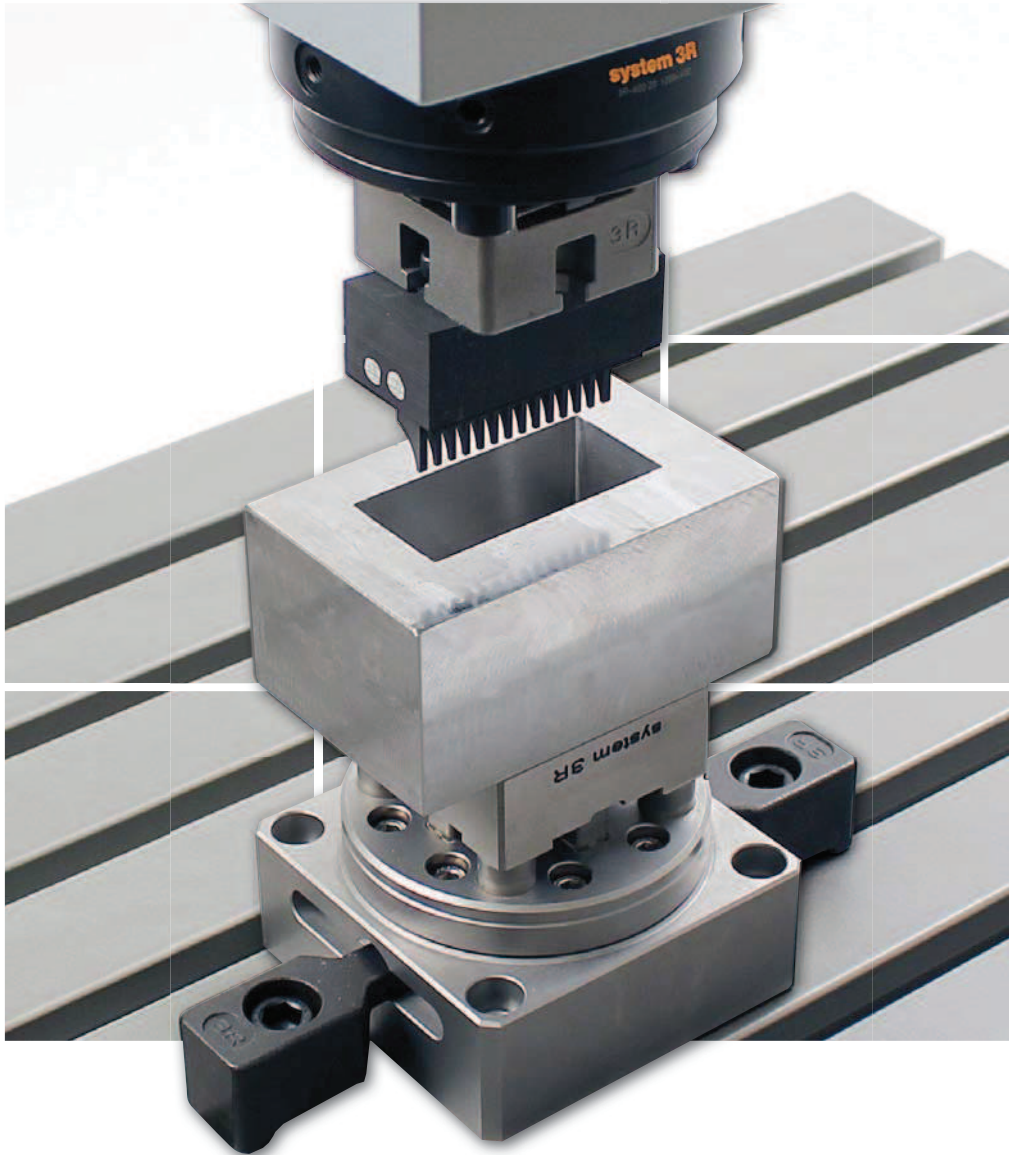
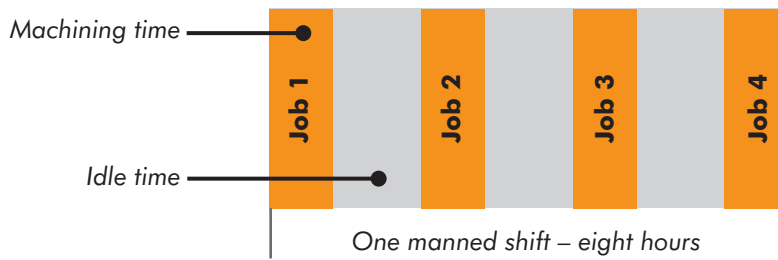


