



# Q.HOME Application Specific Design Guide: DC Coupled with Qcells RSD-D

## Purpose

The purpose of this document is to provide application specific information on the Q.HOME CORE product when DC Coupled with the Qcells RSD-D devices. The information below includes example single line diagrams, bill of materials, and other important application specific information related to the installation and commissioning process. For more details on the installation and commissioning of the DC Coupled with Qcells RSD application, please refer to the Installation Quick Start Guide – DC Coupled with Qcells RSD.

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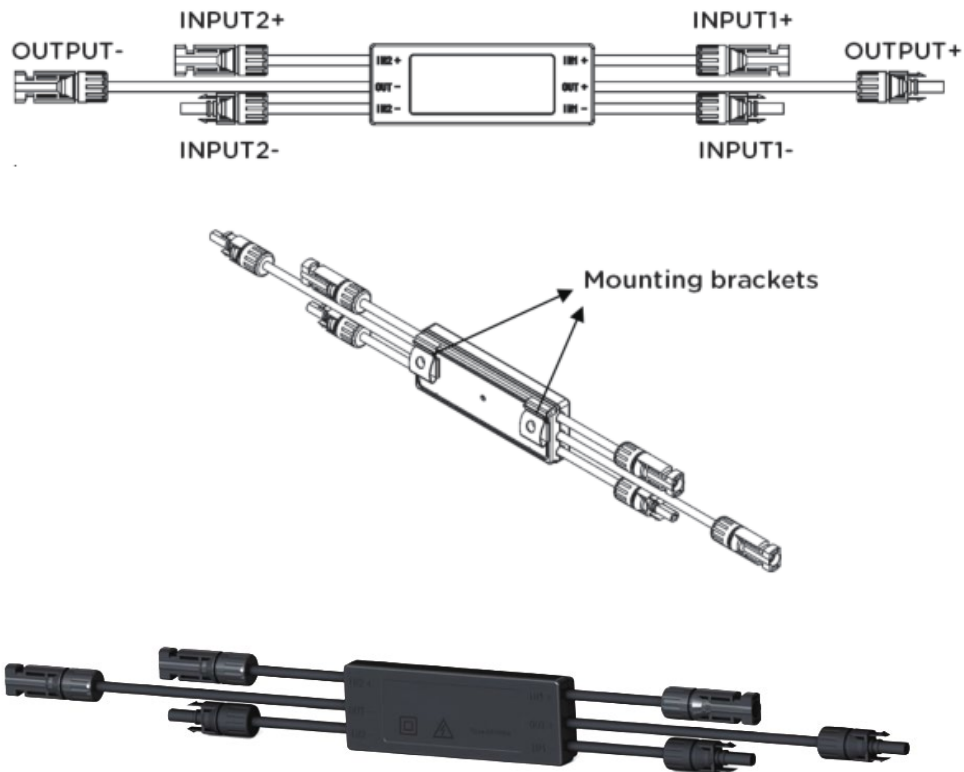
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## Compatible Products

Model Name	Compatibility Note
QCELLS RSD-D	<ul style="list-style-type: none"> <li>• Full validation through testing</li> <li>• Works with rapid shutdown transmitter embedded in the Q.VOLT inverter</li> </ul>

This application uses QCELLS RSD-D RSD receivers, which are sold separately from the Q.HOME CORE system. The RSD-D is a two-channel RSD receiver that communicates with an RSD transmitter imbedded in the Q.VOLT inverter using power line communication (PLC).

