

SYSTEM INFORMATION	
MODULE	HANWHA Q.PEAK DUO BLK ML-G10+ 400
INVERTER	ENPHASE IQ8PLUS-72-2-US
RACKING	SUNMODO EZ GRIP W/ UNIRAC NXT HORIZON 2-RAIL RACKING SYSTEM
SYSTEM SIZE (DC)	4.4 KW
LOCATION	30.1850023,-82.6080949

CLIMATIC & GEOGRAPHIC DESIGN CRITERIA TABLE R301.2(1)	
SPEED (MPH)	130
TOPOGRAPHIC EFFECTS	B
SPECIAL WIND REGION	NO
WIND BORNE DEBRIS ZONE	2
SEISMIC DESIGN CATEGORY	C
CLIMATE ZONE	2A
WIND EXPOSURE CATETORY	B

PLAN KEY	
PV-1	COVER PAGE
PV-1.1	ATTACHMENT DETAIL
PV-1.1 (2)	ATTACHMENT DETAIL CONT.
PV-2	ROOF LAYOUT
PV-3	ELECTRICAL
PV-3.1	ELECTRICAL CONT.
PV-3.2	EQUIPMENT LABELS

FBC, RESIDENTIAL 2020 TABLE R301.2.1.3 WIND SPEED CONVERSIONS <sup>a</sup>											
V <sub>ult</sub>	110	115	120	130	140	150	160	170	180	190	200
V <sub>asd</sub>	85	89	93	101	108	116	124	132	139	147	155

For SI: 1 mile per hour = 0.447 m/s.

- a. Linear interpolation is permitted.

<div><div></div><div></div></div> <div>HANWHA Q.PEAK DUO BLK ML-G10+ 400 400 WATT MODULE 74" X 41.1" X 1.26" (SEE DATASHEET)</div>
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BILL OF MATERIALS	
MODULES	11
INVERTERS	11
L-FOOT ATTACHMENT W/ SUNMODO EZ GRIP	21
171" RAILS	5
SKIRTS	0
ENPHASE COMBINER BOX	1
EATON 60A FUSIBLE AC DISCONNECT	1
35A FUSES	2
20A BACKFEED BREAKER	1

GENERAL NOTES:

THIS PV SYSTEM HAS BEEN DESIGNED TO MEET THE MINIMUM DESIGN STANDARDS FOR BUILDING AND OTHER STRUCTURES OF THE ASCE 7-16, 7TH EDITION 2020 FLORIDA RESIDENTIAL CODE, 7TH EDITION 2020 FLORIDA BUILDING CODE, 7TH EDITION 2020 FLORIDA FIRE PREVENTION CODE, NEC 2017 AND ALL LOCAL CODES & ORDINANCES.

ROOF SHALL HAVE NO MORE THAN TWO LAYERS OF COVERING IN ADDITION TO THE SOLAR EQUIPMENT.

INSTALLATION OF SOLAR EQUIPMENT SHALL BE FLUSH MOUNTED, PARALLEL TO AND NO MORE THAN 6-INCHES ABOVE THE SURFACE OF THE ROOF.

ANY PLUMBING VENTS ARE NOT TO BE CUT OR COVERED FOR SOLAR EQUIPMENT INSTALLATION. ANY RELOCATION OR MODIFICATION OF THE VENT REQUIRES A PLUMBING PERMIT AND INSPECTION.

ALL DESIGN, CALCULATIONS ARE PERFORMED BY DANIEL DUNZIK REGISTERED ARCHITECT. FLORIDA STATE STATUTE 471.003(3) PROVIDES THAT LICENSED ARCHITECTS ARE EXEMPTED FROM THE PROVISIONS OF CHAPTER 471 ENGINEERING AND NOT PRECLUDED FROM PERFORMING ENGINEERING SERVICES FOR INTEGRATED SYSTEMS AND SERVICES THAT ARE INCIDENTAL TO BUILDINGS AND STRUCTURES.

INVERTER PLACEMENT:

SYSTEM UTILIZES "ENPHASE" MICRO-INVERTERS WITH RAPID SHUTDOWN CONTROL LOCATED ON THE BACK SIDE OF EACH MODULE.

