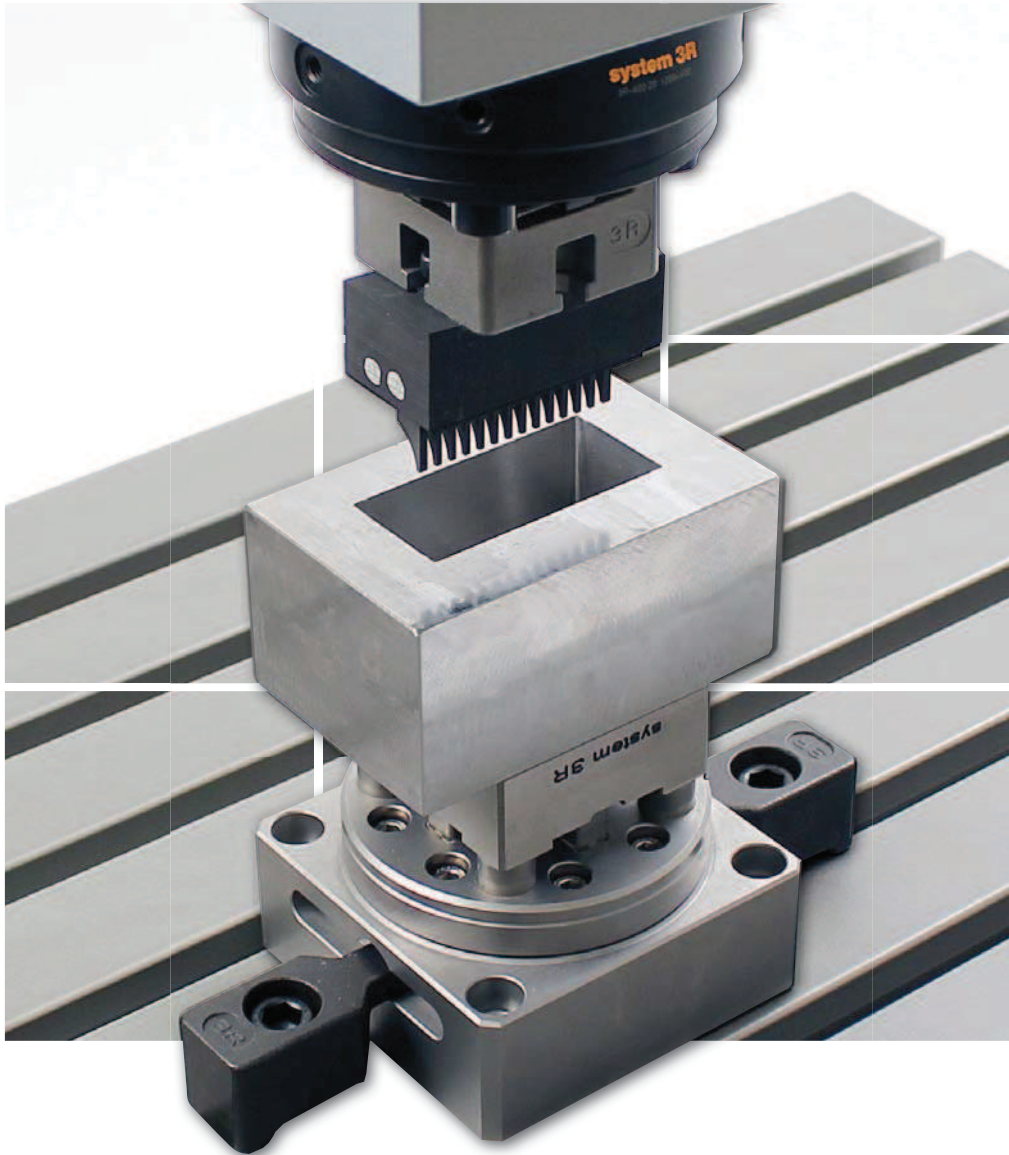
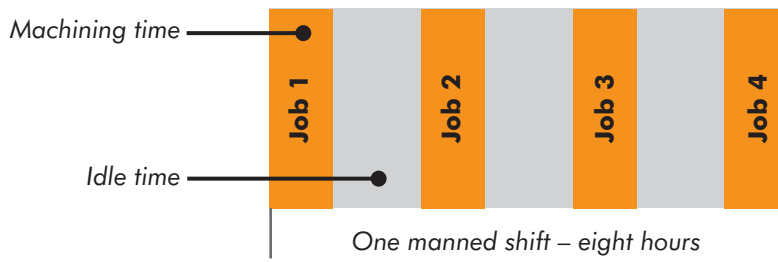


