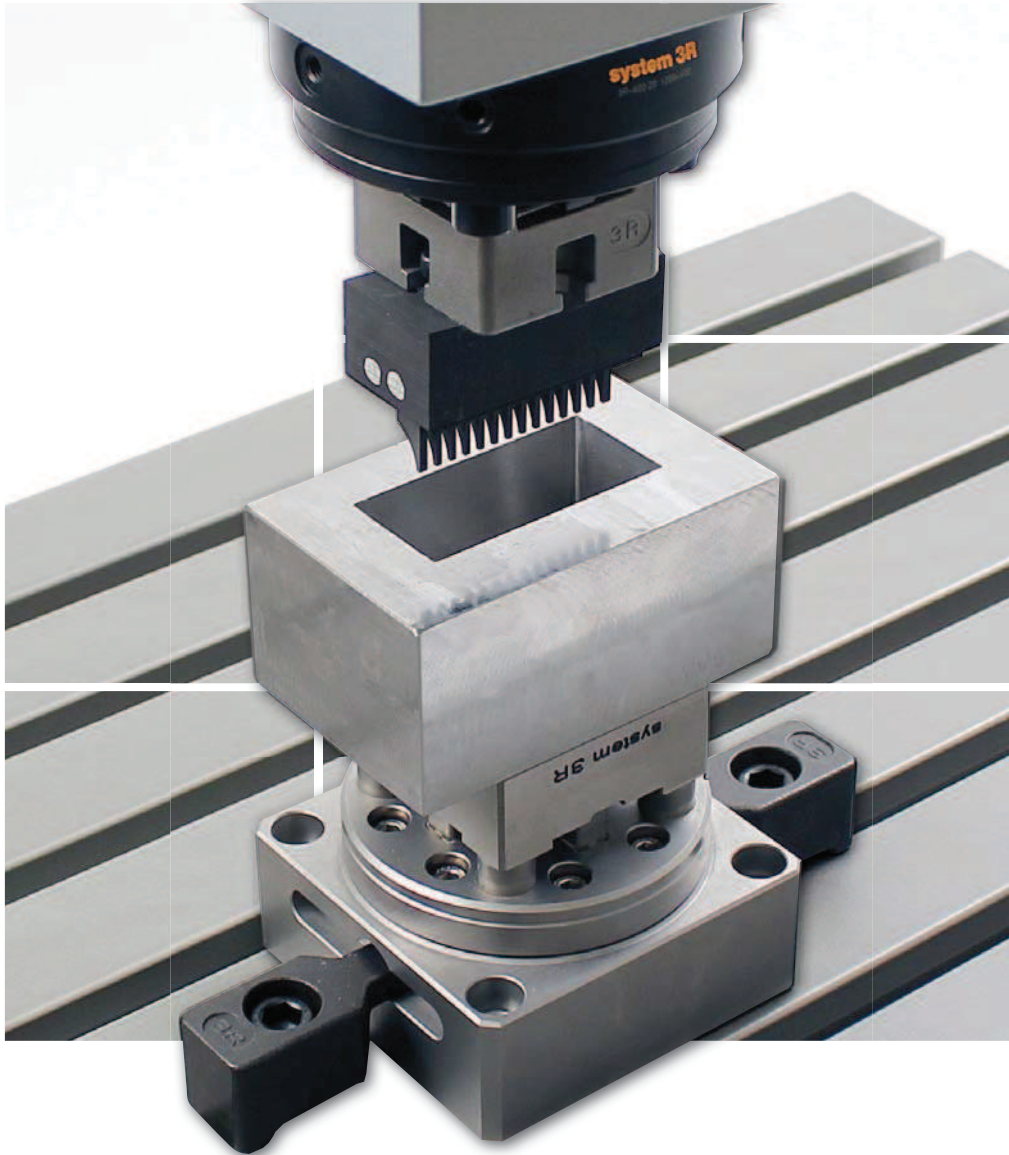
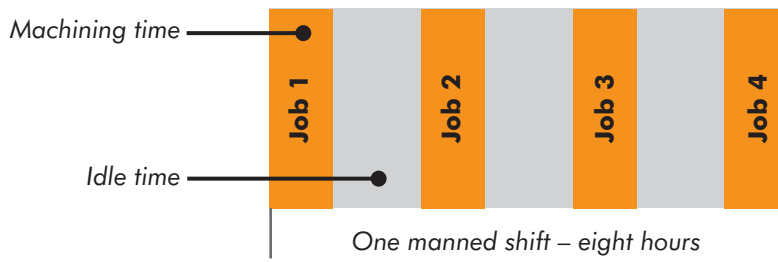


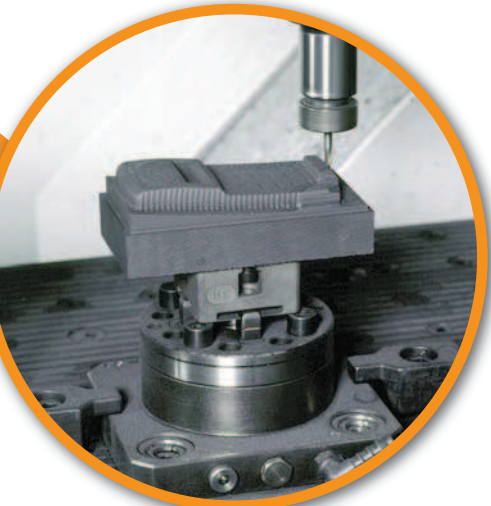
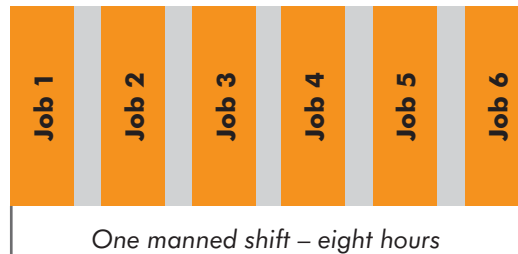
Reference systems for electrode manufacturing & EDMing



Conventional setting-up



Pallet system



Higher productivity, calculation example:

	Conventional setting-up	Pallet system
Working time per day	8	8
Setting-up time per day (hours)	-4	-0.5
Spindle time per day	=4	=7.5
Working days per week	x5	x5
Spindle time per week	= 20	=37.5

Faster payback, calculation example:

	Conventional setting-up	Pallet system
Hourly invoicing (€)	50	50
Spindle time / week (hours)	x20	x37.5
Revenue / week (€)	=1 000	=1 875
Capital cost of machine (€)	150 000	150 000
Capital cost pallet system (€)	0	+10 000
Total capital outlay (€)	=150 000	=160 000
Paybacktime (weeks)	150	85



A reference system minimises setup times

Every minute that can be converted from internal to external setting time increases the spindle time of the machine and with it the productivity of the business.

