Stalker PMG | Pole Mounted Graphics Display

Installation Guide

12”, 15”, and 18” digit height models

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1.0 Introduction

Congratulations on your purchase of the Applied Concepts' Pole Mounted Graphics Display (PMG)!

This powerful, innovative product, coupled with the included data analysis software or with a subscription to the Stalker Street Dynamics Web Portal, represents the latest in Changeable Message Signs paired with multi-lane, multi-direction traffic flow pattern sensing, recording and analysis technology.

Once positioned correctly adjacent to a roadway, properly configured and activated, the PMG will operate unattended to display your selected messages, sense, and record traffic patterns 24 hours a day.

Messages displayed on the PMG can be changed either through the Street Dynamics Web Portal or locally via the included PC application depending on your configuration. Traffic data is automatically uploaded to the Web Portal with your subscription or can be retrieved locally with the included USB drive if so configured.

The recorded statistics can then be analyzed either online via your subscription to the Street Dynamics Web Portal or locally on your own PC via Easy Analyst if you are not a subscriber. Both the Web Portal and the Easy Analyst software allow the user to evaluate the collected data; scrutinize and document traffic speeds, volume, and patterns; and generate survey reports with detailed graphs and other customizable visual depictions of the recorded statistical data.

2.0 Pre-Installation Guidelines

2.1 Traffic Detection Principles of Operation

The Stalker PMG is designed to detect the speed, direction, and size of vehicles in a multi-lane, bi-directional scenario. A radar-based speed detection device such as the PMG works by emitting high-frequency, low power radar waves which strike a vehicle's surface and are reflected toward the emitter. The PMG receives and analyzes the returned signal and, utilizing a principle called the Doppler Effect, is able to very accurately determine the speed and direction of travel for the target vehicle. Depending upon the strength of the returned signal, the PMG is also able to determine the size classification of the vehicle from which the signal is reflected. During normal operation, the system performs this function several times a second and can analyze the reflected signals from several vehicles at once.

2.2 Moving versus Non-moving Traffic Detection

The PMG and other radar-based traffic tools can only determine the speed, direction, and rough size classification of a vehicle or vehicles in motion. If the PMG were to be mounted in a location with an intersection or traffic stop signal within the sensor's field of view, for instance, some of the data collected would be inaccurate because the PMG would "see", count, and record moving vehicle(s) as they approached the intersection or stop signal. Once the vehicle(s) come to a stop, the PMG is no longer be able to detect a Doppler change in the returned signal and the stopped vehicle(s) essentially become invisible to the sensor. When the traffic signal changes and traffic begins to move again, the PMG once again detects the moving vehicle(s), but the system considers the vehicle(s) as new and separate vehicle(s) and adds them to the total vehicle count per time period. This, in effect, causes errors in the Vehicle Count Data recorded. It is therefore best to locate a stationary radar-based PMG beside a roadway with free-flowing traffic and no stops or intersections within the unit's field of view.

2.3 Pole Mounting Options

Using the included pole mount hardware, it is possible to mount the PMG and its accessories onto many different types of poles.

A PMG with the Quad Bay Battery Backpack should be installed to a round pole of diameter of at least 4". If freestanding, the pole should be anchored to an appropriate pad. You can also mount the PMG to a utility pole. If square poles are used, they should be installed as a pair, with a set of horizontal cross-members stabilizing the structure. The poles should be installed on a concrete pad.

A PMG without the integrated Quad Bay Battery Backpack should be installed to a round pole of diameter at least 2 3/8 inch". Freestanding poles should be anchored to an appropriate pad, or the unit can be attached to a utility pole. A single square pole can be used, provided that the pole is 2 ¼ inch square minimum and installed on a concrete pad.

2.4 Mounting Height

PMG sign and its accessories should be mounted according to MUTCD stipulated heights depending on where the sign is located. Please refer to the most current MUTCD release for specific details.

2.5 Other Site considerations

When choosing a location for deployment of the PMG, the following should be reviewed for best results:

- Do not place the PMG too close to an intersection to avoid false triggering on stop and go vehicles.
- Avoid areas where there are trees in the line of sight of the radar, as these can cause false targets and inflate the vehicle count.
- Avoid areas where there is cross-traffic, as this will cause the vehicle count to be inflated due to traffic moving perpendicular to the target area.

3.0 Hardware Install

The following sections are arranged in a suggested order of install.

3.1 PMG Sign Surround OPTIONAL

You should install the optional surround on your sign prior to installing it in your chosen location.

3.1.1 For Units Without the Quad-Bay Battery Backpack

Installing surround bezel panels on a 12”, 15”, or 18” PMG.

Part Number: 200-1369-0X 12-Inch
Part Number: 200-1369-1X 15-Inch
Part Number: 200-1369-2X 18-Inch

Included with the surround bezel are six (6) mounting brackets and six (6) Phillips machine screws that attach the surround to the PMG.

Figure 3-1

Step 1 -
With PMG removed from pole:

Install top and bottom welded brackets to the PMG between the unit and the vertical mounting bracket. (Figures 3-1 & 3-2)

Figure 3-2

Step 2 -
Lay PMG down, LED side up.

Step 3 -
Place surround on the PMG front and secure with two (2) supplied Phillips screws, top and bottom center. (Figure 3-3)

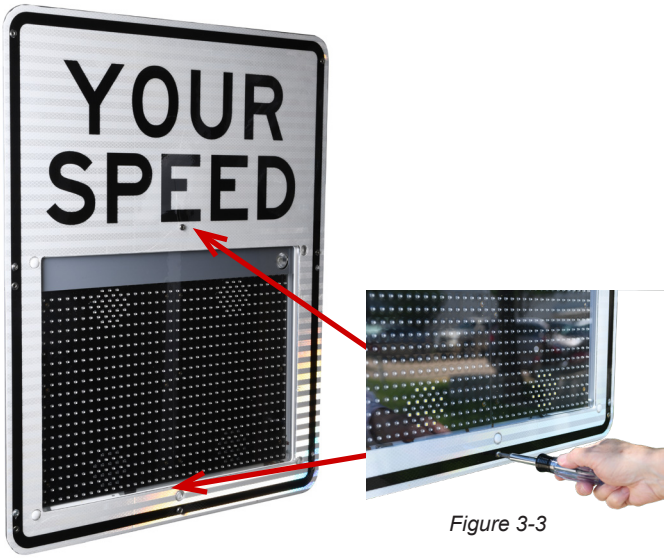


Figure 3-3

Step 4 -
Flip the PMG over, LED side down. Attach four (4) clamps, two (2) each left and right, with supplied Phillips screws inserted through the front of the surround. (Figure 3-4)

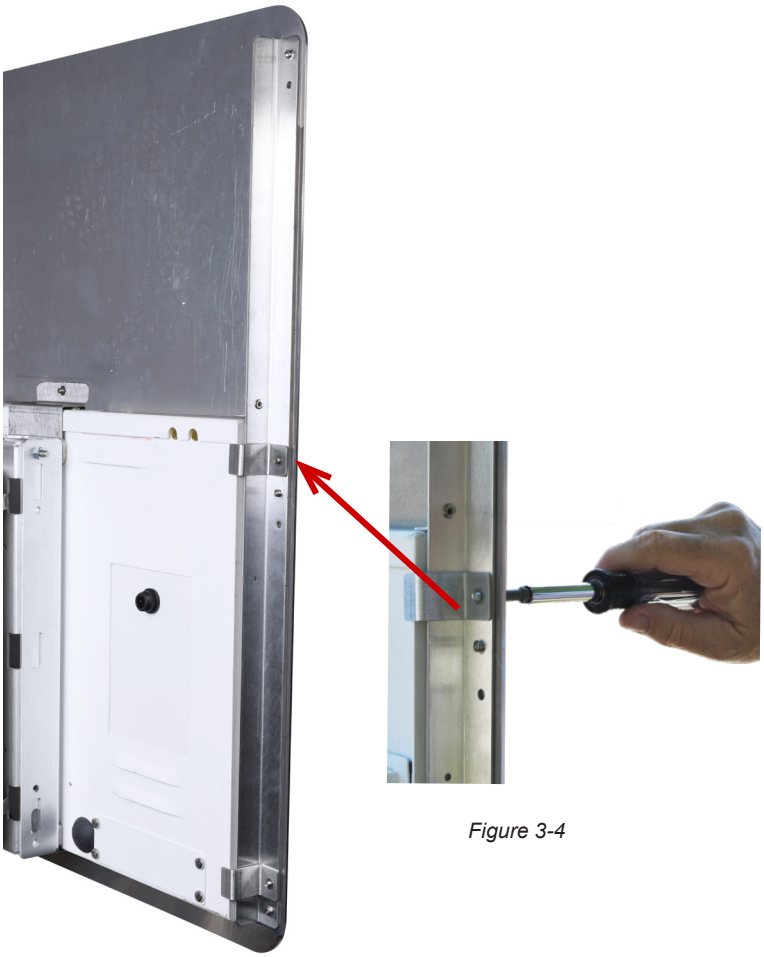


Figure 3-4

3.1.2 For Quad-Bay Battery Backpack-Equipped Units

Installing surround bezel on a 12”, 15”, or 18” PMG with Quad-Bay battery PMG.

Part Number: 200-1369-5x 12-Inch
Part Number: 200-1369-6x 15-Inch
Part Number: 200-1369-7x 18-Inch

Included with the surround bezel are (6) mounting brackets and Phillips machine screws that attach the surround to the PMG. (9) screws for 12”, (11) screws for the 15” and 18”.

Figure 3-5

Figure 3-6

Step 1 - Support Brackets
12” Version:
Install the top and bottom angled brackets to the Quad-bay housing and the PMG as shown. (Figures 3-5 and 3-6) Top and bottom brackets are identical.

15” and 18” Versions:
Install the top bracket to the Quad-bay housing and the PMG as shown. (Figure 3-7)

Install the lower bracket to the PMG as shown by first removing the (2) screws from the welded strut. (Figure 3-8)

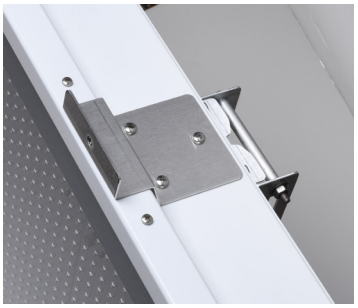


Figure 3-7

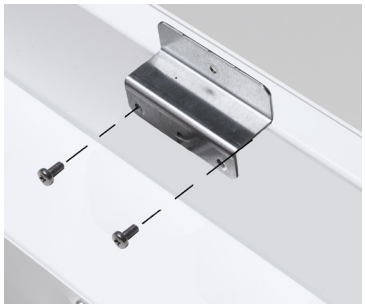


Figure 3-8

Step 2 - Pole Mount Bracket
Attach the pole mount bracket to the back of the Quad-bay battery housing by installing screws top and bottom. (Figures 3-9 and 3-10)

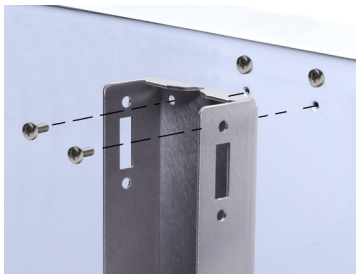


Figure 3-9

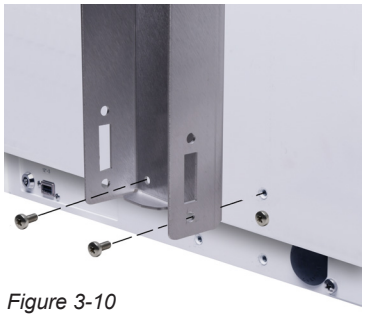


Figure 3-10

Step 3 -
Lay the PMG down with LED facing up.

