

PV MATERIAL SUMMARY: DISTRIBUTOR		
CS6.1-54TM-460H	34	
MCI-2	12	
Tesla PW3 1707000-xx-y	1	
Tesla GW3 1841000-01-y	1	
2065063-00-X	1	
XR-10-184B	13	
XR-10-168B	10	
XR10-BOSS-01-M1	14	
UFO-CL-01-B1	50	
UFO-END-01-B1	36	
XR-LUG-03-A1	11	
4 IN QB2 (NCSN provided)	78	
GC66803 Geocel Sealant	5	
SOLADECK 0799-5B	3	
SOLAR MESH-P-8	3	
SNRAC 242-04105	54	



CLIENT INFO	
MRS JENNIFER LYNN BLACK	
479 CROSS LINK DR	
ANGIER NC 27501	

PROJECT INFO	
DC INPUT:	15.640 kW
AC OUTPUT:	11.500 kW
DOI INSPT. METHOD:	OPTION 2

**Model Energy**

300 Fayetteville St.  
#1430  
Raleigh, NC 27602  
919-274-9905  
ModelEnergy.com

P-1194



CODE REFERENCES	
NATION ELECTRICAL CODE v. 2017	
NC FIRE PROTECTION CODE v. 2018	
NC BUILDING CODE v. 2018	
NC RESIDENTIAL CODE v. 2018	
ACSE v. 7-10	

SITE CONDITIONS	
WIND SPEED:	120 MPH
RISK CATEGORY:	II
EXPOSURE:	B
SNOW:	15 PSF

SHEET INDEX	
PV-1:	COVER SHEET
PV-2:	PV STRUCTURAL
PV-3:	PV ELECTRICAL
PV-4:	PV EQUIPMENT LABELS
PV-5:	PV INSTALL GUIDE

VERSIONS		
FOR:	DESIGNER	DATE
CONSTRUCTION	MCP	8/27/2025

PV SYSTEM COVER  
PAGE

PV-1.1



NOTICE TO CONTRACTOR

All construction must comply with current NC Building Codes and is subject to field inspection and verification.

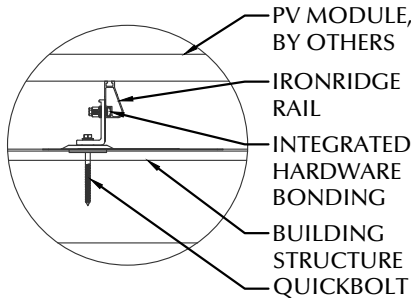
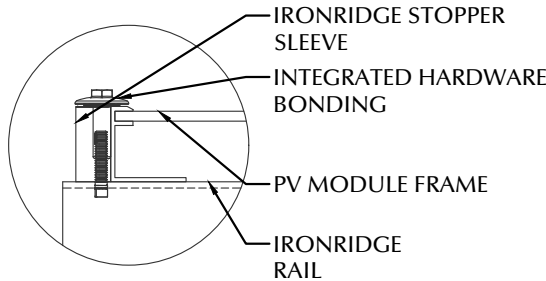
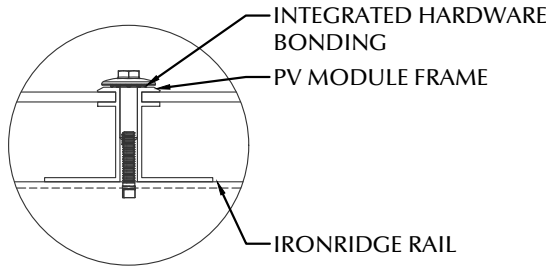
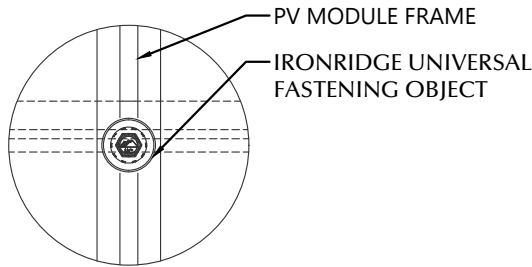
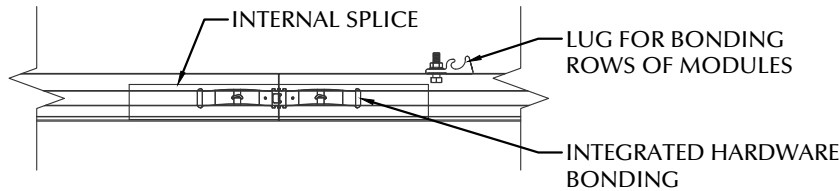
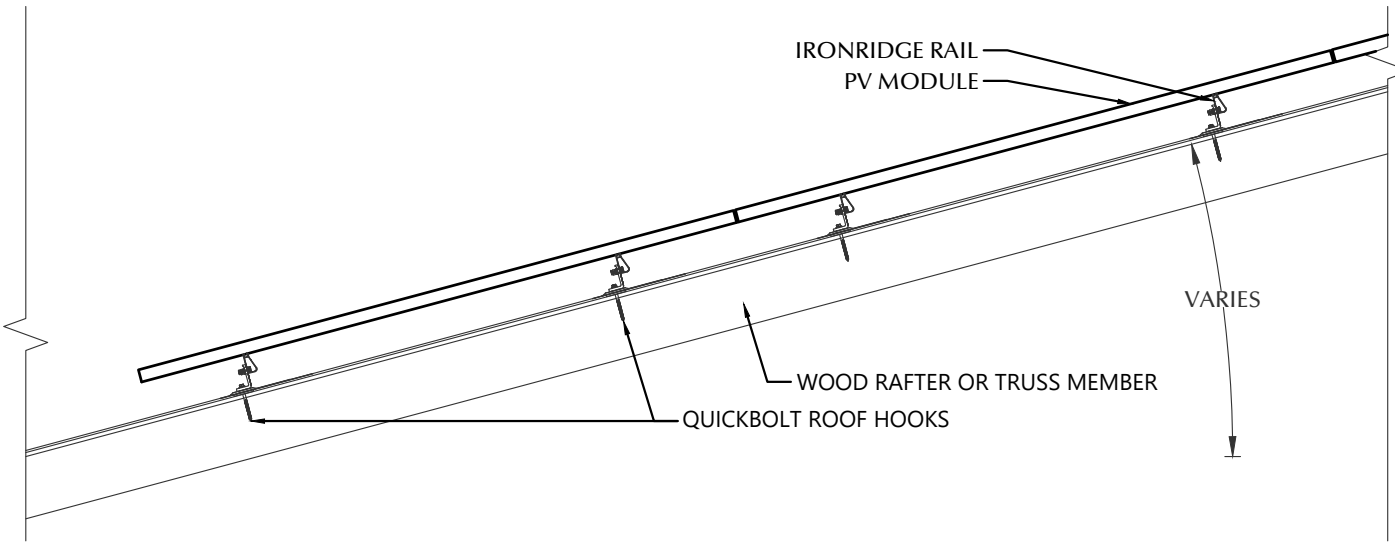
**APPROVED**

Limited building only review  
Permit holder responsible for full compliance with the code

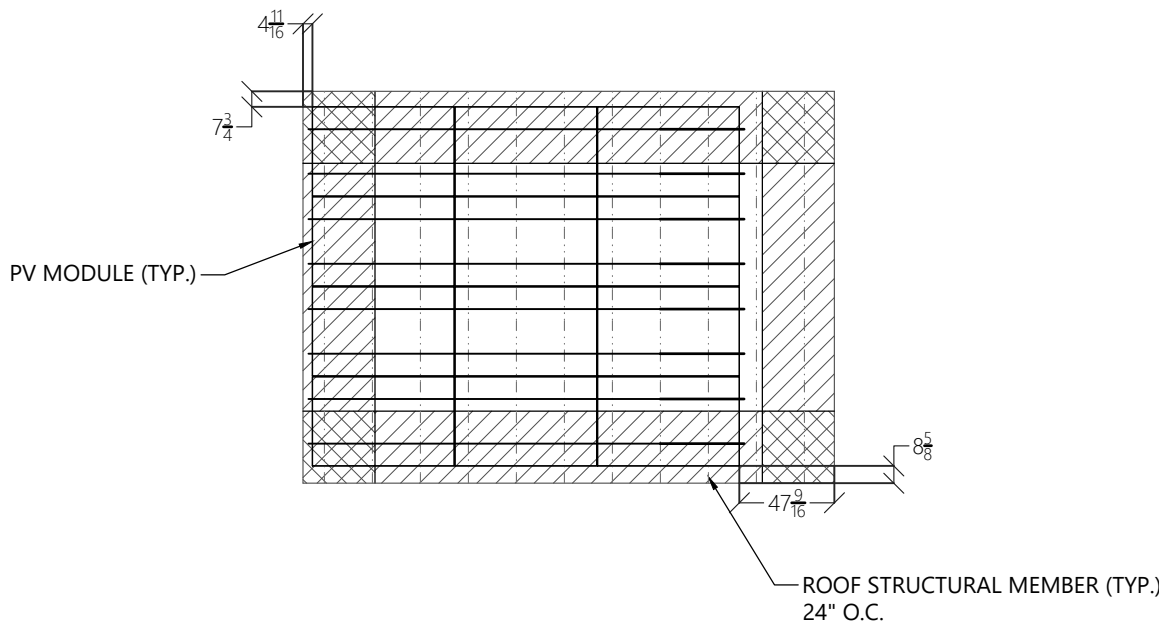
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1 ROOF FASTENER DETAIL  
NOT TO SCALE



2 ROOF A ARRAY LAYOUT  
1/8" = 1'-0"

STATEMENT OF STRUCTURAL COMPLIANCE

THE EXISTING ROOF STRUCTURE HAS BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF THE PROPOSED PV SYSTEM. IN ADDITION, THE RACKING AND FASTENING SYSTEM SHALL BE CAPABLE OF SECURING THE SYSTEM TO THE STRUCTURE UNDER DESIGN CONDITIONS WHEN INSTALLED PROPERLY AND IN ACCORDANCE WITH THE RACKING AND FASTENING ARRANGEMENT DETAILED WITHIN THESE DRAWINGS.

NAME: ANDREW W. KING, PE  
SIGNED: *Andrew W. King*

PV MODULES

MAKE	CANADIAN SOLAR
MODEL	CS6.1-54TM-460H
WIDTH	44.60 IN
LENGTH	70.90 IN
THICKNESS	35 MM
WEIGHT	50.70 LBS.
ARRAY AREA	264 SQFT.
ARRAY WEIGHT	659 LBS.

ROOF SUMMARY

STRUCTURE:	
TYPE	TRUSSES
MATERIAL	SOUTHERN PINE #2
SIZE	2 X 4
SPACING	24 IN O.C.
ALLOWABLE SPAN	88 IN
PITCH	6/12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	COMPOSITE
THICKNESS	7/16 IN
WEIGHT	1.60 LBS./SQFT
ROOFING:	
TYPE	ASPHALT SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.30 LBS./SQFT.

ROOF MOUNT SUMMARY

MAXIMUM (IN) MOUNT SPACING	RAIL OVERHANG
WIND ZONE 1	72 IN 24 IN
WIND ZONE 2	48 IN 24 IN
WIND ZONE 3	48 IN 23 IN

ROOF LOADING

GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD	20 LBS./SQFT.
DEAD LOAD	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	2.5 LBS./SQFT.
TOTAL	6.4 LBS./SQFT.
WIND LOAD:	
UPLIFT ZONE 1	-24.6 LBS./SQFT.
UPLIFT ZONE 2	-29.0 LBS./SQFT.
UPLIFT ZONE 3	-29.0 LBS./SQFT.
DOWNWARD	23.0 LBS./SQFT.
FASTENER LOAD:	
UPLIFT ZONE 1	-273 LBS.
UPLIFT ZONE 2	-215 LBS.
UPLIFT ZONE 3	-215 LBS.
DOWNWARD	255 LBS.

ROOF MOUNT & FASTENER

ROOF MOUNT:	
MAKE	QUICKBOLT
MODEL	4 IN QB2
MATERIAL	STAINLESS / EPDM
FASTENER:	
MAKE	QUICK SCREWS
MODEL	HEX LAG BOLT
MATERIAL	304 SS
SIZE	5/16" X 4" (1/2" HEX)
GENERAL:	
WEIGHT	0.65 LBS.
FASTENERS PER MOUNT	1
MAX. PULL-OUT FORCE	960.0 LBS.
SAFETY FACTOR	2
DESIGN PULL-OUT FORCE	480.0 LBS.

