Application Note AN021

Hub 2 Meter (SEM3-WL) RS485 Wiring Guide

Connecting the Levelise Hub 2 to the Eastron SEM3-WL Hub 2 Meter using RS485 and positioning its CTs

Overview

An Eastron SEM3-WL meter must be used as the Hub 2 Meter instead of the Eastron SDM230-NMI-2 when connecting Hub 2 to the battery systems listed below.

The SEM3-WL is supplied with three current transformers (CTs) that measure the battery inverter, the grid connection and, where present, AC coupled solar PV generation. The SEM3-WL takes its voltage reference from a dedicated, protected single-phase supply.

This note explains how to supply the Hub 2 Meter, where to position the CTs and how to wire the Hub 2-Meter RS485 cable between the meter and Hub 2.

Important: Hub 2 and the Hub 2 Meter must be installed by a qualified electrician.

What You'll Need

- Hub 2 Meter (Eastron SEM3-WL) with three CTs
- Hub 2-Meter RS485 cable (included with Hub 2)
- Suitably-rated enclosure with 35 mm DIN rail
- Dedicated, suitably-rated protective device for the meter supply
- Small flat-blade hand screwdriver
- Wire cutters and strippers
- Bootlace ferrules (single and twin-entry) and ferrule crimp tool
- Multimeter or cable tester (Recommended)

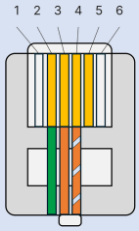
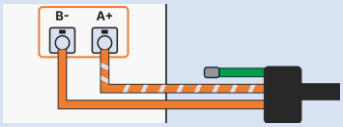
Compatible Models

- Levelise Hub 2 (LEV0002)
- Enphase IQ Battery 5P

Quick Summary for Experienced Users

If you're confident, supply the Hub 2 Meter from a dedicated protected single-phase supply, fit the CTs as shown below and connect the 'Meter' end of the Hub 2-Meter RS485 cable using the tables below. **Do not modify the RJ11 (Hub) end:**

RS485 connections

Wire	Hub End (RJ11 Connector – do not modify)	Hub 2 Meter End (Push-in Terminals)
		
Green (Ground)	**Pin 2**	**Not connected** – trim back and insulate
Orange (RS485 B)	**Pin 3**	**Terminal B-**
Orange & white (RS485 A)	**Pin 4**	**Terminal A+**
Any other cores	Unused by Hub	Do not connect

Voltage and CT connections

Terminal	Function	Connect to
L1	Voltage input 1 (CT1)	Line, via a dedicated protective device
L2	Voltage input 2 (CT2)	Line – linked to L1
L3	Voltage input 3 (CT3)	Line – linked to L1
N	Neutral	Neutral of the same supply
CT	CT harness socket (RJ12)	CT harness RJ12 plug (CT1, CT2 and CT3)

CT positions

CT	Fit around	Arrow points towards
CT1	Line conductor of the battery inverter's AC circuit	**The battery inverter**
CT2	Line conductor of the incoming supply (meter tail)	**The grid**
CT3 (if used)	Line conductor of the solar PV inverter's AC circuit	**The grid**

CT3 is only needed where solar PV is connected through its own inverter (AC-coupled). If there is no solar PV, or the solar PV is DC-coupled to the battery inverter, CT3 is not used.

Important: L1, L2 and L3 must all be connected to the same line as the circuits measured by the CTs. Each CT is measured against its matching voltage input (CT1–L1, CT2–L2, CT3–L3), so all three inputs must be supplied, even if CT3 is not used.

Important: Fit each CT around the line conductor only. A CT fitted around the neutral, or around a cable containing both line and neutral, will not measure correctly.

Important: The CT arrows must point as shown in the table above. A reversed CT gives readings of the wrong sign, and the Levelise app will report an issue with the meter.

Important: Never cut, modify or re-terminate the RJ12 end of the CT harness. If a CT lead must be extended, extend it only between the three-way splitter and that CT. No CT may exceed 30 m in total lead length.

