



Powermax900 Micro-Control Board Replacement

Kit: 128476

**Field Service Bulletin
IM-368
(P/N 803680)**

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Powermax900 Micro-Control Board

INTRODUCTION

The 041688 micro-control board is a direct replacement for the 041575 and 041576 Powermax900 control boards. Included in this bulletin is a list of new LED functions that have been incorporated into the new board. For full troubleshooting and service information, order the Powermax900 Service Manual, 803150, Revision 2.

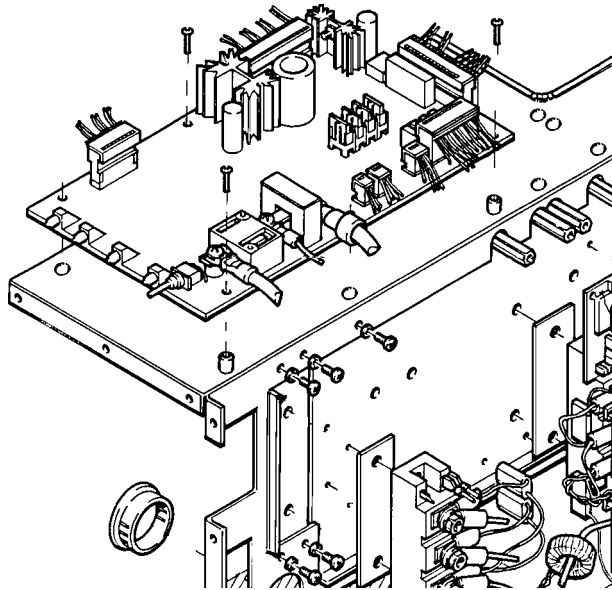
128476 Kit Contents		
Part No.	Description	Qty
041668	PMX900 Micro-control Board	1
803680	FSB:PMX900 Micro-Control Board Replacement	1

		WARNING ELECTRIC SHOCK CAN KILL
MODIFICATION MUST BE PERFORMED ONLY BY HYPERTHERM TECHNICIANS, DISTRIBUTORS OR QUALIFIED ELECTRONICS TECHNICIANS		
Always turn off power, unplug cord from wall and wait 5 minutes before removing cover of the power supply! If power unit is directly connected to a line disconnect box, place line disconnect switch to OFF position. Lock out and tag out switch before proceeding!		

CONTROL BOARD REMOVAL AND REPLACEMENT

Removal

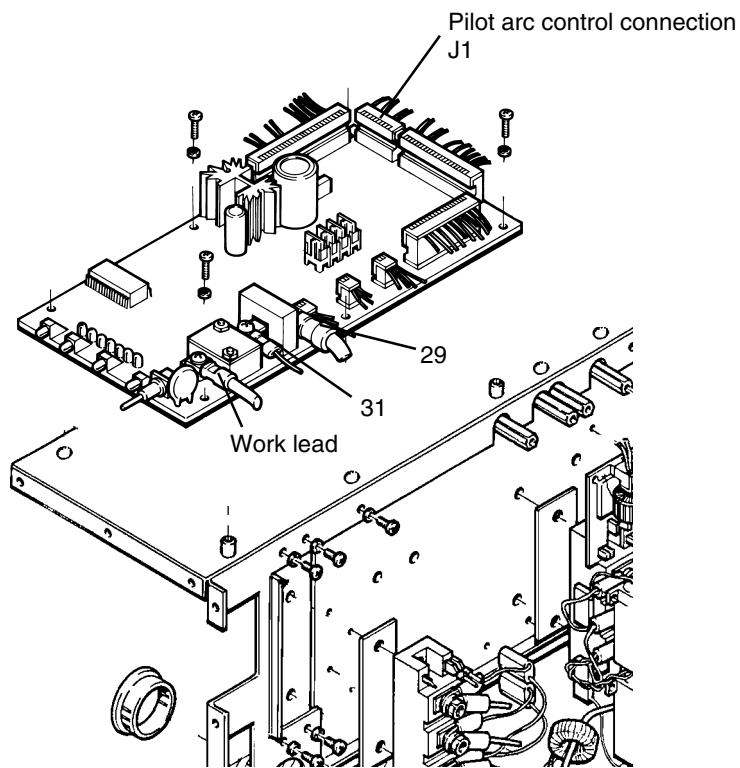
1. Remove all connecting cables and harnesses from the control board.
2. Remove 3 screws that secure the old control board to the Powermax900 chassis.
3. Remove the control board.