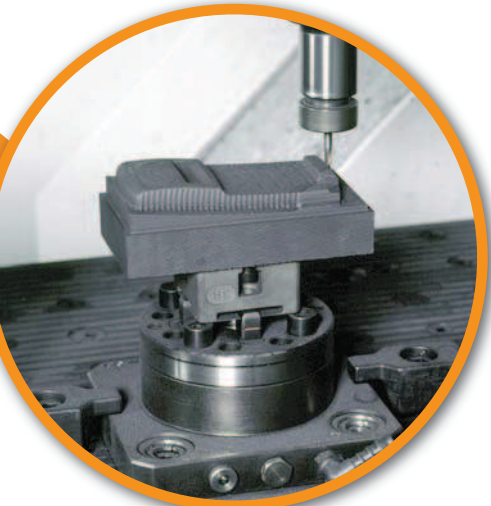
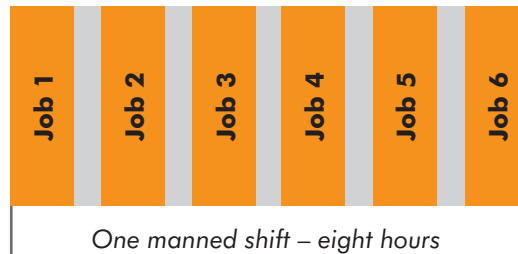
## Reference systems for electrode manufacturing & EDMing



## 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

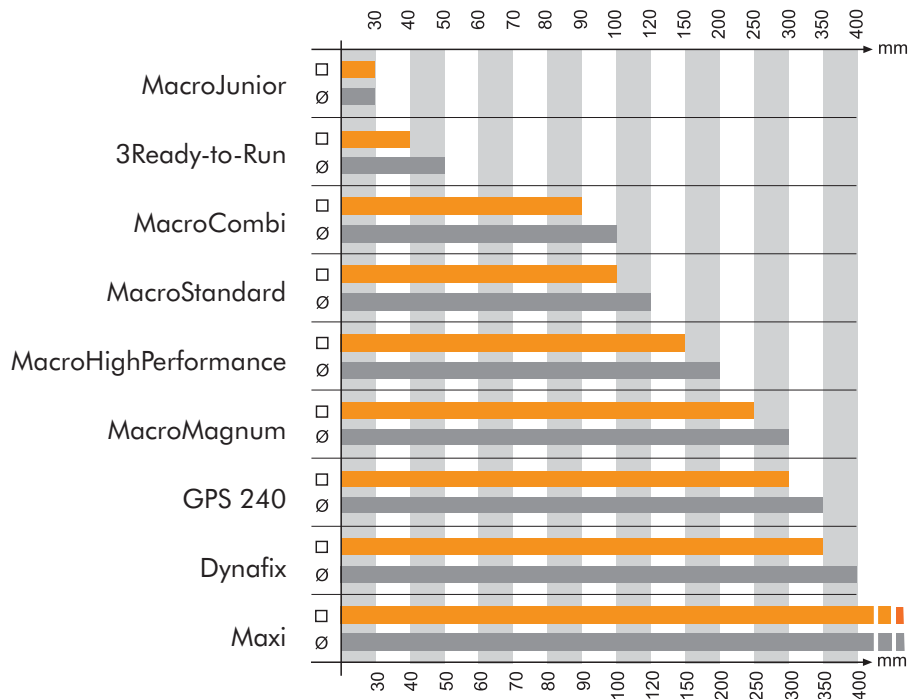
The engineering industry is complex. Every company is unique in terms of type of production, machinery, capacity etc.

