Tech Brief

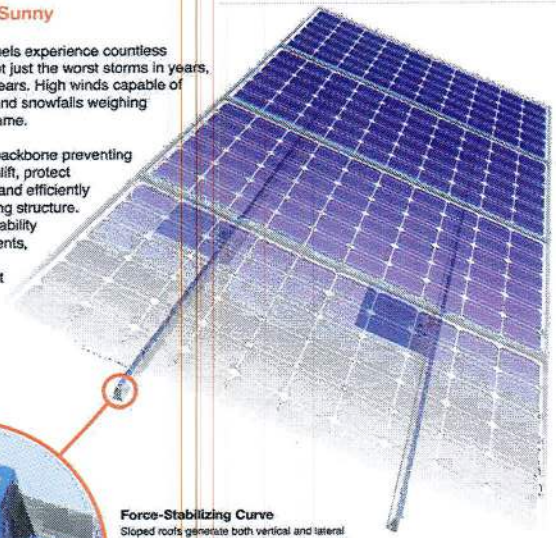
IRONRIDGE

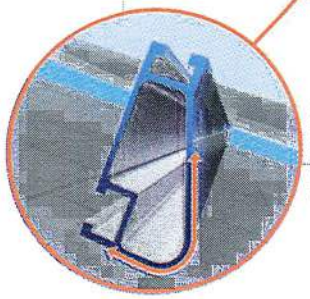
XR Rail Family

Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.





Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs

XR Rails are compatible with FlashFoot and other pitched roof attachments.

IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of 6000-series aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.

Tech Brief

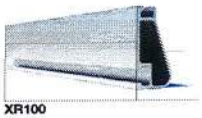
XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.

XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves spans up to 6 feet, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear & black anodized finish
- Internal splices available



XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 10 feet.

- 10' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available

XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans up to 12 feet for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

Rail Selection

The table below was prepared in compliance with applicable engineering codes and standards.* Values are based on the following criteria: ASCE 7-16, Gable Roof Flush Mount, Roof Zones 1 & 2e, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	90	XR10		XR100		XR1000	
	120						
	140						
	160						
20	90						
	120						
	140						
	160						
30	90						
	160						
40	90						
	160						
80	160						
120	160						

*Table is meant to be a simplified span chart for conveying general rail capabilities. Use approved certification letters for actual design guidance.

solar impact
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REVISIONS		
DESCRIPTION	DATE	REV
INITIAL RELEASE	04/26/2022	UR

PROJECT NAME

THOMAS COLLINS
1250 NW DALIAN LN,
LAKE CITY, FL 32055 USA
APN# 313S1706127001
UTILITY: FPL
AHJ: CITY OF LAKE CITY

SHEET NAME
SPEC SHEETS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-14

Tech Brief

IRONRIDGE

Class A Fire Rating

Background

All roofing products are tested and classified for their ability to resist fire.

Recently, these fire resistance standards were expanded to include solar equipment as part of the roof system. Specifically, this requires the modules, mounting hardware and roof covering to be tested together as a system to ensure they achieve the same fire rating as the original roof covering.

These new requirements are being adopted throughout the country in 2016.

IronRidge Certification

IronRidge was the first company to receive a Class A Fire Rating—the highest possible rating—from Intertek Group plc., a Nationally Recognized Testing Laboratory.

IronRidge Flush Mount and Tilt Mount Systems were tested on sloped and flat roofs in accordance with the new UL 1703 & UL 2703 test standards. The testing evaluated the system's ability to resist flame spread, burning material and structural damage to the roof.

Refer to the table below to determine the requirements for achieving a Class A Fire Rating on your next project.

Fire Testing Process

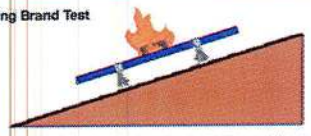
Test Setup

Solar Modules
Solar modules are given a Type classification based on their materials and construction.

Mounting System
Mounting is tested as part of a system that includes type-tested modules and fire-rated roof covering.