Step 4 -
Place surround on PMG front and secure with two (2) supplied Phillips screws, top and bottom center. (Figure 3-11)

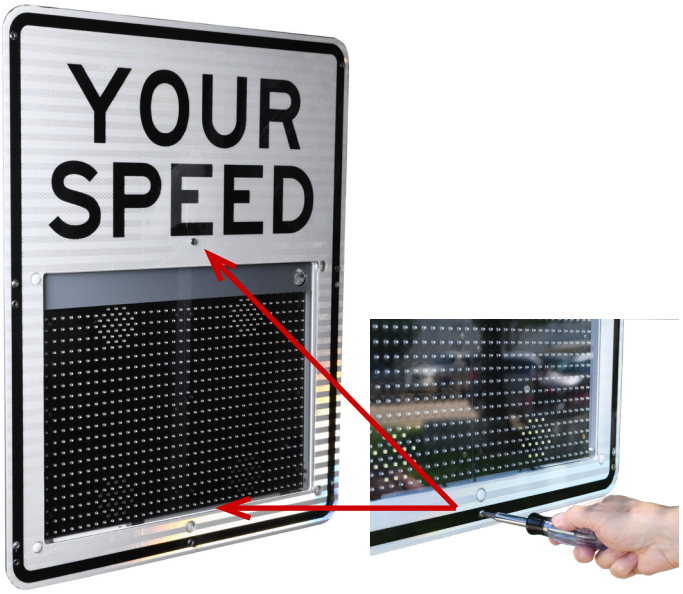


Figure 3-11

Step 5 -
Attach four (4) clamps, two (2) each left and right, with supplied Phillips screws inserted through the front of the surround. (Figure 3-12)

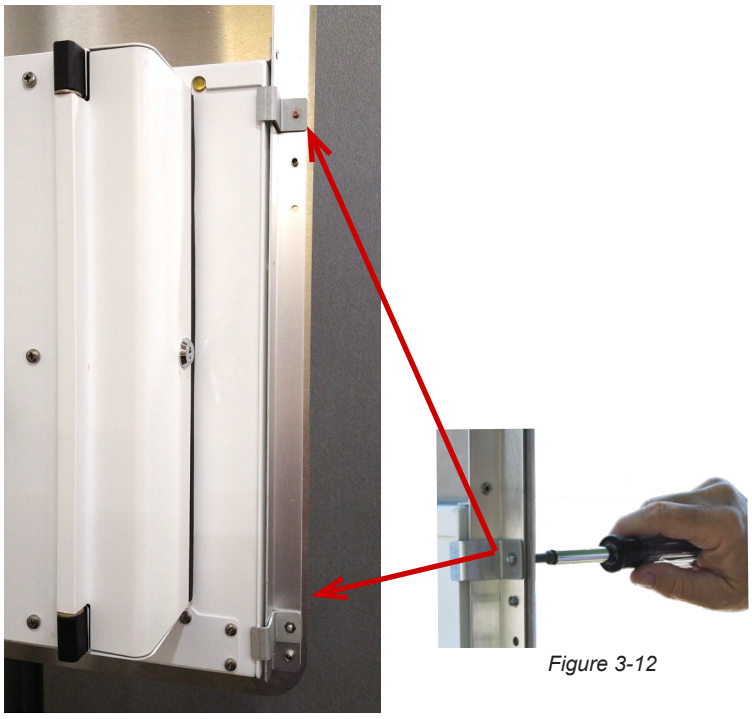


Figure 3-12

3.2 Mounting the PMG to a Pole OPTIONAL

Step 1 -
Install pole bracket using bolts, screws, or straps.

Step 2 -
Install PMG to Pole Bracket via pre-installed bolt on PMG side bracket. Then rotate into position.

Step 3 -
Secure with bolt and lock.

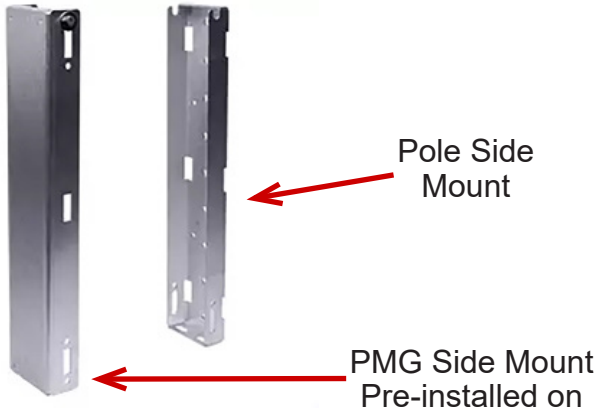


Figure 3-13

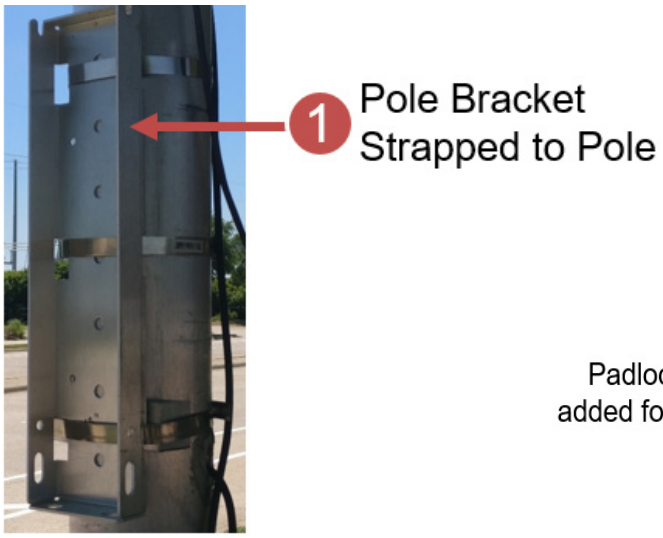


Figure 3-14

Figure 3-15

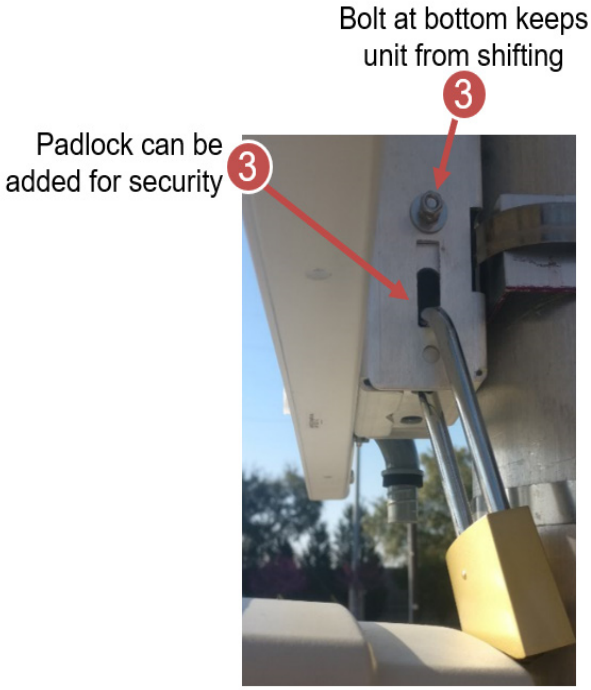


Figure 3-16

3.3 Solar Panel Installation OPTIONAL

3.3.1 Attach the Arm to the Solar Panel

Lay solar panel face down on a smooth, protected surface.

Using a bolt, lock washer, and washer, attach the stationary panel clamp to the arm, tighten loosely. Then, bolt the upper (sliding) panel clamp to arm also using a bolt, lock washer, and washer, tightening loosely. (Figure 3-18)

Center the arm on the back of the panel as shown and position the lower panel clamp under the edge of the panel's lower flange. Make sure that the clamp bolts are resting against the panel's flange before tightening. (Figure 3-19)

Repeat the process with the upper (sliding) panel clamp. Be sure to push the panel clamp tightly under the panel's flange for a secure fit. Make sure the clamp bolts are resting against the panel's flange before tightening.

Figure 3-17

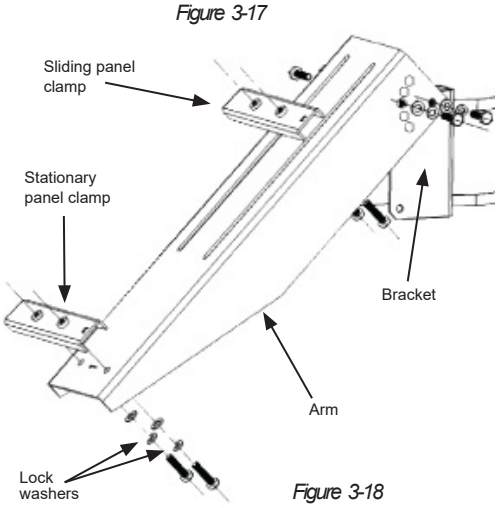


Figure 3-18

3.3.2 Mount the Bracket to the Pole

Square utility pole:
First, determine the direction the solar panel will face for maximum sunlight exposure. Attach the square pole adapter to the pole using the (2) bolts. Then thread each hose clamp through the slots and place the bracket on the pole as shown below and tighten. Align the direction of the solar panel as necessary.

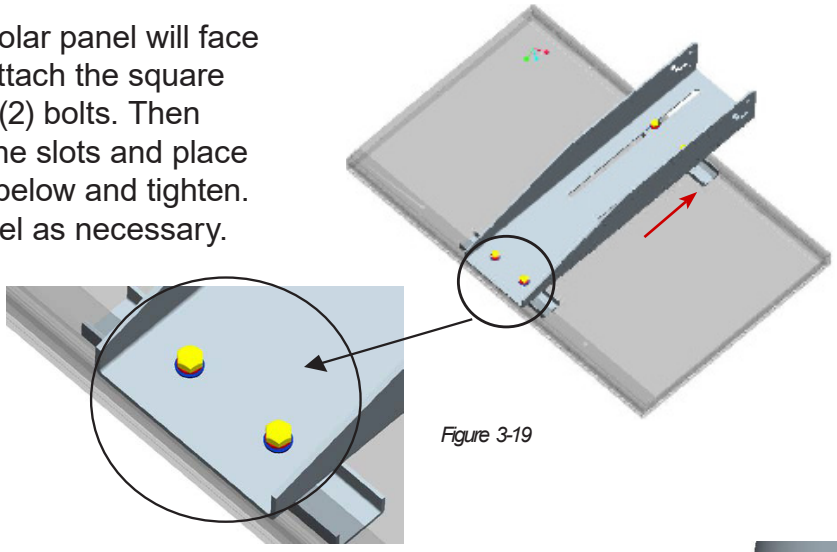


Figure 3-19

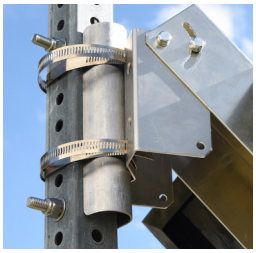


Figure 3-20

Figure 3-21

Round utility pole:

Thread each hose clamp through the slots and mount the bracket on the pole as shown.

Wooden pole:
Screw the bracket directly to the wooden pole.

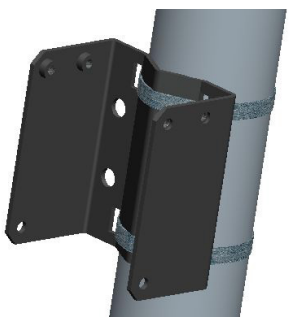


Figure 3-22

3.3.3 Attach Arm to the Mounting Bracket

First, attach the arm to the bracket using a bolt and washer into the pivot hole on both sides. Tighten loosely.

Insert bolts into the adjustable slot on both sides raising the solar panel to the proper angle. Tighten.

Tighten pivot bolts on both sides.

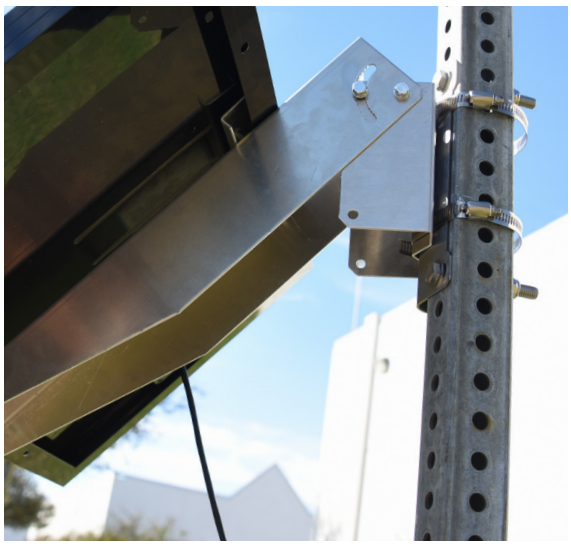


Figure 3-23

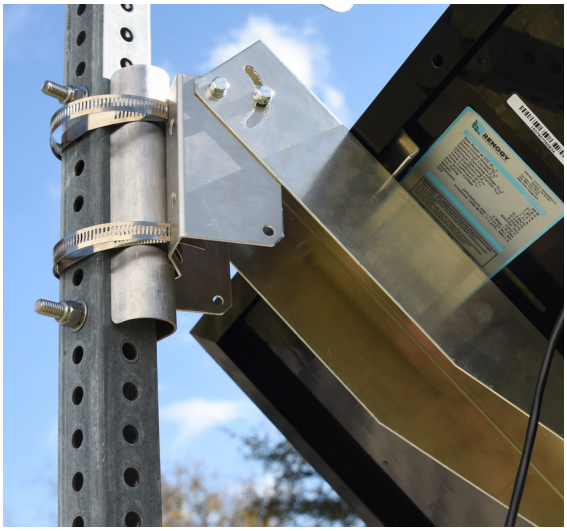


Figure 3-24

3.4 Battery Boxes

3.4.1 All Metal Battery Box Installation OPTIONAL

Note: This installation is only needed if the All-Metal Battery Box option was ordered.

The battery box kit comes complete with all the brackets and hardware necessary for installation. *Note: the battery and cables are not included. The battery shown is for reference purposes only.*

We recommend a Group 24 battery of at least 70Ah for most areas. The battery box will accept batteries up to Group 27 dimensional size.

Figure 3-25

The battery cable can be purchased from Stalker as part number 155-2535-04. It is 4 ft long and has a fused positive lead. This cable requires an adapter to mate to the standard group 27 battery lugs.

Step 1 - Select an Appropriate Mounting Location
Your battery box must be located close enough to the PMG to allow for the battery cable to be connected. Select an appropriate location where the battery cable can be affixed to the supporting pole according to your local regulations.

