

81*i* High/Low Level

Conversion Instructions

Part Number 112946-00

25Mar2016

Note This procedure assumes work is to be performed on one (1) each fully functional and upgraded 81*i* Mercury (Hg) Calibrator. ▲

Note Customer installations vary; this instruction uses general terminology to facilitate completion. ▲

Equipment Required/Provided for Installation

Unpack the box containing the Conversion Kit (114980-00 for High Level and 112945-00 for Low Level) and make sure that the package contains the following components:

- 1 Line Chiller Assembly (102172-00)
- 1 Controller, Mass Flow
 - 100 sccm for High Level (102628-00)
 - 5 sccm for Low Level (112775-00)
- 1 Transducer, High Pressure (111899-00)
- 1 Kynar Cap (114979-00)
- 1 Kynar Tee (10131)
- 2 Kynar Reducer (114977-00)
- 3 PTFE Tubing, 1/4-inch D x 1.75-inch L (4206)
- PTFE Tubing, 1/8-inch D x 6-inch L (5510)
- PTFE Tubing, 1/8-inch D x 8-inch L (5510)
- PTFE Tubing, 1/4-inch D x 3.25-inch L (4206)
- 1 Instructions for 81*i* High/Low Conversion (112946-00)
- 1 Label, Conversion Compliance 81*i*
 - High Level (114982-00)
 - Low Level (112984-00)
- 1 Label, Bubble
 - High Level (102516-02)
 - Low Level (102516-01)

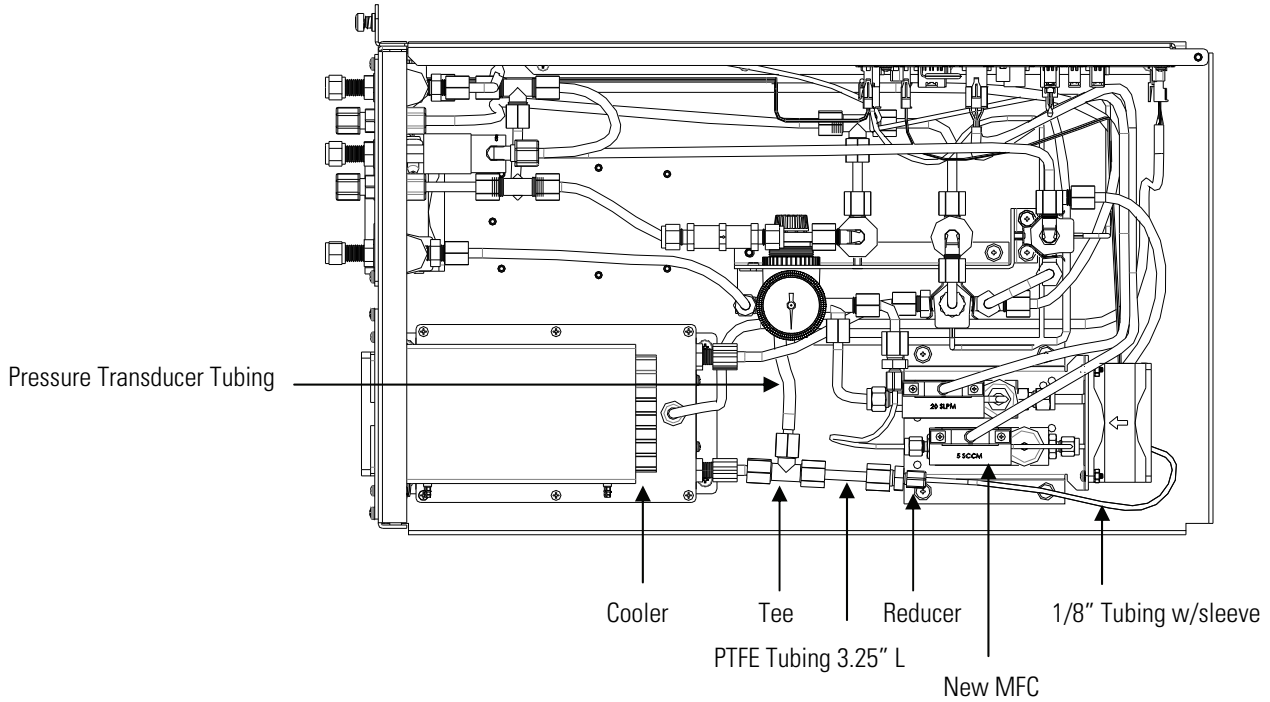


Figure 1. Installed Components

Preparation

Follow the steps below before beginning installation.