Big earnings are within your reach

The machine generates revenue when its spindle is turning – and only then.

Work smarter, not harder.

From small to large

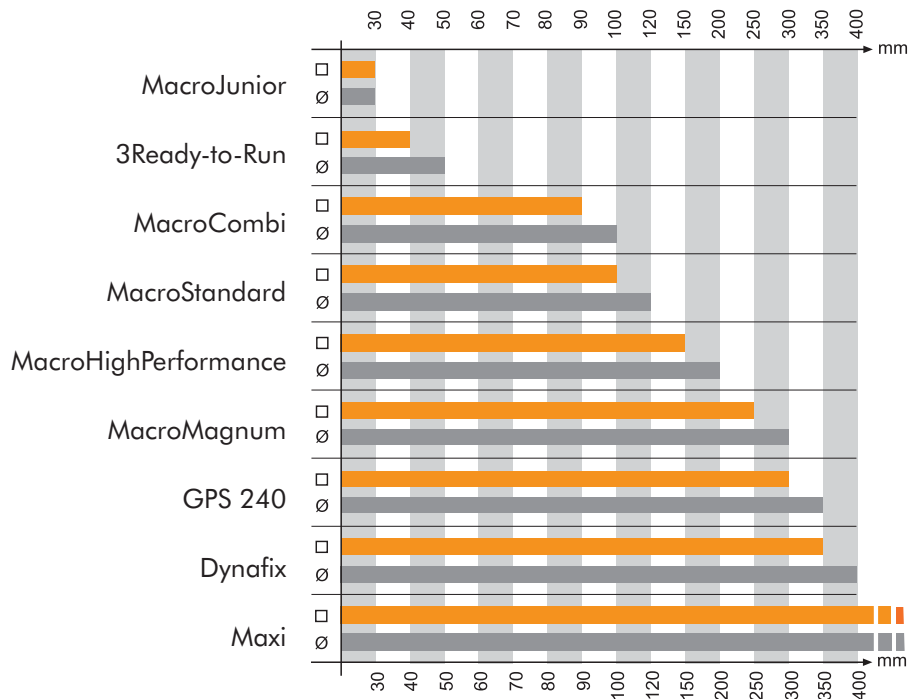
The engineering industry is complex. Every company is unique in terms of type of production, machinery, capacity etc.

To satisfy all these different requirements, System 3R has developed reference systems of exceptional flexibility.

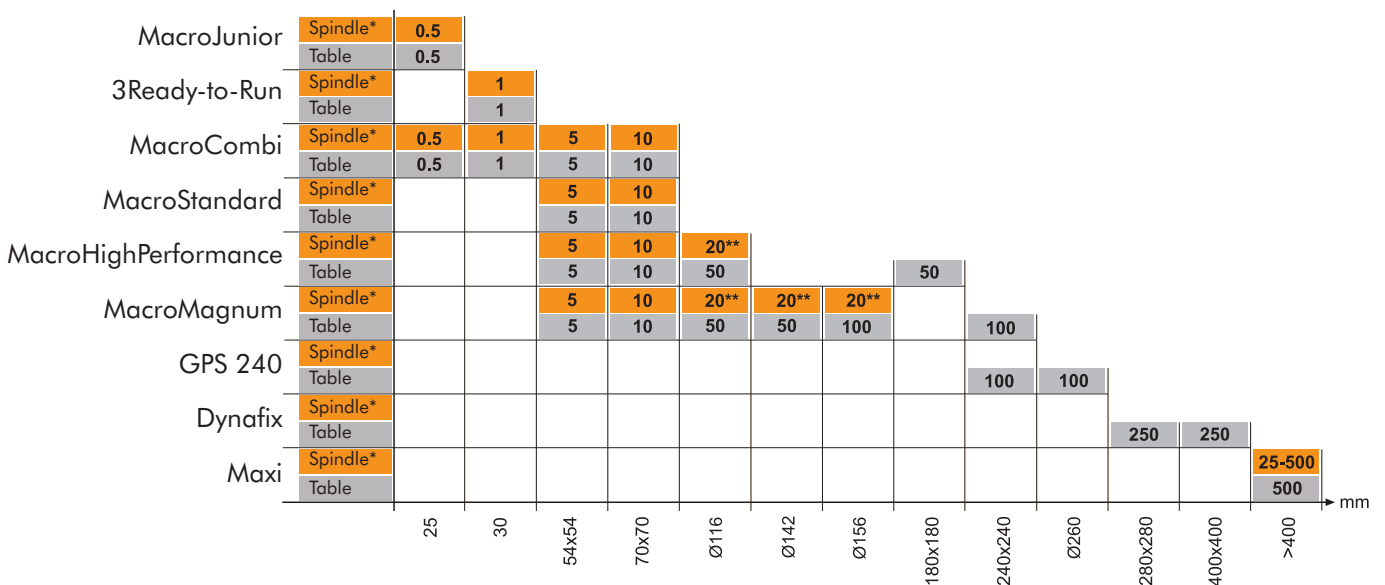
For every size of pallet there is a “recommended”

maximum workpiece size. However, this should only be regarded as a guide, since the size of the workpiece relative to the pallet depends above all on the material and the type of machining.

Maximum size of workpiece or electrode, square or round / mm



Maximum weight of workpiece or electrode, spindle chuck or table chuck / kg



* Die-sinking EDM spindle

** With automatic changing

MacroJunior & MacroCombi

- ... gives extreme flexibility
- ... one chuck, two systems
- ... reduces setting-up times.
- ... ensures precision and quality
- ... is suitable for automatic changing with System 3R's automation program.