STRUCTURAL STATEMENT:

THE EXISTING STRUCTURE IS ADEQUATE TO SUPPORT THE NEW LOADS IMPOSED BY THE PHOTOVOLTAIC MODULE SYSTEM INCLUDING UPLIFT & SHEAR.EXISTING RAFTER SIZES & DIMENSIONS CONFORM TO 7TH EDITION 2020 FLORIDA RESIDENTIAL CODE

MOUNTING BRACKETS AND HARDWARE MEET OR EXCEED FLORIDA CODE REQUIREMENTS FOR THE DESIGN CRITERIA OF THE TOWN.

FSEC CERTIFICATION STATEMENT:

PER FL. STATUE 377.705 , I, MINA A. MAKAR PE# 86753, CERTIFICATE OF AUTHORIZATION #33404, AN ENGINEER LICENSED PURSUANT TO CHAPTER 471,CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE. FBC 2020



PRO CUSTOM SOLAR LLC D.B.A. MOMENTUM SOLAR  
325 HIGH STREET, METUCHEN, NJ 08840  
(732) 902-6224  
MOMENTUMSOLAR.COM

**PROFESSIONAL ENGINEERING**



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**SOLAR CONTRACTOR**  
CAMERON CHRISTENSEN  
CERTIFIED SOLAR CONTRACTOR LICENSE NUMBER: CVC57036  
MOMENTUM SOLAR  
5728 MAJOR BLVD. SUITE 307, ORLANDO FL. 32819

**CUSTOMER INFORMATION**  
MARY ALLEN - MS134140  
293 SE OAKMONT ST  
LAKE CITY, FL 32025  
(386) 965-0403

**PV SYSTEM INFORMATION**  
SYSTEM SIZE (DC ): 4.4 KW  
11 MODULES: HANWHA Q.PEAK DUO BLK ML-G10+ 400  
11 INVERTERS: ENPHASE IQ8PLUS-72-2-US

**PROJECT INFORMATION**

INITIAL	DATE: 8/29/2023	DESIGNER: KJL
REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

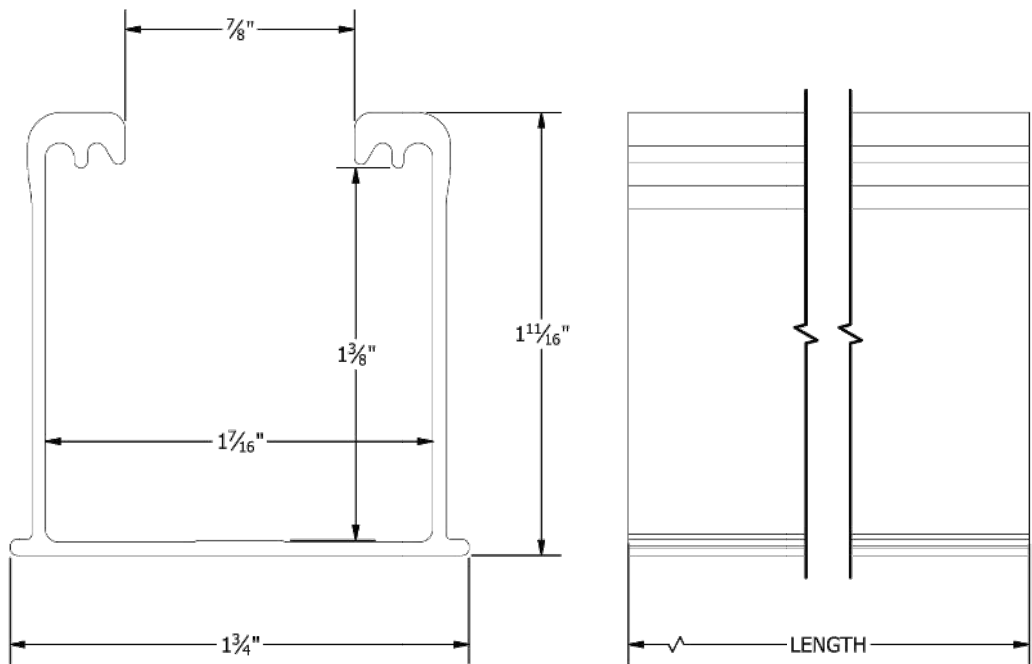
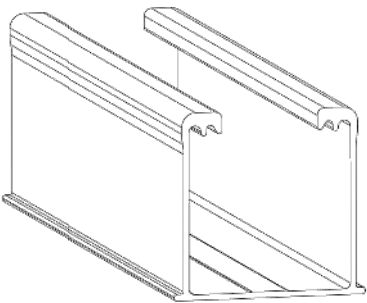
**COVER PAGE**

