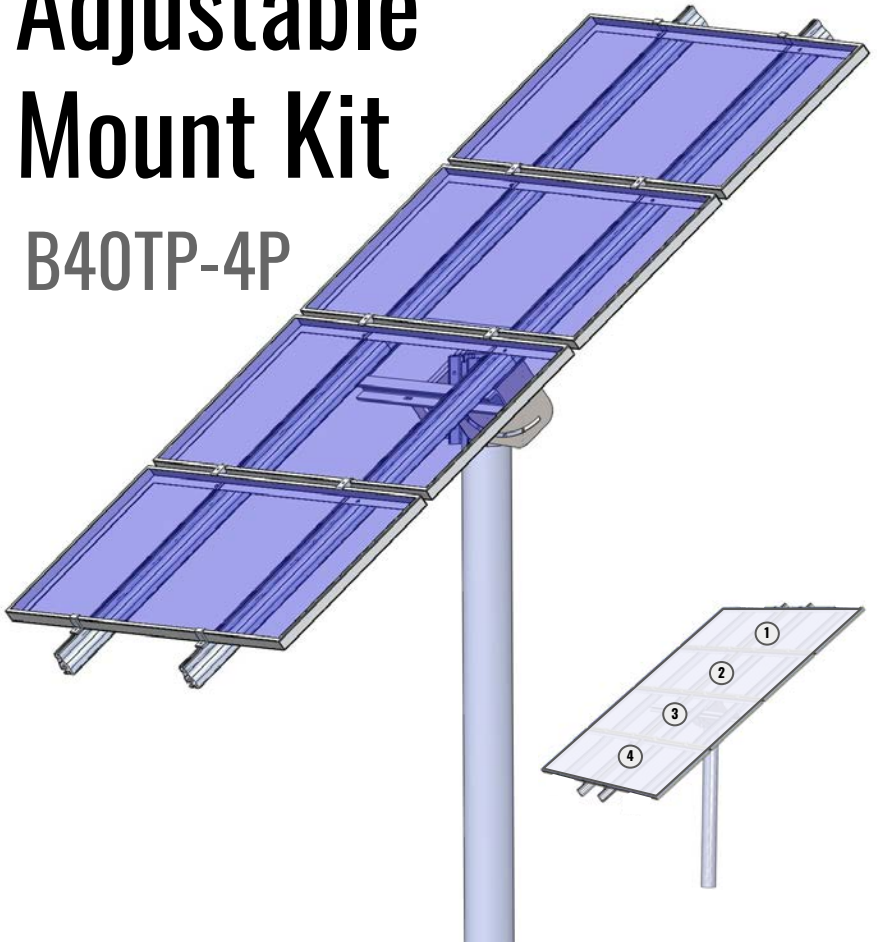


Four Solar Panel Top-of-Pole Adjustable Mount Kit

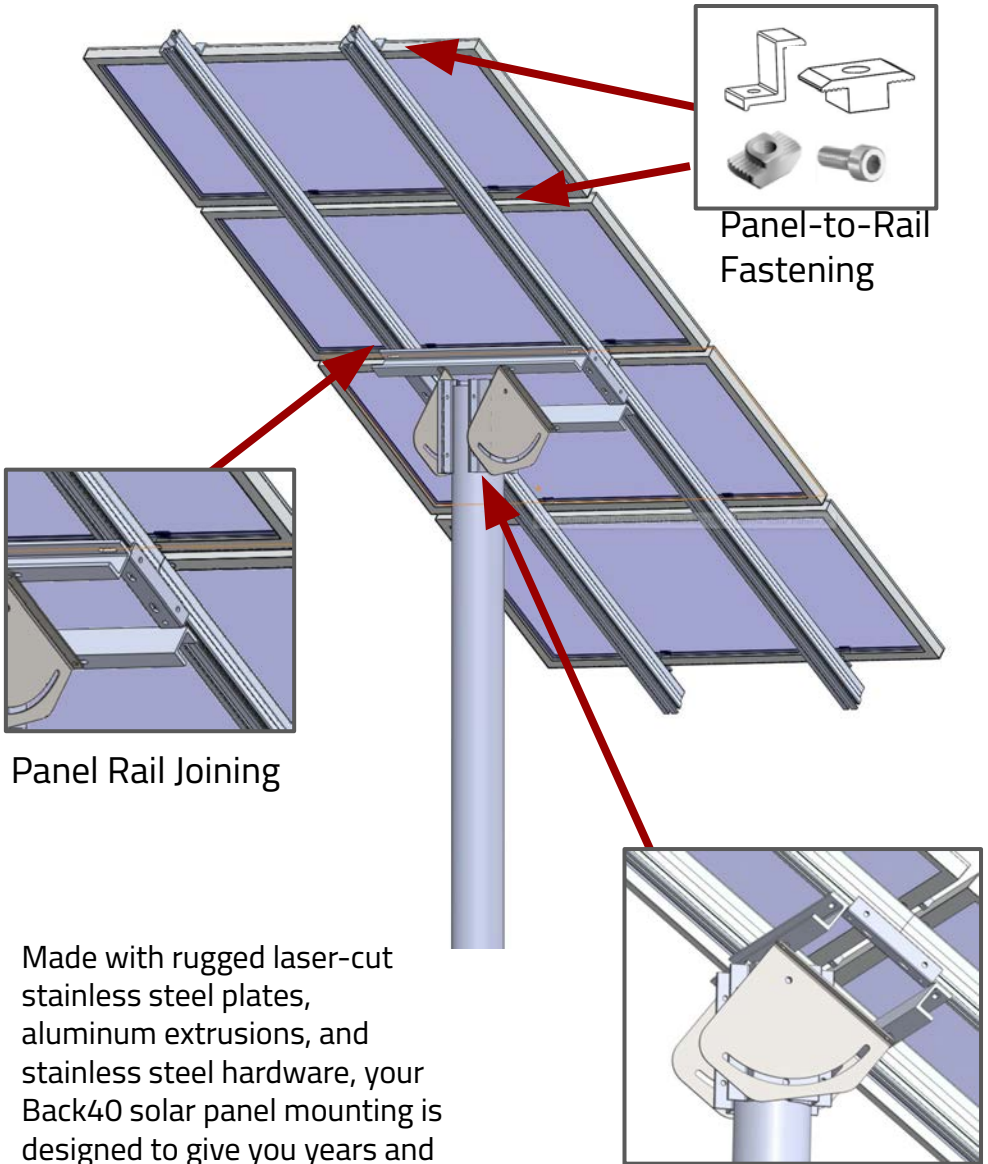
B40TP-4P



REMOTE POWER
FOR FARMS,
RANCHES &
HOMESTEADS
BACK40-SOLAR.COM

OVERVIEW

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Panel-to-Rail
Fastening

Panel Rail Joining

Adjustable Tilt Brackets

Made with rugged laser-cut stainless steel plates, aluminum extrusions, and stainless steel hardware, your Back40 solar panel mounting is designed to give you years and years of service, along with the unique ability to adjust tilt angle based on the season.

Thanks for choosing Back40



REQUIRED TO INSTALL

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EQUIPMENT REQUIRED

- Back40 Mount Kit
- Steel Pipe (Sch40) for Vertical Post
8' to 12' in Length
4" ID / 4.5" OD
- Cement for filling post hole

TOOLS REQUIRED

