

<b>STRUCTURE OF THE CONTROL PANEL AND HOW IT WORKS</b>	<b>2</b>
<b>CONTROL PANEL MAIN COMPONENTS</b>	<b>2</b>
Keypads	2
LCD Viewer	4
<b>DETAILED DESCRIPTION OF THE FUNCTONS</b>	<b>8</b>
Functions	8
<b>GENERAL ADVICE ABOUT CORRECT USE AND MAINTENANCE OF THE SYSTEM:</b>	<b>14</b>
<b>FEATURES OF POWER SUPPLY UNIT Model AL320X</b>	<b>15</b>
<b>Model AL320X</b>	<b>15</b>
<b>Specifications</b>	<b>15</b>
Electrical	15
Size	15
Connections	15
<b>Conformity</b>	<b>16</b>
<b>Practical advice for use</b>	<b>16</b>
Set-up	16
Taking out of service	17
Battery disconnecter	17
Do not:	17
Solar panel	17
Warning Led L1 in Figura 2 (new feature)	17
<b>Application notes for installing solar panels.</b>	<b>19</b>
<b>Introduction</b>	<b>19</b>
<b>General Section</b>	<b>19</b>
<b>Case 1 : Assembly of a single Panel</b>	<b>20</b>
<b>Case 2 : Assembly of two panels</b>	<b>21</b>
<b>Indications of the Control unit LCD</b>	<b>21</b>
<b>POWER HUB FEATURES AND HOW IT WORKS</b>	<b>24</b>
<b>Model PH300S2</b>	<b>24</b>
Inputs	24
Outputs	24
<b>Electrical Specifications</b>	<b>24</b>
<b>Connectors</b>	<b>24</b>
<b>FEATURES OF NODE Model NSA10</b>	<b>27</b>
<b>Model NSA 10</b>	<b>27</b>
Inputs	27
Outputs	27
<b>Electrical Specifications</b>	<b>27</b>
<b>Connectors</b>	<b>27</b>

## STRUCTURE OF THE CONTROL PANEL AND HOW IT WORKS

### CONTROL PANEL MAIN COMPONENTS

#### Keypads

##### *Navigation keypad*

This comprises 4 keys (Figure 1) around a centre OK button on the right of the viewer and is shown below.



Figure 1

Their function varies depending on the context we are in and is described below:



Figure 2

The Figure 2 buttons allow you to:

- scroll the icons horizontally
- after selecting an icon, to set the status of the device controlled (e.g. ON/OFF) or set new values (e.g. clock).



Figure 3

The Figure 3 buttons allow you to:

- scroll the symbols on the viewer vertically;
- after selecting a symbol, scroll the items of the menus associated with each icon

The Figure 4 button allows you to:

- select a symbol to access the menus associated with it;
- return to the symbol navigation mode.



Figure 4

### Quick Keypad

This comprises the four keys (shown in the Figure Figure 5) just below the LCD viewer.



Figure 5

Each key has a little light (also called LED), which shows the status of the icon on it. Now let's see the functions connected with these keys in detail.

P1	Allows you to cut off or supply energy to all the users, thus it is actually a true main switch. The light on means that the electric system is powered, otherwise none of the services are supplied.
P2	This indicates the general lighting switch and allows you to cut off or supply power to all the lights present on the ceiling of the vehicle living quarters. <b>Green light ON = CEILING DISTRIBUTOR on, off = CEILING DISTRIBUTOR off.</b>
P3	This is the remote button for turning the pump on or off. Green light on = PUMP ON, off = PUMP OFF
P4	None.

LCD Viewer

The structure of the LCD viewer is the one shown in Figure 6:

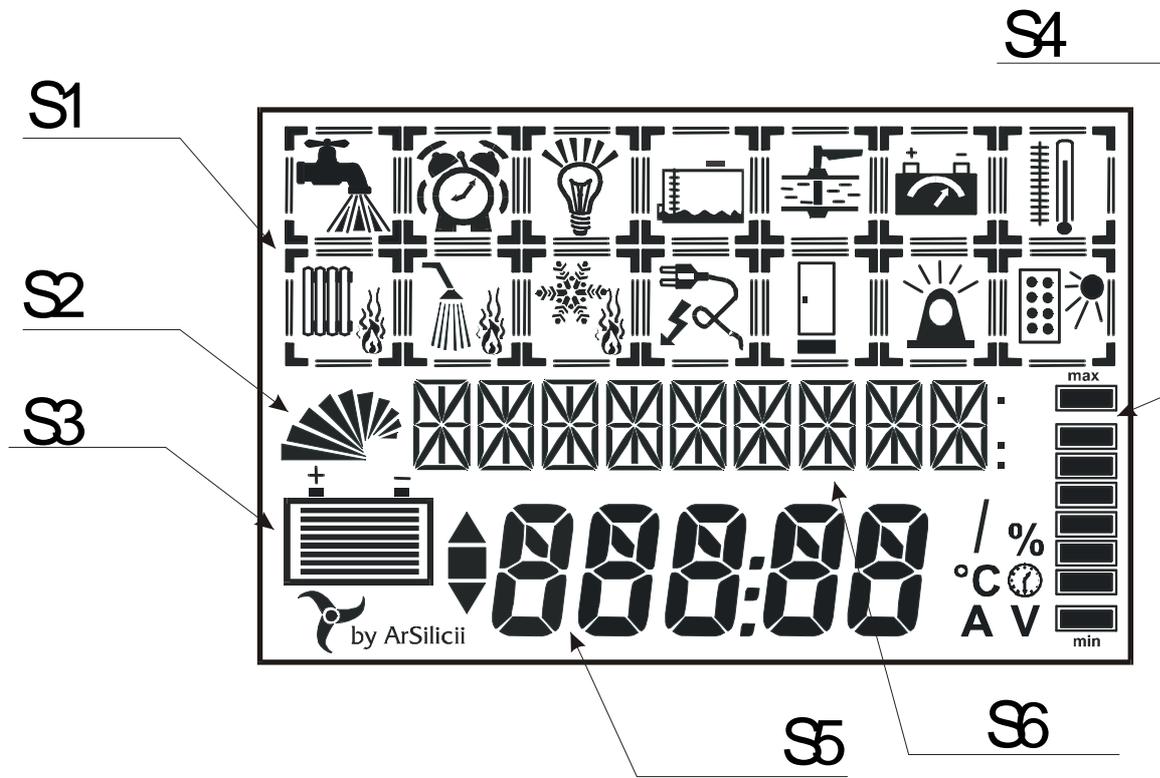


Figure 6

S1	Icons
S2	Bar No.3
S3	Bar No.2
S4	Bar No.1
S5	Line No.2
S6	Line No.1

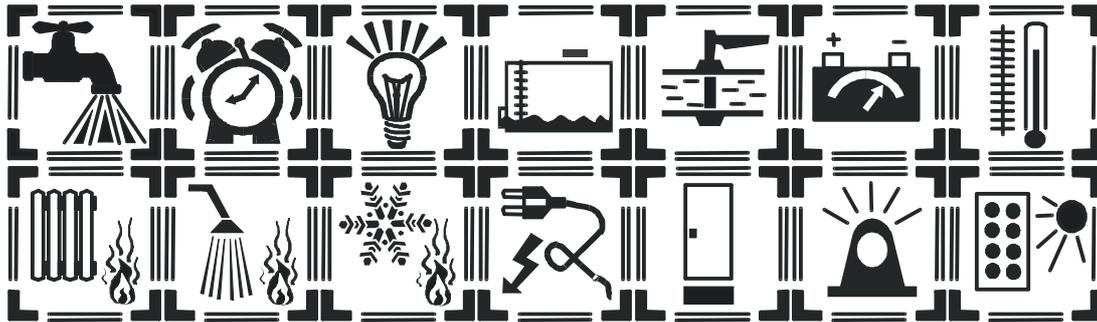
The top part of the display graphically shows the symbols that characterise the main function areas offered by the system; these are called icons.

