NEW PHOTOVOLTAIC GROUND MOUNTED SYSTEM - 9.84 KW DC/8.376 KW AC
64 ISLAND FARMS RD, WEST TISBURY, MA 02575

NEW PV SYSTEM SPECIFICATIONS

SYSTEM SIZE:	DC SIZE: 9.840 KW DC-(STC)
	AC SIZE: 8.376 KW AC
MODULE:	(24) HYUNDAI SOLAR HIS-S410YH(BK)
INVERTER:	(24) ENPHASE IQ8A-72-2-US [240V]

APPLICABLE CODES

ALL WORK SHALL CONFORM TO THE FOLLOWING CODES:
2015 INTERNATIONAL BUILDING CODE W/ 780 CMR
2015 INTERNATIONAL RESIDENTIAL CODE W/ 780 CMR
2015 INTERNATIONAL EXISTING BUILDING CODE W/ 780 CMR
2018 INTERNATIONAL ENERGY CONSERVATION CODE
2018 INTERNATIONAL FIRE CODE
2023 NATIONAL ELECTRICAL CODE
AS ADOPTED BY TOWN OF WEST TISBURY

DESIGN CRITERIA

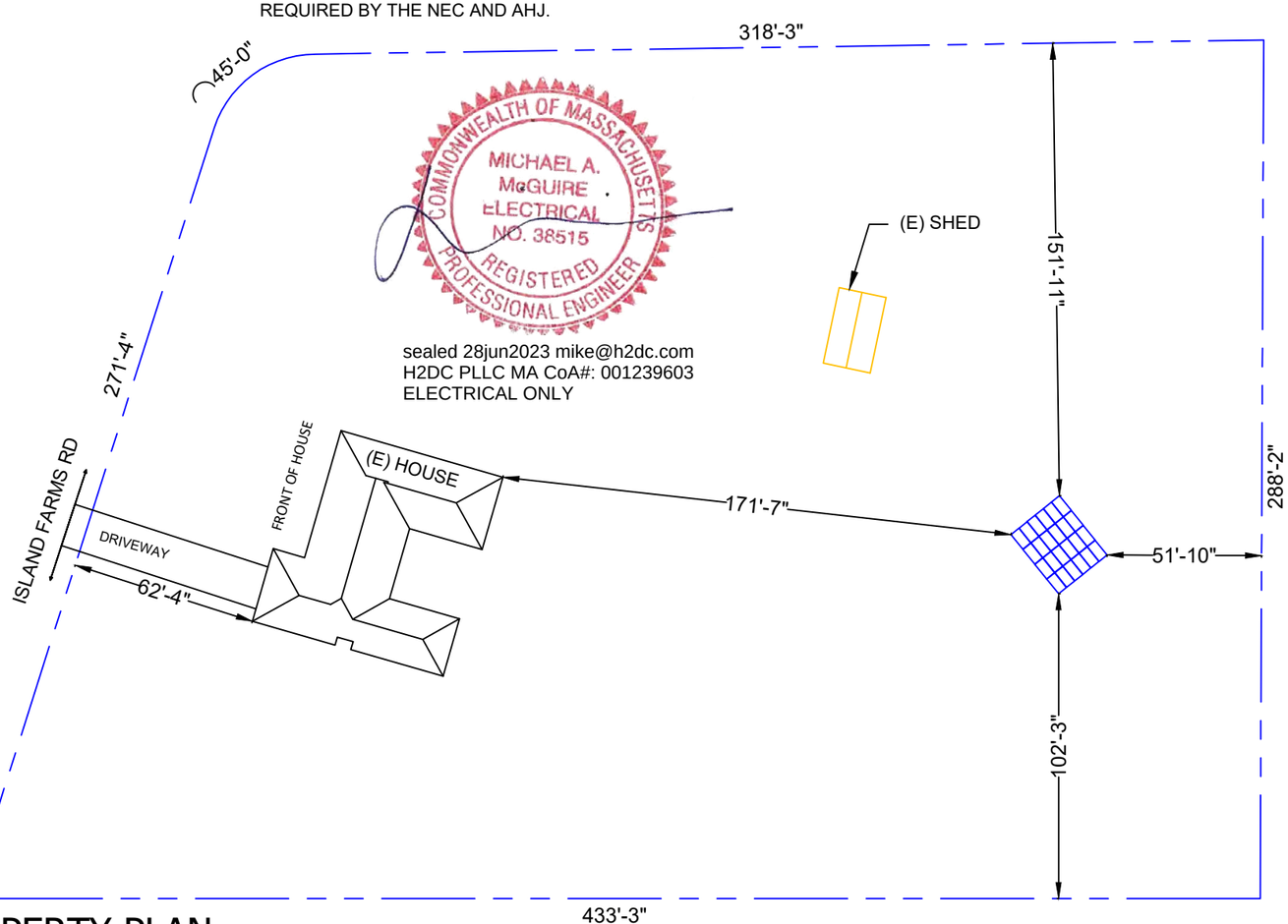
GROUND SNOW LOAD: 50 PSF
WIND SPEED: 140 MPH
WIND EXPOSURE: B
RISK CATEGORY: II

PROJECT NOTES

1.1.1 THIS PHOTOVOLTAIC (PV) SYSTEM SHALL COMPLY WITH THE RELEVANT YEAR OF THE NATIONAL ELECTRIC CODE (NEC), ALL MANUFACTURER'S LISTING AND INSTALLATION INSTRUCTIONS, AND THE RELEVANT CODES AS SPECIFIED BY THE AUTHORITY HAVING JURISDICTION'S (AHJ) APPLICABLE CODES.
1.1.2 THE UTILITY INTERCONNECTION APPLICATION MUST BE APPROVED AND THE PV SYSTEM MUST BE INSPECTED PRIOR TO OPERATION
1.1.3 ALL PV SYSTEM COMPONENTS; MODULES, UTILITY-INTERACTIVE INVERTERS, AND SOURCE CIRCUIT COMBINER BOXES ARE IDENTIFIED AND LISTED FOR USE IN PHOTOVOLTAIC SYSTEMS AS REQUIRED BY NEC AND OTHER GOVERNING CODES
1.1.4 ALL SIGNAGE TO BE PLACED IN ACCORDANCE WITH LOCAL BUILDING CODE. IF EXPOSED TO SUNLIGHT, IT SHALL BE UV RESISTANT. ALL PLAQUES AND SIGNAGE WILL BE INSTALLED AS REQUIRED BY THE NEC AND AHJ.

SCOPE OF WORK

1.2.1 CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND SPECIFICATIONS OF THE GRID-TIED PHOTOVOLTAIC SYSTEM. THE CONTRACTOR WILL BE RESPONSIBLE FOR COLLECTION OF EXISTING ONSITE CONDITIONS TO DESIGN, SPECIFY, AND INSTALL THE GROUND-MOUNTED PHOTOVOLTAIC SYSTEM DETAILED IN THIS DOCUMENT



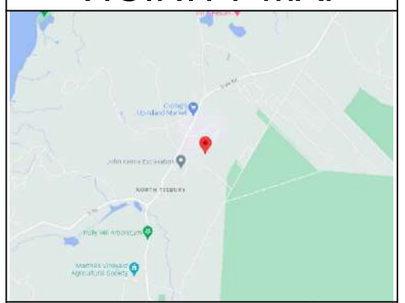
1 PV-01 PROPERTY PLAN
SCALE:1"-50'-0"

SHEET INDEX

LEGEND

- PROPERTY LINE
- FENCE LINE

VICINITY MAP



SATELLITE MAP

CONTRACTOR

FARLEY BUILT, INC

PO BOX 1491, WEST TISBURY, MA 02575

PHONE - (508) 560-3400
LIC. NO. - 96690

PROJECT NAME & ADDRESS

RICH HUFFAM

64 ISLAND FARMS RD,
WEST TISBURY, MA 02575
APN #: WTISM00016B00017L00000

AHJ: TOWN OF WEST TISBURY
UTILITY: EVERSOURCE

SYSTEM DETAILS

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AC SIZE: 8.376 KW AC
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(24) ENPHASE IQ8A-72-2-US [240V]

REVISIONS

REV	DESCRIPTION	DATE

SHEET TITLE

COVER PAGE

DRAWN DATE	6/28/2023
DRAWN BY	PCAD

SHEET NUMBER

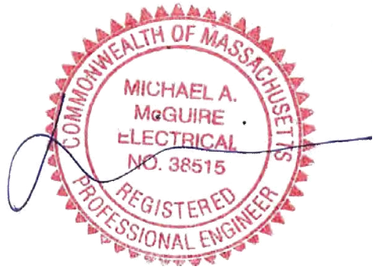
PV-01

NOTES:

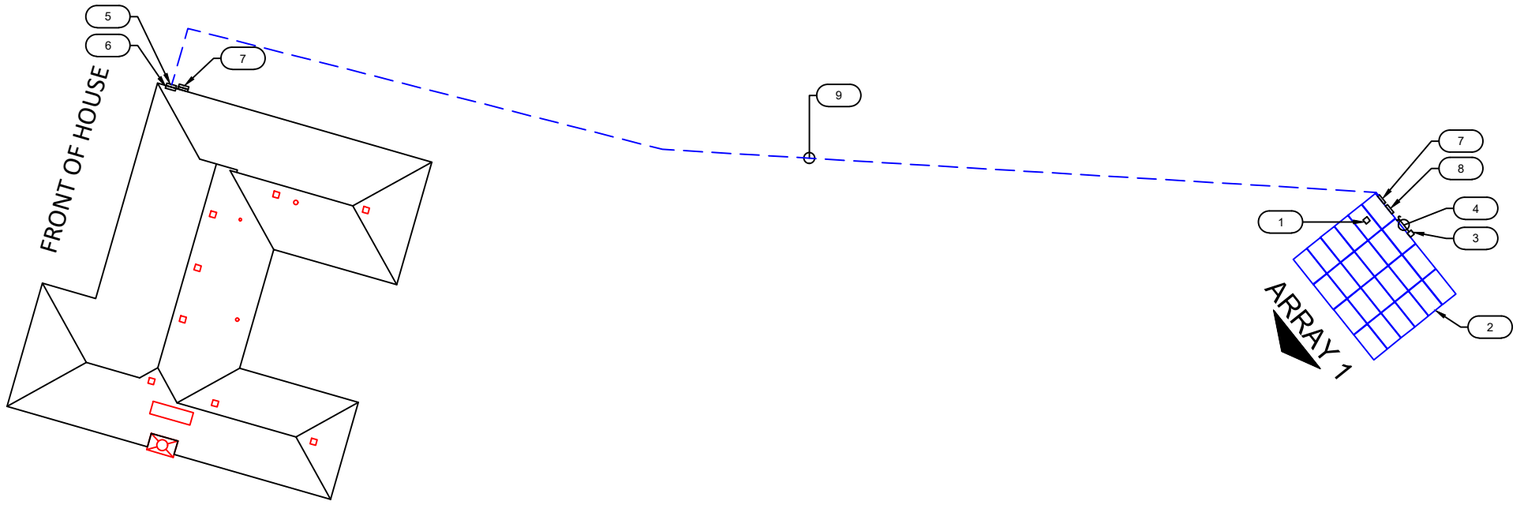
1. STRUCTURES, PATIO COVERS, AND/OR ADDITIONS BUILT WITHOUT PERMITS TO BE RESOLVED BY A SEPARATE PERMIT.

