SISTEMI MAGNETICI ELETTROPERMANENTI
Divisione sollevamento pesante - serie TECNOLIFT

PERMANENT-ELECTRO MAGNETIC SYSTEMS
Heavy Lifters Division - TECNOLIFT

SYSTÈMES MAGNÉTIQUES ÉLECTROPERMANENTS
Section levage lourd - série TECNOLIFT

ELEKTROPERMANENTE MAGNETSYSTEME
Abteilung Heben schwerer Werkstücke - Serie TECNOLIFT

SISTEMAS MAGNÉTICOS ELECTROPERMANENTES
División elevación pesada - serie TECNOLIFT

ELEKTROPERMANENTA MAGNETSYSTEM
Divisionen för tunga lyftdon - TECNOLIFT

ITALIANO
ENGLISH
FRANÇAIS
DEUTSCH
ESPAÑOL
SVENSKA

Manuale uso e manutenzione
Instruction and maintenance manual
Manuel d'utilisation et d'entretien
Betriebs- und Wartungsanleitung
Manual de uso y mantenimiento
Drift- och underhållsmanual

TÜV SÜD

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TECNOMAGNETE®

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ENGLISH

1 GENERAL NOTES

Thank you for purchasing one of the many products manufactured by **TECNOMAGNETE S.p.A.**

This manual is designed to help you become familiar with your new system and must therefore be carefully read and followed.

Should you require any further information regarding the system, please contact the **TECNOMAGNETE** service department.

The descriptions and illustrations provided in this manual are for reference only.

While guaranteeing the basic features specified for each type of equipment, **TECNOMAGNETE S.p.A.** reserves the right to change at any time and without notice the parts, details and accessories that it deems necessary for engineering or commercial reasons or in order to improve the product. The necessary updates, if required, shall be supplied as attachments.

This manual is the property of **TECNOMAGNETE S.p.A.** and cannot be copied (in part or in whole) or made available to third parties without the written consent of the manufacturer. Should the products be amended and/or updated, upon authorization of **TECNOMAGNETE S.p.A.,** the manufacturer shall integrate the existing manual by providing the text explaining the use of the modified/integrated component along with a description of potential residual risks.

1.1 Overview of the company

TECNOMAGNETE started its activities in 1972 as manufacturer of permanent-electro magnetic systems designed to ensure power, flexibility and maximum safety. Its state-of-the-art technologies and the patents developed over the years have enabled the company to become a leading supplier in several international markets.
The permanent-electro magnetic systems manufactured by TECNOMAGNETE are able to produce all the magnetic force required both to clamp and lift parts, thus eliminating the need of using electric power during machining.

Its main fields of activity include:

CLAMPING SYSTEMS FOR TOOL MACHINES

- **For grinders**
- **For millers**
- **For lathes**
- **For the machining of rails**

MOLDING SYSTEMS

- **Systems designed to clamp the molds onto presses**

LIFTING SYSTEMS FOR LIGHT LOADS

- **Manual lifters**
- **Battery operated lifters**

LIFTING SYSTEMS FOR HEAVY LOADS

- **Magnetic lifters**
- **Systems with fixed crossbeams to support magnetic modules**
- **Telescopic crossbeams to support magnetic modules**

TECNOMAGNETE has installed approximately 50,000 units in over twenty years, thanks mainly to its wide-ranging offer, its flexibility to meet customers' requirements and its efficient post-sales service.

1.2 Importance of the manual

A copy of this manual must always be made available to the operators responsible for the installation, operation and maintenance of the system in order to allow them to carry out all the required operations in compliance with the instructions provided in the manual.

A full compliance with the instructions provided in this manual is an essential requirement to be able to correctly use the equipment and ensure the safety of operators and other people.

The manual forms integral part of the system. Therefore, all reproduction and divulgation rights related to the manual or its exhibits are reserved.

The manual must always be transferred to the new owner of the system if the latter is sold.

1.3 Storing the manual

It is severely forbidden to remove parts, tear pages or alter this manual.

The manual should always be carefully preserved so that it is not damaged.

Always protect the manual from excessive humidity and heat and store it in a location where it can be easily accessed by operators in case of need.

1.4 Notations

To simplify consultation, the manual has been divided into the following hierarchical order so that each phase is described in detail:

1 Section 1 of the manual

1.1 Chapter 1 of Section 1 of the manual

1.1.1 Paragraph 1 of Chapter 1 of Section 1 of the manual

1.1.1.1 Subparagraph 1 of paragraph 1 of Chapter 1 of Section 1 of the manual

Some chapters and/or sections have bulleted sections to allow users to follow the operation described step by step.

Parts that require specific attention are highlighted with symbols.

1.5 Definition of symbols

All information related to safety is highlighted in bold.
All warnings that draw the attention of operators on operations that may be hazardous in terms of safety or health or that may cause physical injuries, if the applicable instructions are not followed, are highlighted in bold and marked with the following symbol:

All warnings related to operations that have to be carried out by skilled and qualified personnel are highlighted in bold and marked with the following symbol:

1.6 Personnel responsible for the operation of the system

Some operations, as stated in this manual, can only be performed by qualified and skilled personnel. The qualification level is described by means of the following standard definitions:

- Qualified personnel is personnel with specific technical knowledge and/or the experience necessary to avoid potential risks originating from power and/or mechanical moving parts (engineers and technicians).
- Trained staff is personnel that operates following the instructions and/or under the supervision of qualified personnel, who is responsible for verifying that they are not exposed to potential hazards resulting from the contact with power and/or mechanical moving parts (personnel responsible for operation and maintenance).
- Before using the system, users shall always have to verify with authorized personnel that:
  1. All personnel has received a copy, has read and understood the content of the instruction manual
  2. All personnel has agreed to follow the instructions provided

1.7 Trained personnel

- OPERATORS: workers who, after receiving the necessary instructions, have been authorized by the owner to operate the system. Workers with this qualification must be thoroughly familiar with the content of this manual.
- PERSONNEL RESPONSIBLE FOR HANDLING OPERATIONS: personnel working in this role must possess specific skills (that must sometimes be acquired by following special training courses, if required by current laws) and be familiar with the operation of lifting equipment and methods, types of slinging and procedures to safely handle loads. This qualification implies having a perfect knowledge and full familiarity with the content of this chapter.
- MECHANICAL MAINTENANCE TECHNICIAN: these workers must be thoroughly familiar with installation, adjustment, maintenance, cleaning and/or reparation procedures. This qualification implies having a perfect knowledge and full familiarity with the content of this manual.
- ELECTRIC MAINTENANCE TECHNICIAN (ref. EN60204 paragraph 3.45): this qualification is assigned to all personnel specifically trained to perform operation on electric components, which include connections, adjustments, maintenance and/or reparations, and to personnel who is qualified to perform operations inside electric cubicles and boards. This qualification implies having a perfect knowledge and full familiarity with the content of this manual.

1.8 Individual protection means

All personnel listed above must wear suitable clothing to protect them from potential industrial accidents.

In particular, personnel must always wear industrial shoes along with ear protection, helmets and goggles, if required.

All personnel should refrain from wearing loose clothing that could get tangled with moving components.

1.9 General safety precautions

The instructions and recommendations provided below comply with current safety regulations and imply the obligation of complying with applicable provisions.

TECNOMAGNETE S.p.A. shall not be responsible for damages caused to people or equipment originating from the failure to follow applicable safety provisions and to comply with the instructions given below.

All operators are therefore expected to follow the instructions below and to thoroughly comply with the safety procedures concerning the installation and use of the equipment applicable in the country in which the system is used.

All ordinary and extraordinary maintenance operations must be performed when the system is idle and after it has been disconnected from the power supply, if possible.

To prevent the system from being accidentally started during maintenance operations, it is always advisable to place onto the control panel a sign with the following warning:

ATTENTION! CONTROL DISABLED DUE TO MAINTENANCE

Before connecting the power cable to the terminal box on the main board, it is essential to verify that the line voltage complies with the one shown on the nameplate of the board.

All transportation, installation, ordinary and extraordinary maintenance operations performed on the system must be carried out only by personnel with the qualifications stated in paragraph 1.5.1.

The system can be used only for the applications specified in operating instructions and only in combination with the equipment and components recommended by TECNOMAGNETE S.p.A..

1.10 Behavior during emergency situations

In the event of emergency, it is always advisable to follow the procedures outlined in the operation and maintenance manual of the machine on which the system is installed.
In the event of fire, always use the extinguishing means provided being careful not to use water to extinguish fires on electric parts.

1.11 Improper or non permitted use

The system is not designed to be used in explosive environments.

An improper use may:

- **Cause injuries to personnel**
- **Damage the system or other equipment**
- **Reduce the reliability and performance of the system**

The system must always be used for the applications for which it has been designed and manufactured. Therefore, customers should:

- **Always use suitable lifting parameters**
- **Carry out the required maintenance in accordance with he instructions provided**
- **Comply with all the instructions provided**
- **Safely and firmly fix the system and all its parts**
- **Contact TECNOMAGNETE S.p.A. in case of doubt to determine whether a specific operation is permitted**

The clamping of special materials, other than those referred to in this manual, must be preventively authorized in writing by the TECNOMAGNETE S.p.A.

1.12 Nameplate

All TECNOLIFT PERMANENT-ELECTRO MAGNETIC SYSTEMS are fitted with identification nameplates that provide information on the manufacturer, in compliance with current laws.

The nameplate should never be removed even if the system is resold.

If the nameplate is damaged or has been removed, it is necessary to contact TECNOMAGNETE S.p.A. to order a duplicate.

Always quote the model printed on the nameplate in all communications with TECNOMAGNETE S.p.A.

Failure to comply with the above instructions shall entitle TECNOMAGNETE S.p.A. to disclaim any responsibility for injuries to personnel and damage to equipment, making the user fully responsible before competent authorities.

2 TRANSPORTATION AND HANDLING

Lifting systems can be transported in wooden crates of suitable dimensions and mounted onto a pallet to simplify handling.

2.1 Receipt

All systems are carefully inspected before shipping. Upon receipt, customers should verify that the packaging and the material inside it has not been damaged (unless otherwise instructed by TECNOMAGNETE S.p.A.) in order to ensure that the system has not been damaged during transport and that the material supplied complies with order specifications. Visible transport damages should be immediately reported to TECNOMAGNETE S.p.A. and the forwarding agent.

ATTENTION

All faults and defects must be reported within ten days from receiving the goods.

2.2 Handling

ATTENTION

All personnel involved in handling loads should wear protective gloves and shoes.

The customer will always have to verify that all handling operations are carried out in accordance with applicable safety requirements.

ATTENTION

When lifting or handling the system, always make sure that the surrounding area is clear and free from obstacles, and that the recommended safety distances are maintained, in order to prevent causing injuries to people and animals or damage to equipment present near the system.

The system is designed to be lifted and handled with appropriate lifting equipment with characteristics and capacity suitable for the weight to be handled.

Handling operations must always be performed very carefully in order to avoid potential impacts that could damage the system parts and prevent them from operating correctly.

When using fork lifters, always verify that speed and inclinations are within recommended values.

Do not leave lifting equipment unattended when the load is suspended.