**PV-1**





PART # TABLE		
P/N	DESCRIPTION	LENGTH
084RLM1	NXT HORIZON RAIL 84" MILL	84"
084RLD1	NXT HORIZON RAIL 84" DARK	84"
168RLM1	NXT HORIZON RAIL 168" MILL	168"
168RLD1	NXT HORIZON RAIL 168" DARK	168"
208RLM1	NXT HORIZON RAIL 208" MILL	208"
208RLD1	NXT HORIZON RAIL 208" DARK	208"
246RLM1	NXT HORIZON RAIL 246" MILL	246"
246RLD1	NXT HORIZON RAIL 246" DARK	246"



1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
WWW.UNIRAC.COM

PRODUCT LINE:	NXT HORIZON
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	RAIL
REVISION DATE:	9/13/2021

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

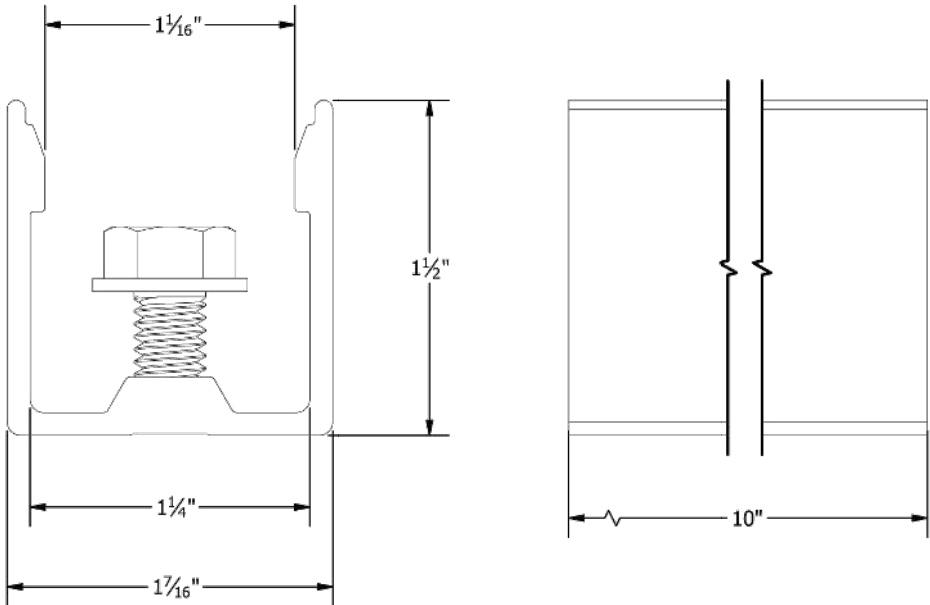
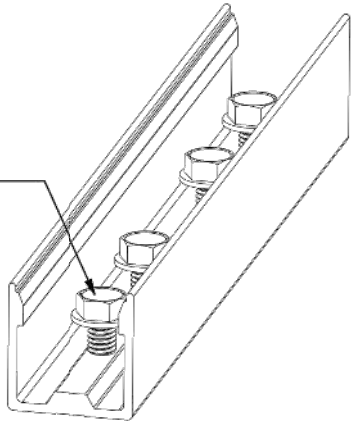
PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

NH-P01

SHEET

PART # TABLE		
P/N	DESCRIPTION	LENGTH
RLSPLCM1	NXT HORIZON RAIL SPLICE	10"

4X - 5/16"-18 x 5/8"  
HEX FLANGE SCREW - TYPE F



1411 BROADWAY BLVD. NE  
ALBUQUERQUE, NM 87102 USA  
PHONE: 505.242.6411  
WWW.UNIRAC.COM

PRODUCT LINE:	NXT HORIZON
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	RAIL SPLICE
REVISION DATE:	9/22/2021

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE  
NOMINAL

PRODUCT PROTECTED BY  
ONE OR MORE US PATENTS  
LEGAL NOTICE

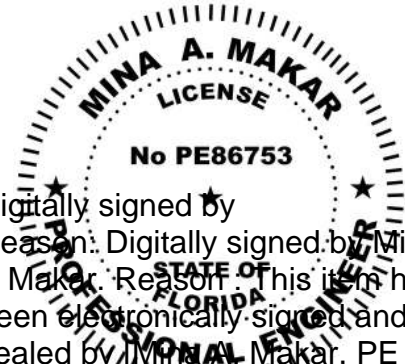
NH-P02

SHEET



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SOLAR CONTRACTOR

CAMERON CHRISTENSEN  
CERTIFIED SOLAR CONTRACTOR LICENSE NUMBER: CVC57036  
MOMENTUM SOLAR  
5728 MAJOR BLVD. SUITE 307, ORLANDO FL. 32819