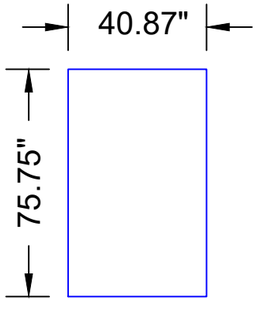
TRENCH NOTES:

1. 18" MINIMUM DEPTH OR BELOW FROST LINE.
2. 24" MINIMUM DEPTH FOR CONDUIT TRENCHED UNDER AREAS SUBJECT TO VEHICLE TRAFFIC.



sealed 28jun2023 mike@h2dc.com
H2DC PLLC MA CoA#: 001239603
ELECTRICAL ONLY





1 PV-02 SITE PLAN
SCALE:1"-30'-0"

LEGEND

NON-DWELLING UNIT USED FOR PV SYSTEM, FIRE SETBACKS ARE NOT REQUIRED

- = MECHANICAL VENT
- = FLUE / PLUMBING VENT
- = FENCE LINE
- 1 MICROINVERTER (1 PER MODULE)
- 2 PV MODULES
- 3 JUNCTION BOX; SIZE DETERMINED IN FIELD
- 4 CONDUIT RUN; SURFACE MOUNTED (ACTUAL CONDUIT RUNS TO BE DETERMINED IN FIELD)
- 5 UTILITY METER
- 6 MAIN SERVICE PANEL
- 7 AC DISCONNECT AND PV PRODUCTION METER - CUSTOMER-OWNED FOR THE REC PROGRAM
- 8 AC COMBINER PANEL
- 9 190FT TRENCH

GROUND-MOUNT ARRAY(S)

ARRAY 1	ARRAY SLOPE	- 37°
	AZIMUTH	- 180°
	MODULE QTY.	- 24

CONTRACTOR

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REVISIONS

REV	DESCRIPTION	DATE

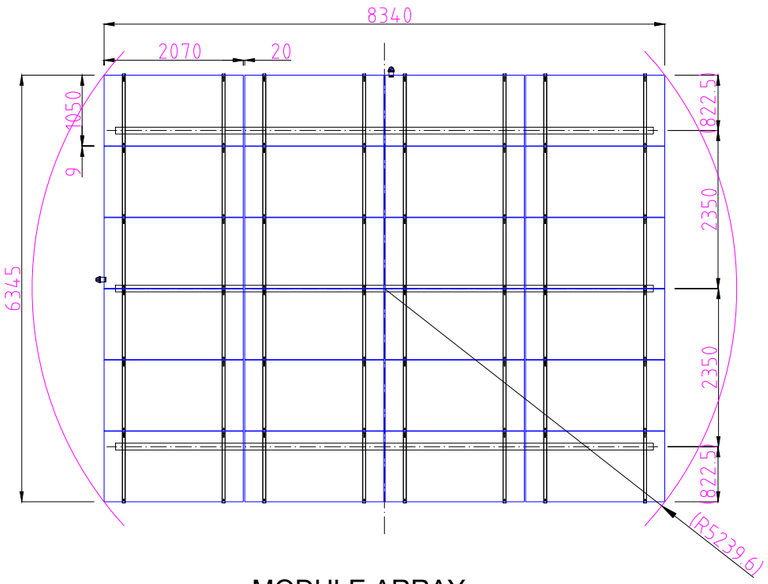
SHEET TITLE

SITE PLAN

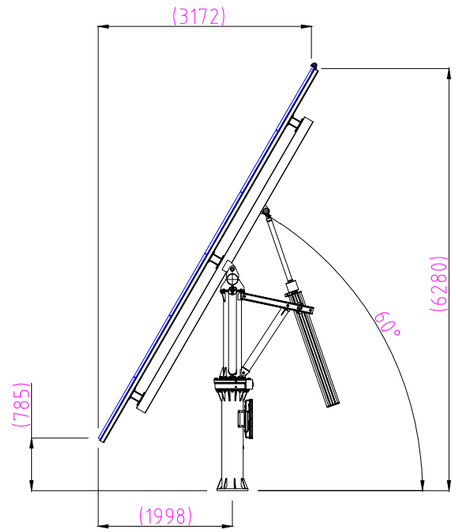
DRAWN DATE	6/28/2023
DRAWN BY	PCAD

SHEET NUMBER

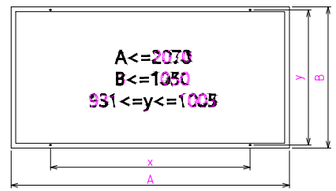
PV-02



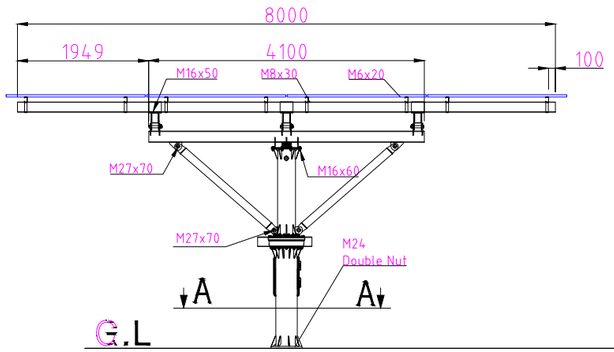
MODULE ARRAY



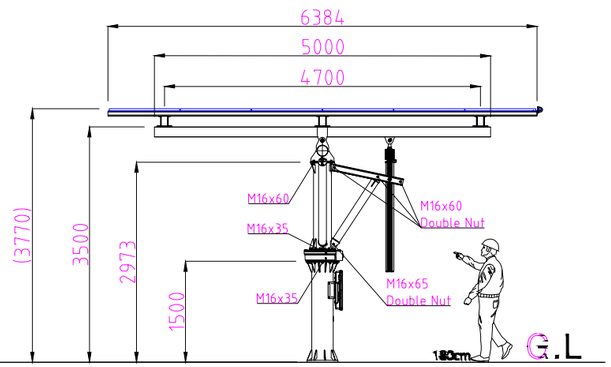
SIDE VIEW(60*)



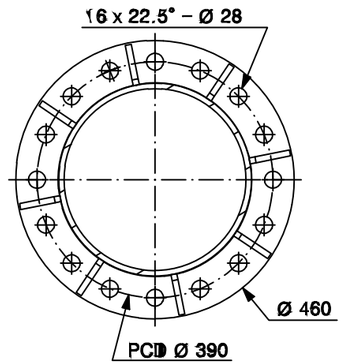
MODULE LAYOUT



FRONT VIEW



SIDE VIEW(0*)



Detail Section View A–A (1:9)

1. All dimensions in mm. Not to scale.
2. Layout/Drawing is for reference use only.
3. Prohibit counterfeiting, unauthorized copy, and opening public.
4. Return to authorized department immediately after competing the work.
5. Control strictly in accordance with classified documents.
6. Should have legal responsibility for information spill without permission.

Product	DUALTRACK 24M [STANDARD V1]	Qty		Approved By	
		Material		Checked By	
Part Name	Layout Drawing	Weight(Kg)		Designed By	
		General Tolerance		Drawn By	
DWG No.	PST-2AL-24M	Projection		Date	

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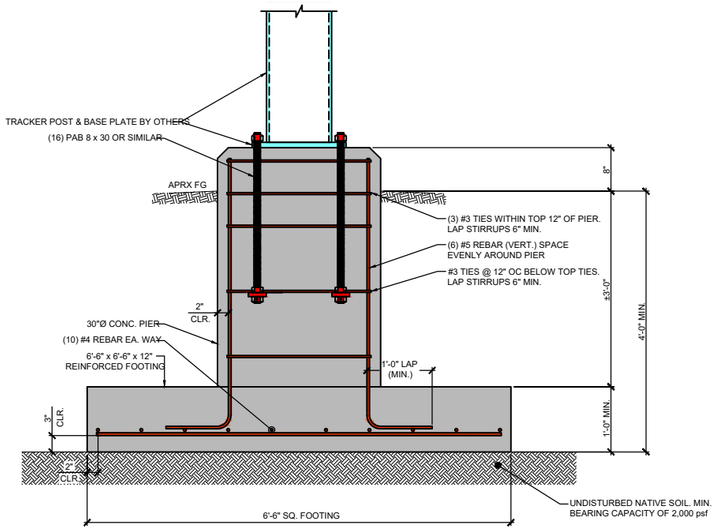
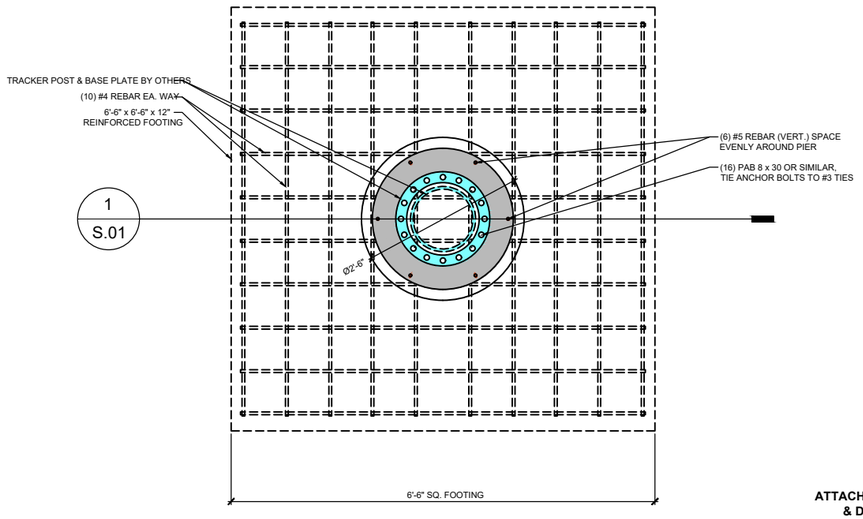
PV-3.0



1 FOOTING/PIER SECTION

NOT TO SCALE



ATTACHMENT PLAN & DETAILS

2 FOOTING/PIER PLAN VIEW

NOT TO SCALE

REV. DELTA - TITLE BLOCK

SOIL CLASSIFICATION NOTE
ALL STRUCTURES TO BE LOCATED ENTIRELY ON UNDISTURBED NATIVE SOILS. IF DISTURBED, COMPACT BELOW ALL FOOTINGS AND SLABS TO A MIN. SOIL BEARING CAPACITY OF 2,500 PSF. IF THE BUILDING INSPECTOR SUSPECTS FILL, EXPANSIVE SOIL, HIGH WATER TABLE OR ANY GEOLOGIC INSTABILITY, CONTACT THE ENGINEER ON RECORD.