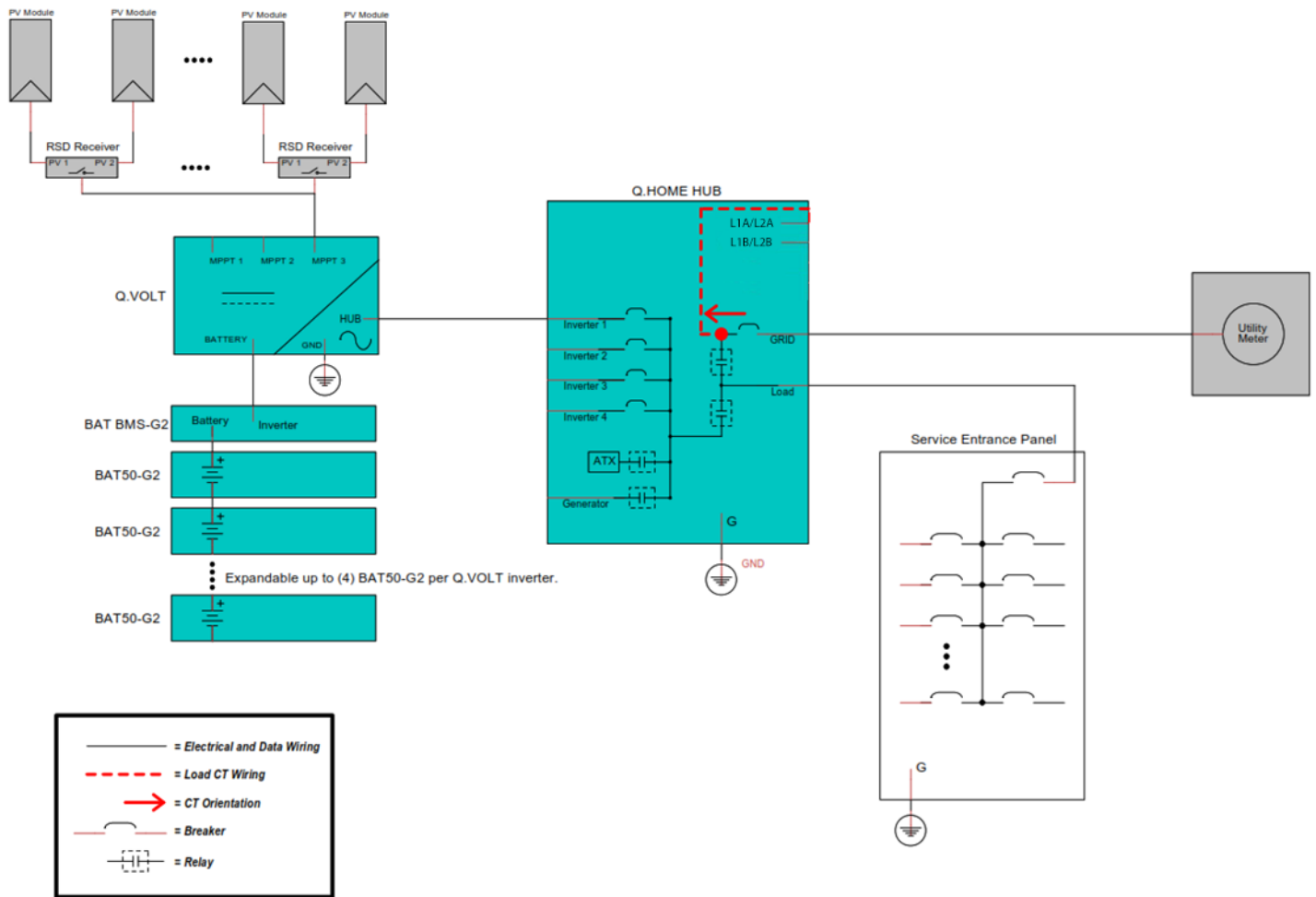
During installation, the RSD-D device is buckled onto the PV module frame and connected in series with adjacent RSD-D devices. An emergency stop switch can be connected to the Q.HOME HUB communication board as the means for initiating the rapid shutdown function. Refer to the Q.HOME Installation Quick Start Guide – DC Coupled with Qcells RSD for more information on using the RSD-D.