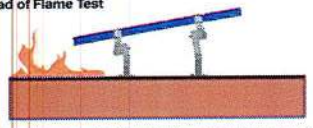
Roof Covering
Roof covering products are given a Fire Class Rating of A, B or C based on their tested fire resistance.

Burning Brand Test



A burning wooden block is placed on module as a fan blows at 12 mph. Flame cannot be seen on underside of roof within 90 minutes.

Spread of Flame Test



Flame at southern edge of roof is aimed up the roof as a fan blows at 12 mph. The flame cannot spread 6 feet or more in 10 minutes.

System	Roof Slope	Module	Fire Rating*
Flush Mount	Any Slope	Type 1, 2, & 3	Class A
Tilt Mount	≤ 6 Degrees	Type 1, 2, & 3	Class A

*Class A rated PV systems can be installed on Class A, B, and C roofs.

Tech Brief

Frequently Asked Questions

What is a "module type"?

The new UL1703 standard introduces the concept of a PV module type, based on 4 construction parameters and 2 fire performance parameters. The purpose of this classification is to certify mounting systems without needing to test it with every module.

What roofing materials are covered?

All fire rated roofing materials are covered within this certification including composition shingle, clay and cement tile, metal, and membrane roofs.

What if I have a Class C roof, but the jurisdiction now requires Class A or B?

Generally, older roofs will typically be "grandfathered in", and will not require re-roofing. However, if 50% or more of the roofing material is replaced for the solar installation the code requirement will be enforced.

Where is the new fire rating requirement code listed?

2012 IBC: 1509.7.2 Fire classification. Rooftop mounted photovoltaic systems shall have the same fire classification as the roof assembly required by Section 1505.

Where is a Class A Fire Rating required?

The general requirement for roofing systems in the IBC refers to a Class C fire rating. Class A or B is required for areas such as Wildland Urban Interface areas (WUI) and for very high fire severity areas. Many of these areas are found throughout the western United States. California has the most Class A and B roof fire rating requirements, due to wild fire concerns.

Are standard mid clamps covered?

Mid clamps and end clamps are considered part of the PV "system", and are covered in the certification.

What attachments and flashings are deemed compatible with Class A?

Attachments and their respective flashings are not constituents of the rating at this time. All code-compliant flashing methods are acceptable from a fire rating standpoint.

What mounting height is acceptable?

UL fire testing was performed with a gap of 5", which is considered worst case in the standard. Therefore, the rating is applicable to any module to roof gap.

Am I required to install skirting to meet the fire code?

No, IronRidge achieved a Class A fire rating without any additional racking components.

What determines Fire Classification?

Fire Classification refers to a fire-resistance rating system for roof covering materials based on their ability to withstand fire exposure.

Class A - effective against severe fire exposure
Class B - effective against moderate fire exposure
Class C - effective against light fire exposure

What if the roof covering is not Class A rated?

The IronRidge Class A rating will not diminish the fire rating of the roof, whether Class A, B, or C.

What tilts is the tilt mount system fire rated for?

The tilt mount system is rated for 1 degrees and up and any roof to module gap, or mounting height.

More Resources

Installation Manuals
Visit our website for manuals that include UL 2703 Listing and Fire Rating Classification.
Go to IronRidge.com

Engineering Certification Letters
We offer complete engineering resources and pre-stamped certification letters.
Go to IronRidge.com

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AHJ: CITY OF LAKE CITY

SHEET NAME
SPEC SHEETS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-15

S-5!®

The Right Way!

NEW PRODUCT
SolarFoot™

Introducing the new SolarFoot™ for exposed fastener metal roofing with the strength, testing, quality, and time-proven integrity you expect from S-5!. The SolarFoot provides an ideal mounting platform to attach the L-Foot (not included) of a rail-mounted PV system to the roof. This solution is The Right Way to secure rail-mounted solar systems to exposed fastener metal such as AG-Panel or R-Panel.

The right way to attach almost anything to metal roofs!

