

System 3R

Tooling

for Powder Compacting Technology



System 3R

Simple, quick & precise!

- + Simple, quick set-up
- + High accuracy
- + Low scrap rate
- + Maximal machine utilization
- + Increased productivity



Contents

Introduction	2
Tooling systems for punches and dies	6
Singel level configuration, 12-16 ton	8
Singel level configuration, 30-32 ton	12
Singel level configuration, 50-64 ton	15
Singel level configuration, 70-100 ton	18
Multi level configuration	19
Flexibility in Press	22
Other tooling	25
Veryfying tools	27
MacroNano & MatrixNano	29
VDP	31
System 3R – One Source Productivity Solutions	33



Experience always shows that measures to reduce the idle times of your machines are significantly more worthwhile than chasing seconds in the actual machining process. The solution is a stable and exact reference system. This lets you preset away from the machine and then set up the machine with minimum idle time.

Quickly and precisely!

Use System 3R tooling when producing punches and dies

Gives an increased productivity in the Tool shop by a reduction of the set-up times, improved accuracy & quality and reduced number of rejections.

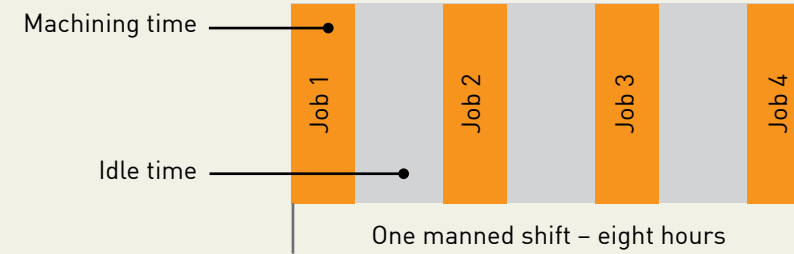
Use System 3R tooling also in the powder compaction process

Reduces the set-up times in the press and gives an improved accuracy & quality and less repairs.

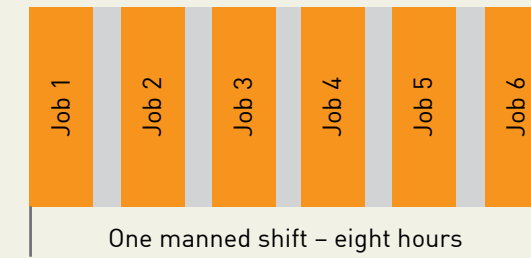


Fitting the machines with the same reference system means that electrodes and workpieces can be moved between the machines without subsequent alignment and checking – **One Minute Set-up.**

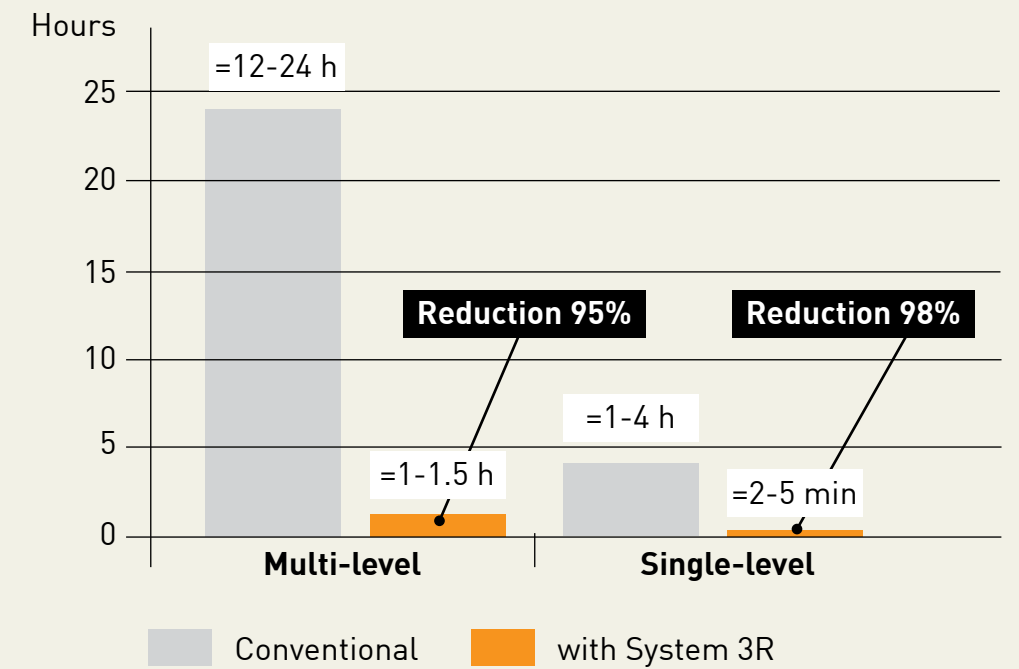
Conventional setting-up



Pallet system



**One Minute Set-up
Set-up time: change & alignment**

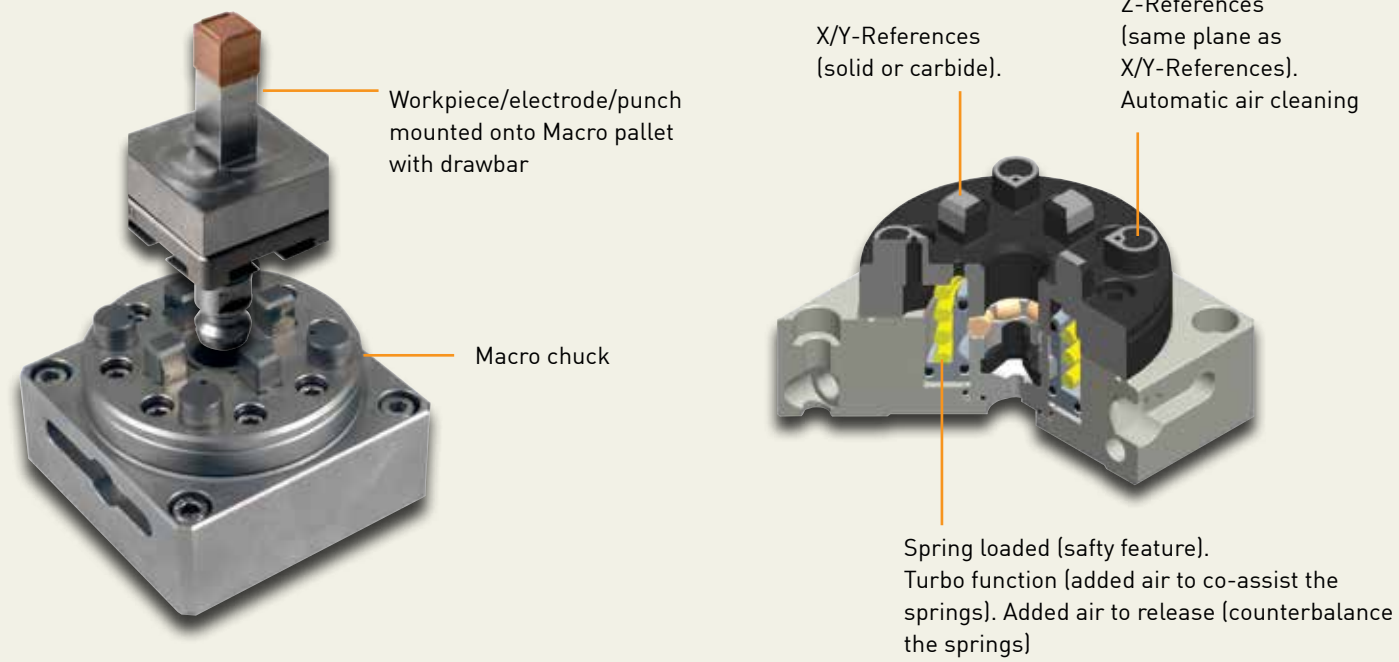


A reference system minimises setup times
Every minute that can be converted from internal to external setting time increases the spindle time of the machine and with it the productivity of the business.

Big earnings are within your reach
The machine generates revenue when its spindle is turning – and only then.
Work smarter, not harder.

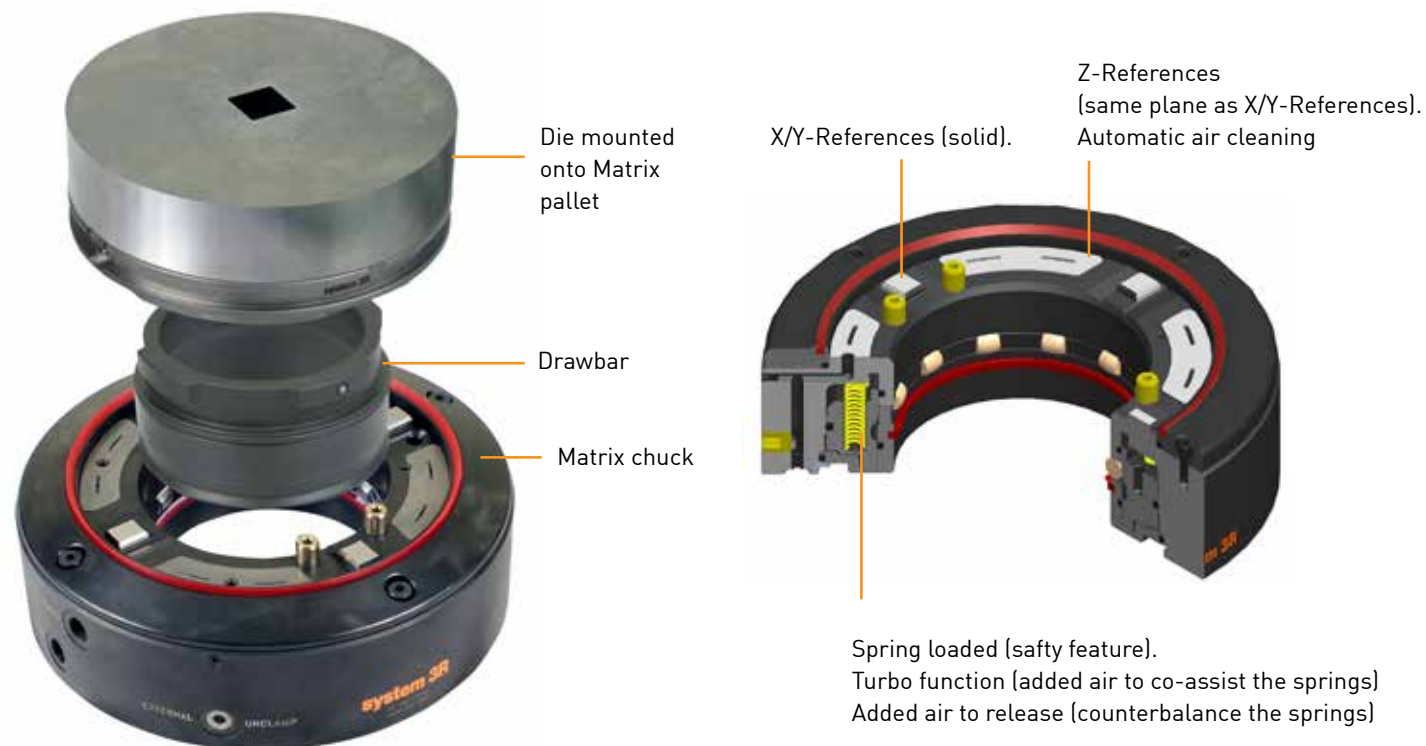
The Macro system for punches

Choice of reference element is determined by required pressing force.



Note: Recommended air pressure, pneumatic chuck 6±1 bar.