DRAINAGE NOTE
ENSURE SURFACE WATER IS DRAINING AWAY FROM BUILDING AND MUST FALL A MINIMUM OF 6 INCHES WITHIN THE FIRST 10 FEET FROM BUILDINGS EDGE

SPREAD FOOTING SCHEDULE	
SYMBOL	DIMENSIONS & REINFORCEMENTS
F2.0	2'-0" SQ. x 1'-0" DEEP SPREAD FOOTING w/ (2)-#4 BARS EA. WAY
F2.5	2'-6" SQ. x 1'-0" DEEP SPREAD FOOTING w/ (3)-#4 BARS EA. WAY
F3.0	3'-0" SQ. x 1'-0" DEEP SPREAD FOOTING w/ (4)-#4 BARS EA. WAY
F3.5	3'-6" SQ. x 1'-0" DEEP SPREAD FOOTING w/ (5)-#4 BARS EA. WAY
F4.0	4'-0" SQ. x 1'-0" DEEP SPREAD FOOTING w/ (6)-#4 BARS EA. WAY

STRUCTURAL DESIGN CRITERIA

1. BUILDING CODE: MASSACHUSETTS STATE BUILDING CODE (MSBC) & THE INTERNATIONAL RESIDENTIAL CODE EDITION 2015 (IRC)
2. LOADS: DEAD / LIVE / SNOW
   a. ARRAY SELF WEIGHT 25 PSF
3. WIND LOADS:
   a. BASIC WIND SPEED = 125 MPH - EXPOSURE B AS PER MSBC
   d.
4. CONCRETE MINIMUM 28-DAY COMPRESSIVE STRENGTH, f'c
   a. FOOTINGS 3,000 PSI
   b. FOUNDATION WALLS 3,000 PSI
   c. SLAB-ON-GRADE 3,000 PSI
   d. HONEY-COMBING, SPALLS, CRACKS ETC. SHALL BE REPORTED TO THE STRUCTURAL ENGINEER.
5. STRUCTURAL ENGINEER IS NOT RESPONSIBLE FOR THE DESIGN OR CONSTRUCTION OF SYSTEMS NOT SHOWN IN STRUCTURAL PLANS.
6. MATERIAL, WORKSMANSHIP, AND DESIGN SHALL CONFORM TO THE REFERENCED BUILDING CODES.
7. FOR DIMENSIONS NOT SHOWN ON THE STRUCTURAL DOCUMENTS, REFER TO DOCUMENTS BY OTHERS.
8. CONTRACTOR IS SOLELY RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES OF CONSTRUCTION.
9. THE STRUCTURE IS ONLY STABLE IN ITS COMPLETED FORM. TEMPORARY SHORING & SUPPORT MAY BE REQUIRED DURING INTERMEDIATE STAGES OF CONSTRUCTION.

REBAR COVER TABLE 20.6.1.3.1 (AS PER ACI)			
CONCRETE EXPOSURE	MEMBER	REINFORCEMENT	SPECIFIED COVER, IN.
CAST AGAINST AND PERMANENTLY IN CONTACT WITH GROUND	ALL	ALL	3
EXPOSURE TO WEATHER OR IN CONTACT WITH GROUND	ALL	#6 THROUGH #18 REBAR	2
		#5 REBAR, W31D31 WIRE AND SMALLER	1-1/2
NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND	SLABS, JOISTS AND WALLS	#14 AND #18 REBAR	1-1/2
		#11 REBAR AND SMALLER	3/4
	BEAMS, COLUMNS, PEDESTALS AND TENSIONS TIES	PRIMARY REINFORCEMENT, STIRRUPS, TIES, SPIRALS AND HOOPS	1-1/2

GLOSSARY

ALT - ALTERNATING	IEBC - INTERNATIONAL EXISTING BUILDING CODE
ARCH, ARCH'L. - ARCHITECT / ARCHITECTURAL	INT. - INTERIOR
B/, BTM. - BOTTOM	IRC - INTERNATIONAL RESIDENTIAL CODE
B/W - BOTH WAYS	KIP, K - 1,000 POUNDS
B.N. - BOUNDARY NAILING	LB. - POUND
B.O. - BOTTOM OF	LSL - LAMINATED STRAND LUMBER
BLK'G. - BLOCKING	MAX. - MAXIMUM
BM. - BEAM	MIN. - MINIMUM
B.P. - BASE PLATE	MSBC - MASSACHUSETTS STATE BUILDING CODE
C.J. - CEILING JOIST - CENTER LINE	MSL. - MEAN SEA LEVEL
COL. - COLUMN	(N) - NEW
CONN. - CONNECTION	O.C. - ON CENTER
D.J. - DECK JOIST	PCF - POUNDS PER CUBIC FOOT
DEV. - DEVELOPMENT	PENE. - PENNETRATION
DIA., Ø - DIAMETER	PL. - PLATE
DIR. - DIRECTION	PLF - POUNDS PER LINEAR FOOT
DN. - DOWN	PLY - PLYWOOD
EA. - EACH	PSF - POUNDS PER SQUARE FOOT
ECT. - ETETERA	PT - PRESSURE TREATED
ELEV. - ELEVATION	REINF. - REINFORCED / REINFORCEMENT
EMBED. - EMBEDDED	RET. - RETAINING
E.N. - END NAILING	REQ'D. - REQUIRED
E.O.R. - ENGINEER OF RECORD	R.O. - ROUGH OPENING
	R.R. - ROOF RAFTER
EQ. - EQUALLY	SF - SUBFLOOR
EXIST., (E) - EXISTING	STAGG. - STAGGERED
EXT. - EXTERIOR	STR. - STRUCTURAL
F.J. - FLOOR JOIST	T/ - TOP
F.N. - FIELD NAILING	T/B - TOP & BOTTOM
F.G. - FINISHED GRADE	T.O. - TOP OF
FOUND. - FOUNDATION	T & G - TONGUE AND GROOVE
GALV. - GALVANIZED	TBD - TO BE DETERMINED
GLB. - GLULAM BEAM	TBR - TO BE REMOVED
HDR. - HEADER	T.P. - TOP PLATE
HORIZ. - HORIZONTAL	TYP. - TYPICAL
IBC - INTERNATIONAL BUILDING CODE	V.I.F. - VERIFY IN FIELD
	w/ - WITH

GENERAL NOTES & DESIGN CRITERIA

1. THE PLANS THAT FOLLOW ARE DESIGNED TO SUPPORT A SUN-ACTION (MANUFACTURER) 24 DUAL AXIS TRACKING SYSTEM AND HAS BEEN DESIGN AS PER THE CRITERIA LISTED BELOW:

AS PER ASCE 7-16		
RISK CATEGORY		I
BASIC WIND SPEED	(V)	*125 MPH (INTERPOLATED FROM FIGURE 26.5-1A)*
DESIGNED WIND SPEED	(V)	*105 MPH (IN "STOW" POSITION (0°))* *40 MPH (AT ALL OTHER POSITIONS)*
WIND DIRECTIONALITY FACTOR	(KD)	0.85
SURFACE ROUGHNESS		B
EXPOSURE CATEGORY		B
GROUND ELEVATION FACTOR	(KE)	1.0
TOPOGRAPHIC FACTOR	(KZT)	1.0
VELOCITY PRESSURE COEFF.	(KH & KZ)	0.85
GUST-EFFECT FACTOR	(G)	0.85
VELOCITY PRESSURE	(QZ)	*28.9 PSF (EQUATION 26.10-1)*
FORCE COEFFICIENT	(CF)	*1.3 (FIGURE 29.4-1)*
DESIGN WIND FORCE	(F)	*15,783LBS (EQUATION 29.4-1)*

2. *MARTHA'S VINEYARD ENGINEERING & DESIGN (MV E&D) IS NOT RESPONSIBLE FOR THE TRACKER COMPONENTS ABOVE THE FOOTING/CONCRETE PIER NOR THE ANCHORAGE DESIGN TO THE FOOTING/CONCRETE PIER. MV E&D IS NOT RESPONSIBLE FOR FOR THE TRACKERS ABILITY TO REACH THE "STOW" OR "SHED" POSITIONS. FAILURE TO REACH THESE POSITIONS DURING HIGH WIND EVENTS COULD CAUSE DAMAGE TO THE TRACKER AND THE SUPPORT FOOTING(S).*
3. *CONTRACTOR IS RESPONSIBLE FOR ALL DIMENSIONS, SITE CONDITIONS AND SHALL NOTIFY THE MANUFACTURER AND/OR ENGINEER IF ANY DISCREPANCIES ARE DISCOVERED ON SITE.*
4. *THE FOUNDATION/CONCRETE PIER IS DESIGNED AS A "FINISHED PRODUCT". TEMPORARY SHORING OR RETAINING OF EARTH DURING CONSTRUCTION IS THE RESPONSIBLY OF THE CONTRACTOR.*
5. *NO PIPES, CONDUIT, ETC. SHALL BE PLACED IN THE FOUNDATION PIER OR FOOTING UNLESS SPECIFIED AND APPROVED BY THE ENGINEER.*

CONTRACTOR

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SHEET TITLE

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DRAWN BY	PCAD

SHEET NUMBER

PV-3.1

MICROINVERTER SPECIFICATIONS	
MANUFACTURER / MODEL #	ENPHASE IQ8A-72-2-US [240V]
INPUT POWER RANGE	295W-500W
MIN/MAX START VOLTAGE	22V/58V
NOMINAL AC VOLTAGE	240V
MAX CONT. OUTPUT CURRENT	1.45A
MAX CONT. OUTPUT POWER	349W
MAX MODULES PER STRING	11 (11 MICROINVERTERS)

SOLAR MODULE SPECIFICATIONS	
MANUFACTURER / MODEL #	HYUNDAI SOLAR HIS-S410YH(BK)
VMP	38.1V
IMP	10.76A
VOC	45.9V
ISC	11.40A
TEMP. COEFF. VOC	-0.268%/°C

