HYPERTHERM®
A Hypertherm Associates Brand

Machine Interface Receptacle with Voltage Divider PCB

Powermax45 XP® and Powermax45 SYNC®

Port d’interface de machine avec panneau diviseur de tension

Powermax45 XP® et Powermax45 SYNC®

Field Service Bulletin
Bulletin de service sur le terrain

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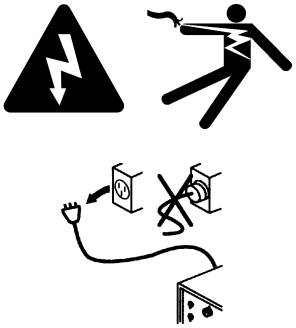
Introduction

⚠ WARNING



ELECTRIC SHOCK CAN KILL

Disconnect electric power before doing installation or maintenance. You can get a serious electric shock if electric power is not disconnected. Electric shock can seriously injure or kill you.

All work that requires removal of the plasma power supply outer cover or panels must be done by a qualified technician.

Refer to the *Safety and Compliance Manual* (80669C) for more safety information.

NOTICE

Static electricity can cause damage to printed circuit boards (PCBs). Use correct precautions when you touch PCBs.

Keep PCBs in antistatic containers.

Put on a grounded wrist strap when you touch PCBs.

Purpose

This Field Service Bulletin (FSB) gives the procedure for installing an internal machine interface receptacle, cables, and voltage divider printed circuit board (PCB).

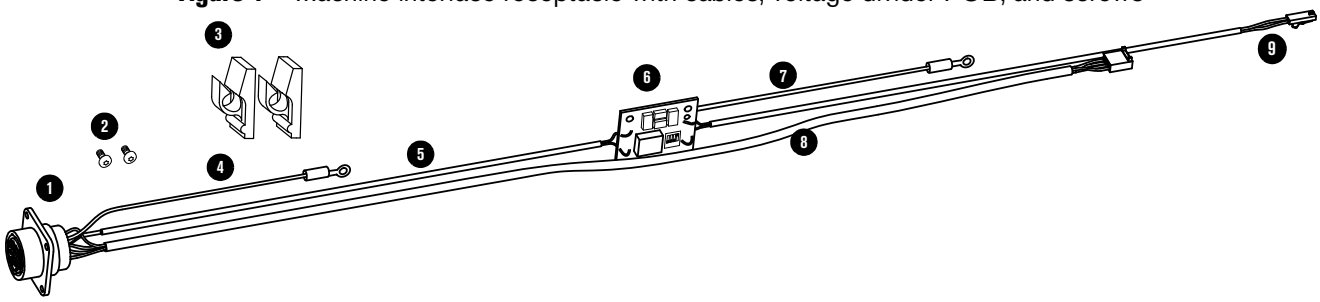
Tools and materials

- Assorted Phillips®, TORX®, and blade screwdrivers
- Grounded wrist strap (or similar grounding accessory)

Kit 428653 contents

Part number	Description	Quantity
075534	Plastite #6 X 5/16 pan head screw	2
223476	Machine interface receptacle with cables and voltage divider PCB	1
074391	Cable holder - Powermax45 XP only	2

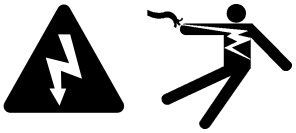
Figure 1 – Machine interface receptacle with cables, voltage divider PCB, and screws



1 Machine interface receptacle
2 Screws (2)
3 Cable holders - Powermax45 XP only (2)
4 Ground wire to air filter assembly
5 Voltage divider PCB wire
6 Voltage divider PCB
7 Ground wire to center panel
8 Power PCB 4-pin connector
9 Power PCB 2-pin connector

Remove the plasma power supply cover and component barrier

⚠ WARNING



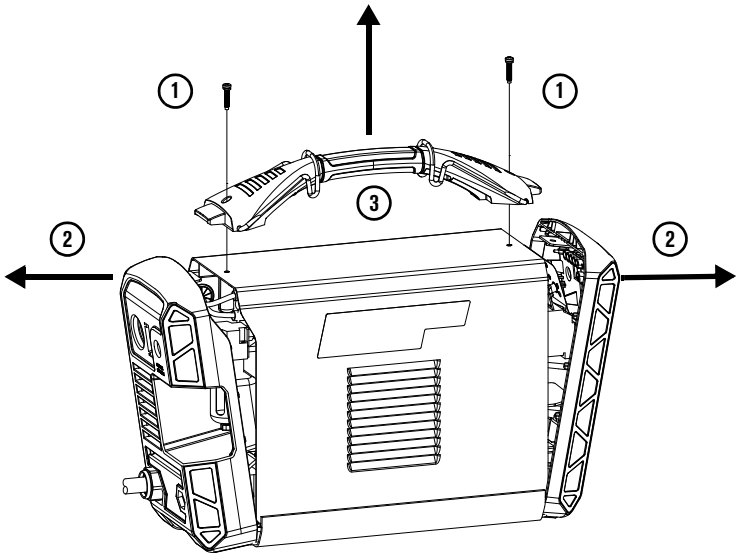
STORED ENERGY HAZARD

You can get a serious electric shock from the uncontrolled release of stored energy in capacitors. Electric shock can seriously injure or kill you.

