

Residential Photovoltaic System

IEEE WV Section Presentation

Steve Goodman

November 2, 2011

Features

- Six solar panels
- Grid connection
- Battery backup as if off-grid



Station Identification

Cell ID:	0253377
State:	West Virginia
Latitude:	38.4 ° N
Longitude:	81.7 ° W

PV System Specifications

DC Rating:	1.44 kW
DC to AC Derate Factor:	0.770
AC Rating:	1.11 kW
Array Type:	Fixed Tilt
Array Tilt:	13.0 °
Array Azimuth:	210.0 °

Energy Specifications

Cost of Electricity:	9.0 ¢/kWh
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Results

Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
1	2.27	76	6.84
2	3.09	94	8.46
3	4.42	147	13.23
4	5.38	168	15.12
5	5.90	185	16.65
6	6.36	188	16.92
7	6.10	185	16.65
8	5.87	176	15.84
9	5.01	149	13.41
10	3.89	124	11.16
11	2.56	80	7.20
12	2.08	67	6.03
Year	4.42	1641	147.69









Renewable Energy

Photovoltaic



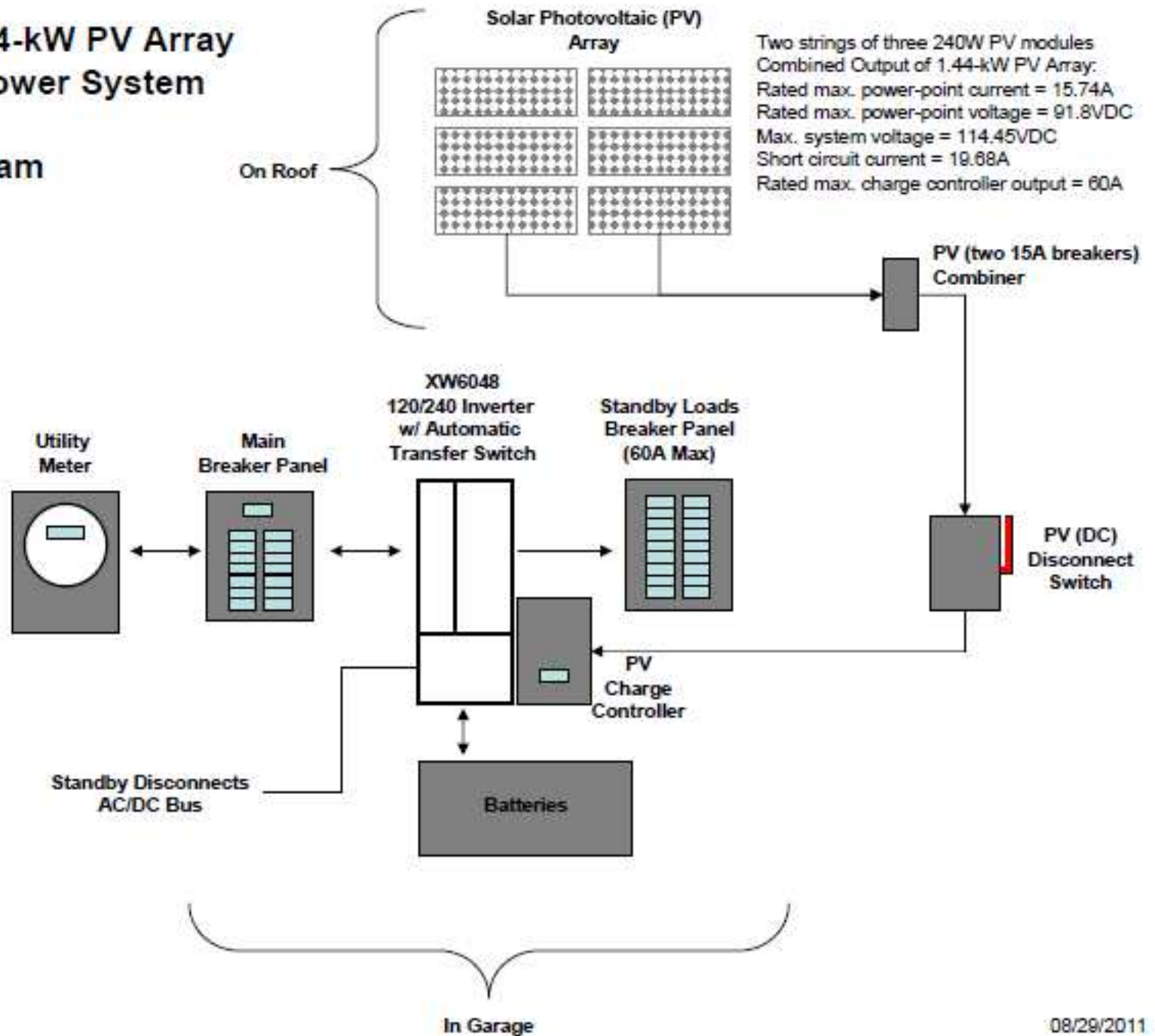
DC
Combiner Box



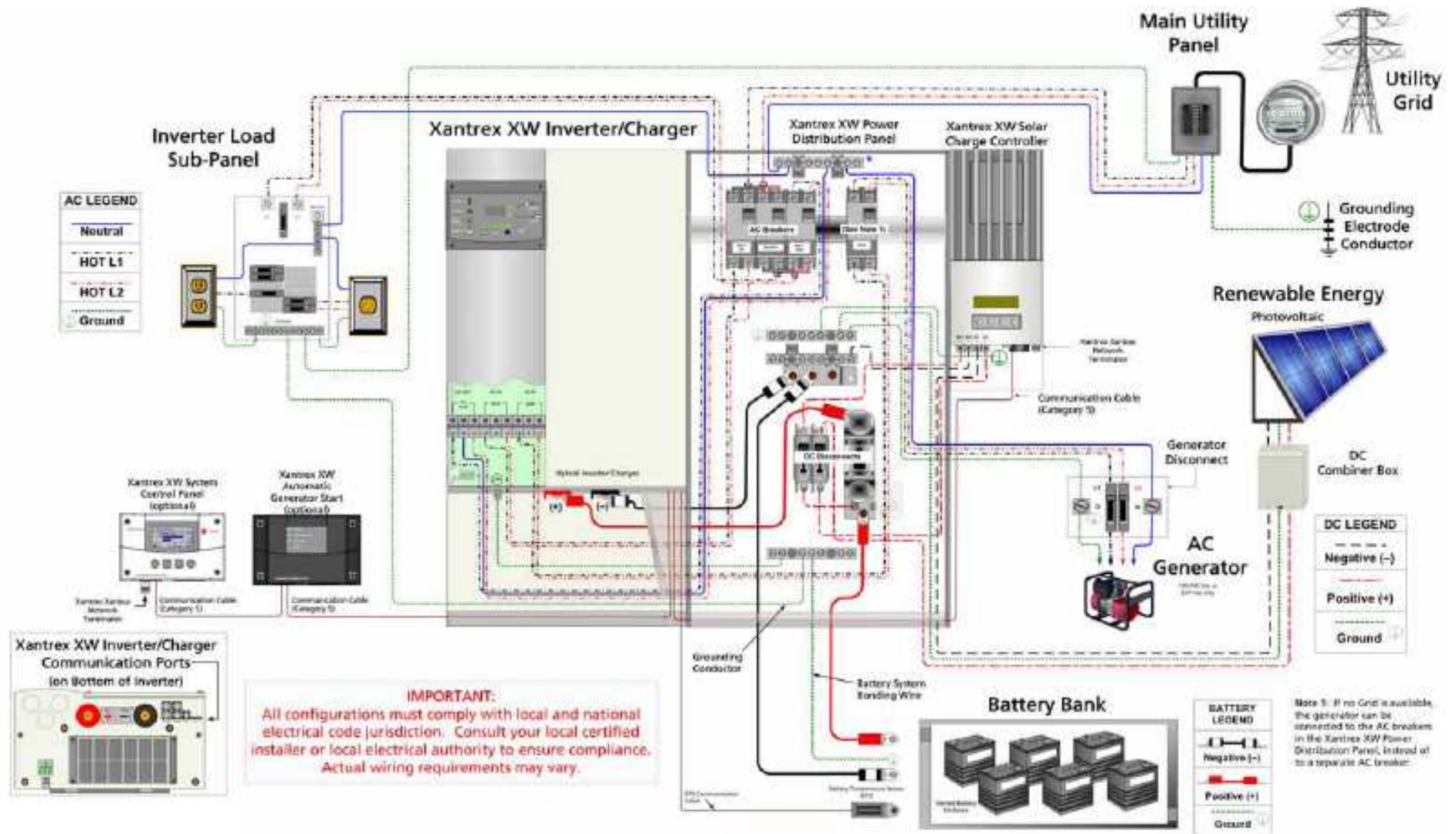


Goodman 1.44-kW PV Array w/ Standby Power System

System Diagram



Single-Inverter System Renewable Energy (Solar)





Schneider Electric

Fault/Warning



Standby



Enter

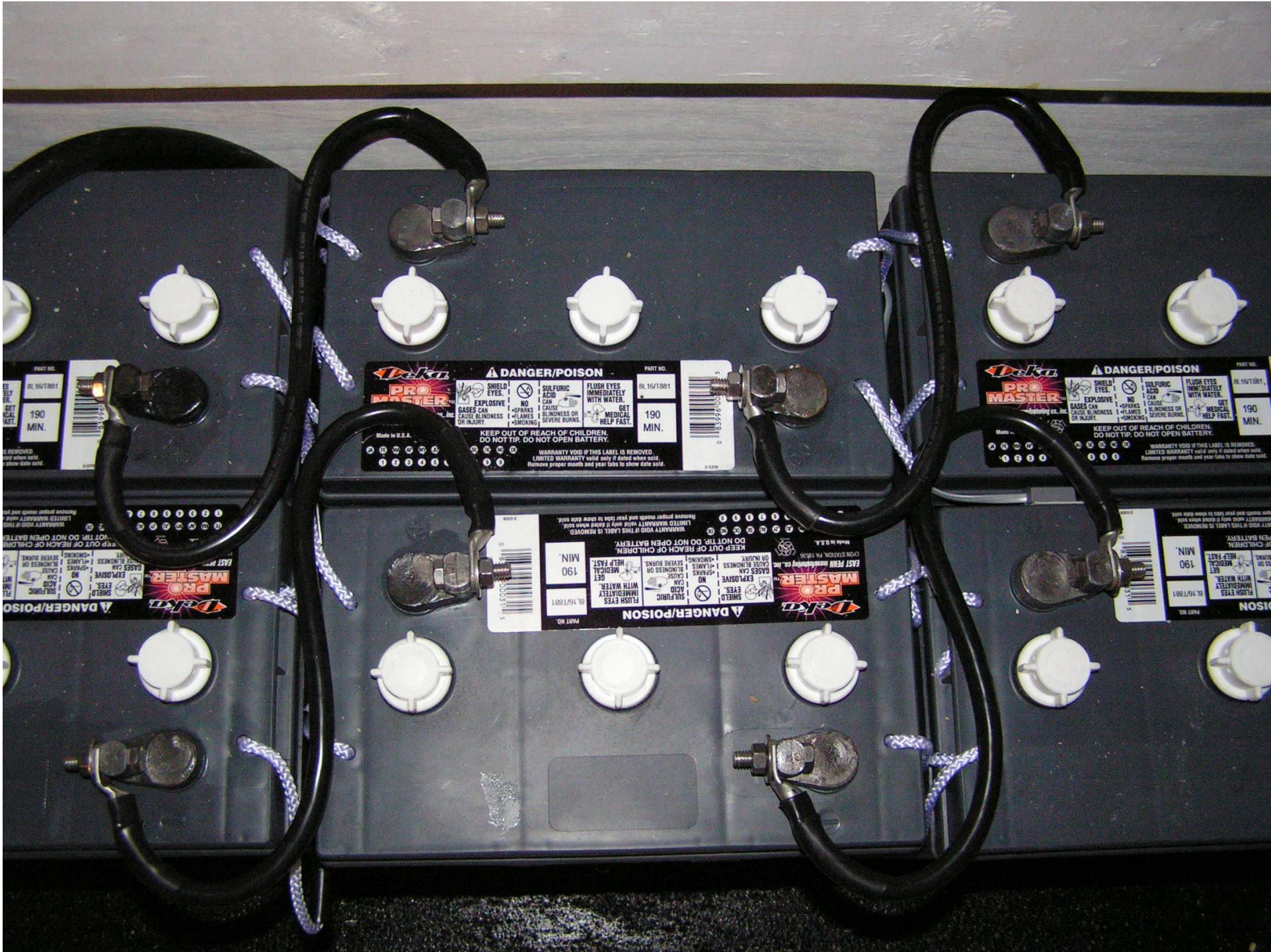


Exit

Xantrex XW SCP







Pro MASTER

▲ DANGER/POISON

SHIELD EYES
EXPLOSIVE
GASES CAN CAUSE BLINDNESS OR INJURY

NO SPARKS
FLAMES OR INJURY

SULFURIC ACID CAN CAUSE BLINDNESS OR SEVERE BURNS

FLUSH EYES IMMEDIATELY WITH WATER.
GET MEDICAL HELP FAST.

KEEP OUT OF REACH OF CHILDREN.
DO NOT TIP. DO NOT OPEN BATTERY.

WARRANTY VOID IF THIS LABEL IS REMOVED.
LIMITED WARRANTY valid only if dated when sold.
Remove proper month and year tabs to show date sold.