SolarFoot Features:

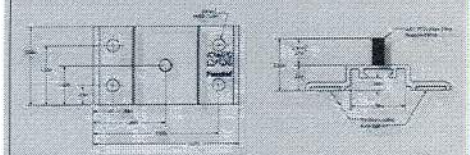
- Manufactured in the U.S.A. from certified raw material
- Fabricated in our own ISO 9001:2015 certified factory
- All aluminum and stainless components
- 25yr limited warranty
- Compatible with all commercial L-Foot products on the market
- Factory applied 40-year isobutylene/isoprene crosslink polymer sealant for reliable weathertightness
- Sealant reservoir to prevent over-compression of sealant
- Load-to-failure tested Normal to Seam by a nationally accredited laboratory on numerous metal roof materials and substrates
- Four points of attachment into structure or deck with tested holding strength for engineered applications
- Integrated M8-1.25x17mm stud and M8-1.25 stainless steel hex flange nut included

888-825-3432 | www.S-5.com |

S-5!® The Right Way!

SolarFoot™ Mounting for Exposed Fastener Roofing

The SolarFoot is a simple, cost-effective pedestal for L-Foot (not included) attachment of rail-mounted solar PV. The unique design is compatible with all rail producer L-Foot components. The new SolarFoot assembly ensures a durable weathertight solution for the life of the roof. Special factory applied butyl co-polymeric sealant contained in a reservoir is The Right Way, allowing a water-tested seal. Stainless integrated stud and hex flange lock-nut secure the L-Foot into position. A low center of gravity reduces the moment arm commonly associated with L-Foot attachments. Direct attachment of the SolarFoot to the structural member or deck provides unparalleled holding strength.



*Fasteners sold separately. Fastener type varies with substrate. Contact S-5! on how to purchase fasteners and obtain our test results. L-Foot also sold separately.

Fastener Selection

Metal to Metal:
1/4-14 Self Drilling Screw
1-1/2" to 2-1/2"

Metal to Wood:
1/4-14 Type 17 AB Milled Point
1-1/2" to 2-1/2"

To source fasteners for your projects, contact S-5!

When other brands claim to be "just as good as S-5!", tell them to PROVE IT.

SolarFoot Advantages:

- Exposed fastener mounting platform for solar arrays attached via L-Foot and Rails
- Weatherproof attachment to exposed fastener roofing
- Butyl sealant reservoir provides long-term waterproof seal
- M8-1.25x17mm stud with M8 hex flange nut for attachment of all popular L-Foot/rail combinations
- Tool: 13 mm Hex Socket or ½" Hex Socket
- Tool Required: Electric screw gun with hex drive socket for self-tapping screws.
- Low Center of Gravity reduces moment arm commonly associated with L-Foot/Rail solar mounting scenarios
- Attaches directly to structure or deck for optimal holding strength
- S-5! Recommended substrate-specific (e.g. steel purlin, wood 2x4, OSB, etc.) fasteners provide excellent waterproofing and pull-out strength
- Fastener through-hole locations comply with NDS (National Design Specification)for Wood Construction

S-5!® Warning! Please use this product responsibly!

The independent lab test data found at www.S-5.com can be used for load-critical designs and applications.

Products are protected by multiple U.S. and foreign patents. For published data regarding holding strength, fastener torque, patents, and trademarks, visit the S-5! website at www.S-5.com. Copyright 2017, Metal Roof Innovations, Ltd. S-5! products are patent protected.

Distributed by:

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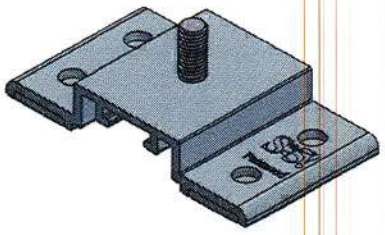
AHJ: CITY OF LAKE CITY

