

PLANNING DEPARTMENT

Town of Durham

8 Newmarket Road
Durham, NH 03824-2898
Phone (603) 868-8064
www.ci.durham.nh.us

HISTORIC DISTRICT COMMISSION
Application for Certificate of Approval

Date: 3/20/2024

Property information

Property address/location: 17 Main Street, Durham, NH 03824

Tax map and lot #: 108/6; (Old tax map and lot # _____)

Date of building, if known: 1962 & 1998

Name of project (if applicable): Durham Community Church Solar Array

Property owner

Name (include name of individual): Durham Community Church / Doug Bencks

Mailing address: 17 Main Street, Durham, NH 03824

Telephone #: _____ Email address: dbencks@comcast.net

Applicant (if different from property owner)

Name (include name of individual): Harmony Energy Works / Jay Arslanian

Mailing address: 10 Gale Road, Hampton, N.H. 03842

Telephone #: 603-926-3366 Email address: jj.arslanian@harmonyenergyworks.com

Architect/Designer (if applicable)

Name (include name of individual): Harmony Energy Works / Jay Arslanian

Professional Designation: Electrical Corporation / Project Manager

Mailing address: 10 Gale Road, Hampton, N.H. 03842

Telephone #: 603-926-3366 Email address: jj.arslanian@harmonyenergyworks.com

Contractor (if applicable)

Name (include name of individual): _____

Mailing address: _____

Telephone #: _____ Email address: _____

(over)

Proposed activity (check all that apply)

New building/structure: ____ Addition onto existing building/structure: X

Alterations to existing building: ____ Demolition: ____ Signage: ____

Site development (other structures, parking, utilities, etc.): ____ Change of use: ____

Wall or fence: ____ Removal of tree(s): ____

Describe project: Installation of a flush mounted, roof-top, grid-tied 40.18 kWDC solar photovoltaic system consisting of 82 American made Silfab Solar SIL-490 HN 490 watt panels mounted on IronRidge racking and 1 SolarEdge SE43.2KUS 43.2 kWAC inverter ____

Proposed starting date: 5/1/2024 or as soon as possible _____

Submission of materials

The following materials must be submitted with this application. Please check off each item:

Elevation drawings. Submit for the building and any pertinent details: X _____

Site plans. Submit if any changes are proposed to the site: X _____

Details. Provide drawings/cut sheets of any pertinent elements: X _____

Qualifications/references

Samples. Provide samples or swatches of proposed colors and materials: & photographs _____

Other items. Provide information or drawings of any other pertinent elements: X _____

Submission of application

This application must be signed by the property owner.

I hereby submit this application to the Town of Durham Historic District Commission pursuant to the Historic District Ordinance and attest to the best of my knowledge that all of the information on this application and in the accompanying materials is true and accurate.

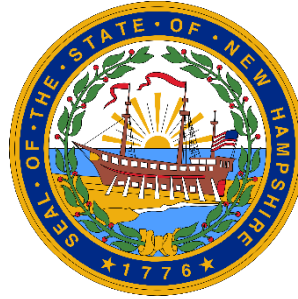
Name of Property Owner: _____

Signature: _____ Date: _____

I authorize and designate Harmony Energy Works _____, attorney or developer or architect designer or contractor or agent (circle all that apply), to represent me in all matters related to this application.

The applicant or a representative must attend the HDC meeting to present the application and answer any questions. If nobody attends the meeting then the HDC may not take action on the application.

State of New Hampshire



Board of Electricians

Authorized as
Electrical Corporation

Issued To

HARMONY ENERGY WORKS INC

License Number: 0390C Active

Issue Date: 10/19/2015
Expiration Date: 05/31/2025

Master/HMV Name: DAVID M CHILDS



PV ARRAY

Manuf/Model	SILFAB SOLAR SIL-490 HN
Module Dimensions	40.8" x 89.1
Module Rating (W)	490
# Module Strings	2 of 11 & 6 of 10
# Modules Total	82
DC Output (KW)	40.18 kWDC
Inverters (208V)	SE43.2KUS



10 Gale Rd, Hampton, NH
603-926-3366
harmonyenergyworks.com

DRAWN BY **D CHILDS**
APPROVED BY **G HORROCKS**

Durham Community Church
17 Main Street, Durham, NH 03824

Ground Layout
40.18 kWDC (43.2 kWAC)

SIZE	FSCM NO	DWG NO	REV
A		1	A
SCALE	DATE	SHEET	
.04" = 1'	3/20/2024	1 of 1	



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Roof
Pitch = 30.3°
Azim. = 195°



 10 Gale Rd, Hampton, NH
 603-926-3366
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Durham Community Church
17 Main Street, Durham, NH 03824


Ground Layout
40.18 kWDC (43.2 kWAC)

DRAWN BY	D CHILDS	SIZE	FSCM NO	DWG NO	REV
APPROVED BY	G HORROCKS	A		1	A
SCALE	.04" = 1'	DATE	3/20/2024	SHEET	1 of 1



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		Durham Community Church 17 Main Street, Durham, NH 03824			
10 Gale Rd, Hampton, NH 603-926-3366 harmonyenergyworks.com		Ground Layout 40.18 kWDC (43.2 kWAC)			
DRAWN BY	D CHILDS	SIZE	FSCM NO	DWG NO	REV
APPROVED BY	G HORROCKS	A		1	A
SCALE	N/A	DATE	3/20/2024	SHEET	1 of 3



3 WEST ELEVATION
1/8" = 1'-0"

7/20/98 VALUE ENGINEERING/BASE BID

REVISIONS

JEAN CARROON ARCHITECTS
INC.

36 BROMFIELD STREET BOSTON, MA 02108
617/422-0709 FAX 617/422-0390

JOB NO.
9605

DATE
5/15/98

DWN BY
ACW/SEH

SCALE
1/8" = 1'-0"



WEST
ELEVATION

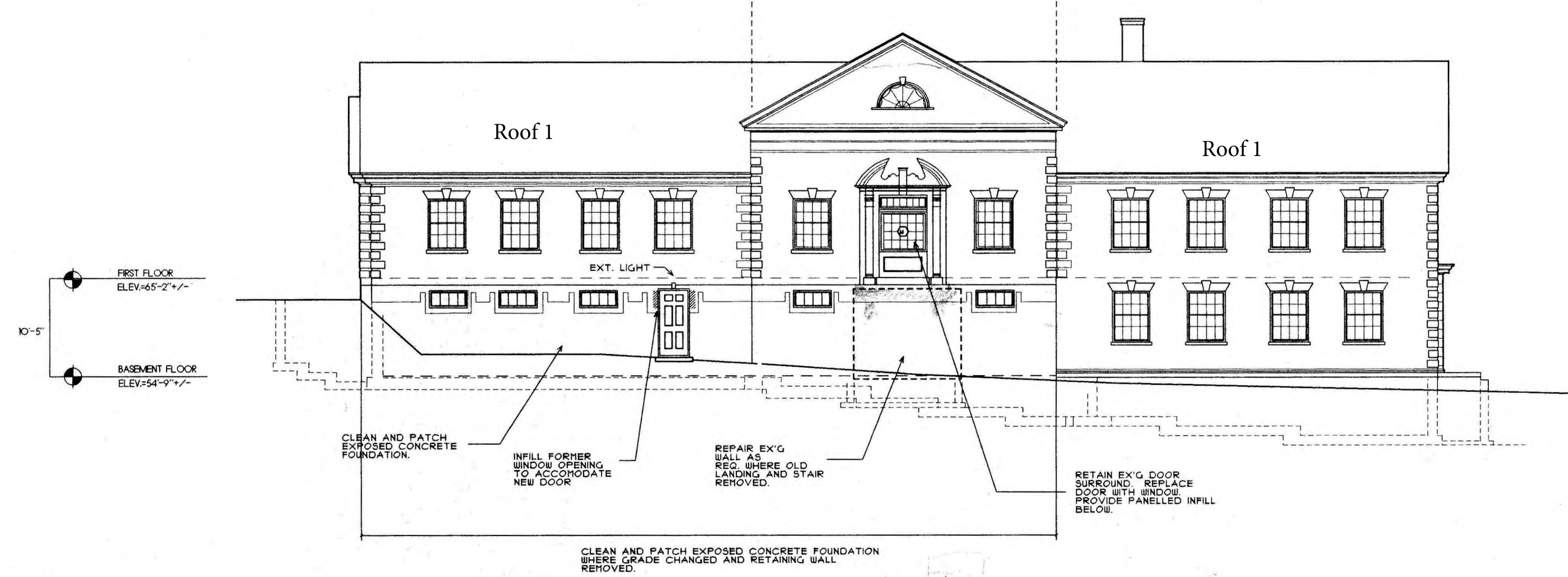
A3.2

KEY

 = AREA OF NEW CONSTRUCTION




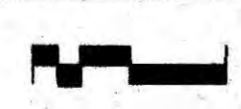
4 SOUTH ELEVATION
1/8" = 1'-0"



