MICHELL Instruments

QMA SPARES

REPLACEMENT

GUIDE

97492 Issue 3
May 2019

For Michell Instruments' contact information please go to

www.michell.com

CONTENTS

APPENDICES

SYMBOLS

Where this symbol appears in the following sections it is used to indicate that there is a health and safety issue with items used at this stage and that care should be taken

!

Where this symbol appears in the following sections it is used to indicate that special attention or care must be taken at this stage

Where this symbol appears in the following sections it is used to indicate that there is an environmental aspect relating to this part of the process

1 DESCRIPTION

The purpose of this manual is to outline the method of replacing the following user-servicable assemblies/parts:

- QMA601 Oven Assembly (Section 4)
- QMA601 Moisture Generator (Section 5)
- QMA601 Crystal Sensor (Section 6)
- QMA601 O-Ring (Section 7)
- QMA601 HMI (Section 8)
- QMA601 Control PCB Fuse (Section 9)

- QMA401 Oven Assembly (Section 13)
- QMA401 Moisture Generator (Section 14)
- QMA401 Crystal Sensor (Section 15)
- QMA401 Control PCB Fuse (Section 16)

Section 2 details all tools and consumables required to carry out the above replacements.

The following forms need to be completed and returned to Michell Instruments:

F0121 Decontamination Certificate (see Appendix B)

Please complete this form prior to this instrument, or any components, leaving your site and being returned to us, or, where applicable, prior to any work being carried out by a Michell Instruments' Engineer at your site.

F0131 Hazardous Area Customer Service Declaration (see Appendix C)

This form must be completed after the work is completed and returned to Michell Instruments in order to ensure that the Warranty is maintained.

2 TOOLS/CONSUMABLES REQUIRED

2.1 Oven Assembly Replacement

On delivery, please check that all the following components are included:

QMA601/401 Spare Oven Assembly: QMA-SOA

TOOLS & CONSUMABLES REQUIRED
2mm hex key
7/16” & 3/8” spanner/wrench
Pozi screwdriver set
Small adjustable spanner/wrench
Safety goggles

QMA601 lid removal handles (delivered with the original analyzer)

Replacement handles can be ordered:
Michell Part Number: QMA601-SH (QMA601 ONLY)

The items below need to be supplied by the customer/service engineer

Pressure regulator & gauge
Pressure transducer
2 x shut off valves
Pressure testing tubes
Thermal paste
Leak detection fluid

or can be ordered from Michell Instruments as a kit:

Michell Part Number:
Pressure Test Kit QMA601: QMA601-SPTK
Pressure Test Kit QMA401: QMA401-SPTK

2.2 Moisture Generator Replacement

On delivery, please check that one of the following components are included:

QMA601/401 Spare Moisture Generator 0.5ppm: QMA-SMG-0.5P
QMA601/401 Spare Moisture Generator 5ppm: QMA-SMG-5P
QMA601/401 Spare Moisture Generator 50ppm: QMA-SMG-50P

TOOLS & CONSUMABLES REQUIRED
2mm & 3mm hex keys
7/16” & 3/8” spanner/wrench
Pozi screwdriver set
Small adjustable spanner/wrench
Safety goggles
Gloves

QMA601 lid removal handles (delivered with the original analyzer)

Replacement handles can be ordered:
Michell Part Number: QMA601-SH (QMA601 ONLY)

The items below need to be supplied by the customer/service engineer

Pressure regulator & gauge
Pressure transducer
2 x shut off valves
Pressure testing tubes
Thermal paste
Leak detection fluid

or can be ordered from Michell Instruments as a kit:

Michell Part Number:
Pressure Test Kit QMA601: QMA601-SPTK
Pressure Test Kit QMA401: QMA401-SPTK

2.3 Crystal Sensor Replacement

On delivery, please check that the following component is included:

QMA601/401 Spare Sensor Assembly: QMA-SSA

TOOLS & CONSUMABLES REQUIRED
2mm & 3mm hex key
7/16” spanner/wrench
Pozi screwdriver set
Small adjustable spanner/wrench
Safety goggles

