



GP-FLEX-100
GP-FLEX-200
GP-FLEX-100E

SOLAR FLEX

User's Manual

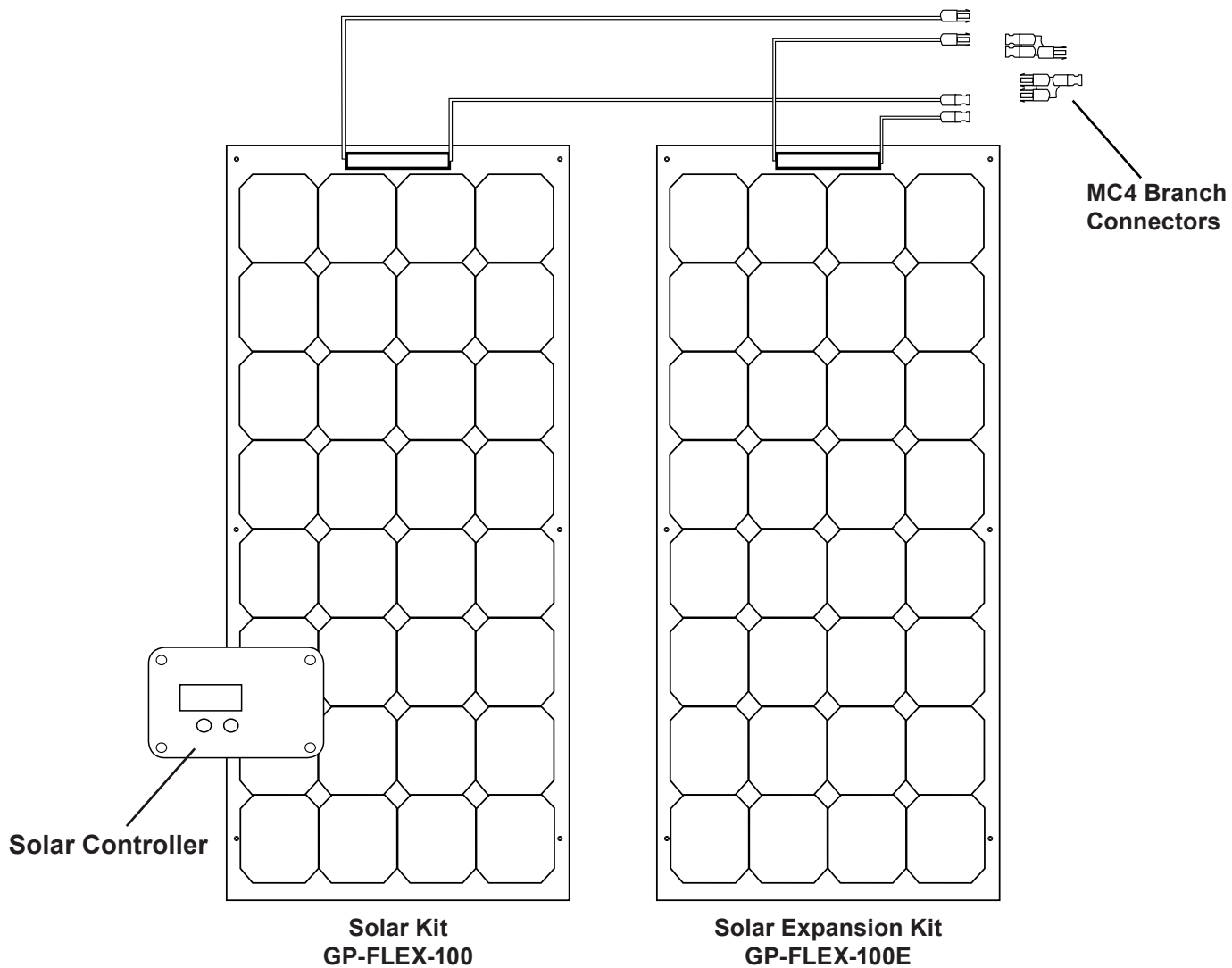


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1.0 General Information

Congratulations on purchasing your Go Power! Solar Flex™ Kit. You have chosen a clean, quiet and sustainable power source. Go Power! Solar Charging Kits allow you to enjoy the luxuries that electricity provides, without hooking up to shore power, by keeping your batteries charged. For simple battery maintenance to full-time live-aboard power, Go Power! Solar Kits are available in a variety of sizes and can be installed on RVs, boats, campers, trailers, fifth wheels, motor homes, cottages/cabins, long-haul trucks and industrial applications. This manual is geared towards RV installation and usability. For other applications, please consult a certified electrician or contact Go Power! Technical Support. Information in this manual is subject to change, please visit gpelectric.com for the most current version of this manual.

Notes:







- Solar Flex Modules have a 30° maximum recommended bend - 2.7" / 69mm bend (100 watt module)
