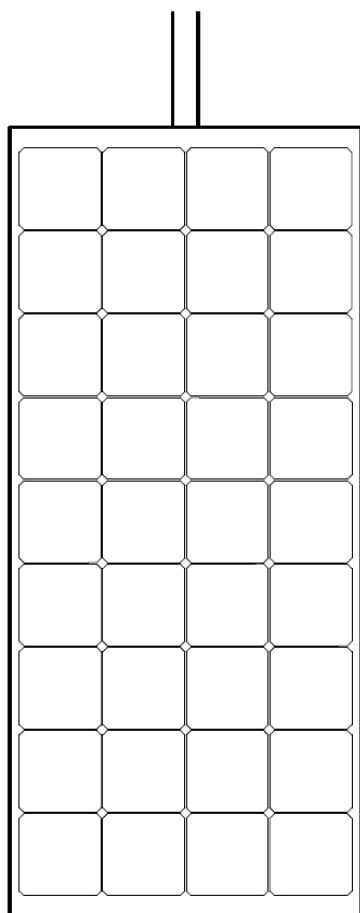


SOLAR FLEX-500 KIT™

User Manual



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Worldwide Technical Support and Product Information gpelectric.com

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82626_MAN_FLEX-500_RevB



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2. GENERAL INFORMATION

Congratulations on purchasing your Go Power! FLEX-500 Solar Kit. You have chosen a clean, quiet and sustainable power source. Go Power! Solar Kits allow you to power appliances in your RV, without hooking up to shore power or a noisy generator. Go Power! solar kits will keep your batteries charged, ensuring you have power when you need it.

This large mobile DC power system is designed for full-time living—even powering a residential-sized electric refrigerator, in addition to lights, fans or water pumps. To power AC electronics or devices off-grid, such as a television or coffee maker, a DC to AC power inverter (sold separately) will be necessary. As with any off-grid power systems, the user is required to manage electrical loads to ensure continual power availability for essential services like the refrigerator. Your location and season (hours of sunlight available) play a role in how much energy can be harnessed from this kit.

Note This manual will aid in the process of installing the Go Power! FLEX-500 Solar Kit. Please read and understand this manual and all included manuals before installing the Go Power! FLEX-500 Solar Kit. Review all diagrams included in this guide for the easiest and safest installation. **Please retain this manual for future reference.**

2.1 DISCLAIMERS

IMPORTANT: Please follow installation and wiring instructions exactly as outlined to ensure safety. We recommend installation by an RV technician or professional electrician to ensure adherence to relevant electrical codes. We have made every reasonable effort to ensure the accuracy of the instructions in this manual, but Go Power! does not guarantee that the information is error free, nor do we make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. The specifications in this manual are for reference purposes only and are subject to change without notice. For additional information please see www.gpelectric.com.

DISCLAIMER: This kit has been engineered for use in a mobile application. Any variance by the end-user is solely of their own discretion. Valterra Power LLC (Go Power!) assumes no responsibility for improper installation in accordance with any laws and regulations governing: cottage, residential or commercial applications. Go Power! disclaims liability for any direct, indirect or incidental damages caused by, or in case of, installation not performed following the instructions and cautions in this manual. Go Power! will refuse requests for exchanges or returns, resulting from the purchase and installation of items which do not comply with local codes. To avoid such concerns Go Power! recommends installation by a professional electrician or RV technician. Examples that are shown within this manual are for illustrative purposes only.



WARNING: The solar panels must be securely fastened only to a rigid surface on your RV roof. Failure to do so could cause the panels to lift, flex and separate from the RV while in transit which could cause significant damage, fire and/or injury.

2.2 HOW DOES A GO POWER! SOLAR CHARGING KIT WORK?

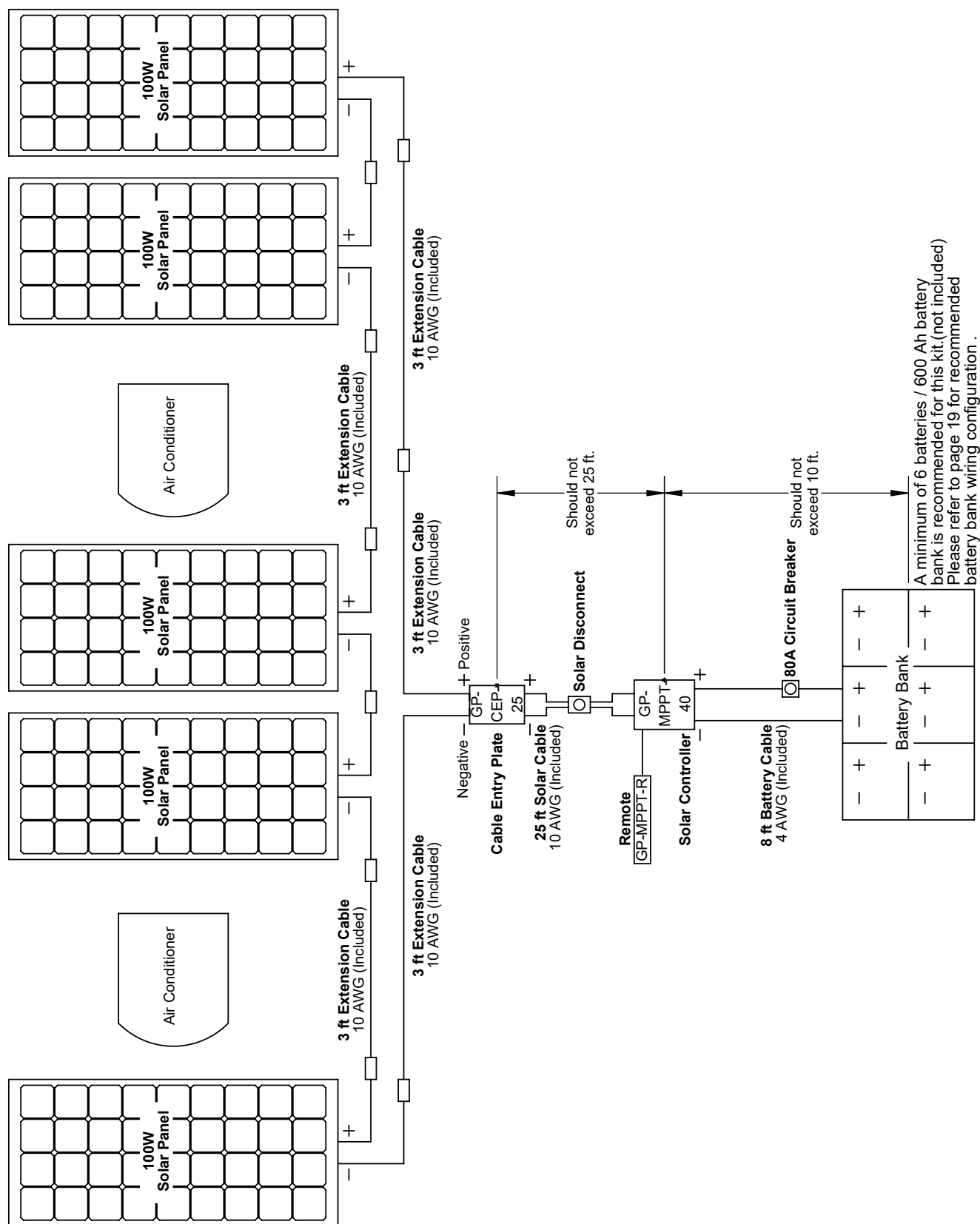
The solar panel converts the sun's energy into DC electricity and this electricity charges the battery. The battery stores the electricity, similar to a water tank storing water. This battery power may be used at any time to operate DC powered devices connected to the battery. To increase the battery service life, a solar controller is used to prevent the solar panels from overcharging the batteries. This process is managed by the GP-MPPT-40 controller included in this kit. (See Figure 2-A on the following page for example).