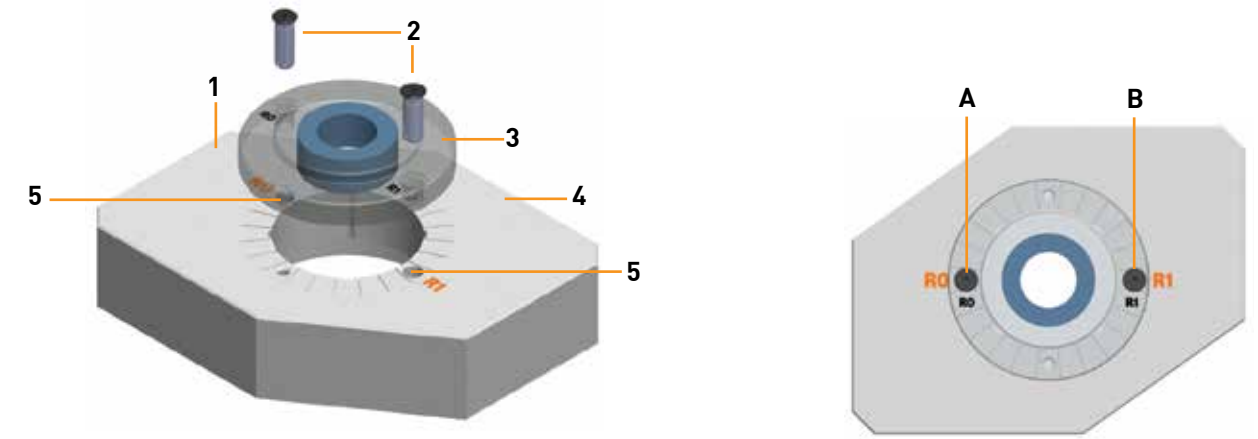
The Matrix system for dies and punches



Note: For the entire product range see www.system3r.com

3Refix for dies

3Refix is a cost effective solution. The 3Refix expanding mandrels (2 pcs) determines the position. First 3Refix mandrel is to determine X/Y-position and the second to determine the angle.



Description

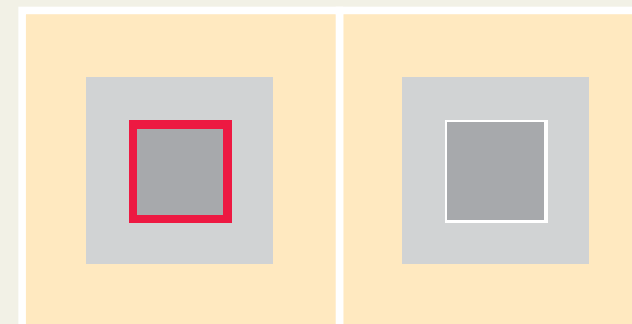
- 1 Z-reference surface
- 2 3Refix mandrels
- 3 Customer made die
- 4 Die plate (table)
- 5 Die plate only requires two holes for 3Refix mandrels

Procedure (always)

- A Tighten R0 (primary)
- B Tighten R1 (secondary)

Positioning accuracy

Improved positional accuracy.
Closer tolerances for finer grains.

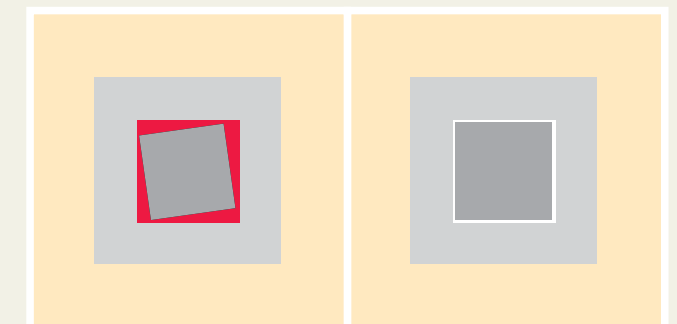


Conventional setting-up

Setting-up with System 3R

Angular accuracy

Smaller angular deviations
Less wear and damage to punch and die.

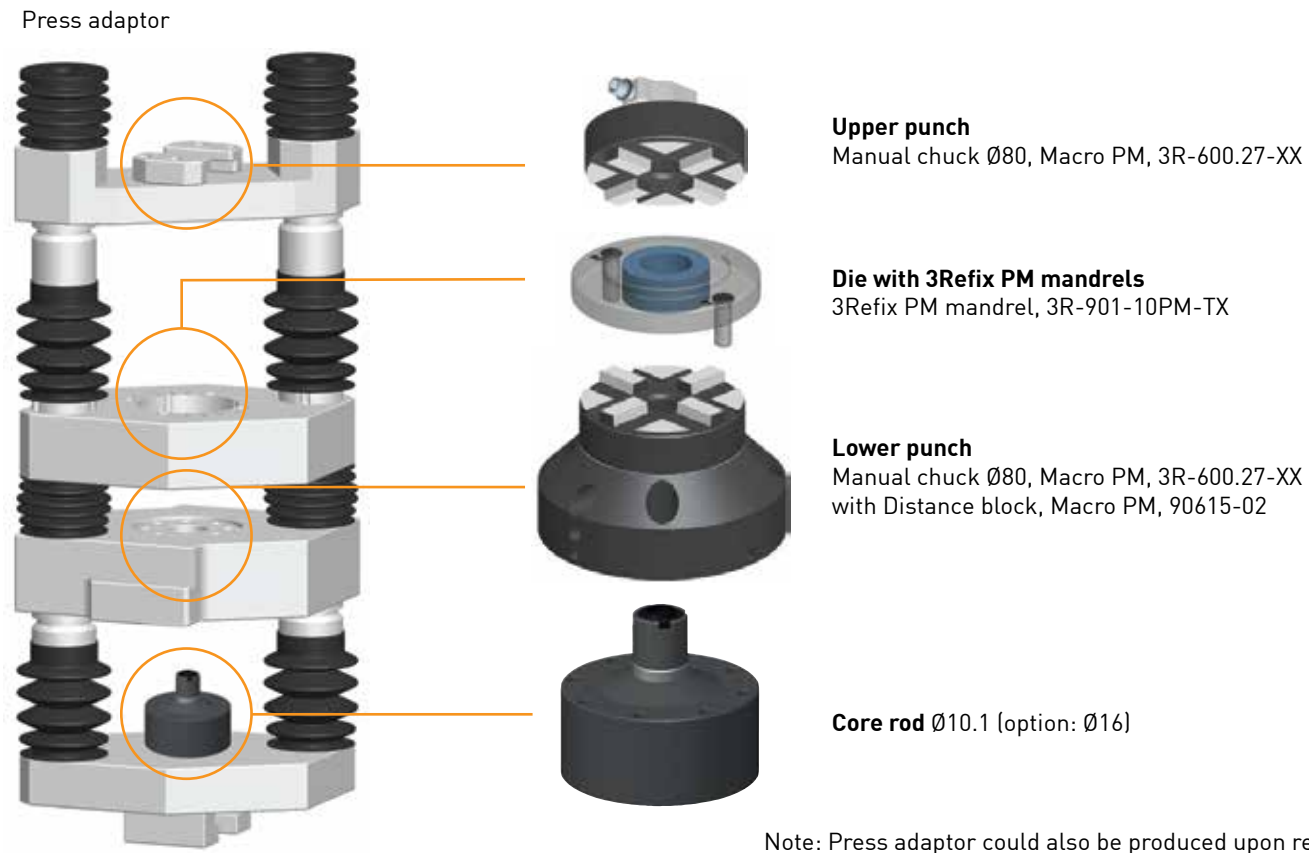


Conventional setting-up

Setting-up with System 3R

Single level configuration

Manual option



Single level – 12-16 ton configuration

Die

3Refix PM mandrel, 3R-901-10PM-TX, Ø10 mm,

- Recommended tightening torque 4 Nm.
- Weight 0.02 kg.



Pneumatic chuck, Matrix 142, 3R-690.1-142

Chuck for permanent mounting into a PM press.

- Built in height 50 mm.
- Max pressure 50 ton.
- Required drawbar 3R-695.2-142
- Weight 7 kg.

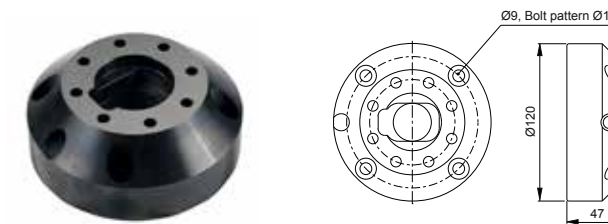


Punch

Distance block, Macro PM, 90615-02

For manual Macro chuck, i.e. 3R-600.27-XX.

- Built in height 47 mm.
- Weight 2.8 kg.



Manual chuck (built-in) Ø80, Macro PM, 3R-600.27-30

- Built in height 22 mm
- Max pressure 32 ton.
- Required drawbar 3R-605.11
- Torque 6 Nm.
- Weight 1 kg.

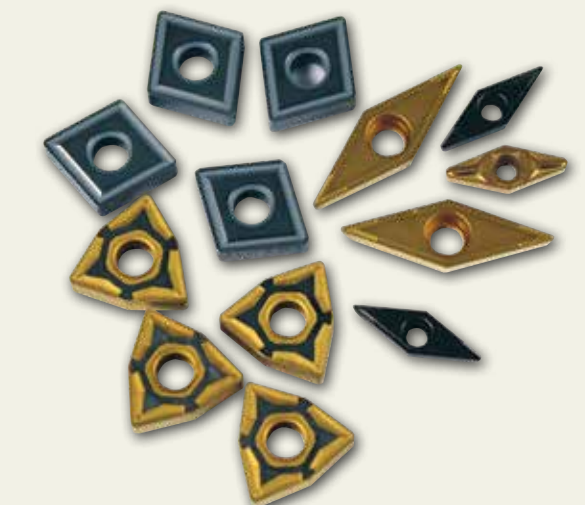


Manual chuck, Macro, D-20173

- Built in height 27 mm
- Max pressure 16 ton.
- Required drawbar 90958
- Weight 1 kg.



Automatic option



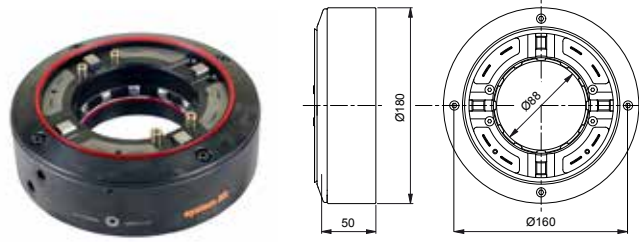
Powder Compacting Technology – Produced details

Single level – 12-16 ton configuration

Pneumatic chuck, Matrix 142, 3R-690.1-142

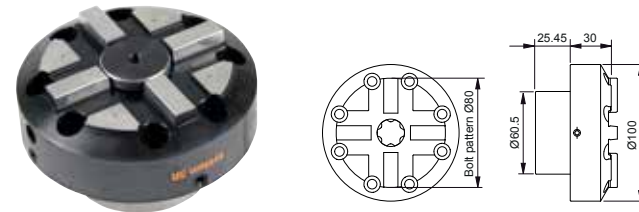
Chuck for permanent mounting into a PM press.

- Built in height 50 mm
- Max pressure 50 ton.
- Required drawbar 3R-695.2-142
- Weight 7 kg.



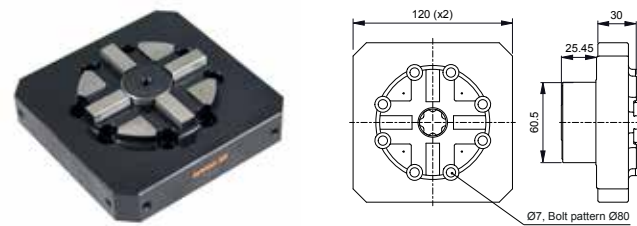
Built in chuck, Pneumatic, Macro PM, 3R-600.17-32

- Built in height 30 mm
- Max pressure 32 ton.
- Required drawbar 3R-605.11
- Weight 2 kg.



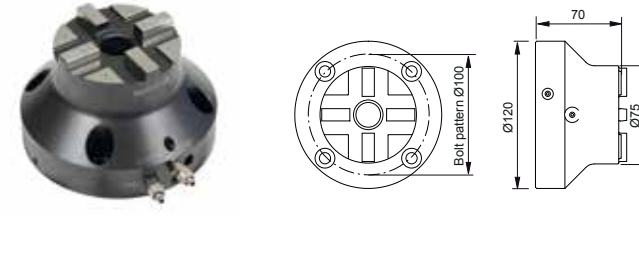
Built in chuck, Pneumatic, Macro PM, 3R-600.17-34

- Built in height 30 mm
- Max pressure 32 ton.
- Required drawbar 3R-605.11
- Weight 2.9 kg.



