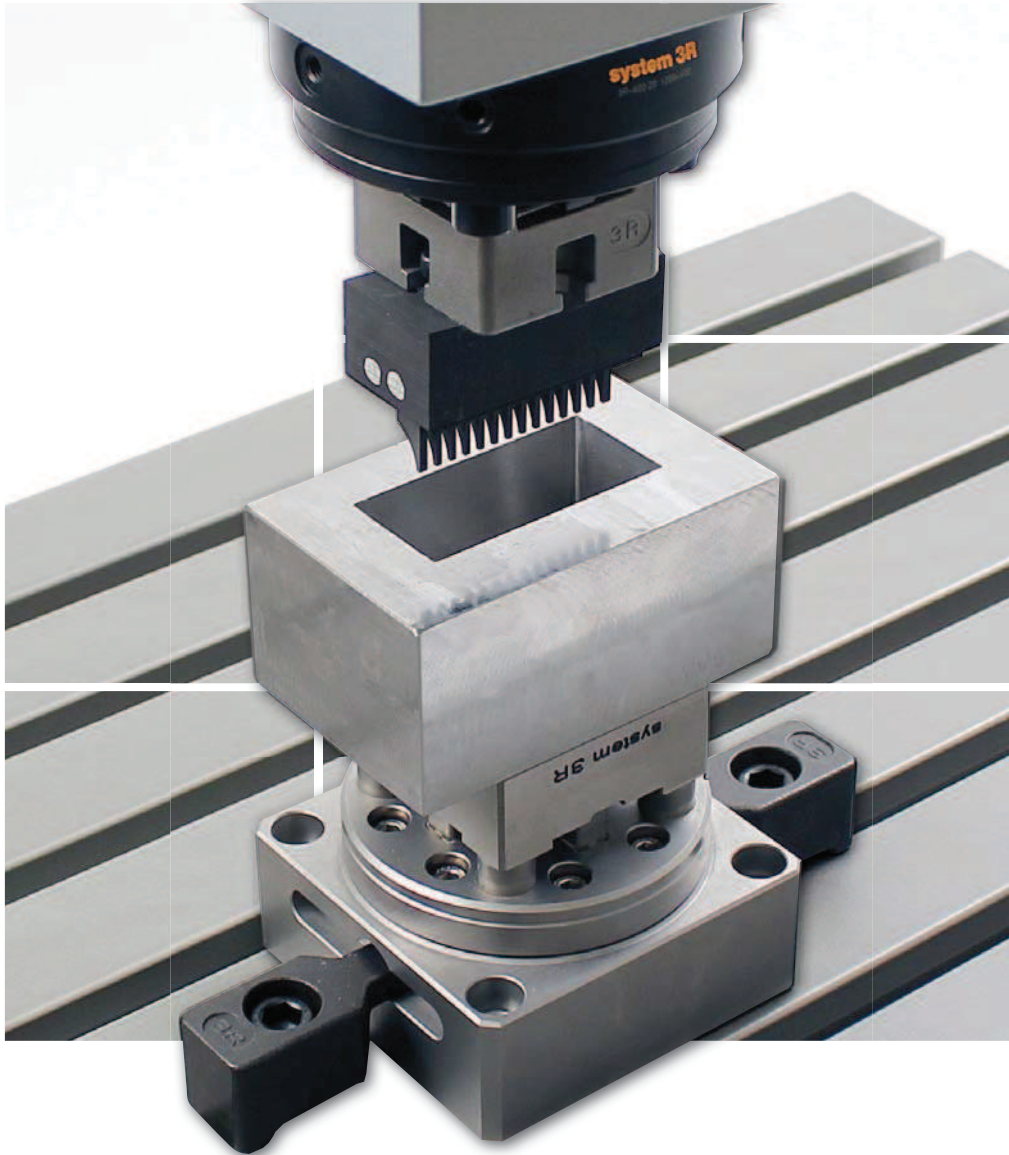
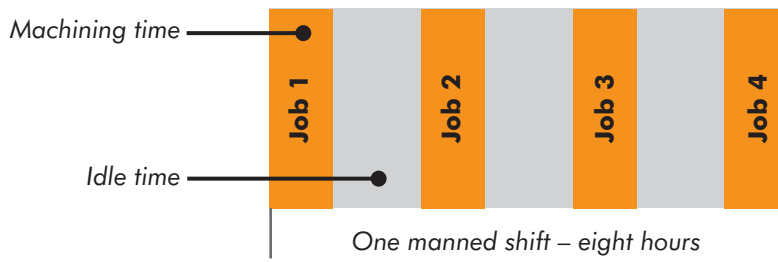


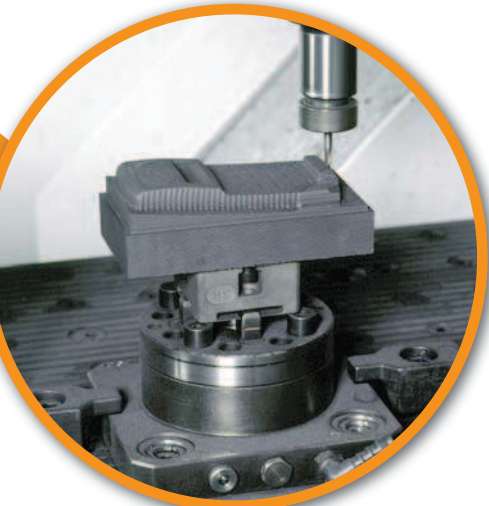
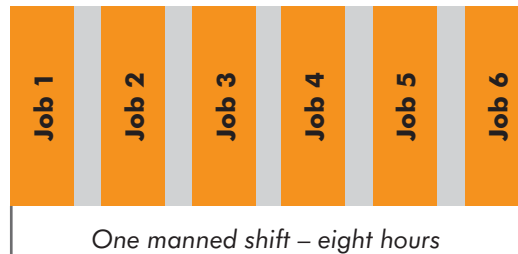
## Reference systems for electrode manufacturing & EDMing



## 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

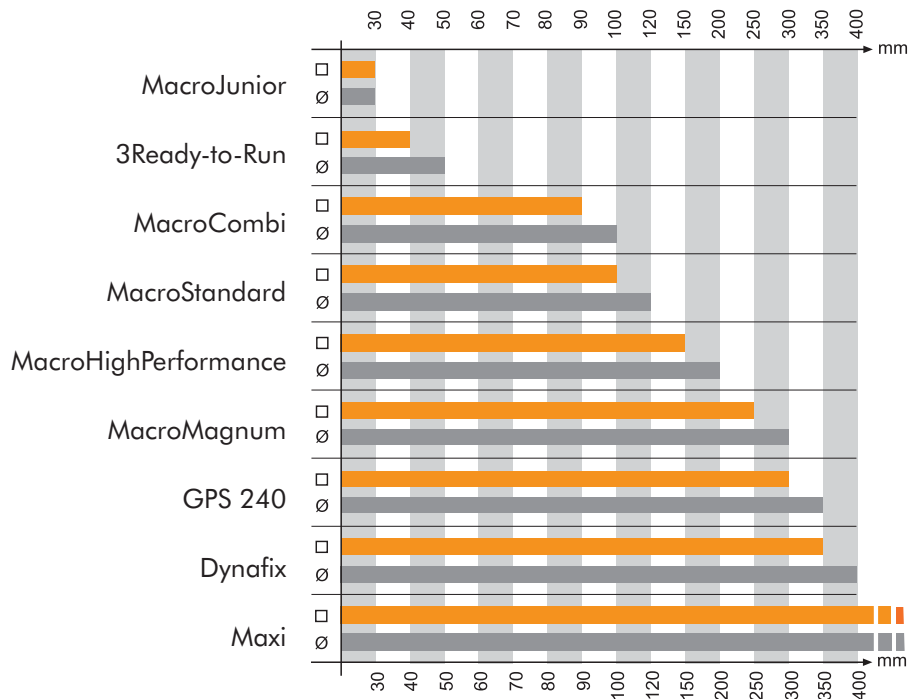
The engineering industry is complex. Every company is unique in terms of type of production, machinery, capacity etc.

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

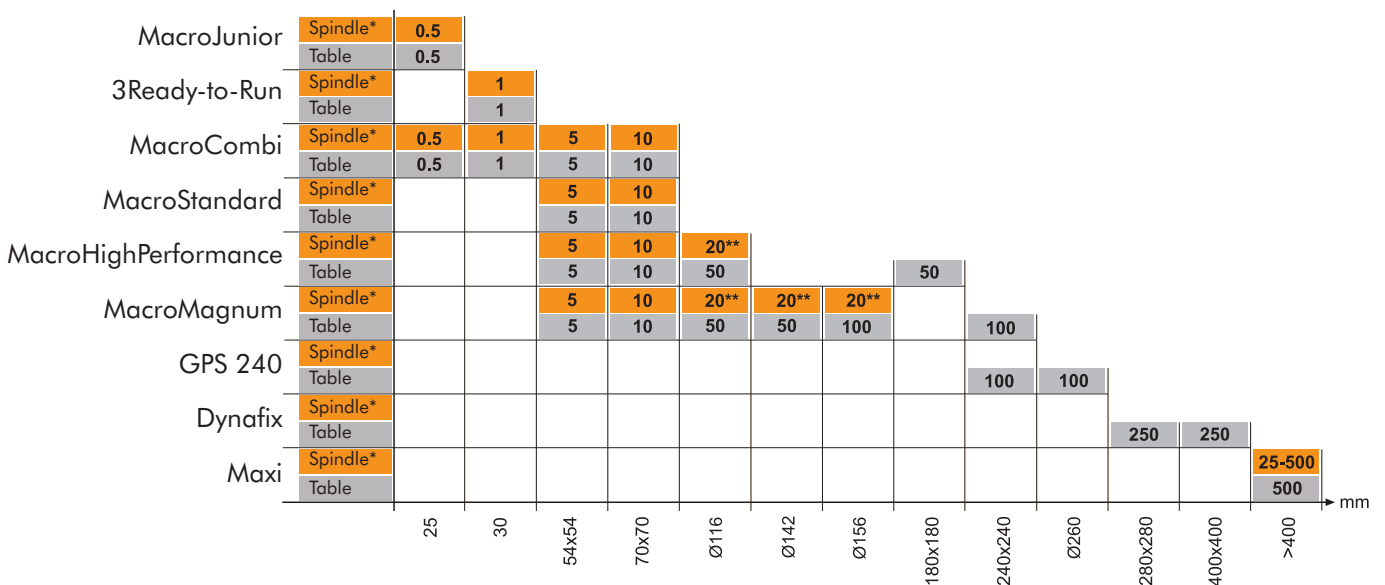
For every size of pallet there is a "recommended"

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

## MacroStd & MacroHP

### Macro...

- ... reduces setting-up times.
- ... ensures precision and quality.
- ... has automatic air-blast cleaning of the references in the pneumatic chucks.
- ... has higher locking force in the pneumatic chucks – turbo locking.
- ... has references of cemented carbide or hardened ground steel.
- ... is suitable for automatic changing with System 3R's automation program.

