

# WRD

## Remote display for WESTERN WRD SYSTEM



*Manuale utente*

**IT**

*User manual*

**EN**

*Manuel de l'utilisateur*

**FR**

*Manual del usuario*

**ES**

*Benutzerhandbuch*

**DE**

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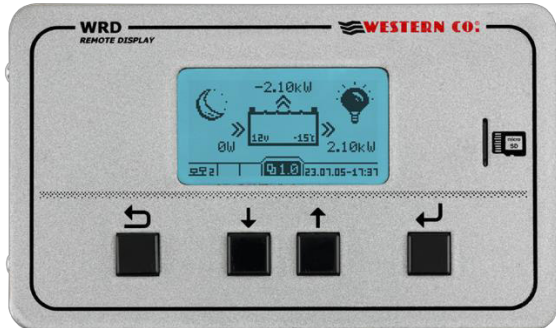
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ELECTRONIC EQUIPMENTS - SOLAR SYSTEMS













## REMOTE DISPLAY FOR WESTERN WRD SYSTEM

IoT Remote Display and Datalogger 12/24/48V



WRD is a display and controller device that together with the proprietary bus **WBUS** is part of the **WESTERN WRD SYSTEM**, a complete and intelligent system for the production and storage of photovoltaic energy in stand-alone systems.

The **WESTERN WRD SYSTEM** is a flexible and advanced stand-alone system with intelligent functions, recording of historical functioning data with remote control from the Internet (cloud). Up to 8 MPPT controllers *WRMxx* can be parallelized with adjustable charging power up to 14kW and monitor the battery bank energy through the battery monitor *WBM*. *WRD* is suitable for 12/24/48V systems with lead or lithium batteries. The system is modular as *WRMxx* controllers can be paralleled to increase the photovoltaic power. *WRD* has a proprietary control bus named **WBUS** to communicate with the various compatible devices, able to access all the parameters both for the display and for the management of the control functions. The simple user interface, with 128x64 display and 4 buttons, allows an immediate visualization of all the parameters: powers, voltages, charge and PV string currents, energy meters, data logger and events. From *WRD* all Setup settings can be made for each single *WRMxx* controller connected and/or *WBM* battery monitor. Through *WBM* is possible to manage contacts related to the charge state of the battery for the intelligent activation of the loads. The logger data is stored in the removable  $\mu$ SD on the front panel. Through the Ethernet connection it is possible to connect to the Internet cloud so that both the data of the logger and all the other functions become remotely and accessible with the portal *WRD SERVER*.

-  **Power supply 12V, 24V and 48V**
-  **Backlighted LCD 128x64**
-  **Internal clock**
-  **Data logger on extractable  $\mu$ SD**
-  **Master for WESTERN WRD SYSTEM**
-  **WBUS Interface**
-  **Internet connection (cloud)**
-  **Cloud monitoring platform**
-  **RJ45 Ethernet**
-  **Installation from panel or with frame**
-  **IP20 Metallic box**
-  **Anti-reverse protection**

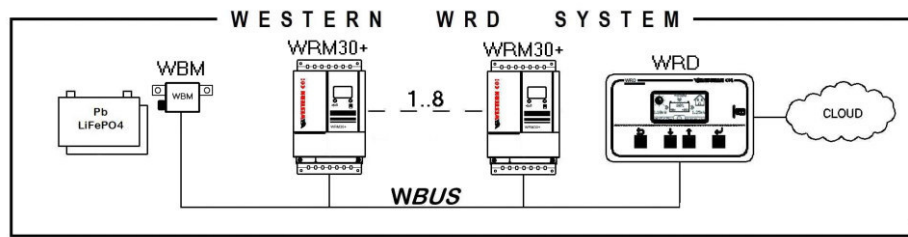


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## 1. GENERAL DESCRIPTION



Pic.1 WESTERN WRD SYSTEM with WRM30 +

In **WESTERN WRD SYSTEM**, WRD is the coordinator and can work in two modes: Viewer or Controller.

### 1.1. Viewer

By setting in the setup menu **8.4 WRD** -> **Oper.Mode: 'MONITOR'**: you get the View mode.

In this mode, the WRD does not control the charging and discharging of the system, but takes care only of displaying the parameters of the connected devices, can change the setup settings of the slaves, collects data and remotely displays them in the cloud. The various devices autonomously perform their main functions independently from the WRD.

### 1.2. Controller

By setting in the setup menu **8.4 WRD** -> **Oper.Mode: 'CONTROLLER'**: you get the Controller mode<sup>1</sup>.

In this mode, the WRD adds a control over the devices, dynamically modifying some parameters in order to optimize the energy management of the entire system and ensure compliance with the battery parameters.

The operating mode of the WRD in menu 2.0 can be recognized from the indication in the battery graphics (§ *Main screens*).

## 2. CONNECTIONS AND INSTALLATION

In the appendix (Pic. A1, An) the system connections are shown for the various possible configurations.

For its functioning the WRD uses the 12/24 / 48V system power supply and the connection **WBUS** which is physically an RS485 bus, while the RJ45 Ethernet connection to the Internet cloud is optional.

The **WESTERN WRD SYSTEM** must be configured by setting to each WRMxx controller a unique address: from 1 to 32, while the WBM already has a fixed address (33) as in the case of connection with a Leonardo (34).

### 2.1. Installation procedure

- 1) To install the WRD in a dry place, there are two fixing options: from the panel and with frame (Pic.4)
- 2) At the back you can access the electrical connections (Pic.4). Both the power connection and that of the **WBUS** are<sup>2</sup> of a removable clamp type, easy to wire. Connect the cables correctly, if the power supply comes from the battery, it is recommended that it is under the use of a fuse (0.5A) for cable protection. Finally, if it is used, also connect the Ethernet cable.
- 3) Once all the connections have been made, power up the system. The WRD turns on and starts to function.
- 4) Now run the system configuration settings that will be required.
  - At the menu: **8.0 WBUS CONFIG.** you can use the 'AutoConf.' command for simplicity, or you can make address settings manually.
  - At the menu: **7.1 DATE / TIME** you set the clock and time zone (Timezone).
  - At the menu: **7.0 SYSTEM** you make system settings. **The correct profile must be selected, corresponding to the battery features** (an incorrect choice could lead over time to damage the battery itself).

<sup>1</sup> It is recognizable if a WRM30+ is remotely controlled (by WRD) if, on the WRM30+ display, the battery contour flashes every ~3sec.

<sup>2</sup> The WBUS has the RS485 as its physical bus, so the two poles A and B must be connected correctly, while the GND pole should be left disconnected.

5) Check the entire functioning by scrolling the screens.

## 2.2. Possible Configuration

The **WESTERN WRD SYSTEM** can work with different combinations of devices.

| n. | Configurations                      | Monitoring                          | Diagrams in Appendix |
|----|-------------------------------------|-------------------------------------|----------------------|
| 1  | WRD + WBM                           | battery                             | A1                   |
| 2  | WRD + WRMxx <sub>(1..8)</sub>       | PV production                       | A2, A3               |
| 3  | WRD + WBM + WRMxx <sub>(1..8)</sub> | battery, PV production, consumption | A4, A5               |
| 4  | WRD + Leonardo Off-Grid             |                                     | A6, A7               |

Depending on the current hardware, the configuration must be set on the WRD. This operation is performed on the menu: **8.0 WBUS CONFIG**. where the addresses of the devices connected to the device must be specified **WBUS** to facilitate the operation an auto configuration command is available that detects the connected hardware.

Depending on the configuration set, the WRD displays the information and can execute its algorithms using the available resources. The screens for each configuration are described below.

## 2.3. System Setup

In the menu: **7.0 SYSTEM** the system settings are executed, the list of parameters changes according to the current configuration. Detailed explanations are described in the chapter *Configurations*.

## 2.4. Date Time Setup

In the menu: **7.1 DATE / TIME** you set the system clock and the time zone (Timezone). It is important to correctly set this last parameter with the Timezone of the place where the system is located, so that the remote clock can be updated correctly.

## 2.5. Data Logger Setup

In the menu: **7.2 DATA LOGGER** you can enable the data logger by setting the minutes for the sampling parameters: 10min. is the default value (enabled). It is also possible to request information regarding the  $\mu$ SD.

## 2.6. Network Setup

In the menu: **7.3 NETWORK** you make the settings of the various network parameters. The DHCP function is set by default, which automatically retrieves the necessary values. The connection to the remote server can be enabled or disabled by the user.

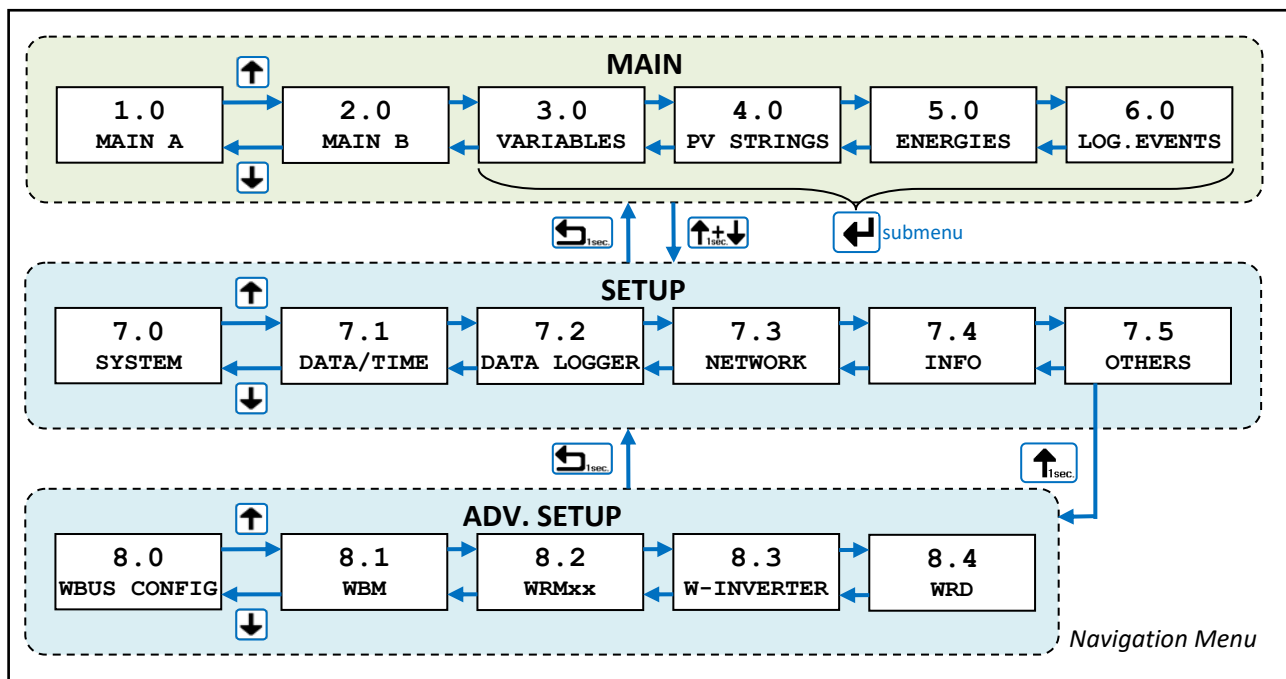
### 3. MENU NAVIGATION

Navigating through the various screens is very simple and intuitive. The WRD has two display environments (*Pic.2*):

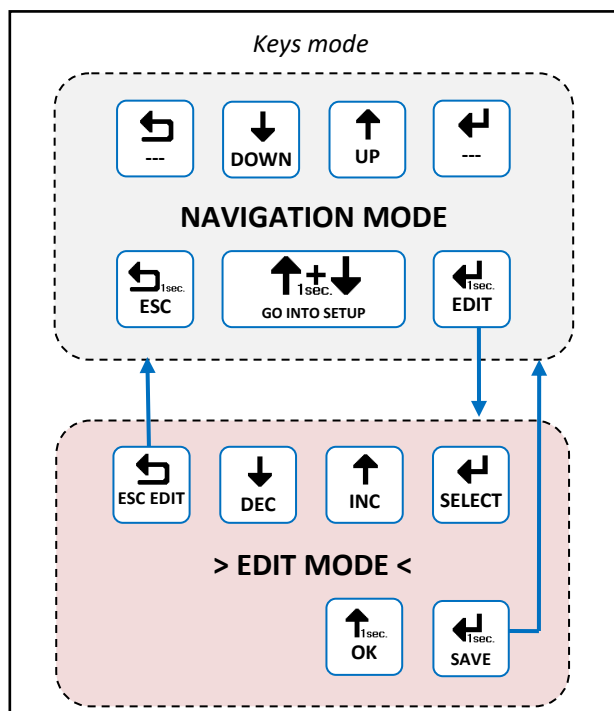
- the main environment MAIN, consisting of six screens where the operation of the system is monitored;
- SETUP setting environment, consisting of 6 screens + 5 in ADV. SETUP where the settings for the operation are set.