SHEET NAME
SPEC SHEETS

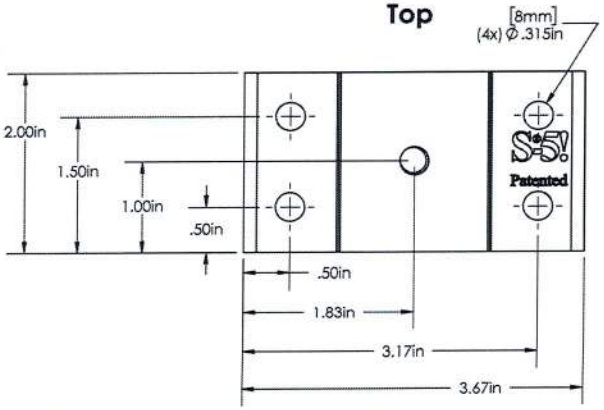
SHEET SIZE
ANSI B
11" X 17"

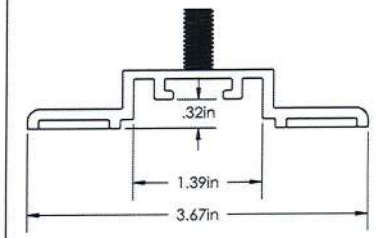
SHEET NUMBER
PV-16

SolarFoot



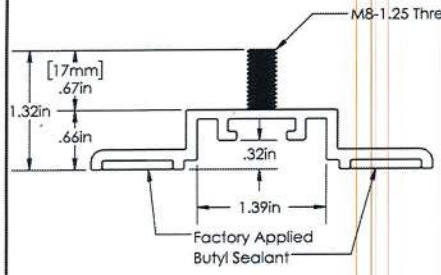
Top





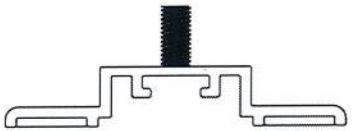
Scale 2:3

Back

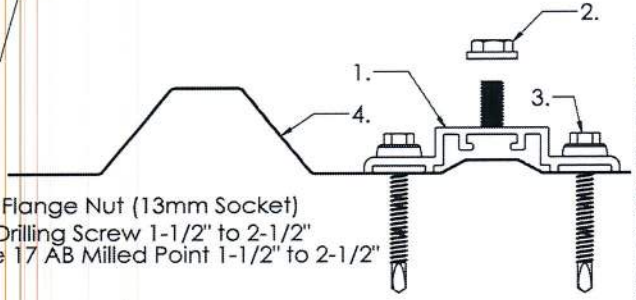


Left

Front



Right



FOR STANDING SEAM SPECIFIC MECHANICAL LOAD TEST INFORMATION AND CLAMP INSTALLATION INFORMATION
PLEASE VISIT: WWW.S-5.COM

General Notes:

1. SolarFoot
2. M8-1.25 Stainless Steel Hex Flange Nut (13mm Socket)
3. Metal to Metal:1/4-14 Self Drilling Screw 1-1/2" to 2-1/2"
   Metal to Wood:1/4-14 Type 17 AB Milled Point 1-1/2" to 2-1/2"
4. Example roof

MATERIAL: 6005A T61 Al	S-5! The Right Way!	METAL ROOF INNOVATIONS, LTD. 8655 TABLE BUTTE RD COLORADO SPRINGS, CO 80908 719-495-0518 719-495-0045(FAX)
EST ASSEMBLY WEIGHT: 0.248 lbs		
SUPPLIED HARDWARE: M8-1.25 Hex Flange Nut	TITLE: SolarFoot [CCD]	
SCALE: 2:3	DRAWING NO.: LP66-A-0-A	DRAWN BY: Paul Leitch — DATE: 09/20/2017
EST. WEIGHT: Bracket: 0.129 lbs Fastener: 0.026 lbs Nut: 0.015 lbs	S-5!® PRODUCTS ARE PROTECTED BY MULTIPLE U.S. AND FOREIGN PATENTS. VISIT OUR WEBSITE AT WWW.S-5.COM FOR COMPLETE INFORMATION ON PATENTS AND TRADEMARKS.	

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SHEET NAME
SPEC SHEETS

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-17

S-5!®

The right way to attach almost anything to metal roofs!

The Right Way!

Please read these install instructions in their entirety before beginning work.