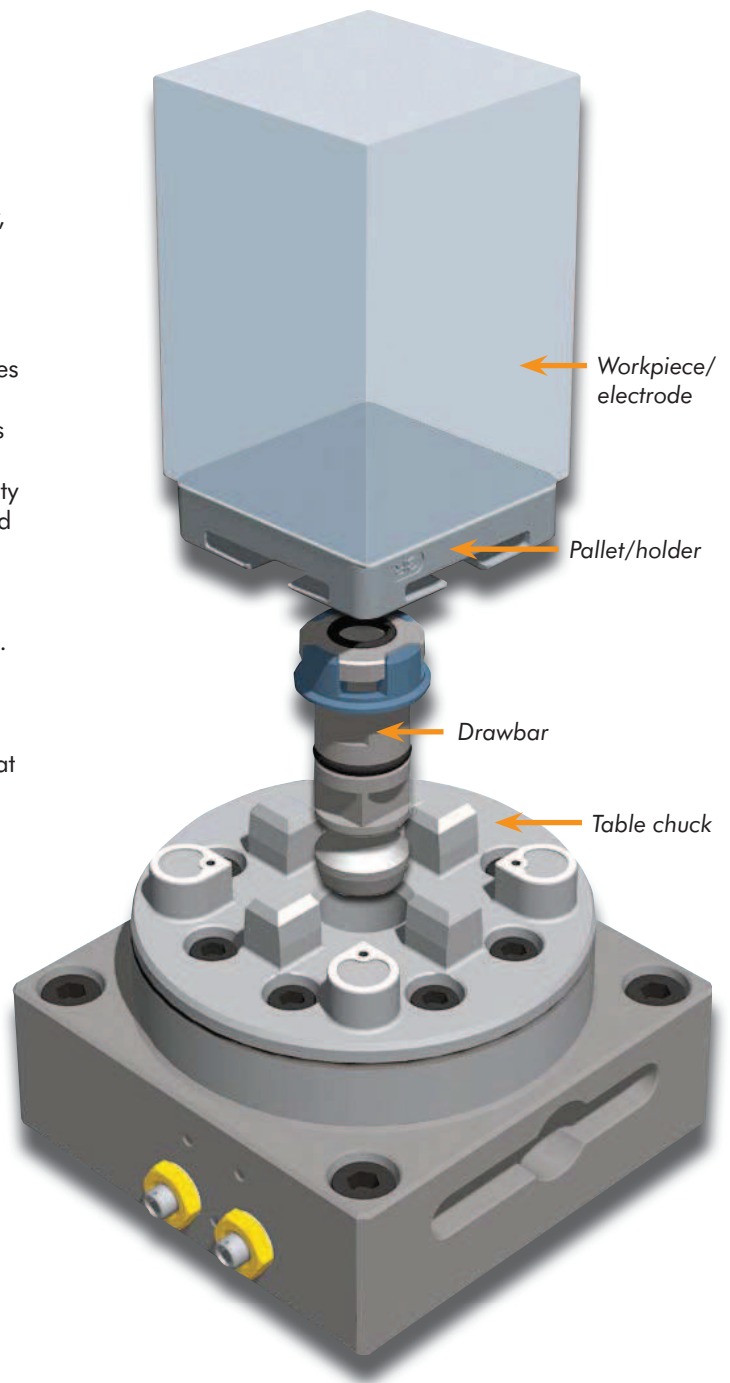
### Macro

If you want to compete in the global manufacturing industry, you need to study every aspect of efficiency. It's a matter of extracting the highest possible number of spindle-hours from each machine, every day of the week. And here, the importance of a high-class reference system can never be over-estimated. A reference system which reduces setup times to a few minutes.

Macro is such a reference system. A system that minimises the throughput time, and which, thanks to its accuracy, practically eliminates rejects. A system that increases flexibility and profitability. A system that increases competitiveness and ensures the success of its users.

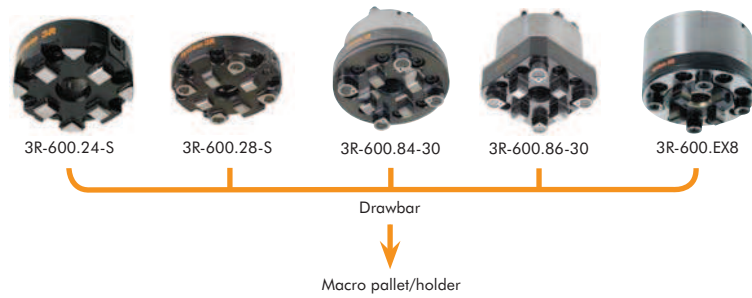
Among users world wide, the Macro system is a byword for precision. And with good reason, since very single Macro product is thoroughly checked before it is dispatched. But precision can be graded too. The Macro products are therefore "classified" in terms of accuracy, material and life – but always with full compatibility – as Standard, High Performance and Nano. Even so, it's worth remembering that the accuracy of a system is determined by the product with the lowest classification.

- Repetition accuracy:
  - MacroNano – within 0.001 mm
  - MacroHighPerformance – within 0.0015 mm
  - MacroStandard – within 0.002 mm
- Locking force – 6000 N
- Fixed index positions 4x90°
- Required air pressure, pneumatic chuck –  $6 \pm 1$  bar
- Recommended tightening torque, manual chuck – 6 Nm
- Recommended max workpiece weight – 50 kg.

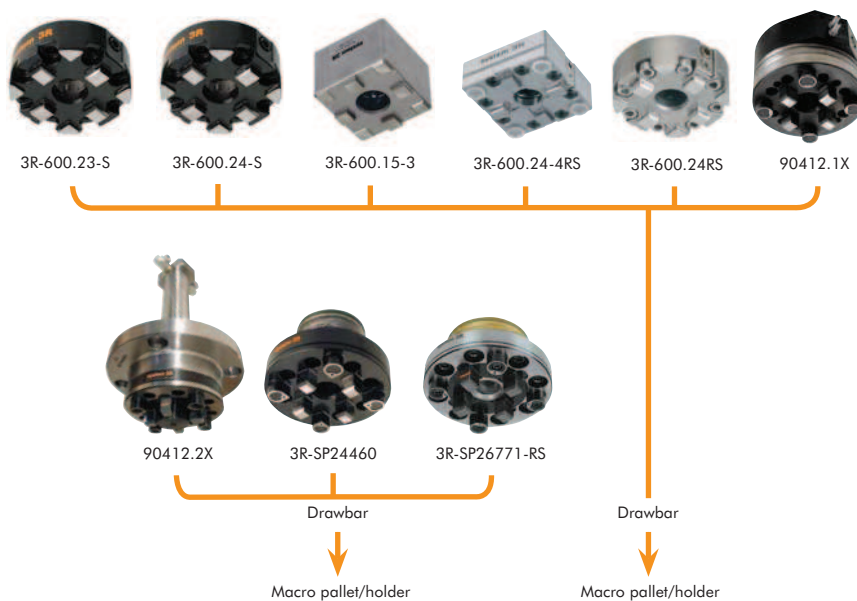


## Macro – Chucks

Chucks	Article number	Drawbar	Feature
Manual Std	3R-600.24-S	3R-605.2	ground rear face
Manual Std	3R-600.28-S	3R-605.2	ground rear face
Pneumatic Std	3R-600.84-30	3R-605.1	machine-adapted
Pneumatic Std	3R-600.86-30	3R-605.1	machine-adapted
Pneumatic Std	3R-600.EX8	3R-605.1	machine-adapted



Chucks	Article number	Drawbar	Feature
Manual Std	3R-600.23-S	3R-605.2	Mounting flange, 6 Nm, Ø75 mm
Manual Std	3R-600.24-S	3R-605.2	Ground back face, 6 Nm, Ø75 mm
Pneumatic HP	3R-600.15-3	3R-605.2	Rust-resistant, Ø 56 mm
Manual HP	3R-600.24-4RS	3R-605.2	Rust-resistant, Ø 70 mm
Manual HP	3R-600.24RS	3R-605.1 / 3R-605.4	Rust-resistant, Ø75 mm
Pneumatic Std	90412.1X	3R-605.1 / 3R-605.4	with swivel, low speed
Pneumatic HP	90412.2X	3R-605.1 / 3R-605.4	with swivel, low speed
Pneumatic Std	3R-SP24460	3R-605.1 / 3R-605.4	
Pneumatic HP	3R-SP26771-RS	3R-605.1 / 3R-605.4	rust-resistant

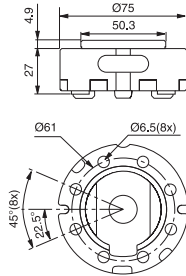


## Macro – Chucks

### Manual chuck, MacroStd 3R-600.23-S

Cast chuck with mounting flange for mounting on the machine spindle or in a fixture.

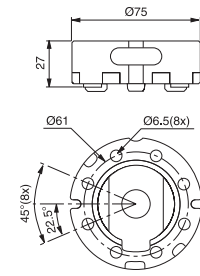
- Required drawbar 3R-605.2
- Fixed index positions 4x90°
- Flushing connection
- Weight 0.7 kg



### Manual chuck, MacroStd 3R-600.24-S

Cast chuck with ground back face for mounting on the machine spindle with 3R-A11489 or in a fixture on the machine table.

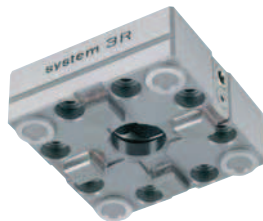
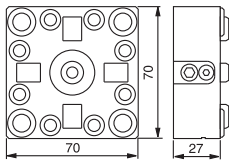
- Required drawbar 3R-605.2
- Fixed index positions 4x90°
- Flushing connection
- Weight 0.7 kg



### Manual chuck, MacroHP 3R-600.24-4RS

Chuck for Macro holder. Mounts on a suitable fixture.

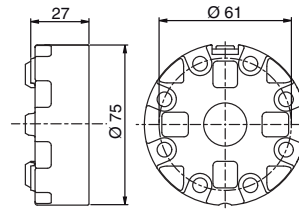
- Required drawbar 3R-605.2RS
- Fixed index positions 4x90°
- Grinded front edge
- Tightening torque 6 Nm
- Rust resistant
- Weight 1 kg



### Manual chuck, MacroHP 3R-600.24RS

Manual chuck designed for permanent mounting.

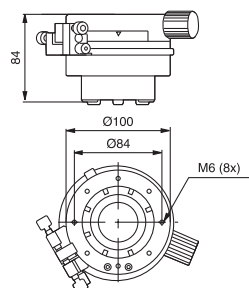
- Tightening torque 6 Nm
- Required drawbar 3R-605.2RS
- Clamping force 6000 N
- Fixed index positions 4x90°
- Rust resistant
- Weight 0.7 kg



### Manual C-axis, MacroStd 3R-600.25

For mounting on machine spindle with 3R-A3620.

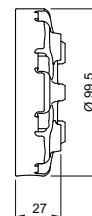
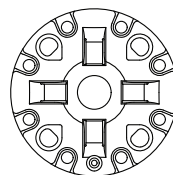
- Required drawbar 3R-605.2
- Fixed index positions 8x45°
- Vernier scale
- Flushing connection
- Weight 4.3 kg



### Manual chuck (low profile), MacroStd 3R-600.28

Cast chuck with ground back face for mounting on the machine spindle. Also suitable in a fixture on the machine table or with adapterplate 3R-A26488.

- Required drawbar 3R-605.2
- Fixed index positions 4x90°
- Flushing connection
- Weight 1.1 kg

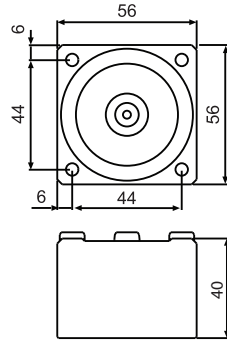


## Macro – Chucks

### Pneumatic chuck, MacroHP 3R-600.15-3

Pneumatic chuck for permanent mounting on the machine table.

- Drawbar 3R-605.2RS included
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Rust resistant
- Weight 0.8 kg



### Pneumatic chuck, MacroStd 90412.1X

Pneumatic added-on chuck with swivel surrounding unit

- For low RPM
- Machine adapted



### Pneumatic chuck, MacroHP 90412.2X

Pneumatic built-in chuck with swivel in the back.

- For high RPM
- Machine adapted



### Pneumatic chuck, MacroStd 3R-SP24460

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

- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of Z-references
- Turbo locking
- Weight 1.8 kg



### Pneumatic chuck, MacroHP 3R-SP26771-RS

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

- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of Z-references
- Turbo locking
- Rust-resistant
- Weight 1.8 kg



## Macro – Chucks

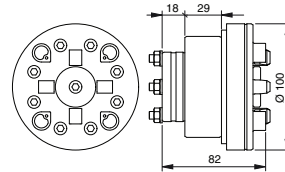


### Machine-adapted pneumatic chuck, MacroStd 3R-600.84-30

Pneumatic chuck for mounting directly on the machine spindle.

*Note: X/Y/Z references of hardened and ground steel, larger Z-references. Note: When ordering state machine make and type.*

- Four M6 clearance holes,  $\varnothing 45$  mm.
- Required drawbar 3R-605.1
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Flushing connection
- Turbo locking
- Weight 2.7 kg



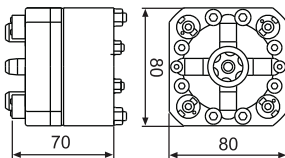
### Machine-adapted pneumatic chuck, MacroHP 3R-600.86-1

Pneumatic chuck for mounting directly on the machine spindle.

