	978.046		
- 90	1	12	32	45	90	45	49	43 - 70	43	HDA12-10032	1.4	800.096			
-110			110		45		69				1.6	800.093			
-HDC14 - 90			14		34		45				46	1.4	978.028		
-HDC16 - 90			16		38		45				90	47	49	1.4	978.193
-HDC18 - 90	2	18	40	45	48	43	-	111	43	HDA16-12037	1.5	978.194			
-HDC19 - 75 *			19		49.2		-				75	43	-	1.4	800.111
-HDC20 - 90			20		42		45				90	48	50	1.4	800.115
-110	50	110	48	70	1.7	800.112									
-HDC24 - 75 *	2	24	63	-	75	47	-	104	45	-	1.6	800.116			
-HDC31 - 75 *			31		74		-				75	30	-	76	56

1. Straight collet (reduction sleeve) is available.

2. * Adjusting screw cannot be used. "H" is the max. tool shank length can be inserted for these models.

For Straight Collet ▶ A158

For Inner Bore Cleaner ▶ A170

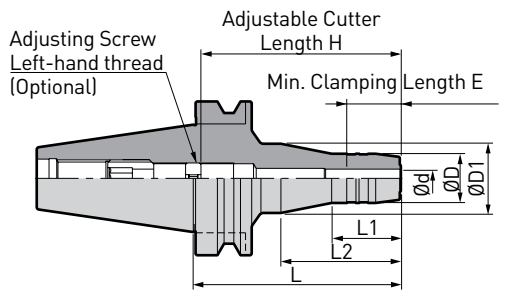
For Adjusting Screw ▶ A168

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended.
- Do not use with cutting tools made with a flat on the shank.
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond E.

Hydraulic Chuck Standard

- Clamping range: $\varnothing 6 - \varnothing 31$
- Coolant-through hole



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	L1	L2	H	E	Adjusting Screw (optional)	Weight (kg)	Order No.
BBT50 -HDC6L -105	6	26	45	105	44	48	80 - 120	28	HDA6-20010	4.2	800.023
-HDC8L -105	8	28			45			43		4.2	800.027
-HDC10L -105	10	30			47			33		4.2	800.264
-HDC12L -105	12	32			47			38		4.2	800.268
-HDC16L -105	16	38	47	90	47	-	149	43	-	4.3	800.272
-HDC19L - 90 *	19	49.2	-	105	45	-	71 - 111	43	HDA20-12047	4.2	800.001
-HDC20L -105	20	42	50	105	47	48	71 - 111	43	HDA20-12047	4.4	800.002
-HDC24L - 90 *	24	63	-	90	41	-	149	45	-	4.5	800.008
-HDC31L - 90 *	31	72	-	90	45	-	147	56	-	4.5	800.015

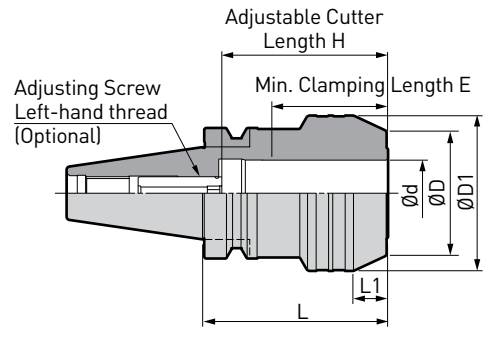
1. Straight collet (reduction sleeve) is available.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw cannot be used. "H" is the max. tool shank length can be inserted for these models.

For Straight Collet ▶ A158
 For Inner Bore Cleaner ▶ A170
 For Adjusting Screw ▶ A168

Hydraulic Chuck High Rigidity

Substantial body design eliminates chatter and deflection when endmilling.

- Clamping range: $\varnothing 32$
- Coolant-through hole



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	L1	H	E	Adjusting Screw (optional)	Weight (kg)	Order No.
BBT40 -HDC32E - 90	32	60	75	90	16	56 - 80.5	56	HDA25-16039	2.2	800.124

1. Straight collet (reduction sleeve) is available.
2. "H" indicates the adjustment length with an adjusting screw.

For Straight Collet ▶ A158
 For Inner Bore Cleaner ▶ A170
 For Adjusting Screw ▶ A168

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended.
- Do not use with cutting tools made with a flat on the shank.
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond E.

Shrink Chuck Slim

Slim design avoids interference with the side wall and draft of the mold.

A.1

- Clamping range: $\varnothing 6 - \varnothing 12$
- Coolant-through hole

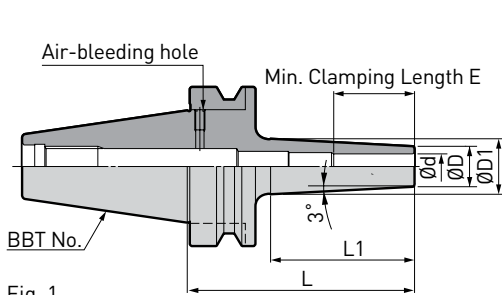


Fig. 1

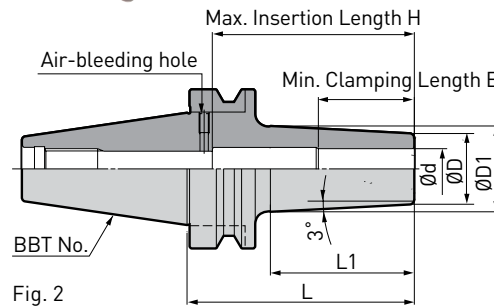


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	L1	E	H	Weight (kg)	Order No.
BBT30 -SRC6S -105	1	6	10	18.0	105	77	26	-	0.48	978.179
-SRC8S -105		8	13	21.0					0.51	978.180
-SRC10S -105	2	10	16	24.0			32	62	0.55	800.063
-SRC12S -105		12	19	27.0			36	72	0.60	978.007
BBT40 -SRC6S -120	1	6	10	19.0	120	86	26	-	1.08	800.168
-165				23.5	165	127			1.21	978.136
-SRC8S -120		8	13	22.0	120	86	1.12		978.205	
-165				26.5	165	129	1.29		978.137	
-SRC10S -120		10	16	25.0	120	86	32		1.17	978.367
-165				29.5	165	129			1.36	978.138
-SRC12S -120		12	19	28.0	120	87	36		1.22	800.163
-165				33.0	165	131			1.44	978.139

1. Use carbide cutter within a tolerance of h6.

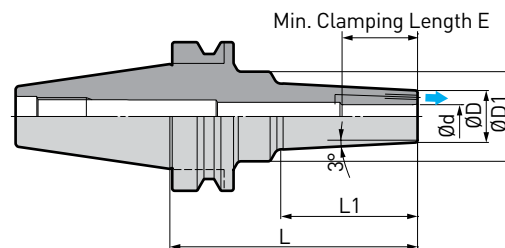
For Inner Bore Cleaner ▶ A170

Please refer to the operation manual of heating / cooling equipments, as some equipment may not be compatible.

Shrink Chuck Jet Through

Efficient coolant supply to the cutting tool periphery.

- Clamping range: $\varnothing 6 - \varnothing 12$
- Coolant-through hole



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	L1	E	Weight (kg)	Order No.		
BBT40 -SRC6J -105	6	16	32	105	55	26	1.3	804.751		
-SRC8J -105	8	19	35				1.3	804.752		
-SRC10J -105	10	22	38				58	32	1.4	804.749
-SRC12J -105	12	24	40				63	36	1.4	804.750
BBT50 -SRC6J -165	6	16	42	165	93	26	4.1	804.755		
-SRC8J -165	8	19	45				99	4.2	804.756	
-SRC10J -165	10	22	48				103	32	4.3	804.753
-SRC12J -165	12	24	50				108	36	4.3	804.754

1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ A170

Please refer to the operation manual of heating / cooling equipments, as some equipment may not be compatible.

Shrink Chuck Standard

Substantial body provides higher rigidity. Available from 4mm clamping diameter.

- Clamping range: $\varnothing 4 - \varnothing 20$
- Coolant-through hole



A.1

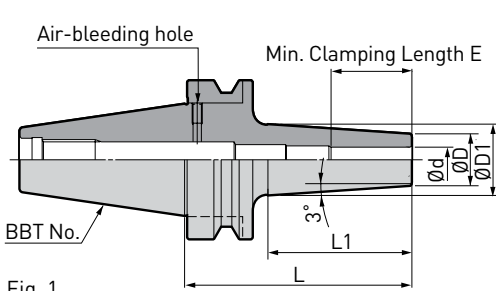


Fig. 1

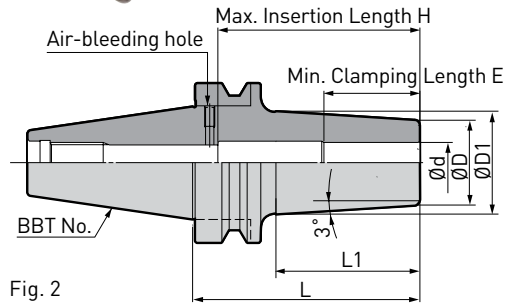


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	Ød	ØD	ØD1	L	L1	E	H	Weight (kg)	Order No.		
BBT30 -SRC4 - 75 *	1	4	10	14.6	75	44	16	-	0.45	978.001		
-SRC6 - 75		6	14	19.0			0.47		978.002			
-SRC8 - 75		8	18	23.0			0.51		978.003			
-SRC10 - 75		2	10	22		27.0	47		32	62	0.56	978.004
-SRC12 - 75			12	24		29.0			36	72	0.58	978.005
-SRC16 - 75			16	28		33.0			48	38	80	0.62
BBT40 -SRC4 - 90 *	2	4	10	15.5	90	52	16	-	1.05	978.291		
-SRC6 - 90		6	14	20.0			1.07		978.056			
-SRC8 - 90		8	18	24.0			1.12		978.057			
-SRC10 - 90		1	10	22		28.0	57		26	1.18	978.058	
-SRC12 - 90			12	24		30.0			36	1.20	978.059	
-SRC16 - 90			16	28		34.0			38	80	1.25	978.060
-165	2			42.0	165	132		1.82	800.164			
-SRC20 - 90		20	34	40.0	90	57	42	100	1.35	978.061		
-165				48.0	165	132			2.08	800.165		
BBT50 -SRC6 -105	1	6	14	20.5	105	61	26	-	3.7	978.105		
-165				26.0	165	116			3.9	800.354		
-SRC8 -105		8	18	24.5	105	61	3.8		978.107			
-165				30.0	165	116	4.0		800.355			
-SRC10 -105		10	22	28.5	105	61	32		3.8	978.109		
-165				34.0	165	116	4.2		800.350			
-SRC12 -105		12	24	30.5	105	61	36		3.9	978.111		
-165				36.0	165	116			4.2	800.351		
-SRC16 -105		16	28	34.5	105	61	38		3.9	978.113		
-165				40.0	165	116			4.3	978.114		
-SRC20 -105		20	34	40.5	105	61	42		4.0	978.115		
-165				46.0	165	116			4.6	800.352		

1. Use carbide cutter within a tolerance of h6.
2. * Use carbide cutter within a tolerance of h5.

For Inner Bore Cleaner ▶ A170

Please refer to the operation manual of heating / cooling equipments, as some equipment may not be compatible.

Face Mill Arbor Type FMH

For cutters that require a coolant hole through the pilot.

A.1

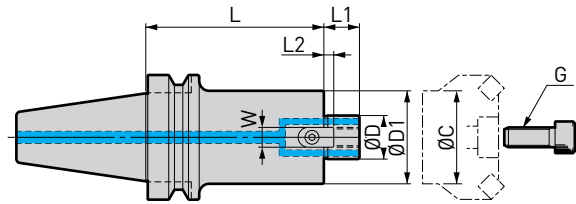
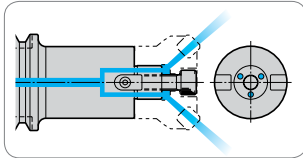


Fig. 1

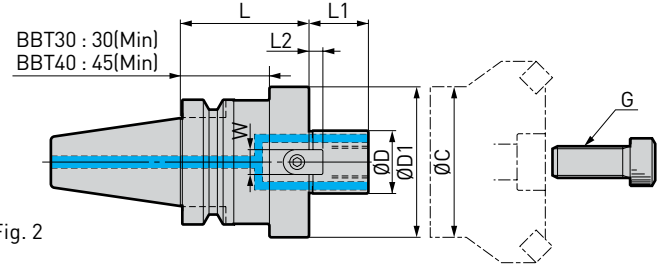


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	ØD (H6)	ØD1	L	L1	Driver Keys		G	ØC min.	Weight (kg)	Order No.					
						L2	W									
BBT30 -FMH16 - 37 - 35	1	16	37	35	16	5	8	M8	28	0.53	978.326					
-FMH22 - 47 - 45	2	22	47	45	18	5	10	M10	38	0.73	978.259					
-FMH22 - 60 - 45			60	45	18	5	10	M10	38	0.90	805.569					
-FMH27 - 60 - 45			27	60	45	20	6	12	M12	38	0.89	978.273				
BBT40 -FMH16 - 37 - 40	1	16	37	40	16	5	8	M8	28	1.1	800.066					
-FMH22 - 47 - 45	1	22	47	45	18	5	10	M10	38	1.3	978.145					
- 60				60								36	1.5	978.324		
- 90				90											1.9	800.074
-150				150												
-FMH22 - 60 - 45	1	22	60	45	18	5	10	M10	49	1.5	978.368					
- 60				60								1.8	800.075			
- 90				90										2.5	978.208	
-FMH27 - 60 - 45	1	27	60	45	20	6	12	M12	46	1.5	978.219					
- 60				60								1.8	800.079			
- 90				90										2.5	978.128	
-FMH27 - 76 - 60	2	27	76	60	20	6	12	M12	48	2.1	800.080					
- 90				90								2.8	800.081			
-FMH32 - 96 - 60	2	32	96	60	22	7	14	M16	58	2.4	978.035					
BBT50 -FMH16 - 37 - 60	1	16	37	60	16	5	8	M8	28	3.8	800.207					
-105				105								4.1	800.204			
-150				150										4.5	800.205	
-200				200												4.9
-FMH22 - 47 - 60	1	22	47	60	18	5	10	M10	38	4.1	978.129					
-105				105								4.7	978.130			
-150				150										5.3	978.131	
-200				200												6.0
-250				250										6.7	800.221	
-FMH22 - 60 - 60	1	22	60	60	18	5	10	M10	38	4.2	978.403					
-105				105								5.2	978.167			
-150				150										6.2	800.224	
-FMH27 - 60 - 45	1	27	60	45	20	6	12	M12	46	3.9	800.237					
- 90				90								5.0	978.174			
-150				150										6.3	978.175	
-200				200												7.4
-250				250										8.5	978.029	
-300				300										9.6	800.236	
-FMH32 - 96 - 45	1	32	96	45	22	7	14	M16	58	4.2	978.132					
- 90				90								6.8	978.133			
-150				150										10.2	978.143	
-200				200												13.3
-300	300	16.4	800.256													
-FMH40 -100 - 45	1	40	100	45	26	8.5	16	M20 (MBA-M20H)	70	4.4	978.149					
- 75				75								6.2	961.371			
-105				105										8.1	961.372	

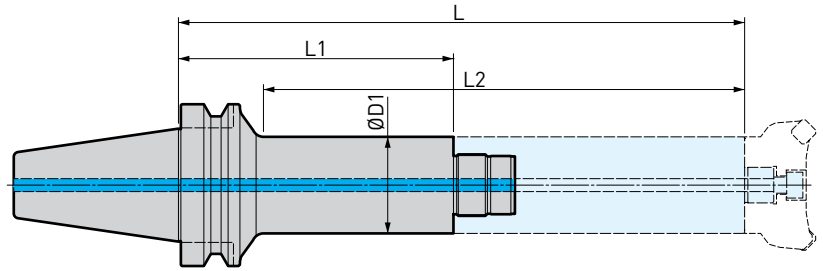
- By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.
- Hexagon socket head cap screw is included.

For Clamp Bolt ▶ A168

Smart Damper “Basic Holder” for Mills



- Modular damping system
- Coolant-through hole

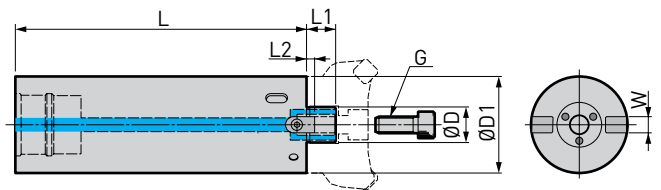


A.1

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	ØD1	L	L1	L2	Damper Head Model	Weight (kg)	Order No.
BBT50 -SDF36 - 47 -170	47	350	170	297	FMH □ □ DP-47	5.6	804.975
- 47 -220		400	220	347		6.3	804.970
-SDF36 - 60 -170	60	350	170	297	FMH □ □ DP-60	6.7	804.973
- 60 -220		400	220	347		7.8	804.974

Smart Damper “Damper Head” for Mills



Model	ØD	ØD1	L	L1	L2	W	G	Wrench	ØC min.	Weight (kg)	Order No.
SDF36-FMH22DP -47 -180	22	47	180	18	5	10	M10	FK45-50L	36	3.0	804.969
-60-180								FK58-62L	49	4.5	804.971
FMH27DP -60-180	27	60	20	6	12	M12	FK58-62L	46	4.5	804.972	

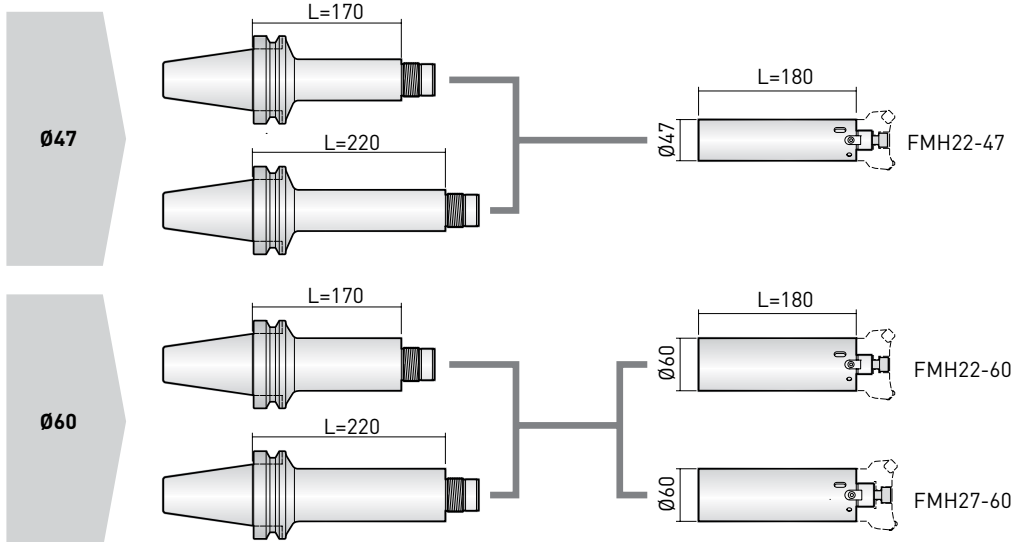
1. Wrench and cutter clamping bolt are included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

For Clamp Bolt ▶ A168

Combinations

Basic Holder

Damper Head



Side Lock Holder for Endmill

A.1

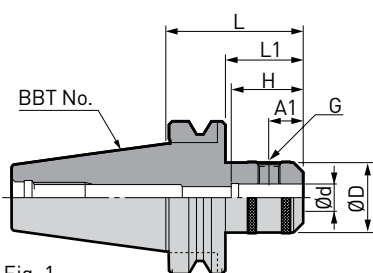


Fig. 1

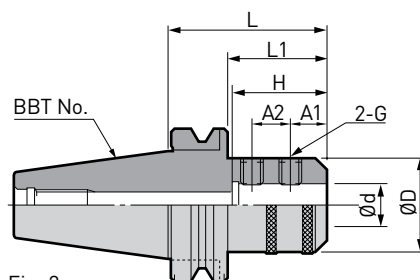


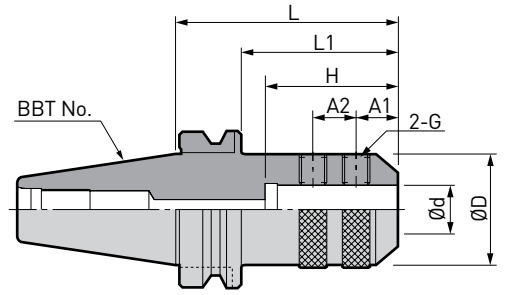
Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	Ød (H5)	ØD	L	L1	A1	A2	H	G	Weight (kg)	Order No.
BBT30 -ISL6 - 60	1	6	25	60	38	18	-	85 *	M6	0.52	961.394
		8	28			M8			0.55	961.395	
		10	35			M10			0.64	961.396	
		12	42			M12			0.74	961.397	
		16	48			M14			0.81	966.341	
BBT40 -ISL12 - 75	1	12	42	75	48	22.5	-	110 *	M12	1.5	961.362
		16	48			24			M14	1.5	961.363
		20	52			25			M16	1.6	961.364
	2	25	63.5	90	63	24	25	60	M18xP2	2.1	961.365
		32	72	105	-	28	28	82	M20xP2	2.9	961.366
BBT50 -ISL16 - 90	1	16	48	90	52	24	-	145 *	M14	4.4	961.367
		20	52			25			M16	4.5	961.368
	2	25	65	105	67	24	25	90	M18xP2	4.6	961.369
		32	72			28	M20xP2		5.3	978.017	
		40	90			30	32		M24xP2	6.5	978.018
		50	99.5			35	35		M24xP2	7.2	978.294

1. "H" is the max. tool shank length that can be inserted into the holder.
2. H dimension marked with * indicates this dimension to the back end of the retention knob.

Side Lock Holder for Drill

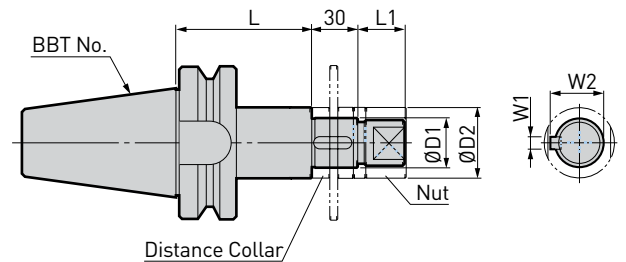


BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Ød	ØD	L	L1	A1	A2	H	G	Weight (kg)	Order No.	
BBT30 -TSL20 - 75	20	48	75	-	14	14	50	M10	0.98	978.314	
	25		80		20	56	M16	0.97	978.315		
	32		85		20	60		1.38	805.243		
BBT40 -TSL16 - 90	16	48	90	63	14	14	48	M10	1.7	800.175	
	20		90	63			50		1.7	800.177	
	25		90	63			56		1.6	800.179	
	-TSL20 - 90		32	63	105	-	20	60	M16	2.4	978.318
	-TSL32 -105		40	68			25	70		2.4	978.317
	-TSL40 -105		40	68			25	70		2.4	978.317
	-TSL50 -105		50	84			25	70		5.4	800.390
BBT50 -TSL16 - 90	16	48	90	52	14	14	48	M10	4.2	800.369	
	20		90	52			50		4.2	800.374	
	25		90	52			56		4.3	800.375	
	-TSL32 -105		32	63	105	67	15	60	M16	4.8	800.380
	-TSL40 -105		40	68				60		4.8	800.385
-TSL50 -105	50	84	67	70	5.4	800.390					

1. "H" is the max. tool shank length that can be inserted into the holder.

Side Cutter Arbor



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	ØD1 (H6)	W1	W2	ØD2	L	L1	Weight (kg)	Order No.
BBT40 -SCA25.4 - 75	25.4	6.35	27.78	40	75	25	1.9	804.760
					120		2.3	804.762
-SCA31.75 - 75	31.75	7.92	34.92	46	75	30	2.4	804.761
BBT50 -SCA25.4 - 90	25.4	6.35	27.78	40	90	25	4.7	804.757
					135		5.1	804.763
					-SCA31.75 - 90	31.75	7.92	34.92
-SCA135 - 90	31.75	7.92	34.92	46	135	30	5.7	804.764
-SCA38.1 - 90	38.1	9.52	42.06	55	90	36	5.8	804.759
					135		6.8	804.765

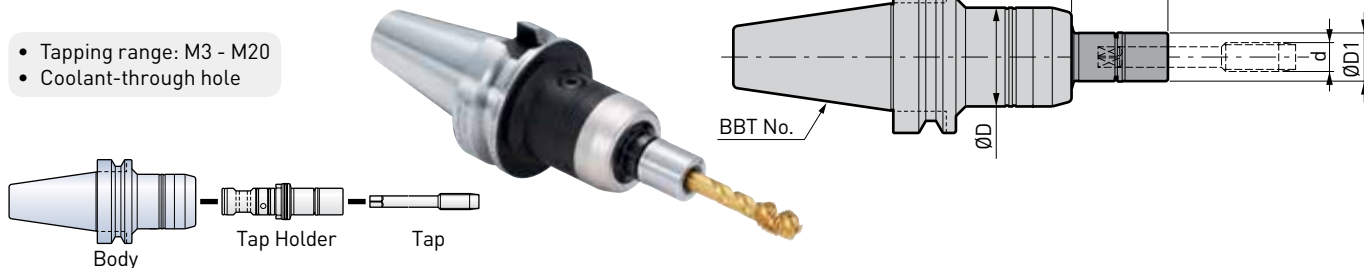
1. Nut is included.
2. Distance collars of 5 mm, 8 mm, 10 mm, and 12 mm are included.

MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

A.1

- Tapping range: M3 - M20
- Coolant-through hole



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)	Order No.
BBT30 -MGT6 - 70	MGT6 -d- 30	M3 - M8	36	16	100	70	30	0.69	965.401
	- 70				70				
	-100				100				
-MGT12 - 70	MGT12-d- 30	M5 - M12 P1/8	41	20	100	70	30	0.74	965.402
	- 70				70				
	-100				100				
-MGT20 -110	MGT20-d- 35	M10 - M20 P1/4 - P1/2	54	30	145	110	35	1.45	965.403
	- 85				85				
	-115				115				
BBT40 -MGT6 - 75	MGT6 -d- 30	M3 - M8	36	16	105	75	30	1.3	965.404
	- 70				70				
	-100				100				
-MGT12 - 75	MGT12-d- 30	M5 - M12 P1/8	41	20	105	75	30	1.4	965.405
	- 70				70				
	-100				100				
-MGT20 - 95	MGT20-d- 35	M10 - M20 P1/4 - P1/2	54	30	130	95	35	1.8	965.406
	- 85				85				
	-115				115				
BBT50 -MGT6 - 90	MGT6 -d- 30	M3 - M8	36	16	120	90	30	3.9	965.407
	- 70				70				
	-100				100				
-MGT12 - 90	MGT12-d- 30	M5 - M12 P1/8	41	20	120	90	30	4.0	965.408
	- 70				70				
	-100				100				
-MGT20 -105	MGT20-d- 35	M10 - M20 P1/4 - P1/2	54	30	140	105	35	4.4	965.409
	- 85				85				
	-115				115				

1. Tap holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.



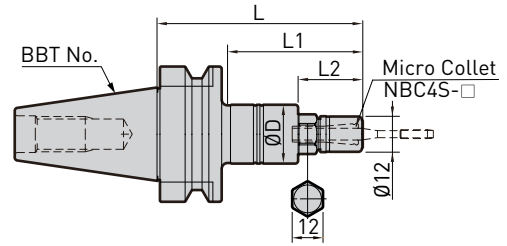
For Tap Holder ▶ A162

For Accessories ▶ A166

MEGA Synchro Tapping Holder

For small Tap MGT3

- Tapping range: M1 - M3
- Collet chuck system



A.1

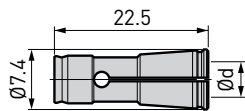
BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Tapping Range d	ØD	L	L1	L2	Weight (kg)	Order No.
BBT30 -MGT3 -70	M1 - M3	20	70	46	22	0.5	965.400
BBT40 -MGT3 -90			90	61		1.2	805.723

1. Nut is included. MEGA Wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the hex portion of the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

For Accessories ▶ A166

Micro Collet for MGT3



Model	Tapping Range d			Tap Shank	Order No.
	DIN371	ISO529	JIS	Ød	
NBC4S-2.5AA	M1 - M1.8	M2		2.5	961.468
NBC4S-2.8AA	M2 - M2.6	M2.2, M2.5		2.8	968.353
NBC4S-3.0AA	-	-	M1 - M2.6	3.0	961.470
NBC4S-3.1AA	-	M3		3.15	968.355
NBC4S-3.5AA	M3	-		3.5	961.472
NBC4S-4.0AA	-	-	M3	4.0	961.474

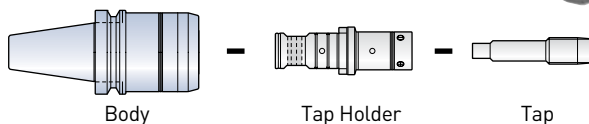
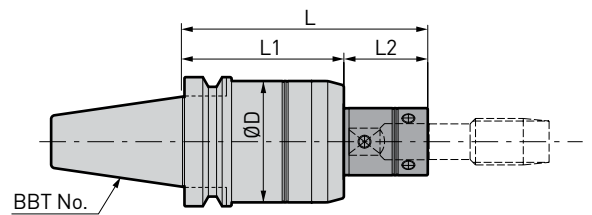
1. Other sizes available. Please refer to micro collet.

For Micro Collet ▶ A135

For large Tap MGT36

Compensation for synchronization error eliminates heavy thrust load of large diameter tapping.

- Tapping range: M22 - M36
- Coolant-through hole
- Side lock clamping system



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Tapping Range d	ØD	L	L1	L2	Weight (kg)	Order No.
BBT50-MGT36-125	M22 - M36 P5/8 - P1	94	190	125	65	7.2	800.323

1. Tap holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.

For MGT36 Tap Holder ▶ A163

For Accessories ▶ A166



Morse Taper Holder

Precise finish of inner taper guarantees high concentricity.

A.1

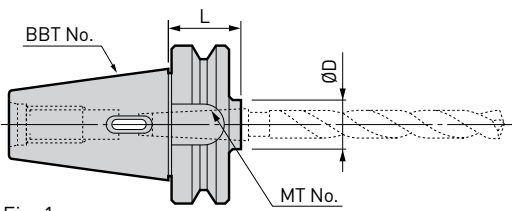


Fig. 1

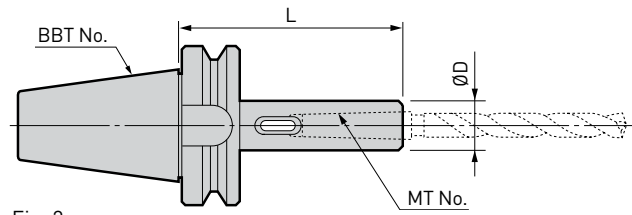


Fig. 2

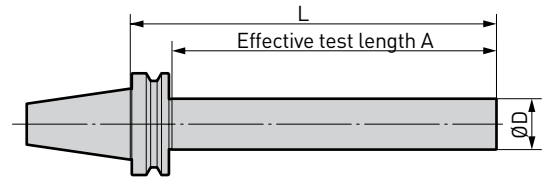
BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	MT No.	ØD	L	Weight (kg)	Order No.
BBT30 -MTA1 - 60	1	1	25	60	0.52	978.274
		2	32		0.55	978.254
		3	40		0.74	978.255
BBT40 -MTA1 - 45	1	1	25	45	1.0	978.399
				120	1.3	800.158
	2	2	32	45	1.0	978.164
				120	1.6	800.159
	1	3	40	75	1.0	978.400
				135	1.7	800.160
	2	4	50	90	1.6	978.165
BBT50 -MTA1 - 45	1	1	25	45	3.9	800.329
				120	4.2	800.325
	2	2	32	45	3.9	800.335
				135	4.3	800.330
	1	3	40	45	3.8	800.341
				150	4.6	800.336
	2	4	50	75	3.9	800.347

Dyna Test

Periodic inspection of machine tools to control production stability.
Shorter models are ideal for measuring ATC repeatability.

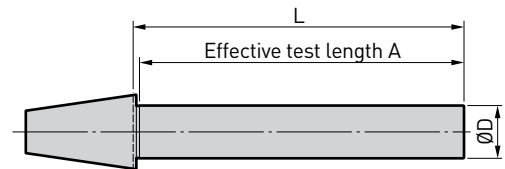
BIG-PLUS BT type



Model	L	A	ØD	Order No.
BBT30 -32 - L150	150	125	32	800.054
- L235	235	210		961.264
BBT40 -50 - L200	200	170	50	800.065
- L350	350	320		978.119
BBT50 -50 - L200	200	159	50	800.184
- L360	360	319		978.290

1. Taper length is in accordance with JIS BT standard.

Conventional BT and BIG-PLUS BT type

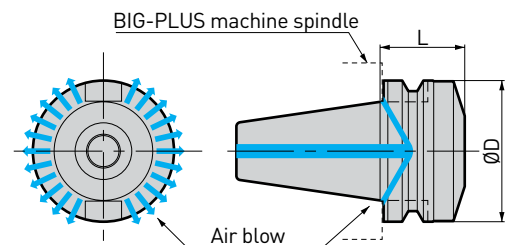


Model	L	A	ØD	Order No.
NT30 -32 - L150	150	144	32	801.759
- L225	225	219		978.253
NT40 -50 - L200	200	184	50	801.760
- L335	335	319		801.761
NT50 -50 - L200	200	194	50	801.762
- L335	335	319		801.763

1. Taper length is in accordance with JIS BT standard.

Cleaner

Blowing air cleans the BIG-PLUS machine spindle face.
Oil and dirt is removed from the spindle face.



Model	ØD	L	Order No.
SBT30-ASC-30T	46	30	802.777
SBT40-ASC-40T	63	40	802.778
SBT50-ASC-60T	100	60	978.150

1. When the cleaner is clamped into a BIG-PLUS machine spindle, faces have 1mm clearance.

BDV / DV Shank (DIN 69871)

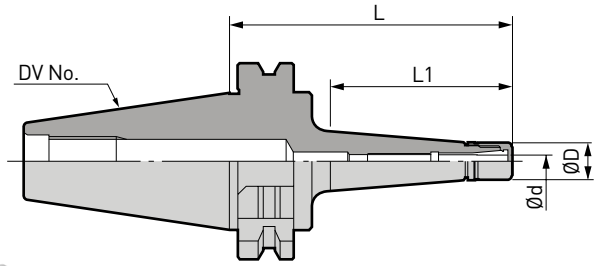
MEGA Micro Chuck	32
MEGA New Baby Chuck	33 - 34
MEGA E Chuck	35
MEGA Double Power Chuck	36
MEGA Perfect Grip	37
New Baby Chuck	38 - 39
MEGA ER Grip	40
New Hi-Power Milling Chuck	41
Shrink Fit Holder	42
Side Lock Holder	43
Face Mill Arbor Type FMH	44
Smart Damper	45
MEGA Synchro Tapping Holder	46
Dyna Test	47
Cleaner	47



MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

- max. 40 000 min⁻¹
- Clamping range: Ø 0.45 - Ø 8.05
- Coolant-through hole



A.2

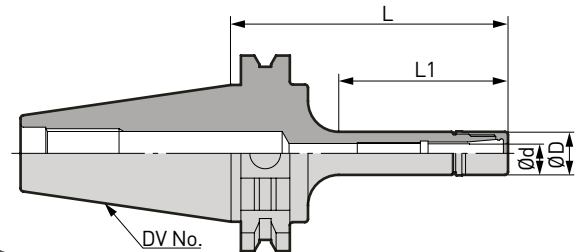
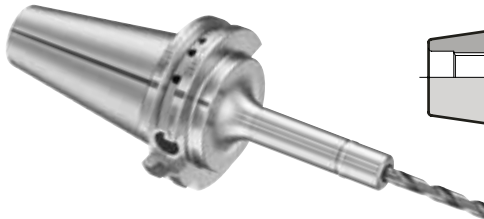
Model	Ød	ØD	L	L1	max. min ⁻¹	Collet Model	Nut Model	Weight (kg)	Order No.
DV30 -MEGA6S- 60T	0.45 - 6.05	14	60	36	40 000	NBC6S-□	MGN6S	0.41	805.016
-MEGA8S- 75T	2.95 - 8.05	18	75	51	35 000	NBC8S-□	MGN8S	0.48	805.246
DV40 -MEGA3S- 90T	0.45 - 3.25	10	90	60	28 000	NBC3S-□	MGN3S	0.91	805.686
-MEGA4S- 90T	0.45 - 4.05	12	90	60	28 000	NBC4S-□	MGN4S	0.93	805.687
-MEGA6S- 60T	0.45 - 6.05	14	60	30	35 000	NBC6S-□	MGN6S	0.90	805.688
- 90T			90	60	28 000			0.94	805.689
-120T			120	90	22 000			1.04	805.690
-MEGA8S- 90T	2.95 - 8.05	18	90	60	28 000	NBC8S-□	MGN8S	1.00	805.691

1. MEGA nut is included.

MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

- max. 28 000 min⁻¹
- Clamping range: Ø 0.45 - Ø 6.05
- Coolant-through hole



Model	Ød	ØD	L	L1	max. min ⁻¹	Collet Model	Nut Model	Weight (kg)	Order No.
DV40 -MEGA6S-90	0.45 - 6.05	14	90	60	28 000	NBC6S-□	MGN6S	1.05	805.685

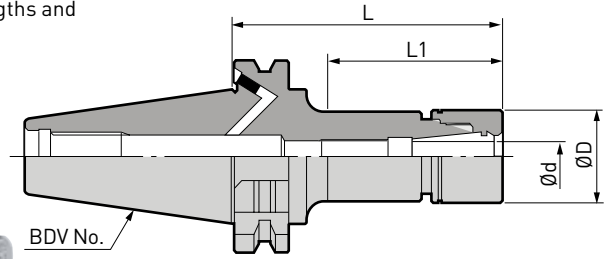
1. MEGA nut is included.

Spare Parts			Accessories							
MEGA Nut			MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		Taper Cleaner	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model		Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-□	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-□	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-□	MGN6S-PS□	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-□	MGN8S-PS□	NBB8S	805.802	SC-NBC8S	805.827

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

- max. 35 000 min⁻¹
- Clamping range: Ø 0.25 - Ø 20
- Coolant-through hole



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Ød	ØD	L	L1	max. min ⁻¹	Collet Model	Nut Model	Weight (kg)	Order No.
DV30 -MEGA10N - 75	1.5 - 10	30	75	54	30 000	NBC10-□	MGN10	0.6	805.247
BDV40-MEGA6N - 90	0.25 - 6	20	90	55	35 000	NBC6-□	MGN6	1.1	969.224
			135	100	20 000			1.2	969.225
-MEGA8N - 90	0.5 - 8	25	90	57	35 000	NBC8-□	MGN8	1.1	969.229
			135	102	20 000			1.3	969.230
-MEGA10N - 90	1.5 - 10	30	90	59	35 000	NBC10-□	MGN10	1.2	969.234
			135	104	20 000			1.4	969.235
-MEGA13N - 90	2.5 - 13	35	90	61	35 000	NBC13-□	MGN13	1.3	969.239
			135	106	20 000			1.6	969.240
			165	136	15 000			1.8	969.241
-MEGA16N - 90	2.5 - 16	42	90	65	30 000	NBC16-□	MGN16	1.5	969.244
			135	110	20 000			1.9	969.245
			165	140	15 000			2.2	969.246
-MEGA20N - 60	2.5 - 20	46	60	40	30 000	NBC20-□	MGN20	1.3	969.248
			90	70				1.6	969.249
			135	115				2.0	969.250
			165	145				2.3	969.251
			200	180				2.6	969.252

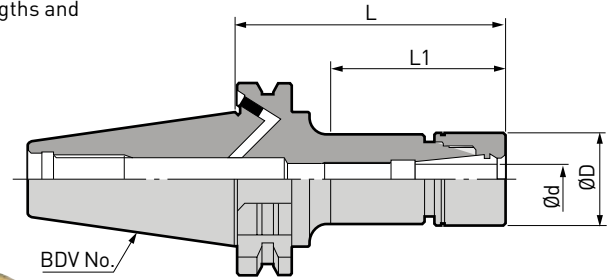
1. MEGA nut is included.

Spare Parts			Accessories										
MEGA Nut			MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw			Rubber	
Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.			
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-□	MPS6-□	NBA6B	M7	12	2	961.527		
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-□	MPS8-□	NBA8B	M9	13	2.5	961.550		
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-□	MPS10-□	NBA10B	M11	16	3	961.572		
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-□	MPS13-□	NBA13B	M14	20	4	961.598		
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-□	MPS16-□	NBA16B	M18	20	4	961.632		
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-□	MPS20-□	NBA20B	M21	20	4	961.680		

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

- max. 20 000 min⁻¹
- Clamping range: Ø 0.25 - Ø 20
- Coolant-through hole



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Ød	ØD	L	L1	max. min ⁻¹	Collet Model	Nut Model	Weight (kg)	Order No.
BDV50 -MEGA6N - 90	0.25 - 6	20	90	50	20 000	NBC6-□	MGN6	3.0	969.253
-120			120	80				3.0	969.254
-165			165	125				3.1	969.255
-MEGA10N - 90	1.5 - 10	30	90	55	20 000	NBC10-□	MGN10	3.2	969.261
-120			120	80				3.3	969.262
-165			165	125				3.5	969.263
-MEGA13N - 90	2.5 - 13	35	90	55	18 000	NBC13-□	MGN13	3.2	969.267
-120			120	80				3.4	969.268
-165			165	125				3.7	969.269
-MEGA16N - 90	2.5 - 16	42	90	55	17 000	NBC16-□	MGN16	3.4	969.274
-120			120	85				3.7	969.275
-165			165	130				4.1	969.276
-200			200	165				4.4	969.277
-MEGA20N - 90	2.5 - 20	46	90	55	16 000	NBC20-□	MGN20	3.5	969.280
-120			120	85				3.8	969.281
-165			165	130				4.3	969.282
-200			200	165				4.6	969.283

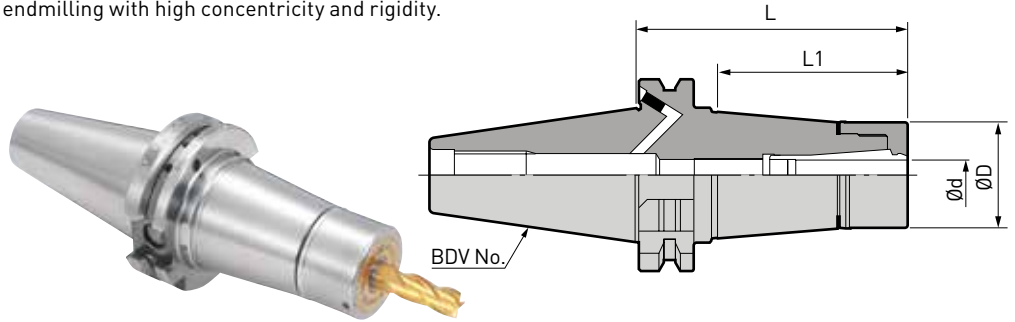
1. MEGA nut is included.

Spare Parts			Accessories									
	MEGA Nut		MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw		Rubber	
					▶ A138	▶ A146						
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.	
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-□	MPS6-□	NBA6B	M7	12	2	961.527	
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-□	MPS8-□	NBA8B	M9	13	2.5	961.550	
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-□	MPS10-□	NBA10B	M11	16	3	961.572	
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-□	MPS13-□	NBA13B	M14	20	4	961.598	
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-□	MPS16-□	NBA16B	M18	20	4	961.632	
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-□	MPS20-□	NBA20B	M21	20	4	961.680	

MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

- max. 30 000 min⁻¹
- Clamping range: Ø 3 - Ø 12
- Coolant-through hole



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Ød	ØD	L	L1	max. min ⁻¹	Collet Model	Nut Model	Weight (kg)	Order No.
BDV40 -MEGA6E - 90	3 - 6	25	90	60	30 000	MEC6-□	MEN6	1.2	968.142
-MEGA8E - 60	3 - 8	30	60	30		MEC8-□	MEN8	1.2	968.144
- 90			90	63				1.3	968.145
-MEGA10E - 60	3 - 10	35	60	33		MEC10-□	MEN10	1.3	968.147
- 90			90	64				1.4	968.148
-MEGA13E - 60	3 - 12	42	60	35		MEC13-□	MEN13	1.5	968.150
- 90			90	61				1.7	968.151
-120			120	95	1.9			968.152	
BDV50 -MEGA6E -120	3 - 6	25	120	90	20 000	MEC6-□	MEN6	3.3	968.154
-MEGA8E -120	3 - 8	30				MEC8-□	MEN8	3.4	968.156
-MEGA10E -120	3 - 10	35				MEC10-□	MEN10	3.6	968.159
-MEGA13E - 90	3 - 12	42	90	60	18 000	MEC13-□	MEN13	3.6	968.161
-120			120	90				3.8	968.162
-165			165	137				4.4	968.163

1. MEGA E nut is included.

Spare Parts			Accessories								
	MEGA E Nut		MEGA Wrench		MEGA E Collet	MEGA E Perfect Seal	Adjusting Screw		Rubber		
					▶ A150	▶ A151					
MEGA E Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.
MEGA6E	MEN6	968.461	MGR25	969.456	MEC6-□	EPS6-□	NBA6B	M7	12	2	961.527
MEGA8E	MEN8	968.462	MGR30	969.458	MEC8-□	EPS8-□	NBA8B	M9	13	2.5	961.550
MEGA10E	MEN10	968.463	MGR35	969.460	MEC10-□	EPS10-□	NBA10B	M14	16	3	961.572
MEGA13E	MEN13	968.464	MGR42	969.462	MEC13-□	EPS13-□	NBA13B	M18	20	4	961.598

MEGA Double Power Chuck Type DS

Close to integral rigidity and precision of a solid tool holder. Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.



- max. 25 000 min⁻¹
- Clamping range: Ø 16 - Ø 42
- Coolant to cutting tool periphery

A.2

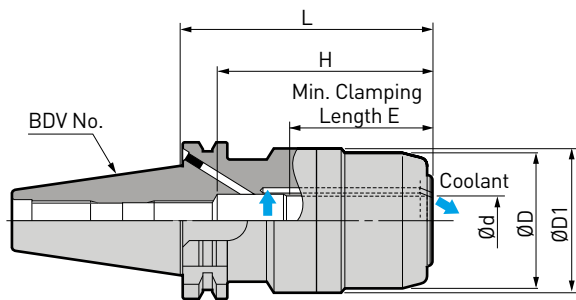


Fig. 1

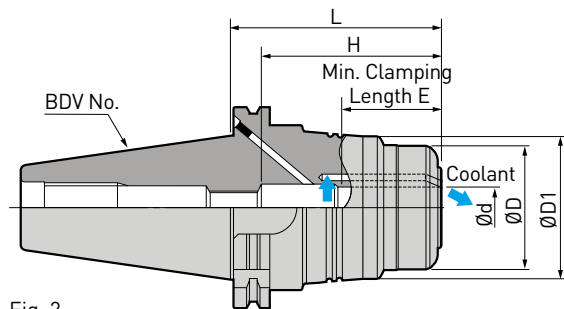



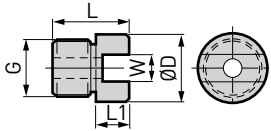
Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	Ød	ØD	ØD1	L	H	E	max. min ⁻¹	Weight (kg)	Order No.
BDV40 -MEGA16DS - 90A *	1	16	42	52.6	92	73	57	25 000	1.8	803.075
-MEGA20DS -100A		20	50	55	102	71 - 81	58	22 000	1.9	803.076
-135A					137			20 000	2.5	805.596
-MEGA25DS -100A		25	62	62.7	102	73 - 83	59	18 000	2.4	803.077
-135A					137			16 000	3.0	805.597
-MEGA32DS -100A					102			12 000	2.2	803.078
-135A	137	10 000	3.0	805.598						
BDV50 -MEGA16DS - 70 *	2	16	46	55	72.5	73	52	20 000	3.5	969.023
-MEGA20DS -100		20	60	69	102.5	71 - 81	58	20 000	4.9	969.025
-135					137.5			19 000	5.7	805.753
-MEGA25DS -105		25	70	77	107.5	78 - 88	67	18 000	5.4	968.059
-135					137.5			17 000	6.3	805.600
-MEGA32DS -105					107.5			15 000	5.7	968.060
-135	137.5	13 000	6.7	805.601						
-MEGA42DS -105	1	42	99	99.7	107	90 - 107	73	12 000	6.1	968.061

1. Wrench is to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw can not be used.

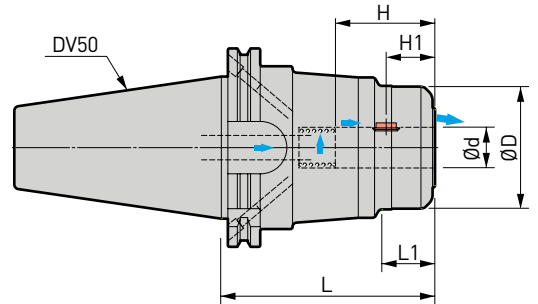
For Straight Collet ▶ A158

Accessories		MEGA Wrench		Adjusting Screw						
										
MEGA Double Power Chuck	Model	Order No.	Model	ØD	L	L1	G	W	Order No.	
BDV40 -MEGA16DS	MGR42L	969.462L	-	-	-	-	-	-	-	
-MEGA20DS	MGR50L	969.464L	HMA-M16	19	27	6	M16P1.5	8	962.311	
-MEGA25DS	MGR62L	969.469L								
-MEGA32DS	MGR70L	969.470L	HMA-M16S	-	-	-	-	10	962.312	
BDV50 -MEGA16DS	MGR46L	969.465L	-	-	-	-	-	-	-	
-MEGA20DS	MGR60L	969.468L	HMA-M16	19	27	6	M16P1.5	8	962.311	
-MEGA25DS	MGR70L	969.470L								
-MEGA32DS	MGR80L	969.471L	HMA-M24	30	36	9.5	M24P1.5	10	962.313	
-MEGA42DS	MGR99L	969.472L								

MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.

- Clamping range: Ø 20 - Ø 32
- Coolant to cutting tool periphery



A.2

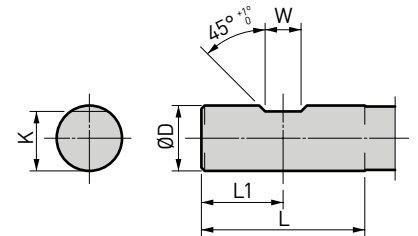
Model	Ød	ØD	L	L1	H	H1	MEGA Wrench	Weight (kg)	Order No.
DV50 -MEGA20DPG -105/ADF	20	60	105	27	49	24	MGR60L	5.1	805.808
-MEGA25DPG -105/ADF	25	70		33	55	23	MGR70L	5.4	805.809
-MEGA32DPG -105/ADF	32	80		41	59		MGR80L	5.6	805.810

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.

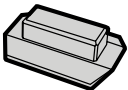


Weldon Shank Standards

(DIN1835-1)

The following standard shank is required for MEGA Perfect Grip.



ØD		L	L1	W		K	Tolerance
Nominal	Tolerance			Nominal	Tolerance		
20	h6	50	25	11	+ 0.05 0	18.2	h13
25		56	32	12		23	
32		60	36	14		30	

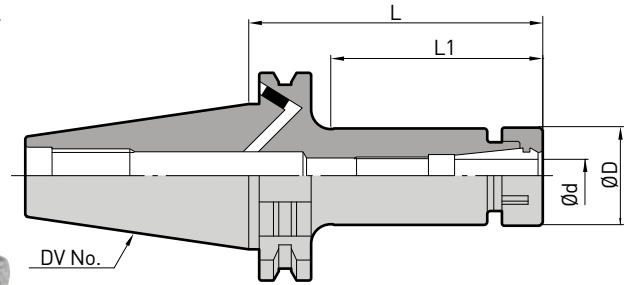
Spare Parts					Accessories	
	Key Grip		Spring		MEGA Wrench	
						
MEGA Perfect Grip	Model	Order No.	Model	Order No.	Model	Order No.
MEGA20DPG	PKG20-2P	805.493	PSP1823	805.497	MGR60L	969.468L
MEGA25DPG	PKG25-2P	805.494	PSP2420	805.498	MGR70L	969.470L
MEGA32DPG	PKG32-2P	805.495	PSP3128	805.499	MGR80L	969.471L

1. Key grip is available in a package of 2 pcs.
2. As key grip is a consumable item, it is recommended to replace on a regular basis.

New Baby Chuck

The original high precision collet chuck to support all machining applications.

- max. 20 000 min⁻¹
- Clamping range: Ø 0.25 - Ø 20
- Coolant-through hole



A.2

Model	Ød	ØD	L	L1	Collet Model	Nut Model	Weight (kg)	Order No.
DV40 -NBS6 - 60	0.25 - 6	20	60	34	NBC6-□	NBN6	0.9	961.831
- 90			90	60			1.0	969.032
-135			135	105			1.0	961.833
-NBS8 - 60	0.5 - 8	25	60	34	NBC8-□	NBN8	0.9	969.034
- 90			90	62			1.0	961.835
-135			135	107			1.2	969.036
-NBS10 - 60	1.5 - 10	30	60	34	NBC10-□	NBN10	1.0	969.037
- 90			90	64			1.1	969.038
-135			135	104			1.4	961.839
-NBS13 - 60	2.5 - 13	35	60	37	NBC13-□	NBN13	1.0	969.040
- 90			90	66			1.2	969.041
-135			135	106			1.6	969.042
-NBS16 - 60	2.5 - 16	42	60	38	NBC16-□	NBN16	1.1	969.043
- 90			90	68			1.4	969.044
-135			135	113			1.8	969.045
-NBS20 - 60	2.5 - 20	46	60	40	NBC20-□	NBN20	1.3	969.046
- 90			90	70			1.6	969.047
-135			135	115			2.0	969.048
-165			165	145			2.3	969.059
-200			200	180			2.6	969.060

1. New baby nut is included.
2. Max. 20 000 min⁻¹ is valid for L=60 and 90 mm.

For Tap Driving Back Stop ▶ A145

Model	Ød	ØD	L	L1	Collet Model	Nut Model	Weight (kg)	Order No.
DV50 -NBS6 -120	0.25 - 6	20	120	85	NBC6-□	NBN6	2.8	969.062
			165	125			3.1	969.063
-NBS8 -120	0.5 - 8	25	120	80	NBC8-□	NBN8	3.2	969.066
			165	130			3.0	969.067
-NBS10 - 90	1.5 - 10	30	90	60	NBC10-□	NBN10	2.9	969.069
			120	85			3.0	969.070
			165	130			3.2	969.071
-NBS13 - 90	2.5 - 13	35	90	60	NBC13-□	NBN13	3.0	969.075
			120	80			3.4	961.876
			165	125			3.7	969.077
-NBS16 - 90	2.5 - 16	42	90	60	NBC16-□	NBN16	3.0	969.082
			120	85			3.9	969.083
			165	130			4.3	969.084
			200	165			4.6	969.085
-NBS20 - 75	2.5 - 20	46	75	45	NBC20-□	NBN20	3.1	969.087
			90	60			3.2	969.088
			120	85			4.0	961.889
			165	130			4.5	969.090
-200			200	165			4.8	969.091

1. New baby nut is included.

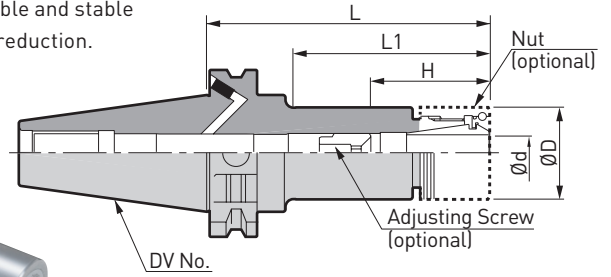
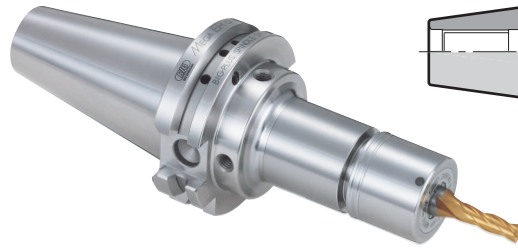
For Tap Driving Back Stop ▶ A145

Spare Parts			Accessories								
New Baby Nut			Wrench		NBC Collet		Baby Perfect Seal		Adjusting Screw		
											
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.
NBS6	NBN6	961.526	NBK6	961.525	NBC6-□	BPS6-□	NBA6B	M7	12	2	961.527
NBS8	NBN8	961.549	NBK8	961.548	NBC8-□	BPS8-□	NBA8B	M9	13	2.5	961.550
NBS10	NBN10	961.571	NBK10	961.570	NBC10-□	BPS10-□	NBA10B	M11	16	3	961.572
NBS13	NBN13	961.597	NBK13	961.596	NBC13-□	BPS13-□	NBA13B	M14	20	4	961.598
NBS16	NBN16	961.631	NBK16	961.630	NBC16-□	BPS16-□	NBA16B	M18	20	4	961.632
NBS20	NBN20	961.679	NBK20	961.678	NBC20-□	BPS20-□	NBA20B	M21	20	4	961.680

MEGA ER Grip

High precision collet, nut and body that outperforms standard ER systems. Reliable and stable runout accuracy will also contribute to improving machining capability and cost reduction.

- max. 35 000 min⁻¹
- Clamping range: Ø 1.9 - Ø 20
- Coolant-through hole
- Various nut selection



Nut is not included.

Model	Ød	ØD	L	L1	H	Nut Model (not included)	max. min ⁻¹	Weight (kg)	Order No.
DV40 -MEGAER16 - 60NL	1.9 - 10.0	30	60	33	35 - 45	MERN16 MER16SN	35 000	0.9	805.695
			90	61	35 - 47			1.1	805.696
			135	106				1.3	805.697
-MEGAER20 - 60NL	2.75 - 13.0	35	60	34	42 - 57	MERN20 MER20SN	35 000	0.9	805.698
			90	62	42 - 62			1.1	805.699
			135	107				1.4	805.700
-MEGAER25 - 65NL	2.75 - 16.0	42	65	39	44 - 60	MERN25 MER25SN	30 000	0.9	805.701
			90	64	44 - 67			1.2	805.702
			135	109				1.6	805.703
-MEGAER32 - 70NL	2.75 - 20.0	50	70	50	50 - 64	MERN32 MER32SN	30 000	1.0	805.704
			90	70				1.3	805.705
			105	85	50 - 68			1.5	805.706
			135	115				1.9	805.707
			165	145				2.3	805.708
DV50 -MEGAER16 -105NL	1.9 - 10.0	30	105	72	35 - 47	MERN16 MER16SN	20 000	3.0	805.709
			165	132				3.2	805.710
-MEGAER20 - 75NL	2.75 - 13.0	35	75	42	42 - 62	MERN20 MER20SN	18 000	2.8	805.711
			105	72				3.0	805.712
-105NL	2.75 - 16.0	42	165	132		MERN25 MER25SN	16 000	3.4	805.713
			75	43	44 - 66			3.0	805.714
-165NL	2.75 - 16.0	42	105	73	44 - 67	MERN25 MER25SN	17 000	3.2	805.715
			165	133				3.7	805.716
-MEGAER32 - 75NL	2.75 - 20.0	50	75	44	50 - 66	MERN32 MER32SN	16 000	3.0	805.717
			105	74	50 - 68			3.3	805.718
-105NL	2.75 - 20.0	50	135	104		MERN32 MER32SN	16 000	3.7	805.719
			165	134				4.1	805.720

1. Collet, wrench and nut are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. Dimensions in the chart reference are with the MERN nut installed.
4. MEGA ER Grip is not able to use DIN6499 Form-A collets and ESX collets.

Caution

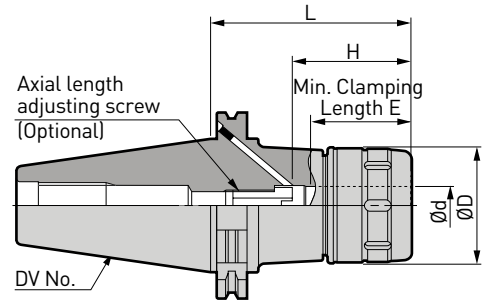
To maintain the accuracy of the tool assembly, do not use collets and nuts manufactured by another company with the chuck body of MEGA ER Grip. Also, we cannot guarantee the accuracy statement for our collets if they are assembled on the chuck body of another manufacturer.

Accessories													
MEGA ER Nut		MEGA ER Solid Nut		MEGA ER Perfect Seal	MEGA Wrench		ER Collet	Adjusting Screw		Rubber			
MEGA ER Grip	Model	Order No.	Model	Order No.	Model	Model	Order No.	Model	Model	G	L	B	Order No.
MEGA ER16	MERN16	967.801	MER16SN	805.663	MERPS16-□	MGR30L	969.448	ERC16-□	NBA10B	M11	16	3	961.572
MEGA ER20	MERN20	967.802	MER20SN	805.664	MERPS20-□	MGR35L	969.460L	ERC20-□	NBA13B	M14	20	4	961.598
MEGA ER25	MERN25	967.803	MER25SN	805.665	MERPS25-□	MGR42L	969.462L	ERC25-□	NBA16B	M18	20	4	961.632
MEGA ER32	MERN32	967.804	MER32SN	805.666	MERPS32-□	MGR50L	969.464L	ERC32-□	NBA20B	M21	20	4	961.680

New Hi-Power Milling Chuck

The original design of slit structure supports heavy and finish end milling with high power and precision.

- Clamping range: $\varnothing 20 - \varnothing 42$
- Coolant-through hole



A.2

Model	$\varnothing d$	$\varnothing D$	L	H	E	Wrench	Weight (kg)	Order No.
DV40 -HMC20S - 85	20	50	85	69 - 79	56	FK45-50L	1.6	962.121S
-105			105				1.8	800.972
-120			120				2.0	800.973
-HMC25S - 95	25	59	95	71 - 81	57	FK58-62L	1.9	800.975
-105			105				2.1	800.974
-HMC32S - 95	32	68	95	79 - 89	64	FK68-75L	2.0	962.124S
-105			105				2.2	800.976
-135			135				2.7	800.977
DV50 -HMC20S -105	20	50	105	69 - 79	56	FK45-50L	4.1	805.430
-135			135				4.6	805.431
-HMC25S -105	25	59	105	76 - 86	57	FK58-62L	4.5	805.424
-135			135				5.2	805.433
-HMC32S -105	32	68	105	88 - 98	72	FK68-75L	4.8	804.995
-135			135				5.5	805.435
-165			165				6.6	805.436
-HMC42S -135	42	85	135	93 - 105	73	FK80-90L	6.6	805.438

1. Wrench and axial adjusting screw are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.

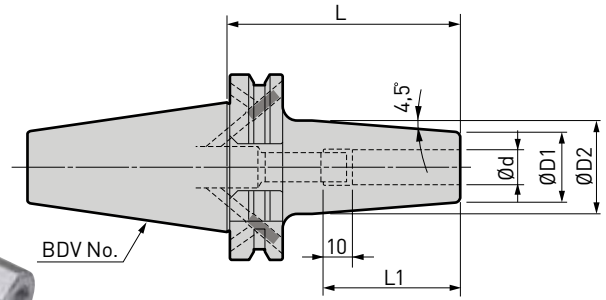
For Straight Collet ▶ A158

Accessories									
New Hi-Power Milling Chuck	Wrench		Adjusting Screw						
	Model	Order No.	Model	$\varnothing D$	L	L1	G	W	Order No.
DV40 -HMC20S	FK45-50L	801.037	HMA-M16	19	27	6	M16P1.5	8	962.311
-HMC25S	FK58-62L	801.038						10	962.312
-HMC32S	FK68-75L	801.039						10	962.312
DV50 -HMC20S	FK45-50L	801.037	HMA-M16	19	27	6	M16P1.5	8	962.311
-HMC25S	FK58-62L	801.038						10	962.312
-HMC32S	FK68-75L	801.039						10	962.312
-HMC42S	FK80-90L	804.771	HMA-M24	30	36	9.5	M24P1.5	10	962.313

Shrink Fit Holder

Substantial body provides higher rigidity.

- Clamping range: $\varnothing 6 - \varnothing 25$
- Coolant-through hole



A.2

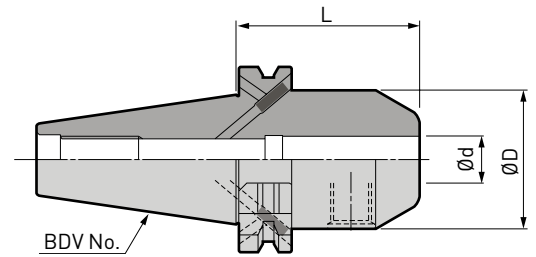
BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	$\varnothing d$	$\varnothing D1$	$\varnothing D2$	L	L1	Weight (kg)	Order No.
BDV40 -SRC6D - 80	6	21	27	80	36	1.0	490.506
				120		1.2	490.556
-SRC8D - 80	8	21	27	80	36	1.0	490.508
				120		1.2	490.558
-SRC10D - 80	10	24	32	80	42	1.1	490.510
				120		1.3	490.560
-SRC12D - 80	12	24	32	80	47	1.1	490.512
				120		1.3	490.562
-SRC14D - 80	14	27	34	80	50	1.1	490.514
				120		1.4	490.566
-SRC16D - 80	16	27	34	80	50	1.1	490.516
				120		1.4	490.566
-SRC18D - 80	18	33	42	80	52	1.3	490.518
				120		1.6	490.570
-SRC20D - 80	20	33	42	80	52	1.2	490.520
				120		1.6	490.570
BDV50 -SRC6D - 80	6	21	27	80	36	2.8	490.606
			38	160		3.5	490.656
-SRC8D - 80	8	21	27	80	36	3.5	490.608
			38	160		3.5	490.658
-SRC10D - 80	10	24	32	80	42	2.8	490.610
			41	160		3.5	490.660
-SRC12D - 80	12	24	32	80	47	2.8	490.612
			41	160		3.5	490.662
-SRC14D - 80	14	27	34	80	50	2.9	490.614
			44	160		3.6	490.664
-SRC16D - 80	16	27	34	80	50	2.8	490.616
			44	160		3.6	490.666
-SRC18D - 80	18	33	42	80	50	3.0	490.618
			50	160		3.9	490.668
-SRC20D - 80	20	33	42	80	52	3.0	490.620
			50	160		3.9	490.670
-SRC25D - 100	25	44	53	100	58	3.5	490.625
			61	160		4.5	490.675

1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ A170

Side Lock Holder



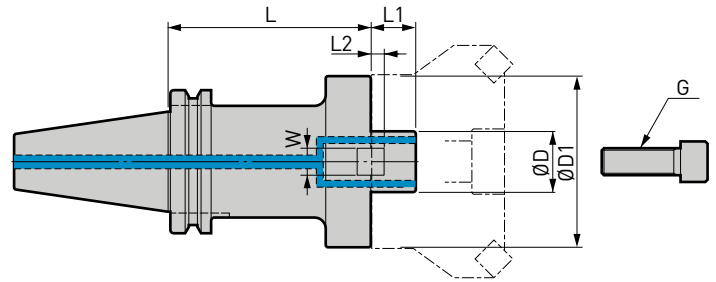
A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

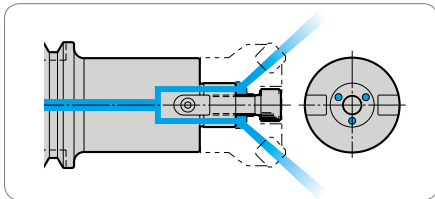
Model	Ød	ØD	L	Weight (kg)	Order No.
BDV40 -SLD6 - 50	6	25	50	0.9	490.106
-SLD8 - 50	8	28		0.9	490.108
-SLD10 - 50	10	35		1.0	490.110
-SLD12 - 50	12	42		1.1	490.112
-SLD14 - 50	14	44		1.1	490.114
-SLD16 - 63	16	48	63	1.3	490.116
-SLD18 - 63	18	50		1.3	490.118
-SLD20 - 63	20	52		1.4	490.120
-SLD25 -100	25	65	100	2.5	490.125
-SLD32 -100	32	72		2.6	490.132
BDV50 -SLD6 - 63	6	25	63	2.7	490.206
-SLD8 - 63	8	28		2.8	490.208
-SLD10 - 63	10	35		2.9	490.210
-SLD12 - 63	12	42		3.0	490.212
-SLD14 - 63	14	44		3.0	490.214
-SLD16 - 63	16	48		3.1	490.216
-SLD18 - 63	18	50		3.1	490.218
-SLD20 - 63	20	52		3.2	490.220
-SLD25 - 80	25	65	80	3.9	490.225
-SLD32 -100	32	70	100	4.5	490.232
-SLD40 -100	40	90		5.5	490.240

Face Mill Arbor Type FMH

For cutters that require a coolant hole through the pilot.



A.2



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	ØD	ØD1	L	L1	Driver Keys		G	ØC min.	Weight (kg)	Order No.						
					L2	W										
BDV40 -FMH22 - 47 - 45	22	47	45	18	5	10	M10	38	1.2	805.584						
- 90			90					36	1.8	805.585						
-150			150					2.5	805.604							
- 60 - 50		60	50					49	1.4	805.605						
- 90			90					2.0	805.606							
-FMH27 - 60 - 50	27	60	50	20	6	12	M12	46	1.4	805.586						
- 90			90					2.0	805.608							
- 76 - 60			60					1.9	805.609							
- 90		76	90					2.3	805.610							
-FMH32 - 96 - 60		32	96					60	22	7	14	M16	58	2.1	805.611	
BDV50 -FMH22 - 47 - 60	22	47	60	18	5	10	M10	38	3.1	805.758						
-105			105					36	3.7	805.623						
-150			150					4.3	805.624							
-200			200					4.9	978.226							
- 60 - 60		60	60					3.5	805.626							
-105			105					4.4	805.627							
-150			150					5.4	805.628							
-200			200					6.5	805.629							
-FMH27 - 60 - 45			27					60	45	20	6	12	M12	46	3.2	805.630
- 90									90					4.1	805.631	
-150	150	5.4		805.632												
-200	200	6.5		805.633												
- 76 - 45	76	45		3.6	805.635											
- 90		90		5.1	805.636											
-150		150		7.2	805.637											
-200		200		8.9	805.638											
-FMH32 - 96 - 50		32		96	50	22	7	14	M16					58	4.1	805.639
- 90					90									6.2	805.640	
-150	150		8.4		805.641											
-200	200		10.4		805.642											
-FMH40 -100 - 50	40	100	50	26	8.5	16	M20	70	4.3	805.643						
- 75			75					5.6	805.644							
-105			105					6.9	805.645							

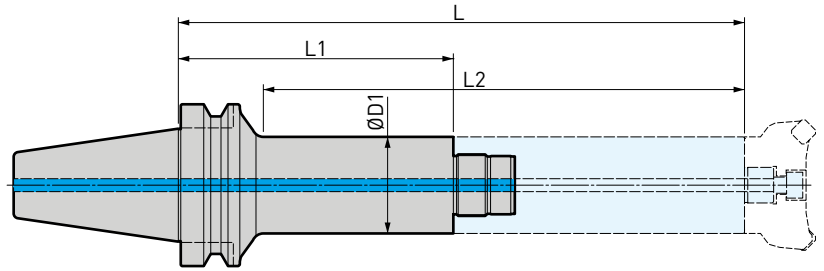
1. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.
2. Hexagon socket head cap screw is included.

For Clamp Bolt ▶ A168

Smart Damper “Basic Holder” for Mills



- Modular damping system
- Coolant-through hole

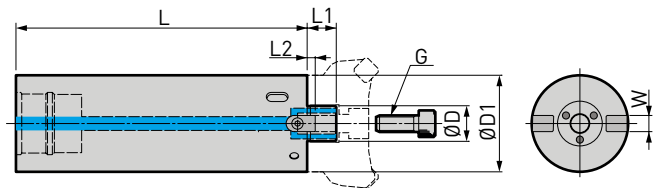


A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	ØD1	L	L1	L2	Damper Head	Order No.
BDV50 -SDF36 - 47 -170	47	350	170	297	FMH □ □ DP-47	805.296
- 47 -220		400	220	347		805.297
-SDF36 - 60 -170	60	350	170	297	FMH □ □ DP-60	805.298
- 60 -220		400	220	347		805.299

Smart Damper “Damper Head” for Mills



Model	ØD	ØD1	L	L1	L2	W	G	Wrench	ØC min.	Weight (kg)	Order No.
SDF36 -FMH22DP - 47 -180	22	47	180	18	5	10	M10	FK45-50L	36	3.0	804.969
- 60 -180		60		20	6	12	M12		49	4.5	804.971
-FMH27DP - 60 -180	27	60						FK58-62L	46	4.5	804.972

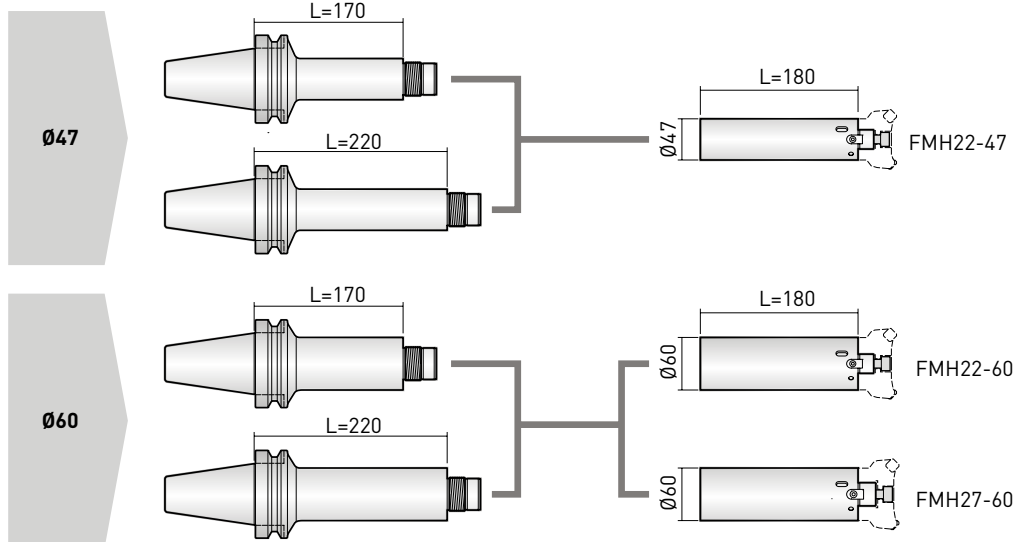
1. Wrench and cutter clamping bolt are included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

For Clamp Bolt ▶ A168

Combinations

Basic Holder

Damper Head



MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

- Tapping range: M3 - M36
- Coolant-through hole

A.2

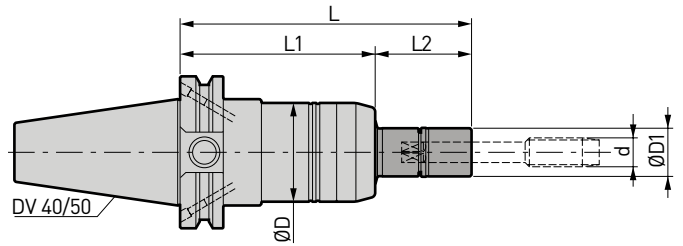


Fig. 1

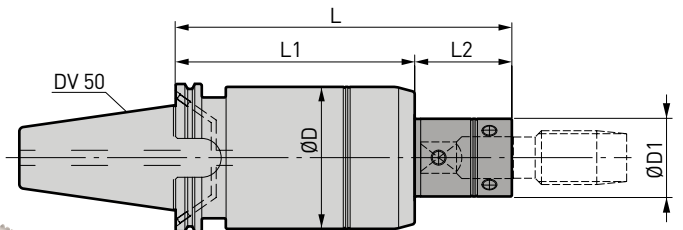
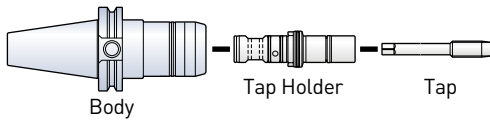


Fig. 2



Model	Fig.	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)	Order No.							
DV40 -MGT6 - 80	1	MGT6 -d - 30	M3 - M8	36	16	110	80	30	1.4	805.692							
		- 70				150		70									
		-100				180		100									
		MGT12 -d - 30	M5 - M12 P1/8			41		20			110	30	1.5	805.693			
		- 70				150					70						
		-100				180					100						
		MGT20-d - 30	M10 - M20 P1/4 - P1/2			54					30	140			35	1.9	805.694
		- 70				190						85					
		-100				220						115					
DV50 -MGT6 - 85	1	MGT6 -d - 30	M3 - M8	36	16	115	85		30	3.6		805.619					
		- 70				155			70								
		-100				185			100								
		MGT12 -d - 30	M5 - M12 P1/8			41		20	115				30	3.7	805.620		
		- 70				155			70								
		-100				185			100								
		MGT20-d - 35	M10 - M20 P1/4 - P1/2			54			30		140		35			4.2	805.621
		- 85				190					85						
		-115				220					115						
DV50 -MGT36 -160	2	MGT36-180145-65	M22 - M36 P5/8 - P1	94	38	225	160			65	8.6	805.721					
		-200160-65			40												
		-220180-65			42												
		-250200-65			49												
		-280220-65			52												

1. Tap Holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.
3. MEGA Wrench is not required for MGT36.

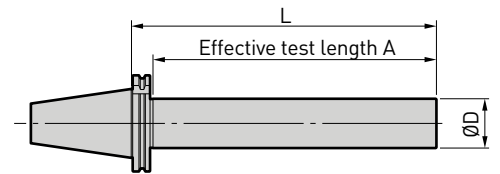


For Tap Holder ▶ A162
For Accessory ▶ A166

Dyna Test

Periodic inspection of machine tools to control production stability.

BIG-PLUS DV type

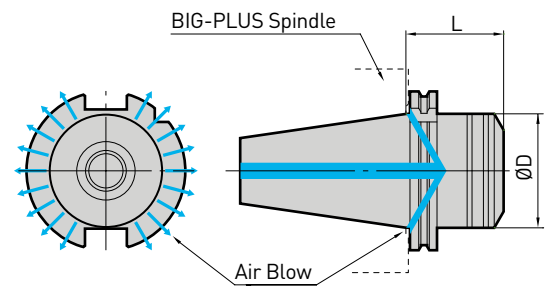


A.2

Model	L	A	ØD	Order No.
BDV40 -50 - L340SD	340	310	50	802.834
BDV50 -50 - L340SD	340	318		961.269

Cleaner

Blowing air cleans the BIG-PLUS machine spindle face.
Oil and dirt is removed from the spindle face.



Model	ØD	L	Order No.
SDV40-ASC-40T	45	40	805.647
SDV50-ASC-60T	70	60	801.670

1. When the cleaner is clamped into a BIG-PLUS machine spindle, faces have 1mm clearance.

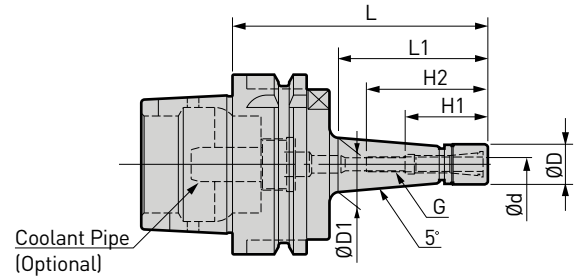
HSK Shank

HSK-A	
MEGA Micro Chuck	50 - 51
MEGA New Baby Chuck	52 - 54
MEGA E Chuck	55
MEGA Double Power Chuck	56 - 57
MEGA Perfect Grip	58
NEW Baby Chuck	59
MEGA ER Grip	60
NEW Hi-Power Milling Chuck	61 - 62
Hydraulic Chuck	63 - 65
Face Mill Arbor	66
Smart Damper	67
MEGA Synchro Tapping Holder	68 - 69
HSK-E	
MEGA Micro Chuck	70 - 71
MEGA New Baby Chuck	72 - 73
Hydraulic Chuck	74
HSK-F	
MEGA Micro Chuck	75
MEGA New Baby Chuck	76
MEGA E Chuck	77
MEGA Double Power Chuck	78 - 79
HSK ACCESSORIES	
Dyna Test	80
Coolant Pipe	81

MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

- max. 40 000 min⁻¹
- Clamping range: Ø 0.45 - Ø 8.05



A.3

Model	Ød	ØD	ØD1	L	L1	H1	H2	G	max. min ⁻¹	Collet Model	Weight (kg)	Order No.
HSK-A32-MEGA6S - 60T	0.45 - 6.05	14	16.0	60	30	28.5	43	-	40 000	NBC6S-□	0.18	978.370
- 90T			21.1	90	61		38 000		0.24		978.371	
-105T			25.0	105	76		35 000		0.27		978.372	
HSK-A40-MEGA3S - 75T	0.45 - 3.25	10	16.0	75	44	22	38	M4 P0.7	32 000	NBC3S-□	0.28	968.936
- 90T			18.0	90	60				28 000		0.31	968.937
-MEGA4S - 60T	0.45 - 4.05	12	14.0	60	27	26.5	44	M5 P0.8	35 000	NBC4S-□	0.27	968.934
- 90T			20.0	90	60		47		28 000		0.33	802.355
-105T			23.0	105	76		25 000		0.37		802.356	
-MEGA6S - 60T *	0.45 - 6.05	14	16.0	60	29	28.5	40	-	35 000	NBC6S-□	0.28	968.925
- 75T			19.0	75	45		32 000		0.31		968.926	
- 90T			21.5	90	60		28 000		0.34		968.927	
-105T			25.0	105	76		25 000		0.39		802.357	
HSK-A50-MEGA6S - 75T	0.45 - 6.05	14	17.0	75	36	28.5	49	M7 P0.75	30 000	NBC6S-□	0.52	805.828
-105T			22.5	105	66				25 000		0.60	805.251
HSK-A63-MEGA3S - 75T	0.45 - 3.25	10	14.0	75	36	22	38	M4 P0.7	32 000	NBC3S-□	0.8	968.961
-120T			21.5	120	81				25 000		0.9	968.963
-MEGA4S - 75T	0.45 - 4.05	12	15.5	75	36	26.5	47	M5 P0.8	32 000	NBC4S-□	0.9	805.259
- 90T			18.0	90	51				28 000		0.9	968.966
-MEGA6S - 60T	0.45 - 6.05	14	15.5	60	23	28.5	37	M7 P0.75	35 000	NBC6S-□	0.8	968.970
- 75T			17.0	75	36		48		32 000		0.9	968.971
- 90T			20.0	90	51		28 000		0.9		805.260	
-105T			22.5	105	66		49		25 000		0.9	968.973
-120T			25.0	120	81		22 000		1.0		805.261	
-135T			27.5	135	96		20 000		1.0		968.975	
-MEGA8S - 90T	2.95 - 8.05	18	23.5	90	51	31	50.5	M9 P0.75	30 000	NBC8S-□	0.9	801.724
-120T			28.5	120	81				22 000		1.1	803.603

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. * Internal thread (G) is not available.

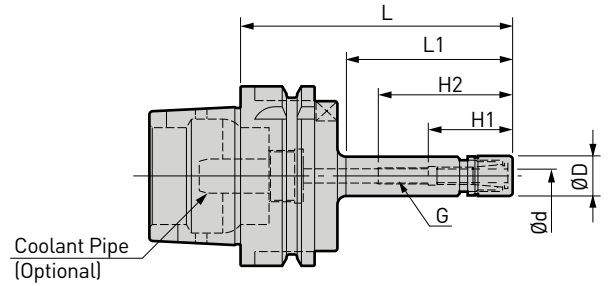
For Coolant Pipe ▶ A81

Spare Parts			Accessories							
MEGA Nut			MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		Taper Cleaner	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-□	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-□	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-□	MGN6S-PS□	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-□	MGN8S-PS□	NBB8S	805.802	SC-NBC8S	805.827

MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

- max. 30 000 min⁻¹
- Clamping range: Ø 0.45 - Ø 8.05



A.3

Model	Ød	ØD	L	L1	H1	H2	G	max. min ⁻¹	Collet Model	Weight (kg)	Order No.
HSK-A40-MEGA3S - 60	0.45 - 3.25	10	60	26	22	39	M4 P0.7	30 000	NBC3S-□	0.26	968.933
-MEGA4S - 60	0.45 - 4.05	12		27					44	M5 P0.8	NBC4S-□
- 90			90	57	47	25 000	NBC4S-□	0.29	968.932		
-MEGA6S - 60 *	0.45 - 6.05	14	60	28	28.5	40	-	30 000	NBC6S-□	0.27	968.929
- 90			90	58					49	M7 P0.75	25 000
HSK-A50-MEGA6S - 75	0.45 - 6.05	14	75	36	28.5	49	M7 P0.75	30 000	NBC6S-□	0.6	805.250
HSK-A63-MEGA4S - 75	0.45 - 4.05	12	75	36	26.5	48	M5 P0.8	30 000	NBC4S-□	0.8	968.965
-105			105	61						47	25 000
-MEGA6S - 75	0.45 - 6.05	14	75	36	28.5	48	M7 P0.75	30 000	NBC6S-□	0.9	968.803
-105			105	61						49	25 000
-MEGA8S - 90	2.95 - 8.05	18	90	48	31	50.5	M9 P0.75	30 000	NBC8S-□	0.9	803.600

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. * Internal thread (G) is not available.

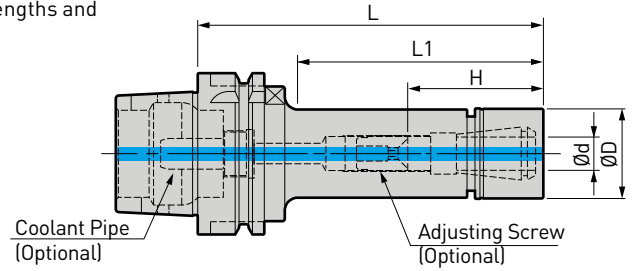
For Coolant Pipe ▶ A81

Spare Parts			Accessories							
MEGA Nut			MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		Taper Cleaner	
					▶ A135	▶ A137	▶ A137			
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-□	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-□	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-□	MGN6S-PS□	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-□	MGN8S-PS□	NBB8S	805.802	SC-NBC8S	805.827

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

- max. 35 000 min⁻¹
- Clamping range: Ø 0.25 - Ø 20
- Coolant-through hole



A.3

Model	Ød	ØD	L	L1	H	max. min ⁻¹	Collet Model	Weight (kg)	Order No.
HSK-A32 -MEGA6N - 75	0.25 - 6	20	75	37	23 - 43	30 000	NBC6-□	0.25	979.010
HSK-A40 -MEGA6N - 60 *			60	30	33	35 000		0.31	968.940
- 75	0.25 - 6	20	75	45	23 - 38	30 000	NBC6-□	0.34	968.941
- 90			90	60	23 - 43			0.37	968.942
-MEGA8N - 60 *	0.5 - 8	25	60	30	41	35 000	NBC8-□	0.35	968.943
- 90			90	60	26 - 44	30 000		0.44	968.945
-MEGA10N - 60 *	1.5 - 10	30	60	26	40	35 000	NBC10-□	0.42	968.946
- 90			90	54	38 - 48	30 000		0.56	968.948
-MEGA13N - 75 *	2.5 - 13	35	75	55	55	25 000	NBC13-□	0.55	968.949
- 90 *			90	70	64			0.64	968.950
-MEGA16N - 75 *	2.5 - 16	42	75	55	53	20 000	NBC16-□	0.65	968.951
- 90 *			90	70	63	15 000		0.78	968.952
-MEGA20N - 90 *	2.5 - 20	46			66		NBC20-□	0.86	968.953
HSK-A50 -MEGA6N - 75	0.25 - 6	20	75	37		30 000	NBC6-□	0.6	805.252
-100			100	60	23 - 43	25 000		0.6	978.031
-135			135	93		20 000		0.7	968.745
-MEGA8N - 75	0.5 - 8	25	75	37	26 - 37	30 000	NBC8-□	0.6	968.738
-100			100	62	26 - 45	28 000		0.7	978.239
-135			135	96		20 000		0.8	803.629
-MEGA10N - 75 *	1.5 - 10	30	75	38	46	33 000	NBC10-□	0.7	805.253
-100			100	63	38 - 48	25 000		0.8	978.261
-135			135	98		20 000		1.0	803.622
-MEGA13N - 75 *	2.5 - 13	35	75	40	46	28 000	NBC13-□	0.7	805.254
-100			100	65	44 - 56	25 000		0.9	801.179
-135			135	100	44 - 63	18 000		1.1	803.620
-MEGA16N - 75 *	2.5 - 16	42	75	49	48	28 000	NBC16-□	1.0	805.255
-100			100	74	48 - 55	20 000		1.1	803.623
-135			135	109	48 - 68	15 000		1.4	803.619
-MEGA20N - 75 **	2.5 - 20	46	75	49	47	20 000	NBC20-□	0.9	805.256
-100			100	74	51 - 54	15 000		1.3	968.742
-135			135	109	51 - 68	10 000		1.8	803.624

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. "H" indicates the adjustment length with an adjusting screw.
4. * Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
5. ** NBC-E collet can not be used.

For Coolant Pipe ▶ A81

For A100, refer to the following pages.

Model	Ød	ØD	L	L1	H	max. min ⁻¹	Collet Model	Weight (kg)	Order No.	
HSK-A63 -MEGA6N - 75 - 90 -105 -120 -135 -165	0.25 - 6	20	75	35	23 - 38	35 000	NBC6-□	0.9	968.811	
			90	48				25 000	0.9	805.262
			105	63					20 000	0.9
			120	76	23 - 43	1.0				968.981
			135	91		1.0		968.813		
			165	121	1.0	968.814				
-MEGA8N - 75 - 90 -105 -120 -135 -165	0.5 - 8	25	75	35	26 - 38	35 000	NBC8-□	0.9	968.815	
			90	50				25 000	1.0	805.263
			105	63					20 000	1.0
			120	76	26 - 45	1.1				968.982
			135	91		1.1		805.264		
			165	121	1.2	968.818				
-MEGA10N - 75 * - 90 -105 -120 -135 -165	1.5 - 10	30	75	36	50	33 000	NBC10-□	1.0	968.819	
			90	50				25 000	1.0	805.265
			105	65					20 000	1.1
			120	80	38 - 48	1.2				968.983
			135	93		1.3		805.266		
			165	123	1.4	968.822				
-MEGA13N - 75 * - 90 * -105 -120 -135 -165	2.5 - 13	35	75	37	49	30 000	NBC13-□	1.0	968.823	
			90	51				25 000	1.1	805.267
			105	66					20 000	1.2
			120	81	44 - 56	1.3				968.984
			135	96		44 - 63		1.4		805.268
			165	125	1.7			968.826		
-MEGA16N - 75 * - 90 * -105 -120 -135 -165 -200	2.5 - 16	42	75	39	48	30 000	NBC16-□	1.1	968.827	
			90	54				25 000	1.3	805.269
			105	69					20 000	1.4
			120	84	48 - 54	1.5				968.985
			135	99		48 - 68		1.7		968.829
			165	129	2.0			968.830		
200	164	8 000	2.4	968.831						
-MEGA20N - 75 * - 90 * -105 -120 -135 -165 -200	2.5 - 20	46	75	39	51	30 000	NBC20-□	1.2	968.832	
			90	54				25 000	1.4	805.270
			105	69					20 000	1.5
			120	84	51 - 54	1.7				968.986
			135	99		15 000		1.8		805.271
			165	129	51 - 68			10 000	2.3	968.835
200	164	8 000	2.7	968.836						

A.3

- MEGA nut is included.
- Coolant pipe is to be ordered separately.
- "H" indicates the adjustment length with an adjusting screw.
- * Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.

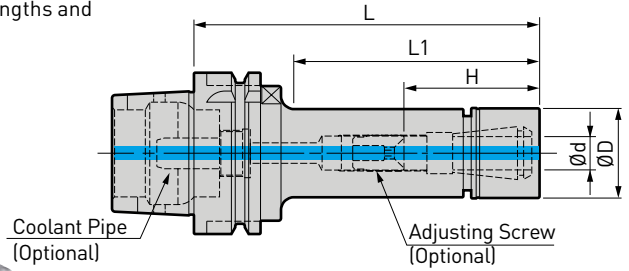
For Coolant Pipe ▶ A81

Spare Parts			Accessories										
MEGA Nut			MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw			Rubber	
													
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Model	G	L	B	Order No.	
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-□	MPS6-□	NBA6B	M7	12	2	961.527		
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-□	MPS8-□	NBA8B	M9	13	2.5	961.550		
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-□	MPS10-□	NBA10B	M11	16	3	961.572		
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-□	MPS13-□	NBA13B	M14	20	4	961.598		
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-□	MPS16-□	NBA16B	M18	20	4	961.632		
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-□	MPS20-□	NBA20B	M21	20	4	961.680		

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

- max. 20 000 min⁻¹
- Clamping range: Ø 0.25 - Ø 20
- Coolant-through hole



A.3

Model	Ød	ØD	L	L1	H	max. min ⁻¹	Collet Model	Weight (kg)	Order No.	
HSK-A100-MEGA6N - 90	0.25 - 6	20	90	43	23 - 43	20 000	NBC6-□	2.5	968.841	
-105			105	58		18 000		2.5	801.146	
-120			120	73		14 000		2.5	968.842	
-135			135	88		12 000		2.5	801.147	
-165			165	113		20 000		2.6	968.843	
-MEGA8N - 90	0.5 - 8	25	90	43	26 - 45	20 000	NBC8-□	2.5	968.844	
-105			105	58		18 000		2.6	968.989	
-120			120	73		14 000		2.6	968.845	
-135			135	88		20 000		2.7	968.990	
-165			165	113		18 000		2.7	968.846	
-MEGA10N - 90	1.5 - 10	30	90	43	38 - 45	20 000	NBC10-□	2.6	968.847	
-105			105	58		18 000		2.7	968.991	
-120			120	73		14 000		2.7	968.848	
-135			135	88		20 000		2.8	968.992	
-165			165	113		18 000		3.0	968.849	
-MEGA13N - 90 *	2.5 - 13	35	90	43	44 - 63	18 000	NBC13-□	2.7	968.850	
-105 *			105	58		70		16 000	2.8	968.993
-120			120	73		14 000		2.9	968.851	
-135			135	88	10 000	3.0		968.994		
-165			165	118	15 000	3.2		968.852		
-200			200	148	14 000	3.5		968.853		
-MEGA16N - 90 *	2.5 - 16	42	90	47	48 - 68	15 000	NBC16-□	2.8	968.854	
-105 *			105	58		70		14 000	2.9	968.995
-120			120	73		13 000		3.1	968.855	
-135			135	88	10 000	3.2		968.996		
-165			165	118	15 000	3.6		968.856		
-200			200	151	14 000	4.0		968.857		
-MEGA20N - 90 *	2.5 - 20	46	90	47	51 - 68	15 000	NBC20-□	2.9	968.858	
-105 *			105	58		70		14 000	3.0	968.997
-120			120	73		13 000		3.2	968.859	
-135			135	88	10 000	3.3		968.998		
-165			165	118	15 000	3.8		968.860		
-200			200	153	14 000	4.3		968.861		

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Coolant pipe is to be ordered separately.

4. * Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.

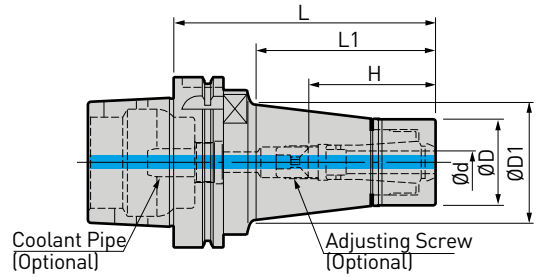
For Coolant Pipe ▶ A81

Spare Parts			Accessories								
MEGA Nut	MEGA Wrench	NBC Collet	MEGA Perfect Seal	Adjusting Screw	Rubber						
		▶ A138	▶ A146								
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-□	MPS6-□	NBA6B	M7	12	2	961.527
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-□	MPS8-□	NBA8B	M9	13	2.5	961.550
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-□	MPS10-□	NBA10B	M11	16	3	961.572
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-□	MPS13-□	NBA13B	M14	20	4	961.598
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-□	MPS16-□	NBA16B	M18	20	4	961.632
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-□	MPS20-□	NBA20B	M21	20	4	961.680

MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

- max. 35 000 min⁻¹
- Clamping range: Ø 3 - Ø 12
- Coolant-through hole



A.3

Model	Ød	ØD	ØD1	L	L1	H	max. min ⁻¹	Collet Model	Weight (kg)	Order No.
HSK-A40 -MEGA6E - 60 *	3 - 6	25	26	60	24	41	35 000	MEC6-□	0.39	968.235
								MEC8-□	0.46	968.238
	3 - 8	30	34	65	30	44	30 000	MEC10-□	0.52	968.241
									0.67	968.242
HSK-A50 -MEGA8E - 75 *	3 - 10	35	35	70	35	48	25 000	MEC13-□	0.62	968.243
									0.67	968.242
	3 - 12	42	42	70	35	50	30 000	MEC8-□	0.7	803.222
								MEC10-□	0.8	978.170
HSK-A63 -MEGA6E - 65 *	3 - 8	30	33	75	40	48	30 000	MEC13-□	0.9	978.010
									1.1	803.220
	3 - 10	35	38	100	74	50 - 55	25 000	MEC13-□	0.9	968.247
									1.0	968.248
HSK-A63 -MEGA8E - 67 *	3 - 6	25	26.5	65	28	43	30 000	MEC6-□	0.9	968.247
			30	90	51	37 - 45	29 000		1.0	968.248
	3 - 8	30	31.5	67	30	45	30 000	MEC8-□	0.9	968.252
			35	90	52	37 - 45	29 000		1.1	968.253
			38	105	68	42 - 51	29 000		1.2	968.254
			40	90	53	64	30 000		1.1	968.257
	3 - 10	35	43	105	69	48 - 58	29 000	MEC10-□	1.2	968.258
			46	120	85	28 000	1.4		968.259	
			43	105	69	48 - 58	29 000		1.4	968.259
			46	120	85	28 000	1.5		968.260	
	3 - 12	42	44	75	31	49	30 000	MEC13-□	1.2	968.262
			45	90	46	64	29 000		1.4	968.263
46			105	61	50 - 57	29 000	1.6		968.264	
47.5			120	77	28 000	1.8	968.265			
HSK-A100-MEGA13E - 90 *	3 - 12	42	47	135	92	26 000	MEC13-□	1.9	968.266	
			46	90	48	50		18 000	2.9	968.287
			48.5	105	63	50 - 61		16 000	3.1	968.288
			51.5	120	78			3.3	968.289	
HSK-A100-MEGA13E - 90 *	3 - 12	42	54	135	93	14 000	MEC13-□	3.6	968.290	
			59	165	123	4.2		968.291		

1. MEGA E nut is included.
2. Coolant pipe is to be ordered separately.
3. "H" indicates the adjustment length with an adjusting screw.
4. * Adjusting screws can not be used. "H" is the max. tool shank length can be inserted for these models.

For Coolant Pipe ▶ A81

Spare Parts			Accessories								
MEGA E Chuck	MEGA E Nut		MEGA Wrench	MEGA E Collet	MEGA E Perfect Seal	Adjusting Screw	Rubber				
Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.	
MEGA6E	MEN6	968.461	MGR25	969.456	MEC6-□	EPS6-□	NBA6B	M7	12	2	961.527
MEGA8E	MEN8	968.462	MGR30	969.458	MEC8-□	EPS8-□	NBA8B	M9	13	2.5	961.550
MEGA10E	MEN10	968.463	MGR35	969.460	MEC10-□	EPS10-□	NBA10B	M11	16	3	961.572
MEGA13E	MEN13	968.464	MGR42	969.462	MEC13-□	EPS13-□	NBA13B	M14	20	4	961.598

MEGA Double Power Chuck Type D

Close to integral rigidity and precision of a solid toolholder. Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and type DS to feed coolant to cutting tool periphery.

- max. 28 000 min⁻¹
- Clamping range: Ø 16 - Ø 32
- Coolant-through hole

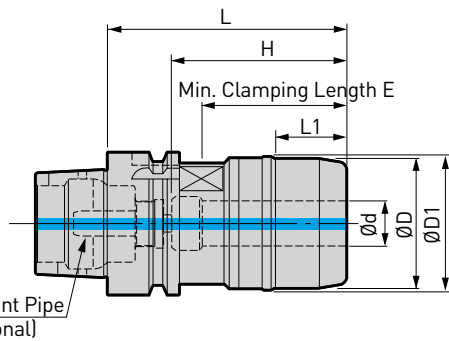


Fig. 1

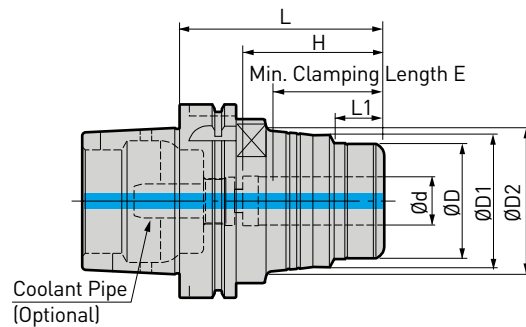


Fig. 2

Model	Fig.	Ød	ØD	ØD1	ØD2	L	L1	H	E	max. min ⁻¹	Weight (kg)	Order No.
HSK -A40 -MEGA16D - 80	1	16	46	-	-	80	25	62	50	12 000	0.75	803.105
HSK -A50 -MEGA16D - 85	1	16	46	-	-	85	25	62	50	25 000	1.0	803.085
-MEGA20D - 85 *		20	50	-	-	86	30	63	51	20 000	1.1	978.011
HSK -A63 -MEGA16D - 90A	2	16	42	53	-	90	25	65	55	28 000	1.5	801.734
-MEGA20D - 90A		20	50	55	-		34	56	56		1.6	801.737
-MEGA25D -100A	1	25	62	63	-	100	39	75	57	24 000	2.0	803.101
-MEGA32D -105A		32	70	70.7	-		105	33	80		64	2.2
HSK -A100-MEGA20D -105	2	20	60	69	74	105	25	73	56	18 000	4.1	968.105
-MEGA25D -105		25	70	77	85		32		65		4.5	968.108
-MEGA32D -115		32	80	86	-	115	39	83	71	5.0	968.111	
-135		32	80	86	-	135	39	103	71	16 000	5.8	968.112

1. Wrench and coolant pipe is to be ordered separately.
2. "H" is the max. tool shank length that can be inserted.
3. * Adjustable straight collet (AC20-□) can not be used.

For Straight Collet ▶ A158

For Coolant Pipe ▶ A81

Accessories					
		MEGA Wrench			
		MEGA Wrench			
MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.
HSK -A40/A50 -MEGA16D,16DS	MGR46L	969.465L	HSK -A100 -MEGA16DS	MGR46L	969.465L
HSK -A50 -MEGA20D,20DS	MGR50L	969.464L	-MEGA20D,20DS	MGR60L	969.468L
HSK -A63 -MEGA16D,16DS	MGR42L	969.462L	-MEGA25D,25DS	MGR70L	969.470L
	MGR50L	969.464L	-MEGA32D,32DS	MGR80L	969.471L
-MEGA25D,25DS	MGR62L	969.469L	-MEGA42DS	MGR99L	969.472L
-MEGA32D,32DS	MGR70L	969.470L	HSK -A125 -MEGA20DS	MGR60L	969.468L
			-MEGA25DS	MGR70L	969.470L
			-MEGA32DS	MGR80L	969.471L
			-MEGA42DS	MGR99L	969.472L

MEGA Double Power Chuck Type DS

Close to integral rigidity and precision of a solid toolholder. Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.



- max. 25 000 min⁻¹
- Clamping range: Ø 16 - Ø 42
- Coolant to cutting tool periphery



A.3

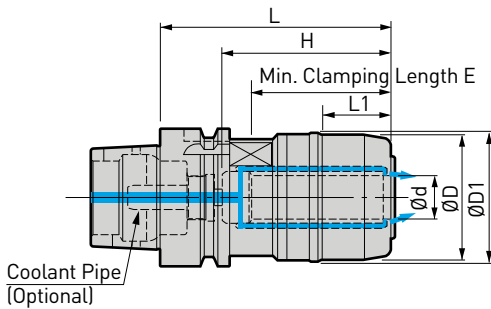


Fig. 1

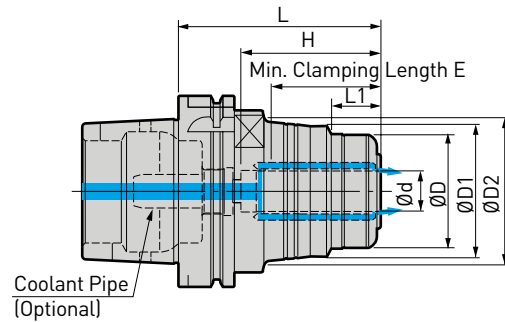


Fig. 2

Model	Fig.	Ød	ØD	ØD1	ØD2	L	L1	H	E	max. min ⁻¹	Weight (kg)	Order No.
HSK-A40 -MEGA16DS - 80	1	16	46	-	-	82.5	28	64	52	12 000	0.75	803.106
HSK-A50 -MEGA16DS - 85	1	16	46	-	-	87.5	28	64	52	25 000	1.0	801.688
-MEGA20DS - 85		20	50	-	-	88.5	33	65	53	20 000	1.05	803.088
HSK-A63 -MEGA16DS - 80A	2	16	42	53	-	82	27	57	52	25 000	1.3	803.089
-MEGA20DS - 90A		20	50	55		92	36	67	58		1.6	803.090
-120A		102	41	77		59	23 000	2.1	801.740			
-MEGA25DS -100A	1	25	62	-	-	102	41	77	59	22 000	2.0	803.102
-MEGA32DS -105A		32	70	-		107.5	35	82	66		2.2	803.081
HSK-A100-MEGA16DS -105	2	16	46	55	63	107.5	26	73	52	18 000	3.5	968.131
-MEGA20DS -105		107.5	75	58	4.1	968.121						
-135		20	60	69	74	137.5	28	87	58	16 000	5.0	968.122
-165 **		167.5	87	58	15 000	5.9	968.123					
-MEGA25DS -105		25	70	77	85	107.5	34	75	67	18 000	4.5	968.124
-135		137.5	92	67	16 000	5.6	968.125					
-MEGA32DS -115	2	32	80	86	-	117.5	85	73	18 000	5.0	968.127	
-135						137.5	42	105	73	16 000	5.8	968.128
-165						167.5	107	73	14 000	7.1	968.129	
-MEGA42DS -115	1	42	99	-	-	117	42	85	80	5.5	968.130	
HSK-A125-MEGA20DS -135	2	20	60	69	80	137.5	64.4	87	58	8 000	6.7	805.658
-165 **						167.5	124.4			7 000	7.6	805.659
-MEGA25DS -135	2	25	70	77	83	137.5	94.4	92	67	8 000	7.1	805.660
-MEGA32DS -135						137.5	87.4				73	7.8
-165						167.5	117.4	107	73		6 000	9.1
-MEGA42DS -120	1	42	99	99.7	-	122.5	77.7	85	80	7 000	7.9	805.662

1. Wrench and coolant pipe is to be ordered separately.
2. "H" is the max. tool shank length that can be inserted.
3. ** Adjusting screw (HMA-M16) can be used.

For Coolant Pipe ▶ A81

For Straight Collet ▶ A158

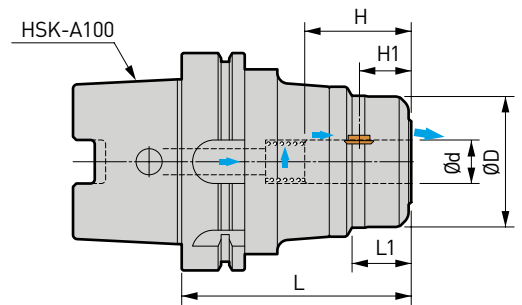
For Adjusting Screw ▶ A160

MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.



- Clamping range: $\varnothing 20 - \varnothing 32$
- Coolant to cutting tool periphery



A.3

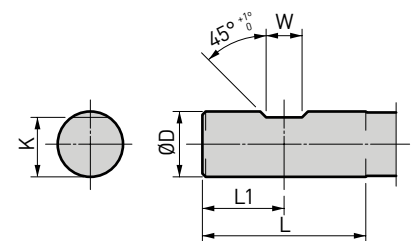
Model	$\varnothing d$	$\varnothing D$	L	L1	H	H1	Wrench	Weight (kg)	Order No.
HSK-A100-MEGA20DPG-105	20	60	105	27	49	24	MGR60L	4.1	805.457
-MEGA25DPG-105	25	70		33	55	23	MGR70L	4.5	805.458
-MEGA32DPG-115	32	80	115	41	59		MGR80L	5.0	805.459

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.

Weldon Shank Standards

(DIN1835-1)

The following standard shank is required for MEGA Perfect Grip.



$\varnothing D$	Tolerance		L	L1	W		Tolerance	K	
	Nominal				Nominal			Nominal	
20	h6		50	25	11	+0.05 0	18.2	h13	
25			56	32	12		23		
32			60	36	14		30		

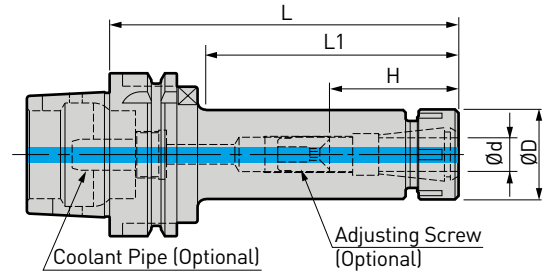
Spare Parts				Accessories		
Key Grip		Spring		MEGA Wrench		
MEGA Perfect Grip	Model	Order No.	Model	Order No.	Model	Order No.
MEGA20DPG	PKG20-2P	805.493	PSP1823	805.497	MGR60L	969.468L
MEGA25DPG	PKG25-2P	805.494	PSP2420	805.498	MGR70L	969.470L
MEGA32DPG	PKG32-2P	805.495	PSP3128	805.499	MGR80L	969.471L

1. Key grip is available in a package of 2 pcs.
2. As key grip is a consumable item, it is recommended to replace on a regular basis.

New Baby Chuck

The original high precision collet chuck to support all machining applications.

- Clamping range: $\varnothing 0.25 - \varnothing 20$
- Coolant-through hole



A.3

Model	Ød	ØD	L	L1	H	Collet Model	Weight (kg)	Order No.
HSK-A63 -NBS6 - 75	0.25 - 6	20	75	35	20 - 35	NBC6-□	0.9	968.771
			105	63			0.9	968.772
			135	91	20 - 40		1.0	968.773
-NBS8 - 75	0.5 - 8	25	75	35	23 - 37	NBC8-□	0.9	968.775
			105	61	23 - 42		1.0	968.776
			135	91	1.1		968.777	
-NBS10 - 75 *	1.5 - 10	30	75	35	48	NBC10-□	1.0	968.779
			105	63	35 - 45		1.1	968.780
			135	93			1.3	968.781
-NBS13 - 75 *	2.5 - 13	35	75	37	48	NBC13-□	1.0	968.783
			105	67	41 - 55		1.2	968.784
			135	97	41 - 60		1.5	968.785
-NBS16 - 75 *	2.5 - 16	42	75	37	45	NBC16-□	1.1	968.787
			105	67	45 - 55		1.4	968.788
			135	97	45 - 65		1.8	968.789
			165	127			2.0	968.790
			200	162			2.4	968.791
-NBS20 - 75 *	2.5 - 20	46	75	39	48	NBC20-□	1.2	968.792
			105	69	48 - 53		1.5	968.793
			135	99	48 - 65		1.9	968.794
			165	129			2.3	968.795
			200	164			2.7	968.796
HSK-A100 -NBS6 -120	0.25 - 6	20	120	68	20 - 40	NBC6-□	2.5	968.572
			165	113			2.6	968.573
-NBS8 -120	0.5 - 8	25	120	73	23 - 42	NBC8-□	2.6	968.575
			165	113			2.7	968.578
-NBS10 -120	1.5 - 10	30	120	73	35 - 45	NBC10-□	2.7	968.580
			165	113			2.9	968.581
-NBS13 -120	2.5 - 13	35	120	73	41 - 60	NBC13-□	2.9	968.583
			165	113			3.2	968.584
-NBS16 -120	2.5 - 16	42	120	73	45 - 65	NBC16-□	3.1	968.587
			165	118			3.5	968.588
			-NBS20 -120	2.5 - 20			46	120
165	118	3.8	968.594					

1. New baby nut is included. Coolant pipe is to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.

3. * Adjusting screws can not be used. "H" is the max. tool shank length can be inserted into these models.

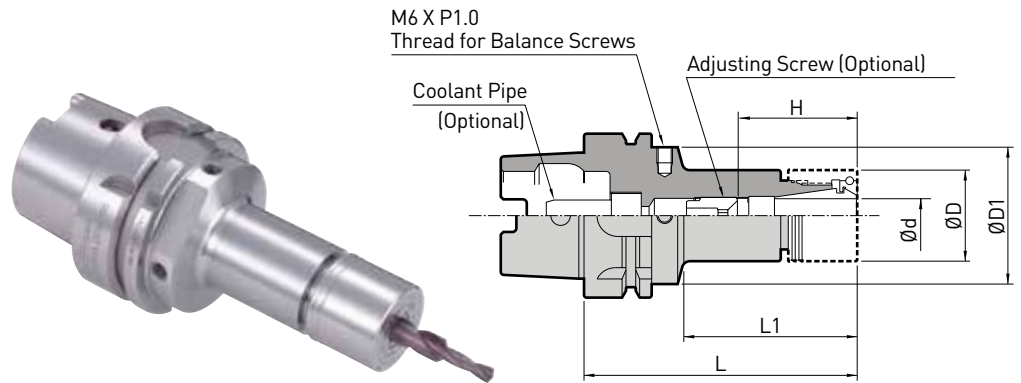
For Coolant Pipe ▶ A81

For Tap Driving Back Stop ▶ A145

Spare Parts			Accessories								
New Baby Nut			Wrench		NBC Collet		Baby Perfect Seal		Adjusting Screw		
New Baby Chuck			Model		Model		Model		Model		
NBS6	NBN6	961.526	NBK6	961.525	NBC6-□	BPS6-□	NBA6B	M7	12	2	961.527
NBS8	NBN8	961.549	NBK8	961.548	NBC8-□	BPS8-□	NBA8B	M9	13	2.5	961.550
NBS10	NBN10	961.571	NBK10	961.570	NBC10-□	BPS10-□	NBA10B	M11	16	3	961.572
NBS13	NBN13	961.597	NBK13	961.596	NBC13-□	BPS13-□	NBA13B	M14	20	4	961.598
NBS16	NBN16	961.631	NBK16	961.630	NBC16-□	BPS16-□	NBA16B	M18	20	4	961.632
NBS20	NBN20	961.679	NBK20	961.678	NBC20-□	BPS20-□	NBA20B	M21	20	4	961.680

MEGA ER Grip

- max. 33 000 min⁻¹
- Clamping range: Ø 1.9 - Ø 20
- Coolant-through hole
- Various nut selection



A.3

Nut is not included.

Model	Ød	ØD	ØD1	L	L1	H	Nut Model (not included)	max. min ⁻¹	Weight (kg)	Order No.
HSK-A63 -MEGAER16 - 70NL *	1.9 - 10.0	30	52.6	70	32	45	MERN16 MER16SN	33 000	1.0	803.544
				105	64	35 - 47		25 000	1.1	803.541
				165	124	15 000		1.4	803.543	
-MEGAER25 - 70NL *	2.75 - 16.0	42	52.6	70	32	45	MERN25 MER25SN	30 000	1.1	802.362
				105	65	44 - 55		20 000	1.4	803.551
				135	95	44 - 67		15 000	1.7	803.552
				165	125	10 000		1.9	802.361	
-MEGAER32 - 75NL *	2.75 - 20.0	50	52.6	75	33	50	MERN32 MER32SN	30 000	1.3	802.367
				105	62	50 - 54		20 000	1.7	802.364
				135	92	50 - 68		15 000	2.0	802.365
				165	122	10 000		2.4	802.366	
HSK-A100 -MEGAER16 - 75NL *	1.9 - 10.0	30	85	75	31	46.5	MERN16 MER16SN	20 000	3.3	803.528
				105	59	35 - 47		18 000	3.4	803.525
				165	119	14 000		3.7	803.527	
-MEGAER25 - 75NL *	2.75 - 16.0	42	85	75	32	44	MERN25 MER25SN	15 000	3.4	803.536
				105	59	44 - 50		14 000	3.7	803.533
				165	119	44 - 67		13 000	4.2	803.535
-MEGAER32 - 80NL *	2.75 - 20.0	50	85	80	36	49	MERN32 MER32SN	15 000	3.6	803.540
				105	59	71		14 000	3.9	803.537
				135	89	50 - 68		13 000	4.3	803.538
				165	119	13 000		4.7	803.539	
HSK-A125 -MEGAER16 -100NL	1.9 - 10.0	30	100	100	55	35 - 47	MERN16 MER16SN	10 000	4.0	805.648
				160	115	8 000		4.3	805.649	
				-MEGAER32 -100NL	2.75 - 20.0	50		100	55	62
160	115	50 - 68	MER32SN				8 000	5.1	805.651	

1. Collet, wrench and coolant pipe are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw can not be used. "H" is the max. tool shank length that can be inserted into this models.
4. Mega ER Grip is not able to use DIN6499 Form-A collets and ESX collets.
6. Dimensions in the chart reference are with the MERN nut included.

For Coolant Pipe ▶ A81

Caution

To maintain the accuracy of the tool assembly, do not use collets and nuts manufactured by another company with the chuck body of MEGA ER Grip. Also, we cannot guarantee the accuracy statement for our collets if they are assembled on the chuck body of another manufacturer.

Accessories													
MEGA ER Nut		MEGA ER Solid Nut		MEGA ER Perfect Seal	MEGA Wrench		ER Collet		Adjusting Screw		Rubber		
MEGA ER Grip	Model	Order No.	Model	Order No.	Model	Model	Order No.	Model	Model	G	L	B	Order No.
	MERN16	967.801	MER16SN	805.663	MERPS16-□	MGR30L	969.448	ERC16-□	NBA10B	M11	16	3	961.572
	MERN25	967.803	MER25SN	805.665	MERPS25-□	MGR42L	969.462L	ERC25-□	NBA16B	M18	20	4	961.632
	MERN32	967.804	MER32SN	805.666	MERPS32-□	MGR50L	969.464L	ERC32-□	NBA20B	M21	20	4	961.680

New Hi-Power Milling Chuck Type S

The original design of slit structure supports heavy and finish end milling with high power and precision.

- Clamping range: $\varnothing 20 - \varnothing 42$
- Coolant-through hole



A.3

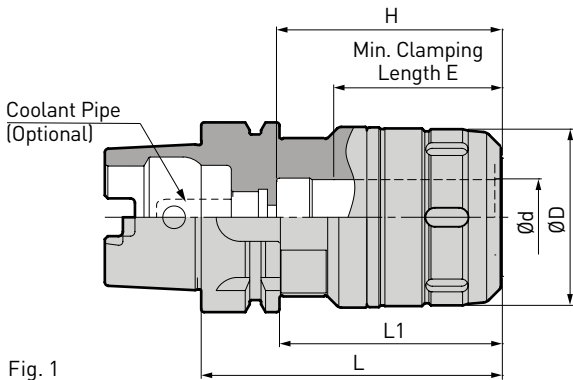


Fig. 1

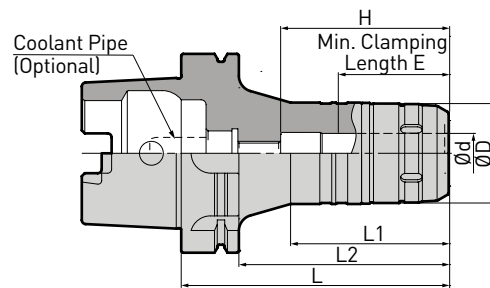


Fig. 2

Model	Fig.	Ød	ØD	L	L1	L2	H	E	Wrench	Weight (kg)	Order No.	
HSK-A40 -HMC20S - 85	1	20	50	85	65	-	66	56	FK45-50L	0.9	805.100	
HSK-A50 -HMC20S - 90	1	20	50	90	64	-	66	56	FK45-50L	1.2	805.101	
HSK-A63 -HMC20S - 90	1	20	50	90	64	-	65	56	FK45-50L	1.5	965.511S	
				120	94		85			1.9	805.102	
-HMC25S -100	1	25	59	100	74	-	75	57	FK58-62L	1.9	968.136S	
-135 *				135	109		80			2.5	805.103	
-HMC32S -110				110	84		85			2.3	968.137S	
-135 **	2	32	68	135	109	-	90	64	FK68-75L	2.6	805.104	
-165 *				165	139		90			3.2	805.105	
HSK-A100-HMC20S -105	1	20	50	105	76	-	73	56	FK45-50L	3.0	805.106	
	-135 ***			135	80		106			85	3.5	805.107
	-165 *			165	100		136			85	4.1	805.108
-HMC25S -105	1	25	59	105	76	-	73	57	FK58-62L	3.3	805.110	
				-135 ***	135		106			90	3.9	804.917
-165 *	2	165	105	136	90	4.8	805.111					
-HMC32S -115	1	32	68	115	86	-	83	72	FK68-75L	3.9	805.112	
				-135	135		106			103	4.4	805.113
	-165 ***			165	105		136			105	5.4	805.114
	-200 *			200	130		171			6.4	805.115	
-HMC42S -115	1	42	85	115	86	-	83	73	FK80-90L	4.9	805.117	

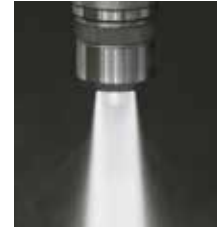
1. Wrench is to be ordered separately.
2. "H" is the max. tool shank length that can be inserted into the holder.
3. Coolant pipe is to be ordered separately.
4. * Axial length adjusting screw can be used. **/*** Commercially available hex socket head screws can be used as a back stop [**=M8 /***=M12]. Coolant is blocked by utilizing these commercial screws.

For Coolant Pipe ▶ A81
For Straight Collet ▶ A158

Accessories										
Wrench			Adjusting Screw							
New Hi-Power Milling Chuck	Model	Order No.	Model	D	L	L1	G	W	Order No.	
HSK -A40/A50/A63/A100 -HMC20S	FK45-50L	801.037	HMA-M16	19	27	6	M16P1.5	8	962.311	
HSK -A63/A100 -HMC25S	FK58-62L	801.038	HMA-M16S					10	962.312	
HSK -A63/A100 -HMC32S	FK68-75L	801.039	-	-	-	-	-	-	-	
HSK -A100 -HMC42S	FK80-90L	804.771	-	-	-	-	-	-	-	

New Hi-Power Milling Chuck HMC12J

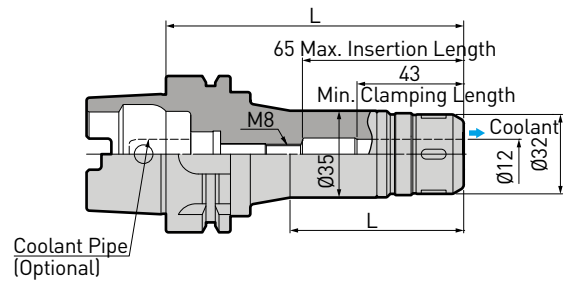
Extremely slim and rigid design with jet through coolant.



- Clamping range: $\varnothing 12$
- Coolant to cutting tool periphery



A.3



Model	L	L1	Wrench	Weight (kg)	Order No.
HSK-A63 -HMC12J - 90	90	52	NBK13	1.1	805.829
-120	120	70		1.4	805.830

1. Wrench is to be ordered separately.
2. Coolant pipe is to be ordered separately.

For Straight Collet ▶ A158

For Coolant Pipe ▶ A81

Accessories		
	Wrench	
New Hi-Power Milling Chuck	Model	Order No.
HSK -A63 -HMC12J	NBK13	961.596

Hydraulic Chuck Super Slim

Ultra precise hydraulic chuck with extremely slim design.

- Clamping range: $\varnothing 3 - \varnothing 12$
- Coolant-through hole



A.3

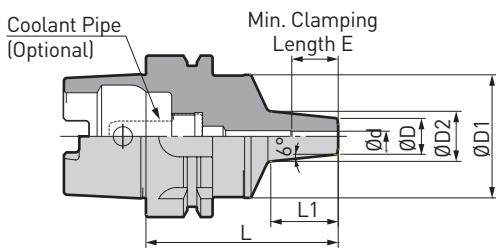


Fig. 1

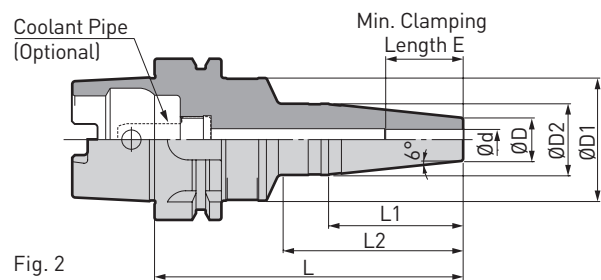


Fig. 2

Model	Fig.	Ød	ØD	ØD1	ØD2	L	L1	L2	H	E	Weight (kg)	Order No.				
HSK-A40 -HDC4S - 65	1	4	14	33	21	65	28	-	49	19	0.33	805.527				
HSK-A50 -HDC4S - 75				40		75	31		55		0.8	805.548				
HSK-A63 -HDC3S - 90		3		24	90	43	68		16	1.1	805.465					
-HDC4S - 75	2	4	48	20	75	75	26	72	53	19	1.0	803.072				
-120		6							26		57	98	1.1	805.466		
-HDC6S -120		8							28	120	52	70	98	25	1.1	803.073
-HDC8S -120		10							30	95	31	1.2	803.074			
-HDC10S -120		12							32	94	33	1.2	803.070			
-HDC12S -120				93	36	1.2	803.071									

1. Adjusting screw and straight collet can not be used.
2. Coolant pipe is to be ordered separately.
3. "H" is the max. tool shank length that can be inserted into the holder.

For Coolant Pipe ▶ A81

For Inner Bore Cleaner ▶ A170

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with Hydraulic Chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the Hydraulic Chuck.
- Always insert the cutting tool into the Hydraulic Chuck beyond min. clamping length E.

Hydraulic Chuck Jet Through

Coolant or oil-mist is supplied to cutting edge securely. Exert maximum performance to high-precision operation at 5-axis machining.



- Clamping range: $\varnothing 4 - \varnothing 32$
- Coolant to cutting tool periphery



A.3

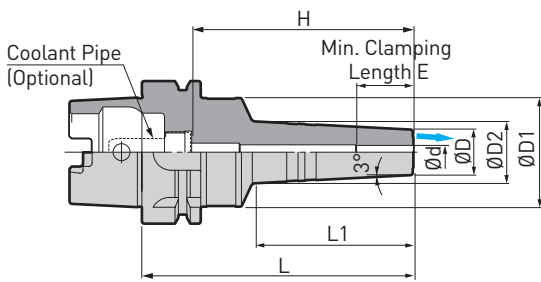


Fig. 1

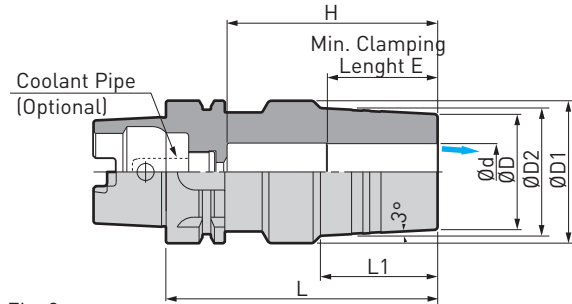


Fig. 2

Model	Fig.	Ød	ØD	ØD1	ØD2	L	L1	H	E	Weight (kg)	Order No.	
HSK-A63 -HDC4J - 75	1	4	20	48	23	75	29	53	19	1.0	805.477	
-HDC6J -120		6			28				25	1.2	805.096	
-HDC8J -120		8	30		31				1.2	805.097		
-HDC10J -120		10	24		32				33	1.3	805.098	
-HDC12J -120		12	26		34				36	1.3	805.099	
-HDC16J -120		16	34		43				92	43	1.5	805.478
-HDC20J -120		20	38						91	43	1.5	805.479
-HDC25J -120	2	25	51	63	57	50	93	49	2.1	805.831		
-HDC32J -120		32	60	69	-			53	56	2.3	805.832	

1. Adjusting screw can not be used.
2. Straight collet can be used for HDC16J or bigger Ød size models.
3. Coolant pipe is to be ordered separately.
4. "H" is the max. tool shank length that can be inserted into the holder.

For Coolant Pipe ▶ A81

For Inner Bore Cleaner ▶ A170

For Straight Collet ▶ A158

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with Hydraulic Chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the Hydraulic Chuck.
- Always insert the cutting tool into the Hydraulic Chuck beyond min. clamping length E.

Hydraulic Chuck Standard

- Clamping range: $\varnothing 6 - \varnothing 32$
- Coolant-through hole

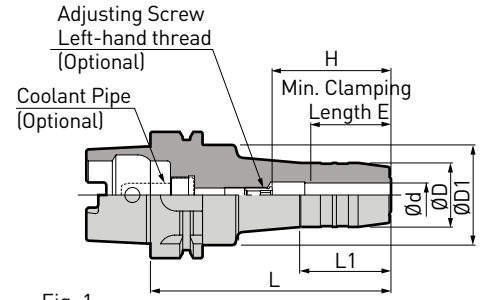


Fig. 1

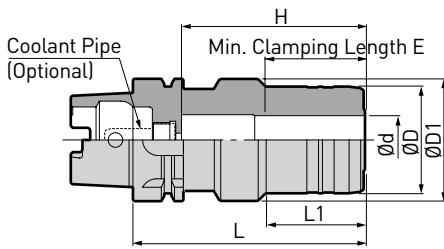


Fig. 2

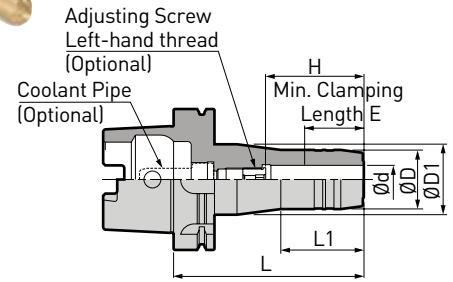


Fig. 3

A.3

Model	Fig.	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	L1	H	E	Adjusting Screw (Optional)	Weight (kg)	Order No.
HSK-A63 -HDC6 - 70 *	1	6	26	50	70	24	46	28	-	1.0	801.222
					120	44	28 - 48		HDA 6-05032	1.2	978.402
					150				HDA 6-06032	1.4	801.221
		8	28	120	45	28 - 48	HDA 8-06032	1.3	979.202		
				120			-	1.1	801.196		
		10	30	120	45	33 - 53	HDA 10-08032	1.3	979.203		
				120			-	1.1	801.201		
		12	32	120	45	38 - 58	HDA 12-10025	1.4	979.204		
				120			-	1.4	801.205		
		14	34	50	45	58 - 68	HDA 16-12015	1.5	801.208		
							15	37	43	-	1.5
		16	38	50	46	65	-	1.3	801.215		
18	40						43	-	1.3	801.217	
18	40	50	48	58 - 68	HDA 20-16015	1.6	979.206				
					20	42	56	-	2.4	801.219	
-HDC32 -125 *	2	32	60	69	125	59	100	56	-	2.4	801.219
HSK-A100-HDC8 -120	3	8	28	50	120	44	28 - 48	28	HDA 8-06032	2.6	801.143
									HDA 10-08032	2.7	801.126
									HDA 12-10025	2.7	801.129
		16	38	135	53	43 - 68	43	HDA 16-12030	3.0	801.133	
								HDA 20-16015	3.1	801.136	
		-HDC20 -135	3	20	42	75	110	62	78	56	-

1. H indicates the adjustment length with an adjusting screw.
2. "H" is the max. tool shank length can be inserted for these models.
3. * Adjusting screws cannot be used.
4. Coolant pipe is to be ordered separately.

- For Coolant Pipe ▶ A81
- For Inner Bore Cleaner ▶ A170
- For Straight Collet ▶ A158
- For Adjusting Screw ▶ A168

Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with Hydraulic Chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the Hydraulic Chuck.
- Always insert the cutting tool into the Hydraulic Chuck beyond min. clamping length E.

Face Mill Arbor Type FMH

For cutters that require a coolant hole through the pilot.

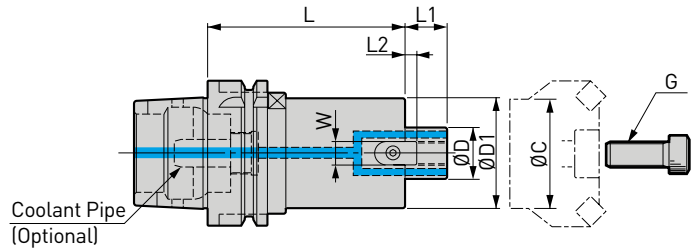
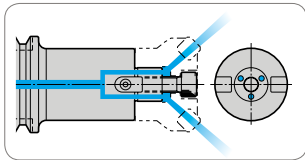


Fig. 1

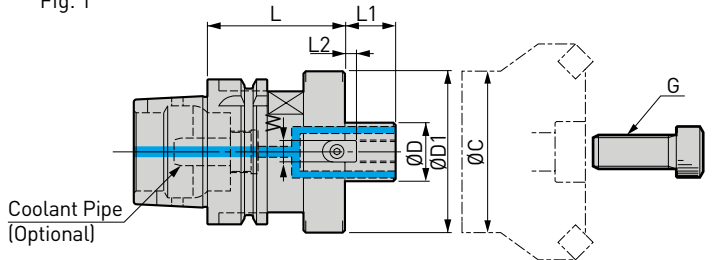


Fig. 2

Model	Fig.	ØD (h6)	ØD1	L	L1	Drive Keys		G	ØC min.	Weight (kg)	Order No.
						L2	W				
HSK-A50 -FMH22 - 47 - 60	2	22	47	60	18	5	10	M10	36	0.8	805.833
		27	60			6	12	M12	46	1.0	805.834
HSK-A63 -FMH16 - 37 - 45	1	16	37	45	16	5	8	M8	28	1.0	979.194
		22	47	60	18	5	10	M10	36	1.3	801.189
90	1.7			978.186							
150	2.5			801.188							
-FMH22 - 60 - 60	2	22	60	60	18	5	10	M10	38	1.4	805.573
				90	1.8	805.574					
-FMH27 - 60 - 60	2	27	60	60	20	6	12	M12	46	1.6	978.185
				90	2.3	979.196					
-FMH32 - 96 - 60	2	32	96	60	22	7	14	M16	58	2.0	805.646
				90	3.4	965.523					
HSK-A100 -FMH22 - 47 - 105	1	22	47	105	18	5	10	M10	36	4.0	978.120
				150						4.7	978.121
-FMH22 - 60 - 105	1	22	60	105	18	5	10	M10	38	3.9	801.092
				150						5.4	801.093
-200	1	22	60	200	18	5	10	M10	38	6.1	801.094
				60						2.9	801.102
-FMH27 - 60 - 60	1	27	60	60	20	6	12	M12	46	3.7	801.103
				90	3.2	801.105					
-FMH27 - 76 - 60	1	27	76	60	20	6	12	M12	62	4.3	801.106
				90	3.8	801.118					
-FMH32 - 96 - 60	2	32	96	60	22	7	14	M16	80	5.5	801.119
				90	4.9	801.125					
-FMH40 - 100 - 75	2	40	100	75	26	8.5	16	M20 (MBA-M20H)	80	6.8	801.124
				105	4.0	805.652					
HSK-A125 -FMH22 - 47 - 50	1	22	47	50	18	5	10	M10	36	4.8	805.653
				78	60	22	7	14	M16	80	7.8
-FMH32 - 78 - 60	1	32	78	60	22	7	14	M16	80	7.8	805.654
				96	105	22	7	14	M16	80	7.8

1. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.
2. Hexagon Socket Head Cap Screw is included.
3. Coolant pipe is to be ordered separately.

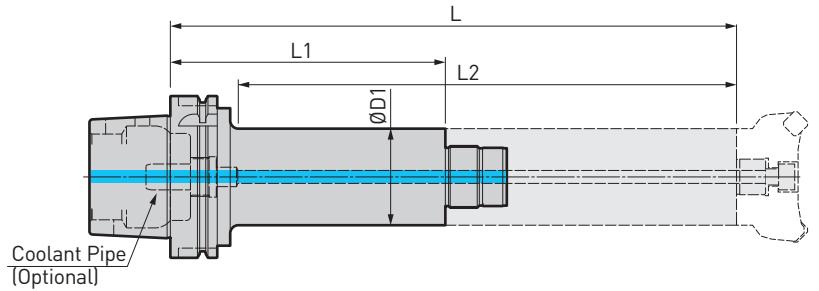
For Coolant Pipe ▶ A81

For Clamp Bolt ▶ A168

Smart Damper “Basic Holder” for Mills



- Modular damping system
- Coolant-through hole



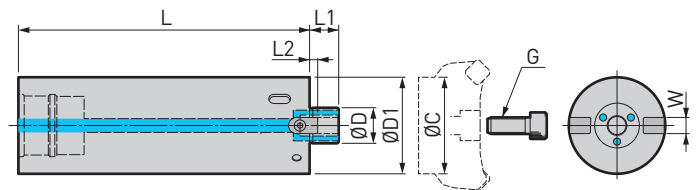
A.3

Model	ØD1	L	L1	L2	Damper Head	Weight (kg)	Order No.
HSK-A100 -SDF36 - 47 -170	47	350	170	310	FMH □ □ DP-47	4.4	804.976
- 47 -220		400	220	360		5.0	804.978
-SDF36 - 60 -170	60	350	170	310	FMH □ □ DP-60	5.5	804.977
- 60 -220		400	220	360		6.5	804.979

1. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ A81

Smart Damper “Damper Head” for Mills



Model	ØD	ØD1	L	L1	L2	W	G	Wrench	ØC min.	Weight (kg)	Order No.
SDF36 -FMH22DP - 47 -180	22	47	180	18	5	10	M10	FK45-50L	36	3.0	804.969
- 60 -180									49	4.5	804.971
-FMH27DP - 60 -180	27	60		20	6	12	M12	FK58-62L	46	4.5	804.972

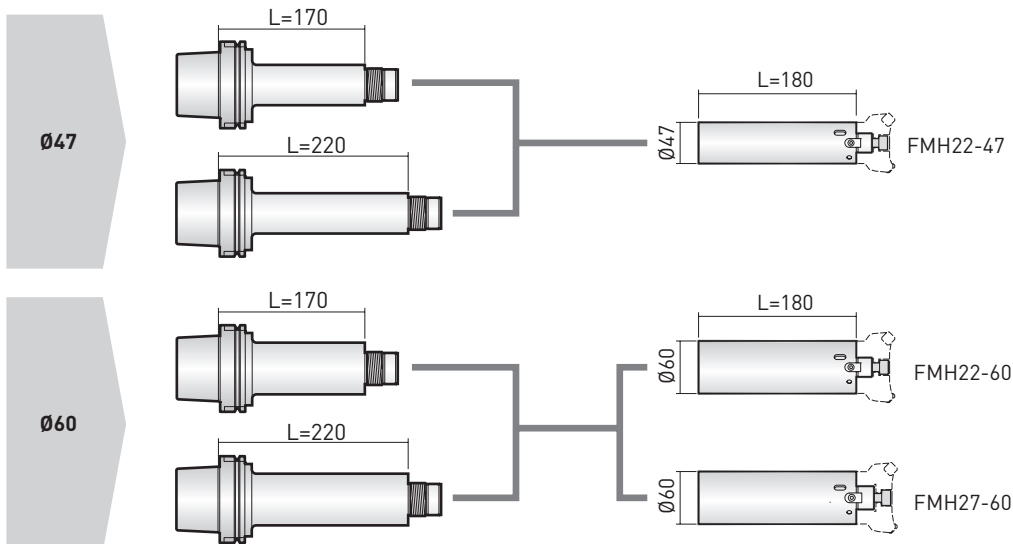
1. Wrench and cutter clamping bolt are included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

For Clamp Bolt ▶ A168

Combinations

Basic Holder

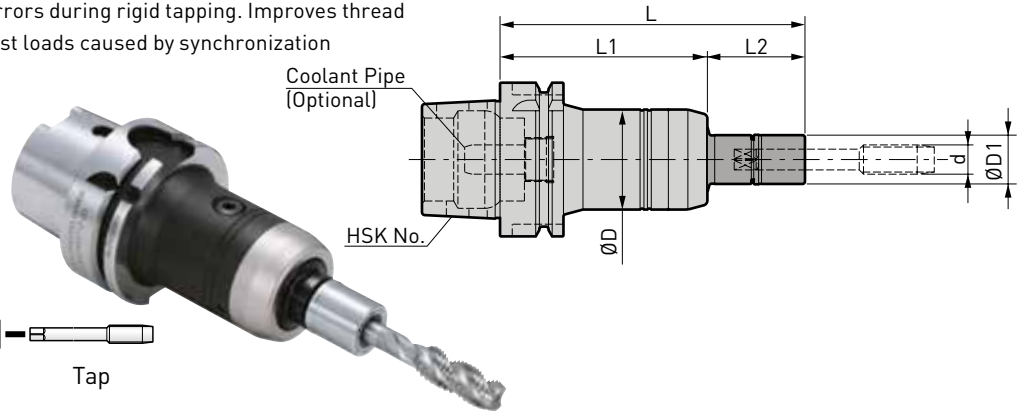
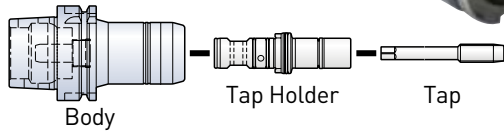
Damper Head



MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

- Tapping range: M3 - M20
- Coolant-through hole



A.3

Model	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)	Order No.	
HSK-A40 -MGT6 - 80	MGT6-d - 30	M3 - M8	36	16	110	80	30	0.6	965.601	
	- 70				150		70			
	-100				180		100			
-MGT12 - 85	MGT12-d - 30	M5 - M12 P1/8	41	20	115	85	30	0.7	965.602	
	- 70				155		70			
	-100				185		100			
HSK-A50 -MGT6 - 85	MGT6-d - 30	M3 - M8	36	16	115	85	30	0.8	965.603	
	- 70				155		70			
	-100				185		100			
-MGT12 - 85	MGT12-d - 30	M5 - M12 P1/8	41	20	115	85	30	0.9	965.604	
	- 70				155		70			
	-100				185		100			
-MGT20 -125	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	160	125	35	1.6	978.325	
	- 85				210		85			
	-115				240		115			
HSK-A63 -MGT6 - 85	MGT6-d - 30	M3 - M8	36	16	115	85	30	1.1	965.606	
	- 70				155		70			
	-100				185		100			
-MGT12 - 85	MGT12-d - 30	M5 - M12 P1/8	41	20	115	85	30	1.2	965.607	
	- 70				155		70			
	-100				185		100			
-MGT20 -110	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	145	110	35	1.8	965.608	
	- 85				195		85			
	-115				225		115			
HSK-A100 -MGT6 - 95	MGT6-d - 30	M3 - M8	36	16	125	95	30	2.6	965.609	
	- 70				165		70			
	-100				195		100			
-MGT12 - 95	MGT12-d - 30	M5 - M12 P1/8	41	20	125	95	30	2.7	965.610	
	- 70				165		70			
	-100				195		100			
-MGT20 -115	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	150	115	35	3.3	965.611	
	- 85				200		85			
	-115				230		115			
HSK-A125 -MGT12 -105	MGT12-d - 30	M5 - M12 P1/8	41	20	105	135	30	4.1	805.655	
	- 70						175			70
	-100						205			100
	-150						255			150
	-200						305			200
-MGT20 -120	MGT20-d - 35	M12 - M20 P1/4 - P1/2	54	30	120	155	35	4.7	805.656	
	- 85						205			85
	-115						235			115
	-150						270			150

1. Tap holder is to be ordered separately.
2. Coolant pipe is to be ordered separately.
3. Rigid tapping function is required on the machine tool.

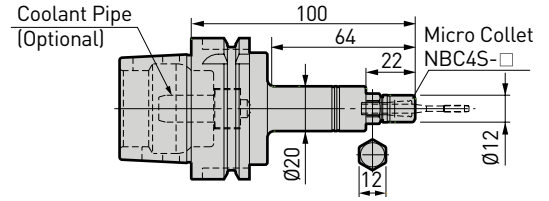


- For Coolant Pipe ▶ A81
- For Tap Holder ▶ A162
- For MEGA Wrench ▶ A161
- For Accessories ▶ A166

MEGA Synchro Tapping Holder

For small Tap MGT3

- Tapping range: M1 - M3
- Coolant-through hole



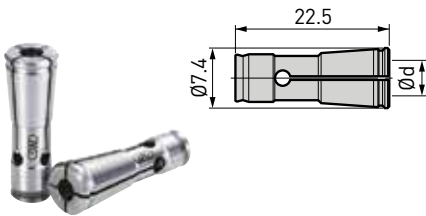
Model	Order No.
HSK-A63-MGT3-100	805.542

For Accessory ▶ A135

1. Nut is included. MEGA wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the hex portion of the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

A.3

Micro Collet for MGT3



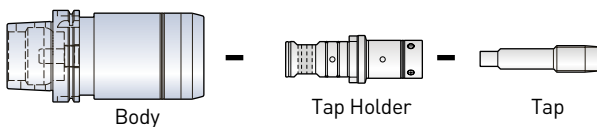
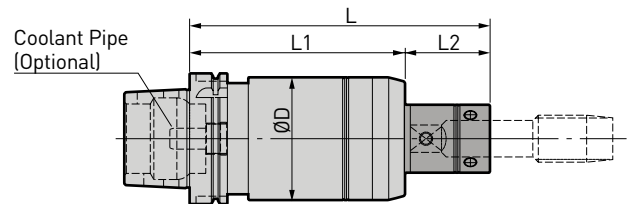
Model	Tapping Range d			Tap Shank Ød	Order No.
	DIN371	ISO529	JIS		
NBC4S-2.5AA	M1 - M1.8	M2		2.5	961.468
NBC4S-2.8AA	M2 - M2.6	M2.2, M2.5		2.8	968.353
NBC4S-3.0AA	-	-	M1 - M2.6	3.0	961.470
NBC4S-3.1AA	-	M3		3.15	968.355
NBC4S-3.5AA	M3	-		3.5	961.472
NBC4S-4.0AA	-	-	M3	4.0	961.474

1. Other sizes available. Please refer to micro collet.

For Micro Collet ▶ A135

For large Tap MGT36

- Tapping range: M22 - M36
- Coolant-through hole
- Side lock clamping system



Model	Tapping Range d	ØD	L	L1	L2	Weight (kg)	Order No.
HSK-A100-MGT36-165	M22 - M36	94	230	165	65	8.2	801.164
-A125-MGT36-170	P5/8 - 1	94	235	170	65	7.9	805.657

1. Tap holder is to be ordered separately.
2. Coolant pipe is to be ordered separately.
3. Rigid tapping function is required on the machine tool.



For Accessories ▶ A166

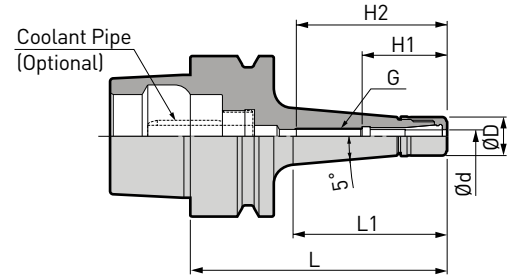
For MGT36 Tap Holder ▶ A162

For Coolant Pipe ▶ A81

MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

- max. 50 000 min⁻¹
- Clamping range: Ø 0.45 - Ø 8.05



A.3

Model	Ød	ØD	L	L1	H1	H2	G	max. min ⁻¹	Collet Model	Weight (kg)	Order No.
HSK-E25 -MEGA3S - 45T *	0.45 - 3.25	10	45	32	22	32	-	50 000	NBC3S-□	0.06	968.870
			60	48			M4 P0.7	40 000		0.08	968.871
-MEGA6S - 45T *	0.45 - 6.05	14	45	33	28.5	31	-	50 000	NBC6S-□	0.08	968.874
			60	49			M7 P0.75	40 000		0.10	968.875
HSK-E32 -MEGA3S - 60T	0.45 - 3.25	10	60	35	22	38	M4 P0.7	40 000	NBC3S-□	0.15	968.917
			60	35			-	50 000		0.14	968.880
-MEGA4S - 45T *	0.45 - 4.05	12	45	23	26.5	26	-	40 000	NBC4S-□	0.16	968.881
			60	35			M5 P0.8	50 000		0.14	968.882
-MEGA6S - 45T *	0.45 - 6.05	14	45	23	28.5	28	-	40 000	NBC6S-□	0.17	968.883
			60	36			M7 P0.75	40 000		0.20	803.604
-MEGA8S - 60T *	2.95 - 8.05	18	60	38	31	43	-	40 000	NBC8S-□	0.20	803.604
			60	38			-	40 000		0.23	968.919
HSK-E40 -MEGA3S - 60T	0.45 - 3.25	10	60	35	22	39	M4 P0.7	40 000	NBC3S-□	0.25	968.920
			75	50			38			40 000	0.24
-MEGA4S - 60T	0.45 - 4.05	12	60	35	26.5	44	M5 P0.8	40 000	NBC4S-□	0.27	968.891
			75	50			47			40 000	0.24
-MEGA6S - 60T *	0.45 - 6.05	14	60	35	28.5	42	-	40 000	NBC6S-□	0.28	968.893
			75	50			49			40 000	0.32
- 90T	0.45 - 6.05	14	90	65	28.5	49	M7 P0.75	40 000	NBC6S-□	0.48	968.907
			90	65			49			40 000	0.48
HSK-E50 -MEGA6S - 80T	0.45 - 6.05	14	80	49	28.5	49	M7 P0.75	40 000	NBC6S-□	0.48	968.907

1. MEGA nut is included.
2. * Internal thread (G) is not available.
3. Coolant pipe is to be ordered separately.

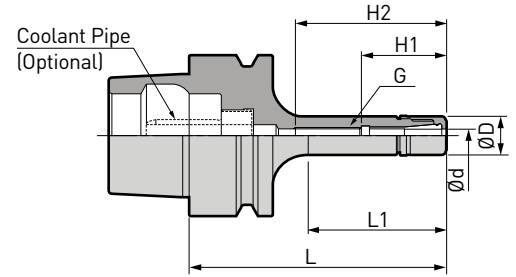
For Coolant Pipe ▶ A81

Spare Parts			Accessories							
MEGA Nut			MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		α Taper Cleaner	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-□	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-□	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-□	MGN6S-PS□	NBB6S	961.498	SC-NBC6S	261.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-□	MGN8S-PS□	NBB8S	805.802	SC-NBC8S	805.827

MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

- max. 50 000 min⁻¹
- Clamping range: Ø 0.45 - Ø 6.05



A.3

Model	Ød	ØD	L	L1	H1	H2	G	max. min ⁻¹	Collet Model	Weight (kg)	Order No.
HSK-E25 -MEGA6S - 45 *	0.45 - 6.05	14	45	32	28	31	-	50 000	NBC6S-□	0.07	968.868
			60	47	28.5	41	M7 P0.75	40 000		0.08	968.869
HSK-E32 -MEGA3S - 45 *	0.45 - 3.25	10	45	23	22	31	-	50 000	NBC3S-□	0.13	968.914
			60	34	26.5	46	M5 P0.8	40 000		0.14	968.876
-MEGA4S - 45	0.45 - 4.05	12	45	22	28.5	31	-	50 000	NBC4S-□	0.14	968.876
			60	34	26.5	46	M5 P0.8	40 000		0.15	968.877
-MEGA6S - 45 *	0.45 - 6.05	14	45	22	28.5	28	-	50 000	NBC6S-□	0.14	968.878
			60	35	38	M7 P0.75	40 000	0.15		968.879	
HSK-E40 -MEGA3S - 40 *	0.45 - 3.25	10	40	19	22	24	-	50 000	NBC3S-□	0.21	968.915
			60	35	28.5	42	-	40 000		NBC6S-□	0.22
-MEGA6S - 45 *	0.45 - 6.05	14	45	23	27.5	27	-	50 000	NBC6S-□	0.22	968.716
			60	35	28.5	42	-	40 000		NBC6S-□	0.23
- 60 *	0.45 - 6.05	14	60	35	28.5	42	-	40 000	NBC6S-□	0.23	968.757
			60	35	28.5	42	-	40 000		NBC6S-□	0.23
HSK-E50 -MEGA6S - 55 *	0.45 - 6.05	14	55	26	28.5	35	-	45 000	NBC6S-□	0.44	978.100
			80	44	49	M7 P0.75	40 000	0.46		968.760	

1. MEGA nut is included.
2. * Internal thread (G) is not available.
3. Coolant pipe is to be ordered separately.
4. "H2" is the max. tool shank length that can be inserted in the tool holder.

For Coolant Pipe ▶ A81

Spare Parts			Accessories							
	MEGA Nut 		MEGA Wrench 		Micro Collet 	Micro Seal Nut 	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-□	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-□	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-□	MGN6S-PS□	NBB6S	961.498	SC-NBC6S	261.280

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

- max. 40 000 min⁻¹
- Clamping range: Ø 0.25 - Ø 20
- Coolant-through hole



A.3

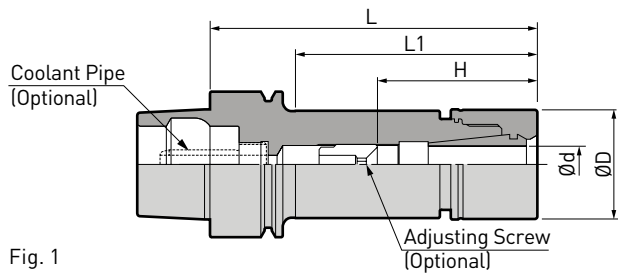


Fig. 1

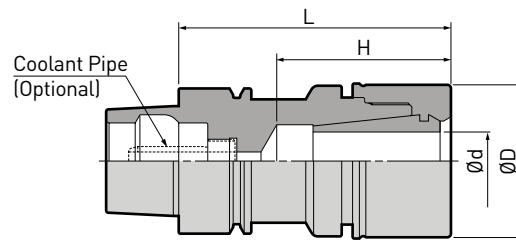


Fig. 2

Model	Fig.	Ød	ØD	L	L1	H	max. min ⁻¹	Collet Model	Weight (kg)	Order No.
HSK-E25 -MEGA6N - 40 *	1	0.25 - 6	20	40	29	25	30 000	NBC6-□	0.10	968.752
-MEGA8N - 45 *	2	0.5 - 8	25	45	-	30	25 000	NBC8-□	0.12	968.753
-MEGA10N - 60 **		1.5 - 10	30	60	-	45	20 000	NBC10-□	0.17	968.754
HSK-E32 -MEGA6N - 45 *	1	0.25 - 6	20	45	24	28	40 000	NBC6-□	0.17	968.884
- 60				60	37	23 - 27	35 000		0.20	968.885
-MEGA8N - 50 *	1	0.5 - 8	25	50	29	33	40 000	NBC8-□	0.22	968.886
HSK-E40 -MEGA6N - 50 *	1	0.25 - 6	20	50	26	31	40 000	NBC6-□	0.26	968.717
- 60				60	34	23 - 26	35 000		0.28	968.895
- 75				75	49	23 - 41	30 000		0.31	968.718
- 90				90	64	23 - 43	28 000		0.35	968.896
-120				120	94		25 000		0.41	968.897
-MEGA8N - 55 *	1	0.5 - 8	25	55	31	36	40 000	NBC8-□	0.31	968.719
- 75				75	51	26 - 41	30 000		0.38	968.720
-MEGA10N - 60 *	1	1.5 - 10	30	60	37	40	35 000	NBC10-□	0.39	968.721
- 75 *				75	52	55	30 000		0.46	968.899
- 90				90	67	38 - 48	28 000		0.53	968.722
-MEGA13N - 65 *	1	2.5 - 13	35	65	44	44	30 000	NBC13-□	0.45	968.900
- 75 *				75	54	55	25 000		0.53	968.723
- 90				90	69	44 - 48			0.62	968.901
-MEGA16N - 75 *	2	2.5 - 16	42	75	-	48	20 000	NBC16-□	0.60	968.905

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. "H" indicates the adjustment length with an adjusting screw.
4. * Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
5. ** NBC-E collet and adjusting screw can not be used.

For Coolant Pipe ▶ A81

Model	Fig.	Ød	ØD	L	L1	H	max. min ⁻¹	Collet Model	Weight (kg)	Order No.
HSK-E50 -MEGA6N - 70	1	0.25 - 6	20	70	38	23 - 39	30 000	NBC6-□	0.50	968.728
-MEGA8N - 60 *	1	0.5 - 8	25	60	30	37	40 000	NBC8-□	0.52	968.729
- 90				90	56	26 - 45	30 000		0.62	968.730
-MEGA10N - 60 **	1	1.5 - 10	30	60	30	35	35 000	NBC10-□	0.56	968.731
-MEGA13N - 70 *				70	40	45	28 000		0.67	968.733
- 90				90	60	44 - 47	25 000		0.80	968.734
-150	1	2.5 - 13	35	150	120	44 - 63	15 000	NBC13-□	1.24	968.910
-MEGA16N - 90 *				90	63	65	25 000		1.00	968.736
-MEGA20N - 75 **	2	2.5 - 20	46	75	-	49	20 000	NBC16-□	0.80	968.764
-100				100	-	51 - 54			20 000	NBC20-□

For Coolant Pipe ▶ A81

- MEGA nut is included.
- Coolant pipe is to be ordered separately.
- "H" indicates the adjustment length with an adjusting screw.
- * Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
- ** NBC-E collet and adjusting screw can not be used.

Spare Parts			Accessories								
MEGA Nut			MEGA Wrench		NBC Collet	MEGA Perfect Seal	Adjusting Screw		Rubber		
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-□	MPS6-□	NBA6B	M7	12	2	961.527
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-□	MPS8-□	NBA8B	M9	13	2.5	961.550
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-□	MPS10-□	NBA10B	M11	16	3	961.572
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-□	MPS13-□	NBA13B	M14	20	4	961.598
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-□	MPS16-□	NBA16B	M18	20	4	961.632
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-□	MPS20-□	NBA20B	M21	20	4	961.680

Hydraulic Chuck Super Slim

Extremely slim design eliminates interference.

- Clamping range: $\varnothing 3 - \varnothing 6$
- Ultra short design



A.3

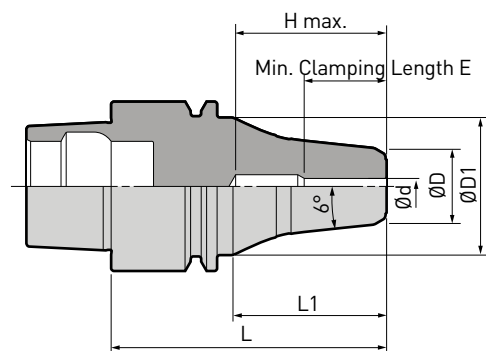


Fig. 1

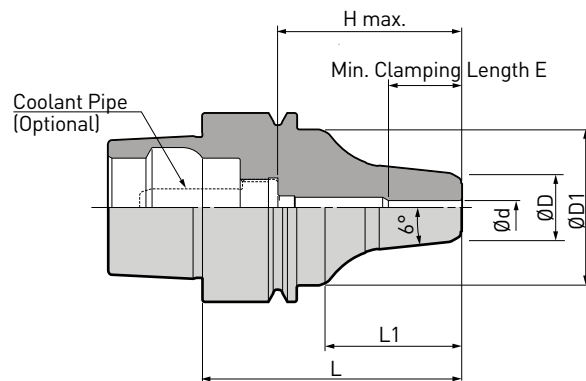


Fig. 2

Model	Fig.	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	L1	E	H max.	max. min ⁻¹	Weight (kg)	Order No.
HSK-E32 -HDC3S -52	1	3	14	26	52	29	16	28	45 000	0.19	805.471
		4					19				
		6					25				
HSK-E40 -HDC3S -55	2	3	14	33	55	29	16	39	40 000	0.31	805.474
		4					19				
		6					25				
-HDC4S -52		4			57	34	25	33		0.20	805.473
-HDC6S -57		6			57	34	25	33		0.20	805.473
-HDC4S -55		4			60	34	25	40		0.32	805.476
-HDC6S -60		6			60	34	25	40		0.32	805.476

1. Center through coolant is not available for HSK-E32.
2. Adjusting screw can not be used.
3. Coolant pipe for E40 is to be ordered separately.

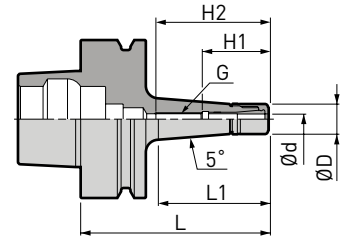
For Coolant Pipe ▶ A81

For Inner Bore Cleaner ▶ A170

MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

- max. 32 000 min⁻¹
- Clamping range: Ø 0.45 - Ø 8.05

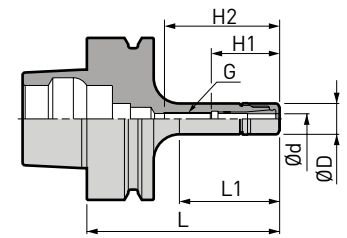


A.3

Model	Ød	ØD	L	L1	H1	H2	G	max. min ⁻¹	Collet Model	Weight (kg)	Order No.
HSK-F63 -MEGA6S - 75T	0.45 - 6.05	14	75	44	28.5	41	M7 P0.75	32 000	NBC6S-□	0.7	803.589
-MEGA8S - 75T	2.95 - 8.05	18			31	58	M9 P0.75		NBC8S-□	0.7	805.576

1. MEGA nut is included.
2. Please contact agent for HSK-F coolant pipe.

MEGA Micro Chuck Type S



Model	Ød	ØD	L	L1	H1	H2	G	max. min ⁻¹	Collet Model	Weight (kg)	Order No.
HSK-F63 -MEGA6S - 90	0.45 - 6.05	14	90	61	28.5	49	M7 P0.75	27 000	NBC6S-□	0.8	803.592
-105			105	76				25 000			

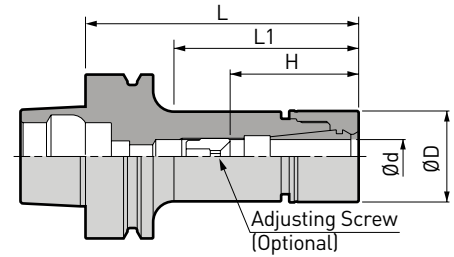
1. MEGA nut is included.
2. Please contact agent for HSK-F coolant pipe.

Spare Parts			Accessories							
	MEGA Nut 		MEGA Wrench 		Micro Collet 	Micro Seal Nut 	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-□	MGN6S-PS□	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-□	MGN8S-PS□	NBB8S	805.802	SC-NBC8S	805.827

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

- max. 30 000 min⁻¹
- Clamping range: Ø 0.25 - Ø 20
- Coolant-through hole



A.3

Model	Ød	ØD	L	L1	H	max. min ⁻¹	Collet Model	Weight (kg)	Order No.	
HSK-F63 -MEGA6N - 90	0.25 - 6	20	90	53	23 - 43	30 000	NBC6-□	0.8	801.287	
			135	99		20 000		0.9	801.677	
-MEGA8N - 90	0.5 - 8	25	90	54	26 - 45	30 000	NBC8-□	0.9	978.199	
			120	84		25 000		0.9	804.962	
-MEGA10N - 90	1.5 - 10	30	90	54	38 - 48	30 000	NBC10-□	0.9	978.146	
			120	84		25 000		1.1	978.152	
-MEGA13N - 75 *	2.5 - 13	35	75	43	44 - 53	30 000	NBC13-□	0.9	978.190	
			90	56				61	1.0	978.215
			105	71				25 000	1.1	801.283
-MEGA16N - 75 *	2.5 - 16	42	75	43	48	30 000	NBC16-□	1.0	978.102	
			90	58		61		25 000	1.2	978.151
-MEGA20N - 75 *	2.5 - 20	46	75	45	51	30 000	NBC20-□	1.1	978.047	
			90	60		61		25 000	1.3	978.147
			105	75		51 - 58		20 000	1.4	978.124

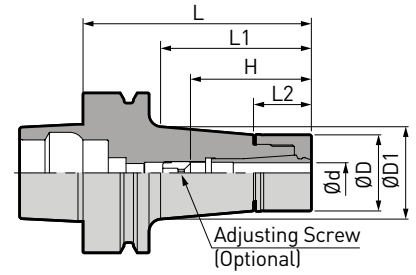
1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw can not be used. "H" is the max. tool shank length that can be inserted for these models.
4. Please contact agent for HSK-F coolant pipe.

Spare Parts			Accessories								
MEGA Nut			MEGA Wrench		NBC Collet		MEGA Perfect Seal	Adjusting Screw		Rubber	
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-□	MPS6-□	NBA6B	M7	12	2	961.527
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-□	MPS8-□	NBA8B	M9	13	2.5	961.550
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-□	MPS10-□	NBA10B	M11	16	3	961.572
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-□	MPS13-□	NBA13B	M14	20	4	961.598
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-□	MPS16-□	NBA16B	M18	20	4	961.632
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-□	MPS20-□	NBA20B	M21	20	4	961.680

MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

- max. 30 000 min⁻¹
- Clamping range: Ø 3 - Ø 12
- Coolant-through hole



A.3

Model	Ød	ØD	ØD1	L	L1	L2	H	max. min ⁻¹	Collet Model	Weight (kg)	Order No.
HSK-F63 -MEGA6E - 65 *	3 - 6	25	28.5	65	34	21	39	30 000	MEC6-□	0.8	803.214
-MEGA8E - 65 *	3 - 8	30	33			22.5	41		MEC8-□	0.8	803.218
-MEGA10E -120	3 - 10	35	47	120	91	23	48 - 58	29 000	MEC10-□	1.6	803.213
-MEGA13E -135	3 - 12	42	52	135	108	25	50 - 60	26 000	MEC13-□	2.0	803.216

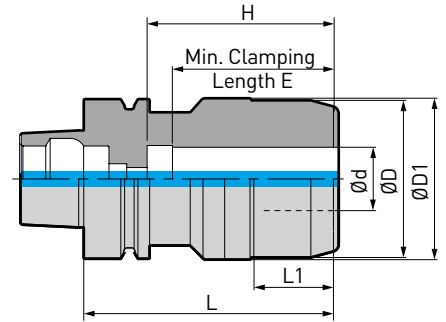
1. MEGA E nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw can not be used. "H" is the max. tool shank length that can be inserted for these models.
4. Please contact agent for HSK-F coolant pipe.

Spare Parts			Accessories									
MEGA E Nut			MEGA Wrench		MEGA E Collet		MEGA E Perfect Seal		Adjusting Screw		Rubber	
MEGA E Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.	
MEGA6E	MEN6	968.461	MGR25	969.456	MEC6-□	EPS6-□	NBA6B	M7	12	2	961.527	
MEGA8E	MEN8	968.462	MGR30	969.458	MEC8-□	EPS8-□	NBA8B	M9	13	2.5	961.550	
MEGA10E	MEN10	968.463	MGR35	969.460	MEC10-□	EPS10-□	NBA10B	M11	16	3	961.572	
MEGA13E	MEN13	968.464	MGR42	969.462	MEC13-□	EPS13-□	NBA13B	M14	20	4	961.598	

MEGA Double Power Chuck Type D

Close to integral rigidity and precision of a solid toolholder. Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and Type DS to feed coolant to cutting tool periphery.

- max. 28 000 min⁻¹
- Clamping range: Ø 16 - Ø 32
- Coolant-through hole




A.3

Model	Ød	ØD	ØD1	L	L1	H	E	max. min ⁻¹	Weight (kg)	Order No.
HSK -F63 -MEGA16D - 80A	16	42	52.6	80	25	55	50	28 000	1.2	803.092
-MEGA20D - 90A	20	50	55	90	34	65	56		1.4	803.093
-MEGA25D -100A	25	62	62.7	100	39	75	57	25 000	1.8	803.103
-MEGA32D -105A	32	70	70.7	105	33.5	80	64	24 000	2.0	803.082

1. Wrench is to be ordered separately.
2. "H" is the max. tool length that can be inserted.
3. Please contact agent for HSK-F coolant pipe.

For Straight Collet ▶ A158

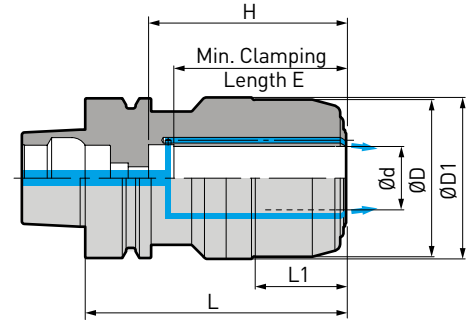
Accessories		
	MEGA Wrench	
		
MEGA Double Power Chuck	Model	Order No.
HSK -F63 -MEGA16D	MGR42L	969.462L
-MEGA20D	MGR50L	969.464L
-MEGA25D	MGR62L	969.469L
-MEGA32D	MGR70L	969.470L

MEGA Double Power Chuck Type DS

Close to integral rigidity and precision of a solid toolholder. Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.



- max. 28 000 min⁻¹
- Clamping range: Ø 16 - Ø 32
- Coolant to cutting tool periphery



A.3

Model	Ød	ØD	ØD1	L	L1	H	E	max. min ⁻¹	Weight (kg)	Order No.
HSK-F63 -MEGA16DS - 80A	16	42	52.6	82	27	57	52	28 000	1.2	803.095
-MEGA20DS - 90A	20	50	55	92	36	67	58		1.4	803.096
-MEGA25DS -100A	25	62	62.7	102	41	77	59	25 000	1.8	803.104
-MEGA32DS -105A	32	70	70.7	107	35.5	82	66	24 000	2.0	803.083

1. Wrench is to be ordered separately.
2. "H" is the max. tool length that can be inserted.
3. Please contact agent for HSK-F coolant pipe.

For Straight Collet ▶ A158

Accessories		
	MEGA Wrench	
MEGA Double Power Chuck	Model	Order No.
HSK -F63 -MEGA16DS	MGR42L	969.462L
-MEGA20DS	MGR50L	969.464L
-MEGA25DS	MGR62L	969.469L
-MEGA32DS	MGR70L	969.470L

Dyna Test

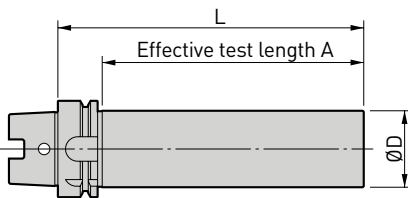
For inspection and adjustment of machine spindle.