Part No. BL 16/1881

190 MIN.

Pro MASTER

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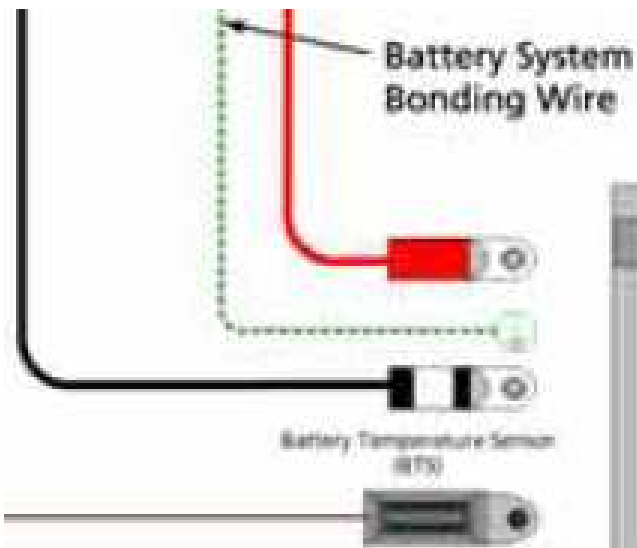
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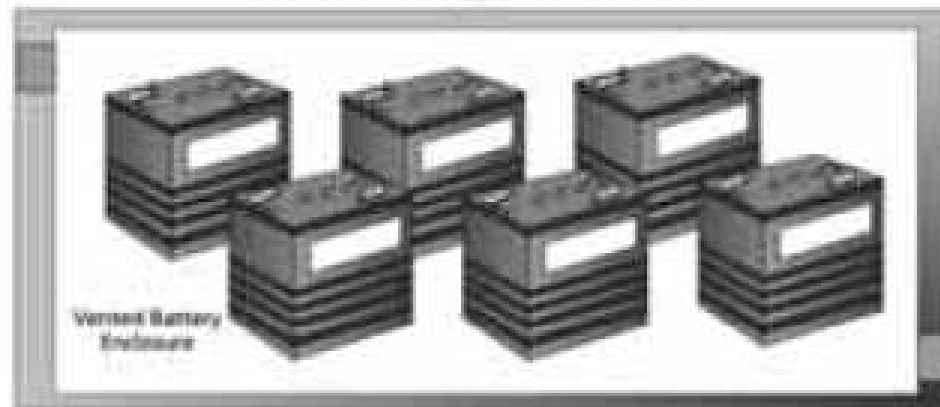
Part No. BL 16/1881

190 MIN.





Battery Bank



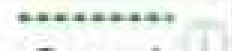
BATTERY LEGEND



Negative (-)

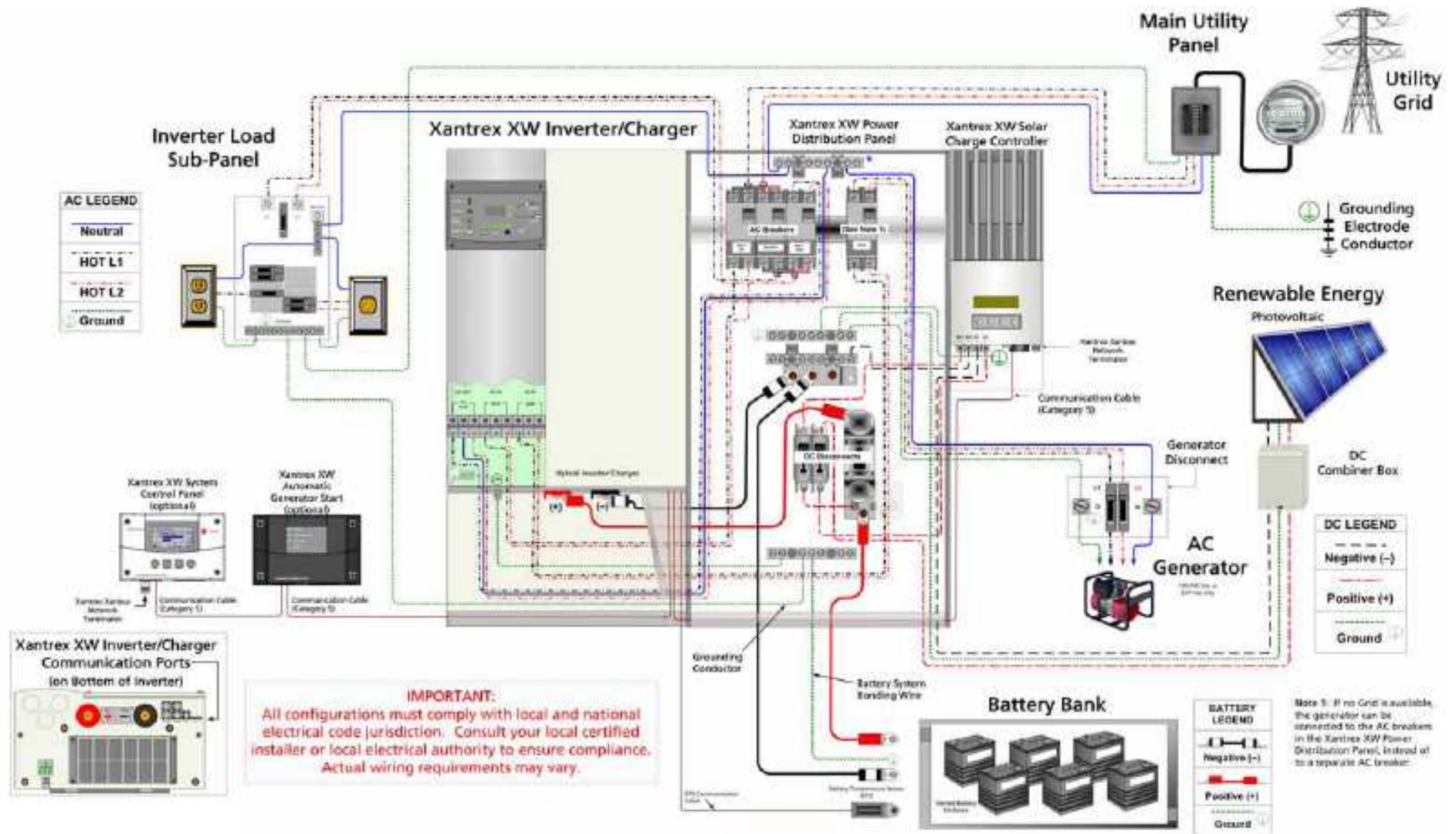


Positive (+)



Ground

Single-Inverter System Renewable Energy (Solar)







1.44-kW PV SYSTEM
Rated max. power-point current
15.74A
Rated max. power-point voltage
91.8VDC
Max. system voltage
114.45VDC
Short circuit current
19.68A
Rated max. charge controller output
60A

INTERCONNECTION SYSTEM EQUIPMENT
ETL
Interlock
POWER SOURCE

01 02 03 04 X1 12 13 14

MODEL NUMBER MNE125STMM
 MNE250XW MNE250DR/TR
 MNE175DR/TR MNE250DR/TR
 NOTTAGUTTER DC ONLY
 RIGHT LITE SCRR 5KA 1P/1P

ELECTRICAL RATINGS: SCRR 5KA 1P/1P
DC BATTERY INPUT OUTPUT 120VDC/15A MAX. 270 AMP'S MAX.
DC PV INPUT OUTPUT 150VDC/15A MAX. 270 AMP'S MAX.
DC PV INPUT OUTPUT 150VDC/15A MAX. 270 AMP'S MAX.
DC PV INPUT OUTPUT 150VDC/15A MAX. 270 AMP'S MAX.

