

RADIAL

POLE

Electro – permanent magnetic systems for vertical turning and grinding

The utmost flexibility and efficiency on high accuracy machining

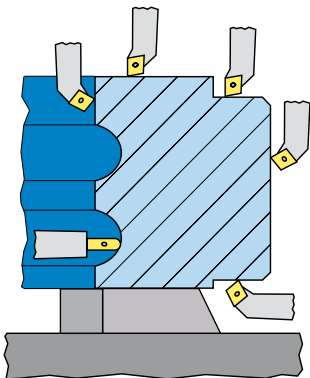


NOMINAL FORCE IN CONTACT
Up to 160 N/cm²



- Parts never distorted or deformed
- Uniform clamping to avoid any vibrations, improving cutting parameters, lowering tools consumption and improving finishing
- Full machine capacity exploited with better tolerances and repeatability
- Complete machining in one set up only
- Practical and quick change over of the workpiece to further increase productivity

FREE ACCESS TO THE WORKPIECE



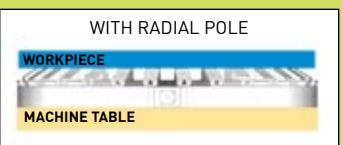
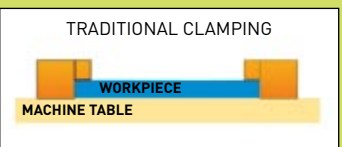
The magnetic clamping surface is given by the reference contact area of the part. Nothing will hinder the full access of the tools for the full machining in a single set up. With the use of pole extensions the workpiece can be raised from the magnetic system surface. The external and internal machining cycle can be exploited due to the absence of any obstacle.

THE PERFECT SOLUTION for machining slewing and bearing rings and round flanges for:

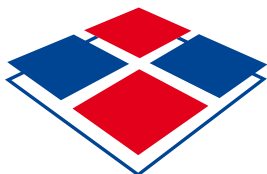
- Power stations and wind generators
- Earth moving machines
- Radar and communication equipments
- Off shore cranes, power cranes
- Machine tools and gearboxes
- Marine engines and transmissions

FULL USE OF THE MACHINE TABLE AREA

Any machine can be fitted with RADIAL-POLE system having the same or slightly larger diameter of the machine table, thus allowing to fully use the machine capacity without losing any portion of surface to accommodate clamps and fixturing units.



Smaller machines can run bigger parts

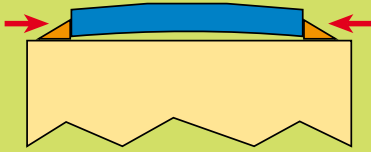


TECNOMAGNETE®
Safety through power

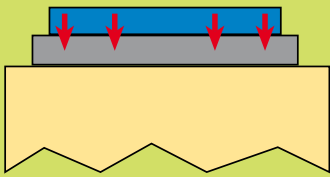
UNIQUE CLAMPING

Steady without distortions

As well as limiting access to the workpiece, conventional mechanical clamping always cause some distortions. Internal / external workholding generates radial warping, while face plate clamping causes axial distortions.



The RADIAL-POLE system completely avoids mechanical deformations and automatically compensates any peculiarity of the workpiece shape.



The uniform clamping along the contact surface eliminates all problems related to machining vibrations with tremendous advantages in terms of machining tolerances, tool life, stock removal and machine productivity.

Quick and easy with always predictable power

Clamping operations are quick and easy to carry out; the result in terms of clamping power is always predictable and independent from the operator.

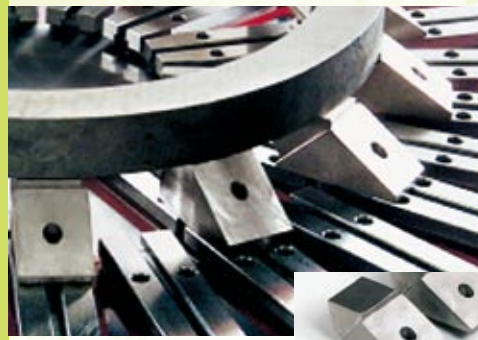


No special tool is needed, no special experience or skill is required to clamp the part.

Time consuming manual shimming operations are no more necessary.

