

**Sistema elettronico di controllo per piani magnetici**

*Electronic control system for magnetic chucks*

**Système électronique de commande pour des plateaux magnétiques**

*Elektronisches Steuersystem für Magnetplatten*

**Sistema electrónico de control para planos magnéticos**

# ST100



# ST200



**Manuale uso e manutenzione**

*Instruction and maintenance manual*

**Manuel d'utilisation et d'entretien**

*Betriebs- und Wartungsanleitung*

**Manual de uso y mantenimiento**



Nr. 50 100 7816



**TECNOMAGNETE®**

ITALIANO

ENGLISH

FRANÇAIS

DEUTSCH

ESPAÑOL



<b>1</b>	<b>GENERAL NOTES</b> .....	32
1.1	Overview of the company.....	32
1.2	Importance of the manual .....	33
1.3	Storing the manual .....	33
1.4	Conventions .....	33
1.5	Definition of symbols .....	33
1.6	Personnel responsible for operations .....	33
1.7	Trained personal .....	34
1.8	Individual protection means .....	34
1.9	General safety precautions.....	34
1.10	Behavior during emergency situations .....	34
1.11	Limitations .....	34
1.12	Improper or non permitted use .....	35
1.13	Nameplate data .....	35
<b>2</b>	<b>TRANSPORTATION AND HANDLING</b> .....	36
2.1	Receipt .....	36
2.2	Handling .....	36
2.3	Transportation .....	36
2.4	Storage .....	36
<b>3</b>	<b>DESCRIPTION OF THE SYSTEM</b> .....	37
3.1	Description of the controllers .....	37
3.2	Model ST100X .....	37
3.3	Model ST200X .....	38
3.4	Control push-buttons for ST controllers .....	39
<b>4</b>	<b>INSTALLATION</b> .....	43
4.1	General .....	43
4.2	Connecting ST100 controllers to the power supply .....	44
4.3	Connecting ST200 controllers to the power supply .....	44
<b>5</b>	<b>ENABLING</b> .....	45
5.1	ST100 .....	45
5.2	ST200 .....	45
<b>6</b>	<b>OPTIONAL COMPONENTS</b> .....	46
6.1	Starting the ST100 controller .....	46
6.2	Push-button panels of models ST100 and ST200 .....	46
6.3	QE version .....	46
<b>7</b>	<b>PLC</b> .....	46

<b>8</b>	<b>CONNECTION TO TECNOMAGNETE MODULE</b> .....	48
8.1	Installation of miller ST100 .....	48
8.2	Installation of grinder ST100 .....	48
8.3	Installation of miller ST200 .....	49
8.4	Installation of grinder ST200 .....	50
<b>9</b>	<b>ORDINARY USE</b> .....	51
9.1	ST100 .....	51
9.2	ST200 .....	51
<b>10</b>	<b>ANALYSIS OF RESIDUAL RISKS</b> .....	52
<b>11</b>	<b>MAINTENANCE</b> .....	52
11.1	Premise .....	52
11.2	Maintenance safety instructions.....	52
11.3	Weekly maintenance .....	53
11.4	Monthly maintenance .....	53
11.5	Maintenance to be carried out every six months .....	53
11.6	Extraordinary maintenance.....	53
11.7	Information on extraordinary repairation and maintenance.....	53
<b>12</b>	<b>TROUBLESHOOTING AND CORRECTIVE ACTIONS</b> .....	54
<b>13</b>	<b>DECOMMISSIONING AND DISPOSAL</b> .....	54
13.1	Decommissioning .....	54
13.2	Dismantling .....	54
<b>14</b>	<b>WARRANTY AND TECHNICAL SUPPORT</b> .....	55
14.1	Warranty terms and conditions .....	55
14.2	Invalidity of warranty .....	55
<b>15</b>	<b>TECHNICAL SUPPORT SERVICE</b> .....	56
	<b>DECLARATION OF CONFORMITY</b> .....	57

## 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 product and must therefore be carefully read and followed.

For further information on the system, you can contact **TECNOMAGNETE's** technical support at any time.

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

While confirming the general characteristics of the controllers described in the manual, **TECNOMAGNETE S.p.A.** reserves the right, at its discretion, to change at any time some of the characteristics in order to improve the product or due to manufacturing and commercial reasons. The necessary updates, if required, shall be supplied as attachments.

This manual is property of **TECNOMAGNETE S.p.A.** and cannot be copied in whole or in part or made available to third parties without the written authorization 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 work pieces, thus eliminating the need of using electric power during machining.

Its main fields of activity include:

**CLAMPING SECTION FOR LIFTING**

- **MTE permanent-electro** lifters designed to enable the handling of ferrous loads of any shape and dimension.
- **BAT-GRIP permanent-electro** lifters with incorporated battery.
- **MaxX manual lifters.**

**WORK HOLDING LINE**

- **QUADSYSTEM chucks** for millers and machining centers of all sizes.
- **TFP0** and **TFP1** for high precision grinding.
- **RADIAL-POLE chucks** for finishing or roughing operations on boring mills.
- **QUAD-RAIL modules** to clamp rails of varying lengths.
- **MDS chucks** for **EDM** machines.

**STAMPING and MOLDING LINE**

- **QUAD-PRESS systems** to clamp molds.

**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 controller 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 controller. 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 machine 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 Conventions

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 contain bulleted lists to allow operators 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 red 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 operations

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 supply (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 (personnel responsible for operation and maintenance). This personnel must have the following qualifications:
  1. All personnel must be trained and authorized to disconnect the machine from the power supply, to connect it to the grounding system and to mark circuits and equipment following standard safety procedures.
  2. All personnel must have been specifically trained to follow correct maintenance procedures and use the protective equipment in accordance with standard safety procedures.
- Before using the unit, 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 personal

- **OPERATORS:** workers who, after receiving the necessary instructions, have been authorized by the owner to operate the controller and the equipment connected to it. Workers with this qualification must be thoroughly familiar 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



The personnel referred to in the paragraph above must always wear suitable protective clothing and use the protection means generally required to operate the tool machine on which the Tecnomagnete module and controller are installed.

In particular, personnel shall always have to 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 unit is used.

All ordinary and extraordinary maintenance operations shall have to be carried out only after the unit has been disconnected from the power supply.

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

All transportation, installation, ordinary and extraordinary maintenance operations performed on the controller must be carried out only by personnel with the qualifications stated in Chapter 1.6 and 1.7.

## 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 controller 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 Limitations



The unit 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.**

## 1.12 Improper or non permitted use



The controller is not designed and has not been manufactured to be used in explosive environments.

An improper use may:

- Cause injuries to personnel.
- Damage the controller or any other equipment connected to it.
- Affect the reliability and performance of the controller.