## Single Line Diagram Examples

### Whole Home Backup:

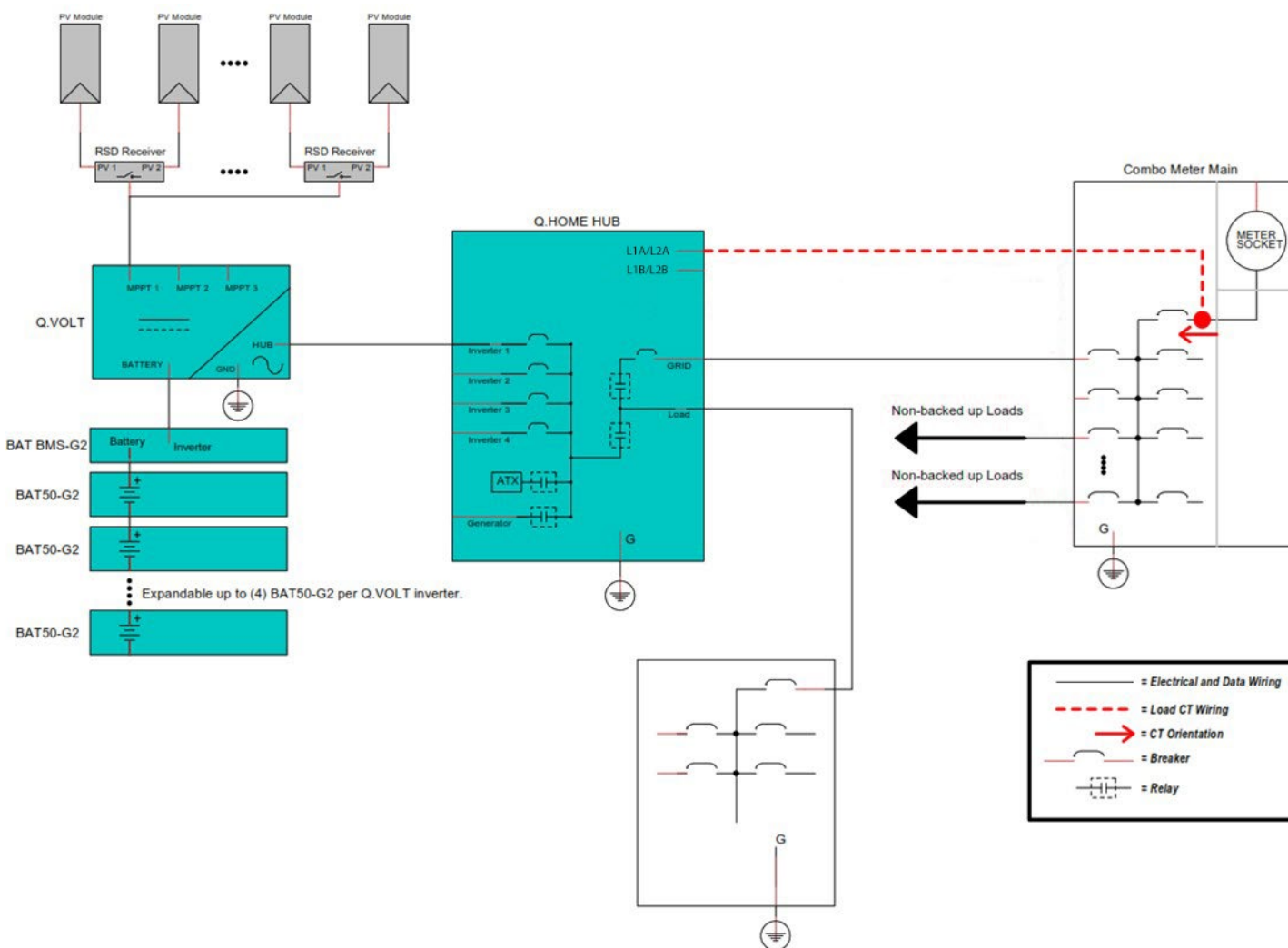
The electrical feed from the utility meter is connected directly to the Q.HOME HUB grid terminal and the main service panel is then connected to the load terminal of the Q.HOME HUB. This way, the home’s entire main service panel can be energized during grid outage events. **The Q.HOME HUB has integrated CT sensors measuring the grid terminal lines and no other CT sensors are required.**



### Partial Home Backup CT Sensor Application 1:

To accurately measure the loads on a Partial Home configuration (where loads are divided between a main and back-up service panel), current still needs to be measured at the grid interconnect point. Along with the inverter’s production data, this will allow the system to accurately calculate, use, and display production and load data. **The Q.HOME HUB integrated CT sensors must be disconnected, and (2) external CTs will need to be installed at the grid interconnect point.**

