INSTALLATION AND OPERATION MANUAL

DC UPS 24 V_{DC} / 15 A
FR-2400-15-ST
FR-2400-15-SNMP (Remote Management)
FR-2400-15-SNMP-X (Remote Management and multi-purpose Digital Inputs)

DC UPS 48 V_{DC} / 10 A
FN-4800-10-ST
FN-4800-10-SNMP (Remote Management)
FN-4800-10-SNMP-X (Remote Management and multi-purpose Digital Inputs)

DC UPS 48 V_{DC} / 25 A
FN-4800-25-ST
FN-4800-25-SNMP (Remote Management)
FN-4800-25-SNMP-X (Remote Management and multi-purpose Digital Inputs)

Summary

1. Safety Precautions

Before installing and powering on the product, carefully read the instructions provided in this installation and operation manual.

 Attention symbol.

 Danger symbol and risk of electrical shock.

 **Caution**
Installation must only be carried out by a qualified technician. Risky voltage and energy present can cause death or injury if the precautions outlined in this manual are ignored.

 **Attention**
Please carefully follow the instructions provided in this manual. If you have any doubts, please contact qualified technical support.

 **Attention**
Use the product only in an enclosed environment.

2. Overview

2.1. Introduction

The FN and FR power supply family converts AC power from the utility grid into stabilized DC power to supply electronic devices. In the absence of AC power, the battery bank automatically takes over, providing continuous and uninterrupted DC power to the loads. The batteries operate in floating mode, always remaining charged and ready to deliver power. This system ensures a reliable and steady power source, particularly in critical applications. Efficient battery management extends their lifespan, making FN and FR a robust and dependable solution for continuous electronic device power supply.

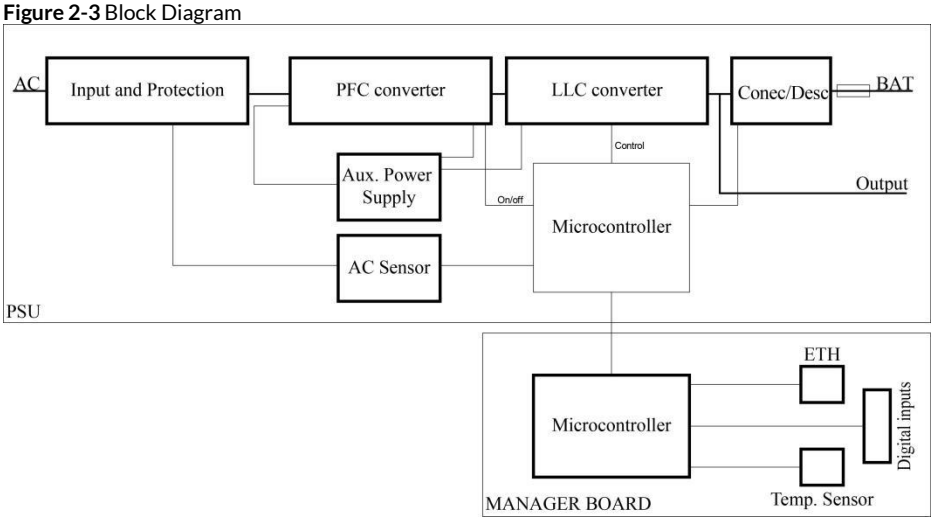
2.2. General Features

Tab. 2-1 General Features

Model	**FR-2400-15 ST/SNMP/SNMP-X**	**FN-4800-10 ST/SNMP/SNMP-X**	**FN-4800-25 ST/SNMP/SNMP-X**
Input Voltage (Nominal)	100 - 240 V_{AC}	100 - 240 V_{AC}	100 - 240 V_{AC}
Frequency	50/60 Hz	50/60 Hz	50/60 Hz
Input Current	4,70 A_{RMS}/1,96 A_{RMS}	5,86 A_{RMS}/2,44 A_{RMS}	14,67 A_{RMS}/ 6,11 A_{RMS}
Nominal Output Voltage	27,5 V_{DC}	54 V_{DC}	54 V_{DC}
Output Voltage Range	20,5 V_{DC} - 28,8 V_{DC}	42 V_{DC} - 58 V_{DC}	42 V_{DC} - 58 V_{DC}
Output Current	15 A	10 A	25 A
Output Power	412,5 W	540 W	1450 W
Power Factor	0,95/ 0,90 (127/ 220 V_{AC})	0,98/ 0,92 (127/ 220 V_{AC})	0,98/0,98 (127/ 220 V_{AC})
Operating Temperature	-10°C até 60°C	-10°C até 60°C	-10°C até 60°C
Input Circuit Breaker (Line and Neutral)	-	-	Two 15 A circuit breakers, one for the Line and another for the Neutral
Input Fuse	6,3 A	6,3 A	-
Battery Fuse	15 A	10 A	25 A
Dimensions (HxWxD)	45x190x240 mm (ST) 45x225x240 mm (SNMP/SNMP-X)	45x190x240 mm (ST) 45x225x240 mm (SNMP/SNMP-X)	45x440x250 mm
Installation Mode	1 U in height for 19" racks	1 U in height for 19" racks	1 U in height for 19" racks

2.3. Block Diagram

Figure 2-3 Block Diagram



2.4. Power Supply Identification

Figure 2-4 FN-4800-10-SNMP-X

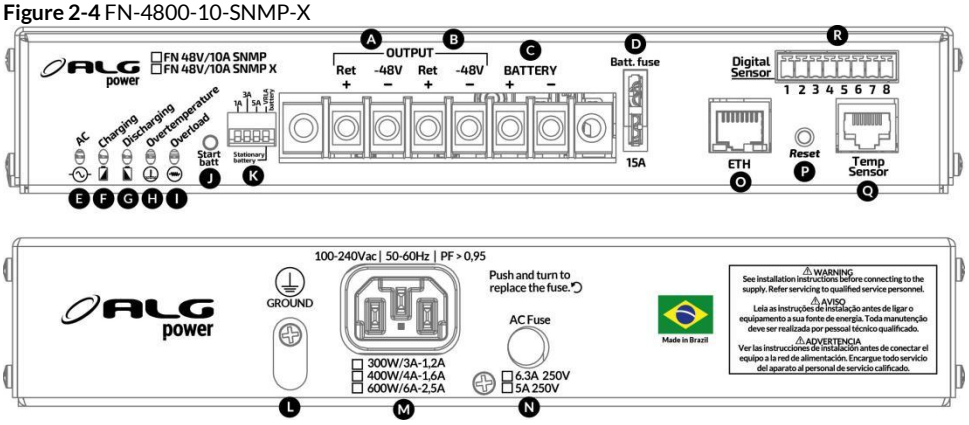


Figure 2-5 FR-2400-15-ST

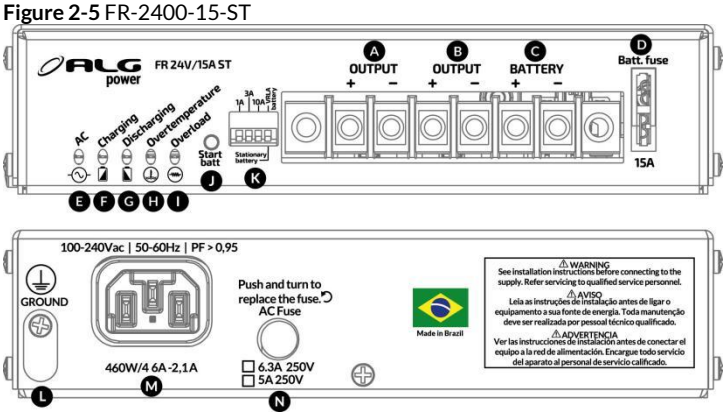
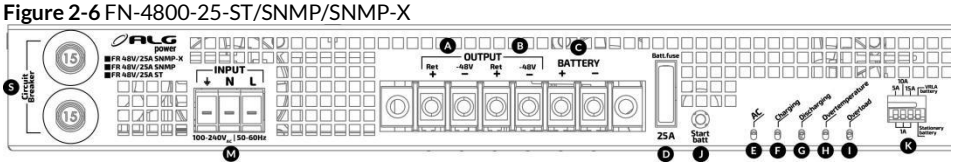


Figure 2-6 FN-4800-25-ST/SNMP/SNMP-X



- **A/B -** Output connectors for powering equipment.

Attention

The outputs are not independent.

- **C -** Battery bank connector.

Attention

The input is protected against reverse polarity.

- **D -** Battery protection fuse.

Attention

The battery fuse varies according to the power supply model. Please refer to Table 2-1 in the general specifications.

- **E** - AC indicator LED.
- **F** - Charging battery indicator LED.
- **G** - Discharging battery indicator LED.
- **H** - Overtemperature indicator LED.
- **I** - Overload indicator LED.
- **J** - Battery Start button.
- **K** - Battery charge configuration switch.
- **L** - Ground connection.
- **M** - AC input connection.
- **N** - AC protection fuse.

Attention

To replace the AC fuse, disconnect the AC power supply from the power supply.

- **O** - Ethernet port for network connection (ETH).
- **P** - Network configuration reset button.
- **Q** - Port for external temperature sensor connection.
- **R** - Port for digital input/dry contact connections.
- **S** - AC Protection Circuit Breakers.

3. Installation Instructions

3.1. Mechanical Installation

3.1.1. Attaching the Mounting Brackets

To attach the brackets on the power supply, loosen the side screws using the indicated key, position the tab, and tighten the screws.

