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How to Install an

Edge Compute Node (ECN) for Solar

VERSION
V2026.10.08

RELEVANT ROLES
EPC or O&M technician · Electrician

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SECTION 01

Overview

This document aims to provide all the information needed for how to install an Edge Compute Node (ECN) at your facility to monitor your power usage, perform a load analysis and be ready for solar monitoring.

Relevant Roles for this document:

EPC or O&M technician | Electrician

SECTION 02

Tools and Information required

- [ ] Edge Compute Node enclosure
- [ ] Volt-meter with amperage (amp-clamp) reading capability
- [ ] Circular Drill bit 20mm
- [ ] Mounting hardware (depends on wall material- outdoor wood screw & sealant / masonry expansion anchor)
- [ ] Additional tools required: wire cutters, wire strippers, conduit cutters, Cat5 network crimp tools
- [ ] 120 Ohm terminating resistors
- [ ] Extension cable for the CTs and splice connectors
- [ ] Shielded Belden 3106A or Shielded CAT6 cable for RTU connections
- [ ] Ecosuite Cap
- [ ] Site specific wiring diagram
- [ ] Electric drill with drill bits / uni-bit
- [ ] 20mm PVC conduit gland
- [ ] Screwdrivers - ¼"flat head, micro flat head, #2 Phillips
- [ ] **Conduit or flex seal, conduit straps, wire, weather tight conduit seals, Cat5 cable, Cat5 terminals**
- [ ] Laptop with ethernet adapter and remote access software like TeamViewer
- [ ] Shielded Ethernet cable
- [ ] Document: Wiring Guidelines For RS-485 Networks

NOTE

The Edge Compute Node should be installed by a qualified technician or licensed electrical professional. While the Edge Compute Node houses standard electrical components familiar to most electricians, the unit also houses a highly capable meter that measures from extremely small currents to extremely large currents with revenue-grade precision. In every installation, proper safety guidelines as mandated by law and advised by NEC and IBC codes should be followed to the letter.

SECTION 03

Context

Your Edge Compute Node can be set up to monitor specific circuits or the overall electric service to your building depending on the size/rating and location of the CT's.

LINE · UTILITY · PRIMARY SIDE

To measure accurate readings from your backup generator

to compare to your utility bill, be careful to place the CT's on the "*line*", "*utility*" or "*primary*" side of your transfer switch or utility CT meter cabinet.

LOAD SIDE

To measure your power consumption and quality

during grid outages, place the CT's on the "*load*" side of your ATS or at the main distribution panel / switchboard.

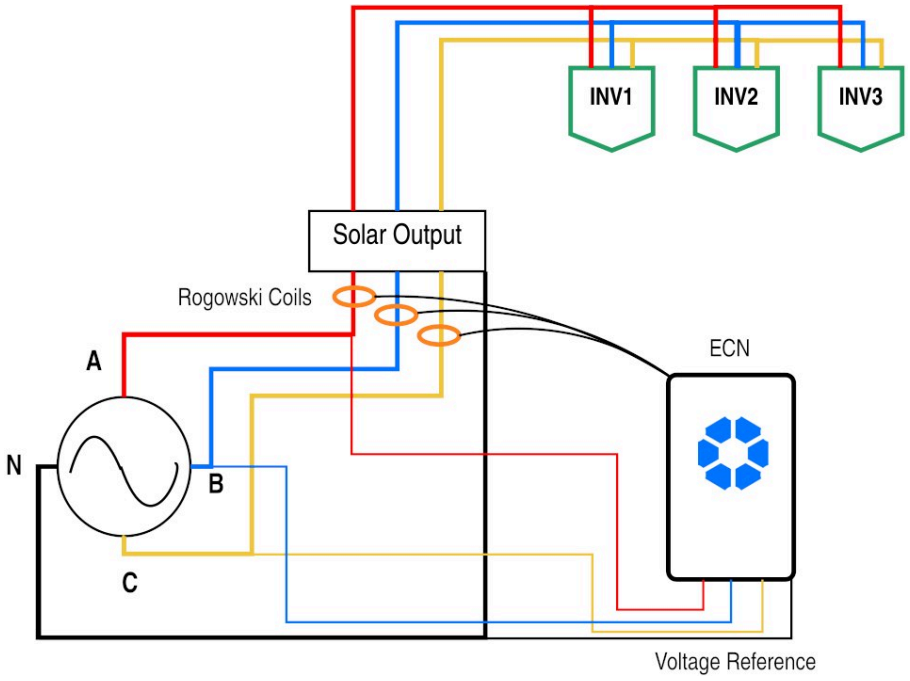


Fig. 1 Rogowski coils on the solar output and voltage reference to the ECN.