In particular, it is essential to adhere to the following instructions:

- Always use suitable working parameters.
- Carry out the required maintenance in accordance with the instructions provided.
- Use suitable equipment.
- Comply with all the instructions provided.
- Fix the unit onto a stable surface.
- Contact **TECNOMAGNETE S.p.A.** in case of doubt to determine whether a specific operation is permitted.

## 1.13 Nameplate data

The controller is fitted with an identification label in compliance with current laws.



### ATTENTION

The nameplate should never be removed even if the unit 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.**

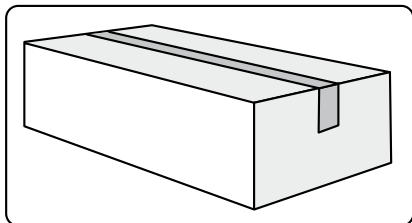
Failure to comply with the above instructions shall entitle **TECNOMAGNETE S.p.A.** to disclaim any responsibility for injuries to personnel and damage to equipment, making the user fully responsible before competent authorities.

## 2 TRANSPORTATION AND HANDLING

The unit is shipped in a cardboard box, covered with a plastic sheet and enveloped by polyurethane foam to protect it from damage in the event of impacts or accidents.

### 2.1 Receipt

All units 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 unit 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 damages and anomalies must be reported within ten days from receiving the goods.

### 2.2 Handling

Weight of model ST100: 0,4 kg.

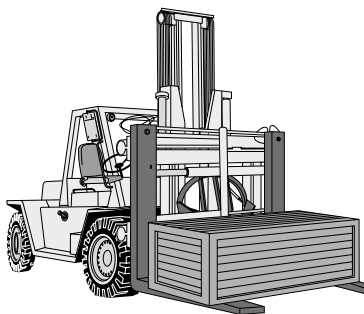
Weight of model ST200: 2,0 kg.

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

### 2.3 Transportation

The unit should always be transported within the following environmental limits: temperature ranging from  $-10^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$ , with temperature increase up to  $70^{\circ}\text{C}$  for a maximum of 24 hours.

If the unit 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. The box should also contain hygroscopic salts to protect the unit from atmospheric agents.



### 2.4 Storage

The unit should always be thoroughly cleaned and adequately protected when stored for long periods of time.

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

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

The temperature of the storage area should range between  $0^{\circ}\text{C}$  ( $32^{\circ}\text{F}$ ) and  $55^{\circ}\text{C}$  ( $131^{\circ}\text{F}$ ).

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 Description of the controllers

**ST** is an innovative **electronic controller for networked chucks** designed for milling and grinding operations.

The sections that follow provide information on the size and the basic characteristics of the available models:

- **ST100F (milling)**
- **ST100R (grinding)**
- **ST200F (milling)**
- **ST200R (grinding)**

### 3.2 Model ST100X

The rated operating voltage is 230V.

The control push-button panel is integrated in to the controller.

The control electronics are situated under the control push-button panel and enclosed in a plastic housing.

To simplify installation and facilitate the reading of the push-button panel, it is also possible to install the controller on a workbench or mount it on the wall by simply rotating the control panel.


The plastic material of the housing ensures a high level of insulation and the utmost safety during use. The rear part of the controller has a block with a male pin (designed to be connected to the power cable), an ON-OFF (0-1) switch and a fuse-holder with two 12.5A protection fuses (type 5x20 mm). Two or more cable ties for the output of the discharge cables of the chucks to be magnetized may be present next to these components.

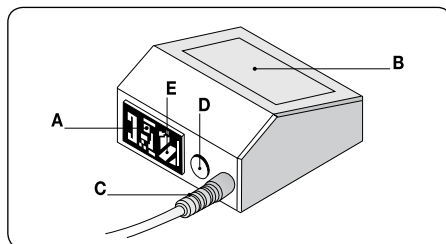
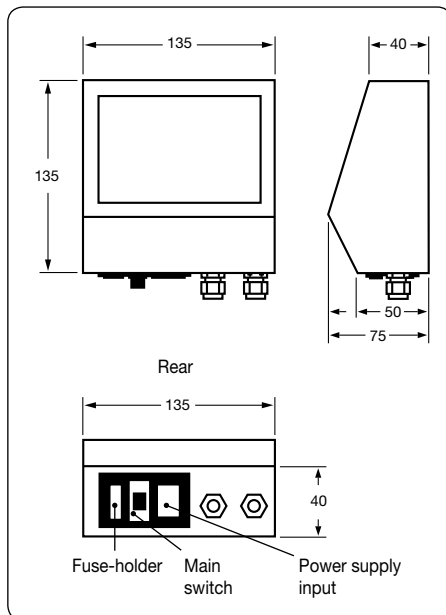
The maximum useful current that flows into the ST100X controller is approximately 12.5A; the current supplied to the module is impulsive with a cycle time around a few hundreds of milliseconds (app. 1 second per discharge).

ST100X controllers are suitable to control small chucks with a single phase voltage of 230V and a maximum absorption of rated current of 3kW.

For different rated voltages, use a transformer with a suitable transformation ratio and a rating suitable to handle the maximum power of the chuck or at any

rate a maximum power of 4kVA. For example, if the available voltage is 400V, a transformer with a 400/230 transformation ratio is required.

**ATTENTION!**  Control units can be moved only when controls are not powered.



#### MAIN PARTS

- A** → Main switch
- B** → Push-button panel
- C** → Discharge cable output
- D** → Start contact
- E** → Power supply input



### 3.3 Model ST200X

The rated operating voltage of this controller varies according to the type of magnetic chuck to which it is connected.

The control push-button is external, but can also be integrated into the controller.

The control electronics are enclosed in a metal housing. The metal material of the housing is grounded in order to guarantee maximum safety during the enabling cycles.

It is important to verify that the grounding system is always in good working order.