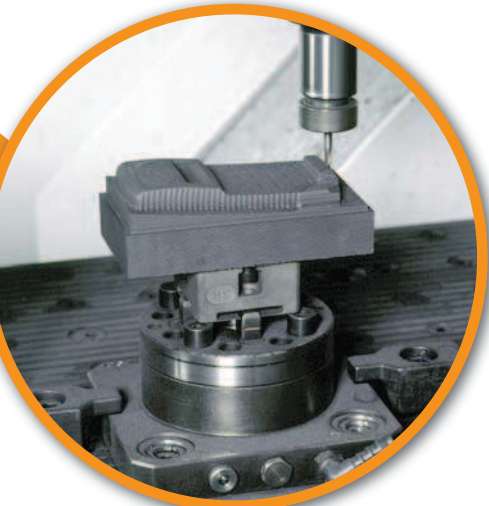
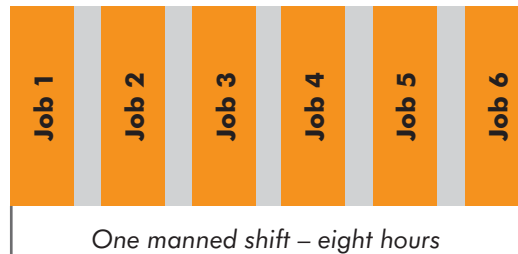
Reference systems for electrode manufacturing & EDMing



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

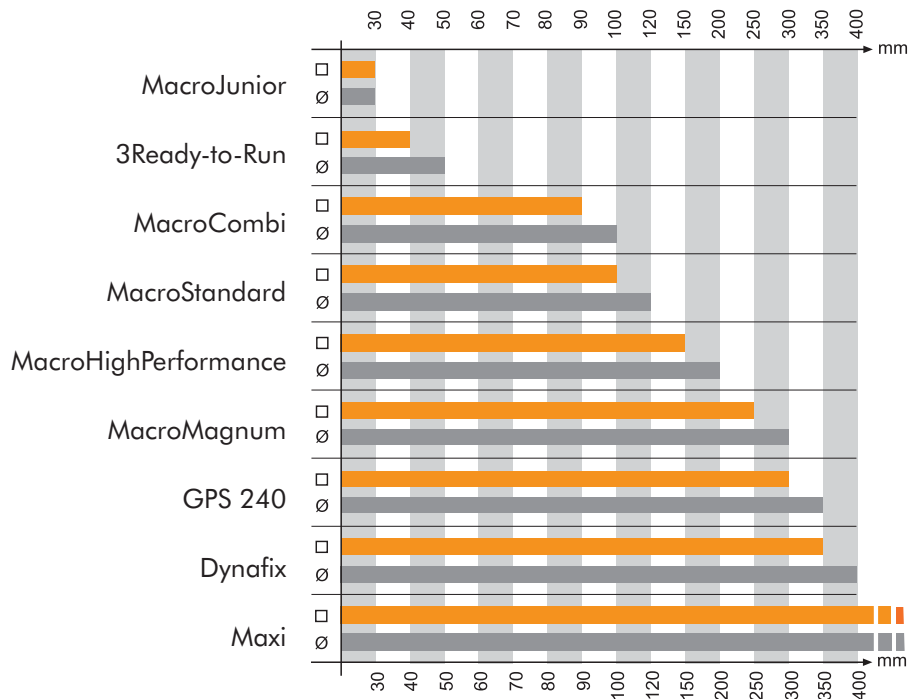
The engineering industry is complex. Every company is unique in terms of type of production, machinery, capacity etc.

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

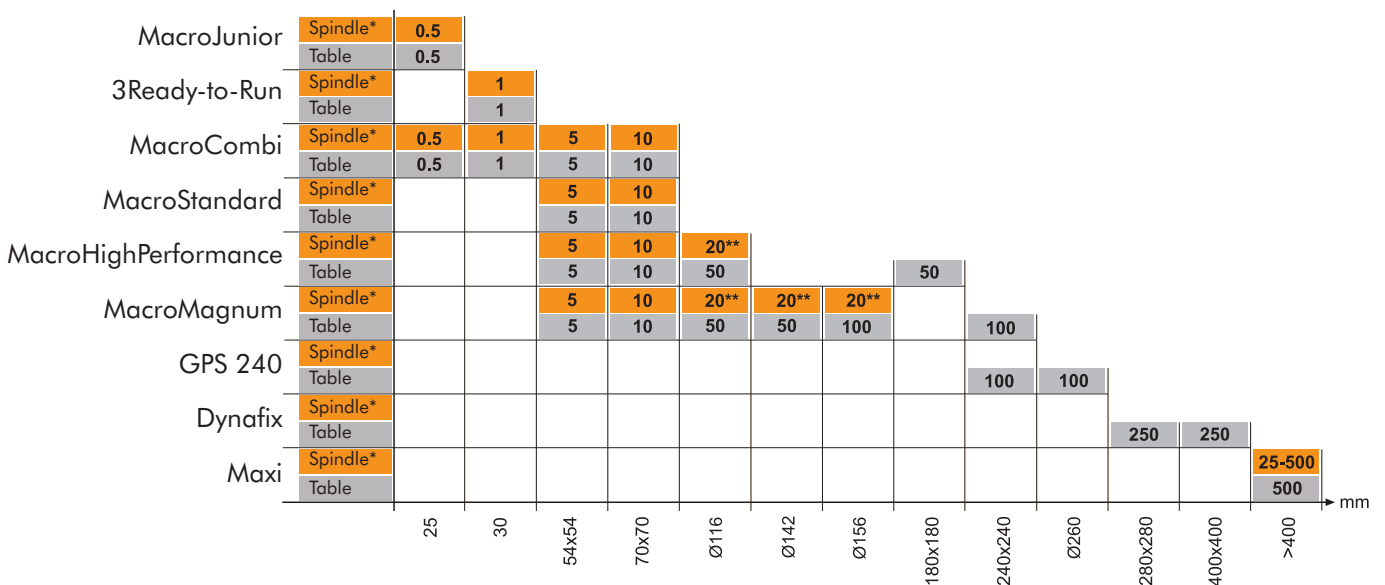
For every size of pallet there is a "recommended"

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

MacroMagnum

- ... allows mounting of both MacroMagnum and Macro palletts
- ... reduces setting-up times
- ... ensures precision and quality
- ... can handle high machining forces
- ... is suitable for automatic changing with System 3R's automation program.