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

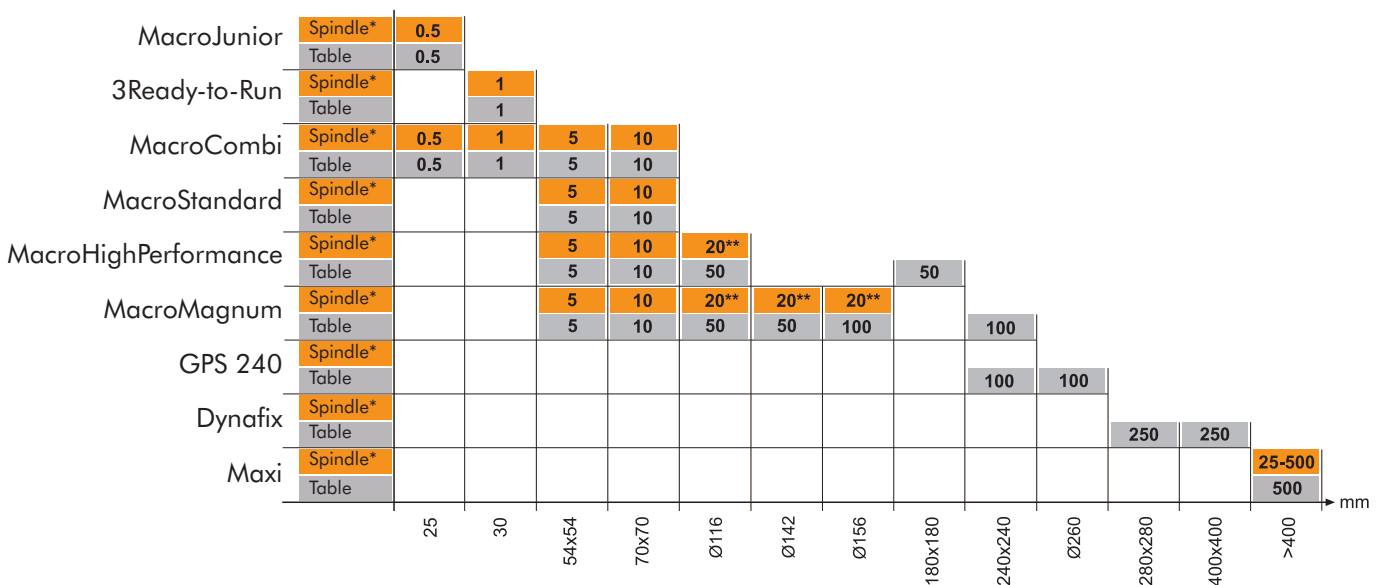
For every size of pallet there is a "recommended"

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

## Mini

- ... reduces setting-up times.
- ... gives rapid and precise mounting.
- ... is suitable for automatic changing with System 3R's automation program.

### Mini

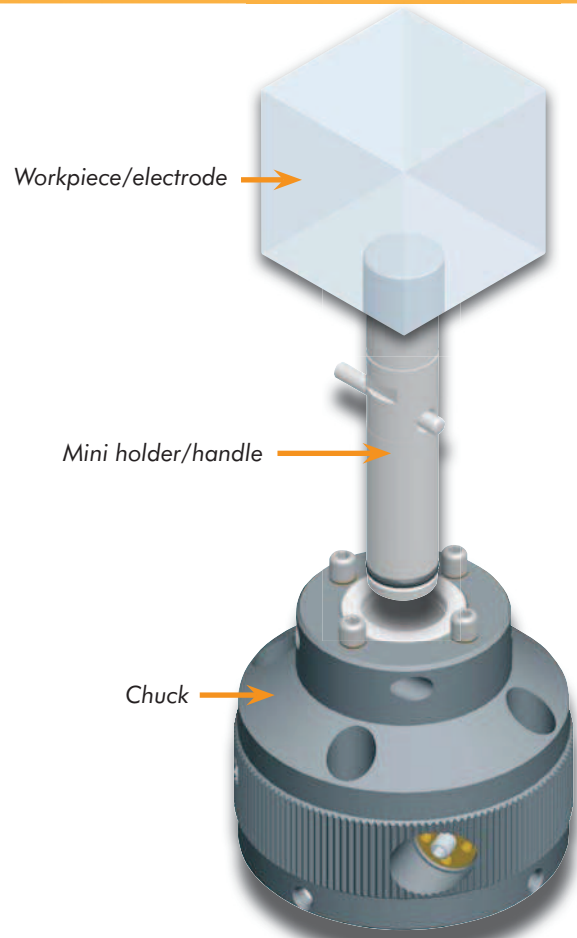
The ancestor of the reference systems! The introduction of the Mini system in the early 1970s created the basis for efficient electrode production and spark-erosion machining. Electrodes could now be produced mounted on inexpensive holders. Subsequent alignment of the electrodes in the spark-erosion machine was eliminated. The Mini system introduced the precision and flexibility that had until then been absent from spark erosion technology.

