

# USE AND MAINTENANCE MANUAL

---



## INSTALLATION, USE AND MAINTENANCE MANUAL OF ELECTRICAL PANELS ON THE MACHINE

Rev.3 - 10.06.2024



# INDEX

1. MANUAL REVISION MATRIX .....	5
2. PREMISES .....	6
2.1 Aim of the instruction manual for use and maintenance .....	6
2.2 Conservation of the manual .....	7
2.3 Definitions .....	7
2.4 Operators qualification.....	8
2.5 IP protection grades .....	9
2.6 Electromagnetic compatibility (EMC).....	9
2.7 Normative requirements .....	10
3. GENERAL INFORMATIONS .....	11
3.1 Identification data of the manufacturer.....	11
3.2 CE marking of the panel .....	11
3.3 Statement .....	12
3.4 Instrumental tests .....	13
3.5 Technical assistance infos.....	15
4. SECURITY.....	16
4.1 Safety general warnings .....	16
4.2 Checks and verifications .....	17
4.3 Intended use.....	17
The panel has been designed and assembled to command and monitor the machine on which it will be installed according to the voltage and current limits indicated on the plate. ....	17
4.4 Contraindications for use .....	18
4.5 In case of fire .....	18
4.6 Safety devices .....	18
4.7 Emergency button on the machines .....	18
5. INSTALLATION.....	21
5.1 Transport and move .....	21
5.2 Storage.....	22
5.3 Commissioning .....	23
6. DEVICE DESCRIPTION.....	25
6.1 Panel characteristics.....	25
6.2 Panel technical data.....	25
6.3 Environmental conditions.....	25
6.4 Standard provision.....	26
6.5 Electromagnetic environment.....	26

7. MAINTENANCE .....	27
7.1 Maintenance levels.....	27
7.2 Particular caution .....	28
7.3 Scheduled routine maintenance .....	30
7.4 Extraordinary maintenance .....	31
7.5 Diagnostics and troubleshooting.....	32
8. ASSISTANCE AND REPLACEMENT .....	33
8.1 Assistance .....	33
8.2 Replacement.....	33
9. ATTACHMENTS .....	35
9.1 Circuit diagram .....	35
9.2 List of components .....	35

# 1. MANUAL REVISION MATRIX

PART OF MANUAL	Revision	Date	Revision	Date	Revision	Date
Index	0.0	05/06/2013				
Chapter 0	0.0	05/06/2013				
Chapter 1	0.0	05/06/2013				
Chapter 2	0.0	05/06/2013				
Chapter 3	0.0	05/06/2013				
Chapter 4	0.0	05/06/2013				
Chapter 5	0.0	05/06/2013				
Chapter 6	0.0	05/06/2013				
Chapter 7	0.0	05/06/2013				

Date	05/06/2013
Signature	



The customer must make sure that, if this document would be modified by the Manufacturer, only the updated versions of the Manual are valid.



**THE OFFICIAL LANGUAGE CHOSEN BY THE MANUFACTURER IS ITALIAN**  
No responsibility is taken for translations not conforming to the original meaning.

## 2. PREMISES

### 2.1 Aim of the instruction manual for use and maintenance

This manual was created to provide the user with instructions for the installation, commissioning, operation and maintenance of the PANEL.

It is an integral part of the framework and aims to provide all the information necessary for:

- The handling of the component, packed and unpacked in safe conditions;
- Correct installation;
- In-depth knowledge of its characteristics and its operating limits;
- Indication of the qualifications and specific training required of the operators and maintenance workers of the switchboard;
- In-depth knowledge of the intended, unforeseen and not permitted uses;
- Its correct use in safe conditions;
- Carry out maintenance and repairs correctly and safely;
- Technical assistance and spare parts management;
- The disposal of the component in safe conditions and in compliance with the regulations in force to protect the health of workers and the environment.

This document assumes that, in the plants where the switchgear is intended, the current safety and hygiene regulations in force are observed.



**The competent manager is obliged, according to the regulations in force, to carefully read the contents of this Instruction Manual and to make to read it to the operators and maintenance technicians in charge, for the parts that belong to them.**

The instructions, documentation and drawings contained in this manual are of a confidential technical nature, strictly owned by the manufacturer. Therefore, outside the purposes for which it was produced, any full or partial reproduction of the content and / or format, must take place with the manufacturer's prior authorisation.

## 2.2 Conservation of the manual

The Instruction Manual must be kept with care and must accompany the switchboard in all changes of ownership that it may have during its life cycle.

Preservation must be favored by handling it with care, with clean hands and not depositing it on dirty surfaces.

Parts must not be removed, torn or arbitrarily modified.

The Manual must be filed in an environment protected from humidity and heat and in the immediate proximity of the panel to which it refers.

## 2.3 Definitions

The most important information corresponds to that provided by the reference standards **EN 61439-1** and **EN 61439-2**, are listed below:

**ORIGINAL MANUFACTURER:** Organization that carried out the original design and associated checks of a FRAMEWORK in accordance with the relevant FRAMEWORK Standard.

**PANEL MANUFACTURER:** Organization that assumes responsibility for the finished PANEL (in the manual also called "constructor of the finished panel" or "assembler").

**NOMINAL PANEL VOLTAGE ( $U_n$ ):** Corresponds to the main circuit voltage of the panel.

**NOMINAL OPERATING VOLTAGE OF A CIRCUIT ( $U_e$ ) (1):** Voltage value, declared by the manufacturer of the PANEL which, together with the rated current, determines its application.

**NOMINAL INSULATION VOLTAGE OF A CIRCUIT ( $U_i$ ):** The rms value of the insulation test voltage characterizes the sealing capacity of its insulation and the insulation surface distances, assigned by the manufacturer.

The rated insulation voltage determines the constructive prerogatives and the relative dielectric tests.

**NOMINAL IMPULSE WITHDRAWAL VOLTAGE OF THE PANEL ( $U_{imp}$ ):** It is the impulse withstand voltage that characterizes the withstand capacity against transient overvoltages.

**NOMINAL CURRENT ( $I_n$ ):** rated current value, declared by the switchboard manufacturer according to the rated values of the components that can be brought without the overtemperatures of the different parts of the switchboard exceeding the limits under specified conditions.

**NOMINAL CURRENT OF A PANEL CIRCUIT ( $I_{nc}$ ):** It is the current that a circuit must be able to carry continuously (with reference to the nominal characteristics of the various electrical components inserted in the circuit) without exceeding the overtemperature limits indicated by the standard.

**PERMISSIBLE RATED PEAK CURRENT ( $I_{pk}$ ) (2):** Value of the short-circuit peak current that the PANEL can withstand under the conditions specified by the manufacturer.