MacroMagnum is larger variant of the patented Macro system. The high clamping force and the position of the reference surfaces far away from the chuck centre mean that MacroMagnum can provide "Macro class" stability and accuracy, even in applications with high machining forces.

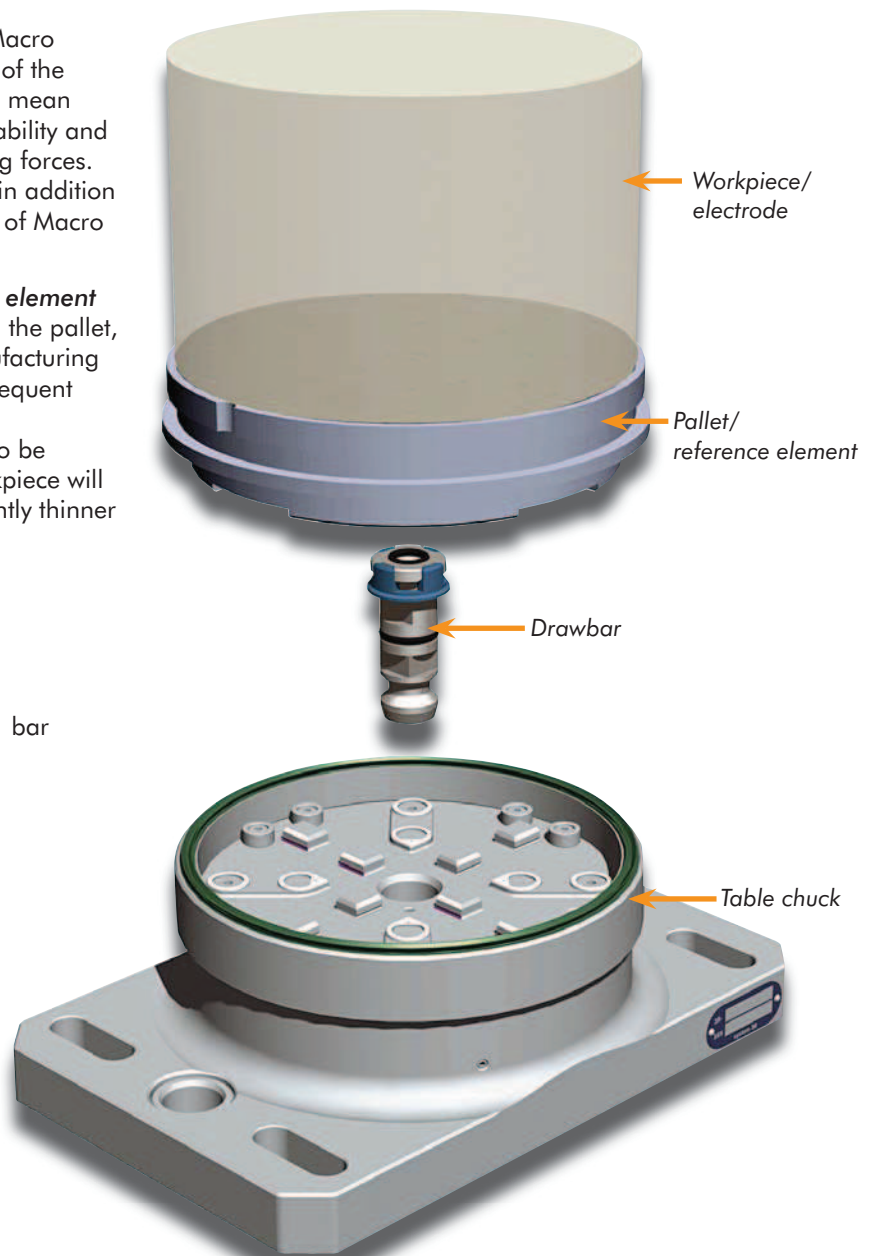
The double references of the chucks mean that in addition to the MacroMagnum pallets, the extensive range of Macro pallets can also be fixed to MacroMagnum.