Note The Go Power! FLEX-500 Solar Kit includes 5 solar panels for use with a 12-volt system.



WARNING: The solar panels in this kit are designed to be connected in SERIES. Failure to follow this will cause the system to produce large currents which the solar disconnect and solar panel cables are not designed to handle. Incorrect wiring can result in irreparable damage to the system (not covered under warranty), fire or serious injuries.

FIGURE 2-A: EXAMPLE WIRING DIAGRAM



2.3 CAUTIONS

	Disconnect all power sources before attempting installation	Electricity can be very dangerous. Installation should be performed only by a licensed electrician or qualified personnel.
	Solar panel safety	Photovoltaic panels generate DC electricity when exposed to sunlight or other light sources. Contact with the electrically active parts of the panel, such as terminals, can result in burns, sparks and lethal shock whether the panel is connected or disconnected. When panels are connected in series, voltages are additive. Consequently, a system assembled from photovoltaic panels can produce high voltages, which constitute an increased hazard. Do not touch terminals while panel is exposed to light. Cover the panel face completely with opaque material to halt the production of electricity when installing or working with panels or wiring.
	Battery and wiring safety	Observe all safety precautions of the battery manufacturer when handling or working around batteries. When charging, batteries produce hydrogen gas, which is highly explosive. Work in a well ventilated area and use caution when making or removing electrical connections. Ensure wires are disconnected from their power sources when wiring. Do not expose battery to open flame, cigarettes or sparks. Shield skin and eyes from battery acid. Ensure all connections are tight and secure. Loose connections may generate sparks and heat. Be sure to check connections one week after installation to ensure they are still tight.
	Work safely	Observe correct polarity at all times Reverse polarity of the battery terminals or solar terminals may damage the controller.
	Do not exceed the voltage and current ratings of the GP-MPPT-40 Solar Charge Controller	Wear protective eyewear and appropriate clothing during installation. Use extreme caution when working with electricity and when handling and working around batteries. Use properly insulated tools only. The total voltage of the solar system is the sum of the open circuit current of the solar panels in series. The voltage of the array is the rated open circuit voltage of the solar panels and is not to exceed 150 volts. The system Imp current is not to exceed 40A. If your solar system exceeds these ratings, contact your dealer for a suitable controller alternative.





2.4 KIT PARTS CHECKLIST

Note

Please unpack and make sure all parts shown in the list below are included in the kit. If any parts are missing please contact Go Power!'s customer service team at customersupport@gpelectric.com or 1-866-247-6527.

2.4.1 PARTS CHECKLIST

ITEM #	DESCRIPTION	SOLAR-AE6
01	FLEX-100 Solar Panel	5
02	#10 x 1" Screw (for Solar Panels and CEP)	36
03	#10 x 3/4" Screw (for Solar Disconnect and Circuit Breaker)	7
04	#8 x 5/8" Screw (for cable clamps)	46
05	#10 Washer	30
06	MC4-OUTPUT-3, 3' Solar Panel Extension Cable with MC4 Connectors	5
07	Cable Entry Plate (CEP)	1
08	Solar Disconnect	1
09	GP-MPPT-40, solar charge controller	1
10	GP-MPPT-R, solar charge controller remote	1
11	Battery cables	1
12	80A circuit breaker	1
13	Tie wrap	42
14	1/4" UV resistant cable clamp	10
15	3/8" cable clamp	36
16	Snap bushing	1
17	Cable gland with locknut	4

Note

See Figure 2-B for parts images on next page.

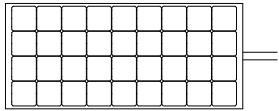
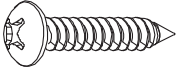
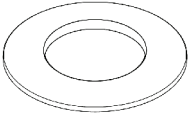
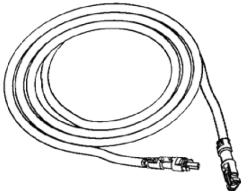
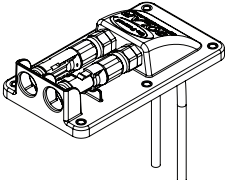
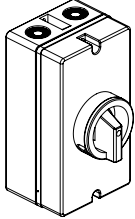
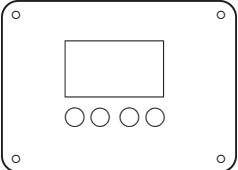
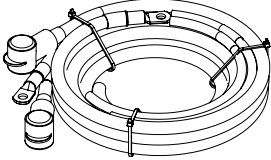
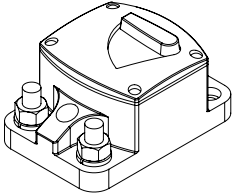
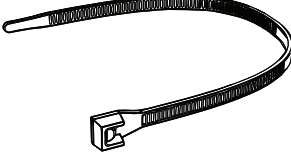
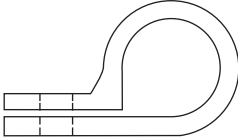
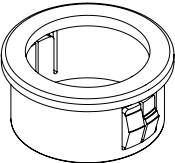
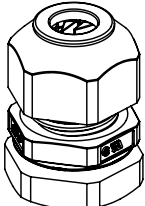
 1	 2, 3, 4	 5	 6
 5	 6, 7, 8	 9, 10	 11
 12	 13	 14	 15
 16	 17		