Fig. 3-1 Tightening the screws

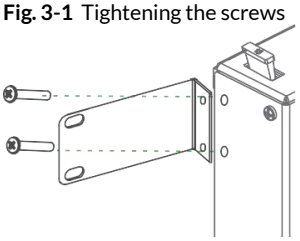
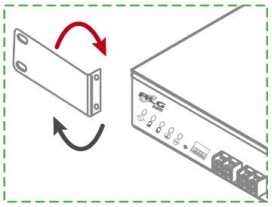
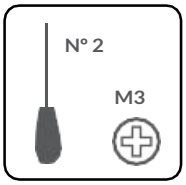


Fig. 3-2 Mounting the Brackets



The mounting brackets can be installed at 0° or 90° angles.

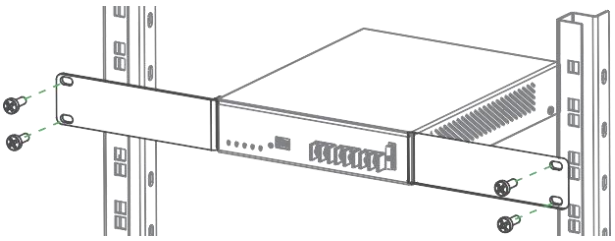
Fig. 3-3 Phillips screwdriver



3.1.2. Mounting the power supply

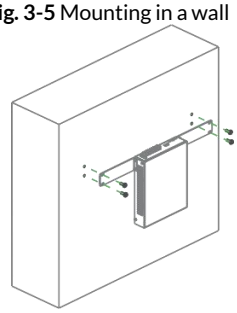
To attach the power supply in the rack, place the screws into the brackets and tighten them against the rail.
To attach the power supply on the wall, assemble the side brackets at a 90° angle. First, fasten the screws to the power supply and then into the wall.

Fig. 3-4 Mounting in a Rack



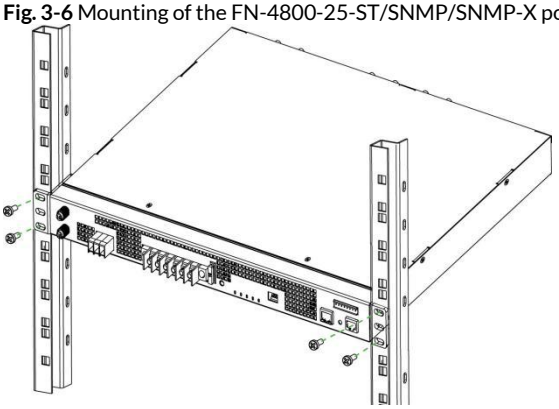
Mounting in a Rack

Fig. 3-5 Mounting in a wall



Mounting in a wall

Fig. 3-6 Mounting of the FN-4800-25-ST/SNMP/SNMP-X power supply in a rack



Mounting in a Rack

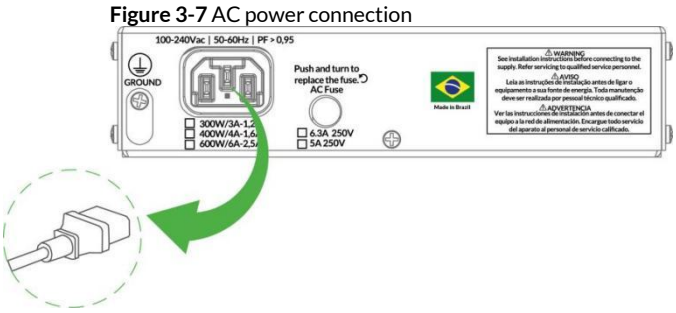
For the FN-4800-25-ST/SNMP/SNMP-X power supply model, it is only possible to mount it in cabinets/racks with 19" standard rails.

3.2. Electrical Installation

3.2.1. AC Connection

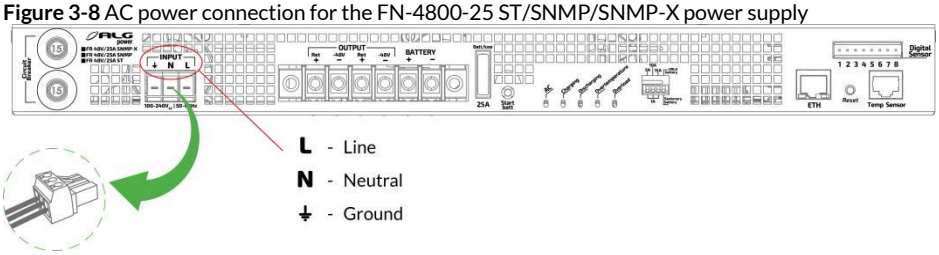
For the 24V/15A and 48V/10A models, connect the AC power cable to the back of the power supply.

Figure 3-7 AC power connection



For the 48V/25A model, connect the AC power cable to the front of the power supply.

Figure 3-8 AC power connection for the FN-4800-25 ST/SNMP/SNMP-X power supply



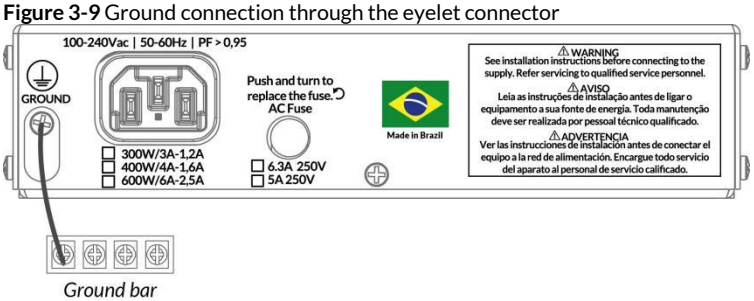
Attention

The power supply has an undervoltage protection circuit for AC voltage. If the voltage drops below 100 V_{AC}, it will shut off, and the rearm time is 10 seconds.

3.2.2. Ground Connection

The grounding option for the unit must be done in one of two ways: through the AC socket or the eyelet connector (except for FN 48V/25A model) . In the case of the eyelet connector, it is necessary to secure the protective ground connection to the corresponding busbar, as illustrated in the image below.

Figure 3-9 Ground connection through the eyelet connector



*Not available for the 48V/25A model.

Attention

In installations where the power supply is placed in external cabinets and locations with metal towers, the probability of an increase in ground potential can enhance the risk of equipment damage. In this regard, the presence of two protective varistors in the power supply will only be effective if this connection is made correctly.

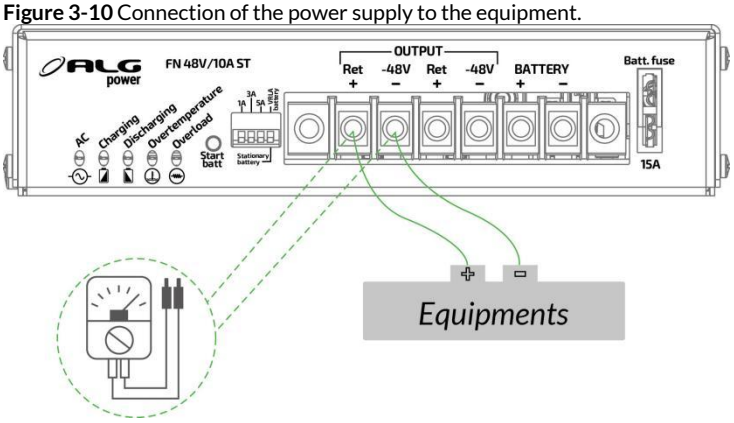
Attention

To comply with the warranty and ensure complete protection, grounding the power supply is MANDATORY.

3.2.3. Equipment Connection

The equipment should be connected to the power supply outputs in their correct polarity as indicated in the following image.

Figure 3-10 Connection of the power supply to the equipment.



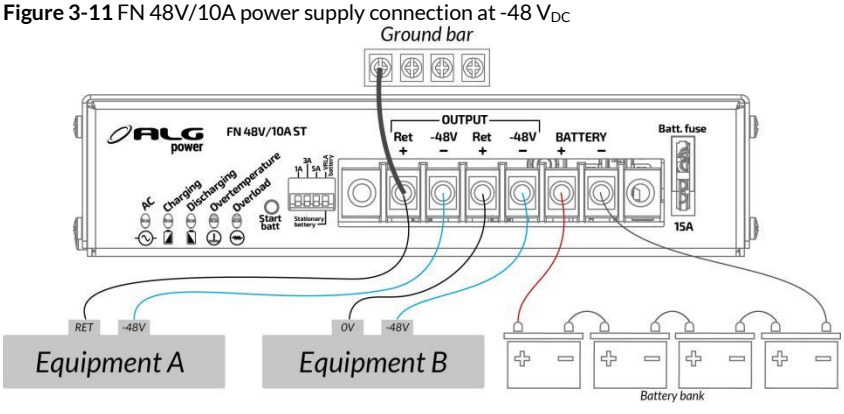
Attention

Please check the maximum voltage supported by the equipment. Use a voltmeter to measure the output voltage to ensure that it matches the input voltage required by the equipment.

For the FN 48V/10A power supply connected to -48 V_{DC}:

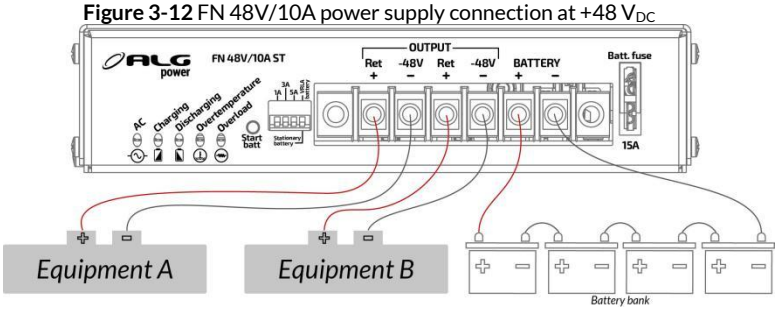
The 0 VDC outputs of the power supply are isolated from the ground (chassis), and it is optional to connect them to the grounding system.

