



MVE Tech Tips



October, 2008

Calibrating the Gas Bypass Sensor

Calibration Instructions Hot Gas Bypass MVE Freezers with TEC 3000 Control System

Please read all instructions before beginning calibration

General

This calibration procedure applies to all MVE freezers equipped with the TEC 3000 Controller and the Hot Gas Bypass option. This instruction applies to (but is not limited to) the following models:

High Efficiency Models:

MVE 800 Series (-150°C & -190°C)

MVE 1500 Series (-150°C & -190°C)

MVE 1800 Series (-150°C & -190°C)

Open Top Models:

MVE 200 Series

MVE 500 Series

MVE 600 Series

Stock Series Models:

MVE 800 Series

MVE 1300 Series

Tools Required

Adjustable Wrench

Phillips head Screwdriver

PTFE Tape

Leak Detection Solution

9/16" Wrench

5/32" Socket or Nut Driver

Liquid Nitrogen

Personal Protective Equipment

NOTE: REMOVING THE HOT GAS BYPASS SENSOR WHEN A LIQUID NITROGEN SUPPLY IS CONNECTED TO THE FREEZER WILL CAUSE THE USER TO BE EXPOSED TO LIQUID NITROGEN! BEFORE BEGINNING THIS PROCEDURE ENSURE THAT ALL SUPPLY SOURCES HAVE BEEN SHUT OFF AND DISCONNECTED FROM THE FREEZER!

Disconnecting Freezer from Liquid Nitrogen Source

1. Ensure all supply valves have been shut off. Using a 7/8" or adjustable wrench, disconnect the transfer hose from the freezer plumbing assembly.

Hot Gas Bypass Sensor Removal:

For High Efficiency Series (-150°C & -190°C) and Stock Series Models:

1. Remove the 4 screws that hold the plumbing shroud to the plumbing platform. Depending on the vintage of the freezer, these screws may be Phillips head or 5/32" hex head screws.
2. Remove the shroud from the plumbing platform.
3. Locate the hot gas bypass sensor (see Figure 1).
 - a. The sensor can generally be identified by a twisted pair of red and white wires that terminate on one end into a hex head pipe plug that screws into the plumbing assembly.
 - b. The other end of the sensor will terminate with a 2 pin amp connector labeled "Bypass Sensor"
4. Using a 9/16" or small adjustable wrench, remove the sensor from the plumbing assembly. It may be necessary to temporarily disconnect the sensor from the wiring harness to prevent over twisting of the wires. Reconnect the sensor to the wiring harness after removal is complete.

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For Open Top Models:

1. Remove the screws that hold the rear panel on to the freezer.
2. Remove the rear panel.
3. Locate the hot gas bypass sensor (see Figure 1).
 - a. The sensor can generally be identified by a twisted pair of red and white wires that terminate on one end into a hex head pipe plug that screws into the plumbing assembly.
 - b. The other end of the sensor will terminate with a 2 pin amp connector labeled "Bypass Sensor"
4. Using a 9/16" or small adjustable wrench, remove the sensor from the plumbing assembly. It may be necessary to temporarily disconnect the sensor from the wiring harness to prevent over twisting of the wires. Reconnect the sensor to the wiring harness after removal is complete.

Calibration of Sensor:

1. On the TEC 3000 keypad, press "SETUP." Input password and then press "ENTER."
2. Press "SETUP" until display reads "Add-on menus" and then press "ENTER."
3. Press "SETUP" until display reads "Hot Gas Bypass menus" and then press "ENTER."
4. Press "SETUP" until display reads "Bypass Probe Calibration" and then press "ENTER."
5. Display should read "Calibration Type Single Point." Press "ENTER."
6. Submerge the bypass temperature probe in LN2, and then press "ENTER."
7. Wait for the displayed bypass temperature to stabilize and then press "ENTER."
8. Remove the bypass temperature probe from the LN2.