AMBIENT TEMPERATURE SPECIFICATIONS	
RECORD LOW TEMP	-17°C
AMBIENT TEMP (HIGH TEMP 2% AVG.)	27°C

(250 ft RUN)

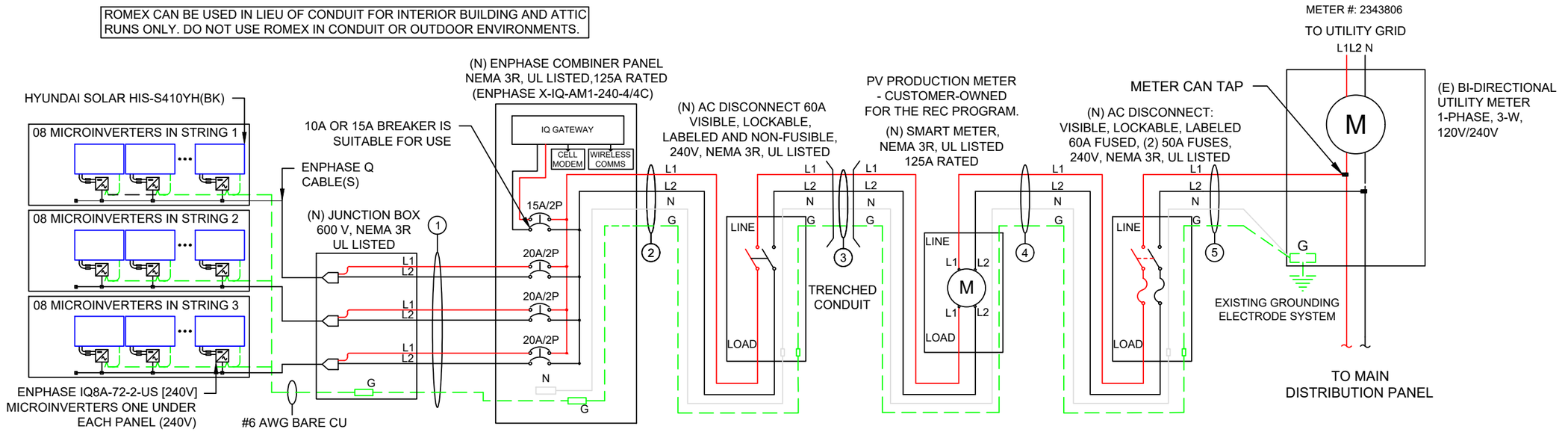
$$Vd = \frac{2 \times 12.9 \times 250 \times 43.5A}{41740} = 6.72 \text{ volts}$$

% VOLTAGE DROP: $\frac{6.722 \text{ volts}}{240 \text{ volts}} = 0.0280 \times 100 = 2.80\%$

Voltage @ Load: 240 volts - 4.4 volts = 233.28volts

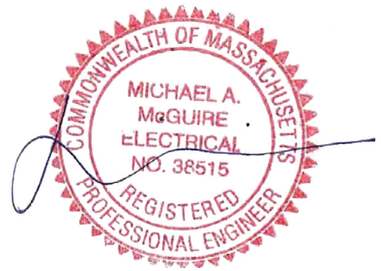
NOTES APPENDIX (AS APPLICABLE FOR TO BE BUILT DRAWING SETS): (A) TOTAL AC VOLTAGE DROP NOT TO EXCEED 2% TO INTERCONNECTION, < 3% FROM INVERTER(S) TO UTILITY TRANSFORMER. (B) ALL CONNECTORS 75C RATED. (C) ALL CONDUCTORS COPPER, UNLESS OTHERWISE NOTED. (D) OUTDOOR EQUIPMENT NEMA3R. (E) ALL CONDUCTORS MUST BE PROTECTED FROM ACCESS BY A FENCE OR SUITABLE COVER, OR OUT OF REACH. (F) PROPERTY LINES, BOUNDARIES AND ALL OTHER EXTERIOR MEASUREMENTS ARE FOR REFERENCE ONLY, AND MUST BE VERIFIED BY A LICENSED SURVEYOR OR CIVIL ENGINEER. (G) NO PVC ALLOWED ON ROOF OR IN ATTIC. (H) MC4 CONNECTORS MAY NOT BE JOINED WITH 'MC4 COMPATIBLE' CONNECTORS. (I) TAP CONNECTIONS IN PANEL MUST NOT VIOLATE CONDITIONS OF ACCEPTABILITY FROM PANEL MANUFACTURER'S NRTL LISTING, OR FIELD LABEL REQUIRED. (J) PV WIRES MAY NOT BE LAID DIRECTLY ON ROOF. (K) TY WRAPS FOR WIRE MANAGEMENT MUST BE STRUCTURAL (S21) UL APPROVED, OR EQUAL. (L) DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING, WHEN INDICATED, DOES NOT SHOW ALL OFFSETS, DROPS, AND RISES OF RUNS. (M) BURIED CONDUITS UNDER AREAS SUBJECT TO VEHICLE TRAFFIC REQUIRE MIN 24" COVER. (N) NM-B OR PAPER INSULATED CONDUCTORS MAY NOT BE USED EXTERIOR. (O) THE DEVELOPER IS REQUIRED TO CONFIRM EXISTING ELECTRICAL SERVICE SIZE FROM THE UTILITY, AND MAY NOT RELY SOLELY ON EXISTING BREAKER SIZES. (P) CONNECTING TO UTILITY EQUIPMENT REQUIRES PRIOR UTILITY CONSENT.

ROMEX CAN BE USED IN LIEU OF CONDUIT FOR INTERIOR BUILDING AND ATTIC RUNS ONLY. DO NOT USE ROMEX IN CONDUIT OR OUTDOOR ENVIRONMENTS.



DESCRIPTION	FORMULA	RESULT
PV OVERCURRENT PROTECTION NEC 690.9(B)	TOTAL INVERTER OUTPUT CURRENT x 1.25 = (24 x 1.45)A x 1.25	43.50A (SELECTED OCPD = 50A)

WIRE ID	EXPECTED WIRE TEMP (°C)	TEMP DERATE (90 °C)	QTY OF CURRENT CARRYING CONDUCTORS	CONDUIT FILL DERATE	MINIMUM CONDUIT SIZE (TBD ON SITE)	WIRE GAUGE & TYPE	CONDUCTOR AMPACITY @ 90°C (A)	CONDUCTOR AMPACITY @ 75°C (A)	REQUIRED CIRCUIT CONDUCTOR AMPACITY (A)	ADJUSTED CONDUCTOR AMPACITY @ 90 °C (A)	NEUTRAL CONDUCTOR SIZE & TYPE	GROUND WIRE SIZE & TYPE
1	27	1	6	0.80	3/4" METAL	#10 THWN-2	40	35	14.50	32.00	NONE	#8 THWN-2
2	27	1	2	1.00	3/4" METAL	#8 THWN-2	55	50	43.50	55.00	#8 THWN-2	#8 THWN-2
3	27	1	2	1.00	1-1/4" PVC	#4 THWN-2	95	85	43.50	95.00	#4 THWN-2	#8 THWN-2
4	27	1	2	1.00	3/4" METAL	#8 THWN-2	55	50	43.50	55.00	#8 THWN-2	#8 THWN-2
5	27	1	2	1.00	3/4" METAL	#6 THWN-2	75	65	43.50	75.00	#6 THWN-2	#8 THWN-2



sealed 28jun2023 mike@h2dc.com
H2DC PLLC MA CoA#: 001239603
ELECTRICAL ONLY

CONTRACTOR

FARLEY BUILT, INC

PO BOX 1491, WEST TISBURY, MA 02575

PHONE - (508) 560-3400
LIC. NO. - 96690

PROJECT NAME & ADDRESS

RICH HUFFAM

64 ISLAND FARMS RD, WEST TISBURY, MA 02575

APN #: WTISM00016B00017L00000

AHJ: TOWN OF WEST TISBURY
UTILITY: EVERSOURCE

SYSTEM DETAILS

DC SIZE: 9.840 KW DC-(STC)
AC SIZE: 8.376 KW AC
(24) HYUNDAI SOLAR HIS-S410YH(BK)
(24) ENPHASE IQ8A-72-2-US [240V]

REVISIONS

REV	DESCRIPTION	DATE

SHEET TITLE

ELECTRICAL DIAGRAM

DRAWN DATE	6/28/2023
DRAWN BY	PCAD

SHEET NUMBER

PV-04

GENERAL NOTES

SITE NOTES

2.1.1 A LADDER WILL BE IN PLACE FOR INSPECTION IN ACCORDANCE WITH OSHA REGULATIONS.
2.1.2 THE PV MODULES ARE CONSIDERED NON-COMBUSTIBLE AND THIS SYSTEM IS A UTILITY INTERACTIVE SYSTEM WITH NO STORAGE BATTERIES.
2.1.3 THE SOLAR PV INSTALLATION WILL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTS.
2.1.4 PROPER ACCESS AND WORKING CLEARANCE AROUND EXISTING AND PROPOSED ELECTRICAL EQUIPMENT WILL BE PROVIDED IN ACCORDANCE WITH SECTION NEC 110.26.
2.1.5 ROOF COVERINGS SHALL BE DESIGNED, INSTALLED, AND MAINTAINED IN ACCORDANCE WITH THIS CODE AND THE APPROVED MANUFACTURER'S INSTRUCTIONS SUCH THAT THE ROOF COVERING SERVES TO PROTECT THE BUILDING OR STRUCTURE.

EQUIPMENT LOCATIONS

2.2.1 ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS IN ACCORDANCE WITH NEC 110.26.
2.2.2 WIRING SYSTEMS INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC 690.31 (A),(C) AND NEC TABLES 310.15 (B)(2)(A) AND 310.15 (B)(3)(C).
2.2.3 JUNCTION AND PULL BOXES PERMITTED INSTALLED UNDER PV MODULES IN ACCORDANCE WITH NEC 690.34.
2.2.4 ADDITIONAL AC DISCONNECT(S) SHALL BE PROVIDED WHERE THE INVERTER IS NOT WITHIN SIGHT OF THE AC SERVICING DISCONNECT.
2.2.5 ALL EQUIPMENT SHALL BE INSTALLED ACCESSIBLE TO QUALIFIED PERSONNEL IN ACCORDANCE WITH NEC APPLICABLE CODES.
2.2.6 ALL COMPONENTS ARE LISTED FOR THEIR PURPOSE AND RATED FOR OUTDOOR USAGE WHEN APPROPRIATE.