Figure 3-11 FN 48V/10A power supply connection at -48 V_{DC}



For the FN 48V/10A power supply connected to +48 V_{DC}:
No grounding connection is required for the output.

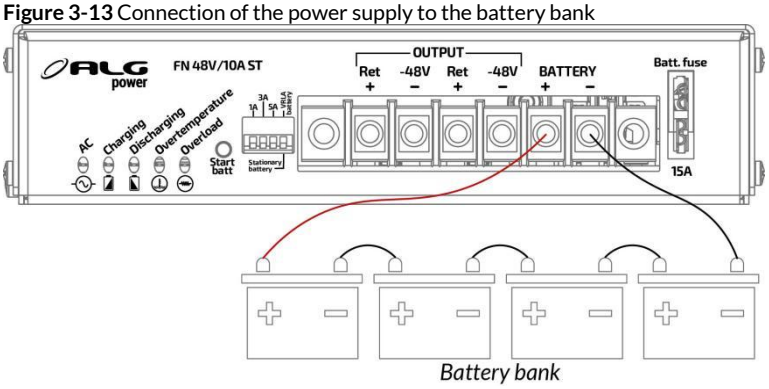
Figure 3-12 FN 48V/10A power supply connection at +48 V_{DC}



3.2.4. Battery Connection

For continuous power supply, it is necessary to connect the power supply to a battery bank. Connect the battery bank to the designated front connector. Pay attention to the correct **voltage and polarity.**

Figure 3-13 Connection of the power supply to the battery bank



Caution

When installing the battery bank, it is important to follow the correct sequence of connections. It is recommended that you connect the battery cables to the power supply before turning it on.

Caution

Make sure that all connections of the battery cables are properly established before turning on the power supply.

Attention

The ST version power supply models only operate with stationary lead-acid or VRLA batteries.

Attention

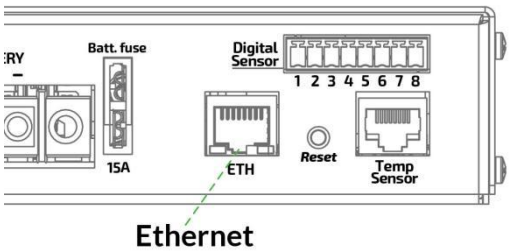
Please check the webpage (“System configs” menu) for the correct configuration for batteries of different chemical compositions.

4. Remote Management and SNMP

4.1. Installation

To connect the SNMP-enabled power supply to the network, simply connect it to an Ethernet cable.

Figure 4-1 Ethernet cable connection location



Default IP: 192.168.1.50.

Username: admin

Password: admin.

If you need to restore the default IP and password settings, press and hold the Reset button for 10 seconds. When you press the Reset button, it does not affect the power supply or battery output, which means it does not turn off or restart the equipment.

4.2. Computer Access Configuration for Windows

1) Click on: Start > Control Panel > Network and Sharing Center.

2) Click on: Change Adapter Settings > Local Area Connection > Properties..

3) Select Internet Protocol Version 4 (TCP/IPv4) > Properties. Configure your local network with the parameters. For example, set the IP address to 192.168.1.10 and subnet mask to 255.255.255.0, and the default gateway to 192.168.1.1.

4) Confirm the current settings by clicking the OK button on both configuration screens.

5) Open your internet browser and select Tools > Internet Options > Connections > LAN Settings.

6) Select the option "Automatically detect settings." The other options should be disabled. Confirm the configuration by clicking the OK button.

7) In your browser, type the default factory IP address 192.168.1.50 to open the initial configuration page of the FN Managed Power Supply.

4.3. Description of Web Page Screens

4.3.1. Status Screen

Table 4-1 Status Screen

Status	
Tab	**Description**
Model	Displays the name and model of the power supply.
Operation mode	Indicates whether the power supply is operating on AC mains or battery power.
System Uptime	Indicates if there has been a voltage drop in the AC mains since the displayed information, allowing monitoring of power grid instability.
Input voltage:	Displays the measurement of the AC input voltage.
Output voltage	Displays the output voltage of the power supply.
AC/DC output current	Displays the output current of the power supply.
Load output current	Displays the charging stage when the battery is connected.
Battery status	Indicates whether the battery bank is connected or not and displays the battery charging stages(Constant Current, Float, and Absorption).
Battery voltage	Displays the voltage of the battery bank.
Battery current	Displays the current of the battery bank, whether it is charging or discharging.
Battery current limit	Displays the configured current limit for maximum battery charging current.
Battery test	
Tab	**Description**
Date	Displays the date of the last battery test performed.
Status	Displays the final result of the test.
Duration	Displays the configured duration in the "Commands" tab.
Current test time	Indicates the final time of the test.
Initial Voltage/Current	Displays the initial voltage and current of the batteries.
Final Voltage/Current	Displays the final voltage and current of the batteries.
Sensors	
Name	**Description**
Internal temperature	Displays the internal temperature of the power supply.
Sensor cable temperature	Displays the temperature at the location where the cable is placed.
Battery temperature	Displays the temperature of the battery bank from the cable (see item 5.4.1. Thermal compensation).
** RLY 1*	Indicates the state of the relay (0 or 1).
** SNS 1/ 2 /3*	Indicates the state of the 3 digital input sensors (0 or 1).

* Available for SNMP-X model.

4.3.2. Alarms Screen

Table 4-2 Alarms Screen

Tab	Description
Clock is halted	Indicates the system clock interruption.
BAT Test needs reschedule	Indicates the need to reschedule the battery test.
AC Power	Indicates that the power supply is operating on AC power.
BAT Power	Indicates that the power supply is operating on battery power.
AC Abnormal	Indicates that the AC power is outside the range of 100-240 V_{AC}.
Overload	Indicates an overload condition in the power supply.
Battery on charging	Indicates that the battery is currently being charged.
Battery on discharging	Indicates that the battery is currently discharging.
High Voltage Warning	Indicates when the power supply output voltage is above the configured value.
High Voltage Shutdown	Indicates that the power supply has been shut down due to high voltage.
Low Voltage Warning	Indicates when the power supply output voltage is below the configured value.
LVD Warning	Indicates when the battery voltage is approaching the disconnect value.
LVD Open	Indicates that the power supply has been shut down due to the battery voltage being below the programmed minimum limit.
System Over Temperature	Indicates an overtemperature condition in the power supply.
Thermal Runaway	Indicates a fast increase in temperature.
Temperature Probe	Indicates a problem with the temperature sensor.
Single Fan	Indicates a problem with a single fan.
Multiple Fan	Indicates a problem with multiple fans.

4.3.3. Commands Screen

Table 4-3 Commands Screen

Name	Description
Output Commands	Allows you to restart the power supply. This command only works when AC power is available.
Battery Test	Allows remote battery testing via manual or periodic testing. This test is only executed if the battery is fully charged and in float mode (Float).
Output Relay (SNMP-X)	Allows you to turn on or off the relay of the digital inputs.

4.3.4. General Settings Screen

Table 4-4 General Settings Screen

Tab	Description
User Configs	Tab to change and set new user credentials (username and password).
Network Configs	Tab to change and set new device configuration values and IP.
SNMP Configs	Tab to configure read/write community identifiers for SNMPv2c agent. Configure multiple community names if you want the SNMP agent to respond to NMS/SNMP manager with different read community names. If less than three communities are sufficient, leave the remaining fields blank.
Install Configs	Tab to configure data about installations, general equipment, and responsibilities.
System Configs	Tab to configure voltage and current parameters of the power supply and batteries, as well as alarm settings and battery thermal compensation (see item 5.4. Web Page Configuration and item 5.4.1. Thermal Compensation).
Time & Date	Tab to configure time and date for scheduling battery tests.

4.4. OIDs da Interface

The MIB file is available for download on the power supply's web page under the "Home Page" tab.