Step 2 - Mount the bracket

Figure 3-26

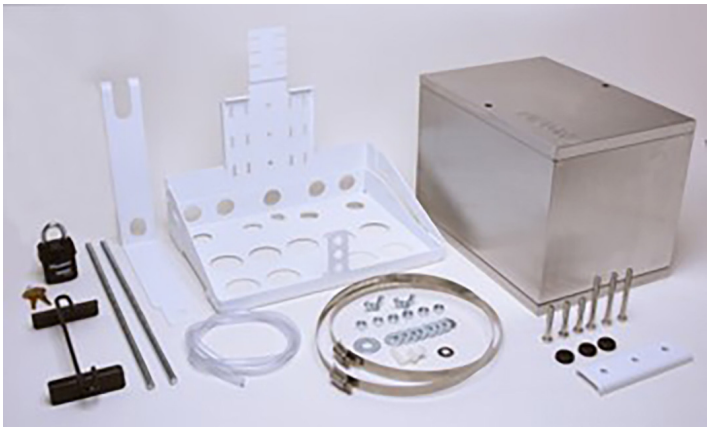


Figure 3-27

The battery box may be installed on several types of poles or structures with hardware specific to that installation. For the common square pole with predrilled holes, use either (3) supplied 2” or 3” hex bolts and the retainer plate. (Figure 3-28)

For a round or solid square pole, thread the metal banding through the bracket as shown in Figure 3-29.

Figure 3-28

Figure 3-29

Step 3 - Install the box

1. Lay the box bottom in place, and using the threaded stock, attach the box bottom to the bracket using washers and nuts both above the box bottom and on the underside of the bracket.

Figure 3-30

Figure 3-31

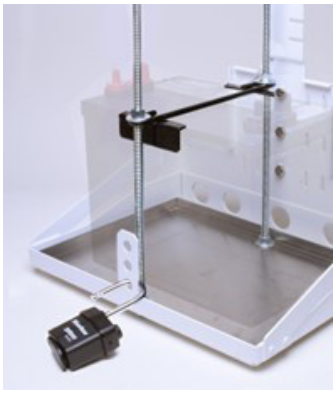


Figure 3-32

2. Place the battery onto the box bottom and secure in place using the battery hold-down bracket with nuts and washers.
3. Loop the padlock through the bottom hole of the lock bracket, but don't fasten the lock.

4. Slide the battery box sides in place, making sure to fit the tabs securely into the box bottom.
5. Install the (2) rubber grommets into the slots at the rear of the box.
6. Do not install the battery wiring at this time, this will be covered in the Power section.

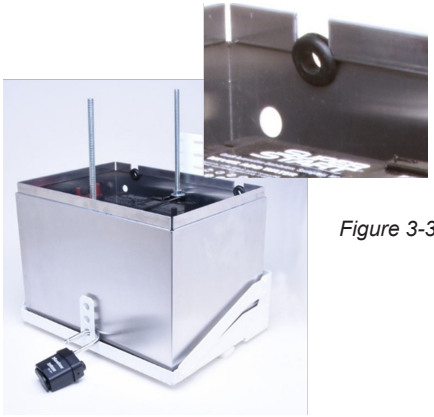


Figure 3-33

3.4.2 PMG Small Battery Box OPTIONAL

Note: This installation is only needed if the Small Battery Box option was ordered.

The battery box kit comes complete with all the brackets and hardware necessary for installation. It also includes the battery cable. *Note: the battery is not included.*

Figure 3-34

Step 1 - Select an Appropriate Mounting Location
Your battery box must be located close enough to the PMG to allow for the battery cable to be connected. Select an appropriate location where the battery cable can be affixed to the supporting pole according to your local regulations.

Step 2 - Mounting bracket orientation
The mounting bracket needs to be oriented so that the tabs are facing up.

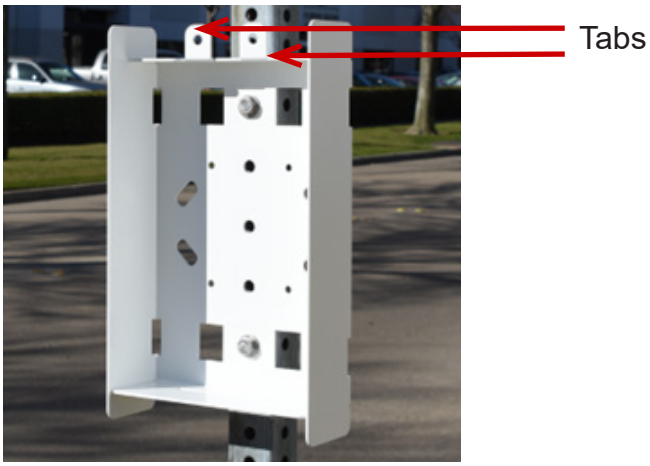


Figure 3-35

Step 3 - Mounting options
The Small Battery Box comes with hardware to attach to various pole types. Use the appropriate hardware for your mounting location.

Sign Posts
For optimum security, orient the Hex Cap Bolts as shown with the Lock Nuts inside the bracket when assembled.

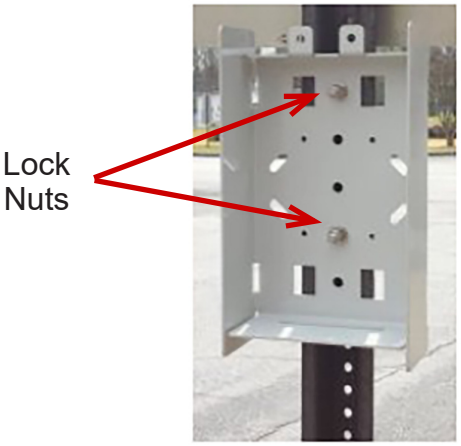


Figure 3-36

Figure 3-37

Figure 3-38

Utility Poles using screws
Use the 2 furthest separated holes for the screws when attaching to a wooded pole.

Figure 3-39

Figure 3-40

Figure 3-41

Utility Poles using adjustable steel straps

For optimum security, position the strap screw adjustment points inside the Pole Backing Plate Assembly as shown below.

Figure 3-42

Figure 3-43

Figure 3-44

Step 4 - Battery box installation

The battery box itself is slid into the mount from the top so that the tabs on the bottom of the battery box slide into the slots on the mount and the tabs on the mount slide into the slots on the battery box top. Do not install the battery yet. Installation of the battery will be covered in the Power section.

Step 5 - Securing the box to the mount

The battery locks onto the mount with the larger of the supplied padlocks. It can be attached to any of the holes in the protruding upper or lower tabs.

3.5 Trailer Hitch OPTIONAL

3.5.1 Description

PMG Trailer Hitch Mount Package (#200-1331-00) shown.
The package includes hitch mount, locking pin, power cable, and cable clips. *PMG not included.*

Note: Trailer Hitch Mount is shown with PMG attached for illustration purposes only. PMG sign is not included.

IMPORTANT SAFETY WARNING

You must dismount the hitch when driving the vehicle.

Figure 3-45

3.5.2 Installation

Requires a 2” square hitch receiver.

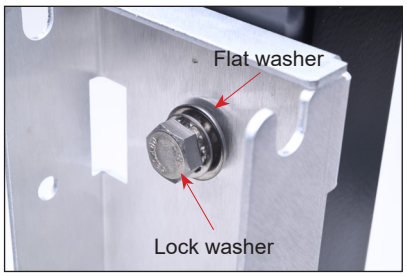


Figure 3-46

When attaching the sign bracket to the PMG Trailer Hitch Mount, position the flat washer against the bracket and the lock washer between the 9/16” bolt head and flat washer.

Figure 3-47

Use the locking pin whenever the PMG Trailer Hitch Mount is in use. Use caution when removing the mounted PMG. Always lift with legs.

Figure 3-48

The PMG power cable connects to the sign and vehicle’s cigarette lighter receptacle. Self-adhesive clips are included to secure the cable.

4.0 External Accessories

The following sections covers external accessories for the PMG and their interconnection to the PMG.

4.1 General Purpose IO (GPIO) OPTIONAL

The PMG can be ordered with an optional General Purpose IO (GPIO) module installed. GPIO allows the PMG to act upon signals from external sources, send signals to external devices, and to provide power for simple devices like detection circuits or relays.

The GPIO port is located on the back of the PMG on the key-switch panel. In the following image it is the connector on the right, depending on your ordered configuration the ports on the key-switch panel will vary.

Figure 4-1

Four (4) separate paired channels are available on the GPIO module. The configuration of the channels must be preconfigured at time of manufacturing the PMG. Available configurations for GPIO are as follows (additional configuration may be added in the future).

Configuration Name	IO-1	IO-2	IO-3	IO-4
2 In, 2 out	Input	Input	Output	Output
0 In, 3 Out, 12V	Output	Output	Output	12V
1 In, 2 Out, 12V	Input	Output	Output	12V

Figure 4-2

4.1.1 GPIO Inputs

The GPIO input pins allow the PMG to respond to signals sent to it by external sources. When enabled and activated, the display and actions configured for that input will override any other setting in the PMG.

4.1.1.1 Usage

The GPIO input ports are arranged with a preset priority to allow for one signal and its associated actions to take priority over another. In the case where multiple inputs are being detected simultaneously, lower port numbers have higher priority even regardless of when the first signal started. Input Port 1 (IO-1) has the highest priority and overrides all other inputs, Input Port 2 (IO-2) is next, then Input Port 3 (IO-3), and Input Port 4 (IO-4) has the lowest priority.

Input configuration settings set on either the PC tool or via Street Dynamics Web Portal:

- Select Enable to allow the input to be used to trigger an action.
- Select the Active State as either Low or High. This is the state that will initiate the PMG response.
- Select the Duration in seconds of how long the response will be active. 0 = while the input is in the Active State.
- Select what to Display on the PMG during the active state. If needed, select a File the active state will activate.
- Select which Action the sign is supposed to perform during the active state.

4.1.1.2 Wiring

All inputs are optically isolated from each other and from the PMG. Their proper connections are shown below. The inputs do have a DC polarity that must be followed in order to operate correctly. The inputs are protected from the application of reverse voltages.

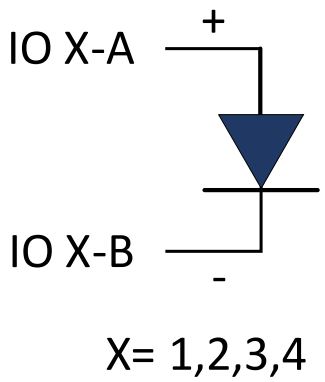


Figure 4-3

Valid inputs are defined as:

• Maximum input voltage	24 Volts
• Minimum logic high	3.5 Volts
• Maximum logic low	2.0 Volts
• Maximum current (logic high)	10 ma ±1 ma
• Turn on time	less than 10 milliseconds
• Turn off time	less than 10 milliseconds

4.1.2 GPIO Outputs

The GPIO output pins allow the PMG to signal external equipment. The source of this action can be a speed limit violation, an alert speed violation, or some other PMG internal option.

4.1.2.1 Usage

Output configuration Settings set on either the PC tool or Street Dynamics website:

- Select Enable to allow the output to be triggered by the PMG.
- Set the Active State to Open or Closed.
- Select the Duration in seconds of how long the output will be kept in the Active State. 0 = while the trigger condition exists.

4.1.2.2 Wiring

Each Output IO Port consists of a pair of output lines. Those two output lines are either shorted (closed) or unconnected (open) depending on the state of the Internal switch.
All outputs are optically isolated from each other and from the PMG. The outputs are not polarity sensitive and can work with low voltage AC sources. The connections are shown below.

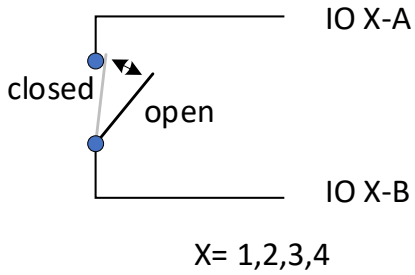


Figure 4-4

Output characteristics:

• Output type	Contact Closure
• Maximum voltage	60 VDC, 40 VAC
• Maximum current	100ma
• Maximum power dissipation	200mW
• Internal current protection	fast blow, resettable fuse

4.1.3 Power Options

The GPIO module can be ordered with option to provide power to an external device. With this option, IO-4 is converted to supplying 12V DC power. The power can be used to power an external device that is used to provide or receive the other IO signals.

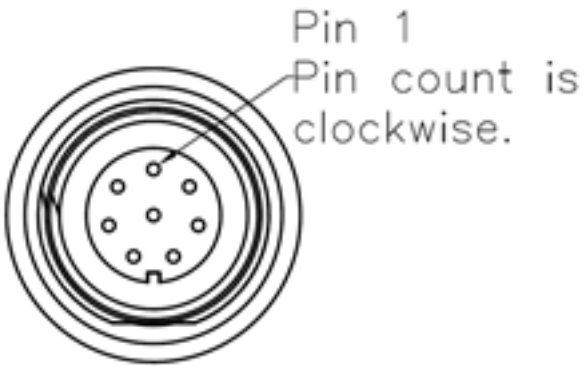
The IO 4-A pin becomes power and IO 4-B pin is the ground connection. The power is fused with a 100mA fast-blow fuse.