CAUTION: RISK OF ELECTRIC SHOCK. MORE THAN ONE EQUIPMENT SWITCH MAY BE REQUIRED TO BE ENERGIZED. THE EQUIPMENT SERVICE SERVICES.

CAUTION: GROUND BETWEEN CONDUIT CONNECTION IS NOT PERMITTED AND MUST BE PROVIDED AS PART OF THE INSTALLATION.

AVERTISSEMENT: UNTEIL EQUIPMENT REFERRE FERRERIE PLUMBERIE CONDUIRE SOLUS TENDRE VOIR LE SCHEMA.

ATTENTION: UNTEIL EQUIPMENT REFERRE FERRERIE PLUMBERIE CONDUIRE SOLUS TENDRE VOIR LE SCHEMA.

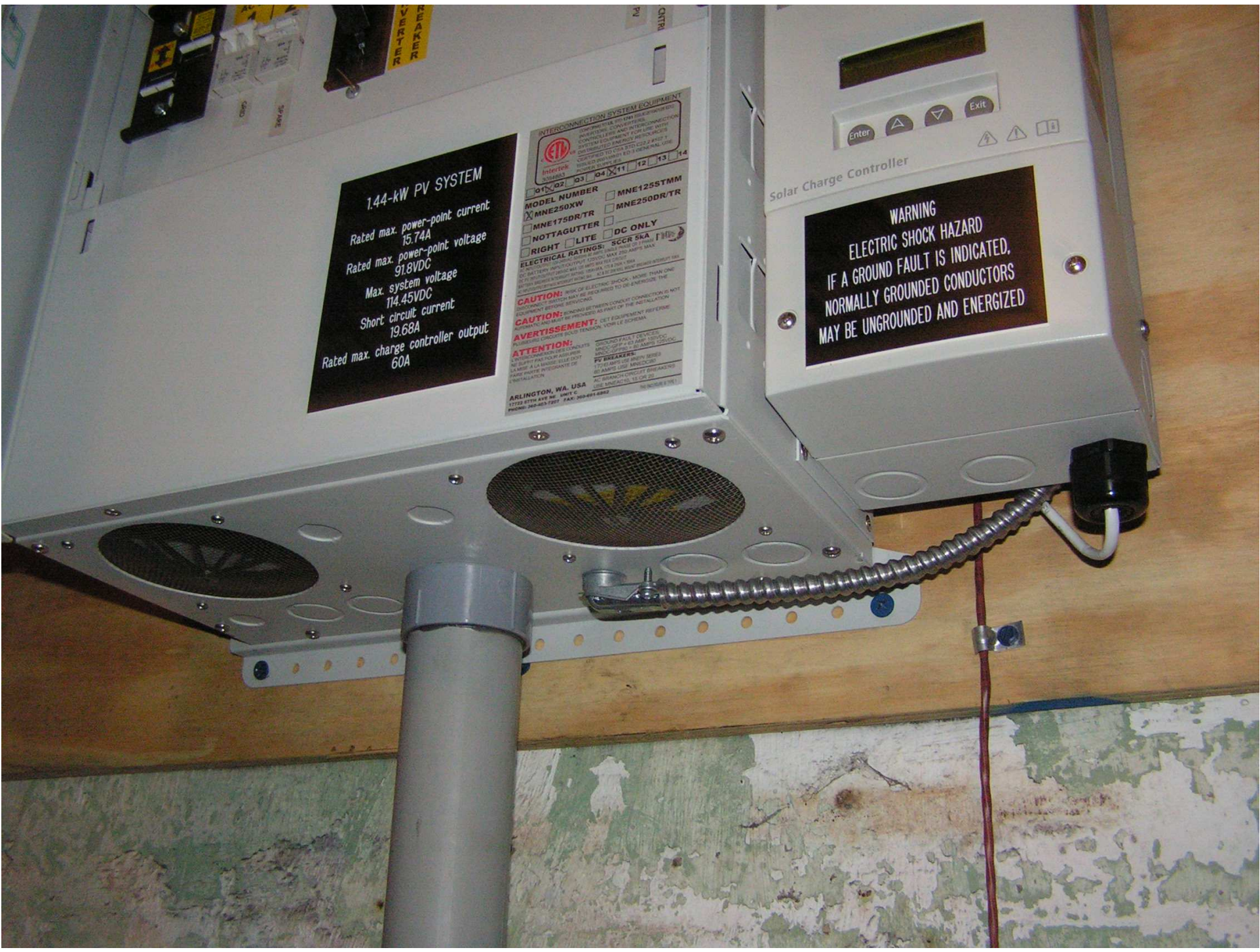
ARLINGTON, WA, USA
17722 17TH AVE NE UNIT C
PHONE: 360-651-7927 FAX: 360-651-6882

