Phase Loss Detection

CH100 and CH130 Upgrade

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The world leader in plasma cutting technology

Phase Loss Detection for CH100 and CH130 Choppers

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Hypertherm, Inc. Hanover, NH USA http://www.hypertherm.com email:info@hypertherm.com

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Hypertherm Offices Worldwide:

Hypertherm, Inc.

Etna Road, P.O. Box 5010 Hanover, NH 03755 USA Tel.: (603) 643-3441 (Main Office) Fax: (603) 643-5352 (All Departments) Tel.: (800) 643-9878 (Technical Service – toll-free in USA and Canada) Tel.: (800) 737-2978 (Customer Service – toll-free in USA and Canada) email: info@hypertherm.com (General Information) email: service@hypertherm.com (Technical/Customer Services)

Hypertherm Plasmatechnik GmbH

Technologiepark Hanau Rodenbacher Chaussee 6 D–63457 Hanau-Wolfgang, Germany Tel.: 49 6181 58 2100 Fax: 49 6181 58 2134

Hypertherm (S) Pte Ltd

No. 19 Kaki Bukit Road 2 K.B. Warehouse Complex Singapore 417847 Tel.: 65 841 2489 Fax: 65 841 2490

Hypertherm UK Ltd

9 Berkeley Court, Manor Park Runcorn, Cheshire, England WA7 1TQ Tel.: 44 1928 579 074 Fax: 44 1928 579 604

France

15 Impasse des Rosiers 95610 Eragny, France Tel.: 33 1 30 37 15 28 Fax: 33 1 30 37 15 79

Hypertherm S.r.L.

Via Torino 2 20123 Milan, Italy Tel.: 39 02 725 46 312 (Customer Service) Tel.: 39 02 725 46 314 (Technical Service) Fax: 39 02 725 46 400 (All Departments)

Hypertherm B.V.

Burg, Haverkampstraat 13 7091 CN Dinxperlo, The Netherlands Tel.: 31 315 655 866 (Customer Service) Fax: 31 315 655 886

European Technical Support Organization (ETSO)

Edisonstraat 12 3281 NC Numansdorp, The Netherlands Tel.: 00 800 4973 7843 (00 800 Hypertherm) – (toll-free Technical Service) Tel.: 31 186 659494 Fax: 31 186 659495

Japan

Shinjuku Park Tower 30th Floor 3-7-1 Nishi-Shinjuku Shinjuku-ku, Tokyo 163-1030, Japan Tel.: 81 03 5326 3142 Fax: 81 03 5326 3001

Phase Loss Detection Upgrade

In this bulletin:

Introduction	2
Purpose	2
General	2
Customer Required Tools	2
128236 Phase Loss Detection Upgrade Kit	2
Assemble Phase Loss Detection Circuit to Chopper Bracket	3
Jumper Settings on 041600 PCB	5
Installation of Phase Loss Detection Circuit to Chopper	6
Power Supplies with Four Choppers	7
Power Supplies with Two Choppers	8
Power Supplies with One Chopper	9
Remove the Capacitor Bracket from Chopper	10
Install the Phase Loss Detection PCB Assembly to Chopper Connecting the Chopper with 041677 PCB to the	11
Phase Loss Detection PCB	12
Connecting all other Choppers to the Phase Loss Detection PCB Connecting the Transformer Temperature Switch to the	13
129394 Harness	14
Phase Loss Detection Circuit Operation	17

INTRODUCTION



Purpose

This field service bulletin will enable a qualified electronics technician to install a phase loss detection circuit to power supplies that have the CH100 or CH130 chopper.

General

When the chopper loses one or more input phases, or if the AC voltage to the chopper drops below 85% of the rated voltage for longer than 1 minute, the chopper or choppers may experience a failure. Typical causes for a lost phase to the chopper are blown fuses or failed power supply contactors. Low AC voltage to the chopper may be caused by extended power reductions from the customer's plant supply lines.

