

MacroNano

- ... Extremely high accuracy.
- ... High-precision machines are linked together in the production chain, without detracting from the extreme accuracy.
- ... Feedback to the machine for supplementary machining after inspection is possible. This feedback is only meaningful if the pallet system is at least as accurate as the measuring machine.

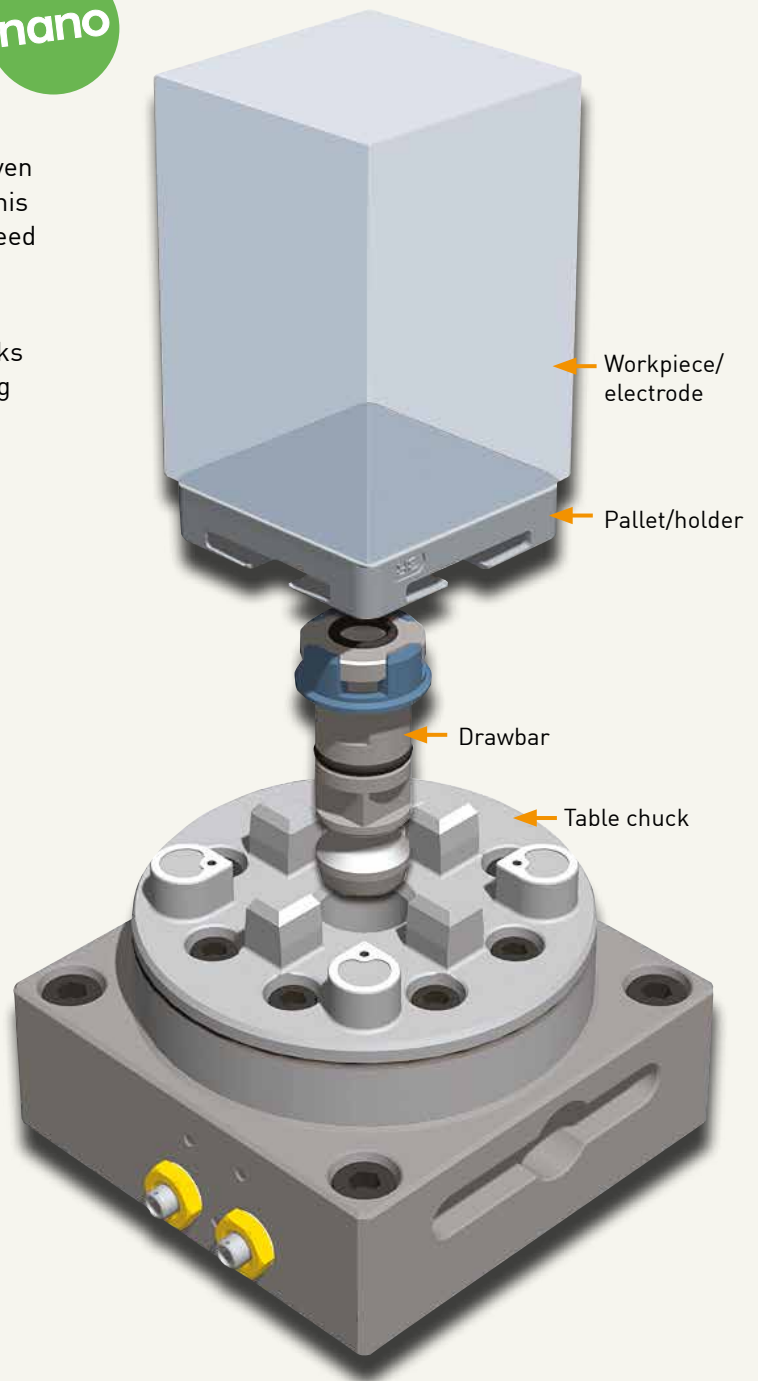


Workholding for Nano Precision

Nano-precision machining requires nano-precision referencing of workpieces and tools- a real challenge even with state of the art solutions available in the market. This becomes even more challenging when the references need to be established in the shortest possible time.

MacroNano system is best described in two words as precise and quick! The MacroNano clamping system links the production chain through an ultra-precision coupling both for workpiece and tool holding.