FIGURE 2-B: PART IMAGES



2.5 REQUIRED TOOLS

a. Screwdriver (with #2 and #3 Phillips bits)	h. #7 and 5/8" Drill Bits
b. 3/4" Hole Saw	i. 9/16", 13/16" and 7/8" Wrench
c. Pencil or Marker	j. 13/16" Crowsfoot Wrench
d. Pliers	k. Caulking Gun
e. Wire Strippers and Cutters	l. Sealant
f. Power Drill	m. Digital Multimeter (troubleshooting only)
g. #2 Phillips and #2 Robertson (square) Power Drill Bits	n. Torque Driver (optional)



3. PLANNING LOCATIONS

3.1 PLACEMENT OF SOLAR PANELS

1. Remove all solar panels from their boxes. **Set aside the boxes as they will be used in the instructions to follow.**
2. Using the solar panel boxes as placeholders, plan the layout of the panels on your RV rooftop. Once you have positioned the boxes correctly, leave the boxes on the RV roof as place holders until the panels are installed. (See Figure 2-B for a sample layout).

Note

- Placement of the panels should be as close together as possible, but with a minimum gap of 1/4" between panels to allow for expansion. Each panel has several feet of cable coming from the junction box. It may be necessary to use the included solar panel extension cables. If required, longer extension cables can be purchased. Please contact your dealer to purchase.
- Select a location where the mounting surface is at least 1/2" thick and strong enough to support the solar panel mounting hardware.
- Solar panels should be located a minimum of 3' from the front of the RV to reduce wind load on the panels.
- Avoid internal wiring when selecting the solar panel mounting locations for drilling the mounting holes.
- Ensure fixed obstacles, such as air conditioners, will not shade the solar panels. (Shading can greatly reduce the performance of the solar system).
- Ensure there is enough room to access the panels and other fixed obstacles for future inspection and maintenance.

3.2 CABLE ENTRY PLATE

1. Plan where the Cable Entry Plate (CEP) will be located on the RV roof.

Note

- Make sure it is within reach of the solar panels. It may be necessary to use the included extension cables to reach the CEP. If required, longer extension cables can be purchased. Please contact your dealer to purchase.
- Make sure the CEP location is also accessible from the interior of the RV to route the cables to the charge controller.
- The GP-MPPT-40 charge controller(s) should be placed no more than 25' from the CEP. Closer is better to reduce the voltage loss due to resistance.

3.3 GP-MPPT-40 CHARGE CONTROLLER

1. Plan where the GP-MPPT-40 charge controller will mount, see Figure 3-A for more detail including maximum distances.

Note

- The GP-MPPT-40 is designed to be mounted vertically in an indoor location inside a weather-proof enclosure.
- The GP-MPPT-40 weighs approximately 2.6lbs. – ensure the mounting location will hold this weight.
- The location will need access to the cable ends from the Cable Entry Plate (CEP), the battery compartment and the GP-MPPT-R remote cable.



WARNING: Failure to secure the GP-MPPT-40 could cause it to become dislodged while the RV is underway and cause severe damage to the unit and/or the RV.

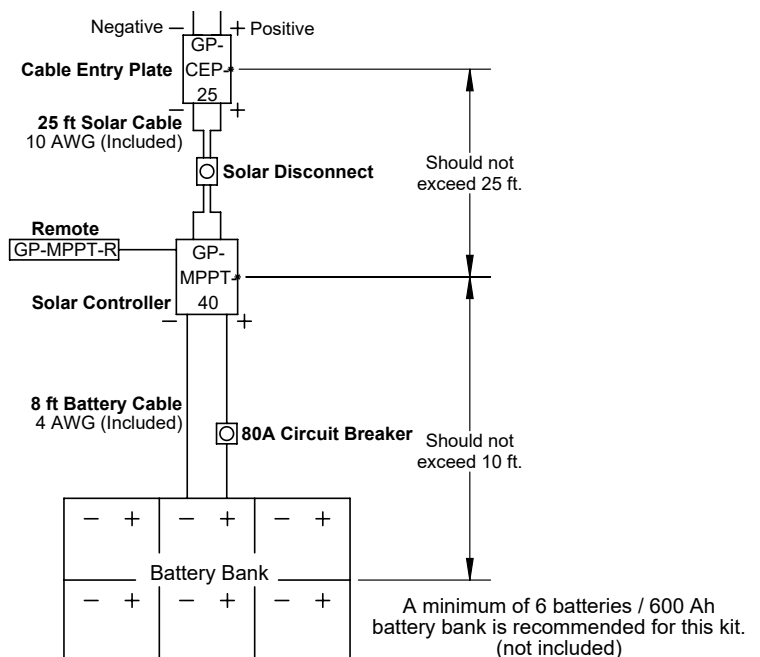


FIGURE 3-A



3.4 GP-MPPT-R CHARGE CONTROLLER REMOTE

1. Plan where the GP-MPPT-R remote will be installed. If space will allow, install the GP-MPPT-R in the location where you find other instruments and controls (often in the instrumentation panel).

Note

Make sure the GP-MPPT-R location is also accessible for routing the cable to the GP-MPPT-40. The GP-MPPT-R includes 25' of cable for connection between itself and the GP-MPPT-R.

Design your solar set up here:

4.1 SOLAR PANELS



WARNING: Photovoltaic panels generate DC electricity when exposed to sunlight or other light sources. When exposed to light, contact with the electricity active parts of the panel, such as terminals, can result in burns, sparks and lethal shock whether the panel is connected or disconnected.

When panels are connected in series voltages are additive. Consequently a system assembled from photovoltaic panels can produce high voltages which constitute an increased hazard. Do not touch the terminals while the panel is exposed to light. Cover the panel faces completely with an opaque material to stop the production of electricity when working with panels or wiring – the cardboard shipping boxes are the perfect option to cover the surface of the panels.

Note Panels are not recommended to bend beyond 30° (for 100W Modules, 30° = 2.7", 69mm Bend).

