



StorEdge™ Wiring Guide & On Site Checklist for North America

Revision History

- Version 1.5 (February 2020)
 - Added support of the Energy Meter.
 - Added support of StorEdge inverters with a single DIP switch in the Connection Unit.
- Version 1.4 (November 2018)
 - Added support of LG Chem batteries with the disconnect switch.
 - Added battery self-test.
- Version 1.3 – support for connection of 2 LG batteries
- Version 1.2 – menu and checklist updates
- Version 1.1 – support for LG batteries
- Version 1.0 – initial version, using Tesla batteries

This document is a battery wiring guide and contains an on-site checklist with steps for post-installation verification of a StorEdge system, for the following batteries:

- LG Chem RESU10H



CAUTION

For proper battery performance, the LG Chem battery should remain connected to the StorEdge Inverter and in charging mode. Extended battery disconnection may result in deep discharge and damage the battery.

For more details, refer to the StorEdge Installation Guide supplied with the StorEdge Inverter. For additional assistance contact SolarEdge Support (refer to the section *Support and Contact Information* on page 15).

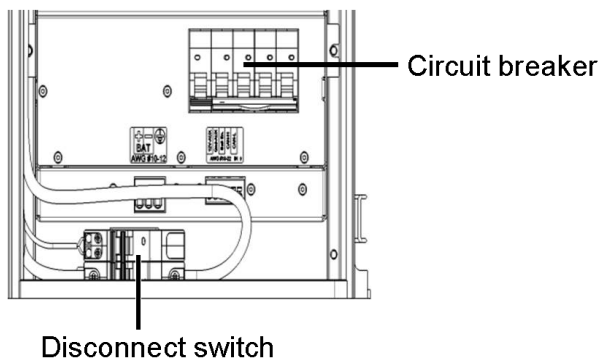
Wiring Guide

**WARNING!**

The LG Chem battery must be powered off before wiring.

LG Chem batteries are available with either of the following two types of powering mechanism design:

With the disconnect switch (requires Firmware version 3.24xx or later)



With the auxiliary power switch

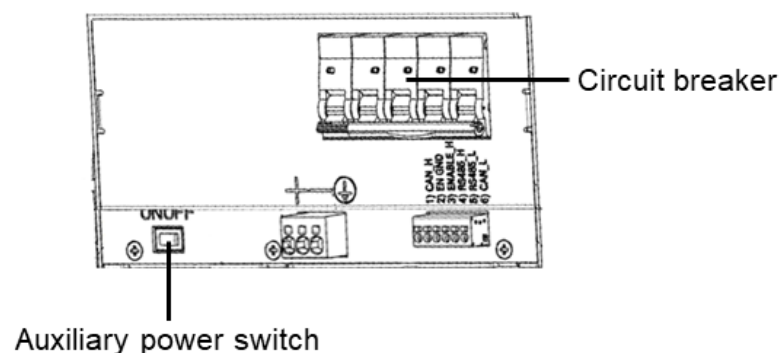


Figure 1: LG Chem Disconnect/Auxiliary Power Switch and Circuit Breaker

→ **To power off the battery:**

1. Turn off the circuit breaker.
2. Turn off the disconnect/auxiliary power switch.

→ **To power on the battery:**

1. Turn on the disconnect/auxiliary power switch.
2. Turn on the circuit breaker.

Wiring Types and Connectors

To connect the battery to the StorEdge Inverter, use the following wiring types and connectors:

Recommended Cable Type (min-max cross section)	SolarEdge Connector	LG Chem RESU10H Battery Connector
DC: 10 AWG (14-10 AWG), 600V insulated Ground/PE: 10-8 AWG, 600V insulated	BAT DC +	DC +
	BAT DC -	DC -
		Ground
Control and monitoring: 5-wire shielded twisted pair cable, 24 AWG (24-16 AWG), 600V insulated. CAT5 600V insulated can also be used.	En (enable)	ENABLE_H
	V+	Not connected
	B- (RS485)	RS485_L
	A+ (RS485)	RS485_H
	G (RS485) or Thermal (depending on inverter type)	EN_G

Wiring Diagrams – Connecting Batteries to the StorEdge Inverter

The diagrams on the following pages illustrate the connection of batteries to the StorEdge system.
Terminate the Energy Meter's RS485 connection, as explained in the Energy Meter installation manual.