Immediately below there are two lines of alphanumerical characters (Line 1 and Line 2), which describe the various items of the menu selected. At the sides of the LCD display, there are graphic bars which allow the immediate viewing of the basic values (e.g. services battery level, instantaneous current absorbed by the system, etc.).

Clearly, not all the graphic symbols shown in the previous Figure can be seen at the same time.

*Icons*

There are fourteen icons, which schematically represent all the control panel functions.



Each icon comprises four parts (Main Body, Secondary Body, Corners and Bars), which can be viewed or not depending on the cases.

The icon shown in the Figure, at the top left of the viewer, is associated with the water pump.

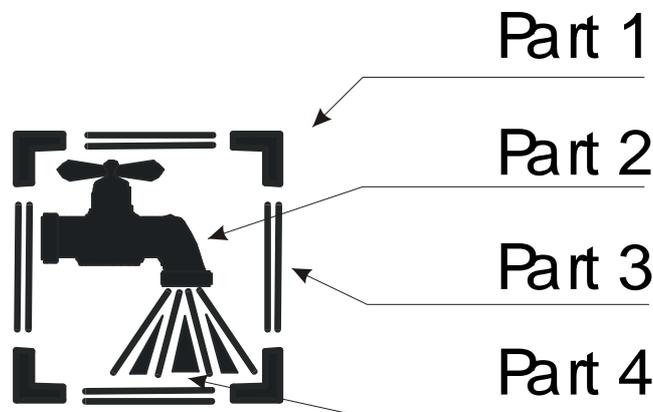


Figure 7

Part 1	Corners
Part 2	Main Body
Part 3	Bars
Part 4	Secondary Body

The parts that form an icon like the one in Figure 7 are:

The **Main Body**, (the tap), indicates the function, in this case the water pump;

The **Secondary Body** (water) shows whether the function is operating or not. In this case, inside the icon the water can be seen coming out of the tap only if the pump is on.

The **Corners** indicate the icon selected at the moment through the *navigation keypad*.

If the **Bars** are lit, they indicate an alarm status or a fault related with that function group (in this case, for example, it could be a short circuit on the pump).

Example: Turning the water pump ON or OFF:



Figure 8

Scrolling the viewer symbols with the *navigation* keys (Figure 8), we move to the icon showing the tap, pressing the OK button (to select the symbol) additional information appears in the form of alphanumerical characters. In this case, the word PUMP is shown (line 1) and its ON/OFF status (line 2).



Figure 9

Using the *navigation* keys (Figure 9) the menu items can be scrolled: PUMP, PROTECTION, and PROBLEMS. Let us move to PUMP.



Figure 10

Using the *navigation* keys (+ and - of Figure 10) chooses the required status to be set on the PUMP: **ON/OFF**



Figure 11

Pressing the OK button (Figure 11) takes you back to the navigation mode.

**GRAPHIC BARS**

There are three graphic bars, Figure 12, which give an evaluation “at a glance” (as they are always visible regardless of the operating mode we are in) of the main data concerning the camper. This information can be examined in more detail in the associated items of the menus provided.



Figure 12

Bar 1	Bar No.1	<b>Bar 1</b> indicates the <u>level of the fresh water</u> The min. and max. levels respectively indicate: fresh water tank <i>Empty</i> and fresh water tank <i>Full</i> . For more accurate information, select the tank symbol and consult the menu provided
Bar 2	Bar No.2	<b>Bar 2</b> indicates the <u>battery charge level</u> In this case, too, more accurate information can be obtained selecting the associated symbol and consulting all the menus it contains.
Bar 3	Bar No.3	<b>Bar 3</b> indicates the <u>instantaneous absorption of the system</u> by the service battery. Its filling takes place <i>counter-clockwise</i> , a higher number of segments indicates higher absorption.

**LINE 1 AND LINE 2 (ALPHANUMERICAL CHARACTERS)**

The area used for showing the characters and numbers is subdivided on two lines. Their behaviour varies depending on whether a symbol is selected or not.

If we are in navigation mode (no symbol selected), the top line will be off completely, while the bottom one shows the time. In the opposite case, the top line shows the name of the menu item, while the bottom one shows the alternative of it. Sometimes, if the symbol selected is associated with a quantity (e.g. with the battery or tank), the top line shows its name, the bottom one the value with the unit of measure at the side.

## **DETAILED DESCRIPTION OF THE FUNCTONS**

In this section we are giving a detailed description of the functions present on the control unit. Please remember that some of them might not be present on the model in your possession, or refer to accessories that are not installed. For reasons of convenience, the functions are grouped according to the icons that contain them.

### Functions

#### *PUMP*



This contains the items of the menus related with use and diagnosis of the water pump. The bars around the symbol are shown only in the case of short circuit on the pump. The running water indicates that the pump is ON.

#### PUMP: ON/OFF

This allows you to set the on or off status of the water pump. *Initially this item of the menu is at OFF.*

#### PROT. ON/OFF

Besides the electrical protection on the PUMP (which is always active due to the node), it is possible to set an additional one. If activated, this prevents the pump from switching on if there is not enough water in the tank. *Initially this item of the menu is at OFF.*

#### PROBLEMS: NO/SC

This indicates whether there are electrical problems on the pump or not (NO = no problem, SC = Short Circuit).

#### *CLOCK*



This contains the items of the menus related with the clock. It allows you to set the current time using the left and right arrow buttons.

#### *LIGHTS*



This contains the items of the menu related with the roof supply of the motorhome.  
 The bars around the icon are only shown in the event of an electrical fault related with the upper part of the electric system. The beams indicate that the ceiling lights or in any case the loads connected to the ceiling distributor output are being supplied.

**LIGHTS: ON/OFF**

This allows you to switch on or off all the loads connected to the vehicle roof distributor output.

