SOCCORRER Manual

2008 EDITION

CONTENTS

1. GENERAL

1.1. Introduction

This manual describes the installation, startup, programming and troubleshooting of **anti-flood controllers**.
This document is addressed to qualified technical personnel skilled in the installation and servicing of water pumping plants.

Anti-flood controllers are recommended for use in civil and industrial installations in which a 230V single phase pump set must be powered and in which temporary power losses could cause flooding of the premises with consequent damage to property and risks for personal safety.

ANTI-FLOOD CONTROLLERS ARE EQUIPPED WITH AN AUTOMATIC CONTROL LOAD (ACL) SYSTEM THAT CONSTANTLY MONITORS THE ENABLE SIGNAL FROM THE FLOAT TO START THE SYSTEM AND THE ELECTROPUMP.

Anti-flood controllers comply with essential safety requirements:

- **Standard EN 62040-1-1: Directive 73/23 EEC**
- **Standard EN 50091-2 cl. B: Directive 89/336 EEC**
- **RoHs – Environmental protection directive** concerning restriction of the use of specific hazardous substances in electrical and electronic appliances **Directive 2002/95/EC.**
- **WEEE – RAEE – Waste electrical and electronic equipment Directive 2002/97/EC – 2002/96/EC.**

1.2. Technical Features

The anti-flood systems are completely automatic because they are entirely controlled by a high performance microprocessor capable of administrating:

- Mains power loss and the need to switch to battery power;
- Type of battery (acid, gel etc.) and charge status;
- Battery charge status monitoring;
- That batteries are charged as rapidly as possible;
- Display of simple messages by audible and visual indicators;
- Starting and stopping of the electropump (ACL System);
- Current monitoring protection system;
- Disconnection of electropump in the case of excessive power draw;
- Automatic reset of electropump;
- Management of manual self-test routine (only for systems connected to electropumps without float);
- Management of programmable automatic self-test routine (only for systems connected to electropumps without float);
- Audible - visual overload alarm;
- Voltage free contact for remote alarm signal;
- Changeover between pumps (only for version with alternation facility);
- Backup activated in the event of faults (only for version with alternation facility).

The unit is equipped with a mains power filter.

Anti-flood systems can control one or more electropumps (single output) or a pair of electropumps operating alternately, simultaneously, or in back-up mode (dual alternate output). Electropumps can be supplied with or without an integral float system.

The unit will keep the electropump(s) running only if it detects power draw of more than 10% of rated power.

It is also possible to perform manual and automatic **tests** on the electropumps in order to check correct operation and run them periodically thereby avoiding prolonged periods of inactivity.
The tests can be performed only in systems with operating float connected directly to the anti-flood controller.

Irrespective of the presence or absence of mains power, anti-flood systems do not supply output current unless expressly requested by the float enable signal. This feature makes it possible to keep the systems on stand-by during a mains power loss, thus increasing battery run time and efficiency.

In anti-flood systems connected to electropumps without float, a safety float or backup float can be connected in the event of a malfunction of the operating float.

The operating status of the anti-flood controller and the relative parameter settings can be viewed on a multifunction display.

Charge status control is composed of two stages (controlled automatically by the microprocessor): one that envisages maintenance of battery charge at 51.7V (25.8V for Soccorrer 600) and one that envisages recharging at 56V (28V for Soccorrer 600). Battery charging is performed when batteries are drained and otherwise at regular cycles.

TECHNICAL DATA TABLE

DATI TECNICI	SOCCORRER 500	SOCCORRER 600	SOCCORRER 1000	SOCCORRER 1500	SOCCORRER 2000	SOCCORRER 2500	SOCCORRER 3000	SOCCORRER 4000	SOCCORRER 5000
TENSIONE DI ALIMENTAZIONE	230 V (+6% / -10%) - 50 Hz								
TENSIONE DI USCITA	230 V (+6% / -10%) - 50 Hz								
FORMA D'ONDA	Stepwave								
TENSIONE DI BATTERIA	48 Vcc	24 Vcc	48 Vcc						
LIMITI DI FUNZIONAMENTO BATTERIA	40 Vcc	20 Vcc	40 Vcc						
RENDIMENTO	90%	85%	88%						
TEMPO D'INSERIMENTO	1 secondo								
COMMUTAZIONE RETE BATTERIA	Automatica								
POTENZA MAX EROGABILE (VA)	500 VA	600 VA	1000 VA	1500 VA	2000 VA	2500 VA	3000 VA	4000 VA	5000 VA
CORRENTE MAX EROGABILE (A)	2,2	2,6	4,4	6,5	8,7	11	13	17,4	22
CORRENTE MAX ELETTROPOMPA MOTORE (A)	1,9	2,3	3,8	5,7	7,6	9,6	11,5	15,2	20
CORRENTE MAX DI SPUNTO (A)	10	10	15	20	25	30	30	50	50
CAMPO DI TEMPERATURA	-20 °C - 60 °C								
UMIDITÀ	≤ 90% non condensata								
GRADO DI PROTEZIONE	IP 21								
DIMENSIONI L x H x P (mm)	285 x 520 x 210								
MATERIALI	Struttura portante in acciaio e rivestimento in ABS autoestinguente								
PESI (Kg)	32	18	24	30	36	40	44	46	55

FUSES TABLE

	Socc. 600	Socc. 1000	Socc. 1500	Socc. 2000	Socc. 2500	Socc. 3000	Socc. 4000	Socc. 5000
Battery Fuse	40A	63A	63A	80A	80A	80A	126A	160A
Switching Fuse	2A	2A	2A	2A	2A	2A	2A	2A
Mains Fuse	10A	10A	10A	10A	16A	16A	25A	25A
Output Fuse	4A	6,3A	8A	10A	16A	16A	25A	25A
CPU Fuse	2A	2A	2A	2A	2A	2A	2A	2A

Battery fuse **F**, see Figure 20 page 49
Switching Fuse **S**, see Figure 17 page 48
CPU Fuse **C**, see Figure 17 page 48

1.3. Panels description

FRONT PANEL

1 Backlit display to present system status messages and program Soccorrer parameters.

2 Button to scroll MENUS up and increase numerical values (UP).

3 Button to scroll MENUS down and decrease numerical values (DOWN).

4 MENU and settings confirmation button.

5 SOCCORRER model.

6 Electrical power line indicator light, illuminated with mains power On, flashing with mains power Off.

7 Inverter indicator light, Off with mains power present, illuminated with mains power Off and pump running.

8 Battery charge indicator light, flashing during charging, steadily illuminated with batteries fully charged.

N.B.: The three indicator lights flash simultaneously when the unit detects an alarm condition (overload).

CONNECTIONS PANEL

1 Cable gland for connection to electrical mains supply

2 Cable gland for connection of electropump 1

3 Cable gland for connection of electropump 2 (only systems with dual alternate output)

4 Cable gland for optional connections and connections to floats

5 Cooling air ventilation grille (terminal boards access panel)

6 SOCCORRER serial number label

1.4. Sizing

1.4.1. Electropump sizing

On the basis of the exposed surface and the pressure head (basic data for sizing) the flow rate of the installed electropump necessary to ensure optimal operation of the plant can be calculated.

Example:	Exposed area	110m^2
	Surface and other exposed areas	22m^2
	Total surface area	132m^2
	Pressure head	3 m

Formula: Total surface area x 1.5 = litres/minute
132 x 1.5 = 198 l/m

This means that we need an electropump providing a flow rate of 198 l/m with a 3 m pressure head.

1.4.2. Sizing of the flood protection controller

To ensure correct sizing of the controller to be installed you need to know the following:

- how many electropumps are to be used;
- their technical specifications;
- the method of use of the electropumps.

There are four possible cases:

- INSTALLATION OF ONE ELECTROPUMP (single output)
  In this case, find the nominal current draw of the electropump and correlate this value with the maximum electropump current data of the flood protection controllers, as indicated in the table.
  N.B.: If the electropump to be installed is not equipped with a float, it must be started with a float connected directly to the flood protection controller.

  E.g.: Assuming the nominal current draw of the electropump is 3.4A, you need a 1000VA flood protection controller, with maximum electropump current of 3.8A.

- INSTALLATION OF TWO INDEPENDENT ELECTROPUMPS (single output)
  In this case, given the nominal current draw of the electropumps, first sum the values together and then compare the result with the flood protection controller's maximum electropump current data given in the table.
  N.B.: If the electropumps are installed in the same sump, they must be mounted at the same height, without integral floats and started by a single float connected directly to Soccorrer unit.
  On the contrary, if the pumps are installed in different sumps, each pump must be controlled by its own integral float.

  E.g.: In the case of two electropumps, respectively with nominal current draw of 3.4A and 4.3A, the total current draw is 7.7A; in this case you need a 2500VA flood protection controller with maximum electropump current of 9.6A.

- INSTALLATION OF A PAIR OF ELECTROPUMPS IN ALTERNATION MODE (dual alternated output)
  In this case, first of all the two electropumps must share the same technical specifications; given the nominal current draw we can compare this value with the maximum electropump current data of the flood protection controllers, shown in the table.
  N.B.: The two electropumps must be installed in the same sump and at the same height.
  In the case of two electropumps with integral float, both floats must rise; after this condition one of the two electropumps will be started, and at the next operation the other electropump will be started.
  In the case of two electropumps without integral float, you can connect the flood protection controller to an operating float and at each enable signal the controller will start the electropumps in alternated mode.

  E.g.: In the case of two electropumps, respectively with nominal current draw of 3.4A and 3.4A, we need a 1000VA Flood Protection Controller with maximum electropump current of 3.8A.

- INSTALLATION OF A PAIR OF ELECTROPUMPS IN ALTERNATION AND SIMULTANEOUS MODE (dual alternated output)
  In this case the two electropumps must share the same technical specifications; we now sum together the nominal current draw values of the two electropumps and then compare the resulting value with the maximum electropump current data of the flood protection controllers, shown in the table.

  N.B.: also in this case the two electropumps must be installed in the same sump and at the same height.
  In the case of two electropumps with integral float, both the floats must rise; after this condition one of the two electropumps will be started, and at the next operation the other electropump will be started.
  Simultaneous starting occurs on receipt of an enable signal from a third float connected to the flood protection controller and located approximately 10 cm higher than the pump floats.
  In the case of two electropumps without integral float, connect an operating float to the flood protection controller and at each enable signal from this float the controller will start the pumps alternately; simultaneous starting occurs on receipt of the enable signal from a second float connected to the controller and located approximately 10 cm higher than the operating float (alternation).

  E.g.: In the case of two electropumps, each with nominal current draw of 3.4A, the total power draw is 6.8A; in this case we need a 2000VA flood protection controller with maximum electropump current of 7.6A.