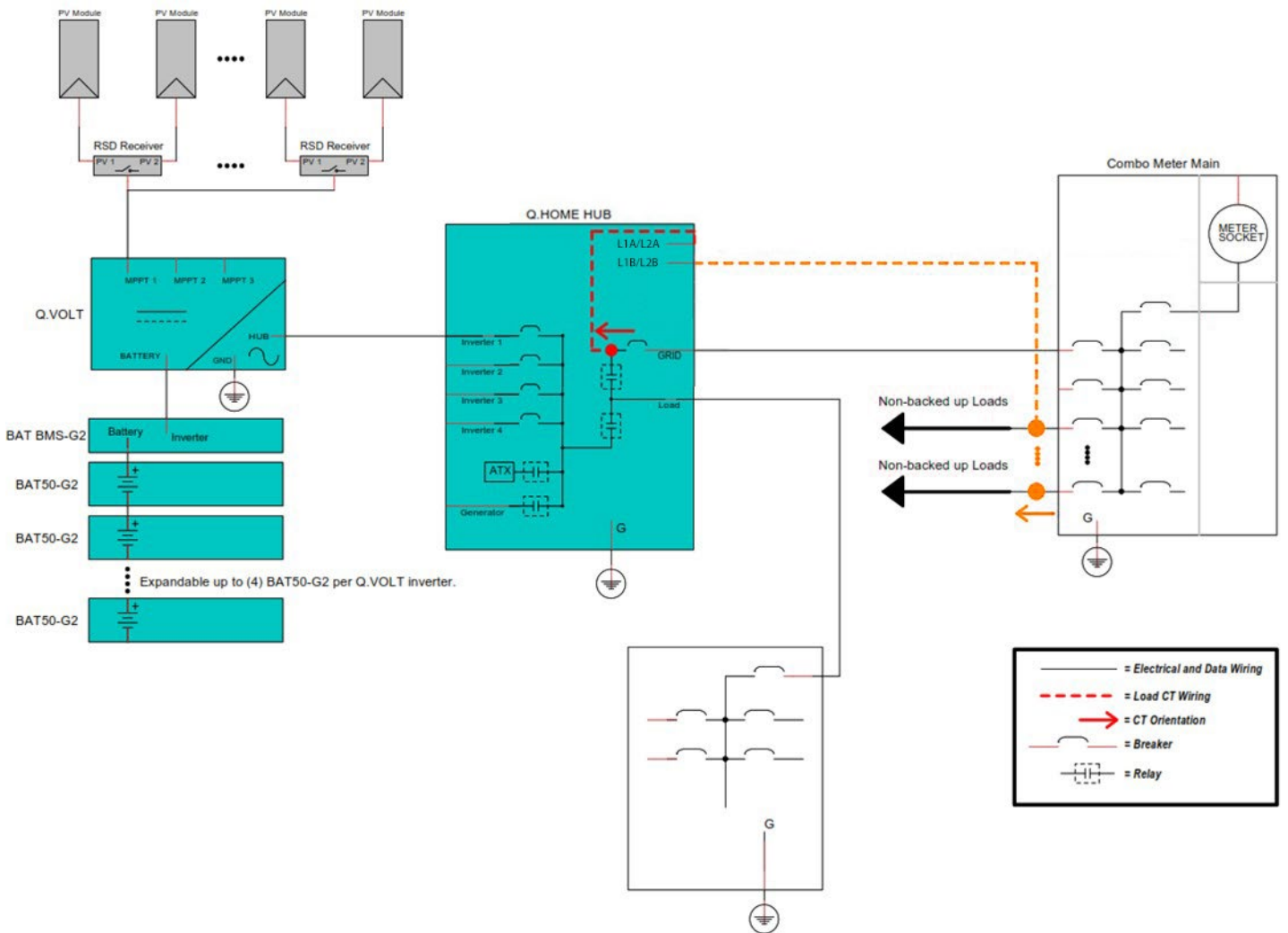
**An alternative method is provided next if the provided CTs cannot be used due to space constraints around conductors at the service entry point.**



### Partial Home Backup CT Sensor Application 2:

In situations where placing the CTs above all loads in the main service panel is impossible due to space constraints, multiple sets of CTs can be connected in parallel to monitor non-backed up loads individually or collectively. CTs must be placed around the conductors coming from the breakers in the service panel to the external loads which are not moved to the back-up service panel. As only a single set of included CTs are provided with the equipment, additional CTs must be purchased separately.