Pneumatic chuck, Macro PM, 3R-600.17-30

- Built in height 70 mm
- Max pressure 32 ton.
- Required drawbar 3R-605.11



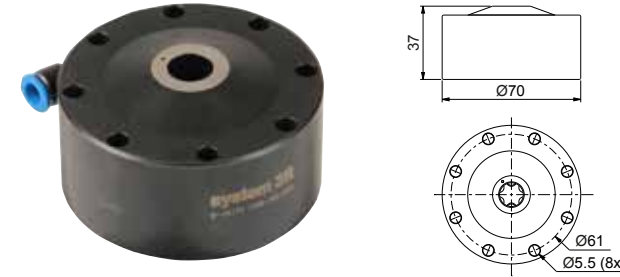
Single level – 12-16 ton configuration

Core rod

Pneumatic Core rod chuck, D-20175

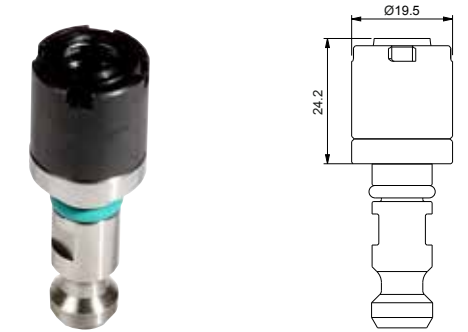
For holder D-20175.10

- Built in height 37 mm



Holder, D-20175.10

Pallet for core rods (Ø10 mm)



Accessories

Drawbar, Macro, 3R-605.11

- Through hole Ø10.2 mm
- Weight 0.2 kg.



Drawbar, Macro, 90958

Requires chuck D-20173.

- Through hole Ø10.2 mm
- Weight 0.1 kg.



Note: With automation, the gripper has to grip on the pallet or change drawbar with gripper interface (i.e. 3R-605.1).

Locking ring key, 3R-605-GE

To lift the locking ring of the drawbars.

- Supplied in sets of 2



Single level – 30-32 ton configuration

Die

3Refix PM mandrel, 3R-901-10PM-TX, Ø10 mm,

- Recommended tightening torque 4 Nm.
- Weight 0.02 kg.



Pneumatic chuck, Matrix 142, 3R-690.1-142

Chuck for permanent mounting into a PM press.

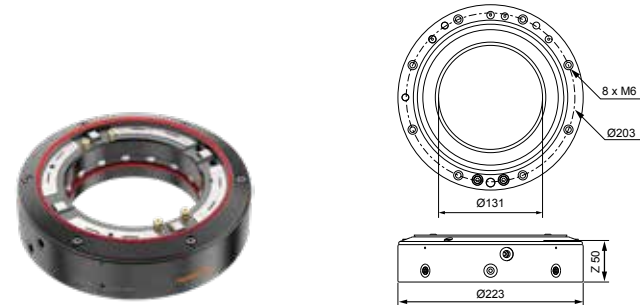
- Built in height 50 mm
- Max pressure 50 ton.
- Required drawbar 3R-695.2-142
- Weight 7 kg.



Pneumatic chuck, Matrix 185, 3R-690.1-185

Chuck for permanent mounting into a PM press.

- Built in height 50 mm
- Max pressure 100 ton.
- Required drawbar 3R-695.2-185
- Weight 9 kg.

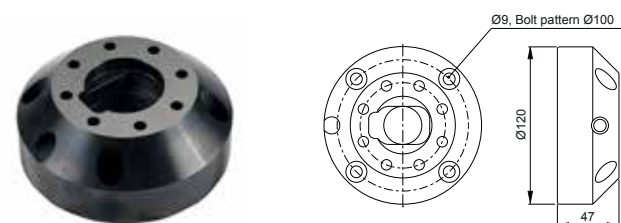


Punch

Distance block, Macro PM, 90615-02

For manual Macro chuck, i.e. 3R-600.27-XX.

- Built in height 47 mm.
- Weight 2.8 kg.



Manual chuck (built-in) Ø80, Macro PM, 3R-600.27-30

- Built in height 22 mm
- Maximal pressure 32 ton.
- Required drawbar 3R-605.11
- Torque 6 Nm.
- Weight 1 kg.

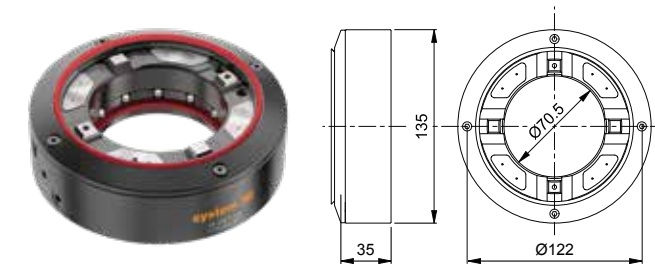


Single level – 30-32 ton configuration

Pneumatic chuck, Matrix 110, 3R-690.1-110

Chuck for permanent mounting into a PM press.

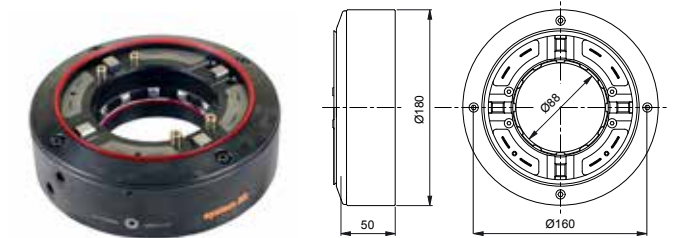
- Built in height 35 mm
- Max pressure 25 ton.
- Required drawbar 3R-695.2-110
- Weight 2.5 kg.



Pneumatic chuck, Matrix 142, 3R-690.1-142

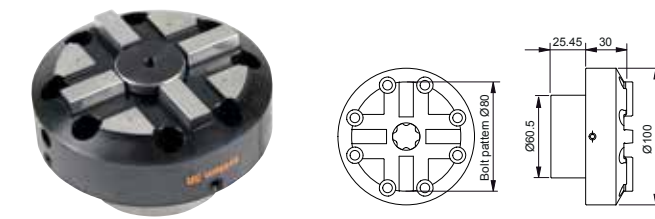
Chuck for permanent mounting into a PM press.

- Built in height 50 mm
- Max pressure 50 ton.
- Required drawbar 3R-695.2-142
- Weight 7 kg.



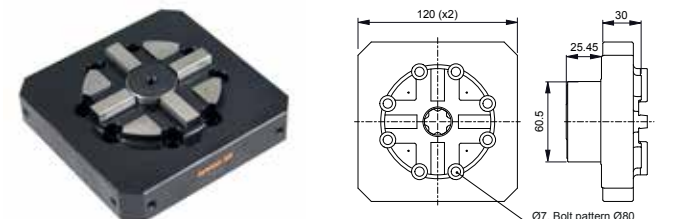
Built in chuck, Pneumatic, Macro PM, 3R-600.17-32

- Built in height 30 mm
- Max pressure 32 ton.
- Required drawbar 3R-605.11
- Weight 2 kg.



Built in chuck, Pneumatic, Macro PM, 3R-600.17-34

- Built in height 30 mm
- Max pressure 32 ton.
- Required drawbar 3R-605.11
- Weight 2.9 kg.

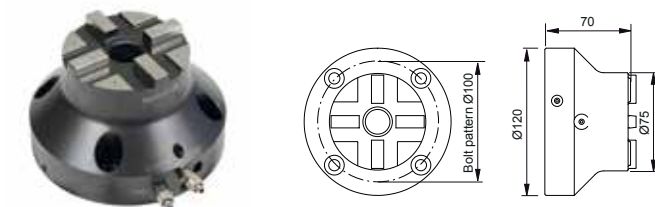


Pneumatic chuck, Macro PM, 3R-600.17-30

- Built in height 70 mm
- Max pressure 32 ton.
- Required drawbar 3R-605.11

Pneumatic chuck, Macro PM, 90803.50

- Built in height 70 mm
- Max pressure 50 ton.
- Required drawbar 90840.55 (core rods up to Ø16 mm can be used)

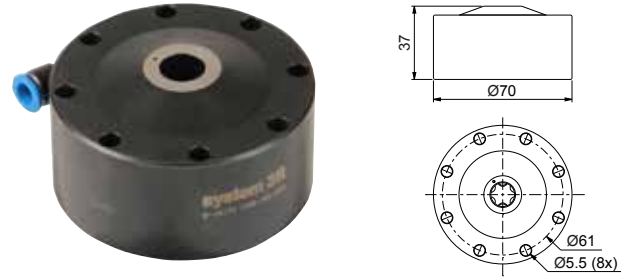


Single level – 30-32 ton configuration

Core rod

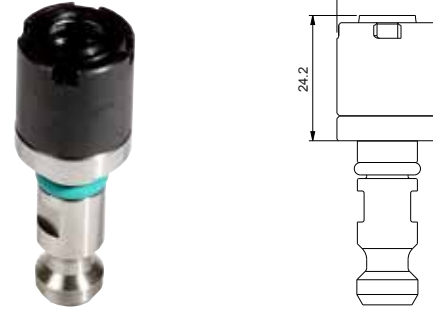
Pneumatic Core rod chuck, D-20175

- For holder D-20175.10
- Built in height 37 mm



Holder, D-20175.10

Pallet for core rods (Ø10 mm)



Accessories

Drawbar, Macro, 90840.55

- Requires chuck 90803.50.
- Through hole Ø16 mm
 - Weight 0.2 kg.



Drawbar, Macro, 3R-605.11

- Through hole Ø10.2 mm
- Weight 0.2 kg.



Note: With automation, the gripper has to grip on the pallet or change drawbar with gripper interface (i.e. 3R-605.1).

Locking ring key, 3R-605-GE

- To lift the locking ring of the drawbars.
- Supplied in sets of 2



Single level – 50-64 ton configuration

Die

3Refix PM mandrels,

3R-901-10PM-TX, Ø10 mm,

- Recommended tightening torque 4 Nm.
- Weight 0.02 kg.

3R-901-20PM-TX, Ø20 mm,

- Recommended tightening torque 10 Nm.
- Weight 0.1 kg.



Pneumatic chuck, Matrix 142, 3R-690.1-142

Chuck for permanent mounting into a PM press.

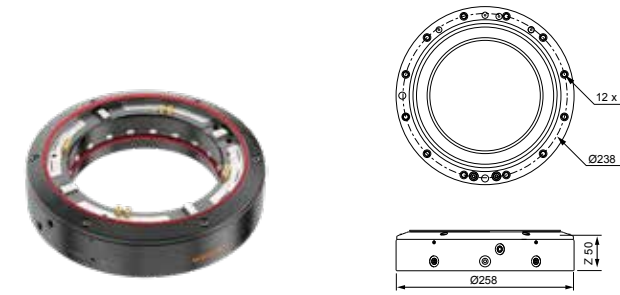
- Built in height 50 mm.
- Max pressure 50 ton.
- Required drawbar 3R-695.2-142
- Weight 7 kg.



Pneumatic chuck, Matrix 220, 3R-690.1-220

Chuck for permanent mounting into a PM press.

- Built in height 50 mm.
- Max pressure 150 ton.
- Required drawbar 3R-695.2-220
- Weight 11 kg.

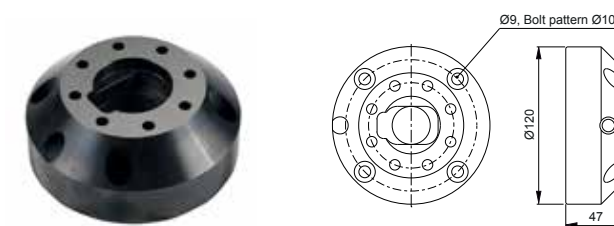


Punch

Distance block, Macro PM, 90615-02

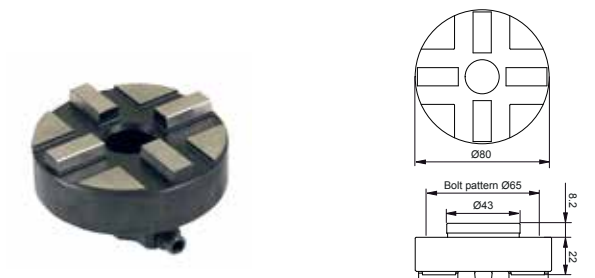
For manual Macro chuck, i.e. 3R-600.27-XX.

- Built in height 47 mm.
- Weight 2.8 kg.



Manual chuck (built-in) Ø80, Macro PM, 3R-600.27-60

- Built in height 22 mm
- Max pressure 64 ton.
- Required drawbar 3R-605.11
- Torque 6 Nm.
- Weight 1 kg.