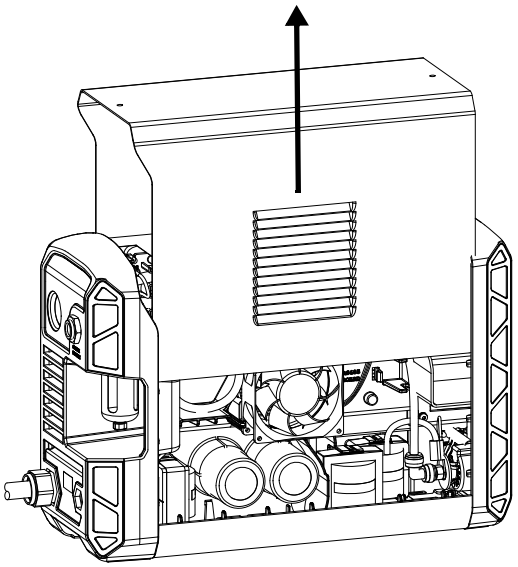
Before you remove the plasma power supply cover, disconnect electrical input power and wait 1 minute to allow stored energy to discharge.

1. Set the power switch to OFF (**O**), disconnect the power cord from the power source, and disconnect the gas supply.
2. Remove the 2 screws from the power supply handle ①. You may need to gently pull up on the handle to remove the screws.

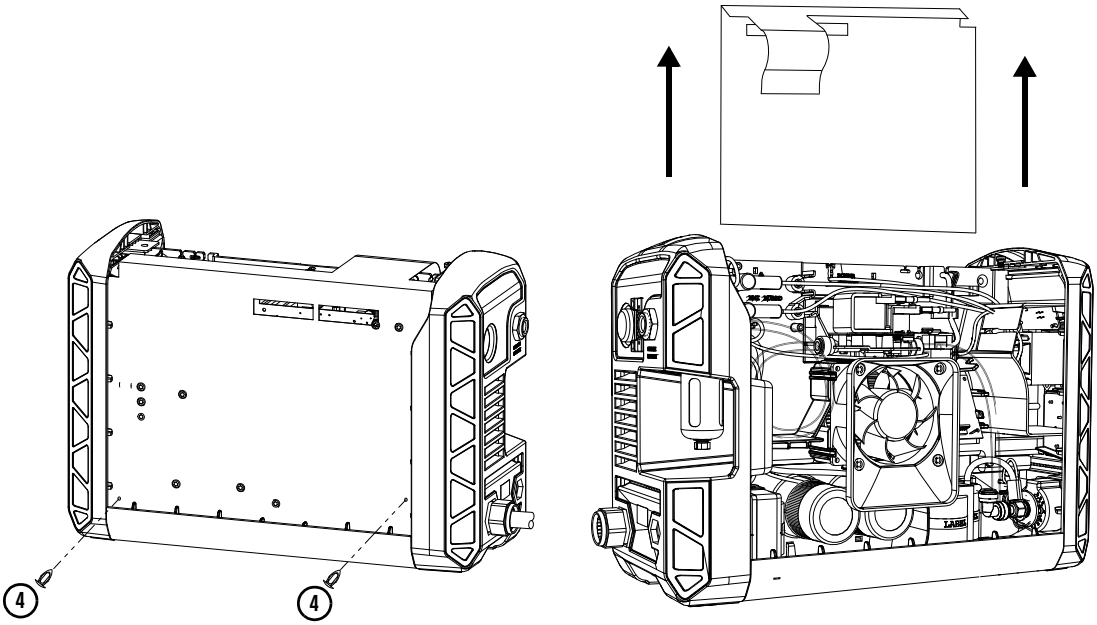
3. Gently tilt the tops ② of the front and rear panels away from the unit to pull the handle ③ out.



4. Slide the cover off.



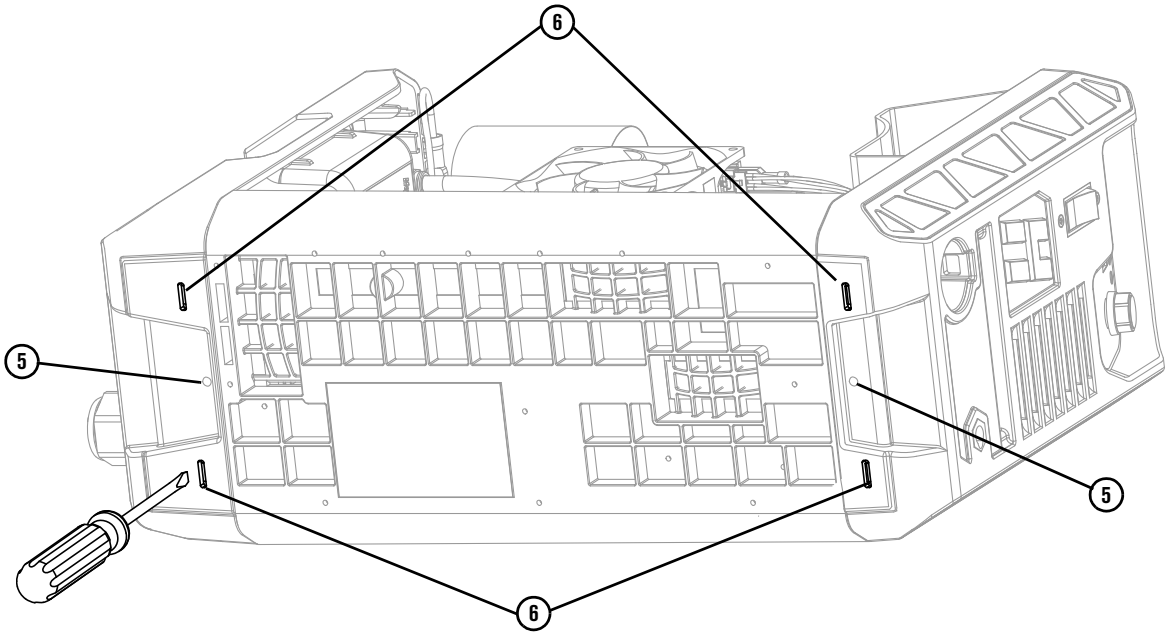
5. Remove the two plastic pins ④ that secure the component barrier to the main power PCB. Slide the component barrier off.