- This installation guide does not list all possible variations of available solar modules. This installation guide will address the assembly of Go Power! Solar Flex™ Kits, which contain one, or more solar modules connected in parallel for a 12 volt system. Expansion Kits are available to add solar modules to an existing system.

1.1 How Does a Go Power! Solar Charging Kit Work?

The solar module 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. The battery power may be used at any time to operate devices connected to the battery. To stop the battery from being overcharged by the solar module, a solar controller is connected in between the solar module and the battery. The GP-PWM-30 controller will disconnect power from the solar module when the battery is fully charged.

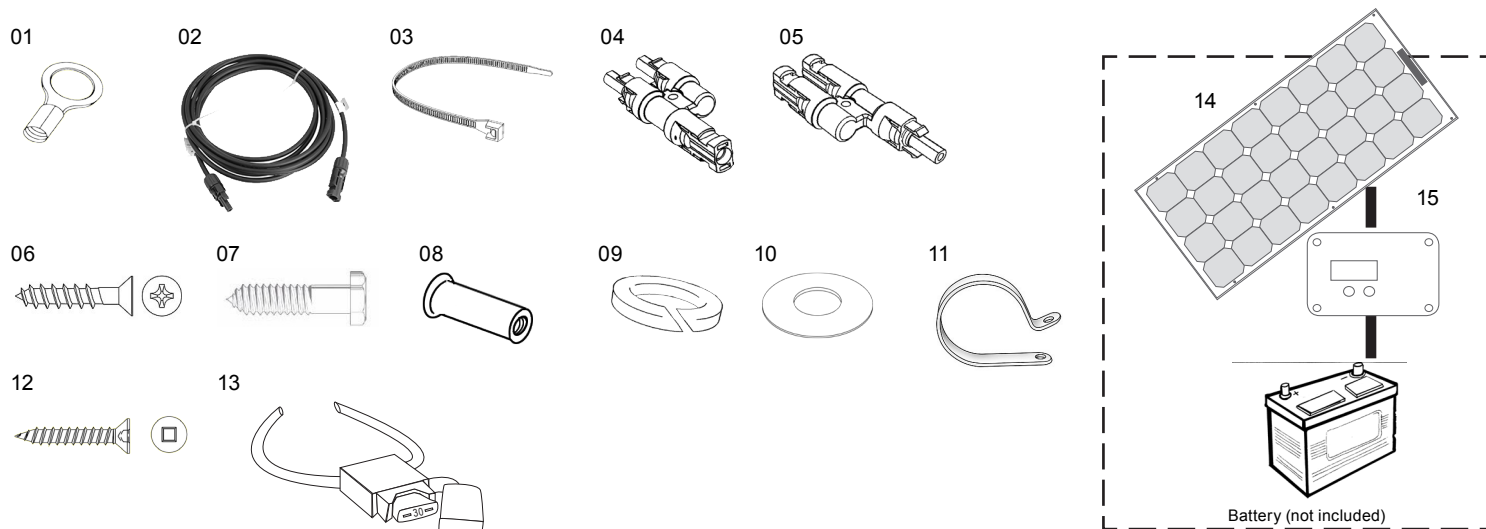
Please read and understand all instructions before installing your new product for the easiest and safest installation. Before installing the kit, please review all diagrams included in this manual. If you have any doubts as to this kit's compatibility with your RV, please contact your authorized Go Power! Dealer. It is advisable to retain this manual for future reference.