CUSTOMER INFORMATION

MARY ALLEN - MS134140  
293 SE OAKMONT ST  
LAKE CITY, FL 32025  
(386) 965-0403

PV SYSTEM INFORMATION

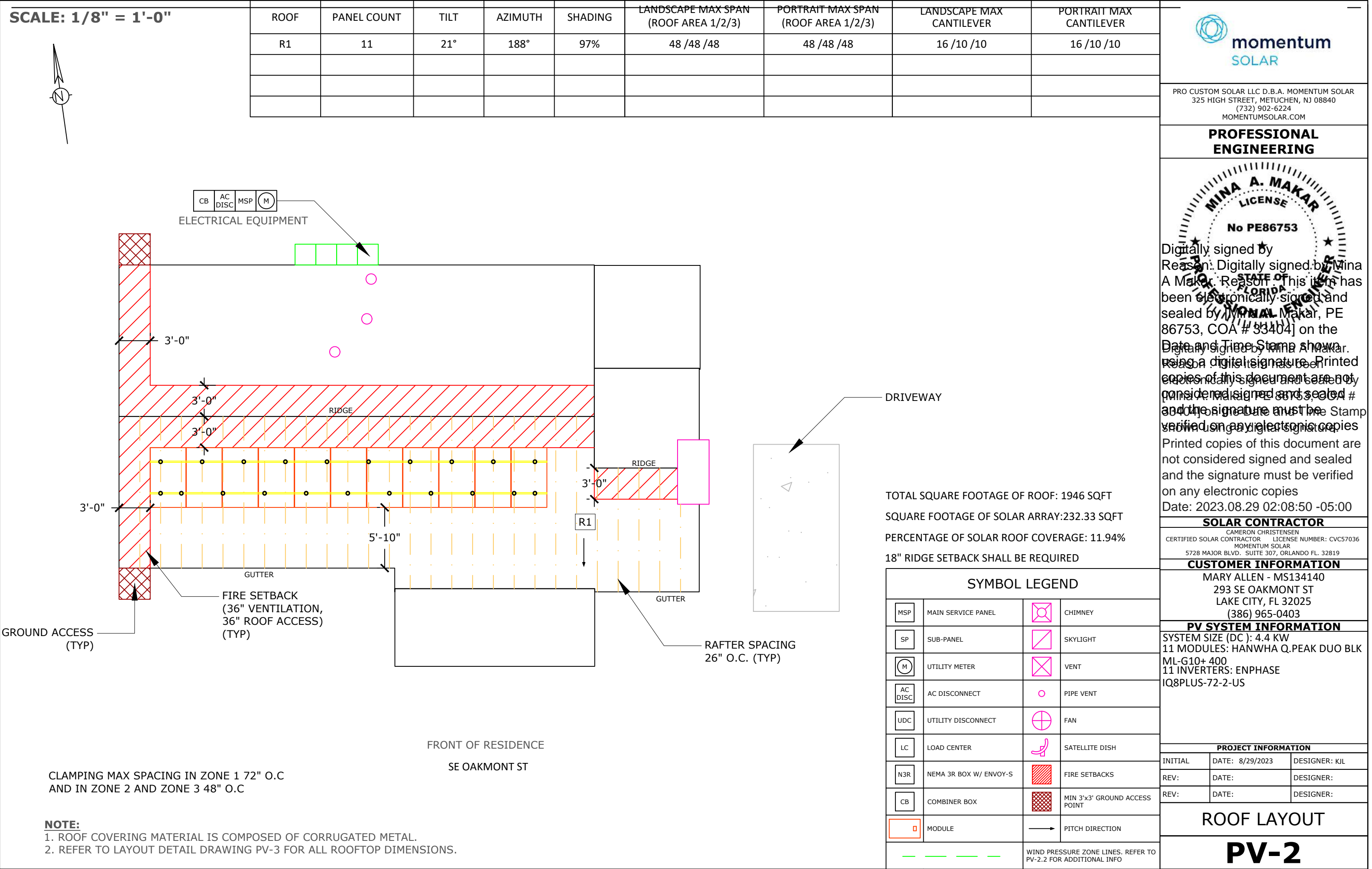
SYSTEM SIZE (DC ): 4.4 KW  
11 MODULES: HANWHA Q.PEAK DUO BLK  
ML-G10+ 400  
11 INVERTERS: ENPHASE  
IQ8PLUS-72-2-US

