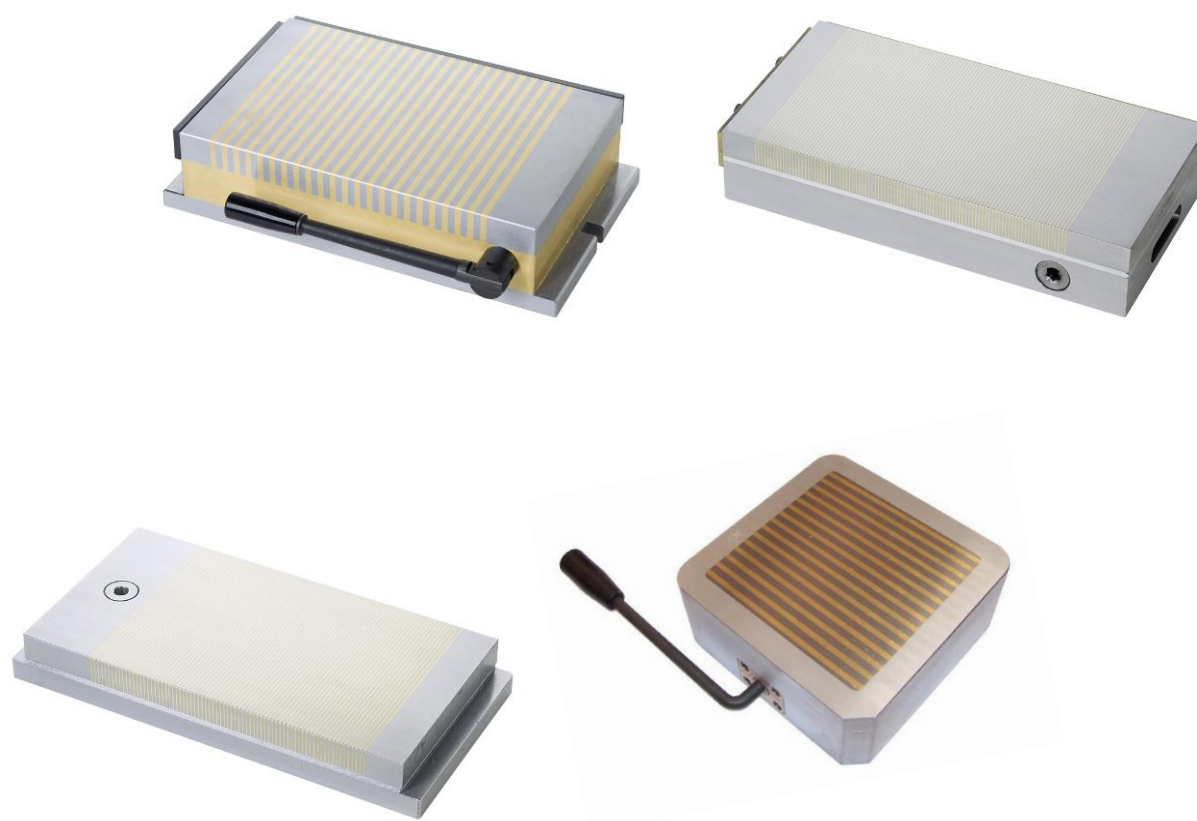


Rectangular Permanent Magnetic Chucks



Dear Customer

Thank you for choosing our products.

We are pleased to provide you with this manual, which is intended to allow you to operate with maximum levels of safety and productivity.

Please read this technical document carefully.

Our focus is on our customers and their satisfaction. We are therefore available to provide any further essential information.

We wish you success in your work

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1. SAFETY

1.1 Symbols Used



This symbol can be found where possible dangers to people are described



This symbol can be found where possible damage to the product is described



This symbol can be found next to essential information about the product or its handling

1.2 Product Use

The intended use of permanent magnetic chucks is to lock ferrous pieces during the various stages of the mechanical machining.

1.3 Safety



When using electro-permanent magnetic chucks, always comply with the health and safety regulations by adopting the necessary Personal Protective Equipment (PPE):

- _ use of gloves,
- _ respect of safety distances,
- _ minimum safety requirements for using working equipment.

The list above is not intended to be complete. The customer must determine what PPE is required for the specific process to be performed. All PPE must comply with the laws in force concerning safety on the workplace (in Italy, Legislative Decree 106/2009 and subsequent amendments and supplements).