Connecting an LG Chem RESU10H Battery to a StorEdge Inverter with One DIP Switch and Energy Meter

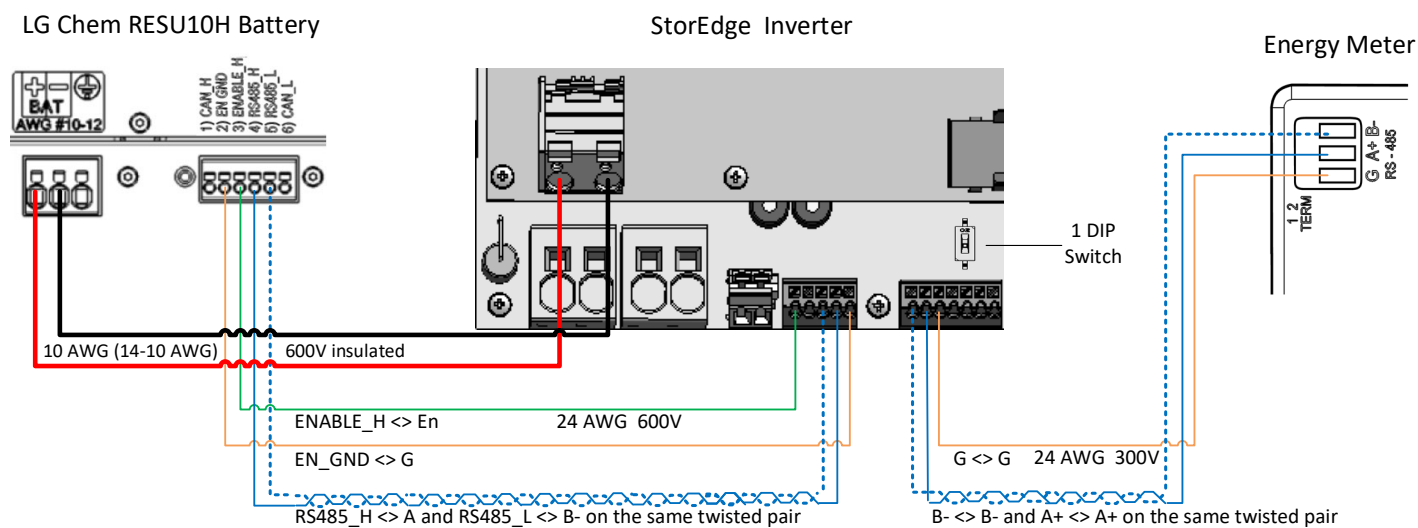


Figure 2: Connecting an LG Chem RESU10H Battery to a StorEdge Inverter with One DIP Switch and Energy Meter

Connecting an LG Chem RESU10H Battery to a StorEdge Inverter with Two DIP Switches and Energy Meter