Installation Instructions

S-5!® Warning! Please use these products responsibly! Visit our website or contact your S-5! distributor for available load test results. The user and/or installer of these parts is responsible for all necessary engineering and design to ensure the Solar Feet™ have been properly spaced and configured.

Notice to S-5! users: Due to the many variables involved with specific panel products, climates, wind loads, snow loads, and job particulars, the manufacturer cannot and does not express any opinions as to the suitability of any S-5! assembly for any specific application and assumes no liability with respect thereto. S-5! products are tested for ultimate holding strength on various profile types and materials. This information is available from the S-5! website: **www.S-5.com.**

These install instructions serve to illustrate the correct procedure for securing the SolarFoot to a roof. Proper layout and frequency will vary on a job specific basis and should be determined by a qualified professional. This document is an installation guide only and the photographs and drawings herein are for the purpose of illustrating installation, tools and techniques, not system designs.

The SolarFoot™ is made for exposed-fastened metal roofing. It provides an ideal, weatherproof mounting platform to attach the L-foot of a rail mounted solar system or other ancillaries to the roof.

Tools Needed

- Electric Screw Gun
- Rag
- String Line
- Tape Measure
- 3/8" Hex Socket Drive
- 13 mm (or 1/2") Hex Socket Drive

Placement Tip

The SolarFoot should be placed in the flat of the panel, between the ribs. It is designed to straddle striations or minor stiffening ribs when necessary. The SolarFoot must be mounted directly over and into the supporting structure of the roof, i.e. wood decking, wood or steel purlins, or trusses, NEVER into the metal roofing material alone.

Fastener Selection

Fastener selection will depend on whether the supporting structure of the roof is metal or wood. When relying upon tested load values one of the below fasteners MUST be used.

To source fasteners visit www.S-5.com

Not Provided

Metal to Metal Screw Specifications: 1/4-14 Self Drilling Screw - 1-1/2" to 2-1/2" Length - 3/8" Hex Washer Head - Zinc/Aluminum Cap

Not Provided

Metal to Wood Screw Specifications: 1/4-14 Type 17-AB Milled Point - 1-1/2" to 2-1/2" Length - 3/8" Hex Washer Head - Zinc/Aluminum Cap

S-5!® Warning! Please use this product responsibly!

These instructions are for use by those experienced in the trade. Always follow appropriate safety precautions and use appropriate tools.

SolarFoot™ Install | www.S-5.com | 888-825-3432

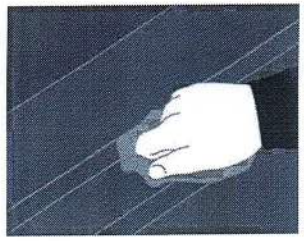
SolarFoot Installation Instructions

To Install SolarFoot™

1. Determine the location of the supporting structure of the roof. Wipe away excess oil and debris from the desired mounting location.
2. Peel the release paper from the base, align, and apply to roof surface so that fasteners will engage the structure below.
3. Install screws through the pre-punched holes in the SolarFoot into the structure below.
4. Install the L-Foot over the stud and secure in place with the provided M8-1.25 hex flange nut tightened to 160 inch pounds (13 ft lbs).

NOTE: Attachment frequency and spacing for PV arrays is the responsibility of the system designer. The makers of S-5! SolarFoot make no representations with respect to the variables involved in PV array design. Visit the S-5! website for load testing data.

1



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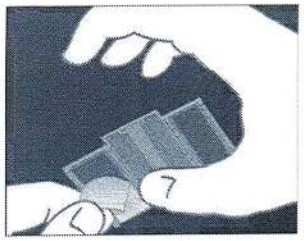

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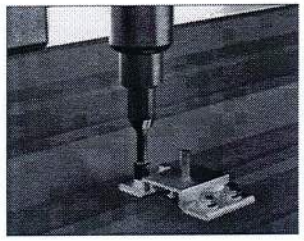

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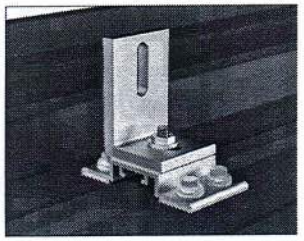

