



**INSTALLATION AND OPERATING  
INSTRUCTIONS**

**IMPORTANT SAFETY INSTRUCTIONS**

**SAVE THESE INSTRUCTIONS**

***INSTRUCTIONS D'INSTALLATION***

**PROMINENCE**

**DC COMBINER BOXES WITH  
600VDC CONTACTOR**



*Document # A1738-I-001*



REV.	ECRA#	DESC.	DATE	AUTHOR
0	-	ISSUED FOR RELEASE	05/01/11	JS

**IMPORTANT SAFETY INSTRUCTIONS**  
**SAVE THESE INSTRUCTIONS**

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*-Proprietary Information-*

SAVE THESE INSTRUCTIONS- THIS MANUAL CONTAINS IMPORTANT INSTRUCTIONS FOR PROMINENCE WITH CONTACTOR MODELS THAT SHALL BE FOLLOWED DURING INSTALLATION AND MAINTENANCE OF THE COMBINER BOXES.

**YOU MUST FOLLOW THESE INSTRUCTIONS DURING INSTALLATION AND/OR MAINTENANCE OF THESE COMBINER 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 combiner box in wet rooftop conditions (i.e. in the presence of rain, snow, or ice).

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- Handle broken or damaged PV modules with extreme caution.
- 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***

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



**GROUND-** This identifies the equipment grounding points.

## ***2. DESCRIPTION***

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### PRODUCT DESCRIPTION

The DC combiner box with contactor 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 combiner 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 combiner box provides a convenient means of diagnosing the DC portion of a PV system for routine maintenance and troubleshooting. With the integrated contactor, it allows for safe interrupt of current downstream of the combiner.

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## SPECIFICATIONS

Model	Max # Of Strings	Maximum Fuse Capacity Per String (DC)	Maximum Output Current (DC)	Maximum Output Wire Size	Number of Output Poles
PR-1-12C	12	16A	200 Amps	350MCM	1
PR-3-12C	12 X 3	16A	200 Amps (3 Outputs)	350MCM	3

## COMPONENTS

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

- **Fuse blocks-** Dead front 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.
- **Contactor-** DC contactor that interrupts voltage and current downstream of the combiner.
- **DC Circuit Breaker-** A current interrupting device able to open contactor for serviceability at the enclosure level.
- **Terminal Blocks-** Tie in terminals for customer to land both signal and 24VDC power wires.

### **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 combiner box. In addition to this, installation requires the following:

- **Multimeter**
- **Phillips Screwdriver**
- **Torque Wrench**
- **Electrical Safety Gloves**
- **Allen Wrench Set**
- **Wire Strippers**
- **Permanent Marking Device**
- **Level**

#### MATERIALS

- **Tie wraps**
- **Liquid tight conduit hubs**
- **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 COMBINER BOX FOR MOUNTING

1.1 Refer to the project drawings to identify the mounting location and any specific combiner 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 Prominence Combiner Box are mounting brackets to be affixed to the enclosure.

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.

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."

**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. WIRING IN THE DC CONTROL CIRCUIT.

2.1 Each contactor combiner box requires a 24VDC input. For boxes with indication at the Controller Box each contactor will require two additional wires, a NO signal wire and a NC signal wire.

2.2 Connect +24VDC and -24VDC to appropriate terminal blocks. For boxes with indication at the Controller Box connect the NO and NC wires to their respective terminals. Torque incoming control wires to 7 in-lbs.

2.3 Verify connections at both the incoming terminals in the Combiner box and outgoing terminals in the Control box are connected properly. Once confirmed power up the contactor controller box.

2.4 Verify 24VDC present between the +24VDC and -24VDC terminals.

2.5 Turn on CB-1 (and CB-2 and CB-3 if present). Verify contactor is operating correctly by placing one of the meter's probes on the respective fused busbar and the other end on the output lug of the contactor. Switch breakers on and off to verify functionality.

2.6 If troubleshooting is needed please refer to the schematic affixed to the inside of the door.

### 3. 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 negative bar).*

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

- 3.1 Label each wire from the array with a reference number as well a polarity.
- 3.2 Run all wires into the combiner box through the watertight hub.
- 3.3 Strip ½” from all of the wires.
- 3.4 Terminate all positive wires on corresponding fuse block.
- 3.5 Terminate all negative wires on negative bus bar tap.
- 3.6 Use Tie wraps and bridge punching on backplate to secure incoming wireways onto backplate.
- 3.7 Use torque and wiring guidelines from Combiner 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-torquing all components on an scheduled basis.***

### 4. ATTACHING POSITIVE AND NEGATIVE TERMINALS TO THE INVERTER

- 4.1 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.
- 4.2 Use torque guidelines from Combiner Box Backplate or the Appendix in the back of this manual to torque output terminals to proper specifications.

