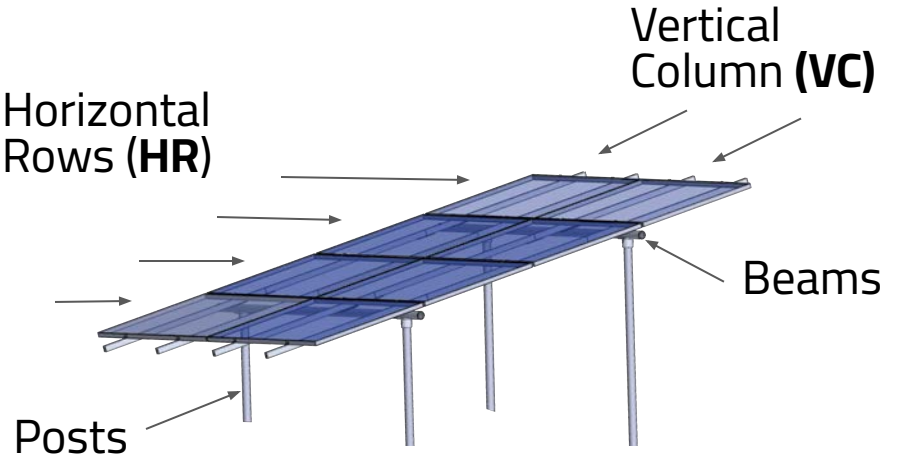
UNIVERSAL SCALABLE SOLAR PANEL GROUND MOUNT KIT

BACK 40 SOLAR

REMOTE POWER FOR FARMS, RANCHES & HOMESTEADS

BACK40-SOLAR.COM

MODELS & SIZES



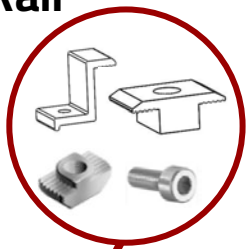
	Vertical Columns				
	1x	2x	3x	4x	*Larger*
4x **Horizontal** Rows (Number of **Larger** Solar Panels ex. 300w)	**VC1-HR4** (4 Panels)	**VC2-HR4** (8 Panels)	**VC3-HR4** (12 Panels)	**VC4-HR4** (16 Panels)	*VC -HR4*
8x **Horizontal** Rows (Number of **Smaller** Solar Panels ex.100w)	**VC1-HR8** (8 Panels)	**VC2-HR8** (16 Panels)	**VC3-HR8** (24 Panels)	**VC4-HR8** (32 Panels)	*VC -HR8*
Rough Array **Dimensions**	7' Wide X 16' Deep	10' Wide X 16' Deep	15' Wide X 16' Deep	20' Wide X 16' Deep	