SECTION 04

Installation setup for solar arrays

With the Edge Compute Node, you can monitor solar generation in two ways - with revenue grade precision as well as at the inverter level across multiple inverters from different manufacturers. This gives you a rich set of data that lets you monitor performance as well as the state of your assets with diagnostics. In these installations, you can treat the input to the revenue grade meter as a source of power rather than a load, but take care to check the orientation of your CTs and the positive/negative aspect of the current and watts values the kWh meter is showing. Edge Compute Node can support multiple lines of communication such as multiple RS-485 networks, each with their own communication parameters, at the same time. So if there is a difficulty in terms of merging RTU devices within the same RS-485 network, you can always add a second or third RS-485 adapter to Edge Compute Node.

SECTION 05

Remote meter connection for data logging

The following diagram shows the Pin-outs for the USB 485 adapter that the ECN uses. Like all 2-wire RS-485 adapters, there are the Data+ and Data- wires that come as a “twisted pair
Along with a third wire for ground to connect to the Modbus Follower device such as a Hukseflux SR05 Modbus Pyranometer.

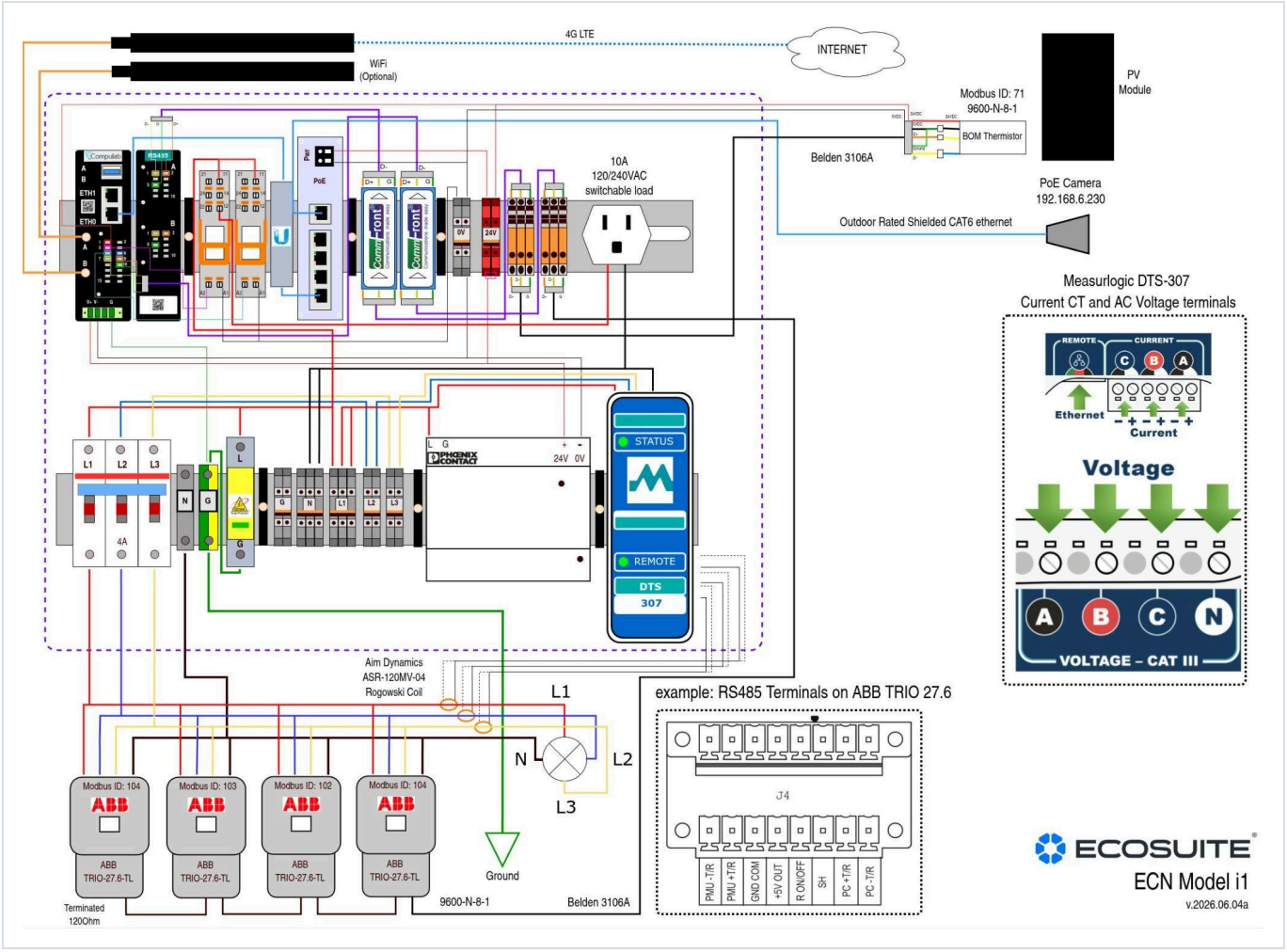


Fig. 2 ECN Model I wiring, including the RS-485 terminals and CT / voltage inputs.

