

## USE AND INSTALLATION HANDBOOK

**DUPLEX /Hp**

CONTROL PANEL FOR 2 ELECTRIC PUMPS WITH  
CURRENT CONTROL.

# DUPLEX - / Hp



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## 1. WARNINGS

The following symbols, accompanied by the words: "Danger", "Warning", indicate the potential hazard resulting from failure to observe the associated warning, as specified below:



**DANGER**  
**RISK OF ELECTRIC**  
**SHOCK**

Failure to observe this warning may result in electric shock



**DANGER**

Failure to observe this warning may cause personal injury and/or damage to property



**WARNING**

Failure to observe this warning may cause damage to the pump, the unit or the system

- **CAUTION:**  
Make sure the pumps are fully primed before you start them.
- **CAUTION:**  
The control panel must be connected by a qualified electrician in compliance with the electrical regulations in force.
- **CAUTION:**  
The electric pump or the motor and the panel must be connected to an efficient grounding system in compliance with the electrical regulations locally in force.
- **CAUTION:**  
Ground the unit before carrying out any other operation.
- **CAUTION:**  
The electric pump or the motor can start up automatically.
- **CAUTION:**  
As a general rule, always disconnect the power supply before proceeding to carry out any operation on the electrical or mechanical components of the unit or system.

## 2. OVERVIEW

The purpose of this manual is to provide the necessary information for the proper installation, use and maintenance of DUPLEX. The user should read this manual before operating the unit. Improper use may cause damage to the machine and lead to the forfeiture of the warranty coverage. Always specify the model identification code and the construction number when requesting technical information or spare parts from our Sales and Service department. The instruction and warnings given below concern the standard version; refer to the sale contract documentation for modifications and special version characteristics. For instructions, situations and events not considered in this manual or in the sale documents, please contact our customer service.

Our units must be installed in sheltered, well-ventilated, non-hazardous environments and must be used at a maximum temperature of +40°C and minimum of -5°C.

## 3. HANDLING



**DANGER**



**WARNING**

The panel must be handled with care, as falls and knocks can cause damage without any visible external signs.

If for any reason the unit is not installed and starter immediately after it has reached its destination it must be stored properly. The external packaging and the separately packed accessories must remain intact, and the whole must be protected from the weather, especially from freezing temperatures, and from any knocks or falls.

**PRELIMINARY INSPECTION:** after you have removed the external packaging, visually inspect the control panel to make sure it has suffered no damage during shipping.

If any damage is visible, inform a FOURGROUP dealer as soon as possible, no later than five days from the delivery date.

## 4. APPLICATION AND WORKING



**DANGER  
RISK OF ELECTRIC  
SHOCK**



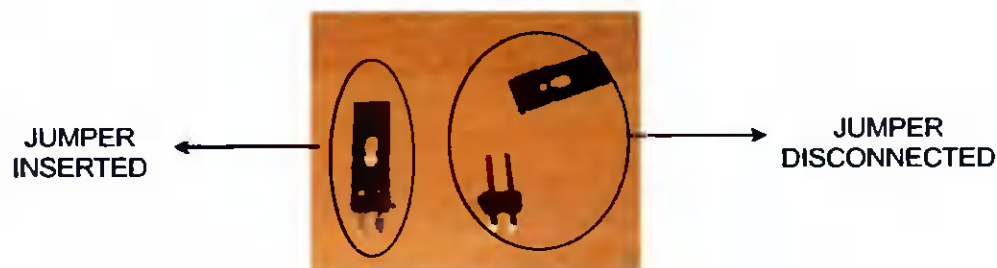
**WARNING**

*These control panels are designed for controlling 2 motors or electric pumps used in pressurization systems or in applications for emptying wells or water tanks.*

**FOURGROUP S.r.l. shall not be liable for any damage caused or suffered by the unit as a result of its unauthorised or improper use.**

