Handbook for

System D2NA

Model

Ganga 1999/2000

ArSilicii

Warnings

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SUMMARY

DETAILS ABOUT THE STRUCTURE OF THE AS D2NA SYSTEM

Description of the system

This introductory document describes the structure of the AS D2NA system; please refer to the following chapters of this manual for details about the types of connectors and wire size specifications.

The AS D2NA system mainly comprises 5 devices, a power unit model AL310X, and two distributors one for the distribution and protection of the floor services, model PH300S2-T and one for the distribution and protection of the ceiling services, model PH300S2-C; the system also includes a display and control panel model CNLCD-99/00 and an actuator node model NSA10.

Connections of the devices

Because of the technology on which the AS D2NA system is based, the devices which form part of it can be located in any position, as no maintenance operations are needed and there is decidedly less wiring than with conventional systems.
The wiring that leads from the distributors is all of the "star" type, composed of point-point connections, namely without "Tees" or secondary branches.
The distributors, in particular, can be set in a central position in relation to the loads connected, thereby shortening the distances of the connections.
Fig. 1 shows the overall view of the whole AS D2NA system.

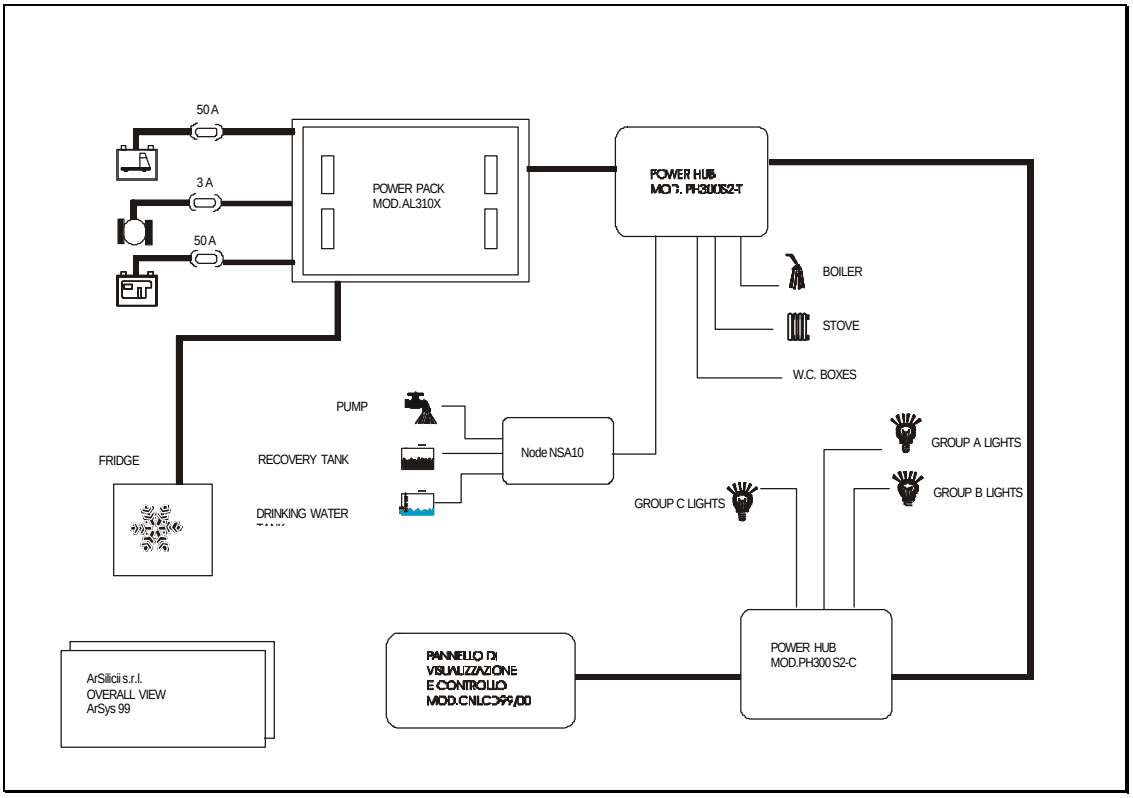


Fig. 1"Overall view of system "

Batteries and Alternator – Power Unit Connection
The services battery is connected to the power unit by a cable with two large dia. wires (+12 and GROUND) and through a fuse with adequate cut-off power (50 A), in series with the wire connected to the battery positive terminal. Connection to the power unit is with the special connector. The battery negative terminal is connected to the vehicle frame next to the battery itself.
The engine battery and engine on signal (D+) are connected to the power unit by a cable with three wires (+12, GROUND, D+). On the wire connected to the battery positive terminal (+12) a fuse with adequate cut-off power (50

A) is necessary. The third wire, associated with the engine on signal (D+), must also have a suitable protection fuse in series with the connector itself (2 A). The battery negative terminal, should be connected to the vehicle frame, if it is not already.
The Schuko plug through which the power unit is connected to the 220V mains, should be connected at the output to the differential switch that protects it and with the characteristic grounding.

If the AL310X power unit is connected to the outside 220V mains it is a completely autonomous source of energy and is therefore capable of delivering power even if the batteries are not present or are damaged, or even if the fuses towards the batteries have blown. This feature guarantees further sturdiness for the user.