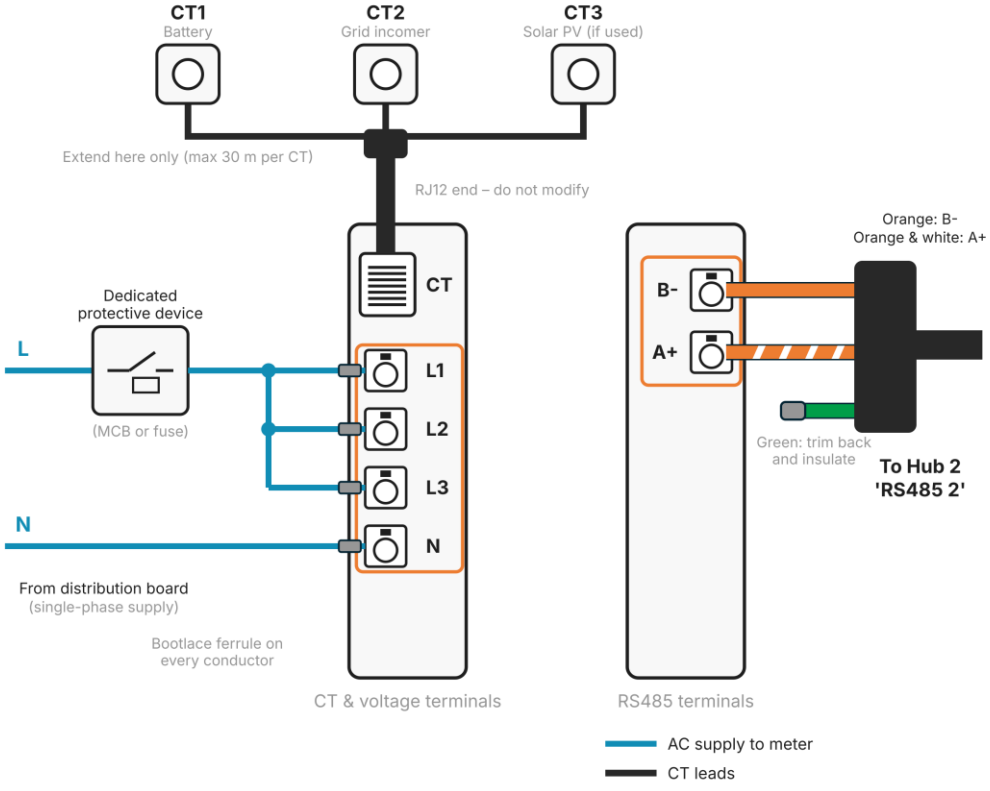
Important: The SEM3-WL has no RS485 ground terminal. The green (ground) wire is not used – trim it back and insulate it.

Important: Do not unwind the twisted orange and orange & white pair further than necessary, as this reduces its noise rejection and increases the likelihood of communication problems.

Otherwise, follow the detailed step-by-step instructions below.