### TECHNICAL FEATURES :

- Electronic control panel;
- Input voltage 1~50/60 Hz 230V  $\pm 10\%$  (single-phase model DUPLEX-M);
- Input voltage 3~50/60 Hz 400V  $\pm 10\%$  (three-phase model DUPLEX-T);
- Very low voltage input for 2 external pressure switches or 2 float switches with "anti-bouncing" system;
- Very low voltage input for external minimum level pressure switch or float switch;
- Pumps' exchanger circuit with 4" delay between the starts of the 2 pumps;
- Possibility to exclude a damaged pump;
- Internal selector for exclusion of pumps exchanger;
- Selectors for AUTO-OFF-MANUAL motor operation (MANUAL temporary);
- Green led for power on;
- N.2 Green led for auto operation;
- N.2 green led for motors operating;
- Red led for min/max water level alarm;
- N.2 Red led for overload motor protection alarm;
- Adjustable motors overload electronic protection;
- Time for protection activation: 5";
- Push-buttons for restoration from protection;
- Alarm output with exchangeable contacts 5 A 250V (resistive load);
- Auxiliary circuits protection fuse;
- Motors protection fuses;
- Main switch with door interlock;
- Box in ABS;
- Output with cable holder;
- Protection IP55;
- Ambient temperature: -5/+40 °C;
- Relative humidity 50% at 40 °C (not condensed).



**Do not use the product in environments where dust, acids, corrosive and/or flammable gases etc. are present.**

## 5. STANDARD OPERATION



**DANGER**  
**RISK OF ELECTRIC**  
**SHOCK**



**DANGER**



**WARNING**

The "**Mains power on**" LED comes on to indicate that the board is functioning properly. The motor can be governed directly by the operator with man present (**Manual**) or by remote signals (**Automatic**) by means of the "**Automatic – Off – Manual**" buttons; (when the automatic button is pushed the related LED above the button lights and the control panel is ready to receive remote signals from the sensors and floats) .

- G.MIN is used as MINIMUM LEVEL FLOAT SWITCH and all the pumps can only work when the minimal level is exceeded.

**With " EXC ALLAR. "Jumper it is possible to exclude the " LEVEL ALARM " red light and the OUTPUT ALARM RELAY when G. MIN float switch is swithes off .**

- G1 input is used as EXCHANGER function ( it can be any free voltage contact – float switch )

- G2 input is used as EMERGENCY function ( the secon pump starts after 4-5 second )

- G.A. input is used as LEVEL ALARM function ( when switches-on the 12Vcc SIREN output is ON with a MAXIMUM absorption 30 mA and activation of the alarm output)

The green pilot lights "**Motor ON**" indicate the functioning of the motors .

If the Overload protections are tripped, the motors stop and the red "**MOTOR PROTECTION ENABLED**" and the red "**LEVEL ALARM**" LED light on. **Push RESET to reset the alarm;** Check for the cause of the malfunction before restoring the motor to operation.

When G1 input contact is open, the motor stop, the "LEVEL ALLARM" led goes on and the "USCITA ALLARME" contact is on.

**- The amperometric protection tripping current can be adjusted by means of the "CORRENTE MOTORE "(MOTOR CURRENT) Trimmer, based on the rated absorption of the motor; the adjustment can be made from a minimum of 2A to a maximum of 22A. The cut-in delay time is fixed at 5 seconds and can be overridden during setting by bridging the " ESCL.TIM.TA " Jumpers ;**

### **GENERAL NOTES :**

During the calibration for Over-Load Protection, start the motor 2-3 times to check the correct operating.

## 6a. INSTALLATION



**DANGER  
RISK OF ELECTRIC  
SHOCK**



**DANGER**



**WARNING**

### **Line of supply current**

Connect the unit at ground before carrying out any other operation.

The voltage input corresponds to the data written on the panel and on the pump.

( **400V** ± 10% 50/60Hz x **DUPLEX - T /Hp** )  
( **230V** ± 10% 50/60Hz x **DUPLEX - M /Hp**).

Make sure that the power-supply-cable can bear the nominal current and connect it to the terminals of the general switch of the control panel.

If the cables are exposed, they must be appropriately protected.

The line must be protected with a differential magnetotermic switch measured in accordance with the regulations locally in force.

### **Line of motor power supply**

Connect the unit at ground before carrying out any other operation.

The voltage input corresponds to the data written on the motors.

(**400V**±10% 50/60Hz **three-phase**)  
(**230V**±10% 50/60Hz **single-phase**).