Built in Optoisolated 485 Adapter	Modbus RTU Thermistor example
PIN 8 Data + : Orange	D+ **Yellow**
PIN 7 Data - : Yellow	D- **BLUE**
PIN 10 Ground **: Green**	Ground: **BLACK**

24VDC DIN power Supply	Modbus RTU Thermistor example
24VDC + **RED**	**RED**
0VDC - **BLACK**	**BLACK**

SURGE PROTECTION

Please note that comprehensive Voltage Surge protection is included with every ECN for Ethernet, RS-485 and AC connections. Look to the WAGO connectors on the right side of the top DIN Rail to connect RS485 devices.

SECTION 06

Terminating the last device

For any 485 network using Modbus, the last device may need to be terminated with a 120 Ohm resistor between the Data+ and Data- terminals, and it has to be the ONLY "slave" device terminated.

- Sometimes this means physically that a small resistor must be attached across these terminals. Other times termination is enabled via a "dip" switch or jumper setting located on the communication card of the device / inverter.
- For Fronius Inverters - If a Fronius inverter is the last physical device in the 485 daisy-chain, it must be terminated and there are two methods depending on the card. Please refer to manual or Fronius tech support.
- For Pyranometers - a 120 Ohm resistor is absolutely needed should the pyranometer be the last physical device in the daisy-chain
- For multiple RS485 adapters - should the pyranometer have its own RS485 adapter and the other devices are on their own RS 485 adapter, connect a 120 Ohm resistor between the data + and data - of the pyranometer.



NOTE

shielding of cables must be bonded together if the total inverter run is to be greater than 100 ft.

For further detail on shielding and cable needed for the 485 connection, please refer to Wiring Guidelines for RS485 Networks in the appendix.

SECTION 07

Step-by-Step process

STEP 0

Put on your Ecosuite Cap

You are about to commission your first Ecosuite ECN - get ready!

STEP 1

Inspect the contents of the Edge Compute Node

It is unlikely based on the quality of packing material, but contents may have been loosened or damaged during shipping. Conduct a pull test and physical inspection for any internal damage and notify Ecosuite immediately should problems arise. See below the standard Edge Compute Node base model out of the packaging without CTs installed.

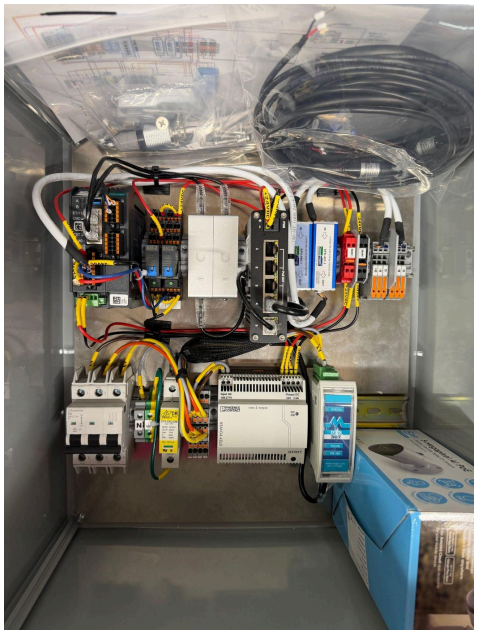


Fig. 3 Standard ECN base model, as shipped, without CTs.

STEP
2

Choose where to install your Edge Compute Node CTs

Placement and direction of the CT's is critical to the meaning of the data gathered. Be careful to choose a location that has ample working room and measures the data you want to gather.

- To monitor power from utility feed only, place the CTs on the Primary conductors facing the grid.
- To monitor the consumption of generator power only, then place the CTs on the Secondary conductors only and face them towards the Generator.
- To monitor the total consumption of the facility including grid and generator power, place the CTs on the "Load" conductors facing the grid / generator.
- To monitor solar production, place the CTs on the solar conductors either at the top of an AC combiner panel or disconnect, or at the interconnecting point in a service entrance facing the inverters.

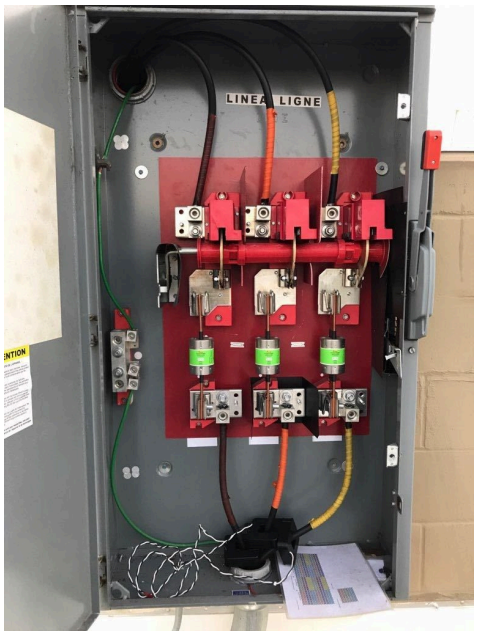


Fig. 4 Example CT location inside a disconnect.