Solar Charge Controller

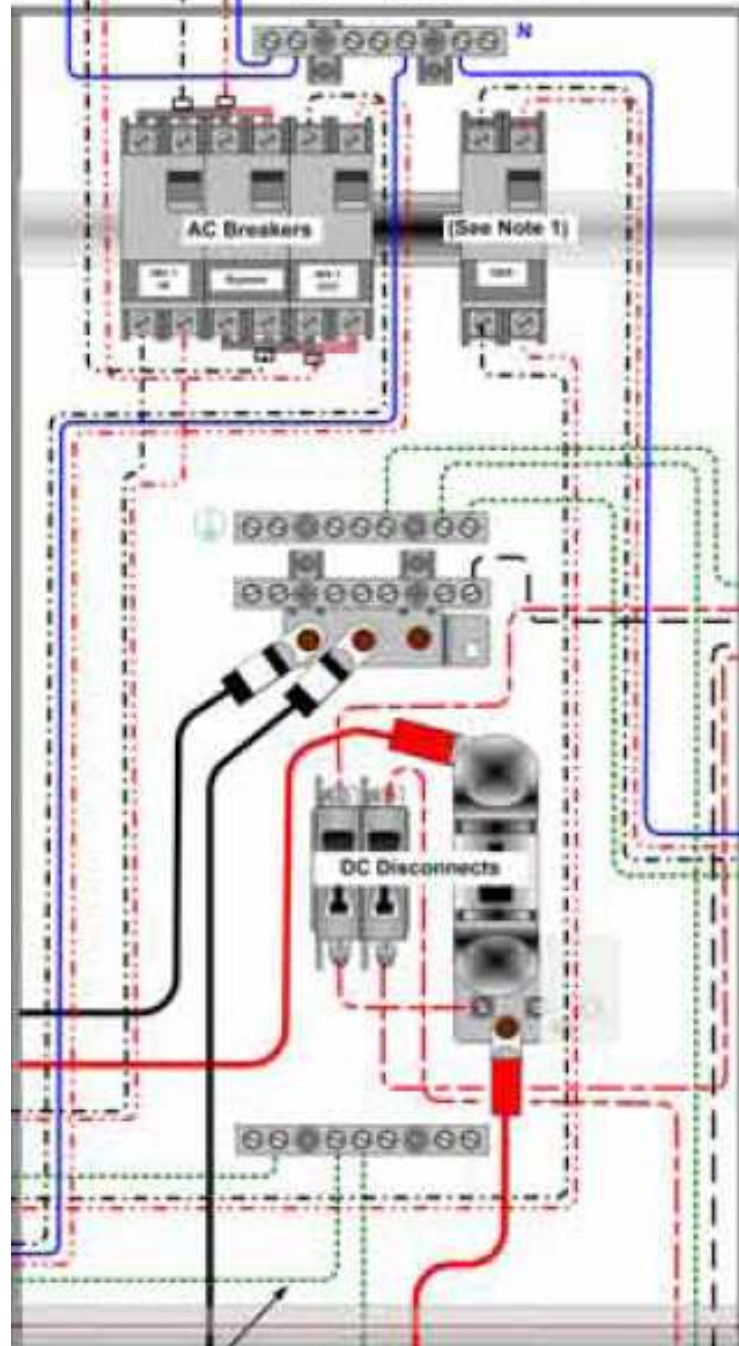
WARNING
ELECTRIC SHOCK HAZARD
IF A GROUND FAULT IS INDICATED,
NORMALLY GROUNDED CONDUCTORS
MAY BE UNGROUNDED AND ENERGIZED

Enter [Up] [Down] Exit

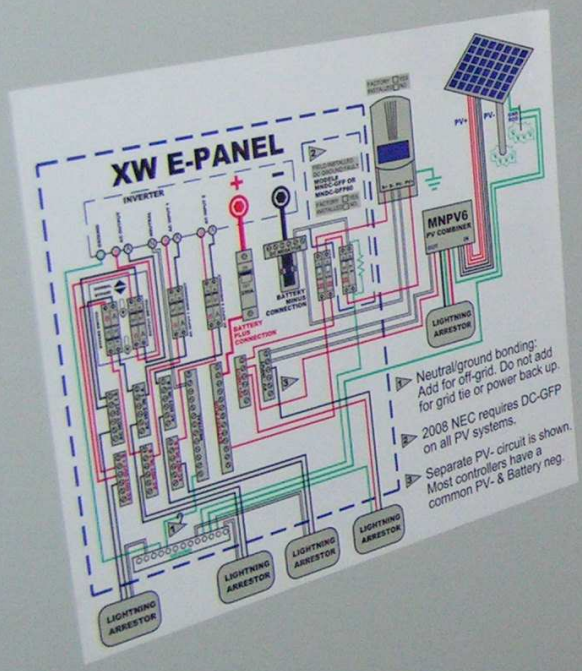
⚠ ⚠ ⚠



Xantrex XW Power Distribution Panel



Standby/Critical Loads Panel



AC IN 1 **AC IN 2**

60A - 02 60A - 02

GRID SPARE

DC INVERTER BREAKER

ON

SOLAR PV **CHARGE CNTRL**

30A 60A

15 MA 15 MA

1.44-kW PV SYSTEM

Rated max. power-point current 15.74A

Rated max. power-point voltage 91.8VDC

Max. system voltage 114.45VDC

Short circuit current 19.68A

Rated max. charge controller output 60A

INTERCONNECTION SYSTEM EQUIPMENT

Complies to UL 310, UL 1741, IEEE 1547, IEEE 1547-2003, IEEE 1547-2018, IEEE 1547-2018-AM1, IEEE 1547-2018-AM2, IEEE 1547-2018-AM3, IEEE 1547-2018-AM4, IEEE 1547-2018-AM5, IEEE 1547-2018-AM6, IEEE 1547-2018-AM7, IEEE 1547-2018-AM8, IEEE 1547-2018-AM9, IEEE 1547-2018-AM10, IEEE 1547-2018-AM11, IEEE 1547-2018-AM12, IEEE 1547-2018-AM13, IEEE 1547-2018-AM14, IEEE 1547-2018-AM15, IEEE 1547-2018-AM16, IEEE 1547-2018-AM17, IEEE 1547-2018-AM18, IEEE 1547-2018-AM19, IEEE 1547-2018-AM20, IEEE 1547-2018-AM21, IEEE 1547-2018-AM22, IEEE 1547-2018-AM23, IEEE 1547-2018-AM24, IEEE 1547-2018-AM25, IEEE 1547-2018-AM26, IEEE 1547-2018-AM27, IEEE 1547-2018-AM28, IEEE 1547-2018-AM29, IEEE 1547-2018-AM30, IEEE 1547-2018-AM31, IEEE 1547-2018-AM32, IEEE 1547-2018-AM33, IEEE 1547-2018-AM34, IEEE 1547-2018-AM35, IEEE 1547-2018-AM36, IEEE 1547-2018-AM37, IEEE 1547-2018-AM38, IEEE 1547-2018-AM39, IEEE 1547-2018-AM40, IEEE 1547-2018-AM41, IEEE 1547-2018-AM42, IEEE 1547-2018-AM43, IEEE 1547-2018-AM44, IEEE 1547-2018-AM45, IEEE 1547-2018-AM46, IEEE 1547-2018-AM47, IEEE 1547-2018-AM48, IEEE 1547-2018-AM49, IEEE 1547-2018-AM50, IEEE 1547-2018-AM51, IEEE 1547-2018-AM52, IEEE 1547-2018-AM53, IEEE 1547-2018-AM54, IEEE 1547-2018-AM55, IEEE 1547-2018-AM56, IEEE 1547-2018-AM57, IEEE 1547-2018-AM58, IEEE 1547-2018-AM59, IEEE 1547-2018-AM60, IEEE 1547-2018-AM61, IEEE 1547-2018-AM62, IEEE 1547-2018-AM63, IEEE 1547-2018-AM64, IEEE 1547-2018-AM65, IEEE 1547-2018-AM66, IEEE 1547-2018-AM67, IEEE 1547-2018-AM68, IEEE 1547-2018-AM69, IEEE 1547-2018-AM70, IEEE 1547-2018-AM71, IEEE 1547-2018-AM72, IEEE 1547-2018-AM73, IEEE 1547-2018-AM74, IEEE 1547-2018-AM75, IEEE 1547-2018-AM76, IEEE 1547-2018-AM77, IEEE 1547-2018-AM78, IEEE 1547-2018-AM79, IEEE 1547-2018-AM80, IEEE 1547-2018-AM81, IEEE 1547-2018-AM82, IEEE 1547-2018-AM83, IEEE 1547-2018-AM84, IEEE 1547-2018-AM85, IEEE 1547-2018-AM86, IEEE 1547-2018-AM87, IEEE 1547-2018-AM88, IEEE 1547-2018-AM89, IEEE 1547-2018-AM90, IEEE 1547-2018-AM91, IEEE 1547-2018-AM92, IEEE 1547-2018-AM93, IEEE 1547-2018-AM94, IEEE 1547-2018-AM95, IEEE 1547-2018-AM96, IEEE 1547-2018-AM97, IEEE 1547-2018-AM98, IEEE 1547-2018-AM99, IEEE 1547-2018-AM100.