Doing some starting make sure that the motors respect the right direction of rotation usually indicated by an arrow printed on the motors .

### **Line of external control**

It is possible to control the motor in " **Automatic** " using a free voltage contact normally open as a float switch or a pressure switch.

It is a line in very low voltage and not a power line. Connect anyway with the control panel switched off and with the magnetotermic circuit breaker disconnected.



## 6b. INSTALLATION

- TO FIX THE CABLES IN THEIR TERMINALS USE A TOOL OF THE PROPER SIZE TO AVOID THE DAMAGING OF THE SCREWS OR OF THEIR SEAT. If use an electric screwier pay attention not to spoil the thread or the screws.
- FIX THE CONTROL PANEL TO A WALL AS IN PICTURE N.1 WITH SCREWS AND SCREW ANCHOR USING THE HOLES ARRANGED IN THE BOX OR THE FIXING BRACKET IF PRESENT.

AFTER THE FIXING, REMOVE EVERY PLASTIC OR METALLIC SURPLUS (ex. Pieces of copper of the cables or plastic shavings of the box) INSIDE THE BOX BEFORE SUPPLING POWER.



Fig.1

**N.B. : DO NOT INSTALL THE CONTROL PANEL CLOSE TO OBJECTS IN CONTACT WITH FLAMMABLE LIQUIDS, WATER OR GAS.**



## 7a. ELECTRICAL CONNECTION DUPLEX-T / Hp



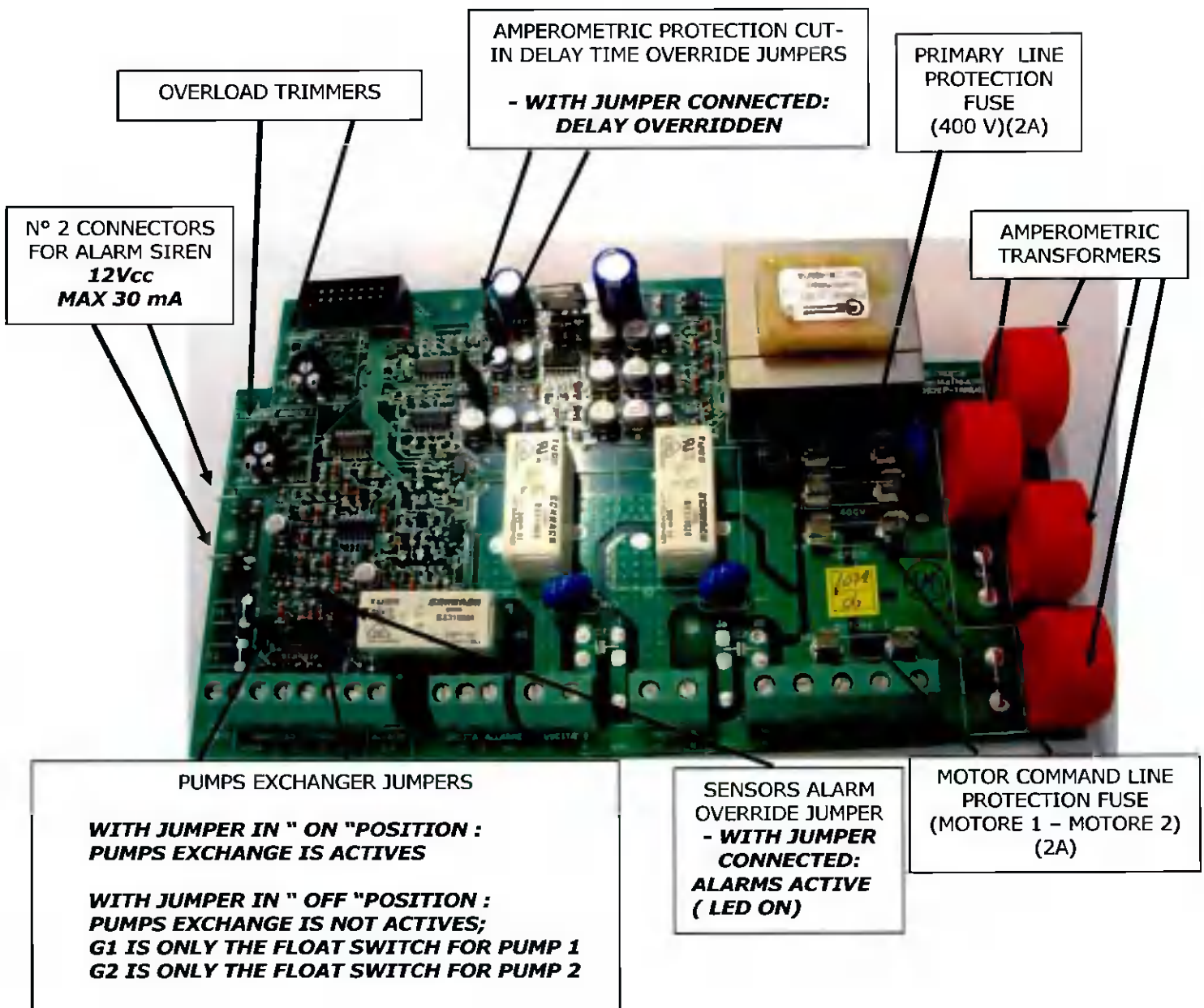
**DANGER**  
**RISK OF ELECTRIC**  
**SHOCK**



