

# MillTec GRIP

PERMANENT-ELECTRO MAGNETIC SYSTEMS FOR MILLING

with more “magnetic” effect



## Total uniformity and maximum rigidity of clamping

- Monolithic technology
- Full metallic surface
- Low thickness and lightweight
- High power
- Total safety



**TECNOMAGNETE®**  
Safety through power



NEW  
INTERNATIONAL  
PATENT



# MillTec GRIP

## The new force in magnetic clamping for milling

Uniform clamping to the piece

No vibrations!

Uniform clamping to the machine table

MillTec GRIP revolutionizes the concept of magnetic clamping on milling machines and machining centers.

Now you can perform a real uniform clamping, i.e. between the workpiece and the magnetic surface and in the same time between the magnetic system and the machine table.

The clamping force of the system to the machine table is 30% of the nominal force the system to the piece; this can reach 75 Tons/m<sup>2</sup>.

These great forces work combined to eliminate any possible bending or deformation caused by the mechanical clamping

elements ensuring a perfect stability and structural uniformity to the whole piece / magnetic chuck / machine.

The complete clearing of all vibrations allows you to enhance the characteristics of uniform clamping of the magnetic system; this to achieve better quality, more precision, optimal machining speed and low consumption tools.

The reduced thickness and the reduced weight help to optimize the machine performances, increasing the daylight and the load capacity, let cycle times faster with less stress.

MillTec GRIP offers great advantages for operating a dramatic increase in productivity and quality.

Easy to use with the practical and innovative push-pull fast connector



42 mm



### Easy to install with a few simple steps:



a) The system, equipped with a special parking plate, is positioned on the machine table.

b) The electronic control unit is connected to the system through the quick connector, the key oriented in the position 0 "grip".

Through the activation of a MAG cycle the system is fixed to the table with constant and permanent force.



c) The key to "position 1 "work": after a DEMAG cycle the parking plate can be removed.

d) The system is ready for an indefinite number of cycles of clamping pieces of various shapes and sizes.

To eventually remove the system from the machine must be followed, a reverse procedure, using the same parking plate.



## Successful development

For more than 25 years, the **Quadsystem** technology patented by Tecnomagnete has represented the most advanced frontier in permanent electromagnetism applied to machine tool workpiece holding systems, for fast clamping on injection molding, metal stamping machines and steel handling systems, with impressive operational advantages witnessed by thousands of customers worldwide.

### The bi-directional magnetic circuit

All N/S poles are energized by a double magnet circuit (Alnico + Neodymium) and can generate the highest level of magnetic induction into the steel with a high magnetomotive force (MMF) for safe operation even under critical air-gap conditions

### The quadrangular chessboard layout

The layout permits horizontal, flat flow of the magnetic flux at a very limited depth, fully concentrated in the polar area and thus in the workpiece being clamped.

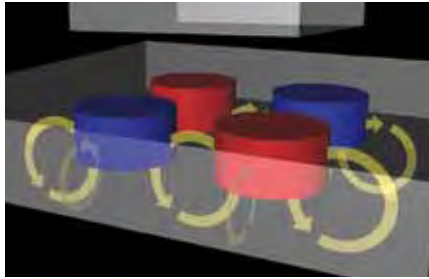
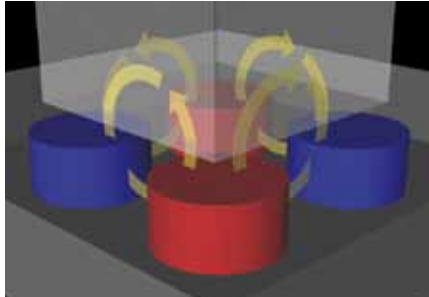
As all N/S poles are absolutely identical, the magnetic circuit is perfectly balanced with no stray flux, no magnetic interference and with constant and predictable performance (Neutral Crown patent).

### Intrinsically safe

After the system has been activated by an electric pulse lasting just a few seconds, the workpiece remains clamped with no time limit, with constant power and no power supply, held only by the power of high-energy permanent magnets.

The system can be subsequently deactivated with a short electric pulse.