Model Number Selection:

Q1 Q2 Q3 Q4 11 12 13 14

Model Number: MNE250XW MNE125STMM

MNE175DR/TR MNE250DR/TR

NOTTAGUTTER RIGHT LITE DC ONLY

ELECTRICAL RATINGS: SCGR 5KA

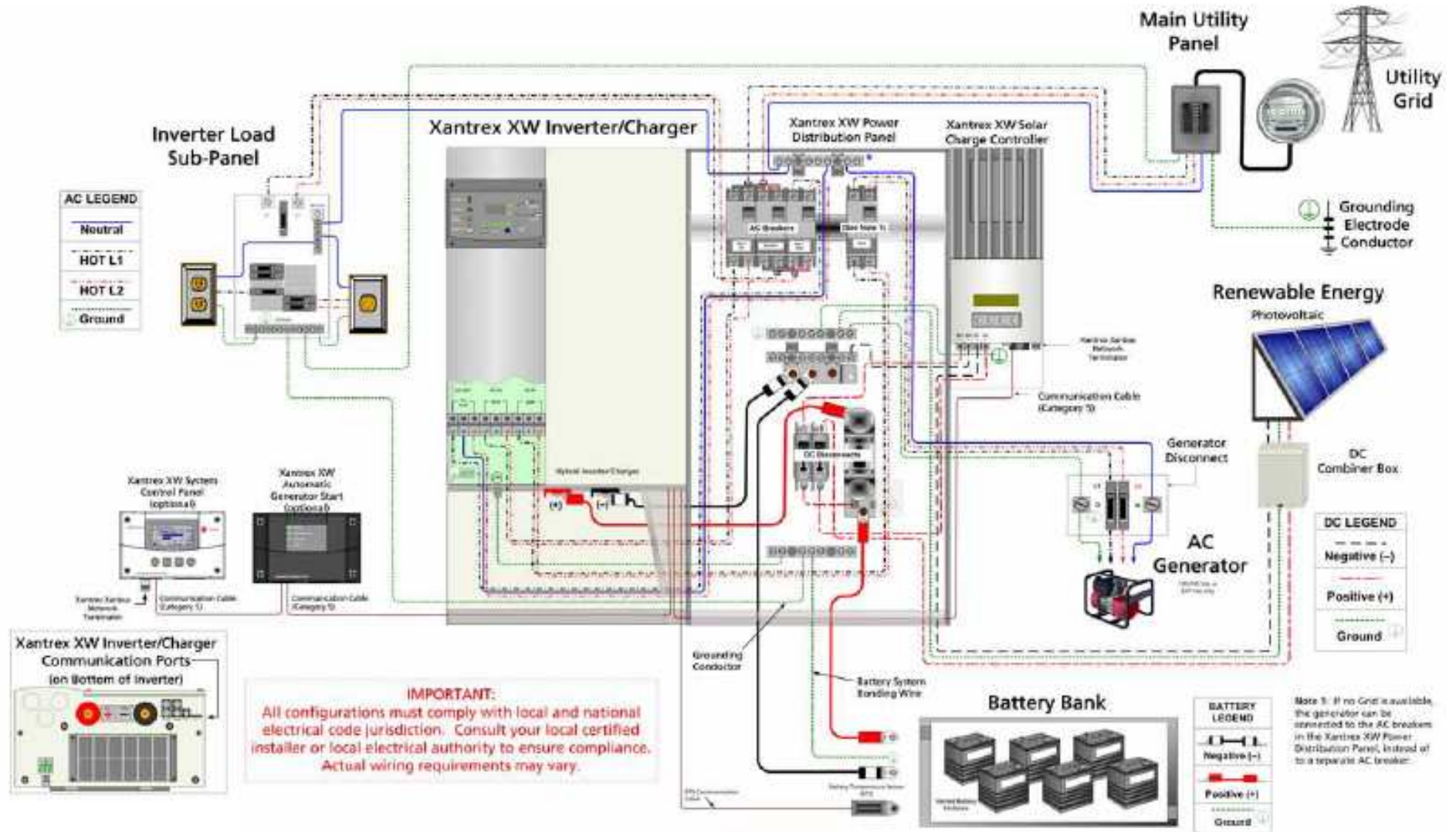
CAUTION: READ ALL INSTRUCTIONS BEFORE USING THIS EQUIPMENT. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY BE NEARLY AS DANGEROUS AS FAILURE TO FOLLOW THE INSTRUCTIONS FOR THE EQUIPMENT.

CAUTION: NEVER TOUCH THE EQUIPMENT WHEN IT IS ENERGIZED. ALWAYS USE THE PROPER SAFETY PROCEDURES.

ATTENTION: THIS EQUIPMENT IS NOT TO BE USED FOR ANY OTHER PURPOSES THAN THE INTENDED USE. ALWAYS FOLLOW THE INSTRUCTIONS FOR THE EQUIPMENT.