7/20/98 VALUE ENGINEERING BASE BID

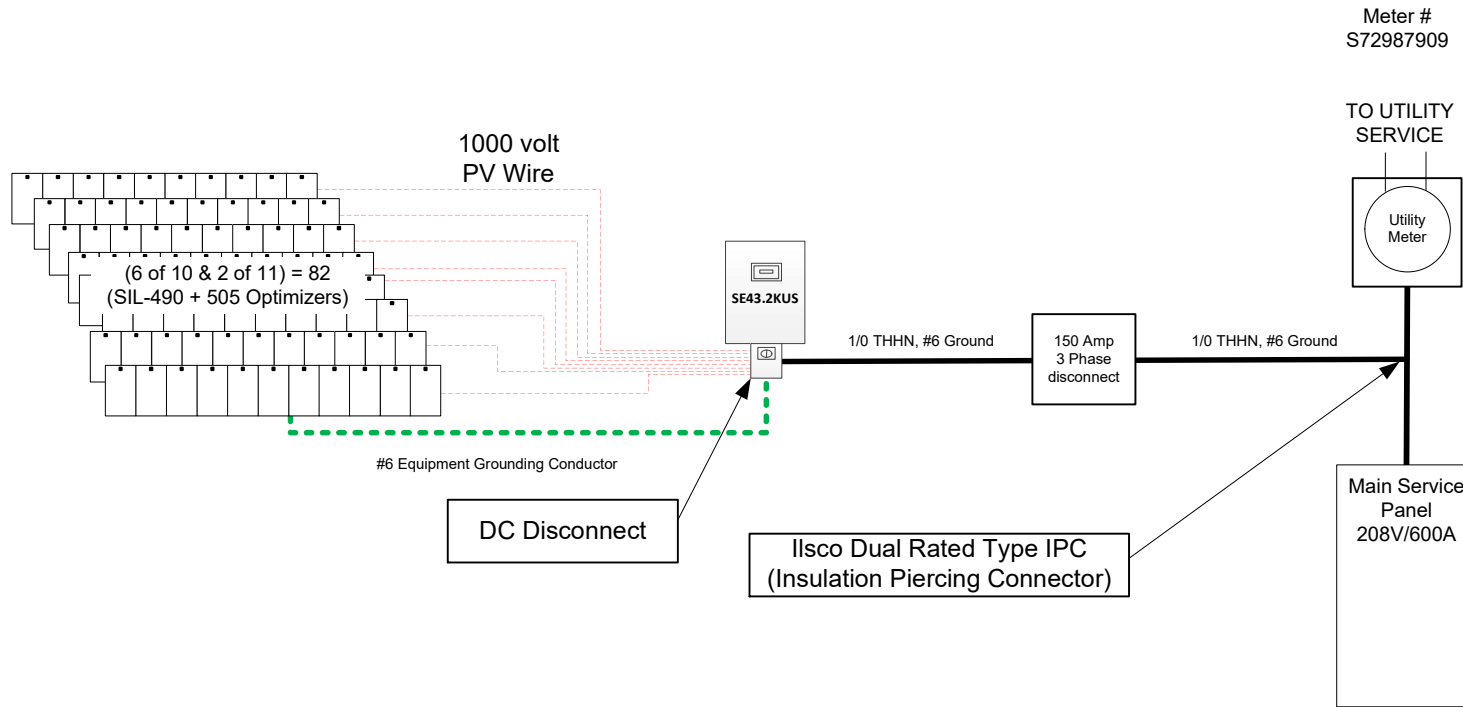
REVISIONS

JEAN CARROON ARCHITECTS
INC.
36 BROMFIELD STREET BOSTON, MA 02108
617/422-0709 FAX 617/422-0390

JOB NO.	9605	
DATE	5/15/98	
DWN. BY:	ACW/SEH	
SCALE	1/8" = 1'-0"	
		

MODULE	Power (W)	Voc (Vdc)	Vmp (Vdc)	Isc (Adc)	Imp (Adc)	TC (%/°C)	Max Fuse
SIL-490-HN	490	53.96	45.23	11.36	10.83	-0.28	20

NOTES:
 208/240 Volt, 60Hz, Three Phase Service
 OCPD1: 120A x 1.25 = 150A



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Harmony
 ENERGY WORKS
 10 Gale Rd, Hampton, NH
 603-926-3366
 harmonyenergyworks.com

Durham Community Church
 17 Main Street, Durham, NH 03824

Ground Layout
 40.18 kWDC (43.2 kWAC)

DRAWN BY D CHILDS	SIZE A	FSCM NO	DWG NO 1	REV A
APPROVED BY G HORROCKS	SCALE N/A	DATE 3/20/2024	SHEET 1 of 1	

20 Temple Street
Newburyport, MA 01950
Phone : 978-985-6129

Kenneth A. Woods, P.E.

March 19, 2024

George Horrocks
Harmony Energy Works Inc.
10 Gale Road
Hampton NH 03842

Re: 17 Main St, Durham NH – roof load capacity
Ref: Site Layout & section by Harmony Energy Works dated 3/9/24, photographs
Drawings by Jean Carroon Architects dated 5/19/98

George,

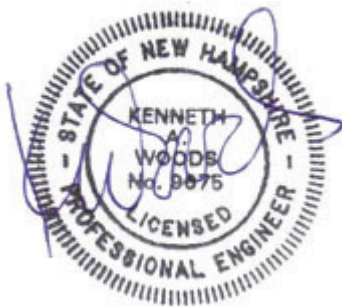
At your request we analyzed the roof framing of the existing building referenced above to determine if the structure could accommodate an additional load of 2.7 PSF for rail mounted solar panels.

The church structure is commercially truss framed. The roofing material is asphalt shingles. Loading Criteria include: Ground snow load $P_g = 55$ psf, $P_f = 38.5$ psf, Ultimate design wind speed Cat. II = 100 mph, Roof system dead load = 10 psf, Panel dead load = 2.7 psf.

This letter is written to certify that the roof structure has sufficient capacity to carry the additional 2.7 PSF solar panel load and satisfies the structural load requirements of the New Hampshire State / International Building Code.

If you have any questions or need any additional information, please contact this office at your earliest convenience.

Sincerely,

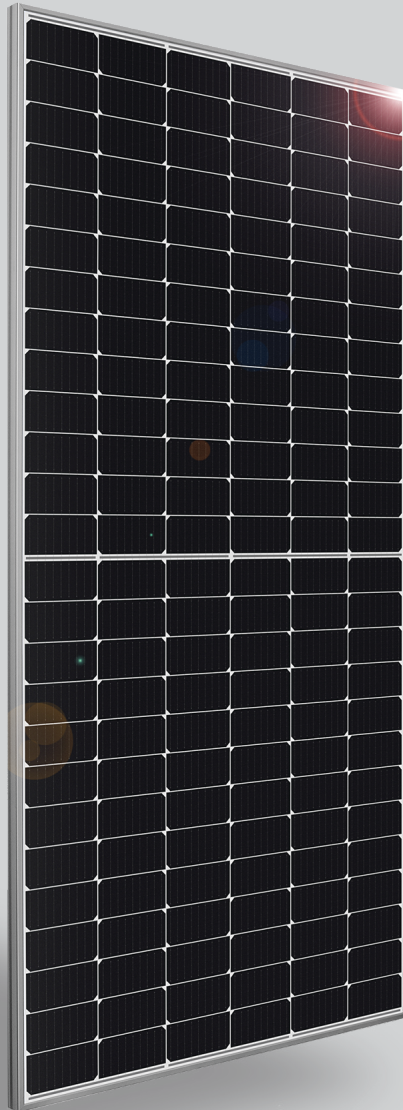


Kenneth Woods
President

SILFAB COMMERCIAL



SIL-490 HN



ENGINEERED FOR COMMERCIAL & UTILITY PROJECTS

Superior performance and proven reliability from a trusted source.

