

# Installation Manual

STP-8212-MAN 2018 Edition v1.0

Formodels:

STP-LCR/82R

STP-LCR/120R





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**Introduction**

The Top of Pole Mount is an extremely sturdy, universal pole mounting solution for small area solar photovoltaic (PV) needs. With its user adjustable angle settings (0° to 60° in 10° increments), the Top of Pole Mount can support installations in a wide range of locations.

**Customer Support**

Tamarack Solar makes every effort to ensure your mounting kit is easy to install. If you need assistance at any point in your installation or have suggestions on how we can improve your experience, call customer support at **1-800-819-7236** or email us at **info@tamaracksolar.com**

**Tools Required**

Tools that support the following size Hex heads: Torque values are “dry”, add 15% if using anti-seize lubricant on **Stainless** hardware (Recommended). A deep socket or short extension needed for 3/8”, in one location.

1. 3/8”= 240\20 In\Ft Lbs
2. 5/16”= 144\12 In\Ft Lbs
3. 1/4”= 84\7 In\Ft Lbs

**Components List:**



**Galvanized coated sheet steel components will show rust on cut edges and is normal and will not affect the structure and function of the mount.**

<b>STP-LCR/82R</b>			
<b>ITEM</b>	<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY.</b>
1	51-04PC-012 REV A	4" Pipe Clamp Half	2
2	51-04CH-012 REV A	Clamp Strong Back Cap	1
3	51-04BC-TLT REV A	Channel, Tilt Plate Mounting	2
4	51-04TP-LR2 REV C	TILT PLATE L/R	2
5	51-04CR-R60 REV B	Rail, 60 in Cross	2
6	51-04TC-082 REV D	Panel Support TP 82 inch	2
7	23-3716-100	Bolt, 3/8-16 x 1.0 Hex SST.	14
8	25-3702-000	Washer, Flat 3/8" SST.	28
9	25-3701-000	Washer, lock 3/8" SST.	14
10	24-3716-440	Nut, 3/8-16 Hex SST.	14
11	27-0456-700	Rod, threaded, SST 5/16-18 x 7" long	4
12	23-3118-875	Bolt, Hex 5/16-18 x .875 SST	4
13	25-3102-000	Washer, flat 5/16" SS	4
14	25-2501-015	Nut, flange 5/16 SST	20
15	23-2520-050	Bolt, Hex 1/4-20 x .75 SST	24
16	25-2502-000	Washer, flat 1/4 SS	32
17	25-2501-000	Washer, lock 1/4"	8
18	24-2520-440	Nut, 1/4-20 fin hex SS	8
19	25-2501-014	Nut, Flange Serrated 1/4-20 SST	16

<b>STP-LCR/120R</b>			
<b>ITEM</b>	<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>QTY.</b>
1	51-04PC-012 REV A	4" Pipe Clamp Half	2
2	51-04CH-012 REV A	Clamp Strong Back Cap	1
3	51-04BC-TLT REV A	Channel, Tilt Plate Mounting	2
4	51-04TP-LR2 REV C	TILT PLATE L/R	2
5	51-07CR-058 REV C	Cross Rail, 58 Inch	2
6	51-07TC-060 REV D	Panel Support, STP/LTP 60"	4
7	51-07CN-030 REV D	Connector, 30"	2
8	23-3716-100	Bolt, 3/8-16 x 1.0 Hex SST.	14
9	25-3702-000	Washer, Flat 3/8" SST.	28
10	25-3701-000	Washer, lock 3/8" SST.	14
11	24-3716-440	Nut, 3/8-16 Hex SST.	14
12	27-0456-700	Rod, threaded, SST 5/16-18 x 7" long	4
15	23-3118-875	Bolt, Hex 5/16-18 x .875 SST	12
16	25-3102-000	Washer, flat 5/16" SS	12
17	25-2501-015	Nut, flange 5/16 SST	28
18	23-2520-050	Bolt, Hex 1/4-20 x .75 SST	28
19	25-2502-000	Washer, flat 1/4 SS	40
20	25-2501-000	Washer, lock 1/4"	12
21	24-2520-440	Nut, 1/4-20 fin hex SS	12
22	25-2501-014	Nut, Flange Serrated 1/4-20 SST	16

### Pre Assembly for Model STP-LCR/120

#### Step 1: Connecting Panel Support Channels

- A. Lay two 60" panel support channels end to end with a connector in the middle.
- B. Using a connector, bolt the 60" panel support channels together. Tighten the 5/16-18 x 7/8" hardware (hex bolt, flat washer, and flange nut) to 144 in-lbs (dry). **(Detail G)** Repeat with the remaining set of channel rails and set aside.