Customer Required Tools

Phillips head screwdriver

128236 Phase Loss Detection Upgrade Kit

Part No.	Description	Qty
004652	Bracket:CH130/100 Cap Mounting	1
008263	Standoff:6-32 X 1/4Hex X 3/8 Long	4
041600	PCB Assembly: Phase Loss Detection Circuit	1
074006	Base:1"X1" Adhesive Cable Tie	3
075404	M/S:6-32 X 1/4 Pan	4
075491	M/S:6-32 X 3/8 Pan	4
129394	Phase Loss Detection Harness	1
343003	Cable Tie	10
803310	Field Service Bulletin: Phase Loss Detection Upgrade	1

Phase Loss Detection Upgrade



ASSEMBLE PHASE LOSS DETECTION CIRCUIT TO CHOPPER BRACKET

- 1. Take the 075491 screws, 008263 standoffs and 004652 chopper bracket from the kit.
- 2. Insert the 075491 screws through the back of the 004652 chopper bracket and screw on the 008263 standoffs in 4 places. See Figure 1.



Figure 1 Attaching Standoffs to Chopper Bracket

3. Line up the 4 holes on the 041600 phase loss detection PCB assembly over the standoffs and screw down the PCB to the standoffs with the 075404 screws. See Figure 2. Note the orientation of the 041600 PCB and the 004652 bracket.



Figure 2 Attaching Phase Loss Detection PCB to Chopper Bracket Standoffs

JUMPER SETTINGS ON 041600 PCB

There are four varieties of choppers in Hypertherm power supplies.

- 1. Check the instruction manual that came with your power supply for your chopper part number. If the manual is not available, use the chart below to determine which chopper you have.
- 2. After determining your particular chopper, set the P3 jumper on the 041600 PCB according to the chart. See Figure 3.

Chopper Part Number	Chopper Name	Power Supply Used On	P3 Position
129160	CH100-CE/LVD	HT4001 after serial # 4001-000500	А
029894	CH100	HT4001 before serial # 4001-000500	A
129118	CH130-CE/LVD	MAX100 380-400V CE manufactured after 10/96 MAX100D 380-400V CE manufactured after 11/96 HT2000 after serial # 2000-002500; HT2000LHF; MAX200 manufactured after 12/96 HD2070 manufactured after 4/97 HD3070 manufactured after 1/97	В
029922	CH130	MAX100 non-CE; MAX100D non-CE; MAX200 manufactured before 12/96 HT2000 before serial # 2000-002500; HT4000; HT4100; HD1070; HD2070 manufactured before 4/97 HD3070 manufactured before 1/97	В



Figure 3 P3 Jumper Location on 041600 PCB

INSTALLATION OF PHASE LOSS DETECTION CIRCUIT TO CHOPPER



Power Supplies with Four Choppers

To add the phase loss detection circuit to power supplies that have four choppers (HT4001):

- 1. Disconnect all power to the power supply and wait 5 minutes before removing power supply covers.
- 2. Remove the power supply left side panel.
- 3. Find chopper #4 on the inside front panel. Phase loss detection circuit will be attached to chopper #4.
- 4. Go to page 10.



Figure 4 Inside Front Panel of the HT4001

Power Supplies with Two Choppers

To add the phase loss detection circuit to power supplies that have two choppers (MAX200, HT2000, HT2000LHF, HT4000, HT4100):

- 1. Disconnect all power to the power supply and wait 5 minutes before removing power supply covers.
- 2. Remove the power supply left side panel.
- 3. Find chopper #2 on the inside front panel. Phase loss detection circuit will be attached to chopper #2.
- 4. Go to page 10.



Figure 5 Inside Front Panel of Two-Chopper Power Supplies

Power Supplies with One Chopper

To add the phase loss detection circuit to power supplies that have one chopper (MAX100, MAX100D, HD1070, HD2070, HD3070):

- 1. Disconnect all power to the power supply and wait 5 minutes before removing power supply covers.
- 2. Remove the power supply front panel and right side panel.
- 3. Remove the chopper from the power supply.
- 4. Go to page 10.



Figure 6 Inside Front Panel of Single-Chopper Power Supplies

Remove the Capacitor Bracket from Chopper

1. Remove the 4 screws that secure the capacitor bracket on the chopper. Save the screws.



Figure 7 Removing Capacitor Bracket from Chopper

Install the Phase Loss Detection PCB Assembly to Chopper

1. Attach the phase loss detection PCB and bracket to the chopper using the same 4 screws that were removed in the previous step.



Figure 8 Installing Phase Loss Detection PCB Assembly to Chopper

Connecting the Chopper with 041677 PCB to the Phase Loss Detection PCB

If your chopper assembly has PCB 041677 (see location of identifying marks below), follow this procedure for connecting the chopper to the phase loss detection PCB. For all other choppers, go to page 13.