1.4.3. Battery sizing

When selecting the batteries to combine with the anti-flood system we recommend calculating run time before recharging of between 1 and 2 hours; making a theoretical calculation, considering that in the case of rain a correctly sized electropump will run for one minute every 10, the system will operate for 6 minutes each hour, so total pump run time on battery power will be between 10 and 20 hours.

GUIDELINE TABLE FOR RUN TIME CALCULATION

	Socc. 600	Socc. 1000	Socc. 1500	Socc. 2000	Socc. 2500	Socc. 3000	Socc. 4000	Socc. 5000
No. of batteries	2	4	4	4	4	4	4	4
45Ah battery	65	85	54	40	31	27	19	15
50Ah battery	75	95	60	45	35	30	22	18
60Ah battery	90	115	72	54	42	36	27	21
70Ah battery	105	140	88	63	51	43	31	25
80Ah battery	130	165	100	72	60	51	37	28
90Ah battery	148	190	110	85	67	59	42	32
100Ah battery	164	220	130	95	75	66	50	38
180Ah battery	330	500	270	190	160	135	96	72
200Ah battery	400	570	310	220	180	155	107	85

The above values are relative to continuous operation at the maximum flow rate; clearly, if the sump and electropump have been sized correctly, run times will be discontinuous so system operating autonomy will be greater. We recommend the batteries in the coloured area of the table to obtain autonomy at maximum power that ensures an adequate safety margin.

N.B.: If the anti-flood system is installed in a garage, in technical premises, or in places subject to specific regulations, **hermetically sealed** batteries must be employed.

1.4.4. Sizing of cables

The system power cables must be suitable sized on the basis of the power draw and the cable length.
The electropumps are supplied complete with a power feeding cable sized on the basis of its length. If the cable must be extended calculate the additional cable cross section in such a way as to avoid voltage drops on the power line.

1.4.5. Sizing Tables

The following tables show various sizes of electropumps and power supply units on the basis of the total exposed surface area, expressed in m^2, with a pressure head of 3 m.

SELECTION OF THE ANTI-FLOOD SYSTEM

- In the table, find the maximum exposed area in compliance with the requirements of the application in order to select the most suitable electropump.
- Now find the required run time in minutes in order to select the correct SOCCORRER complete with batteries.

TABELLA AUTONOMIE SOCCORRER ** (minuti)		MODELLO POMPA	NOVA 180 	NOVA 200 	NOVA 300 	NOVA 600 	FEKA 600 	FEKA VS - VX 550 	FEKA VS - VX 750 
SUPERFICIE TOTALE SCOPERTA (m^2)			40	95	125	190	150	160	230
MODELLO	Funzionamento	N° Batterie							
SOCCORRER 500	SINGOLA USCITA	4 x 18 Ah	106	63	60				
SOCCORRER 600	SINGOLA USCITA DOPPIA USCITA (in alternanza)	2 x 45 Ah	166	100	93				
		2 x 60 Ah	230	138	129				
	DOPPIA USCITA (in coppia)	2 x 45 Ah	83	x	x				
		2 x 60 Ah	115	x	x				
SOCCORRER 1000	SINGOLA USCITA DOPPIA USCITA (in alternanza)	4 x 45 Ah		215	202	95			
		4 x 60 Ah		291	273	129			
		4 x 100 Ah		557	523	246			
	DOPPIA USCITA (in coppia)	4 x 45 Ah		108	101	x			
		4 x 60 Ah		146	137	x			
		4 x 100 Ah		279	261	x			
SOCCORRER 1500	SINGOLA USCITA DOPPIA USCITA (in alternanza)	4 x 60 Ah			257	121	95	98	80
		4 x 100 Ah			463	218	172	176	144
	DOPPIA USCITA (in coppia)	4 x 60 Ah			128	x	x	x	x
		4 x 100 Ah			232	x	x	x	x
SOCCORRER 2000	SINGOLA USCITA DOPPIA USCITA (in alternanza)	4 x 60 Ah				121	95	98	80
		4 x 100 Ah				212	168	172	141
	DOPPIA USCITA (in coppia)	4 x 60 Ah				60	x	x	x
		4 x 100 Ah				106	x	x	x
SOCCORRER 2500	SINGOLA USCITA DOPPIA USCITA (in alternanza)	4 x 60 Ah					94	96	79
		4 x 100 Ah					167	171	140
	DOPPIA USCITA (in coppia)	4 x 60 Ah					47	48	x
		4 x 100 Ah					84	86	x
SOCCORRER 3000	SINGOLA USCITA DOPPIA USCITA (in alternanza)	4 x 60 Ah							81
		4 x 100 Ah							148
	DOPPIA USCITA (in coppia)	4 x 60 Ah							40
		4 x 100 Ah							74
SOCCORRER 4000	SINGOLA USCITA DOPPIA USCITA (in alternanza)	4 x 100 Ah							148
		4 x 180 Ah							284
	DOPPIA USCITA (in coppia)	4 x 100 Ah							74
		4 x 180 Ah							142

TABELLA AUTONOMIE SOCCORRER ** (minuti)		MODELLO POMPA	FEKA VS - VX 1000 	FEKA VS - VX 1200 	DRENAG 1000 	DRENAG 1200 	DRENAG 1400 	FEKA 1400 
SUPERFICIE TOTALE SCOPERTA (m^2)			300	310	230	300	385	385
MODELLO	Funzionamento	N° Batterie						
SOCCORRER 2000	SINGOLA USCITA DOPPIA USCITA (in alternanza)	4 x 60 Ah	62					
		4 x 100 Ah	109					
SOCCORRER 2500	SINGOLA USCITA DOPPIA USCITA (in alternanza)	4 x 60 Ah	61	47	67	54	44	47
		4 x 100 Ah	109	83	120	96	78	85
SOCCORRER 3000	SINGOLA USCITA DOPPIA USCITA (in alternanza)	4 x 60 Ah	62	48	69	55	45	49
		4 x 100 Ah	114	88	127	101	83	89
SOCCORRER 4000	SINGOLA USCITA DOPPIA USCITA (in alternanza)	4 x 100 Ah	115	88	127	101	83	89
		4 x 180 Ah	220	169	243	195	159	172
	DOPPIA USCITA (in coppia)	4 x 100 Ah	57	x	63	51	x	x
		4 x 180 Ah	110	x	122	97	x	x
SOCCORRER 5000	SINGOLA USCITA DOPPIA USCITA (in alternanza)	4 x 100 Ah		88	127	101	83	89
		4 x 180 Ah		167	240	192	157	169
	DOPPIA USCITA (in coppia)	4 x 100 Ah		44	63	51	41	45
		4 x 180 Ah		83	120	96	78	85

2. INSTALLATION

2.1. Introduction

This section illustrates the procedures for physical installation of the system. Do not connect the mains power supply or the batteries at this stage; system commissioning is discussed in the next section of the manual.

Installation must anyway be executed in compliance with statutory legislation.

2.2. Positioning

2.2.1. CONTROLLER

The controller must be sited in a position in which access to the interior components is not restricted.
The place of installation must be well ventilated.
Do not install the controller in dusty or humid places or in locations where it might be subject to vibration or impact.
Do not install the controller in places where it may be exposed to direct sunlight - risk of impairing correct operation.
Metal residues could damage the printed circuits irreversibly when they are supplied with power.

Wall fixing is facilitated by a support bracket (Figure 1) that must be mounted to the wall, ideally with the aid of a spirit level to ensure correct positioning. This makes it possible to mount the controller extremely easily.
The fixing system must be of good quality to ensure it is cable of supporting the full weight of the controller.

2.2.2. BATTERIES UNIT

The batteries unit must be installed alongside or below the controller. Do not install the batteries above the controller.
The position of installation must be easily accessible for maintenance purposes.
The place of installation must be well ventilated.
The fixing system of the racks must be of good quality to ensure the racks are capable of supporting the full weight of the installed batteries.

Figure 1

2.2.3. ELECTROPUMPS

The electropumps must be positioned a few centimetres above the sump base to prevent fouling.
Observe the correct cross-section of the delivery port of the electropump in order to ensure the correct flow rate as shown in the pump technical data.
Position the pumps in such a way that the operating floats are perfectly free moving.
If the power cords must be extended, use cables of suitable cross-section. We advise against installing junction boxes inside the sump, even if the boxes are perfectly water-tight.

N.B.: In the case of installation of systems with dual alternate output, it is mandatory to install the two electropumps on the same level.

