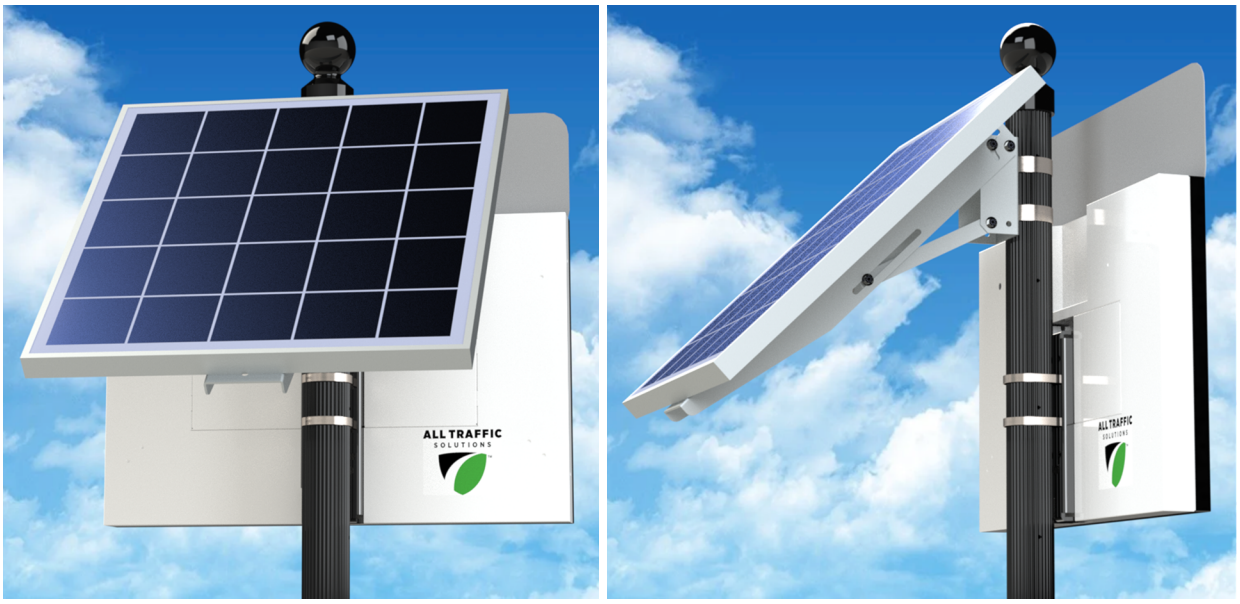
Single-Arm Solar Panel Mounting Bracket installation

The Single-Arm Solar Panel Mounting Bracket is designed to enable you to mount a relatively small (typically 50W to 100W) solar panel on a pole to power your sign. You can adjust the angle according to your needs for your location and the pole you'll be using.



[Figure 1] Solar panel and Integrated Solar Shield

Before you go on the road

It's best to prepare in advance and perform steps 1 to 3, completing the bracket assembly, attaching the bracket to the solar panel, and establishing the angle of the panel, in your shop, before you take the solar panel and sign to the roadside. This guide is intended for anyone who needs to assemble and install the mounting bracket along with the accompanying solar panel on a pole. As the installer, make sure that:

- The installation complies with any local municipal building codes and regulations.
- The installation site has unobstructed sunlight.
- The pole, ideally a round pole, 4-inches in diameter, is tall enough to allow installing the solar panel and the sign out of easy reach of vandals (eight to nine feet off the ground).

CAUTION: **To reduce the risk of vandalism, the sign should be 7 to 10 feet above the roadway and the solar panel higher than 10 feet.**

What's in the box

This section describes how to attach the mounting bracket to a solar panel. You'll receive the bracket preassembled, except for two 5/16" nut and bolt sets used to attach the bracing arms to the pole bracket (initially folded for transport).

You'll receive the following:

- A 50-watt to 100-watt solar panel and wiring harness,
- The Single-Arm Solar Panel Mounting Bracket, including mounting arm, with attached bracing arms, pole bracket, and two panel clamps,
- Two 5/16" nut and bolt sets.

The required tools

- To attach the bracing arms to the pole bracket and adjust the nuts and bolts, you'll need a 1/2" wrench and socket wrench with a 1/2" socket.
- To attach the mounting bracket and panel to the pole, you'll need a power drill or socket wrench with a 5/16" socket, 5/16" flathead screwdriver, and step ladder.
- A compass app and smart phone or compass.
- Internet access.

