

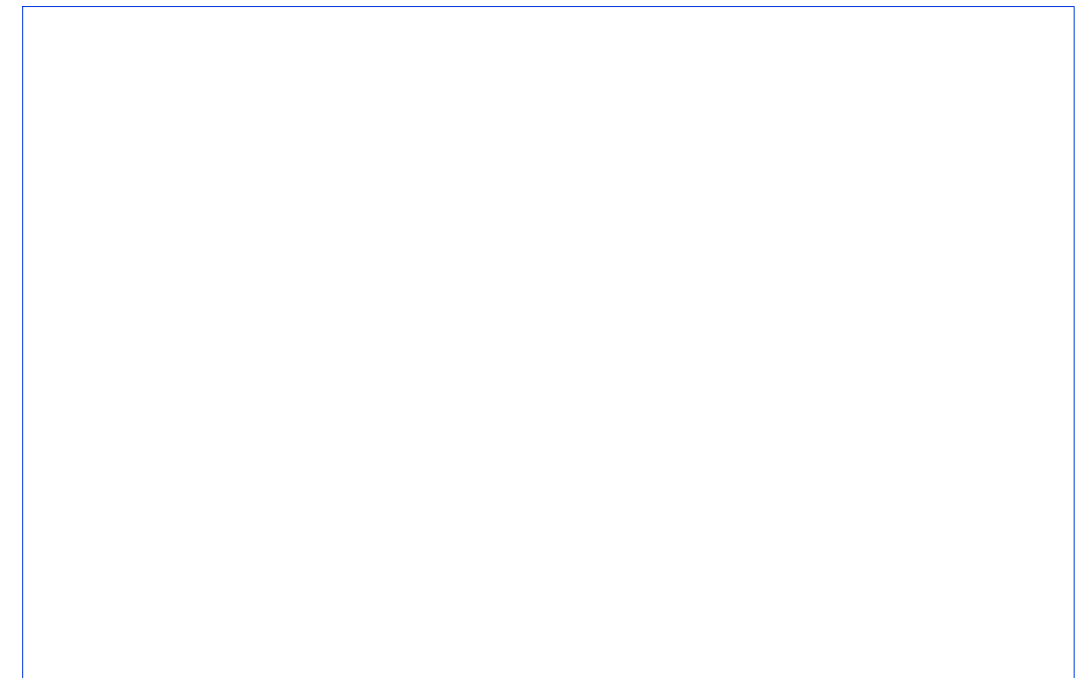
XXX RESIDENCE : XXX
20.4 KW DC ROOF MOUNTED PHOTOVOLTAIC SYSTEM

EQUIPMENT SUMMARY

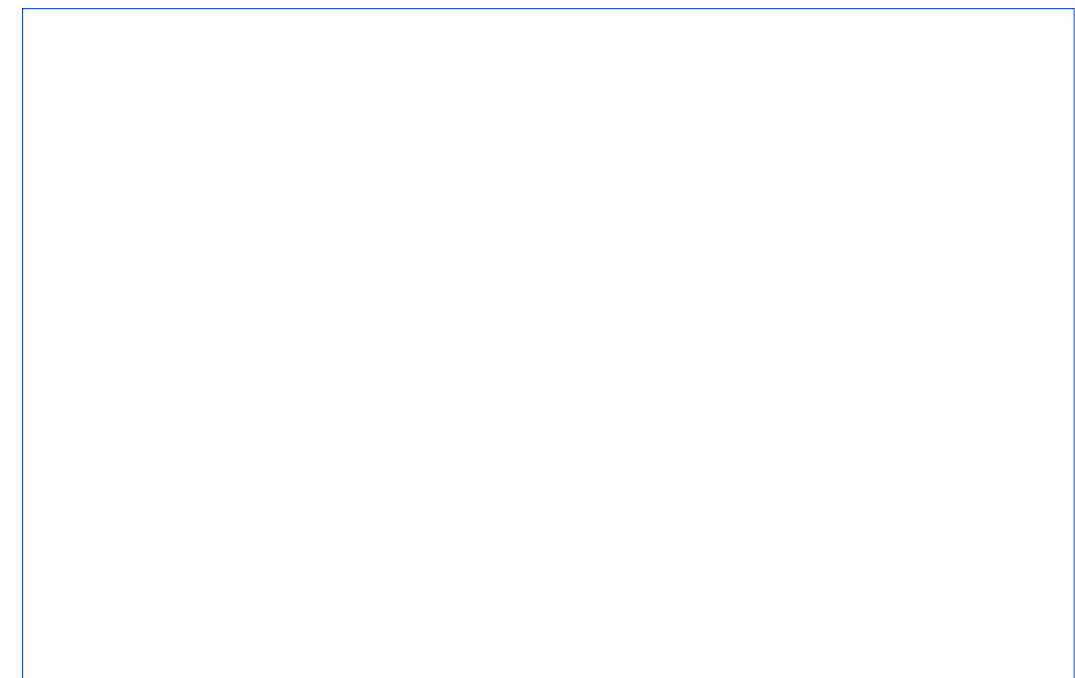
51 NO'S - JINKO 400W EAGLE 72HM G2 JKM400M-72HL-V MODULES
02 NO'S - SOLAREEDGE SE10000H-US INVERTER WITH
51 NO'S OF P400 DC POWER OPTIMIZERS

SHEET INDEX

T-001 COVER SHEET
G-001 ELECTRICAL CONSTRUCTION GENERAL NOTES
P-001 PROPERTY MAP & PROPERTY LAYOUT
P-002 ATTACHMENT LAYOUT
P-003 MODULE DATA SHEET
P-004 MOUNTING ATTACHMENT DATA SHEET-1
P-005 MOUNTING ATTACHMENT DATA SHEET-2