1. Expose the panels to sunlight and use a voltage meter to test for DC voltage.
2. Locate the solar panels on the RV roof replacing each of the boxes used in the planning step.
3. Locate the CEP on the RV roof.
4. Test that the solar panel cables can reach each solar panel (See Figure 2-B).

WARNING: Do not connect the solar panels together at this time.

5. Test that the end solar panel cables can reach the CEP (panel last in line).

WARNING: Do not connect the solar panels to the CEP at this time.

6. Thoroughly clean the RV roof around the hole in the area the mounting feet will be located.
7. Use the #10 x 1" screws provided in the kit to secure the solar panels to the RV. Or an adhesive sealant can be used to attach the panels to the RV roof. Please contact your RV manufacturer for specifications on an appropriate sealant.
8. Apply sealant under, around and on top of each of the 6 screws to ensure a watertight installation.



WARNING: Using an adhesive can create a permanent mounting situation. It is strongly recommended that placement is well thought out and that panel function has been tested before mounting. Go Power! is not responsible for damage caused by the removal of any solar panels.



WARNING: The solar panels must be securely fastened only to a rigid surface on your RV roof. Failure to do so could cause the panels to lift, flex and separate from the RV while in transit which could cause significant damage, fire and/or injury.

Note Use appropriate sealant as recommended by your RV Dealer for your RV roof.

4.2 CABLE ENTRY PLATE

1. Use the 4 included tie-wraps to secure the cables together approximately every 5'.

Note

- This helps reduce the amount of electrical noise radiated by the kit.
- Ensure these paired cables run through the same hole(s) as they are routed through the interior of the RV.

2. Mark the location of the CEP cable hole to be drilled for feeding the cables through the RV roof – details on install below.
3. When the CEP is installed the hole for the cables should be along its center line and approximately 1.25" from the back edge. (See Figure 9-A drill template).

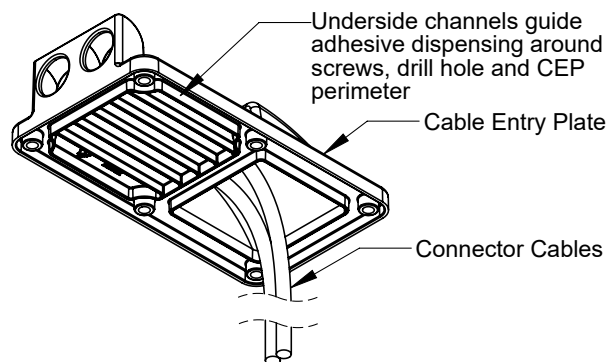


FIGURE 4-A

4. Mark the location of the CEP cable hole to be drilled for feeding the cables through the snap bushing and the RV roof – details on install below. (See Figure 4-B).
5. Drill a small pilot hole in the chosen spot. Using the hole saw enlarge the hole to be 3/4" in diameter.
6. Remove any sharp edges from the hole and install the snap bushing.
7. Thoroughly clean the RV roof around the hole in the area the CEP will be mounted. A clean surface is critical to ensuring a watertight seal.
8. Feed wires down through the snap bushing in the hole until they reach the charge controller mounting location.
9. Apply a generous bead of sealant to the underside of the CEP following the channel provided and around all mounting holes.

Note The sealant should expand significantly beyond the bottom of the CEP.

10. Lower the CEP down until just the tip of the caulking gun fits under the CEP. Apply a generous bead into and around the cable hole including the cable as well. (See Figure 4-C).
11. Finish lowering the CEP on the RV roof.
12. Dispense a generous dab of sealant into each mounting hole.
13. Using the 6 of #10 x 1" screws provided, secure the CEP to the RV roof – through the sealant and into the roof. (See Figure 4-D).

Note Do not over-tighten screws.

14. Apply a dab of sealant on top of and around the head of each screw.
15. Apply another generous bead of sealant around the perimeter of the CEP.
16. Secure the exposed solar panel cables using the cable clamps provided.

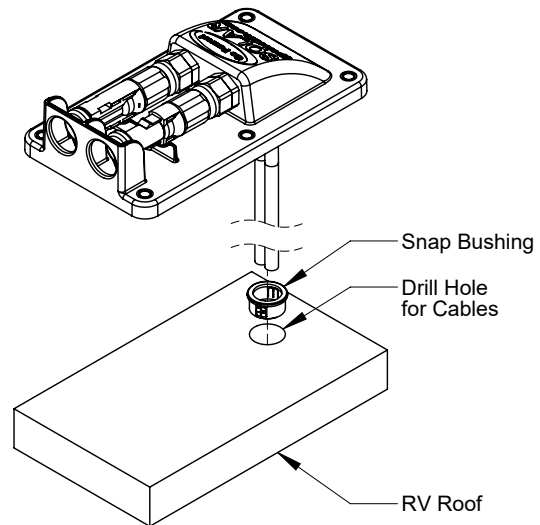


FIGURE 4-B

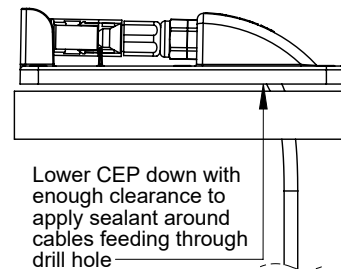


FIGURE 4-C

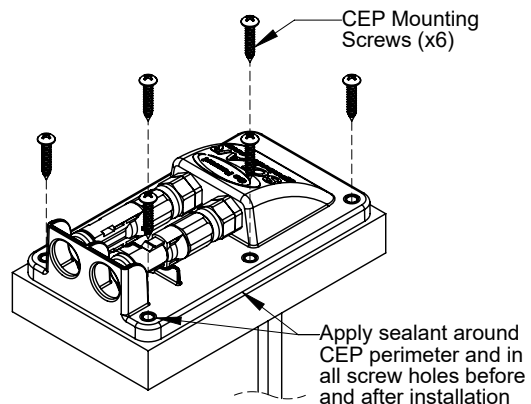


FIGURE 4-D

4.3 SOLAR DISCONNECT

The solar disconnect is a device which serves as a means of disconnecting power from the GP-MPPT-40 charge controller if maintenance or service is required.

1. The solar disconnect must be installed between the CEP and the GP-MPPT-40 charge controller. It should be mounted close to the GP-MPPT-40 preferably in the same space if possible. (See Figure 4-E).