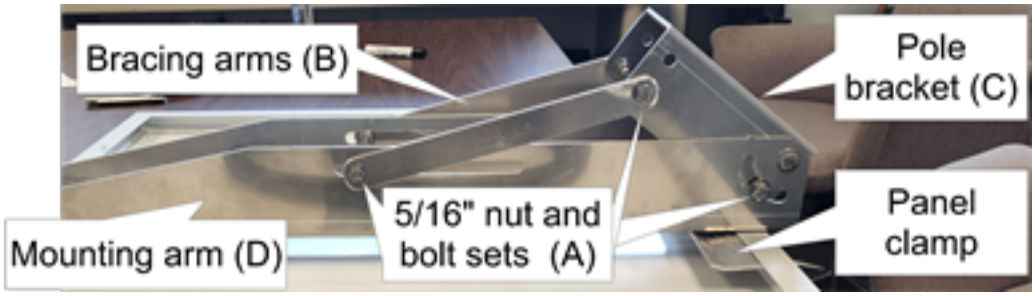
Step 1 - Attach the bracing arms to the pole bracket

1. Place the mounting arm assembly on a flat, protected surface. Here's how it looks when shipped:

[Figure 2] Mounting arm assembly as shipped

2. Loosen all of the nut and bolt sets (A). The nuts and bolts fasten the bracing arms (B) and pole bracket (C) to the mounting arm (D), and the panel clamps to the mounting arm. Loosen each nut and bolt set until just a few threads are showing at the end of each bolt.

[Figure 4] Using 1/2" wrenches



[Figure 3] Mounting bracket parts

3. Lift one of the bracing arms and the pole bracket and attach the two together using one of the additional nut and bolt sets included with the mounting assembly, as shown *[Figure 3] on the previous page* and *[Figure 5] below*.

[Figure 5] Exploded view of the nuts and bolts

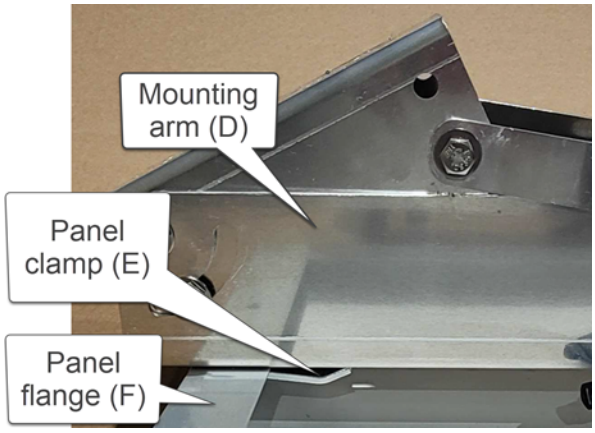
NOTE: Leave the pole bracket, mounting bracket, and bracing arms loosely connected until you are ready to aim the panel. See *Step 3 - Aim the solar panel* on page 5.

[Figure 6] Leave the nuts and bolts loosely connected

4. Repeat for the other bracing arm and side of the mounting bracket.

Step 2 - Attach the mounting arm to the solar panel

1. Place the solar panel face down on a flat, protected surface.
2. Center the mounting arm assembly (D) on the back of the panel and position one of the panel clamps (E) under the panel flange (F). Make sure the panel and mounting arm are perpendicular to each other.



[Figure 7] Mounting arm, clamp, and flange

3. Place the clamp (E) under the flange (F), and insert a 5/16" bolt with a flat washer through the long slot in the center of the mounting arm.
4. Mount the flat washer and lock washer onto the bolt. Finger-tighten the nut onto the bolt.
5. Repeat the previous steps to attach the other mounting bracket on the other end of the mounting bracket to the panel.

Mounting arm orientation: For 50-watt solar panels, install the arm vertically (from top to bottom), as shown in *[Figure 10] on the next page*. For larger solar panels, you'll need to secure the mounting arm to the solar panel horizontally, and use the included longer panel clamps.

[Figure 8] Larger solar panel

[Figure 9] Large panel clamp

Install the banding straps on the pole bracket

1. Insert the stainless steel banding straps through the slots on the back of the pole bracket, as shown in *[Figure 10] below*.
2. If you'll be installing the solar panel over the top of the post, finger-tighten the banding strap couplings together.

[Figure 10] Assembled panel and mounting bracket with banding straps

Step 3 - Aim the solar panel

The solar panel mounting bracket allows for full adjustment to best position the solar panel towards the Sun. It is optimal to position your solar panel towards due Solar South (not magnetic South), if you are in the northern hemisphere and towards due Solar North (not magnetic North) if you are in the southern hemisphere.

Regardless of whether you are in the northern or southern hemisphere, Solar North/South is the position of the sun in the sky at exactly the midpoint between sunrise and sunset.

[Figure 11] Solar panel angle gauge

To set the solar panel angle:

1. Determine the latitude of the planned site. You can easily obtain latitude using mapping software or by doing an internet search for "latitude *your_city*" where *your_city* is the name of the city or region where the panel is being installed.