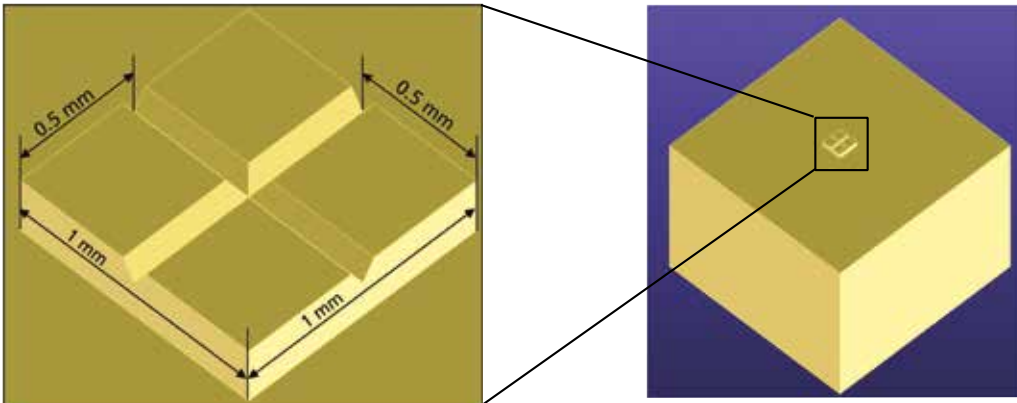
- + Repetition accuracy – within 0,001 mm
- + Locking force – 6000 N
- + Fixed index positions – 4x90°
- + Required air pressure, pneumatic chuck – 6±1 bar
- + Recommended max workpiece weight – 50 kg.



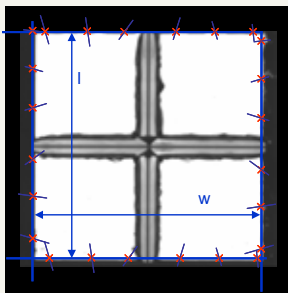
MacroNano

Application example: Microstructuring with Diamond Machining

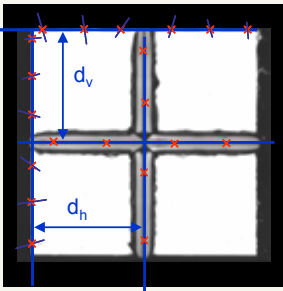
Micro features produced with nano precision



This micro structure is produced by Diamond Flycutting operations on two different machines, each equipped with a MacroNano chuck. The square in the middle of the workpiece (right picture) is produced by plane milling on 1st machine, making use of indexing feature of the MacroNano system. The pallet carrying the workpiece is then transferred to the chuck on 2nd machine to produce the micro-grooves, once again using the indexing feature. The zero reference was determined only once on the 1st machine and then carried through the whole process chain using both the indexing precision and the system precision of the MacroNano system; overall structure deviation is less than 0.5 micron.



Measurement of the cube dimensions

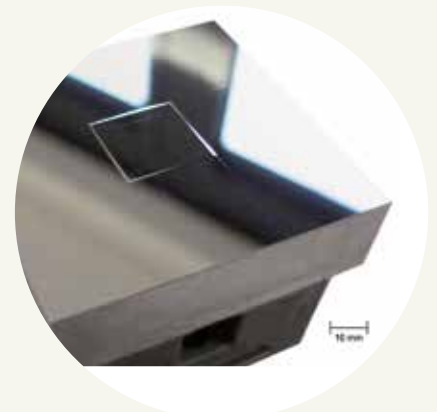
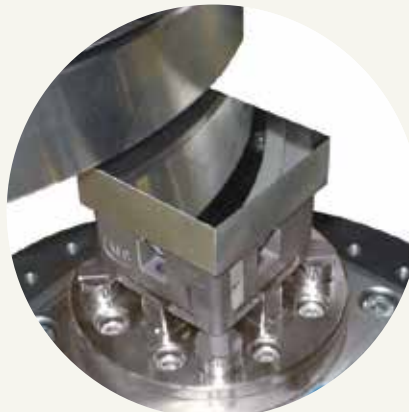


