

# ***Phase Loss Protection***

***HT4001 Upgrade***

***Field Service Bulletin  
803070 - Revision 0***

***Hypertherm***  
*The world leader in  
plasma cutting technology*

**Phase Loss Protection**  
for  
***HT4001***

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**IM-307**  
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# Phase Loss Protection Upgrade

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# Phase Loss Protection Upgrade

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## INTRODUCTION



### Warning



All work must be performed only by qualified personnel!

## Purpose

This field service bulletin will enable a qualified electronics technician to upgrade an HT4001 power supply with a phase loss protection circuit.

## General

When the power supply loses one or more input phases, or if the input voltage drops below 85% of the rated voltage for an extended period of time (greater than 1 minute), the choppers may experience a failure. The new phase loss protection circuit will put the power supply in an idle mode when the voltage drops below 15% of the rated voltage, e.g.: input voltage for a 480V power supply drops below 408V. This may be caused by blown fuses or extended power reductions from the customer's plant supply lines.

**Special Note:** The kit listed below (128314) also includes components to upgrade the communications between the HT4001 power supply and H-401 slave. See field service bulletin 803230 for installation of the slave communication upgrade.

## Customer Required Tools

Phillips head screwdriver

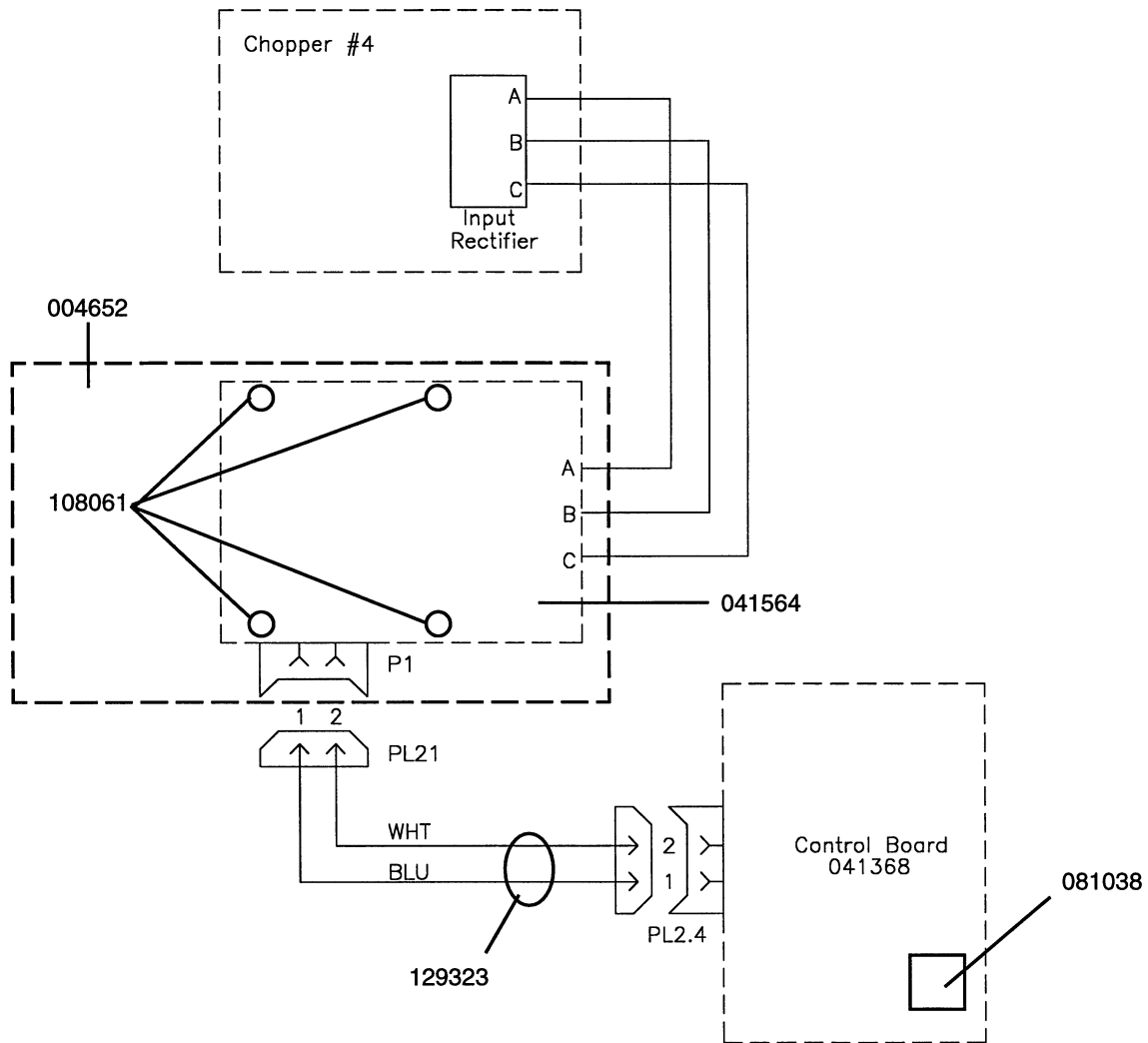
## 128314 HT4001 Phase Loss Protection and H-401 Slave Upgrade Kit

