2
Installation

GROUNDING

PLuS units come equipped with shielded cables that are ready to plug in. In order for that shielding to be effective, care must be taken to insure that a solid ground path exists between system components. Please observe the following recommended procedures:

1) Securely fasten the Keyboard/Controller to the control cabinet with the #10 nuts and star washers provided with the unit. The use of star washers will insure a good electrical connection between the Keyboard/Controller and the control cabinet.

2) If the control cabinet is not mounted directly to the machine, take care to insure a solid connection between the cabinet and the machine. A braided grounding strap or 12 gauge stranded wire is recommended.

3) Securely fasten the encoder to the machine frame using star or split washers. Check to insure that continuity exists between the encoder enclosure and machine ground. Insure that the encoder cable shield wire is attached to the NON-TERMINATED spade connector on the encoder printed circuit board (PCB) if the encoder enclosure is securely attached to machine ground.

4) If the encoder enclosure cannot be securely grounded, insure that the encoder cable shield wire is attached to the TERMINATED spade connector on the encoder PCB.

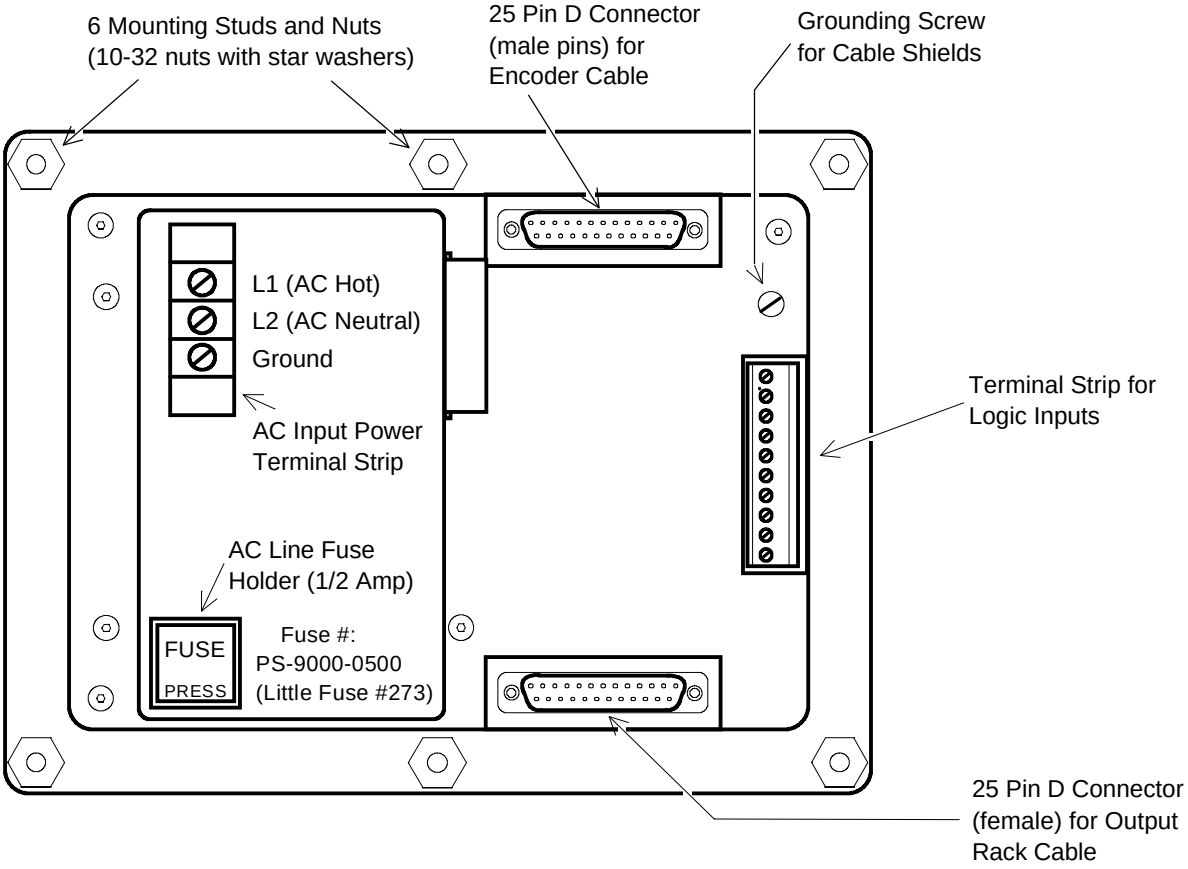
5) Be sure to tighten the screws that hold the encoder and output rack cables in place. These screws are part of the shield connection.