*Initially this item of the menu is at ON.*

**PROBLEMS: NO/SC**

This indicates whether there are electrical problems in the ceiling or not (NO = no problem, SC = Short Circuit). Any symbol next to the wording SC provides extra information for locating the short circuit. In particular the following symbols are followed (Figure 13):

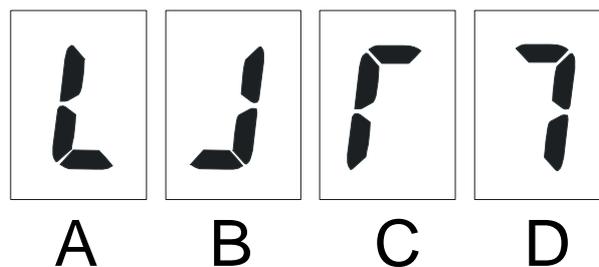


Figure 13

A	Short circuit on the floor distributor left channel
B	Short circuit on the floor distributor right channel
C	Short circuit on the ceiling distributor left channel
D	Short circuit on the ceiling distributor right channel

In the event of more than one source of short circuit there is the combination of the symbols shown above. As mentioned previously, when the cause of the short circuit ceases, the warning ceases and the systems resume correct operation without fuse replacement.

**LEVELS**



This contains the items of the menu related with the tanks.

The bars can indicate: lack of fresh water or overflow of one of the recovery tanks.

**FRESH: X %**

This item of the menu shows the level of the fresh water tank expressed in percentage of the total volume. (for a probe with 4 levels (0%-30%-60%-90%))

FRESH2: X %

This item of the menu shows the level of the additional fresh water tank expressed in percentage of the total volume. (for a probe with 4 levels (0%-30%-60%-90%))

DRAIN 1: NO/FULL

Indicates whether the drain recovery tank 1 is full or not.

DRAIN 2: NO/FULL

Indicates whether the drain recovery tank 2 is full or not.

### *GAS-SOLENOID VALVE*



*Functions that can be activated only by the installation of optional kit.*

This contains the items of the menus related with the protections against gas leaks and the presence of carbon dioxide and it indicates the status of the gas solenoid valve.

GAS SENS: ON/OFF/GAS/--

The dashes (--) indicate that the sensor is not installed or is not working properly. The word ON flashing means that the sensor is warming up, and is therefore unable to detect an alarm situation.

The word ON stops flashing when warm-up has been completed.

The word GAS appears when an alarm situation has occurred, i.e. there is a gas leak.

ALR BUZZ: ON/OFF/--

The dashes (--) indicate that the sensor is not installed or is not working properly. The ON control enables the buzzer on the sensor to sound in the case of alarm, while the OFF one disables it.

### *BATTERIES*



This contains the items of the menus related with the measurements of the voltage rates on the two batteries (engine and services), of the current delivered and of the charge quantity stored.

The bars indicate that the services battery is starting to get damaged.

SERV BATT : X V

Indicates the voltage, expressed in Volts, at the terminals of the services battery.

ENG BATT: X V

Indicates the voltage, expressed in Volts, at the terminals of the engine battery.

CURRENT: X A

Shows the rate of the instantaneously delivered current, **if positive**, by the services battery. Otherwise, a **negative value** expresses the services battery charging current rate.

AMPERE H: X

Indicates the amount of charge, expressed in Ah, utilised or supplied to the battery since the last reset.

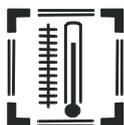
RESETAMPH

Pressing the OK button resets the ampere/hour counter mentioned above.

PROBLEMS: NO/LO

Indicates the presence of problems or not on the services battery (NO = no problem, LO = start of irreversible damage on the services battery).

### TEMPERATURES



*Functions that can be activated through suitable optional kits.*

This contains the items of the menus that indicate the momentary value of the inside and outside temperatures.

IN TEMP : X °c / --

Indicates the temperature expressed in degrees centigrade, inside the living quarters. The dashes indicate that the sensor is not installed.

EXT TEMP : X °c / --

Indicates the temperature expressed in degrees centigrade, outside the living quarters. The dashes indicate that the sensor is not installed.

### HEATING



This contains the items of the menus for remote control and timing of the electronic heater.

*Function not active in this model.*

### BOILER



This contains the items of the menus for remote control and timing of the boiler.

*Function not active in this model.*

**FRIDGE**

This contains the items of the menus for fridge control.

*Function not active in this model.*

**220V NETWORK**

This contains the items of the menus related with the presence of the 220V outside network and with the power unit.

The bars indicate a high temperature inside the switching power unit.

The stroke of lightning indicates connection to the 220V line.

**EXT PWR: ON/OFF**

Indicates whether the vehicle is connected to the 220V mains line or not.

**PARALLEL : ON/OFF**

This allows you to decide, **if the vehicle is connected to the 220V line**, to put the engine battery in parallel with the services battery. *Initially this item of the menu is at OFF.*

**V MAX: X V**

Indicates the maximum voltage rate, expressed in Volts, set at the services battery terminals during charging.

**PU TEMP: X °C**

This gives the power unit internal temperature, expressed in degrees centigrade.

Readings below 70 °C are acceptable. Beyond this threshold, a fault situation exists. However, the power unit begins to reduce the power delivered to prevent damage. As soon as the temperature returns to normal, the power unit resumes normal operation with no external intervention.

**FAST: ON/OFF**

Allows you to set the charging cycles to be performed on the battery/ies. *Initially this item of the menu is at OFF.*

***N.B.:** it is advisable to use fast ON only when the services battery starts having sulphatisation problems, for partial regeneration, or in cases of extreme necessity of a quick charge, as the normal charging cycle (fast OFF) has been designed especially for long battery life and is therefore to be preferred.*

**MAINT. ON/OFF**

If an external source of energy is present, it will be possible to set an alternative charging cycle rather than the fast one. *Initially this item of the menu is at OFF.*

***N. B.:** this type of charge is to be used only in the case of prolonged vehicle stops, as it does not carry out a true charge but compensates for self-discharging of the batteries and can be activated only if a source of external energy is present (220V network or solar panels). It has been designed to prevent consumption of the battery electrolyte during periods of inactivity.*

## LANGUAGES



This contains the items of the menu with which you can choose the language (ITALIAN, ENGLISH, FRENCH, GERMAN and SPANISH), in which you want all the information to be shown.

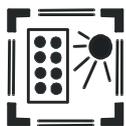
## ALARMS



This contains the items of the menus associated with the alarms present in the motorhome. The bars and beams indicate the presence of danger.

*Functions that can be activated through appropriate optional kits.*

## SOLAR PANELS



This contains the items of the menus associated with the solar panels.

The presence of the sun symbol (top right) indicates that the battery charger internal regulator is on. The absence of it means that it is off, therefore any flow of energy deriving from the solar panel is not allowed.

### SOLAR P: ON/OFF

This allows you to turn the solar panels on or off. Panel ON/OFF

### POWER: X (VA)

This gives the power rate, expressed in Watts, delivered instantaneously by the solar panels. An up arrow at the top left indicates that the power is actually being used, the down arrow means that the power is not being used (for example battery charged that does not require further charging).

The wording NOSUN indicates the lack of energy from the solar panel (night, cloudy sky).

### CURRENT: X

This gives the current rate, expressed in Amperes, delivered instantaneously by the solar panels.

If, despite the presence of the sun, the current rating shows NOSUN, this means that the solar panel is off. If necessary, turn it on using the ON control mentioned above.