**SHORT-TERM PERMISSIBLE RATED CURRENT ( $I_{cw}$ )(3):** Effective value of the short-circuit current that the PANEL itself can carry without being damaged under specified conditions, defined as a function of current and time, declared by the manufacturer.

**CONDITIONING SHORT CIRCUIT RATED CURRENT ( $I_{cc}$ )(4):** Value of the prospective short-circuit current that the PANEL itself can withstand, during the total operating time of the short-circuit protective device (SCPD), under the specified conditions, declared by the manufacturer

**NOMINAL FACTOR OF CONTEMPORANEITY (RDF):** Value related to the unit of the rated current with which the output circuits of the PANEL itself can be loaded simultaneously and continuously taking into account the mutual thermal influences, assigned by the manufacturer.

**NOMINAL FREQUENCY( $F_N$ ):** Frequency value used to designate a circuit and to which the operating conditions refer, declared by the manufacturer

## 2.4 Operators qualification

The minimal requirements to be able to operate must be the following:

- Having reached the majority;
- Being able to do the job physically and psychologically;
- Having been adequately trained on the use and maintenance of the panel;
- Being able to understand and interpret the operator's manual and safety requirements;
- Knowing the emergency procedures.

Different levels of intervention are allowed on the electrical panels according to the level of preparation of the person in charge. The technical standard EN 61439-1 provides various definitions of the figures that can intervene on the switchboard.

**EXPERT PERSON:** with adequate education and experience that allows him/her to prevent risks and avoid dangers.

**PERSON WARNED:** with adequately experienced or warned by an expert who allows him/her to prevent risks and avoid dangers.

**COMMON PERSON:** who is neither expert nor warned.

**AUTHORIZED PERSON:** who is experienced or warned and has been authorized to carry out a work.

The preparation of the technical staff in charge of maintenance is a fundamental prerequisite for the correct and efficient maintenance of the entire electrical system, most of all switches. The necessary manual skills and the adequate knowledge to be good maintainers can only be achieved with practice in the field, supported by adequate theoretical teachings.





**ATTENTION!** The business owner, managers and supervisors, in entrusting tasks of use, restoration, maintenance, etc. of the electrical panel must take into account the skills and qualification of the person in charge.

## 2.5 IP protection grades

### TABELLA IP

Il grado di protezione IP classifica e valuta il grado di protezione fornito da involucri meccanici contro l'intrusione di particelle solide (quali parti del corpo, oggetti e polvere) e l'accesso di liquidi. Il codice è pubblicato dalla Commissione Internazionale Elettrotecnica (IEC).  
Norma europea EN60529.

Al termine fisso IP seguono due cifre:

- Prima cifra: livello di protezione che l'involucro fornisce contro l'accesso di solidi
- Seconda cifra: livello di protezione che l'involucro fornisce contro l'accesso di liquidi.

### IP TABLE

The IP rating classifies and assesses the degree of protection provided by mechanical casing against the intrusion of solid particles (such as body parts, objects and dust) and liquids.

The code is published by the International Electrotechnical Commission (IEC).  
European standard EN60529.  
Two numbers follow the letters "IP":

- First number: the level of protection that the casing provides against the intrusion of solids
- Second number: the level of protection that the casing provides against the intrusion of liquids.

PROTETTO CONTRO LA CADUTA DI LIQUIDI E IMMERSIONE IN ACQUA PROTECTED AGAINST WATER FALL AND EFFECTS OF WATER IMMERSION		NON PROTETTO NON PROTECTED	CADUTA ACQUA VERTICALE VERTICAL WATER DROPS	CADUTA ACQUA CON INCLINAZIONE <15° WATER DROPS WITH <15° TILT ANGLE	CADUTA ACQUA CON INCLINAZIONE <60° WATER DROPS WITH <60° TILT ANGLE	SPRUZZI D'ACQUA DA QUALSIASI DIREZIONE SPLASHING WATER	GETTI D'ACQUA DA QUALSIASI DIREZIONE WATER JETS	FORTI GETTI D'ACQUA DA QUALSIASI DIREZIONE POWERFUL WATER JETS	EFFETTI DI BREVI IMMERSIONI TEMPORARY IMMERSION IN WATER	EFFETTI DI IMMERSIONE PROLUNGATA CONTINUOUS IMMERSION IN WATER
PROTETTO CONTRO L'INGRESSO DI OGGETTI SOLIDI PROTECTED AGAINST FOREIGN SOLID OBJECTS		IPx0	IPx1	IPx2	IPx3	IPx4	IPx5	IPx6	IPx7	IPx8
NON PROTETTO NON PROTECTED	IP 0x	IP00	IP01	IP02						
>50 mm Ø	IP 1x	IP10	IP11	IP12	IP13					
>12.5 mm Ø	IP 2x	IP20	IP21	IP22	IP23					
>2.5 mm Ø	IP 3x	IP30	IP31	IP32	IP33	IP34				
>1 mm Ø	IP 4x	IP40	IP41	IP42	IP43	IP44	IP45	IP46		
INGRESSO DELLA POLVERE DUST-PROTECTED	IP 5x					IP54	IP55	IP56		
ERMETICAMENTE CONTRO L'INGRESSO DELLA POLVERE HERMETICALLY DUST-PROTECTED	IP 6x					IP64	IP65	IP67	IP67	IP68

## 2.6 Electromagnetic compatibility (EMC)

A device must be able to function without electromagnetic disturbances produced by other devices and vice versa. The design and construction of the panel must comply with certain requirements regarding electromagnetic compatibility that the **EMC directive 2014/30/UE**, defines as follows: "This directive regulates the electromagnetic compatibility of equipment. It aims to ensure the functioning of the internal market by requiring equipment to comply with an adequate level of electromagnetic compatibility".

The directive excludes:

- Equipments that are unable to generate electromagnetic emissions that exceed a level compatible with the regular operation of radio and telecommunication equipment.
- Equipments that function without unacceptable deterioration in the presence of electromagnetic disturbances usually deriving from their intended use (immunity).

Parts of a panel such as, carpentry, bars, wire, clamps, etc.. are excluded from the scope of the EMC directive. It is necessary to consider the presence of any electronic devices capable of generating electromagnetic emissions. When selecting and installing the components, the panel builder must ensure the match of the components each others and with the installation environment. Two categories of environments are considered, A and B:

**Environment A** - Networks powered by a high or medium voltage transformer manufacturing serving systems or similar, intended to operate in an industrial setting or nearby. Such environments are characterized by the presence of switching of inductive or capacitive loads with high currents and magnetic fields.