*Note: When ordering state machine make and type.*

*Note: X/Y-references in cemented carbide, Z-references in hardened and ground steel.*

- Four M6 clearance holes,  $67 \times 20$  mm and four M5 clearance holes,  $63 \times 26$  mm
- Required drawbar 3R-605.1
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Flushing connection
- Weight 2.2 kg

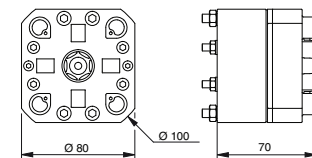


### Machine-adapted pneumatic chuck, MacroStd 3R-600.86-30

Pneumatic chuck for mounting directly on the machine spindle.

*Note: When ordering state machine make and type. Note: X/Y/Z references of hardened and ground steel, larger Z-references.*

- Four M6 clearance holes,  $67 \times 20$  mm and four M5 clearance holes,  $63 \times 26$  mm
- Required drawbar 3R-605.1
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Flushing connection
- Turbo locking
- Weight 2.2 kg



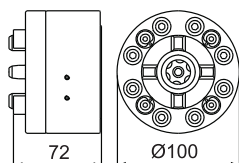
### Machine-adapted pneumatic chuck, MacroStd 3R-600.EX8

Pneumatic chuck for mounting directly on the machine spindle.

*Note: When ordering state machine make and type.*

*Note: X/Y/Z references in hardened and ground steel.*

- Four M6 clearance holes,  $\varnothing 41$  mm.
- Required drawbar 3R-605.1
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Turbo locking
- Flushing connection
- Weight 2.2 kg



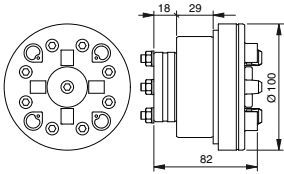


## Macro – Chucks

### Pneumatic chuck, MacroHP 3R-600.84-3

Pneumatic chuck for permanent mounting on the machine spindle.

- Required drawbar 3R-605.1
- Required air pressure  $6 \pm 1$  bar.
- Air-blast cleaning of Z-references.
- Turbo locking.
- Fixed index positions  $4 \times 90^\circ$ .
- Carbide XY-References
- Weight 4 kg.



### Pneumatic chuck, MacroStd 3R-600.84-31

Pneumatic chuck for permanent mounting on the machine spindle.  
Note: For debris guard 3R-SP27962

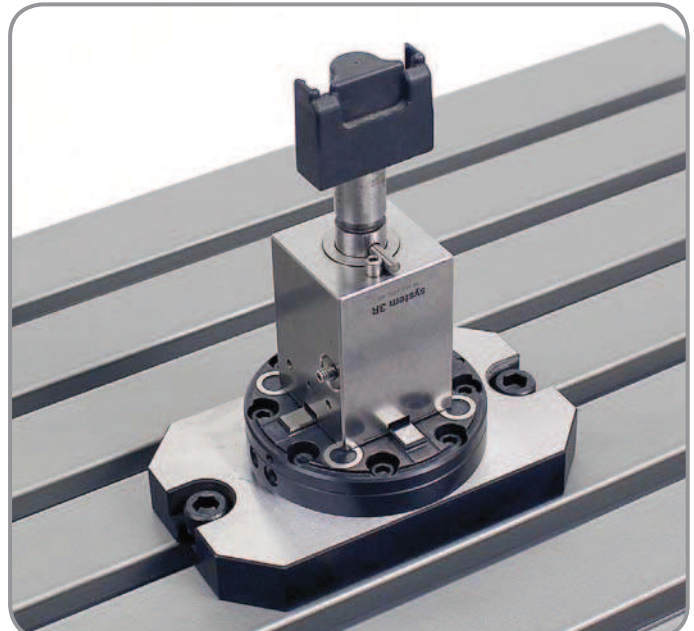
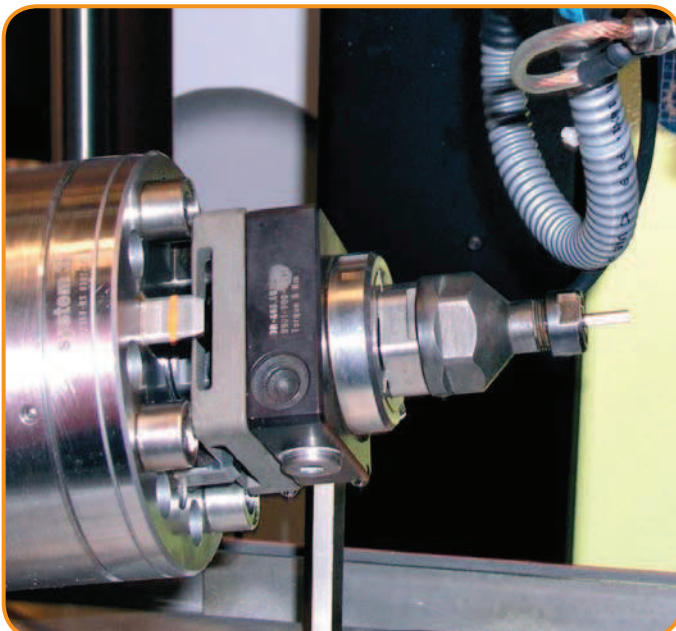
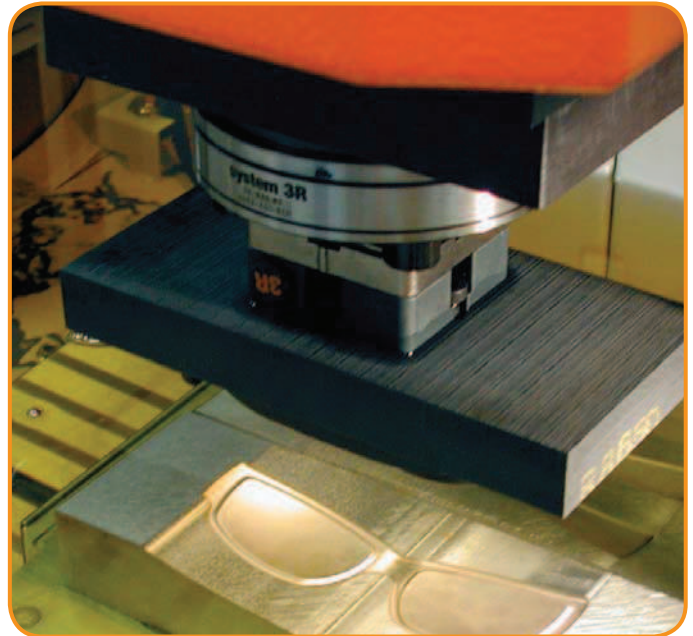
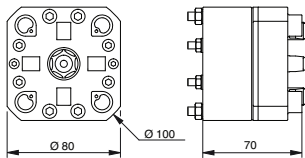
- Required drawbar 3R-605.1
- Required air pressure  $6 \pm 1$  bar.
- Air-blast cleaning of Z-references.
- Turbo locking.
- Fixed index positions  $4 \times 90^\circ$ .
- Weight 4 kg.



### Pneumatic chuck, MacroHP 3R-600.86-3

Pneumatic chuck for permanent mounting on the machine spindle.

- Required drawbar 3R-605.1
- Required air pressure  $6 \pm 1$  bar.
- Air-blast cleaning of Z-references.
- Turbo locking.
- Fixed index positions  $4 \times 90^\circ$ .
- Carbide XY-References
- Weight 4 kg.



# Macro – Chucks

Lathe chucks	Article number	Drawbar	Feature
Manual Std	3R-600.22	3R-605.2	Mounting flange
Manual HP	3R-600.20	3R-605.1 / 3R-605.4	Carbide references, 4 Nm
Pneumatic Std	3R-600.1-30	3R-605.1 / 3R-605.4	

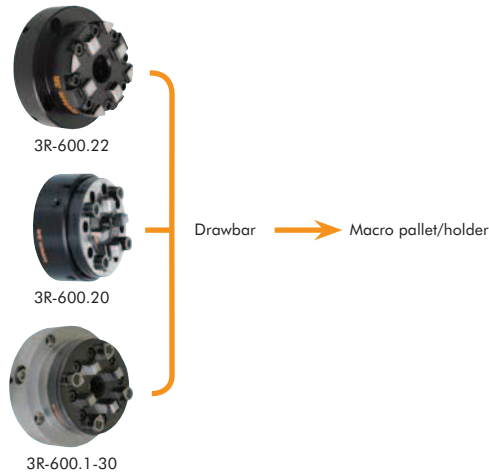
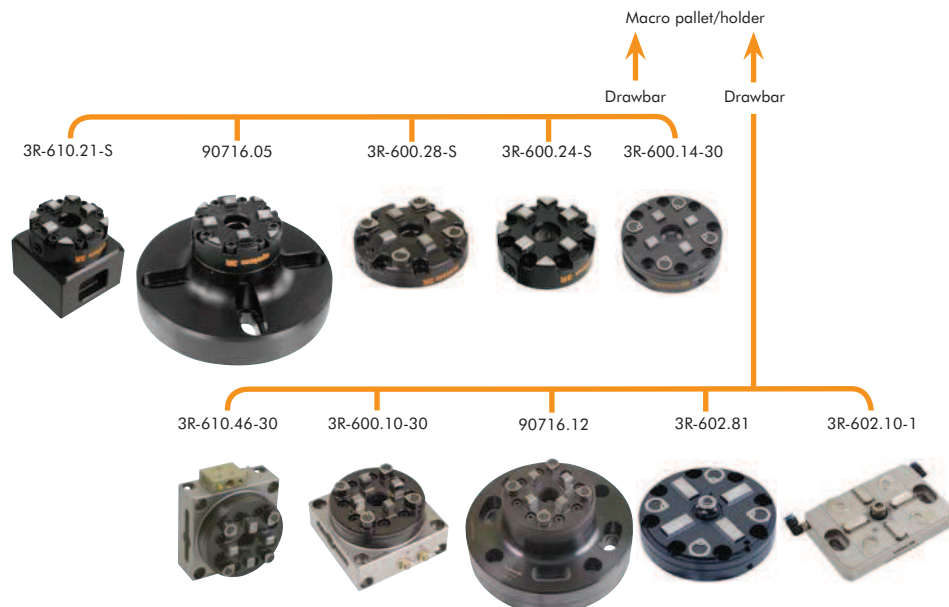


Table chucks	Article number	Drawbar	Feature
Manual Std	3R-610.21-S	3R-605.2	horizontal and vertical, 6 Nm
Manual VDP	90716.05	3R-605.2	vibration-damped, 6 Nm, Ø75 mm
Manual Std	3R-600.28-S	3R-605.2	low profile, 6 Nm, Ø100 mm
Manual Std	3R-600.24-S	3R-605.2	6 Nm, Ø75 mm
Pneumatic Std	3R-610.46-30	3R-605.1 / 3R-605.4	horizontal and vertical
Pneumatic Std	3R-600.10-30	3R-605.1 / 3R-605.4	
Pneumatic Std	3R-600.14-30	3R-605.2	low profile
Pneumatic HP	3R-610.19	3R-605.1 / 3R-605.4	horizontal and vertical. 3Rfix Ø20
Pneumatic VDP	90716.12	3R-605.1 / 3R-605.4	vibration-damped
Pneumatic Std	3R-602.81	3R-605.10	low profile
Pneumatic HP	3R-602.10-1	3R-605.10	rust-resistant

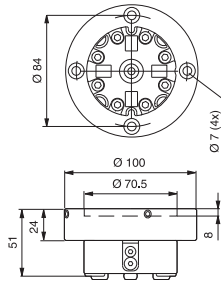


## Macro – Chucks

### Manual lathe chuck, MacroStd 3R-600.22

With setting screws for centring

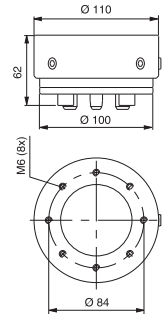
- Required drawbar 3R-605.2
- Fixed index positions 4x90°
- Weight 2.1 kg



### Manual chuck, MacroHP 3R-600.20

For mounting on the machine spindle with 3R-A3620 or on a lathe taper with centring ring 3R-612.6.

- Required drawbar 3R-605.1 or 3R-605.4
- Fixed index positions 4x90°
- Tightening torque 4 Nm
- Weight 3.6 kg



### Pneumatic chuck, MacroStd 3R-600.1-30

Pneumatic chuck for permanent mounting on the machine spindle or onto the machine table.