### MAG



### DEMAG



International patent WO 2009/130721



### The monolithic technology

The new patent identified as **Quadsystem MONOLITE** permits the market launch of a new generation of magnetic devices characterized by solid block structure with no assembled mechanical components.

Machined from a solid block, the poles are integral with the frame and can withstand heavy-duty operations, maintaining absolutely stable conditions without any deflection.

The polar geometry with round poles permits optimum distribution of the magnetic area, with free zones available for additional machining operations to insert high accuracy bushes for side stoppers, specific references or to make a hybrid clamping surface

### An impenetrable single surface

The uniform all-steel metallic surface has no inserts, sealing resin or any filling compound. It therefore acts as an impenetrable mechanical shield offering permanent protection for the electric circuit and the permanent magnets fitted inside.

### Long durability and environmentally friendly

Thanks to the absence of assembled and moving parts and its metallic surface, the product needs no specific maintenance. It remains reliable throughout its service life, and all components can be 95% recycled.

**No waste, no fluid, no heat generation, no power consumption.**



# With **MillTec**

## maximum flexibility and productivity

The innovative magnetic system for milling applications MillTec allows to offer a wide range of strong and safe magnetic modules suitable for a wide variety of both high speed and heavy duty machining operations.

The MillTec modules are the ideal solution for applications both with vertical and horizontal axis on gantry and on moving table or travelling column bed milling machines, on machining centers, on pallets, right angles and tombstones on FMS systems.

### Uniform clamping

When clamped with brackets and wises, workpieces are never fully accessible and multiple setups are needed to complete the machining cycle.

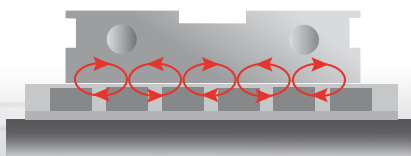


With MillTec the clamping force is uniform on the entire contact surface, with no compression and deformation of the work piece.

### Full machining in one setup

With MillTec, the workpiece is always fully accessible on 5 faces thus allowing the full machining in one setup, improving the tool path in all machining operations (face-milling, contouring, milling and drilling).

Set up and change over times are drastically reduced even with gang multiple work pieces.



### Self shimming and quick stress release

The new generation independent mobile pole extensions RMP make such operations even more simple and practical on any kind of workpiece.

Their round shape and the integrated threaded pin allow an easy and quick positioning without any tool and any possibility of mistake.

The RMP pole extensions design does not permit any chip or any dust to penetrate inside, thus granting the best possible and constant performances even without any cleaning and maintenance.



International patent  
WO 2009/007807



Automatic shimming system

The integrated double slant surface mechanism allows a better flux transmission with a 20% improvement of the magnetic performances compared to traditional pole extensions with single slant surface.

### Contouring and through drilling

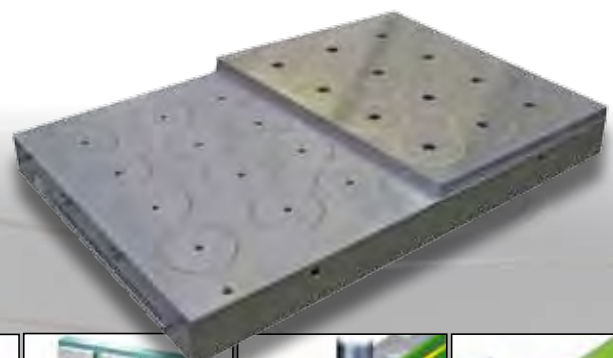
Fixed pole extensions with different heights and integrated threaded pin are available to raise the work piece, from the magnetic clamping surface making easier the full machining cycle.

### Pole extensions with recess

Their designed has been studied to grant a reduced flux depth into the piece, specifically to clamp thin parts (over 10 mm).

### Dedicated polar top plates

Dedicated polar top plates are available to create clamping surfaces shaped according the profile of work piece to be machined.



## An innovative concept to transfer the machine rigidity to the piece

Parking plate



### • MillTec GRIP

It generates a self-clamping force to the machine table equivalent to 30% of the nominal force of the system.

Each pole provides a nominal force of 640 daN to the workpiece and of 200 daN to the machine table.

