



**INSTALLATION AND OPERATING
INSTRUCTIONS**

INSTRUCTIONS D'INSTALLATION

IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

**EQUINOX
DC RECOMBINER BOXES**



Document # A1293-I-001



REV.	ECRA#	DESC.	DATE	AUTHOR
5	-	CHANGED EQUINOX 300 TO 375	2/10/10	J.S.
7	-	ADDITIONAL UPDATES	2/09/11	J.S.
2	-	ADDITIONAL UL1741 Requirements	8/4/09	J.S.
3	-	ADDED EQUINOX 300	12/10/09	J.S.
4	-	UPDATES FOR CSA LISTING	2/3/10	J.S.

IMPORTANT SAFETY INSTRUCTIONS

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SAVE THESE INSTRUCTIONS- THIS MANUAL CONTAINS IMPORTANT INSTRUCTIONS FOR MODELS EQUINOX 375, EQUINOX 750, EQUINOX 1200, AND EQUINOX 2000 THAT SHALL BE FOLLOWED DURING INSTALLATION AND MAINTENANCE OF THE RECOMBINER BOXES.

YOU MUST FOLLOW THESE INSTRUCTIONS DURING INSTALLATION AND/OR MAINTENANCE OF THESE RECOMBINER BOXES

WARNING! THE INSTALLATION, ADJUSTMENT, OR REPAIR OF COMBINER BOXES INVOLVES RISK OF CONTACT WITH POTENTIALLY LETHAL VOLTAGES AND CURRENTS.

ATTENTION! L'INSTALLATION, REGLAGE, DES REPARATIONS OU DES COMBINEUR IMPLIQUE LE RISQUE BOITES DE CONTACT AVEC LES TENSIONS POTENTIELLEMENT MORTELLE ET LES COURANTS.

WARNING! UNIT ONLY TO BE SERVICED WHEN DISCONNECTED FROM ALL SOURCES OF SUPPLY.

ATTENTION! SEULE UNITÉ DE SERVICE DOIT ÊTRE ASSURÉ EN CAS DE DÉCONNEXION DE TOUTES LES SOURCES D'APPROVISIONNEMENT.

WARNING! THESE SERVICING INSTRUCTIONS ARE FOR USE BY QUALIFIED PERSONNEL ONLY. TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING OTHER THAN THAT SPECIFIED IN THE OPERATING INSTRUCTIONS UNLESS YOU ARE QUALIFIED TO DO SO.

ATTENTION! CES INSTRUCTIONS D'ENTRETIEN SONT À USAGE PAR UN PERSONNEL QUALIFIÉ UNIQUEMENT. POUR RÉDUIRE LE RISQUE DE CHOC ÉLECTRIQUE, NE PAS EFFECTUER TOUTE ENTRETIEN AUTRE QUE CELLE INDIQUÉE DANS LE MODE D'SAUF SI VOUS ÊTES QUALIFIÉ POUR LE FAIRE.

Installers should be advised:

- These installation instructions are for use by qualified personnel only.
- The equipment contains lethal DC voltages.
- Site access is intended for authorized personnel only.
- The electrical quick-connects are not for current interrupt. Do not disconnect the quick-connects unless the system is open-circuited and has been checked for a short circuit.
- The inverters contain energy storage devices that require 15 minutes in order to safely discharge their lethal voltages.
- Don not install the recombiner box in wet rooftop conditions (i.e. in the presence of rain, snow, or ice).
- Handle broken or damaged PV modules with extreme caution.

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- Any system work that occurs within six feet of a roof edge must be performed by workers equipped with fall protection.
- Maximum Ambient temperature for guaranteed operation is 50°C.

Installers must reference the National Electric Code (NEC) sections 250 and 690 to ensure proper system wiring and grounding compliance. In addition, all state and federal Occupational Safety and Health Administration (OSHA) guidelines and regulations must be followed.

1. EXPLANATION OF SYMBOLS



ELECTRICAL SHOCK HAZARD- These labels are used to mark components where potentially lethal voltages exist.



GROUND- This identifies the equipment grounding points.

