# solaredge

# SolarEdge Built-in Revenue Grade Meter Troubleshooting

# Contents

| | |
|---|---|
| ⚠ | **CAUTION!** |
| | For full installation and safety details, refer to the *SolarEdge Installation Guide*. Make sure you read, fully understand and follow the detailed instructions in it prior to each installation. **Failure to do so may result in injury or loss of life and damage to the equipment**. |

# Troubleshooting Meter Connection

SolarEdge revenue grade inverters have a built in Revenue Grade Meter (RGM). This section describes how to troubleshoot meter-related installation and performance errors.

## Communication Status Screen Troubleshooting

The meter configuration is set automatically when activating the inverter using the activation card. The communication status screen should display the following:

```
             Dev Prot ##
RS485-1<MTR><WN><  1>
RS485-2<--><-->>--><-->
 ZigBee <--><-->>--><-->
```

### Device Type and Protocol are configured incorrectly

If **MTR** (meter) is not displayed as the device type (DEV), and **WN** (WattNode) is not displayed as the Prot (protocol), the inverter preconfiguration has been overriden. This may be a result of inverter activation or communication board replacement without backing-up and reloading the parameters.

Configure the meter as follows:

1. Select **Communication ➔ RS485-1 Conf ➔ Device Type ➔ Revenue Meter.**

2. Select **Communication ➔ RS485-1 Conf ➔ Protocol ➔ WattNode.**

3. Select **Revenue Meter ➔ Meter Func. ➔ Production**.

4. Check that the Device ID under **Communication ➔ RS485-1 Conf ➔ Device ID** is set to 1.

### Number of devices is not displayed

If **<-->** is displayed under the ## column in the Communication status screen shown above, the meter is not communicating with the inverter. Check the following:

- The meter configuration is as described above.
- There are no loose connections at the inverter connectors and at the meter, specifically the RS485 wiring.
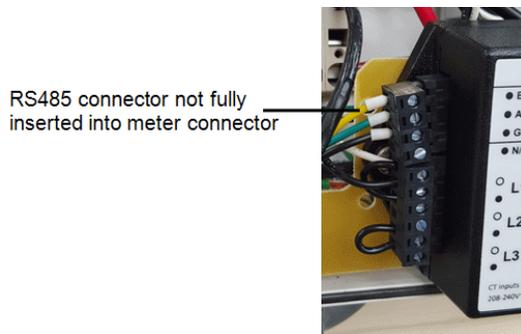


**Figure 1: Example of a loose meter connector**

- The wiring between the black 4-pin terminal block on the meter and the RS485 terminal block on the communication board is correct, as shown below.
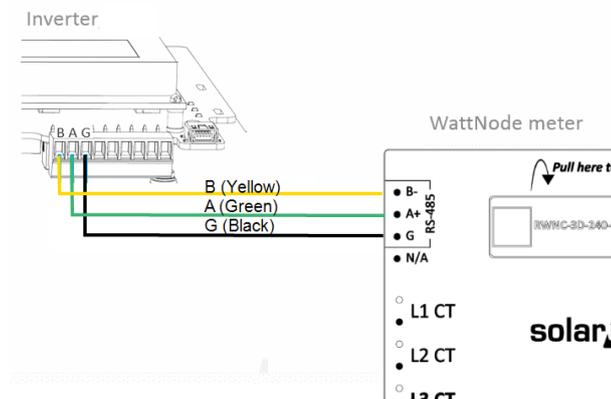


**Figure 2: RS485 connection**

- Check for water damage or sealing problems:
  - Inspect the entire conduit run for possible points of water penetration, and fix leaks.
  - Ensure that proper outdoor rated components are used.
  - In case of damaged equipment, replace either the meter or the Safety Switch, as described in the next sections.
- Use a Voltmeter to measure the voltage on the meter 10-pin terminal block . The L1 – L2 line to line voltage should be 240 Vac ± 10%.