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LP66-V1.0_08/17

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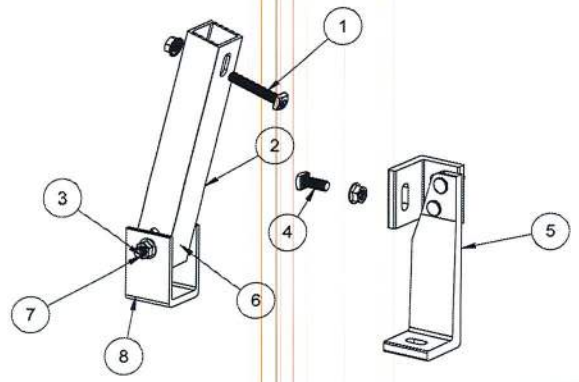
PV-18

Cut Sheet

IRONRIDGE

Tilt Leg



ITEM NO	DESCRIPTION	QTY IN KIT
1	BOLT, BONDING 3/8-16 SQ HEAD, 2.25"	1
2	NORTH TILT LEG, 1.5" SQ, LENGTH VARIES	1
3	NUT, FLANGE HEX 3/8-16 SS	3
4	BOLT, BONDING 3/8-16 SQ HEAD, 1.0"	1
5	PRE-ASSEMBLED SOUTH TILT LEG	1
6	WASHER, FLAT 3/8 SS	1
7	BOLT, 3/8-16 X 2.5" CS SST	1
8	U-FOOT	1

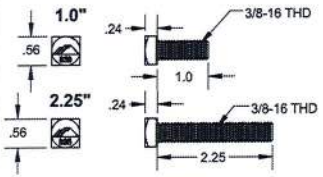
TILT MOUNT KIT OPTIONS

PART NUMBER	DESCRIPTION	NORTH TILT LEG LENGTH
TM-FTL-010	Kit, Fixed Tilt Leg, 10", Mill	10"
TM-FTL-015	Kit, Fixed Tilt Leg, 15", Mill	15"
TM-FTL-020	Kit, Fixed Tilt Leg, 20", Mill	20"
TM-FTL-025	Kit, Fixed Tilt Leg, 25", Mill	25"
TM-FTL-030	Kit, Fixed Tilt Leg, 30", Mill	30"

v1.1

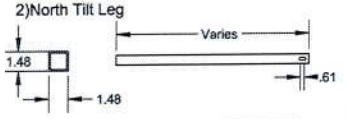
Cut Sheet

1,4) Bolt, Bonding 3/8-16 Sq Head



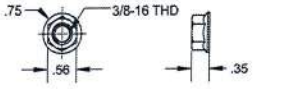
Property	Value
Material	Stainless Steel
Finish	Clear

2)North Tilt Leg



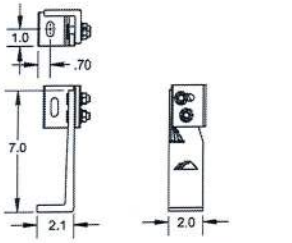
Property	Value
Material	Aluminum
Finish	Mill

3) Nut, Flange Hex 3/8-16 SS



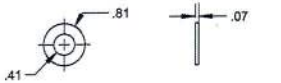
Property	Value
Material	Stainless Steel
Finish	Clear

5)Pre-assembled South Tilt Leg



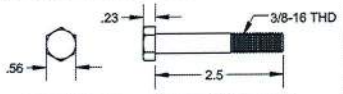
Property	Value
Material	Aluminum
Finish	Mill

6) Washer, Flat 3/8 SS



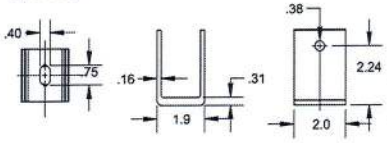
Property	Value
Material	Stainless Steel
Finish	Clear

7) Bolt, 3/8-16 X 2.5" CS SS



Property	Value
Material	Stainless Steel
Finish	Clear

8) U-Foot



Property	Value
Material	Aluminum
Finish	Mill

v1.1

solar impact

BARRY JACOBSON
4509 NW 23RD AVE, STE 20,
GAINESVILLE, FL 32606
TEL: (352)281-5946
CSLB # : CVC56761
Email barry@solarimpact.com

