

# MAGNETIC CLAMPING TECHNOLOGY



CLAMPING. SCREWING. LOCKING.



## WE GENERATE EXCITEMENT.

Since its founding by Andreas Maier in 1890, our company has lived through many exciting times. Today we are the leading manufacturer in Europe, supplying over 5,000 different products from the fields of clamping, screwing and locking. With this extensive product range we can meet all of our customers' needs and requirements. But providing optimal quality means meeting the challenges at all levels: Expert consultation, modern team organisation, individual solutions (including special developments), flexibility in response to changing conditions, etc. And we ourselves find this so exciting that we look forward every day to shaping the market together with our employees and our customers – both now and in the future. That is something you can count on.

### COMPANY HISTORY

- 1890** Company founded by Andreas Maier as a lock manufacturer.
- 1920** Production program extended to include spanners.
- 1928** Production-line assembly of „FELLBACH LOCKS“.
- 1951** With the introduction of clamping elements, AMF diversified into the fields of workpiece and tool clamping.
- 1965** Toggle clamps extend the AMF product range. AMF catalogues are now published in ten languages.
- 1975** Hydraulic clamping marks further specialisation.
- 1982** Clamping and fixture systems round off AMF's clamping expertise.
- 1996** Introduction of the AMF Team Organisation in all business sectors. Quality assurance certified to ISO 9001.
- 2001** Introduction of the AMF Service Guarantee for all products.
- 2004** Introduction of the ZPS zero-point clamping system.
- 2007** The TTEC clamping system for automated welding and magnetic clamping technology extend the AMF product range.



#### MANAGING DIRECTORS

> Volker Göbel  
Johannes Maier  
Hans-Günther Maier



#### THE AMF SERVICE GUARANTEE

> Assuredly on the way to the top

#### 5 Individual development

You cannot find the product you need? Talk to us; we will find the right solution for you – from a special version, right through to a completely new development.

#### 4 Warranty

We believe in the high quality of our products. Complaints are dealt with quickly, unbureaucratically and generously – as far as possible, even well-beyond the guarantee period.

#### 3 Certified quality

AMF stands for painstaking production in our own works. We have followed this tradition since 1890 – today, of course, with a modern quality assurance system to ISO 9001.

#### 2 Short delivery times

From the AMF finished-product stores with over 5.000 articles, we can supply 98 % of orders from stock. And you can be sure that every stock article ordered is dispatched the same day.

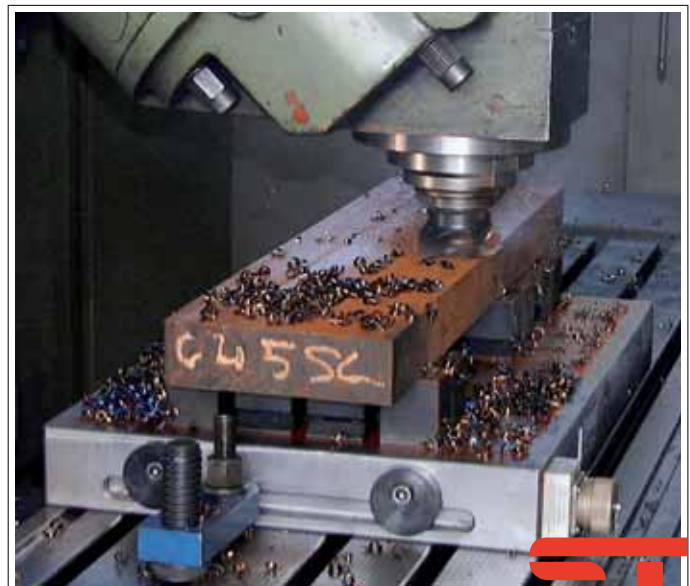
#### 1 Real technical advice

Many tasks and a multitude of solutions. From AMF Professional Products you can find the right way to solve your problem – fast and reliably – either at your local dealer or with the help of the specialist in our team. Just call us!

#### E Made in Germany

It goes without saying that our range of products is developed and manufactured by our team of employees in Germany.

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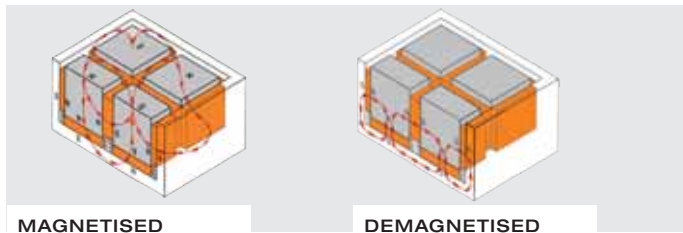


## AMF MAGNETIC CLAMPING TECHNOLOGY, THE WINNING TECHNOLOGY!

Based on years of development work and experience, AMF has been able to go beyond the typical limitations of obsolete electro-mechanical clamping systems, which are unsafe, unreliable, subject to overheating, and maintenance-intensive. The innovative electro permanent technology of AMF magnetic clamping technology guarantees great strength, total security and long-term reliability.

The double magnetic cycle comprises a series of square poles in a chessboard arrangement. At the 4 sides of the poles there are static permanent magnets, while under the poles there are reversible magnets.

The windings of the reversible magnets generate a brief, strong magnetic field that is able to reverse the polarity of this type of magnet in a fraction of a second. This characteristic makes it possible for the square pole plates to either direct their entire magnetic field outwards - the entire force is then available to magnetise workpieces - or to short-circuit it inside the plate - meaning that the clamping surface is then completely free of magnetic flux.



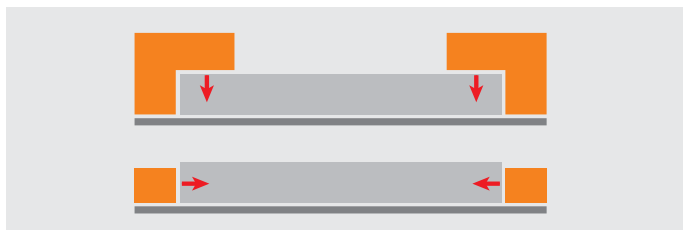
The neutral crown allows complete magnetic insulation. Previously observed problems, such as the adhesion of chips to the workpiece, practically no longer occur.

### THE AMF MAGNETIC CLAMPING TECHNOLOGY REPRESENTS AN INNOVATION OVER PREVIOUS SYSTEMS

Features	previous magnetic clamping systems	The AMF magnetic clamping technology
Clamping force	approx. 350 - 830 daN	375 - 1000 daN
Repeatability	approx. 0,1 mm	0,01 mm
Plane parallelism	approx. 0,1 mm	up to 0.02 mm
Voltage of the magnetic clamping plates	400 V / 16 A	230 V / 16 A
Material thickness of the magnetic clamping plates	larger than 50 mm	from 35 mm
Thread for pole extensions	not hardened	hardened

### TRANSCENDING TRADITIONAL BOUNDARIES

Even the most sophisticated machine tools are frequently unable to realize their full potential due to restraints represented by traditional clamping systems.

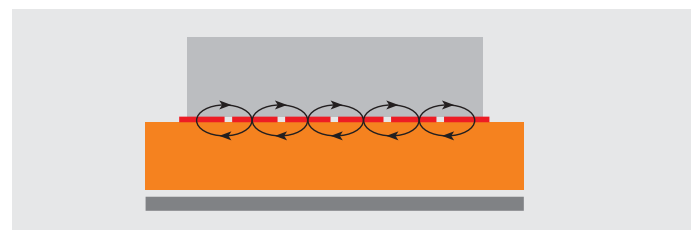


In fact, the workpieces are never freely accessible from all sides when operating with mechanical vices and clamps, and it is therefore necessary to proceed with successive positioning to carry out the machining cycle completely, with all the inevitable drawbacks in terms of productivity.

Moreover, traditional clamping methods induce structural stresses. The resulting workpiece deformations endanger the achievement of the specified tolerances.

### FREE WORKPIECE AND UNIFORM CLAMPING

The use of a magnetic system enables the workpiece to be positioned on a magnetic surface that acts as a mechanical reference and as a clamping area.



The force is uniformly distributed onto the entire contact surface. Compressions or deformations do not occur. The workpiece is completely accessible for machining with one clamping step. Because there are no obstacles or constraints, the machine's capacities can be optimally exploited in all dimensions. The absence of vibration allows higher stock removal, longer life for the tools, better finishing and superior accuracies.



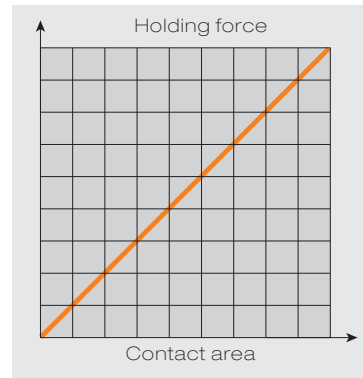
# THE REVOLUTIONARY ANSWER FOR A FIELD OF ALMOST UNLIMITED APPLICATIONS

The magnetic clamping plates from AMF represent the best display of electro permanent magnetism applied to workholding in the metalworking industry.

They allow a large variety of ferrous parts to be clamped quickly and flexibly, on virtually any type of machine tool.

The systems are powerful, lightweight and compact, They are easy to install and use; they ensure a rapid return on investment with significant immediate advantages.

This guarantees real production cost efficiency with simplicity, avoiding complicated and expensive special fixturing equipment or using machines that are larger than necessary, which frees working space, limits capital outlay and increases productivity.



The high clamping strength and power of the magnetic clamping plates is developed uniformly, linearly and proportionally to the contact surface of the workpiece and remains constant over time, not tied to the processing phases.

## THE BENEFITS AT A GLANCE!

### PRODUCTIVITY

- > High clamping forces from 375 to 1000 daN
- > Easy and quick positioning of the workpiece
- > Drastic reduction in set-up times
- > Facilitated interaction with CAD/CAM systems
- > Improved work sequence
- > Improved surface quality and tolerances
- > Material thickness of the magnetic clamping plates from 35 mm

### SECURITY

- > Constant and concentrated force
- > No power consumption during clamping
- > Ergonomic in operation
- > No dispersion of magnetic flux
- > No interference
- > Hardened threads for pole extensions

### FLEXIBILITY

- > Repeatability of 0.01 mm
- > 5-side processing possible
- > All useful strokes used
- > Workpieces larger than the table surface are machinable
- > Simultaneous machining of multiple workpieces side by side
- > Simplified CNC or FMS programming

### COST-EFFECTIVE

- > Limited capital outlay
- > No maintenance
- > No modification to the machine
- > Energy-saving
- > Reduced wear on tools
- > High value over time



## FAQS ABOUT MAGNETIC CLAMPING TECHNOLOGY

<b>&gt; WORKING TEMPERATURE</b>	Up to this temperature, a magnet can be used without irreversible magnetisation losses.
<b>&gt; CURIE TEMPERATURE:</b>	At this temperature, magnetic materials lose their magnetisation irreversibly.
<b>&gt; FERROMAGNETIC MATERIAL:</b>	All materials that exhibit magnetisation after application of an external magnetic field.
<b>&gt; MAGNETIC FIELD STRENGTH (A/M):</b>	Amperes per meter (1A/m = 0.01256 oersted)
<b>&gt; MAGNETIC FLUX DENSITY: (INDUCTION):</b>	The change in a material that is induced by an applied magnetic field. Symbol: B / unit: T
<b>&gt; TESLA (T):</b>	Unit of magnetic induction 1 T = 104 gauss
<b>&gt; GAUSS (G):</b>	outdated unit of magnetic induction.
<b>&gt; SATURATION MAX.:</b>	The workpiece no longer absorbs any magnetisation.
<b>&gt; POLE EXTENSIONS:</b>	Allow 5-side machining without interference contours.
<b>&gt; NEODYMIUM:</b>	Magnetic material (NdFeB = Neodymium-Iron-Boron). They acquire a magnetic orientation during manufacture.
<b>&gt; ALNICO:</b>	Magnetic material (Aluminium-Nickel-Cobalt)

### WHAT HAPPENS IF THERE IS A POWER FAILURE?

The system is insensitive to possible power failures, and therefore „intrinsically safe“. Because the current is needed for reversing for only a few seconds, the power consumption is practically non-existent, even though the magnetic force is constant for an unlimited period. The clamping surface is not heated, so deformation or expansion of the workpieces is not possible.

### HOW CAN THE MAGNETIC CLAMPING PLATES BE FASTENED?

- a) laterally in the recesses with clamps (see catalogue „Mechanical clamping elements“)
- b) with screws through the mounting holes in the magnetic clamping plate
- c) in combination with an adapter plate for the AMF zero-point clamping system
- d) with clamping nipples directly to the AMF zero-point clamping system (offset 45°)

### CAN I CLAMP ON ONE POLE?

At least two poles have to be covered in order for there to be a magnetic flux.  
For optimal clamping, however, 8 pairs of poles should be covered.

### WHAT HAPPENS IF I MILL INTO THE MAGNETIC CLAMPING PLATE?

The size 50 and 70 magnetic clamping plates can be reworked up to 2 mm by repeated re-grinding.  
This also restores the plane parallelism.

### WHAT PRECISION CAN I ACHIEVE WITH THIS SYSTEM?

Plane parallelism of up to 0.02 mm can be achieved by:

- 1) rough-milling the first surface
- 2) turning the plate over, rough-milling, stress-releasing and finishing the second plate
- 3) turning the plate over and finishing the first surface.

