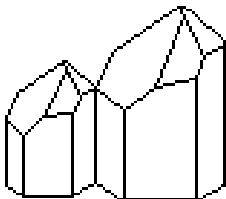


MET3A Fan and Humidity/Temp Sensor (RHT) Replacement



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MET3A Fan and Humidity/Temp Sensor (RHT) Replacement

Overview

This application note describes how to remove and replace the Fan and the Humidity/Temperature Sensor (RHT) on the MET3A sensor.

Materials and Equipment

Customer Supplied

- IPC-A-610 Acceptability of Electronic Assemblies
- Soldering iron
- Torque wrench 0 to 50 in-lb (0 to 5.65 N-m)
- 3/32 Allen wrench (Solar Screen)
- 9/64 Allen wrench (Fan Power Supply PCB & Isothermal Block)
- 5/64 Allen wrench (Fan Cover)
- Acetone
- Cotton Tip applicators (Q-Tip swabs)
- Dow Corning 3145 RTV Adhesive/Sealant or equivalent electronic grade RTV
- Parker Super O Lube (O-ring lubricant) or equivalent
- Humiseal PCB Conformal Coating or equivalent
- Computer IBM compatible Pentium II or higher, VGA graphics card, 8 MB RAM,
- Microsoft Windows 3.x/9x/2000, RS-232 port, mouse
- Digiquartz CD Library Version 2.2 or newer
- Pro Lock removable thread locker (Pro Lock P/N 81788) or equivalent
- ¼ inch (1.27cm wide) Tape
- Rubber gloves or finger cots
- SN63 solder with water soluble rosin core
- Water Soluble Soldering Flux (Kester 2331-ZX) Kit

Paroscientific, Inc. Supplied

- MET3A Fan and Probe Replacement Kit (PN 1709-001) which includes the following:
 - 1 ea. Aspirator Fan
 - 1 ea. Humidity/Temperature Sensor (RHT)

- 1 ea. Humidity/Temperature Sensor O-ring
- 1 ea. Silicone Rubber O-ring
- 2 ea. Solar Shield O-rings
- 1 ea. Washer

Notes:

Warranty:

The MET3A is covered with a 5 year limited warranty on the Digiquartz barometer and the system includes a limited one year warranty. The MET3A should be returned to the factory for repair if it is still under warranty. Performing the field “Fan and Humidity/Temp Sensor (RHT) Replacement” voids the warranty.

Field Repair & Expected Performance:

The field replacement of this kit may result in the MET3A not meeting its original specification for humidity or temperature performance. Expected results are within $\pm 2^{\circ}\text{C}$ for temperature and $\pm 4\%$ RH for humidity. The performance of the barometer is not affected by this modification kit.

Caution:

Failure to use all materials or follow all steps as outlined in this procedure most likely will result in premature failure of the MET3A and higher repair costs at the factory.

Solar Shield Removal:

CAUTION!! When handling electronic components or assemblies, observe all necessary ESD precautions.

Remove the Solar Shield by removing the 2 screws as shown in Figure 1. The screws are bonded with Pro Lock removable thread locker, so some force may be required to break the bond of the thread locker. Slide the solar shield down and away from the housing. Remove the old solar shield o-rings and discard.