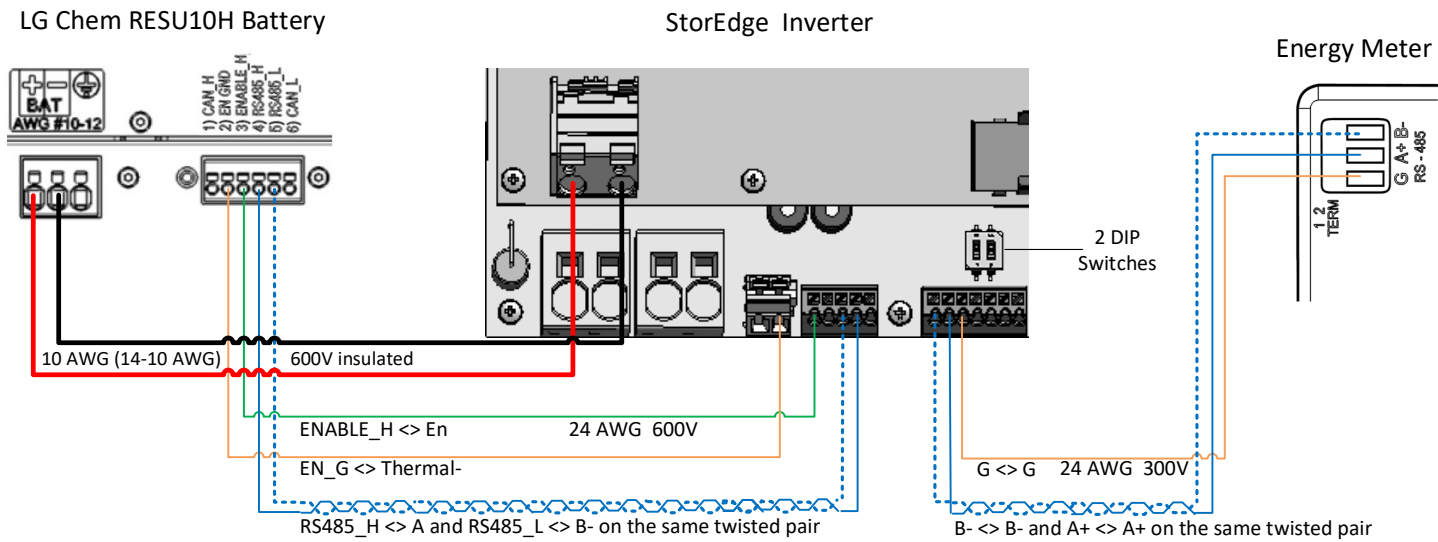


Figure 3: Connecting an LG Chem RESU10H Battery to a StorEdge Inverter with Two DIP Switches and Energy Meter

The diagram illustrates the wiring for a StorEdge Inverter system. It shows the connections between an LG Chem RESU10H Battery, the StorEdge Inverter, and an Energy Meter.

LG Chem RESU10H Battery: The battery has a terminal block labeled "BAT AWG #10-12" and a pin header labeled "1) CAN_H, 2) EN_GND, 3) ENABLE_H, 4) RS485_H, 5) RS485_L, 6) CAN_L".

StorEdge Inverter: The inverter has a terminal block for power and a pin header for communication. It also features three DIP switches.

Energy Meter: The meter has a terminal block labeled "1 2 TERM" with terminals for "G", "A+", and "B-".

Wiring Details:

- Power Connections:**
 - 10 AWG (14-10 AWG) red wire connects the positive battery terminal to the inverter's positive terminal.
 - 600V insulated red wire connects the negative battery terminal to the inverter's negative terminal.
 - 24 AWG 600V green wire connects the inverter's positive terminal to the Energy Meter's A+ terminal.
 - 24 AWG 300V blue wire connects the inverter's negative terminal to the Energy Meter's B- terminal.
- Communication Connections:**
 - 24 AWG 600V green wire connects the inverter's EN_GND pin to the Energy Meter's G terminal.
 - 24 AWG 300V blue wire connects the inverter's RS485_L pin to the Energy Meter's B- terminal.
 - 24 AWG 600V orange wire connects the inverter's RS485_H pin to the Energy Meter's A+ terminal.
- Twisted Pairs:**
 - RS485_H <-> A and RS485_L <-> B- on the same twisted pair (indicated by a blue dashed line).
 - B- <-> B- and A+ <-> A+ on the same twisted pair (indicated by a blue dashed line).

Figure 4: Connecting an LG Chem RESU10H Battery to a StorEdge Inverter with Three DIP Switches and Energy Meter