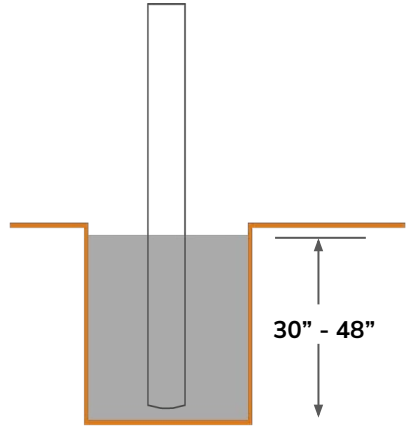
- Auger or post hole digger
- Cement mixing equipment
- Measuring tape
- Compass (or Phone App for True North)
- Level for aligning post vertically
- Sawzall or similar for cutting steel pipe
- Socket & Adjustable Wrenches
- Hex wrench set

WARNING: Whenever you're working with mechanical parts, wiring or connections of solar panels, use caution. Back40 is not liable for damage or injuries that result from improper installation technique.



DIG HOLE & SET POST

Bury the pipe between 30 to 48 inches in the ground based on your site's frost line and local code (30" minimum). It is recommended to use at least two bags of concrete per hole for secure mounting, especially in areas with high winds, soft ground or high snow loads. If concrete is not available, bury pole deeper. Ensure post is vertical on all sides with a Level before cement sets.



