A typical PV system contains:
1. PV Generator / PV Module: Convert solar energy into electric power.
2. DC Switchboard: Link between PV panels and PV inverter, include DC switch and surge protection.
3. Inverter’s DC Switch: PV inverter with DC switch(On/Off).
4. PV Inverter: Converts DC power by PV panels to AC output power for public grid.
5. AC Switchboard: Links between PV inverter and public grid.

**Choosing Proper Installation Site**
Avoid exposing the inverter in direct sunlight or to rain. Mount the inverter in vertical direction; tilt or horizontal mounting should be avoided.

**Keeping Clearance**
To retain the good cooling condition, keep each of unit over 20cm left and right, 30cm upper and down and ensure no any object is put around the units to affect the cooling.

**Diagram Dimensions**

**Assembling Bracket**
Before fixing on wall, assemble the bracket as below. (Use M4 flat screws × 4 item (of accessory kit)

**Mounting Bracket**
1. Place the assembled bracket on where the inverter will be installed. Make proper drill holes and mount the assembled bracket with screws from accessory kit.
2. For safe and firm mounting, make at least 3 drill holes in a triangular manner as demonstrated on right.
3. Use E-item to install mounting bracket on wall.

**Checking**
1. All supporting points are firm
2. Lock caps are tightened with screws
3. Inverter is well installed and secured on wall

**Warranty Information**

- Warranty or liability will be void if damage caused by, but not limited to the following:
  - Unauthorized opening of unit
  - Installation faults such as improper environment, wiring and applications
  - Working conditions beyond specified
  - Improper operation of unit
  - Violation of safety instructions in this manual
  - Damage during transportation
  - Any internal modifications
  - Replacing or installation of unauthorized software
  - Unforeseen calamity or force majeure

**Recycle**
Do not throw this electronic device in a trash dumpster when being disposed of.

**Dimensions**

- 413mm
- 196mm
- 95mm

**Wire Connections**

<table>
<thead>
<tr>
<th>Description</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Input</td>
<td><img src="image1" alt="Power Input" /></td>
</tr>
<tr>
<td>Power Output</td>
<td><img src="image2" alt="Power Output" /></td>
</tr>
<tr>
<td>PV Inverter</td>
<td><img src="image3" alt="PV Inverter" /></td>
</tr>
<tr>
<td>DC Switch</td>
<td><img src="image4" alt="DC Switch" /></td>
</tr>
<tr>
<td>AC Switch</td>
<td><img src="image5" alt="AC Switch" /></td>
</tr>
<tr>
<td>AC-Inverter</td>
<td><img src="image6" alt="AC-Inverter" /></td>
</tr>
<tr>
<td>DC-Output</td>
<td><img src="image7" alt="DC-Output" /></td>
</tr>
<tr>
<td>Ground</td>
<td><img src="image8" alt="Ground" /></td>
</tr>
<tr>
<td>Neutral</td>
<td><img src="image9" alt="Neutral" /></td>
</tr>
</tbody>
</table>

**Note on Cable Selection**
It is recommended to use solid cables to ensure steadfastness of cables on terminal block. If stranded wires are used, apply corresponding materials enclosed in accessory kit for all cables.

**RS485 & RS45 Connections**
1. Remove sealing plug and twist off the cable gland (MODS)
2. Insert wires from rear of guidance and holes of rubber sealing (MODS)
3. Connect RS45 and RS45B wires as shown below
4. Make sure that RI45 cable is around two turns the gray EM core
5. Tighten cable gland to secure cables firmly in position

**DC (PV) Wiring**

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. DC (V)</td>
<td>1100</td>
</tr>
<tr>
<td>Max. Current (A)</td>
<td>10/90AC. 45V Total</td>
</tr>
<tr>
<td>Tinning</td>
<td>2</td>
</tr>
</tbody>
</table>

2. Use either connector a. Wedland P5745C (Preferred) b. Multi-Contact MC4 3. Connect to PV, After all the associated cables and connectors have been prepared
4. Remove sealing plugs as depicted on right
5. Plug in PV cables gently as depicted below

**AC (Grid) Wiring**

1. AC cord configured with M32 cable gland, containing waterproof rubber plug three holes for cable diameter of 7mm × 10mm, diameter is recommended to 3.5/5.5/8/14mm² of wire. The following factors should be taken into account when it comes to actual wiring. Ambient temperature, Wiring nearby, Cooling
2. Recommended to use left M32 cable gland for 1.5/2.5/3 wires and use right cable gland for neutral(NE)/ground(FE) wires.
3. Twist off the cable gland and remove rubber waterproof plug. Remove the required number of sealing plug for AC wires.
4. Use the cable with appropriate wire diameter through the rubber waterproof plug. Then insert the rubber waterproof plug into the cable gland.
5. Remove an appropriate length of the jacket and insulation layer from cable and strip the wires with terminal.
6. Use a screwdriver to fix 1.5/2.5/3, N/Neutral and ground(FE) wires on the AC terminal block from left to right side
7. Tighten cable gland firmly to be wires and achieve waterproof effect

**Note**
- Be sure to use the proper-sized plugs that you put in order to achieve the waterproof section.
- Be sure to switch OFF PV before hand.

**Diagram**

- [Diagram Image](image10)
- [Diagram Image](image11)
- [Diagram Image](image12)
- [Diagram Image](image13)
- [Diagram Image](image14)
**Operation**

**ES Series**

- **LCD display**
  - ES Series offers basic logger functionalities with simple and necessary on-screen information form.