## GENERAL ADVICE ABOUT CORRECT USE AND MAINTENANCE OF THE SYSTEM:

- During prolonged inactivity (over one month) of the vehicle, it is always wise to recharge the batteries, to avoid discharging them, which could seriously compromise the storage capacity of the batteries themselves. If solar panels are present, they keep the batteries charged, therefore they can be kept in parallel using the control provided on the control unit. If a connection to the 220V network is available, the maintenance charging system can be used to compensate self-discharging of the batteries.

In systems with power unit without the main switch in the lack of external energy sources (220V network or solar panels) it is advisable to disconnect the positive terminal of both the engine battery and of the services battery, so that the batteries reduce self-discharging.

- Do not use chemical substances, cleaning solvents or strong detergents to clean the control panel. Clean using a slightly moistened, soft cloth.
- Avoid obstructing the cooling vents of the switching power unit.
- Do not allow the power supply unit to come into contact with fluids or anything else that might get inside the container through the ventilation holes.
- Avoid pressing the control panel buttons using screwdrivers, knives, blades, etc.
- Repairs to the electrical system may only be carried out by skilled personnel.
- Should an emergency intervention be necessary, it is advisable to **disconnect both the positive terminals of the batteries and the connection (if any) to the 220V network or to the solar panels.**
- **If one of the two batteries (services or engine) is installed with the terminals inverted, the power supply unit will undergo damage and correct operation of it will no longer be ensured.**

## FEATURES OF POWER SUPPLY UNIT Model AL320X

### **Model AL320X**

The power supply unit model AL320X is a device conceived for energy management; it is characterised by being able to switch and regulate the various sources of energy available, supplying stable and safe power on the outputs.

In an motor caravan we typically have the following sources of energy:

1. Engine battery/ies;
2. Services battery/ies;
3. Alternator;
4. External electrical network;
5. Solar panels;
6. Generator;
7. Alternative sources (Wind, etc..)

The typical outputs are considered:

1. Services (the whole living quarters at 12 V)
2. Fridge

### **Specifications**

#### Electrical

The electrical specifications of the device are:

- Supply voltage: 110-220 V, 50-60 Hz. According to regulations
- Rated power: 240 VA .
- Services output : 30 Ampere.
- Fridge output : 20 Ampere.
- SMART active protections.
- If connected to the outside 110/220V network, the power supply unit delivers power even if the batteries are not connected
- Main switch
- Warning Led<sup>1</sup>

#### Size

Container: 220x195x82 Weight Kg. 1.5

#### Connections

- AMP Mate-N-Lok 3x1 connector for connecting to the 110/220 V outside network, with selector.
- J1 *molex caimano mlx 94213 - 2014* (connector “S” used for connecting the services battery)
  - contact No.4 → Negative
  - contact No.3 → Not Used
  - contact No.2 → Positive (+12)

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<sup>1</sup> See meaning in the Warning Led section below

- contact No.1 → Not Used
- **J2 molex caimano mlx 94213 - 2014** (connector “M” used for connecting the engine battery and engine ON warning light)
  - contact No.4 → Negative
  - contact No.3 → Not used
  - contact No.2 → Positive (+12)
  - contact No.1 → D+ (Engine ON signal)
- **J3 molex caimano mlx 94213 - 2014** (connector “B” used for distributing energy to the living quarters)
  - contact No.4 → Negative
  - contact No.3 → Bus\_B
  - contact No.2 → Positive (+12)
  - contact No.1 → Bus\_A
- **J4 molex caimano mlx 94213 - 2014** (connector “F” used for connection to the fridge; **not to be used for fitting the AES Fridge**)
  - contact No.4 → Negative
  - contact No.3 → Positive +12 (Power)
  - contact No.2 → Positive (+12) (Low Power)
  - contact No.1 → Input for any sound devices
- **J5 Amp Mate-N-Lock 2x1** (connector “P” used for connecting the solar panel)
  - contact No.1 → Negative
  - contact No.2 → Positive

**Conformity**

<b>Statement of Conformity:</b>	
The device meets the requirements of the Directives of the European Union: 89/336 EEC Electromagnetic Compatibility, 73/23 and 93/68 EEC Safety of electrical products	
<b>ArSilicii Srl</b> Loc.Fosci, Via Sardegna,11 53036 Poggibonsi (Siena)	
Product name:	<b>Fuseless Switching MotorHome Power Unit Model: AL 320 X</b>
Standards :	<b>EN50081-1</b> <b>EN50082-1</b> <b>EN60335-1</b>
Date	<b>01/04/2004</b>

**Practical advice for use**

Set-up

To set up the power unit, you are recommended to proceed as follows:

- Connect all the connectors with the main switch at “OFF”
- Connect the plug for the outside 220V network
- Move the switch to “ON” and wait for about 20 seconds for calibration. The power unit will then come into action supplying power on its outputs. During calibration the warning light will stay on, after which (8 sec), except in the case of problems, the warning light should turn off.

#### Taking out of service

- Move the main switch to “OFF”;
- Disconnect the plug for the outside 220V network
- Disconnect all the connectors

#### Battery disconnecter

With the main switch at “OFF” the battery disconnection function is implemented.

NB. Also when the main switch is at “OFF” the functions that make the parallel of the services battery with the engine battery and the fridge supply remain operational.

#### Do not:

- Connect or leave the solar panel connected in the absence of the service batteries;
- Carry out any maintenance with the outside 220 V network connected.

#### Solar panel

- See application note.

#### **Warning Led L1 in Figura 2 (new feature)**

- At switch on this Led stays on for approx. 8 sec. It then turns off and the system will deliver power on the output.
- If the voltage of the service battery falls below **10.5V** the Led flashes rapidly to alert that we have entered the so-called **Brownout** zone, i.e. the user is alerted that the battery is running low. This condition will end if the battery voltage returns above **10.8V** and consequently, the Led turns off. If the battery voltage falls further to below **9.5V** the so-called **Blackout** zone is reached and the red Led flashes at a lower frequency. During this condition, though the functions associated with D+ at 230VAC and the solar panel remain active, the power unit cuts off the power to its output and will be able to resume powering only when the battery voltage has returned to **12.5V**.

