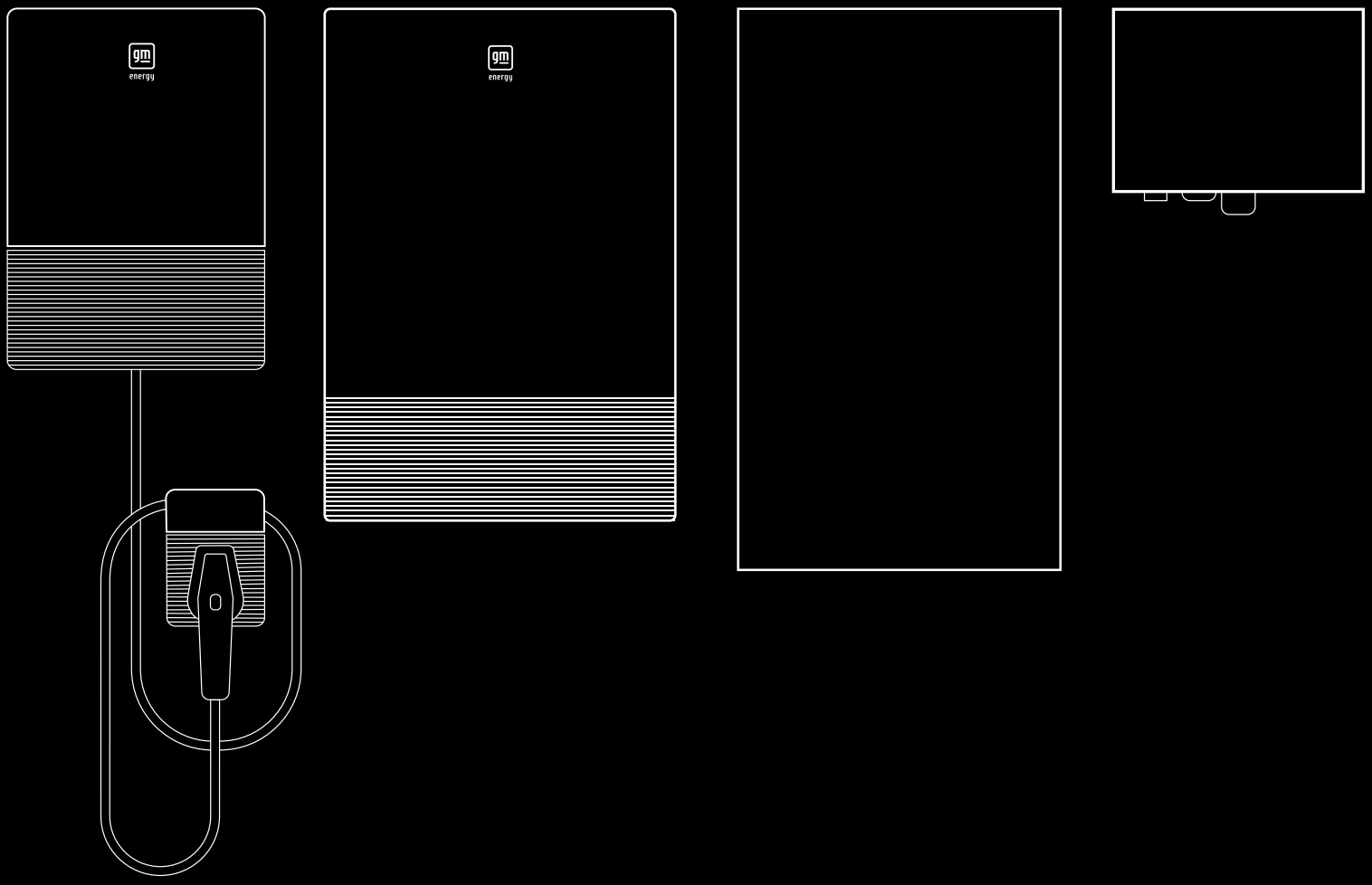


gm energy

V2H Bundle

Installation Manual

Version 1.0 - April 2024

SAFETY, WARNINGS, AND COMPLIANCE

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS – This manual contains important instructions for the GM Energy V2H Bundle (GM Energy PowerShift e1.19, GM Energy Inverter e1.11, GM Energy Home Hub e1.200, GM Energy Dark Start Delta9.6V25Ah) that should be followed during installation and maintenance

	**DANGER!** Indicates a hazard with a high level of risk which will result in serious injury or death
	**WARNING!** Indicates a hazard that could result in injury or death.
	**CAUTION!** Indicates a hazard that could result in property or equipment damage.
	**PROTECTIVE EARTH GROUND:** Identifies terminals which are intended for connection to an external conductor for protection against electrical shock in case of a fault

WARNING! To ensure that the V2H Bundle ("the system") will operate and perform safely and as intended, the system must be designed, installed, commissioned, and placed into operation only by qualified persons, and in compliance with all product requirements, including, but not limited to: equipment integrated as Listed and not exceeding capacities or ratings; equipment secured, fastened, and sealed as required; equipment components installed per National Electric Code ANSI/NFPA 70 requirements and best practices; equipment commissioned, provisioned, and tested as required; and end users oriented for proper operation.

DANGER! The installation, adjustment, commissioning, or repair of the system involves the risk of contact with potentially lethal voltages and currents. Read this entire guide before beginning the installation. Note and observe all warnings and remove all sources of energy prior to interfacing wiring or electrical panels.

WARNING! The GM Energy Home V2H Bundle should not be used as a primary or backup power source for medical equipment or any other products in which failure could lead to injury or loss of life.

CAUTION! If the equipment is damaged during installation, stop the installation, and contact the GM Energy Support Center at **1-833-64POWER**

INTRODUCTION

This document describes the General Motors Energy (GM Energy) V2H Bundle system-level installation steps and requirements for installing and commissioning the following equipment:

- GM Energy PowerShift ("Charger")
- GM Energy Inverter ("Inverter" or "BDI")
- GM Energy Home Hub ("Home Hub" or "Hub" or "MID")
- GM Energy Dark Start Battery ("Dark Start Battery" or "DSB")

IMPORTANT: The installation content in this document is solely focused on the GM Energy V2H Bundle (GM Energy PowerShift Charger, GM Energy Inverter, GM Energy Home Hub, GM Energy Dark Start Battery). The GM Energy PowerBank and DC Solar panel integration into the Inverter is not available at the time of this manual publishing date. Further documentation will be made available at https://gmenergy.gm.com/for-home/resources-and-support when the features become available. For further information, please call the GM Energy Support Center at **1-833-64POWER**

The following shows how the equipment is categorized and bundled:

Name	Equipment Included
GM Energy V2H Enablement Kit	• GM Energy Inverter • GM Energy Home Hub • GM Energy Dark Start Battery
GM Energy V2H Bundle	• GM Energy PowerShift Charger • GM Energy V2H Enablement Kit
GM Energy PowerShift Charger	• GM Energy PowerShift Charger

For more information on each component, please refer to the component installation manuals, as follows. These documents can be found at https://gmenergy.gm.com/for-home/installation-support.

- GM Energy PowerShift – GM Energy PowerShift Charger Installation Manual
- GM Energy Inverter – GM Energy Inverter Installation and Operation Manual
- GM Energy Home Hub – GM Energy Home Hub Installation and Operation Manual
- GM Energy Dark Start Battery - GM Energy Dark Start Battery Installation and Operation Manual

The following diagram depicts the equipment layout when all components are installed, and the Hub is configured as the main service entrance (

Figure 1); this is a general system overview that includes optional components and is meant to show the connections between components. Actual configuration is dependent on the installation environment and house configurations.

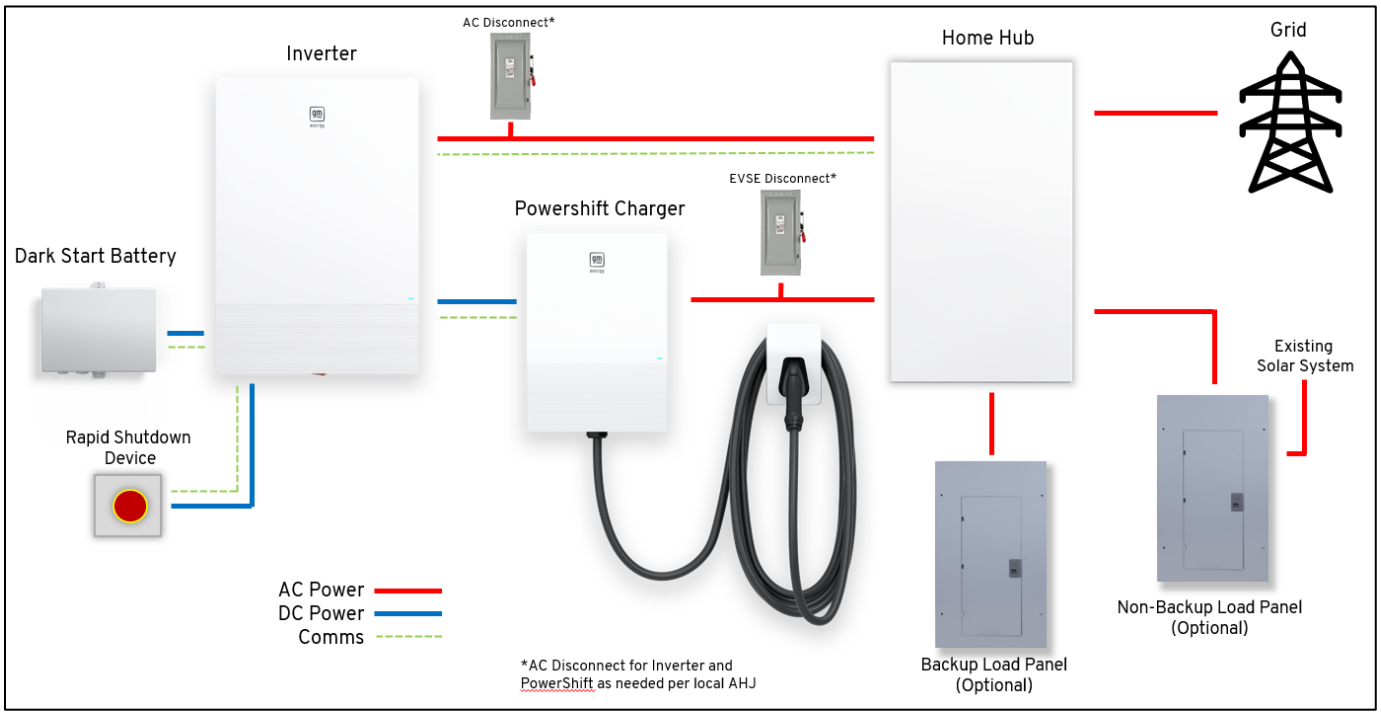


Figure 1: System Overview

Tools, Materials, and Fasteners

Personal Protective Equipment (PPE) for various conditions will be required, and all installers must adhere to all safety protocol. In addition to standard electrician and torque tools, a T20 Torx, a 9/32" deep socket, and Allen wrenches are also required. In addition, the installer shall provide all cables, conductors, and fasteners called out in subsequent sections of this guide. All these items must conform to GM Energy specifications.

Main Components

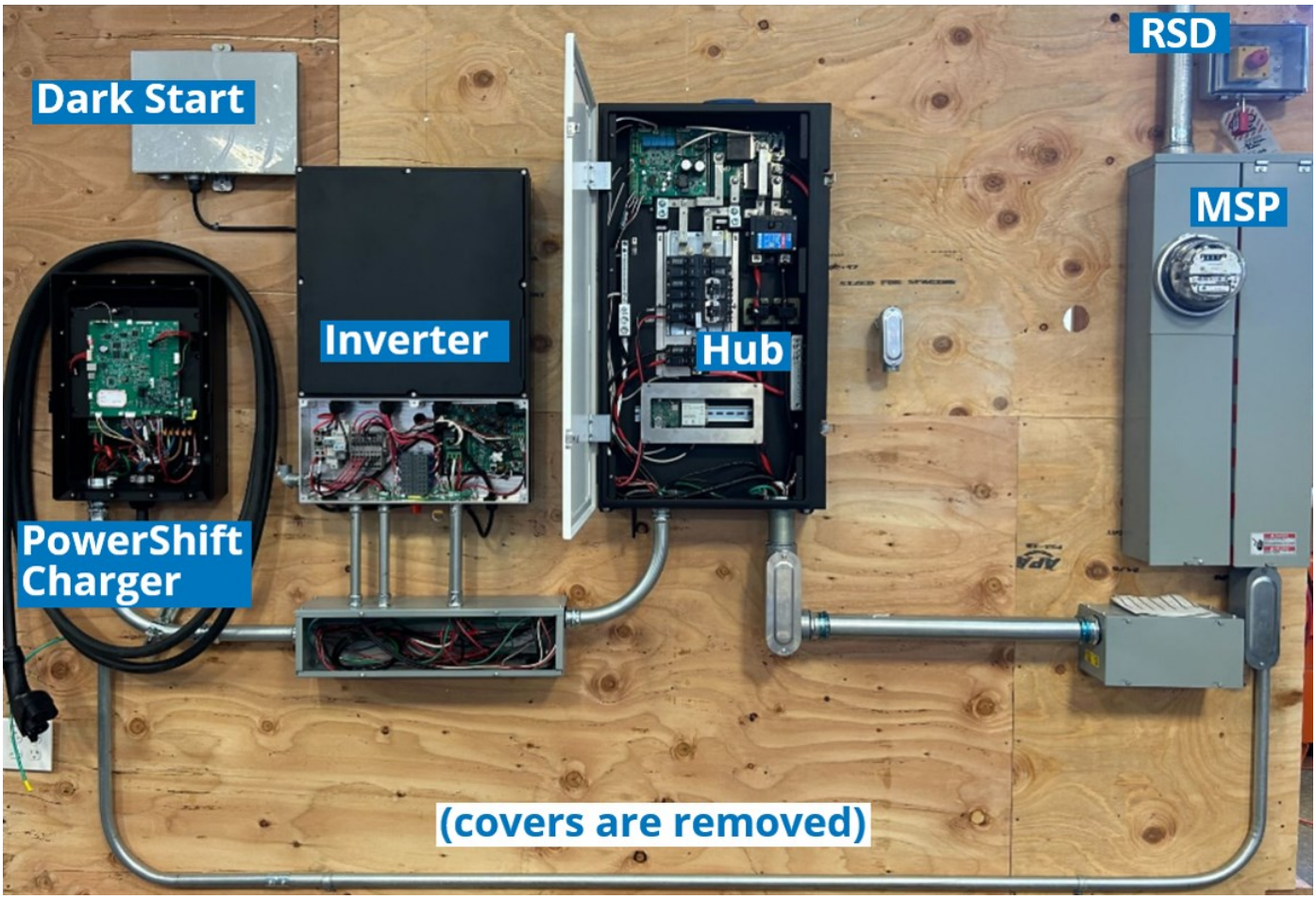


Figure 2: Main components with covers removed

Component		Notes
GM Energy PowerShift Charger	Bi-directional Electric Vehicle Supply Equipment (EVSE)	Standalone AC charging up to 19.2 kW 14.8 × 20.9 × 6.3 in., 38.6 lb.
Inverter	Bi-directional inverter	20.9 × 30.7 × 7.5 in., 94.8 lb.
Dark Start	Dark Start Battery	15.2 × 13.7 × 2.5 in., 8.6 lb.
Home Hub	Microgrid interconnect device and panel(s)	20.5 × 35.8 × 7.56 in., 45.2 lb.
MSP	Main service panel	Existing equipment (as pictured). May be replaced by Home Hub depending on installation configuration
RSD	Rapid Shutdown Device*	Also referred to as ESD (Emergency Shutdown Device).

*Installation of the Rapid Shutdown Device or Emergency Shutdown Device is highly recommended and may be required based on local code or ordinance. Please consult with a qualified installer or electrician for more information.

Equipment Requirements

The following sections summarize temperature, clearance, and distance between equipment requirements. See also the summaries in the respective Quick Installation Guide (QIG, included in the box of each piece of equipment).

Temperature

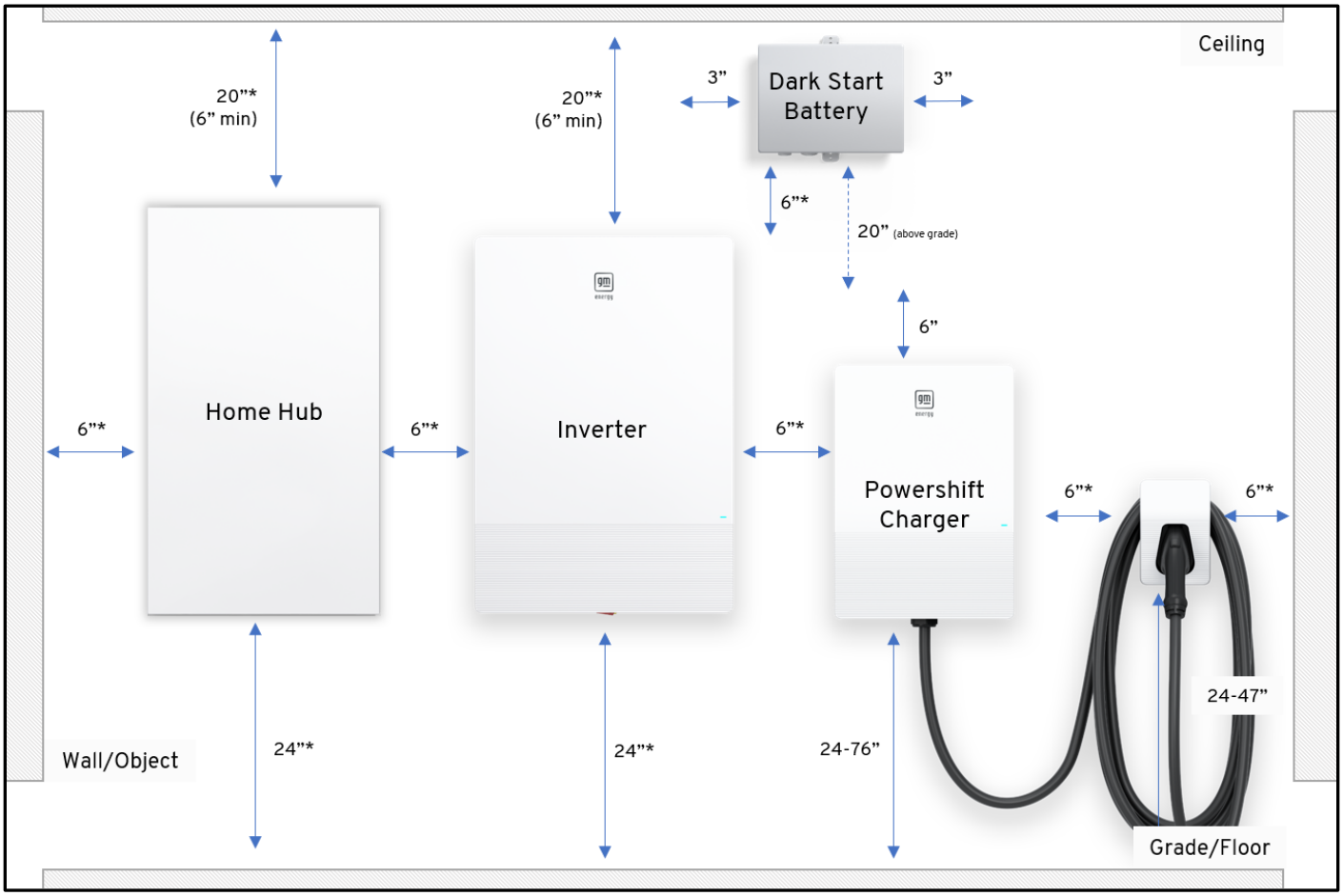
Component	Max. Low Temp. (shipping/ storage)	Operating Min. Temp.	Operating Max. Temp.	Max. High Temp. (shipping/storage)
GM Energy PowerShift Charger	−40°F (−40°C)	−40°F (−40°C)	122°F (50°C)	176°F (80°C)
Hub	−40°F (−40°C)	−4°F (−20°C)	122°F (50°C)	185°F (85°C)
Inverter	−40°F (−40°C)	−22°F (−30°C)	149°F (65°C); with derating above 113°F (45°C)	185°F (85°C)
Dark Start: Charge	−40°F (−40°C)	32°F (0°C)	113°F (45°C)	185°F (85°C)
Dark Start: Discharge		−4°F (−20°C)	122°F (50°C)	

Sun shading is recommended for installation locations exposed to direct sunlight where ambient temperatures exceed 104°F (40°C).

Clearance

The minimum distances shown in *Dimension is recommendation

Figure 3 must be maintained (unless noted as recommendation) to limit equipment derating in certain operating modes, temperatures, and power levels. Refer to local regulations for additional guidance on mounting position.



*Dimension is recommendation

Figure 3: V2H Bundle Clearances

Distance Between Components

The maximum distance between equipment determined by **conductor length**, not physical distance between components. Raceway (conduit) pathway and conductor length taken up *inside* the equipment must be considered:

Figure 4: Maximum conductor length between components

	Conductor and Cable Maximum Distance	Minimum Conductor Sizing
Hub to Inverter	164' (50 m)	• 240 VAC circuit: min. #6 Cu, Black, Red, White, #10 Green. • 12 VDC: #10 Cu, Black/Red.
Inverter to Charger	131' (40 m)*	• DC power conductors: min. #8 Cu, Black, Red, Green. • Serial communication: min. #23 (#18 AWG recommended), twisted pairs.
Dark Start to Inverter	6.5' (2 m) Integrated factory cable	*N/A Integrated Factory Cable*

* Note: Usable Dark Start state of charge is reduced (less available time for dark start recovery) if the distance between Inverter and Charger exceeds 49' (15 m)

Maximum Elevation

The components of the V2H Bundle are not to be installed in locations with an elevation of greater than 3000m above sea level.

Before You Begin

Upon arrival, evaluate the site:

1. Review the design and verify the actual physical details at the site:
    a. Adequate mounting surfaces and O.C. (on center) stud distance when applicable.
    b. Existing electrical system and points of interconnection.
    c. Ensure site is powered by 120/240 VAC service – never with 208 VAC service.
    d. Feeder/long conduit runs and backup circuits.
2. Verify equipment layout:
    a. Verify adequate space for equipment.
    b. Verify that wireway and conduit Balance of System (BOS) plan makes sense and is viable.
    c. Verify that Charger location will enable charge cable to reach vehicle charge port without creating tension at the charge cord connection to the vehicle.
3. Confirm adequate Wi-Fi signal strength at the determined mounting location of both the GM Energy PowerShift Charger and Home Hub.
    a. Signal strength of –75dB or greater at both locations is required in order to commission this system. A stronger Wi-Fi signal will be less negative, or closer to zero.
        i. Various free mobile and web apps will allow you to measure this value prior to installing the equipment. Once the system is wired up, signal strength can be measured through the PowerShift Install App for commissioning.
    b. If you measure insufficient Wi-Fi signal at either location, a range extender or booster may be required to ensure consistent cloud connectivity.
        i. If Wi-Fi signal is insufficient, a mobile hotspot may be used during commissioning. The system may then be connected to the home Wi-Fi network through the vehicle's mobile app after commissioning, if required.
4. Prepare equipment:
    a. Remove equipment from packaging, keeping track of all fasteners and screws!
    b. Remove covers and place in non-work area to avoid damage.
    c. Prepare knockouts and conduit fittings; and install any Hub accessories as necessary

As the installation progresses, be prepared to capture necessary job closeout photos, keeping in mind that some photos can only be taken during the installation process. GM Energy provides recommendations of job closeout photos to take in the Job Closeout section, as these may be beneficial for both the installer and GM Energy to best support the customer if they require service in the future. However, these photos are not required by GM Energy; please refer to your installation company if they require any specific closeout photos or information.

Installation Outline

GM Energy PowerShift Charger Only Install

For installation of the Charger only, please see the GM Energy PowerShift Charger Installation Manual available at https://gmenergy.gm.com/for-home/installation-support

GM Energy V2H Bundle Install (GM Energy PowerShift + V2H Enablement Kit)

Your actual sequence may vary based on site conditions and chosen workflow. The Hub and the Inverter have usable knockouts pre-drilled—you may NOT create any additional knockouts in the Hub or in the Inverter.

1. Attach mounting brackets to wall.
2. Mount equipment on brackets.
3. Remove equipment covers.
4. Prepare knockouts for raceways.
5. Install conduit (or bundled cables) between all equipment.
6. Install and terminate power conductors, communication cables, and control cables.
7. Migrate existing circuits into the Hub.
8. Verify that equipment is adequately secured to mounting surfaces, conduits appropriately sealed, and conductors and cables terminated properly.
9. Safeguard equipment for energization.
10. Conduct and record pre-commissioning checks and data.
11. Commission the equipment.
12. Verify all premises circuits are operational.
13. Reinstall all equipment covers and beauty covers.
14. Orient customer with equipment and any next steps.

INSTALL COMPONENTS AND CONDUIT

Important! **Before you begin, read the instructions in the subsequent *Details* sections for each component as well!**

Install all components on load-bearing walls with framing members only. Do not violate environmental, clearance, or maximum distance requirements. *If you are only installing the Charger, the instructions for the other components do not apply!*

1. Carefully open each component's box. For the Charger, Home Hub, and Inverter, remove the mounting bracket.
2. Verify that the mounting location for each piece of equipment is made of a non-flammable material, provides enough clearance and spacing (*Dimension is recommendation
3. Figure 3 and Figure 4 and Section 1.5), and is adequate for the mounting fasteners.
4. For the Charger and Hub, use the mounting bracket as a template to mark the holes (the center holes when mounting to a single stud), then level and mount each bracket to the wall in the designated location using the hardware described in Table 1. All fasteners must be stainless steel, and must land in the center of the stud. For the Hub, if mounting to drywall with studs, in addition to the two lags you install in the center of the bracket, install one *drywall anchor* in one of the holes left of center and one right of center.

CAUTION! Make sure a surface that is appropriate for the weight of each device is chosen, correct fasteners are used for the intended surface, and the bracket is secure before mounting any device.

5. For the Inverter, use the mounting bracket as a template to mark four holes between two studs (typically the four which are at 16″ o.c.), and then level and mount the bracket to the wall in the designated location using the hardware described in Table 1. All fasteners must be stainless steel, and must land in the center of the stud.
6. Remove covers to the equipment wiring chambers (*you may choose to do this after you mount the equipment*):
   - Charger: using a T20 tool, remove the front cover by removing the two screws holding the bottom and then carefully prying the cover off; then remove the fourteen screws and carefully remove the inner cover. DO NOT LOSE ANY SCREWS!
   - Hub: using a precision screwdriver (or 1/8 Allen wrench), gently pry open the cosmetic covers over the latches on the right side of the Hub, and then open the latches. With a T20 tool, loosen the three dead front screws on the left side, and then remove the three screws on the right side. Carefully pull the right side of the dead front toward you, then slide it to the right and remove it.
   - Inverter: using a T20 tool, loosen the five lower wiring chamber cover retention screws and then remove the cover.

     Note: Latch covers are optional.

Verify equipment mounting location feasibility, and remove plugs and/or prepare knockouts and fittings (as required by conductor specifications) before mounting the equipment. Use only the factory entry locations and do not enlarge any. To remove a conduit plug, use a flat blade screwdriver to turn the plug while at the same time holding the nut on the inside of the wiring box.