The Mini system provides rapid and exact mounting of the electrode holders in hydraulic quick-change chucks. This high change accuracy is achieved thanks to the two chambers of the hydraulic system, which expand uniformly and provide symmetrical locking against the fixed Z reference with angular location.

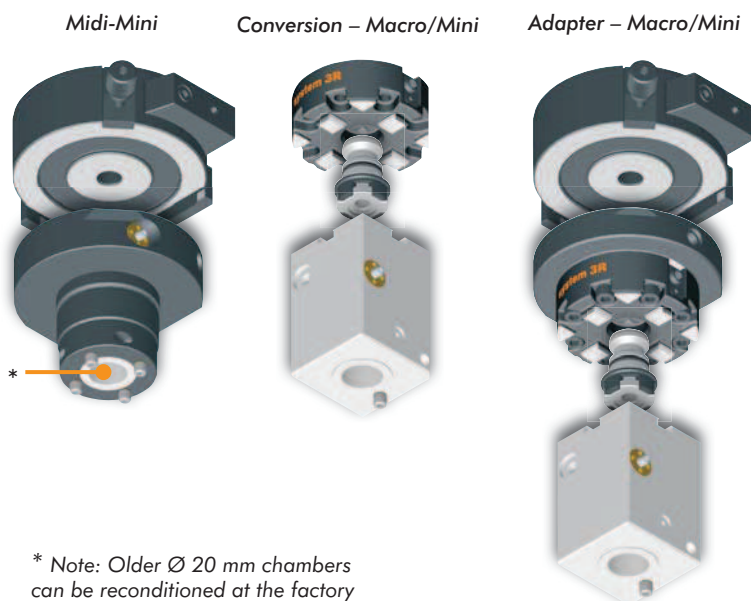
The Mini system is a "Reverse Reference System", in which the chuck adapts itself to the electrode holder, which is why all electrode holders must be exactly alike – in diameter, roundness, straightness and hardness – to meet the accuracy requirements.

Even today, the Mini system is probably the most widespread reference system in the world.

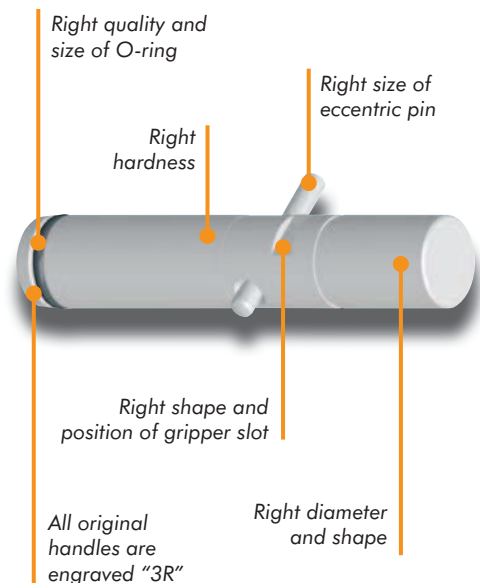
- Clamping force – 4000 N



### Upgrade options:

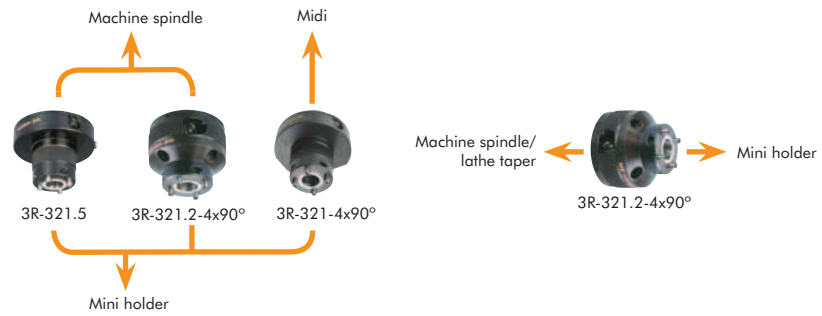


### What distinguishes the original from a pirate copy:



Note: Warranty undertakings only apply if genuine System 3R parts have been used.