Power Unit – Fridge Connection

The point – point connection of the power unit, model AL310X with the Fridge is to be made using a cable with 3 adequately-sized wires (+12, +12D+ and GROUND).

Power Unit – Floor Power Hub Connection

The point – point connection of the power unit, model AL310X with the Floor Power Hub model PH300S2-T is to be made using a cable with 4 adequately-sized wires, two of which for power (+12 and GROUND) and two for signal (BUS_A and BUS_B).

Floor Power Hub – Floor Services Connection

The connections (all point – point) of the Floor Power Hub, model PH300S2-T with the various floor services are made with a four-wire cable, two for power (+12 and GROUND) and two for signal (BUS_A and BUS_B).
Making a wiring completely with cables with four connectors (Smart Ready), it is possible to install *intelligent services*, also at a later time, and exploit all the potential of the AS D2NA system.

Node NSA10 Pump and Level Sensors Connection

This type of connection is the one that exploits the potential of the AS D2NA system. In fact the loads or sensors are connected directly to the node NSA10 which may be located near them and exploit the potential of the control panel for displaying the status of the items connected and their cutting in.

Floor Power Hub – Ceiling Power Hub Connection

The point – point connection of the Floor Power Hub model PH300S2-T with the Ceiling Power Hub model PH300S2-C is to be made using a cable with 4 adequately sized wires, two for power (+12 and GROUND) and two for signal (BUS_A and BUS_B); the connection is made through the special connectors.

Ceiling Power Hub – Ceiling Services Connection

For the connections of the ceiling services to the Ceiling Power Hub model PH300S2-C (all point-point connection) the same considerations apply as for the connection of the Floor Power Hub with the floor services. When the system is installed, Ceiling Power Hub connections with the ceiling services are provided with four wires (Smart Ready); it is therefore possible also at a later time to connect *intelligent services* and fully exploit the potential of the AS D2NA system [1].

Ceiling Power Hub – Display and Control Panel Connection

The connection (point – point) of the Ceiling Power Hub model PH300S2-C with the display and control panel model CNLCD-99/00 should also be made with a cable with 4 wires, 2 for power (+12 and GROUND) and two for signal (BUS_A and BUS_B) headed with the special connectors.

Advice for maintenance

- Never do any work on the system without firstly disconnecting the 220V mains, the solar panels and the batteries.
- Check the acid level of the batteries at regular intervals.
- During prolonged parking and stowage of the vehicle, in the lack of external power sources (220V mains or solar panels) it is advisable to disconnect the positive terminal of both the engine battery and services battery.
- Any repairs on the electric system should only be carried out by skilled personnel.

[1] Example: insert a dioxide sensor that works not only as stand-alone device but integrated directly with the AS D2NA therefore automatically with the statuses that can be displayed and set also by the control panel without having to lay any wire between the sensor and control unit.

Control Unit :