** Exact Dimensions vary with angle and solar panel size*

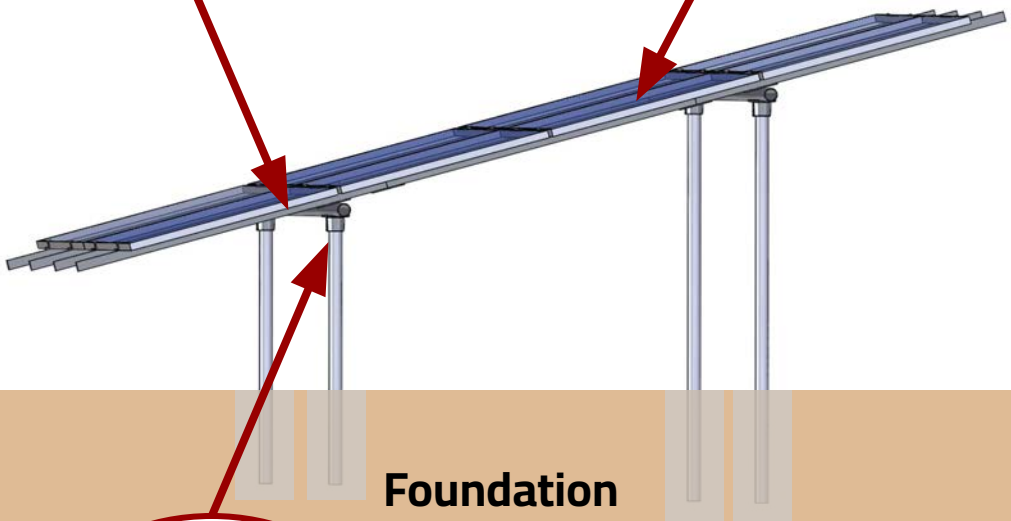
BACK 40 SOLAR

MAIN COMPONENTS

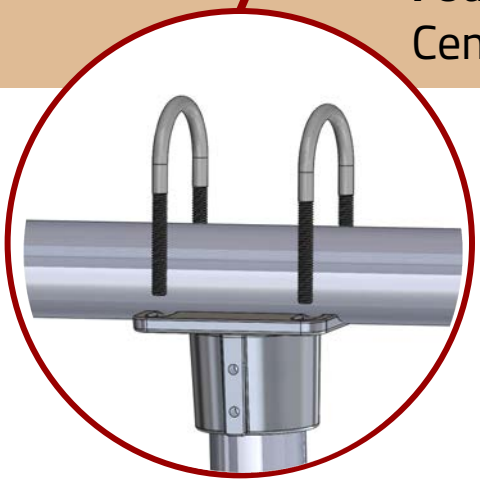
Panels-to-Rail
Fastening



Rail-to-Beam
Fastening



Foundation
Cement Post Holes



Tee Cap &
Pipe Substructure

BACK 40 SOLAR

INCLUDED PARTS

Tee Caps								
	VC1	**VC2**	**VC3**	**VC4**	**VC5**	**VC6**	**VC7**	**VC8**
Tee Cap Assembly	4	4	6	8	10	12	14	16
Each cap comes with two U-bolts and nuts to fasten beam to top of post								

58" Panel Rails								
	VC1	**VC2**	**VC3**	**VC4**	**VC5**	**VC6**	**VC7**	**VC8**
Rails	6	12	18	24	30	36	42	48
Three 58" panel rails will be joined together into a full-length 174" rail. Two of these full-length rails will be used for each column of panels.								

Rail-to-Beam & Rail Joining								
	VC1	**VC2**	**VC3**	**VC4**	**VC5**	**VC6**	**VC7**	**VC8**
Multi-Use L-Plates for **Joining Rails*** **+** for **Rail-to-Beam****	8	16	24	32	40	48	56	64
* Each L-Plate for joining rails comes with **six** 5/16" bolts and flange nuts. ** L-Plates for Rail to Beam connections - **two** 5/16" bolts/flange nuts and a U-bolt/nuts   								

INCLUDED PARTS

Mid Clamps								
	VC1	**VC2**	**VC3**	**VC4**	**VC5**	**VC6**	**VC7**	**VC8**
HR8	14	28	42	56	70	84	98	112
HR4	6	12	18	24	30	36	42	48
Each mid clamp comes with a T-hammer nut and socket head bolt sized to the panel thickness. 								

End Clamps								
	VC1	**VC2**	**VC3**	**VC4**	**VC5**	**VC6**	**VC7**	**VC8**
HR8 (Reg)	4	8	12	16	20	24	28	32
HR4 (XL)	4	8	12	16	20	24	28	32
Each end clamp comes with a T-hammer nut and socket head bolt sized to the panel thickness. 								