#### Step 2: Attach Pole Clamp Assembly to Pole

- A. Slide the pre-assembled pole clamp over the pole, the assembly should rest on the notches on the top edge of the pole. **(Detail A)**.
- B. Loosen the four 1/4" bolts *slightly* to allow the clamp halves to tighten up on the pole.
- C. Orientate brace to face south.
- D. Tighten the 8 outside 5/16 flange nuts on the threaded rods evenly, making sure that each nut is tightened the same amount of turns so the distance between the clamp halves is the same on each side of the pole, until the torque setting is reached. 144 in-lbs (dry).
- E. Finger tighten the 8 inside 5/16 flange nuts up to the flanges of the clamp halves.
- F. Using a long 5/16 box wrench, tighten 5/16 flange nuts, alternating turns from side to side, pulling the flanges together. (Close or touching, not flattened out).
- G. Install 5/16 x 7/8 bolt, flat, and flange nuts in the 4 holes of the clamp halves flange ends. Tighten 5/16 bolts, alternating turns from side to side, pulling the flanges together. (close or touching, not flattened out) **(Detail B)**.
- H. **Check the torque of the 8 outside flange nuts**, re torque as needed.
- I. Torque the four 1/4" bolts on top to 84 in-lbs (dry). **(previously loosened slightly)**
- J. **(Optional)** caulk the seams on top of pipe clamp to seal preventing rain water entering the pipe.

#### Step 3: Attach Tilt Plate Mounting Channel

- A. Place tilt plate mounting channels on the sides of the pole clamp assembly **(Detail C)**.
- B. Install 1/4" bolt, flat and flange nuts 6 places on both sides, tighten to 84 in-lbs (dry). Note: placing the flange nut in the "closed" side of the wrench to align with the bolt through the cutout will make it easier to start. **(Detail D) Note: Dropped nuts cannot be retrieved very easily.**

#### Step 4: Attach Tilt plates

Attach tilt plates, flanges facing to the outside using 3/8-16 x 1.00 bolts, flats, locks and nuts; position the tilt plates with the top parallel to the ground (0°). Do not torque at this time, tighten only enough to hold firmly for next assembly steps. **(Detail E)**.

### Step 5: Attach Cross Rails to Tilt Plates.

Attach cross rails to the tilt plates, open sides facing IN, with 3/8-16 x 1." bolts, locks and flats, nuts. Cross rails are to be on center across the tilt plates and parallel to each other, Torque to 240 in-lbs (dry). **(Detail F)**

### Step 6: Attach Panel Supports to Cross Rails

- A. Confirm the center to center distance of the mounting holes on the PV modules, and mark on the cross rails the slots that will match that dimension.
- B. **Loosely** attach panel supports to the cross rails in the slots previously marked with 3/8 x 1.0 bolts, flats, locks, and nuts.

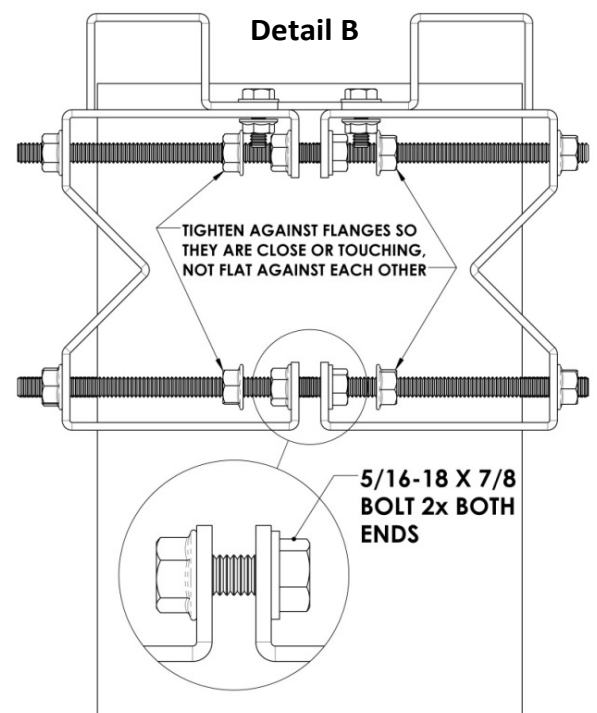
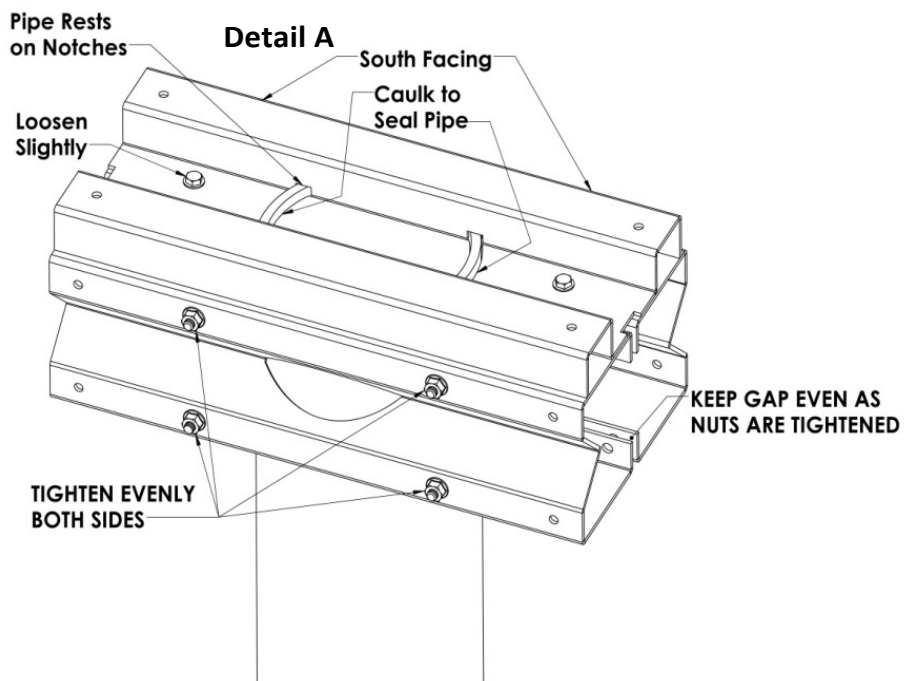
### Step 7: Attach Panels to the supports.

