



Installation Instructions:

Unaka Flush Mount Solar Panel Brackets



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The Unaka Gear Co Team is here to help. If you have issues or questions, please do not hesitate to contact us at csr@unakagearco.com.

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1. Overview

This set of instructions is a basic guideline on how to install our Flush Mount Solar Panel Brackets. The examples shown in this manual use an 8020 roof rack as the platform but these can easily be installed on Uni-strut roof racks as well. Since our brackets are designed to be flexible for DIY projects this set of instructions may not cover everything for your specific installation. If you have questions or issues with our product do not hesitate to contact us at csr@unakagearco.com.

2. Safety

Working with tools involves inherent risks that could result in injury or in extreme cases death. It is important to know how to perform the job and perform it safely. Always use the correct tools for the job and wear the required personal protective equipment (PPE) necessary for the job. If you are unsure of how to complete a task safely consult a friend or a professional. Below are some suggestions for PPE to help stay safe but as individuals may approach a job differently, they may need to adjust the required PPE accordingly.

Suggested PPE:

- Safety Glasses
- Gloves

Ladder Safety: Installing your solar panels will require the use of a ladder. Any ladder used should follow the manufactures guidelines with respect to proper usage.

3. Required Tools

The following tools or a combination of these tools should be used for this installation.

3.1. Tools Required for Unaka Roof Rack Brackets

- Standard socket or wrench set (must include 7/16" socket)
 - 7/16" Socket or wrench is the size required for this job.
- 7/16" Box wrench
- Torque Wrench (Must go up to 75 in-lbs. or 6.2 ft-lbs. and be compatible with a 7/16" socket)
- Standard Allen Wrench Set (must include 3/16" Allen Key)
- Torque Wrench (Must go up to 180 in-lbs. or 15 ft-lbs. and be compatible to use with 3/16" Allen Key)

4. Required Materials

- Blue 242 Loctite: Apply this to the 5/16" Bolts that attach the brackets to the 8020
- Anti seize: **Apply anti seize to the 1/4"-20 bolts prior to bolting the solar panel to your bracket. Failure to do so can result in galling and having to remove the bolt by breaking it or cutting it off

5. Tips

- The slots on the bracket look similar, but one is narrower for the ¼” bolts. Make sure you bolt the narrower slot to the solar panel, otherwise when you put it on the van roof, you won’t be able to get the 5/16” hardware through the slots
- Use anti seize on the ¼-20 bolts, that bolt the solar panel to the flush mount bracket. Do not use power tools to tighten these bolts, as that faster speed promotes galling, and seizing a bolt. Use hand tools and go slow. If a bolt galls, often you can keep trying to tighten it until it breaks off. Otherwise it will have to be cut off.

6. How many brackets to purchase

Small solar panels: On 100W and smaller solar panels use at least 4 brackets (2 Sets) per solar panel

Large Solar Panels: On anything larger than a 100W solar panel we recommend using 6 to 8 brackets (3 to 4 sets) per solar panel. This may require adding additional mounting holes to your solar panel.

*****It is ultimately up to the customer to review their solar panel size, the solar panel manufactures recommendations on how many brackets to use, and to evaluate how they are installing the panel to make sure it is securely attached to the van roof or rack.*****

7. Flush Mount Solar Panel Brackets

Our custom designed flush mount solar panel brackets are one of our most popular accessories to go with a Unaka roof rack kits or your own DIY rack. These brackets are designed to give you the cleanest and easiest solar panel installation possible when used with 8020 or Uni-Strut roof racks. These brackets are likely the most secure bracket that you could use to install your solar panel as most brackets provided by solar panel manufactures are made from aluminum. Our sturdy brackets are precision stamped out of 14 Gage Stainless Steel which will give you a secure corrosion resistant mounting surface that will not only outlast your solar panels but probably your van. The slotted hardware locations in each bracket help compensate for different solar panel sizes as well as for any tolerance stack up that may occur while you are building your roof rack. Each set of brackets comes with 2 flush mount brackets and hardware as shown in Figure 1. Table 1 lists the part numbers, descriptions, and quantities per kit.