PARTS NEEDED

OTHER PARTS NEEDED

- Cement for Post Holes
- 2 Inch Steel Pipe
  Schedule 40 (2" ID, 2⅜"OD)

	Vertical Columns of Solar Panels			
	VC1	**VC2**	**VC3**	**VC4**
Rough Array **Dimensions** (Feet, Wide x D)	7x16	10x16	15x16	20x16
Post Holes	4	4	6	8
Bags of **Cement Needed***	8	8	12	16
Steel Pipe Required* for Substructure (2")	50'	50'	75'	100'

* Customer Supplied 2in steel pipe (2-⅜" OD)

	Vertical Columns of Solar Panels			
	VC5	**VC6**	**VC7**	**VC8**
Rough Array **Dimensions** (Feet, Wide x D)	25x16	30x16	35x16	40x16
Post Holes	10	12	14	16
Bags of **Cement Needed***	20	24	28	32
Steel Pipe Required* for Substructure (2")	125'	150'	175	200'

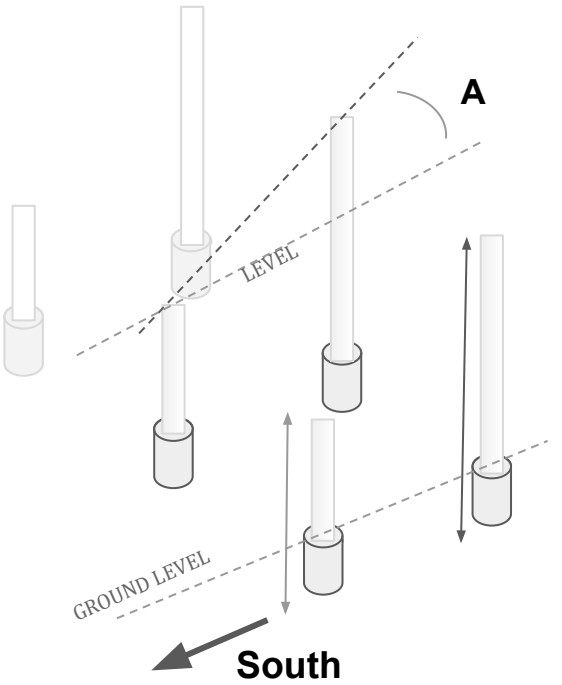
* Customer Supplied 2in steel pipe (2-⅜" OD)

REQUIRED TO INSTALL

BACK 40 SOLAR

TOOLS REQUIRED

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



LATITUDE OF INSTALL	A *Fixed Full Year Angle*
27° (Corpus Christi)	23°
30° (Houston)	26°
35° (Albuquerque)	30°
40° (Denver)	34°
45° (Yellowstone)	37°

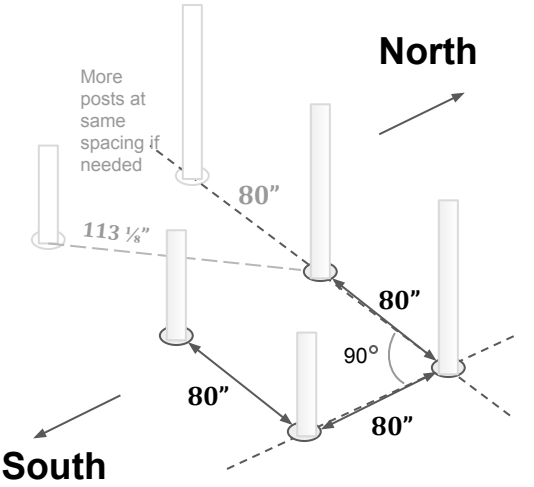
BACK 40 SOLAR

SITE WORK

1. Locate and dig holes

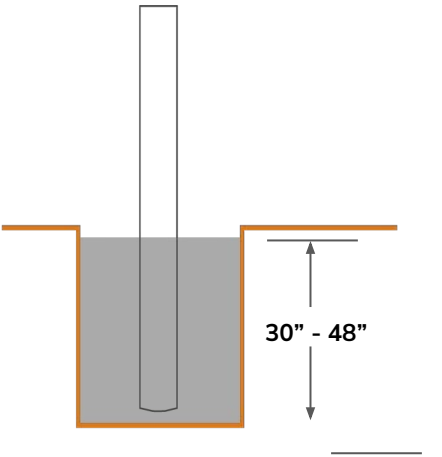
Front post holes and back post holes should be lined up true north and south with the shorter front posts towards true south.