A.3

HSK-A Type

DIN 69893-1 & ISO 12164-1

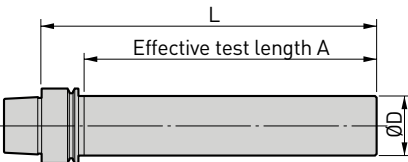


Model	L	A	ØD	Order No.
HSK -A40-32 -L180SD	180	157	32	801.169
-A50-32 -L240SD	240	211		978.198
-A63-50 -L350SD	350	321	50	978.222
-A100-50 -L350SD	350	318		801.073

1. The drive key slots are symmetrical to allow the HSK form A dyna test bar to be indexed 180 degrees.

HSK-E Type

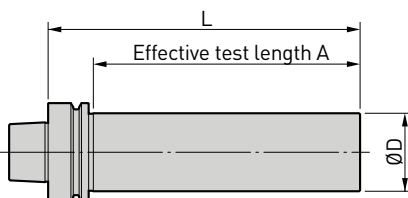
DIN 69893-5



Model	L	A	ØD	Order No.
HSK -E25-20 -L175	175	163	20	978.307
-E32-20 -L180	180	158		802.831
-E40-32 -L180		157	32	978.178
-E50-32 -L240	240	211		979.140

HSK-F Type

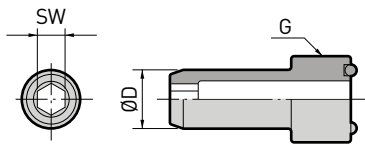
DIN V 69893-6



Model	L	A	ØD	Order No.
HSK -F63-50 -L350	350	321	50	802.832

Coolant Pipe Form A/E

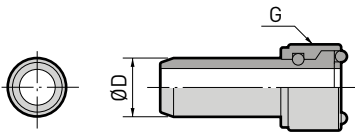
Mono block type



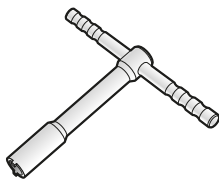
Model	ØD	G	SW	Order No.
HSK 25 -CP	5	M8 x P1	2.5	978.921
32 -CP	6	M10 x P1	3	978.909
40 -CP	8	M12 x P1	4	978.913
50 -CP	10	M16 x P1	5	801.071
63 -CP	12	M18 x P1	6	969.475
80 -CP	14	M20 x P1.5	8	802.828
100 -CP	16	M24 x P1.5	8	802.351
125 -CP	18	M30 x P1.5	10	805.684

A.3

1° swing type (DIN)



Model	ØD	G	Order No.
HSK 40 -CPM	8	M12 x P1	978.907
50 -CPM	10	M16 x P1	801.690
63 -CPM	12	M18 x P1	978.910
80 -CPM	14	M20 x P1.5	802.827
100 -CPM	16	M24 x P1.5	802.314



Clamping Wrench	Order No.
CPW-40	802.825
CPW-50	802.315
CPW-63	978.911
CPW-80	802.824
CPW-100	802.316

Caution

For machines capable of supplying coolant through spindle, the coolant pipe should be fitted to all HSK holders to protect against accidental selection of coolant.

Cylindrical Shank

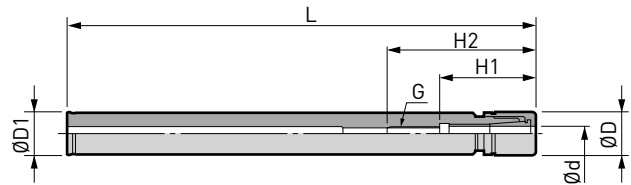
MEGA Micro Chuck	84
MEGA New Baby Chuck	85
New Baby Chuck	86
Hydraulic Chuck	87
New Hi-Power Milling Chuck	87
MEGA Synchro Tapping Holder	88
Overview other products with cylindrical shank	89



MEGA Micro Chuck

Ultra small diameter ($\varnothing 10 - \varnothing 18$) to avoid interference. High precision is maintained by combination with MEGA New Baby Chuck.

- Clamping range: $\varnothing 0.45 - \varnothing 8.05$
- Coolant-through hole



A.4

Model	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	H1	H2	G	Collet Model	Nut Model	Weight (kg)	Order No.
ST10 -MEGA3S -120	0.45 - 3.25	10	10	120	22	38	M4 P0.7	NBC3S-□	MGN3S	0.06	961.777
ST12 -MEGA4S -130	0.45 - 4.05	12	12	130	26.5	47	M5 P0.8	NBC4S-□	MGN4S	0.11	961.773
				160						0.13	961.778
ST14 -MEGA6S -160	0.45 - 6.05	14	14	160	28.5	49	M7 P0.75	NBC6S-□	MGN6S	0.18	961.774
				200						0.21	961.779
ST16 -MEGA8S -160	2.95 - 8.05	18	16	160	31	50.5	M9 P0.75	NBC8S-□	MGN8S	0.23	803.596
				200						0.25	805.575

1. MEGA nut is included.

Spare Parts			Accessories							
MEGA Nut			MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		Taper Cleaner	
		<small>▶ A135</small>	<small>▶ A137</small>	<small>▶ A137</small>						
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-□	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-□	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-□	MGN6S-PS□	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-□	MGN8S-PS□	NBB8S	805.802	SC-NBC8S	805.827

MEGA Micro Chuck Set

Including convenient storage case.



Set Model	Order No.
SST12-MEGA4S-130	961.775

Set Model	Order No.
SST14-MEGA6S-160	961.776

Set Model	Order No.
SST16-MEGA8S-160	805.412

Contents

< SST12 - MEGA4S - 130 >

- Body / ST12 - MEGA4S - 130 (with MGN4S nut)
- Collet / NBC4S - 3.0 & 4.0 [2 pcs.]
- Wrench / MGR12

Contents

< SST14 - MEGA6S - 160 >

- Body / ST14 - MEGA6S - 160 (with MGN6S nut)
- Collet / NBC6S - 3.0, 4.0, 5.0 & 6.0 [4 pcs.]
- Wrench / MGR14

Contents

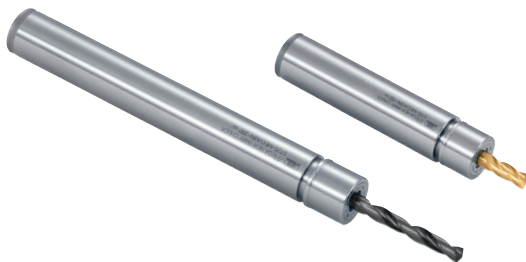
< SST16 - MEGA8S - 160 >

- Body / ST16 - MEGA8S - 160 (with MGN8S nut)
- Collet / NBC8S - 3.0, 4.0, 6.0 & 8.0 [4 pcs.]
- Wrench / MGR18

MEGA New Baby Chuck

Cylindrical shank models offer flexible solutions against possible interference in combination with MEGA Double Power Chuck.

- Clamping range: \varnothing 0.25 - \varnothing 20
- Coolant-through hole



A.4

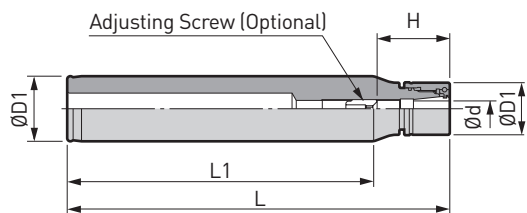


Fig. 1

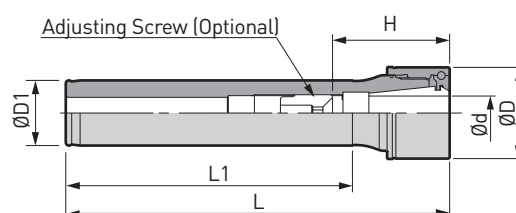


Fig. 2

Model	Fig.	Ød	ØD	ØD1	L	L1	H	Nut Model	Weight (kg)	Order No.			
ST20 -MEGA6N -150	1	0.25 - 6	20	20	150	126	20 - 40	MGN6F	0.3	961.781			
					250	226			0.5	961.782			
	2	0.5 - 8	25		150	115	23 - 42	MGN8F	0.4	961.784			
					250	215			0.6	961.785			
					-MEGA10N -150	1.5 - 10	30	150	110	35 - 45	MGN10F	0.4	961.787
								250	210			0.6	961.788
ST25 -MEGA8N -200	1	0.5 - 8	25	25	200	173	25 - 45	MGN8F	0.7	961.766			
	2	1.5 - 10	30		200	173	35 - 45	MGN10F	0.7	961.768			
					-MEGA13N -200	2.5 - 13	35	160	41 - 60	MGN13F	0.7	961.770	
								200	173	35 - 45	MGN10F	1.1	961.792
ST32 -MEGA10N -200	1	1.5 - 10	30	32	200	170	41 - 60	MGN13F	1.1	961.794			
						300			270	1.6	961.795		
	2	2.5 - 16	42		200	160	45 - 65	MGN16F	1.2	961.797			
					300	260			1.7	961.798			
					-MEGA20N -200	2.5 - 20	46	200	155	48 - 65	MGN20F	1.3	961.800
								300	255			1.9	961.801

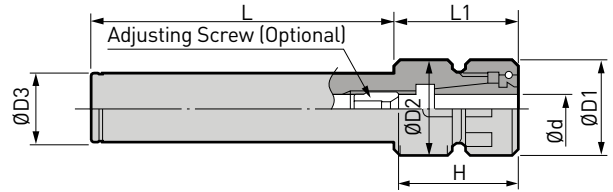
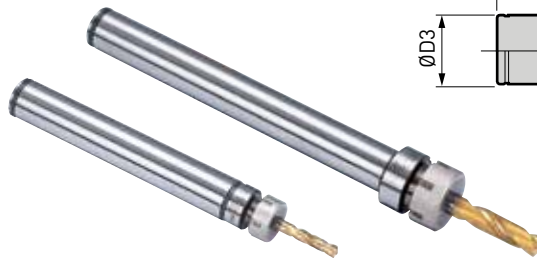
1. MEGA nut short type (MGN_F) is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. MEGA nut standard type and MEGA perfect seal can be used.

Spare Parts			Accessories									
	MEGA Nut Short Type  ▶ A144		MEGA Wrench 		NBC Collet  ▶ A138		MEGA Perfect Seal  ▶ A146		Adjusting Screw 		Rubber 	
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.	
MEGA6N	MGN6F	805.668	MGR20	969.454	NBC6-□	MPS6-□	NBA6B	M7	12	2	961.527	
MEGA8N	MGN8F	805.669	MGR25	969.456	NBC8-□	MPS8-□	NBA8B	M9	13	2.5	961.550	
MEGA10N	MGN10F	805.670	MGR30	969.458	NBC10-□	MPS10-□	NBA10B	M11	16	3	961.572	
MEGA13N	MGN13F	805.671	MGR35	969.460	NBC13-□	MPS13-□	NBA13B	M14	20	4	961.598	
MEGA16N	MGN16F	805.672	MGR42	969.462	NBC16-□	MPS16-□	NBA16B	M18	20	4	961.632	
MEGA20N	MGN20F	805.673	MGR46	969.465	NBC20-□	MPS20-□	NBA20B	M21	20	4	961.680	

New Baby Chuck

Avoids interference when used in combination with BIG KAISER New Hi-Power Milling Chuck.

- Clamping range: \varnothing 0.25 - \varnothing 20



A.4

Model	Ød	ØD1	ØD2	ØD3	L	L1	H	Weight (kg)	Order No.
ST20 -NBS6 -100	0.25 - 6	20	19.5	20	100	24	20 - 40	0.27	961.701
					150			0.39	961.702
					250			0.64	961.703
-NBS8 -100	0.5 - 8	25	24.5	20	100	26	23 - 43	0.29	961.706
					150			0.41	961.707
					250			0.66	961.708
-NBS10 -100	1.5 - 10	30	29.5	20	100	28	35 - 45	0.32	961.711
					150			0.44	961.712
					250			0.69	961.713
					350			0.93	961.714
ST25 -NBS8 -150	0.5 - 8	25	24.5	25	150	26	23 - 42	0.62	961.721
					200			0.81	961.722
					250			1.00	961.723
-NBS10 -150	1.5 - 10	30	29.5	25	150	28	35 - 45	0.65	961.726
					200			0.84	961.727
					250			1.03	961.728
-NBS13 -150	2.5 - 13	35	34.5	25	150	34	41 - 60	0.67	961.731
					200			0.86	961.732
					250			1.05	961.733
ST32 -NBS8 -150	0.5 - 8	25	24.5	32	150	26	23 - 42	0.99	961.741
					200			1.02	961.746
					250			1.33	961.747
-NBS10 -150	1.5 - 10	30	29.5	32	250	28	35 - 45	1.64	961.748
					350			1.95	961.749
					150			1.04	961.751
-NBS13 -150	2.5 - 13	35	34.5	32	200	34	41 - 60	1.35	961.752
					250			1.67	961.753
					300			2.30	961.754
-NBS16 -150	2.5 - 16	42	41.5	32	150	34	45 - 65	1.05	961.756
					200			1.37	961.757
					300			2.00	961.758
-NBS20 -150	2.5 - 20	46	45.5	32	150	34	48 - 65	1.05	961.761
					200			1.37	961.762
					300			2.00	961.763

- New baby nut is included.
- * coolant through hole is not available.
- "H" indicates the adjustment length with an adjustment screw.

Spare Parts			Accessories									
New Baby Nut			Wrench		NBC Collet		Baby Perfect Seal		Adjusting Screw		Rubber	
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.	
NBS6	NBN6	961.526	NBK6	961.525	NBC6-□	BPS6-□	NBA6B	M7	12	2	961.527	
NBS8	NBN8	961.549	NBK8	961.548	NBC8-□	BPS8-□	NBA8B	M9	13	2.5	961.550	
NBS10	NBN10	961.571	NBK10	961.570	NBC10-□	BPS10-□	NBA10B	M11	16	3	961.572	
NBS13	NBN13	961.597	NBK13	961.596	NBC13-□	BPS13-□	NBA13B	M14	20	4	961.598	
NBS16	NBN16	961.631	NBK16	961.630	NBC16-□	BPS16-□	NBA16B	M18	20	4	961.632	
NBS20	NBN20	961.679	NBK20	961.678	NBC20-□	BPS20-□	NBA20B	M21	20	4	961.680	

Hydraulic Chuck Super Slim

High precision Hydraulic Chuck with cylindrical body eliminates any interface problem.

- Clamping range: $\varnothing 4 - \varnothing 20$
- Coolant-through hole

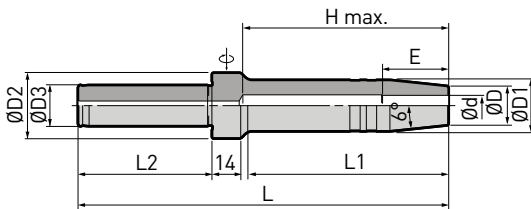


Fig. 1



Fig. 2

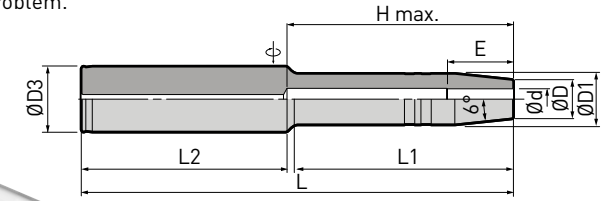
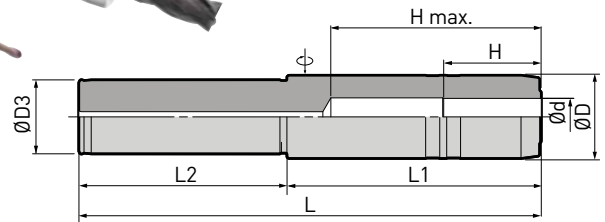


Fig. 3



A.4

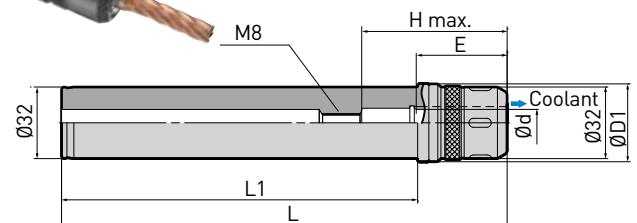
Model	Fig.	$\varnothing d$	$\varnothing D$	$\varnothing D1$	$\varnothing D2$	$\varnothing D3$	L	L1	L2	E	H max.	Weight (kg)	Order No.
ST20 -HDC4S -180	1	4	14	18	32	20	180	94	65	19	101	0.40	805.835
		-HDC6S -180	6	20				25		0.43		805.836	
		-HDC8S -180	8	17				23		31		0.50	805.837
		-HDC10S -180	10	19				25		33		0.54	805.838
		-HDC12S -180	12	21				28		36		0.61	805.839
ST32 -HDC10S -210	2	10	19	25	-	32	210	106	100	33	110	0.98	805.595
		-HDC12S -210	12	21				28		36	109	1.06	805.560
	-HDC16 -200	3	16	36			-	200	110	90	43	91	1.27
-HDC20 -200			20	38	-	90	1.28		805.841				

For Inner Bore Cleaner ▶ A170

New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant

- Clamping range: $\varnothing 12$
- Coolant to cutting tool periphery



Model	$\varnothing d$	$\varnothing D1$	L	L1	H max.	E	Wrench	Weight (kg)	Order No.
ST32 -HMC12J -120	12	35	120	80	65	43	NBK13	0.7	805.842
			160	120				0.9	805.843
			200	160				1.1	805.844

1. Wrench is to be ordered separately.

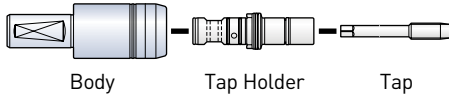
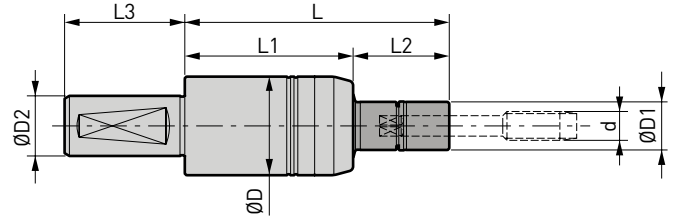
For Straight Collet ▶ A158

For Wrench ▶ A161

MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

- Tapping range: M3 - M20
- Coolant-through hole



Body Tap Holder Tap

A.4

Model	Tap Holder Model	d	ØD	ØD1	ØD2	L	L1	L2	L3	Weight (kg)	Order No.
ST20 -MGT6 - 65	MGT6-d - 30	M3 - M8	36	16	20	95	65	30	40	0.5	963.601
	- 70					70					
	-100					100					
ST25 -MGT12 - 70	MGT12-d - 30	M5 - M12 P1/8	41	20	25	100	70	30	50	0.8	963.602
	- 70					70					
	-100					100					
ST32 -MGT20 - 90	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	32	125	90	35	55	1.5	963.603
	- 85					85					
	-115					115					

1. Tap holder and wrench are to be ordered separately.
2. Rigid tapping function is required on the machine tool.
3. Side lock holder model TSL is recommended as a basic holder.

For Tap Holders ▶ A162

For Accessories ▶ A166

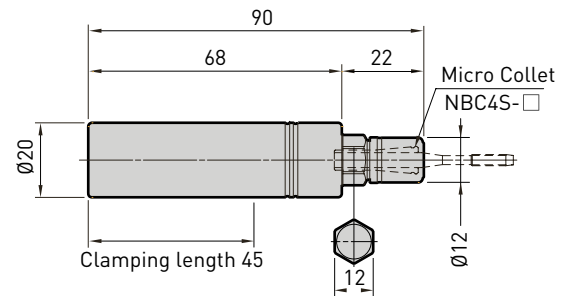
For Side Lock Holder BBT ▶ A25

For Side Lock Holder BDV ▶ A43

For Side Lock Holder BIG CAPTO ▶ A109

For small Tap MGT3

- Tapping range: M1 - M3
- Collet chuck system

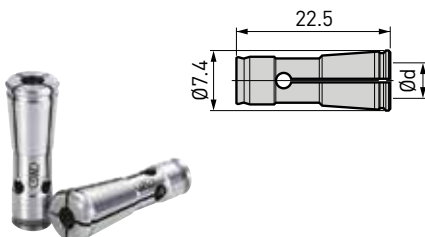


Model	Order No.
ST20-MGT3-90	978.356

For Accessories ▶ A166

1. Nut is included. MEGA Wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

Micro Collet for MGT3



Model	Tapping Range d			Tap Shank	Order No.
	DIN371	ISO529	JIS	Ød	
NBC4S-2.5AA	M1 - M1.8	M2	-	2.5	961.468
NBC4S-2.8AA	M2 - M2.6	M2.2, M2.5	-	2.8	968.353
NBC4S-3.0AA	-	-	M1 - M2.6	3.0	961.470
NBC4S-3.1AA	-	M3	-	3.15	968.355
NBC4S-3.5AA	M3	-	-	3.5	961.472
NBC4S-4.0AA	-	-	M3	4.0	961.474

1. Other sizes available. Please refer to micro collet.

For Micro Collet ▶ A135

Other products with cylindrical shank



▶ A179

Point Master

- Touch probe and edge finder
- High precision stroke and interchangeable stylus for measuring different applications



▶ A183

Accu Center

- Edge finder
- Simple and precise edge finder offering repeatability within 3 µm



▶ A189/200

Fullcut Mill

- Indexable insert endmill
- Shoulder and slot milling cutter with both high radial and axial rake angle



▶ A213

C-Cutter Mini

- Ultra high feed chamfer mill
- 4 inserts and small tool diameter minimize cutting speed



▶ A218

C-Cutter

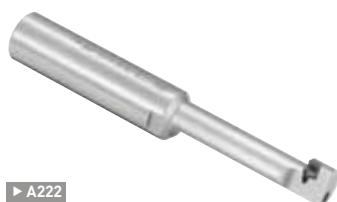
- Wide range chamfer mill
- Reduced number of tools and tool change time



▶ A220

R-Cutter

- Corner rounding mill
- Front & back chamfering
- 4 inserts multiply feed rate



▶ A222

BF-Cutter

- Back spot facing tool for cap screw hole
- Selected spot facing diameters suitable for cap screws



▶ A223

Center Boy

- Center and chamfer in one
- Accurate centering and chamfering can be obtained in a single operation



▶ B35

MW

- Twin-cutter boring head
- Fast and efficient roughing of small bore Ø 16 - 21 mm

Millturn Tooling

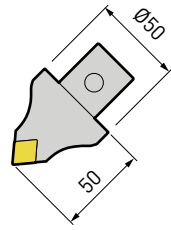
HSK-T SERIES	
Selection Guide	92 - 93
Modular Turning Tools	94 - 99
BIG CAPTO SERIES	
Selection Guide	100 - 101
Modular Turning Tools	102 - 110
Rotation Tools	111 - 123

45°

S50
Type S basic holder

HSK-T 63-S50 - 60
- 75
- 100
HSK-T100-S50 - 115

▶ A94



Type S cartridge ▶ A95

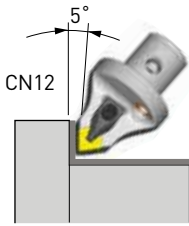
No. 1

No. 2

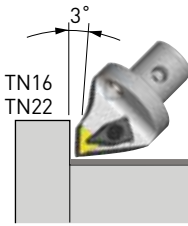
No. 3

No. 4

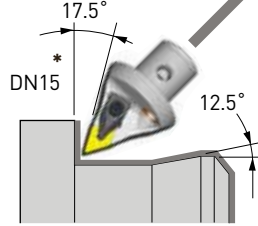
No. 5



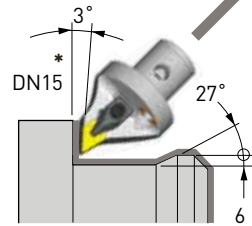
S50-DCLNN-00050-12



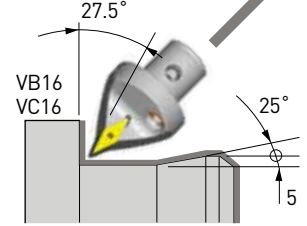
S50-DTJNR-00050-16(22)
-DTJNL-00050-16(22)



S50-DDHNN-00050-15



S50-DDJNR-00050-15
-DDJNL-00050-15



S50-SVQBN-00050-16

* In case of DN1506 insert (thickness of 6.35mm), please replace the standard Carbide Shim by DNS1506 (option).

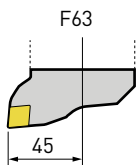
A.5

90°

F63
Type F
basic holder

HSK-T 63-F63
HSK-T100-F63

▶ A96



S63
Type S
basic holder

▶ A94



Type S cartridge ▶ A95

No. 1
No. 3
No. 5
No. 8

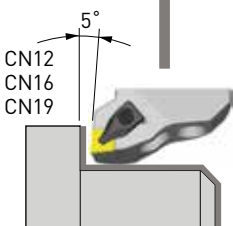
Type F cartridge ▶ A97

No. 10

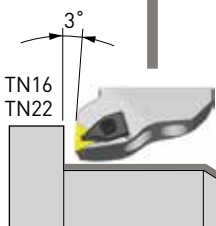
No. 12

No. 13

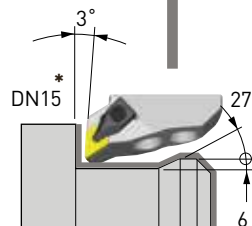
No. 14



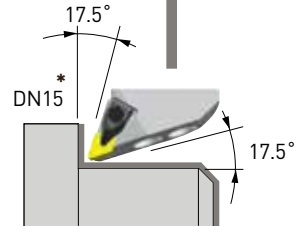
F63-DCLNR-45035-12(16)
-DCLNL-45035-12(16)
F63-PCLNR-45045-19
-PCLNL-45045-19



F63-DTJNR-45035-16(22)
-DTJNL-45035-16(22)

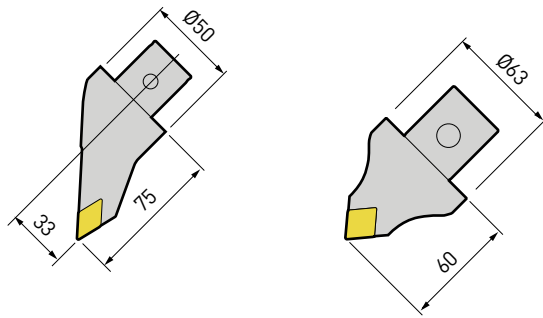


F63-DDJNR-45035-15
-DDJNL-45035-15



F63-DDHNR-45040-15
-DDHNL-45040-15

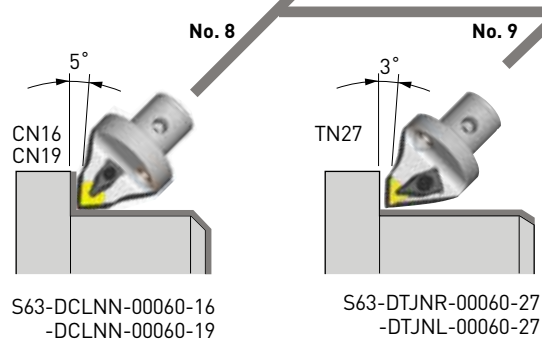
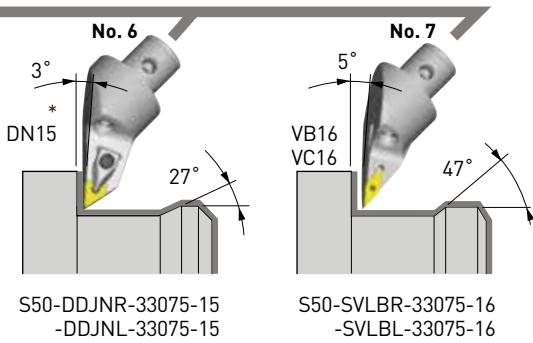
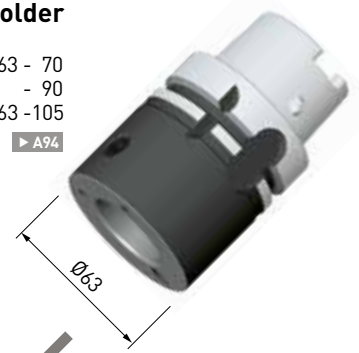
* In case of DN1506 insert (thickness of 6.35mm), please replace the standard Carbide Shim by DNS1506 (option).



S63
Type S basic holder

HSK-T 63-S63 - 70
- 90
HSK-T100-S63-105

▶ A94



S50-DDJNR-33075-15
-DDJNL-33075-15

S50-SVLBR-33075-16
-SVLBL-33075-16

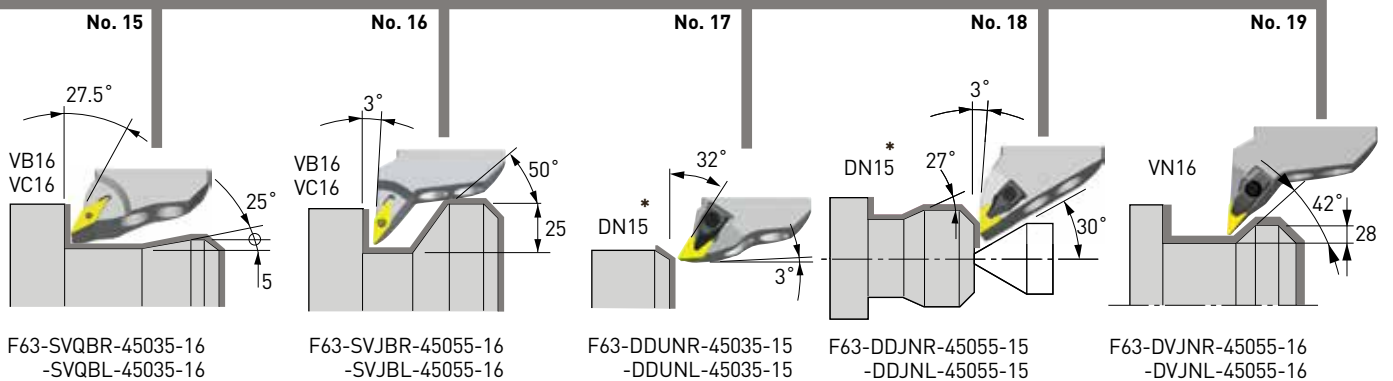
S63-DCLNN-00060-16
-DCLNN-00060-19

S63-DTJNR-00060-27
-DTJNL-00060-27

Boring bar holder ▶ A99



Square tool holder ▶ A98



F63-SVQBR-45035-16
-SVQBL-45035-16

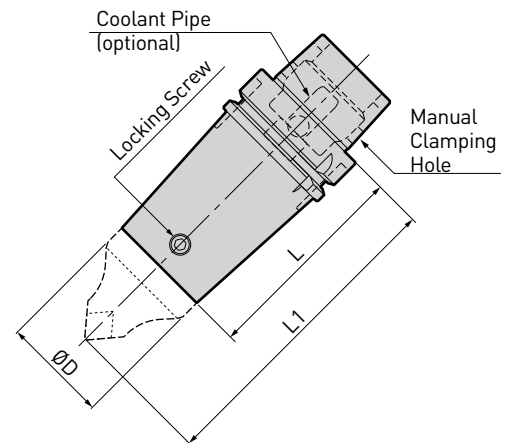
F63-SVJBR-45055-16
-SVJBL-45055-16

F63-DDUNR-45035-15
-DDUNL-45035-15

F63-DDJNR-45055-15
-DDJNL-45055-15

F63-DVJNR-45055-16
-DVJNL-45055-16

45° Basic Holder Type S



A.5

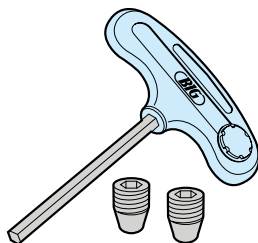
Type	Model	ØD	L	L1	Locking Screw	Order No.
S50	HSK-T63 -S50 - 60	50	60	110	CK5S	801.303
	- 75		75	125		974.006
	-100		100	150		801.302
S63	-S63 - 70	63	70	130	CK6S	805.874
	- 90		90	150		805.875
S50	HSK-T100 -S50 -115	50	115	165	CK5S	805.876
S63	-S63 -105	63	105	165	CK6S	805.877

1. Basic holders include a locking screw.
2. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ A81

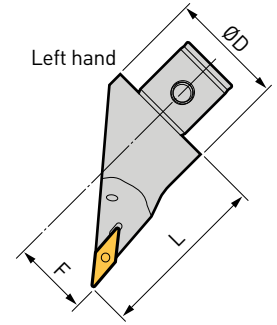
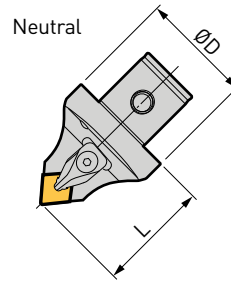
Locking screw set (option)

For type S basic holder



Type	Set-Model	Screw (2p)	T-Wrench (1p)	Order No.
S50	CK5S	M10 x P1.0	CK-T5	805.891
S63	CK6S	M12 x P1.0	CK-T6	805.892

45° Cartridge Type S



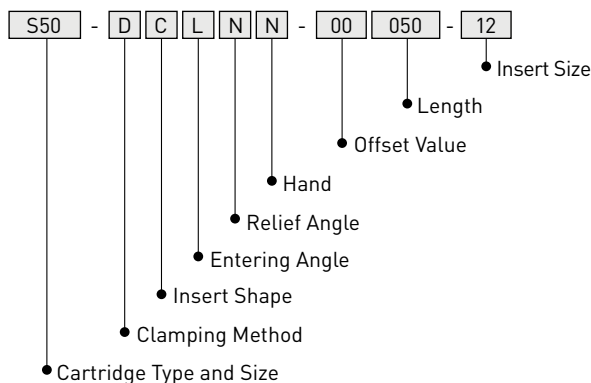
A.5

Entering Angle	No.	Hand	Model	Insert	F	L	ØD	Clamp Piece	Order No.
95°	1	N	S50 -DCLNN -00050-12	CN1204 Rhombic 80°	0	50	50	CP2	973.014
	8	N	S63 -DCLNN -00060-16	CN1606 Rhombic 80°	0	60	63	CP3	973.025
			-00060-19	CN1906 Rhombic 80°				CP5	805.724
93°	2 - 1	R	S50 -DTJNR -00050-16	TN1604 Triangle 60°	0	50	50	CP1	973.015
		L	-DTJNL -00050-16						973.016
93°	2 - 2	R	S50 -DTJNR -00050-22	TN2204 Triangle 60°	0	50	50	CP2	802.130
		L	-DTJNL -00050-22						802.129
93°	9	R	S63 -DTJNR -00060-27	TN2706 Triangle 60°	0	60	63	CP3	805.725
		L	-DTJNL -00060-27						805.726
93°	4	R	S50 -DDJNR -00050-15	DN1504 * (DN1506) Rhombic 55°	0	50	50	CP2	973.017
		L	-DDJNL -00050-15						973.018
	6	R	S50 -DDJNR -33075-15		33	75			973.019
		L	-DDJNL -33075-15						973.020
107.5°	3	N	S50 -DDHNN -00050-15		0	50		973.021	
95°	7	R	S50 -SVLBR -33075-16	VB1604 **	33	75	50	M3.5 ***	973.022
		L	-SVLBL -33075-16	VC1604 **					973.023
117.5°	5	N	S50 -SVQBN -00050-16	Rhombic 35°	0	50		973.024	

For Spare Parts ▶ A110

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. * Carbide shim for 4.76 mm thick DIN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim by DNS1506 (option).
4. ** Both VB1604 and VC1604 inserts are suitable.
5. *** M3.5 is screw-on type.

Coding system for cartridge



Clamping Method	
D	Double-Clamp
P	Lever lock
S	Screw-On

Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°

Relief Angle	
N	0° Negative
B	5° Positive
C	7° Positive

Hand	
R	Right Hand
L	Left Hand
N	Neutral

90° Basic Holder Type F



A.5

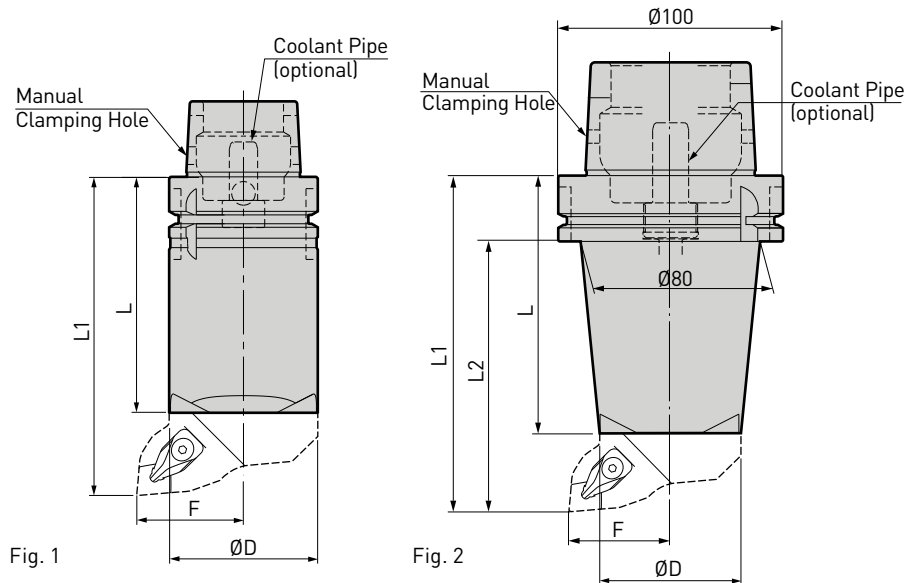


Fig. 1

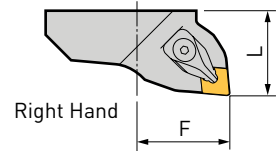
Fig. 2

Type	Model	Fig.	ØD	L	L1	L2	F	Order No.
F63	HSK-T63 -F63 - 50	1	63	50	85	-	45	801.301
	- 75			75	110			974.056
	-100			100	135			974.057
	-130			130	165			801.299
	-170			170	205			801.300
F63	HSK-T100 -F63 -100	2	63	100	135	105	45	805.878
	-150			150	185	155		805.879

1. Basic holders include M10x22L and M10x25L screws for clamping cartridges.
2. Hexagon wrench is required to clamp cartridge (not included).
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ A81

90° Cartridge Type F63



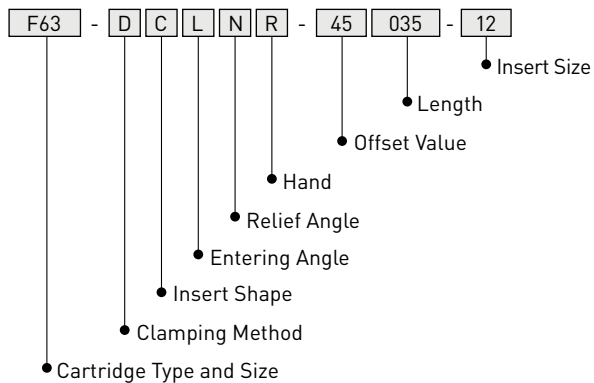
Entering Angle	No.	Hand	Model	Insert	F	L	Clamp Piece	Order No.
95°	10 - 1	R	F63 -DCLNR -45035-12	CN1204 Rhombic 80°	45	35	CP2	973.076
		L	-DCLNL -45035-12					973.077
	10 - 2	R	F63 -DCLNR -45035-16	CN1606 Rhombic 80°	45	35	CP3	973.078
		L	-DCLNL -45035-16					973.079
	10 - 3	R	F63 -PCLNR -45045-19	CN1906 Rhombic 80°	45	45	Lever lock	801.023
		L	-PCLNL -45045-19					801.022
93°	12 - 1	R	F63 -DTJNR -45035-16	TN1604 Triangle 60°	45	35	CP1	973.080
		L	-DTJNL -45035-16					973.081
	12 - 2	R	F63 -DTJNR -45035-22	TN2204 Triangle 60°	45	35	CP2	801.017
		L	-DTJNL -45035-22					801.016
93°	13	R	F63 -DDJNR -45035-15	DN1504 * (DN1506) Rhombic 55°	45	35	CP2	973.082
		L	-DDJNL -45035-15					973.083
	18	R	F63 -DDJNR -45055-15		45	55	CP2	973.084
		L	-DDJNL -45055-15					973.085
107.5°	14	R	F63 -DDHNR -45040-15		45	40	CP2	978.374
		L	-DDHNL -45040-15					978.373
93°	17	R	F63 -DDUNR -45035-15		45	35	CP2	801.015
		L	-DDUNL -45035-15					801.014
117.5°	15	R	F63 -SVQBR -45035-16	VB1604 ** VC1604 ** Rhombic 35°	45	35	M3.5 ***	973.086
		L	-SVQBL -45035-16					973.087
93°	16	R	F63 -SVJBR -45055-16		45	55	M3.5 ***	801.025
		L	-SVJBL -45055-16					801.024
93°	19	R	F63 -DVJNR -45055-16	VN1604 Rhombic 35°	45	55	CP4	801.019
		L	-DVJNL -45055-16					801.018

A.5

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. * Carbide shim for 4.76 mm thick DIN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim by DNS1506 (option).
4. ** Both VB1604 and VC1604 inserts are suitable.
5. *** M3.5 is screw-on type.

For Spare Parts ▶ A110

Coding system for cartridge



Clamping Method	
D	Double-Clamp
P	Lever lock
S	Screw-On

Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

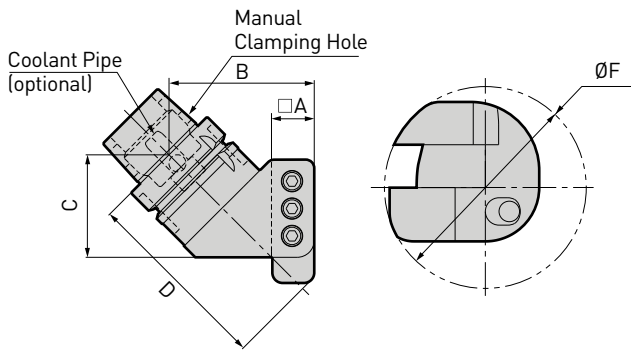
Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°
U	93°

Relief Angle	
N	0° Negative
B	5° Positive
C	7° Positive

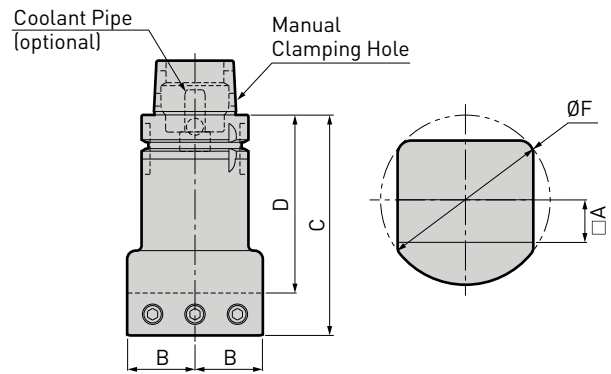
Hand	
R	Right Hand
L	Left Hand
N	Neutral

Square Tool Holder

45 Type



90 Type



A.5

Hand	Model	A	B	C	D	ØF	Order No.
R	HSK-T63 -45 -BH25R -110	25	85	60	110	118	974.028
L	-BH25L -110						801.294

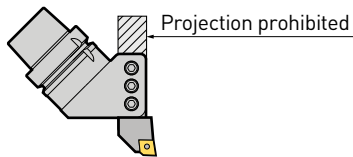
For Coolant Pipe ▶ A81

Hand	Model	A	B	C	D	ØF	Order No.
N	HSK-T63 -90 -BH20N - 80	20	32	80	60	80	801.295
	-BH25N -100	25	40	100	75	100	801.296
	-BH25N -130			130	105		801.297
N	HSK-T100 -90 -BH25N -150	25	55	150	125	128	805.537

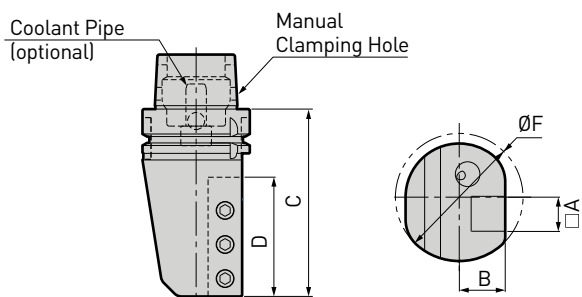
For Coolant Pipe ▶ A81

Caution

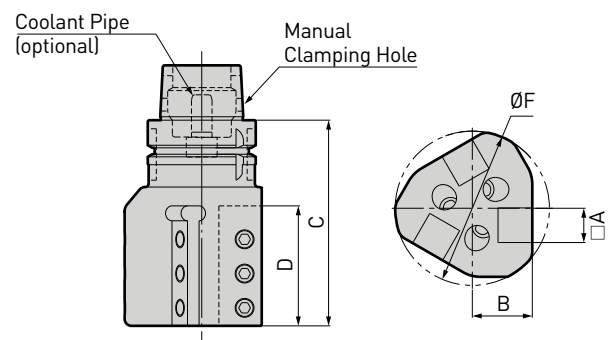
The excess length of a turning tool must be cut off to avoid interference with an ATC arm.



180 Type



180 Multi Type



Hand	Model	A	B	C	D	ØF	Order No.
R	HSK-T63 -180 -BH20R -110	20	27	110	70	75	801.293
L	-BH20L -110						974.035
R	HSK-T63 -180 -BH25R -115	25	29.5	115	80	90	978.390
L	-BH25L -115						978.391
R	HSK-T100 -180 -BH25R -140	25	50	140	90	120	805.306
L	-BH25L -140						805.305
R	-BH25R -180						805.536
L	-BH25L -180						805.535

For Coolant Pipe ▶ A81

Hand	Model	A	B	C	D	ØF	Order No.
R	HSK-T63 -180 -3BH20R -120	20	35	120	70	90	801.290
L	-3BH20L -120						801.289
R	HSK-T63 -180 -3BH25R -120	25	45	120	80	110	801.292
L	-3BH25L -120						801.291

For Coolant Pipe ▶ A81

Caution

60 degree indexing is required to the machine tool spindle.

Boring Bar Holder

Application: boring and thread cutting

- Clamping range: $\varnothing 6 - \varnothing 40$
- Coolant-through hole

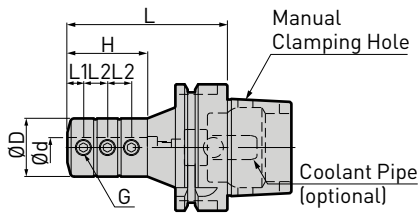


Fig. 1

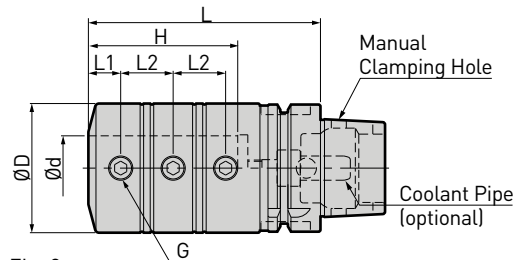


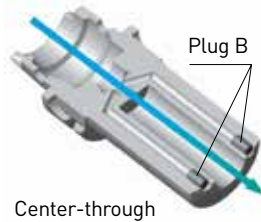
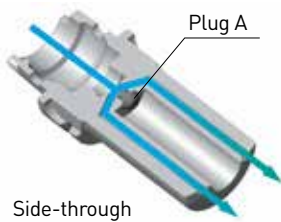
Fig. 2

Model	Fig.	$\varnothing d$	$\varnothing D$	L	L1	L2	H	G	Order No.
HSK-T63 -BSL6 - 70	1	6	23	70	5	8	24	M5 P0.8	979.198
		8	25	75	6	10	32	M6 P1.0	801.298
		10	29	80	8	12	40	M8 P1.0	979.199
		12	34	85		16	45		974.100
		16	40	100	10	21	60	M10 P1.25	978.135
20	50	105	12	20	60	M10 P1.25	974.102		
-BSL25 -105	2	25	55	105	14	23	67	M12 P1.5	974.103
		32	64	115	16	26	74		978.342
		40	80	135	18	32	91	M16 P1.5	978.306
		16	40	105	10	21	60	M10 P1.25	805.880
-BSL20 -110	1	20	50	110	12	20	60	M10 P1.25	805.881
-BSL25 -120		25	55	120	14	23	67	M12 P1.5	805.538
-BSL32 -125		32	64	125	16	26	74		805.539
-BSL40 -135		40	80	135	18	32	90	M16 P1.5	805.540

1. Coolant pipe is to be ordered separately.
2. Reduction sleeve (BSL sleeve) is available.

For Coolant Pipe ▶ A81
For BSL Sleeve ▶ A108

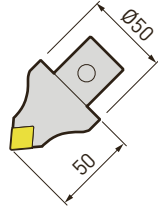
Interchangeable between center-through and side-through coolant supply by using plugs.
Adjustment for either right hand or left hand is also possible.



Chuck Model	Plug A	Plug B
BSL 6	M5 P0.8	M4 P0.7
8	M6 P1.0	
10		
12		
16		
20	M6 P1.0 *	M6 P1.0
25	M8 P1.25 *	
32		
40		

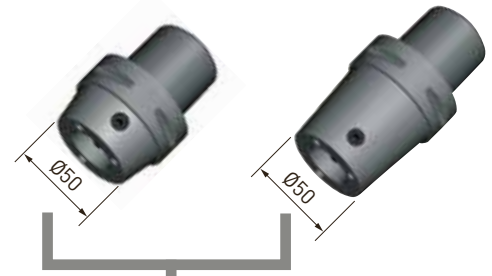
1. Both plugs are included as standard.
2. * Button-head bolt.

45°

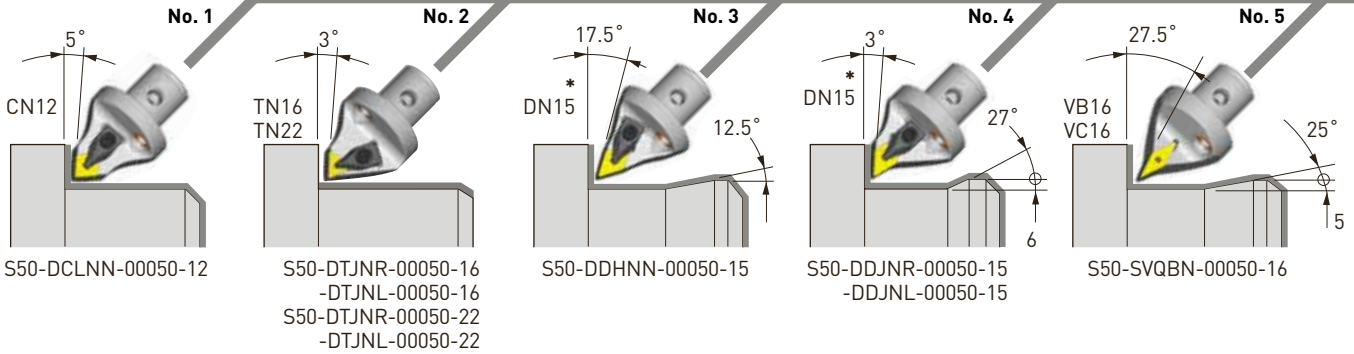


S50
Type S basic holder

- C5-S50- 40
 - 55
 - 75
 - C6-S50- 75
 - 100
 - C8-S50-135
- ▶ A102



Type S cartridge ▶ A103



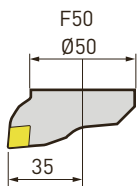
* In case of DN1506 insert (thickness of 6.35 mm), please replace the standard Carbide Shim by DNS1506 (option).

A.5

90°

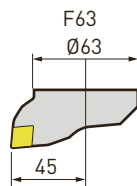
F50
Type F
basic holder

- C5-F50- 25
 - 50
 - 85
 - 125
- ▶ A104



F63
Type F
basic holder

- C6-F63- 30
 - 75
 - 100
 - 130
 - 170
 - C8-F63- 45
 - 100
 - 130
 - 170
- ▶ A104



S50/S63
Type S
basic holder

▶ A102

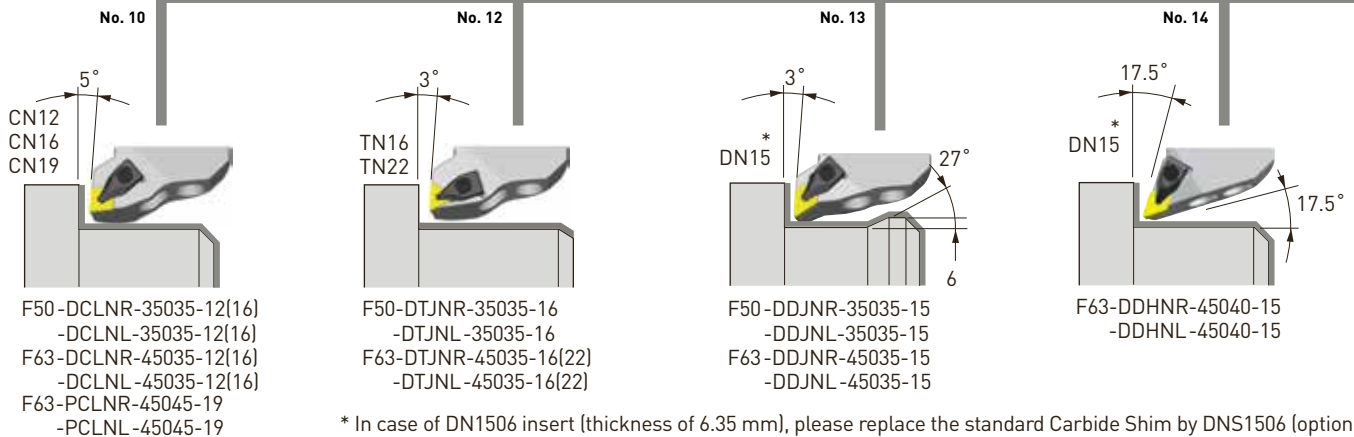


Type S cartridge

▶ A103

- No. 1
- No. 3
- No. 5
- No. 8

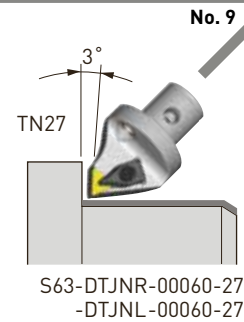
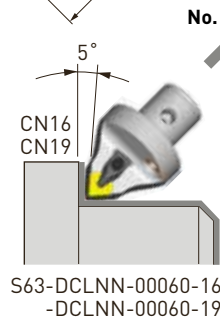
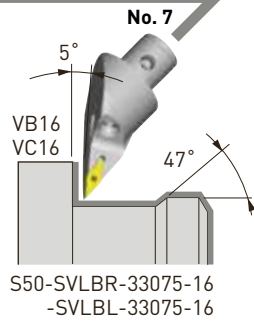
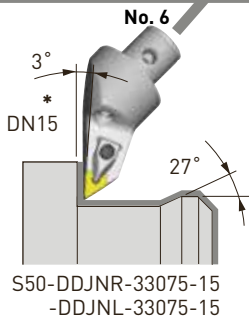
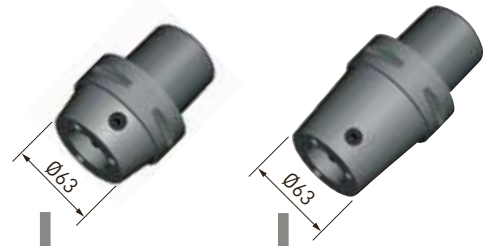
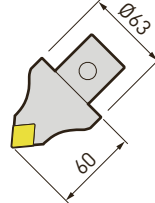
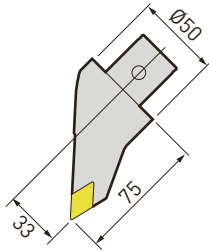
Type F cartridge ▶ A104



* In case of DN1506 insert (thickness of 6.35 mm), please replace the standard Carbide Shim by DNS1506 (option).

S63
Type S basic holder

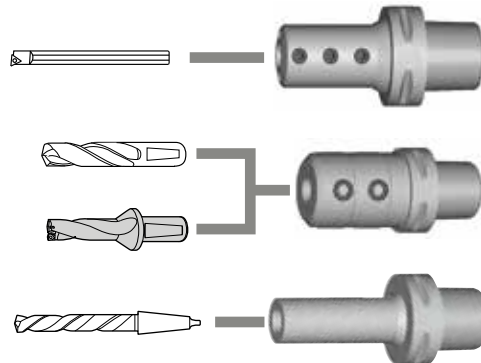
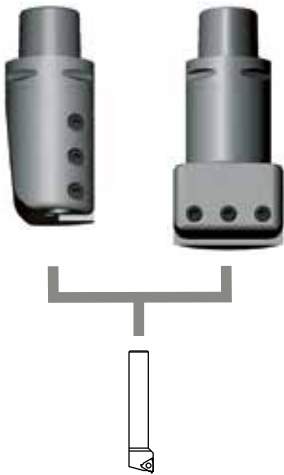
C6-S63- 50
- 90
C8-S63-125
▶ A102



A.5

Square tool holder

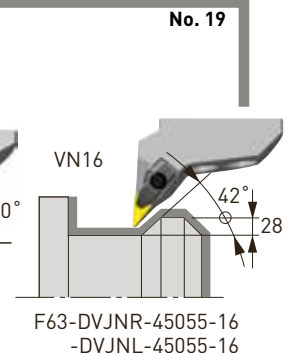
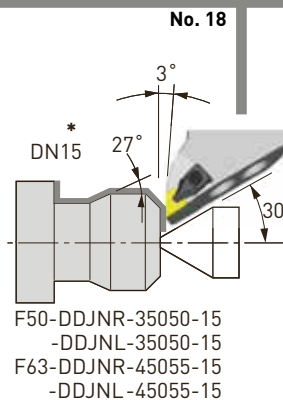
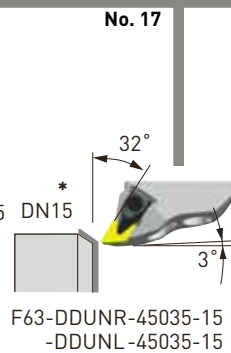
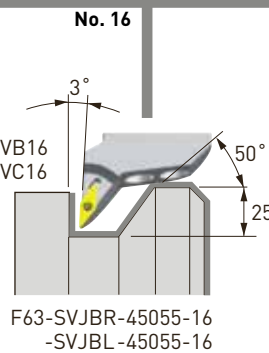
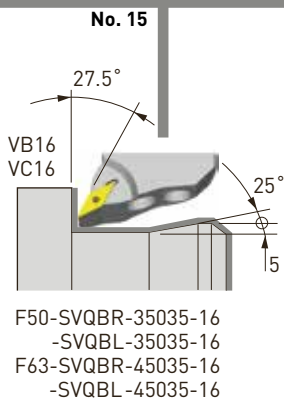
▶ A106



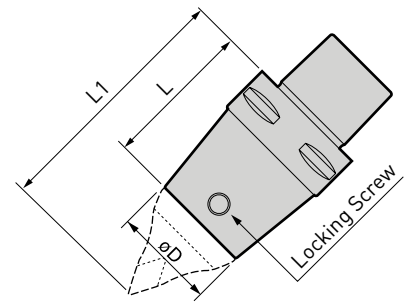
Boring bar holder
▶ A108

Side lock holder
▶ A109

Morse taper holder
▶ A122



45° Basic Holder Type S



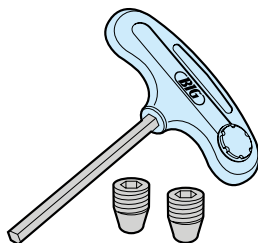
A.5

Type	Model	ØD	L	L1	Locking Screw	Order No.
S50	C5 -S50 - 40	50	40	90	CK5S	973.001
	- 55		55	105		973.002
	- 75		75	125		973.003
S50	C6 -S50 - 75	50	75	125	CK5S	973.006
	-100		100	150		973.007
S63	-S63 - 90	63	90	150	CK6S	805.530
S50	C8 -S50 -135	50	135	185	CK5S	973.011
S63	-S63 -125	63	125	185	CK6S	973.013

1. Basic holders include a locking screw.

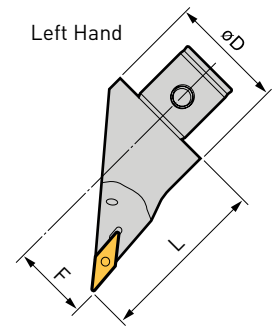
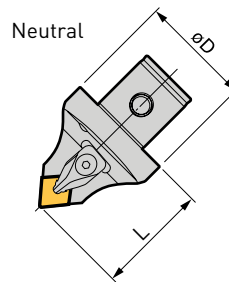
Locking Screw Set (option)

For type S basic holder



Type	Set-Model	Screw (2p)	T-Wrench (1p)	Order No.
S50	CK5S	M10 x P1.0	CK-T5	805.891
S63	CK6S	M12 x P1.0	CK-T6	805.892

45° Cartridge Type S



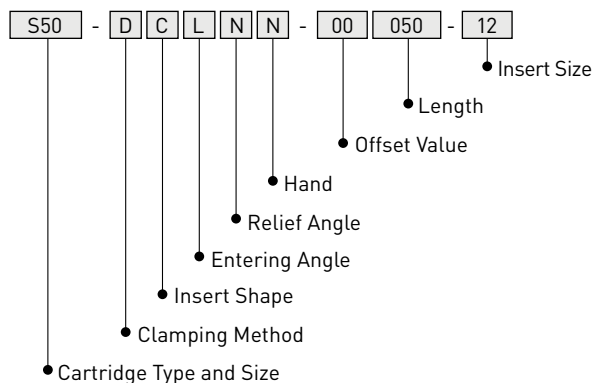
Entering Angle	No.	Hand	Model	Insert	F	L	ØD	Clamp Piece	Order No.
95°	1	N	S50 -DCLNN -00050-12	CN1204 Rhombic 80°	0	50	50	CP2	973.014
	8	N	S63 -DCLNN -00060-16	CN1606 Rhombic 80°	0	60	63	CP3	973.025
			-00060-19	CN1906 Rhombic 80°				CP5	805.724
93°	2 - 1	R	S50 -DTJNR -00050-16	TN1604 Triangle 60°	0	50	50	CP1	973.015
		L	-DTJNL -00050-16						973.016
93°	2 - 2	R	S50 -DTJNR -00050-22	TN2204 Triangle 60°	0	50	50	CP2	802.130
		L	-DTJNL -00050-22						802.129
93°	9	R	S63 -DTJNR -00060-27	TN2706 Triangle 60°	0	60	63	CP3	805.725
		L	-DTJNL -00060-27						805.726
93°	4	R	S50 -DDJNR -00050-15	DN1504 * (DN1506) Rhombic 55°	0	50	50	CP2	973.017
		L	-DDJNL -00050-15						973.018
	6	R	S50 -DDJNR -33075-15		33	75			973.019
		L	-DDJNL -33075-15						973.020
107.5°	3	N	S50 -DDHNN -00050-15		0	50		973.021	
95°	7	R	S50 -SVLBR -33075-16	VB1604 **	33	75	50	M3.5 ***	973.022
		L	-SVLBL -33075-16	VC1604 **					973.023
117.5°	5	N	S50 -SVQBN -00050-16	Rhombic 35°	0	50		973.024	

A.5

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. * Carbide shim for 4.76 mm thick DIN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim by DNS1506 (option).
4. ** Both VB1604 and VC1604 inserts are suitable.
5. *** M3.5 is screw-on type.

For Spare Parts ▶ A110

Coding system for cartridge



Clamping Method	
D	Double-Clamp
P	Lever lock
S	Screw-On

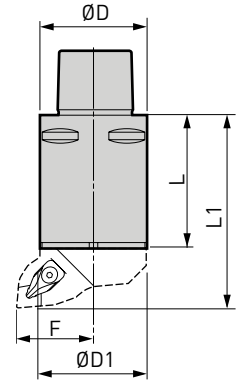
Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°

Relief Angle	
N	0° Negative
B	5° Positive
C	7° Positive

Hand	
R	Right Hand
L	Left Hand
N	Neutral

90° Basic Holder Type F

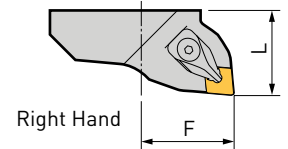


A.5

Type	Model	ØD	ØD1	L	L1	F	Order No.
F50	C5 -F50 - 25	50	50	25	60	35	801.657
	- 50			50	85		973.052
	- 85			85	120		973.053
	-125			125	160		973.054
F63	C6 -F63 - 30	63	63	30	65	45	973.055
	- 75			75	110		973.056
	-100			100	135		973.057
	-130			130	165		973.058
	-170			170	205		973.059
F63	C8 -F63 - 45	80	63	45	80	45	973.060
	-100			100	135		973.061
	-130			130	165		973.062
	-170			170	205		973.063

1. Basic holders include M10x22L and M10x25L screws for clamping cartridges.
2. Hexagon wrench is required to clamp cartridge (not included).

90° Cartridge Type F50

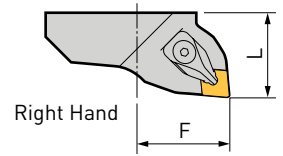


Entering Angle	No.	Hand	Model	Insert	F	L	Clamp Piece	Order No.
95°	10 - 1	R	F50 -DCLNR -35035-12	CN1204 Rhombic 80°	35	35	CP2	973.064
		L	-DCLNL -35035-12					973.065
95°	10 - 2	R	F50 -DCLNR -35035-16	CN1606 Rhombic 80°	35	35	CP3	973.066
		L	-DCLNL -35035-16					973.067
93°	12 - 1	R	F50 -DTJNR -35035-16	TN1604 Triangle 60°	35	35	CP1	973.068
		L	-DTJNL -35035-16					973.069
95°	13	R	F50 -DDJNR -35035-15	DN1504 * (DN1506) Rhombic 55°	35	35	CP2	973.070
		L	-DDJNL -35035-15					973.071
	18	R	F50 -DDJNR -35050-15		35	50	CP2	973.072
		L	-DDJNL -35050-15					973.073
117.5°	15	R	F50 -SVQBR -35035-16	VB1604 **	35	35	M3.5 ***	805.578
		L	-SVQBL -35035-16	VC1604 ** Rhombic 35°				805.727

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. * Carbide shim for 4.76 mm thick DIN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim by DNS1506 (option).
4. ** Both VB1604 and VC1604 inserts are suitable.
5. *** M3.5 is screw-on type.

For Spare Parts ▶ A110

90° Cartridge Type F63



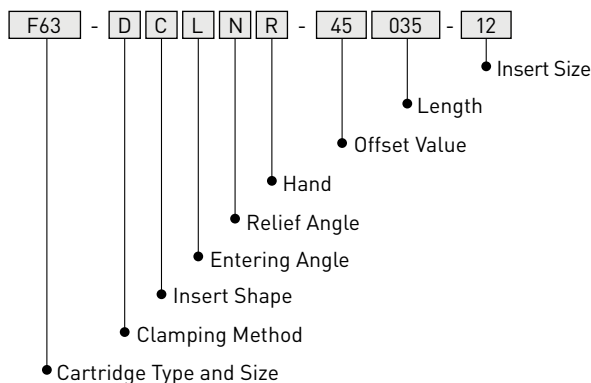
Entering Angle	No.	Hand	Model	Insert	F	L	Clamp Piece	Order No.
95°	10 - 1	R	F63 -DCLNR -45035-12	CN1204 Rhombic 80°	45	35	CP2	973.076
		L	-DCLNL -45035-12					973.077
	10 - 2	R	F63 -DCLNR -45035-16	CN1606 Rhombic 80°	45	35	CP3	973.078
		L	-DCLNL -45035-16					973.079
	10 - 3	R	F63 -PCLNR -45045-19	CN1906 Rhombic 80°	45	45	Lever lock	801.023
		L	-PCLNL -45045-19					801.022
93°	12 - 1	R	F63 -DTJNR -45035-16	TN1604 Triangle 60°	45	35	CP1	973.080
		L	-DTJNL -45035-16					973.081
	12 - 2	R	F63 -DTJNR -45035-22	TN2204 Triangle 60°	45	35	CP2	801.017
		L	-DTJNL -45035-22					801.016
93°	13	R	F63 -DDJNR -45035-15	DN1504 * (DN1506) Rhombic 55°	45	35	CP2	973.082
		L	-DDJNL -45035-15					973.083
	18	R	F63 -DDJNR -45055-15		45	55	CP2	973.084
		L	-DDJNL -45055-15					973.085
107.5°	14	R	F63 -DDHNR -45040-15		45	40	CP2	978.374
		L	-DDHNL -45040-15					978.373
93°	17	R	F63 -DDUNR -45035-15		45	35	CP2	801.015
		L	-DDUNL -45035-15					801.014
117.5°	15	R	F63 -SVQBR -45035-16	VB1604 ** VC1604 ** Rhombic 35°	45	35	M3.5 ***	973.086
		L	-SVQBL -45035-16					973.087
93°	16	R	F63 -SVJBR -45055-16	45	55	M3.5 ***	801.025	
		L	-SVJBL -45055-16				801.024	
93°	19	R	F63 -DVJNR -45055-16	VN1604 Rhombic 35°	45	55	CP4	801.019
		L	-DVJNL -45055-16					801.018

A.5

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. * Carbide shim for 4.76 mm thick DIN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim by DNS1506 (option).
4. ** Both VB1604 and VC1604 inserts are suitable.
5. *** M3.5 is screw-on type.

For Spare Parts ▶ A110

Coding system for cartridge



Clamping Method	
D	Double-Clamp
P	Lever lock
S	Screw-On

Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

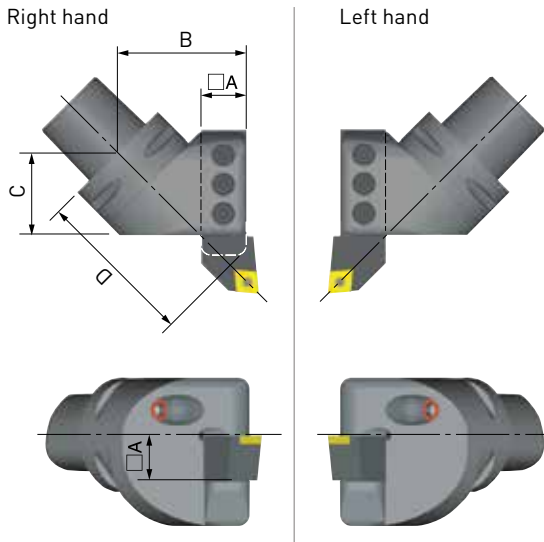
Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°
U	93°

Relief Angle	
N	0° Negative
B	5° Positive
C	7° Positive

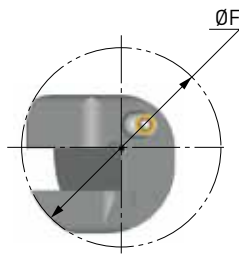
Hand	
R	Right Hand
L	Left Hand
N	Neutral

Square Tool Holder

45 Type



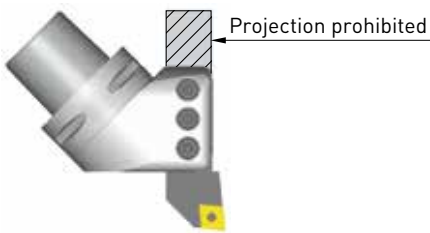
Hand	Model	□A	B	C	D	ØF	Weight (kg)	Order No.
R	C5-45-BH20R-5838	20	58	38	73	94	1.2	973.026
L	-BH20L-5838						1.2	973.027
R	C6-45-BH25R-7752	25	77	52	100	118	2.5	973.028
L	-BH25L-7752						2.5	800.776
R	C8-45-BH32R-85109	32	85	109	145	135	7.3	973.030
L	-BH32L-85109						7.3	973.031



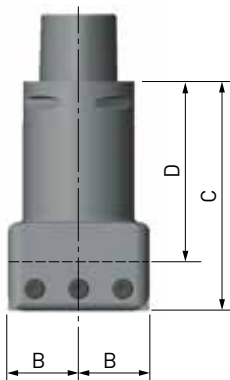
A.5

Caution

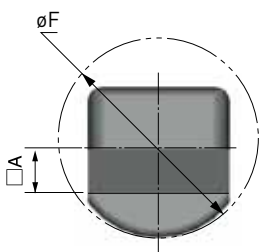
The excess length of a turning tool must be cut off to avoid interference with an ATC arm.



90 Type



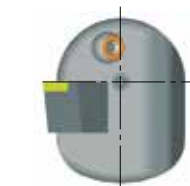
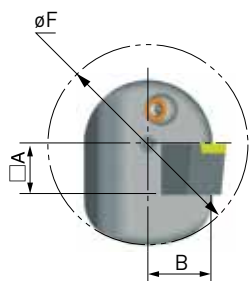
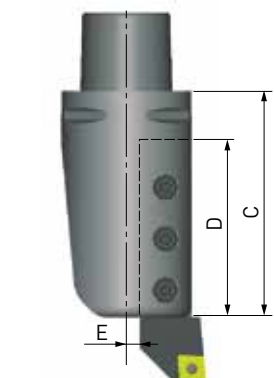
Hand	Model	□A	B	C	D	ØF	Weight (kg)	Order No.
N	C5-90-BH20N-32058	20	32	58	38	80	0.9	978.476
	-32105			105	85		2.2	801.653
N	C6-90-BH20N-32060	20	32	60	40	80	2.4	800.777
	-32115			115	95		3.4	800.778
	-BH25N-40071	25	40	71	46	100	3.3	800.779
-40130	130			105	4.2		801.664	
N	C8-90-BH32N-51085	32	51	85	53	128	6.0	800.889
	-51165			165	133		8.7	801.665



180 Type

Right hand

Left hand



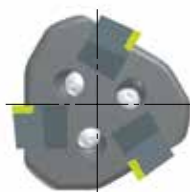
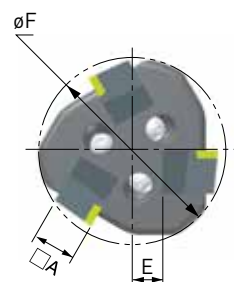
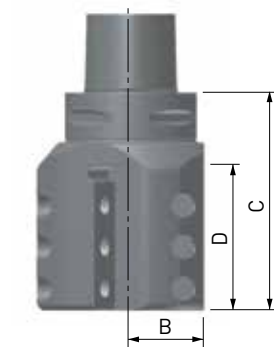
Hand	Model	□A	B	C	D	E	ØF	Weight (kg)	Order No.
R	C5-180 -BH20R - 2590	20	25	90	65	5	80	1.6	973.032
L	-BH20L - 2590							1.6	973.033
R	C6-180 -BH20R -32100	20	31.5	100	65	11.5	80	2.6	973.753
L	-BH20L -32100							2.6	801.663
R	-BH25R -32120S	25	29.5	120	80	4.5	90	3.1	973.034
L	-BH25L -32120S							3.1	973.035
R	C8-180 -BH32R -40125	32	40	125	85	8	128	6.0	973.038
L	-BH32L -40125							6.0	973.039

A.5

180 Multi Type

Right hand

Left hand



Hand	Model	□A	B	C	D	E	ØF	Weight (kg)	Order No.
R	C5-180 -3BH20R -100	20	35	100	70	15	90	2.6	973.040
L	-3BH20L -100							2.6	973.041
R	C6-180 -3BH20R -105	20	35	105	70	15	90	3.2	973.042
L	-3BH20L -105							3.2	973.043
R	-3BH25R -100	25	45	110	80	20	110	4.6	973.044
L	-3BH25L -110							4.6	973.045
R	C8-180 -3BH25R -130	25	45	130	90	20	110	6.1	973.046
L	-3BH25L -130							6.1	973.047

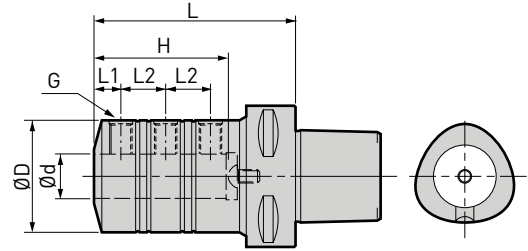
Caution

60 degree indexing is required to the machine tool spindle.

Boring Bar Holder

Application: boring and thread cutting

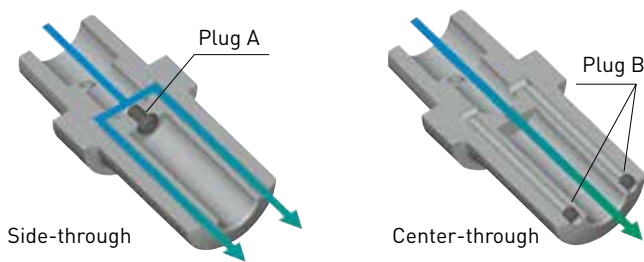
- Clamping range: $\varnothing 6 - \varnothing 40$
- Coolant-through hole



A.5

Model	$\varnothing d$	$\varnothing D$	L	L1	L2	H	G	Weight (kg)	Order No.	
C5	-BSL 6 - 70	6	70	5	8	41	M5P0.8	0.6	973.088	
	-BSL 8 - 70	8		6	10		M6P1.0	0.6	973.089	
	-BSL10 - 70	10	80	8	12	42	M8P1.0	0.6	973.090	
	-BSL12 - 80	12		16	53		0.8	973.091		
	-BSL16 - 90	16	90	10	21	65	M10P1.25	1.0	973.092	
	-BSL20 - 90	20		12	20			60	1.3	973.093
	-BSL25 - 100	25	55	100	14	23	70	M12P1.5	1.6	973.094
	-BSL32 - 110	32	64	110	16	26	78	M12P1.5	2.1	973.095
-BSL40 - 130	40	80	130	18	32	93	M16P1.5	3.7	973.096	
C6	-BSL 6 - 70	6	70	5	8	41	M5P0.8	1.4	973.097	
	-BSL 8 - 70	8		6	10		M6P1.0	1.3	973.098	
	-BSL10 - 70	10	80	8	12	42	M8P1.0	1.3	973.099	
	-BSL12 - 80	12		16	53		1.5	973.100		
	-BSL16 - 90	16	90	10	21	65	M10P1.25	1.7	973.101	
	-BSL20 - 90	20		12	22			60	2.0	973.102
	-BSL25 - 100	25	55	100	14	26	70	M12P1.5	2.3	973.103
	-BSL32 - 110	32	64	110	16	30	78	M12P1.5	2.8	973.104
-BSL40 - 130	40	80	130	18	32	93	M16P1.5	4.3	973.105	
C8	-BSL16 - 90	16	90	10	21	65	M10P1.25	2.9	973.110	
	-BSL20 - 100	20	100	12	22	70	M10P1.25	3.3	973.111	
	-BSL25 - 110	25	55	110	14	26	80	M12P1.5	3.6	973.112
	-BSL32 - 120	32	64	120	16	30	88	M12P1.5	4.1	973.113
-BSL40 - 130	40	80	130	18	32	93	M16P1.5	5.3	973.114	

1. For sealing purpose, please use plugs according to drawing below. Both, plug A and B are included as standard.



Chuck Model	Plug A	Plug B
BSL 6	M8P1.25	M4 P0.7
8	M10P1.0	
10	M12P1.5	M5 P0.8
12	M14P1.5	
16	M18P1.5 (C5:M6P1.0)	M6 P1.0
20	M6P1.0 *	
25		
32		
40	M8P1.25 *	

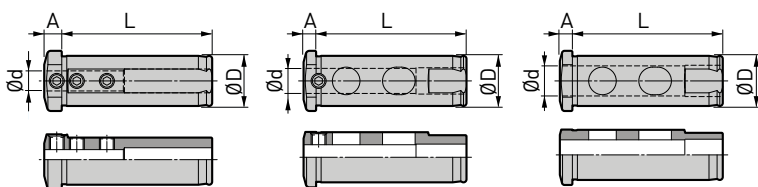
1. * Button-head bolt.

BSL Sleeve

Fig. 1

Fig. 2

Fig. 3

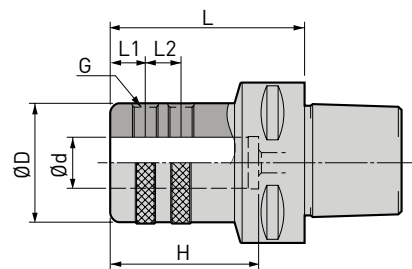


Model	Fig.	$\varnothing d$	$\varnothing D$	L	A	Order No.
BSLA20 - 6	1	6	20	60	5	805.728
		8			7	805.733
	2	10			5	805.734
		3			12	5
			16	5	805.736	
BSLA32 - 10	1	10	32	75	9	805.737
		12			9	805.738
	2	16			6	805.739
		3			20	6

Side Lock Holder

Application: indexable insert drill

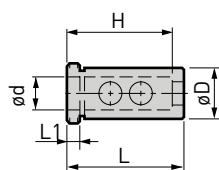
- Clamping range: $\varnothing 16 - \varnothing 40$
- Coolant-through hole



Model	$\varnothing d$	$\varnothing D$	L	L1	L2	H	G	Weight (kg)	Order No.
C4 -TSL16 -56	16	48	56	14	14	48	M10P1.25	0.8	800.687
	20		60			50		0.7	800.688
	25		77			56		0.8	800.689
C5 -TSL16 -60	16	48	60	14	14	48	M10P1.25	0.8	973.115
	20		75			50		0.9	973.116
	25		85			56		0.9	973.117
C6 -TSL16 -70	16	48	70	14	14	48	M10P1.25	1.7	973.119
	20		85			50		1.7	973.120
	25		95			56		1.6	973.121
C8 -TSL16 -80	16	48	80	14	14	48	M10P1.25	3.1	973.124
	20		95			50		3.1	973.125
	25		105			56		3.0	973.126
C5 -TSL25 -75	25	63	75	15	20	56	M16P1.5	0.9	973.117
	32		85			60		1.6	800.775
	40		95			60		2.0	973.122
C6 -TSL25 -75	25	63	75	15	20	56	M16P1.5	0.9	973.117
	32		85			60		1.6	800.775
	40		95			60		2.0	973.122
C5 -TSL32 -85	32	63	85	15	20	60	M16P1.5	1.6	800.775
	40		95			60		2.0	973.122
	50		105			60		2.2	973.123
C6 -TSL32 -85	32	63	85	15	20	60	M16P1.5	1.6	800.775
	40		95			60		2.0	973.122
	50		105			60		2.2	973.123
C5 -TSL40 -85	40	68	85	15	25	70	M16P1.5	2.2	973.123
	50		95			60		2.2	973.123
	60		105			60		2.2	973.123
C8 -TSL40 -85	40	68	85	15	25	70	M16P1.5	2.2	973.123
	50		95			60		2.2	973.123
	60		105			60		2.2	973.123

A.5

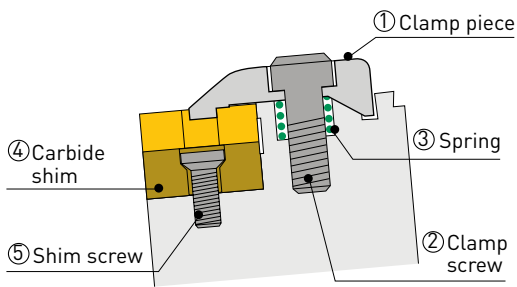
SL Sleeve for Side Lock Holder



Model	$\varnothing d$	$\varnothing D$	L	L1	H	Order No.
OSL25 -16	16	25	62	5.5	48	962.596
	20				50	962.597
OSL32 -16	16	32	66	5.5	48	962.586
	20				50	962.598
	25				56	962.599
OSL40 -16	16	40	76	5.5	48	804.678
	20				50	804.679
	25				56	962.581
	32				60	962.582

Spare Parts for Cartridge

Double Clamp Type



Clamp Piece Set

Set Model	Clamp piece ①	Screw ②	Spring ③	Insert	Order No.
SCP-1	CP1	M5 x 20	Ø 8 x 10	TN16	973.181
SCP-2	CP2			CN12, TN22, DN15, WN08	973.182
SCP-3	CP3			CN16, TN27	973.183
SCP-4	CP4			VN16	802.132
SCP-5	CP5			CN19	802.133

1. Set includes one each of clamp piece, screw and spring.
2. Wrench is to be ordered separately (Model: T-4).

A.5

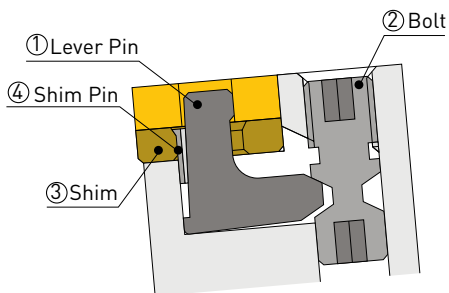
Carbide Shim Set

Set Model	Insert	Shim ④	Screw ⑤	Torx size	Clamping Wrench	Order No.
STNS1604	TN1604	TNS1604	M3x7	T10	DA-T10	973.184
STNS2204	TN2204	TNS2204	M4x8	T15	DA-T15	804.821
STNS2706	TN2706	TNS2706	M5x12	T20	DA-T20	804.822
SDNS1504	DN1504	DNS1504	M4x8	T15	DA-T15	973.186
SDNS1506	DN1506	DNS1506	M4x8	T15		973.187
SCNS1204	CN1204	CNS1204	M4x8	T15		973.185
SCNS1606	CN1606	CNS1606	M5x12	T20	DA-T20	973.188
SCNS1906	CN1906	CNS1906	M5x12	T20		802.131
SVNS1604	VN1604	VNS1604	M3x7	T10	DA-T10	805.781

1. Wrench is not included.

Lever Lock Type

For F63-PCLNR(L) 45045-19



Lever lock set

Set Model	Lever ①	Bolt ②	Spanner Size	Order No.
SLCL6	LCL6	LCS6	4 mm	804.815

Carbide Shim Set

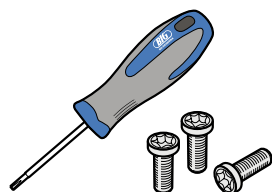
Set Model	Shim ③	Shim Pin ④	Order No.
SLSC63	LSC63	LSP6	804.816

Insert Clamping Screw Set

Set Model	Order No.
S3508DS	966.273

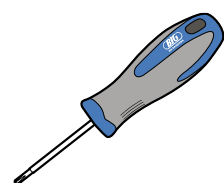
Contents

M3.5 Screws: 10 pcs.
Wrench: DA-T15 1 pce.



Clamping Wrench

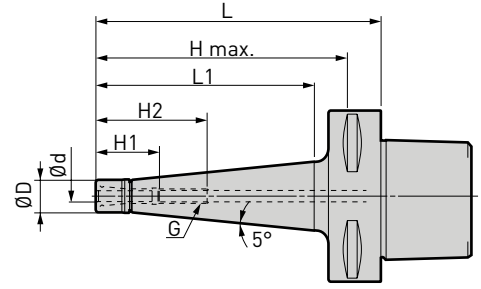
Set Model	Order No.
T-4	805.893
DA-T10	804.774
DA-T15	966.275
DA-T20	804.775



MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.

- Clamping range: \varnothing 0.45 - \varnothing 6.05



Model		$\varnothing d$	$\varnothing D$	L	L1	H1	H2	H max.	G	Collet	Weight (kg)	Order No.			
C4	-MEGA3S - 60T	0.45 - 3.25	10	60	35	22	38	54	M4P0.7	NBC3S-□	0.3	973.954			
	-MEGA6S - 60T	0.45 - 6.05	14										90	65	28
	- 90T			84	84	84	84								
C5	-MEGA6S -105T	0.45 - 6.05	14	105	79	28.5	49	98	M7P0.75	NBC6S-□	0.6	973.203			
	-120T			120	94								113	113	
C6	-MEGA3S -120T	0.45 - 3.25	10	120	92	22.5	38.5	111	M4P0.7	NBC3S-□	1.3	973.204			
	-MEGA4S -120T	0.45 - 4.05	12										135	107	26.5
	-135T			126	126	126									
	-MEGA6S -120T			0.45 - 6.05	14	120	92	28.5	49	111	M7P0.75	NBC6S-□			
	-135T	126	126										126	126	

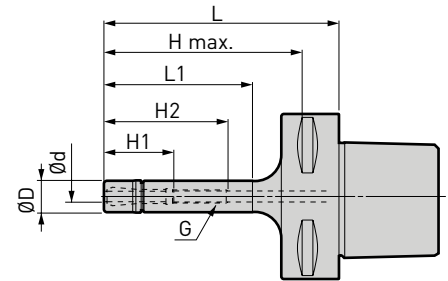
1. MEGA nut is included.

A.5

MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.

- Clamping range: \varnothing 0.45 - \varnothing 6.05
- Coolant-through hole



Model		$\varnothing d$	$\varnothing D$	L	L1	H1	H2	H max.	G	Collet	Weight (kg)	Order No.				
C5	-MEGA4S -75	0.45 - 4.05	12	75	50	26.5	47	68	M5P0.8	NBC4S	0.4	973.208				
	-MEGA6S -75	0.45 - 6.05	14										58	58	58	58
C6	-MEGA3S -90	0.45 - 3.25	10	90	58	22.5	38	81	M4P0.7	NBC3S	1.1	973.210				
	-MEGA4S -90	0.45 - 4.05	12										58	58	58	58
	-MEGA6S -90	0.45 - 6.05	14										58	58	58	58

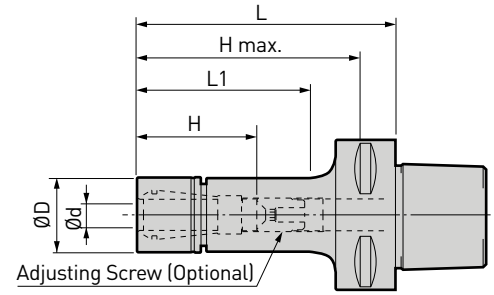
1. MEGA nut is included.

Spare parts			Accessories							
MEGA Nut			MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		α Taper Cleaner	
Model	Order No.		Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-□	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-□	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-□	MGN6S-PS□	NBB6S	961.498	SC-NBC6S	961.280

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

- Clamping range: $\varnothing 0.25 - \varnothing 20$
- Coolant-through hole



A.5

Model	$\varnothing d$	$\varnothing D$	L	L1	H	H max.	Collet Model	Weight (kg)	Order No.	
C4	- MEGA6N - 75	0.25 - 6	20	75	48	23 - 43	69	NBC6-□	0.4	978.196
					49	26 - 45	69	NBC8-□	0.5	978.201
	- MEGA10N - 75	1.5 - 10	30	75	52	38 - 48	69	NBC10-□	0.6	978.202
					54	64	64	NBC13-□	0.7	978.197
	- MEGA16N - 55 *	2.5 - 16	42	55	-	48	48	NBC16-□	0.7	978.203
	- MEGA20N - 60 *	2.5 - 20	46	60	-	53	53	NBC20-□	0.8	978.204
C5	- MEGA6N - 60	0.25 - 6	20	60	34	23 - 36	53	NBC6-□	0.5	973.213
				75	49	23 - 43	68		0.5	973.214
				90	62	23 - 43	83		0.5	973.215
	- MEGA8N - 60	0.50 - 8	25	60	33	26 - 36	53	NBC8-□	0.5	973.218
				75	49	26 - 45	68		0.6	973.219
				90	64	26 - 45	83		0.6	973.220
	- MEGA10N - 55 *	1.50 - 10	30	55	31	48	48	NBC10-□	0.5	973.223
				75	49	38 - 48	68		0.6	973.224
				90	64	38 - 48	83		0.7	973.225
	- MEGA13N - 55 *	2.50 - 13	35	55	31	48	48	NBC13-□	0.6	973.229
				75	49	44 - 48	68		0.7	973.230
				90	64	44 - 63	83		0.8	973.231
	- MEGA16N - 60 *	2.50 - 16	42	60	38	53	53	NBC16-□	0.7	973.235
				75	53	68	68		0.9	973.236
				90	69	48 - 63	83		1.0	973.237
	- MEGA20N - 60 *	2.50 - 20	46	60	39	51	51	NBC20-□	0.8	973.241
				75	54	66	66		1.0	973.242
				90	69	51 - 60	83		1.1	973.243

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw cannot be used. "H" is the max. tool shank length that can be inserted into the holder.

Spare Parts			Accessories										
MEGA Nut			MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw			Rubber	
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.		
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-□	MPS6-□	NBA6B	M7	12	2	961.527		
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-□	MPS8-□	NBA8B	M9	13	2.5	961.550		
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-□	MPS10-□	NBA10B	M11	16	3	961.572		
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-□	MPS13-□	NBA13B	M14	20	4	961.598		
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-□	MPS16-□	NBA16B	M18	20	4	961.632		
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-□	MPS20-□	NBA20B	M21	20	4	961.680		

For C8, refer to the following pages.

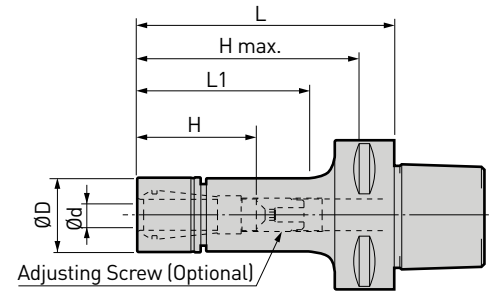
Model	Ød	ØD	L	L1	H	H max.	Collet Model	Weight (kg)	Order No.
C6 -MEGA6N - 60	0.25 - 6	20	60	30	23 - 33	51	NBC6-□	1.2	973.247
			75	43		66		1.2	973.248
			90	58		81		1.2	973.249
			105	73		96		1.3	973.250
			120	88		111		1.3	973.251
			135	103		126		1.3	973.252
			165	128		156		1.4	973.253
-MEGA8N - 60	0.5 - 8	25	60	29	26 - 31	51	NBC8-□	1.3	973.254
			75	43		66		1.3	973.255
			90	58		81		1.3	973.256
			105	73		96		1.4	973.257
			120	88		111		1.4	973.258
			135	103		126		1.5	973.259
			165	133		156		1.6	973.260
-MEGA10N - 60 *	1.5 - 10	30	60	32	38 - 45	51	NBC10-□	1.3	973.261
			75	43		66		1.4	973.262
			90	58		81		1.4	973.263
			105	73		96		1.5	973.264
			120	88		111		1.6	973.265
			135	103		126		1.6	973.266
			165	133		156		1.8	973.267
-MEGA13N - 60 *	2.5 - 13	35	60	32	44 - 55	51	NBC13-□	1.3	973.269
			75	45		66		1.4	973.270
			90	60		81		1.5	973.271
			105	73		96		1.6	973.272
			120	90		111		1.7	973.273
			135	103		126		1.8	973.274
			165	133		156		2.0	973.275
-MEGA16N - 65 *	2.5 - 16	42	65	37	48 - 68	56	NBC16-□	1.5	973.277
			75	47		66		1.6	973.278
			90	60		81		1.7	973.279
			105	75		96		1.8	973.280
			120	90		111		2.0	973.281
			135	105		126		2.1	973.282
			165	135		156		2.4	973.283
-MEGA20N - 65 *	2.5 - 20	46	65	37	51 - 68	51	NBC20-□	1.5	973.285
			75	47		65		1.6	973.286
			90	62		76		1.8	973.287
			105	77		91		2.0	973.288
			120	92		104		2.1	973.289
			135	107		111		2.3	973.290
			165	137				2.6	973.291
200	172		2.9	973.292					

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw cannot be used. "H" is the max. tool shank length that can be inserted into the holder.

MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.

- Clamping range: \varnothing 0.25 - \varnothing 20
- Coolant-through hole



A.5

Model	$\varnothing d$	$\varnothing D$	L	L1	H	H max.	Collet Model	Weight (kg)	Order No.
C8 -MEGA6N - 90	0.25 - 6	20	90	45	23 - 43	90	NBC6-□	2.4	973.293
- 120			120	75		120		2.6	973.295
- 165			165	120		165		2.7	973.297
-MEGA8N - 90	0.5 - 8	25	90	46	26 - 45	90	NBC8-□	2.6	973.298
- 120			120	75		120		2.7	973.300
- 165			165	120		165		2.8	973.302
-MEGA10N - 90	1.5 - 10	30	90	45	38 - 48	90	NBC10-□	2.7	973.304
- 120			120	75		120		2.8	973.306
- 165			165	120		165		3.0	973.308
-MEGA13N - 90	2.5 - 13	35	90	50	44 - 63	90	NBC13-□	2.8	973.311
- 120			120	80		120		2.9	973.313
- 165			165	120		165		3.2	973.315
- 200			200	155		200		3.5	973.316
-MEGA16N - 90	2.5 - 16	42	90	50	48 - 66	90	NBC16-□	2.9	973.318
- 120			120	80	120	3.2		973.320	
- 165			165	125	165	3.6		973.322	
-MEGA20N - 90	2.5 - 20	46	90	50	51 - 68	83	NBC20-□	3.0	973.325
- 120			120	80		113		3.3	973.327
- 165			165	125		113		3.8	973.329
- 200			200	160		113		4.1	973.330

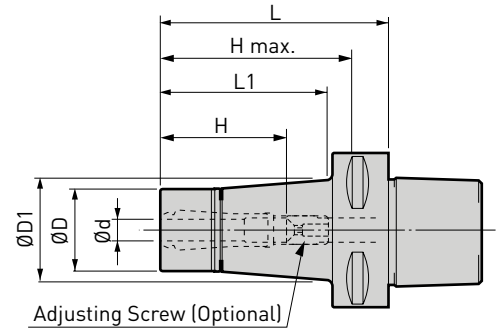
1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw cannot be used. "H" is the max. tool shank length that can be inserted into the holder.

Spare Parts			Accessories									
MEGA Nut			MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw		Rubber	
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.	
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-□	MPS6-□	NBA6B	M7	12	2	961.527	
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-□	MPS8-□	NBA8B	M9	13	2.5	961.550	
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-□	MPS10-□	NBA10B	M11	16	3	961.572	
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-□	MPS13-□	NBA13B	M14	20	4	961.598	
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-□	MPS16-□	NBA16B	M18	20	4	961.632	
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-□	MPS20-□	NBA20B	M21	20	4	961.680	

MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.

- Clamping range: $\varnothing 3 - \varnothing 12$
- Coolant-through hole



Model	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	L1	H	H max.	Collet Model	Weight (kg)	Order No.
C4 -MEGA13E - 60 *	3 - 12	42	-	60	-	54	50	MEC13-□	0.6	800.678
C5 -MEGA13E - 60 *	3 - 12	42	44.4	60	39	50	50		0.8	973.347
- 75 *			44.8	75	54	68	68		0.9	973.348
- 90				90	69	50 - 60	83		1.1	973.349
C6 -MEGA6E - 75	3 - 6	25	29.5	75	48	37 - 45	66	MEC6-□	1.3	973.354
- 90			32.1	90	63		81		1.4	973.355
- 105			34.7	105	78		96		1.5	973.356
- 120			37.3	120	93		111		1.6	973.357
-MEGA8E - 75	3 - 8	30	34.2	75	48	42 - 46	66	MEC8-□	1.4	973.361
- 90			36.7	90	63	81	1.5		973.362	
- 105			39.5	105	78	42 - 51	96		1.7	973.363
- 120			42.1	120	93	111	1.8		973.364	
-MEGA10E - 75 *	3 - 10	35	39.1	75	48	66	66	MEC10-□	1.5	973.368
- 90			41.6	90	63	81	1.6		973.369	
- 105			44.4	105	78	48 - 58	96		1.8	973.370
- 120			47.0	120	93	111	2.0		973.371	
-MEGA13E - 65 *	3 - 12	42	45.1	65	39	56	56	MEC13-□	1.5	973.374
- 90			49.0	90	66	50 - 55	81		1.8	973.376
- 105			51.4	105	80	96	2.1		973.377	
- 120			54.2	120	96	111	2.3		973.378	
- 135			56.8	135	112	50 - 60	126		2.6	973.379
- 165			62.3	165	141	156	3.2		973.380	
C8 -MEGA6E - 90	3 - 6	25	30.7	90	55	37 - 45	90	MEC6-□	2.6	973.382
- 135			38.5	135	100	135	135		3.0	973.385
-MEGA8E - 90	3 - 8	30	35.4	90	55	42 - 51	90	MEC8-□	2.7	973.388
- 135			43.3	135	100	135	135		3.2	973.391
-MEGA10E - 90	3 - 10	35	40.3	90	55	48 - 58	90	MEC10-□	2.8	973.394
- 120			45.6	120	85		120		3.2	973.396
- 135			48.2	135	100		135		3.4	973.397
-MEGA13E - 90	3 - 12	42	47.0	90	55	50 - 60	90	MEC13-□	3.0	973.400
- 120			52.3	120	85		120		3.4	973.402
- 135			54.9	135	100		135		3.7	973.403
- 165			60.1	165	130		165		4.3	973.404

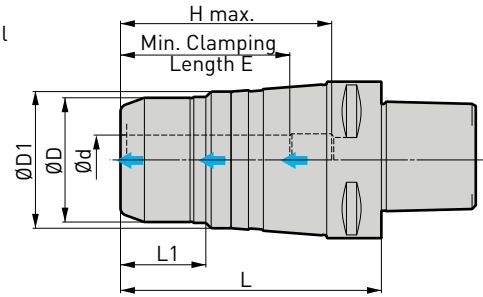
1. MEGA E nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. * Adjusting screw cannot be used. "H" is the max. tool shank length that can be inserted into the holder.

Spare parts			Accessories									
	MEGA E Nut		MEGA Wrench		MEGA E Collet		MEGA E Perfect Seal		Adjusting Screw			
MEGA E Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.	
MEGA6E	MEN6	968.461	MGR25	969.456	MEC6-□	EPS6-□	NBA6B	M7	12	2	961.527	
MEGA8E	MEN8	968.462	MGR30	969.458	MEC8-□	EPS8-□	NBA8B	M9	13	2.5	961.550	
MEGA10E	MEN10	968.463	MGR35	969.460	MEC10-□	EPS10-□	NBA10B	M11	16	3	961.572	
MEGA13E	MEN13	968.464	MGR42	969.462	MEC13-□	EPS13-□	NBA13B	M14	20	4	961.598	

MEGA Double Power Chuck Type D

Close to integral rigidity and precision of a solid tool holder. Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and Type DS to feed coolant to cutting tool periphery.

- Clamping range: $\varnothing 16 - \varnothing 32$
- Coolant-through hole



A.5

Model	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	L1	H	E	Weight (kg)	Order No.
C4 -MEGA16D - 70	16	46	46.7	70	-	64	50	0.8	800.679
-MEGA20D - 65 *	20	50	50.7	65	-	59	51	0.8	800.681
C6 -MEGA20D - 75A	20	50	55	75	34	66	56	2.0	803.182
- 90A				90		81		2.2	803.123
- 105A				105		85		2.5	803.110
- 135A				135		85		3.1	803.164
-MEGA25D - 75A *	25	62	62.7	75	39	66	57	2.1	804.904
- 105A				105		85		2.8	803.126
- 135A				135		85		3.3	803.194
-MEGA32D - 90A	32	70	70.7	90	33	81	64	2.5	803.127
- 135A				135		90		3.4	803.120
C8 -MEGA16D - 70	16	46	55	70	23.5	71	50	2.8	973.427
- 105				105				71	50
-MEGA20D - 75	20	60	69	75	25.5	75	56	3.3	973.431
- 105				105		85		4.2	973.432
- 135				135		85		5.0	973.433
-MEGA25D - 75	25	70	77	75	32	75	65	3.4	973.435
- 105				105		90		4.5	801.666
- 165				165		90		6.4	973.438
-MEGA32D - 90	32	80	86	90	39.5	90	71	4.3	973.436
- 105				105		100		4.8	973.440
- 135				135		105		6.0	973.441

- * Straight collet can not be used.
- Wrench is to be ordered separately.
- "H" is max. tool shank length that can be inserted into the holder.

For Straight Collet ▶ A158

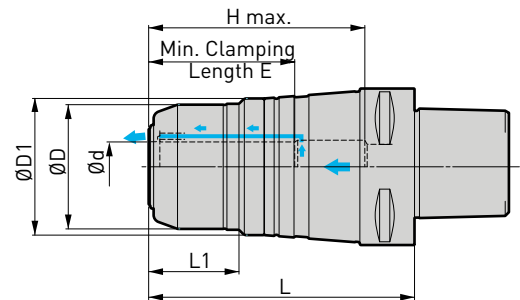
Accessories								
MEGA Wrench			MEGA Wrench			MEGA Wrench		
MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.
C4 -MEGA16D	MGR46L	969.465L	C6 -MEGA16DS	MGR42L	969.462L	C8 -MEGA16D/DS	MGR46L	969.465L
-MEGA20D	MGR50L	969.464L	-MEGA20D/DS	MGR50L	969.464L	-MEGA20D/DS	MGR60L	969.468L
C5 -MEGA16DS	MGR42L	969.462L	-MEGA25D/DS	MGR62L	969.469L	-MEGA25D/DS	MGR70L	969.470L
-MEGA20DS	MGR50L	969.464L	-MEGA32D/DS	MGR70L	969.470L	-MEGA32D/DS	MGR80L	969.471L
-MEGA25DS	MGR62L	969.469L						

MEGA Double Power Chuck Type DS

Close to integral rigidity and precision of a solid tool holder. Flange contacting nut assures highest rigidity. For coolant to cutting tool periphery.



- Clamping range: $\varnothing 16 - \varnothing 32$
- Coolant to cutting tool periphery



A.5

Model	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	L1	H	E	Weight (kg)	Order No.	
C5 -MEGA16DS - 65A	16	42	52.6	67	27	60	57	0.8	803.141	
				92		73		1.3	803.144	
	-MEGA20DS - 75A	20	50	55	77	36	70	58	1.1	803.108
					92		85		1.4	803.183
	-MEGA25DS - 75A	25	62	62.7	77	41	70	59	1.4	803.147
					92		85		1.7	803.179
C6 -MEGA16DS - 70A	16	42	52.6	72	27	63	57	1.6	803.145	
				92		83		2.0	803.206	
				107		73		2.3	803.184	
				137		73		2.9	803.112	
	-MEGA20DS - 75A	20	50	55	77	36	68	58	1.9	803.185
					92		83		2.1	803.125
					107		87		2.4	803.113
					137		87		3.0	803.166
	-MEGA25DS - 75A *	25	62	62.7	77	41	68	59	2.1	803.114
					92		83		2.4	803.177
					107		87		2.8	803.128
					137		87		3.3	803.195
-MEGA32DS - 90A	32	70	70.7	92	35	83	66	2.5	803.129	
				107		92		2.9	803.167	
				137		92		3.4	803.121	
C8 -MEGA16DS - 70	16	46	55	72.5	26	73	52	2.8	973.465	
				107.5		73		3.5	973.466	
	-MEGA20DS - 75	20	60	69	77.5	28	73	58	3.3	973.469
					137.5		87		5.0	973.471
	-MEGA25DS - 75	25	70	77	77.5	34	77	67	3.4	973.473
					137.5		92		5.4	973.475
-MEGA32DS - 90	32	80	86	167.5	42	92	73	6.4	973.476	
				92.5		102		4.3	973.477	
-MEGA32DS - 90	32	80	86	107.5	42	102	73	4.8	973.478	
				167.5		107		7.3	973.480	

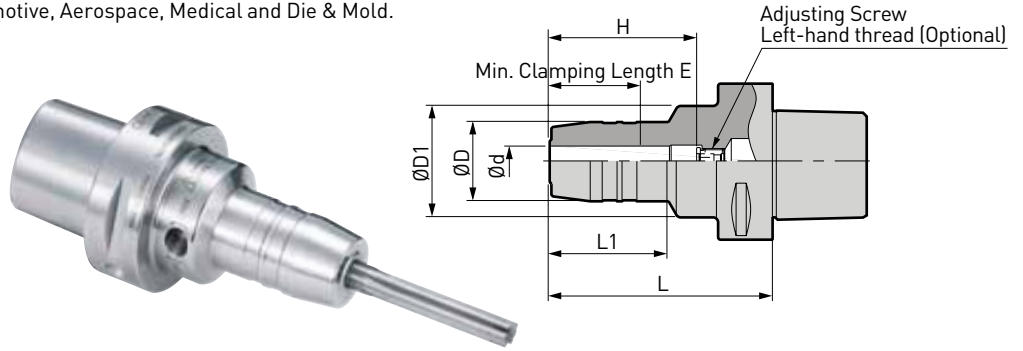
1. * Straight collet can not be used.
2. Wrench is to be ordered separately.
3. "H" is max. tool shank length that can be inserted into the holder.

For Straight Collet ▶ A158

Hydraulic Chuck

For high precision machining in Automotive, Aerospace, Medical and Die & Mold.

- Clamping range: $\varnothing 6 - \varnothing 32$
- Coolant-through hole



A.5

Model		Ød	ØD	ØD1	L	L1	E	H	Adjusting Screw	Weight (kg)	Order No.	
C5	-HDC6 - 90	6	26	45	90	45	28	33 - 50	HDA 6-05020	1.0	800.726	
	-HDC8 - 90	8	28				HDA 8-06020	1.1	800.731			
	-HDC10 - 90	10	30			33	43 - 55	HDA10-08015	1.1	800.703		
	-HDC12 - 90	12	32			48	38	53 - 60	HDA12-10010	1.1	800.708	
	-HDC14 - 90	14	34				43	83	-	1.2	800.717	
	-HDC16 - 90 *	16	38				50	83	-	1.2	800.722	
	-HDC20 - 90 *	20	42			50	52	83	-	1.7	800.723	
-HDC25 - 90 *	25	55	63									
C6	-HDC6 - 90	6	26	45	90	45	28	33 - 50	HDA 6-05020	1.5	800.831	
	-HDC8 - 90	8	28				HDA 8-06020	1.6	800.838			
	-HDC10 - 90	10	30			33	43 - 55	HDA10-08015	1.6	800.795		
	-HDC12 - 90	12	32		120	48	38	48 - 60		1.6	800.802	
	-120											
	-HDC14 - 120	14	34		120	38	38 - 60	HDA10-08032	1.8	800.799		
	-HDC16 - 90 *	16	38		47	90	43	81	-	1.7	800.815	
	-120							48	120	43 - 70	HDA16-12037	2.0
	-HDC18 - 120	18	40		49	120	72	-	1.8	800.822		
	-HDC20 - 90 *	20	42		50	90	43	43 - 70	HDA16-12037	2.1	800.819	
	-120							72	-	1.8	800.822	
	-HDC25 - 90 *	25	55		63	90	46	52	80	-	2.2	800.825
	-120					120	51	52	67 - 79	HDA20-16015	2.8	800.823
-HDC32 - 120	32	63	-	120	-	56	66 - 78		3.0	800.826		

1. "H" indicates the adjustment length with an adjusting screw.
2. * Adjusting screw cannot be used. "H" is the max. tool shank length that can be inserted into the holder.

For Straight Collet ▶ A158

For Inner Bore Cleaner ▶ A170

For Adjusting Screw ▶ A168

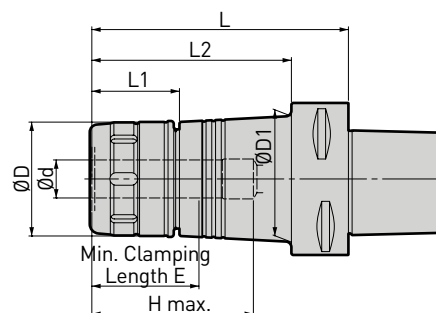
Caution

- Use only cutting tools that have a shank tolerance within h6.
- Do not use with cutting tools made with a flat on the shank (i.e.: Weldon type shank).
- Roughing endmills are not recommended for use with Hydraulic Chucks.
- Do not tighten the clamping screw without first inserting a cutting tool into the toolholder.
- Always insert the cutting tool into the Hydraulic Chuck beyond min. clamping length E.

New Hi-Power Milling Chuck

The original design of slit structure supports heavy and finish end milling with high power and precision.

- Clamping range: $\varnothing 16 - \varnothing 32$
- Coolant-through hole



Model		$\varnothing d$	$\varnothing D$	L	L1	L2	H max.	E	Weight (kg)	Order No.
C5	-HMC16S - 65	16	43	65	44	45	58	55	0.8	800.734
	-HMC20S - 105	20	50	105		-	85	56	1.4	800.735
	-HMC25S - 105	25	55		47	-	87	57	1.7	803.041
	-HMC32S - 85	32	62	85	56	-	78	58	1.6	803.043
C6	-HMC16S - 70	16	43	70	44	48	61	55	1.5	800.842
	-HMC20S - 75	20	50	75	44	53	66	56	1.7	800.845
	- 105			83		85	2.3		800.843	
	- 120			98		85	2.5		800.844	
	-HMC25S - 75	25	59	75	45	53	66	57	2.0	800.848
	- 105			81		87	2.5		800.846	
	- 135			133		87	3.1		800.847	
	-HMC32S - 90	32	68	90	54	-	81	64	2.4	800.851
	- 105			-		90	2.7		800.849	
	- 135			-		-	3.3		800.850	
C8	-HMC20 - 80	20	60	80	46	50	80	56	3.3	973.680
	- 135			105		85	4.7		973.682	
	-HMC25 - 85	25	62	85	55	-	90	65	3.5	973.684
	- 135			105		90	4.7		973.686	
	-HMC32 - 95	32	80	95	63	-	95	71	4.5	973.688
	- 135			-		105	5.8		973.690	

1. Wrench is to be ordered separately.

For Straight Collet ▶ A158

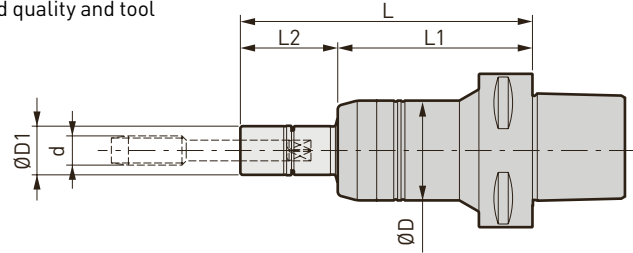
A.5

Accessories									
	Wrench			Wrench			Wrench		
	Model	Order No.		Model	Order No.		Model	Order No.	
New Hi-Power Milling Chuck	C5 -HMC16S	FK45-50L	801.037	C6 -HMC16S	FK45-50L	801.037	C8 -HMC20	FK58-62	962.291
	-HMC20S			-HMC20S			-HMC25		
	-HMC25S	FK52-55	962.294	-HMC25S	FK58-62L	801.038	-HMC32	FK80-90	962.292
	-HMC32S	FK58-62L	801.038	-HMC32S	FK68-75L	801.039			

MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

- Tapping Range: M3 - M20
- Coolant-through hole



A.5

Model	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)	Order No.
C5 -MGT6 - 75	MGT6 -d - 30	M3 - M8	36	16	105	75	30	0.8	800.767
	- 70				145		70		
	-100				175		100		
-MGT12 - 75	MGT12 -d - 30	M5 - M12 P1/8	41	20	105	75	30	0.9	800.765
	- 70				145		70		
	-100				175		100		
-MGT20 - 100	MGT20 -d - 35	M10 - M20 P1/4 - P1/2	54	30	135	100	35	1.4	800.766
	- 85				185		85		
	-115				215		115		
C6 -MGT6 - 80	MGT6 -d - 30	M3 - M8	36	16	110	80	30	1.1	973.754
	- 70				150		70		
	-100				180		100		
-MGT12 - 80	MGT12 -d - 30	M5 - M12 P1/8	41	20	110	80	30	1.2	973.755
	- 70				150		70		
	-100				180		100		
-MGT20 - 100	MGT20 -d - 35	M10 - M20 P1/4 - P1/2	54	30	135	100	35	1.8	973.756
	- 85				185		85		
	-115				215		115		
C8 -MGT6 - 80	MGT6 -d - 30	M3 - M8	36	16	110	80	30	2.1	800.935
	- 70				150		70		
	-100				180		100		
-MGT12 - 80	MGT12 -d - 30	M5 - M12 P1/8	41	20	110	80	30	2.2	800.933
	- 70				150		70		
	-100				180		100		
-MGT20 - 95	MGT20 -d - 35	M10 - M20 P1/4 - P1/2	54	30	130	95	35	2.6	800.934
	- 85				180		85		
	-115				210		115		

1. Tap holder and wrench are to be ordered separately.
2. Rigid tapping function is required on the machine tool.



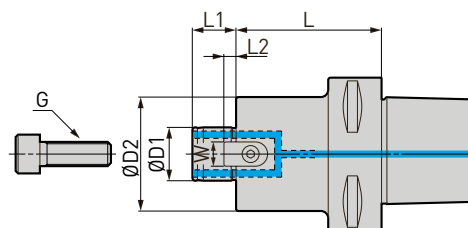
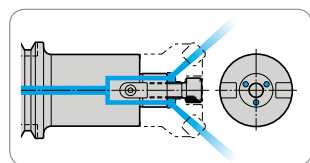
For Tap Holder ▶ A162
For Accessories ▶ A166

Tapping range for DIN & ISO standard

MGT Size	DIN Standard			ISO Standard	
	DIN371	DIN376	DIN353	ISO529	ISO2284
MGT6	M3 - M6	M5 - M8	-	M3 - M5	-
MGT12	M5 - M8	M8 - M12	1/8	M6, M8, M12	1/8
MGT20	M10	M12 - M20	1/4 - 1/2	M10 - M20	1/4 - 3/8

Face Mill Arbor Type FMH

For cutters that require a coolant hole through the pilot.



Model	ØD1	ØD2	L	L1	L2	W	G	Weight (kg)	Order No.	
C5 -FMH22 - 47 - 60	22	47	60	18	5	10	M10	1.2	973.718	
			90					1.6	800.695	
	27	60	60	20	6			1.4	973.720	
			60					1.5	800.698	
C6 -FMH22 - 47 - 45	22	47	45	18	5	10	M10	1.5	973.721	
			60					1.8	973.722	
			90					2.2	973.723	
			150					3.0	800.783	
	-FMH22 - 60 - 45	22	60	45	18			5	1.8	973.724
				60					2.1	973.725
				90					2.8	973.726
				150					2.8	973.726
	-FMH27 - 60 - 45	27	60	45	20			6	1.9	800.788
				60					2.2	800.789
				90					2.8	800.790
				150					4.2	800.787
C8 -FMH22 - 47 - 60	22	47	60	18	5	10	M10	2.9	973.727	
			105					3.5	973.728	
			150					4.1	973.729	
			60					3.2	973.730	
	-FMH22 - 60 - 60	22	60	60	18			5	4.2	973.731
				105					5.2	973.732
				150					4.3	800.903
				150					5.3	800.904
-FMH27 - 60 - 105	27	60	105	20	6	12	M12	5.3	800.904	
			150			6.1	800.910			
-FMH32 - 96 - 105	32	96	105	22	7	14	M16	6.1	800.910	
			150					7.8	800.911	

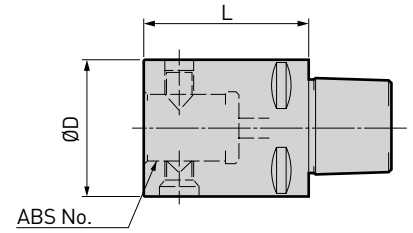
1. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.
2. Hexagon socket head cap screw is included.

For Clamp Bolt ▶ A168

ABS Shank



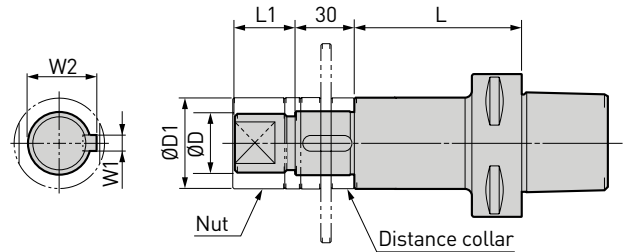
- Coolant-through hole



Model	ABS No.	ØD	L	Weight (kg)	Order No.
C5 -ABS50 -50	50	50	50	0.7	978.140
C6 -ABS50 -50	50	50	50	1.4	978.032
-ABS63 -60	63	63	60	1.8	978.042
C8 -ABS50 -50	50	50	50	2.6	978.054
-ABS63 -60	63	63	60	2.9	978.103
-ABS80 -80	80	80	80	3.7	978.033

A.5

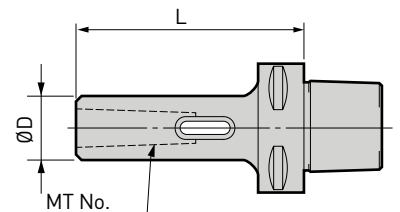
Side Cutter Arbor



Model	ØD	ØD1	L	L1	W1	W2	Weight (kg)	Order No.
C6 -SCA25.4 -75	25.4	40	75	25	6.35	27.78	2.0	800.887
-SCA31.75 -75	31.75	46		30	7.92	34.92	2.4	800.888
C8 -SCA25.4 -90	25.4	40	90	25	6.35	27.78	3.3	800.940
-SCA31.75 -90	31.75	46		30	7.92	34.92	3.7	800.942

- Nut is included.
- Distance collars of 5 mm, 8 mm, 10 mm and 12 mm are included.

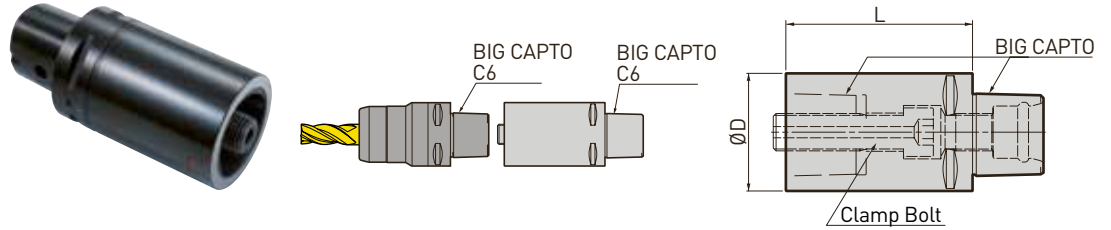
Morse Taper Holder



Model	MT No.	ØD	L	Weight (kg)	Order No.
C5 -MTA1 - 95	1	25	95	0.6	973.572
-MTA2 -110	2	32	110	0.8	973.573
-MTA3 -130	3	40	130	1.2	973.574
C6 -MTA1 - 95	1	25	95	1.3	973.575
-MTA2 -110	2	32	110	1.5	973.576
-MTA3 -130	3	40	130	1.9	973.577
C8 -MTA1 -105	1	25	105	2.6	973.578
-MTA2 -120	2	32	120	2.8	973.579
-MTA3 -140	3	40	140	3.2	973.580

Extension

- Coolant-through hole



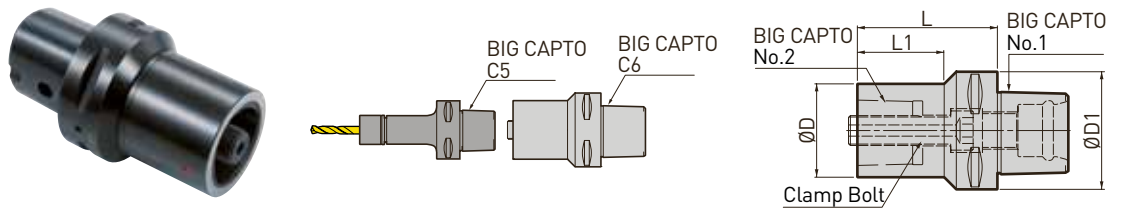
Model	BIG CAPTO	ØD	L	Clamp Bolt			Weight (kg)	Order No.
				Threat Size	Hex.	Tightening Torque		
C6-C6-100	C6	63	100	M20xP2	14 mm	170N·m	1.2	803.738
C8-C8-100	C8	80					1.7	803.740

1. Clamp bolt is included.

Reduction

A.5

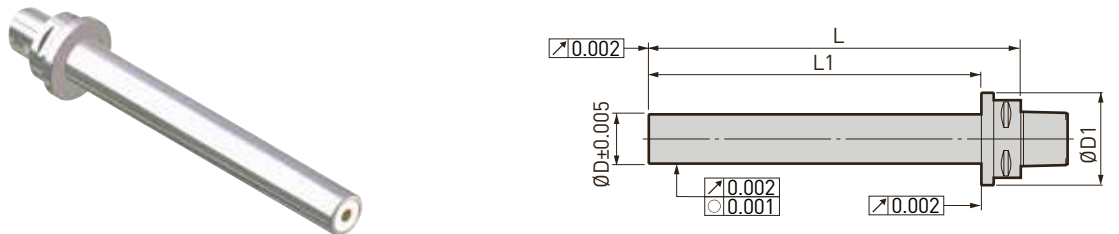
- Coolant-through hole



Model	BIG CAPTO No. 1	BIG CAPTO No. 2	ØD	ØD1	L	L1	Clamp Bolt			Weight (kg)	Order No.
							Threat Size	Hex.	Tightening Torque		
C6-C5-75	C6	C5	50	63	75	46	M16xP1.5	10 mm	95N·m	0.5	803.737
C8-C6-85	C8	C6	63	80	85	50	M20xP2	14 mm	170N·m	0.8	803.739

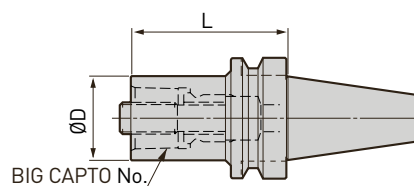
1. Clamp bolt is included.

Dyna Test



Model	ØD	ØD1	L	L1	Weight (kg)	Order No.
C5 -40 -L250	40	63	280	250	0.6	800.045
C6 -40 -L200		75	232	200	1.3	973.737
-L320		75	352	320	1.5	973.738
C8 -40 -L320		85	360	320	2.6	973.740

BIG-PLUS Basic Holder



Model	BIG CAPTO	ØD	L	Order No.
BBT40 -C3-30	C3	32	30	973.598
-C4-40	C4	40	40	802.350
-C5-50	C5	50	50	973.600
-C6-75	C6	63	75	973.601
BBT50 -C3-40	C3	32		973.602
-C4-40	C4	40	40	973.603
-C5-40	C5	50		973.604
-C6-50	C6	63	50	973.605
-C8-70	C8	80	70	803.736

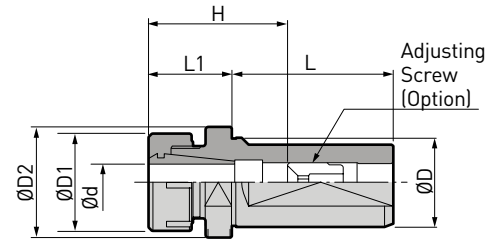
N/C Lathe Tooling

New Baby Chuck	126 - 127
MEGA ER Grip	128 - 129
MEGA Micro Chuck	130
MEGA Synchro Tapping Holder	130
Auto Tapper Type B	131
Synchro Tapping Holder Type R	131

New Baby Chuck Stopper

Flange as a stopper enables presetting of the tool away from machine and minimizes downtime. Shank is designed to be directly mounted into the drill holder of turret.

- Clamping range: \varnothing 2.5 - \varnothing 20
- Coolant-through hole



Model	$\varnothing d$	$\varnothing D$	$\varnothing D1$	$\varnothing D2$	L	L1	H	Order No.
SLS25 -NBS13 - 30	2.5 - 13	25	35	32	54	30	41 - 60	804.285
						60		804.286
SLS32 -NBS13 - 30	2.5 - 13	32	35	39.5	58	30	41 - 60	804.288
						60		804.289
						100		804.287
-NBS20 - 30	2.5 - 20	40	46	45.5	58	30	48 - 65	804.291
						60		804.292
						100		804.290
SLS40 -NBS13 - 30	2.5 - 13	40	35	49.5	68	30	41 - 60	804.294
						60		804.295
						100		804.293
-NBS20 - 30	2.5 - 20	40	46	49.5	68	30	48 - 65	804.297
						60		804.298
						100		804.296

1. New baby nut is included.
2. Designed to be capable of supplying coolant through the body.
3. "H" indicates the adjustment length with an adjusting screw.

A.6

Spare Parts			Accessories									
	New Baby Nut		Wrench		NBC Collet		Baby Perfect Seal		Adjusting Screw		Rubber	
					<small>► A138</small>	<small>► A148</small>						
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	G	L	B	Order No.	
NBS6	NBN6	961.526	NBK6	961.525	NBC6-□	BPS6-□	NBA6B	M7	12	2	961.527	
NBS8	NBN8	961.549	NBK8	961.548	NBC8-□	BPS8-□	NBA8B	M9	13	2.5	961.550	
NBS10	NBN10	961.571	NBK10	961.570	NBC10-□	BPS10-□	NBA10B	M11	16	3	961.572	
NBS13	NBN13	961.597	NBK13	961.596	NBC13-□	BPS13-□	NBA13B	M14	20	4	961.598	
NBS16	NBN16	961.631	NBK16	961.630	NBC16-□	BPS16-□	NBA16B	M18	20	4	961.632	
NBS20	NBN20	961.679	NBK20	961.678	NBC20-□	BPS20-□	NBA20B	M21	20	4	961.680	

New Baby Chuck Standard

Versatile as a basic holder for drills, taps, reamers and small tool bits.

- Clamping range: 0.25 - Ø 20
- Coolant-through hole

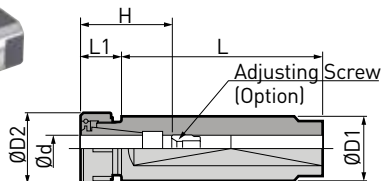


Fig. 1

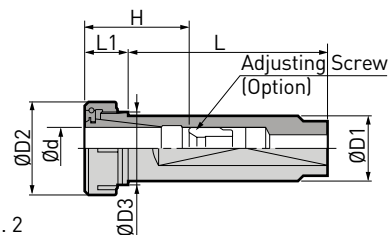


Fig. 2

Model	Fig.	Ød	ØD1	ØD2	ØD3	L	L1	H	Order No.	
SL16 -NBS6 - 40	1	0.25 - 6	16	20		40	15	20 - 40	802.154	
						80			802.155	
		-NBS8 - 40		0.5 - 8		25	40	16.5	23 - 42	802.156
	80					802.157				
	-NBS10 - 40			2		1.5 - 10	30	21	37	35 - 45
		80					802.153			
SL20 -NBS6 - 40		1	0.25 - 6	20	20		40	15	20 - 40	802.162
	80						802.163			
	-NBS8 - 40		0.5 - 8		25		40	16.5	23 - 42	802.164
		80			802.165					
		-NBS10 - 40	2		1.5 - 10		30	21	18	35 - 45
	80						802.159			
	-NBS13 - 40		2	2.5 - 13	35	26	43	41 - 60	802.160	
		80			802.161					
		SL22 -NBS6 - 40	1	0.25 - 6	22	20		40	15	20 - 40
	80							804.272		
	-NBS8 - 40			0.5 - 8		25		40	16.5	23 - 42
			80			804.274				
-NBS10 - 40			1	1.5 - 10		30		40	18	35 - 45
	80					804.268				
	-NBS13 - 40		2	2.5 - 13	35	26	21.5	41 - 47	804.269	
80					804.270					
SL25 -NBS6 - 80			1	0.25 - 6	25	20		80	15	20 - 40
	120							802.172		
	-NBS8 - 80			0.5 - 8		25		80	16.5	23 - 42
			120			802.174				
		-NBS10 - 80	1	1.5 - 10		30		80	18	35 - 45
	120					802.166				
	-NBS13 - 80		2	2.5 - 13	35	26	21.5	41 - 60	802.169	
		120			802.168					
		-NBS16 - 80	2	2.5 - 16	42	32	48	45 - 65	802.171	
	120				802.170					
	SL25.4 -NBS6 - 80		1	0.25 - 6	25.4	20		80	15	20 - 40
		120						804.281		
-NBS8 - 80		0.5 - 8		25		80		16.5	23 - 42	804.284
			120	804.283						
		-NBS10 - 80	1	1.5 - 10		30		80	18	35 - 45
120						804.275				
-NBS13 - 80			2	2.5 - 13	35	26	21.5	41 - 50	804.278	
		120			804.277					
		-NBS16 - 80	2	2.5 - 16	42	32	48	45 - 65	804.280	
120					804.279					
SL32 -NBS13 -100			1	2.5 - 13	32	35		100	21.5	41 - 60
		150						802.177		
	-NBS16 -100	0.5 - 8		42		100		45 - 65		802.178
			150	802.179						
		-NBS20 -100	2	2.5 - 20		46		36	100	48 - 65
	150					802.181				

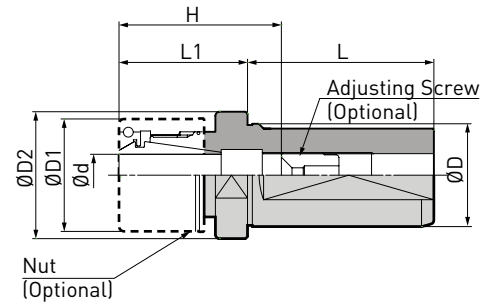
1. New baby nut is included.
2. Designed to be capable of supplying coolant through the body.

3. "H" indicates the adjustment length with an adjusting screw.

MEGA ER Grip Stopper

High precision components outperform standard ER collet system.

- Clamping range: \varnothing 2.75 - \varnothing 20
- Coolant-through hole



Model	$\varnothing d$	$\varnothing D$	$\varnothing D1$	$\varnothing D2$	L	L1	H	Adjusting Screw	Order No.
SLS25-MEGA ER20-45/NL	2.75 - 13	25	35	32	54	45	42 - 62	NBA13B	803.571
-75/NL						75			803.572
SLS32-MEGA ER20-45/NL	2.75 - 13	32	35	39.5	58	45	42 - 62	NBA13B	803.573
-75/NL						75			803.574
-MEGA ER32-45/NL	2.75 - 20		50	50		45	47 - 68	NBA20B	803.575
-75/NL						75	50 - 68		803.576
SLS40-MEGA ER20-45/NL	2.75 - 13	40	35	49.5	68	45	42 - 62	NBA13B	803.577
-75/NL						75			803.578
-MEGA ER32-45/NL	2.75 - 20		50	50		45	50 - 68	NBA20B	803.579
-75/NL						75			803.580

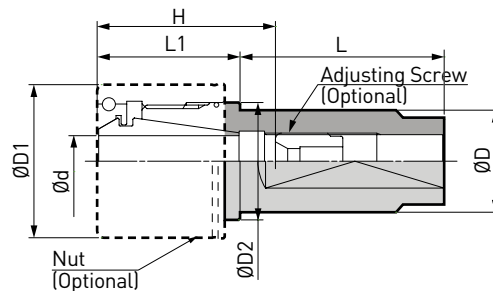
1. Nut is not included. Refer to the "accessories" table on the next page and select the suitable nut according to applications.
2. Designed to be capable of supplying coolant through the body.
3. "H" indicates the adjustment length with an adjusting screw.

For ER Collet ▶ A152

MEGA ER Grip Standard

Flat is provided on the shank to be mounted in the tool post of the NC lathe directly.

- Clamping range: $\varnothing 1.9 - \varnothing 16$
- Coolant-through hole



Model	$\varnothing d$	$\varnothing D$	$\varnothing D1$	$\varnothing D2$	L	L1	H	Adjusting Screw	Order No.	
SL16 -MEGA ER11 - 40/NL	2.75 - 6	16	19	-	40	19	23 - 40	NBA6B	803.554	
- 80/NL					80				803.555	
SL20 -MEGA ER11 - 40/NL	2.75 - 6	20	19	-	40	19	23 - 40	NBA6B	803.560	
- 80/NL					80				803.561	
-MEGA ER16 - 40/NL	1.9 - 10		30	23	-	40	28	35 - 47	NBA10B	801.714
- 80/NL						80				803.562
SL25 -MEGA ER11 - 60/NL	2.75 - 6	25	19	-	60	19	23 - 40	NBA6B	803.564	
-100/NL					100				803.563	
-MEGA ER16 - 60/NL	1.9 - 10		30	-	-	60	28	35 - 47	NBA10B	803.566
-100/NL						100				803.565
-MEGA ER20 - 60/NL	2.75 - 13		35	27	-	60	30	42 - 62	NBA13B	803.568
-100/NL						100				803.567
-MEGA ER25 - 60/NL	2.75 - 16		42	33.5	-	60	48	44 - 67	NBA16B	803.570
-100/NL						100				803.569
SL19.05-MEGA ER11 - 40/NL	2.75 - 6	19.05	19	-	40	19	23 - 40	NBA6B	803.556	
- 80/NL					80				803.557	
-MEGA ER16 - 40/NL	1.9 - 10		30	23	-	40	28	35 - 47	NBA10B	803.558
- 80/NL						80				803.559

1. Nut is not included. Refer to the "accessories" table below and select the suitable nut according to applications.
2. Designed to be capable of supplying coolant through the body.
3. "H" indicates the adjustment length with an adjusting screw.

For ER Collet ▶ A152

A.6

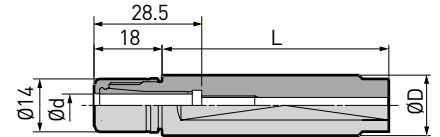
Accessories														
MEGA ER Nut		MEGA ER Perfect Seal		MEGA Wrench		ER Nut		Wrench		Adjusting Screw		Rubber		
MEGA ER Grip	Model	Order No.	Model	Model	Order No.	Model	Order No.	Model	Order No.	Model	G	L	B	Order No.
MEGA ER11	-	-	-	-	-	ERN11	803.581	NBK 6	961.525	NBA6B	M7	12	2	961.527
MEGA ER16	MERN16	967.801	MERPS16-□	MGR30L	969.448	ERN16	803.582	NBK10	961.570	NBA10B	M11	16	3	961.572
MEGA ER20	MERN20	967.802	MERPS20-□	MGR35L	969.460L	ERN20	803.583	NBK13	961.596	NBA13B	M14	20	4	961.598
MEGA ER25	MERN25	967.803	MERPS25-□	MGR42L	969.462L	ERN25	803.584	NBK16	961.630	NBA16B	M18	20	4	961.632
MEGA ER32	MERN32	967.804	MERPS32-□	MGR50L	969.464L	ERN32	803.585	FK45-50L	801.037	NBA20B	M21	20	4	961.680

1. MEGA wrench is required for MEGA nut and MEGA ER perfect seal.
2. Wrench is for ER nut.

MEGA Micro Chuck

Smaller nut diameter than body allows installation into toolholder of small lathes from the back side.

- Clamping range: \varnothing 0.45 - \varnothing 6.05
- Coolant-through hole



Model	$\varnothing d$	$\varnothing D$	L	Collet Model	Order No.
SL16 -MEGA6S -60	0.45 - 6.05	16	60	NBC6S-□	803.594
SL20 -MEGA6S -40		20	40		803.595
-80		80	803.602		
SL15.875-MEGA6S -60		15.875	60		803.593

1. MEGA nut is included.
2. Designed to be capable of supplying coolant through the body.
3. MEGA wrench (MGR14) is to be ordered separately.

For MEGA Wrench ▶ A157

For Micro Collet ▶ A135

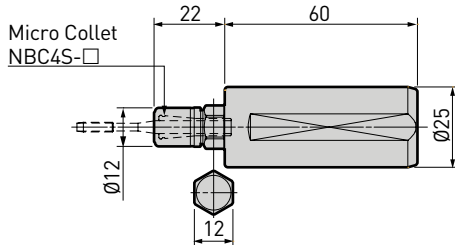
A.6

MEGA Synchro Tapping Holder

Rigid tapping attachment with error compensation

Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.

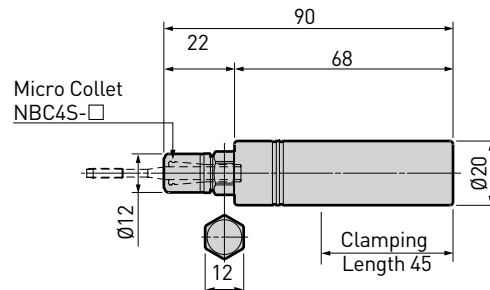
- Tapping range: M1 - M3



Model	Order No.
SLS25-MGT3-22	804.115

For Accessory ▶ A166

1. MEGA nut is included.
2. MEGA wrench (MGR12) and common spanner (12 mm) are required to clamp/unclamp the tap.

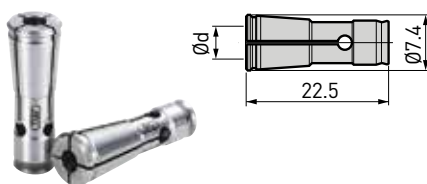


Model	Order No.
ST20-MGT3-90	978.356

For Accessory ▶ A166

1. MEGA nut is included.
2. MEGA wrench (MGR12) and common spanner (12 mm) are required to clamp/unclamp the tap.
3. There is no flat on the shank.

Micro Collet for MGT3



Model	Tapping Range d			Tap Shank	Order No.
	DIN371	ISO529	JIS		
NBC4S -2.5AA	M1 - M1.8	M2		2.5	961.468
-2.8AA	M2 - M2.6	M2.2, M2.5		2.8	968.353
-3.0AA			M1 - M2.6	3.0	961.470
-3.1AA		M3		3.15	968.355
-3.5AA	M3			3.5	961.472
-4.0AA			M3	4.0	961.474

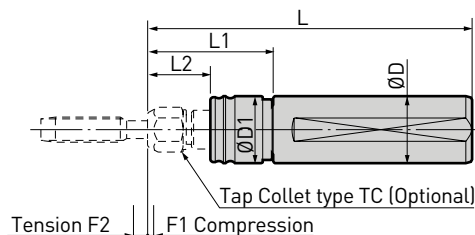
1. Other sizes available. Please refer to micro collet.

For Micro Collet ▶ A135

Auto Tapper Type B

Ideal for blind-hole or pipe tapping with depth control. Designed with minimum projection to clear space limitation on turret.

- Tapping range: M3 - M20
- Depth control



Model	Max. Tap Size	ØD	ØD1	L	L1	L2	F1	F2	Tap Collet Model	Order No.
SLS25 -ATB8 -45	M3 - M8	25	25.5	130	45	17	0.5	3	TC8-d	802.743
SLS32 -ATB12 -60	M3 - M12	32	32	155	60	30		4	TC12-d	802.744
SLS40 -ATB12 -60		40	32	155	60	25		4	802.745	
-ATB20 -70	M8 - M20	40	44	180	70	5		TC20-d	802.746	

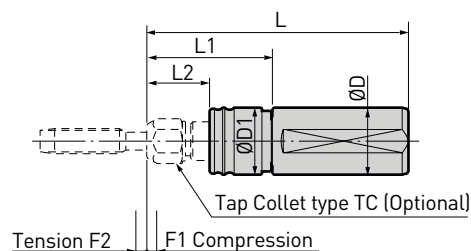
1. Tap collet type TC is to be ordered separately.
2. Not available for left-hand threading.

F1: Compression
F2: Tension

Synchro Tapping Holder Type R

Radial float eliminates misalignment of center between machine spindle and tap. Small axial float compensates for synchronization errors and minimizes thrust loads on a tap.

- Tapping range: M3 - M20
- Rigid tapping



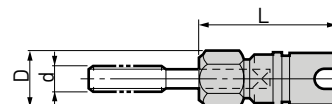
Model	Max. Tap Size	ØD	ØD1	L	L1	L2	F1	F2	Tap Collet Model	Order No.
SLS32 -ATS12R -60	M3 - M12	32	32	125	60	30	0.5	0.5	TC12-d	802.747
SLS40 -ATS12R -60		40	32	125	60	25	0.5	0.5		802.748
-ATS20R -70	M8 - M20	40	44	145	70	25	0.5	0.5	TC20-d	802.749

1. Tap collet type TC is to be ordered separately.
2. Rigid tapping function is required on the machine tool.

F1: Compression
F2: Tension

Tap Collet

(For Synchro Tapping Holder Type R & Auto Tapper Type B)



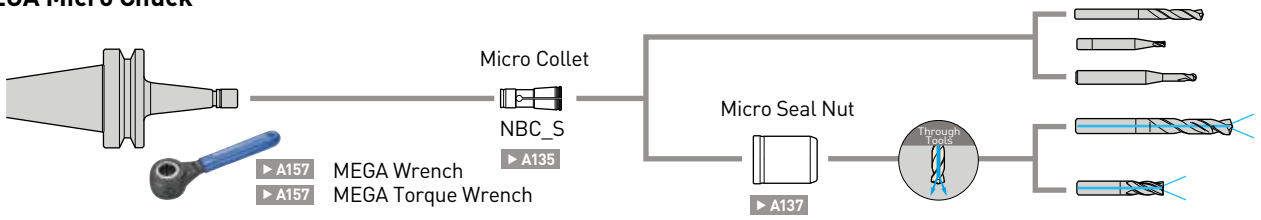
Model	Tapping Range d			D	L	Tapping Attachment
	Metric	Unify	Pipe			
TC8-d	M3 - M4	No. 5 - No. 8	-	15.8	40.5	ATB8
	M5 - M8	No. 10 - U5/16				
TC12-d	M3 - M12	No. 5 - U1/2	P1/8	22	55	ATB12, ATS12R
TC20-d	M8 - M12	U3/8 - U1/2	P1/8	22	63	ATB20, ATS20R
	M14 - M20	U9/16 - U3/4	P1/4, P3/8	31		

1. Specify the tap size and standard (JIS, DIN) when ordering. Please contact BIG KAISER agent for details.

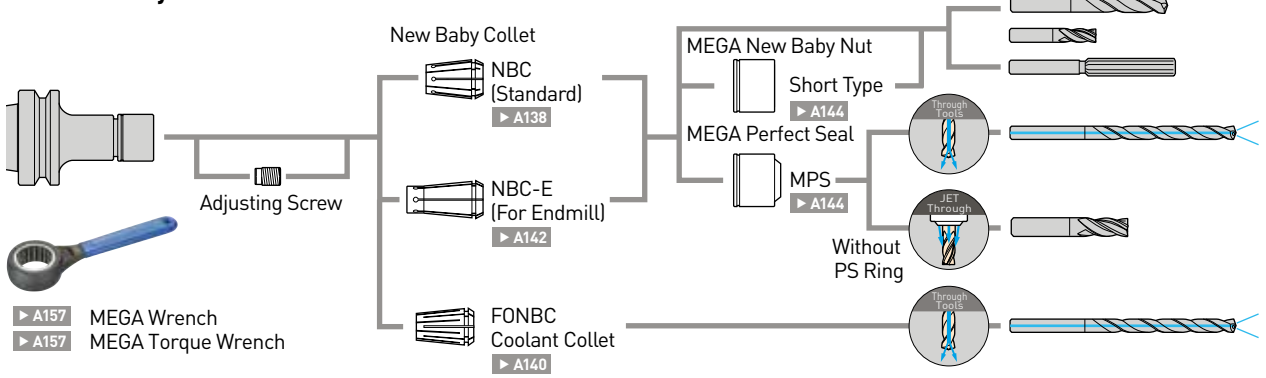
Accessories

Micro Collet	135 - 136
MEGA Nut, Micro Seal Nut, Case for Micro Collet	137
New Baby Collet (NBC/FONBC/NBC-E)	138 - 142
New Baby Collet Set, Collet Ejector, Collet Remover	143
MEGA Nut, Adjusting Screw	144
New Baby Nut, Tap Driving Back Spot	145
Perfect Seal (MPS/BPS)	146 - 149
MEGA E Collet, MEGA E Nut	150
Perfect Seal (EPS)	151
MEGA ER Collet, Collet Remover	152 - 153
MEGA ER Nut	154
Perfect Seal (MERPS)	155 - 156
MEGA Wrench for Collet Chuck	157
Straight Collet (PJC/PSC/OCA/AC), Adjusting Screw	158 - 160
MEGA Wrench for Milling Chuck	161
MEGA Synchro Tapping Holder, Accessories	162 - 167
Adjusting Screw, Clamp Bolt	168
Tooling Mate, Kombi Grip	169
Tool Holder Cleaner and Spindle Cleaner	170 - 171
Clean Tec	172
T-Slot Clean	173
Pullstud Bolt, Pullstud Wrench	174 - 175

MEGA Micro Chuck

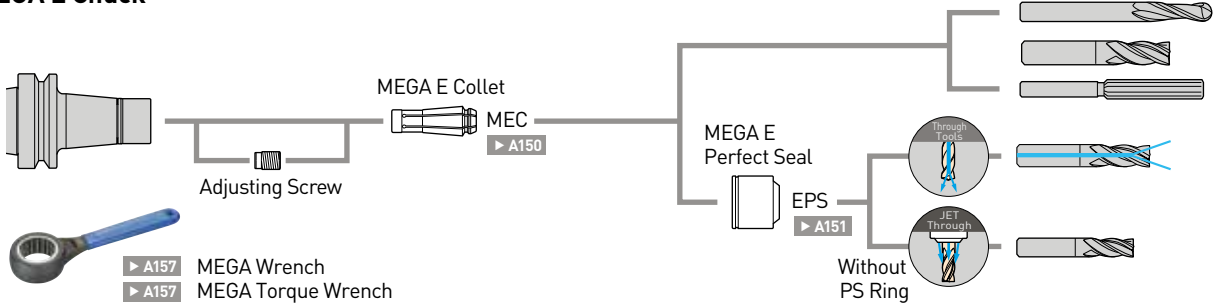


MEGA New Baby Chuck

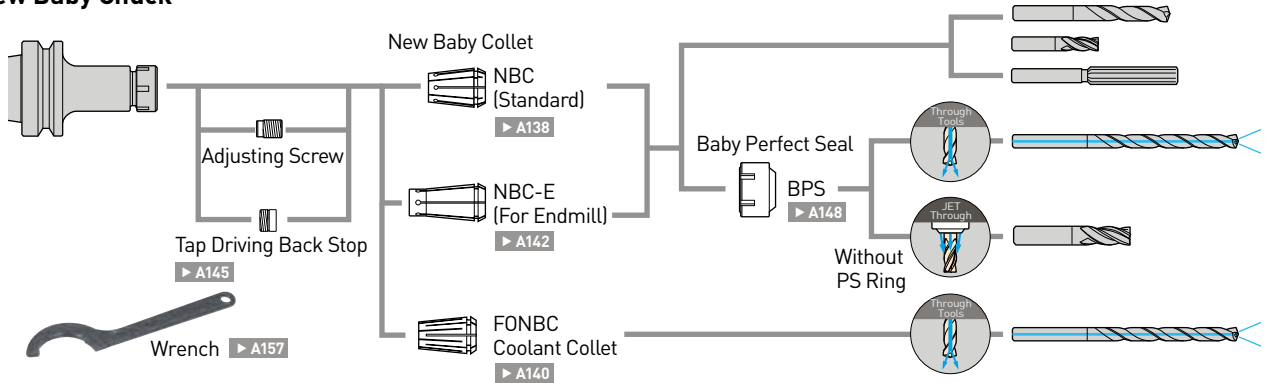


A.7

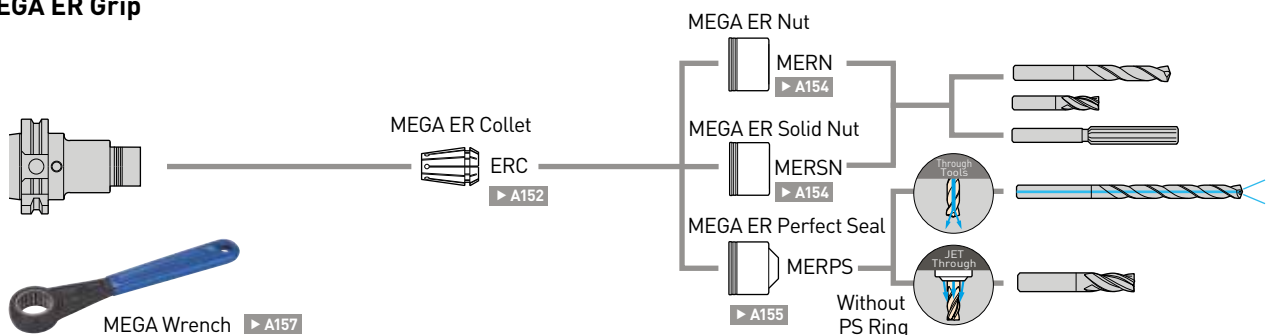
MEGA E Chuck



New Baby Chuck



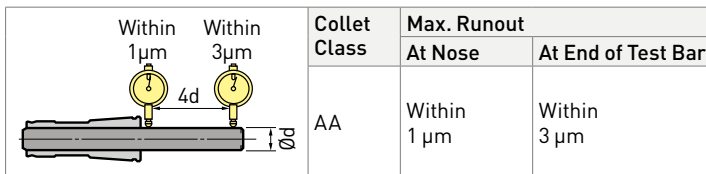
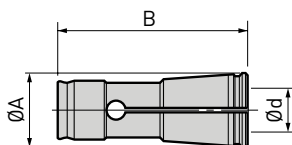
MEGA ER Grip



Micro Collet

For MEGA Micro Chuck

Available in 0.1 mm diameter increments to suit all the cutting tool shank sizes with maximum accuracy. Despite their compact size, high clamping force and accuracy are achieved.



For MEGA6S/8S, refer to the following pages.

MEGA3S			
Model		Clamping Range Ød	Order No.
NBC3S -0.5	AA	0.45 - 0.55	968.301
-0.6	AA	0.55 - 0.65	968.302
-0.7	AA	0.65 - 0.75	968.303
-0.8	AA	0.75 - 0.85	968.304
-0.9	AA	0.85 - 0.95	968.305
-1.0	AA	0.95 - 1.05	968.306
-1.1	AA	1.05 - 1.15	968.307
-1.2	AA	1.15 - 1.25	968.308
-1.3	AA	1.25 - 1.35	968.309
-1.4	AA	1.35 - 1.45	968.310
-1.5	AA	1.45 - 1.55	968.311
-1.6	AA	1.55 - 1.65	968.312
-1.7	AA	1.65 - 1.75	968.313
-1.8	AA	1.75 - 1.85	968.314
-1.9	AA	1.85 - 1.95	968.315
-2.0	AA	1.95 - 2.05	968.316
-2.1	AA	2.05 - 2.15	968.317
-2.2	AA	2.15 - 2.25	968.318
-2.3	AA	2.25 - 2.35	968.319
-2.4	AA	2.35 - 2.45	968.320
-2.5	AA	2.45 - 2.55	968.321
-2.6	AA	2.55 - 2.65	968.322
-2.7	AA	2.65 - 2.75	968.323
-2.8	AA	2.75 - 2.85	968.324
-2.9	AA	2.85 - 2.95	968.325
-3.0	AA	2.95 - 3.05	968.326
-3.1	AA	3.05 - 3.15	968.327
-3.175	AA	3.125 - 3.225	968.328
-3.2	AA	3.15 - 3.25	968.329

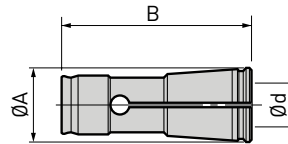
Ø A=6.06 B=18.8

MEGA4S			
Model		Clamping Range Ød	Order No.
NBC4S -0.5	AA	0.45 - 0.55	968.334
-0.6	AA	0.55 - 0.65	968.335
-0.7	AA	0.65 - 0.75	968.336
-0.8	AA	0.75 - 0.85	968.337
-0.9	AA	0.85 - 0.95	968.338
-1.0	AA	0.95 - 1.05	961.462
-1.1	AA	1.05 - 1.15	968.339
-1.2	AA	1.15 - 1.25	968.340
-1.3	AA	1.25 - 1.35	968.341
-1.4	AA	1.35 - 1.45	968.342
-1.5	AA	1.45 - 1.55	961.464
-1.6	AA	1.55 - 1.65	968.343
-1.7	AA	1.65 - 1.75	968.344
-1.8	AA	1.75 - 1.85	968.345
-1.9	AA	1.85 - 1.95	968.346
-2.0	AA	1.95 - 2.05	961.466
-2.1	AA	2.05 - 2.15	968.347
-2.2	AA	2.15 - 2.25	968.348
-2.3	AA	2.25 - 2.35	968.349
-2.4	AA	2.35 - 2.45	968.350
-2.5	AA	2.45 - 2.55	961.468
-2.6	AA	2.55 - 2.65	968.351
-2.7	AA	2.65 - 2.75	968.352
-2.8	AA	2.75 - 2.85	968.353
-2.9	AA	2.85 - 2.95	968.354
-3.0	AA	2.95 - 3.05	961.470
-3.1	AA	3.05 - 3.15	968.355
-3.175	AA	3.125 - 3.225	968.356
-3.2	AA	3.15 - 3.25	968.357
-3.3	AA	3.25 - 3.35	968.358
-3.4	AA	3.35 - 3.45	968.359
-3.5	AA	3.45 - 3.55	961.472
-3.6	AA	3.55 - 3.65	968.360
-3.7	AA	3.65 - 3.75	968.361
-3.8	AA	3.75 - 3.85	968.362
-3.9	AA	3.85 - 3.95	968.363
-4.0	AA	3.95 - 4.05	961.474

Ø A=7.4 B=22.5

Micro Collet

For MEGA Micro Chuck



A.7

MEGA6S			
Model		Clamping Range Ød	Order No.
NBC6S -0.5	AA	0.45 - 0.55	968.369
-0.6	AA	0.55 - 0.65	968.370
-0.7	AA	0.65 - 0.75	968.371
-0.8	AA	0.75 - 0.85	968.372
-0.9	AA	0.85 - 0.95	968.373
-1.0	AA	0.95 - 1.05	961.477
-1.1	AA	1.05 - 1.15	968.374
-1.2	AA	1.15 - 1.25	968.375
-1.3	AA	1.25 - 1.35	968.376
-1.4	AA	1.35 - 1.45	968.377
-1.5	AA	1.45 - 1.55	961.479
-1.6	AA	1.55 - 1.65	968.378
-1.7	AA	1.65 - 1.75	968.379
-1.8	AA	1.75 - 1.85	968.380
-1.9	AA	1.85 - 1.95	968.381
-2.0	AA	1.95 - 2.05	961.481
-2.1	AA	2.05 - 2.15	968.382
-2.2	AA	2.15 - 2.25	968.383
-2.3	AA	2.25 - 2.35	968.384
-2.4	AA	2.35 - 2.45	968.385
-2.5	AA	2.45 - 2.55	961.483
-2.6	AA	2.55 - 2.65	968.386
-2.7	AA	2.65 - 2.75	968.387
-2.8	AA	2.75 - 2.85	968.388
-2.9	AA	2.85 - 2.95	968.389
-3.0	AA	2.95 - 3.05	961.485
-3.1	AA	3.05 - 3.15	968.390
-3.175	AA	3.125 - 3.225	968.391
-3.2	AA	3.15 - 3.25	968.392
-3.3	AA	3.25 - 3.35	968.393
-3.4	AA	3.35 - 3.45	968.394
-3.5	AA	3.45 - 3.55	961.487
-3.6	AA	3.55 - 3.65	968.395
-3.7	AA	3.65 - 3.75	968.396
-3.8	AA	3.75 - 3.85	968.397
-3.9	AA	3.85 - 3.95	968.398
-4.0	AA	3.95 - 4.05	961.489
-4.1	AA	4.05 - 4.15	968.399
-4.2	AA	4.15 - 4.25	968.400
-4.3	AA	4.25 - 4.35	968.401
-4.4	AA	4.35 - 4.45	968.402
-4.5	AA	4.45 - 4.55	961.491
-4.6	AA	4.55 - 4.65	968.403
-4.7	AA	4.65 - 4.75	968.404
-4.7625	AA	4.7125 - 4.8125	801.743
-4.8	AA	4.75 - 4.85	968.405
-4.9	AA	4.85 - 4.95	968.406
-5.0	AA	4.95 - 5.05	961.493
-5.1	AA	5.05 - 5.15	968.408
-5.2	AA	5.15 - 5.25	968.409
-5.3	AA	5.25 - 5.35	968.410
-5.4	AA	5.35 - 5.45	968.411
-5.5	AA	5.45 - 5.55	961.495
-5.6	AA	5.55 - 5.65	968.412
-5.7	AA	5.65 - 5.75	968.413
-5.8	AA	5.75 - 5.85	968.414
-5.9	AA	5.85 - 5.95	968.415
-6.0	AA	5.95 - 6.05	961.497

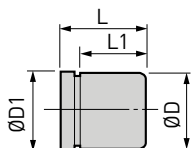
Ø A=9.4 B=24.5

MEGA8S			
Model		Clamping Range Ød	Order No.
NBC8S -3.0	AA	2.95 - 3.05	801.709
-3.1	AA	3.05 - 3.15	804.132
-3.2	AA	3.15 - 3.25	804.134
-3.3	AA	3.25 - 3.35	804.135
-3.4	AA	3.35 - 3.45	804.136
-3.5	AA	3.45 - 3.55	804.137
-3.6	AA	3.55 - 3.65	804.138
-3.7	AA	3.65 - 3.75	804.139
-3.8	AA	3.75 - 3.85	804.140
-3.9	AA	3.85 - 3.95	804.141
-4.0	AA	3.95 - 4.05	801.742
-4.1	AA	4.05 - 4.15	804.142
-4.2	AA	4.15 - 4.25	804.143
-4.3	AA	4.25 - 4.35	804.144
-4.4	AA	4.35 - 4.45	804.145
-4.5	AA	4.45 - 4.55	804.146
-4.6	AA	4.55 - 4.65	804.147
-4.7	AA	4.65 - 4.75	804.148
-4.8	AA	4.75 - 4.85	804.149
-4.9	AA	4.85 - 4.95	804.150
-5.0	AA	4.95 - 5.05	801.702
-5.1	AA	5.05 - 5.15	804.151
-5.2	AA	5.15 - 5.25	804.152
-5.3	AA	5.25 - 5.35	804.153
-5.4	AA	5.35 - 5.45	804.154
-5.5	AA	5.45 - 5.55	804.155
-5.6	AA	5.55 - 5.65	804.156
-5.7	AA	5.65 - 5.75	804.157
-5.8	AA	5.75 - 5.85	804.158
-5.9	AA	5.85 - 5.95	801.746
-6.0	AA	5.95 - 6.05	801.703
-6.1	AA	6.05 - 6.15	804.159
-6.2	AA	6.15 - 6.25	804.160
-6.3	AA	6.25 - 6.35	804.161
-6.4	AA	6.35 - 6.45	804.162
-6.5	AA	6.45 - 6.55	804.163
-6.6	AA	6.55 - 6.65	804.164
-6.7	AA	6.65 - 6.75	804.165
-6.8	AA	6.75 - 6.85	804.166
-6.9	AA	6.85 - 6.95	804.167
-7.0	AA	6.95 - 7.05	804.168
-7.1	AA	7.05 - 7.15	804.169
-7.2	AA	7.15 - 7.25	804.170
-7.3	AA	7.25 - 7.35	804.171
-7.4	AA	7.35 - 7.45	804.172
-7.5	AA	7.45 - 7.55	804.173
-7.6	AA	7.55 - 7.65	804.174
-7.7	AA	7.65 - 7.75	804.175
-7.8	AA	7.75 - 7.85	804.176
-7.9	AA	7.85 - 7.95	804.177
-8.0	AA	7.95 - 8.05	801.704

Ø A=12 B=27

MEGA Nut

For MEGA Micro Chuck

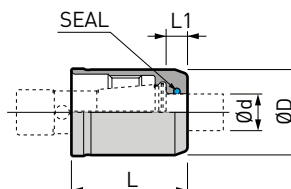


Model	MEGA Micro Chuck	D	ØD1	L	L1	Order No.
MGN3S	MEGA3S	10	10.3	13.0	11.0	969.480
MGN4S	MEGA4S	12	12.2	14.5	12.0	969.481
MGN6S	MEGA6S	14	14.2	17.0	14.5	969.482
MGN8S	MEGA8S	18	18.3	18.5	15.5	804.108

Micro Seal Nut

For MEGA Micro Chuck

Sealed nut for coolant-through tools.



MEGA6S

Model	Ød	ØD	L	L1	Order No.
MGN6S-PS3	3.0	14	19	3.5	978.516
-PS4	4.0				978.513
-PS5	5.0				978.517
-PS6	6.0				978.511

MEGA8S

Model	Ød	ØD	L	L1	Order No.
MGN8S-PS3	3.0	18	20.2	3.5	804.109
-PS4	4.0				804.110
-PS5	5.0				804.111
-PS6	6.0				804.112
-PS7	7.0				804.113
-PS8	8.0				804.114

Micro Collet Protective Case

Exclusive case for MEGA Micro Collet.



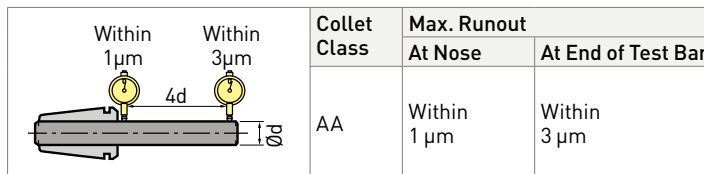
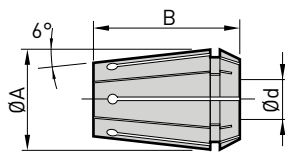
Model	Micro Collet	No. of Spot	Size	Order No.
NBB3S	NBC3S	50	126 x 139 x 50	968.330
NBB4S	NBC4S			968.364
NBB6S	NBC6S	60	200 x 170 x 50	961.498
NBB8S	NBC8S			805.802

1. Micro collet is not included.

A.7

New Baby Collet Standard

For MEGA New Baby Chuck and New Baby Chuck



Clamping diameter: Ø 0.25 - Ø 8.0

MEGA6N / NBS6				
Model			Clamping Range Ød	Order No.
NBC6	-0.5	AA	0.25 - 0.50	961.500
•	-0.75	AA	0.50 - 0.75	961.501
•	-1	AA	0.75 - 1.00	961.502
•	-1.25	AA	1.00 - 1.25	961.503
•	-1.5	AA	1.25 - 1.50	961.504
•	-1.75	AA	1.50 - 1.75	961.505
•	-2	AA	1.75 - 2.00	961.506
•	-2.25	AA	2.00 - 2.25	961.507
•	-2.5	AA	2.25 - 2.50	961.508
•	-2.75	AA	2.50 - 2.75	961.509
•	-3	AA	2.75 - 3.00	961.510
•	-3.175	AA	2.925 - 3.175	801.738
•	-3.25	AA	3.00 - 3.25	961.511
•	-3.5	AA	3.25 - 3.50	961.512
•	-3.75	AA	3.50 - 3.75	961.513
•	-4	AA	3.75 - 4.00	961.514
•	-4.25	AA	4.00 - 4.25	961.515
•	-4.5	AA	4.25 - 4.50	961.516
•	-4.75	AA	4.50 - 4.75	961.517
•	-5	AA	4.75 - 5.00	961.518
•	-5.25	AA	5.00 - 5.25	961.519
•	-5.5	AA	5.25 - 5.50	961.520
•	-5.75	AA	5.50 - 5.75	961.521
•	-6	AA	5.75 - 6.00	961.522

Ø A=9.5 B=14

Clamping diameter: Ø 0.5 - Ø 8.0

MEGA8N / NBS8				
Model			Clamping Range Ød	Order No.
• NBC8	-0.75	AA	0.50 - 0.75	978.507
•	-1	AA	0.75 - 1.00	961.531
•	-1.25	AA	1.00 - 1.25	978.500
•	-1.5	AA	1.25 - 1.50	961.532
•	-1.75	AA	1.50 - 1.75	801.744
•	-2	AA	1.75 - 2.00	961.533
•	-2.25	AA	2.00 - 2.25	978.505
•	-2.5	AA	2.25 - 2.50	961.534
•	-2.75	AA	2.50 - 2.75	978.506
•	-3	AA	2.75 - 3.00	961.535
•	-3.175	AA	2.675 - 3.175	978.499
•	-3.5	AA	3.00 - 3.50	961.536
•	-4	AA	3.50 - 4.00	961.537
•	-4.5	AA	4.00 - 4.50	961.538
•	-5	AA	4.50 - 5.00	961.539
•	-5.25	AA	4.75 - 5.25	801.750
•	-5.5	AA	5.00 - 5.50	961.540
•	-5.75	AA	5.25 - 5.75	801.751
•	-6	AA	5.50 - 6.00	961.541
•	-6.5	AA	6.00 - 6.50	961.542
•	-7	AA	6.50 - 7.00	961.543
•	-7.5	AA	7.00 - 7.50	961.544
•	-8	AA	7.50 - 8.00	961.545

Ø A=12.5 B=18

Clamping diameter: Ø 1.5 - Ø 10.0

MEGA10N / NBS10				
Model			Clamping Range Ød	Order No.
• NBC10	- 1.75	AA	1.50 - 1.75	961.599
•	- 2	AA	1.75 - 2.00	961.551
•	- 2.25	AA	2.00 - 2.25	978.508
•	- 2.5	AA	2.25 - 2.50	961.552
•	- 2.75	AA	2.50 - 2.75	978.509
•	- 3	AA	2.75 - 3.00	961.553
•	- 3.175	AA	2.675 - 3.175	961.120
•	- 3.25	AA	2.75 - 3.25	801.651
•	- 3.5	AA	3.00 - 3.50	961.554
•	- 3.75	AA	3.25 - 3.75	801.652
•	- 4	AA	3.50 - 4.00	961.555
•	- 4.25	AA	3.75 - 4.25	801.655
•	- 4.5	AA	4.00 - 4.50	961.556
•	- 4.75	AA	4.25 - 4.75	801.656

MEGA10N / NBS10				
Model			Clamping Range Ød	Order No.
• NBC10	- 5	AA	4.50 - 5.00	961.557
•	- 5.25	AA	4.75 - 5.25	801.659
•	- 5.5	AA	5.00 - 5.50	961.558
•	- 5.75	AA	5.25 - 5.75	801.660
•	- 6	AA	5.50 - 6.00	961.559
•	- 6.5	AA	6.00 - 6.50	961.560
•	- 7	AA	6.50 - 7.00	961.561
•	- 7.5	AA	7.00 - 7.50	961.562
•	- 8	AA	7.50 - 8.00	961.563
•	- 8.5	AA	8.00 - 8.50	961.564
•	- 9	AA	8.50 - 9.00	961.565
•	- 9.5	AA	9.00 - 9.50	961.566
•	-10	AA	9.50 - 10.00	961.567

Ø A=16.5 B=27

Clamping diameter: \emptyset 2.5 - \emptyset 13.0

MEGA13N / NBS13				
Model			Clamping Range \emptyset d	Order No.
• NBC13	- 3	AA	2.50 - 3.00	961.573
	- 3.175	AA	2.675 - 3.175	961.127
	- 3.25	AA	2.75 - 3.25	801.671
•	- 3.5	AA	3.00 - 3.50	961.574
	- 3.75	AA	3.25 - 3.75	801.672
•	- 4	AA	3.50 - 4.00	961.575
	- 4.25	AA	3.75 - 4.25	801.675
•	- 4.5	AA	4.00 - 4.50	961.576
	- 4.75	AA	4.25 - 4.75	801.676
•	- 5	AA	4.50 - 5.00	961.577
	- 5.25	AA	4.75 - 5.25	801.679
•	- 5.5	AA	5.00 - 5.50	961.578
	- 5.75	AA	5.25 - 5.75	801.680
•	- 6	AA	5.50 - 6.00	961.579

MEGA13N / NBS13				
Model			Clamping Range \emptyset d	Order No.
• NBC13	- 6.5	AA	6.00 - 6.50	961.580
•	- 7	AA	6.50 - 7.00	961.581
•	- 7.5	AA	7.00 - 7.50	961.582
•	- 8	AA	7.50 - 8.00	961.583
•	- 8.5	AA	8.00 - 8.50	961.584
•	- 9	AA	8.50 - 9.00	961.585
•	- 9.5	AA	9.00 - 9.50	961.586
•	-10	AA	9.50 - 10.00	961.587
•	-10.5	AA	10.00 - 10.50	961.588
•	-11	AA	10.50 - 11.00	961.589
•	-11.5	AA	11.00 - 11.50	961.590
•	-12	AA	11.50 - 12.00	961.591
•	-12.5	AA	12.00 - 12.50	961.592
•	-13	AA	12.50 - 13.00	961.593

 \emptyset A=20.5 B=31Clamping diameter: \emptyset 2.5 - \emptyset 16.0

MEGA16N / NBS16				
Model			Clamping Range \emptyset d	Order No.
• NBC16	- 3	AA	2.50 - 3.00	961.601
	- 3.25	AA	2.75 - 3.25	801.694
•	- 3.5	AA	3.00 - 3.50	961.602
	- 3.75	AA	3.25 - 3.75	801.695
•	- 4	AA	3.50 - 4.00	961.603
	- 4.25	AA	3.75 - 4.25	801.697
•	- 4.5	AA	4.00 - 4.50	961.604
	- 4.75	AA	4.25 - 4.75	801.698
•	- 5	AA	4.50 - 5.00	961.605
	- 5.25	AA	4.75 - 5.25	801.700
•	- 5.5	AA	5.00 - 5.50	961.606
	- 5.75	AA	5.25 - 5.75	801.701
•	- 6	AA	5.50 - 6.00	961.607
•	- 6.5	AA	6.00 - 6.50	961.608
•	- 7	AA	6.50 - 7.00	961.609
•	- 7.5	AA	7.00 - 7.50	961.610
•	- 8	AA	7.50 - 8.00	961.611
•	- 8.5	AA	8.00 - 8.50	961.612
•	- 9	AA	8.50 - 9.00	961.613
•	- 9.5	AA	9.00 - 9.50	961.614
•	-10	AA	9.50 - 10.00	961.615
•	-10.5	AA	10.00 - 10.50	961.616
•	-11	AA	10.50 - 11.00	961.617
•	-11.5	AA	11.00 - 11.50	961.618
•	-12	AA	11.50 - 12.00	961.619
•	-12.5	AA	12.00 - 12.50	961.620
•	-13	AA	12.50 - 13.00	961.621
•	-13.5	AA	13.00 - 13.50	961.622
•	-14	AA	13.50 - 14.00	961.623
•	-14.5	AA	14.00 - 14.50	961.624
•	-15	AA	14.50 - 15.00	961.625
•	-15.5	AA	15.00 - 15.50	961.626
•	-16	AA	15.50 - 16.00	961.627

 \emptyset A=25.5 B=35

1. • Models are included in new baby collet set ▶ A143.