4.1.4 GPIO External Wiring OPTIONAL

PMGs with the GPIO option will have a connector on the connector panel in the back for attaching the inputs and outputs. Each input/output pair is assigned to pins as shown below. The specific GPIO option purchased determines if that pin pair is an input or an output as referenced above.

Pin Number	*Connection*
1	IO 4-A or power
2	IO 4-B or ground
3	IO 1-A
4	IO 1-B
5	IO 2-A
6	IO 2-B
7	IO 3-B
8	IO 3-A

Figure 4-5



Looking into connector on PMG

Figure 4-6

Two (2) kits are available for the creation of cables compatible with the connector on the rear of the PMG. GPIO Socket Connector Kit (200-1206-69) is included when you purchase the optional GPIO component.

GPIO Socket Connector	200-1206-69
GPIO Pin Connector	200-1206-86

Figure 4-7

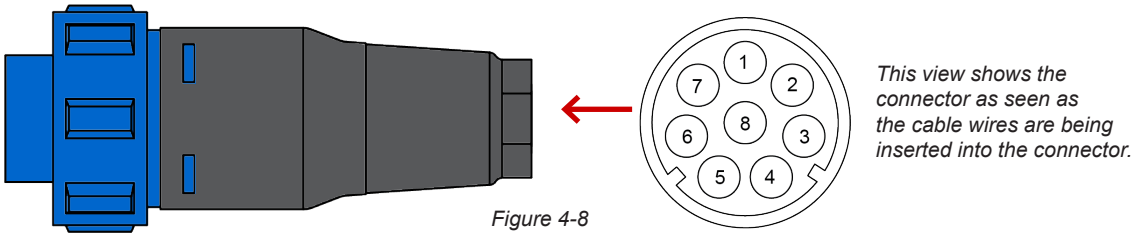
4.1.5 GPIO Socket Connector OPTIONAL

Socket Connector - PX0410

(ACI PN# 200-1206-69)

Cable selection and general instructions

- Cable selection - if needed, should be selected based on the application. Cable diameter must be between .118” (3.0mm) and .275” (7.0mm). The wires should be between 22 AWG and 26 AWG. For CAN Bus cables, twisted pair cable should be used.
- When assembling the cable, choose the correct cable gland and collet set from the sealing packs for the cable diameter being used. This is important in order for the connector to meet IP67 water protection.
- Cut your cable to the desired length. Strip the connector end according to the instructions on the back side of this sheet.
- The contacts must be soldered to the ends of the wires.
- Assemble the connector to the cable following the instructions on the back side of this sheet.



This view shows the connector as seen as the cable wires are being inserted into the connector.

Figure 4-8

PX0410 Flex Connector
(200-1206-69)

Pin Assignment		
Pin Number	GPIO Pin Name	CAN Pin Name
1	IO4A or POWER	CAN-L
2	IO4B or GND	CAN-H
3	IO1A	N/C
4	IO1B	N/C
5	IO2A	N/C
6	IO2B	GND
7	IO3B	GND
8	IO3A	N/C

Figure 4-9

Assembly/Wiring Instructions

Step 1 -
Thread the clamp nut, collet, gland, and body moulding onto the cable. Also thread on the sealing cap retaining straps if using sealing caps with the flex connectors.

Note:
When using Flex Connector PX0410, also be sure the locking ring is fitted over the Carrier Housing.

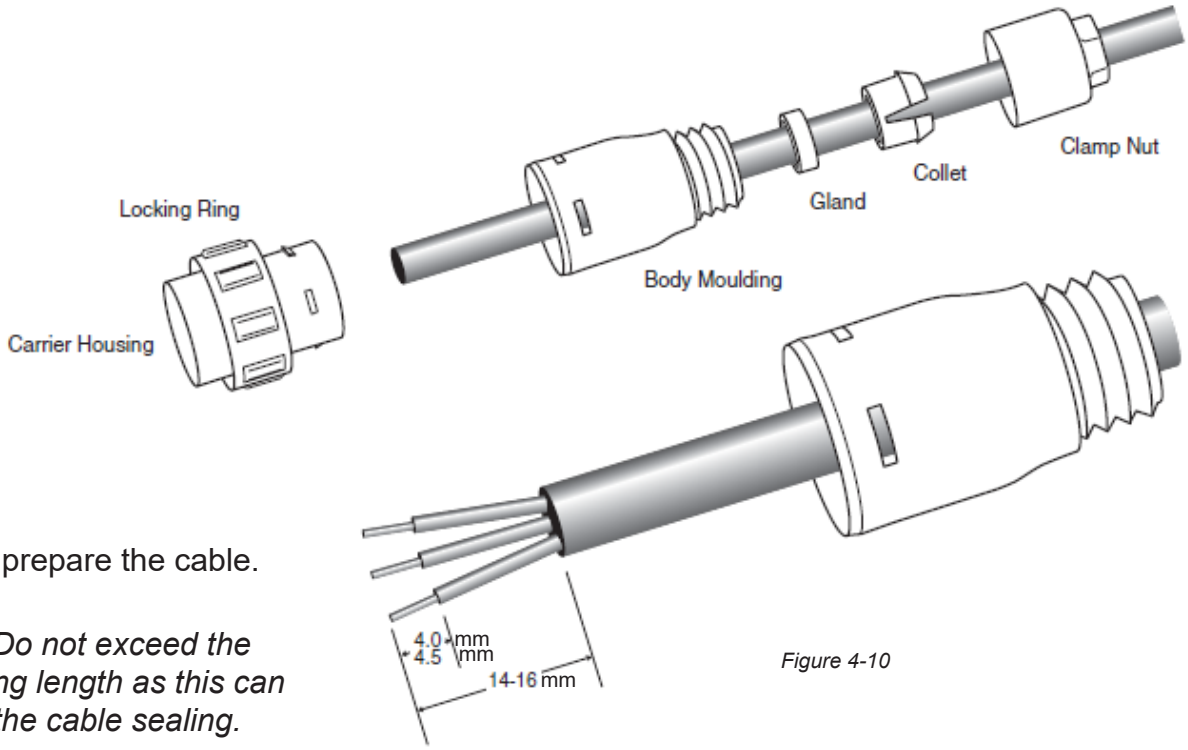


Figure 4-10

Step 2 -
Strip and prepare the cable.

Note: Do not exceed the stripping length as this can effect the cable sealing.

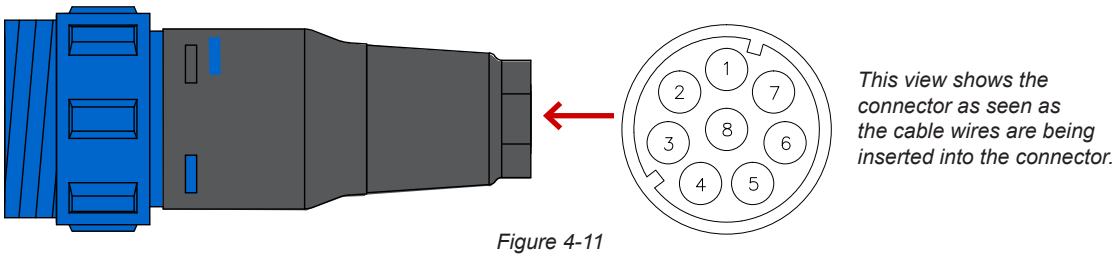
4.1.6 GPIO Pin Connector OPTIONAL

Pin Connector - PX0411

(ACI PN# 200-1206-86)

Cable selection and general instructions

- Refer to PMG Operator Manual (011-0269-00) for detailed information about the wiring options.
- Cable selection - if needed, should be selected based on the application. Cable diameter must be between .118” (3.0mm) and .275” (7.0mm). The wires should be between 22 AWG and 26 AWG. For CAN Bus cables, twisted pair cable should be used.
- When assembling the cable, choose the correct cable gland and collet set from the sealing packs for the cable diameter being used. This is important in order for the connector to meet IP67 water protection.
- Cut your cable to the desired length. Strip the connector end according to the instructions on the back side of this sheet.
- The contacts must be soldered to the ends of the wires.
- Assemble the connector to the cable following the instructions on the back side of this sheet.



This view shows the connector as seen as the cable wires are being inserted into the connector.

Figure 4-11

PX0411 Flex Connector
(200-1206-86)

Pin Assignment		
Pin Number	GPIO Pin Name	CAN Pin Name
1	IO4A or POWER	CAN-L
2	IO4B or GND	CAN-H
3	IO1A	N/C
4	IO1B	GND
5	IO2A	N/C
6	IO2B	GND
7	IO3B	GND
8	IO3A	N/C

Figure 4-12

Assembly/Wiring Instructions

Step 1 -
Thread the clamp nut, collet, gland, and body moulding onto the cable. Also thread on the sealing cap retaining straps if using sealing caps with the flex connectors.

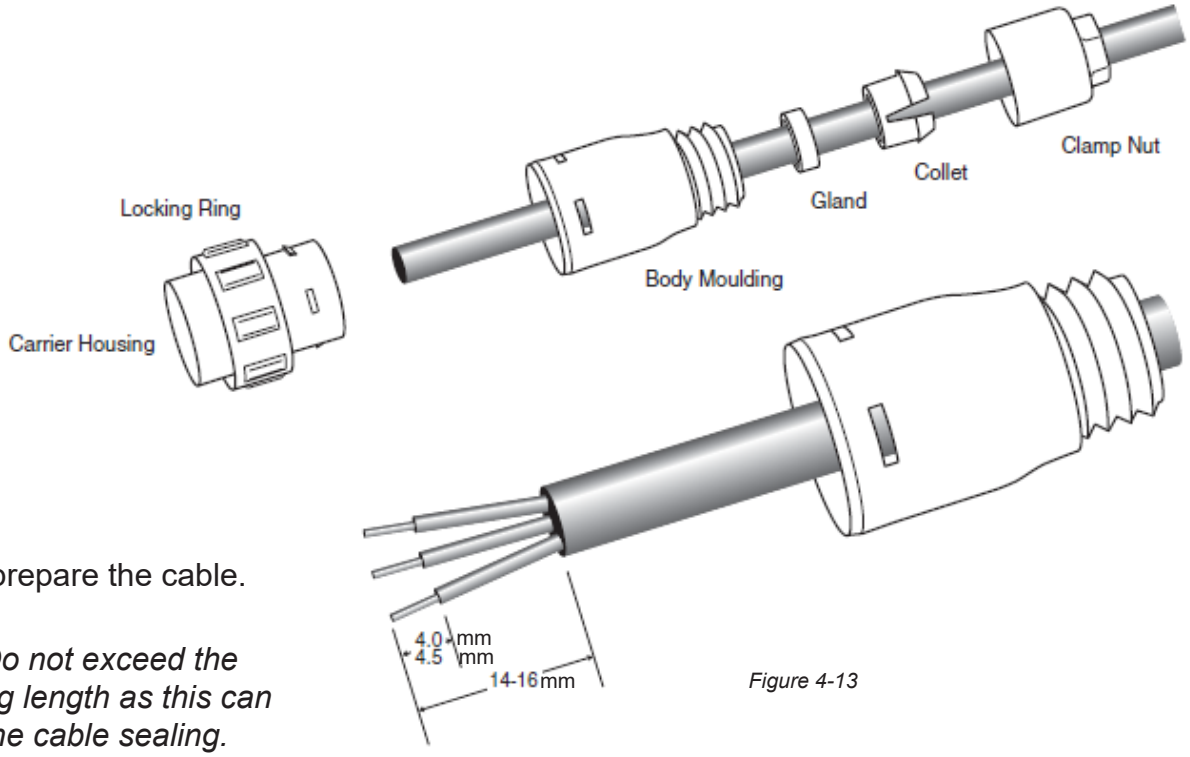


Figure 4-13

Step 2 -
Strip and prepare the cable.

Note: Do not exceed the stripping length as this can effect the cable sealing.