For install locations exposed to water, use the appropriate water-tight fitting to match NEMA rating of unit. For install locations not exposed to water any NEC compliant fitting is allowed. Each wiring entry must allow for a 6″ wire loop *inside* the wiring chamber.

Raceways are required for the conductors, control cables, and communication cables that route between each piece of equipment. For example, the Rapid Shutdown Device (RSD) control cable from the Inverter must route in an appropriate raceway. *If you are only installing the Charger, only the 120/240 V circuit (with grounding conductor) is required.*

With two installers handling each, mount the Charger, the Hub, and the Inverter on their respective brackets.

Mount the Dark Start directly to the wall surface, ensuring that the integrated cable exits from the *bottom* of the installed position.

Measure for, cut, route, and attach conduit between each component (adhering to NEC requirements). Depending on your conduit and wire routing plan, conductors and cables might enter from the back, side, or bottom of the equipment. If rear entry raceway holes will be used on the Charger, and you are installing the Charger outdoors, first apply a rainbow-shaped bead of sealant on the back of the Charger around the knockout.

After you have installed all appropriate fittings and raceways (conduit or tubing) route and pull all wiring into the Inverter, the Hub, and the Charger. Communication and control wires must be minimum #18 AWG; RS485 and CAN wires must be twisted pairs.

Note: this guide provides examples of black/white twisted pairs—*other colors are acceptable if and only if they meet the minimum specifications.*

Lag screws must be minimum 1/4″ × 1 1/2″. Pilot holes shall be 60–75% of the fastener diameter (e.g. if 5/16″ lag screw then 3/16″ pilot hole; if 1/4″ lag screw then 3/32″ pilot hole). Table 1 provides a summary of required mounting fasteners:

Wall Type	Component	Fastener (Quantity)	Notes
Sheetrock (drywall) with wood studs	Charger (Holster requires 2 of same fastener)	M8 × 60 mm (5/16″ × 2 3/8″) min. lags (qty. 2) into framing member. Charger and holster may be center mounted (one stud engaged) (Figure 5).	7/32″ pilot hole
	Hub and Inverter* Blocking or plywood (minimum 5/8”) required	M6 × 76 mm (1/4″ × 3″) min. lags (Inverter min. qty. 4 at 16″ o.c.; Hub min. qty. 2 lags plus 2 anchors) Hub may be center mounted (one stud engaged Figure 6); **Inverter may NOT be center mounted.**	3/16″ pilot hole
	Hub, center mounted*	M6 × 38 mm (1/4″ × 1 1/2″) min. lags (qty. 2) into stud AND min. two #10 wall anchors at outer mounting plate holes.	3/32″ pilot hole
Stucco	Charger (Holster requires 2 of same	M8 × 60 mm (5/16″ × 2 3/8″) min. lags (qty. 4).	7/32″ pilot hole
	Hub and Inverter* Must have 5/8” (or thicker) sheathing	M6 × 76 mm (1/4″ × 3″) min. lags (Inverter min. qty. 4; Hub min. qty. 2 lags plus 2 anchors)	3/32″ pilot hole
Sheathed wall with 3/4″ plywood	Charger (Holster requires 2 of same	M8 × 60 mm (5/16″ × 2 3/8″) min. lags (qty. 4).	7/32″ pilot hole
	Hub and Inverter*	M6 × 76 mm (1/4″ × 3″) min. lags (Inverter min. qty. 4; Hub min. qty. 2 lags plus 2 anchors)	3/32″ pilot hole
Concrete, hollow-block CMU, or red brick	Charger (Holster requires 2 of same fastener)	M8 × 60 mm (5/16″ × 2 3/8″) with anchors (qty. 4).	5/16″ masonry bit
	Hub and Inverter*	1/4″ × 2 3/4″ concrete screws (min. qty. 4)	3/16″ masonry bit pilot hole
All surfaces except concrete	Dark Start	M6 screws (qty. 2).	Included with DSB
Concrete		1/4″ × 1 1/2″ concrete screws (qty. 2)	3/16″ pilot hole

Table 1

*Hub and Inverter also require one M6 screw (and anchor) at each lower front corner.

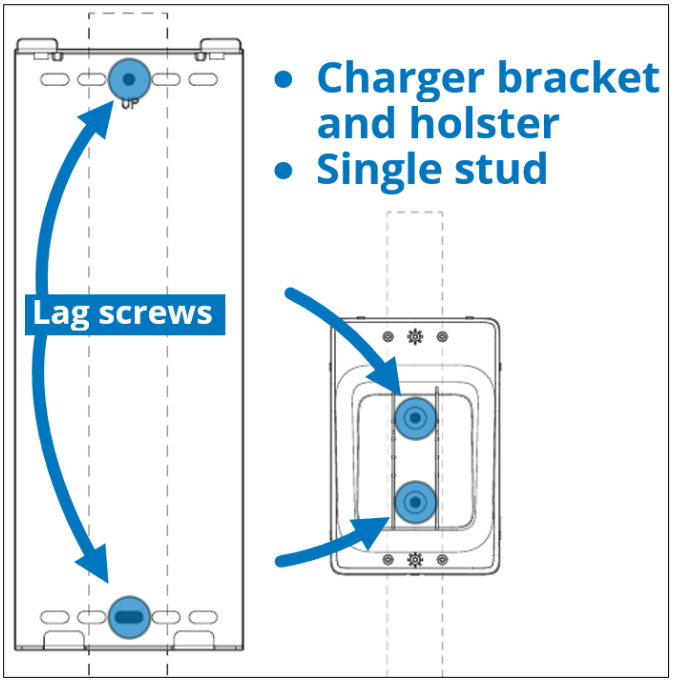


Figure 5: Fastener locations for Charger

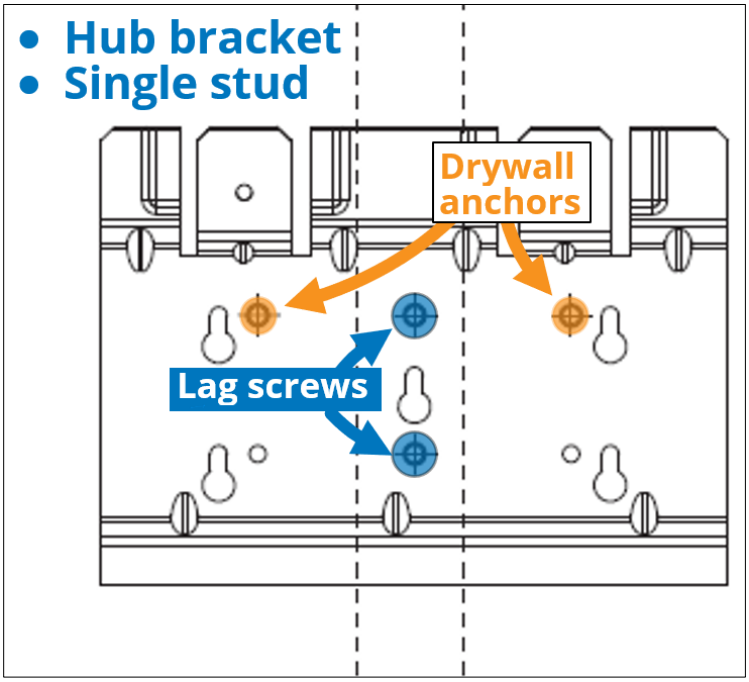


Figure 6: Fastener locations for Hub

Charger Details

Important! For some installations an AC disconnect may be required. Refer to local regulations for guidance.

The Charger has four options for raceway entry (Figure 7). The bottom left has a 1 1/4" threaded plug installed. The other three entry locations (bottom right, bottom left, and right rear) must be drilled out as needed. **Note that DC, AC, and adequately rated comm cables may be routed into the Charger in a single conduit.**

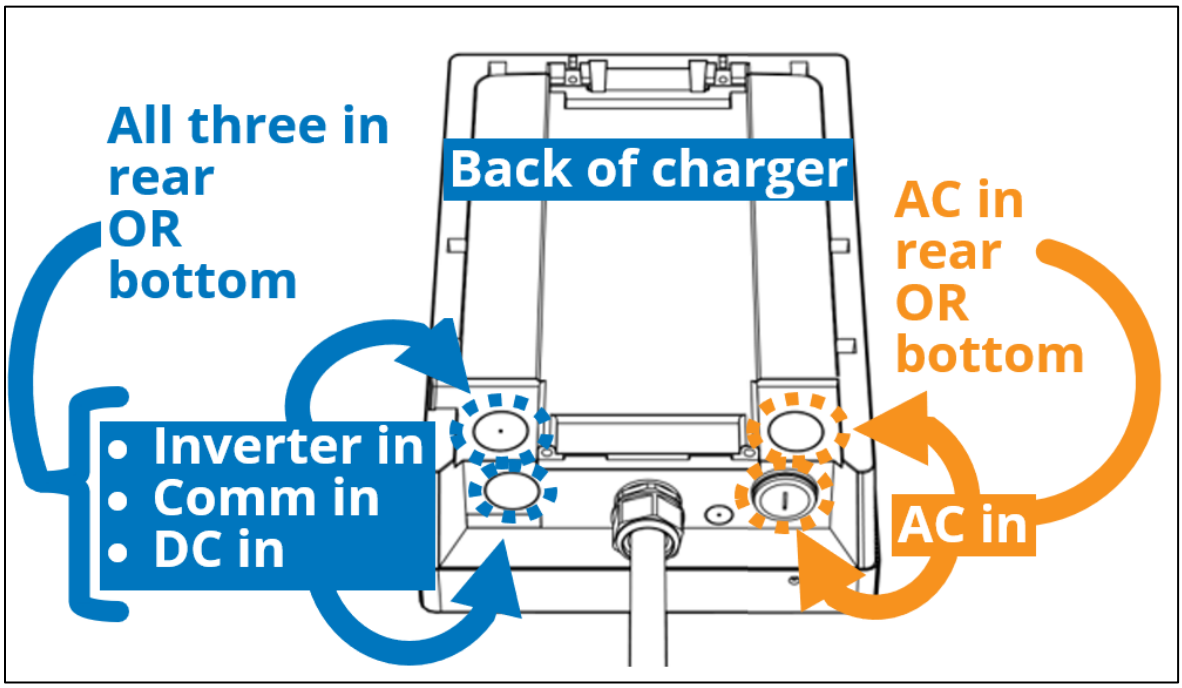


Figure 7: Charger raceway options

Secure the Charger to the mounting plate, using two Phillips flanged M6 screws at the top and two 3/8" Phillips bolts at the bottom, and then torque them to 17.4 in-lb.

Mount the Charger's holster assembly:

a. Release the front cover of the holster using the tabs at the bottom of each side, then remove the inner cover.
b. Mount the plug holder to the mounting surface using the hardware described in Table 1.
c. Attach the inner cover to the plug holder with two Phillips head flanged screws and torque each to 10.4 in-lb.
d. Reattach the front cover (it will click into place).

Coil the charging cord around the holster, and then insert the Charger nozzle into the holster.

Home Hub Details

The Home Hub has seven options for raceway entry (Figure 8):

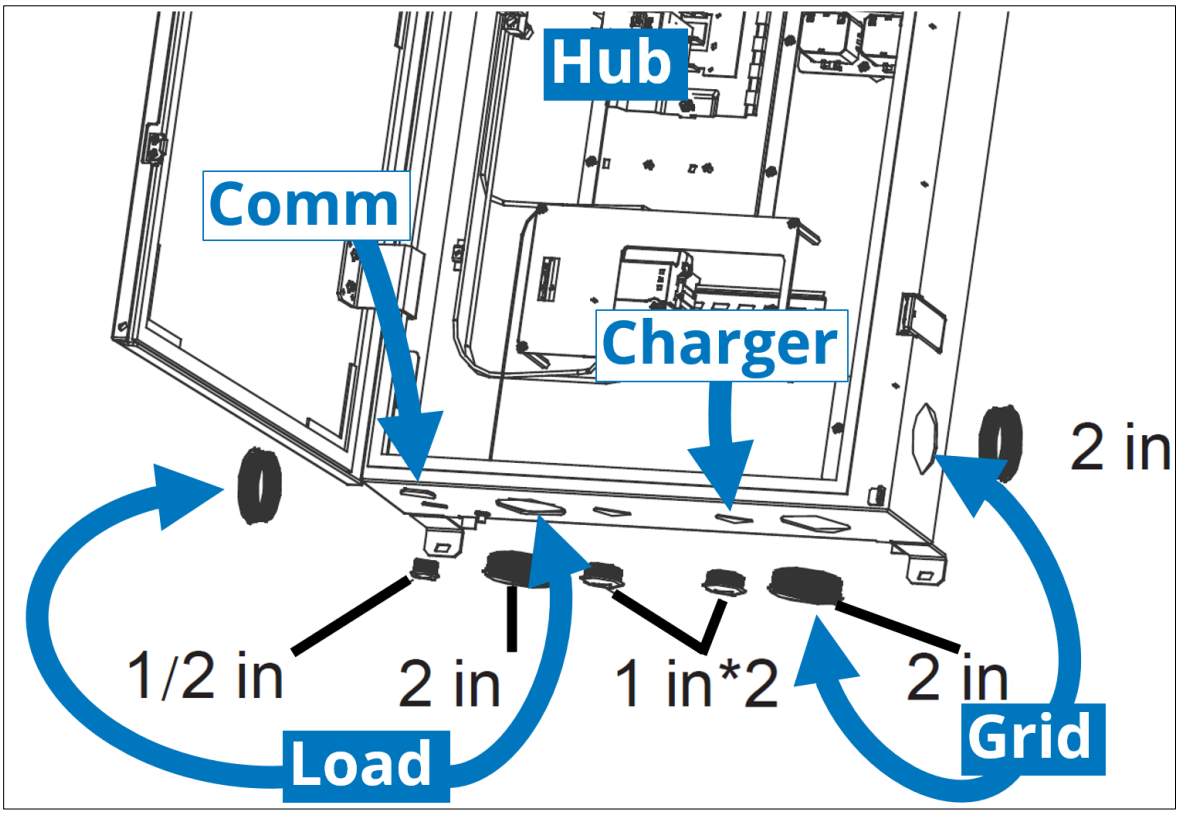


Figure 8: Home Hub raceway options

On the bottom are two 2", two 1", and one 1/2" entry locations. There is also one 2" on the left lower side and one 2" on the right lower side. The left 1" location is for the conduit coming from the Inverter. The left 1/2" location is for the conduit carrying the communication wires. Each location is pre-drilled and has a threaded plug. There are no entry locations on the back/rear.

The Home Hub may require installer-provided accessories such as a main breaker or an additional meter. If these are required, prepare them *before* mounting the Hub. Refer to Appendix C for further details on optional accessories.

After installing the Home Hub, install the antenna from the accessory bag onto the threaded port at the bottom left of the Hub, taking care not to block the antenna area with raceway conduit bodies. See Section 3.0 for full details on accessories.

Inverter Details

The Inverter has eight options for raceway entry (Figure 9):

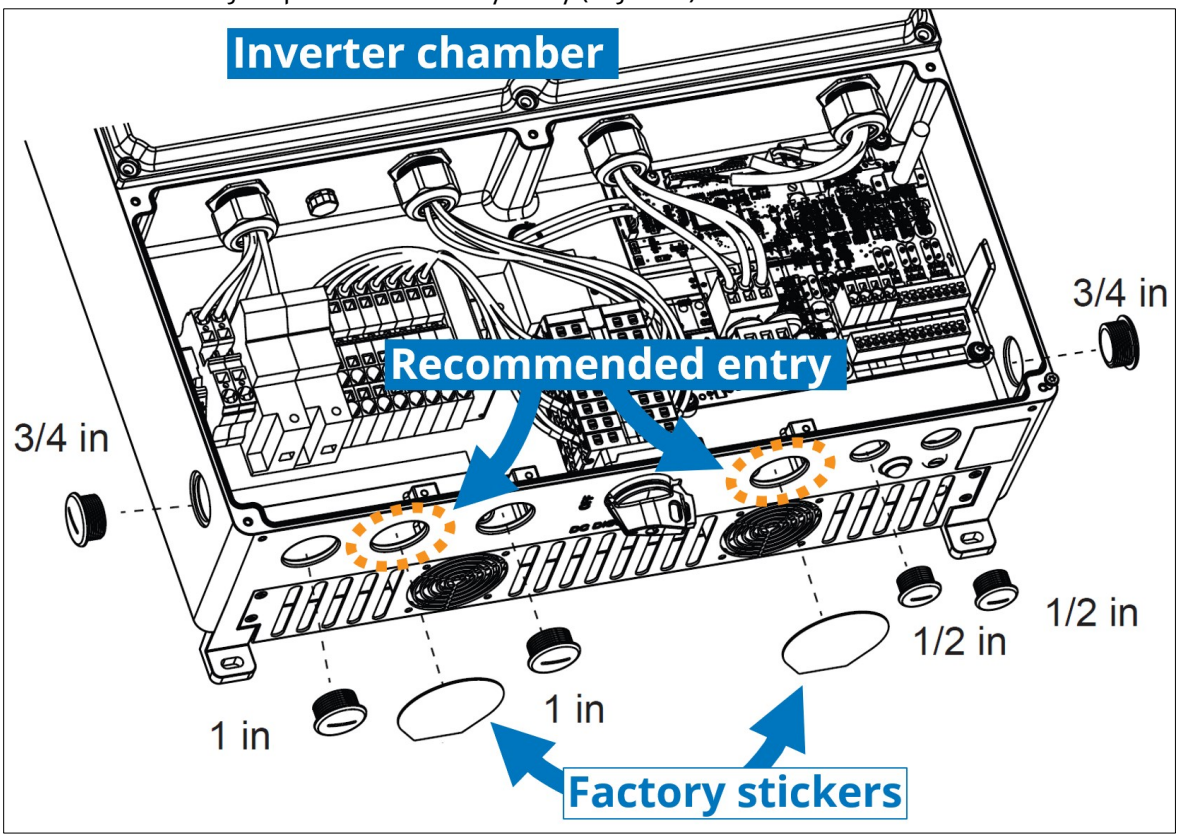


Figure 9: Inverter raceway options

On the bottom are four 1" and two 1/2" entry locations. There is also one 3/4" on the lower left side, and one 3/4" on the lower right side. **Two of the 1" locations have a sticker over them from the factory. These two with stickers are the recommended entry locations.** If you remove a conduit plug to use one of the 1" entries that does NOT have a sticker over it, use that conduit plug to replace a sticker. There are no entry locations on the back or on the top and remember the RSD circuit must be wired into the Inverter.

The Inverter has DC inputs for a stationary storage battery and Solar panels. At the time of this manual publishing date, these features are not enabled. Further documentation will be made available at https://gmenergy.gm.com/for-home/resources-and-support when the features become available. For further information, please call the GM Energy Support Center at 1-833-64POWER

Dark Start Battery Details

The Dark Start Battery should be covered/protected from direct sunlight, rain, or snow when installed outdoors. Typically, any roof overhang is adequate. The dark start has a single 3/4" threaded connection for a cord grip, or raceway fitting. For outdoor installations, conduit fittings must be watertight and rated NEMA 4, 4X, 6, or 6X. Fit the appropriate connector into the threaded connection.

You must mount the dark start close enough to the Inverter so that its attached cable can route and reach into the lower right wiring chamber of the Inverter. Position the dark start so that the integrated cable is exiting from the bottom of the dark start (Figure 10). If and only if the dark start is installed indoors, you may mount the dark start such that the cable exits the left or right side, *but never the top.*

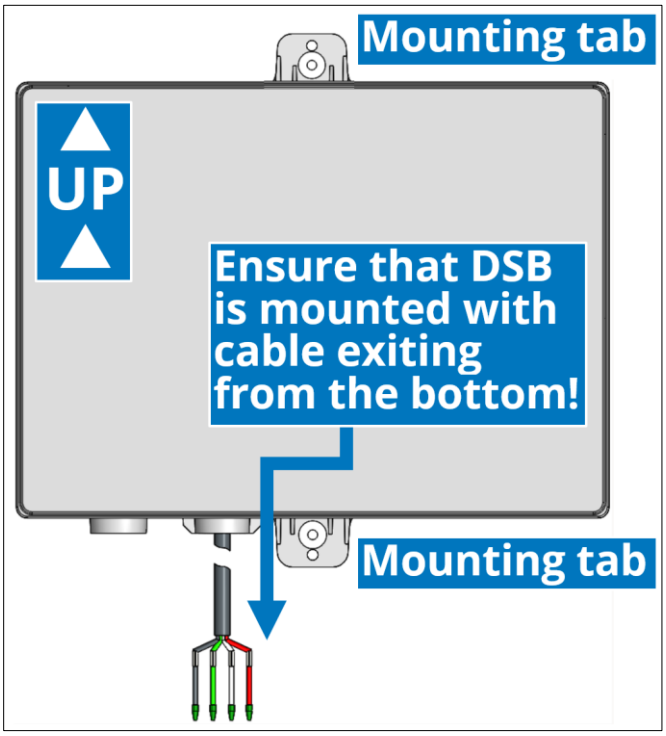


Figure 10: Dark start mounting

A NTP 3/4" threaded hole is provided at the cable outlet. Install an NTP 3/4" conduit fitting or cable gland at the wire egress of unit, torque it to 90–300 in-lb (10–39 N-m), and then route the cable into conduit or secure the factory cable to the mounting surface and route into the Inverter with an additional cable gland. If mounting outdoors, conduit fittings must be watertight and be NEMA 4 or higher. Ensure that the wire bend radius for the exiting cable exceeds 2 1/2" (64 mm).

Rapid Shutdown Device

Installation of the Rapid Shutdown Device (RSD) or Emergency Shutdown Device (ESD) is highly recommended and may be required based on local code or ordinance. Switch must be normally closed, be outdoor rated, be Listed for 12 VDC, and must clearly indicate its ON and OFF positions. The RSD control circuit must be wired into the Inverter. See Appendix C for example switch. It is recommended this switch be located near the home electric meter and be clearly labeled.

HUB CONFIGURATION AND ACCESSORIES

The Hub may require additional accessories to be installed depending on the system design. The following are included with the Hub:

- Hub
- Mounting plate
- Quick installation Guide
- Antenna
- Jumper kit: main service bonding jumper and two M4 screws
- Main breaker wiring kit: main service disconnect label and one M4 nut
- AC solar warning label
- PCS warning labels for CTs

The Hub may be used as the main service equipment, which may require the installation of a main breaker and neutral–ground bonding jumper inside the Hub. The Hub can be configured with an internal non-backup pan (typically for the Charger) which will require installing the Eaton 48INT125B accessory kit. The Hub features one internal, factory-installed energy meter. An additional energy meter may be added depending on site conditions and system design. **All electrical codes and standards must be followed when bonding neutral and ground.**

Installing the Hub as Main Service Equipment

The Hub includes an accessory kit which includes a neutral-to-grounding bonding strap (with hardware), and a MAIN SERVICE DISCONNECT label.

1. Using a T20 tool and M4 screws, install the bonding strap between the neutral bar and the back wall of the Hub (Figure 11). Torque the screws to 14 in-lb.
2. Using a 1/2" socket, remove the two chair lugs and then install the main breaker in their place, using two 1/4"-20 threaded nuts and a 7/16" socket (Figure 12). Torque each nut to 48 in-lb.
3. With a 9/32" deep socket, remove the main breaker housing flange nut, install the main breaker, and then reinstall the flange nut.

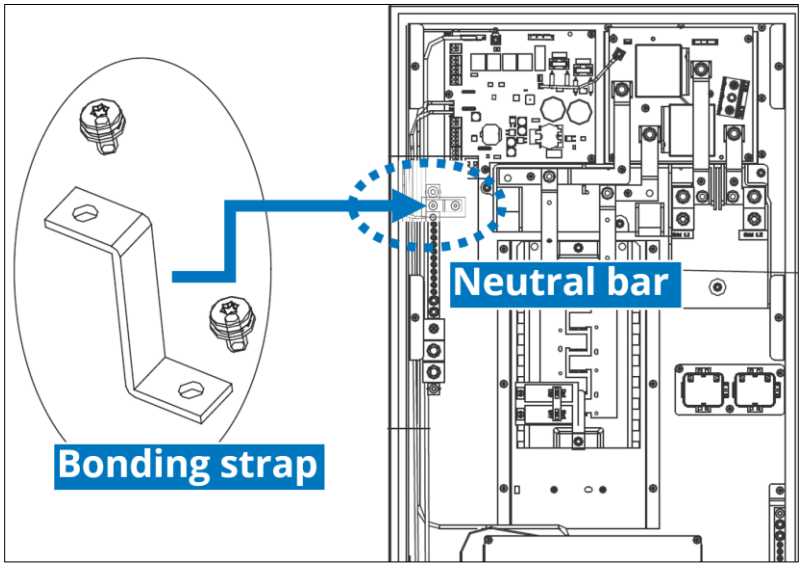


Figure 11: Location of bonding strap for main service panel

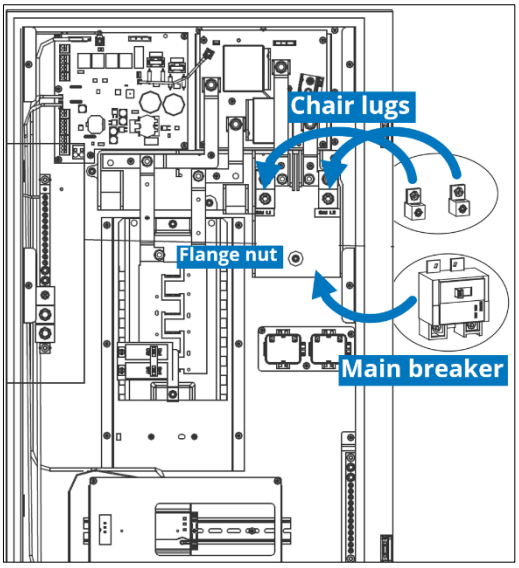


Figure 12: Location of main breaker installation

If the Hub will be used as the main service panel, affix the **MAIN SERVICE DISCONNECT** label on the Hub dead front above the opening for the main breaker (Figure 13):

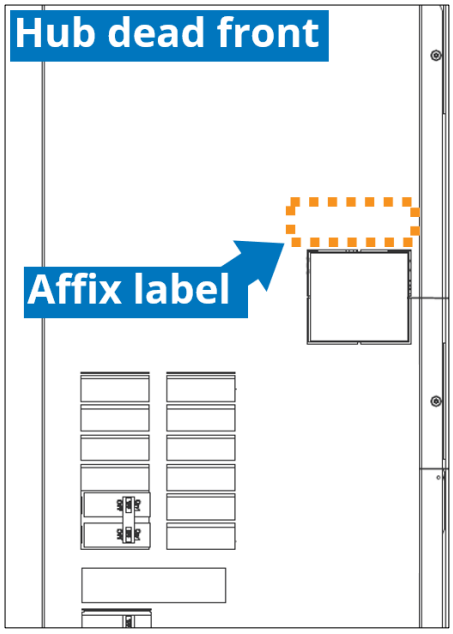


Figure 13: Location to apply MAIN SERVICE DISCONNECT label

The polarity of L1 and L2 is swapped inside Eaton CSR Series main breakers. Therefore, when wiring power conductors into the Hub (see Section 4.4), you must swap the position of the L1 and L2 conductors after installing the main breaker in the Hub, **and** swap the position of the CTs (Figure 14):

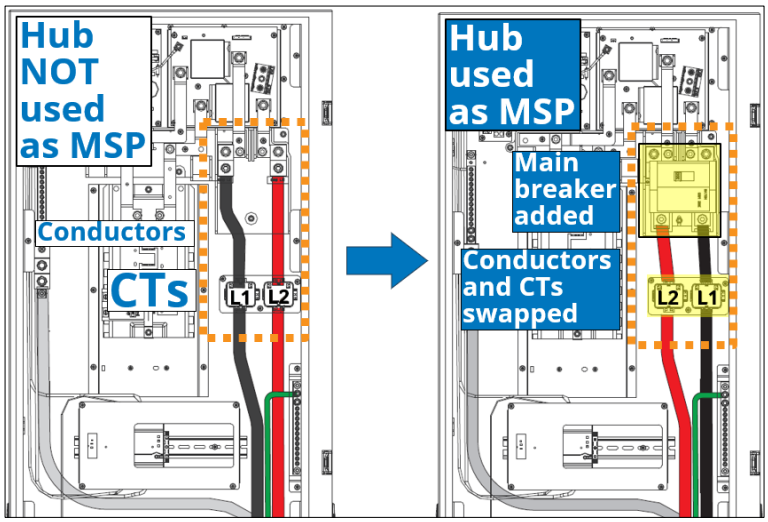


Figure 14: L1/L2 conductors and CTs to be swapped when main breaker added

Apply PCS warning labels to CTs during installation. Only in cases where the conductors in the Hub will be greater than or equal to (≥) AWG 1/0, you must remove the bracket that the CTs are attached to, remove the CTs from the bracket, and then attach the individual CTs to the conductors (Figure 15):

1. Unscrew the three M4 screws holding the CT bracket to the back wall of the Hub.
2. Connect the appropriate L1 and L2 conductors.
3. Cut the four small zip ties that secure the CTs to the bracket.
4. Remove the two CTs from the bracket.
5. Fit the L1 and L2 CTs around their respective conductors, and attach each to the conductor with one zip tie below and one zip tie above.