SILFABSOLAR.COM



ELECTRICAL SPECIFICATIONS		490 HN	
Test Conditions		STC	NOCT
Module Power (Pmax)	Wp	490	362
Maximum power voltage (Vpmax)	V	45.23	41.61
Maximum power current (Ipmax)	A	10.83	8.69
Open circuit voltage (Voc)	V	53.96	49.64
Short circuit current (Isc)	A	11.36	9.12
Module efficiency	%	20.9%	19.3%
Maximum system voltage (VDC)	V	1500	
Series fuse rating	A	20	
Power Tolerance	Wp	0 to +10	

Measurement conditions: STC 1000 W/m² • AM 1.5 • Temperature 25 °C • NOCT 800 W/m² • AM 1.5 • Measurement uncertainty ≤ 3%
Sun simulator calibration reference modules from Fraunhofer Institute. Electrical characteristics may vary by ±5% and power by 0 to +10W.

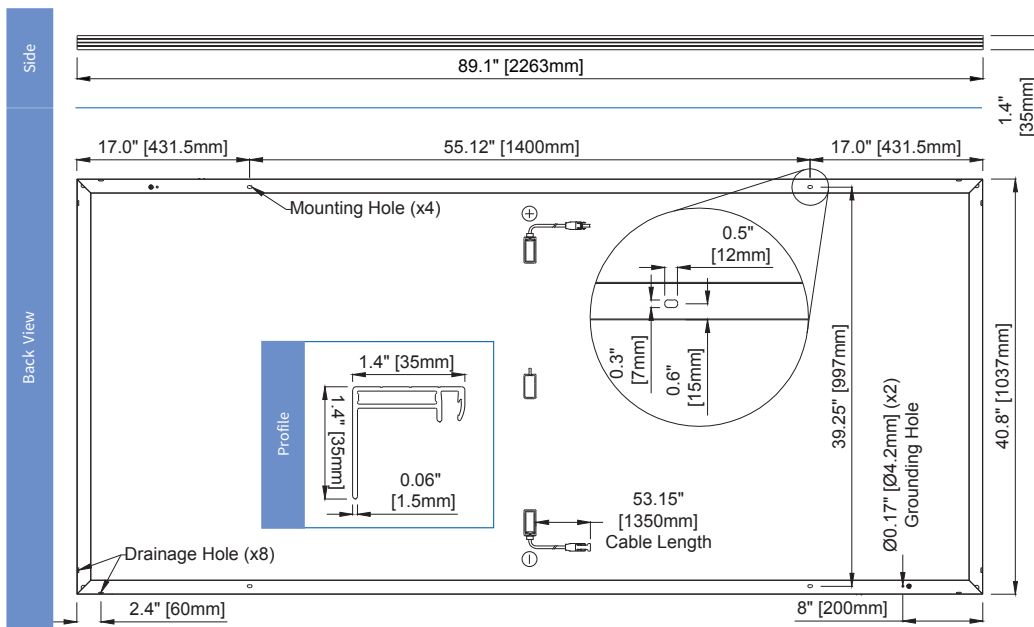
MECHANICAL PROPERTIES / COMPONENTS	METRIC	IMPERIAL
Module weight	25.8kg ±0.2kg	56.9lbs ±0.4lbs
Dimensions (H x L x D)	2263 mm x 1037 mm x 35 mm	89 in x 40.8 in x 1.37 in
Maximum surface load (wind/snow)*	2400 Pa rear load / 5400 Pa front load	50.1 lb/ft ² rear load / 112.8 lb/ft ² front load
Hail impact resistance	ø 25 mm at 83 km/h	ø 1 in at 51.6 mph
Cells	156 Half cells - Si mono PERC 9 busbar - 83 x 166 mm	156 Half cells - Si mono PERC 9 busbar - 3.26 x 6.53 in
Glass	3.2 mm high transmittance, tempered, DSM antireflective coating	0.126 in high transmittance, tempered, DSM antireflective coating
Cables and connectors (refer to installation manual)	1350 mm, ø 5.7 mm, MC4 from Staubli	53.15 in, ø 0.22 in (12AWG), MC4 from Staubli
Backsheet	High durability, superior hydrolysis and UV resistance, multi-layer dielectric film, fluorine-free PV white backsheet	
Frame	Anodized Aluminum (Silver)	
Bypass diodes	3 diodes-30SQ045T (45V max DC blocking voltage, 30A max forward rectified current)	
Junction Box	UL 3730 Certified, IEC 62790 Certified, IP68 rated	

TEMPERATURE RATINGS		WARRANTIES	
Temperature Coefficient Isc	+0.064 %/°C	Module product workmanship warranty	25 years**
Temperature Coefficient Voc	-0.28 %/°C	Linear power performance guarantee	30 years
Temperature Coefficient Pmax	-0.36 %/°C		≥ 97.1% end 1st yr ≥ 91.6% end 12th yr ≥ 85.1% end 25th yr ≥ 82.6% end 30th yr
NOCT (± 2°C)	45 °C		
Operating temperature	-40/+85 °C		

CERTIFICATIONS		SHIPPING SPECS	
Product	ULC ORD C1703, UL1703, CEC listed, UL 61215-1/-2, UL 61730-1/-2, IEC 61215-1/-2, IEC 61730-1/-2, CSA C22.2#61730-1/-2, IEC 62716 Ammonia Corrosion; IEC61701:2011 Salt Mist Corrosion Certified, UL Fire Rating: Type 1	Modules Per Pallet:	31
Factory	ISO9001:2015	Pallets Per Truck	23
		Modules Per Truck	713

* ⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.

** 12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at silfabsolar.com
PAN files generated from 3rd party performance data are available for download at: silfabsolar.com/downloads



SILFAB SOLAR INC.

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SILFABSOLAR.COM

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Silfab - SIL-490-HN+-20231221
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Three Phase Inverter with Synergy Technology

for the 208V Grid for North America

SE43.2KUS



Specifically designed to work with power optimizers

- / Easy two-person installation – each unit mounted separately, equipped with cables for simple connection between units
- / Balance of System and labor reduction compared to using multiple smaller string inverters
- / Independent operation of each unit enables higher uptime and easy serviceability
- / No wasted ground area: wall/rail mounted, or horizontally mounted under the modules (10° inclination)
- / Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- / Built-in module-level monitoring with Ethernet or cellular GSM
- / Fixed voltage inverter for superior efficiency (97%) and longer strings
- / Integrated DC Safety Switch and optional surge protection
- / Built-in RS485 Surge Protection, to better withstand lightning events

Power Optimizer

For North America

P400 / P401 / P485 / P505



POWER OPTIMIZER

PV power optimization at the module level

- Specifically designed to work with SolarEdge inverters
- High efficiency with module-level MPPT, for maximized system energy production and revenue, and fast project ROI
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

/ Power Optimizer

For North America

P400 / P401 / P485 / P505

Optimizer model (typical module compatibility)	P400 (for 72 & 96-cell modules)	P401 (for high power 60 and 72-cell modules)	P485 (for high-voltage modules)	P505 (for higher current modules)	
INPUT					
Rated Input DC Power ⁽¹⁾	400	430	485	505	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	80	60	125 ⁽²⁾	83 ⁽²⁾	Vdc
MPPT Operating Range	8 – 80	8 – 60	12.5 – 105	12.5 – 83	Vdc
Maximum Short Circuit Current (Isc)	10.1	12.5	11	14	Adc
Maximum Efficiency	99.5				%
Weighted Efficiency	98.8				%
Overvoltage Category	II				
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER)					
Maximum Output Current	15				Adc
Maximum Output Voltage	60		80		Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR INVERTER OFF)					
Safety Output Voltage per Power Optimizer	1 ± 0.1				Vdc
STANDARD COMPLIANCE					
EMC	FCC Part 15 Class B, IEC61000-6-2, IEC61000-6-3				
Safety	IEC62109-1 (class II safety), UL1741, NEC/PVRSS				
Material	UL94 V-0, UV Resistant				
RoHS	Yes				
INSTALLATION SPECIFICATIONS					
Maximum Allowed System Voltage	1000				Vdc
Compatible inverters	All SolarEdge Single Phase and Three Phase inverters				
Dimensions (W x L x H)	129 x 153 x 33.5 / 5.1 x 6 x 1.3	129 x 153 x 29.5 / 5.1 x 6 x 1.16	129 x 159 x 49.5 / 5.1 x 6.3 x 1.9	129 x 162 x 59 / 5.1 x 6.4 x 2.3	mm / in
Weight (including cables)	750 / 1.7	655 / 1.5	845 / 1.9	1064 / 2.3	gr / lb
Input Connector	MC4 ⁽³⁾				
Input Wire Length ⁽⁴⁾	0.16 / 0.5				m / ft
Output Wire Type / Connector	Double Insulated / MC4				
Output Wire Length	1.2 / 3.9				m / ft
Operating Temperature Range ⁽⁵⁾	-40 to +85 / -40 to +185				°C / °F
Protection Rating	IP68 / NEMA6P				
Relative Humidity	0 – 100				%

(1) The rated power of the module at STC will not exceed the optimizer Rated Input DC Power. Modules with up to +5% power tolerance are allowed.

