SAVE THIS MANUAL

Keep this manual for safety warnings, precautions, operating, installation, inspection, and maintenance procedures. Write the product's device ID numbers in the back of the manual.

⚠WARNING

Read this material before using this product. Failure to do so can result in serious injury, property damage, and/or electrical shock.

Important Safety Information

Read this First

This document contains instructions for use during installation and maintenance of Legion Solar System. To reduce the risk of electrical shock, and to ensure the safe installation and operation of Legion Solar System, pay close attention to following safety symbols that appear throughout this document.

DANGER! A hazardous condition, if not avoided, will result in death, serious injury, equipment or property damage.

WARNING! A hazardous condition, if not avoided, could result in death, serious injury, equipment or property damage.

WARNING! An electrical condition, if not avoided, could result in death, serious injury, fire, equipment or property damage. Use extreme caution and follow instructions carefully.

Safety Instructions

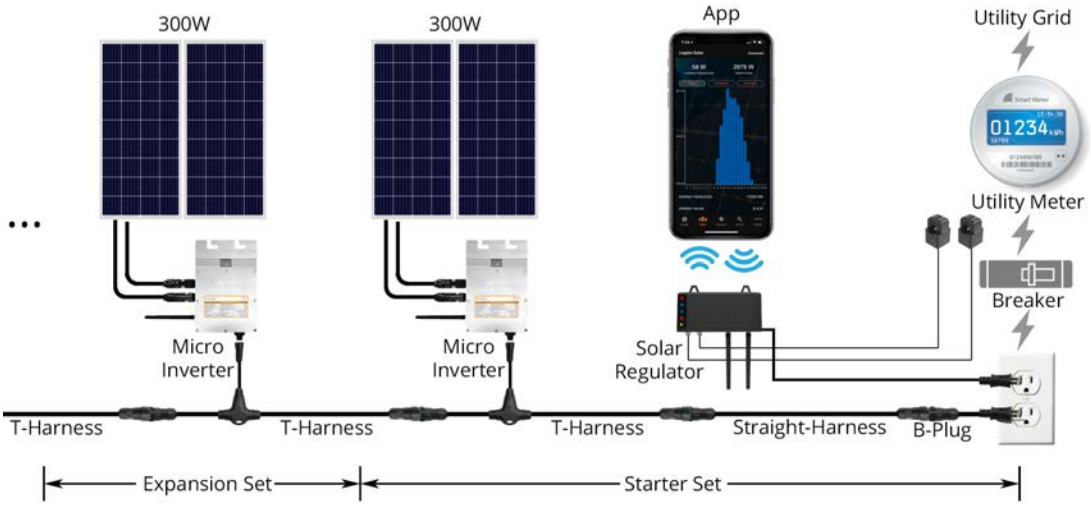
- Before installing or using Legion Solar System, read all instructions and cautionary markings in this document.
- Do not use Legion Solar equipment in a manner not specified by the manufacturer. Doing so may cause death or injury to persons, or damage to equipment and/or property.
- Only qualified personnel should install or replace Legion Solar components and accessories.
- Perform all electrical installations in accordance with all applicable electrical and local jurisdiction codes.
- The DC conductors of this photovoltaic system are ungrounded and may be energized.
- Do not attempt to repair the MicroInverter, Battery Commander, Off Grid Controller, Off Grid Inverter and/or any Legion Solar components/accessories. They contain no user serviceable parts. If it fails contact PLX Devices customer service to obtain an RMA (return merchandise authorization). Tampering with Legion Solar components will void the warranty.
- If the AC cable and/or connectors are broken or damaged, do not install the unit.
- Wear gloves when handling the PV panels to avoid injury, as some edges may be sharp.
- The MicroInverter may get hot during operation can and reach temperatures above 80°C (176° F). To reduce the risk of burns, use caution when working with MicroInverters.
- Do NOT disconnect the photovoltaic modules from the MicroInverter without first disconnecting the AC power.

Legion Solar Overview

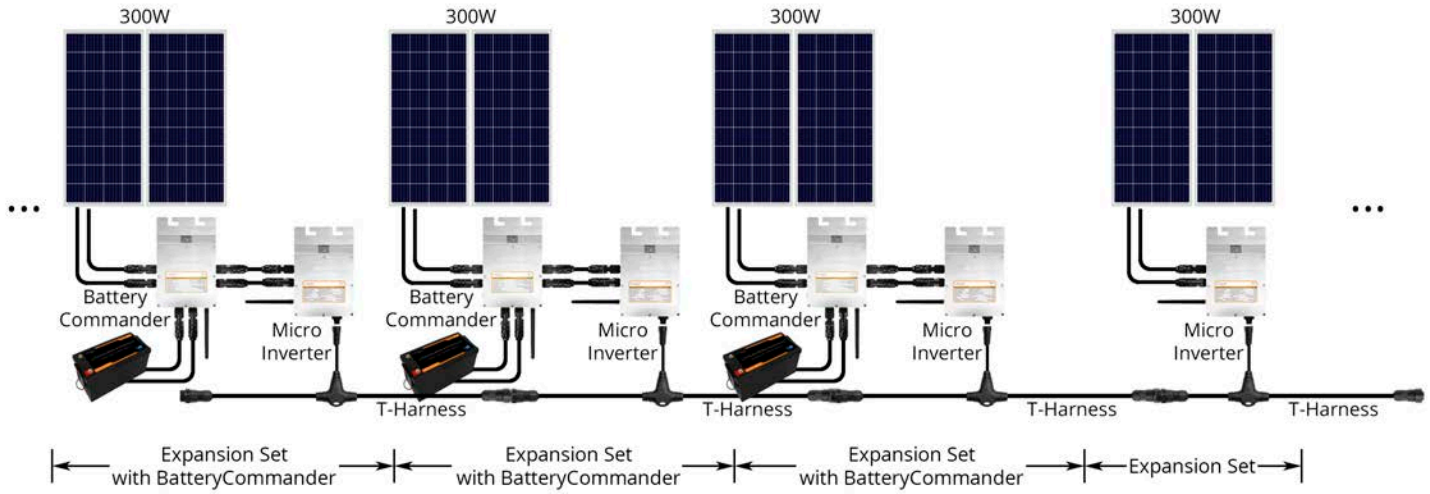
Legion Solar is a permission free off-grid solar system with on-grid benefits. The Photovoltaic panels are high efficiency 'A' Grade silicon and specifically designed to be lightweight enough for one person to handle. The high efficiency MicroInverters installed on the rear of the PV panel simplifies the design and maximizes energy production efficiency. Legion Solar's optimized design methodology makes the system modular, low cost, high output, easy to install and features inverter anti-islanding for safety. Legion Solar is designed to outperform all other solar system solutions with the best price/performance ratio on the market thus enabling you to achieve higher energy production and faster return on investment in both day and night conditions.

Stage 1 - Get familiar with Legion Solar and it's components with the Starter Set. Sets up in minutes and experience instant results. A 300W Starter Set is enough to make a noticeable impact to your electric bill.

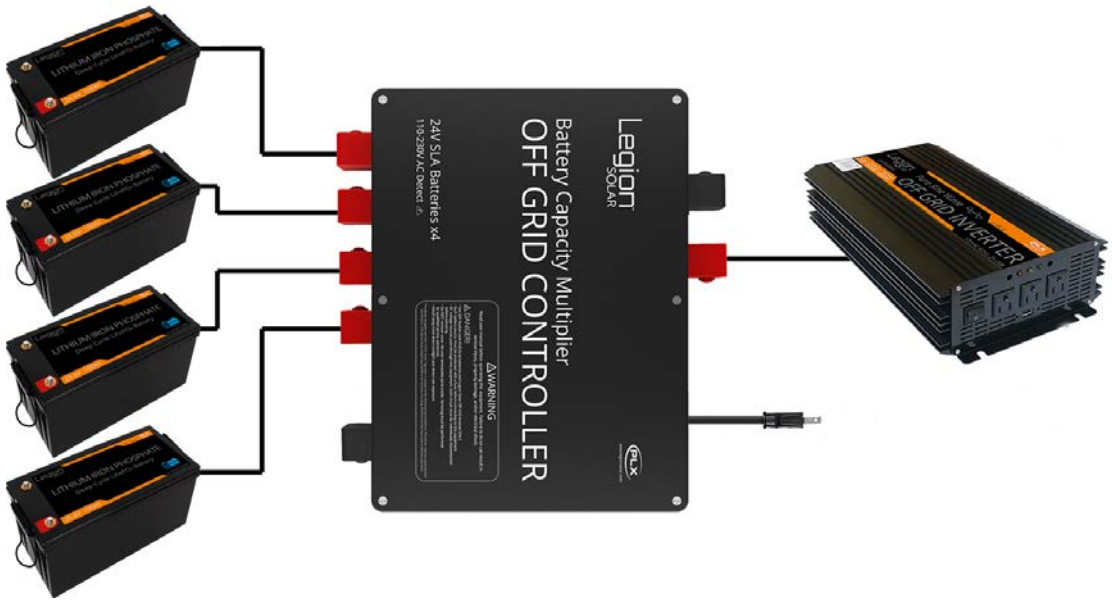
Stage 2 - Scale your solar output with expansion sets to offset more of your daytime usage.



Stage 3 - Once your system is large enough to have excess energy to store during daytime, add expansion sets with BatteryCommander™ for night time consumption. BatteryCommander™ enables the solar panels to charge the batteries, solar panels to supply power to the micro inverters, and batteries to supply power to the micro inverters.