	Collapsibility 0.25/ \emptyset
	Collapsibility 0.5/ \emptyset

Clamping diameter: \emptyset 2.5 - \emptyset 20.0

MEGA20N / NBS20				
Model			Clamping Range \emptyset d	Order No.
• NBC20	- 3	AA	2.50 - 3.00	961.641
	- 3.25	AA	2.75 - 3.25	801.718
•	- 3.5	AA	3.00 - 3.50	961.642
	- 3.75	AA	3.25 - 3.75	801.719
•	- 4	AA	3.50 - 4.00	961.643
	- 4.25	AA	3.75 - 4.25	801.722
•	- 4.5	AA	4.00 - 4.50	961.644
	- 4.75	AA	4.25 - 4.75	801.723
•	- 5	AA	4.50 - 5.00	961.645
	- 5.25	AA	4.75 - 5.25	801.726
•	- 5.5	AA	5.00 - 5.50	961.646
	- 5.75	AA	5.25 - 5.75	801.727
•	- 6	AA	5.50 - 6.00	961.647
•	- 6.5	AA	6.00 - 6.50	961.648
•	- 7	AA	6.50 - 7.00	961.649
•	- 7.5	AA	7.00 - 7.50	961.650
•	- 8	AA	7.50 - 8.00	961.651
•	- 8.5	AA	8.00 - 8.50	961.652
•	- 9	AA	8.50 - 9.00	961.653
•	- 9.5	AA	9.00 - 9.50	961.654
•	-10	AA	9.50 - 10.00	961.655
•	-10.5	AA	10.00 - 10.50	961.656
•	-11	AA	10.50 - 11.00	961.657
•	-11.5	AA	11.00 - 11.50	961.658
•	-12	AA	11.50 - 12.00	961.659
•	-12.5	AA	12.00 - 12.50	961.660
•	-13	AA	12.50 - 13.00	961.661
•	-13.5	AA	13.00 - 13.50	961.662
•	-14	AA	13.50 - 14.00	961.663
•	-14.5	AA	14.00 - 14.50	961.664
•	-15	AA	14.50 - 15.00	961.665
•	-15.5	AA	15.00 - 15.50	961.666
•	-16	AA	15.50 - 16.00	961.667
•	-16.5	AA	16.00 - 16.50	961.668
•	-17	AA	16.50 - 17.00	961.669
•	-17.5	AA	17.00 - 17.50	961.670
•	-18	AA	17.50 - 18.00	961.671
•	-18.5	AA	18.00 - 18.50	961.672
•	-19	AA	18.50 - 19.00	961.673
•	-19.5	AA	19.00 - 19.50	961.674
•	-20	AA	19.50 - 20.00	961.675

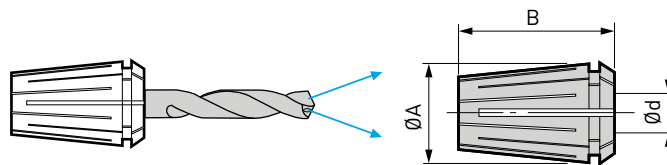
 \emptyset A=28.5 B=38

FONBC Coolant Collet

For MEGA New Baby Chuck and New Baby Chuck

Optimum collet for center-through coolant applications with coolant-through cutting tools.

- Max. Coolant pressure 7 MPa



Clamping diameter: Ø 3.0 - Ø 6.0

MEGA6N / NBS6			
Model	Clamping Range Ød		Order No.
FONBC6 -3 AA	3.00		969.601
-3.25 AA	3.15 - 3.25		969.602
-3.5 AA	3.40 - 3.50		969.603
-3.75 AA	3.65 - 3.75		969.604
-4 AA	3.90 - 4.00		969.605
-4.25 AA	4.15 - 4.25		969.606
-4.5 AA	4.40 - 4.50		969.607
-4.75 AA	4.65 - 4.75		969.608
-5 AA	4.90 - 5.00		969.609
-5.25 AA	5.15 - 5.25		969.610
-5.5 AA	5.40 - 5.50		969.611
-5.75 AA	5.65 - 5.75		969.612
-6 AA	5.90 - 6.00		969.613

Ø A=9.5 B=14

Clamping diameter: Ø 2.9 - Ø 8.0

MEGA8N / NBS8			
Model	Clamping Range Ød		Order No.
FONBC8 -3 AA	2.90 - 3.00		969.615
-3.5 AA	3.40 - 3.50		969.616
-4 AA	3.90 - 4.00		969.617
-4.5 AA	4.40 - 4.50		969.618
-5 AA	4.90 - 5.00		969.619
-5.5 AA	5.40 - 5.50		969.620
-6 AA	5.90 - 6.00		969.621
-6.5 AA	6.40 - 6.50		969.622
-7 AA	6.90 - 7.00		969.623
-7.5 AA	7.40 - 7.50		969.624
-8 AA	7.90 - 8.00		969.625

Ø A=12.5 B=18

Clamping diameter: Ø 2.9 - Ø 10.0

MEGA10N / NBS10			
Model	Clamping Range Ød		Order No.
FONBC10 - 3 AA	2.90 - 3.00		969.627
- 3.5 AA	3.40 - 3.50		969.628
- 4 AA	3.90 - 4.00		969.629
- 4.5 AA	4.40 - 4.50		969.630
- 5 AA	4.90 - 5.00		969.631
- 5.5 AA	5.40 - 5.50		969.632
- 6 AA	5.90 - 6.00		969.633
- 6.5 AA	6.40 - 6.50		969.634
- 7 AA	6.90 - 7.00		969.635
- 7.5 AA	7.40 - 7.50		969.636
- 8 AA	7.90 - 8.00		969.637
- 8.5 AA	8.40 - 8.50		969.638
- 9 AA	8.90 - 9.00		969.639
- 9.5 AA	9.40 - 9.50		969.640
-10 AA	9.90 - 10.00		969.641

Ø A=16.5 B=27

Clamping diameter: Ø 3.0 - Ø 13

MEGA13N / NBS13			
Model	Clamping Range Ød		Order No.
FONBC13 - 3 AA	3.00		969.643
- 3.5 AA	3.40 - 3.50		969.644
- 4 AA	3.90 - 4.00		969.645
- 4.5 AA	4.40 - 4.50		969.646
- 5 AA	4.90 - 5.00		969.647
- 5.5 AA	5.40 - 5.50		969.648
- 6 AA	5.90 - 6.00		969.649
- 6.5 AA	6.40 - 6.50		969.650
- 7 AA	6.90 - 7.00		969.651
- 7.5 AA	7.40 - 7.50		969.652
- 8 AA	7.90 - 8.00		969.653
- 8.5 AA	8.40 - 8.50		969.654
- 9 AA	8.90 - 9.00		969.655
- 9.5 AA	9.40 - 9.50		969.656
-10 AA	9.90 - 10.00		969.657
-10.5 AA	10.40 - 10.50		969.658
-11 AA	10.90 - 11.00		969.659
-11.5 AA	11.40 - 11.50		969.660
-12 AA	11.90 - 12.00		969.661
-12.5 AA	12.40 - 12.50		969.662
-13.0 AA	12.90 - 13.00		969.663

Ø A=20.5 B=31

A.7

Clamping diameter: Ø 4.9 - Ø 16.0

MEGA16N / NBS16		
Model	Clamping Range Ød	Order No.
FONBC16 - 5 AA	4.90 - 5.00	969.669
- 5.5 AA	5.40 - 5.50	969.670
- 6 AA	5.90 - 6.00	969.671
- 6.5 AA	6.40 - 6.50	969.672
- 7 AA	6.90 - 7.00	969.673
- 7.5 AA	7.40 - 7.50	969.674
- 8 AA	7.90 - 8.00	969.675
- 8.5 AA	8.40 - 8.50	969.676
- 9 AA	8.90 - 9.00	969.677
- 9.5 AA	9.40 - 9.50	969.678
-10 AA	9.90 - 10.00	969.679
-10.5 AA	10.40 - 10.50	969.680
-11 AA	10.90 - 11.00	969.681
-11.5 AA	11.40 - 11.50	969.682
-12 AA	11.90 - 12.00	969.683
-12.5 AA	12.40 - 12.50	969.684
-13 AA	12.90 - 13.00	969.685
-13.5 AA	13.40 - 13.50	969.686
-14 AA	13.90 - 14.00	969.687
-14.5 AA	14.40 - 14.50	969.688
-15 AA	14.90 - 15.00	969.689
-15.5 AA	15.40 - 15.50	969.690
-16 AA	15.90 - 16.00	969.691

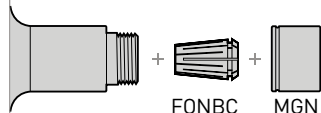
Ø A=25.5 B=35

Clamping diameter: Ø 4.9 - Ø 20.0

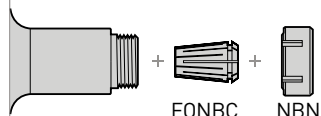
MEGA20N / NBS20		
Model	Clamping Range Ød	Order No.
FONBC20 - 5 AA	4.90 - 5.00	969.697
- 5.5 AA	5.40 - 5.50	969.698
- 6 AA	5.90 - 6.00	969.699
- 6.5 AA	6.40 - 6.50	969.700
- 7 AA	6.90 - 7.00	969.701
- 7.5 AA	7.40 - 7.50	969.702
- 8 AA	7.90 - 8.00	969.703
- 8.5 AA	8.40 - 8.50	969.704
- 9 AA	8.90 - 9.00	969.705
- 9.5 AA	9.40 - 9.50	969.706
-10 AA	9.90 - 10.00	969.707
-10.5 AA	10.40 - 10.50	969.708
-11 AA	10.90 - 11.00	969.709
-11.5 AA	11.40 - 11.50	969.710
-12 AA	11.90 - 12.00	969.711
-12.5 AA	12.40 - 12.50	969.712
-13 AA	12.90 - 13.00	969.713
-13.5 AA	13.40 - 13.50	969.714
-14 AA	13.90 - 14.00	969.715
-14.5 AA	14.40 - 14.50	969.716
-15 AA	14.90 - 15.00	969.717
-15.5 AA	15.40 - 15.50	969.718
-16 AA	15.90 - 16.00	969.719
-16.5 AA	16.40 - 16.50	969.720
-17 AA	16.90 - 17.00	969.721
-17.5 AA	17.40 - 17.50	969.722
-18 AA	17.90 - 18.00	969.723
-18.5 AA	18.40 - 18.50	969.724
-19 AA	18.90 - 19.00	969.725
-19.5 AA	19.40 - 19.50	969.726
-20 AA	19.90 - 20.00	969.727

Ø A=28.5 B=38

For MEGA New Baby Chuck use the standard MGN nut.



For New Baby Chuck use the standard NBN nut.

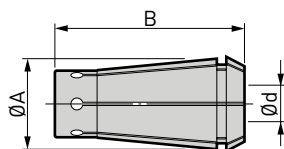


Note

Collapsibility is different from standard NBC collet.

New Baby Collet for Endmill

For MEGA New Baby Chuck and New Baby Chuck



Collet Class	Max. Runout	
	At Nose	At End of Test Bar
AA	Within 1 µm	Within 3 µm

MEGA6N / NBS6		
Model	Clamping Range Ød	Order No.
NBC6 -3E AA	3	961.148
-4E AA	4	961.149
-5E AA	5	961.150
-6E AA	6	961.151

Ø A=9.2 B=17

MEGA8N / NBS8		
Model	Clamping Range Ød	Order No.
NBC8 -3E AA	3	961.152
-4E AA	4	961.153
-5E AA	5	961.154
-6E AA	6	961.155
-8E AA	8	961.156

Ø A=12 B=20

MEGA10N / NBS10		
Model	Clamping Range Ød	Order No.
NBC10 - 3E AA	3	801.654
- 4E AA	4	801.658
- 5E AA	5	801.662
- 6E AA	6	961.160
- 8E AA	8	961.161
-10E AA	10	961.146

Ø A=16 B=32

MEGA13N / NBS13		
Model	Clamping Range Ød	Order No.
NBC13 - 3E AA	3	801.674
- 4E AA	4	801.678
- 5E AA	5	801.682
- 6E AA	6	961.165
- 8E AA	8	961.166
-10E AA	10	961.147
-12E AA	12	961.167

Ø A=20 B=38

MEGA16N / NBS16		
Model	Clamping Range Ød	Order No.
NBC16 - 3E AA	3	961.168
- 4E AA	4	961.169
- 5E AA	5	961.170
- 6E AA	6	961.171
- 8E AA	8	961.172
-10E AA	10	961.173
-12E AA	12	961.174
-14E AA	14	961.175
-16E AA	16	961.176

Ø A=25 B=42

MEGA20N / NBS20		
Model	Clamping Range Ød	Order No.
NBC20 - 3E AA	3	801.721
- 4E AA	4	801.725
- 5E AA	5	801.729
- 6E AA	6	961.180
- 8E AA	8	801.733
-10E AA	10	961.182
-12E AA	12	961.183
-14E AA	14	961.184
-16E AA	16	961.185
-20E AA	20	961.186

Ø A=28 B=45

- Use only a cutting tool shank with exactly the same diameter as the collet bore diameter.
- The tolerance of the cutting tool shank must be within h7.

New Baby Collet Set

For MEGA New Baby Chuck and New Baby Chuck

Contains all the major collet models to cover entire clamping range.



Model	Capacity	Number of Collet	Case Size (Width x Length)	Corresponding Chuck Model	Order No.
SNBC6AA -22	0.5 - 6	22	200 x 170 x 50	MEGA 6N / NBS 6	802.187
SNBC8AA -20	0.5 - 8	20	200 x 170 x 50	MEGA 8N / NBS 8	802.188
SNBC10AA -20	1.5 - 10	20	200 x 170 x 50	MEGA10N / NBS10	802.183
SNBC13AA -21	2.5 - 13	21	245 x 210 x 60	MEGA13N / NBS13	802.184
SNBC16AA -27	2.5 - 16	27	275 x 230 x 65	MEGA16N / NBS16	802.185
SNBC20AA -35	2.5 - 20	35	310 x 260 x 75	MEGA20N / NBS20	961.676

1. Collets included in a set are shown in ►A138/139.

Case for New Baby Collet

Exclusive case to protect and maintain the high precision collets.



Model	Number of Holes	Case Size (Width x Length)	Corresponding Collet Model	Order No.
NBB6	60	200 x 170 x 50	NBC 6 / FONBC 6	961.524
NBB8	50	200 x 170 x 50	NBC 8 / FONBC 8	961.547
NBB10	40	200 x 170 x 50	NBC10 / FONBC10	961.569
NBB13	35	245 x 210 x 60	NBC13 / FONBC13	961.595
NBB16	35	275 x 230 x 65	NBC16 / FONBC16	961.629
NBB20	45	310 x 260 x 75	NBC20 / FONBC20	961.677

1. All cases can not be used with new baby collet for endmill (NBC-E).

A.7

Collet Ejector

Easily and quickly remove New Baby Collet from MEGA nuts and New Baby Nut.



For New Baby Collet

Model	Nut Model	Collet Model	Order No.
NBC6 -CE	MGN6 / NBN6	NBC6 / FONBC6	969.492
NBC8 -CE	MGN8 / NBN8	NBC8 / FONBC8	969.493
NBC10 -CE	MGN10 / NBN10	NBC10 / FONBC10	969.494
NBC13 -CE	MGN13 / NBN13	NBC13 / FONBC13	969.495

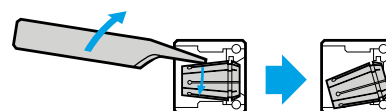
For New Baby Endmill Collet

Model	Nut Model	Collet Model	Order No.
NBC6E -CE	MGN6 / NBN6	NBC6E	969.496
NBC8E -CE	MGN8 / NBN8	NBC8E	969.497
NBC10E -CE	MGN10 / NBN10	NBC10E	969.498
NBC13E -CE	MGN13 / NBN13	NBC13E	969.499

Collet Remover

For MEGA New Baby Chuck, MEGA ER Grip and New Baby Chuck

Model	Order No.
NBJ	969.491



MEGA Nut

For MEGA New Baby Chuck



Standard Type

Model	ØA	B	Chuck Body	Order No.
MGN6	20	20.5	MEGA6N	969.483
MGN8	25	23	MEGA8N	969.484
MGN10	30	24	MEGA10N	969.485
MGN13	35	27	MEGA13N	969.486
MGN16	42	27	MEGA16N	969.487
MGN20	46	27	MEGA20N	969.488

Short Type

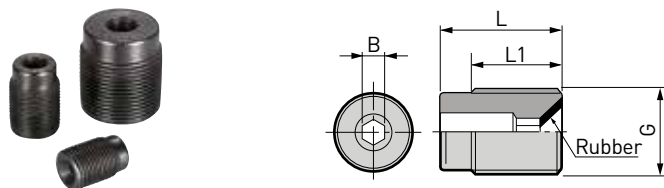
Model	ØA	B	Chuck Body	Order No.
MGN6F	20	18	MEGA6N	805.668
MGN8F	25	20	MEGA8N	805.669
MGN10F	30	21	MEGA10N	805.670
MGN13F	35	24	MEGA13N	805.671
MGN16F	42	24.5	MEGA16N	805.672
MGN20F	46	24.5	MEGA20N	805.673

1. Short type is standardized for MEGA new baby cylindrical type.

A.7

Adjusting Screw

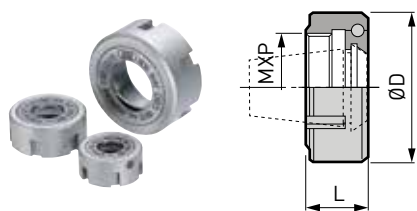
For MEGA New Baby Chuck, MEGA E Chuck, New Baby Chuck and MEGA ER Grip



Model	G	L	L1	B	Chuck Body	Order No.
NBA6B	M7	12	10	2	MEGA6N / MEGA6E / NBS6	961.527
NBA8B	M9	13	10	2.5	MEGA8N / MEGA8E / NBS8	961.550
NBA10B	M11	16	12	3	MEGA10N / MEGA10E / NBS10 / MEGA ER16	961.572
NBA13B	M14	20	15	4	MEGA13N / MEGA13E / NBS13 / MEGA ER20	961.598
NBA16B	M18	20	15	4	MEGA16N / NBS16 / MEGA ER25	961.632
NBA20B	M21	20	15	4	MEGA20N / NBS20 / MEGA ER32	961.680

New Baby Nut

For New Baby Chuck

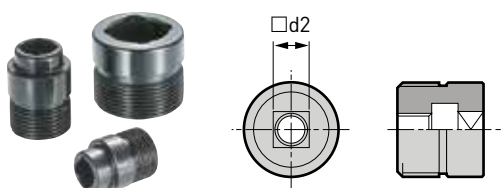


Model	ØD	L	M x P	Chuck Body	Order No.
NBN6	20	9.5	12 x 1	NBS6	961.526
NBN8	25	11	16 x 1	NBS8	961.549
NBN10	30	12.5	21 x 1	NBS10	961.571
NBN13	35	16	26 x 1	NBS13	961.597
NBN16	42	16	32 x 1	NBS16	961.631
NBN20	46	16	36 x 1	NBS20	961.679

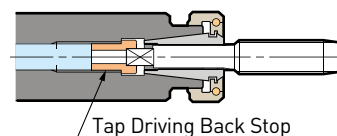
Tap Driving Back Stop

For New Baby Chuck

To suit synchronized tapping.



The square of the tap is positively located by fitting the tap driving back stop.



A.7

Tapping Tool			NBS10		NBS13		NBS16		NBS20	
Tap Size	Standard	□ d2	Model	Order No.	Model	Order No.	Model	Order No.	Model	Order No.
M8	DIN371	6.2	-		NBA13 -M8DD	804.847	-		-	
	JIS	5.0	NBA10 -M8	961.681	NBA13 -M8	961.683	-		-	
M10	DIN371	8.0	-		NBA13 -M14M10DD	804.846	NBA16 -M14M10DD	804.852	-	
	JIS	5.5	NBA10 -M10	804.844	NBA13 -M10	961.684	NBA16 -M10	804.848	-	
M12	DIN376	7.0	-		NBA13 -M12D	961.685	NBA16 -M12D	804.850	NBA20 -M12D	804.855
	JIS	6.5	-		NBA13 -M12	804.845	NBA16 -M12	804.849	NBA20 -M12	804.854
M14	DIN376	9.0	-		-		NBA16 -M14DM16D	804.851	NBA20 -M14DM16D	804.857
	JIS	8.0	-		NBA13 -M14M10DD	804.846	NBA16 -M14M10DD	804.852	NBA20 -M14	804.856
M16	DIN376	9.0	-		-		NBA16 -M14DM16D	804.851	NBA20 -M14DM16D	804.857
	JIS	10.0	-		-		NBA16 -M16	804.853	NBA20 -M16	804.858
M20	DIN376	12.0	-		-		-		NBA20 -M20M20D	804.860
	JIS	12.0	-		-		-			

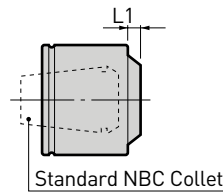
1. Rigid tapping function is required on the machine tool.

MEGA Perfect Seal

For MEGA New Baby Chuck

Unique design increases sealing performance with higher coolant pressure to create a „perfect seal“. Remove the PS Ring, to supply coolant to the cutting tool periphery.

- Max. Coolant pressure 7 MPa

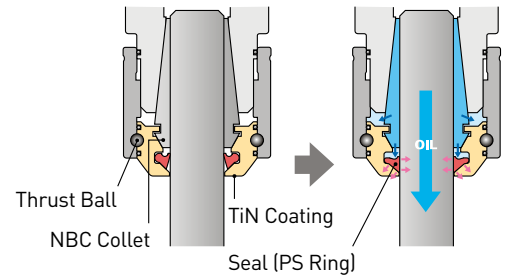


2way coolant



Through tools with PS ring

Jet through without PS ring



A.7

Model	Cutter Shank Dia.	L1	Collet Model	Order No.	
MPS6 -03035	3 - 3.5	2.3	NBC6 -3 - 3.75	961.401	
-0304	3 - 4		-3 - 4.25	969.861	
-04045	4 - 4.5		-4 - 4.75	961.402	
-0405	4 - 5		-4 - 5.25	969.862	
-05055	5 - 5.5		-5 - 5.75	961.403	
-0506	5 - 6		-5 - 6	969.863	
MPS8 -03035	3 - 3.5	3.9	NBC8 -3 - 4	961.404	
-0304	3 - 4		-3 - 4.5	969.864	
-04045	4 - 4.5		-4 - 5	961.405	
-0405	4 - 5		-4 - 5.5	969.865	
-05055	5 - 5.5		-5 - 6	961.406	
-0506	5 - 6		-5 - 6.5	969.866	
-06065	6 - 6.5	3.4	-6 - 7	961.407	
-0607	6 - 7		-6 - 7.5	969.867	
-07075	7 - 7.5		-7 - 8	961.408	
-0708	7 - 8		-7 - 8	969.868	
MPS10 -03035	3 - 3.5		3.9	NBC10 -3 - 4	801.524
-0304	3 - 4			-3 - 4.5	969.869
-04045	4 - 4.5	-4 - 5		801.525	
-0405	4 - 5	-4 - 5.5		969.870	
-05055	5 - 5.5	-5 - 6		801.526	
-0506	5 - 6	-5 - 6.5		969.871	
-06065	6 - 6.5	4.3	-6 - 7	979.986	
-0607	6 - 7		-6 - 7.5	969.872	
-07075	7 - 7.5		-7 - 8	801.527	
-0708	7 - 8		-7 - 8.5	969.873	
-08085	8 - 8.5		-8 - 9	979.987	
-0809	8 - 9		-8 - 9.5	969.874	
-09095	9 - 9.5	3.5	-9 - 10	801.528	
-0910	9 - 10		-9 - 10	969.875	

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
MPS13 -03035	3 - 3.5	4.3	NBC13 - 3 - 4	801.529
-0304	3 - 4		-3 - 4.5	969.876
-04045	4 - 4.5		-4 - 5	801.530
-0405	4 - 5		-4 - 5.5	969.877
-05055	5 - 5.5		-5 - 6	801.531
-0506	5 - 6		-5 - 6.5	969.878
-06065	6 - 6.5	4.6	-6 - 7	961.417
-0607	6 - 7		-6 - 7.5	969.879
-07075	7 - 7.5		-7 - 8	801.532
-0708	7 - 8		-7 - 8.5	969.880
-08085	8 - 8.5		-8 - 9	961.418
-0809	8 - 9		-8 - 9.5	969.881
-09095	9 - 9.5	4.9	-9 - 10	801.533
-0910	9 - 10		-9 - 10.5	969.882
-10105	10 - 10.5		-10 - 11	978.518
-1011	10 - 11		-10 - 11.5	969.883
-11115	11 - 11.5		-11 - 12	801.534
-1112	11 - 12		-11 - 12.5	969.884
-12125	12 - 12.5	4.2	-12 - 13	961.420
-1213	12 - 13		-12 - 13	969.885

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mountet.

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
MPS16 -03035	3 - 3.5	4.0	NBC16 - 3 - 4	801.535
-0304	3 - 4		- 3 - 4.5	969.886
-04045	4 - 4.5		- 4 - 5	801.536
-0405	4 - 5		- 4 - 5.5	969.887
-05055	5 - 5.5		- 5 - 6	801.537
-0506	5 - 6		- 5 - 6.5	969.888
-06065	6 - 6.5		- 6 - 7	801.538
-0607	6 - 7	4.3	- 6 - 7.5	969.889
-07075	7 - 7.5		- 7 - 8	801.539
-0708	7 - 8		- 7 - 8.5	969.890
-08085	8 - 8.5	4.6	- 8 - 9	801.540
-0809	8 - 9		- 8 - 9.5	969.891
-09095	9 - 9.5		- 9 - 10	801.541
-0910	9 - 10		- 9 - 10.5	969.892
-10105	10 - 10.5	5.1	- 10 - 11	801.542
-1011	10 - 11		- 10 - 11.5	969.893
-11115	11 - 11.5		- 11 - 12	801.543
-1112	11 - 12		- 11 - 12.5	969.894
-12125	12 - 12.5	4.1	- 12 - 13	801.544
-1213	12 - 13		- 12 - 13.5	969.895
-1314	13 - 14		- 13 - 14.5	969.896
-1415	14 - 15		- 14 - 15.5	969.897
-1516	15 - 16		- 15 - 16	969.898

- 1 pce. of ps ring is included.
- To supply coolant to the periphery of the cutting tool, adjusting screw should not be mountet.

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
MPS20 -03035	3 - 3.5	4.0	NBC20 - 3 - 4	978.504
-0304	3 - 4		- 3 - 4.5	969.899
-04045	4 - 4.5		- 4 - 5	801.545
-0405	4 - 5		- 4 - 5.5	969.900
-05055	5 - 5.5		- 5 - 6	801.546
-0506	5 - 6		- 5 - 6.5	969.901
-06065	6 - 6.5		- 6 - 7	801.547
-0607	6 - 7	4.3	- 6 - 7.5	969.902
-07075	7 - 7.5		- 7 - 8	801.548
-0708	7 - 8		- 7 - 8.5	969.903
-08085	8 - 8.5	4.6	- 8 - 9	801.549
-0809	8 - 9		- 8 - 9.5	969.904
-09095	9 - 9.5		- 9 - 10	801.550
-0910	9 - 10		- 9 - 10.5	969.905
-10105	10 - 10.5	5.1	- 10 - 11	801.551
-1011	10 - 11		- 10 - 11.5	969.906
-11115	11 - 11.5		- 11 - 12	801.552
-1112	11 - 12		- 11 - 12.5	969.907
-12125	12 - 12.5	5.2	- 12 - 13	978.512
-1213	12 - 13		- 12 - 13.5	969.908
-1314	13 - 14		- 13 - 14.5	969.909
-1415	14 - 15		- 14 - 15.5	969.910
-1516	15 - 16		- 15 - 16.5	969.911
-1617	16 - 17	4.6	- 16 - 17.5	969.912
-1718	17 - 18		- 17 - 18.5	969.913
-1819	18 - 19		- 18 - 19.5	969.914
-1920	19 - 20		- 19 - 20	969.915

PS Ring

Replaceable seal is installed in the MEGA perfect seal.
Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



Model	Corresponding MPS Model	Order No.
PS -0304	MPS □ -03035, 0304	969.981
-0405	-04045, 0405	969.982
-0506	-05055, 0506	969.983
-0607	-06065, 0607	969.984
-0708	-07075, 0708	969.985
-0809	-08085, 0809	969.986
-0910	-09095, 0910	969.987
-1011	-10105, 1011	969.988
-1112	-11115, 1112	969.989
-1213	-12125, 1213	969.990

Model	Corresponding MPS Model	Order No.
PS -1314	MPS □ -1314	969.991
-1415	-1415	969.992
-1516	-1516	969.993
-1617	-1617	969.994
-1718	-1718	969.995
-1819	-1819	969.996
-1920	-1920	969.997

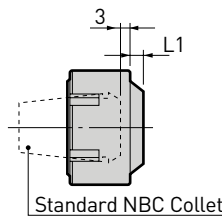
- 1 package contains 5 pcs. (1 size).

Baby Perfect Seal

For New Baby Chuck

Unique design increases sealing performance with higher coolant pressure to create a "perfect seal".
Remove the PS Ring, to supply coolant to the cutting tool periphery.

- Max. Coolant pressure 7 MPa

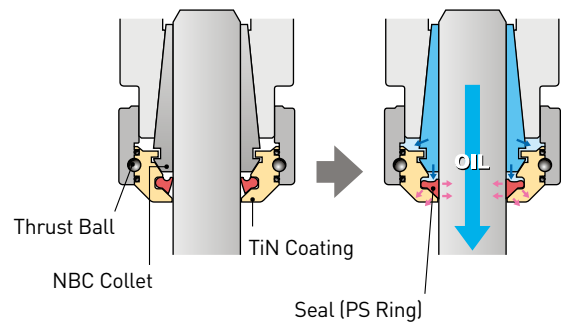


2way coolant



Through tools with PS ring

Jet through without PS ring



A.7

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
BPS6	-03035	3 - 3.5	NBC6 -3 - 3.75	961.409
	-0304	3 - 4		969.921
	-04045	4 - 4.5		961.410
	-0405	4 - 5		969.922
	-05055	5 - 5.5		961.411
	-0506	5 - 6		969.923
BPS8	-03035	3 - 3.5	NBC8 -3 - 4	961.412
	-0304	3 - 4		969.924
	-04045	4 - 4.5	NBC8 -3 - 4.5	961.413
	-0405	4 - 5		969.925
	-05055	5 - 5.5	NBC8 -3 - 5.25	961.414
	-0506	5 - 6		969.926
	-06065	6 - 6.5	NBC8 -3 - 6	961.415
	-0607	6 - 7		969.927
	-07075	7 - 7.5	NBC8 -3 - 7.5	961.416
	-0708	7 - 8		969.928
BPS10	-03035	3 - 3.5	NBC10 -3 - 4	800.403
	-0304	3 - 4		969.929
	-04045	4 - 4.5	NBC10 -3 - 4.5	800.404
	-0405	4 - 5		969.930
	-05055	5 - 5.5	NBC10 -3 - 5.5	800.405
	-0506	5 - 6		969.931
	-06065	6 - 6.5	NBC10 -3 - 6	800.406
	-0607	6 - 7		969.932
	-07075	7 - 7.5	NBC10 -3 - 7.5	800.407
	-0708	7 - 8		969.933
	-08085	8 - 8.5	NBC10 -3 - 8	800.408
	-0809	8 - 9		969.934
	-09095	9 - 9.5	NBC10 -3 - 9	800.409
	-0910	9 - 10		969.935

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
BPS13	-03035	3 - 3.5	NBC13 - 3 - 4	800.410
	-0304	3 - 4		969.936
	-04045	4 - 4.5	NBC13 - 3 - 4.5	800.411
	-0405	4 - 5		969.937
	-05055	5 - 5.5	NBC13 - 3 - 5.5	800.412
	-0506	5 - 6		969.938
BPS14	-06065	6 - 6.5	NBC14 - 3 - 6	800.413
	-0607	6 - 7		969.939
	-07075	7 - 7.5	NBC14 - 3 - 7.5	800.414
	-0708	7 - 8		969.940
	-08085	8 - 8.5	NBC14 - 3 - 8	800.415
	-0809	8 - 9		969.941
	-09095	9 - 9.5	NBC14 - 3 - 9	800.416
	-0910	9 - 10		969.942
BPS15	-10105	10 - 10.5	NBC15 - 3 - 10	800.417
	-1011	10 - 11		969.943
	-11115	11 - 11.5	NBC15 - 3 - 11	800.418
	-1112	11 - 12		969.944
	-12125	12 - 12.5	NBC15 - 3 - 12	800.419
	-1213	12 - 13		969.945

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mountet.

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
BPS16 -03035	3 - 3.5	4.0	NBC16 - 3 - 4	800.420
-0304	3 - 4		- 3 - 4.5	969.946
-04045	4 - 4.5		- 4 - 5	800.421
-0405	4 - 5		- 4 - 5.5	969.947
-05055	5 - 5.5		- 5 - 6	800.422
-0506	5 - 6		- 5 - 6.5	969.948
-06065	6 - 6.5	4.3	- 6 - 7	800.423
-0607	6 - 7		- 6 - 7.5	969.949
-07075	7 - 7.5		- 7 - 8	800.424
-0708	7 - 8		- 7 - 8.5	969.950
-08085	8 - 8.5	4.6	- 8 - 9	800.425
-0809	8 - 9		- 8 - 9.5	969.951
-09095	9 - 9.5		- 9 -10	800.426
-0910	9 - 10	5.1	- 9 -10.5	969.952
-10105	10 - 10.5		-10 - 11	800.427
-1011	10 - 11		-10 - 11.5	969.953
-11115	11 - 11.5		-11 - 12	800.428
-1112	11 - 12		-11 - 12.5	969.954
-12125	12 - 12.5	4.1	-12 - 13	800.429
-1213	12 - 13		-12 - 13.5	969.955
-1314	13 - 14		-13 - 14.5	969.956
-1415	14 - 15		-14 - 15.5	969.957
-1516	15 - 16		-15 - 16	969.958

- 1 pce. of ps ring is included.
- To supply coolant to the periphery of the cutting tool, adjusting screw should not be mountet.

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
BPS20 -03035	3 - 3.5	4.0	NBC20 - 3 - 4	800.430
-0304	3 - 4		- 3 - 4.5	969.959
-04045	4 - 4.5		- 4 - 5	800.431
-0405	4 - 5		- 4 - 5.5	969.960
-05055	5 - 5.5		- 5 - 6	800.432
-0506	5 - 6		- 5 - 6.5	969.961
-06065	6 - 6.5	4.3	- 6 - 7	800.433
-0607	6 - 7		- 6 - 7.5	969.962
-07075	7 - 7.5		- 7 - 8	800.434
-0708	7 - 8		- 7 - 8.5	969.963
-08085	8 - 8.5	4.6	- 8 - 9	800.435
-0809	8 - 9		- 8 - 9.5	969.964
-09095	9 - 9.5		- 9 -10	800.436
-0910	9 - 10	5.1	- 9 -10.5	969.965
-10105	10 - 10.5		-10 - 11	800.437
-1011	10 - 11		-10 - 11.5	969.966
-11115	11 - 11.5		-11 - 12	800.438
-1112	11 - 12		-11 - 12.5	969.967
-12125	12 - 12.5	5.2	-12 - 13	800.439
-1213	12 - 13		-12 - 13.5	969.968
-1314	13 - 14		-13 - 14.5	969.969
-1415	14 - 15		-14 - 15.5	969.970
-1516	15 - 16		-15 - 16.5	969.971
-1617	16 - 17		-16 - 17.5	969.972
-1718	17 - 18	4.6	-17 - 18.5	969.973
-1819	18 - 19		-18 - 19.5	969.974
-1920	19 - 20		-19 - 20	969.975

PS Ring

Replaceable seal is installed in the baby perfect seal.
Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



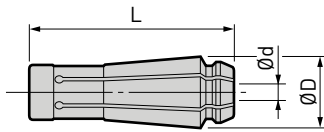
Model	Corresponding BPS Model	Order No.
PS -0304	BPS □ -03035, 0304	969.981
-0405	-04045, 0405	969.982
-0506	-05055, 0506	969.983
-0607	-06065, 0607	969.984
-0708	-07075, 0708	969.985
-0809	-08085, 0809	969.986
-0910	-09095, 0910	969.987
-1011	-10105, 1011	969.988
-1112	-11115, 1112	969.989
-1213	-12125, 1213	969.990

Model	Corresponding BPS Model	Order No.
PS -1314	BPS □ -1314	969.991
-1415	-1415	969.992
-1516	-1516	969.993
-1617	-1617	969.994
-1718	-1718	969.995
-1819	-1819	969.996
-1920	-1920	969.997

- 1 package contains 5 pcs. (1 size).

MEGA E Collet

For MEGA E Chuck



Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 µm	Within 3 µm

MEGA6E			
Model	Ød	Min. Clamping Length	Order No.
MEC6 -3AA	3	19	968.421
-4AA	4	22	968.423
-5AA	5	25	968.424
-6AA	6	27	968.425

L=34.9 ØD=11.3

MEGA8E			
Model	Ød	Min. Clamping Length	Order No.
MEC8 -3AA	3	19	968.427
-4AA	4	22	968.429
-5AA	5	25	968.430
-6AA	6	28	968.431
-7AA	7	29	801.317
-8AA	8	31	968.433

L=39.4 ØD=14.1

MEGA10E			
Model	Ød	Min. Clamping Length	Order No.
MEC10 - 3AA	3	19	968.434
- 4AA	4	22	968.436
- 5AA	5	25	968.437
- 6AA	6	28	968.438
- 7AA	7	29.5	801.313
- 8AA	8	31	968.440
- 9AA	9	33	801.314
-10AA	10	37	968.442

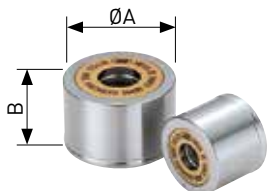
L=45.7 ØD=17.1

MEGA13E			
Model	Ød	Min. Clamping Length	Order No.
MEC13 - 3AA	3	19	968.443
- 4AA	4	22	968.445
- 5AA	5	25	968.446
- 6AA	6	28	968.447
- 7AA	7	29.5	968.448
- 8AA	8	31	968.449
- 9AA	9	33	801.316
-10AA	10	35	968.451
-11AA	11	37	801.315
-12AA	12	39	968.453

L=47.9 ØD=20.6

MEGA E Nut

For MEGA E Chuck

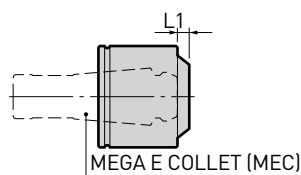


Model	ØA	B	MEGA E Chuck	Order No.
MEN6	25	20.5	MEGA6E	968.461
MEN8	30	22.0	MEGA8E	968.462
MEN10	35	22.5	MEGA10E	968.463
MEN13	42	24.5	MEGA13E	968.464

MEGA E Perfect Seal

For MEGA E Chuck

- Max. Coolant pressure 7 MPa



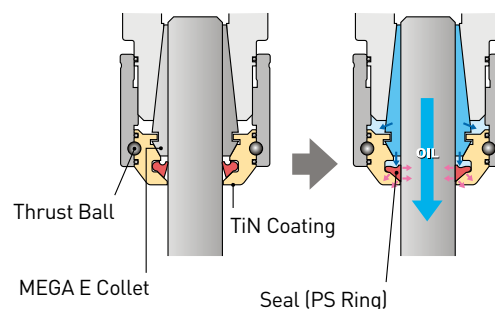
2way coolant



Through tools with PS ring



Jet through without PS ring



A.7

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
EPS6 -03	3	5.6	MEC6 - 3	968.468
-04	4	5.2	- 4	968.469
-05	5		- 5	968.470
-06	6		- 6	968.471
EPS8 -03	3	6.4	MEC8 - 3	968.472
-04	4	6.0	- 4	968.473
-05	5		- 5	968.474
-06	6		- 6	968.475
-07	7	5.6	- 7	968.476
-08	8		- 8	968.477
EPS10 -03	3	6.4	MEC10 - 3	968.478
-04	4	6.0	- 4	968.479
-05	5		- 5	968.480
-06	6		- 6	968.481
-07	7	6.3	- 7	968.482
-08	8		- 8	968.483
-09	9	5.7	- 9	968.484
-10	10		-10	968.485

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
EPS13 -03	3	6.4	MEC13 - 3	968.486
-04	4	6.0	- 4	968.487
-05	5		- 5	968.488
-06	6		- 6	968.489
-07	7	6.3	- 7	968.490
-08	8	6.5	- 8	968.491
-09	9		- 9	968.492
-10	10		-10	968.493
-11	11	6.2	-11	968.494
-12	12		-12	968.495

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

PS Ring

Replaceable seal is installed in the MEGA E perfect seal.
Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



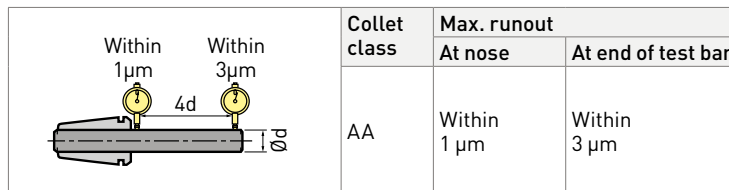
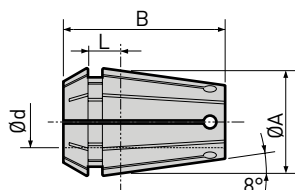
Model	Corresponding EPS Model	Order No.
PS -0304	EPS □ -03	969.981
	-04	
-0405	-05	969.982
-0506	-06	969.983
-0607	-07	969.984
-0708	-08	969.985
-0809	-09	969.986
-0910	-10	969.987
-1011	-11	969.988
-1112	-12	969.989

1. 1 package contains 5 pcs. (1 size).

MEGA ER Collet

For MEGA ER Grip

Available in min. 0.1 mm increments to suit each cutting tool shank size.
Measurement standards are in accordance with DIN6499 and ISO15488.



A.7

MEGA ER 11			
Model		Clamping Range Ød	Order No.
ERC11	-3AA	2.75 - 3.00	802.836
	-3.25AA	3.00 - 3.25	802.837
	-3.5AA	3.25 - 3.50	802.838
	-3.75AA	3.50 - 3.75	802.839
	-4AA	3.75 - 4.00	802.840
	-4.25AA	4.00 - 4.25	802.841
	-4.5AA	4.25 - 4.50	802.842
	-4.75AA	4.50 - 4.75	802.843
	-5AA	4.75 - 5.00	802.844
	-5.25AA	5.00 - 5.25	802.845
	-5.5AA	5.25 - 5.50	802.846
	-5.75AA	5.50 - 5.75	802.847
	-6AA	5.50 - 6.00	802.848

Ø A=11 B=18 L=3.8

MEGA ER 20			
Model		Clamping Range Ød	Order No.
ERC20	- 3AA	2.75 - 3.00	967.532
	- 3.25AA	3.00 - 3.25	967.533
	- 3.5AA	3.25 - 3.50	967.534
	- 3.75AA	3.50 - 3.75	967.535
	- 4AA	3.75 - 4.00	967.536
	- 4.25AA	4.00 - 4.25	967.537
	- 4.5AA	4.25 - 4.50	967.538
	- 4.75AA	4.50 - 4.75	967.539
	- 5AA	4.75 - 5.00	967.540
	- 5.25AA	5.00 - 5.25	967.541
	- 5.5AA	5.25 - 5.50	967.542
	- 5.75AA	5.50 - 5.75	967.543
	- 6AA	5.50 - 6.00	967.544
	- 6.5AA	6.00 - 6.50	967.545
	- 7AA	6.50 - 7.00	967.546
	- 7.5AA	7.00 - 7.50	967.547
	- 8AA	7.50 - 8.00	967.548
	- 8.5AA	8.00 - 8.50	967.549
	- 9AA	8.50 - 9.00	967.550
	- 9.5AA	9.00 - 9.50	967.551
	-10AA	9.50 - 10.00	967.552
	-10.5AA	10.00 - 10.50	967.553
	-11AA	10.50 - 11.00	967.554
	-11.5AA	11.00 - 11.50	967.555
	-12AA	11.50 - 12.00	967.556
	-12.5AA	12.00 - 12.50	967.557
	-13AA	12.50 - 13.00	967.558

Ø A=20 B=31.5 L=6.36

MEGA ER 16			
Model		Clamping Range Ød	Order No.
ERC16	- 2AA	1.90 - 2.00	967.501
	- 2.1AA	2.00 - 2.10	967.502
	- 2.2AA	2.10 - 2.20	967.503
	- 2.3AA	2.20 - 2.30	967.504
	- 2.4AA	2.30 - 2.40	967.505
	- 2.5AA	2.40 - 2.50	967.506
	- 2.6AA	2.50 - 2.60	967.507
	- 2.7AA	2.60 - 2.70	967.508
	- 2.8AA	2.70 - 2.80	967.509
	- 2.9AA	2.80 - 2.90	967.510
	- 3AA	2.75 - 3.00	967.511
	- 3.25AA	3.00 - 3.25	967.512
	- 3.5AA	3.25 - 3.50	967.513
	- 3.75AA	3.50 - 3.75	967.514
	- 4AA	3.75 - 4.00	967.515
	- 4.25AA	4.00 - 4.25	967.516
	- 4.5AA	4.25 - 4.50	967.517
	- 4.75AA	4.50 - 4.75	967.518
	- 5AA	4.75 - 5.00	967.519
	- 5.25AA	5.00 - 5.25	967.520
	- 5.5AA	5.25 - 5.50	967.521
	- 5.75AA	5.50 - 5.75	967.522
	- 6AA	5.50 - 6.00	967.523
	- 6.5AA	6.00 - 6.50	967.524
	- 7AA	6.50 - 7.00	967.525
	- 7.5AA	7.00 - 7.50	967.526
	- 8AA	7.50 - 8.00	967.527
	- 8.5AA	8.00 - 8.50	967.528
	- 9AA	8.50 - 9.00	967.529
	- 9.5AA	9.00 - 9.50	967.530
	-10AA	9.50 - 10.00	967.531

Ø A=16 B=27.5 L=6.26

- Collapsibility 0.1/Ø
- Collapsibility 0.25/Ø
- Collapsibility 0.5/Ø

MEGA ER 25		
Model	Clamping Range Ød	Order No.
ERC25 - 3AA	2.75 - 3.00	967.559
- 3.25AA	3.00 - 3.25	967.560
- 3.5AA	3.25 - 3.50	967.561
- 3.75AA	3.50 - 3.75	967.562
- 4AA	3.75 - 4.00	967.563
- 4.25AA	4.00 - 4.25	967.564
- 4.5AA	4.25 - 4.50	967.565
- 4.75AA	4.50 - 4.75	967.566
- 5AA	4.75 - 5.00	967.567
- 5.25AA	5.00 - 5.25	967.568
- 5.5AA	5.25 - 5.50	967.569
- 5.75AA	5.50 - 5.75	967.570
- 6AA	5.50 - 6.00	967.571
- 6.5AA	6.00 - 6.50	967.572
- 7AA	6.50 - 7.00	967.573
- 7.5AA	7.00 - 7.50	967.574
- 8AA	7.50 - 8.00	967.575
- 8.5AA	8.00 - 8.50	967.576
- 9AA	8.50 - 9.00	967.577
- 9.5AA	9.00 - 9.50	967.578
-10AA	9.50 - 10.00	967.579
-10.5AA	10.00 - 10.50	967.580
-11AA	10.50 - 11.00	967.581
-11.5AA	11.00 - 11.50	967.582
-12AA	11.50 - 12.00	967.583
-12.5AA	12.00 - 12.50	967.584
-13AA	12.50 - 13.00	967.585
-13.5AA	13.00 - 13.50	967.586
-14AA	13.50 - 14.00	967.587
-14.5AA	14.00 - 14.50	967.588
-15AA	14.50 - 15.00	967.589
-15.5AA	15.00 - 15.50	967.590
-16AA	15.50 - 16.00	967.591

Ø A=25 B=34 L =6.66

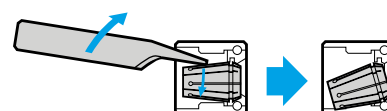
MEGA ER 32		
Model	Clamping Range Ød	Order No.
ERC32 - 3AA	2.75 - 3.00	967.592
- 3.25AA	3.00 - 3.25	967.593
- 3.5AA	3.25 - 3.50	967.594
- 3.75AA	3.50 - 3.75	967.595
- 4AA	3.75 - 4.00	967.596
- 4.25AA	4.00 - 4.25	967.597
- 4.5AA	4.25 - 4.50	967.598
- 4.75AA	4.50 - 4.75	967.599
- 5AA	4.75 - 5.00	967.600
- 5.25AA	5.00 - 5.25	967.601
- 5.5AA	5.25 - 5.50	967.602
- 5.75AA	5.50 - 5.75	967.603
- 6AA	5.50 - 6.00	967.604
- 6.5AA	6.00 - 6.50	967.605
- 7AA	6.50 - 7.00	967.606
- 7.5AA	7.00 - 7.50	967.607
- 8AA	7.50 - 8.00	967.608
- 8.5AA	8.00 - 8.50	967.609
- 9AA	8.50 - 9.00	967.610
- 9.5AA	9.00 - 9.50	967.611
-10AA	9.50 - 10.00	967.612
-10.5AA	10.00 - 10.50	967.613
-11AA	10.50 - 11.00	967.614
-11.5AA	11.00 - 11.50	967.615
-12AA	11.50 - 12.00	967.616
-12.5AA	12.00 - 12.50	967.617
-13AA	12.50 - 13.00	967.618
-13.5AA	13.00 - 13.50	967.619
-14AA	13.50 - 14.00	967.620
-14.5AA	14.00 - 14.50	967.621
-15AA	14.50 - 15.00	967.622
-15.5AA	15.00 - 15.50	967.623
-16AA	15.50 - 16.00	967.624
-16.5AA	16.00 - 16.50	967.625
-17AA	16.50 - 17.00	801.013
-17.5AA	17.00 - 17.50	967.627
-18AA	17.50 - 18.00	967.628
-18.5AA	18.00 - 18.50	967.629
-19AA	18.50 - 19.00	967.630
-19.5AA	19.00 - 19.50	967.631
-20AA	19.50 - 20.00	967.632

Ø A=32 B=40 L =7.16

Collet Remover

Collet Remover eases removal of the collet from the nut.

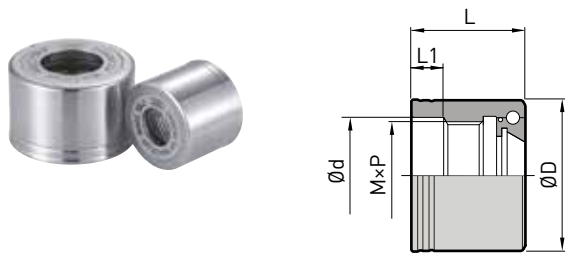
Model	Order No.
NBJ	969.491



MEGA ER Nut

For MEGA ER Grip

High precision nut with ball bearing ensure outstanding runout repeatability.



Model	ØD	L	M x P	Ød	L1	Wrench Type	Body Type	Order No.
MERN16	30	25.0	M22 x P1.5	23.0	7.5	MGR30L	MEGA ER 16	967.801
MERN20	35	26.5	M25 x P1.5	27.0	7.5	MGR35L	MEGA ER 20	967.802
MERN25	42	27.5	M32 x P1.5	33.5	7.5	MGR42L	MEGA ER 25	967.803
MERN32	50	30.2	M40 x P1.5	41.0	7.7	MGR50L	MEGA ER 32	967.804

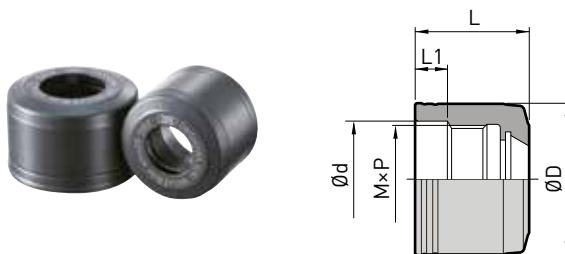
A.7

1. MEGA ER nut can not be used with some of conventional ER chuck. Please check dimensions carefully in that case.
2. To maximize the cutting performance, using with MEGA ER grip is recommended.

MEGA ER Solid Nut

For MEGA ER Grip

Free-notch design nut for high speed machining.



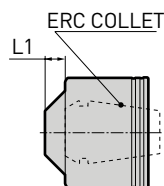
Model	ØD	L	M x P	Ød	L1	Wrench Type	Body Type	Order No.
MER16SN	30	25.0	M22 x P1.5	23.0	7.5	MGR30L	MEGA ER 16	805.663
MER20SN	35	26.5	M25 x P1.5	27.0	7.5	MGR35L	MEGA ER 20	805.664
MER25SN	42	27.5	M32 x P1.5	33.5	7.5	MGR42L	MEGA ER 25	805.665
MER32SN	50	30.2	M40 x P1.5	41.0	7.7	MGR50L	MEGA ER 32	805.666

1. MEGA ER solid nut can not be used with some of conventional ER chuck. Please check dimensions carefully in that case.
2. To maximize the cutting performance, using with MEGA ER grip is recommended.

MEGA ER Perfect Seal

For MEGA ER Grip

- Max. Coolant pressure 7 MPa



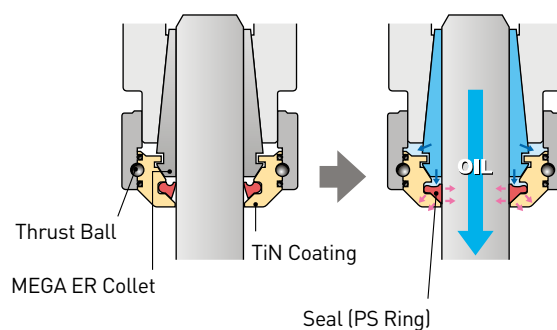
2way coolant



Through tools with PS ring



Jet through without PS ring



A.7

For MERS25/32, refer to the following pages.

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
MERPS16 -030035	3.0 - 3.5	6.4	ERC16 - 3 - 3.75	967.850
-035040	3.5 - 4.0		- 3.5 - 4.25	967.851
-040045	4.0 - 4.5		- 4 - 4.75	967.852
-045050	4.5 - 5.0		- 4.5 - 5.25	967.853
-050055	5.0 - 5.5		- 5 - 6	967.854
-055060	5.5 - 6.0	6.8	- 5.5 - 6.5	967.855
-060065	6.0 - 6.5		- 6 - 7	967.856
-065070	6.5 - 7.0		- 6.5 - 7.5	967.857
-070075	7.0 - 7.5		- 7 - 8	967.858
-075080	7.5 - 8.0		- 7.5 - 8.5	967.859
-080085	8.0 - 8.5	6.1	- 8 - 9	967.861
-085090	8.5 - 9.0		- 8.5 - 9.5	967.862
-090095	9.0 - 9.5		- 9 - 10	967.863
-095100	9.5 - 10.0		- 9.5 - 10	967.864

1. 1 pce. of ps ring is included.

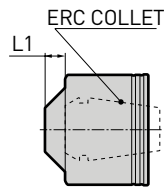
Model	Cutter Shank Dia.	L1	Collet Model	Order No.
MERPS20 -030035	3.0 - 3.5	6.4	ERC20 - 3 - 3.75	967.865
-035040	3.5 - 4.0		- 3.5 - 4.25	967.866
-040045	4.0 - 4.5		- 4 - 4.75	967.867
-045050	4.5 - 5.0		- 4.5 - 5.25	967.868
-050055	5.0 - 5.5		- 5 - 6	967.869
-055060	5.5 - 6.0	6.8	- 5.5 - 6.5	967.870
-060065	6.0 - 6.5		- 6 - 7	967.871
-065070	6.5 - 7.0		- 6.5 - 7.5	967.872
-070075	7.0 - 7.5		- 7 - 8	967.873
-075080	7.5 - 8.0		- 7.5 - 8.5	967.874
-080085	8.0 - 8.5	6.9	- 8 - 9	967.875
-085090	8.5 - 9.0		- 8.5 - 9.5	967.876
-090095	9.0 - 9.5		- 9 - 10	967.877
-095100	9.5 - 10.0		- 9.5 - 10.5	967.878
-100105	10.0 - 10.5		- 10 - 11	967.879
-105110	10.5 - 11.0	6.6	- 10.5 - 11.5	967.880
-110115	11.0 - 11.5		- 11 - 12	967.881
-115120	11.5 - 12.0		- 11.5 - 12.5	967.882
-120125	12.0 - 12.5		- 12 - 13	967.883
-125130	12.5 - 13.0		- 12.5 - 13	967.884

1. 1 pce. of ps ring is included.

MEGA ER Perfect Seal

For MEGA ER Grip

- Max. Coolant pressure 7 MPa



2way coolant



Through tools with PS ring



Jet through without PS ring

A.7

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
MERPS25-030035	3.0 - 3.5	6.3	ERC25- 3 - 3.75	967.885
-035040	3.5 - 4.0		- 3.5 - 4.25	967.886
-040045	4.0 - 4.5		- 4 - 4.75	967.887
-045050	4.5 - 5.0		- 4.5 - 5.25	967.888
-050055	5.0 - 5.5		- 5 - 6	967.889
-055060	5.5 - 6.0		- 5.5 - 6.5	967.890
-060065	6.0 - 6.5	6.7	- 6 - 7	967.891
-065070	6.5 - 7.0		- 6.5 - 7.5	967.892
-070075	7.0 - 7.5		- 7 - 8	967.893
-075080	7.5 - 8.0		- 7.5 - 8.5	967.894
-080085	8.0 - 8.5	6.8	- 8 - 9	967.895
-085090	8.5 - 9.0		- 8.5 - 9.5	967.896
-090095	9.0 - 9.5		- 9 - 10	967.897
-095100	9.5 - 10.0		- 9.5 - 10.5	967.898
-100105	10.0 - 10.5		- 10 - 11	967.899
-105110	10.5 - 11.0		- 10.5 - 11.5	967.900
-110115	11.0 - 11.5	7.3	- 11 - 12	967.901
-115120	11.5 - 12.0		- 11.5 - 12.5	967.902
-120125	12.0 - 12.5		- 12 - 13	967.903
-125130	12.5 - 13.0		- 12.5 - 13	967.904
-130140	13.0 - 14.0	6.6	- 13 - 14.5	967.905
-140150	14.0 - 15.0		- 14 - 15.5	967.906
-150160	15.0 - 16.0		- 15 - 16	801.318

1. 1 pce. of ps ring is included.

Model	Cutter Shank Dia.	L1	Collet Model	Order No.
MERPS32-030035	3.0 - 3.5	6.2	ERC32- 3 - 3.75	967.908
-035040	3.5 - 4.0		- 3.5 - 4.25	967.909
-040045	4.0 - 4.5		- 4 - 4.75	967.910
-045050	4.5 - 5.0		- 4.5 - 5.25	967.911
-050055	5.0 - 5.5		- 5 - 6	967.912
-055060	5.5 - 6.0		- 5.5 - 6.5	967.913
-060065	6.0 - 6.5	6.6	- 6 - 7	967.914
-065070	6.5 - 7.0		- 6.5 - 7.5	967.915
-070075	7.0 - 7.5		- 7 - 8	967.916
-075080	7.5 - 8.0		- 7.5 - 8.5	967.917
-080085	8.0 - 8.5	6.7	- 8 - 9	967.918
-085090	8.5 - 9.0		- 8.5 - 9.5	967.919
-090095	9.0 - 9.5		- 9 - 10	967.920
-095100	9.5 - 10.0		- 9.5 - 10.5	967.921
-100105	10.0 - 10.5		- 10 - 11	967.922
-105110	10.5 - 11.0		- 10.5 - 11.5	967.923
-110115	11.0 - 11.5	7.2	- 11 - 12	967.924
-115120	11.5 - 12.0		- 11.5 - 12.5	967.925
-120125	12.0 - 12.5		- 12 - 13	967.926
-125130	12.5 - 13.0		- 12.5 - 13	967.927
-130140	13.0 - 14.0	7.3	- 13 - 14.5	967.928
-140150	14.0 - 15.0		- 14 - 15.5	967.929
-150160	15.0 - 16.0		- 15 - 16.5	967.930
-160170	16.0 - 17.0		- 16 - 17.5	967.931
-170180	17.0 - 18.0	7.8	- 17 - 18.5	967.932
-180190	18.0 - 19.0		- 18 - 19.5	967.933
-190200	19.0 - 20.0		- 19 - 20	967.934

1. 1 pce. of ps ring is included.

PS Ring

Replaceable seal is installed in the MEGA ER Perfect Seal. Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



Model	Corresponding MERPS Model	Order No.
PS -0304	MERPS □ -030035, 035040	969.981
-0405	-040045, 045050	969.982
-0506	-050055, 055060	969.983
-0607	-060065, 065070	969.984
-0708	-070075, 075080	969.985

1. 1 package contains 5 pcs. (1 size).

Model	Corresponding MERPS Model	Order No.
PS -0809	MERPS □ -080085, 085090	969.986
-0910	-090095, 095100	969.987
-1011	-100105, 105110	969.988
-1112	-110115, 115120	969.989
-1213	-120125, 125130	969.990
-1314	-130140	969.991
-1415	-140150	969.992
-1516	-150160	969.993
-1617	-160170	969.994
-1718	-170180	969.995
-1819	-180190	969.996
-1920	-190200	969.997

MEGA Wrench for Collet Chuck

For MEGA Micro Chuck, MEGA New Baby Chuck, MEGA E Chuck and MEGA ER Grip



Model	Ød	Applicable Tool Models				Order No.
		MEGA Micro Chuck	MEGA New Baby Chuck	MEGA E Chuck	MEGA ER Grip	
MGR10	10	MEGA3S				969.449
MGR12	12	MEGA4S				969.450
MGR14	14	MEGA6S				969.452
MGR18	18	MEGA8S				801.705
MGR20	20		MEGA6N			969.454
MGR25	25		MEGA8N	MEGA6E		969.456
MGR30	30		MEGA10N	MEGA8E		969.458
MGR30L					MEGA ER16	969.448
MGR35	35		MEGA13N	MEGA10E		969.460
MGR35L					MEGA ER20	969.460L
MGR42	42		MEGA16N	MEGA13E		969.462
MGR42L					MEGA ER25	969.462L
MGR46	46		MEGA20N			969.465
MGR50L	50				MEGA ER32	969.464L

A.7

MEGA Torque Wrench

For MEGA Micro Chuck, MEGA New Baby Chuck and MEGA E Chuck

With torque limiter.

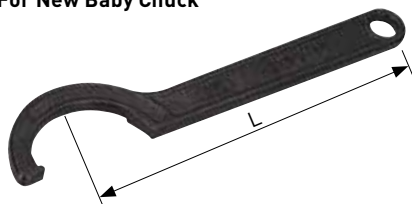


Model	Ød	Applicable Tool Models			Order No.
		MEGA Micro Chuck	MEGA New Baby Chuck	MEGA E Chuck	
MGR10TL	10	MEGA3S			805.460
MGR12TL	12	MEGA4S			969.451
MGR12TLS					804.117
MGR14TL	14	MEGA6S			969.453
MGR14TLS					978.379
MGR18TL	18	MEGA8S			805.553
MGR20TL	20		MEGA6N		969.455
MGR20TLS					804.119
MGR25TL	25		MEGA8N	MEGA6E	969.457
MGR25TLS					
MGR30TL	30		MEGA10N	MEGA8E	969.459
MGR35TL	35		MEGA13N	MEGA10E	969.461
MGR42TL	42		MEGA16N	MEGA13E	969.463
MGR46TL	46		MEGA20N		969.466

1. TLS models are recommended to tighten 3 mm or smaller inner diameter collets.

New Baby Wrench

For New Baby Chuck

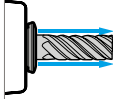
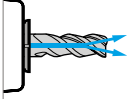
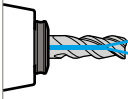
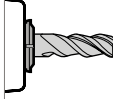


Model	L	Applicable Nut	Order No.
NBK6	65	NBN6/BPS6	961.525
NBK8	94	NBN8/BPS8	961.548
NBK10	104	NBN10/BPS10	961.570
NBK13	113	NBN13/BPS13	961.596
NBK16	122	NBN16/BPS16	961.630
NBK20	131	NBN20/BPS20	961.678

Straight Collet

For MEGA Double Power Chuck, New Hi-Power Milling Chuck and Hydraulic Chuck

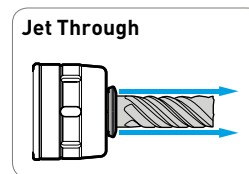
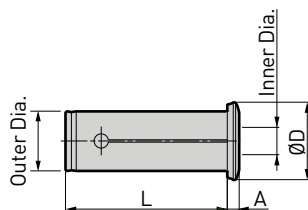
Straight Collet Selection Guide

	PJC Collet	OCA Collet	PSC Collet	AC Collet
				
	Periferical Coolant Supply	Through Tool Coolant Supply	Through Tool Coolant Supply	W/O Center Coolant
MEGA-D MEGA Double Power Chuck	○	○	○	○
MEGA-DS MEGA Double Power Chuck	○		○	○
HMC New Hi-Power Milling Chuck	○	○	○	○
HDC Hydraulic Chuck	○		○	

A.7

PJC Collet for MEGA-D/DS, HMC and HDC

For coolant to cutting tool periphery.



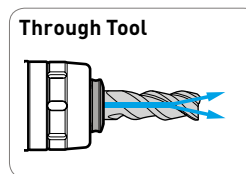
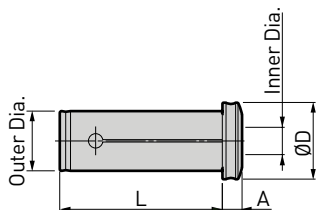
Regardless of the type of chucks, coolant is supplied to cutting tool periphery.

Model	A	ØD	L	Order No.	Model	A	ØD	L	Order No.	
PJC12 - 6	5.4	20.4	40	805.882	PJC25 - 6	5.0	32.5	68	962.484	
- 8				805.883	- 8				962.485	
-10				805.884	-10				962.486	
PJC16 - 6	6.0	23	54	962.468	-12				5.4	962.487
- 8	6.3			962.469	-16				5.8	962.489
-10				962.470	-18				801.685	
-12				962.471	-20	962.491				
PJC20 - 3	5.2	27	61	962.472	PJC32 - 6	5.0	39	74	962.492	
- 4				962.473	- 8				962.493	
- 5				962.474	-10				962.494	
- 6	962.475			-12	962.495					
- 7	5.7			962.476	-14				962.496	
- 8				962.477	-16				962.497	
- 9				962.478	-20	962.499				
-10	6.4			962.479	-25	962.500				
-11				962.480	PJC42 -16	5.0	50.5	83	801.982	
-12				962.481	-20				801.983	
-13	804.834	-25	801.984							
-14	962.488	-32	801.985							
-15	7.3	804.835								
-16		962.483								

1. Model name indicates its outer dia. and inner dia.
(e.g) PJC12-6: outer dia. 12 mm / inner dia. 6 mm
2. Replacement O-ring for PJC and PSC collet are available (PJC□OR). Please contact BIG KAISER agent.

PSC Collet for MEGA-D/DS, HMC and HDC

For coolant-through tools.



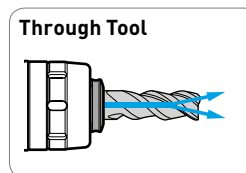
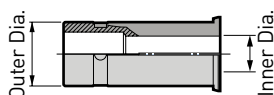
Regardless of the type of chucks, coolant is supplied through cutting tool.

Model	A	ØD	L	Order No.
PSC20 - 3	7.7	27	61	962.437
- 4	7.5			962.438
- 5				962.439
- 6				962.440
- 7	8.2			962.441
- 8				962.442
- 9				962.443
-10				962.444
-11	8.7			962.445
-12				962.446
-13		804.827		
-14		962.447		
-15		804.828		
-16	28	962.448		

Model	A	ØD	L	Order No.
PSC32 - 6	7.5	38	74	962.457
- 7	8.2			804.829
- 8				962.458
- 9				804.830
-10	8.7			962.459
-11				804.831
-12				962.460
-13				804.832
-14	9.2			962.461
-15				804.833
-16		962.462		
-18		962.463		
-19		802.063		
-20	9.5	962.464		
-21		802.064		
-22		802.065		
-23		802.066		
-24		802.067		
-25	962.465			

1. Model name indicates its outer dia. and inner dia. (e.g) PSC20-3: outer dia. 20 mm / inner dia. 3 mm
2. Replacement O-ring for PJC and PSC collet are available (PSC□OR). Please contact BIG KAISER agent.

OCA Collet for MEGA-D and HMC



Model	Chuck Model	Order No.
OCA16 - 6	MEGA16D HMC16(S)	805.156
- 8		805.157
-10		805.158
-12		805.159
OCA20 - 6	MEGA20D HMC20(S)	962.401
- 8		962.402
-10		962.403
-12		962.404
-14		978.501
-16		962.405
OCA25 - 6	MEGA25D HMC25(S)	801.747
- 8		801.748
-10		805.413
-12		801.752
-14		805.244
-16		962.406
-18		805.245
-20		962.407

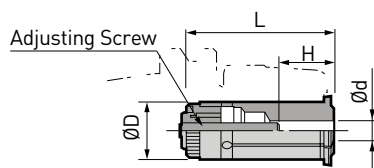
Model	Chuck Model	Order No.
OCA32 - 6	MEGA32D HMC32(S)	962.408
- 8		962.409
-10		962.410
-12		962.411
-13		962.412
-14		962.413
-15		962.414
-16		962.415
-17		962.416
-18		962.417
-19		962.418
-20		962.419
-21		962.420
-22		962.421
-23		962.422
-24		962.423
-25		962.424
-28		805.356

Model	Chuck Model	Order No.
OCA42 - 6	MEGA42D HMC42	801.774
- 8		801.775
-10		801.764
-12		801.765
-16		801.767
-19		801.768
-20		801.769
-24		801.770
-25		801.771
-31		801.772
-32		801.773

1. Model name indicates its outer dia. and inner dia. (e.g) OCA16-6: outer dia. 16 mm / inner dia. 6 mm
2. For coolant-through tools.
3. PJC or PSC collet is recommended for MEGA-D/DS.

AC Collet for MEGA-D/DS and HMC

Tool projection adjustable straight collet.



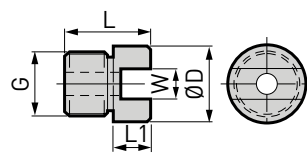
Model	Ød	ØD	L	H		Order No.
				Min.	Max.	
AC16 - 6	6	16	58	30	47	962.196
- 8	8			32		962.197
-10	10			37		962.198
-12	12					962.199
AC20 - 6	6	20	68	30	48	962.201
- 8	8			32		962.202
-10	10			37		962.203
-12	12			40		962.204
-14	14			42		962.205
-16	16					962.205
AC25 - 6	6	25	78.5	30	58	962.221
- 8	8			32		962.222
-10	10			37		962.223
-12	12			40		962.224
-14	14			46		962.225
-16	16			48		962.226
-18	18			52		962.227
-20	20					962.228

Model	Ød	ØD	L	H		Order No.
				Min.	Max.	
AC32 - 6	6	32	84	30	62	962.206
- 8	8			32		962.207
-10	10			37		962.208
-12	12					962.209
-14	14			40		962.251
-16	16			46		962.210
-18	18	48	962.253			
-20	20	52	962.211			
-25	25	55	962.212			
AC42 - 6	6	42	99	30	77	962.236
- 8	8			34		962.237
-10	10			37		962.238
-12	12			46		962.239
-16	16			52		962.240
-20	20			55		962.241
-25	25			62		962.242
-32	32					962.243

1. Model name indicates its outer dia. and inner dia. [e.g] AC16-6: outer dia. 16 mm / inner dia. 6 mm
2. For use without coolant supply.
3. Straight collet without adjusting screw is also available. Model example: C32-20. Please contact BIG KAISER agent.
4. C42-40 is also available. Please contact BIG KAISER agent.

Adjusting Screw

For MEGA Double Power Chuck and New Hi-Power Milling Chuck



Model	ØD	L	L1	G	W	Body		Order No.
						MEGA Double Power Chuck	New Hi-Power Milling Chuck	
HMA-M16	19	27	6	M16P1.5	8	MEGA 20D/DS MEGA25D/DS	HMC20S/HMC20 HMC25S/HMC25	962.311
HMA-M16S	19	27	6	M16P1.5	10	MEGA32D/DS (BBT30/40)	HMC32S	962.312
HMA-M24	30	36	9.5	M24P1.5		MEGA32D/DS (BBT50)	HMC32	962.313
						MEGA42D/DS (BBT50) MEGA50D/DS (BBT50)	HMC42S HMC42	

1. For MEGA16D/DS, HMC12J and HMC16S a commercially available hex socket head screw with M8 can be used.

MEGA Wrench for Milling Chuck

For MEGA Double Power Chuck and MEGA Perfect Grip



Model	Ød	Applicable Tool Models		Order No.
		MEGA Double Power Chuck	MEGA Perfect Grip	
MGR42L	42	MEGA16D/DS-□A(BBT40, HSK-A63/F63)		969.462L
MGR46L	46	MEGA16D/DS (BBT30/50, HSK-A40/A50/A100)	MEGA16DPG	969.465L
MGR50L	50	MEGA20D/DS (BBT30/40, HSK-A50/A63/F63)		969.464L
MGR60L	60	MEGA20D/DS (BBT50, HSK-A100)	MEGA20DPG	969.468L
MGR62L	62	MEGA25D/DS-□A(BBT40, HSK-A63/F63)		969.469L
MGR70L	70	MEGA25D/DS (BBT50, HSK-A100) MEGA32D/DS (BBT40, HSK-A63/F63)	MEGA25DPG	969.470L
MGR80L	80	MEGA32D/DS (BBT50, HSK-A100)	MEGA32DPG	969.471L
MGR99L	99	MEGA42D/DS		969.472L

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FK Wrench

For New Hi-Power Milling Chuck

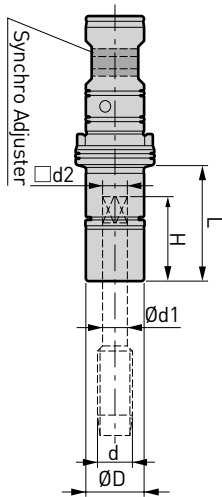


Model	L	Clamping Range	Applicable Tool Models	Order No.
NBK13	113	32 - 35	HMC12J	961.596
FK45- 50L	242	43 - 50	HMC16S/HMC20S	801.037
FK52- 55	220	52 - 55	HMC25S (BBT30)	962.294
FK58- 62	240	58 - 62	HMC20/HMC25 (BBT50)	962.291
FK58- 62L	293		HMC25S (BBT40/50) HMC32S (BBT30)	801.038
FK68- 75L	319	68 - 75	HMC32S (BBT40/50)	801.039
FK80- 90	280	80 - 90	HMC32 (BBT50)	962.292
FK80- 90L	390		HMC42S	804.771
FK92- 100	280	92 - 100	HMC42	962.293

Tap Holder for MEGA Synchro Tapping Holder

Available in short, long and extra long length (150 mm, 200 mm) to meet all production requirements.

MGT6 (Tap size **DIN**: M3 - M8; **ISO**: M3 - M5)



Model	DIN		ISO	Ød1	□d2	H	L	ØD	Weight (kg)	Order No.
	DIN371	DIN376	ISO529							
MGT6 -031025 - 30			M3	3.15	2.5	20	30	16	0.12	963.611
							70		0.18	963.612
							100		0.23	963.613
							150		0.31	963.614
-035027 - 30	M3	M5		3.5	2.7	21	30	0.12	963.615	
							70	0.18	963.616	
							100	0.23	963.617	
							150	0.31	963.618	
-040032 - 30			M4	4.0	3.15	21	30	0.12	963.619	
							70	0.18	963.620	
							100	0.23	963.621	
							150	0.31	963.622	
-045034 - 30	M4	M6		4.5	3.4	21	30	0.12	963.623	
							70	0.18	963.624	
							100	0.22	963.625	
							150	0.30	963.626	
-050040 - 30			M5	5.0	4.0	25	30	0.12	963.627	
							70	0.18	963.628	
							100	0.22	963.629	
							150	0.30	963.630	
-060049 - 30	M5, M6	M8		6.0	4.9	26	30	0.12	963.632	
							70	0.17	963.633	
							100	0.22	963.634	
							150	0.30	963.635	
-200						200	0.37	963.636		

1. Nut is included. Wrench is to be ordered separately.

For Accessory ▶ A166

MGT12 (Tap size **DIN**: M5 - M12; **ISO**: M6 - M12)

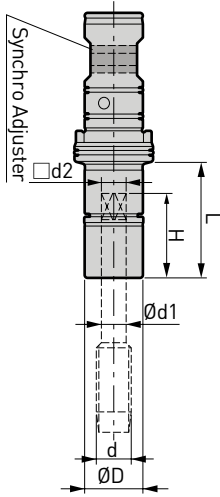
Model	DIN		ISO	Ød1	□d2	H	L	ØD	Weight (kg)	Order No.
	DIN371	DIN376	ISO529							
MGT12 -060049 - 30	M5, M6	M8		6.0	4.9	28	30	20	0.19	963.637
							70		0.29	963.638
							100		0.36	963.639
							150		0.48	963.640
							200		0.60	963.641
-063050 - 30			M6	6.3	5.0	28	30	0.19	963.642	
							70	0.29	963.643	
							100	0.36	963.644	
							150	0.48	963.645	
							200	0.60	963.646	
-070055 - 30		M10		7.0	5.5	28	30	0.19	963.647	
							70	0.28	963.648	
							100	0.35	963.649	
							150	0.47	963.650	
							200	0.59	963.651	
-080063 - 30	M8		M8	8.0	6.3	29	30	0.18	963.652	
							70	0.28	963.653	
							100	0.35	963.654	
							150	0.46	963.655	
							200	0.58	963.656	
-090071 - 30		M12	M12	9.0	7.1	30	30	0.18	963.657	
							70	0.27	963.658	
							100	0.34	963.659	
							150	0.46	963.660	
							200	0.58	963.661	

1. Nut is included. Wrench is to be ordered separately.

For Accessory ▶ A166

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MGT20 (Tap size **DIN**: M10 - M20; **ISO**: M10 - M20)

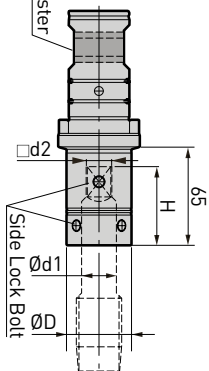


Model	DIN		ISO	Ød1	□d2	H	L	ØD	Weight (kg)	Order No.
	DIN371	DIN376	ISO529							
MGT20-090071 - 35							35		0.55	963.662
- 85							85		0.82	963.663
-115		M12	M12	9.0	7.1	30	115		0.98	963.664
-150							150		1.17	963.665
-100080 - 35							35		0.54	963.666
- 85							85		0.80	963.667
-115	M10		M10	10.0	8.0	33	115		0.96	963.668
-150							150		1.15	963.669
-110090 - 35							35		0.53	963.670
- 85							85		0.79	963.671
-115		M14		11.0	9.0	34	115		0.95	963.672
-150							150		1.14	963.673
-112090 - 35							35		0.53	963.674
- 85							85		0.79	963.675
-115			M14	11.2	9.0	34	115		0.95	963.676
-150							150		1.14	963.677
-120090 - 35							35	30	0.52	963.678
- 85							85		0.78	963.679
-115		M16		12.0	9.0	34	115		0.94	963.680
-150							150		1.13	963.681
-125100 - 35							35		0.52	963.682
- 85							85		0.77	963.683
-115			M16	12.5	10.0	35	115		0.93	963.684
-150							150		1.11	963.685
-140110 - 35							35		0.51	963.686
- 85							85		0.76	963.687
-115			M18	14.0	11.0	36	115		0.92	963.688
-150							150		1.10	963.689
-140112 - 35							35		0.51	963.690
- 85							85		0.76	963.691
-115			M18, M20	14.0	11.2	36	115		0.92	963.692
-150							150		1.10	963.693
-160120 - 35		M20		16.0	12.0	37	35		0.51	805.173

1. Nut is included. Wrench is to be ordered separately.

For Accessory ▶ A166

MGT36 (Tap size **DIN**: M22 - M36)



Tap Holder Model	Tap size		Ød1	□d2	H	ØD	Weight (kg)	Order No.
	DIN376	DIN353						
MGT36-180145-65	M22, 24	P5/8	18	14.5	45	38	1.4	805.240
-200160-65	M27	P3/4	20	16	51	40	1.4	805.241
-220180-65	M30	P7/8	22	18	53	42	1.5	805.238
-250200-65	M33	P1	25	20	58	49	1.6	805.242
-280220-65	M36	-	28	22	62	52	1.6	805.239

1. Wrench is not required.

For Accessory ▶ A166

Caution

Tap shank (Ød1) and square (□d1) must be matched. Please carefully check before order.

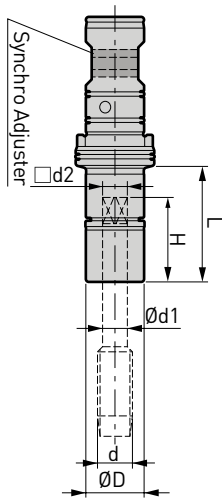
Tap Holder for MEGA Synchro Tapping Holder

Available in short, long and extra long length (150 mm, 200 mm) to meet all production requirements.

MGT6 (Tap size JIS: M2 - M6)



Model	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)	Order No.
	Metric	Pipe	Unify							
MGT6 -M2	- 30	M2	No. 3 No. 4	3	2.5	19	30	16	0.12	963.400
	- 70						70		0.18	801.481
	-100						100		0.23	801.479
	-150						150		0.31	801.480
-M3	- 30	M3	No. 5 No. 6	4	3.2	21	30	0.12	801.484	
	- 70						70	0.18	801.485	
	-100						100	0.23	801.482	
	-150						150	0.31	801.483	
-M4	- 30	M4	No. 8	5	4	25	30	0.12	801.489	
	- 70						70	0.18	801.490	
	-100						100	0.22	801.486	
	-150						150	0.30	801.487	
-M5	- 30	M5	No. 10 No. 12	5.5	4.5	25	30	0.12	801.494	
	- 70						70	0.18	801.495	
	-100						100	0.22	801.491	
	-150						150	0.30	801.492	
-M6, U1/4	- 30	M6	U1/4	6	4.5	25	30	0.12	801.499	
	- 70						70	0.17	801.500	
	-100						100	0.22	801.496	
	-150						150	0.30	801.497	
-200	200	0.37	801.498							



For Accessory ▶ A166

MGT12 (Tap size JIS: M6 - M12)

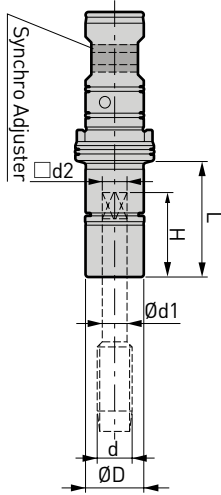
Model	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)	Order No.
	Metric	Pipe	Unify							
MGT12-M6, U1/4	- 30	M6	U1/4	6	4.5	27	30	20	0.19	978.286
	- 70						70		0.29	801.415
	-100						100		0.36	801.412
	-150						150		0.48	801.413
-U5/16	- 30	M6	U5/16	6.1	5	28	30	0.19	801.424	
	- 70						70	0.29	801.425	
	-100						100	0.36	801.421	
	-150						150	0.48	801.422	
-M8	- 30	M8	U5/16	6.2	5	28	30	0.19	978.287	
	- 70						70	0.29	801.419	
	-100						100	0.36	801.416	
	-150						150	0.48	801.417	
-M10, U3/8	- 30	M10	U3/8	7	5.5	28	30	0.19	978.288	
	- 70						70	0.28	801.408	
	-100						100	0.35	801.405	
	-150						150	0.47	801.406	
-U7/16,P1/8	- 30	M10	U3/8	7	5.5	28	30	0.59	801.407	
	- 70						70	0.18	801.429	
	-100						100	0.28	801.430	
	-150						150	0.35	801.426	
-M12	- 30	M12	U7/16	8	6	29	30	0.46	801.427	
	- 70						70	0.58	801.428	
	-100						100	0.18	978.289	
	-150						150	0.27	801.411	
-200	200	0.34	801.409							
-M12	- 30	M12	U7/16	8.5	6.5	29	30	0.46	963.399	
	- 70						70	0.58	801.410	
	-100						100	0.34	801.409	
	-150						150	0.46	963.399	
-200	200	0.58	801.410							

1. Nut is included. Wrench is to be ordered separately.

For Accessory ▶ A166

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MGT20 (Tap size JIS: M12 - M20)

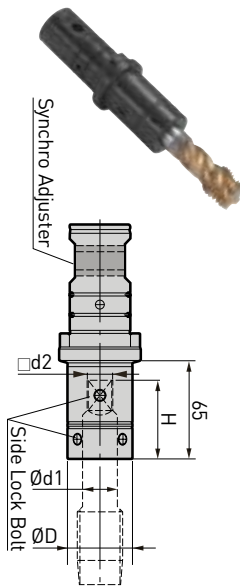


Model	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)	Order No.
	Metric	Pipe	Unify							
MGT20-M12	- 35	M12		8.5	6.5	29	35	30	0.55	801.433
	- 85						85		0.82	801.434
	-115						115		0.98	801.431
	-150						150		1.17	801.432
-U1/2	- 35		U1/2	9	7	30	35		0.55	801.460
	- 85						85		0.82	801.461
	-115						115		0.98	804.130
	-150						150		1.17	804.128
-M14, U9/16	- 35	M14	U9/16	10.5	8	33	35		0.53	801.437
	- 85						85		0.79	801.438
	-115						115		0.95	801.435
	-150						150		1.14	801.436
-P1/4	- 35		P1/4	11	9	31	35		0.53	801.454
	- 85						85		0.79	801.455
	-115						115		0.95	801.452
	-150						150		1.14	801.453
-U5/8	- 35		U5/8	12	9	34	35		0.52	801.462
	- 85						85		0.78	801.463
	-115						115		0.94	804.131
	-150						150		1.13	804.129
-M16	- 35	M16		12.5	10	35	35		0.52	801.441
	- 85						85		0.77	801.442
	-115						115		0.93	801.439
	-150						150		1.11	801.440
-M18, U3/4	- 35	M18	U3/4	14	11	36	35		0.51	801.445
	- 85						85		0.76	801.446
	-115						115		0.92	801.443
	-150						150		1.10	801.444
-P3/8	- 35		P3/8	14	11	33	35		0.51	801.458
	- 85						85		0.76	801.459
	-115						115		0.92	801.456
	-150						150		1.10	801.457
-M20	- 35	M20		15	12	37	35		0.49	801.449
	- 85						85		0.74	801.450
	-115						115		0.89	801.447
	-150						150		1.06	801.448

1. Nut is included. Wrench is to be ordered separately.

For Accessory ▶ A166

MGT36 (Tap size JIS: M20 - M36; P1/4, P3/4, P1)



Tap Holder Model	Tap size		Ød1	□d2	H	ØD	Weight (kg)	Order No.
	Size	l						
MGT36 -M20 -65	M20	65 - 68	15	12	40	32	1.2	801.465
-M22 -65	M22	71 - 74	17	13	44	34	1.3	801.466
-M24 -65	M24	74 - 77	19	15	46	39	1.4	978.330
-M27 -65	M27	80 - 83	20		50	40	1.4	801.467
-M30 -65	M30	83 - 86	23	17	52	43	1.5	801.468
-M33 -65	M33	88 - 91	25	19	57	49	1.6	801.469
-M36 -65	M36	94 - 97	28	21	61	52	1.6	978.331
-P1/2 -65	P1/2	38 - 41	18	14	42	35	1.3	801.471
-P3/4 -65	P3/4		23	17	47	43	1.5	801.473
-P1 -65	P1	49 - 52	26	21	46	50	1.7	801.472

1. Wrench is not required.

For Accessory ▶ A166

Caution

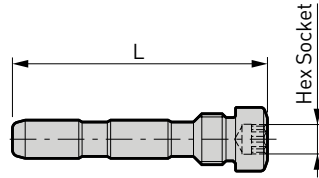
Tap shank (Ød1) and square (□d1) must be matched. Please carefully check before order.

Spare Parts for MEGA Synchro Tapping Holder

MGT Set Screw

For MGT6, MGT12, MGT20, MGT36

Made of high-strength material. Secures the tap holder into body



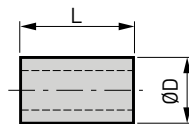
Model	Hex Socket size	L	Body	Order No.
MGT6SS	4	35	MGT6	963.711
MGT12SS	4	40	MGT12	963.432
MGT20SS	5	53	MGT20	963.713
MGT36SS	8	92	MGT36	801.478

Synchro Adjuster

For MGT6, MGT12, MGT20, MGT36

Made of special material. Replaceable bushing in tap holder

A.7

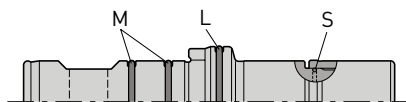
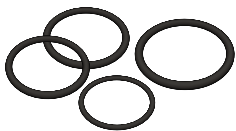


Model	ØD	L	Tap Holder	Order No.
MGT6SA	9	11	MGT6-d-□	963.721
MGT12SA	10	15	MGT12-d-□	963.722
MGT20SA	14	24	MGT20-d-□	963.723
MGT36SA	20	32	MGT36-d-□	801.474

O-Ring Set

For MGT6, MGT12, MGT20

Set includes 1 each of small & large size, 2 middle size.

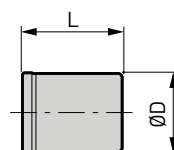


Model	Nut. Dia	Tap Holder	Order No.
MGT6 OR	Ø 16	MGT6-d-□	801.501
MGT12 OR	Ø 20	MGT12-d-□	801.420
MGT20 OR	Ø 30	MGT20-d-□	801.451
MGT36 OR	-	MGT36-d-□	801.470

MGT Nut

For MGT6, MGT12, MGT20

Exclusive nut for MEGA synchro tapping holder.

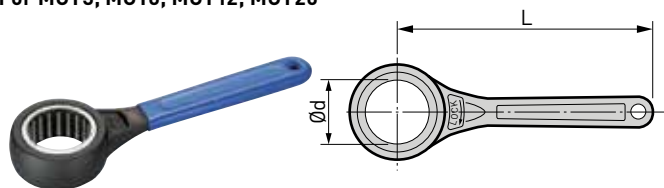


Model	ØD	L	Tap Holder	Order No.
MGN6T	16	19	MGT6-d-□	963.700
MGN12T	20	21	MGT12-d-□	963.702
MGN20T	30	24	MGT20-d-□	963.703

Accessories for MEGA Synchro Tapping Holder

MEGA Wrench

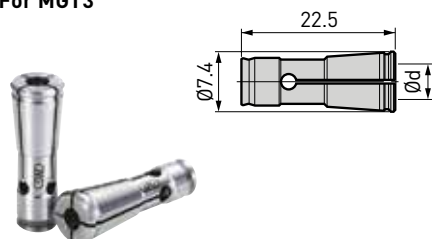
For MGT3, MGT6, MGT12, MGT20



Model	ØD	L	Tap Holder	Order No.
MGR12	12	90	MGT3	969.450
MGR16	16	90	MGT6-d-□	969.446
MGR20L	20	160	MGT12-d-□	969.447
MGR30L	30	220	MGT20-d-□	969.448

Micro Collet

For MGT3



Model	Tapping Range d			Tap Shank	Order No.
	DIN371	ISO529	JIS	Ød	
NBC4S-2.5AA	M1 - M1.8	M2	-	2.5	961.468
NBC4S-2.8AA	M2 - M2.6	M2.2, M2.5	-	2.8	968.353
NBC4S-3.0AA	-	-	M1 - M2.6	3.0	961.470
NBC4S-3.1AA	-	M3	-	3.15	968.355
NBC4S-3.5AA	M3	-	-	3.5	961.472
NBC4S-4.0AA	-	-	M3	4.0	961.474

1. Other sizes available. Please refer to micro collet.

For Micro Collet ▶ A135

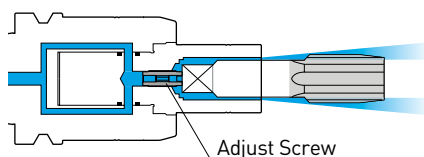
A.7

Adjusting Screw for MGT36

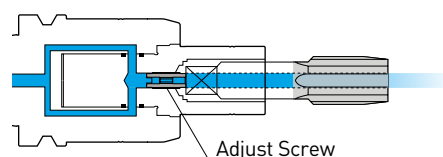
Adjustment of tap projection length (Adjustable amount: 3 mm). Coolant supply is also adjustable in 2 ways by reversing the adjust screw.

Model	Order No.
MGT36AJ	801.464

Tap without hole



Tap with hole



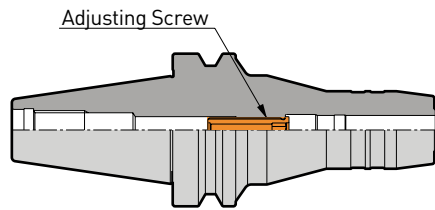
Side Lock Bolt Set for MGT36

Spare locking screw to clamp a tap.

Set Model	Tap Holder Model		Bolt size	Order No.
	DIN	JIS		
MGT36SL6	-	MGT36 -M20 -65	M6 x 8L (x4) + M6 x 10L (x2)	801.476
	-	-M22 -65		
	-	-P1/2 -65		
MGT36SL8	MGT36 -180145-65	-M24 -65	M8 x 10L (x4) + M8 x 12L (x2)	801.477
	-200160-65	-M27 -65		
	-220180-65	-M30 -65		
		-P3/4 -65		
MGT36SL10	MGT36 -250200-65	MGT36 -M33 -65	M10 x 12L (x4) + M10 x 14L (x2)	801.475
	-280220-65	-M36 -65		
		-P1 -65		

Adjusting Screw

For Hydraulic Chuck



One Side Hexagon Socket Type		Both Side Hexagon Socket Type	
Model	Order No.	Model	Order No.
HDA6 -05032	803.743	HDA6 -05032W	802.394
-05020	803.742	-05020W	802.393
HDA8 -06032	803.746	HDA8 -06032W	803.760
-06020	803.745	-06020W	803.759
HDA10 -08032	803.748	HDA10 -08032W	803.762
-08015	803.747	-08015W	803.761
HDA12 -10032	803.751	HDA12 -10032W	802.383
-10010	803.749	-	-
HDA16 -12037	803.754	HDA16 -12037W	802.386
-12030	802.337	-12030W	802.385
HDA25 -16039	803.757	HDA25 -16039W	802.389
HDA6 -20010	802.390	-	-
HDA20 -12047	802.391	-	-
HDA12 -10025	803.750	HDA12 -10025W	803.763
HDA16 -12015	803.752	HDA16 -12015W	802.384
HDA20 -16015	803.755	HDA20 -16015W	802.387

1. One side hexagon socket type can be clamped only from chuck side.

A.7

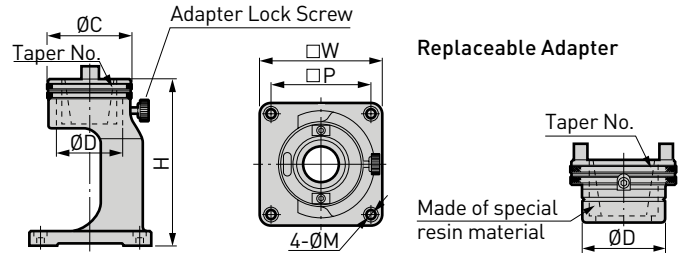
Clamp Bolt

For Face Mill Arbor FMH and Smart Damper FMH type

Clamp Bolt		Clamp Bolt with Coolant Hole						
Model	Order No.	Model	Order No.	ØD	ØD1	L	L1	G
MBA -M12	802.757	TMBA -M12	802.767	33	23	10	2	12
-M12H	802.758	-	-		-		-	
-M16	802.759	-M16	802.768	40	23	10	6	16
-M16H	802.760	-	-		-		-	
-M20	802.761	-M20	802.769	50	27	14	6	20
-M20H	802.762	-	-		-		-	

Tooling Mate

For BBT (BT) and BDV (DV)



Model	BT / DV No.	ØC	ØD	H	□ W	□ P	ØM	Order No.	Adapter Model	Order No.
TMS40	-20	76	60	150	110	90	7 (for M6)	805.489	TMA40 -20	805.894
	-30							961.270	-30	802.944
	-40							961.271	-40	802.945
TMS50	-40	105	88	190	160	130	9 (for M8)	961.272	TMA50 -40	802.942
	-50							961.273	-50	802.943

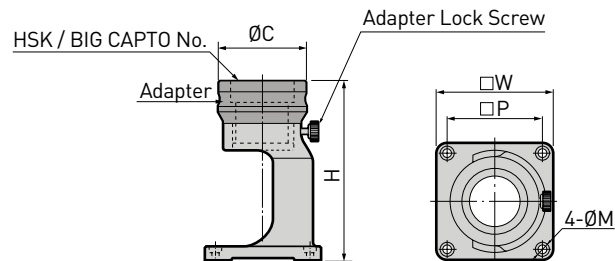
1. 1 pce. of adapter is included.

2. Adapter can be ordered individually.

For HSK and BIG CAPTO

Innovative "Two-way clutch needle roller clamping system" assures secure clamping at the tool flange periphery.

A.7



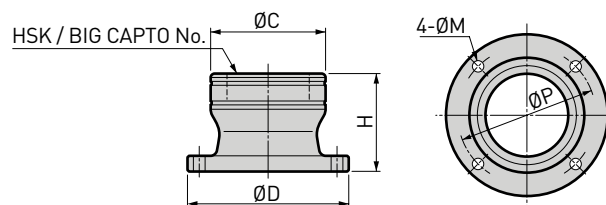
Model	HSK / BIG CAPTO No.	ØC	H	□ W	□ P	ØM	Order No.	Adapter Model	Order No.	
TMS40	- 32R	32/C3	76	165	110	90	7 (for M6)	961.339	TMA40 - 32R	802.948
	- 40R	40/C4						961.342	- 40R	802.949
	- 50R	50/C5						961.346	- 50R	802.950
	- 63R	63/C6						961.338	- 63R	972.331
TMS50	- 80R	80/C8	114	215	160	130	9 (for M8)	802.308	TMA50 - 80R	802.946
	-100R	100	124	219				802.307	-100R	802.947

1. 1 pce. of adapter is included.

2. Adapter can be ordered individually.

Kombi Grip

For HSK and BIG CAPTO



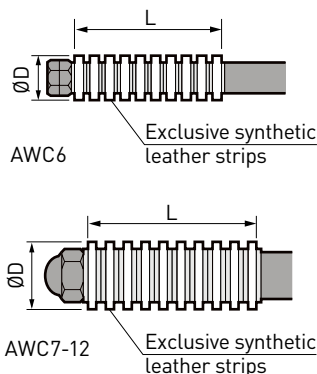
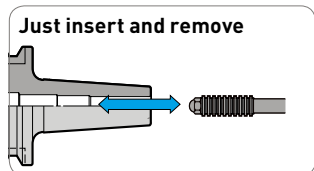
Model	HSK No.	BIG CAPTO No.	ØC	ØD	H	ØP	ØM	Order No.
KG 25R	25	-	48	79	65	62	7 (for M6)	961.291
	32R	C3	55	85		69		961.292
	40R	C4	63	93		77		961.293
	50R	C5	75	105		89		961.294
63R	63	C6	88	123.5	75	105.5	9 (for M8)	961.295
80R	80	C8	107	142	90	124		961.296
100R	100	-	127	162	100	144		961.297

1. 4 pcs. of cap bolts to mount on the table are not included.

α Wiper Cleaner

Perfect for Hydraulic Chuck and Shrink Fit Holder

Easy cleaning by simply inserting and removing.

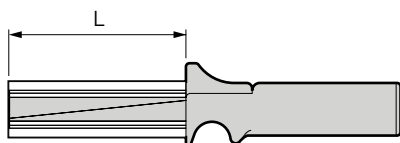


Model	ØD	L	Order No.
AWC6	6	20	978.901
AWC7	7		802.781
AWC8	8		978.902
AWC9	9	26	802.782
AWC10	10		978.903
AWC11	11		802.783
AWC12	12	31	978.904

TK Cleaner

A.7 Perfect for Hydraulic Chuck and Milling Chuck Holder

Absolute cleaning of clamping bore by unique "slide" feature.

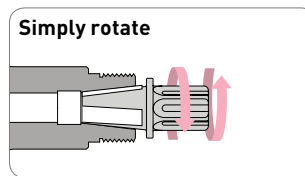
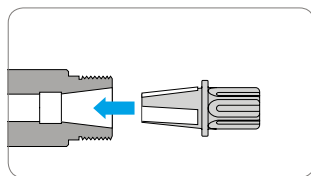


Model	Bore Diameter (Ø)	L	Leather Strips Qty.	Order No.
TKC 14	14	60	2	802.805
16	16	70		802.807
18	18			802.808
20	20			802.809
25	25	80	3	802.810
32	32	100	4	802.811
40	40	105		802.812
42	42			978.905

α Taper Cleaner

For internal collet taper

Maintain accuracy of high precision collet chucks.



For MEGA Micro Chuck

Model	Suitable Model	Order No.
SC-NBC3S	MEGA3S	961.278
SC-NBC4S	MEGA4S	961.279
SC-NBC6S	MEGA6S	961.280
SC-NBC8S	MEGA8S	805.827

For MEGA E Chuck

Model	Suitable Model	Order No.
SC-MEC6	MEGA6E	961.287
SC-MEC8	MEGA8E	961.288
SC-MEC10	MEGA10E	961.289
SC-MEC13	MEGA13E	961.290

For MEGA New Baby Chuck and New Baby Chuck

Model	Suitable Model	Order No.
SC-NBC6	MEGA6N NBS6	961.281
SC-NBC8	MEGA8N NBS8	961.282
SC-NBC10	MEGA10N NBS10	961.283
SC-NBC13	MEGA13N NBS13	961.284
SC-NBC16	MEGA16N NBS16	961.285
SC-NBC20	MEGA20N NBS20	961.286

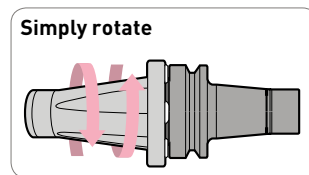
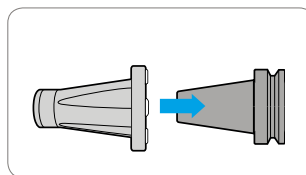
For ER Collet Chuck

Model	Suitable Model	Order No.
SC-MER11	ER11	967.810
SC-MER16	ER16	967.811
SC-MER20	ER20	967.812
SC-MER25	ER25	967.813
SC-MER32	ER32	967.814

α Tooling Cleaner

For tool shank taper and flange

Particles and oil on both taper and flange of 7/24 taper holder are easily removed.



For No. 30 & No.40 tapers

Model	Shank Size	Order No.
SCE-30	No. 30	961.276
SCE-40	No. 40	961.277

Spindle Cleaner

For machine spindle

Easy cleaning of oil or particles from the machine spindle.

A.7



For ISO taper spindle

Model	Taper Size	Order No.
SC20	No. 20	804.945
SC30	No. 30	802.791
SC40	No. 40	802.793
SC45	No. 45	802.794
SC50	No. 50	802.796

For Morse taper spindle

Model	Taper Size	Order No.
SC1	MT1	802.788
SC2	MT2	802.789
SC3	MT3	802.790
SC4	MT4	802.792
SC5	MT5	802.795
SC6	MT6	802.797

For HSK spindle

Model	Taper Size	Order No.
SC-HSK 32	HSK-A32	802.799
40	HSK-A40	979.997
50	HSK-A50	802.800
63	HSK-A63	802.802
80	HSK-A80	802.803
100	HSK-A100	802.798

Model	Taper Size	Order No.
SC-HSK25E	HSK-E25	979.995
32E	HSK-E32	979.996
40E	HSK-E40	979.998
50E	HSK-E50	802.801

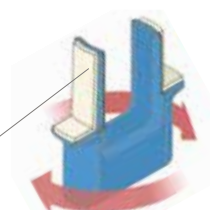
Spindle Cleaner

For BIG CAPTO

Easy cleaning of BIG CAPTO polygon taper.



Cleaning strips



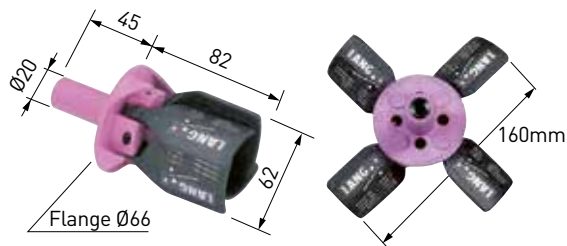
Model	BIG CAPTO No.	Order No.
SC -C3	C3	973.194
-C4	C4	973.195
-C5	C5	973.196
-C6	C6	973.197
-C8	C8	973.198

Clean Tec

For machine spindle

Full automation of swarf and coolant removal by means of wind pressure.

Ø 160 Type

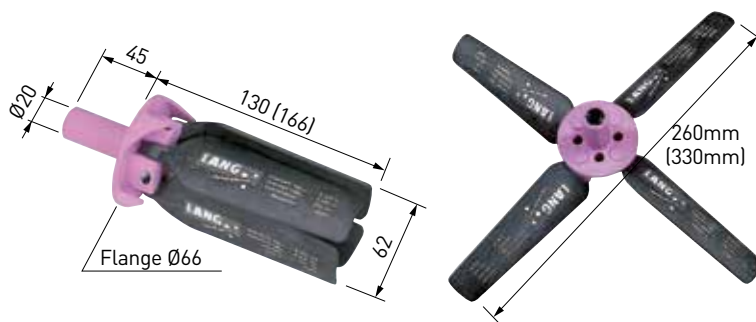


High pressure coolant removes swarf.



Wind pressure cleans workpieces.

Ø 260, Ø 330 Type



A.7

Numbers shown in () are dimensions of ST20-CT330 model.

Model	ST20-CT160	ST20-CT260	ST20-CT330
Order No.	979.994	979.993	804.929
Starting Speed	1 000 min ⁻¹ → 2 000 min ⁻¹ → 3 000 min ⁻¹ → 4 000 min ⁻¹ (1 sec) (0.5 sec) (0.5 sec) (0.5sec)		
Recommended Rotation	min. 6 000 ⁻¹ - max. 9 000 min ⁻¹	min. 4 000 ⁻¹ - max. 7 000 min ⁻¹	min. 3 000 ⁻¹ - max. 6 000 min ⁻¹
Direction of Rotation	Clockwise		
Recommended Feed	3 000 - 10 000 mm/min		

T-Slot Clean

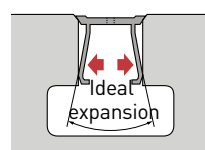
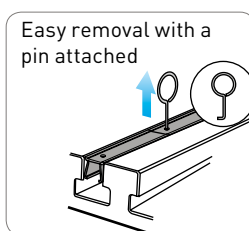
Improve efficiency of table cleaning. Save you from cleaning T-slots packed with swarf. Quick discharge of swarf out of a machine.



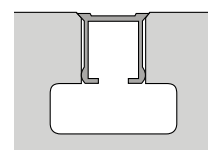
Before



After



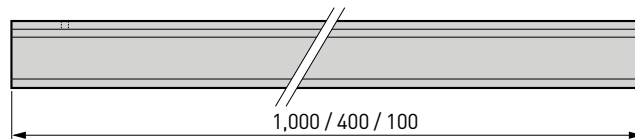
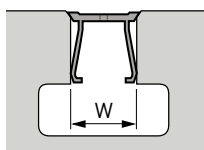
BIG KAISER



Other manufacturer

A.7

Coolant removes heated swarf and avoids thermal displacement of machine.



Standard Set

Set Model	W	Contents of Set	Order No.
TS14-S	14	400 mm x 4 pieces	961.252
TS18-S	18	100 mm x 4 pieces	961.253
TS22-S	22	Removal pin x 1 piece	961.254

400 mm Set

Set Model	W	Contents of Set	Order No.
TS14-400L-100P	14	400 mm x 100 pieces Removal pin x 10 piece	961.255
TS18-400L-100P	18		961.256
TS22-400L-100P	22		961.257

1000 mm Set

For large machines

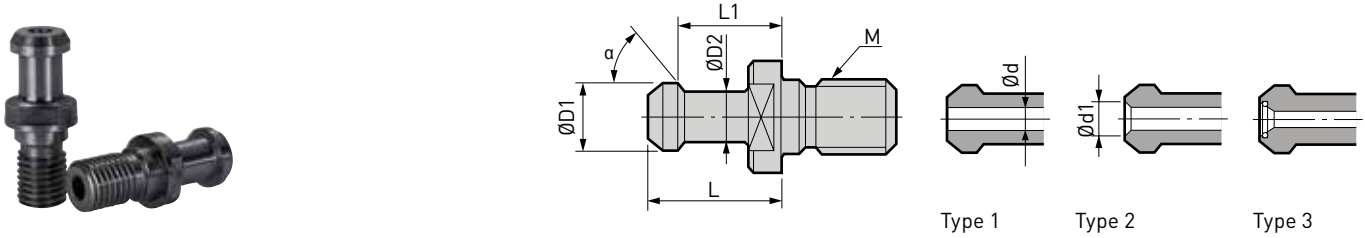
1000 mm (1 m) long version is available.

Set Model	W	Contents of Set	Order No.
TS18-1000L-10P	18	1 000 mm x 10 pieces	802.785
TS22-1000L-10P	22	Removal pin x 1 piece	802.787

Pullstud Bolt

Before ordering

Ensure to check the dimensions of the required pullstud bolt by referring to the specification sheet of the machine tool. In the case of machines with coolant-through-spindle capability especially, provide us a copy of the pullstud bolt drawing, as sealing method may vary even among machines with the same model number.



A.7

Spindle	Model	Standard	ØD1	ØD2	L	L1	α	Ød	Ød1	Hole Type	Specification / Feature	Order No.					
30 (M12)	30PMG	JIS	12	8	23.4	18.4	75	None	-	-	JIS BT30	978.956					
	30PMGH							4.0	-	1	JIS BT30 with hole	978.972					
	30PMGH2							2.5	5.5	3	YASDA	800.450					
	P30T-1MG	MAS-I	11	7	23	18	45	None	-	-	MAS-1 BT30	978.978					
	P30T-1MGH							2.5	-	1	MAS-1 BT30 with hole	978.953					
	P30T-2MG	MAS-II	11	7	23	18	60	None	-	-	MAS-2 BT30	978.979					
	P30T-2MGH							2.5	-	1	MAS-2 BT30 with hole	801.785					
	30P-1MGH	Original	11	8	23	18	45	4.0	-	1	FANUC	978.951					
	P30T-2MGH3							11	7.5	23	18	60	2.5	-	1	BROTHER	801.787
PMO30MG	11							7	23	18	45	2.5	6.5	3	DMG MORI	802.001	
40 (M16)	40PMG	JIS	19	14	29	23	75	None	-	-	JIS BT40	800.463					
	40PMGH							7.0	-	1	JIS BT40 with hole	978.954					
	40PMGH2							7.0	-	1	MAKINO (Face G) *	800.464					
	40PMGH7							4.0	5.0	2	OKUMA (Face G) *	978.958					
	40PMGH4A							7.0	-	1	YASDA Ø3 side hole	978.955					
	40PMGH11							7.0	10.0	3	YASDA	978.977					
	40PMGH12							5.0	-	1	MITSUI	805.885					
	P40T-1MG	MAS-I	15	10	35	28	45	None	-	-	MAS-1 BT40	801.807					
	P40T-1MGHA							3.0	-	1	MAS-1 BT40 with hole	801.814					
	P40T-1MGH1							3.5	5.5	2		801.808					
	P40T-1MGH4							3.0	7.0	3	OKUMA	801.810					
	P40T-1MGH7							4.0	-	1	MAKINO (Face G) *	801.812					
	P40T-1MGH8A							3.0	7.0	3	JTEKT	801.813					
	P40T-2MG	MAS-II	15	10	35	28	60	None	-	-	MAS-2 BT40	801.831					
	P40T-2MGHA							3.0	-	1	MAS-2 BT40 with hole	801.834					
	P40T-2MGH8							3.5	5.5	2		801.833					
	P40T-2MGH1							3.0	7.0	3	OKUMA	801.832					
	PVD40MG							DIN	19	14	26	20	75	7.0	-	1	DIN 69872 from A
	MP40MG	Original	15	10	25	18	90	None	-	-	MITSUI	801.507					
	POM40MG							15	10	35	28	90	None	-	-	DMG MORI w/o hole	802.023
	PMO40MG							19	14	29	23	75	7.0	10.0	3	DMG MORI with hole	978.971
PYN40MG	18.8							12.45	19.11	14.03	45	7.0	-	1	MAZAK	802.112	

1. Machine tool builders have used many various shapes and sizes of pull stud bolts.
2. The use of the incorrect bolts may result in injury or property damage for your machining center.
3. * End face was grinded for the sealing.
4. ** End face has O-ring for the sealing.
5. Other sizes are also available. Contact BIG KAISER agent for pullstud bolts.

MEGA Pullstud Bolt

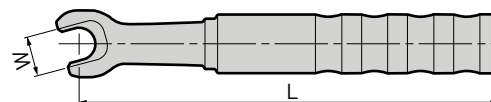
MG in the model numbers stand for MEGA Pullstud Bolt. Tensile strength is improved by utilizing tool steel. Especially recommended for the BIG-PLUS dual contact applications. **(Material: X40CrMOV51)**

 MEGA Pullstud Bolt

Spindle	Model	Standard	ØD1	ØD2	L	L1	α	Ød	Ød1	Hole Type	Specification / Feature	Order No.									
50 (M24)	50PH	JIS	28	21	34	25	75	10.0	-	1	JIS 50 with hole	978.965									
	50PMGH										800.472										
	50PH2										MAKINO (Face G) *	800.468									
	P50T-1	MAS-I	23	17	45	35	45	None	-	-	MAS-1 BT50	961.331									
	P50T-1MG										801.883										
	P50T-1H										8.0	-	1	MAS-1 BT50 with hole	801.860						
	P50T-1MGH										6.0	-	1	801.885							
	P50T-1H1										6.0	-	1	MAKINO (Face G) *	801.861						
	P50T-1H4										6.0	10.4	3	JTEKT	801.873						
	P50T-1H5										5.5	11.2	3	YASDA	961.332						
	P50T-1H8										8.0	11.0	3	DMG MORI (Face G) *	801.867						
	P50T-1MGH25										6.0	7.0	2	OKUMA (Face G) *	801.889						
	P50T-1H19										4.5	-	1	TOSHIBA	801.868						
	P50T-2										MAS-II	23	17	45	35	60	None	-	-	MAS-2 BT50	801.898
	P50T-2MG																			801.942	
	P50T-2H	8.0	-	1	MAS-2 BT50 with hole	801.925															
	P50T-2MGH25	6.0	-	1	801.948																
	P50T-2H4	8.0	11.0	3	DMG MORI (Face G) *	801.938															
	P50T-2H14	6.0	7.0	2	801.929																
	P50T-2MGH14	6.0	7.0	2	OKUMA (Face G) *	801.944															
	P50T-2H11	6.0	9.5	3	OKUMA	801.927															
	P50T-2H15	6.0	10.4	3	JTEKT	801.930															
	P50T-2H16	5.5	11.2	3	YASDA	801.931															
	PVD50	DIN	28	21	34	25	75	11.5	-	1										DIN 69872 from A	978.966
	MP50	Original	24	18	31	23	90	None	-	-										MITSUI	801.509
	MP50H1										8.0	-	1	MITSUI with hole	801.517						
	POM50										None	-	-	DMG MORI	978.967						
	POM50H										8.0	-	1	801.336							
	POM50H1										8.0	12.4	3	DMG MORI with hole	961.333						
	POM50H8										23	17	45	35	90	6.0	-	1	OKK (Face O) **	802.046	
	PYN50-4										28.96	20.83	25.2	17.58	45	10.0	-	1	MAZAK (Face O) **	978.969	
	PYN50-5										MAZAK (Face G) *	802.120									

1. Machine tool builders have used many various shapes and sizes of pull stud bolts.
2. The use of the incorrect bolts may result in injury or property damage for your machining center.
3. * End face was grinded for the sealing.
4. ** End face has O-ring for the sealing.
5. Other sizes are also available. Contact BIG KAISER agent for pullstud bolts.

Pullstud Wrench



Taper Size	Model	W	L	Suitable pullstud specification	Order No.
BBT30 BT30	PLW30	13	140	JIS, MAS-I, MAS-II, 30P-1MGH, P30T-2MGH3, PMO30MG	805.544
BBT40 BT40	PLW-40P	19	200	JIS	805.886
	PLW-P40T			MAS-I, MAS-II, POM40MG	805.887
	PLW-PMO40			PMO40MG	805.888
	PLW-PYN40			PYN40MG	805.889

1. If appearance shape is the same, the specification other than above is also usable.

Measuring Tools

Point Master PMP Series	178 - 179
Point Master PMC Series	179
Point Master PMG Series	180
Base Master Series	181 - 182
Tool Master	183
Accu Center	183
Alignment Tool for ATC Arm	184
Dyna Force	185
Level Master	186

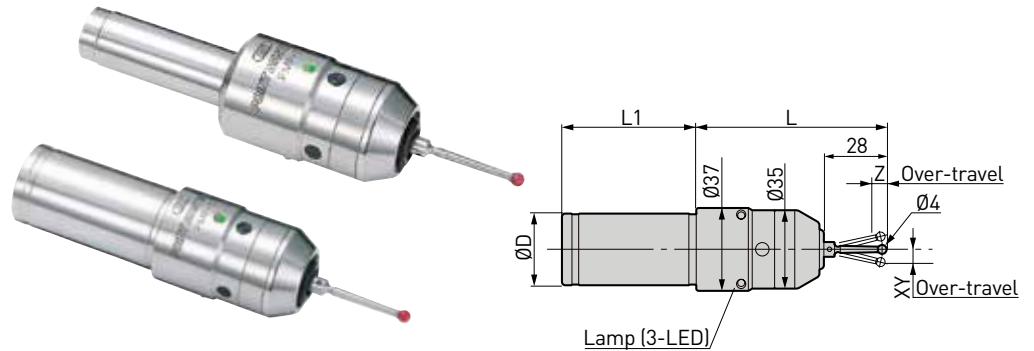


Point Master Pro Series

Point Master Pro Series is a precision 3-D touch sensor operating in non-conductive as well as conductive applications, resin, ceramic or coated workpieces, machines with ceramic spindle taper or bearings can all be accommodated.

- LED lamp
- Repeatability $\pm 1 \mu\text{m}$
- For all materials

Cylindrical Type



Model	ØD (h7)	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Battery Life	Standard Stylus (included)	Weight (kg)	Order No.
				XY	Z	XY	Z					
PMP -10	10	75	49	± 12	5	0.4	1.5	Panasonic Lithium BR435x1	50 hours	ST28-4R	0.4	978.976
-20	20	90	50					LR1x2	50 hours		0.5	961.237

A.8

1. PMP-10 has one LED only.
2. Above table indicates the specification when using stylus ST28-4R.
3. There is approx $5 \mu\text{m}$ lag in X and Y directions and approx. $2 \mu\text{m}$ lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.
4. Battery is not included.

For Stylus ▶ A180

BBT Type

JIS B 6339 (BIG-PLUS)

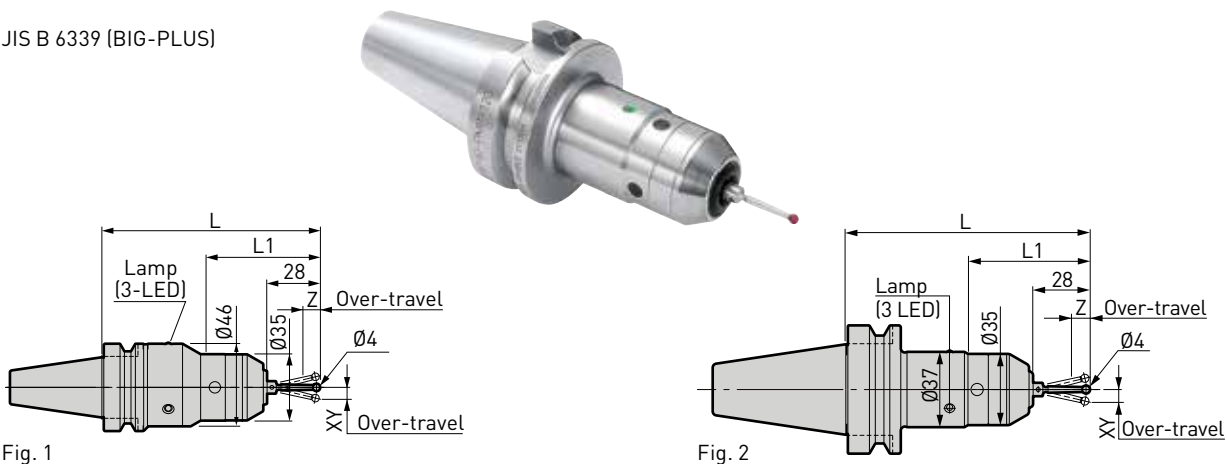


Fig. 1

Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Fig.	BBT No.	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Battery Life	Standard Stylus (included)	Weight (kg)	Order No.
					XY	Z	XY	Z					
BBT30-PMP-115	1	30	115	63	± 12	5	0.4	1.5	CR2x1	90 hours	ST28-4R	0.8	802.313
BBT40-PMP-120	2	40	120	60					LR1x2	50 hours		1.3	804.649

1. Above table indicates the specification when using stylus ST28-4R.
2. There is approx $5 \mu\text{m}$ lag in X and Y directions and approx. $2 \mu\text{m}$ lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.
3. Battery is not included.

For Stylus ▶ A180

HSK Type

ISO 12164(DIN 69893-1) & DIN 69893-5

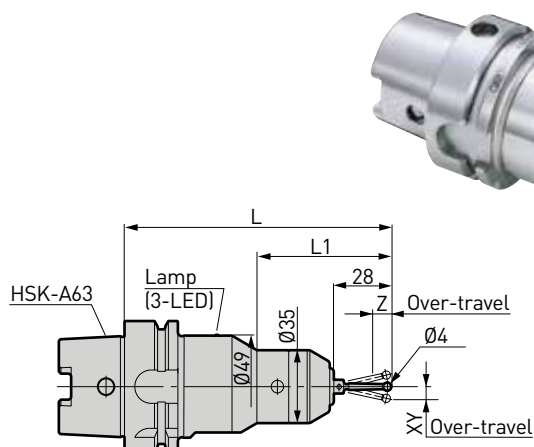


Fig. 1

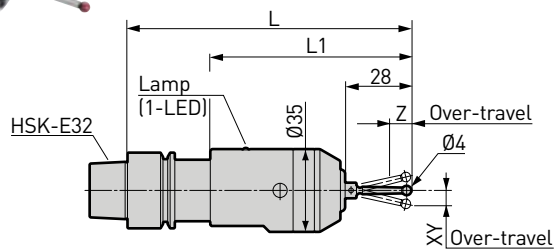


Fig. 2

Model	Fig.	HSK No.	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Battery Life	Standard Stylus (included)	Weight (kg)	Order No.
					XY	Z	XY	Z					
HSK-A63-PMP-130	1	HSK-A63	130	65	± 12	5	0.4	1.5	CR2x1	90 hours	ST28-4R	1.3	804.656
HSK-E32-PMP-120	2	HSK-E32	120	85	± 12	5	0.4	1.5	SR44x2	24 hours	ST28-4R	0.5	805.561

1. There is approx 5 µm lag in X and Y directions and approx. 2 µm lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.

2. Above table indicates the specification when using stylus ST28-4R.
3. Battery is not included.

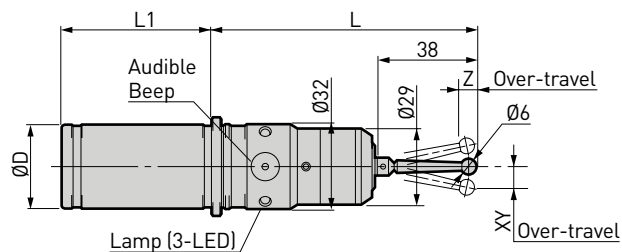
For Stylus ▶ A180

A.8

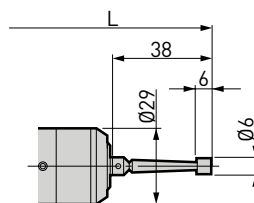
Point Master PMC Series

Point Master PMC series is ideal touch sensor for electric conductive materials. LED lamp illuminates when the stylus touches the workpiece. Stroke of stylus provides sufficient over-travel for safety.

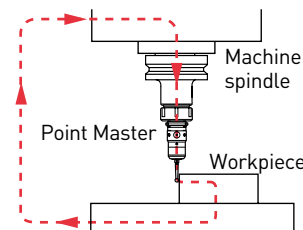
- LED lamp + beep sound
- Repeatability ± 1 µm
- For electric conductive materials



With stylus ST38-6P



With stylus ST38-6x6



Model	ØD h7	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Battery Life	Standard Stylus (included)	Weight (kg)	Order No.
				XY	Z	XY	Z					
PMC-20	20	110	50	± 12	5	0.6	2.7	LR1x2	90 hours	ST38-6P	0.4	961.238
PMC-20S				± 12	5	0.6	2.7			ST38-6x6		804.658

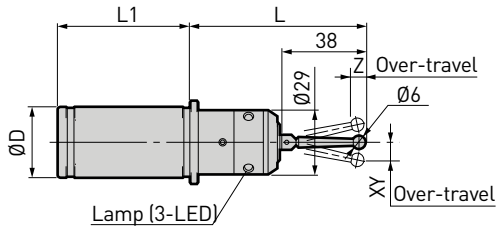
1. Measurement is not possible with non-conductive machine or workpiece.
2. Point Master PMC utilizes conductivity from the machine, toolholder, Point Master through workpiece.
3. Battery is not included.

For Stylus ▶ A180

Point Master PMG Series

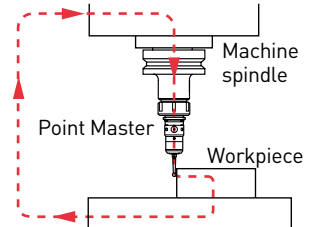
LED lamp illuminates when the stylus touches the workpiece.

- LED lamp
- Repeatability $\pm 1 \mu\text{m}$
- For electric conductive materials



With stylus ST38-6P

With stylus ST38-6x6



Model	ØD h7	L	L1	Over-travel		Measuring Pressure (N)		Battery (not included)	Battery life	Standard Stylus (included)	Weight (kg)	Order No.
				XY	Z	XY	Z					
PMG-20	20	90	50	± 12	5	0.6	2.7	LR1x2	25 hours	ST38-6P	0.3	961.205
PMG-20S										ST38-6x6		961.206

A.8

1. Measurement is not possible with non-conductive machine or workpiece.
2. Point Master PMG utilizes conductivity from the machine, tool holder, point master through workpiece.
3. Battery is not included.

Alternative Stylus

The stylus (M3 thread) is replaceable. Please replace when different model of stylus required or if damaged.

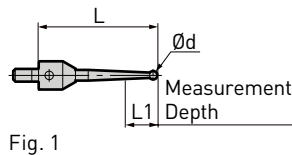


Fig. 1

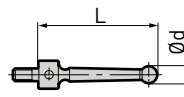


Fig. 2

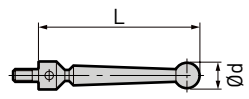


Fig. 3

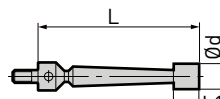
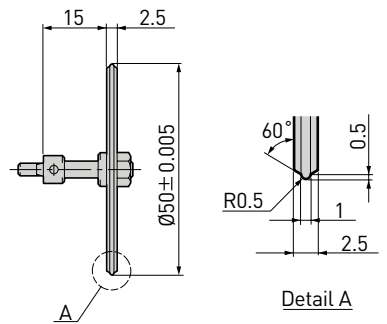


Fig. 4



Model	Fig.	L	L1	Ød	Material	Series	Order No.
ST28 -1P	1	28	2	1	Carbide	PMC-PMP PMG	802.222
-2P			8	2			802.223
-3P			-	3			972.309
-4P				4			972.311
ST38 -6P	3	38	-	6	Steel (SUS)	PMC, PMG	972.304
ST38 -6x6	4		6	6		PMC □ S PMG □ S	972.306
ST28 -4R	2	28	-	4	Ruby	PMP	972.310

Model	Order No.
ST15-50K	804.842

1. Ideal for peculiarly shaped workpiece or tapered portion of plastic mold.
2. PMC-series only.

1. Stylus model ST38-6x6 is exclusive for PMC-20S and PMG-20S. Runout accuracy may worsen when used on other models.



Base Master Series

Base Master Series is a precision touch sensor to determine workpiece offsets and tool length. Mounted on workpiece surface or machine table, LED lamp illuminates immediately when the cutting edge touches the sensor plate and the position is detected.

Base Master

The most popular Base Master model with 1µm accuracy. Operates when a conductive circuit is completed.

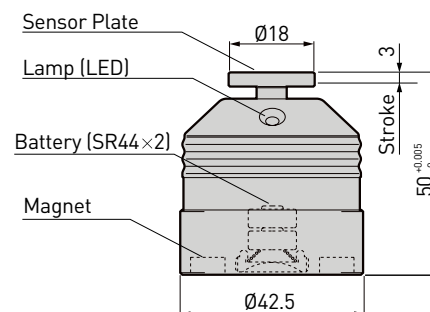
- LED lamp
- For use with conductive cutting tools, workpieces, and machine tools.

Model	Order No.
BM-50	961.201



Height Accuracy	50 ^{+0.005} ₀ mm
Measureable Pressure	3N
Repeatability Accuracy	± 1 µm (2σ)
Min. Measurable Tool Diameter	Ø 1 mm
Battery Life	10 hours (continuous use)
Weight	0.23 kg

1. Battery is not included.



A.8

Base Master Gold

Suitable for various tools and workpieces, including non-conductive materials such as ceramics.

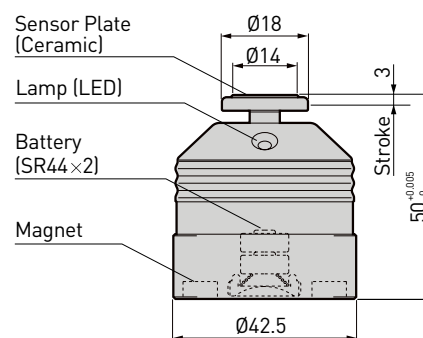
- LED lamp
- For all materials, including non-conductive cutting tools, workpieces, and machine tools

Model	Order No.
BM-50G	961.211



Height Accuracy	50 ^{+0.005} ₀ mm
Measureable Pressure	2N
Repeatability Accuracy	± 1 µm (2σ)
Min. Measurable Tool Diameter	Ø 1 mm
Battery Life	10 hours (continuous use)
Weight	0.24 kg

1. Battery is not included.



Base Master Micro

Specifically designed for micro cutting tools. Low measuring pressure protects the cutting edge.

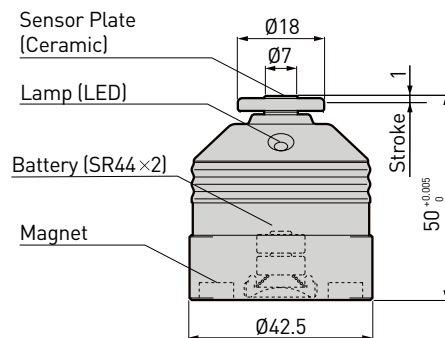
- LED lamp
- For all materials, including non-conductive cutting tools, workpieces, and machine tools

Model	Order No.
BM-50M	961.212



Height Accuracy	50 ^{+0.005} ₀ mm
Measureable Pressure	0.3N
Repeatability Accuracy	± 1 µm (2σ)
Min. Measurable Tool Diameter	Ø 0.05 mm
Battery Life	10 hours (continuous use)
Weight	0.24 kg

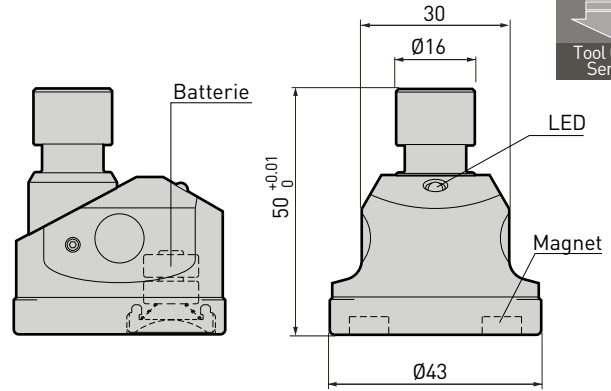
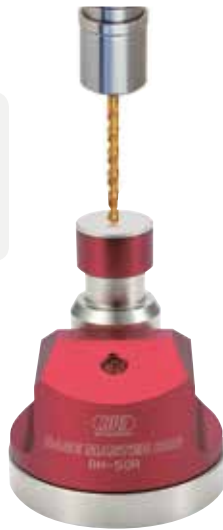
1. Battery is not included.



Base Master Series

Base Master Red

- LED lamp
- For all materials, including non-conductive cutting tools, workpieces, and machine tools
- Replaceable sensor plate, BM-MEG, is available as individual part



Body Set

Model	Order No.
BM-50R	805.675

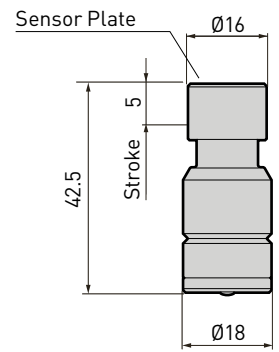
1. BM-MEG is included.

Height Accuracy	50 ^{+0.01} / ₀ mm
Repeatability Accuracy	± 1 µm (2σ)
Min. Measureable Tool Diameter	Ø 1 mm
Measureable Pressure	2 N
Sensor Stroke	5 mm
Signal	LED (red)
Battery	SR44 x 2
Weight	0.2 kg

1. Battery is not included.

Sensor Part

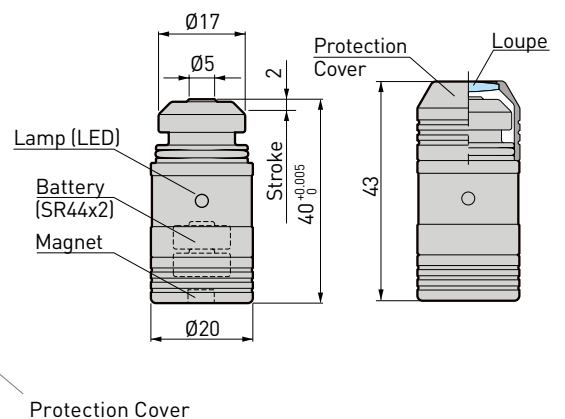
Model	Order No.
BM-MEG	805.674



A.8

Base Master Mini

- LED Lamp
- For all materials, including non-conductive cutting tools, workpieces, and machine tools
- World smallest 20 mm body diameter



Model	Order No.
BMM-20	961.213

1. Protection cover is included.

Height Accuracy	40 ^{+0.005} / ₀ mm
Measureable Pressure	1.8 N
Repeatability Accuracy	± 1 µm (2σ)
Min. Measureable Tool Diameter	Ø 0.1 mm
Battery	SR44 x 2
Battery Life	10 hours (continuous use)
Weight	55 g

1. Battery is not included.

Tool Master

Tool Master is a precision touch sensor with a large dial gauge. LED lamp and sound pre-indicate approach to 100 mm height to ease the detecting operation.



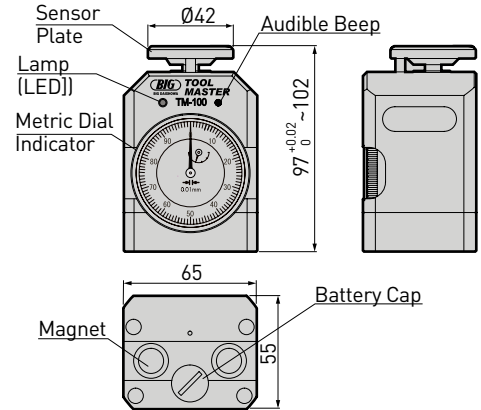
- LED lamp
- Visible dial indicator

Model	Order No.
TM-100	961.347



Height Accuracy	100 $^{+0.02}_0$ mm	
Stroke	5 mm	
Stroke Range	97 - 102 mm	
Measureable Pressure	6N (100 mm)	
Battery	SR44x2	
Weight	1.2 kg	
Dial Gauge	Graduation	0.01 mm
	Indication Tolerance	12 μ m
	Repeatability	3 μ m
	Return Tolerance	3 μ m

1. Dial gauge accuracy in accordance with JISB7503:2011.
2. Battery is not included.



A.8

Accu Center

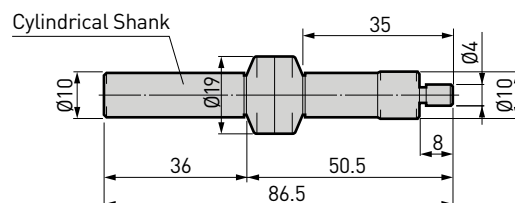
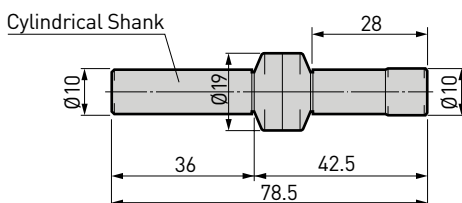
Accu Center is a simple and precise edge finder offering repeatability within 3 μ m. Hard chrome plated stylus offers extended life.

- For all material
- Not for use with horizontal machine tools



Model	Order No.
ACCU-C10	800.483

Model	Order No.
ACCU-C104	800.484

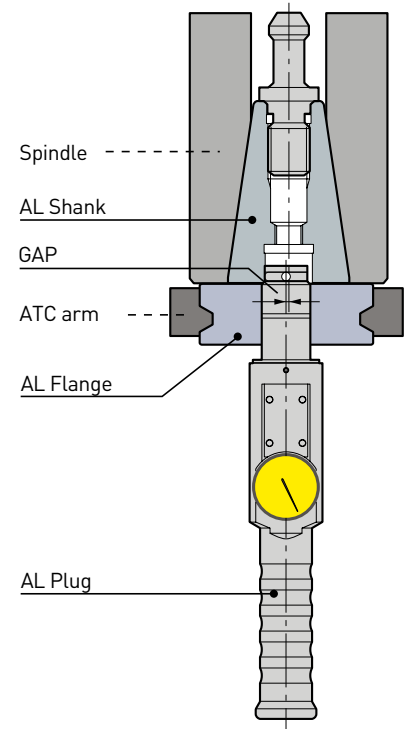


Alignment Tool for ATC arm

For maintenance of machine tool spindle. Measuring equipment of misalignment between the ATC arm and machine tool spindle or magazine pot center.

How to use

- Load the AL Shank in the machine spindle and mount the AL Flange on the ATC arm.
- Insert the AL Plug into the AL Flange.
- Rotate the AL Plug and read the highest and lowest values of the dial indicator.
- This direction is the eccentric direction. Half of the gap of the values is the eccentric amount.
- Adjust the position of the ATC arm so that the front end of the AL Plug will be inserted into the AL Flange fully.



A.8

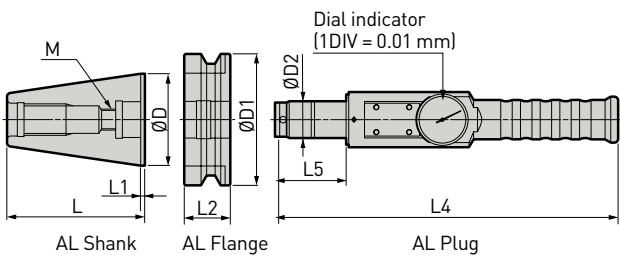


Fig. 1

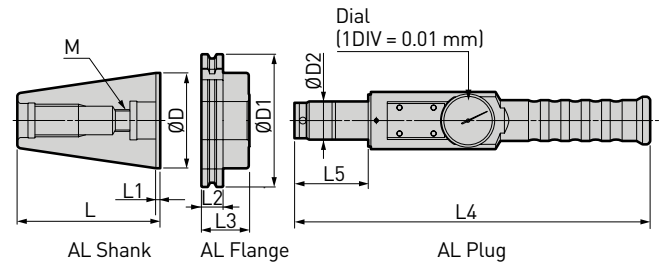


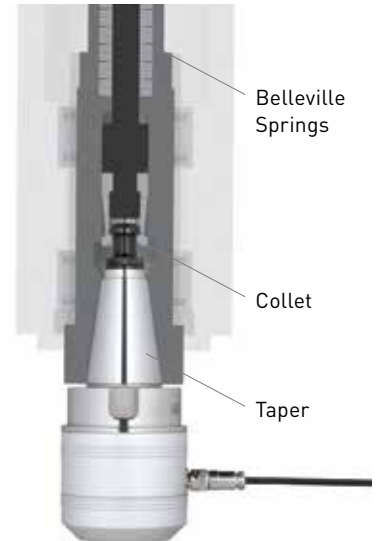
Fig. 2

Model	Fig.	ØD	D1	D2	L	L1	L2	L3	L4	L5	M	Order No.
BT30-ATC18	1	31.75	46.00	18	50.40	2.0	20.0	-	251	44	12	978.238
BT40-ATC20		44.45	63.00	20	67.40	2.0	25.0	-	251	44	12	978.237
BT50-ATC28		69.85	100.00	28	104.80	3.0	35.0	-	261	54	16	978.236
DV40-ATC20	2	44.45	63.55	20	71.60	3.2	15.9	24.3	251	44	12	801.042
DV50-ATC28		69.85	97.50	28	104.95	3.2	15.9	35.3	261	54	16	801.043

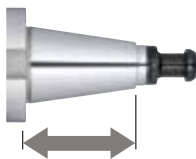
Dyna Force

Measuring device for pulling force of machine tool spindle.

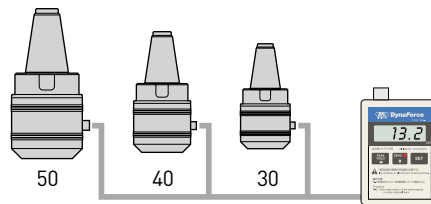
- Periodical measurement avoids reduced rigidity leading to vibrations, loss of machining quality, shortened tool life



Longer taper shank to enhance reliability
Long taper supports itself in long span and stabilizes the value of measurement.



Only one display for all taper sizes
One common display can be used for all taper sizes.



Specification

Corresponding JIS, DIN, ANSI

Measuring device

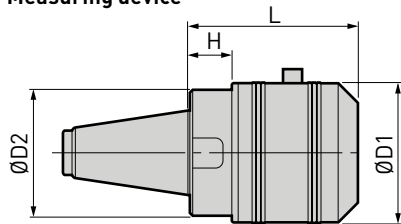


Fig. 1

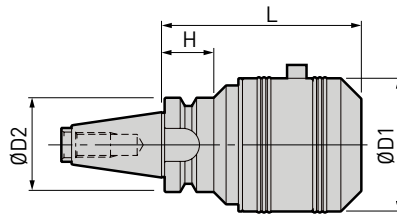


Fig. 2

Display



Cable



Case



Set Model	Contents of Set				Taper Size	Rated Capacity	ØD1	ØD2	L	H	Weight (kg)	Order No.
	Measuring Device	Fig.	Display	Cable								
SNT30 -DF10	NT30 -DF10	1	DFA-1 (AA batteryx2)	DFC-1 (2 m)	30	10kN (980 kgf)	65	58	80	20	1.5	805.845
SBT30 -DF10	BT30 -DF10	2					46	98	26	1.6	805.442	
SNT40 -DF30	NT40 -DF30	1			73	66	90	24	2.5	804.949		
SNT50 -DF50	NT50 -DF50	1			96	90	110	33	6.0	805.423		
-DF30 *	-DF30	1			73	70	86	20	3.9	805.846		

1. Each component is also available separately. Please contact BIG KAISER agent if individual component is required.
2. SBT30-DF10 is designed exclusively for machines not capable of automatic tool change.
3. SBT30-DF10 is suitable for BT/BBT30 machines only.
4. Pull stud bolt is to be ordered separately. For DIN, ISO, ANSI & CAT standard machines, exclusive pull stud bolt for dyna force is required.
5. SNT50-DF30 marked with * is a light-weight model.

Exclusive pull stud bolts for Dyna Force

An exclusive pull stud bolt is needed for a machine spindle in DIN, ANSI or CAT standard.

Pull stud bolts in MAS and JIS standards can be used. These pull stud bolts are not suitable for the SBT30-DF10.



Standard No.	Shank No. 30		Shank No. 40		Shank No. 50	
	Model	Order No.	Model	Order No.	Model	Order No.
DIN69872	DF-PDV30	804.683	DF-PDV40A	804.685	DF-PDV50A	804.686
ISO7388	Type A	-	DF-PAV40	804.681	DF-PAV50	804.682
	Type B	-				
ANSI B5.50	DF-PAV30	804.680	DF-PCV40	804.687	DF-PCV50	804.688
ASME B5.50	DF-PCV30	804.684				

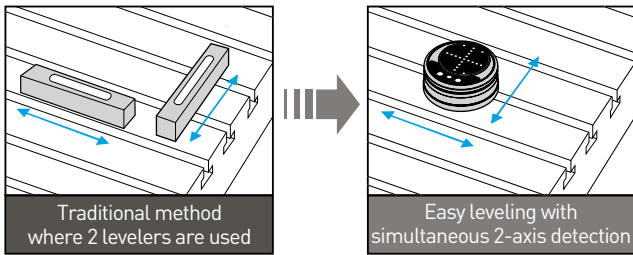
Level Master

2-axis simultaneous detection leveler. LED displays level conditions for both axis simultaneously. LED and buzzer indication when leveling is completed.

- LED lamp + beep sound
- Simultaneous 2-axis detection saves the extra time & cost of using 2 levelers.



Simultaneous 2-axis detection



Model	Order No.
LVM01	801.673

Minimum Read Value	0.01 mm Inclination/m
Power Source	Alkaline batteries (AAA x 4 pcs)
Auto Power Off	30 minutes after power is turned on
Operational Temperature	0-40°C (Recommended 20°C ± 5°)
Battery Life	50 hours
Dimensions	Ø 109 mm x 46 mm H
Weight	985 g

1. Batteries are not included.

Note: In the case of high precision leveling, we recommend to check the Level Master in advance on a reference level, such as a level block.

A.8

LED & buzzer indicate leveling completion

High Mode

when the required level condition is within 0.01mm/1m

Low Mode

when the required level condition is within 0.1mm/1m

LED (blue) & buzzer are simultaneously activated

Included

- Level Master
- Aluminum case
- Manual
- Warranty
- Inspection certificate



Cutting Tools

Fullcut Mill FCR	188 - 190
Contact Grip for FCR Head	191
Contact Grip for Body	192 - 193
Fullcut Mill FCR insert	194 - 196
Fullcut Mill FCM	197 - 203
Contact Grip for FCM Head	204
Fullcut Mill FCM insert	205 - 207
Fullcut Mill FCM Arbor Type	208 - 209
Speed Finisher	210 - 211
Surface Mill	212
C-Cutter Mini	213 - 217
C-Cutter	218 - 219
R-Cutter	220 - 221
BF-Cutter	222
Center Boy	223
C-Cutter Boy	224

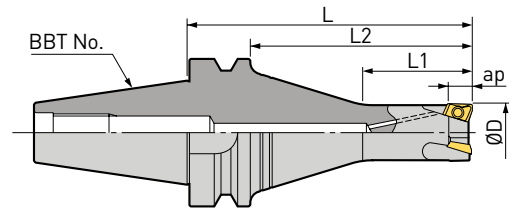


Fullcut Mill FCR

Unique inserts designed for ramping make multi-functional cutting possible.



For Standard Type with BBT



BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.	
16	BBT30 -FCR16082 - 65	8	65	28	43	2	BRG16	0.5	966.683	
20	-FCR20083 - 65			33		3	BRG20	0.5	966.685	
25	-FCR25083 - 65						40	BRG25	0.6	966.687
32	-FCR32103 - 65							BRG32	0.6	966.689
16	BBT40 -FCR16082 - 85	10	85	25	58	2	BRG16	1.3	966.616	
	-120		120	30	93			1.5	966.617	
	-135		135	25	108			1.6	966.618	
20	-FCR20083 - 85	8	85	35	58	3	BRG20	1.2	966.619	
	-120		120	30	93			1.6	966.620	
	-135		135	30	108			1.7	966.621	
	-FCR25083 - 85		85	40	58			BRG25	1.3	966.622
-120	120	45	93	1.6	966.623					
-135	135	35	108	1.8	966.624					
25	-FCR32103 - 85	10	85	45	58	3	BRG25	1.4	966.625	
	-120		120	50	93			1.7	966.626	
	-135		135	40	108			1.9	966.627	

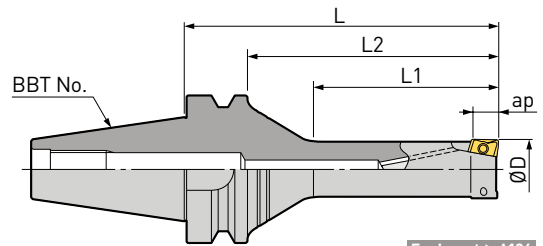
1. Wrench is included. Inserts are to be ordered separately.
2. Long nose type shown below is recommended for medium-heavy or heavy slot milling with long projection, exceeding L = 120 mm for 16 and 20 mm diameters / L = 135 mm for 25 or larger diameters.

For Insert ▶ A194

For Cutting Condition ▶ A195

For BBT50 Adapter ▶ A198

For Long Nose Type with BBT



For Insert ▶ A194

For Cutting Condition ▶ A195

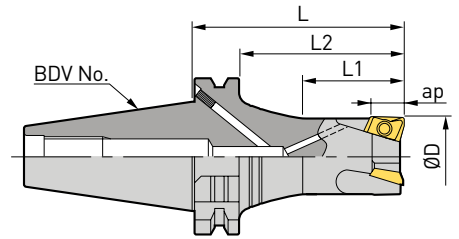
For BBT50 Adapter ▶ A198

BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.
16	BBT30 -FCR16082L - 85	8	85	45	63	2	BRG16	0.5	966.684
20	-FCR20082L - 85			50			BRG20	0.5	966.686
25	-FCR25082L - 85			60			BRG25	0.6	966.688
32	-FCR32102L - 85	10					BRG32	0.7	966.690
16	BBT40 -FCR16082L -105	10	105	45	78	2	BRG16	1.3	966.691
	-120		120	93	1.4			966.692	
	-FCR20082L -120		120	60	108			1.4	966.693
20	-135	8	135	60	108	2	BRG20	1.5	966.694
	-FCR25082L -135	135	75	123	1.5			966.695	
25	-150	10	150	80	108	2	BRG25	1.7	966.696
	-FCR32102L -135	135	90	123	1.7			966.697	
32	-150	10	150	90	123	2	BRG32	1.9	966.698

1. Wrench is included. Inserts are to be ordered separately.

For Standard Type with BDV



BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.
16	BDV40 -FCR16082 - 85	8	85	25	65	2	BRG16	1.3	966.601
	-120		120	30	100			1.5	966.602
	-135		135	25	115			1.6	966.603
20	-FCR20083 - 85	8	85	35	65	3	BRG20	1.2	966.604
	-120		120	30	100			1.6	966.605
	-135		135	30	115			1.7	966.606
25	-FCR25083 - 85	8	85	40	65	3	BRG25	1.3	966.607
	-120		120	45	100			1.6	966.608
	-135		135	35	115			1.8	966.609
32	-FCR32103 - 85	10	85	45	65	3	BRG32	1.4	966.610
	-120		120	50	100			1.7	966.611
	-135		135	40	115			1.9	966.612

1. Wrench is included. Inserts are to be ordered separately.

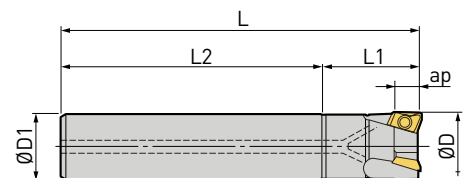
For Insert ▶ A194

For Cutting Condition ▶ A195

For BDV50 Adapter ▶ A199

A.9

For Oversize Type with Cylindrical Shank



Cutter Dia. ØD	Model	ØD1	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.
16	ST15 -FCR16082 -120	15	8	120	25	95	2	BRG16	0.2	805.849
17	ST16 -FCR17082 -120	16	8	120	25	95	2	BRG16	0.2	802.191
20	ST19 -FCR20082 -165	19	8	165	30	135	2	BRG20	0.4	805.850
	-FCR20083 -135			135		105			3	0.3
21	ST20 -FCR21082 -165	20	8	165	30	135	2	BRG20	0.4	802.192
	-FCR21083 -135			135		105			3	0.3
25	ST24 -FCR25082 -180	24	8	180	35	145	2	BRG25	0.7	805.852
	-FCR25083 -150			150		115			3	0.6
26	ST25 -FCR26082 -165	25	8	165	38	127	2	BRG25	0.6	802.220
	-FCR26083 -150			150		112			3	0.6
32	ST28 -FCR32102 -180	28	10	180	48	132	2	BRG32	1.1	805.854
	-FCR32103 -180			180		132			3	1.0
33	ST32 -FCR33102 -180	32	10	180	48	132	2	BRG32	1.1	802.225
	-FCR33103 -180			180		132			3	1.0

1. Wrench is included. Inserts are to be ordered separately.

2. Lower cutting parameters appropriately for applications with either long projection or 3-flutes models.

3. For medium-heavy or heavy slot milling or ramping with projection longer than 2.5 times of diameter, 2-flutes models are recommended.

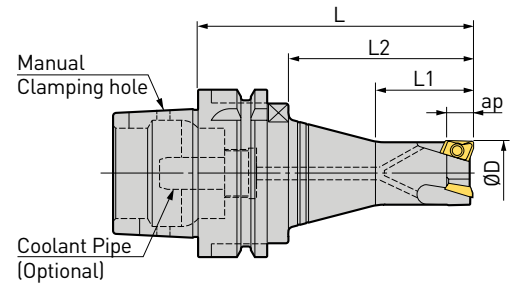
For Insert ▶ A194

For Cutting Condition ▶ A195

Fullcut Mill FCR

Unique inserts designed for ramping make multi-functional cutting possible.

For Standard Type with HSK-A



Cutter Dia. ØD	Model	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.
16	HSK -A50 -FCR16082 - 75	8	75	27	41	2	BRG16	0.5	966.671
20	-FCR20083 - 75			28			BRG20	0.6	966.672
25	-FCR25083 - 75			33		3	BRG25	0.6	966.673
32	-FCR32103 - 75	10	39	BRG32	0.7		966.674		
16	HSK -A63 -FCR16082 - 85	8	85	25	51	2	BRG16	0.9	966.631
	-120		120	30	86			1.1	966.632
	-135		135	25	101			1.2	966.633
20	-FCR20083 - 85	8	85	32	51	3	BRG20	1.0	966.634
	-120		120	30	86			1.2	966.635
	-135		135	30	101			1.3	966.636
25	-FCR25083 - 85	8	85	35	51	3	BRG25	1.0	966.637
	-120		120	45	86			1.2	966.638
	-135		135	35	101			1.4	966.639
32	-FCR32103 - 85	10	85	40	51	3	BRG32	1.1	966.640
	-120		120	50	86			1.4	966.641
	-135		135	40	101			1.5	966.642

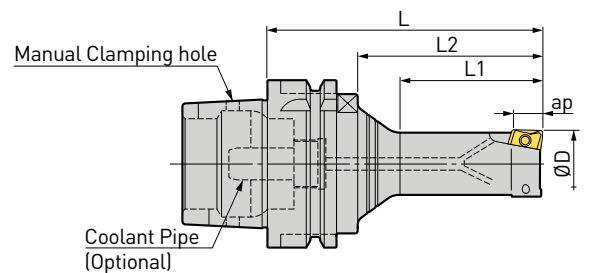
1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ A194

For Cutting Condition ▶ A195

For Coolant Pipe ▶ A81

For Long Nose Type with HSK-A



Cutter Dia. ØD	Model	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.
16	HSK -A63 -FCR16082L - 85	8	85	40	51	2	BRG16	0.9	966.675
	-120		120	45	86			1.0	966.676
20	-FCR20082L -105		105	50	71		BRG20	1.1	966.677
	-120		120	60	86			1.2	966.678
25	-FCR25082L -105	8	105	55	71	3	BRG25	1.1	966.679
	-120		120	65	86			1.1	966.680
32	-FCR32102L -120	10	120	70	86	3	BRG32	1.4	966.681
	-135		135	80	101			1.4	966.682

1. Coolant pipe and inserts are to be ordered separately.

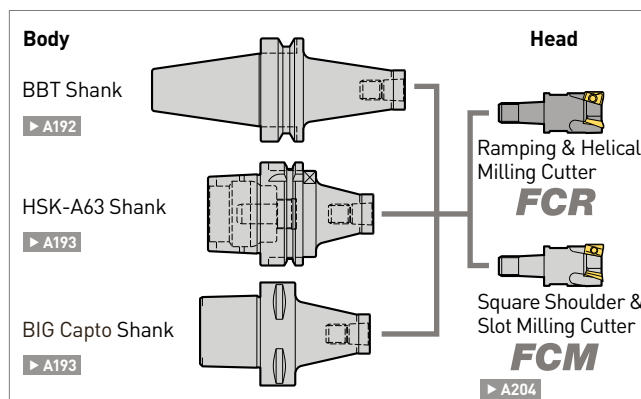
For Insert ▶ A194

For Cutting Condition ▶ A195

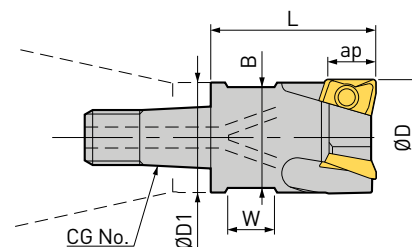
For Coolant Pipe ▶ A81

Contact Grip

Offers amazing cutting performance which is superior to the conventional threaded coupling system.



FCR Head



A.9

Cutter Dia. ØD	Model	CG No.	ØD1	ap	L	No. of Insert	Spanner Flats		Insert Size	Order No.
							B	W		
16	CG15 -FCR16082 -25	CG15	15	8	25	2	12	6.2	BRG16	966.708
	CG19 -FCR20082 -32									966.709
20	-FCR20083 -32	CG19	19	8	32	3	17	8.2	BRG20	966.710
	CG24 -FCR25082 -36									966.711
25	-FCR25083 -36	CG24	24	8	36	3	22	10.2	BRG25	966.712
	CG31 -FCR32102 -43									966.713
32	-FCR32103 -43	CG31	31	10	43	3	27	12.2	BRG32	966.714

1. Wrench to clamp inserts is included. Inserts are to be ordered separately.
2. Standard single-ended wrench is required to clamp the head.

For Insert ▶ A194

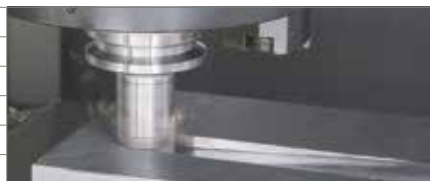
For Cutting Condition ▶ A195

Application example

Amazing cutting performance even on #40 taper machine. (Below application example has been achieved with dry cutting.)

Type FCR, Ramping

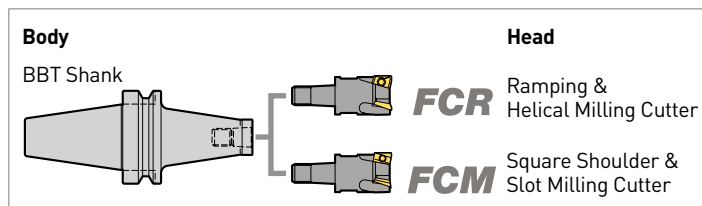
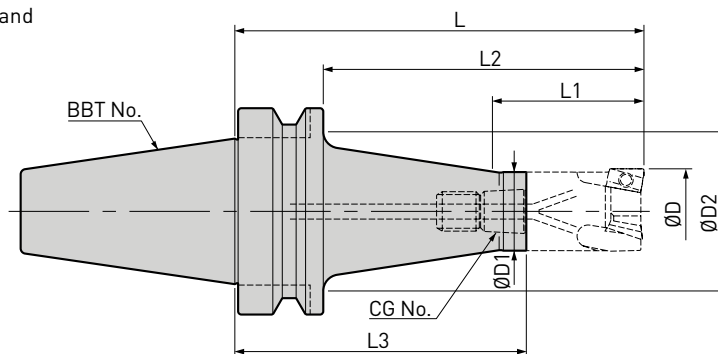
Machine	Vertical M/C, #40 taper
Contact Grip Head	FCR32 [3-inserts]
Work Material	C50 [S50C]
Cutting Speed Vc (m/min.)	150
Feed Rate fz (mm/tooth)	0.1
Axial DOC ap (mm)	max. 10 [Ramping Angle 3°]



Contact Grip

A threaded coupling with taper and face contact. Improved rigidity and accuracy from the BIG-PLUS dual contact system.

For Contact Grip with BBT



BIG-PLUS tools can be used in machining centers with conventional spindles.

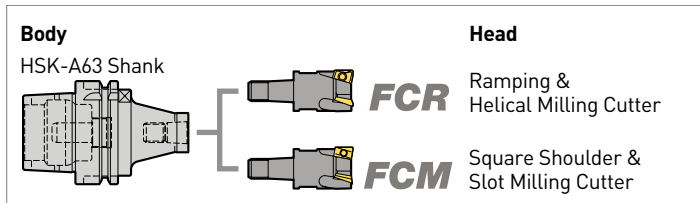
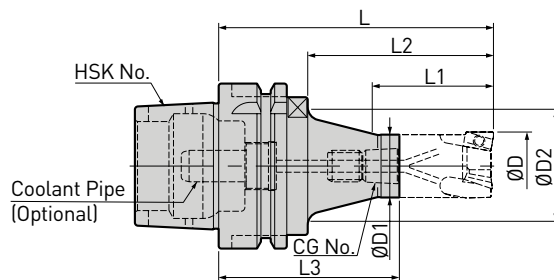
Model	ØD	CG No.	ØD1	ØD2	L	L1	L2	L3	Weight (kg)	Order No.	
BBT30 -CG15 - 50	16	CG15	15	40	75	31	53	50	0.5	966.721	
					105	32	83	80	0.6	966.722	
	20	CG19	19	42	75	39	53	43	0.5	966.723	
					105	40	83	73	0.6	966.724	
-CG24 - 39	25	CG24	24	41	75	45	53	39	0.5	966.725	
					105		83	69	0.6	966.726	
	32	CG31	31	41	75	49	53	32	0.5	966.727	
					105	53	83	62	0.6	966.728	
BBT40 -CG15 - 50	16	CG15	15	46	75	30	48	50	1.1	966.731	
				48	105	32	78	80	1.2	966.732	
				49	125		98	100	1.3	966.733	
	-CG19 - 43	20	CG19	19	45	75	36	48	43	1.1	966.734
					48	105	40	78	73	1.2	966.735
					49	125		98	93	1.3	966.736
	-CG24 - 39	25	CG24	24	39	75	41	48	39	1.0	966.737
					48	105	45	78	69	1.2	966.738
					49	125		98	89	1.3	966.739
	-CG31 - 37	32	CG31	31	43	80	48	53	37	1.0	966.740
					57	120	53	93	77	1.4	966.741
					135	108		92	1.5	966.742	
BBT50 -CG15 -115	16	CG15	15	90	140	30	102	115	4.4	800.185	
				80	170	45	132	145	4.4	966.746	
	-CG19 -108	20	CG19	19	90	140	38	102	108	4.4	800.186
					80	185	60	147	153	4.5	966.747
	-CG24 -114	25	CG24	24	90	150	42	112	114	4.5	800.187
					200	75	162	164	4.9	966.748	
	-CG31 -107	32	CG31	31	95	150	50	112	107	4.7	800.188
					90	200	90	162	157	5.0	966.749

1. Standard single-ended wrench is required to clamp the head.

For FCR Head ▶ A191

For FCM Head ▶ A204

For Contact Grip with HSK-A



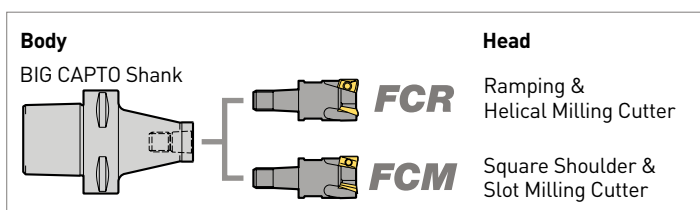
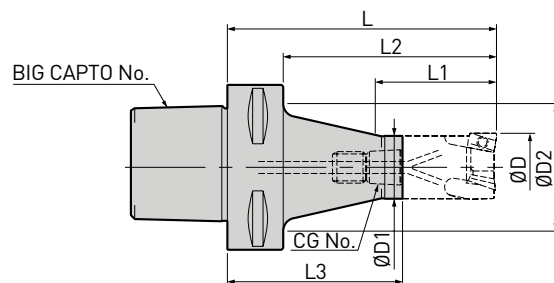
Model	ØD	CG No.	ØD1	ØD2	L	L1	L2	L3	Order No.
HSK-A63 -CG15 - 50	16	CG15	15	36	75	30	41	50	966.751
					105	31	71	80	966.752
					125	32	91	100	966.753
-CG19 - 73	20	CG19	19	45	105	39	71	73	966.754
					125	40	91	93	966.755
					105	44	71	69	966.756
-CG24 - 69	25	CG24	24	45	125	45	91	89	966.757
					120	53	86	77	966.758
					135		101	92	966.759
-CG31 - 77	32	CG31	31	45					

- Standard single-ended wrench is required to clamp the head.
- Coolant pipe is to be ordered separately.

For FCR Head ▶ A191
 For FCM Head ▶ A204
 For Coolant Pipe ▶ A81

A.9

For Contact Grip with BIG CAPTO



Model	ØD	CG No.	ØD1	ØD2	L	L1	L2	L3	Order No.
C6 -CG15 - 50	16	CG15	15	46	75	31	53	50	802.822
				48	105	83	80	802.819	
				49	125	103	100	802.815	
-CG19 - 43	20	CG19	19	45	75	39	53	43	802.823
				48	105	39	83	73	802.820
				125	40	103	93	802.816	
-CG24 - 69	25	CG24	24	49	105	44	83	69	802.821
					125	45	103	89	802.817
					120	53	98	77	802.818
-CG31 - 77	32	CG31	31	57					
					135		113	92	802.814

- Standard single-ended wrench is required to clamp the head.

For FCR Head ▶ A191
 For FCM Head ▶ A204

Fullcut Mill FCR

Indexable Inserts



Model	Cutter Dia.	ap	Nose R	P	M	K	N
				ACZ350S		ACZ310	DS20
BRG160808	Ø16, Ø17	8	0.8	966.651		966.652	966.653
BRG200808	Ø20, Ø21	8	0.8	966.656		800.587	966.658
BRG250808	Ø25, Ø26	8	0.8	966.661		966.662	966.663
BRG321008	Ø32, Ø33	10	0.8	966.666		966.667	966.668
BRG321032		10	3.2	-		-	966.669

- Inserts are available in packets of 10 pcs.
Please clarify the insert type and grade when ordering.

Caution

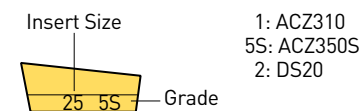
- It is important to use the correct insert for the diameter of Fullcut Mill. Failure to use the correct insert will result in incorrect cutting conditions and poor results.
- There is no compatibility with those of FCM type.

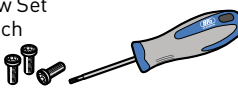
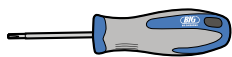
A.9

Insert classifications

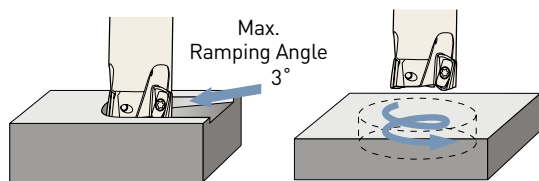
ISO	Grade	Material	Coating
P30	ACZ350S	General steel	TiAlN / TiCN
M30		Stainless steel	
K10	ACZ310	Cast Iron	
N20	DS20	Aluminium	DLC

Marking Description



Spare Parts					
		Insert Clamping Screw Set (10) screws & (1) wrench			
					
Cutter Dia.	Insert	Model	Order No.	Model	Order No.
Ø16, Ø17	BRG1608	S2506DS	966.272	DA-T8	966.274
Ø20, Ø21	BRG2008				
Ø25, Ø26	BRG2508	S3508DS	966.273	DA-T15	966.275
Ø32, Ø33	BRG3210				

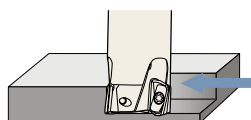
Recommended Cutting Condition



Cutter Dia.	Flat Bottom		Through Hole
	Max. Hole Dia.	Min. Hole Dia.	Min. Hole Dia.
Ø16	Ø30	Ø27	Ø22
Ø20	Ø38	Ø36	Ø29
Ø25	Ø48	Ø45	Ø39
Ø32	Ø62	Ø59	Ø48

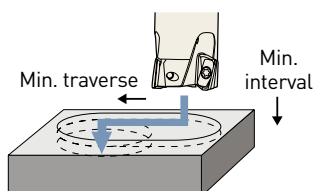
Ramping and helical interpolation

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Die Steel	Cast Iron	Aluminium
	Insert Grade	ACZ350S					ACZ310	DS20
	Cutting Fluid	Dry		Wet	Dry/Wet	Dry		Dry/Wet
Ø16, Ø17	Speed (m/min)	100 - 200	150 - 220	60 - 80	100 - 150	60 - 80	100 - 180	200 - 1000
	Feed (mm/tooth)	0.06 - 0.12	0.06 - 0.12	0.05 - 0.08	0.08 - 0.16	0.06 - 0.1	0.08 - 0.18	0.06 - 0.24
Ø20, Ø25, Ø26	Speed (m/min)	100 - 200	150 - 200	60 - 100	120 - 150	60 - 100	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.06 - 0.1	0.02 - 0.18	0.1 - 0.35
Ø32, Ø33	Speed (m/min)	100 - 200	150 - 200	60 - 100	120 - 150	60 - 120	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.08 - 0.12	0.06 - 0.2	0.1 - 0.35



Shoulder milling and slot milling

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Die Steel	Cast Iron	Aluminium
	Insert Grade	ACZ350S					ACZ310	DS20
	Cutting Fluid	Dry		Wet	Dry/Wet	Dry		Dry/Wet
Ø16, Ø20, Ø21	Speed (m/min)	100 - 200	100 - 200	60 - 80	120 - 180	80 - 120	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.18	0.08 - 0.18	0.05 - 0.1	0.12 - 0.18	0.08 - 0.12	0.08 - 0.18	0.1 - 0.3
Ø25, Ø32, Ø33	Speed (m/min)	100 - 200	100 - 200	60 - 100	120 - 180	80 - 120	100 - 180	200 - 1500
	Feed (mm/tooth)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.08 - 0.12	0.08 - 0.2	0.1 - 0.35



Cutter Dia.	Min. Interval	Min. Traverse
Ø16	0.5	14
Ø20	1	18
Ø25	1	23
Ø32	2	30

Plunge milling

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Die Steel	Cast Iron	Aluminium
	Insert Grade	ACZ350S					ACZ310	DS20
	Cutting Fluid	Air blow		Wet	Air/Wet	Air blow		Air/Wet
Ø16, Ø17	Speed (m/min)	80 - 120	80 - 120	60	80 - 120	60 - 80	80 - 160	200 - 350
	Feed (mm/tooth)	0.06 - 0.1	0.06 - 0.1	0.04 - 0.06	0.05 - 0.08	0.05 - 0.08	0.06 - 0.1	0.06 - 0.1
Ø20, Ø25, Ø26	Speed (m/min)	100 - 160	100 - 160	60 - 100	100 - 160	60 - 100	80 - 180	200 - 500
	Feed (mm/tooth)	0.1 - 0.25	0.1 - 0.25	0.1 - 0.25	0.12 - 0.25	0.1 - 0.2	0.08 - 0.3	0.1 - 0.3
Ø32, Ø33	Speed (m/min)	100 - 160	100 - 160	60 - 100	100 - 160	60 - 100	80 - 180	200 - 600
	Feed (mm/tooth)	0.1 - 0.3	0.1 - 0.3	0.1 - 0.3	0.12 - 0.3	0.1 - 0.2	0.08 - 0.4	0.1 - 0.3

Caution

- The table is just a reference to determine cutting conditions. It should be adjusted according to a condition of a machine tool or workpiece.
- Since chips may scatter, utilize safety enclosures.
- Do not use oil-based cutting fluid, or a fire may take place.