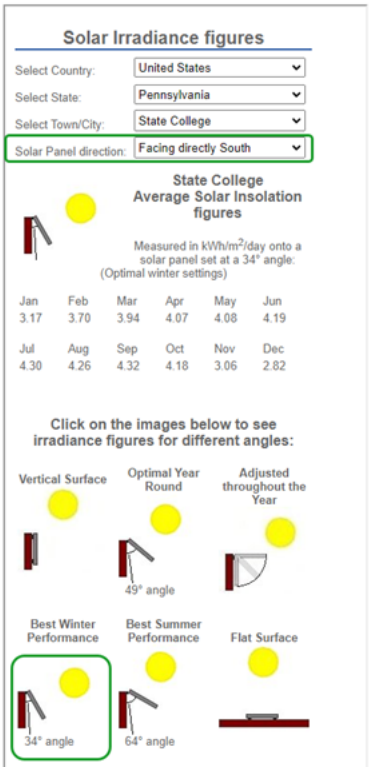
2. Once you have the latitude of the site, you can determine the solar panel tilt angle. The tilt is intended to absorb as much direct sunlight as possible. To determine the number of degrees for the angle, do either of the following:

   - Add 15 degrees to the latitude of the site. For example, if the latitude of the site is 41 degrees then the solar panel should be installed at an angle 56 degrees below horizontal.
   - Go to the *Solar Electricity Handbook* website to determine your optimum angle here:

     http://www.solarelectricityhandbook.com/solar-irradiance.html

     Under Solar Irradiance figures on the Web page, select your country, state, city and solar panel angle (**Facing Directly South**), and then click the **Best Winter Performance** option (bottom left in the figure). For State College, Pennsylvania, the recommended angle is 34 degrees. Subtract 34 degrees from 90 degrees to determine your bracket angle setting (56 degrees).

     The optimum tilt angle for solar panels varies from winter to summer as Earth tilts on its axis, but we recommend setting our solar panels for the best winter performance.



3. Slide the bracing arms on the bracket to set the angle from horizontal until the lower bolts align with the planned tilt angle shown on the gauge (see *[Figure 11] on the previous page*). Exact precision for the angle setting is not necessary for adequate solar panel efficiency to power the sign and battery.
4. Now you can tighten all of the nuts and bolts with the 1/2" wrenches, as shown.

To aim the panel to True South or True North:

- Use a compass app (or Google Maps) to aim the panel towards True South or True North, as required.

[Figure 12] Aiming the panel to True South with a compass app

Step 4 - Attach the mounting bracket and solar panel to the pole

IMPORTANT: Before you begin this step, determine the height on the pole for both the solar panel and your sign. For best performance, the solar panel should be unobstructed from the Sun.

Installing the solar panel and mounting bracket on the pole

Use the methods in this section to install the mounting bracket for your on a pole.

CAUTION: To reduce the risk of vandalism, the sign should be 7 to 10 feet above the roadway and the solar panel higher than 10 feet.

To mount the solar panel:

1. If you are installing the solar panel at the top of the pole, loop the banding straps over the pole, and place the pole bracket against the pole at the preferred height.
2. If you are installing the panel further down the pole, open the banding straps, wrap them around the pole at the preferred height, and tighten them enough to hold the panel in place but leave some slack for the next step. A power drill or screwdriver and hex bit work best to tighten the straps.
3. Recheck your orientation towards True South or True North, depending on your hemisphere, and make sure the panel is properly aimed. For details, refer to the *Single-Arm Solar Panel Mounting Bracket Installation* guide, included with your Integrated Solar Option sign and posted to the ATS Support page.
4. Tighten the banding straps the rest of the way.

To install the mounting bracket:

1. If you are mounting the sign on a U-shaped pole, bolt the mounting bracket to the pole using the supplied carriage bolts or U bolts, and wing nuts.

   The wing nuts will be secured inside the back of the sign to prevent tampering.
2. If you are mounting the sign on a round pole, thread two banding straps (not included) through the mounting bracket, and then tighten the bracket and straps around the pole. Thread the ends of the banding straps together and then tighten them onto the pole.

To mount the sign:

1. Power on the sign by pressing the **Power** button inside the sign mounting channel.
2. Attach the solar panel wiring harness to the corresponding harness on the sign, as shown.
3. Set the top channel on the back of the sign onto the tab at the top of the mounting bracket.
4. Rotate the sign down until it's flush with the bracket.
5. Push the locking pin up to lock the sign into place.
6. Strap the excess cable to the pole.

The panel will now power your sign.

NOTE: We are here to help! To speak with a technician, call us at 1 (866) 366-6602, option 2, or send email to support@alltrafficsolutions.com.