MOUNTING RAILS

MAKE	IRONRIDGE
MODEL	XR10
MATERIAL	ALUMINUM
WEIGHT	0.036 LBS/IN
SPACING	22 IN



CLIENT INFO

MRS JENNIFER LYNN BLACK  
479 CROSS LINK DR  
ANGIER NC 27501

PROJECT INFO

DC INPUT: 15.640 kW  
AC OUTPUT: 11.500 kW  
DOI INSPT. METHOD: OPTION 2

Model Energy

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NC BUILDING CODE v. 2018  
NC RESIDENTIAL CODE v. 2018  
ACSE v. 7-10

SITE CONDITIONS

WIND SPEED: 120 MPH  
RISK CATEGORY: II  
EXPOSURE: B  
SNOW: 15 PSF

SHEET INDEX

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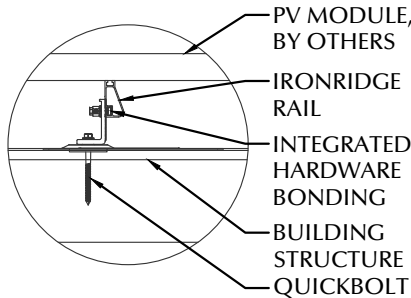
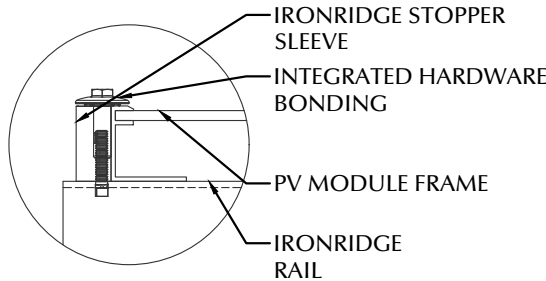
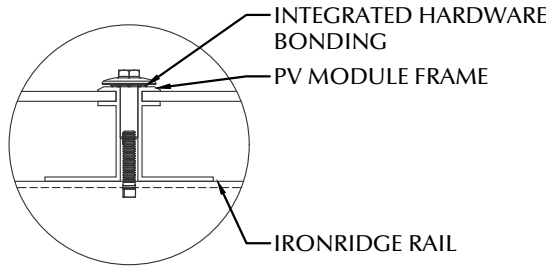
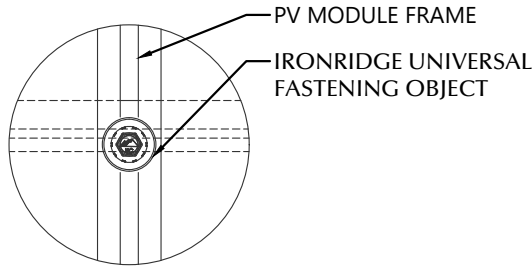
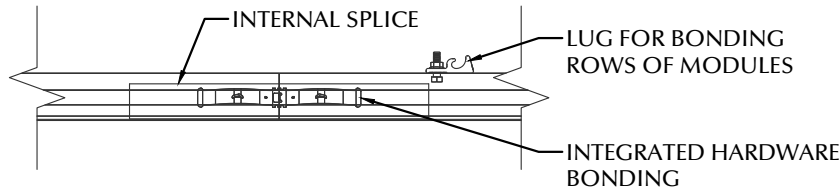
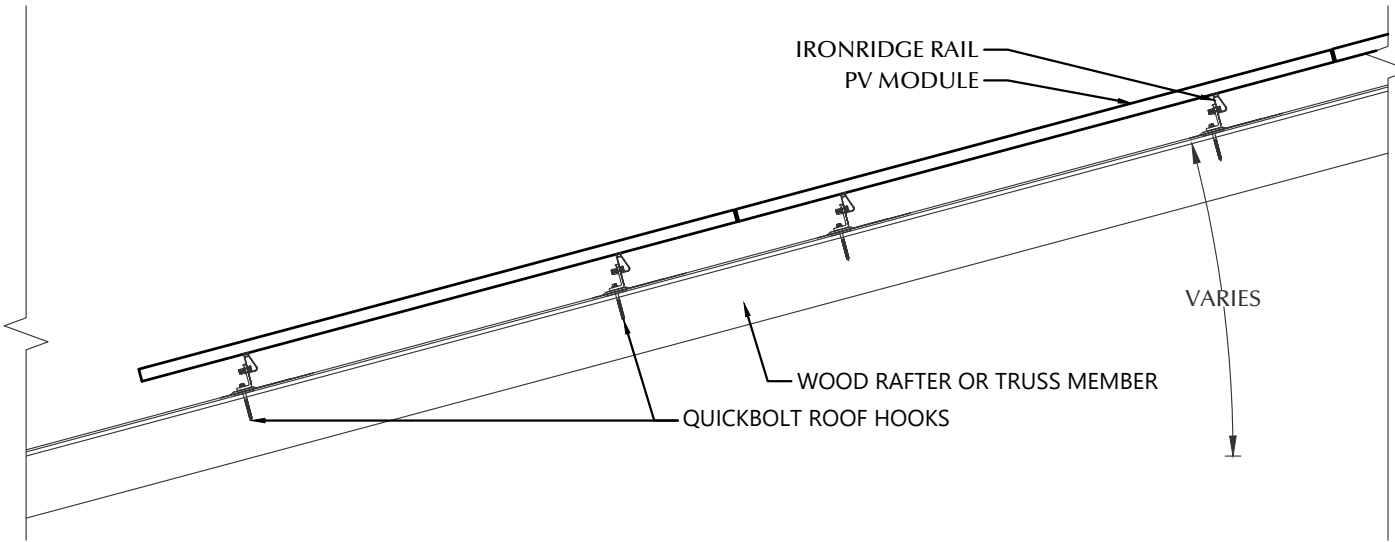
VERSIONS

FOR:	DESIGNER	DATE
CONSTRUCTION	MCP	8/27/2025

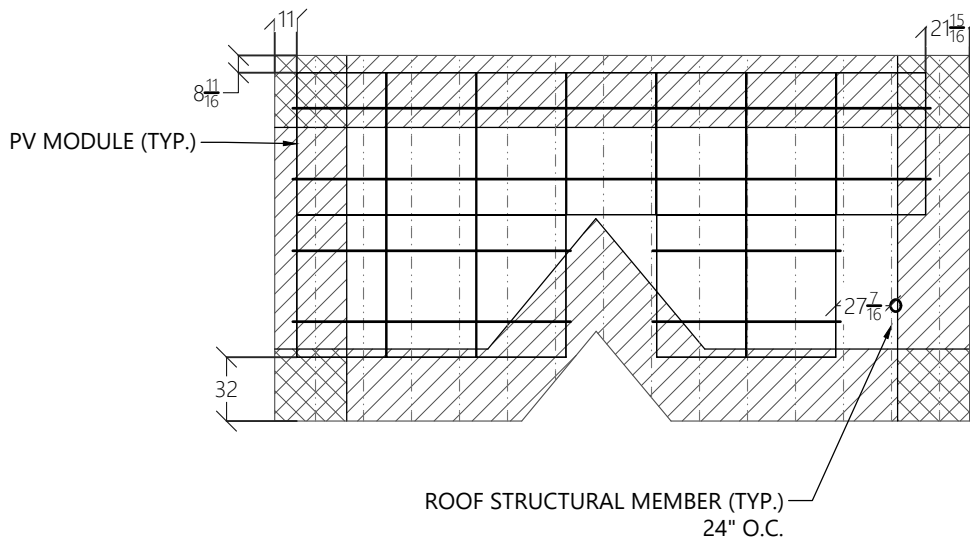
PV SYSTEM STRUCTURAL

PV-2.1

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1 ROOF FASTENER DETAIL  
NOT TO SCALE



2 ROOF B ARRAY LAYOUT  
1/8" = 1'-0"

## STATEMENT OF STRUCTURAL COMPLIANCE

THE EXISTING ROOF STRUCTURE HAS BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF THE PROPOSED PV SYSTEM. IN ADDITION, THE RACKING AND FASTENING SYSTEM SHALL BE CAPABLE OF SECURING THE SYSTEM TO THE STRUCTURE UNDER DESIGN CONDITIONS WHEN INSTALLED PROPERLY AND IN ACCORDANCE WITH THE RACKING AND FASTENING ARRANGEMENT DETAILED WITHIN THESE DRAWINGS.

NAME: ANDREW W. KING, PE

SIGNED:

## PV MODULES

MAKE	CANADIAN SOLAR
MODEL	CS6.1-54TM-460H
WIDTH	44.60 IN
LENGTH	70.90 IN
THICKNESS	35 MM
WEIGHT	50.70 LBS.
ARRAY AREA	264 SQFT.
ARRAY WEIGHT	659 LBS.

## ROOF SUMMARY

STRUCTURE:	
TYPE	TRUSSES
MATERIAL	SOUTHERN PINE #2
SIZE	2 X 4
SPACING	24 IN O.C.
ALLOWABLE SPAN	88 IN
PITCH	6/12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	COMPOSITE
THICKNESS	7/16 IN
WEIGHT	1.60 LBS./SQFT
ROOFING:	
TYPE	ASPHALT SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.30 LBS./SQFT.

## ROOF MOUNT SUMMARY

MAXIMUM (IN) MOUNT SPACING	RAIL OVERHANG
WIND ZONE 1	72 IN
WIND ZONE 2	48 IN
WIND ZONE 3	48 IN
	24 IN
	24 IN
	21 IN

## ROOF LOADING

GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD	20 LBS./SQFT.
DEAD LOAD	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	2.5 LBS./SQFT.
TOTAL	6.4 LBS./SQFT.
WIND LOAD:	
UPLIFT ZONE 1	-24.6 LBS./SQFT.
UPLIFT ZONE 2	-29.0 LBS./SQFT.
UPLIFT ZONE 3	-29.0 LBS./SQFT.
DOWNWARD	23.0 LBS./SQFT.
FASTENER LOAD:	
UPLIFT ZONE 1	-433 LBS.
UPLIFT ZONE 2	-340 LBS.
UPLIFT ZONE 3	-340 LBS.
DOWNWARD	405 LBS.

## ROOF MOUNT & FASTENER

ROOF MOUNT:	
MAKE	QUICKBOLT
MODEL	4 IN QB2
MATERIAL	STAINLESS / EPDM
FASTENER:	
MAKE	QUICK SCREWS
MODEL	HEX LAG BOLT
MATERIAL	304 SS
SIZE	5/16" X 4" (1/2" HEX)
GENERAL:	
WEIGHT	0.65 LBS.
FASTENERS PER MOUNT	1
MAX. PULL-OUT FORCE	960.0 LBS.
SAFETY FACTOR	2
DESIGN PULL-OUT FORCE	480.0 LBS.

## MOUNTING RAILS

MAKE	IRONRIDGE
MODEL	XR10
MATERIAL	ALUMINUM
WEIGHT	0.036 LBS/IN
SPACING	35 IN



## CLIENT INFO

MRS JENNIFER LYNN BLACK  
479 CROSS LINK DR  
ANGIER NC 27501

## PROJECT INFO

DC INPUT: 15.640 kW  
AC OUTPUT: 11.500 kW  
DOI INSPT. METHOD: OPTION 2

## Model Energy

300 Fayetteville St.  
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P-1194



## CODE REFERENCES

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NC RESIDENTIAL CODE v. 2018  
ACSE v. 7-10

## SITE CONDITIONS

WIND SPEED: 120 MPH  
RISK CATEGORY: II  
EXPOSURE: B  
SNOW: 15 PSF

## SHEET INDEX

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## VERSIONS

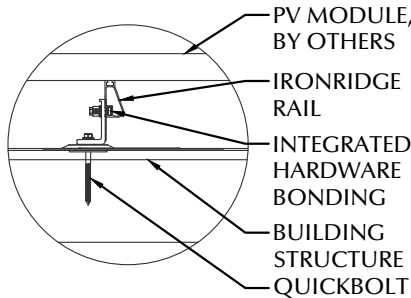
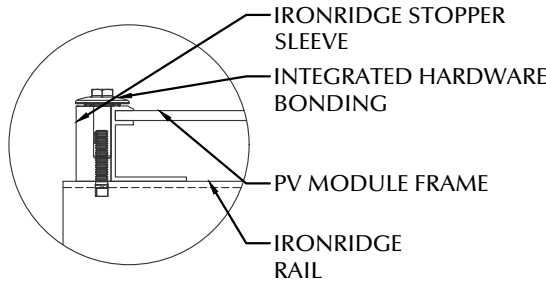
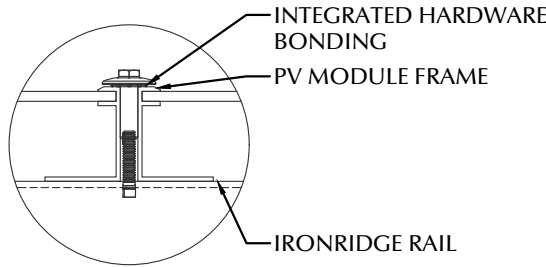
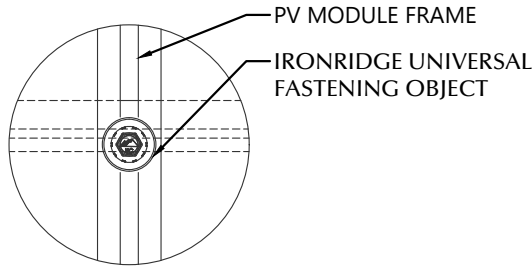
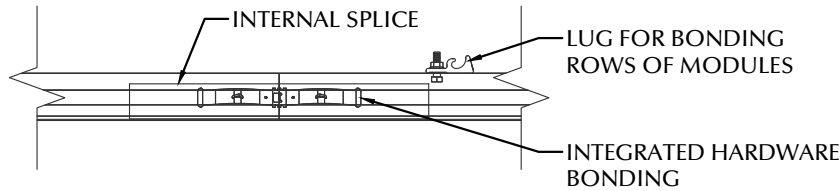
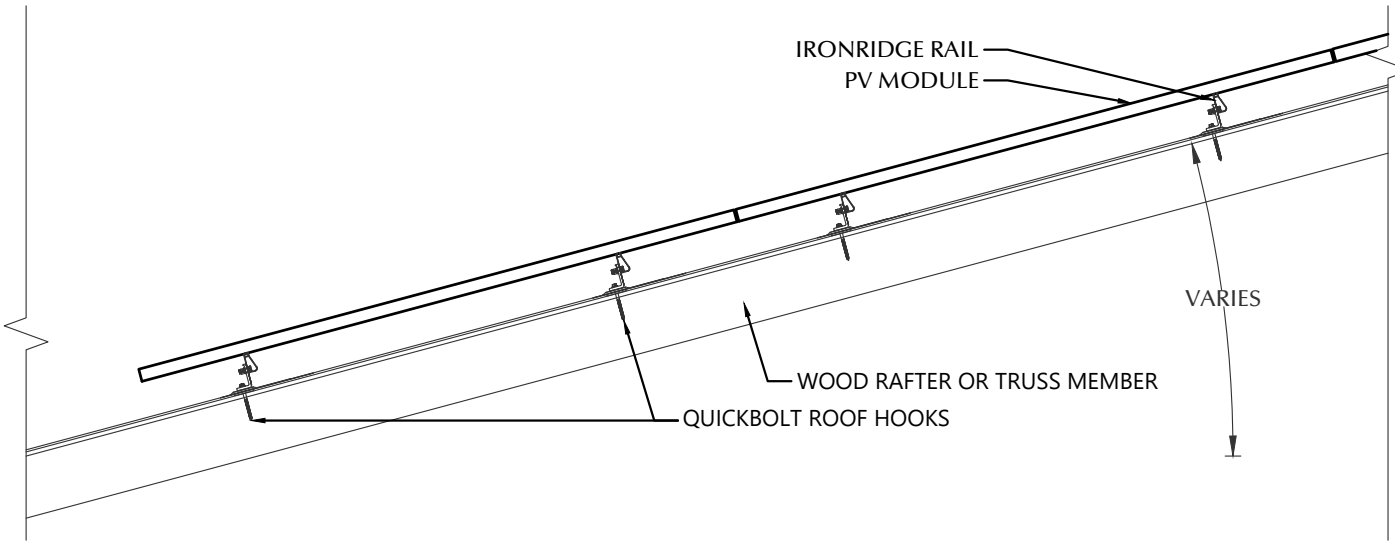
FOR:	DESIGNER	DATE
CONSTRUCTION	MCP	8/27/2025