Fullcut Mill FCR

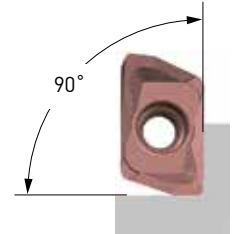
Application example

Bore

Dia. 38 with Helical milling



Fullcut Mill	BBT40-FCR20083-120
Insert	BRG200808 (ACZ350S)
Work Material	C50 (S50C) / Air blow
Cutting Speed Vc (m/min.)	150
Feed Rate Vf (mm/min.)	1 100
Axial DOC ap (mm)	2 mm x 3 times
Hole dia.	Ø38



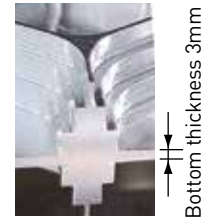
For carbon steel of C50, very smooth cutting with feed rate of 1100 mm/min and excellent squareness are achieved.

Honeycombed

Pocket with Ramping

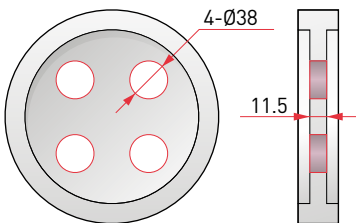


Fullcut Mill	BBT40-FCR20083-85
Insert	BRG200808 (DS20)
Work Material	A2017 Duralumin / Air blow
Cutting Speed Vc (m/min.)	750
Feed Rate Vf (mm/min.)	4 300
Axial DOC ap (mm)	6 mm x 3 times
Radial DOC ae (mm)	max. 20



For less rigid workpiece with 3 mm thickness clamped by a vise, feed rate of 4 300 mm/min on both sides of the workpiece is achieved.

Helical milling



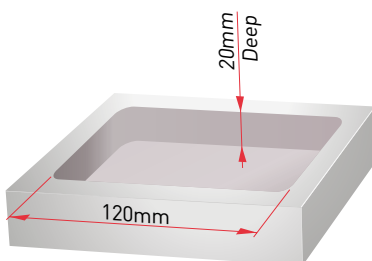
Fullcut Mill	BBT40-FCR20083-120
Insert	BRG200808 (ACZ350S)
Work Material	15CrMo5 (SCM415)
Cutting Speed Vc (m/min.)	150
Feed Rate Vf (mm/min.)	480
Axial DOC ap (mm)	4 mm x 3 times
Hole dia.	Ø38

Compared to another manufacturer

Axial DOC **1.3 times**
Insert life **2 times**

Stable helical milling with 4 mm axial DOC on less rigid workpiece.

Ramping



Fullcut Mill	BBT50-BBT40-50 BBT40-FCR16082-120
Insert	BRG160808 (ACZ350S)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	120
Feed Rate Vf (mm/min.)	480
Axial DOC ap (mm)	4 mm x 5 times

Compared to another manufacturer

No chatter even at higher resistance corner.

Smooth chip evacuation eliminates re-cutting of the swarf and edge chipping of the inserts.

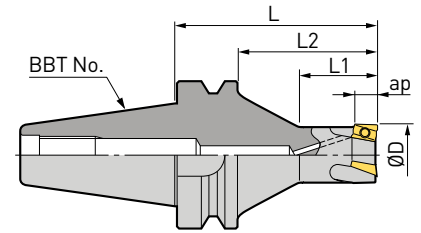
Example of use of BBT50-BBT40 Adapter. An improved result is obtained compared to the product from another manufacturer.



Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.

For Standard Type with FCM



BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.
16	BBT30 -FCM16092 - 65	9	65	23	43	2	ARG16	0.5	966.216
20	-FCM20093 - 65			28	43	3	ARG20	0.5	966.217
25	-FCM25093 - 65			33	43	3	ARG25	0.5	966.218
32	-FCM32113 - 65			38	43	3	ARG32	0.6	966.219
40	-FCM40114 - 50	11	50	25	28	4	ARG40	0.6	966.220
50	-FCM50115 - 50			28		5		0.7	966.120
16	BBT40 -FCM16092 - 85	9	85	23	58	2	ARG16	1.2	966.221
	-105		105	30	78			1.3	966.121
	-120		120	25	93			1.4	966.122
	-150		150	123	1.7			966.123	
20	-FCM20093 - 85	9	85	28	58	3	ARG20	1.2	966.222
	-105		105	35	78			1.3	966.124
	-120		120	30	93			1.4	966.125
	-150		150	123	1.7			966.126	
25	-FCM25093 - 85	9	85	33	58	3	ARG25	1.2	966.223
	-120		120	45	93			1.4	966.127
	-135		135	40	108			1.6	966.128
	-165		165	138	1.9			966.129	
32	-FCM32113 - 85	11	85	38	58	3	ARG32	1.3	966.224
	-120		120	60	93			1.5	966.130
	-135		135	50	108			1.7	966.131
	-165		165	40	138			2.1	966.132
40	-FCM40114 - 85	11	85	43	58	4	ARG40	1.4	966.225
	-120		120	65	93			1.7	966.133
	-135		135	60	108			2.0	966.134
	-165		165	50	138			2.4	966.135
50	-FCM50115 - 70	11	70	38	43	5	ARG40	1.5	966.226
	-120		120	65	93			2.2	966.136
	-135		135	60	108			2.4	966.137
	-165		165	50	138			3.0	966.138

1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ A205

For Cutting Condition ▶ A206

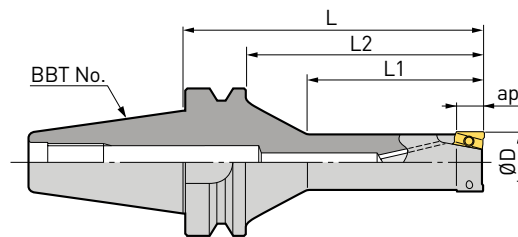
For BBT50 Adapter ▶ A198

Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.



For Long Nose Type with BBT



BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.
16	BBT30 -FCM16092L - 85	9	85	45	63	2	ARG16	0.5	966.081
20	-FCM20092L - 85			50	63		ARG20	0.5	966.082
25	-FCM25092L - 85			50	63		ARG25	0.6	966.083
32	-FCM32112L - 85			60	63		ARG32	0.7	966.084
16	BBT40 -FCM16092L -105	9	105	45	78	2	ARG16	1.3	966.085
	-120		120	93	1.4			966.086	
20	-FCM20092L -120	9	120	60	93	2	ARG20	1.4	966.087
	-135		135	108	1.5			966.088	
25	-FCM25092L -135	9	135	75	108	2	ARG25	1.5	966.089
	-150		150	123	1.7			966.090	
32	-FCM32112L -135	11	135	80	108	2	ARG32	1.7	966.091
	-150		150	90	123			1.9	966.092

1. Wrench is included. Inserts are to be ordered separately.

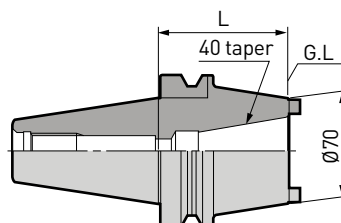
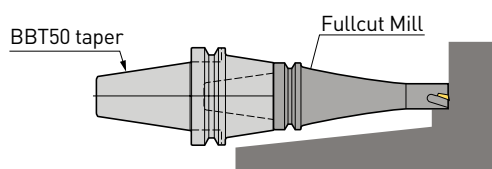
For Insert ▶ A205

For Cutting Condition ▶ A206

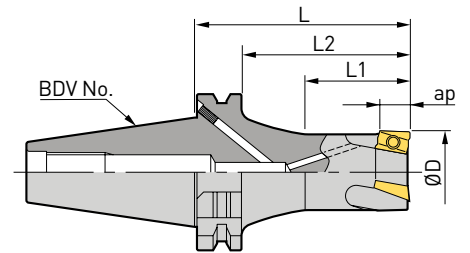
A.9

Adapter for BT50 taper shank (FCR & FCM)

Model	L	Order No.
BBT50 -BBT40 -50	50	803.730
-90	90	803.731



For Standard Type with BDV



BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	ap	L	L1	L2	No. of Insert	Insert Size	Weight (kg)	Order No.
16	BDV40 -FCM16092 - 85	9	85	23	58	2	ARG16	1.2	966.206
	-105		105	30	78			1.3	966.161
	-120		120	25	93			1.4	966.162
20	-FCM20093 - 85	9	85	28	58	3	ARG20	1.2	966.207
	-105		105	35	78			1.3	966.163
	-120		120	30	93			1.4	966.164
25	-FCM25093 - 85	9	85	33	58	3	ARG25	1.2	966.208
	-120		120	45	93			1.4	966.165
	-135		135	40	108			1.6	966.166
32	-FCM32113 - 85	11	85	38	58	3	ARG32	1.3	966.209
	-120		120	60	93			1.5	966.167
	-135		135	50	108			1.7	966.168
40	-FCM400114 - 85	11	85	43	58	4	ARG40	1.4	966.210
	-120		120	65	93			1.7	966.169
	-135		135	60	108			2.0	966.170
50	-FCM50115 - 70	11	70	38	43	5	ARG40	1.5	966.211
	-120		120	65	93			2.2	966.171
	-135		135	60	108			2.4	966.172

1. Wrench is included. Inserts are to be ordered separately.

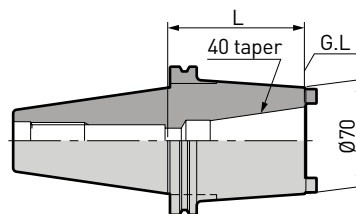
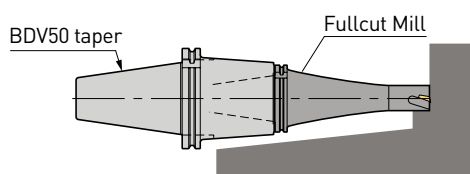
For Insert ▶ A205

For Cutting Condition ▶ A206

A.9

Adapter for DV50 taper shank (FCR & FCM)

Model	L	Order No.
BDV50 -BDV40 -50	50	805.856
-90	90	805.857

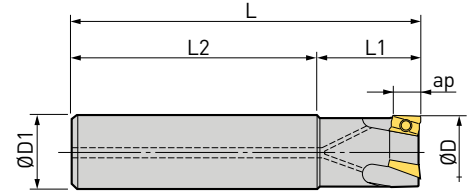


Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.



For Long Nose Type with Cylindrical Shank



Cutter Dia. ØD	Model	ØD1	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.
12	ST16 -FCM12091 - 90	16	9	90	15	70	1	ARG16	0.1	966.237
14	-FCM14091 - 90				17				0.1	966.238
16	-FCM16092 - 90				25	65			2	0.1
20	ST20 -FCM20093 -110	20	9	110	30	80	3	ARG20	0.2	966.240
25	ST25 -FCM25093 -120	25	9	120	35	85	3	ARG25	0.4	966.241
32	ST32 -FCM32113 -130	32	11	130	35	95	3	ARG32	0.7	966.242
	-FCM40114 -130				90	0.8			966.243	
40	-180				40	140	4	ARG40	1.2	802.963
50	-FCM50115 -130				130	90	5		1.0	966.244

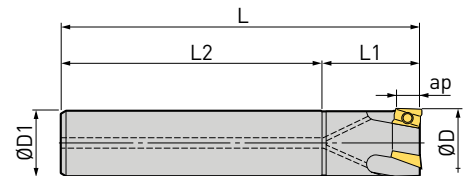
1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ A205

For Cutting Condition ▶ A206

For Oversize Type with Cylindrical Shank

“Trump card” at deep pocket & deep shoulder endmilling.



Cutter Dia. ØD	Model	ØD1	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.
17	ST16 -FCM17092 -120	16	9	120	25	95	2	ARG16	0.2	966.181
21	ST20 -FCM21092 -165	20	9	165	30	135	2	ARG20	0.4	966.182
	-FCM21093 -135			135		105			3	0.3
26	ST25 -FCM26092 -165	25	9	165	38	127	2	ARG25	0.6	966.184
	-FCM26093 -150			150		112			3	0.6
33	ST32 -FCM33112 -180	32	11	180	48	132	2	ARG32	1.1	966.186
	-FCM33113 -180			180		132			3	1.0

1. Wrench is included. Inserts are to be ordered separately.

2. For medium-heavy or heavy slot milling with projection longer than 2.5 times of diameter, 2-flutes models are recommended.

For Insert ▶ A205

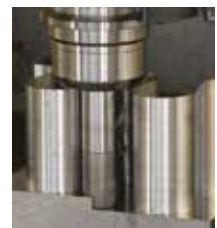
For Cutting Condition ▶ A206

Application Example

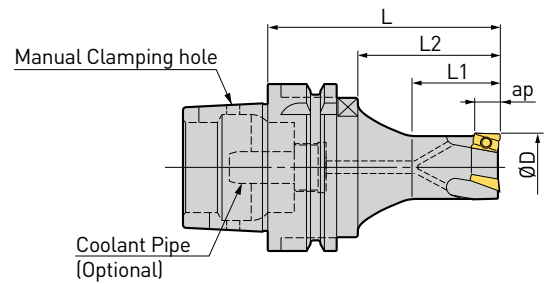
Model	ST32-FCM33112-180
Material	C55 (S55C)
Cutting Speed Vc (m/min.)	120
Feed Rate fz (mm/tooth)	0.1
Axial DOC ap (mm)	10 mm x 10 steps
Radial DOC ae (mm)	Max. 33 mm

Result

Deep shoulder endmilling is achieved with 110 mm projection length and 10 mm axial depth.



For Standard Type with HSK-A



Cutter Dia. ØD	Model	ap	L	L1	L2	No. of Insert	Insert Size	Weight (kg)	Order No.
16	HSK-A40 -FCM16092 - 65	9	65	23	37	2	ARG16	0.3	966.101
20	-FCM20093 - 65			28			ARG20	0.3	966.102
25	-FCM25093 - 65			35		ARG25	0.4	966.103	
32	-FCM32113 - 65			11	65	45	-	4	ARG32
40	-FCM40114 - 65	5	ARG40			0.6	966.105		
50	-FCM50115 - 65	5	ARG40			0.7	966.106		
16	HSK-A50 -FCM16092 - 75	9	75	23	41	2	ARG16	0.6	966.107
20	-FCM20093 - 75			28			ARG20	0.6	966.108
25	-FCM25093 - 75			33		ARG25	0.6	966.109	
32	-FCM32113 - 75			39	ARG32	0.7	966.110		
40	-FCM40114 - 75	11	75	48	-	4	ARG40	0.9	966.111
50	-FCM50115 - 75			-	5		ARG40	1.0	966.112
16	HSK-A63 -FCM16092 - 85				85	23	51	2	ARG16
		105	30		71	1.0	966.141		
		120	25		86	1.1	966.142		
		150	25		116	1.3	966.143		
20	-FCM20093 - 85	9	85	28	51	3	ARG20	1.0	966.232
			105	35	71			1.1	966.144
			120	30	86			1.2	966.145
			150	30	116			1.4	966.146
25	-FCM25093 - 85		85	33	51	3	ARG25	1.0	966.233
			120	45	86			1.2	966.147
			135	40	101			1.3	966.148
			165	40	131			1.5	966.149
32	-FCM32113 - 85		85	38	51	4	ARG32	1.1	966.234
			120	60	86			1.3	966.150
			135	50	101			1.4	966.151
			165	40	131			1.7	966.152
40	-FCM40114 - 85	11	85	43	51	4	ARG40	1.3	966.235
			120	65	86			1.5	966.153
			135	60	101			1.7	966.154
			165	50	131			2.1	966.155
50	-FCM50115 - 70		70	28	28	5	ARG40	1.3	966.236
			120	78	78			1.9	966.156
			135	93	93			2.2	966.157
			165	123	123			2.8	966.158

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ A205

For Cutting Condition ▶ A206

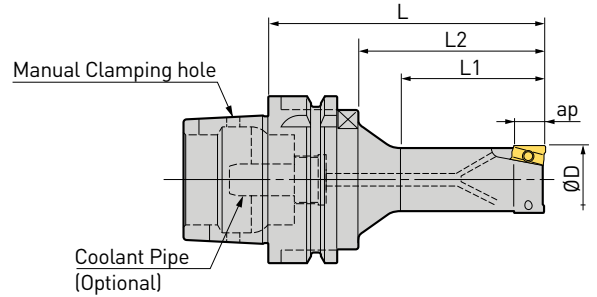
For Coolant Pipe ▶ A81

Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.



For Long Nose Type with HSK-A



Cutter Dia. ØD	Model	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.
16	HSK-A63 -FCM16092L - 85	9	85	40	51	2	ARG16	0.9	966.093
	-120		120	45	86			1.0	966.094
20	-FCM20092L -105	9	105	50	71	2	ARG20	1.1	966.095
	-120		120	60	86			1.2	966.096
25	-FCM25092L -105	9	105	55	71	2	ARG25	1.1	966.097
	-120		120	65	86			1.2	966.098
32	-FCM32112L -120	11	120	70	86	2	ARG32	1.3	966.099
	-135		135	80	101			1.4	966.100

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

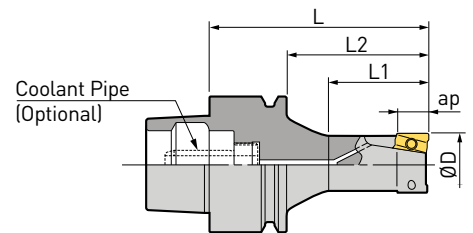
For Insert ▶ A205

For Cutting Condition ▶ A206

For Coolant Pipe ▶ A81

A.9

For Standard Type with HSK-E



Cutter Dia. ØD	Model	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	Order No.
16	HSK -E25 -FCM16092 -45	9	45	23	35	2	ARG16	0.17	966.173
	-E32 -FCM16092 -55		55	23	35			0.20	966.174
	-E40 -FCM16092 -65		65	28	45			0.45	966.115

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ A205

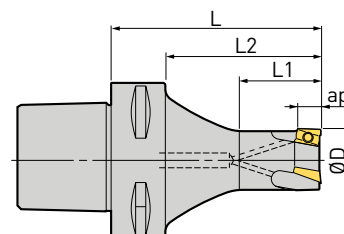
For Cutting Condition ▶ A206

For Coolant Pipe ▶ A81

Caution

As HSK-E type interface does not have drive key-ways, there is a possibility that it may slip in machine tool spindles if cutting load exceeds the gripping force of machine tools. Please ensure to choose proper cutting condition.

For Standard Type with BIG CAPTO



Cutter Dia. ØD	Model	L	L1	L2	ap	No. of Inserts	Insert Size	Weight (kg)	Order No.	
16	C5 -FCM16092	-65	65	23	45	9	2	ARG16	0.5	805.858
		-90	90	30	70				0.6	805.859
20	-FCM20093	-65	65	28	45	9	3	ARG20	0.5	973.609
		-90	90	35	70				0.6	805.860
25	-FCM25093	-65	65	33	45	9	3	ARG25	0.6	805.861
		-90	90	40	70				0.7	805.862
32	-FCM32113	-65	65	38	45	11	3	ARG32	0.6	805.863
		-90	90	45	70				0.8	805.864
40	-FCM40114	-50	50	25	30	11	4	ARG40	0.6	805.865
		-90	90	60	70				1.0	805.866
50	-FCM50115	-50	50	25	30	11	5	ARG40	0.7	805.867
		-90	90	65	70				1.0	805.868

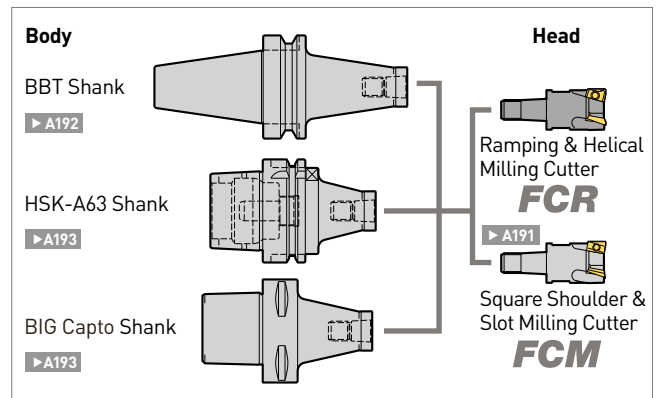
1. Wrench is included.
2. Inserts are to be ordered separately.

For Insert ▶ A205

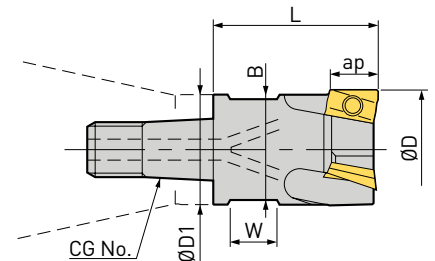
For Cutting Condition ▶ A206

Contact Grip

Offers amazing cutting performance which is superior to the conventional threaded coupling system.



FCM Head



A.9

Cutter Dia.	Model	CG No.	ØD1	ap	L	No. of Inserts	Spanner Flats		Insert Size	Weight (kg)	Order No.
							B	W			
Ø16	CG15 -FCM16092 -25	CG15	15	9	25	2	12	6.2	ARG16	0.03	966.701
	CG19 -FCM20092 -32										
Ø20	-FCM20093 -32	CG19	19	9	32	2	17	8.2	ARG20	0.07	966.703
	CG24 -FCM25092 -36										
Ø25	-FCM25093 -36	CG24	24	9	36	2	22	10.2	ARG25	0.13	966.704
	CG31 -FCM32112 -43										
Ø32	-FCM32113 -43	CG31	31	11	43	2	27	12.2	ARG32	0.26	966.706
	CG31 -FCM32113 -43										

1. Wrench is included. Inserts are to be ordered separately.
2. Standard single-ended wrench is required to clamp the head.

For Insert ▶ A205

For Cutting Condition ▶ A206

Application Example

Amazing cutting performance even on #40 taper machine. (Below application example has been achieved with dry cutting.)

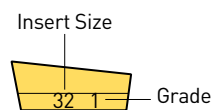
Type FCM, Slot Milling

Machine	Vertical M/C, #40 taper	
Contact Grip Head	FCM32 (2-inserts)	
Work Material	C50 (S50C)	
Cutting Speed Vc (m/min.)	150	
Feed Rate fz (mm/tooth)	0.1	
Axial DOC ap (mm)	11	

Indexable Inserts



Marking Description



1: ACZ310
2: DS20
P2: ACP200
M3: ACM300S
P3: ACP300
5S: ACZ350S

Model	Cutter Dia. ØD	ap	Nose R	P		M		K	N
				ACP200	ACP300	ACM300S	ACZ350S	ACZ310	DS20
ARG160902	Ø 12 - Ø 17	9	0.2	-	978.812	-	978.805	800.488	978.801
ARG160904			0.4	978.827	966.245	805.869	966.246	966.248	966.249
ARG200902	Ø 20, Ø 21	9	0.2	-	978.813	-	978.806	800.046	978.807
ARG200904			0.4	978.804	966.250	805.870	966.251	966.253	966.254
ARG250902	Ø 25, Ø 26	9	0.2	-	978.814	-	978.808	800.047	978.803
ARG250904			0.4	800.048	966.255	805.871	966.256	966.258	966.259
ARG321102	Ø 32, Ø 33	11	0.2	-	978.828	-	800.050	800.049	966.270
ARG321104			0.4	800.051	966.260	805.872	966.261	966.263	966.264
ARG401102	Ø 40, Ø 50	11	0.2	-	800.052	-	978.819	800.053	978.821
ARG401104			0.4	978.809	966.265	805.873	966.266	966.268	966.269

1. Inserts are available in packets of 10 pcs. Please clarify the insert type and grade when ordering.
2. ACP300 is first recommendation for steel and ACM300S is first recommendation for stainless steel.

A.9

Caution

- It is important to use the correct insert for the diameter of Fullcut Mill. Failure to use the correct insert will result in incorrect cutting conditions and poor results.
- Nose radius 0.2 inserts are suitable for light cutting.
- There is no compatibility with those of FCR type.

Insert classifications

ISO	Grade	Material	Coating
P20	ACP200	Prehardened steel	TiAlN / AlCrN
P30	ACP300	General steel	
M30	ACM300S	Stainless steel	TiAlN / TiCN
	ACZ350S	Stainless steel	
K10	ACZ310	Cast Iron	
N20	DS20	Aluminium	DLC

Note

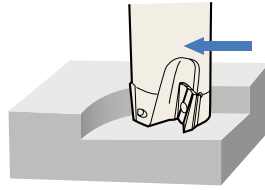
It is recommended to regularly replace clamping screws and wrench to ensure the correct clamping force is maintained.

Spare Parts					
		Insert Clamping Screw Set (10) screws & (1) wrench		Wrench	
Cutter Dia.	Insert	Model	Order No.	Model	Order No.
Ø12	ARG1609	S2505DS	966.271	DA-T8	966.274
Ø14, Ø16, Ø17					
Ø20, Ø21	ARG2009	S2506DS	966.272		
Ø25, Ø26	ARG2509				
Ø32, Ø33	ARG3211			DA-T15	966.275
Ø40	ARG4011	S3508DS	966.273		
Ø50					

Fullcut Mill FCM

Recommended Cutting Condition

Shoulder milling and slot milling



Finish-light cutting

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel		Cast Iron	Aluminium	
	Insert Grade	ACP300			ACP200	ACM300S	ACZ350S	ACZ310	DS20
	Cutting Fluid	Dry			Dry/Wet		Dry	Dry/Wet	
Ø12 - Ø14	Speed (m/min)	150 - 250	180 - 250	80 - 140	140 - 180	140 - 180	100 - 200	200 - 750	
	Feed (mm/tooth)	0.1 - 0.2	0.1 - 0.2	0.08 - 0.12	0.12 - 0.18	0.12 - 0.18	0.1 - 0.2	0.10 - 0.3	
Ø16 - Ø21	Speed (m/min)	150 - 250	180 - 250	80 - 140	140 - 180	140 - 180	100 - 200	200 - 1000	
	Feed (mm/tooth)	0.1 - 0.2	0.1 - 0.2	0.08 - 0.12	0.12 - 0.18	0.12 - 0.18	0.1 - 0.2	0.10 - 0.3	
Ø25 - Ø33	Speed (m/min)	180 - 280	200 - 280	80 - 140	140 - 200	140 - 200	100 - 200	200 - 1500	
	Feed (mm/tooth)	0.1 - 0.24	0.1 - 0.22	0.08 - 0.14	0.12 - 0.2	0.12 - 0.2	0.1 - 0.2	0.10 - 0.35	
Ø40 - Ø50	Speed (m/min)	180 - 280	200 - 280	80 - 140	140 - 200	140 - 200	80 - 200	200 - 1500	
	Feed (mm/tooth)	0.1 - 0.24	0.1 - 0.22	0.08 - 0.14	0.12 - 0.2	0.12 - 0.2	0.1 - 0.2	0.10 - 0.35	

Caution

Fullcut Mill, FCM type, cannot be used for feeding in Z-axis such as ramping, plunging and boring.

A.9

Medium-heavy cutting

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Stainless Steel		Cast Iron	Aluminium
	Insert Grade	ACP300		ACM300S	ACZ350S	ACZ310	DS20
	Cutting Fluid	Dry		Dry/Wet		Dry	Dry/Wet
Ø12 - Ø14	Speed (m/min)	100 - 200	150 - 200	120 - 180	120 - 180	100 - 180	200 - 750
	Feed (mm/tooth)	0.08 - 0.14	0.1 - 0.15	0.12 - 0.15	0.12 - 0.15	0.08 - 0.18	0.10 - 0.2
Ø16 - Ø21	Speed (m/min)	100 - 200	150 - 200	120 - 180	120 - 180	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.14	0.1 - 0.15	0.12 - 0.15	0.12 - 0.15	0.08 - 0.18	0.10 - 0.2
Ø25 - Ø33	Speed (m/min)	100 - 200	160 - 220	120 - 180	120 - 180	100 - 200	200 - 1500
	Feed (mm/tooth)	0.1 - 0.16	0.1 - 0.15	0.12 - 0.15	0.12 - 0.15	0.08 - 0.2	0.10 - 0.3
Ø40 - Ø50	Speed (m/min)	100 - 200	160 - 220	120 - 180	120 - 180	100 - 200	200 - 1500
	Feed (mm/tooth)	0.1 - 0.16	0.1 - 0.15	0.12 - 0.15	0.12 - 0.15	0.08 - 0.2	0.10 - 0.3

Caution

- Nose radius 0.2 inserts are suitable for light cutting.
- Care should be taken in the selection of both axial & radial depth of cut as well as the feed rate.
- This table is a general guideline for cutting data. Please adjust according to machine and workpiece conditions, as well as width of cutting.
- Dry cutting (including air blow) is recommended when cutting of steel, except for finishing.
- Dry cutting is recommended for stainless steel. However use soluble oil in a case where severe built-up edge occurs.

Finishing milling with axial DOC of 0.2 mm or smaller

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Stainless Steel	Cast Iron
	Insert Grade	ACP200			ACZ310
	Cutting Fluid	Wet			
Ø12 - Ø50	Speed (m/min)	200 - 250			
	Feed (mm/tooth)	0.1 - 0.2			

Caution

- For aluminium alloy, same conditions as „Finish-light cutting“ shown above should be applied.
- For finishing of steel, wet cutting improves both surface finish and insert life. ACZ310 grade extends the life further.

Fullcut Mill FCM

Application Example

Slot milling



Fullcut Mill	BBT40-FCM32113-85
Insert	ARG321104 (ACP300)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	150
Feed Rate fz (mm/tooth)	0.12
Axial DOC ap (mm)	9

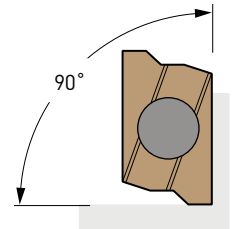


Only Fullcut Mill was capable of achieving this data in a No.40 spindle taper machine.

Shoulder milling



Fullcut Mill	BBT40-FCM32113-85
Insert	ARG321104 (ACP300)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	200
Feed Rate fz (mm/tooth)	0.15
Axial DOC ap (mm)	11
Radial DOC ae (mm)	5



Excellent perpendicularity is achieved.

A.9

Face milling



Fullcut Mill	BBT40-FCM50115-70
Insert	ARG401104 (ACP300)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	200
Feed Rate fz (mm/tooth)	0.15
Axial DOC ap (mm)	1
Radial DOC ae (mm)	30

	Surface Roughness Ry
BIG KAISER	2.53
Manufacturer A	3.75
Manufacturer B	4.32

Finishing surface roughness was Ry = 2.53 at Vc = 200, fz = 0.15 cutting data.

Material of low machinability



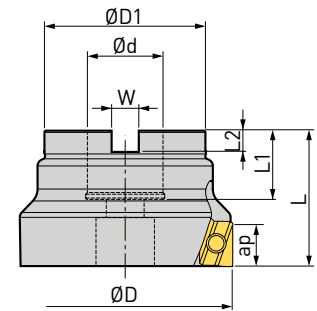
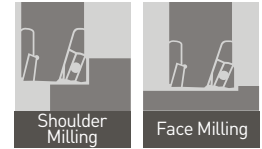
Fullcut Mill	ST25-FCM25093-120
Holder	BBT50-MEGA25D-105
Insert	ARG250904 (ACZ350S)
Work Material	SUS304 Stainless steel
Cutting Speed Vc (m/min.)	150
Feed Rate fz (mm/tooth)	0.2
Axial DOC ap (mm)	9
Radial DOC ae (mm)	3



High efficiency and stable milling (Vf = 1140 mm/min.) is achieved.

Fullcut Mill FCM, Arbor Type

Corresponding to Form FMH of new standard face milling adaptor.



Form FMH

Cutter Dia. ØD	Model	ap	Ød	ØD1	L	L1	L2	W	No. of Insert	Insert Size	Weight (kg)	Order No.
50	FMH22 -FCM50115 -40	11	22	47	40	20	6	10.4	5	ARG40	0.5	966.212
63	-FCM63116 -40									ARG63	0.7	966.213
80	FMH27 -FCM80116 -50		27	60	76	50	22	7	12.4	ARG80	1.2	966.214
100	FMH27 -FCM100116 -50									ARG80	2.0	805.461

For FMH Type BBT ▶ A22

For FMH Type BDV ▶ A44

For FMH Type HSK ▶ A66

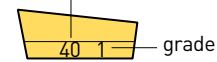
A.9

Indexable Inserts



Marking Description

Insert Size



- 1: ACZ310
- 2: DS20
- P2: ACP200
- P3: ACP300
- M3: ACM300S
- 5S: ACZ350S

Model	Cutter Dia. ØD	ap	Nose R	P		M		K	N
				ACP200	ACP300	ACM300S	ACZ350S	ACZ310	DS20
ARG401102	Ø 50	11	0.2	-	800.052	-	978.819	800.053	978.821
ARG401104		11	0.4	978.809	966.265	805.873	966.266	966.268	966.269
ARG631108	Ø 63	11	0.8	978.810	966.280	-	966.281	966.283	966.284
ARG801108	Ø 80, Ø 100	11	0.8	978.811	966.285	-	966.286	966.288	966.289

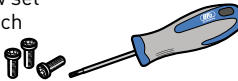
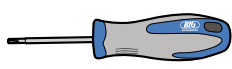
1. Inserts are available in packets of 10 pcs.
2. Please clarify the insert type and grade when ordering.

Caution

It is important to use the correct insert for the diameter of Fullcut Mill. Failure to use the correct insert will result in incorrect cutting conditions and poor results.

Insert classifications

ISO	Grade	Material	Coating
P20	ACP200	Prehardened steel	TiAlN / AlCrN
P30	ACP300	General steel	
M30	ACM300S	Stainless steel	TiAlN / TiCN
	ACZ350S		
K10	ACZ310	Cast Iron	
N20	DS20	Aluminium	DLC

Spare Parts		Insert clamping screw set (10) screws & (1) wrench		Wrench	
					
Cutter Dia.	Insert	Model	Order No.	Model	Order No.
Ø50	ARG401102	S3508DS	966.273	DA-T15	966.275
	ARG401104				
Ø63	ARG631108				
Ø80, Ø100	ARG801108				

Note

It is recommended to regularly replace clamping screws and wrench to ensure the correct clamping force is maintained.

Recommended Cutting Condition

Finish-light cutting

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Cast Iron	Aluminium
	Insert Grade	ACP300		ACP200	ACZ350S	ACZ310	DS20
	Cutting Fluid	Dry			Dry/Wet	Dry	Dry/Wet
Ø50, Ø63, Ø80, Ø100	Speed (m/min)	100 - 220	150 - 240	80 - 120	120 - 180	100 - 200	200 - 1500
	Feed (mm/tooth)	0.1 - 0.24	0.1 - 0.22	0.08 - 0.14	0.12 - 0.20	0.10 - 0.25	0.10 - 0.35

Caution

Fullcut Mill, FCM type, cannot be used for feeding in Z-axis such as ramping, plunging and boring.

Medium-heavy cutting

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Stainless Steel	Cast Iron	Aluminium
	Insert Grade	ACP300		ACZ350S	ACZ310	DS20
	Cutting Fluid	Dry			Dry/Wet	Dry
Ø50, Ø63, Ø80, Ø100	Speed (m/min)	100 - 200	150 - 200	120 - 180	100 - 180	200 - 750
	Feed (mm/tooth)	0.08 - 0.18	0.1 - 0.16	0.12 - 0.15	0.10 - 0.20	0.10 - 0.30

Caution

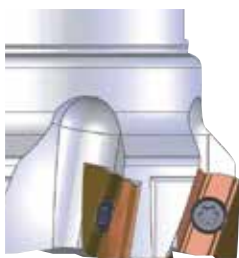
- This table is a general guideline for cutting data. Please adjust according to machine and workpiece conditions, as well as width of cutting.
- Dry cutting (including air blow) is recommended when cutting of steel, except for finishing.
- Dry cutting is recommended for stainless steel. However use soluble oil in a case where severe built-up edge occurs.

Application Example

Indexable Insert Endmill, achieving the excellent squareness and fine surface finish

Machined by Fullcut Mill model: FMH22-FCM63116-40

Arbor model: BBT40-FMH22-47-45



Squareness

Cutting Speed Vc (m/min.)	150
Feed Rate fz (mm/tooth)	0.1
Axial DOC ap (mm)	5
Radial DOC ae (mm)	0.1

BIG KAISER	10 µm
Other manufacturer	40 µm

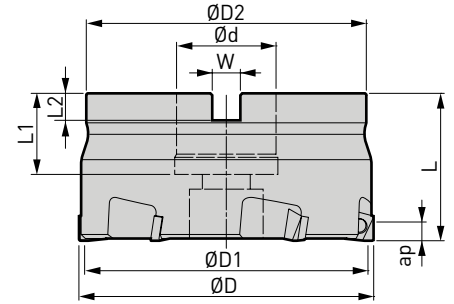
Wiper cutting edge

Cutting Speed Vc (m/min.)	250
Feed Rate fz (mm/tooth)	0.2
Axial DOC ap (mm)	0.1
Radial DOC ae (mm)	50

BIG KAISER	Ra=0.51 µm
Other manufacturer	Ra=1.56 µm

Speed Finisher

Amazing improvement of surface finish at high speed cutting.



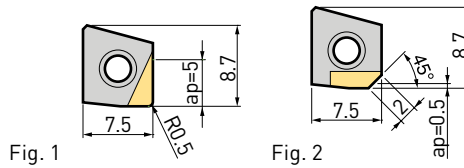
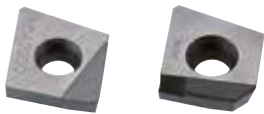
Model	$\varnothing D$	$\varnothing D1$		$\varnothing D2$	$\varnothing d$	L	L1	L2	W	No. of Insert	max. min^{-1}	Clamp Bolt	Weight (kg)	Order No.	
		DA2200	CBN												
FM22-PLS505 -35	50	46.9	44.9	47	22	35	19	6	10.4	5	20 000	M10 Cap Screw	0.4	978.276	
FM22-PLS636 -35	63	59.9	57.9	60	22	35	19	6	10.4			M12 Cap Screw	0.7	978.313	
FM27-PLS806 -40	80	76.9	74.9	76	27	40	22	7	12.4		6	16 000	M12 Cap Screw	1.2	978.277
-PLS1006 -35	100	69.9	94.9	60	27	35	24	7	12.4			12 800	MBA-M12	1.3	805.847
-PLS1256 -35	125	121.9	119.9	60	27	35	24	7	12.4			10 200	MBA-M12	1.9	805.848
FM32-PLS1006 -42	100	96.9	94.9	96	32	42	24	8	14.4	8	12 800	MBA-M16	2.0	801.684	
FM40-PLS1258 -50	125	121.9	119.9	100	40	50	28	9	16.4		10 200	MBA-M20	3.3	805.284	
-PLS16010 -50	160	156.9	154.9	100	40	50	28	9	16.4				8 000	4.1	805.283

1. Wrench and screws are included. Inserts are to be ordered separately.
2. When using at 12 000 min^{-1} or higher speed, contact agent for balancing of the cutter and arbor assembly.
3. Effective cutting edge length ap varies depending on insert models. Refer to the table for insert shown below.
4. Adjusting amount of cutting edge is 0.1 mm. Note this when using reground insert.

For FMH Type BBT ▶ A22
 For FMH Type BDV ▶ A44
 For FMH Type HSK ▶ A66

A.9

Indexable Inserts



Insert Model	Workpiece	Fig.	Material	Cutting Edge Length	Order No.
PL0705 DA2200	Aluminium & nonferrous	1	PCD	5.0	978.278
PL0705 CBN	Cast iron	2	CBN	0.5	978.820


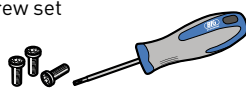
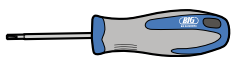
Insert grade

DA2200	CBN
High density sintered material made of ultra-micro diamond particles. Superior hardness comparable to carbide alloy and wear resistance.	Newly designed CBN sintered body with high content rate of CBN improves toughness and thermal conductivity.

Recommended Cutting Condition

Workpiece Material	Insert Material	Cutting Speed (m/min)	Feed Rate (mm/tooth)	Coolant
Aluminium Alloy	DA2200	2000 - 4000	0.05 - 0.2	Wet
		400 - 800		
Copper Alloy	DA2200	500 - 2500	0.05 - 0.2	Wet
Gray Cast Iron	CBN	800 - 2000	0.1 - 0.3	Dry

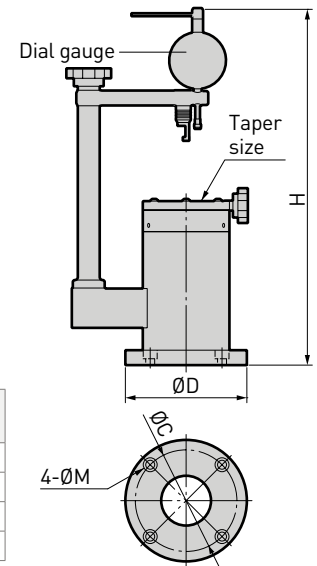
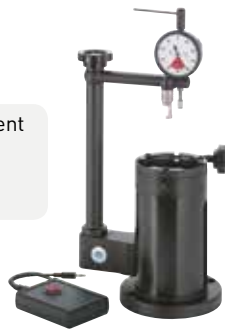
The table is a reference to determine cutting conditions. It should be adjusted according to cutting width, conditions of the machine tool and workpiece.

Spare Parts		Spare Parts		Spare Parts	
Lifting screw set (1) lifting screw & (1) lifting nut		Insert clamping screw set (10) screws & (1) wrench		Wrench	
Model	Order No.	Model	Order No.	Model	Order No.
LSN35	804.796	S2506DS	966.272	DA-T8	966.274

Insert clamping screws and wrenches are consumables. Regular replacement and storage are recommended.

Presetter for Speed Finisher

- Exclusive presetter for quick adjustment in micron order.
- Each cutting edge height is adjustable within 15 sec.



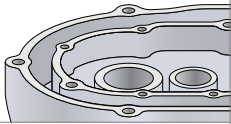
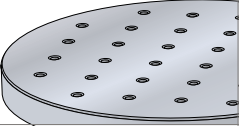
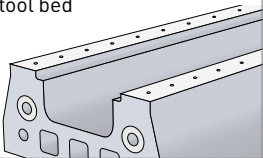
Model	Taper Size	H	ØD	ØC	ØM	Max. Tool Length	Weight (kg)	Order No.
PLP -BBT30	BBT30	> 417	122	102	9 (for M8)	150	7.5	804.644
-BBT40	BBT40						7.6	804.645
-BBT50	BBT50	> 502	172	149	11 (for M10)	160	17.5	804.646
-HSK63	HSK-A63	> 417	122	102	9 (for M8)	150	7.7	978.275

1. Dial gauge and indicator stabilizer (2pcs. AAA batteries included) are standard accessories.
2. Min. reading of the accessory dial gauge is 0.001mm.
3. BT shank cannot be used.
4. Max. tool length indicated in the table is the dimension from the gauge line of the arbor to the cutting edge.
5. Max. cutter diameter is Ø160mm.

A.9

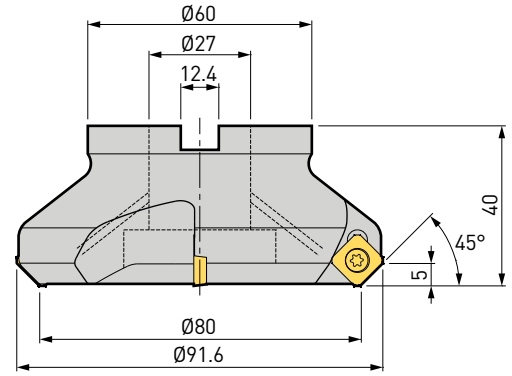
Application Example

(Cutter diameter: Ø 80)

Workpiece	Conditions	Surface Roughness	Height Difference	No. of Workpiece	Result
Crankcase ADC12 	Cutting speed: 4 000 m/min Spindle speed: 15 900 min ⁻¹ Feed rate: 9 550 mm/min Depth of cut: 2.5 mm	Ra = 0.08 µm Rz = 0.55 µm	Within 1 µm	24 500	Rough and finish processes are combined in a single operation.
Parts of semiconductor manufacturing equipment A5052 	Cutting speed: 4 000 m/min Spindle speed: 15 900 min ⁻¹ Feed rate: 9 550 mm/min Depth of cut: 2.0 mm	Ra = 0.07 µm Rz = 0.32 µm	Within 1 µm	320	Mirror finish is achieved.
Machine tool bed FC250 	Cutting speed: 1 500 m/min Spindle speed: 6 000 min ⁻¹ Feed rate: 3 600 mm/min Depth of cut: 0.5 mm	Ra = 0.12 µm Rz = 0.67 µm	Within 2 µm	20	1 to 2 µm flatness is obtained.

Surface Mill

For superior surface finishing.



Model	No. of Inserts	Weight (kg)	Order No.	Insert Clamping Screw Set	Order No.
FM27-SFM804-40	4	0.9	805.890	S4S-T15DS	805.897

1. Wrench and screws are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in Insert clamping screw set.

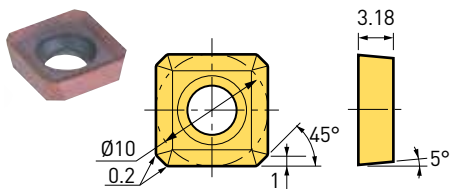
For FMH Type BBT ▶ A22

For FMH Type BDV ▶ A44

For FMH Type HSK ▶ A66

Indexable Inserts

A.9



Insert Model	Coating	Order No.
CM10C1 ACP200	Multi-layer TiAlN & AlCrN for general steel	966.445
CM10C1 DS20	DLC coating for aluminum & non-ferrous	966.446

1. Inserts are available in packet of 10 pcs.

Recommended Cutting Condition

Work Material	Insert Grade	Cutting Speed Vc (m/min)	Feed Rate fz (mm/t)	Axial DOC ap max (mm)
General Steel	ACP200	150-200-250	0.10-0.20-0.30	3
Prehardened Steel		180-240-300	0.10-0.25-0.40	4
Stainless Steel		160-205-250	0.15-0.23-0.30	3
Cast Iron		100-175-250	0.15-0.23-0.30	4
Aluminium, Non-ferrous	DS20	500-750-1000	0.15-0.23-0.30	5

Application Example

Work Material	C50	
Cutting Speed V (m/min.)	200	
Feed Rate f (mm/min.)	0.2	
Axial DOC ap (mm)	3	
Radial DOC ae (mm)	75	
Coolant	Dry	

Surface Mill
Rz = 1.42

Other Manufacture
Rz = 9.04

C-Cutter Mini, Multi Insert Type

Front & Back Chamfering

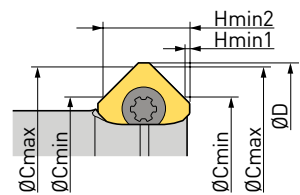
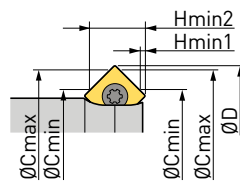
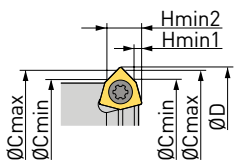
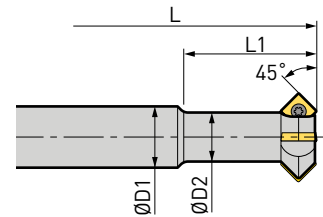
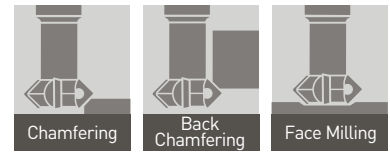


Fig. 1

Fig. 2

Fig. 3

Model	Face Milling	Fig.	ØD	ØD1	ØD2	L	L1	ØCmin.	ØCmax.	Hmin1	Hmin2	Insert Model	No. of Insert	Order No.
ST12 -C1012 -45B - 20	-	1	12.7	12	9	93	20	10	12	1.0	3.7	CM04...	3	966.461
						108	35							966.462
ST12 -C1116 -45B - 25	-	2	17.1	12	9.6	98	25	11	16	0.4	6.2	CM05...	4	966.433
						113	40							966.463
ST16 -C1520 -45B - 50	-	2	20.7	16	13.2	123	50	15	20	0.6	6.3	CM10...		966.464
ST20 -C1924 -45B - 60	-	2	24.7	20	17.2	143	60	19	24	0.6	6.3			966.465
ST20 -C2232 -45B - 50	○	3	32.7	20	19.2	130	50	22	32	0.4	12.4	CM10...	4	966.434
						160	80							966.466
ST32 -C3242 -45B - 65	○	3	42.7	32	30.6	175	65	32	42	0.4	12.4	CM10...	4	966.435
						211	100							966.467

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in Insert clamping screw set.
3. In case of chamfering with 4 insert type, chatter may occur due to increased cutting resistance when plunge cutting. Please try the different types with less inserts, 1 or 2.

For Insert ▶ A216

For Cutting Condition ▶ A216

C-Cutter Mini, Single Insert Type

Front & Back Chamfering

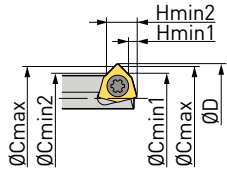
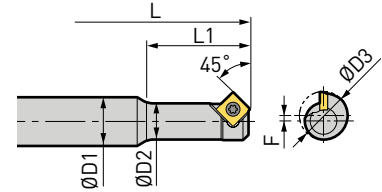
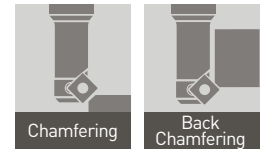


Fig. 1

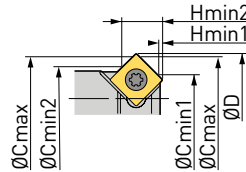


Fig. 2

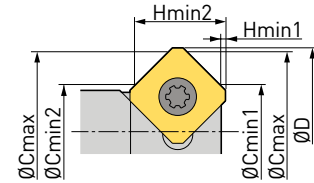


Fig. 3

Model	Fig.	ØD	ØD1	ØD2	ØD3	L	L1	ØC min1	ØC min2	ØC max.	H min1	H min2	Offset F	Insert Model	Order No.
ST10 -C0608 -45B - 16	1	8.8	10	5.7	5.7	78	16	6	6	8	1.0	3.8	1.55	CM04...	966.468
ST10 -C0409 -45B - 20	2	9.8	10	5.4	7.7	86	20	4	6	9	0.5	5.4	1.1	CM05...	966.469
ST10 -C0611 -45B - 20	2	12.0	10	7.4	9.8	81	20	6	8	11	0.4	5.5	1.1	CM05...	966.432
						96	35								966.470
ST16 -C1222 -45B - 40	3	22.6	16	11.0	16.9	117	40	12	12	22	0.3	12.4	2.9	CM10...	966.471

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.

For Insert ▶ A216

For Cutting Condition ▶ A216

A.9

Front Chamfering

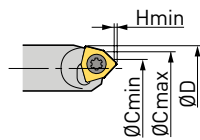
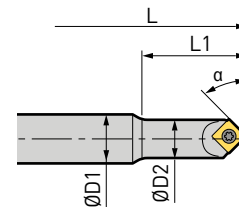


Fig. 1

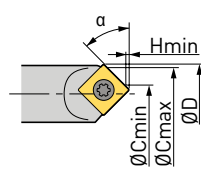


Fig. 2

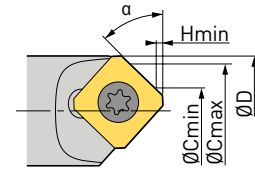


Fig. 3

Model	Fig.	α	ØD	ØD1	ØD2	L	L1	ØC min.	ØC max.	H min.	Insert Model	Order No.
ST10 -C0204 -45 - 15	1	45°	6.3	10	6	78	15	2	4	0.4	CM04...	966.486
						88	25					966.487
ST10 -C0207 -45 - 20	2	45°	8.1	10	7.8	81	20	2	7	0.4	CM05...	966.431
						96	35					966.488
ST16 -C0515 -45 - 50	3	45°	15.8	16	15.2	122	50	5	15	0.4	CM10...	966.489
ST16 -C0214 -30 - 40	3	30°	15.9	16	15.4	105	40	2	14	0.2	CM10...	966.436
ST16 -C0916 -60 - 40	3	60°	16.5	16	15.6	105	40	9	16	0.8	CM10...	966.437

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set. Centering is not possible.

For Insert ▶ A216

For Cutting Condition ▶ A216

C-Cutter Mini, Bolt Hole & Tap Starting Hole

Front & Back Chamfering

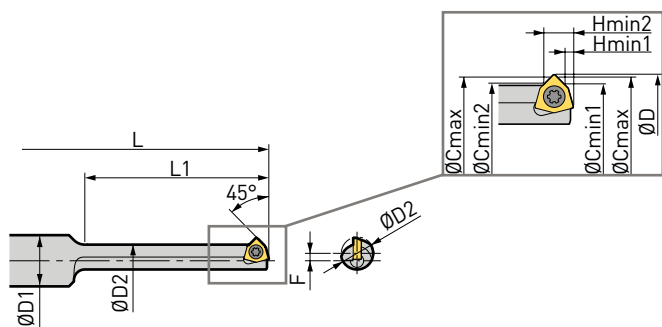
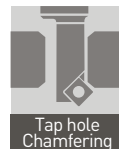


Fig. 1

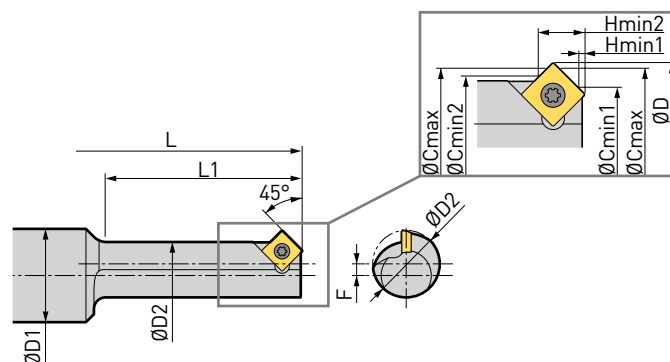


Fig. 2

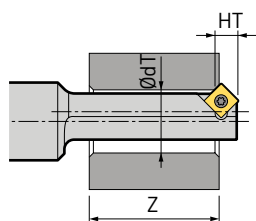
Model	Fig.	ØD	ØD1	ØD2	L	L1	ØC min1	ØC min2	ØC max.	H min1	H min2	Offset F	Insert Model	Order No.
ST10 -CM08 -45B - 19	1	9.2	10	6.3	81	19	6.4	6.6	8.4	1.0	3.7	1.45	CM04...	966.472
						97								35
ST12 -CM10 -45B - 25	2	11.3	12	8.0	99	25	5.5	8.3	10.5	0.5	5.0	1.65	CM05...	966.474
					119	45								966.475
ST12 -CM12 -45B - 29	2	13.4	12	9.7	102	29	7.6	10.0	12.6	0.5	5.2	1.85	CM05...	966.476
					126	53								966.477
ST16 -CM14 -45B - 33	2	15.5	16	11.5	107	33	9.7	11.8	14.7	0.5	5.3	2.00	CM05...	966.478
					135	61								966.479
ST16 -CM16 -45B - 37	2	17.6	16	13.5	110	37	11.8	13.8	16.8	0.5	5.4	2.05	CM05...	966.480
					142	69								966.481
ST20 -CM18 -45B - 42	2	19.7	20	14.9	126	42	13.9	15.2	18.9	0.5	5.7	2.40	CM05...	966.482
					162	78								966.483
ST20 -CM20 -45B - 46	2	21.8	20	16.9	129	46	16.0	17.2	21.0	0.5	5.8	2.45	CM05...	966.484
					169	86								966.485

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.
3. For * Long Type, standard insert is recommended rather than "SE" sharp edge insert to avoid chipping.

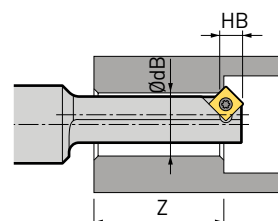
For Insert ▶ A216

For Cutting Condition ▶ A216

Tap starting hole



Bolt hole



Cutter Type	Tap Starting hole		Bolt Hole		Z	
	ØdT	HT	ØdB	HB	Standard Type	Long Type
CM08	6.8 (M8)	3.6	6.6 (M6)	3.7	13	29
CM10	8.5 (M10)	4.9	9 (M8)	4.6	17	37
CM12	10.3 (M12)	5.0	11 (M10)	4.7	21	45
CM14	12.0 (M14)	5.2	-	-	25	53
CM16	14.0 (M16)	5.3	14 (M12)	5.3	29	61
CM18	15.5 (M18)	5.6	16 (M14)	5.3	33	69
CM20	17.5 (M20)	5.6	18 (M16)	5.4	37	77

C-Cutter Mini

Indexable Inserts

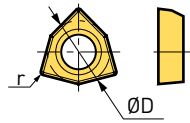


Fig. 1

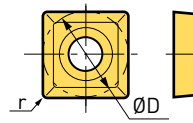


Fig. 2

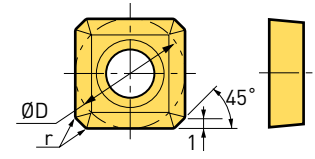


Fig. 3

The suffix SE designates a sharp cutting edge version.

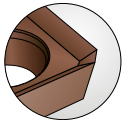
Model	Fig.	ØD	Nose R	P	M	K	N	Insert Clamping Screw Set	Order No.
				ACP300	ACP200	DS20			
CM0402	1	3.97	0.2	966.440	-	-	-	S2SS-T6	966.448
CM0502	2	5	0.2	-	966.441	-	966.442	S2TS-T6	966.449
CM0502SE				800.950	966.443	-			
CM10C1	3	10	0.2	-	966.445	-	966.446	S4S-T15	966.450
CM10C1SE				-	966.447	-			

1. Inserts are available in packets of 10pcs. Please specify model number and grade.
2. It is recommended to regularly replace clamping screws and wrench to ensure the correct clamping force is maintained.

A.9

Sharp cutting edge insert

Sharp cutting edge minimises the generation of burrs. This is especially beneficial when cutting stainless and mild steel materials.



Recommended Cutting Condition

A (Standard conditions)

Work Material	Insert Grade	Cutting Speed Vc (m/min)	Feed Rate fz (mm/tooth)		Coolant
			Chamfering	Face Milling (CM10 insert only)	
General Steel, Alloy Steel, High-Alloy Steel	ACP200 ACP300	100 - 350	0.05 - 0.4	0.05 - 0.2	Dry
Prehardened Steel (Less than HRC40)		60 - 100	0.05 - 0.1	0.05 - 0.1	Wet
Stainless Steel		100 - 250	0.08 - 0.3	0.08 - 0.2	Dry / Wet
Cast Iron		100 - 350	0.1 - 0.5	0.05 - 0.25	Dry
Aluminium, Non-Ferrous	DS20, ACP300	100 - 800	0.1 - 0.5	0.05 - 0.3	Dry / Wet

1. The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. Wet cutting is recommended to obtain the good surface quality.
3. In case built-up edge occurs when cutting aluminum and stainless steel, use soluble oil.

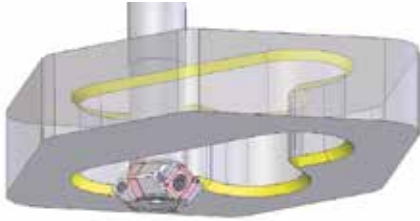
B (For long models of „bolt hole and starting hole for tapping type“)

Work Material	Insert Grade	Cutting Speed Vc (m/min)	Feed Rate fz (mm/tooth)	Coolant
General Steel, Alloy Steel, High-Alloy Steel	ACP200 ACP300	20 - 100	0.03 - 0.12	Wet
Cast Iron		50 - 160	0.05 - 0.20	Dry
Aluminium, Non-Ferrous	DS20, ACP300	30 - 100	0.03 - 0.12	Wet

1. The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. For stainless steel and hardened steel, shorter models are recommended.

Application Examples C-Cutter Mini

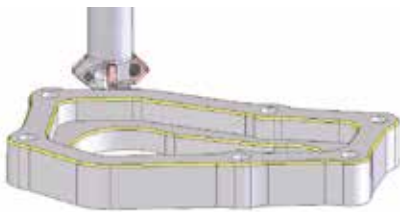
Front & Back chamfering for stainless steel



Material: X5CrNi18-9
 Chamfer: 3 mm x 45°
 Feed: 0.1 mm/tooth

	Competitor's Tool (with TiAlN Coated Carbide Insert)	C-Cutter Mini (ST20-C2232-45B-50)
Chamfering Dia.	Ø 30	Ø 28
Number of Teeth	1	4
Cutting Speed (m/min)	140	180
Spindle Speed (min-1)	1 490	2 050
Feed (mm/min)	149	819
Result	5 times better cutting efficiency	

Chamfering for aluminium



Material: Al-Si7Mg(Fe)
 Chamfer: 0.5 mm x 45°
 Feed: 0.1 mm/tooth

	Competitor's Tool	C-Cutter Mini (ST12-C1116-45B-25)
Chamfering Dia.	Ø 40	Ø 12
Number of Teeth	3	4
Cutting Speed (m/min)	200	600
Spindle Speed (min-1)	1 590	15 920
Feed (mm/min)	477	6 370
Result	13 times better cutting efficiency	

A.9

Front & Back chamfering of starting holes for M8 tapping

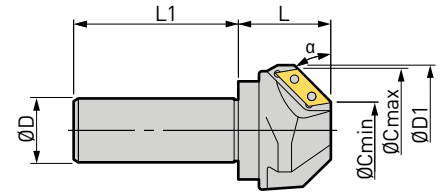
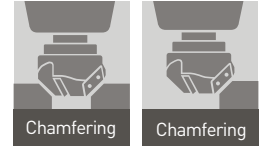


Material: FC250
 Tapped hole: Ø 6.6
 Chamfering dia.: Ø 8.4

	Competitor's Tool (with Non-Coated Carbide Insert)	C-Cutter Mini (ST10-CM08-45B-19)
Cutting Speed (m/min)	30	150
Spindle Speed (min-1)	1 140	5 680
Feed per Tooth (mm/rev)	0.05	0.1
Feed (mm/min)	57	568

C-Cutter, Standard Type

One C-Cutter to cover a wide chamfering range. $\varnothing 5 - \varnothing 25$, $\varnothing 10 - \varnothing 40$, $\varnothing 30 - \varnothing 60$, $\varnothing 50 - \varnothing 100$



Model	Chamfering Angle α	Chamfer		$\varnothing D$	$\varnothing D1$	L	L1	No. of Inserts	Insert Model	Order No.	Screw Set	Order No.
		$\varnothing C$ min	$\varnothing C$ max									
ST32 -C1652C -30	30°	16	52	32	68	48	80	2	CW19	978.336	S3S	801.696
ST42 -C5085C -30		50	85	42	96	52	80	3		802.251		
ST20 -C0525C	45°	5	25	20	33	25	60	1	CW19	966.401	S2S-B	978.284
ST25 -C1040C		10	40	25	45	35	70	2		966.406		
ST32 -C3060C		30	60	32	65	45	80	3		802.224		
ST42 -C50100C		50	100	42	106	70	80	3		966.404		
ST25 -C1434C -60	60°	14	34	25	39	37	70	2	CW19	966.405	S3S	801.696
ST32 -C3050C -60		30	50	32	54	45	80	3		978.338		
ST32 -C4565C -60		45	65	32	69	50	80	3		978.339		

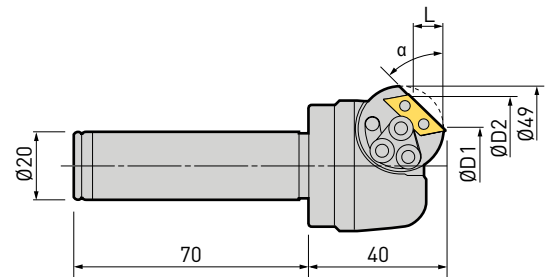
A.9

1. Inserts are to be ordered separately. An insert clamping key and screws are included.
2. 10 pcs. of screws and 1 pce. of wrench are included in screw set.

C-Cutter, Universal Type

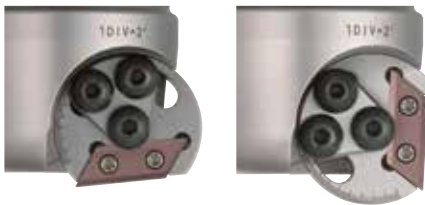
Chamfering angle adjustment from 5° to 85° with a hex key.

Model	Order No.
ST20-C5/85A-40	966.407



Insert Model: CW12

Easy angle adjustment with a hex key.



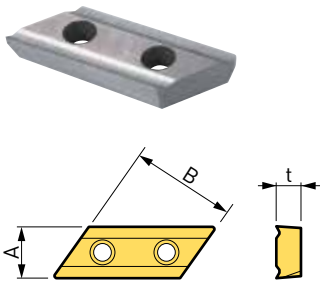
Chamfering range

Angle α	Smallest Hole Dia. $\varnothing D1$	Largest Chamfering Dia. $\varnothing D2$	L
5°	5.5	33.5	1.2
10°	7.3	34.7	2.4
15°	9.0	36.2	3.6
20°	11.2	37.4	4.7
25°	13.0	38.6	5.9
30°	15.2	39.6	7.0
35°	17.4	40.5	8.0
40°	19.6	41.2	9.0
45°	21.8	41.8	10.0

Angle α	Smallest Hole Dia. $\varnothing D1$	Largest Chamfering Dia. $\varnothing D2$	L
50°	24.0	42.2	10.8
55°	26.4	42.4	11.4
60°	28.5	42.5	12.1
65°	30.7	42.4	12.5
70°	32.9	42.1	12.6
75°	34.9	41.7	12.7
80°	36.9	41.1	11.9
85°	38.8	40.3	8.6

C-Cutter

Indexable Inserts



A = Non-coated

AZX = TiCN+TiAlN multilayer coating

Model	A	B	t	P30	P20	N20
				A	AZX	ADLC
CW1206	6.35	12.7	2.7	978.283	800.951	801.753
SCW1206				802.134	978.918	-
CW1909	9.525	19.05	4.5	978.817	800.952	801.754
SCW1909				802.135	802.136	-
CW3115	15.875	31.75	7.0	978.826	800.953	801.755
SCW3115				802.137	802.138	-

1. SCW contains 10 pcs of CW inserts in a package (same insert).
2. ADLC coated insert is available with 1 pce.

Recommended Cutting Condition

Cutter Type	Max. Chamfer	Chamfering	General Steel Alloy Steel		Stainless Steel		Cast Iron		Aluminium	
			Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)
ST20-C5/85A-40	2 mm *	Plunge Cutting	50	0.1	30	0.08	40	0.1	80	0.1
		Side Cutting	80	0.15	60	0.1	50	0.15	100	0.2
C0525C	C2	Plunge Cutting	50	0.1	30	0.08	40	0.1	80	0.1
		Side Cutting	80	0.15	60	0.1	50	0.15	100	0.15
C1040C	C3	Plunge Cutting	90	0.15	40	0.12	60	0.15	100	0.2
C1434C-60 C1652C-30	3 mm *	Side Cutting	120	0.3	60	0.2	90	0.3	150	0.3
C3060C / C3060	C4	Plunge Cutting	120	0.3	60	0.18	90	0.25	150	0.3
C3050C-60 C4565C-60 C5085C-30	4 mm *	Side Cutting	150	0.45	60	0.3	120	0.6	200	0.6
C50100C	C4	Plunge Cutting	150	0.4	80	0.25	120	0.35	180	0.4
		Side Cutting	150	0.45	60	0.36	120	0.6	240	0.6

Vc: Cutting speed (m/min.) f: Feed per revolution (mm/rev.)

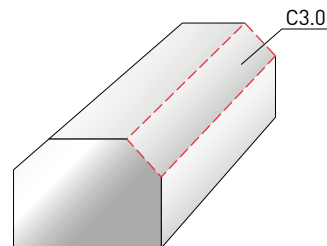
1. Cutting condition is the same for both non-coated and coated inserts. Coated inserts will achieve better surface finish and extended insert life.
2. Peck feed is necessary in case cutting chips are too long.
3. Reduce cutting speed if a larger chamfer than the max. amount shown in the table is required.
4. A high rigidity toolholder is recommended, such as BIG KAISER HMC or MEGA-D Chuck.
5. Max. chamfering amount with * in 30, 60 degree type and Universal type indicates the chamfering length of the longer side.

Application Example

C3 traverse chamfering. Workmaterial: C55 (S55C)

High cutting parameter was achieved without chattering

C-Cutter	ST25-C1040
Insert Model	CW1909A
Spindle speed	3 000 min ⁻¹
Feed	1 800 mm/min



R-Cutter

Front & back R-chamfering are available. 4 inserts multiply feed rate.



Front & Back R Chamfering

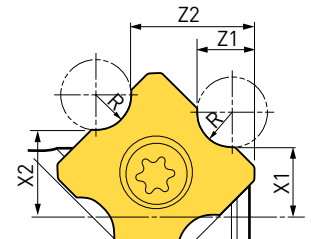
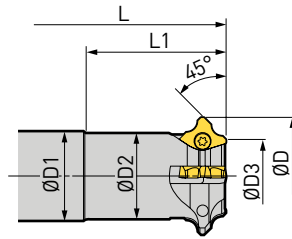
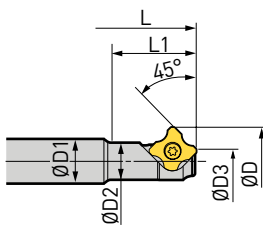


Fig. 1

Fig. 2

R-dimensions

A.9

Model	Fig.	ØD	ØD1	ØD2	ØD3	L	L1	No. of Inserts	R	X1	Z1	X2	Z2	Insert Model	Order No.
ST10 -RC061B - 15	1	12.3	10	6.6	4.4	78	15	1	0.5	3.61	1.93	4.30	5.78	RC06...	966.501
									1	3.35	2.18	4.04	5.53		
									1.5	3.09	2.43	3.78	5.28		
									2	2.83	2.68	3.52	5.03		
ST16 -RC121B - 30	1	24.4	16	13.3	8.6	103	30	1	1	7.17	3.79	8.56	11.63	RC12...	966.502
									2	6.65	4.29	8.03	11.13		
									3	6.13	4.79	7.51	10.63		
									4	5.60	5.29	6.99	10.13		
ST16 -RC064B - 30	2	21	16	15.2	13.2	101	30	4	0.5	7.89	1.93	8.59	5.78	RC06...	966.503
									1	7.64	2.18	8.34	5.53		
									1.5	7.39	2.43	8.09	5.28		
									2	7.13	2.68	7.84	5.03		
ST32 -RC124B - 50	2	42	32	30.8	26.3	141	50	4	1	15.85	3.79	17.26	11.63	RC12...	966.504
									2	15.33	4.29	16.75	11.13		
									3	14.83	4.79	16.24	10.63		
									4	14.31	5.29	15.73	10.13		

1. Wrench and screw are included. Inserts are to be ordered separately.

Indexable Inserts



(4-corners)

Type	Insert Model	Radius	Order No.	Insert Clamping Screw Set	Order No.
RC06	RC06050 ACP300	R0.5	966.530	S2TS-T6	966.449
	RC06100 ACP300	R1.0	966.531		
	RC06150 ACP300	R1.5	966.532		
	RC06200 ACP300	R2.0	966.533		
RC12	RC12100 ACP300	R1.0	966.534	S4S-T15	966.450
	RC12200 ACP300	R2.0	966.535		
	RC12300 ACP300	R3.0	966.536		
	RC12400 ACP300	R4.0	966.537		

1. Inserts are available in packet of 10 pcs.
2. Material is coated carbide.
3. 10 screws and 1 wrench are included in insert clamping screw set.



Front R Chamfering

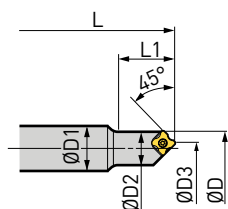


Fig. 1

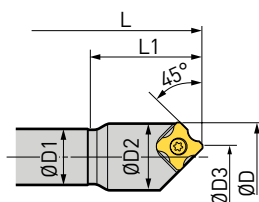
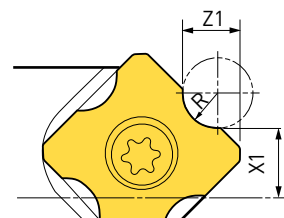


Fig. 2



R-dimensions

Model	Fig.	ØD	ØD1	ØD2	ØD3	L	L1	No. of Inserts	R	X1	Z1	Insert Model	Order No.
ST16 -RC061 - 20	1	12.3	16	11.9	4.5	94	20	1	0.5	3.61	1.93	RC06...	966.505
									1	3.35	2.18		
									1.5	3.09	2.43		
									2	2.83	2.68		
ST20 -RC121 - 40	2	24.4	20	23.8	8.9	121	40	1	1	7.17	3.79	RC12...	966.506
									2	6.65	4.29		
									3	6.13	4.79		
									4	5.60	5.29		

1. Wrench and screw are included. Inserts are to be ordered separately.

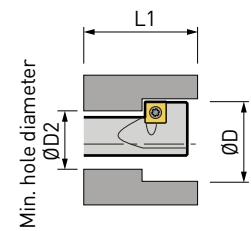
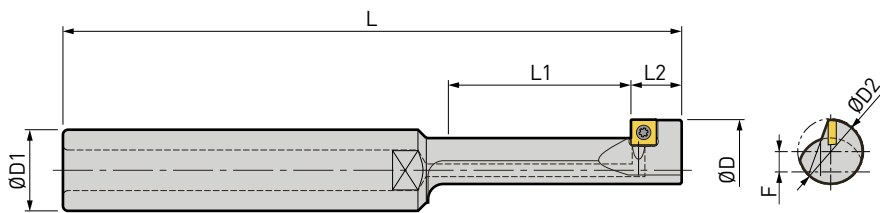
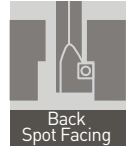
Recommended Cutting Condition

Workpiece Material	Cutting Speed (m/min)	Feed Rate (mm/tooth)	Coolant
Structural, Carbon or Alloy Steel	100 - 350	0.05 - 0.2	Dry
Prehardened Steel (less than HRC40)	60 - 80	0.05 - 0.1	Wet
Stainless Steel	100 - 250	0.08 - 0.2	Dry / Wet
Cast Iron	100 - 350	0.05 - 0.25	Dry
Aluminium	100 - 800	0.05 - 0.25	Dry / Wet

1. The table is a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. Wet cutting is generally recommended to obtain good surface quality.
3. In case of built-up edge occurs when cutting aluminum and stainless steel, use soluble oil.

BF-Cutter

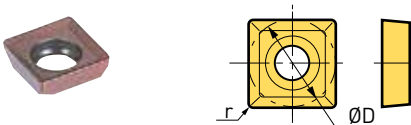
Selected spot facing diameters suitable for cap screws.



Model	ØD	ØD1	ØD2	L	L1	L2	Offset F	Insert Model	Order No.
ST16 -BFM6 -/11 - 12	11	16	6.5	102	12	9	2.40	CM0502	802.752
	-BFM8 -/14 - 20	14	16	8.5	108	9	2.90		802.753
	-BFM10-/17.5 - 25	17.5	16	10.5	112	10	3.65		802.750
	-BFM12-/20 - 36	20	16	13	122	10	3.65		802.751
ST20 -BFM14-/23 - 49	23	20	15	136	49	10	4.15		802.754
	-BFM16-/26 - 56	26	20	17	142	10	4.65		802.755

1. Wrench and screw are included. Inserts are to be ordered separately (10/pkg).
2. 10 screws and 1 wrench are included in insert clamping screw set.

Indexable Inserts



Model	ØD	Nose r	Insert Grade	
			ACP200	DS20
CM0502	Ø5	0.2	966.441	966.442

1. Inserts are available in a packet of 10 pcs.

Spare Parts

Cutting Type	Insert Clamping Screw Set	Order No.
BFM6/11	S2SS-T6	966.448
BFM8/14		
BFM10/17.5	S2TS-T6	966.449
BFM12/20		
BFM14/23		
BFM16/26		

Recommended Cutting Condition

Workpiece Material	Insert Grade	Cutting Speed (m/min)	Feed rate (mm/rev)
General Steel, High-Alloy Steel	ACP200	30	0.03
Cast Iron		30	0.03
Aluminium, Non-Ferrous	DS20	30 - 50	0.03

Insert grade

ACP200	DS20
General steel	Aluminium & non-ferrous
High wear-resistant PVD coating on carbide substrate with ultra multi-layer TiAlN and AlCrN in micron order.	Ultra smooth and low friction DLC coating on carbide substrate having excellent anti-adhesive property.

Center Boy

Accurate centering and chamfering can be obtained in a single operation.

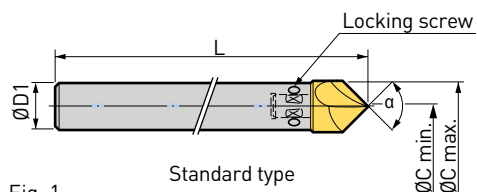
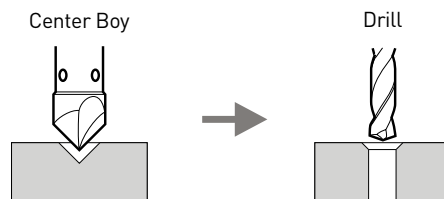
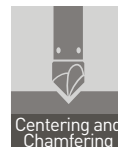


Fig. 1

Standard type

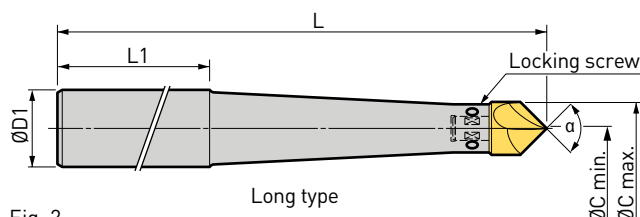


Fig. 2

Long type

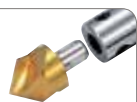
Model	Fig.	Chamfering Angle α	Chamfer		ØD1	L	L1	Bit Model	Spare Locking Screw	Order No.	
			ØC min.	ØC max.							
ST10 -CBY09010	1	90°	0.9	10	10	150	-	CBY09010	H0403-5P	966.415	
ST12 -CBY09013			0.9	13	12			CBY09013		966.416	
ST16 -CBY09016			1.0	16	16	180		CBY09016	H0504-5P	966.417	
ST20 -CBY09022			1.5	22	20			CBY09022	H0505-5P	966.418	
ST20 -CBY09013 -220 *	2		90°	0.9	13	20	220	120	CBY09013	H0403-5P	966.411
-260 *							260				966.412
ST32 -CBY09022 -260 *				1.5	22	32	260		CBY09022	H0505-5P	966.413
-300 *							300				966.414
ST12 -CBY12013	1	120°		0.9	13	12	150	-	CBY12013	H0403-5P	802.756

- 2 pcs of inserts and 2 pcs of locking screws are included as standard accessories.
- Spare locking screws are available in a packet of 5 pcs.

Indexable Bit



Highly accurate
Replaceable bit



Bit Model	Chamfering Angle α	Order No.
CBY09010	90°	966.422
CBY09013		966.423
CBY09016		966.424
CBY09022		966.425
CBY12013	120°	800.945

Locking Screw Model	Order No.
H0403-5P	978.256
H0504-5P	801.046
H0505-5P	801.047

- Bits are available in packages of 5 pcs.
- Bit grade is HSS with TiN coating.

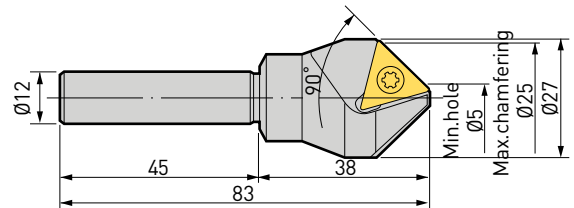
Recommended Cutting Condition

Workpiece Material	Cutter Type	Chamfering		Centering	
		Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)
General Steel Alloy Steel	Standard	20 - 35	0.10	25 - 50	0.08
	long	20 - 35	0.08	20 - 50	0.08
Stainless Steel	Standard	15 - 30	0.08	20 - 40	0.08
	long	15 - 30	0.06	15 - 30	0.06
Cast Iron	Standard	20 - 40	0.12	30 - 45	0.10
	long	20 - 40	0.10	30 - 45	0.10
Aluminium	Standard	45 - 60	0.15	50 - 65	0.15
	long	40 - 60	0.12	40 - 60	0.12

- The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
 - In case vibration occurs, reduce cutting speed V.
 - Projection length should be as short as possible.
- Vc: Cutting speed (m/min.) f: Feed per revolution (mm/rev.)

C-Cutter Boy

For bench drill machine only. Smooth guide with carbide support pad. Never get irregular chamfering. Long tool life with carbide insert. Economical with its 3 cutting edges.



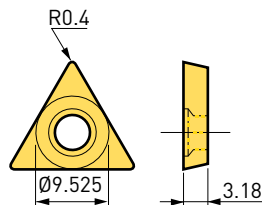
Model	Order No.
ST12B-C0525	966.408

1. Including 1 pce. of insert.

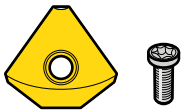
Indexable Insert

Model	Order No.
C1603B	966.409

1. Inserts are available in packages of 10 pcs.



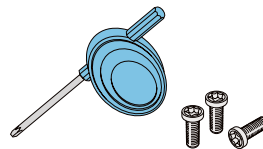
Guide Pad Set



Set Model	Carbide Guide	Thread Size	Order No.
CG0525S	CG0525	M4 x 7	978.908

1. 1 pce. of carbide set and clamping screw are included.

Insert Clamping Screw Set



Set Model	Thread Size	Wrench	Order No.
S4S	M4 x 8	FLR-20S	806.148

1. 10 pce. of clamping screw and 1 pce. of wrench are included.

Recommended Cutting Condition

Hole Dia. Ø	Spindle Speed (min ⁻¹)		
	Steel	Cast Iron	Aluminium
5	600	800	1000
10	500	600	800
15	400	500	600
20	300	400	500

Shanks, Reductions, Extensions, Carbide Boring Bars

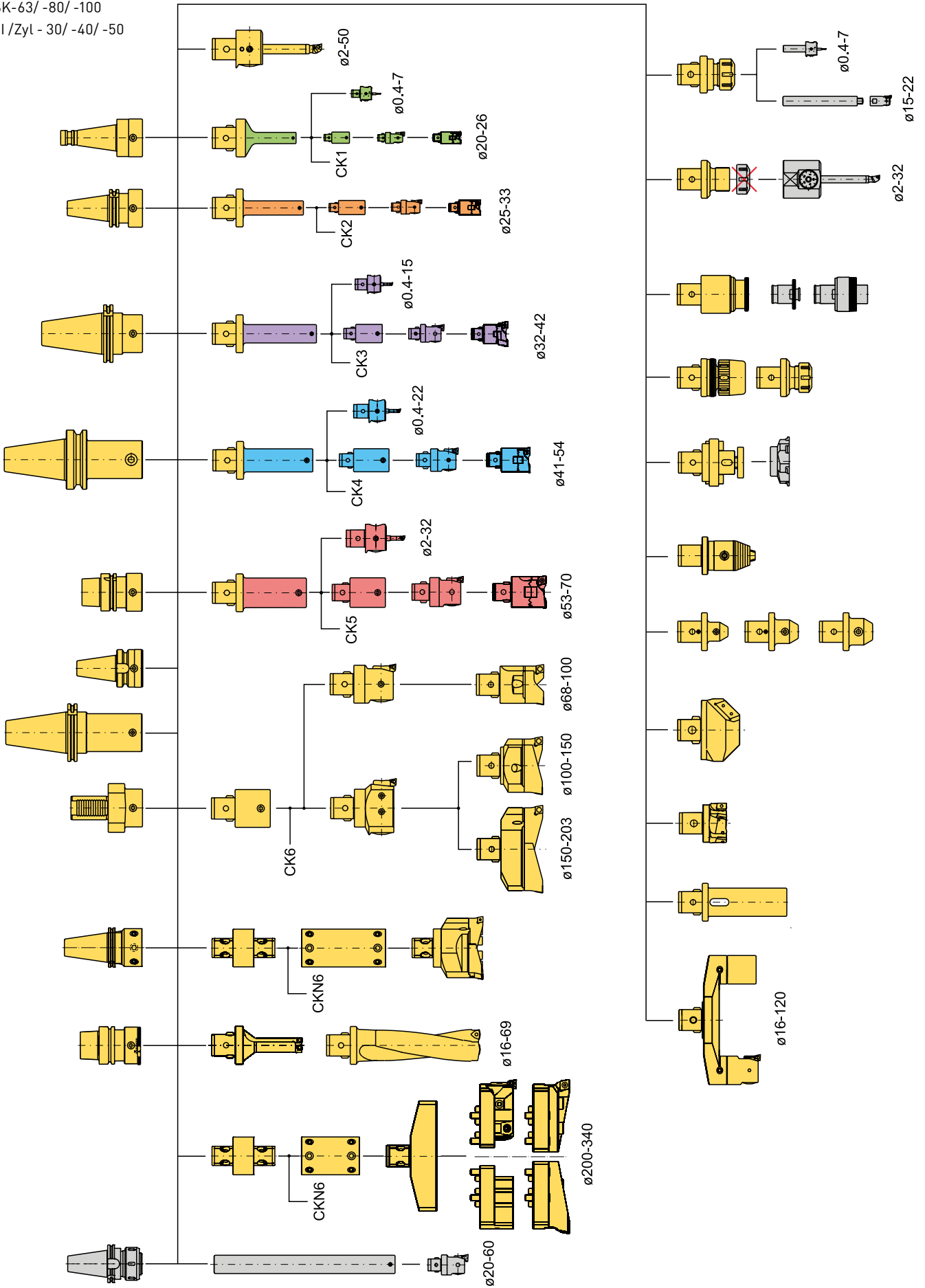
Program Overview CK6	2
Program Overview CK7	3
Taper Standards	4 - 5
Shanks	6 - 10
ER Collet Adapter	11
Tool Holders for Turning Machines	12
Anti-Vibration Shanks Smart Damper	13
Reductions, Extensions	14 - 15
Lightweight Components	16
Carbide Boring Bars and Tool Holders	17 - 19

Shanks

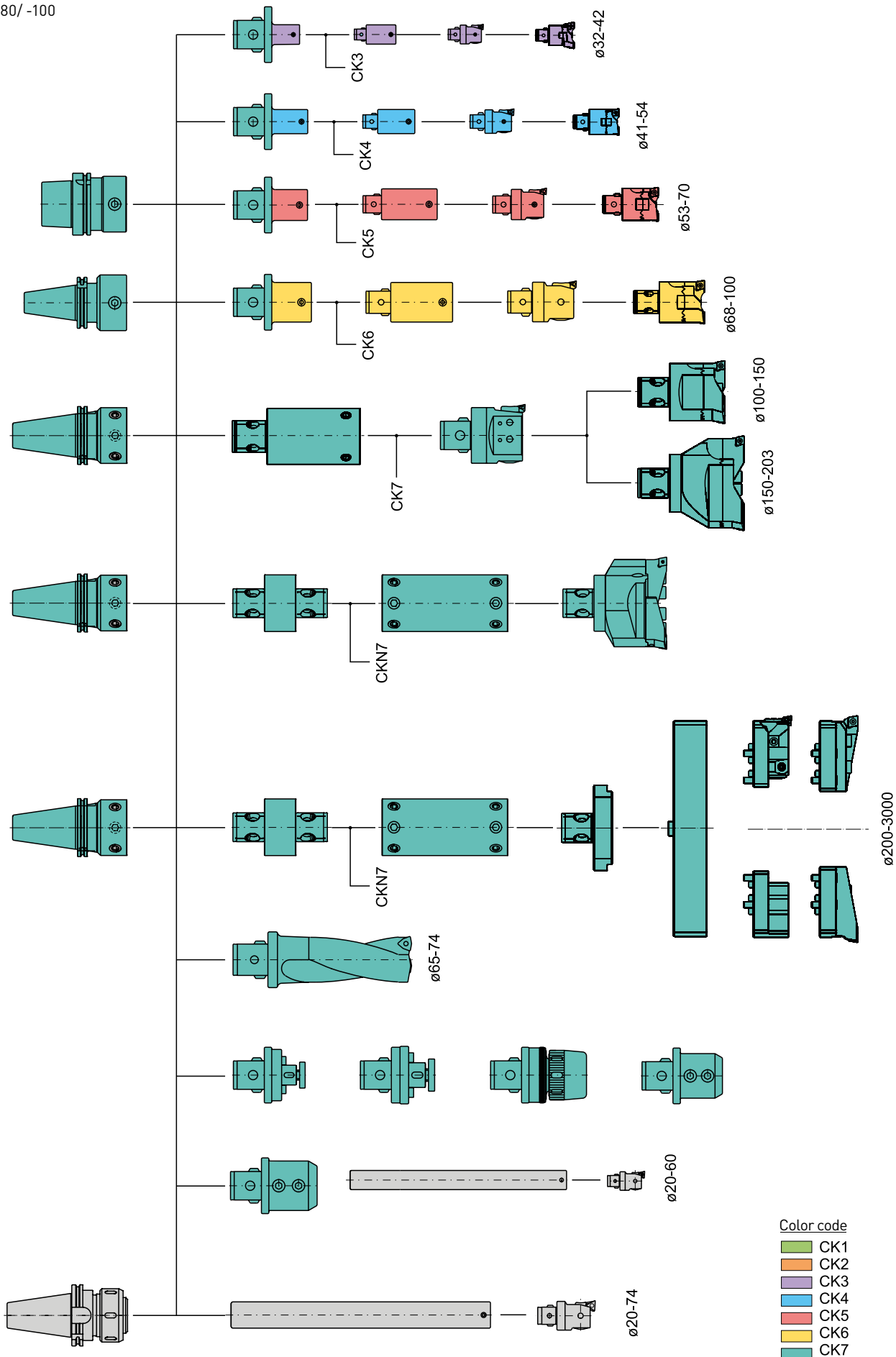
ISO 40 / 45 / 50

HSK-63/ -80/ -100

VDI / Zyl - 30/ -40/ -50



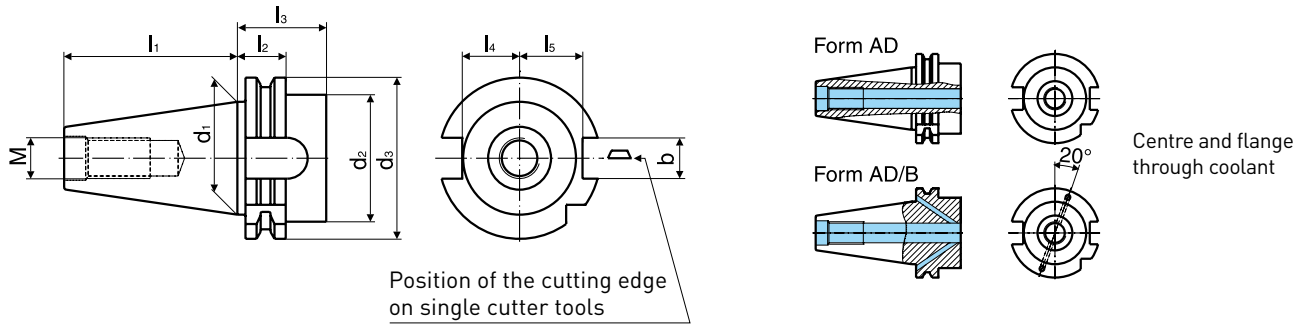
Shanks
ISO 45 / 50
HSK-80 / -100



- Color code
- CK1
 - CK2
 - CK3
 - CK4
 - CK5
 - CK6
 - CK7

B.1

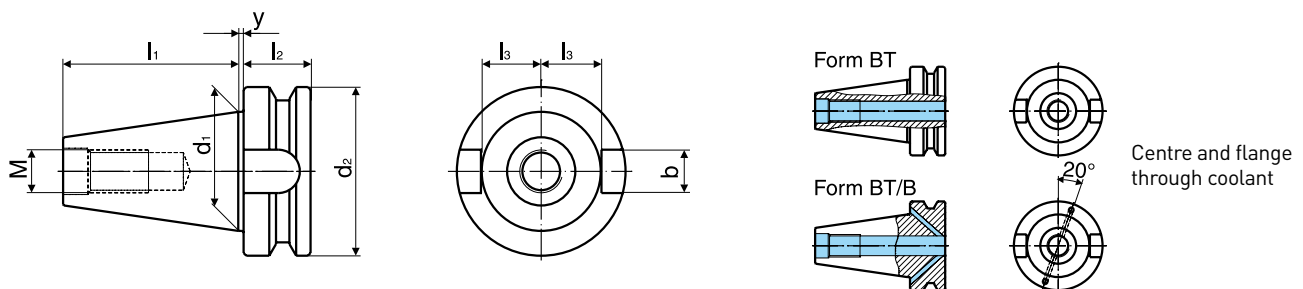
Steep taper shanks DIN 69871



SK	30	40	45	50
d1	31.75	44.45	57.15	69.85
d2 max.	45	50	63	80
d3	50	63.55	82.55	97.75
l1	47.8	68.4	82.7	101
l2	19.1	19.1	19.1	75
l3 min.	35	35	35	19.1
l4	16.4	22.8	29.1	35
l5	19	25	31.3	35.5
b	16.1	16.1	19.3	37.7
M	M12	M16	M20	25.7

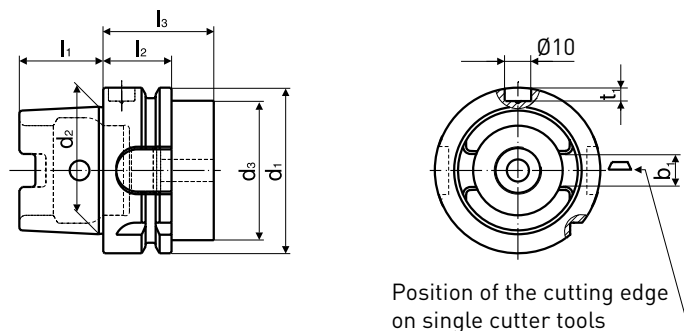
Steep taper shanks MAS 403/BT

B.1



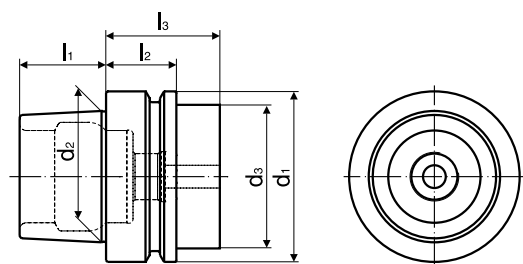
BT	30	40	45	50
d1	31.75	44.45	57.15	69.85
d2	46	63	85	100
y	2	2	3	3
l1	48.4	65.4	82.8	101.8
l2	20	25	30	35
l3	16.3	22.6	29.1	35.4
b	16.1	16.1	19.3	25.7
M	M12	M16	M20	M24

HSK, hollow taper interface DIN 69893, form A



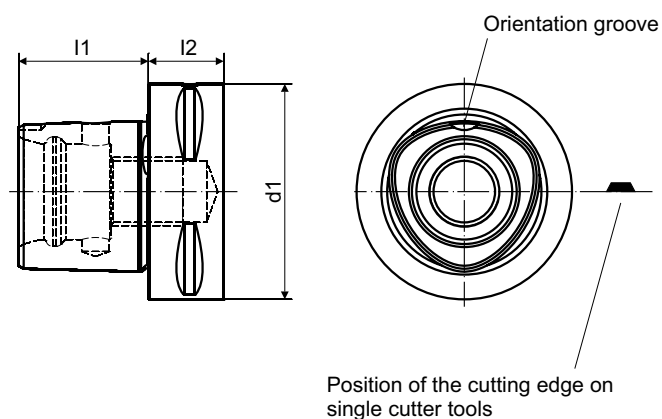
HSK-A	32	40	50	63	80	100
d1	32	40	50	63	80	100
d2	24.007	30.007	38.009	48.010	60.012	75.013
d3 max.	26	34	42	53	68	88
l1	16	20	25	32	40	50
l2	20	20	26	26	26	29
l3 min.	35	35	42	42	42	45
b1	7.05	8.05	10.54	12.54	16.04	20.02
t1	5.4	5.2	5.0	5.0	4.9	4.9

HSK, hollow taper interface DIN 69893, form E



HSK-E	25	32	40	50	63
d1	25	32	40	50	63
d2	19.006	24.007	30.007	38.009	48.010
d3 max.	20	26	34	42	53
l1	13	16	20	25	32
l2	10	20	20	26	26
l3 min.	20	35	35	42	42

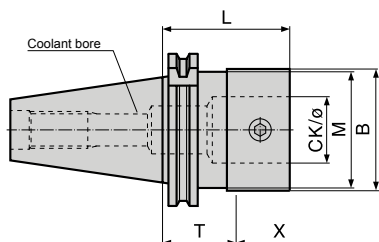
BIG CAPTO (compatible with Polygonal Taper Interface with flange contact surface, according ISO 26623-1)



C	3	4	5	6	8
d1	32	40	50	63	80
l1	19	24	30	38	48
l2	15	20	20	22	30

DIN 69871 Form AD

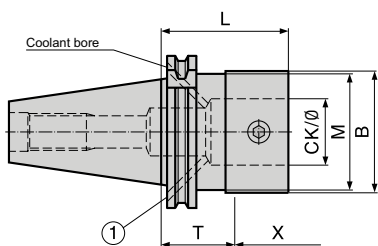
Coolant bore through centre



Taper Size	CK/ø	B	M	T	L	X	Order No.
SK30	CKB1/11	19	-	24	31.5	40	323.703
	CKB5/28	50	44.7	24	50	83	326.005
SK40	CKS5/28	50	50	40	43	60	326.050
	CKS6/36	63.5	50	40	59	90	323.721
SK50	BIG-PLUS CKN6/36	63.5	50	40	59	90	323.821N
	CKS6/36	63.5	70	40	69	100	323.760
	BIG-PLUS CKN6/36	63.5	70	40	69	100	323.860N
	CKS6/36	63.5	70	40	129	160	325.964
	BIG-PLUS CKN6/36	63.5	70	40	129	160	323.864N
	BIG-PLUS CKN6/36	63.5	70	40	229	260	323.865N
	CKS7/46	90	79	40	83	160 (130) ¹	323.761
	BIG-PLUS CKS7/46	90	79	40	83	160 (130) ¹	323.861 *
	BIG-PLUS CKN7/46	90	79	40	83	160 (130) ¹	323.861N
	BIG-PLUS CKS7/46	90	79	40	133	210 (130) ¹	323.862
BIG-PLUS CKN7/46	90	79	40	243	320 (290) ¹	323.866N	

DIN 69871 Form AD/B

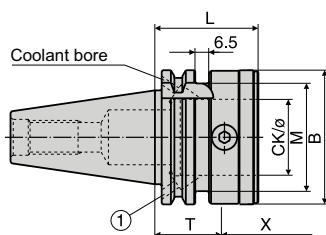
Coolant bores through centre and flange



Coolant bore sealable with set screw ①

Special

Extra short execution similar to DIN 69871 Form B/D



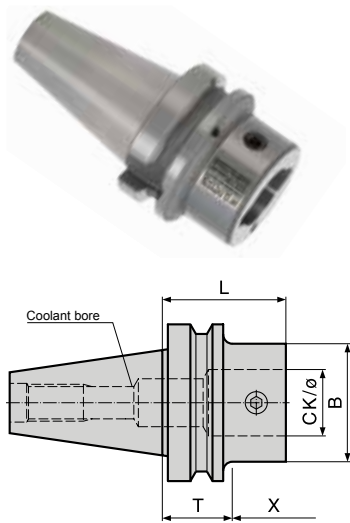
Coolant bore sealable with set screw ①

Taper Size	CK/ø	B	M	T	L	X	Order No.	
SK30	CKB3/18	31	31	24	31	47	323.701	
SK40	CKB1/11	19	44.5	40	90.5	83	326.011	
	CKB2/14	24	44.5	40	84.5	80	326.021	
	CKB3/18	31	31	25	35	50	323.728	
	CKB3/18	31	44.5	40	80	80	326.031	
	CKS4/22	39	44.5	40	73	80	326.041	
	BIG-PLUS CKS4/22	39	39	40	73	80	323.826	
	BIG-PLUS CKS5/28	50	50	40	43	60	326.057	
	BIG-PLUS CKS5/28	50	50	40	43	60	323.825	
	CKS5/28	50	50	40	143	160	326.054	
	CKN6/36	63.5	50	40	59	90	323.726N	
	CKS6/36	63.5	50	40	99	130	323.722	
	CKS6/36	63.5	50	40	129	160	326.064	
	SK40 Special	CKB6/36	63.5	51	40	49	80	329.842 *
	SK50	CKB3/18	31	70	40	130	130	325.933
CKB4/22		39	70	40	93	100	325.942	
CKB4/22		39	70	40	153	160	325.944	
CKS5/28		50	70	40	83	100	325.952	
BIG-PLUS CKS5/28		50	70	40	83	100	323.868	
CKB5/28		50	70	40	143	160	325.954	
CKS5/28		50	70	40	183	200	325.955	
CKN6/36		63.5	70	40	69	100	323.765N	
BIG-PLUS CKS6/36		63.5	70	40	129	160	323.867 *	
CKN6/36		63.5	70	40	129	160	323.767N	
CKS6/36		63.5	70	40	169	200	325.965	
CKN6/36		63.5	70	40	229	260	323.768N	
CKS7/46		90	79	40	83	160 (130) ¹	323.766 *	
CKN7/46		90	79	40	83	160 (130) ¹	323.766N	
BIG-PLUS CKS7/46		90	79	40	133	210 (180) ¹	323.863 *	
BIG-PLUS CKN7/46	90	79	40	273	350 (320) ¹	323.769N		

All BIG KAISER shanks according to DIN 69871 are made with bore for data chip \varnothing 10 mm, according to DIN 69873.

MAS 403/BBT/BT

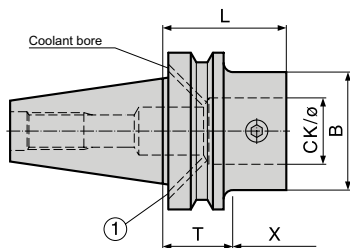
Coolant bore through centre



Taper Size	CK/Ø	B	T	L	X	Order No.
BT30	CKB1/11	19	27	34.5	40	323.707
	BIG-PLUS CKB1/11	19	31.5	72	73	328.308
	BIG-PLUS CKB2/14	24	25	82.5	93	328.260
	BIG-PLUS CKB3/18	31	26	39	53	328.272
	BIG-PLUS CKB4/22	39	27	73	93	328.261
	BIG-PLUS CKB5/28	50	27	38	68	329.866
	BIG-PLUS CKB5/28	50	27	63	93	328.262
BT40	BIG-PLUS CKB6/36	64	27	64	108	328.289
	CKB6/36	63.5	32	46	85	326.160
	BIG-PLUS CKN6/36	63.5	32	46	85	323.832N
	CKS6/36	63.5	32	61	100	323.731
	BIG-PLUS CKN6/36	63.5	32	61	100	323.731N *
BT50	BIG-PLUS CKN6/36	63.5	32	61	100	323.831N
	CKS6/36	63.5	43	72	100	323.770
	BIG-PLUS CKN6/36	63.5	43	72	100	323.770N *
	BIG-PLUS CKN6/36	63.5	43	72	100	323.874N
	CKS7/46	90	43	86	160 (130) ¹	323.771
	BIG-PLUS CKS7/46	90	43	86	160 (130) ¹	323.871 *
	BIG-PLUS CKN7/46	90	43	86	160 (130) ¹	323.871N
BIG-PLUS CKS7/46	90	43	136	210 (180) ¹	323.875	

MAS 403/BTB

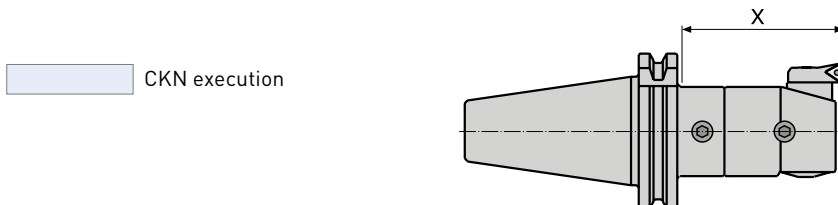
Coolant bores through centre and flange



Taper Size	CK/Ø	B	T	L	X	Order No.
BT30	CKB3/18	31	27	34	47	323.705
	CKB3/18	31	32	42	50	323.738
	CKS4/22	39	32	65	80	326.141
BT40	BIG-PLUS CKS5/28	50	32	55	80	323.730
	BIG-PLUS CKS5/28	50	32	55	80	323.837
	BIG-PLUS CKS5/28	50	32	105	130	326.153
	CKN6/36	63.5	32	46	85	323.735N
	CKN6/36	63.5	32	61	100	323.736N
	CKS6/36	63.5	32	91	130	326.163
	BIG-PLUS CKN6/36	63.5	43	72	100	323.775N
BT50	BIG-PLUS CKN6/36	63.5	43	132	160	323.777
	BIG-PLUS CKN7/46	90	43	86	160 (130) ¹	323.776N
	BIG-PLUS CKS7/46	90	43	136	210 (180) ¹	323.873 *

Coolant bore sealable with set screw ①

X = Boring depth, including length of corresponding boring head. The boring depth can be increased by using extensions. See page B15.

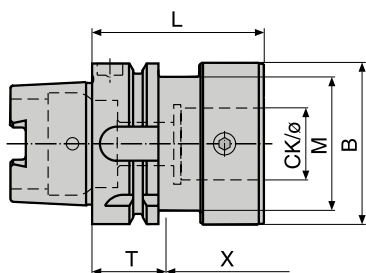


¹ The short executions of the boring heads EWN and SW result in a boring depth of 130/180/290/320 mm.

* As long as stock lasts.

DIN 69893 Form A

With drive key grooves and orientation notch



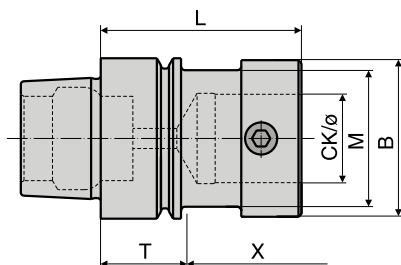
With bore for data chip \varnothing 10 mm, according to DIN 69873

B.1

Taper Size	CK/ø	B	M	T	L	X	Order No.
HSK-A25	CKB2/14	24	24 *	15.5	30	50	328.279F ^{2*}
HSK-A32	CKB2/14	24	24	25.5	33	43	328.278F ²
HSK-A40	CKB1/11	19	19	24	31.5	40	324.112F ²
	CKB2/14	24	24	25.5	35	45	328.277F
	CKB3/18	31	31	25	40	55	324.132F ²
	CKB4/22	39	33	25	50	72	324.142F ²
HSK-A50	CKB3/18	31	31	31	44	53	324.232F ²
	CKB4/22	39	39	31	48	64	324.242F ²
	CKB5/28	50	41	31	61	87	324.252F ²
HSK-A63	CKB1/11	19	19	31	95.5	80	324.312F ²
	CKB2/14	24	24	31	75.5	100	324.322F ²
	CKB3/18	31	31	31	71	80	324.331
	CKB3/18	31	31	31	71	80	324.331F ²
	CKB3/18	31	31	31	121	130	324.332
	CKS4/22	39	39	31	94	110	324.341
	CKS4/22	39	39	31	94	110	324.341F ²
	CKS4/22	39	39	31	114	130	324.342
	CKB5/28	50	50	31	59	85	324.352
	CKB5/28	50	50	31	59	85	324.352F ²
	CKS5/28	50	50	31	89	115	324.353
	CKS5/28	50	50	31	134	160	324.354
	CKB6/36	63.5	53	31	70	110	324.361
	CKB6/36	63.5	53	31	70	110	324.361F ²
	CKN6/36	63.5	53	31	70	110	324.361N
	CKS6/36	63.5	53	31	100	140	324.362
CKN6/36	63.5	53	31	160	200	324.367N	
HSK-A80	CKB6/36	63.5	64	31	75	115	324.461
HSK-A100	CKB3/18	31	31	34	124	130	324.531
	CKS4/22	39	39	34	147	160	324.541
	CKS5/28	50	50	34	107	130	324.551
	CKS5/28	50	50	34	177	200	324.552
	CKB6/36	63.5	64	34	78	115	324.561
	CKN6/36	63.5	64	34	78	115	324.561N
	CKS6/36	63.5	64	34	108	145	324.563
	CKN6/36	63.5	64	34	108	145	324.563N
	CKN6/36	63.5	64	34	223	260	324.566N
	CKB7/46	90	84	34	87	170 (140) ¹	324.571
	CKN7/46	90	84	34	87	170 (140) ¹	324.571N
	CKS7/46	90	84	34	127	210 (180) ¹	324.572
	CKN7/46	90	84	34	127	210 (180) ¹	324.572N
CKN7/46	90	84	34	267	350 (320) ¹	324.575N	

DIN 69893 Form E

Symmetrical execution for high speed machine spindles



Taper Size	CK/ø	B	M	T	L	X	Order No.
HSK-E25	CKB1/11	19	19	14.5	22	40	328.249F ^{2**}
	CKB2/14	24	24 *	15.5	30	50	328.281F ^{2*}
HSK-E32	CKB1/11	19	19	22.5	40	50	328.257F ²
	CKB2/14	24	24	25.5	33	43	328.280F ²
	CKB3/18	31	25.8	20	48	68	328.151F ²
	CKB4/22	39	26	25	68	90	328.218F ²
HSK-E40	CKB1/11	19	19	24	31.5	40	324.111F ²
	CKB2/14	24	24	25.5	35	45	324.121F ²
	CKB3/18	31	31	25	40	55	324.131F ²
	CKB4/22	39	33	25	50	72	324.141F ²
HSK-E50	CKB3/18	31	31	31	44	53	324.231F ²
	CKB4/22	39	39	31	48	64	324.241F ²
	CKB5/28	50	41	31	61	87	324.251F ²

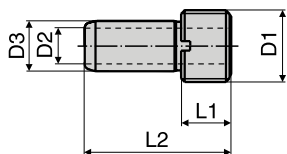
CKN execution

¹ The short executions of the boring heads EWN and TW result in a boring depth of 140/180/320 mm.

² HSK shanks with index "F" are precision balanced to G 6.3 at 15'000 r.p.m.

* The dimension M does not correspond to the HSK standard. ** Without thread for coolant tubes.

Coolant tubes for hollow taper DIN 69893

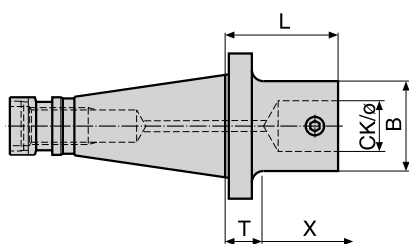


Type	D1	D2	D3	L1	L2	Order No.
HSK-A25/E25	M8 x 1	3	5	4.5	17	324.908
HSK-A32/E32	M10 x 1	3.5	6	5.5	26	324.900
HSK-A40/E40	M12 x 1.0	5	8	7.5	29.5	324.901
HSK-A50/E50	M16 x 1.0	6.4	10	9.5	33	324.902
HSK-A63/E63	M18 x 1.0	8	12	11.5	36.5	324.903
HSK-A80	M20 x 1.5	10	14	13.5	40	324.904
HSK-A100	M24 x 1.5	12	16	15.5	44	324.905

The coolant tubes are sold without installation wrench.

DIN 2080

For manual tool change

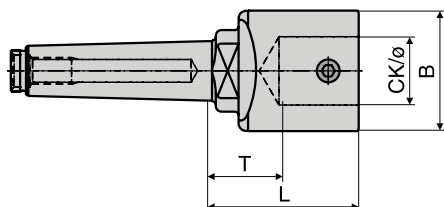


Taper Size	CK/Ø	B	T	L	X	Order No.
40	CKS5/28	50	16	39	80	321.451
	CKB6/36	63.5	16	45	100	321.462
50	CKB6/36	63.5	20	49	100	323.780 *
	CKS7/46	90	20	63	160 [130] ¹	323.781 *

1. * Shanks SK50 without OTT ring groove.

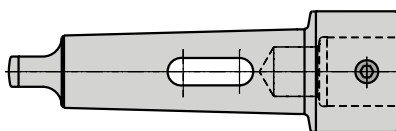
Morse taper shanks

With thread (SIP / Hauser)



Taper Size	CK/Ø	B	T	L	X	Order No.
MK4/M14	CKB6/36	63.5	22	81	130	322.563

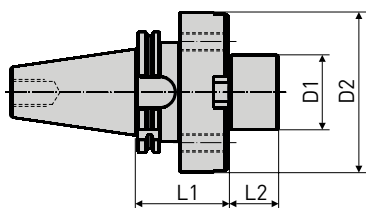
With tang



Taper Size	CK/Ø	B	T	L	X	Order No.
MK5/L	CKB6/36	63.5	11	55	115	323.563

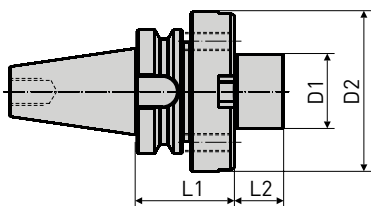
Shanks and tool holders for bridge tools series 318, Ø 620 - 3 000 mm

SK50 BIG-PLUS, DIN 69871 AD



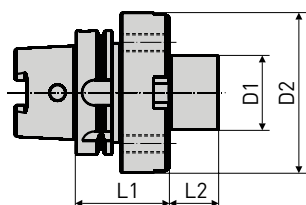
Taper Size	D1	D2	L1	L2	Order No.
SK50	60	129	75	40	328.215

BT50 BIG-PLUS, MAS 403/BT



Taper Size	D1	D2	L1	L2	Order No.
BT50	60	129	85	40	328.213

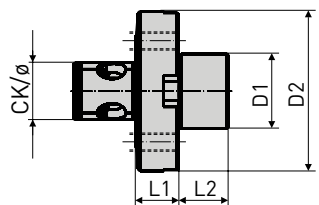
HSK-A100, DIN 69893A



Taper Size	D1	D2	L1	L2	Order No.
HSK-A100	60	129	75	40	328.214

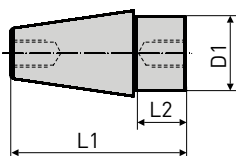
B.1

BIG KAISER CKN



Taper Size	D1	D2	L1	L2	Order No.
CKN7/Ø46	60	129	35	40	328.217N

Centering shank ISO 50



Taper Size	D1	D2	L1	L2	Order No.
ISO 50, M24	60	-	140	40	328.216

Adapter rings and spacers available on request.

 CKN execution

BIG KAISER precision boring heads for turning machines

The new ER collet adapters, available in the sizes ER25 with CKB1 connection and ER32 with CKB1 and CKB2, enable the use of all BIG KAISER precision boring heads of the corresponding sizes on ER collet chucks. Thanks to full compatibility with the modular BIG KAISER extensions also long tool combinations can be achieved easily.

ER collet adapter CKB



Size	Fig.	CK/Ø	L	X	A	Order No.
ER25	1	CKB1/11	55	50	19	335.130
ER32	2	CKB1/11	61	50	19	335.131
ER32	3	CKB2/14	58	50	24	335.132

Fig. 1

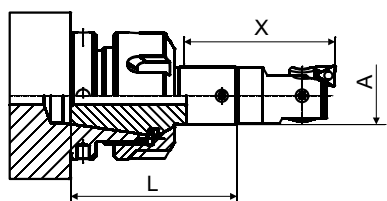


Fig. 2

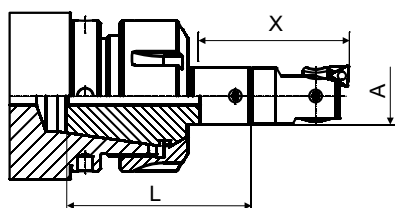
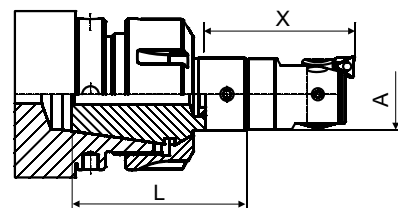


Fig. 3



ER collet adapter CKB



B.1

WTO QuickFlex® adapter with BIG KAISER connection

For the WTO quick change tooling system QuickFlex®, there are now also adapters for BIG KAISER rough- and precision boring heads available. This offers the possibility for precise and fast machining of cross holes in the diameter range from 0.4 – 74 mm on turning machines.

The WTO QuickFlex® adapters with CKB connection are available at BIG KAISER and WTO. Ask for further documentation.

Features

- QuickFlex® adapters with BIG KAISER connection in very short executions
- 4 different adapters in the system sizes CKB1 – CKB4 for BIG KAISER rough and precision boring heads
- Boring range for finishing: \varnothing 0.4 – 74 mm
- Boring range for roughing: \varnothing 16 – 66 mm



WTO QuickFlex® tool holder



QuickFlex® adapter with BIG KAISER connection

BIG KAISER precision boring head



BIG KAISER boring tools

B.1



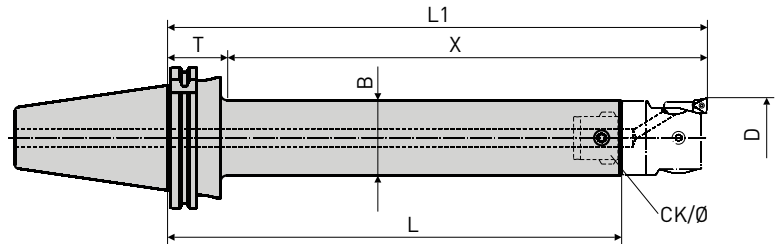
Smart Damper shanks

Tool shanks with integrated damping system for highly efficient deep hole finish boring.

Features

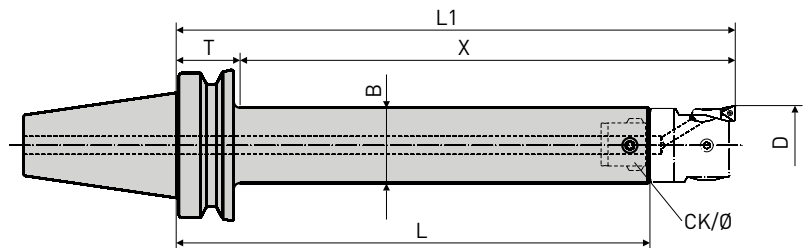
- Diameter-length ratio 1:6
- Less vibration
- Longer tool life
- Higher metal removal rate

DIN 69871 Form AD, BIG-Plus



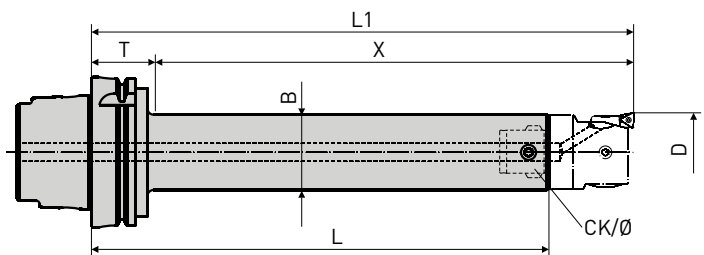
Taper Size		CK/Ø	D	B	T	L	L1	X	Order No.
SK50	BIG-PLUS	CKB5/28	53 - 95	50	40	301	358	318	328.233
	BIG-PLUS	CKB6/36	68 - 150	64	40	377	448	408	328.235

MAS 403/BT, BIG-Plus



Taper Size		CK/Ø	D	B	T	L	L1	X	Order No.
BT50	BIG-PLUS	CKB5/28	53 - 95	50	43	314	371	328	328.228
	BIG-PLUS	CKB6/36	68 - 150	64	43	380	451	408	328.230

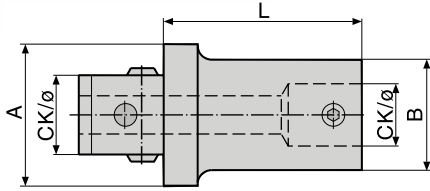
DIN 69893 Form A



Taper Size	CK/Ø	D	B	T	L	L1	X	Order No.
HSK-A100	CKB5/28	53 - 95	50	50	303	360	310	328.238
	CKB6/36	68 - 150	64	50	379	450	400	328.240

B.1

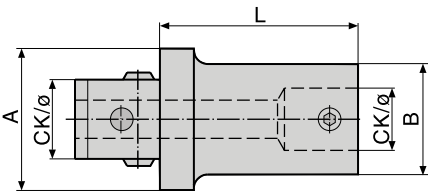
Reductions steel



CK/ø	CK/ø	A	B	L	Y	X	Order No.
CKB2/14	CKB1/11	24	19	36	10.5	55	332.210
CKB3/18	CKB1/11	31	19	40.5	10	60	332.310
CKB3/18	CKB2/14	31	24	34.5	10	60	332.320
CK4/22	CKB1/11	39	19	57.5	12	75	332.410
CKB4/22	CKB2/14	39	24	51.5	12	75	332.420
CKB4/22	CKB3/18	39	31	47	12	75	332.430
CK5/28	CKB1/11	50	19	57.5	17	70	332.511
CK5/28	CKB1/11	50	19	87.5	17	100	332.510
CK5/28	CKB2/14	50	24	51.5	17	70	332.521
CK5/28	CKB2/14	50	24	81.5	17	100	332.520
CKB5/28	CKB3/18	50	31	47	17	70	332.531
CKB5/28	CKB3/18	50	31	77	17	100	332.530
CKS5/28	CKB4/22	50	39	40	17	70	332.541
CKS5/28	CKS4/22	50	39	70	17	100	332.545
CK6/36	CKB1/11	63.5	19	66.5	31	65	332.611
CK6/36	CKB1/11	63.5	19	101.5	31	100	332.610
CK6/36	CKB2/14	63.5	24	60.5	16	80	332.621
CK6/36	CKB2/14	63.5	24	95.5	16	115	332.620
CK6/36	CKB3/18	63.5	31	56	16	80	332.631
CK6/36	CKB3/18	63.5	31	91	16	115	332.630
CK6/36	CKB3/18	63.5	31	136	16	160	332.632
CKS6/36	CKB4/22	63.5	39	49	16	80	332.641
CKS6/36	CKS4/22	63.5	39	84	16	115	332.645
CKS6/36	CKS4/22	63.5	39	129	16	160	332.642
CKS6/36	CKB5/28	63.5	50	39	16	80	332.651
CKS6/36	CKS5/28	63.5	50	74	16	115	332.655
CKS6/36	CKS5/28	63.5	50	119	16	160	332.652
CKS7/46	CKS4/22	90	39	70	17	100	332.741
CKS7/46	CKS4/22	90	39	100	17	130	332.745
CKS7/46	CKB5/28	90	50	60	17	100	332.751
CKS7/46	CKS5/28	90	50	90	17	130	332.755
CKS7/46	CKS5/28	90	50	120	17	160	332.750
CKS7/46	CKS6/36	90	63.5	76	17	130	332.765
CKN7/46	CKN6/36	90	63.5	76	17	130	332.765N ¹
CKS7/46	CKS6/36	90	63.5	106	17	160	332.766

B.1

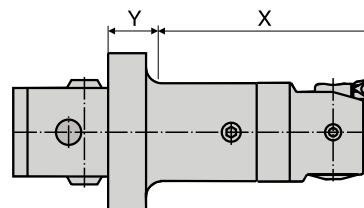
Reductions aluminium



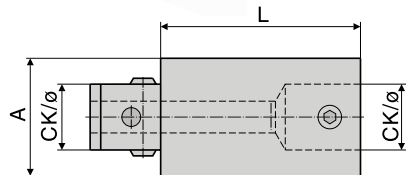
CK/ø	CK/ø	A	B	L	Y	X	Order No.
CKB7/46	CKB6/36	90	63.5	76	17	130	332.763 *
CKB7/46	CKB6/36	90	63.5	106	17	160	332.767 *

1. * As long as stock lasts.

X = Boring depth, including length of corresponding boring head.



Extensions steel



CK/ø	CK/ø	A	L	Order No.
CKB1/11	CKB1/11	19	20	331.110
CKB1/11	CKB1/11	19	30	331.111
CKB2/14	CKB2/14	24	30	331.220
CKB2/14	CKB2/14	24	45	331.221
CKB3/18	CKB3/18	31	30	331.330
CKB3/18	CKB3/18	31	45	331.331
CKS4/22	CKB4/22	39	40	331.440
CKS4/22	CKS4/22	39	60	331.445
CKS5/28	CKB5/28	50	60	331.550
CKS5/28	CKS5/28	50	90	331.555
CKS6/36	CKB6/36	63.5	60	331.660
CKN6/36	CKN6/36	63.5	60	331.660N ¹
CKS6/36	CKS6/36	63.5	100	331.665
CKN6/36	CKN6/36	63.5	100	331.665N ¹
CKS7/46	CKS7/46	90	100	331.775
CKN7/46	CKN7/46	90	100	331.775N ¹
CKS7/46	CKS7/46	90	160	331.776
CKN7/46	CKN7/46	90	160	331.776N ¹

Smart Damper extension



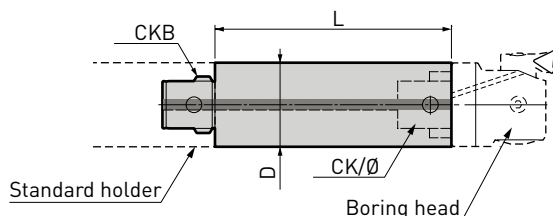
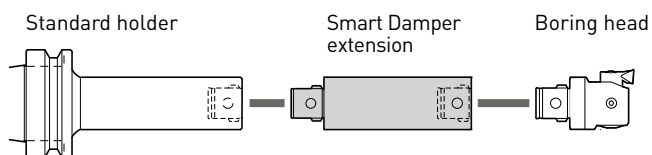
Extension with integrated damping system for highly efficient deep hole finish boring.

Features

- To be used with standard CK-shank
- Can be combined with steel extensions
- Bore depths up to 6 times diameter



B.1

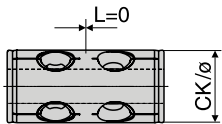


CK/ø	A	L	Order No.
CKB4/22	39	120	389.365
CKB5/28	50	150	389.366
CKB6/36	64	180	389.367

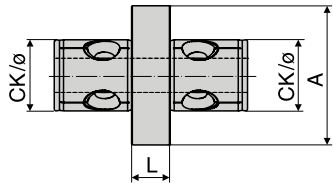
CKN execution

¹ The additionally needed 2 pcs of CK-screws are included in the delivery of the mating CKN component with male connector.

Double connector couplings CKN

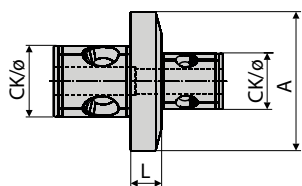


CK/ø	CK/ø	A	L	Order No.
CKN6/36	CKN6/36	-	0	331.864N *
CKN7/46	CKN7/46	-	0	331.874N *



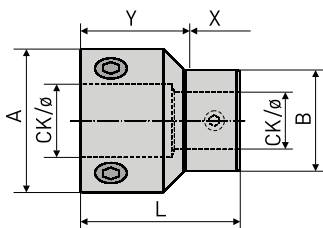
CK/ø	CK/ø	A	L	Order No.
CKN6/36	CKN6/36	63.5	20	331.865N *
CKN7/46	CKN7/46	90	25	331.875N *
CKN7/46	CKN7/46	90	50	331.876N *

Double connector reduction CKN7 - CKN6



CK/ø	CK/ø	A	L	Order No.
CKN7/46	CKN6/36	90	20	332.875N *

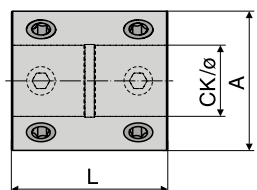
Reduction aluminium CKN7 - CKB6



CK/ø	CK/ø	A	B	L	Y	X	Order No.
CKN7/46	CKB6/36	90	63.5	100	71	100	332.870N *

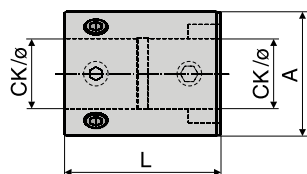
B.1

Extension tubes aluminium CKN



CK/ø	CK/ø	A	L	Order No.
CKN6/36	CKN6/36	63.5	80	331.867N
CKN6/36	CKN6/36	63.5	120	331.868N
CKN7/46	CKN7/46	90	100	331.877N
CKN7/46	CKN7/46	90	150	331.879N
CKN7/46	CKN7/46	90	200	331.878N

Adapter tubes aluminium CKN - CKB



CK/ø	CK/ø	A	L	Order No.
CKN6/36	CKB6/36	63.5	80	331.860N
CKN6/36	CKB6/36	63.5	120	331.861N
CKN7/46	CKB7/46	90	100	331.870N
CKN7/46	CKB7/46	90	150	331.871N

 CKN execution

* The additionally needed 2 pcs of CK-screws are included in the delivery of the mating CKN component with male connector.

For machining of extremely deep bores

Tool combinations with vibration-dampening carbide bars permit efficient machining of bores with diameter/length ratios up to 1 : 10.



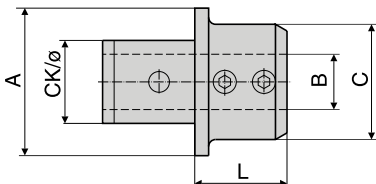
Features

- Bore depths up to 10 x \varnothing
- Carbide bars with CKB connection to be used with rough and finish boring heads as well as with tool holders.
- Fine diameter graduation; for the boring range \varnothing 20 - 33 [47] mm, 6 carbide bars of different diameters and in various lengths are available.
- Optimized tool length due to axial adjustment of the carbide bar inside the collet holder.
- Highest rigidity and dampening of vibration with tool holders for collets according to DIN 6388 in BIG-PLUS and HSK-A execution.
- Tool holders with CKB connection for an even wider choice of the tool combination.

B.1

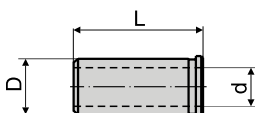
Tool holders with CK connection

Modular tool holders for chucking carbide bars with side lock screws enable the selection of the best possible tool combination for a given boring operation.



CK/Ø	A	B	C	L	Order No.
CK6/36	63.5	19	36	30	335.301
CK6/36	63.5	24	50	40	335.302
CK7/46	90	24	54	48	335.312
CK7/46	90	31	72	80	335.313

Reducers

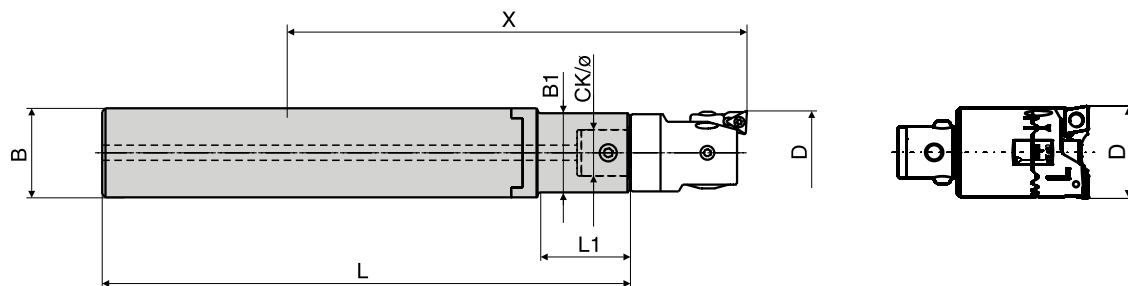


Type	d	D	L	Order No.
31/19	19	31	62	613.633
31/24	24	31	62	613.634

Carbide bars

Due to maximum rigidity, a carbide bar, optimized in length and with the biggest possible diameter, guarantees the best result when machining deep bores.

For the work range from \varnothing 20 - 33 [47] mm, the fine graduated carbide bar program contains bars with 6 different diameters and 3 different lengths per diameter. Therefore, for every deep bore machining in this range, the optimal carbide bar is always available. The program is completed with carbide bars \varnothing 31 and \varnothing 40 mm in 3 different lengths each, for the boring range from \varnothing 32 - 54 [74] mm. Carbide bars \varnothing 40 mm are also available for rent.



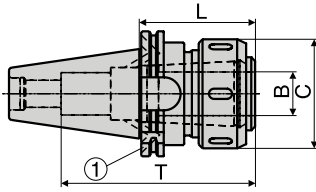
CK/ø	Boring Heads Type	D	B	B1	L	L1	Boring Depth X max.	Order No.		
CKB1/11	SW 20, EWN 20	20 - 26 (31/36)	19	19	140	-	125	335.320		
					190		175	335.321		
					240		225	335.322		
			140		26	125	335.380			
			190			175	335.381			
			240			225	335.382			
		140	26	125	335.383					
		190		175	335.384					
		240		225	335.385					
		CKB2/14	SW 25, EWN 25	25 - 33 (40/47)	24	24	160	-	140	335.323
							220		200	335.324
							290		270	335.325
160	28				140		335.386			
220					200		335.387			
290					270		335.388			
160	28			140	335.389					
220				200	335.390					
290				270	335.391					
CKB3/18	SW 32, EWN 32			32 - 42 (51/60)	31	31	200	-	175	335.326
							260		235	335.331
							350		325	335.327
CKB4/22	SW 41, EWN 41, EWD 41	41 - 54 (66/74)	40	40	235	-	200	335.328 *		
					335		300	335.329 *		
					435		400	335.330 *		

1. * Also available for rent.

Collet holders for collets according to DIN 6388 / ISO 10897

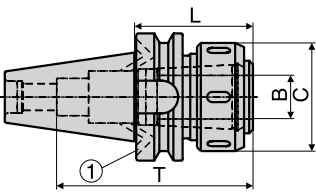
For optimized clamping of the carbide bars, BIG KAISER offers collet holders with BIG-PLUS and HSK-A shanks, and for collets according to DIN 6388. Due to the small taper angle (1:10) a longer collet gripping length and higher clamping force results. The simultaneous taper and flange contact between tool and machine spindle provides a higher rigidity and a better run out accuracy.

DIN 69871 Form AD/B BIG-PLUS



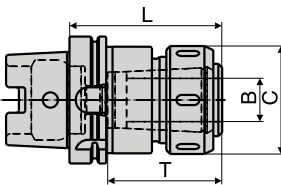
Taper Size	Clamping range B	L	C	T	Collets Type	Order No.
SK40	4 - 32	86	72	102/124 *	B32	335.343
SK50	6 - 40	93	85	154	B40	335.353

MAS 403/BTB BIG-PLUS



Taper Size	Clamping range B	L	C	T	Collets Type	Order No.
BT40	4 - 32	86	72	102/121 *	B32	335.344
BT50	6 - 40	97	85	156	B40	335.354

DIN 69893 Form A



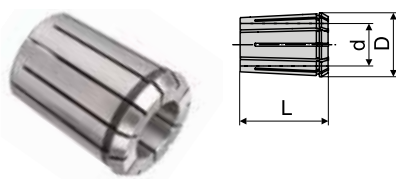
Taper Size	Clamping range B	L	C	T	Collets Type	Order No.
HSK-A63	4 - 32	104	72	80	B32	335.342
HSK-A100	6 - 40	123	85	92	B40	335.352

- * Carbide bars $\varnothing 19 / \varnothing 21 / \varnothing 23 / \varnothing 24$.
- ① Coolant bore sealable with set screw.

B.1

Collets according to DIN 6388 B / ISO 10897 B

Collets with slits on both ends and with a taper rate of 1:10

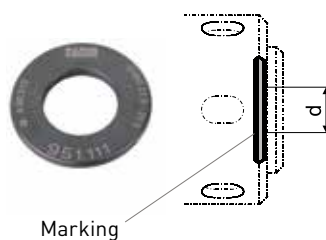


Type	d	D	L	Order No.
B32	19	43.70	60	951.100A
	21			951.101A
	23			951.102A
	24			951.103A
	27			951.104A
	29			951.105A
	31			951.106A

Type	d	D	L	Order No.
B40	19	52.20	68	951.120A
	21			951.121A
	23			951.122A
	24			951.123A
	27			951.124A
	29			951.125A
	31			951.126A
	40			951.127A

Seal discs according to DIN 6388 / ISO 10897

Marking on sealing disc has to be on the inside (not visible from outside).



Type	d	Order No.
B32	19	951.110
	21	951.111
	23	951.112
	24	951.113
	27	951.114
	29	951.115
	31	951.116

Type	d	Order No.
B40	19	951.130
	21	951.131
	23	951.132
	24	951.133
	27	951.134
	29	951.135
	31	951.136
	40	951.137

Indexable Insert Drills, Boring Heads for Roughing

Adjustable Drill Holders	22
Indexable Insert Drills Ø 16 - 30 mm, Series 337	23 - 24
Indexable Insert Drills Ø 31 - 74 mm, Series 336	25 - 26
Twin-Cutter Boring Heads SW, Series 319	27 - 34
Twin-Cutter Boring Heads MW	35
Twin-Cutter Boring Heads TWN, Series 315	36 - 37
Chamfering Rings	38

Drilling in IT9 quality with insert drills

Drill holders with patented double eccentric bush for stepless diameter adjustment of BIG KAISER insert drills with CKB6 tool connection.

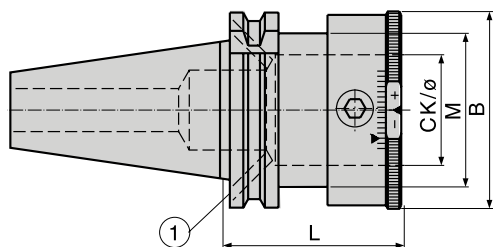
Features

- Stepless adjusting of drill diameter within the range:
Drill nominal dia.: + 1.0/-0.2 mm
- Easy-to-read adjusting scale 1 DIV = 0.1 mm, and adjusting precision better than 0.05 mm Ø.
- Extremely compact and rigid design for drilling under all conditions.
- One only drill-holder for the whole range Ø 16 bis 69 mm.



Adjustable drill holders with steep taper shank

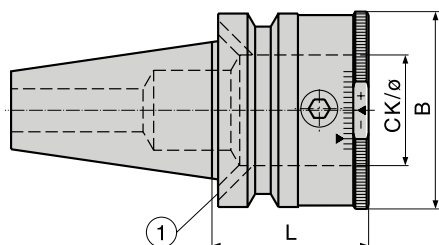
DIN 69871 Form B/D



Type	CK/Ø	B	M	L	Order No.
SK40	CKB6/36	65	50	59	336.301
SK50	CKB6/36	65	-	69	336.303

MAS 403/BTB

B.2

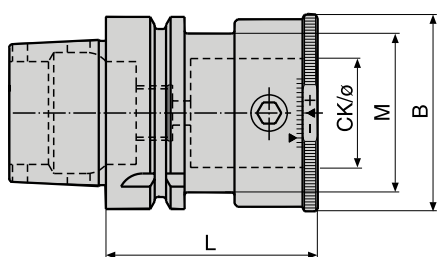


Type	CK/Ø	B	M	L	Order No.
BT40	CKB6/36	65	-	51	336.302
BT50	CKB6/36	65	-	72	336.304

Coolant bores sealable with set screws ①

Adjustable drill holders with HSK

DIN 69893 Form A



Type	CK/Ø	B	M	L	Order No.
HSK-A63	CKB6/36	65	52.5	70	336.309
HSK-A100	CKB6/36	65	-	83	336.310

The coolant pipe is to be ordered separately, see page B9.

Indexable insert drills Ø 16 - 30 mm, 3 x D and 4 x D, with CKS6 connection

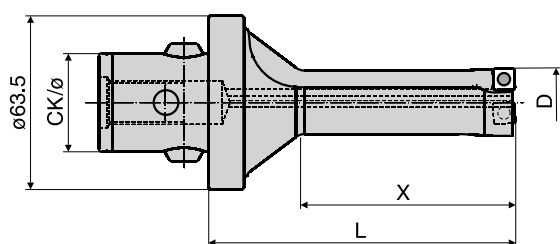
The BIG KAISER indexable insert drills series 337 are made with straight flutes. This design guarantees a short distance for chip evacuation and a high radial and torsional rigidity. The CKS connection features a very high clamping force, a short gauge length and a large seating diameter. This makes the drill suitable for drilling in applications with interruptions such as angled entry or exit surfaces, and cross-holes.

Features

- Clockwise cutting, with 4 edge inserts, also suitable to enlarge existing holes.
- Suitable for use as a rotating or stationary tool.
- Adjustable drill holder allows drills to be used for fractional sized holes as well as for rough bores before finishing. (Adjustment range according to table, see page B24)
- Same insert type for inner and outer insert.
- Indexable inserts for all kinds of workpiece materials, with 4 true cutting edges.




Through tool coolant supply to the cutting edge

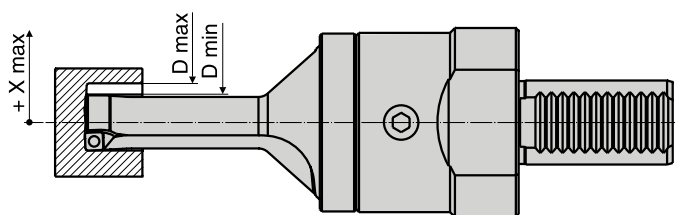


Boring Depth 3 x D				
CK/Ø	D	X	L	Order No.
CKS6/36	16	48	85	337.316
	17	51	88	337.317
	18	54	91	337.318
	19	57	94	337.319
	20	60	97	337.320
	21	63	100	337.321
	22	66	103	337.322
	23	69	106	337.323
	24	72	109	337.324
	25	75	112	337.325
	26	78	118	337.326
	27	81	121	337.327
	28	84	124	337.328
	29	87	127	337.329
30	90	130	337.330	

Boring Depth 4 x D				
CK/Ø	D	X	L	Order No.
CKS6/36	16	64	101	337.416
	17	68	105	337.417
	18	72	109	337.418
	19	76	113	337.419
	20	80	117	337.420
	21	84	121	337.421
	22	88	125	337.422
	23	92	129	337.423
	24	96	133	337.424
	25	100	137	337.425
	26	104	146	337.426
	27	108	150	337.427
	28	112	154	337.428
	29	116	158	337.429
30	120	162	337.430	

	
WP 337-1	
WP 337-2	
WP 337-3	

Off-axis use



D	Adjustment Range *			
	under difficult work conditions		under favourable work conditions	
	X max.	D	X max.	D
16	1.0	16.0 - 18.0	1.7	16.0 - 19.4
17	0.8	17.0 - 18.6	1.5	17.0 - 20.0
18	0.7	18.0 - 19.4	1.3	18.0 - 20.6
19	0.5	19.0 - 20.0	1.0	19.0 - 21.0
20	0.3	20.0 - 20.6	0.8	20.0 - 21.6
21	1.1	21.0 - 23.2	2.0	21.0 - 25.0
22	0.9	22.0 - 23.8	1.7	22.0 - 25.4
23	0.8	23.0 - 24.6	1.5	23.0 - 26.0
24	0.6	24.0 - 25.2	1.2	24.0 - 26.4
25	0.4	25.0 - 25.8	1.0	25.0 - 27.0
26	1.0	26.0 - 28.0	1.7	26.0 - 29.4
27	0.8	27.0 - 28.6	1.4	27.0 - 29.8
28	0.6	28.0 - 29.2	1.2	28.0 - 30.4
29	0.4	29.0 - 29.8	0.9	29.0 - 30.8
30	0.3	30.0 - 30.6	0.7	30.0 - 31.4

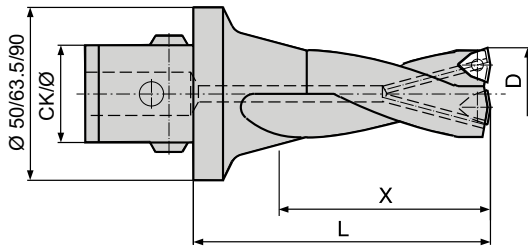
1. * Adjustment range with adjustable drill holder or with stationary off axis use.


Indexable insert drills from Ø 19.5 - 74 mm with CKS5, CKS6 and CKS7 tool connection

Insert drills in two length graduations (2xD and 3xD) with CKS tool connections. The CKS-connection provides versatile clamping and usage possibilities, a large seating diameter and minimum gauge length. Due to the high rigidity and good run out accuracy, maximum performance can be achieved.

Features



- Large helical chip spares and coolant supply to the cutting edge for optimum cooling and chip removal.
- ISO-standard inserts for inner and outer cutting edges guarantee the best possible insert selection.



Boring Depth $\geq 2 \times D$						
CK/Ø	D	X	L	Order No.	inside	outside
CKS5	19.5	39	75	336.171	WC.. 0302	WC.. 0402
	25.5	56	90	336.172	WC.. 0402	WC.. 0503
	29.5	65	100	336.173	WC.. 0503	WC.. 0503
	34.5	76	110	336.174	WC.. 06T3	WC.. 06T3
	39.5	87	125	336.175	WC.. 06T3	WC.. 06T3

Boring Depth $2 \times D$				
CK/Ø	D	X	L	Order No.
CKS6/36	31	62	100	336.631
	32	64	100	336.632
	33	66	110	336.633
	34	68	110	336.634
	35	70	110	336.635
	36	72	110	336.636
	37	74	110	336.637
	38	76	125	336.638
	39	78	125	336.639
	40	80	125	336.640
	41	82	125	336.641
	42	84	125	336.642
	43	86	140	336.643
	44	88	140	336.644
	45	90	140	336.645
	47	94	140	336.647
	49	98	150	336.649
	51	102	150	336.651
	53	106	160	336.653
	55	110	160	336.655
57	114	165	336.657	
59	118	165	336.659	
61	122	165	336.661	

Boring Depth $3 \times D$				
CK/Ø	D	X	L	Order No.
CKS6/36	31	93	130	336.731
	32	96	130	336.732
	33	99	140	336.733
	34	102	140	336.734
	35	105	150	336.735
	36	108	150	336.736
	37	111	150	336.737
	38	114	160	336.738
	39	117	160	336.739
	40	120	165	336.740
	41	123	165	336.741
	42	126	165	336.742
	43	129	180	336.743
	44	132	180	336.744
	45	135	180	336.745
	47	141	190	336.747
	49	147	200	336.749
	51	153	200	336.751
	53	159	215	336.753
	55	165	215	336.755
57	171	220	336.757	
59	177	220	336.759	
61	183	220	336.761	

	
WC.. 06T3	
WC.. 0804	
WC.. 1005	

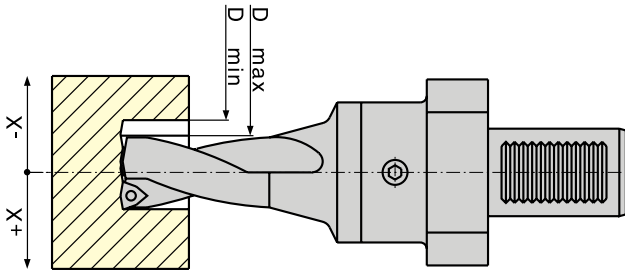
B.2

Boring Depth 153 mm				
CK/Ø	D	X	L	Order No.
CKS6/36	69	153	200	336.569

Boring Depth 153 mm				
CK/Ø	D	X	L	Order No.
CKS7/46	65	153	210	336.665
	74	153	210	336.674

	
WC.. 1005	

Off-axis use



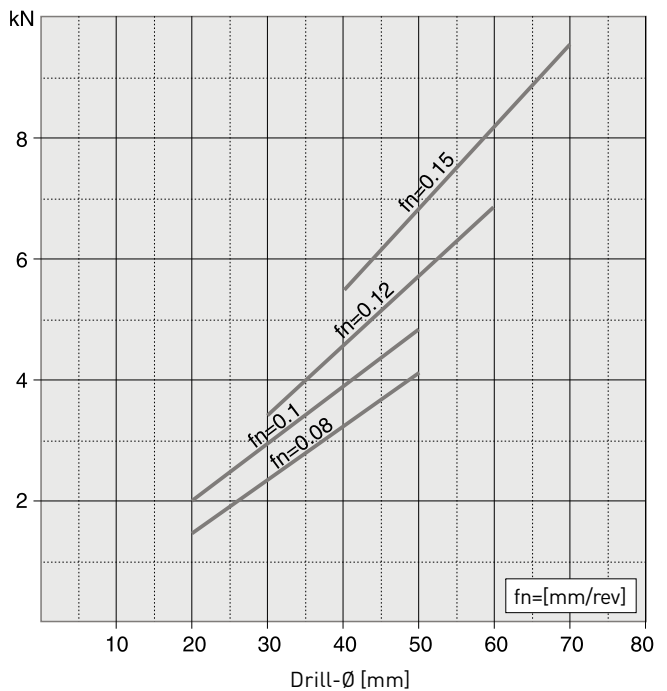
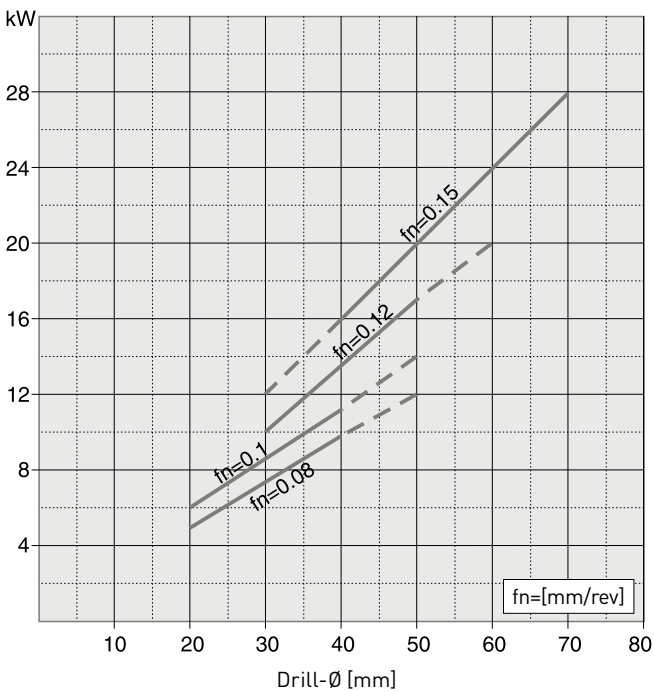
Insert Size	Drill Ø	Adjustable Range		Boring Ø	
		-X	+X	D min.	D max.
WC .. 06 ..	31	0.25	3.5	30.5	38.0
	32		3.25	31.5	38.5
	33		3.0	32.5	39.0
	34		2.75	33.5	39.5
	35		2.5	34.5	40.0
	36		2.25	35.5	40.5
	37		2.0	36.5	41.0
	38		1.75	37.5	41.5
	39		1.5	38.5	42.0
	40		1.25	39.5	42.5
	41		1.0	40.5	43.0
	42		0.75	41.5	43.5
	43		0.5	42.5	44.0
	44		0.25	43.5	44.5
WC .. 08 ..	45	0.5	4.0	44.0	53.0
	47		3.5	46.0	54.0
	49		3.0	48.0	55.0
	51		2.5	50.0	56.0
	53		2.0	52.0	57.0
	55		1.5	54.0	58.0
	57		1.0	56.0	59.0
WC .. 10 ..	59	0.5	0.5	58.0	60.0
	61		3.5	60.0	68.0
	65		3.0	64.0	71.0
	69		2.0	68.0	73.0
	74		1.0	73.0	76.0

Driving power

Vc=220 m/min; Material St 60
 kc 1 = 2 110 N/mm²

Feed force

Material St 60
 kc 1 = 2 110 N/mm²



Note

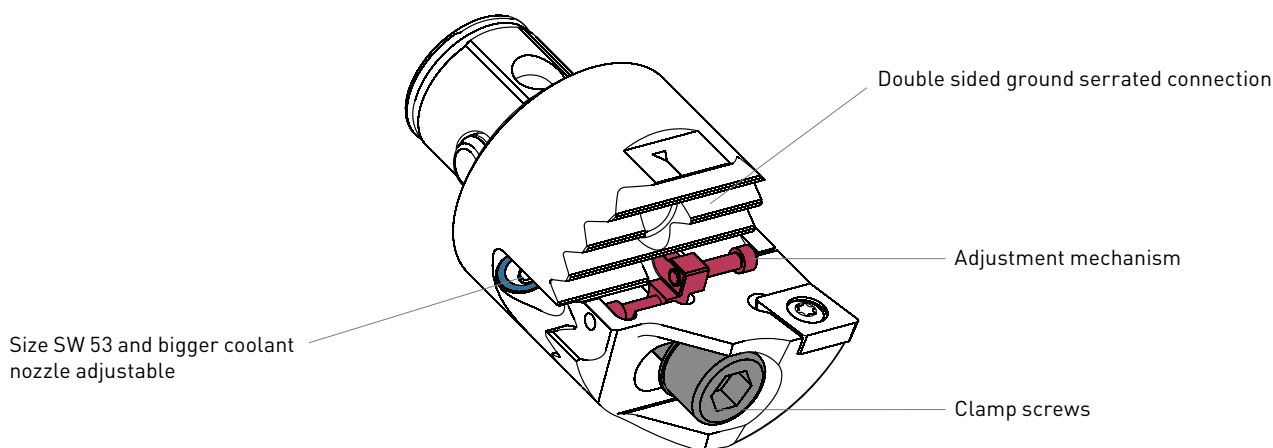
Max. bore depth with coolant supply from outside: 1 x D. Whenever possible, use through tool coolant supply. The coolant flow should be at least 35 l/min.

Perfect roughing

A tool body with supports for insert holders of different heights, and insert holders of different lengths, provide an unmatched versatility to the new roughing tool. Without changing any components and without length adjustment, two different roughing methods, the rotationally-symmetrical-roughing (RSS) and the double-offset-roughing (DVS) can be executed. The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance.

Features

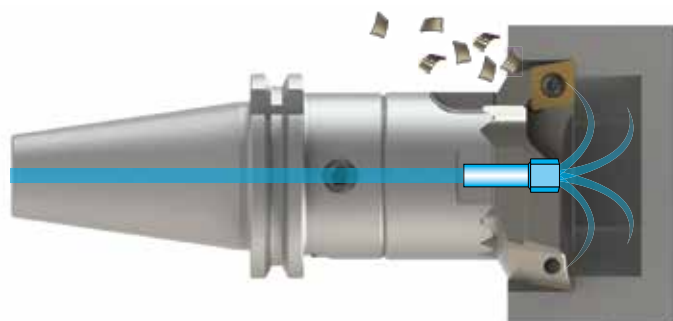
- Different roughing methods without additional components such as function modules, spacers or special insert holders, and without length adjustments. Simply mount insert holders the other way round.
- Repeatable length accuracy due to ground serrations on the mating surfaces of tool body and insert holder.
- Diameter setting in both directions over one screw with defined pitch for accurate incremental adjustment.
SW 20 – SW 32: P = 0.25 mm
SW 41 – SW 148: P = 0.5 mm
- High quality coated tool body and insert holder for complete protection against corrosion.
- SW rough boring heads made of aluminium are available for weight reduction of heavy tool assemblies for bores \varnothing 68 and bigger. (see page B29)



B.2

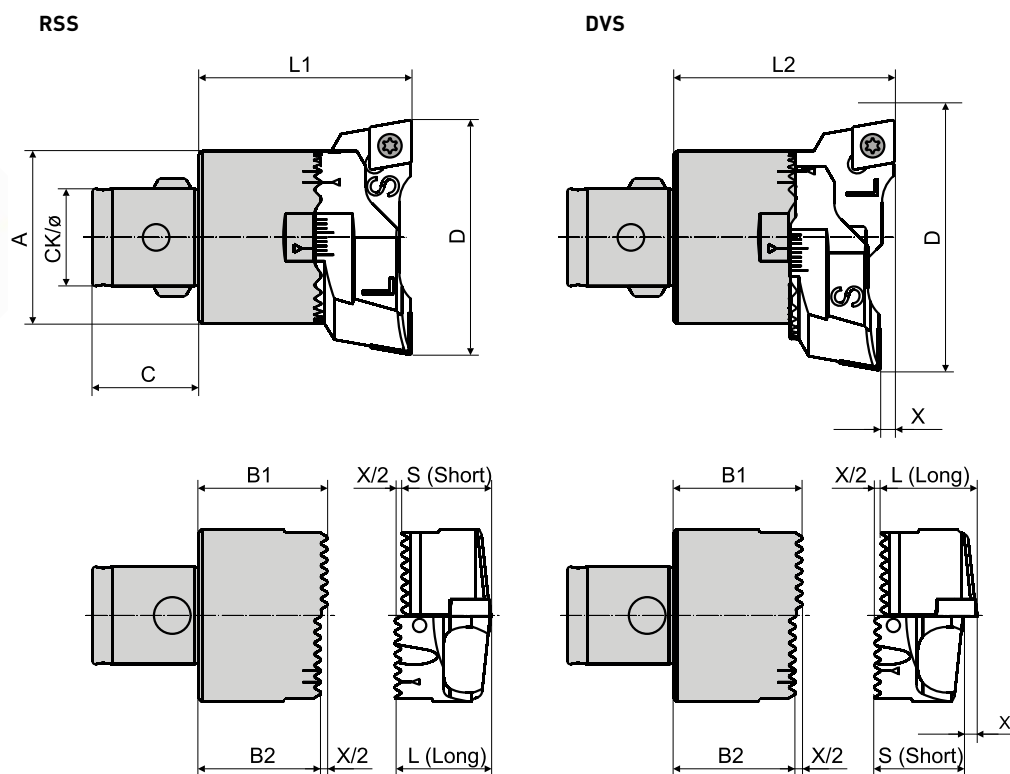
Blind hole roughing with SW AC

The special execution SW AC features frontal coolant exit for blind hole roughing. The insert holders remain unchanged. Without any additional accessories this boring head can easily be adapted to through hole roughing. (see page B29)



Standard execution

Boring range \varnothing 20 – 203 mm



Boring Head Type	CK/ø	D	L1 (RSS)	L2 (DVS)	A	X (DVS)	B1	B2	C	Order No.
SW 20	CKB1/11	20 - 31	32.5	32.6	19	0.2	20.5	20.4	13	319.101
SW 25	CKB2/14	25 - 40	35.5	35.6	24		21.7	21.6	16	319.201
SW 32	CKB3/18	32 - 51	40	40.1	31		22.5	22.4	20	319.301
SW 41	CKS4/22	41 - 66	47	47.2	39		28	27.8	24	319.401
SW 53	CKS5/28	53 - 86	57	57.2	50		33	32.8	30	319.501
SW 68	CKS6/36	68 - 110	71	71.2	63.5	0.4	39.5	39.3	40	319.601
	CKN6/36									319.601N
SW 98	CKS6/36	98 - 153	71	71.2	90	0.4	37	36.8	40	319.602
	CKN6/36									319.602N
SW 148	CKS6/36	148 - 203	71	71.2	140	0.4	37	36.8	40	319.603
	CKN6/36									319.603N
SW 98	CKS7/46	98 - 153	87	87.2	90	0.4	53	52.8	50	319.701
	CKN7/46									319.701N
SW 98L	CKS7/46	98 - 153	117	117.2	90	0.4	83	82.8	50	319.702
	CKN7/46									319.702N
SW 148	CKS7/46	148 - 203	117	117.2	140	0.4	83	82.8	50	319.703
	CKN7/46									319.703N

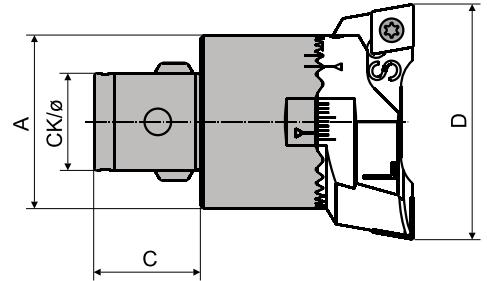
B.2

CKN execution

Lightweight execution

Boring range Ø 68 – 203 mm

Tool body made of high strength aluminium with CKN connection.



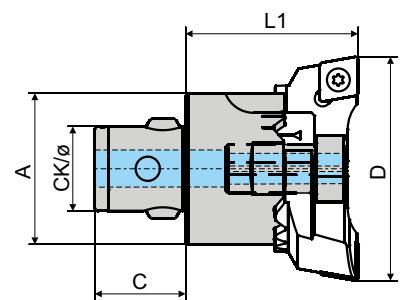
Boring Head Type	CK/Ø	D	L1 (RSS) *	L2 (DVS) *	A	X (DVS) *	B1 *	B2 *	C	Order No.
SW 68 AL	CKN6/36	68 - 110	71	71.2	63.5	0.4	39.5	39.3	40	319.604N
SW 98 AL	CKN6/36	98 - 153	71	71.2	90		37	36.8		319.605N
SW 148 AL	CKN6/36	148 - 203	71	71.2	140		37	36.8		319.607N
SW 98 AL	CKN7/46	98 - 153	87	87.2	90		53	52.8	50	319.705N
SW 98 L, AL	CKN7/46	98 - 153	117	117.2	90		83	82.8		319.706N **
SW 148 AL	CKN7/46	148 - 203	117	117.2	140		83	82.8		319.707N

- * See drawings page B28.
- ** Availability on request.

Special execution for blind hole roughing

Boring range Ø 41 – 153 mm

Frontal coolant exit through insert holder clamp screws with centre bore. Easily adaptable for through hole roughing by exchanging the clamp screws (standard accessory) and removal of set screws from the coolant nozzles.

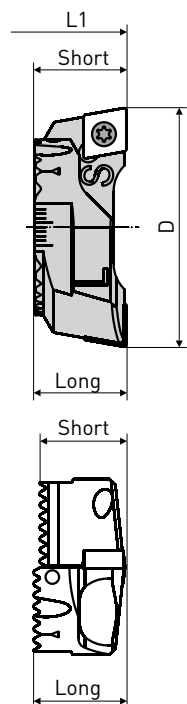



Boring Head Type	CK/Ø	D	L1 (RSS) *	L2 (DVS) *	A	X (DVS) *	B1 *	B2 *	C	Order No.
SW 41 AC	CKS4/22	41 - 66	47	47.2	39	0.4	28	27.8	24	319.420
SW 53 AC	CKS5/28	53 - 86	57	57.2	50		33	32.8	20	319.520
SW 68 AC	CKS6/36	68 - 110	71	71.2	63.5		39.5	39.3	40	319.620
SW 68 AC	CKN6/36	68 - 110	71	71.2	63.5		39.5	39.3	40	319.620N
SW 98 AC	CKS6/36	98 - 153	71	71.2	63.5		37	36.8	40	319.622
SW 98 AC	CKN6/36	98 - 153	71	71.2	63.5		37	36.8	40	319.622N
SW 98 AC	CKS7/46	98 - 153	87	87.2	90		53	52.8	50	319.720
SW 98 AC	CKN7/46	98 - 153	87	87.2	90		53	52.8	50	319.702N

- * See drawing page B28.

Insert holders type CC for RSS and DVS

Standard insert holders for CC- type inserts with 90° lead angle. Suitable for through- and blind holes, as well as for rotationally-symmetrical- (RSS) and double-offset-roughing (DVS).



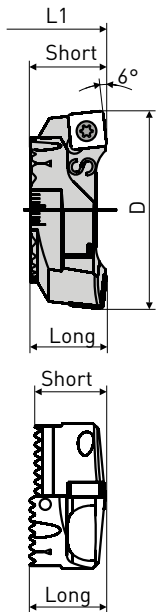
Insert Holder * Type	D	L1	Order No. Set *		
Preferential line					
SW 20	20 - 26	32.5	639.413	CC.. 0602	
	25 - 31	32.5	639.417		
SW 25	25 - 33	35.5	639.423		
	32 - 40	35.5	639.427		
SW 32	32 - 42	40	639.433		CC.. 09T3
	41 - 51	40	639.437		
SW 41	41 - 54	47	639.443	CC.. 1204	
	53 - 66	47	639.447		
SW 53	53 - 70	57	639.453		
	69 - 86	57	639.457		
SW 68	68 - 90	71	639.463		
	88 - 110	71	639.467		
SW 98	98 - 126	71	639.473		
	125 - 153	71	639.477		
SW 98	98 - 126	87	639.473		
	125 - 153	87	639.477		
SW 98 L	98 - 126	117	639.473		
	125 - 153	117	639.477		
SW 148	148 - 176	71	639.483		
	175 - 203	71	639.487		
SW 148	148 - 176	117	639.483		
	175 - 203	117	639.487		
Additional line					
SW 68	68 - 90	71	639.563	CC.. 1605	
	88 - 110	71	639.567		
SW 98	98 - 126	71	639.573		
	125 - 153	71	639.577		
SW 98	98 - 126	87	639.573		
	125 - 153	87	639.577		
SW 98 L	98 - 126	117	639.573		
	125 - 153	117	639.577		
SW 148	148 - 176	71	639.583		
	175 - 203	71	639.587		
SW 148	148 - 176	117	639.583		
	175 - 203	117	639.587		


1. * Set consisting of two insert holders with different lengths, type S (short) and L (long).
The insert holders are also available by the piece as spare parts.



Insert holders type SC/SP for RSS

Inserts inclined 6° for improved entry stability under unfavourable conditions (rolled or scaled surfaces, stacked plates etc.). Only for rotationally-symmetrical application (RSS).



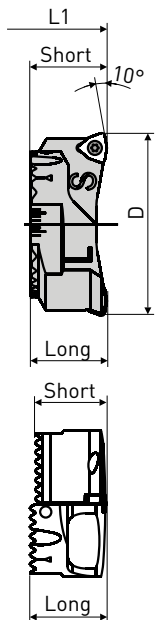
Insert Holder * Type	D	L1	Order No. Set *	
SW 20	20 - 26	32.5	639.113	SP.. 0602
SW 25	25 - 33	35.5	639.123	
SW 32	32 - 42	40	639.133	SC.. 09T3
SW 41	41 - 51	40	639.137	
SW 41	41 - 54	47	639.143	SC..1204
	53 - 66	47	639.147	
SW 53	53 - 70	57	639.153	
	69 - 86	57	639.157	
SW 68	68 - 90	71	639.163	
	88 - 110	71	639.167	
SW 98	98 - 126	71	639.173	
	125 - 153	71	639.177	
SW 98	98 - 126	86	639.173	
	125 - 153	86	639.177	
SW 98 L	98 - 126	117	639.173	
	125 - 153	117	639.177	
SW 148	148 - 176	71	639.183	
	175 - 203	71	639.187	
SW 148	148 - 176	117	639.183	
	175 - 203	117	639.187	


- * Set consisting of two insert holders with different lengths, type S (short) and L (long). The insert holders are also available by the piece as spare parts.

Insert holders type WC for RSS and VPS

For full-profile-roughing (VPS) with very large stock allowance, and for rotationally-symmetrical roughing (RSS) with heavily interrupted cut.

B.2



Insert holder * Type	D	L1	Order No. Set *	
SW 41	49 - 62	47	639.243	WC.. 0402
SW 53	59 - 76	57	639.253	WC.. 0503
	69 - 86	57	639.257 **	
SW 68	73 - 95	71	639.263	WC.. 06T3
	90 - 112	71	639.267	
SW 98	106 - 134	71	639.273	
	131 - 159	71	639.277	
SW 98	106 - 134	86	639.273	
	131 - 159	86	639.277	
SW 98 L	106 - 134	117	639.273	
	131 - 159	117	639.277	
SW 148	156 - 184	71	639.283	
	191 - 209	71	639.287	
SW 148	156 - 184	117	639.283	
	191 - 209	71	639.287	

- * Set consisting of two insert holders with different lengths, type S (short) and L (long). The insert holders are also available by the piece as spare parts.
- ** Set consisting of two insert holders with different lengths, Type S (short) and L (long) and for different boring ranges (639.255: Ø 69 - 86 mm, 639.252: Ø 59 - 76 mm). For full-profile-roughing (VPS) only. The insert holders are also available by the piece.



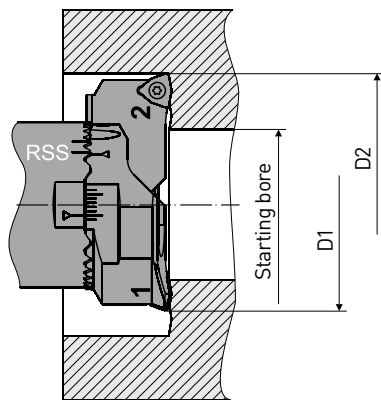
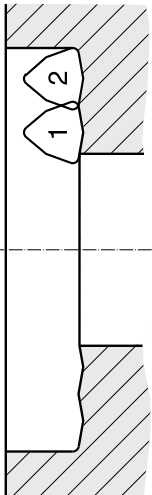
Full profile roughing, application- and adjustment instructions

Full profile roughing permits boring with large stock allowances (30 mm and more in diameter) in a single operation with relatively low drive power.

Adjustment instructions for insert holders type WC:

- Mount the insert holders on mark «RSS».
- Set cutting edge 2 to the final bore diameter (D2).
- Set cutting edge 1 corresponding to the starting bore diameter, according to the table [column D1].
- Both cutting edges must be located at exactly the same height. Use coolant in large quantities.