Do not use the magnetic chuck for operations or services other than what it was intended for.

Do not allow the equipment to be used by unqualified, unsuitable or under age personnel. Use of the equipment is not permitted for:

- People fitted with a PACEMAKER
- People with metallic or electronic prosthesis
- People using insulin pumps
- People with muscular stimulation systems
- Pregnant women

The above mentioned people should keep a safety distance (about 2 m).

1.4 Residual Risks

_ As indicated in the previous section, the magnetic field is dangerous for people, in particular during magnetization and demagnetization.

We recommend all people, even fully suitable ones, to keep a safety distance when the chuck is magnetized.

_ Do not underestimate the risk that the piece does not grip well to the magnetic chuck. Always pay attention and make sure that the piece grips well to the magnetic chuck.

2. WARRANTY

The original configuration of the product should not be changed for any reason whatsoever. Improper use of the equipment for operations not intended by the manufacturer and not indicated in this manual may damage the product and injure workers.

The warranty term is of 12 (twelve) months from date of delivery except for other written commercial agreements on the order. For components not directly manufactured by us, the manufacturer's warranty applies.

The warranty only covers the replacement of components and the repair of product failures causing incorrect operation.

The product, under warranty, must be shipped carriage paid to our plants. The warranty does not include technical service at the customer's premises or location where the equipment is installed. Equipment disassembly from the installation is not included.

Under no circumstances shall the warranty give the right to claim compensation for any direct or indirect injury or damage caused by our equipment to people, property or other machinery resulting from poor use, lack of maintenance or improper use. Repairs under warranty do not imply an extension of warranty or the start of a new period of warranty.

Warranty Exceptions

The warranty does not include any defect entirely or partially resulting from:

- non-compliance with the instructions for inspection and maintenance, or improper use;
- normal wear of the equipment;
- defects resulting from changes or repairs not carried out by the manufacturer or authorised retailer;
- breakdowns caused by incorrect use, assembling and disassembling;
- damage or injury caused by use of non-original spare parts;

The warranty automatically becomes null and void:

- _ In the event of non-payment or other breaches provided for by contract;
- _ If the serial number is illegible;
- _ If the equipment is poorly maintained.

3. COMPONENTS OF SUPPLY

- _ Magnetic chuck
- _ removable key

For different supplies please refer to the commercial agreements.

4. TECHNICAL DATA

Product technical data are available on the catalogue or defined during the commercial phase.

5. TRANSPORT, ASSEMBLY AND INSTALLATION

5.1 Packaging



The permanent magnetic chucks are packed in cardboard boxes for transport.

At receipt, check for product damage and compliance with the requested criteria.

If the material received does not comply with your order, contact the supplier immediately.



WARNING!

Avoid release to the environment.

5.2 Transport

If the magnetic chuck is large and too heavy to be lifted by hand, it can be lifted by a manually operated magnetic lifter of suitable lifting capacity or alternatively using eyebolts depending on the holes provided on the side.

Before handling the product, check for its weight indicated on the side label.

5.3 Storage

Make sure that during transport and storage the temperature does not exceed values between -10°C and +40°C or, only for brief periods (no longer than 24 hours), the temperature of 50°C; otherwise, the magnetic chuck could be damaged.

If the magnetic chuck has to be stored, make sure that the humidity values in the storage area range between 30% and 80%.

NOTE



The presence of magnetic residue on the new chuck surface is due to the use of magnetic lifters for inserting the modules into the boxes. This residue disappears as soon as the first demagnetization cycle is performed.

5.4 Installation in the Machine



Unpack the magnetic chuck first (as indicated in section 5.2) and clean it from the rust preventive oil.

Then fix it to the machine work surface by using screws or brackets, depending on your requirements. Use the side slots or the fixing holes provided (depending on the magnetic chuck model) to fix the magnetic chuck.

After installation, check that the chuck is safely fixed and cannot move in any directions.



Remember that the machine must be turned off during installation.

5.5 Electrical Connections

There are no electrical connections for this type of product.

The permanent magnetic chuck generally does not have electrical connections. If a microswitch is present, see the specific attachment.

5.6 Mechanical Devices

For permanent magnetic chucks, supplementary plates can be applied on request.



5.7 Materials for Use

Electro-permanent magnetic chucks are able to lock all ferromagnetic materials.