In the MAIN environment, the UP and DOWN buttons are used to scroll through the screens from 1.0 to 6.0, the ENTER button accesses any submenu. Pressing the UP / DOWN buttons simultaneously for 1 sec. you access the SETUP environment. Here, it is always repeated with the same UP or DOWN buttons, the scrolling of the screens from 7.0 to 7.5. To return to the MAIN environment use the ESC button pressed for 1 sec.

To enter ADV. SETUP select the "Advanced Setup" item on the 7.5 OTHERS screen, press the UP button so that "-->" appears and then press the OK button for 1 sec.



*Pic.2 - Navigation menu*



*Pic.3 - Edit menu*

It is possible to enter the EDIT mode (*Pic.3*), where it is allowed, to modify the parameters by keeping pressed the EDIT button for 1 sec. Entry into the EDIT mode is visible on the display by the presence of the cursors on the modifiable parameter. For editing are used the / INC/DEC buttons, press the SELECT button to change the value. For **save the changes** the button SAVE must be kept pressed for 1 sec.

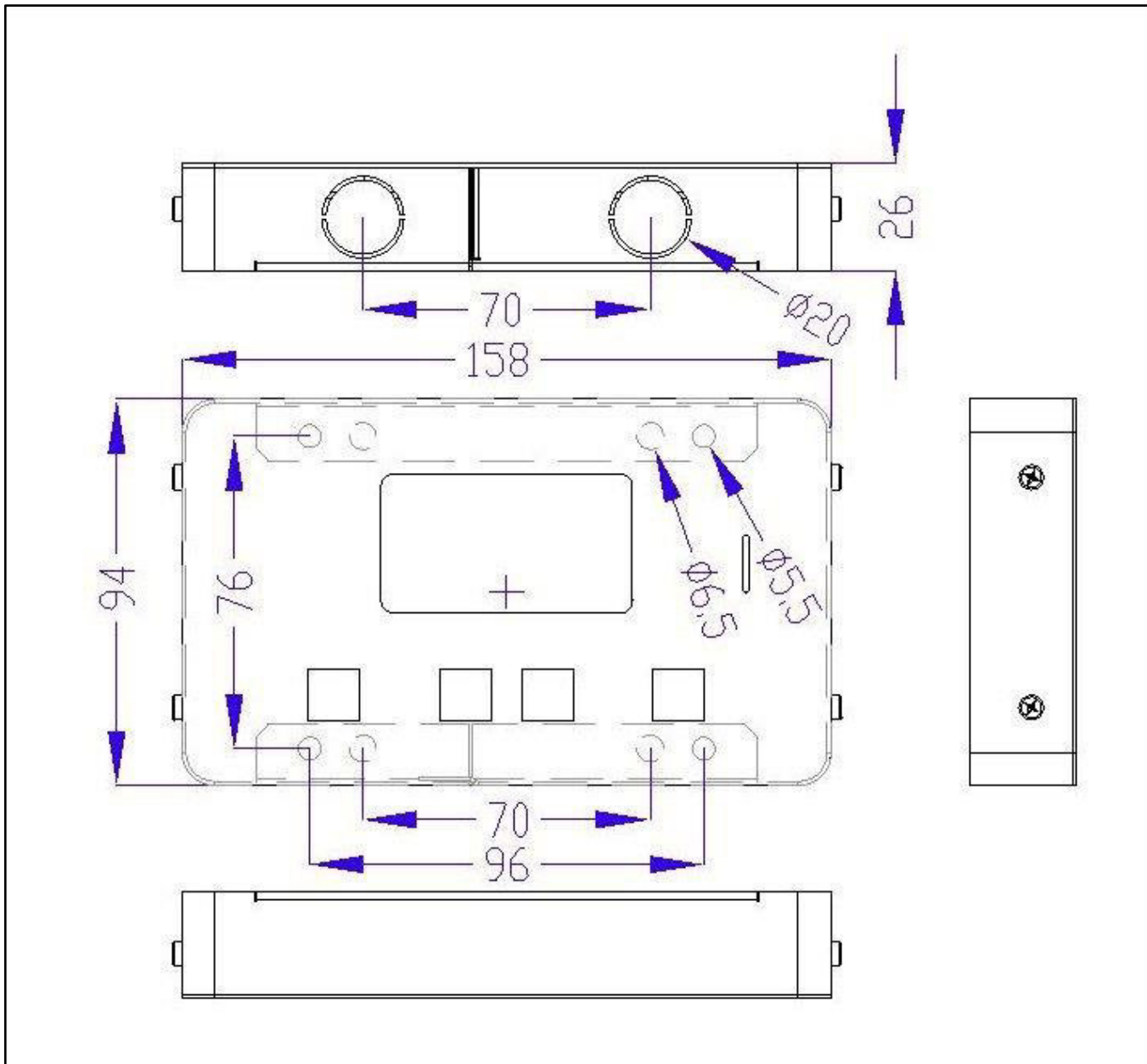
To exit the EDIT mode, **without saving the changes**, use the ESC button. To confirm the items that require an action, press the OK button for 1 sec.

#### 4. ELECTRICAL FEATURES

| DESCRIPTION                                  | PAR.  | VALUE                   | U.M.               |
|--|-------|-------------------------|--------------------|
| Nominal battery voltage                      |       | 12 / 24 / 48 autodetect | (V)                |
| Supply voltage range                         | Vbatt | 10 ÷ 64                 | (V)                |
| Self consumption                             | Pq    | 1.0                     | (W)                |
| Operating temperature                        | Tamb  | -10 ÷ +40               | (°C)               |
| Max cable section terminal (Power and RS485) |       | 1.5                     | (mm <sup>2</sup> ) |
| Weight                                       |       | 250                     | (g)                |
| Dimension LWH                                |       | 160 x 95 x 27           | (mm)               |
| Degree of protection                         |       | IP20                    |                    |

Tab.1 - Electrical features

#### 5. MECHANICAL DIMENSIONS



Pic.4 - Mechanical dimensions

**6. FIXING OPTIONS:**

|  |                                  |                           |               |          |                      |               |          |                          |               |   |          |                           |               |          |               |               |
|--|----------------------------------|---------------------------|---------------|----------|----------------------|---------------|----------|--------------------------|---------------|---|----------|---------------------------|---------------|----------|---------------|---------------|
|  | <p><b>WALL INSTALLATION</b></p>  |                           |               |          |                      |               |          |                          |               |   |          |                           |               |          |               |               |
|  | <p><b>WALL INSTALLATION</b></p>  |                           |               |          |                      |               |          |                          |               |   |          |                           |               |          |               |               |
|  | <p><b>PANEL INSTALLATION</b></p> |                           |               |          |                      |               |          |                          |               |   |          |                           |               |          |               |               |
| <table border="1"> <tr> <td><b>1</b></td> <td><b>self-tapping screw</b></td> <td><b>Q.ty 4</b></td> </tr> <tr> <td><b>2</b></td> <td><b>plastic dowel</b></td> <td><b>Q.ty 4</b></td> </tr> <tr> <td><b>3</b></td> <td><b>M3 L6 cross screw</b></td> <td><b>Q.ty 4</b></td> </tr> </table> | <b>1</b>                         | <b>self-tapping screw</b> | <b>Q.ty 4</b> | <b>2</b> | <b>plastic dowel</b> | <b>Q.ty 4</b> | <b>3</b> | <b>M3 L6 cross screw</b> | <b>Q.ty 4</b> | <table border="1"> <tr> <td><b>4</b></td> <td><b>rubber cable gland</b></td> <td><b>Q.ty 2</b></td> </tr> <tr> <td><b>5</b></td> <td><b>nut M4</b></td> <td><b>Q.ty 4</b></td> </tr> </table> | <b>4</b> | <b>rubber cable gland</b> | <b>Q.ty 2</b> | <b>5</b> | <b>nut M4</b> | <b>Q.ty 4</b> |
| <b>1</b>   | <b>self-tapping screw</b>        | <b>Q.ty 4</b>             |               |          |                      |               |          |                          |               |   |          |                           |               |          |               |               |
| <b>2</b>   | <b>plastic dowel</b>             | <b>Q.ty 4</b>             |               |          |                      |               |          |                          |               |   |          |                           |               |          |               |               |
| <b>3</b>   | <b>M3 L6 cross screw</b>         | <b>Q.ty 4</b>             |               |          |                      |               |          |                          |               |   |          |                           |               |          |               |               |
| <b>4</b>   | <b>rubber cable gland</b>        | <b>Q.ty 2</b>             |               |          |                      |               |          |                          |               |   |          |                           |               |          |               |               |
| <b>5</b>   | <b>nut M4</b>                    | <b>Q.ty 4</b>             |               |          |                      |               |          |                          |               |   |          |                           |               |          |               |               |

Pic.5 - Fixing options

## 7. IOT PLATFORM FOR MONITORING AND REMOTE CONTROL

The WRD, through the Internet connection and IoT technology, communicates with the remote server and transmits operating data. By registering and logging into the WRM MONITOR client web interface, it is possible to interact with the system by changing its settings and, at the same time, monitor its own energy system.

In particular, the user has access to the following features:

- Monitoring of the data sent by the system in real time: values of power produced, absorbed/taken from the battery and consumed by the load, the state of charge of the battery and any alarm status.
- Visualization of graphs, counters and indicators related to system statistics: trend of all the typical values of the system, such as voltages, currents and powers. Possibility to select the display time period.
- Reports of events related to the system, such as alarms or useful information.
- Specific information of the system installed (type, capacity and battery voltage, device firmware versions).



Pic.6 - WEB Client

### Access to the portal

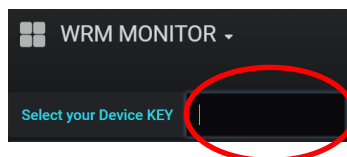
The first time you log in to the WRM MONITOR interface, you need to register. Registration is carried out at the following link (also valid for subsequent accesses).

<http://wrserver.western.it>

You need to enter your name and email address, and then you have to choose a password.

At this point, access to your dashboard is done by clicking on **HOME WRM MONITOR**.