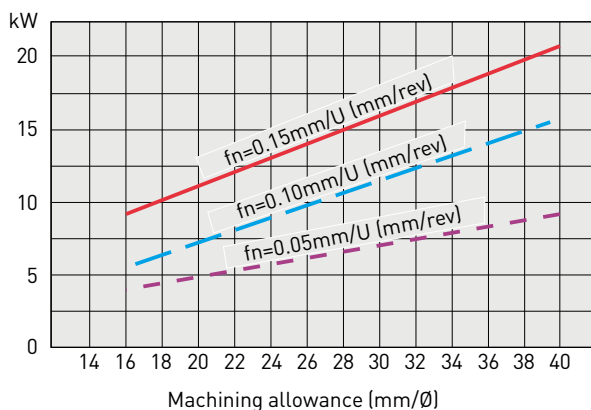
Table for optimum cut sharing in full profile roughing operations VPS



Boring- Ø D2 mm Ø	Adjustment- Ø D1 mm Ø	Starting Bore mm Ø	Boring Head Type	Insert Holders Order No.
51 - 62	49	35 - 37.9	SW 41	639.243
54 - 62	52	38 - 41	SW 53	639.253
61 - 76	59	41 - 44.9		639.257
65 - 76	63	45 - 50		
76 - 86	69	51 - 54.9		
81 - 86	73	55 - 60	SW 68	639.263
75 - 93	73	50 - 55.9		
81 - 93	79	56 - 61.9		
87 - 93	85	62 - 67		
92 - 110	90	67 - 72.9		
98 - 110	96	73 - 78.9		
104 - 110	102	79 - 85	SW 98	639.273
109 - 129	107	84 - 89.9		
115 - 133	113	90 - 95.9		
121 - 133	119	96 - 102.9		
128 - 133	126	103 - 109		
133 - 154	131	108 - 114.9		
140 - 159	138	115 - 121.9	SW 148	639.277
147 - 159	145	122 - 128.9		
154 - 159	152	129 - 135		
159 - 179	157	134 - 139.9		
165 - 183	163	140 - 145.9		
171 - 183	169	146 - 152.9		
178 - 183	176	153 - 159	SW 148	639.283
183 - 204	181	158 - 164.9		
190 - 209	188	165 - 171.9		
197 - 209	195	172 - 178.9		
204 - 209	202	179 - 185		639.287

B.2

Driving power



$V_c = 150$ m/min
Material: St 60, $k_c 1 = 2110$ N/mm²

Cutting data-guide values

Cutting speed: $V_c = 100 - 200$ m/min
Feed: $f_n = 0.05 - 0.15$ mm/rev

Insert holders for chamfering

These insert holders with step-less adjustable chamfer angle from 15° to 75° are made for front chamfering and, with limitations also for back chamfering, on the twin cutter heads for roughing SW 41 to SW 148.

The insert holder with dead piece are available as set (Fig. 1) or as single components (Fig. 2 and Fig. 3)



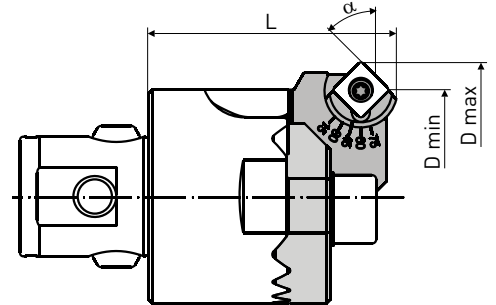
Fig. 1



Fig. 2



Fig. 3



Boring Head					Diameter Range						
	Fig. 1	Fig. 2	Fig. 2		15°	30°	45°	60°	75°	L 45° *	
					min - max	min - max	min - max	min - max	min - max		
SW 41	639.104	639.191	639.914	SC 09	33 - 60	36 - 62	39 - 63	43 - 63	45 - 62	51	
SW 53	639.105	639.192	639.915		45 - 76	48 - 78	51 - 79	55 - 79	57 - 78	58	
SW 68	639.106	639.193	639.916		61 - 97	64 - 99	67 - 100	71 - 100	73 - 99	68	
SW 98	639.107	639.194	639.917	SC 12	77 - 126	81 - 128	86 - 129	90 - 128	94 - 127	73	
	639.108	639.195			104 - 153	108 - 155	113 - 156	117 - 155	121 - 154		
SW 148	639.109	639.196	639.918		131 - 180	135 - 182	140 - 183	144 - 182	148 - 181	73	
	639.110	639.197			158 - 207	162 - 209	167 - 210	171 - 209	175 - 208		
SW 98	639.107	639.194	639.917		SC 12	77 - 126	81 - 128	86 - 129	90 - 128	94 - 127	89
	639.108	639.195		104 - 153		108 - 155	113 - 156	117 - 155	121 - 154		
SW 98 L	639.107	639.194		639.917		77 - 126	81 - 128	86 - 129	90 - 128	94 - 127	119
	639.108	639.195				104 - 153	108 - 155	113 - 156	117 - 155	121 - 154	
SW 148	639.109	639.196		639.918		131 - 180	135 - 182	140 - 183	144 - 182	148 - 181	119
	639.110	639.197	158 - 207		162 - 209	167 - 210	171 - 209	175 - 208			

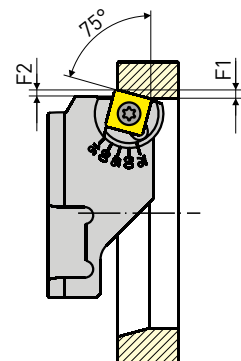
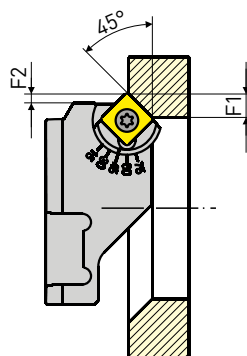
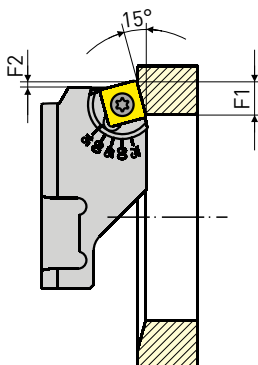
1. * Adjustment RSS

B.2

Max. radial chamfer length for front and back chamfering

Applicable for inserts with nose radius 0.4 mm

Type		Chamfer length F1/F2	Chamfer Angle									
			15°		30°		45°		60°		75°	
			F1	F2	F1	F2	F1	F2	F1	F2	F1	F2
SW 41	SC 09	Chamfer length F1/F2	7.7	0.7	6.9	1.4	5.7	1.8	4.0	1.7	2.1	1.2
SW 53												
SW 68												
SW 98	SC 12	Chamfer length F1/F2	10.6	1.2	9.5	2.2	7.8	2.6	5.5	2.5	2.8	1.8
SW 148												



Insert holders SW for back boring

These insert holders are made for back boring with the twin cutter boring heads for roughing SW 32 to SW 148 and cover the diameter range from Ø 44 - 211 mm.

Insert holder with dead piece are available as set (Fig. 1) or as individual components (Fig. 2 and Fig. 3)



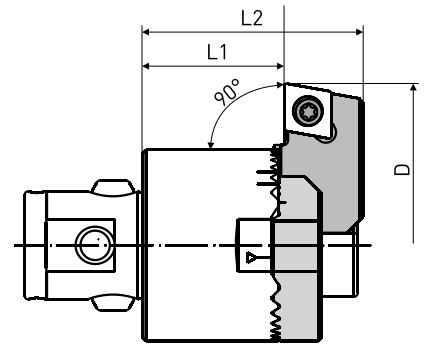
Fig. 1




Fig. 2



Fig. 3



Boring Head	Set Fig. 1	Fig. 2	Fig. 2		D	A	B	L1 *	L2 *
SW 32	639.403	639.490	639.913	CC 09	44 - 54	31	D-17 / min. 31	24	38
SW 41	639.404	639.491	639.914		53 - 66	39	D-21 / min. 39	29	44
SW 53	639.405	639.492	639.915		65 - 82	50	D-28 / min. 50	34	55
SW 68	639.406	639.493	639.916		81 - 103	63.5	D-27 / min. 63.5	41	66
SW 98	639.407	639.494	639.917	CC 12	102 - 130	90	90	38	69
	639.408	639.495			129 - 157				
SW 148	639.409	639.496	639.918		156 - 184	140	140	38	69
	639.410	639.497			183 - 211				
SW 98	639.407	639.494	639.917		102 - 130	90	90	47	78
	639.408	639.495			129 - 157				
SW 98 L	639.407	639.494			129 - 157				
	639.408	639.495			129 - 157				
SW 148	639.409	639.496	639.918	156 - 184	140	140	77	108	
	639.410	639.497		183 - 211					

1. * Adjustment RSS

Back boring

The back bore diameter «D» the diameter of the entry bore «C», the diameter of the interfering edge «B», respectively of the tool body «A» are related to each other. In order to check the feasibility of the back boring operation and to select the best possible tool combination, these values can be calculated as follows:

Minimum entry bore diameter «C»:

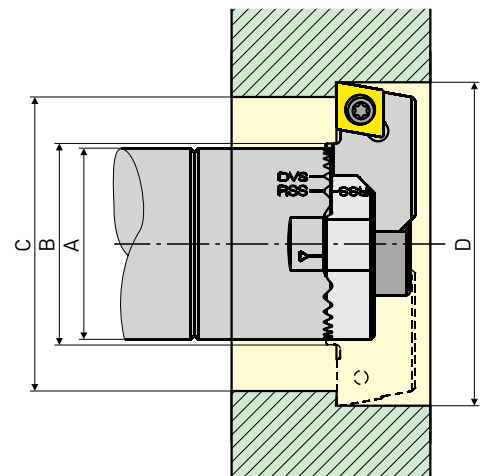
$$C = \frac{D + B}{2} + 0.5$$

Max. diameter of the interfering edge «B»:

$$B = 2(C - 0.5) - D$$

Clearance:

$$0.5 \text{ mm}$$

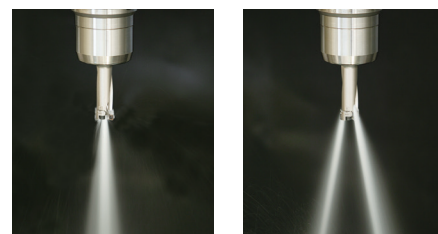
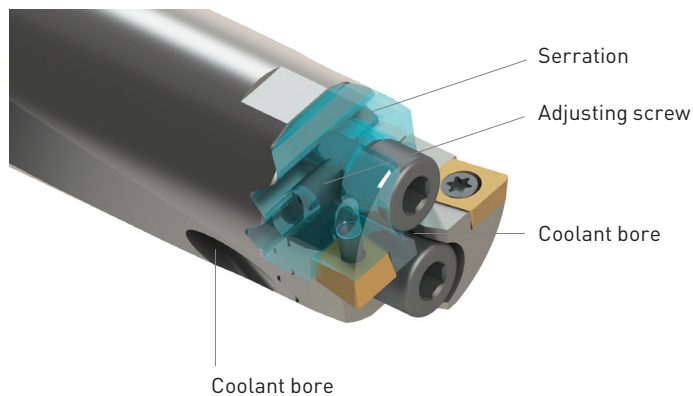


Roughing in the small diameter range

New member in the twin cutter family: The MW boring head permits extremely fast roughing of small holes (\varnothing 16-21 mm).

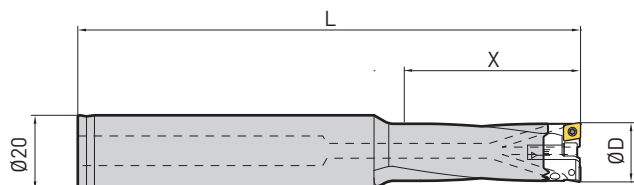
Features

- Repeatable length accuracy due to ground serrations on the mating surfaces of tool body and insert holder
- Positive and friction locked connection between tool body and insert holders for utmost stability
- Adaptable to frontal coolant exit for blind holes or to lateral coolant exit for through holes



Blind holes

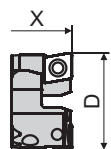
Through holes




Type	Shank \varnothing	Range \varnothing	L	X	Order No.
ST20-MW1619-64	20	16 - 19	150	64	472.051
ST20-MW1821-72	20	18 - 21	155	72	472.061

B.2

Insert holder type MW



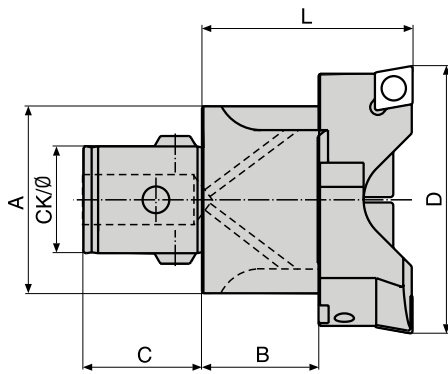
Insert holder			Order No.	
Type	D	X		
MW 1619	16 - 19	64	472.052	MW04
MW 1821	18 - 21	72	472.062	

Roughing beyond limits

The TW roughing tools are in length and boring range identical with the precision boring heads EWN, and cover the diameter range from 20 - 200 mm. The heads of the TWN series have been developed for economical heavy duty rough boring.

Features

- TWN 53 and bigger with adjustable coolant nozzle
- Ground profile on the mating surfaces of insert holder and tool body
- Additional insert holders for extended boring range
- Compact design



B.2

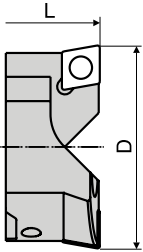
Boring Head Type	CK/Ø	D	L	A	B	C	Order No.
TWN 20	CKB1/11	20 - 31	32.5	18.5	19.5	13	315.101
TWN 25	CKB2/14	25 - 40	35.5	23.4	21.5	16	315.201
TWN 32	CKB3/18	32 - 51	40	30	21	20	315.301
TWN 41	CKS4/22	41 - 66	47	39	25	24	315.401
TWN 53	CKS5/28	53 - 86	57	49	30	30	315.501
TWN 68	CKS6/36	68 - 110	71	63	39.5	40	315.601
TWN 98	CKS6/36	98 - 153	71	90	37	40	315.602
TWN 148	CKS6/36	148 - 203	71	140	37	40	315.603 *
TWN 98	CKS7/46	98 - 153	87	90	53	50	315.701
	CKN7/46						315.701N *
TWN 98 L	CKS7/46	98 - 153	117	90	83	50	315.702 *
	CKN7/46						315.702N *
TWN 148	CKS7/46	148 - 203	117	140	83	50	315.703 *
	CKN7/46						315.703N *


CKN execution

* As long as stock lasts.

Insert holders type CC for RSS

Standard insert holders for CC- type inserts with 90° lead angle. For through- and blind holes. Symmetrical and double offset cutting edge arrangement possible.



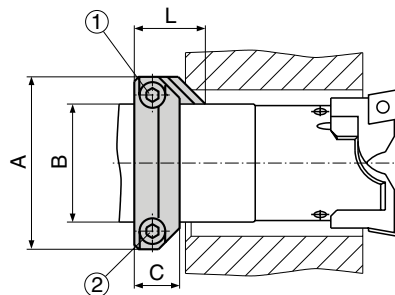
Insert Holder Type	D	L	Order No.	
TW 20	20 - 26	32.5	638.411	CC.. 0602
	25 - 31	32.5	638.412	
TW 25	25 - 33	35.5	638.421	
	32 - 40	35.5	638.422	
TW 32	32 - 42	40	638.431	CC.. 09T3
	41 - 51	40	638.432	
TW 41	41 - 54	47	638.441	
	53 - 66	47	638.442	
TW 53	53 - 70	57	638.451	CC.. 1204
	69 - 86	57	638.452	
TW 68	68 - 90	71	638.461	
	88 - 110	71	638.462	
TW 98	98 - 126	71	638.471	
	125 - 153	71	638.472	
TW 98	98 - 126	87	638.471	
	125 - 153	87	638.472	
TW 98 L	98 - 126	117	638.471	
	125 - 153	117	638.472	
TW 148	148 - 176	71	638.471	
	175 - 203	71	638.472	
TW 148	148 - 176	117	638.471	
	175 - 203	117	638.472	

Additional insert holders type CC, SC, WC see page 160-161

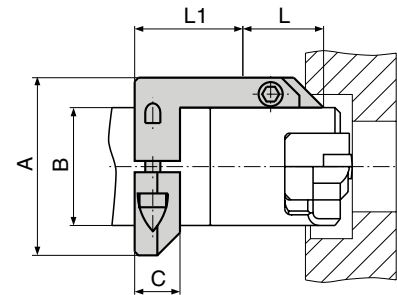
Chamfering rings

Chamfering rings for single- and twin-cutter boring bars for 30° or 45° chamfering immediately after boring without tool change.

Standard execution



Special execution for short bores



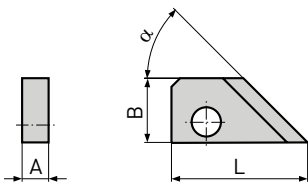
Range Ø	Inserts	Dimensions			Chamfering Rings Type	Order No.
		A	B	C		
20 - 35	ARP 20	35	19	13	AR 20	663.110
25 - 40		42	24	15	AR 25	663.120
32 - 47		49	31	15	AR 32	663.130
41 - 55		57	39	15	AR 41	663.140
53 - 90	ARP 53	85	50	25	AR 53	663.150
68 - 104		100	64	25	AR 68	663.160
90 - 130		130	64	25	AR 93-125	663.170

Dimensions				Chamfering Rings Type	Order No.
A	B	C	L1		
-	-	-	-	-	-
42	24	15	27	AR 25S	663.121
51	31	15	31.5	AR 32S	663.131
57	39	15	38.5	AR 41S	663.141
90	50	25	39	AR 53S	663.151
104	64	25	53	AR 68S	663.161
-	-	-	-	-	-

Cutting inserts 45° und 30°

Carbide inserts with ground chip breaker for machining of cast iron and steel

B.2



Inserts	Range Ø	α	Dimensions			Order No.
			A	B	B	
ARP20/45	20 - 55	45°	4	9	23.5	663.191
ARP53/45	53 - 130	45°	8	20	43	663.195
ARP20/30	20 - 55	30°	4	9	27.5	663.181
ARP53/30	53 - 100	30°	8	20	52	663.185

Insert holders and inserts 45° for chamfering Ø 55 - 130 mm

For different work piece materials and a quick change of the insert.



Chamfering Rings Type	Insert Holder A		Insert Holder B		Inserts		
	Range Ø	Order No.	Range Ø	Order No.	Uncoated/GG *	Coated/ST	Coated/AL
AR 53	55 - 75	805.811	70 - 90	805.812	978.238	800.951	801.753
AR 68	69 - 89		84 - 105				
AR 93-125	95 - 115		110 - 130				

1. * GG = Cast iron / ST = Steel / AL = Aluminium

Assembly instructions

- Mount both ring parts on tool shank and adjust them in length.
- Assemble cutting insert or insert holder between the ring parts and fasten screw ① tightly.
- Fasten clamp screw ②.

Precision Boring Heads EWD/EWN/EWB, Series 112

Precision Boring Heads EWD 2-54/EWB 2-50	40
Precision Boring Heads EWN 2-50XL	41
Accessories	42 - 49
Precision Boring Heads EWD/EWB 2-32	50
Precision Boring Heads EWN 2-32/EWN 04-22	51
Accessories	52 - 54
Precision Boring Heads EWN 04-15	55
Precision Boring Heads EWN 04-7	56

EWD 2-54, highest precision and performance

The precision boring head EWD 2-54, with digital display and direct electronic measuring system on the tool carrier, features absolute setting accuracy. The boring head with CK6 connection is designed for ultra precise boring operations in the range from \varnothing 2-54 mm with highest spindle speeds. With one single button for the functions "on" and "reset", operating errors are practically eliminated.

Technical Data

- Boring range: \varnothing 2-54/80 mm
- Tool holder bore: \varnothing 16 mm
- Setting accuracy: 0.001 mm/ \varnothing
- Adjustment range: -1 / +5 mm \varnothing
- Max. Spindle speed: 20 000 r.p.m.

Model	Order No.
EWD 2-54 x CK6	112.109

LCD Display with a resolution of 0,001 mm \varnothing .

Automatic switch off function which automatically stores the last displayed value



Other features

- Power management for optimized battery life.
- Minimized imbalance with tool carrier in centre position. Fine balancing with a screw fit balancing ring.
- The measuring system shows the effective movement of the tool carrier and permits diameter corrections in both directions.
- Same accessories as for the precision boring head EWN 2-50XL.

Other executions

EWD 2-54 x C6
470.109



EWD 2-54 x HSK-A63
112.125



EWB 2-50, balanceable precision boring head

B.3

Even at max. speeds, balanced tools guarantee vibration-free boring, resulting in increased productivity and highest precision.

Technical Data

- Boring range: \varnothing 2-50 mm
- Tool holder bore: \varnothing 16 mm
- Adjustment precision: 1 Div = 0.005 mm/ \varnothing with vernier 0.001 mm \varnothing
- Adjustment range: -0 / +9 mm \varnothing
- Max. remaining imbalance: 100 gmm

Model	Order No.
EWB 2-50 x CK6	112.107

Integrated counterbalance mechanism allows fine balancing for multiple assembly configurations by rotating the scale ring according to adjustment tables included with the boring head



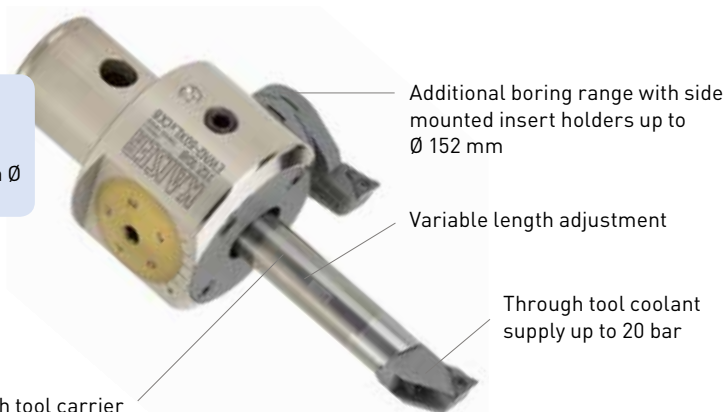
EWN 2-50XL, diameter range Ø 2-54/152 mm

Precision boring heads in modular and integral execution for accurate, high performance boring operations on machine tools with spindles ISO 40, HSK-A63, Polygon shank BIG CAPTO C6 and bigger.

Technical Data

- Boring range: Ø 2-54/152 mm
- Tool holder bore: Ø 16 mm
- Adjustment precision: 1 DIV = 0.005 mm Ø with vernier 0.001 mm Ø
- Adjustment range: -2 / +9 mm Ø

Model	Order No.
EWN 2-50XL x CK6	112.108



Fine balanced with tool carrier in centre position

Other features

- Large range of application with a wide and carefully selected accessory program. See pages B42-B47
- Ground and play-free fitted micrometer spindle for a very precise and direct adjustment of the tool carrier.
- Balanceable over the whole diameter range (2-54 mm) by means of balancing rings (optional) which can be mounted on the face of the boring head. See page B47.

Other executions

EWN 2-50XL x SK40/VBD
112.121



EWN 2-50XL x SK40/BTB
112.122



EWN 2-50XL x HSK-A63
112.123



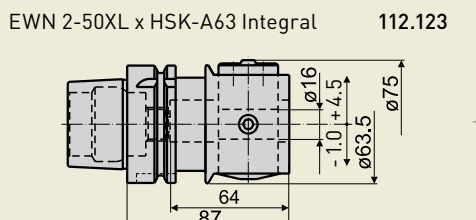
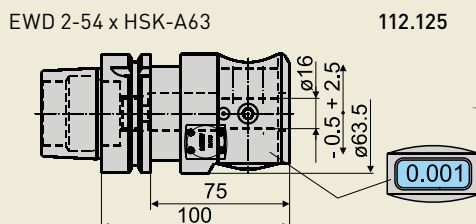
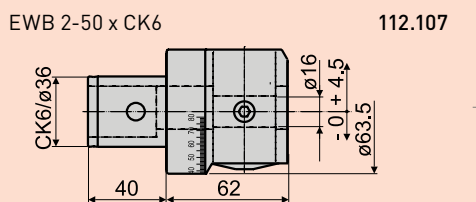
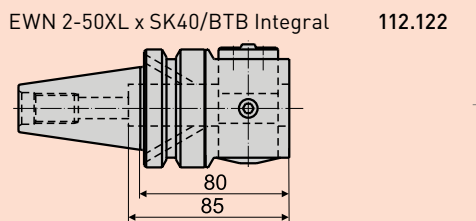
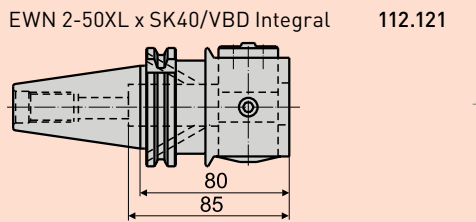
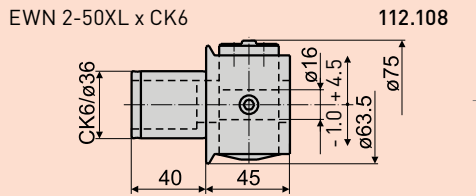
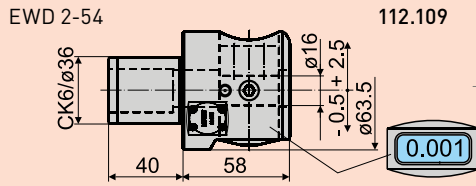
EWN 2-50XL x C6
470.108



► B108

Boring Head

Order No.



Reducer

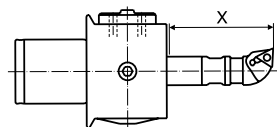
Order No.

L

∅

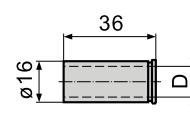
	613.424 ♦	100	16/4
	613.434	88	16/4
	613.422 ♦	100	16/3.5
	613.432	88	16/3.5
	613.423 ♦	100	16/4.5
	613.433	88	16/4.5
	613.425 ♦	100	16/5
	613.435	88	16/5
	613.426 ♦	100	16/6
	613.436	88	16/6
	613.427 ♦	100	16/7
	613.437	88	16/7
	613.428 ♦	100	16/8
	613.438	88	16/8
	613.429 ♦	100	16/9
	613.439	88	16/9
	613.430 ♦	100	16/10
	613.440	88	16/10
	613.411 ♦	36	16/11
	613.412 ♦	36	16/12
	613.413 ♦	36	16/13

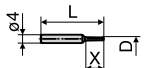
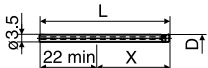
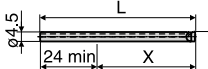
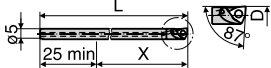
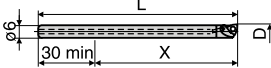

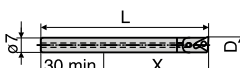
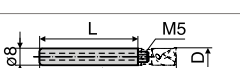

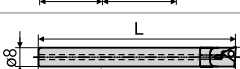
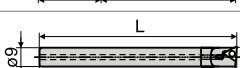


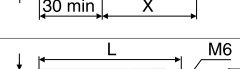
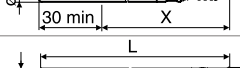
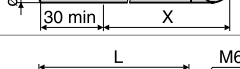

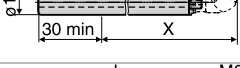
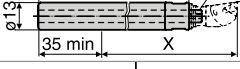
X = Boring depth



Other Reducers

D	Order No.
4	613.404
5	613.405
6	613.406
7	613.407
8	613.408
9	613.409
10	613.410



Tool Holder	Order No.	L		X	Insert Holder	Cutting Edge	Capacity D
	611.155 ♦	30		max. 9		K10	2.0 - 3.0
	611.156 ♦	35		max. 14			K10
	615.080	45		10 - 23		K10	3.9 - 4.9
	615.203 ♦	62		10 - 40			
	615.203A ♦	62		10 - 40			
	615.081	46		10 - 22		K10	4.9 - 5.9
	615.204 ♦	74		10 - 50			
	615.204A ♦	74		10 - 50			
	615.082	50		10 - 25		WC..0201	5.8 - 7.3
	615.083	65		10 - 40			
	615.201 ♦	85		10 - 60			
	615.084	55		10 - 25			7.3 - 8.8
	615.085	75		10 - 45			
	615.202 ♦	95	10 - 65	31 - 65			
	615.086	60		10 - 30			7.8 - 9.8
	615.207 ♦	80	10 - 50	16 - 50			
	615.087	100	15 - 70	36 - 70			
	615.205 ♦	115	30 - 85	51 - 85			
	615.211	47		10 - 35	615.271 ♦		8.8 - 11.8
	615.088	47		10 - 35			
	615.212 ♦	72	10 - 60	26 - 60			
	615.213 ♦	105	20 - 75	41 - 75			
	615.208 ♦	100	15 - 70	36 - 70			9.8 - 11.8
	615.206 ♦	135	50 - 105	71 - 105			
	615.214	52		10 - 45	615.272 ♦		11.8 - 13.8
	615.215 ♦	77	15 - 70	36 - 70			
	615.223 ♦	97	35 - 90	56 - 90			
	615.250 ♦	127	65 - 120	86 - 120			
	615.209 ♦	135	50 - 105	71 - 105			
	615.218	77	15 - 70	36 - 70	615.273 ♦		13.8 - 15.8
	615.225	97	35 - 90	56 - 90			
	615.219 ♦	107	45 - 100	66 - 100			
	615.224 ♦	137	75 - 130	96 - 130			
	615.251 ♦	147	85 - 135	106 - 135			
	615.210 ♦	140	55 - 105	76 - 105			



B.3

Capacity D

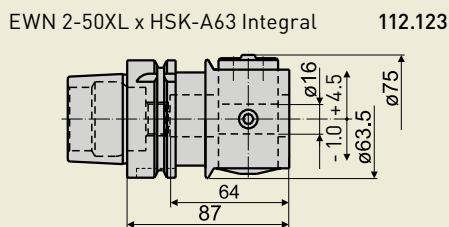
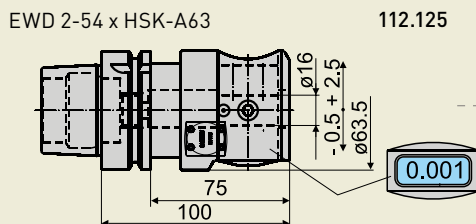
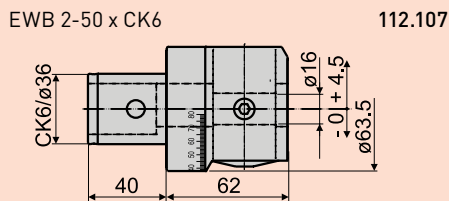
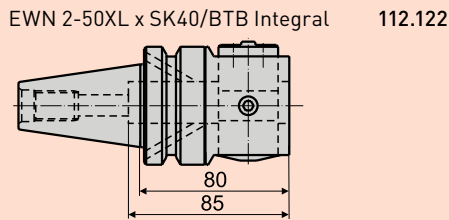
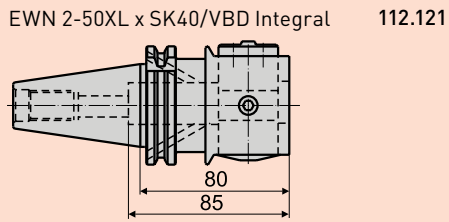
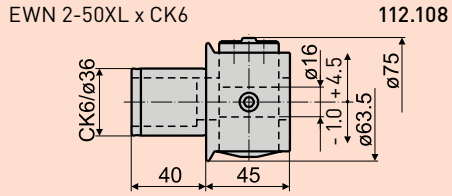
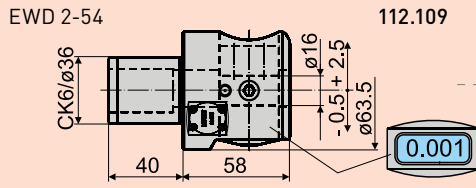
Boring range for the precision boring head EWB 2-50.

Under full use of the adjustment range, the max. boring range will be,

- for EWD 2-54: Lower range + 5 mm Ø
- for EWN 2-50: Lower range + 9 mm Ø

 Carbide tool holders
 Accessories EWB 2-50

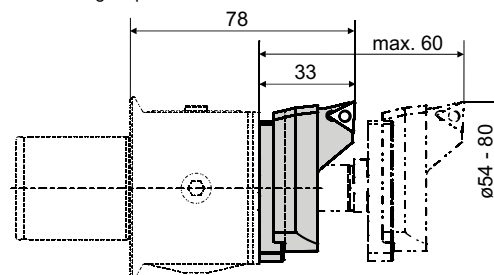
Boring Head **Order No.**



Reducer	Order No.	Ø
	613.414 ♦	16/14

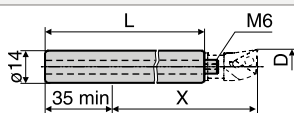
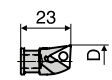

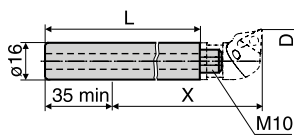
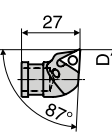

Reducer	Order No.	Ø
	613.409	16/9
	613.411	16/11
	613.413	16/13

X = Boring depth



B.3

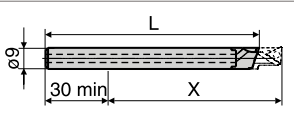
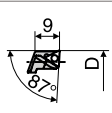

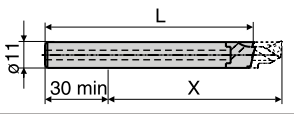
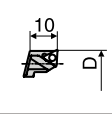

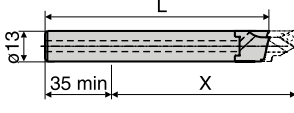
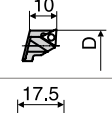

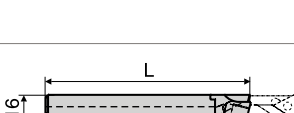
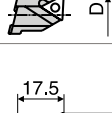

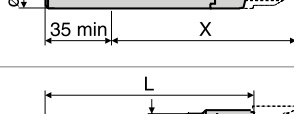
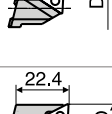

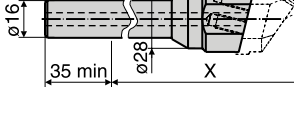
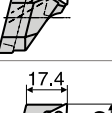


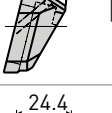

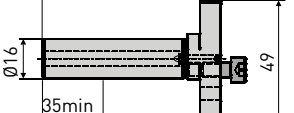
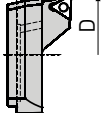

Carbide tool holders
 Accessories EWB 2-50

Tool Holder	Order No.	L			Insert Holder	Insert	Capacity D
		L	X	X			
	615.232	87	25 - 75	46 - 75			14.8 - 16.8
	615.233	117	55 - 105	76 - 105			
	615.221	147	85 - 135	106 - 135			
	615.226	88	30 - 80	51 - 80			17.8 - 19.8
	615.268	88	30 - 80	51 - 80			19.8 - 21.8
	615.227	108	50 - 100	71 - 100			21.8 - 23.8
	615.269	138	80 - 130	101 - 130			23.8 - 24.8
	615.229	168	110 - 160	131 - 160			24.8 - 25.8
							25.8 - 27.8
							27.8 - 31.8
							31.8 - 35.8
							35.8 - 39.8
				39.8 - 44.8			
				44.8 - 50.0			

Capacity D: See page 43 bottom

Adjustable tool holder

The adjustable tool holder allows the coarse diameter setting on the insert holder. This leads to the possibility to machine bores from $\varnothing 9.8 - 54$ mm with the tool holder in the centre position and as a result, with the best possible balancing of the tool combination.

Adjustable Tool Holder	Order No.	L			Insert Holder	Insert	Capacity D
		L	X	X			
	615.374	91	15 - 70	36 - 70			9.8 - 12.0
	615.369	121	45 - 100	66 - 100			
	615.375	90	15 - 70	36 - 70			11.8 - 14.0
	615.376	110	35 - 90	56 - 90			
	615.371	140	65 - 120	86 - 120			
	615.377	95	20 - 70	41 - 70			13.8 - 17.0
	615.378	125	50 - 100	71 - 100			
	615.373	155	80 - 130	101 - 130			
	615.377	95	27 - 77	48 - 77			
	615.378	125	57 - 107	78 - 107			
	615.373	155	87 - 137	108 - 137			14.8 - 18.0
	615.265	88	20 - 70	41 - 70			
	615.262	98	30 - 80	51 - 80			
	615.252	118	50 - 100	71 - 100			
	615.266	148	80 - 130	101 - 130			
	615.253	178	110 - 160	131 - 160			16.8 - 22.0 21.8 - 27.0 26.8 - 33.0
	615.267	93	60 - 80	60 - 80			
	615.264	103	60 - 90	61 - 90			
	615.257	123	60 - 110	81 - 110			
	615.258	173	110 - 160	131 - 160			
	615.387B	63.5	33 - 60	33 - 60			31.8 - 40.0
							39.8 - 54.0
							54 - 80

B.3

Capacity D

When using an adjustable tool holder and under full use of the adjustment range, the max. boring range will be,

- for EWD 2-54: Upper range + 5 mm \varnothing
- for EWN 2-50: Upper range + 9 mm \varnothing

Reducing pieces

Capacity D	Order No.	Capacity D	Order No.
11.8 - 14.5	615.230	13.8 - 18.5	615.231

Extensions

Capacity D	Order No.	Capacity D	Order No.
13.8 - 16.5	615.220	17.8 - 50.0	615.228

Back boring

Tool Holder	Order No.	L	X max.	Insert Holders	Order No.	Entry Diameter		Inserts	Capacity D				
						min.	E						
	615.214	52	40		615.401	13.0	2.9	TC.. 1102	15.8 - 18.5				
	615.215	77	65							615.402	13.9	3.8	17.8 - 20.5
	615.233	97	85										
	615.218	77	65		615.403	15.9	3.9	TC.. 1102	19.8 - 22.8				
	615.219	107	95							615.404	17.4	5.4	22.8 - 25.8
	615.224	137	125										
	615.232	87	70		615.405	19.9	6.0	TC.. 1102	25.8 - 28.8				
	615.233	117	100										
	615.221	147	130										
	615.226	88	75		615.406	22.4	6.3	TC.. 1102	28.8 - 33.5				
	615.227	108	95							615.407	23.9	7.8	31.5 - 36.5
	615.229	168	155							615.408	25.9	9.8	35.8 - 40.5
										615.409	27.9	11.8	39.8 - 44.5

Carbide tool holders

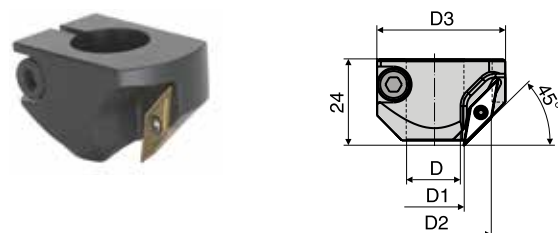
B.3

90° Insert holders

D1	L	D	Order No.	D1	L	D	Order No.
10	23	11.8 - 14.5	CC.. 06	16	27	21.8 - 24.5	CC.. 09
12	23	13.8 - 16.5		16	27	23.8 - 25.5	
14	23	15.8 - 18.5		16	27	25.8 - 28.5	
16	27	17.8 - 20.5	CC.. 09	16	27	27.8 - 32.5	CC.. 09
16	27	19.8 - 22.5		16	27	29.8 - 34.5	
				16	27	29.8 - 34.5	

Chamfering rings

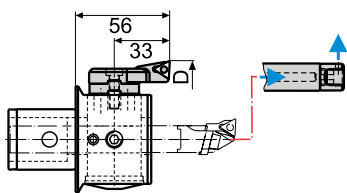
Chamfering rings for tool holders made of steel and carbide \varnothing 12 and \varnothing 16 mm, for 45° chamfering right after boring, without tool change.



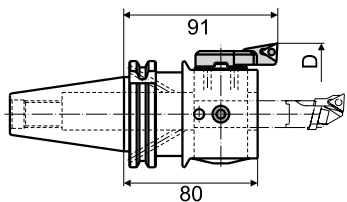
Dimensions				Order No.
D	D1	D2	D3	
12	12.6	27.7	35	VC.. 1103
16	16.6	31.7	39.5	

EWN 2-50XL Ø 80 - 152 mm

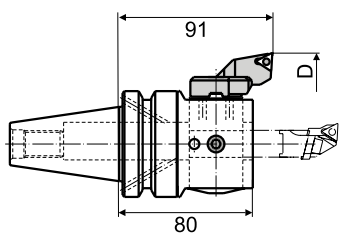
EWN 2-50 XL x CK6



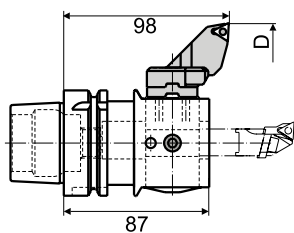
EWN 2-50 XL x SK40/VBD



EWN 2-50 XL x SK40/BTB



EWN 2-50 XL x HSK-A63



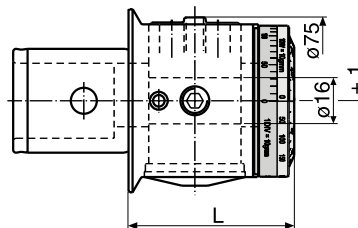
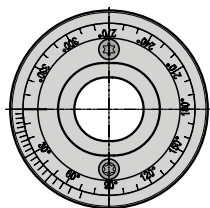
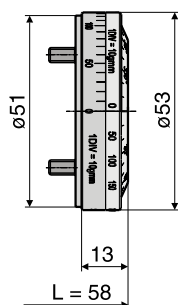
		Order No.	Insert	Capacity D
Insert holder		626.908		80 - 92
Spacer *		626.907		92 - 104
Insert holder		626.908		104 - 116
Insert holder *		626.909		116 - 128
Spacer *		626.907		128 - 140
Insert holder		626.909		140 - 152
Insert holder *		626.910		
Spacer *		626.907		
Insert holder		626.910		
Tool holder		615.226		
Coolant nozzle		615.392		

1. * Also suitable for back boring.

Balancing rings

After removing the front cover plate, the balancing rings can be mounted on to the boring heads. The imbalance has to be measured on a balancing machine. The correction of the imbalance is done by moving the scale rings.

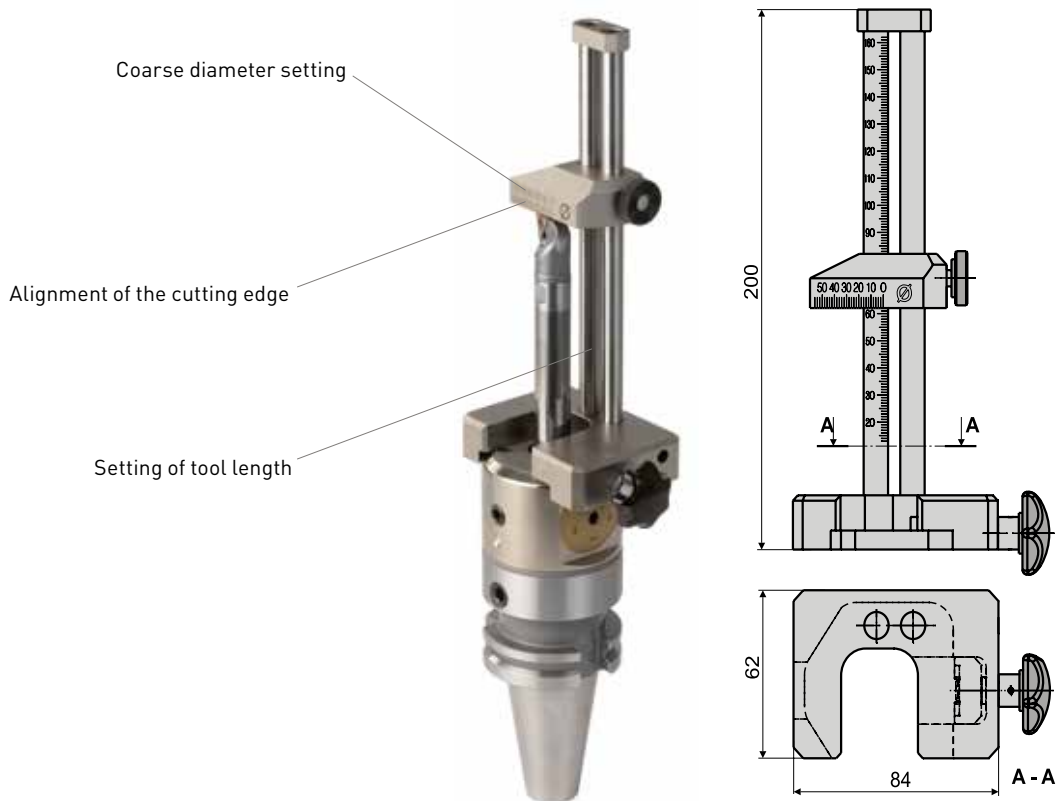
Order No.
112.806



Setting jig

The setting jig can be easily assembled on the front face of the boring heads EWN / EWB / EWD 2-50. Set the measuring slide to the required projection length. Pull the tool holder until the cutting edge touches the lower end of the measuring slide. Align the cutting edge with the edge of the measuring slide. The scale on the measuring slide provides a coarse diameter setting.

Model	Order No.
EV EWN 2-50	112.817



B.3

Tool kit EWD 2-54, Ø 16.8 - 33 mm

Tool kit	Order No.
EWD 2-54, Ø 16.8 - 33	112.826A



Contents	Qty.	Order No.
Boring head		
EWD 2-54 x CK6	1	112.109
Tool holder		
Ø 16 x 118 HM	1	615.252
Adjustable tool holder		
E 17/22 TC 11	1	615.301
E 22/27 TC 11	1	615.302
E 27/33 TC 11	1	615.303

Contents	Qty.	Order No.
Insert		
TCGT 110204 K10 C	10	655.383
Wrench		
GRS SW5 x 80	1	690.816
STS SW6	1	690.806
STS SW4	1	690.804
GRS Torx Plus T15 IP		690.843
GRS Torx Plus T7 IP	1	694.807
Battery		
BAT-CR2032 Lithium 3V	1	718.201
Case		
Case EWD 2-50 Ø 16.8-33	1	671.151

Tool kit EWN 2-50, Ø 16.8 - 33 mm

Tool Kit	Order No.
EWD 2-54, Ø 16.8 - 33	112.097A



Contents	Qty.	Order No.
Boring head		
EWN 2-54 x CK6	1	112.108
Tool holder		
Ø 16 x 118 HM	1	615.252
Adjustable tool holder		
E 17/22 TC 11	1	615.301
E 22/27 TC 11	1	615.302
E 27/33 TC 11	1	615.303

Contents	Qty.	Order No.
Insert		
TCGT 110204 K10 C	10	655.383
Wrench		
GRS SW5 x 80	1	690.816
STS SW6	1	690.806
STS SW4	1	690.804
GRS Torx Plus T7 IP	1	694.807
Case		
Case EWD 2-50 Ø 16.8-33	1	671.151

Tool kit EWN 2-50XL, Ø 17.8 - 152 mm

The tool kit EWN 2-50XL, Ø 17.8 – 152 mm, is available in different versions. The versions differ in the length and the material of the tool holders and in the quantity of the inserts.

Tool Kit	Order No.
EWN 2-50XL, Ø 17.8 - 152 mm	112.837 *



Contents	Qty.	Order No.
Boring head		
EWN 2-50XL	1	112.108
Tool holder		
Ø 16 x 88	1	615.226 *
Insert holder		
E 18 TC 11	1	615.282
E 25 TC 11	1	615.288
E 32 TC 11	1	615.285
E 40 TC 11	1	615.287
E 45 TC 11	1	615.292
E 54/80 TC 11	1	615.306
DS Ø 30 x 6	1	626.907
EK 80-104 TC 11	1	626.908
EK 104-128 TC 11	1	626.909
EK 128-152 TC 11	1	626.910

Contents	Qty.	Order No.
Insert		
TCGT 11024 M10C	10	655.389 *
Screw		
M6 x 20A	2	690.156
Wrench		
GRS SW5 x 80	1	690.816
GRS Torx Plus T7 IP	1	694.807
Coolant nozzle		
KMZ 2-50	1	615.392
Case		
Case EWN 2-150	1	671.150

*** Other versions available**

Tool Kit	Contents	Qty.	Order No.
112.837A	Tool holder made of steel		
	Ø 16 x 88	1	615.226
	Insert		
112.837B	Tool holder made of carbide		
	Ø 16 x 106	1	615.227
	Insert		
112.837C	Tool holder made of carbide		
	Ø 16 x 88	1	615.227
	Insert		
	TC11	2	655.389

EWD 2-32, boring range 2 - 32 mm

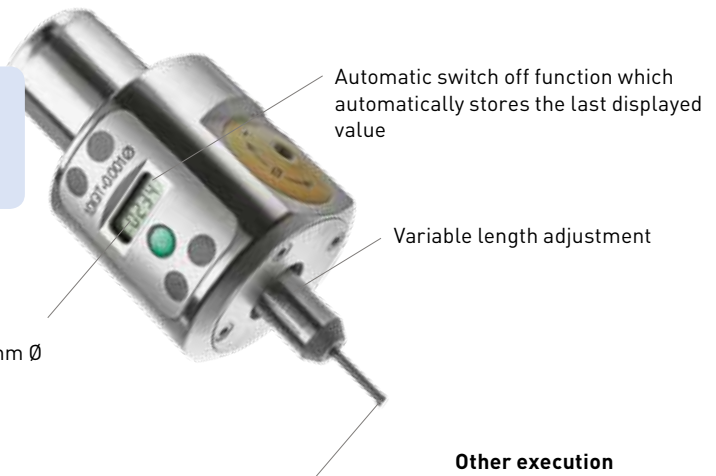
The EWD 2-32 is the smallest digital precision boring head with centre insert holder. It is especially suitable for the use on small machines. In addition, the newest member of the digital family uses the same accessories as the analogue version EWN 2-32.

Technical Data

- Boring range \varnothing 2-32 mm
- Tool holder bore: \varnothing 12 mm
- Setting accuracy: 0.001 mm/ \varnothing
- Adjustment range: -1 / +4 mm \varnothing

Model	Order No.
EWD 2-32 x CK5	112.309

LCD Display with a resolution of 0,001 mm \varnothing



Features

- Power management for optimized battery life.
- Minimized imbalance with tool carrier in centre position.
- The measuring system shows the effective movement of the tool carrier and permits diameter corrections in both directions.
- Same accessories as for the precision boring head EWN 2-32

Other execution

EWD 2-32 x C5
470.103



► B108

EWB 2-32, boring range 02 - 32 mm

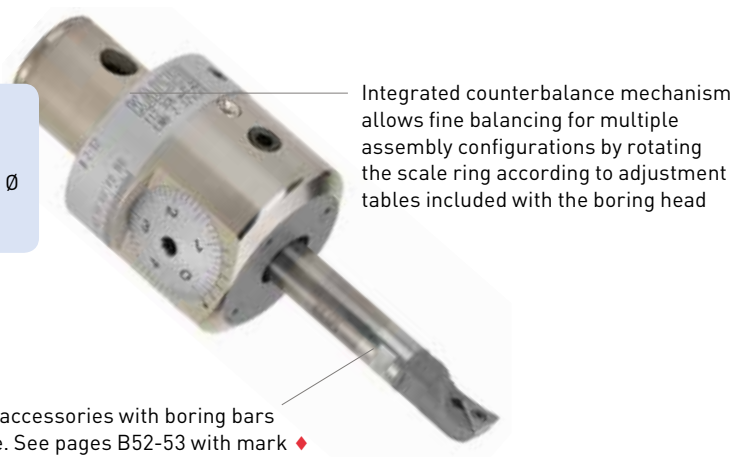
B.3

Technical Data

- Boring range: \varnothing 2-32 mm
- Tool holder bore: \varnothing 12 mm
- Adjustment precision: 1 DIV = 0.01 mm \varnothing , with vernier 0.002 mm \varnothing
- Adjustment range: -0.3 / +7 mm \varnothing
- Max. remaining imbalance: 50 gmm

Model	Order No.
EWB 2-32 x CK5	112.306

Fine graduated accessories with boring bars made of carbide. See pages B52-53 with mark \blacklozenge



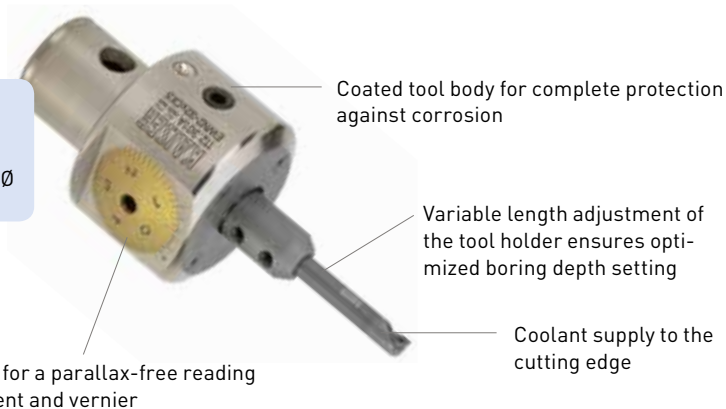
EWN 2-32, boring range 2 - 32 mm

Precision boring head in integral, modular, and screw-on execution for the precise machining of bores. Made for the use on machine tools with spindles ISO30, HSK-A50 (E-50) and bigger, as well as on lathe machines with driven tools.

Technical Data

- Boring range: \varnothing 2-32 mm
- Tool holder bore: \varnothing 12 mm
- Adjustment precision: 1 DIV = 0.01 mm \varnothing , with vernier 0.002 mm \varnothing
- Adjustment range: -0.3 / +7 mm \varnothing

Model	Order No.
EWN 2-32 x CK5	112.301A



Features EWN/EWB 2-32 and EWN 04-22

- Ground and play-free fitted micrometer spindle for a very precise and direct adjustment of the tool carrier.
- Indirect and distortion free locking of the tool carrier.

Other executions

EWN 2-32 x ES32
112.304A



EWN 2-32 x SK30/VD
112.303A

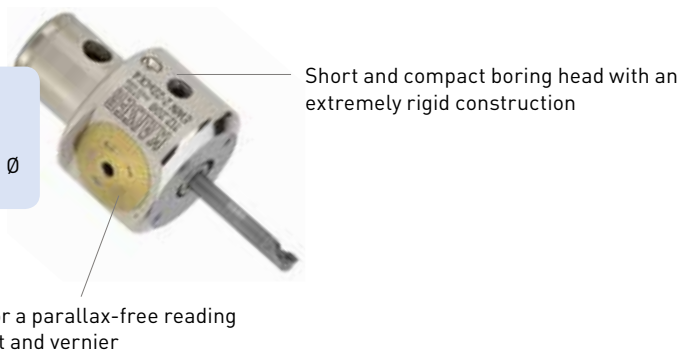


EWN 04-22, boring range 04 - 22 mm

Technical Data

- Boring range \varnothing 04-22 mm
- Tool holder bore: \varnothing 10 mm
- Adjustment precision: 1 DIV = 0.01 mm \varnothing , with vernier 0.002 mm \varnothing
- Adjustment range: -0.5 / +4.5 mm \varnothing

Model	Order No.
EWN 04-22 x CK4	112.206



Other executions

EWN 04-22 x HSK-E40
112.207

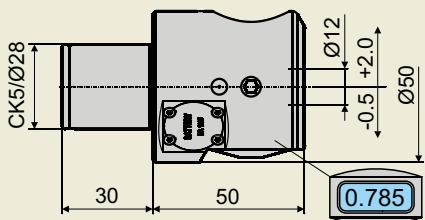


EWN 04-22 x ES25
112.205

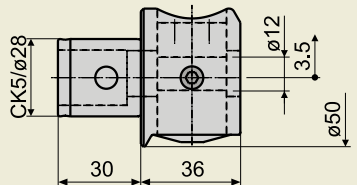


Boring Head Order No.

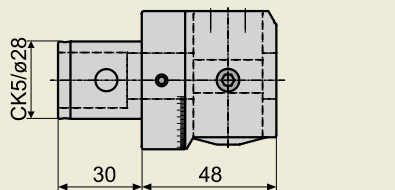
EWD 2-32 x CK5 112.309



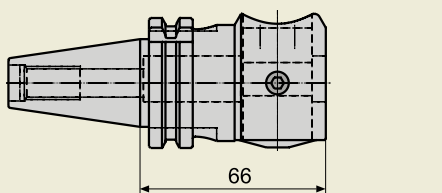
EWN 2-32 x CK5 112.301A



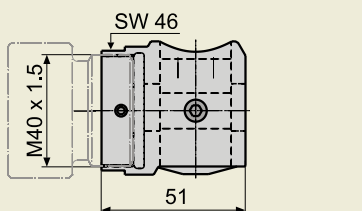
EWB 2-32 x CK5 112.306



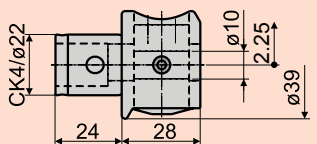
EWN 2-32 x SK30/VD integral 112.303A



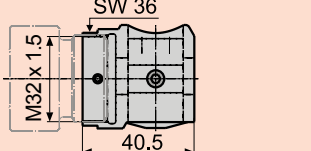
EWN 2-32 x ES32 112.304A



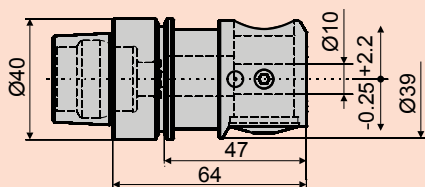
EWN 04-22 x CK4 112.206



EWN 04-22 x ES25 112.205



EWN 04-22 x HSK-E40 112.207



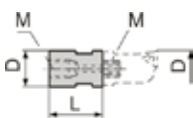
Reducer	Order No.	Reducer	Order No.
	613.324 ♦		613.204
	613.323 ♦		613.202
	613.326 ♦		613.203
	613.325 ♦		613.205
	613.327 ♦		613.206
	613.307 ♦		613.207
	613.308 ♦		613.208
	613.309 ♦		
	613.310 ♦		

Other reducers

D	Order No.
4	613.304
5	613.305
6	613.306

Screw-In Sleeve	A1	Order No.
ES32 / ES25	M32 x 1.5	112.353
ES32 / ES16	M22 x 1.5	112.385

Extensions



D	L	M	D	Order No.	Order No.
12	18	M6	13.8 - 16.5	615.220	112.837
16	25	M10	17.8 - 32.0	615.228	

Screw-In Sleeve	A1	Order No.
ES25 / ES20	M25 x 1.5	112.271
ES25 / ES16	M22 x 1.5	112.272

B.3

Tool Holder	Order No.	L			Insert Holder	Cutting Edge	Capacity D		
		L	X	X					
	611.155 ♦	30	max. 9	max. 9		K10	2.0 - 3.0		
	611.156 ♦	35	max. 14	max. 14			K10	3.0 - 4.0	
	615.080	45	10 - 23	10 - 23		K10	3.9 - 4.9		
	615.203 ♦	62	10 - 40	10 - 40			K10	3.9 - 4.9	
	615.203A ♦	62	10 - 40	10 - 40			K10	3.9 - 4.9	
	615.081	46	10 - 22	10 - 22		K10	4.9 - 5.9		
	615.204 ♦	74	20 - 50	10 - 50			K10	4.9 - 5.9	
	615.204A ♦	74	10 - 50	10 - 50			K10C	4.9 - 5.9	
	615.082	50	10 - 25	10 - 25		WC.. 0201	5.8 - 7.3		
	615.083	65	10 - 40	10 - 40					
	615.201 ♦	85	30 - 60	20 - 60					
	615.084	55	10 - 25	10 - 25			7.3 - 8.8		
	615.085	75	20 - 45	10 - 45					
	615.202 ♦	98	40 - 65	30 - 65					
	615.086	60	10 - 30	10 - 30			7.8 - 9.5		
	615.207 ♦	80	25 - 50	15 - 50					
	615.087	100	45 - 70	35 - 70					
	615.205 ♦	115	60 - 85	50 - 85	615.271 ♦		8.8 - 10.0		
	615.211	47	10 - 35	10 - 35					
	615.088	47	10 - 35	10 - 35					
	615.212 ♦	72	35 - 60	25 - 60		TP.. 0702			
	615.213 ♦	105	50 - 75	40 - 75					
	615.208 ♦	100		35 - 70			10.0 - 11.8		
	615.206 ♦	140		70 - 105					
	615.214	52	20 - 45	10 - 45	615.272 ♦		11.8 - 13.8		
	615.089	52	20 - 45	20 - 45					
	615.215 ♦	77	45 - 70	35 - 70					
	615.223 ♦	97	65 - 90	55 - 90					
	615.216	52	20 - 45		615.273		13.8 - 15.8		
					615.280 615.281		14.8 - 16.8 15.8 - 17.8		
	615.217	52	25 - 50		615.282 615.281		17.8 - 19.8 19.8 - 21.8		
	615.218	77		35 - 70	615.273 ♦	TP.. 0702	13.8 - 15.8		
	615.225 ♦	97		55 - 90					
	615.219	107		65 - 100			615.280 ♦		14.8 - 16.8
	615.224 ♦	137		95 - 130			615.281 ♦		15.8 - 17.8
	615.234	72		35 - 70	615.282 ♦	TC.. 1102	17.8 - 19.8		
	615.243 ♦	92		55 - 90			615.289 ♦	19.8 - 21.8	
	615.239 ♦	112		75 - 110			615.283 ♦	21.8 - 23.8	
	615.240 ♦	142		105 - 140			615.290 ♦	23.8 - 24.8	
							615.288 ♦	24.8 - 25.8	
							615.291 ♦	25.8 - 27.8	
							615.284 ♦	27.8 - 32.0	

Capacity D

Boring range for the precision boring head EWB 2-32.

Under full use of the adjustment range, the max boring range will be,

- for EWN 04-22: Lower range + 4.5 mm Ø
- for EWN 2-32: Lower range + 7 mm Ø
- for EWD 2-32: Lower range + 4 mm Ø

Carbide tool holder

♦ For the balanced boring head EWB 2-32 only use accessories with order no. marked accordingly.

Adjustable tool holder

The adjustable tool holder allows the coarse diameter setting on the insert holder. This leads to the possibility to machine bores from $\varnothing 9.8 - 33$ mm with the tool holder in the centre position and as a result, with the best possible balancing of the tool combination.

Reducer	Order No.	Adjustable Tool Holder	Order No.	L	X	Insert Holder	Cutting Edge	Capacity D
	613.309		615.374 615.369	91 121	35 - 70 65 - 100	615.365	TP.. 0702 	9.8 - 12.0
	613.310		615.354 615.370	85 120	30 - 65 65 - 100	615.366		11.8 - 14.0
			615.355 615.356 615.372	80 110 140	25 - 60 55 - 90 85 - 120	615.367	TC.. 1102 	13.8 - 17.0
			615.355 615.356 615.372	80 110 150	32 - 67 62 - 128 39 - 74	615.300		14.8 - 18.0
			615.357 615.256	86 121	40 - 75 75 - 110	615.301 615.302 615.303		16.8 - 22.0 21.8 - 27.0 26.8 - 33.0

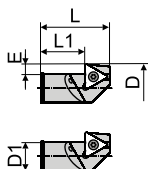
Capacity D

When using an adjustable tool holder, and under full use of the adjustment range, the max. boring range will be:

- for EWN 2-32: Upper range +7 mm \varnothing
- for EWD 2-32: Upper range +4 mm \varnothing

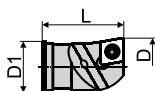
Back boring

B.3



D1	Min. Entry Diameter	E	L	L1	D	D	Order No.	Inserts
10	13.0	2.9	28	18	15.8 - 18.5	15.8 - 18.5	615.401	TC.. 1102
10	13.9	3.8	28	18	17.8 - 20.5	17.8 - 20.5	615.402	
12	15.9	3.9	28	18	19.8 - 22.8	19.8 - 22.8	615.403	
12	17.4	5.4	28	18	22.8 - 25.8		615.404	
14	19.9	6.0	28	18	25.8 - 28.8		615.405	
16	22.4	6.3	32	22	28.8 - 33.5		615.406	

90° Insert holders



D1	L	D	D	Order No.	Inserts
10	23	11.8 - 14.5	11.8 - 14.5	615.420	CC.. 06
12	27	13.8 - 16.5	13.8 - 16.5	615.421	
14	27	15.8 - 18.5	15.8 - 18.5	615.422	
16	27	17.8 - 20.5	17.8 - 20.5	615.423	CC.. 09
16	27	19.8 - 22.5	19.8 - 22.5	615.424	
16	27	21.8 - 24.5		615.425	
16	27	23.8 - 25.5		615.426	
16	27	25.8 - 28.5		615.427	
16	27	27.8 - 32.5		615.428	

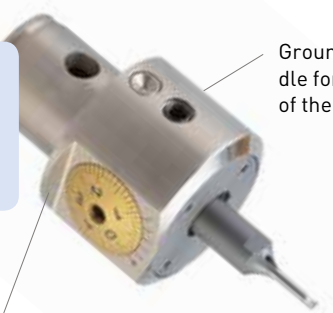
	Carbide tool holder
	Accessories EWN 2-32
	Accessories EWN 04-22

Boring range 04 - 15 mm

Precision boring heads for the machining of smallest bores with highest spindle speeds on machine tools with spindles ISO25, HSK-E32 and bigger. The boring heads are available with the modular CK3 connection and with cylindrical shanks $\varnothing 16$ mm.

Technical Data

- Boring range $\varnothing 04-15$ mm
- Tool holder bore: $\varnothing 7$ mm
- Adjustment precision: 1 DIV = 0.01 mm \varnothing , with vernier 0.002 mm \varnothing
- Adjustment range: -0.4 / +4.0 mm \varnothing
- Max. Spindle speed: 20 000 r.p.m.



Ground and play-free fitted micrometer spindle for a very precise and direct adjustment of the tool carrier

Coated tool body for complete protection against corrosion

Model	Order No.
EWN 04-15 x CK3	112.505

Other execution

EWN 04-15 x $\varnothing 16$
112.506

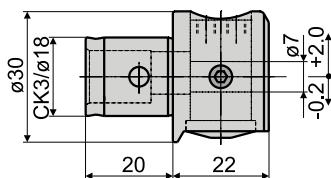


Boring Head

Order No.

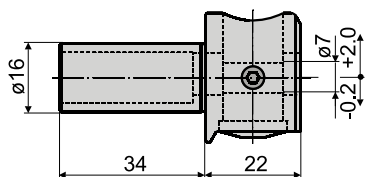
EWN 04-15 x CK3

112.505



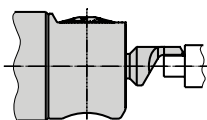
EWN 04-15 x $\varnothing 16$

112.506



Boring Cutter	Order No.	L	X	Cutting Edge	Capacity D
	615.522	52	1.5	K10C	0.4 - 1.0
	615.524		3		0.9 - 1.5
	615.525		5		1.4 - 2.0
	615.501		6		1.9 - 3.0
	615.502		10		2.9 - 4.0
	615.503		13		3.9 - 5.0
615.504	16	4.9 - 6.0			
	615.505	52	20	WC.. 0201	5.8 - 7.0
	615.506		20		6.8 - 8.0
	615.507	52	30	TP.. 0702	7.8 - 9.0
	615.508		30		8.8 - 10.0
	615.509		30		9.8 - 12.00
	615.511		30		11.8 - 15.5

Pin turning



Pin Turning Cutter	Order No.	L	X	Cutting Edge	Capacity D
	615.530		4	K10C	0.2 - 3.0
	615.531		6		2.0 - 6.0



The world wide smallest precision boring head, Boring range 04 - 7 mm

Precision boring heads for the machining of smallest bores with highest spindle speeds on machine tools with spindles ISO 20, HSK-E25 and bigger. The boring heads are available with the modular CK1 connection and with cylindrical shanks $\varnothing 6$ und 10 mm.

Technical Data

- Boring range $\varnothing 04-7$ mm
- Tool holder bore: $\varnothing 4$ mm
- Adjustment precision: 1 DIV = 0.01 mm \varnothing , with vernier 0.002 mm \varnothing
- Adjustment range: -0.2 / +2.1 mm \varnothing
- Max. Spindle speed: 30 000 r.p.m.



Short and compact design

Indirect and distortion free locking of the tool carrier

Model	Order No.
EWN 04-7 x CK1	112.503

Large dial disc for a parallax-free reading of the adjustment and vernier

The world wide smallest precision boring head



Other executions

EWN 04-7 x $\varnothing 10$
112.504



EWN 04-7 x $\varnothing 6$
112.508

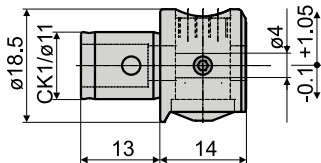


Boring Head

Order No.

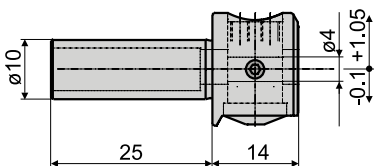
EWN 04-7 x CK1

112.503



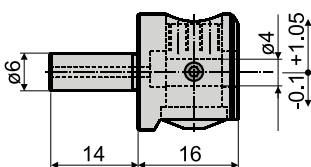
EWN 04-7 x $\varnothing 10$

112.504



EWN 04-7 x $\varnothing 6$

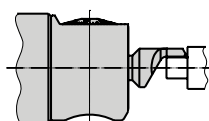
112.508



Boring Cutter	Order No.	L	X	R	Cutting Edge	Capacity D		
	615.541	30	1.5	0.05	K10C	0.4 - 0.9		
	615.542		3			0.9 - 1.4		
	615.543		5			1.4 - 2.0		
	615.544		6			1.9 - 3.0		
	615.545		10			2.9 - 4.0		
	615.546		13			3.9 - 5.0		
	615.547		16			4.9 - 7.0		
	615.561		1.1			0.1	K10C	0.4 - 1.6
	615.562		1.5					0.6 - 0.8
	615.563		2					0.8 - 1.2
615.564	2.5	0.2	K10C	1.2 - 1.5				
615.565	3.5			1.5 - 1.9				
615.566	4.5			1.9 - 3.0				
615.551	1.1	25	0.1	K10	0.4 - 0.6			
615.552	1.5				0.6 - 0.8			
615.553	2				0.8 - 1.2			
615.554	2.5	0.2	K10	1.2 - 1.5				
615.555	3.5			1.5 - 1.9				

The boring cutters are made with flat for cutting edge orientation. Other lengths and geometry on request.

Pin turning



Pin Turning Cutter	Order No.	L	X	Cutting Edge	Capacity D
	615.590	25	2.2	K10C	0.2 - 2.3

Precision Boring Heads EWD/EWN/EWB, Series 309/310

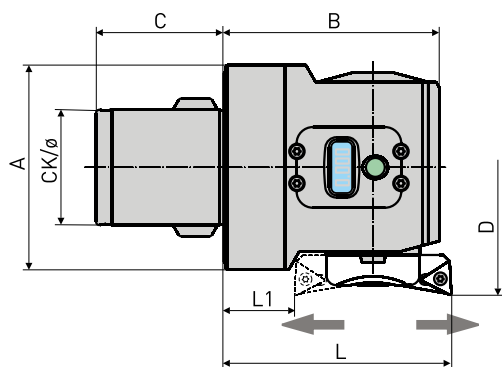
Precision Boring Heads EWD, Series 310	58
Anti-Vibration Boring Bar EWD Smart Damper	59
Precision Boring Heads EWN, Series 310	60
Precision Boring Heads EWN/EWD, Series 310	61 - 63
Balanced Precision Boring Heads EWB, Series 310	64
Balanced Precision Boring Heads EWB AL, Series 310	65
Balanceable Precision Boring Heads EWB UP, Series 309	66
Boring Heads with Thread Connection EW, Series 310	67

Easier, faster, safer

Thanks to the large display with a resolution of 0.001 mm \emptyset , machining of extremely precise bores has become very easy. Moreover the user friendly digital display shortens the time for adjusting the boring head by at least 20 per cent. Thanks to intelligent electronic with automatic switch off function which automatically stores the last displayed value, operator mistakes can be drastically reduced.

Features

- Coated tool body for complete protection against corrosion
- Body protection grade: IP 69K
- LCD Display with a resolution of 0,001 mm \emptyset
- Direct measuring diameter allows corrections in both directions
- Insert holder can be mounted in opposite direction for an easy changeover to back boring
- Large work range due to 3 different insert holders for each boring head
- Automatic switch off function which automatically stores the last displayed value



Boring Head	CK/ \emptyset	Boring Range D		L	L1	A	B	C	Order No.
		→	←						
EWD 41 Digital	CKB4/22	41 - 74	53 - 74	47	14	38	43	24	310.403
EWD 53 Digital	CKB5/28	53 - 95	62 - 95	57	19	49	53	30	310.503
EWD 68 Digital	CKB6/36	68 - 150	80 - 150	71	22	64	67.2	40	310.603
EWD 100 Digital	CKB6/36	100 - 203	112 - 203	71	22	66.5/90 *	67.2	40	310.604
EWD 100 Digital	CKB7/46			87	38	90	83.2	50	310.703

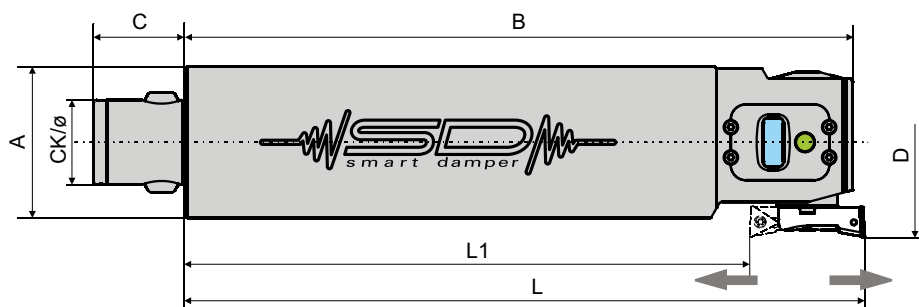
1. * Max. body diameter: 90 mm
2. Insert holders see pages B61-62.

A combination of the most advanced technologies on the market

With the new EWD Smart Damper BIG KAISER combines its most advanced technologies to a powerful and highly productive tool: a digital precision boring head with an innovative and patented damping technology. Due to the vibration damping, machining of extremely deep bores with high cutting parameters have become possible.

Features

- Patented Smart Damper technology for vibration free boring
- Coated tool body for complete protection against corrosion
- Body protection grade: IP 69K
- LCD Display with a resolution of 0,001 mm Ø
- Direct measuring diameter allows corrections in both directions



Boring Head	CK/Ø	Boring Range D		L	L1	A	B	C	Order No.
		→	←						
EWD 41 SD	CKB4/22	41 - 74	53 - 74	200	167	39	196	24	389.395
EWD 53 SD	CKB5/28	53 - 95	62 - 95	225	187	50	221	30	389.396
EWD 68 SD	CKB6/36	68 - 150	80 - 150	260	211	64	241	40	389.397

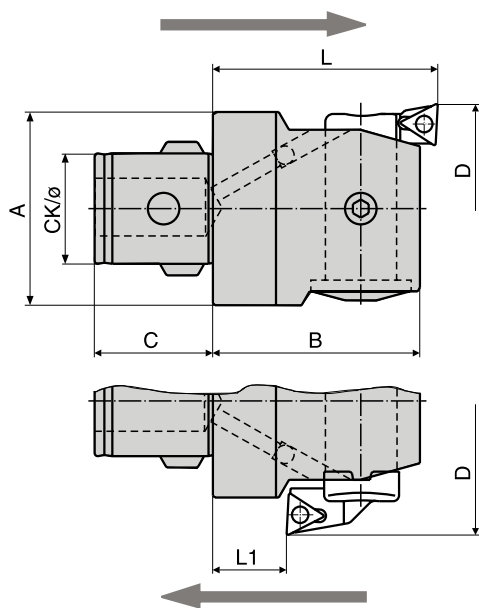
1. Insert holders see pages B61-62.

Multifunctional for highest precision and efficiency

The EWN single cutter boring tool program for finishing, covers a range of \varnothing 20 - 203 mm with only 7 precision boring heads. Due to the optimized balance over the whole adjustment range, cutting speeds up to 1200 m/min are permitted.

Features

- Large dial disc for a parallax-free reading of the adjustment and vernier
- Insert holder can be mounted in opposite direction for an easy changeover to back boring
- CKB connection

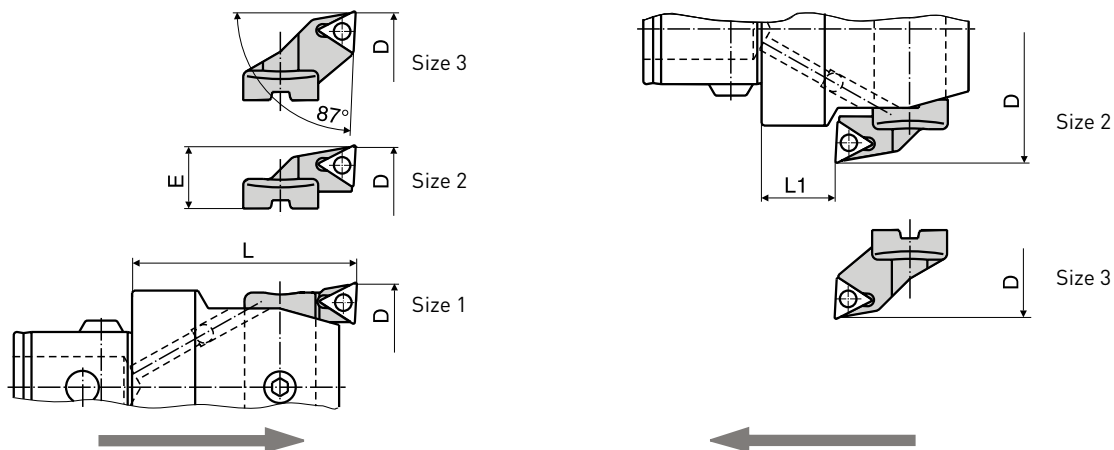


Boring Head	CK/Ø	Boring Range D		L	L1	A	B	C	Order No.
		→	←						
EWN 20	CKB1/11	20 - 36	28 - 36	32.5	10.5	18.5	29.5	13	310.101
EWN 25	CKB2/14	25 - 47	36 - 47	35.5	11.5	23.4	32.5	16	310.201
EWN 32	CKB3/18	32 - 60	46 - 60	40	10	30	35	20	310.301
EWN 41	CKB4/22	41 - 74	53 - 74	47	14	38	43	24	310.401
EWN 53	CKB5/28	53 - 95	62 - 95	57	19	49	53	30	310.501
EWN 68	CKB6/36	68 - 150	80 - 150	71	22	64	67.2	40	310.601
EWN 100	CKB6/36	100 - 203	112 - 203	71	22	65/90 *	67.2	40	310.602
EWN 100	CKB7/46			87	38	90	83.2	50	310.701
EWN 100 L	CKB7/46			117	68	90	113.2	50	310.708

1. * Max. body diameter: 90 mm

Insert holder type E

Standard holder with 87° entering angle, suitable for fine boring in through- and blind holes. Three different insert holders for the extension of the diameter range and for back boring applications.

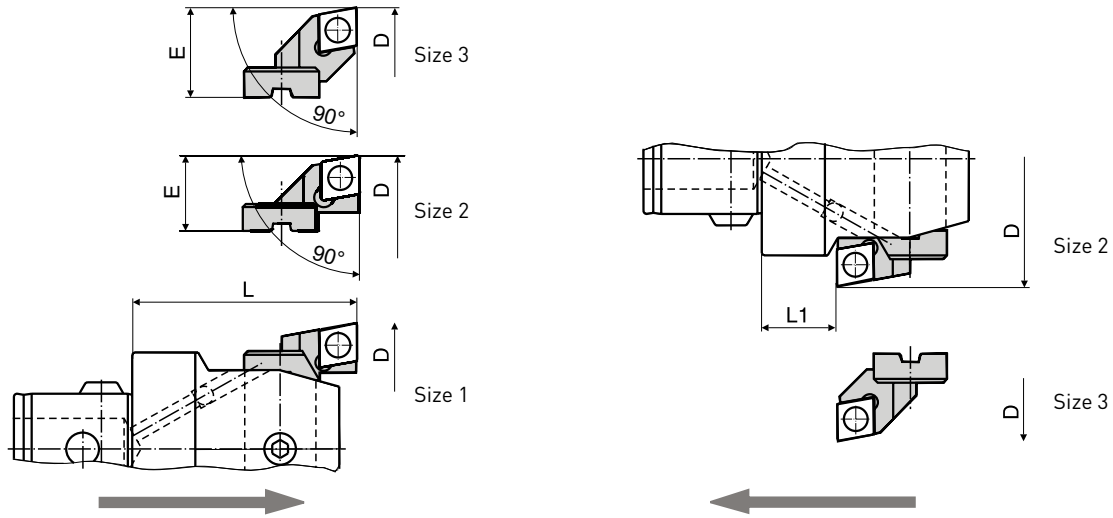


Boring Head	Insert Holder Size	Boring Range D		E	L	L1	Order No.		
		→	←						
EWN 20	1	20 - 26		4.65	32.5	10.5	626.111	TP.. 0702	
	2	25 - 31	28 - 31	7.15			626.112		
	3	30 - 36	30 - 36	9.65			626.113		
EWN 25	1	25 - 33		5.45	35.5	11.5	626.121	TP.. 0702	
	2	32 - 40	36 - 40	8.95			626.122		
	3	39 - 47	39 - 47	12.45			626.123		
EWN 32	1	32 - 42		7.4	40	10	626.131	TP.. 0702	
	2	41 - 51	46 - 51	11.9			626.132		
	3	50 - 60	50 - 60	16.4			626.133		
EWN 41	1	41 - 54		8.1	47	14	626.141	TP.. 0702	
EWD 41	2	50 - 63	53 - 63	12.6			626.142		
	3	61 - 74	61 - 74	18.1			626.143		
EWN 53	1	53 - 70	62 - 70	10	57	19	626.151	TP.. 0702	
	EWD 53	2	65 - 82	69 - 82			16		626.152
		3	78 - 95	78 - 95			22.5		626.153
EWN 68	1	68 - 100	80 - 100	12.5	71	22	626.161	TC.. 1102	
	EWD 68	2	94 - 126	94 - 126			25.5		626.162
		3	118 - 150	118 - 150			37.5		626.163
EWN 100	1	100 - 153	112 - 153	12.5	71	22	626.161	TC.. 1102	
	EWD 100	2	126 - 179	126 - 179			25.5		626.162
		3	150 - 203	150 - 203			37.5		626.163
EWN 100	1	100 - 153	112 - 153	12.5	87	38	626.161	TC.. 1102	
	EWD 100	2	126 - 179	126 - 179			25.5		626.162
		3	150 - 203	150 - 203			37.5		626.163
EWN 100 L	1	100 - 153	112 - 153	12.5	117	68	626.161	TC.. 1102	
	EWD 100	2	126 - 179	126 - 179			25.5		626.162
		3	150 - 203	150 - 203			37.5		626.163

B.4

Insert holder type C

With 90° approach angle, suitable for semi-finish and finish boring and for stepped bores. For each boring head, insert holders with different projections are available for the extension of the boring range and for back boring. The insert holders type C are not available for the boring head EWN 20. There is no insert holder size 1 for the boring head EWN 25

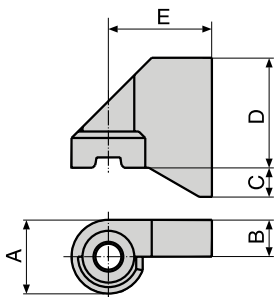


Boring Head	Insert Holder Size	Boring Range D		E	L	L1	Order No.	
		→	←					
EWN 25	2	33 - 41	37 - 41	9.45	35.5	11.5	626.322	CC.. 0602
	3	39 - 47	39 - 47	12.45			626.323	
EWN 32	1	32 - 42		7.4	40	10	636.331	
	2	41 - 51	47 - 51	11.9			626.332	
	3	50 - 60	50 - 60	16.4			626.333	
EWN 41 EWD 41	1	41 - 54		8.1	47	14	626.341	
	2	50 - 63	54 - 63	12.6			626.342	
	3	61 - 74	61 - 74	18.1			626.343	
EWN 53 EWD 53	1	53 - 70	62 - 70	10	57	19	626.351	
	2	62 - 79	67 - 79	14.5			626.352	
	3	78 - 95	78 - 95	22.5			626.353	
EWN 68 EWD 68	1	68 - 100	80 - 100	12.5	71	22	626.361	
	2	78 - 110	82 - 110	17.5			626.362	
	3	108 - 140	108 - 140	32.5			626.363	
EWN 100 EWD 100	1	100 - 153	112 - 153	12.5	71	22	626.361	
	2	110 - 163	110 - 163	17.5			626.362	
	3	140 - 193	140 - 193	32.5			626.363	
EWN 100 EWD 100	1	100 - 153	112 - 153	12.5	87	38	626.361	
	2	110 - 163	110 - 163	17.5			626.362	
	3	140 - 193	140 - 193	32.5			626.363	
EWN 100 L	1	100 - 153	112 - 153	12.5	117	68	626.361	
	2	110 - 163	110 - 163	17.5			626.362	
	3	140 - 193	140 - 193	32.5			626.363	

B.4

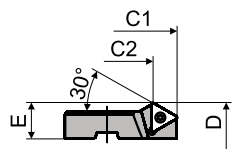
Blank insert holder type ENH

If required, the blanks can be hardened. (Mat. 1.2343)



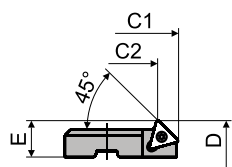
Boring Head	Blank Type	A	B	C	D	E	Order No.
EWN 20	1	8.4	4.2	2.61	11	11.8	626.901
EWN 25	2	10.4	5.2	3.16	10	17.2	626.902
EWN 32	3	11.4	5.7	4.5	17	16	626.903
EWN 41	4	15.4	7.7	5	20	20	626.904
EWN 53	5	19	9.5		25	20	626.905
EWN 68/100	6	29	14.5		40	26	626.906
						50	626.916

Insert holders 30°



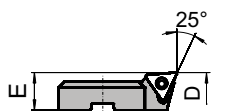
Boring Head	Boring Range		E	C1	C2	Order No.	
	D	E					
EWN 25	28 - 36	6.95	35.5	29.8	626.422	TP.. 07 TC.. 11	
EWN 32	36 - 46	9.4	42	33.3	626.432		
EWN 41	45 - 58	10.1	49	40.3	626.442		
EWN 53/EWD 53	56 - 73	11.5	57	48.4	626.452		
EWN 68/EWD 68	68 - 100	12.5	71	62.3	626.462		
EWN 100/EWD 100	100 - 153	12.5	87	78.3	626.462		

Insert holders 45°



Boring Head	Boring Range		E	C1	C2	Order No.	
	D	E					
EWN 25	28 - 36	6.95	35.5	30.8	626.423	TP.. 07 TC.. 11	
EWN 32	36 - 46	9.4	42	34.8	626.433		
EWN 41	45 - 58	10.1	49	41.8	626.443		
EWN 53/EWD 53	56 - 73	11.5	57	49.8	626.453		
EWN 68/EWD 68	68 - 100	12.5	71	63.8	626.463		
EWN 100/EWD 100	100 - 153	12.5	87	79.8	626.463		

Insert holders 25°



Boring Head	Boring Range		E	Order No.	
	D	E			
EWN 32	32 - 42	7.4	689.197	TP.. 07 TC.. 11	
EWN 41	41 - 54	8.1	689.198		
EWN 53/EWD 53	53 - 70	10	689.001		
EWN 68/EWD 68	68 - 100	12.5	689.007		
EWN 100/EWD 100	100 - 153	12.5	689.007		

Back boring

For back boring, it is required to enter into the bore off centre, with a tool adjusted to the back bore diameter. In this respect, the back bore diameter «D» as well as the diameters of the entry bore «C» and the tool body «A», are related to each other. In order to check the feasibility of the back boring operation and to select the best possible tool combination, these values can be calculated as follows:

B.4

Example:

Calculation of the minimum entry bore diameter «C».

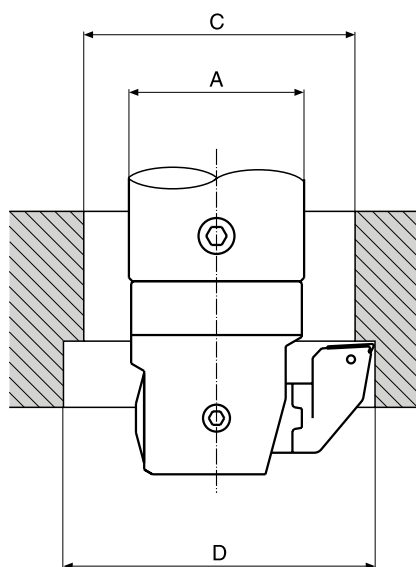
Given:

- Back bore diameter D = 93mm
- Tool combination EWN53, with Insert holder no. 3, A = 50 mm

$$C = \frac{D + A}{2} = \frac{93 + 50}{2} = 71.5 \text{ mm}$$

Caution:

- Counter clockwise spindle rotation is required for back boring operations.
- The cutting edge is at a shorter length than the boring head. Consider total length of tool. Check the space at the back side of the work piece



Min. entry bore diameter «C»

$$C = \frac{D + A}{2}$$

Max. back bore diameter «D»

$$D = 2C - A$$

Max. tool body diameter «A»

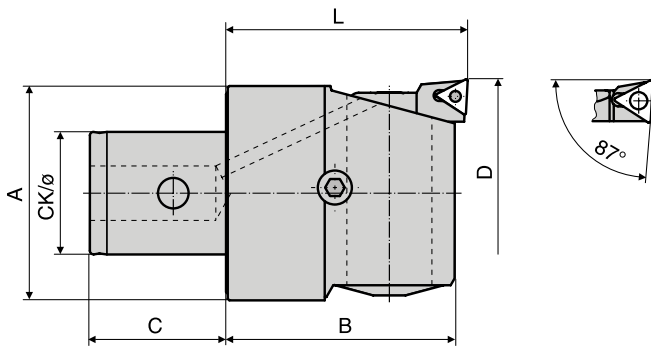
$$A = 2C - D$$


Self balance over the entire adjustment range

The precision balancing of the head happens automatically by the adjustment of the diameter. To balance the whole tool combination there are prebalanced shanks and intermediates available. Even at max. speeds, balanced tools guarantee vibration-free boring, resulting in increased productivity and highest precision.

Features

- For cutting speeds up to 2 000 m/min
- Automatic precision balance over the entire adjustment range
- Only 5 different boring heads to cover the range from 32-105 mm Ø
- All the tool lengths and diameters are the same as the EWN tool program
- Combined clamping for both the micrometer cartridge and the balance counterweight
- Highly accurate and purely radial cutting edge adjustment by means of a ground and play-free micrometer spindle
- Large dial disc and vernier. Adjustment precision: 1 Div. = 0.01 mm Ø, with vernier 0.002 mm Ø
- Through tool coolant supply to the cutting edge
- High quality coated tool body for complete protection against corrosion



Boring Head	CK/Ø	D	L	A	B	C	Order No.	
EWB 32	CK3/18	32 - 42	40	30	37	20	310.305A	TP.. 0702
EWB 41	CK4/22	41 - 54	47	38	43	24	310.405A	TC.. 1102
EWB 53	CK5/28	53 - 70	57	49	53	30	310.505A	
EWB 68	CK6/36	68 - 88	71	63	67.2	40	310.605A	
EWB 85	CK6/36	85 - 105	71	63	67.2	40	310.606A	

1. The EWB-boring heads will be delivered with assembled insert holder.

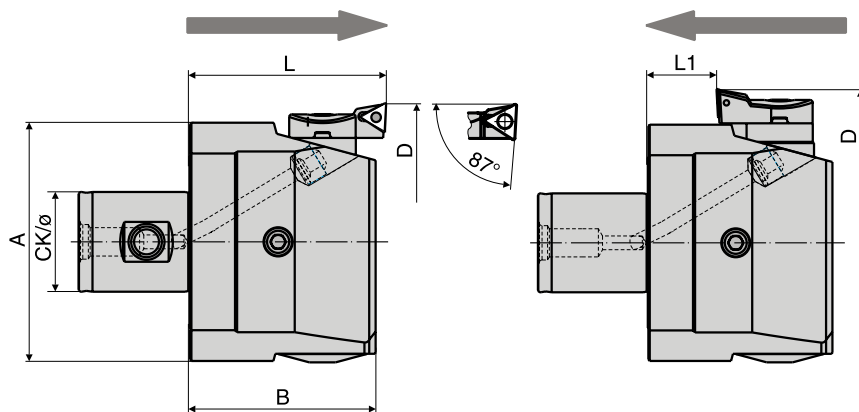



Highly precise, ultra lightweight with self-balancing over the entire adjustment range

The precision boring heads EWB AL are made of high strength aluminium with hard coating. Together with reductions and extensions made in the same way, the weight for long and large diameter tool combinations is reduced by more than 50%. This means that weight problems during ATC and handling are eliminated to a great extent.

Features

- For cutting speeds up to 2 000 m/min.
- Only two different boring heads to cover the range from Ø 100 - 203 mm
- Combined clamping for both the micrometer cartridge and the balance counterweight with excellent positional accuracy
- For forward and back boring applications
- Highly accurate cutting edge adjustment by means of a large scale disc. 1 DIV = 0.01 mm Ø, with vernier 0.002 mm Ø.
- Automatic precision balance over the entire work range
- Hard coated surface for improved wear and scratch resistance



Boring Head	CK/ø	Boring Range D				A	B	Order No.	
		→	←	L	L1				
EWB 100 AL	CK6/36	100 - 153	112 - 153	71	25	90	67	310.607	TC.. 1102
EWB 150 AL		150 - 203	150 - 203	71	25	126	67	310.608	
EWB 100 AL	CK7/46	100 - 153	112 - 153	87	41	90	83	310.705	
EWB 150 AL		150 - 203	150 - 203	87	41	126	83	310.706	

1. The EWB boring heads will be delivered with assembled insert holder.

Peak performance and precision uniquely combined

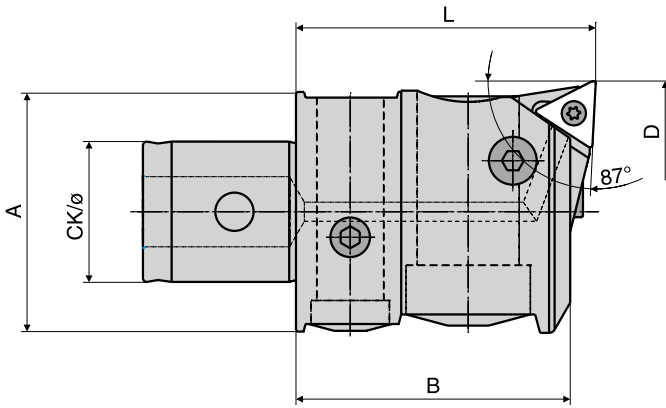
The revolutionary new EWB UP series sets higher standards for boring heads concerning adjustment accuracy and balance quality. Diameter adjustments in the sub-micron range via a high-precision adjustment device and balance qualities of G 6.3 are requirements for tight tolerance bores with maximum rpm's.


Features

- Ultra-precise diameter adjustment via rough adjustment of the insert holder and fine adjustment with dial scale. 1 DIV = 0.001 mm Ø (without vernier).
- Absolutely free from any movement with combined clamping of insert holder and tool carrier
- Quick and precise balance adjustment via balance scale or, in case EWB 25 UP via set screw
- High quality coated tool body for complete protection from corrosion.
- Same tool lengths and boring ranges as with the standard EWN program



Cutting speed
Vc max = 2000 m/mm



Boring Head	CK/Ø	D	L	A	B	Max. Imbalance [gmn]	Order No.	
EWB 25 UP	CK2/14	25 - 33	35.5	23.4	32.5	3	309.201	TP.. 0702
EWB 32 UP	CK3/18	32 - 42	40	30	37	5	309.301	TC.. 1102
EWB 41 UP	CK4/22	41 - 54	47	38	43	5	309.401	
EWB 53 UP	CK5/28	53 - 70	57	49	53	10	309.501	
EWB 68 UP	CK6/36	68 - 100	71	64	67.2	30	309.601	

1. EWB-UP boring heads are sold with assembled insert holders.

B.4



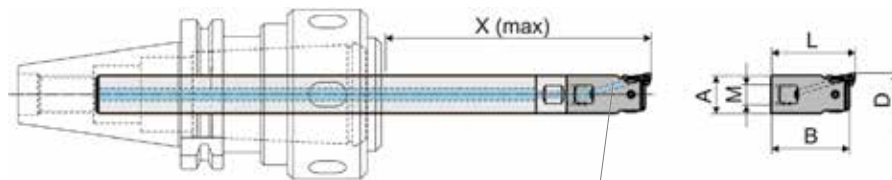
For precise finishing operations of small diameter bores with high spindle speeds

These heads are designed to be used in combination with the steel or carbide-boring bars \varnothing 14 and \varnothing 16 mm out of the accessory program, Series 112. In conjunction with the long carbide bar, the tool is well suited for vibration-free finishing operations in bores with unfavorable \varnothing/L -ratios. There are various integral and modular options for clamping these boring bars. Please see the chapter on tool holders.



Dial disc and vernier.
(1 DIV=0.01 mm \varnothing ,
with vernier 0.002 mm \varnothing)

Highly accurate and purely radial
cutting edge adjustment

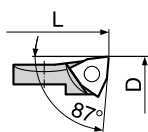



Through tool coolant to
the cutting edge

Boring Head	D	L	M	A	B	Order No.
EW 15	15 - 18.5	30	M6	14	27.5	310.020
EW 18	18 - 22	36	M10	16	33	310.030

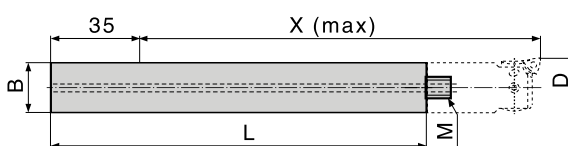
1. Insert holder is not included.

Insert holders



Boring Head Type	D	L	Insert Holder Order No.	
EW 15	15 - 18.5	30	625.020	WC.. 0201
EW 18	18 - 22	36	625.020	

Boring bars



Boring Head Type	D	Boring Bar			Order No.	
		B	M	L		
EW 15	15 - 18.5	14	M6	87	82	615.232
				117	112	615.233
				147	142	615.221
EW 18	18 - 22	16	M10	88	89	615.226
				108	109	615.227
				168	169	615.229

 Carbide tool holder

Large Diameter Boring Tools, Series 317/318

Lightweight Boring Tools Series 318, Ø 200 - 620 mm	70
Roughing / Finishing Ø 200 - 620 mm, Series 318	71 - 72
Flanges / Extension Slides, Series 318	73
Roughing Components, Series 318	74 - 75
Finishing Components, Series 318	76 - 77
Lightweight Boring Tools Series 318, Ø 620 - 3 000 mm	78 - 80
Boring Tools Series 317, Ø 150 - 1 180 mm	81 - 82
Roughing Components, Series 317	83 - 84
Finishing Components, Series 317	85

Super light system provides highest precision and performance

The system is based on aluminum extension slides of different lengths, which support a variety of aluminum and steel components for roughing and finishing tool assemblies. The mounting components are pinned to fit onto specific locations on the slides, and secured with steel bolts. The precise positioning of the components on the slide along with incremental adjustment scales for insert holders permit diameter and length setting without a tool presetter.

Features

- Versatile system for various applications such as roughing, finishing, pin turning and face grooving
- Coolant supply through all components to the cutting edge
- Absolutely safe mounting of the components on the extension slide for highest safety in operation
- Boring range: \varnothing 200 - 340 mm, for ISO 40 / HSK-A63 tapers.
- \varnothing 200 - 620 mm for ISO 50 / HSK-A100 and larger tapers (extendable up to 3000 mm)
- Flanges with CKN connection for highest torque transmission with lightweight tools
- High strength and hard coated aluminium, and nickel coated steel components for scratch resistant and rust protected surfaces
- Accurate balancing without balancing machine by means of two-piece counter weight with slide and scale



Precision boring tool for finishing



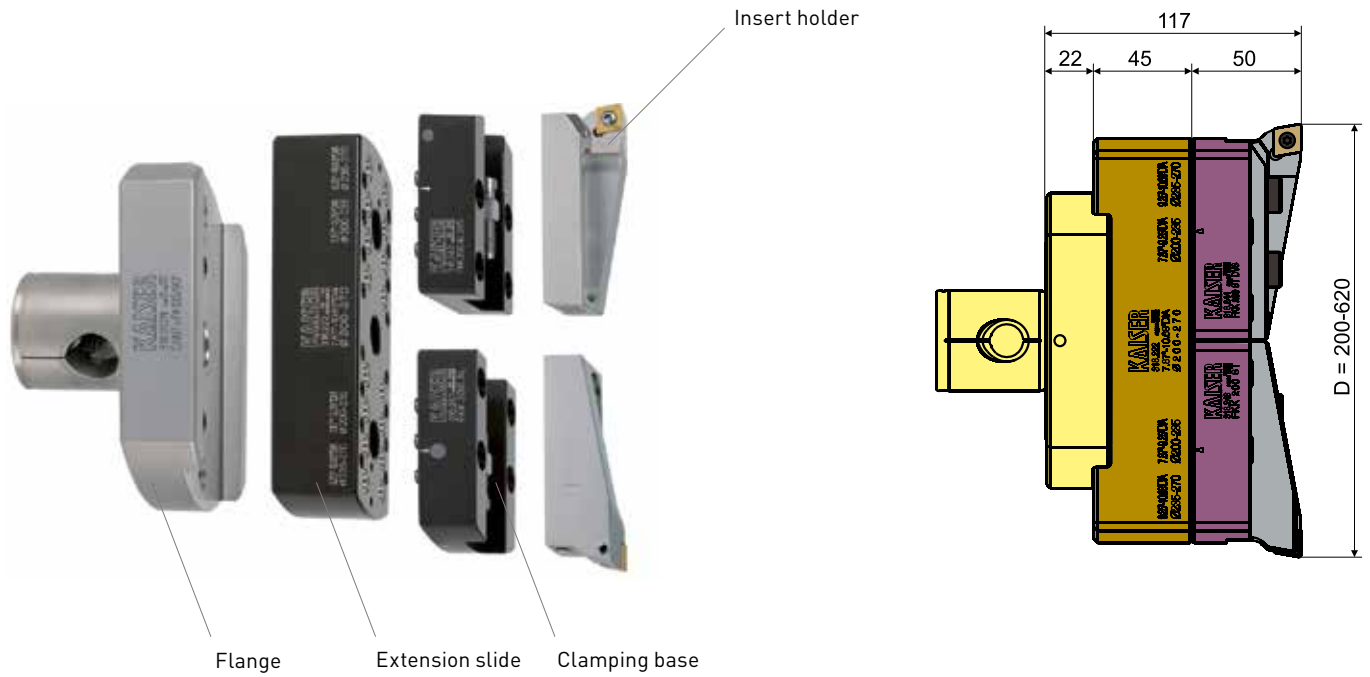
Tool holder for pin turning
See page B90



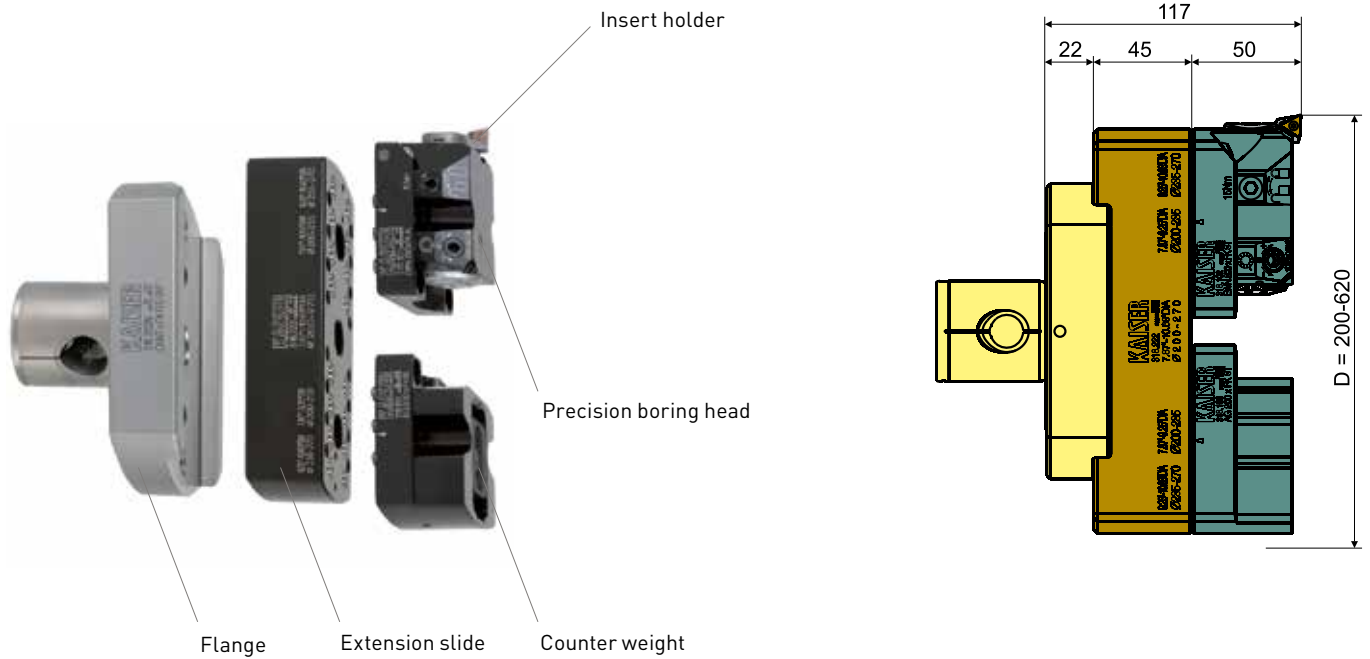
Twin cutter boring tool for roughing

Roughing and finishing tools based on CK7, Ø 200 - 620

Twin cutter boring tool for roughing



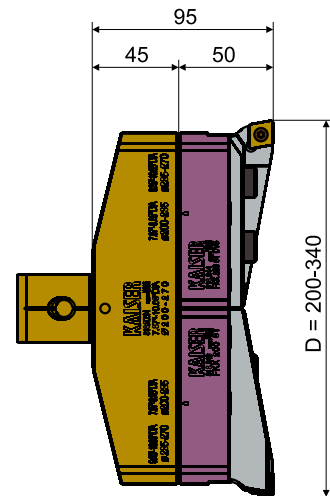
Precision boring tool for finishing



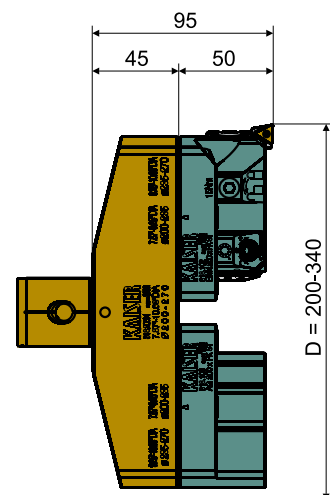
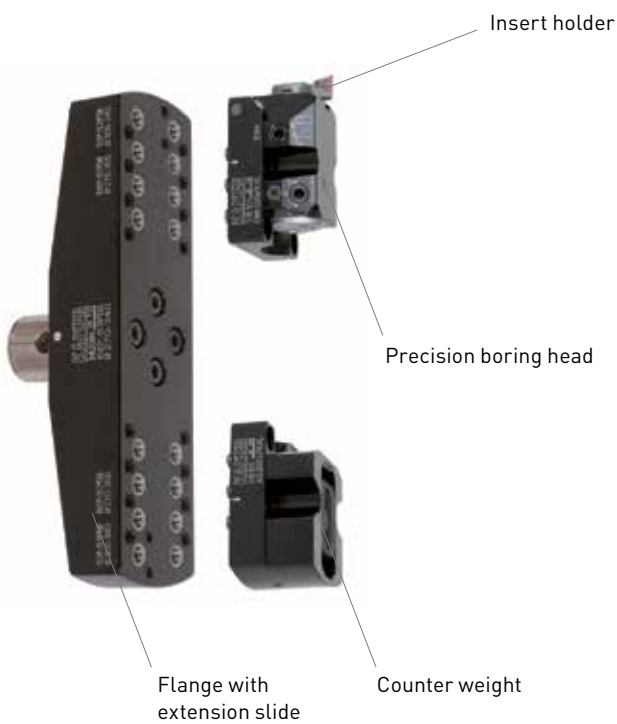
B.5

Roughing and finishing tools based on CK6, Ø 200 - 340

Twin cutter boring tool for roughing



Twin cutter boring tool for finishing



B.5

Flanges

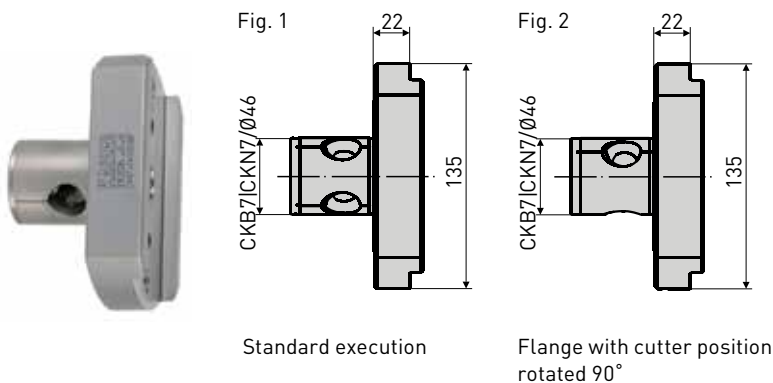
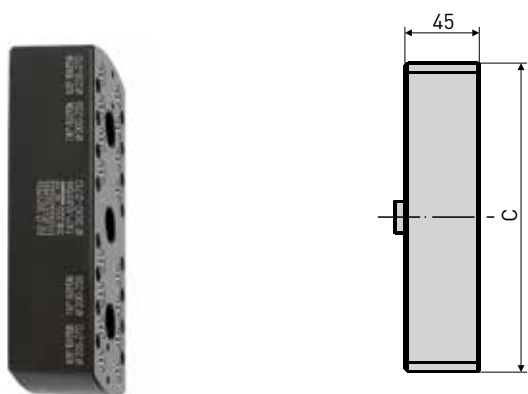


Fig.	CK/Ø	Order No.
1	CKN7	318.201N
	CKS7	318.201
2	CKN7	318.202N
	CKS7	318.202

Extension slides and safety instruction



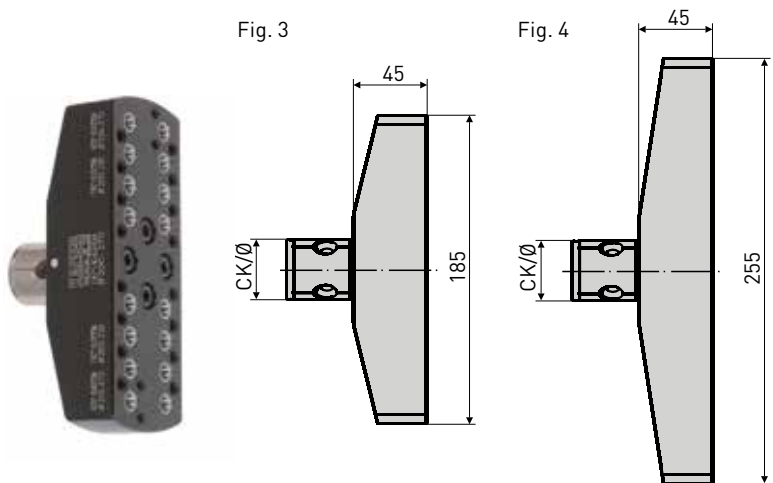
Ø 200 - 600 mm

C	Bore Range D ¹⁾	Max. Speed (min ⁻¹)	Order No.
185	200 - 270	3 200	318.222
255	270 - 340	2 400	318.223
325	340 - 410	1 900	318.224
395	410 - 480	1 600	318.225
465	480 - 550	1 300	318.226
535	550 - 620	1 200	318.227

1. All extension slides are marked with max. speed allowed [n max.].

Flange CKS6 and CKN6 with extension slide

The flange with extension slide is made of two pieces. In case of limited space in the tool magazine, it is possible to disassemble the CK-connector and mount it again with 90° orientation.



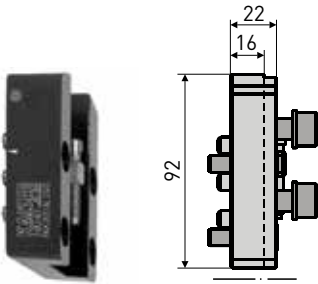
Ø 200 - 600 mm

Fig.	Bore Range D ¹⁾	CK/Ø	Order No.
3	200 - 270	CKN6/36	318.205N
	200 - 270	CKS6/36	318.205
4	270 - 340	CKN6/36	318.206N
	270 - 340	CKS6/36	318.206

█ CKN execution

¹⁾ With the insert holders order No. 626.272 and 626.273, the boring range enlarge by 25 mm and 50 mm. The minimum diameter of the respective work range will be reached with insert holder type 1, order No. 626.271.

Clamp bases

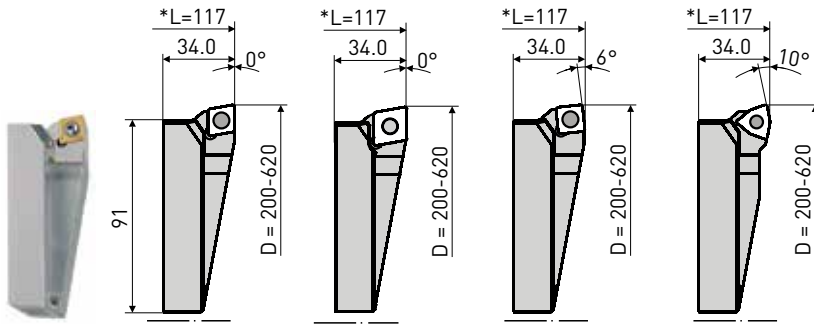


Order No.
318.240 ¹⁾

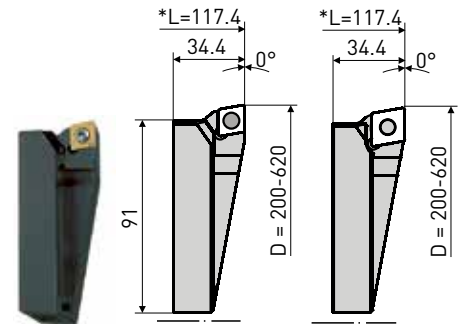
¹⁾ The clamp bases are sold in pairs.

Insert holders

Standard execution



Long execution



Order No.	637.940 ²⁾	637.941 ²⁾	637.942 ²⁾	637.943 ²⁾
Type	CC12	CC16	SC12	WC08

Order No.	637.951 ³⁾	637.953 ³⁾
Type	CC12	CC16

²⁾ The insert holders are sold in pairs.

³⁾ These insert holders are used for double offset roughing and are sold individually.

* L=Tool length to the CK connection.

Insert holders for chamfering, 15° - 75°

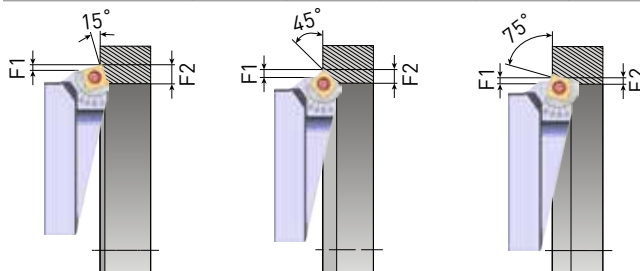
The insert holder with step-less adjustable chamfer angle from 15-75° is made for front chamfering and with limitations also for back chamfering.

B.5

Order No.
637.959



Bore Range D	Chamfer Angle α									
	15°		30°		45°		60°		75°	
	min \emptyset	max \emptyset	min \emptyset	max \emptyset	min \emptyset	max \emptyset	min \emptyset	max \emptyset	min \emptyset	max \emptyset
200 - 270	182	276	186	278	190	279	195	278	199	277
270 - 340	252	346	256	348	260	349	265	348	269	347
340 - 410	322	416	326	418	330	419	335	418	339	417
410 - 480	392	486	396	488	400	489	405	488	409	487
480 - 550	462	556	466	558	470	559	475	558	479	557
550 - 620	532	626	536	628	540	629	545	628	549	627

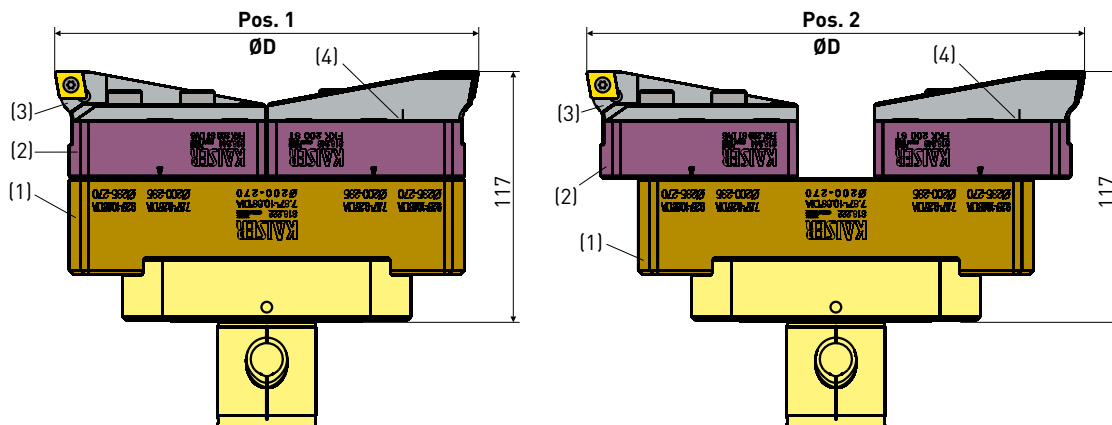


Max. Radial Chamfer Length for Front and Back Chamfering

Insert holder	15°		30°		45°		60°		75°	
	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2
SC12	11.4	3	10.3	4	8.4	4.2	5.9	3.9	3	3

Component selection and assembly adjustment for roughing tools

The table below determines the components such as extension slide (1), clamp bases (2) and insert holders (3) for each diameter range (ØD) and shows in which position (1 or 2) the clamp bases (2) have to be mounted on the extension slide (1). Further, this table also serves for the coarse diameter setting of the cutting edges by means of the scale on the clamp base (2) and the marking (4) on the insert holder (3). The required scale value is calculated by the difference between bore diameter and correction value (α). The insert holder has to be adjusted to the scale value. See example below.



Range ØD	Extension Slide (1)	Fixed Position/Range		Clamp Bases (2)	Insert Holders (3)	Correction α		Max. Speed
		Pos. 1/ØD	Pos. 2/ØD			Pos. 1	Pos. 2	
200 - 270	318.205N	199 - 236	234 - 271	318.240	See page B74	200	235	3 200
	318.222							
270 - 340	318.206N	269 - 306	304 - 341			270	305	2 400
	318.223							
340 - 410	318.224	339 - 376	374 - 411			340	375	1 900
	318.225							
410 - 480	318.225	409 - 446	444 - 481			410	445	1 600
	318.226							
480 - 550	318.226	479 - 516	514 - 551			480	515	1 300
	318.227							
550 - 620	318.227	549 - 586	584 - 621			550	585	1 200

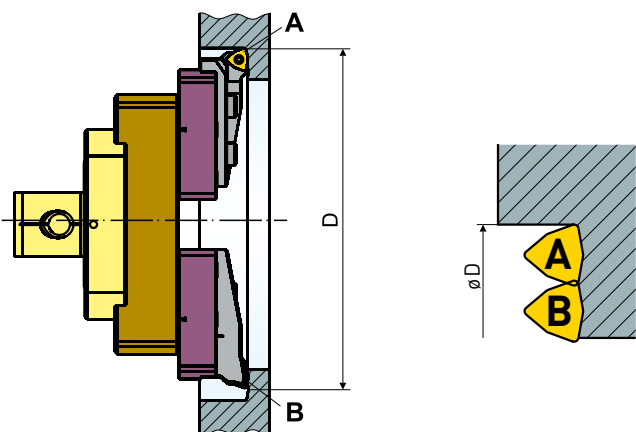
Example: Diameter setting according to scale

ØD: 430 Position: 1 Scale value: ØD - α = 430 - 410 = 20
 Extension slide: 315.225 Correction value α: 410

B.5

Full profile roughing

Full profile roughing permits boring with large stock allowance (up to 60 mm in diameter) in a single operation with relatively low drive power. Set cutting edge A to the final bore diameter, and cutting edge B according to the machining allowance, as listed in the table above.



Stock Allowance [mm Ø]	Cutting Edge A [mm Ø]	Cutting Edge B [mm Ø]
22 - 29.9	D	D - 2
30 - 35.9		D - 6
36 - 41.9		D - 12
42 - 47.9		D - 18
48 - 53.9		D - 24
54 - 60		D - 30

Cutting Data Vc [m/min]	fn [mm/rev]
100 - 180	0.1 - 0.2

Digital precision boring head EWD 200

Model	Order No.
EWD 200 x FK	318.103

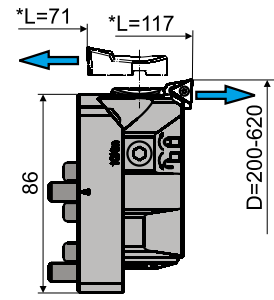
Tool body made of hard-coated aluminum



Highly accurate and purely radial cutting edge adjustment

Adjusting screw

LCD Display with a resolution of 0.001 mm Ø



Forward- and backboring

Precision boring head EWN 200

Model	Order No.
EWN 200 x FK	318.101

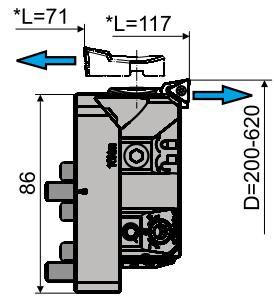
Highly accurate and purely radial cutting edge adjustment

Tool body made of hard-coated aluminum



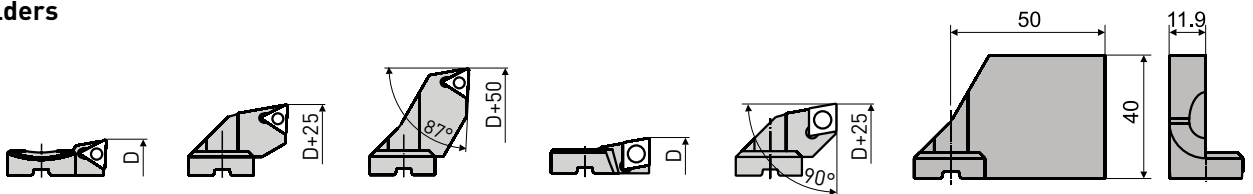
Adjusting screw

Large scale disc 1 DIV = 0.01 mm Ø



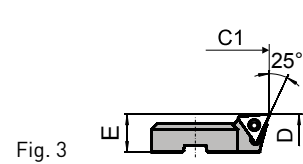
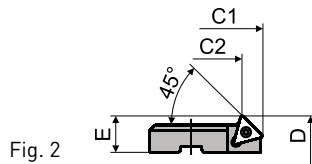
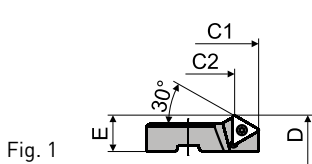
* L = Tool length to the CK connection

Insert holders



Order No.	626.271 *	626.272	626.273	626.371 *	626.372	626.917
Type	TC.. 1102			CC.. 09T3		Blank

Insert holders for chamfering and undercuts



Type	Fig.	C1	C2	E	Order No.	
30°	1		108.3	12.5	626.472 *	TC11
45°	2	117	109.8		626.473 *	
25°	3		-		689.189 *	

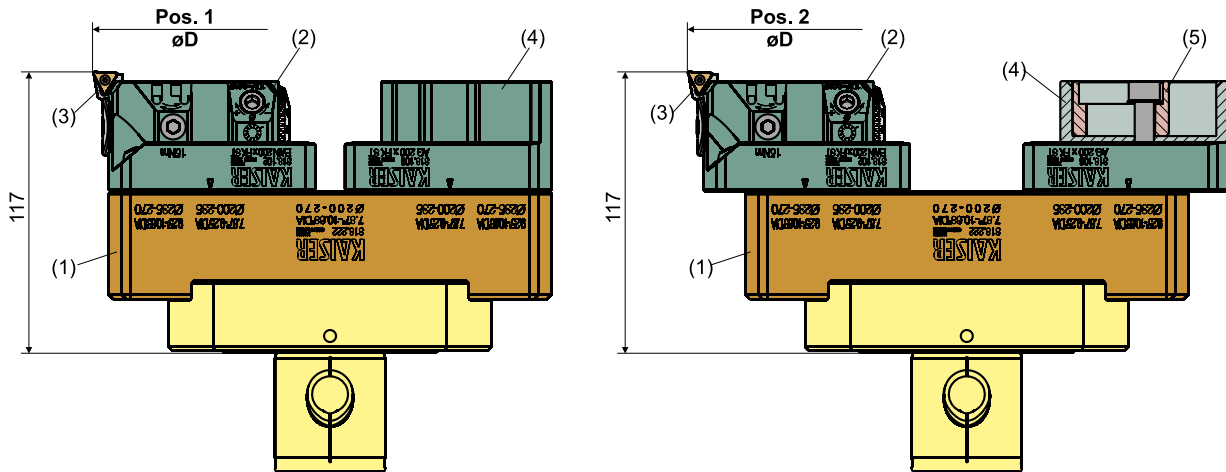
Min. diameter for back boring / back chamfering = D min. [of the respective boring range] + 12 mm.

Example for the lowest range: Min. diameter = 199 + 12 = 211 mm

Component selection and assembly balancing for finishing tools

The table below determines the components such as extension slide (1), boring head (2), insert holder (3) and counter weight (4) for each diameter range and shows in which position the boring head and the counter weight have to be mounted on the extension slide.

Balancing of the tool combination takes place by adjusting the slide (5) on the counter weight according to the scale. The correction value (α) is shown on the table. See example below.



Range ØD	Extension Slide (1)	Fixed Position/Range		Boring Head (2)	Insert Holder (3)	Counter Weight (4)	Correction α		Max. Speed
		Pos. 1/ØD	Pos. 2/ØD				Pos. 1	Pos. 2	
200 - 270	318.205N	199 - 236	234 - 271	318.101	626.271	318.105 * (for fine balancing) 318.107	200		3 200
	318.222						235		
270 - 340	318.206N	269 - 306	304 - 341				270		2 400
	318.223						305		
340 - 410	318.224	339 - 376	374 - 411				340		1 900
							375		
410 - 480	318.225	409 - 446	444 - 481				410		1 600
							445		
480 - 550	318.226	479 - 516	514 - 551				480		1 300
							515		
550 - 620	318.227	549 - 586	584 - 621				550		1 200
							585		

Example: Diameter setting according to scale

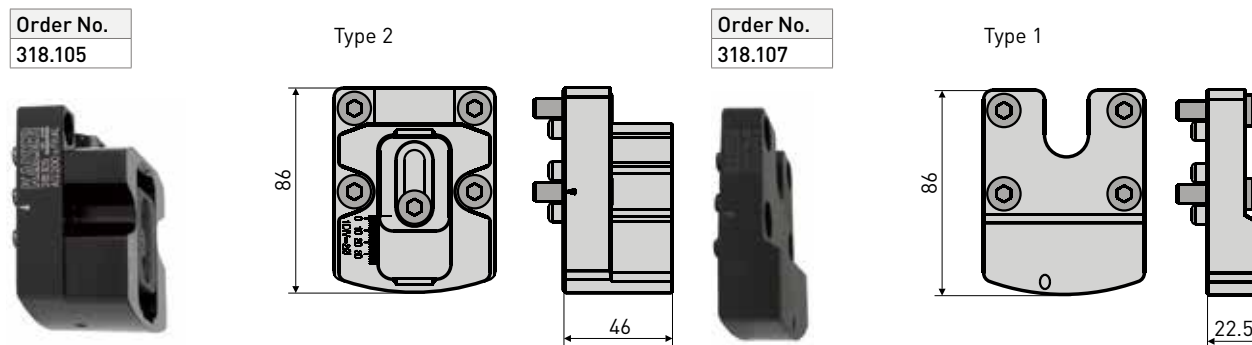
ØD: 335 H7
 Extension slide: 318.223
 Position: 2

Counter weight: 318.105
 Correction value: 305
 Scale: $D - \alpha = 335 - 305 = 30$

B.5

Counter weights

There are two different counter weights available. Type 1 is made of steel and is used for coarse balancing. Type 2 is made of aluminum and contains a slide with a graduated scale for fine balancing of the tool assembly. The scale value is calculated from the correction value α , shown in the table above.

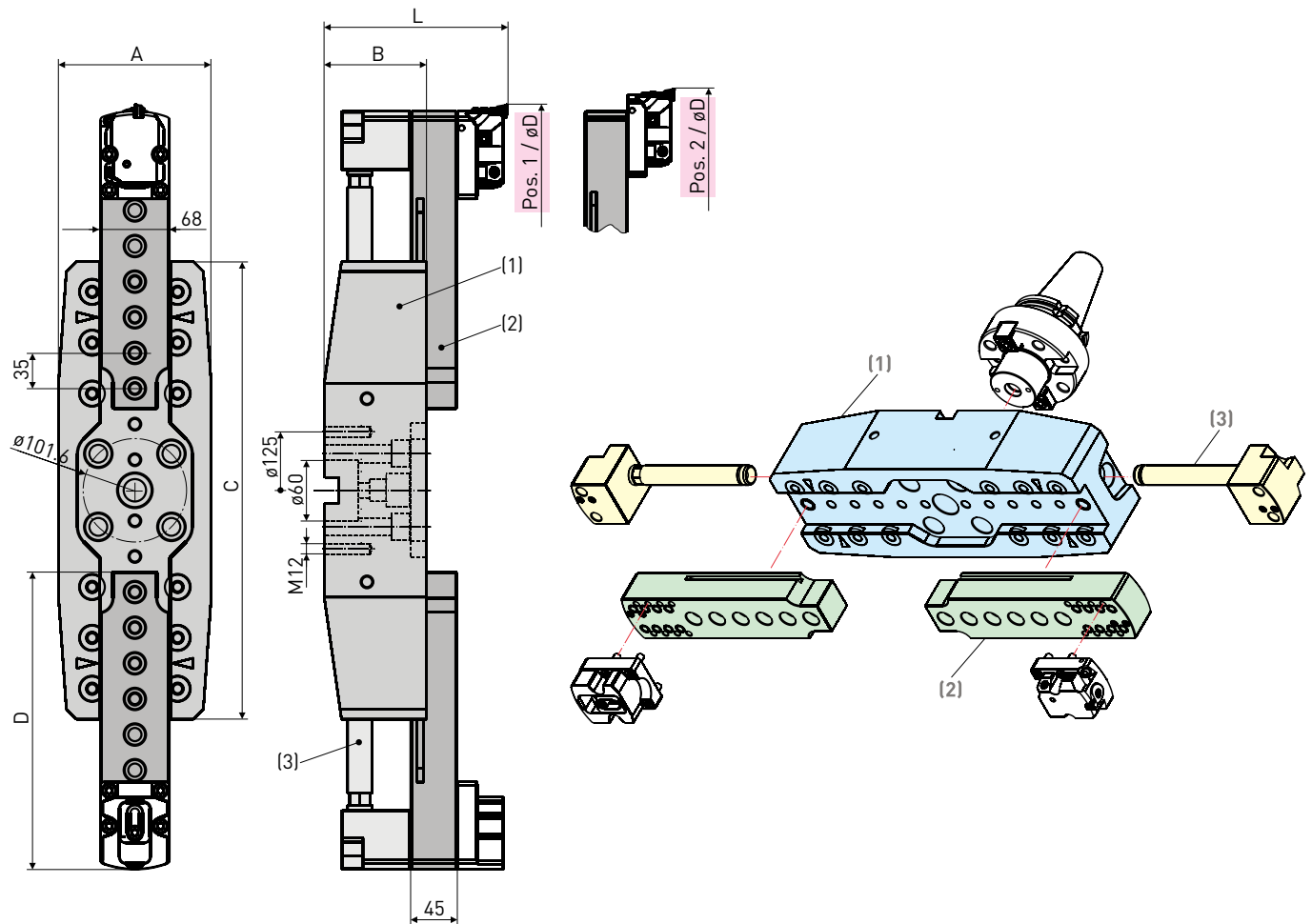


Precise and cost effective boring operations up to \varnothing 3 000 mm

The boring range from \varnothing 620 – 3 000 mm is covered with only five aluminium bridges and five pairs of extension slides. All other components such as boring head, clamp bases and insert holders are the same as for the existing light weight boring tool system \varnothing 200 – 620 mm.

Features

- Versatile system for various applications such as roughing, finishing, pin turning and face grooving
- High strength and hard coated aluminium, and nickel coated steel components for scratch resistant and rust protected surfaces
- Coolant supply through all components to the cutting edge
- Accurate balancing without balancing machine by means of a two-piece counter weight with slide and scale
- Tools up to \varnothing 1 110 mm available from stock, $> \varnothing$ 1 110 mm on request



B.5

Component selection and assembly adjustment

The table below refers to the drawings on page B78. It determines the components such as bridge (1), extension slide (2) and coolant supply (3) for each diameter range (ØD) and shows in which position (1 or 2) the roughing or finishing tools have to be mounted.

In addition, this table also serves to determine the scale values for the coarse diameter setting of the cutting edges for roughing, and to adjust the slide on the counter weight for precise balancing of finish tools. The required scale values are calculated by the difference between bore diameter and correction value (α). See example below.

ØD	L	No.	(1)			(2)		Position		α		(3) No.
			A	B	C	No.	D	Pos. 1/ØD	Pos. 2/ØD	Pos. 1	Pos. 2	
620 - 690	180	318.421	150	100	450	318.431 ¹⁾	292.5	619 - 656	654 - 691	620	655	318.441 ¹⁾
689 - 760								724 - 761	690	725		
760 - 830								794 - 831	760	795		
830 - 900	180	318.422	150	100	660	318.432 ¹⁾	397.5	829 - 866	864 - 901	830	865	318.441 ¹⁾
900 - 970								934 - 971	900	935		
970 - 1040								1004 - 1041	970	1005		
1040 - 1110	180	318.423	150	100	940	318.433 ¹⁾	537.5	1039 - 1076	1074 - 1111	1040	1075	318.442 ¹⁾
1110 - 1180								1144 - 1181	1110	1145		
1180 - 1250								1214 - 1251	1180	1215		
1250 - 1320								1284 - 1321	1250	1285		
1320 - 1390								1354 - 1391	1320	1355		
1390 - 1460								1424 - 1461	1390	1425		
1460 - 1530								1494 - 1531	1460	1495		
1530 - 1600	200	318.424	170	120	1360	318.434 ¹⁾	642.5	1529 - 1566	1564 - 1601	1530	1565	318.443 ¹⁾
1600 - 1670								1634 - 1671	1600	1635		
1670 - 1740								1704 - 1741	1670	1705		
1740 - 1810								1774 - 1811	1740	1775		
1810 - 1880								1844 - 1881	1810	1845		
1880 - 1950								1914 - 1951	1880	1915		
1950 - 2020								1984 - 2021	1950	1985		
2020 - 2090	210	318.425	190	130	1850	318.434 ¹⁾	642.5	2019 - 2056	2054 - 2091	2020	2055	318.443 ¹⁾
2090 - 2160								2124 - 2161	2090	2125		
2160 - 2230								2194 - 2231	2160	2195		
2230 - 2300								2264 - 2301	2230	2265		
2300 - 2370								2334 - 2371	2300	2335		
2370 - 2440								2404 - 2441	2370	2405		
2440 - 2510								2474 - 2511	2440	2475		
2510 - 2580	210	318.425	190	130	1850	318.435 ¹⁾	1167.5	2509 - 2546	2544 - 2581	2510	2545	318.444 ¹⁾
2580 - 2650								2614 - 2651	2580	2615		
2650 - 2720								2684 - 2721	2650	2685		
2720 - 2790								2754 - 2791	2720	2755		
2790 - 2860								2824 - 2861	2790	2825		
2860 - 2930								2894 - 2931	2860	2895		
2930 - 3000								2964 - 3001	2930	2965		

¹⁾ Note: Single pieces

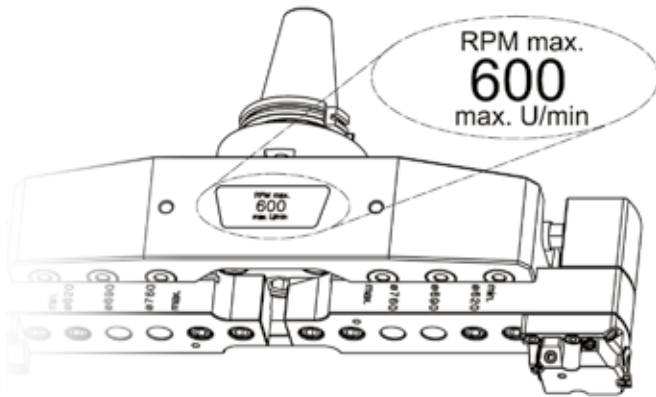
Example: Diameter setting according to scale

- ØD: 1 170 H7
- Bridge: 318.423
- Extension slide: 318.433
- Position: 2
- Counter weight: 318.105
- Coolant supply: 318.442
- Correction value α: 1 145
- Scale: D - α = 1 170 - 1 145 = 25

Application note see page B80.

Safety instruction

The max. speed allowed for series 318 boring tools is in relation to the boring diameter and the extension slide used. All extension slides are marked with max. speed allowed [n max.].



Bore Range D	Max. Speed [min ⁻¹]	Bridge Aluminium
619 - 831	600	318.421
829 - 1111	450	318.422
1109 - 1531	350	318.423
1529 - 2021	250	318.424
2019 - 2511	190	318.425
2509 - 3001	150	318.425

Application notes

1. Roughing

Ø 620 – 1110 mm

Up to Ø 830 mm the bridge tool can be connected to the machine spindle over a tool shank, but only on a machine with good spindle taper, good spindle bearings and with the nominal retraction force available. For the range between Ø 830 – 1110 mm, roughing is possible with the bridge bolted on to the machine spindle. If vibration occurs use just one cutting edge.

Ø > 1110 mm

Roughing is not recommended

2. Finishing

Ø 620 – 1110 mm

Finishing is possible with the bridge tool connected to the machine spindle over a tool shank, providing that the machine spindle is in good condition.

Ø > 1110 mm

The bridge tool must be bolted on to the machine spindle, either directly or if required over a special flange.

B.5

Connecting the bridge tool to the machine spindle

The bridge tool can be connected to the machine spindle over a tool shank (Fig. 1) or it can be bolted on to the spindle face (Fig. 2). A combination of both variants is also possible. A bolted connection is recommended for bore sizes Ø 1110 mm and bigger.

Fig. 1

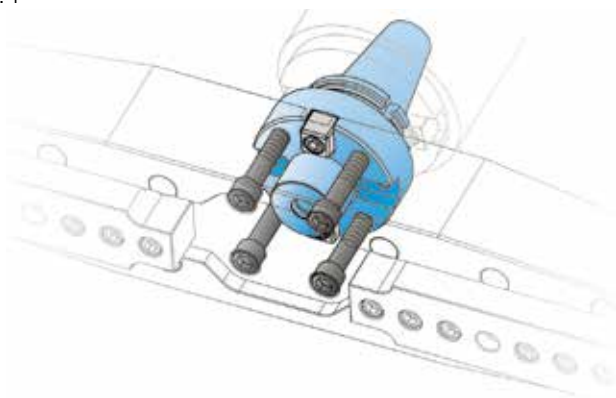
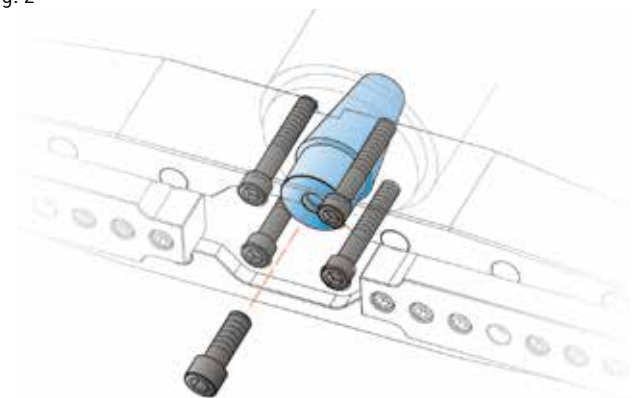


Fig. 2

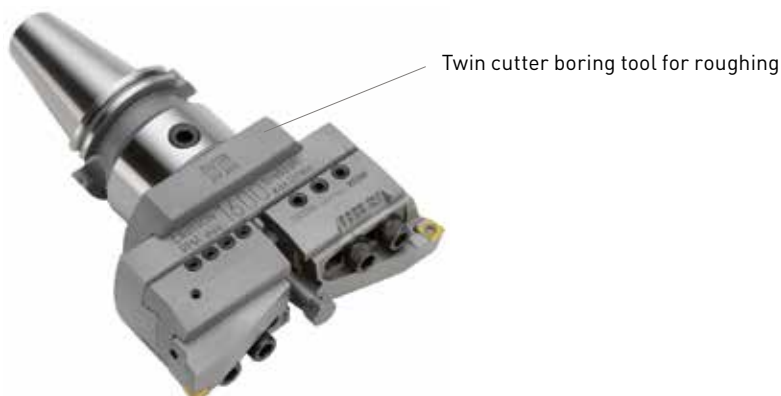
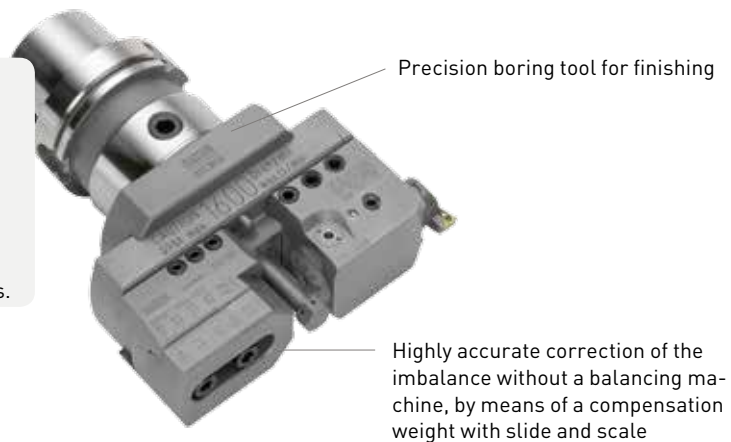


Highly precise, rigid and safe to operate

The modular components such as flange, extension slide, tool holder and boring head, can easily be assembled to single cutter-, twin cutter- and pin turning tools.

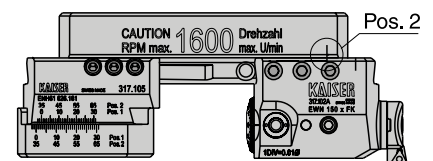
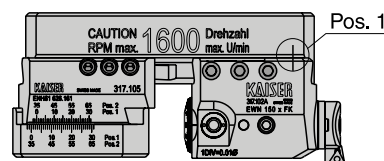
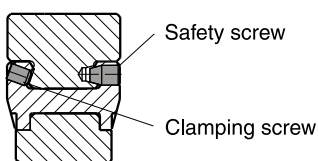
Features

- Modular tool system for roughing and finishing in the diameter range 200 – 620 mm.
- Twin cutter boring tools for various roughing methods (RSS = symmetrical roughing, DVS = double offset roughing and VPS = full profile roughing).
- Precision boring tools with high adjustment precision (1 Div = 0.01 mm Ø, and for forward and backward boring).
- Highest possible operational safety with additional safety screws.



With the introduction of the safety screws on roughing and finishing components as well as on the compensation weight, and with the corresponding bores in the extension slides, these components can be mounted in two fixed positions (Pos. 1 and Pos. 2) on the extension slide.

B.5



Compatibility

New components with safety screws can be mounted on existing extension slides without any restrictions whereas the safety screws have to be removed. Existing components without safety screws can as well be mounted without any restrictions on the new extension slides.

Modification

On request, safety screw modifications can be made to existing precision boring heads and extension slides to prevent tool breakage from accidentally high spindle speeds.

Roughing and finishing tools Ø 200 - 620 based on CK7

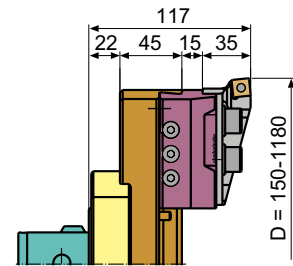
Clamping base



Insert holder

Coolant nozzle

Twin cutter boring tool



Extension slide

Flange

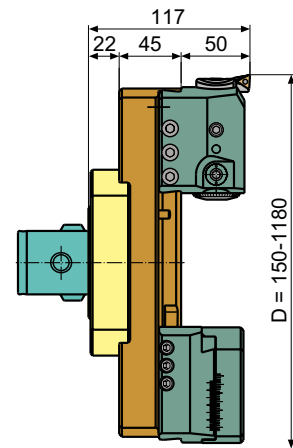


Insert holder

Precision boring head

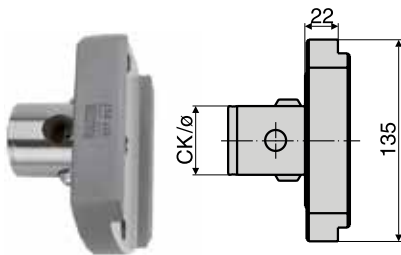
Counter weight

Single cutter boring tool



Flanges

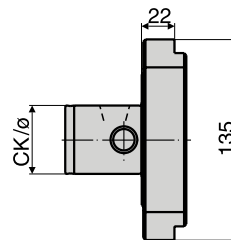
Preferred execution



Model	Order No.
CKS7/Ø46	317.202

Additional executions

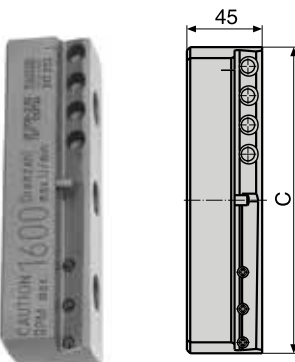
Flange with cutter position 90° twisted.



Model	Order No.
CKS7/Ø46	317.206

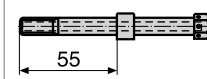
B.5

Extension slides steel (1)



Ø 150 - 620

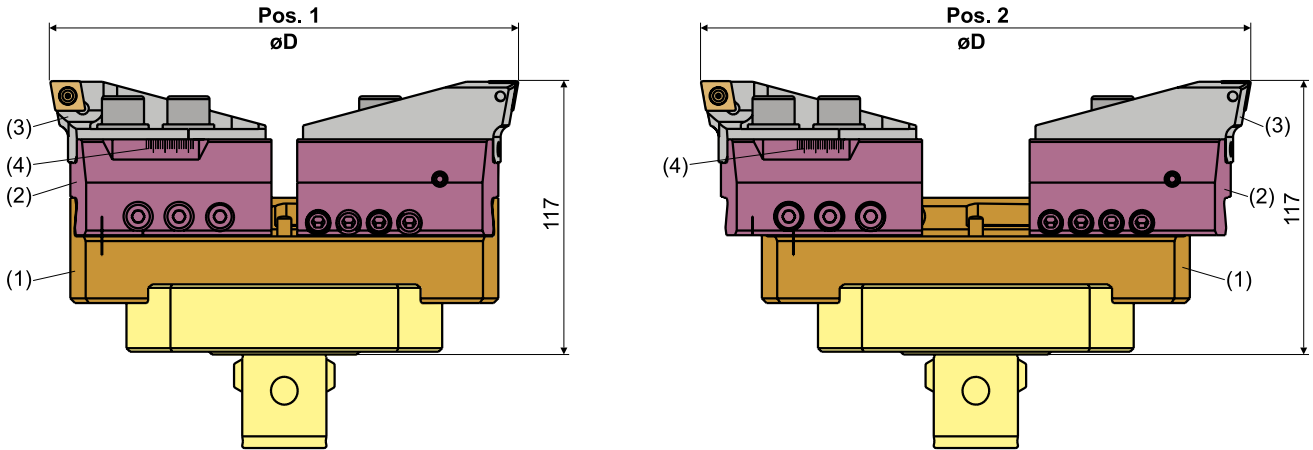
C	Boring Range		Order No.
	D ¹⁾		
183	200 - 270		317.222
253	270 - 340		317.223
323	340 - 410		317.224
393	410 - 480		317.225
463	480 - 550		317.226
533	550 - 620		317.227

Coolant Nozzle	Order No.
	317.205

¹⁾ The diameter ranges D are valid for the tool program for roughing. With the tool program for finishing, the work ranges starting from Ø 200 mm will become bigger; with insert holder type 2, order No. 626.162 by 26 mm and with insert holder type 3, order No. 626.163 by 50 mm. The minimum diameter of the respective work range will be reached with insert holder type 1, order No. 626.161.

Component selection and assembly adjustment for roughing tools

The table below determines the components such as extension slide (1), clamping bases (2) and insert holders (3) for each diameter range and shows in which position the clamping bases have to be mounted on the extension slide. Further, this table also serves for the coarse diameter setting of the cutting edges by means of the scale (4) on the clamping bases (2). The required scale value can be found under consideration of the correction value α on the table. See example below.



Range ØD	Extension Slide (1)	Fixed Position/Range		Correction α
		Pos. 1/ØD	Pos. 2/ØD	
200 - 270	317.222	197 - 235	232 - 270	200
270 - 340	317.223	267 - 305	302 - 340	270
340 - 410	317.224	337 - 375	372 - 410	340
410 - 480	317.225	407 - 445	442 - 480	410
480 - 550	317.226	477 - 515	512 - 550	480
550 - 620	317.227	547 - 585	582 - 620	550

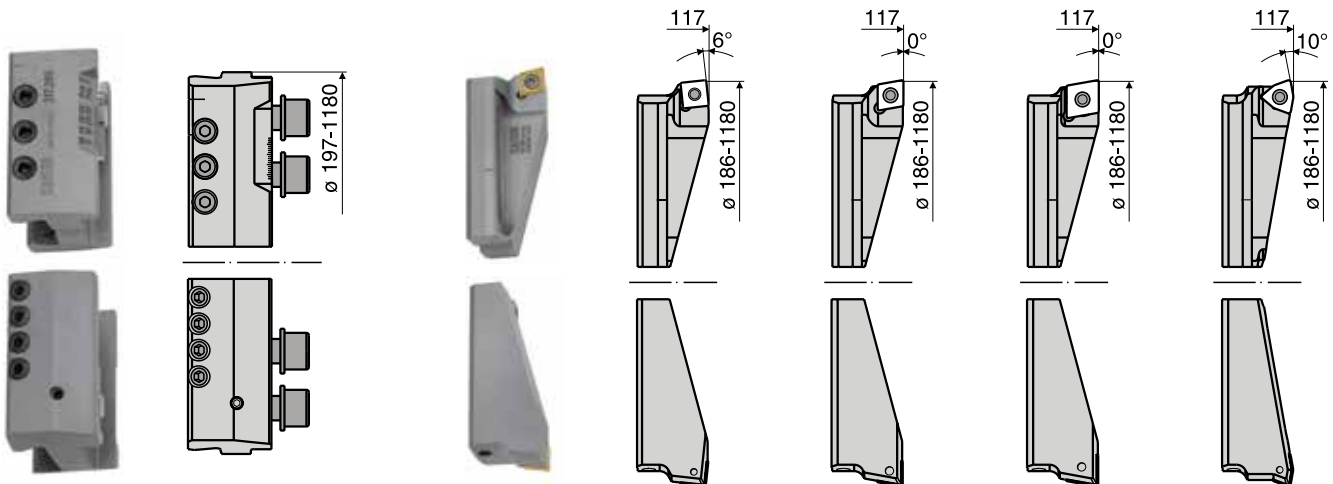
Example: Diameter setting according to scale

ØD: 430
 Extension slide: 317.225
 Position: 1
 Clamping base: 317.289
 Insert holder: Ø 200 - 620
 Correction value α : 410
 Scale: $\text{ØD} - \alpha = 430 - 410 = 20$

Clamping bases (2), Ø 200 - 620

Insert holders (3), Ø 200 - 620

B.5



Order No.	317.289
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Order No.	637.814	637.830	637.834	637.846
Type	SC12	CC12	CC16	WC08

Double offset roughing

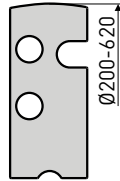
In diameter and height offset cutters allow the removal of twice the stock and with half the feed rate compared with symmetrical roughing.

The cutting edge adjusted to half the stock has to be set in front by means of the spacer.

Spacers

For double offset roughing

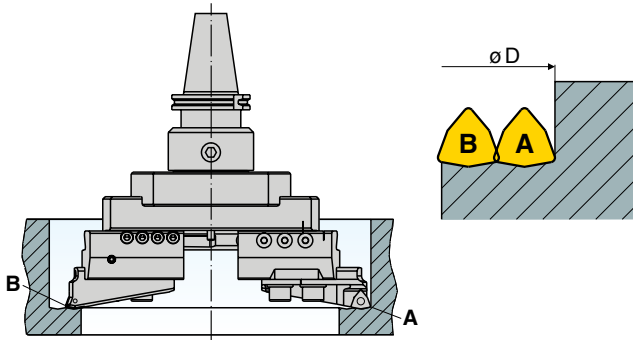
Spacer 0.5 mm	Order No.
Ø 200 - 620	317.287



Full profile roughing (VPS)

Adjustment instructions

Full profile roughing permits boring with large stock allowance (up to 60 mm in diameter) in a single operation with relatively low drive power. Set cutting edge A to the final bore diameter, and cutting edge B according to the machining allowance, as listed in the table below.



Machining Allowance [mm Ø]	Cutting Edge A [mm Ø]	Cutting Edge B [mm Ø]
24 - 29.9	D	D - 2
30 - 35.9		D - 6
36 - 41.9		D - 12
42 - 47.9		D - 18
48 - 53.9		D - 24
54 - 60		D - 30

Example for adjustment

Given: Boring diameter 580 mm Machining allowance 46 mm Ø
 Result: Cutting edge A: Ø 580 mm
 Cutting edge B: Ø 580 - 18 = Ø 562 mm

Cutting data-guide values

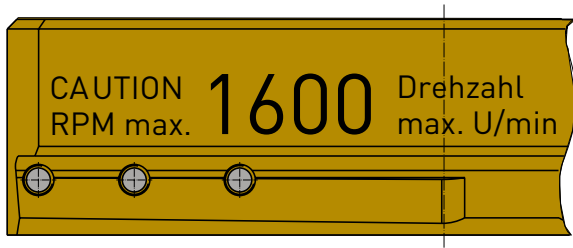
Cutting speed: $V_c = 80-180$ m/min
 Feed: $f = 0.1-0.2$ mm/rev

B.5

Safety instructions

The max. speed allowed for series 317 boring tools is in relation to the boring diameter and the extension slide used. All extension slides are marked with max. speed allowed [n max.].

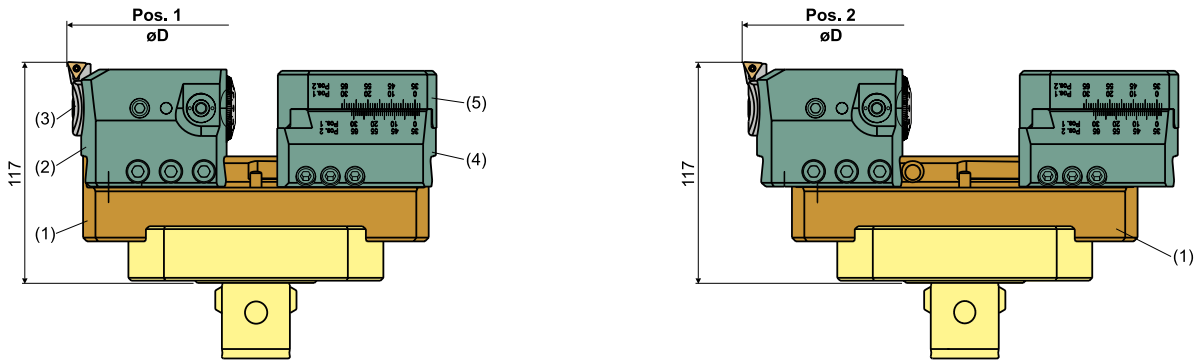
Extension slide



Boring Range [mm]	Max. Speed [min ⁻¹]	Extension Slide Steel	Extension Slide Aluminium
200 - 270	1600	317.222	317.252
270 - 340	1200	317.223	317.253
340 - 410	900	317.224	317.254
410 - 480	750	317.225	317.255
480 - 550	650	317.226	317.256
550 - 620	600	317.227	317.257

Component selection and assembly balancing for finishing tools

The table below determines the components such as extension slide (1), boring head (2), insert holder (3) and compensation weight (4) for each diameter range and shows in which position the boring head and the compensation weight have to be mounted on the extension slide.



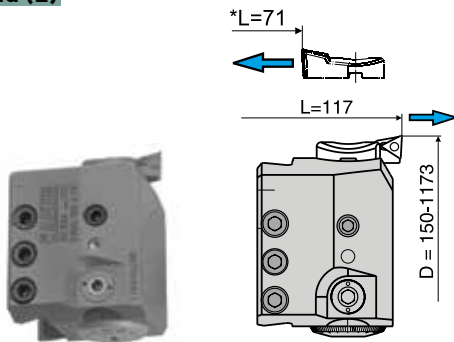
Range ØD	Extension Slide (1)	Fixed Position/Range		Insert Holder (3)	Correction α
		Pos. 1/ØD	Pos. 2/ØD		
200 - 270	317.222	198 - 228	233 - 263	626.161	200
		224 - 254	259 - 289	626.161	
270 - 340	317.223	268 - 298	303 - 333	626.161	270
		294 - 324	329 - 359	626.162	
340 - 410	317.224	338 - 368	373 - 403	626.161	340
		364 - 394	399 - 429	626.162	
410 - 480	317.225	408 - 438	443 - 473	626.161	410
		434 - 464	469 - 499	626.162	
480 - 550	317.226	478 - 508	513 - 543	626.161	480
		504 - 534	539 - 569	626.162	
550 - 620	317.227	548 - 578	583 - 613	626.161	550
		574 - 604	609 - 639	626.162	

Example: Balancing

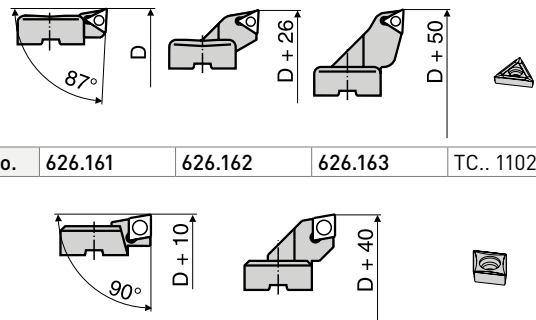
Balancing of the tool combination takes place by adjusting the slide (5) on the compensation weight according to the scale. The correction value α is shown on the table.
 ØD: 335 H7
 Extension slide: 317.223
 Position: 2
 Insert holder: 626.162
 Counter weight: 317.105
 Correction value α: 270
 Scale: ØD - α = 335 - 270 = 65

Boring head (2)

Order No.
317.102A



Insert holder (3)



Order No.	626.161	626.162	626.163	TC.. 1102
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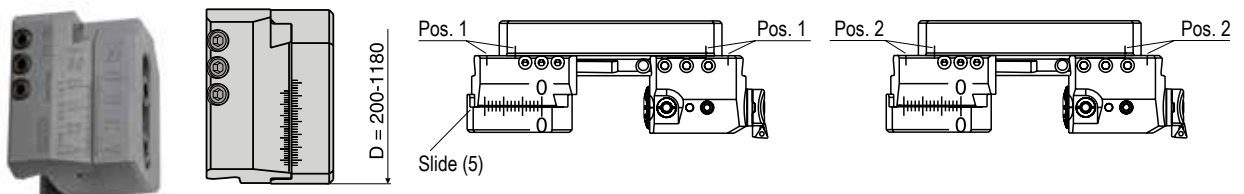
Order No.	626.362	626.363	CC09
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Counter weight (4), Ø 200 - 620 mm

Coarse adjustment of the counter weight

By fixing the compensation weight in the same position (pos. 1 or pos. 2) as the boring head and with the slide on the compensation weight in zero position, a large amount of the imbalance will be compensated. Fine balancing which also compensates the position of the cutting edge as well as the size of the insert holder is possible by adjusting the slide to the corresponding scale value according to the balancing table.

Order No.
317.105



Pin Turning, Face Grooving, Milling Cutters, Tool Holders

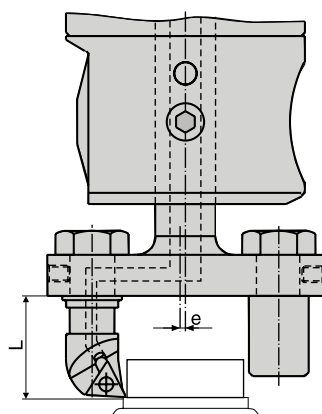
Tool Holders for Pin Turning, \varnothing 1 - 2856 mm	88 - 91
Face Grooving SW, Series 318	92 - 93
Face Grooving EWN/EWD, Series 310/317/318, \varnothing 53 - 3040 mm	94
Face Grooving EWN/EWD, Series 112, \varnothing 14 - 53 mm	95
Slot Milling Cutters	96 - 97
Chamfering Mills	98 - 99
Tool Holders, Blanks	100 - 103
Tapping Attachments	103 - 105

Pin-turning with boring head EWN/EWD 2-50 and eccentric bar, Ø 1 - 32 mm

By using an eccentric bar on the precision boring head EWN/EWD 2-50, it is possible to turn outside diameters up to 32 mm with lengths up to 50 mm. The counterweight is moveable on the eccentric bar. By moving the counterweight, the imbalance can be compensated to a minimum.



Boring heads see page B40-42



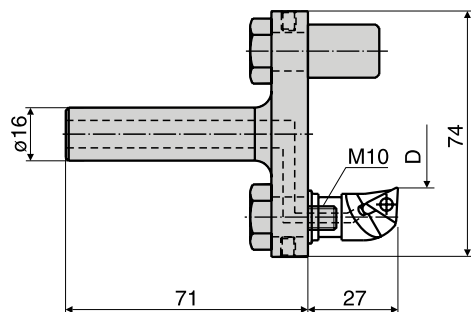
Max. Spindle Speeds		
e [mm]	L = 27 [r.p.m]	L = 52 [r.p.m]
0	8 000	6 000
0.5	6 000	4 500
2.5	4 000	3 500
4.5	3 000	2 500

Attention: Counter-clockwise rotation of spindle!

Remark:

Adjustment of the scale in clockwise direction and eccentric bar with cutting edge positioned as shown on the drawing, results in a smaller pin diameter.

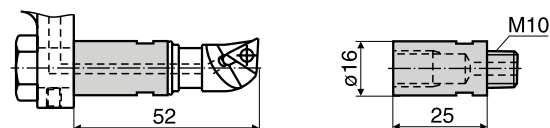
Eccentric bar



Capacity D	Order No.
1 - 32	615.390

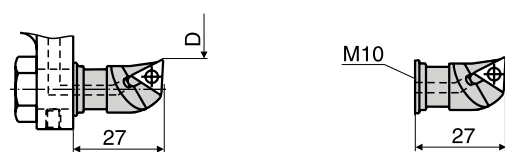
B.6


Extension



Order No.
615.228

Insert holders



Capacity D	Insert	Order No.
28 - 32	TC.. 1102 	615.282
24 - 28		615.283
20 - 24		615.291
15 - 20		615.285
11 - 15		615.286
6 - 11		615.287
1 - 6		615.292

Tool holders for pin turning with boring heads EWD/EWN and SW, Ø 16 - 20 mm

This program consists of tool holders with CKS5 and CKS6 connectors, made for different turning ranges and with tool connections in the sizes CKB3, CKB4 and CKB5. The corresponding precision finish or rough boring heads and counterweights can be mounted on the tool holder either directly or by means of an extension. With this program, outer diameters in the range from Ø 16 -120 mm can be machined.

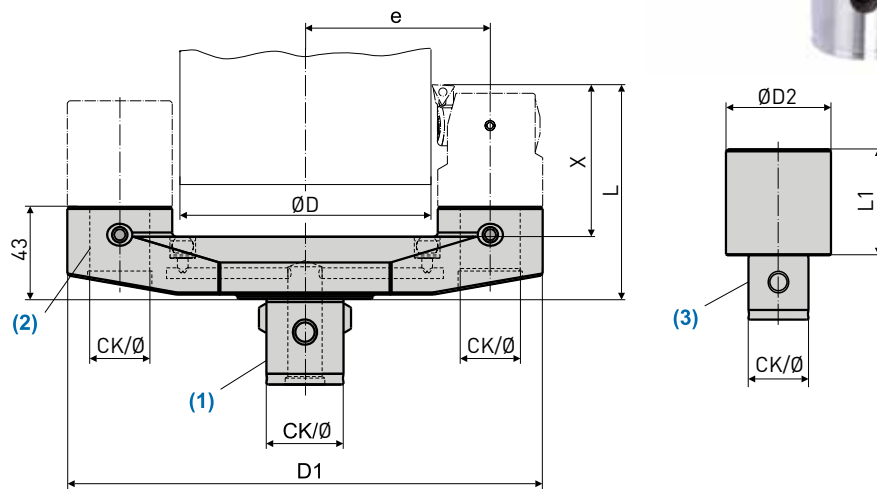
Features

- Simple and cost effective execution
- Through tool coolant supply
- Modular construction, extendable, for long work pieces
- Suitable for boring operations



Finish boring heads see page B58/60

Rough boring heads see page B28



Attention: Counter-clockwise rotation of spindle! Vc max 450 m/min

Range ØD	Tool Holder						Order No.	Counter Weight			Order No.
	(1) CK/Ø	(2) CK/Ø	D1	e	L *	X *		(3) CK/Ø	D2	L1	
16 - 44	CKS5/28	CKB3/18	107	38	83 [113] [128]	51 [81] [96]	335.906	CK3/18	31.3	35	335.915
16 - 44	CKS6/36	CKB3/18	107	38	83 [113] [128]	51 [81] [96]	335.905	CK3/18	31.3	35	335.915
34 - 67	CKS6/36	CKB4/22	147	54	90 [130] [150]	58 [98] [118]	335.904	CK4/22	39	36.4	335.913
57 - 90	CKS6/36	CKB4/22	170	65.5	90 [130] [150]	58 [98] [118]	335.903	CK4/22	39	36.4	335.913
78 - 120	CKS6/36	CKB5/28	222	86.5	100 [160] [190]	68 [128] [158]	335.902	CK5/28	49	49.5	335.912

1. * The numbers in brackets indicate the tool length (L) and the max. pin length (X) with the use of the corresponding extensions. See page B15.

Selection of the correct insert holder

Finishing

Range	Tool Holder	Boring Head	Range ØD Insert Holder No.		
			ØD	ØD	ØD
16 - 44	335.905	EWN 32 x CKB3	16 - 26	25 - 35	34 - 44
	335.906	310.301	626.133	626.132	626.131
34 - 67	335.904	EWN 41 x CKB4	34 - 47	45 - 58	54 - 67
	335.903	310.401	626.143	626.142	626.141
57 - 90	335.903	310.401	57 - 70	68 - 81	77 - 90
			626.143	626.142	626.141
78 - 120	335.902	EWN 53 x CKB5	78 - 95	91 - 108	103 - 120
	310.501	310.501	626.153	626.152	626.151

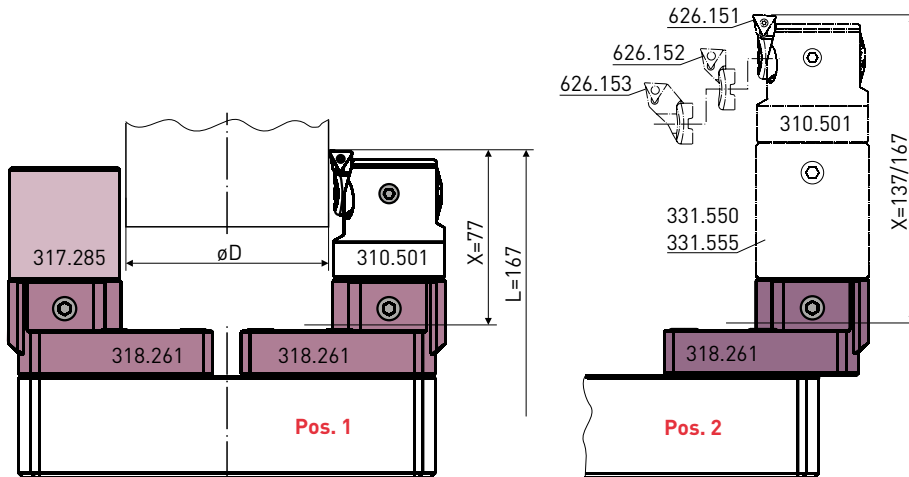
Roughing

Range	Tool Holder	Boring Head	Range ØD Insert Holder No.	
			ØD	ØD
25 - 44	335.905	SW 32 x CKB3	25 - 35	34 - 44
	335.906	319.301	639.437	639.433
42 - 67	335.904	SW 41 x CKS4	42 - 55	54 - 67
	335.903	319.401	65 - 78	77 - 90
639.447			639.443	
78 - 120	335.902	SW 53 x CKS5	87 - 104	103 - 120
	319.501	319.501	639.457	639.453

Tool holders for pin turning with large diameter boring tools, $\varnothing 49 - 476$ mm

The tool holder with CKB5 connection can be mounted on any extension slide. For pin turning it is required to connect the precision boring head EWN53 x CKB5 either directly or by means of an extension to the holder. To compensate the imbalance, a second tool holder and a special counter weight have to be mounted on the opposite side of the extension slide.

Attention: Counter-clockwise rotation of spindle!



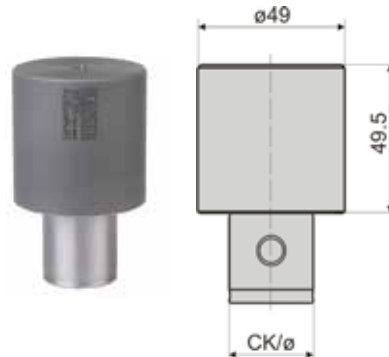
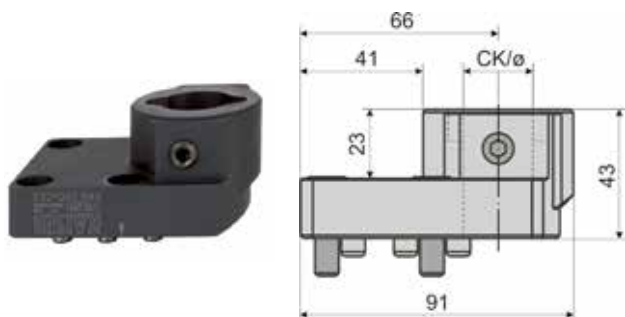
L = Distance to the CK connection.