Autonomous

The RADIAL-POLE chucks are the perfect solution for pallet systems. No electric or hydraulic power is needed during machining operations; the installation becomes very easy because no additional circuit or modification is necessary on the machine. Using the chuck as a pallet, it is possible to prepare the job offline, thus increasing the productivity of the machine.



POLE EXTENSIONS

Dedicated pole extensions are used to raise the workpiece from the chuck surface; both internal and external diameters are accessible for all machining operations in a single set-up.

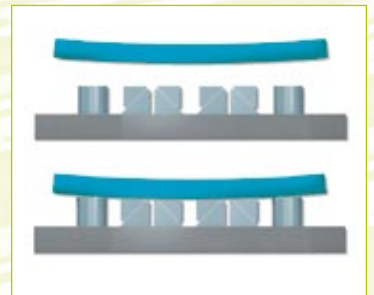


FLUX CONCENTRATION

Pole extensions allow to concentrate the magnetic flux, increasing the clamping force on the polar surface in contact with the workpiece.

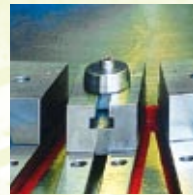
AUTOMATIC SHIMMING AND STRESS RELEASE

Movable pole extensions combined with fixed ones to create a reference for the part surface, adapt the magnetic surface to the workpiece without any need of manual shimming operation and without deforming the part. Stress release operations can be carried out quickly and automatically, even without accessing the working area.



SPECIAL DESIGN

Special pole extensions can be used as a reference for the easy positioning of the workpiece on the chuck.



SOLID BLOCK STRUCTURE

The RADIAL-POLE chucks are cut from solid blocks, increasing the rigidity and allowing compact dimensions. Slots and holes can be cut inside the solid block structure to be used for reference pins or for mechanical stoppers for heavy duty operations. Chucks are in single block structure up to 2000 mm diameter; wider chucks are made of multiple magnetic sectors that can be assembled on the machine table directly or on dedicated bottom platens and pallets.

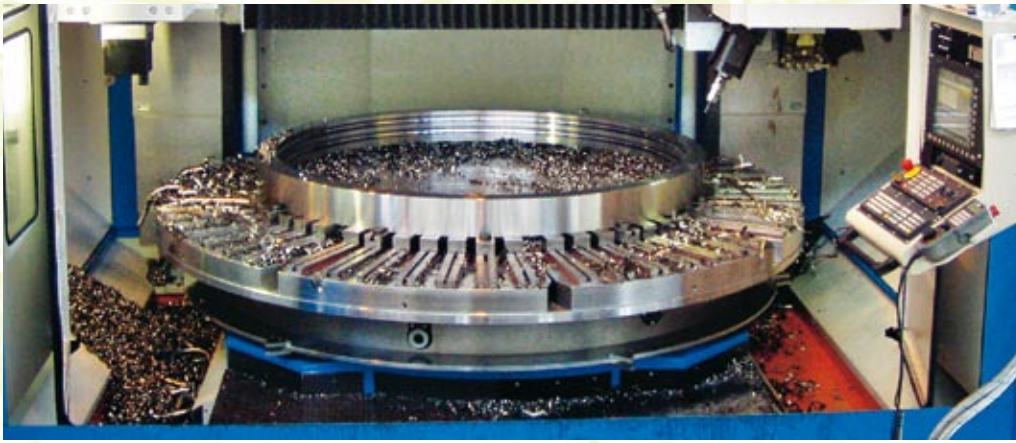


RAISED POLE CONFIGURATION

Magnetic surface is raised from the chuck surface to avoid any vacuum effect that could create problems in removing the workpiece from the chuck after demagnetisation.

The gap between the chuck and the parts allows air to circulate underneath the workpieces, helping to keep the Temperature constant despite the thermal stresses given by the machining operations.

The raised poles make easy the workpiece handling, reducing the risk to damage either the part or the magnetic surface during positioning or removal, and gives more clearance to the chips to move away from the working area. Furthermore, it makes cheaper to repair the chuck in case the contact surface is damaged.



PERMANENT-ELECTRO TECHNOLOGY

TECNOMAGNETE patented permanent electro magnetic circuit needs electrical power only for the quick activation and deactivation phases. During the clamping phase the power is generated only by the high energy permanent magnets built inside.

