



## Solar Power Kits

Installation Instructions 029-03748-0000 Rev F May, 2020

### Covers Solar Kits:

100W	70AH	M75-SOLAR-000C
60W	35AH	M75-SOLAR-000S
100W	140AH	M75-SLR14-000C

**REVISION BLOCK**

REV.	DESCRIPTION	DATE	APPROVED
A	Original Release	November 17, 2012	
A-1	Updated Battery wiring cautions,, REV Block	November 19, 2012	
B	Part number assigned	November 26, 2012	
C	Solar Mounting Revision	October 4, 2017	
D	Removed Solar N reference	May, 2018	
E			
F	Updated Panel Ratigns	May, 2020	Andy P.

This product was manufactured in an ISO 9001 certified facility.



**Table of Contents**

**1 Safety Information..... 2**

    1.1 Intended Use ..... 2

    1.2 Technical Support .....2

    1.3 Safety Messages.....2

        1.3.1 Safety Message Format.....2

    1.4 Safety Considerations ..... 3

        1.4.1 Personal Safety Equipment and Clothing ..... 3

        1.4.2 Electrical Shock ..... 3

        1.4.3 Battery Safety..... 4

        1.4.4 Mechanical Safety.....4

**2 Description ..... 5**

    2.1 Specifications.....5

    2.2 Required Maintenance ..... 5

    2.3 Battery Life... .....5

**3 Installation Requirements..... 6**

    3.1 Equipment Requirements..... 6

    3.2 Installation of Solar Panel.....6

    3.3 Battery Box Installation... .....6

**Warranty..... 9**

**Appendix A: Solar Kit Battery Box Drawing ..... 10**

**Appendix B: Solar Panel Structure assembly .....11**

**NOTICE: Because of TrafficCalm’s commitment to continuous improvement the content of these documents and product specifications may change without notice. Please contact your partner or TrafficCalm Technical service to check for updates before planning your installation.**

## 1 Safety Information

We provide important safety information and warnings to assist you in understanding and avoiding potential harm to yourself, and possible damage to equipment during the installation of TrafficCalm LED Sign solar kit. Although we have included many potential hazards you may encounter during the installation of this equipment, we cannot predict all of the possible hazards and this list should not be a substitute for your judgment and experience.

**Please read and observe all safety information and instructions in this manual before installing the system equipment. Also, save this installation manual for future reference.**

If you are unsure about any part of this installation or of the potential hazards discussed, please contact your supervisor immediately.

### 1.1 Intended Use

The solar kit is intended to be used to power the TrafficCalm LED displays.

### 1.2 Technical Support

If you have questions about the system, its use, or operation, please contact your local partner or call the TrafficCalm Technical Service department at 1-855-738-2722, in the U.S.A. Technical service hours: Monday through Thursday, 7:00 AM to 5:00 PM and Friday from 7:00 AM to 12:00 PM Pacific Standard Time.


### 1.3 Safety Messages

We include safety messages in this manual to help you protect your safety and the safety of others. This section contains important information to help you recognize and understand these safety messages.

 **Please read all messages before proceeding with the installation of this equipment.**

#### 1.3.1 Safety Message Format

Safety messages are designed to alert you to potential hazards that can cause personal injury to you or others. They can also indicate the possibility of property damage.

Each safety message box contains the safety alert symbol ; and one of three signal words:

DANGER, WARNING, or CAUTION; plus a safety message.

The signal words and symbols, and their meanings, are shown below:

<b>DANGER</b>	
	The safety message is in this box.

**DANGER indicates a potentially hazardous situation, which, if not avoided, will result in death or serious injury and/or property damage.**


<b>WARNING</b>	
	The safety message is in this box.

**WARNING indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury and/or property damage.**

<b>CAUTION</b>	
	The safety message is in this box.

**CAUTION indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury and/or property damage.**

In addition to the symbols and words explained above, each safety message identifies the hazard, describes what you can and should do to avoid the risk of exposure to the hazard, and tells the probable consequences of not avoiding the hazard.