| Part No. | Description   | Qty. |
|----------|---|------|
| 074006   | Base: 1"x1" Adhesive Cable Tie                            | 2    |
| 074179   | Terminal: 22-18 Female Tee                                | 2    |
| 129371   | Harness: H-401 Upgrade                                    | 1    |
| 343003   | Cable Tie   | 20   |
| 343005   | Cable Tie   | 4    |
| 004652   | Bracket: CH130 Cap Mounting                               | 1    |
| 041564   | PCB Assembly: Phase Loss Detection Circuit                | 1    |
| 108061   | Standoff: 1/2" Long, Locking Circuit Board Support, Nylon | 4    |
| 129323   | Wire Group: Phase Loss Detection Circuit Output           | 1    |
| 081038   | Firmware: Ht4001 II Rev. A                                | 1    |
| 008197   | Tool: AMP Pin/Socket Extracting                           | 1    |
| 027338   | Tool: All Purpose Chip Extracting                         | 1    |
| 803070   | Field Service Bulletin: Phase Loss Protection Upgrade     | 1    |
| 803230   | Field Service Bulletin: H-401 Slave Upgrade               | 1    |
| 802930   | Field Service Bulletin: H401/H601 Slave Calibration       | 1    |

# Phase Loss Protection Upgrade

## Components for the Phase Loss Protection Upgrade Only

| Part No. | Description   | Qty. |
|----------|---|------|
| 004652   | Bracket: CH130 Cap Mounting                               | 1    |
| 041564   | PCB Assembly: Phase Loss Detection Circuit                | 1    |
| 108061   | Standoff: 1/2" Long, Locking Circuit Board Support, Nylon | 4    |
| 129323   | Wire Group: Phase Loss Detection Circuit Output           | 1    |
| 081038   | Firmware: Ht4001 II Rev. A                                | 1    |
| 027338   | Tool: All Purpose Chip Extracting                         | 1    |
| 803070   | Field Service Bulletin: Phase Loss Protection Upgrade     | 1    |



**Figure 1 Phase Loss Protection Circuit Upgrade Diagram**

# Phase Loss Protection Upgrade



## WARNING



**SHOCK HAZARD:** Always turn off the power, unplug the cord and wait 5 minutes before removing any power supply cover. If the power supply is directly connected to a line disconnect switch, place switch in the OFF position. In the U.S., use a "lock-out / tag-out" procedure until the service or maintenance work is complete. In other countries, follow appropriate local or national safety procedures.