ATTENTION

Always verify that the system is disconnected from energy supplies and that all moving parts are firmly fixed in place when transporting, handling and storing the system.

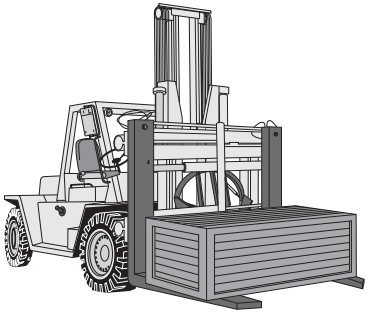
ATTENTION

Do not handle lifting systems with electromagnetic lifting equipment.

ATTENTION

Read all the instructions on the packaging before opening it.

Always keep the original packaging so that it can be used to transport the system if needed.



2.3 Transportation

In order to transport the system, it is sometimes necessary to disassemble some of its parts. These parts will later be reassembled and reconnected during the installation phase by the service technicians of TECNOMAGNETE S.p.A. or of the customer under the supervision of TECNOMAGNETE S.p.A personnel.

The system should always be transported within the following environmental limits: temperature ranging from -10°C to +55°C, with temperature increase up to 70°C for a maximum of 24 hours.

If the system requires the use of specific transportation means (by sea or air), special provisions shall have to be adopted in order to protect it from damages caused by potential impacts. In order to protect the system from atmospheric agents, lubricate it with anti-corrosion oils and place hygroscopic salts in the box. All parts that cannot be permanently fixed in place must be removed.

2.4 Storage

Before removing the system from service or storing it for long periods of time, always thoroughly clean it in order to remove machining scraps and protect all visible metal parts with protective oils or greases to prevent the surfaces from oxidizing.

Disconnect the controller from the magnetic module and from the power supply.

It is generally advisable to cover the system with a waterproof sheet and store it in dry and safe place.

The temperature of the storage area should range between 0°C (32°F) and 55°C (131°F).

Relative humidity should be between 30% and 90%, non condensing.

The atmosphere should be clean, free from acids, corrosive gases, salts, etc.

When restarting the machine, always follow the instructions provided in Chapter 4.

3 DESCRIPTION OF THE SYSTEM

3.1 Introduction

TECNOMAGNETE has been researching and developing permanent-electro magnetic systems for over 30 years, and is now able to offer its customers a technology that combines SAFETY, POWER, PRACTICALITY and ENERGY SAVINGS.

TECNOLIFT permanent-electro magnetic lifters enable to easily hook, transport and release loads.

These systems are also very practical because they work above the load without compressing or deforming it.

In addition, they are also the ideal solution to optimize work space, because they are designed to be used in limited spaces and do not require the loads to be separated.

All the systems described in this manual are permanent-electro magnetic systems designed to lift and handle sheets, semi-finished products, forged parts, profiles and parts cut with oxy cutters.

These systems are able to lift and handle ferromagnetic systems thanks to the fact that these materials are able to distribute (conduct) the magnetic forces produced by the system.

The permanent-electro technology developed by TECNOMAGNETE enables to exploit all the magnetic energy stored or that can be stored in some alloys of special types of components, that is permanent magnets.

European standards concerning the safety of work places and electromagnetic compatibility (conducted and emitted radiations) clear emphasize the superiority of permanent-electro circuits for magnetic lifters. These type of lifters are in fact able to guarantee the compliance with the following requirements:

- They do not require a continuous external energy source (unlike electromagnetic equipment), because the operating principle based on two reversible magnets (TECNOMAGNETE permanent-electro circuit) uses the electric power only for cycles of a few seconds during the magnetization (“MAG”) and demagnetization (“DEMAG”) phases.
- They are intrinsically safe because they can be managed independently from the load and are therefore not influenced by power shortages. The high energy permanent magnets ensure that the load is clamped with a constant force.

- They do not affect the operation of neighboring equipment (because they do not return energy to the power supply during the release phase).

3.2 Operation

All magnetic lifters develop an attraction force that attracts metal parts, regardless of whether the part is in contact or separated by an air gap.

The air gap represents the average distance between the poles of the lifter and the surface of the load.

This air gap generally originates from the presence of foreign bodies or other materials and/or load deformations (concavity, convexity, etc.).

The air gap reduces the clamping force, which decreases proportionally as the air gap increases.

This characteristic is plotted on a Force-Air gap curve (see attachment) that represents the maximum load with a minimum air gap of 0 mm (see standards EN 13155).

Lifters are generally dimensioned to develop a force equivalent to at 3 times the weight of the maximum load that can be lifted.

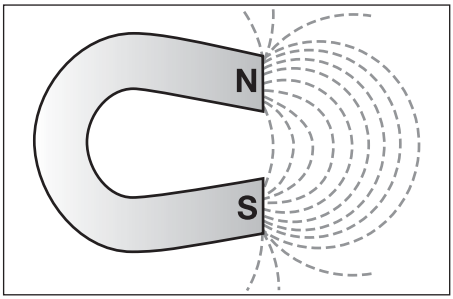
This guarantees an adequate safety margin in the event of overloads, which sometimes occur when the load is handled, provided that appropriate lifting procedures are used (centering of the load, load within maximum lifting capacity, removal of foreign bodies, etc.).

The load is initially lifted with the lifter placed in PICK-UP mode (magnetic force equivalent to 75%) and then translated after the completion of the FULL MAG cycle (with a 100% magnetic force).

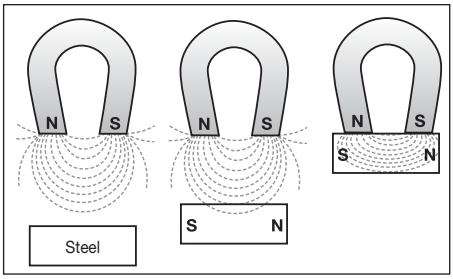
This approach guarantees that the clamping force during handling will also be 30% above the one used to initially lift the load.

3.3 Principles concerning the clamping of loads

The magnetic force lines close between the northern and southern pole of the magnetic system.



This flow can be used to attract and clamp ferrous parts. A steel part exposed to a magnetic field is attracted by the opposed polarity of the field towards the magnet, until contact is achieved.

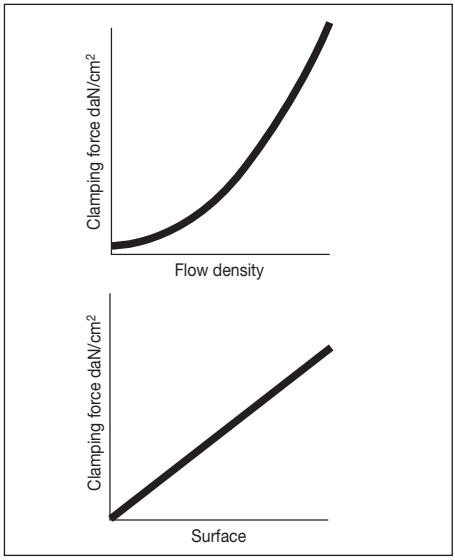


The flow produced by the steel varies according to the material it contains, its dimensions, the level of contact achieved between the load that has to be lifted and the magnetic lifter, and the easiness with which the flow passes through the steel.

3.4 Factors that influence magnetic forces

The amount of magnetic flow applied to the load that has to be lifted is the factor that most influences the clamping force. To achieve an optimum clamping force, it is necessary to apply the greatest possible magnetic flow to the load to be lifted. If the load has a simple design, it is sufficient to correctly position it on the northern and southern poles of the magnetic lifter. The clamping force is proportional to:

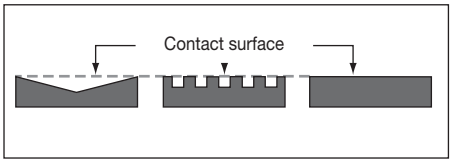
1) The square of the density of the magnetic flow present on the surface that is in contact with the load.
2) The surface of the load to lift that is in contact with the magnetic lifter, calculated up to the maximum saturation point.



Doubling the contact area means doubling the clamping force. A 10% reduction in the flow density reduces by 19% the clamping force. If the flow density is halved, the clamping force is reduced by 75%. The flow density tends to reduce when the flow encounters a magnetic resistance (reluctance). A typical example of this type of situation is represented by air gaps (where an air gap represents the average contact distance between the part to lift and the magnetic lifter) and the elements that form the material of the load being lifted. The main factors that influence the flow density and clamping force applied to a part of any dimension are described below.

3.4.1 Contact surface

The condition that provides maximum lifting force occurs when the air gaps are reduced to the minimum and there is a consistent and continuous contact surface. The worst results are achieved with an air gap and a minimum contact. The clamping force decreases proportionally in function of the actual contact surface of the load to be lifted.



3.4.2 Superficial finish

Even the superficial roughness of the part to lift may improve lifting conditions. A good contact with the magnetic lifter significantly reduces air gaps, thus guaranteeing a consistent magnetic clamping force

3.4.3 Material

Always check the material of the part that has to be lifted in order to verify that it is magnetically conductible. The most conductive material is mild steel. The following reduction factors apply to other materials:

1	Mild steel
0,7 ÷ 0,8	Alloyed steel
0,5	Cast iron
0,2	Nickel
0	Non magnetic stainless steel, brass and aluminum

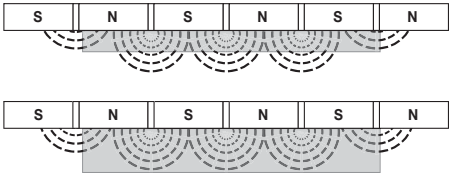
3.4.4 Conditions of the part surface

Superficial heat treatments change the physical structure of surfaces and consequently also influence their capacity of absorbing magnetic flows. Annealed materials provide higher performances. Tempered materials are unable to satisfactorily absorb the flow and tend to withhold a certain amount of magnetism when the lifter is disabled (DEMAG). In other cases, it is sometimes difficult to detach the part from the magnetic lifter. Residual (or absorbed) magnetism can be removed by using a demagnetizer.

3.4.5 Thickness of the part

The flow follows a semicircular path inside the part, which originates from the center of a pole, moves towards the magnetic lifter and reaches the center of the subsequent one. If the part is smaller than this radius, the part of the flow that it is output may disperse and cannot therefore be used to clamp the part.

Consequently, the resulting attraction will be smaller than the one achieved when you machine a part with a thickness that is able to absorb the whole flow.



3.5 Consistent performance and maximum autonomy

The technical features of TECNOMAGNETE systems (regeneration of the saturation level after the completion of every operating cycle, no overheating, complete staticity of all parts and integral shielding from external interferences) are designed to guarantee project performances over long periods of time

During daily/ordinary operations, TECNOMAGNETE lifters are not subject to power reductions, which means that their performances remain unaltered throughout the whole working cycle due to the fact that they are “cold” systems. Consequently the clamping force is not reduced by the progressive overheating of the magnetic modules.

During the lifting and translation phase, TECNOMAGNETE lifters are physically independent from external energy sources.

All lifters are fitted with a DAUTANAC device (optional), automatically controlled by the pulling and lifting controls, which automatically prevents the release, though accidental, of the load, in addition to disabling the electronic controller, which is re-enabled only when the lifter is placed back onto the support.