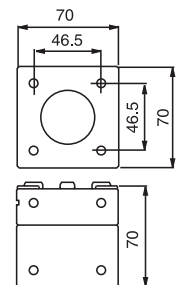
- Required drawbar 3R-605.1
- Fixed index positions 4x90°
- Turbo locking
- Weight 4 kg



### Manual chuck, MacroStd 3R-610.21

Three ground faces for vertical or horizontal mounting on the machine table.

- Required drawbar 3R-605.2
- Fixed index positions 4x90°
- Flushing duct
- Weight 2.2 kg



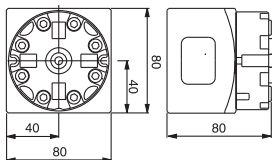
### Manual chuck, MacroStd 3R-610.21-S

Two ground faces for vertical or horizontal mounting on the machine table.

- Required drawbar 3R-605.2
- Fixed index positions 4x90°
- Flushing duct
- Weight 3.5 kg

90842

- Required drawbar 3R-605.1, otherwise as 3R-610.21-S

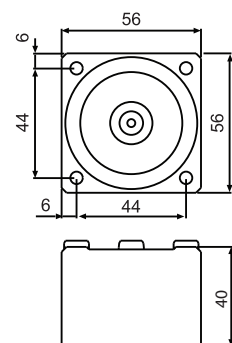


Except 90842

### Pneumatic chuck, MacroHP 3R-600.15-3

Pneumatic chuck for permanent mounting on the machine table.

- Drawbar 3R-605.2RS included
- Required air pressure 6 ± 1 bar
- Fixed index positions 4x90°
- Rust resistant
- Weight 0.8 kg

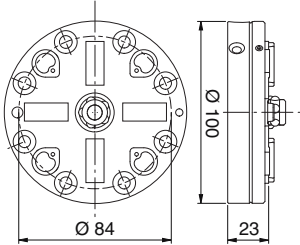


## Macro – Chucks

### Pneumatic chuck (low profile), MacroStd 3R-602.81

Pneumatic chuck for permanent mounting on the machine table.

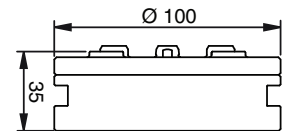
- Required drawbar 3R-605.10
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Weight 1 kg



### Pneumatic chuck (low profile), MacroStd 3R-600.14-30

Pneumatic chuck for permanent mounting on the machine table.

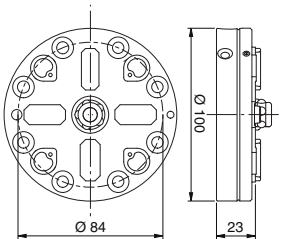
- Required drawbar 3R-605.2
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Weight 2 kg



### Pneumatic chuck, MacroHP 3R-602.81RS

Low-profile

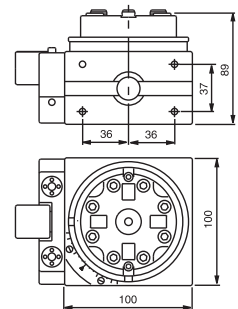
- Required drawbar 3R-605.10
- Clamping force 6000 N
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of Z-references
- Rust resistant
- Weight 1 kg



### Manual 3R block, MacroStd 3R-610.4

For vertical or horizontal mounting on the machine table.

- Required drawbar 3R-605.2
- Fixed index positions  $24 \times 15^\circ$
- Vernier scale
- Weight 5.5 kg

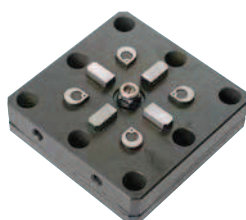


### Pneumatic table chuck, VDP 90716.10

Pneumatic vibration-damped chuck, low-profile version.

- Required drawbar 3R-605.10
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Turbo locking

**VDP®**



### Pneumatic table chuck, VDP 90716.09

Pneumatic vibration-damped chuck.

- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Turbo locking
- Weight 6 kg

**VDP®**



## Macro – Chucks

### Pneumatic table chuck, MacroStd 3R-600.10-31

Pneumatic chuck locked/opened with air gun.

Note: For debris guard 3R-SP27962.

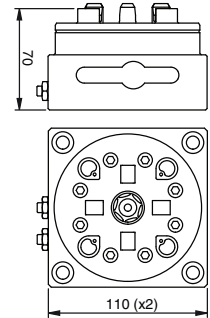
- Required drawbar 3R-605.1 or 3R-605.4
- All references of hardened and ground steel
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Turbo locking
- Weight 4.4 kg



### Pneumatic chuck, MacroHP 3R-600.10-3

Pneumatic chuck locked/opened with air gun.

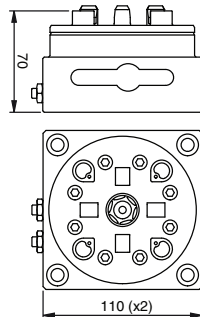
- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Carbide XY-References
- Turbo locking
- Weight 4.4 kg



### Pneumatic table chuck, MacroStd 3R-600.10-30

Pneumatic chuck locked/opened with air gun.

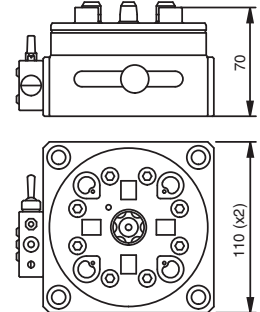
- Required drawbar 3R-605.1 or 3R-605.4
- All references of hardened and ground steel
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Turbo locking
- Weight 4.4 kg



### Pneumatic chuck, MacroStd 3R-610.46-30

Pneumatic chuck for horizontal or vertical use.

- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air unit included
- Weight 4.4 kg



### Pneumatic table chuck, VDP 90716.12

Pneumatic vibration-damped chuck.

- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure  $6 \pm 1$  bar
- Fixed index positions  $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Turbo locking
- Weight 6 kg

**VDP**



### Manual table chuck, VDP 90716.05

Manual vibration-damped chuck,  $\varnothing 170$  mm.

- Required drawbar 3R-605.2
- Building-in height 85 mm.
- Centre spacing 63 to 100 mm
- Weight 6 kg

**VDP**

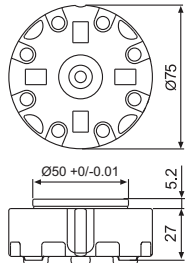


## Macro – Chucks

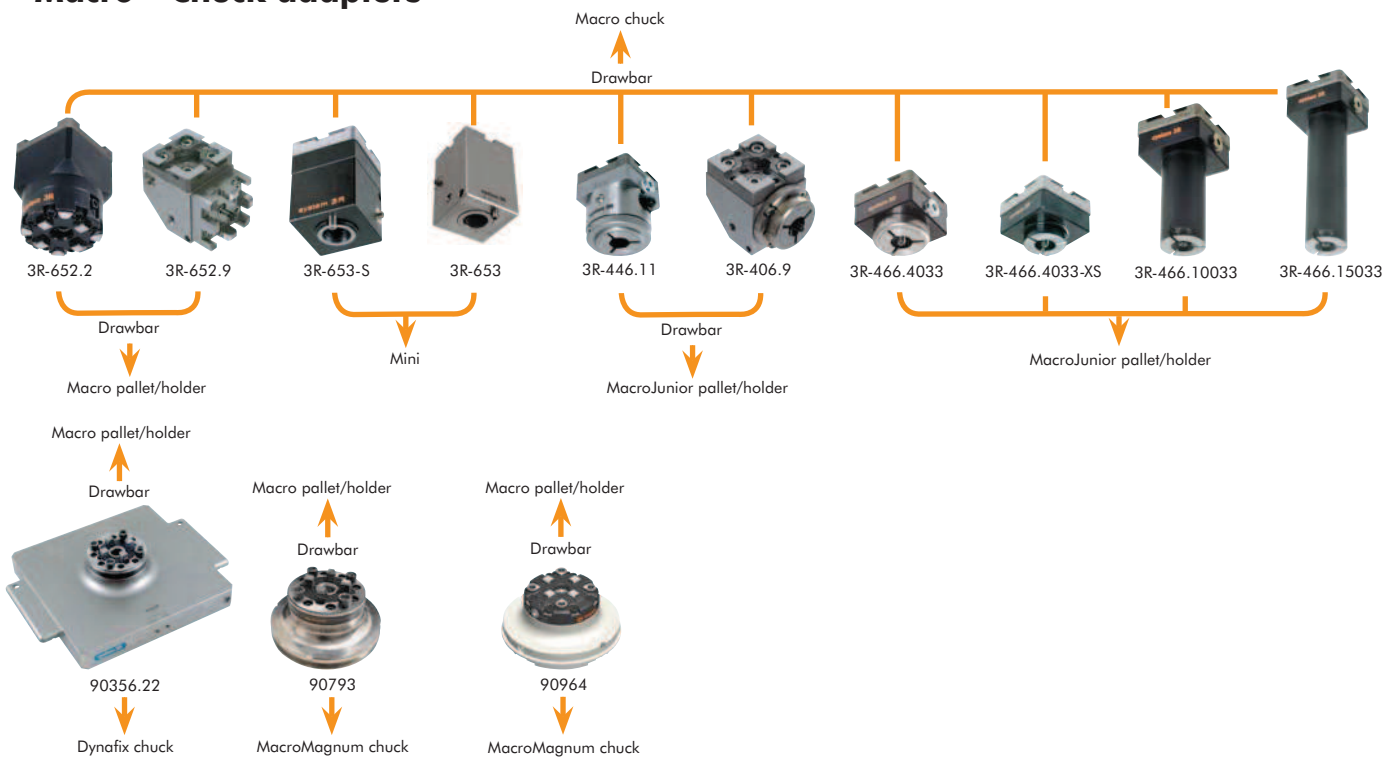
### Manual chuck, MacroStd 3R-SP15055

Cast chuck with ground flange for installation in fixture/plate.

- Required drawbar 3R-605.2
- Fixed index positions 4x90°
- Flushing connection
- Weight 0.7 kg



## Macro – Chuck adapters



### Chuck adapters

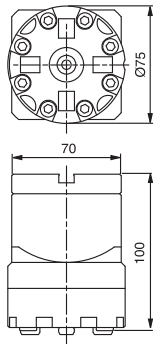
	Article number		Drawbar	Feature
Manual	3R-652.2		3R-605.2	100 mm
Manual	3R-652.9		–	90°. Locking screw with M6 drawpin
Manual	3R-653-S		–	Macro ► Mini
Manual	3R-446.11		3R-405.11	Macro ► MacroJunior
Manual	3R-466.4033		–	Macro ► MacroJunior. locking screw
Manual	3R-466.4033-S		–	Macro ► MacroJunior. locking screw
Manual	3R-406.9		–	Macro ► MacroJunior 90°. locking screw
Manual	3R-466.10033		–	Macro ► MacroJunior 100 mm. locking screw
Manual	3R-466.15033		–	Macro ► MacroJunior 150 mm. locking screw
Manual	3R-653		–	Macro ► Mini, rust-resistant
Pneumatic	90356.22		3R-605.1 / 3R-605.4	Dynafix ► Macro
Pneumatic	90793		3R-605.1 / 3R-605.4	MacroMagnum ► Macro
Manual	90964		3R-605.2	MacroMagnum ► Macro

## Macro – Chuck adapters

### Manual chuck adapter, Macro-Macro 3R-652.2

100 mm extension.

- Recommended clamping torque 6 Nm
- Required drawbar 3R-605.2
- Weight 4.5 kg



### Manual chuck adapter, Macro-Macro 90476.01

Distance adapter to extend the macro spindle. Mechanical clamping from the side.

- Solid X & Y-references
- Length 200 mm
- Ready for automation
- Flushing duct
- Recommended clamping torque 6 Nm
- Permissible torque: 135 Nm
- Suitable drawbar 3R-605.2 or similar.
- Weight 8 kg.



### Manual chuck adapter, Macro-Macro 90476.02

Distance adapter to extend the macro spindle. Mechanical clamping from the side.