SAFETY FIRST

No power failure will affect the magnetic performance. The system is intrinsically safe by definition!

COLD CONTACT SURFACE

No heat is generated by the magnetic chuck, due to the fact that the current is flowing for extremely limited time during the MAG/DEMAG cycles only.

The contact surface between the workpiece and the chuck remains cold, granting high accuracy in machining due to the absence of thermal distortions.

RECTANGULAR SHAPE POLES

The rectangular shape guarantees constant and predictable clamping power, independently from the position along the pole.



SIMPLICITY AND RELIABILITY

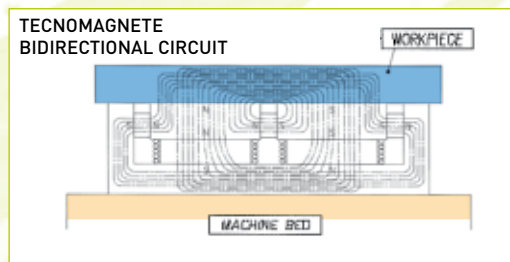
A RADIAL-POLE system has no internal moving parts that can get worn or damaged with the use.

No energy consumption, no heat generation, no maintenances required. Performances will be always predictable and granted in the long run.

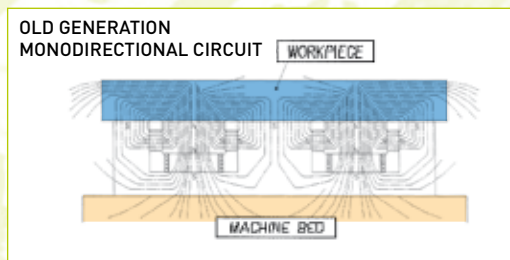
NEUTRAL CROWN

The neutral crown configuration enables the magnetic flux to be fully directed through the active surface, ensuring optimum efficiency and total insulation of the module

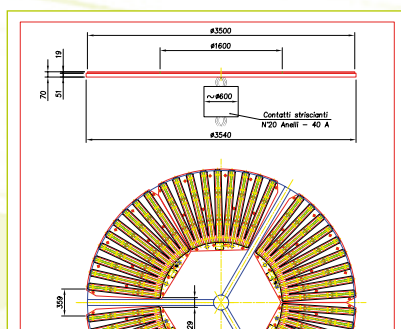
INNOVATIVE BIDIRECTIONAL MAGNETIC CIRCUIT



The clamping force is given by DIRECT POLES (N/S) only, to concentrate the magnetic flux where it is needed. The frame of the chuck remains always neutral, and no interference is given to the tool or the machine due to the total absence of stray flux.



The Magnetic Motive Force is double, providing better performances against air gap, and making easier to remove the magnetic field from the workpiece during DEMAG operations.

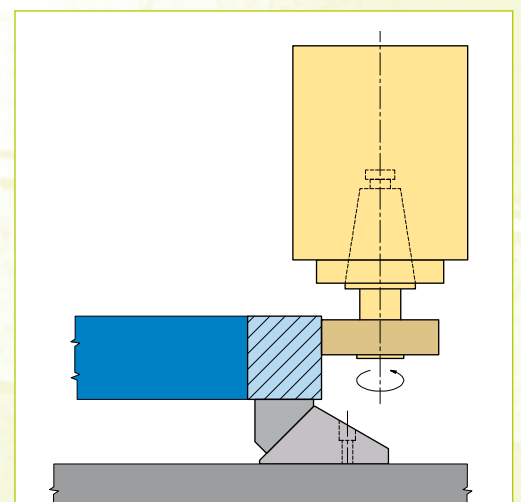


INTEGRATION WITH SELF CENTERING CHUCKS

Automatic self centering chucks can be easily integrated with the solid block magnetic modul structure.

EASY WORKPIECE CENTERING

When the chuck is magnetised at low levels, it is possible to position the workpiece using the machine spindle itself to move the part in the correct location; few revolutions of machine table at low speed are enough to center the part.