## PREPARATION

1. Disconnect power.
2. Remove the side and front panels of the power supply.
3. Find the inside front panel of the power supply. Fig. 2.

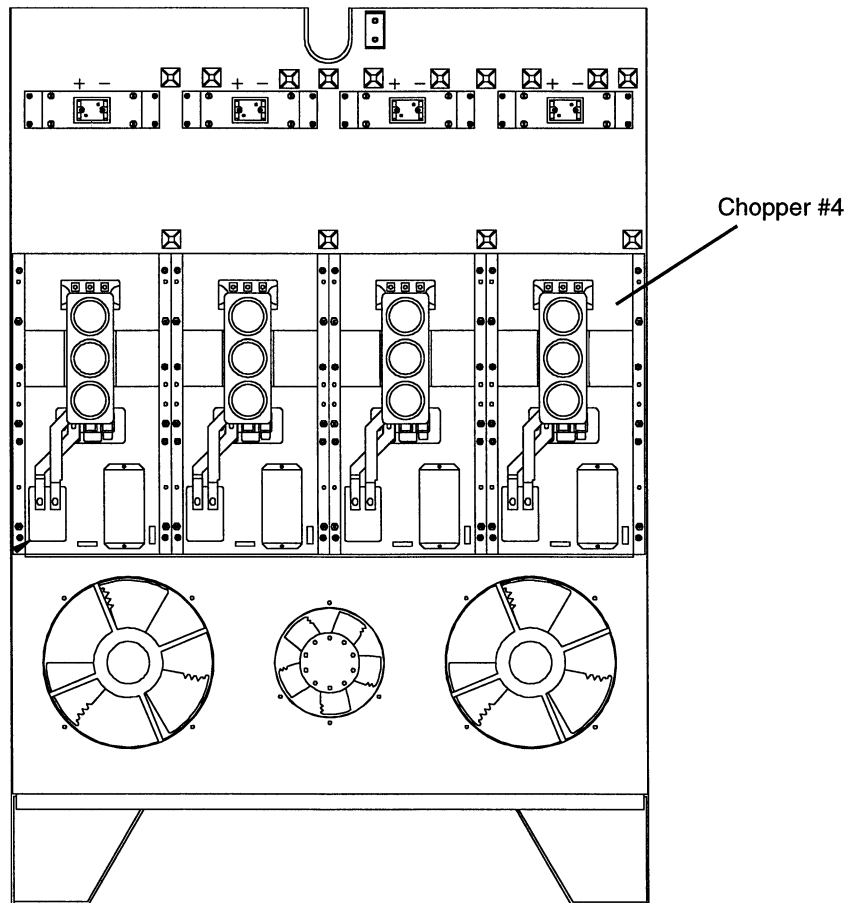


Figure 2 Inside Front Panel of the HT4001 Power Supply

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# Phase Loss Protection Upgrade