REVISIONS		
DESCRIPTION	DATE	REV
INITIAL RELEASE	04/26/2022	UR

PROJECT NAME

THOMAS COLLINS
1250 NW DALIAN LN,
LAKE CITY, FL 32055 USA
APN# 313S1706127001
UTILITY: FPL
AHJ: CITY OF LAKE CITY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

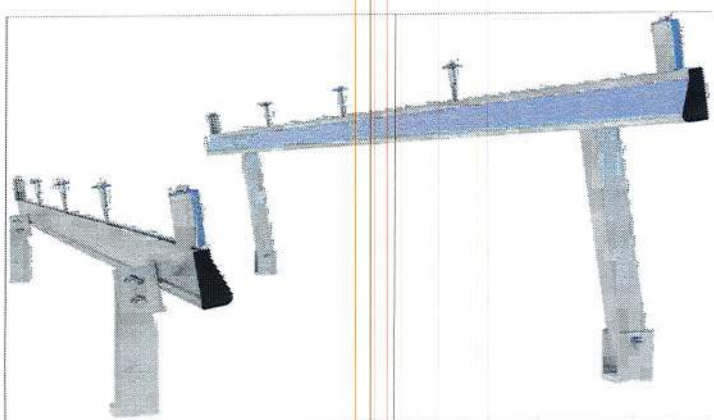
SHEET NUMBER

PV-19

Datasheet

IRONRIDGE

Tilt Mount System



Trust your system at every angle.

The IronRidge Tilt Mount System supports a wide range of solar module tilting angles, while also resisting the extreme wind and snow forces experienced over a building's lifetime.

Every component has been carefully engineered and rigorously tested, and the entire system uses only aluminum and stainless steel materials to resist corrosion.

Roof Friendly
Lightweight and compatible with industry-standard attachments.

Strength Tested
All components evaluated for superior structural performance.

UL 2703 Listed System
Meets newest effective UL 2703 standard.

PE Certified
Pre-stamped engineering letters available in most states.

Design Assistant
Online software makes it simple to create, share, and price projects.

25-Year Warranty
Products guaranteed to be free of impairing defects.

Datasheet

XR Rails & Tilt Legs

XR Rails

Attach directly to Tilt Legs. Available in three targeted sizes to support specific wind and snow loads.
- Unique curved profile
- Spanning capabilities up to 12'
- Clear and black finish

Tilt Legs

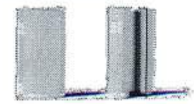
Tilt assembly to desired angle, up to 30 degrees. Kits include South and North Tilt Leg and all hardware.
- Available in multiple lengths for a wide angle range
- Assembled South Tilt Legs include angle indicators
- Legs are electrically bonded to rails

Grounding Clamps

UFOs

Universal Fastening Objects secure and bond modules to rails.
- Fully assembled and lubricated
- Single, universal size
- Clear and black finish

Stopper Sleeves



Snap onto the UFO to transform into a bonded end clamp.
- Bonds modules to rails
- Sized to match modules
- Clear and black finish

CAMO

Bond modules to rails while staying completely hidden.
- Universal end-cam clamp
- Tool-less installation
- Fully assembled

Accessories

BOSS™ Bonded Splices

Bonded Structural Splices connect and bond XR Rails together.
- Integrated bonding
- No tools or hardware
- Self-centering stop tab

Grounding Lugs

Connects Tilt Mount system to equipment ground.
- Low profile
- Single tool installation
- Mounts in any direction

Ends Caps & Wire Clips

Provide a finished look and organize electrical wires.
- Simple snap-in installations
- Clips hold up to ten 5mm wires
- UV-stabilized polymer

Resources

Design Assistant
Go from rough layout to fully engineered system. For free.
Go to IronRidge.com/design

NABCEP Certified Training
Earn free continuing education credits, while learning more about our systems.
Go to IronRidge.com/training

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