

Manual

MS700876 - 19" 1U DC Power Supply 3200 W



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1. Preface

This document gives detailed instructions for operating the 19" Power Supply, which includes both a rectifier module and a monitor module. The manual provides information on the operation and capabilities of both the rectifier module and the monitor module, allowing users to optimize the efficiency and performance of their power supply infrastructure.

Users are recommended to check the most recent version, which is available online or through your MICROSENS sales representative, for the most up-to-date information and support resources.

This product is accompanied by two documents:

- This manual,
- Data sheet, which contains the technical specifications of the product and
- A quick installation guide, which includes product introductions and installation steps.

 | This document is to be used in conjunction with the aforementioned other documents.

1.1. Information available on the MICROSENS Website

Registered users can find the latest firmware versions as well as further information at www.microsens.com:

- Registration: www.microsens.com > Login
 - Click on the '**Not registered**' link.
 - Fill out the e-mail form and send it to sales@microsens.com.
 - MICROSENS will send you an email containing a username and password.
- Login: www.microsens.com > Login
 - Enter your username and password
 - Click the .
 - Please navigate to your device and select the '**Download**' section.
 - Further information is available by selecting the other tabs on the product page.

 | Make sure the browser allows the execution of scripts.

1.2. Announcement

This document's content may be modified without prior notification. This document is intended purely as an operational guide and does not entail any additional commitments. There are no express or implied warranties regarding the accuracy, completeness, or usefulness of the information, descriptions, recommendations, or other aspects of the manual. The images shown are just for illustrative purposes. In the event of any discrepancies between the photos and the actual product, the specifications of the actual product will take precedence.

Prior to performing any operations involving the corresponding device or equipment, users are strongly recommended to thoroughly review this document, as well as any other relevant product-related documents, and to follow all applicable industry safety standards. MICROSENS GmbH & Co. KG does not accept responsibility for any product damage caused by improper operation or exceeding the usage conditions defined in this document.

1.3. Symbol Conventions

The symbols that may be found in this document are defined as follows:

-  | Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.
-  | Indicates a hazard with a medium or low level of risk, which if not avoided, could result in minor or moderate injury.
-  | Indicates a potentially hazardous situation, which if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
-  | Provides additional information to emphasize or supplement important points in the main text.

1.4. Before you begin

1. Make sure that all the equipment necessary to set up the system properly is present
2. Ensure that the earth terminals, DC and AC distribution units are properly installed
3. Please follow the installation and assembly procedures for telecommunications and electrical equipment. Additionally, it is critical to follow local regulations and any specific instructions that are provided. When selecting an installation location, ensure adequate ventilation by allowing free airflow via the ventilation openings. Allow enough room in front of the system to facilitate operational and service tasks. Ensure good cable alignment and leave enough room for other devices as needed.
4. Make sure that the contents in the received package have not been damaged during transportation.

2. Safety Instructions

Prior to commencing work with our company's product, it is imperative to thoroughly review all legal and safety instructions provided herein. Non-compliance with these guidelines may result in damage to the appliance and pose risks to the health, and potentially, the lives of individuals.

Our safety instructions align with national laws concerning health and safety at workplaces, as well as relevant standards and official regulations. Installation procedures should only be undertaken by trained individuals well-versed in locally applicable installation regulations, including those governing installations within buildings and main AC distribution boards.

It is essential to adhere strictly to the guidelines outlined in the product manual for installation, commissioning, operation, and maintenance procedures at all times.

2.1. Restrictions

The device should only be used for its intended purpose and should not be used in situations where a malfunction could result in fatalities, personal injury, or substantial property or environmental damage.

MICROSENS disclaims liability for any dangers or damages caused by improper installation, maintenance, operation, or misuse of the device, including usage outside its intended scope, failure to follow stated instructions, and noncompliance with any safety standards.

MICROSENS is exclusively responsible for the components and services that we provide directly. We are not responsible for third-party components or services such as batteries, repairs, or maintenance. MICROSENS shall not be liable for device malfunctions, risks, or damages caused by such third-party components or services.

Unauthorized changes to the device may result in poor functioning or performance. The user is responsible for any modifications made to the hardware configuration without the manufacturer's or an authorized representative's clear consent.

Installation, operation, and maintenance procedures related with the device should only be performed by properly trained persons with appropriate qualifications. It is the user's responsibility to guarantee that those handling the equipment have received adequate operating and safety training.

The user must identify the system's location as an electrical equipment room with adequate air conditioning and restricted access. Furthermore, the user is responsible for locking the system rack doors to prevent unauthorized entry.

If the power supply lacks a circuit breaker or comparable safety device, the user must install a proper circuit breaker in accordance with the relevant regulations.

2.2. General Instructions



When connected to an electrical power source, the appliance contains hazardous voltages, which can cause electric shock from both the main power supply and/or the batteries.

- Operations involving live appliances require the close supervision of trained personnel. The appointed supervisor should be able administer first aid in the event of an electric shock. It is crucial to note that simply having an emergency stop switch or disconnecter does not provide effective safety.



Before performing any maintenance on the power equipment, the power supply must be turned off for four minutes to allow the capacitor to drain properly. The user is responsible for ensuring the correct precautions are taken for maintenance and service purposes.

- Internal maintenance and part replacement should not be performed separately for safety reasons.
- In any case, such as operation, cleaning, or maintenance, please comply with relevant safety guidelines.