## INSTALL THE PHASE LOSS DETECTION PCB ONTO CHOPPER #4

### Remove the Capacitor Bracket from Chopper #4

1. Remove the 4 screws that secure the capacitor bracket on chopper #4. See Fig. 2 for location of chopper #4.

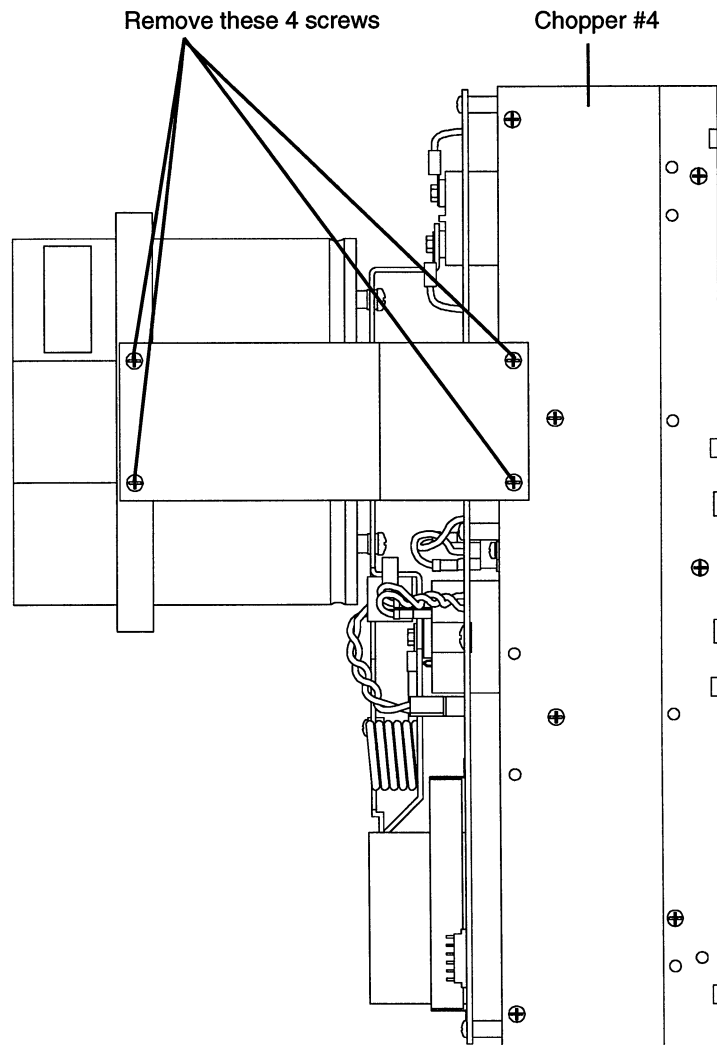


Figure 3 Removing Capacitor Bracket from Chopper #4

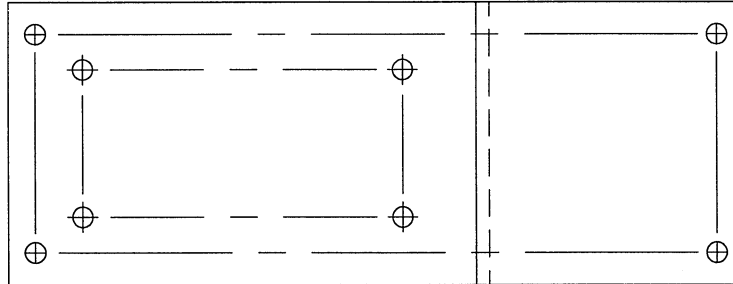


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# Phase Loss Protection Upgrade

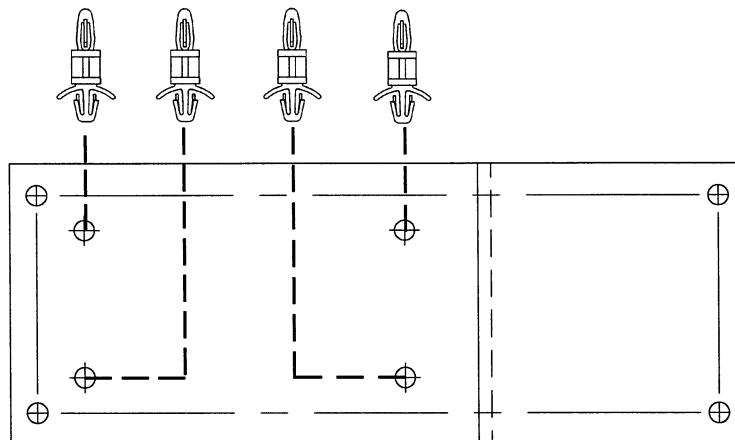
## Mount the Phase Loss Detection PCB on the Chopper Cap Mounting Bracket

1. Locate the chopper cap mounting bracket 004662 from the kit.



**Figure 4 Chopper Cap Mounting Bracket - 004662**

2. Insert the 4 nylon circuit board supports into the 4 holes of the chopper capacitor mounting bracket as indicated in Fig. 5.