- A. Lay PV Modules across the panel supports, adjust spacing between modules and center them all on the panel supports, attach the modules with 1/4 x 3/4 bolts, flats, locks and nuts, once spacing is satisfactory, Torque to 84 in-lbs (dry) the 1/4" bolts. **Detail G**
- B. Torque to 20 ft-lbs (dry) the 3/8" bolts connecting the panel supports to the cross rails.

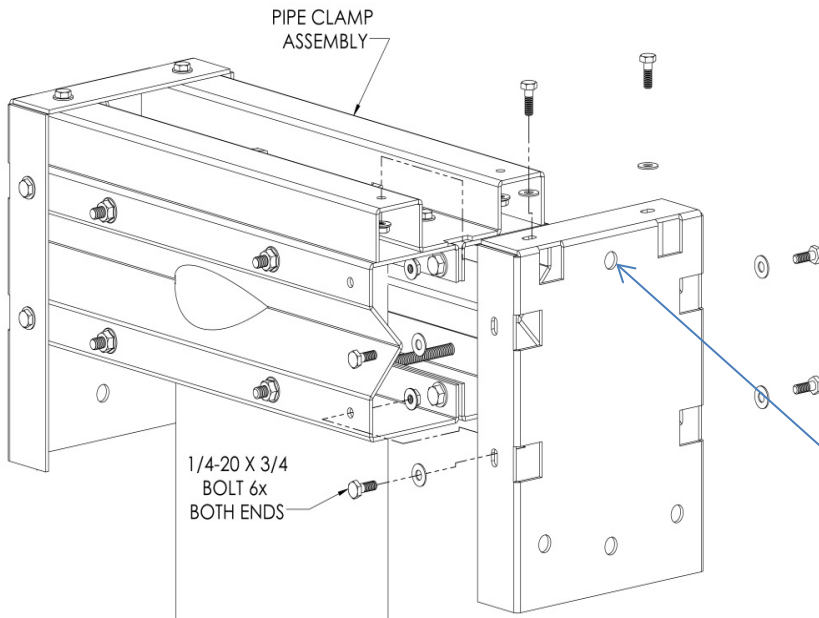
### Step 8: Adjust Tilt Angle

Remove the lower two 3/8-16 x 1.0 bolts from the tilt plates and tilt the array to desired angle, the array tilts in 10° increments from 0° to 60°. Re install 3/8-16 x 1.0 bolts and torque all six 3/8-16 x 1.0 bolts to 20 ft-lbs (dry) **Note:** to set to 60° one bolt set will need to be in the center position