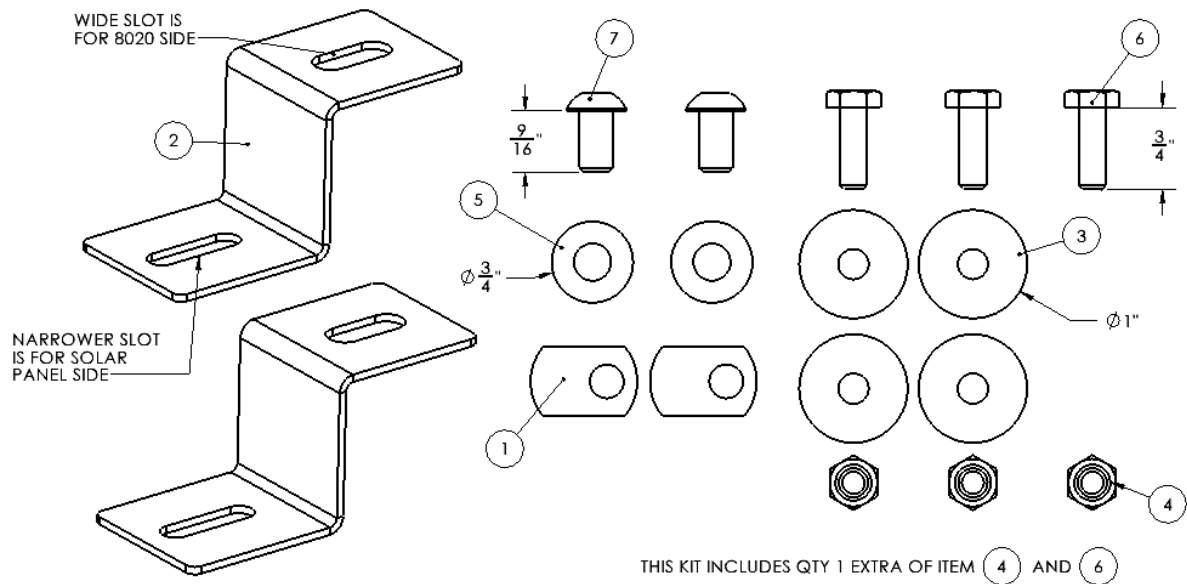


Figure 1: Flush mount solar panel brackets, set of 4

Table 1: Bill of material

ITEM NO.	Manufacturer	PART NUMBER	DESCRIPTION	MATERIAL	LENGTH	QTY.
1	8020	8020-3678	T-NUT, ECONOMY, 5/16 THREAD, SS	NA		2
2	Unaka Gear Co.	1001-MB27-01	FLUSH MOUNT SOLAR PANEL BRACKET, NARROW	AISI 304	1.500 IN.	2
3	ANY	90313A107	WASHER, 1/4" X 1" OD, 18-8 SS	NA		4
4	ANY	91831A029	LOCKNUT, 1/4-20, 18-8 S.S.	NA		3
5	ANY	92141A030	FLAT WASHER, 5/16" SCREW SIZE, 0.344" ID, 0.75" OD, 18-8 SS	NA		2
6	ANY	92240A540	HEX BOLT, 1/4-20 X 0.75" FULLY THREADED, 18-8 S.S.	NA		3
7	ANY	92949A853	BHCS, 5/16-18 X 0.5625" LG. FULLY THREADED, 18-8 S.S.	NA		2

Figure 2 shows a single flush mount solar panel bracket with the respective hardware provided with the separate flush mount bracket 8020 hardware kit. The side of the flush mount bracket with the larger slot mounts on top of the 8020 style extrusion and the single narrower $\frac{1}{4}$ " slot should bolt to the bottom of your solar panel in the holes provided by the panel manufacture.

NOTE, make sure to bolt the smaller slot to your solar panels, otherwise the 5/16" bolt that goes to the 8020 will not fit.

Figure 3 shows a cut away with the 8020 hardware kit securing a single mounting point on the solar panel to a piece of 8020. We typically recommend installing the hex bolt from underneath the solar panel and use the Ny-loc nut on the inside of the solar panel frame.