The following materials, on the contrary, are excluded:

- Aluminium and its alloys
- Bronze
- Brass
- Non-magnetic cast iron
- *Some types of STAINLESS steel (austenitic type even if slightly magnetizable after plastic deformation hardening)*

Even among ferromagnetic materials, the locking degree of the piece depends on the reluctance of the piece to lock.

The value of reluctance depends on the chemical composition of the material. This composition may cause strong reductions (up to 20 ÷ 30%) of the maximum value of the attraction force that can be reached with the mild steel.

Material	Efficiency
Standard steel (Fe 360 - C40)	100%
Crude ferromagnetic steel	90%
Magnetic stainless steel	65%
Cast iron	50%

Heat treatments performed on the piece to be worked on.

Some heat treatments reduce magnetic attraction properties. Special attention should therefore be given to materials which have undergone one of the following treatments:

- Tempering in all possible variants
- Decontamination
- Cementation
- Nitriding

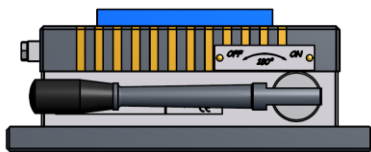
6. OPERATION AND FUNCTIONS

6.1 Positioning the Piece

 The contact surface between the piece to be locked and the magnetic chuck should be as wide as possible to allow a better passage of magnetic flux coming from the chuck poles.

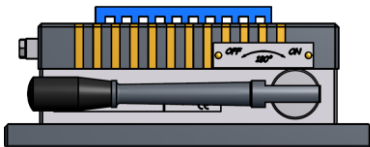
Furthermore, the presence of high roughness causes a reduction in the circulating magnetic flux due to the high air reluctance value resulting in a reduced anchorage force of the piece. Therefore, pieces with fine surface finishings and high contact areas are to be preferred.

The schemes and the diagram below provide useful and immediate information about the anchorage force trend.



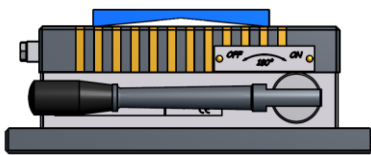
The piece lies entirely on the chuck

The attractive force will be equal to the maximum force



The piece lies only on some points

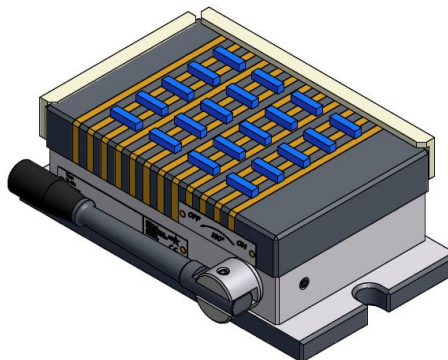
The attractive force will be about 40-70% of the maximum force



The piece lies solely on two points

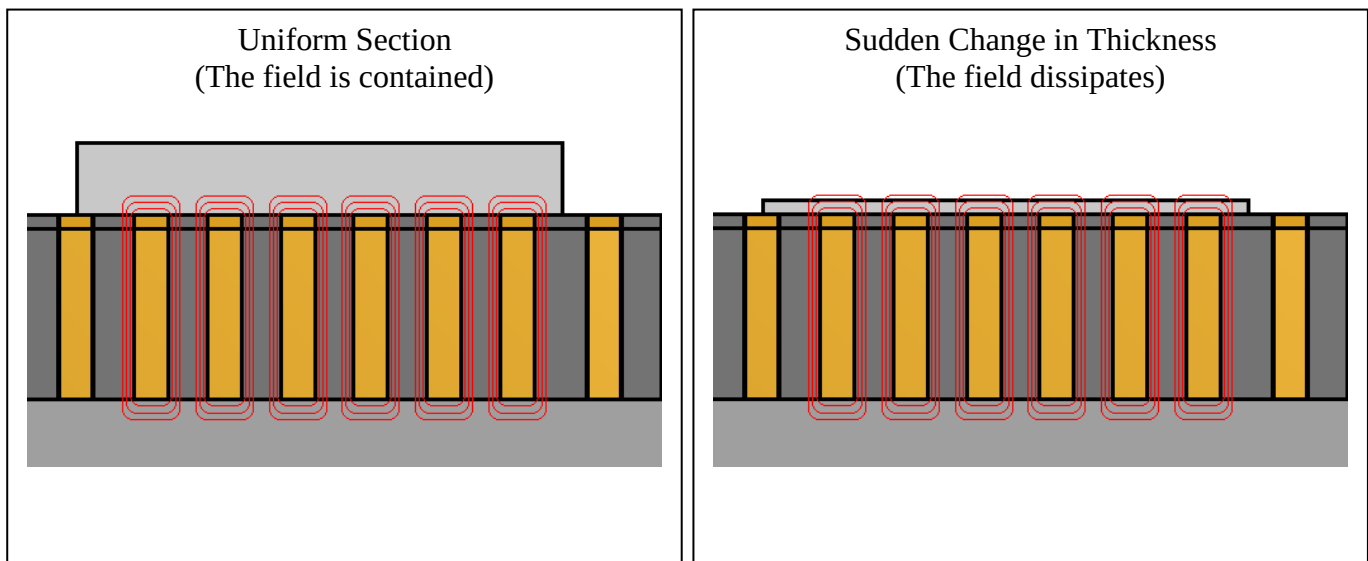
The attractive force will be about 5-15% of the maximum force