(2) NEC 2017 requires that the maximum input voltage not be more than 80V.

(3) For other connector types please contact SolarEdge.

(4) Longer input wire lengths are available for use. For 0.9m input wire length order P401-xxxLxxx.

(5) For ambient temperatures above +85°C / +185°F power de-rating is applied. Refer to the [Power Optimizers Temperature De-Rating Technical Note](#) for more details.

PV System Design Using a SolarEdge Inverter ⁽⁶⁾	SolarEdge Home Hub/Wave Single Phase	Single phase	Three Phase for 208V grid	Three Phase for 277/480V grid	
Minimum String Length (Power Optimizers)	P400, P401	8	10	18	
	P485, P505	6	8	14	
Maximum String Length (Power Optimizers)	25		25	50	
Maximum Power per String	5700 ⁽⁷⁾ (6000 with SE7600-US – SE11400-US)	5250 ⁽⁷⁾	6000 ⁽⁸⁾	12750 ⁽⁹⁾	W
Parallel Strings of Different Lengths or Orientations	Yes				

(6) It is not allowed to mix P485/P505 with P400/P401 in one string.

(7) A string with more than 30 optimizers does not meet NEC rapid shutdown requirements, safety voltage will be above the 30V requirement.

(8) For the 208V grid, it is allowed to install up to 6,500W per string when the maximum power difference between each string is 1,000W.

(9) For 277/480V grid, it is allowed to install up to 15,000W per string when the maximum power difference between each string is 2,000W.

Three Phase Inverter with Synergy Technology for the 208V Grid for North America

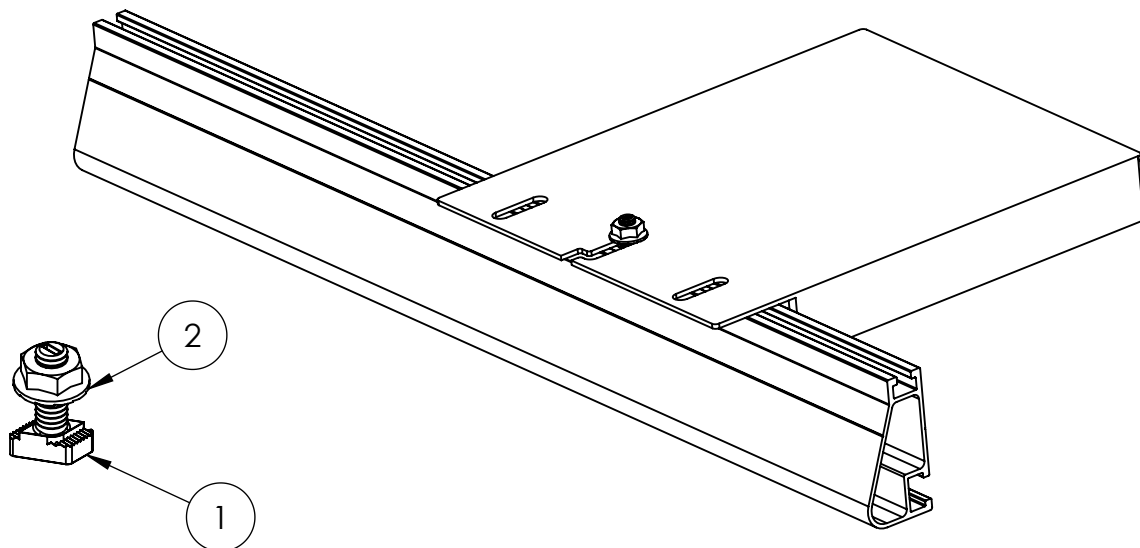
SE43.2KUS

SE43.2KUS		
OUTPUT		
Rated AC Power Output	43200	VA
Maximum AC Power Output	43200	VA
AC Output Line Connections	4-wire WYE (L1-L2-L3-N) plus PE or 3 wire Delta	
AC Output Voltage Minimum-Nominal-Maximum ⁽¹⁾ (L-N)	105-120-132.5	Vac
AC Output Voltage Minimum-Nominal-Maximum ⁽¹⁾ (L-L)	183-208-229	Vac
AC Frequency Min-Nom-Max ⁽¹⁾	59.3 - 60 - 60.5	Hz
Maximum Continuous Output Current (per Phase) @208V	120	A
GFDI Threshold	1	A
Utility Monitoring, Islanding Protection, Configurable Power Factor, Country Configurable Thresholds	Yes	
INPUT		
Maximum DC Power (Module STC), Inverter / Unit	58200 / 19400	W
Transformer-less, Ungrounded	Yes	
Maximum Input Voltage DC to Gnd	300	Vdc
Maximum Input Voltage DC+ to DC-	600	Vdc
Nominal Input Voltage DC to Gnd	200	Vdc
Nominal Input Voltage DC+ to DC-	400	Vdc
Maximum Input Current	114	Adc
Maximum Input Short Circuit Current	135	Adc
Reverse-Polarity Protection	Yes	
Ground-Fault Isolation Detection	350kΩ Sensitivity per Unit	
CEC Weighted Efficiency	97	%
Nighttime Power Consumption	< 12	W
ADDITIONAL FEATURES		
Supported Communication Interfaces	RS485, Ethernet, Cellular GSM (optional)	
Rapid Shutdown	NEC2014 and NEC2017 compliant/certified, upon AC Grid Disconnect	
RS485 Surge Protection	Built-in	
DC SAFETY SWITCH		
DC Disconnect	1000V / 3 x 40A	
DC Surge Protection	Optional, Type II, field replaceable	
STANDARD COMPLIANCE		
Safety	UL1741, UL1741 SA, UL1699B, UL1998, CSA 2.22	
Grid Connection Standards	IEEE 1547, Rule 21, Rule 14 (HI)	
Emissions	FCC part15 class A	
INSTALLATION SPECIFICATIONS		
Number of units	3	
AC Output Conduit Size / Max AWG / Max PE AWG	2" / 4/0 / 4	
DC Output Conduit Size / Terminal Block AWG Range / Number of Strings ⁽²⁾	2 x 1.25" / 6-14 / 9 strings	
Dimensions (H x W x D)	Primary Unit: 37 x 12.5 x 10.5 / 940 x 315 x 260; Secondary Unit: 21 x 12.5 x 10.5 / 540 x 315 x 260	in / mm
Weight	Primary Unit: 105.8 / 48; Secondary Unit 99.2 / 45	lb / kg
Operating Temperature Range	-40 to +140 / -40 to +60 ⁽³⁾	°F / °C
Cooling	Fan (user replaceable)	
Noise	< 60	dBA
Protection Rating	NEMA 3R	
Bracket Mounted (Brackets Provided)		

⁽¹⁾ For other regional settings please contact SolarEdge support

⁽²⁾ Single input option per unit (up to 3AWG) available

⁽³⁾ For power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>



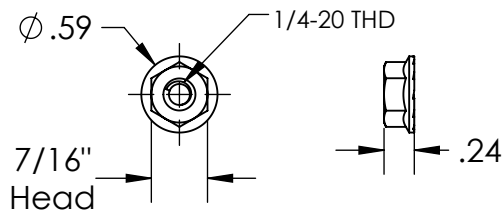
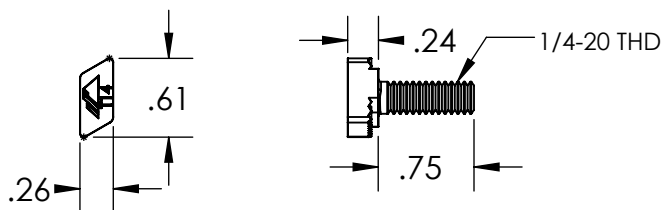
Item Number	Description
1	Bolt, T CSTM 1/4-20 X .75" Lock SS
2	Nut, Flange, Hex 1/4-20 SS