**Figure 5 Inserting Circuit Board Supports into Chopper Cap Mounting Bracket**

# Phase Loss Protection Upgrade

3. Snap the phase loss detection pcb assembly 041564 onto the circuit board supports. Be certain to orient the pcb as shown in Fig. 6.

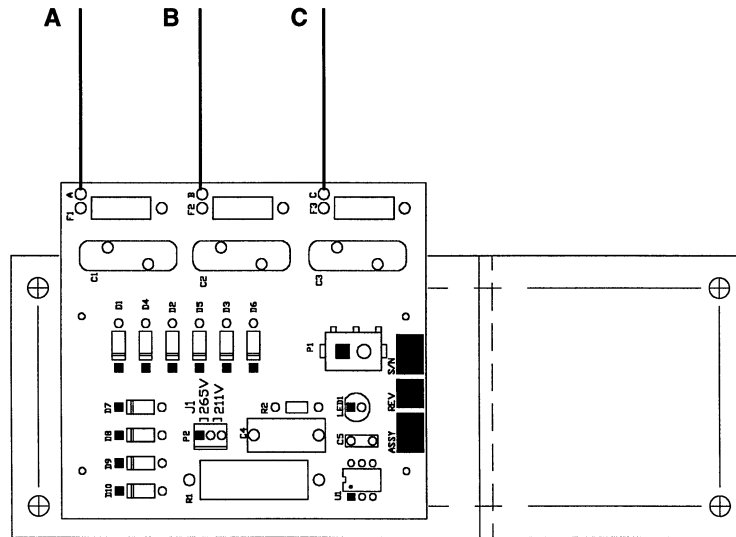


Figure 6 Mounting Phase Loss Detection PCB on Circuit Board Supports

4. Mount the chopper cap mounting bracket onto chopper #4.

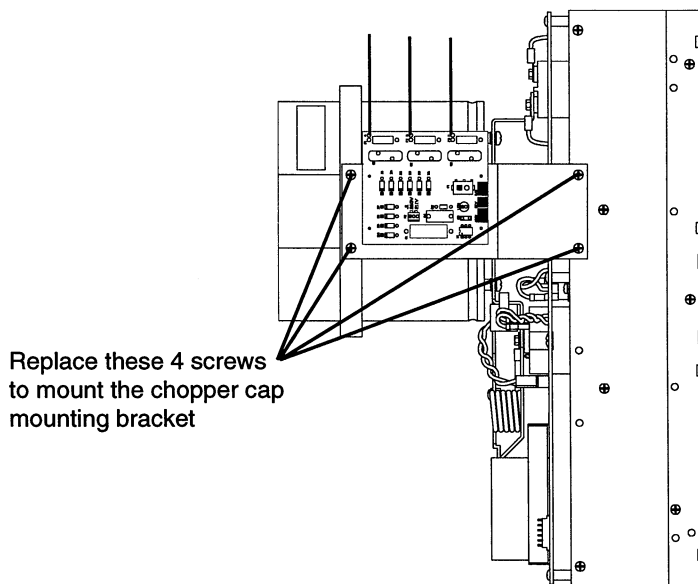


Figure 7 Mounting Chopper Cap Mounting Bracket on to Chopper #4

# Phase Loss Protection Upgrade

5. Connect wires labeled A, B, C to terminals on the chopper input labeled A, B, C.

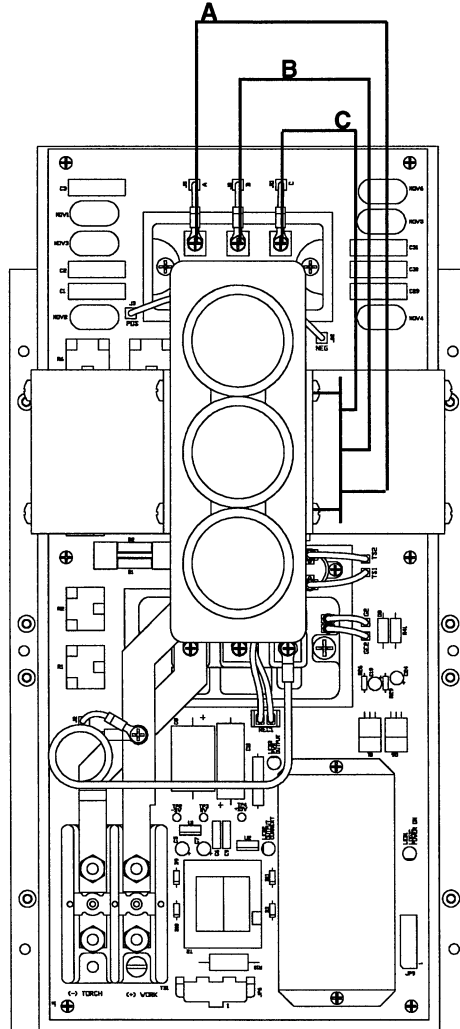


Figure 8 Connecting Phase Loss Detection PCB to Chopper Input