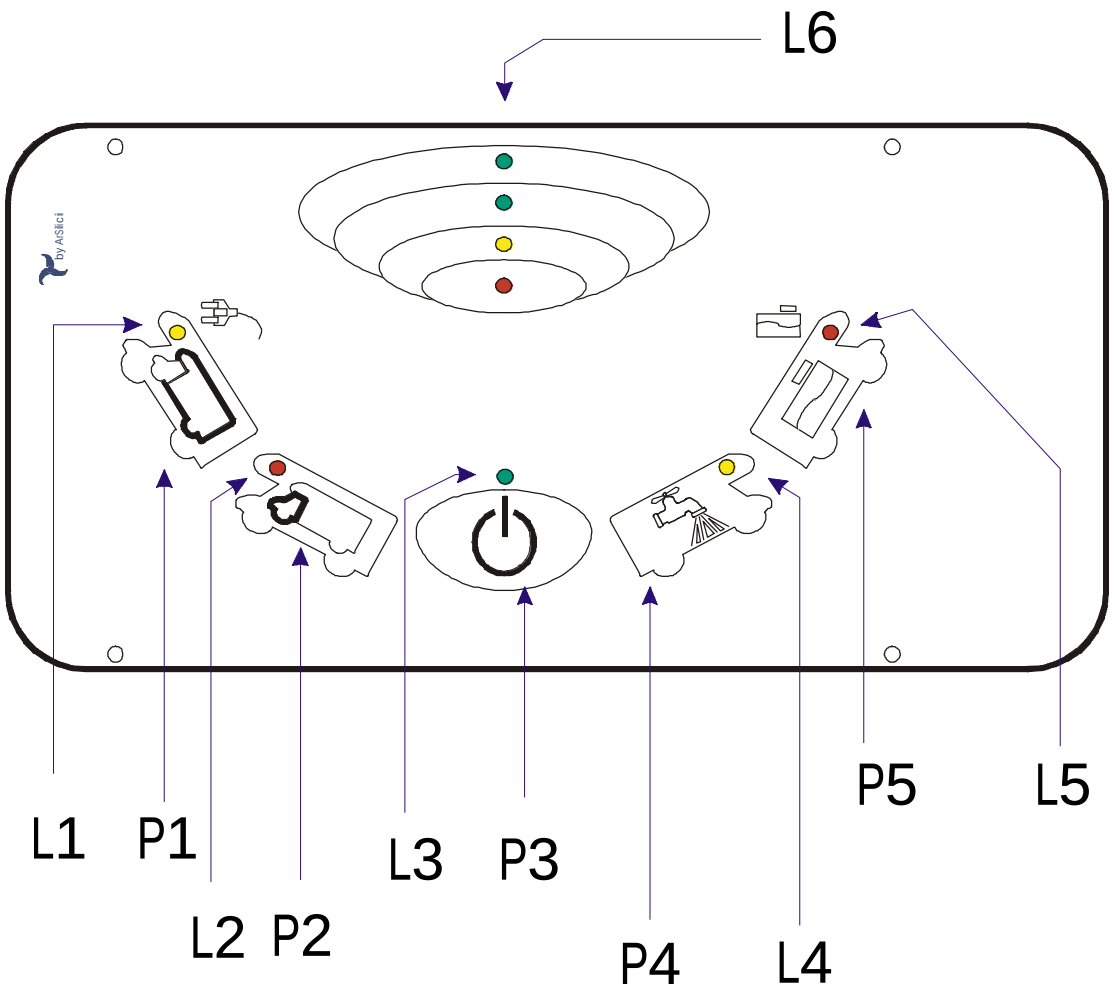


Fig. 2 "Control unit series Ganga 1999/2000"

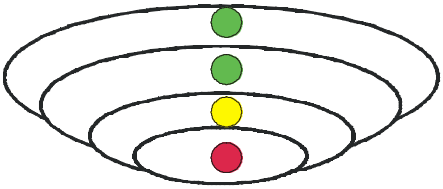
L1	220V mains warning led
P1	Engine accumulator test button
L2	Auxiliary accumulator flat warningled
P2	Auxiliary accumulator test button
L3	Control unit active warning led
P3	Control unit and electric system on/off button
L4	Pump on and pump short circuit warning led
P4	Pump on/off button
L5	Recovery tank full warning led
P5	Fresh water level test button
L6	Led indicator bar

ENGINE ACCUMULATOR BUTTON

Pressing the button the LED indicator will show the engine accumulator voltage level. If the voltage measured is very low, the red LED at the bottom of the indicator will flash. In the event of an overload, the whole LED indicator will flash. In other cases the voltage level displayed will be approx.:

1- GREEN LED	from 13.5 Volt	to 15 Volt	→
2- GREEN LED	above	11.5 Volt	→
3- YELLOW LED	above	10.5 Volt	→
4- RED LED	above	8 Volt	→

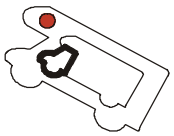
RED LED flashing	Voltage below 8 Volt
All LEDs flashing	Voltage above 15 Volt



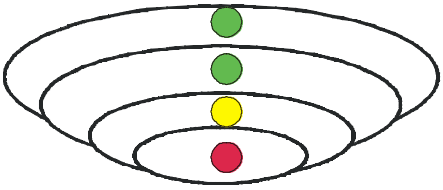
220V MAINS WARNING LED

This is on when the vehicle receives energy from the external socket, namely, when the power unit is connected to the mains.

AUXILIARY ACCUMULATOR BUTTON



Pressing the button the LED indicator will display the voltage level of the auxiliary accumulator. If the voltage measured is very low, the red LED at the bottom of the indicator will flash. In the event of an overload, the whole LED indicator will flash. In other cases the voltage level displayed will be approx.:



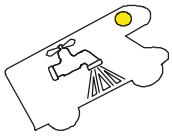
1- GREEN LED	from 13.5 Volt	to 15 Volt	→
2- GREEN LED	above	11.5 Volt	→
3- YELLOW LED	above	10.5 Volt	→
4- RED LED	above	8 Volt	→

RED LED flashing	Voltage below 8 Volt
All LEDs flashing	Voltage above 15 Volt

AUXILIARY ACCUMULATOR BUTTON WARNING LED

The warning led of the auxiliary accumulator button, L2 in Fig. 2, if flashing indicates that the AUXILIARY ACCUMULATOR is FLAT and it should therefore be charged to avoid possible damage to it.

PUMP BUTTON



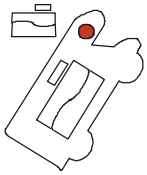
Pressing the button it is possible to turn the water pump on or off.
If the **warning light flashes** a **Short Circuit** has occurred on the pump.

PUMP BUTTON WARNING LED

Indicates the condition of the pump:

Warning light on	Pump on
Warning light off	Pump off
Warning light Flashing Fast/Slow	Pump Short Circuit

TANK LEVEL BUTTON



Pressing the button the LED indicator displays the level in the fresh water tank, starting from the tank full with all the LEDs on, down to reserve with only the lowest LED (RED) on.

1- GREEN LED Tank full
2- GREEN LED Tank over half full
3- YELLOW LED Tank below half full
4- RED LED Tank in reserve

When an abnormal condition is detected on the level sensor the bottom led (RED) will flash..

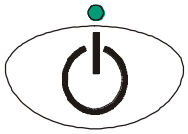
TANK LEVEL BUTTON WARNING LED

This Led flashes when the **drain water** tank is full.

Note:
When two recovery tanks are installed the difference between the flashing frequency of the warning led identifies the full tanks:

off	first and second recovery tank not full
flashing slowly	first recovery tank full
flashing quickly	second recovery tank full
steady glow	both recovery tanks full

MAIN ON/OFF BUTTON



Pressing the button the control unit will be turned on or off.
When turning on and only when turning on the control unit all the home cell energy distribution elements will be activated. Likewise, when turning off and only when turning off they will be deactivated.