4 AVAILABLE TECNOLIFT MODULES

The permanent-electro lifters described in this manual are available in the following modes:

- Systems with crossbeams and telescopic brackets, models TM4/N; TM 6/N or TM ....SP
- Systems with fixed crossbeams, models BF 2; 4 or BF...SP
- Systems with guide braces for existing crossbeams, models GTR4; 6;.....
- Systems with oscillating crossbeams, models TB
- Systems with fixed crossbeams to handle profiles, rails and parts cut with oxy cutters, models TP, RO, TT
- Single lifters to handle blocks, models SML, SMH and SMU
- Handling systems for coils, models CV, CV/T, CO, CH
- Handling systems for billets and thick slabs, models BL, BR
- Handling systems for iron rods, pipes and reservoirs, models RD, TU, CS.

Components supplied with standard TECNOLIFT systems

	TM	BF	GTR	TB	TT	SML	SMH	SMU	CV	CO	CH	BL	BR	TP	RO	RD	TU	CS
Load-bearing frame - Tubular section in high resistance steel	●	●	–	●	●	–	–	–	–	–	–	●	–	●	▲	–	●	●
Guide braces supporting the magnetic modules	●	●	●	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Flexible system to suspend modules	●	●	●	●	–	–	–	–	–	–	–	–	–	●	●	–	–	●
Built-in controller	●	●	–	●	●	●	●	●	–	–	–	–	–	●	●	●	●	●
External controller	–	–	●	–	–	▲	▲	▲	●	●	●	●	●	▲	▲	▲	▲	▲
Double magnetization cycle PICK-UP/FULL MAG	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Telescopic hydraulic system	●	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Remote control	RC	RC	RC	SR	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC	RC
Control panel in booth - Dashboard	–	–	–	–	–	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
APC. power adjustment	●	●	●	–	●	●	●	●	▲	–	–	–	▲	–	–	▲	▲	–
SAFE button	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
DAUTANAC	●	●	●	–	●	●	●	●	–	–	–	▲	▲	●	●	–	–	–
UCS saturation control unit	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Lamp block	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Chain tensioning	●	●	–	–	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Spring-loaded cable winder	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Installation kit	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
SRM - Module rotation system	▲	▲	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Additional hooks	▲	▲	–	–	–	–	–	–	–	–	–	–	–	▲	–	–	–	–

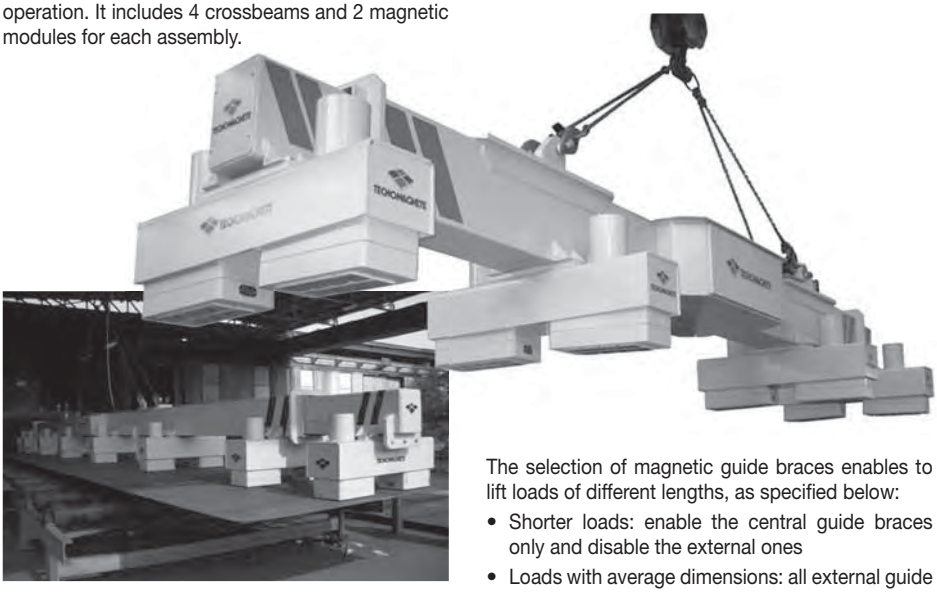
● Supplied as standard ▲ Optional

RC: Standard remote control

SR: Waist-mounting remote control

4.1 Systems with beams and telescopic brackets, Models TM 4/N, TM6/N and TM...SP

TM 4/N: this system can be used to handle sheets with a maximum length of 12 meters with a single operation. It includes 4 crossbeams and 2 magnetic modules for each assembly.



TM 6/N: this system can be used to handle sheets with a maximum length of 12 meters with a single operation. It includes 6 crossbeams and 2 magnetic modules for each assembly.

TM.....SP.: see attachments

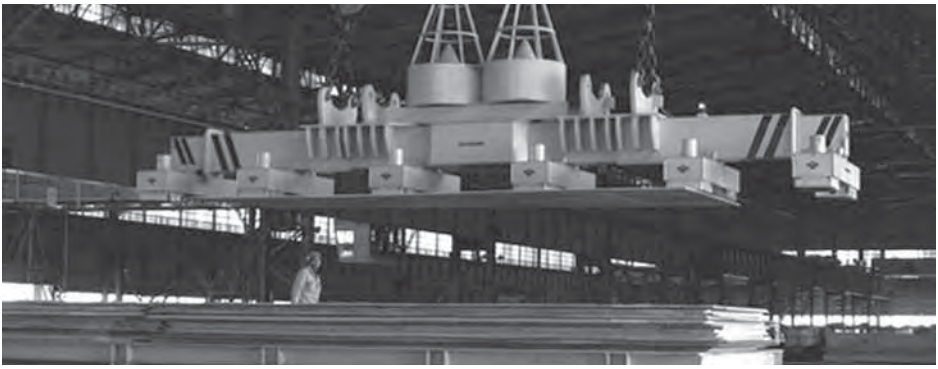
TECNOLIFT-TM crossbeams enable to consistently hook the load from the top, without deforming or damaging it. Therefore, they represent a safe and practical solution to streamline sheet handling and stocking operations.

Crossbeams can increase or reduce the distance between the centers of modules and even select the heads that have to be magnetized (selection of guide braces).

The selection of magnetic guide braces enables to lift loads of different lengths, as specified below:

- Shorter loads: enable the central guide braces only and disable the external ones
- Loads with average dimensions: all external guide braces must be disabled
- Loads with maximum length: all external guide brackets must be enabled (stretched)
- Straps: all guide braces with partially magnetized heads (right or left).

The telescopic movement is achieved by means of a dedicated hydraulic pump. By translating the external heads it is also possible to work with several opening degrees, depending on the model used.



4.2 Systems with fixed crossbeams, Models BF

BF: this system can be used to handle sheets with a single operation. It is constituted by a main beam that is connected to 2; 4; n..... guide brackets to support the magnetic modules.

This system has the same characteristics of models TM, with the only difference that the magnetic guide braces are placed at a fixed distance. This type of system can be used when the sheets to be handled have a standard length and there is no need to perform telescopic movements.

4.3 Systems with guide braces to support magnetic modules, Models GTR

GTR: this system is constituted by 4; 6 ..... magnetic guide braces (respectively models GTR 4/N; GTR 6/N; GTR .....) with controller. It is specifically designed to be installed onto existing fixed or telescopic crossbeams.

Its magnetic power is equivalent to that of models TM4/N, TM6/N, TM...SP and BF.

4.4 Systems with oscillating crossbeams, Models TB

TB: this system can be used to handle sheets with a single operation, both vertically and horizontally.

The system enables to handle sheets both vertically and horizontally, so that they can be positioned vertically and loaded horizontally (for example from warehouses to cutting benches) and vice versa.

All models are supplied with “waist-mounting” remote control.

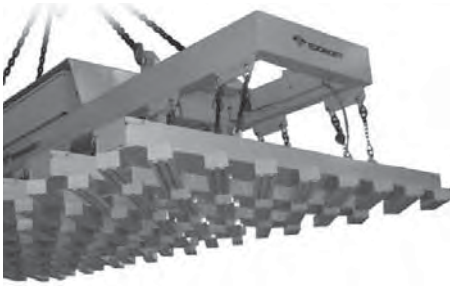
4.5 Systems with fixed crossbeams for TT cutters

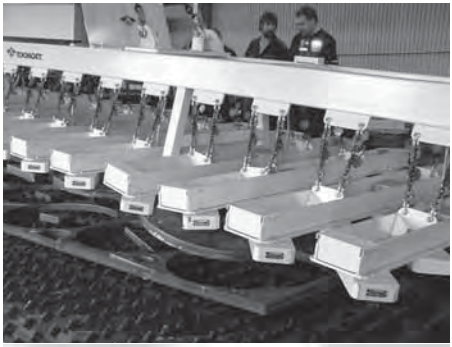
TT: to handle single sheets.

The system enables to quickly load/unload the sheets on/from the cutters (plasma, oxy and high definition laser cutters).

It can also be used to remove the cut sheet and “skeleton” from the workbench with a single operation, so that the machine is immediately ready for the next working cycle.

There are also standard models for sheets with varying surfaces, cut pieces of all dimensions and minimum thickness (see attachments).

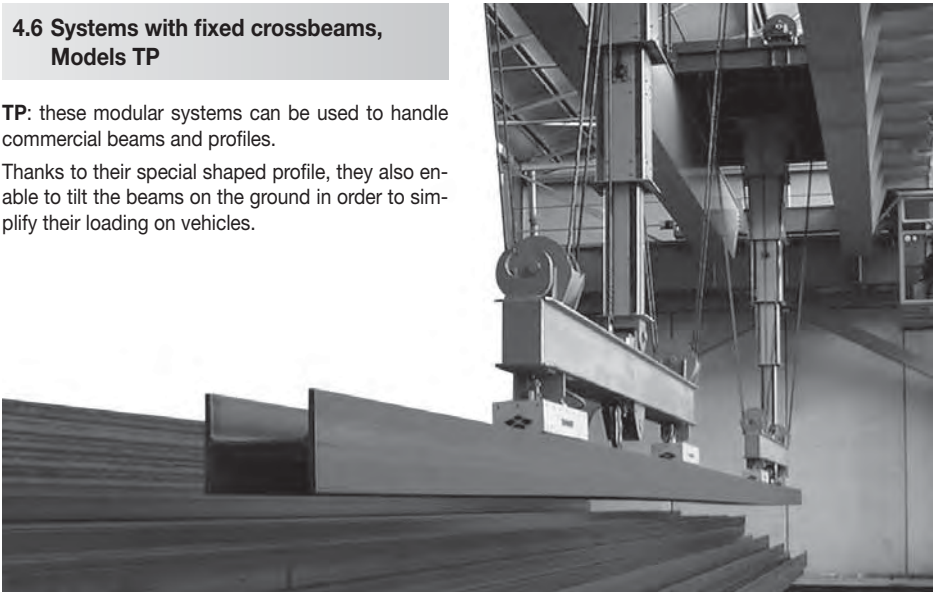




4.6 Systems with fixed crossbeams, Models TP

TP: these modular systems can be used to handle commercial beams and profiles.