Stage 4 - Add OffGridController™ and an off grid inverter so that you have emergency power during grid power outages. Off Grid controller is a battery capacity multiplier and grid power outage detector. When grid power goes out, it automatically supplies power to your Off Grid Inverter. Off Grid Inverter converts battery energy to grid compatible power so that you can power your appliances.



Included Items

Legion Solar Starter Set

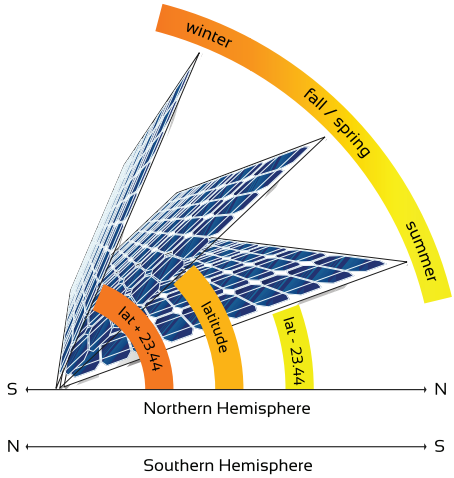
- 1QTY Legion Solar Installation and Operations Manual
- 1QTY Legion Solar Regulator with Bluetooth
- 2QTY Split Core Transformers
- 2QTY 150Watt LS-150P PhotoVoltaic Panels
- 8QTY Aluminum 'Z' Brackets for DIY Mounting Solution
- 8QTY Hex Screw Fine Thread 28 A2-70 0.25" x 5/8"
- 8QTY Nut Fine Thread 28 A2-70 0.25"
- 8QTY Washer A2-70 0.25"
- 8QTY Lock Washer A2-70 0.25"
- 8QTY Self Drill Screw with Plastic Spacer 32mm long 5.0 x 32mm M8
- 1QTY 260Watt LS-260I-xx0VAC MicroInverter
- 1QTY LS-THarness-Vx AC 4ft T-Harness
- 1QTY LS-SHarness-Vx AC 4ft Straight-Harness
- 1QTY LS-PlugNPlay-TypeX AC 1ft Plug and Play Adapter
- 2QTY Hex Screw Thread 1.25mm M8 x 20mm long
- 2QTY Hex Nut Thread 1.25mm M8
- 2QTY Lock Washer M8
- 1QTY 3ft SMA Antenna Wire Extension Cable
- 1QTY Antenna Aluminum Bracket
- 1 QTY 2.4GHz Antenna
- 4QTY Washer M8
- *1QTY Battery Commander
- *1QTY Set of MC4 Male-Male, Female-Female Wire
- *2QTY Hex Screw Thread 1.25mm M8 x 20mm long
- *2QTY Hex Nut Thread 1.25mm M8
- *2QTY Lock Washer M8
- *1QTY 150A Fuse Wire
- *2QTY Set of Positive and Negative Lead Acid Battery Terminals
- *2QTY Set of Positive and Negative Silicone Battery Terminal Covers
- *1QTY 3ft SMA Antenna Wire Extension Cable
- *1QTY Antenna Aluminum Bracket
- *1 QTY 2.4GHz Antenna

* Included with Deluxe Starter Set or with the addition of Battery Commander with the Basic Starter Set.

Legion Solar Expansion Set

- 1QTY Legion Solar Installation and Operations Manual
- 2QTY 150Watt LS-150M PhotoVoltaic Panels
- 8QTY Aluminum 'Z' Brackets for DIY Mounting Solution
- 8QTY Hex Screw Fine Thread 28 A2-70 0.25" x 5/8"
- 8QTY Nut Fine Thread 28 A2-70 0.25"
- 8QTY Washer A2-70 0.25"
- 8QTY Lock Washer A2-70 0.25"
- 8QTY Self Drill Screw with Plastic Spacer 32mm long 5.0 x 32mm Hex is M8
- 1QTY 260Watt LS-260I-xx0VAC MicroInverter
- 1QTY LS-THarness-Vx AC T-Harness
- 2QTY Hex Screw
- 2QTY Hex Nut
- 2QTY Lock Washer
- 2QTY Washer M8
- 1QTY 3ft SMA Antenna Wire Extension Cable
- 1QTY Antenna Aluminum Bracket
- 1 QTY 2.4GHz Antenna

Location Planning



Install the PV panels where the entire surface area is exposed to direct sunlight. Avoid any shaded areas to achieve maximum energy production.

Optimal Tilt Angle

Latitude	Full Year Angle	Latitude	Full Year Angle
0°	0.0°	30°	25.9°
5°	4.4°	35°	29.7°
10°	8.7°	40°	33.5°
15°	13.1°	45°	37.3°
20°	17.4°	50°	41.4°
25°	22.1°	55°	44.9°

Tip: Use your smartphone to download a leveler app to measure tilt angle. Calibrate to 0° from a known flat surface.

Optimal Direction

Hemisphere	Direction	Production
Northern	True South	Best All Around
Northern	West	Better for peak demand 3pm - 7pm
Southern	True North	Best All Around
Southern	West	Better for peak demand 3pm - 7pm

Tip: To achieve a more even power production, spread out your panels facing east, south, west (for northern hemisphere), or facing east, north, west (for southern hemisphere).

Mounting Solutions


COMPOSITE SHINGLE


TILE


METAL


DIY

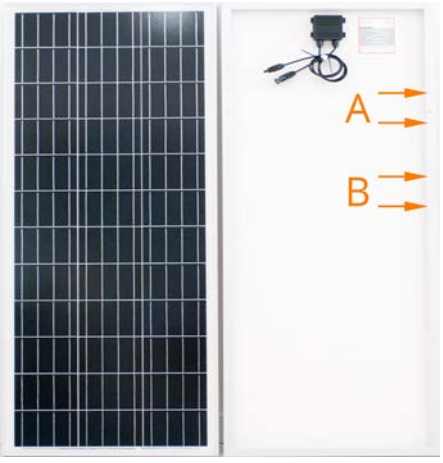
Racking solutions are available from www.legionsolar.com. Tap on SHOP to configure your system and Add to Cart. All hardware components are automatically calculated. Items that you already own such as Starter and Expansion Sets can be removed from your shopping cart prior to check out.

Individual Legion Solar components and accessories can also be purchased from www.plxdevices.com. Tap on LEGION SOLAR.

Detailed step by step how-to videos are available from www.legionsolar.com. Tap on TUTORIALS.

Hardware Installation

Install the MicroInverter to the Photovoltaic Panel



Step1:
1 MicroInverter is used for every 2 photovoltaic panels.

Locate the 4 round (not oval) holes on the rear of the PV panel as indicated by the arrows.

If you do NOT have a Battery Commander paired with this set, install the Micro Inverter in location A.

If you HAVE a Battery Commander paired with this set, install the Micro Inverter in Location B.

Step2:
Place 2 M8 washers on the frame above the two holes. 1 washer per side.

Step3:
Place the MicroInverter on top washers and align the holes with the 2 L shaped notches.

Step4:
Place 2 M8 washers on top of the L shaped notches. Align the washers with the hole.

Step5:
Insert the 2 Hex Screw Thread 1.25mm M8 x 20mm long into the hole making sure the screw goes through the washers.

Step6:
Insert the lock washer M8 followed by the Hex Nut Thread 1.25mm M8. Tighten the screws with 6mm hex key and 14mm wrench.

Step7:
Install the Antenna. If the Inverter is within 30ft of Solar Regulator and is unobstructed by dense materials such as metal, concrete, brick, tile you may install the Antenna directly on the Inverter.

Otherwise, we recommend using the included SMA coax wire (1) to locate your Antenna (2) out and above the PV panels for improved wireless performance and reliability.

Use the included aluminum plate (3) designed to be installed on the Legion Solar End Clamp or Mid Clamp with a 1/4-20 nut (4).

Install the Battery Commander to the Photovoltaic Panel

Step1:
1 Battery Commander is used for every 2 photovoltaic panels.

Install Battery Commander in Location A.

Fasten Battery Commander to the PV panel in the same manner as the Micro Inverter.

Step2:
Install the Antenna. If Battery Commander is within 30ft of Solar Regulator and is unobstructed by dense materials such as metal, concrete, tile you may install the Antenna directly on Battery Commander.

Otherwise, we recommend using the included SMA coax wire (1) to locate your Antenna (2) out and above the PV panels for improved wireless performance and reliability.

Use the included aluminum plate (3) designed to be installed on the Legion Solar End Clamp or Mid Clamp with a 1/4-20 nut (4).

Install ‘Z’ Brackets for Do-it-Yourself Mounting

Note: Skip this section if you are installing the PV panels on a roof racking rail system.

Step1:
8 ‘Z’ Brackets are used for every 2 photovoltaic panels.

Locate the 8 oval holes on the rear of the PV panel.

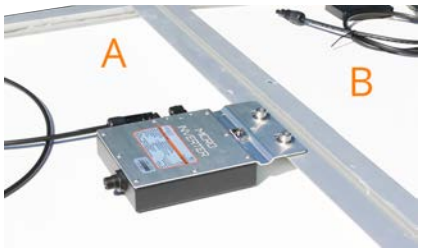
Step2:
Place the ‘Z’ bracket over the oval hole and insert the Hex Screw Fine Thread 28 A2-70 0.25" x 5/8”.