 <b>WARNING</b>	
<p>Battery acid may cause skin irritation and eye injury. <b>To reduce the risk of burns or other acid related injury resulting from handling lead-acid batteries:</b></p> <ul style="list-style-type: none"> <li><b>-Wear gloves, goggles, and an apron when handling batteries,</b></li> <li><b>-Handle batteries with care.</b></li> </ul>	

**! WARNING !**

To reduce the risk of burns or other acid-related injury resulting from exploding batteries:

**! -Always use the recommended charging systems with this product.**

**! WARNING !**

To reduce the risk associated with contamination of water supplies resulting from improper disposal of batteries containing lead and acid:

**! -Please dispose of batteries in accordance with all local government laws and regulations.**

**CAUTION**

**! !** An accidental short circuit may instantly heat conductive jewelry, tools, and surrounding objects to skin-searing temperatures. **To reduce this risk when working around batteries:**

**! -Keep tools, jewelry, and other conductive objects away from the battery terminals.**

**WARNING**

To reduce the risk of impact hazards resulting from falls, accident with a passing vehicle, and/or from unstable equipment:

**! -Use appropriate work zone traffic control methods, equipment, and procedures.**

**CAUTION**

**! !** Strain or back injury may result from lifting equipment improperly. **To reduce the risk of strain or back injury, use proper**

**lifting techniques and have adequate help.**

**CAUTION**

To avoid the possibility of injury due to falling or unstable equipment:

**-Be certain the sign is mounted to an appropriately rated pole or equivalent mounting surface.**

**! -Use appropriately rated mounting hardware.**

### 1.4 Safety Considerations

Please consider the following safety issues before servicing TrafficCalm Driver Feedback Signs and power systems.

Although we have compiled this list of common safety considerations, it should not be considered as complete. It is not intended to take the place of your good judgment, training, and experience. Choose the right equipment for the job. If you are unsure of which safety equipment is recommended or appropriate for the job, ask your supervisor or foreman.

#### 1.4.1 Personal Safety Equipment and Clothing

Personal safety equipment and clothing including high visibility vests, hard hats, gloves, electrical shock or electrocution protection clothing and equipment, safety shoes, safety glasses, face shields, goggles, and hearing protection devices are just some of the items available to you.

#### 1.4.2 Electrical Shock

As a trained installer of electrical equipment you are aware of the dangers associated with servicing electrical devices. Always be sure that the power to the equipment, and all associated equipment, is turned off before beginning any procedure. Use the equipment, techniques, and procedures that you learned during your training or apprenticeship or other electrical industry recognized safety procedures.



## WARNING

To reduce the risk of electric shock related injury resulting from contacting hazardous AC voltage:



**-The charging activity on this equipment must be performed by qualified personnel who is someone with previous training or who has received factory training on these or similar types of equipment so that they thoroughly understand the techniques, tools, and methods required to properly service this equipment.**

### 1.4.3 Battery Safety

Batteries may produce an explosive gas under some conditions. This gas may easily be ignited by a spark or flame as you work near the battery. To reduce the risk of explosion, disconnect the battery, work in a well ventilated area, avoid the use of devices that create sparks or use open flames, and use appropriate personal safety equipment and clothing.



## WARNING

Battery acid may cause skin irritation and eye injury. **To reduce the risk of burns or other acid related injury resulting from handling lead-acid batteries:**

**-Wear gloves, goggles, and an apron when handling batteries,**



**-Handle batteries with care.**



## WARNING

To reduce the risk of burns or other acid-related injury resulting from exploding batteries:



**-Always use the recommended charging systems with this product.**



## WARNING



To reduce the risk associated with contamination of water supplies resulting from improper disposal of batteries containing lead and acid:



**-Please dispose of batteries in accordance with all local government laws and regulations.**

## CAUTION



An accidental short circuit may instantly heat conductive jewelry, tools, and surrounding objects to skin-searing temperatures. **To reduce this risk when working around batteries:**



**-Keep tools, jewelry, and other conductive objects away from the battery terminals.**



**-Do not connect the battery stub ring lugs to the harness until they are securely attached to a battery first.**

### 1.4.4 Mechanical Safety



## WARNING

To reduce the risk of impact hazards resulting from falls, accident with a passing vehicle, and/or from unstable equipment:



**-Use appropriate work zone traffic control methods, equipment, and procedures.**

## CAUTION



Strain or back injury may result from lifting equipment improperly. **To reduce the risk of strain or back injury, use proper lifting.**

## CAUTION

To avoid the possibility of injury due to falling or unstable equipment:

**-Be certain the sign is mounted to an appropriately rated pole or equivalent mounting surface.**



**-Use appropriately rated mounting hardware.**

## 2 Description

The solar kit provides power for a TrafficCalm LED display system using the energy of the sun. Display operating endurance obtained will vary with installation location and conditions, battery condition, weather conditions, and display settings.