Detailed Step-by-Step Guide

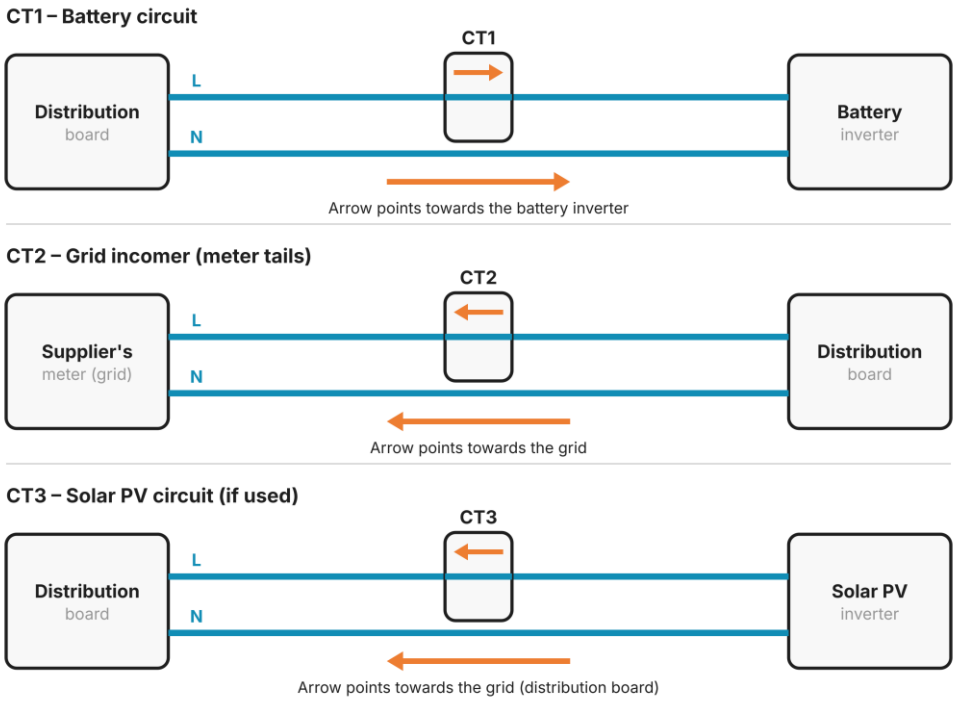
1. **Install and Supply the Hub 2 Meter**
   - Mount the Hub 2 Meter on a 35 mm DIN rail inside a suitably rated enclosure.
   - Provide a single-phase supply for the meter from a **dedicated, suitably rated protective device** (MCB or fuse) at the distribution board.
   - Prepare the supply conductors: strip each conductor to suit the ferrule used and crimp a correctly sized bootlace ferrule onto **every** conductor. Where two conductors share a terminal (for example, to link L1, L2 and L3 at the protective device), use a twin-entry ferrule.
   - Connect the ferruled conductors to the meter's push-in voltage terminals. Ensure:
     - **Terminal L1** is connected to the **line from the protective device**
     - **Terminals L2 and L3** are **linked to the same line** as L1
     - **Terminal N** is connected to the **neutral of the same supply**
   - Push each ferruled conductor fully into its terminal, then gently pull each one to confirm it is held firmly and that no bare conductor is visible. If a conductor needs to be removed, release the terminal first rather than pulling the conductor out.



Warning: The Hub 2 Meter has no internal fuses. Never supply the meter's voltage terminals without a protective device.
Important: Do not connect L1, L2 and L3 to different phases. This note covers single-phase supplies only.

2. Position the CTs

- Identify CT1, CT2 and CT3 on the CT harness.
- Fit each CT around the **line conductor** of its circuit with the arrow pointing as shown below:
  - **CT1** – battery inverter AC circuit, arrow **towards the battery inverter**
  - **CT2** – incoming supply (meter tail), arrow **towards the grid**
  - **CT3** (if used) – solar PV inverter AC circuit, arrow **towards the grid**
- Close each CT fully around the conductor and check that it is securely latched.
- If CT3 is not used, leave it connected to the harness, close it and secure it neatly inside the enclosure.
- If a CT cannot reach its circuit, extend its branch lead **between the three-way splitter and the CT only**:
  - Use suitably rated twisted-pair cable, keeping the CT's two conductors together as one pair.
  - Join each conductor to the extension conductor of the same pair, preserving polarity, using properly made, insulated and enclosed joints.
  - Keep the **total lead length of each CT to no more than 30 m**.
- Plug the CT harness's RJ12 plug into the socket marked **CT** on the Hub 2 Meter.