**DANGER**



**WARNING**



## 7b. ELECTRICAL CONNECTION DUPLEX-M / Hp



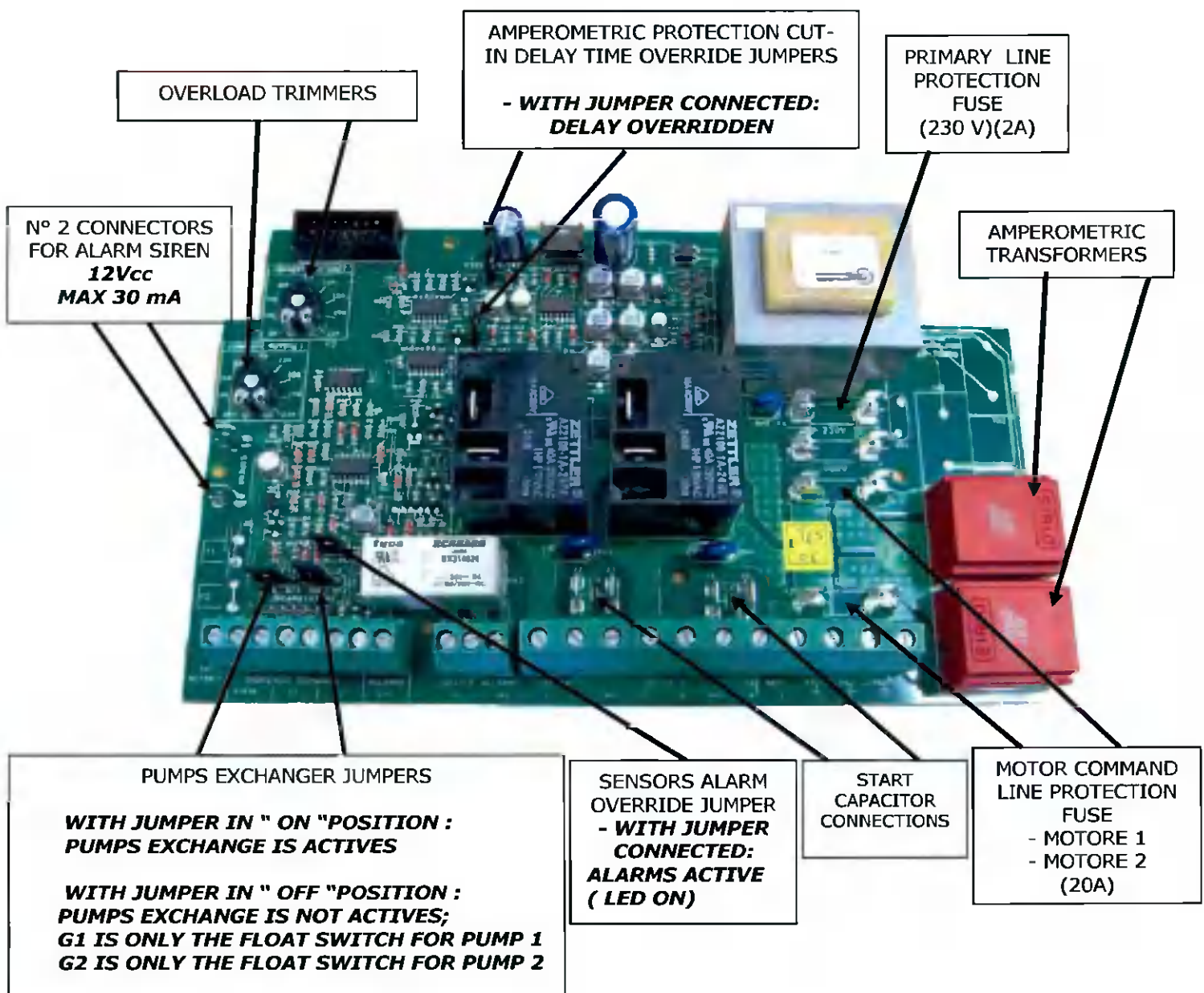
**DANGER**  
RISK OF ELECTRIC  
SHOCK



**DANGER**



**WARNING**

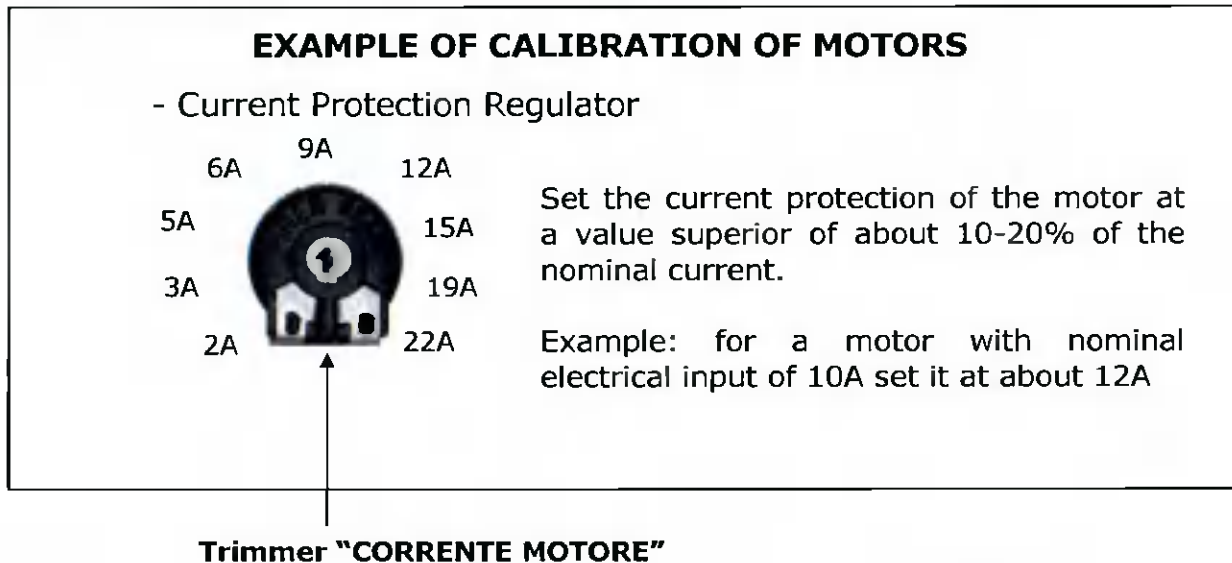


## 8a. REGULATION AND CALIBRATION

Before the ignition the "Sistem of Motor Protection from Overload" has to be calibrated setting the **Current Protection** on the internal regulator of the Board.  
The **Protection Delay** is set at a fix time of **5 seconds**.

**During the calibration close the JUMPER " E.T.TA " to disable the delay protection, after motor start;**

The **Regulator of Current Protection** depends of the value of calibration set on the board ;



**N.B.:** When the setting is complete, reset the protection tripping current delay time by removing the " ESCL.TIM.TA " JUMPER ;

## 8b. REGULATION AND CALIBRATION

EXAMPLE OF CURRENT PROTECTION FOR A THREE PHASE MOTOR:

Suppose that we want to set the Protection from Overload for a three phase motor of 5,5kW (7,5Hp) with a Nominal Supply Current of about **12 A**.