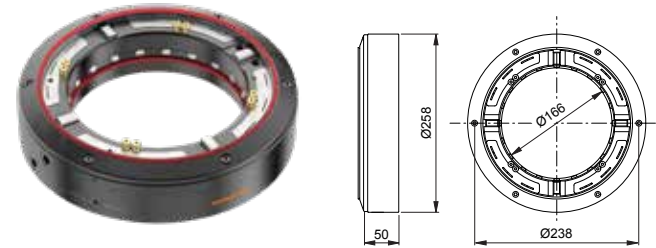


Single level – 50-64 ton configuration

Pneumatic chuck, Matrix 220, 3R-690.1-220

Chuck for permanent mounting into a PM press.

- Built in height 50 mm
- Max pressure 150 ton.
- Required drawbar 3R-695.2-220
- Weight 11 kg.



Pneumatic chuck, Matrix 142, 3R-690.1-142

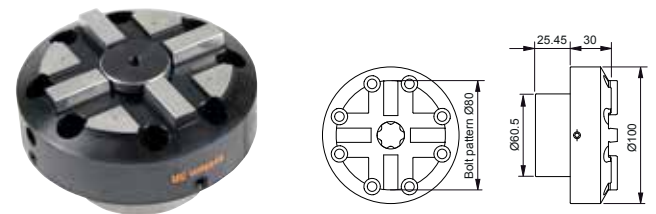
Chuck for permanent mounting into a PM press.

- Built in height 50 mm
- Max pressure 50 ton.
- Required drawbar 3R-695.2-142
- Weight 7 kg.



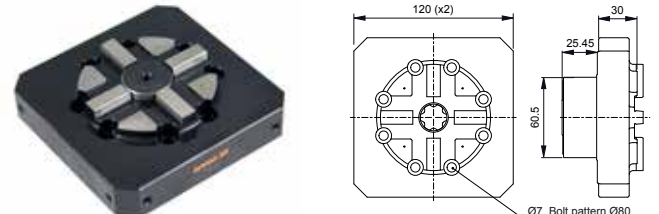
Built in chuck, Pneumatic, Macro PM, 3R-600.17-62

- Built in height 30 mm
- Max pressure 64 ton.
- Required drawbar 3R-605.11
- Weight 2 kg.



Built in chuck, Pneumatic, Macro PM, 3R-600.17-64

- Built in height 30 mm
- Max pressure 64 ton.
- Required drawbar 3R-605.11
- Weight 2.9 kg

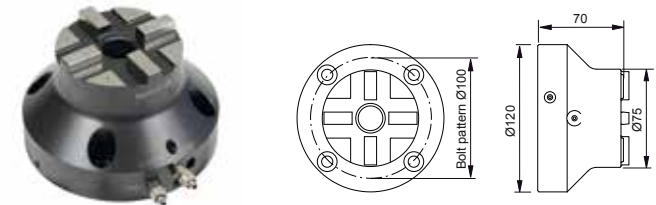


Pneumatic chuck, Macro PM, 3R-600.17-60

- Built in height 70 mm
- Max pressure 64 ton.
- Required drawbar 3R-605.11

Pneumatic chuck, Macro PM, 90803.50

- Built in height 70 mm
- Max pressure 50 ton.
- Required drawbar 90840.55 (core rods up to Ø16 mm can be used)



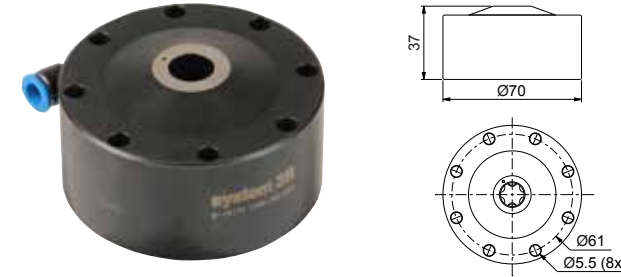
Single level – 50-64 ton configuration

Core rod

Pneumatic Core rod chuck, D-20175

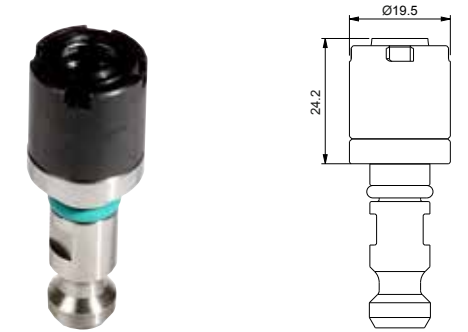
For holder D-20175.10

- Built in height 37 mm



Holder, D-20175.10

Pallet for core rods (Ø10 mm)



Accessories

Drawbar, Macro, 90840.55

Requires chuck 90803.50.

- Through hole Ø16 mm
- Weight 0.2 kg.



Drawbar, Macro, 3R-605.11

- Through hole Ø10.2 mm
- Weight 0.2 kg.



Note: With automation, the gripper has to grip on the pallet or change drawbar with gripper interface (i.e. 3R-605.1).

Locking ring key, 3R-605-GE

To lift the locking ring of the drawbars.

- Supplied in sets of 2



Single level – 70-100 ton configuration

Die

3Refix PM mandrel, 3R-901-20PM-TX, Ø20 mm,

- Recommended tightening torque 10 Nm.
- Weight 0.1 kg.



Pneumatic chuck, Matrix 185, 3R-690.1-185

Chuck for permanent mounting into a PM press.

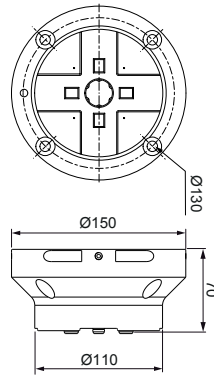
- Built in height 50 mm
- Max pressure 100 ton.
- Required drawbar 3R-695.2-185
- Weight 9 kg.



Punch

Pneumatic chuck, Macro PM, 90803.60

- Built in height 70 mm
- Max pressure 100 ton.
- Required drawbar 90840.55
- Weight 7 kg.



Single level – up to 150 ton configuration

Die

3Refix PM mandrel, 3R-901-20PM-TX, Ø20 mm,

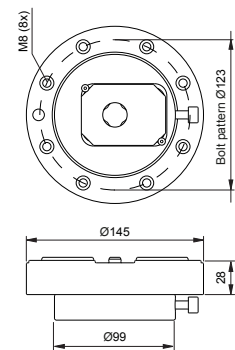
- Recommended tightening torque 10 Nm.
- Weight 0.1 kg.



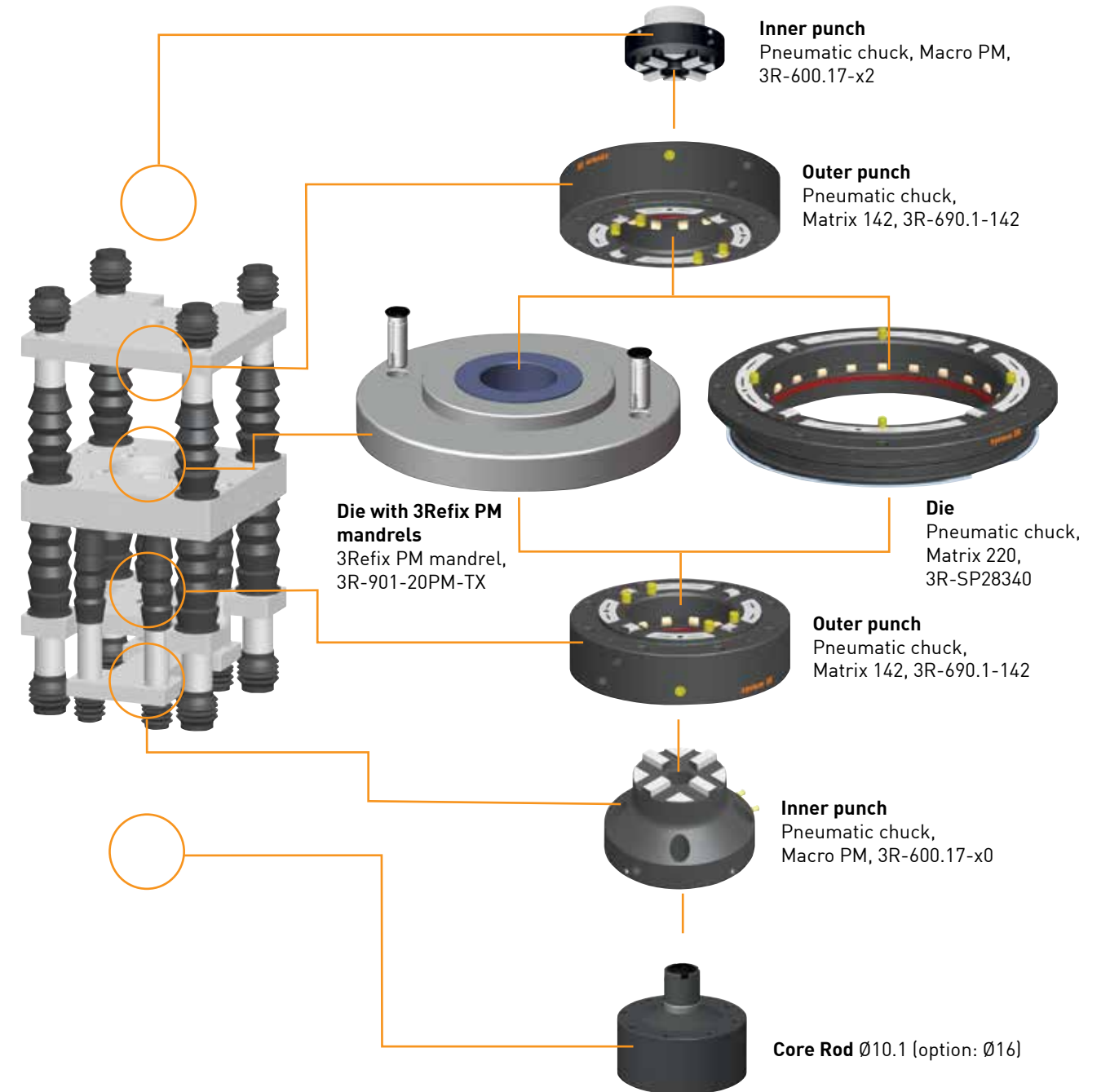
Punch

Manual chuck, MacroMagnum, 3R-680.27-150

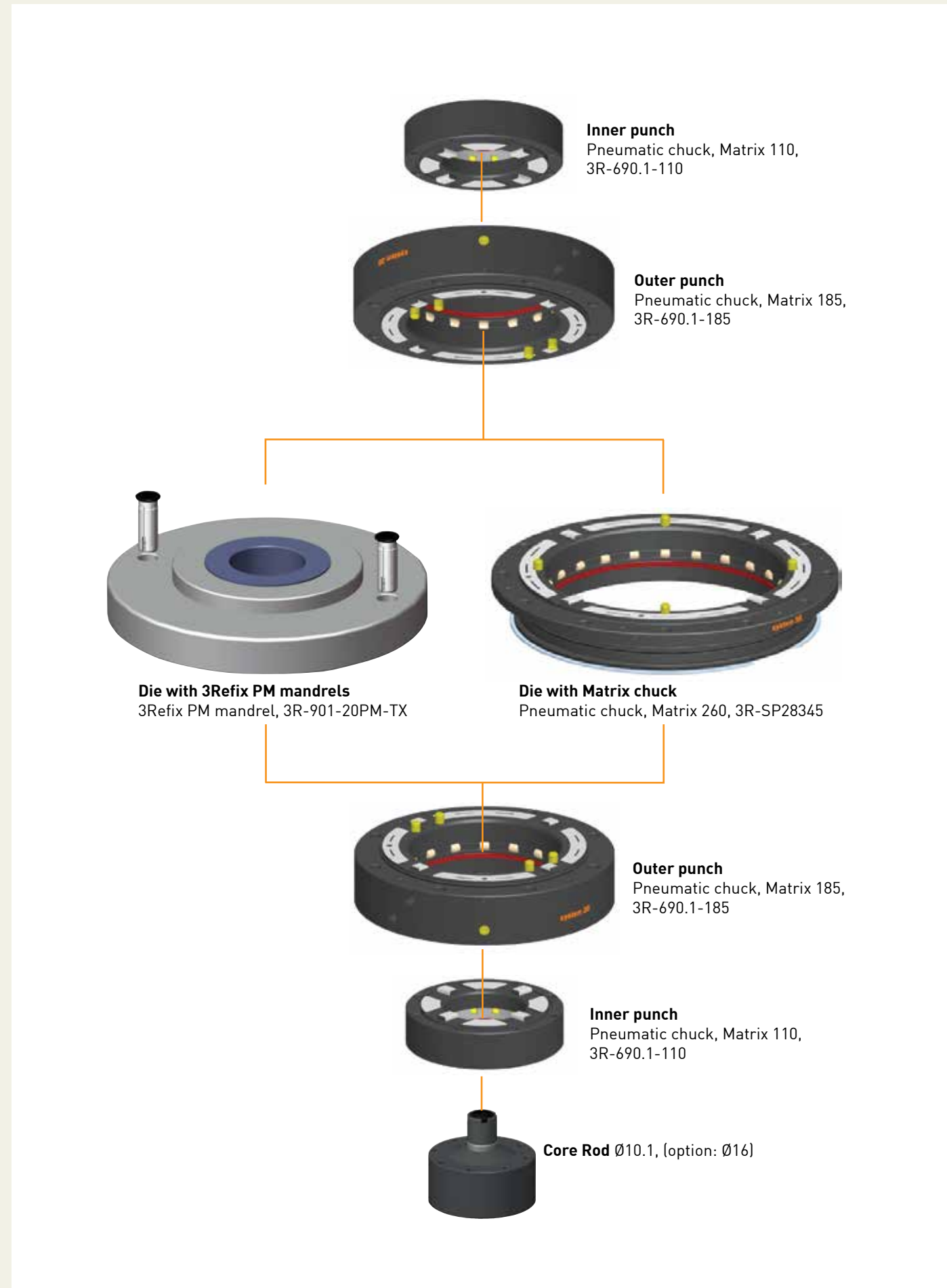
- Built in height 28 mm
- Max pressure 150 ton.
- Required drawbar 3R-605.11
- Weight 4.7 kg.