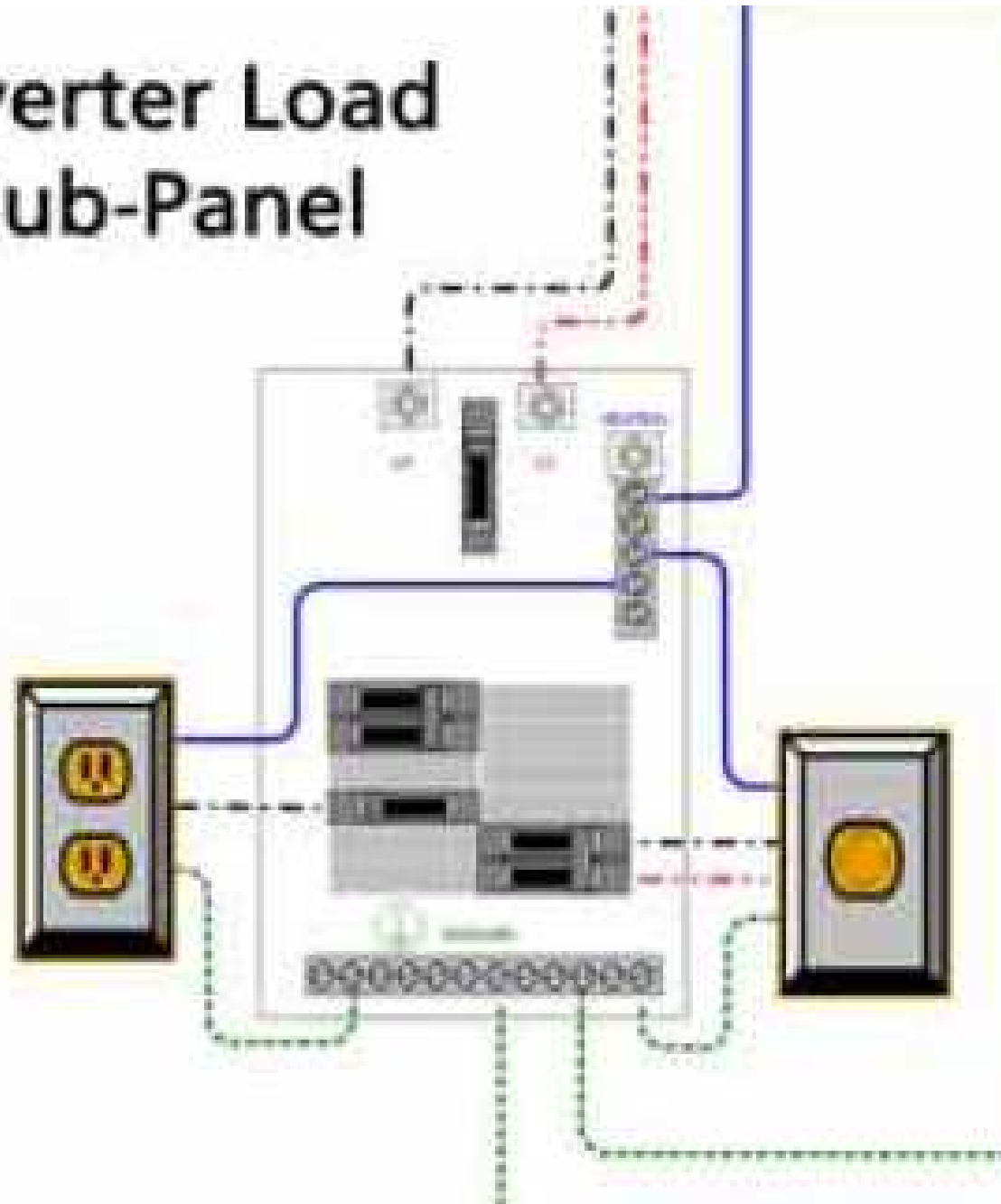
ARLINGTON, WA, USA

Single-Inverter System Renewable Energy (Solar)