When you first log in, you must enter the "Select your Device Key" box, as shown in Pic.7 (below), the KEY CODE identifier of your WRM60 / 90 (e.g. 0123456789ABCDEF) which is written on the label on the side of the product or on the MENU 7.4 of the display (as described at page 15). Once the code is inserted, press ENTER from the keyboard. At this point, you can monitor your system and navigate through the various features.



Pic.7 - Key Code Insertion

## 8. CONFIGURATIONS

### 8.1. Configuration: WRD + WBM

#### 8.1.1. Description

This configuration is used in a plant where you want to monitor the energy flow of the *battery* (Pic. A1). The WBM battery monitor must be connected to the negative battery terminal and provides for the calculation of the incoming and outgoing energy. (See dedicated product manual for more details).

WRD allows configuring the WBM in the Setup menu 7.0 or 8.1:

- Select the correct profile according to the type of battery.
- Select the battery capacity (Ah) correctly, so that the WBM can correctly calculate the State of Charge (%) of the Battery.
- Set the thresholds for the two contacts controlled according to the State of Charge (%) of the Battery.

The 'Discharge' contact can be exploited to control a device capable of disabling the load, thus determining the maximum discharge depth within which the battery will cycle. This contact also intervenes in case of protections: overcurrent, over temperature and under voltage.

With the 'Charge' contact, normally, is controlled a device capable of disabling the charge as it intervenes in the event of protections: overcurrent, over temperature and overvoltage.

Setting the thresholds for the 'Charge' contact it can also be controlled according to the SoC in case some applications require it.

#### 8.1.2. Main screens

In the following picture are described the graphic used in the various screens of the main menu.

Take into account the notes shown in the pictures.

### 8.2. Configuration: WRD + WRMxx (1 ..8)

#### 8.2.1. Description

This configuration is used in a stand-alone system where you want to mainly monitor the energy production (Pic.A2).

The WRMxx controllers, which can be paralleled up to a maximum of 8, are used to charge the battery. (see dedicated product manual for more details).

The WRD allows to collectively configuring the most common parameters of all the WRMxx in the Setup Menu 7.0, while it performs this individually in the Setup Menu 8.2.:

- Select the correct profile according to the type of battery.
- Select appropriately the setting of the Load output
- Set the Low Battery threshold for the output Load.

- With the WRM30+: Load output can be exploited with setting 'SurPlus' to control or directly feed a load when the battery is charged and there is still energy from the PV modules so we have an excess of energy that in this way can be re-used.

#### 8.2.2. Main screens

In the following picture are described the graphic used in the various screens of the main menu.

Take into account the notes shown in the pictures.

### 8.3. Configuration: WRD + WBM + WRMxx(1..8)

#### 8.3.1. Description

This configuration is used in a stand-alone system where you want to monitor the quantities of production, consumption and accumulation (*Fig.A3*).

The WBM battery monitor must be connected to the negative battery terminal and provides for the calculation of the incoming and outgoing energy. (See dedicated product manual for more details).

WRD allows configuring the WBM in the Setup menu 7.0 or 8.1:

- Select the correct profile according to the type of battery.
- Select the battery capacity (Ah) correctly, so that the WBM can correctly calculate the State of Charge (%) of the Battery.
- Set the thresholds for the two contacts controlled according to the State of Charge (%) of the Battery.

The 'Discharge' contact can be exploited to control a device capable of disabling the load, thus determining the maximum discharge depth within which the battery will cycle. This contact also intervenes in case of protections: overcurrent, over temperature and under voltage.

With the 'Charge' contact, normally, is controlled a device capable of disabling the charge as it intervenes in the event of protections: overcurrent, over temperature and overvoltage. Setting the thresholds for the 'Charge' contact it can also be controlled according to the SoC in case some applications require it.

Considering that, in CONTROLLER mode, the charge made by the WRMxx is already controlled through the WBUS, it is not necessary to exploit the 'Charge' contact of the WBM.

The WRMxx controllers, which can be paralleled up to a maximum of 8, are used to charge the battery. (See dedicated product manual for more details).

The WRD allows to collectively configuring the most common parameters of all the WRMxx in the Setup Menu 7.0, while it performs this individually in the Setup Menu 8.2.:

- Select appropriately the setting of the Load output
- Set the Low Battery threshold for the output Load.

- With the WRM30+: Load output can be exploited with setting 'SurPlus' to control or directly feed a load when the battery is charged and there is still energy from the PV modules so we have an excess of energy that in this way can be re-used.

### 8.4. Configuration: WRD + Leonardo System

The WRD can be combined with a Leonardo System to add network monitoring of the system, self-consumption, and other services described in the setup menu 8.3.

#### 8.4.1. Main screens

In the following picture are described the graphic used in the various screens of the main menu.

Take into account the notes shown in the pictures.

#### NOTES:

<sup>1</sup> - not present in WRD + WBM Configuration;

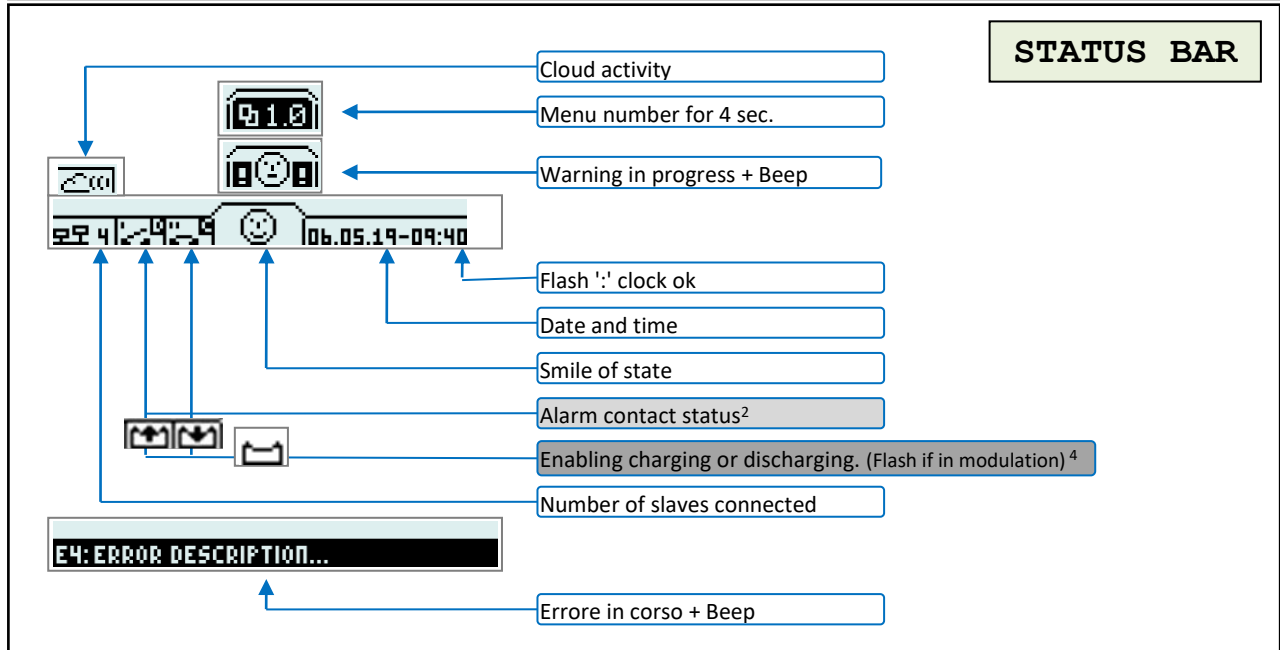
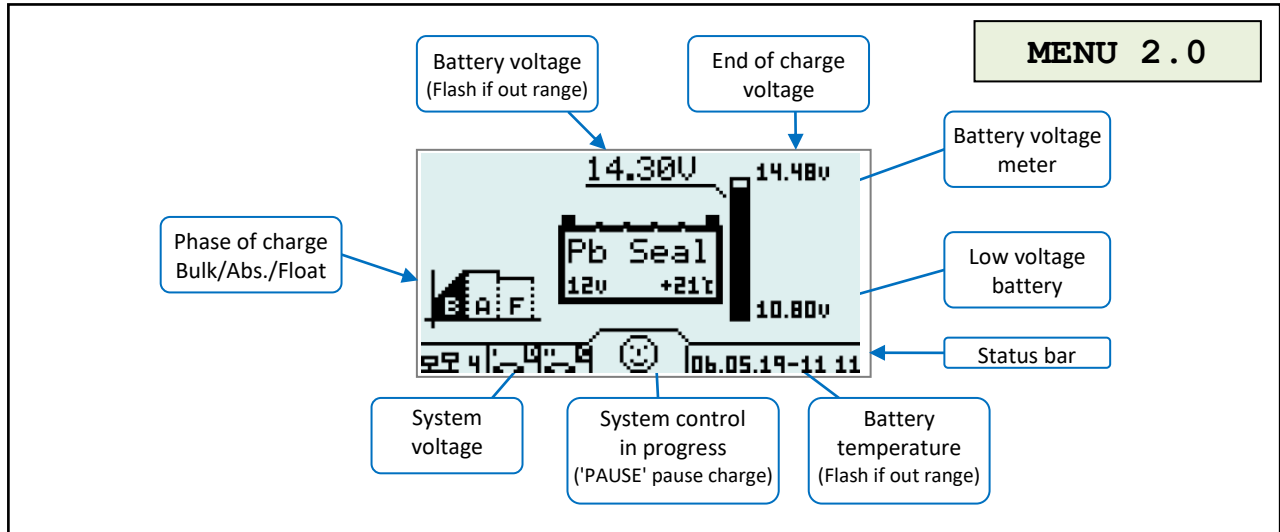
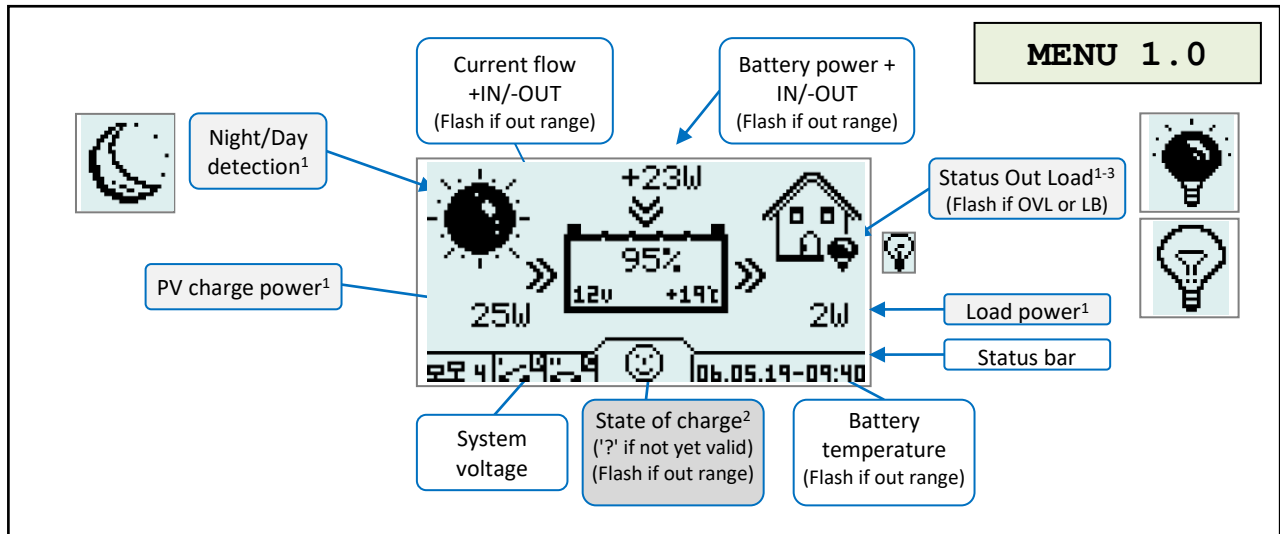
<sup>2</sup> - not present in WRD + WRMxx Configuration;