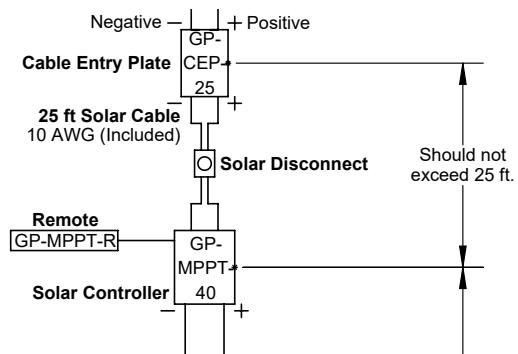


FIGURE 4-E

2. Remove the disconnect cover, internal switch and switch mounting screws before drilling the following clearance holes.
3. Drill 4 clearance holes (0.201") for the #10 x 3/4" mounting screws through the provided housing mounting template on the back wall of the disconnect housing. (See Figure 4-F). Note, the disconnect housing may also be mounted using the 2 slots at the top and bottom if desired.
4. Drill 4 clearance holes (0.625") for the cable glands through the provided housing entry template on the top and bottom walls of the disconnect housing. (See Figure 4-F).
5. Insert the 4 cable glands through the 0.625" clearance holes and thread on the locknut. Restrain the base of the cable gland with the 13/16" wrench and tighten the locknut with the 7/8" wrench to 33-38 in. lbs. (See Figure 4-G).
6. Using 4 of #10 x 3/4" screws, securely mount the solar disconnect. (See Figure 4-H).
7. Cut the solar positive (red) and negative (black) cables at the disconnect. Feed the cables from the CEP through the top cable glands. Feed the other cut cables ends through the bottom cable glands. (See Figure 4-I).

Note The cables should feed to through the cable glands to the switch terminals according the following table.

Cable Description	Switch Terminal
Solar positive (red) from CEP	1
Solar negative (black) from CEP	3
Solar positive (red) to GP-MPPT-40	2
Solar negative (black) to GP-MPPT-40	4

8. Strip 1/4" of the insulation from the cables and insert into the correct switch terminal, as noted in the table above. Torque the terminal screws to 12-15 in. lbs. (See Figure 4-J).
9. Mount the switch to the disconnect housing using the switch mounting screws included with the disconnect. (See Figure 4-K).
10. Torque the screw terminals to 12-15 in. lbs.
11. Ensure there is no tension on the cables. Restrain the cable gland base with the 13/16" crowsfoot wrench and tighten the cable gland sealing nuts around the cables with the 13/16" wrench to 33-38 in. lbs.
12. Install the disconnect cover using the 2 cover mounting screws included with the disconnect. (See Figure 4-L).
13. Use the included 1/4" black cable clamps to secure the cable to the RV.

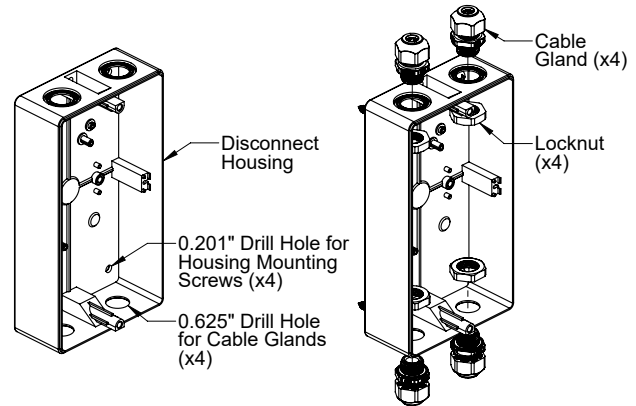


FIGURE 4-F

FIGURE 4-G

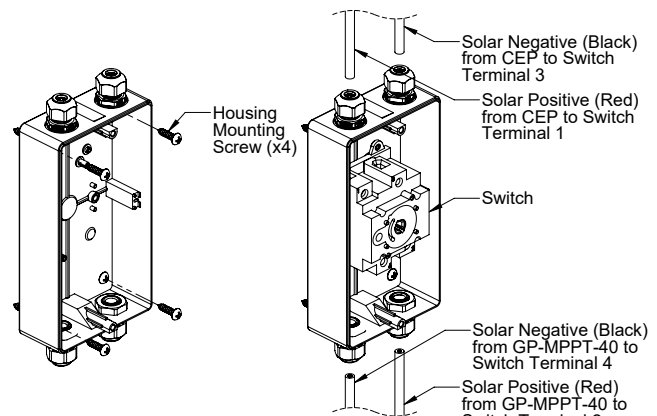


FIGURE 4-H

FIGURE 4-I

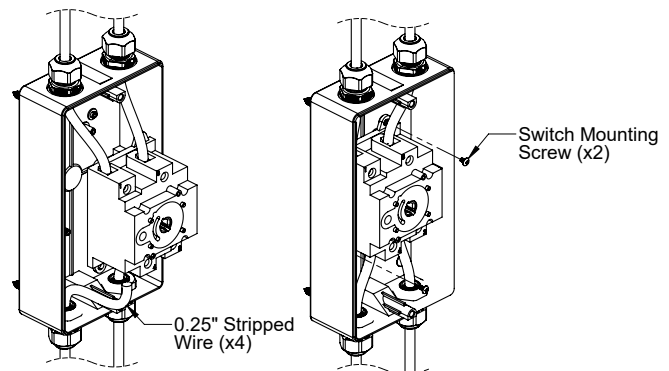


FIGURE 4-J

FIGURE 4-K

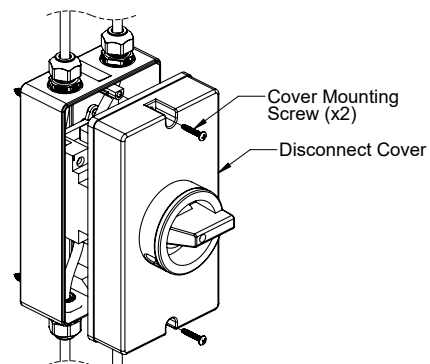


FIGURE 4-L

4.4 GP-MPPT-40 CHARGE CONTROLLER

Note You will need the GP-MPPT-40 User Manual included in the kit to complete installation

1. The GP-MPPT-40 charge controller should be mounted within 10' of the battery for optimal operation. The GP-MPPT-40 is designed to be mounted vertically on the side of a wall in a weather tight enclosure.