Wiring Diagrams – Connecting Two LG Batteries

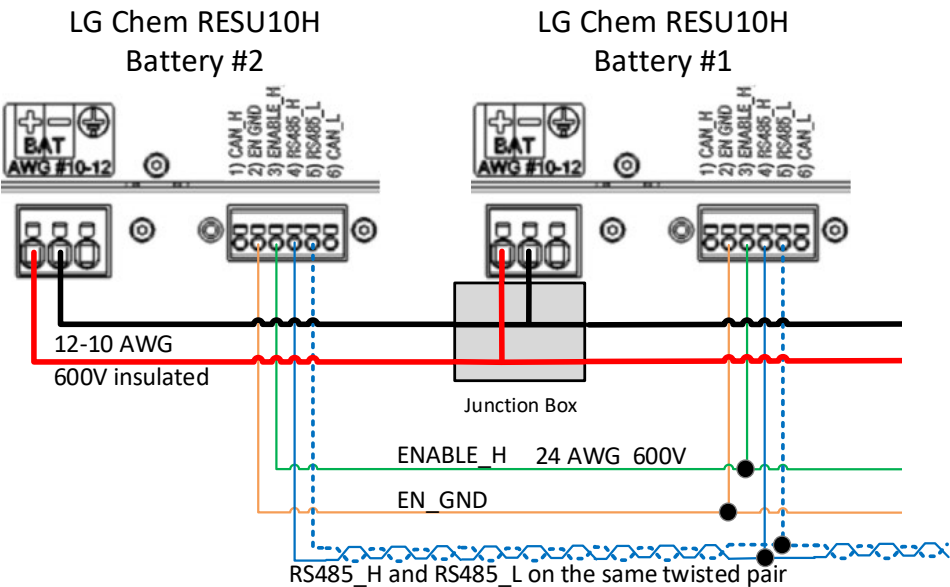


Figure 5: Connecting Two LG Chem RESU10H Batteries

Wiring Diagrams – Auto-transformer Connection

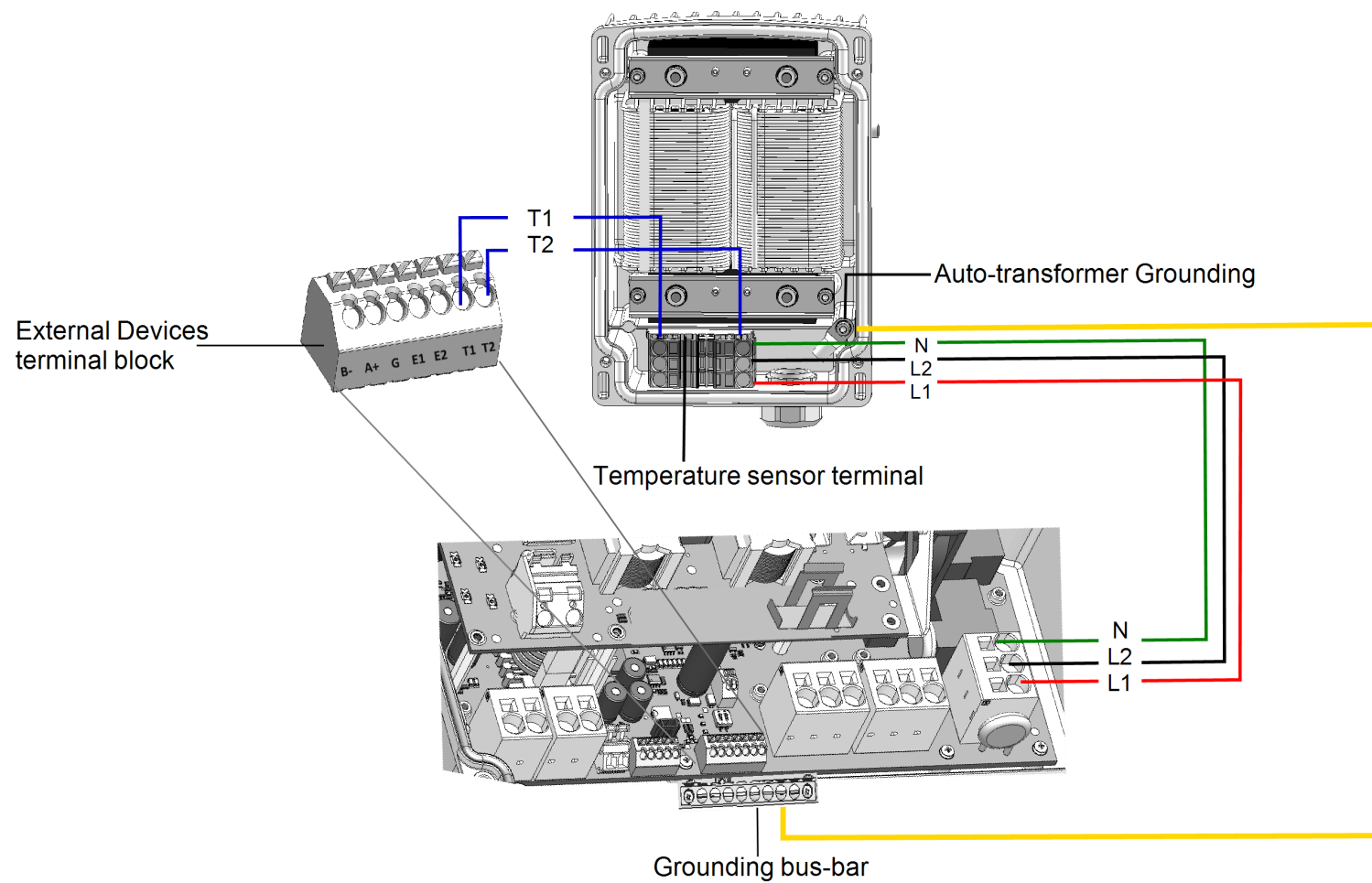


Figure 6: Connecting the Auto-transformer to the Inverter

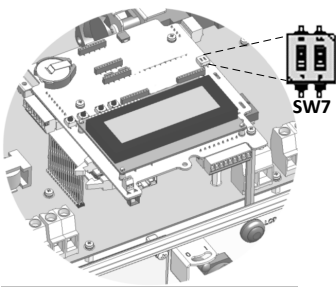
External Shutdown Switch Connection

If required by regulation, install an external shutdown switch, as explained in the complete installation manual.

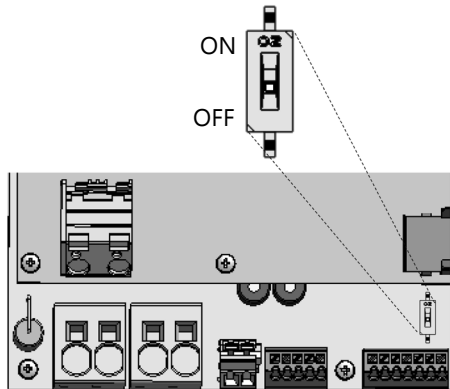
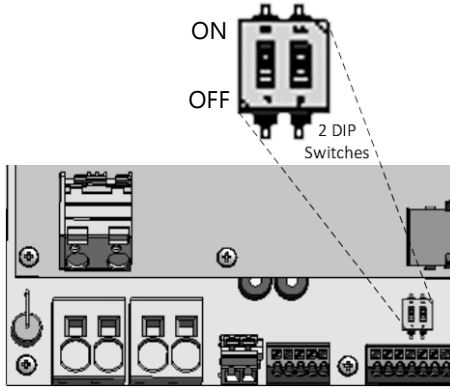
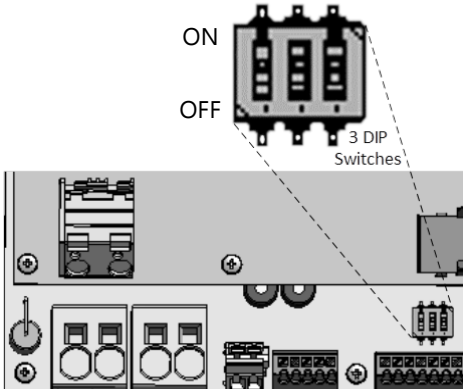


Switch Settings

Setting the DIP Switches on the Inverter Communication Board

<div>Set DIP switch SW7</div> <div></div>	
RS485-1	RS485-2
For RS485-1 connections, use DIP Switch 1 (leftmost): * Up (ON): Terminated (no meter installed) * Down (OFF): Not terminated (meter is installed)	For RS485-2 connections, use DIP Switch 2 (rightmost): * Up (ON): Terminated (no meter installed) * Down (OFF): Not terminated (meter is installed)

Setting the DIP Switches on the Inverter Connection Unit Main Board (with One, Two, or Three DIP Switches)

					
DIP Switch	DIP Switch 1 (leftmost)	DIP Switch 2 (rightmost)	DIP Switch 1 (leftmost)	DIP Switch 2 (center)	DIP Switch 3 (rightmost)
Up (ON) - If no autotransformer is installed. Down (OFF) - If an autotransformer is installed.	Up (ON) - If no external shutdown switch is installed. Down (OFF) – If an external shutdown switch Installed.	Up (ON) - If no autotransformer is installed. Down (OFF) - If an autotransformer is installed.	Up (ON) - If no external shutdown switch is installed. Down (OFF) – If an external shutdown switch Installed.	Up (ON) - If no external shutdown switch is installed. Down (OFF) – If an external shutdown switch Installed.	Up (ON) - If no autotransformer is installed. Down (OFF) - If an autotransformer is installed.

Post Installation Verification and Configuration

Follow the checklist below to verify that the system is properly connected and configured. The checklist is suitable for a backup system with a single StorEdge Inverter, a single battery, an Auto-transformer and a single SolarEdge Electricity Meter installed at the grid connection point. For other system configurations, follow the steps in the StorEdge Installation Guide supplied with the StorEdge Inverter.