At this time the calibration of the bypass sensor is complete. Press "ESC" repeatedly to return the controller to the main display screen.

NOTE: Because the calibration values are stored in the TEC 3000 non volatile memory, the calibration will remain accurate in the event of a power loss. The bypass sensor may be disconnected from the wiring harness, if necessary, during the reinstallation process without affecting the calibration of the sensor. If at any time the sensor must be replaced, it will be necessary to recalibrate.

9. Reinstall the bypass sensor following the removal procedure in reverse order. Apply small amount of PTFE tape to the threads of the sensor before installation.
10. Reconnect the freezer to a liquid nitrogen supply and open supply valve(s).
11. Apply a small amount of leak detection solution to the bypass sensor. If any bubbles appear, tighten/reapply PTFE tape until leak is stopped.
12. Reinstall the plumbing shroud (HE and Stock Models) or rear panel (Open Top Models) following the removal procedure in reverse order.

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Function Testing the Hot Gas Bypass System:

1. Press the "Fill Start:" to initiate a fill cycle. The bypass valve should open and nitrogen vapor should exit the muffler.
2. After the plumbing is cooled to the preset temperature, the bypass valve should close, and the freezer should begin filling.
3. If liquid nitrogen begins to exit the muffler before the freezer begins filling, the "Hot Gas Bypass Setpoint" should be increased. The factory default value is -100°C. Increase the temperature setting in 10°C increments (-90°C, then -80°C, etc) until desired operation is achieved.
4. If the filling process begins before the plumbing is sufficiently cool, the "Hot Gas Bypass Setpoint" should be decreased. The factory default value is -100°C. Decrease the temperature setting in 10°C increments (-110°C, then -120°C, etc) until desired operation is achieved.
5. In applications where the piping is very long and/or uninsulated, a "Hot Gas Bypass" Alarm may occur. In this case, increase the "Bypass Time Delay" in 5 minute increments until the freezer is able to complete the bypass cycle without initiating an alarm. The factory setting for the Bypass Time Delay is 5 minutes.

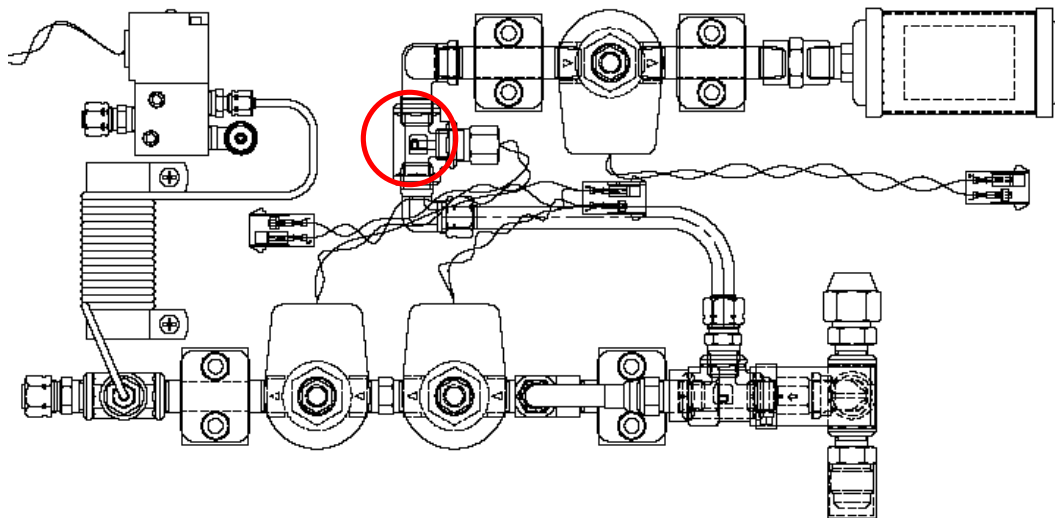


Figure 1: Plumbing assembly with Hot Gas Bypass Option. Bypass sensor is circled.

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