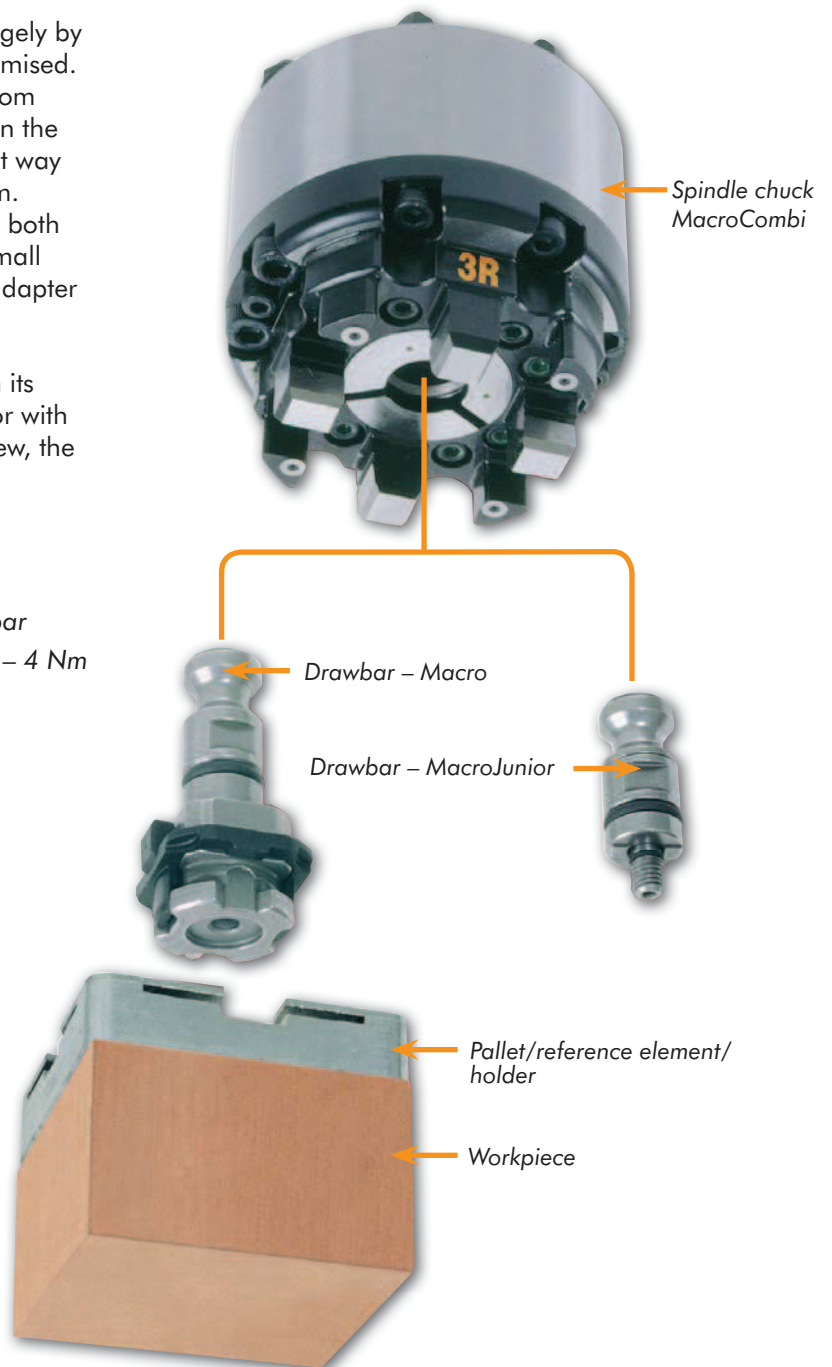
MacroCombi

Profitability in tool manufacturing is determined largely by the extent to which machine downtime can be minimised. A reference system which allows presetting away from the machine – followed by super-rapid tooling-up in the machine when the time comes – is a highly efficient way of working. MacroCombi is such a reference system.

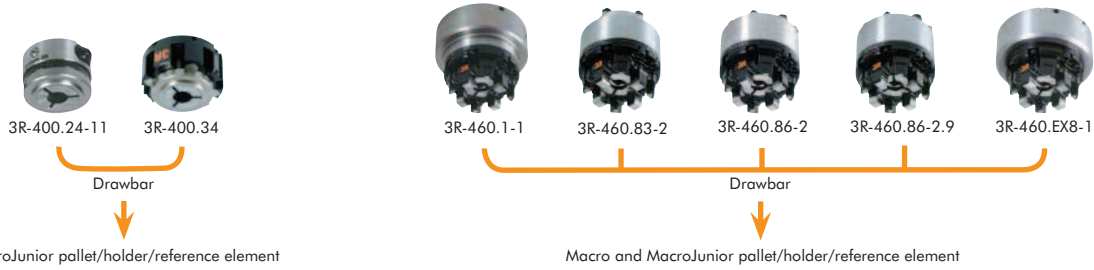
The MacroCombi system offers extreme flexibility both in electrode production and in die-sinking EDM. Small and large electrodes in the same chuck – without adapter elements!

The MacroCombi chucks accept two completely different types of electrode holder. Both Macro with its immovable stability and precision, and MacroJunior with its highly economical holders. The limitations are few, the possibilities many.

- Clamping force – 5000 N
- Fixed index positions 4x90°
- Required air pressure, pneumatic chuck – 6 ± 1 bar
- Recommended tightening torque, manual chuck – 4 Nm

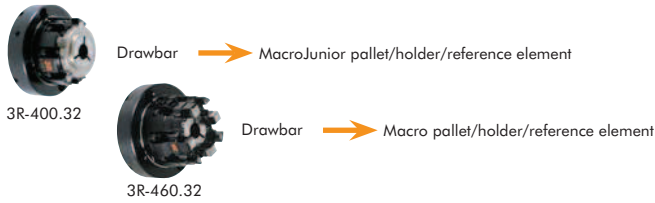


MacroJunior & MacroCombi – Chucks



Spindle chucks

	Article number	Drawbar	Feature
Manual	3R-400.34	3R-405.11	
Pneumatic	3R-460.1-1	3R-405.16 / 3R-405.11	
Pneumatic	3R-460.83-2	3R-405.16 / 3R-405.11	machine-adapted
Pneumatic	3R-460.86-2	3R-405.16 / 3R-405.11	machine-adapted
Pneumatic	3R-460.86-2.9	3R-405.16 / 3R-405.11	machine-adapted. 90°
Pneumatic	3R-460.EX8-1	3R-405.16 / 3R-405.11	machine-adapted
Manual	3R-400.24-11	3R-405.11	



Lathe chuck

	Article number	Drawbar	Feature
Manual	3R-400.32	3R-405.11	
Manual	3R-460.32	3R-405.16/3R-405.11	