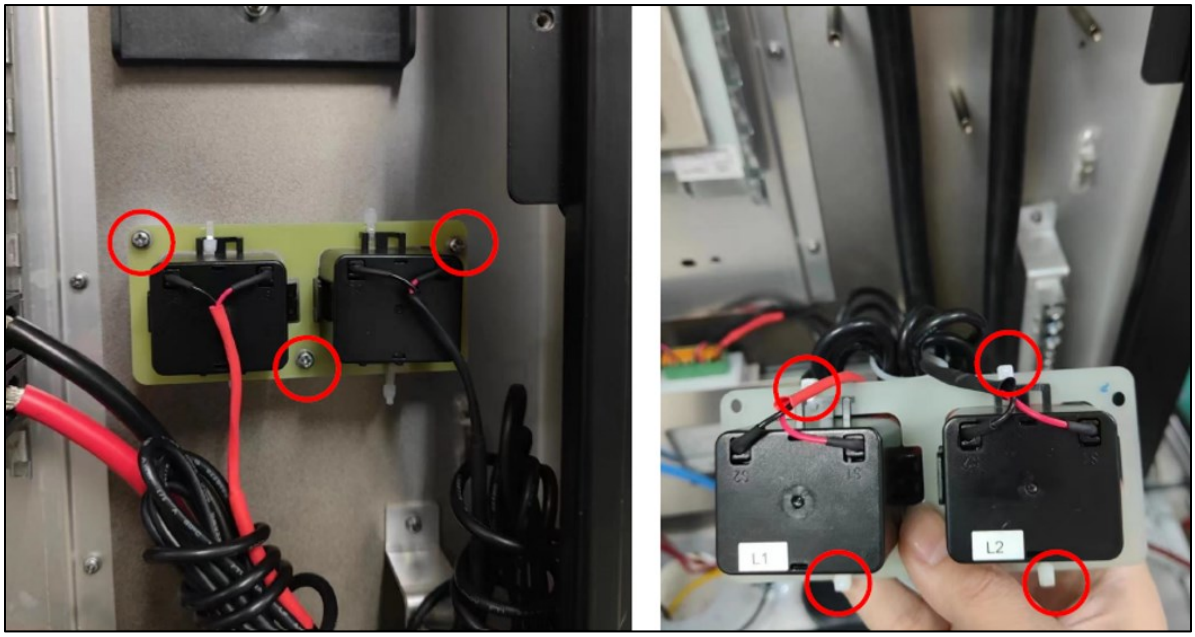


Figure 15: Location of CT bracket screws and zip ties holding CTs to bracket

Optional Non-Backup Panel

Hub-Integrated Charger Non-Backup Panel

If a Hub-integrated Charger non-backup pan is desired, then you must install a non-backup panel (load center) *in the Hub* in order to enable the integration of the Charger. Use only an Eaton 24INT125B-1 or equivalent. See Figure 16 and Figure 29 as well.

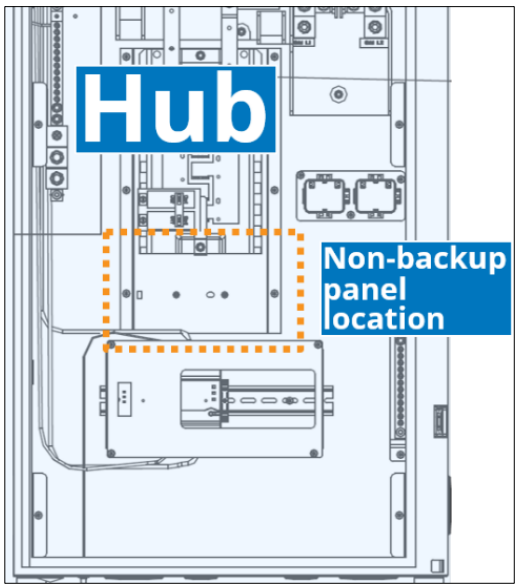


Figure 16: Location of non-backup panel in Hub

1. Position the housing block (the smaller black piece) into the hole at the left side of the space below the central breaker area (Figure 16).
2. Fit the bussing block over the housing block.
3. Using a 5/16 nut driver, secure the two 10/32″ screws into the Hub backplate.
4. Torque each screw to 25 in-lb and mark the connection with a paint pen.
5. Size the wires according to the amps value you will set the Charger to (see Section 4.2), and coach them to fit neatly along the inside of the Hub between the main Hub PCB connector and the busing lugs on the new non-backup load center.
6. Fabricate and install a 20″ copper L1 (black) and a 20″ copper L2 (red) power conductor to route inside the Hub, from the main Hub PCB connector to the new non-backup panel (Figure 17):
   a. At the main Hub PCB connector side:
      i. Strip 1/2″ of insulation from each conductor.
      ii. Install the L1 (black) conductor into the **EVL1** terminal.
      iii. Install the L2 (red) conductor in the **EVL2** terminal.
      iv. Torque each conductor in place to 35 in-lb and paint mark each.
   b. At the non-backup panel side:
      i. Strip 3/4″ of insulation from each conductor.
      ii. Install the L1 (black) conductor into the upper lug.
      iii. Install the L2 (red) conductor into the lower lug.
      iv. Torque each conductor to 45 in-lb and paint mark each.
7. Install an appropriately rated breaker. Recommended type is Eaton BR2*XXX*. Refer to Appendix C for availability.

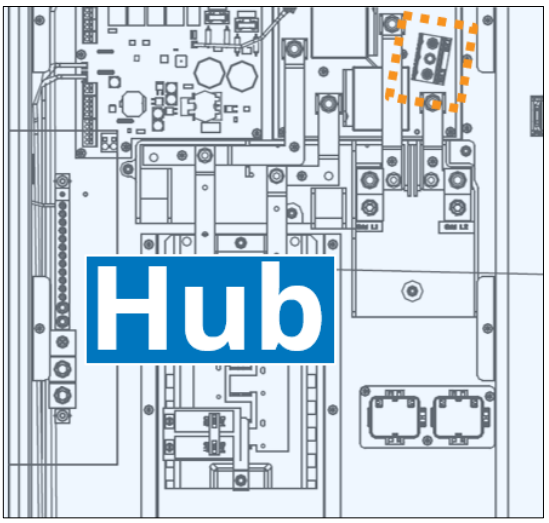


Figure 17: Location of main Hub PCB connector

Exterior Non-Backup Subpanel from Hub

If the design includes an exterior non-backup subpanel which originates from the Hub:

1. Install the external subpanel and route raceway from it to the Hub.
2. Route the subpanel feeder conductors through the raceway into the Hub:
   a. Size the conductors per rating.
   b. An exterior non-backup subpanel will require installation of the Hub-integrated Charger non-backup panel. Install branch breaker in Hub non-backup panel then route **L1** black and L2 red conductors to non-backup breaker. Terminate, torque, and paint mark terminations.
   Note: Do not feed an exterior subpanel directly from the main PCB connector (EVL1 & EVL2)

c. Route, strip, terminate, torque, and paint mark the neutral (white) conductor into the neutral (N) bar.
d. Route, strip, terminate, torque, and paint mark the grounding (green) conductor into the positive earth (PE) grounding bar.

3. In the exterior subpanel, power conductors must be wired into overcurrent protection device (OCPD):
   a. Route **L1** black and L2 red conductors into subpanel main breaker. Terminate, torque, and paint mark terminations.
   b. Route, strip, terminate, torque, and paint mark neutral (white) conductor into the neutral (N) bar.
   c. Route, strip, terminate, torque, and paint mark the grounding (green) conductor into the grounding bar. the positive earth (PE) grounding bar.

Optional Second Energy Meter (for AC Solar Integration)

Important! The GM Energy Home system is compatible with external AC solar but does not control the AC solar. Compliance for utility interconnection must be facilitated through the installer of the external AC solar system.

The AC solar system must be connected to the non-backup panel such that solar production does not occur during a power outage. Integration of AC solar on backup panels may be possible in the future. Please refer to most recent update of this document found at https://gmenergy.gm.com/for-home/installation-support for further information on AC solar integration into the backup panel. Do not rework existing solar system without proper communication with customer and/or the previous solar system installer as existing warranty may be affected.

To support new or existing AC solar, a second energy meter must be sourced and installed into the Hub.

1. GM Energy Preferred Installers will be able to indicate need for an Acrel meter directly to GM Energy. When they do so, it will be packaged with the rest of the Enablement Kit.
2. If you are not a Preferred Installer – or are one and did not indicate need at the outset – you may contact GM Energy Support Center at 1-833-64POWER to obtain one.
   a. If possible, this will be included with the shipment of the Enablement Kit; if the Enablement Kit has already shipped, the Acrel meter will be sent as a separate shipment.
3. Using a #2 Phillips screwdriver, remove the four screws and remove the metal meter cover from the lower section of the Hub.
4. Using a precision flat blade screwdriver, loosen the DIN rail retainer on the right side of the existing Acrel meter, and slide the retainer to the right of the DIN rail.
5. Install the second Acrel meter onto the DIN rail between the existing meter and the retainer.
6. Slide the retainer to the left to secure the second meter in position, and then tighten the retainer to the DIN rail.
7. Secure the CTs from the second meter around the L1 and L2 solar circuit conductors
   a. CTs must capture all solar generation, and are typically installed around the solar subpanel feeder circuit conductors.
   b. Orient the CTs to capture the flow of power in the correct direction (CT arrow should point away from solar inverter)
   c. Install the L1 CT around the L1 conductor, and the L2 CT around the L2 conductor.
8. Wire the second meter to the Hub controller board in the upper right of the Hub.
9. Re-install the metal meter cover.

WIRE THE COMPONENTS

Referring to the diagrams and respective tables in this section, land all pulled wires and conductors; either on terminal blocks, or by using the appropriate fasteners tightened to the correct torque value. Refer to the diagrams in this section for termination points, and to the tables that follow each diagram for wire information. **When you have completed the wiring, reinstall the covers for the Charger, the Inverter, and the Hub.**

Note: Ground ("G") connections are sometimes labeled "PE" for protective earth. These are equivalent for purposes of this guide.

Wire the GM Energy PowerShift Charger

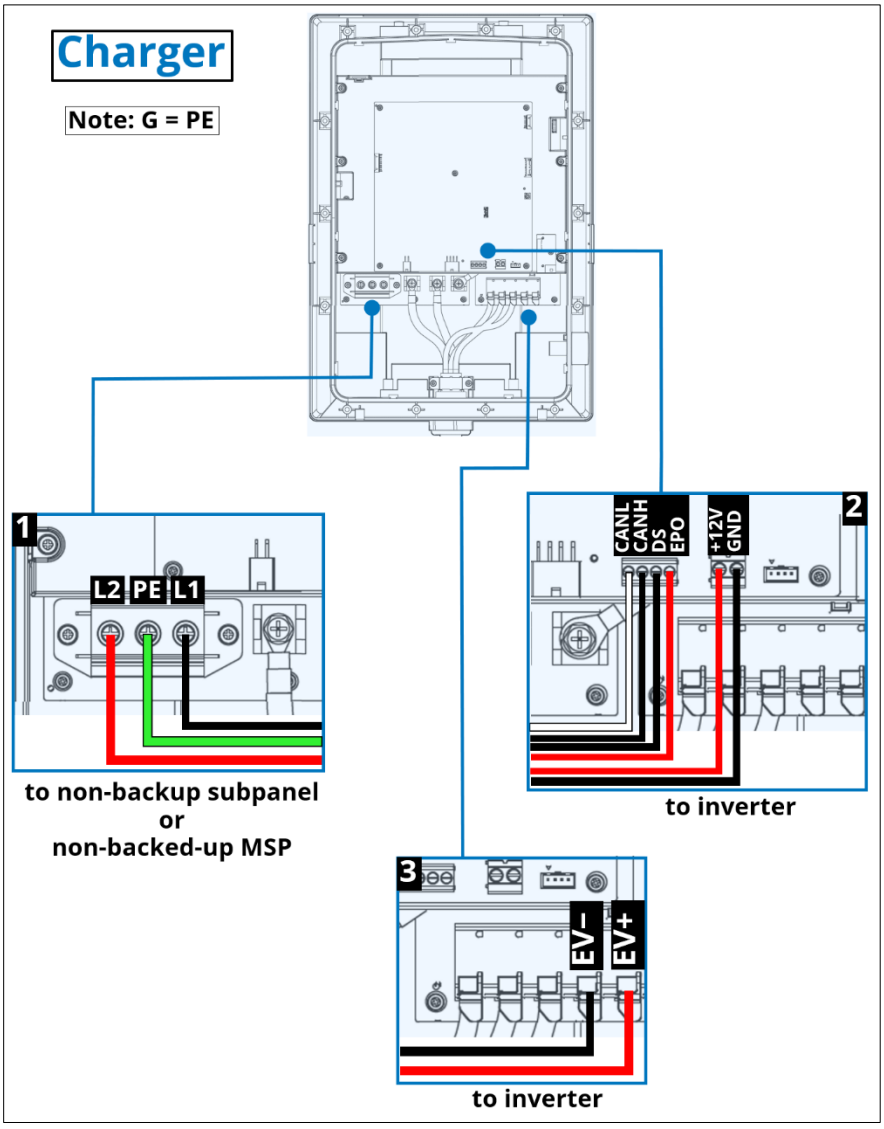


Figure 18: Charger wiring diagram

Charger Only

If the installation is for a standalone Charger only (no V2H Enablement Kit), route and install only the AC power circuit conductors (Figure 18 callout 1 and Table 2).

Route the Charger wires through the conduit, and then strip, torque, and paint mark the wires (**L1, L2, PE**). Verify the connection firmly again. **Note:** Ensure that the Wi-Fi cable in the upper left remains secure and is not loosened when connecting the other wires.

The Charger L1/L2 wiring must comply with the NEC Standards adopted in your region; and the wire ampacity must be matched to the Charger DIP switch setting. **Note: Some installations may not be designed for the maximum rating of the Charger and thus may be designed with smaller gauge conductors which requires setting the DIP switches accordingly!** Always verify whether there are additional local wiring requirements such as AC disconnects and specific labeling!

The Charger has a dark-start button on its right side. For installations that include only the Charger, the button can stop AC charging, but it does not have dark-start capability.

It is recommended to crimp insulated ferrules on L1, L2, PE, EV–, and EV+ terminal end. Ferrules should be sized per conductor gauge. If ferrules are applied, strip the wires 0.71" (18mm) (Figure 19).

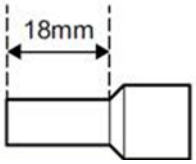


Figure 19: Wire strip length for ferrule crimping

Charger to Home Hub (non-backup panel)

When Charger is installed with V2H Enablement kit, the AC circuit can be routed into the non-backup panel in the Home Hub or a non-backup subpanel. See section titled Optional Non-Backup Panel above for details.

Charger to Inverter

From the Inverter, route the comm, control, and low-voltage wires into the Charger. Strip, terminate, torque, and paint mark the connections (Figure 18 callout 2 and Table 2):

- Min. #18 AWG twisted pair for **CANL** and **CANH.**
- Min. #18 AWG for **DS** and **EPO.**
- Min. #10 AWG for **+12V** and **GND**.

From the Inverter, route minimum #8 AWG red and black conductors to the Charger. Strip, terminate, and paint mark the conductors into the **EV–** and **EV+** terminals (Figure 18 callout 3 and Table 2).

Charger Wiring							
	Type	Qty.	AWG Size / Strip	Color	Torque if not terminal (in-lb)	Label	
1	**AC Charging Circuit**	3	2 8 2 0.75″	1 Red 1 Green 1 Black	33	**@Charger:** **L2** Red **PE** Green **L1** Black	**@Non-backup source equipment:** **L1** and **L2** into OCPD **PE** into grounding bar
2	**Comms and Control***	4	18 0.75″	1 White 2 Black 1 Red	3.5	**@Charger*:** **CANL** White **CANH** Black **DS** Black **EPO** Red	**@Inverter*:** **DS** Black **EPO** Red **CANH** Black **CANL** White
	12 VDC	2	10 0.75″	1 Red 1 Black	7	**@Charger:** **+12V** Red **GND** Black	**@Inverter:** **+12V** Red **GND** Black
3	**DC Power Circuit***	2	8 0.75″	1 Black 1 Red	N/A	**@Charger*:** **EV−** Black **EV+** Red	**@Inverter*:** **EV+** Red **EV−** Black

Table 2

*CANH / CANL, and DC Backup Power Circuit EV+ / EV− are in opposite positions at the Charger with respect to the Inverter!

Set Charger Rating

There is a trio of DIP switches on a small red plate inside the Charger. For each switch, the lower position is a **0** and the upper position is a **1**. The *first* digit of the code is for the *leftmost* switch. The factory setting is **000**, and at this setting *the Charger will not function* and its LED will be solid red. **In accordance with the amperage specified for this install, and referencing the table below, carefully set each DIP switch to its correct position** (Table 3).

If the Charger is de-rated (installed less than 80 A continuous/100 A OCPD), the rating must be indicated on a label on the side of the Charger. For Setting 2 through Setting 7 in the following table, affix the label onto the left side of the Charger. Indicate on the label the **Charger Amps (AC)** value—**NOT** the **Breaker Amps** value!

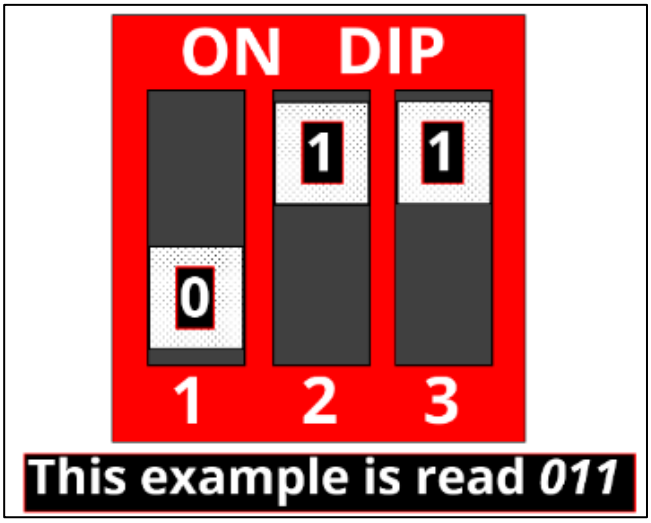


Figure 20: DIP switch setting example

WARNING! Using a charge level that exceeds the electrical circuit or electrical outlet capacity may start a fire or damage the electrical circuit. Ensure DIP switch settings align to Charger amperage and breaker amperage.

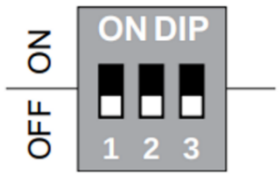
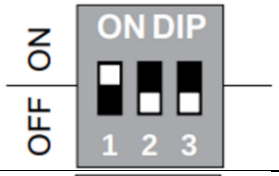
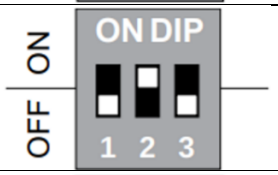
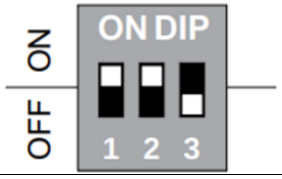
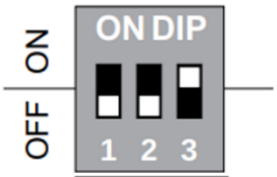
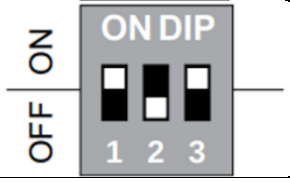
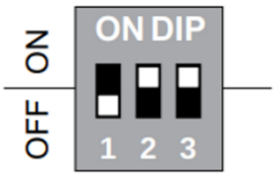
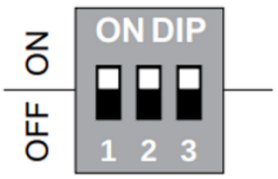
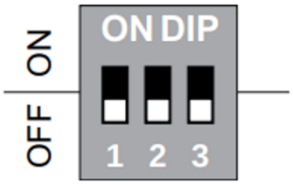
Max. AC output	Pin Configuration 1	2	3	Example	Circuit breaker amps
0A (default)	Off (0)	Off (0)	Off (0)		N/A
16A	On (1)	Off (0)	Off (0)		20
24A	Off (0)	On (1)	Off (0)		30
32A	On (1)	On (1)	Off (0)		40
40A	Off (0)	Off (0)	On (1)		50
48A	On (1)	Off (0)	On (1)		60
64A	Off (0)	On (1)	On (1)		80
80A	On (1)	On (1)	On (1)		100

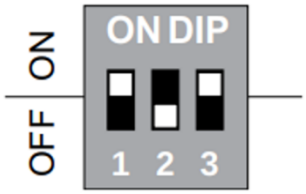
Table 3

Configuring DIP switches during initial installation

1. Open the black middle cover to view the DIP switch. By default, the DIP switch is set to 000.



2. Using Table 3 as a reference, set the DIP switch pins to the amperage of the installation. In this example, the maximum AC output is 48A.



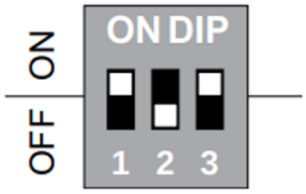
3. Turn on the breaker to power on the Charger. When the LED is solid white, plug the charging connector into the EV to start the charging.

4. DIP switch settings will be confirmed during the commissioning process near the end of installation.

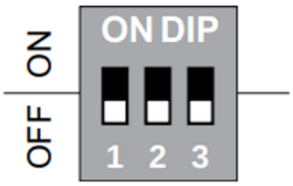
Changing output current after initial setup

In this scenario, the output current has already been set through the DIP switch. If the output current rating for the installation needs to be changed, follow the instructions below. In this example, the DIP switch setting is being changed from 48A to 80A.

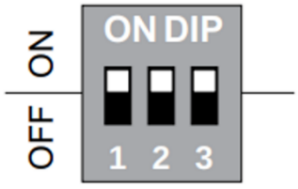
1. Deenergize the Charger and open the black middle cover to view the DIP switch pins. Here, the DIP switch setting is 101, corresponding to a 48A output current.



2. Adjust the DIP switch to the original factory default setting (i.e., 000). Energize the Charger to verify the LED shows solid red. If the output current setting is changed without reverting to factory default setting, the LED turns to blinking red once the Charger is powered back up, and the Charger will not charge. The alarm code will be displayed as EV4299, which can be checked in the commissioning app.



3. Deenergize the Charger again and set the DIP switch pins to the new amperage of the installation, using Table 3 as a reference. Here, the DIP switch setting is 111, corresponding to an 80A output current.



4. Turn on the breaker to power on Charger. When the LED is solid white, plug the charging gun into the EV to start the charging.
5. The installer can use the commissioning app to confirm that the DIP switch setting has been successfully changed.

Charger LED Behavior

For system alarm codes, refer to the GM Energy V2H System Troubleshooting Guide. The Charger LED is located on the lower right of the front cover (Table 4):

LED Behavior		Description
White	**BLINKING**	Charger is Initializing (at install or after reset)
	SOLID	Charger is Ready (unplugged).
Green	**BLINKING** (1 second on , 1 second off)	Active Charging
	BLINKING (1 second on , 4 seconds off)	Active Discharging
	SOLID	Charger is Ready (plugged in, not charging)
Blue	**SOLID**	Discharge Session Initializing
Yellow	**BLINKING**	Firmware Update in Progress
Red	**BLINKING**	Charger Error (refer to installation manual)
	SOLID	Installation Not Complete (DIP switch not set).

Table 4

Wire the Inverter

Before beginning to wire the Inverter, ensure that no live voltages are present on PV input and AC output circuits, and verify that the DC disconnect on the bottom of the Inverter, the AC disconnect, and the dedicated AC branch circuit breaker are all in the OFF (open) position! If there is **no** rapid shutdown (RSD) switch installed, ensure that **RSD 1** and **RSD 2** are jumpered together (Figure 21, callout 5 and callout 9).