Microinverter Bonding Hardware

Part Number	Description
BHW-M1-01-A1	Microinverter Bonding Hardware, T-Bolt

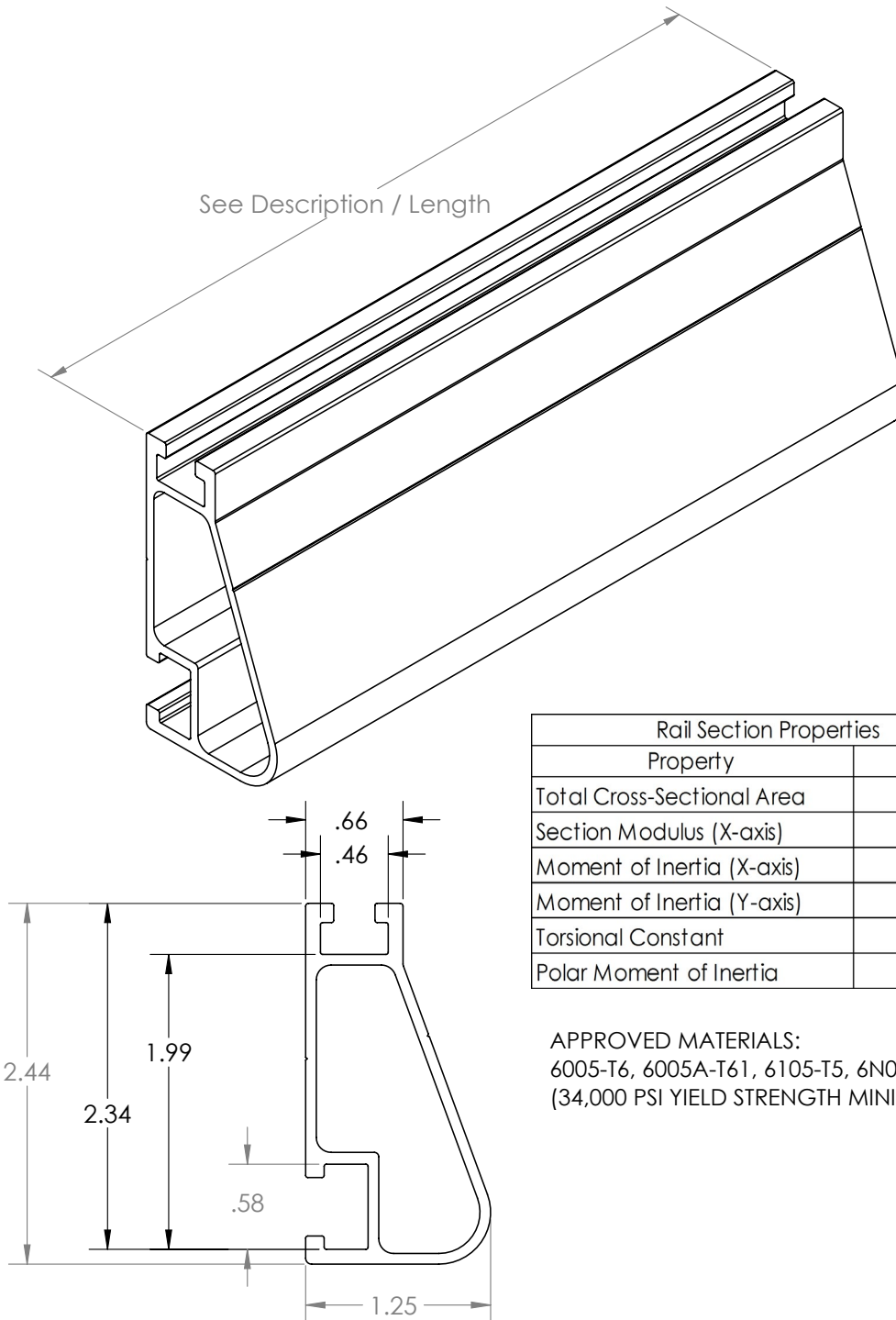
1) Bolt, T CSTM 1/4-20 x .75

2) Nut, Flange Hex 1/4-20



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

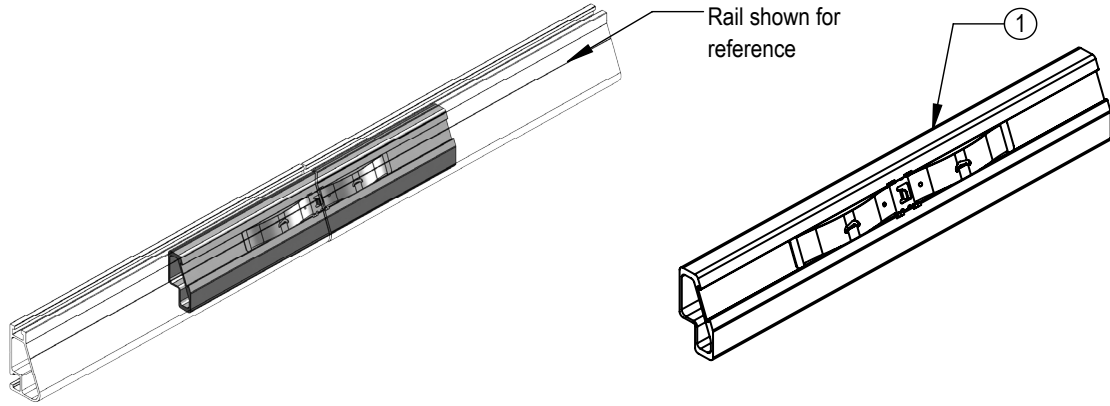
Property	Value
Material	300 Series Stainless Steel
Finish	Clear



Rail Section Properties	
Property	Value
Total Cross-Sectional Area	0.582 in ²
Section Modulus (X-axis)	0.297 in ³
Moment of Inertia (X-axis)	0.390 in ⁴
Moment of Inertia (Y-axis)	0.085 in ⁴
Torsional Constant	0.214 in ³
Polar Moment of Inertia	0.126 in ⁴

APPROVED MATERIALS:
 6005-T6, 6005A-T61, 6105-T5, 6N01-T6
 (34,000 PSI YIELD STRENGTH MINIMUM)

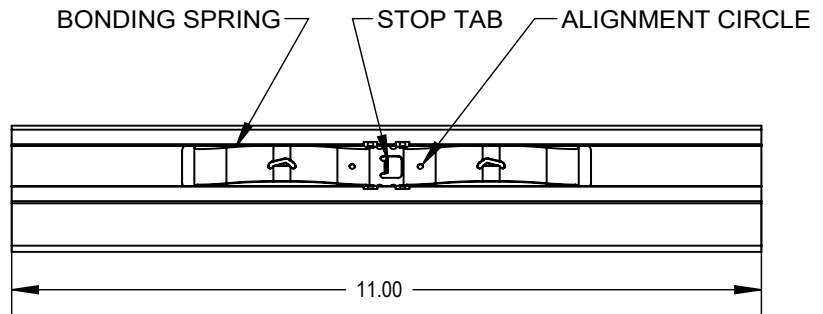
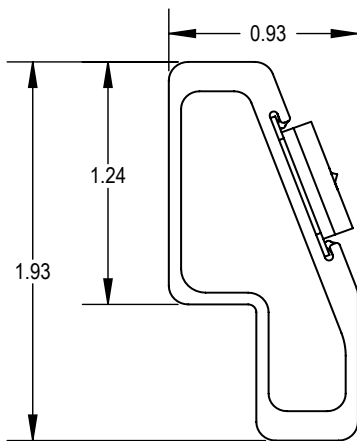
Clear Part Number	Black Part Number	Description / Length	Material	Weight
XR-100-132A	XR-100-132B	XR100, Rail 132" (11 Feet)	6000-Series Aluminum	7.50 lbs.
XR-100-168A	XR-100-168B	XR100, Rail 168" (14 Feet)		9.55 lbs.
XR-100-204A	XR-100-204B	XR100, Rail 204" (17 Feet)		11.60 lbs.