6. Optional - to gain better access to the inside of the front and rear panels, disconnect them from the plasma power supply.

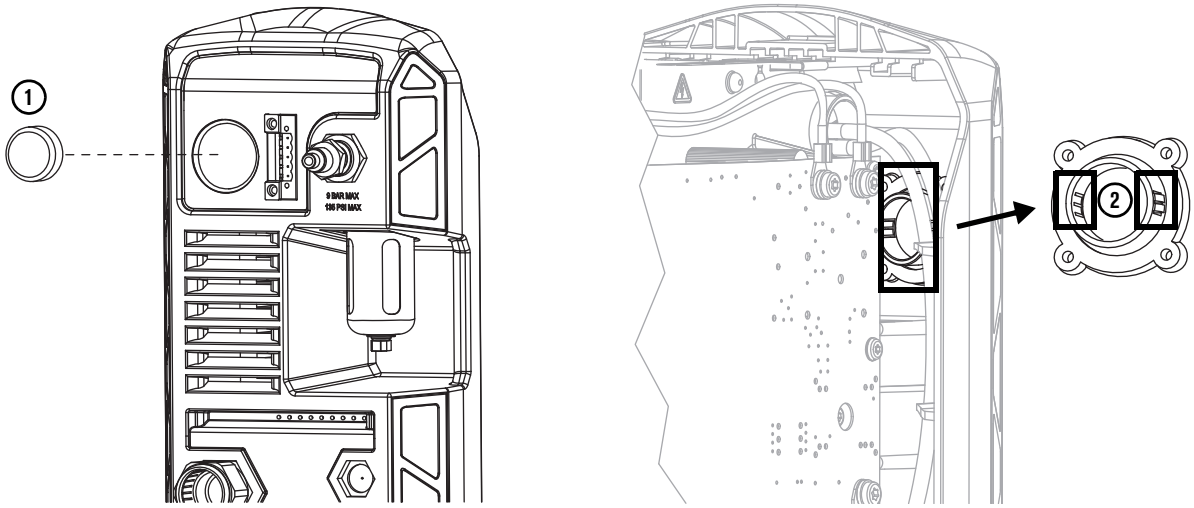
a. Use a TORX screwdriver to remove the 2 screws ⑤ from the front and rear panels.

b. Use a blade screwdriver to push in the 2 tabs ⑥ at the bottom of each of the panels until the panels disconnect from the base.