STRUCTURAL NOTES

2.3.1 RACKING SYSTEM & PV ARRAY WILL BE INSTALLED IN ACCORDANCE WITH THE CODE-COMPLIANT INSTALLATION MANUAL. TOP CLAMPS REQUIRE A DESIGNATED SPACE BETWEEN MODULES, AND RAILS MUST ALSO EXTEND A MINIMUM DISTANCE BEYOND EITHER EDGE OF THE ARRAY/SUBARRAY, IN ACCORDANCE WITH RAIL MANUFACTURER'S INSTALLATION PRACTICES.
2.3.2 JUNCTION BOX WILL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. IF ROOF-PENETRATING TYPE, IT SHALL BE FLASHED & SEALED PER LOCAL REQUIREMENTS.

WIRING & CONDUIT NOTES

2.4.1 ALL CONDUIT AND WIRE WILL BE LISTED AND APPROVED FOR THEIR PURPOSE. CONDUIT AND WIRE SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING.
2.4.2 CONDUCTORS SIZED IN ACCORDANCE WITH THE NEC
2.4.3 AC CONDUCTORS TO BE COLORED OR MARKED PER NEC
2.4.4 LISTED OR LABELED EQUIPMENT SHALL BE INSTALLED AND USED IN ACCORDANCE WITH ANY INSTRUCTIONS INCLUDED IN THE LISTING OR LABELING PER NEC

GROUNDING NOTES

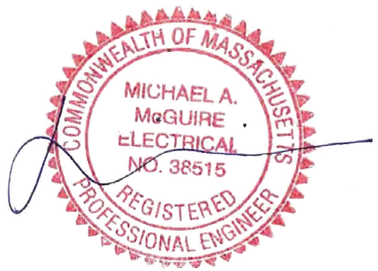
2.5.1 GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES EXPOSED TO THE ELEMENTS SHALL BE RATED FOR SUCH USE.
2.5.2 PV EQUIPMENT SHALL BE GROUNDED IN ACCORDANCE WITH NEC 690.43 AND NEC TABLE 250.122.
2.5.3 METAL PARTS OF MODULE FRAMES, MODULE RACKING, AND ENCLOSURES CONSIDERED GROUNDED IN ACCORDANCE WITH NEC 250.134 AND 250.136(A).
2.5.4 EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH NEC 690.45 AND INVERTER MANUFACTURER'S INSTALLATION PRACTICES
2.5.5 EACH MODULE WILL BE GROUNDED AS SHOWN IN MANUFACTURER DOCUMENTATION AND APPROVED BY THE AHJ.
2.5.6 THE GROUNDING CONNECTION TO A MODULE SHALL BE ARRANGED SUCH THAT THE REMOVAL OF A MODULE DOES NOT INTERRUPT A GROUNDING CONDUCTOR TO ANOTHER MODULE.
2.5.7 GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLORED GREEN OR MARKED GREEN IF #4 AWG OR LARGER PER NEC 250.119
2.5.8 THE GROUNDING ELECTRODE SYSTEM COMPLIES WITH NEC 690.47 AND NEC 250.50 THROUGH 250.106. IF EXISTING SYSTEM IS INACCESSIBLE, OR INADEQUATE, A GROUNDING ELECTRODE SYSTEM PROVIDED IN ACCORDANCE WITH NEC 250, NEC 690.47 AND THE AHJ.
2.5.9 GROUND-FAULT DETECTION SHALL COMPLY WITH NEC 690.41(B)(1) AND (2) TO REDUCE FIRE HAZARDS

DISCONNECTION AND OVERCURRENT PROTECTION NOTES

2.6.1 DISCONNECTING SWITCHES SHALL BE WIRED SUCH THAT WHEN THE SWITCH IS OPENED THE CONDUCTORS REMAINING ENERGIZED ARE CONNECTED TO THE TERMINALS MARKED “LINE SIDE” (TYPICALLY THE UPPER TERMINALS).
2.6.2 DISCONNECTS TO BE ACCESSIBLE TO QUALIFIED UTILITY PERSONNEL, BE LOCKABLE, AND BE A VISIBLE-BREAK SWITCH
2.6.3 PV SYSTEM CIRCUITS INSTALLED ON OR IN HABITABLE BUILDINGS SHALL INCLUDE A RAPID SHUTDOWN FUNCTION TO REDUCE SHOCK HAZARD FOR EMERGENCY RESPONDERS IN ACCORDANCE WITH 690.12
2.6.4 ALL OCPD RATINGS AND TYPES SPECIFIED ACCORDING TO NEC 690.8, 690.9, AND 240.
2.6.5 INVERTER ON-GRID BRANCHES SHALL BE CONNECTED TO A SINGLE BREAKER OR GROUPED FUSE DISCONNECT(S) IN ACCORDANCE WITH NEC 110.3(B).
2.6.6 IF REQUIRED BY THE AHJ, SYSTEM WILL INCLUDE ARC-FAULT CIRCUIT PROTECTION IN ACCORDANCE WITH NEC 690.11 AND UL1699B.

INTERCONNECTION NOTES

2.7.1 LOAD SIDE INTERCONNECTION SHALL BE IN ACCORDANCE WITH NEC 705.12.
2.7.2 THE SUM OF THE UTILITY OCPD AND INVERTER CONTINUOUS OUTPUT MAY NOT EXCEED 120 PERCENT OF BUSBAR RATING PER NEC 705.12.
2.7.3 THE SUM OF 125 PERCENT OF THE POWER SOURCE(S) OUTPUT CIRCUIT CURRENT AND THE RATING OF THE OVERCURRENT DEVICE PROTECTING THE BUSBAR SHALL NOT EXCEED 120 PERCENT OF THE AMPACITY OF THE BUSBAR, PV DEDICATED BACKFEED BREAKERS MUST BE LOCATED OPPOSITE END OF THE BUS FROM THE UTILITY SOURCE OCPD IN ACCORDANCE WITH NEC 705.12.
2.7.4 AT MULTIPLE ELECTRIC POWER SOURCES OUTPUT COMBINER PANEL, TOTAL RATING OF ALL OVERCURRENT PROTECTION DEVICES SHALL NOT EXCEED AMPACITY OF BUSBAR. HOWEVER, THE MAIN OVERCURRENT PROTECTION DEVICE MAY BE EXCLUDED IN ACCORDANCE WITH NEC 705.12.
2.7.5 FEEDER TAP INTERCONNECTION (LOAD SIDE) IN ACCORDANCE WITH NEC 705.12.
2.7.6 SUPPLY SIDE TAP INTERCONNECTION IN ACCORDANCE WITH TO NEC 705.12 WITH SERVICE ENTRANCE CONDUCTORS IN ACCORDANCE WITH NEC 230.42.
2.7.7 BACKFEEDING BREAKER FOR ELECTRIC POWER SOURCES OUTPUT IS EXEMPT FROM ADDITIONAL FASTENING PER NEC 705.12.



sealed 28jun2023 mike@h2dc.com
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64 ISLAND FARMS RD,
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APN #: WTISM00016B00017L00000

AHJ: TOWN OF WEST TISBURY
UTILITY: EVERSOURCE

SYSTEM DETAILS

DC SIZE: 9.840 KW DC-(STC)
AC SIZE: 8.376 KW AC
(24) HYUNDAI SOLAR HIS-S410YH(BK)
(24) ENPHASE IQ8A-72-2-US [240V]

REVISIONS

REV	DESCRIPTION	DATE

SHEET TITLE

NOTES

DRAWN DATE	6/28/2023
DRAWN BY	PCAD

SHEET NUMBER

PV-05

WARNING

ELECTRICAL SHOCK HAZARD

TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL LOCATION: COMBINER PANEL, AC DISCONNECT, POINT OF INTERCONNECTION
PER CODE: NEC 706.15(C)(4), NEC 690.13(B)

WARNING

TURN OFF PHOTOVOLTAIC AC DISCONNECT PRIOR TO WORKING INSIDE PANEL

LABEL LOCATION: COMBINER PANEL(S), MAIN SERVICE DISCONNECT
PER CODE: NEC 110.27(C), OSHA 1910.145(f)(7)

PHOTOVOLTAIC POWER SOURCE

LABEL LOCATION: DC CONDUIT/RACEWAYS
PER CODE: NEC 690.31(D)(2)

SOLAR PV DC CIRCUIT

LABEL LOCATION: DC CONDUIT/RACEWAYS
PER CODE: NEC 690.31(D)(2)

PHOTOVOLTAIC SYSTEM AC DISCONNECT
RATED AC OUTPUT CURRENT: **34.80** A
NOMINAL OPERATING AC VOLTAGE: 240 V

LABEL LOCATION: AC DISCONNECT/POINT OF INTERCONNECTION
PER CODE: NEC 690.54

WARNING DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION: MAIN SERVICE DISCONNECT, PRODUCTION/NET METER
PER CODE: NEC 690.59, 705.12(C)

PV SYSTEM

DISCONNECT

LABEL LOCATION: AC DISCONNECT
PER CODE: NEC 690.13(B)

WARNING

THIS EQUIPMENT FED BY MULTIPLE SOURCES:
TOTAL RATING OF ALL OVERCURRENT DEVICES EXCLUDING MAIN POWER SUPPLY SHALL NOT EXCEED AMPACITY OF BUSBAR

LABEL LOCATION: AC DISCONNECT
PER CODE: NEC 705.12(B)(3)(3)

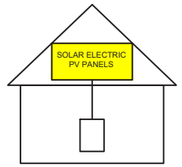
WARNING

POWER SOURCE OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE.