Step		Verification Action	Checked
1	Installation and Wiring		
	1.1	Verify that the distance between components complies with the distances detailed in the supplied installation guide.	<input type="checkbox"/>
	1.2	Take a photograph of the battery connection area and send to SolarEdge support (useful for future debugging if necessary.)	<input type="checkbox"/>
	1.3	Take a photograph of the connection area of the StorEdge Inverter and send it to SolarEdge support.	<input type="checkbox"/>
	1.4	Take a photograph of the installation and send to SolarEdge support.	<input type="checkbox"/>

Step	Verification Action	Checked
1.5	Verify that the battery splash cover is closed.	<input type="checkbox"/>
1.6	Verify that the backed-up loads panel is wired (relevant for backup systems only).	<input type="checkbox"/>
1.7	Verify that the Auto-transformer's AC and temperature sensor wires are connected as above in Figure 6.	<input type="checkbox"/>
1.8	Verify that the Inverter's DIP switches are configured to connect to the Auto-transformer, as shown above in Figure 2 (for boards with two DIP switches), and Figure 4 (for boards with three DIP switches).	<input type="checkbox"/>
1.9	Verify that all DC, communication and AC cabling connections are completed as follows:	
1.9.1	Check AC wiring and circuit breaker.	<input type="checkbox"/>
1.9.2	Check string DC input voltage. Expect 1V per optimizer in the string.	<input type="checkbox"/>
1.9.3	Verify that grounding is properly connected in the battery and inverter.	<input type="checkbox"/>
1.9.4	Check DC wiring to the battery (see Table 1). Check the connections and verify that all are securely connected.	<input type="checkbox"/>
1.9.5	Check connections to the battery and the DIP switch setup as described earlier in this document.	<input type="checkbox"/>
1.9.6	Check connections to the meter. If no meter is connected, the inverter's RS485 bus must be terminated using the DIP switches on the inverter's communication board (see page 9).	<input type="checkbox"/>
1.9.7	Check that a 9V battery is installed in the StorEdge Inverter.	<input type="checkbox"/>
1.9.8	Check connection to the Internet with one of the following options: Cellular, Ethernet, ZigBee Module. The connection status displayed should be S_OK. Note: For inverters with a built-in cellular communication option, Ethernet or ZigBee Module can be used as an alternative if the cellular service does not meet operational requirements.	<input type="checkbox"/>

2	Activation and Firmware Upgrade	
2.1	Turn the inverter ON/OFF switch to OFF and make sure it's OFF during the entire upgrade process.	
2.2	LG Chem Batteries (primary and secondary): Switch on the disconnect/auxiliary power switch and then the circuit breaker.	<input type="checkbox"/>
2.3	Turn the AC to the inverter OFF.	<input type="checkbox"/>
2.4	Verify that the serial number on the activation card supplied with the inverter matches the serial number of the inverter.	<input type="checkbox"/>
2.5	Insert the activation card to the designated slot located on the inverter communication board.	<input type="checkbox"/>
2.6	Turn ON the inverter ON/OFF switch.	<input type="checkbox"/>
2.7	Turn ON the AC to the inverter to start activation.	<input type="checkbox"/>
2.8	Wait until the LCD indicates that the inverter activation process is completed.	<input type="checkbox"/>
2.9	Turn the AC to the inverter OFF.	<input type="checkbox"/>