<sup>3</sup> - the light bulb icon appears in the WRD + WRMxx Configuration;

<sup>4</sup> - in WRD + Leonardo OFF-GRID Configuration;

**9. MAIN SCREENS**

Configuration with WRD + WBM + WRMxx(1..8)



**Configuration with WRD + WBM + WRMxx(1..8)**

**MENU 3.0**

|                             |  |                                |                              |      |
|-----------------------------|--|--------------------------------|------------------------------|------|
|                             | Battery voltage<br>(Flash if out range)        | PV charge current <sup>1</sup> | PV charge power <sup>1</sup> |      |
| Photovoltaic variables      |  | V                              | A                            | W    |
|                             |  | 9.94                           | 133                          |      |
| Battery variables           |  | V                              | A                            | W    |
|                             |  | 13.36                          | 4.20                         | 56   |
| Load variables <sup>3</sup> |  | V                              | A                            | W    |
|                             |  | 5.74                           | 77                           |      |
| n.Menu / Warning            |  | 3.0 VARIABLES                  |                              | 1.7% |
|                             | Battery current IN/OUT<br>(Flash if out range) | Load current <sup>1</sup>      |                              |      |

**MENU 4.0**

|                  |  |                                |                              |                 |
|------------------|--|--------------------------------|------------------------------|-----------------|
|                  | internal temperature<br>PV input hardware<br>(Flash if over Temp.) | PV "A" string                  | PV "B" string                |                 |
|                  | Ti+20t   | V <sub>PV</sub>                | A <sub>PV</sub>              | W <sub>PV</sub> |
|                  |  | 27.12                          | 2.83                         | 77              |
|                  |  | 27.20                          | 2.62                         | 71              |
| n.Menu / Warning | 4.0 PV STRINGS   |                                |                              | 1.27%           |
|                  | PV string voltage <sup>1</sup>                                     | PV string current <sup>1</sup> | PV string power <sup>1</sup> |                 |

**MENU 5.0**

|                  |  |  |                                      |  |          |
|------------------|--|--|--------------------------------------|--|----------|
|                  | PV production counter<br>from Reset        | Battery input counter<br>from Reset        | Battery output counter<br>from Reset | Consumption counter<br>from Reset <sup>3</sup> |          |
|                  |  |  |                                      |  | kWh      |
|                  | 000.000                                    | 000.000                                    | 000.000                              | 000.000  | Start    |
|                  |  |  |                                      |  | 06/05/19 |
|                  |  |  |                                      |  | 06/05/19 |
| n.Menu / Warning | 5.0 ENERGIES                               |  |                                      |  |          |
|                  | Date of Reset<br>WRM counters <sup>1</sup> | Date of Reset<br>WBM counters <sup>2</sup> |                                      |  |          |

**MENU 6.0**

|                  |                                     |                                  |                        |                  |                   |
|------------------|-------------------------------------|----------------------------------|------------------------|------------------|-------------------|
|                  | Progressive number<br>event (1..32) | Oldest event occurring           | Latest event occurring | n.Menu / Warning |                   |
|                  | Info<br>Warnings<br>Error           | List of: All Events              |                        |                  | Event list filter |
|                  |                                     | M.29-i-Cod.259-06/05/19-10:42.16 |                        |                  |                   |
|                  |                                     | M.30-E-Cod.541-06/05/19-10:42.17 |                        |                  |                   |
|                  |                                     | M.31-i-Cod.403-06/05/19-10:45.22 |                        |                  |                   |
|                  |                                     | M.32-W-Cod.152-06/05/19-10:48.40 |                        |                  |                   |
| n.Menu / Warning | 6.0 LOG.EVENTS                      |                                  |                        |                  | 0.0%              |
|                  | Event type                          | Event code                       | Date and time event    |                  |                   |

## 10. SETUP MENU:

Configuration with WRD + WBM + WRMxx(1..8)

| List displayed:             | Value: | Settable value and descriptions:  |
|-----------------------------|--------|---|
| <b>MENU 7.0</b>             |        |   |
| <b>Settings:</b>            |        |   |
| <b>Batt.Type:</b> Pb Seal/  |        | <b>WBM SB:</b><br>Pb Flood 14.80@25°C / 29.60@25°C / 59.20@25°C :<br>Setting to operate with Pb Flood type battery.<br>Pb Seal/Gel 14.40@25°C/ 28.80@25°C / 57.60@25°C:<br>Setting to operate with Pb Seal or Gel type battery.<br>LiFePO4 <14.00..14.70V><br><28.00..29.40V><br><56.00..58.80V> fixed :<br>Setting to operate with Lithium type battery with integrated BMS. |
| <b>B.Capacity:</b> 200Ah    |        | <10..2000Ah> battery bank capacity, to compute SoC. <sup>2</sup>  |
| <b>OFF disch.#1:</b> ↓ 25%  |        | <0%..ON disch> below this threshold, the ALARM output 1 is activated. Discharge OFF. <sup>2</sup>   |
| <b>ON disch.#1:</b> ↑ 40%   |        | <OFF disch..100%> above this threshold, the ALARM output 1 is deactivated. Discharge ON. <sup>2</sup>   |
| <b>OFF charge#2:</b> ↑ 100% |        | <ON charge..100%> above this threshold, the ALARM output 2 is activated. Charge OFF. <sup>2</sup>   |
| <b>ON charge#2:</b> ↓ 90%   |        | <0%..ON charge> below this threshold, the ALARM output 2 is deactivated. Charge ON. <sup>2</sup>  |
| <b>Prog.Load:</b> OnSurplus |        | 24h/24h : LOAD output always active. <sup>1</sup><br><1..16h> : LOAD output active from sunset for the set hours. <sup>1</sup><br>Only Night: LOAD output active only during the night. <sup>1</sup><br>Only Day : LOAD output active only during the day. <sup>1</sup><br>OnSurPlus : LOAD output active only during an energy surplus. <sup>1</sup>                         |
| <b>LowB.Load:</b> 11.12V    |        | <10.8..12.56V> below this threshold, the LOAD output is activated. <sup>1</sup>   |
| 7.0 SYSTEM                  |        |   |

Configuration with WRD + WBM + WRMxx(1..8)

**MENU 7.1**

| List displayed:  | Value: | Settable value and descriptions:  |
|--|--------|---|
| <b>Set Date Time:</b><br><b>dd/mm/yy: 31/12/18</b><br> <br><b>hh:mm:ss: 12:59.00</b><br> <br><b>TimeZone: UTC +1</b> |        | <input type="text" value="&lt;1..31&gt;/&lt;1..12&gt;/&lt;00..99&gt; days/months/years"/> |
|  |        | <input type="text" value="&lt;0..23&gt;:&lt;0..59&gt; hours:minutes.seconds"/>            |
|  |        | <input type="text" value="&lt;-12..+13&gt; site timezone"/>                               |
| <b>7.1 DATE / TIME</b>   |        |   |

**MENU 7.2**

| List displayed:   | Value: | Settable value and descriptions:  |
|---|--------|---|
| <b>Info &amp; Setting:</b><br><b>sample Time: 10min</b><br> <br> <br><b>Info: --&gt;</b><br><b>NOT PRESENT</b><br> <br><b>Info: uSD CARD</b><br><b>File SYS: FAT32</b><br><b>free space: 3772MB</b><br> <br><b>Info: Find WRD*.*</b><br><b>WRDEVENT.LOG 27kB</b><br><b>01/02/12 01:23:45</b><br> <br><b>WRDATA2.LOG 27kB</b><br><b>01/02/12 01:23:45</b><br> <br><b>END LIST</b><br><b>Info: SAMPLE EVENT</b><br><b>00:30</b> |        | <input type="text" value="OFF : Data logger disabled (uSD CARD ejectable) &lt;1..30min&gt; logger sampling time."/>   |
|   |        | Logger information:<br>--> : select the type of information to show.<br>If there is no card show "NOT PRESENT", and no information is available.<br>uSD CARD : read the type of file system (NONE, FAT12/16/32) and calculates the free space on the card.<br>FIND WRD*.* : read and list the files one at a time by showing the name, size, and date of the last update.<br>At the end shows "END LIST".<br>SAMPLE EVENT : show the remaining time for the next sampling |
| <b>7.2 DATA LOGGER</b>  |        |   |

Configuration with WRD + WBM + WRMxx(1..8)

**MENU 7.3**

| List displayed:   | Value: | Settable value and descriptions:   |
|---|--------|--|
| <b>Item:</b> <b>Value:</b><br><b>CONNECTION</b> : <b>OFF</b><br><b>Enable DHCP:</b> <b>ON</b><br> <br><b>1-IP Address:</b> <b>192</b><br><b>2-IP Address:</b> <b>168</b><br><b>3-IP Address:</b> <b>100</b><br><b>4-IP Address:</b> <b>DHCP</b><br> <br><b>1-subNetMask:</b> <b>255</b><br><b>2-subNetMask:</b> <b>255</b><br><b>3-subNetMask:</b> <b>255</b><br><b>4-subNetMask:</b> <b>000</b><br> <br><b>1-Gateway:</b> <b>255</b><br><b>2-Gateway</b> : <b>255</b><br><b>3-Gateway:</b> <b>255</b><br><b>4-Gateway</b> : <b>255</b><br> <br><b>1-prim.DNS</b> : <b>008</b><br><b>2-prim.DNS</b> : <b>008</b><br><b>3-prim.DNS</b> : <b>008</b><br><b>4-prim.DNS</b> : <b>008</b><br> <br><b>1-secon.DNS</b> : <b>255</b><br><b>2-secon.DNS</b> : <b>255</b><br><b>3-secon.DNS</b> : <b>255</b><br><b>4-secon.DNS</b> : <b>255</b> |        | <b>OFF; ON</b> : Disable/Enable cloud connection to transfer data to the server.<br><br><b>OFF; ON</b> : Disable/Enable DHCP function.<br><br><0..255> : set the device IP Address.<br><0..255> : "<br><0..255> : "<br><1..255> : "<br><b>DHCP</b> : set the Network Setup automatically (the other values will be ignored).<br><br><0..255> : set the subnet mask.<br><0..255> : "<br><0..255> : "<br><0..255> : "<br><br><0..255>: set the Gateway IP Address.<br><0..255> : "<br><0..255> : "<br><0..255> : "<br><br><0..255> : set the primary DNS IP Address.<br><0..255> : "<br><0..255> : "<br><0..255> : "<br><br><0..255> : set the secondary DNS IP Address.<br><0..255> : "<br><0..255> : "<br><0..255> : "<br><0..255> : " |
| <b>7.3 NETWORK</b>  |        |  |