Subgroup 1 - Output parameters of the power supply

Table 4-5 Output parameters of the power supply

OID	Description	Type	Parameters	Access
.1.3.6.1.4.1.49136.1.1.1.0	Output Voltage	Integer	V/10 (Volts)	Read-only
.1.3.6.1.4.1.49136.1.1.2.0	Output AC/DC Current	Integer	A/1000 (Amp)	
.1.3.6.1.4.1.49136.1.1.3.0	Load output current	Integer	A/1000 (Amp)	
.1.3.6.1.4.1.49136.1.1.4.0	AC Input Voltage	Integer	V/1000 (Volts)	

Subgroup 2 - Charger Parameters

Table 4-6 Charger parameters

OID	Description	Type	Parameters	Access
.1.3.6.1.4.1.49136.1.2.1.0	Battery Voltage	Integer	V/10 (Volts)	Read-only
.1.3.6.1.4.1.49136.1.2.2.0	Battery Current	Integer	A/1000 (Amp)	Read-only
.1.3.6.1.4.1.49136.1.2.3.0	Charger Status	Integer	0x00=CARREGADOR_BATERIA_NAO_CONECTADA	Read-only
			0x01= CARREGADOR_BATERIA_TENSAO_ERRADA	
			0x02= CARREGADOR_NOBREAK	
			0x03= CARREGADOR_CORRENTE_CONST	
			0x04= CARREGADOR_EQUALIZACAO	
			0x05= CARREGADOR_FLUTUACAO	
			0x06= CARREGADOR_NOBREAK_TIMEOUT	
.1.3.6.1.4.1.49136.1.2.4.0	Charger Current	Integer	A/1000 (Amp)	Read-only

Subgroup 3 – Alarms Parameters

Table 4-7 Alarms Parameters

OID	Description	Type	Parameters	Access
.1.3.6.1.4.1.49136.1.3.1.0	Indicates that the power supply is operating from the battery	Integer	0 - no, 1 - yes	Read-only
.1.3.6.1.4.1.49136.1.3.2.0	Indicates AC power interruption			
.1.3.6.1.4.1.49136.1.3.3.0	Indicates that the battery is being charged			
.1.3.6.1.4.1.49136.1.3.4.0	Indicates that the battery is being discharged			
.1.3.6.1.4.1.49136.1.3.5.0	Indicates an over-temperature condition in the power supply	Integer	0 - normal, 1 - overtemperature	Read-only
.1.3.6.1.4.1.49136.1.3.6.0	Indicates an overload condition in the power supply	Integer	0 - normal, 1 - overload	Read-only
.1.3.6.1.4.1.49136.1.3.11.0	Indicates the system uptime in hours	Integer	Measure in hours	Read-only
.1.3.6.1.4.1.49136.1.3.14.0	Indicates that the AC power is outside the range of 100-240 VAC	Integer	0 - normal, 1 - abnormal	Read-only
.1.3.6.1.4.1.49136.1.3.15.0	Indicates a fuse failure	Integer	0 - normal, 1 - fail	Read-only
.1.3.6.1.4.1.49136.1.3.19.0	Indicates that the power supply has been shut down due to the battery voltage being below the programmed minimum limit	Integer	0 - normal, 1 - off	Read-only
.1.3.6.1.4.1.49136.1.3.20.0	Indicates when the battery voltage is nearing the disconnect value	Integer	0 - normal, 1 -near disconnect	Read-only
.1.3.6.1.4.1.49136.1.3.21.0	Indicates when the power supply voltage is below the desired value	Integer	0 - normal, 1 - low voltage	Read-only
.1.3.6.1.4.1.49136.1.3.22.0	Indicates that the power supply has been shut down due to high output voltage	Integer	0 - normal, 1 - off	Read-only
.1.3.6.1.4.1.49136.1.3.23.0	Indicates when the output voltage of the power supply is above the desired value	Integer	0 - normal, 1 - high voltage	Read-only
.1.3.6.1.4.1.49136.1.3.24.0	Indicates failure of multiple fans	Integer	0 - normal, 1 - fail	Read-only
.1.3.6.1.4.1.49136.1.3.25.0	Indicates failure of a single fan	Integer	0 - normal, 1 -fail	Read-only
.1.3.6.1.4.1.49136.1.3.26.0	Indicates temperature sensor failure	Integer	0 - normal, 1 -fail	Read-only
.1.3.6.1.4.1.49136.1.3.27.0	Indicates that the cable temperature is above the configured temperature for the battery in the System configs	Integer	0 - normal, 1 - abnormal	Read-only

Subgroup 4 – Temperature Parameters

Table 4-6 Temperature Parameters

OID	Description	Type	Parameters	Access
.1.3.6.1.4.1.49136.1.4.1.0	Internal temperature	Integer	°F ou °C	Read-only
.1.3.6.1.4.1.49136.1.4.2.0	External temperature			
.1.3.6.1.4.1.49136.1.4.3.0	Internal heatsink temperature			
.1.3.6.1.4.1.49136.1.4.4.0	Battery temperature			

Subgroup 5 – Input Parameters of the Power Supply

Table 4-7 Input Parameters of the Power Supply

OID	Description	Type	Parameters	Access
.1.3.6.1.4.1.49136.1.6.1.0	AC Input Voltage	Integer	Measured in volts	Read-only

Subgroup 6 – Installation Parameters

Table 4-8 Installation Parameters

OID	Description	Type	Parameters	Access
.1.3.6.1.4.1.49136.1.7.1.0	Set PoP name	Integer	Text	Read-only
.1.3.6.1.4.1.49136.1.7.2.0	Installation Address	Integer	Text	Read-only
.1.3.6.1.4.1.49136.1.7.3.0	Community Installation	Integer	Text	Read-only
.1.3.6.1.4.1.49136.1.7.4.0	Equipment Installation Date	Integer	DD/MM/YYYY (Default)	Read-only
.1.3.6.1.4.1.49136.1.7.5.0	Battery Capacity	Integer	In Ah	Read-only
.1.3.6.1.4.1.49136.1.7.6.0	Battery Brand	Integer	Text	Read-only
.1.3.6.1.4.1.49136.1.7.7.0	Battery Installation Date	Integer	DD/MM/YYYY (Default)	Read-only
.1.3.6.1.4.1.49136.1.7.8.0	Responsible Person	Integer	Text	Read-only

Subgroup 7 – Battery Test Parameters

Table 4-9 Battery Test Parameters

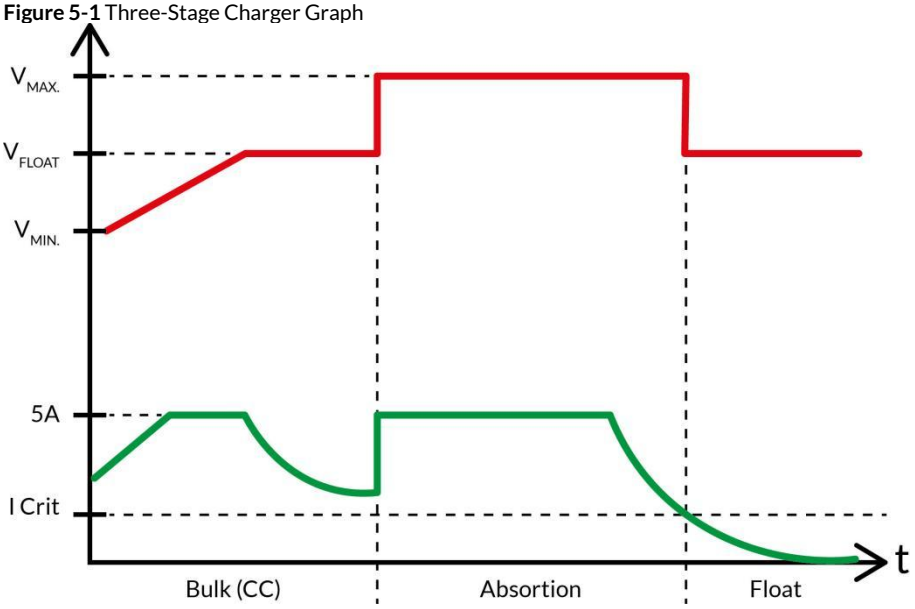
OID	Description	Type	Parameters	Access
.1.3.6.1.4.1.49136.1.8.1.0	Battery test date	Integer	DD/MM/YYYY (Default)	Read-only
.1.3.6.1.4.1.49136.1.8.2.0	Battery test result	Integer	0 - Never done 1 - PASS 2 - RUNNING 3 - ABORTED 4 - FAILED	Read-only
.1.3.6.1.4.1.49136.1.8.3.0	Scheduled duration of battery test	Integer	In minutes	Read-only
.1.3.6.1.4.1.49136.1.8.4.0	Elapsed time of battery test	Integer	hh:mm:ss	Read-only
.1.3.6.1.4.1.49136.1.8.5.0	Initial voltage of battery test	Integer	V/10 (volts)	Read-only
.1.3.6.1.4.1.49136.1.8.6.0	Initial current of battery test	Integer	A/1000 (Amp)	Read-only
.1.3.6.1.4.1.49136.1.8.7.0	Final voltage of battery test	Integer	V/10 (volts)	Read-only
.1.3.6.1.4.1.49136.1.8.8.0	Final current of battery test	Integer	A/1000 (Amp)	Read-only

5. Charger Configuration

5.1. Three-Stage Battery Charger

The battery charger is with 3 or 2 stages and can be configurable.
Below is an illustrative graph depicting the charge curve:

Figure 5-1 Three-Stage Charger Graph



- **01-BULK:** the charger operates with a constant current, which can be programmed according to the model. This allows for a gradual and controlled charging of the batteries. As the batteries reach full charge, the charger advances to the next stage.

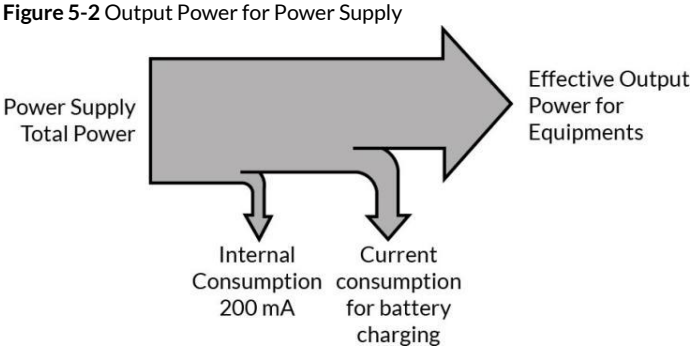
- **02-ABSORTION:** applies a constant voltage with the aim of equalizing the voltage of each battery cell. This process helps to mitigate the premature sulfation effect on the circuit boards, which, in turn, promotes a decrease in the battery's charging capacity and, consequently, its lifespan. Once equalization occurs, the charger moves to the next stage.