# Phase Loss Protection Upgrade

## Connect Phase Loss Detection PCB to Control Board

1. Plug in nylon connector end of 129323 wire group into P1 of phase loss detection pcb.
2. Verify that J1 jumper at P2 on phase loss detection pcb is connected to 265V.

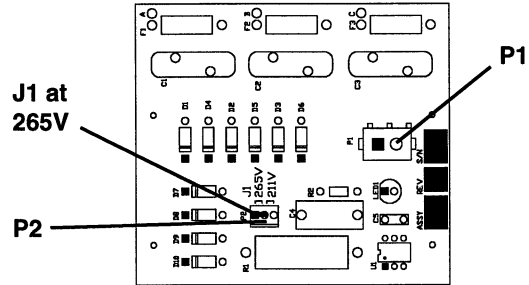


Figure 9 Connecting 129323 Wire Group to Phase Loss Detection PCB

3. Route 129323 wire group from P1 of phase loss detection pcb to control board as shown in Figs. 10 and 11.

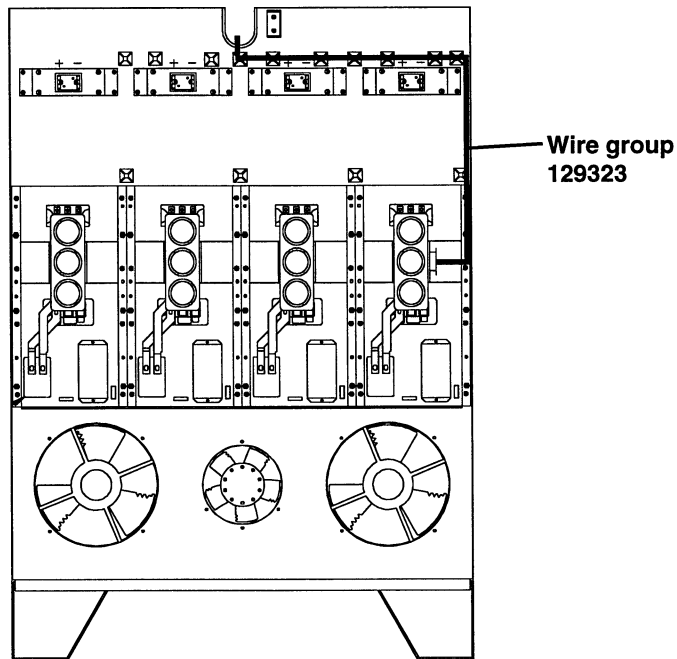


Figure 10 Routing 129323 Wire Group to Control Board - 1 of 2

## Phase Loss Protection Upgrade

4. Insert blue wire from 129323 wire group into hole #1 of plug PL2.4 (connects to REC4 of control PCB).
5. Insert white wire from 129323 wire group into hole #2 of plug PL2.4.