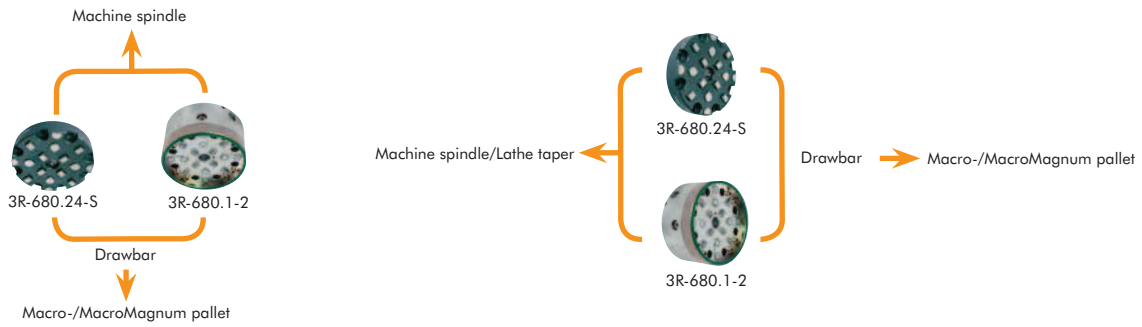
The difference between a pallet and a reference element

Usually the electrode blank is mounted directly on the pallet, which then carries the blank throughout the manufacturing process – from machine to machine, without subsequent alignment.

The reference elements are primarily intended to be mounted on the fixtures or vices in which the workpiece will be clamped. The reference elements are significantly thinner in order to limit the total construction height.

- Repetition accuracy – within 0.002 mm
- Locking force – 16 000 N
- Fixed index positions 4x90°
- Required air pressure, pneumatic chuck – 6 ± 1 bar
- Recommended tightening torque manual chuck – Macro-pallet 5 Nm
- Recommended tightening torque manual chuck – MacroMagnum-pallet 12 Nm





Spindle chucks

	Article number	Drawbar		Feature
Manual	3R-680.24-S	3R-605.2		low profile
Pneumatic	3R-680.1-2	3R-605.1 / 3R-605.4		matching air unit 3R-611.46

Lathe chucks

Manual	3R-680.24-S	3R-605.2		low profile, fits 90809.01-10
Pneumatic	3R-680.1-2	3R-605.1 / 3R-605.4		matching air unit 3R-611.46

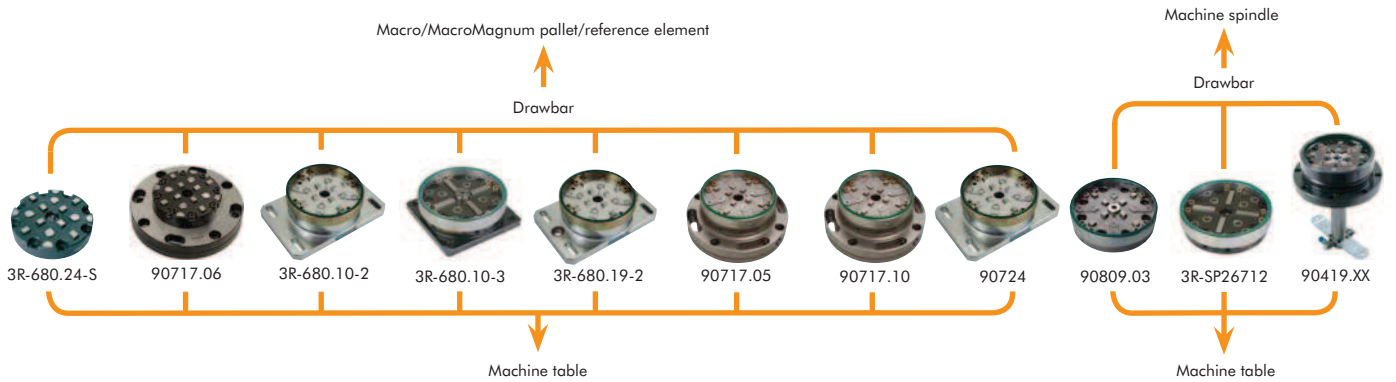
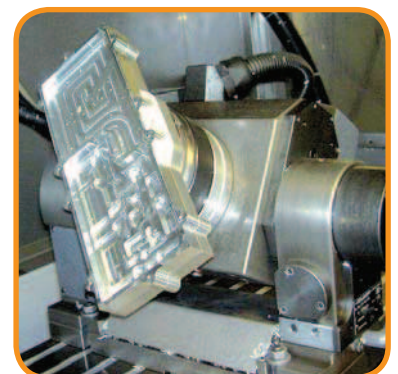
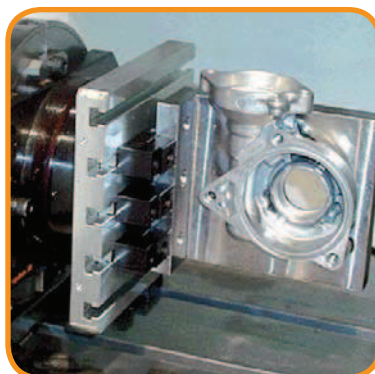