### IS MECHANICAL DEFORMATION POSSIBLE DURING CLAMPING?

Quite the opposite. In the case of flame-cut parts, i.e. with very uneven workpiece surfaces, clamping is carried out with 3 fixed poles (3-point support) and with movable poles. The movable poles compensate for the unevenness, meaning that the workpiece is not deformed during clamping.

### DO MAGNETIC FIELDS PRESENT ANY HAZARDS?

Magnetic field height 0 to 100 mm: In this area, cardiac pacemakers, wristwatches and bank cards may be damaged.  
At magnetic field height 100 mm and greater there is no longer any health risk.  
Caution! Do not put any workpieces on while the magnet is actively clamped – risk of injury!

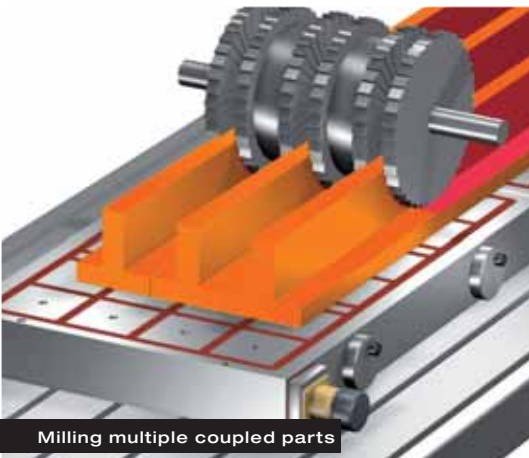
### UP TO HOW MANY DEGREES CELSIUS CAN MAGNETIC TABLES BE USED?

The magnetic tables can be used at operating temperatures up to 120°C.  
The neodymium magnet is guaranteed for a maximum temperature of 120°C (this refers to the temperature in contact with the surface of the magnetic table over a longer time period). As a result of large temperature fluctuations, in some cases „magnetic edges“ may occur, which disappear again when the temperature is again within the guaranteed parameters.

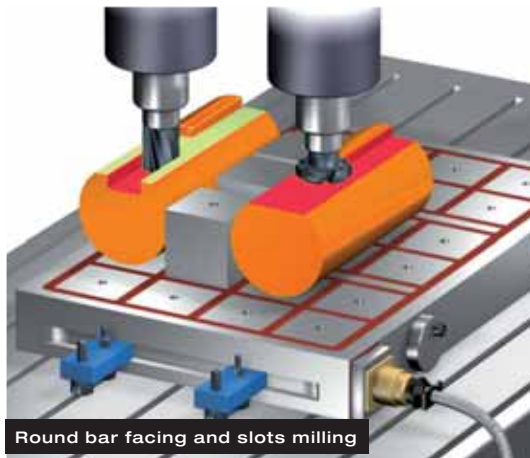
## FREE WORKPIECE AND UNIFORM CLAMPING

AMF magnetic clamping plates enable heavy-duty or high-speed machining to be performed on a large variety of components, positioned both horizontally and vertically.

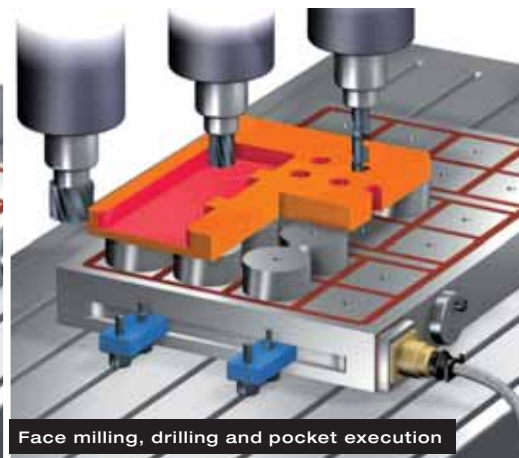
Their robust structure machined from a solid block prevents deformation. Fixing is achieved using through-holes or grooves at the sides. The perfect planar matching between the magnetic modules and the machine table ensure excellent, vibration-free mechanical stability. The systems are the ultimate workholding solution for application on bench type, gantry or fixed table milling machines, on machining centres, on pallets and cube tooling. Their modular design enables multiple combinations to prepare table arrangements or for dedicated solutions.



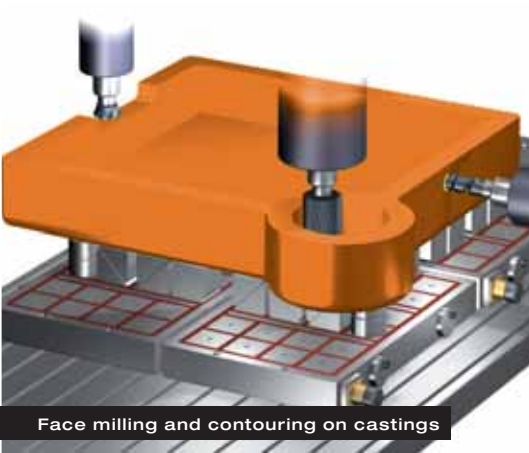
Milling multiple coupled parts



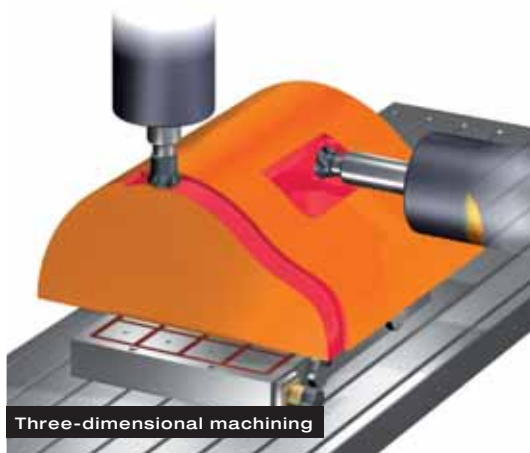
Round bar facing and slots milling



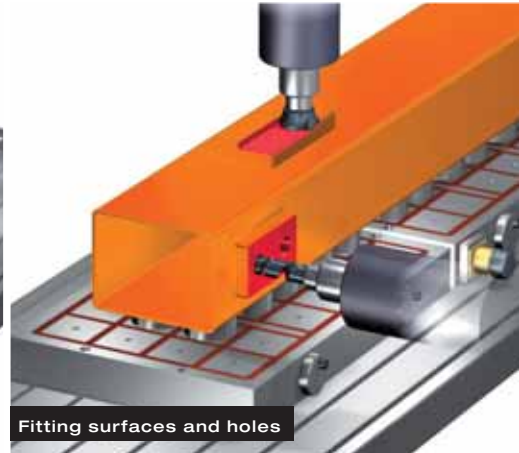
Face milling, drilling and pocket execution



Face milling and contouring on castings



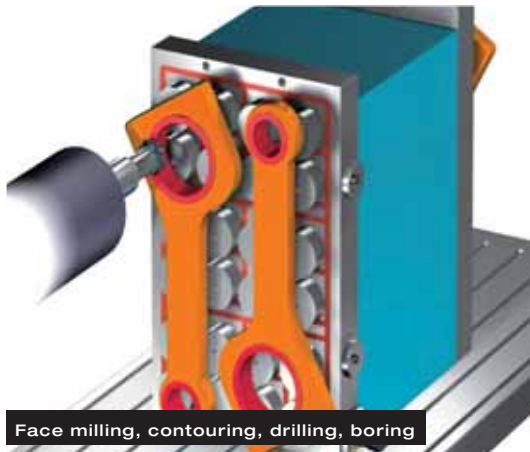
Three-dimensional machining



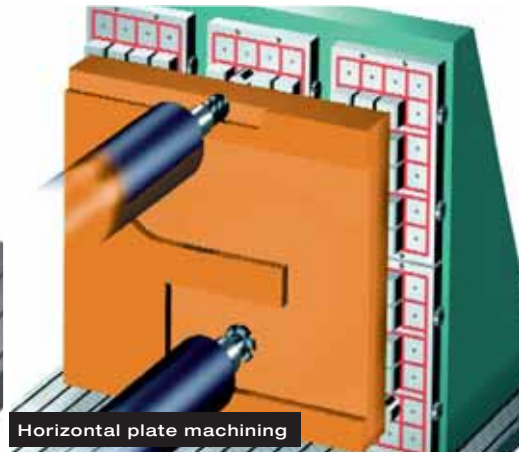
Fitting surfaces and holes



Fitting surfaces and face milling on profiles



Face milling, contouring, drilling, boring



Horizontal plate machining



## A TAILORED SOLUTION

The standard series of magnetic clamping plates includes two different types with different performance characteristics, capable of adapting to different operating needs, depending on the thicknesses, the surface conditions (or the operating air gaps) and the dimensions of the workpiece to be clamped.

The clamping force of each version depends on the different dimensions and types of poles and on the configurations of the magnetic area. Each pair of N/S poles generates an autonomous and defined force which is not influenced by the operating conditions of the other adjacent poles. Therefore by counting the number of poles occupied by the clamped piece it is possible to predetermine the force generated and consequently to establish the usable machine power with the relative machining parameters.



AMF magnetic clamping plates (pole size 50 x 50) in use in a vertical machining centre, machining a hydraulic distributor for a rubber spraying machine. Machining is possible from 5 sides using this clamping.



Use in a horizontal machining centre. Machining of moulds on AMF magnetic clamping plates (pole size 70 x 70).

### MAGNETIC CLAMPING PLATE NO. 2900-50

Comprising poles of size 50 with a force of ca. 400 daN per pole. Specially made for machining with fixed or movable pole extensions, ideal for small and large workpieces with a normal surface and a low thickness.

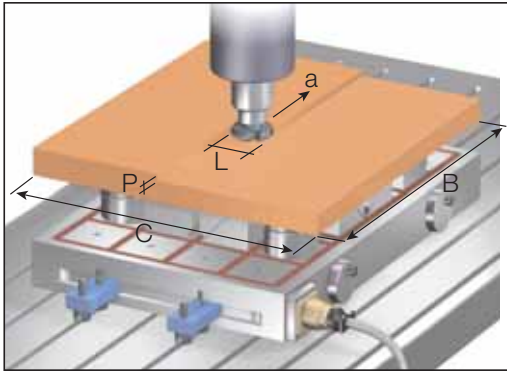
### MAGNETIC CLAMPING PLATE NO. 2900-70

Comprising poles of size 70 with a force of ca. 780 daN per pole. Especially suitable for using movable pole extensions for workpieces of any size with normal surface structure and medium thickness.





## 1) MACHINING FACTORS CALCULATION



$a$  = feed rate [mm/Min]  
 $B$  = workpiece length [mm]  
 $C$  = workpiece width [mm]  
 $L$  = cut width [mm]  
 $P$  = cut depth [mm]  
 $S$  = workpiece surface area [mm<sup>2</sup>] ( $B \times C$ )  
 $\alpha$  = coefficient [mm/Min] (see 2)

$Q_{max}$  = maximum stock removal mm<sup>3</sup>/Min

$$Q_{max} = S \times \alpha$$

Derived formulas:

$$L = \frac{Q_{max}}{P \times a} \quad a = \frac{Q_{max}}{P \times L} \quad P = \frac{Q_{max}}{L \times a} \quad Q_{max} = L \times P \times a$$

### EXAMPLE TRIAL FOR CHECKING THE CALCULATION OF THE MACHINING PARAMETERS

(EXAMPLE FOR POLE SIZE 50):

Workpiece:

Width:  $C = 210$  mm  
 Length:  $B = 350$  mm  
 Height:  $100$  mm  
 Material: C45

Checking in the trial:

selected:

Walter AG, 45° cutter head WKP35,  
 Corner cutting head WKP35, milling tool- $\phi L = 63$  mm,  
 Feed rate  $a = 800$  mm/min

$$\text{Cut depth } P = \frac{Q_{max}}{L \times a} = 4.7 \text{ mm}$$

Calculation:

- $S = B \times C = 210 \times 350 = 73500$  mm<sup>2</sup>
- Coefficient  $\alpha: 3,8$   
 $Q_1 = S \times \alpha = 73500 \text{ mm}^2 \times 3,8 \text{ mm/Min} = 279300 \text{ mm}^3/\text{Min}$
- Minimum magnetic flux of 10 mm is maintained
- Surface condition:  
for rough-milled surface, air gap  $T = 0,1$ ,  $Q_2 = 85\% \times Q_1$  is recommended.  
 $Q_2 = Q_1 \times 0,85 = 237405 \text{ mm}^3/\text{Min}$
- No pole extension -> support on the machine tool table:  $Q_{max} = 100\% \times Q_2$

## 2) COEFFICIENT $\alpha$

Material	2900-50	2900-60*	2900-70
unalloyed steel	3,8	3,9	5,0
alloyed steel	2,4	2,4	3,0
Cast iron	1,6	1,6	2,0

\* Magnetic clamping plates with pole size 60 are found in our separate sales brochure.