Thanks to their special shaped profile, they also enable to tilt the beams on the ground in order to simplify their loading on vehicles.



4.7 Single lifters, Models SML; SMH; SMU

SML: this system can be used to handle with a single operation pre-machined sheets or blocks with low air gaps. All models have a circuit with multiple poles to ensure a consistent distribution of the magnetic flow.

SMH: this system can be used to handle with a single operation thick slabs and forged blocks with high air gaps. All models are fitted with four poles in order to ensure a high concentration of force and magnetic power.

SMU: this system can be used to handle with a single operation plates and straps. All models are specifically dimensioned to handle loads with limited width.

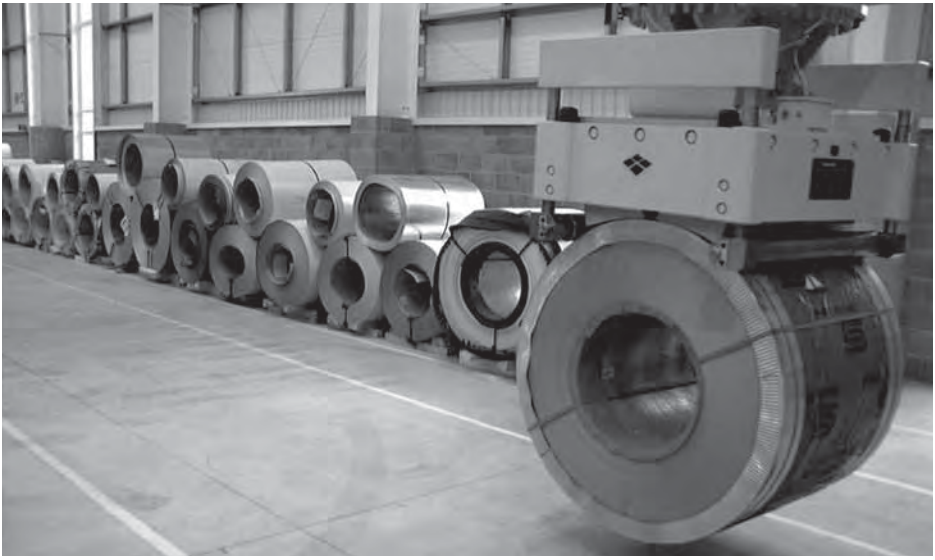
4.8 Handling systems for coils, Models CV; CH: CV/T; CO

CV: these modules can be used to handle cold laminated compact coils with vertical axis.

CH: these modules can be used to handle cold laminated compact coils with horizontal axis. All modules are supplied with an automatic load centering device.

CV/T: these modules can be used to handle cut coils with vertical axis.

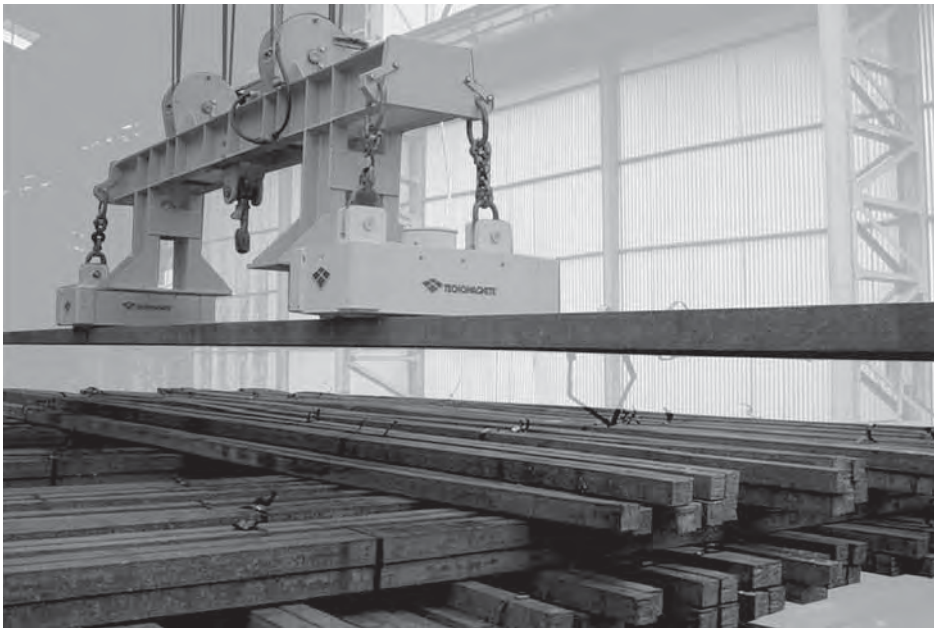
CO: these modules can be used to handle open coils with veridical axis.



4.9 Handling systems for billets and thick slabs, Models BL; BR

BL: these systems can be used to handle bundles of billets. It is also possible to purchase models designed to withstand load temperatures of 600°C down to the core. Custom models with different configurations and loading capacities can be supplied.

BR: these modules can be used to handle thick slabs. They are specifically designed to be fitted on crane used in harbors to load/unload ships. Custom models with different configurations and loading capacities can be supplied.



4.10 Handling systems for rod irons, pipes and reservoirs, Models RD; TU; CS

RD: this system can be used to handle round parts with a single operation. Its special V shaped profile adapts to the shape of the load and simplifies its centering during the hooking phase.

TU: this system can be used to handle pipe bundles without welds and round loads with different shapes.

CS: this system can be used to handle round loads with large dimensions and small thickness values. Custom models are available to safely handle reservoirs and calendaring machines without deforming the load.

5 INSTALLATION

5.1 Mechanical installation

Customers who decide to directly carry out all mechanical installation operations should consult the assembly instructions provided in the attachment supplied with the lifter.

The system must be installed by qualified personnel who has carefully read the content of this manual.

The following tables provide the axial pre-charge value **P** and the corresponding torque values **M** that have to be applied to the screws used to assemble. The values in the table apply to screws with hex head type UNI 5737-65 and to socket head screws type UNI 5931-67. The friction coefficient was considered equivalent to 0.14, which is the value that generally applies to blackened and lubricated surfaces. The torque must be applied gradually using dynamometric wrenches.

Threading	Resistance class = 8.8	
	P (N)	M (Nm)
M 6 x 1	9000	10,4
M 8 x 1,25	16400	24,6
M 10 x 1,5	26000	50,1
M 12 x 1,75	37800	84,8
M 14 x 2	51500	135,0
M 16 x 2	70300	205,0
M 18 x 2,5	86000	283,0
M 20 x 2,5	110000	400,0
M 22 x 2,5	136000	532,0
M 24 x 3	158000	691,0
M 27 x 3	206000	1010,0
M 30 x 3,5	251000	1370,0

5.2 Electric connections

All wiring instructions are provided in the operation and maintenance manual of the controller supplied with the fixed magnetic module. This manual therefore provides only basic information.

5.2.1 Useful technical information

Electric safety can be guaranteed only if the electric system is correctly connected to a grounding system in good working order, as foreseen by current laws concerning electric safety.
Therefore, it is essential to always verify this safety requirements before starting the system and have the distribution system carefully inspected by qualified personnel in case of doubt. TECNOMAGNETE S.p.A. shall not be responsible for damages originating from the failure to connect the system to an appropriate grounding system.
Users shall have to make sure that the system is protected with a differential magnetothermal switch suitable to withstand the rated current used by the system. It is therefore necessary to install a suitable protection with magnetothermal switch (curve C) with a I_n value compliant with nameplate data.

TECNOMAGNETE systems are permanent-electro systems, which means that they need to be powered only during the short cycle phases. This configuration is designed to ensure maximum safety in the event of power failure.

TECNOMAGNETE controllers use the power supply by means of a sophisticated partializing process, which means that they can be operated only when the machine is idle and that they require a rated current that is normally lower than the one required to operate the machine on which the magnetic system being controlled is installed.

ATTENTION
Do not perform repeated MAGNETIZATION/DEMAGNETIZATION CYCLES

TECNOMAGNETE systems are constituted by permanent magnets and use electric power only to enable/disable the operating section. Therefore, they can be regarded “COLD” magnetic clamping systems.
The frequent repetition of magnetization/demagnetization cycles over short intervals of time may increase the temperature of the magnetic lifter.
It is therefore advisable to run cycles only when necessary.

The connection of the magnetic module to the power supply must be carried out by qualified personnel only.
Check the supply voltage and frequency.
The power of the controller must correspond to the value specified on the magnetic system nameplate.

6 PROTECTION AND SAFETY DEVICES

6.1 General

Smaller magnetic lifters are constituted by a single steel block, while those with larger dimensions have a frame supporting the magnetic circuit, which is constituted by several parts (a base plate with shoulders fixed onto the perimetral frame by means of mechanical hardware) arranged so that they form the container. If the shape of the load is likely to cause bending (for example bend the sheets), lifters are also fitted with a flexible suspension system that automatically adapts to the shape and bending of the load.
Safety has been carefully considered during the design phase. The system is in fact fitted with several electronic and electromechanical devices to ensure the correct magnetization of the load and prevent potential errors during magnetization, lifting, handling, demagnetization and release operations.

6.2 Warnings

To effectively use a magnetic lifter, it is important to make sure that the poles are always in good contact with the load surface (least reluctance), due to the fact that the magnetic load also passes through non magnetic bodies like air, particles and generally non ferrous materials.

The trend of the lifter clamping force F reduces as the gap T (mm) increases due to the presence of non magnetic materials between the poles and the load (that may include magnets, foreign particles, concave and convex sections, straps, ropes, etc.).

IT IS THEREFORE ADVISABLE to try and avoid, as much as possible, placing the lifter on very dirty or deformed surfaces.

IT IS ALSO ADVISABLE to try and remove all foreign material from the load surface before placing the lifter on top of it.

The system is designed to work under the following conditions:

Voltage	Rated ±10%
Frequency	Rated ±1%
Operating temperature with built-in controller:	-5°C÷+40°C (23°F÷104°F)
Operating temperature for systems with external controller:	-5°C÷+80°C (23°F÷176°F)
Humidity	<50% a 40°C (104°F)
Maximum altitude	2000 m ASL

The system has a noise emission level of <70 dB.