**Environment B** - Low voltage distribution networks or c.c. powered circuits

Environments type B are residential, commercial and light industrial, such as:

- residential properties, ex. houses, apartments;
- stores, ex. shops, supermarkets;
- professional studios, ex. offices, banks;
- public entertainment areas, for example cinemas, bars, discos.

With reference to the electromagnetic compatibility values of the various components incorporated in the panel, expressed by the manufacturers, the manufacturer of the panel must indicate which environmental category, A or B, it belongs.

## 2.7 Normative requirements

The switchboards are designed to comply with the European and international regulations in force for low voltage switchboards. EN 61439-1 (CEI 17-113) "Assembly of protection and switching equipment for low voltage (LV switchgear) - Part 1: General rules" and EN 61439-2 (CEI 17-114), "Assembly of protection equipment and switching systems for low voltage (LV switchboards) - Part 2: Power switchboards.

The electrical panels also comply with:

- Directive 2014/35/EC "Low voltage electrical components"
- EN60204-1 "Electrical equipment of machinery"
- EN61000-6-4 "Electromagnetic compatibility"
- EN60259 "Degrees of protection of enclosures"

### 3. GENERAL INFORMATIONS

#### 3.1 Identification data of the manufacturer

<b>MANUFACTURER</b>	
<b>ADMINISTRATIVE REGISTERED OFFICE</b>	
<b>TELEPHONE</b>	
<b>FAX</b>	
<b>E-MAIL</b>	
<b>WEB</b>	

#### 3.2 CE marking of the panel

For any communication with the manufacturer, please quote always infos provided by the QR code.



TENSIONE VOLTAGE

FREQUENZA FREQUENCY

POTERE DI INTERRUZIONE BREAKING CAPACITY

POTENZA INSTALLATA POWER FIXED

ARTICOLO ARTICLE

N° DISEGNO DRAWING NUMBER

ANNO DI COSTRUZIONE DATE

S/N:

COSTRUTTORE: CONSTRUCTOR: XXXXXXX



**Download technical docs**

USER:

S/N: XXXXXXXXXXXXXXXXXXXXXXXX

PASSWORD



TENSIONE VOLTAGE

FREQUENZA FREQUENCY

POTERE DI INTERRUZIONE BREAKING CAPACITY

POTENZA INSTALLATA POWER FIXED

ARTICOLO ARTICLE

N° DISEGNO DRAWING NUMBER

ANNO DI COSTRUZIONE DATE

S/N:

COSTRUTTORE: CONSTRUCTOR: XXXXXXX



**Download technical docs**

### 3.3 Statement

#### DECLARATION OF CONFORMITY TO THE STANDARDS OF THE ELECTRICAL PANEL *(Fac-simile)*

The undersigned, Lisetto Disconzi owner of the company *Dis.El di Disconzi Lisetto*, operating in the construction and repair of electrical panels with headquarter in Via Salgarelle 5, Lonigo (VI), tel 0444834824, P.I. 01473090247

Registered in the business register (DPR 7/12/1995, n.581) of the C.I.A.A. of Vicenza n.166321

Registered in the Provincial Register of Artisan Enterprises (Law 8/8/1985, n.443) of Vicenza n.51848 executor of the control panel:

**MODEL:**

**ITEM NUMBER:**

**REF. ORDER:**

**SERIAL NUMBER:**

Commissioned by  **ECOTECH GTS**<sup>®</sup>  
GREEN TECHNOLOGIES & SAFETY

Via Roma, 86 - 38012 Fraz. Taio - Predaia (TN) - ITALY

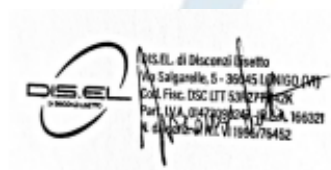
#### DECLARES

Under his own personal responsibility, that the switchgear has been built in a workmanlike manner, having conducted the related project verifications and individual verifications, in accordance with the following standards:

- EN61439-1
- EN60529
- EN60204-1
- EN61000-6-4 EMISSION EN61000-6-4 IMMUNITY

And it complies with the provision of the directive: 2014/35 / EC low voltage electrical components.

Lonigo, 13/06/2022



Dis.El di Disconzi Lisetto  
Via Salgarelle, 5 - 38045 Lonigo (VI)  
Cod. Fisc. DSC LIT 5304774036  
Part. IVA 01473090247 C.I.A.A. 166321  
N. Registro Imp. VI 199675452

### 3.4 Instrumental tests

Introdurre dati utente			
N°	Misure	Esito:	Descrizione
249	Prova dielettrica - Corr. Totale - mod. Manuale		RIGIDITA DIELETTRICA
	<b>Prova dielettrica - Corr. Totale - mod. Manuale</b> I meas 0 mA Ultima tensione 2.500 V Tempo prova 1 s Iap - soglia 1 mA V nominale 2.500 V <b>Informazioni generali</b> Operatore: DIS-EL		
250	MΩ - mod. Manuale		RESISTENZA ISOLAMENTO
	<b>MΩ - mod. Manuale</b> Vmis (+) 515 V Ri >500 MΩ Tempo totale 1 s VPN 4 V R Lim 0,25 MΩ V0 nom 500 V <b>Informazioni generali</b> Operatore: DIS-EL		
251	RPE 200 mA 2 fili - mod. Auto		CONTINUITA CASSA
	<b>RPE 200 mA 2 fili - mod. Auto</b> R mis AC 0,02 Ω I test AC >255 mA R cal 0,07 Ω Rlim 0,30 Ω <b>Informazioni generali</b> Operatore: DIS-EL		
252	RPE 200 mA 2 fili - mod. Auto		CONTINUITA PORTA
	<b>RPE 200 mA 2 fili - mod. Auto</b> R mis AC 0,02 Ω I test AC >255 mA R cal 0,07 Ω Rlim 0,30 Ω <b>Informazioni generali</b> Operatore: DIS-EL		
253	RPE 200 mA 2 fili - mod. Auto		CONTINUITA FILO 2.16
	<b>RPE 200 mA 2 fili - mod. Auto</b> R mis AC 0,02 Ω I test AC >255 mA R cal 0,07 Ω Rlim 0,30 Ω <b>Informazioni generali</b> Operatore: DIS-EL		
254	RPE 200 mA 2 fili - mod. Auto		CONTINUITA TR1
	<b>RPE 200 mA 2 fili - mod. Auto</b> R mis AC 0,03 Ω I test AC >255 mA R cal 0,07 Ω Rlim 0,30 Ω <b>Informazioni generali</b> Operatore: DIS-EL		