2.2.4. INSTALLATION EXAMPLES

Figure 2

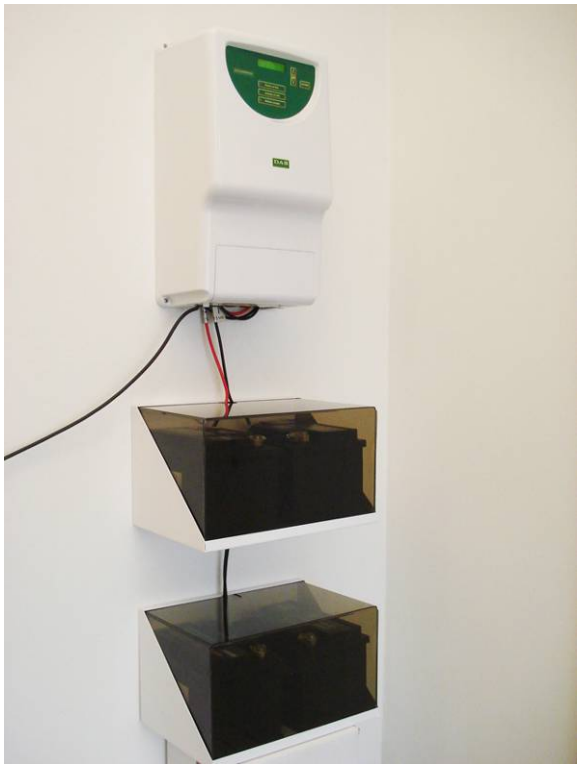


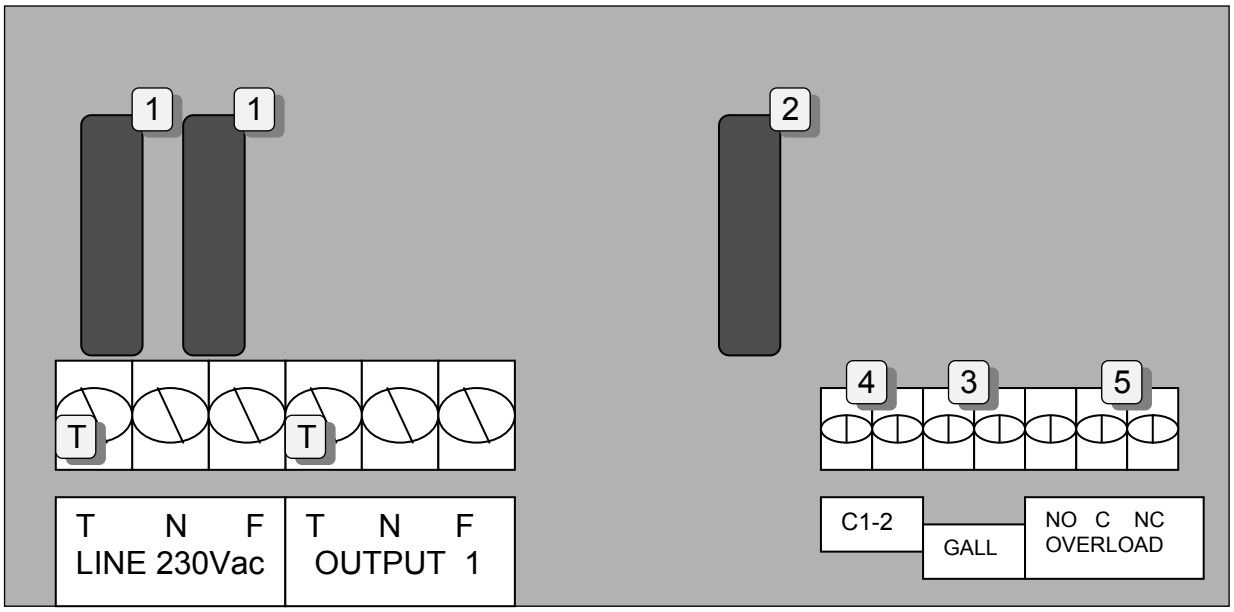
Figure 3

2.3. Electrical Connections

After positioning the parts that make up the anti-flood system, make the electrical connections.

All electrical connections must be made with the electrical power disconnected.
The system must be connected to EARTH.

POSITIONING OF SINGLE OUTPUT SOCCORRER CONNECTIONS



Opening the lower panel reveals the terminals for the electrical connections.

1 Mains input fuses

2 Output fuses

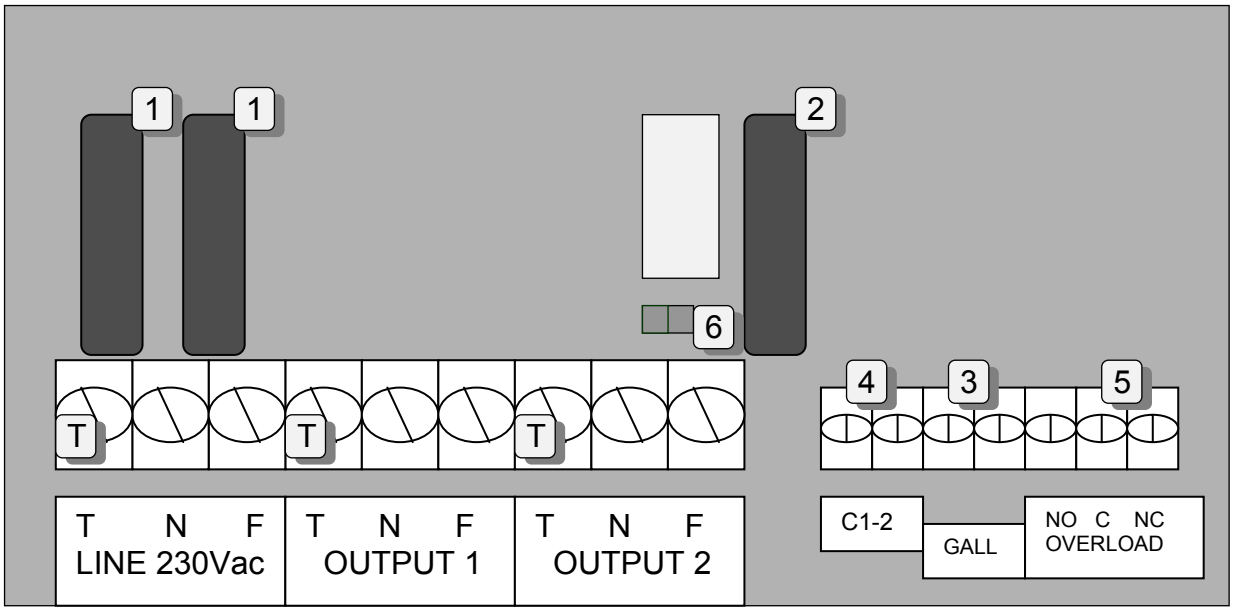
3 GALL terminals to which to connect the operating contact in the case of configuration with ACL 00 (Electropump without float)

4 Terminals C1-2 to which to connect the safety or back-up float (if present) to the operating float

5 Voltage free contact terminals for remote alarm signal

T Earth line connection terminals

POSITIONING OF SINGLE OUTPUT SOCCORRER CONNECTIONS



INTERIOR OF DUAL OUTPUT SOCCORRER

1 Mains input fuses

2 Output fuses

3 GALL terminals to which to connect the SOCCORRER operating contact (Float)

4 Terminals C1-2 to which to connect the simultaneity float, which will start both electropumps (In single output systems this becomes the safety float)

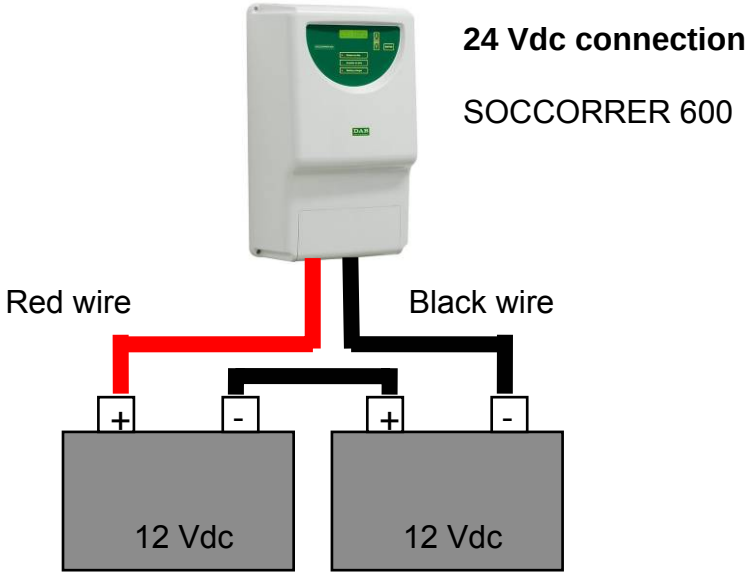
5 Voltage free contact terminals for remote alarm signal

6 Insert pin PS1 if simultaneous operation of the electropumps is envisaged

T Earth line connection terminals

2.4. Battery connections

In this procedure **pay attention to battery polarity**; even momentary polarity inversion will cause serious electrical damage!
Make all the connections with the **exception of connection 1.** (see Figure 4 and Figure 5)
This latter connection will be made later.



INSTALLATION EXAMPLES

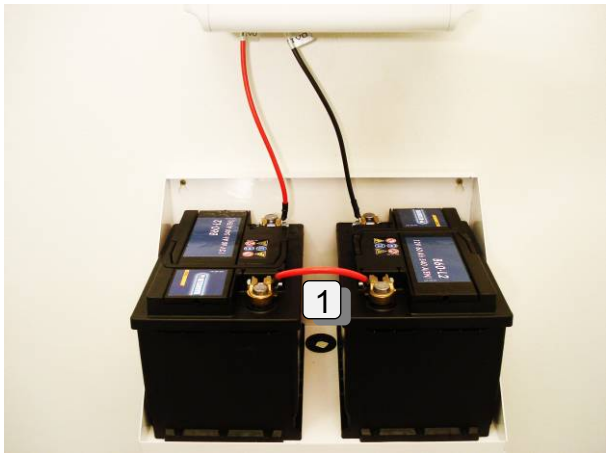
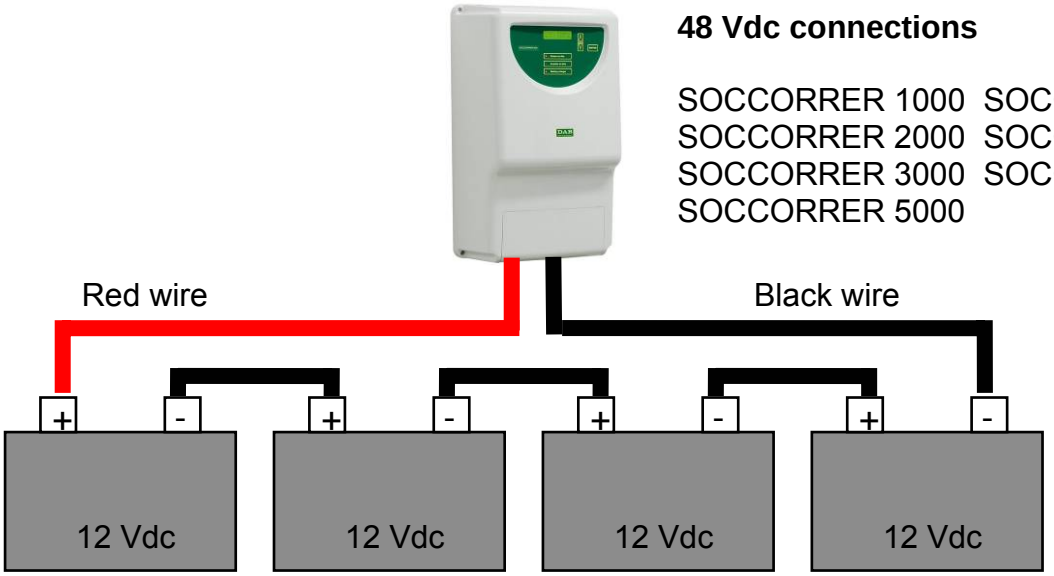


Figure 4



INSTALLATION EXAMPLES

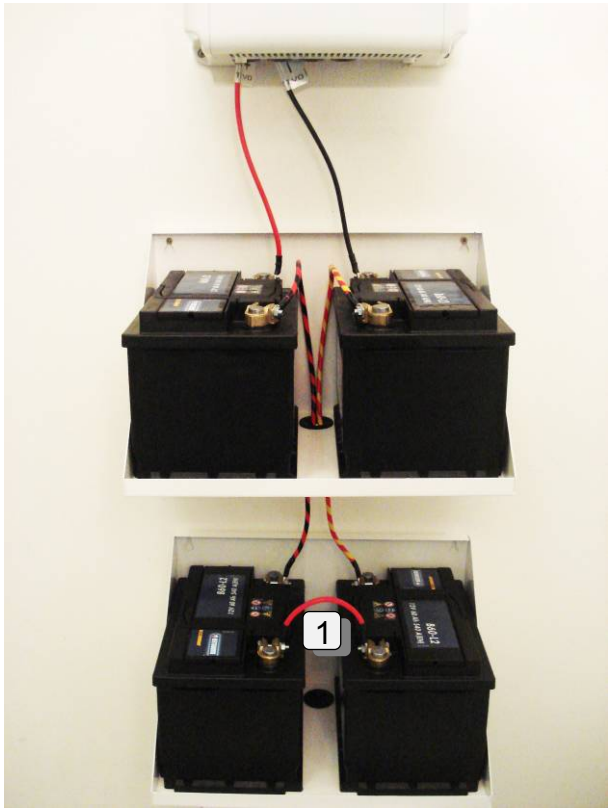


Figure 5

3. COMMISSIONING

3.1. Introduction

Commissioning involves checking that all the connections are correct and that the appliance is functioning correctly. **The system must have been installed in compliance with the instructions given in the previous section of this manual.**

3.2. First start-up

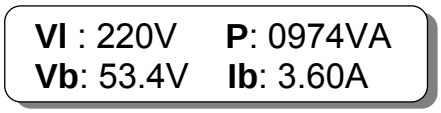
Make sure the operating floats are not transmitting a start enable signal.