	2.10	Remove the activation card from the inverter.	<input type="checkbox"/>
	2.11	Download the latest firmware version available at: https://www.solaredge.com/storedge/firmware to a microSD card.	<input type="checkbox"/>
	2.12	Insert the microSD card with the upgrade file to the designated slot located on the inverter communication board.	<input type="checkbox"/>
	2.13	Turn the AC to the inverter ON.	<input type="checkbox"/>
	2.14	Wait until the LCD indicates that the file was uploaded to the inverter and the battery. Note: The firmware is upgraded first on the inverter, and then on the battery. When the battery firmware update is in process, the ON light will blink.	<input type="checkbox"/>
3	RS485 Configuration Verification (for one battery, a StorEdge inverter with built-in production meter (RGM), and one Export + Import meter)		
	3.1	If not already OFF, switch OFF the StorEdge DC Safety Switch.	<input type="checkbox"/>
	3.2	Switch the inverter ON/OFF switch to OFF.	<input type="checkbox"/>
	3.3	Devices	
	3.3.1	Enter Setup mode and select Communication > RS485-1 Conf > Multi Devices	<input type="checkbox"/>
	3.4	Meter	
	3.4.1	Select Communication > RS485-1 Conf > Meter 1 > Meter ID: 1, Device Type <MTR>, Protocol <WN>, CT Rating (as per CT label), Device ID <2>, Meter Function (Production).	<input type="checkbox"/>
	3.4.2	Select Communication > RS485-1 > Meter 2 > Meter ID: 2, Device Type <MTR>, Protocol <WN>, CT Rating (as per CT label), Device ID <2>, Meter Function (E+I).	<input type="checkbox"/>
	3.4.3	Verify Device Type > Revenue Meter	<input type="checkbox"/>
	3.4.4	Verify Protocol > Meter	<input type="checkbox"/>
	3.4.5	Verify that the CT value matches the value that appears on the CT label: CT Rating > <xxxxA> .	<input type="checkbox"/>
	3.4.6	If CT resets to 0, check the communication with the meter.	<input type="checkbox"/>
	3.5	Battery	
	3.5.1	<p>Select Communication > RS485-1 > Battery 1 > Protocol (LG Battery).</p> <p>Select Communication > RS485-1 > Battery 1 > Battery ID (15).</p> <p>If installing <i>two batteries</i>, ensure that each battery has a <i>different part number</i> – thus ensuring that each battery will have a different Battery ID. The part number is printed on a label on the control panel of the battery. Battery with part number RXXXXXXXXXSEG1XXXXXXXXX and ID 15 is the <i>master</i> battery.</p> <p>Battery with part number RXXXXXXXXXSEG2XXXXXXXXX and ID 14 is the <i>secondary</i> battery.</p> <p>To configure the second battery:</p> <p>Select Communication > RS485-1 > Battery 2 > Battery ID (14).</p>	<div> > Device Type <BAT> Protocol <LG> Device ID <15> Battery Info <> </div> <div> > Device Type <BAT> Protocol <LG> Device ID <14> Battery Info <> </div> <input type="checkbox"/>
	3.6	Optional: RS485 Expansion Kit	

	3.6.1	For a system with multiple inverters that has a single RS485 bus only, install and configure an RS485 Expansion Kit. Refer to the RS485 Expansion Kit Installation Guide. http://www.solaredge.com/files/pdfs/RS485_expansion_kit_installation_guide.pdf	<input type="checkbox"/>
4	RS485 Connection Verification		
	Press the inverter external LCD light button to display the status screens one after the other until a screen like the following is displayed:		
	4.1	Check the RS485 communication status: <ul style="list-style-type: none"> • Verify that the number under Prot displays the number of configured devices. • Verify that the number under ## displays the number of communicating devices. 	<div>Dev Prot ## RS485 - 1 <MLT> <03> <03></div> <input type="checkbox"/>
	4.2	Check the meter(s): In the meter(s) status screen check that the status is OK. If Comm. Error appears, refer to the troubleshooting section in the supplied installation guide.	<div>Export Meter Status: OK Power [W] : x.xxxx Energy [Wh] : x.xxxx</div> <input type="checkbox"/>
	4.3	Check the meter AC and CT connections, including the CT direction. Connect the meter to power supply. Check the LEDs: when configured as export/import meter: green=import, red=export. To verify whether the CT direction is correct, turn the inverter ON/OFF switch to OFF, and check the export screen. If the screen indicates "export", the CT direction should be reversed.	<input type="checkbox"/>
5	Battery Self-test		
	The test is available in CPU version 3.24xx and higher (but not in version 4.x.xxx). If two batteries are installed, the active battery will be tested first, and then the standby battery. If the active battery fails the test, the test will stop and the standby battery will not be tested.		
	5.1	Verify that AC is ON.	<input type="checkbox"/>
	5.2	Turn the inverter ON/OFF switch to ON.	<input type="checkbox"/>
	5.3	Make sure the Connection Unit is ON.	<input type="checkbox"/>