Introdurre dati utente

N°	Misure	Esito:	Descrizione
255	RPE 200 mA 2 fili - mod. Auto		CONTINUITA SCHEDA
	<b>RPE 200 mA 2 fili - mod. Auto</b>		
	R mis AC	0,02 Ω	
	I test AC	>255 mA	
	R cal	0,07 Ω	
	Rlim	0,30 Ω	
	<b>Informazioni generali</b>		
	Operatore: DIS-EL		
256	RPE 200 mA 2 fili - mod. Auto		CONTINUITA ELETTROVALVOLE
	<b>RPE 200 mA 2 fili - mod. Auto</b>		
	R mis AC	0,01 Ω	
	I test AC	>255 mA	
	R cal	0,07 Ω	
	Rlim	0,30 Ω	
	<b>Informazioni generali</b>		
	Operatore: DIS-EL		
257	RPE 200 mA 2 fili - mod. Auto		CONTINUITA MORS X1
	<b>RPE 200 mA 2 fili - mod. Auto</b>		
	R mis AC	0,01 Ω	
	I test AC	>255 mA	
	R cal	0,07 Ω	
	Rlim	0,30 Ω	
	<b>Informazioni generali</b>		
	Operatore: DIS-EL		
258	RPE 200 mA 2 fili - mod. Auto		CONTINUITA MORS X2
	<b>RPE 200 mA 2 fili - mod. Auto</b>		
	R mis AC	0,01 Ω	
	I test AC	>255 mA	
	R cal	0,07 Ω	
	Rlim	0,30 Ω	
	<b>Informazioni generali</b>		
	Operatore: DIS-EL		
259	RPE 200 mA 2 fili - mod. Auto		CONTINUITA MORS X3
	<b>RPE 200 mA 2 fili - mod. Auto</b>		
	R mis AC	0,01 Ω	
	I test AC	>255 mA	
	R cal	0,07 Ω	
	Rlim	0,30 Ω	
	<b>Informazioni generali</b>		
	Operatore: DIS-EL		

### 3.5 Technical assistance infos

The panel is delivered after having tested it, according to the tests required sby the CEI EN 61439. We underline that modifications carried out by the user, without the written permission of the manufacturer, invalidate the warranty and release the manufacturer from any liability for damage.

This is especially true when the modifications are carried out on the safety devices, degrading their effectiveness.

We recommend you to contact our Assistance Service, before carrying out any work on the panel.

Any clear defects present at the time of delivery of the product, must be immediately reported to the company.



**The Manufacturer is not liable for defects not reported by the customer at the time of delivery.**



## 4. SECURITY

### 4.1 Safety general warnings



**Before making the panel operational, read carefully the instructions contained in this Manual and follow carefully the instructions contained therein.**

The information provided in this manual are part of the safety equipment and concern:

- The minimum operator qualification required.
- The residual risks.
- The necessary or recommended personal protection devices.
- The prevention of human errors.
- Prohibitions / obligations relating to reasonably foreseeable misconduct.

The manufacturer is relieved of any responsibility for damage caused by the panel to people, animals or things in case of:

- interventions on the panel by inadequately trained personnel;
- improper use of the panel;
- power supply defects;
- incorrect installation;
- deficiencies in planned maintenance;
- unauthorized modifications or interventions;
- use of non-original or non-specific spare parts;
- total or partial non-compliance with the instructions;
- contrary use to specific national regulations;
- calamities and exceptional events.

## 4.2 Checks and verifications

The checks must be carried out by an expert; visual and functional checks, with the aim of guaranteeing the safety of the panel. They includes:

- Integrity of the envelope;
- Integrity of control devices and signals;
- Check the tightening of the power supply conductors from the mains or to the devices in the field;
- Verification of the absence of foreign objects inside the panel after installation or maintenance.

The results must be reported on a specific form. If the technician finds dangerous anomalies he/she must:

- promptly notify the manufacturer;
- put the panel out of service by carrying out the appropriate checks and / or repairs.



**If anomalies are found, these must be eliminated before putting the panel back into operation and the expert performing the verification he/she must write down the repairs on a specific form, thus giving the approval to use.**

If the worn or defective parts are not promptly replaced, the manufacturer assumes no liability for damage. In order to guarantee maximum safety, it is in any case FORBIDDEN:

- to tamper with any part of the circuits or components;
- to leave the envelope open during normal operation;
- to use the panel working but not in complete efficiency;
- to modify the panel to change the use originally established, without the explicit permission of the manufacturer or without the assumption of full responsibility imposed by the Low Voltage Directive 2006/95 / EC.

## 4.3 Intended use

The panel has been designed and assembled to command and monitor the machine on which it will be installed according to the voltage and current limits indicated on the plate.



**The use of products / materials different than those specified by the Manufacturer, which can cause damage to the panel and dangerous situations for the operator and / or people close to the panel itself, it is considered incorrect and improper.**

## 4.4 Contraindications for use

The panel must not be used:

- For different uses than those established by the manufacturer, different or not mentioned in this manual (Par. 2.2).
- In an explosive atmosphere (ATEX non-applicability), corrosive or with a high concentration of dust or oily substances suspended in the air.
- In an atmosphere at risk of fire.
- Exposed to the weather.
- With safety devices excluded or not working.

## 4.5 In case of fire



**It is strictly forbidden to use water to extinguish the flames inside and near the panel.**

**Before intervening, the main meter of the system must be switched off and always use class C, CO<sub>2</sub> / dielectric powder fire extinguishers.**

## 4.6 Safety devices

The following safety devices are installed in the system:

- **Door lock disconnect** to disconnect the panel during maintenance.
- **Internal components of the panel** finger proof against accidental direct contact. With the door open, the panel has an IP20 degree of protection.
- **Magnetothermic:** for sizing, see the wiring diagram

## 4.7 Emergency button on the machines

The function of the emergency button on a machine, as established by the machinery directive, should derive from a risk analysis which must normally be carried out by the machine manufacturer. He identifies dangerous areas or movements and determines the need for the emergency button.

When we generally talk about an emergency operation, we always tend to think only of the emergency stop, that is to say that maneuver that has the purpose of stopping a process or stopping a movement of a machine that has become dangerous.

However, emergency operations can be single actions or a combination of the following:

- emergency stop;
- emergency starting;
- emergency interruption;
- emergency insertion.

In fact, an emergency function may be required for a machine that involves an emergency activation, that is a maneuver aimed at inserting the power supply in a part of the machine necessary to reduce the risk of danger in a given emergency situation.

Or an emergency function could be required which implies the interruption of the power supply to all parts or only certain parts of a machine in order to remove the risk of electric shock or other dangers of an electrical nature. .

Also, a machine may need an emergency function that involves an emergency start, i.e. a maneuver with the purpose of starting a process or movement necessary to remove or avoid a dangerous situation.