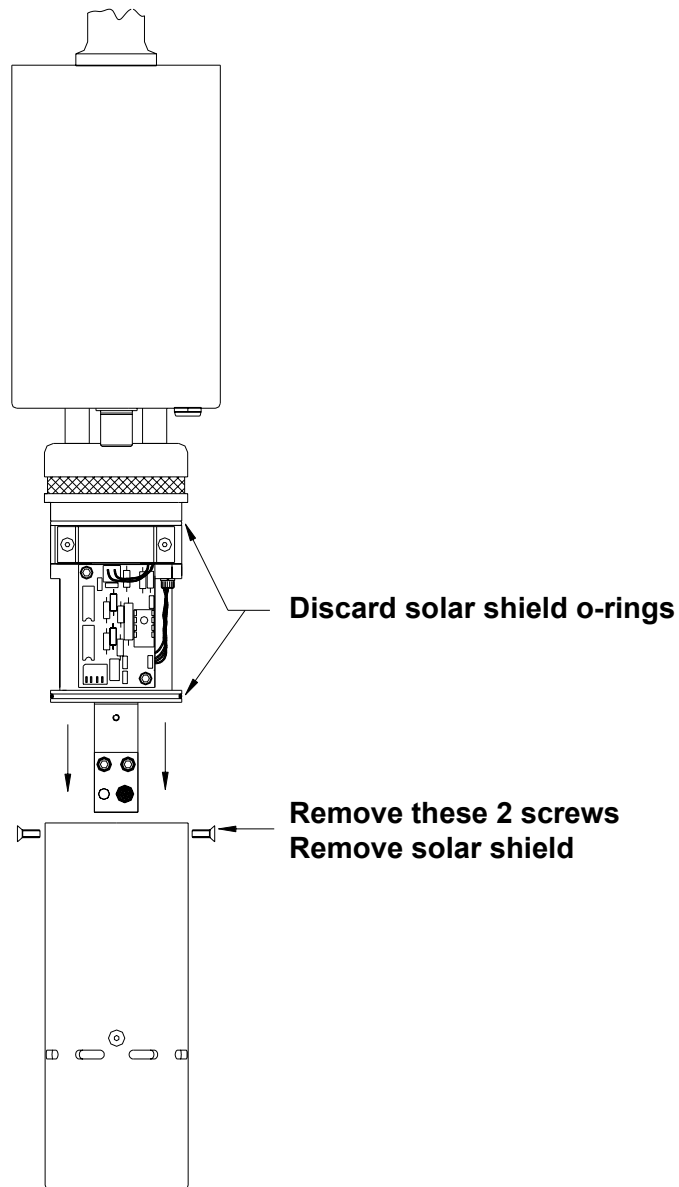


Fig. 1

Fan Replacement:

Remove the fan cover. Remove the fan and clean off any residual RTV.

Remove the 2 fasteners holding the Fan Power Supply/Monitor PCB (see Fig. 2).

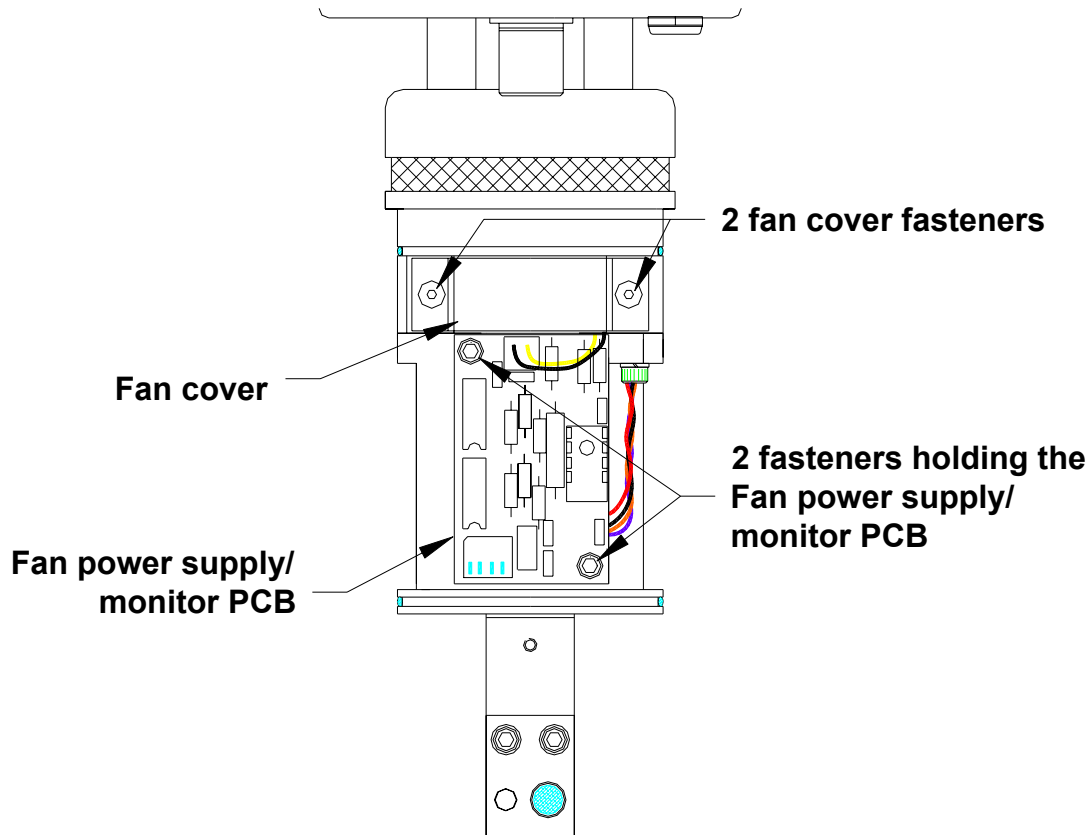


Fig. 2

Using acetone and a cotton tip applicator, scrub away the conformal coating over the yellow and black wires on both sides of the Fan Power Supply/Monitor PCB.