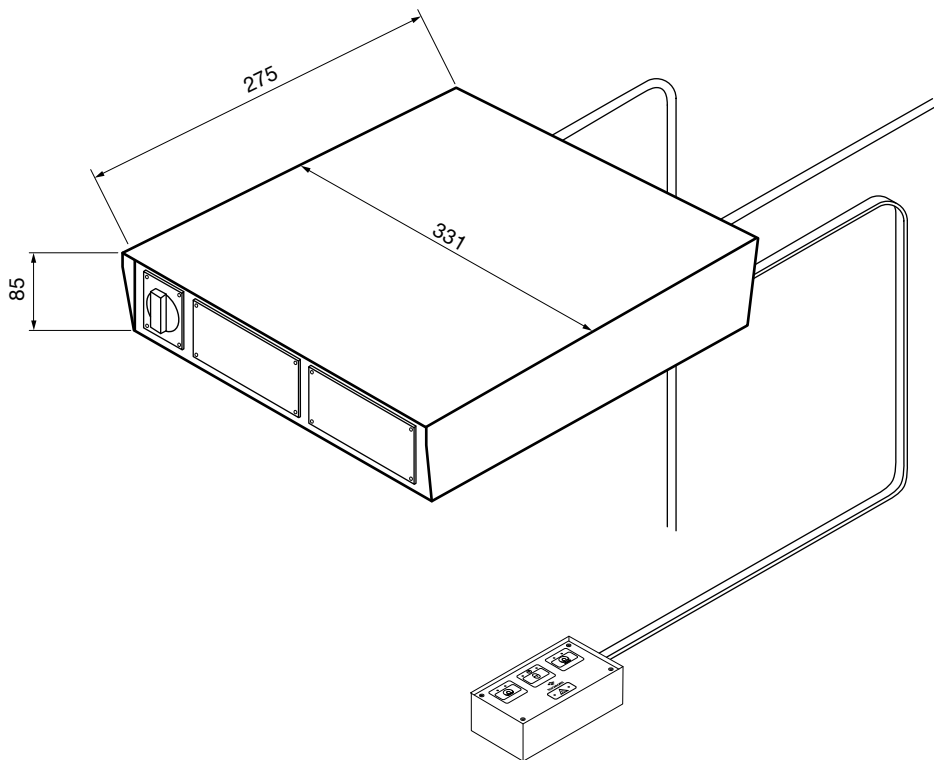
The controller does not have a socket for the connection to the power supply. The controller has an ON-OFF (0-1) switch, thus to adequately protect it against short circuits, it is necessary to install a suitable protection system upstream from the controller. It is generally advisable to use a magneto thermal switch (curve C) with an  $I_n$  value compliant with the rating specified on the magnetic chuck nameplate that will be connected to the controller.

The maximum power of controller ST200X is approximately 25kW per discharge if the single phase power supply is 400V, 15kW for power supplies of 230V and 30kW for power supplies of 480V. The absorbed current is impulsive with a cycle time around a few hundreds of milliseconds (approximately 1 second per discharge).

ST200X controllers are suitable to power single chucks or chucks that are part of large magnetic banks

When using chucks with a different rated voltage, install a transformer with a suitable transformation ratio and a rated power that matches the maximum power of the chuck.

It is also possible to order a compact version for ST200-QE electric cabinets with supporting terminal board, to power the controller and magnetic chuck, with interface connector and push-button panel.



### 3.4 Control push-buttons for ST controllers

ST controllers can be connected to the push-button panels described below.

#### 3.4.1 ST100 (basic version), ST200 (basic version)

This push-button panel is the base model used to control milling chucks.

It is fitted with the following three-buttons:

- Magnetization **FULL-MAG,**
- Demagnetization **DEMAG,**
- Enabling **ENABLE.**

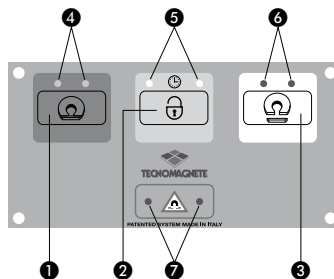
The **ENABLE** button is used together with the magnetization and demagnetization button, depending on the cycle that needs to be performed.

There are also 4 indicator lights placed next to the **FULL-MAG** and **DEMAG** buttons and the **CYCLE** and **ALARM** symbols.

These indicator lights provide information on the status of the controller. When the controller is started, the corresponding LED indicator switches on.

If a cycle is active, the only LED that is on is the one related to the cycle, while all the others are off.

At the end of the cycle, the only visual indication that is on is the one related to the new system status.



#### PUSH-BUTTON PANEL

- ➔ FULL-MAG button
- ➔ ENABLE button
- ➔ DEMAG button
- ➔ MAG led
- ➔ Cycle led
- ➔ DEMAG led
- ➔ Alarm status led

System status	MAG Led	DEMAG Led	Cycle Led	Alarm Led
Full-Mag	Permanently on	Off	Off	Off
Demag	Off	Permanently on	Off	Off
Cycle	Off	Off	Permanently on	Off
Current alarm	Off	Off	Off	Permanently on
Communication alarm*	Off	Off	Off	On flashing

\* For version ST200 only

### 3.4.2 ST100 (version with 2 levels), ST200 (version with 2 levels)

To be able to use different levels of magnetization, it is possible to replace the push-button panel described above with a 2-level model that enables to control milling and grinding chucks.

This push-button panel has the following five buttons:

- Magnetization **FULL-MAG,**
- Partial magnetization **MAG-1L**
- Partial magnetization **MAG-2L**
- Demagnetization **DEMAG,**
- Enabling **ENABLE.**

The magnetization buttons **MAG-1L**, **MAG-2L** and **FULL-MAG** enable to select three different levels of magnetization.

The **ENABLE** button is used together with the magnetization and demagnetization buttons, depending on the cycle that needs to be performed.

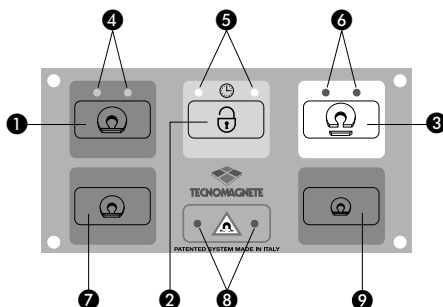
There are also 4 indicator lights placed next to the **FULL-MAG** and **DEMAG** buttons and the **CYCLE** and **ALARM** symbols.

These indicator lights provide information on the status of the controller. When the controller is started, the corresponding LED indicator switches on.

If a cycle is active, the only LED that is on is the one related to the cycle, while all the others are off.

At the end of the cycle, the only visual indication that is on is the one related to the new system status.

**FULL-MAG** and **DEMAG** indicator lights are always on; **MAG-1L** and **MAG-2L** flash only during partial magnetization cycles.



#### PUSH-BUTTON PANEL

- ① → FULL-MAG button
- ② → ENABLE button
- ③ → DEMAG button
- ④ → FULL-MAG led (fixed) of MAG led for partial magnetization (flashing)
- ⑤ → Cycle Led
- ⑥ → DEMAG Led
- ⑦ → 2nd level MAG button
- ⑧ → Alarm status Led
- ⑨ → 2nd level MAG button

System status	MAG Led	DEMAG Led	Cycle Led	Alarm Led
Full-Mag	Permanently on	Off	Off	Off
Demag	Off	Permanently on	Off	Off
Mag Level 1	On flashing	Off	Off	Off
Mag Level 2	On flashing	Off	Off	Off
Cycle	Off	Off	Permanently on	Off
Current alarm	Off	Off	Off	Permanently on
Communication alarm*	Off	Off	Off	On flashing

\* For version ST200 only

### 3.4.3 ST200 (model with 7 levels)

To be able to use several levels of magnetization, it is possible to replace the basic push-button panel with a 7-level model that enables to control milling and grinding chucks.

