



PERMANENT-ELECTRO MAGNETIC SYSTEMS FOR MILLING

with **GRIP EFFECT** even more "magnetic"



**Total uniformity of clamping,
from the workpiece
to the machine table**

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



TECNOMAGNETE®
Safety through power



NEW
INTERNATIONAL
PATENT



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MillTec

with **GRIP EFFECT**

No vibrations!

The new force in magnetic clamping for milling

Uniform clamping to the workpiece

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/m².

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

mm 42

Easy to install with 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 2 "setup".

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.





The evolution of a success

The **Quadsystem** technology patented by Tecnomagnete has represented for more than 25 years the most advanced frontier of the Permanent-electro magnetism applied to machine tool work holding systems, to quick clamping on injection molding, metal stamping machines and on 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 an high Magneto-motive force (MMF) to operate safely even in case of critical air-gap conditions.

The quadrangular chessboard layout

It allows the magnetic flux fowing horizontal and flat with a very limited depth, fully concentrated in the polar area, thus in the work piece to be clamped.

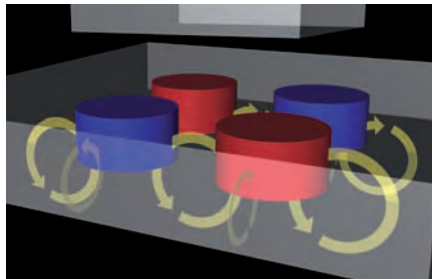
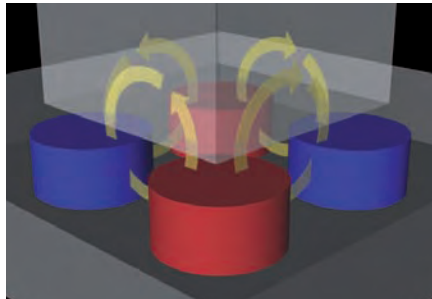
Being all N/S poles absolutely identical, the magnetic circuit is perfectly balanced with no stray flux, no magnetic interference and with constant and predictable performances (Neutral Crown patent).

Intrinsically safe

After the system has been activated by an electric pulse that lasts for few seconds only, the work piece 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 later on deactivated with a short-electric pulse.

MAG



DEMAG



International patent WO 2009/130721



The monolithic technology

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

Machined by solid process, the poles comes integral with the frame and can absorb heavy duty operations keeping absolutely stable conditions without any deflection.

The polar geometry with round poles allows a optimal 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 hybrid clamping surface.

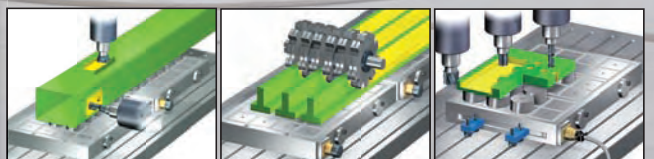
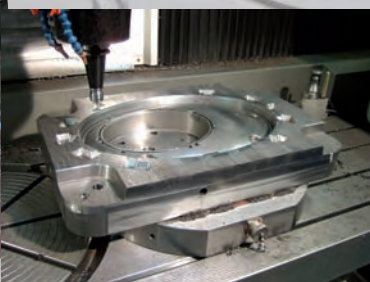
A single surface not penetrable

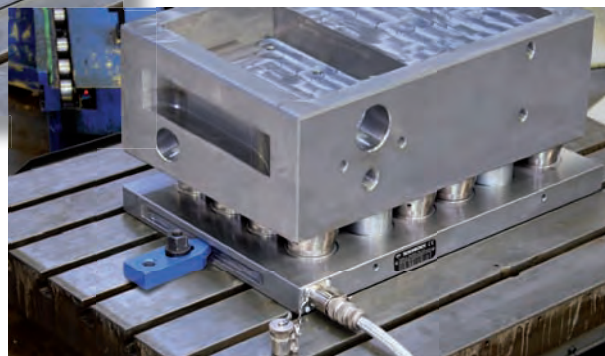
The uniform metallic surface, full steel, with no inserts, sealing resin and any filling par, makes it a mechanical shield impossible to penetrate for any impurity thus creating a permanent protection for the electric circuit and the permanent magnets built in the inner area.

Long durability and environmental friendly

The absence of assembled and moving parts and the metallic surface allow the product not requiring a specific maintenance program. Reliability will be granted over the time and all components can be 95% recyclable.