LABEL LOCATION: POINT OF INTERCONNECTION
PER CODE: NEC 705.12(B)(3)(2)

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY



LABEL LOCATION: MAIN SERVICE DISCONNECT
PER CODE: NEC 690.56(C)

MAIN PHOTOVOLTAIC SYSTEM DISCONNECT

LABEL LOCATION: MAIN SERVICE DISCONNECT, UTILITY METER
PER CODE: NEC 690.13(B)

RAPID SHUTDOWN FOR SOLAR PV SYSTEM

LABEL LOCATION: RSD INITIATION DEVICE, AC DISCONNECT
PER CODE: NEC 690.56(C)(2)

CAUTION

PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFED

LABEL LOCATION: MAIN SERVICE DISCONNECT
PER CODE: NEC 705.12(D), NEC 690.59

DO NOT DISCONNECT UNDER LOAD

LABEL LOCATION: MAIN SERVICE DISCONNECT
PER CODE: NEC 690.15(B) & NEC 690.33(D)(2)

MAXIMUM DC VOLTAGE

OF PV SYSTEM

LABEL LOCATION: DC DISCONNECT/INVERTER/PV DIST. EQUIPMENT
PER CODE: NEC 690.53

WARNING

ELECTRICAL SHOCK HAZARD

TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

LABEL LOCATION: DC DISCONNECT
PER CODE: NEC 690.13(B)

PV METER

LABEL LOCATION: PV METER

WARNING

ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE & LOAD SIDES MAY BE ENERGIZED IN OPEN POSITION

DO NOT DISCONNECT FUSES UNDER LOAD

THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED

PHOTOVOLTAIC SYSTEM
DC DISCONNECT

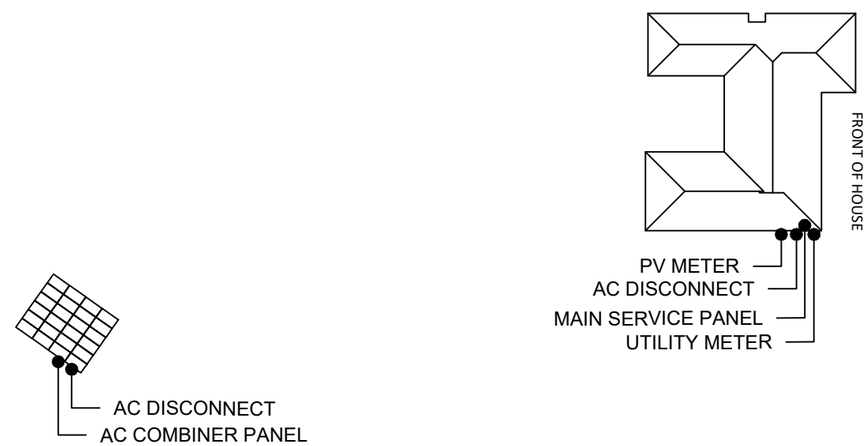
AUTHORIZED PERSONNEL ONLY

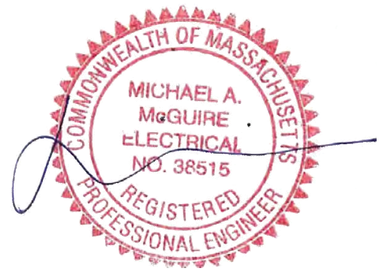
Note: WARNING labels must resemble format in example above with over-sized WARNING, exclamation point in triangle, colors, etc.

CAUTION

MULTIPLE SOURCES OF POWER.
POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN:

ADDRESS: 64 ISLAND FARMS RD, WEST TISBURY, MA 02575





sealed 28jun2023 mike@h2dc.com
H2DC PLLC MA CoA#: 001239603
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CONTRACTOR

FARLEY BUILT, INC

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PHONE - (508) 560-3400
LIC. NO. - 96690

PROJECT NAME & ADDRESS

RICH HUFFAM

64 ISLAND FARMS RD,
WEST TISBURY, MA 02575

APN #: WTISM00016B00017L00000

AHJ: TOWN OF WEST TISBURY
UTILITY: EVERSOURCE

SYSTEM DETAILS

DC SIZE: 9.840 KW DC-(STC)
AC SIZE: 8.376 KW AC
(24) HYUNDAI SOLAR HIS-S410YH(BK)
(24) ENPHASE IQ8A-72-2-US [240V]

REVISIONS

REV	DESCRIPTION	DATE

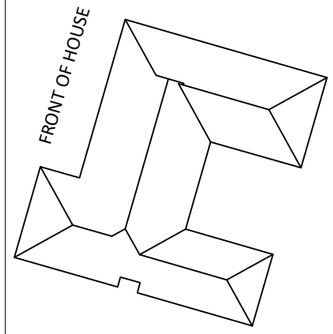
SHEET TITLE

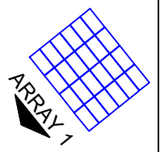
WARNING LABELS

DRAWN DATE	6/28/2023
DRAWN BY	PCAD

SHEET NUMBER

PV-06





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(24) HYUNDAI SOLAR HIS-S410YH(BK)
(24) ENPHASE IQ8A-72-2-US [240V]

REVISIONS

REV	DESCRIPTION	DATE

SHEET TITLE

INSTALLATION RESOURCE

DRAWN DATE	6/28/2023
DRAWN BY	PCAD

SHEET NUMBER

PV-07

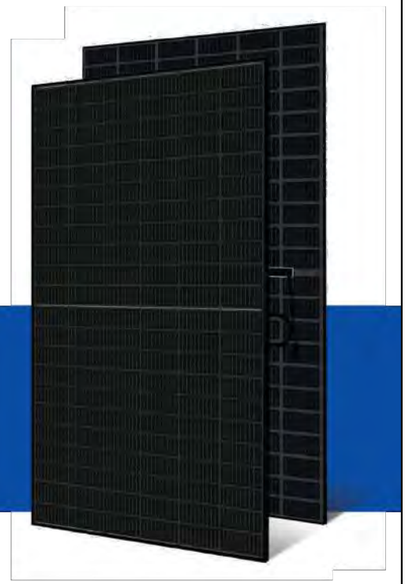
HYUNDAI SOLAR MODULE

25 YR WARRANTY Product & Performance

YH SERIES

Dual Black Max

HiS-S385YH(BK) HiS-S390YH(BK) HiS-S395YH(BK)
HiS-S400YH(BK) HiS-S405YH(BK) **HiS-S410YH(BK)**



Bifacial Cells 132

More Power Generation In Low Light

All black Module For Sleek Design (Black Meshed T-Backsheet)

HYUNDAI CELL Hyundai Cell

Maximized Power Generation

Increased total power output through capturing light from both the front and back of Bifacial solar modules. Back side power gain up to 25% of the front output depending on PV system design.

Half-Cut & Multi-Wire Technology

9 Wires

Improved current flow with half-cut technology and 9 thin wiring technology allows high module efficiency of up to 20.5%. It also reduces power generation loss due to micro-cracks.

Anti-LID / PID

Both LID(Light Induced Degradation) and PID(Potential Induced Degradation) are significantly reduced to ensure higher actual yield during lifetime.

Mechanical Strength

Tempered glass and reinforced frame design withstand rigorous weather conditions such as heavy snow(5,400Pa) and strong wind(5,400Pa).

UL / VDE Test Labs

Hyundai's R&D center is an accredited test laboratory of both UL and VDE.

Reliable Warranty

HYUNDAI

Global brand with powerful financial strength provide reliable 25-year warranty.

Hyundai's Warranty Provisions

25 YEARS
- 25-Year Product Warranty
  - Materials and workmanship

25 YEARS
- 25-Year Performance Warranty
  - Initial year : 98.0%
  - Linear warranty after second year: with 0.54%p annual degradation, 85.0% is guaranteed up to 25 years

About Hyundai Energy Solutions

Established in 1972, Hyundai Heavy Industries Group is one of the most trusted names in the heavy industries sector and is a Fortune 500 company. As a global leader and innovator, Hyundai Heavy Industries is committed to building a future growth engine by developing and investing heavily in the field of renewable energy.

As a core energy business entity of HHI, Hyundai Energy Solutions has strong pride in providing high-quality PV products to more than 3,000 customers worldwide.

PREMIUM MADE IN SOUTH KOREA Cell & Module

Certification

US LISTED E333005

· UL61730 certified by UL, Type 1(for Fire Class A)

Electrical Characteristics

		Mono-Crystalline Type(HiS-S____YH(BK))					
		385	390	395	400	405	410
Nominal Output (Pmpp)	W	385	390	395	400	405	410
Open Circuit Voltage (Voc)	V	44.5	44.8	45.0	45.3	45.6	45.9
Short Circuit Current (Isc)	A	11.04	11.11	11.18	11.25	11.33	11.40
Voltage at Pmax (Vmpp)	V	37.1	37.3	37.5	37.7	37.9	38.1
Current at Pmax (Impp)	A	10.40	10.47	10.54	10.61	10.69	10.76
Module Efficiency	%	19.3	19.5	19.8	20.0	20.3	20.5
Cell Type	-	Mono crystalline, 9busbar					
Maximum System Voltage	V	1,500					
Temperature Coefficient of Pmax	%/K	-0.347					
Temperature Coefficient of Voc	%/K	-0.268					
Temperature Coefficient of Isc	%/K	+0.032					

*All data at STC / Measurement tolerances Pmpp ±3%; Isc ; Voc ±3%. Above data may be changed without prior notice.

Additional Power Gain from rear side		385	390	395	400	405	410
5%	W	399	404	410	415	425	431
15%	W	437	443	449	454	466	472
25%	W	475	482	488	494	506	513

Mechanical Characteristics

Dimensions	1,924 mm (L) x 1,038 mm (W) x 32 mm (H)
Weight	Approx. 21.1 kg
Solar Cells	132 half cut bifacial cells (2 parallel x 66 half cells in series)
Output Cables	Cable : 1,200mm / 4mm² Connector : MC4 genuine connector
Junction Box	IP68, weatherproof, IEC certified (UL listed)
Bypass Diodes	3 bypass diodes to prevent power decrease by partial shade
Construction	Front : 3.2mm, High Transmission, AR Coated Tempered Glass Encapsulant : EVA I Back Sheet : Black Meshed Transparent Backsheet
Frame	Anodized aluminum alloy type 6063

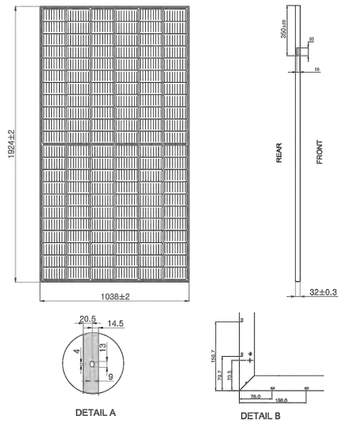
Installation Safety Guide

- Only qualified personnel should install or perform maintenance.
- Be aware of dangerous high DC voltage.
- Do not damage or scratch the rear surface of the module.
- Do not handle or install modules when they are wet.