1.2 Warnings

	<p>Disconnect all power sources before attempting installation</p>	<p>Electricity can be very dangerous. Installation should be performed only by a licensed electrician or qualified personnel.</p>
	<p>Solar module safety</p>	<p>Photovoltaic modules generate DC electricity when exposed to sunlight or other light sources. Contact with the electrically active parts of the module, such as terminals, can result in burns, sparks and lethal shock whether the module is connected or disconnected.</p> <p>When modules are connected in parallel, amperages are additive. Consequently, a system assembled from photovoltaic modules can produce high amperages, which constitute an increased hazard. Do not touch terminals while module is exposed to light. Cover the module face completely with opaque material to halt the production of electricity when installing or working with modules or wiring.</p>
 	<p>Battery and wiring safety</p>	<p>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.</p> <p>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.</p>
	<p>Work safely</p>	<p>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.</p>
	<p>Observe correct polarity at all times</p>	<p>Reverse polarity of the battery terminals will cause the controller to give a warning tone. Reverse connection of the array will not cause an alarm but the controller will not function. Failure to correct this fault could damage the controller.</p>
	<p>Do not exceed the voltage and current ratings of the GP-PWM-30 Controller</p>	<p>The total current of the solar system is the sum of the short circuit current of the solar modules in parallel, multiplied by a safety factor of 1.25. The resulting system current is not to exceed the amperage rating of the controller. The voltage of the array is the rated open circuit voltage of the solar modules and is not to exceed 28 volts for a 12 volt system.</p> <p>The current rating of the solar system is the sum of the Maximum Power Current (Imp) of the solar PV strings in parallel. The resulting system Imp current is not to exceed 30A. If your solar system exceeds these ratings, contact your dealer for a suitable controller alternative.</p>

1.3 Parts Checklist

ITEM#	DESCRIPTION	MODEL:	GP-FLEX-100	GP-FLEX-200	GP-FLEX-100E
			QTY	QTY	QTY
01	Ring Terminal Battery Connector		2	2	0
02	50' MC4 Cable with Male and Female MC4 Connectors		1	1	0
03	Tie Wrap		6	6	6
04	Male (positive) MC4 Parallel Branch Connector		0	1	1
05	Female (negative) MC4 Parallel Branch Connector		0	1	1
06	#10 x 1" Wood Screws		6	12	6
07	#10 x 1.5" Machine Screws		6	12	6
08	#10 Well Nuts		6	12	6
09	#10 Lock Washers		6	12	6
10	#10 Flat Washers		6	12	6
11	3/8" Plastic Cable Clamps		6	12	6
12	#8 x 1" Screws for Cable Clamps		6	12	6
13	Fuse Holder Inline with 30A Fuse		1	2	1
14	Solar Flex Module		1	2	1
15	GP-PWM-30 Controller		1	1	0



1.4 Required Tools (Additional tools may be required)

- a. Phillips / Robertson Screwdriver
- b. Keyhole Saw
- c. Pencil or Marker
- d. Pliers
- e. Wire Strippers
- f. Wire Crimpers
- g. Electric Hand Drill
- h. 1/16 and 3/8 inch Drill Bit
- i. 5/16 and 7/16 inch Wrench
- j. Sealant

2.0 Wiring Modules with MC4 Cables

Solar Kits with MC4 cables contain a potted or sealed junction box with a positive and negative MC4 connector. This is referred to as an MC4 junction box. MC4 connectors are either positive or negative and each connector has its polarity symbol embossed close to the connection point. To extend a cable from an MC4 junction box, a polarity opposite connector must be used. E.G. a negative connector must plug into a positive connector in order to extend it. Please remember, the polarity of an MC4 cable wire run is the polarity symbol on the connector closest to the MC4 junction box. It is advisable to attach a polarity sticker to the positive extension cable in order to avoid confusion during installation.