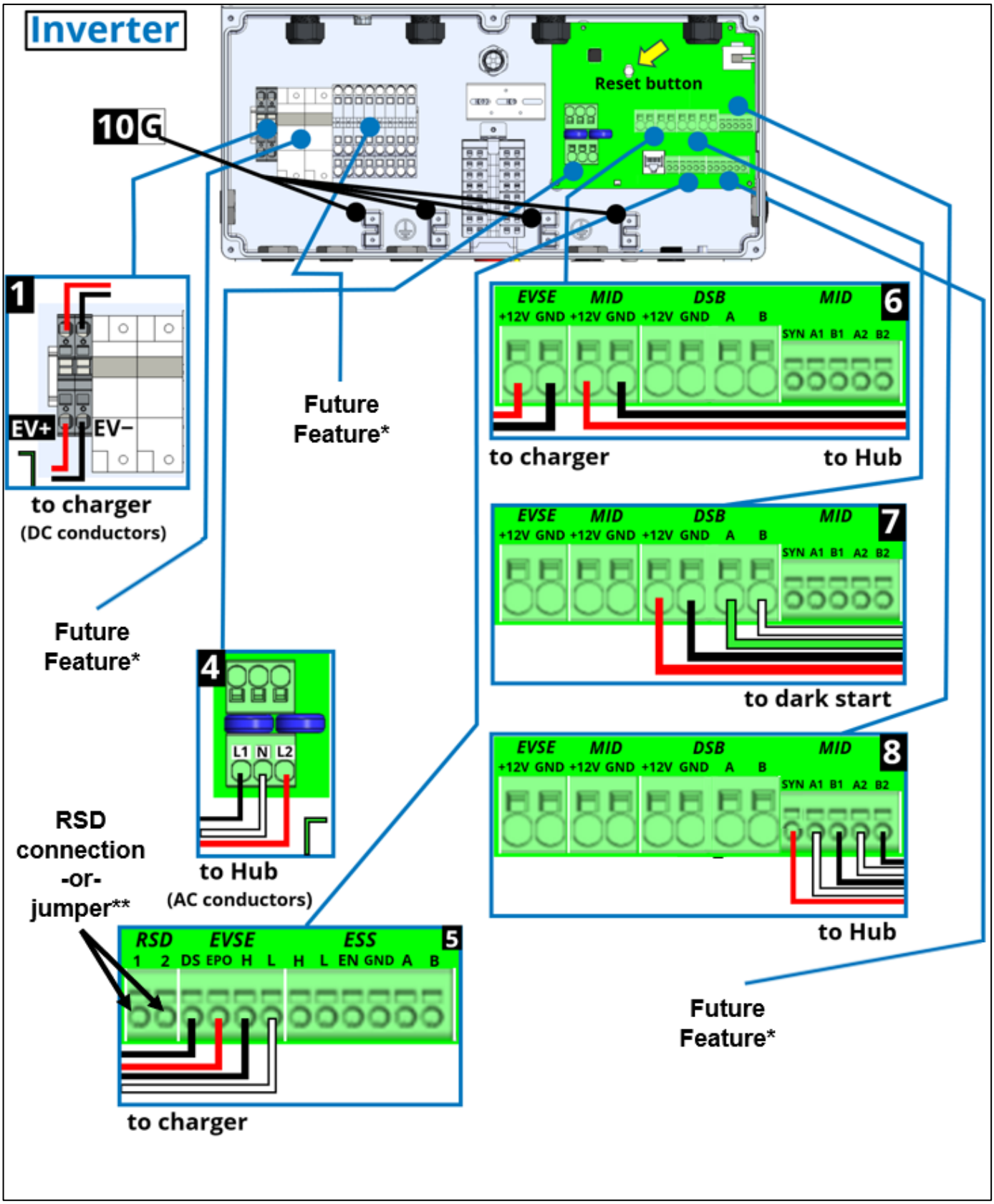


Figure 21: Inverter wiring locations

* See https://gmenergy.gm.com/home/resources-and-support for availability

**For systems without an RSD, connect the RSD terminals with a jumper as shown in callout 5

Conductors without a torque value are landed at lever attachments and therefore require no torque value. Ensure that you wire all the following connections (Figure 21 and Table 5):

	Inverter Wiring						
	Type	Qty.	AWG Size	Strip Length / Torque IF APPLICABLE	Color	Label	
1	**DC Charger**	2	8	0.75″	1 Red 1 Black	**@Inverter:** **EV+** Red **EV−** Black	**@Charger:** **EV+** Red **EV−** Black
2	**Future Feature**						
3	**Future Feature**						
4	**Hub AC**	3 1	6 10	0.7” 0.5” (16 in-lb)	1 Black 1 Red 1 White 1 Green	**@Inverter:** **L1** Black **N** White **L2** Red **G** Green	**@Hub: L1 L2 breaker in the backup pan, N bar and Ground bar**
5	**Comm**	2 twisted pair	Recommend: 18 (Acceptable: 14–23)	0.4”	1 Red 1 Black 1 Black/White twisted pair	**@Inverter** **EVSE*:** **DS** Black **EPO** Red **H** Black **L** White	**@Charger*:** **CAN L** White **CAN H** Black **DS** Black **EPO** Red
	RSD	2	12 to 18	0.5”	Any	**@Inverter :** **RSD 1 / RSD 2** Color and termination per RSD switch.	**If system does NOT have a Rapid Shutdown Device installed, RSD 1 and RSD 2 must be jumpered**
6	**9.6 VDC**	2	10	0.6″	1 Red 1 Black	**@Inverter** **EVSE:** **+12V** Red **GND** Black	**@Charger:** **+12V** Red **GND** Black
	9.6 VDC	2	10	0.6″	1 Red 1 Black	**@Inverter** **MID:** **+12V** Red **GND** Black	**@Hub:** **+12V** Red **GND** Black
7	**Comm**	4	14	0.6″ (factory stripped)	1 Black 1 Red 1 Green 1 White	**@Inverter** **DSB:** **+12V** Red **GND** Black **A** Green **B** White	**@DSB:** Factory wire connection. Add cable gland or raceway fitting.

8	**Comm**	4 (2 twisted pairs)	Recommend: 18 (RS485) Acceptable: 14–23	0.4"	1 Red Black/White Black/White	**@Inverter** **MID:** **SYN** **A1** White **B1** Black **A2** White **B2** Black	**@Hub:** **I/O** **A1** White **B1** Black **A2** White **B2** Black
9	**Future Feature**						
10	**Ground**	Varies	10	0.5" 16 in-lb.	Eight grounding terminals are near the bottom of the Inverter wiring chamber.	**@Inverter:** Green with spade connector recommended.	(Origination varies)

Table 5

Important! Terminations are not in same order (R to L) in each device. And, for a given connection at the Charger, the torque may be different than at, for example, the Inverter.

Wire the Charger Connections

Each lead must have at least 6" **inside** the wiring box. Route, strip, terminate with a flat blade screwdriver at terminal lever, perform a tug test; and then paint mark the minimum #8 AWG red and black to the terminals (Figure 21). Route, strip, crimp on a spade terminal (recommended), terminate, torque; and then paint mark the green wire to the grounding point (Figure 22 and Table 6; see also Figure 18 and Figure 21):

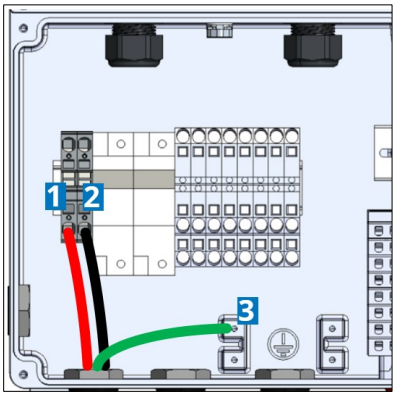


Figure 22: Inverter-Charger connections

	Wire	AWG Size	Strip Length / Torque IF APPLICABLE	Connection Point
1	Red	8	0.75″ 16 in-lb (1.8 N-m) (grounding)	Left terminal.
2	Black			Right terminal.
3	Green			Grounding point to the right of the conduit entry.

Table 6

Wire the AC Output Connections

Conduit from the AC disconnect (if present) or from the 60 A breaker in the Hub backup panel should already be installed. If an AC disconnect is required, then mount disconnect per code requirement. *The AC output (neutral) is not bonded to ground in the Inverter.*

Route wiring through conduit and verify that the exposed wires are at least 6″ to provide adequate strain relief. Strip, terminate with a flat blade screwdriver at terminal lever, perform a tug test; and then paint mark the minimum #6 AWG red, black, and white wires into the terminals. Route, strip, crimp on a spade terminal (recommended), terminate, torque; and then paint mark the green wire to the grounding point (Figure 23 and Table 7):

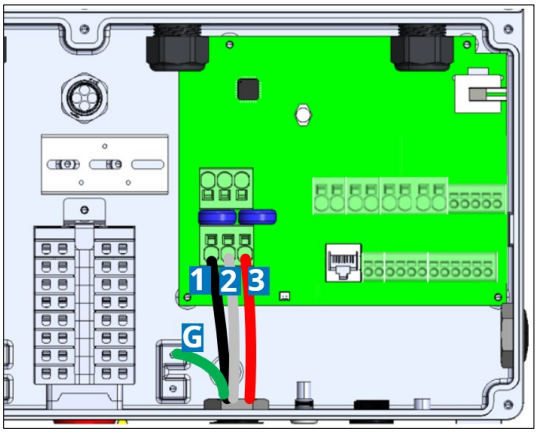


Figure 23: AC output connections

	Wire	AWG Size	Strip Length / Torque IF APPLICABLE	Connection Point
1	Black	6	0.75″	L1
2	White			N
3	Red			L2
G	Green	10	0.75″ 16 in-lb (1.8 N-m) (grounding)	Grounding point to the left of the conduit entry.

Table 7

If an AC disconnect is present, terminate the Inverter's AC output wires appropriately inside the AC disconnect. If there is no AC disconnect, appropriately terminate the output wires on the 60 A breaker in the Hub backup pan.

Wire the Low-Voltage DC Circuits

You should have already routed the #10 AWG red and black conductors from the Charger and the Hub, as well as the cabled conductors from the dark start.

Strip the Charger conductors and the Hub conductors, add insulated ferrules (recommended), insert a flat blade screwdriver into the lever release above the wire termination point and install the Charger conductors into the EVSE **+12V** and **GND** terminals; and the Hub conductors into the MID **+12V** and **GND** positions (Figure 24).

Remove the screwdriver from the lever release, verify with gentle tug test, then paint mark the connection point (Figure 24, Figure 21 callout 6, and Table 5):

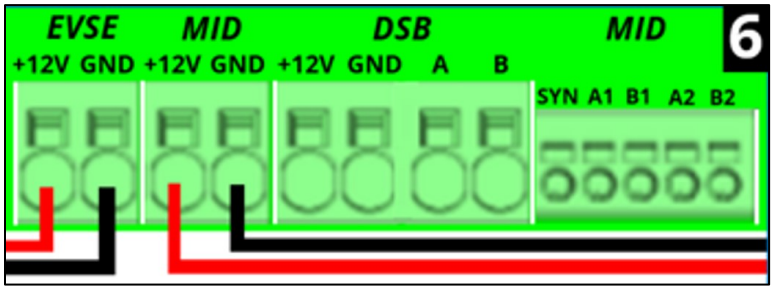


Figure 24: Low-voltage Charger and Hub DC connections

Remove the factory heat shrink on each of the four dark start conductors, then install each of those exposed conductors into the respective DSB terminals: **+12V, GND, A,** and **B** (Figure 25, Figure 21 callout 7, and Table 5):

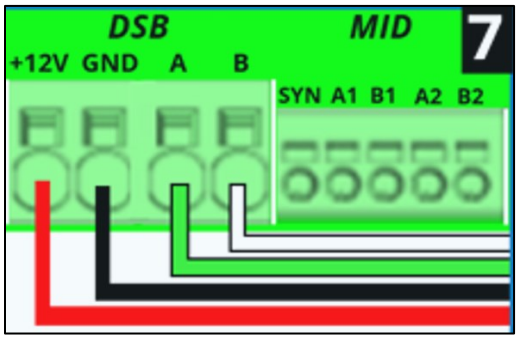


Figure 25: Low-voltage dark start DC connections

Wire the Comm and Control Wires

Important! Mark each twisted pair so that each is easily identifiable and distinguishable after installation.

For the Charger comm and control terminations at the Inverter: strip each wire, add ferrules (recommended), and install the following wires into the EVSE terminals: the **H** and **L** conductors routed between the Charger and the Inverter must be a twisted pair; the **DS** and **EPO** control wires are not required to be twisted pair, but may be twisted pair (Figure 26, Figure 21 callout 5, and Table 5):

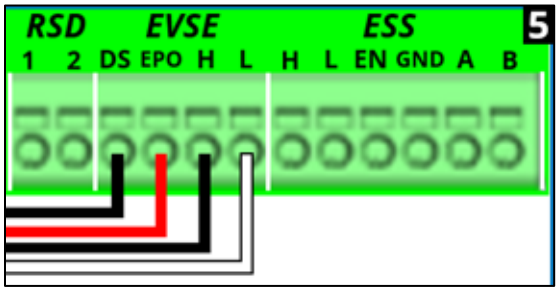


Figure 26: Charger communication connections

For the Hub comm terminations at the Inverter: strip, add ferrules (recommended), and install the following wires into the MID terminals: the **A1/B1** wires and **A2/B2** wires from the Hub must be twisted pairs. The single red SYN wire is required for direct grid feedback from the Hub to the Inverter in the system (Figure 27, Figure 21 callout 8, and Table 5):

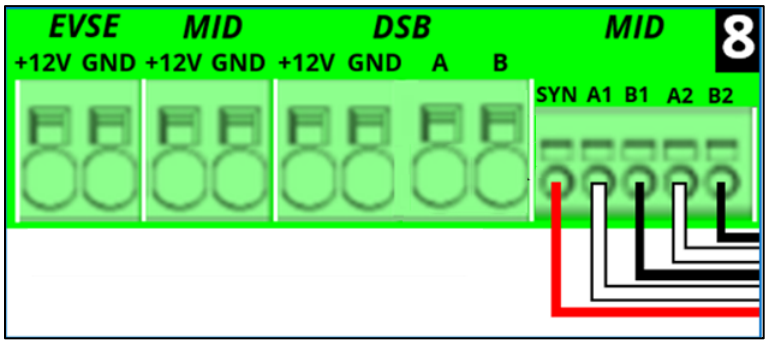


Figure 27: Hub communication connections

Wire the RSD Switch

Installation of the Rapid Shutdown Device (RSD) or Emergency Shutdown Device (ESD) is highly recommended and may be required based on local code or ordinance. Where local code permits, it is recommended to place the RSD, clearly labeled, near the electrical meter.

The RSD switch must be fully compliant with the Rapid Shutdown requirements of NEC 690.12. (For example, Eaton M22-PVL-K01-R.)

The RSD two-wire 12 VDC circuit shall be wired to a normally closed switch, so that when the switch is in the on position, the circuit is closed. When the switch is in the OFF position, the circuit must become open. Wiring will vary based on the switch selected by the installer. If a RSD circuit is not installed, the RSD **1** and **2** terminals must be shorted with a jumper wire (Figure 28, and Figure 21 callout 9):

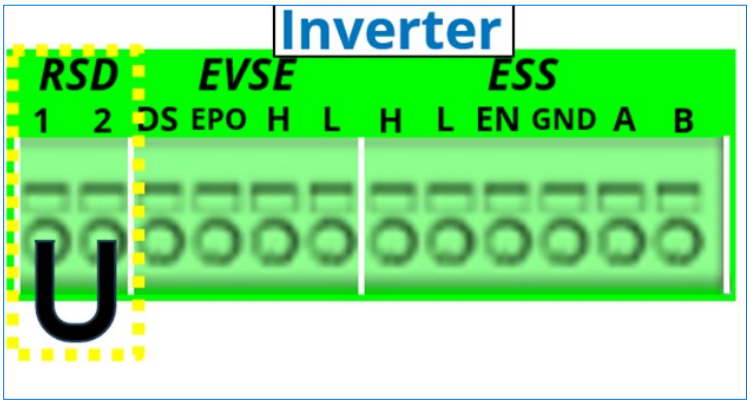


Figure 28: RSD connection

Inverter LED Behavior

The Inverter LED is located on the lower right of the front cover (Table 9).

LED Behavior		Description
White	BLINKING (1 second on / 1 second off)	Inverter firmware update is in progress
	BLINKING (1 second on / 4 seconds off)	Deep Sleep Mode
	SOLID	Inverter is initializing
Green	BLINKING (1 second on / 1 second off)	Charge/discharge is initializing
	BLINKING (1 second on / 4 seconds off)	Inverter is idle (standby).
	SOLID	Inverter is operating normally (is converting power).
Yellow	BLINKING (1 second on / 1 second off)	Fault is present in Dark Start or in PowerBank.
	BLINKING (1 second on / 4 seconds off)	Inverter warning.

	SOLID	**Equipment alarm.**
Red	**BLINKING (half second on / half second off, then 2 seconds on / half second off)**	**Overcurrent protection fault is present.**
	BLINKING (1 second on / 1 second off)	**Ground fault is present.**
	SOLID	**Arc fault is present.**

Table 9

The Inverter reset button (see Figure 21) has the following function (Table 10):

Function	Action
Arc reset	Press for 5 seconds to clear arc fault.

Table 10

Wire the Hub

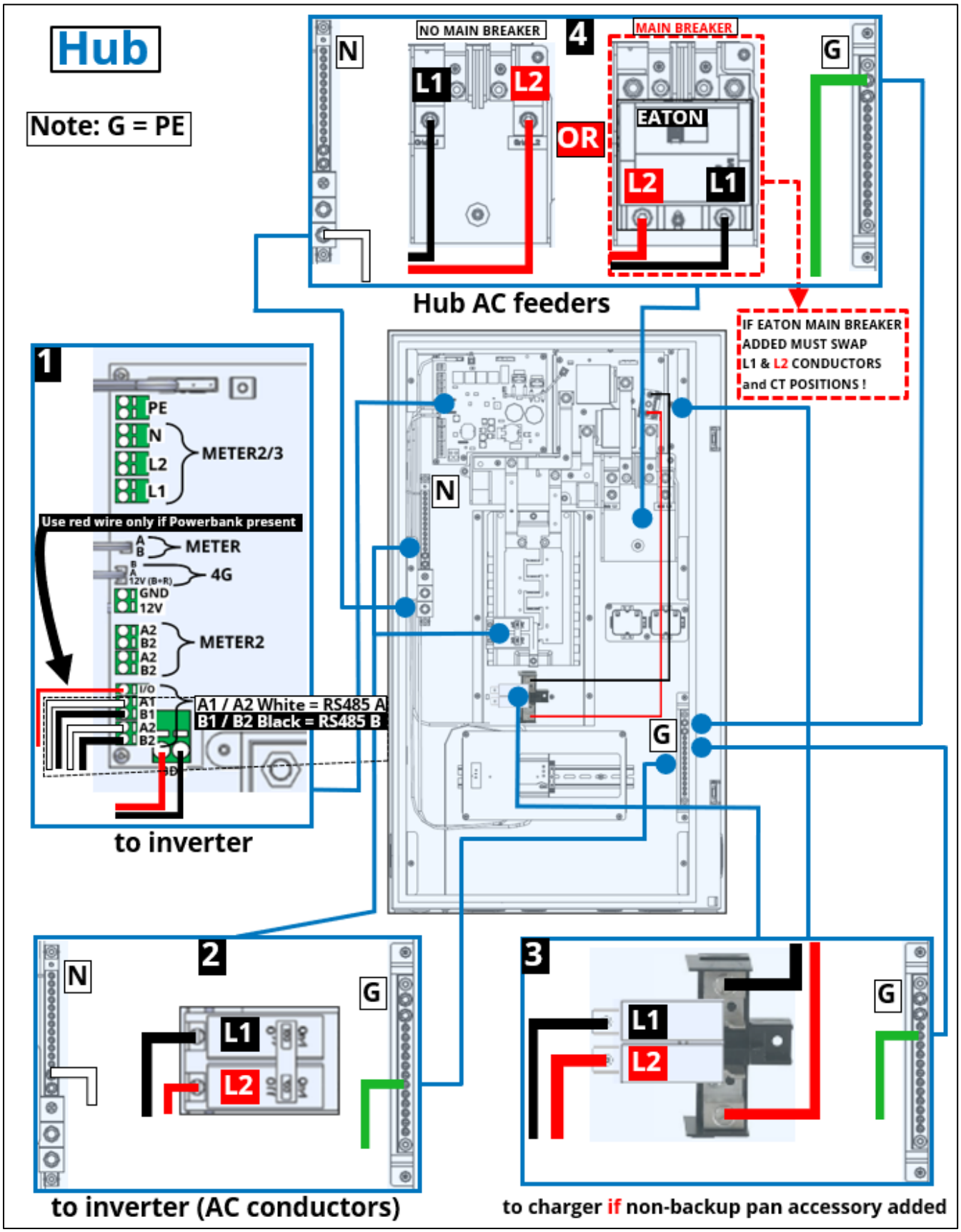


Figure 29: Home Hub wiring locations

	Hub Wiring						
	Type	**Qty.**	**AWG Size**	**Color**	**Strip Length / Torque (in-lb)**	**Label**	
1	**Inverter Comm**	4	**14-23 (RS485)**	2 Black / White twisted pairs 1 Red	**0.4”**	**@Hub:** **I/O** Red **A1** White **B1** Black **A2** White **B2** Black	**@Inverter:** **SYN** Red **A1** White **B1** Black **A2** White **B2** Black
	Inverter 12 V DC	2	**10**	1 Black 1 Red	**0.6”**	**@ Hub:** **+12V** Red **GND** Black	**@Inverter** **MID:** **+12V** Red **GND** Black
2	**Inverter AC**	4	**none given**	1 Red **L1** 1 Black **L2** 1 White **N** 1 Green **PE**	Per breaker	**@ Hub:** Red and black to breaker White to neutral bar Green to ground bar	**@Inverter:** **L1** Black **N** White **L2** Red **Ground bar** Green
3	**Hub main PCB connector to Hub Non-Backup Pan (if added)***	2	**2 (copper only)**	1 Black **L1** 1 Red **L2**	0.71” 35 in-lb @ main PCB connector 45 in-lb @ NBU pan accessory	**@Hub:** Red from lower main PCB connector to lower non-backup pan lug Black from upper main PCB connector to upper non-backup pan lug	
	AC from Charger	3	**2** **2** **14-4**	1 Red **L2** 1 Black **L1** 1 Green **PE**	0.71” 45 in-lb for L1/L2 20 in-lb for 14-10 PE, 25 in-lb for 10-4 PE	**@Hub:** Black to upper L1 of breaker Red to lower L2 of breaker Green to ground bar	**@Charger:** **L2** Red **PE** Green **L1** Black
4	**Hub AC feeders**	4	**#6-250 kcmil** **#6-250 kcmil** **14-2/0** **14-2/0**	1 Red **L2** 1 Black **L1** 1 White **N** 1 Green **PE**	1.25” Breaker lugs & neutral main lug: 275 for 3/0– 250 kcmil 94 for #3–2/0 45 for #6–4	**@Hub:** Black L1 to **L** breaker lug Red L2 to **R** breaker lug *IF EATON MAIN BREAKER:* Black L1 to **R** breaker lug Red L2 to **L** breaker lug White to neutral bar Green to ground bar	**@Inverter:** **L1** Black **N** White **L2** Red **Ground bar** Green
Large Neutral & Ground Lugs torque: 45 for #14–8 110 for #6–4 150 for #3–2/0 Strip length 0.55”				**Small Neutral & Ground Lugs torque:** 20 for #14–10 25 for #8–4 Strip length 0.55”			Neutral & Ground bars have a main, a large, and a small lug size; but Ground bar lacks a main.

Table 11

*Prepare one copper 20" **black L1** and one copper 20" **red L2** conductor for this internal Hub connection. Size the wires per the Charger amps rating (set via DIP switches in Charger). Maximum is 2 AWG for 80 A rating.

Allow for sufficient clearance when routing wires near Home Hub dead front cover hinge locations.

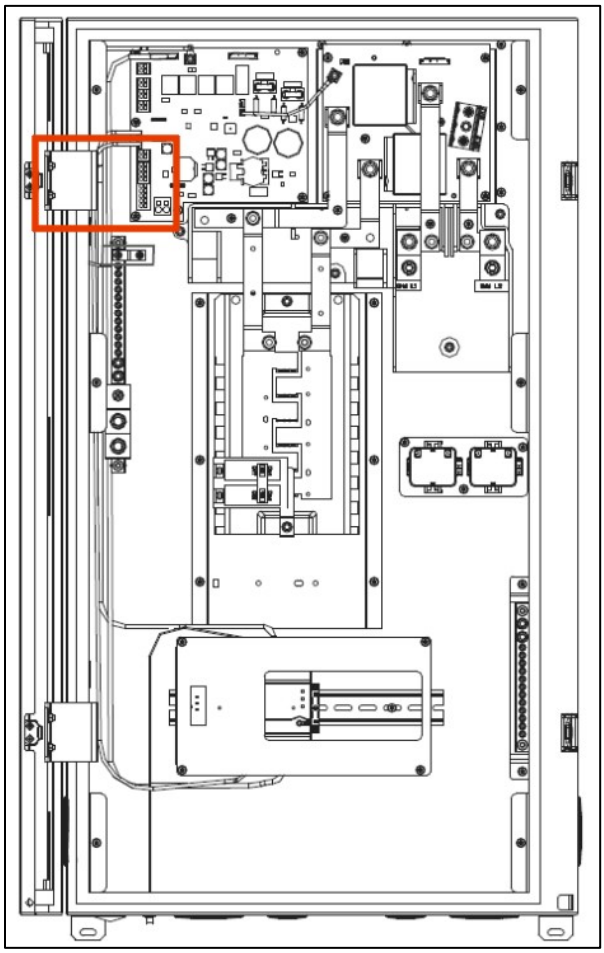


Figure 30: Callout for Home Hub hinge keep out zone

Hub–Inverter Power Wire Connection

Use only 90°C copper wire for Inverter wiring.

1. Install 1″ conduit into the left 1″ conduit hole on the bottom of the Hub.
2. Pull the Inverter power wires **from the Inverter** through this conduit into the Hub.
3. Strip and tighten the AC conductors (**L1, L2, N, G**) according to Figure 29 callout 2 and Table 11.

Grid Power Wire Connection

Depending on your conduit strategy, attach conduit and a watertight conduit fitting to either the 2″ **Grid** knockout on the bottom right OR the 2″ **Grid** knockout on the side right (see Figure 8). Pull the Hub AC feeders (black **L1**, red L2, green ground, and gray neutral/PE) wires through the conduit into either of the 2″ entries, and then strip 1.25” from each end. Land the wires and tighten as per Figure 29 callout 4 and Table 5. Table 12 shows the wiring information for the connections shown in Figure 31.

	Terminal	Wire Gauge (AWG)	Wire Strip Length (in.)	Tool	Torque for Wire Size (in-lb / N-m)
A	Grid and load main lug	6–250 kcmil	1.25”	5/16″ hex	• 275 / 31 for 3/0–250 kcmil • 94 / 11 for #3–2/0 AWG
B	Neutral main lug				
C	Neutral and ground lug (large)	14–2/0	0.55”	3/16″ hex	• 45 / 5 for #14–8 AWG • 110 / 12.5 for #6–4 AWG • 150 / 17 for #3–2/0 AWG
D	Neutral and ground lug (small)	14–4	0.55”	5 mm slotted	• 20 / 2.3 for #14–10 AWG • 25 / 2.8 for #8–4 AWG

Table 12

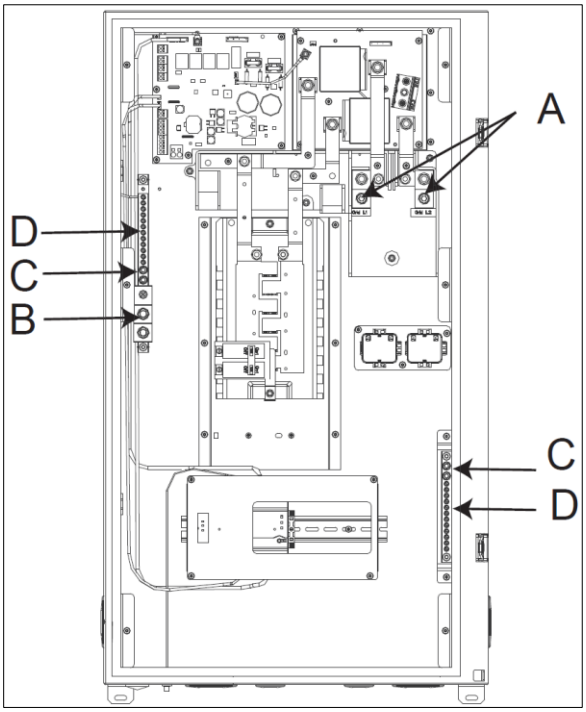


Figure 31: Home Hub grid power connections

Note: Torque circuit breaker terminals to values specified on the breakers. Terminals other than breaker terminals & EVL1/EVL2 are suitable for 60/75ºC AL/CU wire. Breaker terminals are suitable for wire as marked. Communication wires may not be tied to power wires.