Measurement of groove positions

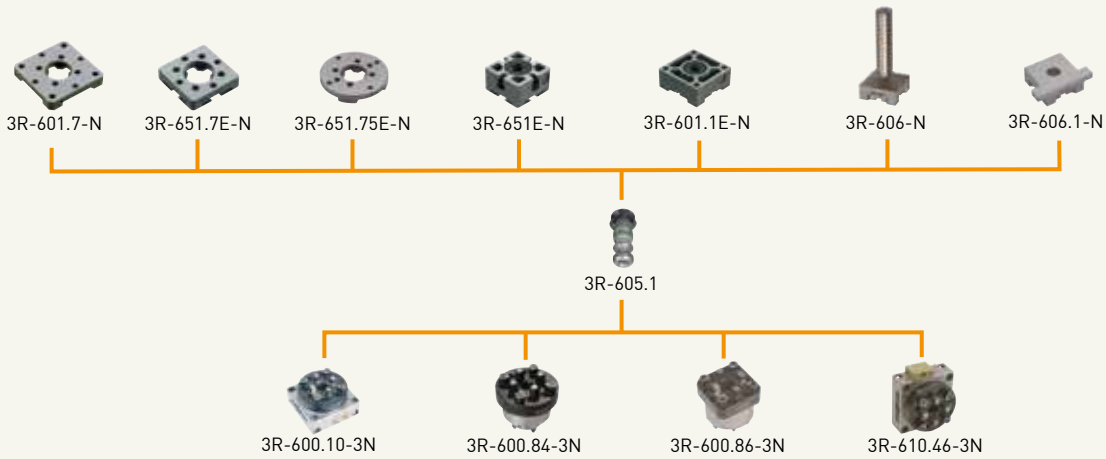
	Width (mm)	Length (mm)	Vertical dist. (mm)	Horizontal dist. (mm)
W_1	0.9996	l_1 0.9999	d_{v1} 0.4988	d_{h1} 0.5013
W_2	0.9996	l_2 0.9999	d_{v2} 0.4993	d_{h2} 0.4995
W_3	0.9996	l_3 0.9999	d_{v3} 0.4996	d_{h3} 0.5001
W_4	0.9997	l_4 0.9999	d_{v4} 0.4991	d_{h4} 0.4995
W_5	0.9996	l_5 0.9998	d_{v5} 0.5010	d_{h5} 0.5001
W_6	0.9996	l_6 0.9998	d_{v6} 0.5007	d_{h6} 0.5002
W_7	0.9997	l_7 0.9999	d_{v7} 0.4996	d_{h7} 0.5012
W_8	0.9996	l_8 0.9999	d_{v8} 0.4992	d_{h8} 0.5009
W_9	0.9997	l_9 0.9999	d_{v9} 0.4996	d_{h9} 0.5009
W_{10}	0.9996	l_{10} 0.9998	d_{v10} 0.4998	d_{h10} 0.5008
W	0.9996	l 0.9999	d_v 0.4997	d_h 0.5004

Mean values

Overall structure deviation < 0.5 μm



MacroNano – Chucks, pallets & accessories



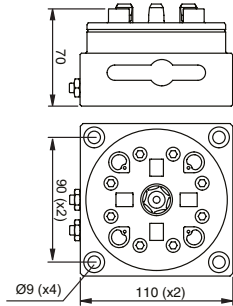
Pneumatic chuck, MacroNano, 3R-600.10-3N

Chuck for mounting on the machine table.

- Fixed index positions 4x90°
- Required air pressure, pneumatic chuck – 6±1 bar
- References of cemented carbide
- Required drawbar 3R-605.1
- Air-blast cleaning of Z-references
- Turbo locking
- Weight 4.4 kg.



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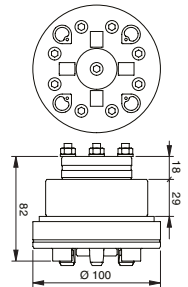
Pneumatic chuck, MacroNano, 3R-600.84-3N

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

- Fixed index positions 4x90°
- Required air pressure, pneumatic chuck – 6±1 bar
- References of cemented carbide
- Required drawbar 3R-605.1
- Air-blast cleaning of Z-references
- Turbo locking
- Weight 2,4 kg.



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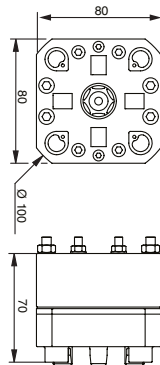
Pneumatic chuck, MacroNano, 3R-600.86-3N

Chuck for building-in, for example in a fixture.

- Fixed index positions 4x90°
- Required air pressure, pneumatic chuck – 6±1 bar
- References of cemented carbide
- Required drawbar 3R-605.1
- Air-blast cleaning of Z-references
- Turbo locking
- Weight 1.8 kg.



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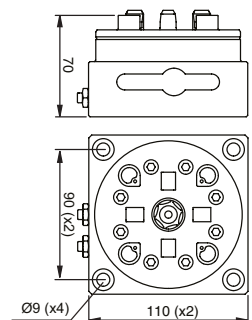
Pneumatic chuck, MacroNano, 3R-610.46-3N

Chuck for mounting on the machine table with integral air unit. For horizontal and vertical use.