Holes should be 6′ 8″ apart (80″ on center). Ensure square with tee or with diagonal distances which between posts should measure 113 ⅛″.



2. Set Vertical Posts in Holes

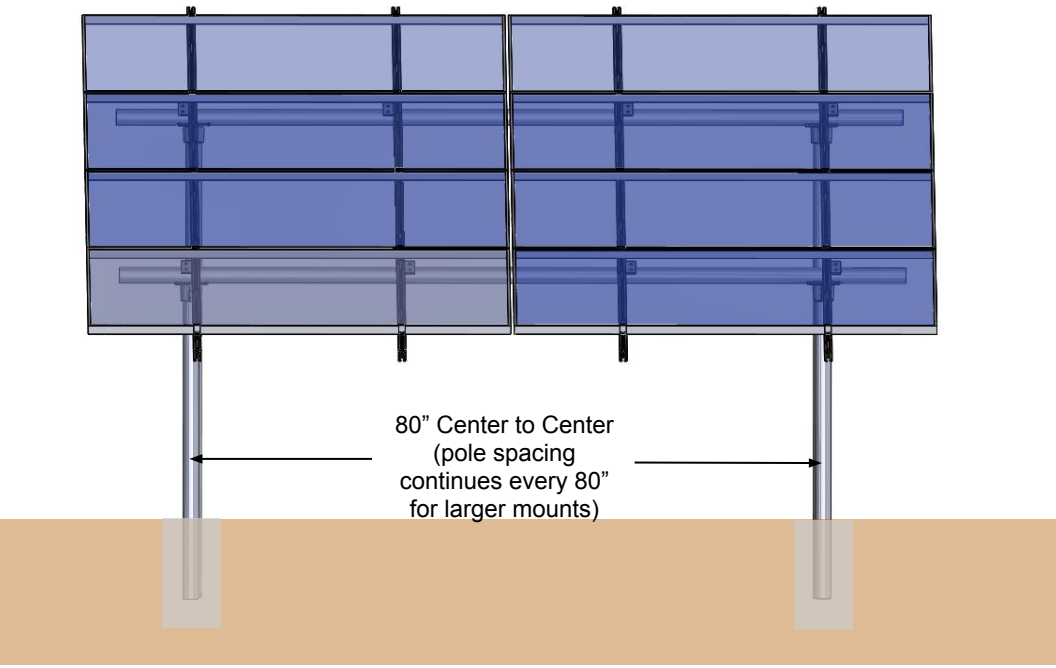
Bury the pipe between 30 to 48 inches in the ground based on your site's frost line and local code (30'' minimum). It is recommended to use at least two bags of concrete per hole for secure mounting, especially in areas with high winds, soft ground or high snow loads. If concrete is not available, bury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