This push-button panel has the following five buttons:

- Magnetization **MAG,**
- Increase of magnetization level **+**
- Reduction of magnetization level **-**
- Demagnetization **DEMAG,**
- Enabling **ENABLE.**

The **ENABLE** button is used together with the magnetization and demagnetization buttons, depending on the cycle that needs to be performed.

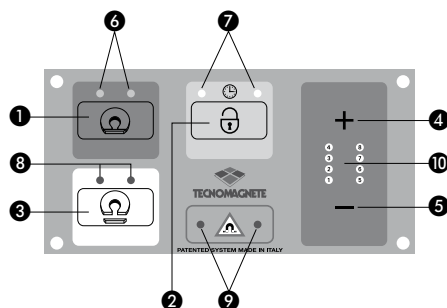
There are also five indicator lights placed next to the full **FULL-MAG**, **DEMAG**, **+** and **-** buttons and the **CYCLE** and **ALARM** buttons.

These indicator lights are used to provide information on the status of the system, which is automatically reset to the last operating cycle.

Once the start sequence has been successfully completed, the indicator light corresponding to the total/partial magnetization or demagnetization switches on, depending on the option selected. A failure in the start sequence switches on the central alarm indicator light.

If a cycle is active, the only LED that is on is the one related to the cycle, while all the others are off.

The **FULL-MAG** and **DEMAG** indicator lights are always on and flash during partial magnetization cycles only.



#### PUSH-BUTTON PANEL

- ① → MAG button
- ② → ENABLE button
- ③ → DEMAG button
- ④ → Button +
- ⑤ → Button -
- ⑥ → FULL-MAG Led (fixed) of MAG Led for partial magnetization (flashing)
- ⑦ → Cycle Led
- ⑧ → DEMAG Led
- ⑨ → Alarm status Led
- ⑩ → Level selection LED (levels from 1 to 7) and FULL-MAG 8

System status	MAG Led	DEMAG Led	Cycle Led	Alarm Led
Full magnetization Level 8	Permanently on	Off	Off	Off
Demag	Off	Permanently on	Off	Off
Partial magnetization Levels 1-7	On flashing	Off	Off	Off
Cycle	Off	Off	Permanently on	Off
Current alarm	Off	Off	Off	Permanently on
Communication alarm*	Off	Off	Off	On flashing

\* For version ST200 only

### 3.4.4 ST200 CH-ENABLE

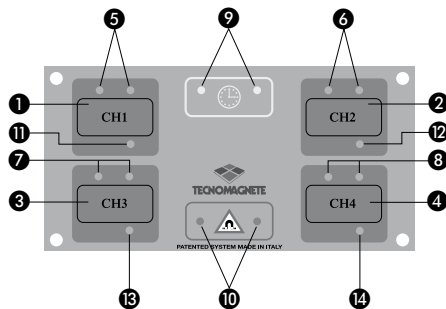
This push-button panel can be used when you need to select different discharge levels for the magnetic chucks, i.e. enable or disable the desired discharge. The push-button panel can be used in combination with a push-button and LED to manage selections. It has four buttons that enable to select/deselect the desired discharge channel. The status of the channel is shown by the corresponding LED.

After you have selected the discharge sequence, you can also specify which discharges have to be carried out with a full or partial magnetization and/or select them with the appropriate buttons (**CH1**, **CH2**, **CH3** and **CH4**).

The status LEDs are off when the corresponding magnetic chuck is in **DEMAG** mode, are on (though not flashing) in **FULL-MAG** mode and flashing when the partial magnetization mode is selected.

The cycle LEDs shall be on (though not flashing) when a cycle is in progress and off when no cycle is in progress.

Alarm LEDs are on (though not flashing) during all alarm conditions, except for communication alarms.



#### PUSH-BUTTON PANEL

- ➊ → CH1 selection button
- ➋ → CH2 selection button
- ➌ → CH3 selection button
- ➍ → CH4 selection button
- ➎ → FULL-MAG Led (fixed) of MAG Led for partial magnetization (flashing), discharge 1
- ➏ → FULL-MAG Led (fixed) of MAG Led for partial magnetization (flashing), discharge 2
- ➐ → FULL-MAG Led (fixed) of MAG Led for partial magnetization (flashing), discharge 3
- ➑ → FULL-MAG Led (fixed) of MAG Led for partial magnetization (flashing), discharge 4
- ➒ → Cycle Led
- ➓ → Alarm status Led
- ➔ → CH1 selection Led
- ➕ → CH2 selection Led
- ➖ → CH3 selection Led
- ➗ → CH4 selection Led

## 4 INSTALLATION

### 4.1 General

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 unit 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 unit to an appropriate grounding system.

Users shall have to make sure that the unit 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 area being machined. Therefore, they can be regarded "COLD" magnetic clamping systems.

The repetition of MAGNETIZATION/DEMAGNETIZATION cycles at very close intervals may increase the temperature of the magnetic chuck, especially when using controllers with DEMAG NUFLUX cycle. It is therefore advisable to run cycles only when necessary.

The connection of the magnetic chuck to the power supply must be carried out by qualified personnel only.

Check the supply voltage and frequency.

The electrical supply to the controller must be single-phase 230V/400V/480V (phase + neutral) or two-phase (phase + phase).

#### ATTENTION

ST100 controllers are designed to operate with supply voltages of 230V 50/60 Hz and cannot therefore be used for Tecnomagnete modules with lower or higher ratings. To use different voltages, install a transformer with a suitable rating (not above 4 kVA) or contact TECNOMAGNETE S.p.A. for assistance.

#### ATTENTION

ST200 controllers are designed to operate with supply voltages of 200V - 480V at 50/60 Hz and can therefore be used, after validation, to enable TECNOMAGNETE modules with different voltage specifications. To use different voltages, install a transformer with a rating compliant to that of the magnetic chuck or contact TECNOMAGNETE S.p.A. for assistance.

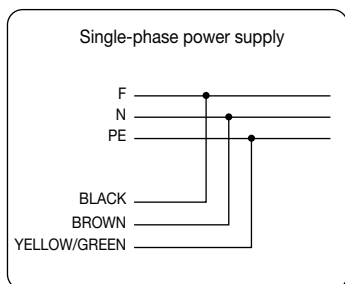
#### ATTENTION

All cables supplied must have a bending radius with a diameter <10mm and a tension of >15N/mm<sup>2</sup>. Installation must always be performed by qualified technicians in accordance with current law requirements.

## 4.2 Connecting ST100 controllers to the power supply

### 4.2.1 Connecting the controller to the power supply

The controller must be supplied with a single-phase voltage. The multi-pole cable supplied with the controller has three leads suitable for the purpose. The controller cannot be powered from the three-phase + neutral distribution network that supplies the tool machine used. If the voltage required for the controller is not available, install a power transformer with a rating suited for the magnetic chuck.