Protective covers and other safety equipment supplied with the appliance must be installed when it is in operation.

- Protective covers can be temporarily removed for installation and maintenance activities. Under no other circumstances should the outer cover be removed or the interior components touched. Use appropriate insulated tools and protective clothes. Handle fuses exclusively with tools designed for the purpose, such as fuse handles.
- When working on the appliance, verify that there is adequate insulation from the earth potential (ground).



The distance between any conductive part of the power supply equipment and the metal components must comply with relevant safety standards.



The power supply should be maintained with good ventilation and heat dissipation. If any smoke or unpleasant odor is detected during start-up or use, switch the unit off immediately.



When power supply equipment is moved from a cold to a warm environment, condensation can pose dangerous problems, hence grounding regulations must be properly observed. Qualified workers must connect the equipment to the power supply.

-  | The power supply should be used within the environmental conditions specified in the manual.
-  | The power supply should not be operated in environments with volatile gases or flammable substances.
-  | High temperatures present.
 - Locally high temperatures (over 70 °C) may arise in rectifier/inverter/distributor plug-in units. Take precautions against burns.
-  | Moving parts
 - Rectifiers and air conditioning units for system enclosures include fans. These can continue to revolve for some time after the power is turned off.
-  | Heavy appliance
 - The weight of the appliance necessitates suitable safety precautions. Additional staff or lifting equipment may be needed. Where applicable, the weight of the appliance is indicated on the front.
-  | Sharp edges
 - Slide-in supports may have sharp edges. We recommend wearing gloves.
-  |
 - The ventilation apertures of the unit should not be obstructed.
 - Only suitable measuring devices should be used. These measuring devices should be calibrated regularly.

2.3. Specific Instructions

- Take note of all warning labels and notices attached to the equipment.
- Additional warnings, cautions, and notes customized to specific equipment or conditions are provided in addition to the relevant instructions.
- It is critical to thoroughly review all necessary documentation on the task at hand.
- When using equipment not supplied by MICROSENS, such as batteries, read and follow any safety warnings and instructions provided by the manufacturer or supplier.

3. Product Description

The MS700876 is a 19" 1U power supply system designed for installation and use in indoor or outdoor cabinets.

The system's primary components are intended to handle a rated current of 60A. The system can be operated with two 1600 W rectifier modules, a distribution unit and a monitor module. The rectifier modules can be utilized in redundancy for an improved total power output of 3200W.

The operation and management of the system is supported by the monitor module.



Figure 1. Power Supply Unit

3.1. Basic Working Principle

The basic operational concept of the MS700876 becomes clear when two distinct scenarios are considered: the MS700876 during normal operation and the MS700876 during a mains power outage.

During normal operation, the monitor module supervises the rectifier module and distribution unit, which operate in accordance with predetermined parameters or user instructions.

In the case of a mains power loss, the system seamlessly switches to battery power. As the battery drains, the voltage gradually decreases. When the voltage at the battery end falls below the user-configurable 46V upper threshold for battery low voltage, the monitor module sounds an alarm, shutting down the load output and stopping system functioning. The system resumes normal operation once external power is restored. Users are able to adjust these monitoring parameters to meet their specific needs.

Furthermore, in environments with temperatures above 55°C, the power system adjusts by reducing output to preserve operational efficiency and dependability.

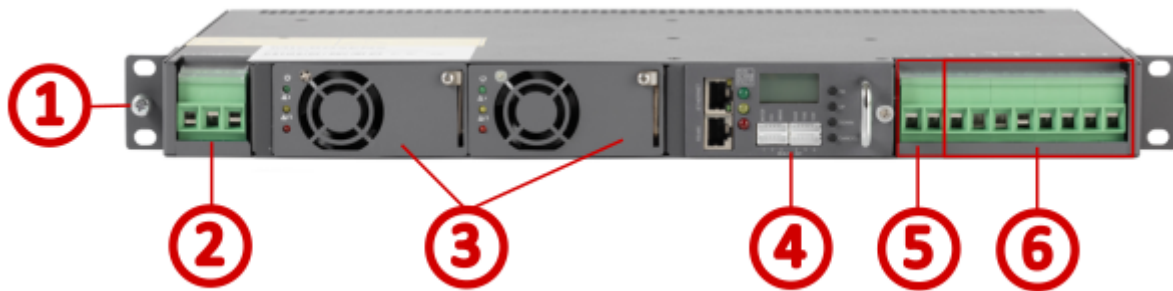


Figure 2. Power Supply Unit - Functions

- | | | |
|----------------|--------------------|---------------|
| ① Ground Screw | ③ Rectifier Module | ⑤ Battery |
| ② AC Input | ④ Monitor Module | ⑥ Load Output |

4. Installation

4.1. Mounting

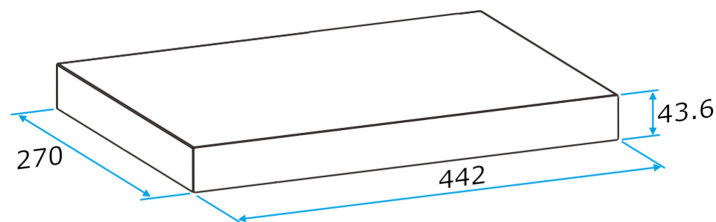


Figure 3. Power Supply Unit - Dimensions

Permissible mounting position: keep free ventilation holes, leave space for cooling! Recommended to have at least 50 mm free space at all sides for ventilation / cooling.