## PV SYSTEM STRUCTURAL

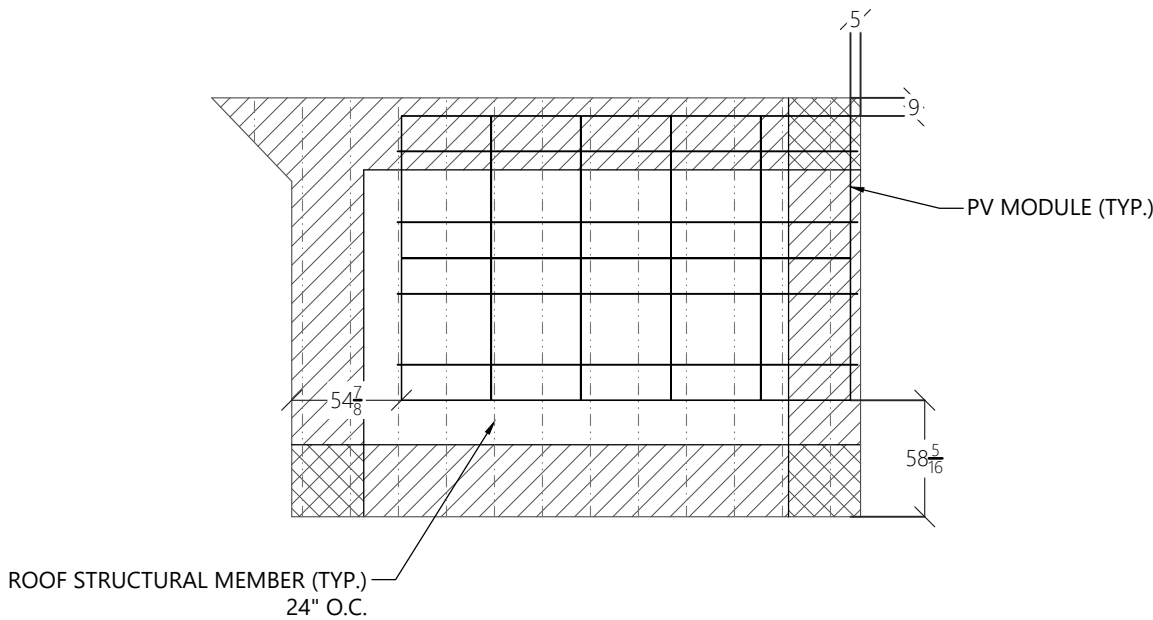
# PV-2.2



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1 ROOF FASTENER DETAIL  
NOT TO SCALE



2 ROOF C ARRAY LAYOUT  
1/8" = 1'-0"

## STATEMENT OF STRUCTURAL COMPLIANCE

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NAME: ANDREW W. KING, PE

SIGNED:

## PV MODULES

MAKE	CANADIAN SOLAR
MODEL	CS6.1-54TM-460H
WIDTH	44.60 IN
LENGTH	70.90 IN
THICKNESS	35 MM
WEIGHT	50.70 LBS.
ARRAY AREA	220 SQFT.
ARRAY WEIGHT	549 LBS.

## ROOF SUMMARY

STRUCTURE:	
TYPE	TRUSSES
MATERIAL	SOUTHERN PINE #2
SIZE	2 X 4
SPACING	24 IN O.C.
ALLOWABLE SPAN	88 IN
PITCH	6/12
DENSITY	30 LBS./CU.FT.
DECKING:	
TYPE	OSB
MATERIAL	COMPOSITE
THICKNESS	7/16 IN
WEIGHT	1.60 LBS./SQFT
ROOFING:	
TYPE	ASPHALT SHINGLE
MATERIAL	ASPHALT
WEIGHT	2.30 LBS./SQFT.

## ROOF MOUNT SUMMARY

MAXIMUM (IN) MOUNT SPACING	RAIL OVERHANG
WIND ZONE 1	72 IN
WIND ZONE 2	48 IN
WIND ZONE 3	48 IN
	24 IN
	24 IN
	21 IN

## ROOF LOADING

GROUND SNOW LOAD:	15 LBS./SQFT.
LIVE LOAD	20 LBS./SQFT.
DEAD LOAD	
ROOFING	3.9 LBS./SQFT.
PV ARRAY	2.5 LBS./SQFT.
TOTAL	6.4 LBS./SQFT.
WIND LOAD:	
UPLIFT ZONE 1	-24.6 LBS./SQFT.
UPLIFT ZONE 2	-29.0 LBS./SQFT.
UPLIFT ZONE 3	-29.0 LBS./SQFT.
DOWNWARD	23.0 LBS./SQFT.
FASTENER LOAD:	
UPLIFT ZONE 1	-433 LBS.
UPLIFT ZONE 2	-340 LBS.
UPLIFT ZONE 3	-340 LBS.
DOWNWARD	405 LBS.

## ROOF MOUNT & FASTENER

ROOF MOUNT:	
MAKE	QUICKBOLT
MODEL	4 IN QB2
MATERIAL	STAINLESS / EPDM
FASTENER:	
MAKE	QUICK SCREWS
MODEL	HEX LAG BOLT
MATERIAL	304 SS
SIZE	5/16" X 4" (1/2" HEX)
GENERAL:	
WEIGHT	0.65 LBS.
FASTENERS PER MOUNT	1
MAX. PULL-OUT FORCE	960.0 LBS.
SAFETY FACTOR	2
DESIGN PULL-OUT FORCE	480.0 LBS.

## MOUNTING RAILS

MAKE	IRONRIDGE
MODEL	XR10
MATERIAL	ALUMINUM
WEIGHT	0.036 LBS/IN
SPACING	35 IN



## CLIENT INFO

MRS JENNIFER LYNN BLACK  
479 CROSS LINK DR  
ANGIER NC 27501

## PROJECT INFO

DC INPUT: 15.640 kW  
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## SITE CONDITIONS

WIND SPEED: 120 MPH  
RISK CATEGORY: II  
EXPOSURE: B  
SNOW: 15 PSF

## SHEET INDEX

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## VERSIONS

FOR:	DESIGNER	DATE
CONSTRUCTION	MCP	8/27/2025

## PV SYSTEM STRUCTURAL

# PV-2.3

CONDUCTOR SCHEDULE										
TAG	CURRENT CARRYING CONDUCTORS			GROUNDING CONDUCTORS			CONDUIT/RACEWAY			NOTES
	QTY.	SIZE	INSULATION	QTY.	SIZE	INSULATION	QTY.	SIZE	LOCATION	
C1	6	10 AWG	PV WIRE	1	6 AWG	BARE	-	-	FREE AIR	1,5
C2	6	10 AWG	THWN-2	1	10 AWG	THWN-2	1	3/4"	EXT/INT	2,4,5
C3	3	6 AWG	THWN-2	1	10 AWG	THWN-2	1	1"	EXTERIOR	2,4,5
C4	3	4/0 AWG ALUMINUM	XHHW	1	6 AWG	THWN-2/BARE	1	2"	EXT/INT	2,4,5,6
C5	3	4/0 AWG ALUMINUM	XHHW	-	-	-	1	2"	EXTERIOR	2,4,5
XC	-	-	-	-	-	-	-	-	-	3

NOTES:

- MANUFACTURER PROVIDED, UL LISTED WIRING HARNESS FOR USE ON EXPOSED ROOFS
- CONDUIT SIZE SHOWN IS CODE MINIMUM. LARGER SIZES ARE ALLOWED.
- EXISTING CONDUCTORS, FIELD VERIFY
- EQUIPMENT TERMINAL RATING SHALL BE A MINIMUM OF 75°C AT BOTH END OF CONDUCTOR
- PLEASE REFERENCE NOTES ON PV-4.1 FOR ADDITIONAL DETAIL
- SERVICE & FEEDER GROUNDED CONDUCTORS MAY BE SIZED SMALLER THAN UNGROUNDED CONDUCTORS PER NEC 310.15(B)(7)

ENERGY MANAGEMENT	
MAKE	TESLA
MODEL	BACKUP GATEWAY 3
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
DISCONNECT CURR.	200 AMPS
UL LIST. (Y/N)	YES
MAIN BREAKER (Y/N)	YES
MAIN BREAKER RATING	200 AMPS

- TROUGH MAY BE USED IF NECESSARY
- INSTALL MAIN BREAKER THAT WILL SERVE AS THE NEW SERVICE DISCONNECT SWITCH
- INSTALL BONDING JUMPER FROM NEUTRAL TO GROUND
- FEED BACKED-UP LOADS PANEL VIA BACKUP LUGS
- LAND POWERWALL 3 ON BREAKER IN EXISTING GATEWAY INTERNAL PANELBOARD

PV MODULE	
MAKE	CANADIAN SOLAR
MODEL	CS6.1-54TM-460H
NOM. POWER (PNOM)	460 WATTS
NOM. VOLT. (VMPP)	33.4 VOLTS
O.C. VOLT (VOC)	39.3 VOLTS
MAX. SYS. VOLT.	1000 VOLTS
NOM. CURR. (IMPP)	13.8 AMPS
S.C. CURR. (ISC)	14.7 AMPS
TEMP. COEF. (PMPP)	-0.29 %/C
TEMP. COEF. (Voc)	-0.25 %/C
MAX SERIES FUSE	25 AMPS
UL COMPLIANT (Y/N)	YES

MAX. DC VOLTAGE CALCULATION	
$V_{OC}MAX = V_{OC} * (1 + (TMIN - TSTC) * (VTC / 100))$	
$V_{OC}MAX$	42.46
MAX STRING VOLTAGE	509.5

MAX. DC CURRENT CALCULATION	
$I_{SC}MAX = I_{SC} * TCX$	
$I_{SC}MAX$ (AMPS)	18.36

MID-CIRCUIT INTERRUPTER	
MAKE	TESLA
MODEL	MCI-2
ENCL. RATING	NEMA 4X / IP65
DC INPUT:	
CONNECTOR TYPE	MC4
MAX IN-LINE PV MODULES	3
MAX MCI PER STRING	5
MAX. SYSTEM VOLTAGE	1000 VOLTS
NOM. CURRENT (Imp)	15.00 AMPS
MAX. CURRENT (Isc)	19.00 AMPS
RSD COMPLIANT (Y/N)	YES
UL COMPLIANT (Y/N)	YES

JUNCTION BOX	
MAKE	SOLADECK
MODEL	0799-5B
PROTECT. RATING	NEMA TYPE 3R
UL LIST. (Y/N)	YES

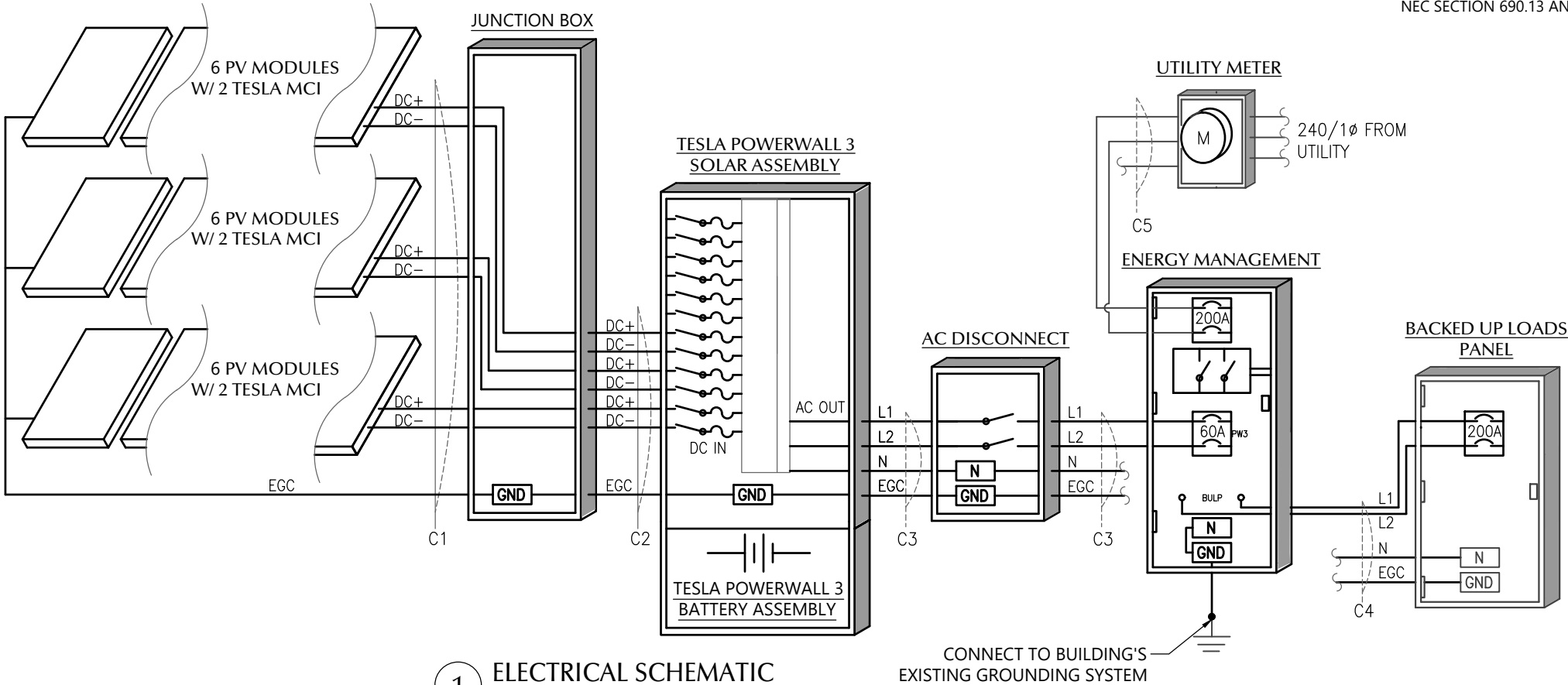
EX. BACKED-UP LOADS PANEL	
MAKE	SIEMENS
MODEL	G3040MB1200CU
ENCL. RATING	NEMA TYPE 1
VOLT. RATING	240
BUS RATING	200 AMPS
UL LIST. (Y/N)	YES
MAIN BREAKER (Y/N)	YES
MAIN BREAKER RATING	200 AMPS

DC/AC INVERTER & BATTERY	
MAKE	TESLA POWERWALL 3
MODEL	1707000-XX-Y
INVERTER INFO:	
DC INPUT:	
MAX POWER	20000 WATTS
INPUT VOLT. RANGE	60-550 VOLTS
MPPT VOLT. RANGE	60-480 VOLTS
MAX. MPPT CUR.	13 AMPS
STRING INPUTS	6 MPPTs
AC OUTPUT:	
MAX. CONT. POWER	11500 WATTS
NOM. VOLT.	240 VOLTS
MAX. CONT. CURRENT	48.00 AMPS
RAPID SHUTDOWN (Y/N)	YES
PROTECT. RATING	NEMA TYPE 3R
BATTERY INFO:	
USABLE ENERGY	13.5 kWh
NOM. VOLT.	240 VOLTS
MAX. CONT. CHARGE	5000 WATTS
UL LIST. (Y/N)	YES