Powermax900 Micro-Control Board

Replacement

1. Install the new control board by fastening to the plastic standoffs.
2. Secure the control board with the 3 screws.
3. Replace the connecting cables and harnesses to their proper positions on the control board.
 - Note placement of cables 29, 31 and the work lead cable.
 - If you have the pilot arc option, note the new position of the harness receptacle (J1).



Powermax900 Micro-Control Board

041668 Control Board LEDs

Control Board LEDs Visible from the Powermax900 Front Panel

- **LED2 POWER ON:** Illuminates when power is applied.
- **LED5 LINE VOLTAGE:** Illuminates different colors for different conditions:
 - LED5 not illuminated (white)
Extremely low AC line voltage or micro-controller failure.
 - LED5 blinking yellow
Line voltage is less than 20% below nominal. In this condition, the power supply is disabled and the contactor is open.
 - LED5 continuous yellow
Line voltage is between 15% and 20% below nominal. Machine will function, but with some performance degradation.

Lower Limit (LED5 continuous yellow)	Line Voltage	Upper Limit	Note: To avoid performance deterioration of the Powermax900, input voltage (as measured at the input terminals to the power supply under load) should be within 10% of the specified system line voltage setting.
170VAC	200VAC	235VAC	
178VAC	208VAC	239VAC	
195VAC	230VAC	270VAC	
204VAC	240VAC	276VAC	
340VAC	400VAC	470VAC	
408VAC	480VAC	552VAC	
510VAC	600VAC	690VAC	

- LED5 continuous green
Line voltage is within proper operating limits (between -15% and +15% of nominal as shown above).
- LED5 continuous red
Voltage is greater than +15% of nominal, or
Retaining cap has not engaged the cap-sensor micro-switch, or
There is an inverter imbalance, or
There is a micro-controller failure.
- LED5 blinking red
There is an internal torch failure (a short from electrode to START or CAP lines).
- **LED11 OVER-TEMP LED:** Remains off when temperature is within operating limits. It Illuminates when the thermostat in the power transformer T2 opens (over 135° C (275° F)) or if the heatsink becomes too hot (over 85° C (185° F)). Overheating can be caused by exceeding the duty cycle rate or by operating at low line voltage.
- **LED14 GAS PRESSURE:** Illuminates when incoming gas pressure sensed by PS1 is within operating limits (over 39 psi (2.7 bar)).

Control Board LEDs Visible from Inside the Powermax900

- **LED1 GAS SOLENOID:** Illuminates when gas solenoid is energized (when GAS TEST switch is pressed or when plasma start is pressed).
- **LED3 PILOT ARC RELAY:** Illuminates when pilot arc relay CR2 is energized.
- **LED4 MAIN CONTACTOR:** Illuminates when contactor CR1 is energized (following "soft start").

Powermax900 Micro-Control Board

- **LED6 PLASMA START:** Illuminates when the torch start button is pushed or when start button is activated from the machine interface.
- **LED7 INVERTER ON:** Illuminates when the command to turn on the inverter modulator is given.
- **LED8 CURRENT:** Illuminates when current greater than 10 amps is detected in electrode circuit.
- **LED9 BLOWBACK:** Illuminates when more than 25 arc volts is detected.
- **LED10 ARC TRANSFER:** Illuminates when arc transfers to the workpiece (when arc current is greater than 1.5 amps).
- **LED12 OVERCURRENT:** Illuminates when CS1 or CS2 senses current above 70 amps. Release the START switch to clear.
- **LED13 FAULT:** Illuminates when there is either an overvoltage condition, an imbalance in the inverters, or a micro-controller failure.

The control board also controls the sequence required to generate plasma:

- Turns on the inverter approximately 1 second after the torch trigger switch is pressed
- After a short delay, turns on the gas solenoid valve V1 to blow back the electrode
- Monitors the pilot arc for arc transfer
- Ramps the current control command from the pilot arc level (22 amps) to the cut current selected by the operator
- Turns the inverter off if the output current fails for any reason
- Turns the inverter off if the torch blow back does not occur within 2 seconds
- Turns off the power supply when the retaining cap is loose or when line voltage is too high.