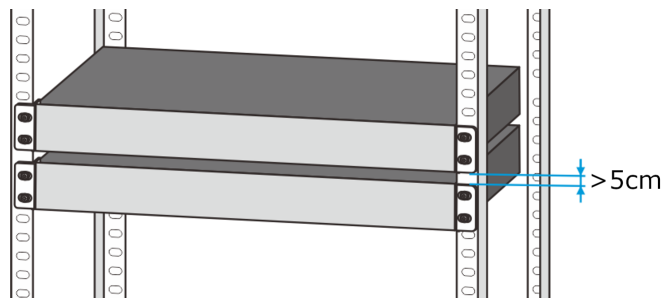


Figure 4. Power Supply Unit - Ventilation

Please read the following instructions to ensure proper installation:

❗ | Make sure the power supply is **Off**

- Prepare the 19" rack for the installation of the power supply.
- Locate and unscrew the small cover screws positioned on the sides of the main unit box of the power supply.

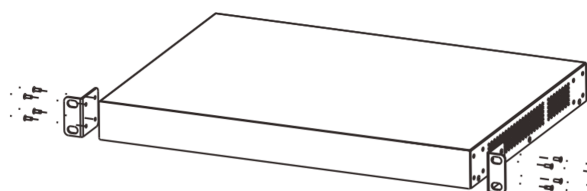


Figure 5. Power Supply Unit - Fixing Screws

- Align the screws located on the side of the main unit box with the grooves on the rack-plate.
- Gently push the main unit box into the grooves, ensuring careful alignment.
- Once positioned correctly, evenly tighten the screws on the sides of the main unit box to firmly secure it to the rack-plate.

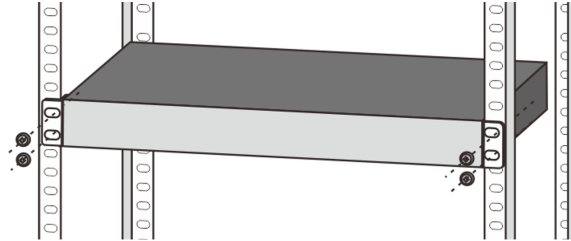


Figure 6. Power Supply Unit - Fixing on Rack

- Unscrew the fixing screws located on the top right corner of the rectifier and monitor modules.
- Insert the monitoring and the rectifier modules into the corresponding slots:
 - Both the monitor module and rectifier module panels come equipped with handles.
 - During insertion into the main unit box, firmly grip the handle of the module with one hand.
 - Support the components with the other hand.
 - Slowly push the modules into the corresponding slots.
 - Ensure the connection terminals on the rear panel of the modules align with the sockets on the main unit box for proper insertion.
 - Tighten the fixing screws on the rectifier and monitor modules.
- Conduct a slight shake test to verify whether the power supply is securely fastened in place.
- Switch the power supply **on** and verify normal operation of the unit with the assistance of the LED tables shown in the [\[Front Elements\]](#).

❗ | Ensure the power supply unit is **grounded** before powering **On**.

4.2. Cabling



Load Output



Battery



AC Input

	Terminal	Description	Data for permitted loads, cable-cross sections and stripping
Load Output	LOADn#+	Load n# positive terminal	• 6 mm² two-core wire • AWG 9 • Withstand voltage > 300 V
	LOADn#-	Load n# negative terminal	
Battery Output	BAT+	Battery positive terminal	Total power of the battery connected to the battery terminal $\geq 2400W$ (according to the load power used by the customer and the power-off holding time).
	BAT-	Battery negative terminal	
AC Input	L	Line	• 4 mm² three-core wire • AWG 11 • Withstand voltage > 500 V
	PE	Protective earth	
	N	Neutral	



- Cable pressure fork terminal, connect as indicated, and tighten with a cross screwdriver.
- Data for permitted loads, cable-cross sections and stripping:
- 10 mm Isolation Stripping Length
- Total power of the battery connected to the battery terminal $\geq 2400W$ (according to the load power used by the customer and the power-off holding time).



Protective covers may be temporarily removed during installation and maintenance. Suitable insulated tools and suitable protective clothing must be used. Fuses may only be handled with tools intended for this purpose, for example with fuse handles.

Please read the following instructions to ensure proper cabling:

1. Connect the frame to the cabinet/rack/system main earthing rail using an earthing cable (PE).
2. See above table for information on the correct cable types to use.
3. Connect the AC supply cables to the mains connection.
4. Connect the positive DC consumer cables to the positive terminals of the DC outputs.
5. Connect the negative DC consumer cables to the negative terminals of the DC outputs.
6. Connect the positive battery cable to the positive battery terminals.
7. Connect the negative battery cable to the negative battery terminals.
8. Check all connections.
9. Switch the power supply **On** and verify normal operation of the unit with the assistance of the LED tables shown in the **LED** subsection of the **Monitor Module** and **Rectifier Module** sections.

4.2.1. Internal Fuse

Internally, 50A car type fuse is available per channel.

The internal fuse serves to protect the unit and must not be replaced by the user. In case of an internal defect, the unit must be returned to the manufacturer for safety reasons.



| External 16A fuses are recommended!