### Detailed Diagrams for Assembly



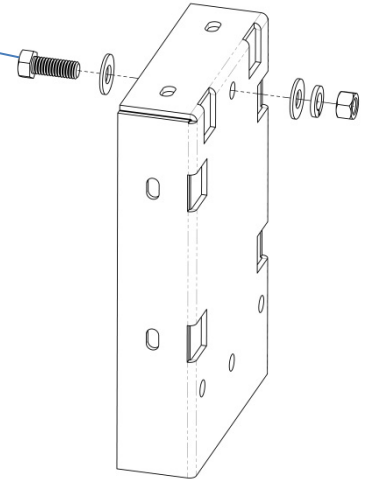
**Detail C**



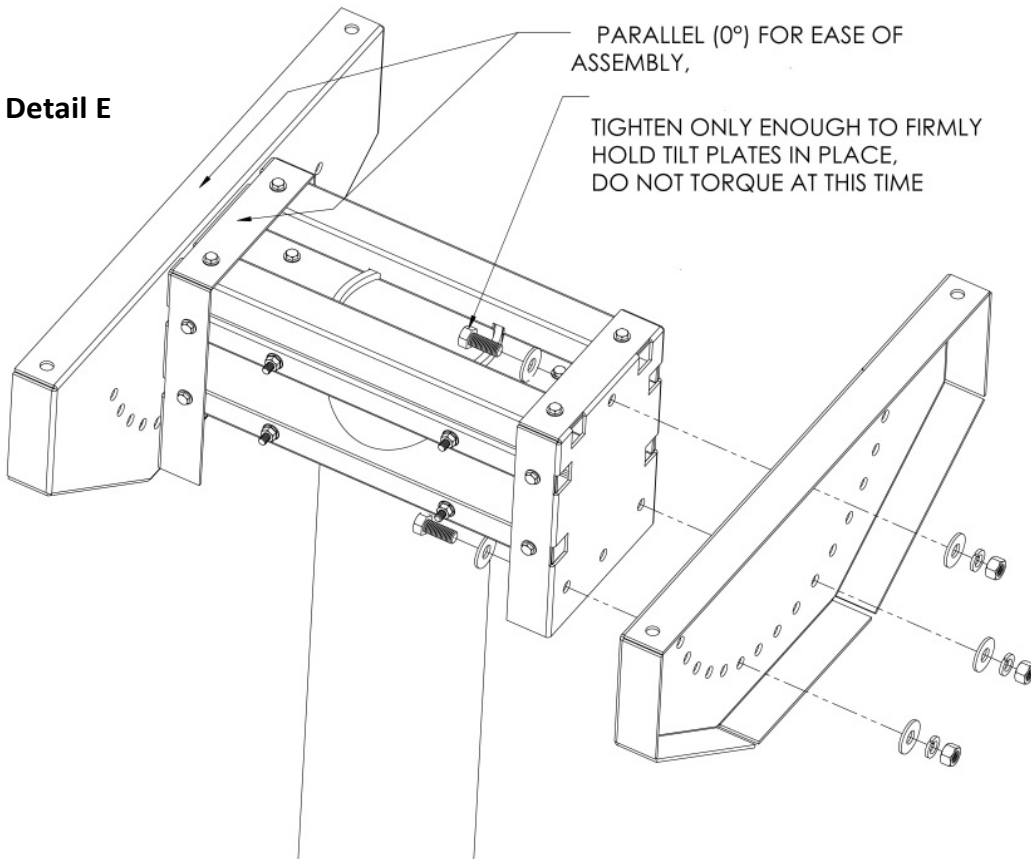
**Detail D**



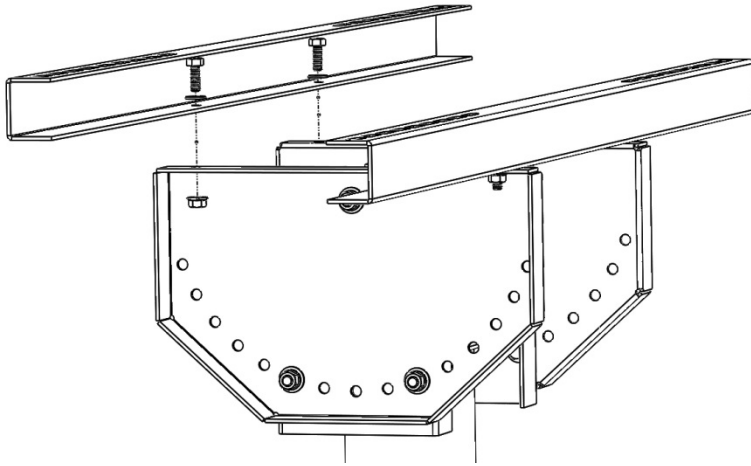
Helpful tip: pre install - 3/8" bolt for ease of assembly in Detail E.