Depending on the part number supplied (see cover page) this kit may include one 150 watt solar panel, or one 100W solar panel or one 60W solar panel, a battery box, mounting brackets, and appropriate conduit to connect the system. The battery box contains four batteries and the charge control device. The following tables contain the specifications for the solar panels and the batteries.

### 2.1 Specifications

Solar Panel:

Polycrystalline 60W, 12V, (Pmax 17.8V, 3.37A).

Or

Polycrystalline 100W, 12V, (Pmax 17.3V, 4.63A).

Battery:

Sealed 12V, 35AH, AGM, 23-lbs, 7.68" x 5.12" x 6.10" with "button" connectors. Non-Spillable DOT approved.

Solar Charger:

Morning Star SunSaver 20L.

20A rated input (solar panel).

Regulation Voltage 14.1V.

Regulation method is PWM.

Maximum Solar Voltage 25V.

Wiring Harness battery connection is fused at 10A fast acting with an ATO 32V fuse.

Enclosure:

NEMA 3R rating.

Mounting bracket for banding or bolting provided.

Enclosure is insulated with R3.3 foil faced rigid foam insulation on all inside surfaces. Batteries sit on polycarbonate shelves.

### 2.2 Required Maintenance

Although this system is designed to require little maintenance, the system will perform most efficiently if a small amount of maintenance is performed.

Inspect and clean the solar panel periodically. Check for local vegetation shading the panel and prune back as needed.

When replacing battery be sure to use a sealed battery of the correct voltage and capacity ratings.

### 2.3 Battery Life

These are suggestions for obtaining the greatest battery lifetime.

- Never let the battery sit in a discharged state for more than a few days.
- During extended cloudy days monitor the battery level and either recharge as necessary or reduce the power consumed by the display by limiting its operation.
- Try to configure the display in such a way as to ensure that no more than 50% of the battery charge is removed at any time.
- Perform a maintenance charge on the battery 3 to 4 times each year.

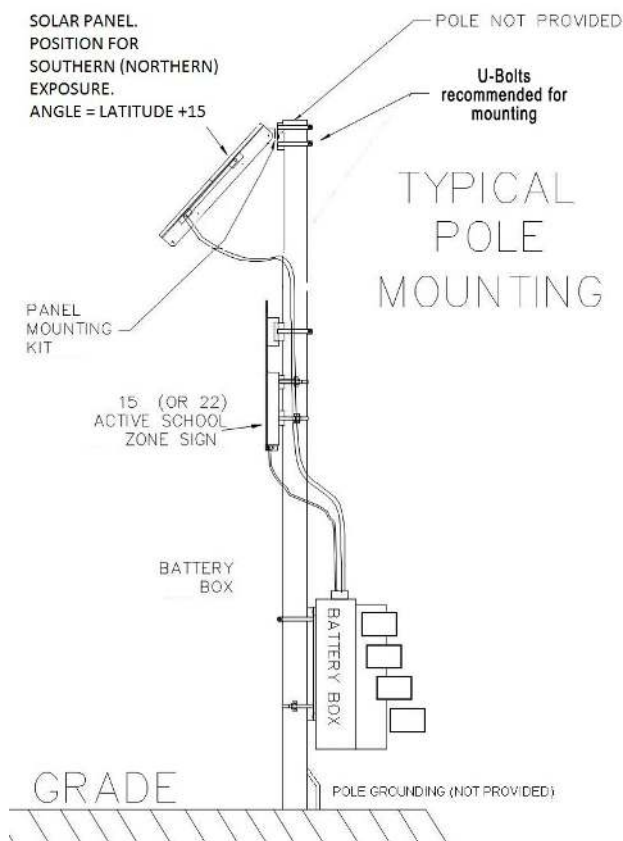
### 3 Installation Requirements

This section describes the components, tools, and information you must have available before installing TrafficCalm 140Ah Solar Kit.