POST LAYOUT

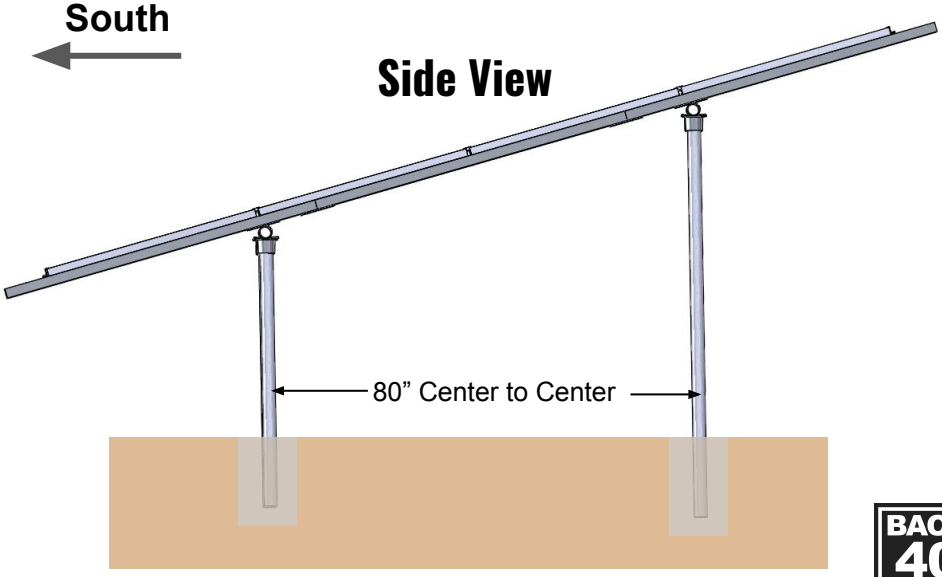
BACK 40 SOLAR

Front View



South

Side View

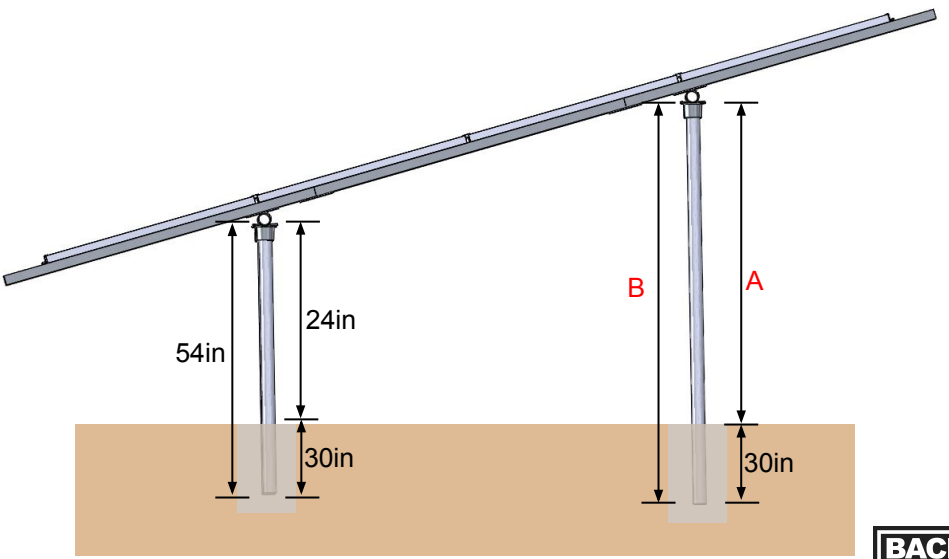


BACK 40 SOLAR

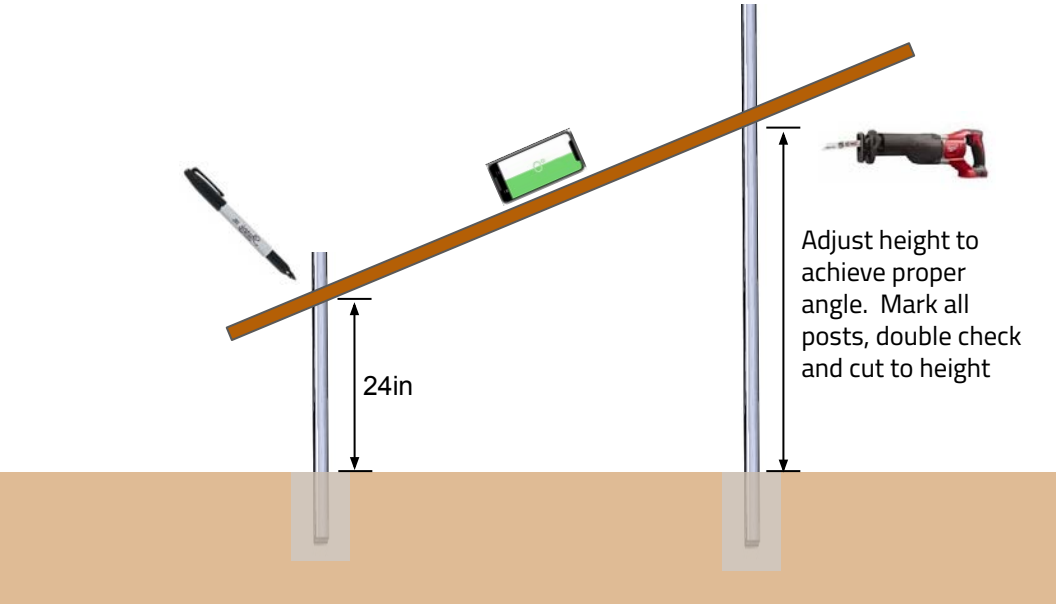
POST LENGTHS (Method 1)