For a proper functioning of the chuck and for a maximum anchorage force, it is necessary that the piece lies on at least two consecutive poles (opposite polarities). If the piece lies solely on a pole or if the contact surface is less than this, the locking force becomes greatly reduced.

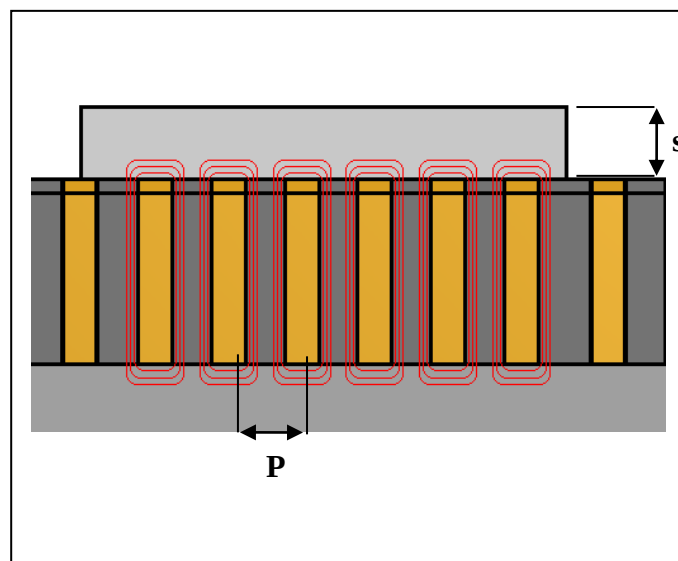


For an optimum functioning, other than the viewed features the workpiece must have good section uniformity to ensure a constant magnetic flux density.

Basically, sudden changes in section that would force the magnetic flux to dissipate into the surrounding space, consequentially reducing the hold on the chuck, are to be avoided.



Similar considerations can be applied to pieces having little thickness. The best hold on the work chuck is achieved through pieces having **S** thickness greater than or at least equal to the pole pitch **P** of the chuck itself.

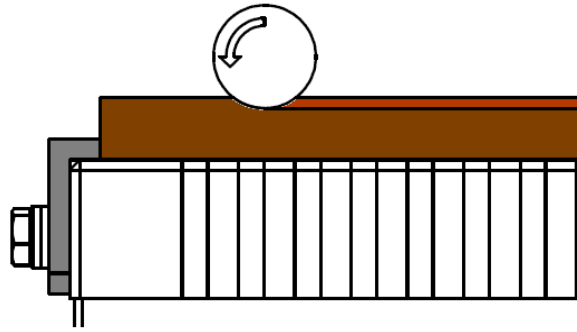


Stop bars or squares can be used as safety elements during operation. They are intended to "help" the chuck prevent the piece from possible sliding on the chuck as a consequence of the mechanical machining it has to undergo.



It is necessary to distinguish 3 fundamental cases:

A) The working motion tends to lift the piece (working with small or medium depth of cut)

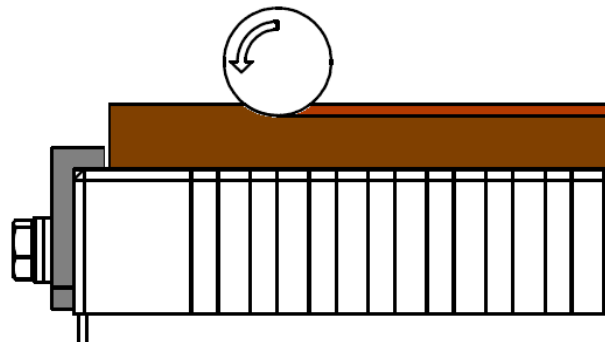


We recommend using stop bars as in the above example.