Two Options when installing 4 more panels with existing 4P mount:

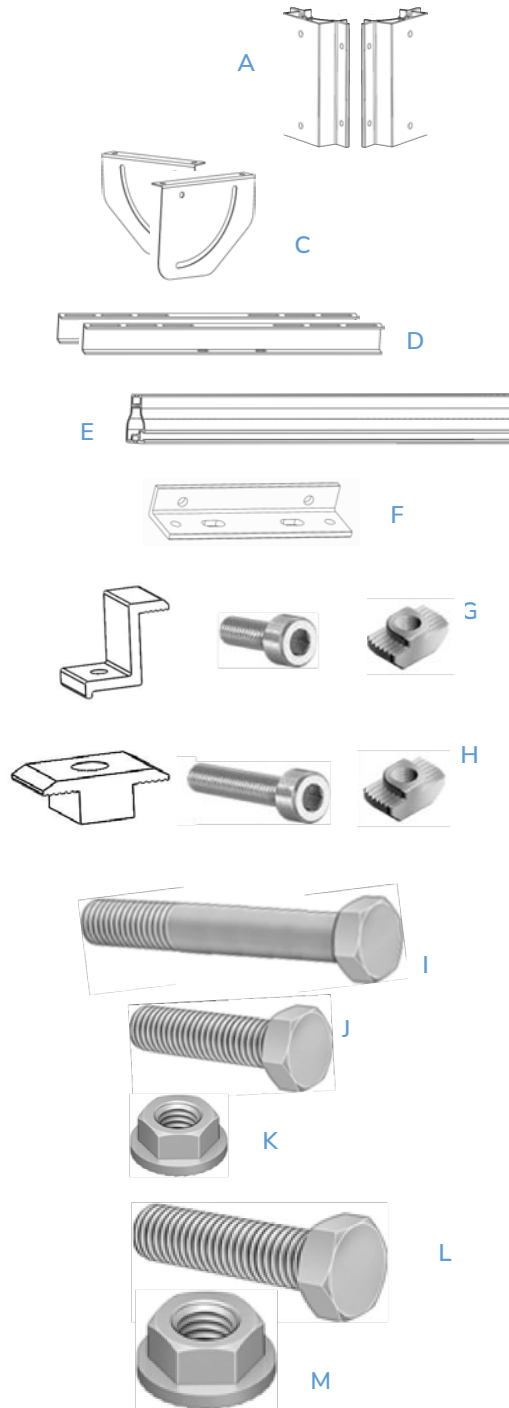
- A. Set an additional 4" post and purchase a second 4P mount (separate the vertical steel posts by at least the length of the long side of the solar panels)*
- B. Purchase the **4P-to-8P Upgrade Kit** that includes the needed hardware to expand the 4 Panel into an 8 Panel Mount on the same 4" post.*

Note: All ratings are based on 4" ID (4.5" OD) Steel Pipe. We have seen installs on 5/6 round treated fence posts (with four longer 5/16 - 18 4.5" bolts when needed) in less windy or protected areas and add additional grounding, and tightening bolts. We cannot speak to longevity on anything but steel pipe as that is what our engineering stamps are based on, but we have seen people get creative with these posts.

4P PARTS

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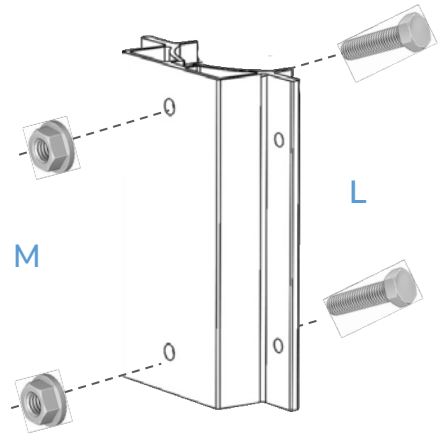
	Qty
Pole Bracket Clamp	2
Tilt Bracket (Left and Right)	2
Extension Rail	2
Panel Rail (45") Full Joined Length: 90"	4
Rail Joining L Plates	2
Panel End Clamp w/ SHORT Socket Head Bolt and Nut	4
Panel Mid Clamp w/ LONG Socket Head Bolt and Nut	6
5/16" - 18 x 3 1/2" Hex Bolt	4
5/16" - 18 x 3/4" Hex Bolt	20
5/16" - 18 Flange Nut	24
3/8" - 16 x 3/4" Hex Bolt	4
3/8" - 16 Flange Nut	4



1 PREPARE POLE CLAMPS

Place the $\frac{3}{8}$ " x $\frac{3}{4}$ " bolts (L) through the holes making sure the head of the bolt is on the inside of the bracket. Repeat for second bracket.