Latitude	Full Year Fixed Angle	Front Post Height Above Ground	Front Post Total Length	A* Rear Post Height Above Ground	B* Rear Post Total Length
25° (Key West)	22.1°	24″	54″	56″	86″
30° (Houston)	25.9°	24″	54″	63″	93″
35° (Albuquerque)	29.7°	24″	54″	70″	100″
40° (Denver)	33.5°	24″	54″	78″	108″
45° (Minneapolis)	37.3°	24″	54″	84″	114″
50° (Winnipeg)	41.1°	24″	54″	94″	124"

*24'' standard front post height above ground with 30" depth in ground. To increase or decrease overall array height, add or subtract the same amount from both front and rear post. If installing deeper than 30" in ground, add additional length to each post



POST LENGTHS (Method 2)



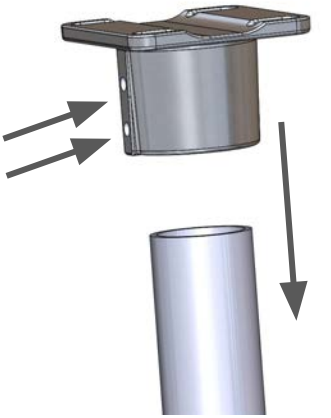
1. Cut 10 ft long 2" pipes in half for the front posts (5ft length) and use full 10ft lengths for the back posts.
2. Set all posts at least 30" in the ground using concrete
3. Using a straight edge (lumber, panel rails or pipes all work) and digital angle measurement (most smartphones have an app) lay the lumber from 24" up the front post to the back post. Adjust the back height in order to achieve the proper angle as shown on the prior page.
    a. Mark front and back post cut heights
    b. Repeat for other pairs of front and back posts
4. Double check measurements by laying a straight edge between marks on back posts and then marks on front post to make sure marks are level
5. After double checking measurements, cut posts to the proper marked height

PIPE SUBSTRUCTURE

3. Attach Tee Caps to Tops of Posts

Place a Tee Cap over the top of each of your posts, aligning the indentation for the Cross Beam pipe to be East/West. The holes in these parts will allow for the U-Bolts to fasten the pipe down.

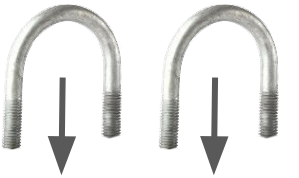
Tighten the set screws with the included Hex wrench to 20 ft-lbs of torque. Torque top screw first, then bottom screw.



4. Fasten Cross Beam Pipes

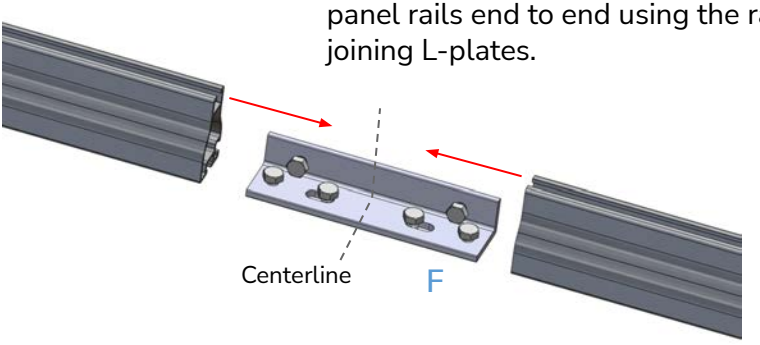
Once all the Tee Caps are in place on top of the posts, lay the horizontal beam pipes in the indentations. Place your U-Bolts over the pipes and into the slots in the Tee Cap. Do this for the front beams and the back beams. If needed, butt ends of 2 horizontal beams together on top of a tee so each beam gets a U-Bolt and the pipe union is centered on the Tee Cap.