6) If you are using a Program Select Switch, or a Program Enable Switch, be sure to attach the shield wire to the Keyboard/Controller grounding lug located next to the Logic Input terminal block.

7) Make sure that proper grounding procedures are followed when wiring AC power to the machine. Always make sure that the machine frame is not “floating” with respect to ground.

PS-4000/4001 Rear Panel Layout

Back View



Right Side View (as viewed from back)

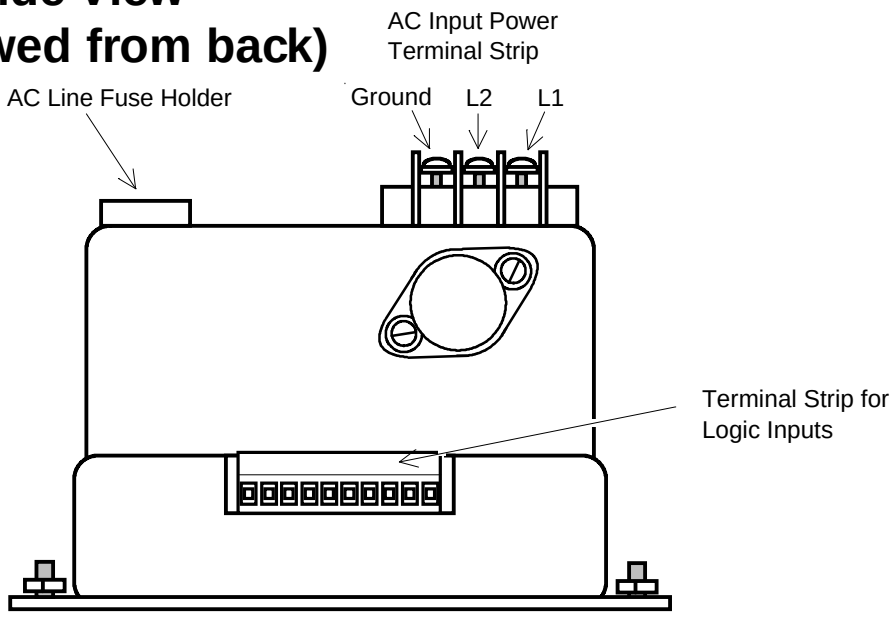
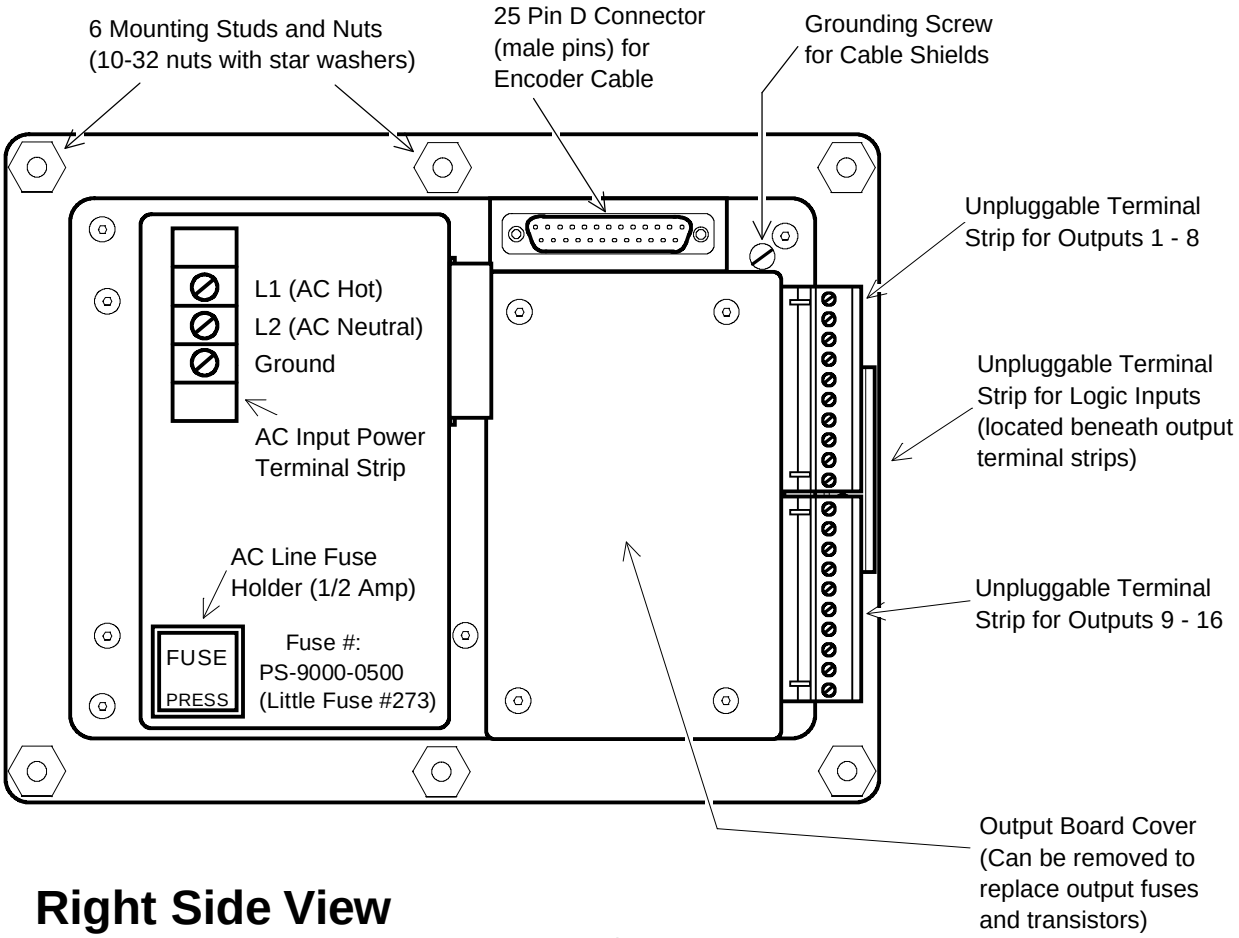