Important:
Once the control unit is off it can only be activated again after two seconds.

Note:
When the control unit is turned on all the LEDs will light up for about half a second to check that they are working properly. To avoid surprises, it is wise to always check the LEDs at switch-on

Warning light

This shows the condition of the control unit
If the **warning light flashes** it means that a **Short Circuit downstream of the distributors has occurred**.

Warning light condition:

Warning light on	Control unit active
Warning light off	Control unit deactivated
Warning light flashing	Short Circuit downstream of distributors

CONTROL UNIT GANG-PSH-1.01 alfa WITH 98/99 SYSTEM

The control unit is perfectly interchangeable with the LCD control unit, the functions described above remain unchanged with the 98/99 electric system with the exception of the following two items:

- At switch-on the distribution elements will not be activated, as they are always active
- Any Short Circuit downstream of the NODES will not be indicated.

WHAT TO DO IF….

The control unit fails to turn on when the ON button is pressed.

- Check whether the connector behind the control unit is connected properly, if necessary check whether battery voltage is present between the RED wire and the BLACK wire.
- Contact skilled personnel.

The control unit turns on but the distribution elements are not activated.

- If the control unit turns on and off correctly but the distribution elements stationary in one condition and it is only possible to switch the lights on and off with the entrance switch, pump control is no longer possible. In this case, too, check that the connector behind the control unit is connected properly, particularly with regard to the orange and grey wires.
- Contact skilled personnel.

A LED does not light up even if the situation would require it to.

- Turn the control unit off and on again to check whether the LEDs are working properly.
- Contact skilled personnel.

The 220V MAINS warning light fails to turn on.

- Check whether the external socket is connected to the 220V mains.
- Turn the control unit off and on again to check that the LEDs are working properly.
- Check whether the differential switch in correspondence with the socket but inside the home cell is active.
- Check whether the power supply unit plug is inserted correctly in its socket.
- Contact skilled personnel.

When the water tank level button is pressed the bottom red LED flashes.

- If the pump turns on and off normally but when the water tank level button is pressed the bottom red LED flashes, try cleaning the level sensor rods which may be dirty.
- Contact skilled personnel.

When the engine accumulator button is pressed the bottom red led flashes.

- Engine accumulator broken.
- The fuse next to the engine accumulator positive terminal may have blown.
- Contact skilled personnel.

It is impossible to turn on the lights and the control unit is on and working perfectly.

- If it is possible to display all the ratings from the control unit and control the pump but the lights cannot be turned on from the local switches, try turning on the lights from the entrance switch [(1)] or turn the control unit off and on again.
- Contact skilled personnel.

Note 1:
The entrance switch works from the main ceiling switch. Therefore it is possible to turn all the lights off with the control unit on. This condition remains until the next time the control unit is turned on.

FEATURES OF POWER UNIT Mod. AL310X

Model AL310X

The power unit model AL310X is a device designed for energy control; it features the possibility to switch and adjust the various sources of energy available supplying stable and safe power on the outputs.
In a Motorhome we typically have the following sources of energy:

1. Engine battery/ies;
2. Services battery/ies;
3. Alternator;
4. External Electricity Mains;
5. Solar Panels;
6. Generating set;
7. Alternative sources (Wind generators, etc..)

And the outputs are typically considered:

- Services (the whole home cell at 12 V)
- Fridge

Specifications

Electric
The electric specifications of the device are the following:

- Supply voltage: 110-220 V, 50-60 Hz. In accordance with regulations
- Rated power:150 VA of battery charger @ 13.5 V.
- Services output : 13.5 Volts 30 Amperes.
- Fridge output : 13.5 Volts 20 Amperes.
- SMART active protections.
- If connected to the 110/220V external mains, the power unit delivers power even if the batteries are not connected

Sizes
Container: 220x195x82 Weight Kg. 1.5
Connections

- Cable (L. 150 cm) for connection to the 110/220V Mains, with selector, 50 – 60 Hz with Schuko plug

I. ***J1 Molex caimano mlx 94213 - 2014*** (connector "S" used for connecting the services battery), colour: white
   - contact No.4 → Negative
   - contact No.3 → Not Used
   - contact No.2 → Positive (+12)
   - contact No.1 → Not Used

II. **J2 *molex caimano mlx 94213 - 2014*** (connector "M" used for connecting the engine battery and engine on signal) colour: red
   - contact No.4 → Negative
   - contact No.3 → Not Used
   - contact No.2 → Positive (+12)
   - contact No.1 → D+ (Engine on signal)

III. **J3 *molex caimano mlx 94213 - 2014*** (connector "B" used for distributing energy to the home cell) colour: black
   - contact No.4 → Negative
   - contact No.3 → Bus_B
   - contact No.2 → Positive (+12)
   - contact No.1 → Bus_A

IV. **J4 *molex caimano mlx 94213 - 2014*** (connector “F” used for connecting to the Fridge**; not to be used for assembly of Fridge *AES***) colour: green
- contact No.4 → Negative
- contact No.3 → Positive +12 (Power)
- contact No.2 → Positive (+12) (Low Power)
- contact No.1 → Aux

V. **J5 *Amp Mate-N-Lock 2x1*** (connector “P” used for connecting the solar panel)
- contact No.1 → Negative
- contact No.2 → Positive

Conformity

The device meets the requirements of European Union Directive: 89/336 EMC Electromagnetic Compatibility, 73/23 and 93/68 EEC Safety of Electrical Products.