4.3 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.

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

## 5. INSTALL FUSES

5.1 Open all fuseblocks and insert a fuse into each. 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.

## 6. VERIFYING VOLTAGE, POLARITY

6.1 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.

## 7. TESTING EMO LOCKOUT

7.1 Verify that the Contactor Control Box is energized. Using a meter, confirm that voltage and current output on Fused busbars drops to zero when EMO button is depressed at Control Box.

## 8. FINALIZING INSTALLATION

8.1 Be sure that the inverter has been turned off.

8.2 Close all fuse blocks.

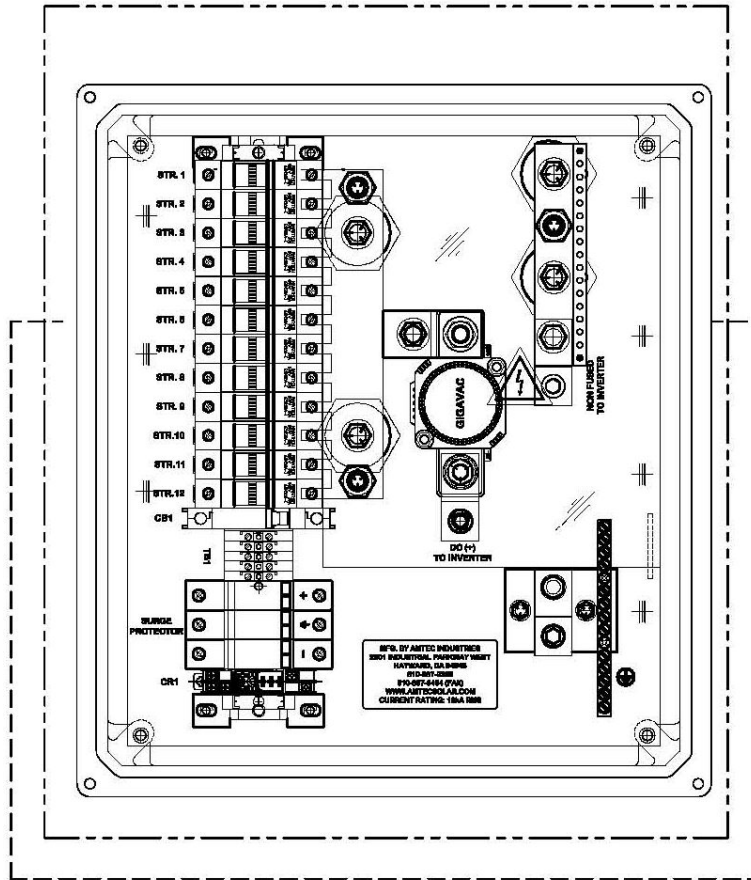
**8.3 Due to possible vibrations during shipment and expansion and contractions of copper due to thermal conditions AMtec suggests verifying torque on all power connections prior to energizing. These values can be found both on the backpan and in this manual.**

**The system is now ready to be energized.**

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KNOCKOUT REGION FOR  
INCOMING CONDUCTORS