- **Check for insulation of solar panels failed**
  - **Router**.
  - **W.°C 1602**

- **Network and Internet (ES Series)**
  - **Accessing Inverter via LAN (Local Area Network)**
  - **Computer via LAN**
  - **Com imposing via Ethernet**

- **WLAN**
  - **Address** totally **Off**

- **Error Message Display**
  - When inverter encounters an error, LCM screen enter error mode and an error message will be displayed on LCM screen continuously. The maximum is 5 in ES.
  - For more detail content please refer to the “error message” chapter.

- **Installing and Trouble shooting**
  - **Network**
  - **Input Protection Class**
  - **Humidity**
  - **Grid Voltage**
  - **WLAN**
  - **Network**
  - **Error Message Display**

- **History Error Message Record**
  - **Network and Internet (ES Series)**
  - **Accessing Inverter via LAN (Local Area Network)**

- **Operation Chart**
  - When inverter has connected to electrical grid and started generating power, the LCM screen enters regular mode. The LCD display flow chart sequence of on-screen information is as the frames below.

- **Status LED**
  - The LED on the inverter side will change its operation status according to different colors.

- **Error Message**
  - The inverter error that has occurred most recently is generally recorded by the history error.

**Specifications**

- **Input**
  - **Recommended Maximum Power**
  - **MPPT Working Range**
  - **Maximum DC Output Power**
  - **Maximum DC Current**
  - **Maximum Power**
  - **Nominal Voltage**
  - **Nominal Frequency**
  - **Power Factor**
  - **Maximum Current**
  - **Minimum Over Current Protection**

- **Output**
  - **Rated Voltage**
  - **Rated Current**
  - **Phase Voltage**

- **Protection**
  - **Overvoltage Protection**
  - **Undervoltage Protection**
  - **Overcurrent Protection**
  - **Over temperature Protection**

- **Warning**
  - **Internal Fault**
  - **Grid Voltage Below Range**
  - **Grid Voltage Above Range**

- **Anti-Isolation**
  - **Connections**
  - **Protection Class**
  - **Humidity**

- **Voltage**
  - **Rated Voltage**
  - **Nominal Voltage**

- **Temperature**
  - **Nominal Operating Temperature**
  - **Nominal Working Temperature**

- **General**
  - **Description**
  - **Input Protection Class**
  - **Humidity**

**Troubleshooting**

- **In cases where an inverter detects a problem**
  - **1. Connect TRI~ and TRI~ of RS485 converter to the TRI+ and TRI- of the data logger**
  - **2. Between two data loggers, match TRI~ and TRI~ of this inverter to TRI+ and TRI- of the new inverter**
  - **3. Set terminal resistor switch “ON” of the terminal end inverter (last data logger of the row) only. The others should be set as “OFF”**
  - **4. Connect data logger and router of RS45 Cable.**

- **Connecting “BUS”**
  - **Between two data loggers**
  - **Trouble**
  - **Check inverter’s ambient temperature**
  - **Wait for stronger sunlight**
  - **Check PV voltages**
  - **Check the error message and take care of it**

- **Key**
  - **Button**
  - **LED Light**
  - **Operation Switch**

- **Notes**
  - **Subject to change without prior notice.**

---

**Specific Instructions**

1. Connect TRI+ and TRI- of the RS485 converter to TRI+/TRI- of the data logger.
2. Between two data loggers, match TRI+ and TRI- of this inverter to TRI+/TRI- of the new inverter.
3. Set the terminal resistor switch “ON” of the terminal-end inverter (last data logger of the row) only. The others should be set as “OFF.”

**Error Message**

- **AC Voltage High**
  - **Grid Voltage Range**
  - **Measured Voltage Displayed**
  - **Grid Voltage Lower Range**
  - **Measured Voltage Displayed**
  - **Grid Voltage Upper Range**
  - **Measured Voltage Displayed**
  - **Grid Frequency Range**
  - **Measured Frequency Displayed**
  - **AC Current Low**
  - **Measured Frequency Displayed**
  - **AC Current Normal**
  - **Measured Frequency Displayed**
  - **AC Current High**
  - **Measured Frequency Displayed**

**Specifications**

- **Input (AC)**
  - **Watt**
  - **Voltage Range**
  - **Rated Current**
  - **Maximum Power Factor**
  - **Maximum Current**
  - **Nominal Voltage**
  - **Nominal Frequency**
  - **Power Factor Correction**
  - **Minimum Over Current Protection**

- **Output (DC)**
  - **Rated Current**
  - **Rated Voltage**
  - **Rated Current**
  - **Rated Voltage**

- **Protection**
  - **Overvoltage Protection**
  - **Undervoltage Protection**
  - **Overcurrent Protection**

- **General**
  - **Description**
  - **Input Protection Class**
  - **Humidity**

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**Troubleshooting**

- **In cases where an inverter detects a problem**
  - **1. Connect TRI+ and TRI- of the RS485 converter to TRI+/TRI- of the data logger**
  - **2. Between two data loggers, match TRI+ and TRI- of this inverter to TRI+/TRI- of the new inverter**
  - **3. Set terminal resistor switch “ON” of the terminal end inverter (last data logger of the row) only. The others should be set as “OFF.”**
  - **4. Connect data logger and router of RS45 cable.**

**Connecting “BUS”**

- **Between two data loggers**
  - **Trouble**
  - **Check inverter’s ambient temperature**
  - **Wait for stronger sunlight**
  - **Check PV voltages**
  - **Check the error message and take care of it**

**Key**

1. **Button**
2. **LED Light**
3. **Operation Switch**

**Notes**

- **Subject to change without prior notice.**