#### 3.1 Equipment Requirements

In addition to the Driver Feedback Sign to be installed, you will need the following suggested items if you intend to follow these directions:

- Pole and Footing material
- Stainless steel banding and banding clips and application tool or adjustable steel banding for installing Battery Box & Sign
- Assorted hand tools.
- Socket set and drive handle.
- U-Bolts for installing solar panel



#### 3.2 Installation of Solar Panel

##### NOTE

**It is the installer's responsibility to ensure that this installation complies with local and national codes.**

Use a pole of proper size with an appropriate footing for the soil and load conditions. ***Consult with a professional Civil engineer for proper pole selection and footing design for the local area.*** Assemble the solar panel mounting bracket using directions supplied with the mounting bracket components. Install the mounting bracket onto the pole with user supplied (U-Bolts).

In northern latitudes aim the bracket at true South, not magnetic south. True South is the direction facing the sun parallel to the shortest shadow of the day cast by the sign pole, which occurs at "Solar Noon". To estimate what time solar noon will occur in your area go to the NOAA web site with your longitude and latitude.

<http://www.srrb.noaa.gov/highlights/sunrise/sunrise.html>

Set the bracket angle using your current latitude +15 degrees as measured from horizontal (flat) to the final position. Example: If the latitude is 45-degrees, set the panel angle 60-degrees away from flat. You may be able to get a small amount of additional power by calculating the set angle using:  $\text{Latitude} * 0.9 + 29$ . This results in a steeper angle than the other method, optimizing collection around the noon hours during the winter months, which is when the most solar energy is available.

Install the solar panel onto the mounting bracket.

#### 3.3 Battery Box Installation

*Note: you may wish to cover the solar panel during daylight installation to prevent accidental short circuit of energized panel during installation.*

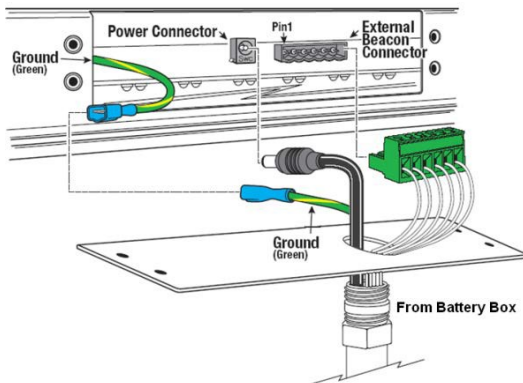
Attach the "I" bracket to the battery box using the included hardware.

- a. Attach the "I" bracket to the center holes of the battery box using two 3/8-16 x 1-1/4 inch bolts, two 3/8-inch flat washers, and two lock washers. (These bolts are hidden when the battery box is mounted on the pole.)
- b. Install 3/8-16 x 1-inch bolts in the remaining four holes of the bracket with a flat washer and a lock washer on each bolt.

Attach the battery box to the pole with user-supplied 3/4-inch banding and a buckle in two places (as close to each cross arm of the bracket as possible).

Connect battery power to the Electronic Control System (ECS) see Figure 3-1 (15" DFB ECS

Shown with optional beacon cable set, see your display installation manual for other display size connections).



**Figure 3-1. 15” Display ECS Access Panel**

- Route the supplied 5 foot conduit with DC power wire and ground cable from the battery box to the bottom of the ECS. It can be installed at either the top or bottom of the battery box, but if installed at the bottom, extra wire (#14 Red and Black, not supplied) will have to be spliced in to make up the extra length used.
- At the bottom of the ECS, remove the access panel and route the power cord and green ground wire through the conduit receptor located on the access panel. Plug in the power connector to the power connector receptacle located inside the ECM. Connect the ground wire to the green wire located inside the ECS.
- Secure the conduit to the conduit receptor.
- Install the access panel cover.

Route solar panel wires to the battery box. See Figure 3-2.

- Remove the battery box cover.
- In the battery box, remove the two right side screws and loosen the two left side screws on the solar charger.
- Pull the charger away from the mounts and allow it to hang out of the way.
- Remove the insulation panel that was under the charger and store it in a safe place. (This gives access to the conduit fittings from inside of the enclosure.)
- Install the wires and cable from the sign and solar panel (solar panel left, sign right) through the provided conduit fittings, and

then tighten the conduit connectors onto the pre-installed fittings.