Step3:
Insert the Washer A2-70 0.25”, followed by the Lock Washer A2-70 0.25”, then followed by Nut Fine Thread 28 A2-70 0.25.” Tighten the screw and nut with 7/16” wrenches.

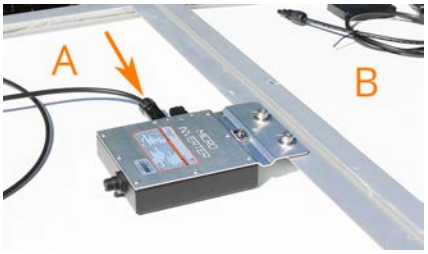
Step4:
Use the Self Drill Screw with Plastic Spacer 32mm long 5.0 x 32mm M8 to affix the PV panels to your mounting solution. Use 8mm socket wrench to tighten.

Electrical Installation

Connect the DC Wires (Inverter Only)



Step1:
Orient the two PV panels where the MicroInverter on panel (A) is adjacent to the other PV panel (B).



Step2:
Connect the minus (-) terminal from panel (A) to the MicroInverter.

Step3:
Connect the plus (+) terminal from panel (A) to the minus (-) terminal from panel (B). This connection may be easier to perform at the time of installation with racking system.

Step4:
Connect the plus (+) terminal from panel (B) to the MicroInverter. This connection may be easier to perform at the time of installation with racking system.

Connect the DC Wires (Inverter + Battery Commander)

Step1:
Orient the two PV panels where the MicroInverter and Battery Commander on panel (A) is adjacent to the other PV panel (B).

Step2:
Connect the two Male-Male, Female-Female MC4 wires between the Inverter and Battery Commander.

Step3:
Connect the minus (-) terminal from panel (A) to Battery Commander.

Step4:
Connect the plus (+) terminal from panel (A) to the minus (-) terminal from panel (B). This connection may be easier to perform at the time of installation with racking system.

Step5:
Connect the plus (+) terminal from panel (B) to the Battery Commander. This connection may be easier to perform at the time of installation with racking system.

Step6:
Connect the 25ft RED and BLACK wires to Battery Commander. This connection may be easier to perform at the time of installation with racking system.

Note: It is recommended that these wires are kept as short as possible to minimize loss. If longer wires are required, you may extend them up to 100ft/ea. Extension wires are available from www.plxdevices.com. Tap LEGION SOLAR or search for Battery Commander in the search box.

Connect the Battery (Lithium)

DANGER! A hazardous condition, if not avoided, will result in death, serious injury, equipment or property damage.

ALWAYS keep opposite polarity terminals covered. A short circuit with wrenches, and/or other metal tools is extremely dangerous. Wear eye protection and gloves.

Lithium Batteries may ONLY be used with Battery Commander V2.0 and Micro Inverter G4 or later. Battery Commander V1.0 and Micro Inverter G3/G3B is NOT compatible with Lithium Batteries. This will cause damage and void your warranty.

Step1:
Battery Selection - Use Legion Solar 24V 100Ah Lithium Iron Phosphate Batteries ONLY. Legion Solar Lithium batteries have a built-in Battery Management System (BMS) designed specifically for use with Battery Commander 2.0 or later. Using other branded lithium batteries may have an incompatible BMS configuration that will cause Battery Commander not to operate properly.

Step2:
Install the battery posts with a 18mm wrench. Note the diameter size difference between the supplied posts with Legion Solar Lithium Batteries. Install the battery post with the larger diameter on the positive (+) terminal indicated on the battery in red with a + symbol. Install the smaller diameter battery post on the negative (-) terminals indicated on the battery in black with a - symbol.

Step3:
Install the (+) terminal over positive terminal of the battery. Install the (-) terminal over the negative terminal of the battery. Tighten with 13mm wrench. Note: The 150A black fuse wire is NOT used for Lithium Battery installations.

Step4:
Insert the black protective sleeve and install the stripped bare end of there 25ft BLACK wire to the (-) side of the battery. Insert the red protective sleeve and install the stripped bare end of the 25ft RED wire to the (+) side of the battery. Listen for 5 click sound on Battery Commander and verify the LED is lit. Tip: If the connection is too loose and the wire slides back out, flip the silver pressure plate on the battery terminal upside-down to secure a more reliable connection.

IMPORTANT! Reverse polarity connection will damage Battery Commander and is not covered by warranty. Double check your battery polarity before making the connections. Tip: Use a digital multi-meter (DMM) to confirm the battery's voltage.

Connect the Battery (Lead Acid)

Step1:
Battery Selection - Use Two 12V Sealed Lead Acid Deep Cycle batteries ONLY. For best price and performance, select 12V batteries with capacity rating between 60-80Ah. Larger capacity batteries (such as 100Ah) may also be used if desired.

Step2:
Install the (+) terminal over the positive battery terminal of battery A. Install the (-) terminal over the negative battery terminal of battery B. Tighten with 13mm wrench. Leave the (-) terminal of battery A and (+) terminal of battery B covered for safety.

Step3:
Insert the Black Fuse Wire wire through the red protective cover on one side and the black protective cover on the other side. Install the Black Fuse Wire with red protective cover on the (+) positive terminal of battery A. Install the other end of the fuse wire with black protective cover on the (-) negative terminal of battery B. Tighten with 10mm wrench and place protective sleeve over terminal for safety.

DANGER! Do not install the Black Fuse wire across the (+) and (-) terminals of the same battery.

Step4:
Install the (+) terminal over positive terminal of battery B. Install the (-) terminal over the negative terminal of battery A. Tighten with 13mm wrench.

Step5:
Insert the black protective sleeve and install the stripped bare end of there 25ft BLACK wire to the (-) side of the battery A. Insert the red protective sleeve and install the stripped bare end of the 25ft RED wire to the (+) side of the battery B. Listen for 5 click sound on Battery Commander and verify the LED is lit. Tip: If the connection is too loose and the wire slides back out, flip the pressure plate on the battery terminal upside-down to secure a more reliable connection.

IMPORTANT! Reverse polarity connection will damage Battery Commander and is not covered by warranty. Double check your battery polarity before making the connections. Tip: Use a digital multi-meter (DMM) to confirm the battery's voltage.

Connect the AC Wires

Step1:
Connect the 'T' Harness to the MicroInverter.

Tip: As you bring a new system online, it is recommended that you test the system by connecting new sets in 300 watt intervals instead of bringing the entire system up all at once.

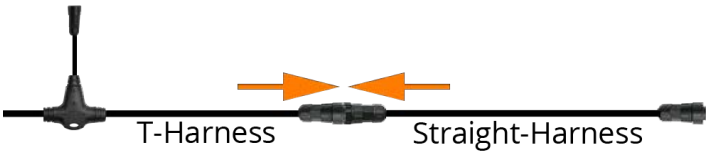
Step2:
Connect additional MicroInverters by mating the male and female connectors of the 'T' Harnesses. Cap the exposed end of the last 'T' Harness in the chain to protect against weather and exposed high voltage AC.

WARNING! Do **NOT** exceed system power on a single circuit breaker specified in Maximum System Size section below. Risk of fire, electric shock, equipment and/or property damage may result. See Legion Solar Electrical Connection Notes for details. www.plxdevices.com/legionsolarelectricalconnections

Maximum System Size

Utility Voltage	Circuit Breaker Amps	Max System Power	Max Number 300W Sets	Connection
110VAC	10 Amps	1200 Watts	4	Plug&Play or Hard Wire
110VAC	15 Amps	1800 Watts	6	Plug&Play or Hard Wire
110VAC	20 Amps	2400 Watts	8	Hard Wire Required
110VAC	30 Amps	3600 Watts	12	Hard Wire Required
230VAC	5 Amps	1200 Watts	4	Plug&Play or Hard Wire
230VAC	10 Amps	2400 Watts	8	Plug&Play or Hard Wire
230VAC	15 Amps	3600 Watts	12	Hard Wire Required
230VAC	20 Amps	4800 Watts	16	Hard Wire Required

Grid Connection Method1: Plug and Play



Step1:
Connect the T-Harness with the Straight-Harness

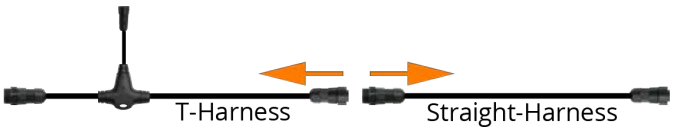
Step2:
Connect the Straight-Harness with the B-Plug.

Step3A:
Plug the B-Plug into your receptacle.

Step3B:
You may choose to extend the length of your wire with outdoor wire. We recommend industrial grade connectors like the photo depicted. Connectors are available at your local hardware store in the electrical section. Refer to the wire selection guide below for sizing.

Step4:
Wrap the connector with moisture sealing electrical tape available at your local hardware store in the electrical section. Use 3M 2228 or equivalent.

Grid Connection Method2: Hardwire



Step1:
Ensure the T-Harness and the Straight-Harness are NOT connected.

Step2:
Cut the male side of the Straight-Harness

Step3:
Obtain the following parts from your local hardware store in the electrical section.

1. Outlet box Three hole 1/2 in. All-weather
2. Outlet box blank cover. All-weather
3. UF Cable Connector 1/2 in.
4. Cord Grip Connector 1/2 in.
5. Wing nut wire connectors
6. Outdoor cable type UF-B two conductor with ground. See table below for gauge selection

Step4:
Install the Cord Grip Connector 1/2 in. Cut the black insulation sheeting, and strip the 3 wires from the Straight-Harness like the photo

Step5:
Check your outdoor cable and ensure that the electricity is OFF.