ITEM NO	DESCRIPTION	QTY IN KIT
1	SPLICE, XR100®, MILL	1

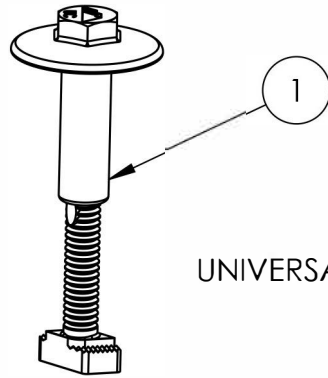
Part Number	Description
XR100®-BOSS®-01-M1	Bonded Splice, XR100®

1) Bonded Splice, XR100



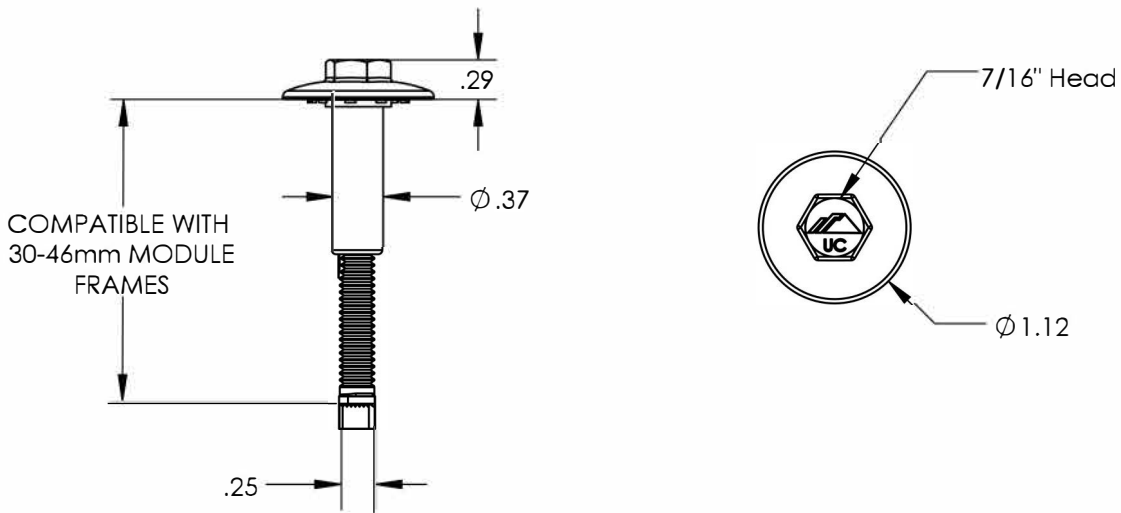
Property	Value
Material	6000 Series Aluminum
Finish	Mill

Only for installation and use with IronRidge products in accord with written instructions see IronRidge.com/UFO



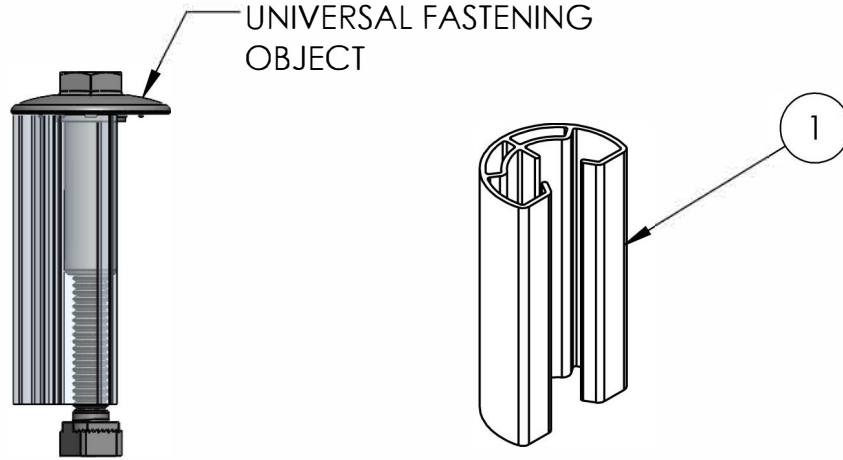
UNIVERSAL FASTENING OBJECT®

ITEM NO.	DESCRIPTION
UFO-CL-01-A1	UNIVERSAL MODULE CLAMP, CLEAR
UFO-CL-01-B1	UNIVERSAL MODULE CLAMP, BLACK



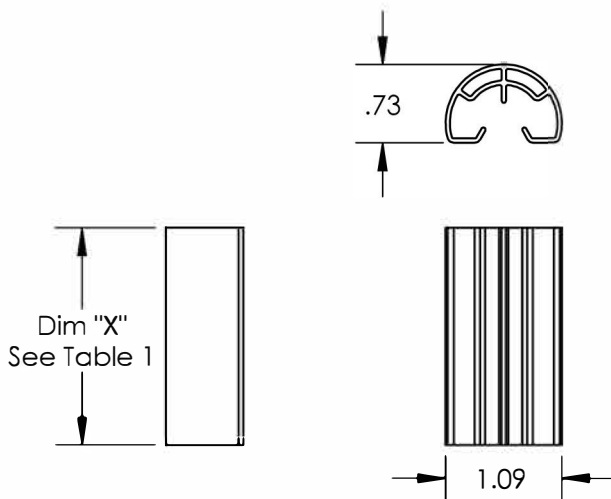
Property	Value
Material	300 Series Stainless Steel
Finish	Clear and Black

Only for installation and use with IronRidge products in accord with written instructions see IronRidge.com/UFO

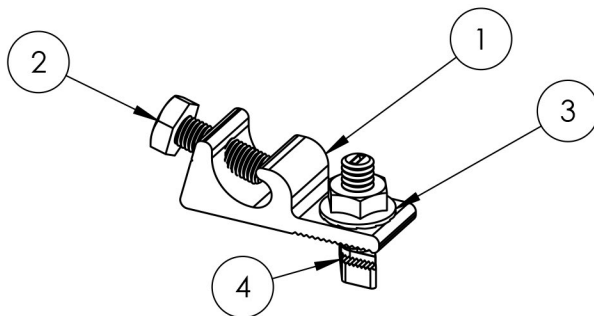


ITEM NO.	COMPONENT
1	STOPPER SLEEVE

MILL PART NUMBER	BLACK PART NUMBER	HEIGHT "X" (mm)
UFO-STP-30MM-M1	UFO-STP-30MM-B1	30
UFO-STP-32MM-M1	UFO-STP-32MM-B1	32
UFO-STP-33MM-M1	UFO-STP-33MM-B1	33
UFO-STP-35MM-M1	UFO-STP-35MM-B1	35
UFO-STP-38MM-M1	UFO-STP-38MM-B1	38
UFO-STP-40MM-M1	UFO-STP-40MM-B1	40
UFO-STP-42MM-M1	UFO-STP-42MM-B1	42
UFO-STP-46MM-M1	UFO-STP-46MM-B1	46



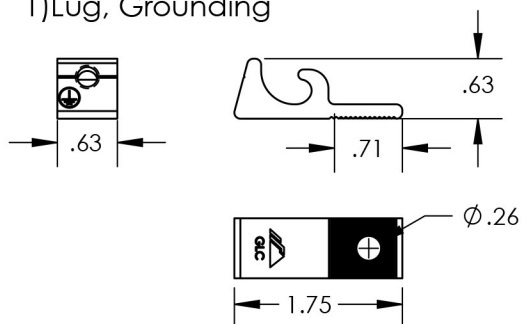
Property	Value
Material	6000 Series Aluminum
Finish	Mill or Black



ITEM NO.	DESCRIPTION
1	LUG, GROUNDING, LAY-IN - LOW PROFILE
2	BOLT, 1/4-28 X .750" HEX CS SST
3	NUT, FLANGE HEX 1/4-20 SST
4	BOLT, T CSTM 1/4-20 X 1.188" LOCK SS

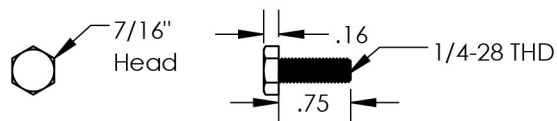
Part Number	Description	Wire Size Range (AWG)
XR-LUG-03-A1	GROUNDING LUG, LOW PROFILE	4-10

1) Lug, Grounding



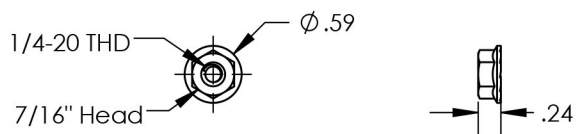
Property	Value
Material	Tin Plated Copper
Finish	Clear Matte