### 4.2.2 Power cable

TECNOMAGNETE supplies a suitable multi-pole power cable with a standard length of two meters, which prevents overheating problems and a voltage drop within the rating of the TECNOMAGNETE module, if used in ordinary operating conditions.

Before using longer cables, always make sure that the cable section used guarantees a voltage drop below 1%.

Ordinary operating conditions are intended as intermittent working cycles, with intervals of at least one minute between two enabling cycles.

### 4.2.3 Selecting the correct dimensions for discharge cables

The discharge cable fitted on ST100 comprises suitable leads, has a standard length of three meters and is dimensioned to prevent overheating and the loss of power on the chuck in ordinary operating conditions.

Ordinary operating conditions are intended as enabling/disabling cycles occurring at an interval above 1 minute.

Before using longer cables, always make sure that the cable section used guarantees a voltage drop below 1%.

## 4.2.4 Electric specifications

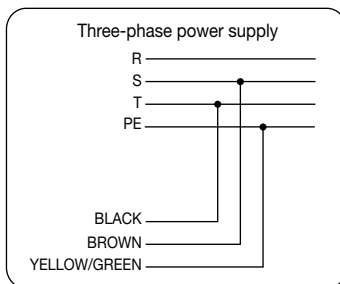
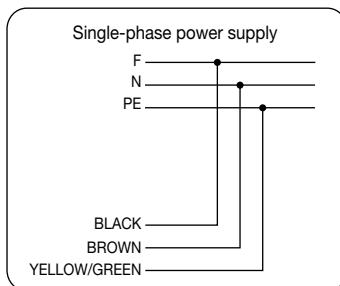
The fuses of model ST100 model are 12.5A lagged fuses with a length of 20 mm and a diameter of 5 mm (20 x 5 mm).

## 4.3 Connecting ST200 controllers to the power supply

### 4.3.1 Connecting the controller to the power supply

The controller must be supplied with a single-phase voltage. The supplied multi-pole cable has three leads suitable for the purpose, two for the phase and neutral terminals (or phase) and one for the earth (yellow/green).

The controller cannot be powered from the three-phase + neutral distribution network that supplies the tool machine used. If the voltage required for the controller is not available, install a power transformer with a rating suited for the magnetic chuck.



### 4.3.2 Power cable

TECNOMAGNETE supplies a suitable multi-pole power cable with a standard length of four meters, which prevents overheating problems and a voltage drop within the rating of the TECNOMAGNETE module, if used in ordinary operating conditions.

Before using longer cables, always make sure that the cable section used guarantees a voltage drop below 1%.

Ordinary operating conditions are intended as intermittent working cycles, with intervals of at least one minute between two enabling cycles.

### 4.3.3 Selecting the correct dimensions for discharge cables

The discharge cable fitted on ST200 comprises four leads suitable for the purpose, has a standard length of six meters and is dimensioned to prevent overheating and the loss of power on the chuck in ordinary operating conditions.

Ordinary operating conditions are intended as enabling/disabling cycles occurring at an interval above 1 minute.

Before using longer cables, always make sure that the cable section used guarantees a voltage drop below 1%.

### 4.3.4 Electric specifications

All ST200 controllers are available as single and two-phase models; the maximum installed power for each cycle is 25 kVA ( $\cos\varphi=0.9$ ) for two-phase 400V plants, 15kVA for 230V plants and 32 kVA for 480V plants.

To optimally protect the installation, it is necessary to install a suitable magnetothermal switch (curve C) with an  $I_n$  value compliant with the rating specified on the nameplate.

## 5 ENABLING

### 5.1 ST100

ST100 controllers are not fitted with a specific enabling device, which may however be ordered as optional (see Chapter 6.1).

### 5.2 ST200

The ST200 controller has an enabling device fitted on connector DB9 situated on the rear of the controller (PINS 8 and 9).

The technical specifications for the contact are:

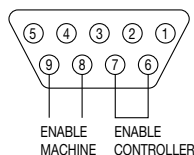
- Voltage 30V, current 1A
- Voltage 110V, current 0.3A

It is always advisable to use an auxiliary relay.

Before using other models of start systems, contact TECNOMAGNETE S.p.A. for assistance.

When at least one of the magnetic chucks controlled by ST200 is in magnetization mode, the enabling contact is closed. PINS 6 and 7 can be connected to the power of the tool machine and used to run the enabling cycles through the controller: the controller can only run the cycles when PINS 6 and 7 are closed. Connect the safety catch to the operating machine on which the TECNOMAGNETE module is installed.

DB9 PIN connector



- pin n° 1 → B1
- pin n° 2 → A2
- pin n° 3 → Vdc
- pin n° 4 → Gnd
- pin n° 5 → Alarm
- pin n° 6 → COM ENABLE Controller
- pin n° 7 → ENABLE Controller
- pin n° 8 → COM ENABLE machine
- pin n° 9 → ENABLE machine

When possible, it is advisable to use both types of contacts.



## 6 OPTIONALS

### 6.1 Starting the ST100 controller

ST100 models can be fitted with an optional external start button, connected with means of a male/female connector.

When the magnetic chuck is controlled by the ST100 controller, it is magnetized, which means that the controller enabling contact is closed

The technical specifications for the contact are:

- 30V voltage, 1A current
- 110V voltage, 0.3A current

It is generally advisable to use an auxiliary relay. Before using other models of start systems, contact TECNOMAGNETE S.p.A. for assistance.

### 6.2 Push-button panels of models ST100 and ST200

ST100 controllers can be fitted with an optional two-level push-button panel for milling and grinding chucks.

Model ST200 can instead be fitted with an optional 2-level push-button panel for milling and grinding operations and with a 7-level push-button panel.

It is also possible to remotely connect all models of push-button panels (basic, 2-level, 7-level).

### 6.3 QE version

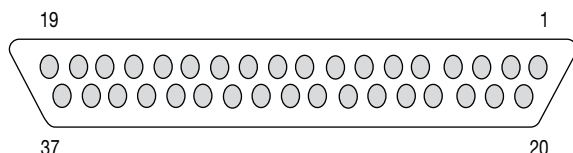
On models QE it is possible to use an optional external telerruptor with a power rating compliant to the one printed on the nameplate of the connected magnetic chuck. Said telerruptor must be installed in accordance with the instructions provided on the electric wiring diagram supplied with the equipment. This device ensures a more efficient control of the electric commands through the machine.

## 7 PLC

Model ST100 is not fitted with a PLC interface that can be used for control purposes.

Model ST200 has a PLC interface that is constituted by an external housing that has to be connected to the controller by means of the DB9 connector. The interface is constituted by a DB37 pin connector designed to be interfaced with the control system and used to receive the magnetization/demagnetization enabling controls, to increase and reduce the magnetization levels and to provide indications on the machine status.