Table chucks

	Article number	Drawbar		Feature
Manual	3R-680.24-S	3R-605.2		low profile
Manual	90717.06	3R-605.2		vibration-damped
Pneumatic	3R-680.10-2	3R-605.1 / 3R-605.4		matching air unit 3R-611.46
Pneumatic	3R-680.10-3	3R-605.2		low profile, matching air unit 3R-611.2/3R-611.4
Pneumatic	3R-680.19-2	3R-605.1 / 3R-605.4		3Refix Ø20 mm, matching air unit 3R-611.46
Pneumatic	90717.05	3R-605.1 / 3R-605.4		vibration-damped, matching air unit 3R-611.46
Pneumatic	90717.10	3R-605.1 / 3R-605.4		vibration-damped, matching air unit 3R-611.46
Pneumatic	90724	3R-605.1 / 3R-605.4		for chuck adapter, matching air unit 3R-611.46

Built-in chucks

	Article number	Drawbar		Feature
Pneumatic	90809.03	3R-605.1 / 3R-605.4		matching air unit 3R-611.46
Pneumatic	3R-SP26712	3R-605.2		low profile, matching air unit 3R-611.2/3R-611.4
Pneumatic	90419.XX	3R-605.1 / 3R-605.4		



MacroMagnum – Chucks

Manual chuck, Low profile 3R-680.24-S

For permanent mounting on the machine spindle or table.

Note: Master pallet 3R-606.1 or 3R-686.1-HD is required at installation.

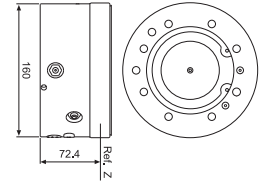
- Required drawbar 3R-605.2.
- Required air pressure 6 ± 1 bar.
- Fixed index positions $4 \times 90^\circ$
- Weight 5 kg.



Pneumatic chuck 3R-680.1-2

Pneumatic chuck for machine spindles and lathes. Opened/locked by an air gun against a valve on the side, or alternatively on the back, of the chuck.

- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure 6 ± 1 bar.
- Fixed index positions $4 \times 90^\circ$
- Sealing ring
- Turbo-locking of MacroMagnum pallets
- Weight 9 kg.



Manual table chuck, VDP 90717.06



Manual vibration-damped table chuck.

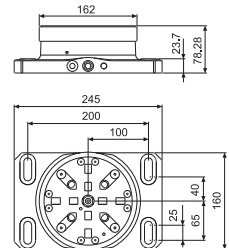
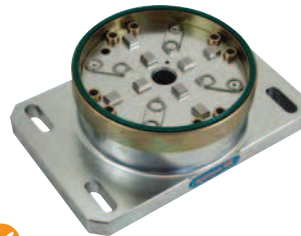
- Required drawbar 3R-605.2
- Fixed index positions $4 \times 90^\circ$
- Weight 10 kg



Pneumatic table chuck 3R-680.10-2

Pneumatic table chuck.

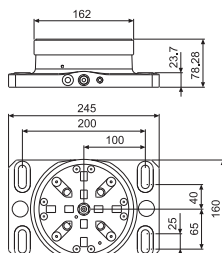
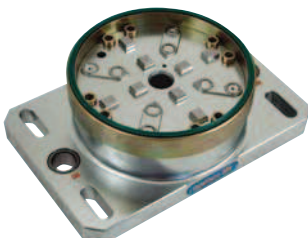
- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure 6 ± 1 bar
- Fixed index positions $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Sealing ring
- Turbo-locking of MacroMagnum pallets
- Weight 12 kg



Pneumatic table chuck 3R-680.19-2

Pneumatic table chuck with 3Refix-holes.

- 3Refix $\varnothing 20$ mm
- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure 6 ± 1 bar
- Fixed index positions $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Sealing ring
- Turbo-locking of MacroMagnum pallets
- Weight 12 kg



Pneumatic table chuck, VDP 90717.05



Pneumatic vibration-damped chuck.

- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure 6 ± 1 bar
- Fixed index positions $4 \times 90^\circ$
- Air-blast cleaning of the Z-references
- Turbo locking
- Weight 13 kg

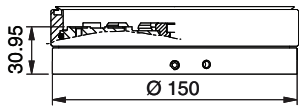


MacroMagnum – Chucks & Chuck adapters

Pneumatic chuck 90809.03

Pneumatic chuck with coarse guiding of the pallet. Intended for permanent building-in.

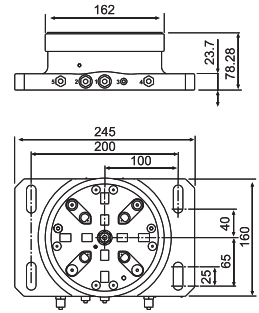
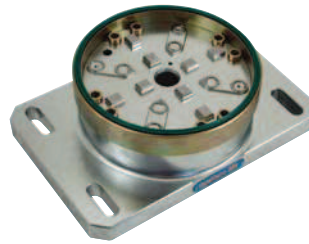
- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure 6 ± 1 bar
- Fixed index positions $4 \times 90^\circ$
- Flushing duct
- Air-blast cleaning of the Z-references
- Sealing ring
- Turbo locking
- Weight 5 kg



Pneumatic table chuck 90724

Pneumatic table chuck for chuck adapter.