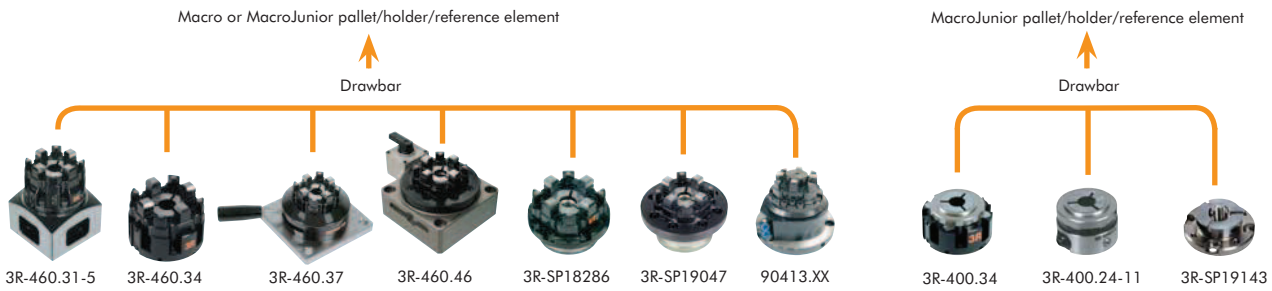


Table chucks

	Article number	Drawbar	Feature
Manual	3R-460.31-5	3R-405.16 / 3R-405.11	horizontal and vertical
Manual	3R-460.34	3R-405.16 / 3R-405.11	
Manual	3R-460.37	3R-405.16 / 3R-405.11	
Pneumatic	3R-460.46	3R-405.16 / 3R-405.11	
Manual	3R-400.34	3R-405.11	

Built-in chucks

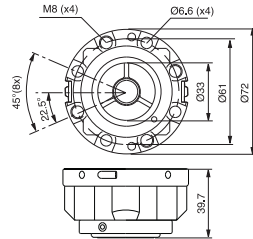
	Article number	Drawbar	Feature
Manual	3R-400.24-11	3R-405.11	
Manual	3R-400.34	3R-405.11	
Manual	3R-460.34	3R-405.16/3R-405.11	
Pneumatic	3R-SP18286	3R-405.16 / 3R-405.11	
Pneumatic	3R-SP19047	3R-405.16 / 3R-405.11	
Manual	3R-SP19143	3R-405.16 / 3R-405.11	
Pneumatic	90413.XX	3R-405.16 / 3R-405.11	

MacroJunior – Chucks

Manual chuck, MacroJunior 3R-400.34

For mounting in the machine spindle by means of 3R-A11489, or on the machine table by means of 3R-A19724 or alternatively 3R-A21944, or in a fixture.

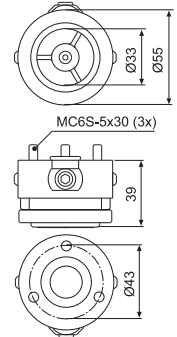
- Required drawbar 3R-405.11
- Fixed index positions 3x120°
- Weight 1.6 kg



Manual chuck, MacroJunior 3R-400.24-11

For mounting on machine spindle.

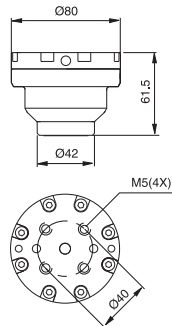
- Required drawbar 3R-405.11
- Fixed index positions 3x120°
- Weight 0.8 kg



Pneumatic chuck, MacroJunior 3R-410.1-M

For mounting on the machine spindle or in a fixture on the machine table.

- Required drawbar 3R-405.11
- Required air pressure 6 ± 1 bar
- Fixed index positions 3x120°
- Air-blast cleaning of Z-references
- Turbo locking
- Weight 1.5 kg

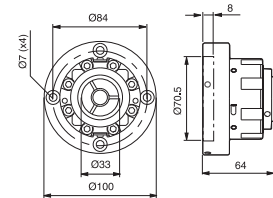


Manual lathe chuck, MacroJunior 3R-400.32

For mounting on a lathe taper.

Note: When ordering a lathe taper, use the order form at the end of the catalogue.

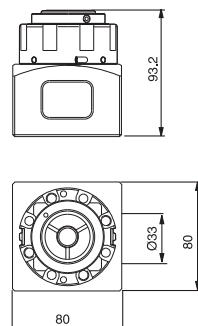
- Required drawbar 3R-405.11
- Fixed index positions 3x120°
- Weight 1.8 kg



Manual chuck, MacroJunior 3R-410.31-5

Chuck in High Performance version. Five ground surfaces for vertical or horizontal mounting on the machine table.

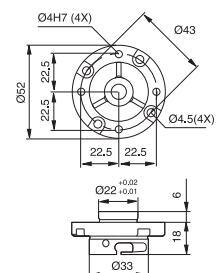
- Required drawbar 3R-405.11
- Fixed index positions 3x120°
- Weight 3.5 kg



Manual chuck, MacroJunior 3R-SP19143

Stainless steel chuck with ground flange $\text{Ø}22 \times 6$ mm for mounting in a fixture or the WEDM system. Axial locking screw with channel for flushing through the electrode.

- Fixed index positions 3x120°
- Weight 0.8 kg

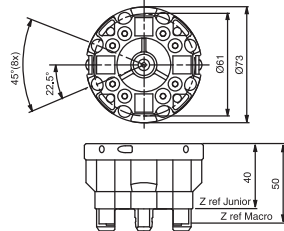


MacroCombi – Chucks

Manual chuck, MacroCombi 3R-460.34

For mounting in the machine spindle by means of 3R-A11489, or on the machine table by means of 3R-A19724 or alternatively 3R-A21944, or in a fixture.