Figure 2.1 PS-4000/4001 Rear Panel Drawing

PS-4011 Rear Panel Layout

Back View



Right Side View (as viewed from back)

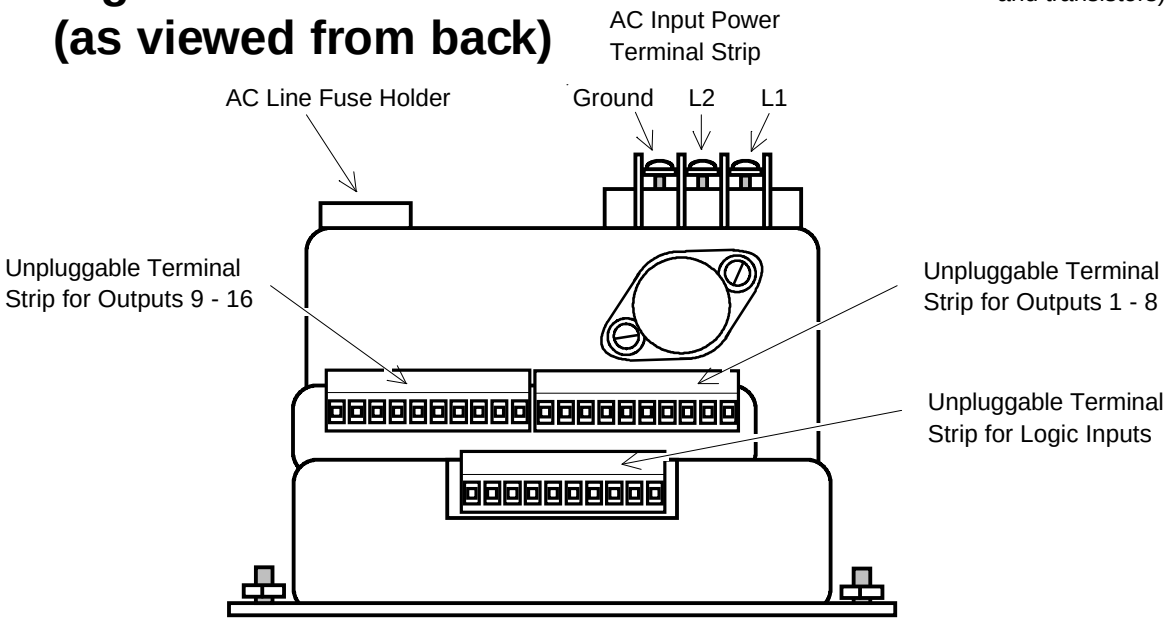


Figure 2.2 PS-4011 Rear Panel Drawing

KEYBOARD/CONTROLLER MOUNTING

The PLuS Keyboard/Controller is mounted to the electrical enclosure with six (6) #10-32 nuts and star washers. Cut a hole in the enclosure to the dimensions as shown in “Mounting Dimensions” (Fig 2.3). Drill six (6) 5/16" holes around the cutout as shown. Remove the #10-32 nuts and star washers from the Keyboard/Controller. Leaving the gasket in place, slide the Keyboard/Controller into the cutout and fasten the unit securely in place with the nuts and star washers. NOTE: The gasket is designed to be sandwiched in between the Keyboard/Controller and the electrical enclosure.