QMA601 lid removal handles (delivered with the original analyzer)

Replacement handles can be ordered:
Michell Part Number: QMA601-SH (QMA601 ONLY)

The items below need to be supplied by the customer/service engineer

Pressure regulator & gauge
Pressure transducer
2 x shut off valves
Pressure testing tubes
Thermal paste
Leak detection fluid

or can be ordered from Michell Instruments as a kit:

Michell Part Number:
Pressure Test Kit QMA601: QMA601-SPTK
Pressure Test Kit QMA401: QMA401-SPTK

2.4 O-Ring Replacement

TOOLS & CONSUMABLES REQUIRED
O-ring Michell Part Number: QMA601-SORING
Small flat headed screwdriver
2mm hex key
Latex gloves

QMA601 lid removal handles (delivered with the original analyzer)

Replacement handles can be ordered:
Michell Part Number: QMA601-SH (QMA601 ONLY)

2.5 HMI Replacement

On delivery, please check that the following component is included:

QMA601 Spare HMI: QMA601-SHMI

TOOLS & CONSUMABLES REQUIRED
Safety goggles
Gloves
2mm hex key

QMA601 lid removal handles (delivered with the original analyzer)

Replacement handles can be ordered:
Michell Part Number: QMA601-SH (QMA601 ONLY)

2.6 Control PCB Fuse Replacement

TOOLS & CONSUMABLES REQUIRED
Fuse Michell Part Number: 26790
Pozi screwdriver
2mm hex key
Tweezers
Latex gloves

QMA601 lid removal handles (delivered with the original analyzer)

Replacement handles can be ordered:
Michell Part Number: QMA601-SH (QMA601 ONLY)

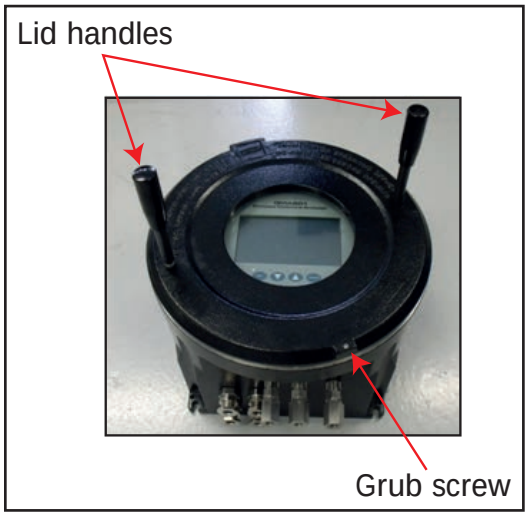
3 QMA601

Sections 3.1 and 3.2 must be completed before replacing the following:

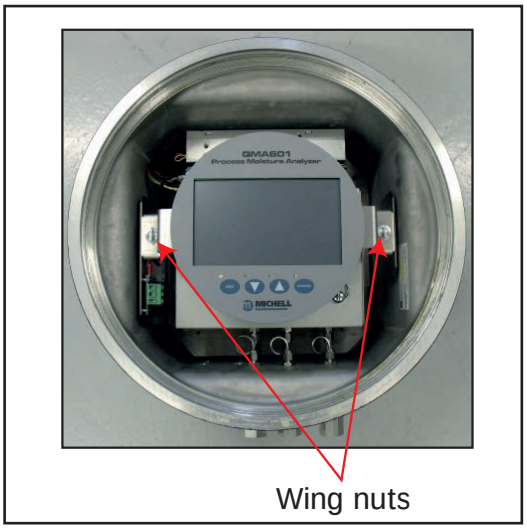
- QMA601 Oven Assembly
- QMA601 Moisture Generator
- QMA601 Crystal Sensor

3.1 Removal of the QMA601 Lid

1. Isolate the gas supply to the QMA601 and depressurize the system.
2. Isolate the power to the QMA601.
3. Loosen the grub screw in the lid using a 2mm hex key. Screw in the analyzer lid handles (Michell Part Number QMA601-SH) and turn the lid anti-clockwise - this may take some force to start the lid moving. Remove the lid. **NOTE: Be careful when the lid is removed as it is heavy.**