- **03-FLOAT:** the final stage of the battery charging process, in which a constant float voltage is applied to neutralize the self-discharge effect, allowing the battery to remain in its optimal charged state for an extended period.

5.2. Power and Charging

The total output power of the power supply is divided among the equipment loads, internal consumption, and the battery charging circuit, as exemplified in the image below:

Figure 5-2 Output Power for Power Supply



The table below shows the total effective output power for equipment based on the charger configuration.

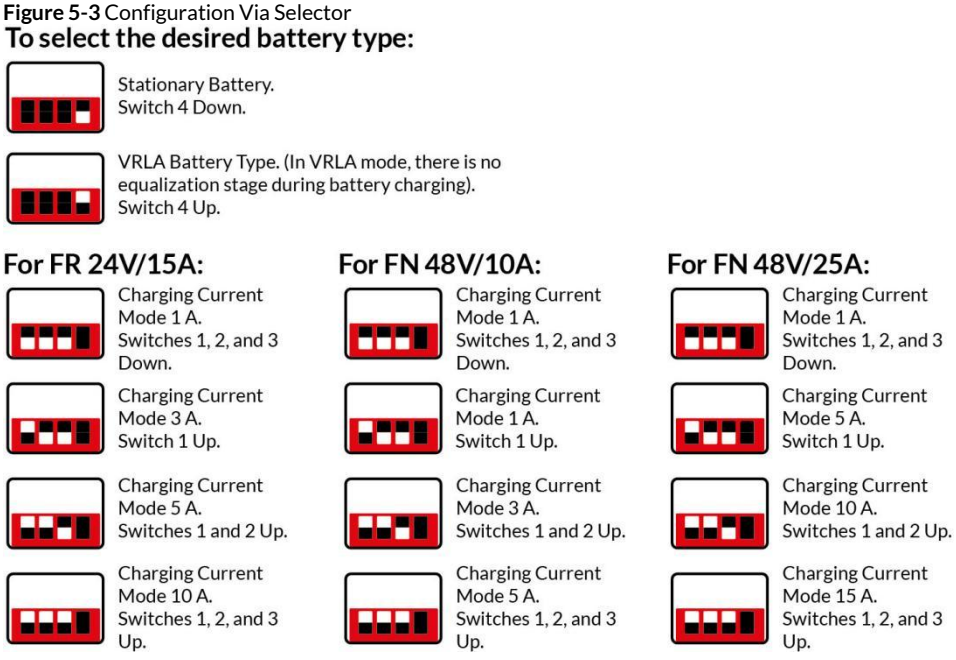
Table 5-2 Output Power for each model

Model	**FR 24V 15A**	**FN 48V 10A**	**FN 48V 25A**
Total output Power	412,5 W	540 W	1450 W
Maximum Charger Power	**FR 24V 15A**	**FN 48V 10A**	**FN 48V 25A**
Power for Equipment	137,5 W	270 W	540 W
Charger Current	10 A	5 A	10 A
Output Current for Equipment	5 A	5 A	15 A
Minimum Charger Power	**FR 24V 15A**	**FN 48V 10A**	**FN 48V 25A**
Power for Equipment	385 W	486 W	1296 W
Charger Current	1 A	1 A	1 A
Output Current for Equipment	14 A	9 A	24 A

5.3. Configuration Via Selector Switch

Manually set the battery charger according to the desired charging current.

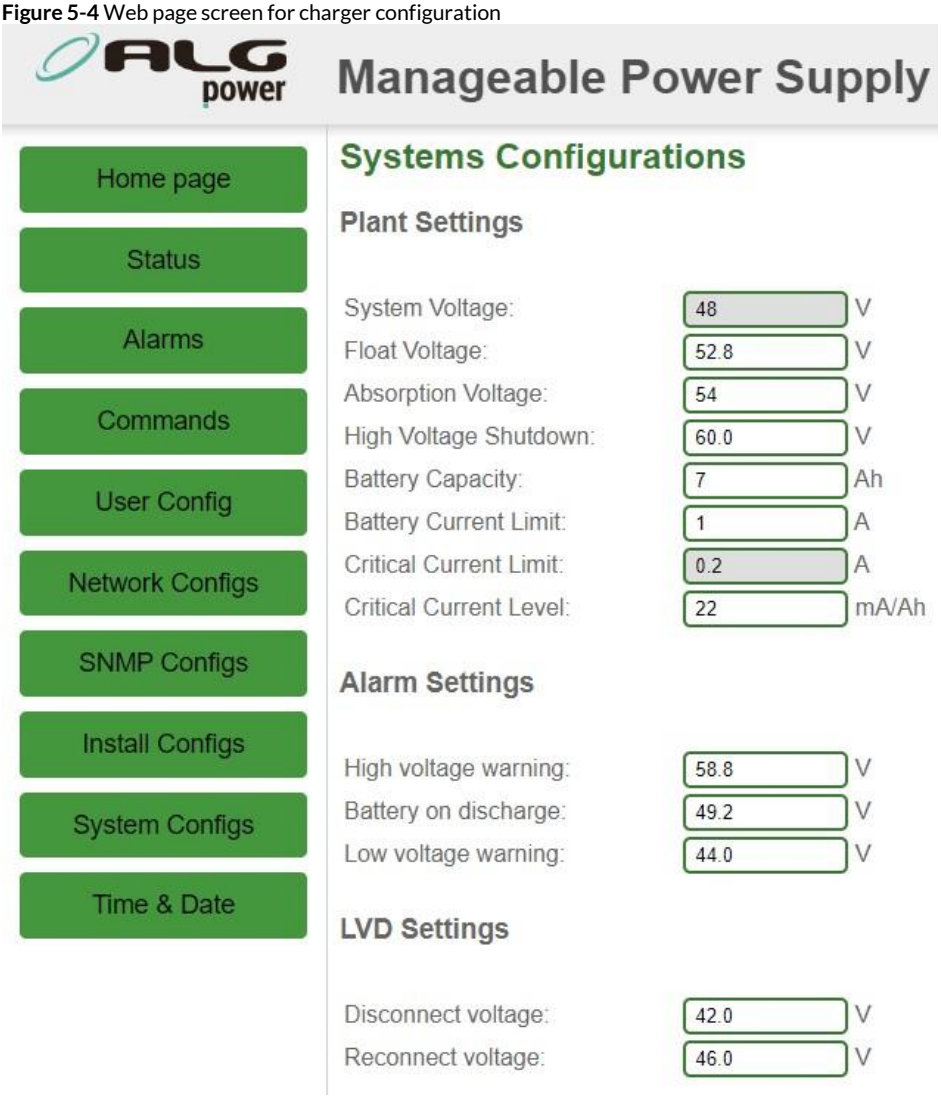
Figure 5-3 Configuration Via Selector



5.4. Configuration Via Web Page

The SNMP power supply models have the functionality to allow remote configuration of battery voltage and current. This can be done through the 'System Configs' tab, which allows adjusting the parameters to make the voltages compatible with lithium batteries.

Figure 5-4 Web page screen for charger configuration



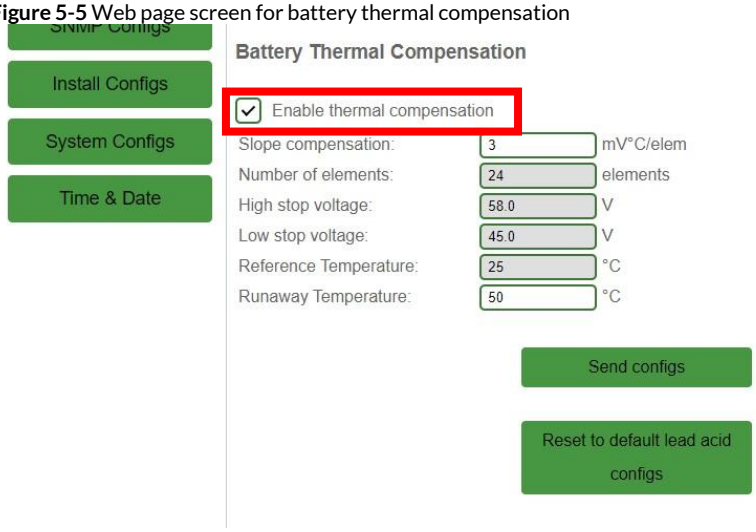
Attention

Refer to your battery datasheet for the parameters.

5.4.1. Thermal compensation for Lead Acid batteries

The SNMP monitoring-enabled power supply models allow configuring battery temperature compensation via the web page. In the 'Commands' tab, enable the 'Enable thermal compensation' field, as shown in the image below:

Figure 5-5 Web page screen for battery thermal compensation



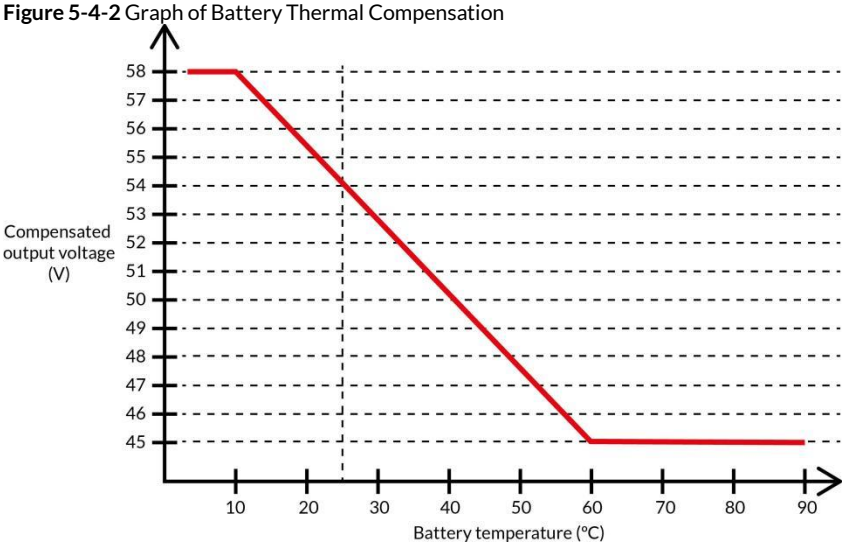
Attention

The temperature sensor should be installed with its tip in contact with the body of the batteries for proper operation.