## CATEGORIES OF STOP FUNCTIONS

The stop functions are classified and grouped into three categories:

- stop categories zero
- arrest categories one
- arrest categories two

Zero stop category means a stop carried out through the immediate removal of the power supply to the machine actuators. It is therefore an uncontrolled stop, i.e. a stop of a particular movement of the machine that is obtained by interrupting the power supply to the machine actuators.

By stopping categories one we mean instead a controlled stop that maintains the power supply to the machine actuators until it stops, subsequently removing the power supply to stop.

On the other hand, stop categories two mean a controlled stop while maintaining the power supply to the actuators on the machine.

As we have seen, therefore, the categories of stopping functions also include stopping the controlled movement, i.e. the possibility of stopping the movement of a machine while maintaining the power supply to the machine actuators during the stopping procedure.

The electrical control panels of ECOTECH-GTS filtration systems are normally, in the absence of specific indications, of category zero, that is, they remove power from the moving parts of the machine, specifically we are talking about suction fan, rotary valves, augers.

In the event of a safety intervention in the field (fire prevention, anti-spark, explosion-proof panels) the cleaning system is also deactivated.

The new IEC 60204-1 also allows the use of electronic and electronic-programmable devices to carry out emergency stop functions.

An E-STOP (Emergency Stop) device must be wherever a danger to the operator may occur.

The E-STOP device must always be operational, easily and quickly accessible.

Each operator panel must have an E-STOP device.

Any additional devices must be provided in other positions, based on the risk analysis.

When the E-STOP device is activated it must necessarily remain blocked (it must not be possible to generate a STOP command without blocking).

Resetting (unlocking) an E-STOP must not cause a dangerous situation and restarting the machine must necessarily require a separate voluntary action.

EMERGENCY-STOP with "mushroom" buttons

Accessible from any danger point.

They do not prevent access to danger, but are complementary to other protective equipment.

They do not replace other safety equipment.

For emergency use only.

The reference standard is EN-ISO 13850/2015 "Safety of Machinery - Emergency stop function - Design principles".

Furthermore:

CEI EN 60204-1 2018

Machinery Directive 2006/42 / EC

## 5. INSTALLATION

### 5.1 Transport and move

Upon arrival of the packaged units check that its corresponds to the transport document and check for any damage to the packaging or to the panel found during the transport or the presence of water, humidity or oxidation.

If there is any difference between the Transport Document and the actual contents of the shipment and / or any damage, inform immediately the supplier by e-mail or fax (attach photographic documentation) so that problems can be ascertained and properly treated.

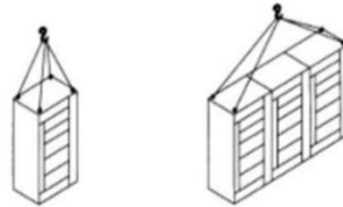
The panel is delivered by the manufacturer already assembled and complete with all its parts, and should only be positioned in the place of use.

The panels can be lifted and moved either by crane, both using the appropriate eyebolts, and with forklifts paying particular attention that the base of the compartment is raised.

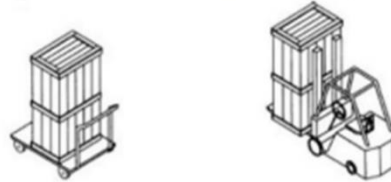
If the panel is closed in a crate (inaccessible eyebolts), the packaged unit must be handled by lifting it with steel cables (fig.2C) or with a forklift (only for crate containing single compartments, fig.2B).

After each panel has been unpacked, it must be moved using the specific eyebolts and, if the area is not sufficient to allow handling with a crane or with a forklift, it will proceed with the positioning of rollers under the panel with a suitable platform interposed between base of the panel and rollers as indicated in fig. 2D.

**Fig. 2A – Control panel handling with light packaging**



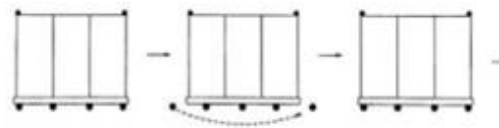
**Fig. 2B – Small cases handling**



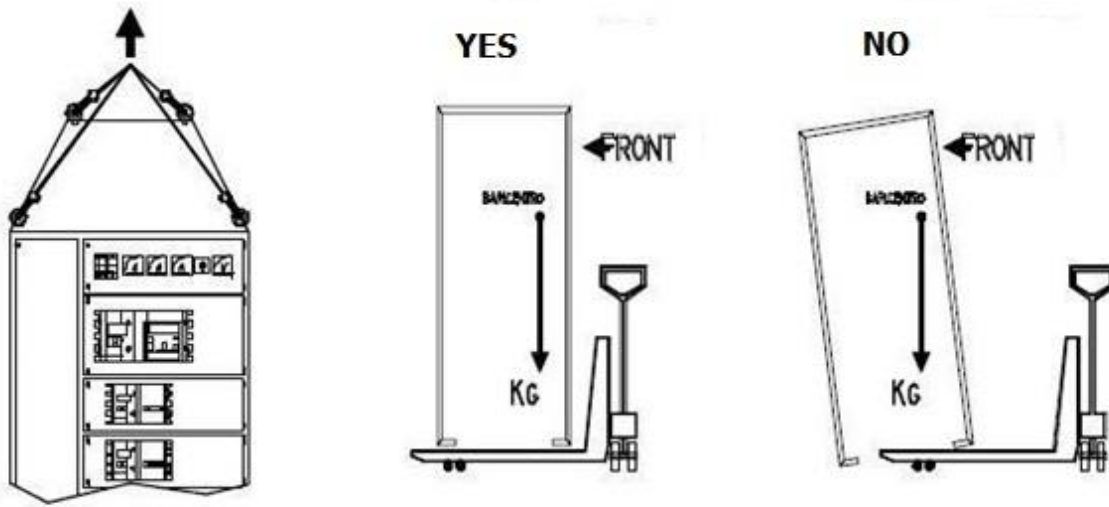
**Fig. 2C – Big cases handling**



**Fig. 2D – Final handling on rollers**



The failure to comply with these indications can cause the damage or the fall of the panels with consequent forfeiture of the guarantee.



It is recommended to always use means that can withstand the weight and size in such a way as to avoid damage to it and to surrounding people or things.



**The Manufacturer is not liable for damage caused to animal, people and goods for the use of lifting systems other than those indicated.**

## 5.2 Storage

The panel must be stored by taking the following precautions:

- store in covered and sheltered place from bad weather;
- protect from shocks and stresses;
- protect from humidity;
- avoid that the panel is subjected to an extreme temperature and protected from high thermal excursions;
- avoid it from coming into contact with corrosive substances;
- covered with a cloth;
- upright;
- it is not possible to stack several panels on top of each other.