AC DISCONNECT	
MAKE	GENERIC
MODEL	NA
ENCL. RATING	NEMA 3R
VOLT. RATING	240 VOLTS
AMP RATING	60 AMPS
UL LIST. (Y/N)	YES
FUSED (Y/N)	NO
FUSE RATING	N/A

- RE-FEED BACKED-UP LOADS PANEL VIA GATEWAY OUTPUTS
- REMOVE N/G BOND IN BACKED-UP LOADS PANEL ONLY

- LOAD-BREAK RATED
- VISIBLE OPEN
- LOCKABLE IN OPEN POSITION
- INSTALL ADJACENT TO METER
- DISCONNECT TO BE READILY ACCESSIBLE TO UTILITY COMPANY PERSONNEL AT ALL TIMES
- DISCONNECT MARKED AND RATED PER NEC SECTION 690.13 AND 705.10



1 ELECTRICAL SCHEMATIC  
NTS



CLIENT INFO  
MRS JENNIFER LYNN BLACK  
479 CROSS LINK DR  
ANGIER NC 27501

PROJECT INFO  
DC INPUT: 15.640 kW  
AC OUTPUT: 11.500 kW  
DOI INSPT. METHOD: OPTION 2

Model Energy  
300 Fayetteville St.  
#1430  
Raleigh, NC 27602  
919-274-9905  
ModelEnergy.com  
P-1194



CODE REFERENCES  
NATION ELECTRICAL CODE v. 2017  
NC FIRE PROTECTION CODE v. 2018  
NC BUILDING CODE v. 2018  
NC RESIDENTIAL CODE v. 2018  
ACSE v. 7-10

SITE CONDITIONS  
WIND SPEED: 120 MPH  
RISK CATEGORY: II  
EXPOSURE: B  
SNOW: 15 PSF

SHEET INDEX  
PV-1: COVER SHEET  
PV-2: PV STRUCTURAL  
PV-3: PV ELECTRICAL  
PV-4: PV EQUIPMENT LABELS  
PV-5: PV INSTALL GUIDE

VERSIONS  
FOR: DESIGNER DATE  
CONSTRUCTION MCP 8/27/2025

PV SYSTEM  
ELECTRICAL

PV-3.1



WARNING: PHOTOVOLTAIC  
POWER SOURCE

NEC 690.31 (G)(3)&(4)  
PLACE ON ALL JUNCTION BOXES, EXPOSED RACEWAYS, AND OTHER  
WIRING METHODS EVERY 10' AND ON EVERY SECTION SEPARATED BY  
ENCLOSURES, WALLS, PARTITIONS, CEILINGS, OR FLOORS.

RAPID SHUTDOWN  
SWITCH FOR  
SOLAR PV SYSTEM

NEC 690.56 (C)(3)  
PLACE ON RAPID SHUTDOWN SWITCH OR EQUIPMENT  
WITH INTEGRATED RAPID SHUTDOWN \*REFLECTIVE\*

PV SYSTEM  
DISCONNECT

NEC 690.13 (B)  
PLACE ON PV SYSTEM DISCONNECTING MEANS.

DIRECT CURRENT  
PHOTOVOLTAIC POWER SOURCE

MAXIMUM VOLTAGE 600 VDC  
MAX CIRCUIT CURRENT 55.08 AMPS

NEC 690.53  
PLACE ON ALL DC DISCONNECTING MEANS

PHOTOVOLTAIC SYSTEM  
AC DISCONNECT

OPERATING VOLTAGE 240 VOLTS  
OPERATING CURRENT 48.0 AMPS

NEC 690.54  
PLACE ON INTERCONNECTION  
DISCONNECTING MEANS

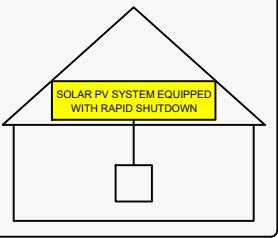
WARNING

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

NEC 705.12 (B)(2)(3)(c)

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



NEC 690.56 (C)(1)(a)  
PLACE WITHIN 3FT OF SERVICE DISCONNECTING MEANS TO  
WHICH THE PV SYSTEMS ARE CONNECTED AND SHALL  
INDICATE THE LOCATIONS OF RAPID SHUTDOWN SWITCHES

WARNING

THREE POWER SOURCES

SOURCES: UTILITY GRID, BATTERY  
AND PV SOLAR ELECTRIC SYSTEM

NEC 705.12(B)(3)  
PLACE ON ALL EQUIPMENT THAT IS SUPPLIED  
BY THREE POWER SOURCES

SERVICE DISCONNECT LOCATED:

PV/BATTERY DISCONNECT LOCATED:

NEC 705.10  
PLACE AT SERVICE EQUIPMENT AND  
PV SYSTEM DISCONNECTING MEANS.

LABEL NOTES:

1. LABELS SHOWN ARE NOT TO SCALE.
2. LABEL MATERIAL SHALL BE SUITABLE FOR THE EQUIPMENT ENVIRONMENT.
3. DC CONDUIT SHALL BE MARKED WITH REQUIRED LABEL EVERY 10 FEET.
4. PHOTOVOLTAIC SYSTEMS SHALL BE PERMANENTLY MARKED AT VARIOUS EQUIPMENT LOCATIONS TO IDENTIFY THAT A PHOTOVOLTAIC SYSTEM IS INSTALLED AND THAT VARIOUS DANGERS ARE PRESENT.
5. EACH PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS SHALL BE PERMANENTLY MARKED TO IDENTIFY IT AS A PHOTOVOLTAIC SYSTEM DISCONNECT.
6. WHERE ALL TERMINALS OF A DISCONNECTING MEANS MAY BE ENERGIZED IN THE OPEN POSITION, A WARNING SIGN SHALL BE MOUNTED ON OR ADJACENT TO THE DISCONNECT.
7. A PERMANENT LABEL FOR THE DIRECT-CURRENT PHOTOVOLTAIC POWER SOURCE SHALL BE PROVIDED AT THE DC DISCONNECT MEANS.
8. A PERMANENT PLAQUE OR DIRECTORY, DENOTING ALL ELECTRIC POWER SOURCES SERVING THE PREMISES, SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION AND AT LOCATIONS OF ALL POWER PRODUCTION SOURCES.
9. LABELS WILL BE APPLIED IN ACCORDANCE WITH THE NEC. SOME LABELS SHOWN MAY NOT BE NECESSARY.

WIRING NOTES:

1. CONDUCTORS SHALL BE COPPER OR ALUMINUM, RATED AT NOT LESS THAN 600 VOLTS
2. MINIMUM SIZE SHALL BE #14 AWG UNLESS OTHERWISE NOTED ON THE DRAWINGS.
3. EXPOSED WIRING CONDUCTOR INSULATION SHALL BE TYPE PV WIRE, USE-2, OR RHW-2 WHERE THE OUTER LAYER OF THE INSULATION IS UV, SUNLIGHT, AND MOISTURE RESISTANT. CABLE ASSEMBLIES SHALL BE TYPE DG. BARE CONDUCTORS SHALL BE A MINIMUM OF #6 AWG.
4. EXTERIOR WIRING CONDUCTOR INSULATION SHALL BE TYPE THWN-2 AND INSTALLED IN ELECTRICAL METALLIC TUBING(EMT), RIGID POLYVINYL CHLORIDE CONDUIT(PVC), RIGID METALLIC CONDUIT (RMC), LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT (LFMC), OR LIQUIDTIGHT FLEXIBLE NON METALLIX CONDUIT (LFNC). SE-TYPE CABLE CAN BE USED AS AN ALTERNATIVE. ADDITIONAL WIRING METHODS SHALL BE PERMITTED ONLY WHEN IN COMPLIANCE WITH ALL NEC REQUIREMENTS.
5. INTERIOR WIRING CONDUCTOR INSULATION SHALL BE TYPE THWN-2 OR XHHW AND INSTALLED IN ELECTRICAL METALLIC TUBING (EMT), FLEXIBLE METAL CONDUIT(FMC), LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC), LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC). TYPE SE, NM, AND MC CABLE ASSEMBLIES SHALL ALSO BE PERMITTED. ADDITIONAL WIRING METHODS SHALL BE PERMITTED ONLY WHEN IN COMPLIANCE WITH ALL NEC REQUIREMENTS.
6. BURIED WIRING CONDUCTOR INSULATION SHALL BE RATED FOR DIRECT BURIAL WHEN INSTALLED OUTSIDE OF RACEWAY. CONDUCTOR INSULATION SHALL BE TYPE THWN-2 OR XHHW AND INSTALLED IN RIGID PVC, RIGID METALLIC CONDUIT, OR HDPE. ADDITIONAL WIRING METHODS SHALL BE PERMITTED ONLY WHEN IN COMPLIANCE WITH ALL NEC REQUIREMENTS.
7. USE SCHEDULE 40 PVC OUTDOORS WHERE NOT SUBJECT TO PHYSICAL DAMAGE OR BELOW FLOOR SLAB. USE SCHEDULE 80 PVC OUTDOORS WHERE SUBJECT TO PHYSICAL DAMAGE
8. MINIMUM CONDUIT SIZE TO BE 1/2".
9. WIRING METHODS TO CONFORM TO CHAPTER 3 OF THE NEC.

CONSTRUCTION NOTES:

1. ALL WORK IS TO BE PERFORMED IN ACCORDANCE WITH THE NEC, STATE, AND LOCAL APPLICABLE CODES.
2. FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS, BEST PRACTICES, AND SPECIFICATIONS.
3. ENSURE REQUIRED MAINTENANCE ACCESS AND CLEARANCES ARE
4. FUSES 0 - 600 AMPS SHALL BE UL CLASS "RK-1" LOW PEAK DUAL ELEMENT TIME DELAY WITH 200,000 AMPERE INTERRUPTING RATING A, UNLESS NOTED OTHERWISE.
5. ALL TERMINALS, SPLICING CONNECTORS, LUGS, ETC SHALL BE IDENTIFIED FOR USE WITH THE MATERIAL (CU/AL) OF THE CONDUCTOR AND SHALL BE PROPERLY INSTALLED.
6. ALL PENETRATIONS THROUGH EXTERIOR ROOFS SHALL BE FLASHED IN A WATERPROOF MANNER.
7. ALL PENETRATIONS THROUGH ATTIC FIRE BARRIERS SHALL BE SEALED WITH FIRE-BARRIER SEALANT CAULK.
8. SUPPORT ALL CONDUIT AND EQUIPMENT IN ACCORDANCE W/ NEC. ANY SUSPENDED MATERIALS SHALL BE DIRECTLY SUPPORTED BY THE BUILDING STRUCTURE.
9. A NORTH CAROLINA REGISTERED DESIGN PROFESSIONAL WILL BE REQUIRED TO SEAL THE STRUCTURAL DESIGN AT THE TIME OF PERMIT APPLICATION IF ANY OF THE FOLLOWING EXIST AND ARE ATTESTED TO BY THE APPLICANT:
  - THE WEIGHT OF THE PV SYSTEM EXCEEDS THREE (3) POUNDS PER SQUARE FOOT(PSF)
  - THE ROOF POSSESSES MORE THAN ONE (1) LAYER OF ASPHALT SHINGLES
  - THE ROOFING MATERIAL CONSISTS OF A TYPE OTHER THAN ASPHALT SHINGLES OR METAL
  - THE ROOF IS LOCATED IN A 140 MPH OR GREATER WIND ZONE



CLIENT INFO

MRS JENNIFER LYNN BLACK  
479 CROSS LINK DR  
ANGIER NC 27501

PROJECT INFO

DC INPUT: 15.640 kW  
AC OUTPUT: 11.500 kW  
DOI INSP.T. METHOD: OPTION 2

Model Energy

300 Fayetteville St.  
#1430  
Raleigh, NC 27602  
919-274-9905  
ModelEnergy.com

P-1194



CODE REFERENCES

NATION ELECTRICAL CODE v. 2017  
NC FIRE PROTECTION CODE v. 2018  
NC BUILDING CODE v. 2018  
NC RESIDENTIAL CODE v. 2018  
ACSE v. 7-10