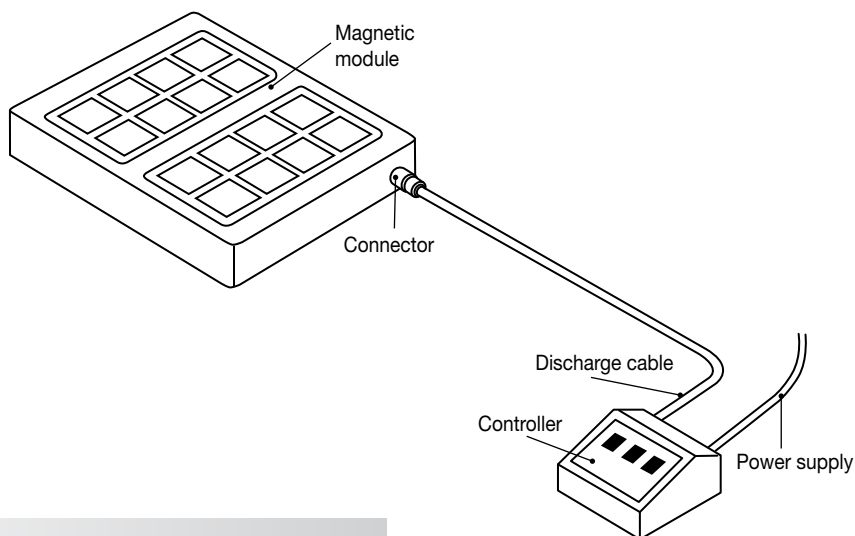
The function of available contacts is described below.



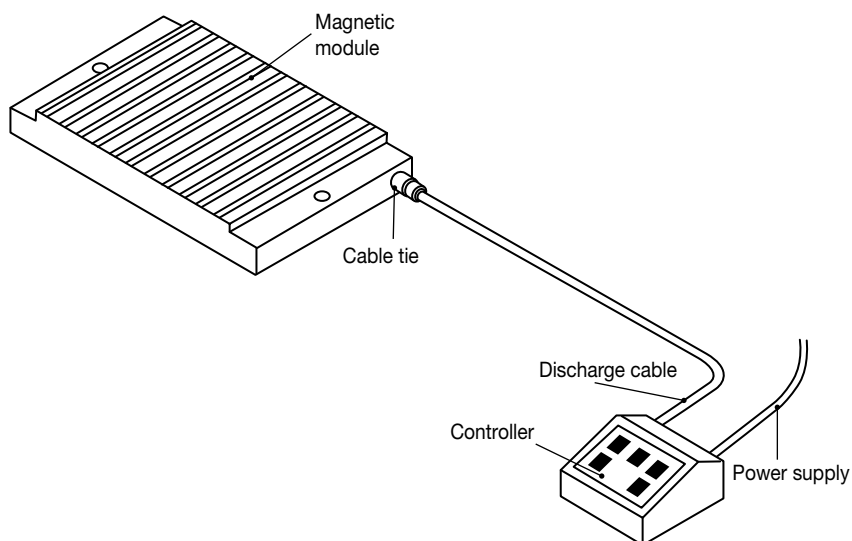
Pin	Name	Direction	Description
1	SW Mag	←	Magnetization button
2	SW Demag	←	Demagnetization button
3	SW Level +	←	Button that increases the magnetization level
4	SW Level -	←	Button that decreases the magnetization level
5	Abilit PLC	←	Enabling input for PLC management
6	Input Enable	←	Input-Enable input
7	nc	—	Not connected
8	nc	—	Not connected
9	nc	—	Not connected
10	Level 1	→	1st level magnetization output
11	Level 2	→	2nd level magnetization output
12	Level 3	→	3rd level magnetization output
12	Level 4	→	4th level magnetization output
14	Level 5	→	5th level magnetization output
15	Level 6	→	6th level magnetization output
16	Level 7	→	7th level magnetization output
17	Level 8	→	8th level magnetization output
18	COM	→	Normally open common contact Out-Abilit
19	NO2	→	Normally open contact Out-Abilit
20	Wait	→	Output, cycle in progress
21	Alarm	→	Alarm output
22	Ld3	—	Not used
23	Ld5	—	Not used
24	Out2	—	Not used
25	Out1	—	Not used
26	nc	—	Not connected
27	nc	—	Not connected
28	Vext	→	Common contact for buttons Mag, Demag, Level+, Level-
29	Vext	←	Insulated 24Vdc (power supply provided by customer)
30	Vext	←	Insulated 24Vdc (power supply provided by customer)
31	Rif	→	Common contact for output statuses
32	Rif	←	Insulated 0V (reference to customer power supply)
33	Rif	←	Insulated 0V (reference to customer power supply)
34	Mag	→	Magnetization status output
35	Demag	→	Demagnetization status output
36	COM	→	Normally open common contact Out-Abilit
37	NO2	→	Normally open contact Out-Abilit

## CONNECTION TO THE TECNOMAGNETE MODULE

### 8.1 Installation of miller ST100

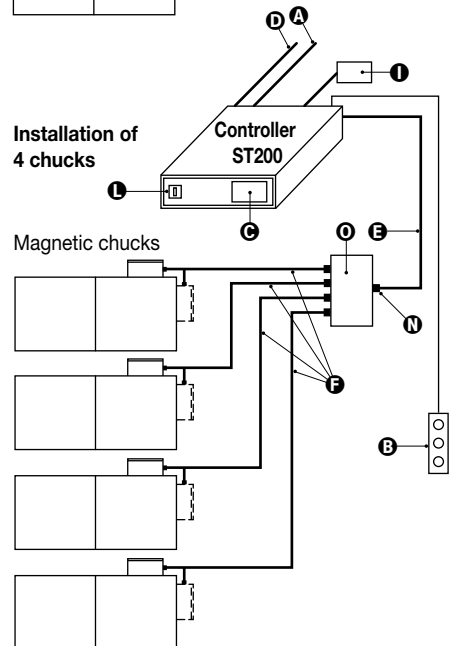
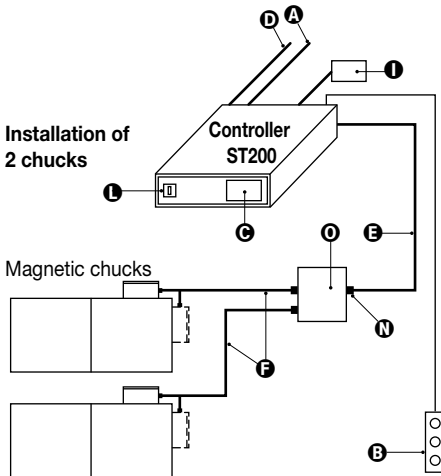
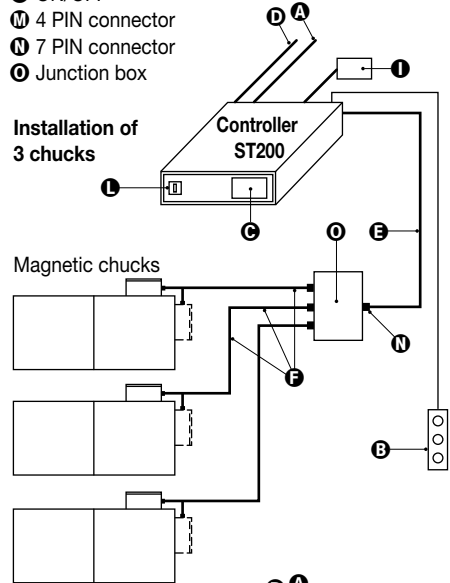
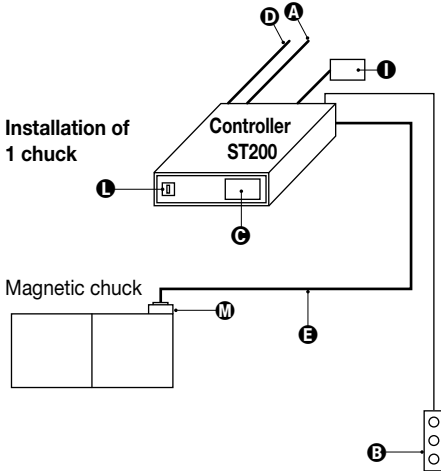