Important: CT2 must measure all current flowing between the grid and the property. Fit it on the line tail between the supplier's meter and the first point at which any circuit is connected – upstream of any Henley block or isolator supplying other circuits.
Important: CT1 must measure only the battery inverter, and CT3 only the solar PV inverter. Do not fit them around conductors that also supply other loads.
Important: The Hub 2 Meter CTs are in addition to any CTs or meters required by the battery inverter manufacturer. Do not remove or relocate the manufacturer's sensors.
Important: Never cut, modify or re-terminate the RJ12 end of the CT harness, or the harness between the RJ12 plug and the splitter. Swapping the two conductors of a CT pair when extending it reverses that CT's reading.

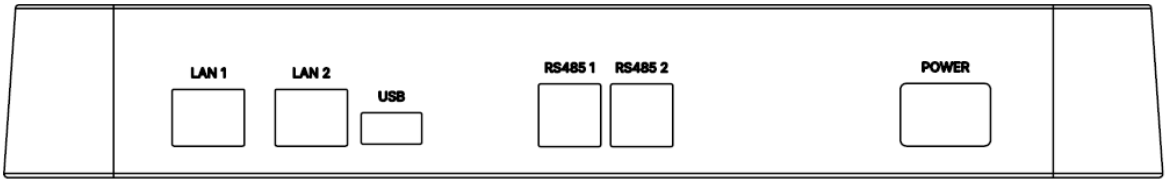
3. Prepare the Meter End of the Cable

- Locate the end of the Hub 2-Meter RS485 cable labelled 'Meter'.
  Important: Only modify the 'Meter' end of the cable. Never cut, re-terminate or replace the RJ11 (Hub) end – poorly re-terminated RJ11 connectors cause unreliable communication with Hub 2. If the cable needs shortening or extending, make the change at the 'Meter' end.
- Trim back the **green** wire and any other unused cores, and insulate them.

Important: The SEM3-WL has no RS485 ground terminal, so the green wire is not connected. Ensure it and any other unused cores are insulated to avoid shorting. Do not use spare cores in the RS485 cable for any other purpose.

4. **Connect the Cable to the Hub 2 Meter**
   - Route the cable into the meter enclosure through a suitable gland, keeping a gap of at least 50 mm between the RS485 cable and any power cables.
   - Ensure:
     - **Orange wire (RS485 B)** is in **terminal B-**
     - **Orange & white wire (RS485 A)** is in **terminal A+**
   - Push each ferruled wire fully into its terminal and gently pull each wire to confirm it is secure.
     Important: Ensure the cable sheath enters the enclosure via the gland for strain relief.

5. **Connect the Cable to Hub 2**
   - Plug the unmodified RJ11 end labelled 'HUB 2' into the port marked **'RS485 2'** on the underside of Hub 2.