2. DESCRIPTION

PRODUCT DESCRIPTION

The DC recombiner box provides a means of combining multiple source circuits from a PV array into a single DC source. Each source circuit is fused separately according to the requirements of the National Electric Code (NEC). The recombiner box allows for fail-safe operation of the system in the unlikely event that a problem with a source circuit leads to abnormally high current. In addition, the recombiner box provides a convenient means of diagnosing the DC portion of a PV system for routine maintenance and troubleshooting.

SPECIFICATIONS

Model	Maximum # Of Strings	Maximum Fuse Capacity Per String (DC)	Maximum Output Current (DC)	Maximum Output Wire Size	Number of Output Poles
EQUINOX 375	4	200 Amps	375 Amps	500MCM	1
EQUINOX 750	8	200 Amps	750 Amps	500MCM	2
EQUINOX 1200	12	200 Amps	1200 Amps	600MCM	4
EQUINOX 2000	20	200 Amps	2000 Amps	600MCM	4

Power information (All Models)

Maximum Input Voltage: 600VDC

Range of Operating Voltage: 0-600VDC

Maximum Short Circuit Current Rating: 10kA RMS

Normal Operational Temperature Range: -15°C to 50°C

COMPONENTS

The recombiner box is a pre-wired, wall or floor mounted electrical enclosure containing the following components:

- **Fuse blocks-** Fuse holders
- **Positive Bus Bar-** Copper bar used to combine all positive inputs.
- **Negative Bus Bar-** Copper bar used to combine all negative inputs.
- **Ground Bus Bar-** Copper bar used to combine individual array grounds to system ground.
- **Plastic Shields-** Plastic guards acting as a means of safety to prevent incidental contact with live parts
- **Insulators-** Plastic standoffs used to isolate the electricity between the buss bars and the metal backplane and enclosure.
- **Mounting Kit-** Hardware used to secure enclosure to wall or ground. (Equinox 375, 750, and 1200 only.) Equinox 2000 is to be bolted to the ground using a minimum of ½” hardware (not included.)

3. REQUIRED TOOLS AND MATERIALS

TOOLS

Standard construction and electrical tools along with basic electrical safety and testing instruments are required for the installation of the recombiner box. In addition to this, installation requires the following:

- **Multimeter**
- **Phillips Screwdriver**
- **Torque Wrench**
- **Electrical Safety Gloves**
- **Allen Wrench Set (including 7/16 and 3/16 for power distribution blocks)**
- **Wire Strippers**
- **Permanent Marking Device**
- **Level**

MATERIALS

- **Tie wraps**
- **Liquid tight conduit hubs (NEMA 4 rating minimum)**
- **Torque Seal (Optional)**

NOTE: IN ADDITION TO TOOLS AND MATERIALS REQUIRED, INSTALLERS MUST REFERENCE THE SPECIFIC SITE SCOPE AND PROJECT DRAWINGS FOR ADDITIONAL INFORMATION AND CONSIDERATIONS, INCLUDING THE SYSTEM LAYOUT AND ANY RELATED ELECTRICAL DRAWINGS.

4. INSTALLATION PROCEDURE

1. PREPARING THE RECOMBINER BOX FOR MOUNTING

1.1 Refer to the project drawings to identify the mounting location and any specific recombiner box location requirements or special instructions. You must mount the box in a position/location where the door is easily accessible.

1.2 Included with your Equinox Recombiner is a kit of mounting hardware. (Equinox 375, 750 and Equinox 1200 only.)

1.3 Refer to the layout diagram of the array and secure the enclosure to a rigid substrate using a minimum of 1/4" stainless hardware. For the Equinox 2000, use a minimum of 1/2" hardware (not provided) to secure the enclosure.

1.4 Refer to the information nameplate on the front door of the enclosure to find the model number. Refer to the appendix in the rear of this manual to identify acceptable punchout locations. Use only water tight conduit fittings to connect the conduit to the punchouts. All hubs must comply with the requirements of UL 514B, "Standards for Fittings for Conduit and Outlet Boxes," and must be rated NEMA 4 minimum to maintain enclosure rating.

DO NOT INSTALL CONDUIT ON UPWARDS FACING SIDES OF THE ENCLOSURE. This is meant to reduce the likelihood of rainwater penetrating into the enclosure.

2. CONNECTING WIRES FROM THE ARRAY*

**In this section it is assumed that all arrays are negatively grounded. To positively ground arrays, route the negative conductors to the fuse blocks and the positive conductors to the bus bar without fuses (labeled as the unfused bar).*

Class 1 wiring methods are to be used for field wiring connections to terminals of a Class 2 circuit.