## 5.3 Commissioning

For the installation and the commissioning, follow the instructions below.

### Placing

The panel must be placed on a well-level structure and fixed by means of expansion plugs or screws, in correspondence with the holes already present in the bottom of the packaging.

The configuration of the switchboard and the machine must allow the wiring of the power cables and of distribution according to the laying expected method .

### Ground connections

Any shelves and panels are assembled in such a way as to guarantee the electrical continuity of all components.

All doors and removable panels are connected to the structure with suitable flexible earth conductors of suitable sections.

Inside is assembled a dimensioned ground plank according to the maximum short-circuit current to earth for which the panel is sized.

The earth plank of the panel must be linked to the relative earthing system of the place in which it is installed with conductors of suitable sections.

### Connecting the power cables

The terminal blocks, and the shanks of the switches are sized for the connection of cables with section conforming to CEI 17-13 standards.

The technician is required to make low voltage linking in compliance with the applicable technical standards.

### Sizing of magnetotermics

To correctly size the circuit breakers upstream of the system, consult the table on the wiring diagram.

It is the responsibility of the final installer to ensure correct sizing.

### Checks before commissioning

At the end of the assembly phases of the panel, carry out the following checks:

- Visual check of the correct arrangement of any modules making up the panel (if the latter consists of several compartments).
- Check the tightening of the compartment coupling screws.
- Check the tightening of the bar connection bolts.
- Check the power and auxiliary connections.
- Verification of the absence of tools or in any case foreign bodies inside the panel.
- Verification of the correspondence between the voltage supplied by the utility company and the rated voltage of the equipment installed.

Please note that the Employer is required to periodically check the efficiency of the earthing circuit of the place where the panels are installed, carrying out measurements in accordance with the regulations of the user's country.



(For Italy, verification is mandatory EVERY 5 YEARS as reported in the CEI 44 - 5 III art. 19 or EVERY 2 YEARS if the workplace is subject to the supervision of the Fire Brigade for fire prevention).

The Manufacturer is not responsible for damage to people, animals and goods, caused by non-compliance with this provision.

## 6. DEVICE DESCRIPTION

### 6.1 Panel characteristics

If the panel is not equipped with an ECOTECH GTS card, the following commands and signals will be present:

- Port lock;
- Emergency stop mushroom button;
- White light of machine running;

If the panel is equipped with an ECOTECH GTS card, the following commands and signals will be present:

- Network presence indicator;
- Emergency stop mushroom button;
- White light of machine running;
- Alarm;
- Operator panel;
- Silence button.

*View the wiring diagram for the devices installed in the panel.*

### 6.2 Panel technical data

*View the wiring diagram.*

### 6.3 Environmental conditions

The panel doesn't require particular environmental conditions. It must be installed in an illuminated environment, ventilated and equipped with a solid and level floor. Are allowed temperatures from 5° to 40° C, with humidity not exceeding 50% at 40 ° C or, not more than 90% at 20 ° C. The switchboard is suitable for operating in environments that are:

- altitude not exceeding 1500 m a.s.l.
- temperature between + 5 ° and + 40 ° C with average temperature around 25 ° C;
- relative humidity between 30 and 95%.



**The panel is not suitable for working in environments with an explosive/ corrosive / with excessive presence of dust/ at risk of fire atmosphere.**

## 6.4 Standard provision

The products can be made according to the technical specifications processed by the customers, or designed and built internally in full compliance with current regulations (Standards EN 61439-1).

The planning uses software packages (Spac Automation) completely compatible with Autodesk standards (dwg-dxf).

The management and programming of PLCs is entrusted to professionals in the sector.

The products are tested with HT ITALIA FULLTEST3 INSTRUMENT

The electrical panels are made with:

- Instruction Manual for the Use and Maintenance;
- Statement of Conformity;
- Electrical safety test report (continuity and isolation);
- Wiring diagram;
- Spare parts list.

## 6.5 Electromagnetic environment

The switchboard is designed to operate correctly in an industrial type electromagnetic environment, remaining within the limits of Emission and Immunity provided for by the following harmonized Standards:

<b>CEI EN IEC 61000-6-4</b>	Electromagnetic compatibility (EMC) Generic standards - Immunity for industrial environments
<b>CEI EN IEC 61000-6-4</b>	Electromagnetic compatibility (EMC) Generic standards - Emission for industrial environments

## 7. MAINTENANCE

The maintenance must be carried out by experienced and qualified personnel. The goals that the maintenance personnel have are multiple: limit the decay of circuits and equipment; prevent injuries; contain the costs for damage; limit the number and duration of interventions; carry out the maintenance integrating it with the more general one.

To achieve these goals, it is necessary:

- the presence of maintenance personnel during the installation phase of the system;
- scrupulous compliance with the maintenance instructions provided by the manufacturers of the various system components;
- strict compliance with the Laws and Safety Standards;
- the organization of an archive with maintenance sheet, repair sheets and constant updating of maintenance personnel.

This prevention is especially necessary in the case of components that guarantee the safety of people. It is always useful and in some cases necessary to record:

1. characteristic electrical parameters of the system during normal operation.
2. electrical parameters due to abnormal functioning.
3. information from the manufacturer on the methods and frequency of maintenance.

### NOTE:

**MAINTENANCE OF PLANTS AND WORK EQUIPMENT**, in order to guarantee the permanence of the safety requirements over time, it falls within the employer's obligations (Art. 71,4-a2 D.Lgs. 81/2008).

Ordinary and extraordinary maintenance activities on machines and work equipment (therefore including panel and electrical equipment) must be noted in the **APPROPRIATE REGISTER** (Art. 71,4-b D.Lgs. 81/2008)



### 7.1 Maintenance levels

Three different levels of maintenance can be distinguished:

**1° LEVEL (normal exercise):** it consists in carrying out the simplest operations, such as replacement of accessories, auxiliary contacts, signal lamps, consumables.

**2° LEVEL (preventive maintenance):** This allows you to avoid having to resort to corrective maintenance which is often a burdensome condition due to the high repair and shutdown costs of the plant.

**3° LEVEL (repairs or replacements):** It should only be carried out in exceptional cases, it is always recommended to entrust the intervention to the manufacturer.