6.3 Safety instructionsa

Never lift the load if:
- The weight of the load exceeds the maximum carrying capacity shown on the system nameplate
- The size of the load exceed the permitted ones
- The load is severely deformed, concave or convex
- The temperature of the load exceeds 80°C (for hot systems, the temperature should not be above the value shown on the nameplate)
- The system is unbalanced after the PICK UP phase
- If the PICK UP phase has not ended or if the red lamp flashes

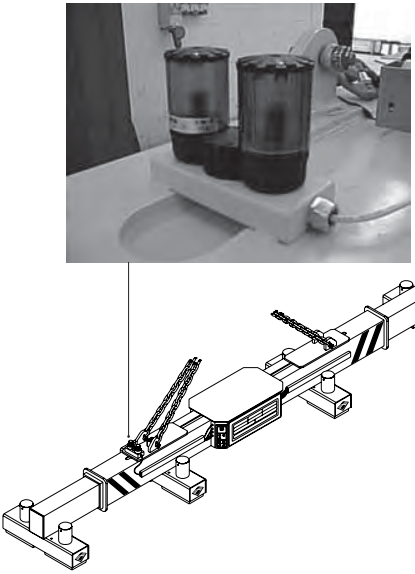
Do not handle the load if:
- The red lamp flashes or turns on permanently
- The system is not running at full power (FULL MAG) and the green lamp is off
- Do not run the magnetization cycle if the lifter is not in contact with the load
- If a power failure occurs, always repeat the last cycle
- Do not touch any of the selectors while the magnetization and demagnetization cycles are in progress
- Do not use the system to move objects
- Avoid hitting the magnetic heads and mechanical frames
- Do not immerse the magnetic heads in water in order to cool them

6.3.1 Luminous indicators

Systems with built-in controller are fitted with luminous indicators that are described in detail in the section below.

On standalone controllers, these luminous indicators are part of the controller and therefore described in the manual of this device.

RED LAMP PERMANENTLY ON	Magnetization cycle in progress or UCS alarm
RED FLASHING LAMP	PICK UP enabled and partially magnetized magnetic system
GREEN LAMP PERMANENTLY ON	The magnetic system is correctly enabled and running at full power (FULL MAG)
WHITE LAMP ON	System enabled (the lamp is situated close to the main switch).



6.3.2 Side flexion

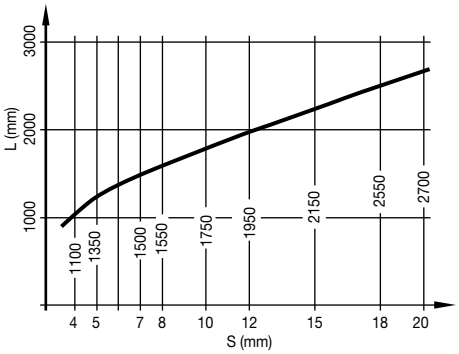
In order to safety handle loads, it is always important to verify that their characteristics are within the values specified in diagram (see figure) **"SIDE FLEXION".**

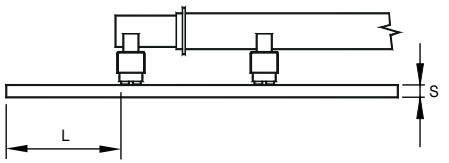
The release of loads generally occurs during the handling of parts with large dimensions and a small thickness, as a result of the "scaling" effect.

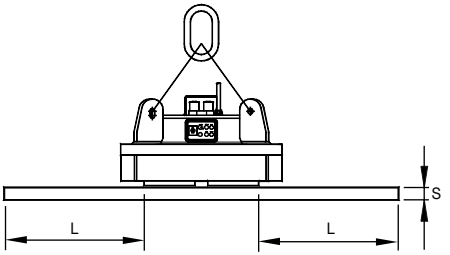
These loads do not have in fact have a sufficient mechanical lift. In this case the **"SIDE FLEXION"** diagram shows the maximum projection for the load to be handled, as compared to the magnetic lifter, in function of its thickness.

TECNOMAGNETE S.p.A. shall not be responsible for injuries to people or damage to equipment originating from the failure to follow the instructions above.

SIDE FLEXION



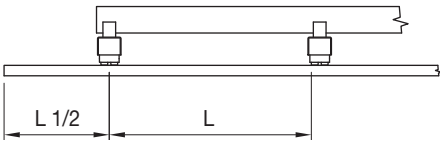




ENGLISH

6.3.3 Overload

To be able to safely handle loads, it is also important not to overload the magnetic modules, specifically when the loads being handled have a high thickness and a weight close to the maximum carrying capacity of the magnetic system. For a correct and safe use of the magnetic system, it is very important to consistently distribute loads. Failure to do so may result in the load being released (see figure).



7 CONTROLS

7.1 Double magnetization cycle

1st “MAG” cycle:
Magnetic force equivalent to 75%
(PICK UP phase)

2nd “MAG” cycle:
Magnetic force equivalent to 100%
(FULL MAG phase)

These controls can be used to lift the load from the ground with a lower power and move it, at maximum power, so that it is always handled within performance specifications.

7.2 Power adjustment device (optional)

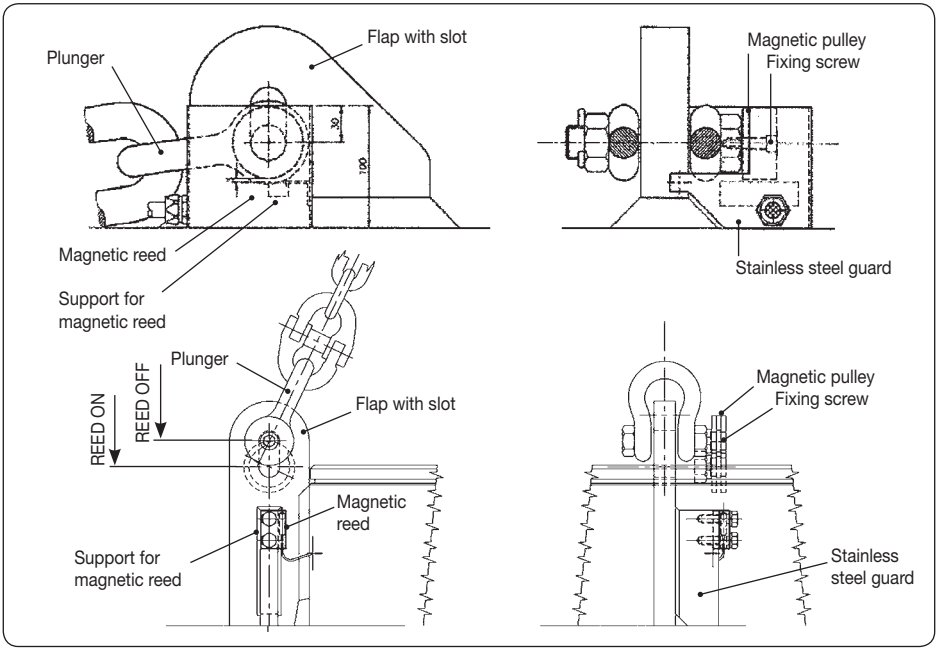
This device enables to adjust the power of the lifting system during the PICK UP phase, if the initial force level prevents the load from being correctly picked up.

ATTENTION
Do not use a partial power level (PICK UP).

7.2.1 DAUTANAC device (optional)

DAUTANAC (device to prevent the accidental release of loads) is situated close to the hooking flaps of the lifter (chains, large ring, etc.) and is used to prevent accidental demagnetization (DEMAG) when the lifter is carrying a load.
The device is constituted by a magnetic switch that enables to magnetize/demagnetize the lifter **only when the chains are aligned,** that is when the load is placed on the ground. This device specifically prevents the accidental demagnetization of the load during handling operations. The chain tensioning system is in high resistance steel, class 80.

The following figure shows an example of application of DAUTANAC.



7.2.2 DAUTANAC a reset (SAFE)
This automatic device can be used to prevent the accidental disabling of the magnetic lifter when the load is lifted. In order to use the device, it is necessary to simultaneously press 2 buttons (SAFE and DEMAG), when the load is released, to prevent it from being accidentally released.

7.2.3 Selector for guide braces / magnetic modules (optional)
This selector enables to select different magnetization levels for guide braces and/or magnetic modules.

7.2.4 UCS (MODULE SATURATION SENSOR)
The electronic UCS saturation control system checks that the current absorbed reaches the value required to ensure a complete magnetic saturation of the modules. **Do not move the load after the completion of the FULL MAG cycle, if the red lamp flashes or switches on permanently and the green lamp is off.**

7.2.5 APC power adjustment control (optional)
If foreseen, the control keyboard is also fitted with a control that enables to adjust the APC power. This control is basically a selector that enables to set the magnetic power required to easily release the load (during the pick-up phase) for loads with a limited thickness.

7.2.6 Remote control
It enables to remotely control the operation of the lifter (PICK UP / FULL MAG / DEMAG / SAFE / POWER / OPEN / CLOSE) (optional) even at a distance from the working area and load.
This unit has an ergonomic grip, a reset button, an emergency push button and a control to adjust the APC power (optional). It also has an adjustable frequency and comes with 2 rechargeable batteries and a battery charger (110 or 220V).

7.2.7 Thermal probe (optional)
This device must be used only when handling loads with a temperature above 200°C.
The probe trips when the maximum permitted temperature is detected inside the magnetic lifter.
In this case, the only option available is DEMAG that enables to place the load back onto the ground.

Note: allow the magnetic lifter to cool at ambient temperature. Do not immerse it in water.

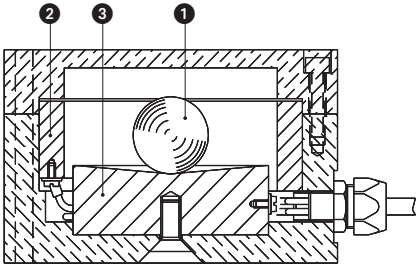
7.2.8 Load balancing device (optional)
This device trips if the inclination of the load is above the programmed one. The device is directly connected to the hook lifting control and is used to stop the lifting operation.

If the device trips, run a demagnetization cycle (DEMAG) and recenter the load.

This device is placed next to the hooking point on the lifter and reads the inclination originating from an improper balancing of the load, thus signaling to the operator when the inclination exceeds the safety limit (the maximum recommended inclination is ± 5°). The following figures show how to use the device.

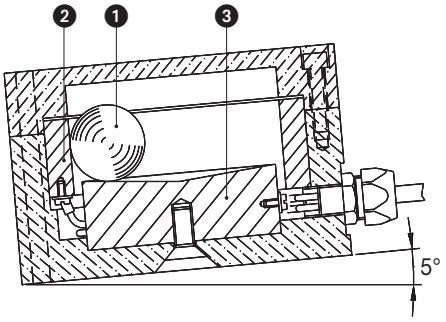
LIFTER WITH BALANCED LOAD

Mercury ❶ is in contact with the slanted surface of disk ❷, which means that the system is left with an open contact surface, the load is balanced and therefore not in alarm.



LIFTER WITH UNBALANCED LOAD

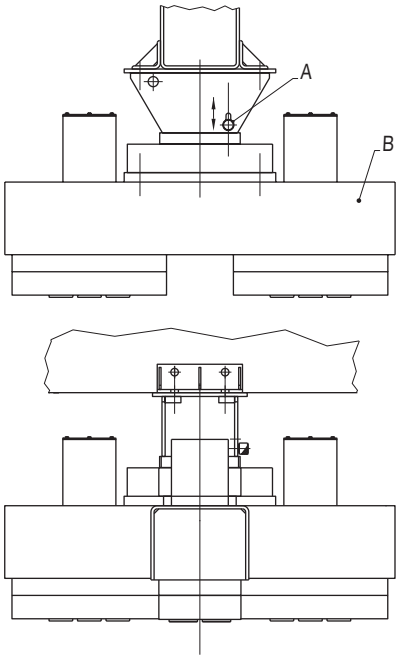
Mercury ❶ is in contact with the slanted surface of disk ❷ and with the external wall ❸, which closes the contact area. Therefore, the load is unbalanced and has an inclination above 5°, and consequently the system is in alarm.