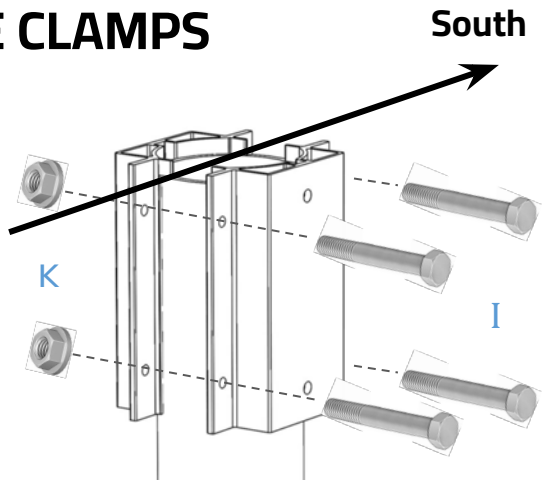
Temporarily secure the bolts with the flange nuts (M)



2 ATTACH POLE CLAMPS

Place the two clamp brackets over the end of the pole. The top tabs should rest on the top of the pole. Use four of the long $\frac{5}{16}$ " bolts (I) and nuts (K) to clamp the brackets to the pole, but not enough to significantly bend the brackets so tightening by hand is ideal.

The clamps should not be able to rotate on the pole once tightened and be facing North/South, bolts aligned East/West. Spec: 11 ft-lbs



3 ATTACH TILT BRACKETS

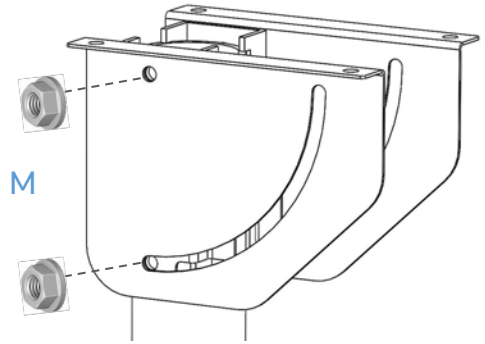
Remove the finger tight $\frac{3}{8}$ " flange nuts (**M**), previously used to hold the brackets together.

Attach one tilt bracket to each side, and use the flange nuts (**M**) to hold the brackets in place.

The top bent portions of the tilt brackets should be facing away from each other, as shown.

With the brackets horizontal, tighten the four $\frac{3}{8}$ " flange nuts to hold the brackets in place.

Spec: 20 ft-lbs



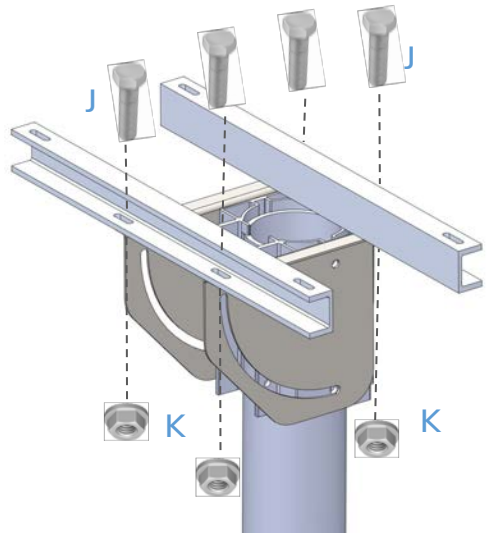
*** In the following steps you'll need these brackets positioned as above horizontally, and fully tightened ***

4 ATTACH EXTENSION RAILS

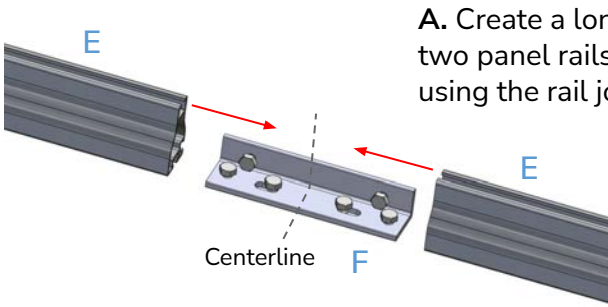
Using four $\frac{5}{16}$ " bolts (**J**) and nuts (**K**), attach the two extension rails (**D**) to the mounting holes on the tilt brackets (**C**).