Note: Do not substitute a brush for a cotton tip applicator. The brush will splatter acetone and the whole PCB will have to be recoated.

Unsolder the yellow and black wires from the Fan Power Supply/Monitor PCB. Remove the fan from the housing.

Cut the new fan wires (black and yellow) 2.5" (6.35 cm) from the fan. Strip and tin the wires per IPC-A-610. Place the fan in the Fan Slot with the wires facing out. Route the wires through the strain relief holes in the PCB (see Fig. 3). Solder the fan wires to the PCB using SN63 solder.

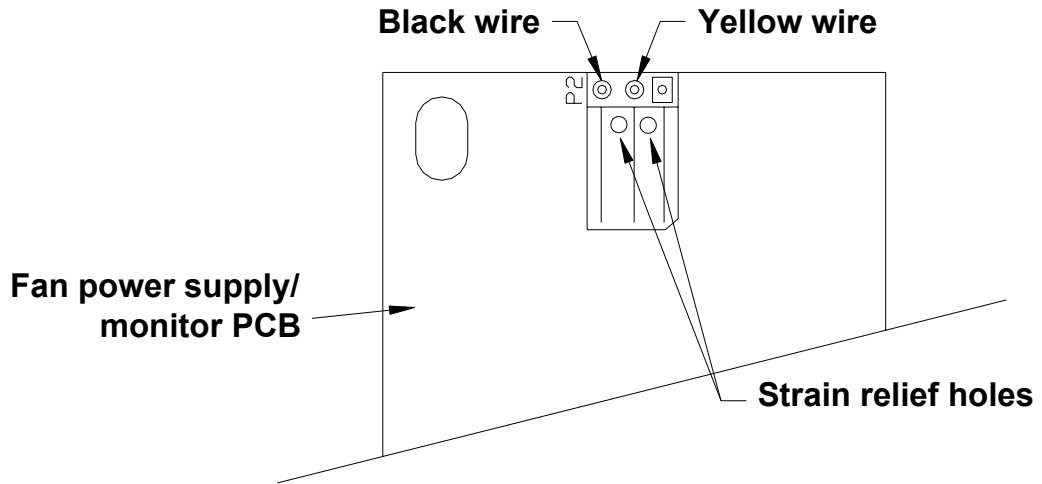


Fig. 3

Clean the solder joints with alcohol and water to remove any residual flux and then let dry.

Place a strip of ¼" (0.635 cm) wide tape across the top edge of the fan (see Fig. 4) to prevent RTV from seizing up the fan blade.

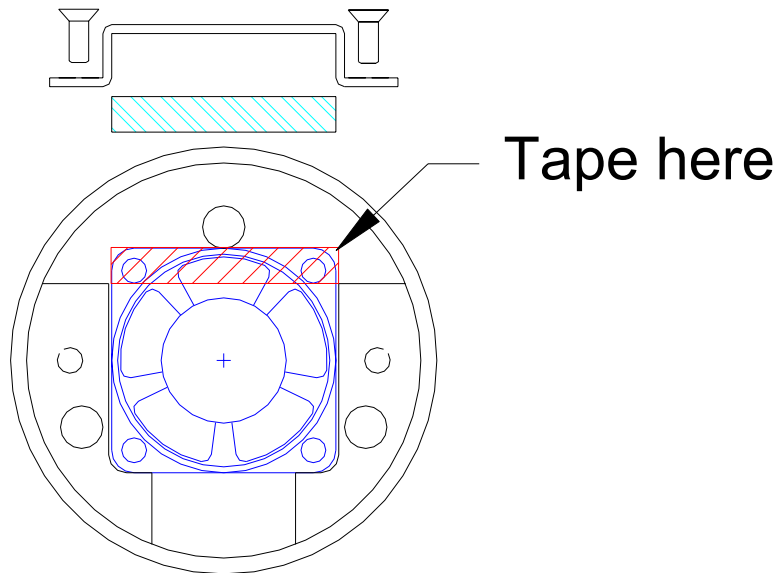


Fig. 4

Apply RTV around the fan as shown in Fig. 5. Apply RTV between the wires as they exit the fan and where they are routed underneath the fan function board.