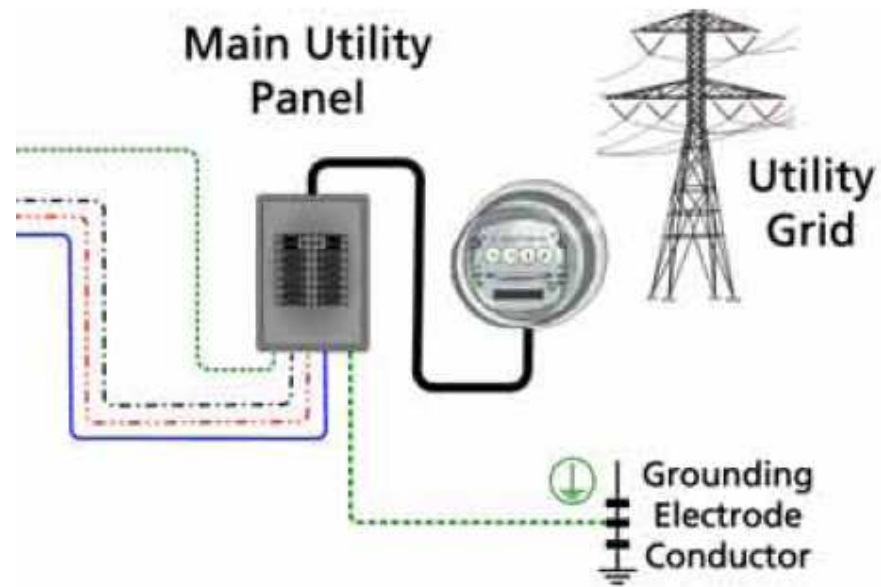


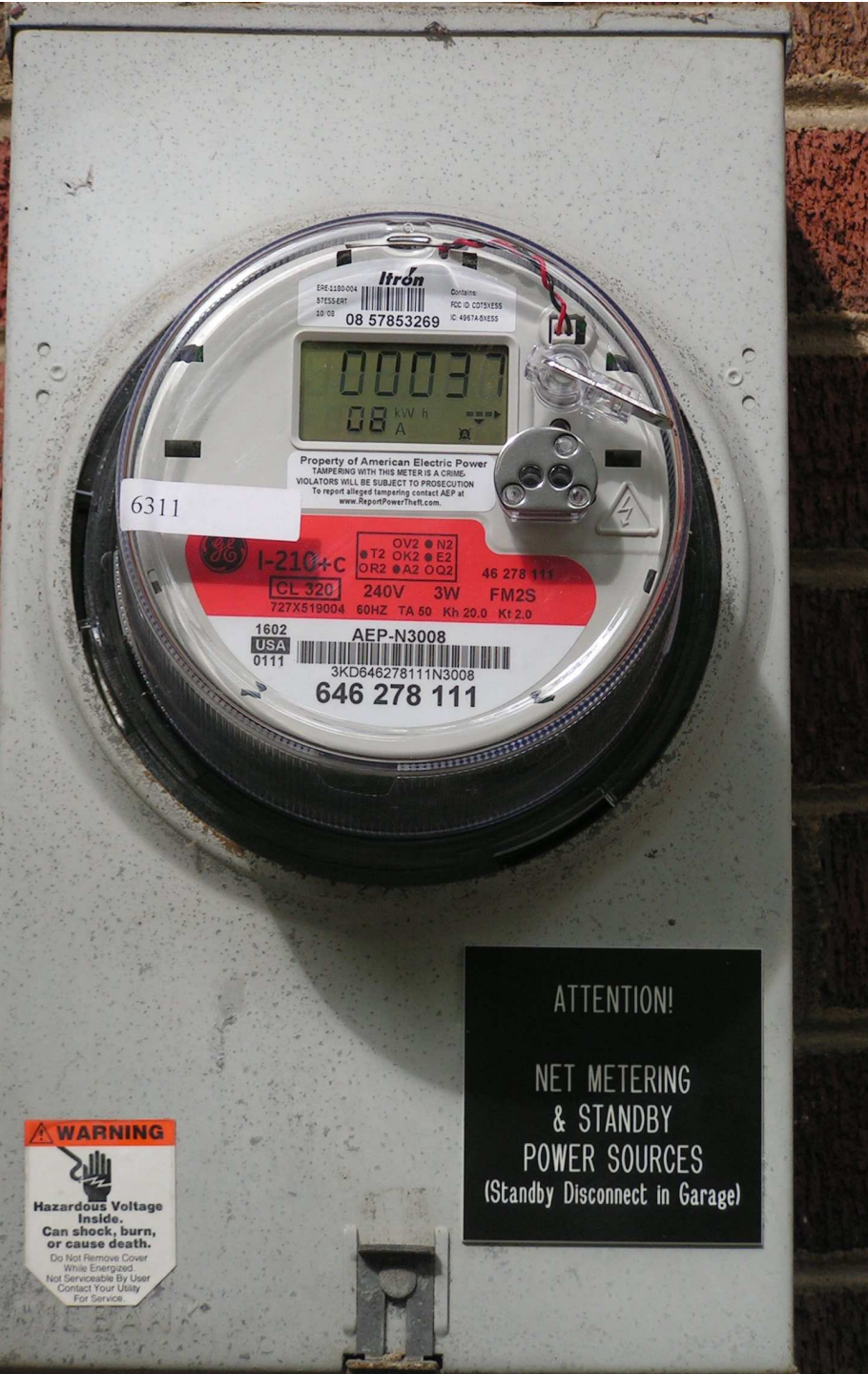


Inverter Load Sub-Panel









Itron
ERE1100004
STESSERT
10/00
08 57853269
Contains
FCC ID: C075V555
C: 4967A8N555

00037
08 kW h
A

Property of American Electric Power
TAMPERING WITH THIS METER IS A CRIME
VIOLATORS WILL BE SUBJECT TO PROSECUTION
To report alleged tampering contact AEP at
www.ReportPowerTheft.com

6311

GE I-210+C
OV2 ● N2
● T2 ● OK2 ● E2
OR2 ● A2 ● OQ2
46 278 111
CL 320 240V 3W FM2S
727X519004 60HZ TA 50 Kh 20.0 Kt 2.0

1602
USA
0111
AEP-N3008
3KD646278111N3008
646 278 111

ATTENTION!
NET METERING
& STANDBY
POWER SOURCES
(Standby Disconnect in Garage)

WARNING

**Hazardous Voltage
Inside.
Can shock, burn,
or cause death.**
Do Not Remove Cover
While Energized
Not Serviceable By User
Contact Your Utility
For Service.



Itron
ERE1480-004
STESSERT
10/09
08 57853269
Contains
FCC ID: C07S558
IC: 4697A-S558

00000
07 kW h
A

Property of American Electric Power
TAMPERING WITH THIS METER IS A CRIME.
VIOLATORS WILL BE SUBJECT TO PROSECUTION
To report illegal tampering contact AEP at
www.ReportPowerTheft.com

6311

GE I-210+C
CL 320 240V 3W FM2S 46 278 111
727X519004 60HZ TA 50 Kh 20.0 Kt 2.0

1602
USA
0111
AEP-N3008
3KD646278111N3008
646 278 111

WARNING

**Hazardous Voltage
Inside.**
**Can shock, burn,
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Do Not Remove Cover
While Energized
Not Serviceable By User
Contact Your Utility
For Service.

ATTENTION!
**NET METERING
& STANDBY
POWER SOURCES**
(Standby Disconnect in Garage)

Schneider Electric

Alert/Warning



Standby

MPPT60 00: Home

Output		0.0A
Battery	51.1V	0W
State	NotCharging	
Harvest	8Ah	0.5kWh
↕setup		system↕

Enter



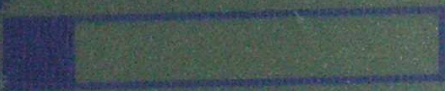
Exit

Xantrex XW SCP

ning



XW6048 00: Home

Status		AC Passthru
Battery	0.0A	51.3V
Load		1056W
AC1	120V	-1094W
◆setup		system◆

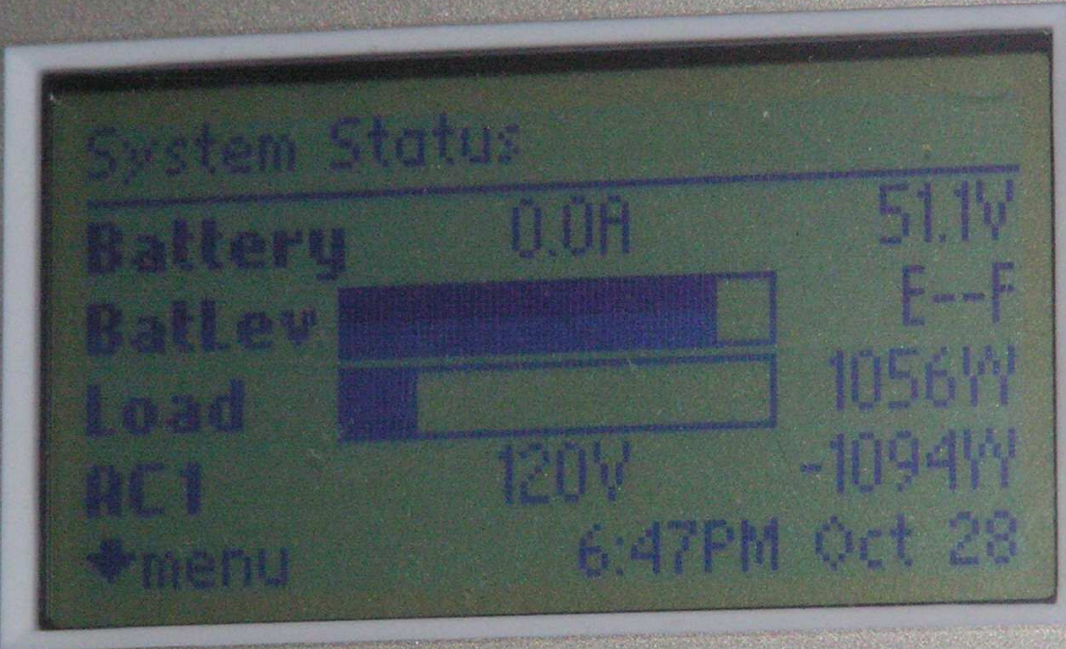
Enter



Exit

Electric

ing



Enter



Exit



Schneider Electric

Fault/Warning

MPPT&D 00: Meters

PV In Power	175W	
PV In	1.7A	101V
DC Out Power	175W	
DC Out	3.3A	53.3V

Standby

Enter ▲ ▼ Exit


Xantrex XW SCP

Schneider Electric

Fault/Warning

 Standby

System Status

Battery	-0.6A	53.7V
Battery		E--F
Load		319W
AC1	122V	-445W
menu	12:05PM	Oct 29

Enter   Exit


Xantrex XW SCP

Schneider
Electric

Fault/Warning

 Standby

XW6048 00: Home

Status		SellToGrid
Battery	-3.1A	53.4V
Load		328W
ACI	122V	-451W
setup		system

Enter





Exit

Xantrex XW SCP