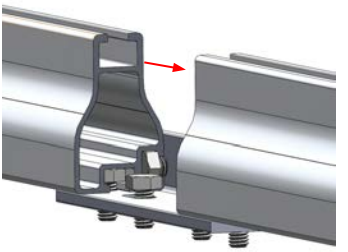
Add washers and nuts from below to the thread of the U-Bolts and tighten firmly.



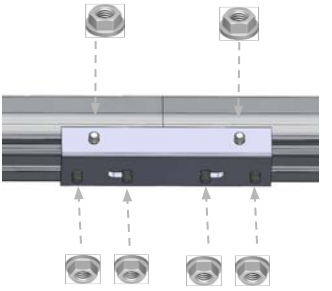
RAIL JOINING

A. Create a long rail by joining three panel rails end to end using the rail joining L-plates.





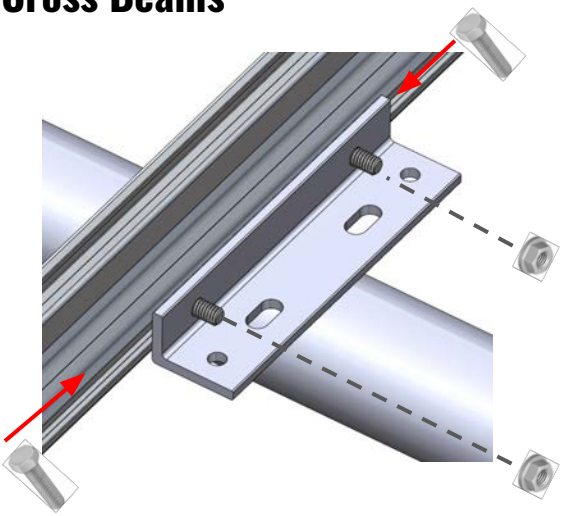
B. Insert six 5/16” bolts into the plate through the bottom and side. Bolt heads will slide into slots in rails as you pull them towards the Centerline.



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. Fastening Rails to Cross Beams

The Panel Rails will be attached to the Horizontal Pipe Beams using a U-Bolt assembly, the remaining 5/16" bolts, and the Rail-to-Pipe plates shown on the right.



Attach two plates to each long rail loosely with the 5/16" bolts, and flange nuts. Bolt heads slide into the slot in the rail from the end and go through the holes in the side of the L plate without the slots.

Position the rails evenly front to back and side to side on the beams and make sure the rails are parallel.

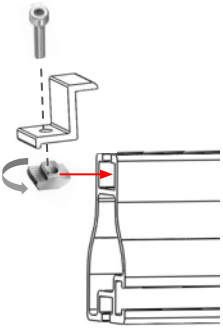
Move the U-Bolts into position from underneath and guide the bolts through the holes. Fasten the U-Bolts in place on the pipe (at the same spacing as the rails next to it) using the washers and nuts.

Tighten all the nuts of the carriage bolts and U-Bolts to secure the rails to the beams. Rails should not slide east/west or north south.

PANELS-TO-RAILS

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.