Advice

Before doing any maintenance work disconnect the 110/220V mains and all sources of energy.
Install the device in a dry, sufficently ventilated place.

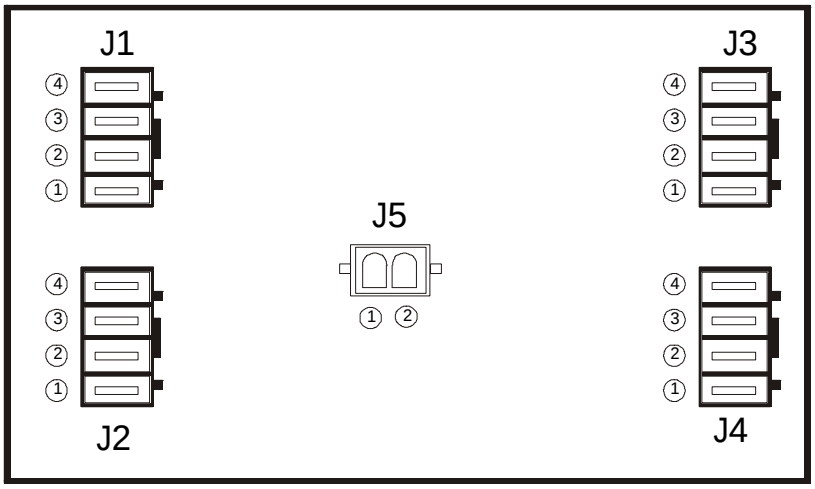


Fig. 3 "Connector Layout – Power Unit AL310X"

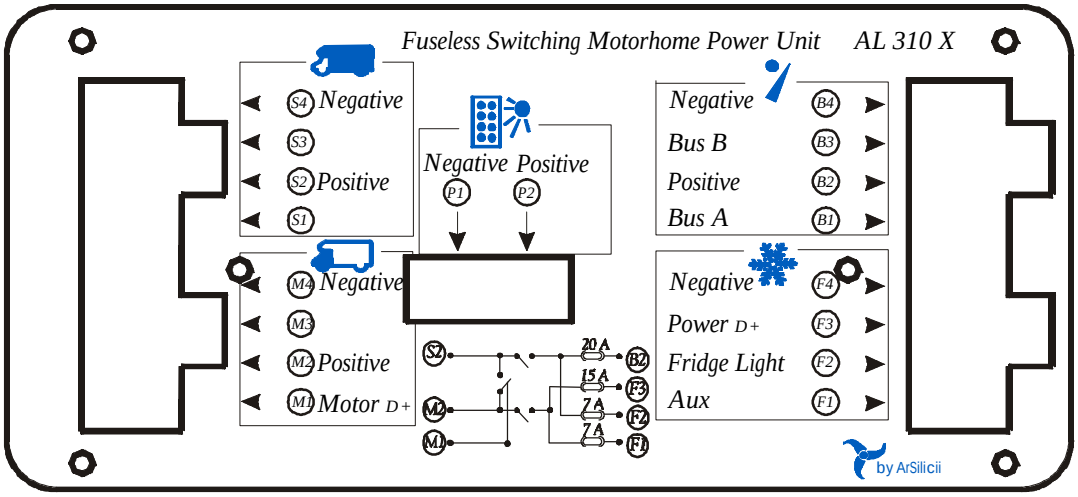


Fig. 4 "Power Unit AL310X Serigraph"

SPECIFICATIONS AND OPERATION OF POWER HUB PH300S2

Model PH300S2

The power-hub, also known as distributor, offers the possibility not only to distribute energy and information to the various devices connected on its outputs, but also to protect them against 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, or by remote control, through the control unit with a special command. The control unit also displays the status of the distributor electrical protections.

Inputs

The device mainly comprises three types of connectors. Connector J1, Fig. 1, normally considered the device input, has the same terminals, i.e. shared, with connectors J2 and J3 which are considered purely as simple feedthroughs. The 2-pole connector J4 is usually used to connect the output control button.

Outputs

The device has a set of connectors for the outputs (from J5 to J12) logically formed of 2 subgroups that can be controlled independently[2], the first from J5 to J8 and the second from J9 to J12

Electrical Specifications

The electrical specifications of the device shown in Fig. 2 are the following:

- Supply voltage 12 V
- J1, J2 4-pole feedthrough connector with 30 A capacity
- J3 4-pole feedthrough connector with 3 A capacity protected by a 5A self-resetting fuse
- J5..J8 four outputs protected in pairs by 7A self-resetting fuses (F4 and F5); the group of four connectors is supplied by a line with a 10 A SMART protection (F2);
- J9..J12 four outputs protected in pairs by 7A self-resetting fuses (F6 and F7); the group of four connectors is supplied by a line with a 10 A SMART protection (F3).
- J4 control connector for sectioning switches I1 and I2

Connectors

The connectors used on the device are of three types (also see Fig. 2)

- J1..J2 Molex *"caimano "* code **mlx94213-2014** with the contacts arranged as follows (also see Fig. 1)

  1 - Bus A
  2 - Positive +12 V
  3 - Bus B

- J12 Molex *"mini-fit Jr"* code **MLX5569-04** with the contacts arranged as follows (also see Fig. 1)

  1 - Bus B
  2 - Ground
  3 - Bus A
  4 - Positive +12 V

- J12 Molex *"mini-fit Jr"* code **MLX5569-02A2** with the contacts arranged as follows (also see Fig. 1)

  1 – Pole A-Switch.
  2 – Pole B-Switch.