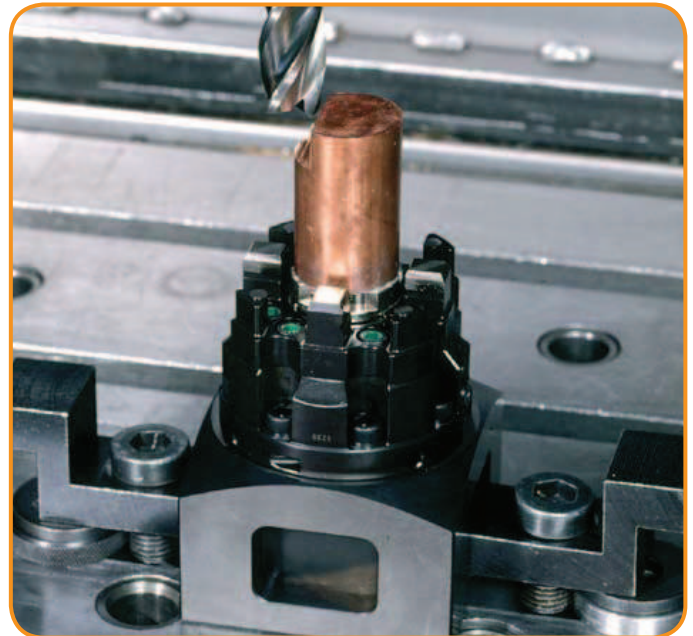
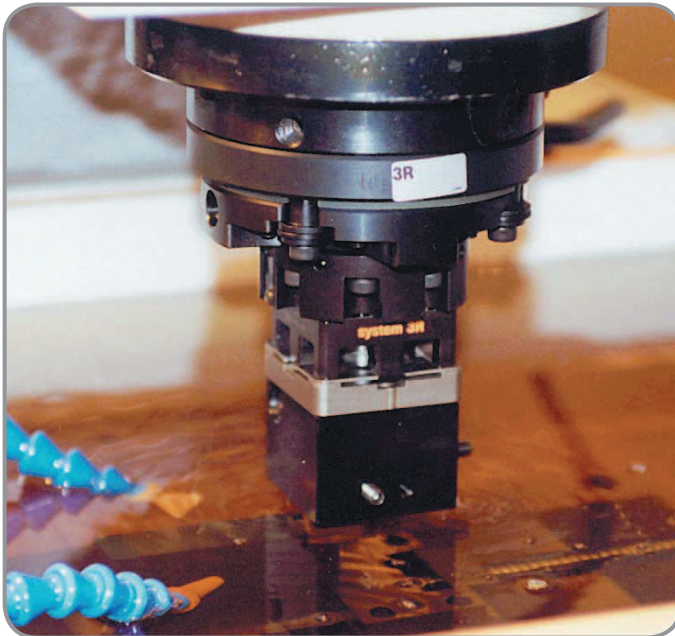
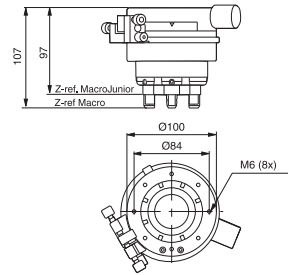
- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Weight 1.8 kg



Manual C-axis, MacroCombi 3R-460.35

For mounting on machine spindle with 3R-A3620.

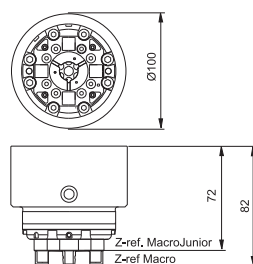
- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Fixed index positions 8x45° and 3x120°
- Vernier scale
- Weight 4.3 kg



Pneumatic chuck, MacroCombi 3R-460.1-1

Pneumatic chuck for mounting on machine spindle with 3R-A3620.

- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Required air pressure 6 ± 1 bar
- Air-blast cleaning of Z-references
- Turbo locking
- Weight 2.5 kg

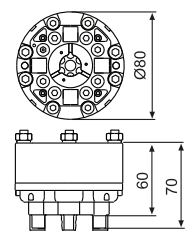


Pneumatic chuck, MacroCombi 3R-460.86-2

Pneumatic chuck for mounting directly on the machine spindle. All X/Y/Z references in hardened and ground steel.

Note: When ordering state machine make and type.

- Four M6 clearance holes, $\varnothing 45$ mm and four M5 clearance holes, 62x26 mm
- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Required air pressure 6 ± 1 bar
- Air-blast cleaning of the Z-references
- Flushing connection
- Weight 1.9 kg



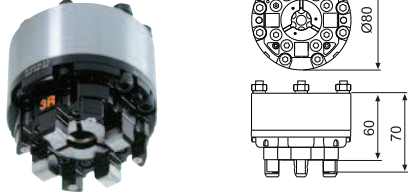
MacroCombi – Chucks

Pneumatic chuck, MacroCombi 3R-460.86-2.9

Pneumatic chuck for mounting directly on the machine spindle. MacroJunior references offset 90°. All X/Y/Z references in hardened and ground steel.

Note: When ordering state machine make and type.

- Four M6 clearance holes, Ø45 mm and four M5 clearance holes, 62x26 mm
- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Required air pressure 6±1 bar
- Air-blast cleaning of the Z-references
- Flushing connection
- Weight 1.9 kg

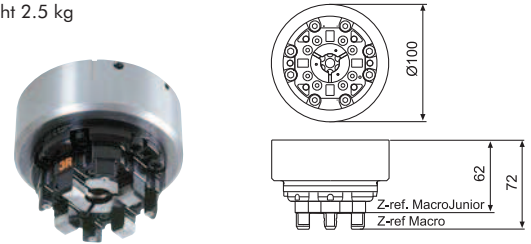


Pneumatic chuck, MacroCombi 3R-460.EX8-1

Pneumatic chuck for mounting directly on the machine spindle. All X/Y/Z references in hardened and ground steel.

Note: When ordering state machine make and type.

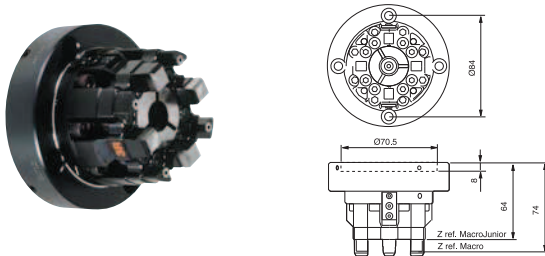
- Four M6 clearance holes, Ø45 mm and four M5 clearance holes, 62x26 mm
- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Required air pressure 6±1 bar
- Air-blast cleaning of the Z-references
- Flushing connection
- Weight 2.5 kg



Manual lathe chuck, MacroCombi 3R-460.32

For mounting on a lathe taper

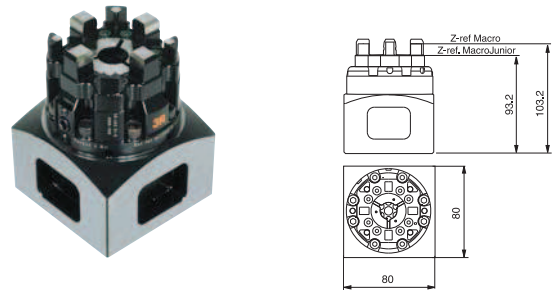
- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Weight 2.0 kg



Manual chuck, MacroCombi 3R-460.31-5

Chuck in HighPerformance version. Five ground surfaces for vertical or horizontal mounting on the machine table.