### CALIBRATION STEPS:

- Override the current protection cut-in delay time by **CONNECTING** the "ESCL.TIM.TA" JUMPER, after motor start;
- Set the maximum value with the internal regulator on the "**Protection tripping current**" panel (turn clockwise)
- Turn the motor on and, with the "**Protection tripping current**" regulator, reduce until the red "Motor Protection" LED comes on and the motor stops; (THIS SHOULD CORRESPOND APPROXIMATELY TO THE RATED CURRENT... 12A);
- Increase the "Protection tripping current" adjustment by approximately 10-20% of the previously set value. (AT APPROX. 15a)
- Reset the Protection Cut-in Delay by **REMOVING ESCL.TIM.TA** JUMPER; (the delay is used to allow for the initial inrush currents);

## 9. STOP OF THE PUMPS



### WARNING

The MOTORS can be switched off in the following ways:

- In "manual", the motors stop when the "MANUAL" button is released;
- In "automatic", the motors stop when the FLOAT SWITCH are no longer enabled or when the current protection is actives, or by pushing the "0 - RESET" button;
- Turning the general switch with door interlock to "0".

## 10. LIGHTS and PUSH-BUTTONS ON THE FRONT-PANEL

### LIGHTS



INDICATES THAT THE MAIN POWER IS ON  
**GREEN LIGHT**



INDICATES THAT THE ALARM LEVEL IS ON  
**RED LIGHT**



INDICATES THAT THE MOTOR IS RUNNING  
**GREEN LIGHT**



THE CONTEMPORARY LIGHTING POINTS OUT THAT THE MOTOR IS IN PROTECTION.  
**2 RED LEDS**

### BUTTONS :



keeping it switched, the motor starts by-passing every alarm; when it is released the motor get disconnected .



disconnect the motor and reset the working protections



WHEN PUSHED, THE AUTOMATIC MODE IS ACTIVATED WHICH IS INDICATED BY THE GREEN LED; THE BOARD IS READY TO RECEIVE SIGNALS FROM THE FLOATS, PRESSURE SWITCHES OR SENSORS.



## 11. MAINTENANCE



**DANGER  
RISK OF ELECTRIC  
SHOCK**



**DANGER**



**WARNING**

DUPLEX../Hp does not require any routine maintenance provided that their working limits are observed. Any maintenance operations must be performed by qualified and experienced personnel, in compliance with the safety regulations in force.

**DANGER!**

**Make sure that DUPLEX.. is disconnected from the power supply before performing any maintenance operations.**

## 12. WASTE DISPOSAL

After the control panel has been installed and started, the customer must provide for the appropriate elimination/disposal of the waste materials according to the legislation locally in force.

If the control panel or parts of it must be taken out of service and dismantled, follow local regulations regarding sorted waste disposal. Refer to the appropriate recycling centres.

**CAUTION:** Contamination of the environment with hazardous substances such as battery acid, fuel, oil, plastic, copper, etc., may cause serious damage to the environment and endanger people's health.

## 13. WARRANTY

Refer to the sales documents for any information.

## 14. SPARE PARTS

Always state the exact model identification number and construction number when requesting technical information or spare parts from our sales and service centre.



Use only original spare parts when replacing any faulty components.



The use of unsuitable spare parts can cause malfunctions, personal injury and damage to property.

## 15. CONFORMITY DECLARATION

**FOURGROUP S.r.l.** with centre in Polverara via Enrico Fermi 8 – Padova – Italy,  
declare that the products

### **DUPLEX.../Hp**

is in compliance with the following European directives and with the national directives  
of actuation :

- Machine 2006/42/CE
- Direttiva Europea 2006/95/CE
- Electromagnetic compatibility 89/336/EEC and following changes in compliance  
with the following technical rules:
- EN 60439-1, EN 55014-1, EN 55014-2, EN 61000-3-2, EN 61000-3-3