The "Enable Thermal Compensation" command allows temperature variation to induce voltage compensation in the output. This feature adjusts the output voltage values according to the temperature.

When the temperature increases, the system's output voltage is reduced to prevent thermal runaway, which can compromise the battery's integrity. On the other hand, when the temperature decreases, the system's output voltage is increased to ensure proper battery charging. As illustrated in the graph below:

Figure 5-4-2 Graph of Battery Thermal Compensation



*Using 10.83 mV/°C per element

This temperature compensation enables more precise and efficient battery charging, extending its lifespan and preventing damage from overcharging or discharging. Moreover, this feature enhances the overall system performance, ensuring greater stability and reliability of the equipment where the battery is installed.

The temperature compensation equation is as follows:
System Voltage = (Configured Voltage) - (Battery Temperature - Reference Temperature) * Number of Battery Cells * Slope Compensation.

Where:
- System Voltage: Compensated output voltage of the system.
- Configured Voltage: Set float or equalization voltage.
- Battery Temperature: Temperature of the battery.
- Reference Temperature: Reference temperature.
- Number of Battery Cells: Number of cells in the battery bank.
- Slope Compensation: Temperature compensation slope in volts per degree Celsius per cell.

Example:
Battery Temperature = 40 °C
Configured Voltage = 54 V_{DC}
Reference Temperature = 25 °C
Number of Cells = 24
Slope Compensation = 3 mV/°C/cell
System Voltage = $54 - (40 - 25) * 24 * 3 * 10^{-3}$
System Voltage = 52,92 V_{DC}, which will be the float voltage for the battery bank.

6. Digital Inputs / Dry Contacts

The SNMP-X version features up to 3 digital inputs available for alarm purposes. These inputs can be used to monitor the status of various devices, such as ports, Surge Protective Devices (SPDs), smoke sensors, battery presence, and other devices.

The digital inputs can be configured to receive signals from either dry contacts or voltage, enabling the detection of events from external devices. These signals are sent to the remote management system, allowing for remote monitoring and control of the status of these devices.

Each sensor can have its name configured through the "Install configs" menu.

- The input sensors accept voltage signals between 0 and 60 V_{DC};
- Voltage values between 5 and 60 V_{DC} will be interpreted as logic "1," while values below 5 V_{DC} will be interpreted as logic "0";
- Each input is isolated with an optocoupler, and the pins are related as per the diagram and table below:

Figure 6-1 Optocoupler diagram

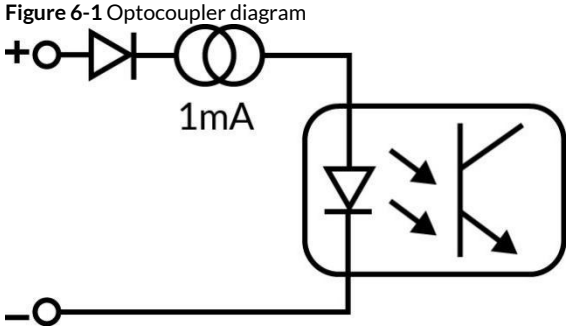


Table 6-1 Pinout of dry contacts

Pin	Description
1	Positive Sensor 1
2	Negative Sensor 1
3	Positive Sensor 2
4	Negative Sensor 2
5	Positive Sensor 3
6	Negative Sensor 3
7	Relay 01 NO
8	Relay 01 NO

The names and states of the sensors and relays have their own unique OIDs, as shown below:

Table 6-2 OIDs for all input sensors and relays

Sensors	OIDs
Sensor 1 Name	.1.3.6.1.4.1.49136.1.6.2.1.0
Sensor 1 State	.1.3.6.1.4.1.49136.1.6.2.2.0
Sensor 2 Name	.1.3.6.1.4.1.49136.1.6.3.1.0
Sensor 2 State	.1.3.6.1.4.1.49136.1.6.3.2.0
Sensor 3 Name	.1.3.6.1.4.1.49136.1.6.4.1.0
Sensor 3 State	.1.3.6.1.4.1.49136.1.6.4.2.0
Relay 1 Name	.1.3.6.1.4.1.49136.1.6.5.1.0
Relay 1 Output State	.1.3.6.1.4.1.49136.1.6.5.2.0

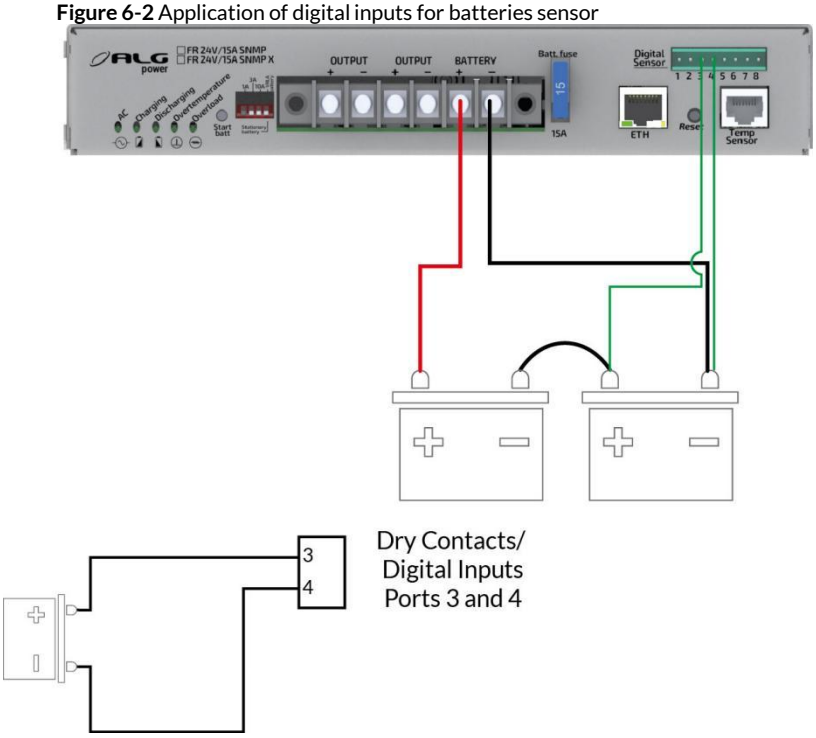
Relay:

- The relay is normally open and supports up to 60 V_{DC} and 0,5 A.
- It is located at the connector of pins 7 and 8.
- It can be triggered through the web page under the "Commands" tab.

6.1. Digital Input Applications

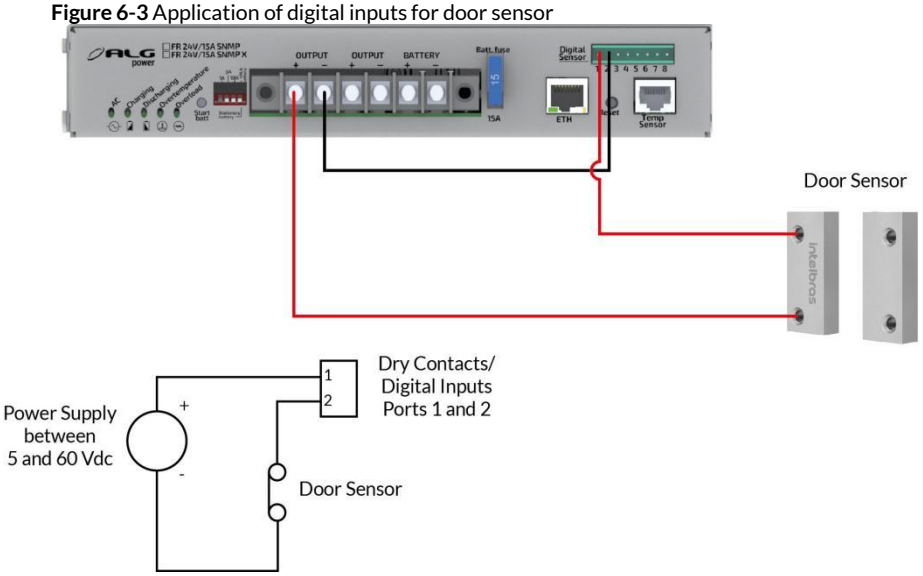
6.1.1. Batteries Sensor

Figure 6-2 Application of digital inputs for batteries sensor



6.1.2. Door Sensor

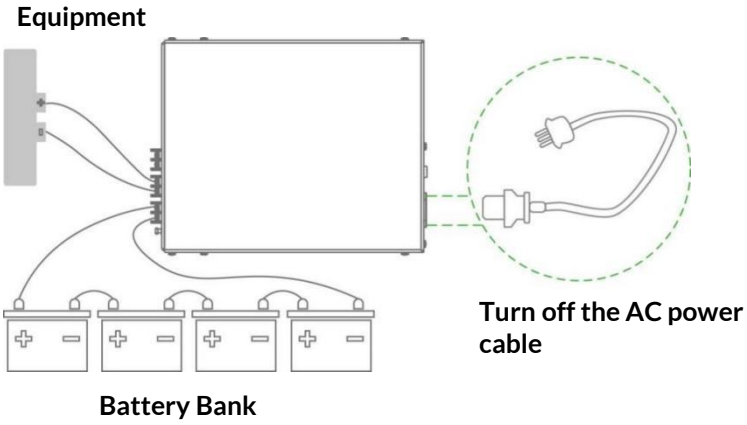
Figure 6-3 Application of digital inputs for door sensor