2.1 Installing your 100 watt Solar Flex™ Kit (GP-FLEX-100)

Solar Kits containing a single module with MC4 cables will be equipped with a single 50' MC4 power cable that has both a male and female MC4 connection. This cable is meant to be cut in half leaving you with a 25' cable with a male MC4 and a 25' cable with a female MC4 connection. Refer to **Diagram-1**, "MC4 Power Cabels For Solar Flex™ Kits".

2.2 Installing your 200 watt Solar Flex™ Kit (GP-FLEX-200)

Solar Kits containing two modules with MC4 cables will be equipped with a 50' MC4 power cable, a negative MC4 parallel branch connector and a positive MC4 parallel branch connector. Refer to **Diagram-2**, "Wiring Parallel (2) Modules with MC4 Parallel Branch Connectors (GP-FLEX-200, GP-FLEX-100E)".

2.3 Adding a 100 watt Solar Flex™ Expansion Kit (GP-FLEX-100E)

Solar Expansion Kits containing a single module with MC4 cables will be equipped with a 50' MC4 power cable, a negative MC4 parallel connector and a positive MC4 parallel connector. Refer to **Diagram-2**, "Wiring Parallel Modules with MC4 Cables."

3.0 Routing Power Cable through the Fridge Vent

Locate the refrigerator vent on the roof of the RV. Remove vent cover to gain access to the duct opening. Refer to **Figure 1**. Retain vent-fastening hardware.

3.1 Method 1 – Hole in Side of Vent

Drill a hole through the side of the vent (5/8" hole). Insert a rubber grommet (not included) into the hole. Insert the power cable (already wired to the solar module) through the hole and carefully route it to the battery. Be certain to leave enough slack to allow cable routing from module to vent along desired path.

3.2 Method 2 – Through Screen Grid

1. Thread power cable (already wired to solar module) carefully through the screen and into opening. Enlarge screen grid hole if necessary.
2. Avoid strapping the power cable to existing wire between the module and the battery. Allowing a few inches of space between the power cable and existing wire will lessen the chance of voltage loss through thermal conduction. Use cable clamps with the #8 self-tapping screws and/or tie wraps every few feet along RV roof and interior route to battery.
3. Ensure all penetrations into the RV roof are watertight. Use an appropriate sealant as recommended by your RV Dealer to seal holes wherever necessary.
4. Replace vent cover.

4.0 Mounting the Solar Module

The solar modules may be horizontally mounted to the roof using the included screws or an adhesive sealant. Please contact your RV manufacturer for specifications on an appropriate adhesive. Panels are not recommended to bend beyond 30° (for 100 watt modules 30° = 2.7" / 69mm bend)

Warning: Using an adhesive can create a permanent mounting situation. It is strongly advised that placement is well thought out and that panel function has been tested before mounting. Go Power! and Carmanah Technologies is not responsible for damage caused the by removal of Solar Flex™ modules.

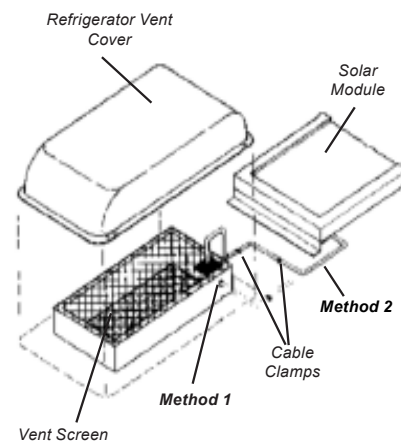


Figure 1

Caution:
 The vent screen may have sharp edges or burrs.

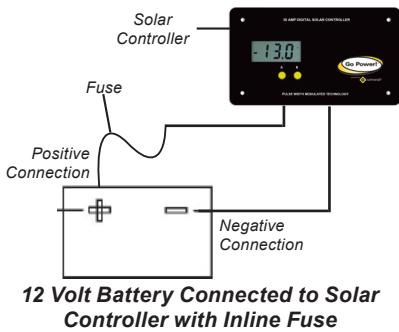
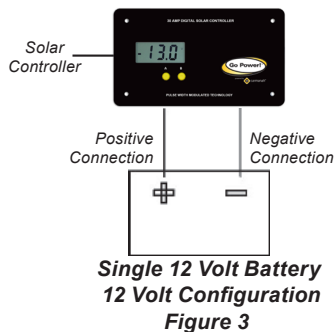