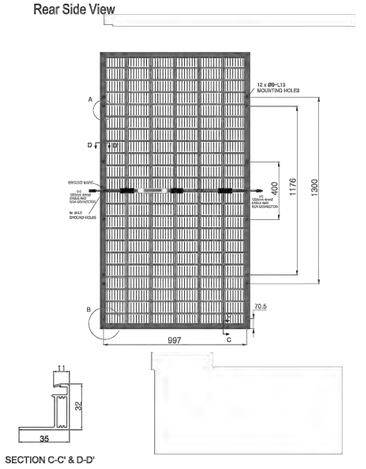
Nominal Operating Cell Temperature	45.5°C ± 2°C
Operating Temperature	-40°C ~ +85°C
Maximum System Voltage	DC 1,500V
Maximum Reverse Current	20A
Maximum Test Load	Front 5,400 Pa (113 psf) Rear 5,400 Pa (113 psf)

Module Diagram (unit : mm)

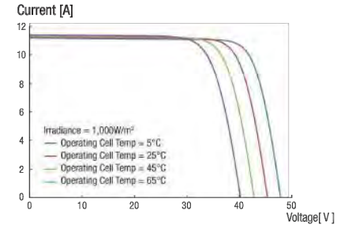
Front Side View

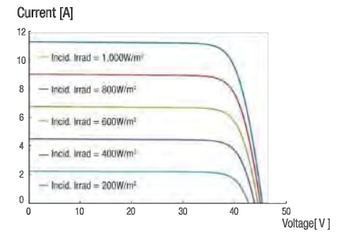


Rear Side View



I-V Curves





HYUNDAI ENERGY SOLUTIONS

ENPHASE.

DATA SHEET

IQ8M and IQ8A Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has superfast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.

Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the IQ Battery, IQ Gateway, and the Enphase App monitoring and analysis software.

Enphase 25 year limited warranty

IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.

Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.

UL CERTIFIED SAFETY

IQ8 Series Microinverters are UL listed as PV Rapid Shutdown Equipment and conform with various regulations, when installed according to manufacturer's instructions.

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) and IEEE 1547:2018 (UL 1741-SB 3rd Ed.)

Note:

IQ8 Microinverters cannot be mixed together with previous generations of Enphase microinverters (IQ7 Series, IQ6 Series, etc) in the same system.

*Only when installed with IQ System Controller 2, meets UL 1741.
**IQ8M and IQ8A support split-phase, 240V installations only.

IQ8M and IQ8A Microinverters

INPUT DATA (DC)		IQ8M-72-2-US	IQ8A-72-2-US
Commonly used module pairings[1]	W	260 – 460	295 – 500
Module compatibility		54-cell / 108 half-cell, 60-cell / 120 half-cell, 66-cell / 132 half-cell and 72-cell / 144 half-cell	
MPPT voltage range	V	30 – 45	32 – 45
Operating range	V	16 – 58	
Min. / Max. start voltage	V	22 / 58	
Max. input DC voltage	V	60	
Max. continuous input DC current	A	12	
Max. input DC short-circuit current	A	25	
Max. module I_{sc}	A	20	
Overvoltage class DC port		II	
DC port backfeed current	mA	0	
PV array configuration		1 x 1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit	
OUTPUT DATA (AC)		**IQ8M-72-2-US**	**IQ8A-72-2-US**
Peak output power	VA	330	366
Max. continuous output power	VA	325	349
Nominal (L-L) voltage / range[2]	V	240 / 211 – 264	
Max. continuous output current	A	1.35	1.45
Nominal frequency	Hz	60	
Extended frequency range	Hz	47 – 68	
AC short circuit fault current over 3 cycles	Arms	2	
Max. units per 20 A (L-L) branch circuit[3]		11	
Total harmonic distortion		<5%	
Overvoltage class AC port		III	
AC port backfeed current	mA	30	
Power factor setting		1.0	
Grid-tied power factor (adjustable)		0.85 leading – 0.85 lagging	
Peak efficiency	%	97.8	97.7
CEC weighted efficiency	%	97.5	97
Night-time power consumption	mW	60	
MECHANICAL DATA			
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)	
Relative humidity range		4% to 100% (condensing)	
DC Connector type		MC4	
Dimensions (H x W x D)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")	
Weight		1.08 kg (2.38 lbs)	
Cooling		Natural convection – no fans	
Approved for wet locations		Yes	
Pollution degree		PD3	
Enclosure		Class II double-insulated, corrosion resistant polymeric enclosure	
Environ. category / UV exposure rating		NEMA Type 6 / outdoor	
COMPLIANCE			
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, IEEE 1547:2018 (UL 1741-SB 3rd Ed.), FCC Part 15 Class B, ICES-0003 Class B, CAN / CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shutdown Equipment and conforms with NEC 2014, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.	

(1) Pairing PV modules with wattage above the limit may result in additional clipping losses. See the compatibility calculator at https://link.enphase.com/module-compatibility. (2) Nominal voltage range can be extended beyond nominal if required by the utility.
(3) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

IQ8MA-12A-DS-0069-03-EN-US-2022-12-27

Data Sheet
Enphase Networking

Enphase IQ Combiner 4/4C

X-IQ-AM1-240-4
X-IQ-AM1-240-4C

X-IQ-AM1-240-4C

X-IQ-AM1-240-4

The **Enphase IQ Combiner 4/4C** with Enphase IQ Gateway and integrated LTE-M1 cell modem (included only with IQ Combiner 4C) consolidates interconnection equipment into a single enclosure and streamlines IQ microinverters and storage installations by providing a consistent, pre-wired solution for residential applications. It offers up to four 2-pole input circuits and Eaton BR series busbar assembly.

Smart

- Includes IQ Gateway for communication and control
- Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), included only with IQ Combiner 4C
- Includes solar shield to match Enphase IQ Battery aesthetics and deflect heat
- Flexible networking supports Wi-Fi, Ethernet, or cellular
- Optional AC receptacle available for PLC bridge
- Provides production metering and consumption monitoring

Simple

- Centered mounting brackets support single stud mounting
- Supports bottom, back and side conduit entry
- Up to four 2-pole branch circuits for 240 VAC plug-in breakers (not included)
- 80A total PV or storage branch circuits

Reliable

- Durable NRTL-certified NEMA type 3R enclosure
- Five-year limited warranty
- Two years labor reimbursement program coverage included for both the IQ Combiner SKU's
- UL listed

UL LISTED

To learn more about Enphase offerings, visit **enphase.com**

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Enphase IQ Combiner 4/4C

MODEL NUMBER	
IQ Combiner 4 (X-IQ-AM1-240-4)	IQ Combiner 4 with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes a silver solar shield to match the IQ Battery system and IQ System Controller 2 and to deflect heat.
IQ Combiner 4C (X-IQ-AM1-240-4C)	IQ Combiner 4C with Enphase IQ Gateway printed circuit board for integrated revenue grade PV production metering (ANSI C12.20 +/- 0.5%) and consumption monitoring (+/- 2.5%). Includes Enphase Mobile Connect cellular modem (CELLMODEM-M1-06-SP-05), a plug-and-play industrial-grade cell modem for systems up to 60 microinverters. (Available in the US, Canada, Mexico, Puerto Rico, and the US Virgin Islands, where there is adequate cellular service in the installation area.) Includes a silver solar shield to match the IQ Battery and IQ System Controller and to deflect heat.
ACCESSORIES AND REPLACEMENT PARTS	(not included, order separately)
Ensemble Communications Kit COMMS-CELLMODEM-M1-06 CELLMODEM-M1-06-SP-05 CELLMODEM-M1-06-AT-05	- Includes COMMS-KIT-01 and CELLMODEM-M1-06-SP-05 with 5-year Sprint data plan for Ensemble sites - 4G based LTE-M1 cellular modem with 5-year Sprint data plan - 4G based LTE-M1 cellular modem with 5-year AT&T data plan
Circuit Breakers BRK-10A-2-240V BRK-15A-2-240V BRK-20A-2P-240V BRK-15A-2P-240V-B BRK-20A-2P-240V-B	Supports Eaton BR210, BR215, BR220, BR230, BR240, BR250, and BR260 circuit breakers. Circuit breaker, 2 pole, 10A, Eaton BR210 Circuit breaker, 2 pole, 15A, Eaton BR215 Circuit breaker, 2 pole, 20A, Eaton BR220 Circuit breaker, 2 pole, 15A, Eaton BR215B with hold down kit support Circuit breaker, 2 pole, 20A, Eaton BR220B with hold down kit support
EPLC-01	Power line carrier (communication bridge pair), quantity - one pair
XA-SOLARSHIELD-ES	Replacement solar shield for IQ Combiner 4/4C
XA-PLUG-120-3	Accessory receptacle for Power Line Carrier in IQ Combiner 4/4C (required for EPLC-01)
XA-ENV-PCBA-3	Replacement IQ Gateway printed circuit board (PCB) for Combiner 4/4C
X-IQ-NA-HD-125A	Hold down kit for Eaton circuit breaker with screws
ELECTRICAL SPECIFICATIONS	
Rating	Continuous duty
System voltage	120/240 VAC, 60 Hz
Eaton BR series busbar rating	125 A
Max. continuous current rating	65 A
Max. continuous current rating (input from PV/storage)	64 A
Max. fuse/circuit rating (output)	90 A
Branch circuits (solar and/or storage)	Up to four 2-pole Eaton BR series Distributed Generation (DG) breakers only (not included)
Max. total branch circuit breaker rating (input)	80A of distributed generation / 95A with IQ Gateway breaker included
Envoy breaker	10A or 15A rating GE/Siemens/Eaton included
Production metering CT	200 A solid core pre-installed and wired to IQ Gateway
Consumption monitoring CT (CT-200-SPLIT)	A pair of 200 A split core current transformers
MECHANICAL DATA	
Dimensions (WxHxD)	37.5 x 49.5 x 16.8 cm (14.75" x 19.5" x 6.63"). Height is 21.06" (53.5 cm) with mounting brackets.
Weight	7.5 kg (16.5 lbs)
Ambient temperature range	-40° C to +46° C (-40° to 115° F)
Cooling	Natural convection, plus heat shield
Enclosure environmental rating	Outdoor, NRTL-certified, NEMA type 3R, polycarbonate construction
Wire sizes	• 20 A to 50 A breaker inputs: 14 to 4 AWG copper conductors • 60 A breaker branch input: 4 to 1/0 AWG copper conductors • Main lug combined output: 10 to 2/0 AWG copper conductors • Neutral and ground: 14 to 1/0 copper conductors Always follow local code requirements for conductor sizing.
Altitude	To 2000 meters (6,560 feet)
INTERNET CONNECTION OPTIONS	
Integrated Wi-Fi	802.11b/g/n
Cellular	CELLMODEM-M1-06-SP-05, CELLMODEM-M1-06-AT-05 (4G based LTE-M1 cellular modem). Note that an Enphase Mobile Connect cellular modem is required for all Ensemble installations.
Ethernet	Optional, 802.3, Cat5E (or Cat 6) UTP Ethernet cable (not included)
COMPLIANCE	
Compliance, IQ Combiner	UL 1741, CAN/CSA C22.2 No. 107.1, 47 CFR, Part 15, Class B, ICES 003 Production metering: ANSI C12.20 accuracy class 0.5 (PV production) Consumption metering: accuracy class 2.5
Compliance, IQ Gateway	UL 60601-1/CANCSA 22.2 No. 61010-1

To learn more about Enphase offerings, visit **enphase.com**

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Data Sheet
Enphase Q Cable Accessories
REGION: Americas

Enphase Q Cable Accessories

The **Enphase Q Cable™** and accessories are part of the latest generation Enphase IQ System™. These accessories provide simplicity, reliability, and faster installation times.