# Meter Status Screen Troubleshooting

```
Revenue Grade Meter
Status: <OK>
<Error Message>
Total[Wh]:XXXXXX
```

## <OK> is not displayed

If **<OK>** is not displayed in the Status line of the status screen shown above, the meter is not communicating with the inverter communication board. Check the following:

- There are no loose connections at the inverter communication board and at the meter.
- The wiring between the black 4-pin terminal block on the meter and the RS485 terminal block on the communication board is correct (See Figure 2).
- Check for water damage or sealing problems:
  - Inspect the entire conduit run for possible points of water penetration, and fix leaks.
  - Ensure that proper outdoor rated components are used.
  - In case of damaged equipment, replace either the meter or the Safety Switch, as described in the next sections.

## An error message is displayed

- If **Comm. Error** is displayed, verify proper connection of:
  - The RS485 cables and connectors
  - The AC connection of the meter
- If a different error message is displayed in the RGM status screen, contact SolarEdge support (support@solaredge.com).

## Total [Wh] value is not advancing

If the Total [Wh] value displays a steady value although the inverter is producing power, check the following:

- There are no loose connections at the inverter connectors and at the meter, specifically the AC wiring on the meter 10-pin connector.
- The CT black and white cables are correctly connected to the 6-pin connector on the meter:
  - White CT wire is connected to L1 CT
  - Black CT wire is connected to L1 CT
- The L1 cable passes through the CT in the correct direction (right to left), according to the arrow on the inside of the CT.



**Figure 3: Meter Connections**
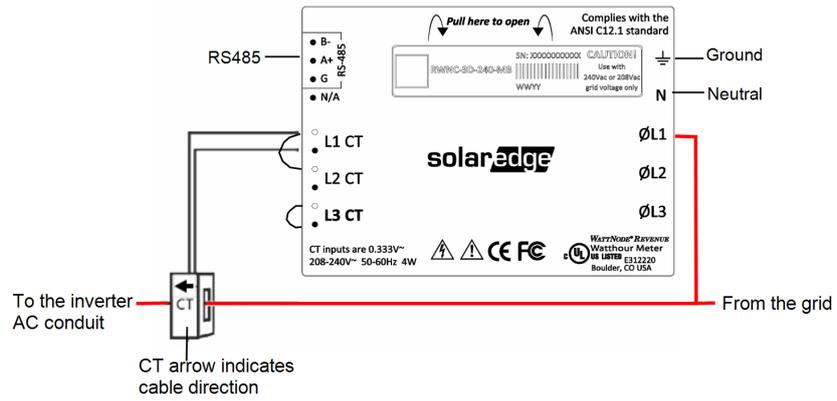
**Figure 4: Meter Connection diagram**

- Check for water damage or sealing problems:
    - Inspect the entire conduit run for possible points of water penetration, and fix leaks.
    - Ensure that proper outdoor rated components are used.
    - In case of damaged equipment, replace either the meter or the Safety Switch, as described in the next sections.

# Replacing the Built-in Meter

This section describes how to replace the meter in the Safety Switch, and how to configure the connection.

## Replacing the Meter

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

> ⚠ **WARNING!**
>
> If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.
>
> *Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.*

2. Turn OFF the Safety Switch and the AC switch of the distribution panel.

3. Open the Safety Switch cover.

4. Carefully disconnect the three terminal blocks from the meter:
   - Green AC 10-pin connector from the right side
   - Black RS485 4-pin connector and black CT 6-pin connector from the left side

5. Release the two screws connecting the meter to the pivoting plate, and put them aside.

6. Install a new meter on the pivoting plate and fasten the screws that were set aside.

7. Connect the terminal blocks to the new meter. Push firmly and verify they cannot be easily disconnected.

## Wiring the Meter

If required (for example, if you disconnected the meter wiring) use the following procedure to rewire the meter connections.