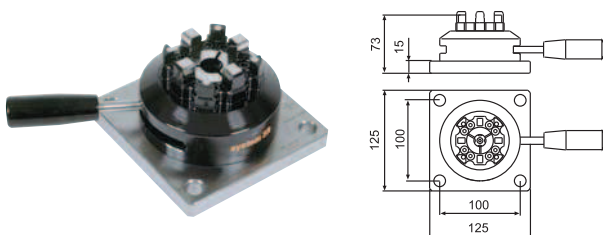
- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Weight 3.5 kg



Manual chuck, MacroCombi 3R-460.37

The locking mechanism is operated by a removable handle.

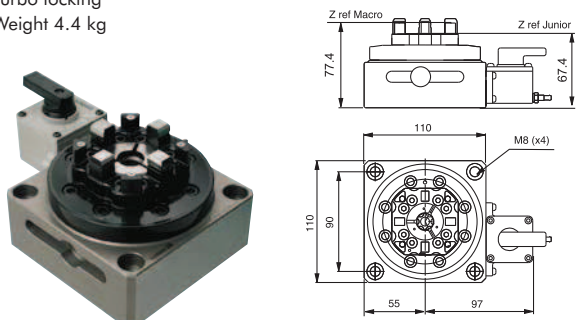
- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Weight 4.5 kg



Pneumatic chuck, MacroCombi 3R-460.46

Pneumatic chuck with integral air unit.

- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Required air pressure 6±1 bar
- Air-blast cleaning of Z-references
- Turbo locking
- Weight 4.4 kg

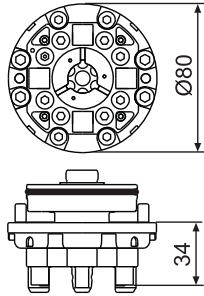


MacroCombi – Chucks

Pneumatic chuck, MacroCombi 3R-SP18286

Pneumatic chuck for building-in, for example in a fixture, dividing head or B-axis.

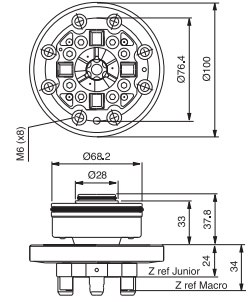
- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Required air pressure 6 ± 1 bar
- Air-blast cleaning of the Z-references
- Turbo locking
- Weight 1.1 kg



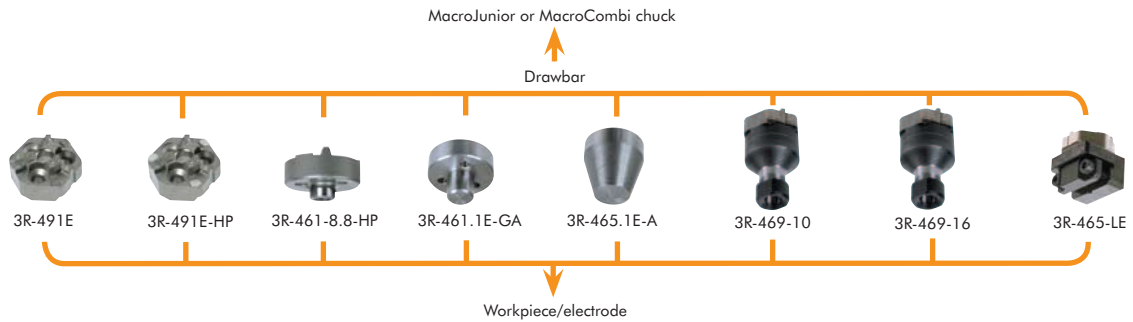
Pneumatic chuck, MacroCombi 3R-SP19047

Pneumatic chuck for building-in, for example in a fixture, dividing head or B-axis.

- Required drawbar for Macro holder 3R-405.16
- Required drawbar for MacroJunior holder 3R-405.11
- Required air pressure 6 ± 1 bar
- Air-blast cleaning of Z-references
- Turbo locking
- Weight 2.1 kg



MacroJunior – Pallets & Holders



Holders

Holders	Article number	Feature
Sintered pallet Ø25 mm MacroJunior	3R-491E	
Sintered pallet Ø25 mm MacroJunior	3R-491E-HP	parallel ground
Holder Ø26 mm MacroJunior	3R-461-8.8-HP	parallel-ground. Journal Ø8.8 mm
Holder Ø28 mm MacroJunior	3R-461.1E-GA	journal Ø10x10 mm
Holder Ø28 mm MacroJunior	3R-465.1E-A	taper
Collet chuck ETS10, MacroJunior	3R-469-10	Ø0.1-10 mm
Collet chuck ER16, MacroJunior	3R-469-16	Ø0.5-10 mm
Holder, MacroJunior	3R-465-LE	Ø4 - 8 or <8x18 mm

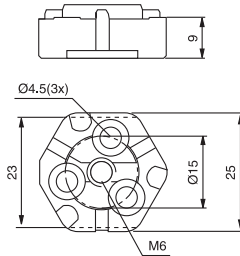
MacroJunior – Chuck adapter, Pallets & Holders

Pallet 25 mm, MacroJunior 3R-491E

For copper or graphite electrodes.

NOTE: The electrode is installed with screw and adhesive assembly, or alternatively brazing.

- Adapted for automatic changing
- Supplied in sets of 30

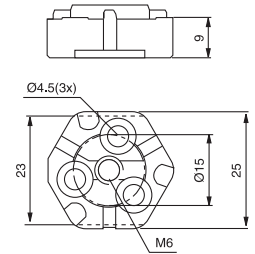


Ground pallet 25 mm, MacroJunior 3R-491E-HP

Top and bottom faces parallel-ground to within 0.002 mm.

NOTE: The electrode is installed with screw and adhesive assembly, or alternatively brazing.

- Adapted for automatic changing
- Supplied in sets of 30

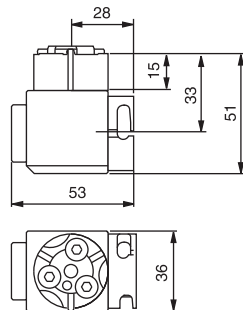


Manual chuck adapter 90°, Junior-Junior 3R-467.9-1

For horizontal mounting of MacroJunior holders. Screw locking.

Note: For EDM machining only.

- Fixed index positions 3x120°
- Weight 0.6 kg



Holder with journal 3R-461.1E-GA

Journal Ø10x10 mm. Intended mainly for graphite electrodes. To be mounted on 3R-491E with three MFT4x12 screws and adhesive.