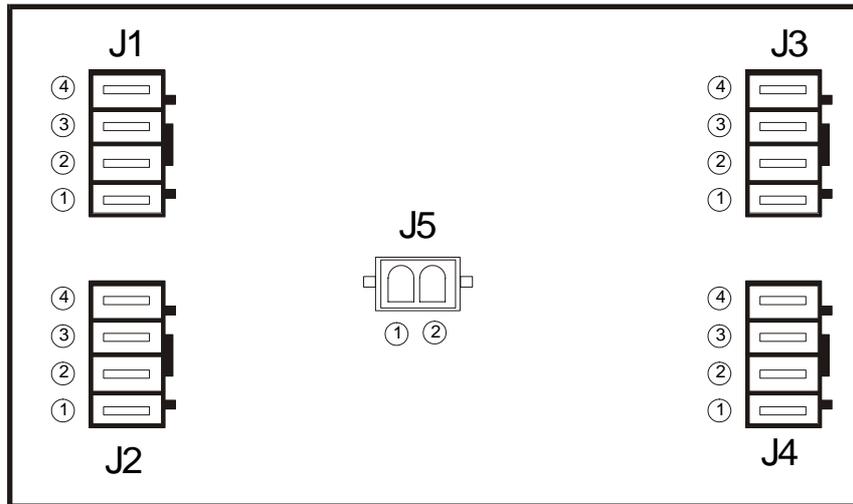


Figure 1 "Connector layout"

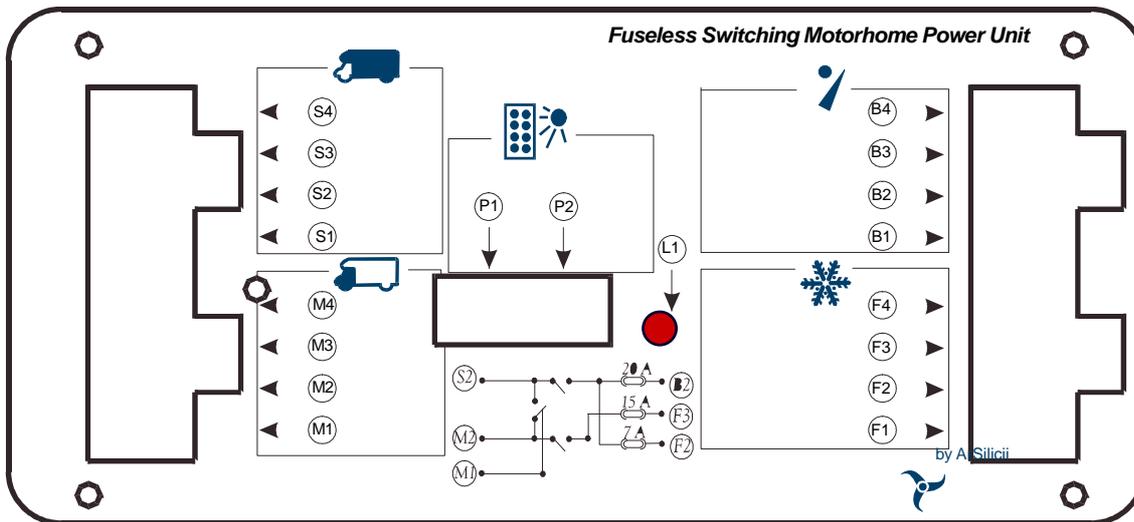


Figura 2 "Disposizione dei contatti e spie"

Figure "Layout of contacts and warning lights"

## Application notes for installing solar panels.

### Introduction

These notes refer to the installation of solar panels on motor caravans fitted with power supply unit Model AL-320X

### General Section

The electric system power supply unit developed by ArSilicii (models . AL-320X) can control the various sources of energy available on the motor caravan.

The energy flows are summarily shown in Figure 3

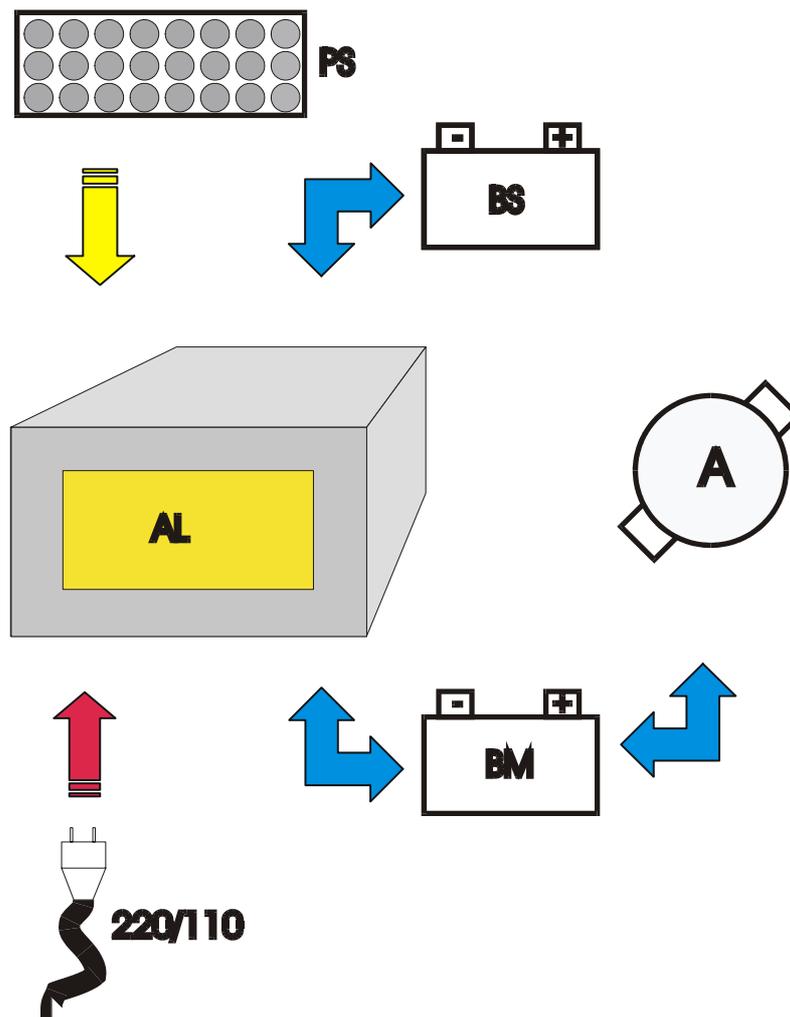


Figure 3 "Overall view"

In Figure 3 the following items are shown:

Symbol	Device
AL	Power Unit
BS	Services Battery
BM	Engine Battery
A	Alternator
220/110	Outside Supply Network

The power unit is therefore capable of charging the batteries, performing the charging cycle chosen by the user, depending on the source available.

In the particular case of the solar panel, **no further devices are needed** between the solar panel and the power supply unit because, as mentioned, the charge adjustment functions are already carried out by the power supply unit itself.

The power supply unit supports panels also up to 300W, unlike the previous version that was indicated for 120W.