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.

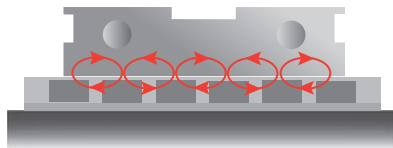
The MillTec modules are the ideal solution for applications both with vertical and horizontal axis on gantry and on moving table or traveling column bed milling machines, on machining centers, on pallets, right angles and tombstones on FMS systems.

Uniform clamping

When clamped with brackets and wires, 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

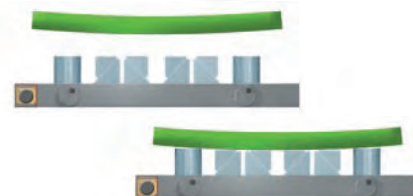
The new generation independent mobile pole extensions RMP make such operations even more simple and practical on any kind of workpiece.

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

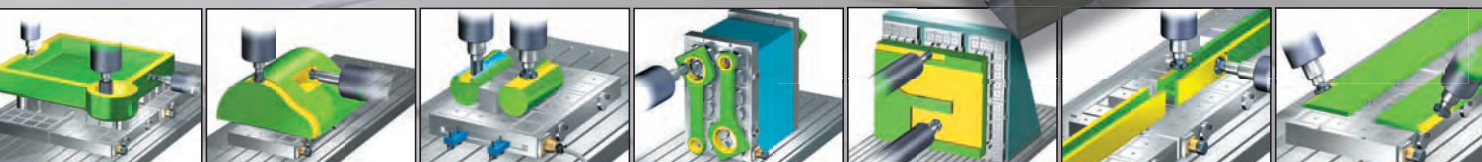
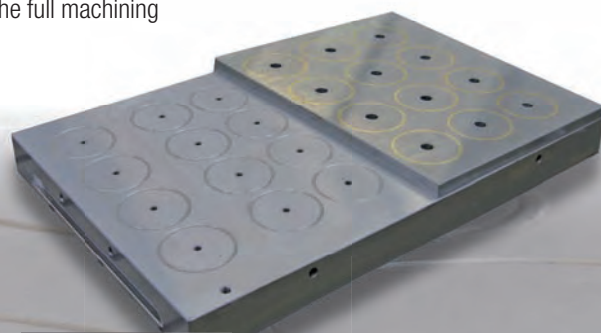
Fixed pole extensions with different heights and integrated threaded pin are available to raise the work piece, from the magnetic clamping surface making easier the full machining cycle.

Thinner parts

Pole extensions with recess have been studied to grant a reduced flux depth into the piece, specifically to clamp thin parts (over 10 mm).

Shaped workpieces

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



A complete range for all operational requirements

MillTec GRIP

• 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 615 daN to the workpiece and of 185 daN to the machine table.

The mechanical clamping elements will be well supported to obtaining perfect stability and clamping uniformity.

• MillTec Autoclamp

This is a version with double magnetic sector capable of ensuring a stronger self-clamping force to the machine table.

Each pole can generate an holding force of 615 daN as well to the workpiece and to the machine table.

However only 80% of the bottom magnetic area is activated during auto-clamping phase of the system to the machine table

The remaining 20% of the poles present reversed polarity and is activated during DEMAG phases only, to guarantee a perfect positioning stability, with no mechanical clamping elements.

• MillTec Basic

The self-clamping function to the machine table is not implemented in this version; in fact the self-clamping base is short-circuited through a dedicated plate, built into the bottom of the chuck.

MillTec Basic must be fixed to the machine table through conventional mechanical clamping elements, as brackets or bolts.

Parking plate

Connector

MillTec Basic

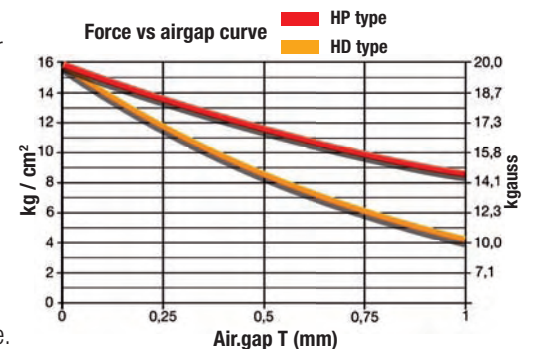
MT GRIP and MT Autoclamp self-clamping forces are always close to the highest nominal levels, due to the reference surface of the machine table is usually flat, smooth, with large areas of intimate contact, i.e with all the best conditions for the magnetic flux circulation.