STEP
3

Choose where to install your Edge Compute Node.

The Edge Compute Node is ideally powered by a circuit breaker (typically a 3 pole for 200 amp+ services) For most electrical components, it is best to choose a physical installation location that can be easily powered by a load distribution panel breaker. The Edge Compute Node is then isolated for servicing if needed. There is a 10 amp breaker in the Edge Compute Node to protect the incoming conductors and isolate the Edge Compute Node components.

STEP
4

Mount the Edge Compute Node leaving cover open

Using the mounting brackets located inside the Edge Compute Node, mount the Edge Compute Node within 25' of the CT location. Take additional care to waterproof any penetrations made.

STEP
5

Feed the Edge Compute Node power

1. Run power to the Edge Compute Node from a breaker via conduit using all three available phases, neutral and ground in the circuit per NEC code.
2. Should no pre-drilled hole exist, penetrate the Edge Compute Node with a weatherproof seal from below or on the side as to avoid flooding.
3. Test for proper voltage and before turning on check the torque of all terminal connections in the Edge Compute Node as some set screws may have loosened in transit during shipping.

STEP
6

Install the CTs

Choose the CT location according to Step 1 and install the CTs with the CT stickers facing the source of the power flow. Run all power supply, communication and CT wires according to NEC code. Be careful to keep CT wires at least 6" from service cabling to avoid magnetic interference. With load monitoring installations, the CT stickers will face the grid in order to measure amperage. With solar power monitoring installations, the CT stickers will face the inverter output which pushes power to the grid. Please note: sometimes the CT stickers are installed incorrectly at the factory. You should confirm polarity / CT functionality using your handheld amp clamp and by reading the watt output on the display. Divide the watts by the voltage to get the amperage.

STEP
7

Determine internet connectivity in this location and route accordingly

Identifying and confirming a solid internet connection is critical to the functionality of the Edge Compute Node.

To verify internet connectivity via router:

1. Begin by checking your cell-phone for 3G or 4G connection in the installation room. This simple check is a decent indicator as to whether the 4G router will function well or whether an extension antennae will be needed to carry a cellular signal to the installation area.
2. When the Edge Compute Node is powered, the 4G router has a set of green LEDs that indicate how strong the 4G signal is in that location. Power up just the 4G router in the location where you want to install the Edge Compute Node and see what kind of signal strength it is getting.
3. Plug your laptop into the WAN port of the 4G router included with the Edge Compute Node to see if you can get an internet connection and view web pages.

This means that your laptop's ethernet adapter should be set to DHCP (typically default).

4. once you have confirmed the router is getting good signal, disconnect your laptop and verify the node is plugged into the router securely

To verify internet connectivity via ethernet:

1. Bring ethernet cable into Edge Compute Node enclosure via watertight cable gland, plug into your laptop to verify data is coming through.
2. Remove the ethernet cord from your laptop and plug directly into the node. Request Ecosuite technical support to verify data connectivity.

STEP
8

Contact Ecosuite to confirm data values vs. clamp meter and meter readings

Contact your Ecosuite rep to confirm the meter readings by calling:

ECOSUITE TECHNICAL SUPPORT

+1-888-245-2470

Meter settings may need to be verified as well. For installations in the United States, contact Ecosuite technical support (phone number details also on the inside of the ECN door).



Fig. 5 Clamp meter reading for comparison.

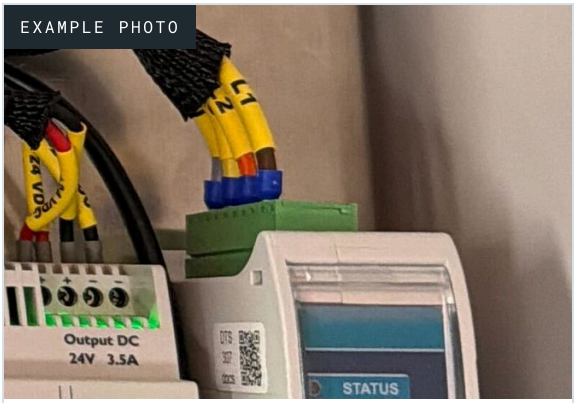
STEP

9

Photograph Edge Compute Node and send to Ecosuite for registration

Take a minimum of 4 photographs of Edge Compute Node once it is installed and tested:

EXAMPLE PHOTO

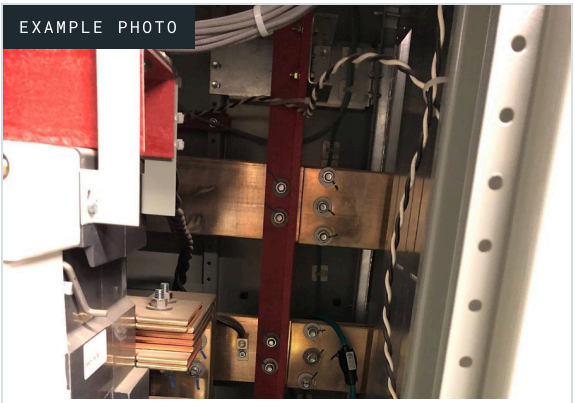


PHOTOGRAPH 1

Edge Compute Node closeup with kWh meter reading of kilowatt-hours

Take a closeup photograph of the Edge Compute Node showing the internal wiring within the Edge Compute Node enclosure, and one where you can visibly see the kWh value on the meter.