Communication Wire Connection

Refer to Figure 29 callout 1 and Table 11:

1. For RS-485 **A1, B1, A2,** and **B2,** use provided 14 AWG wire and strip 3/8″ from the wire ends.
2. For **12V** and **GND**, use provided 14 AWG and strip 3/8″ from the wire ends.

Wire the Dark Start

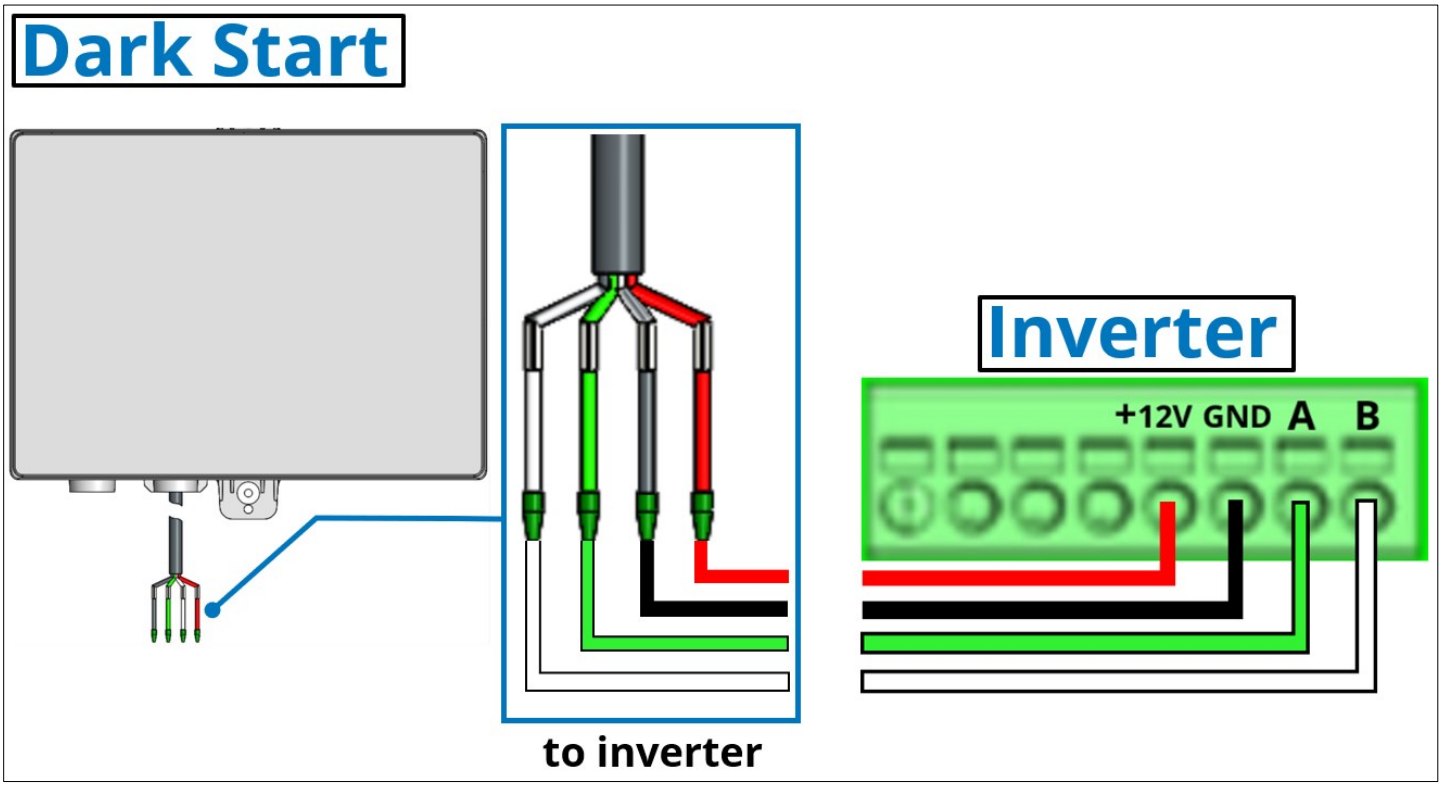


Figure 32: Dark start wiring connections

The wires on the factory-integrated cable are pre-stripped. Insert the following wires into the following terminals (Figure 32 and Table 13):

Wire	Terminal
Red	**+12V**
Black	**GND**
Green	**A**
White	**B**

Dark Start Wiring						
Type	**Qty.**	**AWG Size**	**Color**	**Torque if not terminal**	**Label**	
Comm	4	14	1 Black 1 Green 1 White 1 Red	Lever attachment on Inverter side (no torque required).	**@Dark Start:** N/A (integrated)	**@Inverter:** **GND** Black **A** Green **B** White **+12V** Red

Table 13

Install Covers

If you will not complete pre-commissioning electrical and wiring checks and commissioning before leaving the site, install and properly torque all equipment covers now:

Component	Steps
Charger	Install the middle cover and torque the fourteen M4 ×12 mm Torx screws to 10.4 in-lb. Install the front cover and torque the two M4 ×12 mm Torx screws to 10.4 in-lb.
Hub	Install the dead front, secure each door clasp, and close the cosmetic clasp covers.
Inverter	Install the Inverter wing box cover and torque the five M4 x 14 mm Torx screws to 18 in-lb. Install the front cover* and torque the two M4 x 9 mm Torx screws to 10.4 in-lb.

*Additional force on top corners of beauty cover may be required for proper fit onto Inverter box.

TESTING AND COMMISSIONING

After all equipment is installed, it is critical that you safely verify all electrical work, energize and then verify voltage throughout the system, commission the system, and configure the equipment.
GM Energy recommends printing the System & Voltage Checks, found in Appendix G. After all elements of the system installation are verified, and after commissioning is complete and system operation is verified (for example, the RSD switch operation has been verified), take a photograph of the completed sheet for job closeout records, and then fold it up and place it inside the Hub front cover before closing and sealing the Hub door.

WARNING! This section describes verification requirements for wiring terminations and electrical voltage checks. Prior to beginning, you must ensure that all energy sources have remained de-energized and have had lock out tag out procedures executed.

DANGER! Circuits will be energized and tested, and will remain ON (live) during these activities. Working with this equipment can expose individuals to severe electrical shock hazards. Only qualified persons with appropriate PPE in accordance with NFPA 70E may perform this work.

This section describes the following sequence of work:

1. Verifying electrical and wiring terminations.
2. Verifying low-voltage conductors and communication cables.
3. Pre-commissioning preparation.
4. Commissioning and configuration.

Verify Electrical and Wiring Terminations

Before you begin, there must be no LED lights illuminated in the Hub, the Inverter, or the Charger. If all AC sources are de-energized and locked out, and there is still one or more LEDs that are illuminated, open (turn OFF) the rotary PV DC disconnect on the bottom of the Inverter. Wait 5 minutes for the Inverter to dissipate any possible stored energy.
Prior to energizing electrical equipment, review the electrical installation of raceways/conduits, conductors, and any OCPD. Verify that raceways/conduits are adequately sealed and secured for the specific type and environment; that all OCPDs have been installed according to design and permit; and that each is securely seated into their busbar tabs.

For the steps in this section, regarding circuit conductors, the instruction to "verify" means you must ensure ALL of the following:

- All conductors and OCPDs are installed per requirements.
- All wires have been routed, coached, and secured so that there is no forceful pressure/bias on them or on any respective terminal lug.
- No wiring is subject to a crush or pinch hazard—for example, the Hub hinge area and covers.
- Any spliced wires are in an appropriate enclosure, securely spliced (crimped, splice blocks torqued, or wire nuts twisted), and fully insulated.
- Any non-metallic (NM) bundled cables are appropriately concealed.
- Any relocated multi-wire branch circuits remain paired and bundled with their neutral and ground circuit wires.
- A pull test is performed on de-energized conductors at each terminal location.

- All conductors for each circuit have been torqued.
- All terminal lugs have been paint marked after each is torqued.
- Labeling of new and of any relocated conductors and/or circuits have been preserved and transferred correctly.
- Charger DIP switches are set, and Charger is properly labeled for its particular max. current rating.

Additionally, for installations that include the Charger and V2H Bundle, verify that the:

- Hub main breaker and bonding are installed correctly.
- CTs are correctly installed (or correctly re-located).

Best Practice: The same individual should properly torque and then paint mark all connections.

Verify Communications and Low-Voltage Wiring

For installations that include the Charger and V2H Bundle, proceed to Appendix G and print the System & Voltage Checks (S&VC) form.

- Verify that all 12 VDC conductors are #10 AWG and terminated into the correct 12V and Ground terminals.
- Verify that all RS-485 and CAN cables are twisted pairs, are of adequate conductor size, and are wired into the proper terminals.
- Verify that all control cables (DS, EPO, and RSD/ESD) are of adequate conductor size and are wired into the proper terminals.
- After verifying these conductors and cables, check the appropriate boxes in the LV DC & Comm Cables section of the form.

Measure and Record System Details and Voltages

Establish safe working zones and don PPE.-Systematically energize the utility service to MSP/main breaker, premises circuits, and Charger.

For installations that include the Charger and V2H Bundle, energize the Hub and the Inverter, and each circuit in the Hub.
As equipment is energized, verify 120/240 V and Phase A / Phase B polarity, and record all system values and measurements on the sheet. Compare L1/L2 current and power measurements from commissioning app to readings from an external meter to ensure that the commissioning app is accurately communicating power consumption data.

Reinstall Covers

Reinstall and properly torque all equipment covers:

Component	Steps
Charger	Reinstall the middle cover and torque the fourteen M4 ×12 mm Torx screws to 10.4 in-lb. Reinstall the front cover and torque the two M4 ×12 mm Torx screws to 10.4 in-lb.
Hub	Reinstall the dead front, secure each door clasp, and close the cosmetic clasp covers.
Inverter	Reinstall the wiring chamber and the front cover.

WARNING! Double check that covers are properly assembled and fastened to ensure high voltage is not accessible.

Commissioning, Device Replacement, and Maintenance

This section walks you through the steps to commission or perform maintenance on a GM Energy V2H Bundle.

Before beginning this process, please ensure you have completed all necessary steps documented above in this manual.

Visit https://gmenergy.gm.com/for-home/installation-support to download the most recent PowerShift Install commissioning app.

For the intent and purpose of this section the following equipment will be referenced as the following below and in the PowerShift Install commissioning app:

- GM Energy PowerShift Charger: EVSE
- GM Energy Inverter: BDI
- GM Energy Home Hub: MID
- GM Energy Dark Start Battery: DSB

Pre-Commissioning Systems Check

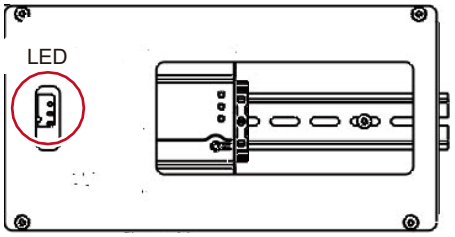
Power on all systems

- Verify the breaker feeding the MID is closed and valid grid voltage is available to energize the MID. LED on the BDI and EVSE should be on.
    - Energize all circuits within the MID including the BDI and EVSE.
- For installations including the EVSE, ensure the Charger connector is in the holster and not plugged into the vehicle.

LED Status Verification

Verify the relevant components of the system are in the following LED state before commissioning the system, please reference the LED guide in this manual if needed.

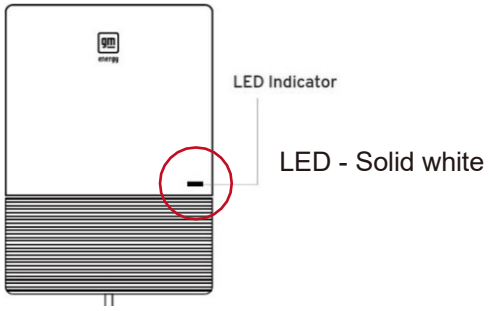
DC1 (Data collector inside of MID)

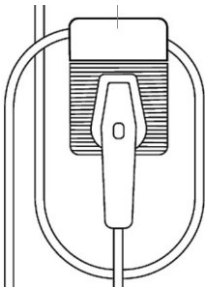


LED Indicator:

- System Ready: Solid Green
- Inverter Comm: Green Blinking
- Internet Comm: Off

EVSE



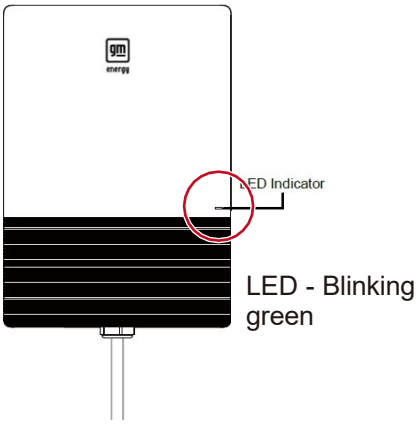


Charge Connector:

Keep connected to Holster. Do not plug-in to EV

If the Charger's indicator LED is red, this indicates that the DIP switch has not been configured. Please set the DIP switch before proceeding. Reference the "Set Charger Rating" for further instructions.

BDI

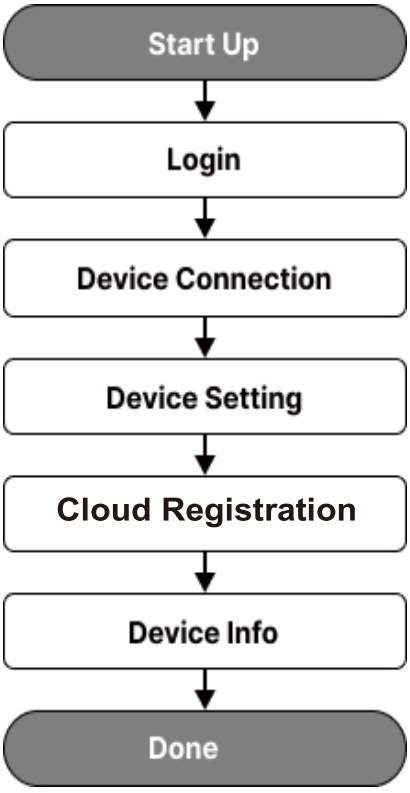


Commissioning Process

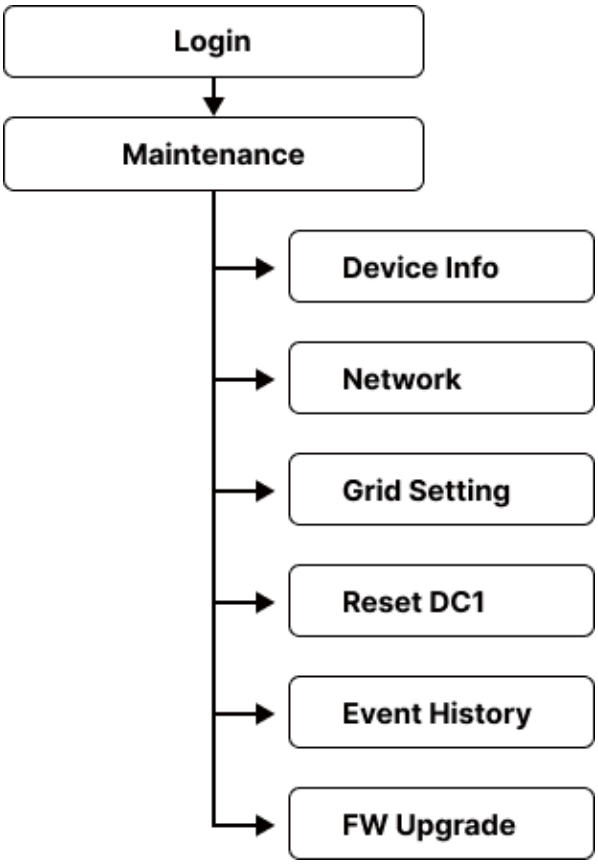
App flow

Please refer to the flow below for expected commissioning steps.

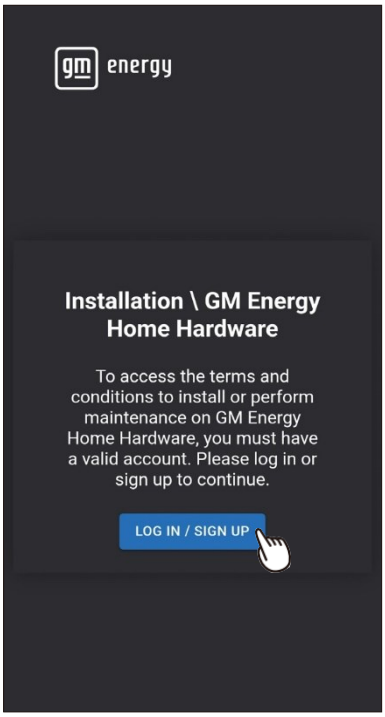
Workflow

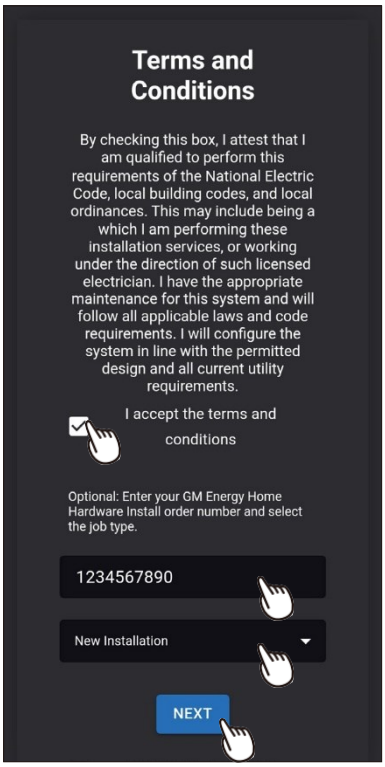


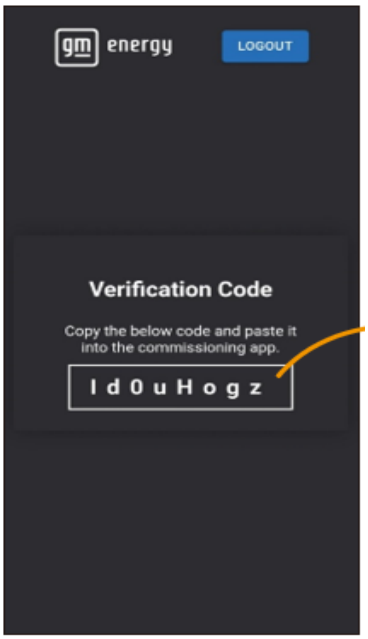
List of App pages



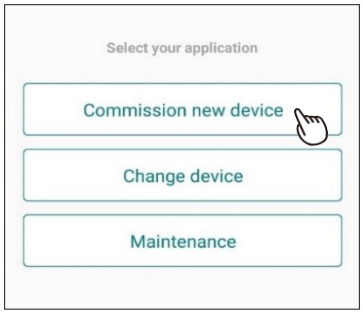
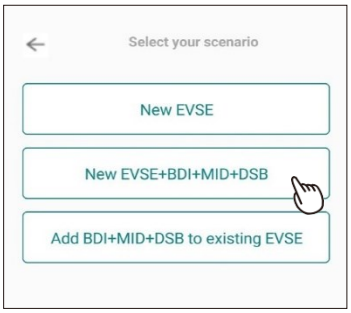
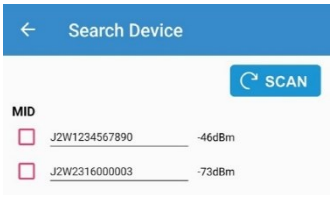
LOGIN

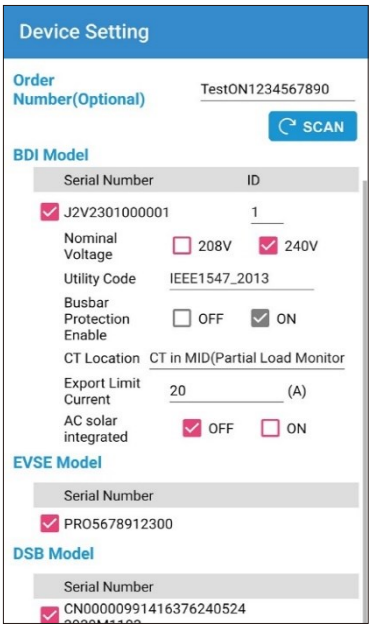
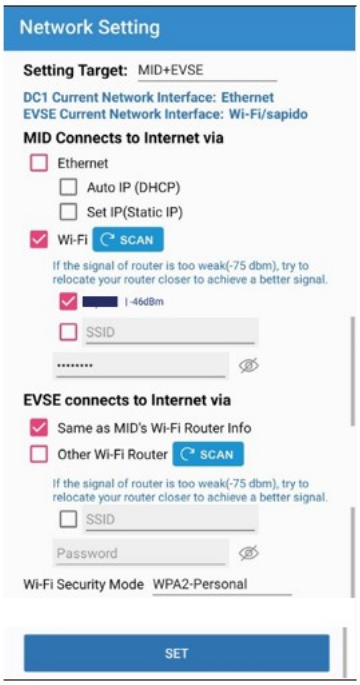
Steps		
1	Open the PowerShift Install App If you are commissioning the equipment for the first time or performing maintenance, you will need to set up an account and agree to the terms and conditions. If you do not have an existing account, refer to the link below to start the process to obtain a login code. https://euss-prod.musea2.azure.ext.gm.com	
2	Navigate to the GM Energy installer website. https://euss-prod.musea2.azure.ext.gm.com If you are commissioning the equipment for the first time or performing maintenance, you will need to set up an account and agree to the terms and conditions.	

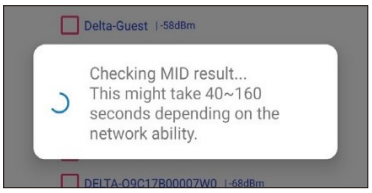
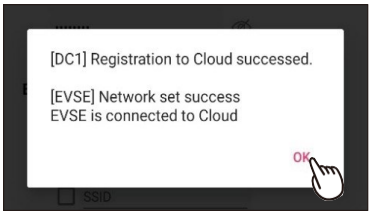
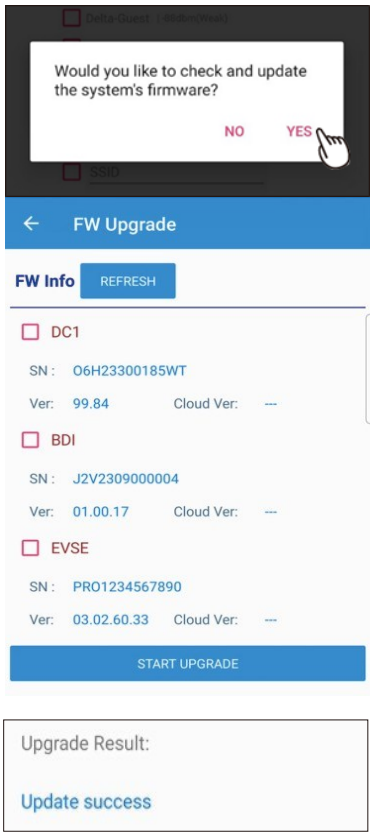
3	This is the GM Energy Installer website sign in page. Sign in using user credentials. If you do not have an existing account, follow the prompt to create a new account. Each installer must create their own GM account; this is separate from the customer's account.	
4	Read the Terms and Conditions. In order to proceed, you must accept these. Input the GM Energy hardware order number if available. Note: Customers will have received the order number as part of the receipt of their purchase. Select installation type. For new installs, select "New Installation" Click "Next" to proceed.	

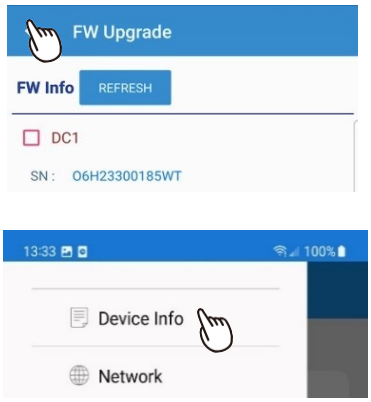
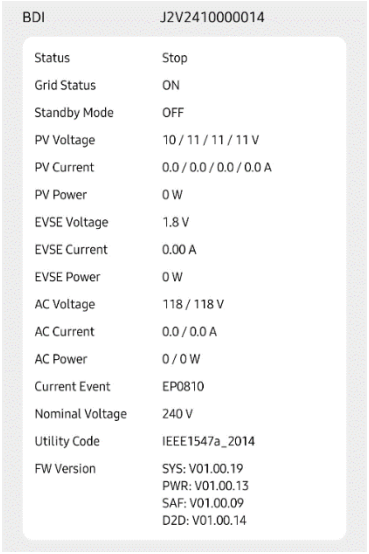
5	A Verification code will be generated. Copy the code as instructed.	
6	Return to the PowerShift Install app. Paste the code and click login.	

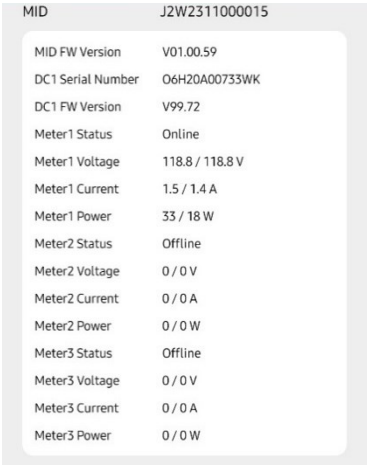
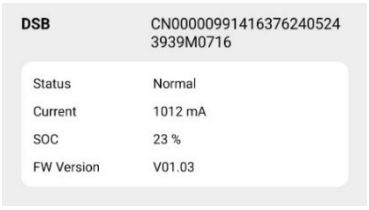
SYSTEM COMMISSIONING

Steps		
1	Select “Commission new device”	
2	Select “New EVSE” if installing a new Charger without the GM Energy V2H Bundle Select “New EVSE+BDI+MID+DSB” if installing the GM Energy V2H Bundle Select “Add BDI+MID+DSB” if installing the GM Energy V2H Enablement Kit with an existing GM Energy PowerShift Charger already previously installed and commissioned.	
3	Search for the target device as prompted. Target Device = MID for GM Energy V2H Bundle Commissioning Target Device = EVSE for GM Energy PowerShift Charger Only installs Ensure the serial number matches the physical serial number on the product (found on the bottom of each hardware). This process automatically connects the App to the Wireless signal generated by the target device. If the target device does not populate automatically (only an option for Android devices), then the user will need to add the device manually. The device serial number can be found at the bottom of the EVSE and MID. Input the MID Serial number if commissioning a V2H Bundle Input EVSE Serial Number if commissioning EVSE only. Both EVSE and MID have QR codes that can be scanned at the bottom of each hardware. This QR code is also available on the Quick Installation Guide for the EVSE and MID that comes packaged with the hardware.	 