Tool holder

Model	Order No.
CKB5/28	318.261

Counter weight

Model	Order No.
CK5/28	317.285



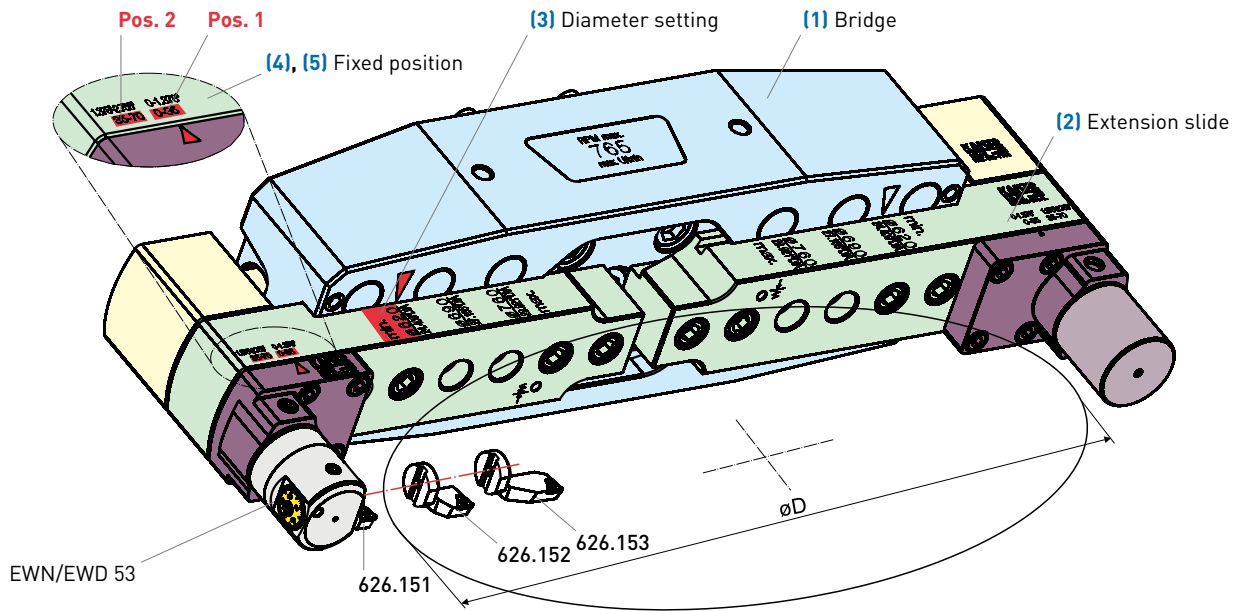
B.6

Adjusting table

Range	Extension Slide	Pos. 1			Pos. 2		
		Range with Insert Holder No:					
		626.153 ØD	626.152 ØD	626.151 ØD	626.153 ØD	626.152 ØD	626.151 ØD
49 - 126	318.222	49 - 66	62 - 79	74 - 91	84 - 101	97 - 114	109 - 126
119 - 196	318.223	119 - 136	132 - 149	144 - 161	154 - 171	167 - 184	179 - 196
189 - 266	318.224	189 - 206	202 - 219	214 - 231	224 - 241	237 - 254	249 - 266
259 - 336	318.225	259 - 276	272 - 289	284 - 301	294 - 311	307 - 324	319 - 336
329 - 406	318.226	329 - 346	342 - 359	354 - 371	364 - 381	377 - 394	389 - 406
399 - 476	318.227	399 - 416	412 - 429	424 - 441	434 - 451	447 - 464	459 - 476

Tool holders for pin turning with large bridge boring tools, Ø 469 - 2 856 mm

Attention: Counter-clockwise rotation of spindle!



Ø-Range ØD	(1)	(2)	(3)	Pos. 1			Pos. 2		
	Bridge	Extension Slide	Dia. Setting	Range with Insert Holder No:			Range with Insert Holder No:		
				626.153 ØD	626.152 ØD	626.151 ØD	626.153 ØD	626.152 ØD	626.151 ØD
469 - 546			620	469 - 486	482 - 499	494 - 511	504 - 521	517 - 534	529 - 546
539 - 616	318.421	318.431	690	539 - 556	552 - 569	564 - 581	574 - 591	587 - 604	599 - 616
609 - 686			760	609 - 626	622 - 639	634 - 651	644 - 661	657 - 674	669 - 686
679 - 756			830	679 - 696	692 - 709	704 - 721	714 - 731	727 - 744	739 - 756
749 - 826	318.422	318.432	900	749 - 766	762 - 779	774 - 791	784 - 801	797 - 814	809 - 826
819 - 896			970	819 - 836	832 - 849	844 - 861	854 - 871	867 - 884	879 - 896
889 - 966			1040	889 - 906	902 - 919	914 - 931	924 - 941	937 - 954	949 - 966
959 - 1036			1110	959 - 976	972 - 989	984 - 1001	994 - 1011	1007 - 1024	1019 - 1036
1029 - 1106			1180	1029 - 1046	1042 - 1059	1054 - 1071	1064 - 1081	1077 - 1094	1089 - 1106
1099 - 1176	318.423	318.433	1250	1099 - 1116	1112 - 1129	1124 - 1141	1134 - 1151	1147 - 1164	1159 - 1176
1169 - 1246			1320	1169 - 1186	1182 - 1199	1194 - 1211	1204 - 1221	1217 - 1234	1229 - 1246
1239 - 1316			1390	1239 - 1256	1252 - 1269	1264 - 1281	1274 - 1291	1287 - 1304	1299 - 1316
1309 - 1386			1460	1309 - 1326	1322 - 1339	1334 - 1351	1344 - 1361	1357 - 1374	1369 - 1386
1379 - 1456			1530	1379 - 1396	1392 - 1409	1404 - 1421	1414 - 1431	1427 - 1444	1439 - 1456
1449 - 1526			1600	1449 - 1466	1462 - 1479	1474 - 1491	1484 - 1501	1497 - 1514	1509 - 1526
1519 - 1596			1670	1519 - 1536	1532 - 1549	1544 - 1561	1554 - 1571	1567 - 1584	1579 - 1596
1589 - 1666	318.424	318.434	1740	1589 - 1606	1602 - 1619	1614 - 1631	1624 - 1641	1637 - 1654	1649 - 1666
1659 - 1736			1810	1659 - 1676	1672 - 1689	1684 - 1701	1694 - 1711	1707 - 1724	1719 - 1736
1729 - 1806			1880	1729 - 1746	1742 - 1759	1754 - 1771	1764 - 1781	1777 - 1794	1789 - 1806
1799 - 1876			1950	1799 - 1816	1812 - 1829	1824 - 1841	1834 - 1851	1847 - 1864	1859 - 1876
1869 - 1946			2020	1869 - 1886	1882 - 1899	1894 - 1911	1904 - 1921	1917 - 1934	1929 - 1946
1939 - 2016			2090	1939 - 1956	1952 - 1969	1964 - 1981	1974 - 1991	1987 - 2004	1999 - 2016
2009 - 2086			2160	2009 - 2026	2022 - 2039	2034 - 2051	2044 - 2061	2057 - 2074	2069 - 2086
2079 - 2156	318.425	318.434	2230	2079 - 2096	2092 - 2109	2104 - 2121	2114 - 2131	2127 - 2144	2139 - 2156
2149 - 2226			2300	2149 - 2166	2162 - 2179	2174 - 2191	2184 - 2201	2197 - 2214	2209 - 2226
2219 - 2296			2370	2219 - 2236	2232 - 2249	2244 - 2261	2254 - 2271	2267 - 2284	2279 - 2296
2289 - 2366			2440	2289 - 2306	2302 - 2319	2314 - 2331	2324 - 2341	2337 - 2354	2349 - 2366
2359 - 2436			2510	2359 - 2376	2372 - 2389	2384 - 2401	2394 - 2411	2407 - 2424	2419 - 2436
2429 - 2506			2580	2429 - 2446	2442 - 2459	2454 - 2471	2464 - 2481	2477 - 2494	2489 - 2506
2499 - 2576			2650	2499 - 2516	2512 - 2529	2524 - 2541	2534 - 2551	2547 - 2564	2559 - 2576
2569 - 2646	318.425	318.435	2720	2569 - 2586	2582 - 2599	2594 - 2611	2604 - 2621	2617 - 2634	2629 - 2646
2639 - 2716			2790	2639 - 2656	2652 - 2669	2664 - 2681	2674 - 2691	2687 - 2704	2699 - 2716
2709 - 2786			2860	2709 - 2726	2722 - 2739	2734 - 2751	2744 - 2761	2757 - 2774	2769 - 2786
2779 - 2856			2930	2779 - 2796	2792 - 2809	2804 - 2821	2814 - 2831	2827 - 2844	2836 - 2856

Single and double cutter face grooving, Ø 53 - 3 002 mm

Face grooving holder for twin-cutter boring heads SW and bridge boring tools Series 318.

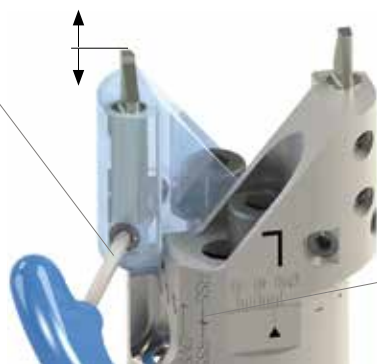
Features

- Single or double cutter, diameter range 53 - 3 002 mm
- Max. groove depth 12 mm
- Max. groove width with double cutting system 9.5 mm
- Length adjustment cutters (range: +/- 0.5 mm)
- Coolant from outside



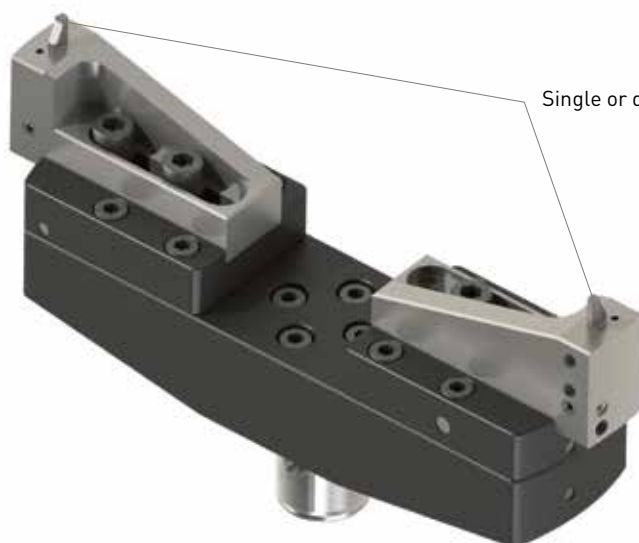
Fits on the twin-cutter boring heads SW

Accurate tool length adjustment by eccentric bolt

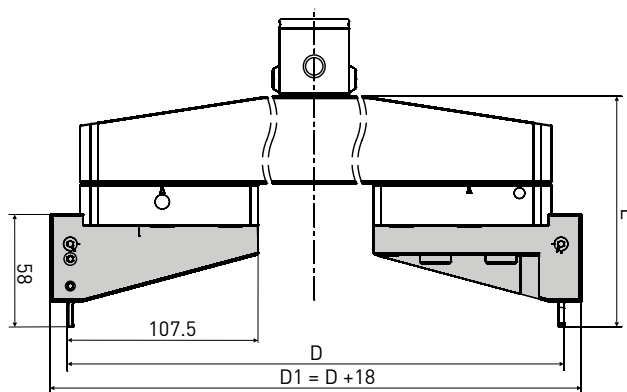
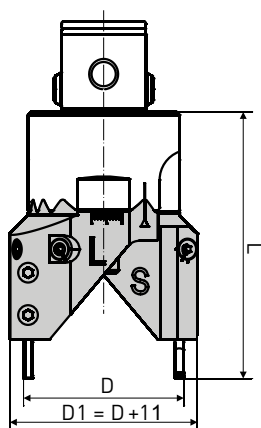


Attention: Mount the face grooving holder on mark «RSS»

B.6



Single or double cutter



Face grooving holder

Fig. 1



Fig. 2



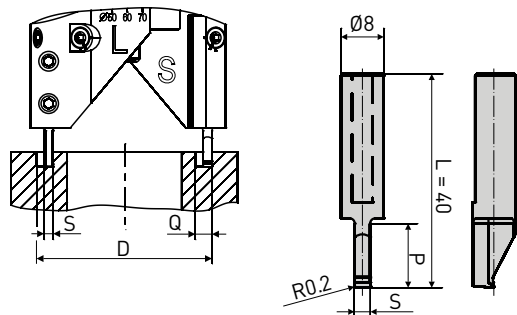
Fig. 3



	Type	D	L	Set Double Cutter SW Fig. 1	Set Single Cutter SW Fig. 2	Single Cutter Series 318 Fig. 3
SW	SW53	53 - 70	88	639.653	639.654	-
	SW68	68 - 90	95	639.663	639.664	-
	SW68	88 - 110	95	639.667	639.668	-
	SW98	98 - 126	113	639.673	639.674	-
	SW98	125 - 153	113	639.677	639.678	-
	SW148	148 - 176	143	639.683	639.684	-
	SW148	175 - 203	143	639.687	639.688	-
Series 318	-	198 - 3 002	119	-	-	637.961

1. Series 318 double cutters: article 637.961 is needed twice.

Cutters



Cutter	Width of Cutter S	Max. Width of Groove Q	Max. Depth of Groove P	Order No.
uncoated K40/AL *	2	3.5	12	958.601
	3	5.5		958.602
	4	7.5		958.603
	5	9.5		958.604
coated P40C/ST, GG *	2	3.5		958.611
	3	5.5		958.612
	4	7.5		958.613
	5	9.5		958.614

* Application
AL = Aluminium
ST = Steel
GG = Cast iron

Single cutter high precision face grooving, Ø 53 - 3 040 mm

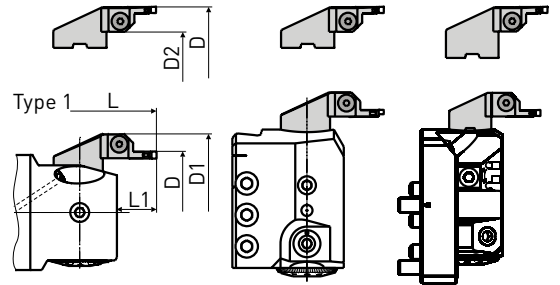
The insert holders and inserts are made for face grooving with the precision boring heads EWN and EWD Series 310 and with the large diameter boring tools Series 317 und 318.

Features

- Width of groove: from 2.5 mm
- Max. depth of groove: 2.7 - 4.3 mm
- Diameter range (outer groove): 53 - 3 040 mm



Type 2



EWN/EWD 310

EWN 150

EWN/EWD 200

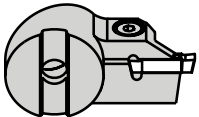
► B58/60

► B85

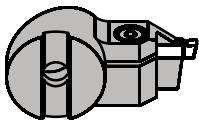
► B76

Insert holders

Type 1



Type 2

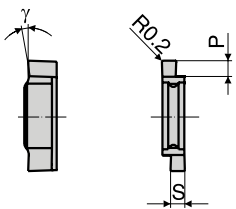


For Boring Head	Insert holder							
	Type 1			Type 2			L *	L1
	D	D1	Order No.	D	D2	Order No.		
EWN/EWD 53 x CKB5 (310.501)/(310.503)	53 - 70	D + 22	626.935	73 - 90	D - 30	626.945	73	20
EWN/EWD 68 x CKB6 (310.601)/(310.603)	68 - 100	D + 24	626.936	88 - 120	D - 28	626.946	88	21
	94 - 126		626.937	114 - 146		626.947		
EWN/EWD 100 x CKB6 (310.602)/(310.604)	100 - 153	D + 24	626.936	120 - 173	D - 28	626.946	88	21
	126 - 179		626.937	146 - 199		626.947		
EWN/EWD 100 x CKB7 (310.701)/(310.703)	100 - 153	D + 24	626.936	120 - 173	D - 28	626.946	104	21
	126 - 179		626.937	146 - 199		626.947		
EWN 100L x CKB7 (310.708)	100 - 153	D + 24	626.936	120 - 173	D - 28	626.946	134	21
	126 - 179		626.937	146 - 199		626.947		
EWN 150 x FK (317.102A)	200 - 613	D + 24	626.936	220 - 633	D - 28	626.946	134	21
	226 - 639		626.937	246 - 659		626.947		
EWN/EWD 200 x FK (318.101)/(318.103)	200 - 3 000	D + 21	626.938	220 - 3 040	D - 28	626.948	134	21

1. * Tool length to the CK connection

Inserts

B.6

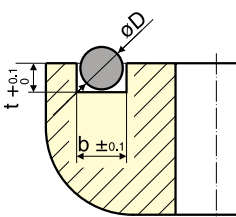


Inserts for Steel and Cast Iron			
S	P	γ	Order No.
2.5	2.7	5°	958.425
3.0	3.3	5°	958.430
3.3	3.6	5°	958.433
3.5	3.8	5°	958.435
4.0	4.3	5°	958.440

Inserts for Aluminium			
S	P	γ	Order No.
2.5	2.7	15°	958.475
3.0	3.3	15°	958.480
3.3	3.6	15°	958.483
3.5	3.8	15°	958.485
4.0	4.3	15°	958.490

Groove dimensions

Recommended groove dimensions for given cross section diameters of O-rings, for static sealing.



Seal Ring ØD	Groove Width b	Groove Depth t
1.78	2.5	1.3
2.0	2.5	1.6
2.5	3.3	1.9
2.62	3.5	2.05
3.0	4.0	2.4

Work Piece Material	Vc m/min	fn mm/rev
Construction- heat treatable steels	120 - 200	0.01 - 0.03
Stainless steels	60 - 120	0.01 - 0.02
GG/GGG	80 - 160	0.02 - 0.04
Aluminium	200 - 400	0.02 - 0.04
Non-ferrous metals		



Single cutter high precision face grooving, $\varnothing 14 - 53$ mm

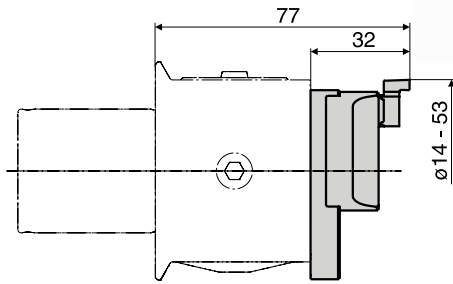
Tool holder, insert holder, and grooving insert are made for face grooving with the precision boring head EWN/EWD 2-50, series 112.

Features

- Width of groove: from 2.0 mm
- Max. depth of groove: 5 mm
- Diameter range (outer groove): 14 - 53 mm
- Coolant supply directly to the cutting edge



Boring heads see page B41-42



Tool- and insert holder

Fig. 1

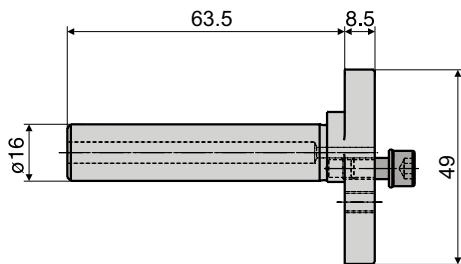


Fig. 2

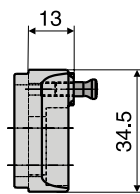
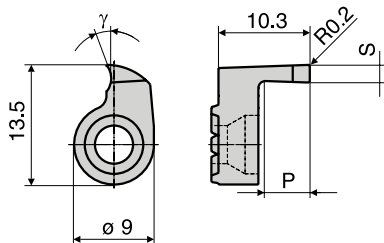


	Fig.	Range	Order No.
Tool holder	1	14 - 53	615.387B
Insert holder	2	14 - 53	615.388

Grooving inserts






For all work piece materials



S	P	γ	Order No.
2.0	5	20°	958.501
2.5			958.502
3.0			958.503

Slot milling cutters with inserts

Slot milling cutters with carbide inserts for circlip grooves as per DIN 472.


Slot Milling Cutter	Order No.	Inserts Type	E	B	Capacity D	Order No.	
						*	
	958.008	Type 0	1.15	0.9	12 - 24	ST	958.051
						GG	958.052
						AL	958.053
						ST	958.055
						GG	958.056
						AL	958.057
	958.010	Type 1	1.15	1.1	22 - 34	ST	958.061
						GG	958.062
						AL	958.063
						ST	958.065
						GG	958.066
						AL	958.067
	958.021	Type 2	1.65	1.6	34 - 50	ST	958.071
						GG	958.072
						AL	958.073
						ST	958.075
						GG	958.076
						AL	958.077
	958.031	Type 3	2.20	2.2	50 - 85	ST	958.081
						GG	958.082
						AL	958.083
						ST	958.085
						GG	958.086
						AL	958.087
	958.041	Type 4	3.20	3.0	85 - 210	ST	958.091
						GG	958.092
						AL	958.093
						ST	958.095
						GG	958.096
						AL	958.097


* Application
GG = Cast iron
ST = Steel
AL = Aluminium


B.6

Blank inserts

Periphery ground without rake angle and chip breakers.

	Type 0	Order No.
	K20	958.313
	P20	958.314

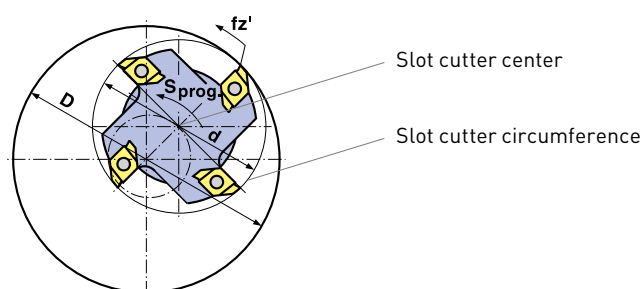
	Type 1	Order No.
	K20	958.157
	P20	958.158

	Type 2	Order No.
	K20	958.155
	P20	958.156

Cutting data

These values relate to the milling cutter circumference and apply under normal working conditions. Climb-cut milling is recommended with helical or tangential plunging to groove depth assuming a continuous program cycle without feed interruption.

Work Piece Material	Cutting Speed V_c [m/min]	Feed per Tooth f_z [mm]
Cast iron	80 - 130	0.12 - 0.25
Steel	120 - 200	0.10 - 0.20
Aluminium	200 - 400	0.15 - 0.30



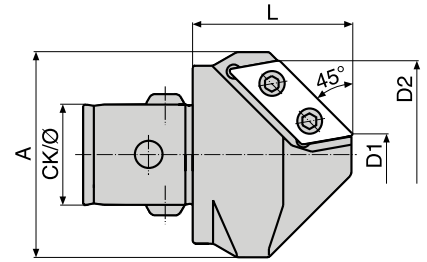
- D Circular slot diameter
- d Slot cutter circumference
- V_f Feed rate at the circumference of the milling cutter
- V_{f1} Feed rate at the center of the milling cutter

In all circular milling operations the programmed feed rate [V_{f1}] applies to the centre of the milling cutter. This may be computed as follows:

$$V_{f1} = V_f \cdot \frac{D - d}{D}$$

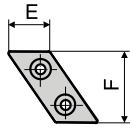
45° Chamfering C-Cutter

Chamfering mill with indexable inserts for efficient and vibration-free 45° chamfering. The long cutting edge provides a wide chamfering range which reduces the number of tools, tool changes, and magazine pots.



Chamfering Mill Type	CK/Ø	D1 D2	L	A	No. of Inserts	Order No.
C 0525	CKB2/14	5 - 25	25	28.5	1	335.021
C 1040	CKB4/22	10 - 40	35	45	2	335.022
C 3060	CKB5/28	30 - 60	40	65	3	335.023
C 50100	CKB6/36	50 - 100	65	106	3	335.024

Inserts



Chamfering Mill Type	Insert		Order No. Cast Iron	Order No. Steel	Order No. Aluminium
	E	F			
C 0525	6.35	12.7	978.283	800.951	801.753
C 1040	9.525	19.05	978.817	800.952	801.754
C 3060	9.525	19.05	978.817	800.952	801.754
C 50100	15.875	31.75	978.826	800.953	801.755

Cutting data

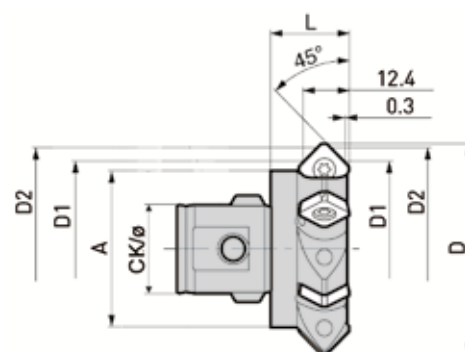
Work Piece Material	Chamfering Mill Type	Recommended Insert	C *	Side Cutting		Plunge Cutting	
				Vc [m/min]	fn [mm/rev]	Vc [m/min]	fn [mm/rev]
Steel	C 0525	800.951	2 x 45°	80	0.15	50	0.1
	C 1040	800.952	3 x 45°	120	0.3	90	0.15
	C 3060	800.952	4 x 45°	150	0.45	120	0.3
	C 50100	800.953	4 x 45°	150	0.45	150	0.4
Stainless steel	C 0525	800.951	2 x 45°	60	0.1	30	0.08
	C 1040	800.952	3 x 45°	60	0.2	40	0.12
	C 3060	800.952	4 x 45°	60	0.3	60	0.18
	C 50100	800.953	4 x 45°	80	0.36	60	0.25
Cast iron	C 0525	978.283	2 x 45°	50	0.15	40	0.1
	C 1040	978.817	3 x 45°	90	0.3	60	0.15
	C 3060	978.817	4 x 45°	120	0.6	90	0.25
	C 50100	978.826	4 x 45°	120	0.6	120	0.35
Aluminium	C 0525	801.753	2.5 x 45°	100	0.15	80	0.1
	C 1040	801.754	4 x 45°	150	0.3	100	0.2
	C 3060	801.754	5 x 45°	200	0.6	150	0.3
	C 50100	801.755	5 x 45°	240	0.6	180	0.4

- * Max. chamfer
- Reduce cutting speed if larger chamfer is required.



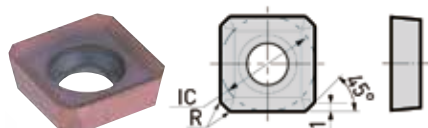
45° Chamfering C-Cutter mini – Ultra high feed rate due to large number of cutting edges

The C-Cutter mini is a high performance tool for chamfering, back chamfering and face milling. The large number of cutting edges (4 -6) combined with the small tool diameter permit extremely high feed rates.



Chamfering Mill Mini					No. of Inserts	Order No.
Type	CK/Ø	D1 D2	L	A		
C 2232	CKB1/11	22 - 32	20	19	4	335.070
C 3242	CKB3/18	32 - 42		31	4	335.071
C 5262	CKB3/18	52 - 62		31	6	335.072
C 4252	CKB4/22	42 - 52		39	6	335.073
C 5262	CKB5/28	52 - 62		51	6	335.074

Inserts



Insert Type	IC	R	Order No.	Order No.	Order No.
			Cast Iron	Steel	Aluminium
CM10C1	10	0.2	966.445	966.445	966.446
CM10C1SE *	10	0.2	966.447	966.447	966.447

- * With sharp cutting edge.
- All inserts coated.

Cutting data

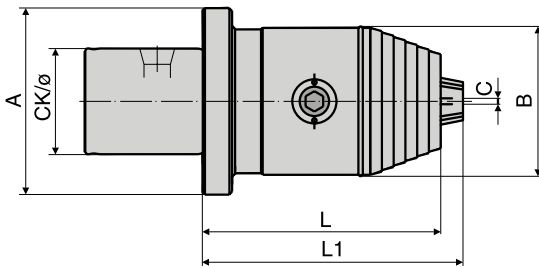
Work Piece Material	Insert	Cutting Speed Vc [m/min]	Chamfering [mm/fz]	Face Milling [mm/fz]	Coolant
Steel	966.447	100 - 350	0.05 - 0.4	0.05 - 0.2	Dry
Tempered Steel <40 HRC	966.447	60 - 100	0.05 - 0.1	0.05 - 0.1	Wet
Stainless steel	966.447	100 - 250	0.08 - 0.3	0.08 - 0.2	Dry/Wet
Cast iron	966.447	100 - 350	0.10 - 0.5	0.05 - 0.25	Dry
Aluminium	966.446	100 - 800	0.10 - 0.5	0.05 - 0.3	Dry/Wet

Universal drill chucks

With strong clamping force and high runout accuracy. Quick and simple clamping over a bevel gear.



Type	CK/Ø	A	B	C	L	L1	Order No.
SBF13	CKS6/36	63.5	50	1 - 13	81	90	335.042
SBF16	CKS6/36	63.5	57	3 - 16	86	92	335.044



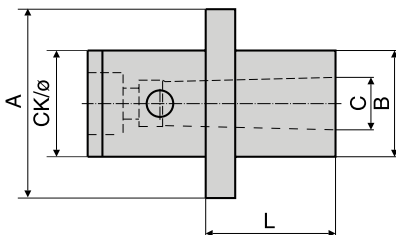
Morse taper adapters

With Morse internal taper for tools with thread and/or tang.



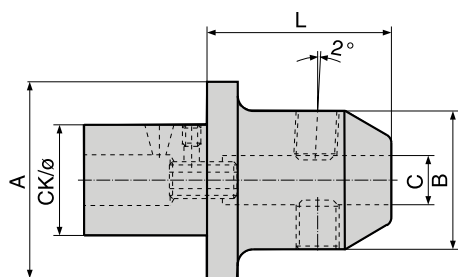
Type	CK/Ø	A	B	C	L	Order No.
MK3/L+M12	CKS6/36	64	40	23.8	65	335.363 *
MK5/L	CK7/46	90	63	44.4	180	335.375 *

1. * As long as stock lasts.



End mill holders

For end mills with cylindrical shank and clamping surface according to DIN 1835B (Weldon system) and to DIN 1835E (Whistle notch system).

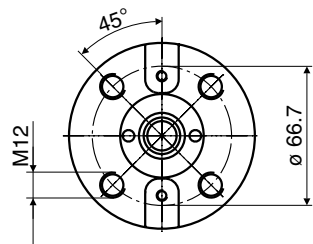
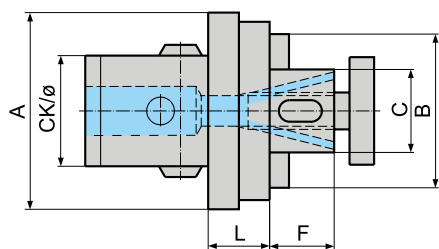


Type	CK/Ø	A	B	C	L	Order No.
6	CKS4/22	39	24	6	50	335.230
8	CKS4/22	39	26	8	50	335.231
10	CKS4/22	39	32	10	55	335.232
12	CKS4/22	39	39	12	60	335.233
6	CKS5/28	50	24	6	50	335.234
8	CKS5/28	50	26	8	50	335.235
10	CKS5/28	50	32	10	55	335.236
12	CKS5/28	50	38	12	60	335.237
14	CKS5/28	50	40	14	60	335.238
16	CKS5/28	50	45	16	62	335.239
20	CKS5/28	50	48	20	60	335.249
6	CKS6/36	63.5	24	6	45	335.240
8	CKS6/36	63.5	26	8	45	335.241
10	CKS6/36	63.5	32	10	45	335.242
12	CKS6/36	63.5	38	12	50	335.243
14	CKS6/36	63.5	40	14	50	335.244
16	CKS6/36	63.5	45	16	50	335.245
18	CKS6/36	63.5	47	18	50	335.246
20	CKS6/36	63.5	48	20	55	335.247
25	CKS6/36	63.5	63.5	25	65	335.248
32 *	CKS7/46	90	72	32	80	335.250
40 *	CKS7/46	90	80	40	90	335.251

1. * Only DIN 1835B (Weldon system).

Universal milling cutter holders

For milling cutters with longitudinal or transverse key ways according to DIN 841, 842, 1880 and cutter heads according to DIN 1830.



Face mill arbor 335.438N with hole circle (Pitch circle)

Type	CK/Ø	A	B	C	L	F	Order No.
16	CKS4/22	39	37	16	18	17	335.420
22	CKS4/22	39	42	22	18	19	335.421
16	CKS5/28	50	40	16	20	17	335.423
22	CKS5/28	50	47	22	20	19	335.424
27	CKS5/28	50	53	27	20	21	335.425
16	CKS6/36	63.5	40	16	20	17	335.430
	CKN6/36	63.5	40	16	20	17	335.430N *
22	CKS6/36	63.5	50	22	20	19	335.431
	CKN6/36	63.5	50	22	20	19	335.431N *
27	CKS6/36	63.5	58	27	20	21	335.432
32	CKS6/36	63.5	70	32	28	24	335.433
	CKN6/36	63.5	70	32	28	24	335.433N *
40	CKS6/36	63.5	80	40	28	27	335.434
	CKN6/36	63.5	80	40	28	27	335.434N *
32	CKS7/46	90	83	32	28	24	335.435
	CKS7/46	90	83	32	28	24	335.437N ¹⁾
	CKS7/46	90	93	40	28	27	335.436
40	CKN7/46	90	93	40	28	27	335.438N *

1. ¹⁾ Face mill arbor without longitudinal key way.
 2. * As long as stock lasts.

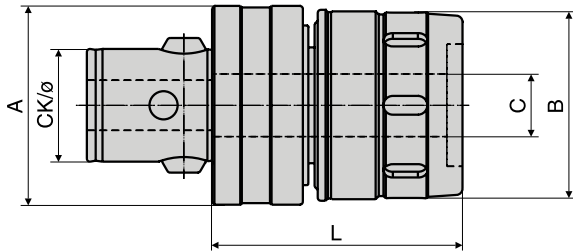
CKN execution

Milling chucks

With needle-bearing chucking nut for maximum clamping force and high concentricity.

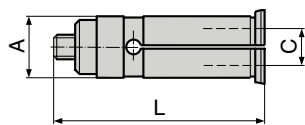


Type	CK/Ø	A	B	C	L	Order No.
HMC20	CKS6/36	63.5	60	20	80	335.066
HMC32	CK7/46	90	80	32	112	335.077



Reduction sleeves

With adjustable length stop.

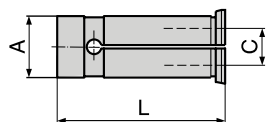


Type HMC20			Order No.
A	C	L	
20	6	68	962.201
	8		962.202
	10		962.203
	12		962.204
	14		962.252
	16		962.205

Type HMC32			Order No.
A	C	L	
32	6	90	962.206
	8		962.207
	10		962.208
	12		962.209
	14		962.251
	16		962.210
	18		962.253
	20		962.211
	25		962.212

Without adjust screw

B.6



Type HMC20			Order No.
A	C	L	
20	6	60	962.260
	8		962.262
	10		962.263
	12		962.264
	14		962.265
	16		962.266

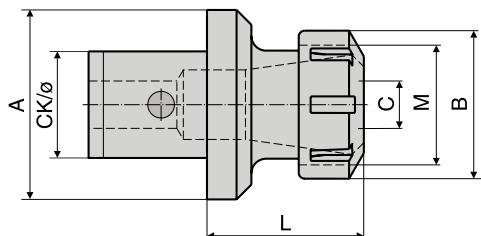
Type HMC20			Order No.
A	C	L	
32	6	74	962.281
	8		962.282
	10		962.283
	12		962.284
	14		962.285
	16		962.286
	18		962.287
	20		962.288
	25		962.289

Collet chucks

For double-taper collets slitted on both sides with extraction groove.



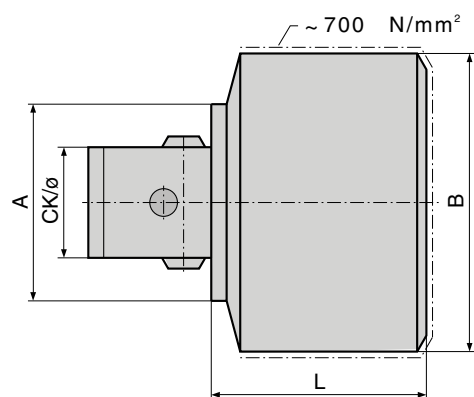
Type	CK/Ø	M	A	B	C	L	Order No.
EX25	CKS4/22	32 x 1.5	39	42	1 - 16	47	335.140
EX25	CKS5/28	32 x 1.5	50	42	1 - 16	47	335.142
EX32	CKS6/36	40 x 1.5	64	50	2 - 20	53	335.164
EX40	CKS6/36	50 x 1.5	64	63	2 - 25	65	335.165



Collets are not available.

Blanks

The CK connector is hardened and ground. In the marked areas (---) the blanks are unhardened and unground.



CK/Ø	A	B	L	Order No.
CKB3/18	--	31	65	335.531
CKB3/18	31	42	50	335.532
CKS4/22	--	39	80	335.541
CKS4/22	39	54	50	335.542
CKS5/28	--	50	100	335.551
CKS5/28	50	70	60	335.552
CKS6/36	--	64	120	335.561
CKS6/36	--	64	220	335.563
CKS6/36	64	97	70	335.562
CKS7/46	--	90	180	335.571

Tapping attachments with axial float - simple and reliable

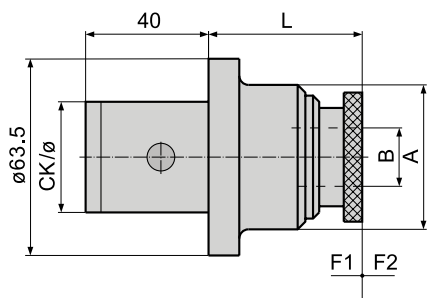
B.6



Type	CK/Ø	Capacity	A	B	L	F1	F2	Order No.
G1	CK6/36	M4 - M12	47	19	50	5	10	335.762
G2	CK6/36	M10 - M24	64	31	80	7	14	335.763

F1 = Length compensation compression

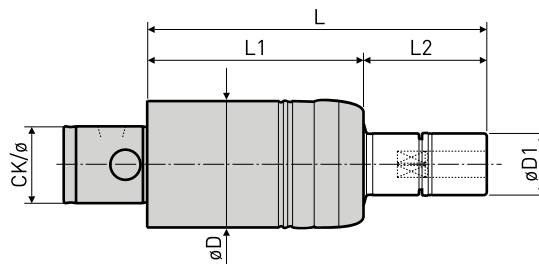
F2 = Length compensation extension



Bilz/Tapmatic compatible tap holders are not available.

Tapping attachments BIG MEGA SYNCHRO

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



CK/ø	Type	d	ØD	ØD1	L	L1	L2	Order No.
CKB4/22	MGT6-62	M2 - M6	36	16	92	62	30	335.764
	MGT12-67	M6 - M12	41	20	97	67	30	335.768
CKB5/28	MGT20-87	M12 - M20	54	30	122	87	35	335.769

Comparison of surface finish

Tapping of exotic materials tends to cause a compressed burr on the thread surface. BIG MEGA Synchro compensates for synchronization errors and minimizes cutting load.



Other manufacturer



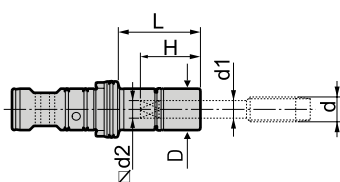
BIG MEGA Synchro



Tap holder MGT6

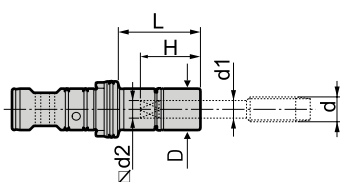


B.6



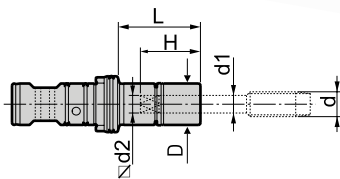
Type	DIN371 Ød	DIN376 Ød	ISO529 Ød	Ød1	∇d2	H	L	ØD	Order No.
MGT6-031025 - 30			M3	3.15	2.5	20	30	16	963.611
							70		963.612
							100		963.613
							150		963.614
MGT6-035027 - 30	M3	M5		3.5	2.7	21	30	963.615	
							70	963.616	
							100	963.617	
							150	963.618	
MGT6-040032 - 30			M4	4.0	3.15	21	30	963.619	
							70	963.620	
							100	963.621	
							150	963.622	
MGT6-045034 - 30	M4	M6		4.5	3.4	21	30	963.623	
							70	963.624	
							100	963.625	
							150	963.626	
MGT6-050040 - 30			M5	5.0	4.0	25	30	963.627	
							70	963.628	
							100	963.629	
							150	963.630	
MGT6-060049 - 30	M5, M6	M8		6.0	4.9	26	30	963.632	
							70	963.633	
							100	963.634	
							150	963.635	
						200	963.636		

Tap holder MGT12



Type	DIN371 Ød	DIN376 Ød	ISO529 Ød	Ød1	∇d2	H	L	ØD	Order No.
MGT12-060049 - 30	M5, M6	M8		6.0	4.9	28	30	20	963.637
							70		963.638
							100		963.639
							150		963.640
							200		963.641
MGT12-063050 - 30			M6	6.3	5.0	28	30		963.642
							70		963.643
							100		963.644
							150		963.645
							200		963.646
MGT12-070055 - 30		M10		7.0	5.5	28	30		963.647
							70		963.648
							100		963.649
							150		963.650
							200		963.651
MGT12-080063 - 30	M8		M8	8.3	6.3	29	30		963.652
							70		963.653
							100		963.654
							150		963.655
							200		963.656
MGT12-090071 - 30		M12	M12	9.0	7.1	30	30		963.657
							70		963.658
							100		963.659
							150		963.660
							200		963.661

Tap holder MGT20



Type	DIN371 Ød	DIN376 Ød	ISO529 Ød	Ød1	∇d2	H	L	ØD	Order No.
MGT20-090071 - 35		M12	M12	9.0	7.1	30	35	30	963.662
							85		963.663
							115		963.664
							150		963.665
							150		963.666
MGT20-100080 - 35	M10		M10	10.0	8.0	33	35		963.667
							85		963.668
							115		963.669
							150		963.670
							150		963.671
MGT20-110090 - 35		M14		11.0	9.0	34	35		963.672
							85		963.673
							115		963.674
							150		963.675
							150		963.676
MGT20-112090 - 35			M14	11.2	9.0	34	35		963.677
							85		963.678
							115		963.679
							150		963.680
							150		963.681
MGT20-120090 - 35		M16		12.0	9.0	34	35		963.682
							85		963.683
							115		963.684
							150		963.685
							150		963.686
MGT20-140110 - 35		M18		14.0	11.0	35	35		963.687
							85		963.688
							115		963.689
							150		963.690
							150		963.691
MGT20-140112 - 35			M18, M20	14.0	11.2	35	35		963.692
							85		963.693
							115		
							150		
							150		

B.6

BIG KAISER-Boring System with Polygon Shank, BIG CAPTO

Precision Boring Heads EWD 2-32/EWD 2-54, EWN 2-50XL	108 - 109
Precision Boring Heads EWN 32-100/EWBD68/EWBD100 AL	110 - 113
Adapters	114 - 115

EWD 2-32, EWD 2-54 for highest precision and performance

The precision boring heads EWD 2-32 and EWD 2-54 with digital display and direct electronic measuring system on the tool carrier feature absolute setting accuracy. The boring heads with BIG CAPTO C5 and C6 connection are designed for ultra-precise boring operations in the range from \varnothing 2-54/80 mm with highest spindle speeds. With one single button for the functions "on" and "reset", operating errors are practically eliminated.

Features

- Same accessories as for the precision boring heads EWN 2-32 and 2-50XL Series 112
- Automatic switch off function which automatically stores the last displayed value
- The measuring system shows the effective movement of the tool carrier and permits diameter corrections in both directions.
- Body protection grade 69K

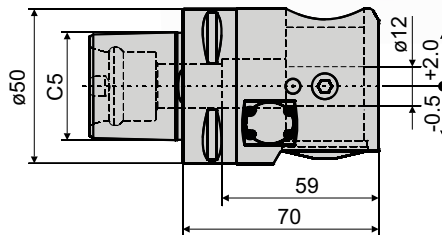


LCD Display with a resolution of 0.001 mm \varnothing

Variable length adjustment

Technical data EWD 2-32

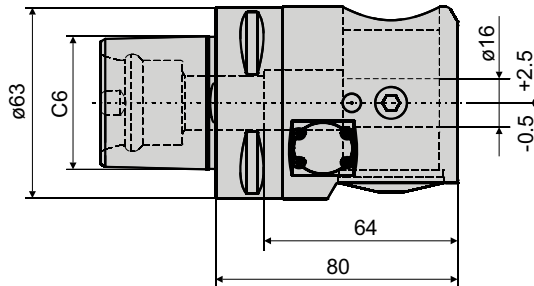
- Setting accuracy: 0.001 mm \varnothing
- Boring range: \varnothing 2-32 mm
- Tool holder bore: \varnothing 12 mm
- Adjustment range : -0.5 / +2.0 mm



Model	Order No.
EWD 2-32	470.103

Technical data EWD 2-54

- Setting accuracy: 0.001 mm \varnothing
- Boring range: \varnothing 2-54 / 80 mm
- Tool holder bore: \varnothing 16 mm
- Adjustment range : -0.5 / +2.5 mm



Model	Order No.
EWD 2-54	470.109

EWN 2-50 XL, Boring range \varnothing 2-54 / 152 mm

The thousand times proven precision boring head for boring operations in the range \varnothing 2-152 mm with highest precision and performance.

Features

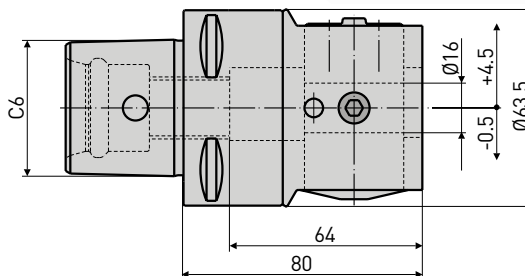
- Ground and play-free fitted micrometer spindle for a very precise and direct adjustment of the tool carrier
- Additional boring range with side mounted insert holders from 50 – 152 mm
- Fine balanced when tool carrier is set in center position



Through tool coolant supply up to 20 bar

Technical data

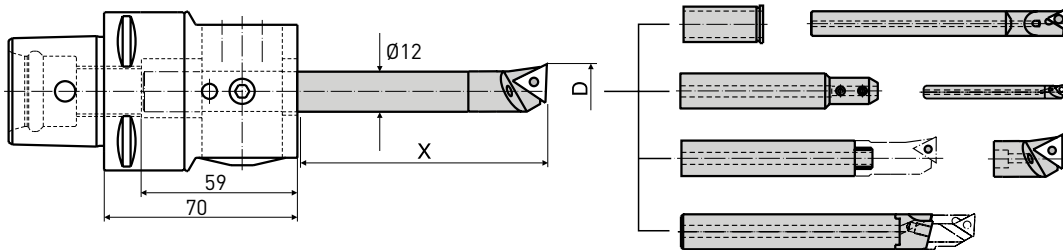
- Boring range: \varnothing 2-54 / 152 mm
- Tool holder bore: \varnothing 16 mm
- Adjustment precision: 1 DIV = 0.005 mm \varnothing , with vernier 0.001 mm \varnothing
- Adjustment range: -0.5 / +4.5 mm



Model	Order No.
EWN 2-50 x C6	470.108

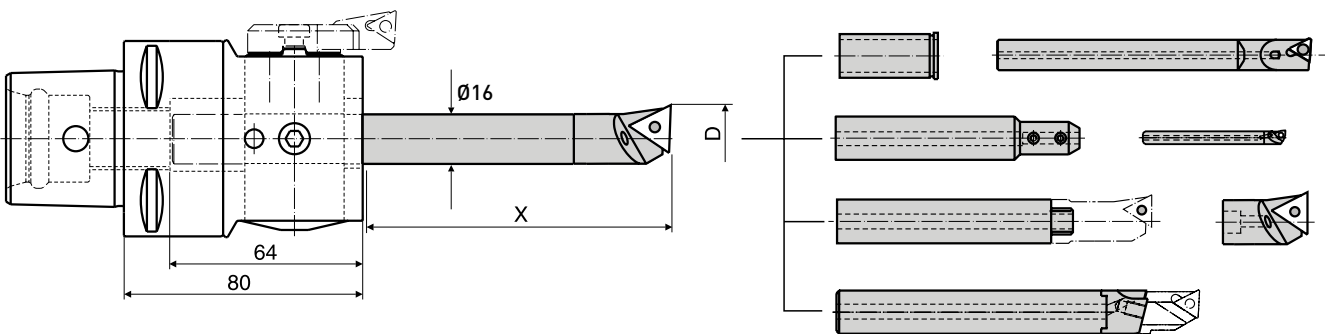
Accessories Ø 2 - 32 mm

See chapter precision boring heads EWN/EWB Series 112, page B52-54.



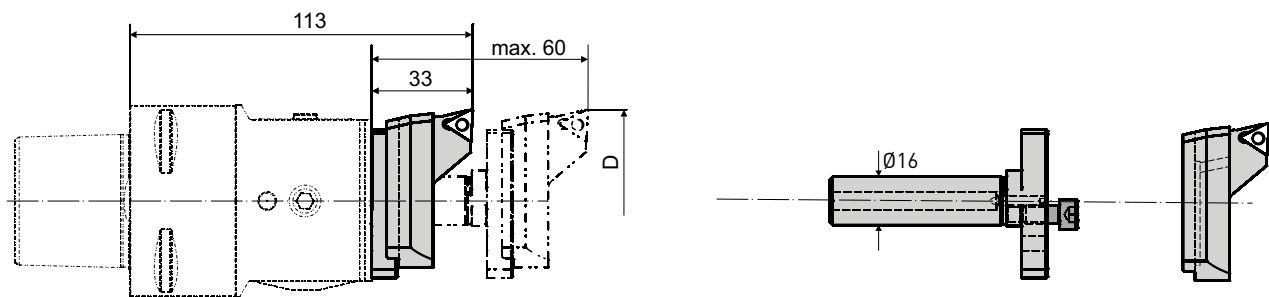
Accessories Ø 2 - 54 mm

See chapter precision boring heads EWN/EWB Series 112, page B42-46.



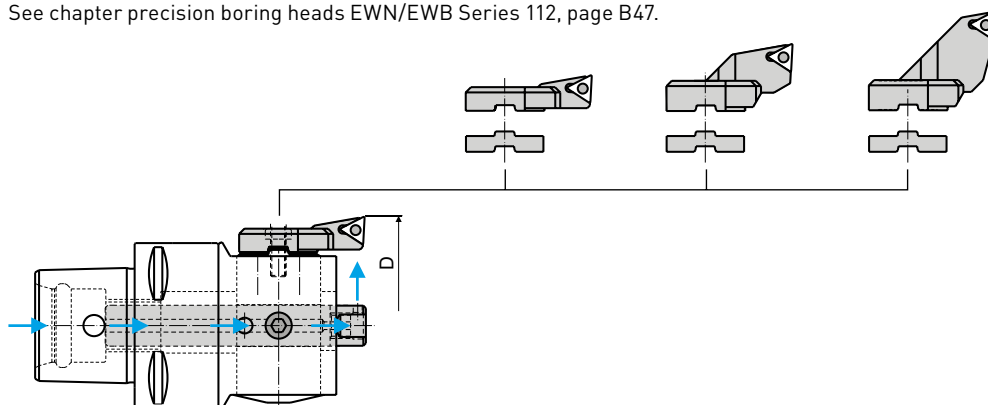
Accessories Ø 54 - 80 mm

See chapter precision boring heads EWN/EWB Series 112, page B45.



Accessories Ø 80 - 152 mm

See chapter precision boring heads EWN/EWB Series 112, page B47.

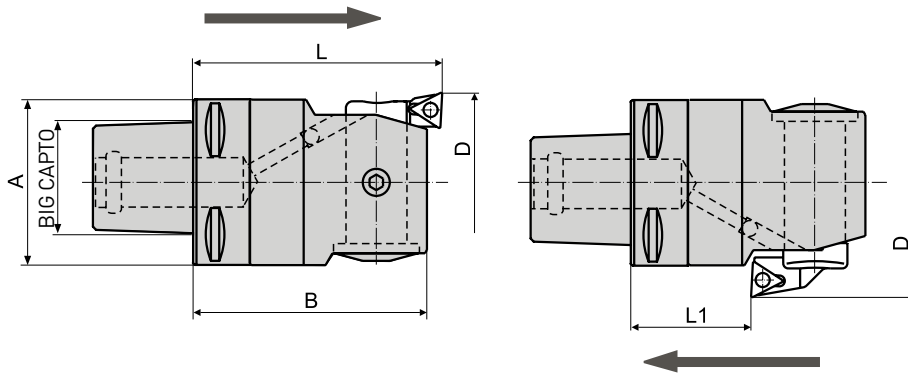


Multifunctional and balance optimized for highest precision and efficiency

With only 5 precision boring heads, the diameter range from \varnothing 32-203 mm is completely covered. The boring heads can be clamped in BIG CAPTO shanks and other polygonal basic holders, or directly in BG CAPTO machine spindles.

Features

- Large work range due to 3 different insert holders for each boring head
- Insert holder can be mounted in opposite direction for an easy changeover to back boring
- Coated tool body for complete protection against corrosion
- Setting accuracy: 0.01 mm \varnothing , with vernier 0.002 mm \varnothing
- Vc max: 1200 m/min



Boring Head	BIG CAPTO	Boring Range D		L	L1	A	B	Order No.
		→	←					
EWN 32	C3	32 - 60	46 - 60	55	25	32	50	470.301
EWN 41	C4	41 - 74	53 - 74	67	34	40	63	470.401
EWN 53	C5	53 - 95	62 - 95	77	39	50	73	470.501
EWN 68	C6	68 - 150	80 - 150	92	43	64	88	470.601
EWN 100	C6	100 - 203	112 - 203	92	43	65/90 *	88	470.602
EWN 100	C8	100 - 203	112 - 203	117	68	80/90 *	113	470.801

1. * Max. body diameter: 90 mm

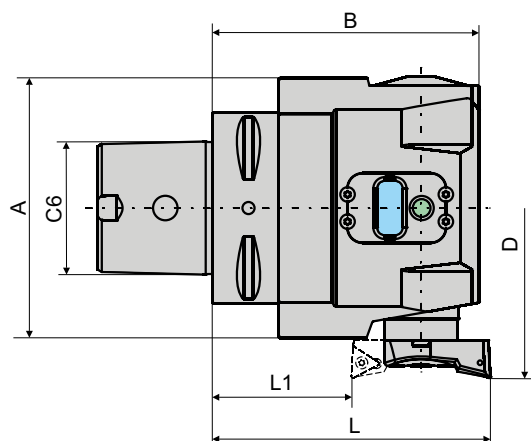
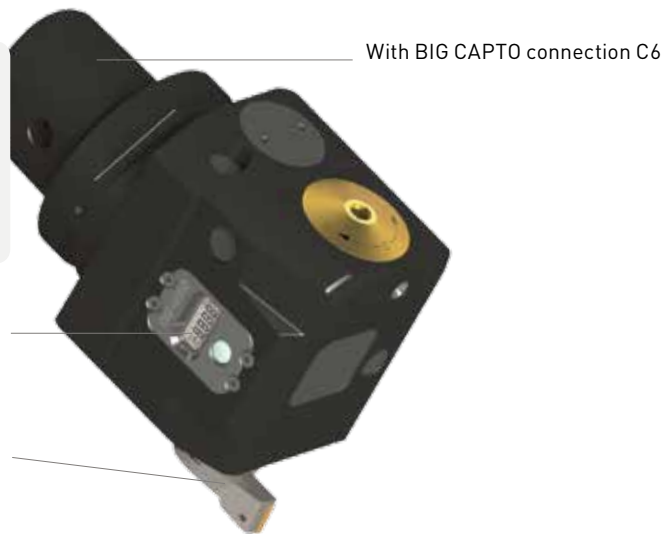
B.7

Self-balanced precision boring heads with digital display

The new precision boring heads EWBD combine the most advanced technologies in one spectacular tool: digital and self-balanced. In addition the ultralight precision boring head EWBD 100 AL is the worlds first tool with polygonal shank, completely made of aluminium.

Features

- Automatic switch off function which automatically stores the last displayed value
- Body protection grade IP 69K
- Self-balanced over the entire adjustment range
- Insert holder can be mounted in opposite direction for an easy changeover to back boring
- Vc max: 2 000 m/min



Other execution

EWBD 68 x C6 (Steel)
470.606

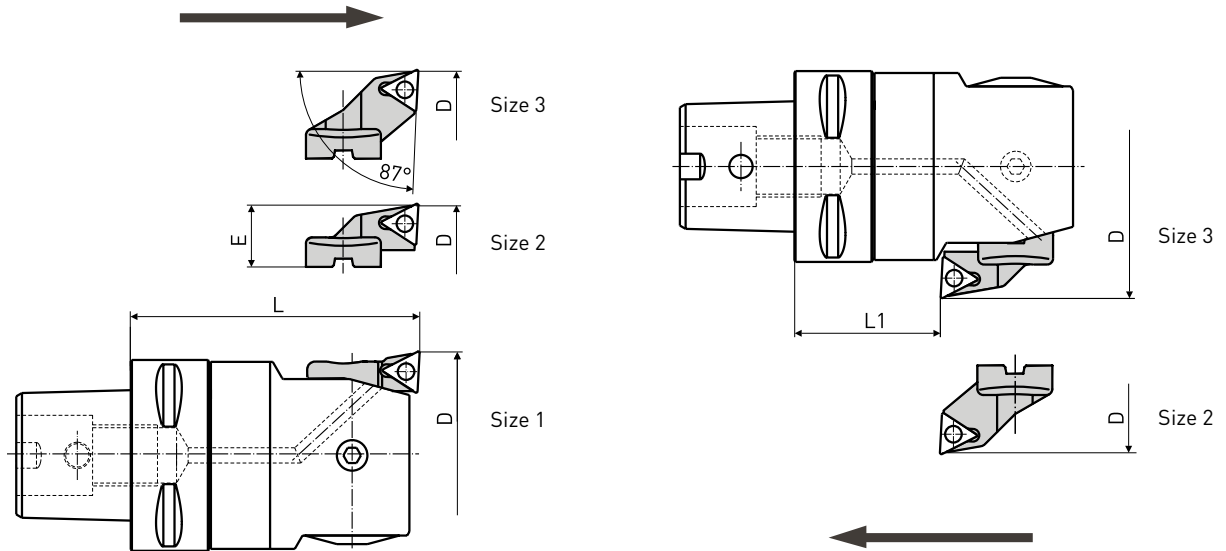



Boring Head	BIG CAPTO	Boring Range D		Material	L	L1	A	B	Order No.
		→	←						
EWBD 68	C6	68 - 102	80 - 102	Steel	92	46	64	88	470.606
EWBD 100 AL	C6	100 - 153	112 - 153	Aluminium	92	46	65/90 *	88	470.609

1. * Max. body diameter: 90 mm

Insert holders type E

Standard holder with 87° entering angle, suitable for fine boring in through- and blind holes. Three different insert holders for the extension of the diameter range and for back boring applications.

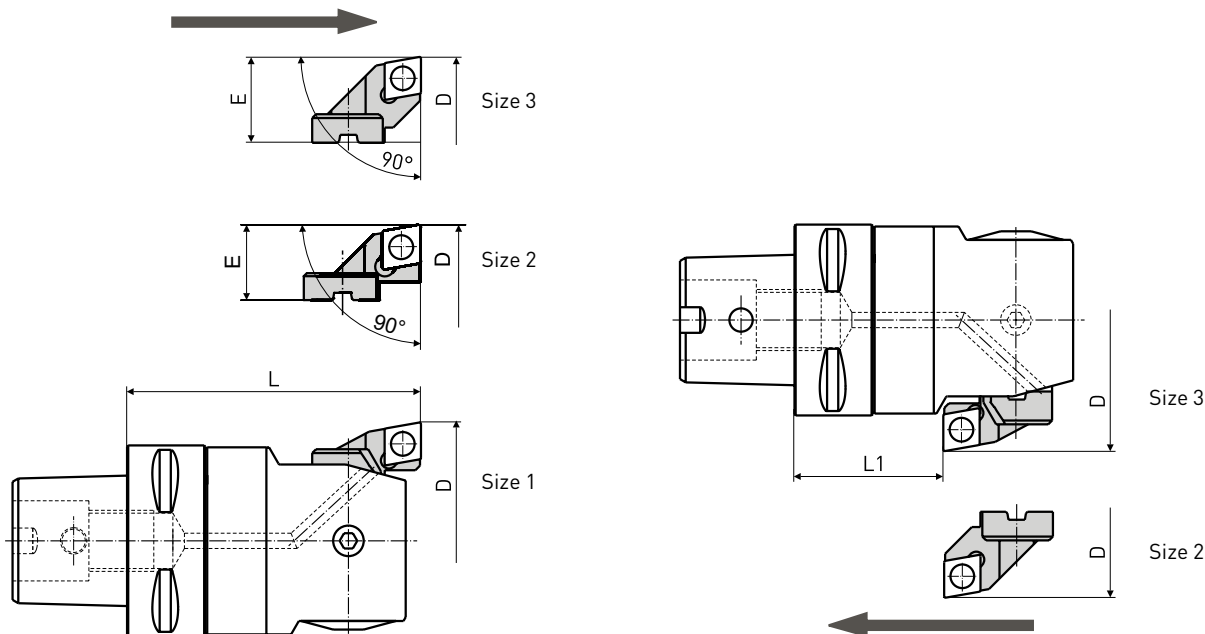


Boring Head	Insert Holder Size	Boring Range D		E	L	L1	Order No.	
		→	←					
EWN 32 x C3	1	32 - 42	-	7.4	55	25	626.131	TC.. 1102
	2	41 - 50	46 - 51	11.9			626.132	
	3	50 - 60	50 - 60	16.4			626.133	
EWN 41 x C4	1	41 - 54	-	8.1	67	34	626.141	
	2	50 - 63	53 - 63	12.6			626.142	
	3	61 - 74	61 - 74	18.1			626.143	
EWN 53 x C5	1	53 - 70	62 - 70	10	77	39	626.151	
	2	65 - 82	69 - 82	16			626.152	
	3	78 - 95	78 - 95	22.5			626.153	
EWN 68 x C6 EWBD 68 x C6	1	68 - 100	80 - 100	12.5	92	43	626.161	
	2	94 - 126	94 - 126	25.5			626.162	
	3	118 - 150	118 - 150	37.5			626.163	
EWN 100 x C6 EWBD 100 AL x C6	1	112 - 153	112 - 153	12.5	92	43	626.161	
	2	126 - 179	126 - 179	25.5			626.162	
	3	150 - 203	150 - 203	37.5			626.163	
EWN 100 x C8	1	100 - 153	112 - 153	12.5	117	68	626.161	
	2	126 - 179	126 - 179	25.5			626.162	
	3	150 - 203	150 - 203	37.5			626.163	

B.7

Insert holder type C

With 90° approach angle, suitable for semi-finish and finish boring and for stepped bores. For each boring head, insert holders with different projections are available for the extension of the boring range and for back boring.

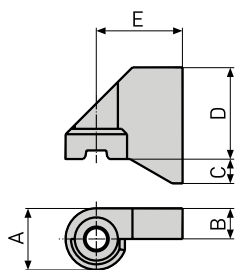


Boring Range	Insert Holder Size	Boring Range D		E	L	L1	Order No.	
		→	←					
EWN 32 x C3	1	32 - 42		7.4	55	25	636.331	
	2	41 - 51	47 - 51	11.9			626.332	
	3	50 - 60	50 - 60	16.4			626.333	
EWN 41 x C4	1	41 - 54		8.1	67	34	626.341	CC.. 0602
	2	50 - 63	54 - 63	12.6			626.342	
	3	61 - 74	61 - 74	18.1			626.343	
EWN 53 x C5	1	53 - 70	62 - 70	10	77	39	626.351	
	2	62 - 79	67 - 79	14.5			626.352	
	3	78 - 95	78 - 95	22.5			626.353	
EWN 68 x C6 EWBD 68 x C6	1	68 - 100	80 - 100	12.5	92	43	626.361	CC.. 09T3
	2	78 - 110	82 - 110	17.5			626.362	
	3	108 - 140	108 - 140	32.5			626.363	
EWN 100 EWBD 100 AL x C6	1	100 - 153	112 - 153	12.5	92	43	626.361	
	2	110 - 163	110 - 163	17.5			626.362	
	3	140 - 193	140 - 193	32.5			626.363	

B.7

Blank insert holders type ENH

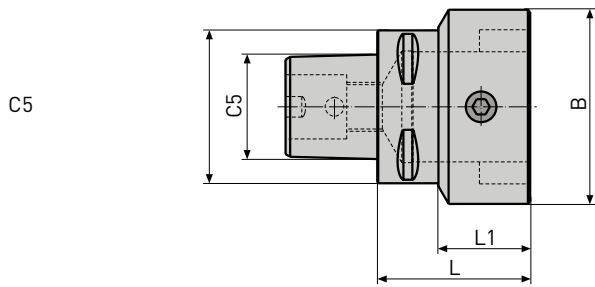
If required, the blanks can be hardened. (Mat. 1.2343)



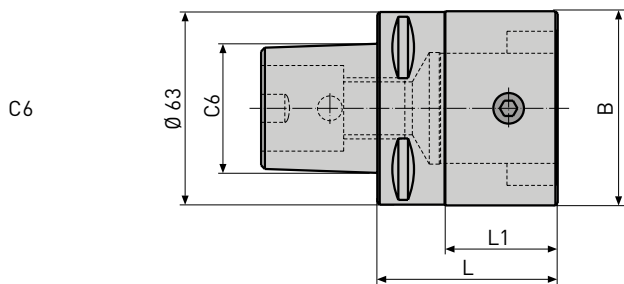
Boring Head	Blank Type	Blank Dimensions					Order No.
		A	B	C	D	E	
EWN 32	3	11.4	5.7	4.5	17.0	16.0	626.903
EWN 41	4	15.4	7.7	5.0	20.0	20.0	626.904
EWN 53	5	19.0	9.5		25.0	20.0	626.905
EWN 86/100	6	29.0	14.5		40.0	26.0	626.906
						50.0	626.916

The CKB/CKN-program for BIG CAPTO-shanks

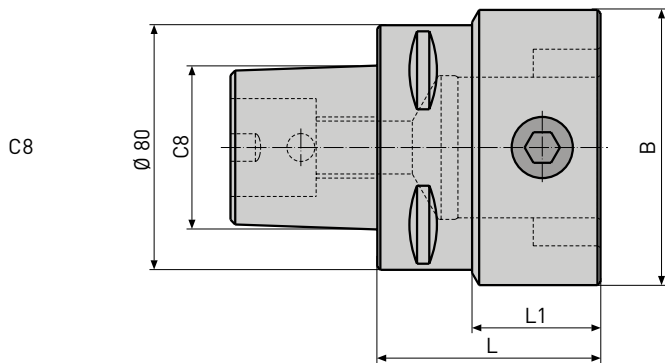
The BIG CAPTO Adapter enable in combination with the standard holders C5, C6 and C8 to use the whole modular boring system for the boring range \varnothing 2 to 1180 mm.



Model	Designation	B	L	L1	Order No.
CKB6	C5 x CK6	\varnothing 63.5	50	30	328.037 *
CKN6	C5 x CKN6	\varnothing 63.5	50	30	328.037N

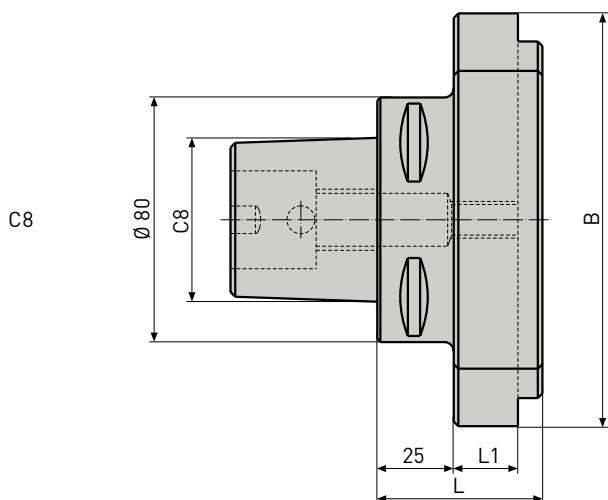


Model	Designation	B	L	L1	Order No.
CKB1	C6 x CKB1	\varnothing 19	77.5	50.5	328.321
CKB2	C6 x CKB2	\varnothing 24	89.5	62.5	328.322
CKB3	C6 x CKB3	\varnothing 31	65	40	328.036
CKB4	C6 x CKB4	\varnothing 39	58	33	328.035
CKB5	C6 x CKB5	\varnothing 50	48	23	328.034
CKB6	C6 x CKB6	\varnothing 63.5	59	37	328.033 *
CKN6	C6 x CKN6	\varnothing 63.5	59	37	328.033N



Model	Designation	B	L	L1	Order No.
CKN6	C8 x CKN6	\varnothing 63.5	74	44	328.053N
CKB7	C8 x CKB7	\varnothing 90	73	42	328.032 *
CKN7	C8 x CKN7	\varnothing 90	73	42	328.032N

B.7



For large diameter boring tools Series 318

Model	Designation	B	L	L1	Order No.
FK 135	C8 x FK 135	\varnothing 135	55	17	328.210
FK 135	C8 x FK 135/90°				328.211

1. For large diameter boring tools series 318.

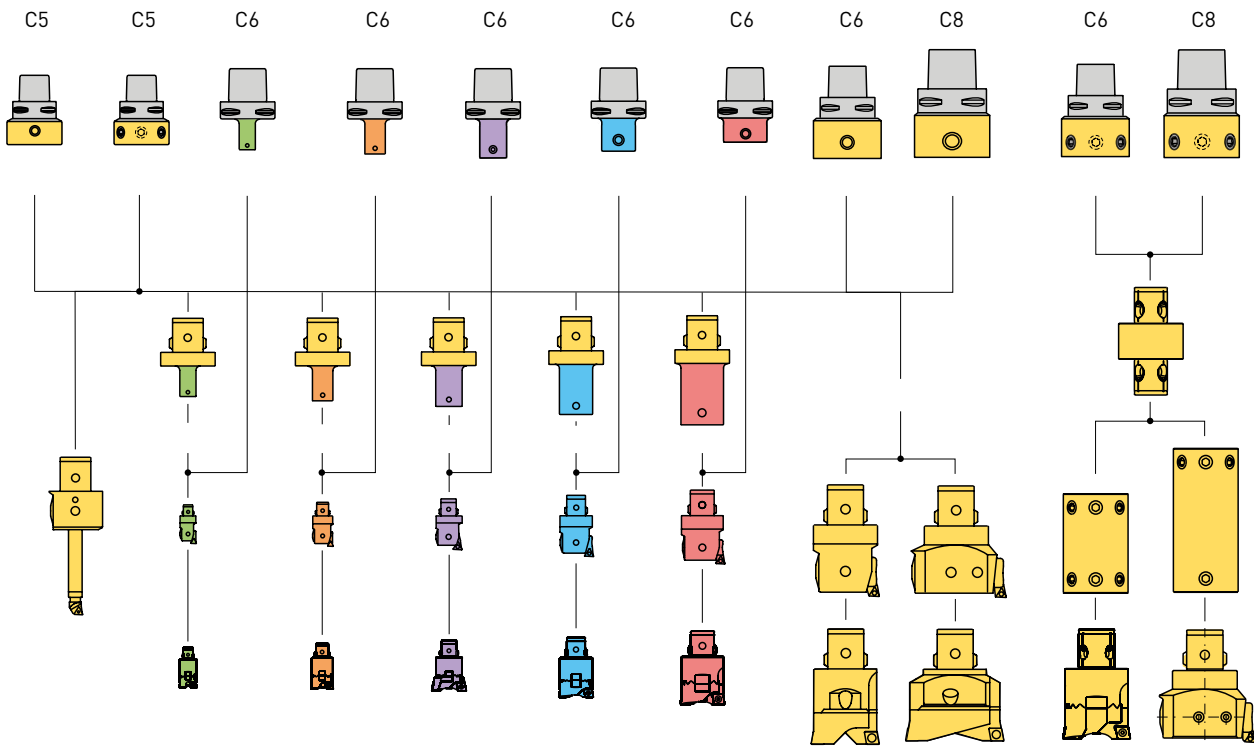
For large diameter boring tools Series 317

Model	Designation	B	L	L1	Order No.
FK 135	C8 x FK 135	\varnothing 135	55	22	328.086
FK 135	C8 x FK 135/90°				328.162

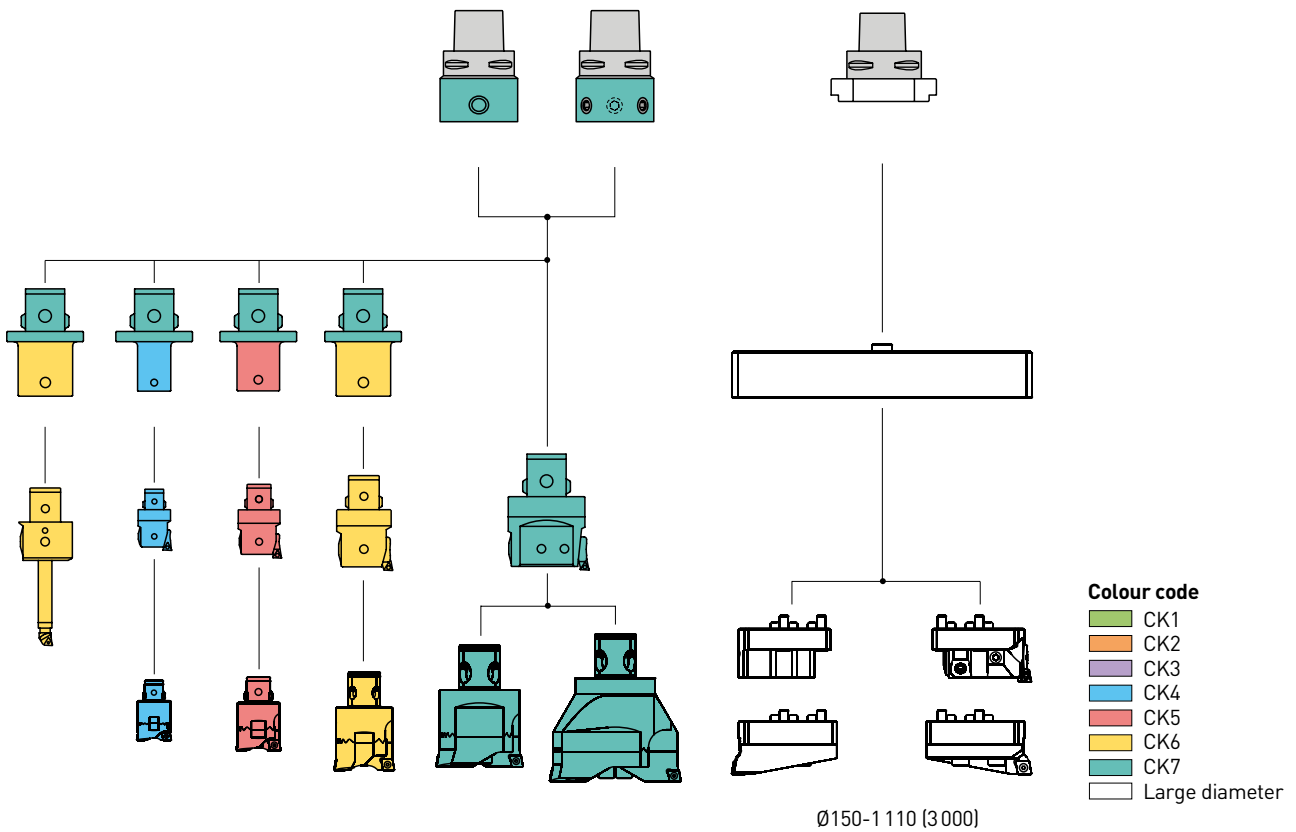
CKN execution
* As long as stock lasts.

Adapters

Program CK6 on C5, C6 and C8



Program CK7 on C8



Inserts

Application Advice	118 - 119
WC-Inserts for Single-Cutter Boring Tools	120
TP/TC-Inserts for Single-Cutter Boring Tools	121 - 124
CC-Inserts for Single- and Twin-Cutter Boring Tools	125 - 128
SP/SC/SD-Inserts for Twin-Cutter Boring Tools	129 - 132
WP 337/WC-Inserts for Indexable Insert Drills and Twin-Cutter Boring Tools	133 - 138
CBN/PCD-Inserts for Single- and Twin-Cutter Boring Tools	139 - 142
Inserts for Different Applications	143 - 148
Solide Carbide Boring Cutters for Single-Cutter Boring Tools	149 - 151

B.8

This catalogue contains a wide range of indexable inserts specially selected for boring with single-cutter or twin-cutter boring tools which have been tested under the most diverse working conditions.

For individual tool combinations comprehensive cutting data tables with detailed information about selection of insert, cutting speed, feed, stock allowance, ect. for different cutting methods are available on request.

Cutting materials

ISO main groups	Work piece materials	ISO application groups				
P	Carbon steels Cast steel	P10	P20	P30	P40	P50
M	Stainless steels	M10	M20	M30	M40	
K	Cast iron	K10	K20	K30		
N	Aluminium Non-ferrous metals Synthetic materials	N10				
S	Titanium NiCo Alloys High temperature alloys	S10				

Features

Uncoated carbide

Uncoated hard metal cutting materials are based on tungsten carbide with the addition of titanium carbide, tantalum carbide and cobalt as binding agents. Depending on the allotted ISO group, they are suitable for rough machining and finishing of metallic and non-metallic materials.

Coated carbide C

Coated hard metal is characterised by its high resistance to wear, its low friction coefficient and minimal built-up edge formation. The multiple coating is a good precondition for cost-effective production machining of all commonly available materials.

Cermet CT

Cermet cutting materials consist of titanium carbide and titanium nitride. They are characterised by high thermal and abrasion resistance and are suitable for finish machining and light rough-machining of steel, cast iron and light metal at high cutting speeds. Polycrystalline cubic boron nitride CBN / Polycrystalline diamond PCD information and application advice about CBN and PCD inserts see page 159.

Silicon nitride SN

Ceramic cutting edges are extremely temperature-stable, highly impact-resistant and accommodate the highest cutting speeds when machining cast iron in continuous as well as in interrupted cutting.

B.8

Polycrystalline cubic boron nitride CBN

CBN cutting materials feature an extremely high wear and heat resistance. Depending on the design, CBN cutting edges are suitable for boring hardened steel, up to 70 HRC, hard cast steel, cast iron and hard nickel alloys.

Polycrystalline diamond PCD

PCD cutting edges are extremely hard and abrasion-resistant. They permit high speed finish machining of non-ferrous materials and composites.

Symbols

	= less suitable
+	= suitable
++	= first choice

ISO Code for inserts for boring and turning

T	C	G	T	11	02	04	F	N
1	2	3	4	5	6	7	8	9

1	Insert shape	2	Clearance angle	3	Tolerance class																
					<table border="1"> <tr> <td>Class</td> <td></td> <td></td> <td></td> </tr> <tr> <td>C</td> <td>± 0.025</td> <td>± 0.013</td> <td>± 0.025</td> </tr> <tr> <td>G</td> <td>± 0.025</td> <td>± 0.025</td> <td>± 0.13</td> </tr> <tr> <td>M</td> <td>± 0.05 - 0.1¹⁾</td> <td>± 0.08 - 0.20¹⁾</td> <td>± 0.13</td> </tr> </table> <p>¹⁾Dependent upon insert size</p>	Class				C	± 0.025	± 0.013	± 0.025	G	± 0.025	± 0.025	± 0.13	M	± 0.05 - 0.1 ¹⁾	± 0.08 - 0.20 ¹⁾	± 0.13
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C	± 0.025	± 0.013	± 0.025																		
G	± 0.025	± 0.025	± 0.13																		
M	± 0.05 - 0.1 ¹⁾	± 0.08 - 0.20 ¹⁾	± 0.13																		

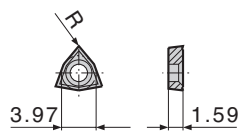
4	Chip breaker/Mounting criteria	5	Insert size																																																																	
	<p>X = Special execution</p>		<table border="1"> <thead> <tr> <th>Size</th> <th>02</th> <th>03</th> <th>04</th> <th>05</th> <th>06</th> <th>07</th> <th>08</th> <th>09</th> <th>10</th> <th>11</th> <th>12</th> <th>16</th> </tr> </thead> <tbody> <tr> <td></td> <td>L [mm] 2 IC [mm] 3.97</td> <td>3 5.56</td> <td>4 6.35</td> <td>5 7.94</td> <td>6 9.52</td> <td></td> <td>8 12.7</td> <td></td> <td>10 15.88</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>7 4.2</td> <td></td> <td></td> <td></td> <td>11 6.35</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>6.35 6.35</td> <td></td> <td></td> <td>9.52 9.52</td> <td></td> <td></td> <td>12.7 12.7</td> <td>16 15.88</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td>6.35 6.35</td> <td></td> <td>8 8.0</td> <td>9.52 9.52</td> <td></td> <td></td> <td>12.7 12.7</td> <td></td> </tr> </tbody> </table>	Size	02	03	04	05	06	07	08	09	10	11	12	16		L [mm] 2 IC [mm] 3.97	3 5.56	4 6.35	5 7.94	6 9.52		8 12.7		10 15.88										7 4.2				11 6.35								6.35 6.35			9.52 9.52			12.7 12.7	16 15.88						6.35 6.35		8 8.0	9.52 9.52			12.7 12.7	
Size	02	03	04	05	06	07	08	09	10	11	12	16																																																								
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6	Insert thickness	7	Corner radius	8	Cutting edge	9	Cutting direction																										
	<table border="1"> <tr><td>01</td><td>s = 1.59</td></tr> <tr><td>02</td><td>s = 2.38 (2.5*)</td></tr> <tr><td>03</td><td>s = 3.18 (3.0*)</td></tr> <tr><td>T3</td><td>s = 3.97</td></tr> <tr><td>04</td><td>s = 4.76</td></tr> <tr><td>05</td><td>s = 5.56</td></tr> </table> <p>*) Special size</p>	01	s = 1.59	02	s = 2.38 (2.5*)	03	s = 3.18 (3.0*)	T3	s = 3.97	04	s = 4.76	05	s = 5.56		<table border="1"> <tr><td>01</td><td>R = 0.1</td></tr> <tr><td>02</td><td>R = 0.2</td></tr> <tr><td>03</td><td>R = 0.3</td></tr> <tr><td>04</td><td>R = 0.4</td></tr> <tr><td>06</td><td>R = 0.6</td></tr> <tr><td>08</td><td>R = 0.8</td></tr> <tr><td>12</td><td>R = 1.2</td></tr> </table>	01	R = 0.1	02	R = 0.2	03	R = 0.3	04	R = 0.4	06	R = 0.6	08	R = 0.8	12	R = 1.2		<p>(W) Wiper geometry, see page B124</p>		
01	s = 1.59																																
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06	R = 0.6																																
08	R = 0.8																																
12	R = 1.2																																

Inserts for Single-Cutter Boring Tools

Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

WCGT 0201



Circumference ground, chip-breakers pressed

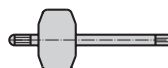
	655.600	WCGT 0201	02	FN	15°	P10CT		+	+						+					
--	---------	-----------	----	----	-----	-------	--	---	---	--	--	--	--	--	---	--	--	--	--	--

Circumference and chip-breakers ground

	655.604	WCGT 0201	01	FL	23°	K10CT							++			++	+			
	655.601	WCGT 0201	02	FL	23°	K10CT							++		++		+			
	655.605	WCGT 0201	01	FL	23°	K10	C (TiAlN)	+	+	+	++	++	+	+		++				
	655.603	WCGT 0201	02	FL	23°	K10	C (TiAlN)	+	+	+	++	++	+	+	++	+	+			
	655.606	WCGT 0201	01	FL	23°	M10	C (AlCrN)	++	++	++	+	+	+	+	+	++				
	655.602	WCGT 0201	02	FL	23°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	++	+	+		

Torx Plus T6 IP M2x3.6

694.101

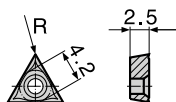


Torx Plus T6 IP

694.806

Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

TPGT 0702



Circumference ground, chip-breakers pressed

	651.802	TPGT 0702	02	FN	15°	P10CT	++	++		+					++				
	651.702	TPGT 0702	04	FN	15°	P10CT	++	++		+					++				

TPMT 0702

Chip-breakers pressed

	651.713	TPMT 0702	04	FN	15°	P10CT	C (AlCrN)	++	++	+	+	+	+		++		+		
	651.813	TPMT 0702	02	FN	15°	P10CT	C (AlCrN)	++	++	+	+	+	+		++		+		

TPGT 0702

Circumference and chip-breakers ground

	651.833	TPGT 0702	02	FL	15°	P10	C (TiAlN)	+	+	+	+	+	+	+	+	++	+		
	651.838	TPGT 0702	02	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+		+	++			
	651.738	TPGT 0702	03	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+		++		+		
	651.839	TPGT 0702	02	FL	15°	S10	C (TiAlN)			+				++	++	+	++	+	
	651.835	TPGT 0702	02	FL	18°	P10CT		++	++		+	+				++			
	651.736	TPGT 0702	03	FL	18°	P10CT		++	++		+	+			++				
	651.834	TPGT 0702	02	FL	20°	P10	C (TiAlN)	+	+	+	+	+	++	+	+	++	+		
	651.734	TPGT 0702	04	FL	20°	P10	C (TiAlN)	++	++	+	++	++	++	+	++		+		
	651.824	TPGT 0702	01	FL	25°	K10	C (TiAlN)	+	+	+	+	+	+		++				
	651.735	TPGT 0702	03	FL	25°	K10	C (TiAlN)	++	++	+	++	++	+	++	+	++		+	
	651.837	TPGT 0702	02	FL	25°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	+	++		
	651.737	TPGT 0702	03	FL	25°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	++	+	+	
	651.823	TPGT 0702	01	FL	25°	K10						++				++			
	651.723	TPGT 0702	03	FL	25°	K10						++			++		++	+	
	651.825	TPGT 0702	02	FL	25°	K10						++			++	++			++
	651.725	TPGT 0702	04	FL	25°	K10						++			++				++

TPGW 0702

Circumference ground without chip-breakers

	651.632	TPGW 0702	03	FN	5°	K10	C (TiAlN)	+	+	+	++	+		++			+		
	651.623	TPGW 0702	03	FN	5°	K10					+			+			+		

Torx Plus T6 IP M2x4.8 694.103
Torx Plus T6 IP M2x4.1 694.102 ¹⁾

Torx Plus T6 IP 694.806

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

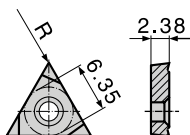
¹⁾ For insert holders 615.205/615.207/615.507/615.508/615.271

Inserts are sold in packages of 10 pieces.

	= less suitable
+	= suitable
++	= first choice

Inserts for Single-Cutter Boring Tools

Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



TCMT 1102

Chip-breakers pressed

	655.322	TCMT 1102	04	FN	15°	P10CT	++	++			+				++		+		
	655.332	TCMT 1102	08	FN	15°	P10CT	++	++			+				++		+		
	655.324	TCMT 1102	04	FN	15°	P10CT	C (TiAlN)	++	++	+	+	+	+		++		+		
	655.334	TCMT 1102	08	FN	15°	P10CT	C (TiAlN)	++	++	+	+	+	+		++		+		
	655.316	TCMT 1102	02	FN	15°	S10	C (TiAlN)			+	+			++	++	+	++	+	
	655.326	TCMT 1102	04	FN	15°	S10	C (TiAlN)			+	+			++	++	+	++	+	
	655.311A	TCMT 1102	02	FN	15°	P20	C [Al ₂ O ₃ -TiCN]	+	+						+	+	+		
	655.321A	TCMT 1102	04	FN	15°	P20	C [Al ₂ O ₃ -TiCN]	+	+						+		++	+	
	655.331A	TCMT 1102	08	FN	15°	P20	C [Al ₂ O ₃ -TiCN]	+	+						++		++	+	
	655.354	TCMT 1102	04	FN	20°	M30C	C (TiAlN+ Al ₂ O ₃)	++	++	++	+	+		++	++	++	++	++	
	655.364	TCMT 1102	08	FN	20°	M30C	C (TiAlN+ Al ₂ O ₃)	++	++	++	+	+		++	++	+	++	++	

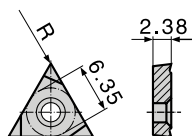
TCGW 1102

Circumference ground without chip-breakers

	655.301A	TCGW 1102	02	FN	0°	K10	C (TiCN-Al ₂ O ₃ -TiN)				++	++			++	+	+			
	655.302A	TCGW 1102	04	FN	0°	K10	C (TiCN-Al ₂ O ₃ -TiN)	+	+	+	++	++			++		+	+		
	655.303A	TCGW 1102	08	FN	0°	K10	C (TiCN-Al ₂ O ₃ -TiN)	+	+	+	++	++			++		+	++		
	655.301	TCGW 1102	02	FN	0°	K10	C (TiCN-Al ₂ O ₃)				+	+		++	+	+	+			
	655.302	TCGW 1102	04	FN	0°	K10	C (TiCN-Al ₂ O ₃)	+	+	+	+	+		++	+		+	+		
	655.303	TCGW 1102	08	FN	0°	K10	C (TiCN-Al ₂ O ₃)	+	+	+	+	+		++	+		+	++		
	655.305	TCGW 1102	04	FN	0°	K10					+								++	
	655.306	TCGW 1102	08	FN	0°	K10					+									++

Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

TCGT 1102



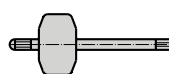
Circumference ground, chip-breakers pressed

	655.313	TCGT 1102	02	FN	15°	P10CT		++	++								++					
	655.314	TCGT 1102	08	FN	15°	M30	C (TiCN-Al ₂ O ₃ -TiN)	+	+	++	+	+	+		++		++	++				

Circumference and chip-breakers ground

	655.370	TCGT 1102	02	FL	10°	K20	C (TiAlN)	++	++	+	++	++	+		+	++	++	+				
	655.380	TCGT 1102	04	FL	10°	K20	C (TiAlN)	++	++	+	++	++	+	++	++		++	++	++			
	655.390	TCGT 1102	08	FL	10°	K20	C (TiAlN)	++	++	+	++	++	+	++	++		++	++	++			
	655.371	TCGT 1102	02	FL	15°	P10	C (TiAlN)	+	+		+	+	+			++						
	655.381	TCGT 1102	04	FL	18°	P10	C (TiAlN)	+	+	+	+	+	+	+			+					
	655.386	TCGT 1102	04	FL	18°	P10CT		++	++		+	+			++							
	655.372	TCGT 1102	02	FN	20°	P10CT		+	+							++						
	655.375	TCGT 1102	02	FL	15°	P10CT	C (TiAlN)	++	++	+	+	+	+		+	++						
	655.385	TCGT 1102	04	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+		++	+						
	655.395	TCGT 1102	08	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+		++							
	655.378	TCGT 1102	02	FL	23°	K10						++			+	++						
	655.388	TCGT 1102	04	FL	23°	K10						++			++	+	+					
	655.398	TCGT 1102	08	FL	23°	K10						++			++	+						
	655.369	TCGT 1102	01	FL	23°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	+	++					
	655.379	TCGT 1102	02	FL	23°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	+	++					
	655.389	TCGT 1102	04	FL	23°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	++	+	+				
	655.399	TCGT 1102	08	FL	23°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	++		++	+			
	655.387	TCGT 1102	04	FL	20°	K10						++			++	+					++	
	655.397	TCGT 1102	08	FL	20°	K10						++			++							++
	655.363	TCGT 1102	01	FL	23°	K10	C (TiAlN)	+	+	+	+	+				++						
	655.373	TCGT 1102	02	FL	23°	K10	C (TiAlN)	+	+	+	+	+				+						
	655.383	TCGT 1102	04	FL	23°	K10	C (TiAlN)	++	++	+	++	++	+	++	+	++		+				
	655.393	TCGT 1102	08	FL	23°	K10	C (TiAlN)	++	++	+	++	++	+	++	+	++		+				

Torx Plus T7 IP M2.5x6.5 694.122



Torx Plus T7 IP 694.807

γ Rake angle with insert on tool.

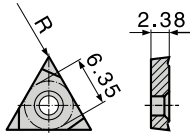
Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

<input type="checkbox"/>	= less suitable
+	= suitable
++	= first choice

Inserts for Single-Cutter Boring Tools

Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



Wiper TCGX 1102

Circumference ground, chip-breakers pressed

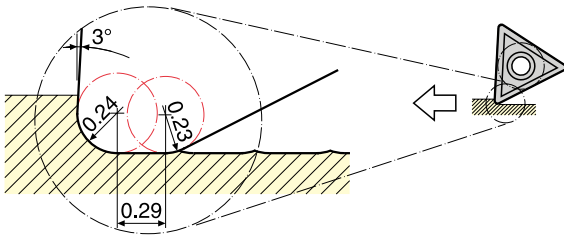
	655.374	TCGX 1102	04	WL	15°	K10	C (TiAlN-TiN)	++	++	+	+	+				++			++	
	655.384	TCGX 1102	04	WL	15°	P10CT		++	++			+	+			++				

Wiper geometrie

Comparison with standard nose radius 0.4 mm

Wiper: Two times the feed rate → Same surface finish

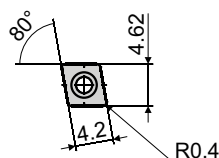
Same feed rate → Two times better surface finish



Torx Plus T7 IP M2.5x6.5 694.122

Torx Plus T7 IP 694.807

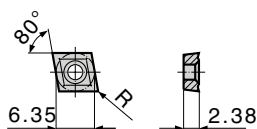
Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



MW 0404

Chip-breakers pressed

	655.942	MW 0404	04		P30	C (TiAlN-AlCrN)	+	++	++						++	+	+		
	655.941	MW 0404	04		K30	C (TiAlN-AlCrN)				++	++				++	+	+		
	655.940	MW 0404	04		N15	C (DLC)						++			++	+	+		



CCMT 0602

Chip-breakers pressed

	654.840A	CCMT 0602	02	FN	15°	P30	C (Al ₂ O ₃ -TiN)	+	+	+	+	+			+	+			
	654.858	CCMT 0602	04	FN	15°	K20				+	+								+
	654.851	CCMT 0602	04	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	+	+	+		+	+	++		+	
	654.852	CCMT 0602	04	FN	15°	K20	C (Al ₂ O ₃ -TiN)	+	+	+	++	++		+	+	++		+	
	654.846	CCMT 0602	02	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	++	+	+		+	+	++		++	++
	654.856	CCMT 0602	04	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	+	+	+		+	+	++		++	++
	654.850A	CCMT 0602	04	FN	15°	P20	C (Al ₂ O ₃ -TiN)	++	++	+	+	+		+	+	++			

CCGT 0602

Circumference ground, chip-breakers pressed

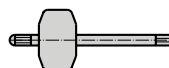
	654.837	CCGT 0602	02	FN	8°	S10	C (TiAlN)			++				++	++	++	+		
	654.847	CCGT 0602	04	FN	8°	S10	C (TiAlN)			++				++	++	+	+		

CCMT 0602

Chip-breakers ground

	654.877	CCMT 0602	02	FL	23°	K10						++			++	+	+		
	654.888	CCMT 0602	04	FL	23°	K10						++		+	++		+		
	654.879	CCMT 0602	02	FL	23°	N10	C (AlCrN)					++		+	++	+	+		
	654.889	CCMT 0602	04	FL	23°	N10	C (AlCrN)					++		+	++		+		

Torx Plus T7 IP M2.5x6.5 694.122



Torx Plus T7 IP 694.807

γ Rake angle with insert on tool.

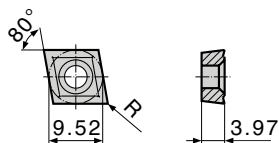
Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

	= less suitable
+	= suitable
++	= first choice

Inserts for Single- and Twin-Cutter Boring Tools

Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



CCMT 09T3

Chip-breakers pressed

	654.942	CCMT 09T3	04	FN	15°	K20	C (Al ₂ O ₃ -TiN)				++	++			+	++			
	654.952	CCMT 09T3	08	FN	15°	K20	C (Al ₂ O ₃ -TiN)				++	++			+	++			
	654.950	CCMT 09T3	08	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	+	+	+			+	++		++	+
	654.935	CCMT 09T3	02	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	++	+	+			+	+	++	++	+
	654.945	CCMT 09T3	04	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	++	+	+			+	+	++	++	++
	654.955	CCMT 09T3	08	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	++	+	+			+	+	++	++	++
	654.930A	CCMT 09T3	02	FN	15°	P30	C (Al ₂ O ₃ -TiN)	+	+	+	+	+					+		
	654.940A	CCMT 09T3	04	FN	15°	P20	C (Al ₂ O ₃ -TiN)	++	++	+	+	+			+	+	++		+

CCGT 09T3

Circumference ground, chip-breakers pressed

	654.937	CCGT 09T3	02	FN	8°	S10	C (TiAlN)			++					++	++	++	+	
	654.947	CCGT 09T3	04	FN	8°	S10	C (TiAlN)			++					++	++	+	+	
	654.957	CCGT 09T3	08	FN	8°	S10	C (TiAlN)			++					++	++		+	

CCMT 09T3

Chip-breakers ground

	654.977	CCMT 09T3	04	FL	23°	K10						++			++	+	+		
	654.987	CCMT 09T3	08	FL	23°	K10						++			++		+		
	654.949	CCMT 09T3	04	FL	23°	N10	C (AlCrN)					++		+	++	+	+		
	654.959	CCMT 09T3	08	FL	23°	N10	C (AlCrN)					++		+	++		+		

B.8

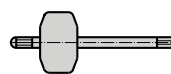
CCGW 09T3

Circumference ground, without chip-breakers

	654.941 *	CCGW 09T3	04	TN	0°	SN				++	+				++		+		
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Torx Plus T15 IP M4x9.2

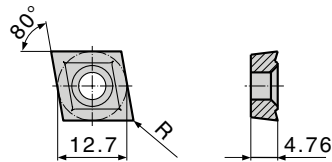
694.141



Torx Plus T15 IP

694.815

Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



CCMT 1204

Chip-breakers pressed

	654.989	CCMT 1204	04	FN	15°	K20	C (TiAlN)												
	654.991	CCMT 1204	08	FN	15°	K20	C (TiAlN)												
	654.964	CCMT 1204	04	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	++	+	+							
	654.965	CCMT 1204	08	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	++	+	+							
	654.993A	CCMT 1204	04	FN	15°	P30	C (Al ₂ O ₃ -TiN)	+	+	+	+	+							
	654.988	CCMT 1204	08	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	+	+	+							
	654.990A	CCMT 1204	08	FN	15°	P20	C (Al ₂ O ₃ -TiN)	++	++	+	+	+							
	654.968	CCMT 1204	04	FN	8°	S10	C (TiAlN)												
	654.969	CCMT 1204	08	FN	8°	S10	C (TiAlN)												

Chip-breakers ground

	654.995	CCMT 1204	04	FL	23°	K10													
	654.992	CCMT 1204	08	FL	23°	K10													
	654.978	CCMT 1204	04	FL	23°	N10	C (AlCrN)												
	654.979	CCMT 1204	08	FL	23°	N10	C (AlCrN)												

CCGW 1204

Circumference ground, without chip-breakers

	654.980	CCGW 1204	08	TN	0°	SN													
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Torx Plus T20 IP M5x13.3 694.150

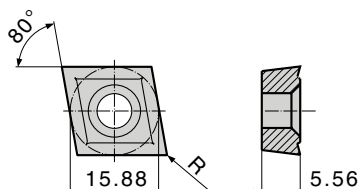
Torx Plus T20 IP 694.820

γ Rake angle with insert on tool.
 Clamping screw (10 screws and 1 wrench)
 Inserts are sold in packages of 10 pieces.
 * As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice

Inserts for Twin-Cutter Boring Tools

Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



CCMT 1605

Chip-breakers pressed

	654.997	CCMT 1605	08	FN	15°	K10				+	+			+			+		
	654.983	CCMT 1605	08	FN	15°	K20	C (Al ₂ O ₃ -TiN)			++	++			+	++			+	
	654.996	CCMT 1605	08	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	+	+		+	+	++		++	+	
	654.986	CCMT 1605	08	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	+	+		+	+	++		++	++	

Chip-breakers ground

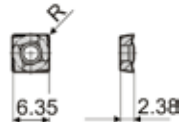
	654.998	CCMT 1605	08	FL	23°	K10						++		++				+	
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Torx Plus T20 IP M5x13.3 694.150

Torx Plus T20 IP 694.820

Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

SPMT 0602



Chip-breakers pressed

	654.150	SPMT 0602	04	FN	15°	P20	C (Al ₂ O ₃ -TiN)	++	++	++	+	+		+	+	+		+	
	654.158 *	SPMT 0602	04	FN	15°	K20					+								++
	654.152	SPMT 0602	04	FN	15°	K20	C (Al ₂ O ₃ -TiN)			++	++		+	+	+				+

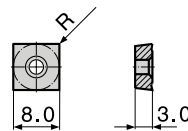
Chip-breakers ground

	654.168	SPMT 0602	04	FL	23°	K10							++			+			+
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Torx Plus T7 IP M2.5x6.5 694.122

Torx Plus T7 IP 694.807

SPGW 0803



Circumference ground, without chip-breakers

	654.128	SPGW 0803	05	FN	5°	K20				+									+
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SPGT 0803

Circumference ground, without chip-breakers

	654.183	SPGT 0803	05	FL	10°	P20		+	+	+		+	+	+					+
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Torx Plus T7 IP M2.5x5.5 694.121

Torx Plus T7 IP 694.807

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

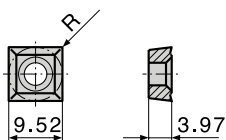
Inserts are sold in packages of 10 pieces.

* As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice

Inserts for Twin-Cutter Boring Tools

Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



SCMT 09T3

Chip-breakers pressed

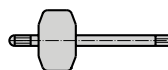
	654.259 *	SCMT 09T3	08	FN	15°	K30					+	+							+	
	654.240	SCMT 09T3	04	FN	15°	P20	C (Al ₂ O ₃ -TiN)	++	++	++	++	++	+		+	+	+			
	654.250	SCMT 09T3	08	FN	15°	P20	C (Al ₂ O ₃ -TiN)	++	++	++	++	++	+		+		+			
	654.251	SCMT 09T3	08	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	+	+	+	+		++		++	++		

Chip-breakers ground

	654.277	SCMT 09T3	04	FL	23°	K10						++			+	+	+			
	654.287	SCMT 09T3	08	FL	23°	K10						++			+			+		

Torx Plus T15 IP M4x9.2

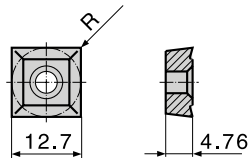
694.141



Torx Plus T15 IP

694.815

Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



SCMT 1204

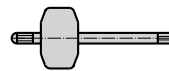
Chip-breakers pressed

	654.359 *	SCMT 1204	08	FN	15°	K30				+	+								+
	654.340	SCMT 1204	04	FN	15°	P20	C (Al ₂ O ₃ -TiN)	+	+	+	+		+			+		+	
	654.350	SCMT 1204	08	FN	15°	P20	C (Al ₂ O ₃ -TiN)	++	++	++	++		+						+
	654.354 *	SCMT 1204	08	FN	15°	P30		+	+	+								++	++
	654.351	SCMT 1204	08	FN	15°	P30	C (Al ₂ O ₃ -TiN)	++	++	+	+		+	+				++	++

Chip-breakers ground

	654.387	SCMT 1204	08	FL	23°	K10							++			+			+
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Torx Plus T20 IP M4 x 11.6 **694.142**
For insert holder RW53



Torx Plus T20 IP **694.820**

Torx Plus T20 IP M4x15 **694.144**
For insert holder RW 68/RW100

Torx Plus T20 IP M5 x 13.3 **694.150**
For insert holder «TW» and «SW»

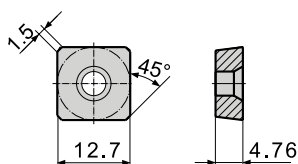
γ Rake angle with insert on tool.
 Clamping screw (10 screws and 1 wrench)
 Inserts are sold in packages of 10 pieces.
 * As long as stock lasts..

	= less suitable
+	= suitable
++	= first choice

Inserts for Twin-Cutter Boring Tools

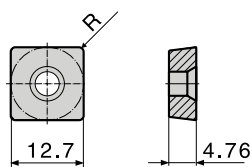
Insert							Work Piece Material							Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

SDCW 1204



Circumference ground, without chip-breakers

	688.599	SDCW 1204AE TN		7°	SN				++	+					++			++	
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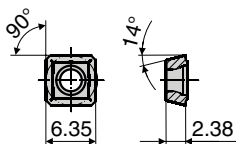
Circumference ground, without chip-breakers

	688.619 *	SDCW 1204 08 TN		7°	SN				++	+					++			+	
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Torx Plus T20 IP M4x15 694.144

Torx Plus T20 IP 694.820

Insert						Work Piece Material							Machining				
Insert Shape	Order No.	Designation	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast iron GG	Cast iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



WP 337-1, Ø16 - 20 mm

Chip-breakers pressed

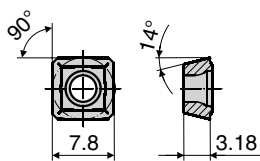
	655.910	WP 337-1 16/20	15°	P35	C (TiCN-Al ₂ O ₃ -TiN)	++	++	+	++	+						+	+
	655.911	WP 337-1 16/20	15°	P40	C (TiCN)	+	+	+	+	+		+	+		++	++	+

Circumference ground, chip-breakers pressed

	655.912	WP 337-1 16/20	15°	M35	C (TiCN)	+	+	++	+	+	+			++		+	++
	655.913	WP 337-1 16/20	15°	K40								++				+	+

Torx Plus T7 IP M2.5x5.8 694.123

Torx Plus T7 IP 694.807



WP 337-2, Ø21 - 25 mm

Chip-breakers pressed

	655.920	WP 337-2 21/25	15°	P35	C (TiCN-Al ₂ O ₃ -TiN)	++	++	+	++	+						+	+
	655.921	WP 337-2 21/25	15°	P40	C (TiCN)	+	+	+	+	+		+	+		++	++	+

Circumference ground, chip-breakers pressed

	655.922	WP 337-2 21/25	15°	M35	C (TiCN)	+	+	++	+	+	+			++		+	++
	655.923	WP 337-2 21/25	15°	K40								++				+	+

Torx Plus T7 IP M3x6 694.130

Torx Plus T7 IP 694.807

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

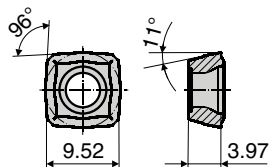
Inserts are sold in packages of 10 pieces.

* As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice

Inserts for Indexable Insert Drills

Insert						Work Piece Material							Machining				
Insert Shape	Order No.	Designation	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast iron GG	Cast iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



WP 337-3, $\varnothing 26 - 30$ mm

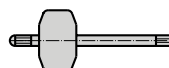
Chip-breakers pressed

	655.930	WP 337-3 26/30	15°	P35	C (TiCN-Al ₂ O ₃ -TiN)	++	++	+	++	+						+	+
	655.931	WP 337-3 26/30	15°	P40	C (TiCN)	+	+	+	+	+		+	+		++	++	+

Circumference ground, chip-breakers pressed with dimples

	655.932	WP 337-3 26/30	15°	M35	C (TiCN)	+	+	++	+	+	+			++		+	++
	655.933	WP 337-3 26/30	15°	K40							++					+	+

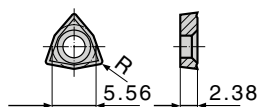
Torx Plus T10 IP M3.5x8.2 694.136



Torx Plus T10 IP 694.810

Insert							Work Piece Material							Machining				
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert

WCMT 0302



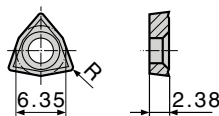
Chip-breakers pressed

	655.620	WCMT 0302	08	FN	15°	P45	C (TiCN-TiN)	++	++		+	+					+	+
	655.622 *	WCMT 0302	08	FN	15°	P45	C (TiCN)	+	+	++							+	+
	655.621	WCMT 0302	08	FN	15°	K20	C (Al ₂ O ₃ -TiN)				++	++	+				+	+

Torx Plus T7 IP M2.2x6 **694.110**

Torx Plus T7 IP **694.807**

WCMT 0402



Chip-breakers pressed

	655.630	WCMT 0402	08	FN	15°	P45	C (TiCN-TiN)	++	++		+	+					+	+
	655.632	WCMT 0402	08	FN	15°	P45	C (TiCN)	+	+	++							+	+
	655.631	WCMT 0402	08	FN	15°	K20	C (Al ₂ O ₃ -TiN)				++	++	+				+	+

Torx Plus T7 IP M2.5x6.3 **694.124**

Torx Plus T7 IP **694.807**

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

* As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice

Inserts for Indexable Insert Drills and Twin-Cutter Boring Tools

Insert							Work Piece Material							Machining				
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



Chip-breakers pressed

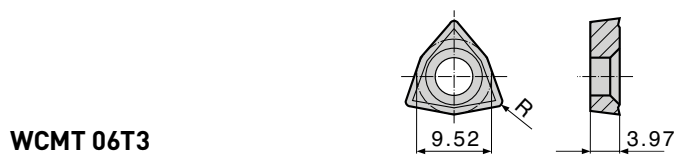
	655.640	WCMT 0503	08	FN	15°	P45	C (TiN)	++	++	++	+	+					+	+
	655.644	WCMT 0503	08	FN	15°	P40	C (TiN)	++	++	++	+	+				++	++	+
	655.641	WCMT 0503	08	FN	15°	K20	C (TiCN-Al ₂ O ₃)				++	++	+				+	+

Chip-breakers pressed with dimples

	655.642	WCMT 0503	08	FN	15°	P45	C (TiN)	++		+					++			++
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Torx Plus T9 IP M3x8.2 694.131

Torx Plus T9 IP 694.809



Chip-breakers pressed

	655.650	WCMT 06T3	08	FN	15°	P45	C (TiN)	++	++	++	+	+					+	+
	655.654	WCMT 06T3	08	FN	15°	P40	C (TiN)	++	++	++	+	+				++	++	+
	655.651	WCMT 06T3	08	FN	15°	K20	C (TiCN-Al ₂ O ₃)				++	++	+				+	+

Chip-breakers pressed with dimples

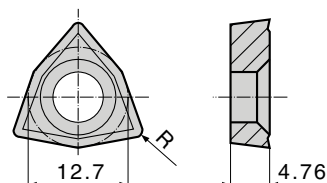
	655.652	WCMT 06T3	08	FN	15°	P45	C (TiN)	++		+					++			++
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Torx Plus T10 IP M3.5x9.2 694.137

Torx Plus T10 IP 694.810

B.8

Insert							Work Piece Material							Machining				
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



WCMT 0804

Chip-breakers pressed

	655.660	WCMT 0804	12	FN	15°	P45	C (TiN)	++	++	++	+	+					+	+	
	655.664	WCMT 0804	12	FN	15°	P40	C (TiN)	++	++	++	+	+					++	++	+
	655.661	WCMT 0804	12	FN	15°	K20	C (TiCN-Al ₂ O ₃)				++	++	+				+	+	

Chip-breakers pressed with dimples

	655.662	WCMT 0804	12	FN	15°	P45	C (TiN)	+		+						++		++
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Torx Plus T15 IP M4x11.8 694.143

Torx T15 M4x8.2 336.905

For drills with pockets

Torx Plus T15 IP 694.815

Torx T15 690.843

γ Rake angle with insert on tool.

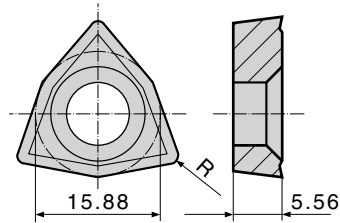
Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

	= less suitable
+	= suitable
++	= first choice

Inserts for Indexable Insert Drills

Insert							Work Piece Material							Machining				
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 54 HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



WCMT 1005

Chip-breakers pressed

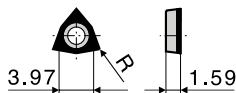
	655.670	WCMT 1005	12	FN	15°	P45	C (TiCN)	++	++	++	++	++						+	+
	655.671	WCMT 1005	12	FN	15°	K20					+	+	+					+	+

Torx Plus T20 IP M5x13.3 694.150

Torx Plus T20 IP 694.820

Insert						Work Piece Material						Machining				
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≥ 52 HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

WCGW 02



Full face made with CBN/PCD, 3 cutting edges

	938.883	WCGW 0201	02	FN	0°	PCD			++		++	++		+		+
	938.884	WCGW 0201	02	FN	0°	CBN-10		++				++	+	+		
	938.885	WCGW 0201	02	FN	0°	CBN-25			++	+		++				

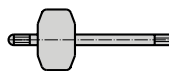


One cutting edge made with CBN

	948.101	WCGW 0201	02	TN	0°	CBN-30			++			++		++	++	
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Torx Plus T6 IP M2x3.6

694.101



Torx Plus T6 IP

694.806

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

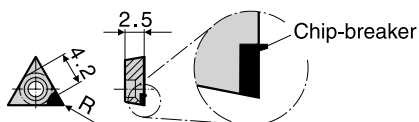
CBN/PCD inserts are sold individually.

	= less suitable
+	= suitable
++	= first choice

CBN/PCD Inserts for Single-Cutter Boring Tools

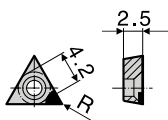
Insert						Work Piece Material						Machining				
Insert Shape	Order No.	Designation	Radius [mm]	Rake angle γ	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≥ 52 HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

TPGW 07



One cutting edge made with PCD

	948.201	TPGW 0702	04	FL	5°	PCD			++			++	++		+		++
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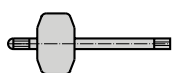


One cutting edge made with PCD/CBN

	938.840	TPGW 0702	03	FN	5°	PCD			++			++	++		+		+
	948.210	TPGW 0702	02	FN	5°	CBN-15	++	++			+	+	+				
	938.837	TPGW 0702	03	FN	5°	CBN-10	++	+			+	+					
	948.211	TPGW 0702	04	FN	5°	CBN-15	++	++			+	+			+		
	948.230	TPGW 0702	02	TN	5°	CBN-15	++	++				++	+	++			
	938.879	TPGW 0702	03	TN	5°	CBN-10	++	+				++		++			
	948.231	TPGW 0702	04	TN	5°	CBN-15	++	++				++		++	+		
	948.250	TPGW 0702	01	FN	5°	CBN-30			++	+		+	+				
	938.880	TPGW 0702	03	FN	5°	CBN-25			++	+		+					
	948.251	TPGW 0702	03	FN	5°	CBN-30			++	+		+					
	948.270	TPGW 0702	01	TN	5°	CBN-30			++			++	+	+			
	948.271	TPGW 0702	03	TN	5°	CBN-30			++			++		++	+		

Torx Plus T6 IP M2x4.8
Torx Plus T6 IP M2x4.1

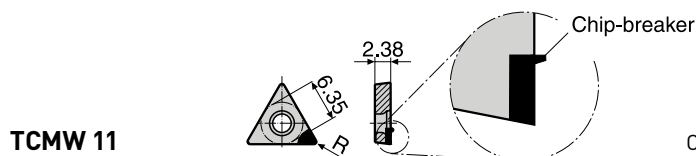
694.103
694.102 ¹⁾



Torx Plus T6 IP

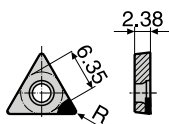
694.806

Insert						Work Piece Material						Machining					
Insert Shape	Order No.	Designation	Radius [mm]		Rake Angle γ	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≥ 52 HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



One cutting edge made with PCD

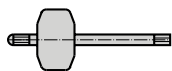
	948.301	TCMW 1102	04	FL	0°	PCD			++			++	++		+		++
	948.302	TCMW 1102	08	FL	0°	PCD			++			++	++		+		++



One cutting edge made with PCD/CBN

	938.841	TCMW 1102	04	FN	5°	PCD			++			+	++		+		+
	948.310	TCMW 1102	02	FN	0°	CBN-15	++	++			+		++	++			
	948.311	TCMW 1102	04	FN	0°	CBN-15	++	++			+		++	+	+		
	948.312	TCMW 1102	08	FN	0°	CBN-15	++	++			+		++		+		
	938.834	TCMW 1102	04	FN	0°	CBN-10	++	+			+		++	+	+		
	948.330	TCMW 1102	02	TN	0°	CBN-15	++	++					++		+		
	948.331	TCMW 1102	04	TN	0°	CBN-15	++	++					++		+		
	948.332	TCMW 1102	08	TN	0°	CBN-15	++	++					++		++	+	
	938.876	TCMW 1102	08	TN	0°	CBN-10	++	+					++		+		
	948.350	TCMW 1102	02	FN	0°	CBN-30				++	+		+	+			
	948.351	TCMW 1102	04	FN	0°	CBN-30				++	+		+				
	948.352	TCMW 1102	08	FN	0°	CBN-30				++	+		++		+		
	938.878	TCMW 1102	04	FN	0°	CBN-25				++	+		+				
	948.370	TCMW 1102	02	TN	0°	CBN-30				++			++	+	+		
	948.371	TCMW 1102	04	TN	0°	CBN-30				++			++		++		
	948.372	TCMW 1102	08	TN	0°	CBN-30				++			++		++	+	

Torx Plus T7 IP M2.5x6.5 694.122



Torx Plus T7 IP 694.807

γ Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

¹⁾ For insert holders 615.205/615.207/615.507/615.508/615.271

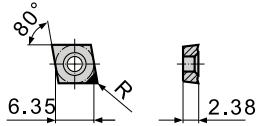
CBN/PCD inserts are sold individually.

	= less suitable
+	= suitable
++	= first choice

CBN/PCD Inserts for Single- and Twin-Cutter Boring Tools

Insert						Work Piece Material					Machining					
Insert Shape	Order No.	Designation	Radius [mm]	Rake Angle γ	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≥ 52 HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

CCMW 06

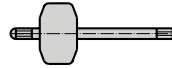


One cutting edge made with PCD/CBN

	938.866	CCMW 0602	04	FL	5°	PCD			++		++	++		+		
	938.867	CCMW 0602	04	FN	0°	CBN-10	++	+				++				

Torx Plus T7 IP M2.5x6.5

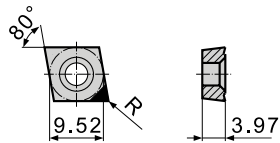
694.122



Torx Plus T7 IP

694.807

CCMW 09

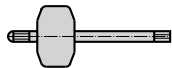


One cutting edge made with PCD/CBN

	938.868	CCMW 09T3	04	FL	5°	PCD			++		++	++		+		
	938.869	CCMW 09T3	04	FN	0°	CBN-10	++	+				++				
	938.835	CCMW 09T3	08	FN	0°	CBN-10	++	+				++		+		

Torx Plus T15 IP M4x9.2

694.141

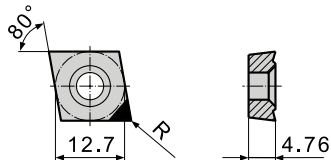


Torx Plus T15 IP

694.815

B.8

CCMW 12

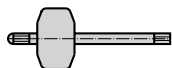


One cutting edge made with PCD/CBN

	938.870	CCMW 1204	04	FL	5°	PCD			++		++	++	+	+		
	938.871	CCMW 1204	08	FL	5°	PCD			++		++	++		+		
	938.862	CCMW 1204	08	FN	0°	CBN-10	++	+				++		+		

Torx Plus T20 IP M5x13.3

694.150

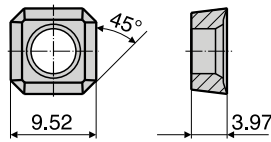


Torx Plus T20 IP

694.820


CBN/PCD inserts are sold individually.

Insert							Work Piece Material					Machining		
Insert Shape	Order No.	Designation	Rake Angle γ	Radius [mm]	Grade	Coating	Low-Alloyed Steel	Stainless Steels	Cast Iron	AL / Non-Ferrous Metals	NiCo Alloys/Titanium	Standard Face Milling	Unfavorable Conditions	Stable Conditions




SD.. 09T3

Chip-breakers pressed



	654.230	SDLT 09T3AE EN	8°	-	P30	C (Al ₂ O ₃ -TiN)	++	+	+			++	+	+
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Circumference ground, chip-breakers polished

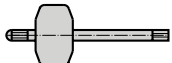
	654.231	SDHT 09T3AE FN	18°	-	K20					++		++	++	++
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SDHW 09T3


Pressed, land ground

	654.232 *	SDHW 09T3AE EN	0°	-	K10	C (Al ₂ O ₃ -TiN)			++			++	+	+
	654.233 *	SDHW 09T3AE SN	0°	-	K20	SN			++			++		++

 Torx Plus T15 IP M4x9.2 694.141

 Torx Plus T15 IP 694.815

γ Rake angle with insert on tool.

 Clamping screw (10 screws and 1 wrench)

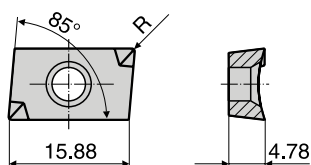
Inserts are sold in packages of 10 pieces.

* As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice


Inserts for Square Shoulder Cutter 90°

Insert							Work Piece Material					Machining		
Insert Shape	Order No.	Designation	Rake Angle γ	Radius [mm]	Grade	Coating	Low-Alloyed Steel	Stainless Steels	Cast Iron	AL / Non-Ferrous Metals	NiCo Alloys/Titanium	Standard Face Milling	Unfavorable Conditions	Stable Conditions




APHT 1604

Pressed, land ground

	655.800	APHT 1604PD SR	12°	0.4	P30	C (Al ₂ O ₃ -TiN)	++	+	+			++	+	+


APET 1604

Circumference ground, chip-breakers polished

	655.801	APET 1604PD FR	14°	0.4	K20					++		++	++	++


APKT 1604

Chip-breakers pressed

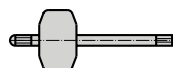
	655.803A	APKT 160408 ER	12°	0.8	P35	C (Al ₂ O ₃ -TiN)	++	+	+			+	++	

APHW 1604

Chip-breakers pressed


	655.802	APHW 1604PD ER	0°	0.4	K10	C (Al ₂ O ₃ -TiN)			++			++	+	+

 Torx Plus T15 IP M4x11.8 694.143

 Torx Plus T15 IP 694.815

B.8

γ Rake angle with insert on tool.

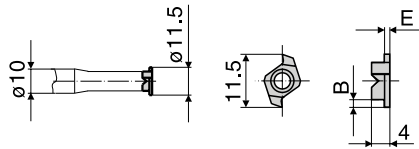
 Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

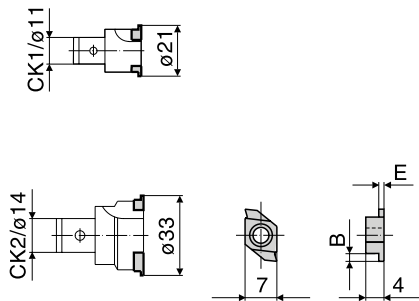
	= less suitable
+	= suitable
++	= first choice

Carbide inserts for circlip grooves as per DIN 472

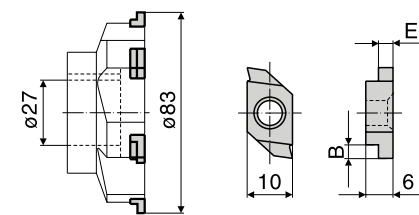
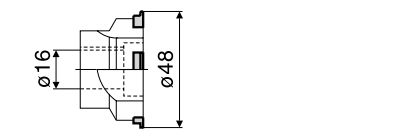
Insert			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Capacity D	Width of Groove E	Depth of Groove B	Cast Iron	Steel	Aluminium



Type 0	958.052	K20	12 - 24	1.15	0.9	++		
	958.051	P20					++	
	958.053	K20						++
	958.056	K20	12 - 24	1.35	1.3	++		++
	958.055	P20					++	
	958.057	K20						++
Blank	958.313	K20						
	958.314	P20						



Type 1	958.062	K20	22 - 34	1.15	1.1	++		
	958.061	P20					++	
	958.063	K20						++
	958.066	K20	22 - 34	1.35	1.5	++		
	958.065	P20					++	
	958.067	K20						++
	958.072	K20	34 - 50	1.65	1.6	++		
	958.071	P20					++	
	958.073	K20						++
	958.076	K20	34 - 50	1.90	2.0	++		
	958.075	P20					++	
	958.077	K20						++
	958.082	K20	50 - 85	2.20	2.2	++		
	958.081	P20					++	
	958.083	K20						++
958.086	K20	50 - 85	2.70	2.6	++			
958.085	P20					++		
958.087	K20						++	
Blank	958.157	K20						
	958.158	P20						



Torx T8 M3x9.0 **958.048**

Torx T8 **690.836**

Type 2	958.092	K20	> 85	3.20	3.0	++		
	958.091	P20					++	
	958.093	K20						++
	958.096	K20	> 85	4.20	3.5	++		
	958.095	P20					++	
	958.097	K20						++
Blank	958.155	K20						
	958.156	P20						

Torx T20 M5x16.5 **958.049**

Torx T20 **690.838**

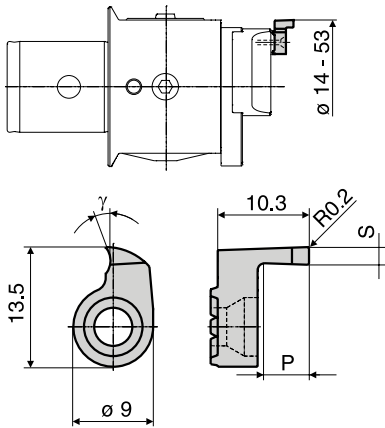
Clamping screw (10 screws and 1 wrench)
Inserts are sold individually.


= less suitable
+ = suitable
++ = first choice

Inserts for Face Grooving

Inserts for face grooves $\varnothing 14 - 53$ mm

(Insert holder, boring head EWN 2-50XL, Series 112)



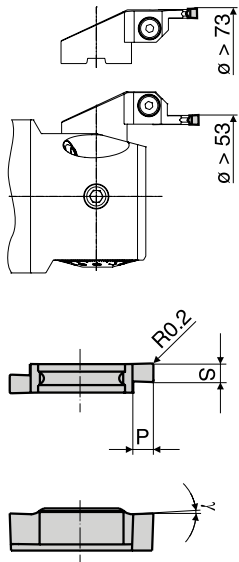
Insert			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Rake Angle γ	Width of Groove S	Depth of Groove P	Cast iron	Steel	Aluminium
	958.501	P30C	20°	2.0	5.0	++	++	++
	958.502			2.5		++	++	++
	958.503			3.0		++	++	++



 Torx Plus T15 IP M4x11.8 694.143

 Torx Plus T15 IP 694.815

Inserts for face grooves $\varnothing 53 - 3040$ mm

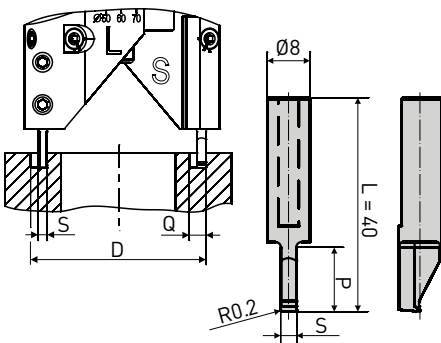
(Insert holder, boring heads EWN/EWD 53 - 100, EWN 150, EWN/EWD 200, Series 310/317/318)





Insert			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Rake Angle γ	Width of Groove S	Depth of Groove P	Cast iron	Steel	Aluminium
	958.425	P20C	5°	2.5	2.7	++	++	
	958.430			3.0	3.3	++	++	
	958.433			3.3	3.6	++	++	
	958.435			3.5	3.8	++	++	
	958.440			4.0	4.3	++	++	
	958.475	K10	15°	2.5	2.7			++
	958.480			3.0	3.3			++
	958.483			3.3	3.6			++
	958.485			3.5	3.8			++
	958.490			4.0	4.3			++

1. Further sizes on request

Insert holder, boring head SW53 - 148, Series 318



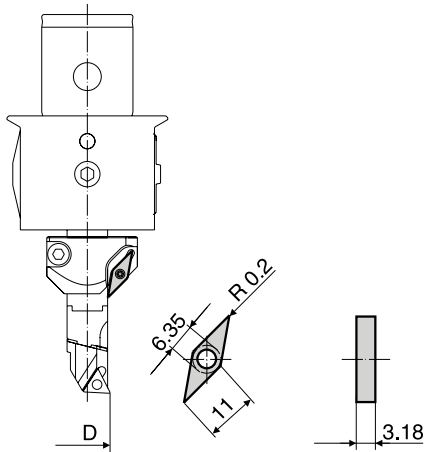
Insert			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Rake Angle γ	Width of Groove S	Depth of Groove P	Cast iron	Steel	Aluminium
	958.611	K40C	7°	2.0	12	++	++	
	958.612			3.0		++	++	
	958.613			4.0		++	++	
	958.614			5.0		++	++	
	958.601	K40	7°	2.0	12			++
	958.602			3.0				++
	958.603			4.0				++
	958.604			5.0				++

K10/K40 = Uncoated carbide

P20C/30C/P40C = Coated carbide AlCrN

Inserts for chamfering rings 45°, diameter range Ø 12.6 - 39.5 mm

(Boring heads EWN 2-32 / EWN 2-50, Series 112)



Insert						Work Piece Material		
Insert Shape	Order No.	Designation	Grade	Capacity D	Rake Angle γ	Cast Iron	Steel	Aluminium
	655.821	VCMT 110302	P20C	12.6 - 39.5	15°	++	++	++
	655.822	VCGT 110302	K20		23°			

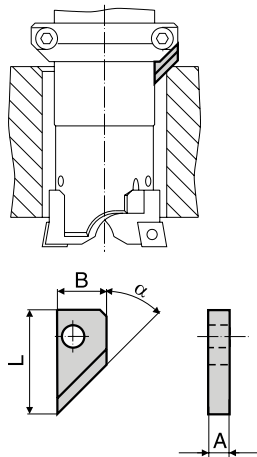
1. Inserts are sold in packages of 10 pieces.

Torx Plus T8 IP M2.5x8.7 694.125

Torx Plus T8 IP 694.808

Inserts for chamfering rings 30° / 45°, diameter range Ø 20 - 130 mm

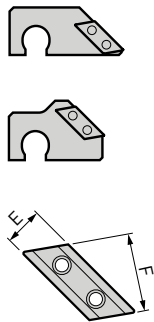
(Boring bars CK1 - CK6)



Insert				Dimensions			Work Piece Material			
Insert Shape	Order No.	Grade	Capacity D	α	A	B	L	Cast Iron	Steel	Aluminium
	663.191	HM	20 - 55	45°	4	9	23.5	++	++	+
	663.195		53 - 130		8	20	43			
	663.181	HM	20 - 55	30°	4	9	27.5	++	++	+
	663.185		53 - 130		8	20	52			

1. Inserts are sold individually.

Inserts for chamfering mills 45°, diameter range Ø 55 - 138 mm



Insert					Dimensions		Screws/Wrench			Work Piece Material		
Insert Shape	Insert Type	Order No.	Grade	Capacity D	E	F	Screws	Type	Wrench	Cast iron	Steel	Aluminium
	CW1206	978.283	P30	55 - 138	6.35	12.7	978.284	T6	690.834	++	+	
		800.951	P20C							+	++	
		801.753	N20C									++

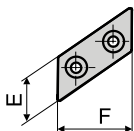
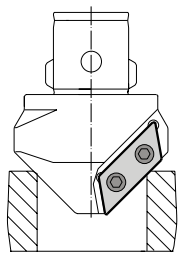
1. Inserts are sold individually.

HM = Carbide

= less suitable
 + = suitable
 ++ = first choice

Inserts for Chamfering Tools

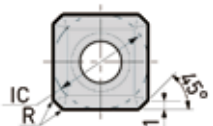
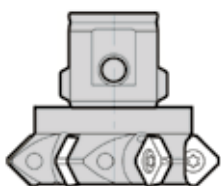
Inserts for chamfering mills C-Cutter 45°



Insert					Dimensions		Screws/Wrench			Work Piece Material		
Insert Shape	Insert Type	Order No.	Grade	Capacity D	F	F	Screws	Type	Wrench	Cast Iron	Steel	Aluminium
	CW1206	978.283	P30	5 - 25	6.35	12.7	978.284	T6	690.834	++	+	
		800.951	P20C							+	++	
		801.753	N20C									++
	CW1909	978.817	P30	10 - 40	9.525	19.05	801.696	T10	690.837	++	+	
		800.952	P20C	und						+	++	
		801.754	N20C	30 - 60								++
CW3115	978.826	P30	50 - 100	18.875	31.75	801.699	T20	690.838	++	+		
	800.953	P20C							+	++		
	801.755	N20C									++	

1. Inserts are sold individually.

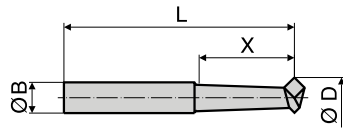
Inserts for chamfering mills C-Cutter mini 45°



Insert				Dimensions		Screws/Wrench			Work Piece Material		
Insert Shape	Insert Type	Order No.	Grade	IC	R	Screws	Type	Wrench	Cast Iron	Steel	Aluminium
	CM10C1	966.445	P20C	10	0.2	966.450	T15	690.843	++	++	
		966.446	N20C								++
		CM10C1SE*	966.447						M20C		++

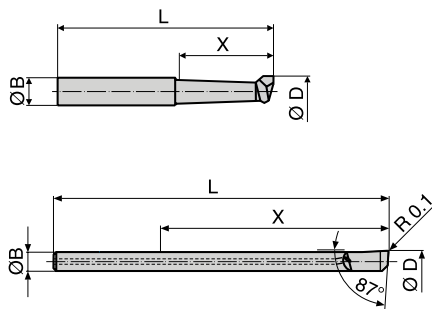
1. Inserts are sold in packages of 10 pieces.
2. * With sharp cutting edge to avoid secondary burrs.

Boring cutters for single-cutter boring tools, Series 112



Boring Cutter				Dimensions			Work Piece Material		
Shape	Order No.	Grade	Capacity D	X	B	L	Cast Iron	Steel	Aluminium
	612.110 *	HSS	0.4 - 0.7	3	4	27		+	+
	612.111 *		0.6 - 1.0	3		28		+	+
	612.112 *		0.9 - 1.5	4		28		+	+
	612.113 *		1.2 - 1.8	5		29		+	+
	612.114 *		1.5 - 3.5	7		31		+	+
	612.116 *		3.0 - 5.5	14		38		+	+
	612.117 *		5.0 - 7.5	22		38		+	+
	612.213 *	HSS	7.0 - 9.5	28	10	56		+	+
	612.215 *		13.0 - 17.5	54		80		+	+
	611.115	K10	2.0 - 3.5	9	4	33	+	+	+
	611.116		3.0 - 5.5	14		38	+	+	+
	611.117	K10	5.0 - 7.5	22	10	38	+	+	+
	611.212		5.0 - 7.5	22		50	+	+	+
	611.213		7.0 - 9.5	28		56	+	+	+
	611.214		9.0 - 13.5	32		64	+	+	+
611.215	13.0 - 17.5	54	80	+	+	+			

Counter boring cutters for single-cutter boring tools, Series 112



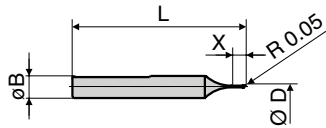
	611.152	K10	0.9 - 1.5	4	4	25	+	+	+
	611.153		1.2 - 1.8	6		27	+	+	+
	611.154		1.5 - 3.5	7		28	+	+	+
	611.155		2.0 - 3.5	9		30	+	+	+
	611.156		3.0 - 5.5	14		35	+	+	+
	611.157		5.0 - 7.5	22		38	+	+	+
	611.252	K10	5.0 - 7.5	22	10	50	+	+	+
	611.253		7.0 - 9.5	28		56	+	+	+
	611.254		9.0 - 13.5	32		65	+	+	+
	611.255		13.0 - 17.5	55		80	+	+	+
	612.253 *	HSS	7.0 - 9.5	28	10	56		+	+
	612.254 *		9.0 - 13.5	32		65		+	+
	612.255 *		13.0 - 17.5	55		80		+	+
	615.203	K10	4.0 - 6.0	42	3.5	62		+	+
	615.203A	K10C						++	
	615.204	K10						+	+
	615.204A	K10C						++	

K10 = Uncoated carbide
 HSS = High speed steel
 K10C = Coated carbide AlCrN
 * As long as stock lasts.

 = less suitable
 + = suitable
 ++ = first choice

Solid Carbide Boring Cutters

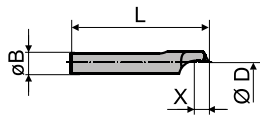
Counter boring cutters for single cutter boring tools, EWN 04-7



Boring Cutter				Dimensions			Work Piece Material		
Shape	Order No.	Grade	Capacity D	X	B	L	Cast Iron	Steel	Aluminium
	615.541	K10C	0.4 - 0.9	1.5	4	30	+	++	++
	615.542		0.9 - 1.4	3			+	++	++
	615.543		1.4 - 2.0	5			+	++	++
	615.544		1.9 - 3.0	6			+	++	++
	615.545		2.9 - 4.0	10			+	++	++
	615.546		3.9 - 5.0	13			+	++	++
	615.547		4.9 - 7.0	16			+	++	++
	615.561	K10	0.4 - 0.6	1.1	4	25	+	++	++
	615.562		0.6 - 0.8	1.5			+	++	++
	615.563		0.8 - 1.2	2			+	++	++
	615.564		1.2 - 1.5	2.5			+	++	++
	615.565		1.5 - 1.9	3.5			+	++	++
	615.566		1.9 - 3.0	4.5			+	++	++
	615.551		0.4 - 0.6	1.1			+	+	+
	615.552	0.6 - 0.8	1.5	+	+	+			
	615.553	0.8 - 1.2	2	+	+	+			
	615.554	1.2 - 1.5	2.5	+	+	+			
	615.555	1.5 - 1.9	3.5	+	+	+			

Pin turning

The boring cutters are made with flat for cutting edge orientation.

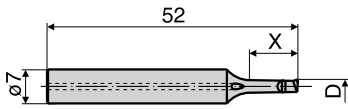


	615.590	K10C	0.2 - 2.3	2.2	4	25	+	++	++
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K10 = Uncoated carbide
K10C = Coated carbide AlCrN

□ = less suitable
+ = suitable
++ = first choice

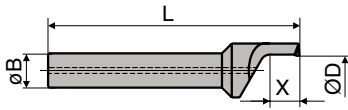
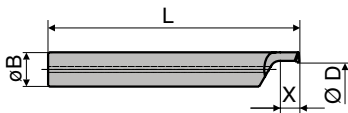
Counter boring cutters for single cutter boring tools, EWB 04-12 / EWN 04-15



Boring Cutter				Dimensions			Work Piece Material		
Shape	Order No.	Grade	Capacity D	X	B	L	Cast Iron	Steel	Aluminium

	615.522	K10C	0.4 - 1.0	1.5	7	52	+	++	++
	615.524		0.9 - 1.5	3			+	++	++
	615.525		1.4 - 2.0	5			+	++	++
	615.501		1.9 - 3.0	6			+	++	++
	615.502		2.9 - 4.0	10			+	++	++
	615.503		3.9 - 5.0	13			+	++	++
	615.504		4.9 - 6.0	16			+	++	++

Pin turning



	615.530	K10C	0.2 - 3.0	4	7	52	+	++	++
	615.531	K10C	2.0 - 6.0	6	7	52	+	++	++

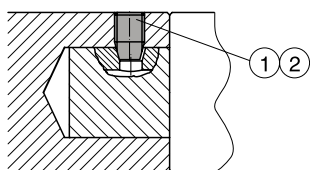
Spare Parts, Technical Data

Tool Connection, Shanks	154 - 156
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B.9

CKB connection

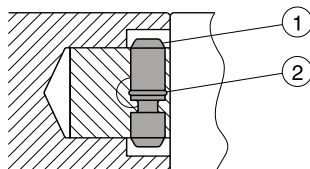
CK- screws and allen wrenches



Clamping Screw					Allen Wrench		
CK	A	B	①	M [Nm] *	CK	SW	②
CK1	M4 x 0.5	5	690.431	1.5	CK1	2	690.801
CK2	M5 x 0.5	6.5	690.432	3.0	CK2	2.5	690.802
CK3	M6 x 0.75	8.5	690.433	4.5	CK3	3	690.803
CK4	M8 x 0.75	11	690.434	7.0	CK4	4	690.804
CK5	M10 x 1	14	690.435	14.0	CK5	5	690.805
CK5	M10 x 1	12	690.594 *	14.0	CK5	5	690.805
CK6	M12 x 1	18	690.436	24.0	CK6	6	690.806
CK7	M20 x 1.5	29	690.437	45.0	CK7	10	690.808

1. * Shanks 326.005 / 329.866

Cross bolts and locking rings

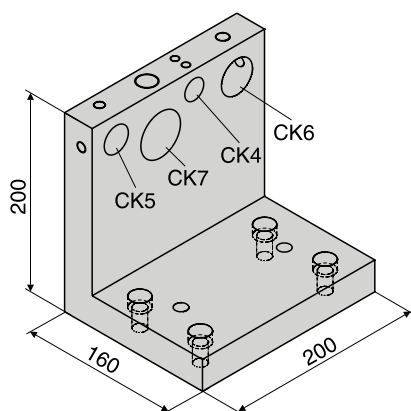


Clamping Screw				O-Ring	Snap Ring
CK	A	B	①	②	②
CKB1	4	13.5	691.501	692.270	
CKB2	5	17	691.502	692.271	
CKB3	7	22	691.503	692.272	
CKB4	8.5	26.5	691.504	692.286	
CKB5	11	33	691.505		693.304
CKB6	14	43	691.506		693.305
CKB7	18	56	691.507		693.306

CKS connection

Assembling device for reductions and extensions

The assembly device is used to tighten and loosen the CKS thread bushings in reductions and extensions. The CK connectors of reductions and extensions in the system sizes CK4 - CK7 can be mounted from both sides into the assembly device.

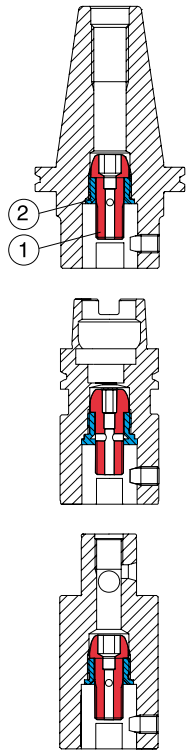


Order No.
662.600

* M = Recommended torque for tightening the screws

CKS connection

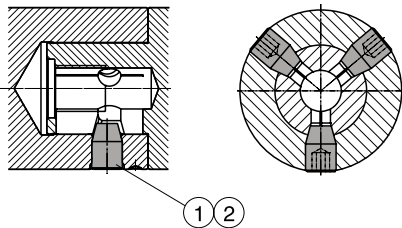
CKS components



		Tension Screw			Thread Bushing	Socket Wrench with Thread	Socket Wrench		
ISO	CKS	A		M [Nm] *			L	SW	
40	CKS4	M12 x 1.5	690.126	100	690.654	690.851	140	8	690.847
	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.128	120	690.656	690.853	140	10	690.848
50	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.129	160	690.656	690.853	180	12	690.855
	CKS7	M24 x 2	690.130	200	690.657	690.854	150	14	690.850
HSK	CKS	A		M [Nm] *			L	SW	
63	CKS4	M12 x 1.5	690.126	100	690.654	690.851	140	8	690.847
	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.167	100	690.656	690.853	140	8	690.847
100	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.128	120	690.656	690.853	140	10	690.848
	CKS7	M24 x 2	690.168	120	690.657	690.854	140	10	690.848
	CKS4	M12 x 1.5	690.126	100	690.654	690.851	140	8	690.847
	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.129	160	690.656	690.853	140	12	690.849
	CKS7	M24 x 2	690.130	200	690.657	690.854	150	14	690.850

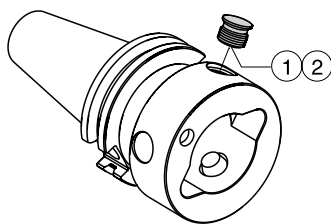
CKN connection

CK- screws and allen wrenches



	Clamping Screws				Allen Wrenches	
CKN	A	B	①	M [Nm] *	SW	②
CKN6	M12 x 1	18	690.436	24	6	690.806
CKN7	M20 x 1.5	29	690.437	45	10	690.808

Blind screws

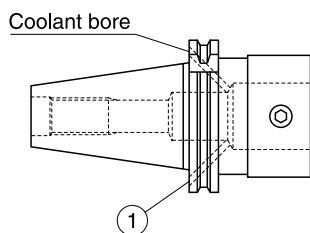



	Blind Screws		Allen Wrenches	
Type	①	SW	②	
CKN6	690.666	6	690.806	
CKN7	690.667	10	690.810	

* M = Recommended torque for tightening the screws

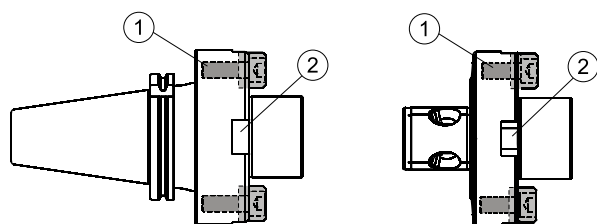
Shanks



Set screws for coolant bores



		
ISO	①	Remarks
30	690.451	
	690.451	
40	690.576	Only for shanks 323.826, 326.041
	690.419	Only for shank 326.163
50	690.576	

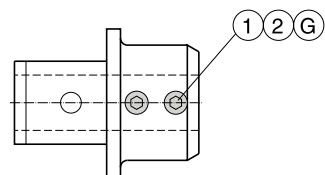
Shanks and tool holders for bridge tools Series 318, Ø 620 - 3 000 mm





		
Type	①	②
328.215	690.131	691.637
328.213	690.131	
328.214	690.131	
328.217N	690.172	

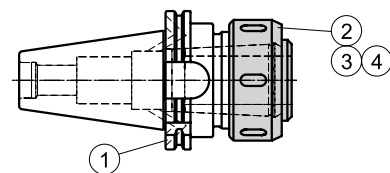
Tool holders and shanks for carbide boring bars





Clamp screws and Allen wrenches for tool holders with CK connection



				
Type	①	M [Nm] *	G	②
335.301	690.460	8	M8	690.804
335.302	690.452	15	M10	690.805
335.312	690.469	15	M10	690.805
335.313	690.484	75	M20	690.810

Clamp nuts, hook wrenches and set screws for collet holders



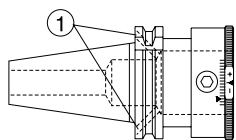
					
Type	①	②	M [Nm] *	③	④
335.342		951.108	160	951.109	951.149
335.343	690.451	951.108		951.109	
335.344	690.418	951.108		951.109	
335.352		951.128	220	951.129	
335.353	690.576	951.128		951.129	
335.354	690.576	951.128		951.129	

1. ④ Hook attachment for torque wrench

* M = Recommended torque for tightening the screws

Adjustable drill holder

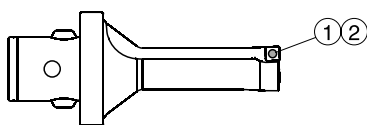
Set screws for coolant bores



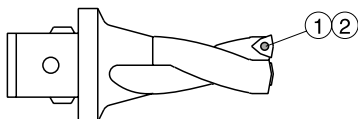
Type	①
336.301	690.451
336.302	690.419
336.303	690.419
336.304	690.573

Indexable insert drills, Series 336/337

Clamp screws for inserts

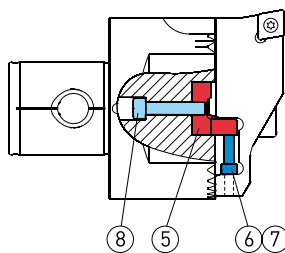
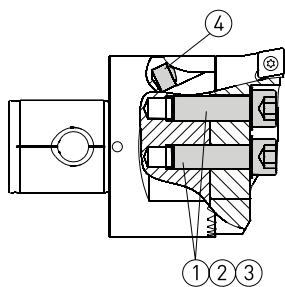


Type	① **	M [Nm] *	②
WP 337-1	694.123	0.7	694.807
WP 337-2	694.130	0.7	694.807
WP 337-3	694.136	1.8	694.810



Type	① **	M [Nm] *	②
WC.. 0302	694.110	0.7	694.807
WC.. 0402	694.124	0.7	694.807
WC.. 0503	694.131	0.5	694.809
WC.. 06T3	694.137	1.8	694.810
WC.. 0804	694.143	3.0	694.815
WC.. 1005	694.150	6.0	694.820

Boring heads for roughing SW, Series 319

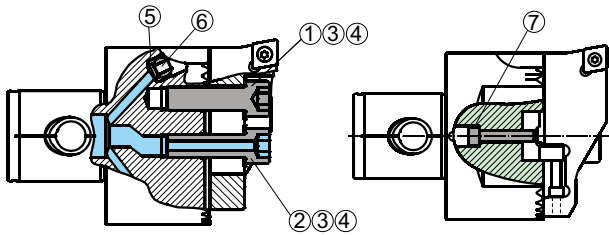


Type	①	②	M [Nm] *	③	④	⑤	⑥	⑦	⑧
SW 20	690.188	693.175	4.0	690.803		319.150	690.191	690.819	690.184
SW 25	690.157	693.176	7.0	690.804		319.250	690.192	690.819	690.186
SW 32	690.108	693.177	12.0	690.805		319.350	690.193	690.811	690.189
SW 41	690.163	693.178	20.0	690.806		319.450	690.194	690.812	690.189
SW 53	690.105	693.179	35.0	690.807	692.409	319.550	690.195	690.812	690.189
SW 68	690.106	693.179	35.0	690.807	692.406	319.650	690.196	690.813	690.101
SW 98 x CK6	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.108
SW 98 x CK7	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.173
SW 148 x CK6	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.108
SW 148 x CK7	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.173

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

Boring heads for roughing SW/AC, Series 319



Type	①	②	③	M [Nm] *	④	⑤	⑥	⑦
SW 41 AC	690.163	319.451	693.178	20.0	690.806		690.529	690.190
SW 53 AC	690.105	319.551	693.179	35.0	690.807	692.409	690.561	690.189
SW 68 AC	690.106	319.651	693.179	35.0	690.807	692.406	690.576	690.101
SW 98 AC x CKS6 / CKN6	690.970	319.751	693.187	40.0	690.810	692.406	690.576	690.107
SW 98 AC x CKS7 / CKN7	690.970	319.751	693.187	40.0	690.810	692.406	690.576	690.173
SW 98L AC	690.970	319.751	693.187	40.0	690.810	692.406	690.576	690.173

1. * M = Recommended torque for tightening the screws

Insert holders

Type	D	Type CC	Type SC/SP	Type WC
Preferential line				
SW 20	20 - 26	639.411	639.412	20 - 26
	25 - 31	639.415	639.416	
SW 25	25 - 33	639.421	639.422	25 - 33
	32 - 40	639.425	639.426	
SW 32	32 - 42	639.431	639.432	32 - 42
	41 - 51	639.435	639.436	41 - 51
SW 41	41 - 54	639.441	639.442	41 - 54
	53 - 66	639.445	639.446	53 - 66
SW 53	53 - 70	639.451	639.452	53 - 70
	69 - 86	639.455	639.456	69 - 86
SW 68	68 - 90	639.461	639.462	68 - 90
	88 - 110	639.465	639.466	88 - 110
SW 98	98 - 126	639.471	639.472	98 - 126
	125 - 153	639.475	639.476	125 - 153
SW 148	148 - 176	639.481	639.482	148 - 176
	175 - 203	639.485	639.486	175 - 203
Additional line				
SW 68	68 - 90	639.561	639.562	
	88 - 110	639.565	639.566	
SW 98	98 - 126	639.571	639.572	
	125 - 153	639.575	639.576	
SW 148	148 - 176	639.581	639.582	
	175 - 203	639.585	639.586	

B.9

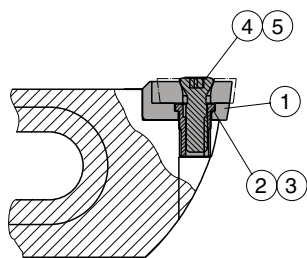
Clamp screws for inserts







Type	**	M [Nm] *
CC.. 0602	694.122	0.7
CC.. 09T3	694.141	3.0
CC.. 1204	694.150	6.0
CC.. 1605	694.150	6.0

Type	**	M [Nm] *
SP.. 0602	694.122	0.7
SC.. 09T3	694.141	3.0
SC.. 1204	694.150	6.0

Type	**	M [Nm] *
WC.. 0402	694.124	0.7
WC.. 0503	694.131	1.5
WC.. 06T3	694.137	1.8



Insert holders SW, for chamfering





							
Type	①	②	③		④ **	M [Nm] *	⑤
639.191	695.101	691.756	690.899	SC.. 09T3	694.138	3.0	694.815
639.192	695.101	691.756	690.899		694.138		694.815
639.193	695.101	691.755	690.899		694.138		694.815
639.194	695.102	691.757	690.804	SC.. 1204	694.145	3.0	694.815
639.195	695.102	691.757	690.804		694.145		694.815
639.196	695.102	691.757	690.804		694.145		694.815
639.197	695.102	691.757	690.804		694.145		694.815

Insert holders SW, back boring

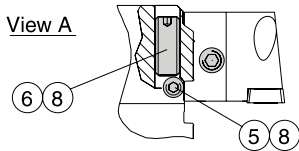
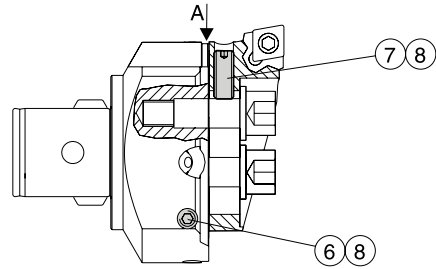
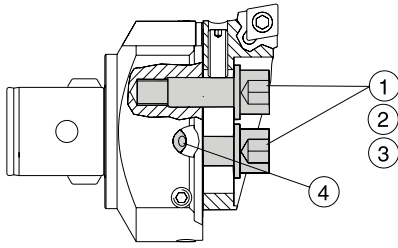


			
Type	① **	M [Nm] *	②
639.490	694.141	3.0	694.815
639.491	694.141		694.815
639.492	694.150	3.0	694.820
639.493	694.150		694.820

			
Type	① **	M [Nm] *	②
639.494	694.150	3.0	694.820
639.495	694.150		694.820
639.496	694.150		694.820
639.497	694.150		694.820
	694.150		694.820

** Per package: 10 screws and 1 wrench

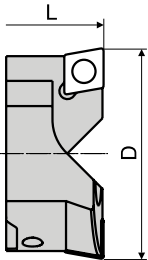
Boring heads for roughing TW, Series 315




Type	①	②	M [Nm] *	③	④
TW 20	315.160	693.180	4.0	690.803	
TW 25	315.250	693.181	7.0	690.804	
TW 32	315.350	693.182	12.0	690.805	
TW 41	315.450	693.183	20.0	690.806	
TW 53	315.550	693.184	35.0	690.807	692.409
TW 68	315.650	693.184	35.0	690.807	692.406
TW 98	315.750	693.185	40.0	690.810	692.406
TW 148	315.750	693.185	40.0	690.810	692.406

Type	⑤	⑥	M [Nm] *	⑦	M [Nm] *	⑧
TW 20	315.161	690.529	0.3	690.900	0.3	690.800
TW 25	315.251	690.538	0.3	690.901	0.3	690.800
TW 32	315.351	690.451	0.8	690.902	0.8	690.811
TW 41	315.451	690.541	1.5	690.903	1.5	690.812
TW 53	315.551	690.583	2.5	690.904	2.5	690.813
TW 68	315.651	690.586	2.5	690.905/906	2.5	690.813
TW 98	315.751	690.585	2.5	690.907/908	2.5	690.814
TW 148	315.751	690.585	2.5	690.907/908	2.5	690.814

Insert holders TW, Type CC for RSS



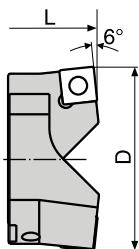
Additional line


Insert Holders			Order No.	
Type	D	L1		
TW 68	68 - 90	71	638.561	CC.. 1605
	88 - 110	71	638.562	
TW 98	98 - 126	71	638.571	
	125 - 153	71	638.572	
TW 98	98 - 126	87	638.571	
	125 - 153	87	638.572	
TW 98 L	98 - 126	117	638.571	
	125 - 153	117	638.572	
TW 148	148 - 176	71	638.571	
	175 - 203	71	638.572	
TW 148	148 - 176	117	638.571	
	175 - 203	117	638.572	

1. The insert holders are sold in pairs.

* M = Recommended torque for tightening the screws

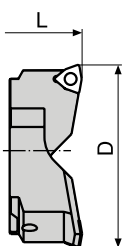
Insert holders TW, Type SC/SP for RSS




Insert Holders			Order No.	
Type	D	L1		
TW 20	20 - 26	32.5	638.111	SP.. 0602
TW 25	25 - 33	35.5	638.121	
TW 32	32 - 42	40	638.131	SC.. 09T3
	41 - 51	40	638.132	
TW 41	41 - 54	47	638.141	
	53 - 66	47	638.142	
TW 53	53 - 70	57	638.151	SC.. 1204
	69 - 86	57	638.152	
TW 68	68 - 90	71	638.161	
	88 - 110	71	638.162	
TW 98	98 - 126	71	638.171	
	125 - 153	71	638.172	
TW 98	98 - 126	87	638.171	
	125 - 153	87	638.172	
TW 98 L	98 - 126	117	638.171	
	125 - 153	117	638.172	
TW 148	148 - 176	71	638.171	
	175 - 203	71	638.172	
TW 148	148 - 176	117	638.171	
	175 - 203	117	638.172	

1. The insert holders are sold in pairs.




Insert holders TW, Type WC for RSS and VPS









Insert Holders			Order No.	
Type	D	L1		
TW 41	49 - 62	47	638.241	WC.. 0402
TW 53	59 - 76	57	638.251	WC.. 0503
	69 - 86	57	638.252 *	
TW 68	73 - 95	71	638.261	WC.. 06T3
	90 - 112	71	638.262	
TW 98	106 - 134	71	638.271	
	131 - 159	71	638.272	
TW 98	106 - 134	87	638.271	
	131 - 159	87	638.272	
TW 98 L	106 - 134	117	638.271	
	131 - 159	117	638.272	
TW 148	156 - 184	71	638.271	
	181 - 209	71	638.272	
TW 148	156 - 184	117	638.271	
	181 - 209	71	638.272	

1. The insert holders are sold in pairs.

Clamp screws for inserts

			
Type	**	M [Nm] *	
CC.. 0602	694.122	0.7	694.807
CC.. 09T3	694.141	3.0	694.815
CC.. 1204	694.150	6.0	694.820
CC.. 1605	694.150	6.0	694.820

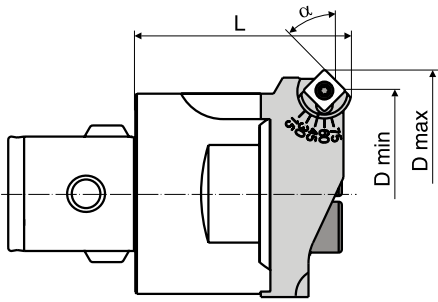
			
Type	**	M [Nm] *	
SP.. 0602	694.122	0.7	694.807
SC.. 09T3	694.141	3.0	694.815
SC.. 1204	694.150	6.0	694.820

			
Type	**	M [Nm] *	
WC.. 0402	694.124	0.7	694.807
WC.. 0503	694.131	1.5	694.809
WC.. 06T3	694.137	1.8	694.810

* Pair consisting of insert holders of different size. Only for full profile roughing (VPS).

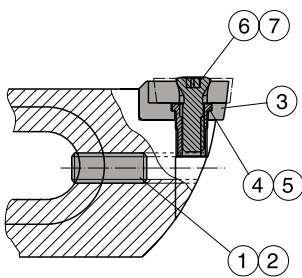
**Per package: 10 screws and 1 wrench

Chamfering tool TW, with adjustable chamfering angle



Boring Head	Chamfering Tool		Ø-Range
Type	Order No.		
TW 41	638.104	SC.. 09T3	29 - 58
TW 53	638.105		43 - 75
TW 68	638.106		61 - 98
TW 98	638.107	SC.. 1204	79 - 128
	638.108		109 - 158
TW 148	638.107		129 - 178
	638.108	159 - 208	

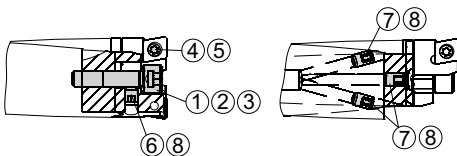
Clamp screws for inserts



Type	①	②	③	④	⑤
638.104	690.903	690.802	695.101	691.756	690.899
638.105	690.904	690.803	695.101	691.755	690.899
638.106	690.905	690.803	695.101	691.755	690.899
638.107	690.907	690.804	695.102	691.757	690.804
638.108	690.908	690.804	695.102	691.757	690.804

	⑥ **	M [Nm] *	⑦
SC.. 09T3	694.138	3.0	694.815
SC.. 09T3	694.138	3.0	694.815
SC.. 09T3	694.138	3.0	694.815
SC.. 1204	694.145	3.0	694.815
SC.. 1204	694.145	3.0	694.815

Twin-cutter boring heads MW

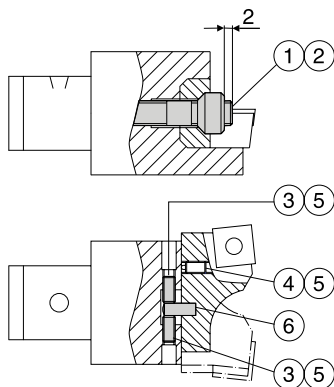


Type	①	②	M [Nm] *	③	④ **	M [Nm] *	⑤	⑥ **	⑦ **	⑧
MW 1619	690.159	693.186	1	690.802	694.105	0.3	694.806	690.413	690.668	690.833
MW 1821	690.159	693.186	1	680.802	694.105	0.3	694.806	690.668	690.668	690.833

* M = Recommended torque for tightening the screws

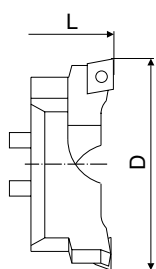
** Per package: 10 screws and 1 wrench

Boring heads for roughing RW, Series 314



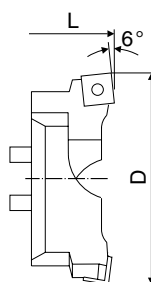
Type	①	M [Nm] *	②	③	M [Nm] *	④	⑤	⑥
RW 25	690.603	2.0	690.811	690.467	0.2	690.467	690.833	691.371
RW 32	690.604	3.5	690.812	690.462	0.3	690.462	690.800	691.370
RW 41	690.605	10.0	690.814	690.425	0.8	690.425	690.811	691.369
RW 53	690.606	18.0	690.805	690.464	1.5	690.466	690.812	691.372
RW 68	690.607	25.0	690.806	690.464	2.0	690.466	690.812	691.372
RW 100	690.607	25.0	690.806	690.465	2.0	690.466	690.812	691.372

Insert holders RW, Type CC



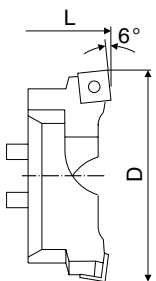
Insert Holder Type	D	Order No.
Preferential line		
RW 25	25 - 33	637.421
	30 - 37	637.422
RW 32	32 - 42	637.431
	40 - 48	637.432
RW 41	41 - 54	637.441
	51 - 62	637.442
RW 53	53 - 70	637.451
	66 - 81	637.452
RW 68	68 - 88	637.461
	86 - 106	637.462
RW 100	100 - 125	637.463
	125 - 150	637.464
Additional line		
RW 68	68 - 88	637.561
	86 - 106	637.562
RW 100	100 - 125	637.563
	125 - 150	637.564

Insert holders RW, Type SC/SP



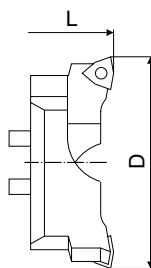
Insert Holder Type	D	Order No.
RW 25	25 - 33	637.121
RW 32	32 - 42	637.131
RW 41	41 - 54	637.141
RW 53	53 - 70	637.151
RW 68	68 - 88	637.161
	86 - 106	637.162
RW 100	100 - 125	637.163
	125 - 150	637.164

Insert holders RW, Type SD



Insert Holder Type	D	Order No.
RW 53	53 - 70	688.736
	68 - 88	688.582
RW 68	86 - 106	688.583
	100 - 125	688.584
RW 100	125 - 150	688.585

Insert holders RW, Type WC



Insert Holder Type	D	Order No.
RW 41	51 - 62	637.641
RW 53	61 - 76	637.651
	61 - 86	637.652 **
RW 68	75 - 93	637.661
	92 - 110	637.662
RW 100	109 - 130	637.663
	129 - 150	637.664

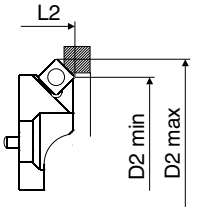
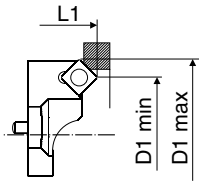
- ** Pair consisting of insert holders of different size.
- Only for full profile roughing (VPS).


The insert holders are sold in pairs.


Boring Heads for Roughing, Insert Holders

Insert holders RW, for chamfering

Front chamfering





Boring Head Type	Insert Holder Type 1				Blank Piece Order No.	
	Order No.	Capacity		L1		
		D1 min.	D1 max.			
RW 41	637.103	29	55	50	314.450	SC.. 09T3
RW 68	637.105	58	97	71	314.650	SC.. 1204
RW 100	637.107	90	134	71 (117) *	314.651	


Boring head Type	Insert Holder Type 2				Blank Piece Order No.	
	Order No.	Capacity		L2		
		D2 min.	D2 max.			
RW 41	637.104	40	66	45	314.450	SC.. 09T3
RW 68	637.106	67	106	63	314.650	SC.. 1204
RW 100	637.108	104	148	63 (109) *	314.651	

1. * With RW 100 x CK7

Clamp screws for inserts

Type	**	M [Nm] *	
CC.. 0602	694.122	0.7	694.807
CC.. 09T3	694.141	3.0	694.815
CC.. 1204	694.150	6.0	694.820
CC.. 1605	694.150	6.0	694.820

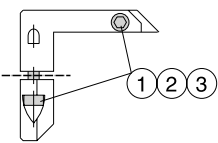
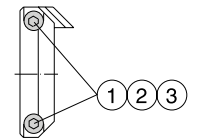
Type	**	M [Nm] *	
SP.. 0803	694.121	0.7	694.807
SC.. 09T3	694.141	3.0	694.815
SC.. 1204	694.142 ¹	6.0	694.820
SC.. 1204	694.144 ²		
SD.. 1204	694.144	6.0	694.820




Type	**	M [Nm] *	
WC.. 0402	694.124	0.7	694.807
WC.. 0503	694.131	1.5	694.809
WC.. 06T3	694.137	1.8	694.810

1. ¹ For insert holder RW 53

2. ² For insert holder RW 68/RW100

Clamp screws for chamfering rings

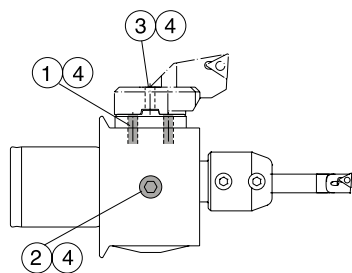


Type			M [Nm] *	
	①	②		③
20	690.101	693.175	4.0	690.803
25	690.102	693.176	7.0	690.804
32	690.103	693.176	7.0	690.804
41	690.104	693.176	7.0	690.804
53	690.105	693.131	25.0	690.807
68	690.106	693.131	25.0	690.807
90	690.106	693.131	25.0	690.807

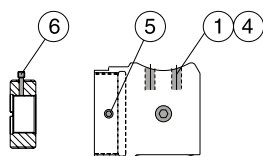
* M = Recommended torque for tightening the screws

**Per package: 10 screws and 1 wrench

Precision boring heads EWN, Series 112

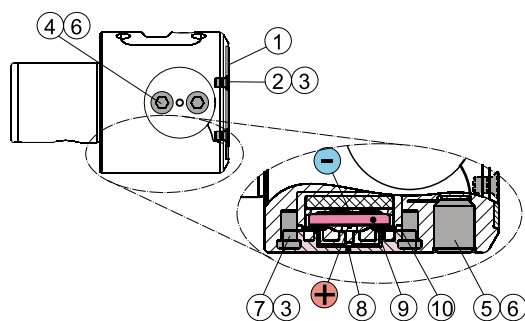


Type	①	M [Nm] *	②	M [Nm] *	③	M [Nm] *	④
EWN 04-7	690.538	0.8	690.978	0.8			690.800
EWN 04-15	690.440	1.5	690.418	1.5			690.812
EWN 04-22	690.421	2.5	690.489	2.5			690.813
EWN 2-32	690.460	5.0	690.449	5.0			690.814
EWN 2-50XL	690.595	10.0	690.452	10.0	690.156	12.0	690.816



Type	⑤	Type	⑥
EWN 04-22 x ES	690.417	112.271	195.003
		112.272	195.001
EWN 2-32 x ES	690.582	112.353	195.001
		112.385	195.007

Precision boring heads EWD, Series 112

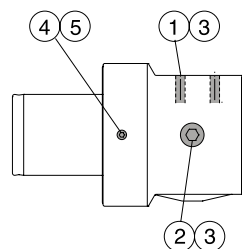


Type	①	②	③	④	M [Nm]	⑤	M [Nm]
EWD 2-54	195.081 ¹ 195.127 ²	690.981 ¹ 690.614 ²	690.843	690.457	10.0	690.469 ¹ 690.995 ²	10.0
EWD 2-32	112.371	690.611	690.836	690.460	5.0	690.996	5.0

Type	⑥	⑦	M [Nm]	⑧	⑨	⑩
EWD 2-54	690.816	690.320 ¹	4.0	112.080 ¹	718.201 ¹	692.296 ¹
		690.994 ²	1.0	310.905 ²	696.901 ²	692.381 ²
EWD 2-32	690.814	690.994	1.0	310.905	696.901	692.381

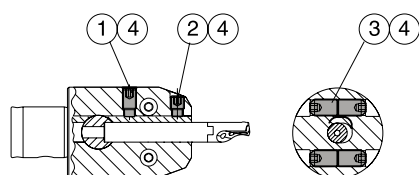
1. ¹ Spare parts for boring heads with Order No. 112.109A
 2. ² Spare parts for boring heads with Order No. 112.109B

Precision boring heads EWB, Series 112



Type	①	M [Nm] *	②	M [Nm] *	③	④	M [Nm] *	⑤
EWB 2-32	690.460	4.0	690.449	4.0	690.814	112.381	0.5	690.811
EWB 2-50	690.457	8.0	690.452	8.0	690.816	690.208	1.5	690.812

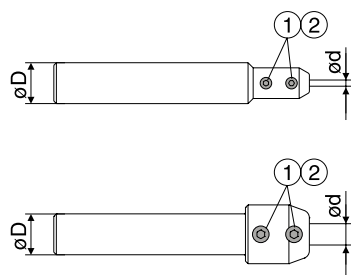
EWB 04-12 Hi-Speed





Type	①	M [Nm] *	②	M [Nm] *	③	M [Nm] *	④
EWB 04-12	690.925	3.0	690.541	3.0	690.947	3.0	690.812

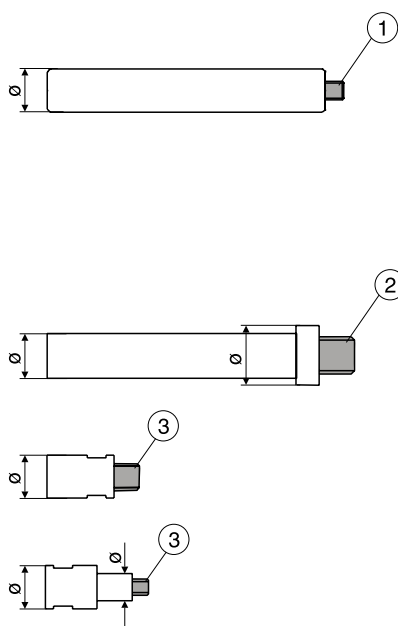
* M = Recommended torque for tightening the screws


Reducers





Type	Type			
D - d	D - d	①	M [Nm] *	②
12 - 3.5	16 - 3.5	690.459	0.5	690.801
12 - 4.0	16 - 4.0			
12 - 4.5	16 - 4.5			
12 - 5.0	16 - 5.0			
12 - 6.0	16 - 6.0			
	16 - 7.0	690.489	2.5	690.803
	16 - 8.0			
	16 - 9.0			
	16 - 10.0			


Tool holders



ØD	Type	G	
8	615.088	M5	690.486
	615.211		690.486
	615.212		690.486
	615.222		690.486
10	615.089	M6	690.487A
	615.214		690.487A
	615.215		690.487A
	615.223		690.487A

ØD	Type	G	
11	615.250	M6	690.487A
12	615.218	M6	690.487A
	615.219		690.487A
	615.224		690.487A
	615.225		690.487A
13	615.251	M6	690.487A
14	615.232	M6	690.487A
16	615.226	M10	690.488


Type	Ø	G	
615.216	10 / 12	M6	690.487A
615.217	10 / 16	M6	690.487A
615.239	12 / 16	M10	690.488
615.240	12 / 16	M10	690.488
615.243	12 / 16	M10	690.488

Type	Ø	G	
615.220	12	M6	690.487A
615.230	16 / 10	M6	690.487A
615.231	16 / 12	M6	690.487A


Screws glued in with Locite 270 or Ergo 4101.