EXAMPLE PHOTO

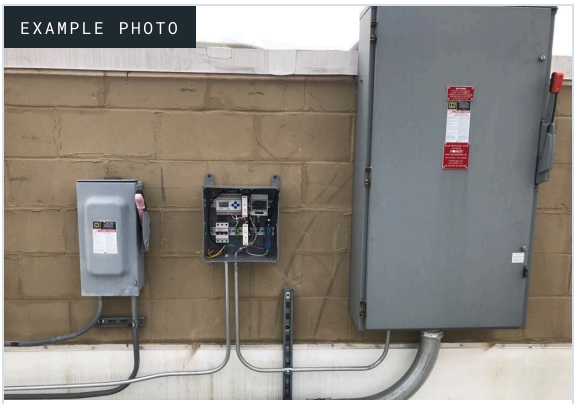


PHOTOGRAPH 2

Closeup of CTs

Take a photograph of the CTs as they are attached to the conductors.

EXAMPLE PHOTO



PHOTOGRAPH 3

Edge Compute Node in Context of service connection with Cover Off

Take a photograph showing the final installation of the Edge Compute Node showing location of CTs, conduit run, power supply channel (including circuit breaker if any) with the cover off.

EXAMPLE PHOTO



PHOTOGRAPH 4

Edge Compute Node in Context of service connection with Cover On

Take a photograph showing the final installation of the Edge Compute Node with the cover on.

SECTION 08

Conclusion

Once a connection has been established with the Edge Compute Node in under normal field conditions, please send all photos to Ecosuite at: <ecn@ecosuite.io> with the subject heading *"Edge Compute Node install (Site name, today's date)"*

SEND PHOTOS TO	SUBJECT HEADING
ecn@ecosuite.io	*Edge Compute Node install (Site name, today's date)*

Double-check you have accomplished everything necessary using the checklist below

Checklists

Pre-OnSite Meeting / Call with installing electrician

Item	Check	Notes
Electrician has 3 documents: up to date wiring diagram, Pyranometer Howto, Node Install Howto	☐	Has color printed diagram included, Knows how the 4 conductors will attach to 3-pole isolator, neutral junction block, ground, knows which side of ECN waterproof gland penetration will be made based on site, knows which RS485 ports will be used for meter and pyranometer
Electrician has Ecosuite support kit	☐	extra spare tire stuff (extra FTDI, extra pyran wiring clip, extra glands, generic rescue node?, High Gain 4G antenna)
Electrician has a ethernet laptop DHCP with enough battery	☐	So they can test the bandwidth on the ECN
Electrician has handheld irradiance sensor	N/A	To confirm pyranometer readings
Electrician has received and opened ECN shipment	☐	Checking contents for ECN voltage and CT attachments, Pyranometer, Pyranometer WAGO wiring clamp
Electrician has access to Inverter Portal inverters via setup app	N/A	Knows about Modbus ID settings, Modbus TCP port 502. Make sure the electrician knows the most recent firmware version.
Electrician has blank Inverter Portal transfer form	N/A	Ready to transfer site ownership to Ecosuite
Electrician has a video chat app to share video onsite	☐	Test FaceTime/WhatsApp/Skype

Item	Check	Notes
Electrician has watch node Howto video	☐	(TBD - we need this video created)(TBD - we need this video created)

On-Site Checklist

Item	Responsibility	Check	Notes
Unit Contents, wiring unchanged in shipping	Installer	☐	Making sure wires are solid - pull test,matches wiring diagram
Land Wires to correct spaces	Installer	☐	L1,L2,L3, N, G
Voltage check before throwing isolator in enclosure	Installer	☐	L1-N: _____ L2-N: _____ L3-N _____
kWh Meter powers up	Installer	☐	LCD lit up
ECN powers up	Installer	☐	Ethernet lights on port are lit, RED LED lit, Ethernet LEDs lit
ECN media access lights up at boot	Installer	☐	Green flashing
4G shows signal strength LEDs	Installer	☐	Should get 4 lights strong signal
Speedtest-cli bandwidth check	Ecosuite	☐	Record value in Mbit/sec UP DOWN Testing download speed _____
Laptop able to see internet on 4G LAN, WAN ports	Installer	☐	(only needed if ECN not posting data)
Double check ethernet cable click in	Installer	☐	
SolarSSH works	Ecosuite	☐	Ecosuite to verify remotely
ECN log file shows datum persisting, uploading to SolarNet	Ecosuite	☐	We verify remotely
Photograph of the CT direction around conductors	Installer	☐	Orientation of CTs confirmed, and identification of CT to Voltage reference checked

