

# PRR

## Flush Mount Racking System



## Installation Manual

Release, September 2014



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# 1. INTRODUCTION

## 1.1 PRODUCT OVERVIEW

As a robust, versatile, long-life, and weather resistant mounting system, the PRR has been designed for a variety of flush mount, ground mount and specialty applications.

The overall design of the PRR has been optimized to provide a low total-life cycle cost solution capable of being installed in a wide range of roof conditions while minimizing environmental impact.

### SIMPLE INSTALLATION

The PRR system utilizes Polar Racking's innovative Rotite™ nut which allows for a standardized fastening method for all PRR components. Additionally, its rigid and modular design improves installation time dramatically by minimizing part complexity.

### SERVICE LIFE WARRANTY

Polar Racking provides a limited product warranty of 10 years for the service life of all materials used.

### DURABILITY

The aluminum and stainless steel construction provides robust strength and longevity, extending system durability. All components are corrosion-resistant and completely recyclable, and have been designed to meet UL2703 requirements.

### SAFETY

If a building permit is required, Polar Racking will design and engineer the mounting system according to an auditable assessment of the statics on request.

## 1.2 ABOUT THIS MANUAL

### SUBJECT

This manual details the installation and assembly of the PRR Flushmount Rooftop PV Mounting System.

### TARGET AUDIENCE

This manual is intended for qualified personnel with a working knowledge of mechanics, hand tools and those who possess mechanical skills.

### SIGNPOSTS

The following will assist you in finding your way around in this manual:

### HEADERS

The headers display the heading of the current chapter.

### FOOTERS

The footers display the product name, the name of the document, and the page number.

### TEXT MARKUPS

Labels in the text are printed in **bold**, brand and company names in *italics* and item numbers from the illustrations are depicted in a text box as 1., 2., etc.

### OVERVIEW

An overview with legend serves as an orientation aid for the installation and is located in chapter 6 of this installation manual.

### ADDITIONAL INFORMATION

Identifies background and additional information for processes.

# 1. INTRODUCTION CONT'D

## 1.3 PRODUCT LIABILITY

This technical documentation is part of the product. Polar Racking is not liable for damages resulting from failure to comply with the installation instructions, particularly the safety instructions, as well as misuse of the product.

## 1.4 STANDARDS COMPLIANCE

The PRR Flush Mount Racking System is tested in accordance with the Ontario Building Code, the International Building Code, the National Building Code of Canada, the ASCE 7-05, and the ASCE 7-10.

## 1.5 PRODUCT CARE AND MAINTENANCE

### MAINTENANCE PERIODS

The maintenance work described below must be performed once every year from the date of installation.

### MAINTENANCE REQUIREMENTS

- Inspect all fasteners and component connections once per year. Observe for any deformation, cracks or other visible defects on the PRR components and replace.
- Check bolts on all hardware for specified torque and retighten if required (ensuring solar modules are seated correctly).

# 2. SAFETY CONSIDERATIONS

## 2.1 BASIC SAFETY CONSIDERATIONS

The following basic safety instructions and the warning notes are an essential part of this manual and are of fundamental importance for handling the product.

## 2.2 WARNINGS

Throughout this manual you will notice several warning notes which consist of:

- Warning Symbols
- Indicator Word to dictate the danger Level
- Information regarding the source and type of the danger
- Information about possible consequences if the hazard is not observed
- Measures for avoiding the hazard, and ways to prevent injuries or property damages



### DANGER

Denotes a major risk. Failure to observe may lead to serious injury or death.



### WARNING

Denotes a potentially dangerous situation. Failure to observe may lead to moderate to severe injury and/or property damage.



### CAUTION

Denotes a potential hazard which may lead to physical injury and/or property damage.

## 2.3 RESPONSIBILITIES OF THE INSTALLER

It is the responsibility of the installer to ensure all applicable safety measures are strictly adhered to while installing this PV Mounting system. Any modifications are to be performed only by authorized personnel and should be approved by Polar Racking prior to implementation. The installer must have adequate skill and knowledge with any materials and tools used to install this system. Furthermore, the installer must be able to recognize any possible dangers, whether they are stated in this manual or not. Every person installing this system must read, and fully understand, every section of this manual prior to working on the system.