4.3. Unmounting

- Switch the power supply **off**.
 - Make sure the rectifier fan stops revolving.
- Remove the monitoring and the rectifier modules into the corresponding slots:
 - Unscrew the fixing screws located on the top right corner of the rectifier and monitor modules.
 - Slowly pull the modules out.
- Hold the main unit box carefully and unscrew the screws on the sides of the main unit box that is firmly secured on to the rack-plate.
- Gently unmount and remove.

5. Rectifier Module

5.1. Appearance

The images below show the rectifier module.



Figure 7. Rectifier Module



Figure 8. Rectifier Module - Front View

5.2. Functions



Figure 9. Rectifier Module - Functions

- | | | |
|-------------|-------------|----------------|
| ① RUN LED | ③ FAULT LED | ⑤ Fixing Screw |
| ② ALARM LED | ④ Fan | |

5.2.1. General Function Introductions

Output overvoltage shutdown

If the output voltage exceeds the pre-set threshold, the rectifier automatically shuts down. At full load, the overvoltage shutdown point is reduced by approximately 1V to ensure a smooth rectifier shutdown in the case of overvoltage.

Hot plug

During rapid module insertion or removal, ensure the module is fully discharged internally to facilitate smooth auto-

matic restart. In order to ensure the sufficient discharge of the power supply is to monitor the rotation of the fan (until it stops rotating) after the module is unplugged. The module can then be inserted again.

Inrush current

Upon rectifier startup, the peak input surge current must not exceed twice the maximum input current. During startup, both output voltage and current gradually rise from zero, offering a soft load characteristic for connected equipment.

Over temperature protection characteristics

When the rectifier's internal temperature reaches its maximum operating limit, the output current gradually reduces to lower internal temperature. In extreme environments, even with reduced output current, internal temperature may persistently rise. In such cases, the rectifier shuts down completely, automatically restarting once the internal temperature normalizes. At full load, the rectifier operates within -40..+55 °C, with a maximum operating temperature of +65 °C. In temperatures ranging from +55..+65 °C, the rectifier is unloaded to maintain internal temperature within the acceptable range.

Reverse polarity protection

Internal reverse polarity protection fuses and diodes safeguard the rectifier, ensuring timely and effective protection.

Current sharing characteristics

In systems employing multiple rectifiers, the rectifiers balance the current effectively. Rectifiers monitor the voltage of the current sharing bus and adjust their output current to synchronize with other rectifiers.

Fan cooling

The rectifier monitors internal temperature, ambient temperature, and output current to adjust fan speed. The fan speed control reduces noise and dust accumulation. In case of fan failure and subsequent inability to restart, a fan failure alarm output is set and the rectifier shuts down the output.

5.2.2. LED

Colour	Normal	Abnormal	Description
Green (Running)	On	Off	- When the red light is on, the green light turns off. - If the green light is on, the module is working normally.
Yellow (Protection)	Off	On	 For more information on what happens to the green light when the yellow light turns on, see table below. - The yellow light blinks when communication is interrupted. - The yellow light turns on and the alarm output is set during over temperature protection, input overvoltage, input undervoltage, automatic derating, fan failure, overcurrent and current limitation. - The yellow light turns on during hibernation shutdown.
Red (Fault)	Off	On	The red light turns on when there is an irreparable fault inside the module. It also turns on when the module malfunctions and there is no output due to overvoltage shutdown, overheating shutdown, remote shutdown, fan failure, output short circuit, or other internal reasons.

LED Detailed Definition Table

Status	Fault Protocol Sign	Protection Protocol Sign	Fan Fault Protection Sign	AC Power-off Sign	Green LED	Yellow LED	Red LED	Pin Alarm	Pin Fault
AC power-off alarm	0	0	0	1	Off	Off	Off	-	-
Normal	0	0	0	0	On	Off	Off	Low-res	Low-res
Over temperature	0	1	0	0	Off	On	Off	Hi-res	Low-res
AC under/overvoltage	0	1	0	0	Off	On	Off	Hi-res	Low-res
Sleep	0	0	0	0	Off	On	Off	Hi-res	Low-res
Output overcurrent	0	1	0	0	On	On	Off	Hi-res	Low-res
Fan fault	1	0	1	0	Off	Off	On	Low-res	Hi-res
Output overvoltage	1	0	0	0	Off	Off	On	Low-res	Hi-res
Short	1	0	0	0	Off	Off	On	Low-res	Hi-res

Communication interruption (60s) 0 0 0 0 Off Blinking Off Low-res Low-res

5.2.3. Connector Pin Definitions

The module output gold finger is shown below:

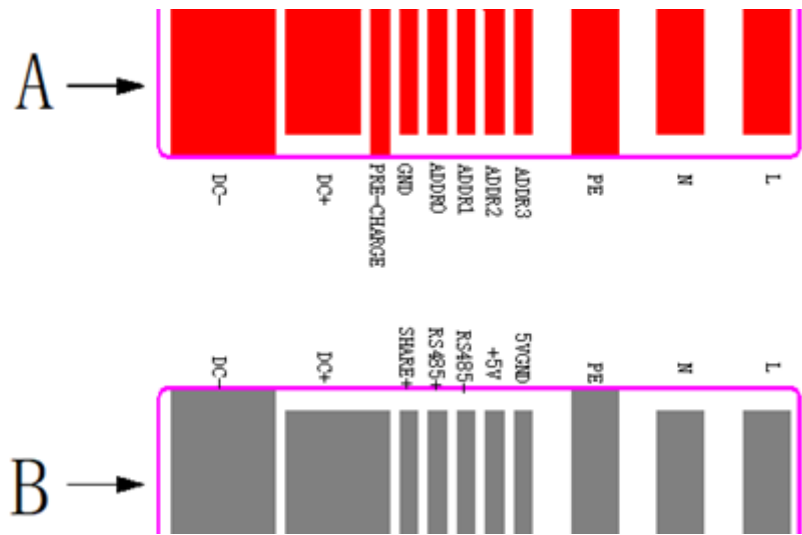


Figure 10. Rectifier Module - Output Gold Finger

The terminals used in conjunction with the module output gold finger (installed on the system’s backplane) are shown in the following figure. The figure is depicted from the perspective of the rectifier module insertion direction.

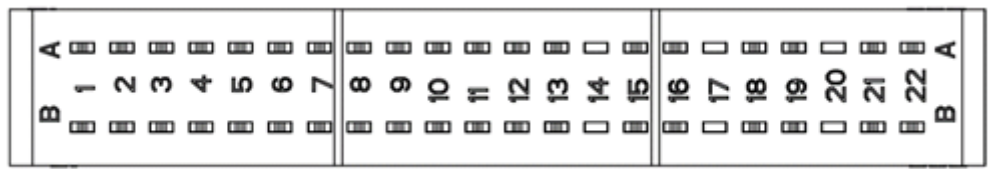


Figure 11. Rectifier Module - Terminals

Pin Number	Function	Description
A22, A21, B22, B21	L	
A18, A19, B18, B19	N	
A15, A16, B15, B16	PE	Protected earth (long needle)
A5 to A7, B5 to B8	48V+	Output+ (long needle)
A1 to A4, B1 to B4	48V-	Output- (long needle)
A8	PRE-CHARGE	CHARGE
A9	SHARE+	Modules are all streamlined
B9	GND	
A10	ADDR0	Module address line
A11	ADDR1	
A12	ADDR2	
A13	ADDR3	
B12	5V+	A 5V power supply from the system supplies power to the communi- cation chip isolated from the RS485 module output.
B13	5VGNND	

B10	RS485+	Module communication line, 485 bus isolated from CPU inside the module.
B11	RS485-	

5.3. Maintenance

1. Red light (Fail) Indicator
 - During normal operation, if the red light (FAIL) on the rectifier module's front panel remains illuminated, it signifies a malfunction within the module, necessitating its removal from the system for repair.
2. Hot swapping procedure
 - To remove the entire module from operation, loosen the fastening screws, grasp the handle, and pull it out without switching off the AC power. This procedure ensures that a power system comprising multiple modules can continue operation without interruption when a rectifier module requires maintenance, thereby maintaining the system's operational integrity.
 - When connecting the rectifier module's electrical interface to the power system, it's essential to ensure that the indicator light on the rectifier module's front panel is off before inserting the module.

i | Please contact MICROSENS for repair, maintenance and replacement of the affected components.

6. Monitor Module

6.1. Appearance

The images below show the monitor module.



Figure 12. Monitor Module - Front View

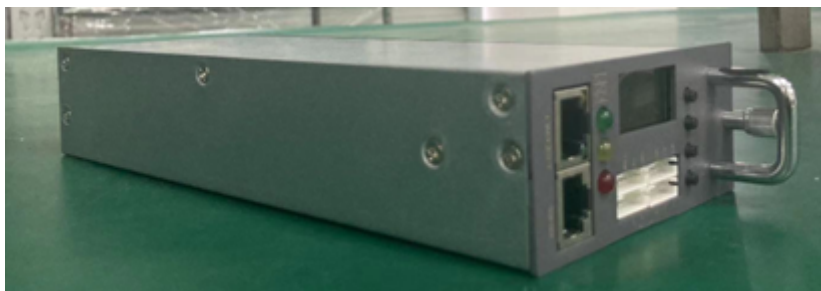


Figure 13. Monitor Module - Side View

6.2. Functions

6.2.1. Communication between monitor unit and host computer

Effective communication with the host computer is an essential component of the monitor module. The monitor module, which is equipped with an RS485 interface, allows for the following basic functions:

1. Transmit real-time simulation data from the monitor module to the host computer.
2. Relay real-time switch data from the monitor module to the host computer.
3. Accept commands from the host computer, which allows you to do things like set system parameters and toggle the rectifier module on/off.
4. Respond to control commands sent by the host computer.
5. Send alarm statuses to the upper computer.

To establish a host-slave relationship, the device and monitor module require that all reading, setting, and control processes be initiated by the host computer. The monitor module, which operates in a slave state, relies on correct

commands from the host computer to actively report data.