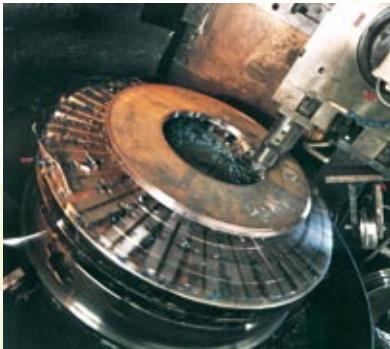
“PRS” VERSION FOR LIGHT TURNING AND GRINDING

Single magnet “PRS” model is perfectly suitable for clamping alloy steel parts and bearings, thanks to the built in demagnetisation device (Nuflux system).



“PRH” VERSION FOR TURNING

Double magnet “PRH” model is available for heavy duty operations on seamless rolled rings, turning flanges and machining plates.



TAILOR MADE SOLUTIONS

Special magnetic layouts to clamp small diameter parts.



Very large chucks made by multiple solid block magnetic sectors assembled on dedicated bottom plates that can be used as a pallet.

ELECTRONIC CONTROL UNITS

The state of the art of the technology

RADIAL-POLE chucks are equipped with dedicated control units, incorporating the UCS function to detect how the current is flowing during the MAG/DEMAG cycles to guarantee the correct execution of the operations. Controller enable and machine safety contacts are available in the standard configuration of the controllers. “PRS” models are supplied with control units with built-in demagnetisation device (Nuflux system) to fully remove the magnetic field from the workpiece during the DEMAG cycle. Double action activation procedures (i.e. 2 buttons or key + button) are always requested to avoid accidentally activated cycles.

Clamping power control

The clamping power can be calibrated at different levels, to avoid deformations of thin pieces or to make easy the positioning and centering of the workpieces on the chuck at lower power levels, before clamping them with full power.

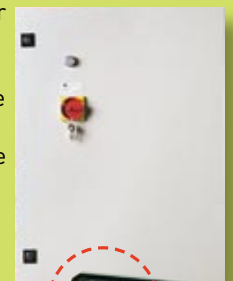
Full integration with machine tool

All RADIAL-POLE control units can be driven by the machine tool PLC, through the full interface option available.

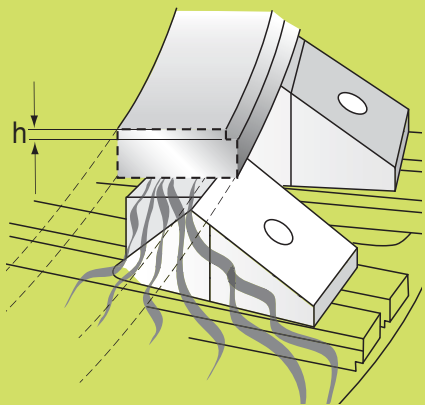
ST200RB control unit is the standard controller supplied with small-medium chucks (up to 1250 mm ext. diameter), with 8 level power adjustment and digital remote pendant.



ST500 control unit with IP54 cabinet is the standard controller supplied with larger chucks (over 1250 mm ext diameter), with 5 level power control. Intermediate power levels can be operated through separate button, for faster and more intuitive magnetisation procedures. This control unit is available as an option for smaller chucks also.



ST200QE control units are available on request for built-in configurations inside machine electrical cabinets.



STOCK REMOVAL DATA

Different materials, different surface treatments and conditions change the clamping force due to different absorption of magnetic flux by the workpiece.

Mild steel is the most conductive material, fully absorbing the magnetic flux; 20-30% for alloy steel and 50% for cast iron are

the clamping power reduction factors to be considered. Annealed materials absorb better the flux than tempered parts. Finished surfaces have lower friction factor than rough ones; at the same time they have lower air gap that increases the overall clamping force.

MAX STOCK REMOVAL SECTION (h)

Common steel	Alloyed steel
3 - 4 mm ²	1 - 1,2 mm ²

Data valid for rings with min section 40 x 40 mm.