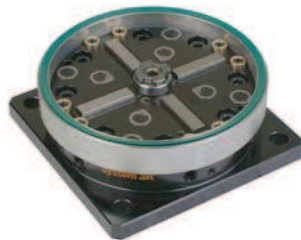
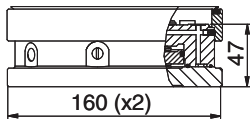
- Required drawbar 3R-605.1 or 3R-605.4
- Required air pressure 6 ± 1 bar
- Fixed index positions $4 \times 90^\circ$
- Air-blast cleaning of Z-references on chuck and chuck adapter
- Sealing ring
- Turbo-lockings
- Weight 12 kg



Pneumatic table chuck 3R-680.10-3

For permanent mounting on the machine table.

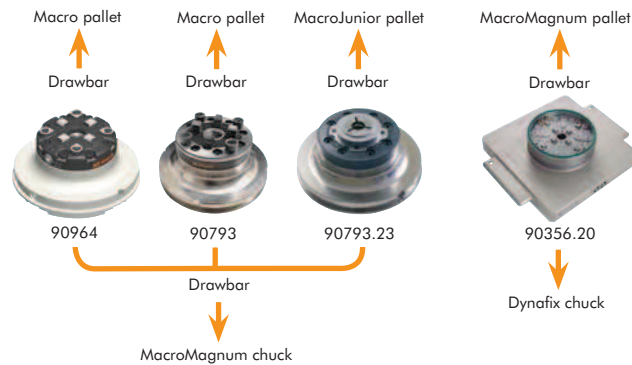
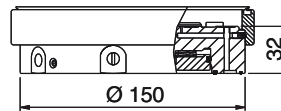
- Supplied with drawbar 3R-605.2
- Required air pressure 6 ± 1 bar
- Fixed index positions $4 \times 90^\circ$
- Flushing duct
- Air-blast cleaning of the Z-references
- Sealing ring
- Turbo locking
- Weight 7.5 kg



Pneumatic chuck 3R-SP26712

For permanent mounting on the machine table.

- Supplied with drawbar 3R-605.2
- Required air pressure 6 ± 1 bar
- Fixed index positions $4 \times 90^\circ$
- Flushing duct
- Air-blast cleaning of the Z-references
- Sealing ring
- Turbo locking
- Weight 5 kg



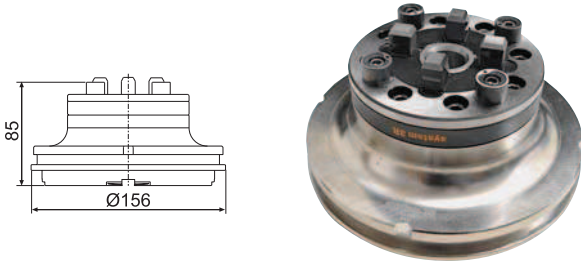
Chuck adapters	Article number	Drawbar	Feature
Pneumatic	90964	3R-605.1 / 3R-605.4 + 3R-605.2	MacroMagnum ► Macro
Pneumatic	90793	3R-605.1 / 3R-605.4 + 3R-605.2	MacroMagnum ► Macro
Pneumatic	90793.23	3R-605.1 / 3R-605.4 + 3R-405.11	MacroMagnum ► MacroJunior
Pneumatic	90356.20	3R-605.2 / 3R-605.4	Dynafix ► MacroMagnum

MacroMagnum – Chuck adapters

Pneumatic chuck adapter, MacroMagnum-Macro 90793

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

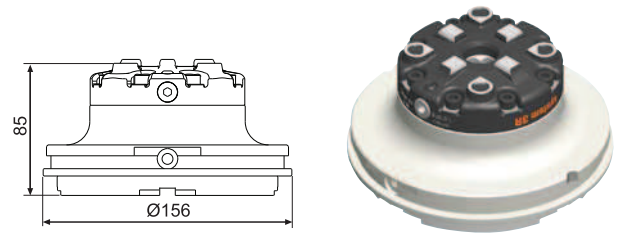
- Weight 4.5 kg



Manual chuck adapter, MacroMagnum-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