- Make the final connection **1** of the batteries unit thus closing the set of batteries (USE CAUTION, closing this circuit may cause sparking);
- The system can be started in two different manners: by connecting mains power, or by pressing the ENTER button on the front panel. The system will start only if the battery voltage is higher than **40V** (**20V** for Soccorrer 600)

- When SOCCORRER is started, the display will show the manufacturer's logo and the model of the equipment

- After 3 seconds the display will show this screen

- After 60 seconds, or when ▲ is pressed, the display will show the main operating page: **SOCC. MONITOR**



The SOCCORRER MONITOR function displays the main electrical parameters:

Vl = mains voltage
P = electropump power consumption
Vb = battery voltage
Ib = battery charging current. When the mains power is off, instead of "**Ib**" the letters "**Il**" will be displayed
Il = electropump current consumption

N.B.: ALL FUNCTIONS OF THE UNIT WILL BE OPERATIONAL ONLY WHEN THE DISPLAY SHOWS THE ABOVE MAIN OPERATING PAGE!

3.3. Operating modes

For all the functions to be active, the flood protection controller display must show the main page (Soccorr. Monitor).

With the float(s) at rest, there will be no power on the output terminals irrespective of the presence or absence of mains power.

With mains power present, the flood protection controller will keep the batteries charged by means of regular charging cycles.

When mains power is present, if the floats generate an enable signal, the flood protection controller will feed the electropumps, bypassing the line voltage.

When mains power is lost, if the floats generate an enable signal, the flood protection controller will feed the electropumps from the batteries.

If the electropump current draw exceeds the maximum deliverable current, the flood protection controller will signal an overload; if the current draw exceeds 10% the electropump will be disconnected followed by an automatic reset after 10 seconds. In the case of alternation mode configuration, after 10 seconds the unit will switch to the other electropump.

The voltage free contact for the remote alarm signal will be activated when the flood protection controller disconnects the electropump due to overload conditions.

Each time the main operating page is closed, when it is re-opened the flood protection controller will perform a charging cycle automatically.

THE FOLLOWING SECTION DESCRIBES THE NUMEROUS OPERATIONAL POSSIBILITIES OF THE SYSTEM

- INSTALLATION OF AN ELECTROPUMP WITH INTEGRAL FLOAT (OUT 01; ACL 01)
  In this situation the flood protection controller will feed the electropump as soon as the relative float generates the enable signal.
  When the float enable signal falls, the flood protection controller will take approximately one second to disconnect power from the electropump.
  (See Figure 6)

- INSTALLATION OF AN ELECTROPUMP WITH FLOAT CONNECTED TO THE FLOOD PROTECTION CONTROLLER (OUT 01; ACL 00)
  In this situation the flood protection controller will feed the electropump as soon as the operating float (GALL) generates the enable signal.
  When the float enable signal falls, the flood protection controller will take approximately one second to disconnect power from the electropump.
  (See Figure 6)
  N.B.: In this configuration a safety float or back-up float can be connected to ensure continued operation of the system in the event of a malfunction of the operating float. (GALL=C1-2)

- INSTALLATION OF TWO OR MORE ELECTROPUMPS WITH INTEGRAL FLOAT (OUT 01; ACL 01)
  In this situation the flood protection controller will feed the electropump whose float generates the relative enable signal.
  The flood protection controller will continue to supply power as long as at least one of the electropump floats provides the enable signal.
  When none of the floats provides an enable signal, the flood protection controller will take approximately one second to disconnect power from the electropump.
  (See Figure 6)

- INSTALLATION OF TWO OR MORE ELECTROPUMPS WITH FLOAT CONNECTED TO THE FLOOD PROTECTION CONTROLLER (OUT 01; ACL 00)
  In this situation the flood protection controller will feed the electropumps simultaneously as soon as the operating float (GALL) generates the enable signal.
  When the float enable signal falls, the flood protection controller will take approximately one second to disconnect power from the electropumps.
  (See Figure 6)
  N.B.: In this configuration a safety float or back-up float can be connected to ensure continued operation of the system in the event of a malfunction of the operating float. (GALL=C1-2)

- INSTALLATION OF A PAIR OF ELECTROPUMPS IN ALTERNATION WITH INTEGRAL FLOAT (OUT 02; ACL 01)
  In this situation the flood protection controller will feed one of the two electropumps as soon as both the floats generate the enable signal.
  When the floats no longer provide the permissive, the flood protection controller will take approximately one second to disconnect power from the electropump.
  The next time an enable signal is generated, the flood protection controller will feed power to the other pump.
  (See Figure 7)

- INSTALLATION OF A PAIR OF ELECTROPUMPS IN ALTERNATION WITH FLOAT CONNECTED TO THE FLOOD PROTECTION CONTROLLER (OUT 02; ACL 00)
  In this situation the flood protection controller will feed the one of the two electropumps as soon as the operating float (GALL) generates the enable signal.
  When the float enable signal falls, the flood protection controller will take approximately one second to disconnect power from the electropump.
  The next time an enable signal is generated, the flood protection controller will feed power to the other pump.
  (See Figure 7)
  N.B.: In this configuration a safety float or back-up float can be connected to ensure continued operation of the system in the event of a malfunction of the operating float. (GALL=C1-2)

- INSTALLATION OF A PAIR OF ELECTROPUMPS IN ALTERNATION AND SIMULTANEITY WITH INTEGRAL FLOAT (OUT 02; ACL 01)
  In this situation the flood protection controller will feed one of the two electropumps as soon as both their floats generate the enable signal; for simultaneous starting of both electropumps, the simultaneity float (C1-2) must provide the enable signal.
  When the simultaneity float enable signal falls, the electropump that started first will continue to run
  When the electropump floats no longer provide the enable signal, the flood protection controller will take approximately one second to disconnect power from the electropump.
  (See Figure 7)
  The next time an enable signal is generated, the flood protection controller will feed power to the other pump.
  N.B.: To use the simultaneity function, it is mandatory to insert pin PS1.

- INSTALLATION OF A PAIR OF ELECTROPUMPS IN ALTERNATION AND SIMULTANEITY WITH FLOAT CONNECTED TO THE FLOOD PROTECTION CONTROLLER (OUT 02; ACL 00)
  In this situation the flood protection controller will feed the one of the two electropumps as soon as the operating float (GALL) generates the enable signal;
  for simultaneous starting of both the electropumps, the simultaneity float (C1-2) must provide the enable signal.
  When the simultaneity float enable signal falls, the electropump that started first will continue to run.
  When the float enable signal falls, the flood protection controller will take approximately one second to disconnect power from the electropump.
  The next time an enable signal is generated, the flood protection controller will feed power to the other pump.
  (See Figure 7)
  N.B.: To use the simultaneity function, it is mandatory to insert pin PS1.
  The simultaneity float functions also as a back-up for the operating float.

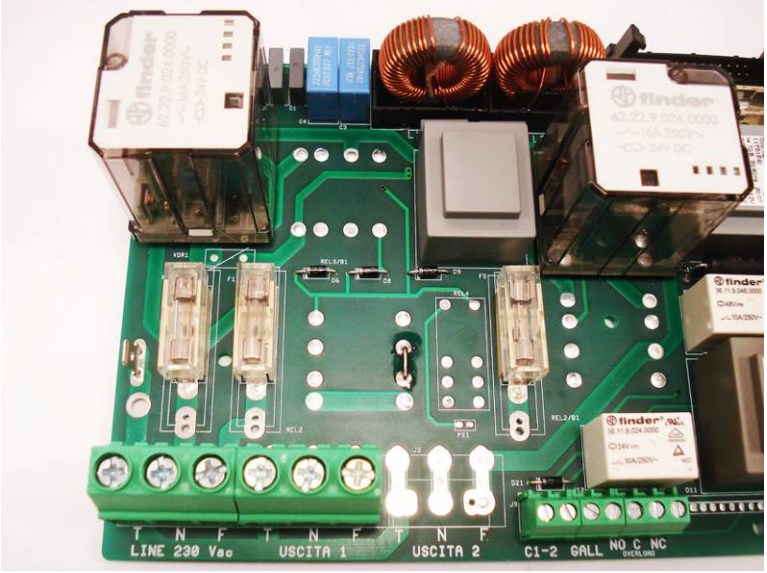


Figure 6

Ошибка! Стиль не определен. Ошибка! Стиль не определен.