TECHNICAL SPECIFICATIONS

Standard Model	Dimensions (mm)		Magnetic Area		Poles	Thick. ≠ mm	Weight ~ kg
	Ext. Ø	Int. Ø	Ext. Ø	Int. Ø			
PRS 060025	635	600	250	14	125	210	
PRS 080025	835	800	250	14	125	400	
PRS 100025	1035	1000	250	28 / 14	125	650	
PRS 125025	1285	1250	250	28 / 14	125	1040	
PRS 100050	1035	1000	500	26	125	520	
PRS 125050	1285	1250	500	26	125	910	
PRS 130035	1335	1300	350	36 / 18	125	1080	
PRS 150050	1535	1500	500	52 / 26	125	1380	
PRS 160080	1635	1600	800	42	125	1320	
PRS 180080	1850	1800	800	42	125	1790	
PRS 200100	2050	2000	1000	52	125	2070	
PRS 260140*	2650	2600	1400	54	125	3300	
PRS 300060*	3000	3000	585	48 / 24	155	7200	
PRS 350170*	3500	3500	1700	60	335	8700	
PRS 460210*	4630	4600	2100	64	265	11800	

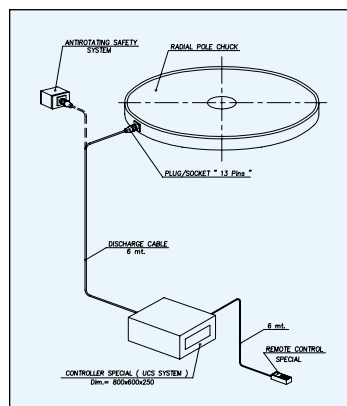
* models to be equipped with dedicated back-plates with different thickness.

STANDARD SUPPLY SPECIFICATION

- Permanent-electro magnetic chuck with raised poles and central "T" slot for fixing the pole extensions
- Electronic control unit ST200RB / ST500 with UCS current detecting system, Nuflux system ("PRS" version) machine safety and controller enable and integrated anti-rotation contact ("CR" version)
- Remote push-button for MAG/DEMAG cycles with power adjustment
- Wiring chuck-controller (6m PVC cable)
- Instruction book

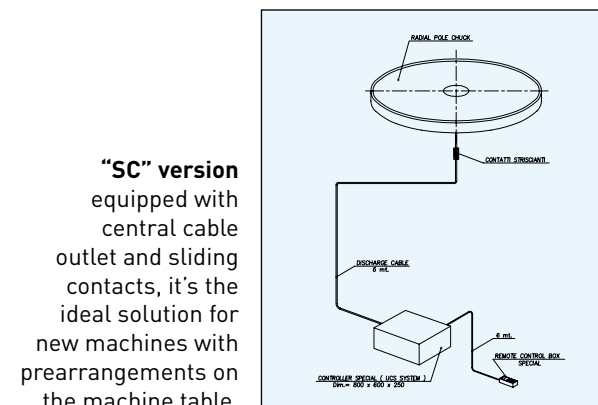
INSTALLATION LAYOUT

RADIAL-POLE chucks are available in 2 versions:



"CR" version

equipped with water proof fast connector on chuck's side and integrated anti-rotation contact, it's the ideal solution to retrofit existing machines or for new ones without any need to modify the machine table.



"SC" version

equipped with central cable outlet and sliding contacts, it's the ideal solution for new machines with prearrangements on the machine table.

CONTROLLER DIMENSIONS AND WEIGHT

Model	W mm	L mm	H mm	weight ~ kg
ST200	331	275	85	5
Pendant	135	47	85	0,2
ST500	600	250	800	35
Pendant	152	86	152	1

Standard Voltages available at 50/60 Hz

V1: 200 V

V2: 230 V

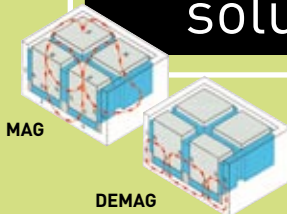
V3: 400 / 415 / 440 V

V4: 460 / 480 V



A world of magnetic solutions

Here is a strong statement:
Tecnomagnete has revolutionized the world of work holding!
Do you want a stronger one?
The QuadSystem!



This permanent electro magnetic system generates a concentrated and predetermined force that is highly effective to clamp steel parts on machine tools, moulds for injection molding and dies for metal stamping machines, and the handling of ferrous loads.

We've believed in the force of our QuadSystem patent and many companies have believed in this powerful innovative technology. The large variety of applications of hundreds of thousands systems sold world wide gave all our customers a sharp competitive edge with safety and flexibility.

Nowadays, with the global network of our subsidiaries and commercial partners we are at your disposal to show you state of the art technical solutions for all applications and increase your success.

Tecnomagnete: all the magnetism of the leader.

We reserve the right to make changes related to the technological progress.

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