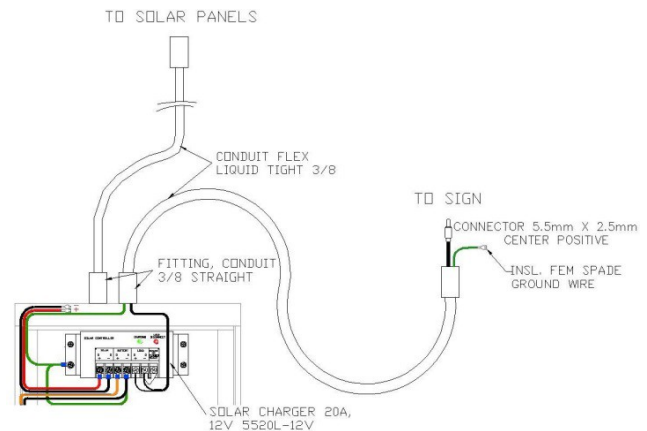
- Replace the insulation panel removed earlier, and re-install the solar charger.



**Figure 3-2. Remove Solar Charger from Battery Box**

Connect ECS wires to solar charger in battery box. See Figure 3-3.

- Connect the ground wire from the display to the solar charger mounting screw.
- Connect the ECS power cable lead with the white stripe to the solar charger terminal marked “LOAD +”, which is terminal 6.
- Connect the other ECS power cable lead to the terminal marked “LOAD -”, which is terminal 5.



**Figure 3-3. Wiring Solar Charger in Battery Box**

Install the batteries in the battery box. Install the battery Ring Lug stubs onto the batteries first. Then connect the batteries to their respective connectors (one set provided per shelf) in the harness matching orange to orange and black to black. The operating voltage is 12VDC. At this point the display has power.

Connect the wires to the solar panel.

- At the solar panel, make sure the opaque cloth is still covering the panel.



- b. In multi-panel parallel solar arrays inspect that blocking diodes are properly installed on the solar panel terminal blocks (in the solar panel wiring boxes) to prevent back feeding on shaded panels.
  - c. Connect the battery box red wire (+) to the panel + on the solar panel terminal block. Connect the battery box black wire to panel negative in the panel terminal block.
8. Connect the solar panel wires to the solar charger in the battery box. See Figure 3-3.
- a. Make sure the opaque cloth is still covering the panel.
  - b. Connect the solar panel red wire to the positive (+) terminal of the solar charger “SOLAR +” terminal (4).
  - c. Connect the solar panel black wire to the solar charger “SOLAR –“ terminal (3).

Check the panel operation and battery charging using a volt meter. During daylight hours, if the battery voltage rises above night levels, then the solar panel and charger are working.

Monitor the charge process through a full charge. If the charge voltage is excessive, then the charger may have failed and will damage the batteries unless action is taken to disconnect the solar panel until repairs are made.

The charger is temperature compensated. It is normal for the charge voltage to be higher when the weather is cold, and lower when the weather is hot. The normal full charge voltage varies -28mV per degree C of deviation from 25°C.

*Note: The solar panel only provides power when illuminated by the sun. If the panel was covered during installation, remove the cover before performing this test.*

For best results, start with a new fully charged battery. Never mix old and new batteries. ***Be sure to ground the solar panel rack and battery box properly according to code.***



TrafficCalm Systems, a division of MOR Manufacturing, provides the following warranty for its traffic calming solutions whether sold directly by TrafficCalm or by an authorized TrafficCalm distribution partner.

### **Warranty**

- TrafficCalm Systems warrants the product, excluding batteries, will be free of defect in materials and workmanship for a period of two (2) years beginning on the day the end user receives the product. Warranty is only valid if the product is ineffective for its intended purpose due to defects in materials or workmanship.
- Warranty is only valid if the product is installed, operated and maintained in accordance with the manufacturer's instructions and recommendations (available upon request).
- TrafficCalm's sole responsibility and the purchaser's and user's exclusive remedy shall be that TrafficCalm will furnish replacements for defective parts.
- Replacement parts will carry the unexpired warranty of the parts they replace. Non warranty repairs are guaranteed for a period of 90 days.
- Claims made under this warranty will be honored only if TrafficCalm is notified of a failure within the warranty period, reasonable information requested by TrafficCalm is provided, and TrafficCalm is permitted to verify the cause of the failure.
- TrafficCalm assumes no liability for any incidental or consequential damages, in any way related to the product regardless of the legal theory on which the claim is based.