**Due to impedance differences between CT products all CTs connected in parallel must be the same make and model.**



## Balance of System Components

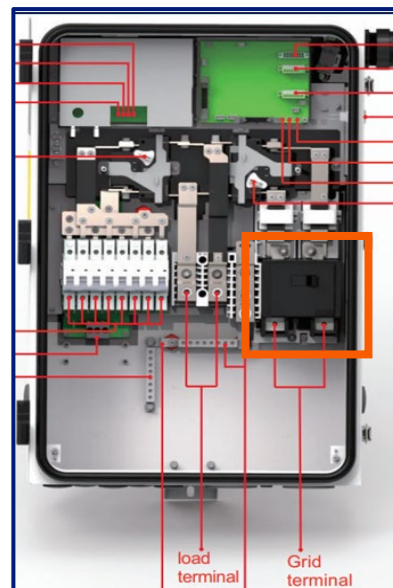
See below for a list of materials that come with the product, a few recommended tools, and **important items sold separately that are needed to install the Q.HOME CORE product in this application.** This list is intended to be high level and does not include details such as conduit, wire length, load distribution breakers, etc.

**Note that the categories “Tools”, “Wiring”, and “BOS” do not come with the product.**

Category	Quantity	Item	Item Description
Product	1	Q.VOLT H3.8SX or Q.VOLT H7.6SX	Hybrid Inverter carton
	1	BAT50 BMS-G2	Battery management system carton
	2-4	BAT50 SYS-G2	Battery module carton
	1	Battery Mounting Carton	Battery mounting bracket carton
	1	Mounting Accessories Carton	Mounting accessories carton
Tools	1	5 mm Phillips head	Used for installing system
	1	4 mm Phillips head	Used for installing system
	1	8 mm Drill bit	Used for installing system
	1	10 mm bolt head	Used for installing system
Wiring	Site Specific	12 - 8 AWG	Inverter to Hub wiring based on lug/terminal size or breaker size
	Site Specific	6 - 4/0 AWG	Hub to load wiring based on lug/terminal size
	Site Specific	6 - 4/0 AWG	Hub – utility meter wiring based on lug/terminal or breaker size
	Site Specific	8 - 4 AWG	Hub and Load Ground wiring based on lug/terminal size
BOS	1	Q.HOME Hub Breaker, up to 200A	Main breaker for Q.HOME HUB, see approved list
	1	E-stop Switch	Optional RSD activation source
	Site Specific	RSD-D	Qcells RSD receivers
	0-4	CT Sensors	Additional CT sensors may be required for partial home backup or applications
	Site Specific	CT Sensor Extension Cable	CT sensor extension cable may be required depending on the site requirements

When installed as service equipment (in the whole-home backup scenario), a main breaker must be installed in the Hub. The following are a list of compatible EATON breakers:

Index	Part Number	Description
1	CSR2100	100A/240V, 25kAIC, 2-Pole
2	CSR2125N	125A/240V, 25kAIC, 2-Pole
3	CSR2150N	150A/240V, 25kAIC, 2-Pole
4	CSR2175N	175A/240V, 25kAIC, 2-Pole
5	CSR2200N	200A/240V, 25kAIC, 2-Pole
6	BW2100	100A/240V, 10kAIC, 2-Pole
7	BW2125	125A/240V, 10kAIC, 2-Pole
8	BW2150	150A/240V, 10kAIC, 2-Pole
9	BW2175	175A/240V, 10kAIC, 2-Pole
10	BW2200	200A/240V, 10kAIC, 2-Pole
11	BWH2100	100A/240V, 25kAIC, 2-Pole
12	BWH2125	125A/240V, 25kAIC, 2-Pole
13	BWH2150	150A/240V, 25kAIC, 2-Pole
14	BWH2175	175A/240V, 25kAIC, 2-Pole
15	BWH2200	200A/240V, 25kAIC, 2-Pole



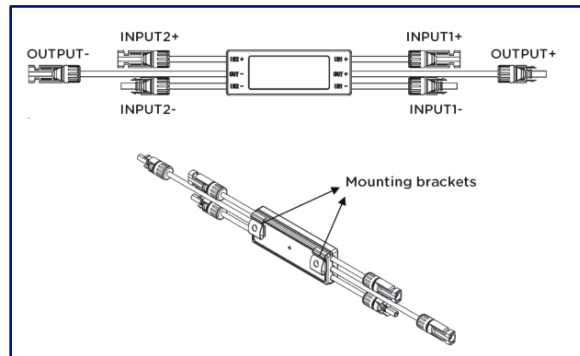
## System Installation Considerations

To see the full breakdown of the mechanical and electrical installation process, please refer to the Q.HOME CORE Installation and Operation Manual or the Q.HOME CORE Quick Start – DC Coupled with Qcells RSD-D document.