1. Remove top cover to 81*i* Hg Calibrator.
2. Remove air pressure to 81*i* Hg Calibrator. Monitor pressure gauge on 81*i* regulator/gauge assembly; proceed when pressure drops to zero psi.
3. Shut OFF 81*i* front panel power switch.



WARNING Implementation of this conversion kit will invalidate any existing certification due to the required recalibration of major components. Refer to the Model 81*i* Instruction Manual for manufacturer's disclosure. ▲



Equipment Damage High Pressure Transducer Assembly 111899-00 can be damaged by small amounts of static electricity. A properly ground antistatic wrist strap must be worn while handling any internal component. If an antistatic wrist strap is not available, be sure to touch the instrument chassis before unpacking transducer or touching any internal components. When the instrument is unplugged, the chassis is not at earth ground. ▲

Removal Perform the following in sequence:

4. View pressure gauge on 81*i* regulator/gauge assembly; ensure it reads zero psi before proceeding.
5. Remove the Mass Flow Controller, Hg Line Chiller, and Pressure Transducer Assemblies. Refer to Model 81*i* Instruction Manual 103068-00, Chapter 7, Servicing.

Removing the Mass Flow Controller

Use the following procedure to remove the mass flow controller (MFC).

Equipment Required:

Philips screwdrivers, #1 and #2

Wrench, 9/16-inch

Wrench, 7/16-inch

Wrench, 8/8-inch

Flat blade screwdriver

- a. Disconnect the electrical connectors from the top of the 50 sccm MFC and the fan.
- b. Disconnect the pneumatics from the 50 sccm MFC.
- c. Loosen the four captive retaining screws securing the MFC assembly to the base and lift the assembly off.
- d. Turn the assembly over and remove the two retaining screws from the 50 sccm MFC.

Removing the Cooler Assembly

Use the following procedure to remove the cooler assembly.

Equipment Required:

Wrench, 7/16-inch

Wrench, 5/8-inch

Nut driver, 1/4-inch

Philips screwdriver

Wire cutters

- a. Pull the power connector off the cooler fan, and remove pneumatic and electrical connections. Cut any tie straps necessary.
- b. Remove the four screws securing the cooler shroud and remove the shroud.
- c. Remove the four screws holding cooler to floor plate and remove the cooler assembly.

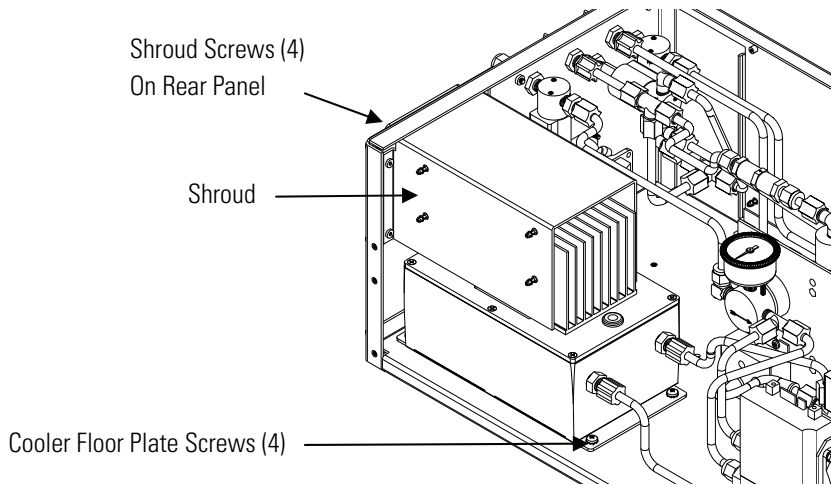


Figure 2. Removing the Cooler

Note The Mercury Line Chiller Assembly contains Mercury. This assembly and any tubing removed during this procedure are to be properly disposed of or reused in accordance with local directives. ▲

Removing the Pressure Transducer Assembly

Use the following procedure to remove the pressure transducer assembly.

Equipment Required:

#1 Philips screwdriver

- a. Disconnect plumbing from the pressure transducer assembly. Note the plumbing connections to facilitate reconnection.
- b. Disconnect the pressure transducer cable from the measurement interface board.
- c. Loosen the two pressure transducer assembly retaining screws and remove the pressure transducer assembly by sliding it down then taking it out.
- d. Install Kynar cap onto open fitting, tighten.