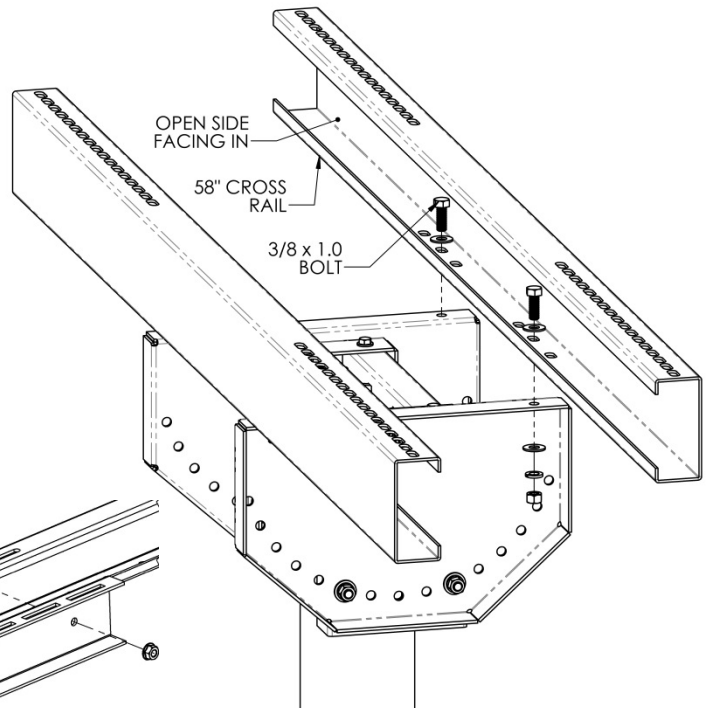
**Detail E**



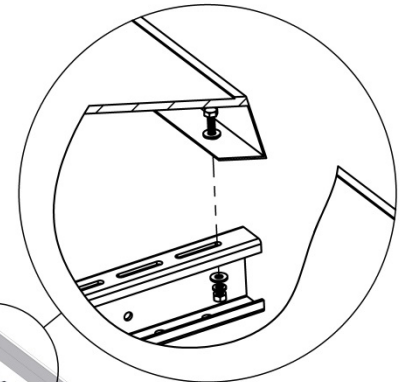
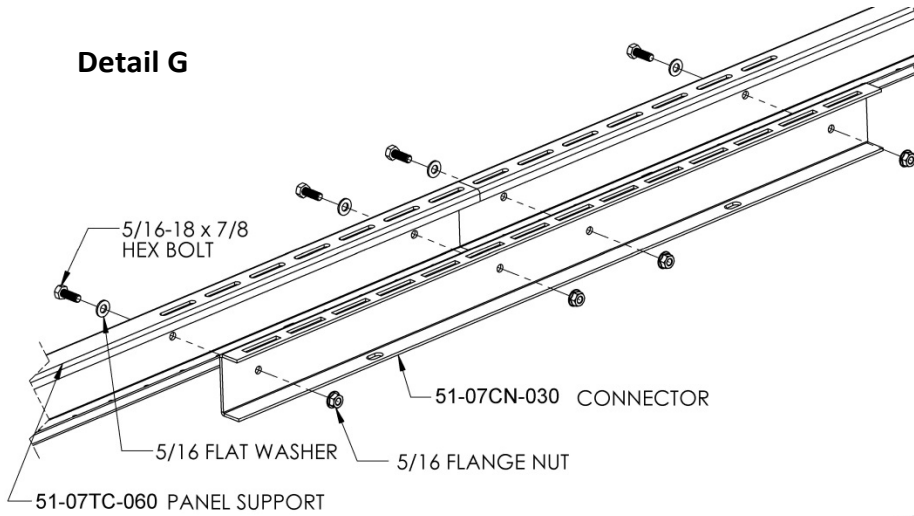
**Detail F STP-LCR/82R**



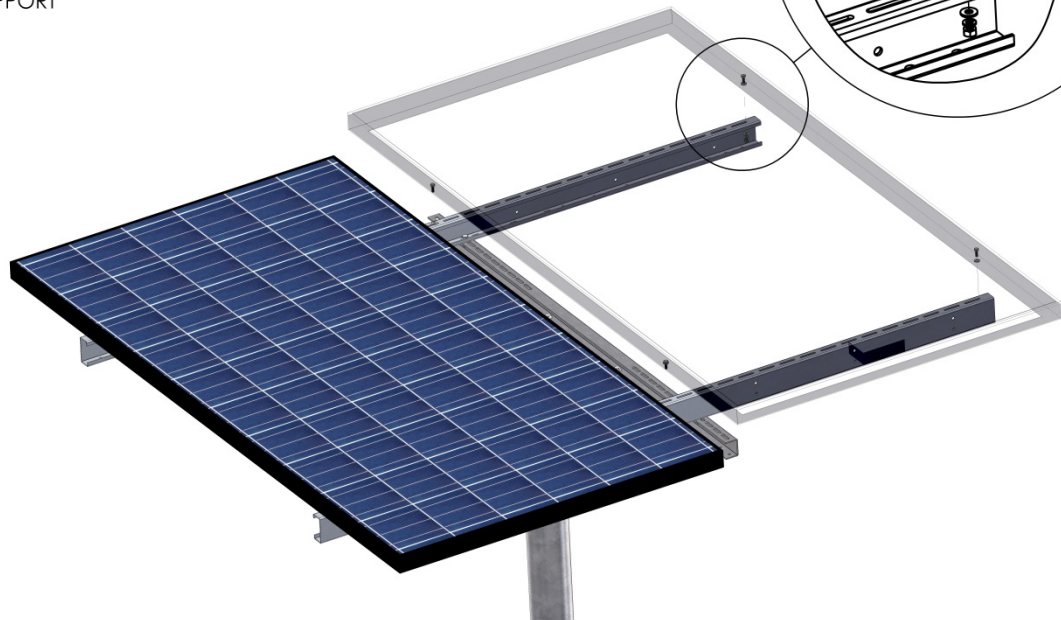
**Detail F STP-LCR/120R**



**Detail G**



**Detail H  
STP-LCR/82R  
SHOWN**



### **Foundation Hole Guidelines (see charts pages 9,10)**

The suggestions below are **recommendations only**. It is the installer's responsibility to validate foundation parameters prior to installation, as local geotechnical report may be required to assess ground conditions. We recommend consulting with a local engineer familiar with local regulations and build site requirements, including soil conditions, terrain and load criteria (wind, snow, seismic). All of these parameters may impact foundation requirements.