4.2 Flood Sensor Setup OPTIONAL

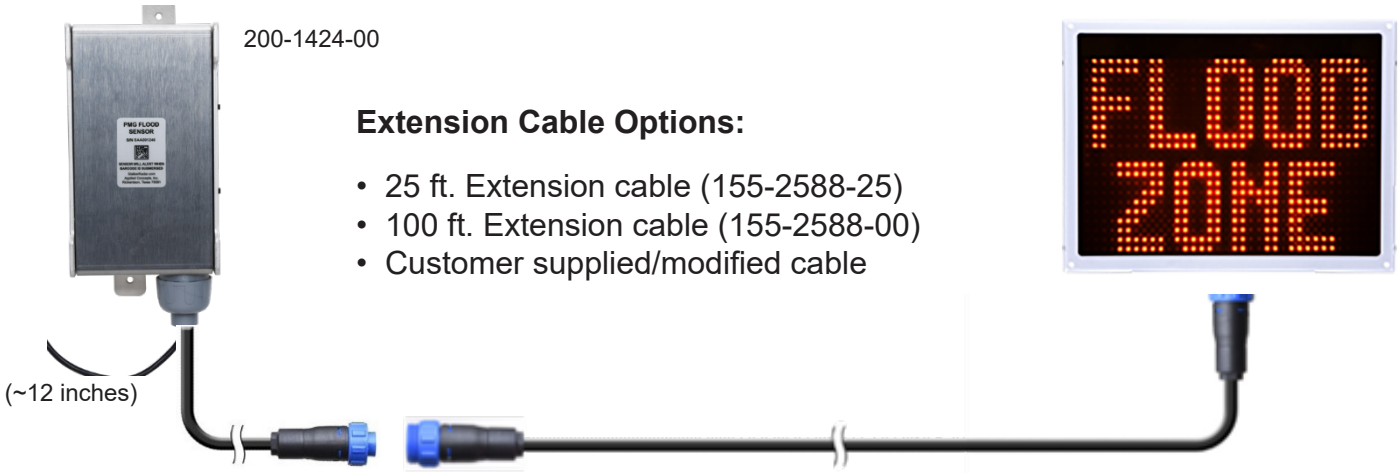
PMG Flood Sensor Overview

- The PMG Flood Sensor consists of a tamper-proof metal enclosure which houses the fluid sensor. The sensor is designed to be able to be submerged in water with no damage.
- The device should be placed in the flood-prone area so that the detector level, as indicated by the QR code sticker on the device, is at the desired height of the high- water trigger point.
- When water levels are at or above the QR-code on the label, the sensor will be triggered, and a signal will be sent to the PMG.
- The PMG can be programmed to display a message for the alert. The alert message is selectable by the user from pre-set options or can be customized by the user.
- Up to 3 flood sensors can be connected to a single PMG, allowing for progressive levels of alert escalation and de-escalation based on current water levels.

Key Technical Information

- PMG must have “Text & Graphics” option enabled for display of flood specific messages.
- The Flood Sensor requires that the PMG be configured with the 3 Input, +12V GPIO option.
- Connecting multiple Flood sensors to a PMG:
  - With its built-in GPIO port, a PMG can only support a single Flood Sensor.
  - A 3-port expander is available to allow for up to 3 Flood Sensors to be connected to a single PMG.

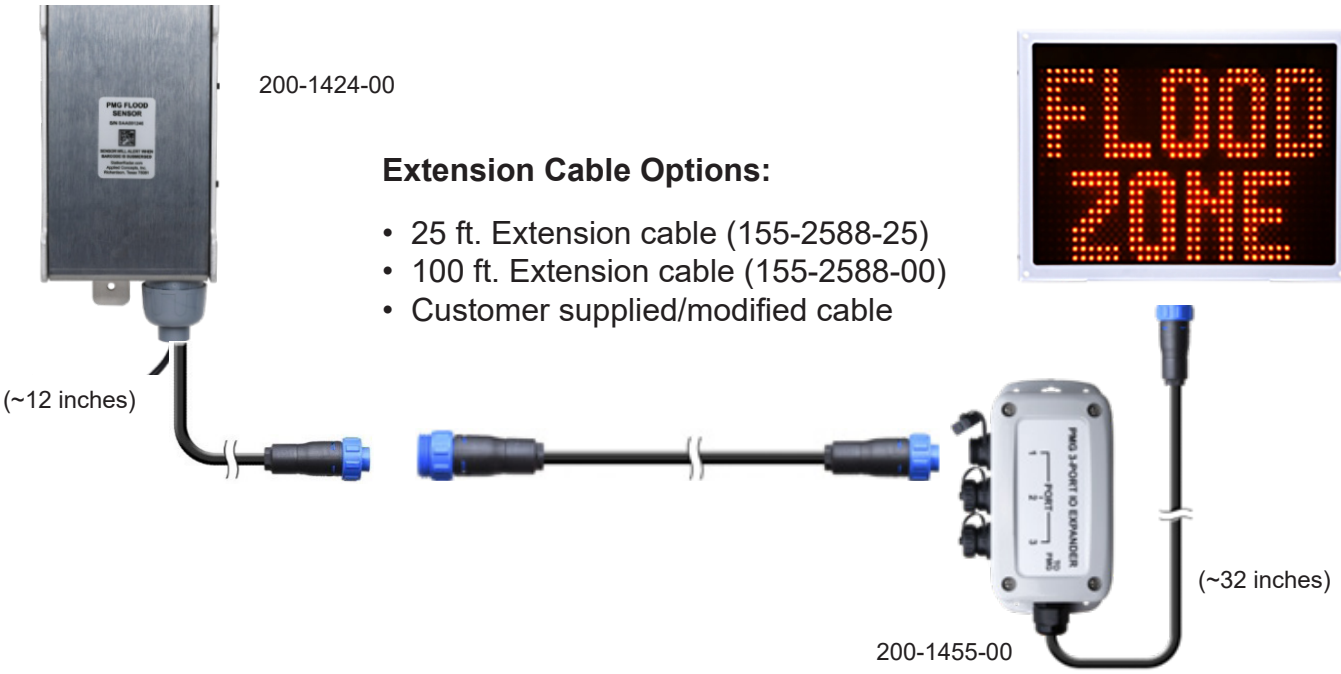
Installation - Direct to PMG



Extension Cable Options:

- 25 ft. Extension cable (155-2588-25)
- 100 ft. Extension cable (155-2588-00)
- Customer supplied/modified cable

Installation - With 3-port expander



Extension Cable Options:

- 25 ft. Extension cable (155-2588-25)
- 100 ft. Extension cable (155-2588-00)
- Customer supplied/modified cable

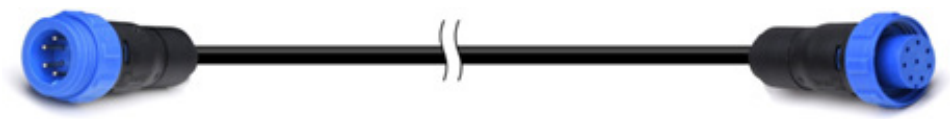
Customer Supplied / Modified Cable

To Flood Sensor

Pin Connector (200-1206-86)
PX0411

To PMG / 3-Port Expander

Socket Connector (200-1206-69)
PX0410

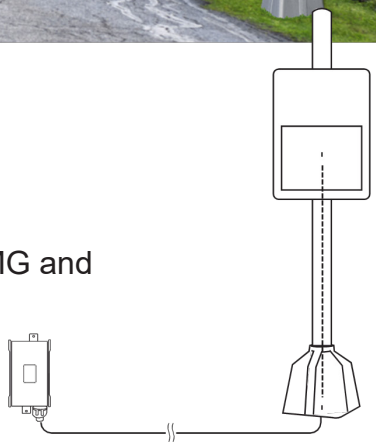


Pre-Installation

- Placement of the PMG and detector(s) should be chosen to provide enough warning to the intended recipient to allow for evasive action to be taken, i.e. PMG placed far enough from high water detection point to allow for a car to stop and turn around.
- Extension cables are available for long runs from the detector to the PMG. A cable termination kit is also available to allow for custom cable lengths.
- Pre-made Flood Sensor cables are configured to use GPIO-1 port ONLY.
- If more than one Flood Sensor is to be used, or if it is desired to use other GPIO input ports, the PMG must have 3-port expander. *Note that the expander port lines are all configured as GPIO-1 but will be combined to GPIO-1 through GPIO-3 when the signal is returned to the PMG.*

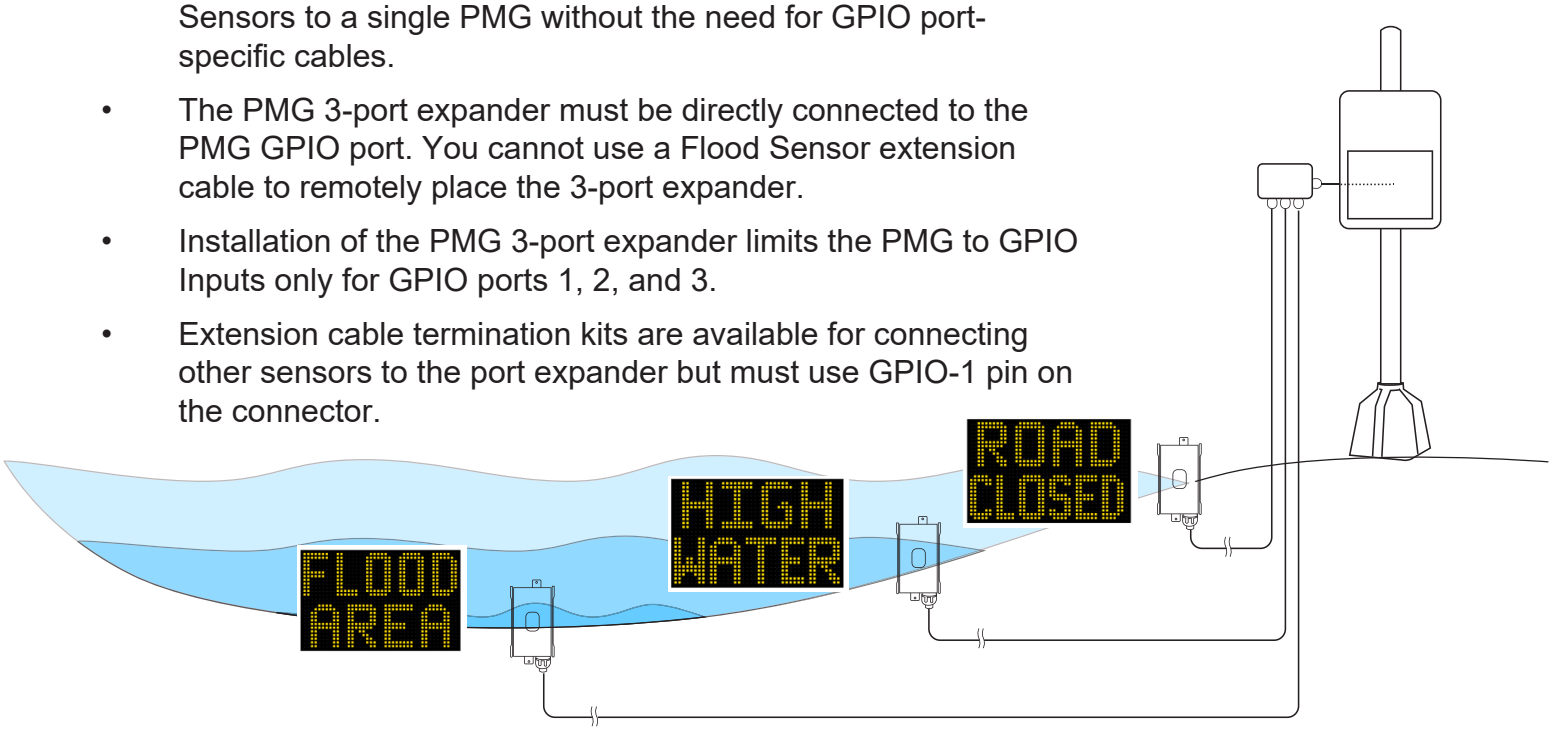
Single Flood Sensor Installation

- The cable from the flood detector plugs into the back of the PMG.
- Flood Sensor extension cables can be connected between the PMG and the Flood Sensor assembly.



PMG 3-Port I/O Expander Installation

- The 3-port expander allows for connecting multiple Flood Sensors to a single PMG without the need for GPIO port-specific cables.
- The PMG 3-port expander must be directly connected to the PMG GPIO port. You cannot use a Flood Sensor extension cable to remotely place the 3-port expander.
- Installation of the PMG 3-port expander limits the PMG to GPIO Inputs only for GPIO ports 1, 2, and 3.
- Extension cable termination kits are available for connecting other sensors to the port expander but must use GPIO-1 pin on the connector.



Sensor to PMG Distance

- Combined cable lengths up to 1025 ft. have been verified as the cable provides both signal and power for the flood sensor setup. This length should provide adequate distance for drivers to read the message on the PMG and be able to stop at various speeds.

Cable

- Stock cables are available in 25 ft. and 100 ft lengths.
- Connections and cable are designed to be waterproof.
- Cables should be selected to minimize number of cables and excess cable length based on installation location.
- It is recommended that the cable be run through 3/4” or larger conduit (a minimum of 3/4” is required to accommodate the cable connector).
- Cable termination kits are available for customers to shorten stock cables, or create one of your own.
- For custom cables, Stalker Radar recommends 22-gauge wire, 4 conductor, suitable for outdoor water exposure and direct burial.

Pin Assignment

Pin Number	GPIO Pin Name
1	POWER
2	GND
3	IO1A
4	IO1B

Figure 4-14

Optional PMG Flood Sensor Accessories

- 25ft Flood Sensor extension cable (155-2588-25)
- 100 ft Flood Sensor extension cable (155-2588-00)
- PMG 3-Port I/O expander (200-1455-00)
- PMG GPIO/CAN connector wiring kit - Socket (200-1206-69)
- PMG GPIO/CAN connector wiring kit - Pin (200-1206-86)
- Flood Sensor with 25ft cable (200-1424-00)

155-2588-25
155-2588-00

200-1206-69

200-1206-86

200-1455-00

4.3 Ethernet Cabling OPTIONAL

The PMG can be hooked up to ethernet through the supplied ethernet port located on the Key Switch panel on the back of the PMG.