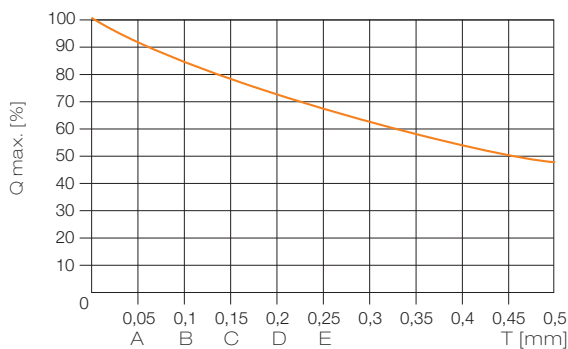
## 3) MINIMUM THICKNESSES FOR TOTAL MAGNETIC SHORT-CIRCUITING

(WITH WORKPIECE POSITIONED ON AT LEAST 4 ADJACENT POLES)

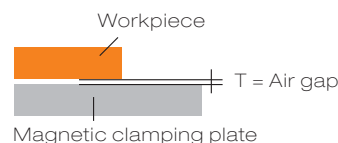
Material	2900-50	2900-60*	2900-70
unalloyed steel	10	15	19
alloyed steel	12	17	22
Cast iron	17	19	27

## 4) STOCK REMOVAL CURVE / SURFACE CONDITION

(WORKPIECE ON MAGNETIC CLAMPING PLATE)

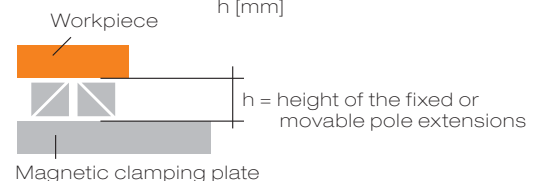
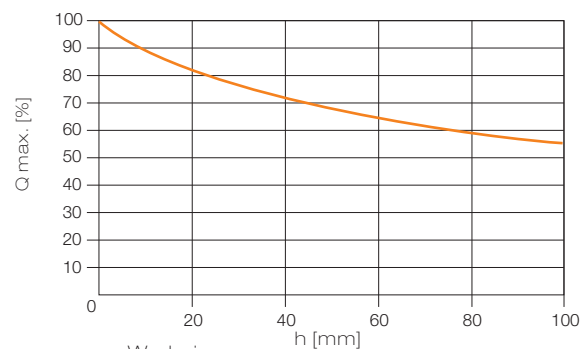


A = milled  
 B = rough-sized  
 C = stamped / rolled  
 D = shell casting  
 E = sand casting



## 5) CURVE FOR STOCK REMOVAL / EXTENSIONS HEIGHT

(WORKPIECE ON POLE EXTENSIONS)



### NOTE:

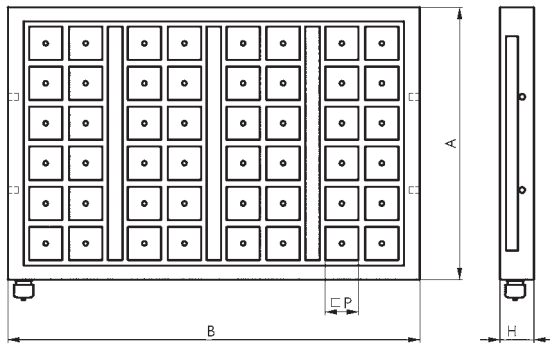
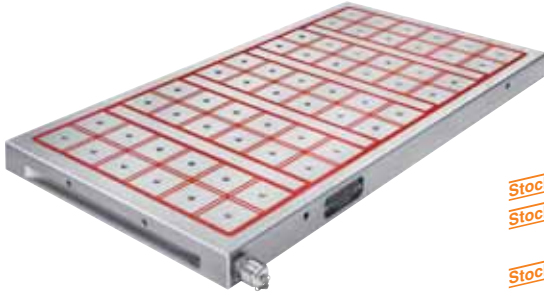
- > These data are only indicative. They were determined by trials that were performed with workpieces having a ratio  $B/C \leq 2$ . (For minimum thickness, refer to item 3). The workpiece was directly clamped on the magnetic clamping plate. Refer to 4) to relate the stock removal value  $Q_{max}$  to the surface condition of the workpiece.
- > The  $Q_{max}$  value obtained can be improved up to 5 times with the workpiece against stop references.
- > Shape errors are reduced by using pole extensions (refer to item 5)

## No. 2900-50

### Magnetic clamping plate for milling

Force / pole ca. 400 daN  
Pole density per m<sup>2</sup>: approx. 196

Scope of supply consists of:  
- Magnetic clamping plate  
- Plug contact on the long side  
- Clamping groove on the front



Order no.	A	B	H	Pole size P	Number of poles	Control device for a plate 230 V / 16 A SG1	Control device for a plate 400 V / 32 A SG2-1	Weight [kg]
424606	230	330	51	50	12	✓	✓	25
424614	230	480	51	50	18	✓	✓	40
424622	230	620	51	50	24	✓	✓	50
424630	230	770	51	50	30	✓	✓	65
424648	230	920	51	50	36	✓	✓	75
424655	230	1070	51	50	42	✓	✓	90
421578	300	330	51	50	16	✓	✓	35
424663	300	480	51	50	24	✓	✓	50
424671	300	620	51	50	32	✓	✓	65
424689	300	770	51	50	40	✓	✓	85
424697	300	920	51	50	48	✓	✓	100
424705	300	1070	51	50	56	✓	✓	115
424713	410	330	51	50	24	✓	✓	50
421594	410	480	51	50	36	✓	✓	70
303123	410	620	51	50	48	✓	✓	90
303099	410	770	51	50	60	✓	✓	115
424721	410	920	51	50	72	-	✓	135
303131	410	1070	51	50	84	-	✓	160
424739	490	330	51	50	28	✓	✓	60
424747	490	480	51	50	42	✓	✓	85
424754	490	620	51	50	56	✓	✓	110
303792	490	770	51	50	70	-	✓	135
424762	490	920	51	50	84	-	✓	160
304337	490	1070	51	50	98	-	✓	190
424770	600	330	51	50	36	✓	✓	70
424788	600	480	51	50	54	✓	✓	105
424796	600	620	51	50	72	✓	✓	135
424804	600	770	51	50	90	-	✓	165
424812	600	920	51	50	108	-	✓	200
424820	600	1070	51	50	126	-	✓	230

Stocked!

Stocked!

Stocked!

Stocked!

Stocked!

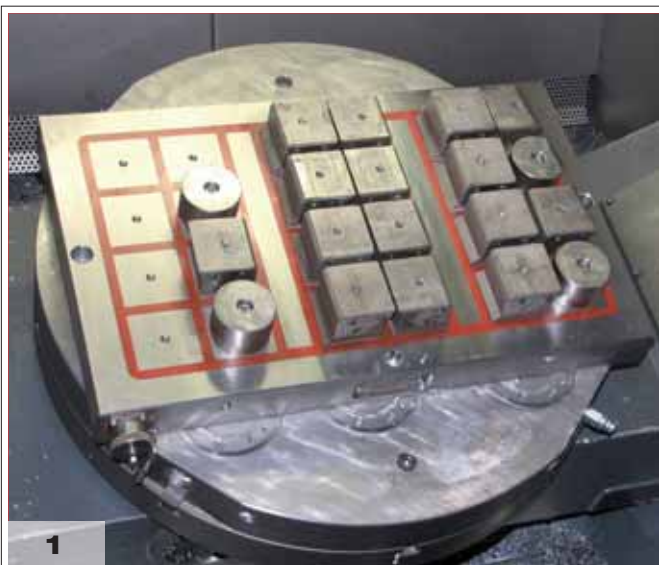
#### Feature:

- Optimal for clamping small and large workpieces.
- High rigidity due to monoblock design.
- Hardened threads for the pole extensions
- Voltage of the magnetic clamping plates 230V.

#### Note:

The control unit is not included in the scope of supply. Please order it separately.  
Control unit No. 2900SE2: Control of one to two magnetic clamping plates No. 2900-50.  
Control unit No. 2900SE4: Control of one to four magnetic clamping plates No. 2900-50.

Our magnetic clamping plates that are not in stock can be delivered to you within about 6 weeks.



The structure (maching centre) of a magnetic clamping plate with fixed and movable pole extensions, clamped with the AMF Zero-Point System.



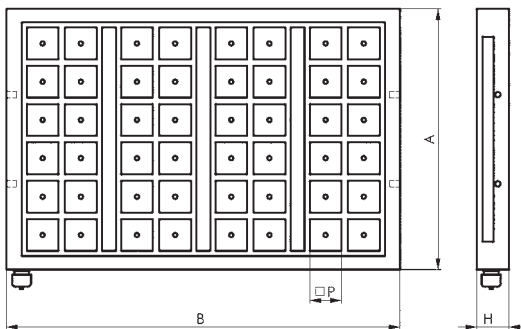
Flame-cut blank on the magnetic clamping plate, prepared for 5-side machining.

## No. 2900-70

### Magnetic clamping plate for milling

Force / pole ca. 780 daN  
Pole density per m<sup>2</sup>: approx. 100

Scope of supply consists of:  
- Magnetic clamping plate  
- Plug contact on the long side  
- Clamping groove on the front



Stocked!

Stocked!

Stocked!

Stocked!

Stocked!

Stocked!

Order no.	A	B	H	Pole size P	Number of poles	Control device for a plate 230 V / 16 A SG1	Control device for a plate 400 V / 32 A SG2-1	Weight [kg]
424846	220	420	51	70	8	✓	✓	35
424853	220	610	51	70	12	✓	✓	50
424861	220	810	51	70	16	✓	✓	65
424879	220	1000	51	70	20	✓	✓	80
424887	300	420	51	70	12	✓	✓	45
424895	300	610	51	70	18	✓	✓	65
424903	300	810	51	70	24	✓	✓	85
424911	300	1000	51	70	30	✓	✓	110
303594	390	420	51	70	16	✓	✓	60
303966	390	610	51	70	24	✓	✓	85
303982	390	810	51	70	32	✓	✓	115
304220	390	1000	51	70	40	-	✓	140
424937	480	420	51	70	20	✓	✓	75
424945	480	610	51	70	30	✓	✓	105
420737	480	810	51	70	40	-	✓	140
420745	480	1000	51	70	50	-	✓	175
424960	580	420	51	70	24	✓	✓	90
424978	580	610	51	70	36	✓	✓	125
424986	580	810	51	70	48	-	✓	170
304154	580	1000	51	70	60	-	✓	210

### Feature:

- Optimal for clamping large workpieces and for using pole extensions.
- High rigidity due to monoblock construction.
- Hardened threads for the pole extensions
- Voltage of the magnetic clamping plates 230V.

### Note:

The control unit is not included in the scope of supply. Please order it separately.  
Control unit No. 2900SE2: Control of one to two magnetic clamping plates No. 2900-70.  
Control unit No. 2900SE4: Control of one to four magnetic clamping plates No. 2900-70.

Our magnetic clamping plates that are not in stock can be delivered to you within about 6 weeks.



The workpieces were positioned directly on the magnetic clamping plate and milled. A stop strip and intermediate bars further facilitate an optimum clamping on the magnetic clamping plate.



The workpiece for the mould is directly positioned on two magnetic clamping plates and all 5 sides are milled with one clamping.



## No. 2900SG1

### Control device for a plate 230 V / 16 A

Scope of supply consists of:

- UCS current control system
- Connector contact (DB9) for machine safety connector
- Discharge cable 3 m with 7-pin plug



Order no.	for magnetic clamping plate size	L	B	H	Weight [kg]
420547	50 / 70	140	140	80	1,4

#### Note:

The compact control unit is suitable for operating a type 50 or 70 magnetic clamping plate. Please select your controller based on the desired plate size. Has no option for connection to interface box No. 2900IFB as an SPS interface.

Mains voltage 230V / 16A.

In the DEMAG phase, the control unit allows complete deactivation of the clamping plate, the workpiece and the machining chips, which can then be easily brushed off.

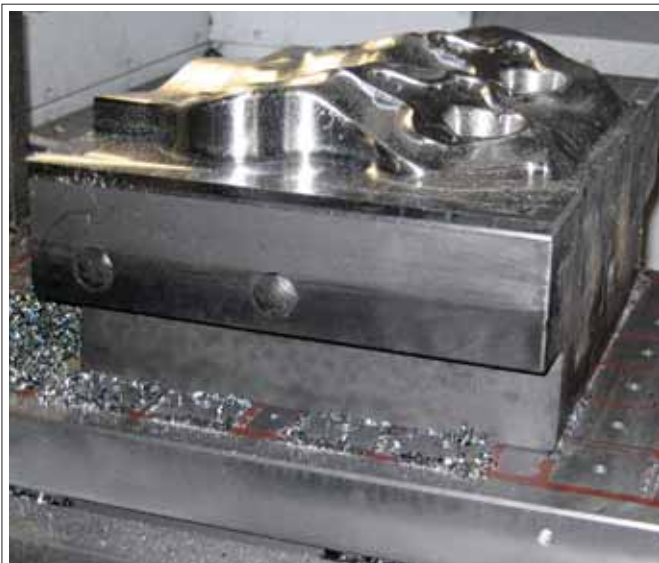
The underside of the control device is magnetic and can thus be mounted on a metallic surface close to the operator.

#### Application:

- Magnetisation
- Demagnetisation
- Activation

**MAG + ENABLE**  
**DEMAG + ENABLE**  
**ENABLE**

The **ENABLE** button is used simultaneously with those for activation or deactivation, depending on the desired activation cycle. It serves as protection against inadvertent activation of the cycles.



The mould part was directly clamped on the magnetic clamping plate and machined on all 5 sides with one clamping.



Flame-cut workpiece is clamped on fixed and movable pole extensions and milled. The discharge cable is unplugged during the machining.

## No. 2900SG2-1 Control device for a plate 400 V / 32 A

- Scope of supply consists of:
- UCS current control system
  - Connector contact (DB9) for machine safety connector
  - Discharge cable 6 m with 7-pin plug
  - Hand-held controller with channel selection, cable length 6 m



Order no.	for magnetic clamping plate size	L	B	H	Weight [kg]
420562	50 / 70	330	275	85	11,0

### Note:

The control unit is suitable for operating a type 50 or 70 magnetic clamping plate. Short cycle times (ca. 1 sec) can be achieved with this control device. Has the option for connection to interface box No. 2900IFB as an SPS interface.