Conformity

The device meets the requirements of European Union Directive: 89/336 EMC Electromagnetic Compatibility, 73/23 and 93/68 EEC Safety of Electrical Products

Advice

Install the device in a dry and sufficiently ventilated place.

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[2] In the Power Hub model 300 S2 the two outputs are activated/deactivated in parallel

NB. If the device control “button” is not connected to connector J4 as standard it can be inserted at any time to be able to control the device locally and remotely.

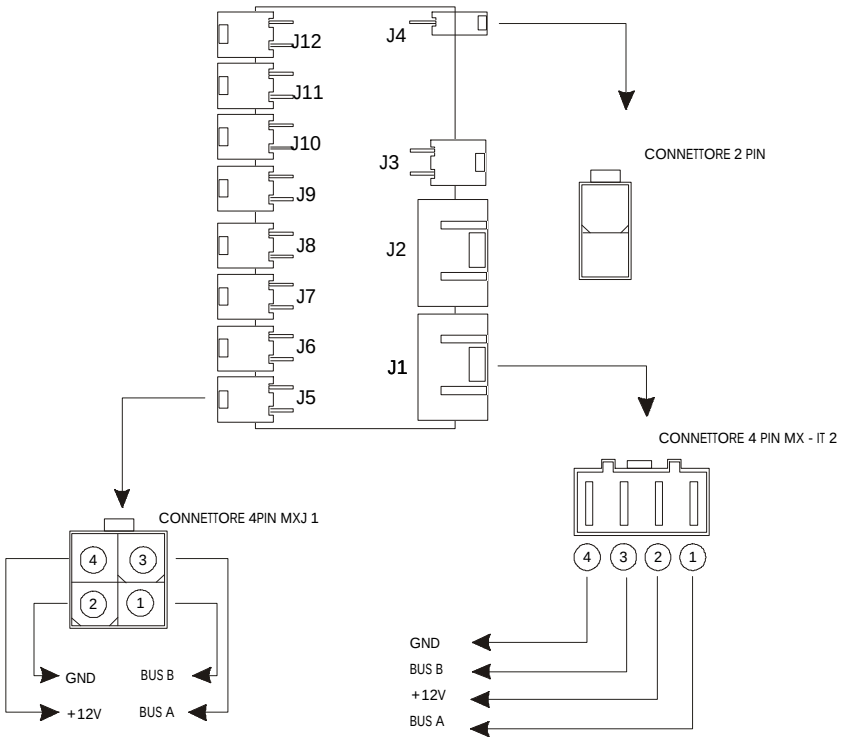

Fig. 5 "Power Hub"

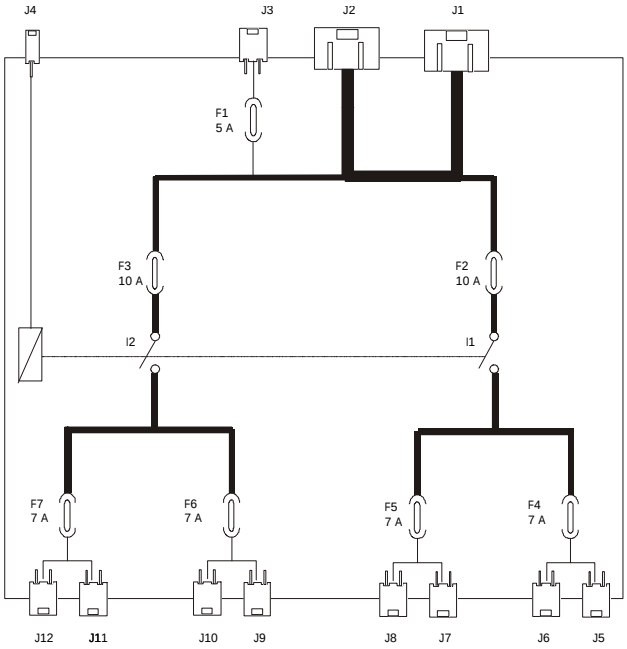

Fig. 6 " Power Hub Logic Layout"

FEATURES OF NODE Model NSA10

Model NSA 10

This system makes it possible to deliver power on a load, such as the water pump, connected to its output, but also to protect it against any short circuits or abnormal overloads.
This node is set to detect levels with discrete sensors (with 4 levels) and two overflow sensors.
The device can be controlled to enable/disable the flow of energy towards the pump in two ways: locally, through a normal switch (on/off), and remotely, via the control unit. The control unit displays the status (on/off) of the device and the status of its protections and level sensors.

Inputs

The device, as shown in Fig. 7, mainly comprises three types of connectors. Connector J1, the device input; connector J4 with six poles usually used to detect the levels of a tank with a discrete four-level sensor and connector J5 with 4 poles which is used to detect the overflow signal from two separate tanks.