Setup of Ethernet is accomplished via the PC Configuration tool and a USB connection of the USB COMM port located on the Key Switch panel of the PMG. Setup of ethernet is covered into the operations guide of the PMG.

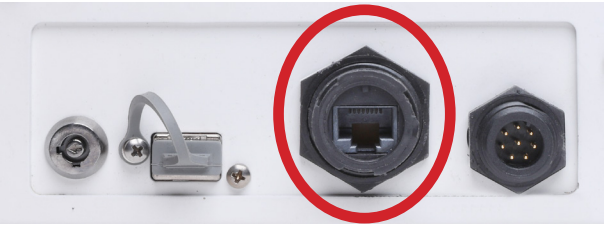


Figure 4-15

It is recommended to not connect the Ethernet cable until the appropriate Ethernet parameters have been setup via the PC Configuration tool.

A separate waterproof ethernet cable is available for purchase, part number 155-2556-16. This cable is designed to provide waterproof connection between the ethernet cable and the PMG ethernet port and is 16 ft long.

Figure 4-16

5.0 Power Connections

5.1 Preparation

Make sure the PMG power switch is in the OFF position. The OFF position is the full counter-clockwise position (rotate key to the left), rely on the rotation of the key, not the positioning of the key.

To turn off the PMG, insert the key and rotate it to the left (counter-clockwise) until it stops turning. Then remove the key.

Note: Not all Connector Panels will look the same. They will be different for each combination of PMG options ordered.

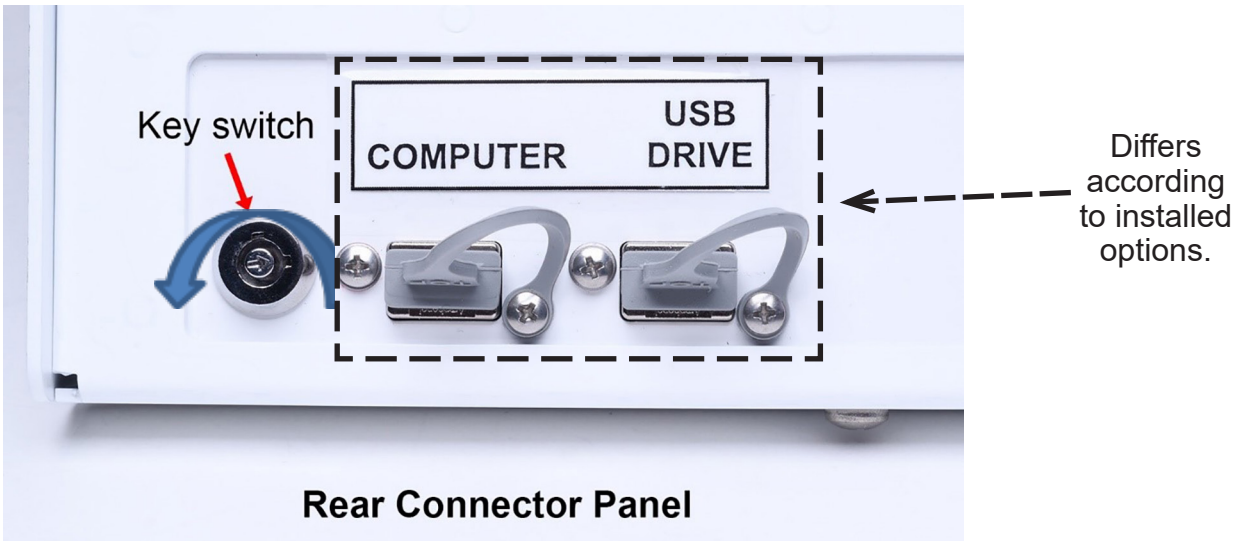


Figure 5-1

5.2 External Regulated DC Power Source OPTIONAL

This option allows for a removable connection to an external DC power source. It consists of a round 2 pin connector on the back of the PMG.

If you are connecting directly to a battery and your PMG does not have the round 2-pin connector on the back, please refer to section 5.3 for wiring instructions.

We have various standard sources available for the DC power.

Figure 5-2

5.2.1 AC/DC Power Supply OPTIONAL

Two (2) different external AC/DC power adapters are available.

Description	Part Number
AC/DC Power Adapter for Outdoor Use	155-2521-00
AC/DC Power Adapter for Indoor Use	155-2542-00

Figure 5-3

- Plug the connector into the DC input connector on the back of the display.
- An adhesive strip is supplied for mounting the power supply on the back of the PMG or other nearby surface if desired. Peel the backings off the adhesive strip and apply it to the power supply, then press the power supply to the desired surface for several seconds to allow the adhesive to adhere.
- If needed, run an appropriate extension cord to the power supply and plug in the supply.

Once installed, proceed to Section 8.0.

5.2.2 Vehicle / Alternate Power Supply OPTIONAL

A power cable with a vehicle power adapter is available, this is a 14ft cable with the correct termination for the PMG and a “cigarette lighter” power connector on the other end.

This cable can be altered to allow for the connection to a suitable DC power source. The power source should be 12 V with at least 7.5A capability. It is recommended that if the cable is altered, that an appropriate fuse be used on the (+) lead.

Once installed, proceed to Section 8.0

Figure 5-4

5.3 External Battery / Solar / AC Wiring OPTIONAL

5.3.1 Cable Routing and Shortening

The Solar cable (if purchased) is unique and has pre-installed connectors for connection to the Solar Panel. These connectors are designed to prevent accidental shorting of the power leads the equipment. Do not remove the factory installed connectors.

Cable Routing

- Follow standard practice for cable routing to protect cable from rubbing / snagging on support structure.
- If installing with excess cable, keep excess cable looped and secured at solar panel to avoid entanglement / vandalism.

Cable Shortening

- If cable shortening is desired, cut from raw cable end (PMG end).
- DO NOT remove the factory provided connectors as these are provided to prevent accidental shorting of the power leads.

Figure 5-5

5.3.2 PMG Cable Elbow Installation OPTIONAL

Remove the Power Access Plate exposing the wiring inside the PMG.

Figure 5-6

Attach the supplied elbow to the Power Access Plate and tighten.

Figure 5-7

Note: Ensure the elbow is securely tightened to the Power Access Plate, with rubber O-ring on the outside of Power Access Plate.

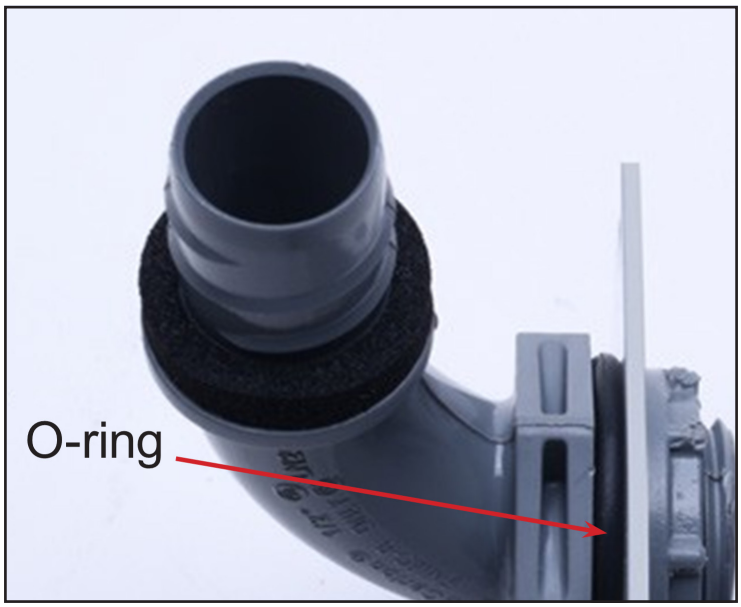


Figure 5-8

5.3.3 AC Wiring OPTIONAL

This section covers the wiring need for AC operation.

If your PMG is setup for AC wiring, this can be identified by the number and color of the wires in the cavity behind the Power Access Plate.

The PMG can accept either 120V or 220V AC power.

AC Wiring Color Coding			
Conductors	International	North America	PMG
Line	Brown	Black Or Brown	Brown
Neutral	Blue	White Or Blue	Blue
Ground	Green/Yellow	Green Or Green/Yellow	Green/Yellow

Figure 5-9

- Make sure A/C cord/wires are NOT connected to mains power.
- Feed wire through elbow.
- Using provided wire nuts, connect like-colored wires together per diagram below.
- Attach Ground wires to post at the bottom of the housing using nut provided.

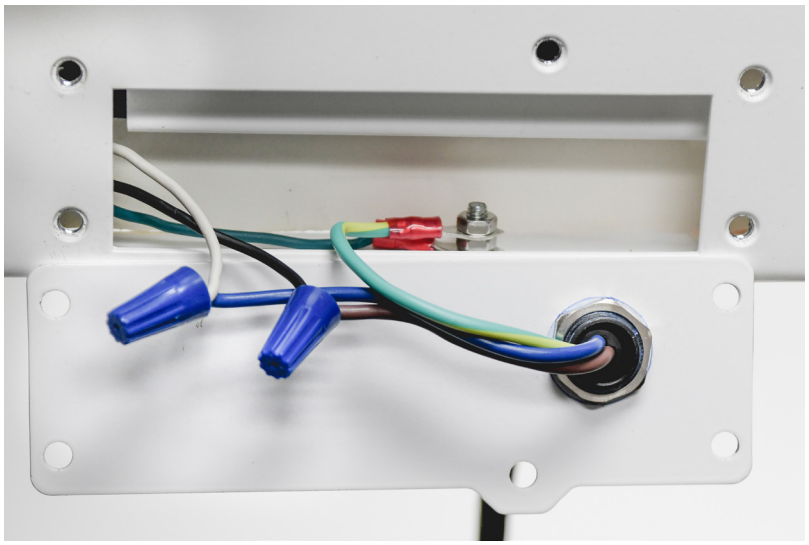


Figure 5-10

Re-install the power panel.
Proceed to step 6.0, Initial Startup

5.3.4 Solar Panel and Battery Wiring OPTIONAL

Note: Before starting, ensure battery wires are not connected to the battery, and solar wires are not connected to the solar panel.

Warning

Do not install the battery fuse until all wiring connections are completed.

Ensure the PMG Key Switch is in the OFF position (fully counter-clockwise position).

Installation of Solar and Battery wires will be addressed at the same time since it is easier to install them at the same time. If your unit does not have solar, then ignore the references to solar power wires.

5.3.4.1 Wire Preparation

Cut and strip the ends of the External Solar Wires as shown below using the power panel as a guide for approximate length. *Note that the Grey wire is longer than the Black wire.*

Figure 5-11

Cut and strip the ends of the External Battery Wires as shown below using the power panel as a guide for approximate length. *Note that the Red wire is longer than the Black wire.*

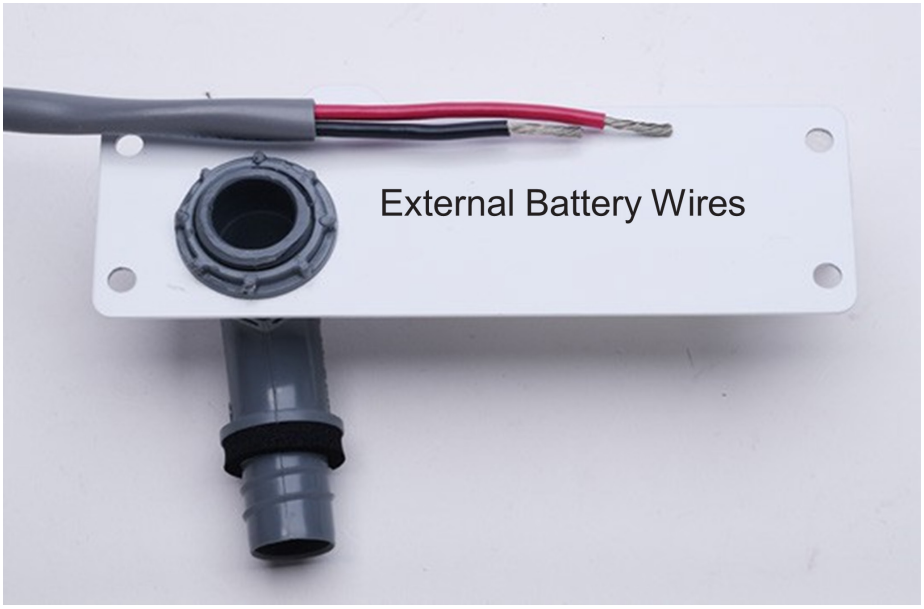


Figure 5-12

Feed the External Solar Wires and External Battery Wires through elbow as shown.