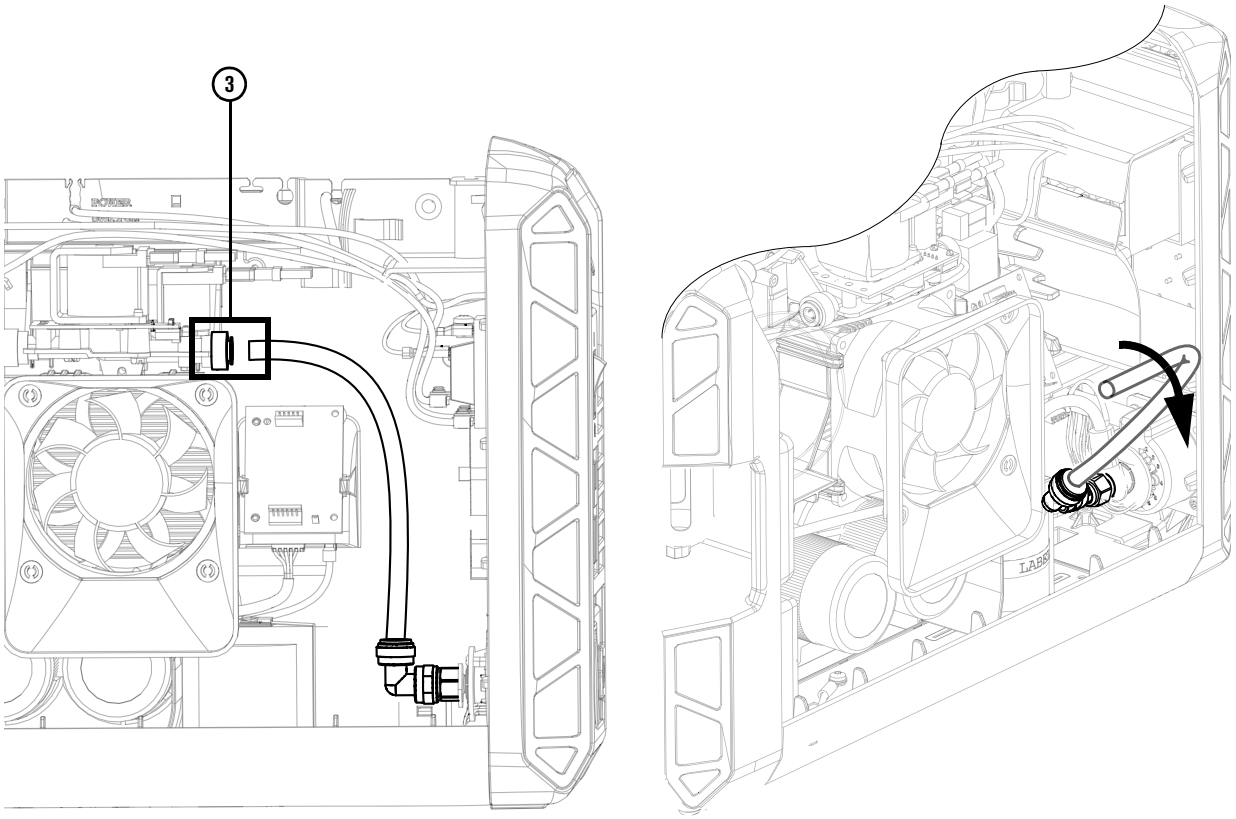


Disconnect the internal components

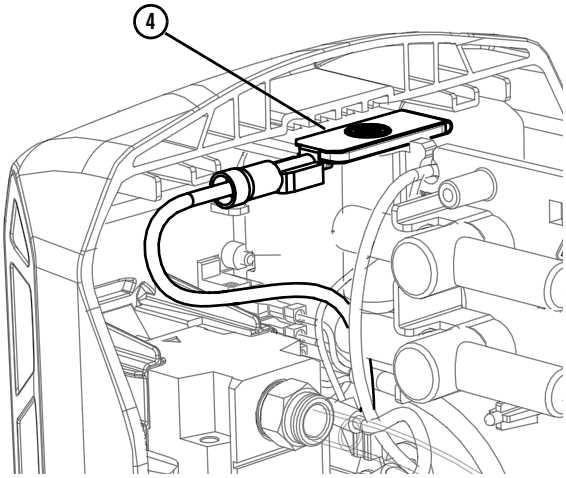
1. Remove the protective cover ① from the rear panel. Push on the tabs ② on the inside of the protective cover to remove it.



2. Remove the gas supply hose ③ from the push-to-disconnect fitting on the right side of the solenoid valve and move the hose away from the plasma power supply.



3. Move the ground clip ④ off of the rear panel. Keep the ground wire connected to the ground clip.

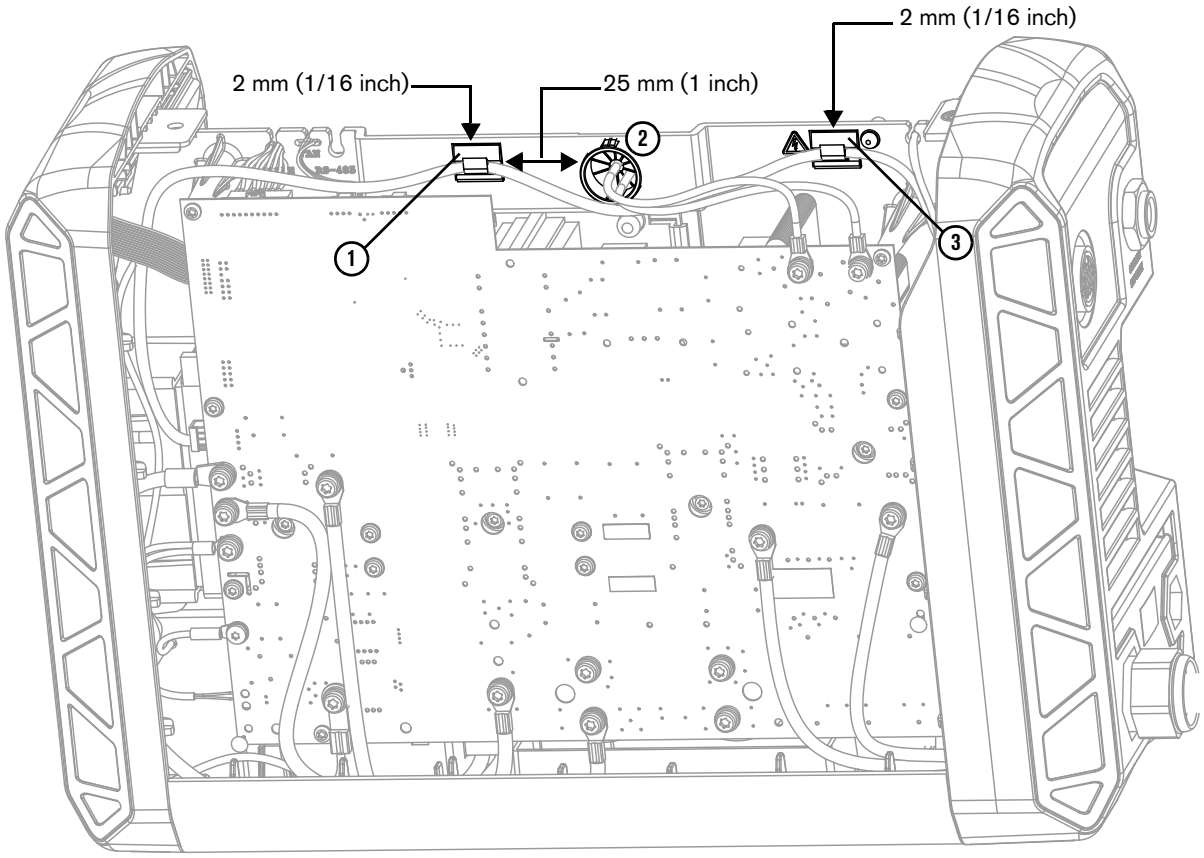


Install the cable holders (Powermax45 XP only)

The cable holders help prevent electrical interference by keeping the 4-pin connector cable away from other electrical components. Make sure that you install the cable holders correctly.