Outputs

The output comprises connector J2, as shown in Fig. 1 (on certain models connector J3 may not be fitted); connector J2 will have the power output and two contacts (Wire A and Wire B) for connecting the control switch

Electrical Specifications

The electrical specifications of the device are the following:

- Supply voltage 12 V
- J1 6-pole connector input, capacity xx A
- J2, J3 the two possible outputs controlled respectively by the corresponding switch connected to contacts CON_01 and CON_02 respectively protected by a 3 A SMART fuse
- J4, J5 the two connectors for the level sensors.

Connectors

The connectors used on the device are of three types:

- J1 Molex *"mini-fit Jr"* code **MLX5569-04** with contacts arranged as follows (also see Fig. 8)
  1 - Bus B
  2 - Ground
  3 - Bus A
  4 - Positive +12 V
- J2, J3 Molex *"mini-fit Jr" code* **MLX5569-04** with contacts arranged as follows (also see Fig.1)
  1 - Wire_01
  2 - Ground
  3 - Wire_02
  4 - Positive +12 V

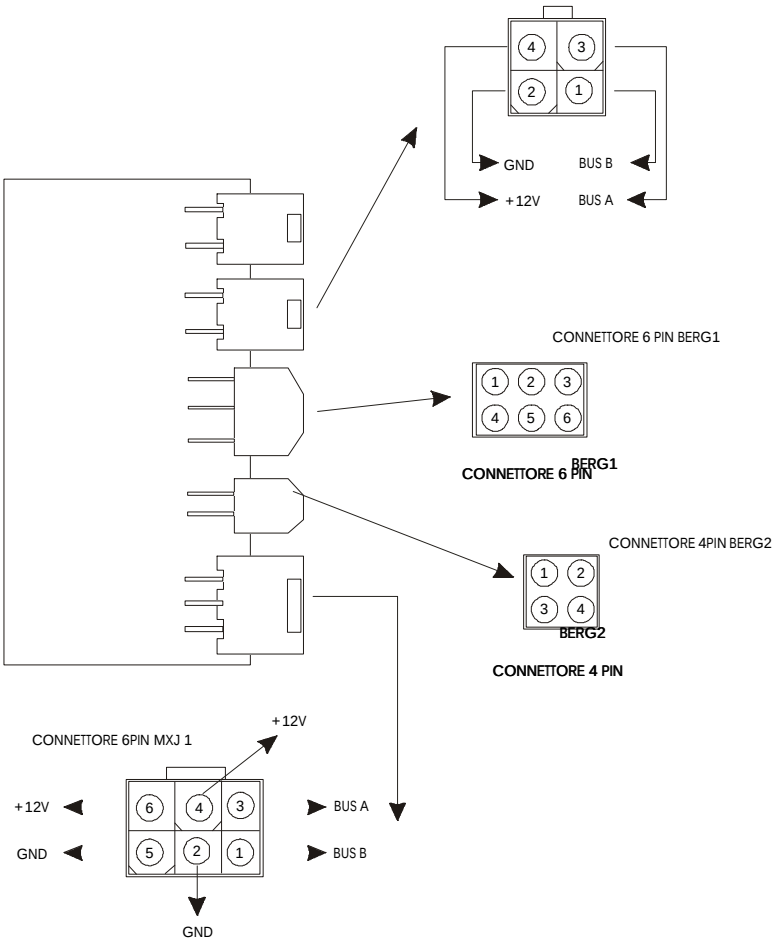

Fig. 7 “Node & connectors”

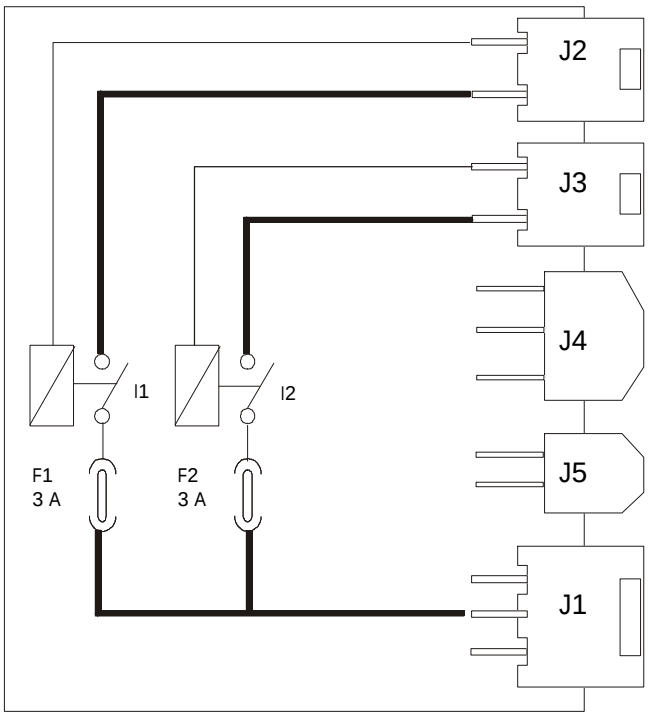

Fig. 8 “Node logic layout”