PROJECT INFORMATION

INITIAL	DATE: 8/29/2023	DESIGNER: KJL
REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

ATTACHMENT DETAIL

PV-1.1 (2)



PV MODULE RATINGS			INVERTER RATINGS		VOLTAGE DROP CALCULATIONS									
MODULE MAKE		HANWHA	INVERTER MAKE		ENPHASE		FORMULA USED PER NEC HANDBOOK 215.2(A)(4) WHERE APPLICABLE							
MODEL		Q.PEAK DUO BLK ML-G10+ 400	MODEL		IQ8PLUS-72-2-US		WIRE RUN	V <sub>mp</sub>	I <sub>mp</sub>	R	L (FT)	V <sub>o</sub>	% V <sub>o</sub>	WIRE SIZE
MAX POWER		400W	MAX OUTPUT POWER		290W		BRANCH TO J-BOX	240.00	13.31	1.98	72.42	3.817	1.59%	12 AWG
OPEN CIRCUIT VOLTAGE		45.3V	OPEN DC VOLTAGE		60V		J-BOX TO LOAD CENTER	240.00	13.31	1.24	50.00	1.650	0.69%	10 AWG
MPP VOLTAGE		37.13V	NOMINAL AC VOLTAGE		240V		LOAD CENTER TO AC DISCONNECT	240.00	16.6375	0.778	3.00	0.078	0.03%	08 AWG
SHORT CIRCUIT CURRENT		11.14A	MAX AC CURRENT		1.21A		AC DISCONNECT TO INTERCONNECTION	240.00	16.6375	0.778	10.00	0.259	0.11%	08 AWG
MPP CURRENT		10.77A	CEC INVERTER EFFICIENCY		97%									
NUMBER OF MODULES		11	NUMBER OF INVERTERS		11									
UL1703 COMPLIANT		YES	UL1703 COMPLIANT		YES									
SUB PANEL BREAKER SIZE		# OF MODULES	PV BREAKER PER BRANCH	THIS SOLAR PHOTOVOLTAIC SYSTEM COMPLIES WITH THE 2020 FLORIDA BUILDING CODE AND THE 2017 NATIONAL ELECTRICAL CODE										
		UP TO 16	20A											
11 HANWHA Q.PEAK DUO BLK ML-G10+ 400 400W MODULES PAIRED WITH 11 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS														
<div><div>BRANCH CIRCUIT A 11 MICRO-INVERTERS</div><div><p>TERMINATION CAP INSTALLED ON END OF CABLE</p></div></div> <p>NEC 705.12(B)(2)(3)(b) 120% RULE (1.25 x INVERTER OUTPUT) + MAIN OCPD ≤ BUS RATING x 1.20 (1.25 x 13.31) + 150 ≤ 200 x 1.20</p> <p><b>FSEC CERTIFICATION STATEMENT:</b> PER FL. STATUE 377.705 , I, MINA A. MAKAR PE# 86753, CERTIFICATE OF AUTHORIZATION #33404, AN ENGINEER LICENSED PURSUANT TO CHAPTER 471,CERTIFY THAT THE PV ELECTRICAL SYSTEM AND ELECTRICAL COMPONENTS ARE DESIGNED AND APPROVED USING THE STANDARDS CONTAINED IN THE MOST RECENT VERSION OF THE FLORIDA BUILDING CODE. FBC 2020</p> <p>NEW 200A MAIN SERVICE PANEL 240 V MAIN BREAKER: 150A</p>														
<p>Digitally signed by Reason: Digitally signed by Mina A Makar Reason: This item has been electronically signed and sealed by Mina A Makar, PE 86753, COA # 33404] on the Date and Time Stamp shown as a digital signature. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies</p> <p>Date: 2023.08.29 02:08:50 -05:00</p> <p><b>SOLAR CONTRACTOR</b> CAMERON CHRISTENSEN CERTIFIED SOLAR CONTRACTOR LICENSE NUMBER: CVC57036 MOMENTUM SOLAR 5728 MAJOR BLVD. SUITE 307, ORLANDO FL. 32819</p> <p><b>CUSTOMER INFORMATION</b> MARY ALLEN - MS134140 293 SE OAKMONT ST LAKE CITY, FL 32025 (386) 965-0403</p> <p><b>PV SYSTEM INFORMATION</b> SYSTEM SIZE (DC ): 4.4 KW 11 MODULES: HANWHA Q.PEAK DUO BLK ML-G10+ 400 11 INVERTERS: ENPHASE IQ8PLUS-72-2-US</p>														
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REV:	DATE:		DESIGNER:											
REV:	DATE:		DESIGNER:											
THREE LINE DIAGRAM														
PV-3														