AC power is supplied through a three position terminal block mounted on the back of the Keyboard/Controller. Wire L1, L2, and Ground as shown on the unit label.

Check that the fuse cap on the fuse holder is securely in place, and that there is a fuse (.5 Amp) inside the holder.

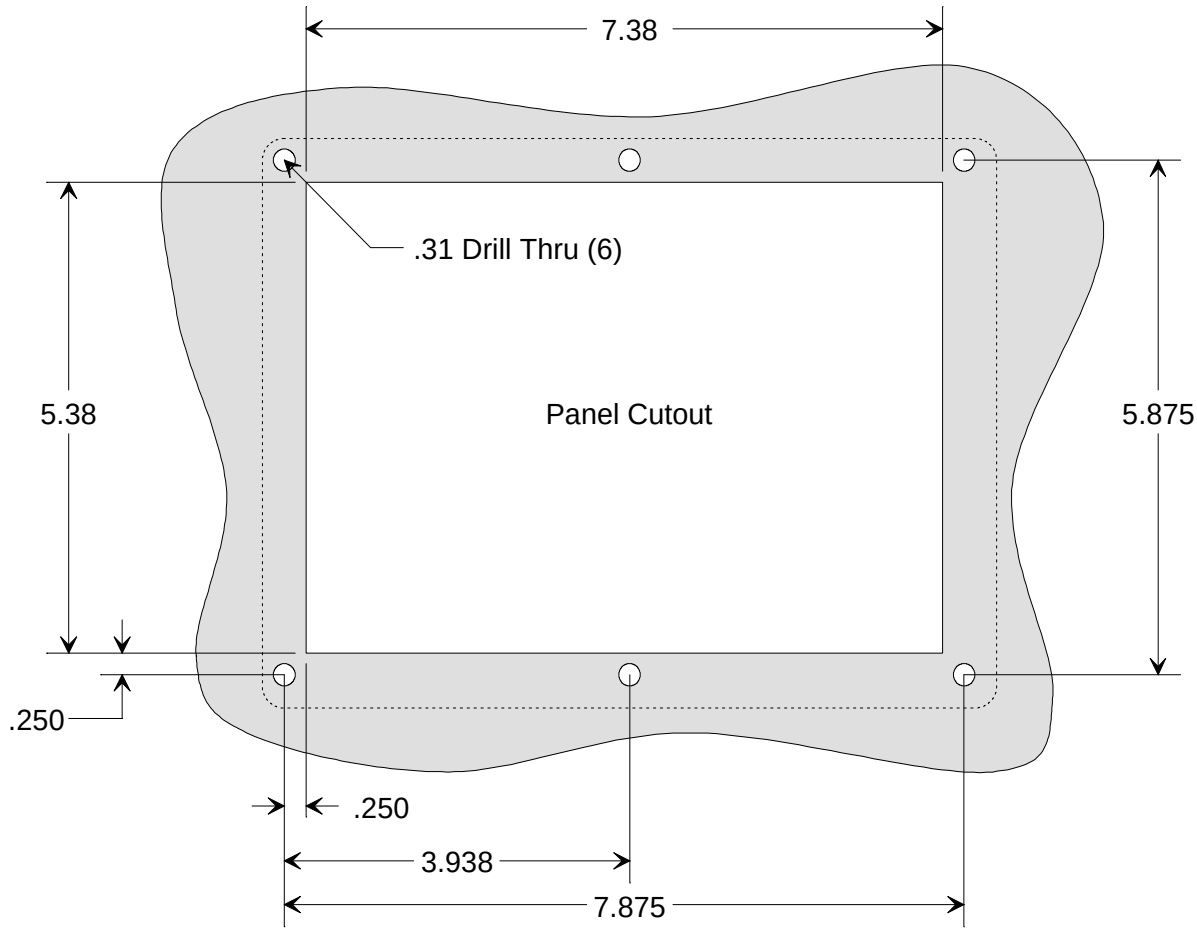


Figure 2.3 Panel Cutout

DIRECTION OF INCREASING ROTATION:
Keyboard/Controller units are shipped with a jumper wire in place between terminals 9 and 10 on the Logic Input/Output terminal block. This jumper causes the controller to show INCREASING indicated encoder shaft position with CCW rotation viewed from the left hand shaft extension. Remove this jumper with power off if you wish to indicate increasing position with CW rotation.