Enphase Q Cable

- Two-wire, double-insulated Enphase Q Cable is 50% lighter than the previous generation Enphase cable
- New cable numbering and plug and play connectors speed up installation and simplify wire management
- Link connectors eliminate cable waste

Field-Wireable Connectors

- Easily connect Q cables on the roof without complex wiring
- Make connections from any open connector and center feed any section of cable within branch limits
- Available in male and female connector types

To learn more about Enphase offerings, visit **enphase.com**

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Enphase Q Cable Accessories

CONDUCTOR SPECIFICATIONS	
Certification	UL3003 (raw cable), UL 9703 (cable assemblies), DG cable
Flame test rating	FT4
Compliance	RoHS, OIL RES I, CE, UV Resistant, combined UL for Canada and United States
Conductor type	THHN/THWN-2 dry/wet
Disconnecting means	The AC and DC bulkhead connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.

Q CABLE TYPES / ORDERING OPTIONS				
Connectorized Models	**Size / Max Nominal Voltage**	**Connector Spacing**	**PV Module Orientation**	**Connector Count per Box**
Q-12-10-240	12 AWG / 277 VAC	1.3 m (4.2 ft)	Portrait	240
Q-12-17-240	12 AWG / 277 VAC	2.0 m (6.5 ft)	Landscape (60-cell)	240
Q-12-20-200	12 AWG / 277 VAC	2.3 m (7.5 ft)	Landscape (72-cell)	200

ENPHASE Q CABLE ACCESSORIES		
Name	**Model Number**	**Description**
Raw Q Cable	Q-12-RAW-300	300 meters of 12 AWG cable with no connectors
Field-wireable connector (male)	Q-CONN-10M	Make connections from any open connector
Field-wireable connector (female)	Q-CONN-10F	Make connections from any Q Cable open connector
Cable Clip	Q-CLIP-100	Used to fasten cabling to the racking or to secure looped cabling
Disconnect tool	Q-DISC-10	Disconnect tool for Q Cable connectors, DC connectors, and AC module mount
Q Cable sealing caps (female)	Q-SEAL-10	One needed to cover each unused connector on the cabling
Terminator	Q-TERM-10	Terminator cap for unused cable ends
Enphase EN4 to MC4 adaptor[1]	ECA-EN4-S22	Connect PV module using MC4 connectors to IQ micros with EN4 (TE PV4-S SOLARLOK). 150mm/5.9" to MC4.
Enphase EN4 non-terminated adaptor[1]	ECA-EN4-FW	For field wiring of UL certified DC connectors. EN4 (TE PV4-S SOLARLOK) to non-terminated cable. 150mm/5.9"
Enphase EN4 to MC4 adaptor (long)[1]	ECA-EN4-S22-L	Longer adapter cable for EN4 (TE PV4-S SOLARLOK) to MC4. Use with split cell modules or PV modules with short DC cable. 600mm/23.6"
Replacement DC Adaptor (MC4)	Q-DCC-2	DC adaptor to MC4 (max voltage 100 VDC)
Replacement DC Adaptor (UTX)	Q-DCC-5	DC adaptor to UTX (max voltage 100 VDC)

1. Qualified per UL subject 9703.

TERMINATOR
Terminator cap for unused cable ends, sold in packs of ten (Q-TERM-10)

SEALING CAPS
Sealing caps for unused aggregator and cable connections (Q-BA-CAP-10 and Q-SEAL-10)

DISCONNECT TOOL
Plan to use at least one per installation, sold in packs of ten (Q-DISC-10)

CABLE CLIP
Used to fasten cabling to the racking or to secure looped cabling, sold in packs of one hundred (Q-CLIP-100)

To learn more about Enphase offerings, visit **enphase.com**

2020-06-26

ENPHASE.

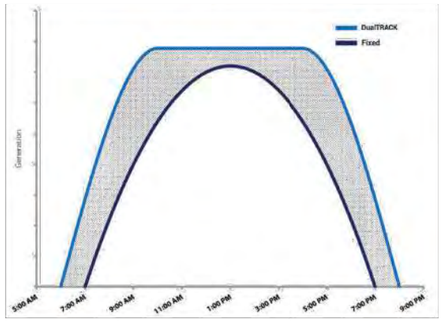
DualTrack 24

Dual Axis with Real-Time Sensing Technology

More power to you.

DualTrack 24 captures the most optimal energy for your home, thanks to our patented Real-Time Sensors (RTS) that guide our systems to the maximum point of sunlight throughout the day. This results in **30-40 percent more** power production than conventional fixed arrays.

Rating chart using a sunny day



Key features

Reliability

Contains self-healing Magnesium Alloy Coated (MAC) steel, a strong alloy that is 5-10 times stronger than galvanized steel.

Utilizes patented Real-Time Sensors for ultimate tracking, allowing **no wasted energy** during cloudy days - unlike conventional GPS input tracking systems that follow their pre-programmed path.

We provide company support during the lifetime of the tracker (Operation & Troubleshooting)

Installation Flexibility

Simple electrical Plug N' Play connection with the use of RTS technology. No pre-programming or skilled technician is required.

Can be installed on any terrain.

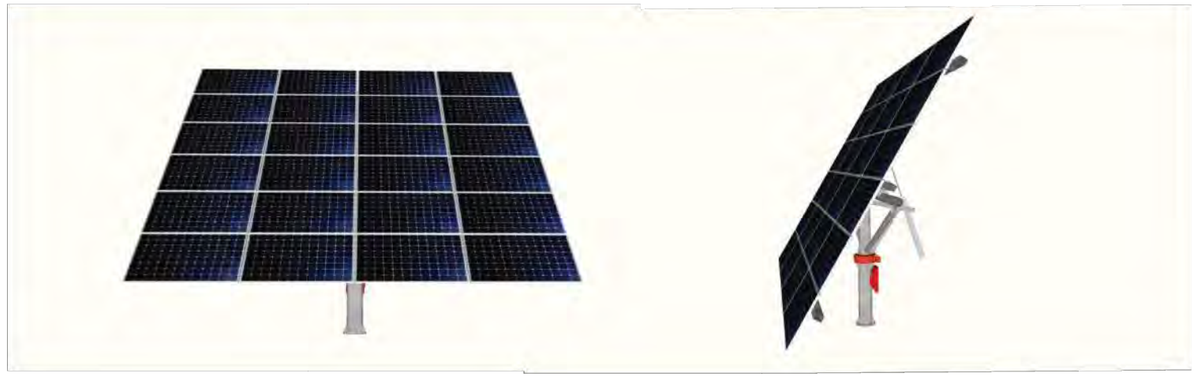
Flexible system that can accommodate any commercially available solar module.

Low Maintenance

Low voltage DC motors which require low maintenance and minimum downtime.

No skilled technician is required.

Learn more about **Real-Time Sensing**



Tracker Specifications

Tracking Type	Dual Axis
Model	DualTrack 24
Module Area (Max)*	48m² [24 modules 72-cell]
System Weight	1,500kg, without modules & foundation
Tracking Axis	Dual Axis: azimuth & vertical
Tracking Range of Motion	Azimuth: -120° to +120° Vertical: 0° to 60°
Azimuth Rotation	Slew drive
Vertical Tilt	Linear actuator
Power Supply to Controller	100-240VAC / 50 ~ 60Hz
Materials	Magnesium Alloy Coated / Hot-dip Galvanized steel
Solar Tracking Method	Real-Time Solar Sensor
Max Wind Speed	Standard 47m/s (105MPH)
Safety Mode (Automatic Horizontal)	Wind mode, Less than 3,000 lux
Safety Mode (Tilted Position)	Snow Mode
Temperature Range	-25 to 55°C (-13 to 131°F)

The above specifications could vary according to local conditions
**Module Area (Max) - Optional 60 cell modules*

Available for Residential, Commercial & Industrial use.

Sun Action Trackers

3660 Thousand Oaks, Suite 316 | San Antonio, Texas 78247
Main:844-366-7525
Email: info@sat-energy.com

www.sat-energy.com

CERTIFICATE OF COMPLIANCE

Certificate Number	20211109-E341165
Report Reference	E341165-20210317
Issue Date	2021-11-09

Issued to: Enphase Energy Inc.
1420 N. McDowell Blvd. Petaluma, CA 94954-6515

This is to certify that representative samples of Grid Support, Utility Interactive Supporting Energy Storage, Multimode, Bi-directional Microinverters

Models IQ8-60, IQ8PLUS-72, IQ8M-72, IQ8A-72, IQ8H-208-72, IQ8H-240-72, may be f/b -2, -5, -E, or -M, may be f/b -ACM, f/b -US, may be f/b -NM, may be f/b -RMA, may be f/b -&, where "&" designates additional characters.

Has been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: See Page 2

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

This *Certificate of Compliance* is provided as a courtesy to help our customers communicate product compliance information, as documented in our UL Follow-Up Services procedure. This Certificate of Compliance does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

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Bruce Mahrenholz, Director North American Certification Program

UL LLC

CERTIFICATE OF COMPLIANCE

Certificate Number	20211109-E341165
Report Reference	E341165-20210317
Issue Date	2021-11-09

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Standards for Safety:

UL 62109-1, STANDARD FOR SAFETY OF POWER CONVERTERS FOR USE IN PHOTOVOLTAIC POWER SYSTEMS - PART 1: GENERAL REQUIREMENTS, Edition 1, Revision Date 04/30/2019

IEC 62109-2, SAFETY OF POWER CONVERTERS FOR USE IN PHOTOVOLTAIC POWER SYSTEMS - PART 2: PARTICULAR REQUIREMENTS FOR INVERTERS, Edition 1, Issue Date 06/2011

UL 1741, Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources, Edition 2, Revision Date 06/10/2021, including the requirements in UL 1741 Supplement SA, sections as noted in the Technical considerations.

IEEE 1547, IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems.

IEEE 1547.1, IEEE Standard for Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems.

CSA C22.2 No. 62109-1, Safety of Power Converters for Use in Photovoltaic Power Systems - Part 1: General Requirements, Edition 1, Issue Date 07/2016

CSA C22.2 No. 62109-2, Safety of Power Converters for Use in Photovoltaic Power Systems - Part 2: Particular Requirements for Inverters, Edition 1, Issue Date 07/2016

Bruce Mahrenholz, Director North American Certification Program

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