4	If available, please enter the order number associated with this hardware. Doing so is beneficial to facilitate an easier setup for the customer in their vehicle's mobile app post commissioning. Note: Customers will have received the order number as part of the receipt of their purchase. Set up the BDI Device Settings. Refer to Appendix J: Commissioning App Settings for further details on each BDI setting. BDI settings are specific to each install, only an example of settings is shown to the left. Confirm EVSE Model Confirm DSB Model	
5	Connect to Wi-Fi. Select Target MID+EVSE at the top if not already pre-populated Scan for the desired Wi-Fi network, and use the appropriate Wi-Fi credentials. If end user Wi-Fi credentials are not available, a personal hot-spot may be used for commissioning purposes. After the installer leaves the site, please inform the user the hardware will lose internet and the user can later use their vehicle's mobile app (myChevrolet, myBuick, myGMC or myCadillac) to connect their hardware to their home Wi-Fi router to regain internet connectivity to their hardware. If EVSE is within range of the same Wi-Fi network, then select "Same as MID's Wi-Fi Router info", if not, scan for other network and input separate credentials for that secondary network. Click SET to proceed to the next step	

6	Once completed, the following message should pop up. Click Ok to proceed to the next step. This may take up to 160s to complete. Please do not close the app while the devices are connecting.	 
7	Check for System Firmware updates. Click Refresh to search for most recent FW updates. If the "Cloud Version" shows a more recent version available, select device(s) requiring updates and Start Upgrade. Note: DC1 refers to the data collector module in the MID. Device upgrades can be selected as desired (either individually or all together -DC1, BDI, and EVSE. Please do not close the app during the FW update(s). These may take up to 15 minutes. The following message should pop up once the Update is complete.	

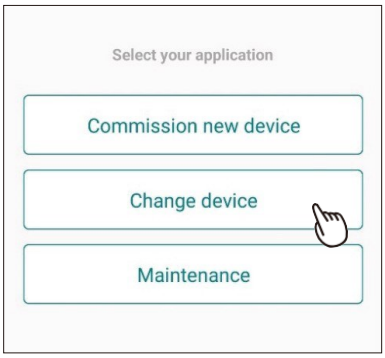
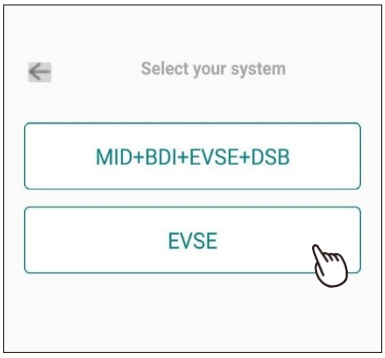
8	To complete commissioning after a firmware update. Navigate to the “Device Info” Page by selecting it from the list of options in the left corner	
9	Review the device info image and data checks below to confirm commissioning is complete and successful	
10	Confirm Cloud and hardwired connections: The image will show green connections if complete; a disconnected device will display gray. Red text will display with the type of error in the connectivity of the system if disconnected due to a fault. Please go to maintenance section of network settings and try to connect the system again. If further issues occur call GM Energy Customer Support Center at 1-833-64POWER	
11	Confirm BDI Setup: Status: Confirm status is not in alarm or fault Standby Mode: Default is off. This mode can be used if a AHJ and/or Utility has not approved the system to operate yet. This mode can be changed to “ON” in the maintenance section of this app. If selected “ON” the installer will need to return to the site to disable Standby Mode once AHJ/Utility approval is granted. Please confirm with the AHJ and/or utility, as applicable, whether they will allow system operation prior to inspection and/or PTO; requirements may vary by system setup and AHJ/utility. DC PV Voltage, Current, Power: Should be 0 as DC solar is not supported at this time EVSE Voltage, Current, Power: Confirm accurate values AC Voltage, Current, Power: Confirm accurate values Current Event: Note EP0810 is an acceptable event code. If any other event code is present, you can go to “Event History” in the Maintenance portion of this app to see more details about this error. Nominal Voltage and Utility Code: Confirm previous selections from BDI setup	

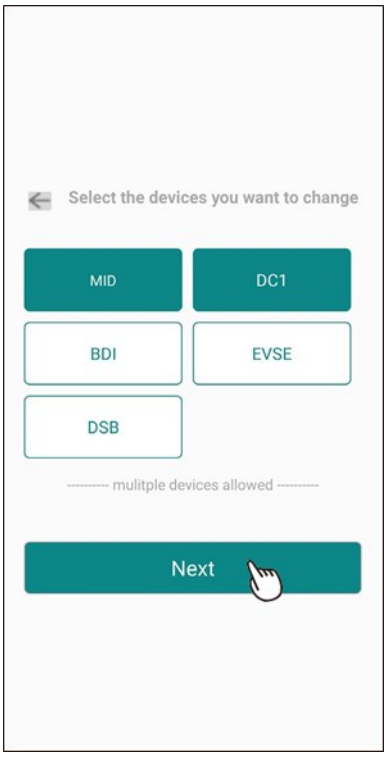
	If any questions on how to troubleshoot a fault, please call GM Energy Customer Support Center at 1-833-64POWER	
12	Confirm EVSE setup: EVSE Voltage, Current, Power: Confirm accurate values HW Dip Switch: Confirm this is reading the proper value set Current Event: EV0000 is an acceptable event code. If any other event code is present, you can go to “Event History” in the Maintenance portion of this app to see more details about this error. If any questions on how to troubleshoot a fault, please call GM Energy Customer Support Center at 1-833-64POWER	
13	Confirm MID setup: Meter 1: Confirm this is online and reading the grid (or partial loads) properly by checking voltage, current, power. If possible, check values are accurate using a multimeter or other external measurement device Meter 2: If this system was installed with AC Solar check the status and voltage, current, and power readings to confirm accurate readings. If possible, check values are accurate using a multimeter or other external measurement device. Meter 3: Should read 0 for this system NOTE: Meter status should show online with proper values, if shown offline or values are not accurate, check the meter and CT connections.	
14	Confirm DSB setup: Status: confirm this is showing “normal” Current: confirm current reading is accurate SOC: confirm reading is non-zero. DSB will ship below 100% SOC. Positive current should be seen when below 80%.	
15	Functional Checks: If the system is safely installed per the previous installation manual requirements above and already approved to operate at this point, the installer can test functionality of system. If the user’s EV is available confirm the following. Charging. Attempt to charge the vehicle. Confirm the EVSE status on the “Device Info” page shows charging. Discharging: Attempt a discharge by flipping the main circuit breaker.	

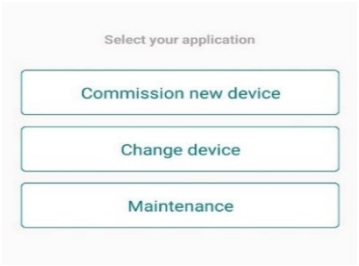
	Note: Customer must setup EV discharge settings in their vehicle mobile app (myChevrolet, myBuick, myGMC or myCadillac). Discharge requirements can be found in the customers GM Energy user guide available at the following website: https://gmenergy.gm.com/for-home/resources-and-support.

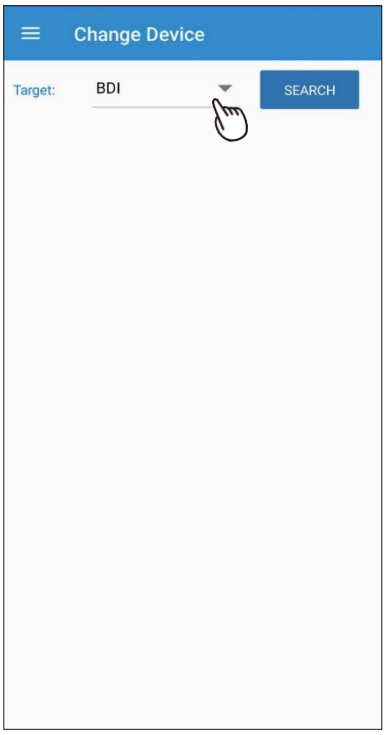
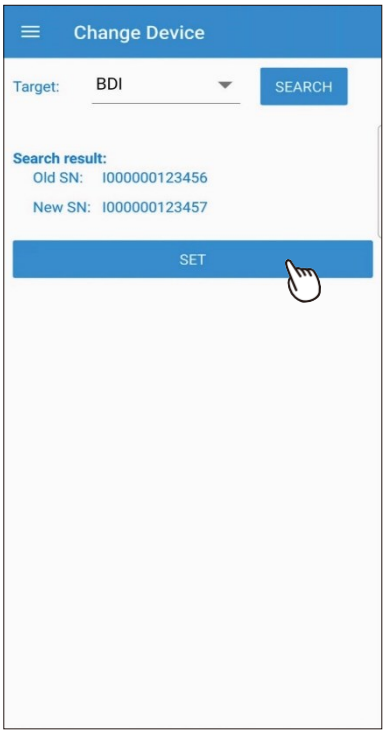
CHANGE DEVICE

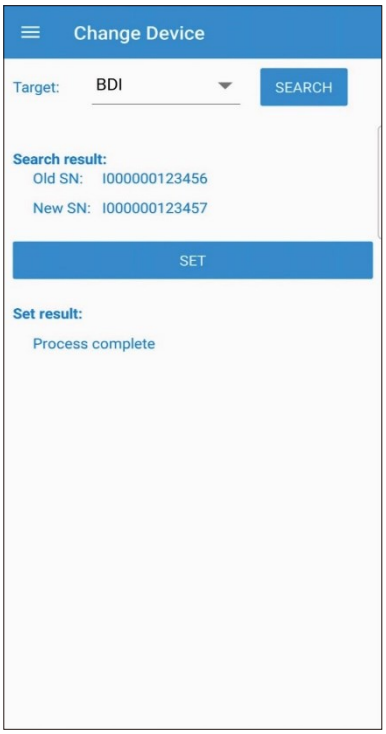
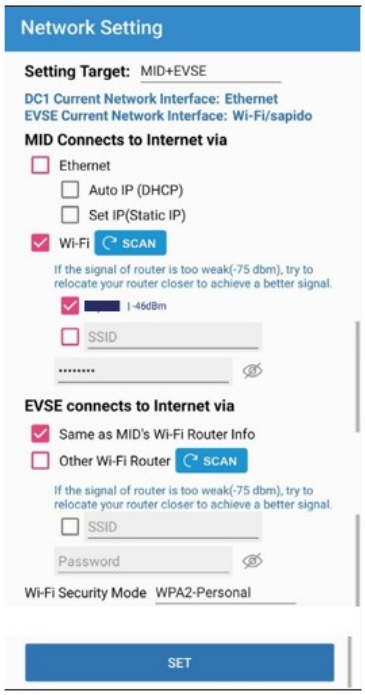
This function will be used in the event that a component of the system is replaced.

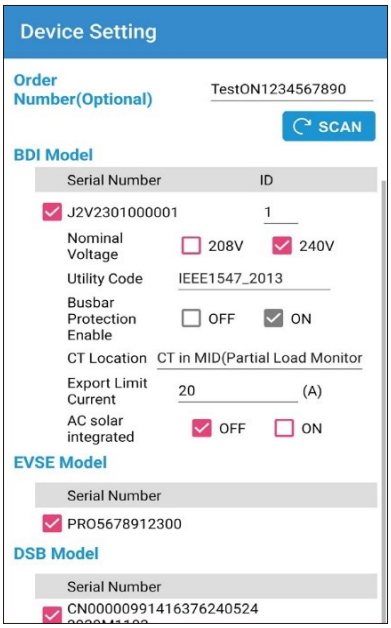
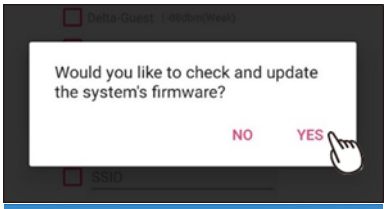
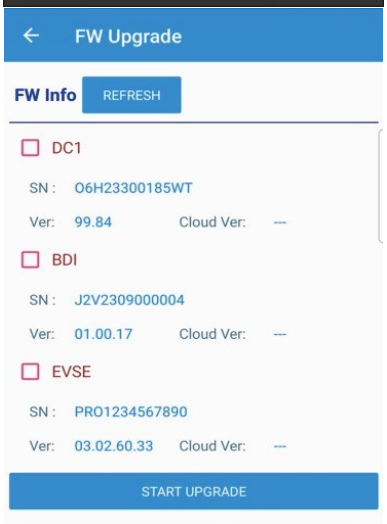
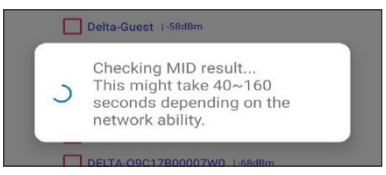
Steps		
1	Select “Change device” Please use this step if replacing a device that was previously installed.	
2	Select “EVSE” if replacing an existing, standalone EVSE without the GM Energy V2H Enablement Kit. Select “MID+BDI+EVSE+DSB” if replacing any device in a GM Energy V2H Bundle, even if that device is the EVSE.	

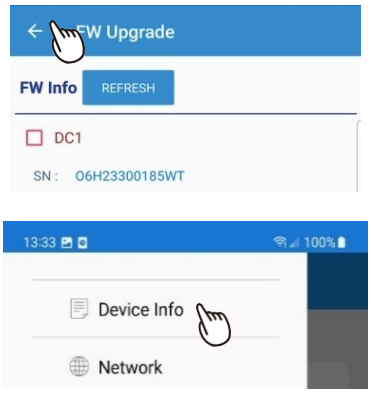
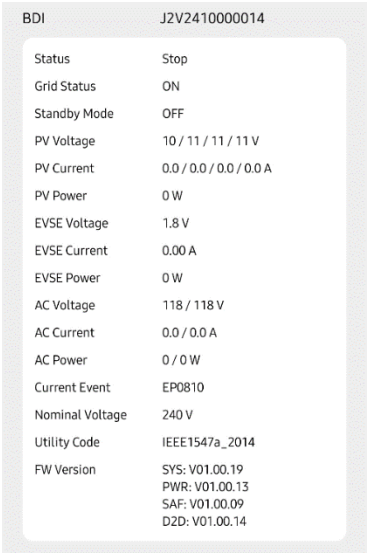
3	For EVSE only replacements (No GM Energy V2H Bundle), the following screen will appear. Please enter the serial number of the prior EVSE which has now been replaced. The previous EVSE should be uninstalled and the new EVSE should be connected, fully installed, and ready to be commissioned at this step.	
4	For GM Energy V2H Bundle hardware replacement. The following screen will appear. Please select the product(s) which will be replaced. The previous hardware should be uninstalled and the new hardware should be connected, fully installed, and ready to be commissioned at this step. Note: as part of a repair process, the DC1 may be replaced without replacing the entire MID. Every MID replacement will auto select the DC1 to update as well.	

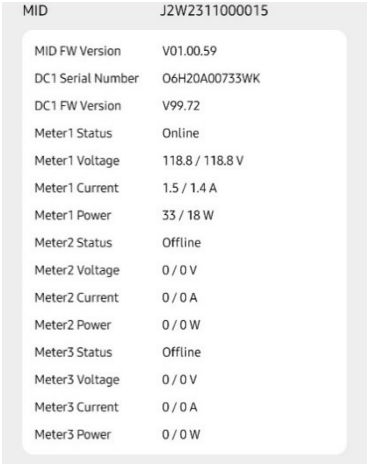
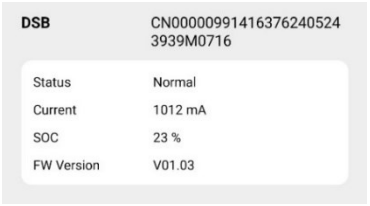
5	Search for the target device as prompted. Ensure the serial number matches the physical serial number on the product. The device serial number can be found on the bottom of the “Product”. If nothing shows up above or you are performing the install on iOS device you will need to scan the QR code or type in the serial number to continue. Note: Only the EVSE and MID have QR codes. If replacing a BDI or DSB, you must scan the MID, as instructed, to connect to the system .	 

6	Select each device you are replacing one by one next to the Target input box. Then select search to scan for the old and new devices.	
7	Proceed with Device change. Confirm Old Serial number and New Serial numbers are accurate. Click SET to continue For GM Energy V2H Bundles, all settings are saved in the MID, therefore replacing the BDI, DSB or EVSE requires no additional setting requirements. You can still edit settings as needed by going into the maintenance portion of this app.	

8	Finish Device change. The following message should pop up once device change is successful.	
9	If replacing EVSE or MID, you may be prompted to connect to Wi-Fi. Scan for the Wi-Fi network and use the appropriate Wi-Fi credentials. If end user Wi-Fi credentials are not available, a personal hot-spot may be used for commissioning purposes. After the installer leaves the site, please inform the user the hardware will lose internet and the user can later use their vehicle's mobile app (myChevrolet, myBuick, myGMC or myCadillac) to connect their hardware to their home Wi-Fi router to regain internet connectivity to their hardware.	

10	If available, please enter the order number associated with this hardware. Set up the BDI Device Settings (Refer to Appendix G for Inverter device settings support information) Confirm EVSE Model Confirm DSB Model	
11	Complete registration Once completed, the following message should pop up. Click Ok to proceed to the next step.	
12	Check for System Firmware updates. Click Refresh to search for most recent FW updates. Select device(s) requiring updates and Start Upgrade. Note: DC1 refers to the datalogging module in the MID. The following message should pop up once the Update is complete.	  

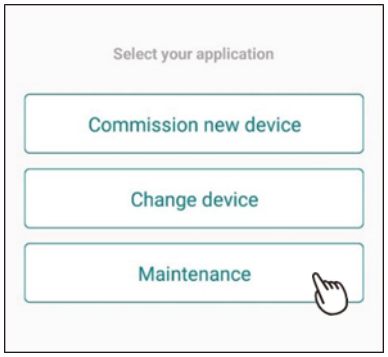
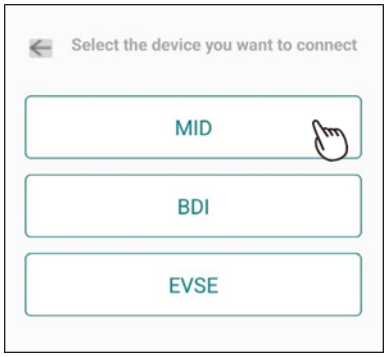
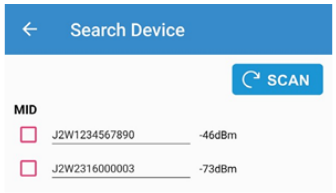
13	To complete commissioning after a firmware update. Navigate to the “Device Info” Page by selecting it from the list of options in the left corner	
14	Review the device info image and data checks below to confirm commissioning is complete and successful	
15	Confirm Cloud and hardwired connections: The image will show green connections if complete; a disconnected device will display gray. Red text will display with the type of error in the connectivity of the system if disconnected due to a fault. Please go to maintenance section of network settings and try to connect the system again. If further issues occur call GM Energy Customer Support Center at 1-833-64POWER	
16	Confirm BDI Setup: Status: Confirm status is not in alarm or fault Standby Mode: Default is off. This mode can be used if a AHJ and/or Utility has not approved the system to operate yet. This mode can be changed to “ON” in the maintenance section of this app. If selected “ON” the installer will need to return to the site to disable Standby Mode once AHJ/Utility approval is granted. Please confirm with the AHJ and/or utility, as applicable, whether they will allow system operation prior to inspection and/or PTO; requirements may vary by system setup and AHJ/utility. DC PV Voltage, Current, Power: Should be 0 as DC solar is not supported at this time EVSE Voltage, Current, Power: Confirm accurate values AC Voltage, Current, Power: Confirm accurate values Current Event: Note EP0810 is an acceptable event code. If any other event code is present, you can go to “Event History” in the Maintenance portion of this app to see more details about this error.	

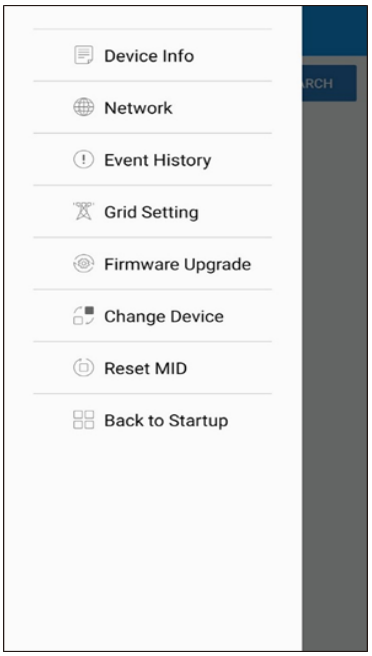
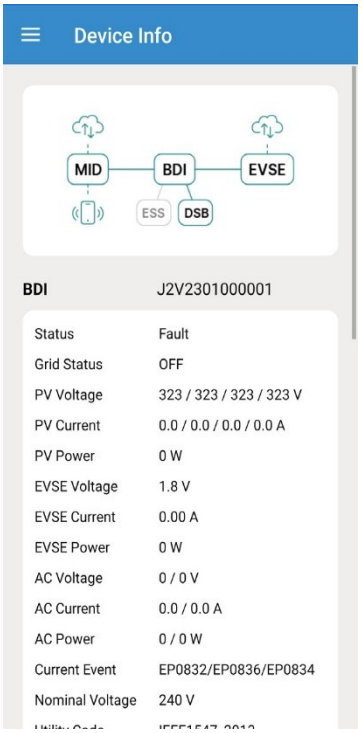
	Nominal Voltage and Utility Code: Confirm previous selections from BDI setup If any questions on how to troubleshoot a fault, please call GM Energy Customer Support Center at 1-833-64POWER	
17	Confirm EVSE setup: EVSE Voltage, Current, Power: Confirm accurate values HW Dip Switch: Confirm this is reading the proper value set Current Event: EV0000 is an acceptable event code. If any other event code is present, you can go to “Event History” in the Maintenance portion of this app to see more details about this error. If any questions on how to troubleshoot a fault, please call GM Energy Customer Support Center at 1-833-64POWER	
18	Confirm MID setup: Meter 1: Confirm this is online and reading the grid (or partial loads) properly by checking voltage, current, power. If possible, check values are accurate using a multimeter or other external measurement device. Meter 2: If this system was installed with AC Solar check the status and voltage, current, and power readings to confirm accurate readings. If possible, check values are accurate using a multimeter or other external measurement device. Meter 3: Should read 0 for this system NOTE: Meter status should show online with proper values, if shown offline or values are not accurate, check the meter and CT connections.	
19	Confirm DSB setup: Status: confirm this is showing “normal” Current: confirm current reading is accurate SOC: confirm reading is non-zero. DSB will ship below 100% SOC. Positive current should be seen when below 80%.	
20	Functional Checks: If the system is safely installed per the previous installation manual requirements above and already approved to operate at this point, the installer can test functionality of system. If the user’s EV is available confirm the following. Charging. Attempt to charge the vehicle. Confirm the EVSE status on the “Device Info” page shows charging.	

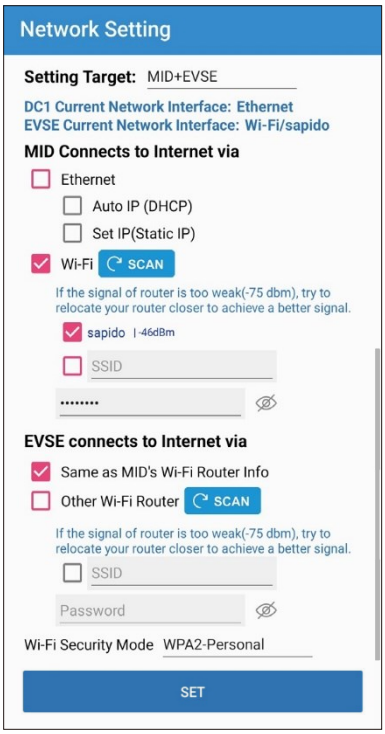
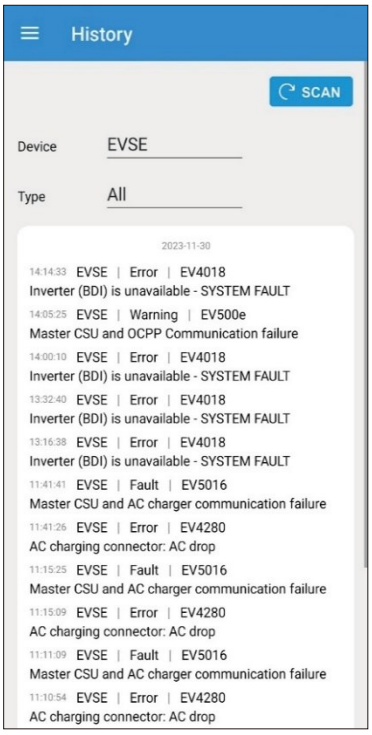
	Discharging: Attempt a discharge by flipping the main circuit breaker. Note: Customer must setup EV discharge settings in their vehicle mobile app (myChevrolet, myBuick, myGMC or myCadillac). Discharge requirements can be found in the customers GM Energy user guide available at the following website: https://gmenergy.gm.com/for-home/resources-and-support

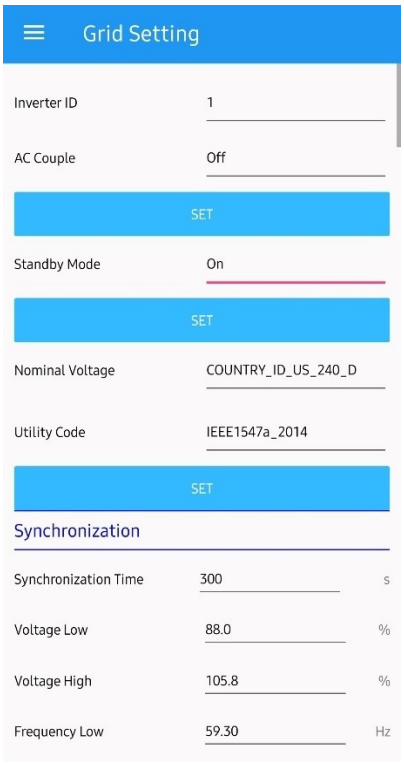
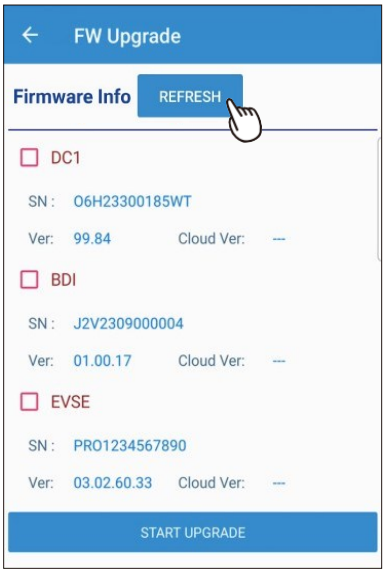
MAINTENANCE

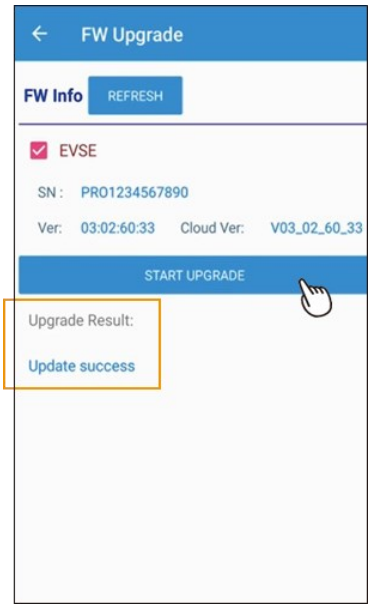
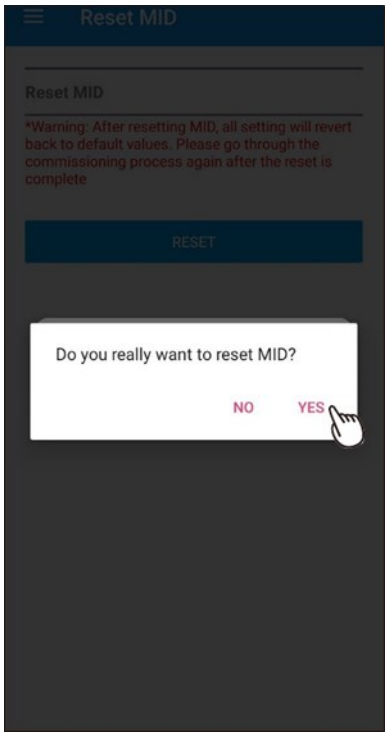
Please reference this section if performing maintenance or service on a system. You may use this to view the system configuration for troubleshooting purposes, perform FW upgrades, or update device settings. If you are replacing a component of the system, please refer to the Change Device section, above.