Figure 2



Single 12 Volt Battery
 12 Volt Configuration
 Figure 3

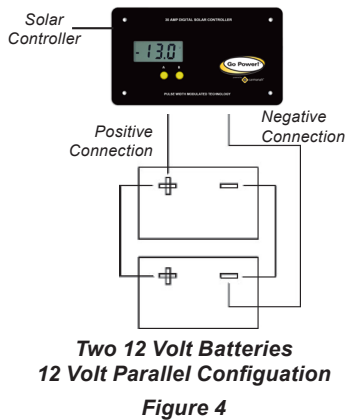


Figure 4

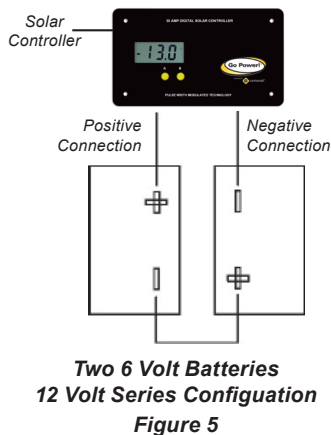


Figure 5

5.0 Installing The GP-PWM-30 Solar Controller

The GP-PWM-30 is included in all Go Power! Solar Flex™ Kits mentioned in this manual, except for the GP-FLEX-100E Expansion Kit.

The GP-PWM-30 protects the battery from overcharging. A condensed version of the installation instructions appear below. Please read the full installation manual included with the GP-PWM-30 Solar Controller before installing.

1. Disconnect or cover the solar modules and disconnect the batteries before commencing the GP-PWM-30 wiring.
2. Run the solar module power cable to the location of The GP-PWM-30. **Do not connect the wires to the controller or the batteries. Identify the polarity of the wires located on the battery and solar module (positive and negative).** Use coloured tape or mark wire ends with tags. Contacting the leads of the controller in reverse polarity, however brief, will cause the controller to go into lock out mode and the solar controller will need to be reset.
3. Kits include a fuse holder with an inline 30A fuse to protect the wire between the battery and solar controller. Install your inline fuse as close to the battery as possible before connecting the solar controller to the battery terminal. See **Figure 2: "12 Volt Battery Connected to Solar Controller with Inline Fuse"**.
4. Wire the controller according to the terminal identification on the back of controller, starting with the battery connections. Tighten the positive and negative battery connections and then set the battery type (see controller manual for instruction). Then, connect and tighten the positive and negative solar module connections.

5.1 Mounting The GP-PWM-30 Controller

The GP-PWM-30 should be mounted in a location relatively close to the battery, but easily seen for monitoring system operation. Wires must be run from the solar module to the controller and then to the battery. The GP-PWM-30 is designed to be flush mounted on the side of a cabinet or wall where the wiring can be accessed from the back. Allow two to three inches behind the unit. **The controller should be mounted indoors, in a dry location.**

1. Select a suitable location for the installation of the controller. Run the power cable from the solar module to the location selected.
2. Use the template included in the GP-PWM-30 Manual to mark the four mounting holes and the "cutting line for flush mounting". Drill the mounting holes. Use a keyhole or jig saw to cut along the rectangular outline you marked.
3. Wire the controller as shown in the GP-PWM-30 Manual. Use the leftover power cable to connect the controller to the batteries.
4. Mount the controller to the wall using the four screws provided in the GP-PWM-30 box. Ensure the back of the controller is protected from damage by any object.

6.0 Connecting to the Battery & Solar Array

It is recommended to connect directly to the battery wherever possible. You can also connect to the converter/charger where the battery positive and negative wires connect to the converter.

1. Clean all corrosion from battery terminals before proceeding. Crimp ring terminals onto the negative and positive wires of the power cable to be attached to the battery.
2. Attach the negative (black) wire's 3/8" ring terminal to the RV battery. Check all electrical connections and apply a protective coating to battery terminals.