WARNING! An electrical condition, if not avoided, could result in death, serious injury, fire, equipment or property damage. Use extreme caution and follow instructions carefully.

Step6:
Install the UF Cable Connector 1/2 in. Cut the insulation and strip the wires like the photo depicted. Refer to the wire size selection table below for sizing. Tip: Run cable inside grounded conduit pipe for improved durability and safety.

Step7:
Use the wire connectors to twist the connections in place.

1. Connect the Yellow/Green wire from the Straight-Harness to ground. Ground is the exposed wire without insulation.
2. Connect the Brown wire from the Straight-Harness to Hot.
3. Connect the Blue wire from the Straight-Harness to Neutral.

Step8:
Close the outlet box with the cover to provide a weatherproof seal.

Tighten the UF Cable Connector and the Cord Grip Connector to provide a weatherproof seal.

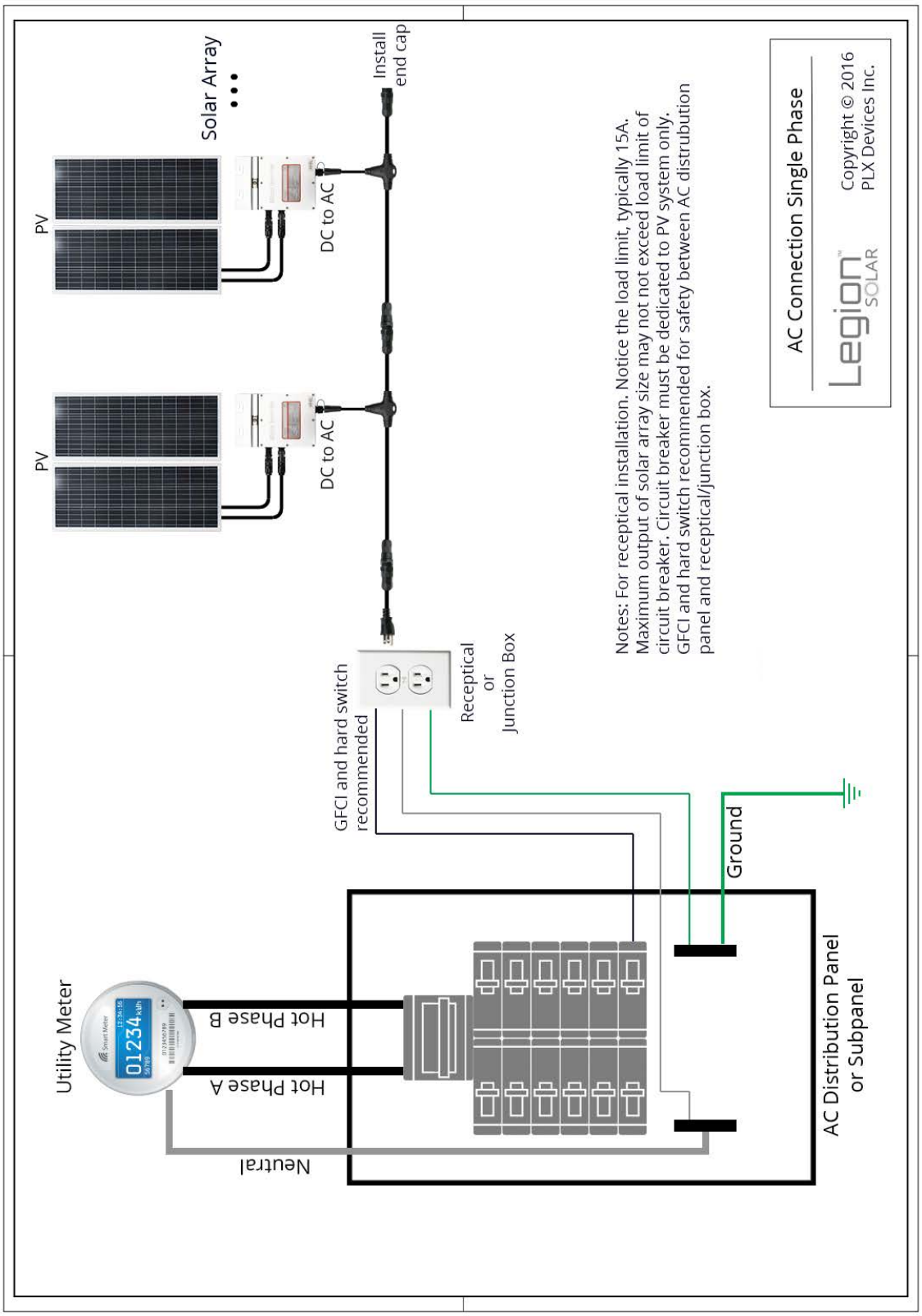
Reconnect the T-Harness with the Straight Harness. Restore power to the circuit.

Wire Selection Guide

	5 Amps	10 Amps	15 Amps	20 Amps	25 Amps	30 Amps
50 Feet	14 AWG	14 AWG	12 AWG	12 AWG	10 AWG	10 AWG
100 Feet	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG	6 AWG
150 Feet	12 AWG	10 AWG	8 AWG	6 AWG	6 AWG	4 AWG
200 Feet	12 AWG	8 AWG	6 AWG	6 AWG	4 AWG	4 AWG
250 Feet	10 AWG	6 AWG	6 AWG	4 AWG	4 AWG	3 AWG

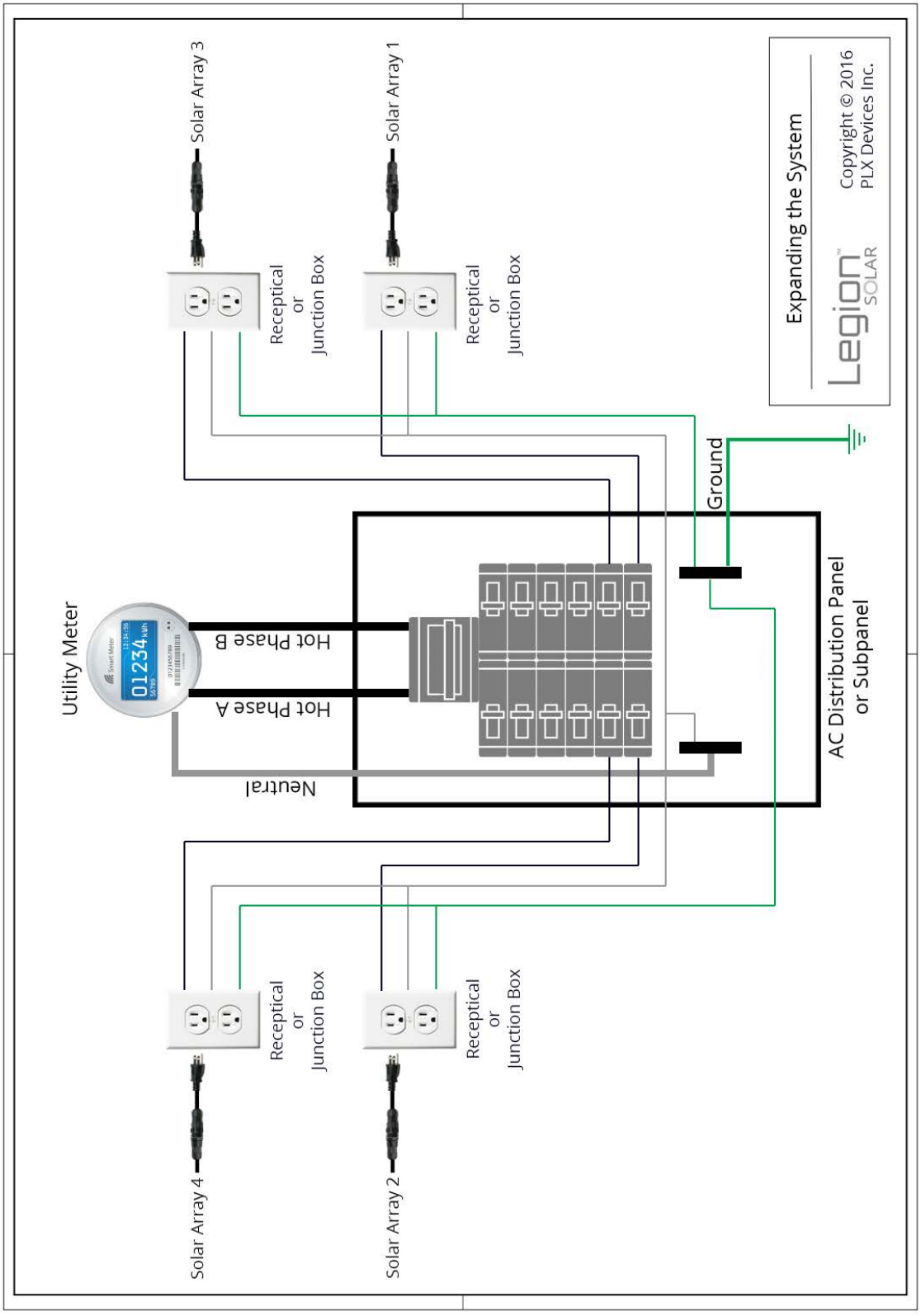
*Greater than 20 Amps per array not recommended for DIY installation