Item	Responsibility	Check	Notes
kWh meter measurements match clampmeterInstallerInstaller	Installer	☐	Watts value is positive and power factor is a sane number 0.9 - 1.0
Pyranometer readings match handheld sensor	Installer & Ecosuite	N/A	In watts per meter^2
Double check Inverter comm settings and termination	Installer	N/A	Modbus Ids, Leader/Follower setup in Inverter Portal, Modbus TCP on port 502 enabled
Inverter portal shows correct reading	Installer & Ecosuite	N/A	node values match what Inverter is saying
Inverter firmware version is up to date	Installer & Ecosuite	N/A	Modbus TCP connection
Inverter connections made	Ecosuite	N/A	We verify remotely
Inverter production sum in line with kWh meter	Installer	N/A	
Inverter LCD reading match ECN datum	Installer & Ecosuite	N/A	We confirm what they are seeing onsite from the inverter LCD screens
Backup of configuration made	Ecosuite	☐	
Shutdown and cold start SolarSSH in	Installer	☐	5 minute wait before ECN reporting
Photos taken and emailed	Installer	☐	Inside the enclosure, pyranometer on roof, pyranometer wiring clamp connection, back 10 ft from ECN
SourceIds changed to permanent values	Ecosuite	☐	
Ecosuite reflecting sane data	Ecosuite	☐	Screenshot of Ecosuite with date time stamp
Backup of configuration made	Ecosuite	☐	
System shutdown	Installer	☐	

APPENDIX

Wiring Guidelines for RS485 Networks

Overview

This serves as a guide to wiring RS-485 networks conforming to the EIA-485 standard. The RS-485 standard allows for very robust communications over distances of up to 1200 meters (4000 feet).

Operation

RS-485 networks use the convention 'A+' and "B-" to represent lines 'A' and 'B', defined by the RS-485 standard. Two-wire RS-485 networks operate in half-duplex mode on one twisted pair plus a ground wire. Data may only travel in one direction at a time. All devices on the network can be transmitters or receivers, but only one may transmit at any given time. On the same network bus, there may be multiple master devices and multiple slave devices. Each device has a Device ID to identify the controller in the same segment of the network and a Network ID to identify the network segment in the network bus. Device ID and Network ID are set by the user.

All devices on the same network segment receive any transmitted data. The device for which the data is intended responds if necessary.

Network Topology

A network segment consists of multiple controllers (up to 32) connected with a cable. For robust data communications a daisy chain topology is recommended between controllers in the same segment.

For complex applications with more than 32 devices, a router device is used to connect between different network segments. Router devices can also link RS-485 networks with other networks, like TCP/IP over Ethernet.

Daisy chain connection

In practice, the wiring of a daisy chain topology is most easily implemented by using the Master-Slave / Token-Passing (MS/TP) connector on the device to link the network to the upstream and downstream nodes. This could lead to incorrect wiring, so care should be taken to avoid inadvertently connecting the network in a star configuration. All controllers use the same type of connector for the MS/TP



network, a two piece terminal block connector with 3 positions. The connector pinout is shown in the following drawing, as seen from above, with the wire screw input at the bottom side.

Fig. 6 MS/TP connector pinout, seen from above.

RS-485 always requires at least 3 conductors: 2 signal wires (A+ and B-) and 1 signal return path (GND).

When multi pair twisted pair cable is being used, one pair shall be used for A+ and B- signals (blue and white/blue) and one pair for GND (orange + white/orange). Unused wires should be terminated with 100 Ohm resistors to ground at both ends of the cable. Connect the A+ wire from the upstream device into the local A+ connector and connect the A+ line for the downstream device into the same pin of the connector. Repeat this procedure for the B-line and GND.