### 8.2 Installation of grinder ST100



### 8.3 Installation of miller ST200

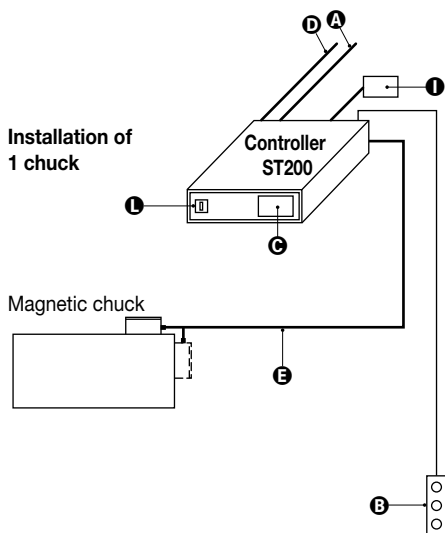
- A** Power supply
- B** Push-button panel
- C** CH ENABLE push-button panel
- D** Enabling
- E** Discharge
- F** Discharge
- I** PLC interface
- L** ON/OFF
- M** 4 PIN connector
- N** 7 PIN connector
- O** Junction box



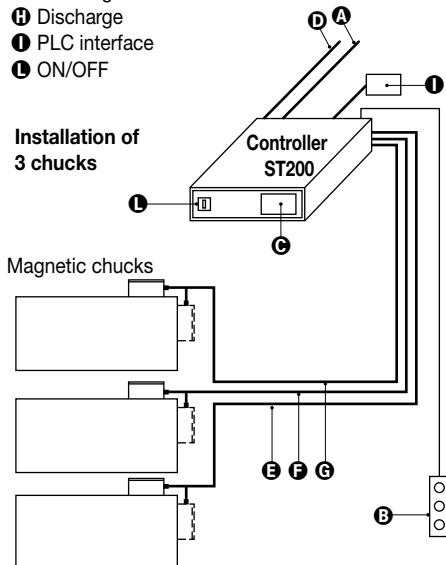
## 8.4 Installation of grinder ST200

- A** Power supply
- B** Push-button panel
- C** CH ENABLE push-button panel (optional)
- D** Enabling
- E** Discharge
- F** Discharge
- G** Discharge
- H** Discharge
- I** PLC interface
- L** ON/OFF

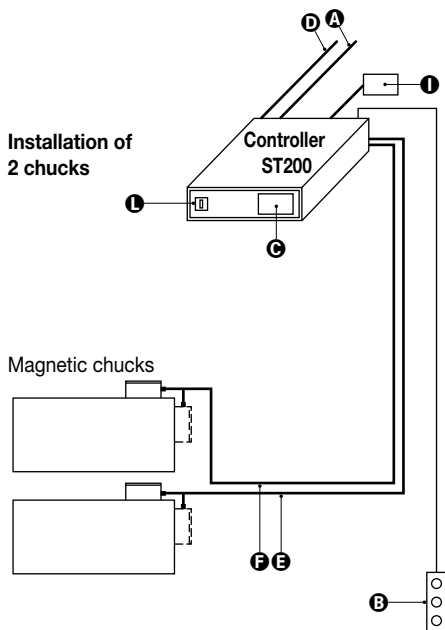
Installation of 1 chuck



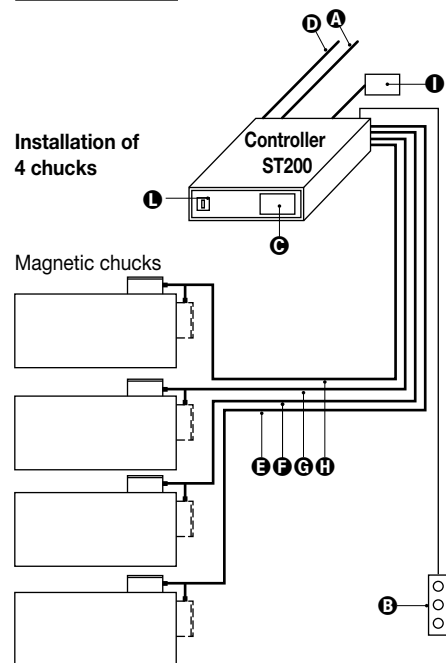
Installation of 3 chucks



Installation of 2 chucks



Installation of 4 chucks



## 9

## ORDINARY USE

## 9.1 ST100

To start the ST100 controller, follow this procedure:

- 1) Connect the discharge cable to TECNOMAGNETE's module.
- 2) Connect the plug of the power cable to the 230V electric socket and connect the connector to the magnetic chuck, where available.
- 3) Switch the ST100 controller on using the switch on the rear of the controller.
- 4) Verify that the LEDs on the push-button panel turn on.
- 5) Press the demagnetization button (DEMAG).  
**Note:** for ST100 (base) and ST100 (version with 2 levels) simultaneously press buttons ENABLE and DEMAG.
- 6) Verify that the LED above the DEMAG button turns on.
- 7) Press the magnetization button (MAG).  
**Note:** for ST100 (base) and ST100 (version with 2 levels) simultaneously press buttons ENABLE and FULL-MAG.
- 8) Verify that the LED above the MAG button switches on.
- 9) Verify that the module is magnetized.
- 10) Start working remembering to close the connector and check the status of the chuck after every magnetization/demagnetization cycle.