Align the two rails so they extend the same amount on both sides. Tighten the 4 bolts.

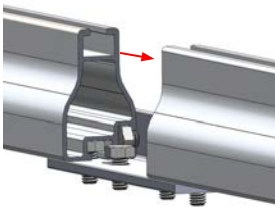
Spec: 11 ft-lbs.



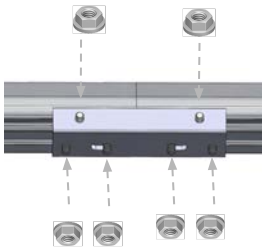
5 JOIN PANEL RAILS



A. Create a long rail by joining two panel rails (E) end to end using the rail joining L-plates (F).

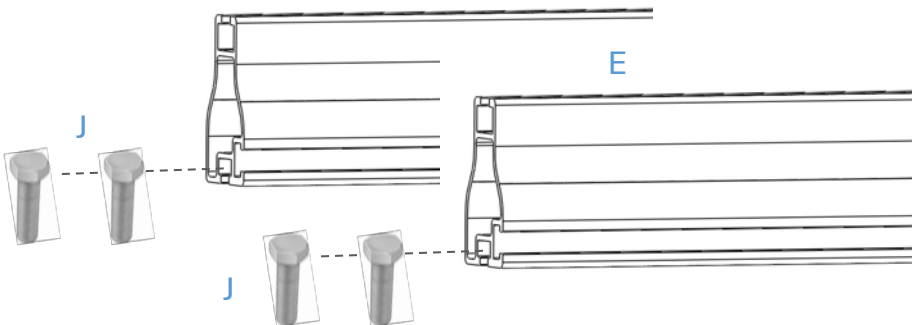


B. Insert six 5/16" bolts into the plate through the bottom and side. Bolt heads will slide into slots in rails as you pull them towards the Centerline.



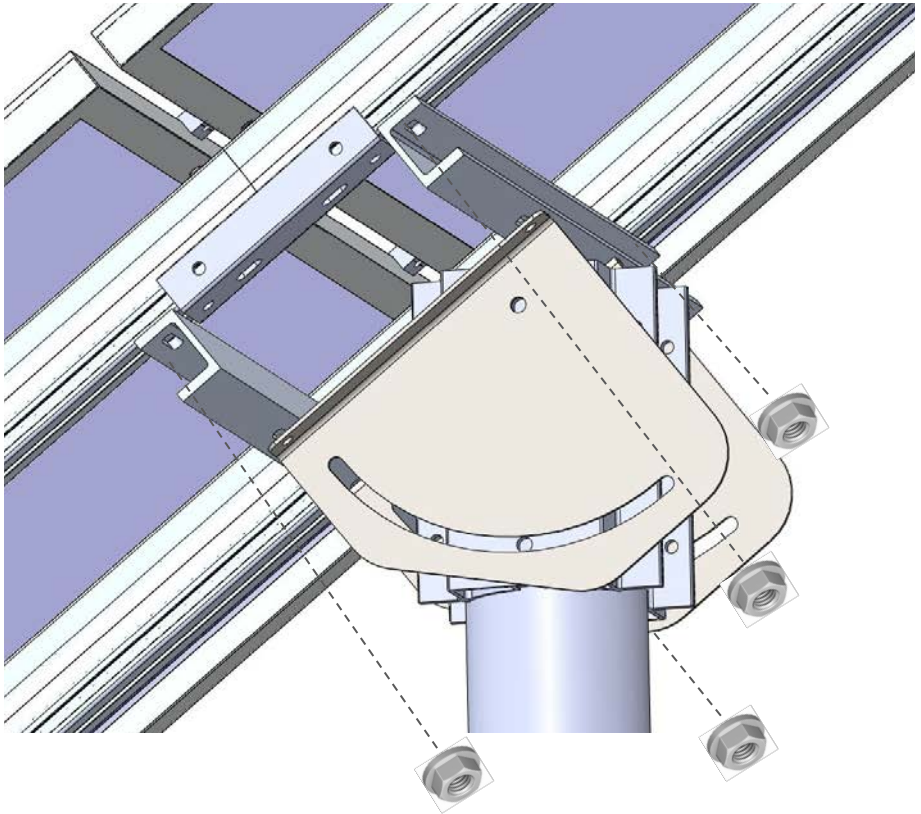
C. The gap should be minimized at the Centerline of the joining plate before tightening all the flange nuts on the bottom and side. Tightening one at a time helps ensure the two rails are even and flush. Spec: 11 ft-lbs

6 PANEL RAILS TO EXTENSION RAILS



The two long Panel Rails (E) will be attached to the Extension Rails (D) using the remaining four 5/16" Hex bolts (J) and nuts (K).