Mains voltage 400V / 32A.

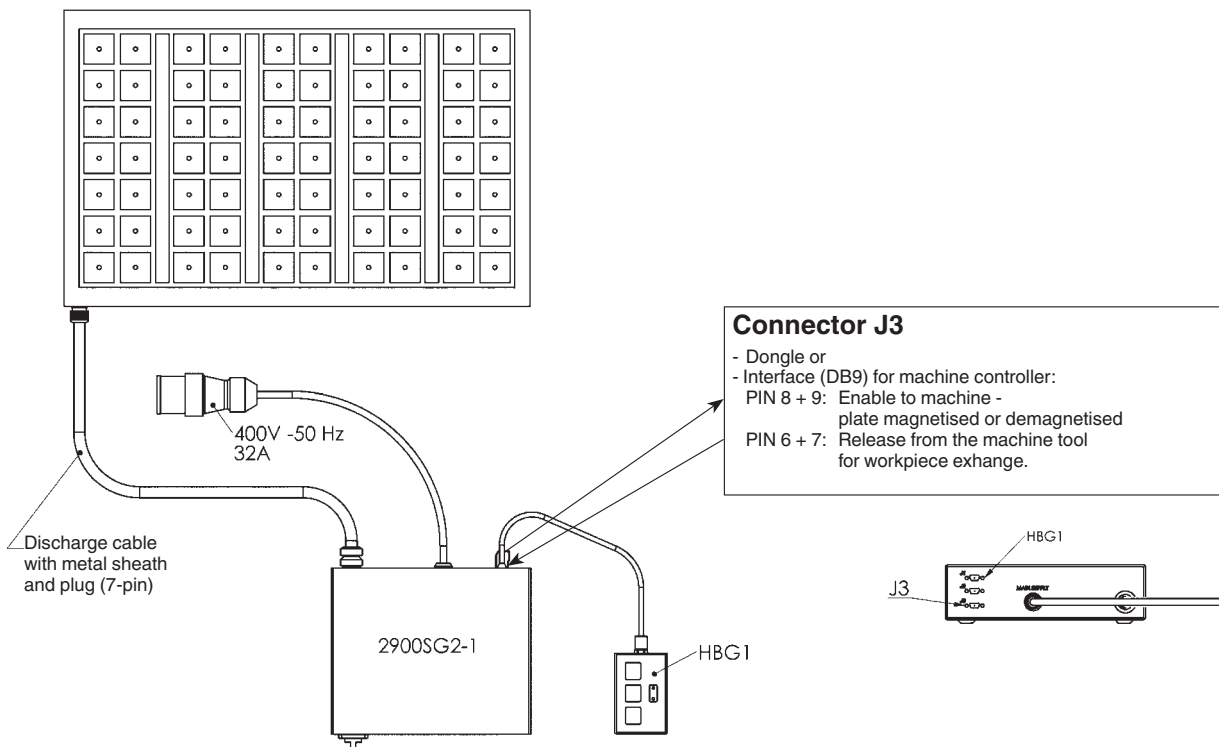
In the DEMAG phase, the control unit allows complete deactivation of the clamping plate, the workpiece and the machining chips, which can then be easily brushed off.

### Application:

- Magnetisation
- Demagnetisation
- Activation

**MAG + ENABLE**  
**DEMAG + ENABLE**  
**ENABLE**

The **ENABLE** button is used simultaneously with those for activation or deactivation, depending on the desired activation cycle. It serves as protection against inadvertent activation of the cycles.



## No. 2900SE

### Control unit

for controlling 14 magnetic clamping plates  
Type 50 or type 70

Scope of supply consists of:

- UCS current control system
- Distributor box
- Connector contact (DB9) for machine safety connector
- Discharge cable 3 m with 7-pin plug
- Hand-held controller with channel selection
- Cable length 6 m.

Order no.	Number of magnetic clamping plates to control	Control unit SG	Distributor box VB	Hand-held controller HBG	Weight [kg]
421610	1 - 2	2-2	1-2	2	12,0
421644	1 - 4	2-4	1-4	4	13,0

### Note:

The individual plates can be selected and removed with the hand-held controller. The control unit has the option for connection to interface box No. 2900IFB as an SPS interface.

Mains voltage 400V / 32A.

In the DEMAG phase, the control unit allows complete deactivation of the clamping plate, the workpiece and the machining chips, which can then be easily brushed off.

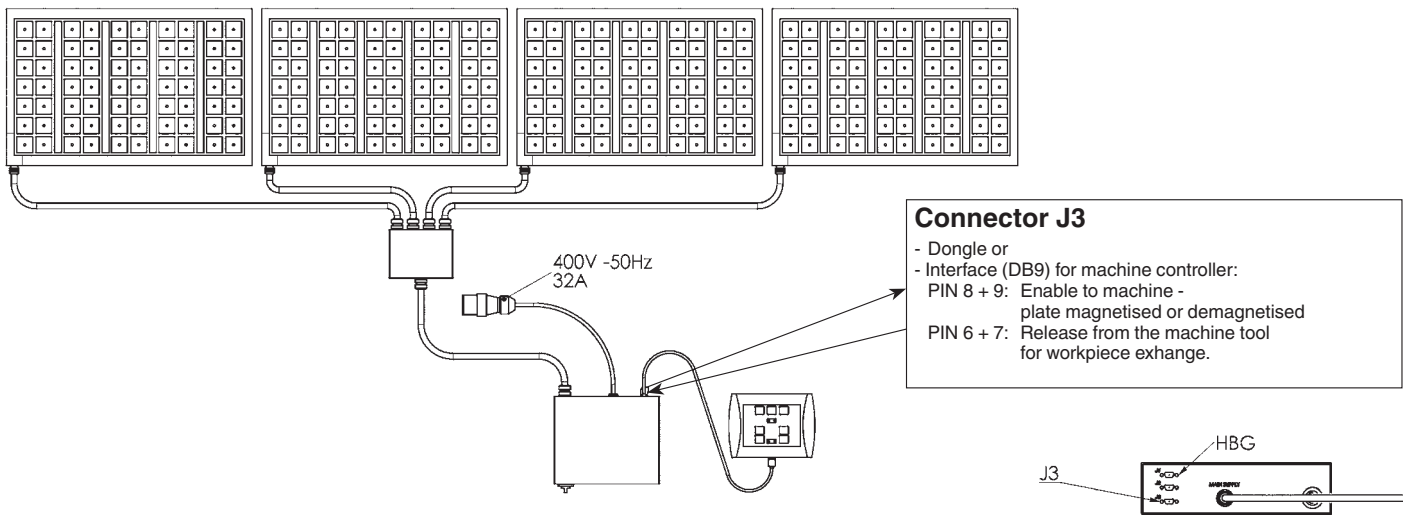
The underside of the control device is magnetic and can thus be mounted on a metallic surface close to the operator.

### Application:

- Magnetisation
- Demagnetisation
- Activation

**MAG + ENABLE**  
**DEMAG + ENABLE**  
**ENABLE**

The **ENABLE** button is used simultaneously with those for activation or deactivation, depending on the desired activation cycle. It serves as protection against inadvertent activation of the cycles. The cable length can be reduced, if desired.





## No. 2900IFB

### Interface box

Interface for activating the magnetic clamping plate by means of the machine controller.  
 Interface box, 32-bit, SPS-SPC  
 Cable length 6 m with DB9 plug connection.

Order no.	L	B	H	Weight [kg]
421727	135	88	40	0,8

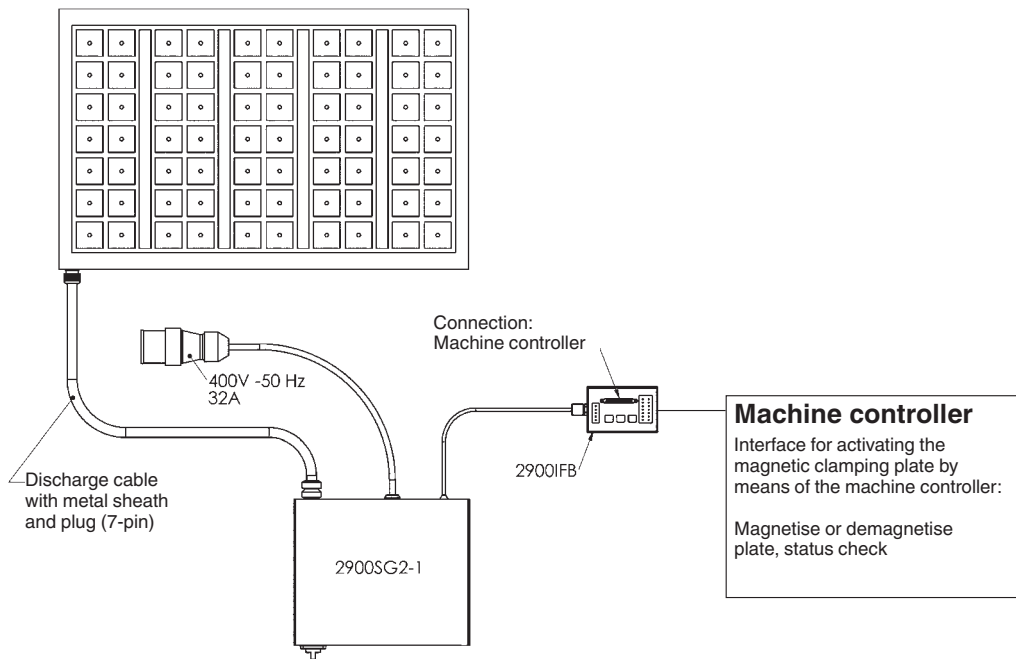
#### Note:

The interface box is connected to connector J1 of control unit No. 2900SG2 instead of the hand-held controller. If the interface box is used for control, the dongle must be removed from connection J3 of control unit No. 2900SG2. As the external interface, model DB connector with 37 pins is provided, which is connected to the machine controller; it receives commands for MAG - DEMAG activation as well as all status signals.

Control voltage 24V / DC.

#### Caution!

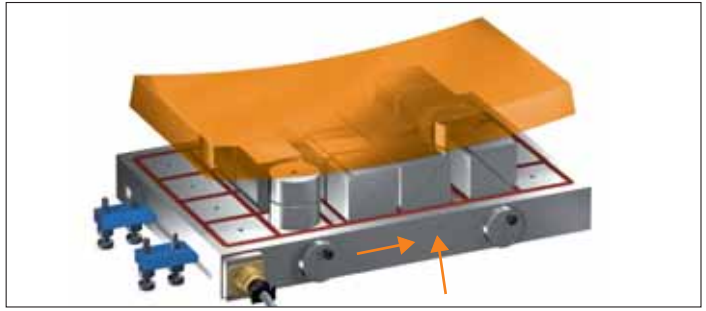
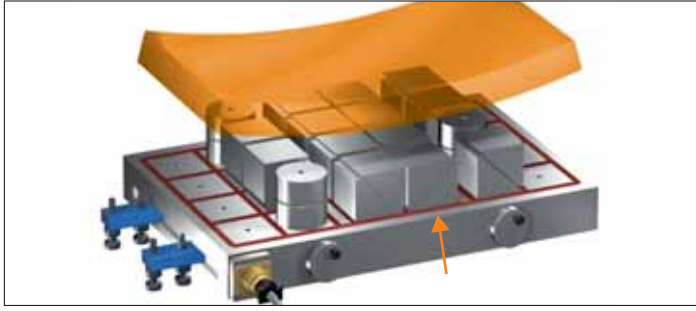
Do not use it alternately with the hand-held controller.



#### Connector J3

Remove dongle





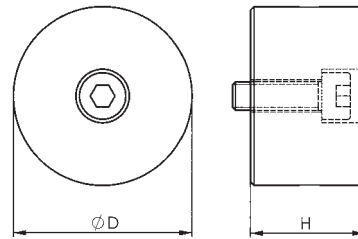
Optimal adaptation to the workpiece surface contour is guaranteed by the movable pole extensions. These pole extensions adapt themselves to the workpiece surface. The workpiece is supported and rests securely on the pole extensions. Optimal machining is possible from 5 sides without any interference contours.

## No. 2900PVF Pole extension, fixed

Order no.	Size	Ø D	H	Weight [g]
420588	50	50	32	460
420604	70	70	45	1340

### Note:

With M8x25 screws for size 50 and M8x40 for size 70 to ISO 4762 in 8.8.

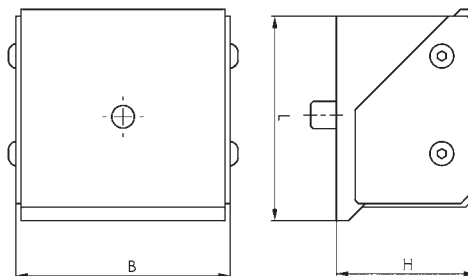


## No. 2900PVB Pole extension, movable

Order no.	Size	L	B	H	Weight [g]
420620	50	48	48	30-34	520
420604	70	69	73	42-48	1620

### Note:

With M8x12 screws for size 50 and M8x18 for size 70 to ISO 4762 in 8.8.



## No. 2900PVS

### Pole extension set

consisting of pole extensions  
no. 2900PVF and no. 2900PVB.