## 2.4 RESPONSIBILITIES OF THE OPERATOR

It is the responsibility of the operator to ensure all scheduled maintenance is performed on time. He/She must ensure that the installation of the system is performed only by qualified personnel with adequate skill and knowledge who are able to meet the responsibilities listed in Chapter 2.2. The operator must ensure a copy of this manual is available to any installer and/or maintenance person as it is part of the system. A replacement manual may be obtained by contacting Polar Racking using the contact information provided on the back of this manual.

# 3. PREPARATION

## 3.1 ROOFING SYSTEMS

The PRR system is compatible with virtually all roofing types and membranes. It is the responsibility of the developer, owner and/or system installer to ensure that the holder of the roof warranty is aware of the solar installation using the PRR and will continue to honor its warranty. It is the responsibility of the developer, owner, and/or installer to verify that the substrate and the PRR system are compatible with the roofing system.

## 3.2 TOOLS AND MATERIALS

The following tools and materials are required for installation:

- 6mm T Handle Ball End Allen Wrench
- Cordless Drill
- Tape Measure
- Chalk Line
- Compass
- Drill bit for metal roofs - 3/16"
- Drill bit for shingled roofs - 1/4"
- Drill bit for concrete roofs - 3/8"

## 3.3 SITE PREPARATION

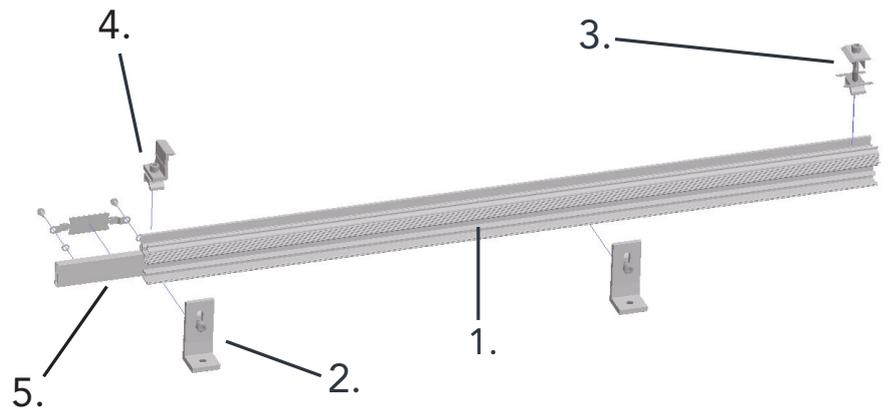
Prior to commencing installation of the PRR system ensure the following:

- All safety preparations have been made in compliance with local regulations
- All required tools and materials are available for the installation
- All loose debris and any potential safety hazards have been removed from the roof
- The installers have copies of the construction drawings