AC Connection Schematic



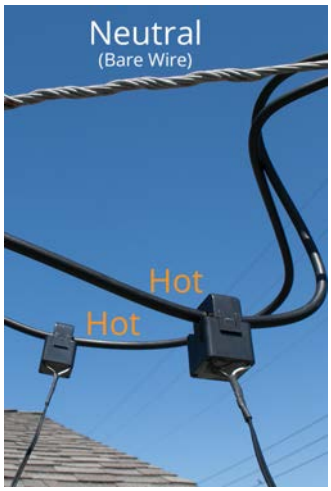
WARNING! A dedicated circuit breaker for the Legion Solar system is recommended for safety.
See Legion Solar Electrical Connection Notes for details.
www.plxdevices.com/legionsolarelectricalconnections

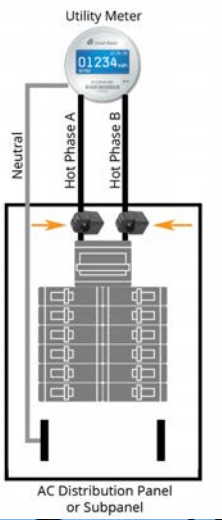
Expanding your System



Installing Solar Regulator

Step1:
Locate a suitable location to install Solar Regulator away from direct sunlight and rain. For best wireless performance, situate Solar Regulator within 100ft of Inverters/Battery Commanders and position the antennas away from dense materials such as concrete, brick, tile, and metal. Antenna extension wires are available for purchase if you choose to locate the antennas away from Solar Regulator housing for improved wireless performance.





Step2:
Install the split core transformers on your overhead wires. For underground fed wires, install inside your electrical panel. Attach one transformer on HOT Phase A and one transformer on HOT Phase B. *For single phase, the 2nd transformer is not used and not connected to Solar Regulator.

Each transformer can clamp onto a wire up to 16mm diameter. If the included transformers do not fit, 24mm diameter transformers are available for purchase from www.plxdevices.com tap Legion Solar or search for Split Core in the search bar.

Split core transformers are not waterproof. If installing on overhead wires, wrap transformers with moisture sealing electrical tape available at your local hardware store in the electrical section. Use 3M 2228 or equivalent.

Step3:
Connect the split core transformers to Solar Regulator. Any transformer can be connected to any connector. Direction does not matter at this time.

Once system calibration has been performed via Legion Solar App. Do NOT reverse connector positions, otherwise re-calibration must be performed.

Note: If you choose to locate Solar Regulator away from the distribution panel such as to optimize wireless range with Inverters and Battery Commanders, split core transformer wires can be cut and extended up to 100ft/ea. Use AWG22 or thicker wires to extend the length and use moisture barrier tape to ensure a waterproof seal.

Step4:
Purchase an uninterruptible power supply (UPS). This is required if you have ANY sets with Battery Commander. If you do NOT have any sets with Battery Commander, a UPS is optional but recommended.

A UPS is a device with a built-in battery to supply AC power when grid power goes down. A rating of 400VA or larger is recommended. UPS is not included.

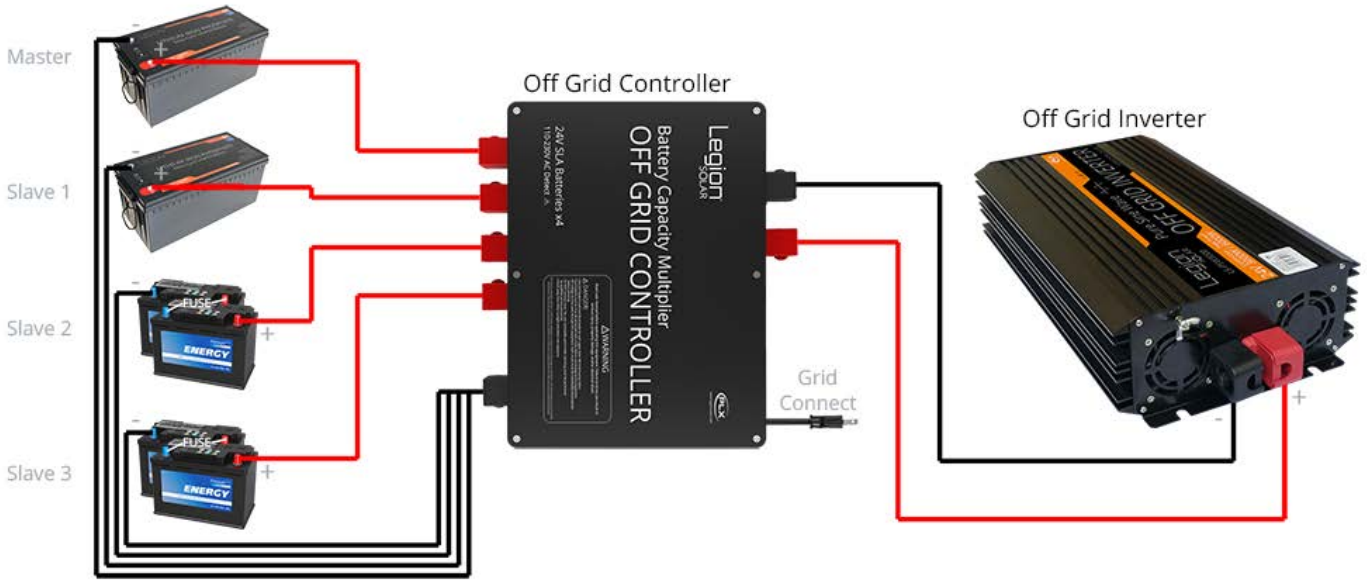
Step5:
Plug the AC cord from Solar Regulator into any AC outlet. If you're using a UPS, plug the AC cord into the Battery Backup receptacle (not surge only).

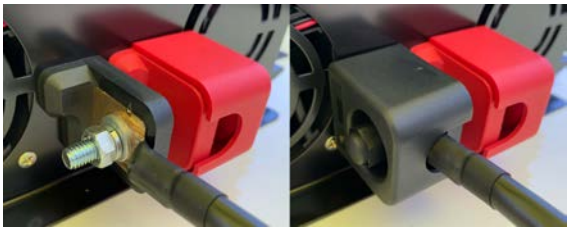
Tip: Disconnect the AC cord from the UPS to simulate a power outage and check if Solar Regulator LED indicator lights remains on.

Step6:
Download Legion Solar app for iOS/Android and follow the instructions in the app to setup and calibrate your system. *Please ensure that you smartphone is within 20ft line of sight for best wireless performance. Enable bluetooth and location services.

Installing Off Grid Controller and Off Grid Inverter

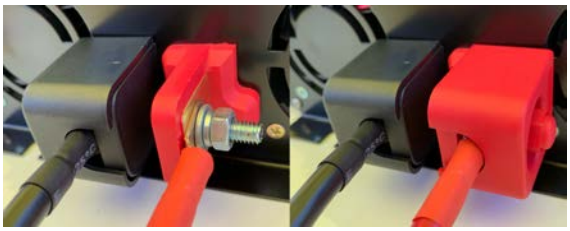
WARNING! Follow the steps below in sequential order for safety. Ensure that all terminals are covered after each step to reduce the risk of short circuit. Off grid controller is compatible with both 24V Lithium and 24V Lead Acid Batteries. Off Grid Controller is NOT fused. When connecting Lead Acid batteries, ensure that the 150A Black Fuse Wire (supplied with Battery Commander) is installed for safety. When connecting Legion Solar Lithium Batteries, the 150A Black Fuse Wire is not used. The built-in Battery Management System will protect against short circuits.





Step1:
Install the black wire included with the Off Grid Inverter to the negative terminal of Off Grid Inverter. Use 10mm wrench to tighten. Hand tighten plastic nut over the plastic cover.

Step2:
Install the black wire to the negative terminal of Off Grid Controller. Use 10mm wrench to tighten. Hand tighten plastic nut over the plastic cover.



Step3:
Install the red wire included with Off Grid Inverter to the positive terminal of Off Grid Inverter. Use 10mm wrench to tighten. Hand tighten plastic nut over the plastic cover.

Step4:
Install the red wire to the positive terminal of Off Grid Controller. Use 10mm wrench to tighten. Hand tighten plastic nut over the plastic cover.

Step5:
Set Off Grid Inverter power switch to OFF position.

Step6:
Install the supplied AC power cable to Off Grid Controller and plug the pronged end to an AC 120/230VAC power source. *Do NOT connect AC power wire to uninterruptible power supply (UPS). This input must be connected to grid power only.

Step7:
Install the black wire (stainless steel colored ring end) included with the Off Grid Controller to the negative terminal of Off Grid Controller. Use 10mm wrench to tighten. Hand tighten plastic nut over the plastic cover.

Step8:
Insert the black wire (brass colored ring end) through the black protective cover and install the black wire to the negative terminal of the Battery. Use 13mm wrench to tighten. Slide the cover back over the battery terminal.

Step9:
Install the red wire (stainless steel colored ring end) included with the Off Grid Controller to the Master+ terminal of Off Grid Controller. Use 10mm wrench to tighten. Hand tighten plastic nut over the plastic cover.

Step10:
Insert the red wire (brass colored ring end) through the red protective cover and install the red wire to the positive terminal of the Battery. Use 13mm wrench to tighten. Slide the cover back over the battery terminal.

Listen for the relay test click sounds and check Master+ Red LED is on.