ENCODER MOUNTING

WARNING: Do not attempt to adjust the metal encoder disks. These are preset at the factory to tight tolerances. Moving the encoder disks will cause malfunction and will void your warranty.

Mount the encoder to the machine frame using four 1/4" bolts with locking washers. Insure that the unit is mounted to a flat surface, and that tightening the bolts does not distort the encoder enclosure in any way.

The 3/4" encoder shaft may be coupled to the machine using timing belts, chains, gears, or couplings. A 3/16" woodruff keyway (#606) is supplied on the shaft for securing timing belt pulleys, sprockets, gears, or flexible couplings.

DO NOT OVERTIGHTEN THE DRIVING BELT OR CHAIN! Although the 3/4" shaft is supported on both ends with rugged ball bearings, it is not indestructible.

NOTE: Always keep the cover in place after cable installation. Failure to keep cover in place may cause malfunction and will void your warranty.

ENCODER CABLE

NOTE:
The following encoder cable installation is for the standard supplied fitting. If you desire to run the cable in 3/4" flexible conduit, the standard fitting can be removed and a sealed 3/4" conduit fitting put in its place.

1) Slide the threaded conduit endcap, split plastic reinforcing endcap, and split rubber grommet on to the encoder cable.

2) Gently push the socket connector and shield wire through the conduit fitting.

3) Spread the locking/eject clips apart on the encoder PCB board header and insert the the cable connector. The socket connector and header are polarized, so that it is not possible to install this connector backwards. Push gently down on the socket connector until the locking/eject clips snap back into a vertical position. The connector is now locked in place.

4) Attach the shield wire to one of the spade connectors on the encoder PCB as described in “GROUNDING”, above.

5) Gently slide the rubber grommet up to the conduit fitting. Leave enough cable inside the encoder so that there is no strain on the 26 pin locking header. Make sure that the split plastic endcap is in place and screw the threaded conduit cap securely onto the conduit fitting. Make sure that the cable does not become twisted during tightening.

5) Screw the encoder cover securely back in place after making sure that 1) the cable is not twisted or under strain, 2) the shield wire is properly terminated, and 3) that there is no debris in the encoder enclosure, especially not metal shavings.

NOTE: Always keep the cover in place after cable installation. Failure to keep cover in place may cause malfunction and will void your warranty.

6) Connect the other end of the cable to the Keyboard/Controller using the two screws attached to the connector hood. This connector is “gender compatible” with only one of the DB25 connectors on the Keyboard/Controller, so that it is not possible to install this cable incorrectly.

OUTPUT RACK MOUNTING (PS-4000/4001)

Output racks are mounted to the electrical enclosure panel with #6 x 1" self tapping screws (or equivalent). Four screws are required for 8 and 16 point I/O racks.

Install output modules in the sockets provided on the rack. Output modules may be placed anywhere on the rack, it is not necessary to have a contiguous block of output modules. Output racks will accept AC, DC, and reed relay output modules in any position. It is recommended, of course, that AC and DC wiring be physically separated for the most effective elimination of any electrical noise that may be transmitted through the wiring to other control devices.

Refer to figures 2.4 and 2.5 for general output module wiring information. Specific output module wiring examples are found in the “Wiring and Application Notes” section of this manual.

OUTPUT RACK CABLE

Secure the output rack cable to both the output rack and the Keyboard/Controller using the screws attached to the hoods. These connectors are also “gender compatible” with only one of the DB25 connectors on the Keyboard/Controller, so that it is not possible to install these cables incorrectly.