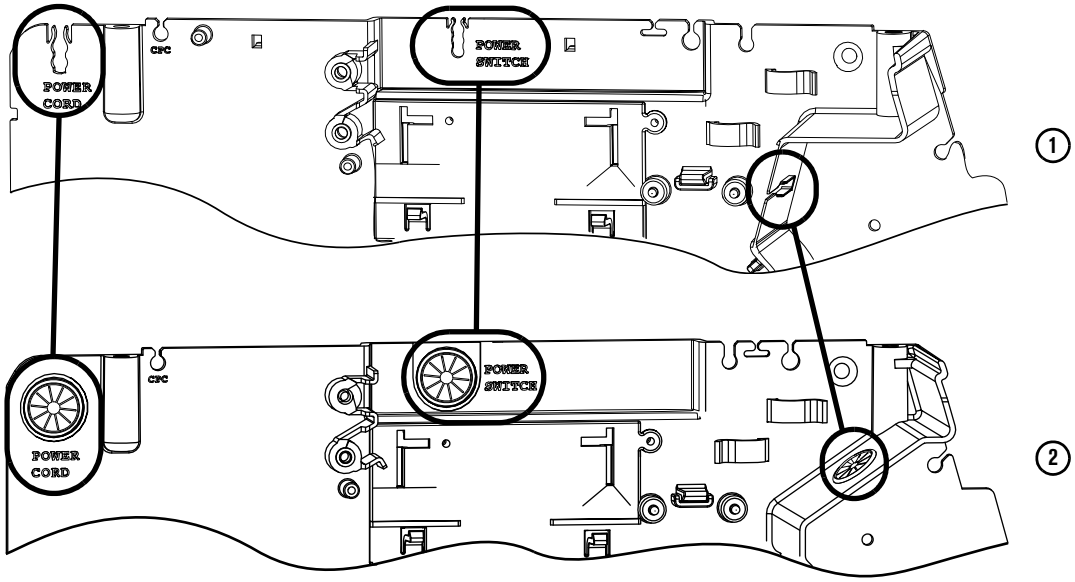
If the plasma power supply already has cable holders installed, continue to Install the machine interface receptacle with voltage divider PCB on page 10.

1. Turn the plasma power supply so that the power PCB is facing you.
2. Bond the cable holders to the center panel with the openings of the cable holders pointing up. The 4-pin connector cable is shown for reference.
   a. Remove the adhesive cover on 1 of the cable holders ① and bond the cable holder 25 mm (1 inch) to the left of the middle grommet ② and 2 mm (1/16 inch) below the edge of the center panel.
   b. Remove the adhesive cover on the other cable holder ③ and bond the cable holder between the warning label and the center panel screw, and 2 mm (1/16 inch) below the edge of the center panel.



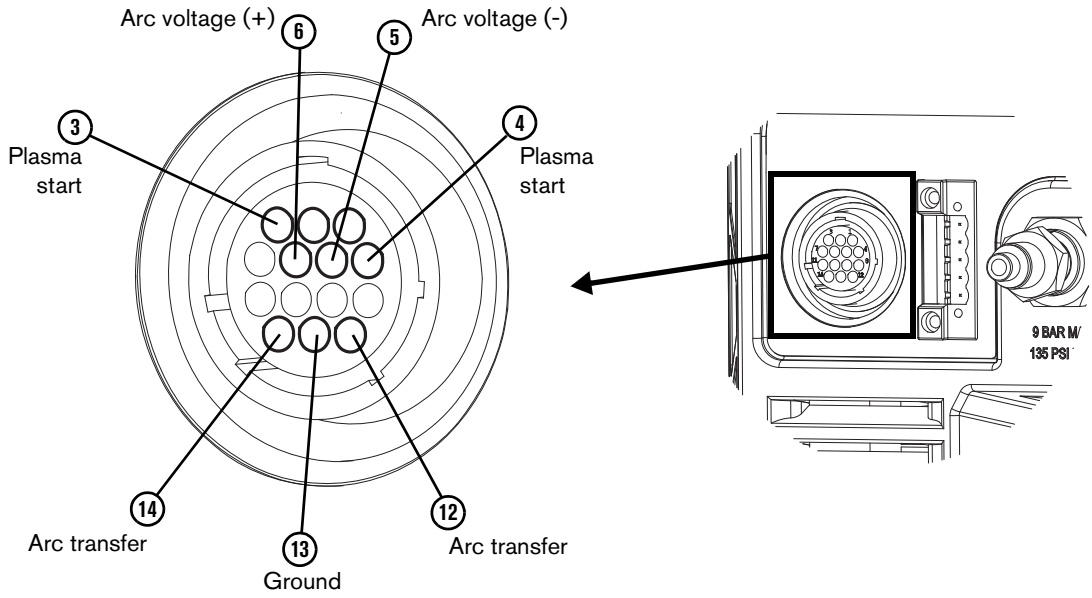
Install the machine interface receptacle with voltage divider PCB

The Powermax45 SYNC ① and Powermax45 XP ② plasma power supplies use different center panels. The drawings in this FSB show the Powermax45 SYNC center panel, but the general installation instructions are the same for both plasma power supplies.