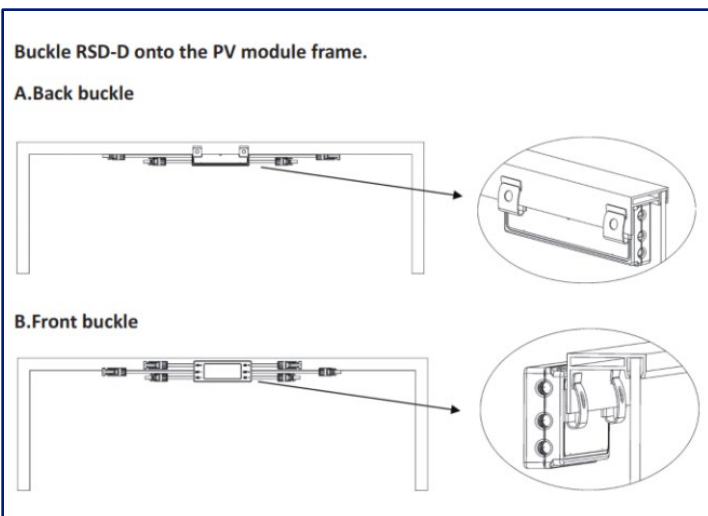
The items below are considerations unique to this application of the Q.HOME CORE product.

### Rapid Shutdown (RSD) Receivers:

- The Q.VOLT inverter has an integrated RSD transmitter that uses powerline communication (PLC) to communicate with the Qcells RSD-D receivers.
- Each RSD-D receiver has (6) connection points: (2) for PV module input 1, (2) for PV module input 2, and the (2) receiver-to-receiver AC power wiring connectors.
- The Qcells RSD-D rapid shutdown receivers are two channel receivers, meaning one receiver is needed for each two PV modules (odd numbers can be supported by connecting a single module to the same device).
- Be sure to confirm that the voltage and current specifications of the PV modules fall within the operational specifications of the RSD-D receiver.
- The RSD-D receiver should be buckled onto the PV module frame.



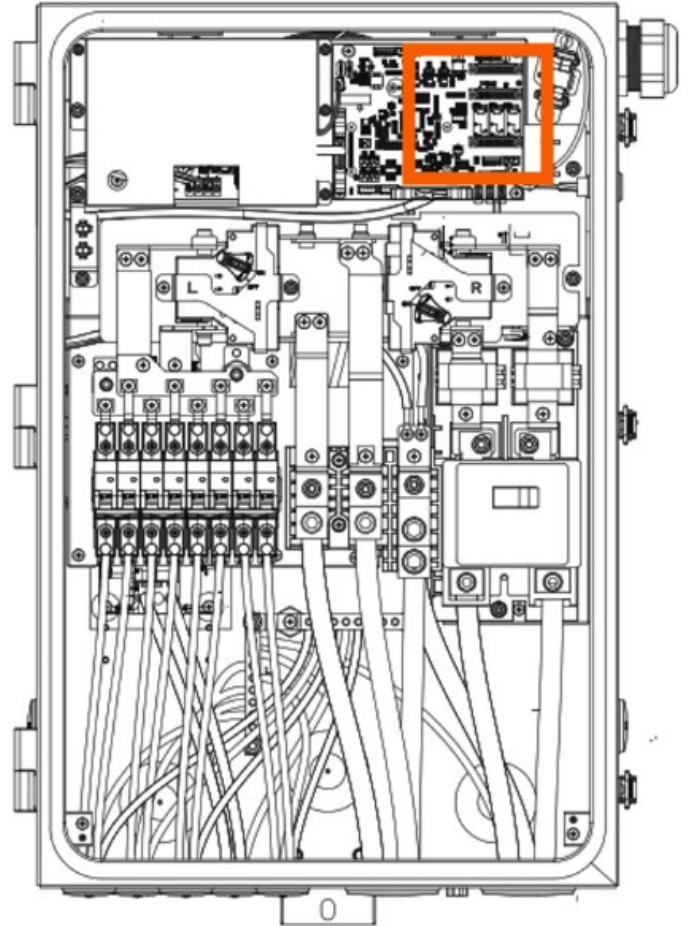
Input Data (DC)	
Input operating Voltage Range	8-80V Per Channel
Maximum Cont. Input Current (Imax)	15A Per Channel
Output Data (DC)	
Output operating Voltage Range	16-160V
Maximum Output Current	15A
Maximum System Voltage	1000V/1500V
Mechanical Data	
Operating Ambient Temperature Range	-40 °F to +167 °F (-40 °C to +75 °C)
Dimensions (without cable & connectors)	5.5" x 2" x 0.8"(140 mm x 50.6 mm x 20 mm)
Cable Length	Input 500mm/Output 1200mm
Cable Cross Section Size	TUV:4mm <sup>2</sup> /UL:12AWG
Connector	MC4
Enclosure Rating	NEMA Type 6P/IP68
Over temperature protection	Yes
Features & Compliance	
Communication Compliance	PLC
Safety Compliance	NEC 2017 & 2020 (690.12); UL1741; CSA C22.2 No. 330-17; IEC/EN62109-1
EMC Compliance	FCC Part15; ICES-003