### Case 1 : Assembly of a single Panel

**Make sure the panel is fitted with a non-return diode and if not, install one.**

If a single panel is fitted, it should be connected as shown in Figure 4:

In the figure below the panel is understood to be fitted with non-return diode

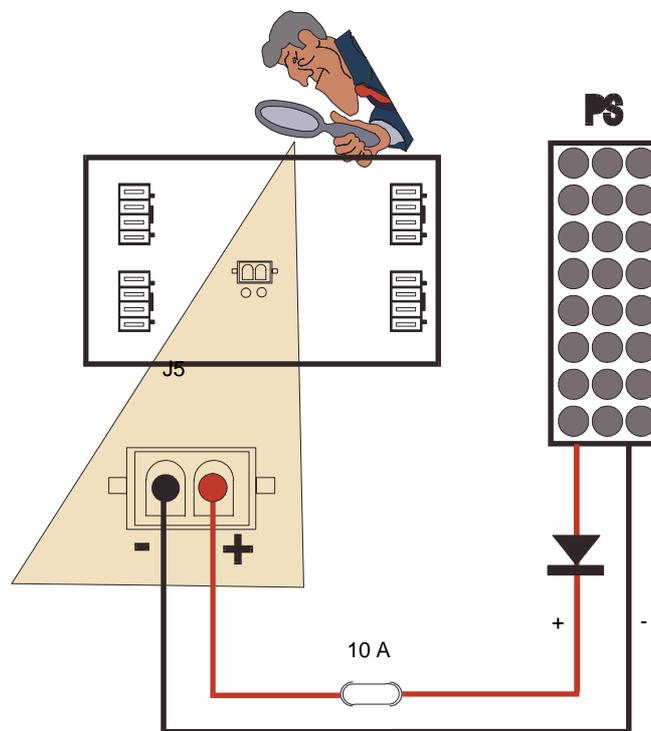


Figure 4 "Assembly of a single Panel"

It should be noted that along the cable of the positive terminal, **near the power supply unit**, a fuse of adequate amperage is fitted.

How should the fuse cut-off power be chosen?

Clearly, the fuse should be chosen in accordance with the normal operating current and the diameter of the cable connections used.

Example:

For a generic 100 W panel the maximum current (Short Circuit Current) indicated by the manufacturer can be approximately:

$$\text{Short Circuit Current} = 7 \text{ A}$$

Using cables with a diameter of  $4\text{mm}^2$ , bearing in mind that it is very roughly possible to consider a maximum current density of approx. 5 Ampere/ $\text{mm}^2$ ., to be safe, the maximum current flow in the wires must be 20 A.

Consequently, the Cut-off Power (COP) of the fuse must meet the following two conditions:

$$1^\bullet \rightarrow COP \geq 7 A$$

$$2^\bullet \rightarrow COP \leq 20 A$$

In this case a 10 or 15 Ampere fuse can be used.

### Case 2 : Assembly of two panels

The connection is similar to the previous one with the difference that the two panels are put in parallel with the appropriate non return diodes.

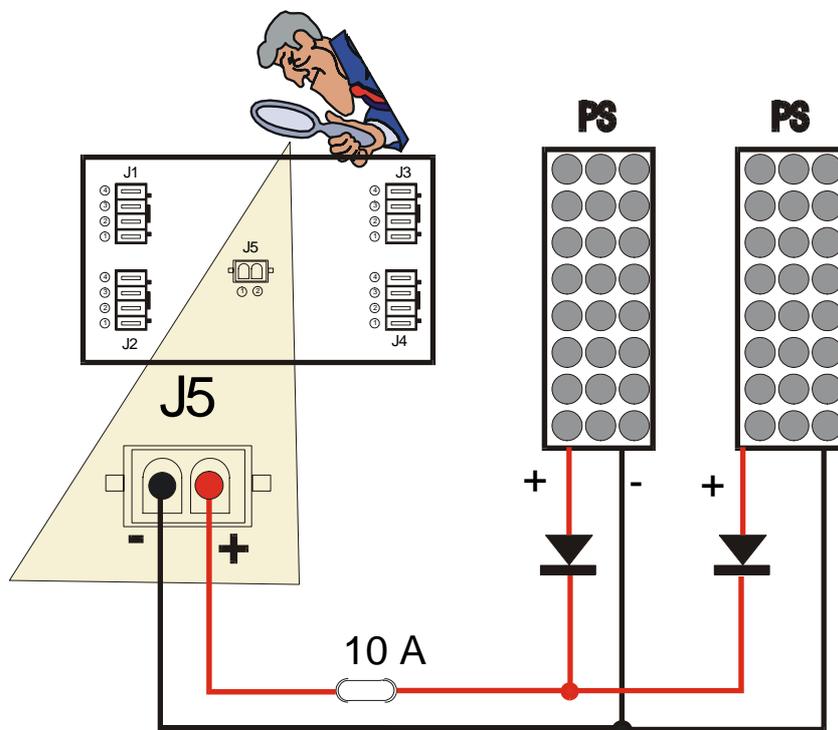


Figure 5 "Assembly of double Panel"

The diodes to be adopted must be able to withstand a maximum voltage of 20 V and a current of 3 A.

A suitable model can be diode **1N5401** shown in Figure 6 or the equivalent of it



Figure 6 "Diode 1N5401"

### Indications of the Control unit LCD

The power indications and control related with the solar panel can be viewed and performed from the control unit panel.

The solar panel icon with the presence of the sun indicates that the regulator is on, therefore with the possible flow of usable power, otherwise the regulator is off.



Figure 7 "Regulator On and Regulator Off"

To activate the regulator, access the solar panel hierarchy pressing OK and use the right and left arrows to turn ON and OFF respectively.

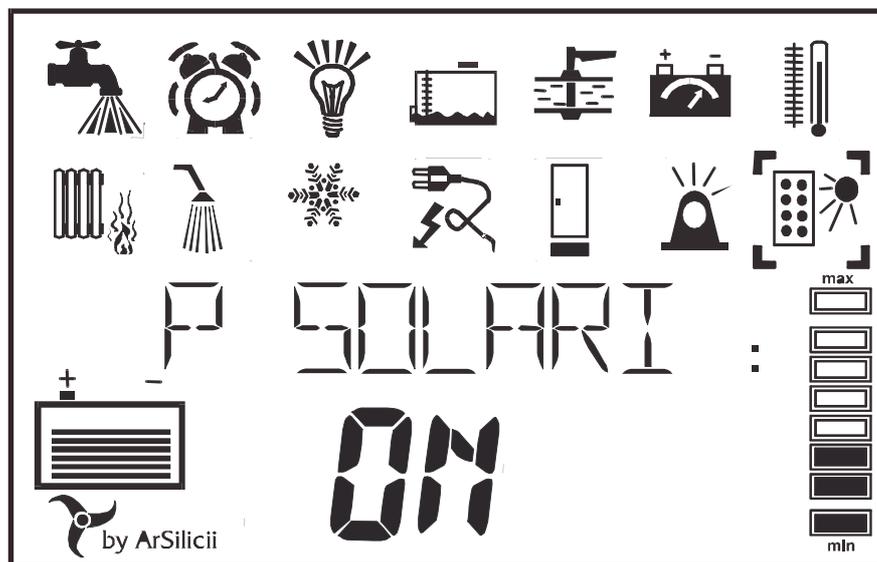


Figure 8 Switching the Panel On/Off

Moving down the hierarchy using the down arrow takes you to the **power (W)** display section: Usually, the number shown, i.e. the power in watts, is preceded by an up arrow or a down arrow, indicating respectively that the power is used or not used (example batteries charged.) If the solar panel power is at a minimum the display will be as shown in Figure 9



Figure 9 "Power indication"

Moving further down the hierarchy takes you to the current display, instead of Power in Figure 9 the current will be shown, this time expressed in Amperes.

## POWER HUB FEATURES AND HOW IT WORKS

### **Model PH300S2**

The power-hub, also called distributor, makes it possible not only to distribute energy and information to the various devices connected on its outputs, but also to protect them from any short circuits or abnormal overloads.