# Mini – Chucks



## Spindle chucks

	Article number	Image	Feature
Manual	3R-321.5		Midi ▶ Mini
Manual	3R-321.2-4x90°		
Manual	3R-321-4x90°		

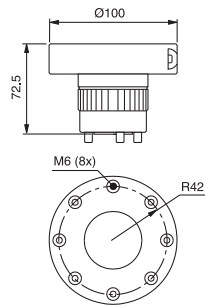
## Lathe chuck

	Article number	Image	Feature
Manual	3R-321.2-4x90°		

### Manual chuck 3R-321.5

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

- Fixed index positions 4x90°
- Flushing connection
- Weight 1.8 kg



### Manual chuck adapter, Midi-Mini 3R-321-4x90°

Hydraulic chuck for mounting on machine spindle with Midi system.

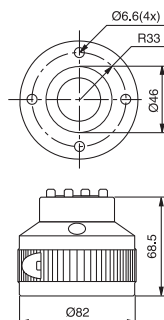
- Fixed index positions 4x90°
- Flushing connection
- Weight 1.3 kg



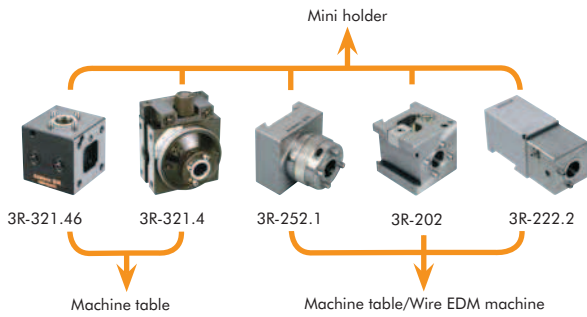
### Manual lathe chuck 3R-321.2-4x90°

Hydraulic chuck with set screws, for mounting on a lathe taper.

- Fixed index positions 4x90°
- Weight 1.3 kg

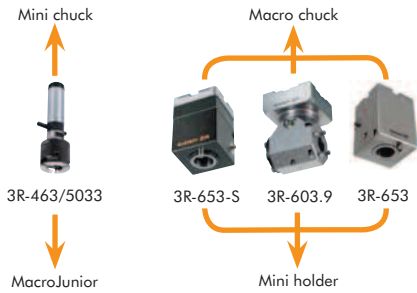


# Mini – Table chucks, Chuck adapters & Rotating spindles



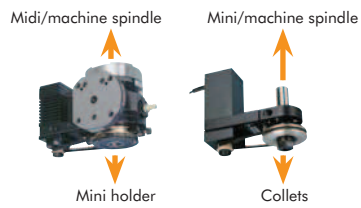
## Table chucks

Manual	Article number	Image	Feature
Manual	3R-321.46		vertical and horizontal
Manual	3R-321.4		vernier scale
Manual wire EDM	3R-252.1		stainless steel
Manual wire EDM	3R-202		stainless steel. Vertical and horizontal
Manual wire EDM	3R-222.2		stainless steel



## Chuck adapters

Manual	Article number	Image	Feature
Manual	3R-463/5033		Mini ► MacroJunior 50 mm
Manual	3R-603.9		Macro ► Mini 90°, rust-resistant
Manual	3R-653		Macro ► Mini, rust-resistant
Manual	3R-653-S		Macro ► Mini



## Rotating spindles

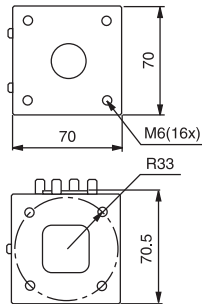
Vertical and horizontal	Article number	Image	Feature
Vertical and horizontal	3R-1.6S		tubular electrodes
Vertical	3R-1.321-HS		tubular electrodes

## Mini – Table chucks, Chuck adapters & Rotating spindles

### MiniBlock 3R-321.46

Manual hydraulic chuck for vertical or horizontal mounting on the machine table.