2.1 Label each wire from the array with a reference number as well a polarity.

2.2 Run all cables into the recombiner box through the watertight hub.

2.3 Strip 3/4" from all of the cables.

2.4 Terminate all positive wires on corresponding fuses.

2.5 Terminate all negative wires on negative bus.

2.6 Use Tie wraps and bridge punching on backplate to secure incoming conductors onto backplate.

2.7 Use torque and wiring guidelines from Recombiner Box Backplate or the Appendix in the back of this manual to torque components to proper specifications.*

****Due to the inherent expansion and contraction of metals when subjected to temperature changes, we suggest re-torque all components on annual scheduled basis.***

3. ATTACHING POSITIVE AND NEGATIVE TERMINALS TO THE INVERTER

3.1 After referring to the electrical drawings to determine which wire to use, connect all three conductors (positive, negative, and ground) to either the inverter or DC switch, depending on the system.

3.2 Use torque guidelines from Recombiner Box Backplate or the Appendix in the back of this manual to torque output terminals to proper specifications.

3.3 After components have been properly torqued, permanently mark the hex nuts so that any change in the rotation will be easily discerned. Use either torque seal or a permanent marker. See backpan for torquing information.

3.4 Refer to the single-line drawings to identify the correct wire and conduit, then install the conduit and pull the wire from the recombiner box to the inverter or DC switch.

4. INSTALL FUSES

4.1 If not installed, insert a fuse into each holder. Be sure to use only fuses of the proper rating. Fuse sizing can be determined by $1.56 \times I_{sc}$ of the corresponding modules.

5. VERIFYING VOLTAGE, POLARITY

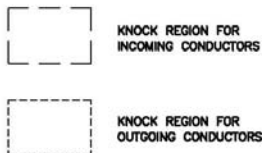
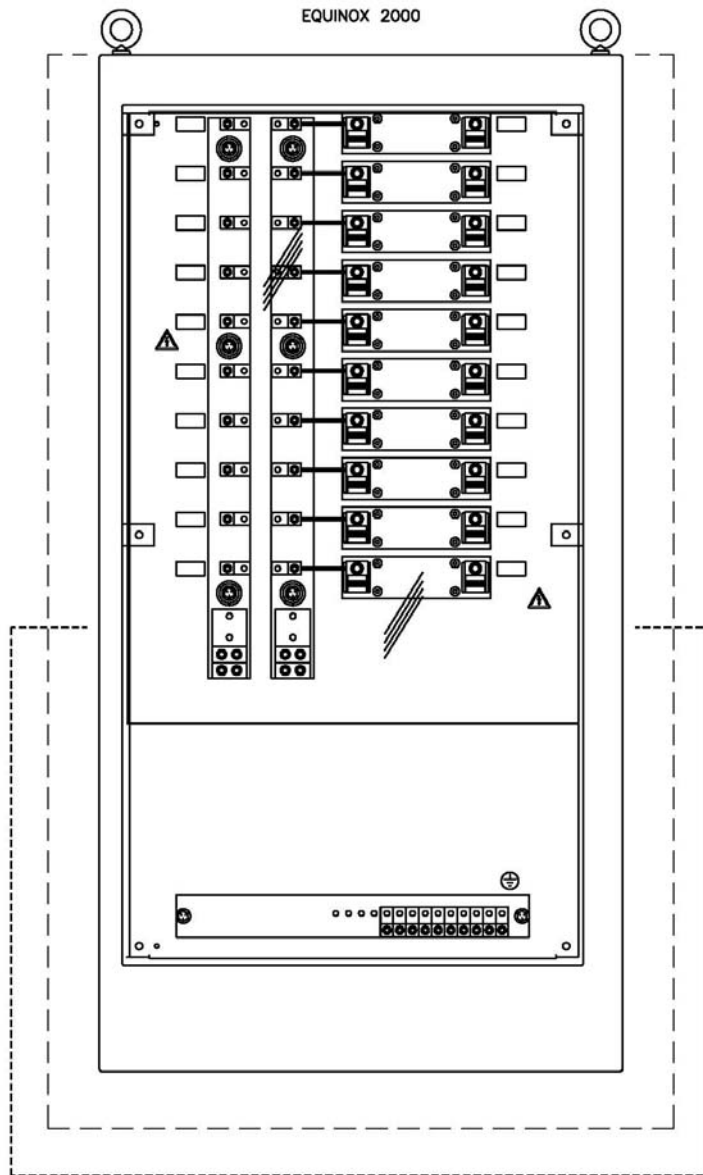
5.1 Using a multimeter, test the voltage of each string by measuring between the array side of the fuse block and the negative bus bar. Ensure that each string has the proper polarity.