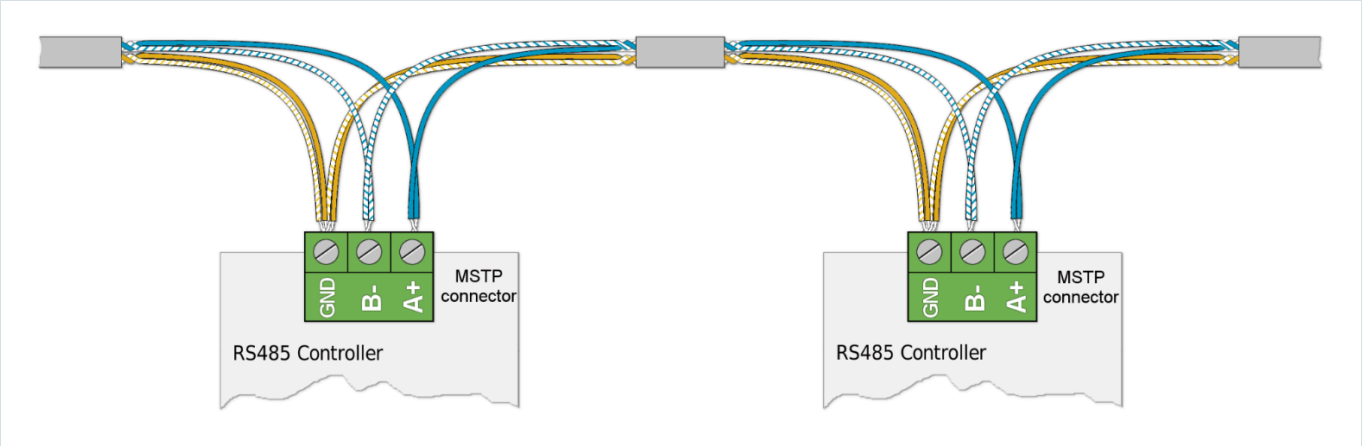


Fig. 7 Daisy-chaining controllers through the MS/TP connector.

The length of the untwisted wires from a twisted pair that links to the terminal block connector, should be kept as short as possible. To wire the connections, carefully strip away about 1/4 inch of the conductor insulation, twist tight the two striped wires together, insert them into the correct terminal slot and then fasten the screw. The screws should never be over-tightened as this may damage the conductors.

When interconnecting with a range of different RS-485 products or models, there may be different signal naming conventions on the devices, 'A+' is equivalent to '+', 'B-' is equivalent to '-' and 'Ground', 'g', 'return' is equivalent to 'GND'. Some devices may have different signal naming conventions and also different pinouts for the connector (e.g.: "+ - " instead of "A+ B- GND").

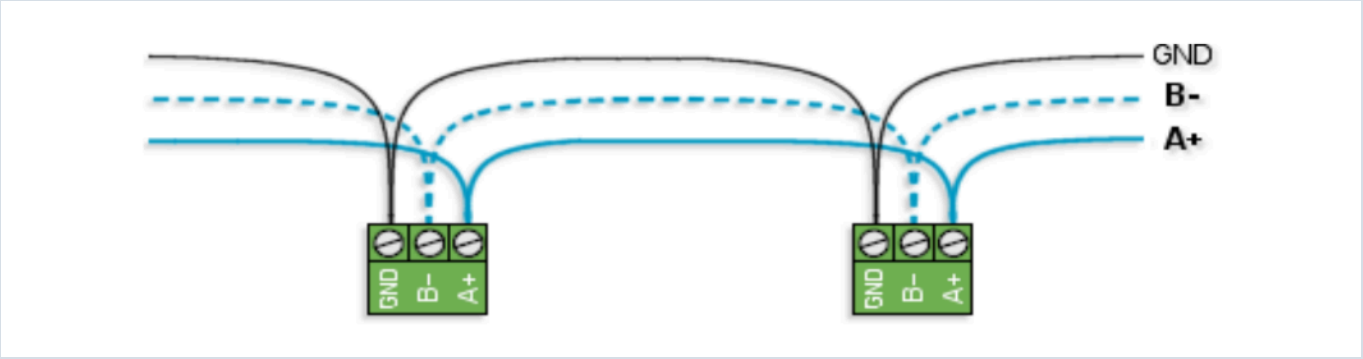


Fig. 8 Same bus, different connector pinouts.

Grounding

Grounding is essential to reliable operation of any RS-485 network. EIA-485 is a three-wire system. The third wire is required so that all nodes on the bus share a common ground reference connection. This ground wire could be a separate wire or a pair of the twisted pair cable. If shielded twisted pair cable is used (recommended), the shield shall be connected to earth ground **only at one end**.