7. Operation

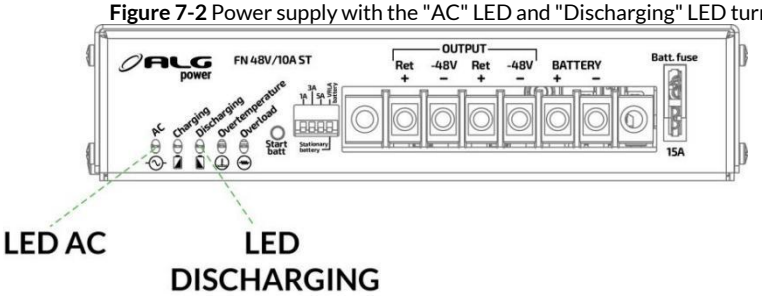
1) With the devices connected to the output or with a voltmeter connected to the output, disconnect the AC power cable.

Figure 7-1 Disconnecting the AC power cable from the power supply



2) The equipment is now powered by the battery. At this stage, the "AC" LED should be off, and the "Discharging" LED should be on.

Figure 7-2 Power supply with the "AC" LED and "Discharging" LED turned on



3) Reconnect the AC power cable to the power supply. At this stage, the "AC" and "Charging" LEDs should be turned on.

Figure 7-3 Reconnecting the AC cable

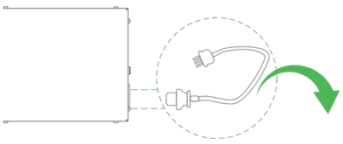
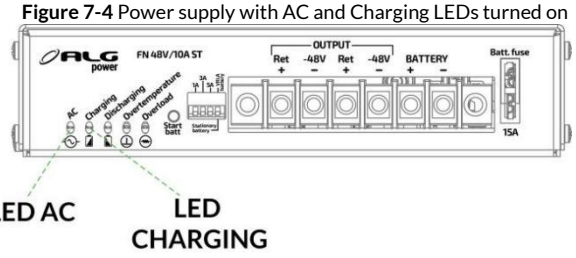


Figure 7-4 Power supply with AC and Charging LEDs turned on



4) **Smart Fan:** The fans remain on as long as AC power is available. However, when the AC power supply is interrupted and the power supply switches to battery mode, the fans are automatically turned off after 5 minutes. This functionality is designed to save battery power, as fan cooling may not be as essential in situations where the power supply is operating on battery power.

8. Frequently Asked Questions (FAQs)

8.1. Power Supplies and Batteries

1. Is my battery in good condition?
To perform the test, disconnect the battery bank from the power supply and measure it using a voltmeter. A lead-acid battery has voltage values of 10,5 V_{DC} at 0% charge and up to 12,8 V_{DC} at 100% charge. If your battery's voltage is below 10,5 $V_{DC,}$ it needs to be recharged. The power supply chargers do not work with batteries below 10,5 V_{DC}, so it's best to use an automotive charger. The first step is to fully charge the battery, and then let it sit idle for 24 hours. Measure the voltage afterward. If it is below 12 V_{DC}, the battery needs to be discarded.

2. Is my battery bank balanced/equalized?
Before installing the battery bank in a power supply, it is advisable to measure the individual voltage of each battery to determine if they are balanced or equalized. To do this, measure the individual voltage of each battery. If any of them are below 10 V_{DC}, follow the procedure described in item 1. If the voltage difference between individual batteries is greater than 0,8 V_{DC}, connect them all in parallel and leave them connected for 24 hours until they reach the same voltage. It is recommended to balance the battery bank during regular maintenance every six months or one year.

3. The power supply does not switch to battery mode when AC power is lost, what could be the problem?
Step 1. Check item 6 to ensure that the battery has been recognized. If the battery has not been recognized, refer to item 4.
Step 2. If the battery has been recognized but the power supply is quickly shutting off, use a multimeter to measure the voltage of the battery bank. Disconnect the AC power and check if the voltage falls within the ranges described in the table in item 4, step 3.

4. The power supply does not recognize my battery/bank, what could be the problem?
Step 1. Check the polarity in the connector and ensure that the battery bank is not reversed.
Step 2. Check the fuse located next to the battery connector.
Step 3. Verify if the voltage of the battery bank falls within any of the ranges below:

Table 8-1 Voltage ranges of batteries

Output voltage of the power supply	Minimum battery voltage	Maximum battery voltage
12 V_{DC}	10 V_{DC}	17 V_{DC}
24 V_{DC}	20 V_{DC}	30 V_{DC}
48 V_{DC}	42 V_{DC}	60 V_{DC}

If the voltage is outside these ranges, the power supply will not recognize the battery bank as valid, and they will not connect. To resolve this issue, please refer to item 6.

5. When measuring the voltage at the battery connector, the reading shows 0 V_{DC}. Is this correct?
The power supply charger indeed performs the process of measuring the battery bank first to verify if the voltage is appropriate before initiating the current injection for charging. Therefore, in order for there to be voltage at the battery connector, the battery bank must be properly connected.

6. How to know if the power supply has recognized the batteries?
The power supply should activate the "Battery charging" or "Battery discharging" LED indicators. After connecting the battery bank, it may take approximately 30 seconds for the LED to turn on, indicating that the power supply has recognized the batteries..

7. What is the difference between VRLA charging and stationary battery charging?
The power supply chargers have three stages: constant current, equalization, and float. However, for VRLA batteries, the equalization stage does not occur.

8. How to start the power supply without AC power, by connecting the equipment to the output using only the battery?
Step 1. Connect the battery bank correctly.
Step 2. Press the Start Battery button.

9. When will the power supply enter the float stage?
The float stage will be the final stage of the battery charging process. The battery will be fully charged when it reaches a voltage of 54 V_{DC} for the 48 V_{DC} power supply and 27.5 V_{DC} for the 24 V_{DC} power supply.

10. Why does the front fuse of the batteries blow?
The battery fuse is designed to protect the battery and conductors from damage caused by short circuits. If a short circuit occurs at the output of the power supply, the fuse may be damaged. To solve the problem, it is necessary to remove the short circuit and replace the damaged fuse with a new one.

11. Why does the AC power input fuse blow?
The power supply has varistors at its AC input to protect against power surges. However, in some situations, the varistors may short circuit during a surge, leading to the blowing of the fuse. Typically, replacing the fuse is sufficient to resolve the issue. If the fuse continues to blow after replacement, it is necessary to have the power supply repaired. In such cases, it is recommended to contact our customer service for technical assistance.

12. If Overload LED is turned on, what is the problem?
The LED overload indicates that there is an overload on the power supply or there may be an overload due to the charger configuration. For example, a 48V 10A power supply with a charger set to 5 A and an additional 6 A of equipment consumption. In this condition, the LED will turn on and the power supply will protect itself by charging the battery bank with only 1 A.
Solution: Configure the charger to 3 A to turn off the alarm.

13. If Overtemperature LED is blinking, what is the problem?
This indicates a fan failure. The fan may be stuck or damaged. Please check what happened and contact our customer service for assistance.

14. If Overtemperature LED is turned on, what is the problem?
There is an over-temperature condition in the power supply, triggering the thermal protection and causing the AC/DC converter to shut down. The power supply will then operate in battery mode.

15. Charging LED does not turn off, is this normal?
Yes, the power supply considers that it is always charging the battery bank as long as it has AC power. It may be in one of the three charging stages: CC, Equalization,

or Float. When the battery is fully charged, it will be in the float stage, and the power supply will maintain that voltage to keep the battery charged.

16. How to configure the charging voltages for lithium batteries?
Access the power supply's web page and go to "System configs". Refer to the battery manufacturer's datasheet to confirm the appropriate voltage values.

17. Is there overvoltage protection on the output?
Yes, the 48 V_{DC} power supply will shut down the AC/DC converter if the output voltage reaches 60 V_{DC}. The 24 V_{DC} power supply will shut down if the voltage exceeds 30 V_{DC}.

18. Is there overvoltage and undervoltage protection for AC input?
Yes, the power supply has an AC voltage monitoring feature that will switch to battery mode if the AC voltage drops below 100 V_{AC}. In case of overvoltage, the power supply is programmed to shut down when the AC voltage reaches 260 V_{AC}. Furthermore, if the AC voltage exceeds 300 V_{AC}, the varistors located at the input of the power supply will activate to protect the system against electrical surges.

19. What will happen if I connect the battery bank in reverse polarity?
The power supply will not recognize the battery bank and will not connect to it.

8.2. Remote Management and SNMP

1. What is the default IP, username, and password?
Default IP: 192.168.1.50,
Default username: admin,
Default password: admin.

2. Will the power outputs be turned off when pressing the reset button?
Pressing the "reset" button does not affect the power outputs of the power supply. This button only restores the IP, username, and password to their default settings (mentioned in item 1).

3. Does the equipment power supply get affected during a firmware update?
The power output of the power supply is not affected during a firmware update, and once the update process is completed, the power supply will return to the saved IP.