**Attention! Work on electrical systems must always be carried out in compliance with the requirements of the CEI 11/27 standard**

## 7.2 Particular caution

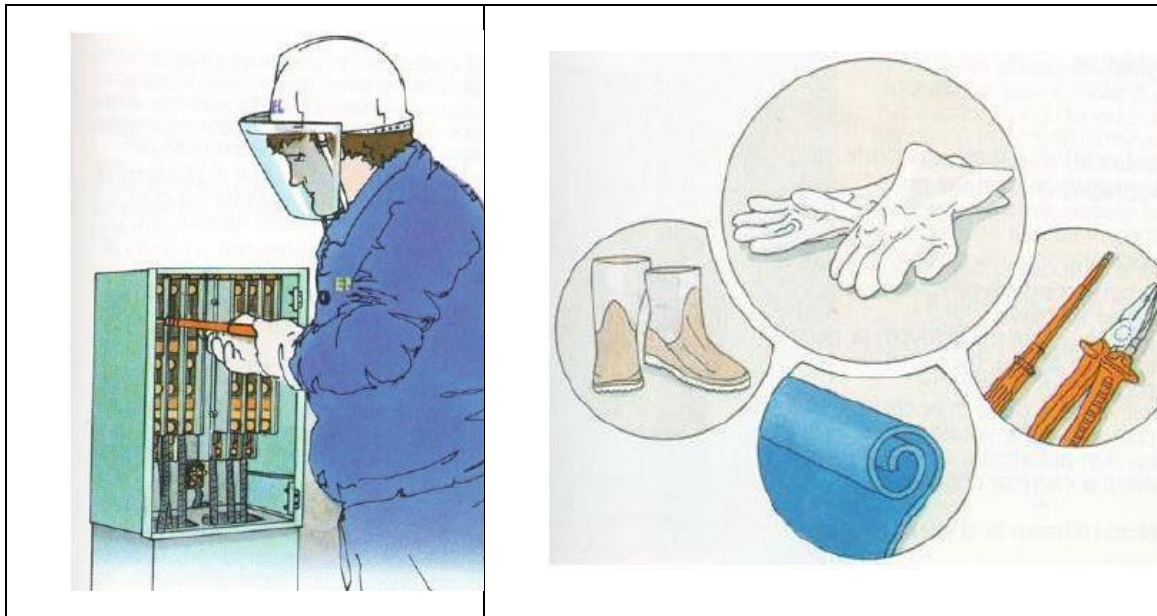
The **CEI EN 11-27 Standard** dictates the requirements for the execution of works on electrical systems belonging to category I systems (rated voltage <1000V in a.c. and <1500V in d.c.). The standard defines the measures to be adopted, both for live work and for live work. Basic are:

- staff preparation;
- the identification of the work parts and the adjacent active parts, with which it is possible to come into contact;
- the definition, reporting and when is necessary, the delimitation of the work area;
- the safety and / or protection;
- the leaflet;
- measures against untimely maneuvers;
- the reliability of the operating and protection means used.

During the work it is necessary to provide the operator with a condition of double insulating protection towards the live parts, be careful not to approach them with parts of the body not protected by insulation.

The recommended PPE are as follows:

- insulated tools and implements;
- insulated gloves and footwear;
- possibly logs, platforms, insulating mats;
- helmet and visor against the risk of electric arcs.



The panel is equipped with an **interlock device** that disconnects the power supply to the internal parts when the port is opened. These devices allow the panel to be powered again with the port open to carry out checks, live operations and maneuvers.



**ATTENTION!** Any circuits that remain live with the port open they are distinguished by cables with **ORANGE** colored insulation protected by enclosures bearing electrical voltage hazard pictograms.

Let's see in detail the cable / color service correspondence.

- protective conductor: yellow / green
- neutral conductor: light blue
- AC and DC power circuits: black
- control circuits in alternating current: red
- direct current control circuits: blue (if there is a neutral conductor in the panel, it is recommended to use the gray color)
- circuits that carry non-sectionable external voltages inside the panel: orange
- The remaining colors (brown, purple, white, pink, turquoise) are allowed for very simple paintings where the only way to identify them is the color.



**ATTENTION!** Checks, operations and maneuvers with the open panel and undervoltage must be allowed only to **AUTHORIZED AND EXPERT PERSONS**, under the direct responsibility of the Employer.



When carrying out maintenance and / or repair work, strictly observe the following instructions:

- Display a sign indicating "MACHINE UNDER MAINTENANCE" in a clearly visible position.
- Don't use solvents and flammable materials.

After the panel maintenance and before commissioning it is recommended to take at least the following measures:

- check that no foreign bodies have been left inside the panel;
- restore and fix correctly all the protections and guards removed, opened and deactivated;
- clean the various components and / or parts of the panel as a whole;
- check the insulation level;
- close the switches progressively to easily identify any faulty lines;
- check the voltage available for the auxiliary services;
- check the state of insulation of the auxiliary circuits;
- check the maneuvering organ;
- check the release maneuver;
- check the auxiliary signaling contacts;
- check the functionality of the remote control, if provided.



**The manufacturer is not responsible for the non-observance of the above recommendations and for any other use that is different or not mentioned in these instructions.**

### 7.3 Scheduled routine maintenance

It is up to the users of the machine and the maintenance manager to judge its condition and suitability for use. It is recommended to stop and intervene whenever you feel a suboptimal functioning.

The necessary routine maintenance operations are described below.

Activities	Timing	Notes for the operator
Cleaning the panel AS NEEDED	Once a year	Clean the components and the inside of the panel removing any processing residues e dust. Replace the filters of the eventual aspiration system.

Check the anti-condensation heaters	Once a year	---(if applicable)
Checking the ventilation	Once a year	---(if applicable)
Check the tightening of the screws of terminals and components	Once a year	Random check of the bolt tightening of busbar coupling and cable connection terminals.
Checking the voltage detectors	Once a year	Measure the presence of voltage with a tester, if the warning lights are off but voltage is present, proceed with the replacement of non-functioning components.
Control of differential protections	Once a year	Check functionality of emergency circuits and interlocks. In case of a negative result, restore or replace the faulty component.
Mechanical operation check	Once a year	Mechanical operation test for levers e maneuvers electrical components. In case of a negative result, replace the faulty component.
Check ground connections	Once a year	Check the integrity of the ground circuits. In case of a negative result, proceed to restore.
Check insulation	Once a year	Check that the insulation of all components and cables is intact. In case of a negative result, replace the component and / or wiring.

For any maintenance interventions, download and fill in the form on the site after scanning the QR code.



**Failure to comply with the requirements,exempts the manufacturer from any liability for the purposes of the Warranty.**

**exempts the manufacturer from any liability for the purposes of the Warranty.**

#### 7.4 Extraordinary maintenance

Extraordinary maintenance essentially concerns the replacement of equipment damaged by wear or accidental overloads. Refer to the circuit diagram and the attached list of materials to request spare parts.

## 7.5 Diagnostics and troubleshooting

For defects or malfunctions of the electrical equipment not described in this Instruction Manual, please contact the Manufacturer.

## 8. ASSISTANCE AND REPLACEMENT

### 8.1 Assistance

For any type of information, the Manufacturer is considered always available. From the Customer it is advisable to ask the questions with references to this Manual and to the instructions listed.