### ELECTRICAL NOTES:

1. ALL CALCULATIONS FOR VOC, VMAX, IMP AND ISC HAVE BEEN CALCULATED USING THE MANUFACTURED STRING CALCULATOR BASED ON ASHRAE 2% HIGH AND EXTREME MINIMUM TEMPERATURE COEFFICIENTS.
2. THE ENTIRE ARRAY IS BONDED ACCORDING TO (NEC 690.46 - 250.120 PARAGRAPH C). THE GROUND IS CARRIED AWAY FROM THE GROUNDING LUG USING #6 BARE COPPER WIRE OR #8 THWN-2 COPPER WIRE.
3. THIS SYSTEM COMPLIES WITH NEC 2017
4. BRANCH CIRCUIT CALCULATION FOR WIRE TAG 1 DISPLAYS THE LARGEST BRANCH CIRCUIT IN SYSTEM. OTHER BRANCH CIRCUITS SHALL HAVE LOWER DESIGN CURRENT THAN THE ONE SHOWN. IN ADDITION, VOLTAGE DROP CALCULATIONS FROM PANELS TO THE COMBINER BOX SHALL BE SHOWN IN A SIMILAR FASHION
5. ALL CONDUCTORS ARE SIZED BASED ON NEC 2017 ARTICLE 310
6. ALL EQUIPMENT INSTALLED IS RATED AT 75°C
7. INVERTER NOC (NOMINAL OPEN CURRENT) OBTAINED FROM EQUIPMENT DATASHEET
8. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH ALL LOCAL AND NATIONAL CODE REQUIREMENTS.
9. EACH MODULE MUST BE GROUNDED ACCORDING TO USER INSTRUCTIONS
10. ALL EQUIPMENT SHALL BE LISTED PER NEC 690.4(B)
11. PER NEC 690.13, 690.15, PROVIDE A WARNING SIGN AT ALL LOCATIONS WHERE TERMINALS OF THE DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION> SIGN SHALL READ \*WARNING - ELECTRIC SHOCK HAZARD - DO NOT TOUCH TERMINALS - OR EQUIVALENT.
12. PER NEC 705.10, PROVIDE A PERMANENT PLAQUE OR DIRECTORY SHOWING ALL ELECTRIC POWER SOURCES ON THE PREMISES AT SERVICE ENTRANCE.
13. INTERCONNECTION METHOD SHALL COMPLY WITH NEC 705.12
14. AND OPTION FOR A SINGLE CIRCUIT BRANCH TO BE SPLIT INTO TWO SUB-CIRCUIT BRANCHES IS ACCEPTABLE.
15. ALL CONDUCTORS MUST BE COPPER.
16. NEUTRAL AND EQUIPMENT GROUNDING CONDUCTOR BONDED AS PER NEC 250.24(C).
17. EQUIPMENT GROUNDING CONDUCTOR IS CONNECTED TO A GROUNDING ELECTRODE SYSTEM PER 250.54(D).
18. FUSES FOR PV DISCONNECT HAVE AIC RATINGS OF 200KA AC AND 20KA DC.
19. SUPPLY SIDE CONNECTION SHALL BE MADE USING ILSKO INSULATION PIERCING CONNECTORS (IPC). MAKE, MODEL, AND RATING OF INTERCONNECTION CAN BE SEEN ON TABLE 1 BELOW.
20. METHOD OF INTERCONNECTION CAN BE SEEN IN FIGURE 1.
21. UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE.