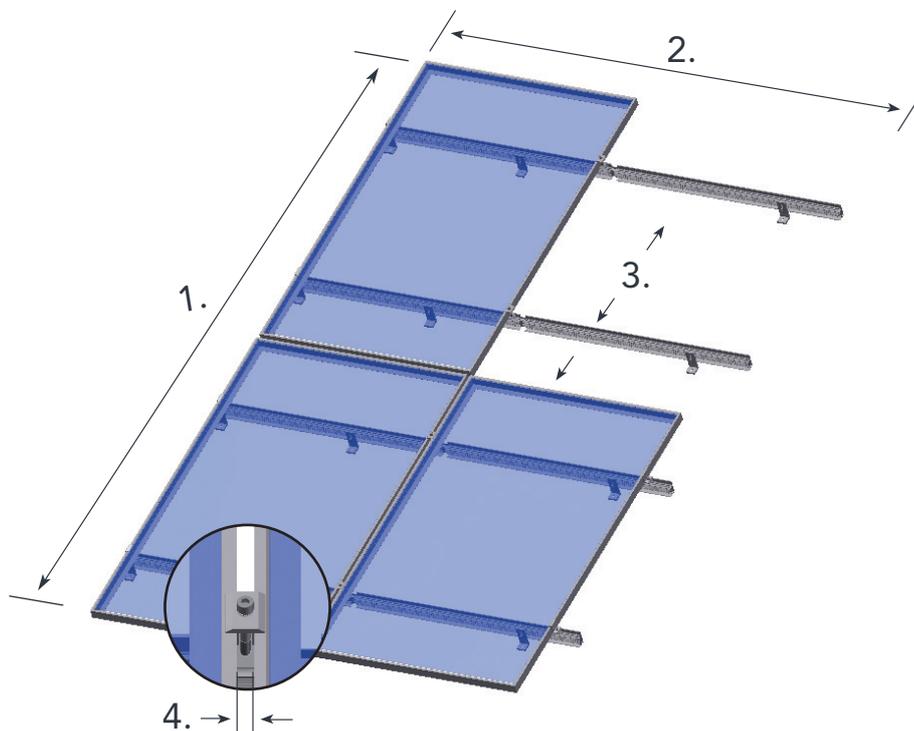
# 4. INSTALLATION PREPARATION

## 4.1 OVERVIEW OF SYSTEM COMPONENTS

1. The PRR
2. L-Foot (Roof Attachment)
3. Intermodule Clamp
4. Module End Clamp
5. Splice & Bonding Jumper



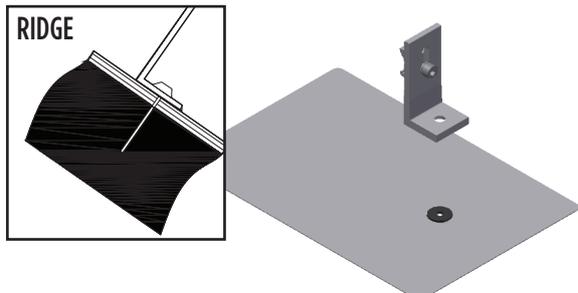
## 4.2 PLANNING THE ARRAY LAYOUT



## 4.2 PLANNING THE ARRAY LAYOUT

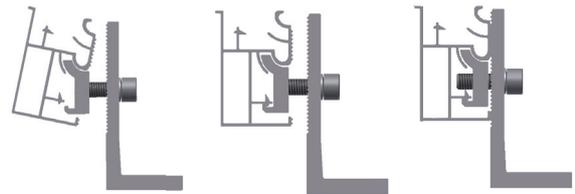
1. Array height = number of modules in the vertical direction x (module height + 13mm)
2. Array width = number of modules in horizontal direction x (module width + 13mm)
3. Vertical distance from module frame to roof attachment  $\frac{1}{5}$  x module height
4. Distance between the solar modules on all sides: 13mm
5. Maximum Solar Module dimensions = 1000 x 2000 x 50

# 5. INSTALLATION



## 1. INSTALLING L-FEET ON 3-TAB SHINGLE ROOFS

Install flashing system as per manufacturers installation manual at spacing determined by your structural engineer. Install one L Foot per flashing at its specific mounting area.



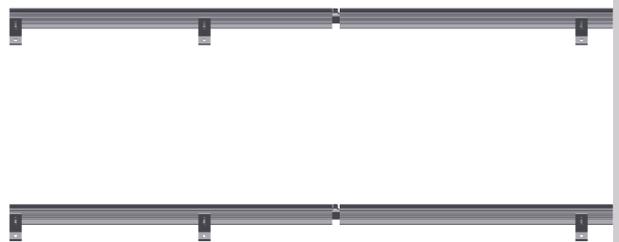
## 2. CONNECTING RAIL TO ROOF ATTACHMENTS

Attach rail to L Feet or approved roof attachment using supplied bolts, washers, and Rotite™ nut as shown. Make sure serrated rail surface faces serrated surface of roof attachments.



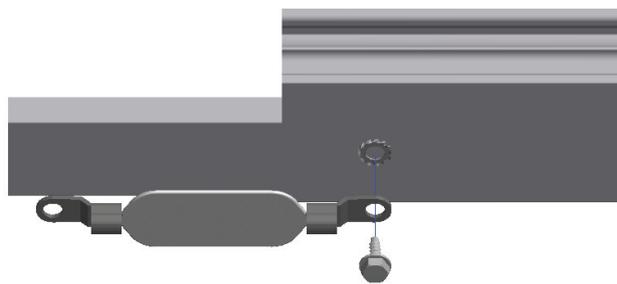
## 3. ALIGN TO ROOF ATTACHMENTS

Note that rail can be adjusted horizontally along the rail channel and vertically within the roof attachment slot (L-Foot shown) when bolts are tightened only 2 to 3 turns.