SITE VICINITY MAP



SITE AERIAL MAP

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ELECTRICAL CONSTRUCTION GENERAL NOTES:

1.1 Site Notes

- 1.2 A ladder shall be in place for inspection in compliance with OSHA regulations.
- 1.3 The PV modules are considered non-combustible and this system is a utility interactive system with no storage batteries.
- 1.4 The solar PV installation shall not obstruct any plumbing, mechanical, or building roof vents.
- 1.5 Proper access and working clearance around existing and proposed electrical equipment will be provided as per section [NEC 110.26].
- 1.6 Alternative power source placard shall be plastic, engraved in a contrasting color to the plaque. This plaque will be attached using an approved method. If exposed to sunlight, it shall be UV resistant. All plaques and signage will be installed as required by the NEC.
- 1.7 The grounding electrode conductor shall be protected from physical damage between the grounding electrodes and the panel (or inverter) if smaller than #6 AWG copper wire per NEC 250-64B. The grounding electrode conductor will be continuous, expect for splices or joints at bus bars within listed equipment per [NEC250.64C.]
- 1.8 Roof coverings shall be designed, installed, and maintained in accordance with this code and the approved manufacturer's instructions such that the roof covering shall serve to protect the building or structure.
- 1.9 Rigid conduit (and/or nipples) must have a pull bushing to project wires.
- 1.10 Bolted connection required in dc disconnects on the white grounded conductor (use Polaris block or neutral bar)
- 1.11 Any connection above live parts must be watertight. Reducing washers disallowed above live parts, Meyers hubs recommended.

2.1 Solar Contractor

- 2.2 Module certifications will include UL1703, IEC61646, and IEC61730.
- 2.3 If applicable, module grounding lugs must be installed at the marked grounding lug holes per the manufactures installation requirements.
- 2.4 As indicated by design, other NRTL listed module grounding devices may be used in place of standard grounding lugs as shown in manufacturer documentation and approved by the AHJ.
- 2.5 Conduit and wire specifications are based on minimum code requirements and are not meant to limit up-sizing as required by field conditions.
- 2.6 Conduit point of penetration from to interior to be installed and sealed with a suitable sealing compound.
- 2.7 Dc wiring limited to module footprint w/ Enphase ac system.
- 2.8 Enphase wiring systems shall be located and secured under the array w/suitable wiring clips.
- 2.9 Max dc voltage calculated using manufacturer provided temp coefficient for Voc unless not available.
- 2.10 All inverters, motor generators, photovoltaic modules, photovoltaic panels, ac photovoltaic modules, source circuit combiners, and charge controllers intended for use in a photovoltaic power system will be identified and listed for the application per690.4(d).
- 2.11 All signage to be placed in accordance with local building code.

3.1 Equipment Locations

- 3.2 All equipment shall meet minimum setbacks as required by [NEC 110.26].
- 3.3 Equipment installed in direct sunlight must be rated for expected operating temperature as specified by [NEC 690.31 (a)-(b)] and [NEC table 310.15(b) (2) (c)].
- 3.4 Additional ac disconnects shall be provided where the inverter is not adjacent to the utility ac disconnect, or not within sight of the utility ac disconnect.
- 3.5 All equipment shall be installed accessible to qualified personal according to NEC applicable codes.
- 3.6 All components are listed for their purpose and rated for outdoor usage when appropriate.

4.1 Wiring & Conduit Notes

- 4.2 All conduit sizes and types, shall be listed for its purpose and approved for the site applications.
- 4.3 All PV cables and home run wires be #10AWG *USE-2, PV wire, or proprietary solar cabling specified by MFR, or equivalent; routed to source circuit combiner boxes as required
- 4.4 All conductors and OCPD sizes and types specified according to [NEC 690.8(a) (1) & (b) (1)], [NEC 240] [NEC690.7] for multiple conductors.
- 4.5 All PV dc conductors in conduit exposed to sunlight shall be de rated according to [NEC table 310.15(b) (2) (c) block only**
- 4.6 Exposed roof PV dc conductors shall be use-2, 90°C rated, wet and UV resistant, and UL listed rated for 600v, UV rated spiral wrap shall be used to protect wire from sharp edges.
- 4.7 Phase and neutral conductors shall be dual rated THHN/THWN-2 insulated, 90° C rated, wet and UV resistant, rated for 600V per NEC 2008 or 1000V per NEC 2011.
- 4.8 4-wire delta connected systems have the phase with the higher voltage to ground marked orange or identified by other effective means
- 4.9 All source circuits shall have individual source circuit protection
- 4.10 Voltage drop limited to 2% for dc circuits and 1% for ac circuits
- 4.11 Negative grounded systems dc conductors shall be color coded as follows: dc positive -red (or marked red), dc negative - grey (or marked grey)
- 4.12 Positive grounded systems dc conductors color coded: dc positive -grey (or marked grey), dc negative- black (or marked black)
- 4.13 AC conductors >4awg color coded or marked: phase a or L1-black, phase b or L2-red, phase c or L3-blue, Neutral- white/ gray

*USE-2 is not indoor rated but PV cable is rated THWN/THWN-2 and may be used inside

**USE-2 is available as UV white

5.1 Structural Notes:

- 5.2 Racking system & PV array shall be installed according to code-compliant installation manual.
- 5.3 Roof mounted standard rail requires one thermal expansion gap for every run of rail greater than 40'.
- 5.4 Array shall be a min. Height of 3" above the composition roof.
- 5.5 Junction box shall be installed per manufacturer's specifications.it shall be flashed &sealed per local requirements.
- 5.6 Rooftop penetrations permitting to solar racking will be completed and sealed w/approved chemical sealant per code by a licensed contractor.
- 5.7 All PV related racking attachments will be spaced no greater than the span distance specified by the racking manufacturer, O.C. final attachment locations may be adjusted in the field as necessary.
- 5.8 All PV related racking attachments shall be staggered by row amongst the roof framing members.