Order no.	Size	Number of fixed pole extensions	Number of movable pole extensions	Weight [g]
420513	50	3	45	24,8
420539	50	3	57	31,0
420554	50	3	81	43,5
420570	50	3	67	36,2
420596	50	3	95	50,8
420612	70	3	21	38,0
420638	70	3	29	51,0
420653	70	3	37	64,0
420695	70	3	47	80,2
420711	70	3	57	96,4

### Note:

These kits are for magnetic clamping plates in stock.  
For magnetic clamping plates not in stock, the poles are individually assembled.

Example:  
Pole extension set 420513 suitable for magnetic clamping plate 303123.

## No. 2900PVBR

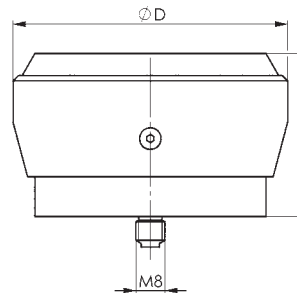
### Pole extension, movable, round



Order no.	Size	Ø D	H	Weight [g]
424572	50	55	32-35	540
424598	70	76	42-47	1150

### Feature:

- Due to the integrated threaded pins, the pole extensions can be installed quickly without problems and without tools..
- Interference with neighbouring pole fields is reduced by the central installation.
- Because of the vertical stroke, no alignment is necessary.
- Up to 20% more magnetic power.
- The enclosed design reduces penetration of contaminants.





## FOR YOU INDIVIDUAL NEEDS, OUTSIDE OUR CATALOGUE

We offer technical and economical solutions developed and manufactured to your exact specifications, for optimal usage of your machine tool.

Please get in touch with us. We look forward to meeting your challenges.

### NECESSARY DATA

> Dimensions or shape of the workpiece (drawing)

.....

> Material of the workpiece

.....

> Dimensions of the magnetic clamping plate [W x H x D]

.....

> Customer' s production steps (sketch of the machine table)

.....

### CHARACTERISTIC DATA

(For formulas to calculate the characteristic data, see page 9)

Feed rate a [mm/min.]

.....

Length B [mm]

Width C [mm]

.....

Milling tool diameter L [mm]

.....

Cut depth P [mm]

.....

Workpiece surface area S [mm<sup>2</sup>] (B x C)

.....

Coefficient  $\alpha$  [mm/min.]

.....



Sketch of machine table

> Pole size  50  (62)  70 Number fixed: ..... Pieces

Number movable: ..... Pieces

> Control device  single 230 V  single 400 V  with IFB

> Control unit  for 1-2 plates 400 V  for 1-4 plates 400 V

> Length of connecting cable: .....

> Stops: .....

### MAGNETIC CLAMPING WITH ZERO-POINT

Pitch spacing .....

Adapter plate  yes  no

### NOTES

.....

.....

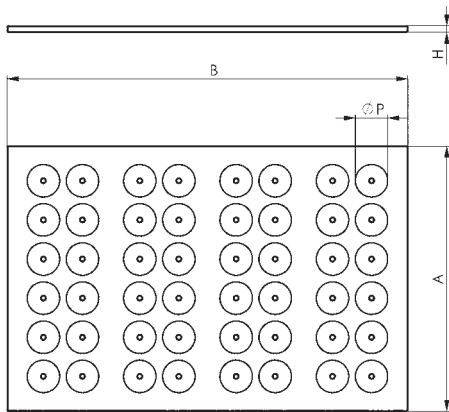


Shaped carrier plate as base plate. With this plate, you can machine individual small or asymmetrical parts that cannot be clamped other than on a magnetic clamping plate.



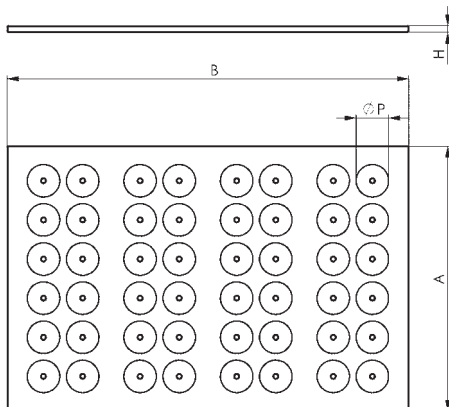
Rapid and economical clamping of asymmetrical components; shaped carrier plate in use with individual components: An additional thin sheet metal plate is fixed on the shaped carrier plate. Support on four poles guarantees the fit in the axes, and an optimal magnetic force results.

## No. 2900T50 Pole carrier plate



Order no.	A	B	H	Pole size P	Number of poles	Weight [kg]
425421	230	330	10	50	12	6,0
425439	230	480	10	50	18	8,5
425447	230	620	10	50	24	11,5
425454	230	770	10	50	30	14,0
425462	230	920	10	50	36	17,0
425470	230	1070	10	50	42	19,5
425488	300	330	10	50	16	8,0
425496	300	480	10	50	24	11,5
425504	300	620	10	50	32	14,5
425512	300	770	10	50	40	18,0
425520	300	920	10	50	48	21,5
425538	300	1070	10	50	56	25,0
425546	410	330	10	50	24	10,5
425553	410	480	10	50	36	15,5
425561	410	620	10	50	48	20,0
425579	410	770	10	50	60	25,0
425587	410	920	10	50	72	30,0
425595	410	1070	10	50	84	34,5
425603	490	330	10	50	28	13,0
425611	490	480	10	50	42	18,5
425629	490	620	10	50	56	24,0
425637	490	770	10	50	70	30,0
425645	490	920	10	50	84	35,0
425652	490	1070	10	50	98	41,0
425660	600	330	10	50	36	15,5
425678	600	480	10	50	54	22,5
425686	600	620	10	50	72	29,0
425694	600	770	10	50	90	36,0
425702	600	920	10	50	108	43,0
425710	600	1070	10	50	126	50,0

## No. 2900T70 Pole carrier plate



Order no.	A	B	H	Pole size P	Number of poles	Weight [kg]
425728	220	420	10	70	8	7,5
425736	220	610	10	70	12	10,5
425744	220	810	10	70	16	14,0
425751	220	1000	10	70	20	17,5
425769	300	420	10	70	12	10,0
425777	300	610	10	70	18	14,5
425785	300	810	10	70	24	19,0
425793	300	1000	10	70	30	23,5
425801	390	420	10	70	16	13,0
425819	390	610	10	70	24	18,5
425827	390	810	10	70	32	25,0
425835	390	1000	10	70	40	30,5
425843	480	420	10	70	20	16,0
425850	480	610	10	70	30	23,0
425868	480	810	10	70	40	30,5
425876	480	1000	10	70	50	38,0
425884	580	420	10	70	24	19,0
425892	580	610	10	70	36	28,0
425900	580	810	10	70	48	37,0
425918	580	1000	10	70	60	45,5

### Feature:

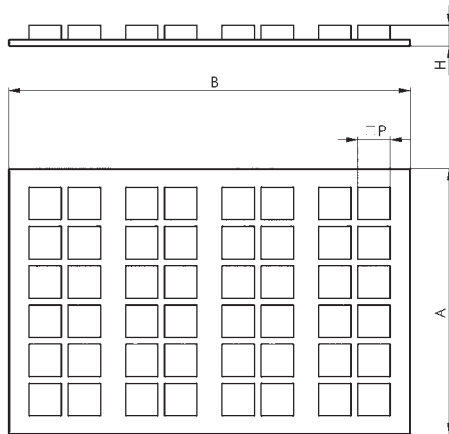
Complete clamping arrangements, including the installed pole extensions, can be quickly replaced thanks to the use of pole carrier plates.

### Note:

The fastening holes and attaching threads are not included.

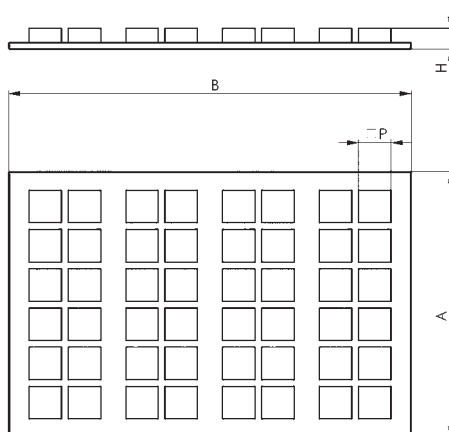


## No. 2900F50 Shaped carrier plate



Order no.	A	B	H	Pole size P	Number of poles	Weight [kg]
425926	230	330	32	50	12	8,0
425934	230	480	32	50	18	12,0
425942	230	620	32	50	24	15,5
425959	230	770	32	50	30	19,0
425967	230	920	32	50	36	23,0
425975	230	1070	32	50	42	27,0
425983	300	330	32	50	16	10,5
425991	300	480	32	50	24	15,5
426007	300	620	32	50	32	20,5
426015	300	770	32	50	40	25,5
426023	300	920	32	50	48	30,0
426031	300	1070	32	50	56	35,5
426049	410	330	32	50	24	15,0
426056	410	480	32	50	36	22,0
426064	410	620	32	50	48	28,5
426072	410	770	32	50	60	35,5
426080	410	920	32	50	72	42,5
426098	410	1070	32	50	84	49,5
426106	490	330	32	50	28	18,0
426114	490	480	32	50	42	26,0
426122	490	620	32	50	56	34,0
426130	490	770	32	50	70	42,0
426148	490	920	32	50	84	50,5
426155	490	1070	32	50	98	59,0
426163	600	330	32	50	36	22,0
426171	600	480	32	50	54	29,0
426189	600	620	32	50	72	42,0
426197	600	770	32	50	90	50,0
426205	600	920	32	50	108	63,0
426213	600	1070	32	50	126	73,0

## No. 2900F70 Shaped carrier plate



Order no.	A	B	H	Pole size P	Number of poles	Weight [kg]
426221	220	420	45	70	8	10,0
426239	220	610	45	70	12	17,0
426247	220	810	45	70	16	23,0
426254	220	1000	45	70	20	28,0
426262	300	420	45	70	12	16,0
426270	300	610	45	70	18	24,5
426288	300	810	45	70	24	32,0
426296	300	1000	45	70	30	40,0
426304	390	420	45	70	16	22,0
426312	390	610	45	70	24	32,0
426320	390	810	45	70	32	42,5
426338	390	1000	45	70	40	52,5
426346	480	420	45	70	20	27,0
426353	480	610	45	70	30	39,5
426361	480	810	45	70	40	52,5
426379	480	1000	45	70	50	65,0
426387	580	420	45	70	24	32,5
426395	580	610	45	70	36	48,0
426403	580	810	45	70	48	64,0
426411	580	1000	45	70	60	78,0

### Feature:

For machining complex components. The use of shaped carrier plates enables quick replacement of complete clamping arrangements.

### Note:

The fastening holes and attaching threads are not included.

## No. 2900W15

### Magnetic clamping angle for milling, single

Force / pole approx. 400 daN



Order no.	A	B	C	H	Pole size P	Number of poles	Weight [g]
425066	330	410	180	600	50	24	270
425074	480	410	180	600	50	36	380
425124	480	600	200	780	50	54	535
425132	630	600	200	780	50	72	735
425140	630	665	200	860	50	80	810
425165	770	600	200	780	50	90	900

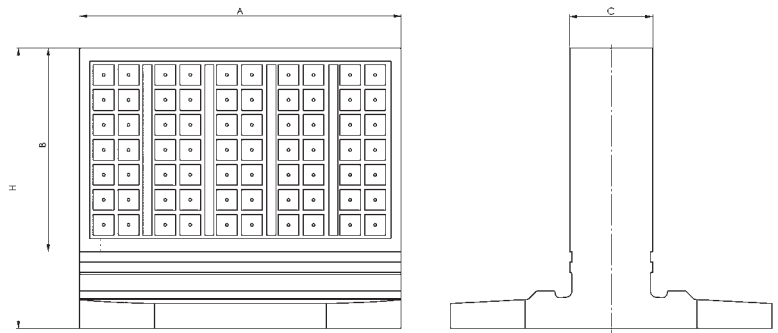
#### Feature:

Magnetic clamping angles are optimally suited to the machining of small and large workpieces. The monoblock design provides a high degree of rigidity.

The voltage of the plates is 230V.

#### Note:

The control unit is not included in the scope of supply. Please order it separately.



## No. 2900W25

### Magnetic clamping angle for milling, double

Force / pole approx. 400 daN



Order no.	A	B	C	H	Pole size P	Number of poles	Weight [g]
425181	330	410	180	600	50	2 x 24	260
425199	480	410	180	600	50	2 x 36	370
425249	480	600	200	780	50	2 x 54	510
425256	630	600	200	780	50	2 x 72	725
425264	630	665	200	860	50	2 x 80	780
425280	770	600	200	780	50	2 x 90	865

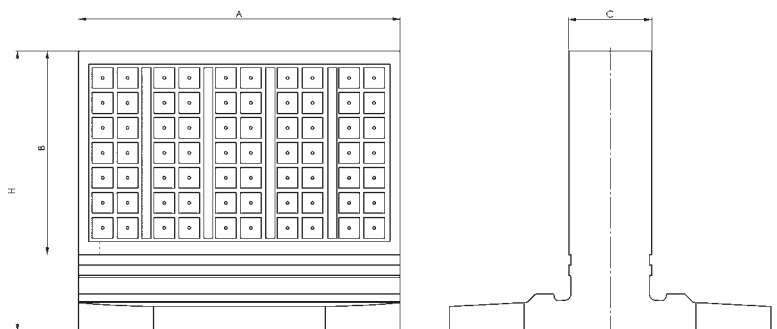
#### Feature:

Magnetic clamping angles are optimally suited to the machining of small and large workpieces. The monoblock design provides a high degree of rigidity.