In this case, 2 components intervene:

- _ Horizontal component of the force that tends to transfer the piece on the work chuck; this action is partially balanced by the magnetic field and partially by the stop bars.
- _ Vertical component of the force that tends to lift the piece from the work chuck. This action is fully compensated by the magnetic field

B) The working motion of the tool tends to pull the piece (working with high depth of cut)

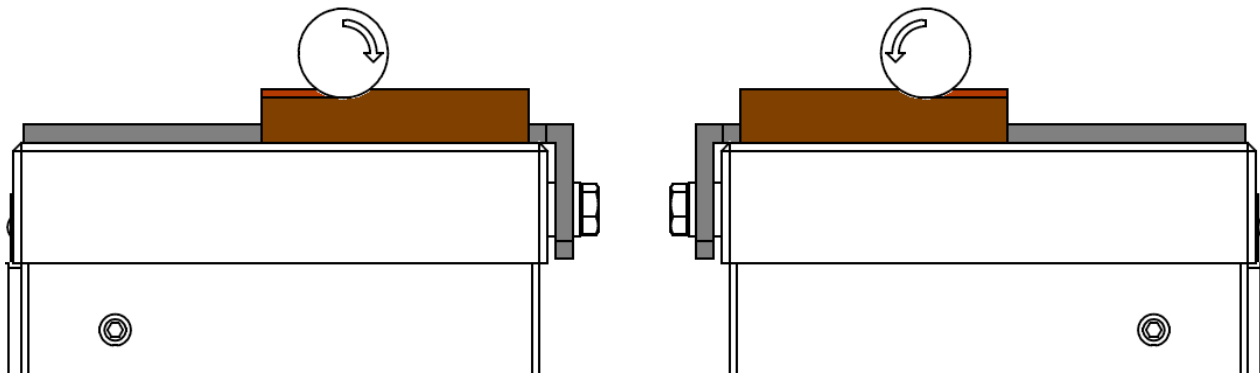


We recommend using stop bars as in the above example.

In this case, 2 components intervene:

- _ Horizontal component of the force that tends to transfer the piece on the work chuck; this action is partially balanced by the magnetic field and partially by the stop bars.
- _ Vertical component of the force that tends to compress the piece on the work chuck. This action is fully compensated by the reaction of the magnetic field and chuck

C) Rotation axis of the tool perpendicular to the work chuck.



In this case, there are no considerable forces directed perpendicularly to the work chuck.



6.2 First Operation

- Check that the machine tool is not working;
- Clean the work surface of the piece(s) and the chuck;
- Place the piece on the chuck (see section 6.2);
- Adjust the height of the squares (or stop bars) depending on the type of operation;
- Magnetize the magnetic chuck by turning the magnetization lever clockwise for about 180°;
- Check that the piece is locked;
- Turn on the machine and continue the operation;
- When the operation is complete, turn off the machine tool;
- Remove the magnetism of the magnetic chuck by rotating the magnetization lever counterclockwise back to its natural rest position;
- Remove the piece(s)

6.3 Usual Functions

Repeat the stages described above following this sequence: **positioning, magnetization, locking test.** At the end of the process proceed with the **demagnetization of the chuck.**

7. TROUBLESHOOTING

Malfunction detected	Likely cause	Suggested operation
The chuck lever turns without results	Lever pivot / internal mechanism is broken	Contact service
Chuck lever is difficult to turn and magnetization is not good	Dirt may have reached some parts of the internal mechanism	Contact service

Should you have any problems or need any further information, please contact the technical assistance service (see contacts in section 13)

8. PRODUCT CARE AND MAINTENANCE



Maintenance should be performed by trained and skilled staff only. Maintenance personnel must carefully read this manual. Good and constant maintenance is a decisive factor for best performance under optimal operating conditions and for an increased operative life.

It is suggested to periodically check the condition of the product.

Before performing any operation, thoroughly clean the chuck surfaces in contact with the piece to be worked.

9. DISPOSAL

The magnetic chuck is made up of electric, plastic and iron components. When placing the product out of service, dismantle it and dispose of the materials separately in compliance with the relevant regulations in force.

10. ACCESSORIES

- _ Removable key
- _ Supplementary plates