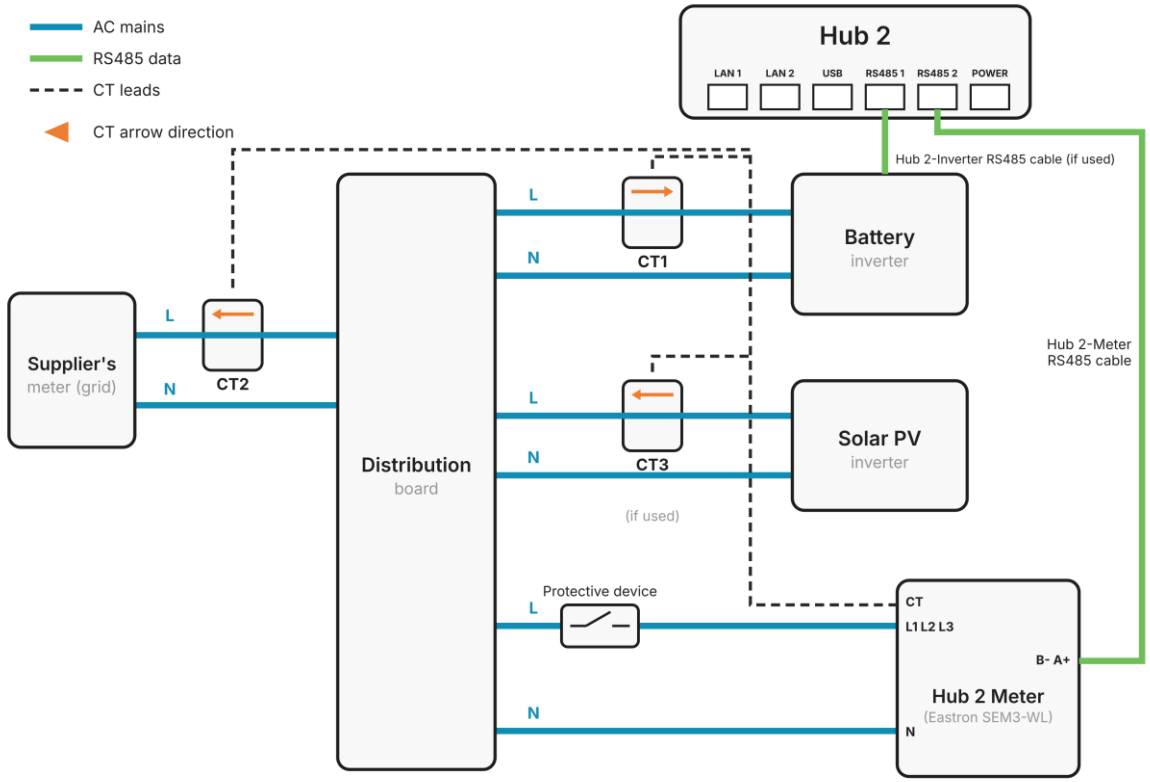
   - If using the Outdoor Kit, ensure all cable glands are properly sealed and the RS485 cables are not bent at the port.

6. **Power Up the Hub 2 Meter**
   - Restore the supply. During initialisation and self-checking, all three LEDs on the front of the Hub 2 Meter flash.
   - After self-checking, the Wi-Fi LED remains lit. This is normal – Hub 2 does not use the meter's Wi-Fi interface.

7. **Verify in the Levelise App**
   - Power on Hub 2 and complete installer commissioning in the Levelise app.
   - Confirm that the app shows Hub 2 communicating with the Hub 2 Meter.
   - Confirm that the app correctly reports:
     - **Battery** charging and discharging (CT1)

- **Grid** import and export (CT2)
- **Solar PV** generation (CT3, if used)

Example Wiring Diagram



Troubleshooting

Levelise app indicates Hub 2 cannot communicate with the Hub 2 Meter

- Check the RJ11 end is fully inserted into the Hub 2 port marked ‘RS485 2’ (not ‘RS485 1’).
- Check the orange wire is in terminal B- and the orange & white wire is in terminal A+, and that both are fully inserted.
- Check the Hub 2 Meter is powered: its LEDs should be lit. If not, check the protective device and the supply to L1 and N.
- Check the continuity of the cable using a multimeter or cable tester.
- If the wiring is correct and the problem persists, contact Levelise support. The meter’s Modbus settings cannot be checked at the meter.

Levelise app reports an issue with the battery, grid or solar readings

- Check each CT is on the correct circuit and its arrow points in the correct direction (see the CT positions table).
- Check each CT is fitted around the line conductor only, and is fully closed and latched.
- Check the CT harness plug is fully inserted into the socket marked CT.
- If a CT lead has been extended, check the joints, that the pair's conductors have not been swapped and that the total lead length does not exceed 30 m.
- Check that L1, L2 and L3 are all supplied, from the same line as the circuits measured by the CTs.
- Check that CT1 measures only the battery inverter, CT3 only the solar PV inverter, and that CT2 is upstream of all circuits in the property.

Additional Resources

For the Hub 2 User Manual, Quick Installation Guide and other application notes, including AN020 Hub 2 Meter RS485 Wiring Guide (SDM230-NMI-2), visit support.levelise.com

For more details on the SEM3-WL, refer to Eastron's documentation at eastrongroup.com