2) Bolt, 1/4-28 x .750 Hex



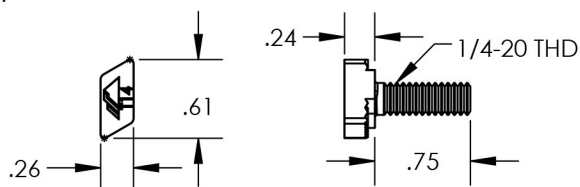
Property	Value
Material	300 Series Stainless Steel
Finish	Clear

3) Nut, Flange Hex 1/4-20

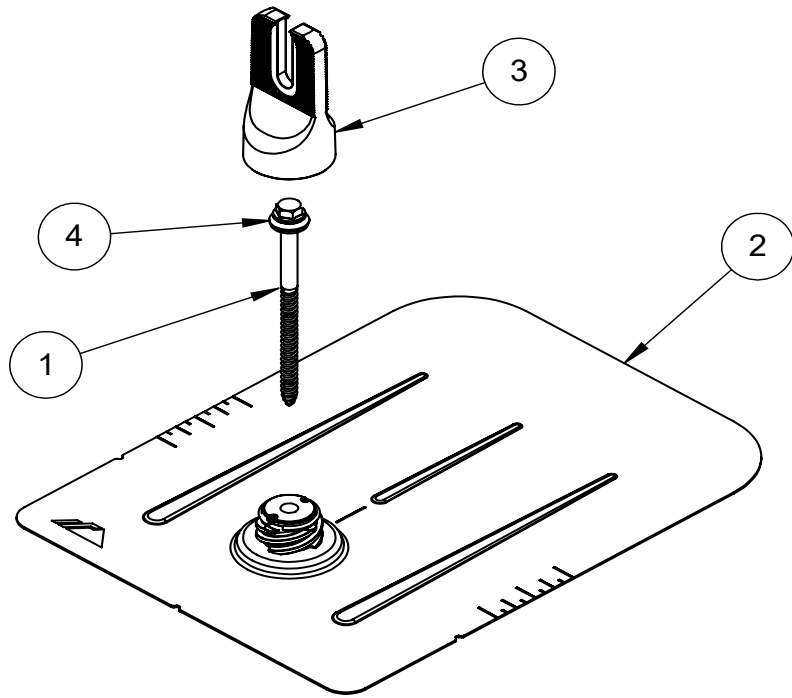


Property	Value
Material	300 Series Stainless Steel
Finish	Clear

4) Bolt, T CSTM 1/4-20 x .750



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

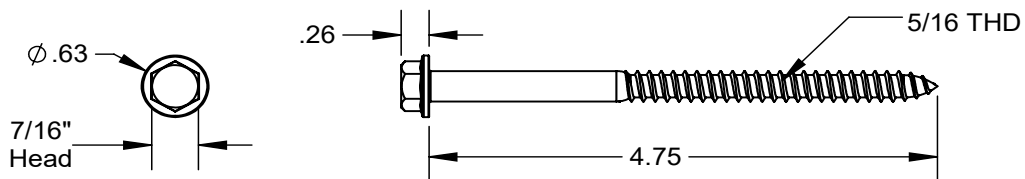


ITEM NO.	DESCRIPTION	Qty in Kit
1	BOLT LAG 5/16 X 4.75"	1
2	ASSY, FLASHING	1
3	ASSY, CAP	1
4	WASHER, EPDM BACKED	1

FLASHFOOT 2

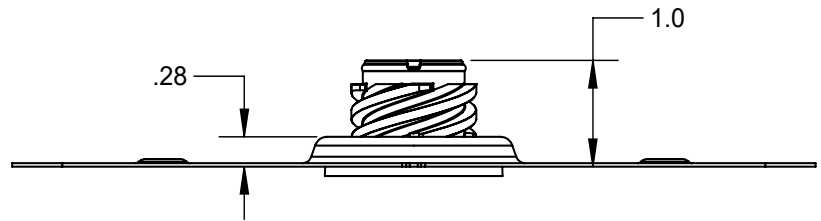
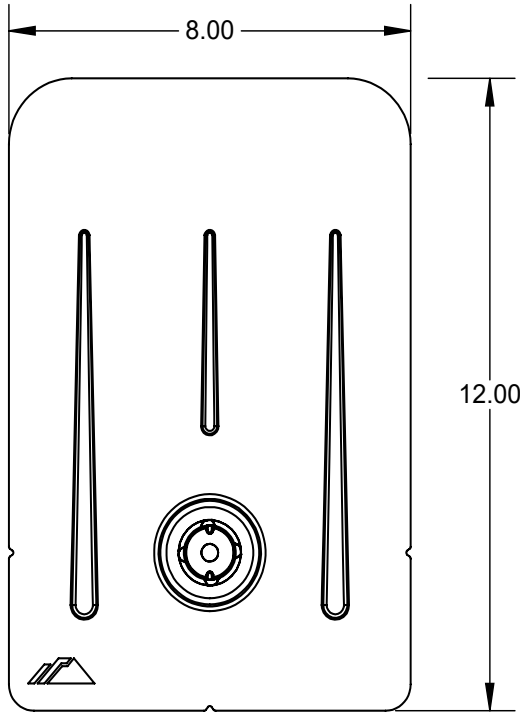
Part Number	Description
FF2-02-M2	FlashFoot2® (Mill)
FF2-02-B2	FlashFoot2® (Black)

1) Bolt, Lag 5/16 x 4.75



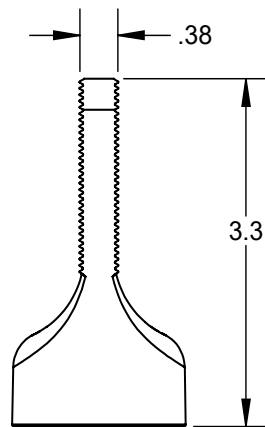
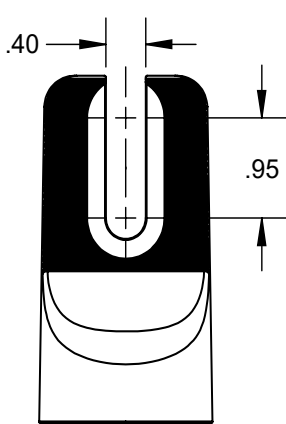
Property	Value
Material	300 Series Stainless Steel
Finish	Clear

2) Assy, Flashing



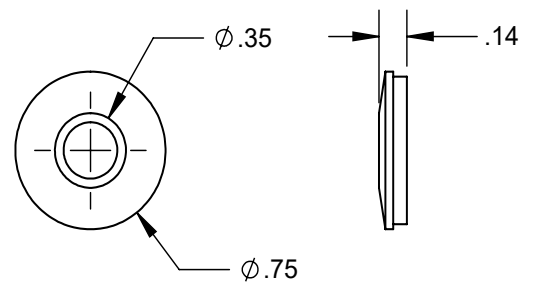
Property	Value
Material	Aluminum
Finish	Mill/Black

3) Assy, Cap



Property	Value
Material	Aluminum
Finish	Mill/Black

4) Washer, EPDM Backed



Property	Value
Material	300 Series Stainless Steel
Finish	Clear

Certifications

Licensing

Harmony Energy Works is properly licensed and in good standing with the State of New Hampshire Secretary of State.

- Business License ID number: 652414
Letter of Good Standing with Secretary of State provided upon request.
- Following the Awarding of the contract, and prior to initiation of construction, Harmony Energy Works will provide OSHA 10-hr Certificates for all designated installation workers.

Insurance

- Harmony's General Liability and Workmen's Compensation insurance certifications are available upon request.

Operations and Maintenance

In the event of a problem being detected, Harmony Energy Work's headquarters is 40 miles from the arrays. This allows for quick response times in dealing with any issues that may arise, as well as easy maintenance trips, and regular visual inspections. The PV system will be closely monitored for performance. In the event of a malfunction or degradation beyond expectation, we will inspect all components, evaluate for functionality, and repair or replace parts determined to be problematic.

Operation and Maintenance Manuals and As-Built Drawings

Upon completion of the installation, operation and maintenance manuals and as-built drawings, as well as an electronic copy of each, will be provided. Data sheets for the main equipment being used (modules and inverters) are attached.

System Monitoring

In addition to providing revenue-grade production meters, we will be installing an online monitoring system (for both Web and smartphone access) which tracks hourly, daily, and annually production to the individual module level. The monitoring system automatically alerts the installer, and other designees, in the event of an error, a failure, or a reduction in power.