The self-clamping force is maximum when the surface of the machine table is smooth and with large areas of intimate contact. The clamping force to the piece is always influenced by the inevitable operating air gaps, the unpredictability of the contact areas and the eventual presence of polar extensions.

In many operational situations the clamping forces to the table could be equal or greater than the clamping forces generated on the pieces.

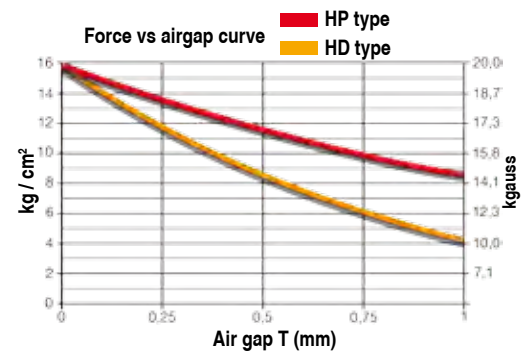
In case of vertical installation we suggest the use of mechanical stops for the piece as well for the chuck, to compensate the sliding coefficient.

Connector

### • HP versions

MillTec can be realized in HP (High Power) version, with a thickness slightly increased, to allow maximum operational efficiency even in the presence of high air gaps and heavy operating conditions, such as large stock removal with high power machines.

The parking plate, supplied with the system, is essential for the transport and installation. It can be reused in case of removal of the system and / or transfer to another machine.



## Machining examples with MillTec Grip

### FACE MILLING



### SLOT EXECUTION



### EDGE MILLING



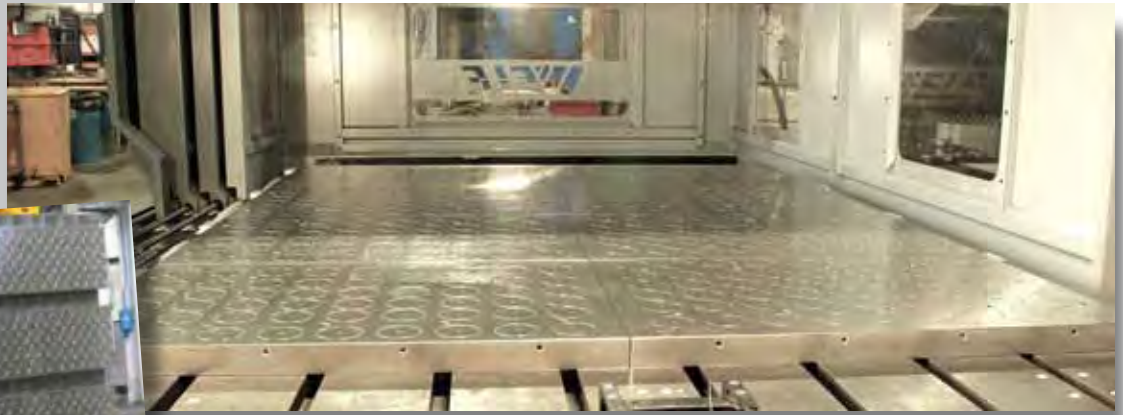
			FACE MILLING	SLOT EXECUTION	EDGE MILLING
<b>D<sub>c</sub></b>	Tool diameter	mm	125	50	50
<b>Z<sub>n</sub></b>	Cutting edges	n.	8	5	5
<b>n</b>	Cutting speed	rpm	860	1800	1800
<b>a<sub>p</sub></b>	Cutting depth	mm	1,5	2	5
<b>a<sub>e</sub></b>	Cutting width	mm	80	50	5
<b>V<sub>f</sub></b>	Feed of the table	mm/min	4000	5000	4000
<b>Q</b>	Stock removal rate	cm <sup>3</sup> /min	<b>480</b>	<b>500</b>	<b>100</b>

Piece dimensions: 410x260x50mm, positioned on 3 fixed extensions PFR 70/45 and 9 mobile RMP 70/45.