Clamp screws for inserts




Type	**	M [Nm] *	
WC.. 0201	694.101	0.5	694.806




Type	**	M [Nm] *	
TP.. 0702	694.102 ¹	0.5	694.806
TP.. 0702	694.103	0.5	694.806



Type	**	M [Nm] *	
TC.. 1102	694.122	0.7	694.807

B.9



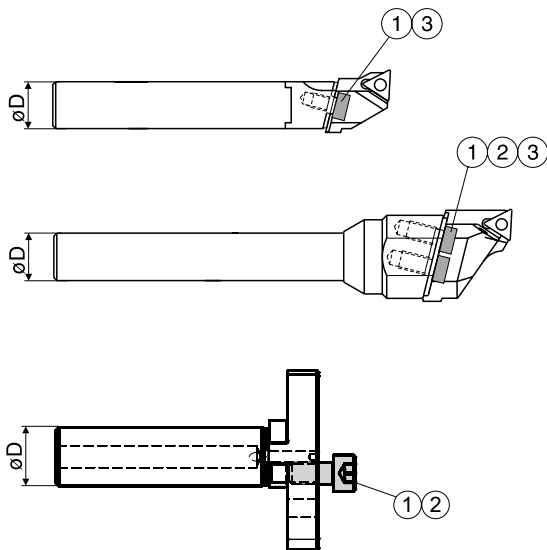
Type	**	M [Nm] *	
CC.. 0602	694.122	0.7	694.807
CC.. 09T3	694.141	3.0	694.815

¹ For Insert holder 615.086/615.207/615.087/615.205/615.271/615.507/615.508

* M = Recommended torque for tightening the screws

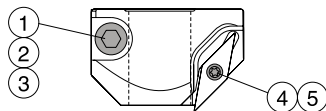
**Per package: 10 screws and 1 wrench

Adjustable tool holder



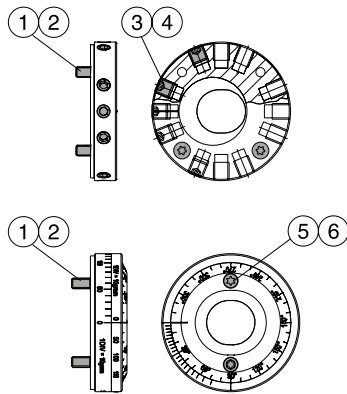
$\varnothing D$	Type	①	②	M [Nm] *	③
9	615.369	690.323		1.0	690.837
	615.374	690.323		1.0	690.837
11	615.371	690.324		2.0	690.838
	615.375	690.324		2.0	690.838
13	615.373	690.183		4.0	690.803
	615.377	690.183		4.0	690.803
	615.378	690.183		4.0	690.803
16	615.252	690.113		10.0	690.804
	615.253	690.113		10.0	690.804
	615.262	690.113		10.0	690.804
	615.265	690.113		10.0	690.804
	615.266	690.113		10.0	690.804
16	615.257	690.150	615.904	17.0	690.805
	615.258	690.150	615.904	17.0	690.805
	615.264	690.150	615.904	17.0	690.805
	615.267	690.150	615.904	17.0	690.805
16	615.387B	690.107	693.182	12.0	690.805

Chamfering rings



Type	①	②	M [Nm] *	③	④	M [Nm] *	⑤
615.394	690.157	693.181	10.0	690.814	VC.. 1103	694.125	0.8
615.395							694.808

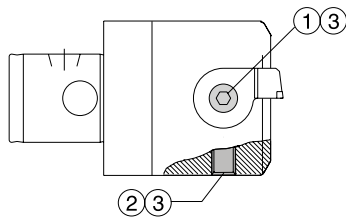
Balancing rings



Type	①	②	③ **	④	⑤	⑥
112.387	690.611	690.836	690.541	690.812		
112.805	690.614	690.843	690.964	690.813		
112.806	690.614	690.843			694.141	690.965

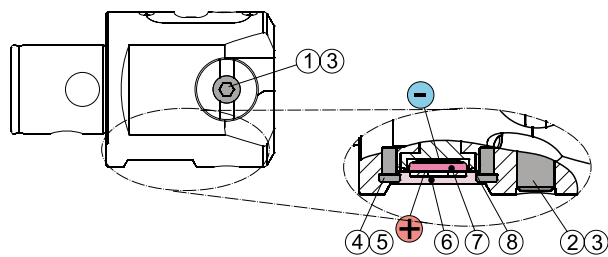
**Per package: 10 screws and 1 wrench

Precision boring heads EWN, Series 310



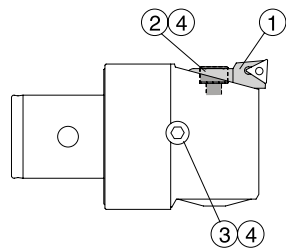
Type	①	M [Nm] *	②	M [Nm] *	③
EWN 20	690.135	1.0	690.410	0.5	690.811
EWN 25	690.136	1.0	690.549	0.5	690.811
EWN 32	690.137	2.5	690.550	1.5	690.812
EWN 41	690.138	3.0	690.551	2.5	690.813
EWN 53	690.139	6.0	690.552	6.0	690.814
EWN 68	690.141	12.0	690.553	10.0	690.816
EWN 100	690.141	12.0	690.553	10.0	690.816

Precision boring heads EWD, Series 310/318/BIG CAPTO



Type	①	M [Nm] *	②	M [Nm] *	③	④	M [Nm] *	⑤	⑥	⑦	⑧
EWD 41	690.138	3.0	690.997	2.5	690.813	690.994	1.0	694.808	310.905	696.901	692.381
EWD 53	690.139	6.0	690.996	6.0	691.814						
EWD 68	690.141	12.0	690.469	10.0	690.816						
EWD 100			690.553								
EWD 200	690.140	12.0	690.469	12.0	690.816						
EWBD 68			690.580								
EWBD 100 AL											

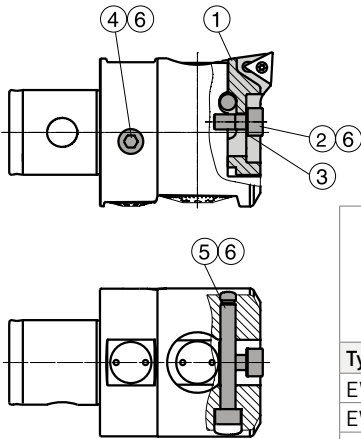
Precision boring heads EWB, Series 310









Type	①	②	M [Nm] *	③	M [Nm] *	④
EWB 32	626.231	690.137	2.5	690.577	2.5	690.812
EWB 41	626.241	690.138	3.0	690.578	3.0	690.813
EWB 53	626.251	690.139	6.0	690.579	6.0	690.814
EWB 68	626.261	690.140	12.0	690.580	12.0	690.816
EWB 85	626.261	690.140	12.0	690.580	12.0	690.816
EWB 100 AL	626.261	690.140	12.0	690.580	12.0	690.816
EWB 150 AL	626.261	690.140	12.0	690.580	12.0	690.816

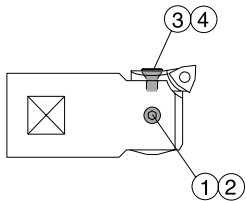
* M = Recommended torque for tightening the screws





Precision boring heads EWB-UP, Series 309



Type				M [Nm] *		M [Nm] *		M [Nm] *	
EWB 25 UP	627.121	690.182	693.289	1.0		1.0	690.940	1.0	690.811
EWB 32 UP	627.131	690.179	693.186	1.5	690.550	1.5	690.180	1.5	690.812
EWB 41 UP	627.141	690.176	693.175	2.5	690.943	2.5	690.115	2.5	690.813
EWB 53 UP	627.151	690.177	693.176	4.0	690.658	4.0	690.178	4.0	690.814
EWB 68 UP	627.161	690.953	693.177	5.0	690.591	5.0	690.954	6.5	690.816



Boring heads with thread connection EW 15/EW 18, Series 310







Type		M [Nm] *			M [Nm] *	
EW 15	690.414	0.5	690.819	694.120	1.2	694.807
EW 18	690.416	0.5	690.819	694.120	1.2	694.807

Clamp screws for inserts



Type		M [Nm] *	
WC.. 0201	694.101	0.5	694.806

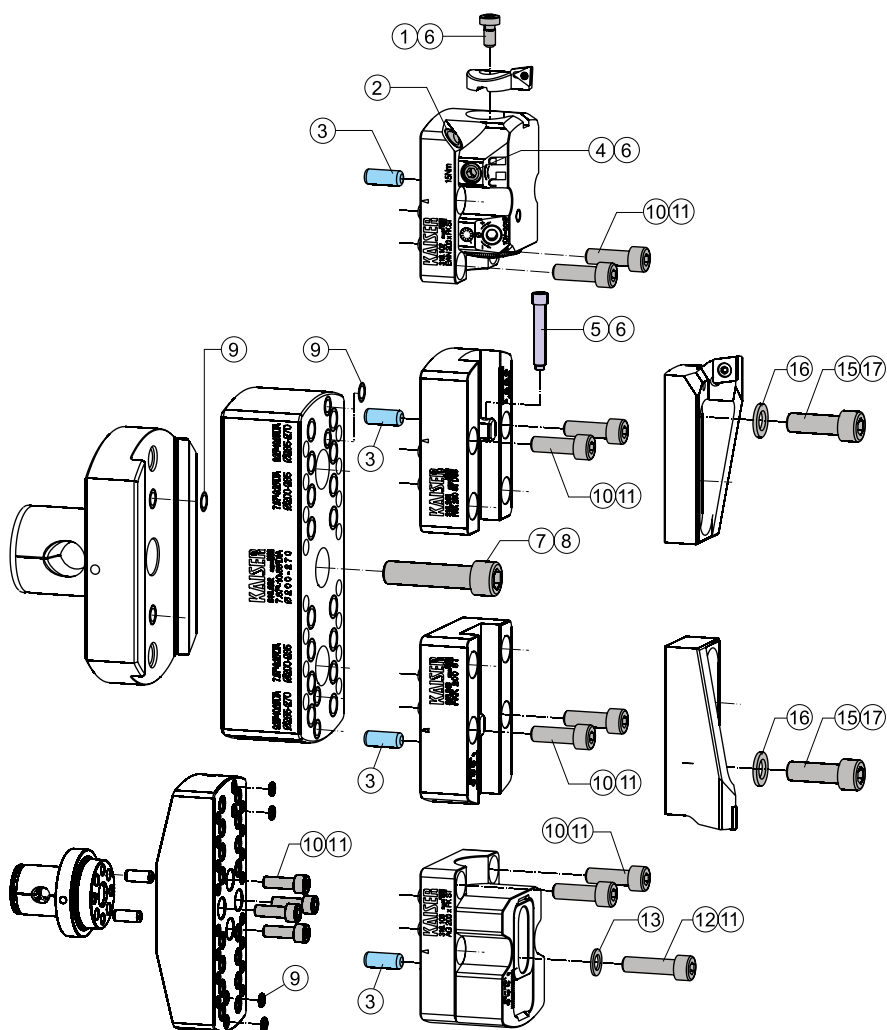
Type		M [Nm] *	
TP.. 0702	694.103	0.5	694.806
TC.. 1102	694.122	0.7	694.807

Type		M [Nm] *	
CC.. 0602	694.122	0.7	694.807
CC.. 09T3	694.141	3.0	694.815

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

Lightweight boring tools, Ø 200 - 620 mm, Series 318



①	M [Nm] *	②	③
690.140	12.0	692.406	691.390
④	M [Nm] *	⑤	⑥
690.553	10.0	317.193	690.816
⑦	M [Nm] *	⑧	⑨
690.121	45.0	690.808	692.295
⑩	M [Nm] *	⑪	
690.163	20.0	690.806	
⑫	⑬	M [Nm] *	⑭
690.124	693.183	15.0	690.806
⑮	⑯	M [Nm] *	⑰
690.105	693.184	30.0	690.807

Clamp screws for inserts

Type	**	M [Nm] *	
CC.. 1204	694.150	5.0	694.820
CC.. 1605	694.150	5.0	694.820

Type	**	M [Nm] *	
SC.. 1204	694.144	5.0	694.820

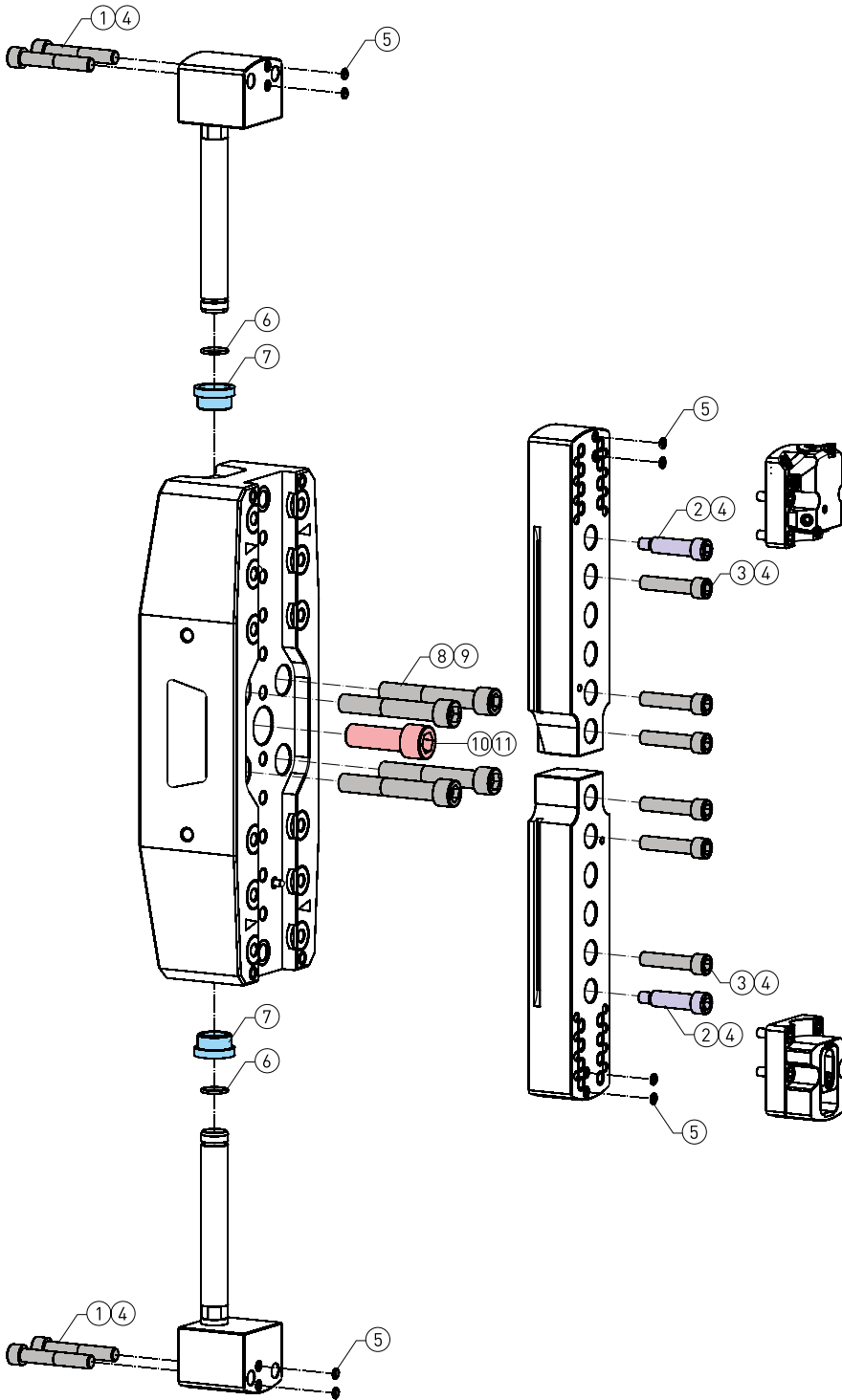
Type	**	M [Nm] *	
WC.. 0804	694.143	3.0	694.815












Type	**	M [Nm] *	
TC.. 1102	694.122	0.7	694.807

* M = Recommended torque for tightening the screws

**Per package: 10 screws and 1 wrench

Lightweight boring tools, Ø 620 - 3 000 mm, Series 318



		
①	M [Nm] *	
690.991	50	
		
②	M [Nm] *	
690.989	30	
		
③	M [Nm] *	④
690.132	50	690.810
		
⑤	⑥	⑦
692.295	692.298	690.990
		
⑧	M [Nm] *	⑨
690.984 ¹	125	690.832
690.985 ²		
690.986 ³		
		
⑩	M [Nm] *	⑪
690.987	250	690.861

¹ For bridges 318.421/318.422/318.424

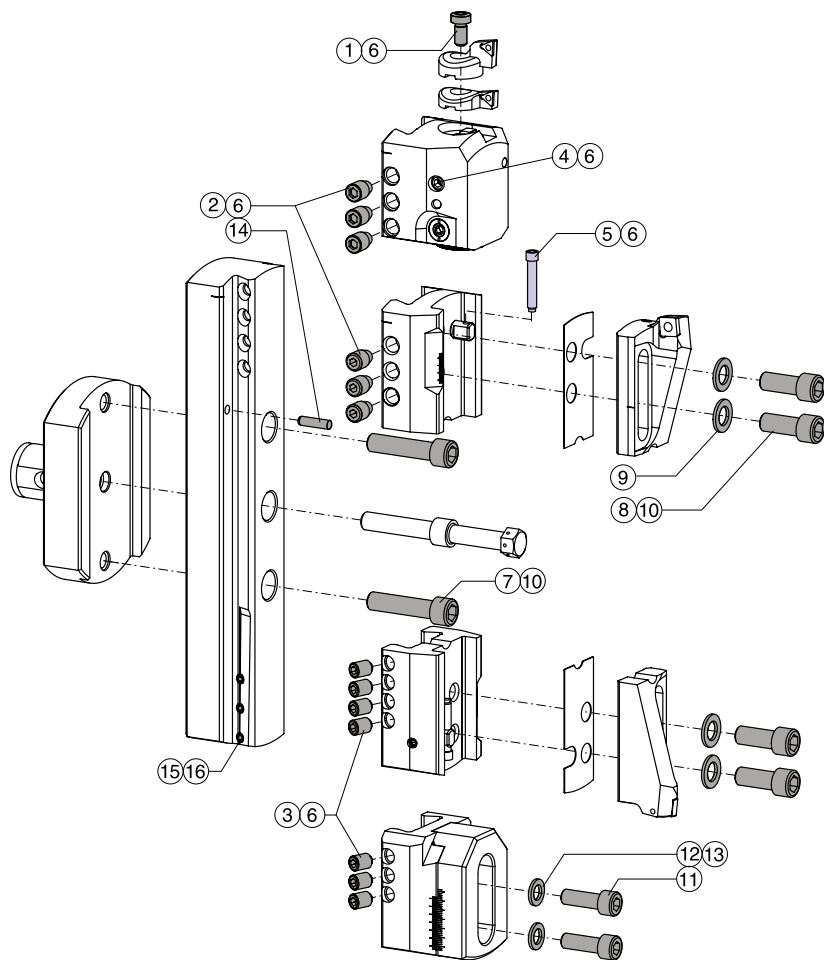
² For bridge 318.423

³ For bridge 318.425

* M = Recommended torque for tightening the screws

** Per package: 10 screws and 1 wrench

Large diameter boring tools, Series 317



①	M [Nm] *	②	M [Nm] *
690.141	15	690.596	10
③	M [Nm] *	④	M [Nm] *
690.469		690.553	15
⑤	⑥	⑦	M [Nm] *
317.193	690.816	690.121	120
⑧	⑨	M [Nm] *	⑩
690.172	693.185	100	690.808
⑪	⑫	M [Nm] *	⑬
690.105	693.184	70	690.807
⑭	⑮	⑯	
691.373	317.274	690.845	

Clamp screws for inserts

Type	**	M [Nm] *	
CC.. 1204	694.150	6.0	694.820
CC.. 1605	694.150	6.0	694.820

Type	**	M [Nm] *	
SC.. 1204	694.144	6.0	694.820
SD.. 1204	694.144	6.0	694.820

Type	**	M [Nm] *	
WC.. 0804	694.143	3.0	694.815

Type	**	M [Nm] *	
TC.. 1102	694.122	0.7	694.807

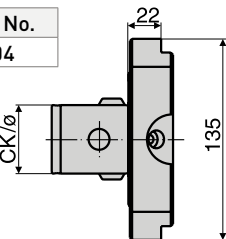
* M = Recommended torque for tightening the screws

**Per package: 10 screws and 1 wrench

Flanges steel

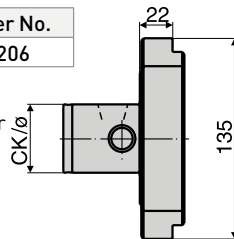
Type	Order No.
CKS7/Ø46	317.204

Flange with adjustable coolant nozzles mounted on both side



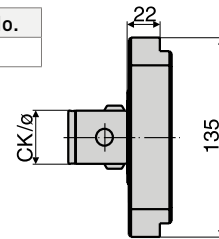
Type	Order No.
CKS7/Ø46	317.206

Flange with cutter position 90° twisted



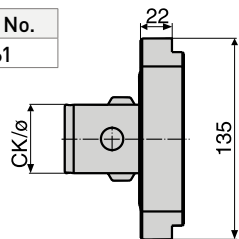
Type	Order No.
CKS6/Ø36	317.207

With CK6 connector for boring range 150 - 200 mm



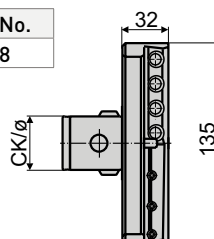
Flange aluminium

Type	Order No.
CKS7/Ø46	317.261



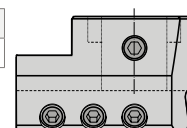
Flange CK6 with extension slide

Type	Order No.
CKS6/Ø36	317.208

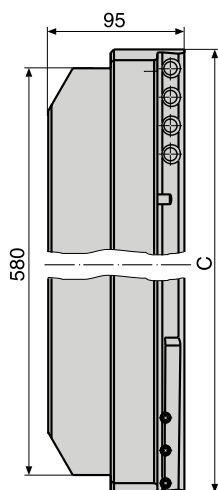


Tool holders for pin turning

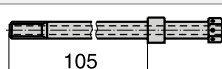
Type	Order No.
CKB5/28	317.284



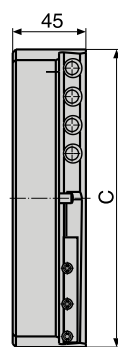
Extension slides steel



C	Boring Range		Order No.
	D *		
603	620 - 690		317.231
673	690 - 760		317.232
743	760 - 830		317.233
813	830 - 900		317.234
883	900 - 970		317.235
953	970 - 1040		317.236
1023	1040 - 1110		317.237
1093	1110 - 1180		317.238

Coolant nozzle	Order No.
	389.221

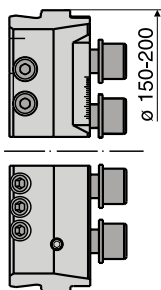
Extension slides aluminium



C	Boring Range		Order No.
	D *		
183	200 - 270		317.252
253	270 - 340		317.253
323	340 - 410		317.254
393	410 - 480		317.255
463	480 - 550		317.256
533	550 - 620		317.257

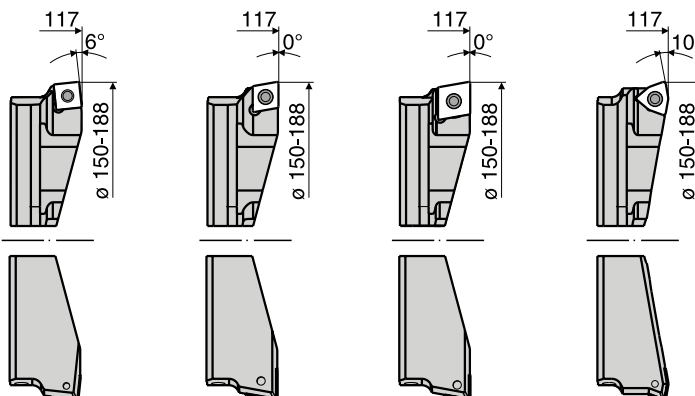
Clamping bases Ø 150 - 200

Order No.
317.204



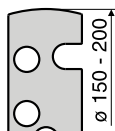
Insert holders Ø 150 - 188

Order No.	637.813	637.829	637.833	637.845
Type	SC12	CC12	CC16	WC08

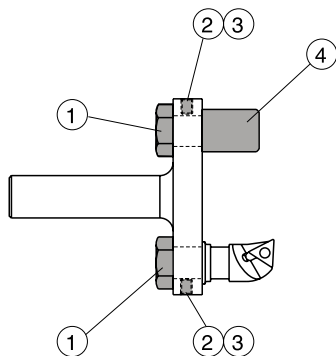






Spacers

Spacer	Order No.
0.5 mm	
Ø 150 - 200	317.286

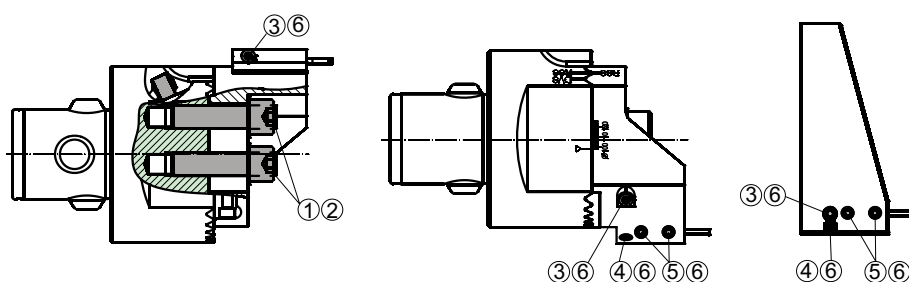








Pin turning / Eccentric bar



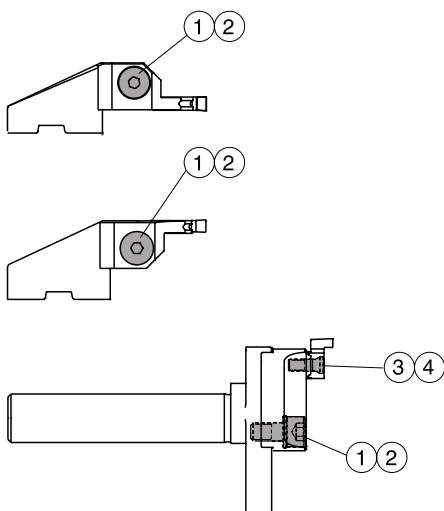
				
Type	①	②	③	④
615.390	690.716	690.573	690.813	615.903



Face grooving holder SW, Series 318







								
Typ	①	M [Nm] *	②	③	④	⑤	M [Nm] *	⑥
SW53	639.691	16	690.805	639.690	690.400	690.511	2.5	690.813
SW68	639.691	16	690.805	639.690	690.400	690.622	2.5	690.813
SW98 x CKN6	639.693	20	690.806	639.690	690.400	690.912	2.5	690.813
SW98 x CKN7	639.693	20	690.806	639.690	690.400	690.912	2.5	690.813
SW148 x CKN6	639.693	20	690.806	639.690	690.400	690.913	2.5	690.813
SW148 x CKN7	639.693	20	690.806	639.690	690.400	690.913	2.5	690.813
FKW 200 (Serie 318)	-	-	-	637.962	690.400	690.511	2.5	690.813

Insert holders for face grooving



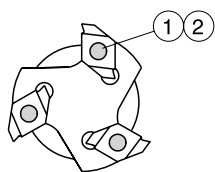
				
Type	Type	①	M [Nm] *	②
626.935	626.945	690.183	4.0	690.813
626.936	626.946			
626.937	626.947			
626.938	626.948			



						
Type	①	②	M [Nm] *	③ **	M [Nm] *	④
615.387	690.107	693.182	12.0	694.143	3.0	694.815
615.388						

B.9

Slot milling cutters

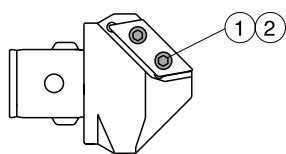
Clamp screws for inserts





			
Type	① **	M [Nm] *	②
0	958.048	0.8	690.836
1	958.048	0.8	690.836
2	958.049	6.0	690.838

Chamfering mills C-Cutter

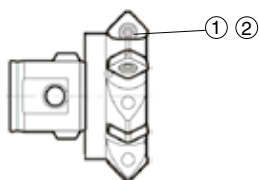
Clamp screws for inserts





			
Type	① **	M [Nm] *	②
C 0525	335.035	0.5	690.834
C 1040	335.036	1.8	690.837
C 3060	335.036	1.8	690.837
C 50100	335.037	6.0	690.838

Chamfering mills C-Cutter mini

Clamp screws for inserts

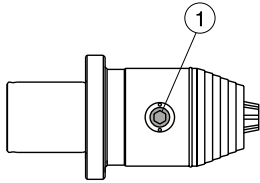



			
Type	① **		②
C 2232	966.450		690.843
C 3242			
C 4252			
C 5262			

* M = Recommended torque for tightening the screws

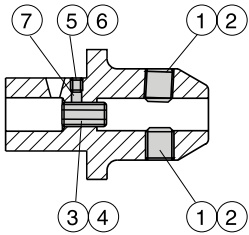
**Per package: 10 screws and 1 wrench








Drill chuck



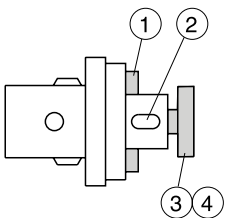
		
Type	①	M [Nm] *
335.042	690.817	20
335.044	690.817	20

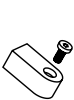



End mill holders



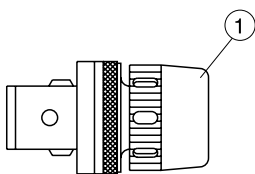
								
Type	①	M [Nm] *	②	③	④	⑤	⑥	⑦
6	690.477	5	690.803	690.512	690.802	690.419	690.802	691.318
8	690.478	10	690.804	690.513	690.803	690.489	690.803	691.316
10	690.479	16	690.805	690.514	690.804	690.489	690.803	691.316
12	690.480	28	690.806	690.515	690.805	690.489	690.803	691.315
14	690.480	28	690.806	690.515	690.805	690.489	690.803	691.315
16	690.481	28	690.806	690.510	690.806	690.489	690.803	691.315
18	690.481	28	690.806	690.510	690.806	690.489	690.803	691.315
20	690.482	42	690.807	690.510	690.806	690.489	690.803	691.315
25	690.483	50	690.810	690.510	690.806	690.489	690.803	691.315
32	690.484	72	690.810					
40	690.484	72	690.810					


Universal milling cutter holders



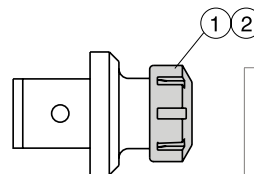
					
Type	①	②	③	M [Nm] *	④
16	691.605	691.600	690.703	18	690.805
22	691.606	691.601	690.704	35	690.806
27	691.607	691.602	690.705	70	690.807
32	691.608	691.604	690.706	80	690.810
40	691.609	691.603	690.707	80	690.809



Milling chuck



	
Type	①
GMC20	962.291
GMC32	962.292

Collet chuck

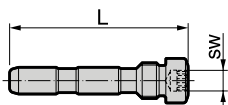


		
Type	①	②
EX25	951.076	951.077
EX32	951.065	951.009
EX40	951.060	951.061

* M = Recommended torque for tightening the screws

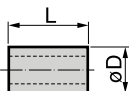
Tapping attachments BIG KAISER MEGA Synchro

Safety Screw



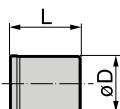
Type	sw	L	Order No.
MGT 6SS	4	35	963.711
MGT 12SS	4	40	963.432
MGT 20SS	5	53	963.713

Synchro Adjuster



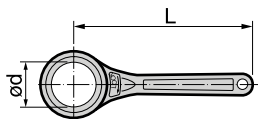
Type	ØD	L	Order No.
MGT 6SA	9	11	963.721
MGT 12SA	10	15	963.722
MGT 20SA	14	24	963.723

Nut



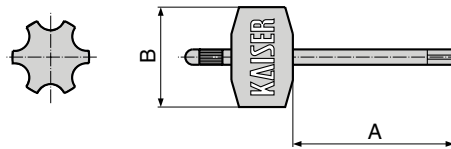
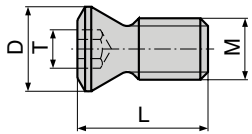
Type	ØD	L	Order No.
MGT 6T	16	19	963.701
MGT 12T	20	21	963.702
MGT 20T	30	24	963.703

Wrench



Type	ØD	L	Order No.
MGR 16	16	90	969.446
MGR 20L	20	160	969.447
MGR 30L	30	220	969.448

Clamp screws and wrenches for inserts



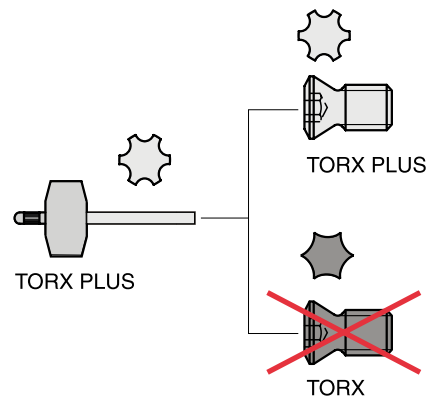
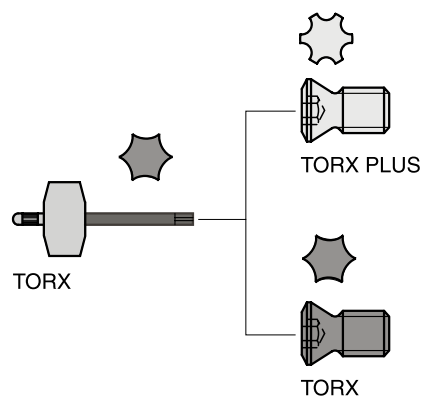
Screws

Dimensions					Torx	Torx Plus	
Torx/Torx Plus	Thread M	D	L	Nm ¹	Order No.	Order No.	
T6	M2	3.0	4.0	0.5	335.035		
T6 IP	M2	2.7	3.6			694.101	
T6 IP	M2	2.7	4.1			694.102	
T6 IP	M2	2.7	4.8			694.103	
T7 IP	M2.2	3.5	6.0	0.7		694.110	
T7 IP	M2.5	3.5	6.5			694.122	
T7 IP	M2.5	3.5	5.8			694.123	
T7 IP	M2.5	3.5	6.3			694.124	
T7 IP	M2.5	4.3	5.5			694.121	
T7 IP	M3	4.6	6.0			694.130	
T8	M3	4.4	9.0	0.8	958.048		
T8 IP	M2.5	3.5	8.7				694.125
T9 IP	M3	4.4	8.2	1.5		694.131	
T10	M3	4.1	7.0	1.8	335.036		
T10 IP	M3.5	4.8	9.2				694.137
T10 IP	M3.5	5.5	8.2				694.136
T15	M4	5.7	8.2	3.0	336.905		
T15 IP	M4	5.1	9.2				694.141
T15 IP	M4	5.5	11.8				694.143
T20	M5	6.6	16.5	6.0	658.049		
T20	M5	7.0	12.0			335.037	
T20 IP	M4	6.4	15.0				694.144
T20 IP	M4	6.5	11.6				694.142
T20 IP	M5	7.0	13.3				694.150

Screws

Dimensions			Torx	Torx Plus
Torx/Torx Plus	A	B	Order No.	Order No.
T6	42	26	690.834	
T6 IP				694.806
T7 IP				694.807
T8	42	26	690.836	
T8 IP				694.808
T9 IP				694.809
T10	50	34	690.837	
T10 IP				694.810
T15				690.843
T15 IP				694.815
T20				690.838
T20 IP			694.820	

Compatibility TORX - TORX PLUS

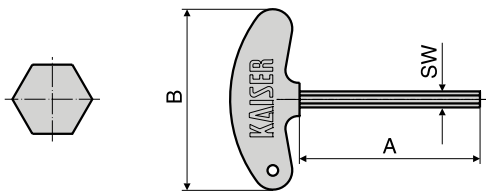


B.9

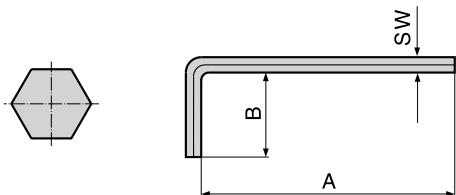
¹ Maximum tightening torque

The clamping screws for the inserts are supplied in packages of 10 pieces with a corresponding wrench.

Wrenches



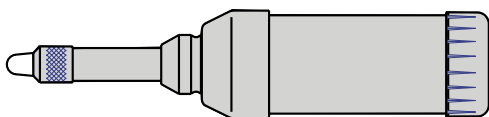
A	B	SW	Order No.
50	45	1.5	690.819
		2	690.811
		2.5	690.812
		3	690.813
		4	690.814
70	65	5	690.816
		6	690.817



A	B	SW	Order No.
42	14	1.3	690.833
50		1.5	690.800
50	16	2	690.801
56	18	2.5	690.802
63	20	3	690.803
67	24	3.5	690.899
71	25	4	690.804
80	28	5	690.805
90	32	6	690.806
100	36	8	690.807
112	40	10	690.810
200		10	690.808
125	45	12	690.809
140	56	14	690.860
140	63	17	690.861

Lubrication gun

Order No.
692.404A



Lubricant

For lubricating the precision boring heads type AW, EW, EWN, EWD, EWB, EWB-UP a light machine oil of the following types is recommended:

- Mobil Vactra Oil No. 2
- BP Energol HLP-32
- Klueber Isoflex PDP 94

The lubricating instructions are shown in the operating instructions that are included with each head.

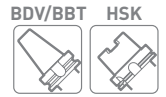
Angle Head

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C.1

New Baby Chuck Type

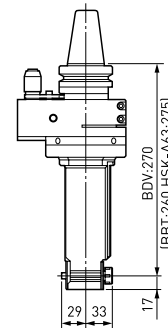
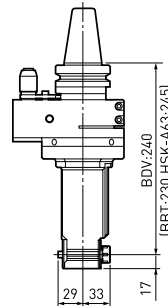
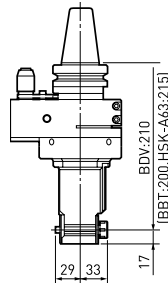
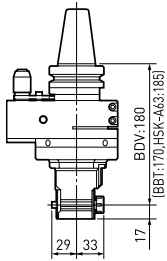
► C6



BDV40, BBT40, HSK-A63

max. 6 000 min⁻¹ (except for NBS20 models)

Ø0.25 - Ø6



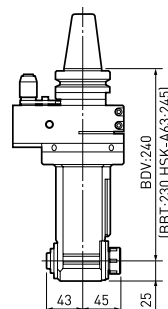
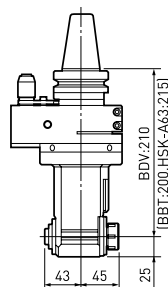
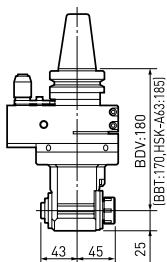
BDV40-AG90/NBS6-180
BBT40-AG90/NBS6-170
HSK-A63-AG90/NBS6-185

BDV40-AG90/NBS6-210
BBT40-AG90/NBS6-200
HSK-A63-AG90/NBS6-215

BDV40-AG90/NBS6-240
BBT40-AG90/NBS6-230
HSK-A63-AG90/NBS6-245

BDV40-AG90/NBS6-270
BBT40-AG90/NBS6-260
HSK-A63-AG90/NBS6-275

Ø1.5 - Ø10

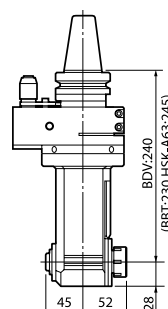
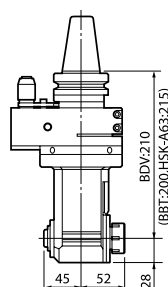
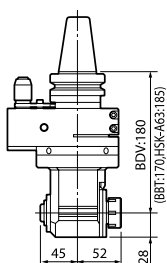


BDV40-AG90/NBS10-180
BBT40-AG90/NBS10-170
HSK-A63-AG90/NBS10-185

BDV40-AG90/NBS10-210
BBT40-AG90/NBS10-200
HSK-A63-AG90/NBS10-215

BDV40-AG90/NBS10-240
BBT40-AG90/NBS10-230
HSK-A63-AG90/NBS10-245

Ø2.5 - Ø13

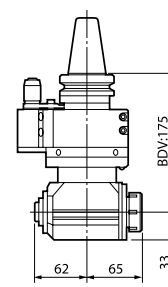


BDV40-AG90/NBS13-180
BBT40-AG90/NBS13-170
HSK-A63-AG90/NBS13-185

BDV40-AG90/NBS13-210
BBT40-AG90/NBS13-200
HSK-A63-AG90/NBS13-215

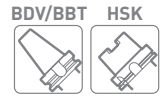
BDV40-AG90/NBS13-240
BBT40-AG90/NBS13-230
HSK-A63-AG90/NBS13-245

Ø2.5 - Ø20



BDV40-AG90/NBS20S-175S
BBT40-AG90/NBS20S-165S
HSK-A63-AG90/NBS20S-180S
max. 3 000 min⁻¹

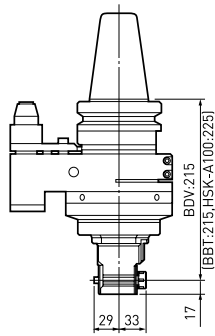
C.1



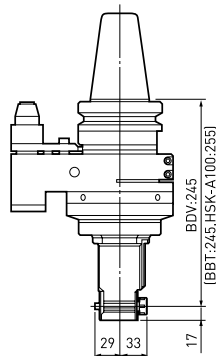
BDV50, BBT50, HSK-A100

max. 6 000 min⁻¹ (except for NBS20 models)

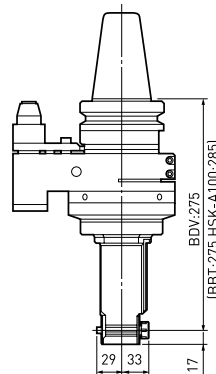
Ø0.25 - Ø6



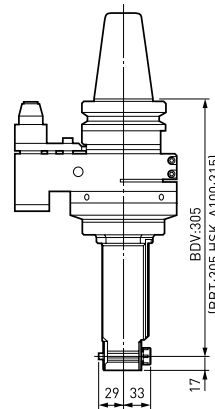
BDV50-AG90/NBS6-215
BBT50-AG90/NBS6-215
HSK-A100-AG90/NBS6-225



BDV50-AG90/NBS6-245
BBT50-AG90/NBS6-245
HSK-A100-AG90/NBS6-255

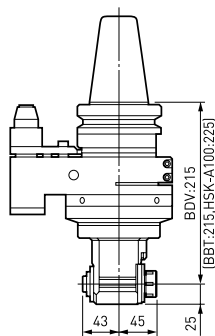


BDV50-AG90/NBS6-275
BBT50-AG90/NBS6-275
HSK-A100-AG90/NBS6-285

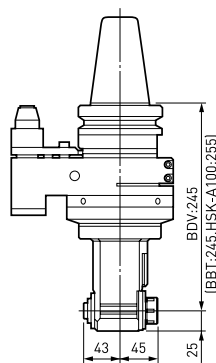


BDV50-AG90/NBS6-305
BBT50-AG90/NBS6-305
HSK-A100-AG90/NBS6-315

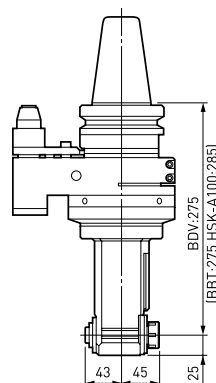
Ø1.5 - Ø10



BDV50-AG90/NBS10-215
BBT50-AG90/NBS10-215
HSK-A100-AG90/NBS10-225

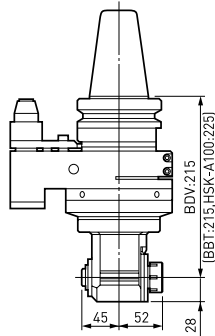


BDV50-AG90/NBS10-245
BBT50-AG90/NBS10-245
HSK-A100-AG90/NBS10-255

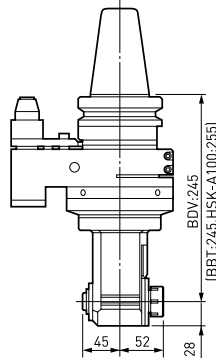


BDV50-AG90/NBS10-275
BBT50-AG90/NBS10-275
HSK-A100-AG90/NBS10-285

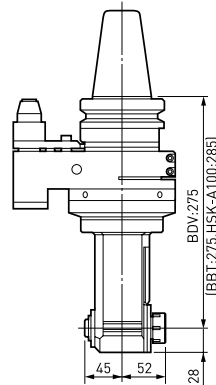
Ø2.5 - Ø13



BDV50-AG90/NBS13-215
BBT50-AG90/NBS13-215
HSK-A100-AG90/NBS13-225

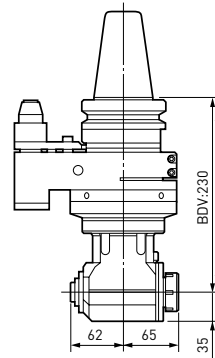


BDV50-AG90/NBS13-245
BBT50-AG90/NBS13-245
HSK-A100-AG90/NBS13-255



BDV50-AG90/NBS13-275
BBT50-AG90/NBS13-275
HSK-A100-AG90/NBS13-285

Ø2.5 - Ø20



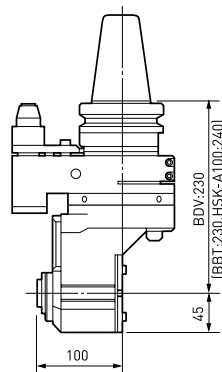
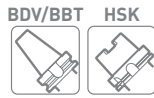
BDV50-AG90/NBS20-230
BBT50-AG90/NBS20-230
HSK-A100-AG90/NBS20-240
max. 3 000 min⁻¹

Build-Up Type

► C14

BBT50, BDV50, HSK-A100

BDV50-AG90/AGH35-230
 BBT50-AG90/AGH35-230
 HSK-A100-AG90/AGH35-240
 max. 3 000 min⁻¹
 (Quick change adapters)

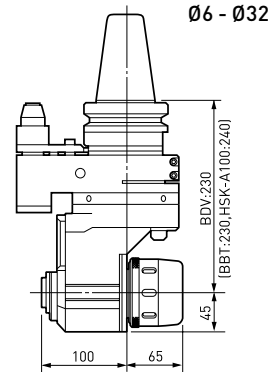
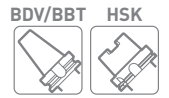


HMC Type

► C17

BBT50, BDV50, HSK-A100

BDV50-AG90/HMC32-230
 BBT50-AG90/HMC32-230
 HSK-A100-AG90/HMC32-240
 max. 3 000 min⁻¹



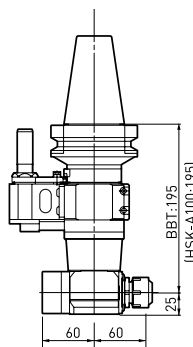
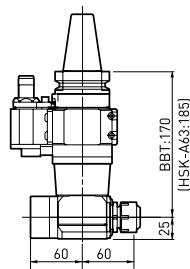
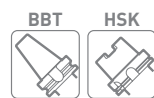
OAG Type

► C11

BBT40, BBT50, HSK-A63, HSK-A100

BBT40-OAG90-13-170
 HSK-A63-OAG90-13-185
 max. 5 000 min⁻¹

BBT50-OAG90-13-195
 HSK-A100-OAG90-13-195
 max. 5 000 min⁻¹

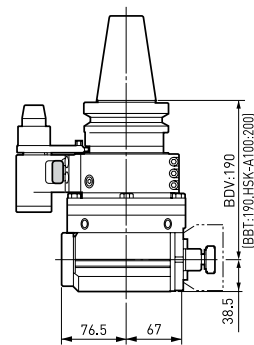
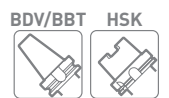


Face Mill Type

► C16

BBT50, BDV50, HSK-A100

BDV50-AG90-FMA25.4S-190S
 BBT50-AG90-FMA25.4S-190S
 HSK-A100-AG90-FMA25.4S-200S
 max. 1 500 min⁻¹

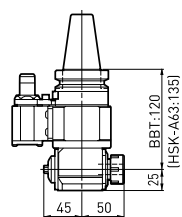


Compact Type

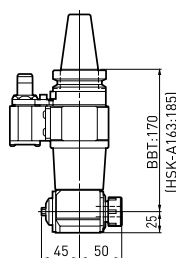
► C10

BBT40, HSK-A63

BBT40-AG90-13-120
 HSK-A63-AG90-13-135
 max. 5 000 min⁻¹
 Ø2.5 - Ø13

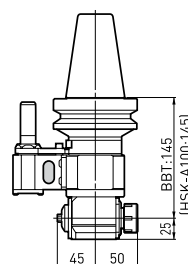


BBT40-AG90-13-170
 HSK-A63-AG90-13-185
 max. 5 000 min⁻¹

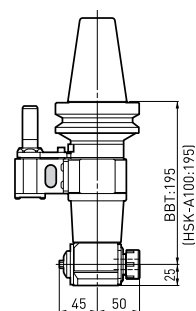


BBT50, HSK-A100

BBT50-AG90-13-145
 HSK-A100-AG90-13-145
 max. 5 000 min⁻¹
 Ø2.5 - Ø13



BBT50-AG90-13-195
 HSK-A100-AG90-13-195
 max. 5 000 min⁻¹



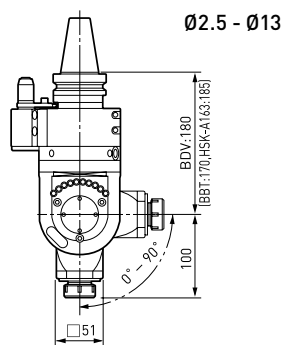
Automatic tool change may not be utilized for some machining center.

Universal Type

► C18

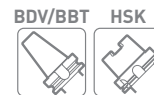
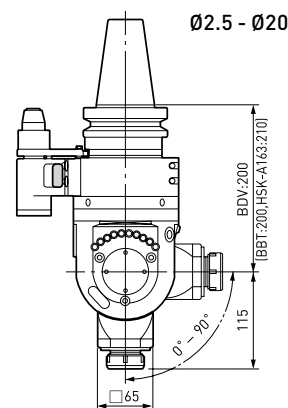
BBT40, BDV40, HSK-A63

BDV40-AGU/NBS13-280
 BBT40-AGU/NBS13-270
 HSK-A63-AGU/NBS13-285
 max. 6 000 min⁻¹



BBT50, BDV50, HSK-A100

BDV50-AGU/NBS20-315
 BBT50-AGU/NBS20-315
 HSK-A100-AGU/NBS20-325
 max. 4 000 min⁻¹

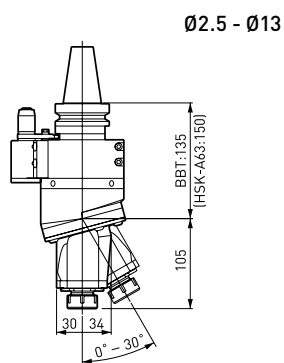


Universal 30 Type

► C19

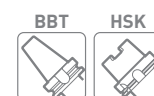
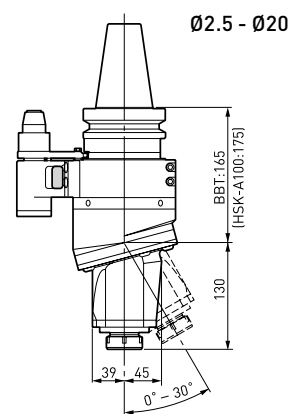
BBT40, HSK-A63

BBT40-AGU30/NBS13-240
 HSK-A63-AGU30/NBS13-255
 max. 6 000 min⁻¹



BBT50, HSK-A100

BBT50-AGU30/NBS20-295
 HSK-A100-AGU30/NBS20-305
 max. 4 000 min⁻¹

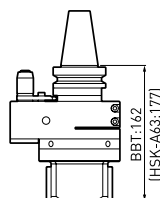


Small Bore Type

► C12

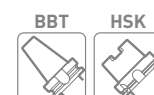
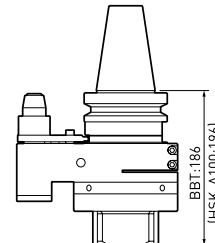
BBT40, HSK-A63

BBT40-AGB-162
 HSK-A63-AGB-177
 max. 2 000 min⁻¹

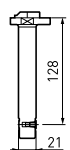
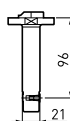


BBT50, HSK-A100

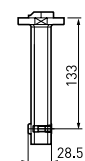
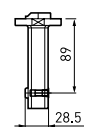
BBT50-AGB-186
 HSK-A100-AGB-196
 max. 2 000 min⁻¹



Ø3 - Ø4



Ø3 - Ø6



Automatic tool change may not be utilized for some machining center.

New Baby Chuck Type

It is the outstanding rigidity and accuracy of the New Baby Chuck, used for holding the cutting tool, that produces high precision with less runout. Available in various sizes to meet specific production requirements.



BBT40/BBT50

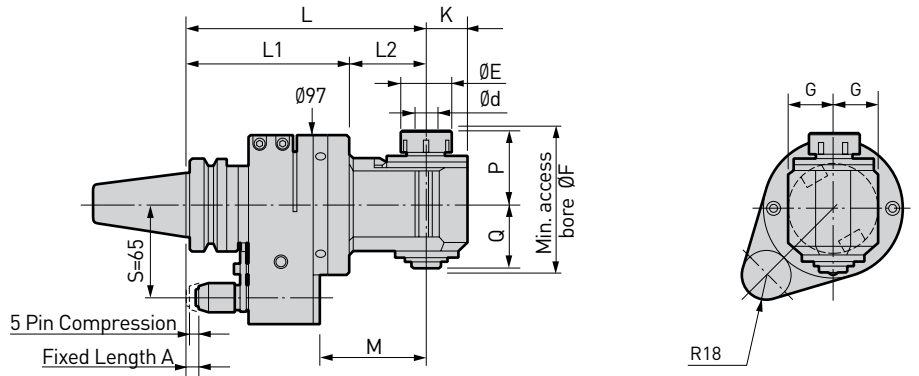


Fig. 1

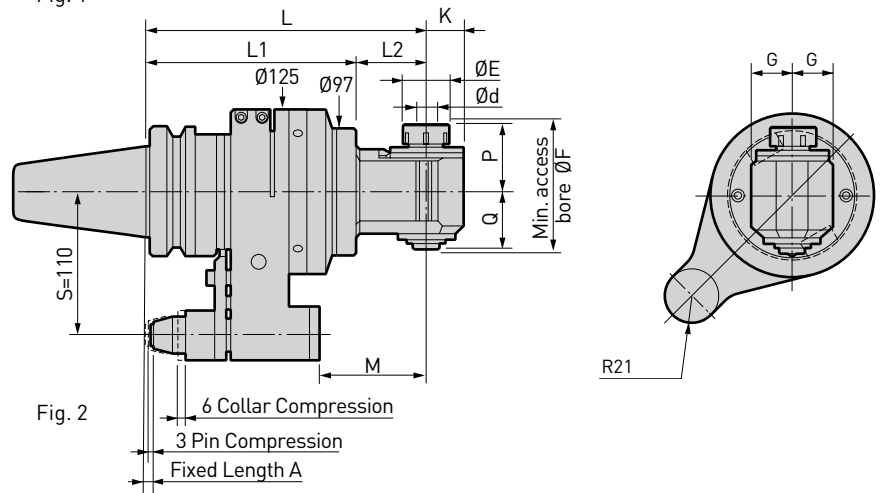


Fig. 2

Exclusive Stop Block is required.

Model	Fig.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet	Max. min ⁻¹	Weight (kg)	Order No.	
BBT40 -AG90/NBS6 -170	1	0.25 - 6	20	21	17	170	115	55	77	33	29	67	NBC6	6 000	5.1	802.463	
						200		85	107						5.3	802.465	
						230		115	137						5.5	802.467	
						260		145	167						5.7	802.469	
		-AG90/NBS10 -170	1.5 - 10	30	30	25	170	115	55	77	45	43	91	NBC10	6 000	5.5	802.449
							200		85	107						5.9	802.451
							230		115	137						6.2	802.453
							260		145	167						6.5	802.455
		-AG90/NBS13 -170	2.5 - 13	35	31	28	170	115	55	77	52	45	101	NBC13	6 000	6.0	802.457
							200		85	107						6.3	802.459
							230		115	137						6.6	802.461
							260		145	167						6.9	802.463
-AG90/NBS20S -165S	2.5 - 20	46	35	33	165	112	53	72	65	62	132	NBC20	3 000	8.0	802.462		
BBT50 -AG90/NBS6 -215	2	0.25 - 6	20	21	17	215	160	55	82	33	29	67	NBC6	6 000	12.6	802.515	
						245		85	112						12.8	802.518	
						275		115	142						13.0	802.521	
						305		145	172						13.2	802.524	
		-AG90/NBS10 -215	1.5 - 10	30	30	25	215	160	55	82	45	43	91	NBC10	6 000	13.0	802.494
							245		85	112						13.4	802.497
							275		115	142						13.7	802.500
							305		145	172						14.0	802.503
		-AG90/NBS13 -215	2.5 - 13	35	31	28	215	160	55	82	52	45	101	NBC13	6 000	13.1	802.503
							245		85	112						13.5	802.506
							275		115	142						13.8	802.509
							305		145	172						14.1	802.512
-AG90/NBS20 -230	2.5 - 20	46	35	35	230	160	70	97	65	62	132	NBC20	3 000	14.2	802.512		

- The standard fixed length A is 8 mm for BBT40 and 6 mm for BBT50. Other lengths are available upon request.
- New baby nut and wrench are included. New baby collet is to be ordered separately.
- New baby collet for endmilling (NBC□-□EAA) can not be used.

For New Baby Collet ▶ A138
For Stop Block ▶ C20

New Baby Chuck Type



BDV40/BDV50

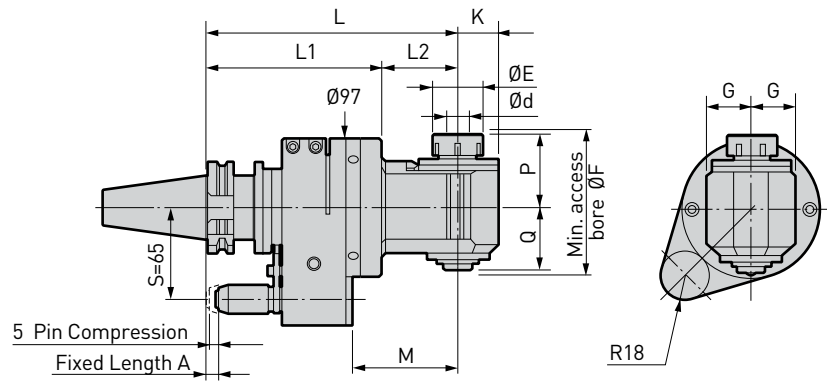


Fig. 1

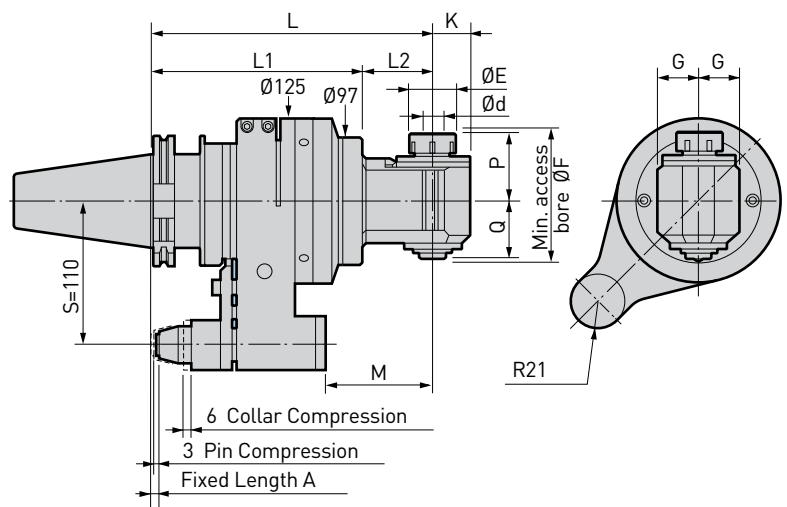


Fig. 2



Exclusive Stop Block is required.

Model	Fig.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet	Max. min ⁻¹	Weight (kg)	Order No.	
BDV40 -AG90/NBS6 -180	1	0.25 - 6	20	21	17	180	125	55	77	33	29	67	NBC6	6000	5.1	802.553	
						210		85	107						5.3	802.554	
						240		115	137						5.5	802.555	
						270		145	167						5.7	802.556	
		-AG90/NBS10 -180	1.5 - 10	30	30	25	180	125	55	77	45	43	91	NBC10	6000	5.5	802.546
							210		85	107						5.9	802.547
							240		115	137						6.2	802.548
							270		145	167						6.3	802.549
		-AG90/NBS13 -180	2.5 - 13	35	31	28	180	125	55	77	52	45	101	NBC13	6000	5.6	802.549
							210		85	107						6.0	802.550
							240		115	137						6.3	802.551
							270		145	167						6.3	802.551
-AG90/NBS20S -175S	2.5 - 20	46	35	33	175	122	53	72	65	62	132	NBC20	3000	8.0	802.552		
BDV50 -AG90/NBS6 -215	2	0.25 - 6	20	21	17	215	160	55	82	33	29	67	NBC6	6000	12.6	802.569	
						245		85	112						12.8	802.570	
						275		115	142						13.0	802.571	
						305		145	172						13.2	802.572	
		-AG90/NBS10 -215	1.5 - 10	30	30	25	215	160	55	82	45	43	91	NBC10	6000	13.0	802.562
							245		85	112						13.4	802.563
							275		115	142						13.7	802.564
							305		145	172						13.7	802.564
		-AG90/NBS13 -215	2.5 - 13	35	31	28	215	160	55	82	52	45	101	NBC13	6000	13.1	802.565
							245		85	112						13.5	802.566
							275		115	142						13.8	802.567
							305		145	172						13.8	802.567
-AG90/NBS20 -230	2.5 - 20	46	35	35	230	160	70	97	65	62	132	NBC20	3000	14.2	802.568		

1. The standard fixed length A is 8 mm for BDV40 and 6 mm for BDV50. Other lengths are available upon request.
2. New baby nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmilling (NBC□-□EAA) can not be used.

For New Baby Collet ▶ A138

For Stop Block ▶ C20

New Baby Chuck Type

It is the outstanding rigidity and accuracy of the New Baby Chuck, used for holding the cutting tool, that produces high precision with less runout. Available in various sizes to meet specific production requirements.



HSK-A63/HSK-100

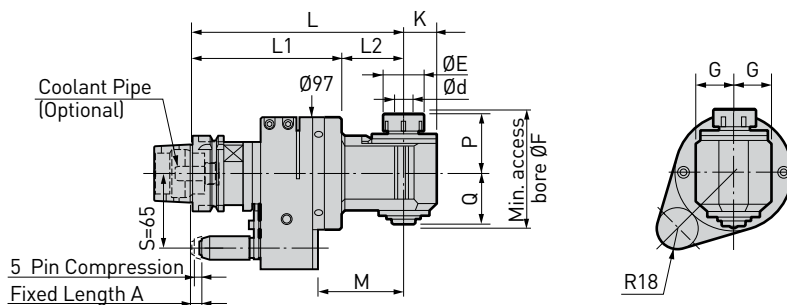


Fig. 1

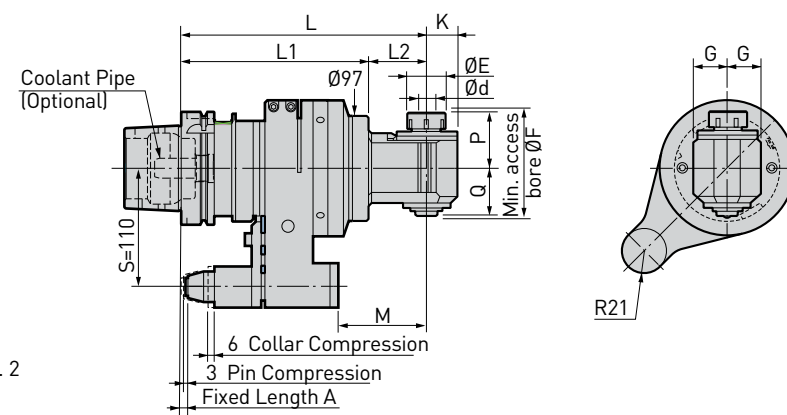


Fig. 2

Exclusive Stop Block is required.

Model	Fig.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet	Max. min ⁻¹	Weight (kg)	Order No.
HSK-A63-AG90/NBS6 -185	1	0.25 - 6	20	21	17	185	130	55	77	33	29	67	NBC6	6 000	5.0	802.717
						215		85	107						5.2	802.719
						245		115	137						5.4	802.721
						275		145	167						5.6	802.723
						245		115	137						6.1	802.706
-AG90/NBS10 -185	1	1.5 - 10	30	30	25	185	130	55	77	45	43	91	NBC10	6 000	5.4	802.702
						215		85	107						5.8	802.704
						245		115	137						6.1	802.706
						245		115	137						6.2	802.712
-AG90/NBS13 -185	1	2.5 - 13	35	31	28	185	130	55	77	52	45	101	NBC13	6 000	5.5	802.708
						215		85	107						5.9	802.710
						245		115	137						6.2	802.712
-AG90/NBS20S -180S	1	2.5 - 20	46	35	33	180	127	53	72	65	62	132	NBC20	3 000	7.9	802.716
HSK-A100 -AG90/NBS6 -225	2	0.25 - 6	20	21	17	225	170	55	82	33	29	67	NBC6	6 000	11.8	802.666
						255		85	112						12.0	802.669
						285		115	142						12.2	802.672
						315		145	172						12.4	802.675
						225		55	82						12.2	802.645
-AG90/NBS10 -225	2	1.5 - 10	30	30	25	255	170	85	112	45	43	91	NBC10	6 000	12.6	802.648
						285		115	142						12.9	802.651
						225		55	82						12.3	802.654
						255		85	112						12.7	802.657
-AG90/NBS13 -225	2	2.5 - 13	35	31	28	255	170	85	112	52	45	101	NBC13	6 000	13.0	802.660
						285		115	142						13.4	802.663
						285		115	142						13.0	802.660
-AG90/NBS20 -240	2	2.5 - 20	46	35	35	240	170	70	97	65	62	132	NBC20	3 000	13.4	802.663

1. The standard fixed length A is 8 mm for HSK-A63 and 6 mm for HSK-A100. Other lengths are available upon request.
2. New baby nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmilling (NBC□-□EAA) can not be used.

For New Baby Collet ▶ A138

For Stop Block ▶ C20

New Baby Chuck Type Extra Long Type

For drilling and key slotting in deep hole of large workpiece.

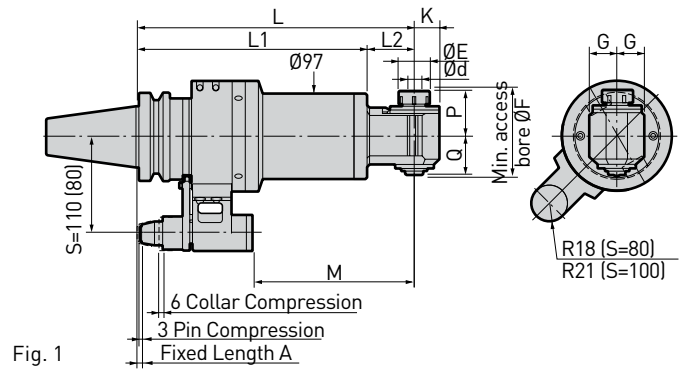


Fig. 1

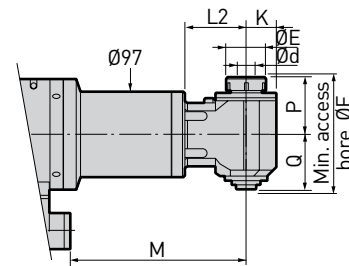


Fig. 2

Exclusive Stop Block is required.

Model	Fig.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet	Max. min ⁻¹	Weight (kg)	Order No.
BBT50 -AG90/NBS6 -315LS	1	0.25 - 6	20	21	17	315	260	55	182	33	29	67	NBC6	6000	18.9	805.035
						345		85	212						19.1	805.036
						375		115	242						19.3	805.037
						405		145	272						19.5	805.038
-AG90/NBS10 -315LS	1	1.5 - 10	30	30	25	315	260	55	182	45	43	91	NBC10	6000	19.3	805.047
						345		85	212						19.7	805.048
						375		115	242						20.0	805.049
-AG90/NBS13 -315LS	1	2.5 - 13	35	31	28	315	260	55	182	52	45	101	NBC13	6000	19.4	805.057
						345		85	212						19.8	805.058
						375		115	242						20.1	805.060
-AG90/NBS20 -330LS	2	2.5 - 20	46	35	35	330	260	70	197	65	62	132	NBC20	3000	20.5	805.067
BBT50 -AG90/NBS6 -415LS	1	0.25 - 6	20	21	17	415	360	55	282	33	29	67	NBC6	6000	23.3	805.039
						445		85	312						23.5	805.040
						475		115	342						23.7	805.041
						505		145	372						23.9	805.042
-AG90/NBS10 -415LS	1	1.5 - 10	30	30	25	415	360	55	282	45	43	91	NBC10	6000	23.7	805.050
						445		85	312						24.1	805.051
						475		115	342						24.4	805.052
-AG90/NBS13 -415LS	1	2.5 - 13	35	31	28	415	360	55	282	52	45	101	NBC13	6000	23.8	805.061
						445		85	312						24.2	805.062
						475		115	342						24.5	805.063
-AG90/NBS20 -430LS	2	2.5 - 20	46	35	35	430	360	70	297	65	62	132	NBC20	3000	24.9	805.069
BBT50 -AG90/NBS6 -515LS	1	0.25 - 6	20	21	17	515	460	55	382	33	29	67	NBC6	6000	27.7	805.043
						545		85	412						27.9	805.044
						575		115	442						28.1	805.045
						605		145	472						28.3	805.046
-AG90/NBS10 -515LS	1	1.5 - 10	30	30	25	515	460	55	382	45	43	91	NBC10	6000	28.1	805.053
						545		85	412						28.5	805.054
						575		115	442						28.8	805.055
-AG90/NBS13 -515LS	1	2.5 - 13	35	31	28	515	460	55	382	52	45	101	NBC13	6000	28.2	805.064
						545		85	412						28.6	805.065
						575		115	442						28.9	805.066
-AG90/NBS20 -530LS	2	2.5 - 20	46	35	35	530	460	70	397	65	62	132	NBC20	3000	29.3	805.070

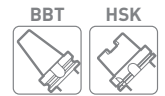
1. The standard fixed length A is 6 mm. Other lengths are available upon request.
2. Clamping nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmill model NBC□-□EAA can not be used.

For New Baby Collet ▶ A138

For Stop Block ▶ C20

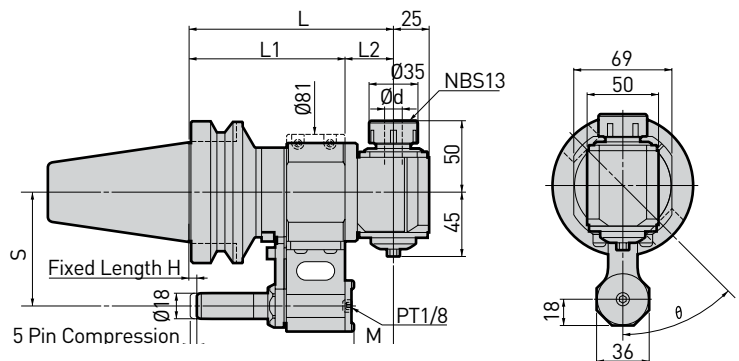
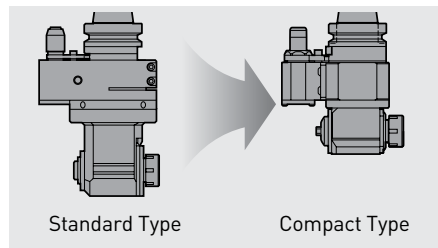
Compact Type

Compact and lightweight design combined with the accuracy required for drilling. Ideal size for small machining centers.



For drilling

- High precision New Baby Collet
- Spiral bevel gears and angular contact bearings
- Advanced non-contact sealing structure

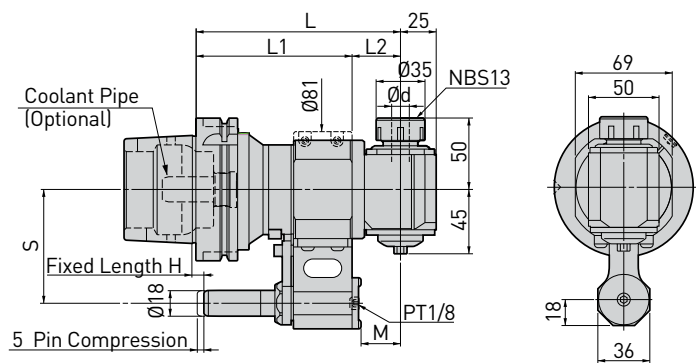


BBT

BBT40/BBT50/HSK-A63/HSK-A100



Exclusive Stop Block is required.



HSK

Shank	Model	Ød	L	L1	L2	M	Collet	Max. min ⁻¹	Weight (kg)	Order No.
BBT	BBT40 -AG90-13-120	2.5 -13	120	86	34	27.85	NBC13	5 000	4.5	802.471
			170		84	77.85			5.5	802.472
	BBT50 -AG90-13-145		145	111	34	27.85	NBC13	5 000	7.6	802.527
			195		84	77.85			8.6	802.528
HSK	HSK-A63 -AG90-13-135	2.5 -13	135	101	34	27.85	NBC13	5 000	4.4	802.725
			185		84	77.85			5.4	802.726
	HSK-A100-AG90-13-145		145	111	34	27.85	NBC13	5 000	6.8	802.678
			195		84	77.85			7.8	802.679

1. Standard fixed length H is 6 mm. Other lengths are available upon request.
2. Standard "S" is 80 mm for BBT50/HSK-A100 and 65 mm for BBT40/HSK-A63.
3. New baby nut and wrench are included. New baby collet is to be ordered separately.
4. New baby collet for endmilling (NBC□-□EAA) can not be used.

For New Baby Collet ▶ A138

For Stop Block ▶ C20

Application examples

High rigidity and runout accuracy provides stable machining.

C.1

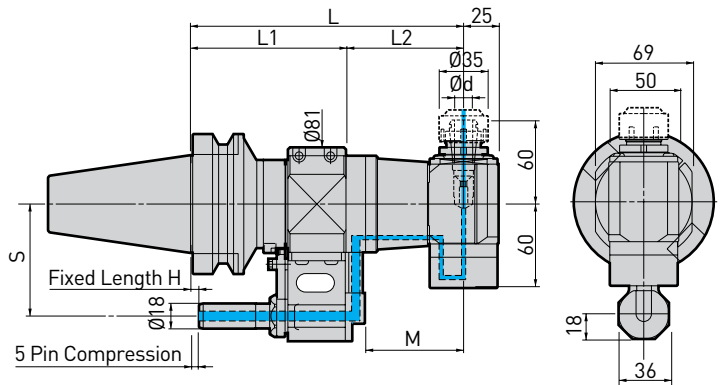
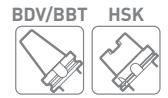


Drilling Ø 12

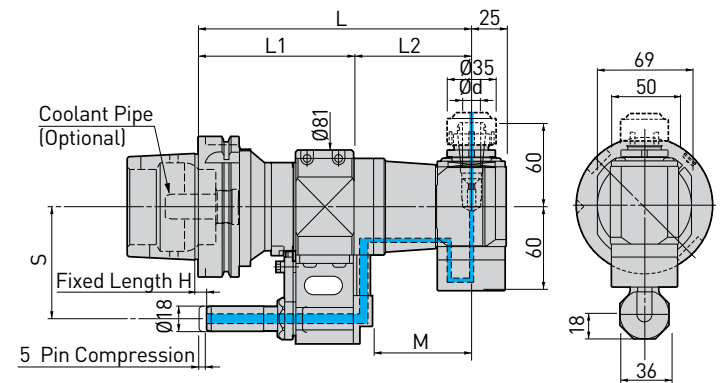
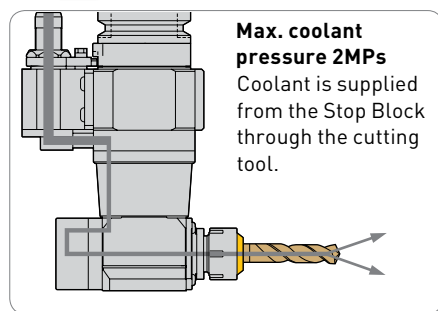
Cutter	Ø 12 carbide drill
Workpiece	C50
Cutting Speed	70 m/min
Cutting Feed	372 mm/min 0.2 mm/rev
Spindle Speed	1860 min ⁻¹

OAG Type

BBT40/BBT50/HSK-A63/HSK-A100



BBT



HSK



Exclusive Stop Block is required.

Shank	Model	Ød	L	L1	L2	M	Collet	Nut	Max. min ⁻¹	Weight (kg)	Order No.
BBT	BBT40 -OAG90-13-170	2.5 - 13	170	86	84	70.5	NBC13	BPS13	5 000	6.0	802.482
	BBT50 -OAG90-13-195		195	111						9.2	802.545
HSK	HSK-A63 -OAG90-13-185		185	101	5.9					802.736	
	HSK-A100 -OAG90-13-195		195	111	8.4					802.697	

- Standard fixed length A is 6 mm. Other lengths are available upon request.
- Standard "S" is 80 mm for BBT50/HSK-A100 and 65 mm for BBT40/HSK-A63.
- New baby nut and wrench are included. New baby collet is to be ordered separately.

For New Baby Collet ▶ A138

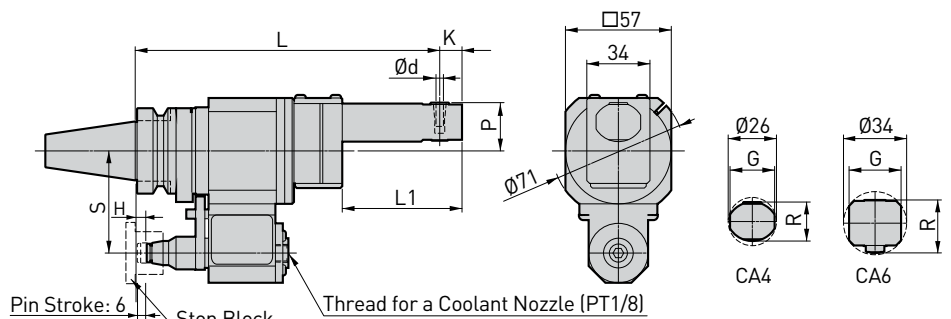
For Baby Perfect Seal ▶ A148

For Stop Block ▶ C20

BBT30 Light Weight Type



Exclusive Stop Block is required.



max. 2 000 min⁻¹

Model	L	L1	Ød	K	P	G	R	Ratio	Collet	Weight (kg)	Order No.
BBT30 -AG90-CA4SG-164	164	64.5	3 ~ 4	12	26	24	21	1 : 1.13	CA4 - _	1.90	805.570
-AG90-CA6SG-164	164	67	3 ~ 6	14.5	28	28	28.5	1 : 0.91	CA6 - _	1.98	805.571

- H and S dimension and angle must be indicated before ordering.
- Tolerance of the cutting tool shank must be within h7.
- Exclusive collet is to be ordered separately.

For Exclusive Collet ▶ C13

Small Bore Type



Angular operation in a $\varnothing 30$ mm bore (min.) is possible. Modular heads enhance versatility. Head is aligned with spindle center for easy programming.

BBT40/BBT50

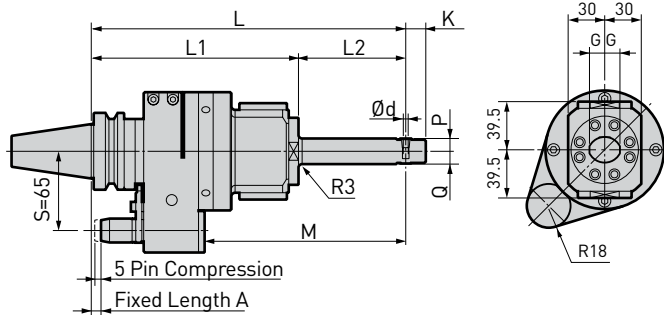
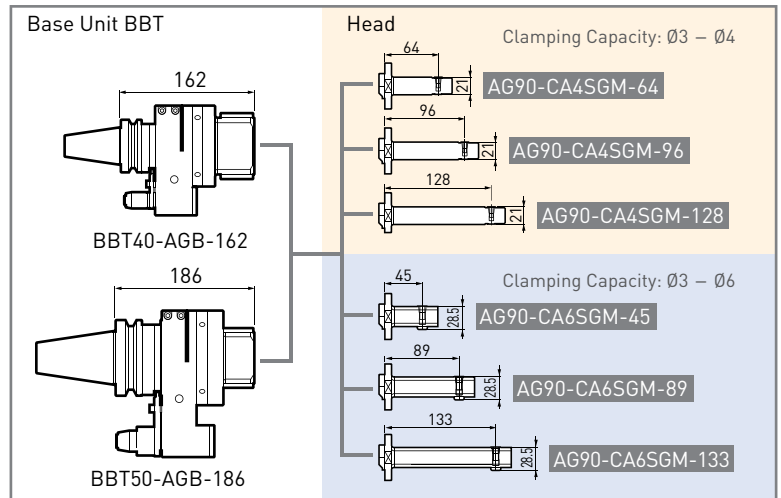


Fig. 1

max. 2 000 min⁻¹

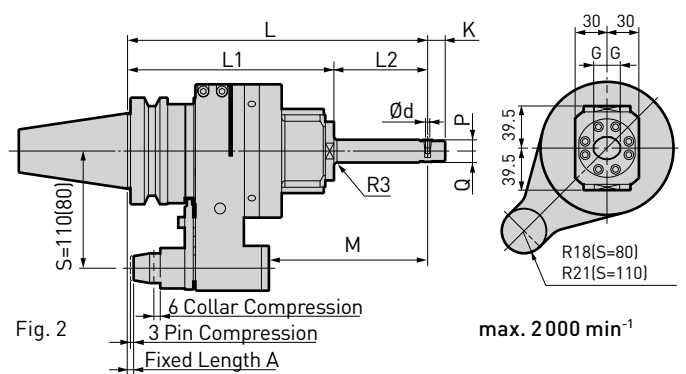


Fig. 2

max. 2 000 min⁻¹



Exclusive Stop Block is required.

Model	Base	Head	Fig.	$\varnothing d$	G	K	L	L1	L2	M	P	Q	Speed Ratio	Weight (kg)			Order No.	
														S=65	S=80	S=110		
BBT40-AG90 -CA4SGM -226 -258 -290 -CA6SGM -207 -251 -295	BBT40-AGB-162	AG90-CA4SGM - 64	1	3 - 4	12.5	16.5	226	170	56	133	10.5	10.5	1:1.06	5.6			802.473	
		258					88		165	5.7						802.474		
		290					120		197	5.8						802.475		
		AG90-CA6SGM - 45		3 - 6	15	20	207	37	114	12.5	16	1:0.77	5.7			802.476		
		251					81	158	5.9						802.477			
		295					125	202	6.1						802.478			
BBT50-AG90 -CA4SGM -250 -282 -314 -CA6SGM -231 -275 -319	BBT50-AGB-186	AG90-CA4SGM - 64	2	3 - 4	12.5	16.5	250	194	56	117	10.5	10.5	1:1.06		12.5	11.9	802.529	
		282					88		149					12.6	12	802.531		
		314					120		181					12.7	12.1	802.533		
		AG90-CA6SGM - 45		3 - 6	15	20	231	37	98	12.5	16	1:0.77				12.6	12	802.535
		275					81	142					12.8	12.2	802.537			
		319					125	186					13	12.4	802.539			

- Standard fixed length A is 6 mm for BBT50 and 8 mm for BBT40. Other lengths are available upon request.
- Order No. for BBT50 is with S = 110. S = 80 type for BBT50 is available upon request.
- Internal coolant can not be used.
- Exclusive collet is to be ordered separately.

For Stop Block ▶ C20

Small Bore Type



HSK-A63/HSK-A100

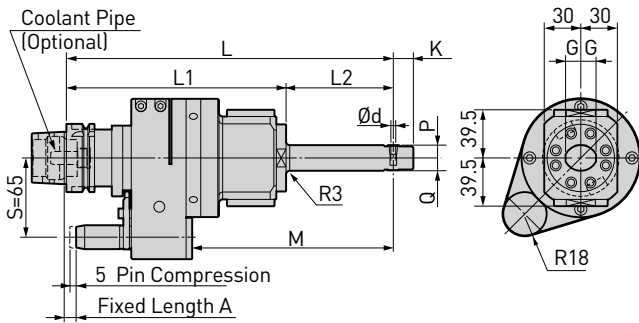
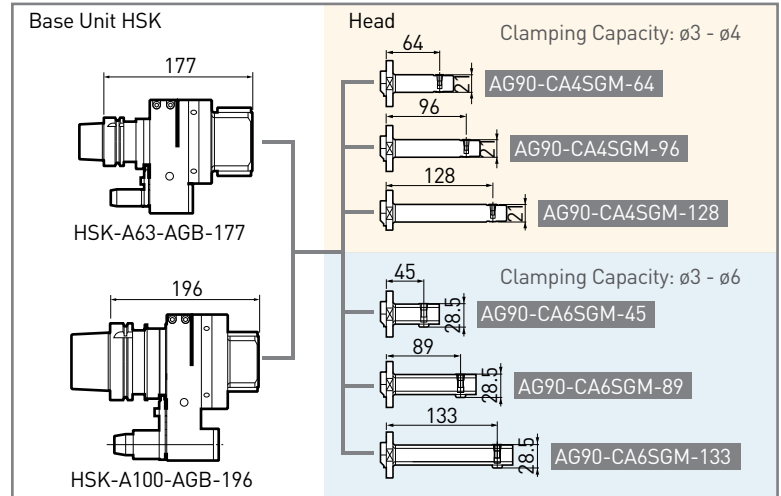


Fig. 1

max. 2 000 min⁻¹

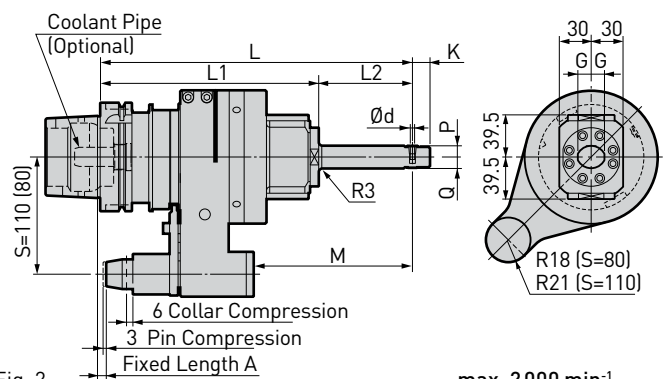


Fig. 2

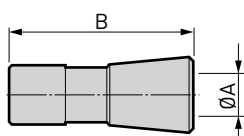
max. 2 000 min⁻¹

Model	Base	Head	Fig.	Ød	G	K	L	L1	L2	M	P	Q	Speed Ratio	Weight (kg)			Order No.		
														S=65	S=80	S=110			
HSK-A63-AG90 -CA4SGM -241	HSK-A63-AGB-177	AG90-CA4SGM - 64	1	3 - 4	12.5	16.5	241	185	56	133	10.5	10.5	1:1.06	5.5			802.727		
-273		- 96					273		88	165				5.6			802.728		
-305		-128					305		120	197				5.7			802.729		
HSK-A100-AG90 -CA6SGM -222		HSK-A100-AGB-196		AG90-CA6SGM - 45	2	3 - 6	15	20	222	204	37	114	12.5	16	1:0.77	5.6			802.730
-266				- 89					266		81	158				5.8			802.731
-310				-133					310		125	202				6.0			802.732
HSK-A100-AG90 -CA4SGM -260	HSK-A100-AGB-196		AG90-CA4SGM - 64	2		3 - 4	12.5	16.5	260	204	56	117	10.5	10.5	1:1.06	-	11.7	11.1	802.680
-292			- 96						292		88	149				-	11.8	11.2	802.682
-324			-128						324		120	181				-	11.9	11.3	802.684
HSK-A100-AG90 -CA6SGM -241		HSK-A100-AGB-196	AG90-CA6SGM - 45		2	3 - 6	15	20	241	204	37	98	12.5	16	1:0.77	-	11.8	11.2	802.686
-285			- 89						285		81	145				-	12.0	11.4	802.688
-329			-133						329		125	186				-	12.2	11.6	802.690

- Standard fixed length A is 6 mm for HSK-A100 and 8 mm for HSK-A63. Other lengths are available upon request.
- Order No. for HSK-A100 is with S = 110. S = 80 type for HSK-A100 is available upon request.
- Internal coolant can not be used.
- Exclusive collet is to be ordered separately.

For Collet ▶ A138
For Stop Block ▶ C20

Exclusive collet for Small Bore Angle Head

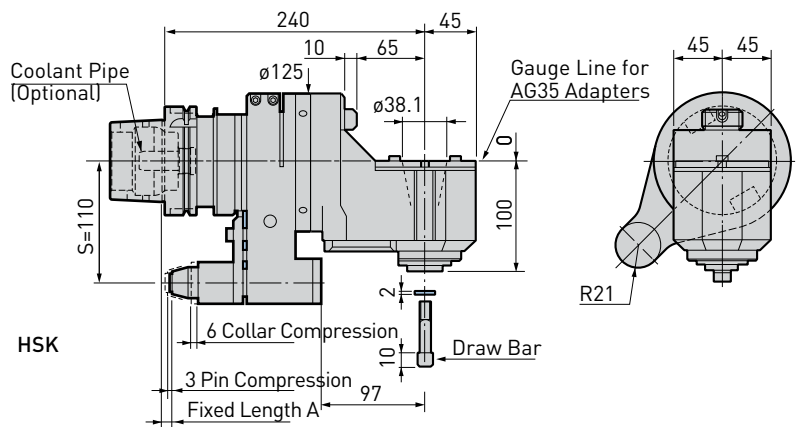
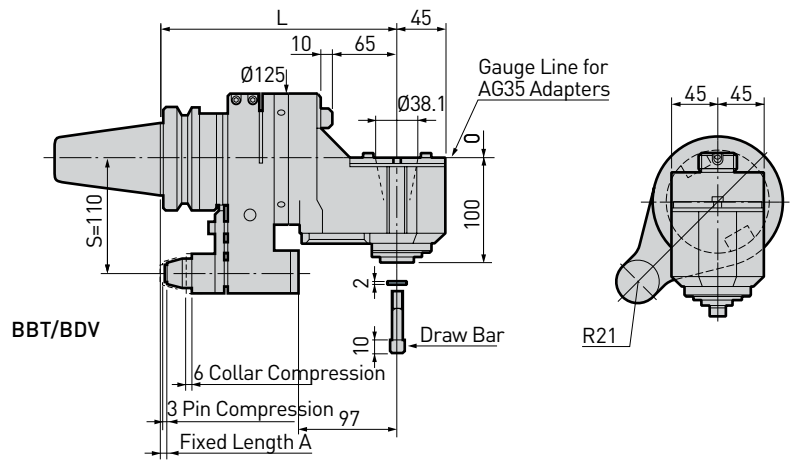
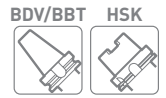


Model	ØA	B	Order No.
CA4 -3	3	16.5	804.666
-3.5	3.5		804.667
-4	4		804.668

Model	ØA	B	Order No.
CA6 -3	3	22	804.669
-4	4		804.670
-5	5		804.671
-6	6		804.672

Build-Up Type

Designed for greater rigidity by having the face of the spindle bore in line with the center of the machine spindle. Also helps minimize interference problems with ATC and storage problems within the magazine.



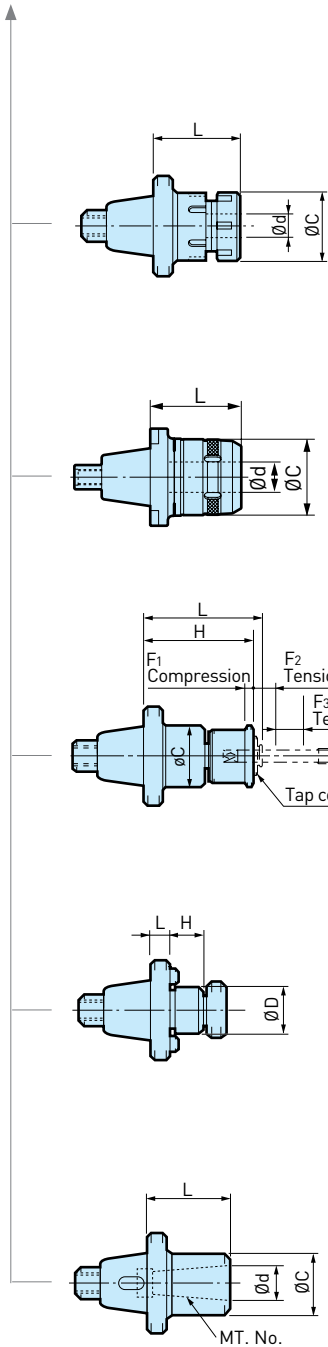
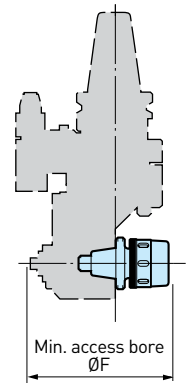
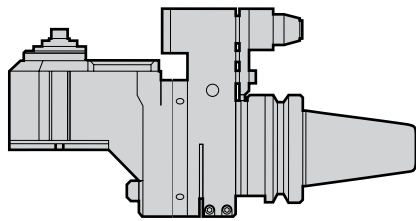
Exclusive Stop Block is required.

Shank	Model	L	Max. min ⁻¹	Weight (kg)	Order No.
BBT	BBT50 -AG90/AGH35-230	230	3 000	15.0	802.489
	-AG90/AGH35-230S	230	3 000	16.3	802.490
BDV	BDV50 -AG90/AGH35-230	230	3 000	15.0	802.558
	-AG90/AGH35-230S	230	3 000	16.3	802.559
HSK	HSK-A100 -AG90/AGH35-240	240	3 000	14.2	802.639
	-AG90/AGH35-240S	240	3 000	15.5	802.640

1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.

For Stop Block ▶ C20

AG35 adapters



New Baby Chuck

Model	Ød	L	ØC	ØF	Weight (kg)	Order No.
AG35 -NBS10	1.5 - 10	47	30	162	0.6	962.793
-NBS13	2.5 - 13	54	35	168	0.7	962.794
-NBS16	2.5 - 16		42	170	0.8	962.795
-NBS20	2.5 - 20		46	170	0.9	962.796

1. New baby collet and wrench are to be ordered separately.

For New Baby Collet ▶ A138

For Wrench ▶ A157

New Hi-Power Milling Chuck

Model	Ød	L	ØC	ØF	Weight (kg)	Order No.
AG35 -HMC20S	20	60	52	178	1.5	802.742

1. Wrench (FK45-50L) is included.

For Straight Collet ▶ A158

Auto Tapper Type B (automatic depth control)

Model	d	L	ØC	H	F1	F2	F3	Weight (kg)	Order No.
AG35 -ATB12E	M4 - M12	80	40.5	72	0.5	5	4	1.0	802.435
-ATB20E	M8 - M20	115	57.5	102.5		6.5	5	1.7	802.436

1. Please contact BIG KAISER agent for tap collet.

Face Mill Arbor

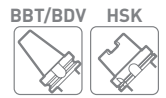
Model	ØD	L	H	Weight (kg)	Order No.
AG35 -FMH22 -30	22	30	18	1.0	802.740
-FMH27 -20	27	20	20	1.0	802.741

Morse Taper Adapter

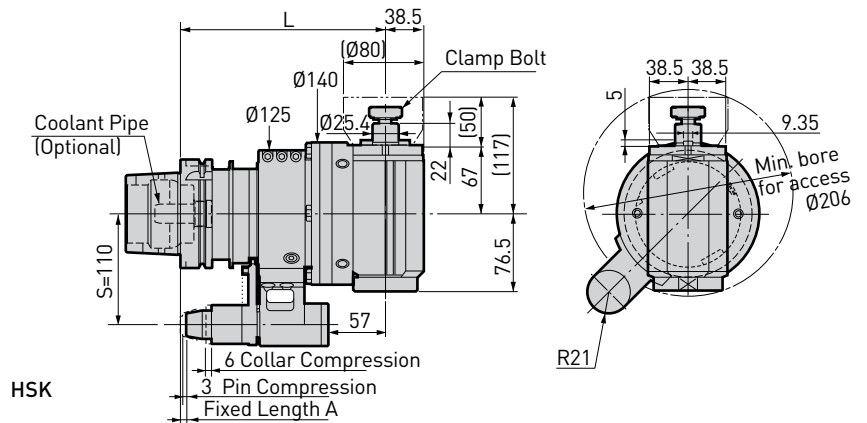
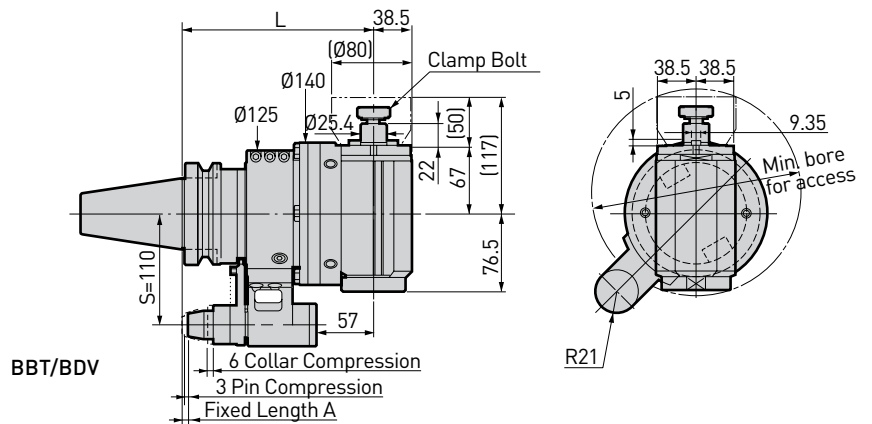
Model	Ød	MT. No.	L	ØC	ØF	Weight (kg)	Order No.
AG35 -MT1	12.065	1	50	24	164	0.6	962.785
-MT2	17.78	2	60	32	180	0.7	962.786

Face Mill Type

High rigidity bearings and substantial spindle design. Max. power transmission 20Kw. (at 1500 min⁻¹).



BBT50/BDV50/HSK-A100



Exclusive Stop Block is required.

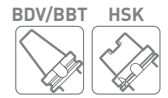
Shank	Model	L	Max. min ⁻¹	Weight (kg)	Order No.
BBT	BBT50 -AG90-FMA25.4S-190S	190	1500	19.2	802.541
BDV	BDV50 -AG90-FMA25.4S-190S	190	1500	19.2	805.895
HSK	HSK-A100 -AG90-FMA25.4S-200S	200	1500	18.4	802.692

- Standard fixed length A is 6 mm. Other lengths are available upon request.
- Order No. is with S = 110. S = 80 type is available upon request.
- Figures in () in the drawing indicate dimensions when 80 mm dia. and 50 mm height face mill cutter is mounted.

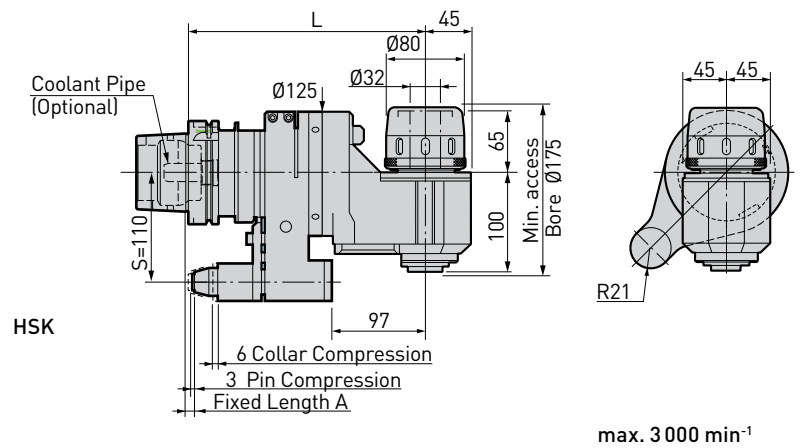
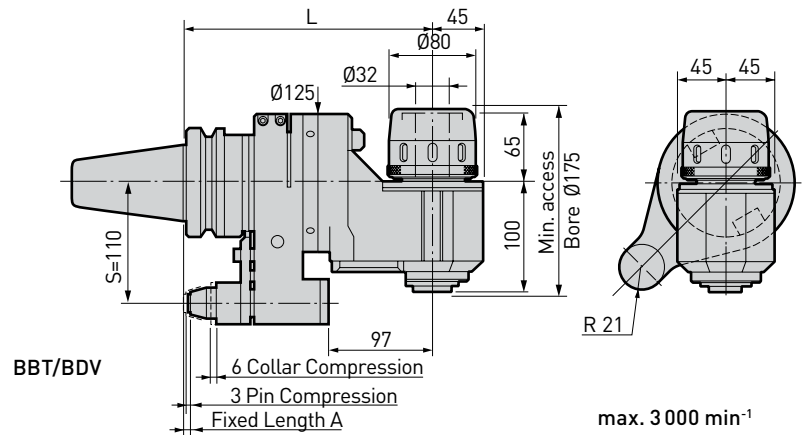
For Stop Block ▶ C20

HMC Type

Improved versatility is achieved from the 32 mm capacity Milling Chuck by using parallel reduction collets and other accessories.



BBT50/BDV50/HSK-A100



Exclusive Stop Block is required.

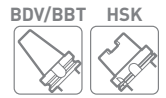
Shank	Model	L	Max. min ⁻¹	Weight (kg)	Order No.
BBT	BBT50 -AG90/HMC32 -230	230	3 000	16.8	802.492
	-AG90/HMC32 -230S	230	3 000	18.1	802.493
BDV	BDV50 -AG90/HMC32 -230	230	3 000	16.8	802.560
	-AG90/HMC32 -230S	230	3 000	18.1	802.561
HSK	HSK-A100 -AG90/HMC32 -240	240	3 000	16.0	802.642
	-AG90/HMC32 -240S	240	3 000	17.3	802.643

1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Wrench (FK80-90) is included.

For Stop Block ▶ C20

Universal Type

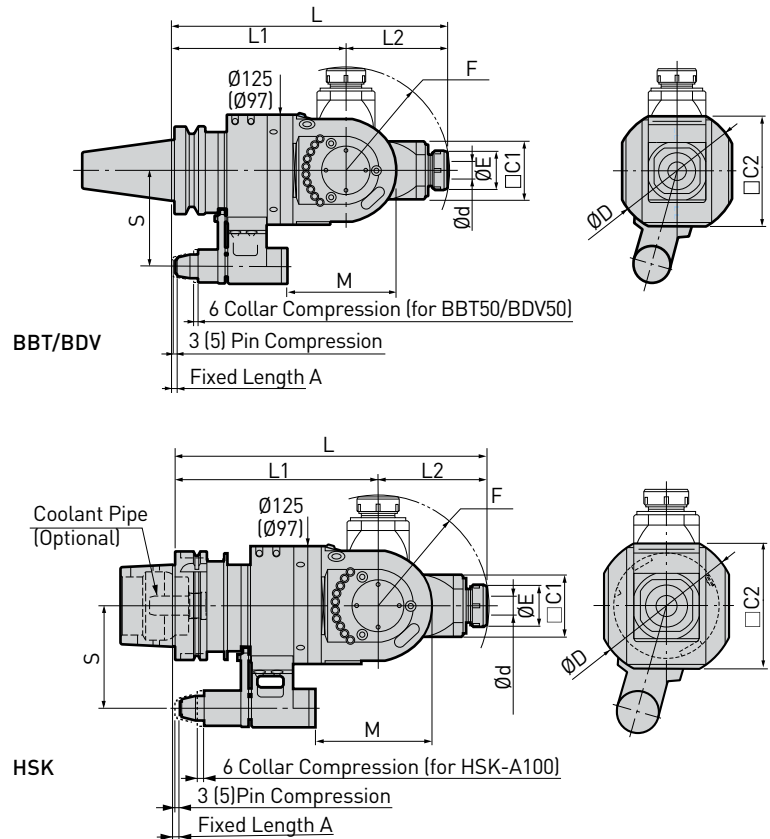
Suitable for all cutting angles. In addition to the cutter head being adjustable a full 360°, the spindle also becomes easily and precisely adjustable from 0° to 90° by 1 increments.



BBT40/BBT50/BDV40/BDV50/HSK-A63/HSK-A100



Exclusive Stop Block is required.



Shank	Model	Ød	ØE	ØD	□C1	□C2	L	L1	L2	M	F	S	Collet	Max. min ⁻¹	Weight (kg)	Order No.	
BBT	BBT40-AGU/NBS13	-270	2.5 - 13	35	115	51	97	270	170	100	124	102	65	NBC13	6 000	9.7	802.480
	BBT50-AGU/NBS20	-315	2.5 - 20	46	140	65	125	315	200	115	125	118	110	NBC20	4 000	20.8	802.318
BDV	BDV40-AGU/NBS13	-280	2.5 - 13	35	115	51	97	280	180	100	124	102	65	NBC13	6 000	9.7	802.557
	BDV50-AGU/NBS20	-315	2.5 - 20	46	140	65	125	315	200	115	125	118	110	NBC20	4 000	20.8	802.573
HSK	HSK-A63-AGU/NBS13	-285	2.5 - 13	35	115	51	97	285	185	100	124	102	65	NBC13	6000	9.6	802.734
	HSK-A100-AGU/NBS20	-325	2.5 - 20	46	140	65	125	325	210	115	125	118	110	NBC20	4000	20.0	802.695

- Standard fixed length A is 6 mm for BBT50/HSK-A100 and 8 mm for BBT40/HSK-A63. Other lengths are available upon request.
- Order No. for BBT50/BDV50 and HSK-A100 is with S = 110. S = 80 type for BBT50 and HSK-A100 is available upon request.
- Figures in () in the drawing indicate dimensions for BBT40/BDV40 and HSK-A63.
- New baby nut and wrench are included.

For New Baby Collet ▶ A138

For Stop Block ▶ C20

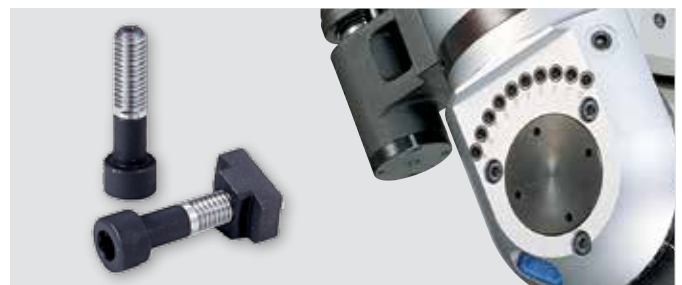
C.1



Easily adjustable spindle angle from 0° to 90°.



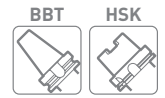
Unique setting mechanism enables the spindle angle to be precisely set at 1° increments.



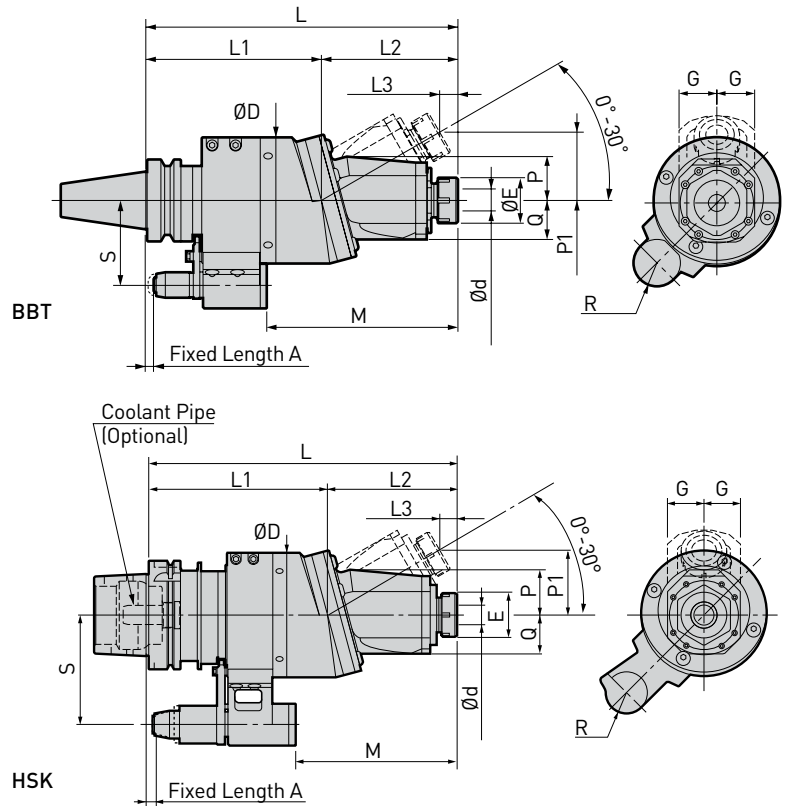
Specially selected materials and special design for clamping the head guarantees rigidity for even end milling applications.

AGU30 Type

Spindle angle is adjustable from 0° to 30°. Large swivel flange assures high rigidity.



BBT40/BBT50/HSK-A63/HSK-A100



Exclusive Stop Block is required.

Model	Ød	ØD	ØE	G	L	L1	L2	L3 max.	O	P	P1 max.	R	S	Max. min ⁻¹	Collet	Weight (kg)	Order No.
BBT40 -AGU30/NBS13 -240	2.5 - 13	97	35	29	240	135	105	14	30	34	52.5	18	65	6 000	NBC13	6.9	802.481
BBT50 -AGU30/NBS20 -295	2.5 - 20	125	46	36.5	295	165	130	17	39	45	65	21	110	4 000	NBC20	16.1	802.544
HSK-A63 -AGU30/NBS13 -255	2.5 - 13	97	35	29	255	150	105	14	30	34	52.5	18	65	6 000	NBC13	6.8	802.735
HSK-A100-AGU30/NBS20 -305	2.5 - 20	125	46	36.5	305	175	130	17	39	45	65	21	110	4 000	NBC20	15.3	802.696

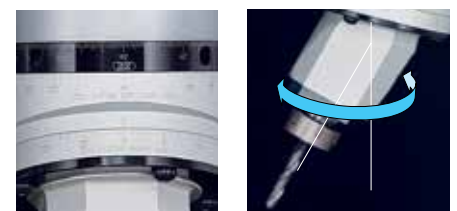
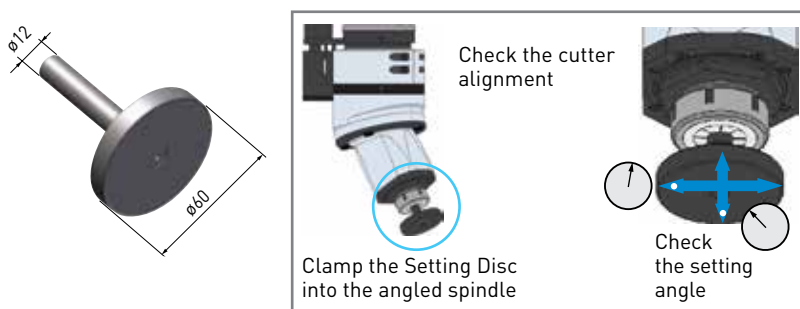
- Standard fixed length A is 6 mm for BBT50/HSK-A100 and 8 mm for BBT40/HSK-A63. Other lengths are available upon request.
- Order No. for BBT50 and HSK-A100 is with S = 110. S = 80 type for BBT50 and HSK-A100 is available upon request.
- New baby nut, wrench and setting disk are included.

For New Baby Collet ▶ A138

For Stop Block ▶ C20

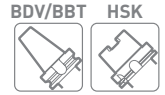
Setting Disc (included accessory)

For precise adjustment of the spindle angle or direction.



Spindle angle is easily adjustable from 0° to 30° using the scale indication on the body.

Set Up Information



Preparing the Stop Block

The Angle Head utilizes a Locating Pin that engages with the Stop Block, which is mounted to the machine spindle to prevent radial movement of the Angle Head during operation. Therefore, it is necessary to use a Stop Block with the proper dimensions to match the Locating Pin of the Angle Head.

1. Standard Setup of the Locating Pin

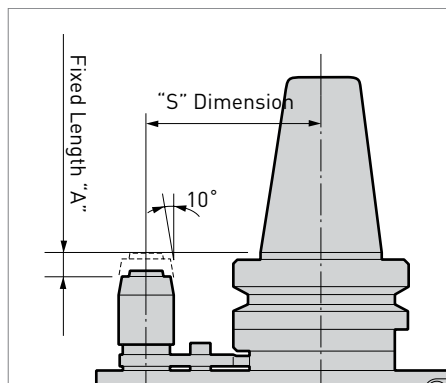
Please note that the "S" dimension and Fixed Length "A" are not adjustable by the user. If the standard dimensional values shown below are not suitable for your machine, please contact us.

"S" Dimension

The distance from the centerline of the Angle Head spindle to the centerline of the Locating Pin.

Fixed Length "A"

The axial distance from the gauge line to the top of the Locating Pin, when the Locating Pin is properly engaged in the Stop Block.



	"S" Dimension	Fixed Length "A"
BDV / BBT40 / HSK-A63	65	8
BDV / BBT50 / HSK-A100	110	6

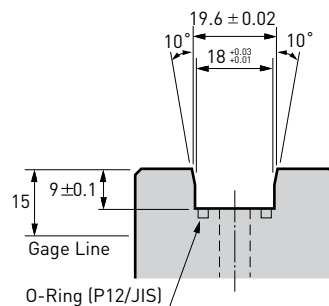
2. Stop Block Dimensions

Please order a Stop Block from the machine tool builder. Refer to the following diagrams for the proper Stop Block groove dimensions and configurations for use with the Angle Head.

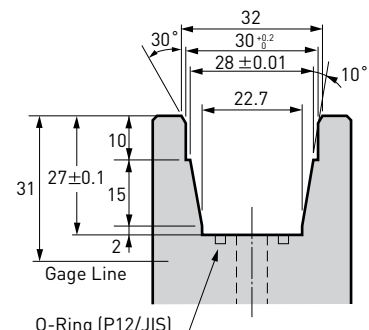


Stop Block

BDV40/BBT40/HSK-A63



BDV50/BBT50/HSK-A100



Note

For a BDV50/BBT50/HSK-A100 unit with an 80 mm "S" dimension, please use the Stop Block dimensions for BDV40/BBT40/HSK-A63, as the Locating Pin dimension differs from that of a standard unit with a 110 mm "S" dimension.

3. Semi-Finished Stop Block

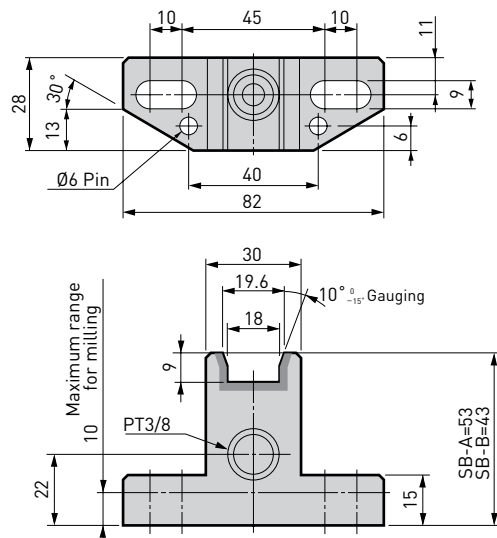
A semi-finished Stop Block has the proper groove form for use with the Angle Head, as well as additional material to allow the user to machine the block to the correct height.

If a pre-made Stop Block is unobtainable from the machine tool builder, a semi-finished Stop Block can be used. Please consult with the machine tool builder for selection, machining, and mounting of a semi-finished Stop Block.

BDV40/BBT40/HSK-A63

Model: SB-A/SB-B

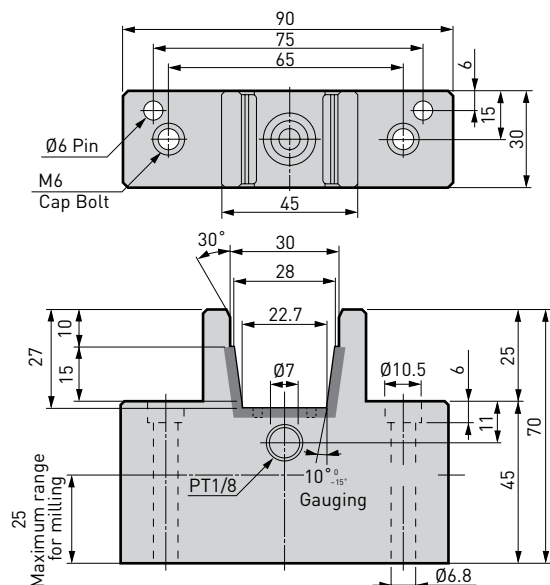
1. Adjustment to the required height by milling the base.
2. Fix the stop block by inserting two dowel pins ($\varnothing 6$).



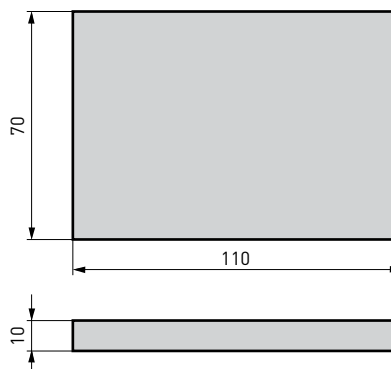
BDV50/BBT50/HSK-A100

Model: SB-G/E

1. Adjustment to the required height by milling the base.
2. Fix the stop block by inserting two dowel pins ($\varnothing 6$).



Model	Order No.
SB - A	962.571
SB - B	962.572
SB - G/E	802.329



Note

On the sketch indicates heat treatment (HRC45-50), all other surfaces can be milled.

Application examples

**AG90-Series (Build-Up Type)****Standard Type**

BBT50-AG90/AGH35-230

(with AG35-FMA25.4-20)

Workpiece: Carbon Steel C55**Cutter:** 80 mm Face Mill**Cutting Depth:** 2 mm**Spindle Speed:** 600 min⁻¹**Cutting Speed:** 150 m/min.**Cutting Feed:** 360 mm/min.**S-Type**

BBT50-AG90/AGH35-230S

(with AG35-FMA25.4-20)

Workpiece: Carbon Steel C55**Cutter:** 80 mm Face Mill**Cutting Depth:** 3 mm**Spindle Speed:** 600 min⁻¹**Cutting Speed:** 150 m/min.**Cutting Feed:** 360 mm/min.**AG90-Series (HMC Type)****Standard Type**

BBT50-AG90/HMC32-230

Workpiece: Carbon Steel C55**Cutter:** 20 mm Face Mill**Cutting Depth:** 3 mm**Spindle Speed:** 400 min⁻¹**Cutting Speed:** 25 m/min.**Cutting Feed:** 72 mm/min.**S-Type**

BBT50-AG90/HMC32-230S

Workpiece: Carbon Steel C55**Cutter:** 20 mm Face Mill**Cutting Depth:** 4 mm**Spindle Speed:** 400 min⁻¹**Cutting Speed:** 25 m/min.**Cutting Feed:** 72 mm/min.**AGU-Series (AGU30 Type)**

BBT40-AGU30/NBS13-240

Workpiece: Pre-hardened steel (HRC40)**Cutter:** R5 2-flute carbide ball end mill**Cutting Depth:** Ad = 0.1 mm**Spindle Speed:** 6 000 min⁻¹**Peck Feed:** Pf = 0.4**Cutting Speed:** 90 m/min.**Cutting Feed:** 900 mm/min.

Special Designs

Our long experience and expertise enables us to design and manufacture special custom made Angle Heads for almost any customer application.

Special angle



Special length



Coolant feeder



BBT30



Air Turbine Spindle

Center Through Type	24 - 25
Side Through Type	26 - 27
Application Examples	28
Air Filter Regulator	29
Set Up Information	30

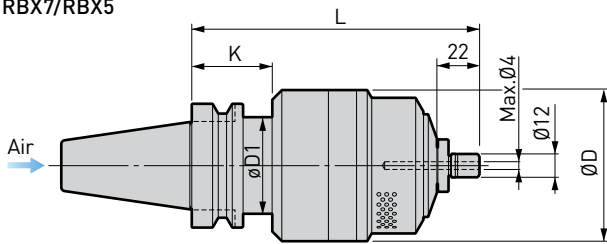
C.2

Air Turbine Spindle

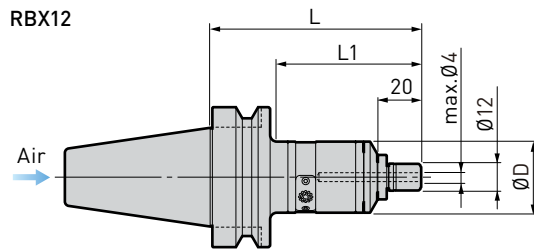
Center Through Type



RBX7/RBX5



RBX12



Shank	Model	Operation Speed (min ⁻¹)	L	L1	ØD	K	Nut	Weight (kg)	Order No.
BBT	BBT30 -RBX12C -4S- 95	100 000 - 120 000	95	70	32	-	MGN4S-HG	0.7	804.890
	BBT40 -RBX12C -4S- 95	100 000 - 120 000	95	65	32	-	MGN4S-HG	1.3	804.891
	-RBX7C -4S-150	60 000 - 80 000	150	-	78	43	MGN4S	3.1	802.409
	-RBX5C -4S-150	40 000 - 50 000	150	-	96	43	MGN4S	4.1	802.403
	BBT50 -RBX7C -4S-160	60 000 - 80 000	160	-	78	53	MGN4S	6.3	802.420
	-RBX5C -4S-160	40 000 - 50 000	160	-	96	53	MGN4S	7.3	802.415
BDV	BDV40 -RBX7C -4S-150	60 000 - 80 000	150	-	78	43	MGN4S	3.1	801.040
	-RBX5C -4S-150	40 000 - 50 000	150	-	96	43	MGN4S	4.1	962.642
	BDV50 -RBX7C -4S-145	60 000 - 80 000	145	-	78	38	MGN4S	5.8	802.424
	-RBX5C -4S-145	40 000 - 50 000	145	-	96	38	MGN4S	6.8	802.422

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and XF1 (air unit) are to be ordered separately.

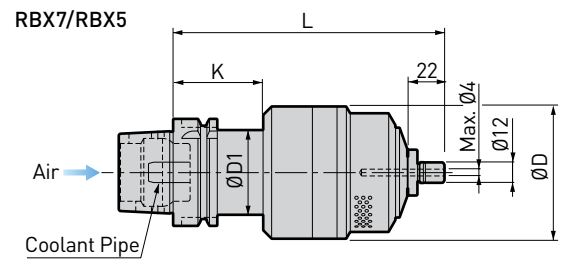
For Micro Collet ▶ A135

For Air Filter ▶ C29

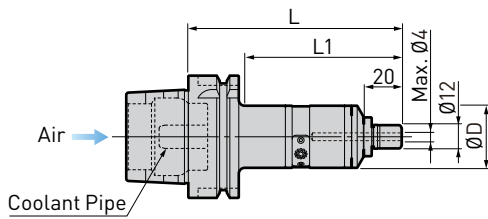
For Stop Block ▶ C30



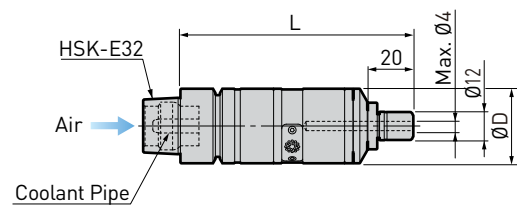
Center Through Type



HSK-A63-RBX12



HSK-E32-RBX12



Shank	Model	Spindle Speed (min ⁻¹)	L	L1	ØD	ØD1	K	Nut	Weight (kg)	Order No.
HSK-E	HSK-E32 -RBX12C-4S-100	100 000 - 120 000	100	-	32	-	-	MGN4S-HG	0.45	803.226
HSK-A	HSK-A63 -RBX12C-4S-110	100 000 - 120 000	110	81	32	-	-	MGN4S-HG	1.0	805.749
	-RBX7C -4S-160	60 000 - 80 000	160	-	78	50	53	MGN4S	2.9	965.505
	-RBX5C -4S-160	40 000 - 50 000	160	-	96	50	53	MGN4S	3.9	965.506
	HSK-A100 -RBX7C -4S-165	60 000 - 80 000	165	-	78	68	58	MGN4S	4.9	802.430
	-RBX5C -4S-165	40 000 - 50 000	165	-	96	68	58	MGN4S	5.9	802.427

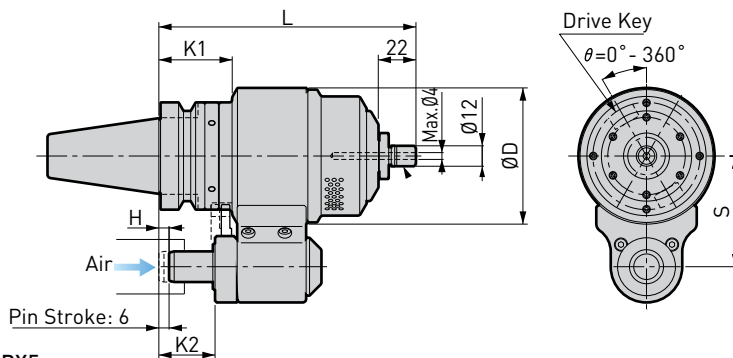
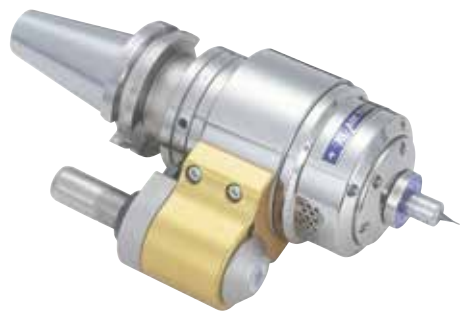
1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27), coolant pipe and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-_) and coolant pipe are to be ordered separately.
3. XF1 (air unit) is to be ordered separately.

For Micro Collet ▶ A135
 For Air Filter ▶ C29
 For Stop Block ▶ C30
 For Coolant Pipe ▶ A81

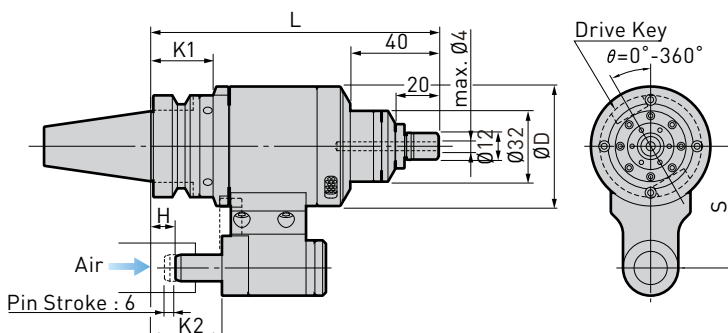
Air Turbine Spindle

Side Through Type

BDV/BBT



RBX7/RBX5



RBX12



Exclusive Stop Block is required.

Shank	Model	Operation Speed (min ⁻¹)	L	ØD	K1	K2	S	H	Nut	Weight (kg)	Order No.
BBT	BBT30 -RBX12 -4S-130-55	100 000 - 120 000	130	54	28	32	55	0 - 20	MGN4S-HG	1.7	804.883
	BBT40 -RBX12 -4S-135-65	100 000 - 120 000	135	63	-	33	65	-24 - 21	MGN4S-HG	3.0	804.885
	BBT30 -RBX7 -4S-152-55	60 000 - 80 000	152	80	28	33	55	-10 - 22	MGN4S	2.7	802.395
	BBT40 -RBX7 -4S-151-65	60 000 - 80 000	151	80	43	33	65	-24 - 21	MGN4S	4.0	802.404
	-RBX5 -4S-151-65	40 000 - 50 000		96						5.0	802.398
	BBT50 -RBX7 -4S-166-80	60 000 - 80 000	166	100	58	48	80	-9 - 36	MGN4S	8.7	802.416
-RBX5 -4S-166-80	40 000 - 50 000	96		9.7	802.411						
BDV	BDV40 -RBX7 -4S-165-65	60 000 - 80 000	165	80	57	47	65	-10 - 35	MGN4S	4.0	962.667
	-RBX5 -4S-165-65	40 000 - 50 000		96						5.0	962.668
	BDV50 -RBX7 -4S-170-80	60 000 - 80 000	170	100	62	52	80	-5 - 40	MGN4S	8.7	962.669
	-RBX5 -4S-170-80	40 000 - 50 000		96						9.7	962.670

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. XF1 (air unit) is to be ordered separately.
3. MEGA micro collet (NBC4S - _) is to be ordered separately.

For Micro Collet ▶ A135

For Air Filter ▶ C29

For Stop Block ▶ C30

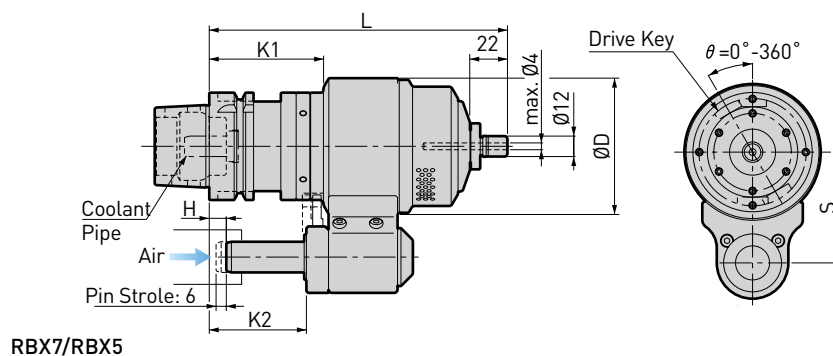
C.2

For manual tool change

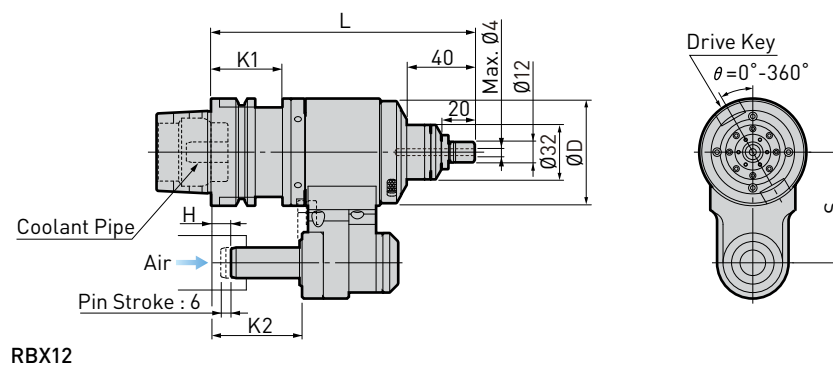
Easily mounted on machines without a stop block. When ordering, please contact BIG KAISER agent.



HSK



RBX7/RBX5



RBX12



Exclusive Stop Block is required.

Shank	Model	Operation Speed (min ⁻¹)	L	ØD	K1	K2	S	H	Nut	Weight (kg)	Order No.
HSK-A	HSK-A63 -RBX12-4S-155-65	100 000 - 120 000	155	63	42	53	65	-4 - 41	MGN4S-HG	3.0	805.748
	HSK-A63 -RBX7 -4S-175-65	60 000 - 80 000	175	80	67	57	65	0 - 45	MGN4S	3.8	802.433
	-RBX5 -4S-175-65	40 000 - 50 000		4.8						802.431	
	HSK-A100 -RBX7 -4S-180-80	60 000 - 80 000	180	100	72	62	80	5 - 50	MGN4S	8.4	802.428
	-RBX5 -4S-180-80	40 000 - 50 000								9.4	802.425

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. XF1 (air unit) is to be ordered separately.
3. MEGA micro collet (NBC4S - _) is to be ordered separately.

For Micro Collet ▶ A135

For Air Filter ▶ C29

For Stop Block ▶ C30

For Coolant Pipe ▶ A81

For manual tool change

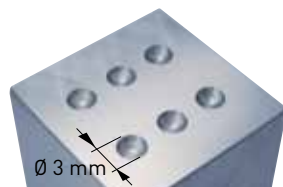
Easily mounted on machines without a stop block. When ordering, please contact BIG KAISER agent.



Application examples

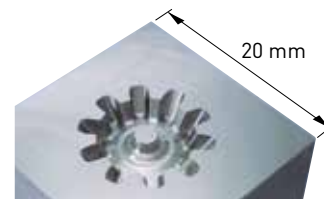
RBX12

Dimpling on sintered HSS
Machining time 90 sec./hole



Cutter	Ball nose endmill CBN
Spindle Speed	120 000 min ⁻¹
Cutting Feed	1500 mm/min
D.O.C	ap = 0.01 mm

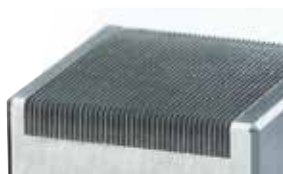
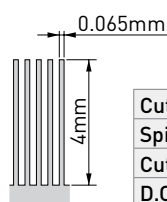
Milling on die steel
Machining time 23 min.



Cutter	Ball nose endmill CBN
Spindle Speed	120 000 min ⁻¹
Cutting Feed	2 400 mm/min
D.O.C	ap = 0.01 mm

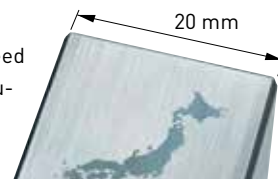
RBX7

Aluminium A2017
Outstanding runout accuracy permits perfect thin wall cutting.



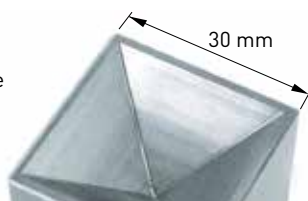
Cutter	Ø 0.5 mm Rib-endmill
Spindle Speed	70 000 min ⁻¹
Cutting Feed	1 500 mm/min
D.O.C	ap = 0.02 mm

Prehardened steel HRC40
Drastic time reduction by ultra high speed rotation. Excellent dynamic runout accuracy makes DOC of 5 µ clearly visible.



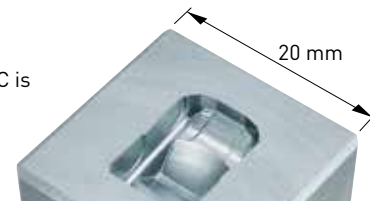
Cutter	R0.1 mm Ball nose endmill
Spindle Speed	80 000 min ⁻¹
Cutting Feed	400 mm/min
D.O.C	ap = 0.01 mm

Prehardened steel HRC40
Overall cutting length of 656 m can be achieved with one ball nose endmill. Drastically extended tool life.



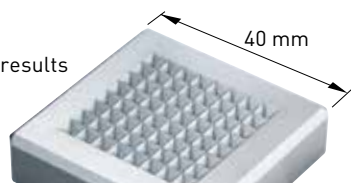
Cutter	R0.5 mm Ball nose endmill
Spindle Speed	65 000 min ⁻¹
Cutting Feed	4 200 mm/min
D.O.C	ap = 0.02 mm; ae = 0.05 mm

Prehardened steel HRC40
Original 5hour operation in MC is reduced to 2 hours.



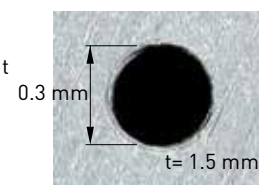
Cutter	R0.2 mm Ball nose endmill
Spindle Speed	70 000 min ⁻¹
Cutting Feed	1 000 mm/min
D.O.C	ap = 0.01 mm

Prehardened steel HRC40
No thermal expansion of spindle results in finely detailed surface finish.



Cutter	R0.5 mm Ball nose endmill
Spindle Speed	75 000 min ⁻¹
Cutting Feed	400 mm/min
D.O.C	ap = 0.02 mm

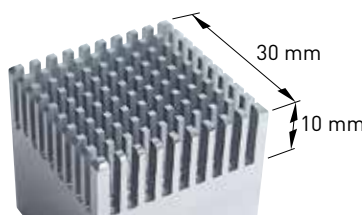
Aluminium A2017
High-precision drilling is possible without center drill operation. Even after 3500 holes, no problems can be found on the cutting edge.



Cutter	Ø 0.3 mm Solid drill
Spindle Speed	75 000 min ⁻¹
Cutting Feed	200 mm/min
Peck	0.03 mm

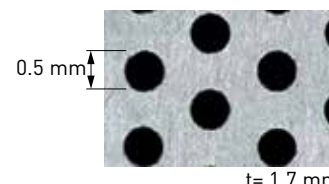
RBX5

Prehardened steel HRC40
Even a taper endmill that has high cutting forces can achieve stable cutting.



Cutter	Ø 1.5 mm Rib-endmill
Spindle Speed	40 000 min ⁻¹
Cutting Feed	1 000 mm/min
D.O.C	ap = 0.05 mm

Stainless steel SUS303
Tool life is doubled with over 1200 holes and cutting time is reduced to 1/3.

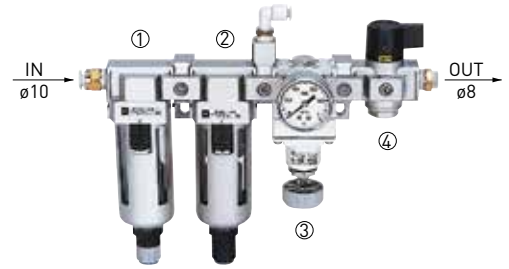


Cutter	Ø 0.5 mm Solid drill
Spindle Speed	40 000 min ⁻¹
Cutting Feed	20 mm/min
Peck	0.01 mm

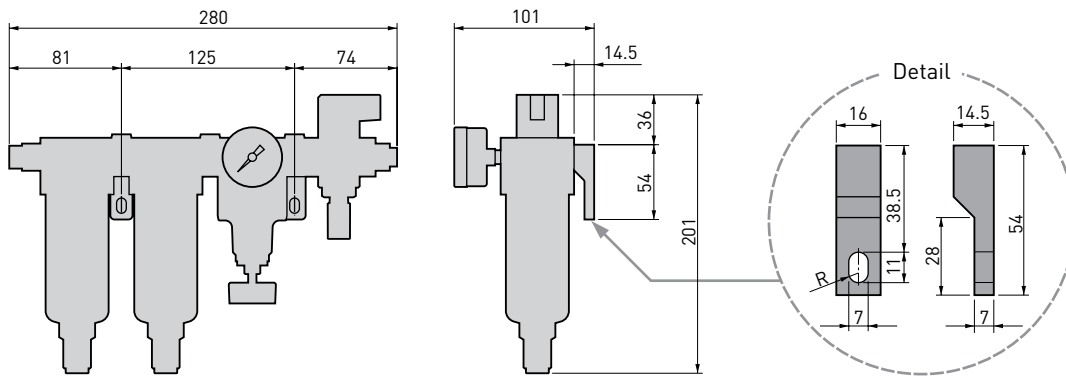
Air filter regulator for RBX

Model XF1

1. Mist separator (filtration: 0,3 µm).
2. Micro mist separator (filtration: 0,1 µm).
3. Precision regulator.
4. Three ports valves for extracting pressurization (non-grease type).



Model	Order No.
XF1	962.661



Accessories for RBX

Accessories							
	MEGA Nut		Exclusive Nut		MEGA Wrench		Micro Collet
							
Air Turbine Spindle	Model	Order No.	Model	Order No.	Model	Order No.	Model
RBX12-4S	-	-	MGN4S-HG	805.747	MGR12	969.450	NBC4S-□
RBX7-4S	MGN4S	969.481	-	-	MGR12	969.450	NBC4S-□
RBX5-4S	MGN4S	969.481	-	-	MGR12	969.450	NBC4S-□

Set Up Information



Preparing the Locating Pin and Stop Block

The Air Turbine Spindle utilize a Locating Pin that engages with the Stop Block, which is mounted to the machine spindle. Please refer to the following instructions to select / adjust the Locating Pin, and to prepare it for the Stop Block.

1. Standard Setup of the Locating Pin

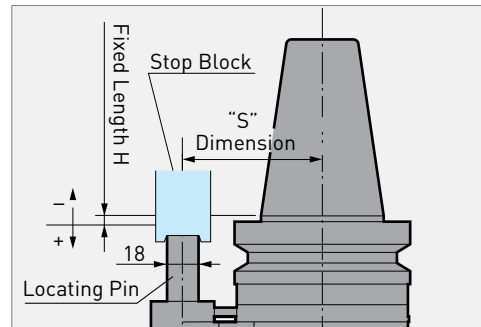
“S” Dimension

The distance from the centerline of the holder to the centerline of the Locating Pin. Please note that this dimension is not adjustable by the user.

	“S” Dimension
BDV / DV / BBT40	65
BDV / DV / BBT50	80

Fixed Length “H”

The axial distance from the gauge line of the spindle to the bottom of the groove on the Stop Block. This dimension is adjustable by the user. Three (3) Locating Pin models are available: LP-A, LP-B and LP-C. Each Locating Pin is adjustable to provide a different range of Fixed Length “H”, as shown in the tables below. Please specify the required Fixed Length “H” when ordering. Otherwise, we will deliver a set at the standard 6 mm.

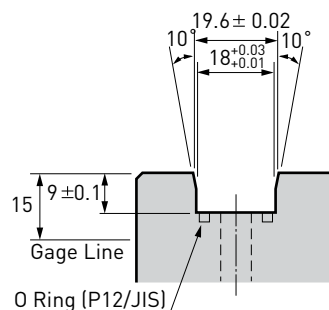


Air Turbine Spindle

	BDV40	BDV50	BBT40	BBT50
LP-A	-10 / +5	-5 / +10	-24 / -9	-9 / +6
LP-B	+5 / +20	+10 / +25	-9 / +6	+6 / +21
LP-C	+21 / +35	+25 / +40	+6 / +21	+21 / +36

2. Stop Block Dimensions

The diagram on the right shows the proper groove dimensions for a suitable Stop Block for use with Air Turbine Spindle. When ordering a Stop Block from a machine tool builder, please reference these specify dimensions.

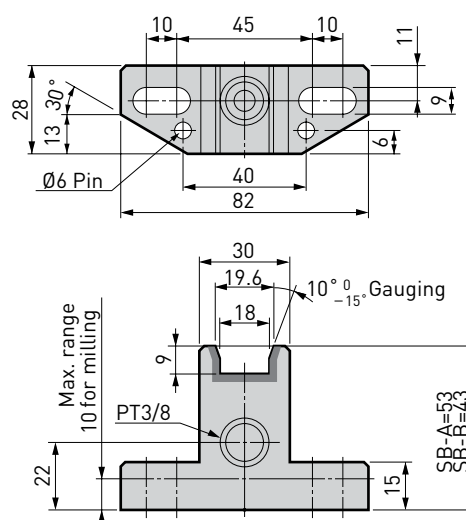


3. Semi-Finished Stop Block

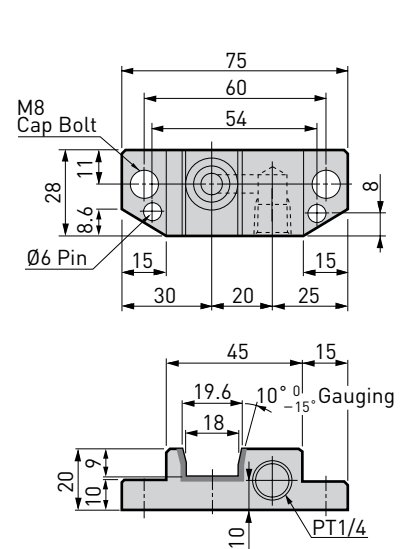
A semi-finished Stop Block has the proper groove form for use with Air Turbine Spindle, as well as additional material to allow the customer to machine the block to the correct height. (Note: Stop Block SB-F is not height-adjustable.) If a pre-made Stop Block is unobtainable from the machine tool builder, a semi-finished Stop Block can be used.

Please consult with the machine tool builder for selection, machining, and mounting of the semi-finished Stop Block.

SB-A/SB-B



SB-F



C.2

Model	Order No.
SB - A	962.571
SB - B	962.572
SB - F	962.574

High Spindle

GTG Type	32
GTX Type	33
Set Up Information	34

C.3

High Spindle GTG Type

BDV/BBT

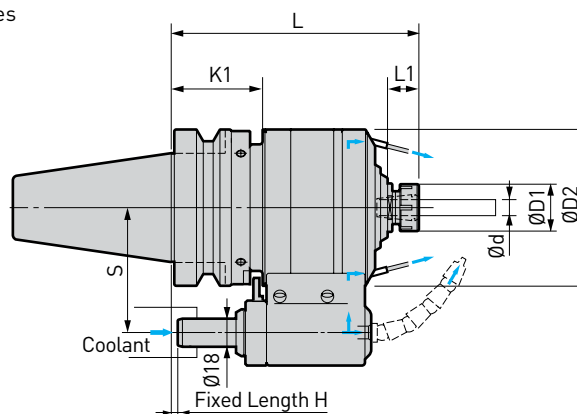


Speed Inserter

High Spindle improves drilling and end-milling performance on existing machines by multiplying the spindle speed 4, 5 or 6 times.



Exclusive Stop Block is required.



Shank	Model	Ød	L	L1	ØD1	ØD2	K1	S	Collet	Speed Ratio	Max. min ⁻¹	Weight (kg)	Order No.
BBT	BBT40 -GTG5-10-140	1.5 - 10	140	20	30	80	43	65	NBC10	4.67	20 000	4.8	802.964
	BBT50 -GTG6-10-158	1.5 - 10	158	20	30	100	58	80	NBC10	5.67	20 000	8.8	802.970
	-GTG4-16-177	2.5 - 16	177	25.5	42	110	58	80	NBC16	3.80	15 000	10.6	802.968
BDV	BDV40 -GTG5-10-155	1.5 - 10	155	20	30	80	58	65	NBC10	4.67	20 000	5.0	802.975
	BDV50 -GTG6-10-163	1.5 - 10	163	20	30	100	63	80	NBC10	5.67	20 000	9.0	802.977
	-GTG4-16-182	2.5 - 16	182	25.5	42	110	63	80	NBC16	3.80	15 000	10.8	802.976

1. The standard fixed length H is 6 mm. Other lengths are available upon request.
2. In case of more than 30 min. continuous use, rotation speed must be reduced by 20%.
3. Please do not use with neat oil coolant.
4. Nut, wrench and following collet are included.

For Stop Block ▶ C34

Model	New Baby Collet
GTG5-10	NBC 10 -10AA
GTG6-10	10 -10AA
GTG4-16	16 -16AA

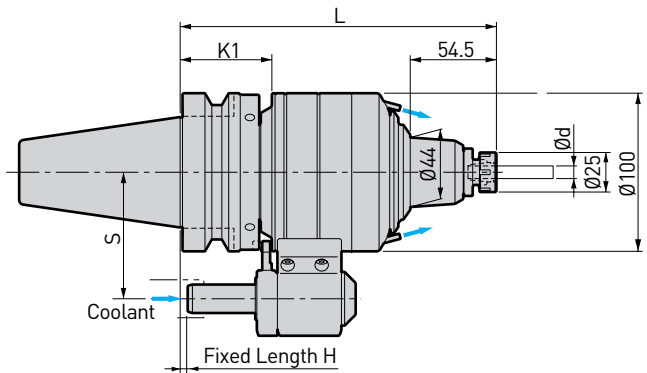
Application examples

Model	BBT40-GTG5-10-140	BBT50-GTG6-10-158	BBT50-GTG6-10-158	BBT50-GTG4-16-177
Cutter	Solid carbide endmill Ø8 / 2 flutes	Solid carbide endmill Ø6 / 2 flutes	Solid carbide drill Ø2	Solid carbide drill Ø16
Workpiece Material	Duralumin (A-2017)	S55C / CK55	Duralumin (A-2017)	Duralumin (A-2017)
Revolution	20 000 min ⁻¹	16 000 min ⁻¹	20 000 min ⁻¹	15 000 min ⁻¹
Feed Rate	3 000 mm/min	3 500 mm/min	2 000 mm/min	1 000 mm/min
Result	High metal removal rate 90 cm ³ /min	High metal removal rate 35 cm ³ /min	Extended tool life 1200 holes by 1 drill	Surface roughness Ry max. 2 µm

High Spindle GTX Type

Special design for die & mold. Long nose design for minimized interference.
Long tool life with a grease nipple.

BDV/BBT







Exclusive Stop Block is required.

Shank	Model	Ød	L	K1	S	Collet	Speed Ratio	Max. min ⁻¹	Weight (kg)	Order No.
BBT	BBT50 -GTX6-8-200	0.5 - 8	200	58	80	NBC8	5.67	24 000	9.3	802.974
BDV	BDV50 -GTX6-8-205	0.5 - 8	205	62	80	NBC8	5.67	24 000	9.5	802.978

1. The standard fixed length H is 6 mm. Other lengths are available upon request.
2. Nut and wrench are included. Collet (NBC8-_) is to be ordered separately.
3. In case of more than 30 min. continuous use, rotation speed must be reduced by 20%.
4. Please do not use with neat oil coolant.

For Stop Block ▶ C34

Accessories for GTG and GTX

Accessories								
	New Baby Nut		Wrench		New Baby Collet		Taper Cleaner	
								
	▶ A138							
High Spindle	Model	Order No.	Model	Order No.	Model	Model	Order No.	
GTG5-10	NBN10	961.571	NBK10	961.570	NBC10-□	SC-NBC10	961.283	
GTG6-10	NBN10	961.571	NBK10	961.570	NBC10-□	SC-NBC10	961.283	
GTG4-16	NBN16	961.631	NBK16	961.630	NBC16-□	SC-NBC16	961.285	
GTX6-8	NBN8	961.549	NBK8	961.548	NBC8-□	SC-NBC8	961.282	

Set Up Information



Preparing the Locating Pin and Stop Block

The High Spindle utilize a Locating Pin that engages with the Stop Block, which is mounted to the machine spindle. Please refer to the following instructions to select / adjust the Locating Pin, and to prepare it for the Stop Block.

1. Standard Setup of the Locating Pin

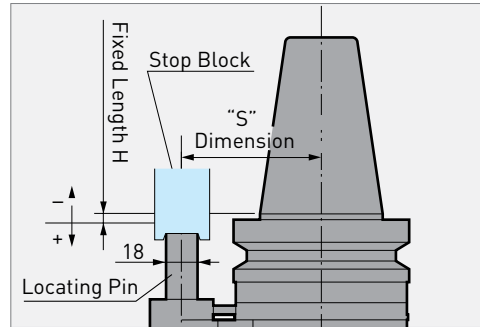
"S" Dimension

The distance from the centerline of the holder to the centerline of the Locating Pin. Please note that this dimension is not adjustable by the user.

	"S" Dimension
BDV40 / BBT40	65
BDV50 / BBT50	80

Fixed Length "H"

The axial distance from the gauge line of the spindle to the bottom of the groove on the Stop Block. This dimension is adjustable by the user. Three (3) Locating Pin models are available: LP-A, LP-B and LP-C. Each Locating Pin is adjustable to provide a different range of Fixed Length "H", as shown in the tables below. Please specify the required Fixed Length "H" when ordering. Otherwise, we will deliver a set at the standard 6 mm.

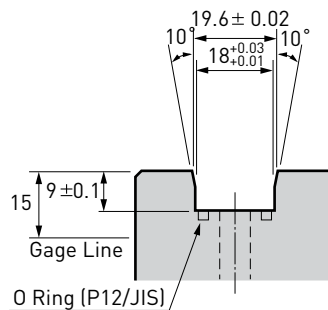


High Spindle

	BDV40	BDV50	BBT40	BBT50
LP-A	-9 / +6	-4 / +11	-24 / -9	-9 / +6
LP-B	+6 / +21	+11 / +26	-9 / +6	+6 / +21
LP-C	+21 / +36	+26 / +41	+6 / +21	+21 / +36

2. Stop Block Dimensions

The diagram on the right shows the proper groove dimensions for a suitable Stop Block for use with High Spindle. When ordering a Stop Block from a machine tool builder, please reference these specify dimensions.

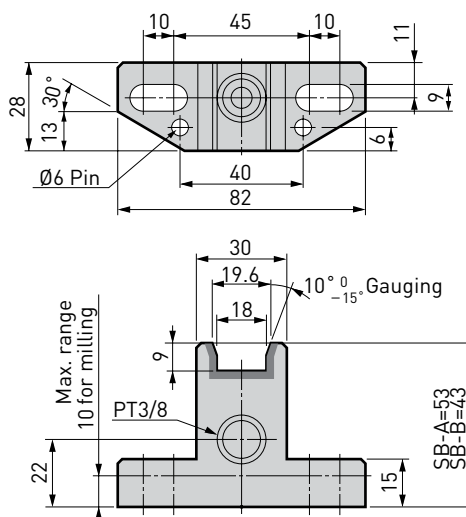


3. Semi-Finished Stop Block

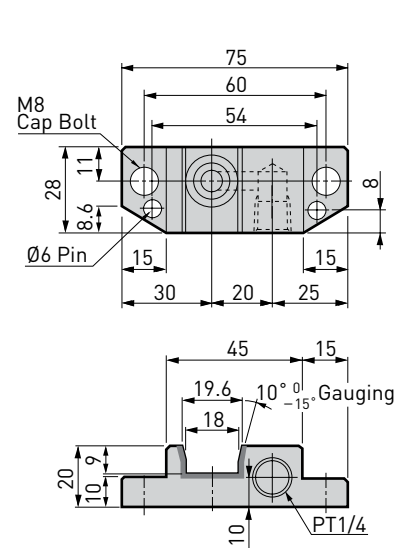
A semi-finished Stop Block has the proper groove form for use with High Spindle, as well as additional material to allow the customer to machine the block to the correct height. (Note: Stop Block SB-F is not height-adjustable.) If a pre-made Stop Block is unobtainable from the machine tool builder, a semi-finished Stop Block can be used.

Please consult with the machine tool builder for selection, machining, and mounting of the semi-finished Stop Block.

SB-A/SB-B



SB-F



Model	Order No.
SB - A	962.571
SB - B	962.572
SB - F	962.574

Hi-Jet Holder

New Baby Chuck Type	36
Milling Chuck Type	37
Side Lock Type	38
Set Up Information	39

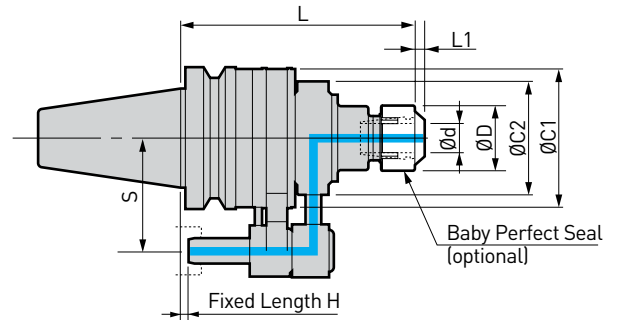
C.4

Hi-Jet Holder New Baby Chuck Type



Spindle speeds up to 10 000 min⁻¹. For water-soluble coolant only.

Bearings in a separate housing from the coolant for extended life.



Exclusive Stop Block is required.

Shank	Model	Ød	ØD	L	ØC1	ØC2	S	Collet	Max. min ⁻¹	Merit Set	Weight (kg)	Order No.								
BBT	BBT30 -ONBS 10N -135	3 - 10	30	138	66	65	*	NBC10	10 000	MES-40	3.0	802.989								
	13N -140	3 - 13	35	143				NBC13			3.1	802.990								
	16N -140	3 - 16	42					NBC16			3.3	802.991								
	20N -140	3 - 20	46					NBC20			3.3	802.992								
	BBT40	-ONBS 10N -165	3 - 10	30	168	81.6	73	65	NBC10	10 000	MES-40	3.9	802.994							
		-200			203				NBC10	8 000		4.1	802.995							
		-ONBS 13N -165	3 - 13	35	168				NBC13	10 000		4.0	802.996							
		-200			203				NBC13	8 000		4.2	802.997							
		-ONBS 16N -165	3 - 16	42	168				80	65		NBC16	8 000	MES-50	4.3	802.998				
		-200			203							NBC16	6 000		4.6	802.999				
		-ONBS 20N -165	3 - 20	46	168		NBC20				8 000	4.3	803.000							
		-200			203						6 000	4.7	803.001							
		BBT50	-ONBS 10N -165	3 - 10	30						168	99.6	80		80	NBC10	8 000	MES-50	7.2	803.007
			-200								203					NBC10	6 000		7.4	803.008
			-250				253		NBC10	4 000	7.6			803.009						
			-ONBS 13N -165	3 - 13	35		168		NBC13	8 000	7.3			803.010						
	-200		203			6 000	7.5	803.011												
	-250		253			4 000	7.8	803.012												
	-ONBS 16N -165		3 - 16	42	168	NBC16	8 000	7.5		803.013										
	-200				203		6 000	7.8		803.014										
	-250				253		4 000	8.2		803.015										
	-ONBS 20N -165		3 - 20	46	168		NBC20	8 000	7.5	803.016										
	-200				203			6 000	7.9	803.017										
	-250				253			4 000	8.2	803.018										
DV	DV40 -ONBS13N -165	3 - 13	35	165	81.6	73		65	NBC13	10 000	MES-40	4.0	803.026							
	-ONBS16N -165	3 - 16	42						NBC16	8 000	MES-50	4.3	803.027							
	-ONBS20N -165	3 - 20	46						NBC20	8 000	4.3	803.028								
	DV50	-ONBS13N -165	3 - 13	35	165	99.6	80	80	NBC13	8 000	MES-50	7.3	803.035							
		-ONBS16N -165	3 - 16	42					NBC16			7.3	803.036							
		-ONBS20N -165	3 - 20	46					NBC20			7.5	803.037							

- The standard fixed length H is 6 mm. Other lengths are available upon request.
- There is no standard "S" for BBT30. Please indicate "S" when ordering.
- Collet, wrench and baby perfect seal are to be ordered separately.
- Please refer to page A148 for L1.

For Stop Block ▶ C39

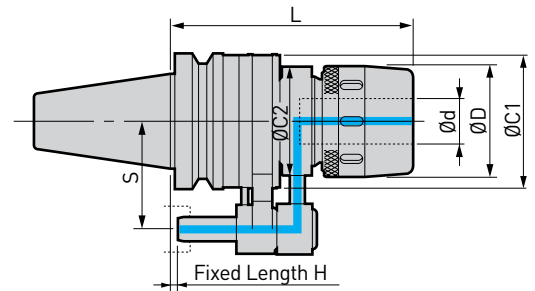
Accessories									
	Baby Perfect Seal			Wrench			NBC Collet		Adjusting Screw
	▶ A148						▶ A138		
New Baby Chuck	Model	Model	Order No.	Model	Model	G	L	B	Order No.
ONBS10	BPS10-□	NBK10	961.570	NBC10-□	NBA10B	M11	16	3	961.572
ONBS13	BPS13-□	NBK13	961.596	NBC13-□	NBA13B	M14	20	4	961.598
ONBS16	BPS16-□	NBK16	961.630	NBC16-□	NBA16B	M18	20	4	961.632
ONBS20	BPS20-□	NBK20	961.678	NBC20-□	NBA20B	M21	20	4	961.680

Hi-Jet Holder Milling Chuck Type

Suitable for end mills with straight shanks due to superior gripping force.



Exclusive Stop Block is required.



Shank	Model		Ød	ØD	L	ØC1	ØC2	S	Max. min ⁻¹	Merit Set	Weight (kg)	Order No.
BBT	BBT40	-OMC20N-170	20	60	170	81.6	80	65	8 000	MES-50	4.8	802.993
	BBT50	-OMC20N-165	20	60	165	99.6	80	80	8 000	MES-50	6.8	803.005
		-OMC32N-180	32	80	180		98		6 000	MES-65	8.5	803.006
DV	DV40	-OMC20N-170	20	60	170	81.6	80	65	8 000	MES-50	4.8	803.025
	DV50	-OMC20N-165	20	60	165	99.6	80	80	8 000	MES-50	6.8	803.032
		-OMC32N-180	32	80	180		98		6 000	MES-65	8.5	803.033

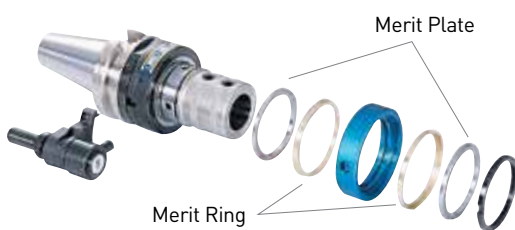
1. The standard fixed length H is 6 mm. Other lengths are available upon request.
2. Wrench is included.
3. Straight collet [OCA] can be used.

For Straight Collet ▶ A159

For Stop Block ▶ C39

Merit Set

Easy maintenance kit by replacing wear parts.



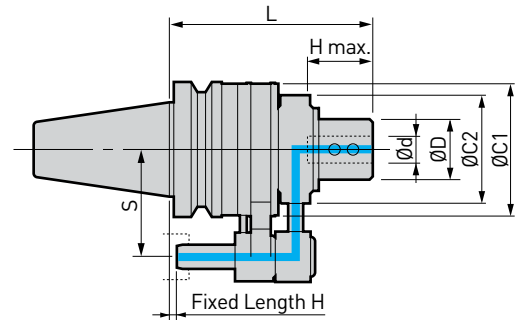
Model	Order No.	Wrench (excluded)
MES-40	802.328	FK52
MES-50	802.331	FK58
MES-65	972.341	FK80
MES-90	804.677	FK105

1. Wrench is required for replacement.
2. Please contact BIG KAISER agent in case of OMC type.

Hi-Jet Holder Side Lock Type



Suitable for popular straight shanks with a flat.

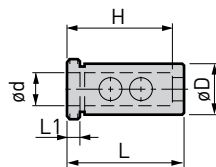


Exclusive Stop Block is required.

Shank	Model	$\varnothing d$	$\varnothing D$	L	H max.	$\varnothing C1$	$\varnothing C2$	S	Max. min ⁻¹	Merit Set	Weight (kg)	Order No.			
BBT	BBT40 -OSL16N -150	16	48	150	48	81.6	80	65	8 000	MES-50	4.4	803.002			
		20			50		80				4.3	803.003			
		25	58	165	56		99.6				98	4.4	803.004		
		32			60						98	5.7	804.899		
	BBT50 -OSL16N -150	16	48	150	48	99.6	80	80	8 000	MES-50	7.5	803.019			
		20			50		80				7.4	803.020			
		25	58	165	56		98				98	7.5	803.021		
		32			60						98	7.9	803.022		
DV	DV40 -OSL16N -150	16	48	150	48	129.6	80	65	8 000	MES-50	4.4	803.029			
		20			50		80				4.3	962.525			
		25	58	165	56		98				98	4.4	803.030		
		32			60						98	5.7	803.031		
DV50 -OSL16N -150	16	48	150	48	99.6	80	80	8 000	MES-50	7.5	803.038				
	20			50		80				7.4	803.039				
	25	58	165	56		98				98	7.5	962.546			
	32			60						98	7.9	962.547			
DV	-OSL40N -165	40	64	165	70	129.6	121	80	6 000	MES-65	8.0	962.548			
		50			84		185				70	121	121	11.9	803.024
		50	84	185							70		121	121	4 000
		50			84		185				70	121		121	4 000

1. The standard fixed length H is 6 mm. Other lengths are available upon request.

SL Sleeve for Side Lock Holder



Model	$\varnothing d$	$\varnothing D$	L	L1	H	Order No.
OSL25	-16	16	62	5.5	48	962.596
	-20	20			50	962.597
OSL32	-16	16	66	5.5	48	962.586
	-20	20			50	962.598
	-25	25			56	962.599
OSL40	-16	16	76	5.5	48	804.678
	-20	20			50	804.679
	-25	25			56	962.581
	-32	32			60	962.582

Set Up Information



Preparing the Locating Pin and Stop Block

The Hi-Jet Holder utilize a Locating Pin that engages with the Stop Block, which is mounted to the machine spindle. Please refer to the following instructions to select / adjust the Locating Pin, and to prepare it for the Stop Block.

1. Standard Setup of the Locating Pin

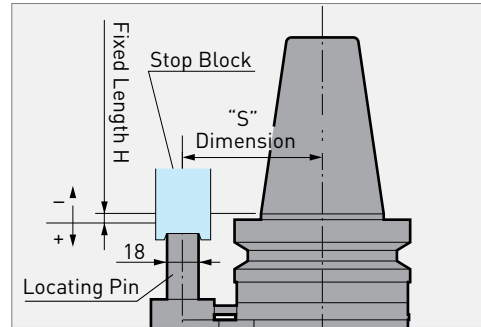
“S” Dimension

The distance from the centerline of the holder to the centerline of the Locating Pin. Please note that this dimension is not adjustable by the user.

	“S” Dimension
DV / BBT40	65
DV / BBT50	80

Fixed Length “H”

The axial distance from the gauge line of the spindle to the bottom of the groove on the Stop Block. This dimension is adjustable by the user. Three (3) Locating Pin models are available: LP-A, LP-B and LP-C. Each Locating Pin is adjustable to provide a different range of Fixed Length “H”, as shown in the tables below. Please specify the required Fixed Length “H” when ordering. Otherwise, we will deliver a set at the standard 6 mm.

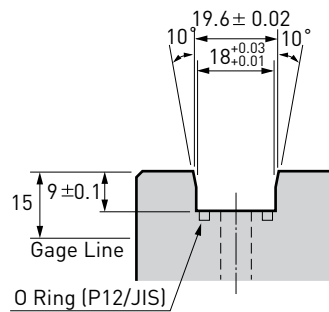


Hi-Jet Holder

	DV40	DV50	BBT40	BBT50
LP-A	-9 / +6	-4 / +11	-24 / -9	-9 / +6
LP-B	+6 / +21	+11 / +26	-9 / +6	+6 / +21
LP-C	+21 / +36	+26 / +41	+6 / +21	+21 / +36

2. Stop Block Dimensions

The diagram on the right shows the proper groove dimensions for a suitable Stop Block for use with Hi-Jet Holder. When ordering a Stop Block from a machine tool builder, please reference these specify dimensions.



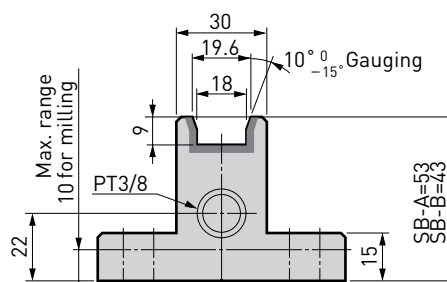
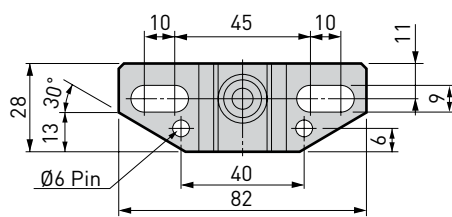
3. Semi-Finished Stop Block

A semi-finished Stop Block has the proper groove form for use with Hi-Jet Holder, as well as additional material to allow the customer to machine the block to the correct height. (Note: Stop Block SB-F is not height-adjustable.) If a pre-made Stop Block is unobtainable from the machine tool builder, a semi-finished Stop Block can be used.

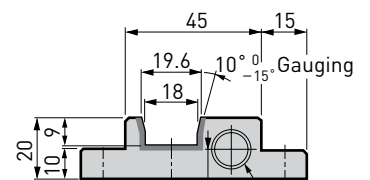
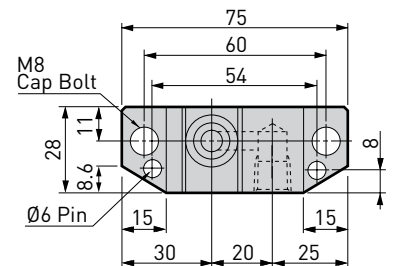
Please consult with the machine tool builder for selection, machining, and mounting of the semi-finished Stop Block.