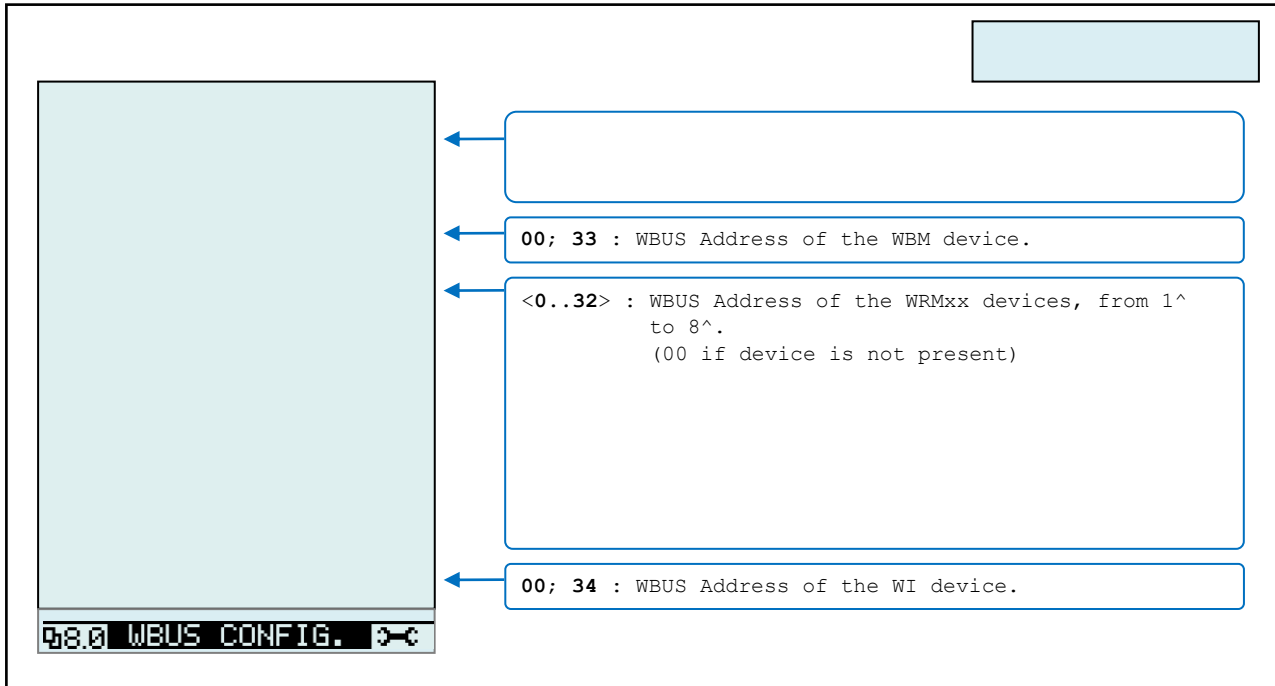
Configuration with WRD + WBM + WRMxx(1..8)

| List   | Value:           | Settable value and descriptions:  |
|--|------------------|---|
| <b>MENU 7.4</b>  |                  |   |
| Network param.:  |                  |   |
| status:  | OFF-LINE         | OFF-LINE; ON-LINE : current status of cloud connection.   |
| IP :   | 192.168.100.067  | current device IP Address.  |
| sNM:   | 255.255.255.000  | current subnet mask.  |
| Gwy:   | 255.255.255.255  | current Gateway IP Address.   |
| DNS:   | 255.255.255.255  | current primary DNS IP Address.   |
| dns:   | 255.255.255.255  | current secondary DNS IP Address.   |
| MAC:   | D880394F5632     | device MAC Address.   |
| KEY:   | 0123456789ABCDEF | device KEY code.  |
| Device: rev.Fw:  |                  |   |
| WRD  | : 1.0            | firmware revision of the WRD device.  |
| WBM  | : 1.0            |   |
| WRMxx n.1:   | 1.0              | firmware revision of the WRMxx devices, from 1^ to 8^.<br>(0.0 if device is not present)  |
| WRMxx n.2:   | 1.0              |   |
| WRMxx n.3:   | 0.0              |   |
| WRMxx n.4:   | 0.0              |   |
| WRMxx n.5:   | 0.0              |   |
| WRMxx n.6:   | 0.0              |   |
| WRMxx n.7:   | 0.0              |   |
| WRMxx n.8:   | 0.0              |   |
| W-INVERTER   | : 0.0            | firmware revision of the W-INVERTER device.   |
| U.I. Mode:   | Basic            | U.I. mode choice<br>Basic: It ist possible to access the configuration menus<br>Advanced: You have access to all menus * firmware revision of the WBM device. |
| <div style="border: 1px solid black; padding: 2px;"> <b>7.4 SYSTEM INFO</b> </div> |                  |   |

\* Reserved for qualified personnel only

| List displayed:  | Value: | Settable value and descriptions:         |
|--|--------|--|
| <b>MENU 7.5</b>  |        |  |
| Items:   |        |  |
| En.EvBeep:   | ON     | OFF; ON : Disable/Enable sound alert.    |
| PAUSE Charge:  | OFF    | OFF; ON : Pause the PV charge.           |
| Advanced Setup:  | -->    | --> : Access to advanced setup menu 8.X. |
| <div style="border: 1px solid black; padding: 2px;"> <b>7.5 VARIOUS</b> </div> |        |  |

**Configuration with WRD + WBM + WRMxx(1..8)**



Configuration with WRD + WBM + WRMxx(1..8)

| List displayed:   | Value:   | Settable value and descriptions:   |
|---|----------|--|
| <b>MENU 8.1</b>   |          |  |
| <b>WBM SETUP:</b>   |          |  |
| Batt.Type:  | Pb Seal/ | <b>WBM SB:</b><br><b>Pb Flood</b> 14.80@25°C / 29.60@25°C / 59.20@25°C :<br>Setting to operate with Pb Flood type battery. <sup>2</sup><br><b>Pb Seal/Gel</b> 14.40@25°C/ 28.80@25°C / 57.60@25°C:<br>Setting to operate with Pb Seal or Gel type battery. <sup>2</sup><br><b>LiFePO4</b> <14.00..14.70V><br><28.00..29.40V><br><56.00..58.80V> <b>fixed</b> :<br>Setting to operate with Lithium type battery with BMS integrated. <sup>2</sup> |
| B.Capacity:   | 200Ah    | <10..2000Ah> battery bank capacity, to compute SoC. <sup>2</sup>   |
| OFF disch.#1:   | ↓ 25%    | <0%..ON disch> below this threshold, the ALARM output 1 is activated. Discharge OFF. <sup>2</sup>  |
| ON disch.#1:  | ↑ 40%    | <OFF disch..100%> above this threshold, the ALARM output 1 is deactivated. Discharge ON. <sup>2</sup>  |
| OFF charge#2:   | ↑ 100%   | <ON charge..100%> above this threshold, the ALARM output 2 is activated. Charge OFF. <sup>2</sup>  |
| ON charge#2:  | ↓ 90%    | <0%..ON charge> below this threshold, the ALARM output 2 is deactivated. Charge ON. <sup>2</sup>   |
| UPDATE FW:  | ---      | <b>RUN</b> : *CAUTION* starts the procedure to update the firmware in the WBM device. The firmware update file must be present in the uSD card. <sup>2</sup>   |
| <div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> <span>8.1</span> <span>WBM</span> <span>⏪ ⏩</span> </div> |          |  |

Configurazione con WRD + WBM + WRM30(1..8)

| List displayed:   | Value: | Settable value and descriptions:   | MENU 8.2 |
|---|--------|--|----------|
| WRM30 n.1 SETUP:  |        | <1..8> select the WRM30 to edit. <sup>1</sup>  |          |
| VEoCharge: 14.40V   |        | Set the battery charge voltage:<br><b>Pb Flood</b> 14.80@25°C / 29.60@25°C / 59.20@25°C :<br>Setting to operate with Pb Flood type battery. <sup>1</sup><br><b>Pb Seal/Gel</b> 14.40@25°C/ 28.80@25°C / 57.60@25°C :<br>Setting to operate with Pb Seal or Gel type battery. <sup>1</sup><br><b>LiFePO4</b> <14.00..14.70V><br><28.00..29.40V><br><56.00..58.80V> <b>fixed</b> :<br>Setting to operate with Lithium type battery with integrated BMS. <sup>1</sup> |          |
| VLowBatte: 12.56V   |        | <12.00..12.56V> / <24.00..25.12V> / <48.00..50.24V> :<br>below this threshold, the WRM30 goes into Low Battery status and deactivates the LOAD. <sup>1</sup>   |          |
| VEndLBatt: auto   |        | <b>auto</b> (VEoC-0.2/0.4/0.8V);<br><12.72..13.68V> / <25.44..27.36V> / <50.88..54.72V> :<br>above this threshold, the WRM30 goes out Low Battery status and reactivates the LOAD. <sup>1</sup>  |          |
| Prog.Load: 16hour   |        | <b>24h/24h</b> : LOAD always active. <sup>1</sup><br><1..16h> : LOAD active from sunset for the set hours. <sup>1</sup><br><b>Only Night</b> : LOAD active only during the night. <sup>1</sup><br><b>Only Day</b> : LOAD active only during the day. <sup>1</sup><br><b>OnSurPlus</b> : LOAD active only during an energy surplus. <sup>1</sup>  |          |
| VnightThd: 2.00V  |        | 2.00V; 3.28V; 4.56V; 5.84V : below this threshold, the WRM30 detects the sunset. <sup>1</sup>  |          |
| MPPT algo: auto   |        | <b>auto</b> ; <b>parall.</b> ; <b>indep.</b> : mode in which the MPPT algorithm considers the two channels. <sup>1</sup>   |          |
| HrToFloat: 1hour  |        | <1..8h> : time in Absorption phase before moving to Float phase. <sup>1</sup>  |          |
| UPDATE FW: ---  |        | <b>RUN</b> : *CAUTION* starts the procedure to update the firmware in the WBM device. The firmware update file must be present in the USD card. <sup>1</sup>   |          |
| <div style="border: 1px solid black; padding: 2px; display: flex; justify-content: space-between;"> <span>8.2</span> <span>WRM30</span> <span>⏪ ⏩</span> </div> |        |  |          |

Configuration with WRD + WBM + WRMxx(1..8)

| List displayed:  | Value: | Settable value and descriptions: | MENU 8.3 |
|--|--------|----------------------------------|----------|
| WI.SETUP:  |        |                                  |          |
| not present  |        | Device not present.              |          |
| <div style="border: 1px solid black; padding: 2px; display: flex; justify-content: space-between;"> <span>8.3</span> <span>W-INVERTER</span> <span>⏪ ⏩</span> </div> |        |                                  |          |