Note The GP-MPPT-40 must be mounted indoors in a dry location - such as inside the battery compartment.

2. Follow the GP-MPPT-40 installation section in the User Manual.

4.5 BATTERY CIRCUIT BREAKER

The circuit breaker is a safety device designed to protect the battery cables from high over-current faults.

1. The circuit breaker is to be mounted on the positive (red) cable between the GP-MPPT-40 charge controller and the batteries. (See Figure 4-M)

Note The circuit breaker should be mounted as close to the batteries as possible. Go Power! recommends using the 2 ft. positive (red) cable between the circuit breaker and the battery bank.

2. Using 3 of #10 x 3/4" screws included, securely mount the circuit breaker. (See Figure 4-N).
3. Assemble the ring lugs of the positive (red) cables to the circuit breaker. (See Figure 4-O).
4. Tighten the nuts holding the ring lugs to 75 in. lbs.
5. Connect the bare end of the 8 ft. positive (red) cable to the GP-MPPT-40 charge controller. Cut excess cable length as required. Follow the GP-MPPT-40 User Manual for additional details and recommended torque and strip lengths.
6. Connect the bare end of the 10 ft. negative (black) cable to the GP-MPPT-40 charge controller. Cut excess cable length as required. Follow the GP-MPPT-40 User Manual for additional details and recommended torque and strip lengths.
7. Use the included tie-wraps to secure the cables together.

Note

- This helps reduce the amount of electrical noise radiated by the kit.
- Ensure these paired cables run through the same hole(s) as they are routed.

8. Use the included 3/8" white cable clamps to secure the cable to the RV.

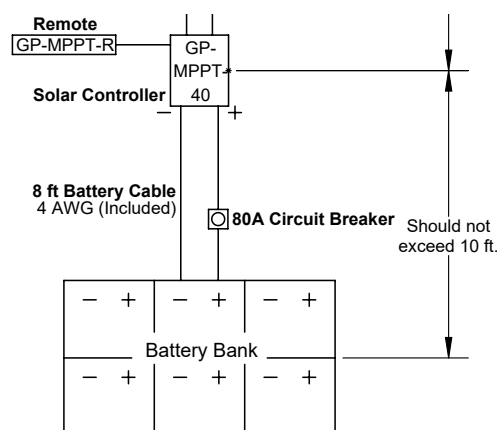


FIGURE 4-M

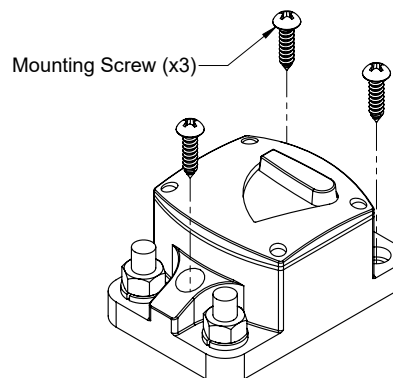


FIGURE 4-N

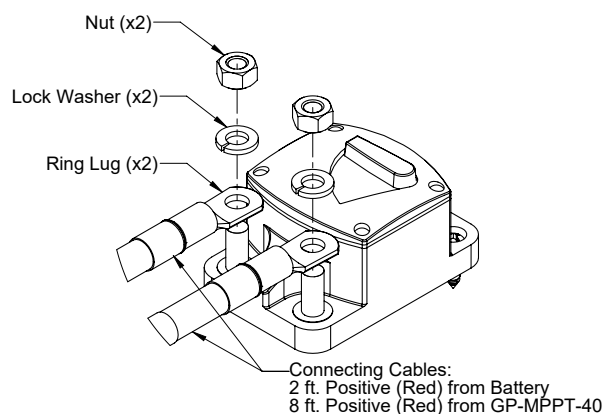


FIGURE 4-O

4.6 GP-MPPT-R CONTROLLER REMOTE

1. Using location planned for the GP-MPPT-R controller remote, follow the GP-MPPT-R User Manual regarding installation.
2. Connect the remote to the GP-MPPT-40 and the GP-MPPT-R remote via the supplied cable.

5. CONNECTIONS

5.1 SOLAR PANELS



WARNING: Before starting this section ensure the solar disconnect is in the off position.

1. Before beginning you must securely cover the solar panels with a solid, non-transparent material. We recommend that you use the solar panel shipping boxes.
2. Connect all the solar panels together in **series**. (See Figure 5-A).
3. Recall from the planning section that it may be necessary to use the provided 3' solar extension cables for this step.

Note Solar panels use polarized MC4 connectors, meaning the positive connector is different than the negative connector. Each connector has its polarity symbol (+ or -) embossed near the end of the connector. This polarity symbol is relative to the solar panel. To extend a cable, an opposite polarity connector must be used. For example, a negative connector must plug into a positive connector in order to extend it. It is advisable to attach or mark the positive cable in order to avoid confusion during the installation. (See Figure 5-B and Figure 5-C).

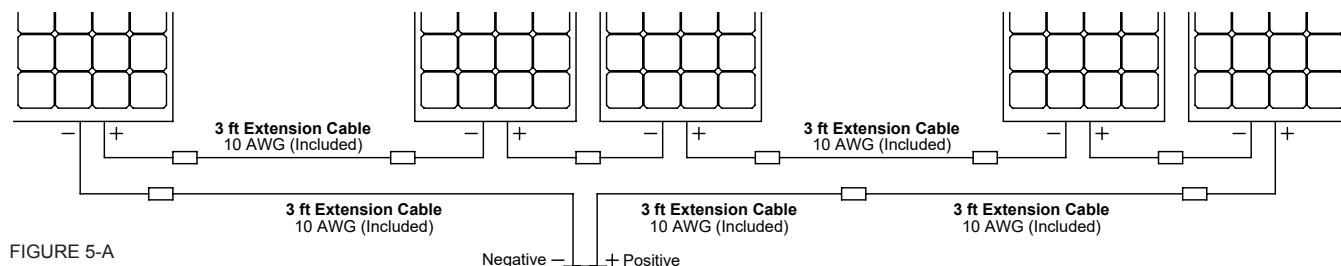


FIGURE 5-A

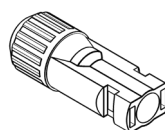
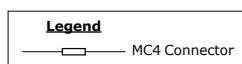


FIGURE 5-B: MC4 NEGATIVE

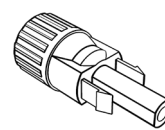


FIGURE 5-C: MC4 POSITIVE

5.2 CABLE ENTRY PLATE

1. Remove the sealing caps from the ends of the MC4 connectors in the CEP.
2. Connect the positive and negative connectors to the CEP. (See Figure 5-D).
3. Recall from the planning section that it may be necessary to use the provided 3' solar extension cables for this step.