22. WORKING CLEARANCES AROUND THE EXISTING AND NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED IN ACCORDANCE WITH NEC ARTICLE 110.26.
23. CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C)(1) AND ARTICLE 310.8 (D).
24. CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C).
25. TOTAL AREA OF ALL CONDUCTORS, SPLICES, AND TAPS INSTALLED AT ANY CROSS SECTION OF THE WIRING DOES NOT EXCEED 75% OF THE CROSS SECTIONAL AREA OF THE SPACE. NEC 312.8(A)(2).
26. SYSTEM IS CONSIDERED AN AC MODULE SYSTEM. NO DC CONDUCTORS ARE PRESENT IN CONDUIT, COMBINER, JUNCTION BOX, DISCONNECT. AND COMPLIES WITH 690.6 - NO DC DISCONNECT AND ASSOCIATED DC LABELING ARE REQUIRED.
27. SYSTEM COMPLIES WITH 690.12 RAPID SHUTDOWN AND ASSOCIATED LABELING AS PER 690.56(C). AC VOLTAGE AND SYSTEM OPERATING CURRENT SHALL BE PROVIDED 690.52.
28. CONDUCTORS IN CONDUIT ARE AC CONDUCTORS BRANCH CIRCUITS AND NOT PV SOURCE CIRCUITS. 690.6.
29. ALL GROUNDING SHALL COMPLY WITH 690.47(A) IN THAT THE AC MODULES WILL COMPLY WITH 250.64.
30. NO TERMINALS SHALL BE ENERGIZED IN THE OPEN POSITION IN THIS AC MODULE SYSTEM 690.13, 690.15, 690.6.
31. WHERE APPLICABLE: INTERCONNECTION SHALL COMPLY WITH 705.12(A) OR 705.12(B)
32. ALL WARNING SIGN(S) OR LABEL(S) SHALL COMPLY WITH 2017 NEC ARTICLE 110.21(B). LABEL WARNINGS SHALL ADEQUATELY WARN OF THE HAZARD. LABELS SHALL BE PERMANENTLY AFFIXED TO THE EQUIPMENT, AND LABELS REQUIRED SHALL BE SUITABLE FOR THE ENVIRONMENT.
33. PV POWER CIRCUIT LABELS SHALL APPEAR ON EVERY SECTION OF THE WIRING SYSTEM THAT IS SEPARATED BY ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

**TABLE 1:**

MAKE	MODEL	VOLTAGE RATING	CONDUCTOR RANGE MAIN	CONDUCTOR RANGE TAP
ILSCO	IPC 4006	600 V	4/0-4 AWG	6-14 AWG
ILSCO	IPC 4020	600 V	4/0-2 AWG	2/0-6 AWG

MAKE	MODEL	VOLTAGE RATING	CONDUCTOR RANGE MAIN	CONDUCTOR RANGE TAP
ILSCO	IPC 4006	600 V	4/0-4 AWG	6-14 AWG
ILSCO	IPC 4020	600 V	4/0-2 AWG	2/0-6 AWG

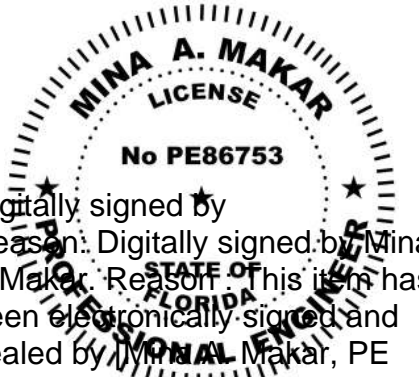
## INSTRUCTIONS FOR LINE TAPS

- FIGURE 1:
1. ADJUST THE CONNECTOR NUT TO SUITABLE LOCATION
2. PUT THE BRANCH WIRE INTO THE CAP SHEATH FULLY
3. INSERT THE MAIN WIRE, IF THERE ARE TWO LAYS OF INSULATED LAY IN THE MAIN CABLE, SHOULD STRIP A CERTAIN LENGTH OF THE FIRST INSULATED LAY FROM INSERTED END
4. TURN THE NUT BY HAND, AND FIX THE CONNECTOR IN SUITABLE LOCATION.
5. SCREW THE NUT WITH THE SLEEVE SPANNER.
6. SCREW THE NUT CONTINUALLY UNTIL THE TOP PART IS CRACKED AND DROPPED DOWN



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## ELECTRICAL CONT.

## PV-3.1