Refer to *Figure 5*.
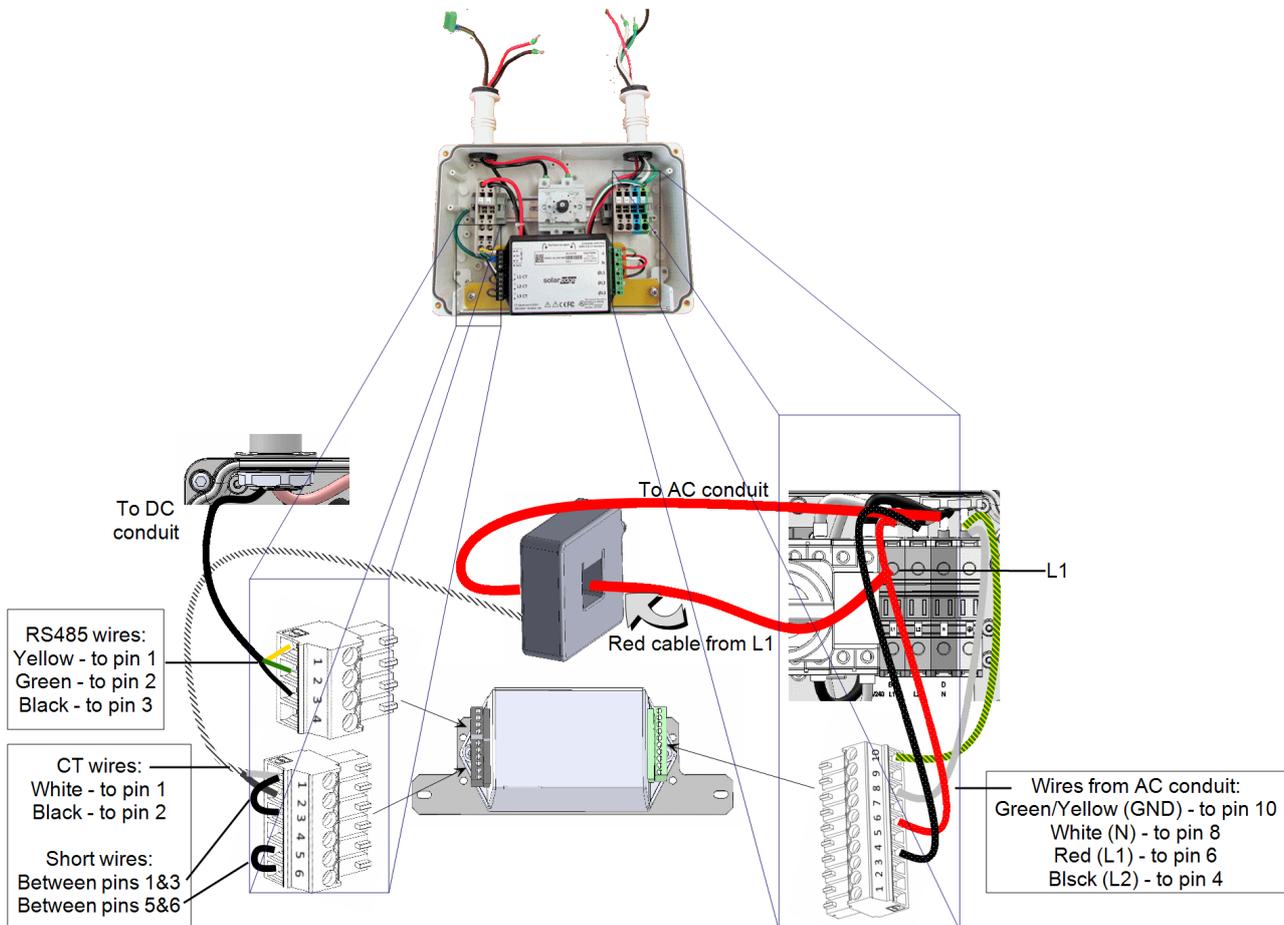


**Figure 5: RGM connections**

#### To connect the meter to AC:

1. Remove the green 10-pin terminal block from the right side of the meter.

2. Insert the thin cables from the AC side of the Safety Switch to the terminal block, as described below:

| Color | From | To pin # |
|---|---|---|
| Green/Yellow | GND | 10 |
| White | N | 8 |
| Red | L1 | 6 |
| Black | L2 | 4 |