Figure 5-13

5.3.4.2 Connection to PMG

- **Step 1 - Connect the wires**

Using appropriately sized wire nuts, twist and lock:

- Internal Solar Input (+) wire to External Solar wire (+)
- Internal Solar Input (-) wire to External Solar wire (-)
- Internal Battery Input (+) wire to External Battery wire (+)
- Internal Battery Input (-) wire to External Battery wire (-)

- **Step 2 - Tuck in wires and replace the back panel**

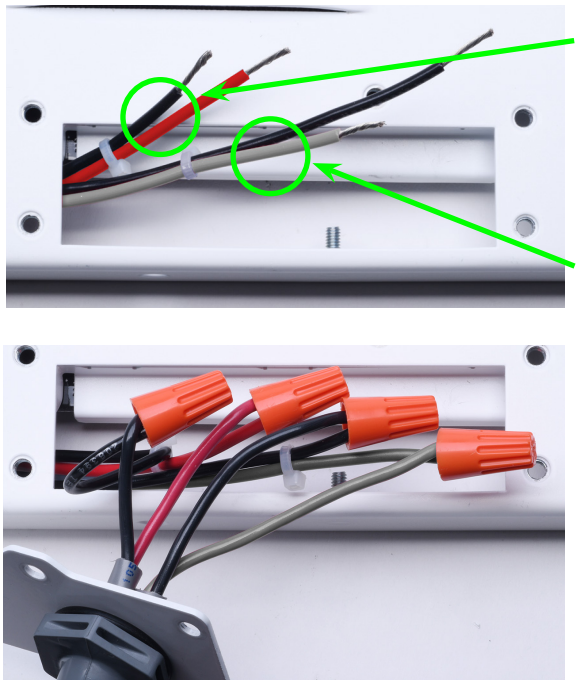


Figure 5-14

Attach Access Plate to PMG Sign and tighten screws.

Figure 5-15

5.3.4.3 Connection to Solar Panel

Connect the solar panel side of the External Solar Wires as described in Section 8.2.

- **Step 1 - Connect solar panel leads to PMG solar panel cable**

Plugging

Line up the prongs on the male end with the slots on the female end, using the dimple on the top edge as a reference. Push them together until you hear/feel a click. (Figure 5-16)

Unplugging

Using the blue separation tool Locate the slot where the prongs are visible. Using the blue separation tool (with the angled edge facing the prongs). Carefully insert the tool into the slot and push down until it separates, then pull apart. (Figure 5-17)

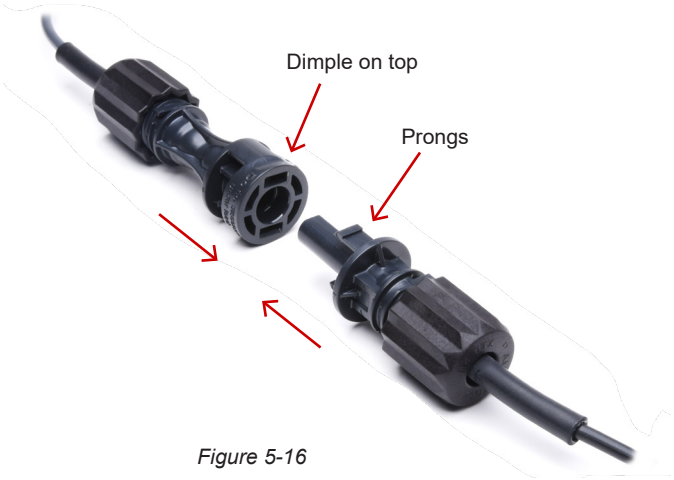


Figure 5-16

Figure 5-17

- **Step 2 - Initialization**
  - Connect the battery cables to the battery (See instructions included with the battery)

5.3.5 Install Batteries and Fuses

5.3.5.1 All Metal Battery Box OPTIONAL

The PMG requires a Group 27 battery for use with the All Metal Battery Box.

With the battery already installed in the box, see section 3.4.1, install the battery end of the cable through the rubber grommet on the back the box. The fuse holder should be located inside of the battery box. (Figure 5-18)

Figure 5-18

If using the Stalker battery cable, remove the fuse from the fuse holder, connect all wiring and connectors as necessary. Secure the cable between the battery box and PMG.

- Stalker Fuse is an ATC 10 Amp

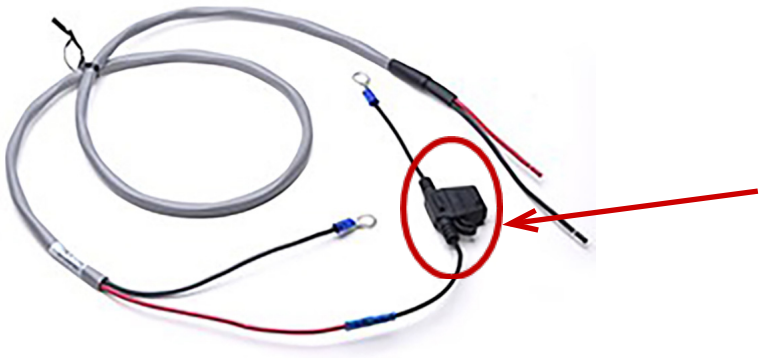


Figure 5-19

- Connect the red lead to the (+) terminal and the black lead to the (-) terminal. You may need additional hardware for these connections depending on your choice of battery.
- If using the Stalker battery cable, insert the provided fuse into the fuse holder in the cable.
- Once wiring and connectors are in place, slide the battery box top in place and secure using washers and wing nuts. (Figure 5-20)

Figure 5-20

- Finally, install the retainer bar by inserting the top tabs into the rear slotted bracket and looping the bottom hole through the padlock loop. Secure the padlock.

Figure 5-21

5.3.5.2 PMG Small Battery Box OPTIONAL

5.3.5.2.1 Customer Supplied Battery

If installing your own battery, you will need our install kit 200-1126-00 which includes the terminal straps and battery handle.

Recommended battery:

BATTERY SPECS:
12 V, 22 AH
SEALED LEAD ACID (AGM)

DIM: 7.13 (L) X 2.99 (W) X 6.57 (H)

RECOMMENDED:
UNIVERSAL POWER GROUP
UB12220K

Install this kit as follows:

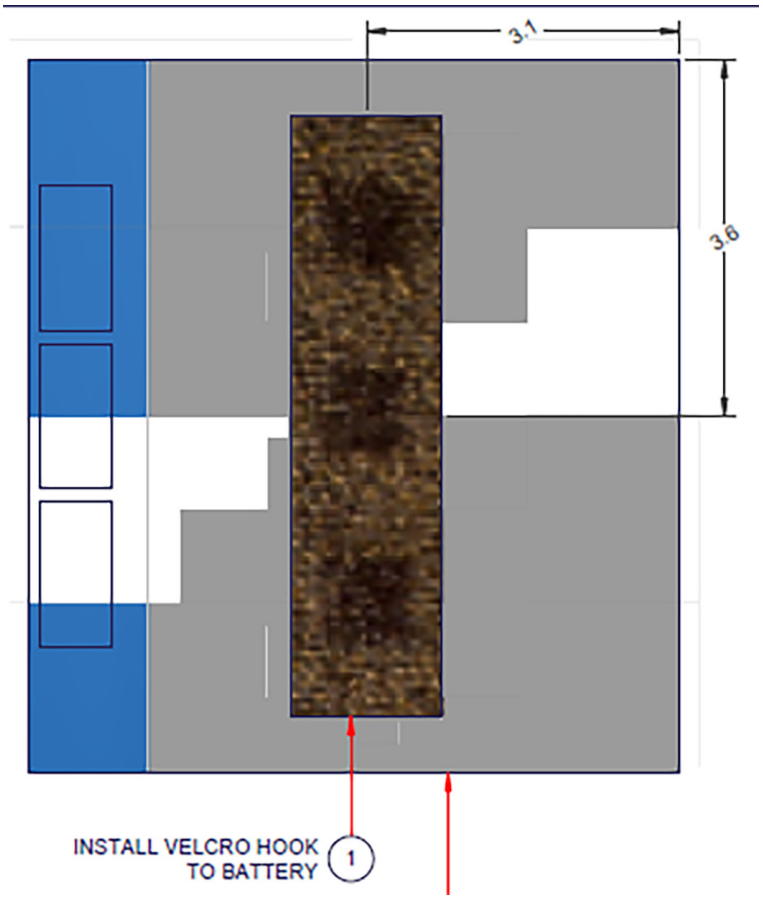


Figure 5-22

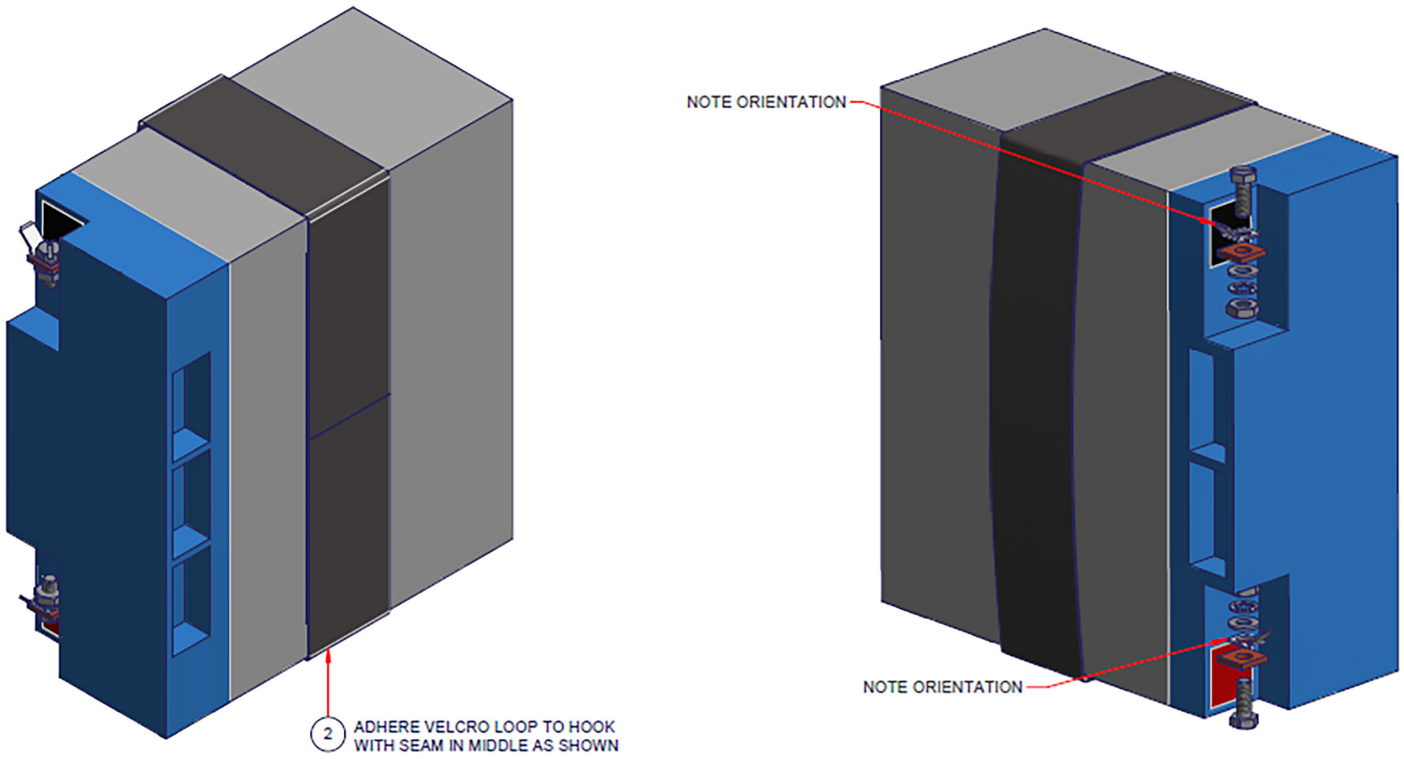


Figure 5-23

5.3.5.2.2 Battery Installation

- Make sure the fuse is removed from the fuse holder, see figure 5-25.

Install the battery into the Small Battery Box. The battery is installed as shown below, oriented with the terminals aligned with the right hand side of the enclosure. Connect the battery terminals to the battery wiring. Tighten the tie down to secure the battery in place.

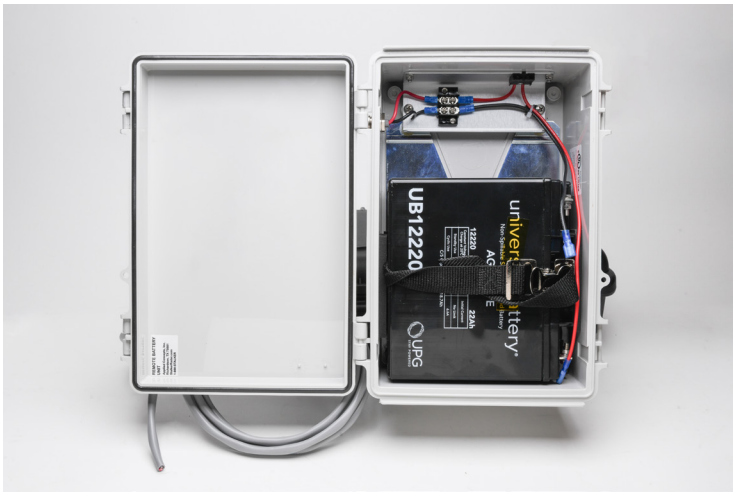


Figure 5-24

5.3.5.2.3 Fuse Installation

Do not install the fuse until all the other wiring connections are made.