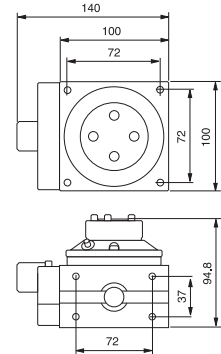
- Fixed index positions 4x90°
- Weight 2.3 kg



### 3R block 3R-321.4

Manual hydraulic chuck for vertical or horizontal mounting on the machine table.

- Fixed index positions 72x5°
- Vernier scale
- Weight 5.4 kg

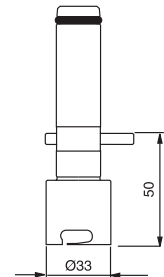


### Manual chuck adapter, Mini-MacroJunior 3R-463/5033

For mounting MacroJunior holders in the Mini system. Axial locking screw with channel for flushing through the electrode.

*Note: For EDM machining only.*

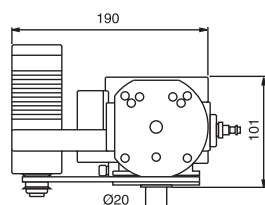
- Adapted for automatic changing
- Fixed index positions 3x120°
- Weight 0.8 kg



### Rotating spindle 3R-1.6S

Electric rotating spindle for electrodes on Mini holders. Vertical or horizontal mounting.

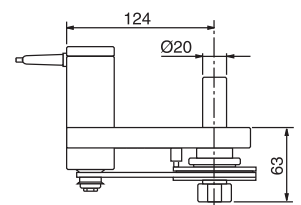
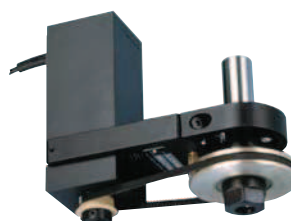
- Immersible
- Maximum electrode weight 2 kg
- Speed range 20-200 rev/min
- Recommended maximum flushing pressure 2 bar.
- Weight 11.6 kg



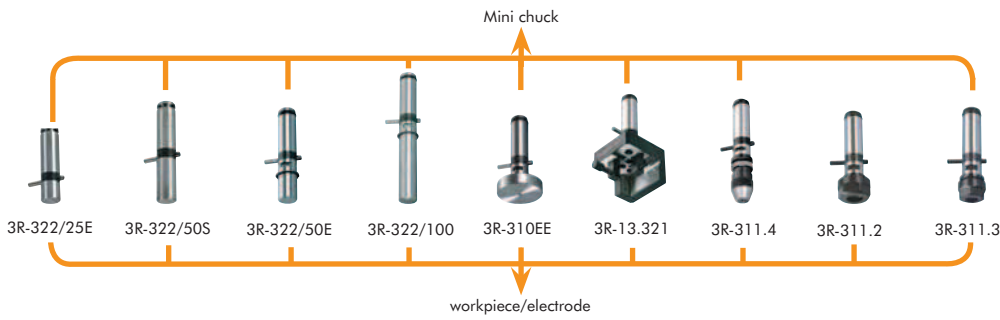
### Rotating spindle 3R-1.321-HS

Electric spindle for tubular electrodes in collets ER16.

- Supplied with collet set 3R-ER16E
- Electrode sizes Ø0.5 – 10 mm.
- Speed range 200 – 2000 rev/min.
- Recommended maximum flushing pressure 40 bar.
- Weight 1.4 kg



# Mini – Electrode holders



Electrode holder	Article number	Feature
Electrode holder Ø20 mm	3R-322/25E	25 mm
Electrode holder Ø20 mm	3R-322/50S	50 mm
Electrode holder Ø20 mm	3R-322/50E	50 mm. automatic changing
Electrode holder Ø20 mm	3R-322/100	100 mm. automatic changing
Electrode holder	3R-310EE	flange Ø50 mm
Electrode holder	3R-13.321	square electrodes
Three-jaw chuck	3R-311.4	Ø0.1 - 3 mm
Collet chuck	3R-311.2	<Ø13 mm, ER20
Collet chuck	3R-311.3	<Ø10 mm, ER 16

## Electrode holder Ø20 mm

Holder with hardened reference part and unhardened electrode mounting part.