**Configurazione con WRD + Leonardo OFF-GRID**

| List displayed:       | Value:   | Settable value and descriptions:  |
|-----------------------|----------|---|
| <b>MENU 8.3</b>       |          |   |
| <b>WI.SETUP:</b>      |          |   |
| <b>System Type:</b>   | ---      | <p>Set the type of the installed system:</p> <p>1-4K-LI: Provides the presence of WRM, recharging from AC-IN is not allowed, feeding into the grid is not admitted.</p> <p>2-PRO-LI: Provides the presence of PV-On Grid, feeding into the grid is not admitted.</p> <p>3-GE-LI: For Use with a Genset. The Meter port is used to start the Genset. Is not allowed feeding into the grid. Charging power defined by the GE Power field.</p> <p>4-FIAMM-R: Provides the presence of PV-OnGrid, feeding into the grid admitted.</p> <p>5-FIAMM-N: Provides the presence of PV-OnGrid, feeding into the grid admitted.</p> <p>6-PRO-LI_WEB: Provides the presence of PV-OnGrid, feeding into the grid is not admitted. Setting of the power exchanged with the grid remotely is allowed.</p> <p>7-CUSTOM: The characteristics of the system are defined by the following fields.</p> |
| <b>GE Power:</b>      | 1.4 Kw   | < --- ~ 25.5 Kw >: If the MeterPort item is set to the Genset value, it defines the power necessary to charge the battery pack.   |
| <b>MeterPort:</b>     | ---      | <p>Defines the use of the MeterPort.---</p> <p>Port not used</p> <p>PV Pulse: Used in case of system with AC configuration, to connect the counter of photovoltaic production.</p> <p>Genset: By jumpering this port with the AUX1 input using the cable supplied, it is possible to control the ignition of a generator when the battery percentage falls below the OFF disk # 1 threshold. The signal will remain active until the ON threshold of disk # 1 is reached.</p> <p>Surplus: By jumpering this port with the AUX1 input via the cable supplied, it is possible to control the switching on of a load when the battery exceeds the OFF charge # 2 threshold. The signal will remain active until the ON charge # 2 threshold is reached.</p>  |
| <b>AC Charger:</b>    | OFF      | Allows battery recharging from the AC-IN input  |
| <b>WRM Feed-In:</b>   | OFF      | Enables the input of energy via AC-IN by the WRMs, then PV, once the OFF charge # 2 threshold has been exceeded.  |
| <b>Web SetPoint:</b>  | OFF      | Enable the setting of the exchanged power remotely.   |
| <b>TA Position:</b>   | Pre PV   | <Pre/Post PV>: If present, the external TA sensor defines whether this is positioned before or after the entry point of the pre-existing PV system  |
| <b>Max Pw Grid:</b>   |          | < --- ~ 25.5 Kw >: It defines the maximum power that can be taken from the grid.  |
| <b>Ubat GE Start:</b> |          | < --- ~ 56 V >: In Monitor mode, it defines the voltage at which the contact for turning on the GE is closed. Closing counted if Vbat + less than GE start.   |
| <b>Ubat GE Hist:</b>  |          | < 8 ~ 11 V >: In Monitor mode, it defines the contact opening voltage for switching on the GE. Contact opening when the battery voltage rises above the GE start + GE Hist value.   |
| <b>RESET:</b>         | RUN      | RUN : Resets the W-Inverter   |
| <b>UPDATE FW:</b>     | ---      | <b>RUN: * CAUTION *</b> starts the firmware update procedure of the W-Inverter device. The firmware update file must be present on the USD card.  |
| <b>Device:</b>        | Address: |   |
| 88.3 W-INVERTER       |          |   |

**Configuration with WRD + WBM + WRMxx(1..8)**

| List displayed:        | Value:          | Settable value and descriptions:   | <b>MENU 8.4</b> |
|------------------------|-----------------|--|-----------------|
| <b>WRD SETUP:</b>      |                 |  |                 |
| <b>Oper. Mode:</b>     | <b>MONITOR</b>  | <b>MONITOR; CONTROLLER</b> : Operating Mode: Monitor/Controller  |                 |
| <b>Backlight:</b>      | <b>auto OFF</b> | <b>auto OFF; always ON</b> : Backlight LCD: Auto power-OFF/<br>always ON   |                 |
| <b>RESET:</b>          | <b>RUN</b>      | <b>RUN</b> : Reset the WRD device.   |                 |
| <b>UPDATE FW:</b>      | <b>RUN</b>      | <b>RUN</b> : *CAUTION* starts the procedure to update the<br>firmware in the WRD device. The firmware update<br>file must be present in the uSD card. To start<br>the procedure press both ↑ and ↓ keys. |                 |
| <b>Tech. Menu Psw:</b> | <b>00</b>       | <b>&lt;0..FF&gt;</b> password to access the Technical Menu.<br>*CAUTION* Technical Menu is reserved for factory<br>checks.   |                 |
|                        |                 |  |                 |

**NOTES:**

<sup>1</sup> - not present in WRD + WBM Configuration;

<sup>2</sup> - not present in WRD + WRMxx Configuration;

<sup>3</sup> - the light bulb icon appears in the WRD + WRMxx Configuration;

<sup>4</sup> - in WRD + Leonardo OFF-GRID Configuration;

## 11. WARRANTY

Western CO. Srl guarantees the good quality and good design of its own Products obliging itself, during the warranty period of 5 (five) years, to repair or replace at its sole discretion, for free, those defective parts owing to poor quality of material or defect in workmanship.

The defective product must be returned to Western Co. Srl or to the company delegated by Western Co to make product support, at customer's expenses, together with a copy of the invoice both for repairing and warranty replacement. The costs of re-installation of the equipment will be borne by the customer.

Western CO. Srl will bear the transport expenses of the repaired or replaced product.

The warranty does not cover Products that, according to our discretion, are defective due to natural wear, showing damages caused by incompetence or negligence of the customer, imperfect installation, by tampering or other interventions different by the instructions supplied by us.

The warranty is not valid also in case of damages coming from:

- transport and/or incorrect storage of the product.
- force majeure or catastrophic events (frost, fire, floods, lightning, vandalism, etc.).

All of the above mentioned guarantees are the sole and exclusive agreement which supersedes any proposal or agreement, oral or written, and any other communication made between the manufacturer and the purchaser in respect of the above.

For any dispute the jurisdiction is Ascoli Piceno.

## 12. WASTE DISPOSAL

Western CO. as manufacturer of the electrical device herein described and in accordance with DL 07/25/2005 n 151, informs the consumer that this product, once abandoned, must be delivered to an authorized collection centre or, in case of purchase of an equivalent equipment, it can be returned free of charge to the distributor of the new equipment. The penalties will be applied by individual Municipalities.



**Western CO. Srl**  
Via Pasubio, 1  
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ph: (+39) 0735 751248 fax: (+39) 0735 751254  
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web: [www.western.it](http://www.western.it)