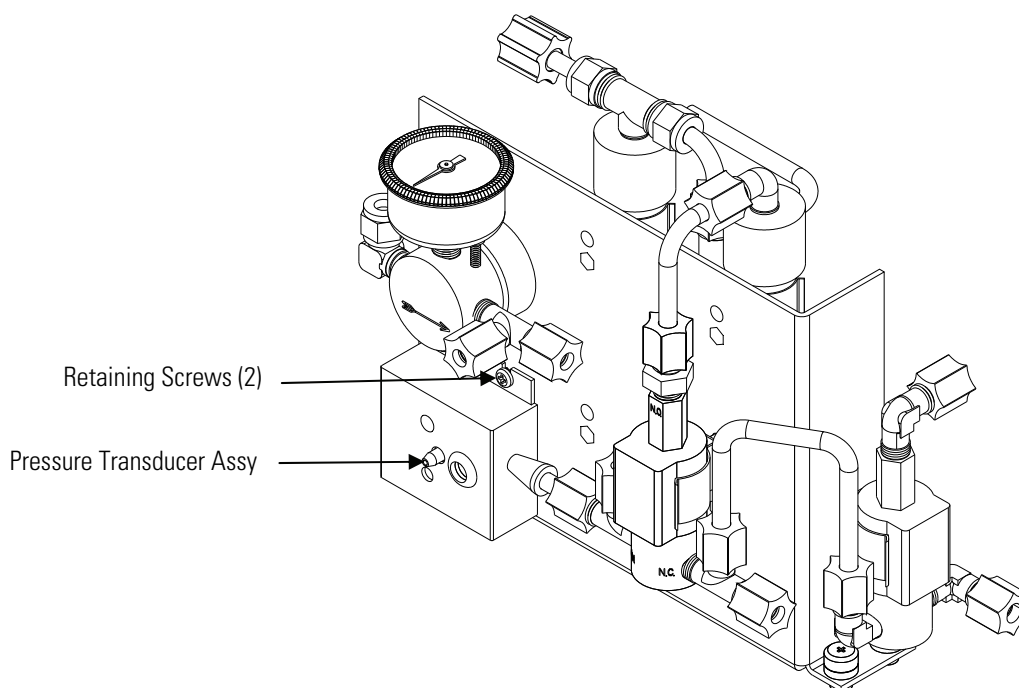


Figure 3. Removing the Pressure Transducer Assembly

Installation

Perform the following in sequence:

6. Install the new High Pressure Transducer. Refer to the Model 81*i* Instruction Manual 103068-00, Chapter 7, Servicing.

Installing the High Pressure Transducer

Use the following procedure to install the new high pressure transducer.

- a. Install the new pressure transducer assembly by following previous steps in reverse. Refer to “[Removing the Pressure Transducer](#)” in this document.
7. Install the new Chiller Assembly. Refer to the Model 81*i* Instruction Manual 103068-00, Chapter 7, Servicing.

Installing the Chiller Assembly

Use the following procedure to install the new chiller assembly.

- a. Install the new chiller by following previous steps in reverse. Be sure to connect the fan power cable before installing the shroud. Refer to “[Removing the Cooler](#)” in this document.
8. Install the Mass Flow Controller Assembly. Refer to the Model 81*i* Instruction Manual 103068-00, Chapter 7, Servicing.

Installing the Mass Flow Controller Assembly

Use the following procedure to install the new mass flow controller (MFC).

- a. Install the new 100 sccm MFC for high level and the new 5 sccm MFC for low level by following the previous steps in reverse. Refer to “[Removing the Mass Flow Controller](#)” in this document, and [Figure 1](#).
 - b. Connect the 1/8-inch tubing from output of MFC to reducing union input. Connect other end of reducing union to one end of PTFE tubing 1/4 x 3.25-inch L.
 - c. Connect Kynar tee to the other end of PTFE tubing 1/4 x 3.25-inch L. Note arrow direction pointing to chiller.
 - d. Take 1.75-inch L of 1/4-inch tubing from tee into chiller assembly.
 - e. Reuse flexible Silastic tubing and cut to 3.5-inch.
 - f. Route from Kynar tee at chiller input to transducer.
 - g. Tighten all nuts.
9. Replace bubble label on front panel with new bubble label and place compliance label as shown.