SOLUTION TO THE MORE COMMON PROBLEMS

SHOULD THE FOLLOWING OCCUR …..	WHAT TO CHECK…..AND…DO
The Services Battery fails to charge when the vehicle is travelling.	• Check the engine battery fuse (50 A reed in the black box on the battery positive terminal); • check that the connectors of the power unit are inserted in the correct positions (colours of male connectors same as colours of female connectors); • check that the 3 A fuse at the alternator output has not blown; • check that the "engine on" signal[3] (alternator output of mechanical unit, the one commonly called D+) is picked up correctly and that it reaches the power unit input; • check with the engine running that the engine and services battery have the same rating (around 13.5 V, apart from the differences due to voltage drop of the wires, typically a few tenths of volt); this can be checked in two ways: by reading directly on the control unit, on which we can read the voltage ratings of the engine and services batteries, otherwise measuring the voltage directly on the terminals; • contact skilled personnel.
There is no voltage on "all" the home cell (including the control unit).	• Check that the power unit switch is at *on*; • check that the services battery is charged and that the fuse (50 A reed) has not blown; • check the power unit output for short circuit[4]; • check with the engine running or 220 V on, that current reaches the home cell. If it does, the services battery may be flat or damaged; • contact skilled personnel.
The entrance light turns off on its own when the other lights are switched on	• Replace the "cherry" circuit.
The fridge is not working with the engine on	• check the fuse (3A engine compartment) of the engine on signal (D+) see note no. 5; • check the power unit fridge output for short circuit or that the supply positive is not cut off; • check that the "engine on" signal (engine alternator) is picked up correctly and reaches the power unit input; • check the connections to the power unit and fridge respectively following the instructions and in the fridge Instructions; • contact skilled personnel.
The fridge is working at 12 V with the engine off	• Check that the connections to the power unit and fridge respectively are correct (take care not to mistake the +12 wire with the D+ especially in AES models); • check that the "engine on" signal is picked up correctly and reaches the power unit input following the instructions and in the fridge Instructions;

[3] The "engine on" signal that reaches the power unit is usually picked up from the alternator output of the vehicle mechanical unit as shown in; in certain mechanical units there may be more than one wire at the alternator output; it is therefore necessary to make sure that the signal is picked up from the right one. In other mechanical units the signal is picked up from the ignition key.

[4] On power unit or later ones if, with the main switch at *on*, the warning led stays on permanently there is either a short circuit at the power unit output or it is damaged internally.

SHOULD THE FOLLOWING OCCUR …..	WHAT TO CHECK…..AND…DO
	• replace the power unit and check whether the problem persists; • contact skilled personnel.
The water pump is not controlled by the control unit	• Make sure that the switch on the power unit (main) is activated and that the warning led is off; • check in the pump menu that the pump protection has not been activated which prevents it from being turned on in the lack of water in the tank; • check the control node for damp owing to a water leak, then try drying it; • check the correct position of the cables at the sewage node (as mentioned in the manual); • check whether the other floor services (boiler, cisterns, stove) are working properly, i.e. if the floor distributor , usually near the power unit, is working properly. If the floor services are not powered, try operating the floor distributor through the button with which the vehicle is fitted. To do this (see section check the pump input for short circuit (from the control unit); • check that the pump can be operated from the local switch (not fitted on all models); • check whether the fault remains also after system *reset* • check the presence of the sewage node from the advanced menu, see 1.10; • if necessary use the direct *bypass* power connector of the pump with which the vehicle is fitted; • contact skilled personnel.
The water level is not indicated correctly.	• Check that the sensor has been connected to node NSA see 1.0 as specified; • check the level sensor electrodes for dirt[5]; • check the presence of the sewage node, see 1.10, from the advanced menu; • contact skilled personnel.
The flash is not displayed when connecting to the 220 V mains	• Check that the power unit plug is in its socket; • check that the differential switch is "armed"; • contact skilled personnel.
The ceiling lights fail to turn on	• Check that the upgoing line is not shorted and that the power unit supplies power at the output; • check that the ceiling distributor is on using the input button; • check the advanced menu for the presence of the ceiling distributor; • contact skilled personnel.
The floor services are not supplied	• Check that the upgoing line is not shorted and that the power unit supplies power at the output; to do this, check that the warning led on the power unit does not stay on permanently; • check whether the floor distributor, usually near the power unit, can be operated using the button with which the vehicle is fitted. To turn it on see section; • contact skilled personnel.
The current indicator on the control unit gives a reading other than zero Amperes even if **all** the loads of the cell have been switched off	• Make sure the solar panels, if fitted, have been switched off; • check directly on the service battery that it is delivering current (to do this, insert an ammeter in series with the wire connected to the services battery positive terminal); • Reset the current to zero from the advanced menu;

[5] For this reason, you are recommended to keep the four-level sensor electrodes clean.

SHOULD THE FOLLOWING OCCUR …..	WHAT TO CHECK…..AND…DO
	• contact skilled personnel.

System reset or re-arming procedure:

- move the power unit switch to*off;*
- make sure that the services output connector (the black one) is on;
- wait for a few seconds;
- move the switch back to*on;*
- the warning led should stay on for about 16 sec. then go out. During the 16 sec. there is no supply at the output and the power unit performs the calibration stage;
- if the warning led stays on after 16 sec., this means a short circuit at the power unit output, exactly on the carrier line (therefore the whole home cell must be without power)