6.1 Grounding Notes

- 6.2 A grounding electrode system in accordance with [nec690-47] and [nec250-50] through [NEC 60 250-166] shall be provided. Per NEC, grounding electrode system of existing building may be used and bonded to at the service entrance. If existing system is inaccessible, or inadequate, or is only metallic water piping, a supplement grounding electrode will be used at the inverter location consisting of a UL listed 8ft ground rod with acorn clamp.
- 6.3 Grounding electrode conductors shall be no less than#8 AWG and no greater than#6 AWG copper and bonded to the existing grounding electrode to provide for a complete system.
- 6.4 PV system shall be grounded in accordance to [NEC 250.21], [NEC table 250.122], and all metal parts or module frames according to [NEC 690.43].
- 6.5 Module source circuits shall be grounded in accordance to [NEC 690.42].
- 6.6 The grounding connection to a module shall be arranged such that the removal of a module does not interrupt a grounded conductor to another module.
- 6.7 Each module will be grounded using the supplied connections points identified in the manufacturer's installation instructions.
- 6.8 Enclosures shall be properly prepared with removal of paint/finish as appropriate when grounding equipment with termination grounding lugs.
- 6.9 Grounding system components shall be listed for their purpose, and grounding devises exposed to the elements shall be rated for direct burial.
- 6.10 Grounding and bonding conductors shall be copper, solid or stranded, and bare when exposed.
- 6.11 Equipment grounding conductors shall be size according to [NEC 690.45] and be a minimum of #10awg when not exposed to damage (#6awg shall be used when exposed to damage).
- 6.12 Grounding and bonding conductors, if insulated, shall be color coded green (or marked green if #4awg or larger)
- 6.13 All conduit between the utility ac disconnect and the point of connection shall have grounded bushings at both ends.
- 6.14 AC system GEC sized according to [NEC 690.47], [NEC table 250.66], dc system GEC sized according to [NEC 250.166], minimum #8awg when insulated, #6awg when exposed to damage.
- 6.15 Exposed non-current carrying metal parts of module frames, equipment's, and conductor enclosures shall be grounded in accordance with 250.134 or 250.136(a) regardless of voltage.

7.1 Interconnection Notes

- 7.2 PV provided back feed breakers must be located at the opposite end of the bus from the main service breaker or transformer input feeder in accordance with [NEC 690.64(b) (7)]
- 7.3 Sum of breaker ratings supplying the bus may not exceed 120% of the bus bar rating per [NEC 690.64(b) (2)] and/or [nec705.12 (d) (1)].
- 7.4 Ground fault protection in accordance with [nec215.9] & [NEC 230.95].all equipment to be rated for back feeding.
- 7.5 Supply side interconnection according to [NEC 690.64(a) and/or [NEC 705.12(a)] with service entrance conductors in accordance with [NEC 230.42(b)]
- 7.6 Micro inverter branches shall be connected to a single breaker OCPD in accordance with [NEC 110.3(b)].

8.1 Disconnect Notes

- 8.2 Disconnecting switches shall be wired such that when the switch is opened the conductors remaining live are connected to the terminals marked "line side" (typically the upper terminals).
- 8.3 AC disconnect must be accessible to qualified utility personnel, be lockable, and be a visible- break switch.
- 8.4 DC current conductors are to remain outside of building prior to either a fuse able source circuit combiner box or a load-break disconnecting device.

9.1 Storm Water Prevention

9.2 Storm water pollution prevention devices and practices shall be installed and/or instituted as necessary to ensure compliance with the city water quality standards contained in local regulations, federal regulations and any erosion control plan associated with this project. all such devices and practices shall be maintained, inspected and/or monitored to ensure adequacy and proper function throughout the duration of the construction project.

Compliance with the water quality standards and any erosion control plan associated with this project includes, but is not limited to the following:

- 9.3 All pollutants shall be retained on site until properly disposed of, and may not be transported from the site via sheet flow, swales, area drains, natural drainage courses or wind.
- 9.4 Stockpiles of construction-related materials shall be protected from being transported from the site by forces of wind or water flow.
- 9.5 Trash and construction solid wastes shall be deposited into covered receptacle to prevent contamination of rainwater and dispersal by wind.

10.1 Visibility From Adjacent Property : The solar panels may be visible from adjacent properties. Paint all structural elements to match the existing roofing.