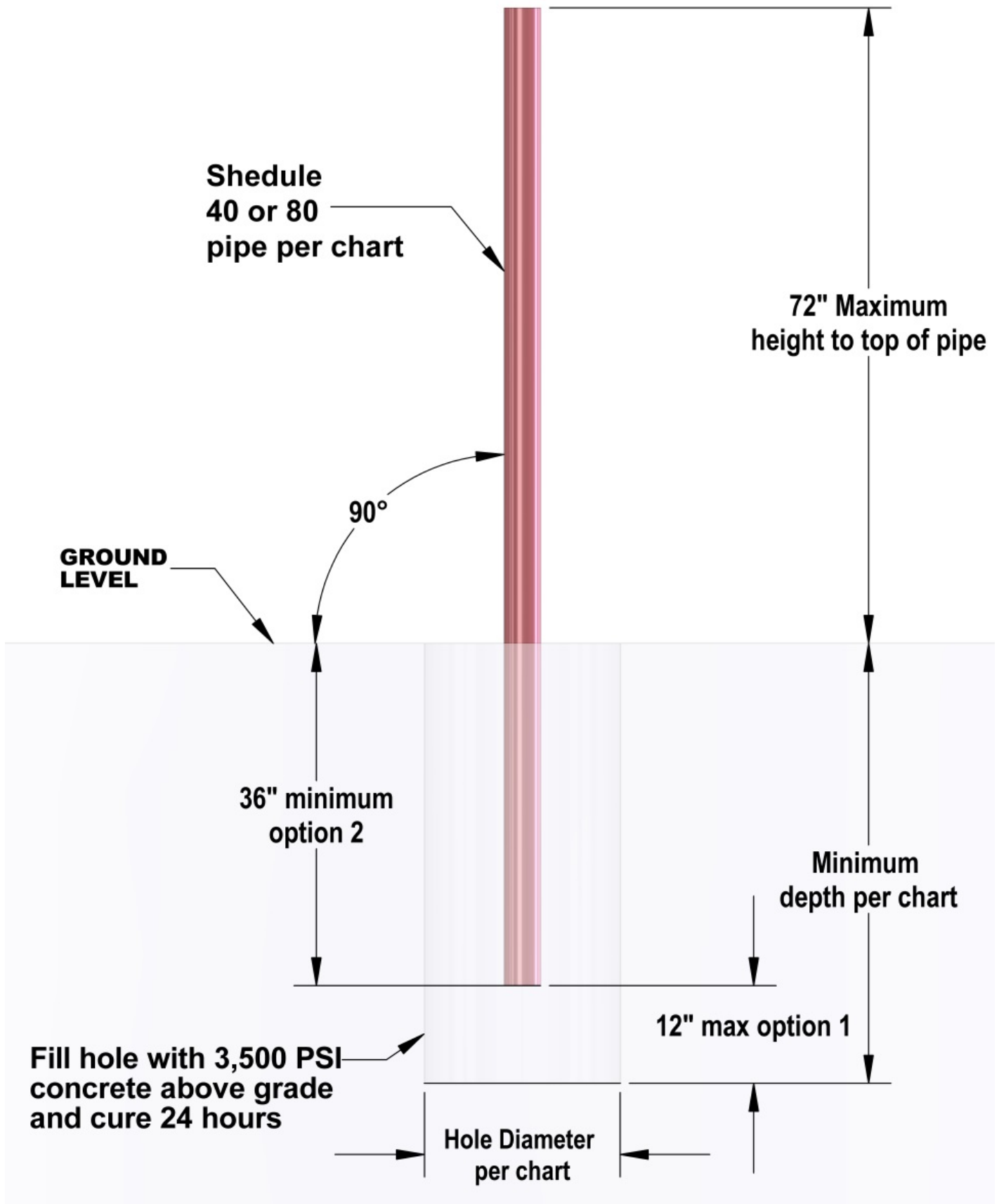
#### ***Installation Recommendations: Concrete to be min 3,500 PSI***

1. *Auger hole to minimum depth shown in foundation guidelines, + 6" for (#2).  
Drilled holes to be filled with concrete shall be cleaned to remove all loose cuttings.*
2. *Stumps or other decomposable material exceeding 3 inches in the least dimension located within the drilled diameter of the foundation shall be removed entirely prior to placing concrete.*
3. *The bottom 6" of hole should be filled with crushed rock or a blocking; this will prevent the pipe(s) from touching the base of the hole, insuring complete encapsulation of the pipe when concrete is poured, as well as allowing for water drainage. (see option 1)*
4. *The pipe(s) should be installed vertically no matter the slope of the install site and centered in the hole.*
5. *Make arrangements to prevent the pipe(s) from twisting or moving prior to and during pouring of the concrete.*
6. *The pipe(s) should be braced to remain plumb and in position until concrete has cured at least 24hrs.*
7. *The solar system shall not be attached to the support pipe until the concrete has reached 3,500 psi.*