3. Fasten the terminal block screws. Apply torque of 4.4 Lb*in (0.5 N*m).

4. Connect the terminal block to the to the meter. Push it firmly and verify that it cannot be easily disconnected.
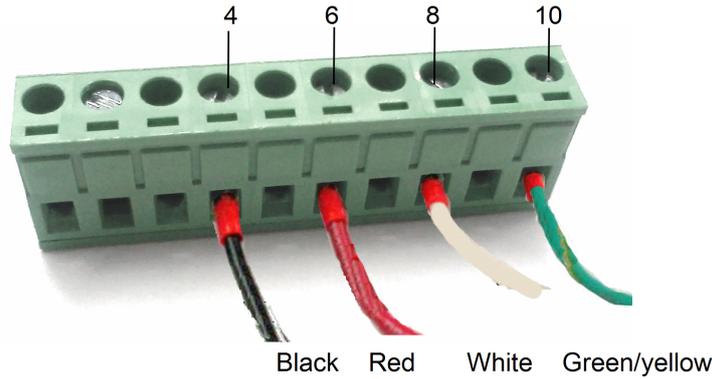


**Figure 6: 10-pin connections**

#### To connect the Current Transformer (CT):

1. Remove the black 6-pin terminal block from the left side of the meter.

2. Insert the cables to the terminal block, as described below:

| Color and type | From | To pin # |
|---|---|---|
| White CT wire | CT | 1 (L1 CT) |
| Black CT wire | CT | 2 (L2 CT) |
| Black short cable | Terminal block Pin #1 | 3 |
| Black short cable | Terminal block Pin #5 | 6 |

3. Fasten the terminal block screws. Apply torque of 0.5 N*m (4.4 Lb*in).
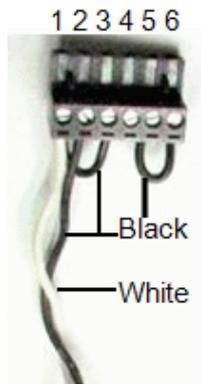


**Figure 7: CT connections**

4. Connect the terminal block to the meter. Push it firmly and verify that it cannot be easily disconnected.

5. If disconnected, insert the red thick cable from the L1 terminal on the AC side of the Safety Switch through the CT from right to left, and through the AC conduit towards the inverter. The direction is indicated by the arrow on the CT.

> **NOTE**
>
> Make sure that the only cable passing through the CT is the one from the L1 AC terminal block. Other cables passing through the CT may cause incorrect meter readings.
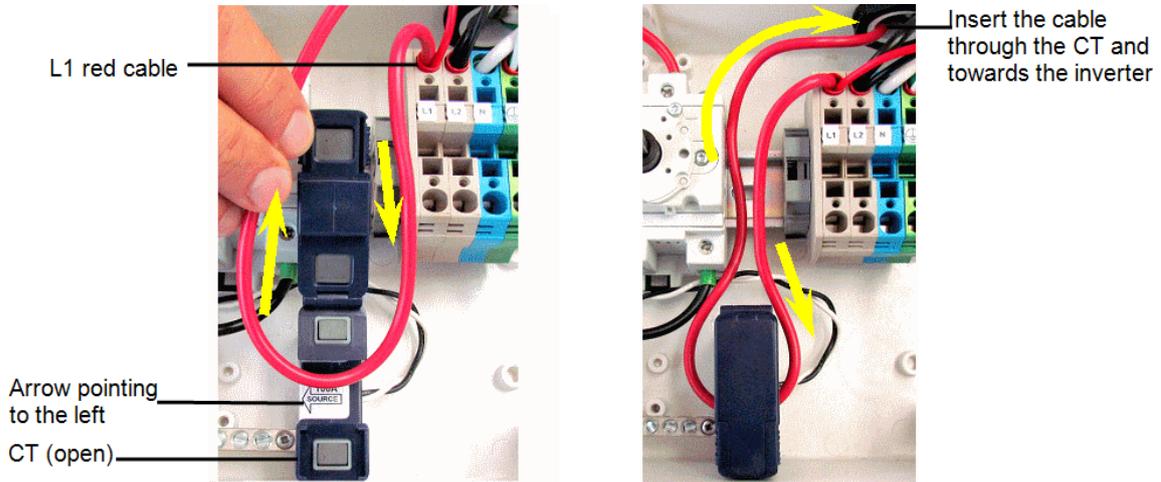