- 1. Plug the PL1 connector from the 129394 harness into P2 receptacle on the 041600 PCB.
- 2. Remove connector from JP6 on the chopper and plug it into P1 receptacle on the 041600 PCB.
- 3. Plug the PL2 connector from the 129394 harness into JP6 receptacle on the chopper.
- 4. Plug the P3 connector from the 129394 harness into the J1 receptacle on the chopper.
- 5. Connect wires A, B and C from 041600 PCB to chopper locations A, B and C.
- 6. Power supplies with one chopper: Fasten chopper to power supply and reconnect power supply wires to it.
- 7. Go to page 14 to complete the installation.



Figure 9 Connecting the Chopper with 041677 PCB to the Phase Loss Detection PCB

Connecting all other Choppers to the Phase Loss Detection PCB

If your chopper assembly does not have PCB 041677 (see location of identifying marks on previous page), follow this procedure for connecting the chopper to the phase loss detection PCB.

- 1. Plug the PL1 connector from the 129394 harness into P2 receptacle on the 041600 PCB.
- 2. Remove connector from JP6 on the chopper and plug it into P1 receptacle on the 041600 PCB.
- 3. Plug the PL2 connector from the 129394 harness into JP6 receptacle on the chopper.
- 4. Remove connector REC1 from the chopper and plug it into P4 receptacle on the 041600 PCB.
- 5. Remove the small harness assembly from the PL3 connector on 129394 harness and plug PL3 into the REC1 receptacle on the chopper. See 129394 Harness figure below.
- 6. Connect wires A, B and C from 041600 PCB to chopper locations A, B and C.
- 7. Power supplies with one chopper: Fasten chopper to power supply and reconnect power supply wires to it.





FIELD SERVICE BULLETIN

Connect the Transformer Temperature Switch to the 129394 Harness

The transformer temperature switch mates to the power supply harness in one of two ways:

- One configuration has a single connector coming from the transformer that mates to a receptacle from the power supply harness.
- The other configuration has two wires coming from the transformer that attach to power supply harness terminals.

Find the power supply transformer to determine which configuration matches your system.

Single Connector Transformer Temperature Switch

- 1. Disconnect the plug and receptacle between the transformer temperature switch and the power supply harness. See Figure 11 (HT2000 shown).
- 2. Route the 129394 harness from the mounted chopper location to the transformer and plug PL7 and PL8 into mating transformer temperature switch and power supply harness connectors. See Figures 11 and 12. Use tie bases and cable ties provided in the kit to secure the 129394 harness. Also see warning on page 3.
- 3. Go to page 17.



Figure 11 Single Connector Transformer Temperature Switch Connection to 129394 Harness





Two Wire Transformer Temperature Switch

- 1. Disconnect one of the two wires between the transformer temperature switch and the power supply harness (either wire will work). See Figure 13 (HD3070 shown).
- 2. Remove PL7 and PL8 from the 129394 harness by disconnecting at the mating #4 and #5 terminals. See Figure 12.
- 3. Route the 129394 harness from the mounted chopper location to the transformer and plug terminals #4 and #5 into the mating transformer temperature switch and power supply harness connectors. See Figures 12 and 13. Use tie bases and cable ties provided in the kit to secure the 129394 harness. Also see the warning on page 3.



Figure 13 Two Wire Transformer Temperature Switch Connection to 129394 Harness

FIELD SERVICE BULLETIN



Installation is complete. Replace power supply covers and resume normal operations.

Figure 14 Phase Loss Detection Circuit

PHASE LOSS DETECTION CIRCUIT OPERATION

Refer to Figure 14. The phase loss detection (PLD) circuit monitors the ac voltage to the chopper and the chopper's current transformer (CT) signal. The chopper's CT signal tells the PLD circuit when the chopper is operating and producing more than the minimal output current. The chopper's AC input voltage tells the PLD circuit if all 3 phases are present or if the input voltage is less than 85% of the rated voltage. When the chopper is operating and one or both conditions exist (lost phase and/or voltage below 85% of nominal) the PLD circuit will put the power supply in an idle mode by tripping the interlock system.

The PLD circuit will automatically reset when the chopper(s) are turned off. If the detected condition persists and the interlocks are turned back on, the PLD circuit will re-trip when the chopper(s) are turned back on and are producing more than the minimal output current.

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