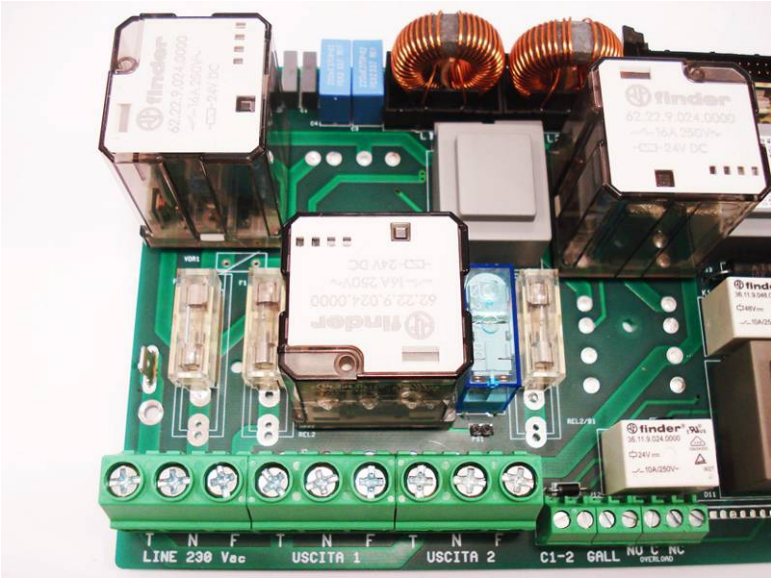

finder
T N F T N F T N F
LINE 230 Vac
USCITA 1
USCITA 2
C1-2 GALL NO C NC
OVERLOAD

Figure 7

4. SOFTWARE FUNCTIONS AND VIDEO PAGES

4.1. Introduction

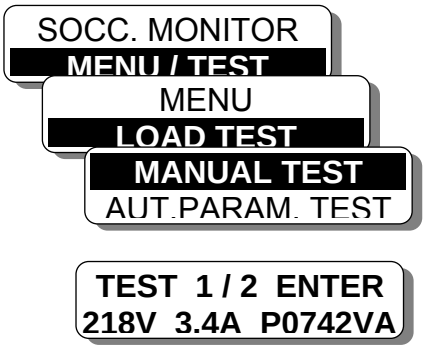
This section describes the main functions of Soccorrer.

Use the ▲ and ▼ buttons and ENTER to bring up the flood protection controller menus on the display.
For rapid and easy interpretation of this manual the paths to follow to change from one menu to another are shown in bold type. The numerical data shown in the video pages of this manual are purely guideline.

All the functions programmed on the Flood protection controller, including operation of the electropump(s) both on the mains supply, on the battery supply, and in batteries control mode, are enabled only in SOCCORRER MONITOR video page. From any video page the SOCCORRER MONITOR function will be restored automatically after 60 seconds, allowing full operation of the system.
The Soccorrer Monitor page is NOT restored automatically from the TEST PAGES.

4.1.1. Electropumps manual test

The MANUAL TEST menu is accessed from the MAIN MENU by means of the screens shown alongside, by pressing the ▲ and/or ▼ buttons as indicated on the display.
The manual test can be performed only in installations with electropump(s) without float (ACL00), and hence with operating float connected on GALL.
The manual test screen shows that it is possible to activate electropump no.1 manually by holding down button ▲; if Soccorrer model has two alternate outputs, to activate electropump no.2 manually, hold down button ▼. When one of the two outputs has been activated, the second line of the display will show, in sequence from left to right, the current and voltage available on the output terminals and the power consumption of the electropump.



The test can be executed both with mains power present and absent.

4.1.2. Electropumps automatic test

The electropumps automatic test requires the setting of data that allow the unit to start the electropump(s) independently.
These data are as follows:

- **Time between tests**; or how frequently Soccorrer will perform the test (between 10 and 50 hours).
- **Duration of tests**; or the number of seconds for which the tests are performed (from zero to 60 sec.)

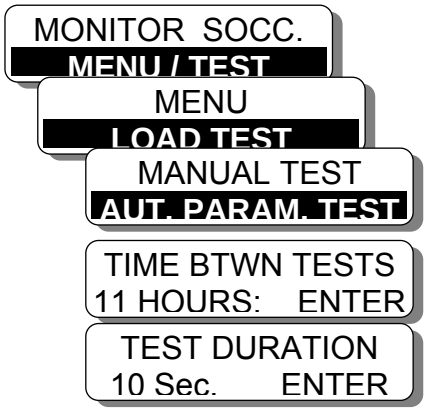
In the case of flood protection controllers with dual alternate outputs, the same time settings are considered and the tests are performed sequentially.
The video pages shown alongside indicate how to enter the setup menu, in which the times can be increased or decreased with the ▲ and ▼ buttons.
To switch from the TIME BETWEEN TESTS menu to the TESTS DURATION menu, press

ENTER

To inhibit automatic tests set the tests duration time to **0** (zero).

In the factory setting Soccorrer test duration is 10 seconds every 10 hours.

The manual and automatic test in a system configured for electropump(s) with integral float (ACL 01), are **not** settable.



In the case of an attempt to display the MANUAL TEST and AUTOMATIC TEST, the video page will be displayed.

NO LOAD
TEST IMPOSSIBLE

4.1.3. Overload or no load conditions

During normal operation or during manual or automatic tests anomalies may occur such as overload or zero load.
At the same time as the overload alarm the video page **(see alongside)** will be displayed, showing the maximum instantaneous value read before disconnection.
The video page will disappear automatically when the alarm terminates.

WARNING ! **Il : 5.6A**
OVERLOAD!

4.1.4. Soccorrer Log

This menu serves to check how many times Soccorrer has operated and the running hours of the electropump, both with mains power and with battery power.
To access these video pages follow the sequences illustrated alongside.
Soccorrer **INTERVENTIONS ON MAINS** page shows the number of interventions performed (max 99999) when mains power is present.
Soccorrer **INTERVENTIONS ON BATT** page shows the number of interventions performed (max 99999) when mains power is absent (inverter function).
The **OUTPUT FUNCT. TIME** page indicates the overall run time of the electropump shown in hours and minutes (max 99999 hours), both with and without mains power.

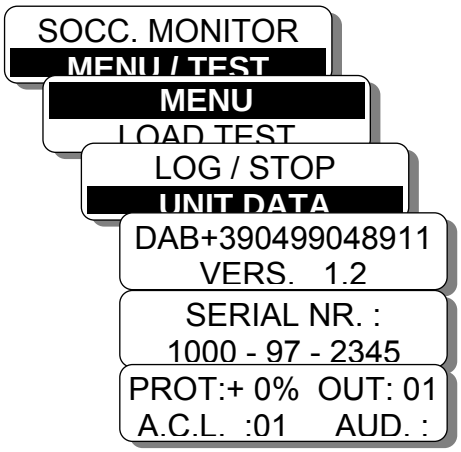
The **INV. FUNCT. TIME** indicates the overall run time of the electropump shown in hours and minutes (max 99999 hours), in battery mode (inverter function).
These values can be reset by following the instructions of the last three pages and entering the following four digit password: **9701**.
If the reset operations are performed correctly, the display will show the message RESET EXECUTED (as per last page shown alongside).

4.1.5. Machine data and system configuration

Following the pages shown alongside, in this menu you can view the phone number of your local technical service organisation, the system software version, and data for identification of the unit (serial number) and the system configuration.

The system configuration page is read-only and it contains the following information:

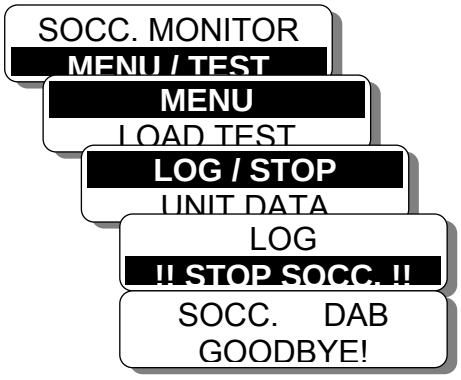
- **PROT: +00%** Shows the percentage value of increase of the overload threshold. This value may vary from +00% to +10%.
  In the basic configuration this value is set to +00%.
- **OUT:** Specifies the number of available outputs, which can be one or two in alternation.
  01: One output.
  02: Two outputs in alternation



- **ACL:** Indicates the type of startup of Soccorrer system.
  01: Startup with automatic control (electropump(s) with float).
  00: Startup by means of GALL contact (electropump(s) without float).
- **CIC:** Indicates whether or not the audible warning and alarm contact are active.
  01: Active
  00: Inactive.

4.1.6. System software shutdown

Total shutdown of Soccorrer can be achieved after disconnecting the mains supply and then navigating through the menus to **STOP SOCCORRER.**
Automatic shutdown occurs without mains power when the minimum battery voltage reaches **20 V** for Soccorrer 600, or **40 V** for all other systems.



5. CHANGING SOFTWARE SETTINGS

The following section illustrates the sequence of operations to perform to change the software settings.

- First of all Soccorrer unit must be switched off but with the batteries connected (if the unit is already running, perform the SYSTEM SOFTWARE SHUTDOWN procedure)
- Press ENTER and hold it down; the display will initially illuminate but will remain blank, then the following page will appear

  ↑↓ CODE:0000 ENT

  Release ENTER
- Use ▲ and ▼ to enter the number **8642** in place of the zeros
- Once the number has been entered, press ENTER, the following page will appear

  SET SERIAL No.:
  0000-00-0000

  where Soccorrer serial number will be shown in place of the zeros (it is advisable never to change this number!)
  A flashing cursor will appear on the final of the first 4 digits; press ENTER and the flashing cursor will move to the next 2 digits, then pressing again will cause the cursor to move to the other 4 digits. To change the number, use ▲ and ▼ when the cursor is on the series of numbers in question.
- Pressing ENTER when the cursor is on the four digits to the right will cause the display to change the screen so that the following page is displayed

  ADJUST
  PROTECTION:+00%

  with the cursor flashing on the zeros.
  This value shows the percentage increase of the overload threshold. This value may vary from +00% to +10%. In the basic configuration this value is set to +00%.
  To change the value use ▲ and ▼
  Do not increase the threshold unless this action is strictly necessary!
- Press ENTER again to open the following page

  OUT NUMBER: 01

This value specifies the number of available outputs, which may be one or two in alternation: **01 one output – 02 two outputs in alternation**

To change the setting use ▲ and ▼

- Press ENTER again to open the following page

ACL CONTROL: 01

This value shows the type of startup of Soccorrer system:
ACL 01: Startup with automatic control (electropump(s) with float)
ACL 00: Startup by means of optional GALL contact (electropump(s) without float)

To change the setting use ▲ and ▼

- Press ENTER again to open the following page

AUD. & RELAY: 01

This value indicates whether the audible warning and voltage free alarm contact are active:**01**: Active **00**: Inactive

To change the setting use ▲ and ▼

It is advisable to keep the audible warning and alarm contact active at all times, otherwise alarm signals may be missed.

- Press ENTER again to open the Soccorrer startup page.

N.B.: By changing even just one of the foregoing values, specifically OUT NUMBER and ACL CONTROL, correct operation of the system may be compromised.

6. TROUBLESHOOTING

6.1. Introduction

This section deals with any possible operating anomalies of the anti-flood system and the recommended methods for solving problems.
Anomalies are subdivided as follows:

- Generic anomalies concerning Soccorrer;
- Electropump starting anomalies;
- Electropump operating anomalies in the absence of mains power.