**Figure 8: Wiring the L1 cable through the CT**

### ► To connect an RS485 communication cable:

1. Remove the black 4-pin terminal block from the left side of the meter.

2. Insert the cable wires to the terminal block, as described below:

| Color and type | To pin # |
|----------------|----------|
| Yellow (B-) | 1 |
| Green (A+) | 2 |
| Black (G) | 3 |
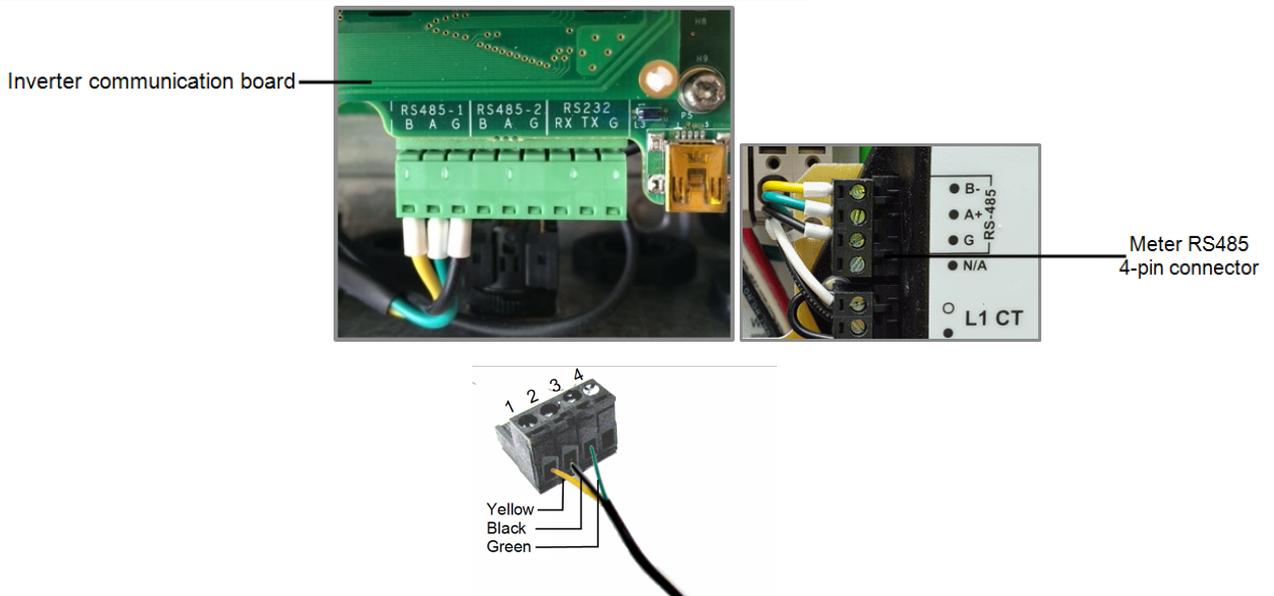


**Figure 9: RS485 connection**

3. Fasten the terminal block screws. Apply torque of 4.4 Lb*in (0.5 N*m).

4. Connect the terminal block to the meter. Push it firmly and verify that it cannot be easily disconnected.

5. Connect the other end of the cable to the SolarEdge inverter as detailed in *Connecting a Built-in Revenue Grade Meter* on page 12.

6. Close the Safety Switch cover.

7. When the inverter is ON and operating, check the following:

- In the Meter status screen:

  ○ <S_OK> is displayed

  ○ The Total [Wh] value is advancing

  ○ There is no error messsage

```
Revenue Grade Meter
Status: <OK>
<Error Message>
Total[Wh]:XXXXXXX
```

- In the Communication status screen, the following configuration is displayed:

```
          Dev Prot ##
RS485-1<MTR><WN>< 1>
RS485-2<---><--><-->
 ZigBee <---><--><-->
```

# Replacing the Safety Switch

## Removing the Safety Switch

1. Turn OFF the inverter ON/OFF switch, and wait until the LCD indicates that the DC voltage is safe (<50V), or wait five minutes before continuing to the next step.