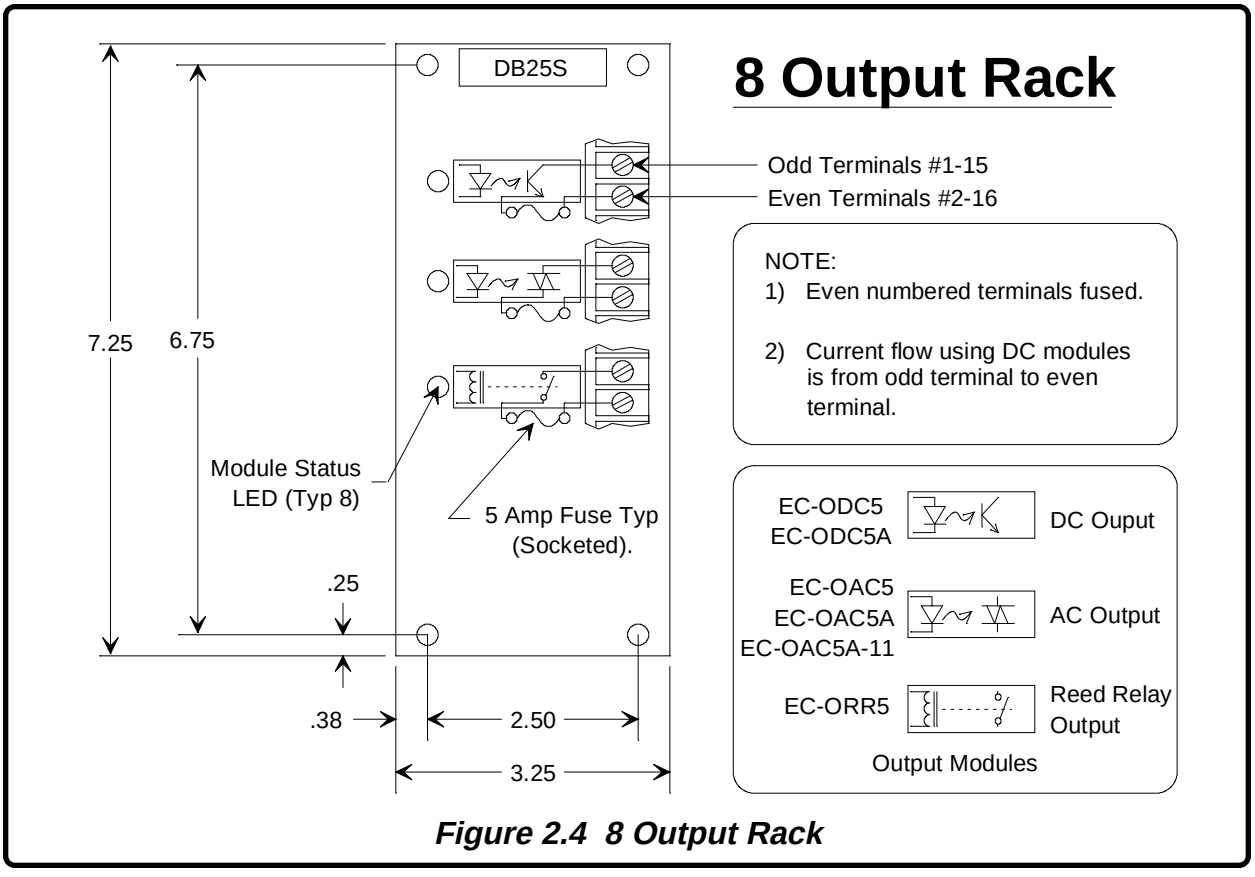


Figure 2.4 8 Output Rack

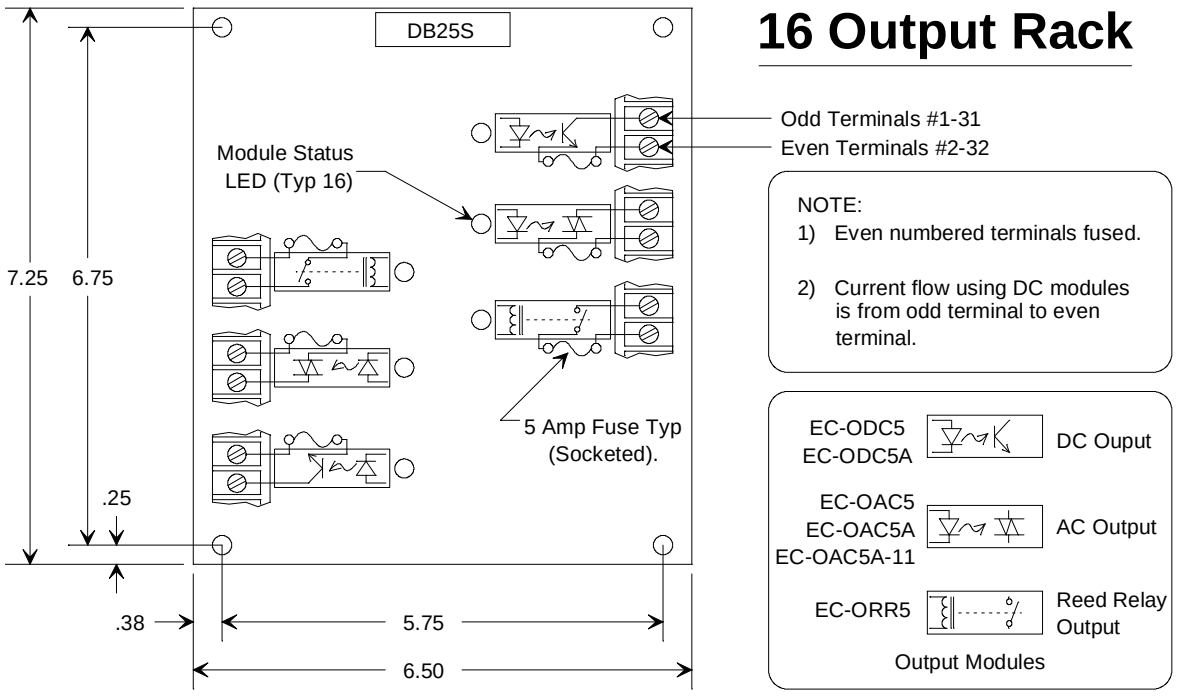


Figure 2.5 16 Output Rack

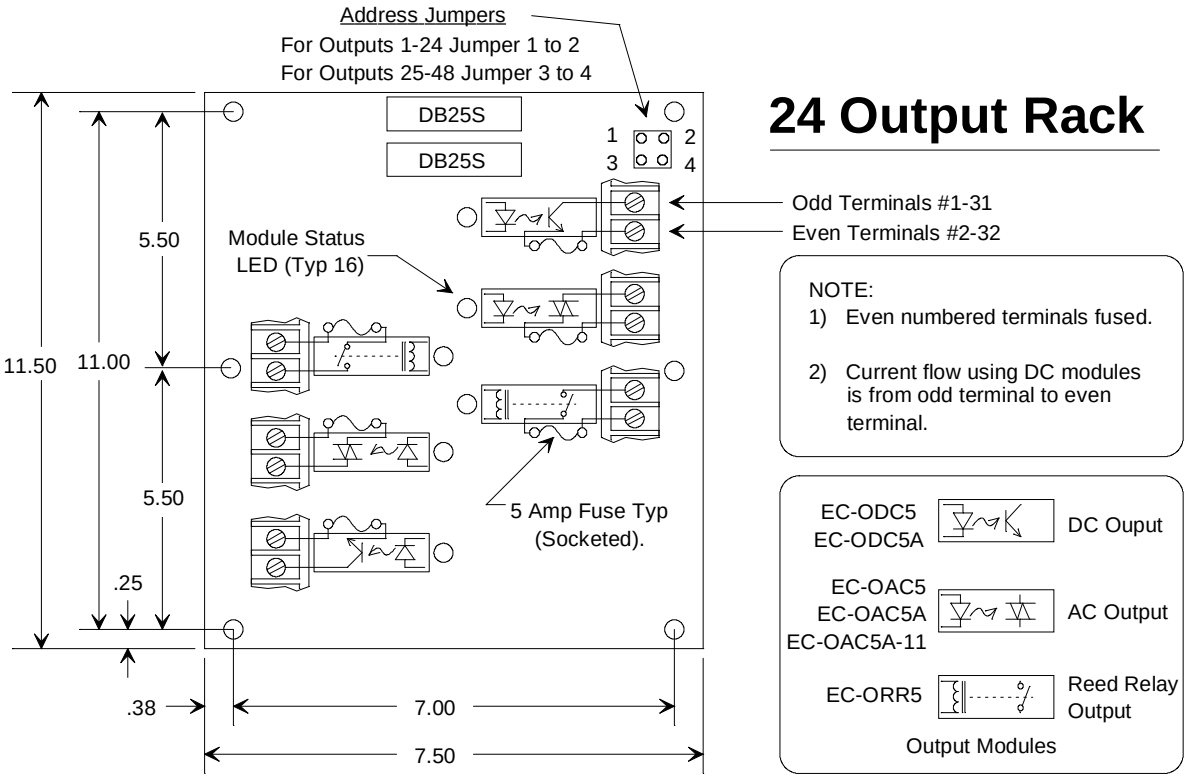


Figure 2.6 24 Output Rack

PS-4011 OUTPUT BOARDS

The Output Board which contains the output transistor array chips and the fuses is located under the output board cover shown in Figure 2.2. The unpluggable output terminal strips plug into receptacles that are mounted to the output board. The only time it will be necessary to remove the output board cover is when an output fuse is blown or a transistor array chip is damaged.

Output Transistor Array Chip(s)

Each group of 8 output transistors is contained in a single 18 pin transistor array chip. If one or more of these transistors becomes damaged the chip can simply be unplugged from the socket and replaced with an equivalent chip. Note in Figure 2.7 that the Sinking and Sourcing output boards do NOT use the same transistor array chip.