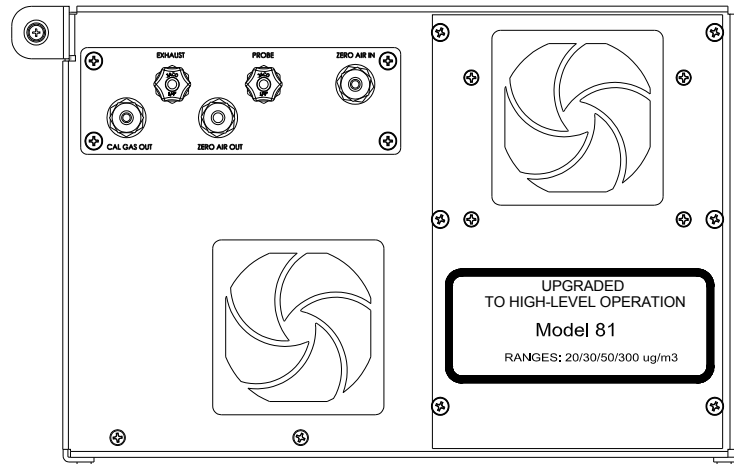


Figure 4. Conversion Label

10. Perform instrument leak test and calibration.

Leak Test

Use the following procedure to perform the leak test. Refer to the Model 81*i* Instruction Manual 103068-00, Chapter 5, Preventive Maintenance.

- a. Cap the following ports on the instrument's rear panel:
EXHAUST
ZERO AIR
CAL GAS
- b. Remove the check valve and temporarily replace the check valve with a union connector.
- c. Connect an external pump (Thermo part number 101426-00 or equivalent) to the PROBE bulkhead connector on the instrument's rear panel.
- d. Connect a 500 cc flow meter to the pressure side of the pump.
- e. Turn the pump ON.
- f. Flow should decrease to less than 10 cc/min. Allow ten minutes to evacuate the calibrator lines.
- g. Remove the union connector installed in Step b, and replace the check valve in the proper orientation, arrow pointing toward front panel.
- h. Verify that the check valve is functioning correctly.
 - i. Connect a pressure gauge to the PROBE bulkhead.
 - ii. In the Instrument Controls menu, select Gas Mode > Orifice Zero.

The gauge should not read greater than 12 psig. If the reading is greater than 12 psig, check the plumbing and valve set point. To adjust, refer to document no. MS-CRD-0047 at:

www.swagelok.com





Pressure Transducer Calibration

Use the following procedure to calibrate the pressure transducer. Refer to the Model 81*i* Instruction Manual 103068-00, Chapter 7, Servicing.


Note Do not try to calibrate the pressure transducer unless the atmospheric pressure is accurate and NIST Traceable. ▲

Equipment Required:


Vacuum pump

- a. Disconnect the tubing from the pressure transducer and connect a vacuum pump known to produce a vacuum less than 1 mmHg.
- b. From the Main Menu, press  to scroll to **Service** > press  >  to scroll to **Pressure Calibration** > and press .


The Pressure Sensor Cal menu appears.



- c. At the Pressure Sensor Cal screen, press  to select **Zero**.

The Calibrate Pressure Zero screen appears.






- d. Wait at least 30 seconds for the zero reading to stabilize, then press  to save the zero pressure value.

- e. Disconnect the pump from the pressure transducer.

- f. Press  to return to the Pressure Sensor Cal screen.

- g. At the Pressure Sensor Cal screen, press   to select **Span**.

- h. The Calibrate Pressure Span screen appears.

- i. Wait at least 30 seconds for the ambient reading to stabilize, use   and   to enter the known barometric pressure, and press  to save the pressure value.

- j. Reconnect the Silastic tubing to the pressure transducer.

Mass Flow Controller Calibration

In order to calibrate the mass flow meter section of the zero or gas mass flow controller, a NIST traceable flow meter is required. The term calibration means determining the actual flow versus the flow setting for seven equally spaced flows along the range of the device. The Model 81*i* then corrects the output according to an internal algorithm.

Calibration may be done with a properly calibrated flow meter. For the most accurate calibration procedure, use a volumetric NIST traceable calibrator with the following step-by-step calibration procedure. Refer to the Model 81*i* Instruction Manual 103068-00, Chapter 4, Calibration.

- a. Connect a source of clean, dry air to the inlet of the mass flow controller.
- b. Measure barometric pressure and room temperature.
- c. Connect a suitable flow meter to the mass flow controller outlet.

- d. Set Model 81*i* to Hg Flow or Zero Air Flow Calibration. Refer to the Model 81*i* Instruction Manual 103068-00, Chapter 3, Operation.
 - e. Set flow controller to 95 percent of full scale, then wait until flow meter reading stabilizes.
 - f. Enter the flow meter reading using the flow input screen.
 - g. Repeat Steps e and f for the remaining flow settings.
- If you encounter a flow controller malfunction, contact Thermo Fisher Scientific.

11. These changes will require NIST traceability certification. Please contact Thermo Fisher Scientific Customer Service.

Service Locations

For additional assistance, service is available from exclusive distributors worldwide. Contact one of the phone numbers below for product support and technical information or visit us on the web at:

www.thermoscientific.com/aqi.

1-800-282-0430 Toll Free

1-508-520-0430 International

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