Cover the entire piece of tape protecting the fan blades with RTV.

Allow the RTV to cure for 8 hr. at room temperature.

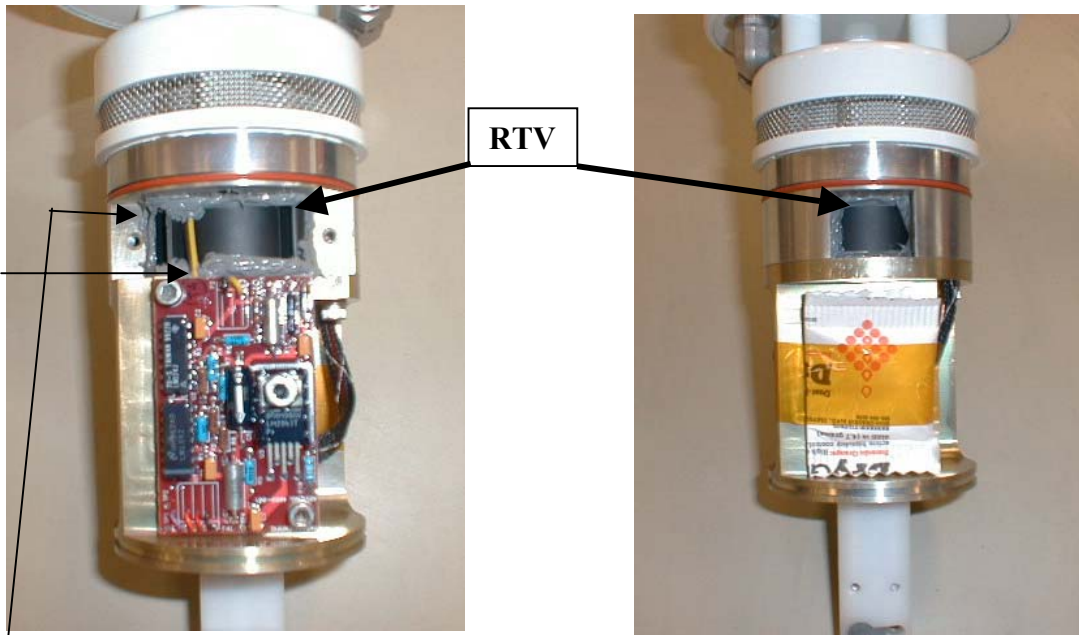


Fig. 5

Caution; do not apply so much RTV as to cause interference with the fan cover.

Leave enough room in the RTV to prevent the sharp edges of the PCB from cutting into the fan wires.

To install the fan cover, apply a minimal amount of thread locker to the threads of the fasteners. Install the fan cover and secure with the fasteners. Torque to 10 to 25 in-lb (1.13 to 2.82 N-m).

Remove and Install Humidity/Temperature Sensor:

Remove the isothermal block from the probe mount by removing the 2 fasteners.

Remove the defective RHT sensor and o-ring (see Fig. 6).