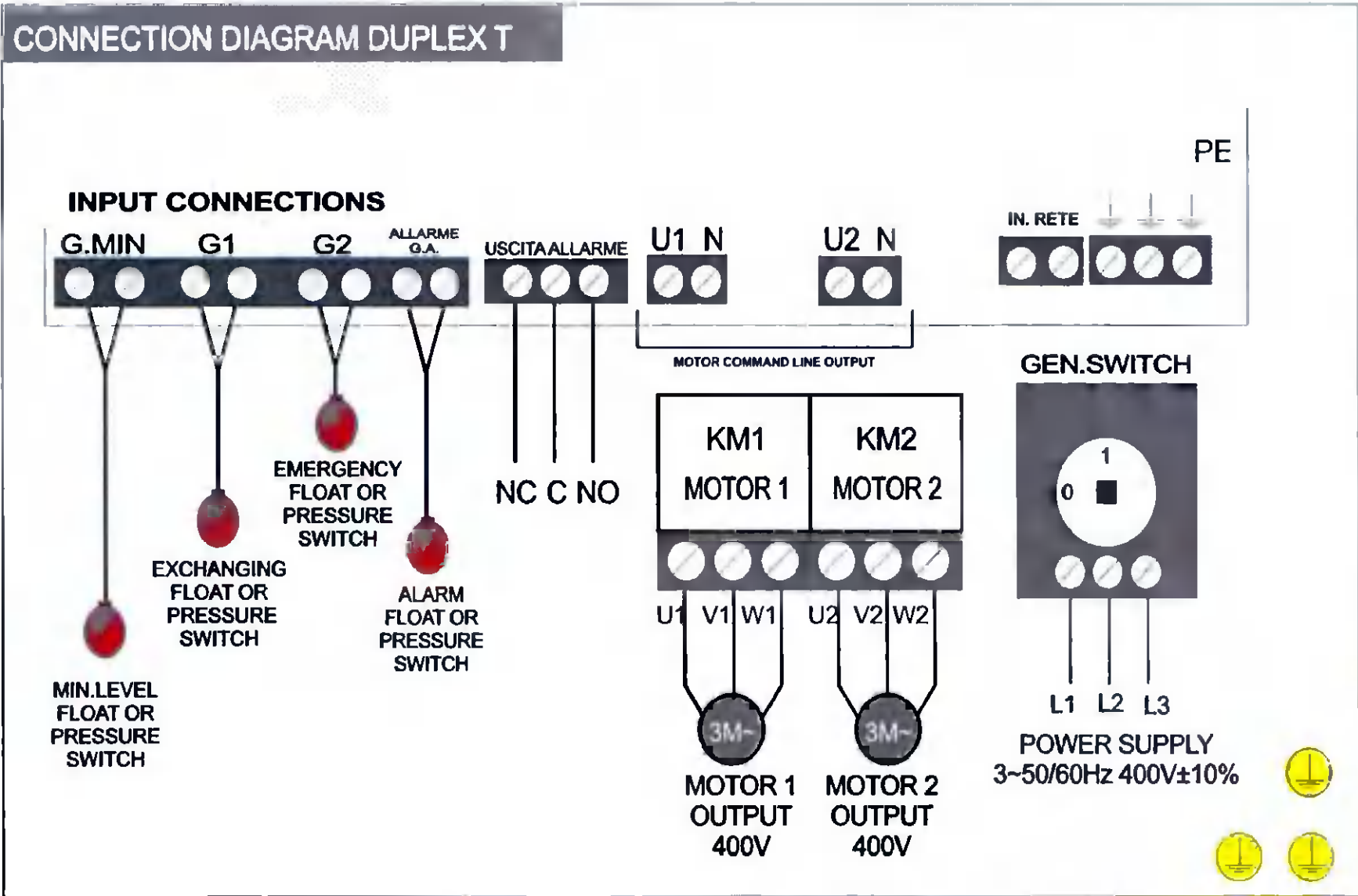
Polverara – Italy, 05/08/09

TECHNICAL MANAGER

(Grigoletto Per. Ind. Walter)



# CONNECTION DIAGRAM DUPLEX T



16a. CONNECTIONS DUPLEX-T/Hp



# CONNECTION DIAGRAM DUPLEX M