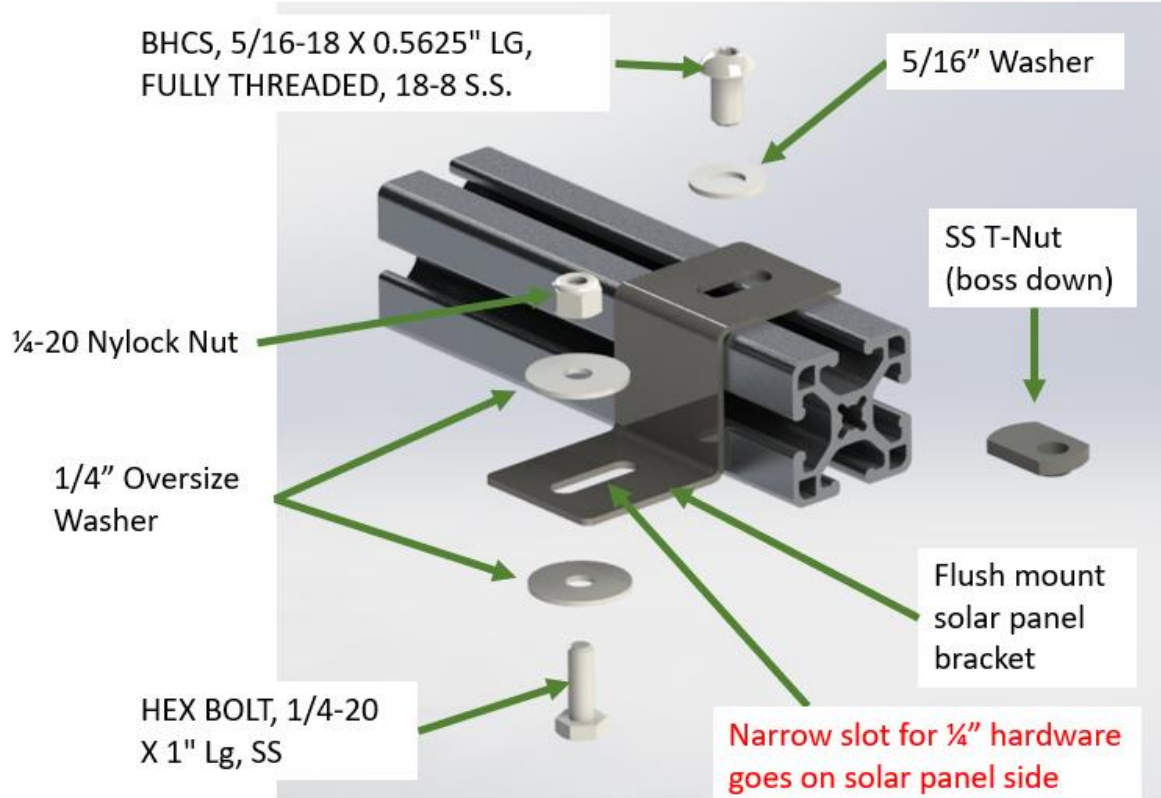


Figure 2: Single flush mount bracket with 8020 hardware shown.