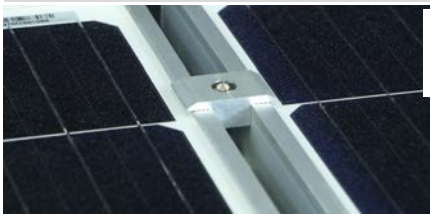


G

END Clamp

H

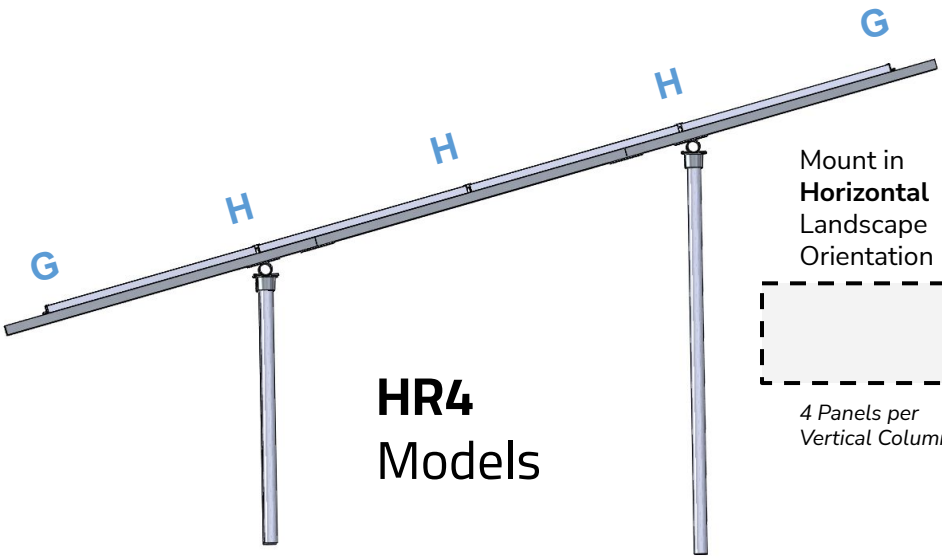
MID Clamp



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

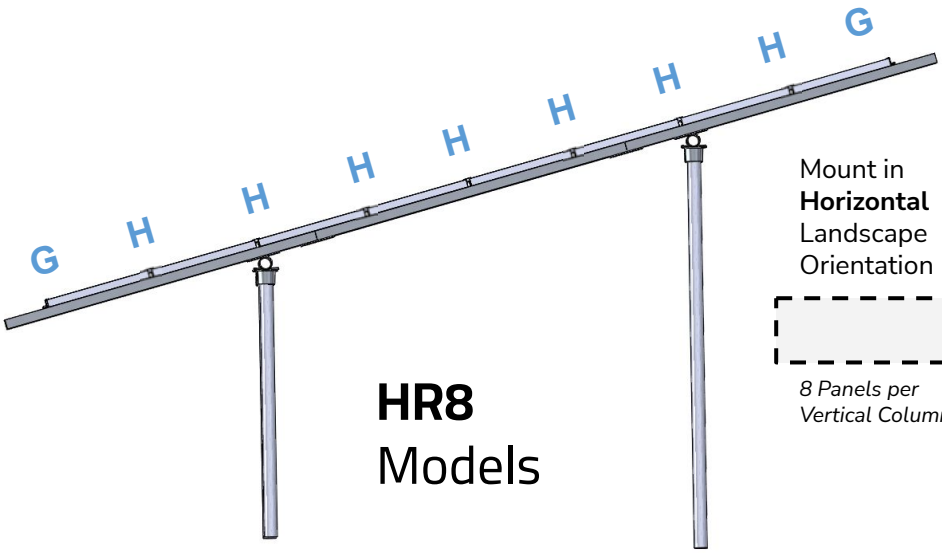
PANELS-TO-RAILS



HR4
Models

Mount in
Horizontal
Landscape
Orientation

4 Panels per Vertical Column



HR8
Models

Mount in
Horizontal
Landscape
Orientation

8 Panels per Vertical Column

Thank you
for your business!
- The Back 40 Team

REMOTE POWER FOR FARMS, RANCHES & HOMESTEADS

BACK4OSOLAR.COM