- Supplied in sets of 30

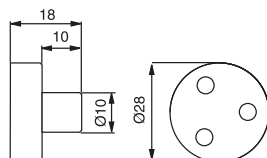


Plate 5.5 mm 3R-SP19270

Used in combination with 3R-491E when electrode blanks are mounted with adhesive and screws*. Permits mounting in MacroCombi chucks.

- Supplied in sets of 30
- *Accessory 3R-PI4.5x25E



Plate 10 mm 3R-SP19269

Used in combination with 3R-491E when soldering round (<50 mm) or square (<40 mm) copper blanks. Permits mounting in MacroCombi chucks.

- Supplied in sets of 30
- Accessory 3R-MFT4x16E



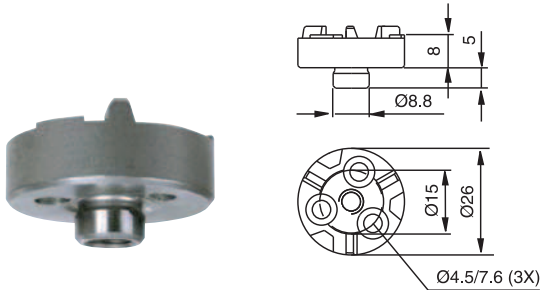
Except 3R-SP19269

MacroJunior – Holders

Holder 25 mm, MacroJunior 3R-461-8.8-HP

Upper and lower faces ground parallel within 0.002 mm.
Locating pin $\varnothing 8.8$ mm (0/0.05 mm).

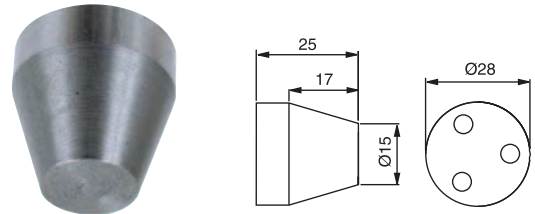
- Not intended for automatic changing
- Supplied singly



Holder with taper 3R-465.1E-A

The taper is machined suitably for attaching very small electrodes.
To be mounted on 3R-491E with three screws MFT4x12.

- Supplied in sets of 30



Collet chucks, MacroJunior

3R-469-10

- For collets ETS10
- Electrode sizes 0.1-2 mm
- Building-in height 47 mm
- Weight 0.1 kg



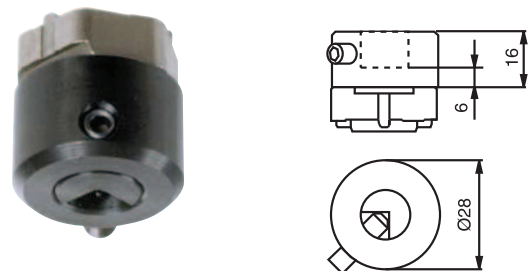
3R-469-16

- For colles ER16
- Electrode sizes 0.5-10 mm
- Building-in height 59.5 mm
- Weight 0.2 kg

Holder, MacroJunior 3R-465-VE

For small electrodes $\varnothing 1$ -4 mm, maximum height 30 mm.

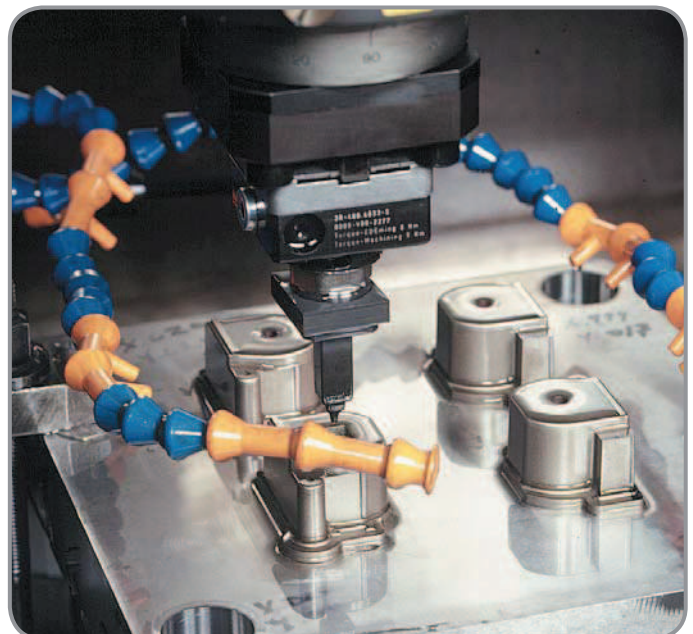
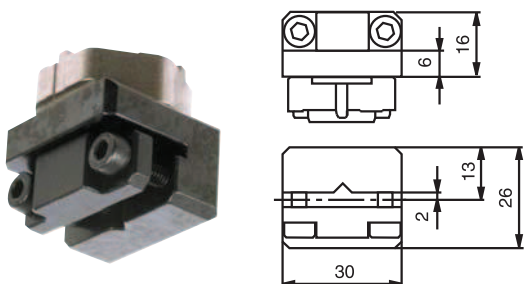
- Supplied in sets of 5



Holder, MacroJunior 3R-465-LE

For round electrodes $\varnothing 4$ -8 mm or square $< 8 \times 18$ mm,
and with maximum height 30 mm.

- Supplied in sets of 5



MacroJunior & MacroCombi – Accessories

3Ready-to-Run 3R-494-XXX

The stock range is matched to local preferences and ways of working. This applies to electrode materials, different grades of graphite and copper, and to dimensions. Contact your local 3R representative for further information.

The Vällingby factory can supply holders with factory-mounted copper blanks in sets of ten, as shown in the table.



Article number	Dimensions
3R-494-D10x50	Round blank Ø10x50 mm
3R-494-D12x50	Round blank Ø12x50 mm
3R-494-D16x50	Round blank Ø16x50 mm
3R-494-D22x50	Round blank Ø22x50 mm
3R-494-D26x50	Round blank Ø26x50 mm
3R-494-D32x50	Round blank Ø32x50 mm
3R-494-D40x50	Round blank Ø40x50 mm
3R-494-D50x50	Round blank Ø50x50 mm
3R-494-S12x50	Square blank 12x12x50 mm
3R-494-S22x50	Square blank 22x22x50 mm
3R-494-S26x50	Square blank 26x26x50 mm
3R-494-S32x50	Square blank 32x32x50 mm
3R-494-S40x50	Square blank 40x40x50 mm
3R-494-32x22x50	Square blank 32x22x50 mm
3R-494-40x22x50	Square blank 40x22x50 mm

Drawbar 3R-405.11E

Drawbar Ø15 mm to mount MacroJunior holders in chucks 3R-400.XX and 3R-460.XX.