6. FINALIZING INSTALLATION

6.1 Be sure that the inverter has been turned off.

6.2 Verify that all fuses are properly mounted.

The system is now ready to be energized.

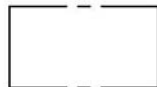
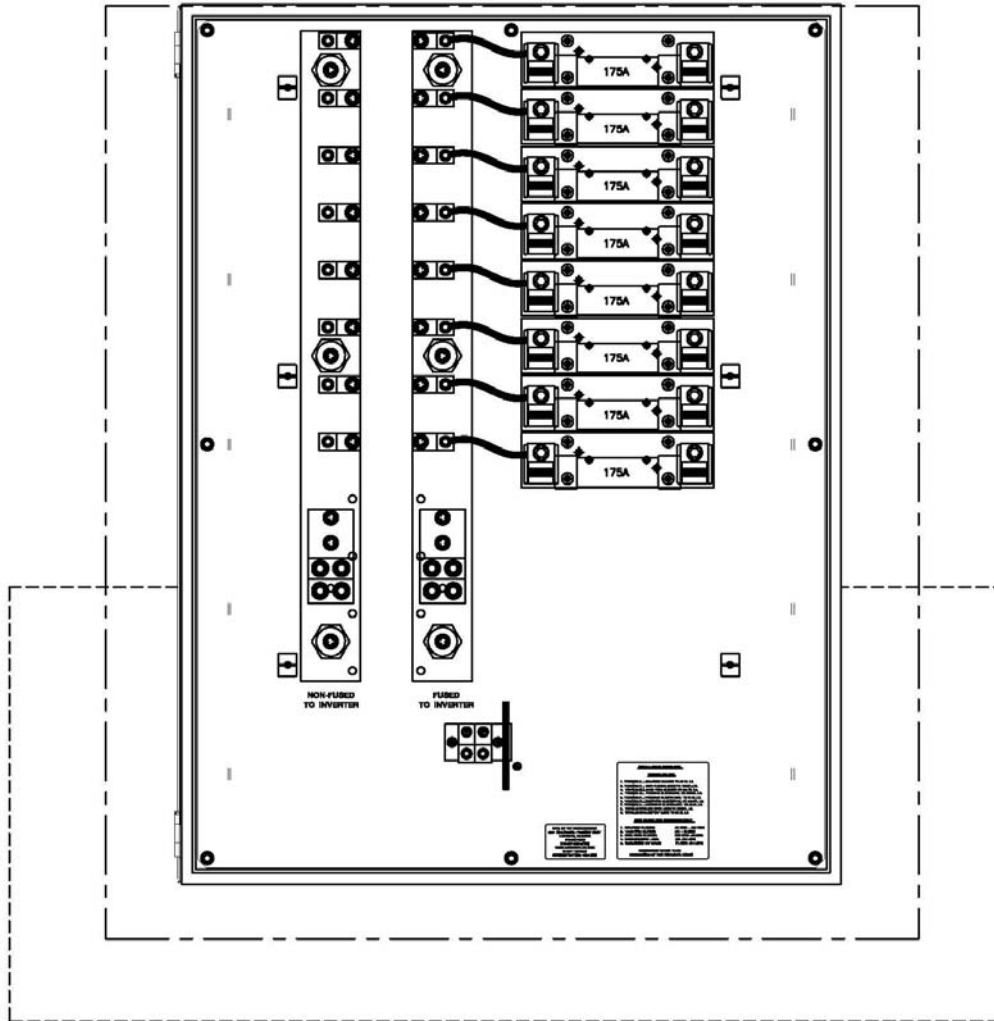