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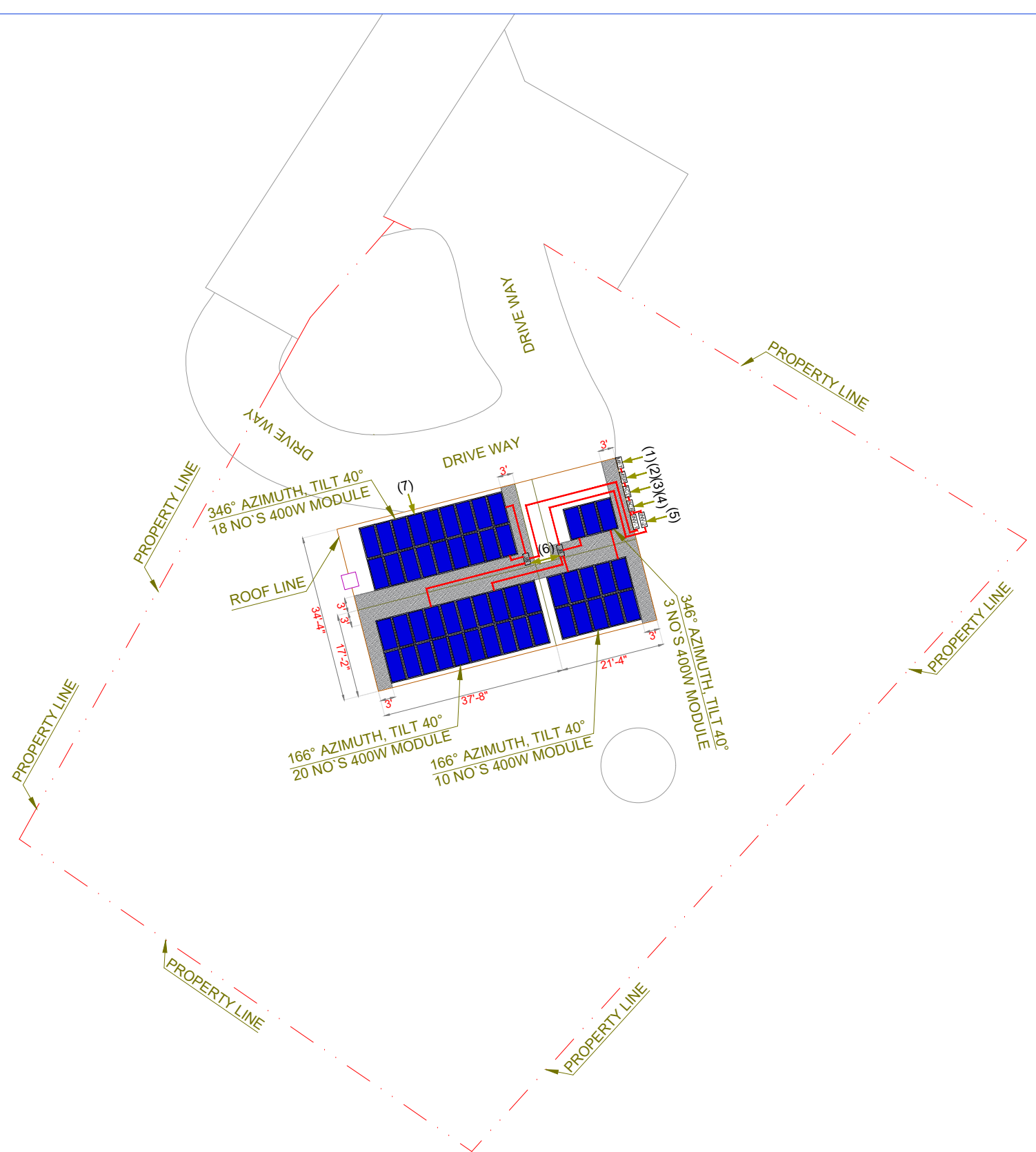
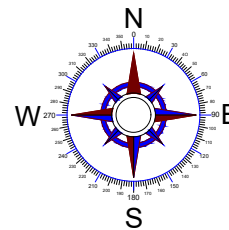
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DESCRIPTION
1. UTILITY METER
2. MAIN SERVICE PANEL
3. AC DISCONNECT
4. AC COMBINER BOX
5. INVERTER
6. JUNCTION BOX
7. PV MODULES
■ FIRE SETBACK