6.1 Typical Battery Connection

1. Single 12 Volt battery connection (See **Figure 3**)
2. Parallel 12 Volt battery connection (See **Figure 4**)
3. 2 x 6 Volt series battery connection (See **Figure 5**)

7.0 Warranty Return Procedure

This product is covered by Carmanah Technologies (Go Power!) standard warranty. Visit gpelectric.com for additional information.

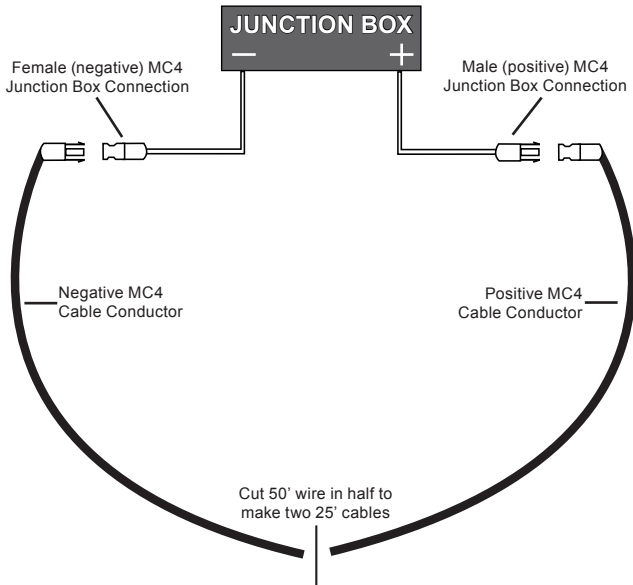
Before contacting Go Power!'s customer service department, please visit gpelectric.com to read the "frequently asked questions" section of our website to troubleshoot the problem. If trouble persists:

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

8.0 Diagrams

Diagram 1:

MC4 Power Cables For Solar Flex™ Kits



The MC4 power cable is usually the final connection between the solar array and the solar controller. If it has not already been done, cut the MC power cable into two pieces so that there is a positive conductor cable and negative conductor cable.

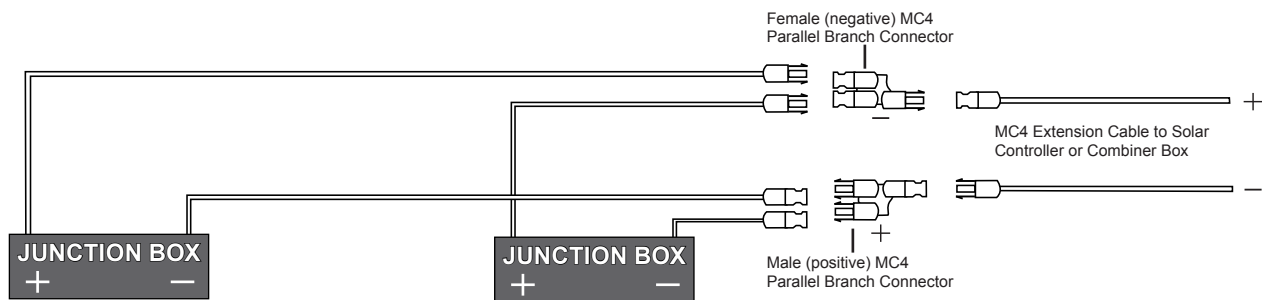
1. Cover the solar module(s) with an opaque material. Attach the appropriate MC4 power cable conductor to the positive and negative connectors of the MC4 junction box. If you have more than one module, refer to the specific diagram for wiring a parallel MC4 connection.
2. Run the positive and negative MC4 cable conductors from the solar array to the solar controller. Attach a positive polarity label to the end of the positive conductor. If the positive conductor needs to be shortened and the polarity label is removed, remember to re-label it as both positive and negative conductors look exactly the same. Leave a few feet of cable at the solar controller in case of future adjustment.

Note:

Solar module junction box and MC4 cables may not be exactly as shown.

Diagram 2:

Wiring Parallel (2) Modules with MC4 Parallel Branch Connectors (GP-FLEX-200, GP-FLEX-100E)



Note:

Solar module junction box and MC4 cables may not be exactly as shown.



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