The distributor can be controlled to enable/disable the flow of energy to the outputs in two ways: locally, through a button (on/off) directly connected to the distributor (J4 in Figure 10), or remotely via the control unit, with a special control. The latter also displays the status of the distributor electrical protections.

### Inputs

The device essential comprises three types of connectors. Connector J1, Figure 10, normally considered the input of the device, has the same terminals as, i.e., shared, with connectors J2 and J3, which are thus considered as simple feed-throughs.

The two-pin connector J4 is usually used for connecting the output control button.

### Outputs

The device has a connector unit for the outputs (from J5 to J14).

### **Electrical Specifications**

The electrical specifications of the device with reference to Figure 11 are the following:

- Supply voltage 12 V
- J1, J2 4-pin feed-through connector with 30 A capacity
- J3 4-pin feed-through connector with 3 A capacity protected by 5A self-resetting fuse
- J4 connector for local Power Hub main control button
- J5..J12 protected two-way outputs;
- J13..J14J4 protected two-way outputs in the Ceiling four-way Power Hub with Bus in the Floor Power Hub

### **Connectors**

Three types of connectors are used on the device (also see Figure 11);

- J1..J2 Molex "*caimano*" code **mlx94213-2014** with the contacts arranged as follows  
(also see Figure 10)
  - 1 - Bus A
  - 2 - Positive +12 V
  - 3 - Bus B
- J3,J13,J14<sup>2</sup> Molex "*mini-fit Jr*" code **MLX5569-04** with the contacts arranged as follows  
(also see Figure 10)
  - 1 - Bus B
  - 2 - Earth
  - 3 - Bus A
  - 4 - Positive +12 V

- J4,..J12 Molex "mini-fit Jr" code **MLX5569-02A2** with the contacts arranged as follows (also see Figure 10)

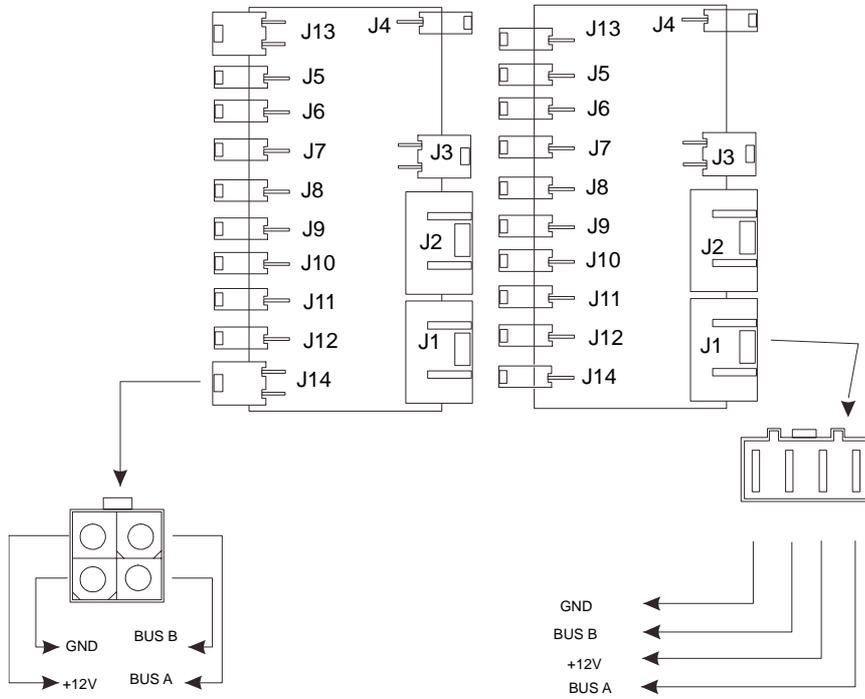


Figure 10 "Layout of Floor and Ceiling Power Hub connectors"

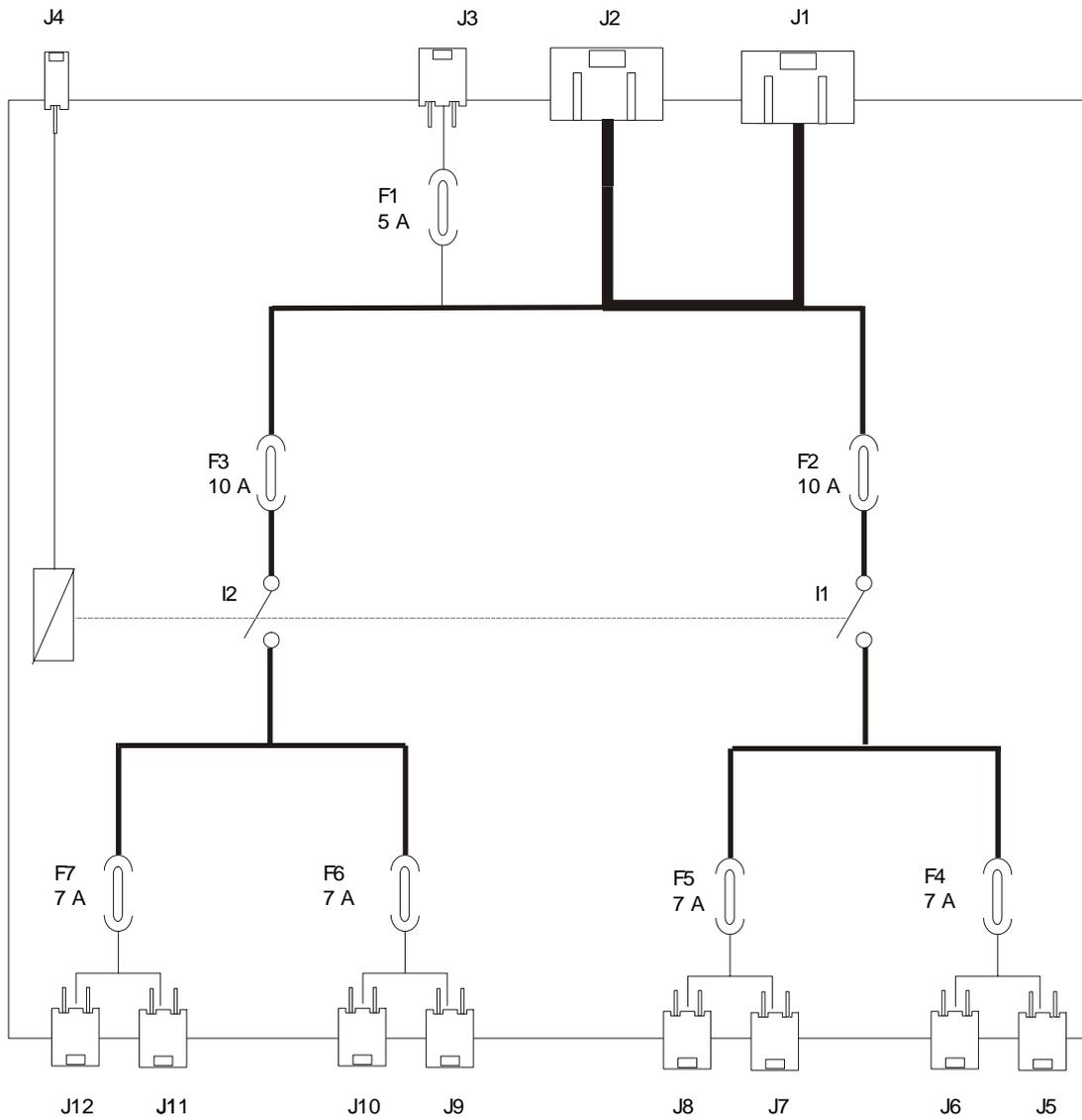


Figure 11 "Power Hub logic diagram"

## FEATURES OF NODE Model NSA10

### **Model NSA 10**

This system allows the delivery of power on a load, such as the water pump, that is connected to its output, but also the protection of it against short circuits or abnormal overloads.