To begin, slide two bolts into the channel on either side of the rails. Place the long rail on top of the Extension Rails, move the bolts into position and guide the bolts through the holes.

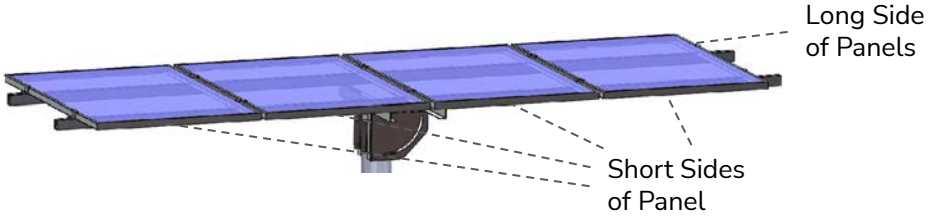


Position the rails about 19" apart and make sure the rails are parallel. Attach the nuts and tighten the bolts to secure the rails. If the bolts are spinning as you try and attach the nuts, simply push the rail to one side so that the pressure holds the bolt in place. Spec: 11 ft-lbs

8

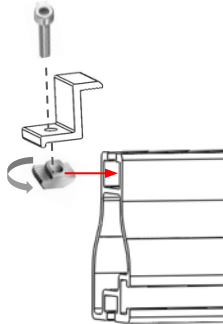
ATTACHING SOLAR PANELS

Your solar panels will affix with their long side across your two horizontal panel rails in 'landscape mode' using the hardware in the kit.



We will be using END clamps (**G**) to secure the ends of the panels and MID clamps (**H**) to secure and attach adjoining panels. Both types consists of the clamp, a bolt, and a T-nut. These can be loosely assembled, and the nuts can be inserted into the channel lengthwise of the Panel Rails from the ends or in the middle. The T-nut locks in place perpendicularly to the channel as tightened.

Start with setting one panel on the rails and using two END clamps and secure the first panel near the end of the rails by tightening the bolts with a hex wrench.



G



END Clamp



H



MID Clamp



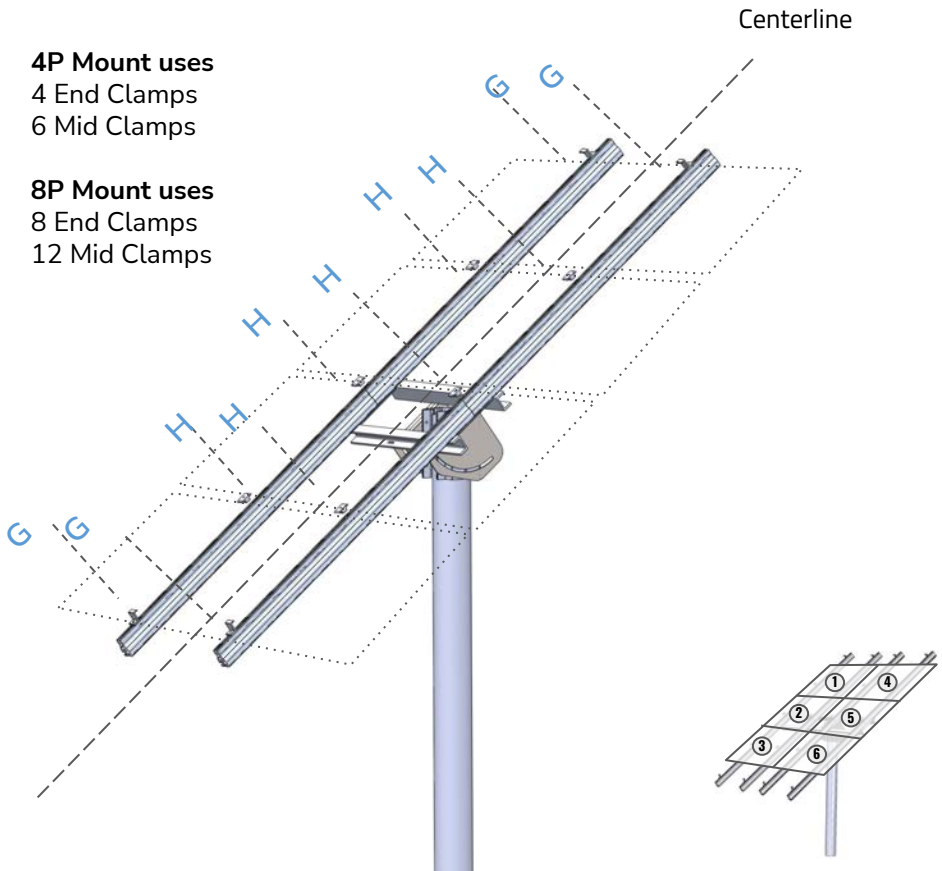
Add the second panel and secure it with the first panel using a MID clamp.