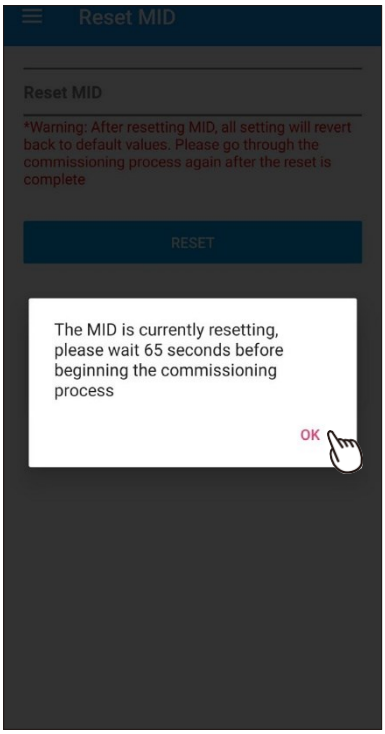
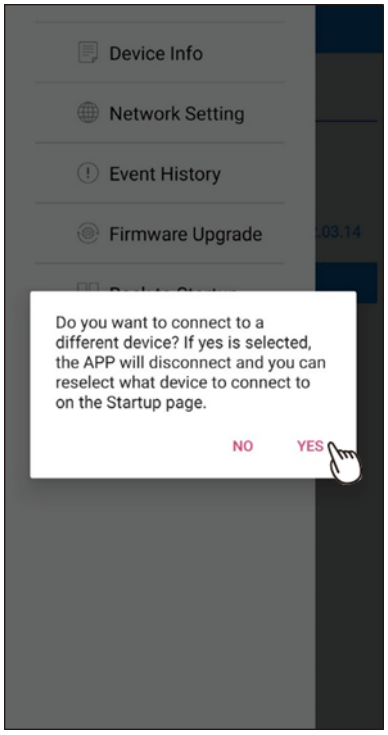
Steps		
1	Select “Maintenance” This allows the user to monitor device properties and alter device settings	
2	Select “EVSE” if viewing settings for an EVSE-only system Select “MID” if viewing GM Energy V2H Bundle settings Note: Direct BDI connections are not needed for standard maintenance	
3	Select target device. Ensure the device serial number is displayed correctly.	 

4	Maintenance Menu: Please access the maintenance menu by selecting the icon at the top left of the screen. Select the target setting you wish to view or alter.	
5	Device info: Displays device connection status and real-time system information. Connection Status: Monitor the connection status of device and internet. - Notes (1) The connected device will display green (2) The disconnected device will display gray System Status: Monitor real-time system values of connected devices or any event codes (faults, errors, etc.).	

6	Network Setting Manage device internet network settings	
7	Event History Show the event history by device or event type (Fault, Error, Warning, etc.)	

8	Grid Settings Manage device Grid settings. Refer to the Appendix J: Commissioning App Settings for details. Confirm any specific grid settings with the local AHJ and Utility. Standby Mode: Default is off. This mode can be used if a AHJ and/or Utility has not approved the system to operate yet. This mode can be changed to “ON” in the maintenance section of this app. If selected “ON” the installer will need to return to the site to disable Standby Mode once AHJ/Utility approval is granted. Please confirm with the AHJ and/or utility, as applicable, whether they will allow system operation prior to inspection and/or PTO; requirements may vary by system setup and AHJ/utility.	
9	Firmware Upgrade Monitor and upgrade device firmware versions. Click “Refresh” to search for recent Firmware versions. Select the device(s) requiring an upgrade and “Start Upgrade”.	

10	The update process should take a few minutes, and upon completion the following message should appear.	
11	Reset MID. If a system was already commissioned and this action needs to be performed, please contact GM Energy Support Center at 1-833-64POWER before completing this action. Factory reset device to default settings. This process will delete all configuration settings previously installed on the target device. Click “Yes” to proceed with factory reset. Click “No” to cancel reset and exit.	

12	The MID reset usually takes a few minutes to complete. Upon completion, the user will be redirected to the commissioning menu. Note: If an MID reset occurs, the user must re-commission the system to the appropriate settings before leaving the site.	
13	Back to Startup Click “Yes” to exit the Maintenance menu and return to the Home screen.	

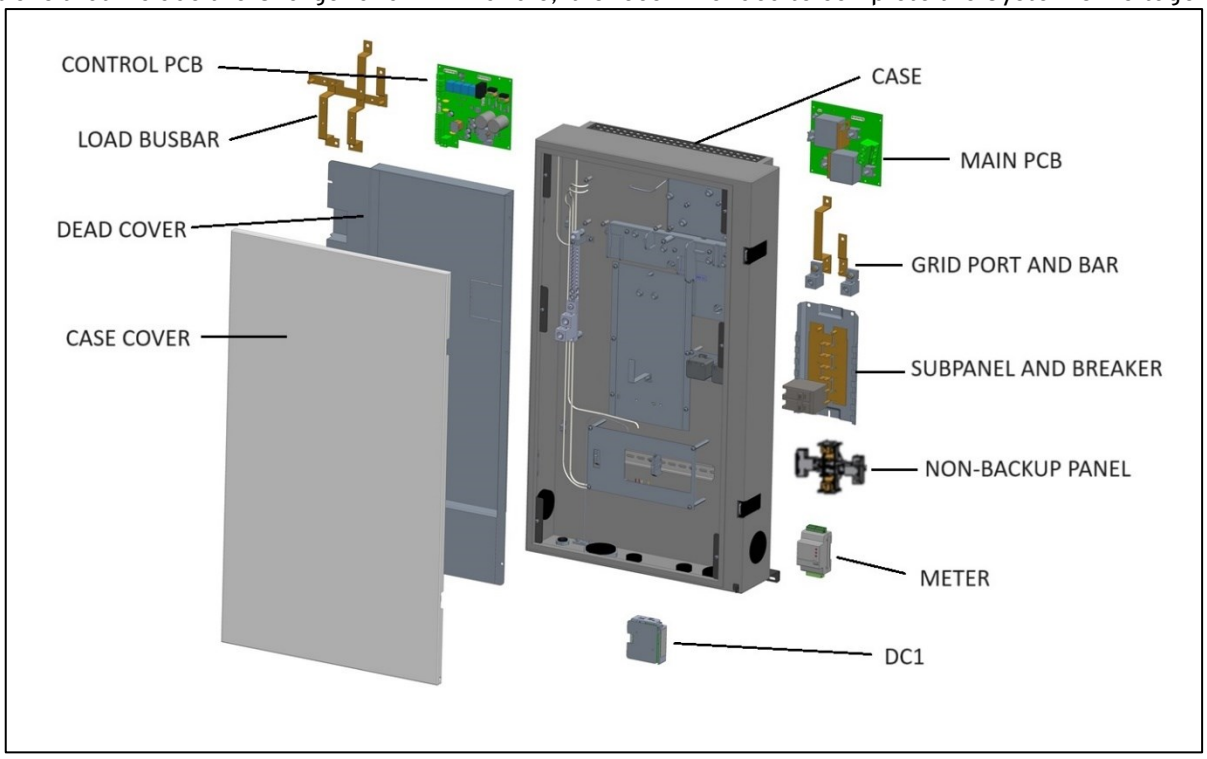
Commissioning Closeout

After commissioning is successful (confirmed cloud connections, hardware statuses, settings, and readings, and overall functionality), leave the system in a state that is compliant with all local requirements imposed by the utility, AHJ, or other regulatory body. This may require locking out or flipping breakers to the equipment. The Installer should communicate with the customer of when the system is approved to operate.

Job Closeout

Remove and discard the protective film from the Charger.

For installations that include the Charger and V2H Bundle, it is recommended to complete the System & Voltage Checks Form, available in



Appendix H: System & Voltage Checks Form, with technician names legibly recorded and date and time entered. Take a photo of the form for your job closeout records, and then fold it up and place it inside the Hub front cover before closing and sealing the Hub door. Additionally, GM Energy recommends taking the following photos for your closeout record. Be aware, certain photos can only be taken mid-install, as noted below; others should be taken before covers are fastened to reduce time spent.

Photos for Charger-Only Installations

Typical Photo	Reason	Photo Taken During Install
Charger (middle cover, attached screws visible)	High chance of water ingress; verify middle cover is attached properly.	
Charger (cover removed, all wiring terminations visible, showing conduit/wire entry points)	Verify wiring workmanship and terminations.	X
	Verify conduit entries.	
Charger (cover removed, showing DIP switch settings) *Refer to Section 4.2.*	Verify DIP switch setting.	X
	You must verify that the DIP switch setting does not exceed capability of circuit per code requirements	
Charger (two feet away from Charger and holster)	Verify clearances and hardware mounting workmanship.	
Charger breaker in MSP	Verify breaker and DIP switch settings are correct.	
Charger enclosure label (showing amp setting)	Verify NEC Edition-specific rating setting.	
Charger AC disconnect (showing rating and conductor torque paint marks)	If applicable, various NEC Edition-specific requirements.	
Charger LED (showing status light GREEN/WHITE/BLUE)	Verify Charger is in an acceptable state (blinking red requires attention).	

Photos for V2H Bundle

Typical Photo	Reason	Photo Taken During Install
Main service panel (cover removed, all wiring terminations visible)	Quality control.	X
Main service panel (cover on, all labeling legible)	Quality control.	
Load center 1 (if applicable, cover removed, all wiring terminations visible)	If applicable (same reason as MSP).	X
Load center 1 (if applicable, cover on, all labeling legible)	If applicable (same reason as MSP).	X
Additional load center (if applicable, cover removed, all wiring terminations visible)	If applicable (same reason as MSP).	X
AC disconnect (if required, cover removed, fuses legible)	Required if MSP and Hub are not in same space and accessible.	X
AC Disconnect labeling (if applicable, cover on, labeling legible)	Verify which equipment AC disconnect is associated with. (NEC 625.43 Disconnecting Means)	X
Solar System (if present; include any subarrays)	Confirm array layout.	
Consumption CTs (any additional premises CT's must be captured)	Verify installation.	X
	Verify orientation and wiring.	
Production CTs	If required.	X
Hub mounting bracket (attached to wall, with sample fastener atop)	Record of fastener used.	X
Inverter mounting set screws	Separate photo.	X
Hub (top half, cover removed, top back-up section with all wiring, terminations, and breakers visible) **Capture additional CT configurations if applicable.**	Verify Eaton Breaker and backup breaker torque/phasing.	X
	Verify busbar breakers.	
	Verify ground bonding strap (if installed), and grounding terminations and torque.	
	Verify PCB wiring connections.	
	Verify non-factory wiring workmanship (field wiring).	
	Verify consumption CTs orientation.	
	Verify conduit entry and wiring workmanship.	

Hub (bottom half, cover removed, bottom non-backup with all wiring, terminations, and conduit entry points visible)	Verify DC1 and Acrel meter wiring.	X
Hub (entire enclosure, two feet away with cover removed)	Overall system record.	
Inverter (two feet away with cover removed, all wiring terminations visible)	Verify conduit entry and wiring workmanship.	X
	Verify grounding.	
	Verify terminations (L1/L1, comms, DC, solar, PowerBank).	
Inverter (closeup of wiring box, cover removed, all wiring terminations visible)	Verify communication wiring, and DC, L1/L2, and ESS/DSB communications terminations.	X
Electrical equipment (two feet away, showing all electrical enclosures with covers on) **Multiple photos may be necessary if equipment is in different locations.**	Conduit workmanship, entries, and weep holes.	
	Equipment layout and clearances.	
	Must capture dark start, Inverter, Hub, MSP, PowerBank, and subpanels; and conduit, and conduit gutter boxes.	
Gutter boxes (cover removed, showing all wiring)	Verify NEC compliance and wiring workmanship.	X
	Verify conduit workmanship.	
Dark start (showing factory-installed cable to Inverter)	Verify drain valve/mounting orientation.	
	Verify clearances.	
Charger (middle cover, attached screws visible)	High chance of water ingress; verify middle cover is attached properly.	
Charger (cover removed, all wiring terminations visible, showing conduit/wire entry points)	Verify wiring workmanship and terminations; verify conduit entries.	X
Charger (cover removed, showing DIP switch settings) *Refer to Section 4.2.*	Verify DIP switch setting.	X
	You must verify that the DIP switch setting does not exceed capability of circuit per code requirements	
Charger (two feet away showing Charger and holster, including conduit water drain)	Verify clearances and hardware mounting workmanship.	
	Verify water egress method and conduit drain fitting.	
Charger breaker in MSP	Verify breaker and DIP switch settings are correct.	
Charger enclosure label (showing rating setting)	Verify rating setting.	

Charger LED (showing status light GREEN/WHITE)	Verify EVSE is in an acceptable state (blinking red requires attention).	
Equipment serial number labels (dark start, Charger, Inverter, Hub, and PowerBank)	RMA and remote troubleshooting/monitoring.	
System & Voltage Checks form (completely filled out)	Verify systems checks completed. As-built documentation for records.	
GM Energy PowerShift Install app device info screen(s) Be sure to scroll down and capture info on each device as applicable. Multiple screenshots may be required. Compare L1/L2 current and power readings to concurrent readings from an external power meter.	Confirm correct amperage and CT functionality.	

APPENDIX A: PRODUCT DATASHEETS

Please refer to GM Energy website for product data sheets at https://gmenergy.gm.com/for-home/resources-and-support

APPENDIX B: DESIGN GUIDELINES

- Determine Charger breaker size:
  - If available, use Green Button data/usage data to size Charger breaker as large as possible without triggering a main panel upgrade (MPU).
  - Otherwise, perform traditional NEC load calculations and determine largest breaker possible without triggering MPU.
- Show DIP switch setting on installation notes corresponding with selected size (see Section 4.2).
- Minimum practical Charger breaker size = 40 A.
- Determine loads being backed up:
  - Prioritize single-pole circuits, lighting, and plugs.
  - No individual load greater than 40 A (based on Inverter rating).
    - No individual load with an LRA (Locked Rotor Amperage) than 62 A.
      - Soft starters may be installed to reduce startup current of inductive loads (such as air conditioner) although performance is not guaranteed.
  - Follow guidance for interior located subpanels having potentially disqualifying loads:
    - If they can be easily routed out via exterior (such as an AC unit with an exterior disconnect), add notes to enable inclusion in scope of work.
    - Otherwise, subpanel is disqualified for backup.
- Add load calculations to PVE-2:
  - If using traditional load calculation, include:
    - Whole-home load calculation.
    - Hub load calculation.
  - If using green button data/usage data, only include that calculation justifying Charger breaker size, and Hub load calculation.
- Choose appropriate Hub interconnection method based on existing panel limitations, and load calculation of circuits being relocated:
  - Branch breaker
  - Lug kit
  - Hub as Main Service Entrance
    - May require using non-backup panel, limited to 110 A.
  - Use appropriate resources to determine max. branch breaker/lug kit compatibility.
  - NEC 705 rules apply: 120% rule, sum of breakers, or PCS to protect MSP busbar.
    - Prioritize using PCS whenever possible and avoid relocating non-backup loads out of MSP.
- Hub backup panel limited to 200 A total (125 A max. branch breaker).
  - Must use Eaton BR or BQ type breakers.
  - Backup panel in Hub contains 12 single pole breaker spots. One dual pole 60A breaker is pre-installed for Inverter.
  - The pre-installed 60A breaker in the Hub must be used for the Inverter. Do not replace this breaker unless replacing with a breaker of the same or similar model.
  - Ensure no single load exceeds 40A continuous rated current. Loads that cannot be powered by Inverter during an outage should be landed on a non-backup panel.

- Larger branch breakers can be used to feed a subpanel. For breakers with an amperage of 100A or greater, it is recommended that a breaker hold-down kit (part number BRHDK125) be applied to the breaker.

- Equipment placement:
  - Place Charger in the preferred location for vehicle charging:
    - Site survey team will specify vehicle location.
    - Reference the **Maximum Wire Run** chart for wire runs.
    - Always place dark start near Inverter.
  - Add RSD or AC disconnect as needed for the 60 A Inverter circuit:
    - If Hub is in garage or in a non-accessible location:
      - add AC disconnect outside if NEC 2020.
      - add RSD switch outside if NEC 2023.
    - If Hub is placed in an accessible location, no RSD or AC disconnect is required.

- CT placement: reference CT decision tree and diagrams. Apply PCS warning labels to CTs during installation.

3rd Party Generator Compatibility

At the time of this manual publishing date, GM Energy does not allow the installation of the V2H Enablement Kit with new or existing backup generators. Violation of this policy impacts the GM Energy limited warranty and may result in damage to generators and/or V2H equipment. Please see the GM Energy limited warranty for more details.

A new or existing backup generator does not preclude the installation of a stand-alone GM Energy Powershift Charger.

3rd Party Battery Storage Compatibility

GM Energy does not allow the installation of the V2H enablement kit with new or existing 3rd Party ESS. Violation of this policy impacts the GM Energy limited warranty and may result in damage to 3rd party ESS and/or V2H equipment. Please see the GM Energy limited warranty for more details.

A new or existing 3rd party ESS does not preclude the installation of a stand-alone GM Energy Powershift Charger.

APPENDIX C: ACCESSORIES

Installer-Procured Accessories

Recommendations and links provided for convenience. Always reference the most current manufacturer installation guides for the most up-to-date requirements.

Hub Main Breaker (100 A, 125 A, 150 A, 175 A, or 200 A), CSR (**25 kAIC**); https://www.eaton.com/us/en-us/skuPage.CSR2200N.html https://www.eaton.com/us/en-us/skuPage.CSR2175NSR12.html https://www.eaton.com/us/en-us/skuPage.CSR2150N.html https://www.eaton.com/us/en-us/skuPage.CSR2125N.specifications.html https://www.eaton.com/us/en-us/skuPage.CSR2100BM.html	
Hub Main Breaker (100 A, 125 A, 150 A, 175 A, or 200 A), BW (**10 kAIC**); https://www.eaton.com/us/en-us/skuPage.BW2200.html https://www.eaton.com/us/en-us/skuPage.BW2150.html https://www.eaton.com/us/en-us/skuPage.BW2175.html https://www.eaton.com/us/en-us/skuPage.BW2100BM.specifications.html	
Required rubber covers for Hub Main Breaker: https://www.eaton.com/us/en-us/skuPage.TICSR300C.html https://www.platt.com/p/0318924/eaton/terminal-insulator-kit-breaker-type/786676037150/cutticsr300	
The recommended examples of Rapid Shutdown Devices (RSD) are: **IMO** SI16-PEL64R-2 enclosed DC switch: https://imoautomation.com/imo_us_usd_view/enclosed-dc-switch-ip66.html **Eaton** switch consisting of: • M22S-ST-GB10: https://datasheet.eaton.com/datasheet.php?model=216499&locale=en_GB • M22-WRK: https://www.eaton.com/us/en-us/skuPage.M22-WRK.html • M22-KC10: https://www.eaton.com/us/en-us/skuPage.M22-KC10.html • M22-I1-PG: https://www.eaton.com/us/en-us/skuPage.M22-I1-PG.html **Note:** The RSD must be assembled in an outdoor-rated enclosure, visible at point of interconnection to clearly indicate ON and OFF positions, and be labeled appropriately. See Section 2.5.	 
Non-backup breaker pan, 48INT125B: https://www.eaton.com/us/en-us/skuPage.48INT125B.html https://www.platt.com/p/0847536/eaton/oem-br-loadcenter-interior/786679094136/cut48int125b	

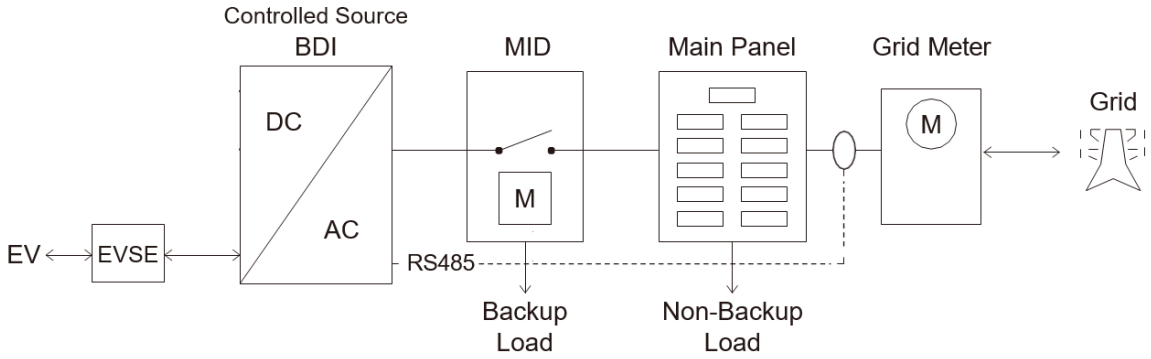
600 V rated communications cable (required if sharing raceway): https://www.belden.com/products/Cable/Tray-TC-Cable/3088A (1 pair) https://www.belden.com/products/cable/tray-tc-cable/1048a (2 pair) https://www.digikey.com/en/products/detail/belden-inc/3088A-01010000/8122257?s=N4IgTCBcDaIMwAYAcSCCIC6BfIA https://www.digikey.com/en/products/detail/belden-inc/1048A-0107500/8122194?s=N4IgTCBcDaIlwAYAsAOAgiAugXyA	

APPENDIX D: ELECTRICAL DIAGRAMS

D.1 Electrical Diagram Examples and App PCS Settings

Meter Placed at Service Entrance – Partial Home Backup

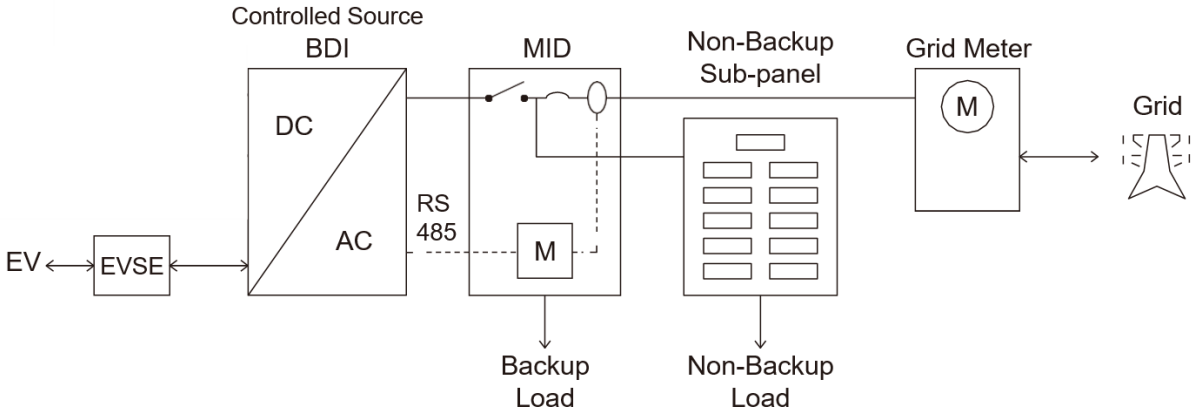
Place the PCS meter at the grid connection to real time monitor the grid current. Inverter can manage to control the output power based on the calculation results of the load condition, if it is over 80% of busbar rating. At the moment the current hits 80% the Inverter stops providing power. The main breaker capacity must be set in the commissioning app properly for this setup.



Commissioning App Busbar Settings	Input
CT location	CT at Grid Meter
Main breaker capacity	0 - 200 A

Meter Placed at Service Entrance – Whole Home Backup

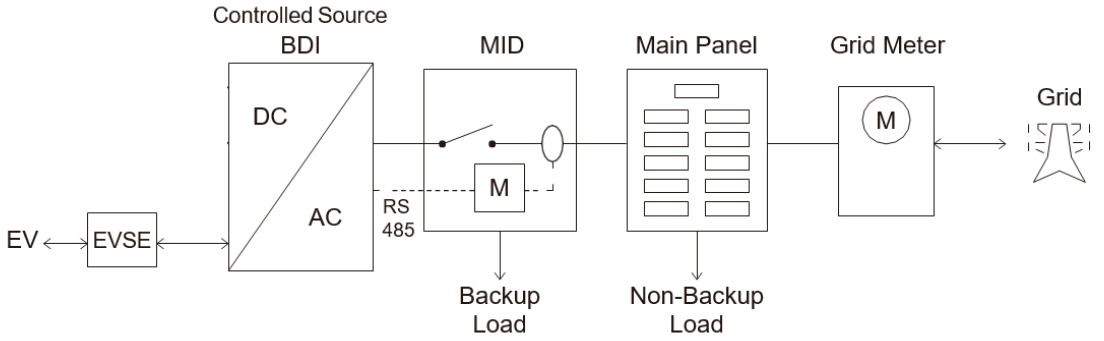
For whole home backup setup, the CT is left in the factory-installed location in the Hub. Inverter can manage to control the output power based on the calculation results of the load condition, if it is over 80% of busbar rating. At the moment the current hits 80% the Inverter stops providing power. The main breaker capacity must be set in the commissioning app properly for this setup.



Commissioning App Busbar Settings	Input
CT location	CT at Grid Meter
Main breaker capacity	0 - 200 A

Meter Placement on MID Output

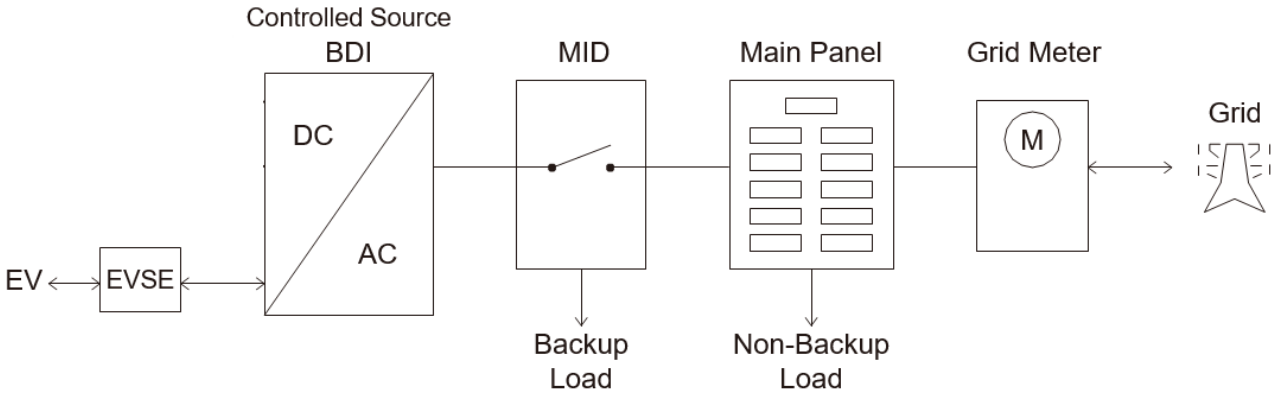
When the meter cannot be placed at the grid connection (preferred setup due to customer app displays) the PCS meter can be put on the output of the MID as an alternative and left in the factory-installed location. An export limit must be calculated and set in the commissioning app for this setup.