Install the machine interface receptacle

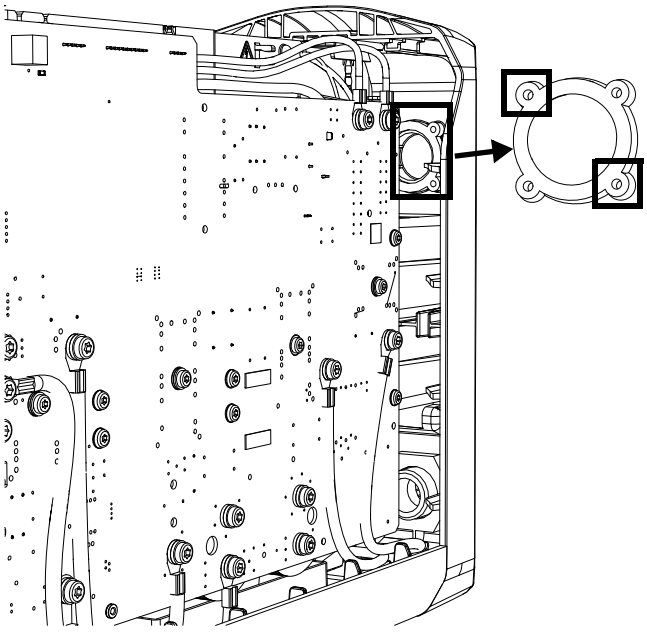
1. Put the machine interface receptacle in the opening in the rear panel. Make sure that the green and yellow ground wire is at the bottom of the opening.



Pin 1 and Pin 2 are wired but not used.

2. Put 2 screws in opposite corners of the machine interface receptacle. Tighten the screws to 1.1 N·m (10 in·lb).

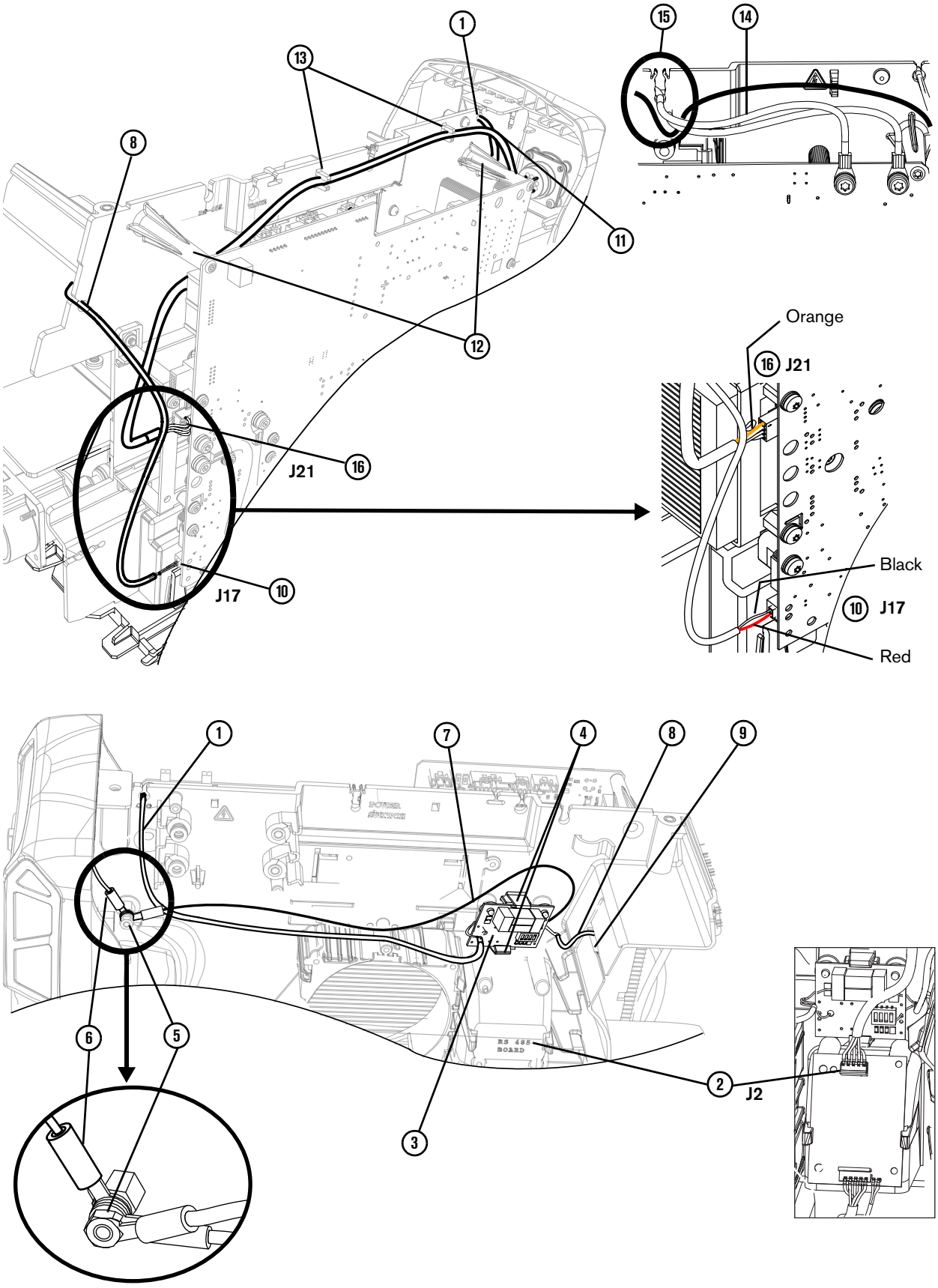
3. You may need to separate the end panel from the plasma power supply. This will make it easier to tighten the screws. Refer to Remove the plasma power supply cover and component barrier on page 4.