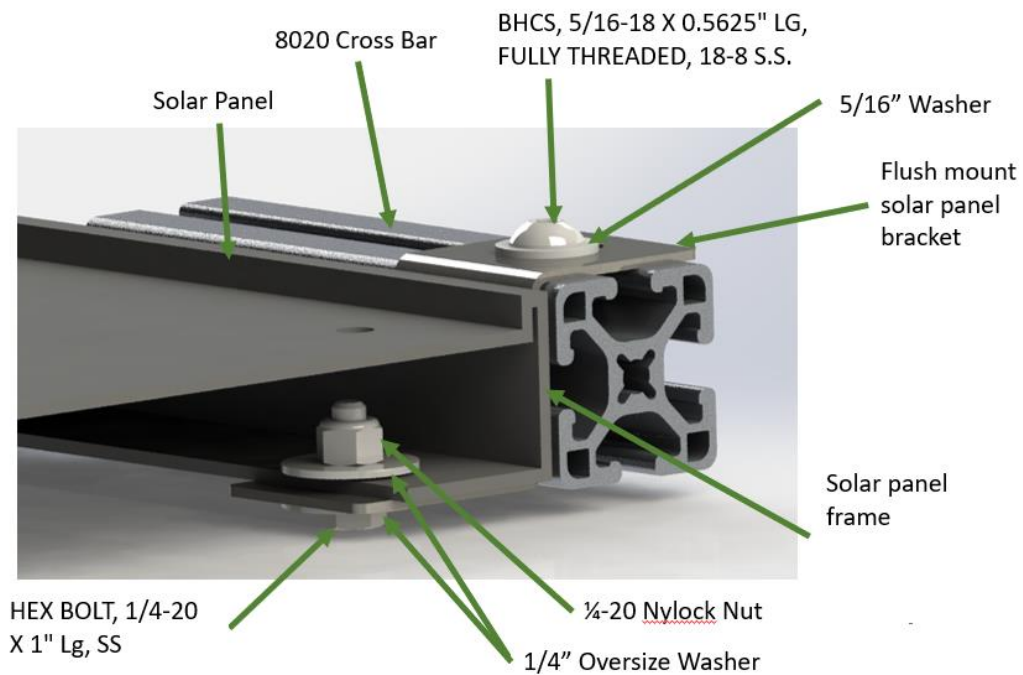


Figure 3: Cut away view showing flush mount hardware inside of a mounted solar panel

8. Flush Mount Solar Panel Installation Summary

Before installing these brackets, please review the next section which covers some additional notes on the installation process for these brackets. If you are installing an 8020 roof rack kit you should also review our 8020 roof rack kit installation manual.

1. Identify the mounting locations you plan to use on your solar panel.
2. Loosely install the solar panel bracket with the single narrower slot for ¼" hardware going to your solar panel. *****Note the bracket looks similar, but the 2 slots are different sizes*****
3. If you are trying to minimize the total width of your solar panel and bracket combination, slide the solar panel bracket all the way against the side of your solar panel before tightening you're the hardware
4. Install you're the mounting hardware into the respective cross bars or side rails
5. With all of your solar panel brackets in position, lower place your solar panel onto your roof rack cross bars
6. Tighten the hardware to secure your solar panels to your cross bars

9. Flush Mount Solar Panel Bracket Installation Notes

Installation Notes:

- Before installing a solar panel using any bracket, make sure you review the installation instructions provided by your solar panel provider. The solar panel manufactures installation recommendations should be used if there are any contradictions in this manual to their instructions.
- Each flush mount solar panel bracket requires 1 t-nuts to be installed in the 8020 mounting locations for each solar panel bracket. If 2 flush mount brackets are overlapping as described in Figure 4 and Figure 5 then those brackets in that location will share the same 2 t-nuts and bolts.
- Unaka recommends using the flush mount solar panel brackets along the longest edge of the solar panel for maximum support. In some cases, this requires additional support cross bars along the length of the solar panel.
- If two or more solar panels are mounted next to each other as shown in Figure 4, the flush mount solar panel brackets can be overlapped as needed to utilize the same mounting holes on one solar panel to the next. Figure 5 shows a cut away of this installation.
- Some solar panel manufactures will void the solar panel warranty if additional mounting holes are added to the solar panel. If you choose to add extra holes to re-locate your mounting brackets do so carefully as to not damage the solar panel.
- Figure 4 shows an example of multiple solar panels installed using the Unaka flush mount solar panel brackets.

Figure 4 shows an example of multiple solar panels installed using the Unaka flush mount solar panel brackets.