4. I can access the web page, but I cannot read the OIDs. What should I do?
First, check if the community settings are correct, as the default community for the power supplies is "public," and the software may be configured with a different community.

5. Where can I download the MIB file for the power supply?
The MIB file can be downloaded from the power supply's web page, under the "home" menu.

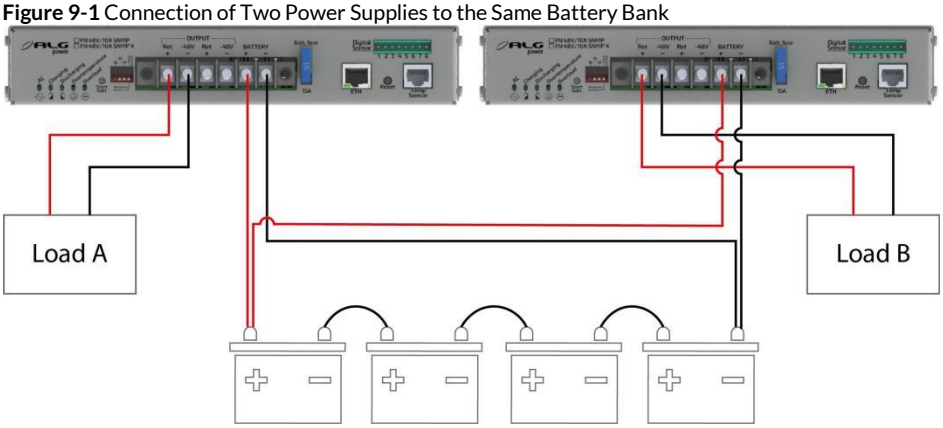
6. How can I reset the power supply output?
To reset the power supply output, which means turning off all connected equipment for 10 seconds, go to the "commands" menu, enter the login and password, and press "reset output."
Note: To perform this command, the power supply must be powered by the AC mains.

7. What templates does ALGcom provide?
ALGcom provides templates for Zabbix, PRTG, and instructions for installation on TheDude. They are available on the website (www.algcom.com.br) under products/power supplies and converters by selecting the purchased power supply.

9. Special Connections

9.1. Two Power Supplies in the Same Battery Bank

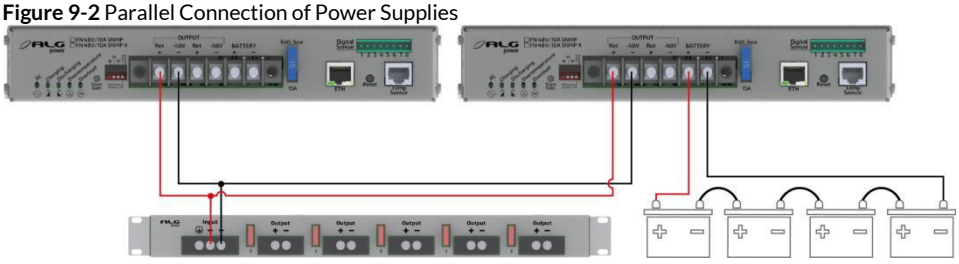
Figure 9-1 Connection of Two Power Supplies to the Same Battery Bank



The charging current will be the sum of the currents from the power supplies.

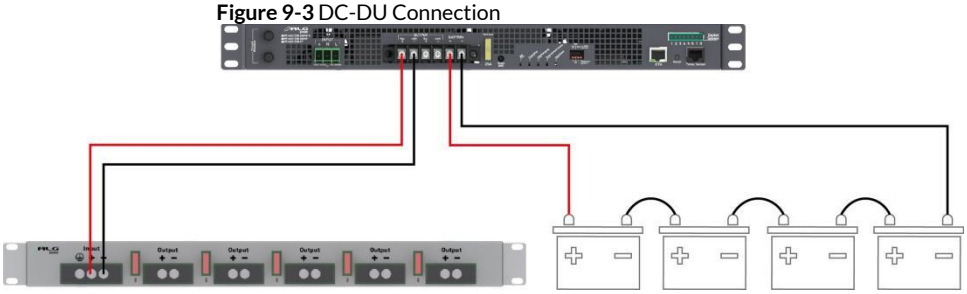
9.2. Parallel Power Supplies

Figure 9-2 Parallel Connection of Power Supplies



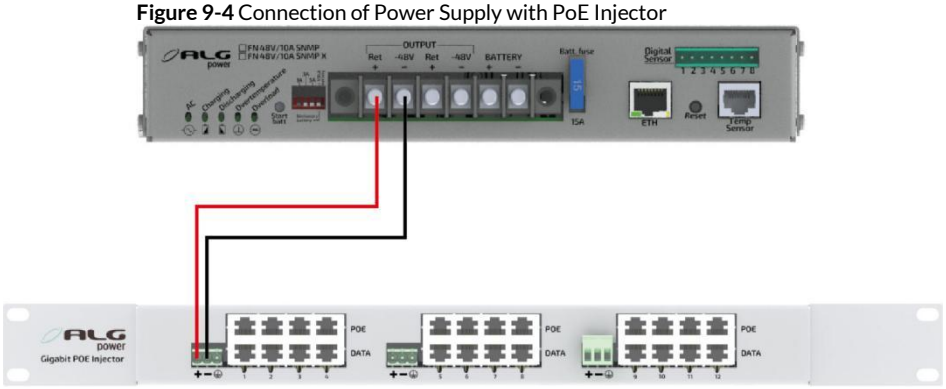
9.3. DC-DU

Figure 9-3 DC-DU Connection



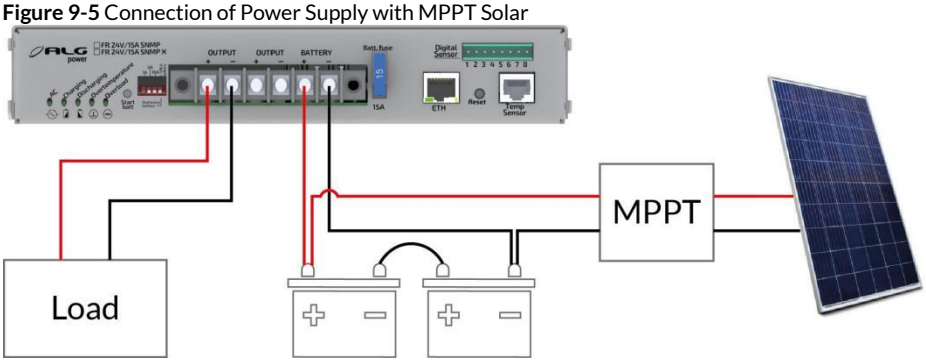
9.4. With Injetor PoE

Figure 9-4 Connection of Power Supply with PoE Injector



9.5. Connection of Hybrid/MPPT Solar (24 V_{DC}) with Power Supply

Figure 9-5 Connection of Power Supply with MPPT Solar



Note: To prioritize power supply from the solar panel, configure the MPPT voltage to 27,5 V_{DC} and the float voltage of the power supply to 27,3 V_{DC} on the web page under "System configs". By doing so, the power supply will recognize and prioritize the energy provided by the solar panel, ensuring a more efficient and cost-effective operation.

10. Warranty Terms

1 - Warranty Period and Proof
The warranty period provided by ALGcom is **1 YEAR**, starting from the date of purchase as stated on the sales invoice.

Information regarding the warranty period and expiration date can be obtained by contacting sac@algcom.com.br. Please provide the model, serial number or lot number, manufacturing date, and sales invoice number.

Note: The warranty is only valid upon presentation of the sales invoice.

2 - Warranty Attention
It is the responsibility of the installer to comply with the regulations applicable to the installation and to follow the instructions contained in this manual.

Use only **components and fixing elements provided by ALGcom in the mounting kit.**

Maintenance should be performed by authorized and trained personnel to minimize risks to themselves and others.

Conduct at least an annual inspection of the installation to verify the condition of the equipment.

3 - Warranty Exclusions
The warranty does not cover and is the responsibility of the buyer:

Violation, modification, component replacement, adjustment, or repair carried out by unauthorized personnel.

Damages to the product resulting from improper installation and use outside the conditions specified in this manual.

Parts that naturally wear out with regular use, such as "connectors, power cables, fans, varistors, or any other parts that indicate wear and tear."

Boards and components broken due to electrical discharge, scorching, or evidence of damage caused by electrical discharge.

Damages caused by a lack of grounding.

Protective elements such as varistors with visible signs of electrical discharge.

Any other damage that is not classified as a manufacturing defect.

4 - Recommendations
Carefully read the installation and operation instructions in this manual before operating the product.

Ensure that the power supply voltage is within the values specified in this manual.

Keep the product protected from the elements (rain, humidity, wind, sunlight, etc.).

5 - Repair and Technical Assistance Services
ALGcom offers repair and technical assistance services to its customers. Pay attention to the following information:

Products outside the warranty period will be repaired upon approval of a quotation by the customer.

Repaired products outside the original warranty period will have a 3-month warranty on the repair.

For products repaired within the warranty period, the expiration date of the warranty remains the original one.

6 - Location of Warranty Service
For products not purchased directly from the ALGcom factory, please contact the representative or authorized reseller from whom the purchase was made. They will then contact the ALGcom customer service.

In case of a need for product repair within the warranty period, please contact the authorized ALGcom product distributor in your country. If there is none, contact the ALGcom customer service directly.

For complaints, comments, questions, or suggestions regarding the products or repairs, please call our Customer Service: +55 54 3201.1903.

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