Multi level configuration, #1



Multi level configurations, #2



Multi level configuration

Die

3Refix PM mandrels, 3R-901-10PM-TX, Ø10 mm,

- Recommended tightening torque 4 Nm.
- Weight 0.02 kg.

3R-901-20PM-TX, Ø20 mm,

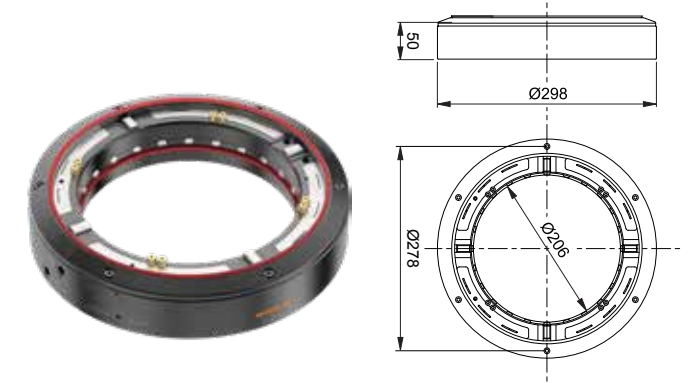
- Recommended tightening torque 10 Nm.
- Weight 0.1 kg.



Pneumatic chuck, Matrix 260, 3R-690.1-260

Chuck for permanent mounting into a PM press.

- Built in height 50 mm
- Max pressure 200 ton.
- Required drawbar 3R-695.2-260
- Hardened references
- Weight 13 kg.

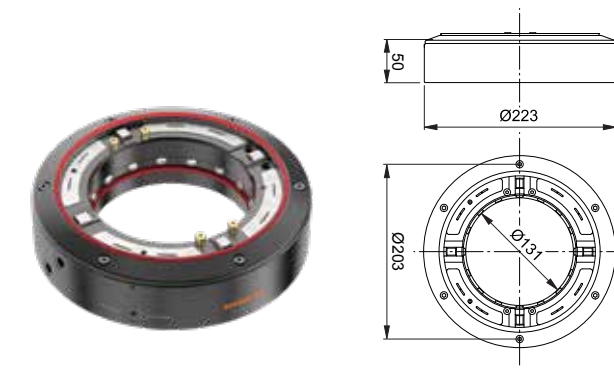


Outer punch

Pneumatic chuck, Matrix 185, 3R-690.1-185

Chuck for permanent mounting into a PM press.

- Built in height 50 mm
- Max pressure 100 ton.
- Required drawbar 3R-695.2-185
- Weight 9 kg.



Inner punch

Pneumatic chuck, Matrix 110, 3R-690.1-110

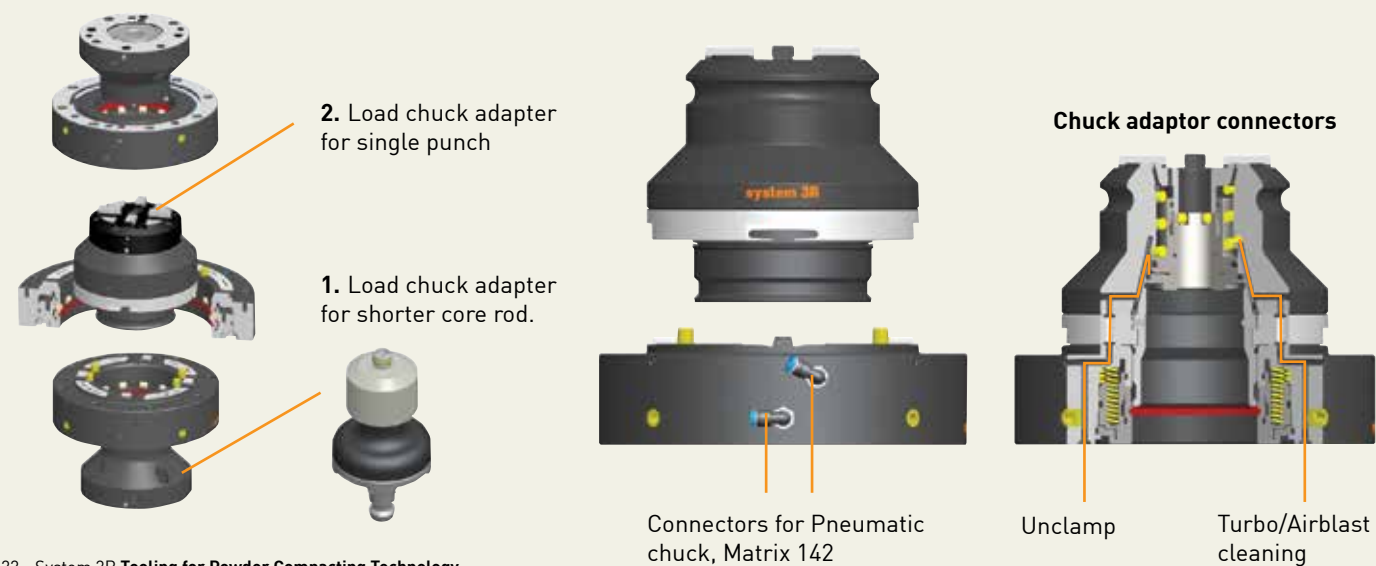
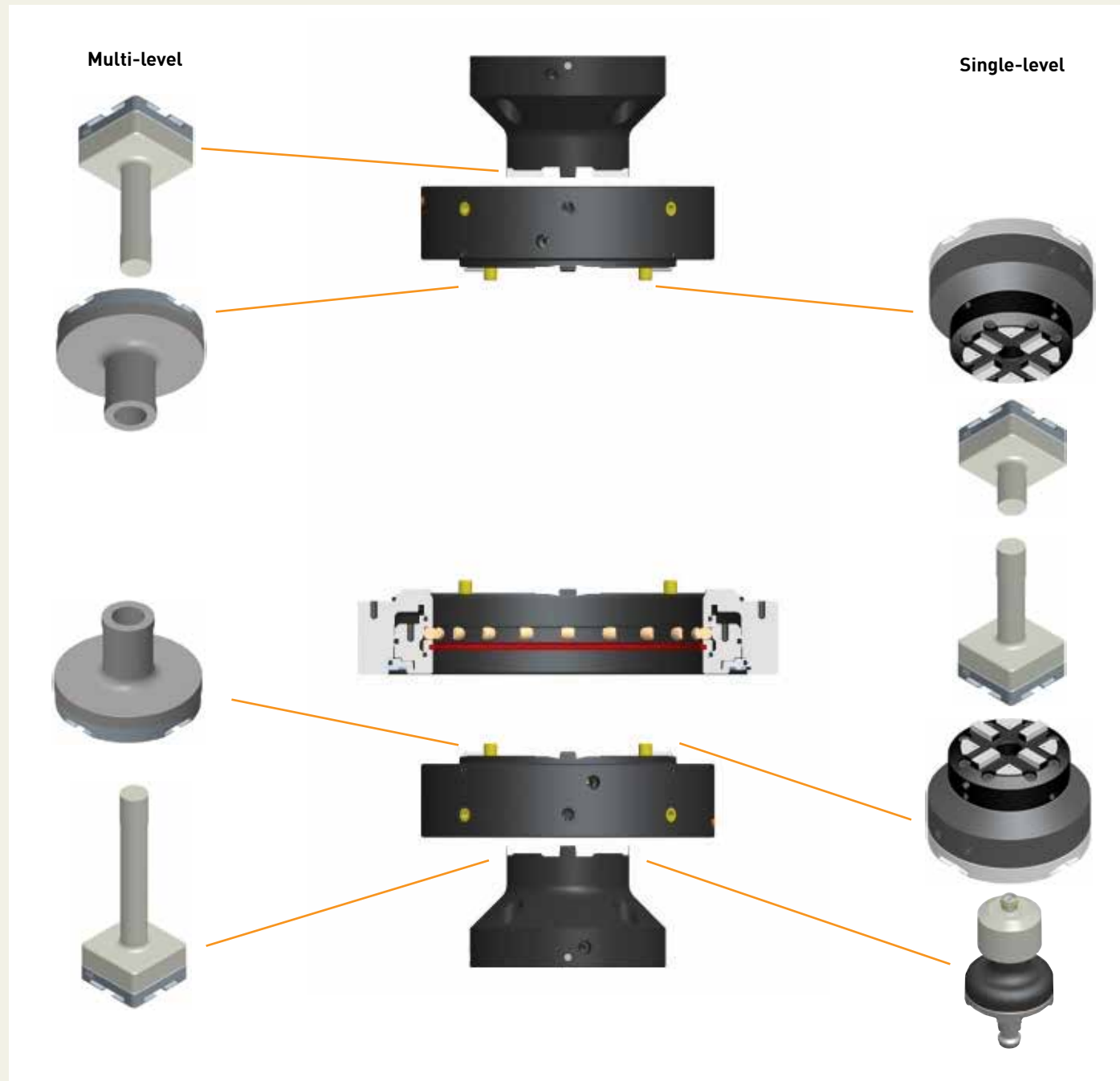
Chuck for permanent mounting into a PM press.

- Built in height 35 mm
- Max pressure 25 ton.
- Required drawbar 3R-695.2-110
- Weight 2.5 kg.



Powder Compacting Technology
– Produced details

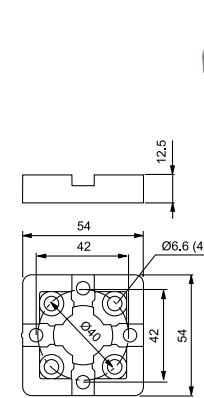
Maintain flexibility in Press – Convert Multi to single configuration



Pallets, Macro & MacroMagnum

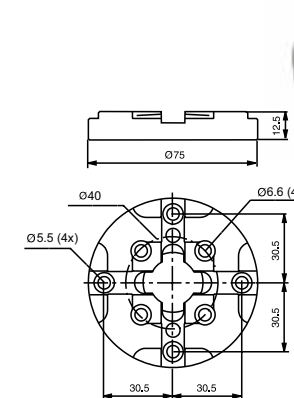
Pallet 54 mm, 3R-651.7E-P

- Max press force: 16 ton.
- Supplied in set of 8 pcs
- Rust resistant material
- Size 54x54x12.5 mm
- Weight 0.2 kg/pc.



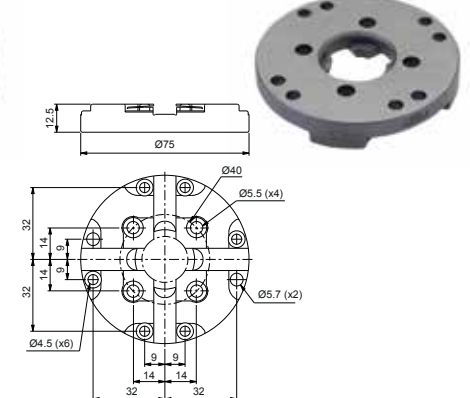
Pallet Ø75 mm, 3R-651.75E-P

- Max press force: 32 ton.
- Supplied in set of 10 pcs
- Rust resistant material
- Size Ø75x12.5 mm
- Weight 0.3 kg/pc.