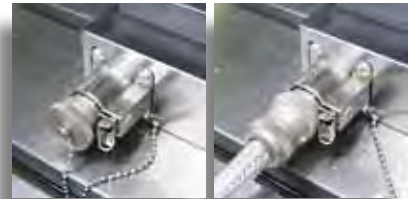
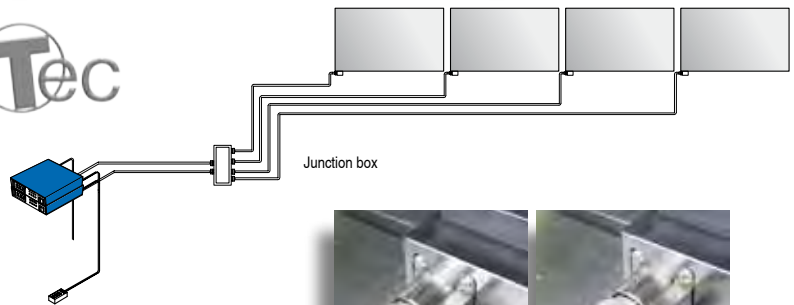
Material: FE 275 JR. Machine: VMC 1600 - 27kW

Magnetic chuck: MillTec GRIP 304HD (320x425x42mm), magnetically clamped on machine table.

Lateral stops could be required for the piece as well for the chuck in presence of heavy duty machining operations.



**MillTec**



**TECNOMAGNETE®**

All the magnetism of the leader

**TECNOMAGNETE spa**  
 20020 Lainate (MI) - Italy  
 Via Nerviano 31  
 Tel. +39 02.937.591  
 Fax +39 02.935.708.57  
 e-mail: info@tecnomagnete.it  
 www.tecnomagnete.it

**Subsidiaries:**  
**China**  
 TECNOMAGNETE SHANGHAI R.O.

**France**  
 TECNOMAGNETE S.A.R.L.

**Germany**  
 TECNOMAGNETE GmbH

**Japan**  
 TECNOMAGNETE Ltd.

**USA**  
 TECNOMAGNETE Inc.

Distributor:

**Modularity for any need**

The wide range of standard MillTec modules is ideal to configure different magnetic tables both on fixed layouts and pallet systems, horizontal and vertical.

Modules can be fixed through the dedicated side slots or with through holes that can be drilled in the solid block structure of the chuck.

**Standard Specifications**

Model	Dimensions (mm)		Poles n°	Force kgf (*)
	A	B		
MTG 304	320	x 420	12	7.800
MTG 306	320	x 600	18	11.700
MTG 308	320	x 785	24	15.600
MTG 310	320	x 970	30	19.500
MTG 404	405	x 420	16	10.400
MTG 405	405	x 500	20	13.000
MTG 406	405	x 600	24	15.600
MTG 408	405	x 785	32	20.800
MTG 410	405	x 970	40	26.000
MTG 506	485	x 600	30	19.500
MTG 508	485	x 785	40	26.000
MTG 510	485	x 970	50	32.500
MTG 606	570	x 600	36	23.400
MTG 608	570	x 785	48	31.200
MTG 610	570	x 970	60	39.000

(\*): Maximum force with workpiece in intimate contact, with all poles covered

Thickness 42mm (HD) - 57mm (HP)  
 Up to 16 kg/cm<sup>2</sup> in active magnetic area  
 Over 75 Ton/m<sup>2</sup> in workpiece contact area  
 2 lateral slots to fix on machine table  
 Magnetic flux depth: 17mm

**Electrical connections**

MillTec modules are equipped with new waterproof fast connectors ERGON series. Fixed connections can be provided to assemble magnetic tables.

**Electronic control units**

ST series electronic control units are equipped with current (UCS) and cycle status control systems.

They have been designed for quick activation and deactivation cycles, to save power consumption, to limit electromagnetic emissions and grant long reliability in time.

A RS232 connector is located on the back side, to interlock with machine PLC.

The ST100 version at 230V is compact and light, is built with integrated push button.

The ST200 version, available from 200V to 400V, is suitable to control modules of large dimensions and is equipped with the practical TC remote pendant.

The ST200 is also used to control tables with multiple chucks, equipped with TCF pendant that allows to select each MillTec module independently.

**ST 100**



**ST 200**



**TCF**