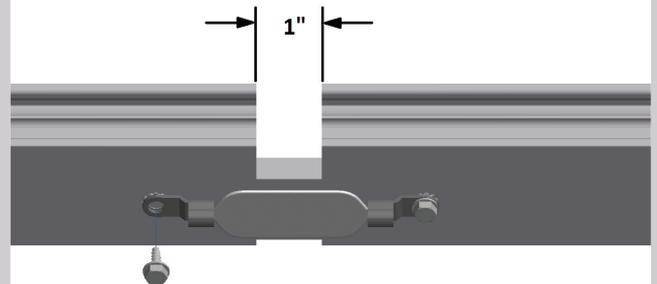
## 4. CONNECTING RAIL TO ROOF ATTACHMENTS

Align and level rails using a guide as appropriate. Once rails are in position, hand tighten L Feet with a 6 mm T Handle Allen Wrench. Use torque wrench and tighten to 120 in-lbs.



## 5. CONNECTING MULTIPLE RAILS USING SPLICES

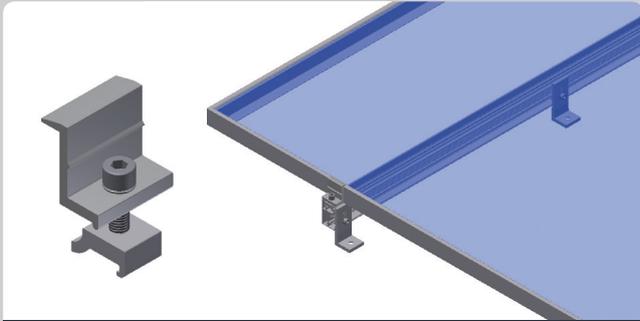
Join rail segments by sliding Splice bar into the first rail segment 2.5" and secure by drilling a self tapping screw, washer, bonding jumper and star washer, to one side as shown. Once thread has started torque to 30 in-lbs.



## 6. CONNECTING MULTIPLE RAILS USING SPLICES

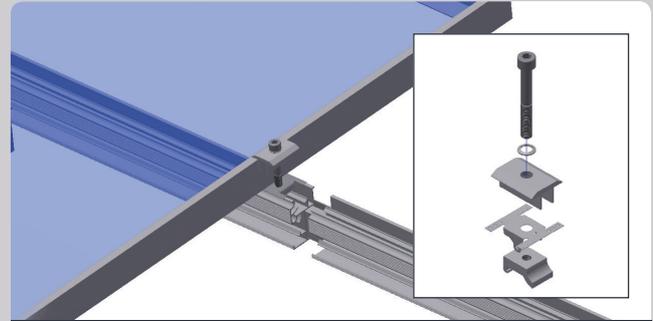
Slide second rail over top of Splice Bar, leaving a 1" expansion gap between rails. Drill second self tapping screw to opposite side as shown. Once thread has started torque to 30 in-lbs.

# 5. INSTALLATION



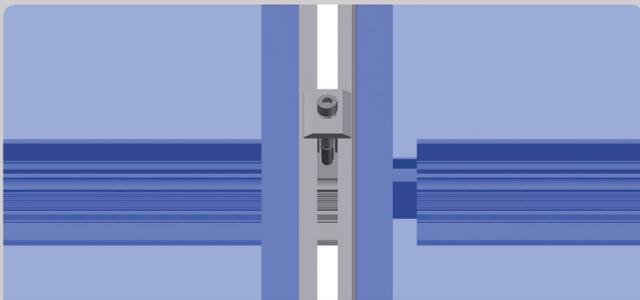
## 7. INSTALLING MODULE END CLAMPS

Place a solar module onto a set of two rails and position at approximate 2" from the edge. Put the Rotite™ nut portion of any end clamp into the channel and place the clamp firmly against the module frame. Hand tighten with a 6mm T Handle Allen Handle wrench. Torque to 120 in-lbs.



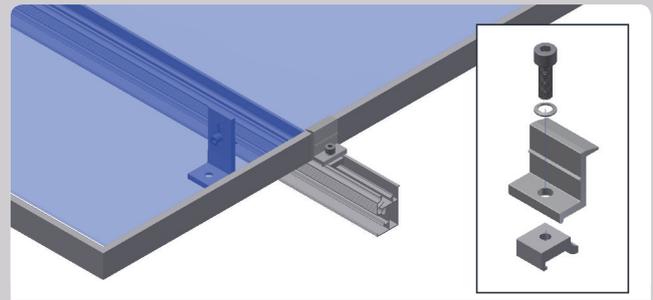
## 8. INSTALLING INTERMODULE CLAMPS

Insert intermodule clamp's Rotite™ nut into rail channel and position clamp firmly against first module frame. Ensuring that the grounding washer is under the module frame, tighten bolt 2 to 3 turns. Hand tighten and torque to 120 in-lbs.