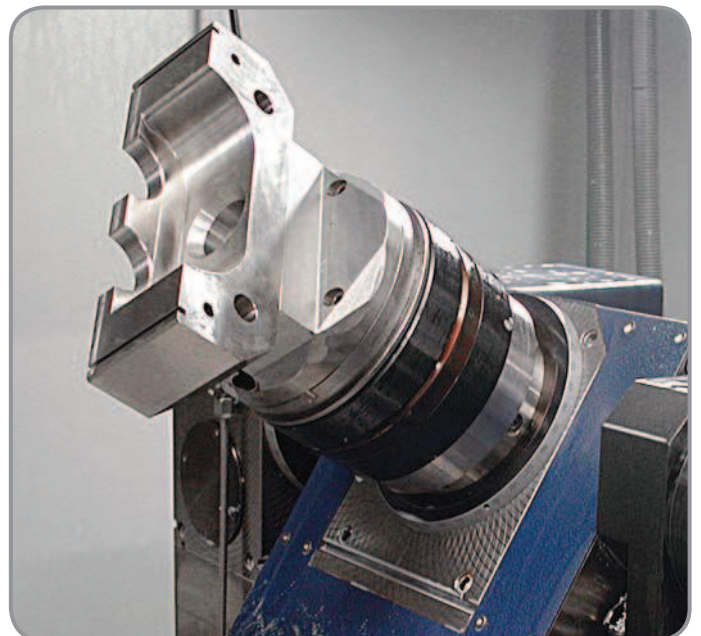
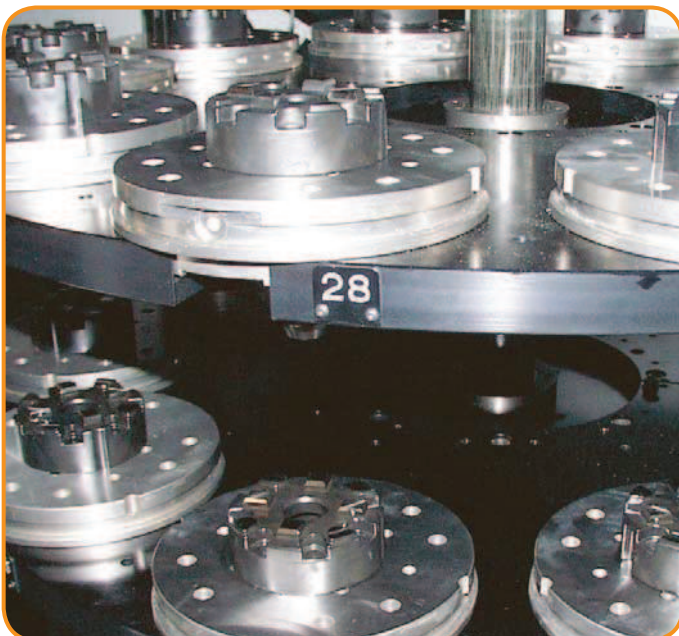
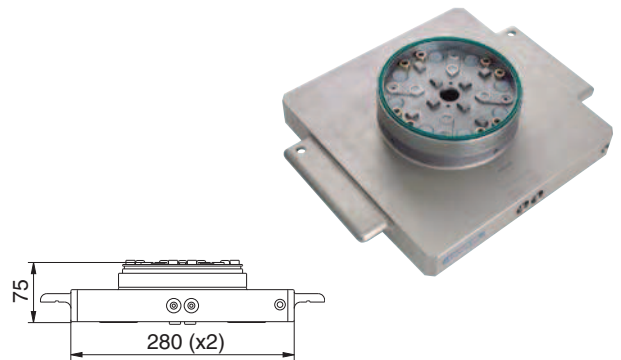
Pneumatic chuck adapter, MacroMagnum-MacroJunior 90793.23

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

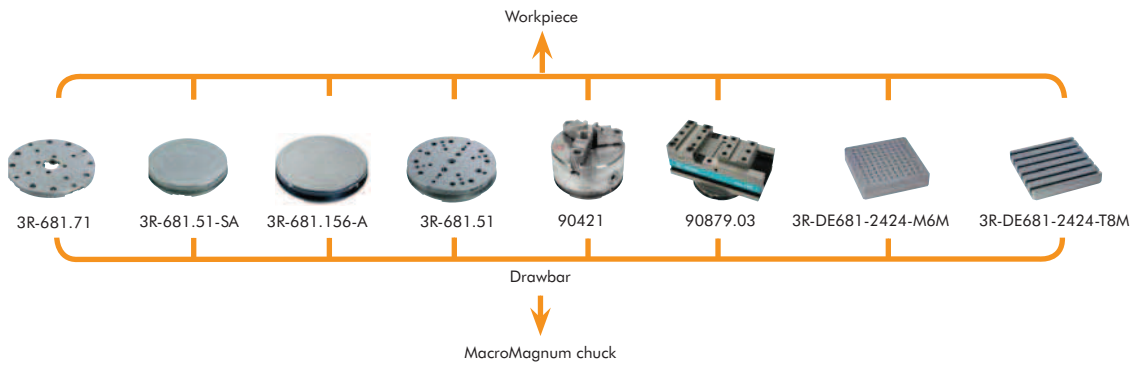


Pneumatic chuck adapter, Dynafix-MacroMagnum 90356.20

Chuck adapter with built-in pneumatic MacroMagnum chuck for mounting in 90356.10 or similar. See Dynafix for further information.



MacroMagnum – Pallets



NOTE: All Macro pallets can be used in the MacroMagnum chucks

Pallets, reference element Ø142 mm

Article number	Feature
3R-681.71	Hardened reference element 12.5 mm rust-resistant

Pallets Ø156 mm

Article number	Feature
3R-681.51-SA	Unhardened pallet 35 mm
3R-681.156-A	Unhardened pallet 35 mm reference element Ø142 mm
3R-681.51	Hardened pallet 35 mm 3Refix Ø10 mm
90421	Three-jaw chuck
90879.03	Vice

Pallets 240x240 mm

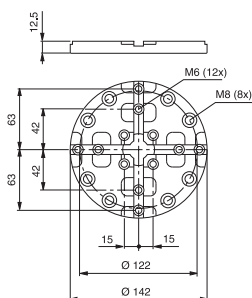
Article number	Feature
3R-DE681-2424-M6M	Aluminium M6 threads / no automatic changing
3R-DE681-2424-T8M	Aluminium T-slots / no automatic changing

Pallet Ø142 mm 3R-681.71

Hardened pallet with clearance holes for fixing screws.