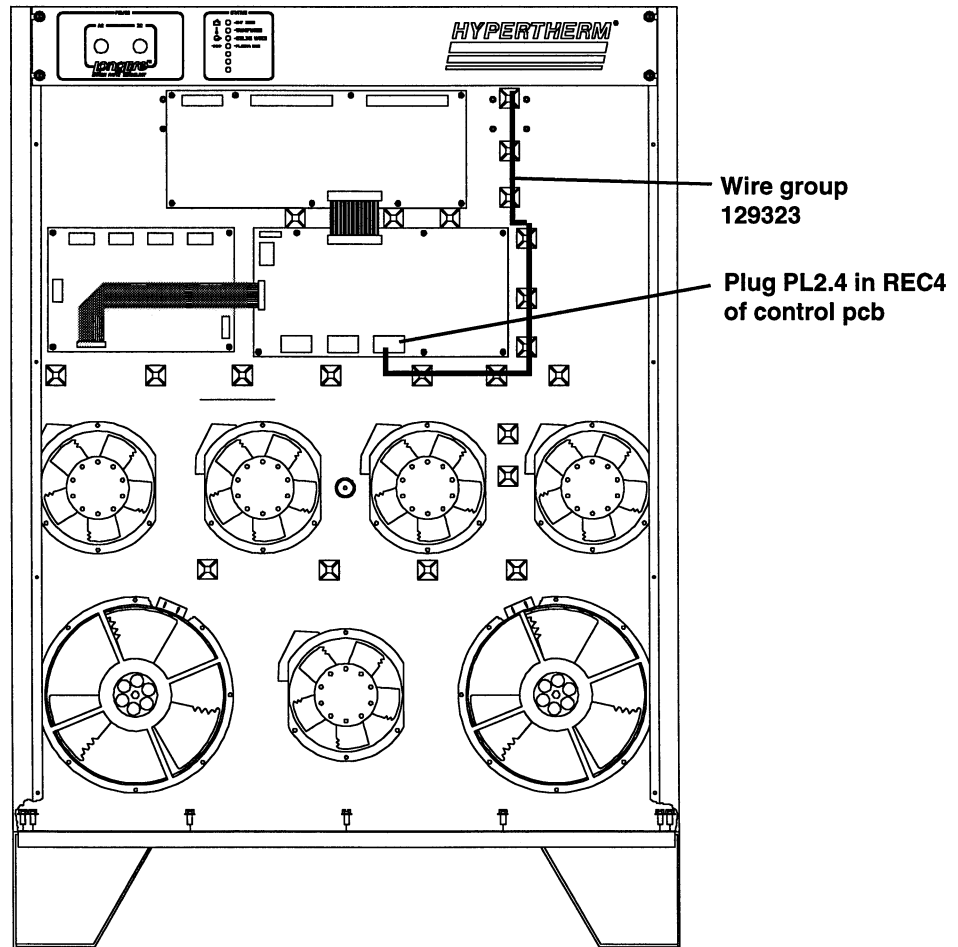


Figure 11 Routing 129323 Wire Group to Control Board - 2 of 2

# Phase Loss Protection Upgrade

## INSTALL 081038 FIRMWARE

Take necessary grounding precautions before handling firmware.

1. Remove 081019 firmware from the control board socket by using the extraction tool (027338) included in the kit. See Fig. 12.
  - a. Remove firmware cover.
  - b. Insert the removal tool into the corner slot. Ensure bend on the removal tool catches on the bottom of the firmware.
  - c. Pull the removal tool straight out until the firmware releases from the socket.
  - d. If the firmware only partially releases, repeat steps a. and b. at the opposite corner.
  - e. Discard old firmware.