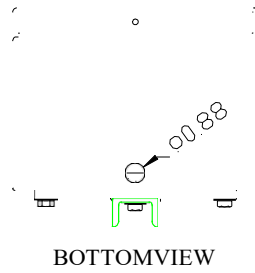
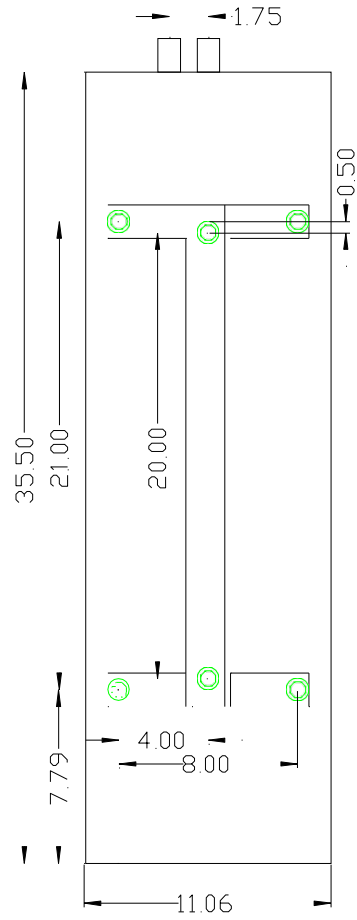
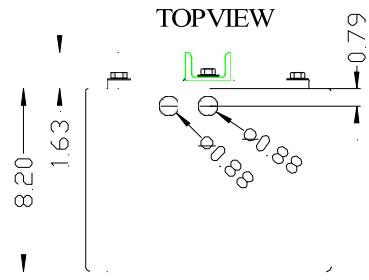
#### **This warranty does not cover damage resulting from:**

- Accidents, vandalism, impact with a foreign object or acts of God.
- Product modifications made by someone not authorized by TrafficCalm
- Failure of Customer to follow TrafficCalm's published operating instructions,
- Failure to follow TrafficCalm's published site selection and installation instructions,
- Removal or relocation of the unit,
- Electrical work external to the unit, virus/hacker activity, and external computer errors.

THIS WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES AND CONDITIONS, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY.

E. 5676 Seltice Way • Post Falls, Idaho 83854 • 1-855-738-2722 • [support@trafficalmsystems.com](mailto:support@trafficalmsystems.com)