Output Fuse(s)

Each group of 8 outputs (1 transistor array chip) is protected by a 1 Amp plug in fuse. This fuse will blow if the DC power polarity is incorrectly wired to the "+" and "-" terminals on the output terminal strip. On the sourcing output versions this fuse will also blow if the total amount of current being conducted by that group of 8 outputs exceeds 1 Amp. If a fuse does blow, all 8 of the outputs in that group will be inoperative until the fuse is replaced.

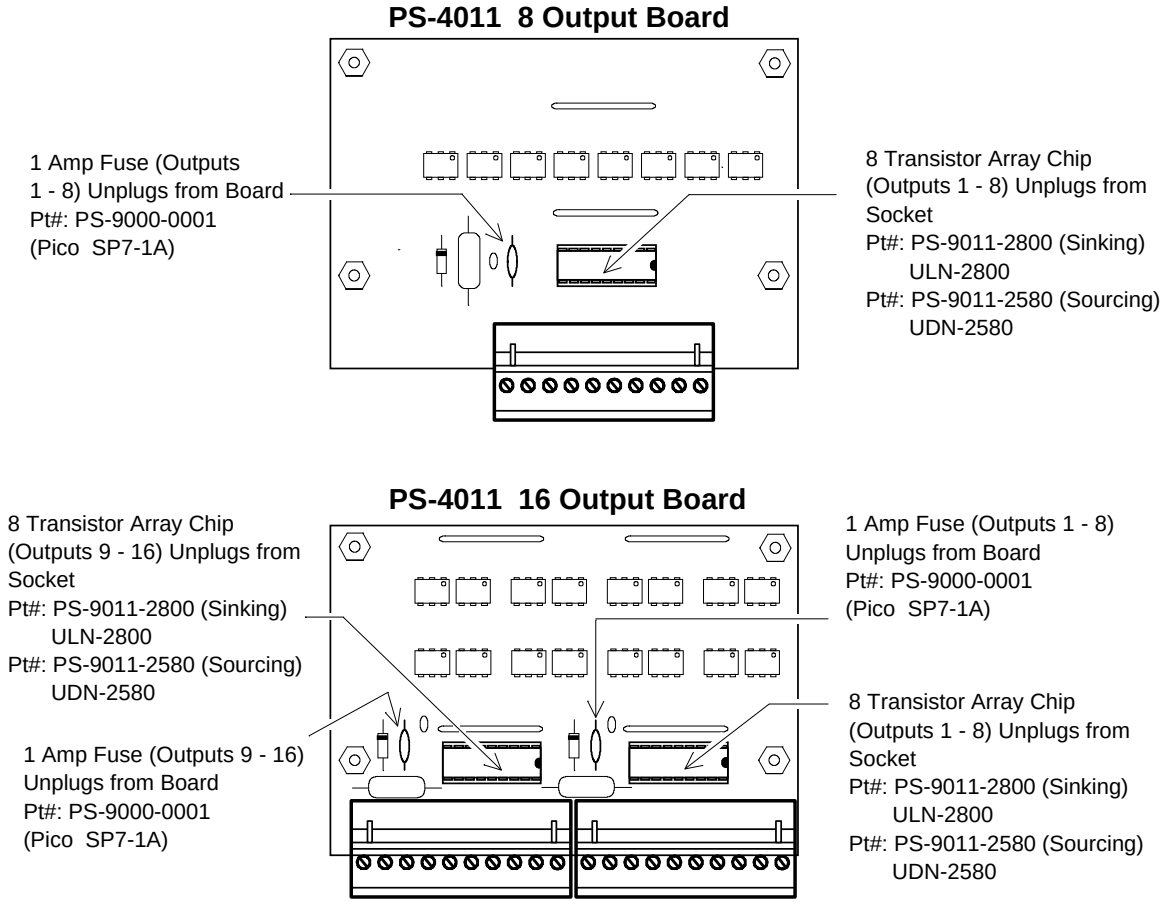


Figure 2.7 PS-4011 Output Boards

PS-4011 OUTPUT CABLE(S)

The PS-4011 uses unpluggable screw terminal strips to connect the transistor outputs to the load device. Therefore, no special connectors are needed for output wiring. However, shielded cable is recommended (Electro Cam Pt#: PS-4300-04-XXX, 2 cables required for system with more than 8 outputs) to maximize the system's immunity to electrical noise. The shield should be connected to the Grounding screw located on the back paned just above the output terminal strips (see Figure 2.2). The shield should be left unconnected at the load end of the cable. Also, the cable should be kept away from other electrical wiring, especially control wiring involving solenoids, relays, contactors and motors.

Wiring diagrams which show how to connect the PS-4011 outputs to load devices are located in section 8 of this manual, Figures 8.25 and 8.26.