Model	Order No.
SB - A	962.571
SB - B	962.572
SB - F	962.574

SB-A/SB-B



SB-F



List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
112.080	B165	tdb	310.703	B58	4.000	317.286	B173	0.009
112.097A	B49	tdb	310.705	B65	1.700	317.287	B84	0.012
112.107	B40	1.370	310.706	B65	2.260	317.289	B83	2.200
112.108	B41	1.100	310.708	B60	5.360	318.101	B76	0.820
112.109	B40	1.290	310.905	B165	0.005	318.103	B76	0.800
112.121	B41	1.770	315.101	B36	0.050	318.105	B77	0.840
112.122	B41	1.890	315.160	B160	0.005	318.107	B77	0.830
112.123	B41	1.710	315.161	B160	0.001	318.201	B73	2.750
112.125	B40	1.710	315.201	B36	0.100	318.201N	B73	2.800
112.205	B51	0.260	315.250	B160	0.005	318.202	B73	2.730
112.206	B51	0.265	315.251	B160	0.001	318.202N	B73	2.730
112.207	B51	2.220	315.301	B36	0.165	318.205	B73	1.830
112.271	B52	0.025	315.350	B160	0.008	318.205N	B73	1.830
112.272	B52	0.035	315.351	B160	0.002	318.206	B73	2.320
112.301A	B51	0.540	315.401	B36	0.340	318.206N	B73	2.320
112.303A	B51	0.880	315.450	B160	0.017	318.222	B73	1.500
112.304A	B51	0.540	315.451	B160	0.005	318.223	B73	2.040
112.306	B50	0.670	315.501	B36	0.635	318.224	B73	2.620
112.309	B50	0.400	315.550	B160	0.033	318.225	B73	3.210
112.353	B52	0.048	315.551	B160	0.010	318.226	B73	3.900
112.371	B165	0.010	315.601	B36	1.290	318.227	B73	4.400
112.381	B165	0.001	315.602	B36	1.850	318.240	B74	1.100
112.385	B52	0.096	315.603	B36	2.520	318.261	B90	1.210
112.503	B56	0.030	315.650	B160	0.036	318.421	B79	14.660
112.504	B56	0.030	315.651	B160	0.013	318.422	B79	21.450
112.505	B55	0.130	315.701	B36	3.100	318.423	B79	33.000
112.506	B55	0.150	315.701N	B36	3.100	318.424	B79	68.000
112.508	B56	0.030	315.702	B36	4.500	318.425	B79	90.000
112.806	B47	0.160	315.702N	B36	4.500	318.431	B79	2.110
112.817	B48	0.900	315.703	B36	5.600	318.432	B79	2.900
112.826A	B48	tdb	315.703N	B36	5.600	318.433	B79	4.000
112.837	B49	2.570	315.750	B160	0.061	318.434	B79	5.000
195.001	B165	0.001	315.751	B160	0.024	318.435	B79	9.500
195.003	B165	0.001	317.102A	B85	1.800	318.441	B79	1.280
195.007	B165	0.001	317.105	B85	1.890	318.442	B79	1.500
195.081	B165	0.008	317.202	B82	2.750	318.443	B79	1.700
195.127	B165	0.008	317.204	B173	2.750	318.444	B79	3.400
			317.205	B82	0.090	319.101	B28	0.050
309.201	B66	0.120	317.206	B82	2.750	319.150	B157	0.001
309.301	B66	0.220	317.207	B173	2.500	319.201	B28	0.110
309.401	B66	0.400	317.208	B173	1.900	319.250	B157	0.005
309.501	B66	0.850	317.222	B82	3.450	319.301	B28	0.190
309.601	B66	1.750	317.223	B82	4.900	319.350	B157	0.001
310.020	B67	0.033	317.224	B82	6.200	319.401	B28	0.360
310.030	B67	0.050	317.225	B82	7.700	319.420	B29	0.385
310.101	B60	0.075	317.226	B82	9.100	319.450	B157	0.001
310.201	B60	0.130	317.227	B82	10.600	319.451	B158	0.015
310.301	B60	0.210	317.231	B173	27.000	319.501	B28	0.660
310.305A	B64	0.220	317.232	B173	29.000	319.520	B29	0.710
310.401	B60	0.400	317.233	B173	30.000	319.550	B157	0.002
310.403	B58	0.400	317.234	B173	32.000	319.551	B158	0.022
310.405A	B64	0.410	317.235	B173	33.000	319.601	B28	1.180
310.501	B60	0.825	317.236	B173	35.000	319.601N	B28	1.180
310.503	B58	0.780	317.237	B173	36.000	319.602	B28	1.900
310.505A	B64	0.810	317.238	B173	37.000	319.602N	B28	1.900
310.601	B60	1.650	317.252	B84	1.240	319.603	B28	2.520
310.602	B60	2.400	317.253	B84	1.740	319.603N	B28	2.520
310.603	B58	1.650	317.254	B84	2.260	319.604N	B29	0.545
310.604	B58	1.650	317.255	B84	2.960	319.605N	B29	0.850
310.605A	B64	1.700	317.256	B84	3.270	319.607N	B29	1.100
310.606A	B64	1.730	317.257	B84	3.800	319.620	B29	1.320
310.607	B65	1.350	317.261	B173	1.145	319.620N	B29	1.275
310.608	B65	1.770	317.284	B173	0.985	319.622	B29	2.050
310.701	B60	3.850	317.285	B90	0.846	319.622N	B29	2.050

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
319.650	B157	0.005	323.871	B7	4.910	325.965	B6	5.500
319.651	B158	0.028	323.871N	B7	4.900	326.005	B6	0.600
319.701	B28	3.100	323.873	B7	7.400	326.011	B6	1.200
319.701N	B28	3.100	323.874N	B7	3.950	326.021	B6	1.200
319.702	B28	4.500	323.875	B7	7.400	326.031	B6	1.300
319.702N	B28	4.500	324.111F	B8	0.220	326.041	B6	1.300
319.703	B28	5.600	324.112F	B8	0.220	326.050	B6	0.920
319.703N	B28	5.600	324.121F	B8	0.200	326.054	B6	2.550
319.705N	B29	1.300	324.131F	B8	0.265	326.057	B6	1.100
319.706N	B29	1.920	324.132F	B8	0.255	326.064	B6	2.750
319.707N	B29	2.300	324.141F	B8	0.364	326.141	B7	1.180
319.720	B29	3.100	324.142F	B8	0.340	326.153	B7	1.850
319.750	B157	0.005	324.231F	B8	0.465	326.160	B7	0.990
319.751	B158	0.030	324.232F	B8	0.440	326.163	B7	2.200
321.451	B9	1.000	324.241F	B8	0.520	328.032	B114	3.100
321.462	B9	1.090	324.242F	B8	0.500	328.032N	B114	3.100
322.563	B9	1.800	324.251F	B8	0.710	328.033	B114	1.300
323.563	B9	2.060	324.252F	B8	0.665	328.033N	B114	1.300
323.701	B6	0.380	324.312F	B8	0.730	328.034	B114	0.970
323.703	B6	0.350	324.322F	B8	0.830	328.035	B114	0.940
323.705	B7	0.390	324.331	B8	0.850	328.036	B114	0.880
323.707	B7	0.350	324.331F	B8	0.850	328.037	B114	0.780
323.721	B6	1.130	324.332	B8	1.120	328.037N	B114	0.780
323.722	B6	2.060	324.341	B8	1.150	328.053N	B114	2.350
323.726N	B6	1.120	324.341F	B8	1.150	328.086	B114	3.700
323.728	B6	0.820	324.342	B8	1.305	328.151F	B8	tbd
323.730	B7	1.200	324.352	B8	0.960	328.162	B114	3.800
323.731	B7	1.320	324.352F	B8	0.960	328.210	B114	3.740
323.731N	B7	1.300	324.353	B8	1.320	328.211	B114	3.740
323.735N	B7	1.000	324.354	B8	1.940	328.213	B10	5.480
323.736N	B7	1.300	324.361	B8	1.250	328.214	B10	6.570
323.738	B7	0.965	324.361F	B8	1.250	328.215	B10	7.500
323.760	B6	3.400	324.361N	B8	1.250	328.216	B10	2.400
323.761	B6	4.600	324.362	B8	1.820	328.217N	B10	4.500
323.765N	B6	3.450	324.367N	B8	3.200	328.218F	B8	tbd
323.766	B6	4.800	324.461	B8	1.950	328.228	B13	7.000
323.766N	B6	4.750	324.531	B8	2.450	328.230	B13	12.100
323.767N	B6	4.850	324.541	B8	2.870	328.233	B13	7.500
323.768N	B6	7.200	324.551	B8	2.905	328.235	B13	12.100
323.769N	B6	13.700	324.552	B8	3.770	328.238	B13	6.800
323.770	B7	4.000	324.561	B8	2.900	328.240	B13	11.400
323.770N	B7	3.950	324.561N	B8	2.800	328.249F	B8	0.050
323.771	B7	5.000	324.563	B8	3.450	328.257F	B8	0.155
323.775N	B7	3.900	324.563N	B8	3.350	328.260	B7	tbd
323.776N	B7	4.950	324.566N	B8	6.000	328.261	B7	tbd
323.777	B7	5.400	324.571	B8	4.050	328.262	B7	tbd
323.780	B9	3.000	324.571N	B8	4.100	328.272	B7	tbd
323.781	B9	3.850	324.572	B8	5.800	328.277F	B8	0.215
323.821N	B6	1.100	324.572N	B8	5.750	328.278F	B8	tbd
323.825	B6	0.920	324.575N	B8	11.930	328.279F	B8	tbd
323.826	B6	1.150	324.900	B9	0.012	328.280F	B8	0.140
323.831N	B7	1.300	324.901	B9	0.016	328.281F	B8	0.075
323.832N	B7	0.990	324.902	B9	0.016	328.289	B7	tbd
323.837	B7	1.150	324.903	B9	0.025	328.308	B7	tbd
323.860N	B6	3.350	324.904	B9	0.033	328.321	B114	tbd
323.861	B6	4.500	324.905	B9	0.050	328.322	B114	tbd
323.861N	B6	4.450	324.908	B9	0.008	329.842	B6	1.070
323.862	B6	7.000	325.933	B6	3.750	329.866	B7	0.480
323.863	B6	7.000	325.942	B6	3.650	331.110	B15	0.050
323.864N	B6	4.800	325.944	B6	4.250	331.111	B15	0.070
323.865N	B6	7.000	325.952	B6	3.800	331.220	B15	0.100
323.866N	B6	13.200	325.954	B6	4.700	331.221	B15	0.150
323.867	B6	4.750	325.955	B6	4.550	331.330	B15	0.160
323.868	B6	3.250	325.964	B6	4.700	331.331	B15	0.250

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
331.440	B15	0.350	335.023	B98	0.710	335.354	B19	3.900
331.445	B15	0.470	335.024	B98	2.680	335.363	B100	0.700
331.550	B15	0.850	335.035	B175	0.006	335.375	B100	3.500
331.555	B15	1.210	335.036	B175	0.015	335.380	B18	0.570
331.660	B15	1.360	335.037	B175	0.030	335.381	B18	0.810
331.660N	B15	1.360	335.042	B100	1.350	335.382	B18	1.005
331.665	B15	2.200	335.044	B100	1.520	335.383	B18	0.700
331.665N	B15	2.200	335.066	B102	1.980	335.384	B18	0.970
331.775	B15	4.400	335.070	B99	0.081	335.385	B18	1.300
331.775N	B15	4.400	335.071	B99	0.181	335.386	B18	1.050
331.776	B15	7.250	335.072	B99	0.311	335.387	B18	1.530
331.776N	B15	7.250	335.073	B99	0.281	335.388	B18	2.050
331.860N	B16	0.550	335.074	B99	0.451	335.389	B18	1.230
331.861N	B16	0.800	335.077	B102	4.750	335.390	B18	1.770
331.864N	B16	0.450	335.130	B11	0.130	335.391	B18	2.400
331.867N	B16	0.520	335.131	B11	0.230	335.420	B101	0.265
331.868N	B16	0.820	335.132	B11	0.235	335.421	B101	0.350
331.870N	B16	1.410	335.140	B103	0.590	335.423	B101	0.420
331.871N	B16	2.200	335.142	B103	0.740	335.424	B101	0.510
331.874N	B16	0.950	335.164	B103	1.150	335.425	B101	0.640
331.877N	B16	1.530	335.165	B103	1.700	335.430	B101	0.700
331.878N	B16	3.000	335.230	B101	0.280	335.430N	B101	0.700
331.879N	B16	2.250	335.231	B101	0.300	335.431	B101	0.770
332.210	B14	0.090	335.232	B101	0.390	335.431N	B101	0.770
332.310	B14	0.150	335.233	B101	0.550	335.432	B101	0.930
332.320	B14	0.160	335.234	B101	0.410	335.433	B101	1.300
332.410	B14	0.230	335.235	B101	0.425	335.433N	B101	1.300
332.420	B14	0.250	335.236	B101	0.535	335.434	B101	1.750
332.430	B14	0.300	335.237	B101	0.670	335.434N	B101	1.700
332.510	B14	0.440	335.238	B101	0.690	335.435	B101	2.100
332.511	B14	0.440	335.239	B101	0.790	335.436	B101	2.500
332.520	B14	0.550	335.240	B101	0.610	335.437N	B101	1.850
332.521	B14	0.420	335.241	B101	0.630	335.438N	B101	2.350
332.530	B14	0.670	335.242	B101	0.690	335.531	B103	0.440
332.531	B14	0.435	335.243	B101	0.820	335.532	B103	0.560
332.541	B14	0.540	335.244	B101	0.840	335.541	B103	0.820
332.545	B14	0.700	335.245	B101	0.900	335.542	B103	0.940
332.610	B14	0.910	335.246	B101	0.920	335.551	B103	1.700
332.611	B14	0.790	335.247	B101	1.050	335.552	B103	1.850
332.620	B14	0.800	335.248	B101	1.660	335.561	B103	3.300
332.621	B14	0.700	335.249	B101	0.800	335.562	B103	4.050
332.630	B14	0.960	335.250	B101	2.900	335.563	B103	5.800
332.631	B14	0.750	335.251	B101	3.400	335.571	B103	9.500
332.632	B14	1.200	335.301	B17	0.700	335.762	B103	0.870
332.641	B14	0.820	335.302	B17	0.740	335.763	B103	1.550
332.642	B14	1.450	335.312	B17	2.050	335.764	B104	0.500
332.645	B14	1.050	335.313	B17	2.650	335.768	B104	0.600
332.651	B14	0.840	335.320	B18	0.470	335.769	B104	1.200
332.652	B14	1.950	335.321	B18	0.740	335.902	B89	2.750
332.655	B14	1.230	335.322	B18	0.950	335.903	B89	2.100
332.741	B14	1.500	335.323	B18	0.860	335.904	B89	1.750
332.745	B14	1.730	335.324	B18	1.100	335.905	B89	1.450
332.750	B14	2.460	335.325	B18	1.750	335.906	B89	2.700
332.751	B14	1.650	335.326	B18	1.810	335.912	B89	0.850
332.755	B14	2.010	335.327	B18	3.650	335.913	B89	0.400
332.763	B14	0.890	335.328	B18	3.690	335.915	B89	0.200
332.765	B14	2.250	335.329	B18	5.400	336.301	B22	1.160
332.765N	B14	2.250	335.330	B18	7.150	336.302	B22	1.070
332.766	B14	2.900	335.331	B18	2.500	336.303	B22	3.330
332.767	B14	1.145	335.342	B19	1.600	336.304	B22	3.850
332.870N	B16	1.110	335.343	B19	1.350	336.309	B22	1.195
332.875N	B16	1.660	335.344	B19	1.450	336.310	B22	2.900
335.021	B98	0.085	335.352	B19	3.300	336.569	B25	3.300
335.022	B98	0.255	335.353	B19	3.350	336.631	B25	0.930

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
336.632	B25	0.920	337.417	B23	0.750	490.518	A42	1.250
336.633	B25	1.000	337.418	B23	0.780	490.520	A42	1.175
336.634	B25	0.980	337.419	B23	0.790	490.556	A42	1.150
336.635	B25	0.960	337.420	B23	0.800	490.558	A42	1.145
336.636	B25	1.030	337.421	B23	0.805	490.560	A42	1.290
336.637	B25	1.150	337.422	B23	0.830	490.562	A42	1.250
336.638	B25	1.140	337.423	B23	0.855	490.566	A42	1.310
336.639	B25	1.160	337.424	B23	0.875	490.570	A42	1.560
336.640	B25	1.160	337.425	B23	0.905	490.606	A42	2.725
336.641	B25	1.190	337.426	B23	0.960	490.608	A42	2.715
336.642	B25	1.220	337.427	B23	0.995	490.610	A42	2.780
336.643	B25	1.330	337.428	B23	1.020	490.612	A42	2.770
336.644	B25	1.350	337.429	B23	1.055	490.614	A42	2.820
336.645	B25	1.400	337.430	B23	1.095	490.616	A42	2.800
336.647	B25	1.460	389.221	B173	0.140	490.618	A42	2.940
336.649	B25	1.590	389.365	B15	1.250	490.620	A42	2.915
336.651	B25	1.750	389.366	B15	tbd	490.625	A42	3.500
336.653	B25	1.770	389.367	B15	5.180	490.656	A42	3.500
336.655	B25	2.150	389.395	B59	tbd	490.658	A42	3.500
336.657	B25	2.000	389.396	B59	tbd	490.660	A42	3.500
336.659	B25	2.090	389.397	B59	tbd	490.662	A42	3.500
336.661	B25	2.270				490.664	A42	3.600
336.665	B25	4.100	470.103	B50	tbd	490.666	A42	3.600
336.674	B25	5.000	470.108	B41	1.800	490.668	A42	3.900
336.731	B25	0.990	470.109	B40	tbd	490.670	A42	3.900
336.732	B25	1.010	470.301	B110	0.295	490.675	A42	tbd
336.733	B25	1.040	470.401	B110	0.585			
336.734	B25	1.100	470.501	B110	1.125	611.115	B149	0.003
336.735	B25	1.190	470.601	B110	2.190	611.116	B149	0.004
336.736	B25	1.240	470.602	B110	2.890	611.117	B149	0.004
336.737	B25	1.250	470.606	B111	tbd	611.152	B149	0.002
336.738	B25	1.270	470.609	B111	1.380	611.153	B149	0.003
336.739	B25	1.400	470.801	B110	5.200	611.154	B149	0.003
336.740	B25	1.370	472.051	B35	0.260	611.155	B43	0.003
336.741	B25	1.380	472.052	B35	0.005	611.156	B43	0.004
336.742	B25	1.600	472.061	B35	0.280	611.157	B149	0.004
336.743	B25	1.520	472.062	B35	0.007	611.212	B149	0.015
336.744	B25	1.560	490.106	A43	0.880	611.213	B149	0.020
336.745	B25	1.600	490.108	A43	0.905	611.214	B149	0.025
336.747	B25	1.750	490.110	A43	0.980	611.215	B149	0.040
336.749	B25	1.920	490.112	A43	1.070	611.252	B149	0.015
336.751	B25	2.000	490.114	A43	1.085	611.253	B149	0.020
336.753	B25	2.400	490.116	A43	1.270	611.254	B149	0.025
336.755	B25	2.650	490.118	A43	1.285	611.255	B149	0.040
336.757	B25	2.600	490.120	A43	1.315	612.110	B149	0.002
336.759	B25	2.950	490.125	A43	2.410	612.111	B149	0.002
336.761	B25	2.840	490.132	A43	2.600	612.112	B149	0.002
336.905	B137	0.020	490.206	A43	2.670	612.113	B149	0.003
337.316	B23	0.740	490.208	A43	2.710	612.114	B149	0.003
337.317	B23	0.750	490.210	A43	2.810	612.116	B149	0.004
337.318	B23	0.760	490.212	A43	2.940	612.117	B149	0.004
337.319	B23	0.765	490.214	A43	2.975	612.213	B149	0.020
337.320	B23	0.785	490.216	A43	3.040	612.215	B149	0.040
337.321	B23	0.785	490.218	A43	3.050	612.253	B149	0.020
337.322	B23	0.795	490.220	A43	3.110	612.254	B149	0.025
337.323	B23	0.820	490.225	A43	3.850	612.255	B149	0.040
337.324	B23	0.840	490.232	A43	4.500	613.202	B53	0.012
337.325	B23	0.855	490.240	A43	5.500	613.203	B53	0.011
337.326	B23	0.885	490.506	A42	0.990	613.204	B53	0.012
337.327	B23	0.920	490.508	A42	0.985	613.205	B53	0.010
337.328	B23	0.935	490.510	A42	1.050	613.206	B53	0.009
337.329	B23	0.960	490.512	A42	1.035	613.207	B53	0.007
337.330	B23	0.990	490.514	A42	1.085	613.208	B53	0.005
337.416	B23	0.750	490.516	A42	1.065	613.304	B52	0.020

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
613.305	B52	0.020	615.212	B43	0.045	615.356	B54	0.150
613.306	B52	0.019	615.213	B43	0.035	615.357	B54	0.125
613.307	B53	0.019	615.214	B43	0.025	615.365	B45	0.005
613.308	B53	0.015	615.215	B43	0.070	615.366	B45	0.010
613.309	B53	0.019	615.216	B53	0.025	615.367	B45	0.015
613.310	B53	0.008	615.217	B53	0.040	615.369	B45	0.105
613.323	B53	0.065	615.218	B43	0.060	615.370	B54	0.120
613.324	B53	0.065	615.219	B43	0.140	615.371	B45	0.170
613.325	B53	0.060	615.220	B46	0.015	615.372	B54	0.200
613.326	B53	0.060	615.221	B45	0.300	615.373	B45	0.260
613.327	B53	0.060	615.223	B43	0.100	615.374	B45	0.070
613.404	B42	0.050	615.224	B43	0.200	615.375	B45	0.100
613.405	B42	0.050	615.225	B43	0.140	615.376	B45	0.130
613.406	B42	0.045	615.226	B45	0.125	615.377	B45	0.170
613.407	B42	0.045	615.227	B45	0.260	615.378	B45	0.220
613.408	B42	0.040	615.228	B46	0.035	615.387B	B45	0.140
613.409	B42	0.040	615.229	B45	0.400	615.388	B95	0.040
613.410	B42	0.035	615.230	B46	0.030	615.390	B88	0.340
613.411	B43	0.029	615.231	B46	0.035	615.392	B47	0.012
613.412	B43	0.025	615.232	B45	0.093	615.394	B46	0.050
613.413	B43	0.018	615.233	B45	0.250	615.395	B46	0.050
613.414	B45	0.015	615.234	B53	0.065	615.401	B46	0.015
613.422	B43	0.125	615.239	B53	0.170	615.402	B46	0.015
613.423	B43	0.120	615.240	B53	0.215	615.403	B46	0.015
613.424	B43	0.130	615.243	B53	0.135	615.404	B46	0.015
613.425	B43	0.130	615.250	B43	0.140	615.405	B46	0.015
613.426	B43	0.120	615.251	B43	0.250	615.406	B46	0.015
613.427	B43	0.120	615.252	B45	0.300	615.407	B46	0.015
613.428	B43	0.150	615.253	B45	0.450	615.408	B46	0.015
613.429	B43	0.120	615.256	B54	0.180	615.409	B46	0.015
613.430	B43	0.130	615.257	B45	0.370	615.420	B46	0.015
613.432	B43	0.110	615.258	B45	0.520	615.421	B46	0.015
613.433	B43	0.110	615.262	B45	0.140	615.422	B46	0.015
613.434	B43	0.110	615.264	B45	0.240	615.423	B46	0.015
613.435	B43	0.110	615.265	B45	0.210	615.424	B46	0.020
613.436	B43	0.110	615.266	B45	0.370	615.425	B46	0.020
613.437	B43	0.130	615.267	B45	0.290	615.426	B46	0.020
613.438	B43	0.130	615.268	B45	0.220	615.427	B46	0.020
613.439	B43	0.130	615.269	B45	0.350	615.428	B46	0.020
613.440	B43	0.120	615.271	B43	0.010	615.429	B46	0.020
613.633	B17	0.220	615.272	B43	0.012	615.501	B55	0.022
613.634	B17	0.140	615.273	B43	0.015	615.502	B55	0.021
615.080	B43	0.010	615.280	B45	0.015	615.503	B55	0.021
615.081	B43	0.010	615.281	B45	0.019	615.504	B55	0.021
615.082	B43	0.020	615.282	B45	0.025	615.505	B55	0.020
615.083	B43	0.020	615.283	B45	0.030	615.506	B55	0.022
615.084	B43	0.030	615.284	B45	0.035	615.507	B55	0.023
615.085	B43	0.030	615.285	B45	0.040	615.508	B55	0.023
615.086	B43	0.030	615.286	B45	0.040	615.509	B55	0.024
615.087	B43	0.050	615.287	B45	0.050	615.511	B55	0.030
615.088	B43	0.030	615.288	B45	0.030	615.522	B55	0.020
615.201	B43	0.020	615.289	B45	0.030	615.524	B55	0.020
615.202	B43	0.040	615.290	B45	0.030	615.525	B55	0.020
615.203	B43	0.008	615.291	B45	0.030	615.530	B55	0.020
615.203A	B43	0.008	615.292	B45	0.035	615.531	B55	0.030
615.204	B43	0.015	615.300	B45	0.010	615.541	B56	0.003
615.204A	B43	0.015	615.301	B45	0.015	615.542	B56	0.003
615.205	B43	0.020	615.302	B45	0.018	615.543	B56	0.003
615.206	B43	0.115	615.303	B45	0.020	615.544	B56	0.003
615.207	B43	0.045	615.304	B45	0.053	615.545	B56	0.003
615.208	B43	0.085	615.305	B45	0.060	615.546	B56	0.004
615.209	B43	0.160	615.306	B45	tbd	615.547	B56	0.004
615.210	B43	0.235	615.354	B54	0.080	615.551	B56	tbd
615.211	B43	0.016	615.355	B54	0.105	615.552	B56	tbd

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
615.553	B56	tbd	626.473	B76	tbd	637.814	B83	0.850
615.554	B56	tbd	626.901	B62	0.005	637.830	B83	0.853
615.555	B56	tbd	626.902	B62	0.008	637.834	B83	0.850
615.561	B56	tbd	626.903	B62	0.013	637.846	B83	0.860
615.562	B56	tbd	626.904	B62	0.027	637.940	B74	0.710
615.563	B56	tbd	626.905	B62	0.042	637.941	B74	0.710
615.564	B56	tbd	626.906	B62	0.130	637.942	B74	0.355
615.565	B56	tbd	626.907	B47	0.025	637.943	B74	0.700
615.566	B56	tbd	626.908	B47	0.055	637.951	B74	0.360
615.590	B56	0.003	626.909	B47	0.090	637.953	B74	0.350
615.903	B174	0.025	626.910	B47	0.110	637.959	B74	0.385
615.904	B167	0.005	626.916	B62	0.241	637.961	B93	0.591
625.020	B67	0.007	626.917	B76	0.187	637.962	B174	0.033
626.111	B61	0.007	626.935	B94	0.060	638.104	B162	0.052
626.112	B61	0.007	626.936	B94	0.110	638.105	B162	0.103
626.113	B61	0.008	626.937	B94	0.130	638.106	B162	0.178
626.121	B61	0.007	626.938	B94	0.090	638.107	B162	0.288
626.122	B61	0.008	626.945	B94	0.060	638.108	B162	0.406
626.123	B61	0.009	626.946	B94	0.110	638.111	B161	0.015
626.131	B61	0.009	626.947	B94	0.130	638.121	B161	0.022
626.132	B61	0.010	626.948	B94	0.080	638.131	B161	0.053
626.133	B61	0.010	627.121	B169	0.020	638.132	B161	0.074
626.141	B61	0.013	627.131	B169	0.020	638.141	B161	0.100
626.142	B61	0.015	627.141	B169	0.040	638.142	B161	0.140
626.143	B61	0.018	627.151	B169	0.035	638.151	B161	0.190
626.151	B61	0.020	627.161	B169	0.050	638.152	B161	0.270
626.152	B61	0.025	636.331	B62	tbd	638.161	B161	0.340
626.153	B61	0.030	637.103	B164	0.050	638.162	B161	0.470
626.161	B61	0.045	637.104	B164	0.050	638.171	B161	0.580
626.162	B61	0.070	637.105	B164	0.160	638.172	B161	0.830
626.163	B61	0.080	637.106	B164	0.280	638.241	B161	0.110
626.231	B168	0.008	637.107	B164	0.230	638.251	B161	0.200
626.241	B168	0.014	637.108	B164	0.230	638.252	B161	0.225
626.251	B168	0.022	637.121	B163	0.020	638.261	B161	0.350
626.261	B168	0.035	637.131	B163	0.045	638.262	B161	0.450
626.271	B73	0.040	637.141	B163	0.080	638.271	B161	0.605
626.272	B73	0.050	637.151	B163	0.150	638.272	B161	0.805
626.273	B73	0.060	637.161	B163	0.300	638.411	B37	0.014
626.322	B62	0.008	637.162	B163	0.350	638.412	B37	0.018
626.323	B62	0.009	637.163	B163	0.450	638.421	B37	0.022
626.332	B62	0.011	637.164	B163	0.550	638.422	B37	0.028
626.333	B62	0.013	637.421	B163	0.028	638.431	B37	0.050
626.341	B62	tbd	637.422	B163	0.025	638.432	B37	0.070
626.342	B62	0.015	637.431	B163	0.040	638.441	B37	0.095
626.343	B62	0.020	637.432	B163	0.060	638.442	B37	0.130
626.351	B62	tbd	637.441	B163	0.080	638.451	B37	0.175
626.352	B62	0.030	637.442	B163	0.090	638.452	B37	0.250
626.353	B62	0.035	637.451	B163	0.150	638.461	B37	0.325
626.361	B62	tbd	637.452	B163	0.170	638.462	B37	0.450
626.362	B62	0.060	637.461	B163	0.300	638.471	B37	0.560
626.363	B62	0.090	637.462	B163	0.350	638.472	B37	0.780
626.371	B76	0.032	637.463	B163	0.450	638.561	B160	0.320
626.372	B76	0.048	637.464	B163	0.550	638.562	B160	0.450
626.422	B63	0.004	637.561	B163	0.300	638.571	B160	0.555
626.423	B63	0.004	637.562	B163	0.350	638.572	B160	0.770
626.432	B63	0.008	637.563	B163	0.450	639.104	B33	0.100
626.433	B63	0.008	637.564	B163	0.550	639.105	B33	0.185
626.442	B63	0.013	637.641	B163	0.090	639.106	B33	0.385
626.443	B63	0.014	637.651	B163	0.150	639.107	B33	0.110
626.452	B63	0.020	637.652	B163	0.170	639.108	B33	0.775
626.453	B63	0.020	637.661	B163	0.350	639.109	B33	1.050
626.462	B63	0.044	637.662	B163	0.380	639.110	B33	1.150
626.463	B63	0.050	637.663	B163	0.450	639.111	B158	0.010
626.472	B76	tbd	637.664	B163	0.500	639.112	B158	0.010

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
639.113	B31	0.020	639.275	B158	0.540	639.487	B30	1.300
639.121	B158	0.010	639.276	B158	0.540	639.490	B34	0.051
639.122	B158	0.010	639.277	B31	1.080	639.491	B34	0.102
639.123	B31	0.020	639.281	B158	0.580	639.492	B34	0.230
639.131	B158	0.030	639.282	B158	0.580	639.493	B34	0.390
639.132	B158	0.030	639.283	B31	1.160	639.494	B34	0.502
639.133	B31	0.060	639.285	B158	0.650	639.495	B34	0.558
639.135	B158	0.040	639.286	B158	0.650	639.496	B34	0.677
639.136	B158	0.040	639.287	B31	1.300	639.497	B34	0.720
639.137	B31	0.080	639.403	B34	0.120	639.561	B158	0.200
639.141	B158	0.045	639.404	B34	0.840	639.562	B158	0.200
639.142	B158	0.045	639.405	B34	0.170	639.563	B30	0.400
639.143	B31	0.090	639.406	B34	0.380	639.565	B158	0.250
639.145	B158	0.060	639.407	B34	0.660	639.566	B158	0.250
639.146	B158	0.060	639.408	B34	0.770	639.567	B30	0.500
639.147	B31	0.120	639.409	B34	1.040	639.571	B158	0.385
639.151	B158	0.100	639.410	B34	1.155	639.572	B158	0.385
639.152	B158	0.100	639.411	B158	0.010	639.573	B30	0.770
639.153	B31	0.200	639.412	B158	0.010	639.575	B158	0.465
639.155	B158	0.130	639.413	B30	0.020	639.576	B158	0.465
639.156	B158	0.130	639.415	B158	0.020	639.577	B30	0.930
639.157	B31	0.260	639.416	B158	0.010	639.581	B158	0.545
639.161	B158	0.215	639.417	B30	0.020	639.582	B158	0.545
639.162	B158	0.215	639.421	B158	0.020	639.583	B30	1.090
639.163	B31	0.430	639.422	B158	0.020	639.585	B158	0.645
639.165	B158	0.275	639.423	B30	0.040	639.586	B158	0.645
639.166	B158	0.275	639.425	B158	0.020	639.587	B30	1.290
639.167	B31	0.550	639.426	B158	0.020	639.653	B93	tbd
639.171	B158	0.405	639.427	B30	0.040	639.654	B93	tbd
639.172	B158	0.405	639.431	B158	0.030	639.663	B93	0.610
639.173	B31	0.810	639.432	B158	0.030	639.664	B93	0.440
639.175	B158	0.550	639.433	B30	0.060	639.667	B93	0.550
639.176	B158	0.550	639.435	B158	0.040	639.668	B93	0.770
639.177	B31	1.100	639.436	B158	0.040	639.673	B93	0.805
639.181	B158	0.550	639.437	B30	0.060	639.674	B93	0.805
639.182	B158	0.550	639.441	B158	0.030	639.677	B93	1.360
639.183	B31	1.100	639.442	B158	0.030	639.678	B93	0.950
639.185	B158	0.660	639.443	B30	0.060	639.683	B93	1.460
639.186	B158	0.660	639.445	B158	0.060	639.684	B93	1.210
639.187	B31	1.320	639.446	B158	0.060	639.687	B93	1.740
639.191	B33	0.053	639.447	B30	0.060	639.688	B93	1.350
639.192	B33	0.107	639.451	B158	0.095	639.690	B174	0.003
639.193	B33	0.150	639.452	B158	0.095	639.691	B174	0.004
639.194	B33	0.150	639.453	B30	0.190	639.693	B174	0.006
639.195	B33	0.150	639.455	B158	0.095	639.913	B34	0.014
639.196	B33	0.150	639.456	B158	0.095	639.914	B33	0.026
639.197	B33	0.671	639.457	B30	0.190	639.915	B33	0.052
639.241	B158	0.055	639.461	B158	0.200	639.916	B33	0.140
639.242	B158	0.055	639.462	B158	0.200	639.917	B33	0.260
639.243	B31	0.110	639.463	B30	0.400	639.918	B33	0.477
639.251	B158	0.120	639.465	B158	0.200	651.623	B121	0.001
639.252	B158	0.120	639.466	B158	0.200	651.632	B121	0.001
639.253	B31	0.240	639.467	B30	0.400	651.702	B121	0.001
639.255	B158	0.120	639.471	B158	0.410	651.713	B121	tbd
639.257	B31	0.240	639.472	B158	0.410	651.723	B121	0.001
639.261	B158	0.225	639.473	B30	0.820	651.725	B121	0.001
639.262	B158	0.225	639.475	B158	0.410	651.734	B121	0.001
639.263	B31	0.450	639.476	B158	0.410	651.735	B121	0.001
639.265	B158	0.275	639.477	B30	0.820	651.736	B121	0.001
639.266	B158	0.275	639.481	B158	0.550	651.737	B121	0.001
639.267	B31	0.550	639.482	B158	0.550	651.738	B121	0.001
639.271	B158	0.425	639.483	B30	1.100	651.802	B121	0.001
639.272	B158	0.425	639.485	B158	0.650	651.813	B121	tbd
639.273	B31	0.850	639.486	B158	0.650	651.823	B121	0.001

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
651.824	B121	0.001	654.980	B127	0.008	655.606	B120	0.001
651.825	B121	0.001	654.983	B128	0.016	655.620	B135	0.001
651.833	B121	0.001	654.986	B128	0.015	655.621	B135	0.001
651.834	B121	0.001	654.987	B126	0.004	655.622	B135	0.001
651.835	B121	0.001	654.988	B127	0.007	655.630	B135	0.001
651.837	B121	0.001	654.989	B127	0.009	655.631	B135	0.001
651.838	B121	0.002	654.990A	B127	0.009	655.632	B135	0.001
651.839	B121	0.001	654.991	B127	0.009	655.640	B136	0.002
654.128	B129	0.002	654.992	B127	0.009	655.641	B136	0.002
654.150	B129	0.001	654.993A	B127	0.009	655.642	B136	0.002
654.152	B129	0.001	654.995	B127	0.009	655.644	B136	0.002
654.158	B129	0.002	654.996	B128	0.016	655.650	B136	0.004
654.168	B129	0.001	654.997	B128	0.016	655.651	B136	0.004
654.183	B129	0.002	654.998	B128	0.016	655.652	B136	0.004
654.230	B143	0.003	655.301	B122	0.001	655.654	B136	0.004
654.231	B143	0.002	655.301A	B122	0.001	655.660	B137	0.009
654.232	B143	0.002	655.302	B122	0.001	655.661	B137	0.009
654.233	B143	0.002	655.302A	B122	0.001	655.662	B137	0.010
654.240	B130	0.004	655.303	B122	0.002	655.664	B137	0.009
654.250	B130	0.004	655.303A	B122	0.002	655.670	B138	0.016
654.251	B130	0.003	655.305	B122	0.001	655.671	B138	0.017
654.259	B130	0.004	655.306	B122	0.001	655.800	B144	0.007
654.277	B130	0.004	655.311A	B122	0.001	655.801	B144	0.007
654.287	B130	0.004	655.313	B123	0.001	655.802	B144	0.008
654.340	B131	0.008	655.314	B123	0.001	655.803A	B144	0.007
654.350	B131	0.008	655.316	B122	0.001	655.821	B147	0.001
654.351	B131	0.008	655.321A	B122	0.001	655.822	B147	0.001
654.354	B131	0.008	655.322	B122	0.001	655.910	B133	0.002
654.359	B131	0.008	655.324	B122	0.001	655.911	B133	0.002
654.387	B131	0.008	655.326	B122	0.003	655.912	B133	0.002
654.837	B125	tbd	655.331A	B122	0.001	655.913	B133	0.002
654.840A	B125	0.001	655.332	B122	0.001	655.920	B133	0.002
654.846	B125	0.001	655.334	B122	0.001	655.921	B133	0.002
654.847	B125	tbd	655.363	B123	0.001	655.922	B133	0.002
654.850A	B125	0.001	655.369	B123	tbd	655.923	B133	0.002
654.851	B125	0.001	655.370	B123	0.001	655.930	B134	0.003
654.852	B125	0.001	655.371	B123	0.001	655.931	B134	0.003
654.856	B125	0.001	655.372	B123	0.001	655.932	B134	0.003
654.858	B125	0.001	655.373	B123	0.001	655.933	B134	0.003
654.877	B125	0.001	655.374	B124	0.002	655.940	B125	0.001
654.879	B125	tbd	655.375	B123	0.001	655.941	B125	0.001
654.888	B125	0.001	655.378	B123	0.001	655.942	B125	0.001
654.889	B125	tbd	655.379	B123	0.002	662.600	B154	13.300
654.930A	B126	0.004	655.380	B123	0.001	663.110	B38	0.045
654.935	B126	0.004	655.381	B123	0.001	663.120	B38	0.070
654.937	B126	tbd	655.383	B48	0.001	663.121	B38	0.140
654.940A	B126	0.004	655.384	B124	0.002	663.130	B38	0.090
654.941	B126	0.001	655.385	B123	0.001	663.131	B38	0.180
654.942	B126	0.004	655.386	B123	0.001	663.140	B38	0.100
654.945	B126	0.004	655.387	B123	0.001	663.141	B38	0.210
654.947	B126	tbd	655.388	B123	0.001	663.150	B38	0.500
654.949	B126	tbd	655.389	B49	0.001	663.151	B38	0.950
654.950	B126	0.003	655.390	B123	0.001	663.160	B38	0.640
654.952	B126	0.004	655.393	B123	0.001	663.161	B38	1.250
654.955	B126	0.004	655.395	B123	0.001	663.170	B38	0.600
654.957	B126	tbd	655.397	B123	0.002	663.181	B38	0.010
654.959	B126	tbd	655.398	B123	0.001	663.185	B38	0.040
654.964	B127	0.004	655.399	B123	0.001	663.191	B38	0.005
654.965	B127	0.004	655.600	B120	0.001	663.195	B38	0.030
654.968	B127	tbd	655.601	B120	0.001	671.150	B49	2.000
654.969	B127	tbd	655.602	B120	0.001	671.151	B48	tbd
654.977	B126	0.004	655.603	B120	0.001	688.582	B163	0.300
654.978	B127	tbd	655.604	B120	0.001	688.583	B163	0.360
654.979	B127	tbd	655.605	B120	0.001	688.584	B163	0.450

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
688.585	B163	0.440	690.323	B167	0.001	690.595	B165	0.003
688.599	B132	0.002	690.324	B167	0.002	690.603	B163	0.003
688.619	B132	0.002	690.400	B174	0.001	690.604	B163	0.007
688.736	B163	0.135	690.410	B168	0.001	690.605	B163	0.010
689.001	B63	0.020	690.413	B162	td	690.606	B163	0.025
689.007	B63	0.050	690.414	B169	0.001	690.607	B163	0.040
689.189	B76	td	690.416	B169	0.001	690.611	B165	0.001
689.197	B63	td	690.417	B165	0.001	690.614	B165	0.001
689.198	B63	td	690.418	B156	0.001	690.622	B174	0.002
690.101	B157	0.002	690.419	B156	0.001	690.654	B155	0.010
690.102	B164	0.004	690.421	B165	0.001	690.655	B155	0.030
690.103	B164	0.004	690.425	B163	0.001	690.656	B155	0.035
690.104	B164	0.005	690.431	B154	0.001	690.657	B155	0.080
690.105	B157	0.025	690.432	B154	0.001	690.658	B169	0.005
690.106	B157	0.030	690.433	B154	0.002	690.666	B155	0.005
690.107	B158	0.005	690.434	B154	0.003	690.667	B155	0.030
690.108	B157	0.005	690.435	B154	0.003	690.668	B162	td
690.113	B167	0.004	690.436	B154	0.010	690.703	B176	0.020
690.115	B169	0.003	690.437	B154	0.050	690.704	B176	0.045
690.121	B170	0.053	690.440	B165	0.001	690.705	B176	0.080
690.124	B170	0.017	690.449	B165	0.002	690.706	B176	0.140
690.126	B155	0.030	690.451	B156	0.001	690.707	B176	0.240
690.127	B155	0.055	690.452	B156	0.005	690.716	B174	0.019
690.128	B155	0.100	690.457	B165	0.003	690.800	B160	0.001
690.129	B155	0.095	690.459	B166	0.001	690.801	B154	0.001
690.130	B155	0.240	690.460	B156	0.002	690.802	B154	0.001
690.131	B156	td	690.462	B163	0.001	690.803	B154	0.005
690.135	B168	0.001	690.464	B163	0.002	690.804	B48	0.010
690.136	B168	0.001	690.465	B163	0.002	690.805	B154	0.018
690.137	B168	0.003	690.466	B163	0.001	690.806	B48	0.030
690.138	B168	0.004	690.467	B163	0.001	690.807	B157	0.060
690.139	B168	0.002	690.469	B156	0.005	690.808	B154	0.160
690.140	B168	0.004	690.484	B156	0.045	690.809	B176	0.170
690.141	B168	0.007	690.486	B166	0.001	690.810	B155	0.100
690.150	B167	0.005	690.487A	B166	0.008	690.811	B157	0.014
690.156	B49	0.005	690.488	B166	0.007	690.812	B157	0.015
690.157	B157	0.004	690.489	B165	0.001	690.813	B157	0.016
690.159	B162	td	690.510	B176	0.010	690.814	B157	0.020
690.163	B157	0.017	690.511	B174	0.001	690.816	B48	0.050
690.167	B155	0.105	690.512	B176	0.002	690.817	B176	0.045
690.168	B155	0.250	690.513	B176	0.003	690.819	B157	0.014
690.172	B156	0.040	690.514	B176	0.004	690.833	B163	0.001
690.173	B157	0.010	690.515	B176	0.008	690.834	B147	0.002
690.176	B169	0.005	690.529	B158	0.001	690.836	B145	0.004
690.177	B169	0.005	690.538	B160	0.001	690.837	B148	0.010
690.178	B169	0.005	690.541	B160	td	690.838	B145	0.010
690.179	B169	0.001	690.549	B168	0.001	690.843	B48	0.010
690.180	B169	0.003	690.550	B168	0.001	690.847	B155	0.125
690.182	B169	0.003	690.551	B168	0.001	690.848	B155	0.170
690.183	B167	0.003	690.552	B168	0.004	690.849	B155	0.220
690.184	B157	0.001	690.553	B168	0.005	690.850	B155	0.300
690.186	B157	0.001	690.561	B158	td	690.851	B155	0.110
690.188	B157	0.003	690.573	B157	0.001	690.852	B155	0.200
690.189	B157	0.001	690.576	B156	0.002	690.853	B155	0.325
690.190	B158	td	690.577	B168	0.002	690.854	B155	0.680
690.191	B157	0.005	690.578	B168	0.002	690.855	B155	0.250
690.192	B157	0.001	690.579	B168	0.003	690.860	B179	0.150
690.193	B157	0.001	690.580	B168	0.004	690.861	B171	0.271
690.194	B157	0.001	690.582	B165	0.004	690.899	B159	0.005
690.195	B157	0.001	690.583	B160	0.002	690.900	B160	0.001
690.196	B157	td	690.585	B160	0.004	690.901	B160	0.001
690.197	B157	0.005	690.586	B160	0.003	690.902	B160	0.002
690.208	B165	0.001	690.591	B169	0.005	690.903	B160	0.002
690.320	B165	0.001	690.594	B154	0.004	690.904	B160	0.003

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
690.905	B160	0.003	693.175	B157	0.001	800.050	A205	0.005
690.906	B106	0.003	693.176	B157	0.001	800.051	A205	0.005
690.907	B160	0.005	693.177	B157	0.001	800.052	A205	0.005
690.908	B162	0.005	693.178	B157	0.001	800.053	A205	tbd
690.912	B174	0.002	693.179	B157	0.001	800.054	A29	tbd
690.913	B174	0.002	693.180	B160	0.001	800.058	A3	0.310
690.925	B165	0.001	693.181	B160	0.003	800.063	A20	0.550
690.940	B169	0.001	693.182	B160	0.004	800.065	A29	tbd
690.943	B169	0.005	693.183	B160	0.017	800.066	A22	1.110
690.947	B165	0.001	693.184	B160	0.024	800.074	A22	1.820
690.953	B169	0.005	693.185	B160	0.004	800.075	A22	1.710
690.954	B169	tbd	693.186	B162	0.001	800.079	A22	1.750
690.964	B167	0.001	693.187	B157	0.002	800.080	A22	1.900
690.965	B167	0.001	693.289	B169	0.001	800.081	A22	2.800
690.970	B157	0.030	693.304	B154	0.001	800.085	A18	1.500
690.978	B165	0.001	693.305	B154	0.325	800.088	A18	1.200
690.981	B165	0.001	693.306	B154	0.325	800.093	A18	1.600
690.984	B171	0.205	694.101	B120	0.005	800.096	A18	1.400
690.985	B171	tbd	694.102	B121	0.005	800.111	A18	1.400
690.986	B171	tbd	694.103	B121	0.005	800.112	A18	1.700
690.987	B171	0.236	694.105	B162	tbd	800.115	A18	1.445
690.989	B171	0.080	694.110	B135	0.005	800.116	A18	1.600
690.991	B171	0.081	694.120	B169	0.005	800.124	A19	2.200
690.994	B165	0.001	694.121	B129	0.005	800.128	A18	1.500
690.995	B165	tbd	694.122	B123	0.005	800.131	A18	1.200
690.996	B165	0.003	694.123	B133	0.005	800.144	A13	1.830
691.315	B176	0.001	694.124	B135	0.005	800.146	A13	2.780
691.316	B176	0.001	694.125	B147	0.002	800.147	A13	2.268
691.318	B176	0.001	694.130	B133	0.005	800.148	A13	3.200
691.369	B163	0.001	694.131	B136	0.005	800.158	A28	tbd
691.370	B163	0.001	694.136	B134	0.005	800.159	A28	1.600
691.371	B163	0.001	694.137	B136	0.005	800.160	A28	1.700
691.372	B163	0.001	694.138	B159	0.005	800.163	A20	1.160
691.501	B154	0.001	694.141	B126	0.005	800.164	A21	1.784
691.502	B154	0.002	694.142	B131	0.005	800.165	A21	2.065
691.503	B154	0.006	694.143	B137	0.005	800.168	A20	1.030
691.504	B154	0.011	694.144	B131	0.005	800.175	A25	1.700
691.505	B154	0.021	694.145	B159	0.005	800.177	A25	1.660
691.506	B154	0.050	694.150	B127	0.005	800.179	A25	1.570
691.507	B154	0.110	694.806	B120	0.002	800.184	A29	tbd
691.600	B176	0.001	694.807	B48	0.004	800.185	A192	4.400
691.601	B176	0.004	694.808	B147	0.004	800.186	A192	4.400
691.602	B176	0.005	694.809	B136	0.004	800.187	A192	4.500
691.603	B176	0.010	694.810	B134	0.009	800.188	A192	4.580
691.604	B176	0.006	694.815	B126	0.009	800.204	A22	4.100
691.605	B176	0.015	694.820	B127	0.010	800.205	A22	4.500
691.606	B176	0.022	695.101	B159	0.004	800.206	A22	4.900
691.607	B176	0.045	695.102	B159	0.010	800.207	A22	3.800
691.608	B176	0.075	696.901	B165	0.001	800.221	A22	6.700
691.609	B176	0.075				800.224	A22	6.000
691.637	B156	0.086	718.201	B48	0.003	800.235	A22	7.100
691.755	B159	0.002				800.236	A22	9.600
691.756	B159	0.015	800.001	A19	2.000	800.237	A22	3.840
691.757	B159	0.015	800.002	A19	4.080	800.256	A22	16.400
692.270	B154	0.001	800.008	A19	1.500	800.264	A19	4.200
692.271	B154	0.001	800.015	A19	4.500	800.268	A19	4.200
692.272	B154	0.001	800.023	A19	4.200	800.272	A19	4.300
692.286	B154	0.001	800.027	A19	4.200	800.278	A13	4.200
692.296	B165	0.001	800.029	A11	1.260	800.279	A13	4.600
692.298	B171	0.001	800.045	A123	0.600	800.280	A13	5.000
692.381	B165	0.001	800.046	A205	tbd	800.282	A13	4.280
692.406	B157	0.003	800.047	A205	tbd	800.283	A13	tbd
692.409	B157	0.002	800.048	A205	0.002	800.284	A13	2.100
693.131	B164	0.001	800.049	A205	tbd	800.287	A13	4.600

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
800.288	A13	5.170	800.468	A175	tbd	800.888	A122	2.400
800.289	A13	5.900	800.472	A175	0.200	800.889	A106	6.000
800.291	A13	4.600	800.483	A183	0.065	800.903	A121	4.300
800.292	A13	5.400	800.484	A183	0.055	800.904	A121	5.300
800.293	A13	6.400	800.488	A205	tbd	800.910	A121	6.100
800.323	A27	7.080	800.557	A111	1.400	800.911	A121	7.800
800.325	A28	3.870	800.587	A194	0.002	800.933	A120	2.200
800.329	A28	3.900	800.678	A115	0.600	800.934	A120	2.600
800.330	A28	4.020	800.679	A116	0.800	800.935	A120	2.100
800.335	A28	3.500	800.681	A116	0.800	800.940	A122	3.300
800.336	A28	4.410	800.687	A109	0.800	800.942	A122	3.700
800.341	A28	tbd	800.688	A109	0.700	800.945	A223	0.056
800.347	A28	3.610	800.689	A109	0.800	800.950	A216	0.003
800.350	A21	4.030	800.695	A121	1.600	800.951	A219	0.002
800.351	A21	4.200	800.698	A121	1.500	800.952	A219	0.009
800.352	A21	tbd	800.703	A118	1.100	800.953	A219	0.040
800.354	A21	3.790	800.708	A118	1.100	800.972	A41	1.960
800.355	A21	3.890	800.712	A118	1.100	800.973	A41	2.000
800.369	A25	4.200	800.717	A118	1.200	800.974	A41	2.010
800.374	A25	4.200	800.722	A118	1.200	800.975	A41	1.810
800.375	A25	4.195	800.723	A118	1.700	800.976	A41	2.105
800.380	A25	4.700	800.726	A118	1.000	800.977	A41	2.780
800.385	A25	4.680	800.731	A118	1.100	801.013	A153	tbd
800.390	A25	5.400	800.734	A119	0.800	801.014	A97	tbd
800.403	A148	tbd	800.735	A119	1.400	801.015	A97	tbd
800.404	A148	tbd	800.746	A111	0.600	801.016	A97	tbd
800.405	A148	tbd	800.765	A120	0.830	801.017	A97	tbd
800.406	A148	tbd	800.766	A120	1.400	801.018	A97	tbd
800.407	A148	tbd	800.767	A120	0.754	801.019	A97	tbd
800.408	A148	tbd	800.775	A109	1.500	801.022	A97	tbd
800.409	A148	tbd	800.776	A106	2.500	801.023	A97	tbd
800.410	A148	tbd	800.777	A106	2.400	801.024	A97	tbd
800.411	A148	tbd	800.778	A106	3.400	801.025	A97	0.400
800.412	A148	tbd	800.779	A106	3.300	801.037	A13	0.190
800.413	A148	tbd	800.783	A124	3.000	801.038	A13	0.290
800.414	A148	tbd	800.787	A121	4.200	801.039	A13	0.365
800.415	A148	tbd	800.788	A121	1.900	801.040	C24	3.100
800.416	A148	tbd	800.789	A121	2.200	801.042	A184	tbd
800.417	A148	tbd	800.790	A121	2.800	801.043	A184	tbd
800.418	A148	tbd	800.795	A118	1.600	801.046	A223	0.002
800.419	A148	tbd	800.799	A118	1.800	801.047	A223	0.003
800.420	A149	tbd	800.802	A118	1.600	801.071	A81	0.024
800.421	A149	tbd	800.806	A118	1.900	801.073	A80	tbd
800.422	A149	tbd	800.812	A118	2.000	801.092	A66	3.880
800.423	A149	tbd	800.815	A118	1.700	801.093	A66	5.005
800.424	A149	tbd	800.816	A118	2.000	801.094	A66	6.100
800.425	A149	tbd	800.819	A118	2.100	801.102	A66	2.900
800.426	A149	tbd	800.822	A118	1.800	801.103	A66	3.590
800.427	A149	tbd	800.823	A118	2.800	801.105	A66	3.200
800.428	A149	tbd	800.825	A118	2.200	801.106	A66	4.300
800.429	A149	tbd	800.826	A118	3.000	801.118	A66	3.690
800.430	A149	tbd	800.831	A118	1.500	801.119	A66	5.500
800.431	A149	tbd	800.838	A118	1.600	801.124	A66	6.800
800.432	A149	tbd	800.842	A119	1.500	801.125	A66	4.900
800.433	A149	tbd	800.843	A119	1.755	801.126	A65	2.700
800.434	A149	tbd	800.844	A119	2.500	801.129	A65	2.700
800.435	A149	tbd	800.845	A119	1.380	801.133	A65	3.000
800.436	A149	tbd	800.846	A119	2.500	801.136	A65	3.100
800.437	A149	tbd	800.847	A119	3.100	801.139	A65	3.700
800.438	A149	tbd	800.848	A119	2.000	801.143	A65	2.600
800.439	A149	tbd	800.849	A119	2.700	801.146	A54	2.500
800.450	A174	tbd	800.850	A119	3.300	801.147	A54	2.500
800.463	A174	tbd	800.851	A119	2.400	801.164	A69	tbd
800.464	A174	0.075	800.887	A122	2.000	801.169	A80	4.900

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
801.179	A52	0.795	801.434	A165	0.820	801.499	A164	0.120
801.188	A66	2.380	801.435	A165	0.950	801.500	A164	0.170
801.189	A66	1.190	801.436	A165	1.140	801.501	A166	0.001
801.196	A65	1.100	801.437	A165	0.530	801.507	A174	tbd
801.201	A65	1.100	801.438	A165	0.790	801.509	A175	tbd
801.205	A65	1.400	801.439	A165	0.930	801.517	A175	0.195
801.208	A65	1.500	801.440	A165	1.110	801.524	A146	0.070
801.215	A65	1.300	801.441	A165	0.520	801.525	A146	tbd
801.217	A65	1.230	801.442	A165	0.770	801.526	A146	tbd
801.219	A65	2.400	801.443	A165	0.920	801.527	A146	tbd
801.221	A65	1.400	801.444	A165	1.100	801.528	A146	tbd
801.222	A65	1.000	801.445	A165	0.510	801.529	A146	tbd
801.283	A76	1.100	801.446	A165	0.760	801.530	A146	tbd
801.287	A76	0.800	801.447	A165	0.890	801.531	A146	tbd
801.289	A98	tbd	801.448	A165	1.050	801.532	A146	tbd
801.290	A98	3.042	801.449	A165	0.490	801.533	A146	0.050
801.291	A98	tbd	801.450	A165	0.740	801.534	A146	tbd
801.292	A98	tbd	801.451	A166	0.001	801.535	A147	tbd
801.293	A98	1.500	801.452	A165	0.950	801.536	A147	0.155
801.294	A98	tbd	801.453	A165	1.140	801.537	A147	0.155
801.295	A98	tbd	801.454	A165	0.530	801.538	A147	tbd
801.296	A98	tbd	801.455	A165	0.790	801.539	A147	tbd
801.297	A98	3.860	801.456	A165	0.920	801.540	A147	tbd
801.298	A99	tbd	801.457	A165	1.100	801.541	A147	tbd
801.299	A96	3.120	801.458	A165	0.510	801.542	A147	tbd
801.300	A96	tbd	801.459	A165	0.760	801.543	A147	tbd
801.301	A96	tbd	801.460	A165	0.550	801.544	A147	tbd
801.302	A94	tbd	801.461	A165	0.820	801.545	A147	tbd
801.303	A94	tbd	801.462	A165	0.520	801.546	A147	tbd
801.313	A150	0.040	801.463	A165	0.780	801.547	A147	tbd
801.314	A150	0.032	801.464	A167	tbd	801.548	A147	tbd
801.315	A150	0.050	801.465	A165	0.490	801.549	A147	tbd
801.316	A150	0.058	801.466	A165	tbd	801.550	A147	tbd
801.317	A150	tbd	801.467	A165	tbd	801.551	A147	tbd
801.318	A156	0.150	801.468	A165	1.400	801.552	A147	tbd
801.405	A164	0.350	801.469	A165	tbd	801.651	A138	tbd
801.406	A164	0.470	801.471	A165	tbd	801.652	A138	tbd
801.407	A164	0.590	801.472	A165	tbd	801.653	A106	2.200
801.408	A164	0.270	801.473	A165	tbd	801.654	A142	0.025
801.409	A164	0.340	801.474	A166	tbd	801.655	A138	tbd
801.410	A164	0.580	801.475	A167	tbd	801.656	A138	tbd
801.411	A164	0.270	801.476	A167	tbd	801.657	A104	tbd
801.412	A164	0.360	801.477	A167	tbd	801.658	A142	0.026
801.413	A164	0.480	801.478	A166	tbd	801.659	A138	tbd
801.414	A164	0.600	801.479	A164	0.230	801.660	A138	tbd
801.415	A164	0.290	801.480	A164	0.310	801.662	A142	0.025
801.416	A164	0.360	801.481	A164	0.180	801.663	A107	2.600
801.417	A164	0.480	801.482	A164	0.230	801.664	A106	4.200
801.418	A164	0.600	801.483	A164	0.310	801.665	A106	8.700
801.419	A164	0.290	801.484	A164	0.120	801.666	A116	4.500
801.420	A166	0.001	801.485	A164	0.180	801.670	A47	tbd
801.421	A164	0.360	801.486	A164	0.220	801.671	A139	0.005
801.422	A164	0.480	801.487	A164	0.300	801.672	A139	tbd
801.423	A164	0.600	801.488	A164	0.370	801.673	A186	1.870
801.424	A164	0.190	801.489	A164	0.120	801.674	A142	0.048
801.425	A164	0.290	801.490	A164	0.180	801.675	A139	0.005
801.426	A164	0.350	801.491	A164	0.220	801.676	A139	tbd
801.427	A164	0.460	801.492	A164	0.300	801.677	A76	0.900
801.428	A164	0.580	801.493	A164	0.370	801.678	A142	0.048
801.429	A164	0.180	801.494	A164	0.120	801.679	A139	tbd
801.430	A164	0.280	801.495	A164	0.180	801.680	A139	tbd
801.431	A165	0.980	801.496	A164	0.220	801.682	A142	0.048
801.432	A165	1.170	801.497	A164	0.300	801.684	A210	2.100
801.433	A165	0.550	801.498	A164	0.370	801.685	A158	tbd

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
801.688	A57	1.000	801.775	A159	0.660	802.161	A127	tbd
801.690	A81	0.018	801.785	A174	tbd	802.162	A127	tbd
801.694	A139	tbd	801.787	A174	0.030	802.163	A127	tbd
801.695	A139	tbd	801.807	A174	0.075	802.164	A127	tbd
801.696	B148	0.005	801.808	A174	tbd	802.165	A127	tbd
801.697	A139	tbd	801.810	A174	tbd	802.166	A127	tbd
801.698	A139	tbd	801.812	A174	tbd	802.167	A127	tbd
801.699	B148	0.028	801.813	A174	tbd	802.168	A127	tbd
801.700	A139	tbd	801.814	A174	tbd	802.169	A127	tbd
801.701	A139	tbd	801.831	A174	tbd	802.170	A127	tbd
801.702	A136	tbd	801.832	A174	tbd	802.171	A127	tbd
801.703	A136	0.003	801.833	A174	tbd	802.172	A127	tbd
801.704	A136	0.007	801.834	A174	tbd	802.173	A127	tbd
801.705	A2	0.009	801.860	A175	0.245	802.174	A127	tbd
801.709	A136	0.004	801.861	A175	0.260	802.175	A127	tbd
801.711	A8	1.490	801.867	A175	tbd	802.176	A127	tbd
801.712	A9	1.480	801.868	A175	tbd	802.177	A127	tbd
801.713	A9	2.321	801.873	A175	0.258	802.178	A127	tbd
801.714	A129	tbd	801.883	A175	tbd	802.179	A127	tbd
801.718	A139	tbd	801.885	A175	0.250	802.180	A127	0.505
801.719	A139	tbd	801.889	A175	tbd	802.181	A127	tbd
801.720	A2	1.074	801.898	A175	0.350	802.183	A143	0.640
801.721	A142	0.110	801.925	A175	tbd	802.184	A143	1.115
801.722	A139	tbd	801.927	A175	0.250	802.185	A143	2.320
801.723	A139	tbd	801.929	A175	0.260	802.187	A143	0.310
801.724	A50	0.858	801.930	A175	tbd	802.188	A143	0.003
801.725	A142	0.115	801.931	A175	tbd	802.191	A189	0.210
801.726	A139	tbd	801.938	A175	tbd	802.192	A189	0.400
801.727	A139	tbd	801.942	A175	tbd	802.193	A189	0.380
801.729	A142	0.114	801.944	A175	tbd	802.220	A189	0.600
801.730	A8	2.100	801.948	A175	tbd	802.221	A189	0.600
801.731	A8	1.250	801.982	A158	tbd	802.222	A180	0.003
801.733	A142	0.114	801.983	A158	tbd	802.223	A180	0.003
801.734	A56	1.500	801.984	A158	tbd	802.224	A218	1.075
801.737	A56	1.400	801.985	A158	tbd	802.225	A189	1.110
801.738	A138	0.004	802.001	A174	0.028	802.226	A189	1.040
801.740	A57	2.100	802.023	A174	0.074	802.251	A218	tbd
801.742	A136	0.011	802.046	A175	0.270	802.307	A169	tbd
801.743	A136	0.004	802.063	A159	0.280	802.308	A169	tbd
801.744	A138	0.009	802.064	A159	0.250	802.313	A178	0.800
801.746	A136	0.010	802.065	A159	tbd	802.314	A81	0.050
801.747	A159	0.215	802.066	A159	tbd	802.315	A81	0.101
801.748	A159	tbd	802.067	A159	tbd	802.316	A81	0.187
801.750	A138	tbd	802.112	A174	0.050	802.318	C18	20.800
801.751	A138	tbd	802.120	A175	0.193	802.328	C37	0.090
801.752	A159	0.180	802.129	A95	tbd	802.329	C21	tbd
801.753	A219	0.003	802.130	A95	tbd	802.331	C37	tbd
801.754	A219	0.011	802.131	A110	tbd	802.337	A168	0.017
801.755	A219	0.052	802.132	A110	tbd	802.350	A123	tbd
801.759	A29	tbd	802.133	A110	tbd	802.351	A81	0.050
801.760	A29	tbd	802.134	A219	tbd	802.355	A50	0.330
801.761	A29	tbd	802.135	A219	0.080	802.356	A50	0.370
801.762	A29	tbd	802.136	A219	0.100	802.357	A50	0.390
801.763	A29	tbd	802.137	A219	tbd	802.361	A60	1.900
801.764	A159	0.660	802.138	A219	tbd	802.362	A60	1.100
801.765	A159	0.660	802.152	A127	tbd	802.364	A60	1.700
801.767	A159	0.640	802.153	A127	tbd	802.365	A60	2.000
801.768	A159	0.617	802.154	A127	tbd	802.366	A60	2.400
801.769	A159	0.600	802.155	A127	tbd	802.367	A60	1.300
801.770	A159	0.480	802.156	A127	0.073	802.383	A168	tbd
801.771	A159	0.465	802.157	A127	tbd	802.384	A168	tbd
801.772	A159	0.360	802.158	A127	tbd	802.385	A168	tbd
801.773	A159	0.340	802.159	A127	tbd	802.386	A168	tbd
801.774	A159	0.665	802.160	A127	tbd	802.387	A168	tbd

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
802.389	A168	tbd	802.533	C12	12.100	802.710	C8	5.900
802.390	A168	tbd	802.535	C12	12.000	802.712	C8	6.200
802.391	A168	tbd	802.537	C12	12.200	802.716	C8	7.900
802.393	A168	tbd	802.539	C12	12.400	802.717	C8	5.000
802.394	A168	tbd	802.541	C16	19.200	802.719	C8	5.200
802.395	C26	2.700	802.544	C19	16.100	802.721	C8	5.400
802.398	C26	5.000	802.545	C11	9.200	802.723	C8	5.600
802.403	C24	4.100	802.546	C7	5.500	802.725	C10	4.400
802.404	C26	4.370	802.547	C7	5.900	802.726	C10	5.400
802.409	C24	3.100	802.548	C7	6.200	802.727	C13	5.500
802.411	C26	9.700	802.549	C7	5.600	802.728	C13	5.600
802.415	C24	7.300	802.550	C7	6.000	802.729	C13	5.700
802.416	C26	8.700	802.551	C7	6.300	802.730	C13	5.600
802.420	C24	6.300	802.552	C7	8.000	802.731	C13	5.800
802.422	C24	6.800	802.553	C7	5.100	802.732	C13	6.000
802.424	C24	5.800	802.554	C7	5.300	802.734	C18	9.600
802.425	C27	9.400	802.555	C7	5.500	802.735	C19	6.800
802.427	C25	5.900	802.556	C7	5.700	802.736	C11	5.900
802.428	C27	8.400	802.557	C18	9.700	802.737	C15	1.000
802.430	C25	4.900	802.558	C14	15.000	802.738	C15	1.700
802.431	C27	4.800	802.559	C14	16.300	802.740	C15	0.780
802.433	C27	3.800	802.560	C17	16.800	802.741	C15	0.780
802.449	C6	5.500	802.562	C7	13.000	802.742	C15	1.200
802.451	C6	5.900	802.563	C7	13.400	802.747	A131	tbd
802.453	C6	6.200	802.564	C7	13.700	802.748	A131	tbd
802.455	C6	5.600	802.565	C7	13.100	802.749	A131	tbd
802.457	C6	6.000	802.566	C7	13.500	802.750	A222	tbd
802.459	C6	6.300	802.567	C7	13.800	802.751	A222	tbd
802.462	C6	8.000	802.568	C7	14.200	802.752	A222	0.300
802.463	C6	5.100	802.569	C7	12.600	802.753	A222	tbd
802.465	C6	5.300	802.570	C7	12.800	802.754	A222	tbd
802.467	C6	5.500	802.571	C7	13.000	802.755	A222	tbd
802.469	C6	5.700	802.572	C7	13.200	802.756	A223	0.020
802.471	C10	4.500	802.573	C18	20.800	802.757	A168	tbd
802.472	C10	5.500	802.639	C14	14.200	802.758	A168	tbd
802.473	C12	5.600	802.641	C14	15.500	802.759	A168	tbd
802.474	C12	5.700	802.642	C17	16.000	802.760	A168	tbd
802.475	C12	5.800	802.645	C8	12.200	802.761	A168	tbd
802.476	C12	5.700	802.648	C8	12.600	802.762	A168	tbd
802.477	C12	5.900	802.651	C8	12.900	802.767	A168	tbd
802.478	C12	6.100	802.654	C8	12.300	802.768	A168	tbd
802.480	C18	9.700	802.657	C8	12.700	802.769	A168	tbd
802.481	C19	6.900	802.660	C8	13.000	802.777	A29	tbd
802.482	C11	6.000	802.663	C8	13.400	802.778	A29	tbd
802.483	A16	1.900	802.666	C8	11.800	802.781	A170	tbd
802.489	C14	17.400	802.669	C8	12.000	802.782	A170	tbd
802.490	C14	16.300	802.672	C8	12.200	802.783	A170	tbd
802.491	C14	16.300	802.675	C8	12.400	802.785	A173	1.550
802.492	C17	16.800	802.678	C10	6.800	802.787	A173	tbd
802.494	C6	13.000	802.679	C10	7.800	802.788	A171	tbd
802.497	C6	13.400	802.680	C13	11.100	802.789	A171	tbd
802.500	C6	13.700	802.682	C13	11.200	802.790	A171	tbd
802.503	C6	13.100	802.684	C13	11.300	802.791	A171	tbd
802.506	C6	13.500	802.686	C13	11.200	802.792	A171	tbd
802.509	C6	13.800	802.688	C13	11.400	802.793	A171	tbd
802.512	C6	14.200	802.690	C13	11.600	802.794	A171	tbd
802.515	C6	12.600	802.692	C16	18.400	802.795	A171	tbd
802.518	C6	12.800	802.695	C18	20.000	802.797	A171	tbd
802.521	C6	13.000	802.696	C19	15.300	802.798	A171	tbd
802.524	C6	13.200	802.697	C11	8.400	802.799	A171	tbd
802.527	C10	7.600	802.702	C8	5.400	802.800	A171	tbd
802.528	C10	8.600	802.704	C8	5.800	802.801	A171	tbd
802.529	C12	11.900	802.706	C8	6.100	802.802	A171	tbd
802.531	C12	12.000	802.708	C8	5.500	802.803	A171	tbd

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
802.805	A170	tbd	802.998	C36	4.300	803.072	A63	1.000
802.807	A170	tbd	802.999	C36	4.600	803.073	A63	1.100
802.808	A170	tbd	803.000	C36	4.300	803.074	A63	1.200
802.809	A170	tbd	803.001	C36	4.700	803.075	A36	1.650
802.810	A170	tbd	803.002	C38	4.400	803.076	A36	2.100
802.811	A170	tbd	803.003	C38	4.300	803.077	A36	2.060
802.812	A170	tbd	803.004	C38	4.400	803.078	A36	2.120
802.814	A193	tbd	803.005	C37	6.800	803.080	A56	2.000
802.815	A193	tbd	803.006	C37	8.500	803.081	A57	2.200
802.816	A193	tbd	803.007	C36	7.200	803.082	A78	2.000
802.817	A193	tbd	803.008	C36	7.400	803.083	A79	2.000
802.818	A193	tbd	803.009	C36	7.600	803.085	A56	1.000
802.819	A193	tbd	803.010	C36	7.300	803.088	A57	1.050
802.820	A193	tbd	803.011	C36	7.500	803.089	A57	1.360
802.821	A193	tbd	803.012	C36	7.800	803.090	A57	1.440
802.822	A193	tbd	803.013	C36	7.500	803.092	A78	1.200
802.823	A193	tbd	803.014	C36	7.800	803.093	A78	1.400
802.824	A81	tbd	803.016	C36	7.500	803.095	A79	1.200
802.825	A81	tbd	803.017	C36	7.900	803.096	A79	1.400
802.827	A81	tbd	803.018	C36	8.200	803.101	A56	1.220
802.828	A81	tbd	803.019	C38	7.500	803.102	A57	2.000
802.831	A80	tbd	803.020	C38	7.400	803.103	A78	1.800
802.832	A80	tbd	803.021	C38	7.500	803.104	A79	1.800
802.834	A47	tbd	803.022	C38	7.900	803.105	A56	0.750
802.836	A152	tbd	803.023	C38	8.000	803.106	A57	0.750
802.837	A152	tbd	803.024	C38	11.900	803.108	A117	1.100
802.838	A152	tbd	803.025	C37	4.800	803.110	A116	2.500
802.839	A152	tbd	803.026	C36	4.000	803.112	A117	2.900
802.840	A152	tbd	803.027	C36	4.300	803.113	A117	2.400
802.841	A152	tbd	803.028	C36	4.300	803.114	A117	2.100
802.842	A152	tbd	803.029	C38	4.400	803.116	A8	2.000
802.843	A152	tbd	803.030	C38	4.400	803.117	A9	2.700
802.844	A152	tbd	803.031	C38	5.700	803.118	A9	2.000
802.845	A152	tbd	803.032	C37	6.800	803.119	A9	1.430
802.846	A152	tbd	803.033	C37	8.500	803.120	A116	3.400
802.847	A152	tbd	803.035	C36	7.300	803.121	A117	3.400
802.848	A152	tbd	803.036	C36	7.300	803.123	A116	2.200
802.942	A169	tbd	803.037	C36	7.500	803.125	A117	2.100
802.943	A169	tbd	803.038	C38	7.500	803.126	A116	2.800
802.944	A169	tbd	803.039	C38	7.400	803.127	A116	2.500
802.945	A169	tbd	803.040	C38	11.900	803.128	A117	2.800
802.946	A169	tbd	803.041	A119	1.700	803.129	A117	2.080
802.947	A169	tbd	803.043	A119	1.600	803.131	A8	2.400
802.948	A169	tbd	803.051	A15	0.710	803.132	A9	2.600
802.949	A169	tbd	803.052	A15	0.720	803.133	A9	2.400
802.950	A169	tbd	803.053	A15	0.510	803.135	A8	3.100
802.963	A200	1.200	803.054	A15	0.650	803.136	A9	3.700
802.964	C32	0.000	803.055	A15	0.650	803.137	A9	3.100
802.968	C32	10.600	803.056	A15	1.400	803.141	A117	0.800
802.970	C32	8.800	803.057	A15	1.700	803.144	A117	1.300
802.974	C33	9.300	803.058	A15	1.400	803.145	A117	1.600
802.975	C32	5.000	803.059	A15	1.800	803.147	A117	1.400
802.976	C32	10.800	803.060	A15	1.200	803.148	A8	1.600
802.977	C32	9.000	803.061	A15	1.160	803.149	A9	2.100
802.978	C33	9.500	803.062	A15	1.300	803.150	A9	1.600
802.989	C36	3.000	803.063	A15	1.600	803.161	A9	3.200
802.990	C36	3.100	803.064	A15	1.400	803.162	A9	3.000
802.991	C36	3.300	803.065	A15	1.700	803.163	A9	3.700
802.992	C36	3.300	803.066	A15	4.300	803.164	A116	3.100
802.993	C37	4.800	803.067	A15	4.400	803.166	A117	3.000
802.994	C36	3.900	803.068	A15	4.200	803.167	A117	2.900
802.995	C36	4.100	803.069	A15	4.300	803.177	A117	2.400
802.996	C36	4.000	803.070	A63	1.200	803.179	A117	1.700
802.997	C36	4.200	803.071	A63	1.200	803.182	A116	2.000

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
803.183	A117	1.400	803.589	A75	0.700	804.141	A136	tbd
803.184	A117	2.300	803.591	A75	0.800	804.142	A136	tbd
803.185	A117	1.470	803.592	A75	0.800	804.143	A136	tbd
803.194	A116	3.300	803.593	A130	tbd	804.144	A136	tbd
803.195	A117	3.300	803.594	A130	tbd	804.145	A136	tbd
803.198	A8	2.300	803.595	A130	tbd	804.146	A136	tbd
803.199	A8	2.150	803.596	A84	1.200	804.147	A136	tbd
803.200	A9	3.300	803.597	A2	1.200	804.148	A136	tbd
803.202	A9	2.150	803.598	A2	0.620	804.149	A136	tbd
803.206	A117	2.000	803.599	A3	1.100	804.150	A136	tbd
803.213	A77	1.600	803.600	A51	0.900	804.151	A136	tbd
803.214	A77	0.800	803.601	A2	1.200	804.152	A136	tbd
803.216	A77	2.000	803.602	A130	tbd	804.153	A136	tbd
803.218	A77	0.800	803.603	A50	1.100	804.154	A136	tbd
803.220	A55	1.100	803.604	A70	tbd	804.155	A136	tbd
803.222	A55	0.700	803.608	A3	0.510	804.156	A136	tbd
803.226	C25	0.450	803.619	A52	1.400	804.157	A136	tbd
803.525	A60	3.400	803.620	A52	1.100	804.158	A136	tbd
803.527	A60	3.700	803.622	A52	1.000	804.159	A136	tbd
803.528	A60	3.300	803.623	A52	1.100	804.160	A136	tbd
803.533	A60	3.700	803.624	A52	1.800	804.161	A136	tbd
803.535	A60	4.200	803.629	A52	0.800	804.162	A136	tbd
803.536	A60	3.400	803.730	A198	tbd	804.163	A136	tbd
803.537	A60	3.900	803.731	A198	tbd	804.164	A136	tbd
803.538	A60	4.300	803.736	A123	tbd	804.165	A136	tbd
803.539	A60	4.700	803.737	A123	0.500	804.166	A136	tbd
803.540	A60	3.600	803.738	A123	1.200	804.167	A136	tbd
803.541	A60	1.100	803.739	A123	0.800	804.168	A136	0.009
803.543	A60	1.400	803.740	A123	1.700	804.169	A136	tbd
803.544	A60	1.000	803.742	A168	tbd	804.170	A136	tbd
803.551	A60	1.400	803.743	A168	tbd	804.171	A136	tbd
803.552	A60	1.700	803.745	A168	tbd	804.172	A136	tbd
803.554	A129	tbd	803.746	A168	tbd	804.173	A136	tbd
803.555	A129	tbd	803.747	A168	tbd	804.174	A136	tbd
803.556	A129	tbd	803.748	A168	tbd	804.175	A136	tbd
803.557	A129	tbd	803.749	A168	tbd	804.176	A136	tbd
803.558	A129	tbd	803.750	A168	tbd	804.177	A136	tbd
803.559	A129	tbd	803.751	A168	tbd	804.267	A127	tbd
803.560	A129	tbd	803.752	A168	tbd	804.268	A127	tbd
803.561	A129	tbd	803.754	A168	tbd	804.269	A127	tbd
803.562	A129	tbd	803.755	A168	tbd	804.270	A127	tbd
803.563	A129	tbd	803.757	A168	tbd	804.271	A127	tbd
803.564	A129	tbd	803.759	A168	tbd	804.272	A127	tbd
803.565	A129	tbd	803.760	A168	tbd	804.273	A127	tbd
803.566	A129	tbd	803.761	A168	tbd	804.274	A127	tbd
803.567	A129	tbd	803.762	A168	tbd	804.275	A127	tbd
803.568	A129	tbd	803.763	A168	tbd	804.276	A127	tbd
803.569	A129	tbd	804.108	A2	tbd	804.277	A127	tbd
803.570	A129	tbd	804.115	A130	tbd	804.278	A127	tbd
803.571	A128	tbd	804.117	A157	tbd	804.279	A127	tbd
803.572	A128	tbd	804.119	A157	tbd	804.280	A127	tbd
803.573	A128	tbd	804.121	A157	tbd	804.281	A127	tbd
803.574	A128	tbd	804.128	A165	1.170	804.282	A127	tbd
803.575	A128	tbd	804.129	A165	1.130	804.283	A127	tbd
803.576	A128	tbd	804.130	A165	0.980	804.284	A127	tbd
803.577	A128	tbd	804.131	A165	0.940	804.285	A126	tbd
803.578	A128	tbd	804.132	A136	tbd	804.286	A126	tbd
803.579	A128	tbd	804.134	A136	tbd	804.287	A126	tbd
803.580	A128	tbd	804.135	A136	tbd	804.288	A126	tbd
803.581	A129	tbd	804.136	A136	tbd	804.289	A126	tbd
803.582	A129	tbd	804.137	A136	tbd	804.290	A126	tbd
803.583	A129	tbd	804.138	A136	tbd	804.291	A126	tbd
803.584	A129	tbd	804.139	A136	tbd	804.292	A126	tbd
803.585	A129	tbd	804.140	A136	tbd	804.293	A126	tbd

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
804.294	A126	tbd	804.847	A145	tbd	805.064	C9	28.200
804.295	A126	tbd	804.848	A145	tbd	805.065	C9	28.600
804.296	A126	tbd	804.849	A145	tbd	805.066	C9	28.900
804.297	A126	tbd	804.850	A145	tbd	805.067	C9	20.500
804.298	A126	tbd	804.851	A145	tbd	805.069	C9	24.900
804.644	A211	tbd	804.852	A145	tbd	805.070	C9	29.300
804.645	A211	tbd	804.853	A145	tbd	805.077	A16	0.540
804.646	A211	tbd	804.854	A145	tbd	805.078	A16	0.690
804.649	A178	1.330	804.855	A145	tbd	805.079	A16	0.710
804.656	A179	1.300	804.856	A145	tbd	805.080	A16	0.740
804.658	A179	0.400	804.857	A145	tbd	805.081	A16	0.760
804.666	C13	tbd	804.858	A145	tbd	805.082	A16	1.300
804.667	C13	tbd	804.860	A145	tbd	805.083	A16	1.300
804.668	C13	tbd	804.883	C26	1.700	805.084	A16	1.500
804.669	C13	tbd	804.885	C26	3.000	805.085	A16	1.300
804.670	C13	tbd	804.890	C24	0.700	805.086	A16	1.600
804.671	C13	0.010	804.891	C24	1.300	805.087	A16	1.300
804.672	C13	tbd	804.899	C38	5.700	805.088	A16	1.600
804.677	C37	tbd	804.904	A116	1.615	805.089	A16	1.300
804.678	A109	tbd	804.917	A61	tbd	805.090	A16	1.700
804.679	A109	tbd	804.929	A172	tbd	805.091	A16	4.100
804.680	A185	tbd	804.945	A171	tbd	805.092	A16	4.100
804.682	A185	tbd	804.949	A185	2.500	805.093	A16	4.200
804.683	A185	tbd	804.962	A76	0.900	805.094	A16	4.200
804.684	A185	tbd	804.969	A23	0.450	805.096	A64	1.200
804.686	A185	tbd	804.970	A23	6.300	805.097	A64	1.200
804.688	A185	tbd	804.971	A23	4.500	805.098	A64	1.300
804.749	A20	1.400	804.972	A23	4.880	805.099	A64	1.300
804.750	A20	1.400	804.973	A23	6.880	805.100	A61	1.398
804.751	A20	1.300	804.974	A23	7.800	805.101	A61	1.398
804.752	A20	1.300	804.975	A23	4.100	805.102	A61	1.398
804.753	A20	4.300	804.976	A67	4.400	805.103	A61	1.398
804.754	A20	4.300	804.977	A67	5.580	805.104	A61	1.398
804.755	A20	4.100	804.978	A67	5.000	805.105	A61	1.398
804.756	A20	4.200	804.979	A67	6.500	805.106	A61	1.398
804.757	A25	4.700	804.995	A41	4.800	805.107	A61	1.398
804.758	A25	5.100	805.016	A32	0.380	805.108	A61	1.398
804.759	A25	5.800	805.035	C9	18.900	805.110	A61	1.398
804.760	A25	1.900	805.036	C9	19.100	805.111	A61	1.398
804.761	A25	2.400	805.037	C9	19.300	805.112	A61	1.398
804.762	A25	2.300	805.038	C9	19.500	805.113	A61	1.398
804.763	A25	5.100	805.039	C9	23.300	805.114	A61	1.398
804.764	A25	5.700	805.040	C9	23.500	805.115	A61	1.398
804.765	A25	6.550	805.041	C9	23.700	805.117	A61	1.398
804.771	A161	tbd	805.042	C9	23.900	805.156	A159	0.073
804.774	A110	tbd	805.043	C9	27.700	805.157	A159	0.073
804.775	A110	tbd	805.044	C9	27.900	805.158	A159	0.073
804.815	A110	tbd	805.045	C9	28.100	805.159	A159	0.073
804.816	A110	tbd	805.046	C9	28.300	805.173	A163	0.475
804.821	A110	tbd	805.047	C9	19.300	805.194	A111	0.289
804.822	A110	tbd	805.048	C9	19.700	805.238	A163	0.110
804.827	A159	0.090	805.049	C9	20.000	805.239	A163	0.110
804.828	A159	tbd	805.050	C9	23.700	805.240	A163	0.110
804.829	A159	tbd	805.051	C9	24.100	805.241	A163	0.110
804.830	A159	tbd	805.052	C9	24.400	805.242	A163	0.110
804.831	A159	tbd	805.053	C9	28.100	805.243	A25	0.930
804.832	A159	0.323	805.054	C9	28.500	805.244	A159	0.096
804.833	A159	tbd	805.055	C9	28.800	805.245	A159	0.096
804.834	A158	tbd	805.057	C9	19.400	805.246	A32	0.480
804.835	A158	0.075	805.058	C9	19.800	805.247	A33	0.600
804.842	A180	tbd	805.059	C9	20.100	805.250	A51	0.600
804.844	A145	tbd	805.061	C9	23.800	805.251	A50	0.576
804.845	A145	tbd	805.062	C9	24.200	805.252	A52	0.530
804.846	A145	tbd	805.063	C9	24.500	805.253	A52	0.610

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
805.254	A52	0.655	805.479	A64	1.500	805.628	A44	1.240
805.255	A52	0.720	805.480	A16	0.860	805.629	A44	1.240
805.256	A52	0.650	805.481	A16	0.960	805.630	A44	1.240
805.257	A51	0.800	805.482	A16	1.400	805.631	A44	1.240
805.258	A51	0.840	805.484	A16	1.500	805.632	A44	1.240
805.259	A50	0.900	805.485	A16	2.000	805.633	A44	1.240
805.260	A50	0.825	805.486	A16	4.400	805.635	A44	1.240
805.261	A50	1.000	805.487	A16	4.500	805.636	A44	1.240
805.262	A53	0.880	805.489	A169	2.900	805.637	A44	1.240
805.263	A53	0.930	805.492	A10	0.019	805.638	A44	1.240
805.264	A53	1.090	805.493	A10	0.019	805.639	A44	1.240
805.265	A53	0.990	805.494	A10	0.019	805.640	A44	1.240
805.266	A53	1.216	805.495	A10	0.019	805.641	A44	1.240
805.267	A53	1.040	805.496	A10	0.019	805.642	A44	1.240
805.268	A53	1.340	805.497	A10	0.019	805.643	A44	1.240
805.269	A53	1.140	805.498	A10	0.019	805.644	A44	1.240
805.270	A53	1.110	805.499	A10	0.019	805.645	A44	1.240
805.271	A53	1.710	805.527	A63	0.320	805.646	A66	1.240
805.283	A210	tbd	805.530	A102	tbd	805.647	A47	tbd
805.284	A210	tbd	805.535	A98	9.300	805.648	A60	4.000
805.296	A45	tbd	805.536	A98	9.950	805.649	A60	4.300
805.297	A45	tbd	805.537	A98	6.480	805.650	A60	4.300
805.298	A45	tbd	805.538	A99	3.450	805.651	A60	5.100
805.299	A45	tbd	805.539	A99	3.900	805.652	A66	4.000
805.305	A98	tbd	805.540	A99	5.070	805.653	A66	4.800
805.306	A98	7.400	805.544	A175	tbd	805.654	A66	7.800
805.356	A159	0.280	805.548	A63	0.800	805.655	A68	1.000
805.412	A84	0.430	805.549	A16	1.500	805.656	A68	1.000
805.413	A159	tbd	805.550	A17	1.060	805.657	A69	1.000
805.423	A185	6.000	805.551	A17	1.020	805.658	A57	1.000
805.424	A41	4.500	805.553	A157	0.080	805.659	A57	1.000
805.430	A41	tbd	805.560	A87	1.060	805.660	A57	1.000
805.431	A41	4.780	805.561	A179	0.500	805.661	A57	1.000
805.433	A41	4.720	805.569	A22	0.727	805.662	A57	1.000
805.435	A41	5.960	805.570	C11	1.900	805.663	A154	1.000
805.436	A41	7.050	805.571	C11	1.980	805.664	A154	1.000
805.438	A41	tbd	805.573	A66	1.590	805.665	A154	1.000
805.442	A185	1.600	805.574	A66	1.590	805.666	A154	1.000
805.449	A10	4.600	805.575	A84	0.250	805.668	A85	0.090
805.450	A10	5.800	805.576	A75	0.700	805.669	A85	0.090
805.451	A10	5.100	805.578	A104	0.160	805.670	A85	0.090
805.452	A10	6.900	805.584	A44	tbd	805.671	A85	0.090
805.453	A10	5.400	805.585	A44	tbd	805.672	A85	0.090
805.454	A10	7.700	805.586	A44	tbd	805.673	A85	0.090
805.455	A10	5.600	805.595	A87	0.980	805.674	A182	tbd
805.456	A10	8.400	805.596	A36	2.100	805.675	A182	tbd
805.457	A58	4.100	805.597	A36	2.100	805.677	A16	1.900
805.458	A58	4.500	805.598	A36	2.100	805.678	A16	2.300
805.459	A58	5.000	805.600	A36	2.100	805.679	A16	5.200
805.460	A157	0.080	805.601	A36	2.100	805.680	A16	5.600
805.461	A208	1.175	805.604	A44	1.240	805.684	A81	0.024
805.462	A15	0.650	805.605	A44	1.240	805.685	A32	1.050
805.463	A15	1.300	805.606	A44	1.240	805.686	A32	0.910
805.464	A15	1.400	805.608	A44	1.240	805.687	A32	0.930
805.465	A63	1.100	805.609	A44	1.240	805.688	A32	0.900
805.466	A63	1.100	805.610	A44	1.240	805.689	A32	0.940
805.471	A74	0.200	805.611	A44	1.240	805.690	A32	1.040
805.472	A74	0.190	805.619	A46	3.430	805.691	A32	1.000
805.473	A74	0.200	805.620	A46	3.400	805.692	A46	7.080
805.474	A74	0.310	805.621	A46	4.150	805.693	A46	7.080
805.475	A74	0.310	805.623	A44	1.240	805.694	A46	7.080
805.476	A74	0.320	805.624	A44	1.240	805.695	A40	0.900
805.477	A64	1.000	805.626	A44	1.240	805.696	A40	1.100
805.478	A64	1.500	805.627	A44	1.240	805.697	A40	1.300

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
805.698	A40	0.900	805.827	A2	tbd	805.891	A94	tbd
805.699	A40	1.100	805.828	A50	0.520	805.892	A94	tbd
805.700	A40	1.400	805.829	A62	1.100	805.893	A110	tbd
805.701	A40	0.900	805.830	A62	1.400	805.894	A169	tbd
805.702	A40	1.200	805.831	A64	2.100			
805.703	A40	1.600	805.832	A64	2.300	938.834	B141	0.001
805.704	A40	1.000	805.833	A66	0.800	938.835	B142	0.004
805.705	A40	1.300	805.834	A66	1.000	938.837	B140	0.001
805.706	A40	1.500	805.835	A87	0.400	938.840	B140	0.001
805.707	A40	1.900	805.836	A87	0.430	938.841	B141	0.001
805.708	A40	2.300	805.837	A87	0.500	938.862	B142	0.008
805.709	A40	3.000	805.838	A87	0.540	938.866	B142	0.001
805.710	A40	3.200	805.839	A87	0.610	938.867	B142	0.001
805.711	A40	2.800	805.840	A87	1.270	938.868	B142	0.004
805.712	A40	3.000	805.841	A87	1.280	938.869	B142	0.004
805.713	A40	3.400	805.842	A87	0.700	938.870	B142	0.008
805.714	A40	3.000	805.843	A87	0.900	938.871	B142	0.008
805.715	A40	3.200	805.844	A87	1.100	938.876	B141	0.002
805.716	A40	3.700	805.845	A185	1.500	938.878	B141	0.002
805.717	A40	3.000	805.846	A185	3.900	938.879	B140	0.001
805.718	A40	3.300	805.847	A210	tbd	938.880	B140	0.001
805.719	A40	3.700	805.848	A210	tbd	938.883	B139	0.001
805.720	A40	4.100	805.849	A189	0.200	938.884	B139	1.000
805.721	A46	4.150	805.850	A189	0.400	938.885	B139	0.001
805.723	A27	1.200	805.851	A189	0.300	948.101	B139	0.001
805.724	A95	1.635	805.852	A189	0.700	948.201	B140	0.001
805.725	A95	tbd	805.853	A189	0.600	948.210	B140	0.001
805.726	A95	tbd	805.854	A189	1.100	948.211	B140	0.001
805.727	A104	0.160	805.855	A189	1.000	948.230	B140	0.001
805.728	A108	0.019	805.856	A199	tbd	948.231	B140	0.001
805.733	A108	0.019	805.857	A199	tbd	948.250	B140	0.001
805.734	A108	0.019	805.858	A203	0.500	948.251	B140	0.001
805.735	A108	0.019	805.859	A203	0.600	948.270	B140	0.001
805.736	A108	0.019	805.860	A203	0.600	948.271	B140	0.001
805.737	A108	0.019	805.861	A203	0.600	948.301	B141	0.010
805.738	A108	0.019	805.862	A203	0.700	948.302	B141	0.001
805.739	A108	0.019	805.863	A203	0.600	948.310	B141	0.001
805.740	A108	0.019	805.864	A203	0.800	948.311	B141	0.001
805.747	C29	0.006	805.865	A203	0.600	948.312	B141	0.001
805.748	C27	3.000	805.866	A203	1.000	948.330	B141	0.001
805.749	C25	1.600	805.867	A203	0.700	948.331	B141	0.001
805.750	A57	1.000	805.868	A203	1.000	948.332	B141	0.001
805.753	A36	2.100	805.869	A205	0.001	948.350	B141	0.001
805.758	A44	1.240	805.870	A205	0.001	948.351	B141	0.001
805.781	A110	0.017	805.871	A205	0.001	948.352	B141	0.001
805.802	A2	0.230	805.872	A205	0.001	948.370	B141	0.001
805.808	A37	5.100	805.873	A205	0.001	948.371	B141	0.001
805.809	A37	5.400	805.874	A94	tbd	948.372	B141	0.001
805.810	A37	5.600	805.875	A94	tbd	951.009	B176	0.371
805.811	B38	0.210	805.876	A94	tbd	951.060	B176	0.245
805.812	B38	0.210	805.877	A94	tbd	951.061	B176	0.474
805.814	A14	0.580	805.878	A96	tbd	951.065	B176	0.127
805.815	A14	1.400	805.879	A96	tbd	951.076	B176	0.092
805.816	A14	1.600	805.880	A99	tbd	951.077	B176	0.726
805.817	A14	4.000	805.881	A99	tbd	951.100A	B19	0.030
805.818	A14	4.300	805.882	A158	tbd	951.101A	B19	0.030
805.819	A14	4.700	805.883	A158	tbd	951.102A	B19	0.030
805.820	A15	0.650	805.884	A158	tbd	951.103A	B19	0.030
805.821	A15	0.650	805.885	A174	0.070	951.104A	B19	0.020
805.822	A15	4.600	805.886	A175	tbd	951.105A	B19	0.020
805.823	A15	4.700	805.887	A175	tbd	951.106A	B19	0.020
805.824	A15	4.800	805.888	A175	tbd	951.108	B156	0.430
805.825	A15	4.800	805.889	A175	tbd	951.109	B156	0.249
805.826	A18	1.800	805.890	A212	0.900	951.110	B19	0.030

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
951.111	B19	0.030	958.157	B96	0.002	961.237	A178	0.500
951.112	B19	0.030	958.158	B96	0.003	961.238	A179	0.400
951.113	B19	0.020	958.313	B96	0.002	961.252	A173	tbd
951.114	B19	0.020	958.314	B96	0.002	961.253	A173	tbd
951.115	B19	0.010	958.425	B94	0.004	961.254	A173	tbd
951.116	B19	0.010	958.430	B94	0.004	961.255	A173	tbd
951.120A	B19	0.570	958.433	B94	0.004	961.256	A173	tbd
951.121A	B19	0.560	958.435	B94	0.004	961.257	A173	9.500
951.122A	B19	0.540	958.440	B94	0.004	961.264	A29	7.500
951.123A	B19	0.530	958.475	B94	0.004	961.269	A47	9.140
951.124A	B19	0.490	958.480	B94	0.004	961.270	A169	2.900
951.125A	B19	0.460	958.483	B94	0.004	961.271	A169	2.370
951.126A	B19	0.430	958.485	B94	0.004	961.272	A169	2.900
951.127A	B19	0.260	958.490	B94	0.004	961.273	A169	2.900
951.128	B156	0.753	958.501	B95	0.001	961.276	A171	0.015
951.129	B156	0.407	958.502	B95	0.001	961.277	A171	0.015
951.130	B19	0.040	958.503	B95	0.001	961.278	A2	0.003
951.131	B19	0.040	958.601	B93	tbd	961.279	A2	0.005
951.132	B19	0.040	958.602	B93	tbd	961.280	A2	0.005
951.133	B19	0.040	958.603	B93	tbd	961.281	A170	0.005
951.134	B19	0.030	958.604	B93	tbd	961.282	A170	0.005
951.135	B19	0.030	958.611	B93	tbd	961.283	A170	0.009
951.136	B19	0.030	958.612	B93	tbd	961.284	A170	0.009
951.137	B19	0.010	958.613	B93	tbd	961.285	A170	0.005
951.149	B156	0.310	958.614	B93	tbd	961.286	A170	0.005
958.008	B96	0.045	961.120	A138	0.023	961.287	A170	0.005
958.010	B96	0.035	961.127	A139	0.041	961.288	A170	0.010
958.021	B96	0.080	961.146	A142	0.002	961.289	A170	0.010
958.031	B96	0.110	961.147	A142	0.003	961.290	A170	0.005
958.041	B96	0.500	961.148	A142	0.004	961.291	A169	0.720
958.048	B145	0.010	961.149	A142	0.004	961.292	A169	0.880
958.049	B145	0.060	961.150	A142	0.004	961.293	A169	1.100
958.051	B96	0.002	961.151	A142	0.022	961.294	A169	1.500
958.052	B96	0.002	961.152	A142	0.009	961.295	A169	2.035
958.053	B96	0.002	961.153	A142	0.009	961.296	A169	3.380
958.055	B96	0.002	961.154	A142	0.009	961.297	A169	tbd
958.056	B96	0.002	961.155	A142	0.009	961.331	A175	0.275
958.057	B96	0.002	961.156	A142	0.009	961.332	A175	0.260
958.061	B96	0.002	961.160	A142	0.022	961.333	A175	0.240
958.062	B96	0.002	961.161	A142	0.020	961.336	A175	0.260
958.063	B96	0.002	961.165	A142	0.045	961.338	A169	2.600
958.065	B96	0.002	961.166	A142	0.045	961.339	A169	2.900
958.066	B96	0.002	961.167	A142	0.030	961.342	A169	2.950
958.067	B96	0.002	961.168	A142	0.085	961.346	A169	2.600
958.071	B96	0.002	961.169	A142	0.085	961.347	A183	tbd
958.072	B96	0.002	961.170	A142	0.085	961.362	A24	1.370
958.073	B96	0.002	961.171	A142	0.085	961.363	A24	1.370
958.075	B96	0.002	961.172	A142	0.085	961.364	A24	1.550
958.076	B96	0.002	961.173	A142	0.080	961.365	A24	1.370
958.077	B96	0.002	961.174	A142	0.070	961.366	A24	1.370
958.081	B96	0.002	961.175	A142	0.064	961.367	A24	4.085
958.082	B96	0.002	961.176	A142	0.050	961.368	A24	4.200
958.083	B96	0.002	961.180	A142	0.117	961.369	A24	4.900
958.085	B96	0.002	961.182	A142	0.110	961.371	A22	8.200
958.086	B96	0.002	961.183	A142	0.105	961.372	A22	8.200
958.087	B96	0.002	961.184	A142	0.097	961.394	A24	0.493
958.091	B96	0.010	961.185	A142	0.085	961.395	A24	0.521
958.092	B96	0.010	961.186	A142	0.051	961.396	A24	0.610
958.093	B96	0.010	961.201	A181	0.200	961.397	A24	0.703
958.095	B96	0.010	961.205	A180	0.265	961.401	A146	0.028
958.096	B96	0.010	961.206	A180	0.300	961.402	A146	0.028
958.097	B96	0.010	961.211	A181	0.200	961.403	A146	0.025
958.155	B96	0.012	961.212	A181	tbd	961.404	A146	0.020
958.156	B96	0.013	961.213	A182	tbd	961.405	A146	0.045

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
961.406	A146	tbd	961.535	A138	0.025	961.603	A139	0.075
961.407	A146	tbd	961.536	A138	0.005	961.604	A139	0.075
961.408	A146	tbd	961.537	A138	0.010	961.605	A139	0.075
961.409	A148	0.020	961.538	A138	0.005	961.606	A139	0.075
961.410	A148	tbd	961.539	A138	0.010	961.607	A139	0.070
961.411	A148	tbd	961.540	A138	0.005	961.608	A139	0.070
961.412	A148	0.035	961.541	A138	0.010	961.609	A139	0.070
961.413	A148	0.035	961.542	A138	0.004	961.610	A139	0.070
961.414	A148	tbd	961.543	A138	0.004	961.611	A139	0.070
961.415	A148	0.040	961.544	A138	0.004	961.612	A139	0.070
961.416	A148	tbd	961.545	A138	0.008	961.613	A139	0.065
961.417	A146	tbd	961.547	A143	0.230	961.614	A139	0.065
961.418	A146	0.101	961.548	A11	0.038	961.615	A139	0.065
961.420	A146	0.980	961.549	A11	0.025	961.616	A139	0.065
961.462	A135	0.003	961.550	A4	0.001	961.617	A139	0.060
961.464	A135	0.003	961.551	A138	0.022	961.618	A139	0.060
961.466	A135	0.003	961.552	A138	0.022	961.619	A139	0.060
961.468	A27	0.003	961.553	A138	0.022	961.620	A139	0.055
961.470	A27	0.003	961.554	A138	0.022	961.621	A139	0.055
961.472	A27	0.002	961.555	A138	0.022	961.622	A139	0.055
961.474	A27	0.003	961.556	A138	0.022	961.623	A139	0.050
961.477	A136	0.005	961.557	A138	0.022	961.624	A139	0.050
961.479	A136	0.005	961.558	A138	0.021	961.625	A139	0.050
961.481	A136	0.004	961.559	A138	0.021	961.626	A139	0.050
961.483	A136	0.004	961.560	A138	0.022	961.627	A139	0.050
961.485	A136	0.004	961.561	A138	0.020	961.629	A143	0.730
961.487	A136	0.004	961.562	A138	0.020	961.630	A11	0.080
961.489	A136	0.004	961.563	A138	0.019	961.631	A11	0.075
961.491	A136	0.003	961.564	A138	0.018	961.632	A4	0.005
961.493	A136	0.003	961.565	A138	0.017	961.641	A139	0.095
961.495	A136	0.003	961.566	A138	0.016	961.642	A139	0.095
961.497	A136	0.003	961.567	A138	0.015	961.643	A139	0.095
961.498	A2	0.305	961.569	A143	0.360	961.644	A139	0.095
961.500	A138	0.004	961.570	A6	0.045	961.645	A139	0.095
961.501	A138	0.004	961.571	A11	0.042	961.646	A139	0.095
961.502	A138	0.004	961.572	A4	0.007	961.647	A139	0.095
961.503	A138	0.004	961.573	A139	0.042	961.648	A139	0.100
961.504	A138	0.004	961.574	A139	0.041	961.649	A139	0.100
961.505	A138	0.004	961.575	A139	0.040	961.650	A139	0.100
961.506	A138	0.004	961.576	A139	0.045	961.651	A139	0.100
961.507	A138	0.004	961.577	A139	0.039	961.652	A139	0.100
961.508	A138	0.004	961.578	A139	0.039	961.653	A139	0.100
961.509	A138	0.005	961.579	A139	0.038	961.654	A139	0.100
961.510	A138	0.004	961.580	A139	0.038	961.655	A139	0.100
961.511	A138	0.003	961.581	A139	0.037	961.656	A139	0.095
961.512	A138	0.003	961.582	A139	0.037	961.657	A139	0.095
961.513	A138	0.003	961.583	A139	0.036	961.658	A139	0.095
961.514	A138	0.003	961.584	A139	0.036	961.659	A139	0.095
961.515	A138	0.003	961.585	A139	0.035	961.660	A139	0.090
961.516	A138	0.003	961.586	A139	0.034	961.661	A139	0.090
961.517	A138	0.003	961.587	A139	0.033	961.662	A139	0.090
961.518	A138	0.003	961.588	A139	0.032	961.663	A139	0.085
961.519	A138	0.003	961.589	A139	0.031	961.664	A139	0.085
961.520	A138	0.003	961.590	A139	0.030	961.665	A139	0.080
961.521	A138	0.003	961.591	A139	0.029	961.666	A139	0.080
961.522	A138	0.003	961.592	A139	0.027	961.667	A139	0.075
961.524	A143	0.220	961.593	A139	0.027	961.668	A139	0.070
961.525	A11	0.018	961.595	A143	0.350	961.669	A139	0.070
961.526	A11	0.013	961.596	A11	0.085	961.670	A139	0.065
961.527	A4	0.003	961.597	A11	0.055	961.671	A139	0.065
961.531	A138	0.006	961.598	A4	0.016	961.672	A139	0.060
961.532	A138	0.006	961.599	A138	0.015	961.673	A139	0.055
961.533	A138	0.006	961.601	A139	0.075	961.674	A139	0.055
961.534	A138	0.006	961.602	A139	0.075	961.675	A139	0.050

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
961.676	A143	3.960	961.800	A85	0.960	962.206	A160	0.450
961.677	A143	0.920	961.801	A85	1.415	962.207	A160	0.420
961.678	A11	0.100	961.831	A38	1.010	962.208	A160	0.420
961.679	A11	0.085	961.833	A38	1.160	962.209	A160	0.400
961.680	A4	0.006	961.835	A38	1.120	962.210	A160	0.370
961.681	A145	tbd	961.839	A38	1.370	962.211	A160	0.350
961.683	A145	tbd	961.876	A39	3.200	962.212	A160	0.280
961.684	A145	tbd	961.889	A39	3.450	962.221	A160	0.225
961.685	A145	tbd	961.915	A11	0.550	962.222	A160	0.240
961.701	A86	0.230	961.916	A11	0.900	962.223	A160	0.240
961.702	A86	0.400	961.917	A11	0.420	962.224	A160	0.230
961.703	A86	0.520	961.918	A11	0.500	962.225	A160	0.220
961.706	A86	0.260	961.919	A11	0.470	962.226	A160	0.210
961.707	A86	0.410	961.920	A11	0.500	962.227	A160	0.200
961.708	A86	0.537	961.921	A11	0.510	962.228	A160	0.170
961.711	A86	0.270	961.922	A11	0.660	962.236	A160	tbd
961.712	A86	0.380	961.923	A11	0.720	962.237	A160	tbd
961.713	A86	0.660	961.924	A11	0.720	962.238	A160	tbd
961.714	A86	0.900	961.925	A11	0.530	962.239	A160	tbd
961.721	A86	0.530	961.926	A11	0.810	962.240	A160	0.630
961.722	A86	0.810	961.932	A11	1.065	962.241	A160	tbd
961.723	A86	0.530	961.933	A11	1.150	962.242	A160	0.550
961.726	A86	0.550	961.935	A11	1.130	962.243	A160	0.415
961.727	A86	0.715	961.936	A11	1.270	962.251	A160	0.305
961.728	A86	1.000	961.938	A11	1.200	962.252	A160	0.080
961.731	A86	0.580	961.939	A11	1.410	962.253	A160	0.292
961.732	A86	0.845	961.941	A11	1.280	962.260	B102	0.090
961.733	A86	1.040	961.942	A11	1.550	962.262	B102	0.090
961.741	A86	0.850	961.944	A11	1.390	962.263	B102	0.085
961.746	A86	0.850	961.945	A11	1.810	962.264	B102	0.080
961.747	A86	0.900	961.946	A11	1.090	962.265	B102	0.070
961.748	A86	1.550	961.947	A11	1.450	962.266	B102	0.055
961.749	A86	2.200	961.948	A11	1.975	962.281	B102	0.290
961.751	A86	0.850	961.959	A11	2.350	962.282	B102	0.290
961.752	A86	0.850	961.962	A12	3.700	962.283	B102	0.295
961.753	A86	1.590	961.963	A12	4.100	962.284	B102	0.290
961.754	A86	2.300	961.964	A12	3.820	962.285	B102	0.275
961.756	A86	1.050	961.966	A12	4.100	962.286	B102	0.240
961.757	A86	1.370	961.967	A12	4.200	962.287	B102	0.260
961.758	A86	2.000	961.970	A12	3.850	962.288	B102	0.240
961.761	A86	0.900	961.971	A12	4.070	962.289	B102	0.175
961.762	A86	1.295	961.972	A12	4.600	962.291	A14	0.210
961.763	A86	1.910	961.976	A12	3.990	962.292	A14	0.380
961.766	A85	0.700	961.977	A12	4.240	962.293	A14	0.400
961.768	A85	0.700	961.978	A12	4.445	962.294	A13	0.170
961.770	A85	0.090	961.983	A12	4.400	962.311	A8	0.023
961.773	A84	0.090	961.984	A12	4.490	962.312	A8	tbd
961.774	A84	0.175	961.985	A12	5.200	962.313	A8	tbd
961.775	A84	0.390	961.988	A12	3.910	962.401	A159	0.115
961.776	A84	0.430	961.989	A12	4.250	962.402	A159	0.115
961.777	A84	0.055	961.990	A12	4.670	962.403	A159	0.100
961.778	A84	0.115	961.991	A12	5.020	962.404	A159	0.090
961.779	A84	0.170	961.992	A12	5.990	962.405	A159	0.055
961.781	A85	0.285	962.121S	A41	1.480	962.406	A159	0.150
961.782	A85	0.472	962.124S	A41	1.850	962.407	A159	0.096
961.784	A85	0.175	962.196	A160	0.140	962.408	A159	0.037
961.785	A85	0.475	962.197	A160	0.140	962.409	A159	0.370
961.787	A85	0.900	962.198	A160	0.140	962.410	A159	0.365
961.788	A85	0.498	962.199	A160	0.140	962.411	A159	0.360
961.792	A85	1.100	962.201	A160	0.140	962.412	A159	0.350
961.794	A85	0.960	962.202	A160	0.140	962.413	A159	0.350
961.795	A85	0.090	962.203	A160	0.095	962.414	A159	0.350
961.797	A85	1.200	962.204	A160	0.120	962.415	A159	0.330
961.798	A85	1.500	962.205	A160	0.100	962.416	A159	0.295

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
962.417	A159	0.280	962.572	C21	0.310	963.648	A162	0.270
962.418	A159	0.270	962.574	C30	tdb	963.649	A162	0.345
962.419	A159	0.260	962.581	A109	tdb	963.650	A162	0.460
962.420	A159	0.350	962.582	A109	tdb	963.651	A162	0.580
962.421	A159	0.240	962.586	A109	tdb	963.652	A162	0.170
962.422	A159	0.200	962.596	A109	0.155	963.653	A162	0.265
962.423	A159	0.200	962.597	A109	0.118	963.654	A162	0.335
962.424	A159	0.190	962.598	A109	0.290	963.655	A162	0.455
962.437	A159	tdb	962.599	A109	0.200	963.656	A162	0.570
962.438	A159	0.115	962.642	C24	4.100	963.657	A162	0.170
962.439	A159	tdb	962.661	C29	1.920	963.658	A162	0.265
962.440	A159	0.120	962.667	C26	4.000	963.659	A162	0.335
962.441	A159	tdb	962.668	C26	4.850	963.660	A162	0.450
962.442	A159	0.115	962.669	C26	8.700	963.661	A162	0.570
962.443	A159	tdb	962.670	C26	9.700	963.662	A163	0.500
962.444	A159	0.105	962.785	C15	0.600	963.663	A163	0.750
962.445	A159	tdb	962.786	C15	0.700	963.664	A163	0.950
962.446	A159	0.100	962.793	C15	0.530	963.665	A163	1.150
962.447	A159	0.140	962.794	C15	0.700	963.666	A163	0.515
962.448	A159	0.065	962.795	C15	0.800	963.667	A163	0.770
962.457	A159	0.350	962.796	C15	0.750	963.668	A163	0.940
962.458	A159	0.345	963.399	A164	0.180	963.669	A163	1.120
962.459	A159	0.340	963.400	A164	0.112	963.670	A163	0.550
962.460	A159	0.332	963.432	A166	0.011	963.671	A163	0.780
962.461	A159	0.313	963.601	A88	1.275	963.672	A163	0.930
962.462	A159	0.306	963.602	A88	0.750	963.673	A163	1.110
962.463	A159	0.292	963.603	A88	1.476	963.674	A163	0.500
962.464	A159	0.267	963.611	A162	0.110	963.675	A163	0.800
962.465	A159	0.190	963.612	A162	0.175	963.676	A163	0.950
962.468	A158	0.070	963.613	A162	0.220	963.677	A163	1.150
962.469	A158	0.500	963.614	A162	0.300	963.678	A163	0.500
962.470	A158	0.064	963.615	A162	0.110	963.679	A163	0.800
962.471	A158	0.040	963.616	A162	0.175	963.680	A163	0.180
962.472	A158	0.105	963.617	A162	0.220	963.681	A163	1.100
962.473	A158	0.100	963.618	A162	0.300	963.682	A163	0.500
962.474	A158	0.110	963.619	A162	0.110	963.683	A163	0.760
962.475	A158	0.110	963.620	A162	0.170	963.684	A163	0.910
962.476	A158	tdb	963.621	A162	0.215	963.685	A163	1.090
962.477	A158	0.090	963.622	A162	0.295	963.686	A163	0.492
962.478	A158	tdb	963.623	A162	0.110	963.687	A163	0.750
962.479	A158	0.090	963.624	A162	0.170	963.688	A163	0.900
962.480	A158	tdb	963.625	A162	0.215	963.689	A163	1.090
962.481	A158	0.180	963.626	A162	0.295	963.690	A163	0.500
962.483	A158	0.064	963.627	A162	0.110	963.691	A163	0.750
962.484	A158	0.180	963.628	A162	0.170	963.692	A163	0.900
962.485	A158	0.180	963.629	A162	0.215	963.693	A163	1.080
962.486	A158	0.170	963.630	A162	0.285	963.700	A166	0.015
962.487	A158	0.170	963.631	A162	0.360	963.701	B177	tdb
962.488	A158	0.064	963.632	A162	0.105	963.702	A166	0.021
962.489	A158	0.140	963.633	A162	0.165	963.703	A166	0.140
962.491	A158	0.101	963.634	A162	0.210	963.711	A166	0.011
962.492	A158	0.330	963.635	A162	0.285	963.712	B177	tdb
962.493	A158	0.320	963.636	A162	0.360	963.713	A166	0.023
962.494	A158	0.320	963.637	A162	0.180	963.721	A166	0.010
962.495	A158	0.310	963.638	A162	0.275	963.722	A166	0.010
962.496	A158	0.290	963.639	A162	0.345	963.723	A166	0.020
962.497	A158	0.280	963.640	A162	0.465	964.101S	A13	0.745
962.499	A158	0.250	963.641	A162	0.850	964.102S	A13	0.880
962.500	A158	0.186	963.642	A162	0.180	964.103S	A13	1.050
962.525	C38	4.300	963.643	A162	0.275	964.190S	A13	1.300
962.546	C38	7.510	963.644	A162	0.345	964.191S	A13	1.410
962.547	C38	8.130	963.645	A162	0.465	964.192S	A13	1.530
962.548	C38	8.000	963.646	A162	0.580	964.194S	A13	1.850
962.571	C21	0.370	963.647	A162	0.175	964.195S	A13	2.150

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
964.196S	A13	2.070	966.112	A201	1.000	966.210	A199	1.360
964.221	A14	4.730	966.115	A202	0.310	966.211	A199	1.400
964.222	A14	5.370	966.120	A197	0.691	966.212	A208	0.370
964.225	A14	4.600	966.121	A197	1.290	966.213	A208	0.545
964.226	A14	5.300	966.122	A197	tbd	966.214	A208	1.175
964.228	A14	5.150	966.123	A197	tbd	966.216	A197	0.550
964.229	A14	6.310	966.124	A197	tbd	966.217	A197	0.550
964.233	A14	6.000	966.125	A197	tbd	966.218	A197	0.600
964.234	A14	7.500	966.126	A197	1.750	966.219	A197	0.600
965.400	A27	0.500	966.127	A197	1.450	966.220	A197	0.610
965.401	A26	0.665	966.128	A197	tbd	966.221	A197	1.220
965.402	A26	0.710	966.129	A197	tbd	966.222	A197	1.240
965.403	A26	1.430	966.130	A197	1.600	966.223	A197	1.280
965.404	A26	1.240	966.131	A197	1.750	966.224	A197	1.330
965.405	A26	1.290	966.132	A197	tbd	966.225	A197	1.460
965.406	A26	1.740	966.133	A197	1.790	966.226	A197	1.480
965.407	A26	3.840	966.134	A197	2.000	966.231	A201	0.900
965.408	A26	3.910	966.135	A197	2.400	966.232	A201	0.950
965.409	A26	4.310	966.136	A197	2.200	966.233	A201	0.930
965.505	C25	3.500	966.137	A197	2.520	966.234	A201	1.000
965.506	C25	3.900	966.138	A197	2.950	966.235	A201	1.140
965.511S	A61	1.398	966.141	A201	0.800	966.236	A201	1.280
965.523	A66	3.190	966.142	A201	1.100	966.237	A200	0.160
965.601	A68	0.532	966.143	A201	1.300	966.238	A200	0.190
965.602	A68	0.700	966.144	A201	1.000	966.239	A200	0.160
965.603	A68	0.800	966.145	A201	1.200	966.240	A200	0.270
965.604	A68	0.900	966.146	A201	1.400	966.241	A200	0.445
965.606	A68	1.000	966.147	A201	1.148	966.242	A200	0.735
965.607	A68	1.085	966.148	A201	1.230	966.243	A200	0.840
965.608	A68	1.665	966.149	A201	1.500	966.244	A200	1.000
965.609	A68	2.600	966.150	A201	1.220	966.245	A205	0.001
965.610	A68	2.506	966.151	A201	1.220	966.246	A205	0.002
965.611	A68	3.100	966.152	A201	1.700	966.248	A205	0.002
966.081	A198	0.500	966.153	A201	1.300	966.249	A205	0.002
966.082	A198	0.620	966.154	A201	1.650	966.250	A205	0.001
966.083	A198	0.600	966.155	A201	1.950	966.251	A205	0.002
966.084	A198	0.700	966.156	A201	1.840	966.253	A205	0.002
966.085	A198	1.300	966.157	A201	2.200	966.254	A205	0.003
966.086	A198	1.400	966.158	A201	2.800	966.255	A205	0.001
966.087	A198	1.400	966.161	A199	1.300	966.256	A205	0.002
966.088	A198	1.500	966.162	A199	1.400	966.258	A205	0.002
966.089	A198	1.473	966.163	A199	1.100	966.259	A205	0.003
966.090	A198	1.700	966.164	A199	1.300	966.260	A205	0.001
966.091	A198	1.700	966.165	A199	1.400	966.261	A205	0.005
966.092	A198	1.900	966.166	A199	1.600	966.263	A205	0.005
966.093	A202	0.900	966.167	A199	1.500	966.264	A205	0.005
966.094	A202	1.000	966.168	A199	1.700	966.265	A205	0.005
966.095	A202	1.000	966.169	A199	1.700	966.266	A205	0.005
966.096	A202	1.200	966.170	A199	2.000	966.268	A205	0.005
966.097	A202	1.100	966.171	A199	2.200	966.269	A205	0.005
966.098	A202	1.130	966.172	A199	2.400	966.270	A205	0.005
966.099	A202	1.300	966.173	A202	1.300	966.271	A205	tbd
966.100	A202	1.000	966.174	A202	0.900	966.272	A194	0.040
966.101	A201	0.317	966.181	A200	0.800	966.273	A110	0.047
966.102	A201	0.336	966.182	A200	0.400	966.274	A194	0.040
966.103	A201	0.400	966.183	A200	0.300	966.275	A110	0.041
966.104	A201	0.500	966.184	A200	0.600	966.280	A208	0.005
966.105	A201	0.600	966.185	A200	0.445	966.281	A208	0.002
966.106	A201	0.700	966.186	A200	1.220	966.283	A208	0.005
966.107	A201	0.600	966.187	A200	1.040	966.284	A208	0.005
966.108	A201	0.600	966.206	A199	1.200	966.285	A208	0.005
966.109	A201	0.600	966.207	A199	1.250	966.286	A208	0.005
966.110	A201	0.700	966.208	A199	1.330	966.288	A208	0.002
966.111	A201	0.900	966.209	A199	1.300	966.289	A208	0.002

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
966.341	A24	0.985	966.488	A214	0.054	966.671	A190	0.500
966.401	A218	0.210	966.489	A214	0.183	966.672	A190	0.600
966.404	A218	td	966.501	A220	0.047	966.673	A190	0.600
966.405	A218	0.374	966.502	A220	0.160	966.674	A190	0.700
966.406	A218	0.396	966.503	A220	0.160	966.675	A190	0.900
966.407	A218	0.210	966.504	A220	0.827	966.676	A190	1.000
966.408	A224	0.140	966.505	A221	0.160	966.677	A190	1.100
966.409	A224	0.004	966.506	A221	0.160	966.678	A190	1.200
966.411	A223	0.480	966.530	A220	0.001	966.679	A190	1.100
966.412	A223	0.480	966.531	A220	0.001	966.680	A190	1.100
966.413	A223	1.175	966.532	A220	0.001	966.681	A190	1.260
966.414	A223	1.320	966.533	A220	0.001	966.682	A190	1.315
966.415	A223	0.110	966.534	A220	0.001	966.683	A188	0.512
966.416	A223	0.120	966.535	A220	0.001	966.684	A188	0.500
966.417	A223	0.270	966.536	A220	0.001	966.685	A188	0.520
966.418	A223	0.480	966.537	A220	0.001	966.686	A188	0.578
966.422	A223	0.027	966.601	A189	1.100	966.687	A188	0.600
966.423	A223	0.050	966.602	A189	1.500	966.688	A188	0.640
966.424	A223	0.090	966.603	A189	1.600	966.689	A188	0.550
966.425	A223	0.250	966.604	A189	0.950	966.690	A188	0.700
966.431	A214	0.060	966.605	A189	1.300	966.691	A188	1.250
966.432	A214	0.060	966.606	A189	1.700	966.692	A188	1.400
966.433	A213	0.100	966.607	A189	1.100	966.693	A188	1.340
966.434	A213	0.340	966.608	A189	1.320	966.694	A188	1.475
966.435	A213	1.000	966.609	A189	1.800	966.695	A188	1.490
966.436	A214	0.190	966.610	A189	1.220	966.696	A188	1.590
966.437	A214	0.190	966.611	A189	1.452	966.697	A188	1.670
966.440	A216	0.001	966.612	A189	1.900	966.698	A188	1.785
966.441	A216	0.001	966.616	A188	1.220	966.701	A204	0.030
966.442	A216	0.001	966.617	A188	1.425	966.702	A204	0.070
966.443	A216	0.001	966.618	A188	1.600	966.703	A204	0.070
966.445	A216	0.001	966.619	A188	1.210	966.704	A204	0.130
966.446	A216	0.001	966.620	A188	1.530	966.705	A204	1.900
966.447	A216	0.002	966.621	A188	1.700	966.706	A204	0.260
966.448	A216	0.018	966.622	A188	1.200	966.707	A204	0.260
966.449	A216	0.007	966.623	A188	1.530	966.708	A191	td
966.450	A216	0.047	966.624	A188	1.800	966.709	A191	td
966.461	A213	0.080	966.625	A188	1.200	966.710	A191	0.100
966.462	A213	0.010	966.626	A188	1.500	966.711	A191	td
966.463	A213	0.010	966.627	A188	1.900	966.712	A191	td
966.464	A213	0.171	966.631	A190	0.900	966.713	A191	0.280
966.465	A213	0.010	966.632	A190	1.100	966.714	A191	0.270
966.466	A213	0.340	966.633	A190	1.200	966.721	A192	0.500
966.467	A213	1.250	966.634	A190	0.900	966.722	A192	0.600
966.468	A214	td	966.635	A190	1.200	966.723	A192	0.500
966.469	A214	td	966.636	A190	1.300	966.724	A192	0.600
966.470	A214	td	966.637	A190	1.000	966.725	A192	0.500
966.471	A214	td	966.638	A190	1.200	966.726	A192	0.600
966.472	A215	0.045	966.639	A190	1.400	966.727	A192	0.500
966.473	A215	0.800	966.640	A190	1.100	966.728	A192	0.600
966.474	A215	0.075	966.641	A190	1.280	966.731	A192	1.100
966.475	A215	0.081	966.642	A190	1.500	966.732	A192	1.200
966.476	A215	td	966.651	A194	0.001	966.733	A192	1.300
966.477	A215	0.800	966.652	A194	0.001	966.734	A192	1.000
966.478	A215	td	966.653	A194	0.003	966.735	A192	1.150
966.479	A215	td	966.656	A194	0.003	966.736	A192	1.200
966.480	A215	td	966.658	A194	0.001	966.737	A192	1.000
966.481	A215	td	966.661	A194	0.001	966.738	A192	1.050
966.482	A215	td	966.662	A194	0.001	966.739	A192	1.300
966.483	A215	td	966.663	A194	0.001	966.740	A192	1.000
966.484	A215	td	966.666	A194	0.001	966.741	A192	1.400
966.485	A215	0.330	966.667	A194	0.001	966.742	A192	1.500
966.486	A214	0.045	966.668	A194	0.001	966.746	A192	4.400
966.487	A214	td	966.669	A194	0.005	966.747	A192	4.500

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
966.748	A192	4.900	967.554	A152	tbd	967.618	A153	0.137
966.749	A192	4.950	967.555	A152	tbd	967.619	A153	tbd
966.751	A193	tbd	967.556	A152	tbd	967.620	A153	0.134
966.752	A193	tbd	967.557	A152	tbd	967.621	A153	tbd
966.753	A193	tbd	967.558	A152	tbd	967.622	A153	0.130
966.754	A193	1.900	967.559	A153	tbd	967.623	A153	tbd
966.755	A193	tbd	967.560	A153	tbd	967.624	A153	0.126
966.756	A193	tbd	967.561	A153	tbd	967.625	A153	tbd
966.757	A193	tbd	967.562	A153	tbd	967.627	A153	tbd
966.758	A193	tbd	967.563	A153	0.074	967.628	A153	tbd
966.759	A193	1.115	967.564	A153	tbd	967.629	A153	tbd
967.501	A152	0.026	967.565	A153	tbd	967.630	A153	0.108
967.502	A152	tbd	967.566	A153	tbd	967.631	A153	tbd
967.503	A152	tbd	967.567	A153	0.050	967.632	A153	0.100
967.504	A152	tbd	967.568	A153	tbd	967.801	A129	0.068
967.505	A152	tbd	967.569	A153	tbd	967.802	A129	tbd
967.506	A152	tbd	967.570	A153	tbd	967.803	A129	0.135
967.507	A152	tbd	967.571	A153	0.073	967.804	A129	tbd
967.508	A152	tbd	967.572	A153	tbd	967.810	A170	0.005
967.509	A152	tbd	967.573	A153	0.074	967.811	A170	0.011
967.510	A152	tbd	967.574	A153	tbd	967.812	A170	0.014
967.511	A152	0.023	967.575	A153	0.073	967.813	A170	0.020
967.512	A152	tbd	967.576	A153	tbd	967.814	A170	0.029
967.513	A152	tbd	967.577	A153	0.072	967.850	A155	tbd
967.514	A152	tbd	967.578	A153	tbd	967.851	A155	tbd
967.515	A152	0.023	967.579	A153	0.070	967.852	A155	tbd
967.516	A152	tbd	967.580	A153	tbd	967.853	A155	tbd
967.517	A152	tbd	967.581	A153	0.067	967.854	A155	tbd
967.518	A152	tbd	967.582	A153	tbd	967.855	A155	tbd
967.519	A152	0.023	967.583	A153	0.065	967.856	A155	tbd
967.520	A152	tbd	967.584	A153	tbd	967.857	A155	tbd
967.521	A152	tbd	967.585	A153	0.059	967.858	A155	tbd
967.522	A152	tbd	967.586	A153	tbd	967.859	A155	tbd
967.523	A152	0.022	967.587	A153	tbd	967.861	A155	tbd
967.524	A152	tbd	967.588	A153	tbd	967.862	A155	tbd
967.525	A152	0.021	967.589	A153	0.051	967.863	A155	tbd
967.526	A152	tbd	967.590	A153	tbd	967.864	A155	tbd
967.527	A152	0.020	967.591	A153	0.048	967.865	A155	tbd
967.528	A152	tbd	967.592	A153	0.140	967.866	A155	tbd
967.529	A152	0.018	967.593	A153	tbd	967.867	A155	tbd
967.530	A152	tbd	967.594	A153	tbd	967.868	A155	tbd
967.531	A152	0.015	967.595	A153	tbd	967.869	A155	tbd
967.532	A152	tbd	967.596	A153	0.135	967.870	A155	tbd
967.533	A152	tbd	967.597	A153	tbd	967.871	A155	tbd
967.534	A152	tbd	967.598	A153	tbd	967.872	A155	tbd
967.535	A152	tbd	967.599	A153	tbd	967.873	A155	tbd
967.536	A152	tbd	967.600	A153	0.143	967.874	A155	tbd
967.537	A152	tbd	967.601	A153	tbd	967.875	A155	tbd
967.538	A152	tbd	967.602	A153	tbd	967.876	A155	tbd
967.539	A152	tbd	967.603	A153	tbd	967.877	A155	tbd
967.540	A152	tbd	967.604	A153	0.145	967.878	A155	tbd
967.541	A152	tbd	967.605	A153	tbd	967.879	A155	0.109
967.542	A152	tbd	967.606	A153	0.145	967.880	A155	tbd
967.543	A152	tbd	967.607	A153	tbd	967.881	A155	tbd
967.544	A152	tbd	967.608	A153	0.145	967.882	A155	tbd
967.545	A152	tbd	967.609	A153	tbd	967.883	A155	tbd
967.546	A152	tbd	967.610	A153	0.145	967.884	A155	tbd
967.547	A152	tbd	967.611	A153	tbd	967.885	A156	tbd
967.548	A152	tbd	967.612	A153	0.143	967.886	A156	tbd
967.549	A152	tbd	967.613	A153	tbd	967.887	A156	tbd
967.550	A152	tbd	967.614	A153	0.142	967.888	A156	tbd
967.551	A152	tbd	967.615	A153	tbd	967.889	A156	tbd
967.552	A152	tbd	967.616	A153	0.140	967.890	A156	tbd
967.553	A152	tbd	967.617	A153	tbd	967.891	A156	0.150

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
967.892	A156	tbd	968.127	A57	4.790	968.257	A55	2.040
967.893	A156	tbd	968.128	A57	5.540	968.258	A55	1.200
967.894	A156	tbd	968.129	A57	7.100	968.259	A55	1.300
967.895	A156	0.150	968.130	A57	5.500	968.260	A55	1.446
967.896	A156	tbd	968.131	A57	3.500	968.262	A55	1.150
967.897	A156	tbd	968.136S	A61	1.720	968.263	A55	1.285
967.898	A156	tbd	968.137S	A61	2.010	968.264	A55	1.480
967.899	A156	0.150	968.142	A35	1.200	968.265	A55	1.670
967.900	A156	tbd	968.144	A35	1.200	968.266	A55	1.830
967.901	A156	tbd	968.145	A35	1.300	968.287	A55	2.750
967.902	A156	tbd	968.147	A35	1.300	968.288	A55	3.000
967.903	A156	0.155	968.148	A35	1.400	968.289	A55	3.300
967.904	A156	tbd	968.150	A35	1.100	968.290	A55	3.600
967.905	A156	tbd	968.151	A35	1.700	968.291	A55	4.000
967.906	A156	0.150	968.152	A35	1.910	968.301	A135	0.002
967.908	A156	tbd	968.154	A35	3.300	968.302	A135	0.002
967.909	A156	tbd	968.156	A35	3.400	968.303	A135	0.002
967.910	A156	tbd	968.159	A35	3.600	968.304	A135	0.002
967.911	A156	tbd	968.161	A35	3.600	968.305	A135	0.002
967.912	A156	tbd	968.162	A35	3.800	968.306	A135	0.002
967.913	A156	tbd	968.163	A35	4.400	968.307	A135	0.002
967.914	A156	tbd	968.167	A7	0.580	968.308	A135	0.002
967.915	A156	tbd	968.170	A7	0.530	968.309	A135	0.002
967.916	A156	tbd	968.171	A7	0.680	968.310	A135	0.002
967.917	A156	tbd	968.174	A7	0.520	968.311	A135	0.002
967.918	A156	tbd	968.175	A7	0.800	968.312	A135	0.002
967.919	A156	tbd	968.178	A7	0.570	968.313	A135	0.002
967.920	A156	tbd	968.179	A7	0.590	968.314	A135	0.002
967.921	A156	tbd	968.180	A7	0.965	968.315	A135	0.002
967.922	A156	tbd	968.181	A7	1.170	968.316	A135	0.002
967.923	A156	tbd	968.183	A7	1.080	968.317	A135	0.002
967.924	A156	tbd	968.185	A7	1.200	968.318	A135	0.002
967.925	A156	tbd	968.188	A7	1.530	968.319	A135	0.002
967.926	A156	tbd	968.191	A7	1.130	968.320	A135	0.002
967.927	A156	tbd	968.193	A7	1.300	968.321	A135	0.002
967.928	A156	tbd	968.196	A7	1.730	968.322	A135	0.002
967.929	A156	tbd	968.199	A7	1.230	968.323	A135	0.002
967.930	A156	tbd	968.201	A7	1.400	968.324	A135	0.001
967.931	A156	tbd	968.204	A7	1.960	968.325	A135	0.001
967.932	A156	tbd	968.207	A7	1.200	968.326	A135	0.003
967.933	A156	tbd	968.208	A7	1.375	968.327	A135	0.001
967.934	A156	0.217	968.209	A7	1.568	968.328	A135	0.003
968.033	A8	7.600	968.210	A7	1.780	968.329	A135	0.005
968.037	A8	7.390	968.211	A7	2.000	968.330	A2	0.111
968.038	A8	9.900	968.212	A7	2.340	968.334	A135	0.003
968.059	A36	5.020	968.213	A7	2.800	968.335	A135	0.003
968.060	A36	5.120	968.214	A7	3.610	968.336	A135	0.003
968.061	A36	4.500	968.217	A7	4.000	968.337	A135	0.003
968.076	A9	5.160	968.221	A7	4.100	968.338	A135	0.003
968.077	A9	5.700	968.225	A7	4.200	968.339	A135	0.003
968.080	A9	6.730	968.228	A7	4.038	968.340	A135	0.003
968.083	A9	7.600	968.229	A7	4.410	968.341	A135	0.003
968.086	A9	4.800	968.230	A7	5.230	968.342	A135	0.003
968.087	A9	8.500	968.235	A55	0.350	968.343	A135	0.003
968.088	A9	9.600	968.238	A55	0.460	968.344	A135	0.003
968.105	A56	3.995	968.241	A55	0.520	968.345	A135	0.003
968.108	A56	3.900	968.242	A55	0.670	968.346	A135	0.003
968.111	A56	4.800	968.243	A55	0.543	968.347	A135	0.003
968.112	A56	5.800	968.247	A55	0.800	968.348	A135	0.003
968.121	A57	3.900	968.248	A55	0.970	968.349	A135	0.003
968.122	A57	4.880	968.249	A55	1.100	968.350	A135	0.003
968.123	A57	5.900	968.252	A55	0.900	968.351	A135	0.003
968.124	A57	4.270	968.253	A55	1.050	968.352	A135	0.002
968.125	A57	5.600	968.254	A55	1.200	968.353	A27	0.002

List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
968.354	A135	0.002	968.431	A150	0.020	968.711	A9	5.400
968.355	A27	0.002	968.433	A150	0.020	968.712	A9	6.500
968.356	A135	0.003	968.434	A150	0.040	968.713	A9	5.460
968.357	A135	0.002	968.436	A150	0.040	968.714	A9	6.890
968.358	A135	0.003	968.437	A150	0.042	968.716	A71	0.220
968.359	A135	0.002	968.438	A150	0.040	968.717	A72	0.250
968.360	A135	0.002	968.440	A150	0.035	968.718	A72	0.350
968.361	A135	0.002	968.442	A150	0.025	968.719	A72	0.290
968.362	A135	0.002	968.443	A150	0.065	968.720	A72	0.350
968.363	A135	0.002	968.445	A150	0.065	968.721	A72	0.350
968.364	A2	0.115	968.446	A150	0.065	968.722	A72	0.470
968.369	A136	0.004	968.447	A150	0.065	968.723	A72	0.480
968.370	A136	0.004	968.448	A150	0.060	968.728	A73	0.489
968.371	A136	0.004	968.449	A150	0.060	968.729	A73	0.510
968.372	A136	0.004	968.451	A150	0.055	968.730	A73	0.600
968.373	A136	0.004	968.453	A150	0.045	968.731	A73	0.540
968.374	A136	0.004	968.461	A7	0.044	968.733	A73	tbd
968.375	A136	0.004	968.462	A7	0.066	968.734	A73	0.747
968.376	A136	0.004	968.463	A7	1.070	968.736	A73	tbd
968.377	A136	0.004	968.464	A7	0.150	968.738	A52	0.600
968.378	A136	0.004	968.468	A151	0.048	968.742	A52	1.010
968.379	A136	0.005	968.469	A151	0.048	968.745	A52	0.700
968.380	A136	0.005	968.470	A151	tbd	968.752	A72	0.155
968.381	A136	0.005	968.471	A151	0.049	968.753	A72	0.120
968.382	A136	0.005	968.472	A151	0.075	968.754	A72	0.180
968.383	A136	0.005	968.473	A151	0.074	968.757	A71	0.231
968.384	A136	0.004	968.474	A151	tbd	968.760	A71	tbd
968.385	A136	0.005	968.475	A151	0.074	968.764	A73	tbd
968.386	A136	0.005	968.476	A151	tbd	968.771	A59	0.900
968.387	A136	0.005	968.477	A151	0.073	968.772	A59	0.900
968.388	A136	0.005	968.478	A151	tbd	968.773	A59	1.000
968.389	A136	0.005	968.479	A151	tbd	968.775	A59	0.900
968.390	A136	0.005	968.480	A151	tbd	968.776	A59	1.000
968.391	A136	0.005	968.481	A151	tbd	968.777	A59	1.050
968.392	A136	0.005	968.482	A151	tbd	968.779	A59	1.000
968.393	A136	0.005	968.483	A151	0.097	968.780	A59	1.050
968.394	A136	0.005	968.484	A151	tbd	968.781	A59	1.300
968.395	A136	0.005	968.485	A151	0.096	968.783	A59	1.000
968.396	A136	0.004	968.486	A151	0.150	968.784	A59	1.133
968.397	A136	0.004	968.487	A151	0.150	968.785	A59	0.130
968.398	A136	0.004	968.488	A151	0.150	968.787	A59	1.100
968.399	A136	0.004	968.489	A151	0.150	968.788	A59	1.400
968.400	A136	0.004	968.490	A151	0.152	968.789	A59	1.800
968.401	A136	0.004	968.491	A151	0.150	968.790	A59	2.000
968.402	A136	0.004	968.492	A151	tbd	968.791	A59	2.400
968.403	A136	0.004	968.493	A151	0.150	968.792	A59	1.065
968.404	A136	0.004	968.494	A151	tbd	968.793	A59	1.300
968.405	A136	0.004	968.495	A151	0.150	968.794	A59	1.650
968.406	A136	0.004	968.517	A4	0.770	968.795	A59	2.300
968.408	A136	0.004	968.572	A59	2.500	968.796	A59	2.700
968.409	A136	0.004	968.573	A59	2.600	968.803	A51	0.800
968.410	A136	0.004	968.575	A59	2.600	968.811	A53	0.870
968.411	A136	0.004	968.578	A59	2.700	968.812	A53	0.885
968.412	A136	0.004	968.580	A59	2.700	968.813	A53	0.970
968.413	A136	0.004	968.581	A59	2.900	968.814	A53	0.885
968.414	A136	0.003	968.583	A59	2.900	968.815	A53	0.845
968.415	A136	0.004	968.584	A59	3.200	968.816	A53	0.945
968.421	A150	0.013	968.587	A59	3.100	968.818	A53	1.190
968.423	A150	0.013	968.588	A59	3.320	968.819	A53	0.865
968.424	A150	0.012	968.593	A59	3.010	968.820	A53	1.010
968.425	A150	0.010	968.594	A59	3.800	968.822	A53	1.363
968.427	A150	0.020	968.708	A9	4.600	968.823	A53	0.960
968.429	A150	0.020	968.709	A9	5.050	968.824	A53	1.150
968.430	A150	0.023	968.710	A9	5.910	968.826	A53	1.150

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
968.827	A53	tbd	968.917	A70	0.148	969.047	A38	1.360
968.828	A53	1.280	968.919	A70	0.315	969.048	A38	1.870
968.829	A53	1.576	968.920	A70	0.246	969.059	A38	2.300
968.830	A53	1.860	968.925	A50	0.280	969.060	A38	2.400
968.831	A53	tbd	968.926	A50	0.310	969.062	A39	2.800
968.832	A53	1.110	968.927	A50	0.310	969.063	A39	3.100
968.833	A53	1.390	968.929	A51	0.250	969.066	A39	3.200
968.835	A53	2.050	968.930	A51	0.280	969.067	A39	3.000
968.836	A53	2.500	968.931	A51	0.260	969.069	A39	2.900
968.841	A54	2.440	968.932	A51	0.290	969.070	A39	3.105
968.842	A54	2.500	968.933	A51	0.240	969.071	A39	3.300
968.843	A54	2.600	968.934	A50	0.255	969.075	A39	4.200
968.844	A54	2.500	968.936	A50	0.260	969.077	A39	3.700
968.845	A54	2.590	968.937	A50	0.310	969.082	A39	3.000
968.846	A54	2.700	968.940	A52	0.270	969.083	A39	3.415
968.847	A54	2.600	968.941	A52	tbd	969.084	A39	4.300
968.848	A54	2.615	968.942	A52	0.350	969.085	A39	4.000
968.849	A54	2.700	968.943	A52	0.320	969.087	A39	3.100
968.850	A54	2.600	968.945	A52	0.440	969.088	A39	3.200
968.851	A54	2.900	968.946	A52	0.350	969.090	A39	3.990
968.852	A54	3.200	968.948	A52	0.490	969.091	A39	4.800
968.853	A54	3.356	968.949	A52	0.462	969.209	A2	0.385
968.854	A54	2.800	968.950	A52	0.460	969.210	A2	0.450
968.855	A54	2.720	968.951	A52	0.515	969.211	A2	0.480
968.856	A54	3.600	968.952	A52	0.780	969.214	A2	0.470
968.857	A54	3.678	968.953	A52	0.690	969.215	A2	0.500
968.858	A54	2.900	968.961	A50	0.800	969.218	A2	0.416
968.859	A54	3.010	968.963	A50	0.900	969.220	A2	0.470
968.860	A54	3.800	968.965	A51	0.781	969.221	A2	0.527
968.861	A54	3.925	968.966	A50	0.900	969.222	A2	1.100
968.868	A71	0.065	968.970	A50	0.770	969.224	A33	0.990
968.869	A71	0.080	968.971	A50	0.800	969.225	A33	1.085
968.870	A70	0.155	968.973	A50	0.860	969.229	A33	1.060
968.871	A70	0.076	968.975	A50	0.993	969.230	A33	1.330
968.874	A70	0.070	968.981	A53	0.940	969.234	A33	1.250
968.875	A70	0.090	968.982	A53	0.945	969.235	A33	1.450
968.876	A71	0.136	968.983	A53	1.150	969.239	A33	1.205
968.877	A71	tbd	968.984	A53	1.249	969.240	A33	1.483
968.878	A71	0.140	968.985	A53	1.040	969.241	A33	1.665
968.879	A71	0.155	968.986	A53	1.150	969.244	A33	1.317
968.880	A70	tbd	968.989	A54	2.600	969.245	A33	1.800
968.881	A70	0.155	968.990	A54	2.700	969.246	A33	2.010
968.882	A70	0.140	968.991	A54	2.540	969.248	A33	1.100
968.883	A70	0.160	968.992	A54	2.700	969.249	A33	1.365
968.884	A72	0.160	968.993	A54	2.630	969.250	A33	1.900
968.885	A72	0.160	968.994	A54	3.100	969.251	A33	2.300
968.886	A72	0.195	968.995	A54	2.850	969.252	A33	0.350
968.890	A70	0.230	968.996	A54	3.200	969.253	A34	3.000
968.891	A70	0.260	968.997	A54	3.950	969.254	A34	3.800
968.892	A70	0.315	968.998	A54	3.300	969.255	A34	1.310
968.893	A70	0.270	969.023	A36	3.500	969.261	A34	3.200
968.894	A70	0.315	969.025	A36	4.580	969.262	A34	3.300
968.895	A72	0.275	969.032	A38	1.070	969.263	A34	3.360
968.896	A72	0.330	969.034	A38	1.030	969.267	A34	3.200
968.897	A72	0.350	969.036	A38	1.260	969.268	A34	3.400
968.899	A72	0.470	969.037	A38	1.040	969.269	A34	3.700
968.900	A72	0.417	969.038	A38	1.170	969.274	A34	3.230
968.901	A72	0.560	969.040	A38	1.040	969.275	A34	3.458
968.905	A72	0.460	969.041	A38	1.230	969.276	A34	4.000
968.907	A70	0.460	969.042	A38	1.500	969.277	A34	4.400
968.910	A73	1.146	969.043	A38	1.040	969.280	A34	3.600
968.911	A73	1.030	969.044	A38	1.360	969.281	A34	3.580
968.914	A71	tbd	969.045	A38	1.670	969.282	A34	4.300
968.915	A71	0.221	969.046	A38	1.015	969.283	A34	4.600

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
969.319	A2	0.416	969.468L	A8	0.960	969.548	A5	1.090
969.322	A2	0.985	969.469L	A8	0.950	969.549	A5	1.200
969.323	A2	1.080	969.470L	A8	1.060	969.550	A5	1.250
969.324	A2	0.820	969.471L	A8	0.990	969.551	A5	2.290
969.326	A2	1.025	969.472L	A161	1.370	969.552	A5	2.690
969.328	A2	1.115	969.475	A81	0.029	969.553	A6	3.620
969.330	A2	0.003	969.480	A2	0.005	969.554	A6	3.800
969.331	A2	1.000	969.481	A2	0.006	969.555	A6	3.900
969.332	A2	1.030	969.482	A2	0.075	969.556	A6	3.860
969.333	A2	1.100	969.483	A4	0.025	969.557	A6	3.800
969.334	A2	1.135	969.484	A4	0.040	969.558	A6	2.800
969.335	A2	1.200	969.485	A4	0.060	969.559	A6	4.100
969.341	A4	0.580	969.486	A4	0.090	969.560	A6	4.200
969.344	A4	0.528	969.487	A4	0.120	969.561	A6	3.750
969.347	A4	0.580	969.488	A4	0.140	969.562	A6	3.890
969.348	A4	0.728	969.491	A143	0.019	969.563	A6	4.100
969.349	A4	0.632	969.492	A143	0.050	969.564	A6	4.260
969.350	A4	0.870	969.493	A143	0.030	969.565	A6	4.700
969.351	A4	0.590	969.494	A143	0.036	969.566	A6	4.900
969.353	A4	0.742	969.495	A143	0.100	969.567	A6	3.830
969.354	A4	1.080	969.496	A143	0.028	969.568	A6	3.990
969.361	A5	td	969.497	A143	0.029	969.569	A6	4.270
969.362	A5	1.200	969.498	A143	0.036	969.570	A6	4.500
969.363	A5	1.130	969.499	A143	0.037	969.571	A6	5.000
969.364	A5	td	969.504	A3	0.430	969.572	A6	5.300
969.365	A5	1.290	969.506	A3	1.000	969.574	A6	3.920
969.366	A5	td	969.508	A3	1.000	969.575	A6	4.160
969.367	A5	1.150	969.509	A4	0.421	969.576	A6	4.520
969.368	A5	1.352	969.510	A4	0.500	969.577	A6	4.850
969.369	A5	1.350	969.511	A4	0.480	969.578	A6	5.260
969.370	A5	1.190	969.512	A4	0.570	969.579	A6	3.800
969.371	A5	1.400	969.513	A4	0.650	969.580	A6	3.950
969.372	A5	1.480	969.514	A5	1.215	969.581	A6	4.260
969.373	A5	1.250	969.516	A4	0.530	969.582	A6	4.710
969.374	A5	1.539	969.518	A4	1.352	969.583	A6	5.060
969.375	A5	1.670	969.519	A4	0.590	969.584	A6	5.570
969.376	A5	1.270	969.520	A4	0.590	969.593	A8	5.060
969.377	A5	1.620	969.521	A4	0.600	969.595	A8	5.400
969.378	A5	1.780	969.522	A4	0.930	969.596	A8	6.500
969.446	A167	0.065	969.523	A5	1.035	969.597	A8	5.460
969.447	A167	0.239	969.524	A5	1.070	969.601	A140	0.003
969.448	A129	0.484	969.525	A5	1.170	969.602	A140	0.003
969.449	A2	0.060	969.526	A5	1.230	969.603	A140	0.003
969.450	A2	0.075	969.527	A5	1.320	969.604	A140	0.003
969.451	A157	0.080	969.528	A5	1.050	969.605	A140	0.003
969.452	A2	0.065	969.529	A5	1.140	969.606	A140	0.003
969.453	A157	0.170	969.530	A5	1.280	969.607	A140	0.003
969.454	A4	0.070	969.531	A5	1.300	969.608	A140	0.003
969.455	A157	0.190	969.532	A5	1.490	969.609	A140	0.003
969.456	A4	0.120	969.533	A5	1.080	969.610	A140	0.003
969.457	A157	0.270	969.534	A4	0.680	969.611	A140	0.003
969.458	A4	0.150	969.535	A5	1.400	969.612	A140	0.003
969.459	A157	0.360	969.536	A5	1.550	969.613	A140	0.003
969.460	A4	0.200	969.537	A5	1.718	969.615	A140	0.010
969.460L	A129	0.200	969.538	A5	1.090	969.616	A140	0.009
969.461	A157	0.520	969.539	A5	1.290	969.617	A140	0.009
969.462	A4	0.300	969.540	A5	1.565	969.618	A140	0.008
969.462L	A8	0.570	969.541	A5	1.750	969.619	A140	0.008
969.463	A157	0.520	969.542	A5	1.970	969.620	A140	0.008
969.464L	A8	0.798	969.543	A5	1.100	969.621	A140	0.007
969.465	A4	0.250	969.544	A5	1.100	969.622	A140	td
969.465L	A8	0.650	969.545	A5	1.800	969.623	A140	0.007
969.466	A157	0.790	969.546	A5	2.100	969.624	A140	td
969.467L	A78	0.850	969.547	A5	2.427	969.625	A140	0.005

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
969.627	A140	0.030	969.702	A141	0.111	969.899	A147	0.167
969.628	A140	0.026	969.703	A141	0.100	969.900	A147	0.167
969.629	A140	0.030	969.704	A141	0.112	969.901	A147	0.168
969.630	A140	0.025	969.705	A141	0.108	969.902	A147	0.168
969.631	A140	0.022	969.706	A141	0.108	969.903	A147	0.168
969.632	A140	0.025	969.707	A141	0.099	969.904	A147	0.170
969.633	A140	0.022	969.708	A141	0.105	969.905	A147	0.170
969.634	A140	0.025	969.709	A141	0.103	969.906	A147	0.169
969.635	A140	0.020	969.710	A141	0.102	969.907	A147	0.170
969.636	A140	0.021	969.711	A141	0.094	969.908	A147	0.170
969.637	A140	0.020	969.712	A141	0.098	969.909	A147	0.165
969.638	A140	0.020	969.713	A141	0.094	969.910	A147	0.168
969.639	A140	0.014	969.714	A141	0.093	969.911	A147	0.168
969.640	A140	0.017	969.715	A141	0.088	969.912	A147	0.163
969.641	A140	0.015	969.716	A141	0.088	969.913	A147	0.160
969.643	A140	0.045	969.717	A141	0.083	969.914	A147	tbd
969.644	A140	0.045	969.718	A141	0.083	969.915	A147	0.016
969.645	A140	0.046	969.719	A141	0.080	969.921	A148	0.020
969.646	A140	0.045	969.720	A141	0.077	969.922	A148	0.020
969.647	A140	0.043	969.721	A141	0.074	969.923	A148	0.020
969.648	A140	0.044	969.722	A141	0.071	969.924	A148	0.035
969.649	A140	0.042	969.723	A141	0.066	969.925	A148	0.036
969.650	A140	0.045	969.724	A141	0.063	969.926	A148	0.037
969.651	A140	0.040	969.725	A141	0.060	969.927	A148	0.033
969.652	A140	0.010	969.726	A141	0.056	969.928	A148	0.035
969.653	A140	0.039	969.727	A141	0.050	969.929	A148	0.053
969.654	A140	0.038	969.861	A146	0.029	969.930	A148	0.054
969.655	A140	0.037	969.862	A146	0.029	969.931	A148	0.050
969.656	A140	tbd	969.863	A146	0.029	969.932	A148	0.053
969.657	A140	0.034	969.864	A146	0.045	969.933	A148	0.050
969.658	A140	0.034	969.865	A146	0.047	969.934	A148	0.053
969.659	A140	0.031	969.866	A146	0.048	969.935	A148	0.047
969.660	A140	tbd	969.867	A146	0.045	969.936	A148	tbd
969.661	A140	0.030	969.868	A146	0.047	969.937	A148	0.080
969.662	A140	0.028	969.869	A146	0.069	969.938	A148	0.082
969.663	A140	0.024	969.870	A146	0.070	969.939	A148	tbd
969.669	A141	0.080	969.871	A146	0.070	969.940	A148	0.082
969.670	A141	0.082	969.872	A146	0.070	969.941	A148	0.083
969.671	A141	0.082	969.873	A146	0.070	969.942	A148	0.083
969.672	A141	tbd	969.874	A146	0.070	969.943	A148	0.079
969.673	A141	0.079	969.875	A146	0.070	969.944	A148	0.080
969.674	A141	tbd	969.876	A146	0.101	969.945	A148	0.080
969.675	A141	0.078	969.877	A146	0.101	969.946	A149	0.115
969.676	A141	tbd	969.878	A146	0.101	969.947	A149	0.115
969.677	A141	0.077	969.879	A146	0.101	969.948	A149	0.115
969.678	A141	tbd	969.880	A146	0.070	969.949	A149	0.115
969.679	A141	0.073	969.881	A146	0.102	969.950	A149	0.115
969.680	A141	tbd	969.882	A146	0.100	969.951	A149	0.116
969.681	A141	0.070	969.883	A146	0.100	969.952	A149	0.115
969.682	A141	tbd	969.884	A146	0.095	969.953	A149	0.320
969.683	A141	0.066	969.885	A146	0.095	969.954	A149	0.115
969.684	A141	tbd	969.886	A147	0.146	969.955	A149	0.116
969.685	A141	0.063	969.887	A147	0.146	969.956	A149	0.111
969.686	A141	tbd	969.888	A147	0.145	969.957	A149	0.111
969.687	A141	0.060	969.889	A147	0.150	969.958	A149	0.110
969.688	A141	tbd	969.890	A147	0.146	969.959	A149	0.132
969.689	A141	tbd	969.891	A147	0.150	969.960	A149	0.132
969.690	A141	tbd	969.892	A147	0.148	969.961	A149	0.134
969.691	A141	0.048	969.893	A147	0.150	969.962	A149	0.133
969.697	A141	0.117	969.894	A147	0.150	969.963	A149	0.135
969.698	A141	0.116	969.895	A147	0.150	969.964	A149	0.135
969.699	A141	0.115	969.896	A147	0.150	969.965	A149	0.135
969.700	A141	0.115	969.897	A147	0.150	969.966	A149	0.134
969.701	A141	0.111	969.898	A147	0.150	969.967	A149	0.135

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
969.968	A149	0.135	973.042	A107	3.010	973.116	A109	0.840
969.969	A149	0.135	973.043	A107	3.010	973.117	A109	0.935
969.970	A149	0.133	973.044	A107	4.600	973.119	A109	1.700
969.971	A149	0.130	973.045	A107	4.600	973.120	A109	1.260
969.972	A149	0.128	973.046	A107	6.100	973.121	A109	1.280
969.973	A149	0.128	973.047	A107	6.100	973.122	A109	1.710
969.974	A149	0.128	973.052	A104	0.850	973.123	A109	1.820
969.975	A149	0.125	973.053	A104	tbd	973.124	A109	3.100
969.981	A147	0.002	973.054	A104	tbd	973.125	A109	3.100
969.982	A147	0.002	973.055	A104	0.947	973.126	A109	3.000
969.983	A147	0.002	973.056	A104	1.998	973.127	A109	3.500
969.984	A147	0.005	973.057	A104	tbd	973.128	A109	3.500
969.985	A147	0.004	973.058	A104	tbd	973.181	A110	tbd
969.986	A147	0.005	973.059	A104	tbd	973.182	A110	1.635
969.987	A147	0.004	973.060	A104	tbd	973.183	A110	tbd
969.988	A147	0.010	973.061	A104	3.720	973.184	A110	tbd
969.989	A147	0.006	973.062	A104	tbd	973.185	A110	0.011
969.990	A147	0.005	973.063	A104	5.700	973.186	A110	0.017
969.991	A147	0.001	973.064	A104	0.240	973.187	A110	0.013
969.992	A147	0.010	973.065	A104	0.700	973.188	A110	0.017
969.993	A147	0.010	973.066	A104	tbd	973.194	A171	0.007
969.994	A147	0.002	973.067	A104	tbd	973.195	A171	0.015
969.995	A147	0.002	973.068	A104	tbd	973.196	A171	0.011
969.996	A147	0.002	973.069	A104	tbd	973.197	A171	0.015
969.997	A147	0.010	973.070	A104	0.210	973.198	A171	0.020
972.304	A180	0.005	973.071	A104	0.210	973.203	A111	0.580
972.306	A180	0.005	973.072	A104	tbd	973.204	A111	1.300
972.309	A180	0.003	973.073	A104	tbd	973.205	A111	1.300
972.310	A180	0.003	973.076	A97	0.338	973.206	A111	1.035
972.311	A180	0.003	973.077	A97	0.700	973.208	A111	0.400
972.331	A169	tbd	973.078	A97	tbd	973.209	A111	0.400
972.341	C37	0.150	973.079	A97	tbd	973.210	A111	1.100
973.001	A102	0.550	973.080	A97	0.330	973.211	A111	0.800
973.002	A102	tbd	973.081	A97	0.700	973.212	A111	0.800
973.003	A102	tbd	973.082	A97	0.380	973.213	A112	0.500
973.006	A102	tbd	973.083	A97	0.700	973.214	A112	0.500
973.007	A102	tbd	973.084	A97	tbd	973.215	A112	0.500
973.011	A102	tbd	973.085	A97	0.700	973.218	A112	0.500
973.013	A102	tbd	973.086	A97	tbd	973.219	A112	0.600
973.014	A95	1.352	973.087	A97	0.276	973.220	A112	0.630
973.015	A95	tbd	973.088	A108	0.640	973.223	A112	0.500
973.016	A95	1.352	973.089	A108	0.645	973.224	A112	0.600
973.017	A95	0.460	973.090	A108	0.647	973.225	A112	0.715
973.018	A95	0.460	973.091	A108	0.785	973.229	A112	0.600
973.019	A95	0.740	973.092	A108	0.974	973.230	A112	0.700
973.020	A95	0.740	973.093	A108	1.280	973.231	A112	0.800
973.021	A95	1.352	973.094	A108	1.540	973.235	A112	0.700
973.022	A95	0.680	973.095	A108	2.100	973.236	A112	0.900
973.023	A95	0.680	973.096	A108	3.700	973.237	A112	0.932
973.024	A95	1.635	973.097	A108	1.400	973.241	A112	0.800
973.025	A95	1.635	973.098	A108	1.300	973.242	A112	1.000
973.026	A106	1.200	973.099	A108	1.300	973.243	A112	1.100
973.027	A106	1.200	973.100	A108	1.100	973.247	A113	1.200
973.028	A106	1.270	973.101	A108	1.270	973.248	A113	1.200
973.030	A106	7.300	973.102	A108	2.000	973.249	A113	1.200
973.031	A106	7.300	973.103	A108	1.840	973.250	A113	1.300
973.032	A107	1.600	973.104	A108	2.800	973.251	A113	1.300
973.033	A107	1.600	973.105	A108	3.730	973.252	A113	1.200
973.034	A107	3.100	973.110	A108	2.900	973.253	A113	1.070
973.035	A107	1.270	973.111	A108	3.300	973.254	A113	1.300
973.038	A107	6.000	973.112	A108	3.600	973.255	A113	1.300
973.039	A107	6.000	973.113	A108	3.580	973.256	A113	1.300
973.040	A107	2.600	973.114	A108	5.300	973.257	A113	1.400
973.041	A107	2.600	973.115	A109	0.880	973.258	A113	1.400

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
973.259	A113	1.500	973.370	A115	1.800	973.721	A121	1.110
973.260	A113	1.600	973.371	A115	2.000	973.722	A121	1.800
973.261	A113	0.900	973.374	A115	1.500	973.723	A121	2.200
973.262	A113	1.400	973.376	A115	1.430	973.724	A121	1.800
973.263	A113	1.040	973.377	A115	1.660	973.725	A121	2.100
973.264	A113	1.110	973.378	A115	1.900	973.726	A121	2.800
973.265	A113	1.180	973.379	A115	2.600	973.727	A121	2.900
973.266	A113	1.248	973.380	A115	2.790	973.728	A121	3.500
973.267	A113	1.380	973.382	A115	2.600	973.729	A121	4.100
973.269	A113	0.930	973.385	A115	3.000	973.730	A121	3.200
973.270	A113	1.400	973.388	A115	2.700	973.731	A121	4.200
973.271	A113	1.120	973.391	A115	3.200	973.732	A121	5.200
973.272	A113	0.900	973.394	A115	2.800	973.737	A123	1.300
973.273	A113	1.300	973.396	A115	3.200	973.738	A123	1.500
973.274	A113	1.400	973.397	A115	3.400	973.740	A123	7.000
973.275	A113	2.000	973.400	A115	2.300	973.753	A107	2.600
973.277	A113	1.500	973.402	A115	3.400	973.754	A120	1.110
973.278	A113	1.600	973.403	A115	3.700	973.755	A120	1.197
973.279	A113	1.260	973.404	A115	4.300	973.756	A120	1.722
973.280	A113	1.800	973.427	A116	2.800	973.954	A111	0.273
973.281	A113	2.000	973.428	A116	3.500	973.955	A111	0.289
973.282	A113	1.650	973.431	A116	2.585	974.006	A94	1.300
973.283	A113	2.400	973.432	A116	4.200	974.028	A98	tbd
973.285	A113	1.140	973.433	A116	4.380	974.035	A98	2.424
973.286	A113	1.600	973.435	A116	2.705	974.056	A96	tbd
973.287	A113	1.330	973.436	A116	3.340	974.057	A96	tbd
973.288	A113	2.000	973.438	A116	6.400	974.100	A99	1.050
973.289	A113	2.100	973.440	A116	4.800	974.102	A99	1.390
973.290	A113	2.300	973.441	A116	5.250	974.103	A99	1.760
973.291	A113	2.600	973.465	A117	2.800	978.001	A21	0.418
973.292	A113	2.900	973.466	A117	3.500	978.002	A21	0.445
973.293	A114	2.400	973.469	A117	2.570	978.003	A21	0.485
973.295	A114	2.600	973.471	A117	5.000	978.004	A21	0.530
973.297	A114	2.700	973.473	A117	2.700	978.005	A21	0.550
973.298	A114	2.600	973.475	A117	5.400	978.006	A21	0.555
973.300	A114	2.700	973.476	A117	6.400	978.007	A20	0.550
973.302	A114	2.800	973.477	A117	3.350	978.010	A55	0.900
973.304	A114	2.700	973.478	A117	4.800	978.011	A56	0.962
973.306	A114	2.800	973.480	A117	7.300	978.017	A24	5.150
973.308	A114	3.000	973.572	A122	0.660	978.018	A24	6.450
973.311	A114	2.800	973.573	A122	0.900	978.025	A17	0.768
973.313	A114	2.900	973.574	A122	1.200	978.027	A18	1.400
973.315	A114	3.200	973.575	A122	0.990	978.028	A18	1.400
973.316	A114	3.500	973.576	A122	1.150	978.029	A22	8.200
973.318	A114	2.900	973.577	A122	0.990	978.030	A9	0.723
973.320	A114	3.200	973.578	A122	2.600	978.031	A52	0.590
973.322	A114	3.600	973.579	A122	2.800	978.032	A122	1.090
973.325	A114	3.000	973.580	A122	2.420	978.033	A122	3.700
973.327	A114	3.300	973.598	A123	tbd	978.034	A17	0.688
973.329	A114	3.800	973.600	A123	tbd	978.035	A22	2.400
973.330	A114	4.100	973.601	A123	tbd	978.038	A17	0.840
973.347	A115	0.750	973.602	A123	tbd	978.042	A122	1.800
973.348	A115	0.900	973.603	A123	tbd	978.046	A18	1.240
973.349	A115	1.100	973.604	A123	tbd	978.047	A76	1.040
973.354	A115	1.300	973.605	A123	3.620	978.054	A122	1.820
973.355	A115	1.040	973.609	A203	1.017	978.056	A21	1.030
973.356	A115	1.500	973.680	A119	2.500	978.057	A21	1.074
973.357	A115	1.260	973.682	A119	4.700	978.058	A21	1.132
973.361	A115	1.400	973.684	A119	3.500	978.059	A21	1.155
973.362	A115	1.500	973.686	A119	3.650	978.060	A21	1.195
973.363	A115	1.700	973.688	A119	3.550	978.061	A21	1.252
973.364	A115	1.800	973.690	A119	5.800	978.071	A17	0.700
973.368	A115	1.500	973.718	A121	1.200	978.073	A17	0.820
973.369	A115	1.250	973.720	A121	1.400	978.075	A17	0.610

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Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
978.076	A17	0.695	978.194	A18	1.435	978.373	A97	0.700
978.078	A17	0.840	978.196	A112	0.350	978.374	A97	0.700
978.080	A17	0.700	978.197	A112	0.520	978.378	A22	2.590
978.081	A17	0.764	978.198	A80	tbd	978.379	A157	tbd
978.083	A17	tbd	978.199	A76	1.040	978.390	A98	2.784
978.085	A17	0.620	978.201	A112	0.408	978.391	A98	2.785
978.086	A17	0.710	978.202	A112	0.600	978.399	A28	1.005
978.088	A17	0.940	978.203	A112	0.700	978.400	A28	1.169
978.092	A17	0.550	978.204	A112	0.800	978.402	A65	1.200
978.095	A17	0.761	978.205	A20	1.072	978.403	A22	4.060
978.097	A17	1.520	978.208	A22	2.355	978.404	A65	1.500
978.100	A71	tbd	978.215	A76	1.040	978.476	A106	1.360
978.102	A76	1.040	978.219	A22	1.434	978.499	A138	0.025
978.103	A122	2.190	978.222	A80	3.900	978.500	A138	0.006
978.105	A21	3.590	978.226	A44	tbd	978.501	A159	0.073
978.107	A21	3.630	978.236	A184	tbd	978.504	A147	tbd
978.109	A21	3.690	978.237	A184	tbd	978.505	A138	0.006
978.111	A21	3.710	978.238	A184	tbd	978.506	A138	0.006
978.113	A21	3.750	978.239	A52	0.700	978.507	A138	0.006
978.114	A21	4.180	978.253	A29	7.150	978.508	A138	0.075
978.115	A21	3.850	978.254	A28	2.050	978.509	A138	0.075
978.119	A29	7.150	978.255	A28	2.050	978.511	A137	0.008
978.120	A66	3.770	978.256	A223	0.002	978.512	A147	0.017
978.121	A66	4.410	978.259	A22	0.727	978.513	A137	0.008
978.124	A76	1.480	978.261	A52	0.610	978.516	A137	0.010
978.128	A22	2.390	978.273	A22	0.727	978.517	A137	0.009
978.129	A22	3.820	978.274	A28	2.050	978.518	A146	0.010
978.130	A22	4.465	978.275	A211	tbd	978.801	A205	0.002
978.131	A22	5.060	978.276	A210	0.378	978.803	A205	0.003
978.132	A22	4.200	978.277	A210	tbd	978.804	A205	0.001
978.133	A22	6.570	978.278	A210	0.001	978.805	A205	0.002
978.134	A111	1.035	978.279S	A13	2.050	978.806	A205	0.002
978.135	A99	1.270	978.283	A219	0.002	978.807	A205	0.002
978.136	A20	1.150	978.284	B147	0.006	978.808	A205	0.002
978.137	A20	1.220	978.286	A164	0.180	978.809	A205	0.002
978.138	A20	1.240	978.287	A164	0.180	978.810	A208	0.002
978.139	A20	1.440	978.288	A164	0.180	978.811	A208	0.002
978.140	A122	0.700	978.289	A164	0.180	978.812	A205	0.002
978.143	A22	10.200	978.290	A29	7.150	978.813	A205	0.003
978.145	A22	1.240	978.291	A21	3.363	978.814	A205	0.003
978.146	A76	0.900	978.294	A24	6.450	978.817	A219	0.009
978.147	A76	1.200	978.306	A99	1.270	978.819	A205	0.001
978.148	A22	5.700	978.307	A80	tbd	978.820	A210	0.001
978.149	A22	4.440	978.313	A210	tbd	978.821	A205	0.005
978.150	A29	tbd	978.314	A25	tbd	978.826	A219	0.042
978.151	A76	1.200	978.315	A25	0.930	978.827	A205	0.002
978.152	A76	1.100	978.317	A25	2.320	978.828	A205	0.004
978.164	A28	2.050	978.318	A25	2.380	978.901	A170	0.015
978.165	A28	1.600	978.324	A22	1.435	978.902	A170	tbd
978.167	A22	8.200	978.325	A68	1.600	978.903	A170	0.027
978.170	A55	0.800	978.326	A22	0.727	978.904	A170	0.043
978.174	A22	4.730	978.330	A165	0.180	978.905	A170	tbd
978.175	A22	6.400	978.331	A165	0.180	978.907	A81	0.009
978.178	A80	tbd	978.336	A218	1.240	978.908	A224	0.013
978.179	A20	1.150	978.338	A218	0.930	978.909	A81	0.006
978.180	A20	1.150	978.339	A218	tbd	978.910	A81	0.026
978.181S	A13	1.700	978.342	A99	2.282	978.911	A81	0.130
978.183	A22	8.200	978.343	A18	1.374	978.913	A81	0.010
978.184	A9	0.779	978.356	A88	tbd	978.918	A219	0.001
978.185	A66	1.450	978.367	A20	1.110	978.921	A81	tbd
978.186	A66	1.590	978.368	A22	1.500	978.951	A174	0.025
978.190	A76	0.890	978.370	A50	0.180	978.953	A174	0.025
978.192	A18	1.400	978.371	A50	0.240	978.954	A174	0.025
978.193	A18	1.400	978.372	A50	0.270	978.955	A174	tbd

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978.956	A174	0.028
978.958	A174	0.028
978.965	A175	0.275
978.966	A175	0.215
978.967	A175	0.275
978.969	A175	0.195
978.971	A174	0.070
978.972	A174	0.025
978.975	A174	0.070
978.976	A178	0.263
978.977	A174	0.070
978.978	A174	0.025
978.979	A174	0.025
979.010	A52	0.270
979.140	A80	tbd
979.194	A66	1.000
979.196	A66	2.300
979.198	A99	tbd
979.199	A99	tbd
979.202	A65	1.300
979.203	A65	1.300
979.204	A65	1.400
979.206	A65	1.600
979.986	A146	0.070
979.987	A146	0.068
979.993	A172	0.200
979.994	A172	0.200
979.995	A171	tbd
979.996	A171	tbd
979.997	A171	tbd
979.998	A171	tbd

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