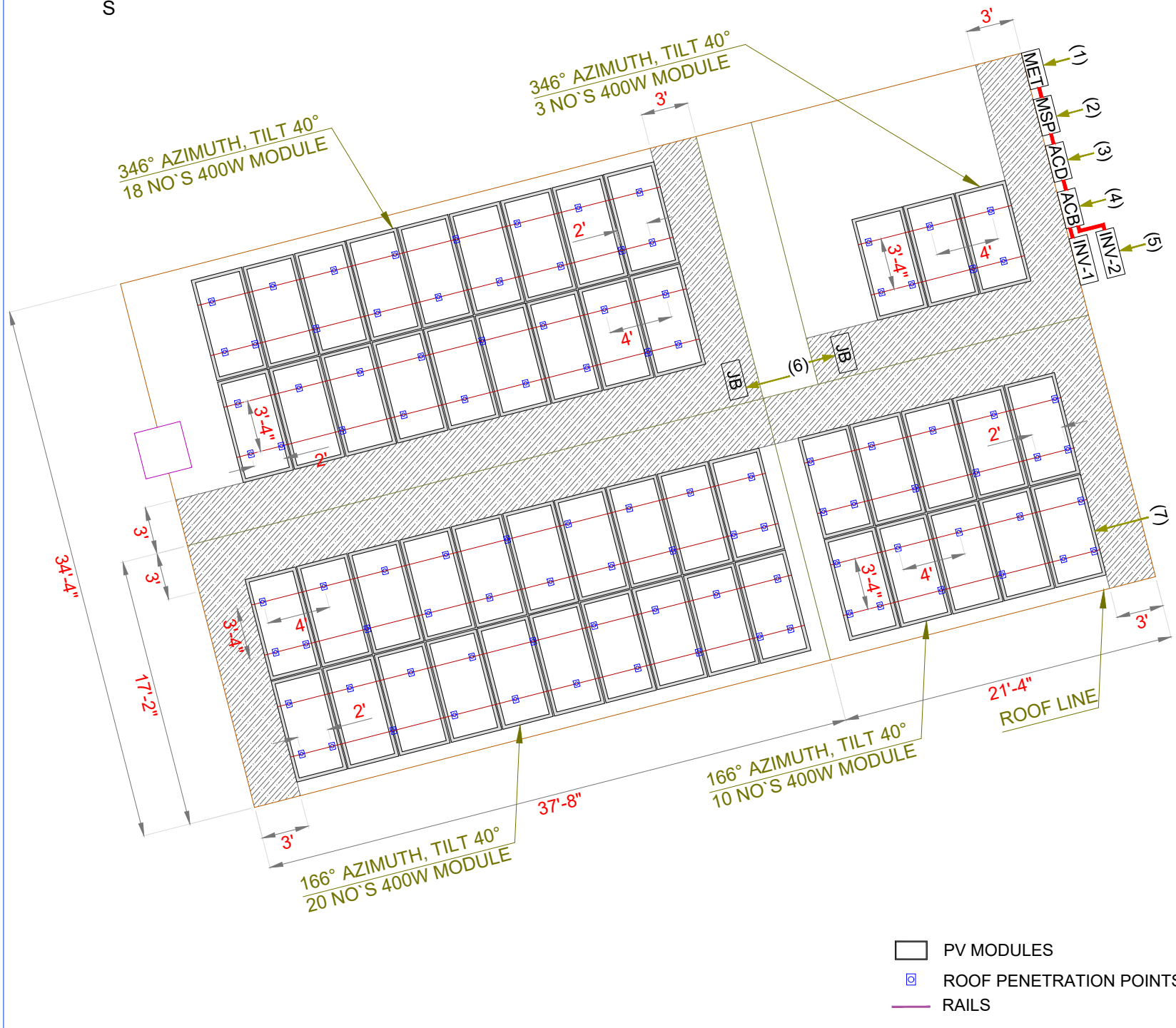
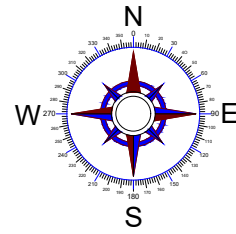
PROPERTY MAP & LAYOUT

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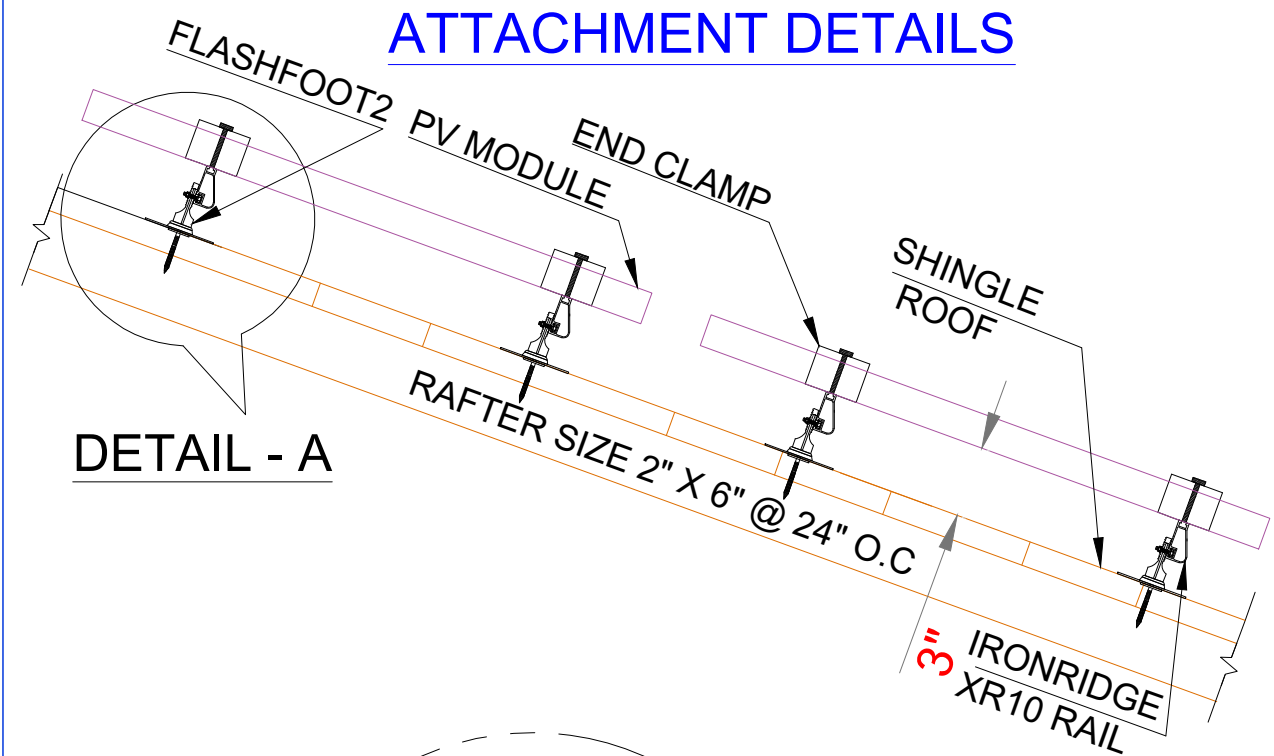
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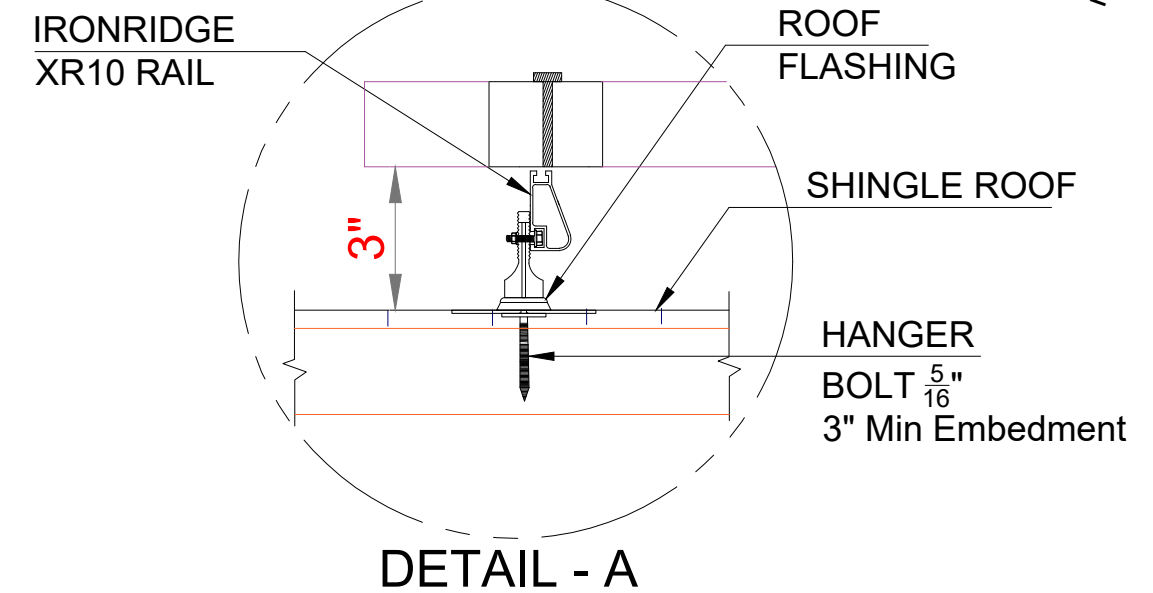
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ATTACHMENT DETAILS