6.2. Generic faults

- SOCCORRER FAILS TO DETECT MAINS PRESENCE
  Check that mains power is effectively present on the “LINE 230Vac” terminals; if present, check the mains input fuses; if the fuses are OK, the fault may depend on the batteries supply board or the CPU board; perform an initial visual inspection of the two boards to check for possible burnt components; if no problems are found **first change the CPU board; if this fails to solve the problem, change the batteries supply board.**

- SOCCORRER FAILS TO CHARGE BATTERIES
  First of all check for the presence of mains power on the “LINE 230Vac” terminals and ensure the input fuses are OK. If mains power is not present or if the fuses are blown, reconnect mains power and/or change the fuses; if mains power is arriving correctly, the problem may be caused by incorrect batteries connections, by one or more open circuit battery elements, or because the batteries supply system is defective.
  First of all check the battery connections; if all is in order, if there are any open elements when mains power is disconnected the Vb will fall rapidly; to check the condition of the batteries start the electropump(s) in battery mode and track the fall-off of the Vb value: also in this case, if battery voltage drops rapidly this indicates that the batteries are not in optimal condition. If necessary, change the batteries.
  If the batteries are in good working order, to check operation of the batteries supply system proceed as follows:
  - with mains power present, break connection **1** (see Figure 4 or Figure 5): Soccorrer should switch off. **Change the battery supply board.**

- SOCCORRER CHARGES BATTERIES CONTINUOUSLY
  There may be two causes for this fault: one or more batteries has reached the end of its life cycle, or batteries power supply board fault.

  In the first case, on starting the electropump(s) pump run time in battery mode will be minimal; the Vb value will start to drop rapidly. **Change the batteries.**
  Even when just one battery has reached the end of its life cycle, always change all the batteries together.
  If the batteries are in good condition, break batteries connection **1** (see Figure 4 or Figure 5), set Soccorrer to charge mode and measure the voltage on the red and black wires coming out of the unit: the voltage will probably be greater than 28V (Soccorrer 600) or 56V (other Soccorrer versions). **Change the batteries supply board.**

- ONE OR MORE BATTERIES GETS HOT
  If one or more of the batteries tends to heat up, this indicates that the charge current is not being divided correctly over all the batteries: to check this situation, set Soccorrer to charge mode (see operating modes) and measure the voltage on each battery; this should show that the voltage on the various batteries is different. If the batteries have already been in use for several years **they should be changed.**
  On rare occasions it may occur that the battery that tends to overheat is the one connected to the positive red wire from Soccorrer: in this case invert the positions of this battery and the one currently connected to the black wire from Soccorrer and then re-check operation.
  If all the batteries tend to heat up, this means that the batteries are being overcharged: refer to the section of the manual immediately before the present section.

- WHEN MAINS POWER IS DISCONNECTED SOCCORRER SWITCHES OFF
  Generally this is due to the fact that the batteries are at the end of their life cycle or that one or more of the battery elements is open. First of all check that the batteries are connected correctly. This done, with Soccorrer powered on, measure the voltage (with a multimeter) on the red and black wires from Soccorrer; while measuring the voltage disconnect the mains power supply. In this case you should notice that the voltage value will initially drop rapidly and then it should return to near normal values. **Change the batteries.**

- SOCCORRER OFF
  First of all check for the presence of mains power on the “LINE 230Vac” terminals and ensure the input fuses are OK. If mains power is not present or if the fuses are blown, restore mains power or change the fuses: if Soccorrer switches on after this procedure, this means that the unit had switched off because the batteries had been drained. In this case simply wait for the batteries to recharge.

If the power supply is OK, this fault may be caused also by problems with the batteries, the batteries power supply board, or the CPU board power supply.
Starting with the unit connected to the mains supply, use a multimeter to check the voltage on the red and black wires coming from Soccorrer: if the reading is less than 20V (Soccorrer 600) or less than 40V (other Soccorrer versions), disconnect the red and black wires from Soccorrer and try to switch it on with batteries in good condition, or with a DC power supply unit having an output of 24Vdc or 48Vdc connected in place of the batteries): if Soccorrer switches on, this means that the problem was caused by the batteries: **Change the batteries.**
If Soccorrer fails to switch on, then the problem is related to the batteries supply board. **Renew the supply board.** In this condition however, it is anyway important to check that the batteries are in good condition.
In contrast, if the voltage is above 20V (Soccorrer 600) or above 40V (other Soccorrer versions), the problem may anyway be caused by the batteries power board or the CPU board power supply: perform an initial visual inspection of fuses **S** and **C** (see Figure 17) and the boards, to check for the presence of burnt-out components: if fuse **S** (switching) is blown, this indicates a faulty battery supply board, which should therefore be renewed; if fuse **C** is blown, this indicates a possible fault in the CPU power supply: change the fuse and then try switching on the system. If this fails, renew the CPU board.
If the visual inspection fails to reveal any problems, **first renew the batteries power supply board and then, if necessary, renew the CPU board.**

- DISPLAY ON BUT BLANK AND THREE INDICATOR LIGHTS STEADILY ILLUMINATED
  First of all switch off the Flood protection controller disconnecting also the batteries and the flat cable from the CPU board to the power stage board. Now try to switch the Flood protection controller on; if the problem has been solved, **renew the power stage board**. If the problem persists, the fault lies in the CPU board. **Renew the CPU board.**

- DISPLAY SHOWS POWER CONSUMPTION EVEN WHEN PUMPS ARE STOPPED
  First of all disconnect the electropump(s) power feeding cables from Soccorrer output terminals: if this solves the problem then the fault is caused by the electropumps or the relative power feeding line.
  If the fault persists, **renew the CPU board.**

- DISPLAY PAGES CHANGE SPONTANEOUSLY WITHOUT USER ACTION
  If this fault occurs when the user is not performing any actions, **renew the CPU board.**
  If the fault occurs when Soccorrer disconnects battery charge current, check whether Vb falls momentarily below 20V (Soccorrer 600) or 40V (other Soccorrer versions): if this occurs, **change the batteries.**

- CONSTANT OVERLOAD SIGNAL
  First disconnect the electropump(s) power feeding cables from Soccorrer output terminals; if this solves the problem, check the condition of the electropump(s) and the power feeding line.
  If the fault persists, **renew the CPU board.**

- AUDIBLE SOUND OF A RELAY SWITCHING CONTINUOUSLY INSIDE SOCCORRER UNIT
  This defect must be considered in relation to three possible cases:
  - <u>System with one electropump with integral float (ACL 01)</u>

    In this case the ACL system detects a load to be fed with power but the pump fails to start. Disconnect the electropump power feeding line (this should solve the problem) and perform the relevant checks. If the pump starts this means that no power draw is detected (see power indicated on the display in Soccorrer MONITOR function): perform an initial visual inspection of the CPU and batteries power supply boards to check for the presence of visibly damaged components, and if no problems are noted, **first renew the CPU board and then renew the batteries power supply board, if necessary.**

  -<u>System with two electropumps in alternation with integral float (ACL 01)</u>

    Generally in this case the fault occurs because Soccorrer unit detects just one of the two pumps. Therefore either just one of the two floats of the two electropumps is in the high position or one of the two output lines is generating a load on Soccorrer even with the floats in the low position.
    Check the position of the floats and if they are both low disconnect the electropumps feeding lines from the output terminals; this action should solve the problem. Now check the condition of the electropumps power feeding lines, the floats, and the electropumps. (Moisture in junction boxes or inside floats or damaged starting capacitors can cause the above problem). If the pumps start this means that no absorbed power is detected (see power indicated on the display in the SOCCORRER MONITOR function): perform an initial visual inspection of the CPU and batteries power supply boards to check for the presence of visibly damaged components, and if no problems are noted, **first renew the CPU board and then renew the batteries power supply board, if necessary**.

  -<u>System with one or two electropumps with separate float (ACL 00)</u>

    In this case the fault occurs because the operating float is generating an enable signal to start the electropump(s) and Soccorrer fails to detect power absorption.

In this case check the output fuse and if it is OK check the electropump power feeding lines; if also this check fails to reveal any problems, the problem lies in the reading of the absorbed power (see power shown by the display in the SOCCORRER MONITOR function): perform an initial visual inspection of the CPU and batteries power supply boards to check for the presence of visibly damaged components, and if no problems are noted, **first renew the CPU board and then renew the batteries power supply board, if necessary.**

- MAINS INPUT FUSES BLOWN
  Blown fuses can be caused by a faulty battery power supply or excess power absorption by the electropump(s) (although in this latter case the output fuse will usually blow too). Disconnect the mains power supply, change the blown fuses and then reconnect the mains after checking that no enable signals for pump starting are currently present. If the fuses blow again, the problem is caused by the batteries power supply. **Renew the supply board.** If the fuses do not blow, try starting the pump (pump should not run empty but only as long as it is draining water) and then check the fuses.

- OUTPUT FUSES BLOWN
  In this case the fuses may blow exclusively because of an electropump(s) overload: check that the electropump(s) is(are) functioning correctly.

- VOLTAGE READING BETWEEN STEEL STRUCTURE AND PROTECTIVE EARTH CONDUCTOR
  Since the unit is equipped with a mains filter, if the connection with the earth line is faulty a potential of approximately 100Vac may be created between the steel frame and the earth conductor: restore correct electrical connection between the earth conductor and Soccorrer frame.

- SYSTEM CAUSES RESIDUAL CURRENT DEVICE TO TRIP
  In this case establish whether the problem is caused by Soccorrer or by the electropumps; disconnect the electropumps completely from Soccorrer and then connect the mains power supply: if the residual current device trips again, check the connections of the terminals inside Soccorrer; if no problems are detected then the cause must be the batteries power supply board, so **renew the board**.
  If the fault does **not** recur, check correct operation of the electropumps.

- BATTERIES POLARITY INVERSION
  This type of event will inevitably damage the batteries power supply board and the output power stage so these components must be **renewed** following polarity inversion. Polarity inversion may also damage the CPU board, which must be checked as follows: once you have changed the power stage and batteries supply boards, perform an initial visual inspection of the CPU board and, if there is no evident visible damage, try powering on Soccorrer.

If the unit powers on correctly, perform a series of general operating checks; if the unit fails to power on, **renew** also the CPU board (check the batteries power supply board fuse C at the same time - see Figure 17

- POWER OUTPUT STAGE CAPACITOR C10 BURST
  This capacitor may burst following battery polarity inversion (see previous heading) or because of an output overvoltage on the battery power supply circuit: this second case is associated with the situation in which Soccorrer keeps the batteries under charge constantly causing them to overheat and/or become contaminated with condensed acid vapour. **Change the power stage board and the batteries power supply board.** Check also the CPU board and then check the batteries.

- POWER OUTPUT STAGE CAPACITOR C9 BURST
  This capacitor may burst due to repeated starts of the electropumps on battery power when said starts require high torque such as to create repeated overloads of Soccorrer in rapid succession without any form of control being imposed.
  In this case check that the electrical specifications of the electropumps are within the parameters recommended for Soccorrer model installed and check also that the electropumps are functioning correctly (focusing in particular on starting characteristics).
  Finally, **renew** the power output stage and check the output fuse.