- Supplied in sets of 10



Check ruler 3R-406.11

For setting angular positions and for centring.

- Measuring length 60 mm



Check mandrel 3R-406.23

Check mandrel with ground C-reference.

- Measuring length 50 mm
- Weight 0.6 kg



Drawbar 3R-405.16E

Drawbar Ø15 mm to mount Macro holders in chucks 3R-460-XX.

- Supplied in sets of 10



Fixed measuring probes

3R-US400.3

For machines with measurement cycle function.

- Measuring ball Ø3 mm
- Overall length 102 mm
- Weight 0.3 kg



3R-US400.5

For machines with measurement cycle function.

- Measuring ball Ø5 mm
- Overall length 103 mm
- Weight 0.3 kg



MacroJunior & MacroCombi – Accessories

TORX screwdriver 3R-333-T20

For screws 3R-PI4.5x20E and 3R-PI4.5x25E.



Torque wrench 3R-614-04

For manual MacroJunior and MacroCombi chucks. Also for 3Refix mandrels Ø10 mm, 3R-901-10E.

- 4 Nm



TORX screws M4 3R-MFT4x12E

For mounting electrode blanks.

- Length 12 mm
- Supplied in sets of 100, including a TORX screwdriver.



Self tapping TORX-screws 3R-PI4.5x20E

For mounting electrode blanks.

- Length 20 mm
- Supplied in sets of 100.



Self tapping TORX-screws 3R-PI4.5x25E

For mounting electrode blanks.

- Length 25 mm
- Supplied in sets of 100.



Soldering kit 3R-404-25

For soldering electrode blanks on 3R-491E or 3R-SP19269

- Supplied with flux.
- Supplied in sets of 100.



Cassette insert 3R-650/8-JR

For storing MacroJunior holders in 3R-650/8x5 and 3R-150/5.

- Supplied in sets of 8



MacroJunior & MacroCombi – Kit & Accessories

User kit

3R-468.31-S

3R-405.11	Drawbar, MacroJunior	x5
3R-405.16	Drawbar, Macro	x5
3R-460.31-5	Manual table chuck	x1
3R-465-L	Holder, MacroJunior	x2
3R-465-V	Holder, MacroJunior	x2
3R-491	Holder, MacroJunior	x30
3R-651.7-S	Pallet Macro 54x54 mm	x6
3R-656.1	Check ruler	x1
3R-658.1-S	Intermediate plate, Macro 54x54 mm	x2
3R-658.2-S	Holder, Macro 54x54 mm	x2
3R-658.4-S	Holder, Macro 54x54 mm	x2
3R-333-T20	Screwdriver, TORX	x1
3R-PI4.5x20	TORX screw	x100
3R-614-04	Torque wrench, 4 Nm	x1



Microscope

3R-4.450

- Magnification x25
- Field of view Ø4 mm
- Weight 0.6 kg



Splash guard

90027.02

Intended for MacroCombi chucks. Can also be used as a cover for unused chucks.



Ring with code carrier

3R-863.25-10

With pre-programmed unique identity, designed for MacroJunior 25 mm, 3R-491E

- Supplied in sets of 10



Ring with code carrier

3R-863.30-10

With pre-programmed unique identity, designed for 3Ready-to-Run, 3R-494-XX.XX

- Supplied in sets of 10

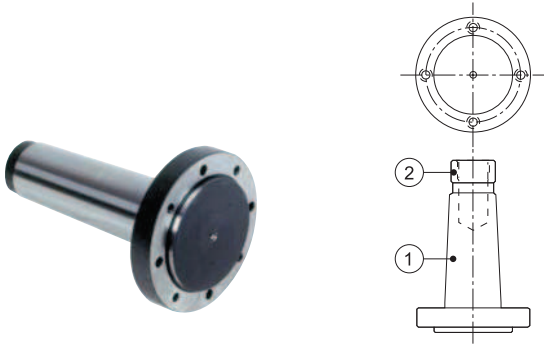


MacroJunior & MacroCombi – Accessories

Lathe taper 3R-TXXXX

Taper attachment for mounting chucks in taper spindles.

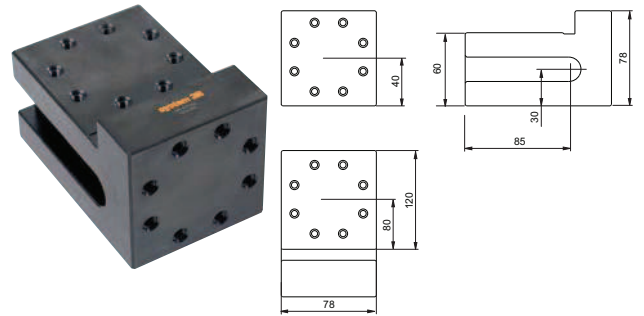
Note: Manufactured on request. State machine type, taper (1), drawbar thread (2) and which 3R chuck is to be mounted. Use the order form at the end of the catalogue.



Angle shelf 3R-A21944

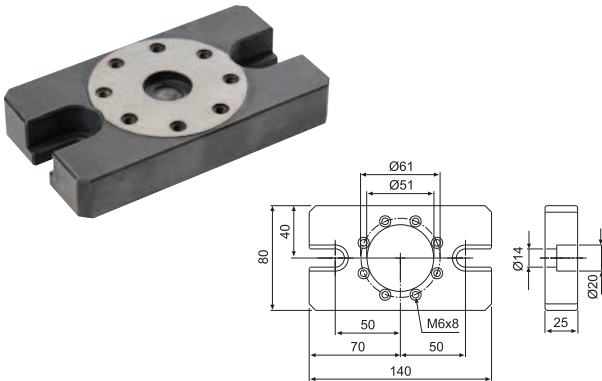
For vertical or horizontal mounting of 3R-400.34, 3R-460.34 and 3R-600.24-S on the machine table.

Note: Chuck to be ordered separately.



Adapter plate 3R-A19724

For mounting of 3R-400.34, 3R-460.34 and 3R-600.23-S on machine table. Supplied with fixing screws for chuck and table.



Air unit 3R-611.46

Unit for operation of pneumatic chucks. Three positions – open/neutral/closed.