Pallet Ø75 mm, 3R-651.75-50E

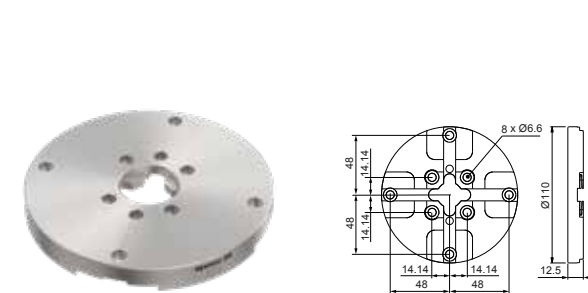
- Max press force: 64 ton.
- Supplied in sets of 10 pcs.
- Rust resistant material
- Size Ø75x12.5 mm
- Weight 0.3 kg/pc.



Pallet Ø110 mm, 90506.06

Hardened pallet with clearance holes for fixing screws.

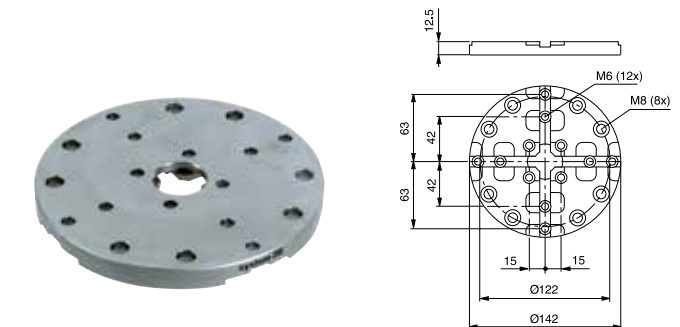
- Max press force: 100 ton.
- Rust resistant material
- Size Ø110x12.5 mm
- Weight 0.7 kg.



Pallet Ø142 mm, 3R-681.71

Hardened pallet with clearance holes for fixing screws.

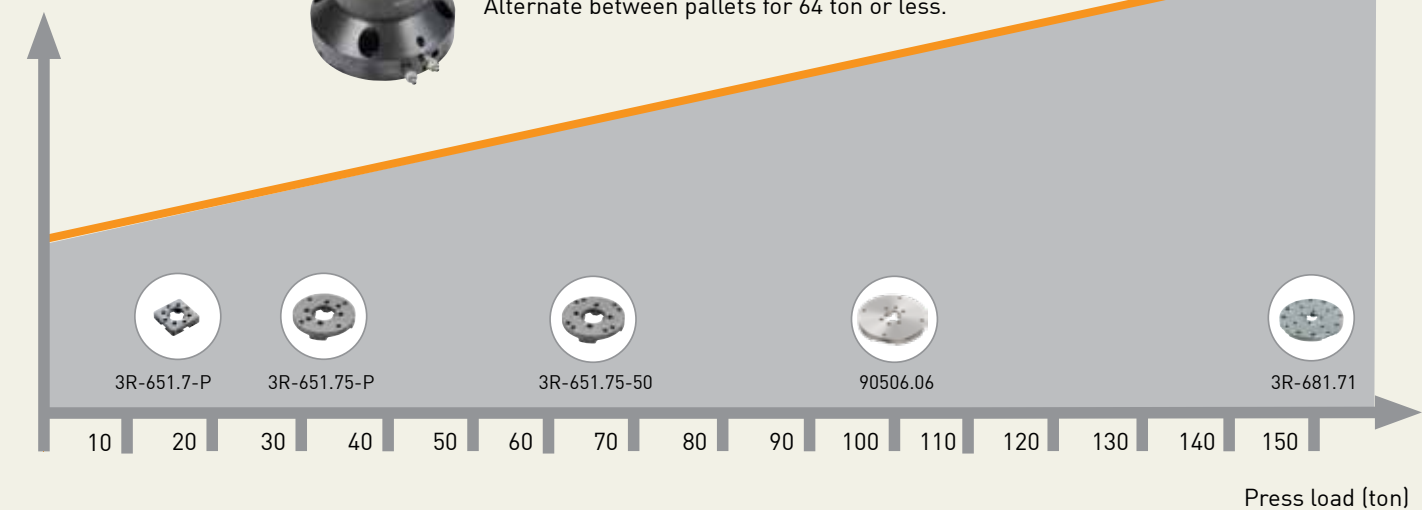
- Max press force: 150 ton.
- Rust resistant material
- Size Ø142x12.5 mm
- Weight 1 kg.



Choice of chuck, sets permissible max press load for punches

Price on consumables pallets

Example: MacroPM chuck, 3R-600.17-60
Max. Press force: 64 ton.
Alternate between pallets for 64 ton or less.

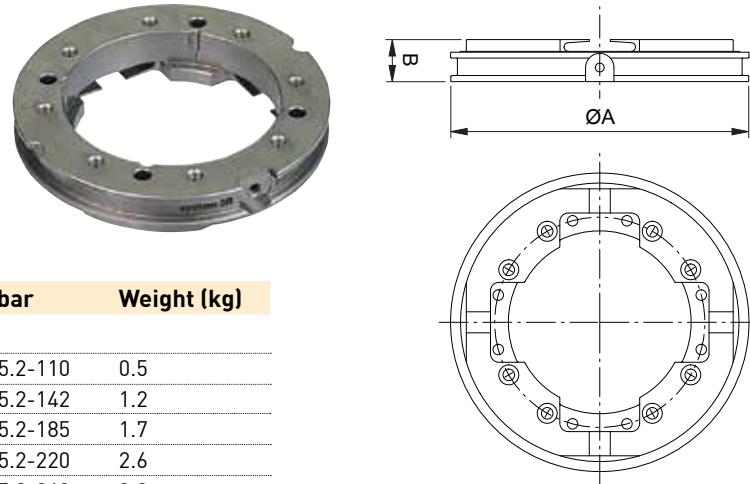


Pallets, drawbars & check rulers, Matrix & other tooling

Pallets, Matrix

- Rust resistant material
- Adapted for automatic changing.

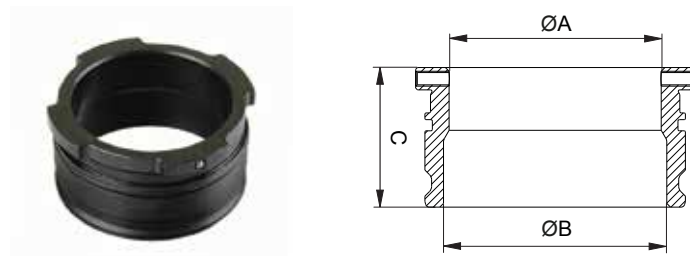
Note: Not self carrying, requires extra support.



Art. No	A	B	Press load (ton)	Drawbar	Weight (kg)
3R-691.1-110	110	20	25	3R-695.2-110	0.5
3R-691.1-142	142	20	50	3R-695.2-142	1.2
3R-691.1-185	185	20	100	3R-695.2-185	1.7
3R-691.1-220	220	25	150	3R-695.2-220	2.6
3R-691.1-260	260	25	200	3R-695.2-260	3.2

Drawbars, Matrix

Note: In automation the gripper has to grip on the pallet and not on the drawbar.



Art. No	A	B	C	Weight (kg)
3R-695.2-110	57	60	38	0.3
3R-695.2-142	67	76	45.5	0.5
3R-695.2-185	112	119	45.5	0.8
3R-695.2-220	147	149	45.5	1.3
3R-695.2-220	187	189	45.5	1.5

Torque wrench, 4 Nm, 3R-614-04

Intended for Ø10 mm 3Refix mandrels.

- 4 Nm.

Torque wrench, 6 Nm, 3R-614-06

Intended for Macro manual chucks.

- 6 Nm.



Torque wrench, 10 Nm, 3R-914-10

Intended for Ø20 mm 3Refix mandrels.

- 10 Nm.

Air unit, 90125.25-05

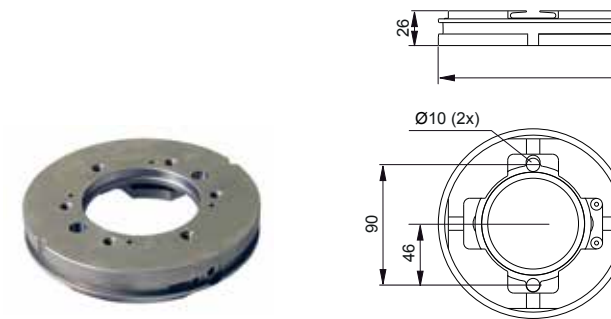
- Weight 1 kg.

Other tooling

Adapterpalett Matrix 142-3Refix Ø10, 3R-SP29388

Adapterpalett Matrix 142 to 3Refix (44/46) for dies.

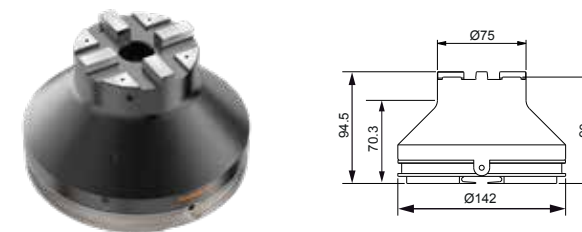
- Required drawbar 3R-SP29403
- Weight 1.6 kg.



Chuck adapter, Matrix 142-Macro, 3R-SP33230

From Matrix 142 into Macro system. Chuck adapter with built-in Macro chuck.

- Built in height 90 mm
- Hardened references
- Maximal pressure 50 ton.
- Required drawbar 3R-605.11
- Weight 7 kg.



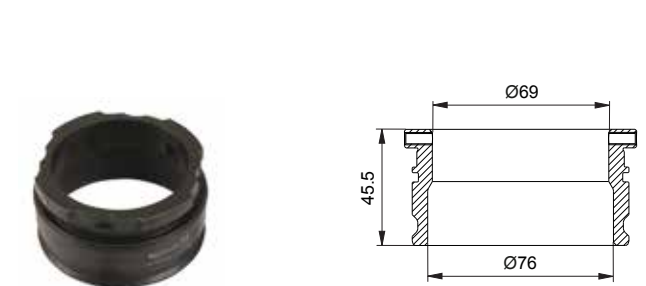
Force gauge press Ø72 mm, 3R-SSP122

Intended for checking the clamping force of Macro chucks.



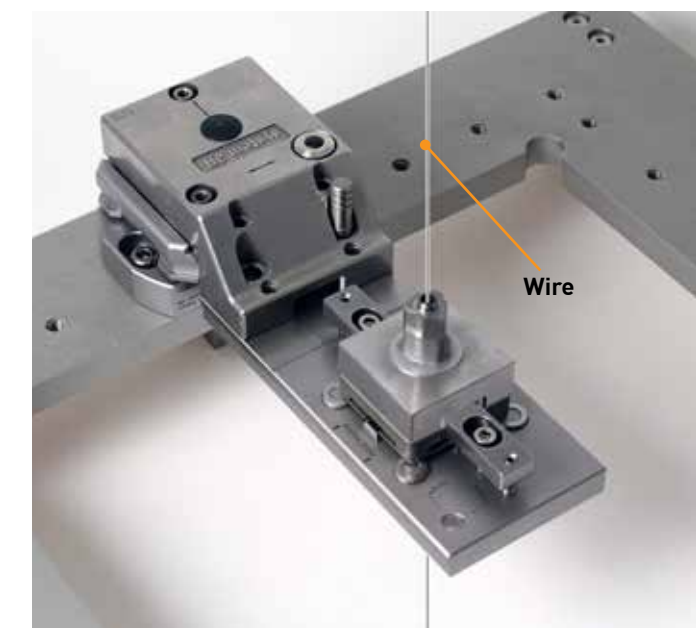
Matrix 142-3Refix Drawbar, 3R-SP29403

Special Matrix 142 drawbar for adapterpallet 3R-SP29388.



Fixture for punch on Macro, 90238

Fixture for punch on Macro, in order to wire-cut a through hole within Ø20 mm.



Other tooling

Punch alignment system, D-20158-V3

This fixture enables adjustment of punches within metal powder compacting by Macro system. The fixture is a stand-alone unit. It is possible to replace the indicators with electrical or even with optical sensors. Free access from underneath, to access fixation-screws for the pallets.