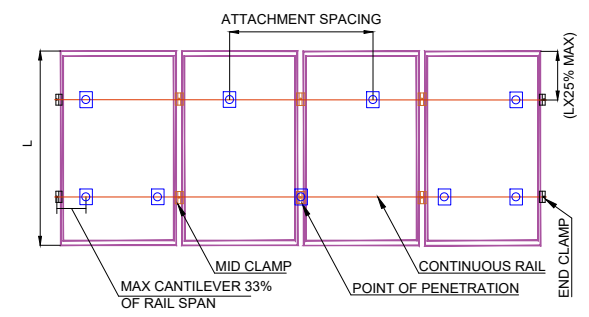


DETAIL - A



DETAIL - A

Roof Cover Type : Shingle Roof
 Rafter Size with O.C : 2" X 6" @ 24"
 Attachment Spacing : 4'
 No. of Attachment Points : 101
 Attachment Type : Staggered



ATTACHMENT LAYOUT

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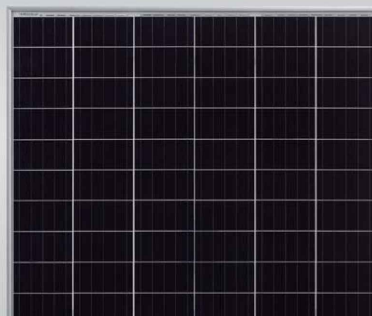
jinkosolar.us



Eagle 72HM G2 380-400 Watt

MONO PERC HALF CELL MODULE

Positive power tolerance of 0~+3%



KEY FEATURES

- Diamond Cell Technology**
Uniquely designed high performance 5 busbar mono PERC half cell
- 1500V High Voltage**
UL and IEC 1500V certified; lowers BOS costs and yields better LCOE
- Higher Module Power**
Decrease in current loss yields higher module efficiency
- Shade Tolerance**
More shade tolerance due to twin arrays
- PID FREE**
Reinforced cell prevents potential induced degradation
- Strength and Durability**
Certified for high snow (5400Pa) and wind (2400 Pa) loads

- ISO9001:2008 Quality Standards
- ISO14001:2004 Environmental Standards
- OHSAS18001 Occupational Health & Safety Standards
- IEC61215, IEC61730 certified products
- UL1703 certified products

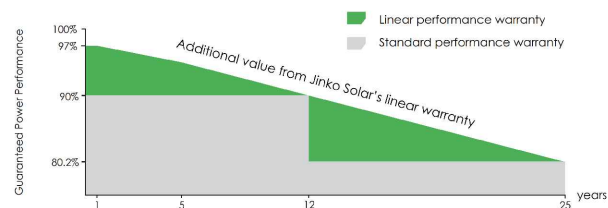
Nomenclature:
JKM400M-72HL-V

Code	Cell	Code	Cell	Code	Certification
null	Full	null	Normal	null	1000V
H	Half	L	Diamond	V	1500V