The analog data transmitted from the monitor module to the host computer encompasses:

- AC voltage
- busbar voltage
- battery current
- load current
- battery temperature
- ambient temperature
- ambient humidity
- module fan speed

Meanwhile, switch signals relayed to the host computer cover:

- module failure
- DC undervoltage
- DC overvoltage
- battery power-off
- module on/off
- battery fuse status
- load fuse status
- battery float charging status
- backup sensor status

Alarm statuses communicated by the monitor module to the upper computer span:

- AC overvoltage
- AC undervoltage
- AC phase loss
- AC air switch
- module fault
- fan fault
- module current limiting
- DC undervoltage
- DC overvoltage
- battery power-off
- load fuse
- battery fuse status

Furthermore, the host computer sends setting parameters to the monitor module, including:

- average charging voltage
- float charging voltage
- DC output overvoltage alarm point
- load current too high alarm point
- battery current too high alarm point
- battery undervoltage alarm point
- battery temperature too low alarm point
- battery temperature too high alarm point
- environmental temperature too high alarm point
- environmental temperature too low alarm point
- primary power off voltage value
- primary power off recovery value
- battery power off alarm point
- battery capacity
- battery current limiting coefficient
- temperature compensation coefficient
- average charging to float charging current coefficient
- float charging to average charging current coefficient
- periodic average charging interval time
- continuous average charging time
- current limiting point current
- AC voltage too high alarm point
- AC voltage too low alarm point
- AC power off value

Control commands dispatched from the host computer to the monitor module encompass:

- module on/off
- temperature compensation on/off
- backup relay on/off
- manual equalization

6.2.2. Control

The monitor module can send control signals in response to monitored values or directions from the host computer.

1. Output voltage adjustment: Using background software, the module modifies the equalizing float charge voltage and determines the output voltage of the system based on the equalizing float charging status.
2. Battery management:
 - Battery low voltage: If the system detects an output voltage below the preset battery low voltage, it sets a background alarm and the dry contact will set an alarm output.
 - Battery power-off: If the battery discharges and the output voltage falls below the designated battery power-off voltage, the battery DC contact disconnects, turning off all loads and disconnecting the battery from the system. A manual restart is required to resume operation.
 - Battery equalization and float charge management: If the battery's charging rate exceed the predetermined maximum, the system initiates constant current equalization charging on the battery. Upon reaching the equalization charging voltage under constant current equalization, the system transitions to constant voltage equalization charging. If the constant voltage equalization charging current falls below the equalization to float charging current, it transitions to a maintenance or "float" charge phase, where the charge rate lightly adjusts as needed. Conversely, if the float charging current surpasses the equalization to float charging current, the system reverts to equalization charging after a specific duration of simultaneous equalization and float charging. If the period of applying a constant voltage for equalization extends beyond a set limit, the system defaults to the float charging mode while manual equalization will switch to equalization charging.
 - Temperature compensation: With the battery temperature sensor connected and temperature compensation enabled, the system changes battery temperature compensation in response to environmental conditions. Compensation is positive above 25°C and negative below 25°C, with a maximum compensation value of 2V (calculated as temperature multiplied by coefficient).

6.2.3. Detection

The monitor module possesses the capability to monitor both the rectifier module and DC output parameters.

1. Rectifier Module: The monitor module actively monitors the status of the rectifier module, including its on/off state, output voltage, current, fan speed, and fault status.
2. DC Output: It also oversees various aspects of the DC output, such as busbar voltage, load current, battery current, temperature, and fuse status.

6.2.4. Remote Control

Remote Control Quantity Characteristics

Parameter	Description
Rectifier module switch	The monitor module regulates the shutdown of the rectifier module in response to background power-off commands. Once powered on, the module starts working automatically.
Rectifier module equalization and float charging	The monitor module controls the rectifier module's equalization and float charging processes in response to background commands or battery management conditions.
Rectifier module voltage regulation	The monitor module controls the rectifier module's voltage regulation in response to background commands or battery management conditions.
Rectifier module current limit	The monitor module controls the rectifier module's current limit according to battery management conditions.
Six Alarm Outputs (Dry Node Output)	• System emergency alarms: AC power failure alarm, rectifier module alarm, LVD disengagement alarm • System non-emergency alarms: AC overvoltage and undervoltage alarm, 4-way load fusing alarm, 1-way battery fusing alarm, battery undervoltage alarm • High and low temperature alarm • Door prohibition alarm • Smoke alarm • Water prohibition alarm



Among the above mentioned alarms, the system emergency alarms and the system non-emergency alarms can be set.