SITE CONDITIONS

WIND SPEED: 120 MPH  
RISK CATEGORY: II  
EXPOSURE: B  
SNOW: 15 PSF

SHEET INDEX

PV-1: COVER SHEET  
PV-2: PV STRUCTURAL  
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PV-5: PV INSTALL GUIDE

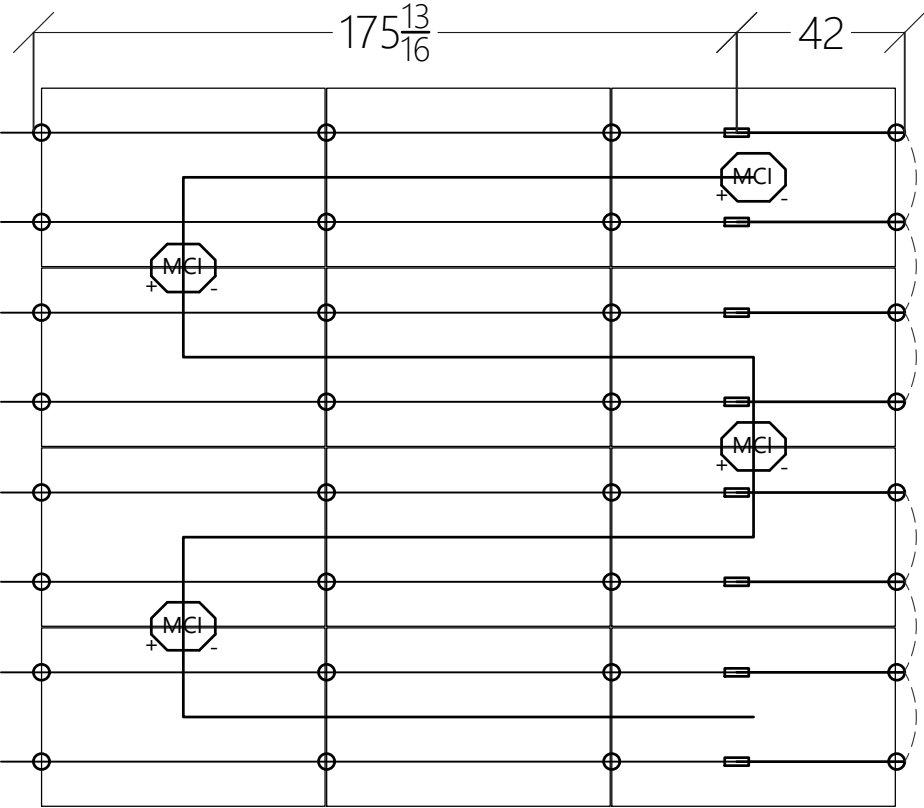
VERSIONS

FOR:	DESIGNER	DATE
CONSTRUCTION	MCP	8/27/2025

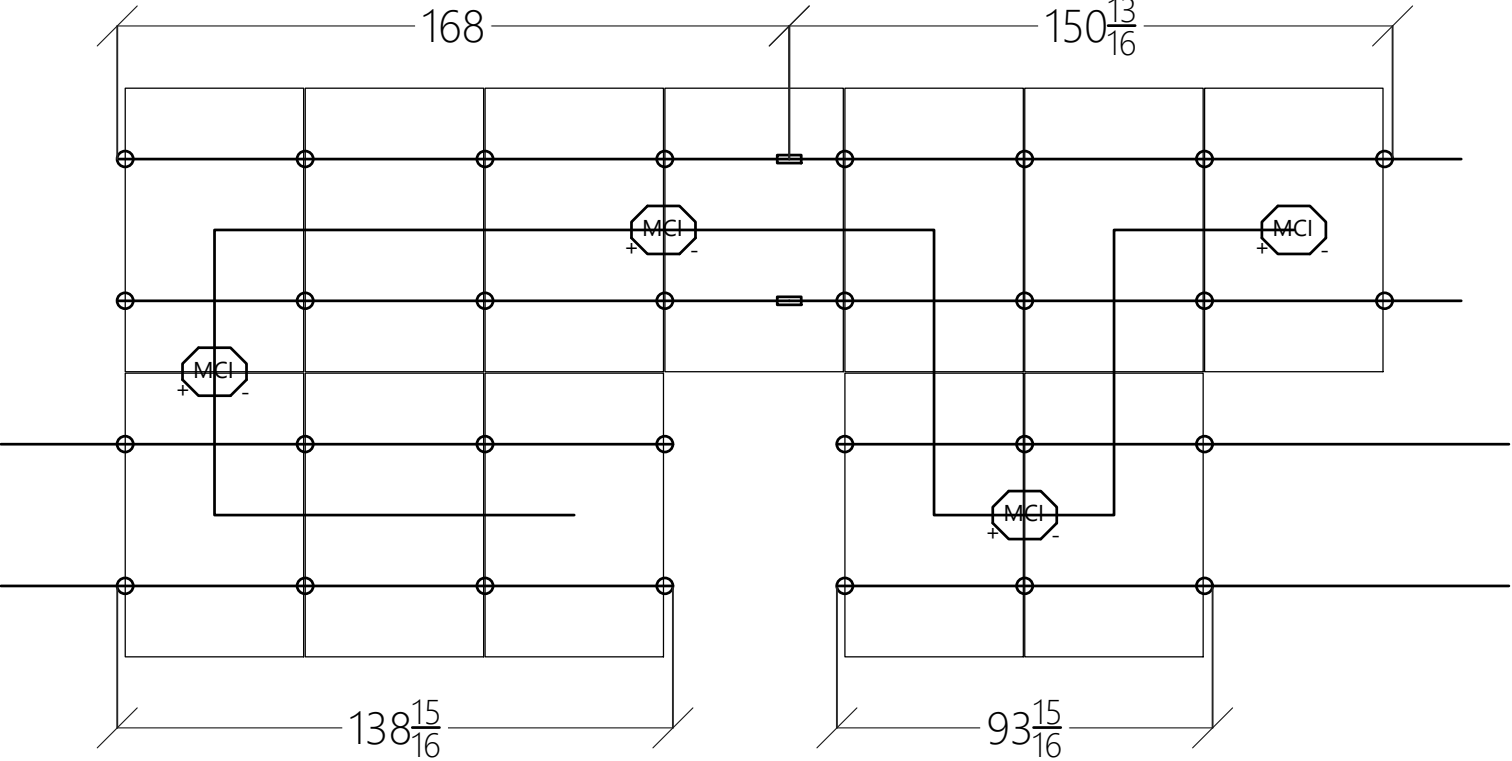
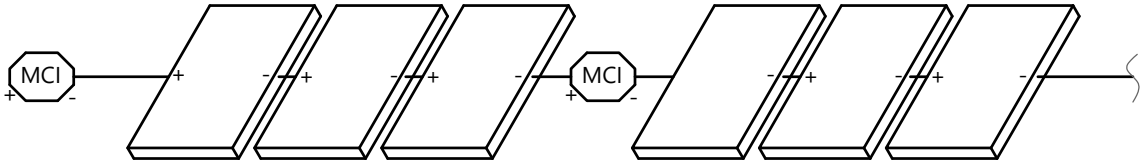
PV SYSTEM  
EQUIPMENT LABELS

PV-4.1

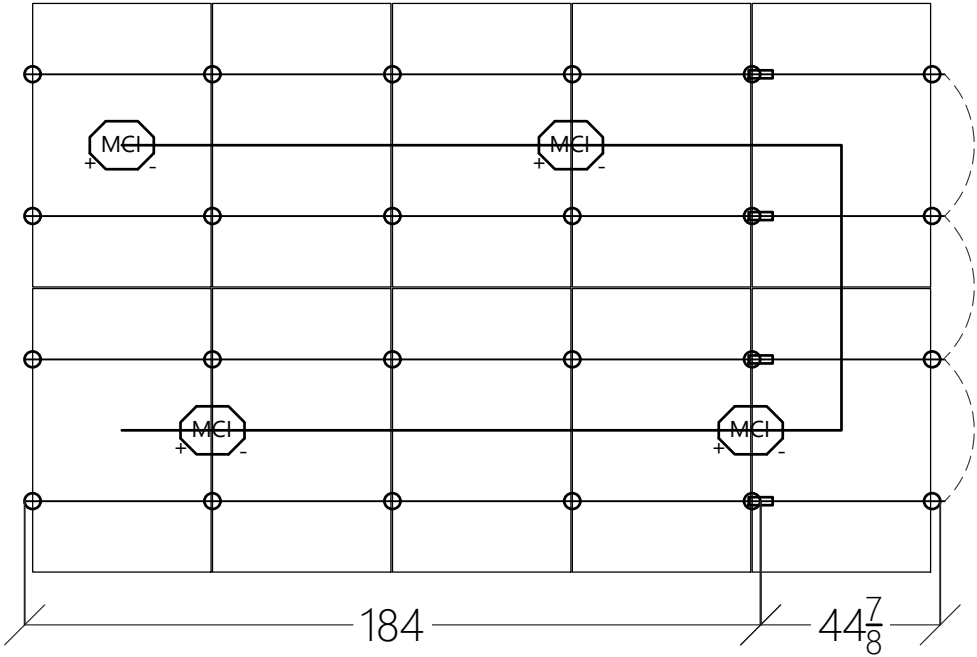
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2 STRING WIRING + MCI DETAIL  
NOT TO SCALE



1 ARRAY LAYOUT DETAIL  
NOT TO SCALE



CLIENT INFO	
MRS JENNIFER LYNN BLACK 479 CROSS LINK DR ANGIER NC 27501	
PROJECT INFO	
DC INPUT:	15.640 kW
AC OUTPUT:	11.500 kW
DOI INSP. METHOD:	OPTION 2

**Model Energy**

300 Fayetteville St.  
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Raleigh, NC 27602  
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CODE REFERENCES	
NATION ELECTRICAL CODE v. 2017 NC FIRE PROTECTION CODE v. 2018 NC BUILDING CODE v. 2018 NC RESIDENTIAL CODE v. 2018 ACSE v. 7-10	

SITE CONDITIONS	
WIND SPEED:	120 MPH
RISK CATEGORY:	II
EXPOSURE:	B
SNOW:	15 PSF

SHEET INDEX	
PV-1:	COVER SHEET
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VERSIONS		
FOR:	DESIGNER	DATE
CONSTRUCTION	MCP	8/27/2025

PV SYSTEM INSTALL  
GUIDE

PV-5.1



# NEW QB2

NO  
LIFTING  
SHINGLES

NO  
REMOVING  
NAILS

SEALANT IS  
NOW YOUR  
CHOICE

FOR ASPHALT, TPO, & EPDM ROOFS

## LAYERS OF PROTECTION

### OPTIONAL SEALANT

We recommend that sealant is inserted into the predrilled hole to fill the penetration and ensure that the Microflashing® adheres completely to the roof.

### MICROFLASHING®

Our innovative Microflashing® is placed over the predrilled hole to flash the penetration.

### QB2 SHOULDER

The shoulder of the QB2 compresses the Microflashing® to create a leak-proof seal and acts like a cork to plug the hole.

THE FASTEST, SIMPLEST,  
MOST EFFICIENT QUICKBOLT

## ERROR-PROOF COMPRESSION

The QB2 doesn't leave any room for user error when it comes to Microflashing® compression. Once the Dual Drive Shoulder Screw is secured, the Microflashing® is compressed!

## ONLY 3 COMPONENTS

The QB2 is comprised of Microflashing®, an L-Foot, and a Dual Drive Shoulder Screw. No more Nuts needed to tighten and secure the L-Foot! Not only does this simplify the installation process, it also cuts down the installation time!

## DUAL DRIVE

The new Dual Drive Shoulder Screw design can be driven using a standard ½" Hex Nut Setter or a 6mm Hex Driver. Installers can use the drive that works best with the rest of the components of their array.

## INDEPENDENT LAB TEST RESULTS

ASTM E331 (modified)	Water pressure test at 15psf for 120 minutes	NO LEAKAGE
ASTM E2140	Static water pressure test in 6" water column for 7 days	NO LEAKAGE
BOTH TESTS PASSED WITH AND WITHOUT SEALANT		

Complete Test Results available online in the AHJ Packets  
Patent# 8448407



3" QB2: PN 17662 | 4" QB2: PN 17663

**QUICKBOLT.COM**

(844) 671-6045 • MON-FRI: 7AM-5PM PST





## Flush Mount System



### Built for solar's toughest roofs.

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

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



#### Strength Tested

All components evaluated for superior structural performance.



#### PE Certified

Pre-stamped engineering letters available in most states.



#### Class A Fire Rating

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



#### Design Assistant

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



#### UL 2703 Listed System

Entire system and components meet newest effective UL 2703 standard.



#### 25-Year Warranty

Products guaranteed to be free of impairing defects.

## XR Rails ☺

### XR10 Rail



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

- 6' spanning capability
- Moderate load capability
- Clear and black finish

### XR100 Rail



The ultimate residential solar mounting rail.

- 8' spanning capability
- Heavy load capability
- Clear and black finish

### XR1000 Rail



A heavyweight mounting rail for commercial projects.

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

### Bonded Splices



All rails use internal splices for seamless connections.

- Self-drilling screws
- Varying versions for rails
- Forms secure bonding

## Clamps & Grounding ☺

### UFOs



Universal Fastening Objects bond modules to rails.

- Fully assembled & lubed
- Single, universal size
- Clear and black finish

### Stopper Sleeves



Snap onto the UFO to turn into a bonded end clamp.

- Bonds modules to rails
- Sized to match modules
- Clear and black finish

### CAMO



Bond modules to rails while staying completely hidden.

- Universal end-cam clamp
- Tool-less installation
- Fully assembled

### Grounding Lugs



Connect arrays to equipment ground.

- Low profile
- Single tool installation
- Mounts in any direction

## Attachments ☺

### FlashFoot2



Flash and mount XR Rails with superior waterproofing.

- Twist-on Cap eases install
- Wind-driven rain tested
- Mill and black finish

### Conduit Mount



Flash and mount conduit, strut, or junction boxes.

- Twist-on Cap eases install
- Wind-driven rain tested
- Secures 3/4" or 1" conduit

### Slotted L-Feet



Drop-in design for rapid rail attachment.

- Secure rail connections
- Slot for vertical adjusting
- Clear and black finish

### Bonding Hardware



Bond and attach XR Rails to roof attachments.

- T & Square Bolt options
- Nut uses 7/16" socket
- Assembled and lubricated

## Resources



### Design Assistant

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

[Go to IronRidge.com/design](https://www.ironridge.com/design)



### NABCEP Certified Training

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

[Go to IronRidge.com/training](https://www.ironridge.com/training)



# Powerwall 3

## Power Everything

Powerwall 3 is a fully integrated solar and battery system, designed to accelerate the transition to sustainable energy. Customers can receive whole home backup, cost savings, and energy independence by producing and consuming their own energy while participating in grid services. Once installed, customers can manage their system using the Tesla App to customize system behavior to meet their energy goals.

Powerwall 3 achieves this by supporting up to 20 kW DC of solar and providing up to 11.5 kW AC of continuous power per unit. It has the ability to start heavy loads rated up to 185 LRA, meaning a single unit can support the power needs of most homes. Powerwall 3 Expansions make it easier and more affordable to scale up customers' systems to meet their current or future needs. Powerwall 3 is designed for fast and efficient installations, modular system expansion, and simple connection to any electrical service.



# Powerwall 3 Technical Specifications

## System Technical Specifications

Model Number	1707000-xx-y			
Nominal Grid Voltage (Input & Output)	120/240 VAC			
Grid Type	Split phase			
Frequency	60 Hz			
Nominal Battery Energy	13.5 kWh AC <sup>1</sup>			
Nominal Output Power (AC)	5.8 kW	7.6 kW	10 kW	11.5 kW
Maximum Apparent Power	5,800 VA	7,600 VA	10,000 VA	11,500 VA
Maximum Continuous Current	24 A	31.7 A	41.7 A	48 A
Overcurrent Protection Device <sup>2</sup>	30 A	40 A	60 A	60 A
Configurable Maximum Continuous Discharge Power Off-Grid (PV Only, -20°C to 25°C)	15.4 kW <sup>3</sup>			
Maximum Continuous Charge Current / Power (Powerwall 3 only)	20.8 A AC / 5 kW			
Maximum Continuous Charge Current / Power (Powerwall 3 with up to (3) Expansion units)	33.3 A AC / 8 kW			
Output Power Factor Rating	0 – 1 (Grid Code configurable)			
Maximum Output Fault Current (1 s)	160 A			
Maximum Short-Circuit Current Rating	10 kA			
Load Start Capability	185 LRA			
Solar to Battery to Home/Grid Efficiency	89% <sup>1,4</sup>			
Solar to Home/Grid Efficiency	97.5% <sup>5</sup>			
Power Scalability	Up to 4 Powerwall 3 units supported			
Energy Scalability	Up to 3 Expansion units (for a maximum total of 7 units)			
Supported Islanding Devices	Gateway 3, Backup Switch, Backup Gateway 2			
Connectivity	Wi-Fi (2.4 and 5 GHz), Ethernet, Cellular (LTE/4G <sup>6</sup> )			
Hardware Interface	Dry contact relay, Rapid Shutdown (RSD) certified switch and 2-pin connector, RS-485 for meters			
AC Metering	Revenue Grade (+/- 0.5%, ANSI C12.20)			
Protections	Integrated arc fault circuit interrupter (AFCI), Isolation Monitor Interrupter (IMI), PV Rapid Shutdown (RSD) using Tesla Mid-Circuit Interrupters			
Customer Interface	Tesla Mobile App			
Warranty	10 years			

<sup>1</sup>Values provided for 25°C (77°F), at beginning of life. 3.3 kW charge/discharge power.