7.2.9 System to revolve guide braces supporting modules (SRM) (optional)

This manual system enables to rotate by 90° the brace guides supporting magnetic modules. It is particularly suitable to handle sheets like straps and to reduce the overall width of the system. When placed in the original position, the guide braces that support the modules are placed transversally as compared to the main beam. Therefore, it is sufficient to rotate them by 90° in order to align them and reduce the overall dimensions.

The following figure shows an application example of the SRM device.



GUIDE BRACE OPERATING PHASES

① Lift the rotation stop **A**

② Rotate the guide brace **B** into the desired position (transversally or close to the crossbeam).

③ Release the rotation stop pin **A**

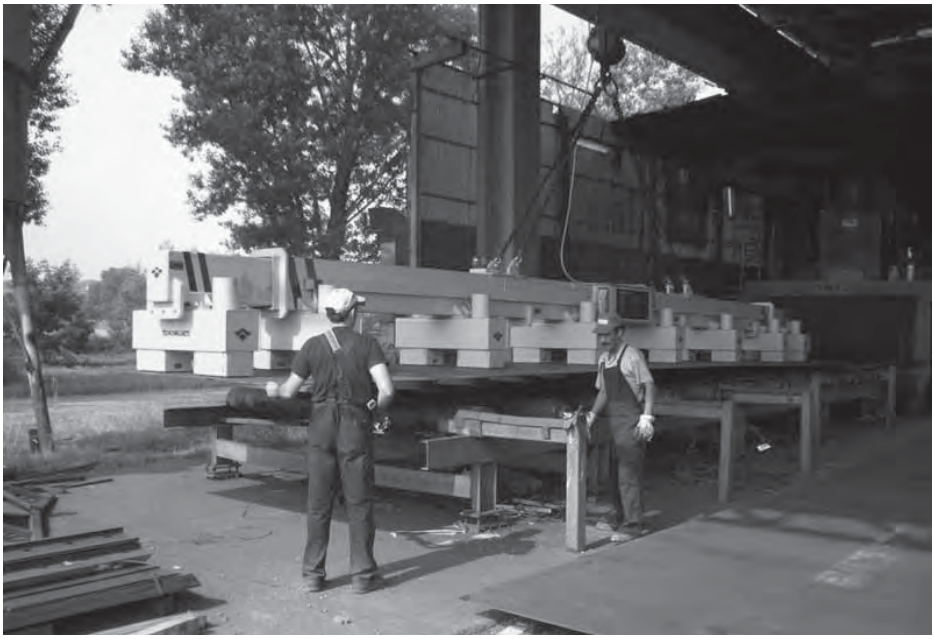
ATTENTION! Verify that the rotation stop pin A is firmly fitted in place.

8 EVALUATION OF RESIDUAL RISKS

In designing the lifter, the manufacturer has taken into account specific manufacturing criteria and all applicable and current safety requirements, which do not however eliminate other potential residual risks.

This chapter provides a description of the potential risks that could arise in specific situations.

- **As the lifter is designed to be fitted onto lifting equipment, it is essential to make sure that operators have read and understood the instructions contained in this manual, along with those of the machine where the magnetic lifter will be installed, and that they are therefore aware of he residual risks of this machine as well.**
- **The individual protection means that have to be used when working with the magnetic lifter are the same ones required for the use of the tool machine on which the system is installed.**
- **As for the potential residual risks originating from the exposure to electromagnetic fields, specific precautions should be taken by pregnant women; users suffering from specific pathologies; users with pacemakers or other prosthesis with electronic circuits including hearing aids, intracranial metal implants (or any other implant situated next to vital anatomic structures), vascular clips or chips in ferromagnetic material. It is useful to remember that:**
  1. **TECNOMAGNETE magnetic systems are stationary systems and do not generate electric fields.**
  2. **The V/m (Volt/meter) value generated during operation is equivalent to 0 (ZERO).**
  3. **The electromagnetic emissions generated during the magnetization/demagnetization phase does not exceed 100 Gauss at a distance of 100 mm from the system.**



9 ORDINARY USE OF THE SYSTEM

Some models are fitted with a built-in controller, while others are supplied with a standalone controller that has to be purchased separately.
The following sections provide information on built-in controllers. For information on how to use standalone controllers, refer to the manual provided with the controller.

9.1 Built-in push-button panels

9.1.1 Single magnetic lifters (SML; SMH; SMU; CV; CO; CH; BR.....)

REMOTE CONTROL RC:

A Partial magnetization button (PICK UP)

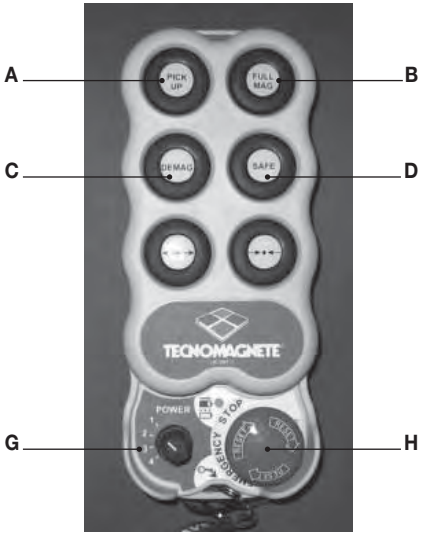
B Full magnetization button (FULL MAG)

C Demagnetization button (DEMAG)

D SAFE button

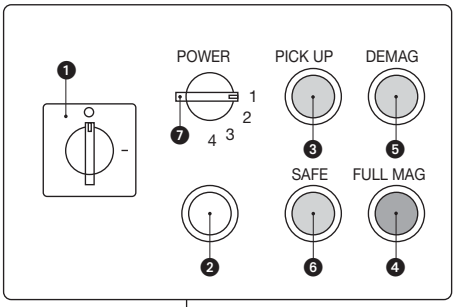
G Selector for partial magnetization power level (optional)

H Button to switch the remote control off. Press it down to switch the remote control OFF and rotate it by approximately 60° to switch it ON.



AUXILIARY PUSH-BUTTON PANEL:

1. Main ON/OFF button
2. Voltage lamp
3. Partial magnetization luminous button (PICK UP)
4. Full magnetization luminous button (FULL MAG)
5. Demagnetization luminous button (DEMAG)
6. SAFE button
7. Selector for partial magnetization power (optional)



9.1.1.1 Use

1) Switch the system on using the main switch ❶ and wait for the power LED ❷ to light.

ATTENTION! ⚠: Before using the system, always verify that the DAUTANAC device (if installed) is cleaned, in order to achieve optimum working conditions.

2) Use the **power level** selector ❼ (if present) to adjust the power in function of the shims to be moved.

Note: this adjustment is very important, because it enables to select the power for the load lifting phase (PICK UP) in function of the geometrical and physical characteristics of the load. The level of the setting should also be selected taking into account the weight of the load to lift and potential superficial deformations, if present. This means that operating requirements may vary for sheets with the same thickness and the same power level.

ATTENTION! : Always refer to the thickness information provided on the nameplate and adjust the level in accordance with the following table:

Power level	Sheet thickness	Applied force
1	Minimum thickness	15%
2	Medium/minimum thickness	25%
3	Medium/maximum thickness	35%
4	Maximum thickness	75%

3) Place the permanent-electro magnetic system onto the load, taking into account the WARNINGS listed in paragraph 9.2. All the lamps should be off in this phase.

4) Press button **PICK UP** ❸: the red lamp switches permanently until the cycle is completed, and starts to flash when the system is running a full power.

5) Lift the load and verify that it has been correctly clamped: the red lamp flashes to indicate that a magnetization at low power is being performed and that there may be hazards.

ATTENTION! : NEVER MOVE THE LOAD IN THESE CONDITIONS.

6) Press button **FULL MAG** ❹ to complete the magnetization cycle and increase the force generated by the system to the maximum value, in order to be able to safely translate the load. The red lamp switches on permanently until the cycle is completed and then turns off, while the green lamp turns on.

Green lamp on: normal condition

Red lamp (ALARM) flashing: alarm condition; the permanent-electro magnetic system has not been fully magnetized. Press once more **FULL MAG** and lower the load if the lamp does not switch off.

7) Move the load to the desired position and lower it in order to align the clamping device of the permanent-electro magnetic system.

8) Press DEMAG ❺ together with SAFE ❻ (if present). Once the cycle is completed, the red and green lamps switch off.

To stop the system, move the main switch to position **"0"** and place the load in a dry area.

9.1.2 Systems with crossbeam and telescopic brackets

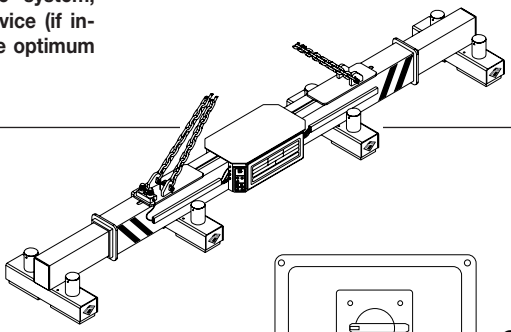
9.1.2.1 Use

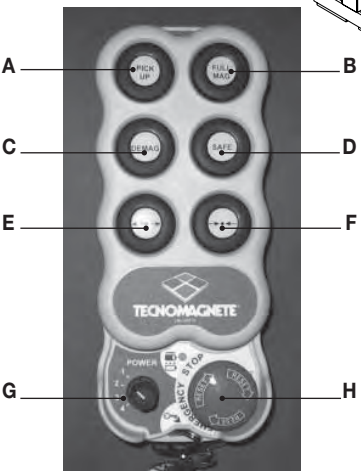
1) Switch the system on using the main switch ❶ and wait for the power LED ❷ to light.

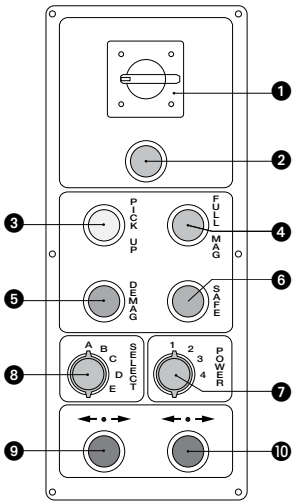
ATTENTION! ⚠: Before using the system, always verify that the DAUTANAC device (if installed) is cleaned, in order to achieve optimum working conditions.

2) Press the **opening and closing buttons** ❾ and ❿ in order to adjust the opening of the telescopic brackets to the dimensions of the load to be handled.

3) Use the power level selector ❼ (if present) to adjust the power in function of the shims to be moved.







REMOTE CONTROL RC:

- **A** Partial magnetization button (PICK UP)
- **B** Full magnetization button (FULL MAG)
- **C** Demagnetization button (DEMAG)
- **D** SAFE button
- **E** Button to open the telescopic brackets
- **F** Button to close the telescopic brackets
- **G** Selector for partial magnetization power level
- **H** Button to switch the remote control off. Press it down to switch the remote control OFF and rotate it by approximately 60° to switch it ON.