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.

MT GRIP and MT Autoclamp will be used with the parking plate, supplied with the system and essential for the transport and installation.

It can be reused in case of removal of the system and / or transfer to another machine.

All models are available in HD (High Density) version for standard machining operations, while HP (High Power) versions are available for heavy duty machining operations with substantial air-gap conditions.



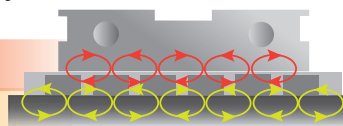
The right choice

Model **MillTec**

• GRIP

Distribution of the clamping force

Workpiece **100%**
Table **30%**



Thickness mm

42

Parking plate



Control unit

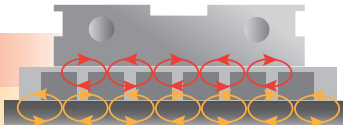


Mechanical fixing

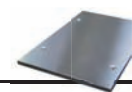


• AUTOCLAMP

Workpiece **100%**
Table **80%**

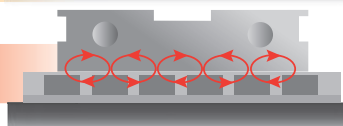


54



• BASIC

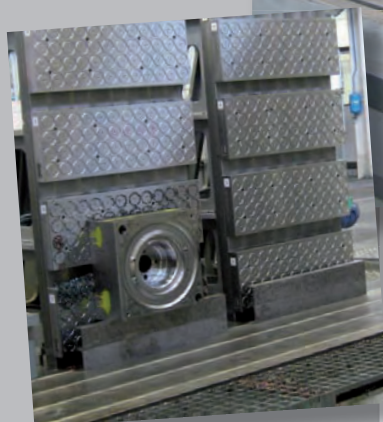
Workpiece **100%**



60

NO





TECNOMAGNETE®

All the magnetism of the leader

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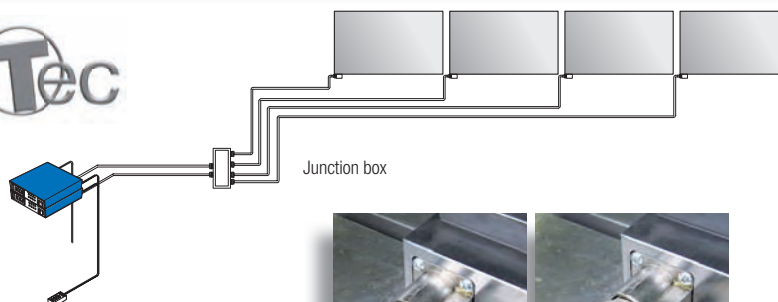
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- magnetic attraction -

MillTec



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.

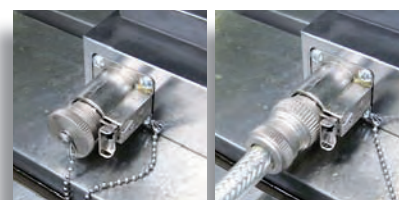
Modularity for any need

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.

Version	Thickness (mm)	
	HD	HP
MTG - MT GRIP	42	57
MTA - MT Autoclamp	54	69
MTB - MT Basic	60	75

Up to 16 kg/cm² in active magnetic area
Over 75 Ton/m² 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.



Model	Standard Specifications Dimensions (mm)		Poles n°	Force daN (*)
	A	B		
MT 304	320 x 425		12	7.400
MT 306	320 x 610		18	11.100
MT 308	320 x 800		24	14.800
MT 310	320 x 965		30	18.500
MT 404	405 x 425		16	9.800
MT 406	405 x 610		24	14.800
MT 408	405 x 800		32	19.700
MT 410	405 x 965		40	24.600
MT 504	485 x 425		20	12.300
MT 506	485 x 610		30	18.500
MT 508	485 x 800		40	24.600
MT 510	485 x 965		50	30.800
MT 606	570 x 610		36	22.100
MT 608	570 x 800		48	29.500
MT 610	570 x 965		60	36.900

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