5.4	<p>Enter Setup mode and select Maintenance → StorEdge Self-Test → Start Test. The battery charges and discharges within approximately two minutes to check performance.</p> <p>During the test, the following message is displayed:</p> <div><pre>Short test in progress... Any button to stop</pre></div> <p>Upon the test completion, the following message is displayed:</p> <div><pre>Self-test completed successfully Any button to cont.</pre></div> <p>If an error message is displayed during the test, use the following table to resolve the error.</p> <table><tr><th>Error</th><th>Solution</th></tr><tr><td>Bat 1 charge failed</td><td>Check that the power and communication cables between the battery and inverter are properly connected.</td></tr><tr><td>Bat 1 discharge failed</td><td>Check that the power and communication cables between the battery and inverter are properly connected.</td></tr><tr><td>Low SOE</td><td>Charge the battery to 20 percent SOE at least.</td></tr><tr><td>Battery comm. error</td><td>Check that the communication cables between the battery and inverter are properly connected.</td></tr><tr><td>Turn switch to On</td><td>Turn the inverter ON/OFF switch to ON.</td></tr></table>	Error	Solution	Bat 1 charge failed	Check that the power and communication cables between the battery and inverter are properly connected.	Bat 1 discharge failed	Check that the power and communication cables between the battery and inverter are properly connected.	Low SOE	Charge the battery to 20 percent SOE at least.	Battery comm. error	Check that the communication cables between the battery and inverter are properly connected.	Turn switch to On	Turn the inverter ON/OFF switch to ON.	<div></div>
Error	Solution													
Bat 1 charge failed	Check that the power and communication cables between the battery and inverter are properly connected.													
Bat 1 discharge failed	Check that the power and communication cables between the battery and inverter are properly connected.													
Low SOE	Charge the battery to 20 percent SOE at least.													
Battery comm. error	Check that the communication cables between the battery and inverter are properly connected.													
Turn switch to On	Turn the inverter ON/OFF switch to ON.													
6	Battery Connection Check													
6.1	<p>Scroll through the menus until you reach the battery status screen. Check the BSN (battery serial number), ID (15 for LG – 14 for a secondary battery), SOE (battery capacity in percentage), PWR (charge/discharge power), Total (total discharged energy) and the Status (Charging/Discharging, Idle, Init or Fault).</p>	<div>BSN: 6572b81 ID: 15 SOE: 97% PWR: 0W Status: Idle</div>	<div></div>											
7	Battery Firmware Version Check													
7.1	<p>Switch OFF the inverter and wait 3 minutes.</p>		<div></div>											
7.2	<p>Select Communication > RS485-1 > Battery 1 (or Battery 2 if installing two batteries) > Battery Info</p>	<div>SN: 6572b81 Model: R11163P3SSEG1 Nameplate[kWH]: 7.0 FW Ver.: DCDC 5.2.3</div>	<div></div>											

8	Setup StorEdge Operating Mode		
	8.1	Turn ON the inverter.	<input type="checkbox"/>
	8.2	Use the status screens to check charge or discharge according to the current condition.	<input type="checkbox"/>
	8.3	Set up the operating mode according to one of the following options:	
		Maximize Self Consumption	
	7.3.1	Select Power Control > Energy Manager > Energy Control > Max self-Consume	<input type="checkbox"/>
		Charge/Discharge Profile Programming	
9	7.3.2	Select Power Control > Energy Manager > Energy Control > Time of Use	<input type="checkbox"/>
	Battery State of Energy (SOE) Check		
	9.1	Turn ON the inverter.	<input type="checkbox"/>
	9.2	Check battery's SOE value on the inverter display. If the SOE is below 10%, immediately check that the inverter is successfully charging the battery.	<input type="checkbox"/>
10	9.3	If the battery does not charge: * Record the date of manufacture, which is embedded in the part number. The part number is printed on a label on the control panel of the battery XXXXXXXXXXXXYYMMDDXXX, Example: R15563P3SSEG1 170328 032, YY=17 MM=03 DD=28 * Contact your LG Chem regional customer service representative for assistance.	<input type="checkbox"/>
	Basic System Operation (optional)		
	10.1	Turn the AC power to the inverter OFF, and verify that the inverter has switched to backup mode.	<input type="checkbox"/>
	10.2	Turn the AC power to the inverter ON, and verify that the inverter is operating properly.	<input type="checkbox"/>

Support and Contact Information

If you have technical queries concerning our products, please contact us:

■ USA and Canada: +1 510 498 3200

■ Worldwide: +972 073 2403118

Fax: +1 (530) 273-2769

Email: support@solaredge.us