#### ***The Steel Post shall be embedded into the concrete pier using one of the following options:***

- A. **Option 1:** *To within 12" of the bottom of the concrete pier.*
- B. **Option 2:** *The steel post embedment shall be a minimum of 36" into the concrete pier with (2) #5 bars extending vertically to within 12" of the bottom of the pier, one on each side of the steel post. The rebar shall lap with the steel post a minimum of 30". A bolt (5/16" minimum) shall be placed through the steel post at approximately 6" (+/- 2") from the bottom of the post with a hand tightened nut to provide uplift resistance in direct bearing with the concrete*





**Footing Chart 2 panel STP-LCR/82R**

60 and 72 cell modules										60 and 72 cell modules									
0° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )							0° TILT									
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type				Class 5		Class 4				
	110 MPH	85 MPH	72	72	72	72	60	Diameter				18"	30"	18"	30"				
	115 MPH	89 MPH	72	72	72	60	Footing Depth (feet)				4.00	3.50	3.75	3.25					
	120 MPH	93 MPH	72	72	72	60													
	130 MPH	100 MPH	72	72	72	60													
	140 MPH	108 MPH	72	72															
150 MPH	116 MPH	72	72																
10° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )							10° TILT									
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type				Class 5		Class 4				
	110 MPH	85 MPH	72	72	72					Diameter				18"	30"	18"	30"		
	115 MPH	89 MPH	72	72	60					Footing Depth (feet)				4.00	3.25	3.50	3.00		
	120 MPH	93 MPH	72	72	60														
	130 MPH	100 MPH																	
	140 MPH	108 MPH																	
150 MPH	116 MPH																		
20° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )							20° TILT									
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type				Class 5		Class 4				
	110 MPH	85 MPH	72	72	72					Diameter				18"	30"	18"	30"		
	115 MPH	89 MPH	72	72	72					Footing Depth (feet)				4.75	4.00	4.25	3.50		
	120 MPH	93 MPH																	
	130 MPH	100 MPH																	
	140 MPH	108 MPH																	
150 MPH	116 MPH																		
30° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )							30° TILT									
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type				Class 5		Class 4				
	105 MPH		72	72					Diameter				18"	30"	18"	30"			
	115 MPH	89 MPH								Footing Depth (feet)				5.25	4.3	4.5	3.8		
	120 MPH	93 MPH																	
	130 MPH	100 MPH																	
	140 MPH	108 MPH																	
150 MPH	116 MPH																		
40° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )							40° TILT									
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type				Class 5		Class 4				
	105 MPH		72	72					Diameter				18"	30"	18"	30"			
	115 MPH	89 MPH								Footing Depth (feet)				5.72	4.75	5.00	4.00		
	120 MPH	93 MPH																	
	130 MPH	100 MPH																	
	140 MPH	108 MPH																	
150 MPH	116 MPH																		
50° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )							50° TILT									
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type				Class 5		Class 4				
	110 MPH	85 MPH	72	72	72					Diameter				18"	30"	18"	30"		
	115 MPH	89 MPH								Footing Depth (feet)				6.75	5.50	5.75	4.75		
	120 MPH	93 MPH																	
	130 MPH	100 MPH																	
	140 MPH	108 MPH																	
150 MPH	116 MPH																		
60° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )							60° TILT									
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type				Class 5		Class 4				
	105 MPH		72	72					Diameter				18"	30"	18"	30"			
	115 MPH	89 MPH								Footing Depth (feet)				6.75	5.50	5.75	4.75		
	120 MPH	93 MPH																	
	130 MPH	100 MPH																	
	140 MPH	108 MPH																	
150 MPH	116 MPH																		