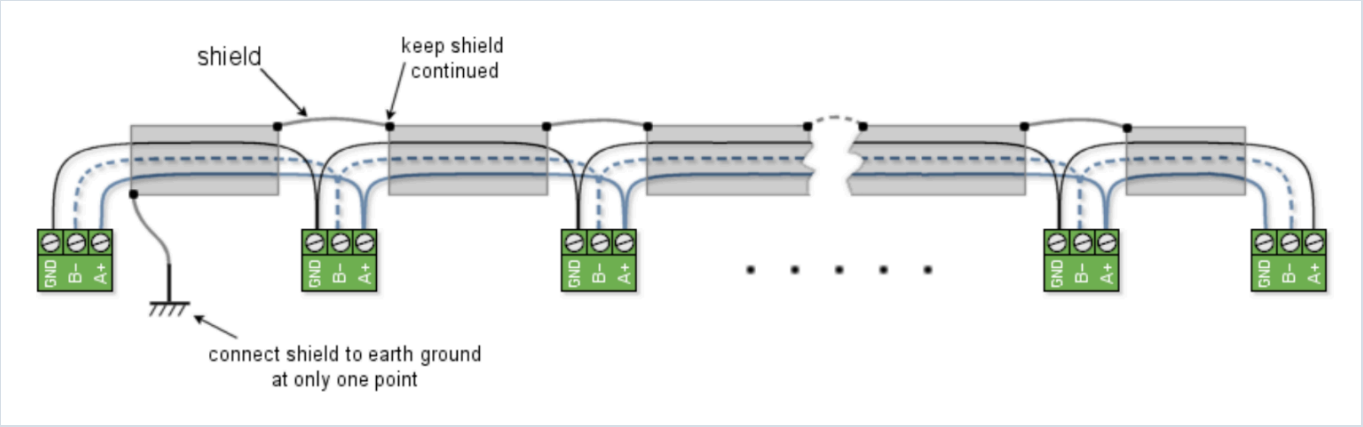


Fig. 9 Keep the shield continuous; connect it to earth ground at one point only.

Blue and white/blue conductors must be in the same twisted pair. The black ground wire could be a separate wire or another twisted pair. Preferred method for wiring is a shielded one pair cable with an extra wire used specifically for a ground wire. The advantage to using this wiring method (3 conductor cabling) is you would reduce noise induced through ground potential differences. If the shield is grounded in more than one point, a ground loop is created and leakage ground currents may corrupt data communications.

Though not recommended, the shield of the twisted pair cable could be used to implement the common ground wire (GND) if you have no other option.

Termination and fail-safe biasing

The interconnect media for the RS-485 is a transmission line, so reflections may occur due to impedance discontinuity that a traveling wave sees as it propagates down the line. This happens mostly at the end of the cable. A reflection of sufficient magnitude and polarity can result in data corruption and possible damage to the interface circuitry. For this reason, **the RS-485 bus must be terminated at both ends of the cable**. The termination can be a simple 120 Ohm resistor.

The network must be terminated at both ends. If only one end is terminated, it may lead to overall communication failure on the RS-485 bus. This situation may occur also if termination is enabled on intermediate devices on the bus. Termination jumpers must be disabled for those intermediate nodes and enabled only for the two end nodes.

Network segment length in the daisy chain

Minimum cable length between adjacent devices shall be more than 30 cm (1 ft) and maximum cable length for a network segment shall not exceed 1200m (4000 ft). This is required in order to maintain signal integrity, thus keeping the guaranteed high data communication rate.

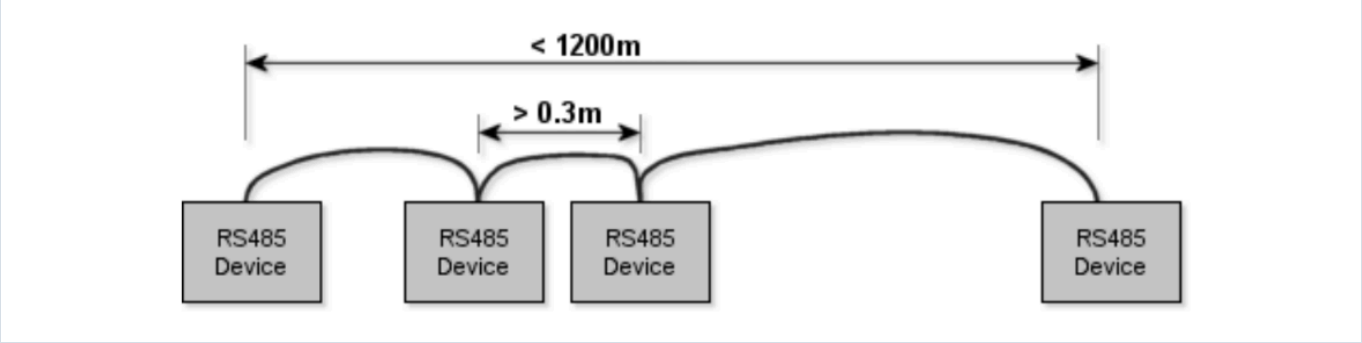


Fig. 10 Segment limits: over 0.3 m between devices, under 1200 m in total.

For longer cable runs, two network segments of up to 1200m each can be connected to a router device.

Recommended cable

Cable type	2 pairs
Conductor gauge	AWG 24 stranded
Insulation	foam-polyethylene
Shielded	Braided > 80% coverage
Mutual capacitance	20 pF/ft @ 1 KHz
Ground capacitance	< 30 pF/ft @ 1 KHz
Characteristic impedance	100-120 Ohm
Conductor DCR	≤ 26 Ω / 1000 ft @ 20°C
Shield DCR	≤ 2.5 Ω / 1000 ft @ 20°C

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CALL

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SEND ALL PHOTOS TO

ecn@ecosuite.io