The voltage of the plates is 230V.

#### Note:

The control unit is not included in the scope of supply. Please order it separately.



## No. 2900W17

### Magnetic clamping angle for milling, single

Force / pole: approx. 780 daN



Order no.	A	B	C	H	Pole size P	Number of poles	Weight [g]
425314	415	580	180	780	70	24	490
425322	605	665	200	860	70	42	790
425330	605	855	220	1060	70	48	1070
425348	795	855	230	1060	70	64	1470

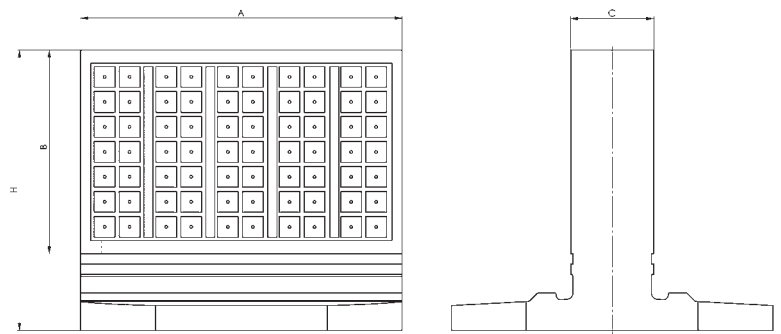
#### Feature:

Magnetic clamping angles are optimally suited to the machining of small and large workpieces. The monoblock design provides a high degree of rigidity.

The voltage of the plates is 230V.

#### Note:

The control unit is not included in the scope of supply. Please order it separately.



## No. 2900W27

### Magnetic clamping angle for milling, double

Force / pole: approx. 780 daN



Order no.	A	B	C	H	Pole size P	Number of poles	Weight [g]
425371	415	580	180	780	70	2 x 24	490
425389	605	665	200	860	70	2 x 42	790
425397	605	855	220	1060	70	2 x 48	1070
425405	795	855	230	1060	70	2 x 64	1470

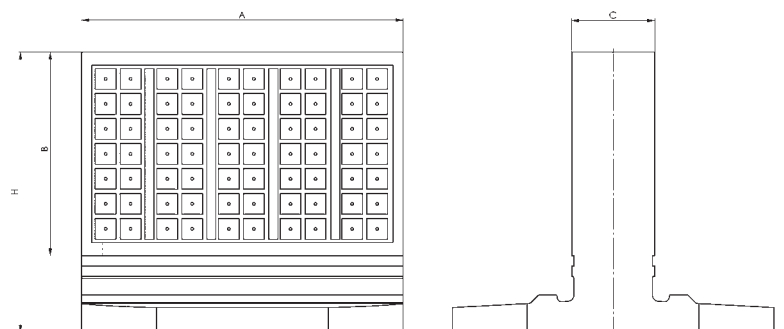
#### Feature:

Magnetic clamping angles are optimally suited to the machining of small and large workpieces. The monoblock design provides a high degree of rigidity.

The voltage of the plates is 230V.

#### Note:

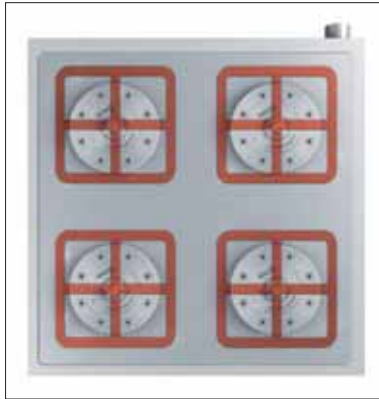
The control unit is not included in the scope of supply. Please order it separately.



# THE COMBINATION OF TWO INNOVATIVE CLAMPING SYSTEMS

- > High clamping force with 400 daN
- > Precise positioning thanks to a repeatability of 0.01 mm instead of 0.1 mm previously
- > Low voltage - electro permanent magnet with 230 volts/16A
- > Low material thickness of 35 mm
- > Cost savings through reduction of your set-up times
- > System can be used flexibly - special fixtures are no longer required

Clamping systems can be easily combined by using an adapter plate. The advantage is the guaranteed lateral parallelism, so that the useful strokes of the machine are usable to their full extent.



Until now, users who wanted to use magnetic and zero-point clamping technology in combination had only two clamping possibilities. If the two plates were to lie laterally parallel one above the other, that could only be achieved with a very thick magnetic clamping plate, since otherwise a zero-point nipple could not be installed. The only other possibility was to arrange the two system plates offset by 45° from one another. Both possibilities had the drawback that it was not possible to utilize the useful strokes of the machine tool to 100% of capacity.

AMF took on this problem and developed an adapter plate that makes it possible to arrange the two clamping plates laterally parallel one above the other. Due to the low thickness of the magnetic clamping plate and the adapter plate, the entire machine tool cutting path can be utilized.





## No. 2900N

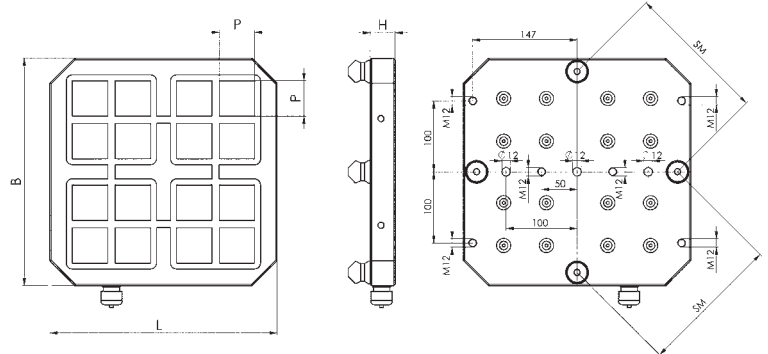
### Magnetic clamping plate

Force / pole: approx. 400 daN.  
with zero-point clamping nipples Size K20

Order no.	L	B	H	SM	Pole size P	Number of poles	Weight [kg]
420661	320	320	35	200	50	16	25

#### Note:

The following clamping nipples and nipple screws are supplied:  
Clamping nipple no. 6370ZN-20 (1 x zero point nipple 303149, 1 x slit nipple 303156, 2 x undersize nipple 303164), 4 x nipple screw no. 6370ZNS-001 (303222).  
Our complete zero point clamping programme can be found in our catalogue „Zero-Point-Systems“.



## No. 2900A

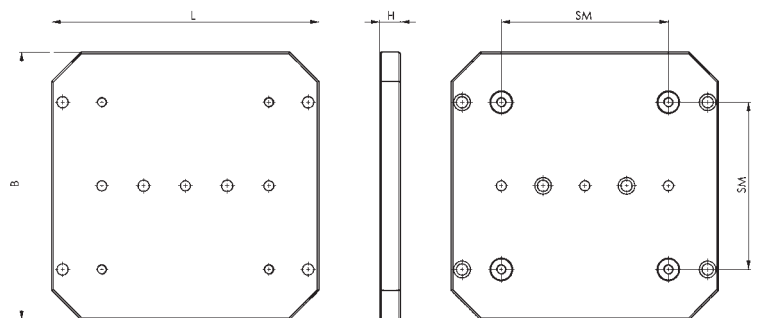
### Adapter plate

with mounting kit

Order no.	L	B	H	SM	Weight [kg]
420687	320	320	25	200	7

#### Note:

The adapter plate is provided in combination with magnetic clamping plate no. 2900N. The magnetic and zero-point clamping plates can be clamped parallel to one another by using the adapter plate.

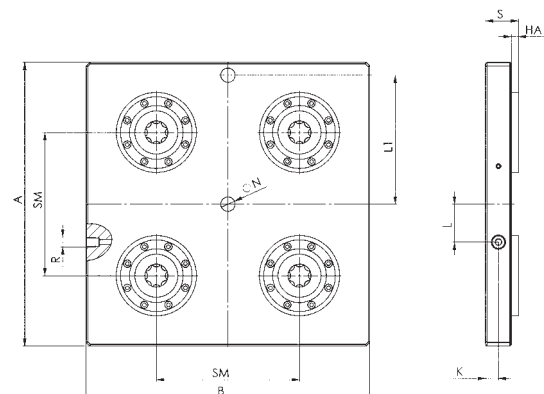


## No. 6370S4-002

### Quadruple clamping station

Hydraulic unlocking.  
Steel, unhardened.  
Repeatability < 0.005 mm.

Order no.	Pull-in/locking force up to [kN]	Holding force [kN]	Weight [kg]
303321	4 x 20	4 x 55	40



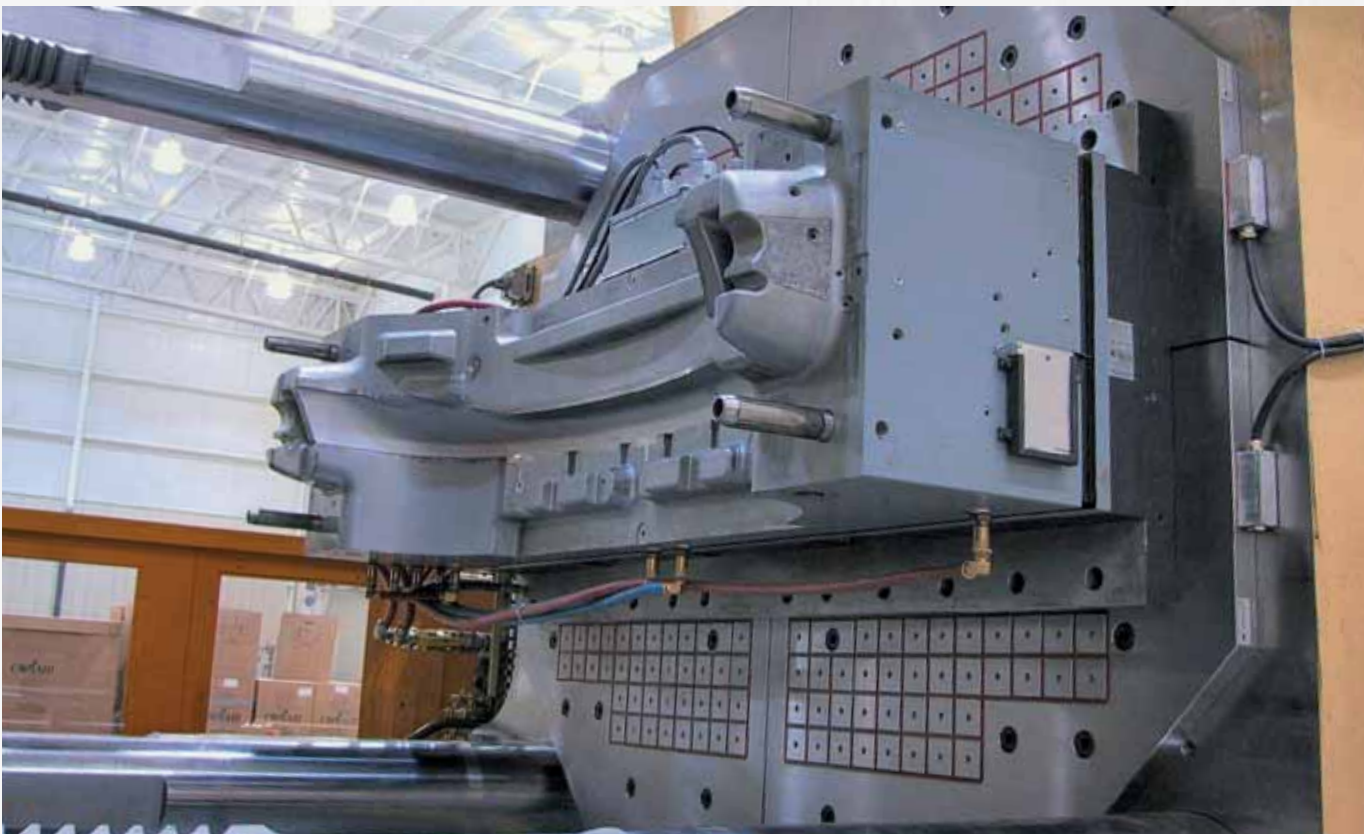
#### Dimensions:

Order no.	A	B	HA	K	L	L1	ØN	R	S	SM
303321	396	396	10	18	148	180	20	G	0	0

Subject to technical alterations.



Four individual magnetic clamping plates are bolted into an injection moulding machine and connected to one another.



Magnetic clamping technology in use on an injection moulding machine. An automobile bumper (moulded bumper) is being produced.

Subject to technical alterations.



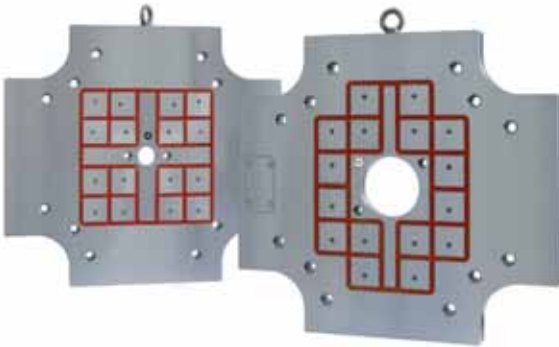
## No. 2910S

### Magnetic clamping plate for injection moulding machines

Force / pole: approx. 600 daN.