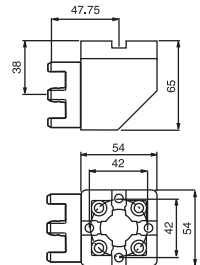
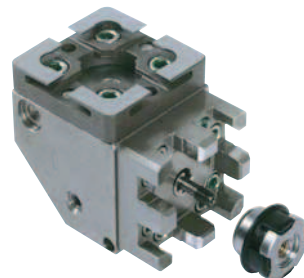
- Solid X & Y-references
- Length 250 mm
- Ready for automation
- Flushing duct
- Recommended clamping torque 6 Nm
- Permissible torque: 135 Nm
- Suitable drawbar 3R-605.2 or similar.
- Weight 9 kg.



### Manual chuck adapter 90°, Macro-Macro 3R-652.9

For horizontal mounting of Macro holders. Supplied with drawbar for screw locking.

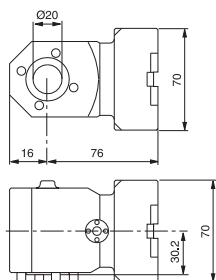
- Rust-resistant
- Weight 2.4 kg



### Manual chuck adapter 90°, Macro-Mini 3R-603.9

For horizontal mounting of Mini holders in the Macro system.

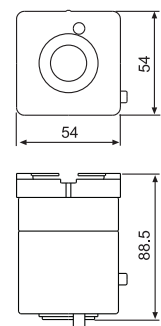
- Rust-resistant
- Flushing connection
- Weight 1.9 kg



### Manual chuck adapter, Macro-Mini 3R-653-S

For mounting Mini holders in the Macro system.

- MacroStandard coupling
- Can be changed automatically
- Weight 1.3 kg



## Macro – Chuck adapters

### Manual chuck adapter, Macro-Mini 3R-653

For mounting Mini holders in the Macro system.

- MacroHP coupling
- Can be changed automatically
- Rust-resistant
- Weight 1.3 kg



### Manual chuck adapter, Magnum-Macro 90964

From MacroMagnum into Macro system. Chuck adapter with built-in Macro chuck.

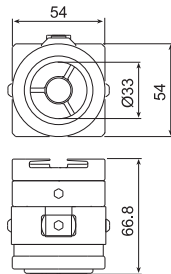
- Requires drawbar 3R-605.2 or similar.
- Solid X & Y-References
- Recommended clamping torque 6 Nm
- Permissible torque 135 Nm
- Clamping force 6000 N
- Max load 50 kg to acquire accuracy 0.002 mm
- Weight 4.3 kg



### Manual chuck adapter, Macro-Junior 3R-446.11

For mounting in the Macro system. Side locking of the MacroJunior holder. Duct for flushing through the electrode.

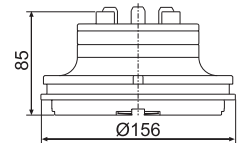
- Precision-cast Macro reference element
- Adapted for automatic changing
- Required drawbar 3R-405.11
- Fixed index positions 3x120°
- Weight 1.3 kg



### Pneumatic chuck adapter, Magnum-Macro 90793

Chuck adapter with built-in pneumatic Macro chuck for mounting in 90724.

- Weight 4.5 kg

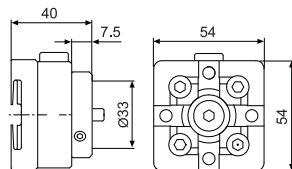


### Manual chuck adapters, Macro-Junior 3R-466.4033-S

For mounting in the Macro system. Axial locking screw with channel for flushing through the electrode.

#### 3R-466.4033

- Precision-cast Macro reference element
- Adapted for automatic changing
- Fixed index positions 3x120°
- Weight 1.1 kg



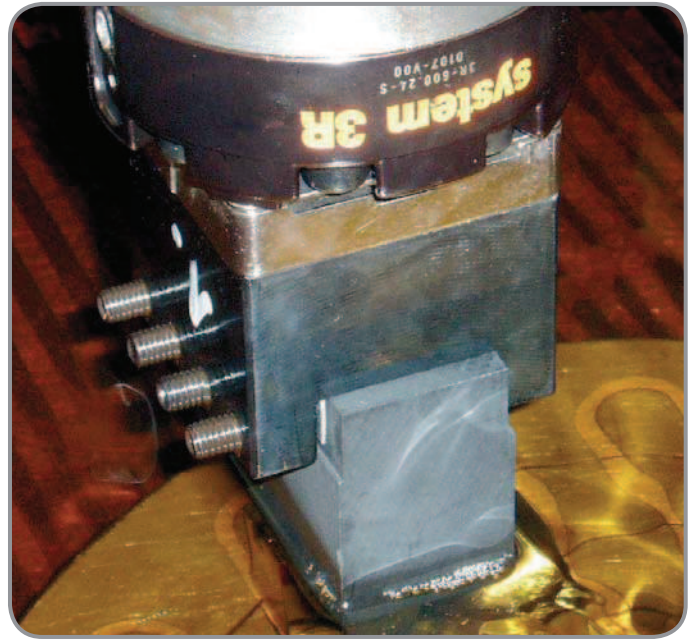
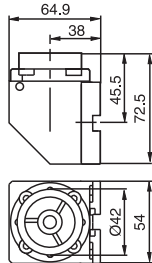


## Macro – Chuck adapters & Rotating spindles

### Manual chuck adapter 90°, Macro-Junior 3R-406.9

For horizontal mounting of MacroJunior holders in the Macro system. Screw locking.

- Adapted for automatic changing
- Rust-resistant
- Fixed index positions 3x120°
- Weight 2.4 kg



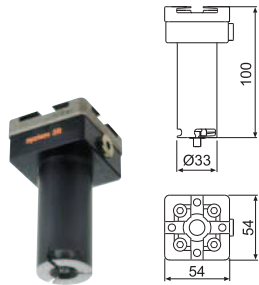
### Manual chuck adapters, Macro-Junior

For mounting in the Macro system. Axial locking screw with channel for flushing through the electrode.

Note: For EDM machining only.

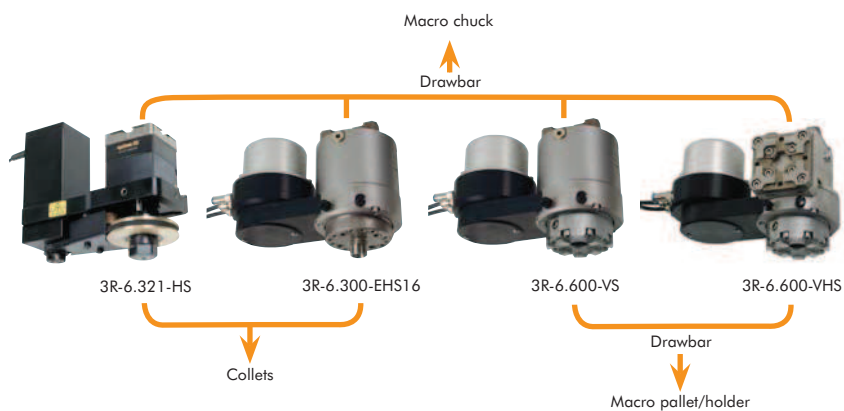
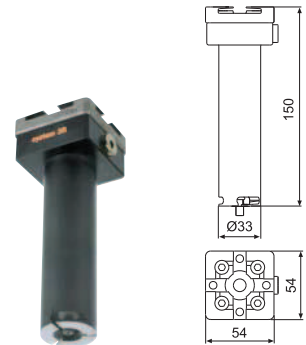
#### 3R-466.10033

- Adapted for automatic changing
- Fixed index positions 3x120°
- Weight 0.8 kg



#### 3R-466.15033

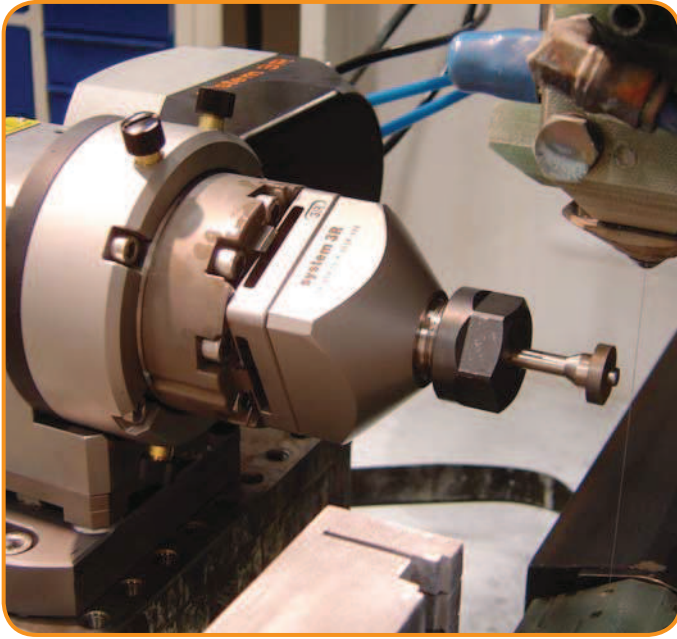
- Adapted for automatic changing
- Fixed index positions 3x120°
- Weight 1.2 kg



### Rotating spindles

	Article number		Drawbar	Feature
Vertical standard	3R-6.321-HS		–	collets
Vertical standard	3R-6.600-VS		3R-605.2	rust-resistant
Vertical and horizontal standard	3R-6.600-VHS		3R-605.2	rust-resistant
Vertical standard	3R-6.300-EHS16		–	collets, ER-16, rust-resistant

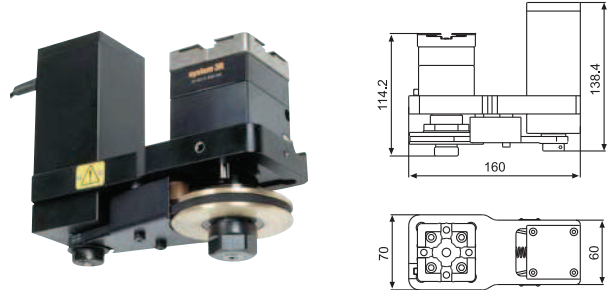
## Macro – Rotating spindles



### Rotating spindle 3R-6.321-HS

Electrical spindle for round electrodes.

- Supplied with collet chuck set 3R-ER16E
- Electrode sizes  $\varnothing 0.5-10$  mm
- Speed range 200-2000 rev/min
- Recommended maximum flushing pressure 40 bar
- Weight 4.9 kg



### Rotating spindles

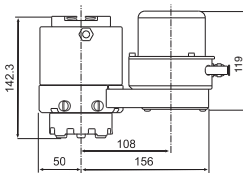
For mounting in a Macro chuck. Flushing via flushing connection

- Control unit included
- Required drawbar 3R-605.2, but 3R-605.2RS in wire EDM machines
- Rust-resistant
- Immersible
- Maximum electrode weight 5 kg
- Maximal flushing pressure through the chuck: 40 bar
- Weight 9.5 kg

#### 3R-6.600-VS

For vertical mounting in EDM machines.

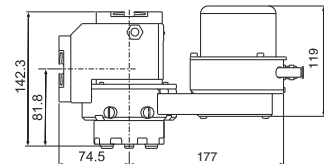
- Speed range 60-2000 rev/min



#### 3R-6.600-VHS

For vertical mounting in die-sinking EDM machines and horizontal mounting in wire EDM machines.

- Speed range 60-1500 rev/min



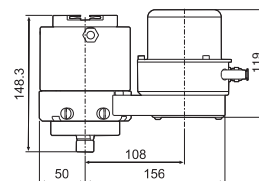
### Rotating spindles 3R-6.300-EHS16

For clamping in a vertical Macro chuck. Flushing via flushing connection.