Remote Signal Characteristics

Parameter	Description
Absence of AC input	Alarm output is set when mains voltage falls below 60V and recovers when it surpasses 70V.
AC input overvoltage	- Alarm output is set if mains voltage exceeds the AC input overvoltage alarm point (default at 295V). - Alarm recovery conditions include: - Voltage remains below overvoltage alarm point - 10V for 10 consecutive seconds. - Voltage stays continuously below overvoltage alarm point - 3V for 10 ± 3 minutes. - The AC input overvoltage alarm point is configurable via either the LCD display or the web interface, and can be disabled if necessary, to hide the alarm.
AC input undervoltage	- Alarm output is set if mains voltage falls below the AC input undervoltage alarm point (default at 90V). - Alarm recovery conditions include: - Voltage remains above undervoltage alarm point + 10V for 10 seconds. - Voltage stays continuously above undervoltage alarm point + 3V for 10 ± 3 minutes. - The AC input undervoltage alarm point is configurable via the web interface, and can be disabled if necessary, to hide the alarm.
	 If the power supply unit is running on both AC and DC power and the mains voltage falls below the AC input undervoltage alarm point, then the AC undervoltage alarm is not set.
DC output overvoltage	- Alarm point is customizable within the setting range (floating charge voltage + 1) - 60V, with a return difference of 1V. - Default value: 59V; the DC output overvoltage alarm output is set when the bus voltage exceeds 59V and is reset when it is ≤ 58V.
DC output undervoltage	- Alarm point is customizable with the lower limit voltage of the setting range as -(floating charge voltage - 2)V, and a return difference of 1V. - Default value: 47V; the DC output undervoltage alarm output is set when the bus voltage falls below 45V and is reset when it is ≥ 46V.
Over temperature alarm	- Alarm output is set when temperature exceeds the over temperature alarm point (default at 50°C). - Alarm recovers when the temperature ≤ (over temperature alarm point - 3)°C
Low temperature alarm	- Alarm output is set when temperature falls below the low temperature alarm point (default at -10°C). - Alarm recovers when the temperature exceeds ≤ (low temperature alarm point + 3)°C
n# rectifier fault	Alarm indicates fault(s) in the n# rectifier module, including input overvoltage/undervoltage, over-temperature, and output overvoltage.
Battery fuse break	Alarm output is set when the battery circuit breaker is disconnected.
Load fuse break	Alarm output is set when either the load or the load circuit breaker are disconnected (excluding L4 connected to the fan, which doesn't generate an alarm upon disconnection).
Door	Alarm output is set when the door is open. Only 1 channel is allotted for the door alarm input detection.
Fan alarm	Alarm output is set when the fan is not working.
Smoke	Smoke detection is an accessory. If a smoke detector is connected, the alarm output is set when the sensor triggers the alarm.



The smoke detector is not provided with the power supply.

6.2.5. LED

Color	State	Description
Green (Running)	Always on or always off	Failure in the monitor module of no DC input
	Blinking	Monitor module is working normally
Yellow (Alarm)	Off	No alarm output is set
	On	Alarm output is set

Red (Fault)	Off	No failure detected
	On	Failure detected

6.2.6. Connector Definitions

RJ45 Interface

	Name	Pin	Description
	Ethernet		
	RS485	PIN2	A+
		PIN3	B-

4x 6P Connector

	PIN1	PIN2	PIN3	PIN4	PIN5	PIN6
	Water		VCC		Smoke	
	Door		BAT-TEM2		LJ-TEM1	
	DO01		DO02		DO03	
	DO04		DO05		DO06	

 | Type of 6P Connector: JST PH 2.0

6.2.7. Display

LCD Operating Instructions

- LCD operation keys: The LCD interface has a simple set of four operating buttons strategically located on the front panel: **UP**, **DOWN**, **OK**, and **CANCEL**, allowing for seamless movement across menus, function changes, and parameter modifications.
 - UP**: Starts upward scrolling within menus, allows parameter adjustments by increasing values, and aids in navigating through various settings.
 - OK**: Allows for quick transitions between menus of the same level or equal tiers, speeding menu navigation and selection processes.
 - DOWN**: Allows for downward scrolling in menus, parameter adjustments by decreasing values, and aids in navigating through various settings.
 - CANCEL**: Provides a quick exit path by canceling current actions and returning users to the previous menu level, hence improving user experience and workflow efficiency. When the cursor is in the numerical parameter editing state, a prolonged press of **CANCEL** aborts parameter modifications.
- Main page: The main page immediately displays basic system information, when the battery is connected or the rectifier module is activated.
 - Regardless of the current operation or display condition, the system returns to the main interface after 30 seconds.
- Monitoring menu structure: The monitoring menu structure is hierarchical and multi-level, with step-by-step and cyclical tree structures. For more information on how it is organized and navigated, refer to the [Monitoring Main Menu Structure](#) section.

Monitoring Main Menu Structure

Main Menu	First Level
-----------	-------------

Standby System status,
Exchange of information,
Battery information, Tem-
perature information

AC distribution
DC distribution
Rectifier module
Alarm setting
Shunt metering
System configuration
Event record
Equipment information

First Level: AC Distribution

Second Level

Status

Alarm

Set

Configuration

Third Level

A Phase voltage

A Phase current

B Phase voltage

B Phase current

C Phase voltage

C Phase current

Frequency

Power factor

Active power

Active kWh

A Phase lost

A Phase voltage over

A Phase voltage under

A Phase current over

B Phase lost

B Phase voltage over

B Phase voltage under

B Phase current over

C Phase lost

C Phase voltage over

C Phase voltage under

C Phase current over

Frequency over

Frequency under

AC voltage over alarm

AC voltage under alarm

Phase lost alarm

AC current over alarm

Frequency over alarm

Frequency under alarm

CT

Type

Calibration	A Phase voltage
	A Phase current
	B Phase voltage
	B Phase current
	C Phase voltage
	C Phase current

First Level: DC Distribution

Second Level	Third Level	Fourth Level
Status	Charge discharge status	
	Bus Volt	
	Load Volt	
	Batt Curr 1	
	Batt Curr 2	
	Rectifier total curr	
	Load total curr	
	Batt Temp	
	Circumstance Temp	
	Circumstance Humidity	
	Extending Temp	
	Batt Remain Capacity	
	Load Curr 1	
	Load Curr 2	
	Load Curr 3	
	Load Curr 4	
Set	Charge Setting	Float Volt
		Boost Volt
		System lowest Volt
		Batt Capacity
		Boost charge to float charge coefficient
		float charge to Boost charge coefficient
		Batt Charge Curr limit value
Set	Alarm threshold value	Sys Curr limit value
		Load Curr over value
		Batt Curr over value
		DC volt over value
		Batt volt under value