Commissioning App Busbar Settings	Input
CT location	CT at MID (partial load monitoring)
Export Limit Current	Perform the following calculation for this input: 1.2 x Busbar Capacity – Main Breaker Rating – AC Solar Rating **(Default can be set to 0 A for V2H Installs)**

No external metering possible

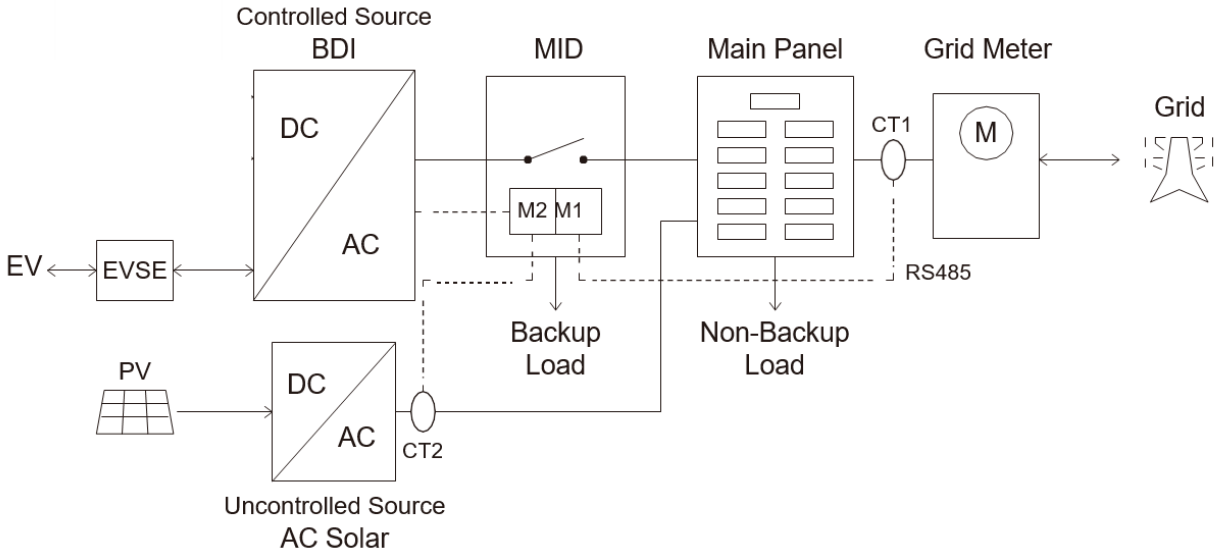
If a meter is not possible to be placed at the grid or at the MID, the installer can calculate and input a single source output limit for the Inverter.



Commissioning App Busbar Setting	Input
CT location	Single source output
Inverter Limit Current	0 - 48 A Default can be set to 0 A

Partial Home Backup With Existing AC Solar at the Main Service Panel (or non-backup panel)

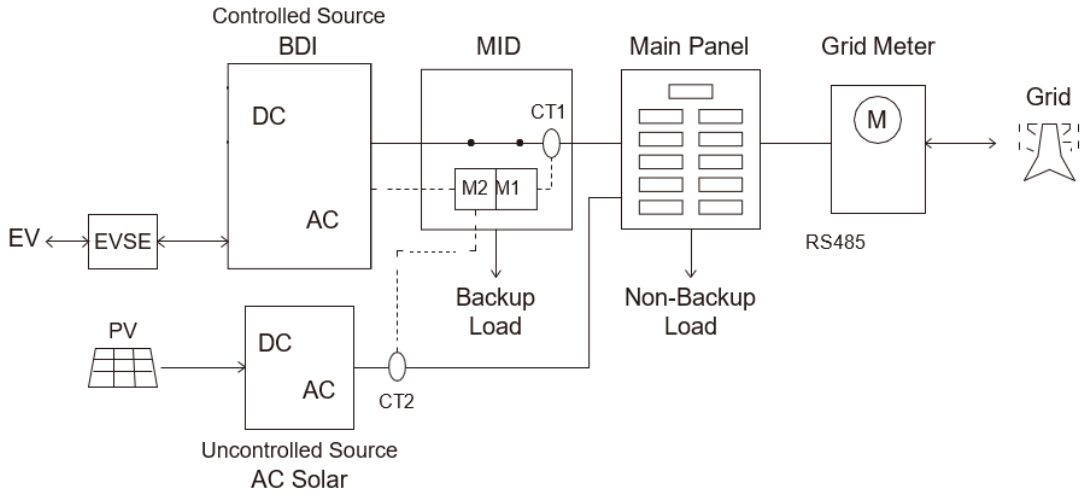
For this setup, CT1 is placed at the grid meter and CT2 is placed at the existing solar. The existing solar will stay on the non-backup load part of the system. The installer will need to calculate an export limit by utilizing the busbar capacity, main breaker rating, and existing AC solar rating.



Commissioning App PCS Settings	Input
CT location	CT(1) at grid meter
Export Limit Current	Perform the following calculation for this input: 1.2 x Busbar Capacity – Main Breaker Rating – AC Solar Rating (Default can be set to 0 A for V2H Installs)
AC Solar	Enabled

Partial Home Backup with Existing Solar at the Main Service Panel (or non-backup panel) – Meter 1 on MID Output

For this setup, CT1 is placed on the MID output and CT2 is placed at the existing solar. The existing solar will stay on the non-backup load part of the system. The installer will need to calculate an export limit by utilizing the busbar capacity, main breaker rating, and existing AC solar rating.



Commissioning App PCS Settings	Input
CT location	CT(1) at grid meter
Export Limit Current	Perform the following calculation for this input: 1.2 x Busbar Capacity – Main Breaker Rating – AC Solar Rating (Default can be set to 0 A for V2H Installs)
AC Solar	Enabled

D.2 Load Calculation Example

ELECTRICAL CALCULATIONS

Load Calculation - New Backup Subpanel

220.82(B)(1)	General Lighting @ 3VA per square ft	1500	ft^2		4500	VA
	Small Appliance	2			3000	VA
	Laundry				0	VA
	Microwave				0	VA
	Refrigerator				0	VA
	Dishwasher/Garbage Disposal				0	VA
	FAU				0	VA
	Range				0	VA
	Oven				0	VA
	Dryer	1			5000	VA
	Water Heater	1			5760	VA
	SPA				0	VA
	Pool				0	VA
	EV Charging Equipment				0	VA
	Other 2P circuit	1			9600	VA
			Total		27860	VA
220.82(C)		First 10,000 VA at 100%			10000	VA
		Remainder @ 40%			7144	VA
		Net General Load			17144	VA
	Heating and Air Conditioning					
	AC#1	7680	VA	Heating #1	0	VA
	AC#2	0	VA	Heating #2	0	VA
	AC#3	0	VA	Heating #3	0	VA
			Total Heating and AC Load		7,680	VA
			Net Load		24,824	VA
			AMPS		103.43	A
			Minimum Service Required		125	A

Load Calculation - Whole Home

220.82(B)(1)	General Lighting @ 3VA per square ft	2500	ft^2		7500	VA
	Small Appliance	2			3000	VA
	Laundry				0	VA
	Microwave				0	VA
	Refrigerator				0	VA
	Dishwasher/Garbage Disposal				0	VA
	FAU				0	VA
	Range				0	VA
	Oven				0	VA
	Dryer	2			10000	VA
	Water Heater	2			11520	VA
	SPA				0	VA
	Pool				0	VA
	EV Charging Equipment	1			9600	VA
	Other 2P circuit	2			17280	VA
			Total		58900	VA
220.82(C)		First 10,000 VA at 100%			10000	VA
		Remainder @ 40%			19560	VA
		Net General Load			29560	VA
	Heating and Air Conditioning					
	AC#1	7680	VA	Heating #1	0	VA
	AC#2	7680	VA	Heating #2	0	VA
	AC#3	0	VA	Heating #3	0	VA
			Total Heating and AC Load		15,360	VA
			Net Load		44,920	VA
			AMPS		187.17	A
			Minimum Service Required		200	A

APPENDIX E: OPERATION AND MAINTENANCE

E.1 De-Energize and Lockout/Tagout the System

Before working on or servicing any system components, power source(s) must be removed from the equipment (de-energize), and then locked in the OFF position with a tag identifying the individual's name, date, and contact information.
For installations that include only the Charger, de-energize the Charger by turning OFF (opening) the OCPD (circuit breaker) that powers the Charger.
A lockout/tagout (LOTO) device can be affixed to the breaker handle; or, if the OCPD is in an electrical panel with a lockable door, the door can serve as the means of LOTO.
If an AC disconnect was installed in series with the power circuit, open the disconnect and apply the LOTO steps.
If additional work or service will be performed on any premises with GM Energy equipment, care must be taken to de-energize and create a safe physical working space with respect to all energy sources.
If one is present, activate the Rapid Shutdown Device (RSD). Doing so will place all the V2H Bundle equipment in standby.

Perform the following in the order presented:

E.1.1 Charger

Remove the charging connector from the vehicle, and then LOTO the AC circuit as described in Section E.1 (OCPD or AC disconnect if present).

E.1.2 Inverter

1. Verify that the charging connector is removed from the vehicle
2. In the Hub, turn OFF (open) the two-pole 60 A OCPD (circuit breaker) labeled ***BDI Inverter***. LOTO the OCPD handle.

E.1.3 Hub

1. Verify that the two-pole 60 A circuit to the Inverter is OFF (open) and is LOTO. .
2. If a main breaker was installed in the Hub, turn OFF (open) the Hub main breaker by moving the handle to the left, and then LOTO the breaker handle.
3. If a main breaker is not present in the Hub, turn OFF (open) the Hub feeder power source circuit (meter AC disconnect, or feeder OCPD at upstream electrical equipment). After this disconnect is open, or the OCPD is open (OFF), LOTO the disconnect; or LOTO the breaker handle; or close the equipment door and LOTO the door in its closed position.

To re-energize, perform the steps in Section E.1.1, E.1.2, and E.1.3 in reverse order.

E.2 Field-Replaceable Components

The following components may be replaced in the field after system installation.

Important! For some of the procedures in this appendix, the customer's vehicle will be required to fully test and verify the replacement process. Recommissioning using the PowerShift Install application, verifying operation of the full V2H Bundle, and verification of continuity for the backup circuits are also required.

E.2.1 Charger

This section outlines the troubleshooting and replacement procedures for the Charger. it may need to be reset, may require new firmware to be downloaded, or simply may be defective and need replacement.

T*his overview does not include all the steps in the actual procedure:*

1. If the Charger will be replaced under warranty, service personnel will be issued an RMA number to receive the replacement component.
2. Upon arrival at the site, service personnel must coordinate planned site activity with homeowner and clearly communicate the duration of time that power to the premises will be off.
3. Perform site arrival inventory and evaluation.
4. Replace the Charger.
5. Perform the "change device" function through the commissioning app and perform post-commissioning system & voltage checks.
6. Prepare an RMA for shipping and complete any job closeout procedure (or through other approved method).
7. Ship the defective Charger back to the supplier using the original shipping box and return label provided.
8. Inform the homeowner of the work performed and of any next steps

Note: The Charger cable may be replaced separately.

E.2.2 V2H Enablement Kit Components (Inverter, Hub, and Dark Start)

This section outlines the troubleshooting and replacement procedures for the Inverter, the Hub, and the dark start. These components may need to be reset, may require new firmware to be downloaded, or simply may be defective and need replacement.

The Inverter contributes to V2H operation based on external inputs from the Hub, the Charger, and the dark start. The Inverter also provides additional communication interfaces.

The Hub contributes to V2H operation based on external inputs from the Inverter, the Charger, and the dark start. The Hub also provides additional communication interfaces.

The dark start contributes to V2H operation based on external inputs from the Inverter, the Hub, and the Charger. The dark start also provides additional communication interfaces.

T*his overview does not include all the steps in the actual respective procedures:*

1. If the component will be replaced under warranty, service personnel will be issued an RMA number to receive the replacement component.
2. Upon arrival at the site, service personnel must coordinate planned site activity with homeowner and clearly communicate the duration of time that power to the premises will be off.
3. Perform site arrival inventory and evaluation.
4. Replace the component.
5. Perform the “change device” function through the commissioning app and perform post-commissioning system & voltage checks.
6. Prepare an RMA for shipping and complete job closeout activity (or other approved method).
7. Ship the defective component back to the supplier using the original shipping box and return label provided.
8. Inform the homeowner of the work performed and of any next steps.

APPENDIX F: TROUBLESHOOTING

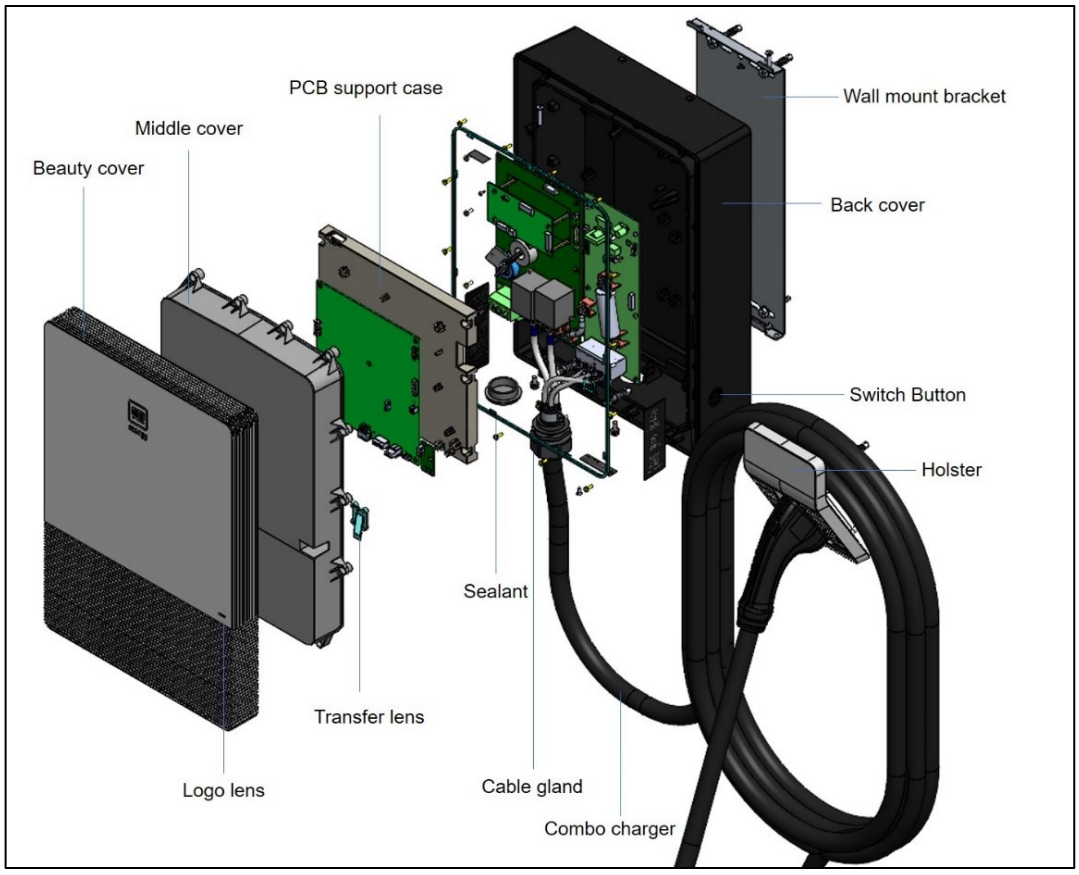
Troubleshooting information is available at https://gmenergy.gm.com/for-home/resources-and-support

For additional Troubleshooting, call the GM Energy Support Center at 1-833-64POWER.

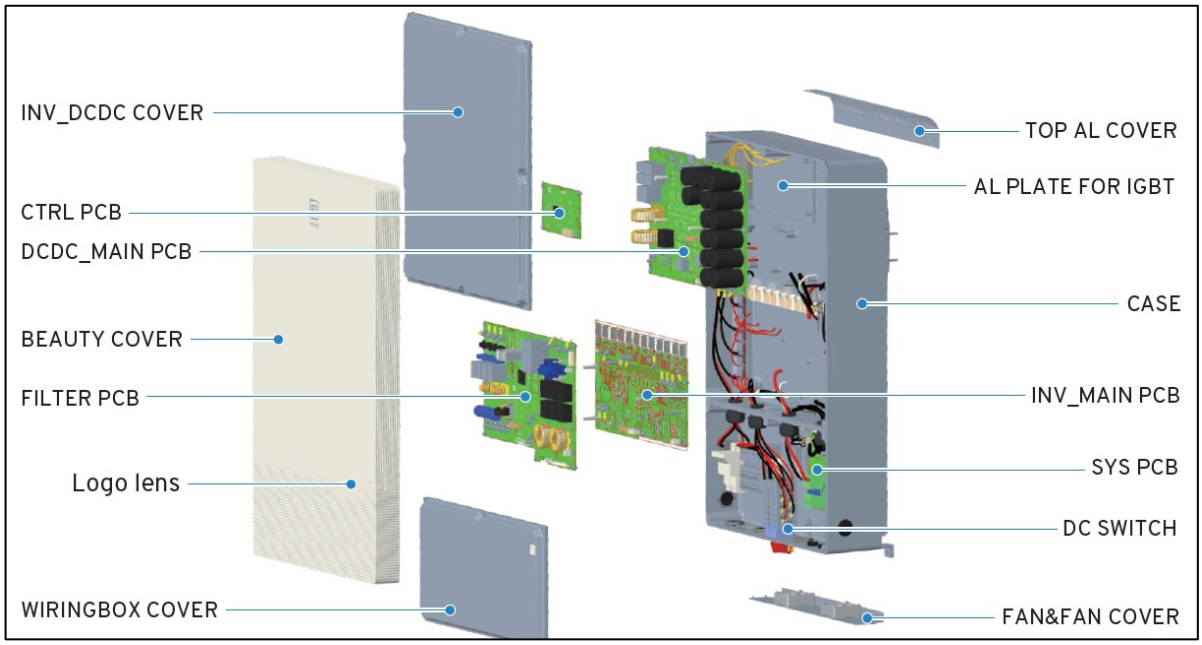
APPENDIX G: EXPLODED VIEW

These diagrams show the individual parts of the Charger, Inverter and the Hub.

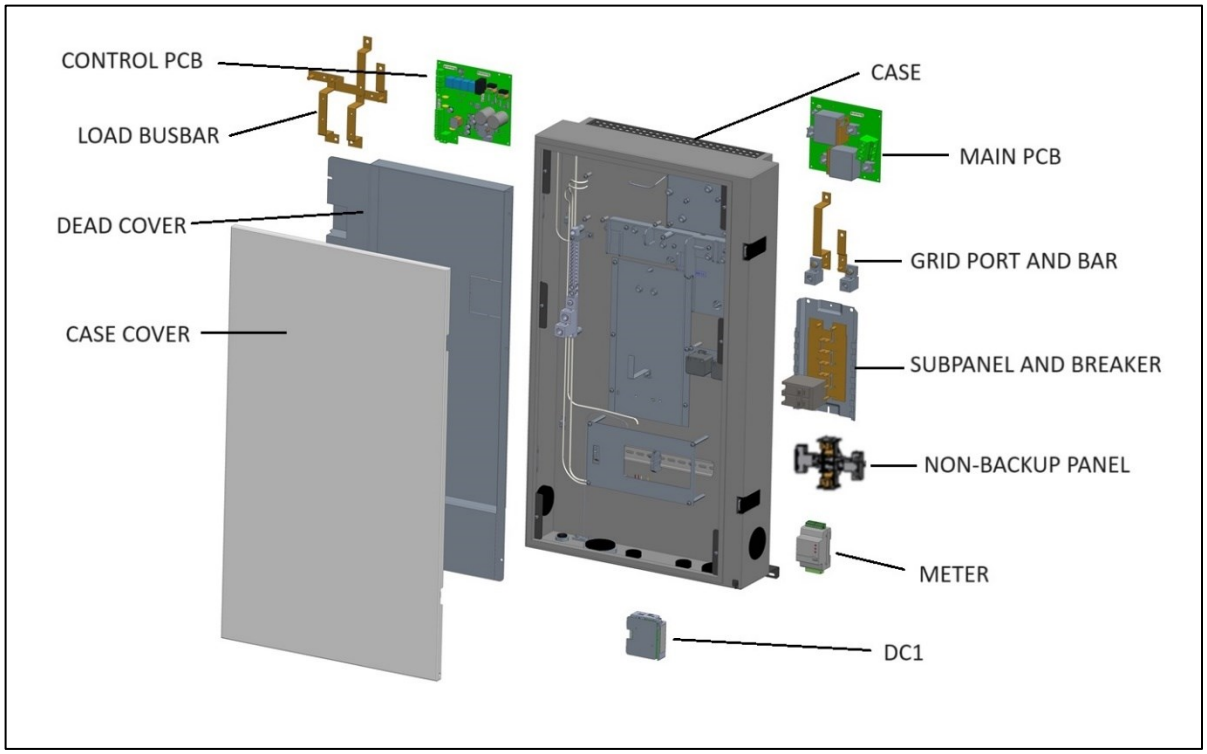
Charger



Inverter



Hub


CONTROL PCB
LOAD BUSBAR
DEAD COVER
CASE COVER
CASE
MAIN PCB
GRID PORT AND BAR
SUBPANEL AND BREAKER
NON-BACKUP PANEL
METER
DC1

APPENDIX H: SYSTEM & VOLTAGE CHECKS FORM

Print the **System & Voltage Checks** form, ensure that all values and markings are recorded on the it, and then fold it and place it inside the Hub case cover:

System & Voltage Checks — general motors

Instructions: Verify equipment; verify electrical and wiring terminations; and then check each box.

Is the Hub the main service panel? Y ☐ N ☐

If Y, system main bonding jumper verified: ☐

If Y, previous main bonding jumper removed: ☐ N/A ☐

If Hub is MSP: main breaker required, or optional main breaker installed: ☐

☐ If Y, CTs in Hub swapped: L1 to right position, L2 to left position.

☐ If Y, Hub feeder L1 wired into main breaker right side, feeder L2 wired into main breaker left side.

☐ Feeder circuits. ☐ Overcurrent protective devices. ☐ All circuits labeled, including re-located circuits.

☐ **LV DC & comm cables:** Hub–Inverter (×6) ☐ Inverter–DSB (×4) ☐ Inverter–Charger (×6) ☐ Hub–PVS (×__) ☐ DSB–ESS (×__) ☐

PCS configured ☐ Y ☐ N **If Y, check the correct values:**

MSP bus rating (A): ☐ 100 ☐ 125 ☐ 150 ☐ 175 ☐ 200 ☐ 225 ☐ 400

MSP main breaker rating (A):

☐ 100 ☐ 125 ☐ 150 ☐ 175 ☐ 200 ☐ 225 ☐ 400

MID feeder breaker rating (A):

☐ _____ ☐ 100 ☐ 125 ☐ 150 ☐ 175 ☐ 200

Charger:

AC circuit breaker rating (A):

☐ 20 ☐ 25 ☐ 30 ☐ 40 ☐ 50 ☐ 60 ☐ 70 ☐ 80 ☐ 90 ☐ 100 ☐_____

DIP switches correctly set. ☐

Charger label marked for de-rated capacity: ☐ Y ☐ **N/A**

☐ **Premises CTs are in main service panel (MSP) (*unless the Hub is the MSP*).** ☐ All site circuits captured within CTs. **Total Premises CT pairs:** _____

Premises CTs (pairs):	☐ All premises CTs are terminated into the Hub.	☐ L1 CT(s) on phase A. ☐ L2 CT(s) on phase B.	☐ All CT labels face toward utility voltage source.	☐ Splices verified correct. ☐ N/A	☐ CT clips fully seated and secure.

Total Number of AC Modules: _____ **Total Number of DC Modules:** _____

Module SKU: (e.g. *A400-G-AC*) _____

PV system size backed up: _____ ☐ kW AC ☐ kW DC

PV system size non-backup: _____ ☐ kW AC ☐ kW DC

Solar Production CT(s):	☐ Production CTs capture **all** solar production.	Second relay installed? ☐ Y ☐ N	☐ All CT labels face toward utility voltage source.	☐ Splices verified correct. ☐ N/A	**Total Production CTs:** _____

	L1–G	L1–N	N–G	L2–G	L2–N	L1–L2	Polarity Confirmed
Main Service Panel:							
Line voltage into Hub (Hub line-side busbar):							☐
Hub backup pan (Hub load-side busbar):							☐
Hub non-backup pan (optional):							☐
Inverter (AC power circuit):							☐
Charger (AC power circuit):							☐

☐ Hub contactor verified (closes when energized).

☐ Voltage on all branch circuit breakers verified. ☐ **MSP** ☐ **Sub1** ☐ **Sub2** ☐ **Sub3** ☐ **Sub4**

EPO switch operation verified? ☐ Y ☐ N/A

Installing Technician: _____ **Date:** / / **Time:** : ☐AM ☐PM

Commissioning Technician: _____ **Date:** / / **Time:** : ☐AM ☐PM

APPENDIX J: COMMISSIONING APP SETTINGS

BDI Device settings	Definition
Nominal Voltage	Incoming Line to Line AC Voltage at installation site. - **240V** for Split phase service (Default) - **208V** for Three phase service
Utility Code	Grid code settings at installation location. Please confirm the required grid code settings with your local utility. The following options are available as a drop down in the commissioning app. - **IEEE 1547_2013** for Mainland US - **IEEE 1547a_2014** for Mainland US (Default) - **UL1741SB_CA** for California - **UL1741SB_HECO** for Hawaii Note: Custom grid code settings can be configured using the grid setting page in the Maintenance section of this app.
Busbar Protection Enable	Busbar protection is automatically enabled for this system
CT location	Meter 1 current transformer (CT) location. Refer to **Appendix D.2 Electrical Diagram Examples with App PCS Settings** for various installation setups and recommended CT location settings - **CT at Grid meter (Recommend if possible):** CTs located at main feeders from grid meter. This selection should be used if the CTs monitor every load in the home. CTs will be in MID if used at main service entrance or relocated to main panel if MID is used downstream of main panel - **CT at MID (Partial Load Monitoring):** CTs located at main feeders of MID. This is used only when not all home loads are able to be monitored by the CT placement. - **Single Power Source output limit:** This limits the output current from the Inverter to avoid exceeding generation backfeed current limits.
Main breaker capacity	Option available when "CT at Grid" meter selected. This value represents the amperage of the main breaker feeding the MSP. Typical values range: 100A, 125A, 150A, 200A

Export Limit Current	Option available when "CT at MID" selected. This value dictates the total generation backfeed current limit from the MID per the 120% rule. A 200A MSP with a 200A main breaker will have the maximum generation backfeed current at 40A. See NEC 705.12(D)(2)
Inverter Limit Current	Option available when "Single Power Source output limit" selected. This value dictates the generation backfeed current limit from the Inverter per the 120% rule. A 200A MSP with a 200A main breaker, the maximum generation backfeed current is 40A. See NEC 705.12(D)(2)
AC Solar Enabled	Check this box if this system has existing AC solar. The second meter (CT 2) will be placed to read the total output from this power source. Refer to **Appendix D: Electrical Diagrams** for various installation setups and recommended CT location settings