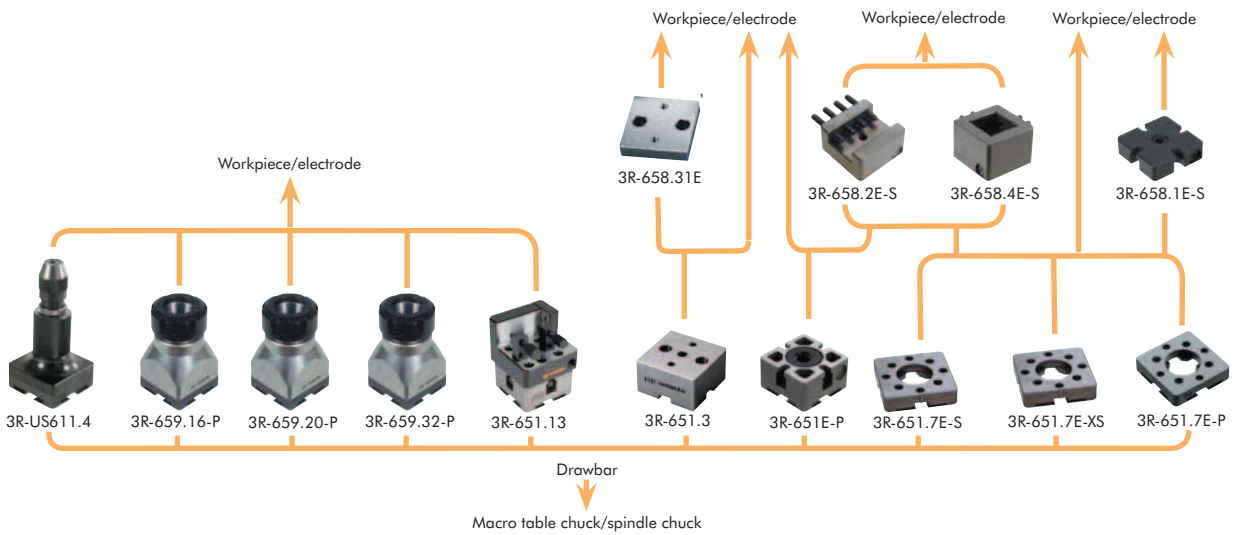
- Control unit included
- Drawbar depends on chosen chuck
- Rust-resistant
- Immersible
- Speed range 60-2000 rev/min
- Maximum flushing pressure 80 bar
- Weight 10 kg

#### Recommended collet sets

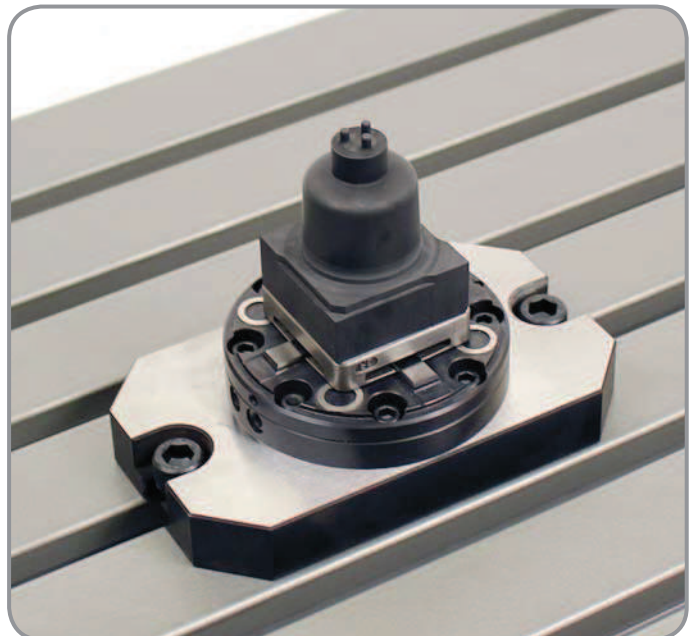
Make	Collet set	Size (mm)	Nut M19x1
Balzer	EHS16	$\varnothing 0.09-3$	Integral
Regofix	ER16, ER16-UP	$\varnothing 0.5-10$	ERM16, ERM16, ER16 MS
Tecnopinz	ETS16	$\varnothing 1.25-10$	ETS16,2



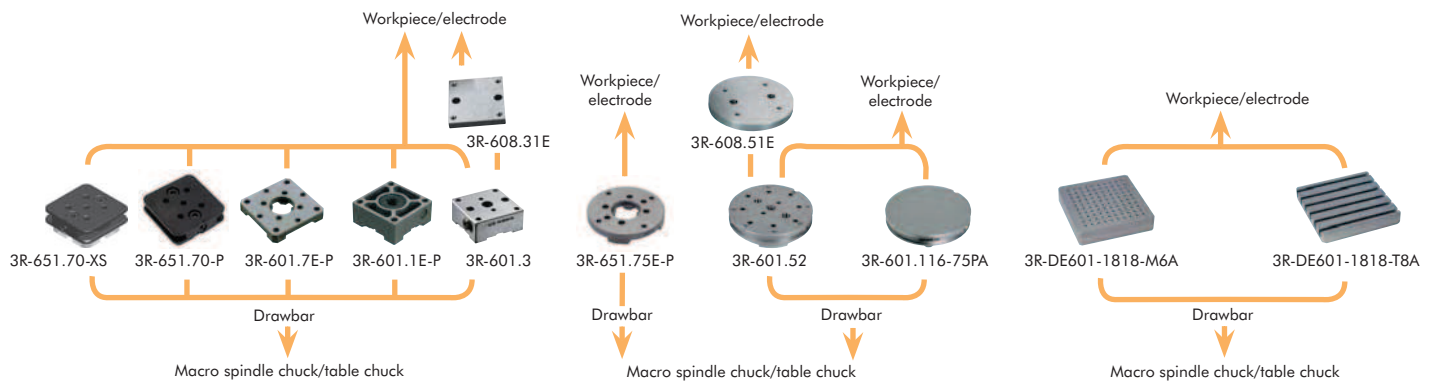
# Macro – Pallets, Holders & Ref. elements



Holder, pallets and ref. element, 54x54 mm	Article number	Feature
Hardened reference element 12.5 mm, HP	3R-651.7E-P	rust-resistant
Hardened reference element 12.5 mm, Std	3R-651.7E-XS	
Hardened reference element 12.5 mm, Std	3R-651.7E-S	surface-treated
Hardened pallet 30 mm, HP	3R-651E-P	rust-resistant
Hardened pallet 30 mm, HP	3R-651.3	52x52 mm / 3Refix Ø10, rust-resistant
Unhardened pallet 14.4 mm	3R-658.31E	52x52 mm / 3Refix Ø10
Hardened holder, HP	3R-651.13	<30x30 mm
Unhardened holder	3R-658.4E-S	<30x30 mm
Unhardened holder	3R-658.2E-S	<30 mm
Spacer plate, Std and HP	3R-658.1E-S	
Collet chuck ER16, HP	3R-659.16-P	Ø0,5-10 mm, rust-resistant
Collet chuck ER20, HP	3R-659.20-P	Ø1-13 mm, rust-resistant
Collet chuck ER32, HP	3R-659.32-P	Ø2-20 mm, rust-resistant
Three-jaw chuck	3R-US611.4	



# Macro – Pallets, Holders & Spacers



## Pallets and ref. elements, 70x70 mm

	Article number	Feature
Hardened reference element 12.5 mm, HP	3R-601.7E-P	rust-resistant
Hardened pallet 30 mm, HP	3R-601.1E-P	rust-resistant
Hardened pallet 30 mm, HP	3R-601.3	rust-resistant. 3Refix Ø10
Unhardened pallet 14.2 mm	3R-608.31E	3Refix Ø10
Unhardened pallet, HP	3R-651.70-P	reference element 54x54 mm
Unhardened pallet, Std	3R-651.70-XS	reference element 54x54 mm

## Ref.element, Ø75 mm

Hardened reference element 12.5 mm standard and HP	3R-651.75E-P	rust-resistant
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## Pallets, Ø116 mm

	Article number	Feature
Hardened pallet, HP	3R-601.52	3Refix Ø10 mm, rust-resistant
Unhardened pallet, HP	3R-601.116-75PA	With reference element Ø75 mm
Unhardened pallet	3R-608.51E	3Refix Ø10 mm

## Pallets, 180x180 mm

	Article number	Feature
Aluminium, HP	3R-DE601-1818-M6A	M6 threads
Aluminium, HP	3R-DE601-1818-T8M	T-slot. Not automatic changing



## Macro – Pallets & Holders

### Pallet, Ø116 mm 3R-601.116-75PA

Unhardened palett with reference element 3R-651.75-P.

- X, Y & Z-references hardened
- Ready for code carrier
- Ready for automation



#### Accessories:

### Sealing ring, High 3R-612.116-A

Suitable for chucks with drawbar 3R-605.1.



### Sealing ring, Low 3R-612.116-S

Suitable for pneumatic chucks with drawbar 3R-605.2.



### Pallet, 70x70 mm 3R-651.70-P

Unhardened palett.

- Ready for code carrier
- Ready for automation
- Weight 1 kg



### Pallet, 70x70 mm 3R-651.70-XS

Unhardened palett with reference element 3R-651.7-XS

- X, Y & Z-references hardened
- Ready for code carrier
- Ready for automation
- Weight 1 kg



#### Accessories:

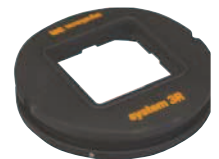
### Sealing ring, High 3R-612.54-A

Suitable for chucks with drawbar 3R-605.1.



### Sealing ring, Low 3R-612.54-S

Suitable for pneumatic chucks with drawbar 3R-605.2.

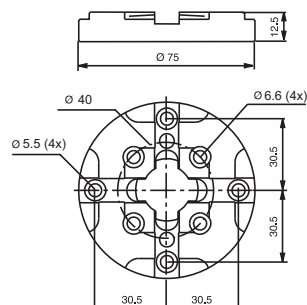


Application example.

### Pallet, Ø75 mm 3R-651.75E-P

Hardened and milled with clearance holes for eight fixing screws.

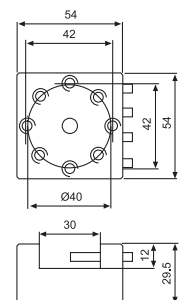
- Fixed index positions 4x90°
- Parallel-ground top and bottom faces
- Adapted for automatic changing
- Rust resistant
- Supplied in sets of 10 pcs.
- Weight per set 2.7 kg.



### Holder, 54x54 mm 3R-658.2E-S

Unhardened holder for flat electrodes with maximum width 30 mm. To be mounted on 3R-651.7E-S or 3R-651.7E-XS.

- Ready for code carrier
- Flushing duct
- Supplied in sets of 8
- Weight per set 3.5 kg

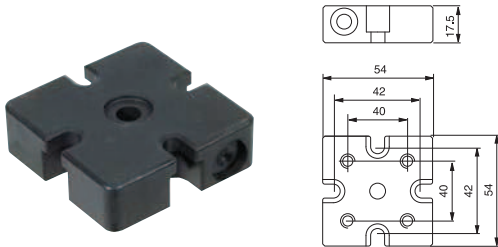


## Macro – Pallets, Holders & Spacers

### Spacer plate, 54x54 mm 3R-658.1E-S

For graphite electrodes or copper electrodes/workpieces with a rough mounting surface. To be mounted on 3R-651.7E-S, 3R-651.7E-XS or 3R-651.7E-P.

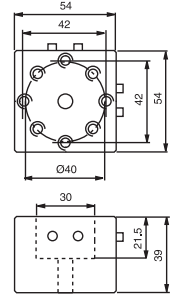
- Ready for code carrier
- Supplied in sets of 8
- Weight per set 2.5 kg



### Holder, 54x54 mm 3R-658.4E-S

Unhardened holder for square or round electrodes, max 30 mm. To be mounted on 3R-651.7E-S, 3R-651.7E-XS or 3R-651.7E-P.

- Ready for code carrier
- Flushing duct
- Supplied in sets of 8
- Weight per set 5.5 kg



### Pallet 54x54 mm, MacroStd

Hardened pallet for copper electrodes and workpieces.

*Note: Must be mounted on the copper blank/workpiece before it is locked in a chuck.*

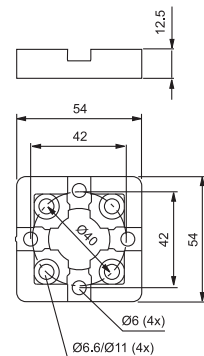
*Note: For graphite electrodes, spacer plate 3R-658.1E-S is required.*

#### 3R-651.7E-S

- Nickel-plated side faces
- Adapted for automatic changing
- Supplied in sets of 8
- Weight per set 1.3 kg

#### 3R-651.7E-XS

- Untreated side faces
- Adapted for automatic changing
- Supplied in sets of 8
- Weight per set 1.3 kg

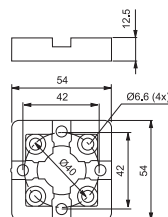
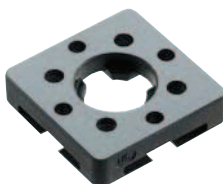


### Pallet, 54x54 mm, MacroHP 3R-651.7E-P

Hardened and precision-cast, with clearance holes for four fixing screws.