Step11:
For additional battery sets, repeat step 7-10 for Slave 1, Slave 2, Slave 3. When Off Grid Controller has detected a slave battery set has been added, the Red LED will illuminate. Trim the black protective cover accordingly with scissors to fit the additional fanout of black wires on the negative terminal.

Step12:
Set Off Grid Inverter power switch to ON position.

Test:
Unplug AC cord from 120/230VAC source and check if Off Grid Inverter Power turns on. LED indicator on Off Grid Controller will turn green corresponding to the battery set currently supplying power to Off Grid Inverter. Connect a few appliances to test. Reconnect AC cord back to 120/230VAC source and wait 10 seconds for Off Grid Inverter to turn off.

Troubleshooting

MicroInverters

LED Indicator
Located on the side of each MicroInverter is an LED indicator light to visually indicate the status of your energy production.

Inverter LED Status	Description
No Light	No DC Power or no sun light, AC Power may be present, check PV panel connections
Red Blinking	Low DC Power or low sunlight. AC Power may be present.
Red Solid	PV Panels producing DC, No AC Power, check breaker and wires. Over temperature fault, low/high AC power fault, low/high DC power fault
Green Blinking	DC power OK, AC power OK. Inverter is optimizing power output with MMPT
Green Solid	DC power OK, AC power OK. Inverter is running at optimal energy production.

Battery Commander V2.0

LED Indicator
Located on the side of each Battery Commander is an LED indicator light to visually indicate the unit's status.

Battery Commander V2.0 LED Status	Description
No Light	No DC power from batteries
Red Solid	Battery Commander configured to Lead Acid Battery Mode. DC power from batteries OK.
Green Solid	Battery Commander configured to Lithium Battery Mode. DC power from batteries OK.

Battery Commander V2.0 LED Status	Description
Red to Green Blinking (1Hz)	Battery Commander is the learning battery chemistry and set to Solar to Battery mode until the battery becomes fully charged from the solar panels. Once the battery is fully charged, Battery Commander will auto detect the battery chemistry and switch to solid red or solid green. During this learning period, battery capacity reported in the Legion Solar app for this Battery Commander unit will be 0%.
Red Blinking (1Hz)	Battery Commander in factory default mode. Disconnect battery and solar panel, wait 10 seconds and reconnect battery first, then solar panel. Set battery discharge limit above 40% in Legion Solar app. If problem persists. Contact customer service to send in the unit for repair.
Green Blinking (1Hz)	Disconnect battery and solar panel, wait 10 seconds and reconnect battery first, then solar panel. Set battery discharge limit above 40% in Legion Solar app. If problem persists, contact customer service to send in the unit for repair. Battery Commander needs to be programmed with an ID number. This can only be done at the factory.
Red Blinking (15Hz)	Hardware error with battery voltage and/or battery current detection circuits. Contact customer service.
Green Blinking (15Hz)	Battery voltage is out of 20.0V - 29.4V operating voltage range. Check battery voltage and connections.

Upon power-up the LED color is amber, followed by relay click sounds, then blinking Red to Green LED (1Hz) to indicate that Battery Commander V2.0 has successfully started and initialized. Once Battery Commander V2.0 has detected a full battery charge it will learn the battery chemistry and set the LED to either solid Red or solid Green LED.

Battery Commander V1.0

LED Indicator
Located on the side of each Battery Commander is an LED indicator light to visually indicate the unit's status.

Battery Commander V1.0 LED Status	Description
No Light	No DC power from batteries
Red Solid	Unit not configured
Green Solid	DC power from batteries OK

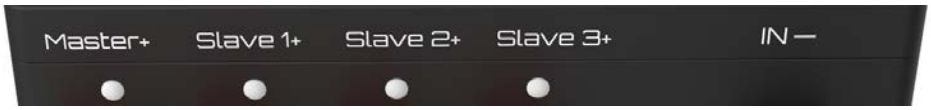
Upon power-up the LED color is amber, followed by relay click sounds, then solid green LED to indicate that Battery Commander V1.0 has successfully started and initialized.

Solar Regulator

5 LED Indicators
Located on the side of the SolarRegulator are indicator lights to describe various operational parameters.

Status	Tri-Color (Status)	Blue (Bluetooth)	Blue (BLE Busy)	Red (TX)	Yellow (RX)
Solar Regulator Not Setup	Red	-	-	-	-
Inverters Configured, Calibration not Performed	Yellow	-	-	-	-
Solar Regulator Setup, System Running Normally	Green	-	-	-	-
Bluetooth not Connected	-	Blink	-	-	-
Bluetooth Connected	-	On	-	-	-
Bluetooth Communicating with Smart Device	-	-	On	-	-
Solar Regulator Sending Request to Inverter or BC	-	-	-	On	-
Solar Regulator Received Data from Inverter or BC	-	-	-	-	On

Off Grid Controller



4 LED Indicators
Located on the front of the Off Grid Controller are indicator lights to describe various operational parameters.

Status	Master	Slave 1	Slave 2	Slave 3
Battery Voltage NOT Detected	Off	Off	Off	Off
Battery Voltage Detected	Red	Red	Red	Red

Status	Master	Slave 1	Slave 2	Slave 3
Battery Supplying Power to Inverter	Green	Green	Green	Green

Upon power-up, 4 click sounds indicate that Off Grid Controller has successfully started and initialized.

Off Grid Inverter

Status	Green LED	Yellow LED	Red LED
Operating Normally. AC Outputting.	On	-	-
Over Temperature Protection	-	On	-
Short Circuit or Overload Protection	-	-	On

Helpful Videos

Visit **legionsolar.com**, tap on Tutorials to view our library of how-to videos.

Helpful 3rd Party Tools

Power Meter
As a system comes online, a bi-directional power meter is a useful tool for testing, debugging, and confirming angle/ placement direction. Use the Amps meter to confirm your wire selection and circuit breaker selection.

Ground and Outlet Tester
A useful tool for plug and play AC installation to test and validate your outlet's connection for proper ground, hot and neutral wiring.

Sponge Mop
A low cost solution for cleaning your PV panels to keep them running at peak efficiency.

Live Wire Tester
A useful safety tool to verify that your wires are not energized before you start working on them.

Digital Multi-Meter
Useful for checking battery charge levels and AC voltage.

Outdoor UV Rated Zip Ties
For cable organization under solar panels, Battery Commander wires, etc.

Maintenance

Clean the PV panels at least once a month with water, light soap and dry with a terry cloth for maximum energy production. Inspect your wires for damage for any sign of wear/damage every 6 months. Routinely monitor your system for any sign of malfunction such as circuit breaker trips, GFCI trips. Pay close attention to your system after heavy rainfall and carefully inspect all elements for proper function.

Run system diagnostics and health checks at least once a month via Legion Solar app. Sealed lead acid batteries start to degrade after about 400 charge cycles. Monitor for weak cells and replace the batteries as necessary.

Technical Data

LS-150P PhotoVoltaic 150W Panels (Pair of Panels)	
Peak Power (Pmax)	310 Watts
Cell Type	Polycrystalline Silicon
Number of Cells	72
Cell Efficiency	18.5%
Cell Quality	A Grade
Open Circuit Voltage (Voc)	45.14V
Optimum Operating Voltage (Vmp)	38.04V
Optimum Operating Current (Imp)	7.89A
Short Circuit Current	8.37A
Max System Voltage	1000V
Construction	Aluminum Frame, Low iron tempered glass
Connectors	MC4
Operating Temperature	-40° C to 80° C
Nominal Operating Cell Temp	47 +- Deg C
Fire Rating	Class C
Module Application	Class A
Standard Test Condition	Irradiance 1000 W/m2, T = 25° C, AM = 1.5
Single Module Dimensions	58.33 x 26.46 x 1.38 inches (1483 x 672 x 35mm)
Single Module Weight	25.6 lbs (11.6Kg)

LS-260IG4 MicroInverter 260W (OK for use with Battery Commander 1.0 and 2.0)		
	120VAC	**230VAC**
Maximum Output Power	300W (Solar), 260W (Batteries)	300W (Solar), 260W (Batteries)
Maximum Output Current	2.36A	1.18A
Maximum Efficiency	94%	95.5%
Output Voltage Range	80 - 160VAC	180 - 280VAC
Output Frequency	58 - 62 HZ	48 - 63 Hz
Power Factor	> 98%	> 98%
Night Time Power	< 50mW	< 70mW
THD	< 5%	< 5%
Technology	Solid State MMPT 99.5%	Solid State MMPT 99.5%
Peak Power Tracking Voltage	20 - 47V	20 - 47V
PV Max Input Power	300W	300W
PV Input Voltage Range	17 - 47V	17 - 47V
PV Connector	MC4	MC4
Maximum DC Short Circuit	15A	15A
Maximum Input Current	10.4A	10.4A
Dimensions	7.87 x 5.12 x 1.26 inches (200 x 130 x 32 mm)	7.87 x 5.12 x 1.26 inches (200 x 130 x 32 mm)
Construction	Steel/Aluminum	Steel/Aluminum
Waterproof	IP67	IP67
Weight	0.37lbs (0.17Kg)	0.37lbs (0.17Kg)
Operating Temperature	-40° C to 80° C	-40° C to 80° C
Ground	Integrated	Integrated
Communication	Wireless 2.4Ghz	Wireless 2.4Ghz
Safety	Anti-islanding, Over temperature, Over current	Anti-islanding, Over temperature, Over current
Compatible Battery Commander	V1.0 and V2.0	V1.0 and V2.0