> ⚠️ **WARNING!**
>
> If you cannot see the inverter panel, or if a malfunction is indicated on the LCD panel, wait five minutes for the input capacitors of the inverter to discharge.
>
> *Si vous ne pouvez pas voir l'écran de l'onduleur ou si un dysfonctionnement est indiqué sur l'écran LCD, attendez cinq minutes pour que les condensateurs d'entrée de l'onduleur soient déchargés.*

2. Turn OFF the Safety Switch and the AC switch of the distribution panel.

3. Open the inverter cover.

4. Disconnect the DC and AC wires from the inverter. If there are ferrite beads on the DC and AC wires in the inverter, open them and set aside.

5. Disconnect the RS485 connector from the inverter communication board.

6. Unscrew the two conduit nuts in the inverter securing the Safety Switch to the inverter.

7. Open the Safety Switch cover and disconnect the DC and AC wires. Unscrew the two conduit nuts securing the Safety Switch to the external conduits.

8. If the Safety Switch bracket is screwed to the wall, release it.

9. Carefully remove the Safety Switch with its mounting bracket and RGM communication cable from the wall.

## Installing a New Safety Switch

1. Open the conduit knockouts of the new Safety Switch (refer to *Opening Conduit Knockouts* on page 1).

2. Position the new Safety Switch below the inverter and from the inside of the inverter grab the AC and DC wires extending from the switch conduits, as shown below:
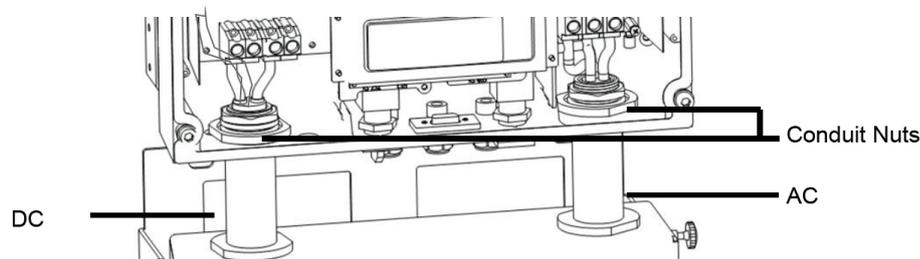


**Figure 10: Inserting the AC and DC conduits**

3. Attach the Safety Switch with its bracket to the wall and slightly close the screws. Do not over tighten.

4. Insert the RGM RS485 cable through the DC side conduit of the Safety Switch and connect to the inverter communication board.

5. Securely screw the two conduit nuts onto the conduit ends in the inverter. Verify proper conduit sealing.

## Connecting the Safety Switch to the Inverter

1. If ferrite beads were removed from the DC and AC wires, place them on the wires and close them. Make sure the DC labeled ferrite bead is placed on the DC wires and the AC labeled ferrite bead is placed on the AC wires.

2. Connect the DC, as follows:
   - Connect the red wire to any of the DC+ terminals in the inverter.
   - Connect the black wire to any of the DC- terminals in the inverter.
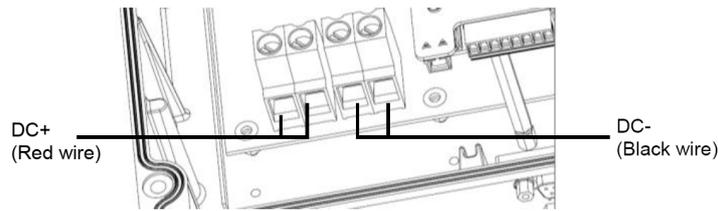
**Figure 11: Single phase 3-7.6kW inverter DC terminals**

DC+
(Red wire)

DC-
(Black wire)



DC+
(Red wire)