This node has a provision for detecting levels with discrete sensors (with 4 levels) and with two overflow sensors.

The device can be controlled to switch the flow of energy to the pump on/off in two ways: locally via a normal switch (on/off) and also remotely via the control unit. The latter displays the status (on/off) of the device and also the status of its protections and of the level sensors.

### Inputs

The device, as may be seen in Figure 12 essentially comprises three types of connectors. Connector J1, the device input; connector J4 with six pins usually used to detect the levels of a tank with a discrete sensor with four levels and connector J5 with 4 pins used to detect the overflow signal from two separate tanks.

### Outputs

The output is connector J2, as shown Figure 13 on some models connector J3 cannot be fitted) connector J2 will have a power output and two contacts (Wire A and Wire B) for connecting the control switch.

### **Electrical Specifications**

The electrical specifications of the device are:

- Supply voltage 12 V
- J1 6-pin connector input, capacity 5 A
- J2, J3 the two possible outputs controlled respectively by the corresponding switch connected to contacts CON\_01 and CON\_02 respectively protected with the 3 A SMART fuse
- J4, J5 two connectors for the level sensors.

### **Connectors**

Three types of connectors are used on the device:

- J1 Molex "*mini-fit Jr*" code **MLX5569-04** with the contacts arranged as follows:
  - 1 - Bus B
  - 2 - Earth
  - 3 - Bus A
  - 4 - Positive +12 V
- J2, J3 Molex "*mini-fit Jr*" code **MLX5569-04** with the contacts arranged as follows:
  - 1 - Wire\_01
  - 2 - Earth
  - 3 - Wire\_02
  - 4 - Positive +12 V

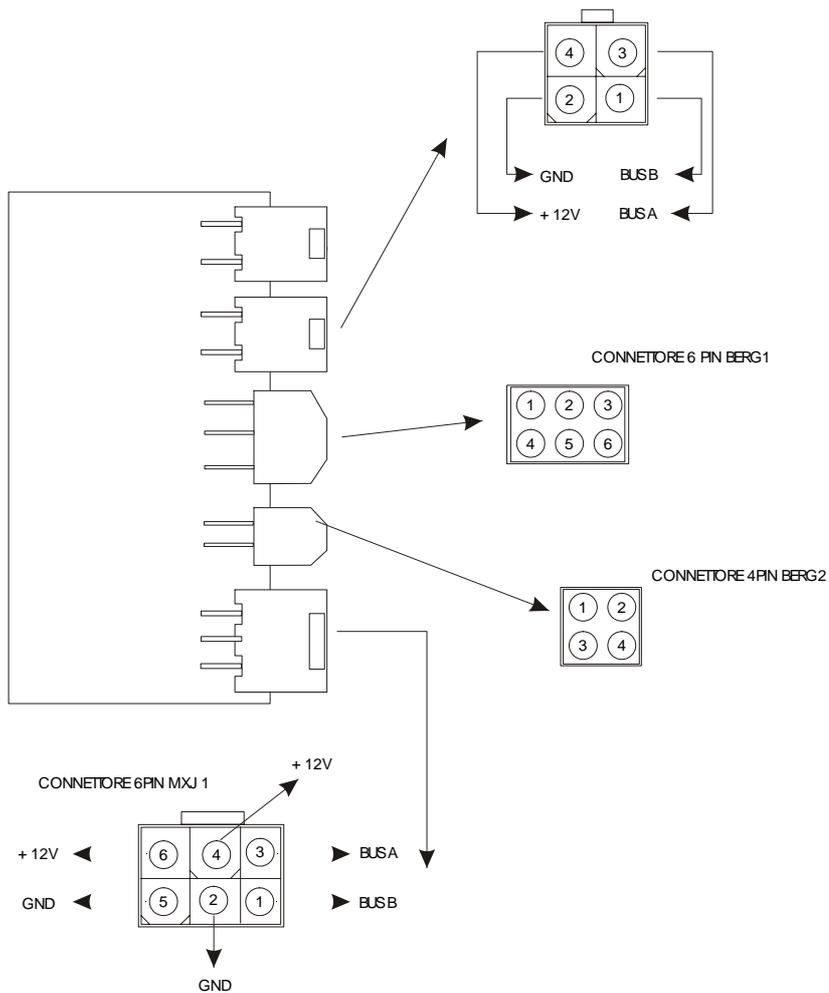


Figure 12 "Layout of Node Connectors"

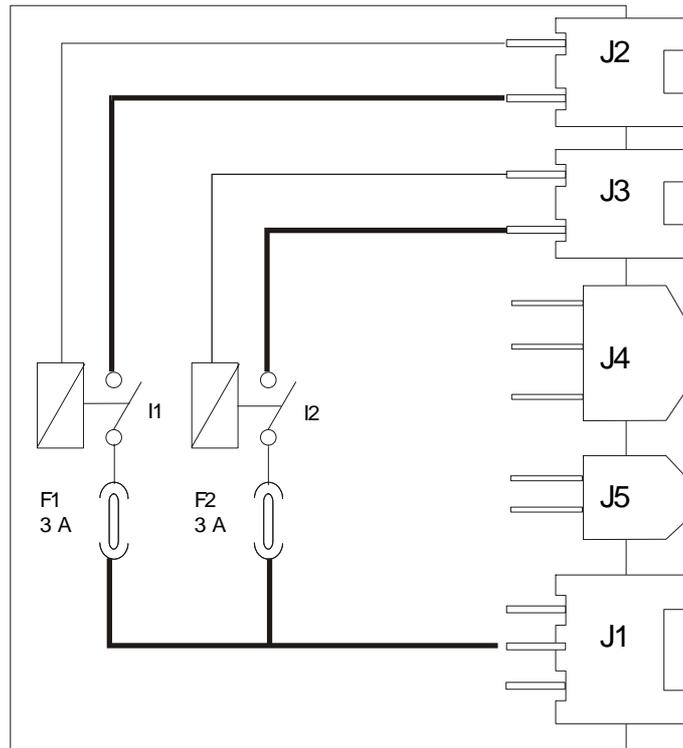


Figure 13 "Node equivalent logic layout"