- 7) Press the magnetization button (MAG).

**Note:** for ST200 (base) and ST200 (version with 2 levels) simultaneously press buttons ENABLE and FULL-MAG. For ST200 (version with 7 levels) simultaneously press buttons ENABLE and MAG.

- 8) Verify that the LED above the MAG button switches on.
- 9) Verify that the module is magnetized.
- 10) If the discharge cable has been removed, start the working cycle remembering to close the connector and check the status of the chuck at the end of each magnetization and demagnetization cycle.

**WARNING**

**Do not place the discharge connector near or in the presence of liquids, flammable material or any other hazardous material.**

## 9.2 ST200

To start ST200 controllers, follow this procedure:

- 1) Connect the discharge cable to TECNOMAGNETE's module.
- 2) Connect the plug of the power cable to the electric socket and connect the connector to the magnetic chuck, where available.
- 3) Switch the ST200X controller on using the switch on the front of the controller.
- 4) Verify that the LEDs on the push-button panel turn on.
- 5) Press the demagnetization button (DEMAG).  
**Note:** for ST200 (base), ST200 (version with 2 levels) and ST200 (version with 7 levels) simultaneously press buttons ENABLE and DEMAG.
- 6) Verify that the LED above the DEMAG button turns on.

## 10 ANALYSIS OF RESIDUAL RISKS



In designing the chuck, 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 controller is designed to be used to control **TECNOMAGNETE** modules that are generally installed on tool machines, it is essential to make sure that operators have read and are familiar with the instructions provided in this manual, in the manual of the module and of the tool machine on which the module is installed. Operators must also be made aware of any other potential residual risk.
- The individual protection means that have to be used when working with the chuck are the same ones required for the use of the tool machine on which the module 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 anatomical 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 enabling/disabling phase does not exceed 100 Gauss at a distance of 100 mm from the system.

## 11 MAINTENANCE



### 11.1 Premise

An appropriate maintenance is essential to maintain the unit in good working order for a long period of time, to ensure excellent performances and to guarantee its functional safety.

### 11.2 Maintenance safety instructions

#### ATTENTION

All maintenance operations must be performed by qualified personnel only (see Chapter 1.7).

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

- All maintenance operations should be performed when the unit 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 unit 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.
- When performing cleaning operations, avoid using grinders or abrasive, corrosive or solvent material that could cause the removal and/or make numbers, initials or information printed on the unit illegible.
- Never wet the unit.
- Clean all electric parts with a vacuum system only, not with compressed air.

### 11.3 Weekly maintenance

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

- Inspection of the indicator lights;
- Inspection of the buttons.

### 11.4 Monthly maintenance

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

- Visual inspection of the terminal boards, the magnetic chucks and the controllers;
- Visual inspection of the cables and plugs.

### 11.5 Maintenance to be carried out 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:

- Disconnection of the discharge cables of the magnetic chucks from the connection boxes;
- Measurement of the resistance and insulation values at 500V;
- Reconnection of the discharge cables of the magnetic chucks to the connection boxes.

### 11.6 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.

### 11.7 Information on extraordinary repair and maintenance

The sections that follow provide a dimensional layout and assembly instructions for each chuck model to simplify troubleshooting.

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



## 12 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.

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.

All reparation on electric components must be carried out only after disconnecting the unit 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 unit.

Problem	Cause	Corrective action
The LEDs do not turn on when the switch is pressed.	Disconnected power cable	Switch the controller off and inspect the connections using the wiring diagram as reference.
The LEDs do not turn on when the switch is pressed.	No voltage	Verify that voltage is present.
The controller performs the required cycle, but does not magnetize the chuck.	Disconnected discharge cable	Inspect the connections.

## 13 DECOMMISSIONING AND DISPOSAL

### 13.1 Decommissioning

The unit should always be disconnected from the power supply and disassembled from the tool machine on which it is installed if it is not likely to be used for extended periods of time.

### 13.2 Dismantling

The user is responsible for the demolition, dismantling and disposal of the materials/components that are part of the unit. 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 performing the following operations:

- Disassembly of the unit in the installation site.
- Dismantling of the unit.
- Separation of the materials/components that are part of the unit.

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 apply in particular to:

- 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 36 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:

- Malfunctions caused by incorrect use or fitting
- Damages originating from the use of spare parts other than those recommended
- Damages caused by oxidation.

### 14.2 Invalidity of warranty

The warranty shall not apply in the following cases:

- If the customer fails to make the payments at due time or fulfill contractual obligations
- If unauthorized reparations or alterations are made
- 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®

**TECNOMAGNETE S.p.A.**

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Sede Operativa ed Amministrativa in Lainate (Mi),

via Nerviano 31 - 20020 Italy



**TECNOMAGNETE®**



**DICHIARAZIONE DI CONFORMITA'**

LA SOTTOSCRITTA DITTA:

**DECLARATION OF CONFORMITY**

THE FIRM

**TECNOMAGNETE SPA  
VIA NERVIANO 31  
20020 – LAINATE (MI) ITALY**

DICHIARA SOTTO LA PROPRIA RESPONSABILITÀ CHE:

**LE UNITA' DI CONTROLLO  
ELETTRONICHE**

DECLARES ON IT'S OWN RESPONSABILITY :

**THE ELECTRONIC CONTROL UNITS**

**Modelli/Models**

**“ST 100 / 200”**

AL QUALE QUESTA DICHIARAZIONE SI RIFERISCE È  
CONFORME ALLE SEGUENTI NORME O ALTRI DOCU-  
MENTI NORMATIVI:

- DIRETTIVA 89/336 CEE (COMPATIBILITÀ  
ELETTROMAGNETICA) E SUCCESSIVE  
MODIFICHE ED INTEGRAZIONE
- DIRETTIVA BASSA TENSIONE 73/23

TO WHICH THIS DECLARATION REFERS CONFORMS  
WITH THE REQUIREMENTS OF THE FOLLOWING  
DIRECTIVES:

- DIRECTIVE 89/336 CEE (ELECTO  
MAGNETIC COMPATIBILITY) AND  
FOLLOWING AMENDMENTS
- LOW TENSION DIRECTIVE 73/23

SONO STATE UTILIZZATE LE SEGUENTI NORME E  
SPECIFICHE TECNICHE:

THE GROUP ALSO CONFORMS WITH THE  
FOLLOWING STANDARDS AND TECHNICAL  
SPECIFICATIONS:

**EN 61000-6-4 ; EN 61000-6-2 ; EN 61000-4-3 ; EN 55011**

THE LEGAL REPRESENTATIVE  
MICHELE CARDONE

SIGNATURE AND STAMP OF AUTHORIZED PERSON



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