EQUINOX 2000 OR 1200-FREESTANDING KNOCKOUT LOCATIONS

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KNOCKOUT REGION FOR
INCOMING CONDUCTORS



KNOCKOUT REGION FOR
OUTGOING CONDUCTORS

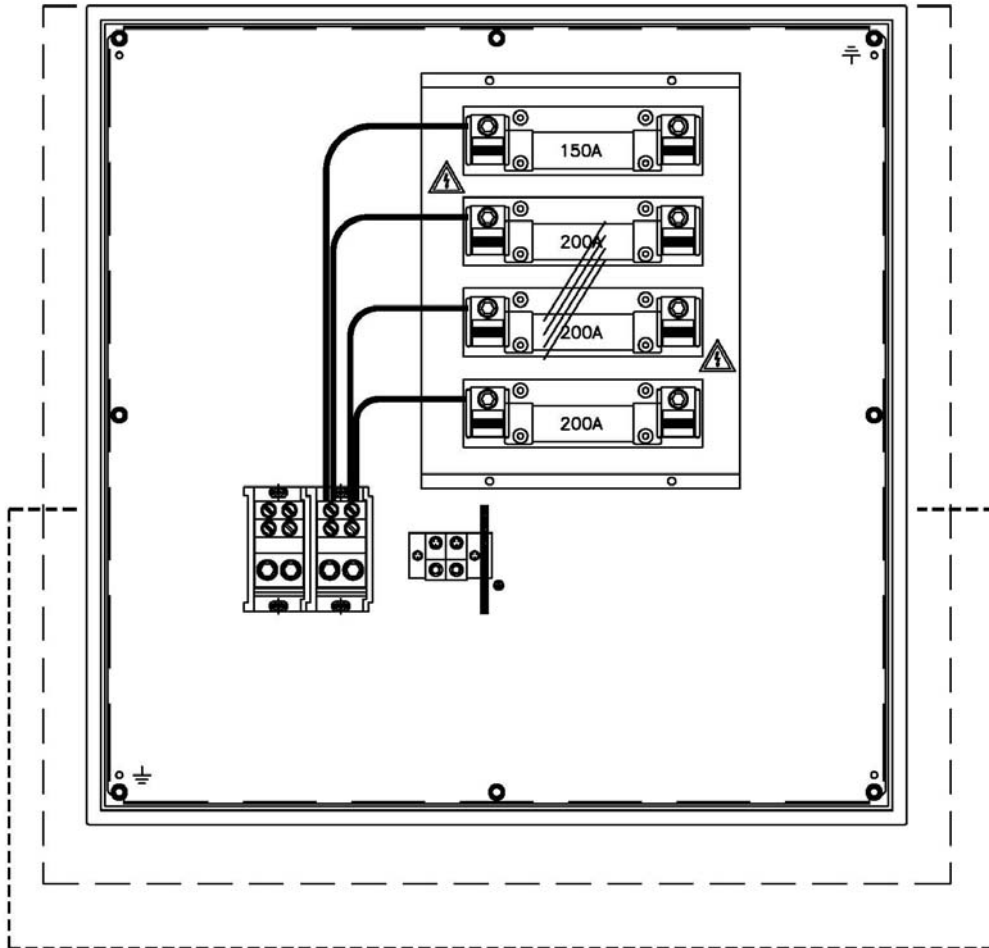
EQUINOX 1200- WALL MOUNT KNOCKOUT LOCATIONS