***Appendice***

**IT**

***Appendix***

**EN**

***Annexe***

**FR**

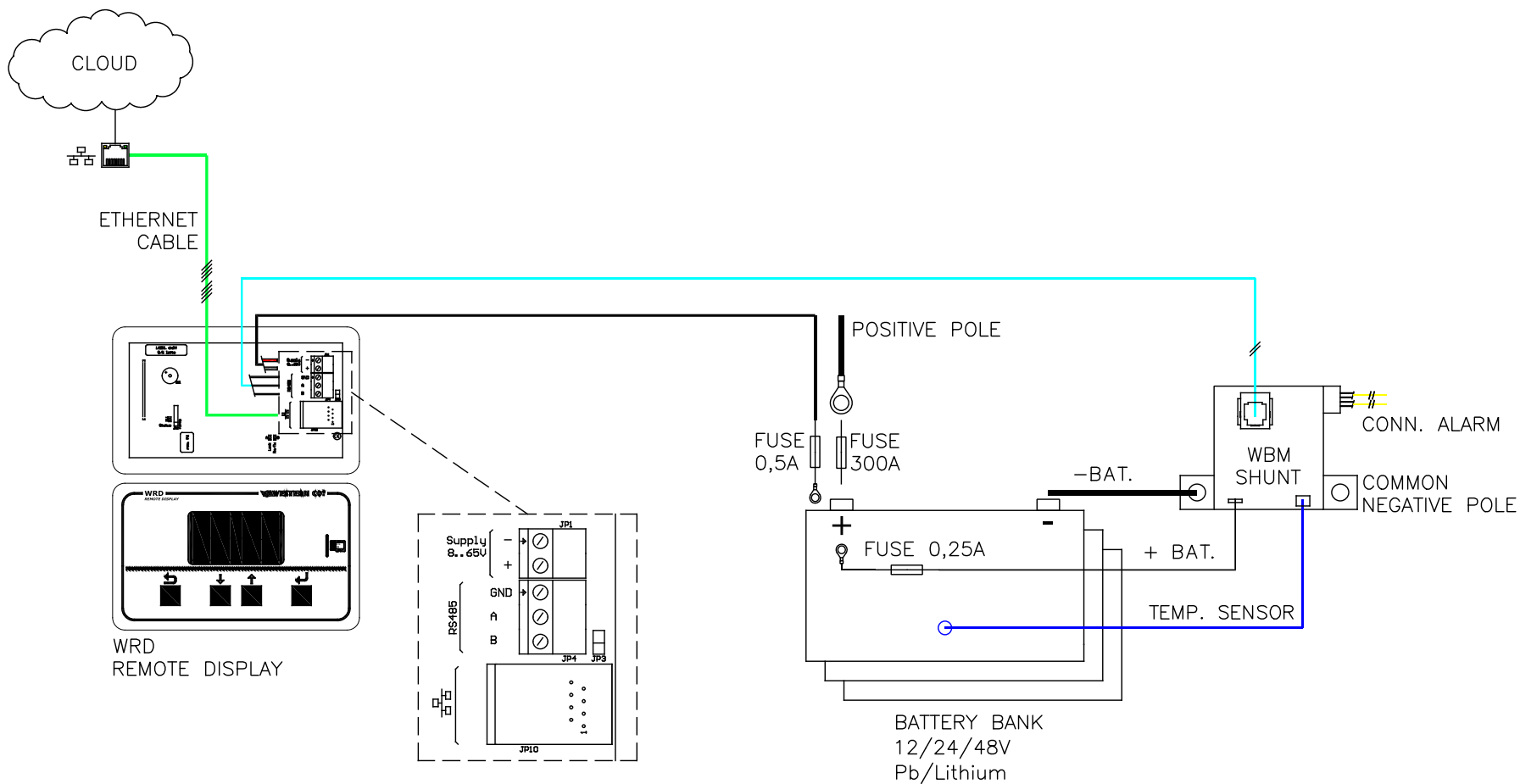
***Apéndice***

**ES**

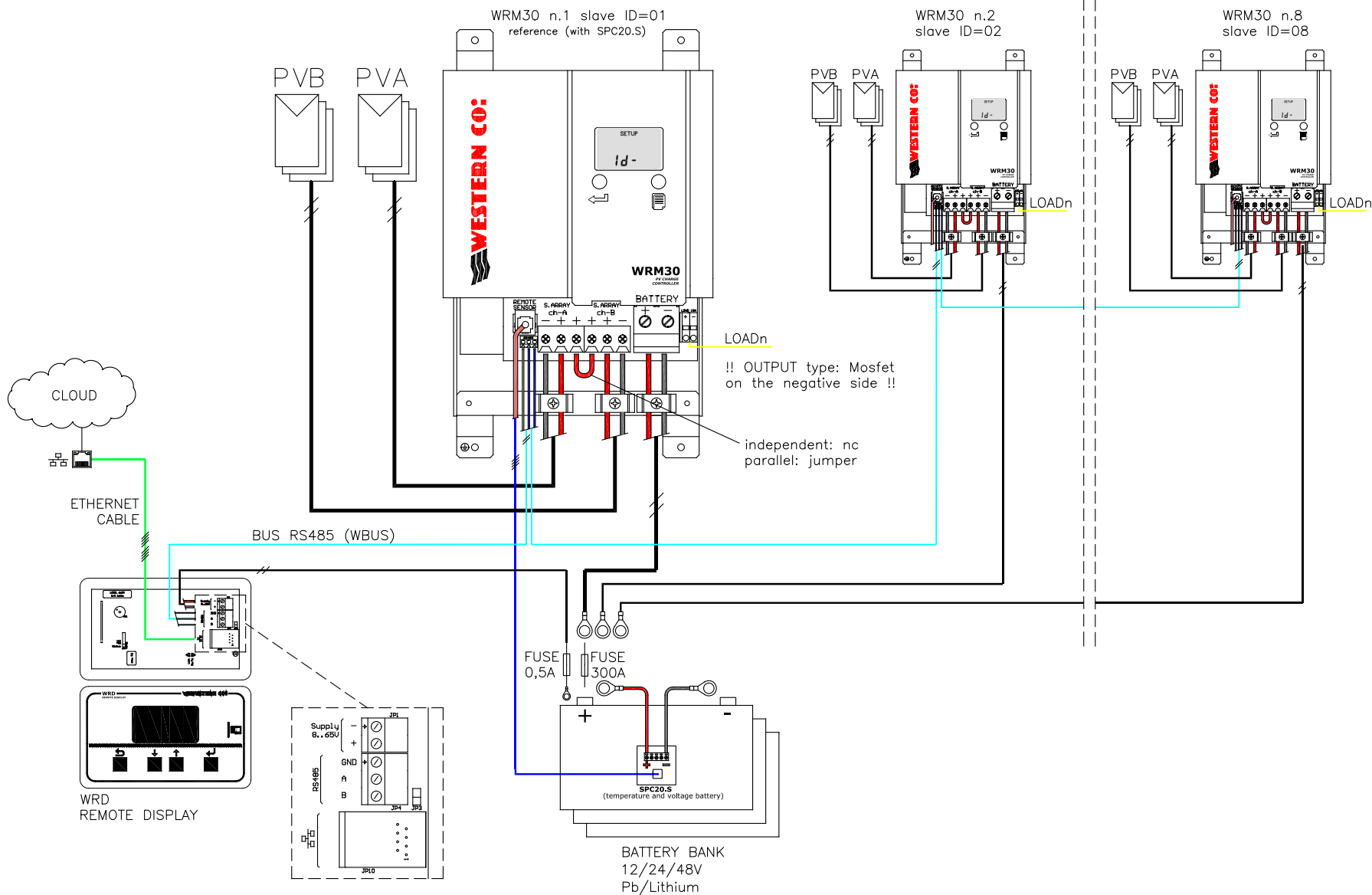
***Anhang***

**DE**

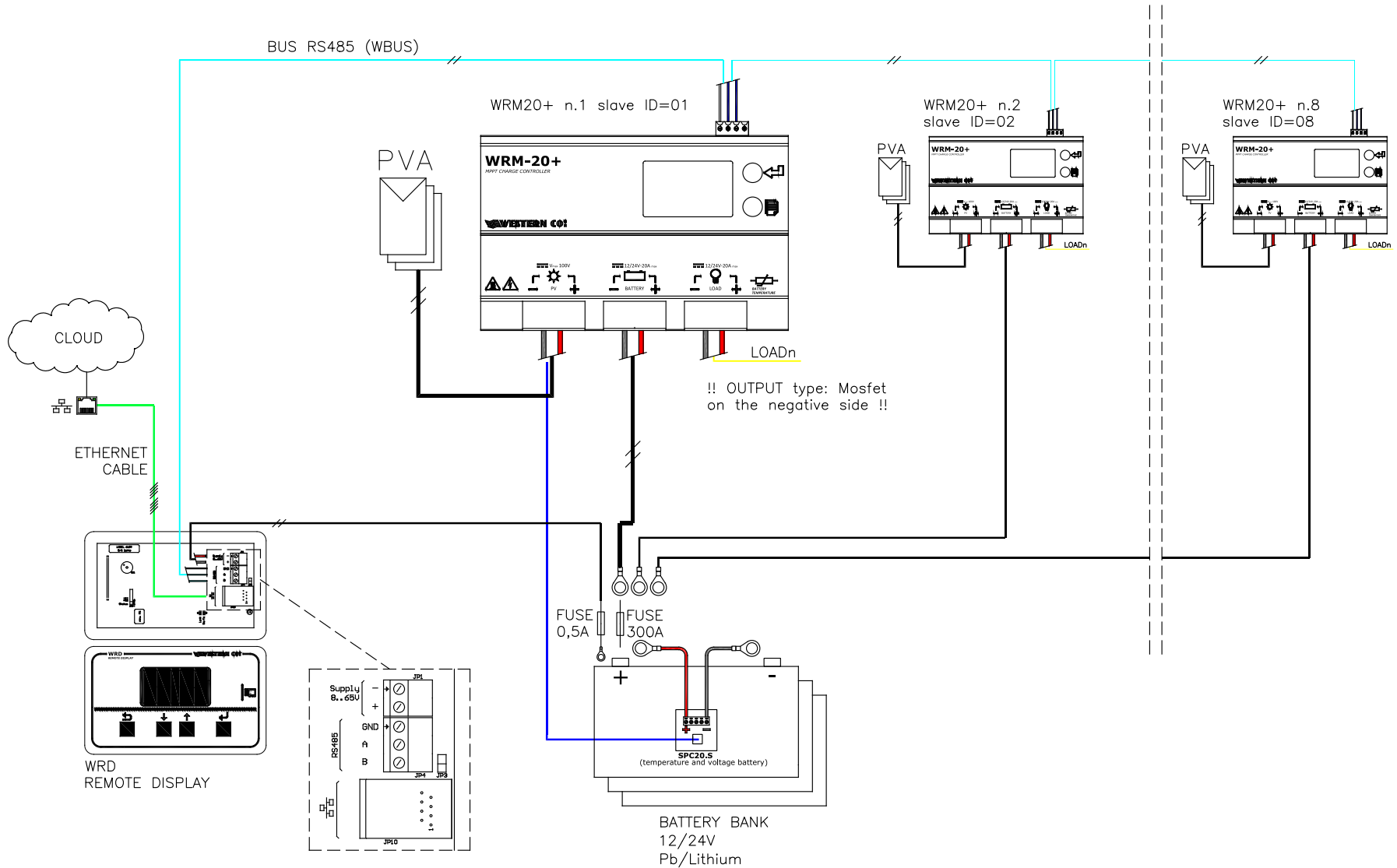
CONFIGURATION WITH WRD + WBM 12/24/48V



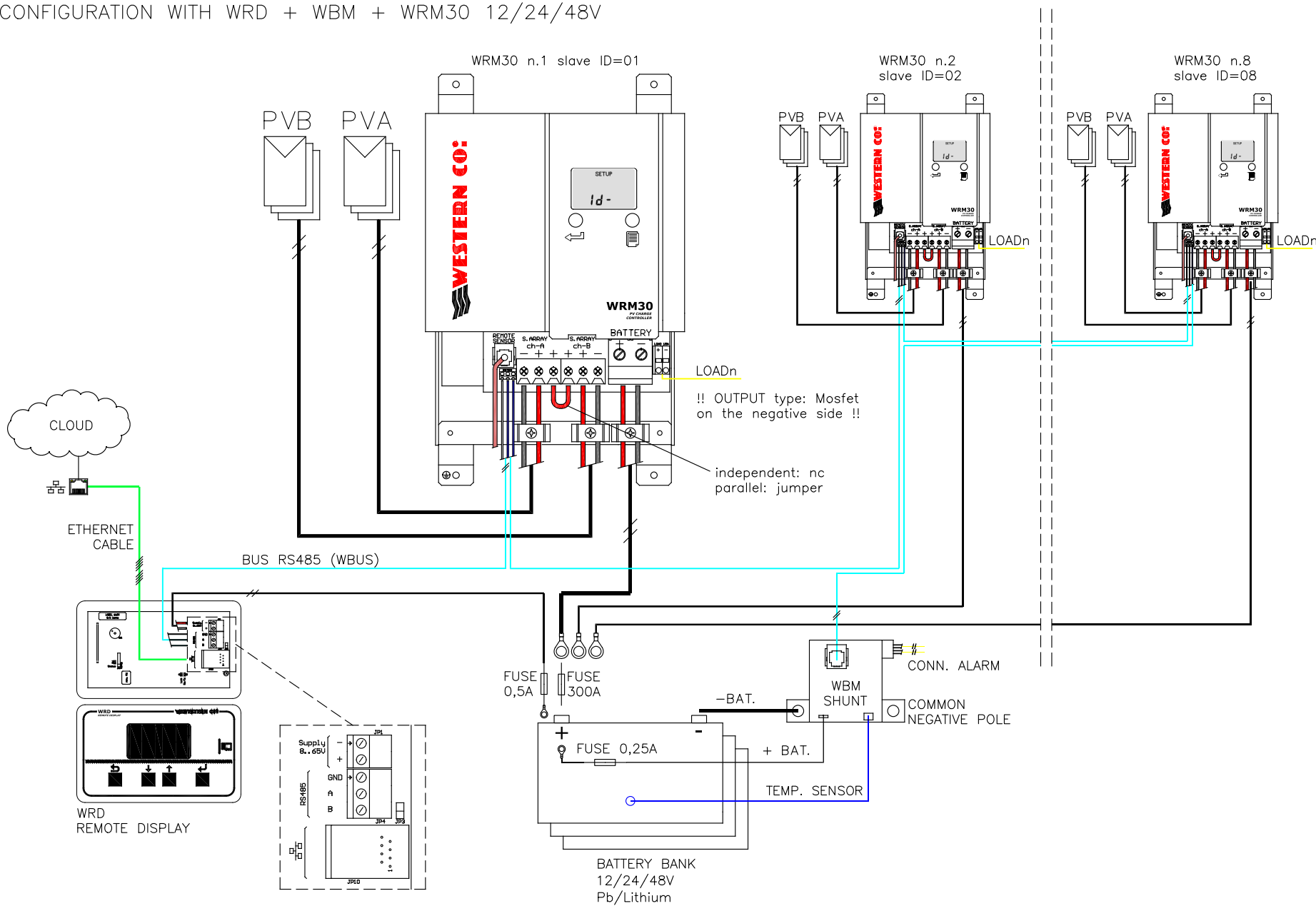
CONFIGURATION WITH WRD + WRM30 12/24/48V