Footing Chart 2 panel STP-LCR/120R

		60 and 72 cell modules								60 and 72 cell modules				
0° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )						0° TILT					
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type		Class 5		Class 4	
	110 MPH	85 MPH	72	72	72	60			Diameter		18"	30"	18"	30"
	115 MPH	89 MPH	72	72	72	60			Footing Depth (feet)					
	120 MPH	93 MPH	72	72	72	60								
	130 MPH	100 MPH	72	72					4.00	3.25	3.50	3.00		
	140 MPH	108 MPH	72	72										
150 MPH	116 MPH	72	72											
10° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )						10° TILT					
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type		Class 5		Class 4	
	110 MPH	85 MPH	72	72					Diameter		18"	30"	18"	30"
	115 MPH	89 MPH	72	72					Footing Depth (feet)					
	120 MPH	93 MPH	72	72										
	130 MPH	100 MPH	72	72					4.75	4.00	4.00	3.50		
	140 MPH	108 MPH												
150 MPH	116 MPH													
20° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )						20° TILT					
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type		Class 5		Class 4	
	110 MPH	85 MPH	72	72					Diameter		18"	30"	18"	30"
	115 MPH	89 MPH	72	72					Footing Depth (feet)					
	120 MPH	93 MPH												
	130 MPH	100 MPH							4.75	4.00	4.25	3.50		
	140 MPH	108 MPH												
150 MPH	116 MPH													
30° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )						30° TILT					
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type		Class 5		Class 4	
	105 MPH		72	72					Diameter		18"	30"	18"	30"
	115 MPH	89 MPH							Footing Depth (feet)					
	120 MPH	93 MPH												
	130 MPH	100 MPH							6.00	5.00	5.25	4.25		
	140 MPH	108 MPH												
150 MPH	116 MPH													
40° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )						40° TILT					
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type		Class 5		Class 4	
	100 MPH		72	72					Diameter		18"	30"	18"	30"
	115 MPH	89 MPH							Footing Depth (feet)					
	120 MPH	93 MPH												
	130 MPH	100 MPH							6.50	5.25	5.50	4.50		
	140 MPH	108 MPH												
150 MPH	116 MPH													
50° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )						50° TILT					
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type		Class 5		Class 4	
	95 MPH		72	72					Diameter		18"	30"	18"	30"
	115 MPH	89 MPH							Footing Depth (feet)					
	120 MPH	93 MPH												
	130 MPH	100 MPH							8.00	6.50	7.00	5.75		
	140 MPH	108 MPH												
150 MPH	116 MPH													
60° TILT	Design Wind Speed (V)		Ground Snow Load (p <sub>g</sub> )						60° TILT					
	ASCE 7-10	ASCE 7-05	0	10	20	30	40	50	Soil Type		Class 5		Class 4	
	95 MPH		72	72					Diameter		18"	30"	18"	30"
	115 MPH	89 MPH							Footing Depth (feet)					
	120 MPH	93 MPH												
	130 MPH	100 MPH							8.00	6.50	7.00	5.75		
	140 MPH	108 MPH												
150 MPH	116 MPH													

## Installer Responsibility

The installer is solely responsible for:

- i. Complying with all applicable local or national building codes, including any that may supersede this manual;
- ii. Ensuring that Tamarack Solar and other products are appropriate for the particular installation and the installation environment;
- iii. Using only Tamarack Solar parts and installer-supplied parts as specified by Tamarack Solar. Substitution parts may void the warranty;
- iv. Ensuring safe installation of all electrical aspects of the PV array; and
- v. Ensuring correct and appropriate design parameters are used in determining the design loading used for the specific installation. Parameters, such as snow loading, wind speed, exposure and topographic factor should be confirmed with the local building official or a licensed professional engineer.

## Warranty Information

Tamarack Solar warrants each Mounting Structure to be free from defects in materials and workmanship for ten (10) years from the date of first purchase (“Warranty Period”), when installed properly and used for the purpose for which it is designed, except for the finish, which shall be free from visible peeling, or cracking or chalking under normal atmospheric conditions for a period of three (3) years, from the earlier of 1) the date the installation of the Product is completed, or 2) 30 days after the purchase of the Product by the original Purchaser (“Finish Warranty”). The Finish Warranty does not apply to any foreign residue deposited on the finish.

**Galvanized coated sheet steel components will show rust on cut edges and is normal and will not affect the structure and function of the mount.**

**All installations in corrosive atmospheric conditions are excluded.** The Finish Warranty is VOID if the practices specified by AAMA 609 & 610-02 – “Cleaning and Maintenance for Architecturally Finished Aluminum” ([www.aamanet.org](http://www.aamanet.org)) are not followed by Purchaser for Tamarack Solar’s aluminum based products.

The warranty covers the replacement cost of parts to repair the product to proper working condition. Transportation and incidental costs associated with warranty items are not reimbursable. The warranty does not cover normal wear, or damage resulting from misuse, abuse, improper installation, negligence, or accident, or **typographical errors in instruction manuals**. The Warranty does not cover any defect that has not been reported in writing to Tamarack Solar within ten (10) days after discovery of such defect. Furthermore, it does not cover units that have been altered, modified or repaired without written authorization from the manufacturer or its authorized representative, or units used in a manner or for a purpose other than that specified by the manufacturer. Tamarack Solar’s entire liability and Purchaser exclusive remedy, whether in contract, tort or otherwise, for any claim related to or arising out of breach of the warranty covering the Mounting Structures shall be correction of defects by repair, replacement, or credit, at Tamarack Solar’s discretion. Refurbished Mounting Structures may be used to repair or replace the Mounting Structures

Tamarack Solar shall have no liability for any injuries or damages to persons or property resulting from any cause, whatsoever, or any claims or demands brought against Tamarack Solar by Purchaser, any employee of Purchaser, client of Purchaser, end-user of the Product or other party, even if Tamarack Solar has been advised of the possibility of such claims or demands (collectively, “Third Party Claims”). This limitation applies to all materials provided by Tamarack Solar during and after the Warranty Period.