- Reference ring for Macro 54, 1 pc
- Reference ring for Macro Ø75, 1 pc
- Matrix 142, 1 pc
- Linear probes, 3 pcs
- Measuring accuracy for the probes
 - deviation: 0.2 µm
 - repetition error: 0.05 µm
 - applied pneumatic pressure: 1.1-1.5 bar



Alignment tool & control Z-distance, Macro PM, 90909

Alignment and control tool for the Macro + 3Refix system in PM. Alignment is rough but helps reduce assembly time before final verification and alignment with verification tools. Also to be used to check parallelism between punch levels versus die-platen-level.

- Dimensions: Ø115x75 mm
- cc. 3Refix Ø10 mm: 46+44 mm
- Weight: 2.1 kg.



Tool for Z-distance, Macro, D-20158.11

Tool to establish Z-distance in combination with either 3Refix or Matrix 142 pallet. This unit requires additional tool.

It is possible to apply electrical or mechanical indicators while measuring top surface.

Note: Linear probe is not included.

- Built in height 50 mm
- Requires drawbar 3R-605.11 or similar.



Fixture unit for Z-distance, Matrix 142, D-20158.10

Fixture to establish Z-distance from Matrix 142 pallet system to another. This unit requires additional tool.

It is possible to apply electrical or mechanical indicators.

If used in powder compaction, the solid pallet may be flipped over to measure opposite direction.

Note: Linear probe not included.

- Built in height 40 mm
- Required drawbar 3R-695.2-142 or similar.



Tool for Z-distance, Macro, D-20158.12

Tool to establish Z-distance in combination with either 3Refix or Matrix 142 pallet. This unit requires additional tool.

It is possible to apply electrical or mechanical indicators while measuring top surface.

Note: Linear probe is not included.

- Built in height 100 mm
- Requires drawbar 3R-605.11 or similar.



Aligning equipment for all chucks in the press – Verifying tool, HP



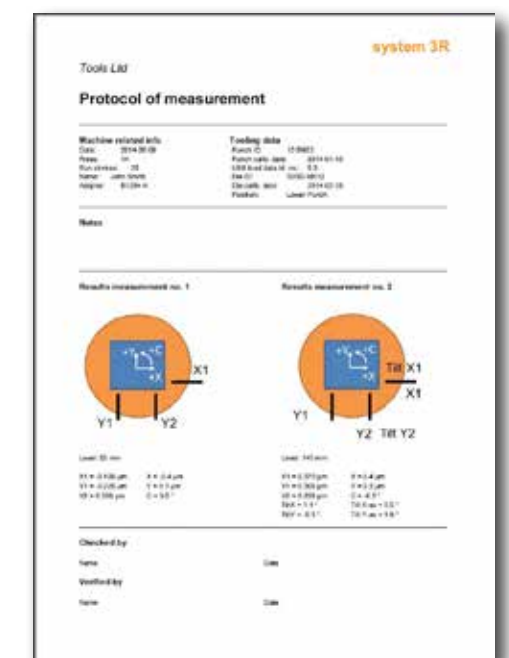
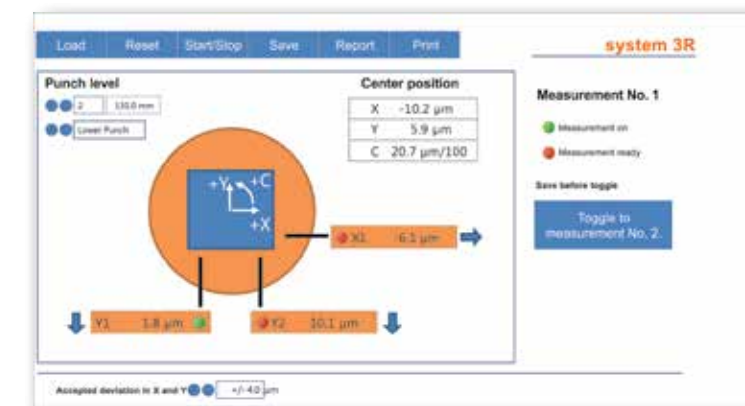
Software makes it easy to read and follow the steps. Formal document is possible to print and/or store after alignment.

Verification set – High Performance

A set of non-contact device utilizing IR-LED light and electronics to measure distances more accurately down to 0.1 µm within a second. Handheld computer allows operator to bring it inside the machine for better monitoring of exact location while checking alignment. After each punch chuck has been aligned, values may be printed or stored. These sets are made available by various tooling interfaces though only made for single-level press.

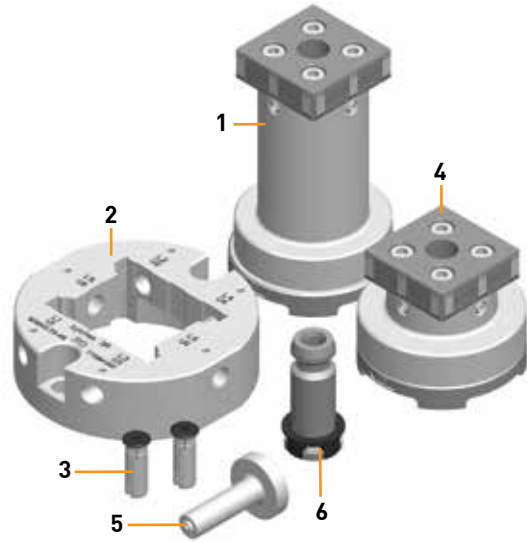
Contents:

- Lap-top
- Software
- Converter (light to signals)
- Die pallet to house fiber optical cables (3Refix or Matrix)
- Punch for upper and lower chuck
- Check-tool
- Drawbar
- 3Refix mandrels (only for 3Refix version)
- Torque wrench (only for 3Refix version).



Verifying tools, Standard (produced upon customer request)

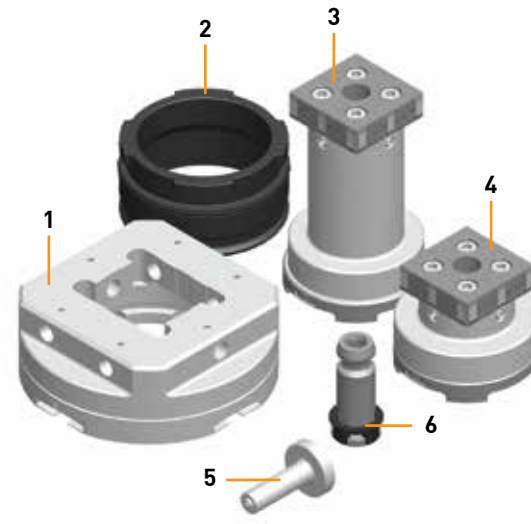
For Single-level press, 3Refix



- 1 Lower punch (Macro)
- 2 Die pallet to hold dial indicators
- 3 3Refix Ø10 mm
- 4 Upper punch (Macro)
- 5 Pre-set tool
- 6 Drawbar (Macro)

Note: Dial indicators are optional.

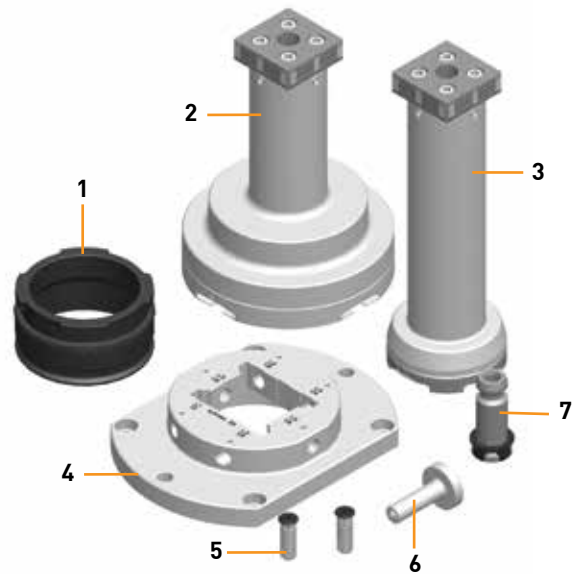
For Single-level press, Matrix 142



- 1 Die pallet to hold dial indicators (Matrix 142)
- 2 Drawbar (Matrix 142)
- 3 Lower punch (Macro)
- 4 Upper punch (Macro)
- 5 Pre-set tool
- 6 Drawbar (Macro)

Note: Dial indicators are optional.

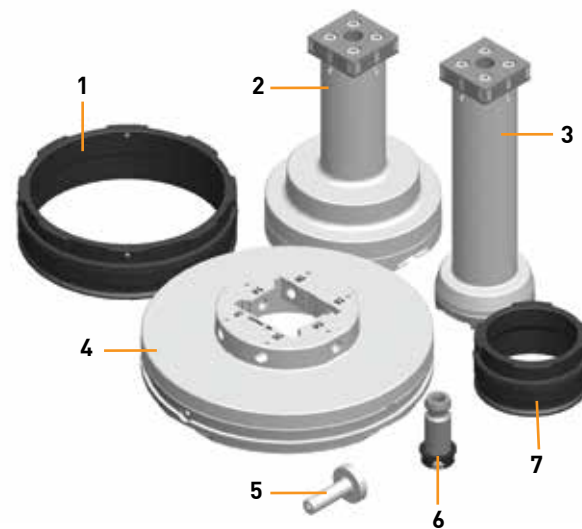
For Multi-level press, 3Refix



- 1 Drawbar (Matrix 142)
- 2 Outer punch (Matrix 142)
- 3 Inner punch (Macro)
- 4 Die pallet to hold dial indicators
- 5 3Refix Ø10 mm
- 6 Pre-set tool
- 7 Drawbar (Macro)

Note: Dial indicators are optional.

For Multi-level press, Matrix 220



- 1 Drawbar (Matrix 220)
- 2 Outer punch (Matrix 142)
- 3 Inner punch (Macro)
- 4 Die pallet to hold dial indicators (Matrix 220)
- 5 Pre-set tool
- 6 Drawbar (Macro)
- 7 Drawbar (Matrix 142)

Note: Dial indicators are optional.

MacroNano & MatrixNano*

- ... 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.

* Matrix 110 & Matrix 142

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.

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

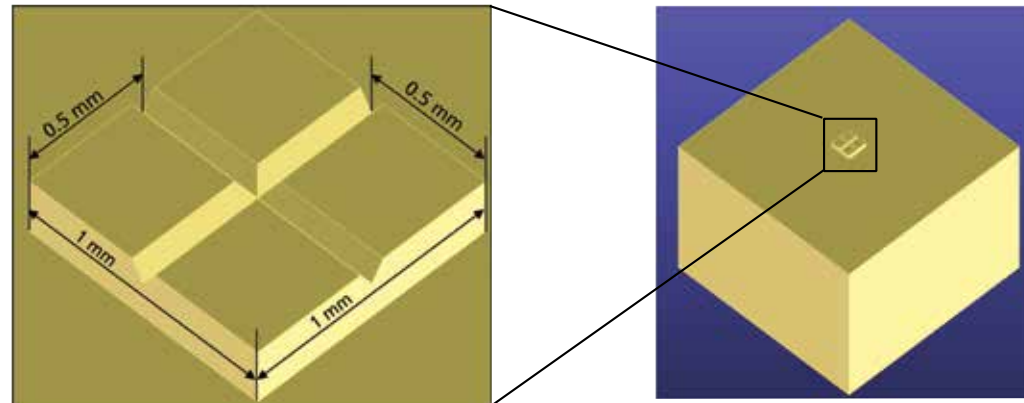
- + Repetition accuracy – within 0.001 mm
- + Fixed index positions 4x90°
- + Required air pressure, pneumatic chuck – 6±1 bar



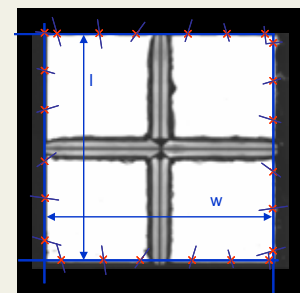
MacroNano

Application example: Microstructuring with Diamond Machining

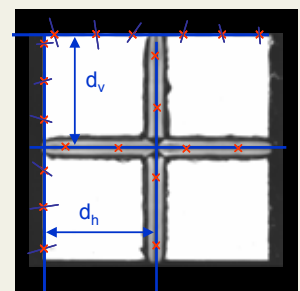
Micro features produced with nano precision



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

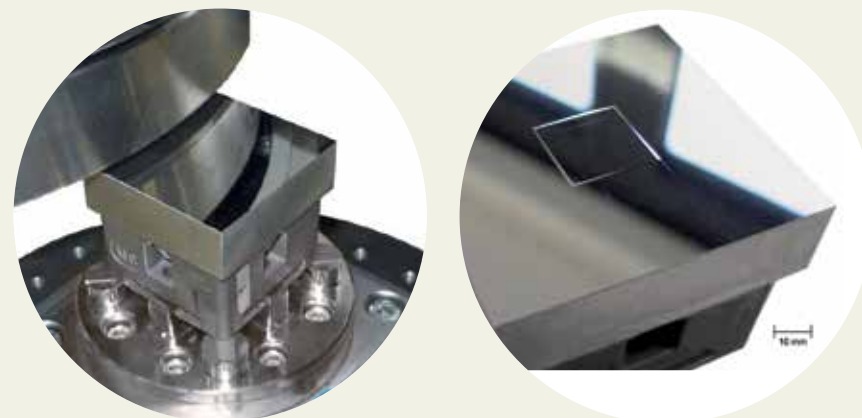


Measurement of groove positions

	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



VDP (Vibration-Damped Palletisation)

- ... improve your surface finish.
- ... reduces cutting forces by up to 25%. Lower cutting forces gives lower power consumption and less tool wear.
- ... lengthens tool life tool wear by up to 30%, giving lower tool costs.
- ... lengthens the life of the machine spindle. Less vibration in the machine spindle extends the life of the spindle by at least 30%.
- ... gives shorter lead times. VDP allows machining with higher cutting data – better utilisation of the existing machine capacity. A 30 % capacity increase is within your reach.