Work Site

All materials are to be purchased by Harmony prior to being installed. All installation instructions shall be followed in accordance with manufacturer's requirements. Harmony will protect any and all areas, surfaces, grounds and surrounding areas. Any damage occurring as a result of Harmony negligence will be repaired or replaced by Harmony. No drugs, alcohol, or smoking of any kind will be permitted on work site grounds.

Special Provisions

Harmony will procure all necessary permits, interconnection agreements, and will not transfer this contract, if awarded. Harmony will be responsible for all construction equipment on site and will not hold the customer accountable for lost or stolen tools or equipment.

Safety

Safety to all involved (contractors, employees, pedestrians, etc.) is of the utmost importance. Harmony will utilize all possible means to prevent any injuries, including the placement of signs, barricades, ropes, and warning devices. Harmony will comply with all laws, EPA, State and OSHA regulations that apply.

Contractor/Installer Qualifications

Harmony Energy Works Project Team



Harmony Energy Works is a privately held Hampton-based solar company that designs, installs, and maintains commercial, government, and residential solar projects in three New England States – New Hampshire, Massachusetts, and Maine. Harmony is an authorized dealer for Solar World modules and is unique in that we are the only solar company in NH that exclusively sells American-made solar products – modules, inverters, and balance of system components. Its president, George Horrocks, is one of only 9 NABCEP nationally certified professional solar PV installers in the state.

George Horrocks: Harmony Energy Works, *President*

George Horrocks is an electrical engineer (BSEE) with more than 35 years of experience. He is one of only nine NABCEP (# 032611-147) nationally-certified Solar PV Installation Professionals in the state of New Hampshire. Mr. Horrocks has been Principal Design Engineer and Project Manager for well over 100 solar photovoltaic projects totaling over 6500KW – residential and commercial – and was responsible for engineering design, procurement, and project management of those solar PV installations. Prior to founding Harmony Energy Works, he has had a successful engineering career in a number of startup companies as Engineering Manager at Bedford Computer Corporation, VP of Hardware Engineering at Computek, Senior Technical Staff at Hendrix Advanced Systems Technology (Hastech), Director of Engineering at Intertext, and President of Sparrow Information.

Mr. Horrocks is a member of IEEE (Institute of Electronic and Electrical Engineers) and ASES (American Solar Energy Society) professional organizations, NH Green Alliance, NHSEA (NH Sustainable Energy Association) and a board member of the community-based solar organization, SEAREI (Seacoast Area Renewable Energy Initiative).

David Childs, *Master Electrician*

David Childs is the Corporate Master and primary electrician for Harmony Energy Works. He has been an electrician for over 30 years. David is licensed in New Hampshire, Massachusetts, and Maine. He is a well-respected electrician in the area and has done work for many notable corporations.

Commercial Project References



Project Name: Warner Village Water District
Key Contact: Ray Martin / 603-456-2298
Location: 55 W. Joppa Rd., Warner, NH 03278
Installation Date: 6/14/2016
Total System Production: 153,732kWh
Description: 114kW Roof-mounted Solar PV Array

- 380 SolarWorld SW300 300W modules
- 5 SolarEdge SE20KUS Inverters
- Schletter Racking

Incentives / Rebates / Grants:

- NH Commercial & Industrial Solar Rebate
- Community Block Grant



Project Name: High Knoll Equestrian Center
Key Contact: Dr. Grant Myhre / 603-335-4777
Location: 100 Ten Rod Road, Rochester, NH 03867
Installation Date: 3/14/2016
Total System Production: 60.515kWh
Description: 47.88kW Roof-mounted Solar PV Array

- 171 SolarWorld SW280 280W modules
- 4 SolarEdge SE10KUS Inverters
- IronRidge Racking

Incentives / Rebates / Grants:

- NH Commercial & Industrial Solar Rebate
- Business Energy Investment Tax Credit (ITC)
- USDA Rural Energy for America Program (REAP) Grant



Project Name: Conner Bottling Works/Squamscott Beverages
Key Contact: Thomas Conner / 603-772-3376
Location: 120 Exeter Road, Newfields, NH
Installation Date: 3/1/2014
Total System Production: 54,416 kWh
Description: 43.68kW Solar PV Array

- 156 SolarWorld SW280 modules
- 4 SolarEdge SE10000AUS inverters
- Ironridge roof-, Schletter ground-mount racking systems

Incentives / Rebates / Grants:

- NH Commercial & Industrial Solar Rebate
- U.S. Treasury Section 1603 Grant
- USDA Rural Energy for America Program (REAP) Grant



Project Name: Applecrest Farm Orchards
Key Contact: Peter Wagner / 603-926-3721
Location: 133 Exeter Rd, Hampton Falls, NH 03844
Installation Date: 9/16/2012
Total System Production: 54,871.60 kWh
Description: 39.78 kW Roof-mounted Solar PV Array

- 156 SolarWorld SW255 255W modules
- 6 SMA SB7000US inverters
- IronRidge XR1000 racking w/S-5 Clamps

Incentives / Rebates / Grants:

- NH Commercial & Industrial Solar Rebate
- U.S. Treasury Section 1603 Grant
- USDA Rural Energy for America Program (REAP) Grant



Project Name: United States Drug Enforcement Administration
Key Contact: Peter Bielagus / 603-668-7046
Location: 324 South River Road, Bedford, NH 03110
Installation Date: 2/8/2013
Total System Production: *Confidential*
Description: 12.24 kW Roof-mounted Solar PV Array

- 48 SolarWorld SW245 245W modules
- 1 Fronius 11.4-3 inverter
- Schletter Iso-Top Racking Structure

Incentives / Rebates / Grants:

- NH Commercial & Industrial Solar Rebate
- U.S. Treasury Section 1603 Grant



Project Name: Cherry Hill Apartments
Key Contact: Scott Foster / 603-659-5665
Location: 600 Bennett Way, Newmarket, NH 03857
Installation Date:

- 8/19/2013 - 6 sub-arrays
- 12/19/2013 - 2 sub-arrays

Description: 69.79 kW Roof-mounted Solar PV Array

- 6 sub-arrays
 - 82 SolarWorld SW265 265W modules
 - 82 Enphase micro-inverters
 - IronRidge XR1000 racking
- 2 sub-arrays
 - 178 SolarWorld SW270 270W modules
 - 178 Enphase micro-inverters
 - IronRidge XRS racking

Incentives / Rebates / Grants:

- NH Commercial & Industrial Solar Rebate
- Business Energy Investment Tax Credit (ITC)



Project Name: Hauch Storage
Key Contact: Katie Wood / 603-235-1869
Location: 2185 Woodbury Ave, Newington, NH 03801
Installation Date: March 4, 2013
Total System Production: 19,170.63 kWh
Description: 15.3 kW Roof-mounted Solar PV Array

- 60 SolarWorld SW265 265W modules
- 2 SMA SB7000US inverters
- IronRidge XR1000 racking

Incentives / Rebates / Grants:

- NH Commercial & Industrial Solar Rebate
- Business Energy Investment Tax Credit (ITC)
- USDA Rural Energy for America Program (REAP) Grant



Project Name: The Derryfield School
Key Contact: Gary Harper / 603-624-6143
Location: 2018 River Road, Manchester, NH 03104
Installation Date: 8/20/2013
Total System Production: 12,406.16 kWh
Description: 19.08 kW Roof-mounted Solar PV Array

- 72 SolarWorld SW265 265W modules
- 2 SMA SB10000TL-US
- IronRidge XR1000 racking

Incentives / Rebates / Grants:

- NH Commercial & Industrial Solar Rebate
- Business Energy Investment Tax Credit (ITC)



Project Name: MainStreet Properties
Key Contact: Neil Nevins / 603-456-2700
Location: 16 East Main Street, Warner, NH 03278
Installation Date: 12/14/2011
Total System Production: 29,308.23 kWh
Description: 11.52 kW Top-of-pole Solar PV Array

- 48 Sharp 240UF-2 240W modules
- 2 SMA SB6000US inverters
- 4 DPW High Wind Version Top-of-pole racking systems

Incentives / Rebates / Grants:

- NH Commercial & Industrial Solar Rebate
- U.S. Treasury Section 1603 Grant
- USDA Rural Energy for America Program (REAP) Grant

For additional information please refer to: harmonyenergyworks.com