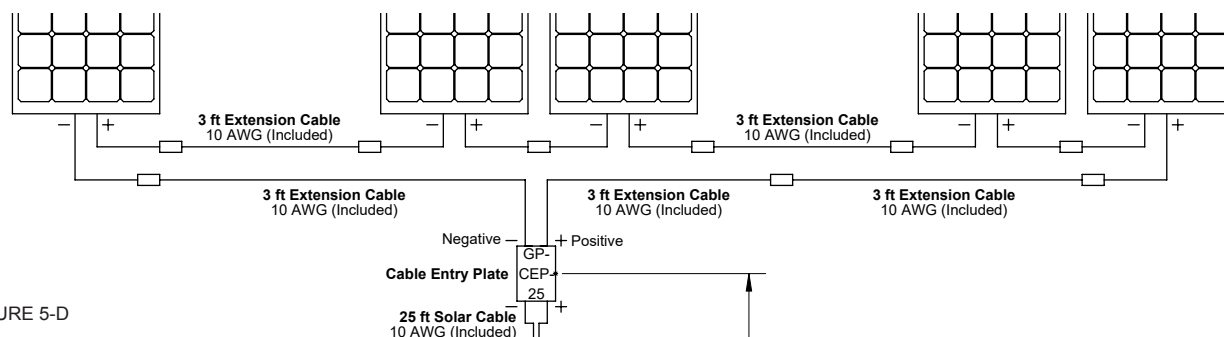


FIGURE 5-D

5.3 BATTERY



WARNING: Before starting this section ensure the circuit breaker is in the off position.

Ensure that correct polarity is being observed when making connections to the batteries. Serious damage to equipment could result if these instructions are not followed exactly.

1. Connect the negative (black) cable from the GP-MPPT-40 to the battery's negative terminal. Connect the positive (red) cable from the circuit breaker to the battery's positive terminal. Tighten according to the battery manufacturer's recommendations.

Note

The individual batteries must be connected together before the connection to the GP-MPPT-40 is made. (See Figure 5-E for typical battery configurations). Go Power! recommends the use of the Go Power! GP-AGM-100 (12V) or GP-AGM-224 (6V) batteries with this kit.

2. The GP-MPPT-40 will now be powered.

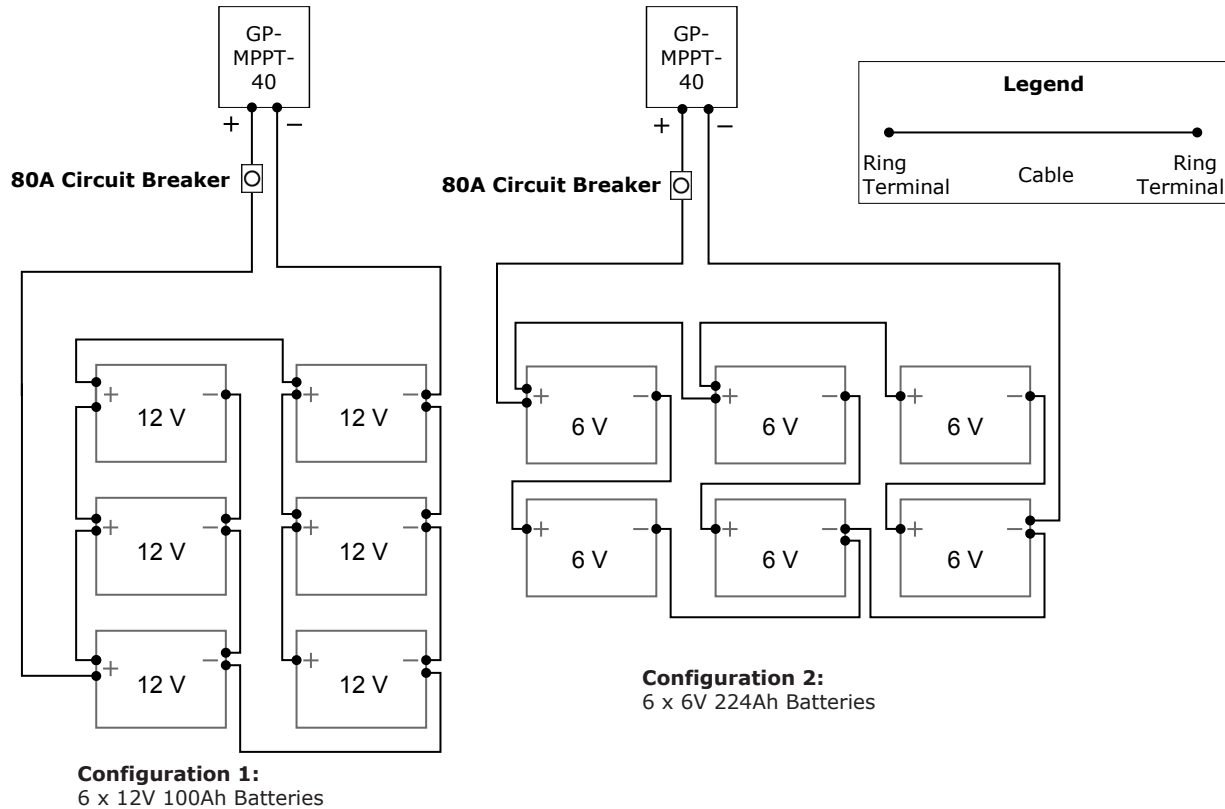


FIGURE 5-E: TYPICAL BATTERY BANK CONFIGURATIONS



6. OPERATING

1. The installation is complete. Remove the opaque material from the solar panels.
2. Switch the circuit breaker and solar disconnect to the on position.
3. Follow the GP-MPPT-40 User Manual for setup and operating steps.