### 8.2 Replacement



**USE ALWAYS ORIGINAL SPARE PARTS.**

**FOR ANY SPARE PARTS PLEASE CONTACT THE MANUFACTURER.**

**ECOTECH GTS is not liable for breakages, malfunctions or damage to people or things resulting from the use of non-original parts.**

For the management of spare parts there is a module that allows a quick request for the piece to be replaced. To request spare parts, fill in the attached form, taking care to follow the instructions given therein.

In order to interact in the most effective way with our technicians, please follow the procedure below:

- 1. call the Company's spare parts service and describe the type of fault found;**
- 2. possibly describe the non-functioning part;**
- 3. trace the detail of the system in which the detail is located;**
- 4. order the part using the Order Form on the next page.**

## SPARE PARTS REQUEST FORM

<b>CUSTOMER'S DATA</b>	<b>NAME / SURNAME</b>	
	<b>ADDRESS</b>	
	<b>REGION</b>	
	<b>PROVINCE</b>	
	<b>CITY</b>	
	<b>CAP</b>	
	<b>TEL</b>	
	<b>E-MAIL</b>	

<b>CONTROL PANEL'S DATA</b>	<b>MODEL</b>	
	<b>SERIAL NUMBER</b>	
	<b>CONSTRUCTION YEAR</b>	

<b>LIST OF COMPONENTS TO BE INSERTED</b>	<b>ID</b>	<b>QUANTITY</b>

NOTE:

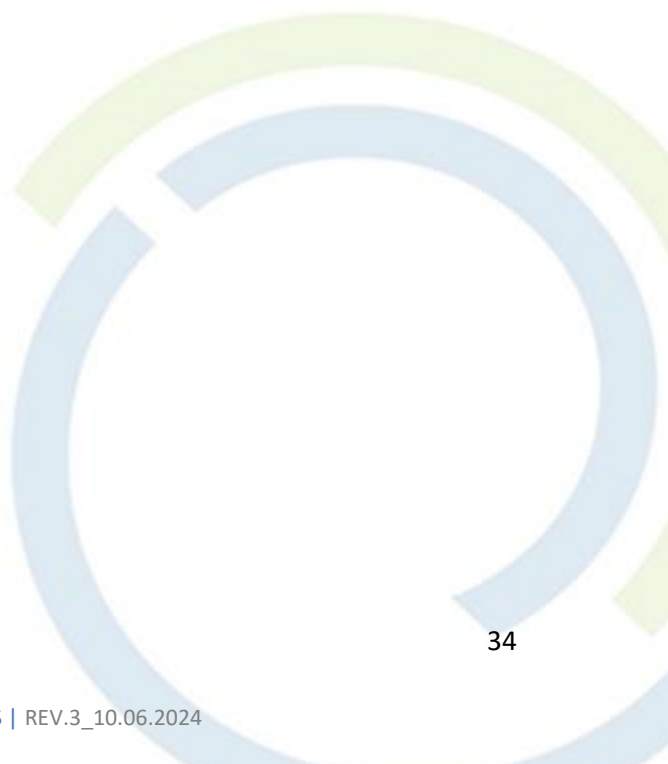
---



---



---



## 9. ATTACHMENTS

### 9.1 Circuit diagram

Circuit diagram of the panel showing any data for correct installation.

### 9.2 List of components

The list of components used is shown in the table on the wiring diagram.

## EN 60204-1 Annex F - References to EN 60439 (61439) for electrical panels

This Part of EN 60204 provides a large number of general requirements that it can whether or not applicable to the electrical equipment of a specific machine.

A simple reference, without any clarification, to the entire EN 60204-1 standard, therefore it is not enough. Choices must be made to cover all the requirements of this Part of EN 60204.

A technical committee that prepares a standard for a product family, or a dedicated product standard (type C in CEN) and the supplier of a machine for which there are no product family standards, or dedicated product standards should use this Part of EN 60204:

**Tabella F.1 – Opzioni di applicazione**

Oggetto	Articolo o Paragrafo	i)	ii)	iii)	iv)
Campo di applicazione	1		X		
Prescrizioni generali	4	X	X	X	ISO 12100 (tutte le parti) ISO 14121
Scelta dell'equipaggiamento	4.2.2		X	X	IEC 60439 serie
Dispositivi di sezionamento (isolamento) dell'alimentazione	5.3	X			
Circuiti esclusi	5.3.5	X		X	ISO 12100 (tutte le parti)
Prevenzione di avviamenti imprevisti, sezionamento	5.4, 5.5 e 5.6	X	X	X	ISO 14118
Protezione contro la scossa elettrica	6	X			IEC 60364-4-41
Operazioni di emergenza	9.2.5.4	X		X	ISO 13850
Comando a due mani	9.2.6.2	X	X		ISO 13851
Comando senza fili	9.2.7	X	X	X	
Funzioni di comando in caso di guasto	9.4	X	X	X	ISO 14121 ISO 13849 (tutte le parti) IEC 62061
Sensori di posizione	10.1.4	X	X	X	ISO 14119
Colori e marcatura dei dispositivi di interfaccia operatore	10.2, 10.3 e 10.4	X	X		IEC 60073 IEC 61310 (tutte le parti)
Dispositivi per l'arresto di emergenza	10.7	X	X		ISO 13850
Dispositivi per l'interruzione di emergenza	10.8	X			
Apparecchiatura di comando – protezione contro l'ingresso di agenti contaminanti, ecc.	10.1.3 e 11.3	X	X	X	IEC 60529
Identificazione dei conduttori	13.2	X	X		
Verifica	18	X	X	X	
Requisiti supplementari dell'utilizzatore	Allegato B		X	X	
<p>Articoli e Paragrafi della presente Parte della IEC 60204 per i quali dovrebbe essere considerata un'azione (indicata da una X) relativamente a:</p> <ul style="list-style-type: none"> <li>i) scelta tra le misure indicate;</li> <li>ii) prescrizioni supplementari;</li> <li>iii) prescrizioni diverse;</li> <li>iv) altre norme eventualmente rilevanti.</li> </ul>					





**ECOTECH GTS Srl**

Via Roma, 86 - 38012 Fraz. Taio, Predaia - Trento (IT)  
Tel. +39 0463 461049

**BDO - Business Development Office**

Via Bologna, 22 - Trezzano Rosa - Milano  
Tel. +39 0250033164

E-mail: [info@ecotechgts.com](mailto:info@ecotechgts.com)

Pec: [ecotechgts@pec.it](mailto:ecotechgts@pec.it)

Web: [www.ecotechgts.com](http://www.ecotechgts.com)