AUXILIARY PUSH-BUTTON PANEL:

- ❶ Main ON/OFF button
- ❷ Voltage lamp
- ❸ Partial magnetization luminous button (PICK UP)
- ❹ Full magnetization luminous button (FULL MAG)
- ❺ Demagnetization luminous button (DEMAG)
- ❻ SAFE button
- ❼ Selector for partial magnetization power level
- ❽ Selector for number of operating modules
- ❾ Button to open the telescopic brackets
- ❿ Button to close the telescopic brackets

Note: this adjustment is very important, because it enables to select the power for the load lifting phase (PICK UP) in function of the geometrical and physical characteristics of the load. The level of the setting should also be selected taking into account the weight of the load to lift and potential superficial deformations, if present. This means that operating requirements may vary for sheets with the same thickness and the same power level.

ATTENTION! : Always refer to the thickness information provided on the nameplate and adjust the level in accordance with the following table:

Power level	Sheet thickness	Applied force
1	Minimum thickness	15%
2	Medium/minimum thickness	25%
3	Medium/maximum thickness	35%
4	Maximum thickness	75%

4) Place the permanent-electro system onto the load taking into account the WARNINGS listed in paragraph 9.2. All the lamps should be off in this phase.

5) Press button **PICK UP** ❸: the red lamp switches permanently until the cycle is completed, and starts to flash when the system is running a full power.

6) Lift the load and verify that it has been correctly clamped: the red lamp flashes to indicate that a magnetization at low power is being performed and that there may be hazards.

ATTENTION! : NEVER MOVE THE LOAD IN THESE CONDITIONS.

7) Press button **FULL MAG** ❹ to complete the magnetization cycle and increase the force generated by the system to the maximum value, in order to be able to safely translate the load. The red lamp switches on permanently until the cycle is completed and then turns off, while the green lamp turns on.

Green lamp on: normal condition

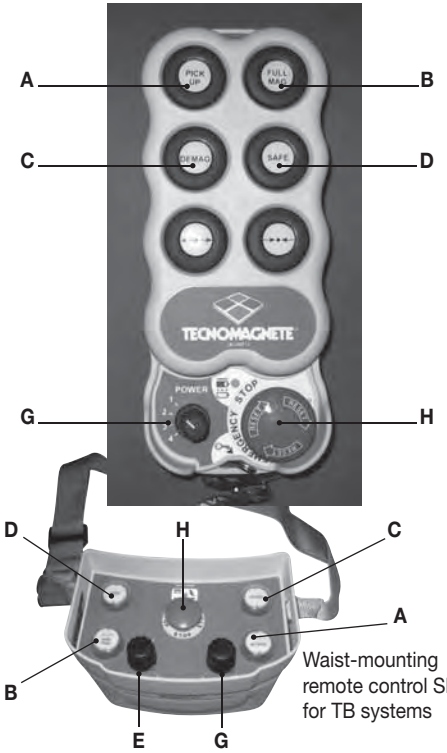
Red lamp (ALARM) flashing: alarm condition; the permanent-electro magnetic system has not been fully magnetized. Press once more **FULL MAG** ❹ and lower the load if the lamp does not switch off.

8) Move the load to the desired position and lower it in order to align the clamping device of the permanent-electro magnetic system.

9) Press **DEMAG** ❺ together with **SAFE** ❻ (optional). Once the cycle is completed, the red and green lamps switch off.

To stop the system, move the main switch to position **"0"** and place the load in a dry area.

9.1.3 Systems with fixed crossbeams (BF; TB; TP.....)



Waist-mounting remote control SR for TB systems

REMOTE CONTROL RC:

A Partial magnetization button (PICK UP)

B Full magnetization button (FULL MAG)

C Demagnetization button (DEMAG)

D SAFE button (available on request)

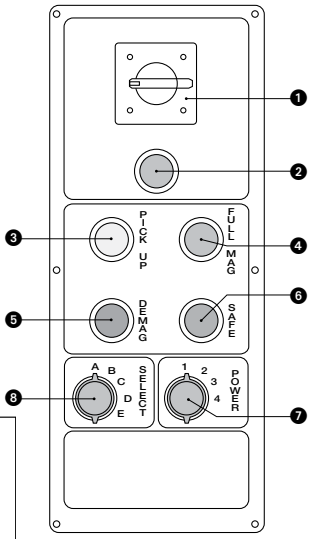
E Selector for number of operating modules

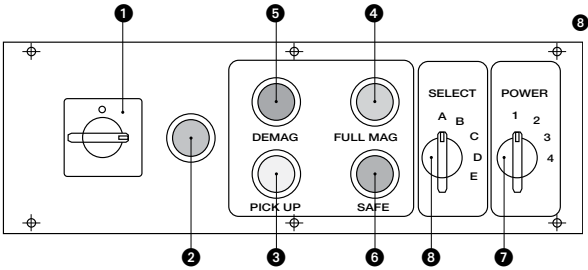
G Selector for partial magnetization power level (optional)

H Button to switch the remote control off. Press it down to switch the remote control OFF and rotate it by approximately 60° to switch it ON.

AUXILIARY PUSH-BUTTON PANEL:

1. Main ON/OFF button
2. Power lamp
3. Partial magnetization button (PICK UP)
4. Full magnetization button (FULL MAG)
5. Demagnetization button (DEMAG)
6. SAFE button
7. Selector for partial magnetization power level
8. Selector for number of operating modules





9.1.3.1 Use

1) Switch the system on using the main switch ❶ and wait for the power lamp ❷ to light.

ATTENTION! ⚠: Before using the system, always verify that the DAUTANAC device (if installed) **is cleaned, in order to achieve optimum working conditions.**

2) Use the power level selector ❼ (if present) to adjust the power in function of the shims to be moved.

Note: this adjustment is very important, because it enables to select the power for the load lifting phase (PICK UP) in function of the geometrical and physical characteristics of the load. The level of the setting should also be selected taking into account the weight of the load to lift and potential superficial deformations, if present. This means that operating requirements may vary for sheets with the same thickness and the same power level.

ATTENTION!  : Always refer to the thickness information provided on the nameplate and adjust the level in accordance with the following table:

Power level	Sheet thickness	Applied force
1	Minimum thickness	15%
2	Medium/minimum thickness	25%
3	Medium/maximum thickness	35%
4	Maximum thickness	75%

3) Place the permanent-electro magnetic system onto the load, taking into account the WARNINGS listed in paragraph 9.2. All the lamps should be off in this phase.

4) Press button **PICK UP** ❸: the red lamp switches permanently until the cycle is completed, and starts to flash when the system is running a full power.

5) Lift the load and verify that it has been correctly clamped: the red lamp flashes to indicate that a magnetization at low power is being performed and that there may be hazards.

ATTENTION! ⚠: NEVER MOVE THE LOAD IN THESE CONDITIONS.

6) Press button **FULL MAG** ❹ to complete the magnetization cycle and increase the force generated by the system to the maximum value, in order to be able to safely translate the load. The red lamp switches on permanently until the cycle is completed and then turns off, while the green lamp turns on.

Green lamp on: normal condition

Red lamp (ALARM) flashing: alarm condition; the permanent-electro magnetic system has not been fully magnetized. Press once more **FULL MAG** and lower the load if the lamp does not switch off.

7) Move the load to the desired position and lower it in order to align the clamping device of the permanent-electro magnetic system.

8) Press **DEMAG** ❺ together with SAFE ❻ (optional). Once the cycle is completed, the red and green lamps switch off.

To stop the system, move the main switch to position **"0"** and place the load in a dry area.

9.2 Precautions concerning handling

9.2.1 Systems for stratiform loads (BL; RO; ...)
The clamping phase of stratiform loads (billets, pipes, rod irons, straps, rails, etc.) requires a lot of attention. It is generally preferable to group the layer to lift in order to achieve optimum clamping (Figure 1).
The seizure of this accessory may prevent the correct centering of the load being handled.

9.2.2 Systems with load centering devices (CH; RD; TU; CS; .....)
Place the magnetic system on the load, verifying that the centering device is in contact with its surface. In order to achieve maximum performances with the centering device, always verify that it is able to freely slide along the guides. Seizures may cause the loss of the load.

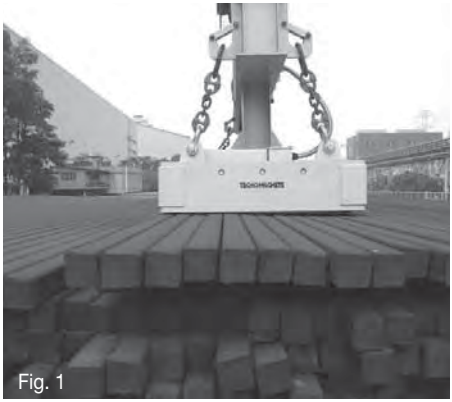


Fig. 1

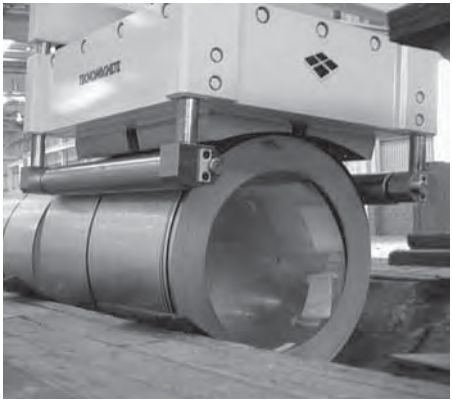



Fig. 2

9.2.3 Systems with load balancing devices (BR)
Place the magnetic system onto the load and verify that it is correctly centered. If the load is not centered during the loading phase, it may slant to one side and become dangerous. If the inclination of the load is hazardous, follow the procedures described in paragraph 7.2.8.

9.2.4 Systems with polar profile designed to tilt the load to handle (TP; ...)
Place the magnetic system onto the load, verifying that the lateral magnetic surface of the lifter is in contact with the lateral side of the part that has to be rotated (see Figure 1) before starting the magnetization cycle.


Fig. 1

Lift the magnetic system supporting the rotation of the magnetically clamped part on one side (see Figures 2 and 3)


Fig. 2

At this point, the polar surface of the magnetic system is above the part to handle. This operation, illustrated in Figures 1 and 3 requires extreme care and a good knowledge of the translation features of the system.


Fig. 3

9.2.5 Systems with oscillating magnetic modules (TB; ...)

Place the magnetic system onto the load to handle in a decentralized position as compared to the centerline along the width. Check that the smaller end (as compared to the centerline) of the load being handled is aligned with the smaller ends (as compared to the rotation pin) of the magnetic modules (see Figure 1).