## Rapid Shutdown (RSD) Activation Device

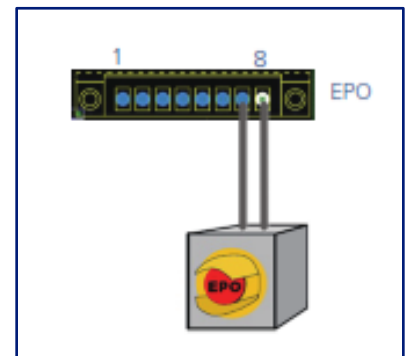
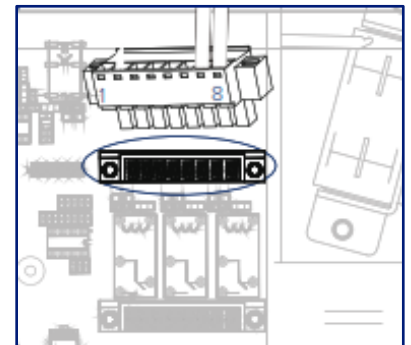
In locations where an external rapid shutdown device is required due to firefighter safety requirements, the Q.HOME CORE system has a prepared input mechanism built into the communication board of the Q.HOME HUB.

To activate the RSD function of the Q.HOME CORE system, the Q.HOME HUB has a normally closed (NC) contact emergency stop connection point that can be used to trigger the rapid shutdown function by powering off the embedded RSD transmitter. The function does not need to be enabled, just an external device connected.



## Connection of the RSD Activation Initiation Device

1. Remove the factory installed 8-pin connector with jumper wire from the Q.HOME HUB communication board.
2. Remove the jumper wire and rewire pins 7 and 8, using 18-24 AWG, to a suitable emergency stop switch.
3. Positioning the switch to the OFF (open) position will force the system into IDLE mode, initiating discharge of DC energy from the PV circuit coming from the array.