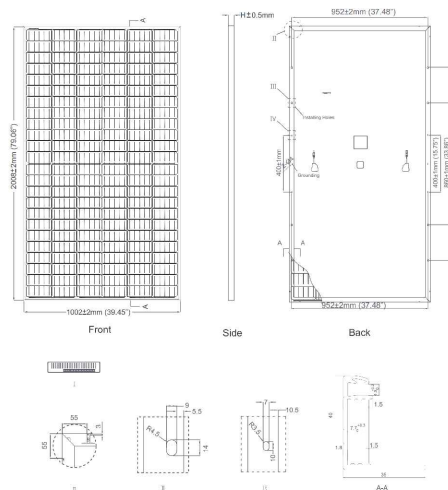


LINEAR PERFORMANCE WARRANTY

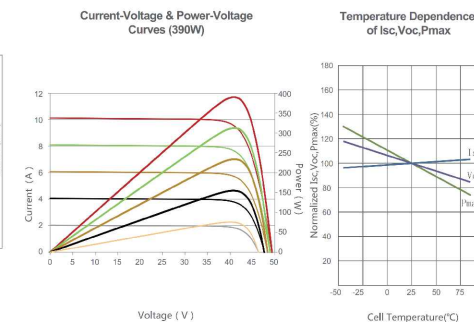
10 Year Product Warranty • 25 Year Linear Power Warranty



Engineering Drawings



Electrical Performance & Temperature Dependence



Mechanical Characteristics

Cell Type	Mono PERC Diamond Cell (158.75 x 158.75 mm)
No. of Half-cells	144 (6x24)
Dimensions	2008x1002x40mm (79.05x39.45x1.57 inch)
Weight	22.5 kg (49.6 lbs)
Front Glass	3.2mm, Anti-Reflection Coating, High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminium Alloy
Junction Box	IP67 Rated
Output Cables	12AWG, Anode 1400mm(55.12 in), Cathode 1400mm(55.12 in) or Customized Length
Fire Type	Type 1

Packaging Configuration

(Two pallets = One stack)
26pcs/pallet, 52pcs/stack, 572pcs/40'HQ Container

SPECIFICATIONS

Module Type	JKM380M-72HL-V		JKM385M-72HL-V		JKM390M-72HL-V		JKM395M-72HL-V		JKM400M-72HL-V	
	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT	STC	NOCT
Maximum Power (Pmax)	380Wp	286Wp	385Wp	290Wp	390Wp	294Wp	395Wp	298Wp	400Wp	302Wp
Maximum Power Voltage (Vmp)	40.5V	38.6V	40.8V	38.8V	41.1V	39.1V	41.4V	39.3V	41.7V	39.6V
Maximum Power Current (Imp)	9.39A	7.42A	9.44A	7.48A	9.49A	7.54A	9.55A	7.60A	9.60A	7.66A
Open-circuit Voltage (Voc)	48.9V	47.5V	49.1V	47.7V	49.3V	48.0V	49.5V	48.2V	49.8V	48.5V
Short-circuit Current (Isc)	9.75A	7.88A	9.92A	7.95A	10.12A	8.02A	10.23A	8.09A	10.36A	8.16A
Module Efficiency STC (%)	18.89%		19.14%		19.38%		19.63%		19.88%	
Operating Temperature (°C)	-40°C~+85°C									
Maximum System Voltage	1500VDC(UL)/1500VDC(IEC)									
Maximum Series Fuse Rating	20A									
Power Tolerance	0~+3%									
Temperature Coefficients of Pmax	-0.36%/°C									
Temperature Coefficients of Voc	-0.28%/°C									
Temperature Coefficients of Isc	0.048%/°C									
Nominal Operating Cell Temperature (NOCT)	45±2°C									

STC: ☀ Irradiance 1000W/m² 📖 Cell Temperature 25°C ☁ AM=1.5

NOCT: ☀ Irradiance 800W/m² 📖 Ambient Temperature 20°C ☁ AM=1.5 🌀 Wind Speed 1m/s

* Power measurement tolerance: ± 3%

CAUTION: READ SAFETY AND INSTALLATION INSTRUCTIONS BEFORE USING THE PRODUCT.
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JKM380-400M-72HL-V-A2-US

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Roof Mount System

Datasheet



Built for solar's toughest roofs.

IronRidge builds the strongest roof mounting system in solar. Every component has been tested to the limit and proven in extreme environments.

Our rigorous approach has led to unique structural features, such as curved rails and reinforced flashings, and is also why our products are fully certified, code compliant and backed by a 20-year warranty.



Strength Tested

All components evaluated for superior structural performance.



Class A Fire Rating

Certified to maintain the fire resistance rating of the existing roof.



Integrated Grounding

UL 2703 system eliminates separate module grounding components.



PE Certified

Pre-stamped engineering letters available in most states.



Design Software

Online tool generates a complete bill of materials in minutes.



20 Year Warranty

Twice the protection offered by competitors.

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Datasheet

XR Rails

XR10 Rail



A low-profile mounting rail for regions with light snow.

- 6' spanning capability
- Moderate load capability
- Clear & black anod. finish

XR100 Rail



The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear & black anod. finish

XR1000 Rail



A heavyweight mounting rail for commercial projects.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish

Internal Splices



All rails use internal splices for seamless connections.

- Self-tapping screws
- Varying versions for rails
- Grounding Straps offered

Attachments

FlashFoot



Anchor, flash, and mount with all-in-one attachments.

- Ships with all hardware
- IBC & IRC compliant
- Certified with XR Rails

Slotted L-Feet



Drop-in design for rapid rail attachment.

- High-friction serrated face
- Heavy-duty profile shape
- Clear & black anod. finish

Standoffs



Raise flush or tilted systems to various heights.

- Works with vent flashing
- Ships pre-assembled
- 4" and 7" Lengths

Tilt Legs



Tilt assembly to desired angle, up to 45 degrees.

- Attaches directly to rail
- Ships with all hardware
- Fixed and adjustable

Clamps & Grounding

End Clamps



Slide in clamps and secure modules at ends of rails.

- Mill finish & black anod.
- Sizes from 1.22" to 2.3"
- Optional Under Clamps

Grounding Mid Clamps



Attach and ground modules in the middle of the rail.