Install the provided fuse into the socket in the battery box

The Small battery box utilizes an ATC 7.5 Amp fuse. This fuse is provided with the battery box.

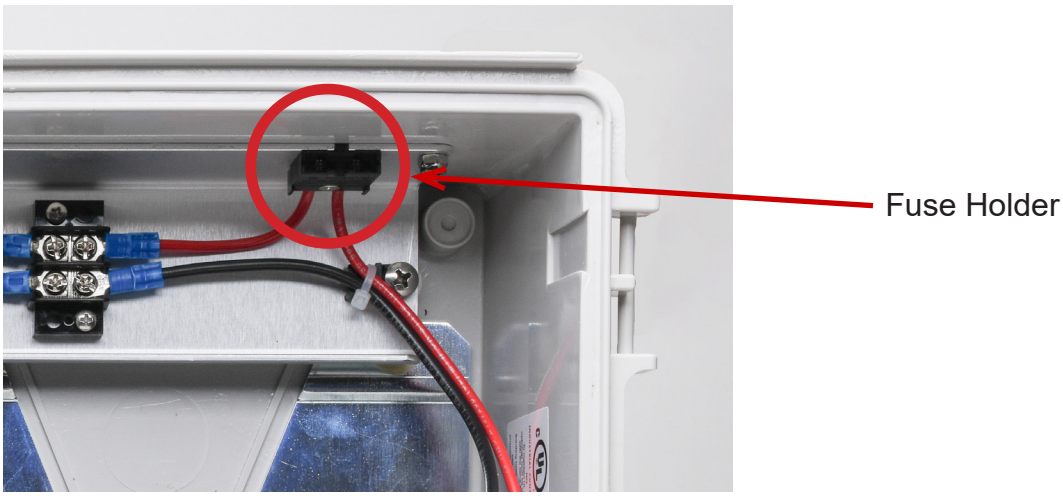


Figure 5-25

5.3.5.3 Quad Bay Battery Backpack OPTIONAL

5.3.5.3.1 Customer Supplied Battery

If installing your own battery, you will need our install kit 200-1397-01 which includes the terminal straps, wiring, and battery handle.

Recommended battery:

BATTERY SPECS:
12 V, 22 AH
SEALED LEAD ACID (AGM)

DIM: 7.13 (L) X 2.99 (W) X 6.57 (H)

RECOMMENDED:
UNIVERSAL POWER GROUP
UB12220K

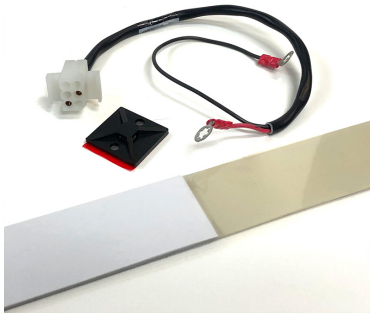


Figure 5-26

Preparing the Battery for Installation

1. The battery installation kit is supplied with a self-adhesive strip, a wiring harness to connect with the PMG, and a self-adhesive cable tie base and zip tie for the wiring harness.
2. The adhesive strip is applied to the battery to form a handle for sliding the battery in and out of the battery bays.
3. The wiring harness' red wire is connected to the positive (+) terminal and the black wire is connected to the negative (-) terminal.
4. Adhere the cable tie base on the battery near the positive terminal and use the zip tie to *tightly* secure the wiring harness to the battery.

1

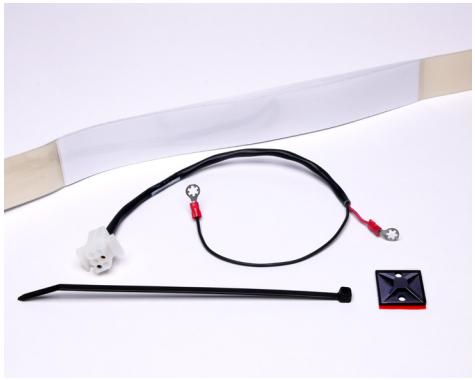


Figure 5-27

2

Figure 5-28

3

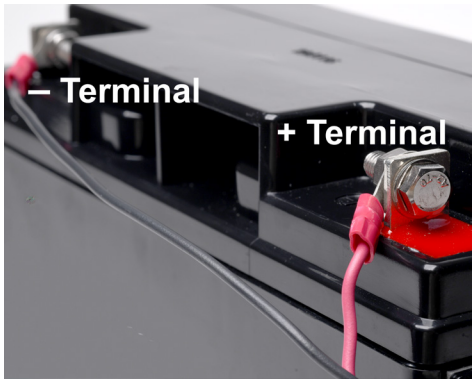


Figure 5-29

4

Figure 5-30

5.3.5.3.2 Installing Batteries

Changing Batteries

Changing the batteries is straightforward when the PMG is mounted on a pole.

Step 1 -
Open PMG Quad Bay Battery Pack left or right access door with the supplied key.

If it recently rained, some water may be in the compartment, this can be ignored.

Step 2 -
Batteries should be installed starting with the bottom two slots (1 left and 1 right). Batteries 3 and 4, if supplied, should go into the upper slots.

Note: When removing batteries, grasp the strap. Avoid pulling with the wiring harness.

Step 3 -
Connect all the battery harnesses to the PMG through the Molex connector.

Step 4 -
Removal of a battery is the opposite of insertion.

Figure 5-31

Figure 5-32

Figure 5-33

Figure 5-34

5.3.5.3.3 Fuse Installation

There is no fuse to install for the Quad Bay Battery Box.

5.3.6 External Regulated DC Power Sources OPTIONAL

Connect the power source to the DC power connector on the back of the PMG and plug it into the appropriate power source.

5.4 AC Wiring OPTIONAL

Either plug in the AC power cord attached to the PMG or turn on the AC power as appropriate for your installation.

6.0 Initial Startup

6.1 Turning the PMG On

To turn the PMG on, insert the key provided into the key switch located on the rear connector panel on the back side. Turn the key to the right (clockwise) until it stops turning.
The key should be removed after the unit has been turned on. Leaving the key inserted could cause the unit to turn off if vibrated. Be sure to keep the key in a safe place.
Note: Not all Connector Panels will look the same. They will be different for each combination of PMG options ordered.

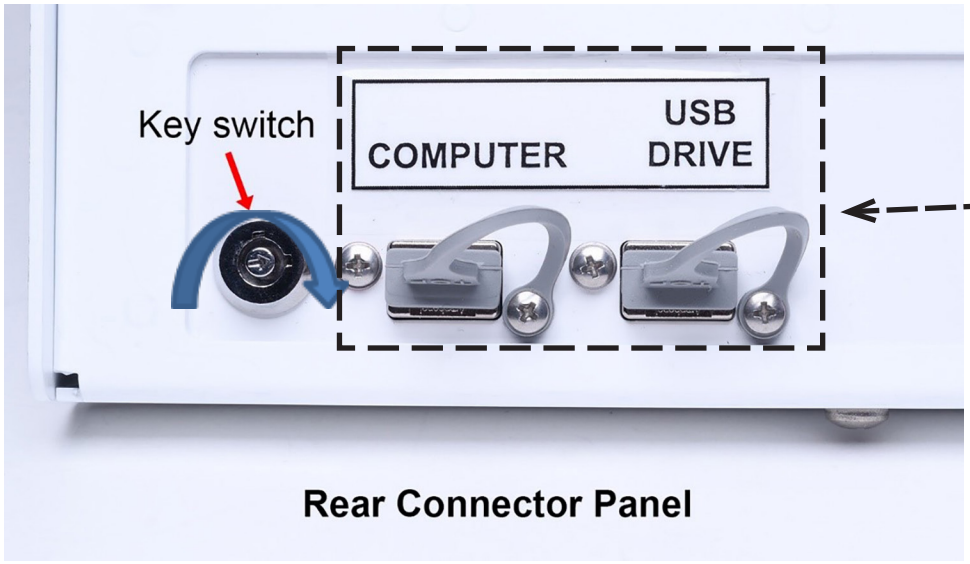


Figure 6-1

6.2 Sign Verification

Once the power switch is turned on, the PMG will boot up. You will eventually see the words “Starting PMG” displayed on the sign, followed by the screen going blank.

At this point the PMG is powered on and working. You can now proceed to program your PMG

For programming information, please refer to the Street Dynamics website if you have subscribed to the Street Dynamics Web Portal, or to the PMG Operators Guide which is included on the accompanying Flash Drive.

Figure 6-2

7.0 Battery Charging OPTIONAL

7.1 All Metal Battery Box

In the case where your battery has fully discharged or where you do not have a solar panel to provide ongoing charging, you will need to supply a 3rd party 12-volt vehicle battery charger. To charge the battery, remove the battery and follow the directions from your separately purchased automotive battery charger.

7.2 PMG Small Battery Box

In the case where your battery has fully discharged or where you do not have a solar panel to provide ongoing charging, you will need to purchase a separate battery charger, part number 200-1120-00.

- Remove the battery from the Battery Box.
- Locate the Red (Positive) and Black (Negative) terminals on the system battery.

Figure 7-1

- Connect the charger's **RED Quick-Connect Plug to the battery's Positive Post and the BLACK Quick-Connect Plug to the battery's negative Post.**
- Plug in the charger to the wall outlet.
- The charger's LED should turn red while charging and change to green when fully charged.
- This charger is capable of outputting a maximum of 5 Amp/Hours of charge into the battery. It will fully charge a completely dead battery in approximately 3.5 hours.

7.3 Quad Bay Battery Box

In the case where your battery has fully discharged or where you do not have a solar panel to provide ongoing charging, you will need to purchase a separate battery charger, part number 200-1120-01. This charger can only recharge a single battery at a time.

- Remove the battery from the Battery Box.
- Connect MOLEX connector from battery to that on the charger.
- Plug in the charger to wall outlet.
- The charger's LED should turn red while charging and change to green when fully charged.
- This charger is capable of outputting a maximum of 5 Amp/Hours of charge into the battery. It will fully charge a completely dead battery in approximately 3.5 hours.

Figure 7-2

8.0 Specifications

General	12”	15”	18”
Width	21.2” (54.0 cm)	25.8” (65.0 cm)	30.3” (77.0 cm)
Height	16.1” (40.9 cm)	19.2” (49.0 cm)	22.1” (56.0 cm)
Depth	1.25” std, 2.1” (5.4 cm) with power module	1.25” std, 2.1” (5.4 cm) with power module	1.25” std, 2.1” (5.4 cm) with power module
Weight	9.3 lbs. (4.22 kg) w/o battery option	13.2 lbs. (5.98 kg) w/o battery option	17.45 lbs. (7.92 kg) w/o battery option
Ingress rating range	NEMA 3R		
Operating temperature	-22° to +122° F (-30° to +50° C)		

Display

Display Height	12” (30.4 cm)	15” (38.1 cm)	18” (45.7 cm)
Display Width	18.5” (47.0 cm)	23” (58.4 cm)	25.5” (64.7 cm)
Display Depth	2.1” (5 cm)	2.1” (5 cm)	2.1” (5 cm)

Energy

Energy Source	AC, DC, Battery, or Solar (12 VDC or 90-240 VAC @ 50/60 Hz)		
Power Consumption (idle)	1.6 watts	1.6 watts	1.6 watts
Power consumption (88 at 100% brightness)	14 watts	20 watts	26 watts

Radar

Detection Distance	900’ typical (275 m)	900’ typical (275 m)	900’ typical (275 m)
Radar beam width	33° x 33°		
Directionality	Approaching + Receding (singular display, dual logged)		

Battery Enclosures

Quad Bay	
Enclosure	23 lbs steel / 15 lbs Al
SLA (1 battery)	13-15 lbs
Large Battery Box	
Size	approx 14.25” x 10.5” x 12.75” (wxdxh)
Weight	~8 lbs
Group 27 Battery	50-65 lbs
Small Battery Box	
Enclosure	approx: 11.81” x 7.87” x 5.11”
Weight	~4 lbs
12V Battery (1)	13-15 lbs

Specifications continued

Signs

Small Your Speed			
Weight	~1.5 lbs		
Size	27” x 6”		
Large Surround			
Weight	~6 lbs		
Size	24” x 30”	28.5” x 35”	33” x 40”

Solar Panels

50W	
Size	22.9 x 20.0 x 1.9 or 26.7 x 21.6 x 1.4
Weight	7.7 lbs or 9.9 lbs
100W	
Size	~47.2 x ~21.2 x ~1.4
Weight	~18 lbs
Mount	~4 lbs

Supplier's Declaration of Conformity

47 CFR § 2.1077 Compliance Information
Pole Mounted Graphics Display
Applied Concepts, Inc., 855 E. Collins Blvd., Richardson, Texas 75081-2251
+1-972-398-3750

FCC Compliance Statement
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

This product may contain one or more of the following:
FCC ID: UXS-IPS937
FCC ID: QOQ-BGM111
FCC ID: QOQ-WGM110
FCC ID: MCQ-XB3M1

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Customer Notes

Customer Notes

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Power to Enforce