Install the voltage divider PCB

1. Install the voltage divider PCB as follows. Refer to Figure 2 on page 13.
   a. Put the voltage divider PCB cable ① through the slot in the center panel that is labeled **CPC**.
   b. If an RS-485 serial interface PCB ② is installed, disconnect the J2 connector from the top of the RS-485 PCB.
   c. Push the voltage divider PCB ③ into position on the center panel. If necessary, gently lift the plastic tabs ④. The voltage divider PCB makes a click when the PCB is in position.
   d. Put the voltage divider PCB cable above the fan. Make sure that the routing of the voltage divider PCB cable is as shown in Figure 2.
2. Install the 2 ground wires as follows. Refer to Figure 2.
   a. On the fan side of the plasma power supply, remove the nut from the ground stud ⑤.
   b. From the power PCB side, put the green and yellow ground wire ⑥ for the machine interface receptacle through the power cord grommet (Powermax45 XP) or slot (Powermax45 SYNC).
   c. Put the green and yellow ground wire on the ground stud ⑤. Do not install the ground stud nut at this time.
   d. Put the green voltage divider PCB ground wire ⑦ above the voltage divider PCB and above the fan. Make sure that the routing of the ground wire is as shown in Figure 2.
   e. Put the voltage divider PCB ground wire on the ground stud ⑤.
   f. Install the nut loosely on the ground stud with your fingers.
   g. Rotate the ground wire terminals on the stud so that each wire points in a different direction. Make sure that all of the other ground wires stay connected to the ground stud. Refer to Figure 2.
   h. Tighten the nut to 1.7 N·m (15 in·lb).
3. Install the 2-pin connector cable ⑧ as follows. Refer to Figure 2.
   a. Put the 2-pin connector cable ⑧ from the voltage divider PCB through the power switch grommet (Powermax45 XP) or slot (Powermax45 SYNC) in the center panel ⑨.
   b. Connect the 2-pin connector to the power PCB at J17 ⑩. The black wire is at the top of the connector and the red wire is at the bottom.
4. Install the 4-pin connector cable ⑪ as follows. Refer to Figure 2. **To help prevent electrical interference, install the cable into the cable holders correctly.**
   a. Put the 4-pin connector cable around the black plastic mounting posts ⑫, into the cable holders ⑬, and then below and behind the power switch cables ⑭ as shown.
   b. Make sure that the 4-pin connector cable is perpendicular ⑮ to the power switch cables that pass through the grommet (Powermax45 XP) or slot (Powermax45 SYNC) in the center panel. Keep to a minimum the distance that the cables are parallel.
   c. Connect the 4-pin connector to the power PCB at J21 ⑯. The orange wire is at the top of the connector.

Figure 2 – Machine interface receptacle cable routing (some internal components removed for clarity)



Set the voltage divider PCB

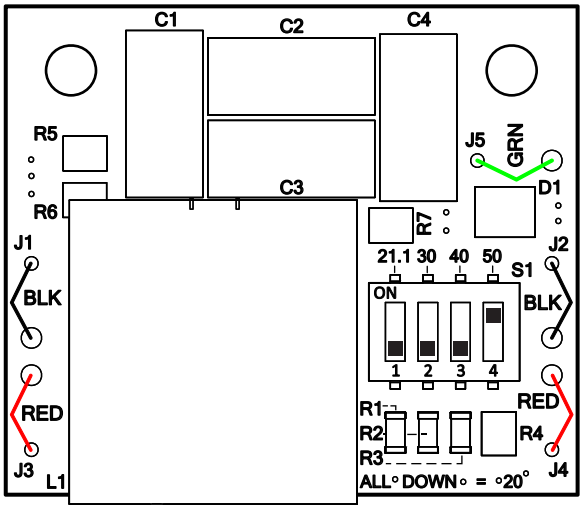
NOTICE

The voltage divider PCB is a simple resistive divider of raw arc voltage. To prevent ground loops and electrical interference, **you must isolate the divided arc signal**.

⚠ CAUTION

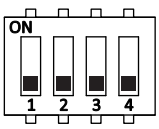
The factory-installed voltage divider PCB supplies a voltage that is in proportion to the arc voltage. The DIP switch settings on the voltage divider PCB control the output in open circuit conditions, to a maximum output of 16 V. This output is an impedance-protected, functional extra-low voltage (ELV) output. This type of output prevents shock, energy, and fire under normal conditions at the machine interface receptacle and in single-fault conditions with the machine interface wiring. The voltage divider PCB is not fault tolerant and ELV outputs do not comply with safety extra-low voltage (SELV) requirements for direct connection to electrical devices.

The factory setting on the voltage divider PCB is 50:1.

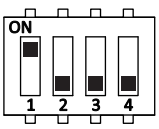


To change the voltage divider to a different setting, set the DIP switches to one of the following:

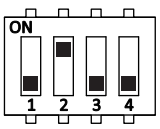
20:1



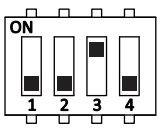
21.1:1



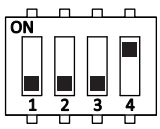
30:1



40:1

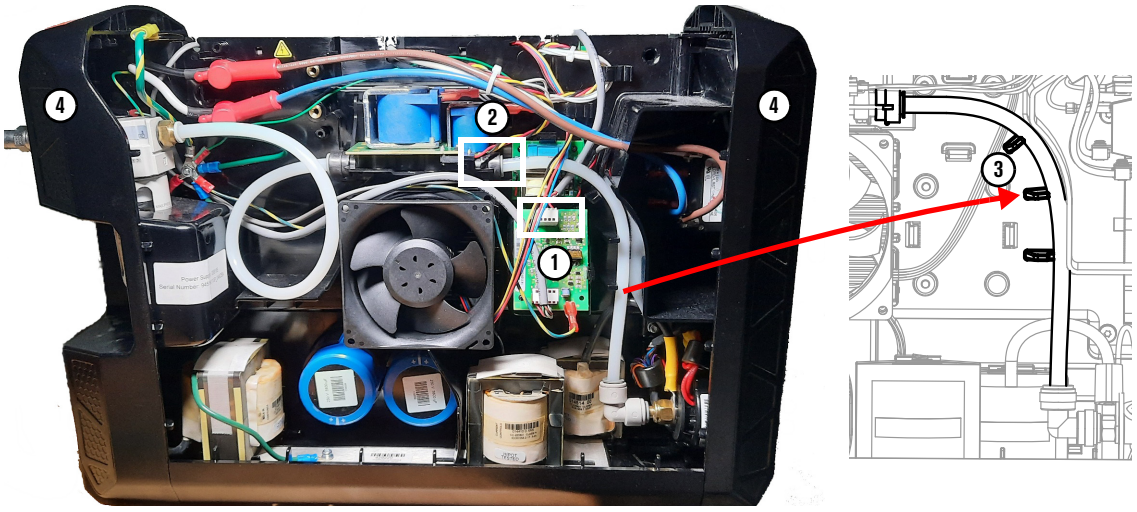


50:1



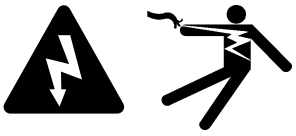
Connect the internal components

1. If the RS-485 serial interface receptacle is installed, connect the serial interface cable to the J2 connector ① on the RS-485 serial interface PCB.
2. Put the gas supply hose in the push-to-connect fitting on the right side of the solenoid valve ②.
3. Push the gas supply hose into the plastic chassis divider guides ③.
4. If you separated the front or rear panels ④ from the plasma power supply, push them until they click into position. Make sure that none of the cables are pinched.



Install the plasma power supply component barrier and cover

⚠ WARNING



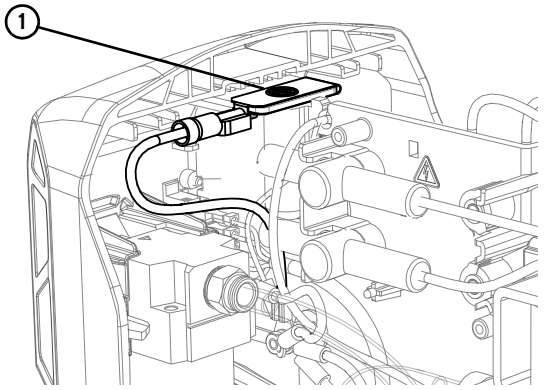
SHOCK HAZARD

You can get a serious electric shock if you touch exposed plasma power supply components. Electric shock can seriously injure or kill you.

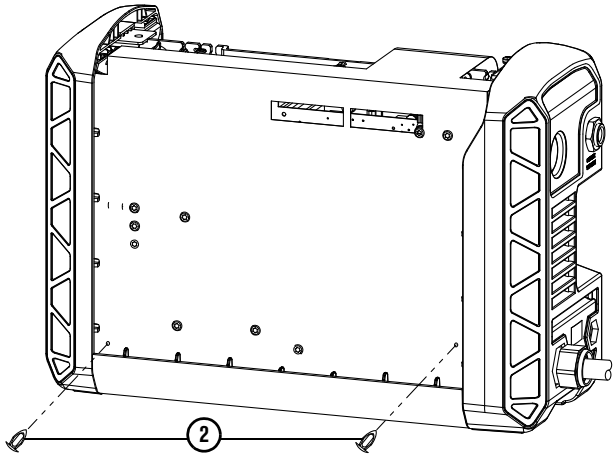
You must install the component barrier and the plasma power supply cover. Never operate the plasma power supply unless the component barrier and the plasma power supply cover are in position.

1. Reconnect the front and rear panels to the plasma power supply if necessary.

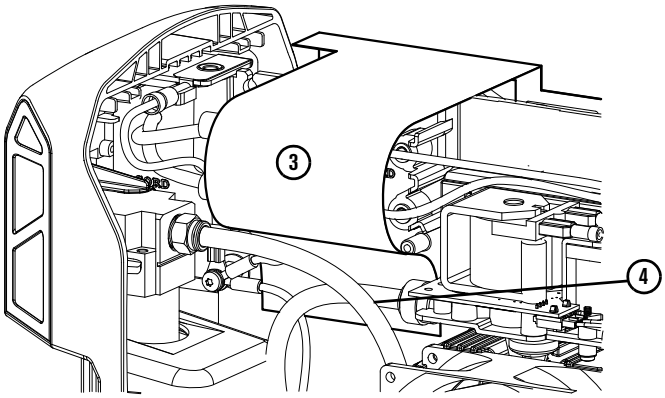
2. Put the ground clip ① into position to align with the screw from the handle. Make sure that the ground clip is connected to the ground wire.



3. Attach the component barrier to the power PCB with the 2 plastic pins ②.



4. Put the extended piece of the component barrier ③ above the power cord connection points and behind the gas hose ④.



5. Put the cover ⑤ on the plasma power supply.

a. Align the louvers in the cover with the fan ⑥.

b. Make sure that none of the cables are pinched.

6. Install the handle as follows:

a. Align the handle ⑦ with the holes in the cover.

b. Put the ends of the handle below the edges of the front and rear panels ⑧.

c. Install the 2 screws ⑨ that attach the handle and cover to the plasma power supply.

7. Install the 2 screws ⑩ that attach the bottoms of the front and rear panels to the plasma power supply.