- Fixed index positions 4x90°
- Required air pressure, pneumatic chuck – 6±1 bar
- References of cemented carbide
- Required drawbar 3R-605.1
- Air-blast cleaning of Z-references
- Turbo locking
- Weight 4.4 kg.



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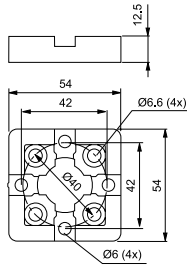
MacroNano – Pallets & accessories

Reference element 54x54 mm, MacroNano, 3R-651.7E-N

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.

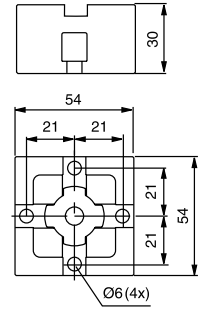
- Fixed index positions 4x90°
- Parallel-ground top and bottom face
- Rust resistant
- Supplied in sets of 8 pcs.
- Weight per set 1.2 kg.



Pallet 54x54 mm, MacroNano, 3R-651E-N

Hardened with clearance holes for four fixing screws.

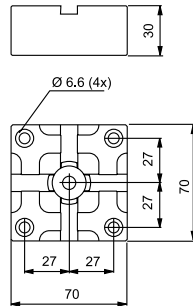
- Fixed index positions 4x90°
- Ready for code carrier
- Rust resistant
- Supplied in sets of 8 pcs.
- Weight per set 3.4 kg.



Pallet 70x70 mm, MacroNano, 3R-601.1E-N

Hardened with clearance holes for four fixing screws.

- Fixed index positions 4x90°
- Ready for code carrier
- Rust resistant
- Supplied in sets of 5 pcs.
- Weight per set 3.6 kg.

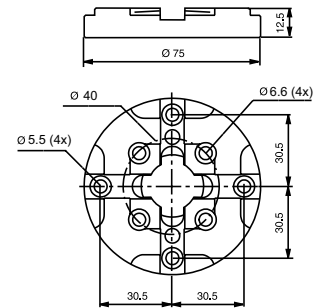


Reference element Ø 75 mm, MacroNano, 3R-651.75E-N

Hardened and milled with clearance holes for eight fixing screws.

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

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

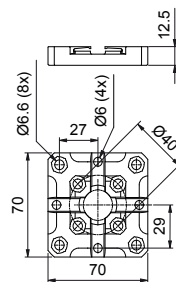
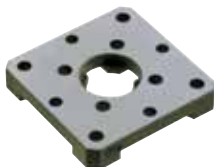


Reference element 70x70 mm, MacroNano, 3R-601.7-N

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.

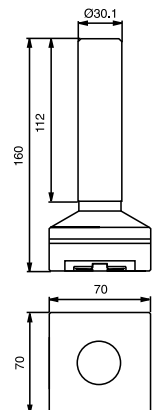
- Parallel-ground top and bottom faces
- Fixed index positions 4x90°
- Rust resistant
- Supplied in sets of 5
- Weight per set 3 kg.



Check mandrel, MacroNano, 3R-606-N

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

- Measuring length 110 mm.
- Weight 2.3 kg.

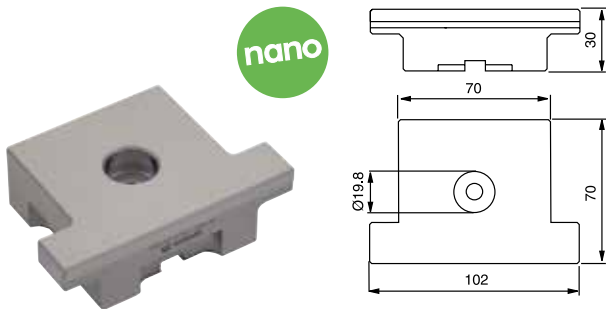


MacroNano – Accessories

Check ruler, MacroNano, 3R-606.1-N

For setting angular positions and for centring Macro chucks.

- Measuring length 100 mm.
- Weight 1.4 kg.



Drawbar, 3R-605.1E

- $\varnothing 20 \times 57.1$ mm with flushing holes $\varnothing 7$ mm.
- Supplied in sets of 10 pcs.



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 use on pallets.

- Supplied in sets of 10.