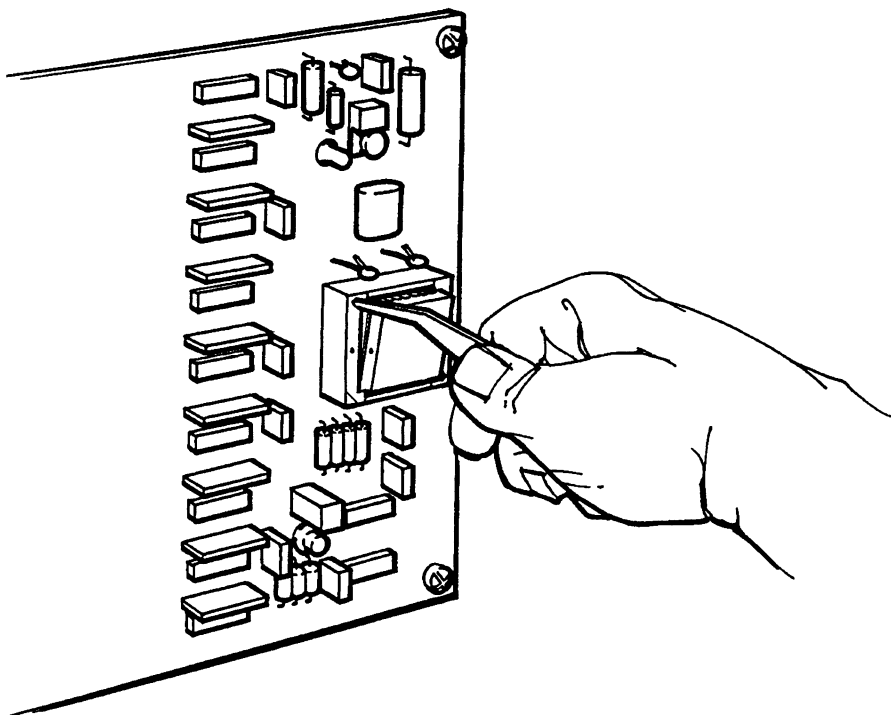


Figure 12 Removing 081019 Firmware from Control PCB

## Phase Loss Protection Upgrade

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2. Carefully install 081038 Rev. A firmware into socket.
  - a. Orient firmware by aligning the dot and bevel on IC (indicating pin 1) to the dot on socket. (Some firmware has only a bevel indicating the side where pin 1 is located.) See Fig. 13. Be careful not to bend any pins during installation.

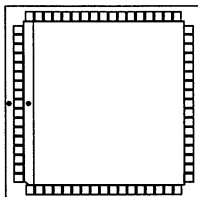


Figure 13 081038 Firmware

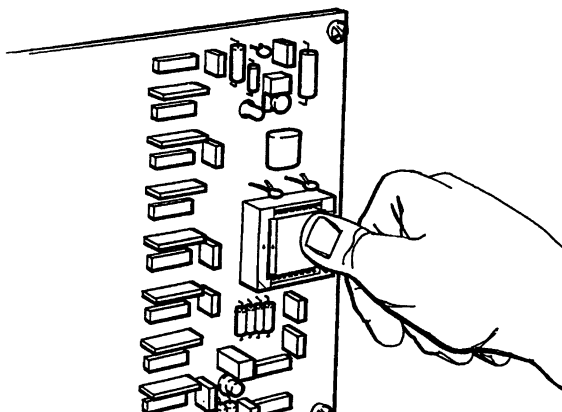


Figure 14 Installing 081038 Firmware

Installation of the phase loss protection circuit is complete. Replace the firmware cover. See instruction manuals 803230 to install the H-401 slave upgrade, and 802930 to calibrate the H-401 slave before resuming normal operations.



**WARNING**



**Install all power supply covers before operating the HT4001 system.**

See also the HT4001 instruction manual 802000 (or 802470 for 200V power supplies) for complete installation, operation, maintenance and parts list information for the HT4001 system.