### 3R-322/25S

- Electrode mounting part 25 mm
- Flushing duct
- Supplied in sets of 30 pcs
- Weight per set 7 kg

### 3R-322/50S

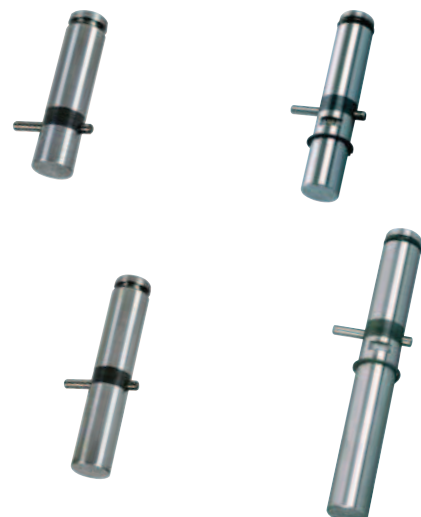
- Electrode mounting part 50 mm
- Flushing duct
- Supplied in sets of 30 pcs
- Weight per set 7.7 kg

### 3R-322/50E

- Adapted for automatic changing
- Electrode mounting part 50 mm
- Flushing duct
- Supplied in sets of 30 pcs
- Weight per set 7.7 kg

### 3R-322/100

- Adapted for automatic changing
- Electrode mounting part 100 mm
- Flushing duct
- Supplied in sets of 10 pcs
- Weight per set 3.8 kg



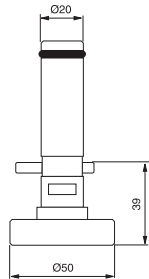


## Mini – Electrode holders & Accessories

### Electrode holder 3R-310EE

Holder with hardened reference part  $\varnothing 20$  mm and unhardened flange  $\varnothing 50$  mm.

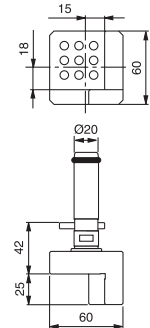
- Adapted for automatic changing
- Electrode mounting part 39 mm
- Flushing duct
- Supplied in sets of 10 pcs.
- Weight per set 4 kg



### Electrode holder 3R-13.321

Holder with hardened reference part  $\varnothing 20$  mm for mounting square and flat electrodes.

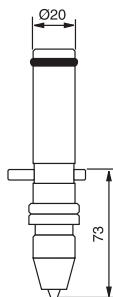
- Max. workpiece: 32x28 mm
- Adapted for automatic changing
- Flushing duct
- Weight 1 kg



### Three-jaw chuck 3R-311.4

Chuck  $\varnothing 20$  mm for  $\varnothing 0.1$ -3 mm electrodes.

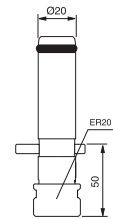
- Adapted for automatic changing
- Weight 0.3 kg



### Collet chuck ER20 3R-311.2

Chuck  $\varnothing 20$  mm for collets ER20 with electrodes  $< \varnothing 13$  mm.

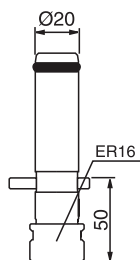
- Adapted for automatic changing
- Weight 0.2 kg



### Collet chuck ER16 3R-311.3

Chuck  $\varnothing 20$  mm for collets ER16 with electrodes  $< \varnothing 10$  mm.

- Adapted for automatic changing
- Weight 0.2 kg



### Check mandrel 3R-23

Ground C-reference.

- Measuring length 100 mm
- Weight 0.6 kg



## Mini – Accessories

### Check ruler 3R-314.2

For setting angular positions.

- Measuring length 96 mm
- Weight 0.4 kg



### Indicating spindle 3R-3.321-2

For measuring centre holes.

- Dial indicator required
- Weight 0.4 kg



### Microscope 3R-4.321

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

- Magnification x25
- Field of view Ø6 mm
- Weight 0.6 kg



### Clip 3R-301

For angular fixing of Mini holders.

- Supplied in sets of 10 pcs.



### Soldering kit 3R-403

For soldering electrode blanks on Mini holders.

- Supplied with flux.



### Electrode cassette 3R-150/5

For Mini holder x30.

- Supplied in sets of 5 pcs.



### Adapter plate 3R-601.6

For mounting (for example) rotating spindles in the Macro system.

- MacroHP coupling
- Rust-resistant