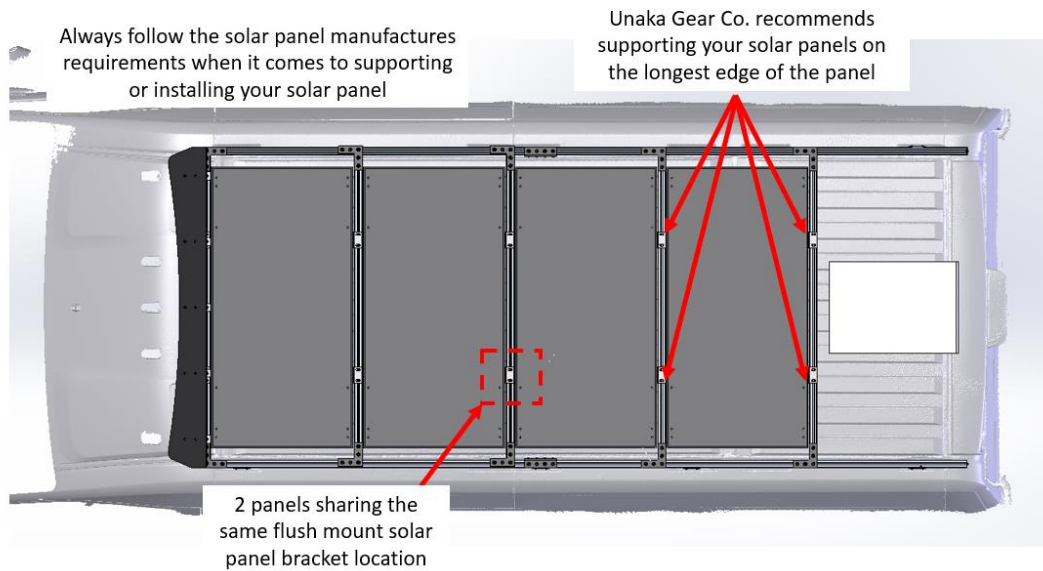


Figure 4: Flush mount brackets used for multiple solar panel installation.

Figure 5 shows a cut away of two flush mount solar panel brackets being installed in the same position to utilize the same mounting hole in one solar panel to the next. In some cases, solar panels have multiple mounting hole locations in which case the flush mount solar panel brackets can be staggered so they don't have to overlap.

Note that if both sides of a single solar panel installation or not overlapping the next set of flush mount brackets the panel may be installed at a slight angle as one bracket will be resting lower than the other. If the solar panel is too stiff to allow this compensation, spacers or shims can be added to the lower side to bring the flush mount bracket up to the same height as the other side.

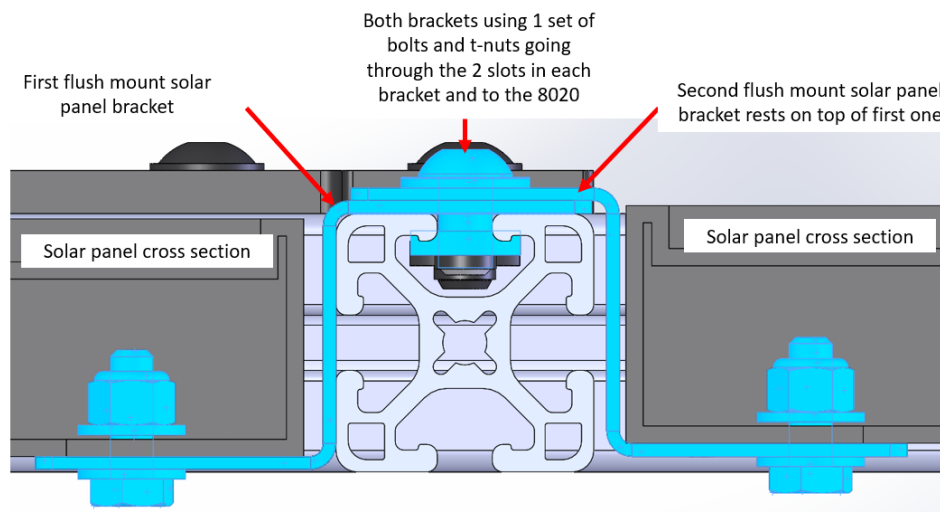


Figure 5: Cut away view of overlapping flush mount solar panel brackets

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