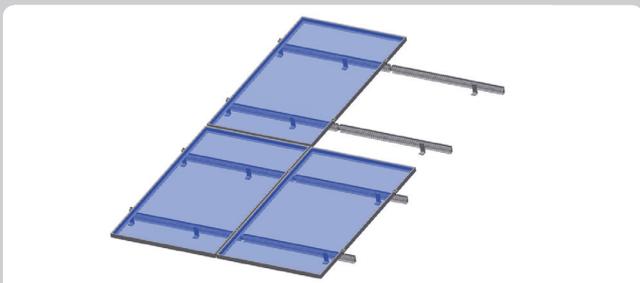
## 9. INSTALLING INTERMODULE CLAMPS

Place second module firmly into place against intermodule clamp and once again ensuring that the grounding washer is under the module frame hand tighten with the 6mm T Handle Allen Wrench. Torque to 120 in-lbs.



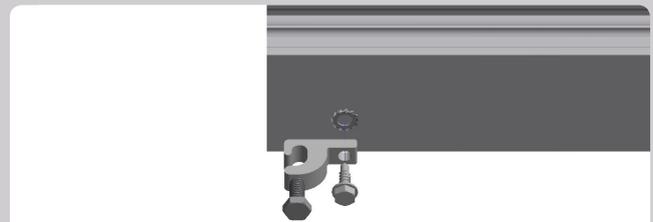
## 10. INSTALLING MODULES AT ROW ENDS USING END CLAMP

Place last module in row onto rails. Insert end clamp's Rotite™ nut into rail element and slide clamp firmly against module frame. Hand tighten with the 6mm T Handle Allen Wrench. Torque to 120 in-lbs.



## 11. INSTALLING ADJACENT ROWS OF MODULES

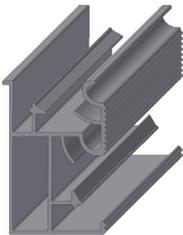
Place first module of next row in alignment with corresponding module of adjacent row. For aesthetic reasons, maintain at least 13mm minimum regular vertical separation between module rows. Continue installing modules as described above until installation is complete. Ensure all clamp bolts are torqued to 120 in-lbs.



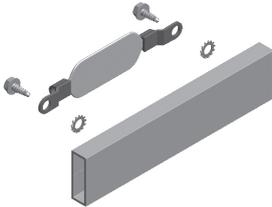
## 12. INSTALLATION OF GROUNDING LUG

Secure grounding lug at the end of each row of modules by using the provided self tapping screw, serrated washer and grounding lug and drilling them all together on the rail as depicted in the picture above. Once thread has started torque to 30 in-lbs. Grounding shall be bare copper wire sized at a minimum of 10AWG. All electrical connections are to be done in accordance with the NEC/NFPA 70 as well as CSA C22.1, Safety Standards for Electrical Installations, Canadian Code, Part 1.

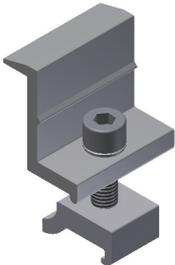
# 6. OVERVIEW OF SYSTEM COMPONENTS



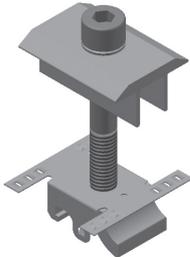
**RAIL**



**SPLICE & BONDING JUMPER**



**MODULE END CLAMP**



**INTERMODULE CLAMP**



**GROUNDING LUG**

# 7. WARRANTY

Polar Racking Inc. ("Polar"), warrants to the original purchaser ("Purchaser") of its racking Product(s) ("Product") that the Product shall be free from defects in material and workmanship for a period of ten (10) years from the date of original purchase ("Racking Warranty"), save and except for the finish of said Product.

## WHAT DOES THE WARRANTY COVER?

The Racking Warranty covers any defects in material and workmanship, but does not include on-site labour.