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

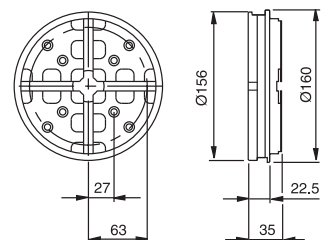
- Rust-resistant
- Weight 1 kg



Pallet Ø156 mm 3R-681.51-SA

Unhardened pallet with hardened references and hole markings for eight clearance holes.

- Adapted for automatic changing
- Ready for code carrier
- Weight 4.5 kg

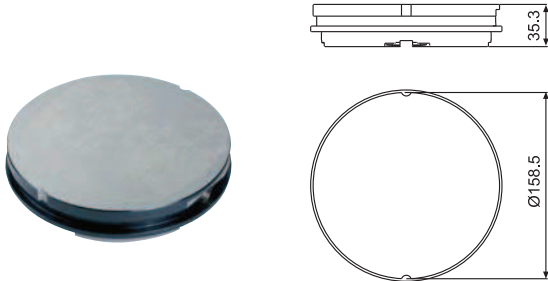


MacroMagnum – Pallets & Accessories

Pallet Ø156 mm 3R-681.156-A

Unhardened pallet with hardened reference element type 3R-681.71.

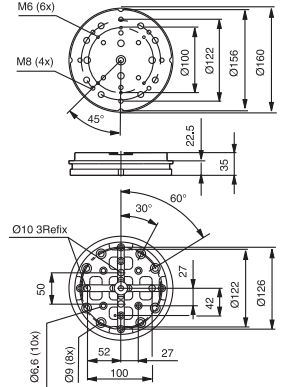
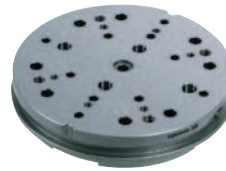
- Adapted for automatic changing
- Ready for code carrier
- Weight 4.5 kg



Pallet Ø156 mm 3R-681.51

Hardened pallet with threads and clearance holes for eight and ten fixing screws.

- 3Refix Ø10 mm
- Adapted for automatic changing
- Ready for code carrier
- Rust-resistant
- Flushing connection
- Weight 5 kg



Pallets 240x240 mm

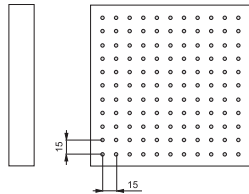
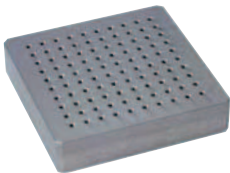
Anodized aluminium pallets with M6 threads.

3R-DE681-2424-M6A

- Mounted on pallet 3R-681.51-SA
- Adapted for automatic changing
- Ready for code carrier
- Building-in height 75.3 mm
- Weight 11 kg

3R-DE681-2424-M6M

- Mounted on pallet 3R-681.71
- Building-in height 52.5 mm
- Weight 7.5 kg



Pallets 240x240 mm

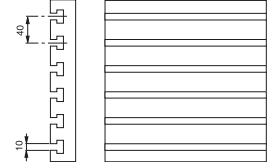
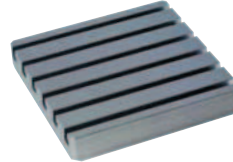
Anodized aluminium pallets with T-slots.

3R-DE681-2424-T8A

- Mounted on pallet 3R-681.51-SA
- Adapted for automatic changing
- Ready for code carrier
- Building-in height 75.3 mm
- Weight 11 kg

3R-DE681-2424-T8M

- Mounted on pallet 3R-681.71
- Building-in height 52.8 mm
- Weight 7.5 kg



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-605.4E

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.



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.



MacroMagnum – Accessories

Check ruler 3R-686.1-HD

Check ruler for setting flatness and angular positions.
Ground hole for centring.

- Adapted for automatic changing
- Ready for code carrier
- Measuring length 130 mm
- Weight 6 kg



Splash guard 90027.03

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



Chip guard 90443

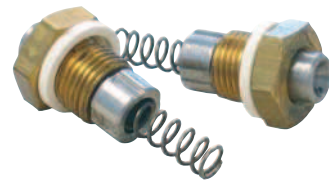
For Macro pallets 52x52, 54x54 and 70x70 in MacroMagnum chucks. For sealing we recommend 3R-RU52L or 3R-RU70 respectively in combination with the debris guard.



Connection for air gun 90815

For manual operation of pneumatic chucks with air gun.

- Supplied in sets of 2 pcs.



Code carriers 3R-863.01-10

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

- Supplied in sets of 10 pcs.



Lifting device 90855

For dia. 156 mm pallets, prepared for automation only.

- Suitable for: 3R-681.51, 3R-681.51-SA and 3R-681.156-A
- Weight 1 kg



MacroMagnum – Accessories

3Refix mandrel 3R-901-10E

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

Note: When positioning with 3Refix mandrels – always tighten the expanding mandrel in the R⁰ hole first.



Torque wrench 3R-614-04

For Ø10 mm 3Refix mandrels.

- 4 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.



Air unit 3R-611.46

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