<sup>2</sup>See [Powerwall 3 Installation Manual](#) for fuse requirements if using fuse for overcurrent protection.

<sup>3</sup>If enabling the 15.4 kW off-grid maximum continuous discharge power, Powerwall 3 must be installed with an 80 A breaker and appropriately sized conductors.

<sup>4</sup>Typical solar shifting use case.

<sup>5</sup>Tested using CEC weighted efficiency methodology.

<sup>6</sup>The customer is expected to provide internet connectivity for Powerwall 3; cellular should not be used as the primary mode of connectivity. Cellular connectivity subject to network operator service coverage and signal strength.



# Powerwall 3 Technical Specifications

## Solar Technical Specifications

Maximum Solar STC Input	20 kW
Withstand Voltage	600 V DC
PV DC Input Voltage Range	60 — 550 V DC
PV DC MPPT Voltage Range	60 — 480 V DC
MPPTs	6
Maximum Current per MPPT ( $I_{mp}$ )	13 A <sup>7</sup>
Maximum Short Circuit Current per MPPT ( $I_{sc}$ )	15 A <sup>7</sup>

<sup>7</sup>Where the DC input current exceeds the MPPT rating, a jumper can be used to combine two MPPTs into a single input to intake DC current up to 26 A  $I_{MP}$  / 30 A  $I_{SC}$ .

## Environmental Specifications

Operating Temperature	−20°C to 50°C (−4°F to 122°F) <sup>8</sup>
Operating Humidity (RH)	Up to 100%, condensing
Storage Temperature	−20°C to 30°C (−4°F to 86°F), up to 95% RH, non-condensing, State of Energy (SOE): 25% initial
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Rating	NEMA 3R
Ingress Rating	IP67 (Battery & Power Electronics) IP55 (Wiring Compartment)
Pollution Rating	PD3
Operating Noise @ 1 m	< 50 db(A) typical < 62 db(A) maximum

<sup>8</sup> Performance may be de-rated at operating temperatures above 40°C (104°F).

## Compliance Information

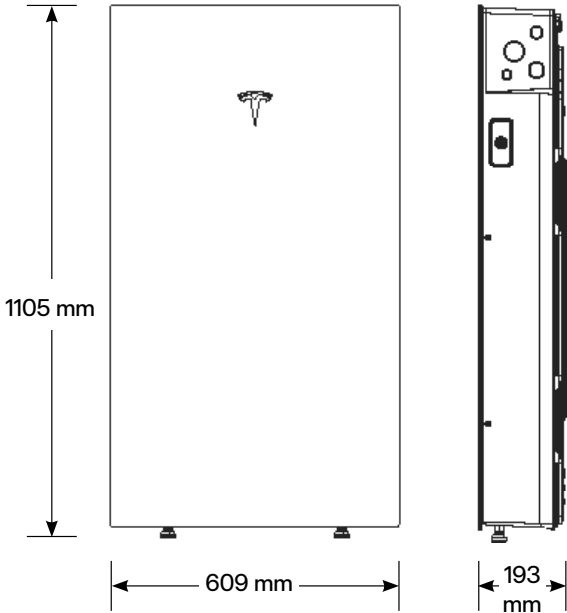
Certifications	UL 1741, UL 9540, UL 9540A, UL 3741, UL 1741 PCS, UL 1741 SA, UL 1741 SB, UL 1973, UL 1699B, UL 1998, CSA C22.2 No. 0.8, CSA C22.2 No. 107.1, CSA C22.2 No. 330, CSA 22.3 No. 9, IEEE 1547, IEEE 1547A, IEEE 1547.1, CA Rule No.21
Grid Connection	United States and Canada
Emissions	FCC Part 15 Class B, ICES 003
Environmental	RoHS Directive 2011/65/EU
Seismic	AC156, IEEE 693-2005 (high)
Fire Testing	Meets the unit level performance criteria of UL 9540A

# Powerwall 3 Technical Specifications

## Mechanical Specifications

Dimensions	1105 x 609 x 193 mm (43.5 x 24 x 7.6 in) <sup>9</sup>
Total Weight of Installed Unit	132 kg (291.2 lb)
Weight of Powerwall 3	124 kg (272.5 lb)
Weight of Glass Front Cover	6.5 kg (14.5 lb)
Weight of Wall Bracket	1.9 kg (4.2 lb)
Mounting Options	Floor or wall mount

<sup>9</sup> These dimensions include the glass front cover being installed on Powerwall 3.





# Powerwall 3 Expansion Technical Specifications

## Battery Technical Specifications

Model Number	1807000-xx-y
Nominal Battery Energy	13.5 kWh
Voltage Range	52 – 92 V DC <sup>10</sup>

<sup>10</sup> Powerwall 3 Expansion units are connected in parallel and are not field serviceable.

## Environmental Specifications

Operating Temperature	–20°C to 50°C (–4°F to 122°F) <sup>11</sup>
Operating Humidity (RH)	Up to 100%, condensing
Storage Temperature	–20°C to 30°C (–4°F to 86°F), up to 95% RH, non-condensing, State of Energy (SOE): 25% initial
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Rating	NEMA 3R
Ingress Rating	IP67
Pollution Rating	PD3

<sup>11</sup> Performance may be de-rated at operating temperatures above 40°C (104°F).

## Compliance Information

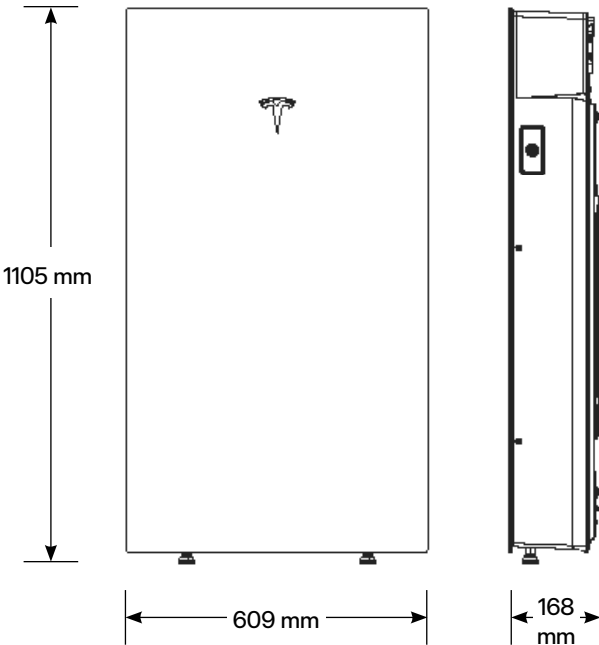
Certifications	UL 1973, UL 9540
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## Mechanical Specifications

Dimensions	1105 x 609 x 168 mm (43.5 x 24 x 6.6 in) <sup>12</sup>
Total Weight of Wall-Mounted Expansion Unit	118.5 kg (261.2 lb)
Weight of Expansion Unit	110 kg (242.5 lb)
Weight of Glass Front Cover	6.5 kg (14.5 lb)
Weight of Wall Bracket	1.9 kg (4.2 lb)
Weight of Expansion Accessories	0.7 kg (1.5 lb)
Mounting Options	Floor or wall mount
Stacking Capability (Floor Mount Only)	Up to (3) Expansion units behind a Powerwall 3
Compatibility with Other Systems	Only compatible with Powerwall 3
Connection to Powerwall 3 or Expansions	Powerwall 3 Expansion harness <sup>13</sup>

<sup>12</sup> These dimensions include the glass front cover being installed on Powerwall 3 Expansion.

<sup>13</sup> The Powerwall 3 Expansion harness is a listed component of the UL 9540 certification.



# Solar Shutdown Device Technical Specifications

The Solar Shutdown Device is a Mid-Circuit Interrupter (MCI) and is integral to the rapid shutdown (RSD) function required for rooftop PV systems in accordance with Article 690 of the NEC. When paired with Powerwall 3, solar array shutdown is initiated by an External System Shutdown Switch or the On/Off Enable switch located on Powerwall 3. Systems not subject to rapid shutdown requirements must still install one or more MCIs for functional purposes; see the Powerwall 3 installation manual for details.

Electrical Specifications	Model	MCI-1	MCI-2	MCI-2 High Current
	Nominal Input DC Current Rating (I <sub>MP</sub> )	13 A	13 A	15 A
	Maximum Input Short Circuit Current (I <sub>SC</sub> )	19 A	17 A	19 A
	Maximum System Voltage	600 V DC	1000 V DC <sup>14</sup>	1000 V DC <sup>14</sup>
	Maximum Disconnect Voltage <sup>15</sup>	600 V DC	165 V DC	165 V DC
<sup>14</sup> Maximum System Voltage is limited by Powerwall to 600 V DC.				
<sup>15</sup> Maximum Disconnect Voltage is the maximum voltage allowed across each MCI in the open position (Rapid Shutdown Initiated). An individual MCI-2 has a voltage rating of 165V but in combination (connected in the same string) their voltage ratings are additive.				
RSD Module Performance	Maximum Number of Devices per String	5		
	Control	Power Line Excitation		
	Passive State	Normally Open		
	Maximum Power Consumption	7 W		
	Warranty	25 years		
Environmental Specifications	Operating Temperature	−40°C to 50°C (−40°F to 122°F)	−45°C to 70°C (−49°F to 158°F)	
	Storage Temperature	−30°C to 70°C (−22°F to 158°F)	−30°C to 70°C (−22°F to 158°F)	
	Enclosure Rating	NEMA 4X / IP65		
Mechanical Specifications	Electrical Connections	MC4 Connector		
	Housing	Plastic		
	Dimensions	125 x 150 x 22 mm (5 x 6 x 1 in)	173 x 45 x 22 mm (6.8 x 1.8 x 1 in)	
	Weight	350 g (0.77 lb)	120 g (0.26 lb)	
	Mounting Options	ZEP Home Run Clip M4 Screw (#10) M8 Bolt (5/16") Nail / Wood screw	Wire Clip	
Compliance Information	Certifications	UL 1741 PVRSE, UL 3741, PVRSA (Photovoltaic Rapid Shutdown Array)		
	RSD Initiation Method	External System Shutdown Switch or Powerwall 3 Enable Switch		

## UL 3741 PV Hazard Control (and PVRSA) Compatibility

See [UL 3741 Application Addendum](#)



# Gateway 3

Tesla Gateway 3 controls connection to the grid in a Powerwall system, automatically detecting outages and providing seamless transition to backup power. It provides energy monitoring that is used by Powerwall for solar self-consumption, time-based control, and backup operation.

## Performance Specifications

Model Number	1841000-x1-y	AC Meter	+/- 0.5%
Nominal Grid Voltage	120/240 V AC	Communication	CAN
Grid Configuration	Split phase	User Interface	Tesla App
Grid Frequency	60 Hz	Backup Transition	Automatic disconnect for seamless backup
Continuous Current Rating	200 A	Overcurrent Protection Device	100–200 A Service entrance rated Eaton CSR, BWH, or BW, or Square D QOM breakers
Maximum Supply Short Circuit Current	22 kA with Square D or Eaton main breaker 25 kA with Eaton main breaker <sup>16</sup>	Internal Panelboard	200 A 8-space/16 circuit breakers Eaton BR, Siemens QP, or Square D HOM breakers rated to 10–125A
IEC Protective Class	Class I	Warranty	10 years
Overvoltage Category	Category IV		

<sup>16</sup> Only Eaton CSR or BWH main breakers are 25 kA rated.

## Environmental Specifications

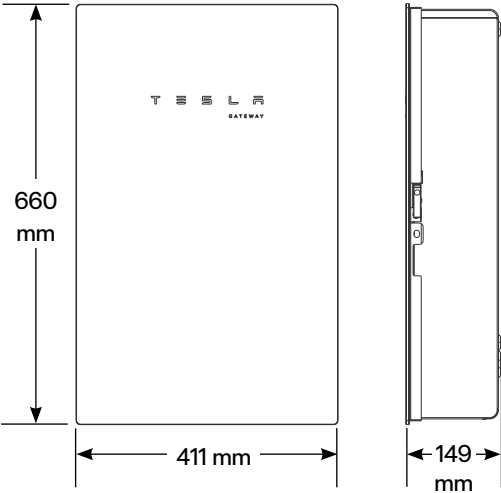
Operating Temperature	–20°C to 50°C (–4°F to 122°F)
Operating Humidity (RH)	Up to 100%, condensing
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Type	NEMA 3R

## Compliance Information

Certifications	UL 67, UL 869A, UL 916, UL 1741 PCS, CSA 22.2 107.1, CSA 22.2 29
Emissions	FCC Part 15, Class B, ICES 003

## Mechanical Specifications

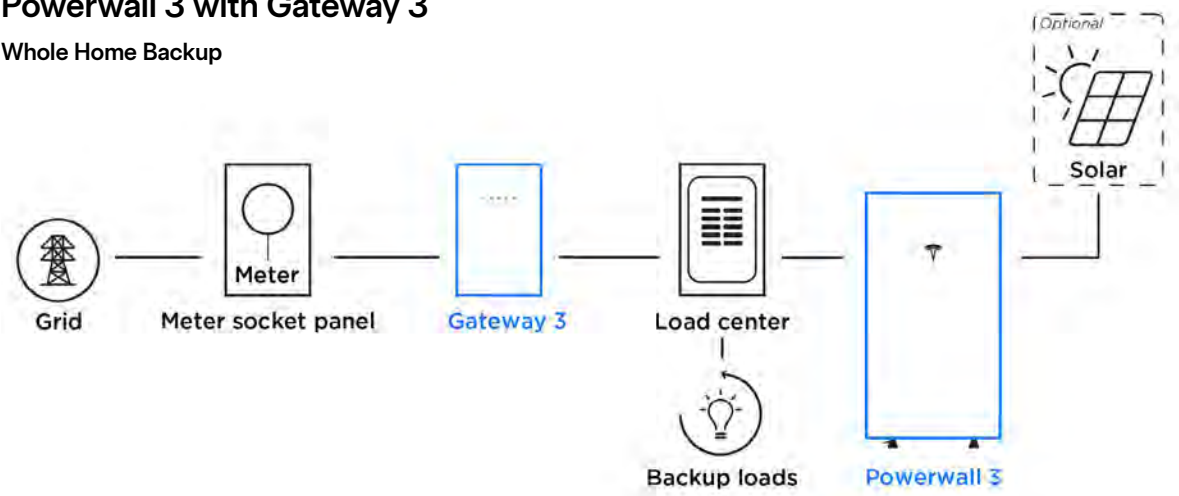
Dimensions	660 x 411 x 149 mm (26 x 16 x 6 in)
Weight	16.3 kg (36 lb)
Mounting options	Wall mount