Continue adding one panel at a time until all panels are secured. Finish by adding the last two END clamps. Tighten all bolts.
Spec: 4 ft-lbs

Diagram of the End and Mid Clamps on the 8P Mount on the following page.

DIAGRAM

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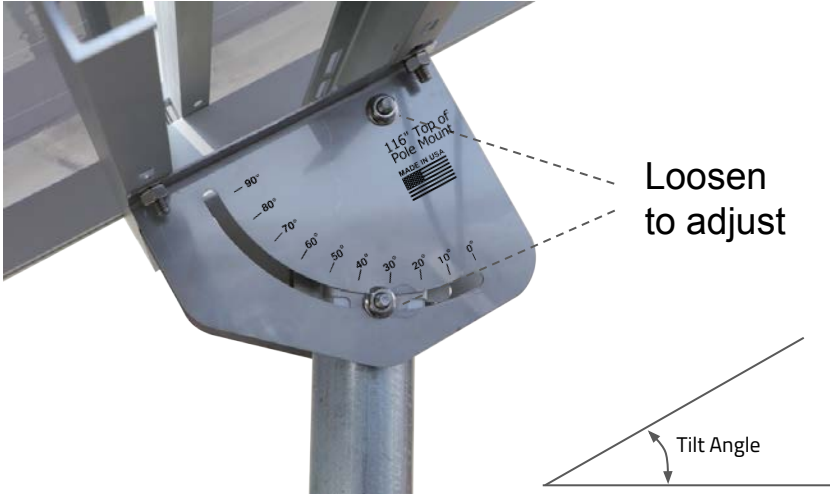


TIP: Tightening the outer $\frac{3}{8}$ " Bolts to secure the rails horizontally allows easier attaching of solar panels with the MID and END clamps.

In most cases, 4 Panel Mount kits can be upgraded to hold 6 or 8 panels with the 4P-to-8P Upgrade Kit that includes the needed hardware to expand the 4 Panel into an 8 Panel Mount on the same 4" post. In some cases there may be some extra overhang of rail length past the ends of the solar panels. This can be chopped off with a sawzall or left there, which allows for the adding of more solar panels in the future. Setting an additional 4" post and purchasing a second 4P mount (separate the vertical steel posts by at least the length of the long side of the solar panels) is also an option.

ADJUSTING TILT ANGLE

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While supporting the panels, loosen the flange nuts on the tilt brackets to adjust the panels to the appropriate angle (see reference table for regional tilt angles) then tighten again. Spec: 20 ft-lbs

Latitude	Fixed Position		Seasonal Change *		
	Full Year Fixed Angle	Avg. Insolation	Summer Angle	Winter Angle	Avg. Insolation
25° (Key West)	22.1°	6.2	2.3°	41.1°	6.6
30° (Houston)	25.9°	6.1	6.9°	45.5°	6.4
35° (Albuquerque)	29.7°	6.0	11.6°	49.8°	6.2
40° (Denver)	33.5°	5.7	16.2°	54.2°	6.0
45° (Minneapolis)	37.3°	5.4	20.9°	58.6°	5.7
50° (Winnipeg)	41.1°	5.1	25.5°	63°	5.3

*Adjust Summer Angle on March 30th, Adjust Winter Angle on September 12th



*Well done!...and thank you
for your business!
- The Back 40 Team*