Set	LVD set	LVD1 start Power down delay Load 1 Power off Load 1 Power recover Load 1 Power down delay Load 2 Power off Load 2 Power recover Load 2 Power down delay Load 3 Power off Load 3 Power recover Load 3 Power down delay Load 4 Power off Load 4 Power recover Load 4 LVD2 start LVD2 break value LVD2 recover value
Set	Temp&Humidity	Batt temp over alarm Batt temp low alarm Circumstance Temp Over Circumstance Temp under Circumstance Humi Over Circumstance Humi low
Set	Temp Compensation	Start Coefficient
Set	Periodic Boost Charge	Start Interval time Duration time
Set	Manual Boost charge	time Charge time
Set	Batt quick charge	Start quick charge volt value quick charge time limit
Set	Batt test	Start Batt test starting voltage Batt test ending voltage Batt test Duration time Test Result

Alarm	DC Volt Over
	DC Volt Under
	Primary Power down
	Secondary Power down
	Load Fuse
	Batt Fuse
	Batt Curr over
	Load Curr over limit
	Batt Temp Over
	Batt Temp Under
	Lightning
	Smoke
	Water immersing
	Door
	Air Condition
	Impact
	Circumstance Temp Over
	Circumstance Temp Under
	Power Down Load 1
	Power Down Load 2
	Power Down Load 3
	Power Down Load 4
Config	Number of Batt Set
	Type of Batt Contactor
	Batt Shunt Current
	Batt Shunt Volt
	Number of Load
	Type of Load Contactor
Calibration	Load Shunt Current
	Load Shunt Volt
	Bus Volt
	Load Volt
	Batt curr 1
	Batt curr 2
	Load total Curr
	Load Curr 1
	Load Curr 2
	Load Curr 3
	Load Curr 4
First Level: Rectifier	
Second Level	Third Level
Status	
Curr/Volt Limit	Over Curr Limit value
	Over Volt limit vale

Energy saving settings	Energy saving start-up
	Module sleep coefficient
Number of rectifier	Rated Number of rectifier

First Level: Alarm Setting

Relay status	DO1 Output status
	DO2 Output status
	DO3 Output status
	DO4 Output status
	DO5 Output status
	DO6 Output status
Relay setting	DO1 Alarm Type
	DO1 Output Type
	DO2 Alarm Type
	DO2 Output Type
	DO3 Alarm Type
	DO3 Output Type
	DO4 Alarm Type
	DO4 Output Type
	DO5 Alarm Type
	DO5 Output Type
	DO6 Alarm Type
	DO6 Output Type
Alarm Level	AC over volt alarm
	AC power off alarm
	AC frequency
	AC Over Curr
	Rectifier
	Rectifier Over Volt
	Batt Under Volt
	LVD1 Alarm
	LVD2 Alarm
	Batt Over Curr
	Load Over Curr
DI1 (Door)	DI set
DI2 (Smoke)	
DI3 (Lighting)	
DI4 (Water Immersion)	
DI5 (Air Condition)	
DI6 (Impact)	

First Level: Shunt Metering

Total Power consumption
Monthly Power consumption
Daily Power consumption
Clean

First Level: System Configuration

Second Level	Third Level
Serial port settings	Equipment Address
	RS485 Baud rate
Network Configuration	Local IP address
	Subnet mask
	Default gateway
	Port No
Sys Display	Buzzer switch
	LCD Language
	LCD Backlight delay
Sys time	
Code set	

First Level: Event Record

Second Level	Third Level
View Records	Record 1
	...
Clean Records	

First Level: Equipment Information

Equipment Information

6.3. Maintenance

1. Analysis and Maintenance of 485 Communication Interruption:
 - Check the Connection: Ensure that the 485 communication line is properly and securely connected.
 - Verify Communication Parameters: Detect the communication parameters, including communication address and baud rate, between the monitoring unit and the host computer.
2. Potential Causes for Incorrect or Unchanged Reported Data and Inconsistent Control State: If the reported data is incorrect and remains unchanged, or if the control state doesn't align with issued commands, or if parameter settings don't match actual implementation, the following issues may be the cause:
 - Incorrect Input Signal
 - Damaged Input Circuit
 - Rectifier Module Failure

 | Please contact MICROSENS for repair, maintenance and replacement of the affected components.

7. Web Interface

1. On your computer go to Control Panel > Network and Internet > Network and Sharing Center > Change adapter settings
2. Set the Ethernet properties as shown below:
 - Set the local IP address.



The above set IP address and the IP address of the monitor module must be in the same segment, but the IP address must not be the same.

3. Web interface login window:
 - Enter the IP address of the monitor module in the address bar of your web browser and press **Enter** to confirm. This opens the Web interface login window.
 - Enter a valid username and password and click on the **Confirm** button.

Username	Password	Rights
user	user	Low permission; no permission to upload/download configuration files
admin	admin	
root	root	

4. Web interface:
 - After entering the correct username and password, access to the web interface is granted.

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