# Powerwall 3 Example System Configurations

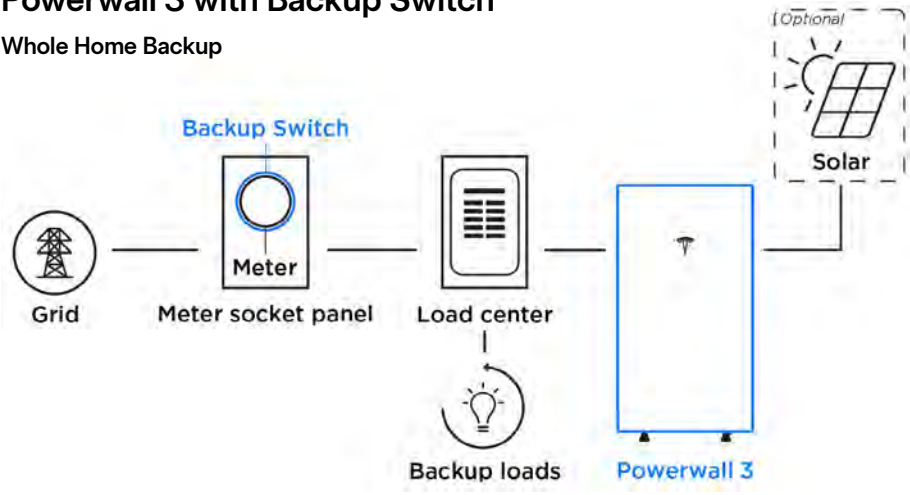
## Powerwall 3 with Gateway 3

Whole Home Backup



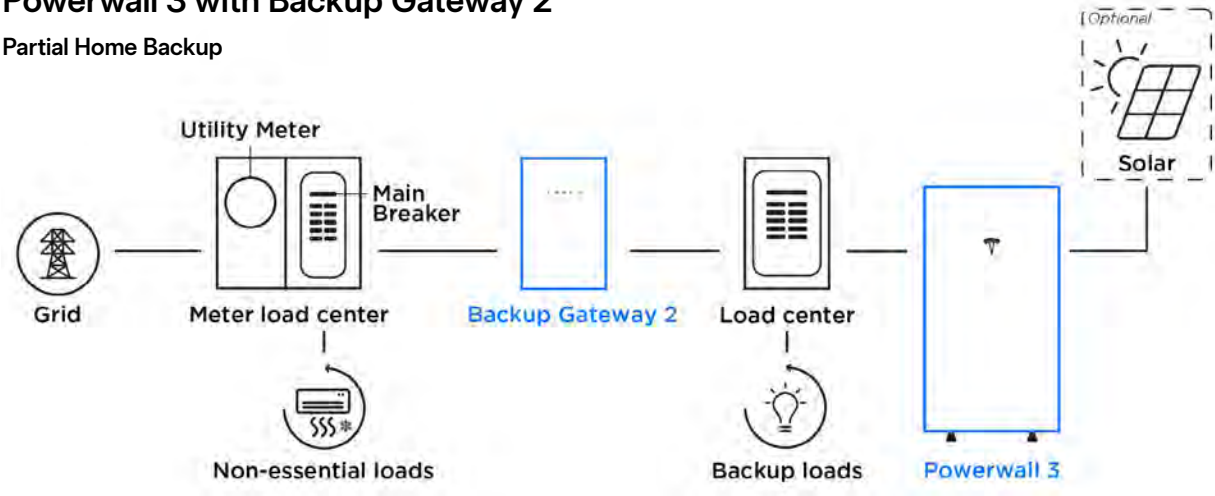
## Powerwall 3 with Backup Switch

Whole Home Backup



## Powerwall 3 with Backup Gateway 2

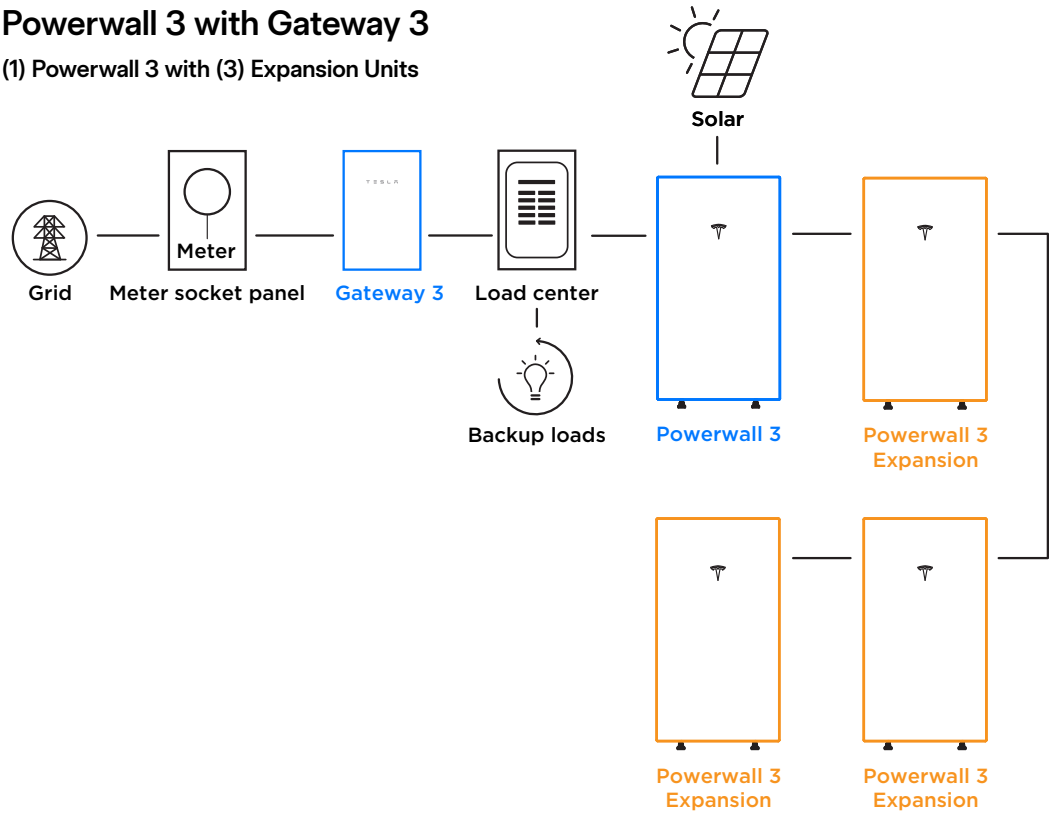
Partial Home Backup



# Powerwall 3 Example System Configurations

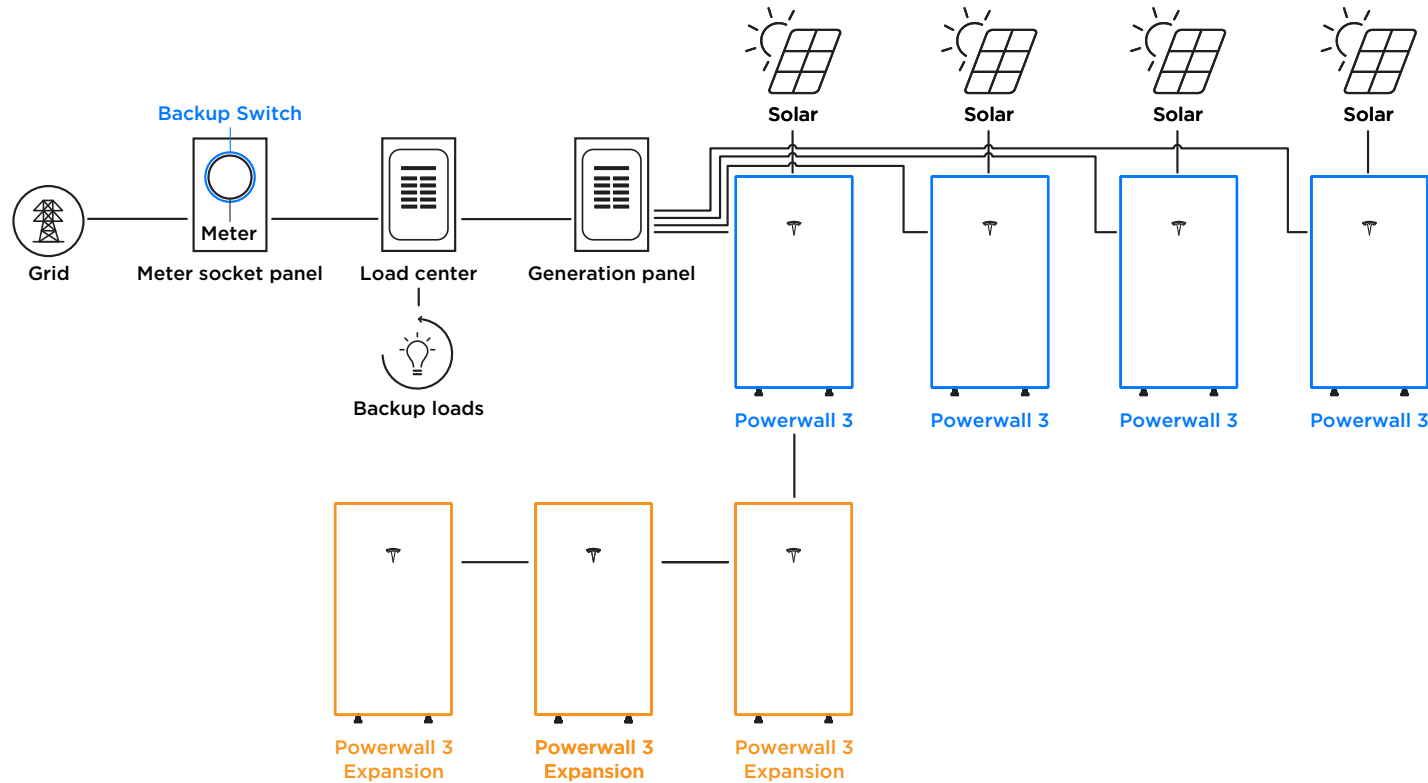
## Powerwall 3 with Gateway 3

(1) Powerwall 3 with (3) Expansion Units

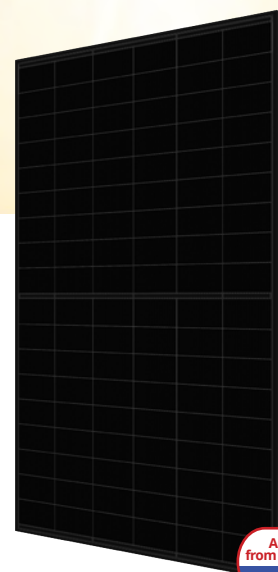


## Powerwall 3 with Backup Switch

(4) Powerwall 3 Units with (3) Expansion Units (Maximum System Size)







Assembled in the US  
from imported components  
**USA**

## TOPHiKu6 (All-Black)

N-type TOPCon Technology

435 W ~ 465 W

CS6.1-54TM-435 | 440 | 445 | 450 | 455 | 460 | 465H

### MORE POWER



Module power up to 465 W  
Module efficiency up to 22.8 %



Excellent anti-LeTID & anti-PID performance.  
Low power degradation, high energy yield



Lower temperature coefficient (Pmax): -0.29%/°C,  
increases energy yield in hot climate



Lower LCOE & system cost

### MORE RELIABLE



Minimizes micro-crack impacts



Heavy snow load up to 8100 Pa,  
wind load up to 6000 Pa\*



**Industry Leading Product Warranty on Materials  
and Workmanship\***



**Linear Power Performance Warranty\***

**1<sup>st</sup> year power degradation no more than 1%  
Subsequent annual power degradation no more than 0.4%**

\*Subject to the terms and conditions contained in the applicable Canadian Solar Limited Warranty Statement. Also this 25-year limited product warranty is available only for products installed and operating on rooftops in certain regions.

### MANAGEMENT SYSTEM CERTIFICATES\*

ISO 9001:2015 / Quality management system  
ISO 14001:2015 / Standards for environmental management system  
ISO 45001: 2018 / International standards for occupational health & safety  
IEC62941: 2019 / Photovoltaic module manufacturing quality system

### PRODUCT CERTIFICATES\*

IEC 61215 / IEC 61730 / CE / CGC  
CEC listed (US California) / FSEC (US Florida)  
UL 61730 / IEC 61701 / IEC 62716 / IEC 60068-2-68  
UNI 9177 Reaction to Fire: Class 1



\* The specific certificates applicable to different module types and markets will vary, and therefore not all of the certifications listed herein will simultaneously apply to the products you order or use. Please contact your local Canadian Solar sales representative to confirm the specific certificates available for your Product and applicable in the regions in which the products will be used.

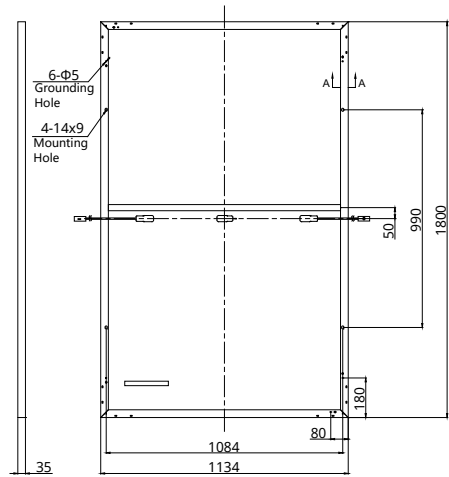
**CSI Solar Co., Ltd.** is committed to providing high quality solar photovoltaic modules, solar energy and battery storage solutions to customers. The company was recognized as the No. 1 module supplier for quality and performance/price ratio in the IHS Module Customer Insight Survey. Over the past 23 years, it has successfully delivered over 150 GW of premium-quality solar modules across the world.