## HOW LONG DOES THE COVERAGE LAST?

The Racking Warranty lasts for a period of ten (10) years from the date of original purchase. The warranty, during its term, is transferable from the Purchaser to a new owner of the Product upon written notice of said change of ownership being given from the original purchase to Polar within 60 days of said change of ownership.

## WHAT WILL POLAR DO?

If within the specified Warranty periods the Product shall be reasonably proven to be defective, then Polar shall at its option, and subject to the limitations described herein, Polar will: (i) repair or replace any defective Product at no charge; (ii) refund the full purchase price of the Product; or (iii) issue credit in the amount of the purchase to be used toward the purchase of new Product or accessories from Polar. Such repair or replacement shall completely satisfy and discharge all of Polar's liability with respect to this limited Warranty.

## WHAT DOES THIS WARRANTY NOT COVER?

The following are not covered by these warranties: on-site labour in any form and any problem or damage that is caused by abuse; negligence; failure to follow professional engineer stamped drawings for the specific installation; normal wear and tear; defective roofing; modifications or repairs not performed or authorized by Polar; overloading; misuse, including but not limited to failure to assemble, mount, or use the Product in accordance with its written instructions or guidelines included with the Product or made available to the Purchaser; or an act of God (such as wind storms or similar events). Polar is not liable for or warranty material used on or fixed to the bottom of Product, which in all installations are chosen by the original purchaser/ installer/ user of the Product. All installations in corrosive atmospheric conditions are excluded and void said Racking Warranty. This Racking Warranty shall be Void if installation of the Product is not performed in accordance with any Professional Engineer stamped drawings created for the specific installation, or Polar's written installation instructions, or if the Product has been modified, repaired, or reworked in a manner not previously authorized in writing by Polar, or if the Product is installed in an environment of fashion for which it was not designed.

The Racking Warranty does not cover damage to the Product that occurs during its shipment, storage, or installation.

No warranty is given for Products purchased or used outside the United States, Canada, or Mexico. To the furthest extent permitted by law, (i) this warranty does not cover damage to property other than the Product itself; and (ii) the remedies provided for herein shall be exclusive.

POLAR LIMITS THE DURATION OF ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE TO THE SHORTEST PERIOD PERMITTED BY LAW, WHICH IN ANY EVENT SHALL NOT EXCEED THE DURATION OF THIS WARRANTY. Some provinces/ states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. ALSO, CONSEQUENTIAL AND INCIDENTAL DAMAGES ARE NOT RECOVERABLE UNDER THIS WARRANTY. Under no circumstances shall Polar be liable for special, indirect or consequential damages arising out of or related to use by Purchaser of the Product. Manufacturers of related items. Some provinces/ states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Polar will not be held responsible for any modification or alterations made to any approved design layout and/ or specification provided by Polar. Any and all proposed changes must first be reviewed, and approved in writing by Polar's Engineering team. No warranty is provided or implied by Polar with regards to longevity or leak-resistance of the roof, validity of any roof warranty, ballasting or anchoring of the Product, suitability of the roof to support the installation of such Product, or otherwise. By acceptance of this document, the Purchaser acknowledges that they understand and agree to/ with the above statement and any and all limitations detailed in this warranty.

## HOW DO YOU GET SERVICE?

In order to be eligible for service under this warranty you must immediately notify Polar, in writing, upon learning of any defect of its Products by either calling the phone number listed above or writing to the address listed above and explaining the nature of defect. If appropriate, arrangement for service under this warranty will be made. You may be required to provide proof of purchase prior to obtaining service under this warranty. In addition, Polar may require you to return the Product to Polar, in its sole discretion, as to whether the Product is defective.

### IMPORTANT WARNING

It is critical that the Polar Racking be properly and securely attached together and installed on a roof. Improper installation could result in injury or damage to people and property including, but not limited to, the installer(s), building, roof, solar modules and other people and equipment. You are responsible for installing and securing the Polar Racking system properly and checking the attachments prior to module installation.

Read and understand all of the instructions and cautions supplied with your Polar Racking Product prior to installation or use. If you do not understand all of the instructions and cautions, or if you do not have sufficient mechanical and electrical experience and are not thoroughly familiar with the installation procedures, you should have the Product installed by a professional installer.



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