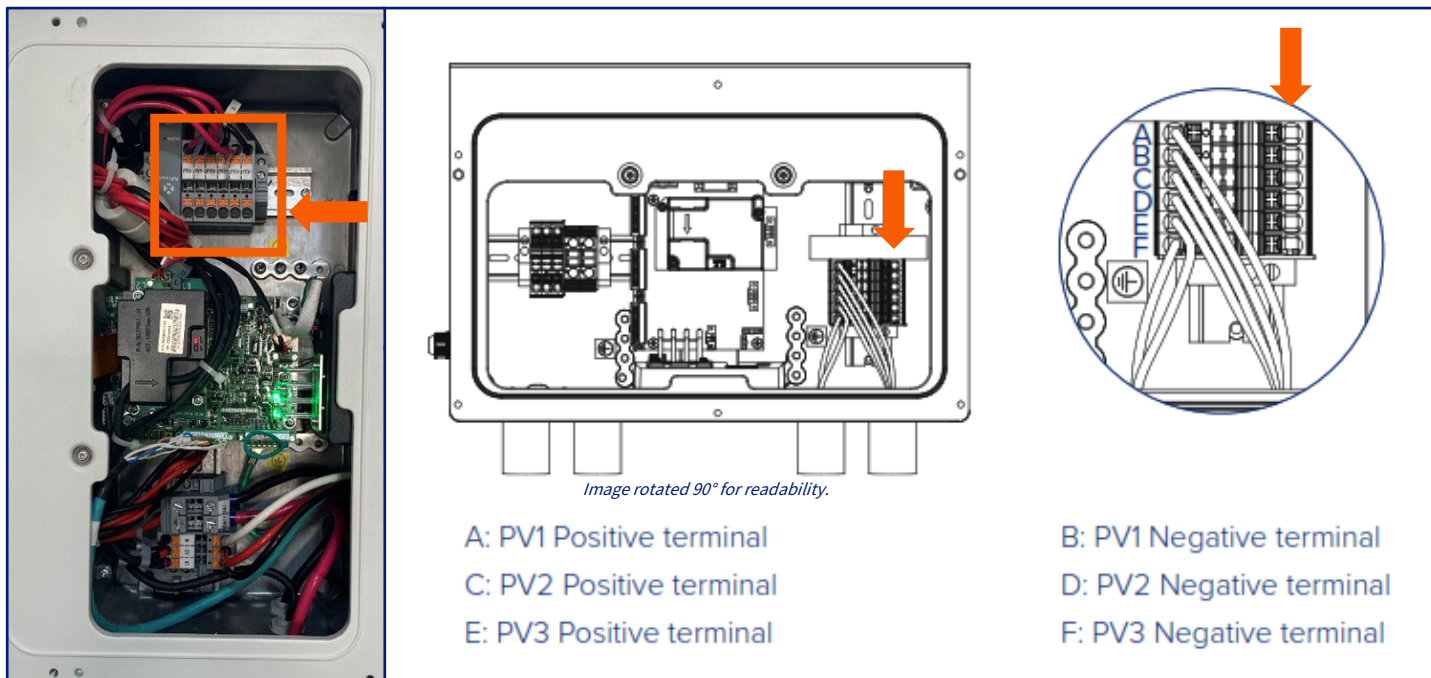
## Q.VOLT PV Input Considerations

The table below shows different PV input specifications of the Q.VOLT inverter series.

The maximum input DC voltage per MPPT channel is 550V and the minimum startup voltage per MPPT channel is 120V.

		Q.VOLT H3.8SX	Q.VOLT H7.6SX
<b>INPUT PV</b>			
Maximum recommended PV power	[W]	7600	15200
Maximum DC voltage	[V]	550	
Normal DC operating voltage	[V]	360	
Maximum input current	[A]	A: 16/B: 16	A: 16/B: 16/C: 16
Maximum short circuit current	[A]	A: 20/B: 20	A: 20/B: 20/C: 20
MPPT voltage range	[V]	90 to 500	
Start input voltage	[V]	120	
No. of MPP trackers, Strings per MPP tracker		2, 1/1	3, 1/1
DC disconnection switch		YES	

The Q.VOLT inverter series has up to **3 PV Input MPPT channels** located in the upper section of the inverter wiring box.





## System Commissioning Considerations

To review the entire commissioning process, please refer to the Q.HOME Installation and Operation Manual. For application-specific guidance refer to the Q.HOME Installation Quick Start Guide – DC Coupled with Qcells RSD-D.

### Installation teams should be capable and prepared to perform the following steps:

Installation team will require either a laptop or cellular device with access to the Qcells monitoring portal. This will be required to:

- Confirm that the expected PV voltage and current is showing on the monitoring portal for each MPPT channel with a connected PV string.
- Verify production and consumption data appear correctly on the monitoring portal to ensure correct CT location and configuration.

It is recommended, and often required, to perform the RSD activation test during the commissioning and inspection processes to ensure the RSD-D transmitters, receivers, and the means of activation are all configured properly. If an AHJ will require validating the voltage reading on the DC circuit while being deenergized, the installer should have the appropriate electrical safety equipment and training to perform work on energized equipment.

For technical support please contact us at: [pti-ess@qcells.com](mailto:pti-ess@qcells.com).

## Revision Table

Revision	Date	Description	Author
v1.0	3/8/23	Document created	SR/JP