\* For detailed information, please refer to the Installation Manual.

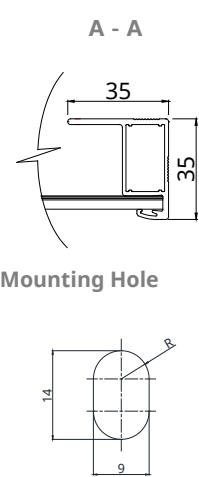
**CSI Solar Co., Ltd.**  
1350 Treat Blvd. Suite 500, Walnut Creek, CA 94597 | [www.csisolar.com/na](http://www.csisolar.com/na) | [service.ca@csisolar.com](mailto:service.ca@csisolar.com)

ENGINEERING DRAWING (mm)

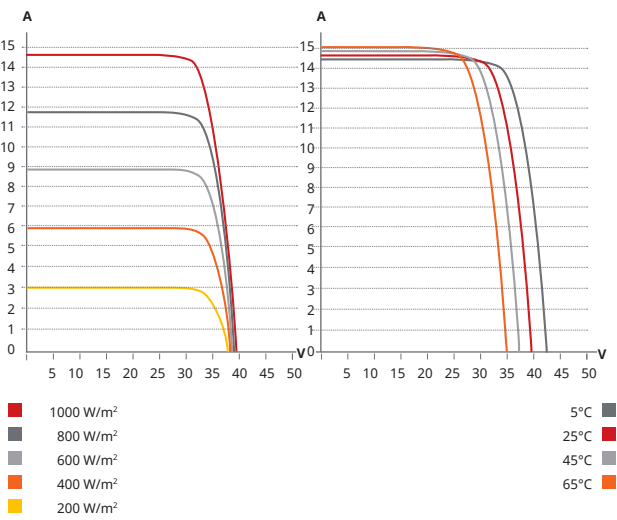
Rear View



Frame Cross Section



CS6.1-54TM-455H / I-V CURVES



ELECTRICAL DATA | STC\*

CS6.1-54TM	435H	440H	445H	450H	455H	460H	465H
Nominal Max. Power (Pmax)	435 W	440 W	445 W	450 W	455 W	460 W	465 W
Opt. Operating Voltage (Vmp)	32.4 V	32.6 V	32.8 V	33.0 V	33.2 V	33.4 V	33.6 V
Opt. Operating Current (Imp)	13.45 A	13.52 A	13.59 A	13.66 A	13.72 A	13.78 A	13.85 A
Open Circuit Voltage (Voc)	38.3 V	38.5 V	38.7 V	38.9 V	39.1 V	39.3 V	39.5 V
Short Circuit Current (Isc)	14.33 A	14.41 A	14.48 A	14.55 A	14.61 A	14.69 A	14.77 A
Module Efficiency	21.3%	21.6%	21.8%	22.0%	22.3%	22.5%	22.8%
Operating Temperature	-40°C ~ +85°C						
Max. System Voltage	1000V (IEC/UL)						
Module Fire Performance	TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730)						
Max. Series Fuse Rating	25 A						
Protection Class	Class II						
Power Tolerance	0 ~ + 10 W						

\* Under Standard Test Conditions (STC) of irradiance of 1000 W/m<sup>2</sup>, spectrum AM 1.5 and cell temperature of 25°C.

MECHANICAL DATA

Specification	Data
Cell Type	TOPCon cells
Cell Arrangement	108 [2 X (9 X 6)]
Dimensions	1800 × 1134 × 35 mm (70.9 × 44.6 × 1.38 in)
Weight	23 kg (50.7 lbs)
Front Cover	3.2 mm tempered glass with anti-ref- lective coating
Frame	Anodized aluminium alloy
J-Box	IP68, 3 bypass diodes
Cable	4 mm <sup>2</sup> (IEC), 12 AWG (UL)
Connector	T6 or MC4 or MC4-EVO2 or MC4- EVO2A
Cable Length (Including Connector)	1500 mm (61.0 in) (+) / 1100 mm (43.3 in) (-)
Per Pallet	30 pieces
Per Container (40' HQ)	720 pieces

ELECTRICAL DATA | NMOT\*

CS6.1-54TM	435H	440H	445H	450H	455H	460H	465H
Nominal Max. Power (Pmax)	328 W	332 W	335 W	339 W	343 W	347 W	351 W
Opt. Operating Voltage (Vmp)	30.5 V	30.7 V	30.9 V	31.1 V	31.3 V	31.5 V	31.7 V
Opt. Operating Current (Imp)	10.74 A	10.80 A	10.85 A	10.91 A	10.96 A	11.02 A	11.07 A
Open Circuit Voltage (Voc)	36.2 V	36.4 V	36.5 V	36.7 V	36.9 V	37.1 V	37.3 V
Short Circuit Current (Isc)	11.56 A	11.63 A	11.68 A	11.74 A	11.79 A	11.85 A	11.92 A

\* Under Nominal Module Operating Temperature (NMOT), irradiance of 800 W/m<sup>2</sup>, spectrum AM 1.5, ambient temperature 20°C, wind speed 1 m/s.

TEMPERATURE CHARACTERISTICS

Specification	Data
Temperature Coefficient (Pmax)	-0.29 % / °C
Temperature Coefficient (Voc)	-0.25 % / °C
Temperature Coefficient (Isc)	0.05 % / °C
Nominal Module Operating Temperature	42 ± 3°C

PARTNER SECTION



\* The specifications and key features contained in this datasheet may deviate slightly from our actual products due to the on-going innovation and product enhancement. CSI Solar Co., Ltd. reserves the right to make necessary adjustment to the information described herein at any time without further notice. Please be kindly advised that PV modules should be handled and installed by qualified people who have professional skills and please carefully read the safety and installation instructions before using our PV modules.

RSTC Enterprises, Inc.  
2214 Heimstead Road  
Eau Claire, WI 54703  
715-830-9997



## **Outdoor Photovoltaic Enclosures**

Composition/Cedar Roof System

### **ETL listed and labeled**

Report # 3171411PRT-002 Revised May, 2018

- UL50 Type 3R, 11 Edition Electrical equipment enclosures
- CSA C22.2 No. 290 Nema Type 3R
- Conforms to UL 1741 Standard

### **0799 Series Includes:**

0799 - 2                      Wire size 2/0-14

0799 - 5                      Wire size 14-6

0799 - D                     Wire size 14-8

Models available in Grey, Black or Stainless Steel

### **Basic Specifications**

Material options:

- Powder coated, 18 gauge galvanized 90 steel (1,100 hours salt spray)
- Stainless steel

Process - Seamless draw (stamped)

Flashing - 15.25" x 17.25"

Height - 3"

Cavity - 255 Cubic inches

### **Base Plate:**

- Fastened to base using toggle fastening system
- 5 roof deck knockouts
- Knockout sizes: (3) .5", (1) .75" and (1) 1"
- 8", 35mm slotted din rail
- Ground Block

Passthrough and combiner kits are available for either AC or DC applications.

## **0799 Series**





# Product data sheet

Specifications



Safety switch, general duty, non fusible, 60A, 2 pole, 10hp, 240VAC, NEMA 3R, bolt on provision

DU222RB

Product availability : Stock - Normally stocked in distribution facility

Price\* : 353.00 USD

## Main

Product	Single Throw Safety Switch
Duty Rating	General duty
Device Application	Residential
Disconnect Type	Non-fusible disconnect switch
Factory Installed Neutral	None
Phase	3 phase
Number of Poles	2
Current Rating	60 A
Voltage Rating	240 V AC
Enclosure Rating NEMA	NEMA 3R
Motor power hp	10 hp at 240 V AC 60 Hz for 1 phase motors

## Complementary

Mounting Type	Surface
Electrical Connection	Lugs
Wiring configuration	2 wires
Wire Size	AWG 12...AWG 3 aluminium AWG 14...AWG 3 copper
Tightening torque	35 lbf.in (3.95 N.m) 0.00...0.01 in² (2.08...5.26 mm²) (AWG 14...AWG 10) 35 lbf.in (3.95 N.m) (AWG 14...AWG 10) 45 lbf.in (5.08 N.m) 0.01 in² (8.37 mm²) (AWG 8) 45 lbf.in (5.08 N.m) 0.02...0.03 in² (12.3...21.12 mm²) (AWG 6...AWG 4) 50 lbf.in (5.65 N.m) 0.04 in² (26.67 mm²) (AWG 3)
Depth	3.75 in (95.25 mm)
Width	7.75 in (196.85 mm)
Height	9.63 in (244.60 mm)
Net Weight	16.98 lb(US) (7.7 kg)

## Environment

Certifications	UL listed file E2875
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\* Price is “List Price” and may be subject to a trade discount – check with your local distributor or retailer for actual price.

Ordering and shipping details

Category	00106-D & DU SW,NEMA3R, 30-200A
Discount Schedule	DE1A
GTIN	785901491491
Returnability	Yes
Country of origin	MX

Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Height	5.30 in (13.462 cm)
Package 1 Width	7.20 in (18.288 cm)
Package 1 Length	10.00 in (25.4 cm)
Package 1 Weight	4.65 lb(US) (2.109 kg)
Unit Type of Package 2	PAL
Number of Units in Package 2	120
Package 2 Height	36.50 in (92.71 cm)
Package 2 Width	40.00 in (101.6 cm)
Package 2 Length	48.00 in (121.92 cm)
Package 2 Weight	610.00 lb(US) (276.691 kg)
Unit Type of Package 3	CAR
Number of Units in Package 3	5
Package 3 Height	10.70 in (27.178 cm)
Package 3 Width	10.20 in (25.908 cm)
Package 3 Length	23.50 in (59.69 cm)
Package 3 Weight	24.60 lb(US) (11.158 kg)

Offer Sustainability

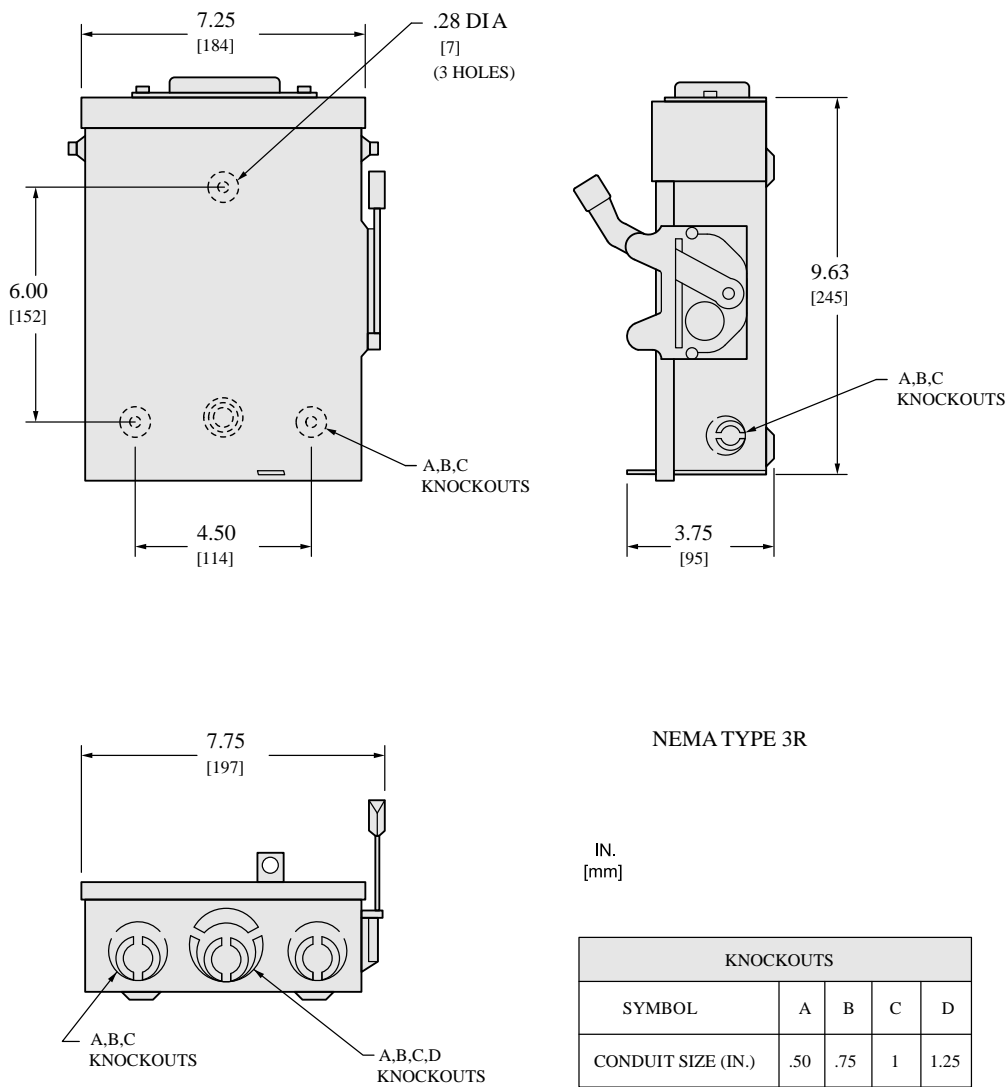
Sustainable offer status	Green Premium product
California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to <a href="http://www.P65Warnings.ca.gov">www.P65Warnings.ca.gov</a>
REACH Regulation	<a href="#">REACH Declaration</a>
REACH free of SVHC	Yes
EU RoHS Directive	Compliant <a href="#">EU RoHS Declaration</a>
Toxic heavy metal free	Yes
Mercury free	Yes
China RoHS Regulation	<a href="#">China RoHS declaration</a> Pro-active China RoHS declaration (out of China RoHS legal scope)
RoHS exemption information	<a href="#">Yes</a>
Environmental Disclosure	<a href="#">Product Environmental Profile</a>
PVC free	Yes

Contractual warranty

Warranty	18 months
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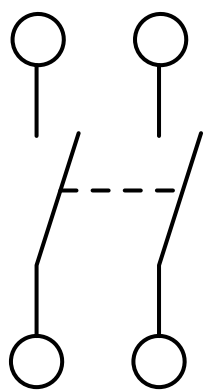
Dimensions



TOP OF NEMA TYPE 3R SWITCHES HAVE PROVISIONS FOR MAXIMUM 2 1/2" BO LT-ON HUB.  
ALL DIMENSIONS ARE APPROXIMATE. REFER TO TECHNICAL DRAWINGS AND DOCUMENTATION.

Wiring Diagram

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DU222RB

Recommended replacement(s)