Scope of supply consists of:

- Magnetic clamping plate for fixed and movable side
- Control unit 230V
- Proximity switch for each side



Order no.	L	B	H	Pole size P	max. holding force per side [to]	Tool weight up to [kg]	min. toolsize [mm]	Weight [kg]
421651	510	460	45	62	4,8	960	230 x 230	55
421677	560	560	45	62	7,2	1440	280 x 280	75
421693	690	640	45	62	9,6	2400	300 x 300	110

#### Note:

- Max. achievable holding force when all poles occupied
- Max. operating temperature 120°C

The inductive proximity sensor monitors:

- The presence of the tool to activate the magnetisation cycle
- Enables immediate interruption of machine operation from
- Separate monitoring of both plates

Control unit:

- UCS current control system
- Connector contact (DB9) for machine safety connector
- With key switch

Cable lengths:

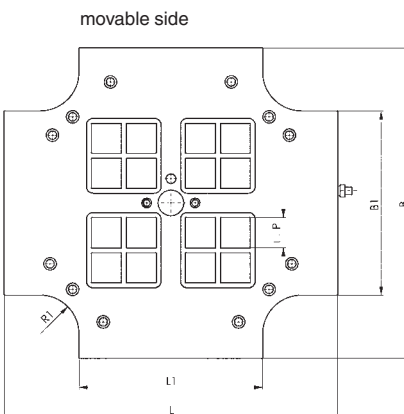
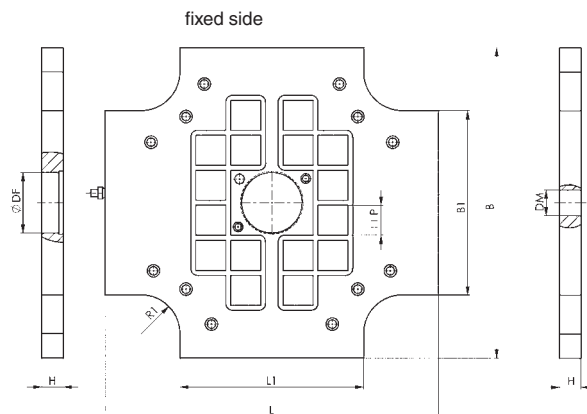
- Discharge cable to movable plate: 14 m
- Discharge cable to fixed plate: 8 m

Mounting bores:

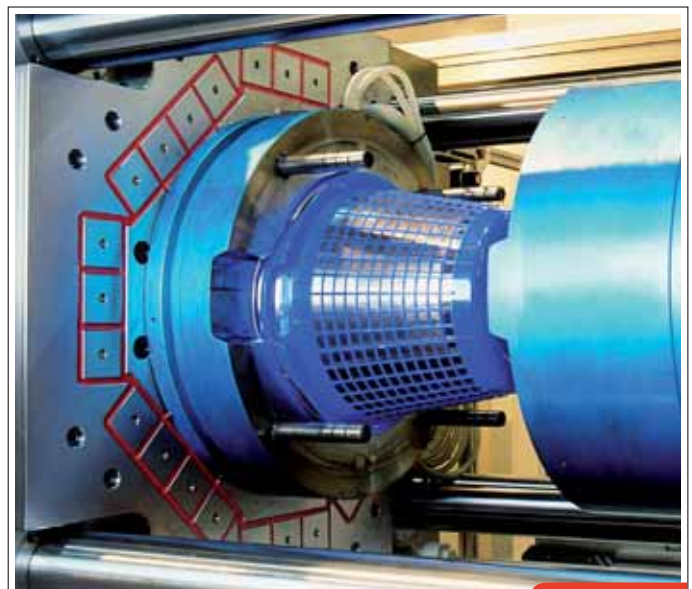
- In accordance with standards: Euromap, SPI, JIS
- Other mounting or ejector bores can be incorporated

#### Dimensions

Order no.	L1	B1	DF H8	DM	R1	min. tiebar spacing AH
421651	260	260	100	53	50	300 x 300
421677	340	340	125	53	50	380 x 380
421693	380	380	125	53	80	440 x 440



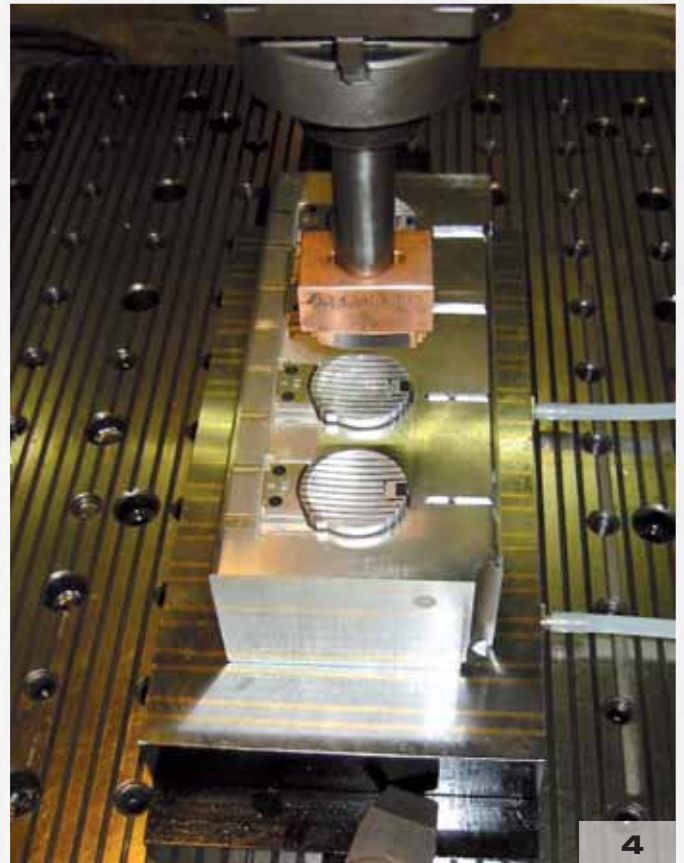
Magnetic clamping plate with an injection mould



Production of plastic baskets







- > **1** magnetic clamping plate on a hydraulic press (available on request)
- > **2** AMF magnetic clamping plates being used for surface grinding (available on request)
- > **3+4** magnetic clamping plates for eroding are available on request.

# PRACTICAL, SECURE AND ECONOMICAL

These magnetic lifters are a real revolution in magnetic handling. Compact dimensions, low weight, high power and total operational reliability are the special features of this device. They make this solution especially cost-effective for both small workshops and large industrial firms, with near zero operating costs and quick return on investment.

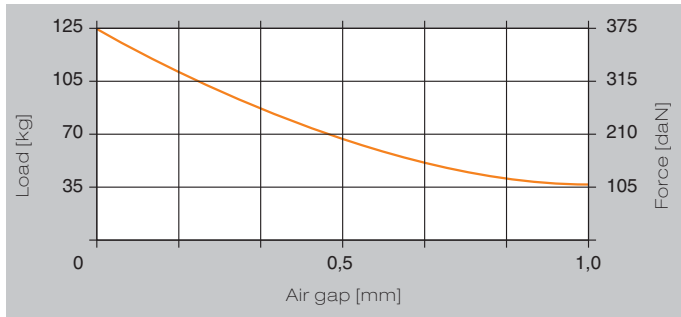
The series consists of 5 models with carrying capacities of up to 2000 kg. The equipment is easy and practical to operate. There are great advantages in increased performance and productivity in a great many applications, even with limited space and lifters with low carrying capacity.

Ideal for handling workpieces in machine tools and oxygen cutting operation, for plates, sheet and iron blocks in steel structural works and shipyards building, in steel industries and distribution centres, for changing tooling in production and in general for all the requirements of the modern mechanical workshops.

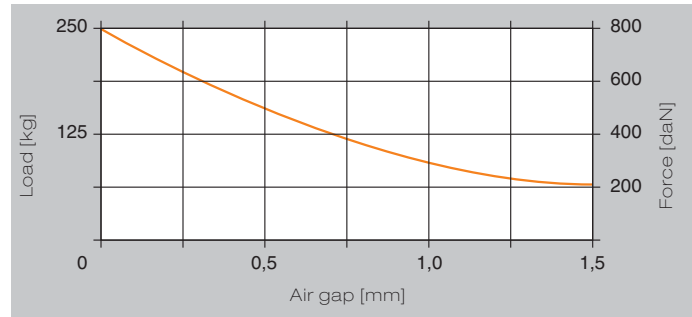
A single operator can handle the load, which is always anchored from above and lifted from the top without deformation or damage and with optimal use of the available work space, perfect human engineering and full safety for men and equipment.

## POWER VS LOAD AIR GAP CURVES (for common structural steel of type FE 370B with poles completely covered)

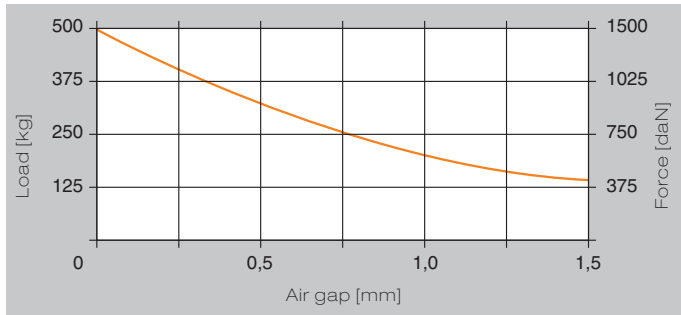
**SIZE 125** - MINIMUM THICKNESS 20 MM



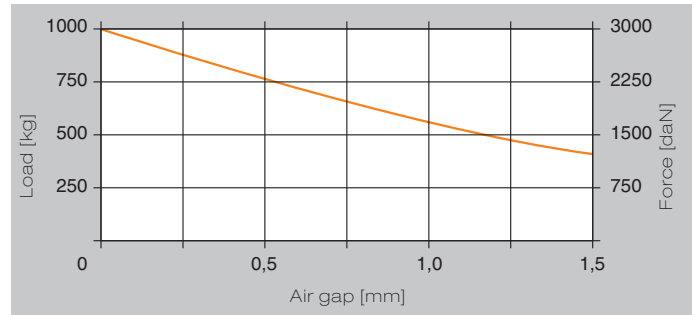
**SIZE 250** - MINIMUM THICKNESS 20 MM



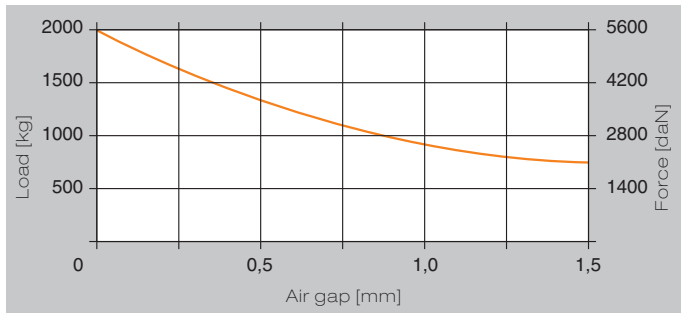
**SIZE 500** - MINIMUM THICKNESS 25 MM



**SIZE 1000** - MINIMUM THICKNESS 40 MM



**SIZE 2000** - MINIMUM THICKNESS 55 MM



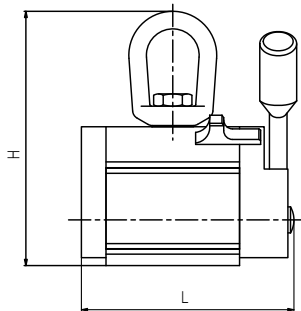
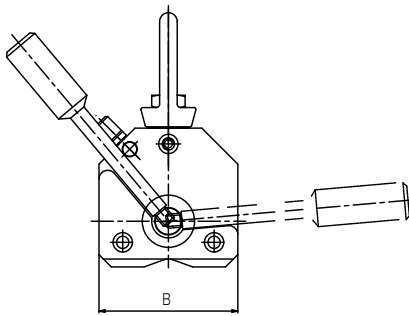
### Definitions:

Load = carrying capacity [kg] (with safety factor =3)

Force = max. tearing force [daN] (without safety factor)

## No. 2940

### Magnetic lifting device with manual actuation



Order no.	Size	L	B	H	Weight [kg]
420752	125	121	79	145	4
420760	250	189	79	142	6
420778	500	250	106	189	15
420505	1000	342	133	219	34
420521	2000	457	166	293	80

#### Note:

Size 125 with rotatable hook.  
Max. temperature of the load: 80°C.