7. SPECIFICATIONS

FLEX-100 Solar Panel Specs

Rated power (Pm)	100W
Maximum power voltage (Vmp)	18.9V
Maximum power current (Imp)	5.66A
Open circuit voltage (Voc)	23.4V
Short circuit current (Isc)	5.92A

GP-MPPT-40 Specs (Detailed specs available in the manual)

Maximum Solar Array Current	40A (amperage is reduced above 50°C)
Maximum Solar Array Power	600/1200W
Maximum Solar Voltage	150VDC

Solar Disconnect

Maximum Voltage	600VDC
Maximum Current	25A

Circuit Breaker

Rating (amperage, maximum voltage)	80A, 48VDC
Class	Type III - switchable/manual reset - trip free



8. WARRANTY RETURN PROCEDURE

The Go Power! warranty is valid against defects in materials and workmanship for the specific product warranty period. It is not valid against defects resulting from, but not limited to:

- Misuse and/or abuse, neglect or accident
- Exceeding the unit's design limits
- Improper installation, including, but not limited to, improper environmental protection and improper hook-up
- Acts of God, including lightning, floods, earthquakes, fire, and high winds
- Damage in handling, including damage encountered during shipment

A warranty shall be considered void if the warranted product is in any way opened or altered. The warranty will be void if any eyelet, rivets, or other fasteners used to seal the unit are removed or altered, or if the unit's serial number is in any way removed, altered, replaced, defaced, or rendered illegible.

Warranty Return Procedure

Before contacting Go Power!'s customer service department, please read the "frequently asked questions" section of our website to troubleshoot the problem. If trouble persists:

1. Call your Go Power!™ Technical Support team (1-866-247-6527) or
2. Return defective product to place of purchase

Unless approved by Go Power! management, all product shipped collect to Go Power! will be refused. Test items or items that are not under warranty, or units that are not defective, will be charged a minimum bench charge of (\$50.00 US) plus taxes and shipping. A 15% restocking charge will be applied on goods returned and accepted as "new" stock.

An RMA number (Return Materials Authorization number) from Go Power! Customer Service is required prior to returning any Go Power! Products. Go Power! reserves the right to refuse any items sent to Go Power! without an associated RMA number. To obtain an RMA number, please contact customersupport@gpelectric.com or Telephone 1-866-247-6527 or Fax 1-866-607-6527 worldwide – or Toll Free for US & Canada 1-866-247-6527.

Out of Warranty

Go Power! electronic products are non-repairable, Go Power! does not perform repairs on its products nor does it contract out those repairs to a third party. Go Power! does not supply schematics or replacement parts for any of its electronic products.

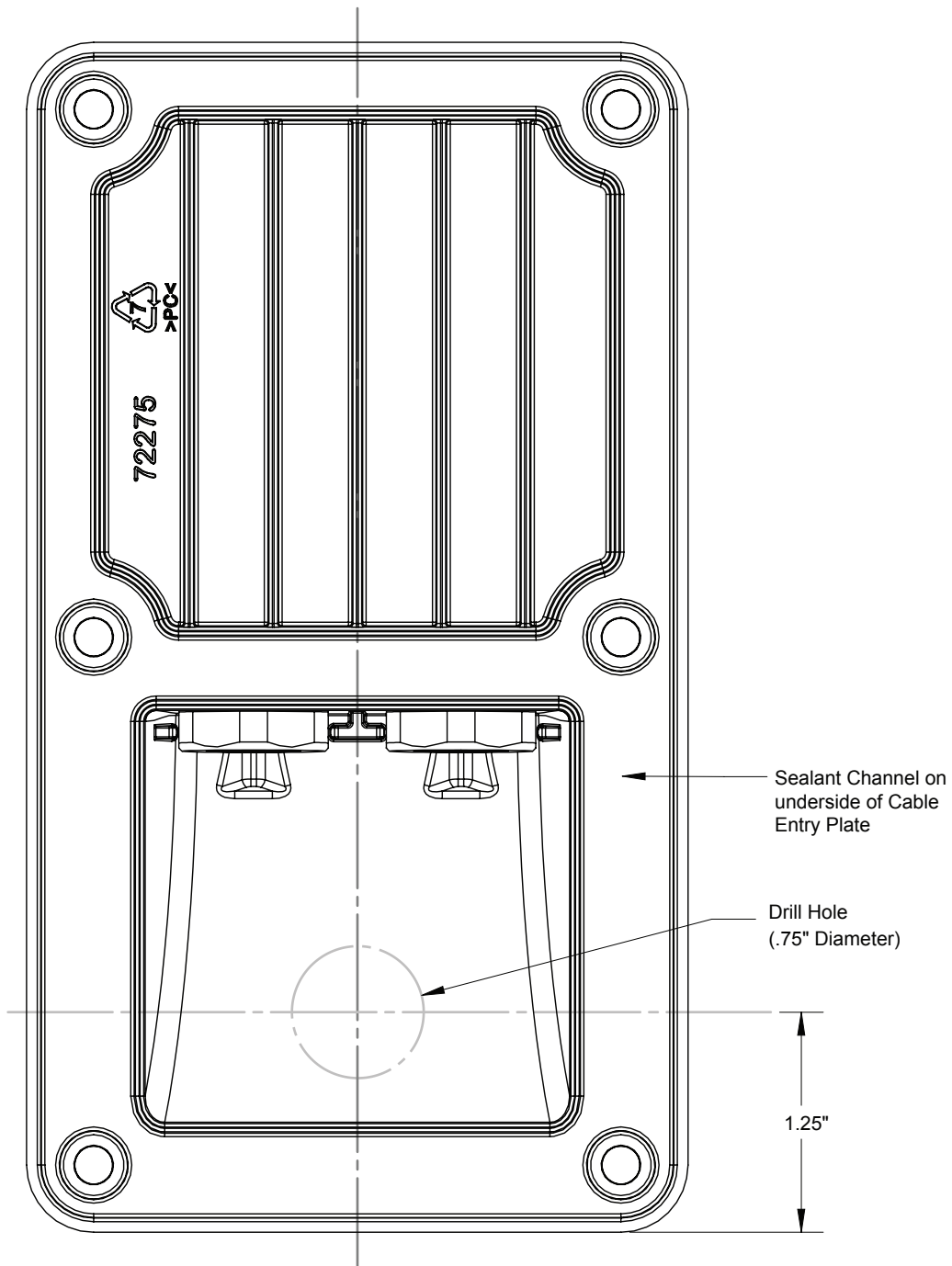


FIGURE 9-A DRILL TEMPLATE