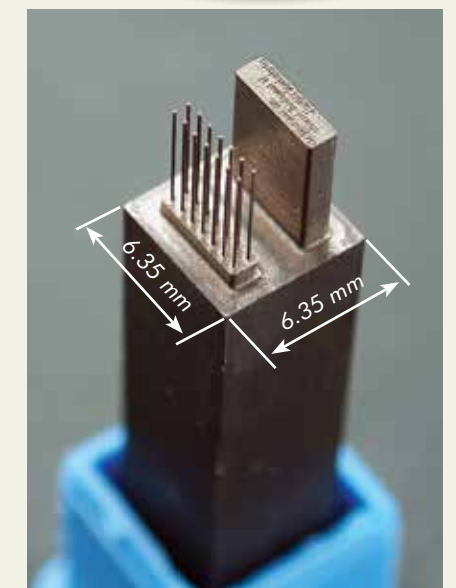
With conventional chucks, vibrations of the workpiece caused by the dynamic forces due to the action and rotation of the cutting tool. Restrictions therefore have to be imposed on the rotation speed and feed rate of the cutting tool, to prevent instability and to achieve the necessary surface quality.

Advantages of a damped chuck

After intensive research into the dynamics of chuck systems, machine tool maker System 3R has developed and patented a chuck with vibration-damped palletisation (VDP). By reducing the vibrations of the workpiece and a considerable proportion of the vibrations of the cutting tool, the VDP technology improves the dynamics of the entire metal cutting process. This means that machine tools can be operated at higher speeds with greater accuracy and at the same time with less wear. Workpieces can usually be produced in a single operation within strict dimensional tolerances and with a surface quality in the micrometer range – a millionth of a metre.

- + **Better surface finish** reduces the need for finishing.
- + **Higher material removal rate** improves productivity.
- + **Less tool wear** extends the life of the cutting tools.
- + **Less vibration** in the machine spindle.
- + **Better dimensional accuracy** gives fewer rejects.
- + **Greater scope** for machining difficult materials and complex shapes.
- + **Shorter lead times** thanks to a higher material removal rate.
- + **Lower noise level** during machining.

VDP[®]



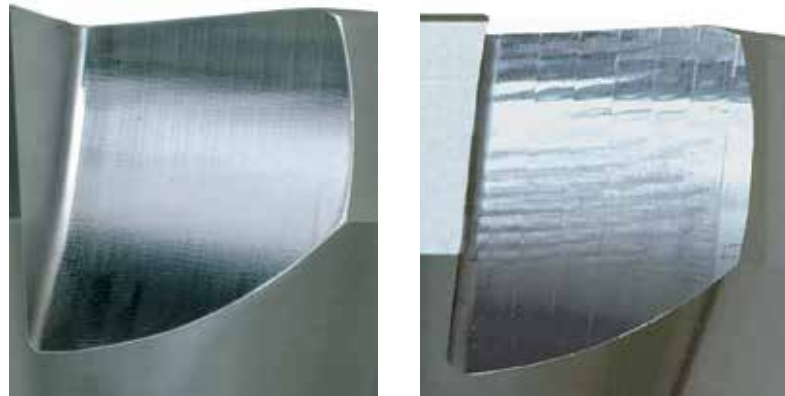
Example Micro Milling:

VDP advantages: The electrode Aspect Ratio (L/Ø) was doubled with VDP.

Dimensions: Ø 0.134 mm, length 4.8 mm

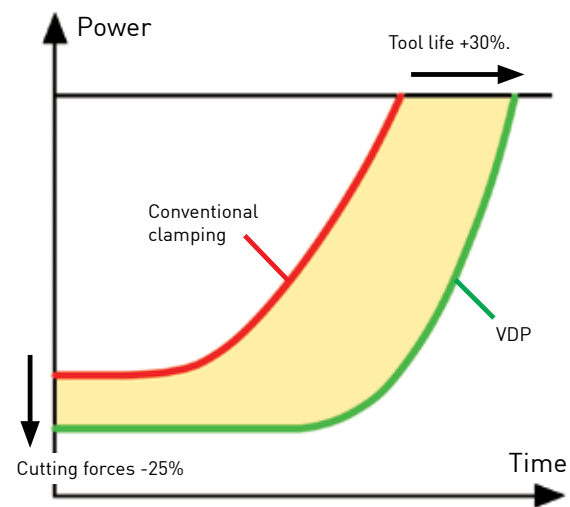
VDP (Vibration-Damped Palletisation)

Increase your capacity with > +30%

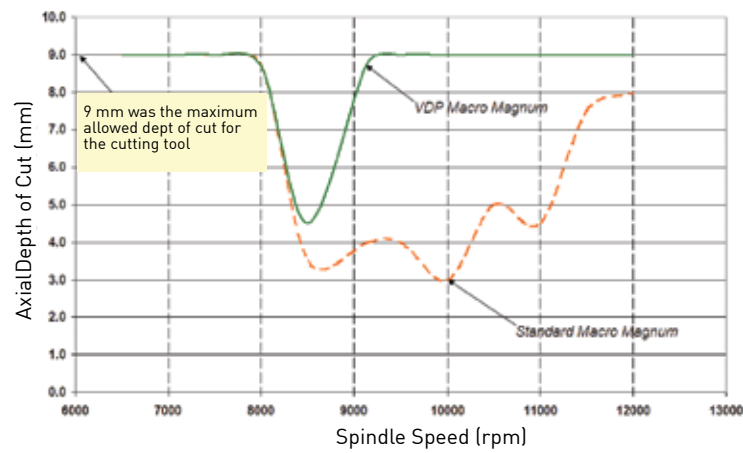


WITH

WITHOUT



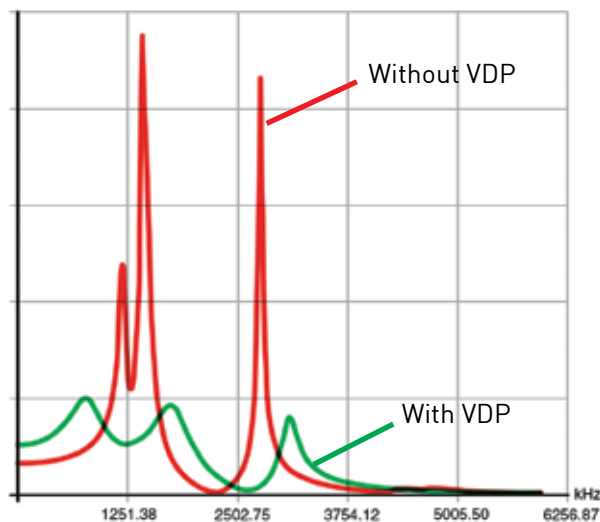
Less tool wear extends the life of the tools = increased revenue.



Process Stability Analysis (Swiss machine tool manufacturer)

Cutting Speed (RPM)	Axial Depth of Cut (mm)		Increase in removal rate due to VDP (%)
	Magnum Std	Magnum VDP	
8500	3.5	4.5	28.6
9000	4.0	9.0*	125
10000	3.0	9.0*	200

Depth of cut is limited by the cutting tool used for the tests and not by the VDP.



The diagram shows the effect on the oscillation amplitude when machining with the workpiece clamped conventionally and in a damped chuck.

A wide range of Tooling and Automation products from a single source



Tooling Catalogues

- + Tooling – for electrode manufacturing and EDMing
- + Tooling – for wire EDMing
- + Tooling – for Parts production
- + Tooling, Delphin modular Clamping System



Automation Catalogues

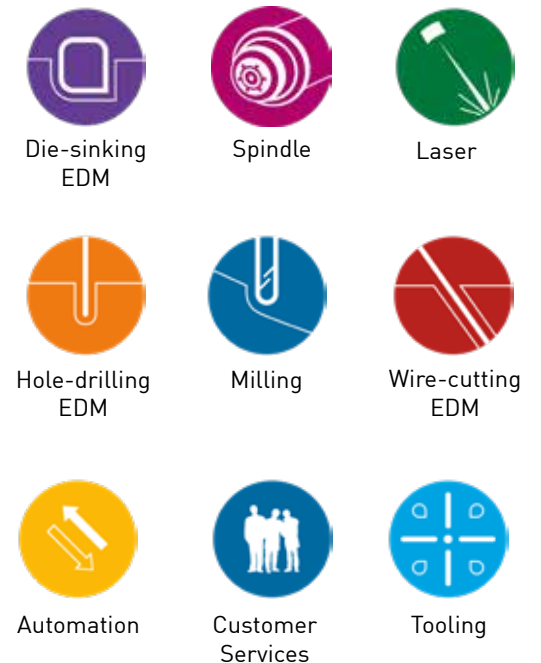
- + WorkPal 1
- + WorkPartner 1+
- + Fanuc, six-axis robot
- + WSM – WorkShopManager

For details, Please ask for a copy on your own.

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Utilise every hour of the day and night!

An automatic production cell can generate revenue round the clock, seven days a week. Why be satisfied with 40 productive machine-hours a week when the same machine can achieve over 100 additional hours a week? Use every hour of the day and night for production!

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And not least – they bring faster payback on the investments you made.

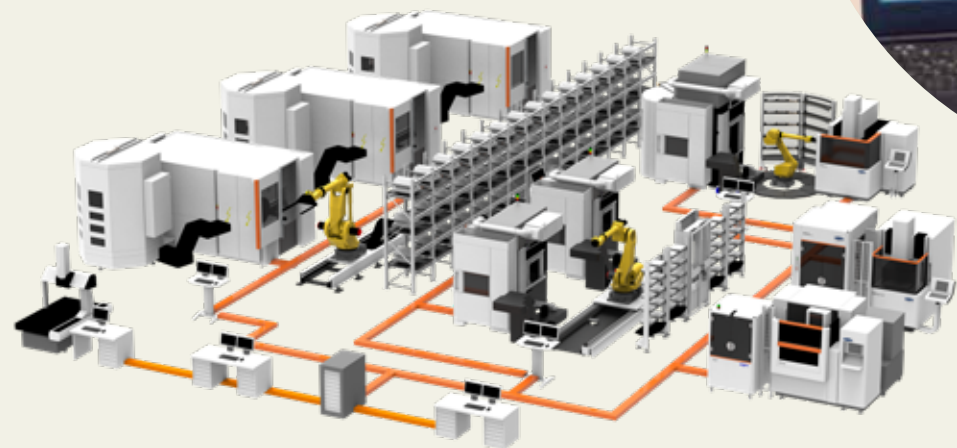


WSM – WorkShopManager

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Master workshop complexity and manage all control processes with our software. For manually controlled and automated processes.

- + Simplify the preparation of jobs
- + Easily execute the jobs in manual or automated machines
- + Monitor the process, change priorities and get utilization statistics
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- + Reducing running costs and wasted parts.
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