#### Technical data for lifting flat workpieces:

Order no.	Size	Holding force up to [kg]	Min. workpiece thickness [mm]	Max. workpiece length [mm]
420752	125	125	20	1000
420760	250	250	20	1500
420778	500	500	25	2000
420505	1000	1000	40	3000
420521	2000	2000	55	3000

#### Technical data for lifting round workpieces:

Order no.	Size	Holding force up to [kg]	Min. workpiece diameter [mm]	Max. workpiece diameter [mm]
420752	125	50	10	300
420760	250	100	10	300
420778	500	200	15	400
420505	1000	400	25	450
420521	2000	800	35	600





**... BY ITEM NO.**

Article-no.	Cat.	Page	Article-no.	Cat.	Page	Article-no.	Cat.	Page	Article-no.	Cat.	Page
No. 2900-50		10	No. 2900IFB		15	No. 2900PVS		17	No. 2900T70		20
No. 2900-70		11	No. 2900N		25	No. 2900SE		14	No. 2900W15		22
No. 2900A		25	No. 2900PVB		16	No. 2900SG1		12	No. 2900W17		23
No. 2900F50		21	No. 2900PVBR		17	No. 2900SG2-1		13	No. 2900W25		22
No. 2900F70		21	No. 2900PVF		16	No. 2900T50		20	No. 2900W27		23
									No. 2910S		27
									No. 2940		31
									No. 6370S4-002		25

**... BY ORDER NO.**

Order-no.	Cat.	Page	Order-no.	Cat.	Page	Order-no.	Cat.	Page	Order-no.	Cat.	Page
303099		10	421677		27	425066		22	425637		20
303123		10	421693		27	425074		22	425645		20
303131		10	421727		15	425124		22	425652		20
303321		25	424572		17	425132		22	425660		20
303594		11	424598		17	425140		22	425678		20
303792		10	424606		10	425165		22	425686		20
303966		11	424614		10	425181		22	425694		20
303982		11	424622		10	425199		22	425702		20
304154		11	424630		10	425249		22	425710		20
304220		11	424648		10	425256		22	425728		20
304337		10	424655		10	425264		22	425736		20
420505		31	424663		10	425280		22	425744		20
420513		17	424671		10	425314		23	425751		20
420521		31	424689		10	425322		23	425769		20
420539		17	424697		10	425330		23	425777		20
420547		12	424705		10	425348		23	425785		20
420554		17	424713		10	425371		23	425793		20
420562		13	424721		10	425389		23	425801		20
420570		17	424739		10	425397		23	425819		20
420588		16	424747		10	425405		23	425827		20
420596		17	424754		10	425421		20	425835		20
420604		16	424762		10	425439		20	425843		20
420604		16	424770		10	425447		20	425850		20
420612		17	424788		10	425454		20	425868		20
420620		16	424796		10	425462		20	425876		20
420638		17	424804		10	425470		20	425884		20
420653		17	424812		10	425488		20	425892		20
420661		25	424820		10	425496		20	425900		20
420687		25	424846		11	425504		20	425918		20
420695		17	424853		11	425512		20	425926		21
420711		17	424861		11	425520		20	425934		21
420737		11	424879		11	425538		20	425942		21
420745		11	424887		11	425546		20	425959		21
420752		31	424895		11	425553		20	425967		21
420760		31	424903		11	425561		20	425975		21
420778		31	424911		11	425579		20	425983		21
421578		10	424937		11	425587		20	425991		21
421594		10	424945		11	425595		20	426007		21
421610		14	424960		11	425603		20	426015		21
421644		14	424978		11	425611		20	426023		21
421651		27	424986		11	425629		20	426031		21
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									426411		21



These conditions of sale apply to business conducted with companies, legal entities in the public sector, and legal entities with special budget in the public sector. Our deliveries and services are carried out exclusively on the basis of the conditions stated below. Deviating purchasing conditions of the buyer will not become part of the contract, not even through acceptance of the order, unless we have expressly accepted them.

## 1. Offer and entering into a contract

The basis of our delivery contracts is the latest edition of our catalogue. Orders are not considered as accepted until they have been confirmed by us in writing. When goods are supplied from stock and, for organisational reasons, you receive no separate confirmation, the invoice has the additional function of confirming the order. Details of dimensions and weights, and illustrations, drawings and data are not binding and may be changed by us at any time. Deviations cannot be excluded.

## 2. Prices

Prices are quoted in EUR ex-works excluding turnover tax, packing, freight, carriage, and insurance. Unless otherwise agreed, our list prices on the day of delivery apply. In order to cover our costs, orders under EUR 50.– net value are subject to a small order surcharge of EUR 10.–.

## 3. Delivery

Delivery delays are quoted to the best of our knowledge but without guarantee. Agreed delivery delays begin on the day we accept the order and refer to the completion of the goods in our works.

## 4. Transfer of risk

Risks are transferred to you when the goods are passed to a specific person, company, or organisation that is charged with the execution of carriage of the goods. This applies also to partial deliveries and when we have accepted the costs of carriage, delivery or erection. The risks are also transferred to you when you have defaulted on acceptance.

## 5. Dispatch

Goods are supplied ex-works. Dispatch is at your cost and risk. Scheduled, FOB, and CIF deliveries are also at your risk. In the absence of specific instructions concerning dispatch, we will arrange same as we think fit, but without accepting any responsibility for choosing the cheapest or most suitable method of dispatch. We make a handling charge of EUR 5.– if goods are sent at your request to a third party. You accept that your order can be supplied in partial deliveries insofar as this is reasonable.

## 6. Reservation of proprietary rights

Goods delivered remain our property until payment of all claims has been received in full or until redemption of cheques given in payment. The cancellation of individual positions in an open invoice and the drawing of a balance and its acceptance do not affect proprietary rights. You have the right to dispose of the goods as a normal commercial transaction, but you are forbidden to pawn, mortgage, or transfer ownership of them in settlement of a debt or debts. You surrender to us herewith your right to payment for goods for which we reserve our proprietary rights. You have the right to collect these payments as long as you meet your obligations to us. If we request it, you are obliged to name the third party and we have the right to publish this information and the transfer of rights.

## 7. Cancellation rights due to late payment or insolvency

If you do not pay for the goods by the time payment is due, and if you have not paid after expiry of a reasonable time limit set by us, we have the right to withdraw from the contract and demand the return of goods already supplied. Rights under § 323 BGB (BGB = German civil law code) remain otherwise unaffected. Application for the opening of insolvency proceedings gives us the right to withdraw from the contract and demand the immediate return of goods supplied before the bankruptcy court orders protective measures.

## 8. Packaging

Packages comply with the German packaging regulations (WO). Disposable packaging is charged at cost. The packaging is not returnable.

## 9. Tooling costs

In the absence of any agreement to the contrary, tooling made for the execution of an order remains our property in all cases. This applies even if we have made a charge for a proportion of the tooling costs.

## 10. Payment

Our invoices are payable net within 30 days of the date of the invoice, or with 2% discount if paid within 10 days. Invoices below EUR 50.– are payable immediately without discount. Our credit notes and your charges on us reduce the amount subject to discount. Late payment entitles us to interest at the rate the bank charges us for a current account overdraft but at least 8 percent above the current base rate of the European Central Bank. If payment is overdue, we are entitled, after giving you notice in writing, to cease fulfilling our obligations under the contract until payment is received.

## 11. Offsetting exclusion

You can only offset payments with legally-established or unopposed counter claims.

## 12. Guarantee

If you come to an agreement with us on properties of the goods, we include this agreement in our technical specifications. If we have to supply to your drawings, specifications, samples, etc., you accept the risk associated with suitability for the intended purpose. The point in time at which risk is transferred is decisive for the contractual condition of the goods. The deterioration of parts subject to wear in the course of normal use does not constitute a defect. If the goods supplied are defective, we will – at our choice and within a reasonable time limit set by you – supply a replacement or repair the goods. If such repair or replacement is not satisfactory, you have the right to reduce the price or withdraw from the contract. Any further guarantee claims are excluded. Recognisable defects must be notified at the latest within 10 days of receipt and defects that are not recognisable must be notified as soon as they are discovered. The guarantee period is 24 months and starts with dispatch of the goods from our works.

## 13. Hindered or impossible performance

If we are prevented from meeting our obligation by some unforeseeable event (e.g. disruption of our plant, or delay in the delivery of important raw materials), which, in spite of taking all reasonable care appropriate to the circumstances of the case, we have been unable to avert, and it has become impossible to execute the delivery or service punctually, the delivery delay will be extended to an appropriate extent.

## 14. Liability

Except in the case of injury to life or limb, or damage to health caused by our breach of duty, we are only liable in the event of intent or culpable negligence on our part.

## 15. Customer specials

Orders for customer specials must be in writing and include binding details of execution, quantities etc. For technical reasons we reserve the right to supply 10% more or less than the quantity specified. If technical changes or cancellation are required, the costs incurred will be charged to the customer.

## 16. Deliveries of samples and return of goods

Samples will be charged. When goods have been sent for testing or as samples, we will credit you with the additional price against subsequent orders, as long as the net contract value is at least EUR 125.–. The return of goods is only possible with prior agreement. Customer specials may not be returned. For goods returned for reasons outside our responsibility (e.g. wrongly ordered), we charge 10% of the value of the goods but at least EUR 7.50, to cover administration costs.

## 17. Place of fulfilment, court of jurisdiction

The place of fulfilment for all obligations arising from this contract is D-70707 Fellbach. The court of jurisdiction for any legal dispute arising from this contract is D-71332 Waiblingen. (All disputes that arise from this contract or about its validity will be decided by a court of arbitration according to the Arbitration Rules of the German Committee for Arbitration Courts/Settlement and Arbitration Procedure of the International Chamber of Commerce. Such decisions will be final and normal legal procedures are excluded.) German law applies (BGB and HGB = civil and commercial codes). The application of UN purchasing law (CISG) is excluded.

## 18. Validity clause

If individual conditions should be found to be not legally valid, the remaining conditions continue to apply. The invalid conditions will be replaced by conditions which fulfil as closely as possible the commercial intent of the contract with reasonable consideration of the interests of both parties. With the publication of these Conditions for Sales, Deliveries and Payment, all previous versions become invalid. This does not apply to contracts agreed before publication.

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Using the direct online connection to the AMF inventory control system, you can check the availability and delivery of the goods you need, and check the current status of your order at any time.

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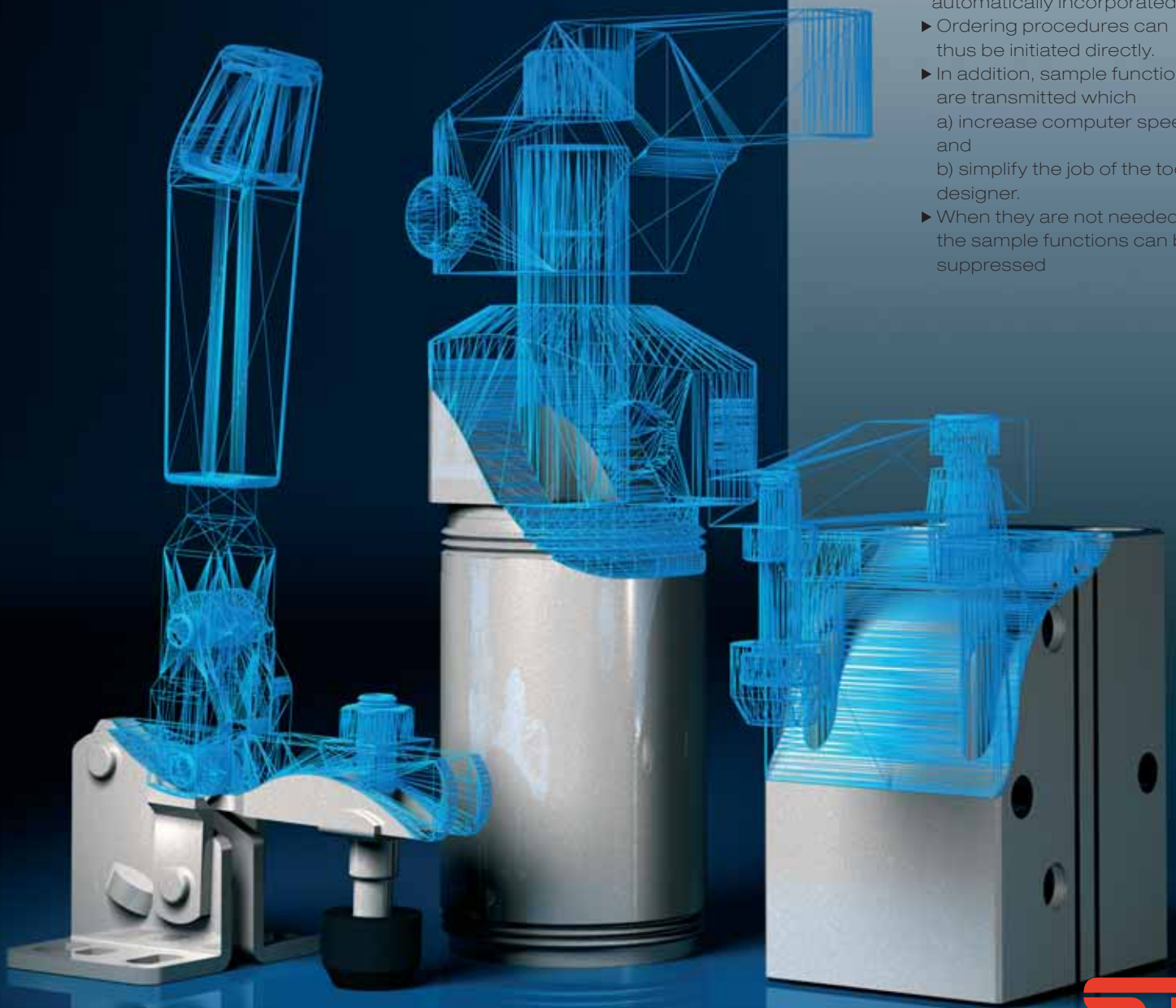
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- ▶ Complete transmission of the structure tree, including all accessories, with all CAD systems!
- ▶ When parts lists are generated, the article designations from the structure tree are automatically incorporated.
- ▶ Ordering procedures can thus be initiated directly.
- ▶ In addition, sample functions are transmitted which
  - a) increase computer speed and
  - b) simplify the job of the tool designer.
- ▶ When they are not needed, the sample functions can be suppressed







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