#### **Appendix A: Solar Kit Battery Box Drawings**



### Kit Components & Parts

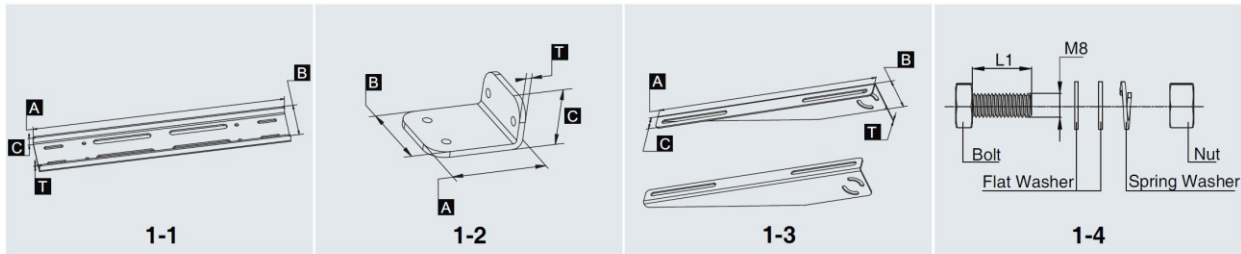
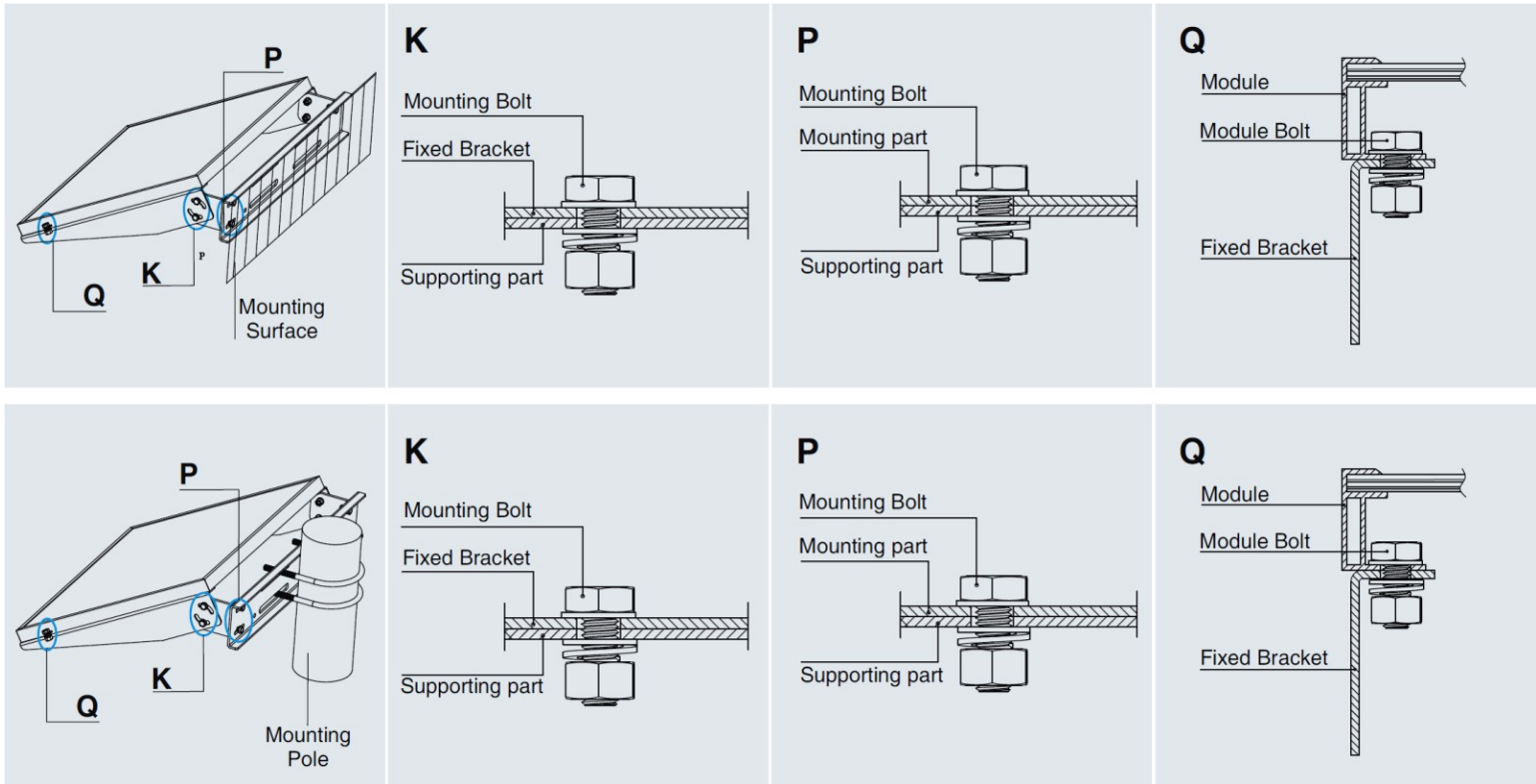


Diagram	Component	Material	Surface Treatment	Quantity	Dimensions
1-1	Fixed Bracket	5052Al	N/A	1	A=800mm[34.50in.], B=110mm[4.33in.] C=25mm[0.98in.], T=5.0mm[0.20in.]
1-2	Fixed Bracket	5052Al	N/A	2	A=100mm[3.94in.], B=83mm[3.27in.] C=50mm[1.97in.], T=6.0mm[0.24in.]
1-3	Tilt Arm	5052A	N/A	2	A=675mm[26.57in.], B=82mm[3.23in.] C=38mm[1.50in.], T=3mm[0.12in.]
1-4	Module Bolt	AISI304	N/A	4	M8X25[0.98in.]
	Mounting Bolt	AISI304	N/A	8	M8X25[0.98in.]

**\*Note:** U-Bolts or Steel Clamps are not supplied in this kit and must be procured separately if pole mount is required



Pole Mounting for the 40W to 140W panels