*Note: Must be mounted on the workpiece/fixture before it is locked in a chuck.*

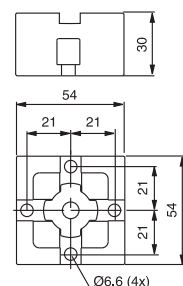
- Adapted for automatic changing
- Parallel-ground top and bottom faces
- Fixed index positions 4x90°
- Rust-resistant
- Supplied in sets of 8
- Weight per set 1.3 kg



### Pallet, 54x54 mm, MacroHP 3R-651E-P

Hardened, with clearance holes for four fixing screws.

- Adapted for automatic changing
- Ready for code carrier
- Fixed index positions 4x90°
- Rust-resistant
- Flushing duct
- Supplied in sets of 8
- Weight per set 3.4 kg

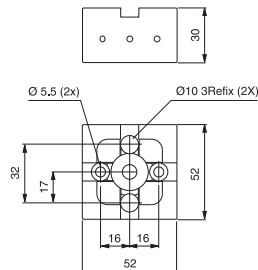


## Macro – Pallets & Holders

### Pallet, 52x52 mm, MacroHP 3R-651.3

Hardened, with 3Refix holes, flushing connection and clearance holes for two fixing screws.

- 3Refix Ø10 mm
- Adapted for automatic changing
- Ready for code carrier
- Parallel-ground top and bottom faces
- Fixed index positions 4x90°
- Rust-resistant
- Flushing duct
- Weight 0.5 kg



### Pallet, 52x52 mm 3R-658.31E

Unhardened with 3Refix holes and two M5 threads. Designed to be mounted on 3R-651.3.

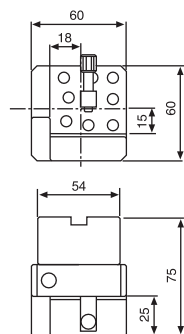
- 3Refix Ø10 mm
- Building-in height 14.4 mm
- Supplied in sets of 10
- Weight per set 2.2 kg



### Holder, MacroHP 3R-651.13

Hardened holder for square electrodes max 30 mm.

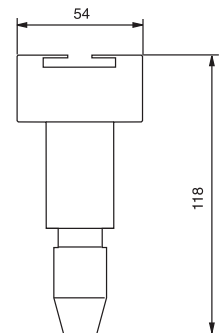
- Max. workpiece: 32x28 mm
- Adapted for automatic changing
- Parallel-ground top and bottom faces
- Fixed index positions 4x90°
- Flushing connection
- Weight 1.2 kg



### Three-jaw chuck 3R-US611.4

For 0-3 mm electrodes.

- Weight 0.8 kg



### Collet chucks, MacroHP

#### 3R-659.16-P

- For collets ER16
- Electrode size 0.5-10 mm
- Flushing duct
- Building-in height 62 mm
- Weight 0.8 kg

#### 3R-659.32-P

- For collets ER32
- Electrode size 2-20 mm
- Flushing duct
- Building-in height 94 mm
- Weight 1.2 kg

#### 3R-659.20-P

- For collets ER20
- Electrode size 1-13 mm
- Flushing duct
- Building-in height 69 mm
- Weight 1.2 kg



### Gate chuck 3R-US90-601

Fixed index positions at 0, 30, 45, 60 and 90 degrees. Other angles are set with a sine rule.

- Weight 1.1 kg



## Macro – Pallets & Holders

### Pallet, 70x70 mm 3R-608.31E

Unhardened with 3Refix holes and four M6 threads.  
Designed to be mounted on 3R-601.3 or 3R-601.52.

- 3Refix  $\varnothing 10$  mm
- Building-in height 14.2 mm
- Supplied in sets of 10
- Weight per set 4.4 kg

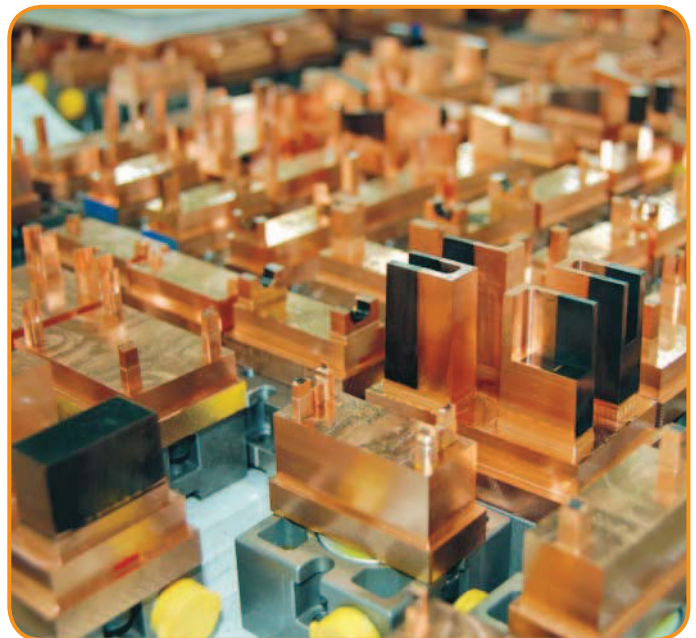
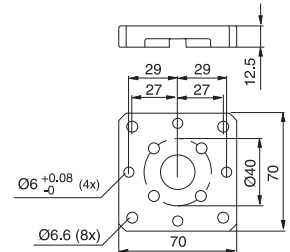
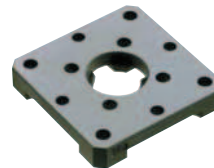


### Pallet, 70x70 mm, MacroHP 3R-601.7E-P

Hardened and precision-cast, with clearance holes for four fixing screws.

*Note: Must be mounted on the workpiece/fixture before it is locked in a chuck.*

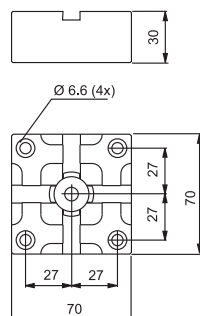
- Adapted for automatic changing
- Parallel-ground top and bottom faces
- Fixed index positions  $4 \times 90^\circ$
- Rust-resistant
- Supplied in sets of 5
- Weight per set 3 kg



### Pallet, 70x70 mm, MacroHP 3R-601.1E-P

Hardened, with clearance holes for four fixing screws.

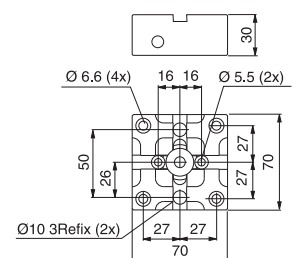
- Adapted for automatic changing
- Ready for code carrier
- Fixed index positions  $4 \times 90^\circ$
- Rust-resistant
- Flushing duct
- Supplied in sets of 5
- Weight per set 3.2 kg



### Pallet, 70x70 mm, MacroHP 3R-601.3

Hardened with 3Refix holes, flushing connection and clearance holes for six fixing screws.

- 3Refix  $\varnothing 10$  mm
- Adapted for automatic changing
- Ready for code carrier
- Parallel-ground top and bottom faces
- Fixed index positions  $4 \times 90^\circ$
- Rust-resistant
- Flushing duct
- Weight 1 kg



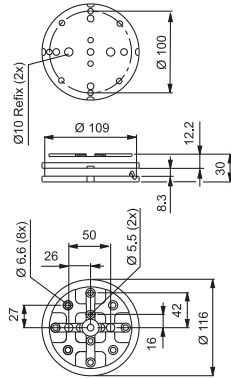


## Macro – Pallets & User kits

### Pallet, Ø116 mm, MacroHP 3R-601.52

Hardened, with 3Refix holes and clearance holes for ten fixing screws.

- 3Refix Ø10 mm
- Adapted for automatic changing
- Ready for code carrier
- Parallel-ground top and bottom faces
- Fixed index positions 4x90°
- Rust-resistant
- Weight 1.9 kg



### Accessories:

#### Sealing ring, High 3R-612.116-A

Suitable for chucks with drawbar 3R-605.1.



#### Sealing ring, Low 3R-612.116-S

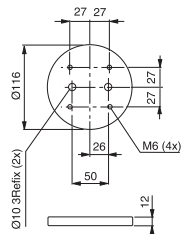
Suitable for pneumatic chucks with drawbar 3R-605.2.



### Pallet, Ø116 mm 3R-608.51E

Unhardened with 3Refix holes and four M6 threads. Designed to be mounted on 3R-601.3 or 3R-601.52.

- 3Refix Ø10 mm
- Supplied in sets of 10
- Weight per set 10 kg

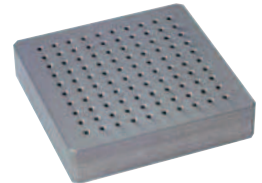


### Pallets, 180x180 mm

Anodized aluminium pallets with M6 threads.

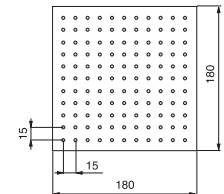
#### 3R-DE601-1818-M6A

- Mounted on pallet 3R-601.116-PA
- Building-in height 70.3 mm
- Adapted for automatic changing
- Ready for code carrier
- Weight 5.5 kg



#### 3R-DE601-1818-M6M

- Mounted on pallet 3R-601.7E-P
- Building-in height 52.5 mm
- Weight 4 kg

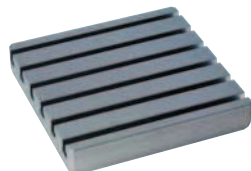


### Pallets, 180x180 mm

Anodized aluminium pallets with T-slots.

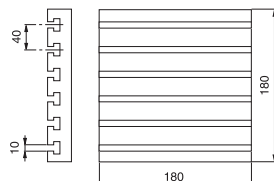
#### 3R-DE601-1818-T8A

- Mounted on pallet 3R-601.116-PA
- Building-in height 70.3 mm
- Adapted for automatic changing
- Ready for code carrier
- Weight 5.5 kg



#### 3R-DE601-1818-T8M

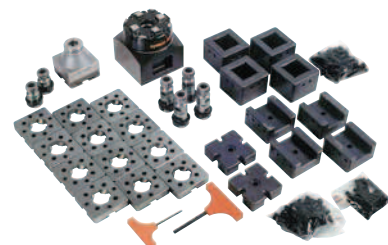
- Mounted on pallet 3R-601.7E-P
- Building-in height 52.5 mm
- Weight 5.5 kg



### User kit

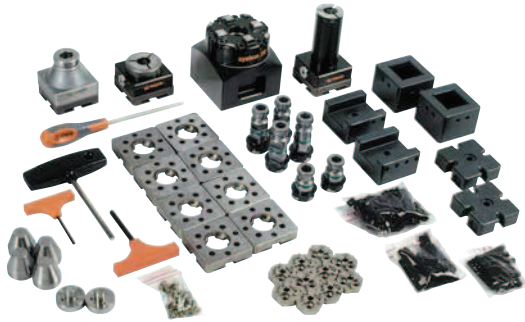
#### 3R-628.31-S

3R-605.1	Drawbar, long	x4
3R-605.2	Drawbar, short	x2
3R-610.21-S	Manual table chuck	x1
3R-651.7-S	Pallet, 54x54 mm	x12
3R-656.1	Check ruler	x1
3R-658.1-S	Spacer plate 54x54 mm	x2
3R-658.4-S	Holder 54x54 mm	x4
3R-658.2-S	Holder 54x54 mm	x4



## Macro – User kits & Accessories

### User kit 3R-628.41-S



3R-465.1-A	Holder with MacroJunior taper	x4
3R-461.1-GA	Holder with MacroJunior journal	x2
3R-466.4033	Chuck adapter Macro/MacroJunior	x1
3R-466.10033	Chuck adapter Macro/MacroJunior	x1
3R-491	Pallet 25 mm MacroJunior	x10
3R-605.1	Drawbar, long	x4
3R-605.2	Drawbar, short	x2
3R-610.21-S	Manual table chuck	x1
3R-651.7-S	Pallet, 54x54 mm	x8
3R-656.1	Check ruler	x1
3R-658.1-S	Spacer plate 54x54 mm	x2
3R-658.4-S	Holder 54x54 mm	x2
3R-658.2-S	Holder 54x54 mm	x2
	Screw MTF4x12	x90
	Screw wrench	x1

### Drawbars

#### 3R-605.1E

- Ø20x57.1 mm with flushing holes Ø7 mm
- Supplied in sets of 10 pcs.