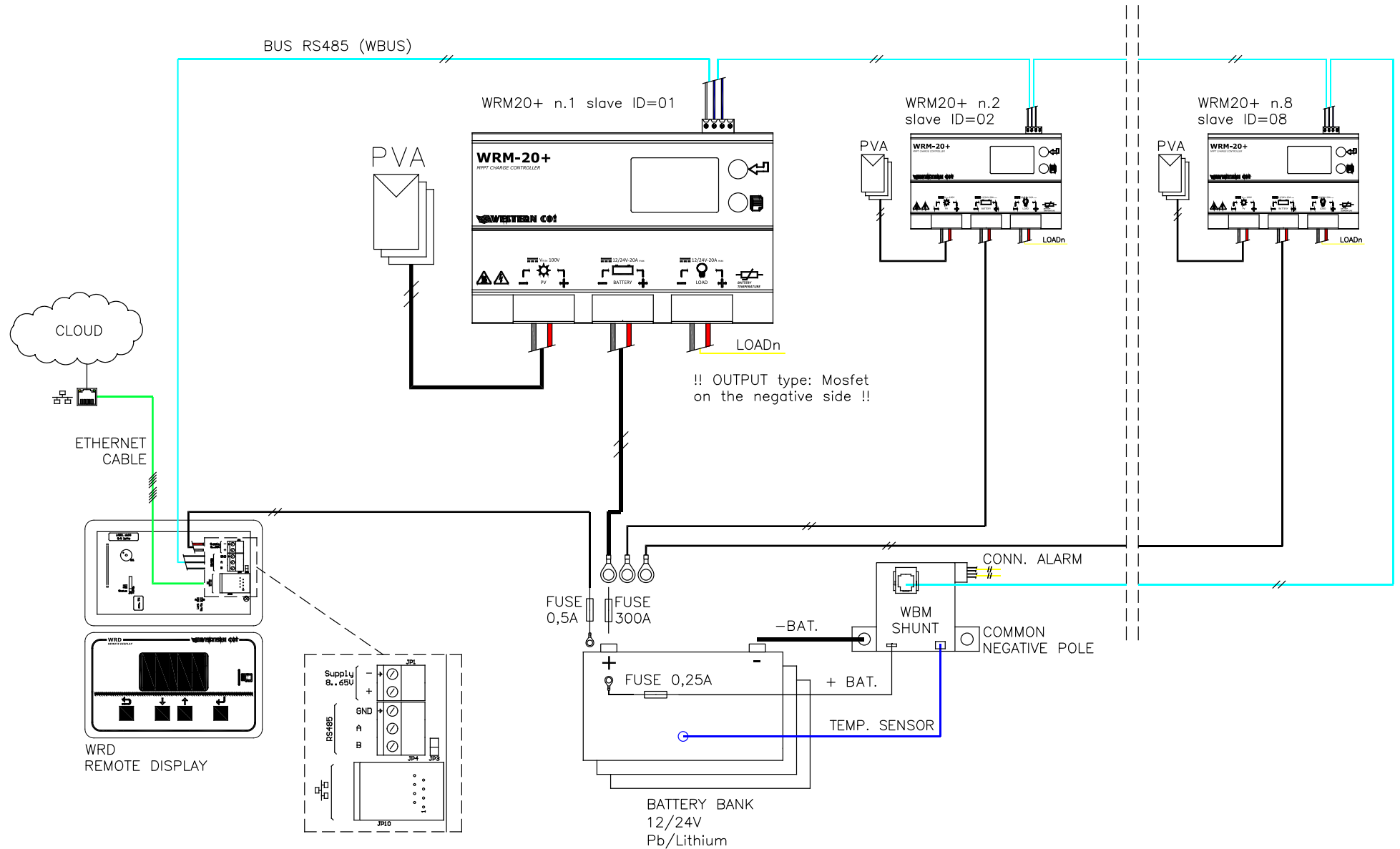
CONFIGURATION WITH WRD + WRM20+ 12/24V



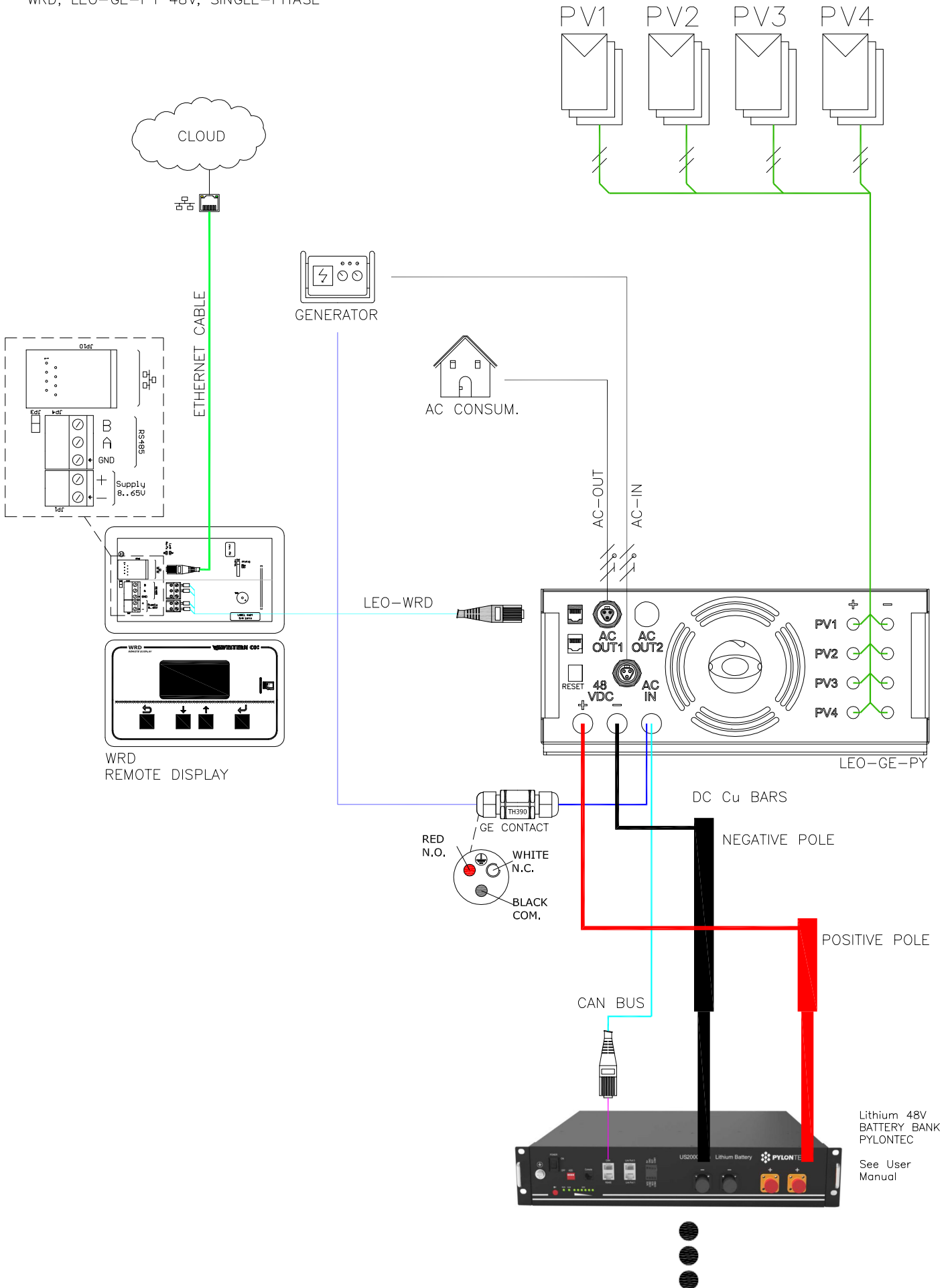
CONFIGURATION WITH WRD + WBM + WRM30 12/24/48V



CONFIGURATION WITH WRD + WBM + WRM20+ 12/24V

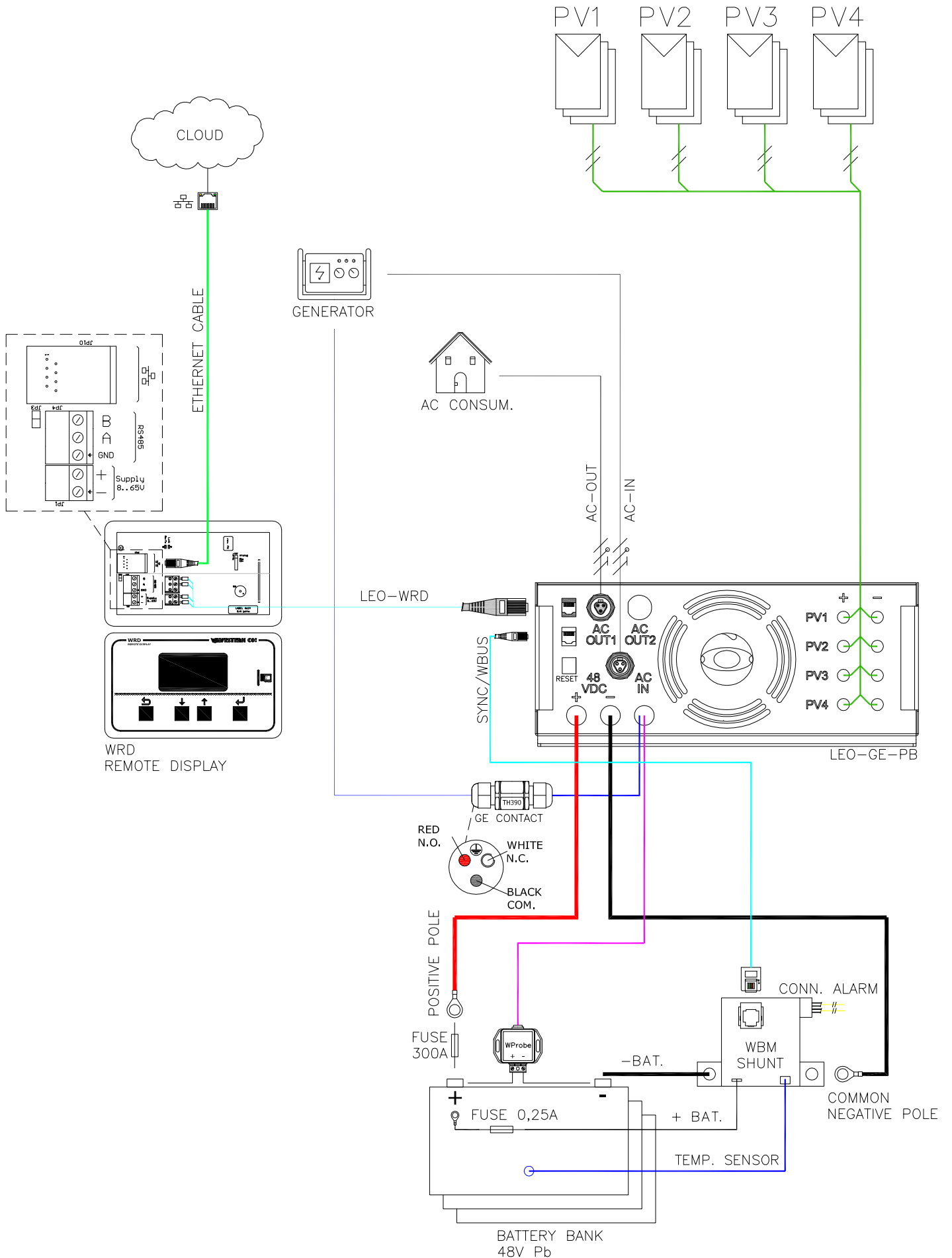


WRD, LEO-GE-PY 48V, SINGLE-PHASE



Lithium 48V  
BATTERY BANK  
PYLONTEC  
See User  
Manual

WRD, LEO-GE-PB 48V, WBM SHUNT



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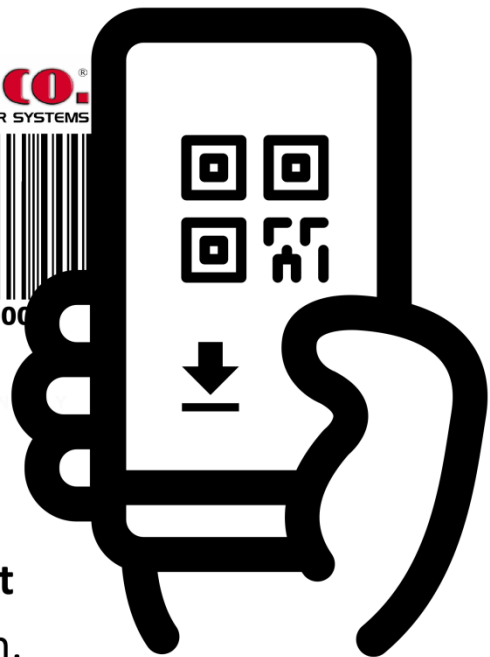
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**WESTERN CO.**  
ELECTRONIC EQUIPMENTS - SOLAR SYSTEMS

Product Name  
P/N XXXXXXX  
S/N: XXXXXXXXX  
Input: 12/24/48 VDC  
CE



Scan the **QR CODE** placed on the side of the product or visit **[www.western.it](http://www.western.it)** to download the latest manual version.