KNOCKOUT REGION FOR  
OUTGOING CONDUCTORS

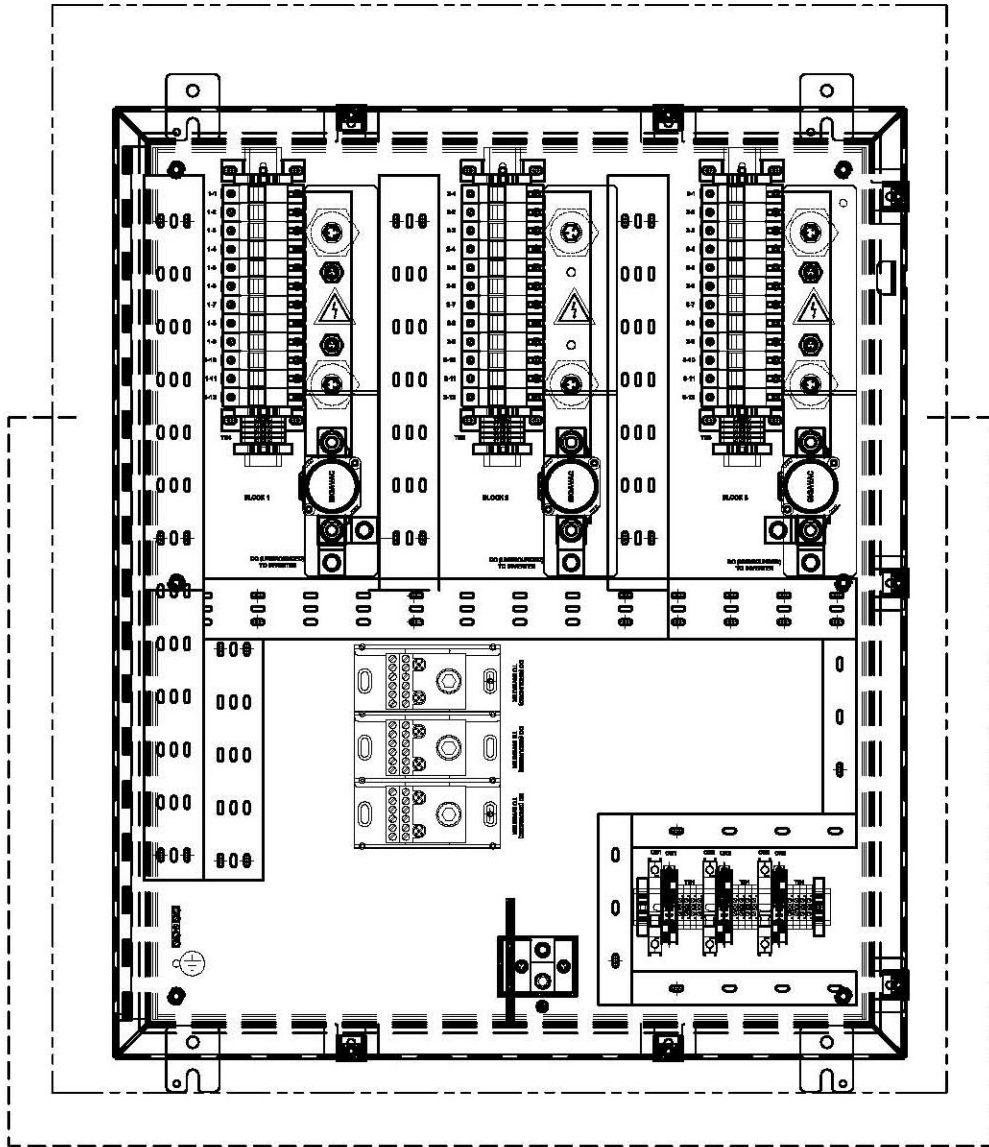
**PR-1-12C**



## **KNOCKOUT LOCATIONS**

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- 
KNOCKOUT REGION FOR  
INCOMING CONDUCTORS
  
- 
KNOCKOUT REGION FOR  
OUTGOING CONDUCTORS

## PR-3-12C KNOCKOUT LOCATIONS

# APPENDIX

## TORQUE VALUES

*All Values Given in In-Lbs.*

	PR-1-12C	PR-3-12C
<b>FUSE BLOCKS</b>	<b>15</b>	<b>15</b>
<b>FUSED OUTPUT LUGS</b>	<b>325</b>	<b>325</b>
<b>NON FUSED/GND TAP BARS</b>	<b>35</b>	<b>35</b>
<b>NON FUSED PRIMARY</b>	<b>325</b>	<b>325</b>
<b>NON FUSED/GND SECONDARY</b>	<b>325</b>	<b>325</b>
<b>GROUND PRIMARY</b>	<b>325</b>	<b>325</b>

## WIRE RANGES

*For Reference Only*

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

	PR-1-12C	PR-3-12C
<b>FUSE BLOCKS</b>	<b>6-14</b>	<b>6-14</b>
<b>FUSED OUTPUT LUGS</b>	<b>350MCM – 6</b>	<b>350MCM – 6</b>
<b>NON FUSED/GND TAP BARS</b>	<b>4-14</b>	<b>4-14</b>
<b>NON FUSED PRIMARY</b>	<b>350MCM - 6</b>	<b>350MCM - 6</b>
<b>NON FUSED/GND SECONDARY</b>	<b>4-14</b>	<b>4-14</b>
<b>GROUND PRIMARY</b>	<b>350MCM – 6</b>	<b>350MCM – 6</b>

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