LS-260IG3 or G3B MicroInverter 260W (Do NOT use with Battery Commander 2.0)		
	120VAC	**230VAC**
Maximum Output Power	260W (Solar), 220W (Batteries)	260W (Solar), 220W (Batteries)
Maximum Output Current	2.36A	1.18A
Maximum Efficiency	94%	95.5%
Output Voltage Range	80 - 160VAC	180 - 260VAC
Output Frequency	57 - 62 HZ	47 - 63 Hz
Power Factor	> 98%	> 98%
Night Time Power	< 50mW	< 70mW
THD	< 5%	< 5%
Technology	Solid State MMPT 99.5%	Solid State MMPT 99.5%
Peak Power Tracking Voltage	20 - 50V	20 - 50V
PV Max Input Power	300W	300W
PV Input Voltage Range	17 - 50V	17 - 50V
PV Connector	MC4	MC4
Maximum DC Short Circuit	15A	15A
Maximum Input Current	10.4A	10.4A
Dimensions	7.87 x 5.12 x 1.26 inches (200 x 130 x 32 mm)	7.87 x 5.12 x 1.26 inches (200 x 130 x 32 mm)
Construction	Steel/Aluminum	Steel/Aluminum
Waterproof	IP67	IP67
Weight	0.37lbs (0.17Kg)	0.37lbs (0.17Kg)
Operating Temperature	-40° C to 80° C	-40° C to 80° C
Ground	Integrated	Integrated
Communication	Wireless 2.4Ghz	Wireless 2.4Ghz
Safety	Anti-islanding, Over temperature, Over current	Anti-islanding, Over temperature, Over current
Compatible Battery Commander	V1.0 Only (Not compatible with V2.0)	V1.0 Only (Not compatible with V2.0)

LS-BC Battery Commander V2.0	
Inverter Compatibility	Legion Solar Micro Inverter Only
Solar Panel	200-320W 72 Cell
Battery Type	Lithium Iron Phosphate 24V, Deep Cycle Sealed Lead Acid 24V
Operating Temperature	-40° C to 80° C
Water/Dust	IP67
Communication Mode	Solar Regulator V2.0 Protocol
Interface	Wireless 2.4 GHz
Maximum Current	20 Amps DC
Connector Type	MC4
Over Current Protection Fuses	20A
Dimensions	7.68 x 5.12 x 1.26 inches (195 x 130 x 32 mm)
Construction	Steel/Aluminum
Weight	0.37lbs (0.17Kg)

LS-BC Battery Commander V1.0 (Do NOT Use with Lithium Batteries)	
Inverter Compatibility	Legion Solar Micro Inverter Only
Solar Panel	200-320W 72 Cell
Battery Type	Deep Cycle Sealed Lead Acid 24V, Not compatible with Lithium Batteries
Operating Temperature	-40° C to 80° C
Water/Dust	IP67
Communication Mode	Solar Regulator V2.0 Protocol
Interface	Wireless 2.4 GHz
Maximum Current	20 Amps DC
Connector Type	MC4
Over Current Protection Fuses	20A
Dimensions	7.68 x 5.12 x 1.26 inches (195 x 130 x 32 mm)
Construction	Steel/Aluminum
Weight	0.37lbs (0.17Kg)

LS-Regulator Legion Solar SolarRegulator	
Voltage	120/230 VAC
Frequency	60/50 Hz
Power Consumption	2.5 Watts Typical
Operating Temperature	-40º C to +80º C
Water/Dust	IP65
Communication Mode	Wireless 2.4 GHz
Interface	Bluetooth 5
Monitoring Capability	32 Micro Inverters (9.6kW) + 32 Battery Commanders
AC Current Sense	65A for each phase (130A Total)
Compatible Utility Meters	Net Meters, Bi-Directional Meters, Single Direction
Phase/Voltage	1 and 2 phase systems on both 110VAC and 230VAC (Residential Version) 1,2, and 3 phase system on both 110VAC and 230VAC (Commercial Version)
Utility Lines	Overhead and underground
Enclosure	ABS Plastic

Device IDs

Write down the device ID of your MicroInverters and Battery Commanders. IDs are 6 characters long and can be found on the front side of your units. Devices IDs are used during setup and system calibration. Be sure to write down the Battery Commander ID that is specifically paired with the Inverter ID for each set.