#### 3R-605.1EE

- Supplied in sets of 40 pcs.



#### 3R-605.2RS

- Ø20x36.9 mm with flushing holes Ø7 mm
- Rust-resistant
- Supplied 1 pc.



#### 3R-605.14E

- Ø20x57 mm with flushing holes Ø7 mm
- Supplied in sets of 10 pcs.
- Intended for MacroCombi automatic electrode changers



### Drawbars

#### 3R-605.2E

- Ø20x36.9 mm with Ø7 mm flushing hole
- Supplied in sets of 5 pcs.

#### 3R-605.2EE

- Supplied in sets of 20 pcs.



#### 3R-605.10

- Ø20x13 mm
- Supplied 1 pc.

#### 3R-605.10EE

- Supplied in sets of 20 pcs.



#### 3R-605.4E

For round pallets adapted for automatic changing

- Ø20x57.1 without flushing hole
- Supplied in sets of 10 pcs.

#### 3R-605.4EE

- Supplied in sets of 40 pcs.

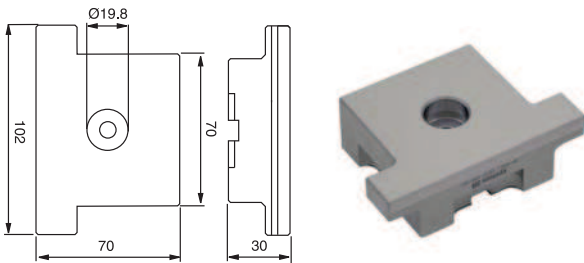


## Macro – Accessories

### Control ruler 3R-606.1

For setting angular positions and for centring Macro chucks.

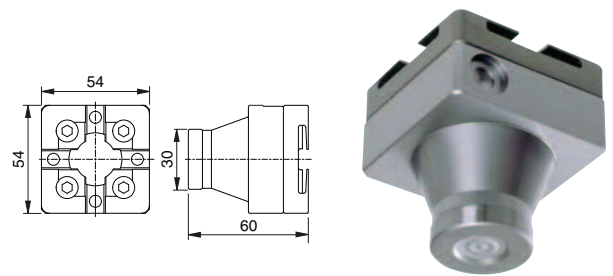
- Ground hole for centring.
- Measuring length 100 mm
- Weight 1.4 kg



### Control ruler 3R-656.1

For setting angular positions. Ground outside diameter for centring.

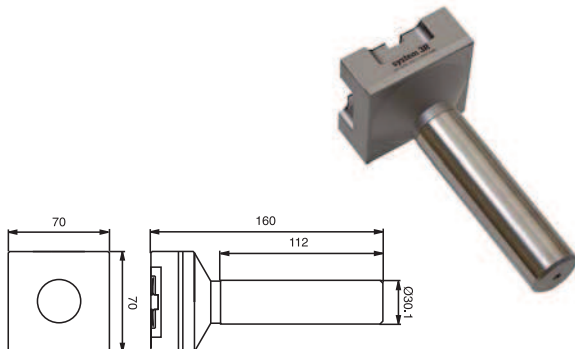
- Measuring length 50 mm
- Weight 0.8 kg



### Control rod 3R-606

Check mandrel with ground C-reference for setting Macro chucks.

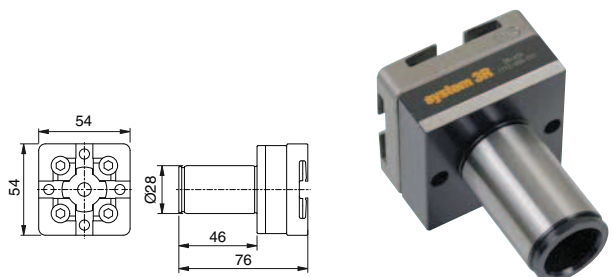
- Measuring length 110 mm
- Weight 2.3 kg



### Control rod 3R-656

Check mandrel with ground C-reference for setting Macro chucks.

- Measuring length 38 mm
- Weight 1 kg



### Measuring probes

Measuring probes with Renishaw measuring head for machines with measurement cycle function.

- Max ball deflection:  
X-Axis  $\pm 10^\circ$   
Y-Axis  $\pm 10^\circ$   
Z-Axis  $\pm 3$  mm

#### 3R-656.31-3P

- Building-in height 112 mm
- Measuring ball Ø3 mm
- Weight 0.6 kg

#### 3R-656.31-5P

- Building-in height 112 mm
- Measuring ball Ø5 mm
- Weight 0.6 kg



### Measuring probe 3R-656.21-SP03

Measuring probe with measuring head for machines with measurement cycle function.

- Building-in height 130 mm
- Measuring ball Ø3 mm
- Stiff probe
- Weight 0.8 kg



## Macro – Accessories

### Microscope 3R-4.650

With transformer (110/220V)  
for integral lighting.

- Magnification x25
- Field of view Ø6 mm
- Weight 0.8 kg



### Indicating spindle 3R-656.2-P

For measuring centre holes

- Dial indicator required
- Weight 0.6 kg



### Centring ring 3R-612.6

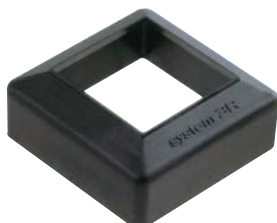
For centring 3R-600.20.



### Splash guard 3R-RU52L

Rubber guards for pallets 52x52 and  
54x54 mm.

- Height 33 mm



### Splash guard 3R-RU52

Rubber splash guard for pallets 52x52  
and 54x54 mm.

- Height 13 mm



### Splash guard 3R-RU70

Rubber splash guard for pallets 70x70 mm.

- Height 13 mm



### Splash guard 90027

Splash guard for Macro chucks with long drawbar. Can also be  
used as a cover for unused chucks.

*Note: Does not work with sealing ring 3R-612.116.*



### Splash guard 90027.01

Fits MacroStandard chucks with drawbar 3R-605.2.



## Macro – Accessories

### Clamping force meter 3R-SSP059

For pneumatic and manual chucks. Suits all chucks from MacroCombi to MacroMagnum.

- Required drawbar 3R-605.1 or similar
- Working range 1-25 kN.
- Weight 5 kg



### Torque wrenches 3R-614-04

Mainly for MacroCombi and Ø10 3Refix mandrels.

- 4 Nm

### 3R-614-06

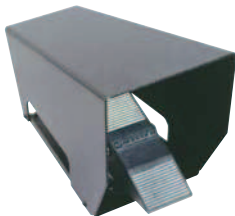
For Macro chucks

- 6 Nm



### Air unit 3R-611.2

Foot operation of pneumatic chucks.



### Air unit 3R-611.4

Unit for operation of pneumatic chucks. Two functions, opened/closed.



### Locking ring key 3R-605-GE

To lift the locking ring of the drawbars.

- Supplied in sets of 2



### Code carriers 3R-863.01-10

With pre-programmed unique identity, designed for pallet use.

- Supplied in sets of 10



### Sealing ring, High 3R-612.70-A

For reference element 70x70 mm.



### Sealing ring, Low 3R-612.70-S

For reference element 70x70 mm.



### Sealing ring, Low 3R-612.75-S

For reference element Ø75 mm.



## Macro – Accessories

### Chip guard 3R-SP27962

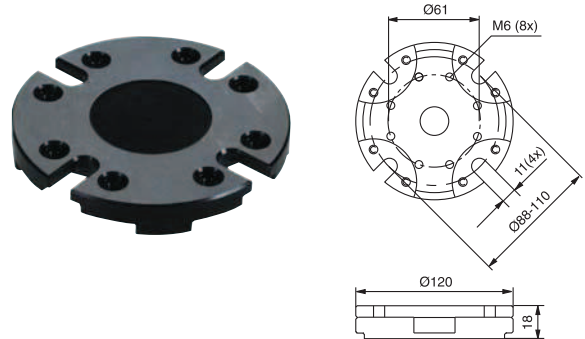
Debris guard for Macro pallets and reference elements 54x54 mm. Requires special Macro chucks similar to 3R-600.10-31, also requires drawbar 3R-605.1.



### Adapter plate 3R-A11489

For mounting of 3R-400.34, 3R-460.34 and 3R-600.24-S. Supplied with insulation plate and fixing screws.

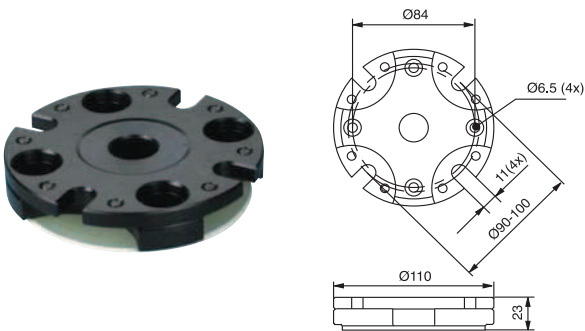
- Flushing connection



### Adapter plate 3R-A3620

Adapter plate with eight adjusting screws for mounting spindle chucks. Supplied with fixing screws.

- M10 for 90 mm pitch circle
- M6 for 96 mm pitch circle
- M8 for 100 mm pitch circle

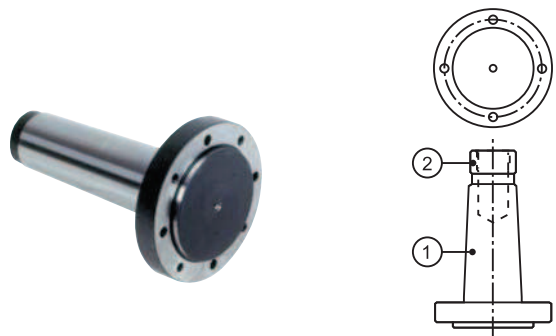


### Lathe taper 3R-TXXXX

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.*

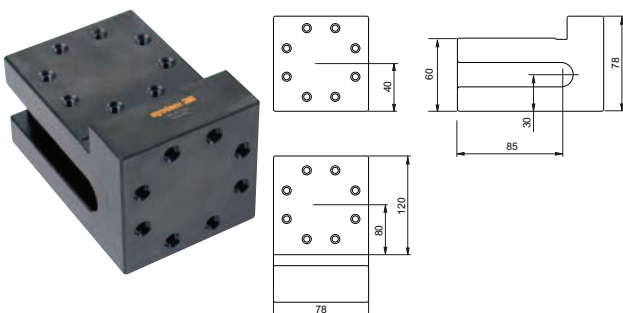
*Use the order form at the end of the catalogue.*



### 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.

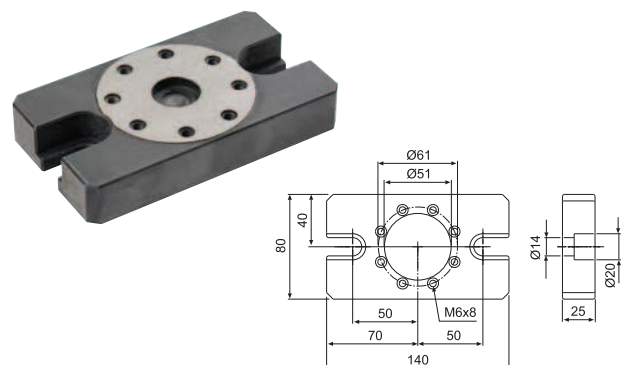
*Note: Chuck to be ordered separately.*



### Adapter plate 3R-A19724

For mounting of 3R-400.34, 3R-460.34 and 3R-600.24-S on machine table. Supplied with fixing screws for chuck and table.

*Note: Chuck to be ordered separately.*



## Macro – Accessories

### Electrode cassette 3R-650/8x5

For eight electrodes 52x52 and 54x54 mm.  
• Supplied in sets of 5



### 3Refix mandrel 3R-901-10E

- 3Refix Ø10 mm
- Recommended tightening torque 4 Nm
- Supplied in sets of 10
- Weight per set 0.2 kg

*Note: When positioning with 3Refix mandrels – always tighten the expanding mandrel in the R<sup>9</sup> hole first.*



### Adapter plate 3R-A26488

For mounting 3R-600.28-S



### Converter kit 90842.01

To convert 3R-600.24-S to enable long drawbar 3R-605.1.