- Parallel bonding T-bolt
- Reusable up to 10 times
- Mill & black stainless

T-Bolt Grounding Lugs



Ground system using the rail's top slot.

- Easy top-slot mounting
- Eliminates pre-drilling
- Swivels in any direction

Accessories



Provide a finished and organized look for rails.

- Snap-in Wire Clips
- Perfected End Caps
- UV-protected polymer

Free Resources



Design Assistant

Go from rough layout to fully engineered system. For free.

Go to IronRidge.com/rm



NABCEP Certified Training

Earn free continuing education credits, while learning more about our systems.

Go to IronRidge.com/training

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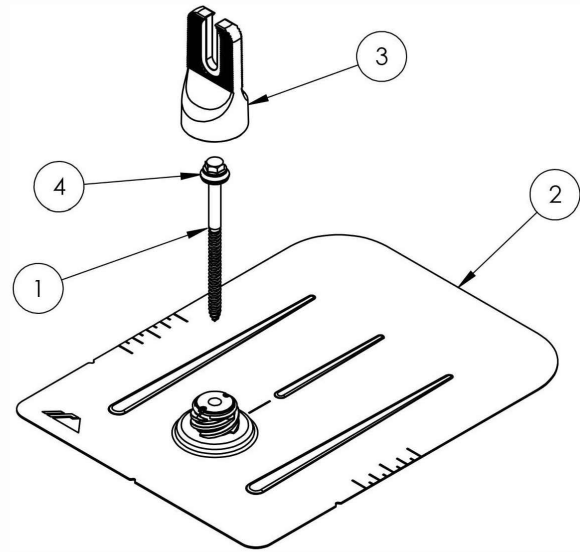


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FlashFoot2

Cut Sheet

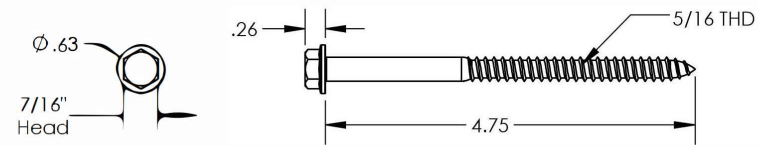


ITEM NO.	DESCRIPTION
1	BOLT LAG 5/16 X 4.75"
2	ASSY, FLASHING
3	ASSY, CAP
4	WASHER, EPDM BACKED

FLASHFOOT 2

Part Number	Description
FF2-01-M1	FLASHFOOT2, MILL
FF2-01-B1	FLASHFOOT2, BLACK

1) Bolt, Lag 5/16 x 4.75

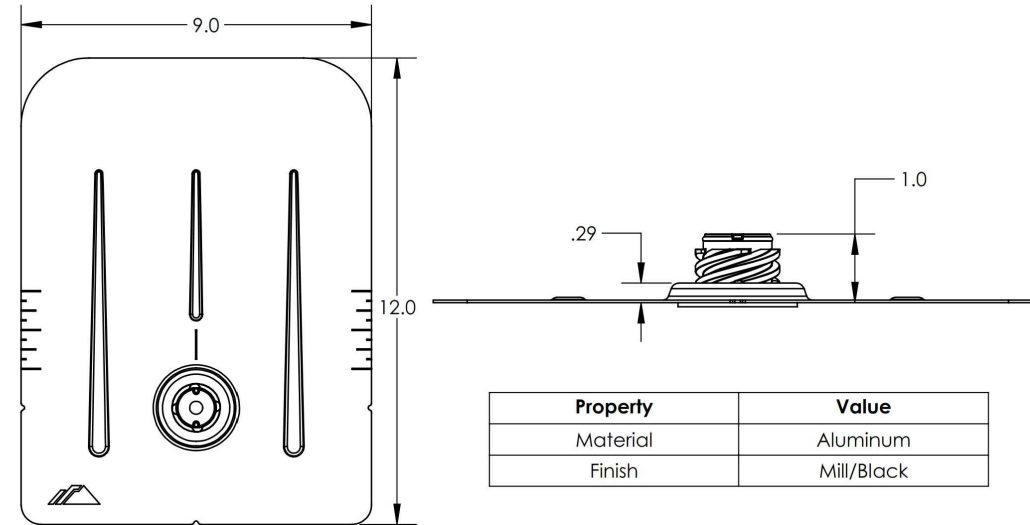


Property	Value
Material	300 Series Stainless Steel
Finish	Clear

v1.21

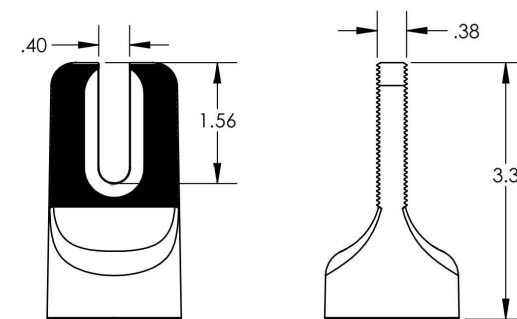
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2) Assy, Flashing



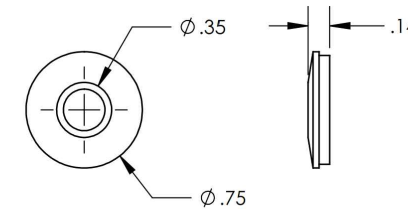
Property	Value
Material	Aluminum
Finish	Mill/Black

3) Assy, Cap



Property	Value
Material	Aluminum
Finish	Mill/Black

4) Washer, EPDM Backed



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

v1.21

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