Set Number	Inverter ID	Battery Commander ID
1		
2		
3		
4		
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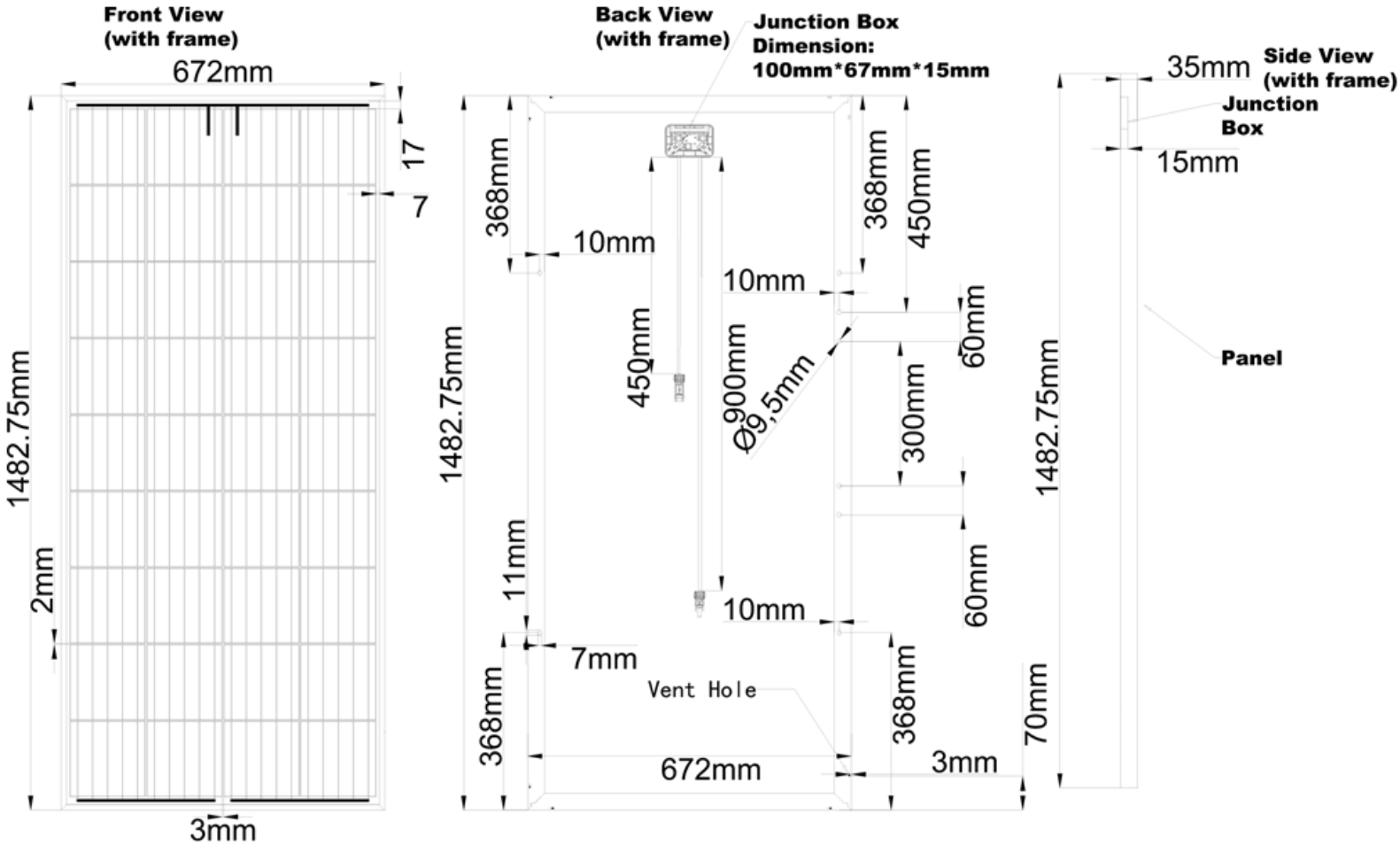
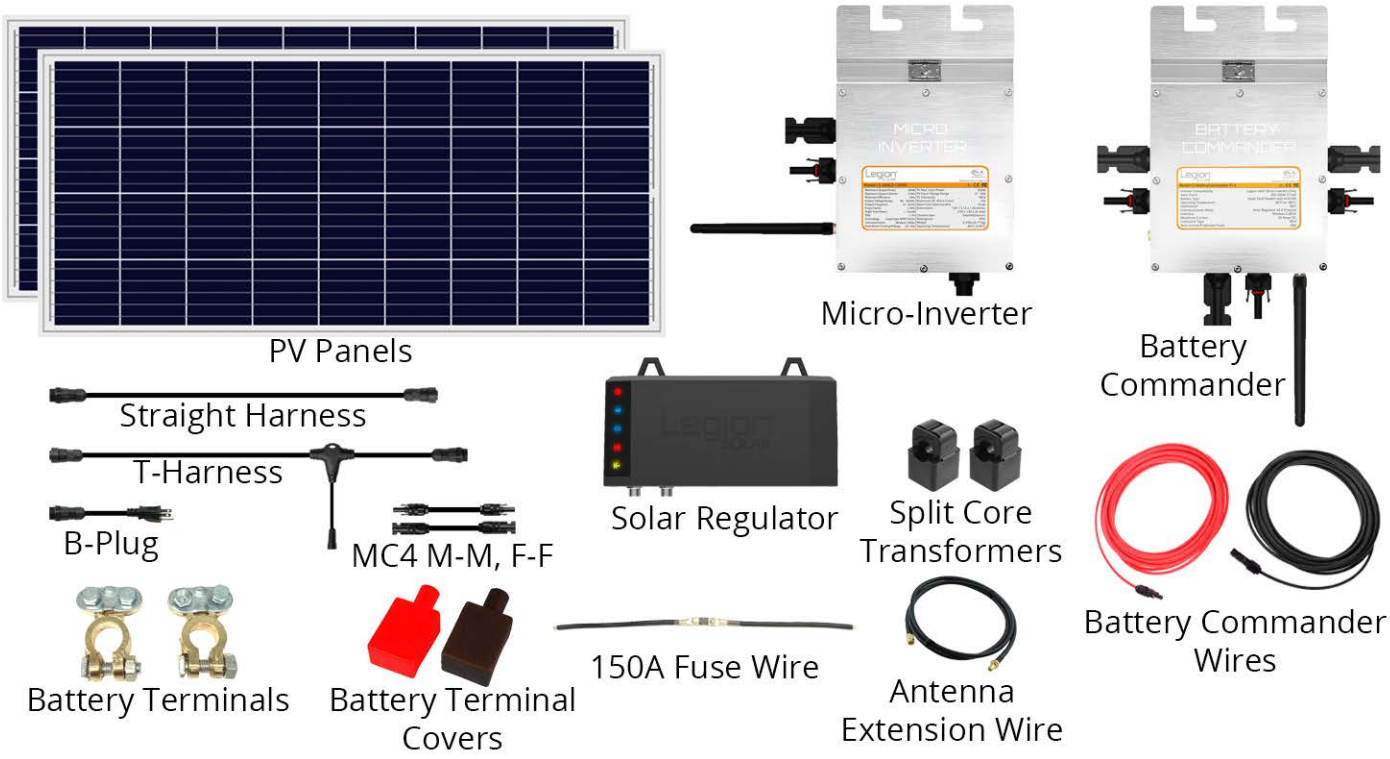
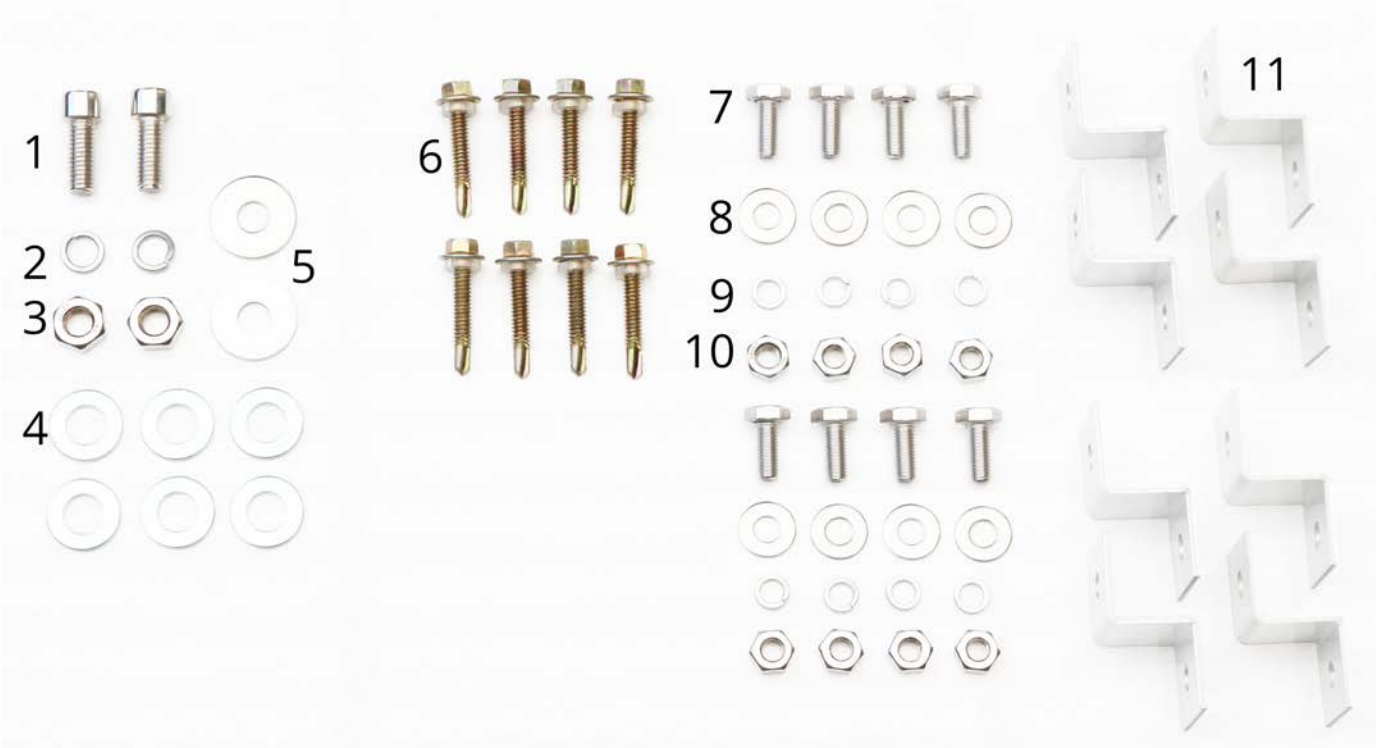
PV Panel Drawing



Part Descriptions





1) Hex Screw Thread 1.25mm M8 x 20mm long	4) Washer ID 10.6mm OD 19.75mm Thickness 2mm	7) Hex Screw Fine Thread 28 A2-70 0.25" x 5/8"	10) Nut Fine Thread 28 A2-70 0.25"
2) Lock Washer M8	5) Washer M8	8) Washer A2-70 0.25"	11) Aluminum 'Z' Brackets for DIY Mounting Solution
3) Hex Nut Thread 1.25mm M8	6) Self Drill Screw with Plastic Spacer 32mm long 5.0 x 32mm M8	9) Lock Washer A2-70 0.25"	

230VAC Micro Inverters on 120VAC Grids

If your utility's grid single phase voltage is 120VAC, you **MUST** use 120VAC Micro Inverters for Legion Solar to properly operate. Using 230VAC Micro Inverters on 120VAC single phase grids by connecting to two 120VAC hot phases to obtain 230VAC will NOT work properly with Legion Solar. Legion Solar's Solar Regulation services (the Artificial Intelligence computer to contain the energy generated behind your meter to prevent back feeding to your utility company) will NOT work in this configuration. Be sure to use ONLY 120VAC Micro Inverters on 120VAC grids for proper system operation.

Legion Solar with Utility Approved Grid Tied Solar Systems

If you already have a utility approved grid tied solar system where permission to back feed has already been granted, you may use Legion Solar to produce more energy. Simply setup the system as normal. In the Legion Solar app, when asked to calibrate, tap skip calibration. Once the setup is complete perform the following steps.

In the App:

1. Navigate to Setup > Utility. Set Regulation to Off.
2. Navigate to Setup > System Control
3. Tap on each Micro Inverter to ensure that it is in the ON position. Please note. Every time that you run a System Test from the Health screen you will need to repeat this step because System Test will turn off all of your Micro Inverters. Simply turn them back on.

Verify energy production from the Home or Production screen.

If you have any Battery Commander units it is recommended that you perform the following steps.

1. Set the Battery Commander Mode to Solar -> Battery to charge your battery.
2. Battery Commander automatically stop charging the battery once it has detected it is full.
3. Navigate to the Heath screen in the app and verify your battery charge percentage.
4. Set the Battery Commander Mode to Solar -> Inverter and turn the Inverter ON in System Control.
5. Every 2 weeks, repeat steps 1-4.

Warranty

PLX Devices Inc. warrants to be free from defects Legion Solar Regulator for five (5) years, PhotoVoltaic Panels, Inverters and Battery Commander for ten (10) years and all other PLX Devices Inc. product(s) for one (1) year from the date of purchase. If applicable other non-serviceable items are excluded from stated warranty. Serviceable

goods must be accompanied with proof of purchase and determined by PLX Devices Inc. to be defective before any warranty service or replacement is issued. PLX Devices Inc.' obligation under warranty shall be limited to repairing or replacing, under the discretion of PLX Devices Inc. any part proven defective. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. This warranty is limited to the repair or replacement of parts in the manufactured good and the necessary labor done to affect its repair or replacement.

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Limitations of Liability

Using and installing any component of Legion Solar you agree to hold that PLX Devices Inc. shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our products. Neither PLX Devices Inc. nor any of its affiliates, directors, employees or other representatives will be liable for damages arising out of or in connection with the use of this document or the information, content, materials or products included in this document. This document has not been evaluated by any country, state, or local electrical code authority. PLX Devices Inc. and its agents are not responsible for errors and omissions in this document.

Service and Support

If you should have any questions, we're here to help. Please feel free to submit a support ticket from www.legionsolar.com/contact.html or call +1-408-745-7591 M-F 8am-5pm PST for any technical related or service inquiries.