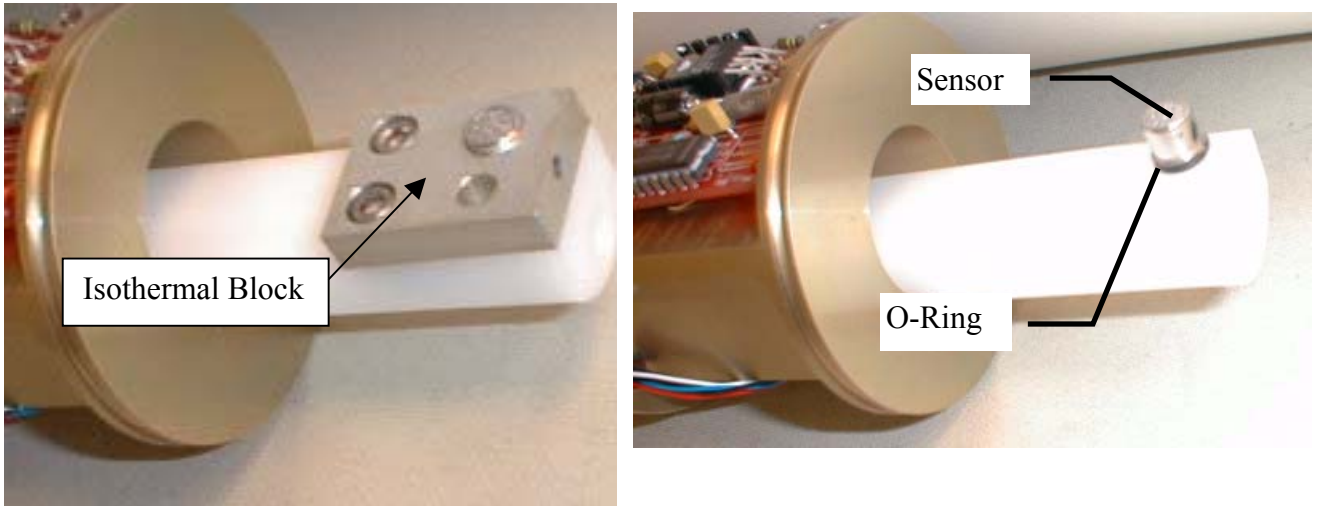


Fig. 6

Lubricate the new RHT sensor o-ring from the kit with a small amount of o-ring lubricant.

Caution: The assembler must wear clean ESD gloves when handling the probe as it is important to keep the screen on top of the sensor free of all oils and contamination.

Lubricate the smaller o-ring with a small amount of o-ring lubricant. Install the o-ring onto the probe pins and insert the probe into the probe socket. Pay close attention to the alignment of the probe as defined in Fig. 7.

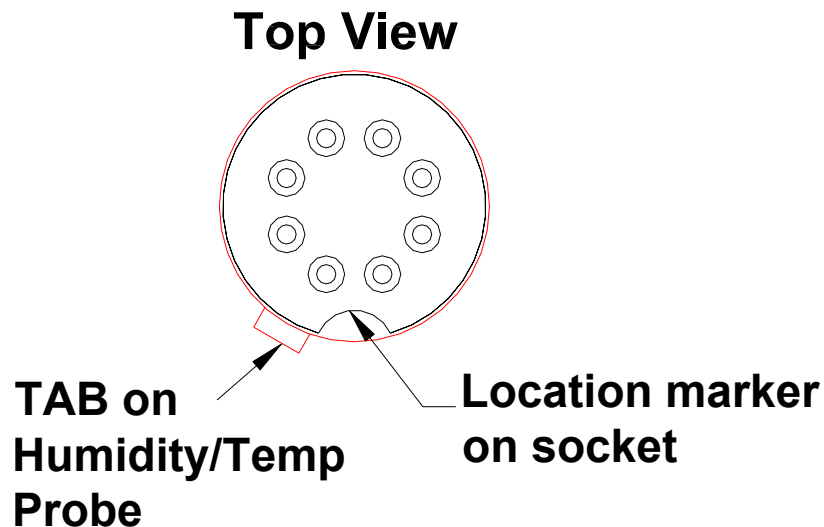


Fig. 7

Install the washer over the probe body, until it seats on the flange of the body.

Lubricate the larger o-ring with a small amount of o-ring lubricant. Place the o-ring over the body of the Humidity/Temp probe until it is seated against the flange of the probe, above the washer.

Install the Isothermal Block over the probe (see Fig. 6).

Install one split washer onto each screw and install through the Isothermal block and screw into the R/H probe mount. Torque should not exceed 5 in-lbs (0.565 N-m).

Functional Test:

Connect the MET3A to a computer and power up. Start the program DQI. Select the COM port where the MET3A is connected.

- Click “start”. Verify that the instrument is found
- Click “OK”
- Click “Measure”. Click “MET3”.

Read the

- Indicated pressure
- Indicated temperature (the temperature should match the room temperature within approximately ± 2 °C)
- Indicated humidity (the humidity should match the room humidity within approximately ± 4 % RH)

Note: Temperature and humidity values will be closer to the references after the coefficients are loaded, which is done at a later step.