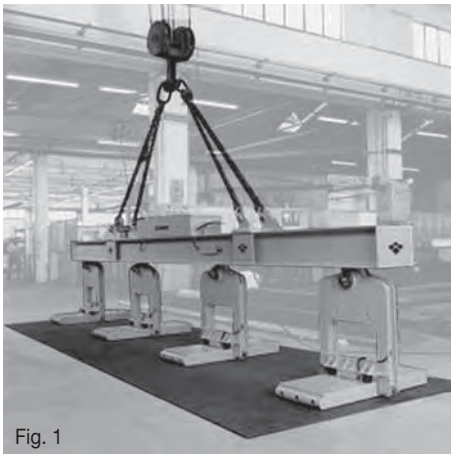


Fig. 1

This ensures that the less projecting part is lifted from the ground following the rotation path of the magnetic system and that the most projecting remains in contact with the ground (see Figure 2) during the lifting phase. At this point, it is possible to continue lifting the load and, once it has been lifted from the ground, translate it to the desired position (see Figure 3).

Fig. 2

Before unloading a load in vertical position, always make sure that it firmly and safely rests on the supporting devices. This procedure can be used to handle loads stocked in vertical position, by simply reversing the sequence of the operations.

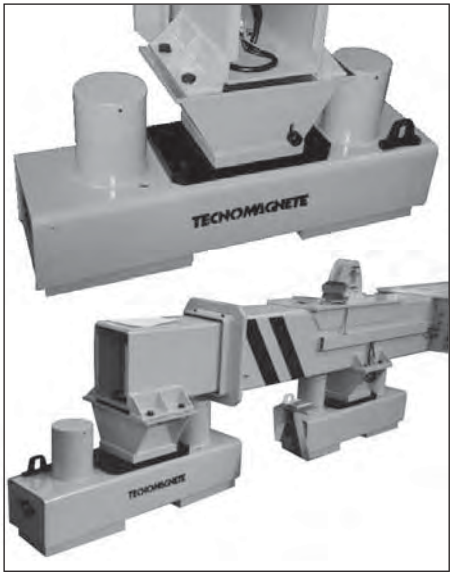
ATTENTION!! ⚠

When dimensioning lifting systems for vertical loads, always remember that the element that most influences the weight is the friction coefficient between the two contact surfaces (load- and magnetic surface of the “poles”). For this reason, all magnetic systems that operate in the conditions described above are over-dimensioned in order to contrast the effects that may result from the loading sliding off.

Fig. 3

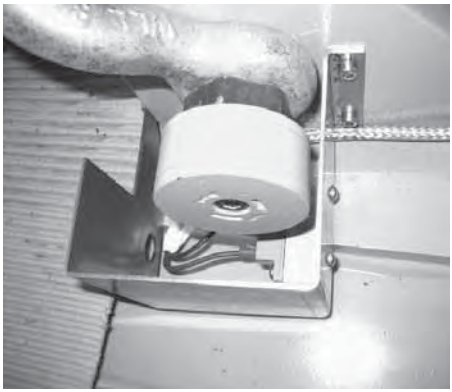
9.2.6 Systems with guide braces to support revolving modules (SRM)

Verify that the rotation stop pin of the guide brace is fixed in place before moving the load.



9.2.7 Systems with traction chains and DAUTANAC

Place the magnetic system onto the load and disable the “DAUTANAC” safety system only after verifying that the chains are loose.



10 MAINTENANCE

10.1 Premise

Correct maintenance significantly influences the life cycle of the system, ensures a high performance and fault-free operation, along with maximum functional safety.

10.2 Safety precautions applicable to maintenance

ATTENTION

Always verify that all maintenance operations are carried out by qualified and trained personnel (see Chapter 1.7).

While performing maintenance operations, always take into account the following:

- All maintenance operations should be performed when the system is idle and disconnected from the power supply.
- All reparations on electric systems must be performed after disconnecting the system from the power supply and enabling the emergency button. All personnel responsible for the operation, maintenance and cleaning of the system shall have to thoroughly follow the safety instructions applicable to the country of installation.
- Always wear safety gloves and shoes and any other type of PPE required including overalls that cover as much of the body as possible.
- Do not wear rings, watches, chains, bracelets, loose clothing, etc. during maintenance work.
- Stand on a rubber insulating mat (if possible) when doing maintenance work.
- Avoid working on wet floors or under very damp conditions.
- Always perform maintenance operation according to schedule.
- Always replace components with original spare parts in order to guarantee maximum performance.
- Always refrain from using grinding wheels or abrasive, corrosive or solvent materials to clean the system, which could cause the detachment and/or erase numbers, serial numbers or instructions placed on the system.
- Protect all electric and electronic equipment from water.
- Clean all electric parts with a vacuum system only, not with compressed air.

10.3 Daily maintenance

These operations must be performed at the end of the daily shifts by the operator or personnel responsible for cleaning operations:

- Verify that the optional DAUTANAC device is clean and that are no foreign objects that could prevent it from operating correctly.
- Clean all the equipment.

10.4 Weekly maintenance

These operations, which have to be carried out by the operator at the end of the week, include:

- Inspection of signaling lamps (refer to the operation and maintenance manual supplied with the controller).
- Inspection of buttons (refer to the operation and maintenance manual supplied with the controller).
- Inspection of sliding parts, lack of wear and lubrication if required.

10.5 Monthly maintenance

These operations, which must be performed once a month for daily working shift of 8÷10 hours and must be performed by qualified and skilled personnel, include:

- Visual inspection of the conditions of the permanent-electro systems.
- Tightening of all the screws of the permanent-electro systems.
- Removal of roughness and sharp edges from the surfaces of the poles.
- Inspection of the surfaces of the poles.
- Visual inspection of the terminal boards of permanent-electro systems and of the controller.
- Inspection of the conditions of the suspension ring aimed at verifying that the material of ears is not worn or deformed.
- Inspection of all electric connections and specifically of all connection screws and junction boxes.

10.6 Maintenance operations required every six months

These operations, which are based on a daily working shift of 8-10 hours and must be performed by qualified and skilled personnel, include:

- Disconnecting the discharge cables of the permanent-electro magnetic systems from the connection boxes.
- Carefully cleaning the contacts and remove dust from electronic boards.
- Checking the integrity of contacts and removing dust from electronic boards.
- Inspecting the conditions of the cooling fins fitted on the SCR and power diodes.
- Measuring the resistance and insulation values at 1,000V with an ohmmeter or amperometric pliers.
- Passing a steel sheet over the surface of the pole to detect potential signs of residual magnetism.
- Reconnecting the discharge cables of the permanent-electro magnetic systems to the connection boxes.

ATTENTION! ⚠: Always remember to disconnect the modules before using a mega ohmmeter to test the insulation values at 1,000 V, in order not to damage the diodes or SCRs of the power rectifier.

10.7 Extraordinary maintenance

Maintenance operations not specifically described in this manual are considered extraordinary maintenance and must be carried out by qualified personnel specifically authorized by TECNOMAGNETE S.p.A.

10.8 Information on extraordinary reparation and maintenance operations

To allow users to quickly perform troubleshooting operations, the manual includes also the following documents:

- Layout and assembly instructions for the lifter in use.
- Wiring diagrams.
- Dimensional drawing of the magnetic system.

TECNOMAGNETE S.p.A. can be contacted at any time for further information or queries regarding the operation and maintenance of the magnetic system.

11 TROUBLESHOOTING AND CORRECTIVE ACTIONS

This section provides information designed to help operators to troubleshoot and correct the problems that may arise during the use of the equipment.

It is particularly important to pay attention to clamping forces, as specified in previous paragraphs (section 3) and to carefully determine the safety factors to be used for the calculation of these forces.

For information on how to solve problems related to electric issues, see the enclosed diagrams and the operation and maintenance manuals supplied with the controller (for systems with built-in controller).

All reparation on electric components must be carried out only after disconnecting the system from the power supply and enabling the emergency button. All personnel responsible for reparation operations must thoroughly follow the accident prevention procedures in force in the country of installation of the system.

12 SPARE PARTS

All TECNOLIFT systems are supplied with a list of spare parts attached to the manual.

13 DECOMMISSIONING AND DISPOSAL

13.1 Decommissioning

To decommission the system, disconnect it from the power supply, place it out of service and remove the controller and all mobile parts.

13.2 Disposal

The user is responsible for the demolition, dismantling and disposal of the materials/components that are part of the system. Said operations shall have to be carried out in accordance with UE directives or with the laws in force in the country of use.

Dismantling operations must always be carried out with utmost care to ensure maximum safety and prevent potential industrial accidents. Specific care should be taken when:

- Disassembling the system in the installation site.
- Transporting and handling of the system.
- Dismantling the system.
- Separating the materials/components that are part of the system.

Demolition and disposal operations should be carried out in compliance with appropriate regulations in order to protect the health of workers and the environment. In particular all separation, recycling and disposal operations must be compliant with the provisions stated in the national or regional laws concerning the disposal of solid industrial and toxic and dangerous waste. Said provisions specify in particular that:

- Sleeves, flexible ducts and plastic or non metal parts must be disposed of as special waste.
- Electric components such as switches, transformers, sockets, etc. must be disassembled so that they can be reused, if in good conditions, or inspected and recycled.

14 WARRANTY AND TECHNICAL SUPPORT

14.1 Warranty terms and conditions

TECNOMAGNETE products are guaranteed for 24 months from the date of manufacture except where otherwise indicated in writing. Said warranty covers all defects of materials and workmanship. Faulty parts shall be replaced or repaired by the manufacturer in his workshops.

All material to be repaired must be sent CARRIAGE PAID.

After reparation, the controller shall be sent CARRIAGE FORWARD to the customer.

The warranty does not cover expenses relating to our engineers visiting the installation site nor machine dismantling. If on-site assistance is required, labor cost shall be invoiced at current prices, along with transfer and travel expenses.

The manufacturer shall not be responsible for direct or indirect damages caused to people or property by this controller or by reparations carried out by the purchaser or third parties.

Reparations under warranty shall not affect the duration of the warranty period.

This warranty does not cover:

- Damages originating from ordinary wear resulting from the use of the system
- Malfunctions caused by incorrect use or fitting
- Damages originating from the use of spare parts other than those recommended
- Damages caused by incrustation.

14.2 Warranty invalidity

The warranty shall not apply in the following cases:

- If the customer fails to make the payments at due time or fulfill contractual obligations.
- In the event of unauthorized reparations or changes.
- If the serial number has been tampered with or deleted
- If the damage originates from improper operations or use; for example improper maintenance, impacts and other causes that cannot be attributed to ordinary operating conditions.
- If the controller has been disassembled, tampered with or repaired without the written authorization of TECNOMAGNETE S.p.A.

All controversies originating from this warranty shall be settled by the Court of Milan.

For help or further information, contact our technical services department at the following address:

TECHNICAL SUPPORT SERVICE

TECNOMAGNETE®

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service@tecnomagnete.it

Società soggetta alla direzione e al coordinamento
della Finmagneti S.p.A. con sede in Lainate, via Nerviano 31

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16 ATTACHMENTS

This manual includes the following attachments:

a) Dimensional drawing

b) Force curve of the system

c) Installation chart

d) List of spare parts

16.1 Declaration of conformity

TECNOMAGNETE S.p.A. hereby declares that the equipment is compliant with the main requirements and any other applicable provision specified in directives:

2006/42/CE; 2004/108/CE; 2006/95/CE.

The EC declaration of conformity is available for reference at the following Web page:

http://www.tecnomagnete.com/engcecertificate.htm

To view the declaration of conformity, open the Web page and click the name of the purchased product.

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