6.3. Electropump starting faults

This section is divided into several parts on the basis of the anti-flood system configuration.

FLOOD PROTECTION CONTROLLER WITH SINGLE OUTPUT FOR ELECTROPUMP WITH INTEGRAL FLOAT

When the operating float is raised the pump fails to start (in this case Soccorrer fails to detect the enable signal transmitted by the float):

- Check the output fuse.
- Check the setting of the ACL. CONTROL (must be set to 01)
- Check that Soccorrer display is showing the operating page.
- Try disconnecting the electropump from Soccorrer and connecting it directly to the mains power supply to check that it is functioning correctly.

- If the problem persists after the foregoing checks have been performed, **first renew the CPU board and then, if necessary, renew the batteries power supply board.**

The electropump runs constantly, even when the float is in its low position (Soccorrer is reading an enable signal from the float):

- Check the condition of the operating float.

FLOOD PROTECTION CONTROLLER WITH SINGLE OUTPUT FOR ELECTROPUMP WITHOUT FLOAT

When the operating float is raised the pump fails to start:

- Check the output fuse.
- Check that Soccorrer display is showing the operating page.
- Check that the float connected to GALL is functioning correctly. (in the enable position the contact on GALL should close)
- Try disconnecting the electropump from Soccorrer and connecting it directly to the mains power supply to check that it is functioning correctly.
- If the problem persists after the foregoing checks have been performed, **first renew the CPU board and then, if necessary, renew the batteries power supply board**.

The electropump runs constantly, even when the float is in its low position:

- Check that the operating float is functioning correctly and check also the safety float (the float contacts must be open when the floats are in the low position)
- Check the setting of the ACL. CONTROL (must be set to 00)

The electropump starts and stops (Soccorrer detects excessively low or zero absorbed power):

- Check that the absorbed power shown on the display while the electropump is draining water shows a value above 10% of Soccorrer rated power; if not, there are two possible reasons: either the electropump power draw is too low and should therefore be checked (e.g. with a clamp meter), or the voltage/amperage monitoring system is subject to a reading error; in this case, **renew** the CPU board.

FLOOD PROTECTION CONTROLLER WITH DUAL ALTERNATE OUTPUT FOR ELECTROPUMPS WITH INTEGRAL FLOAT

When the operating floats are raised the pumps fail to start (Soccorrer is not detecting the start enable signal transmitted by the floats):

- Check the output fuse

- Check the setting of the ACL CONTROL (must be set to 01)
- Check that Soccorrer display is showing the operating page
- Check that both electropump floats are in their high position
- Try disconnecting the electropumps from Soccorrer and connecting them directly to the mains power supply to check that they are functioning correctly
- If the problem persists after the foregoing checks have been performed, **first renew the CPU board and then, if necessary, renew the batteries supply board**

The electropumps run constantly, even when the floats are in their low position (Soccorrer is reading an enable signal from the floats):

- Check the condition of the operating floats.

When the float connected to C1-2 provides an enable signal for simultaneous starting of both electropumps, only one of the electropumps effectively starts running:

- Check that pin PS1 is correctly inserted.
- Check that the float connected to C1-2 is functioning correctly.

Audible sound of a relay switching continuously inside Soccorrer unit (Soccorrer detects the enable signal from just one float):

- Check that both floats are in their high position rather than just one of them.
- Check to ensure that one of the two electropump power feeding lines is not generating a false load in respect of the flood protection controller: to perform this latter check, disconnect the power feeding line of the electropump connected to output 2; if this solves the problem, check the disconnected line, otherwise disconnect the line connected to output 1 and check it.

DUAL ALTERNATE OUTPUT FLOOD PROTECTION CONTROLLER FOR ELECTROPUMPS WITHOUT FLOAT

When the operating float is raised the pumps fail to start:

- Check the output fuse.
- Check that Soccorrer display is showing the operating page.
- Check that the float connected to GALL is functioning correctly. (when the float is raised the contact on GALL should close)
- Try disconnecting the electropumps from Soccorrer and connecting them directly to the mains power supply to check that they are functioning correctly.
- If the problem persists after the foregoing checks have been performed, **first renew the CPU board and then, if necessary, renew the batteries power supply board**.

The electropumps run constantly, even when the operating float is in its low position:

- Check that the operating float is functioning correctly and check also the safety float, if present (the float contacts must be open when the floats are in their low position)
- Check the setting of the ACL CONTROL (must be set to 00)

The electropumps start and stop (Soccorrer detects excessively low or zero absorbed power):

- Check that the absorbed power shown on the display while the electropumps are draining water shows a value above 10% of Soccorrer rated power; if not, there are two possible reasons: either the electropumps power draw is too low and should therefore be checked (e.g. with a clamp meter), or the voltage/amperage monitoring system of Soccorrer is subject to a reading error; in this case, **renew the CPU board**.

When the float connected to C1-2 transmits an enable signal for simultaneous starting of both electropumps, only one of the electropump effectively starts running:

- Check that pin PS1 is correctly inserted.
- Check that the float connected to C1-2 is functioning correctly.

6.4. Electropump operating faults without mains power

INTENSE VIBRATION AT ELECTROPUMP STARTUP

This problem is caused by the power output stage, which is functioning on just one of the two circuit branches. **Renew power output stage board.**

INVERTER RUN INDICATOR LIGHT ILLUMINATES BUT ELECTROPUMP FAILS TO START

If failure to start of the electropump occurs exclusively when mains power is absent, the problem is caused by the power output stage, which has caused the power stage fuse to blow. **Change the power output stage board and the power output fuse.**

SOCCORRER SHUTS DOWN AS SOON AS THE PUMP STARTS

As the first step, check that the batteries are in good condition: if the voltage drops below 40V (20V for Soccorrer 600) at the time of electropump starting even momentarily, Soccorrer will shut down. Check by connecting a multimeter to the red and black output wires from Soccorrer and monitor the battery voltage at the time of electropump startup. If voltage anomalies are detected, **change the batteries.**

If the batteries are found to be in good condition, the problem is generally caused by the power output stage. **Renew the power output stage board.**

It may occasionally occur that this problem is caused by the CPU board; **renew the CPU board if necessary.**

AS SOON AS THE ELECTROPUMP STARTS THE DISPLAY SHOWS THE **SOCC. MONITOR / TEST MENU** PAGE

This type of anomaly is generally caused by a fault in the power output stage. However, before renewing the power stage check that the batteries are in good condition: connect a multimeter to the red and black output wires and monitor the battery voltage at the time of electropump startup. If the voltage tends to fluctuate downwards, the problem may be caused by a battery fault. In any case, if a fast fluctuation is detected the batteries should be checked.

In certain cases this problem may be caused by a faulty CPU board; **renew the CPU board if necessary.**

7. DISASSEMBLY

7.1. Introduction

This section illustrates the procedures for disassembly of Soccorrer so that the various circuit boards can be checked or replaced.
In all the following operations take **care to keep the various components of Soccorrer perfectly clean**. Therefore, the unit should be thoroughly cleaned inside and out.
Look out for the presence of oxide or other signs that could betray the presence of moisture inside Soccorrer: decide whether or not to change the conditions and place of installation of the unit.

WARNING: Soccorrer must be opened only in the absence of electrical power, i.e. with the mains power supply and the batteries disconnected.

7.2. Chassis Disassembly

The first step is to undo screws **5** and **6**, remove the cover and then undo screws **1**, **2**, **3** and **4**.

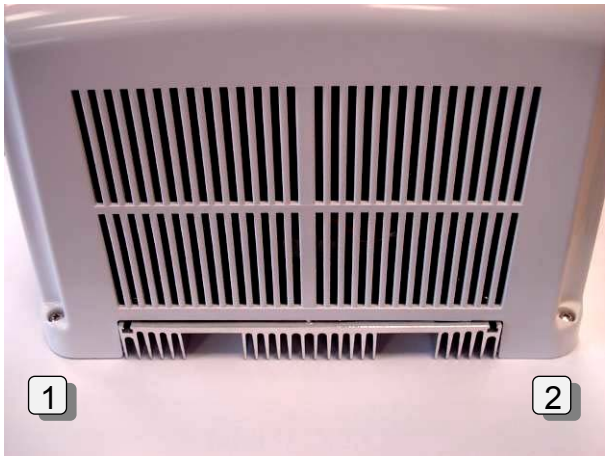


Figure 8

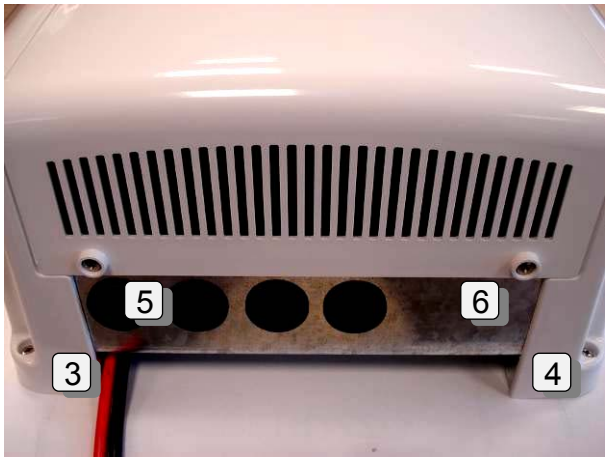


Figure 9

Lift the chassis from one side and unplug connectors **A** and **B**.

Figure 10

Connectors **A** and **B** are shown in Figure 11 and Figure 12.

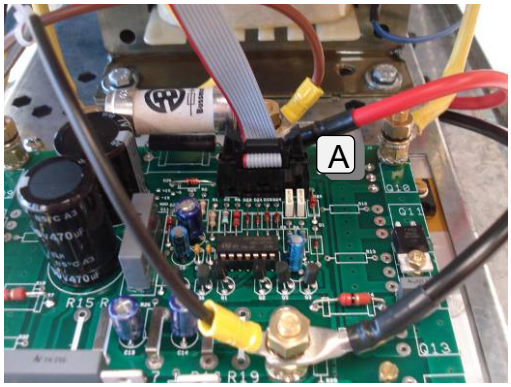


Figure 11

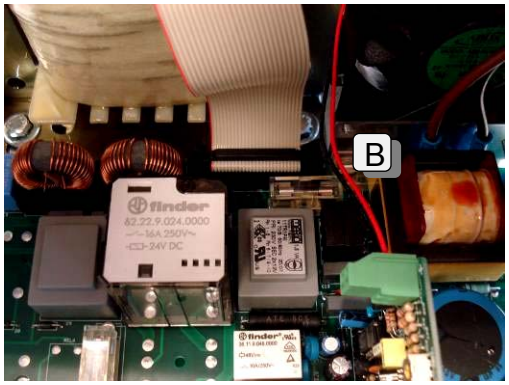


Figure 12

To unplug the connectors shift the two lateral ejector tabs outwards; this action will cause the connector to lift out of the socket and break the electrical connection.