- Listen for the fan motor operation

Air should be drawn in through the center hole probe support housing and pushed out the top side screens (see Figure 8).

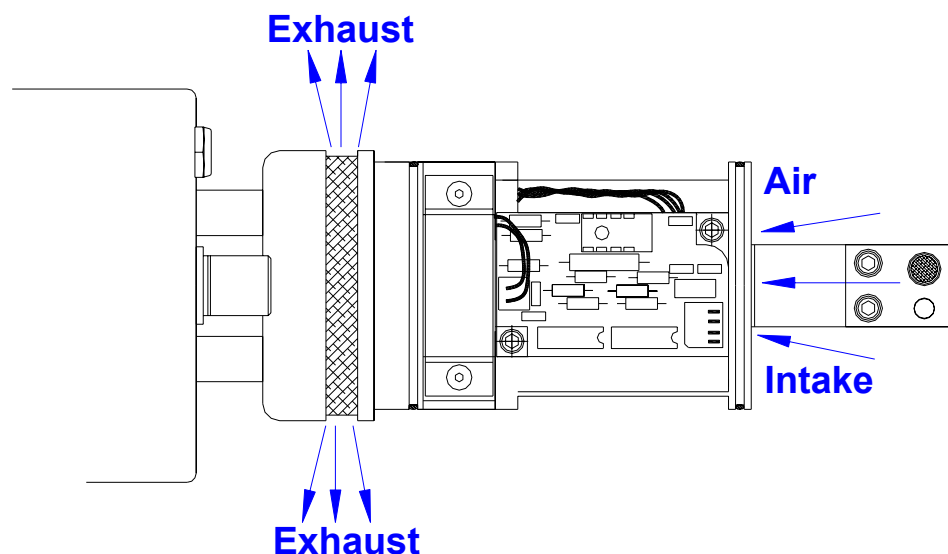


Fig. 8

- Click “exit”. Click “File”. Click “exit” to terminate DQI.

If the unit fails the functional test:

- Check the probe installation. Verify the orientation of the probe to the socket.
- Check the continuity.

Apply Conformal Coating:

Note: Coating and curing must be conducted under a hood or well ventilated area. Always wear safety glasses and gloves when coating boards.

Inspect boards for contamination prior to coating application.

Brush conformal coating over both sides of the Fan Power Supply/Monitor PCB, where the coating was removed for the fan replacement.

Cure for a minimum of 24 hours at $25 \pm 5^\circ\text{C}$ ($77 \pm 10^\circ\text{F}$):

Inspect the conformal coating per IPC-A-610.

Reinstall the Fan Power Supply/Monitor PCB and secure with fasteners. Torque the fasteners to 10 to 25 in-lb (1.13 to 2.82 N-m).

Lubricate the new o-rings for the Solar Shield with small amount of o-ring lubricant and install them in the grooves provided on the aspirator fan housing.

Install solar shield. Secure the solar shield screws with a small amount of thread locker. Torque to 15 to 25 in-lb (1.7 to 2.82 N-m).

Reset Coefficients:

Connect the MET3A to a computer and power up. Start the program DQI. Select the COM port where the MET3A is connected. Click "start". Verify that the instrument is found at the baud rate of 9600.

- Click "OK"
- Click on CONFIGURATION menu
- Click on AUXILIARY
- Click START
- Click H1. Reference the paperwork that comes with the sensor and type in the serial number of the RHT sensor that you are installing.
- Click E2. Referencing the RHT sensor paperwork, type in the output voltage @0%, in Volts DC (approx. 0.8XX).
- Click OK
- Click F2. Referencing the RHT sensor paperwork, type in the output voltage @75.3%, in Volts DC (approx. 3.XX).
- Click OK
- Click E1. Type in 0 (zero)
- Click OK

- Click F1. Type in -262.493
- Click OK
- Click G1. Type in 11.153
- Click OK
- Click "Measure". Click "MET3".

Read the

- Indicated pressure
- Indicated temperature (the temperature must match the room temperature within $\pm 2^{\circ}\text{C}$)
- Indicated humidity (the Humidity must match the room humidity within $\pm 4\%$ RH)

If the unit fails the functional test:

- Check the continuity.
- Verify the coefficients have been entered correctly.

Click "exit". Click "File". Click "exit" to terminate DQI.