DC-
(Black wire)
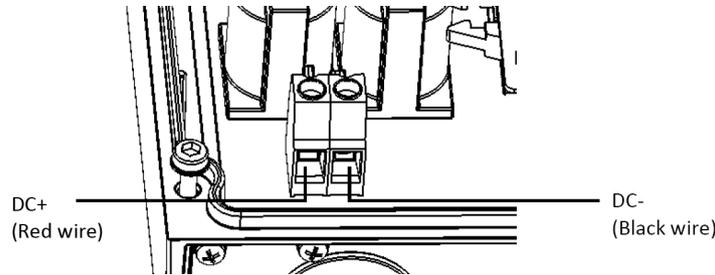
**Figure 12: Single phase 10-11.4 kW inverter DC terminals**

3. Connect the AC wires according to the labels on the AC terminal blocks, as follows:

| Single Phase Inverter | | |
|---|---|---|
| **Wire color** | **Connect to terminal** | |
| White | N |  |
| Green/yellow | Ground ⏚ | |
| Red | L1 | |
| Black | L2 | **Figure 13: Single phase inverter AC terminals** |

4. Tighten the screws of each terminal with a torque of 0.88-1.1 lb.*ft / 1.2-1.5 N*m.

5. Connect the RS485 connector from the RGM to the inverter communication board.

6. Verify that there are no unconnected wires at the output of the Safety Switch and that any unused terminal screws are tightened.

7. Connect the DC and AC wires to the Safety Switch.

8. Ensure proper conduit sealing; inspect the entire conduit run and use standard conduit sealants to avoid water penetration.

# Connecting a Built-in Revenue Grade Meter

1. Pull out the 9-pin RS485 terminal block connector located on the inverter communication board, as shown below:
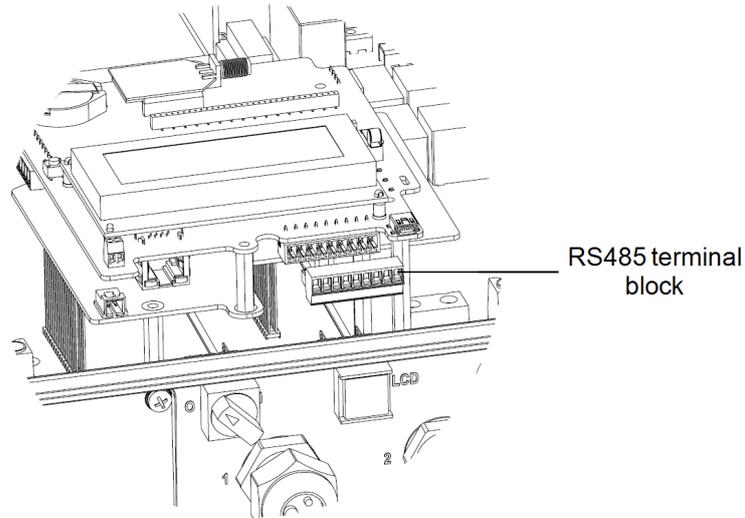


**Figure 16: The RS485 terminal block**

2. Loosen the screws of pins A and B of the RS485-1 port, as shown below:
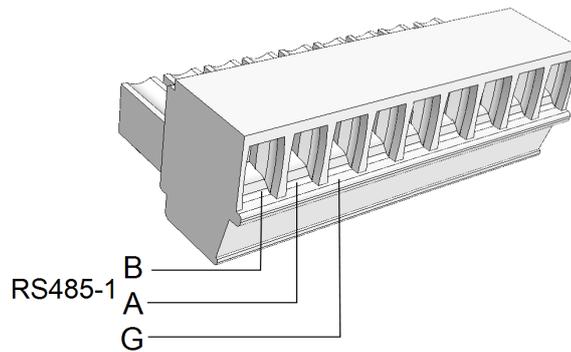


**Figure 17: RS485 terminal block**

3. Insert the wire ends from the meter into the pins shown above:

   - Connect the wire from RS485 A+ in the meter to pin A.
   - Connect the wire from RS485 B- in the meter to pin B.
   - Connect the wire from RS485 G in the meter to pin G.

4. Tighten the terminal block screws.

5. Push the RS485 terminal block firmly all the way into the communication board.