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EQUINOX 750



KNOCK REGION FOR
INCOMING CONDUCTORS



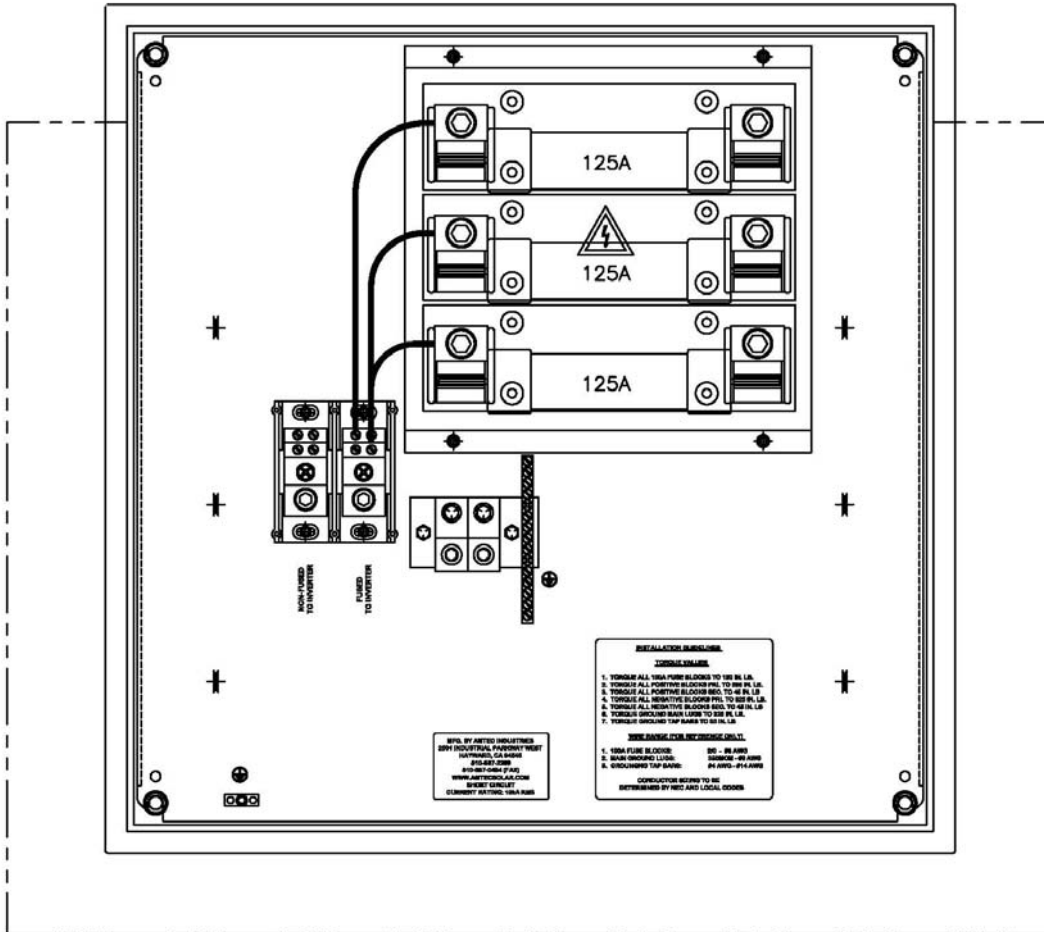
KNOCK REGION FOR
OUTGOING CONDUCTORS

EQUINOX 750 KNOCKOUT LOCATIONS

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KNOCKOUT REGION FOR
 BOTH INCOMING AND
 OUTGOING CONDUCTORS

EQUINOX 375 KNOCKOUT LOCATIONS

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APPENDIX

TORQUE VALUES

All Values Given in In-Lbs.

	EQ-375	EQ-750	EQ-1200	EQ-2000
35 – 60A FUSEHOLDERS	45	45	45	45
65 – 100A FUSEHOLDERS	120	120	120	120
110 – 200A FUSEHOLDERS	375	375	375	375
NEGATIVE INCOMING	50	50	325	325
POS. & NEG. OUTPUT	500	375	375	375
GROUND PRIMARY	325	325	325	325
GROUND SECONDARY	35	35	35	-

WIRE RANGES

For Reference Only

All Values in A.W.G. (Unless Otherwise Noted)

	EQ-375	EQ-750	EQ-1200	EQ-2000
35 – 60A FUSEHOLDERS	2 – 14AWG	2 – 14AWG	2 – 14AWG	2 – 14AWG
65 – 100A FUSEHOLDERS	2/0 – 6AWG	2/0 – 6AWG	2/0 – 6AWG	2/0 – 6AWG
110 – 200A FUSEHOLDERS	350MCM - 6	350MCM - 6	350MCM – 6	350MCM – 6
NEGATIVE INCOMING	2/0 – 14	2/0 – 14	350MCM – 6	350MCM – 6
POS. & NEG. OUTPUT	500MCM – 2	500MCM – 4	600MCM – 2	600MCM - 2
GROUND PRIMARY	350MCM – 6	350MCM – 6	350MCM – 6	350MCM - 6
GROUND SECONDARY	4-14	4-14	4-14	-

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