7.3. Removing CPU Board

Undo screws **1**, **2**, **3** and **4** (Figure 13) and carefully lift the CPU board; use caution because the connector that links the board to the front panel buttons is located under the board (Figure 14).

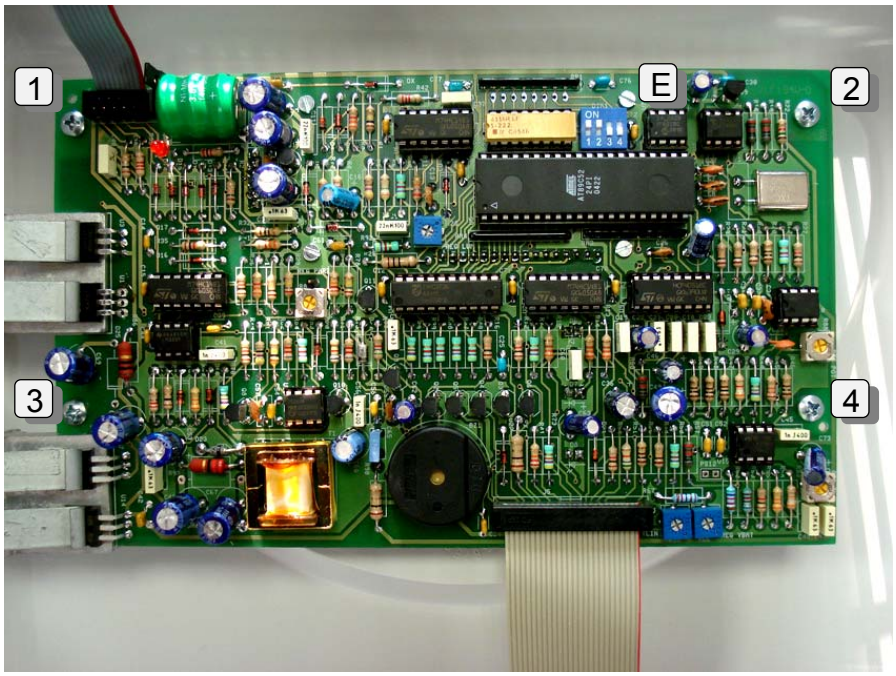


Figure 13

To disconnect the front panel connector simply extract it carefully from the edge connector on the CPU board.

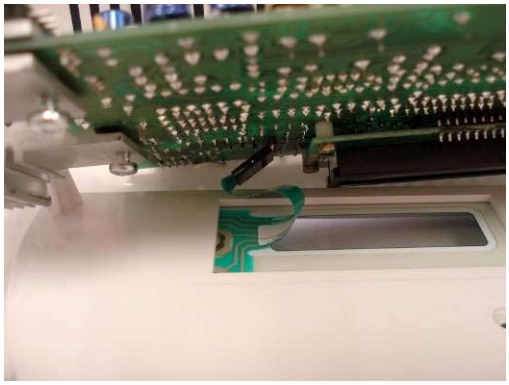


Figure 14

Figure 15

N.B.: if the CPU board must be changed, you must remove integrated circuit E (Figure 13) from the faulty board and fit it on the new board, using the maximum caution in relation to the integrated circuit pins and the direction of installation.
This operation is required because the memory of integrated circuit E contains the serial number of the unit and the operating settings.

7.4. Removing Power Supply Board

First of all disconnect: the wires of the fan inserted in terminal **C** (Figure 18), the wires from the power output stage board inserted in Faston connectors **A** and **B** (Figure 18), and the wires from the transformer secondary winding inserted in Faston connectors **D** and **E** (Figure 19).
Now undo screws **1**, **2**, **3**, **4** and **5**.

N.B.: during reassembly use caution in relation to the polarity of the wires from the fan and from the power output stage board.

Fan:	**red wire**	**= positive (+) terminal C**
	black wire	**= negative (–) terminal C**
Power Stage Board:	**brown wire**	**= positive (+) terminal B**
	black wire	**= negative (–) terminal A**

The wires from the transformer secondary circuit have no specific polarity!

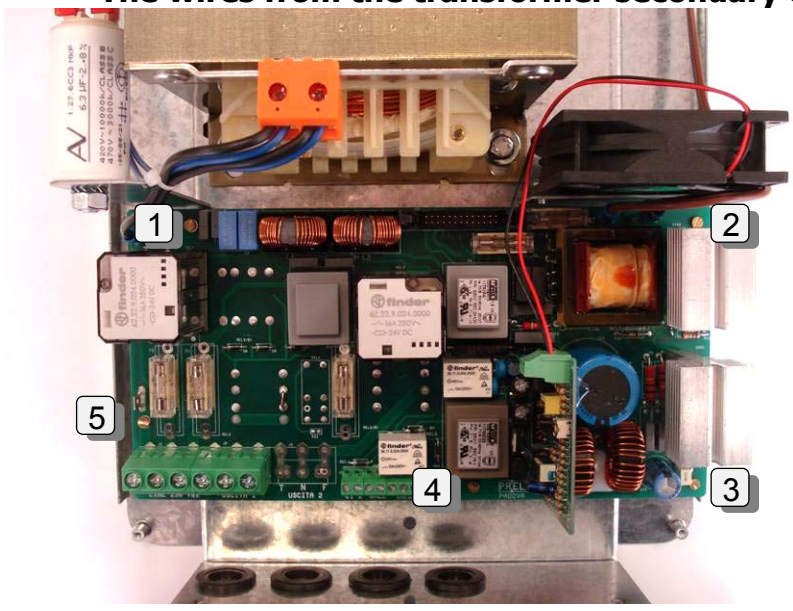


Figure 16

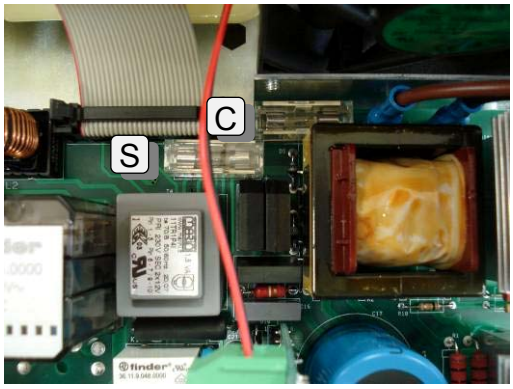


Figure 17

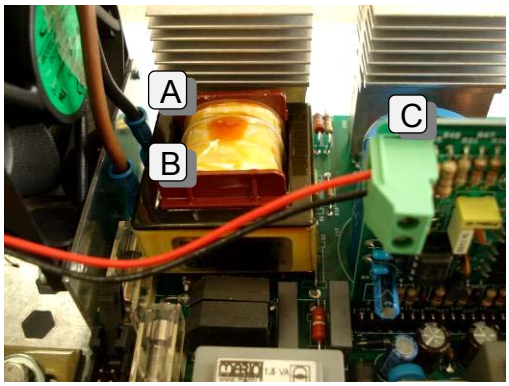


Figure 18

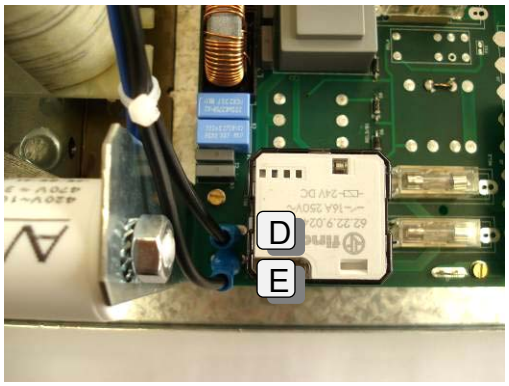


Figure 19

7.5. Removing Power Stage Board

The first step is to unscrew nuts **A**, **B**, **C**, **D** and **E** (Figure 20) and remove all the cable lugs inserted.
Now undo screws **1**, **2**, **3** and **4** (Figure 20) in order to lift out (in the direction of the arrow) the heat sink with the respective power output stage board.

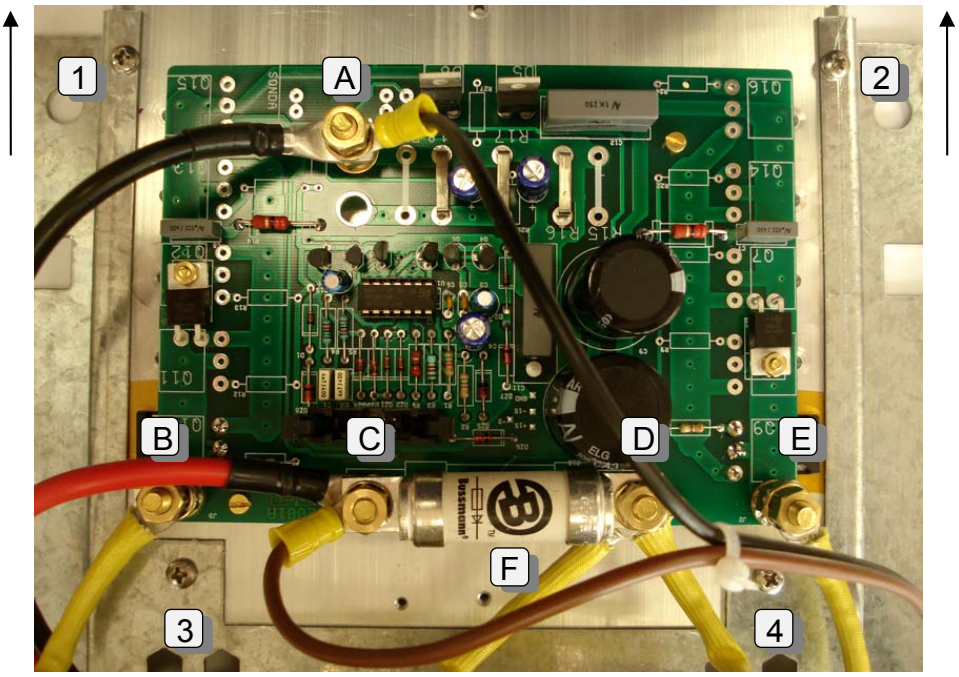


Figure 20

N.B.: during reassembly take care to tighten the nuts pre-mounted on the base of the board and use caution in relation to wire polarity.

Power supply wires:	**brown wire**	**= positive screw C**
	black wire	**= negative screw A**
Battery Wires:	**red wire**	**= positive screw C**
	black wire	**= negative screw A**