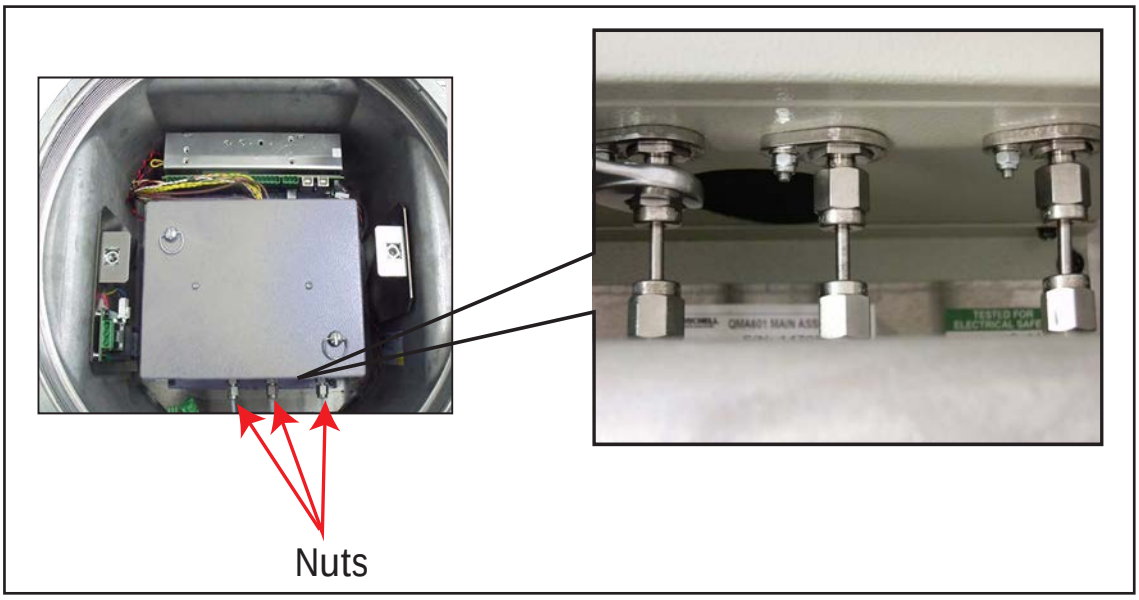
4. To remove the display assembly, undo the 2 x 1/4 turn wing nuts. This will release the display assembly.



5. **Carefully** pull the display assembly away from the housing as it is connected by a power cable and a ribbon cable. Disconnect these first and then remove the display. Store the display safely.

3.2 Removal of the QMA601 Oven Lid

1. Loosen the three nuts on the outside of the oven using a 7/16” spanner/ wrench.



2. Remove the oven lid by turning the 2 screws anti-clockwise.

For QMA601 Oven Assembly Replacement go to Section 4

For QMA601 Moisture Generator Replacement go to Section 6

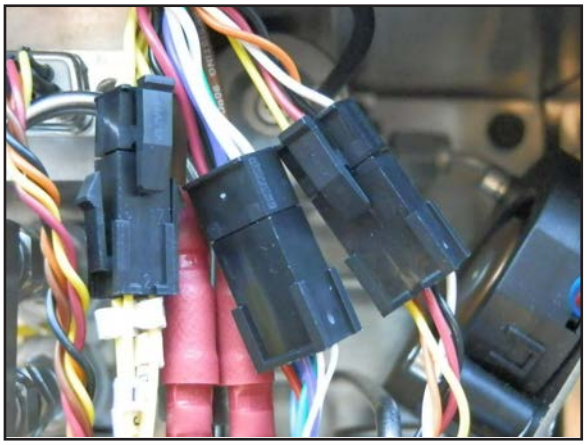
For QMA601 Crystal Sensor Replacement go to Section 6

4 QMA601 OVEN REPLACEMENT

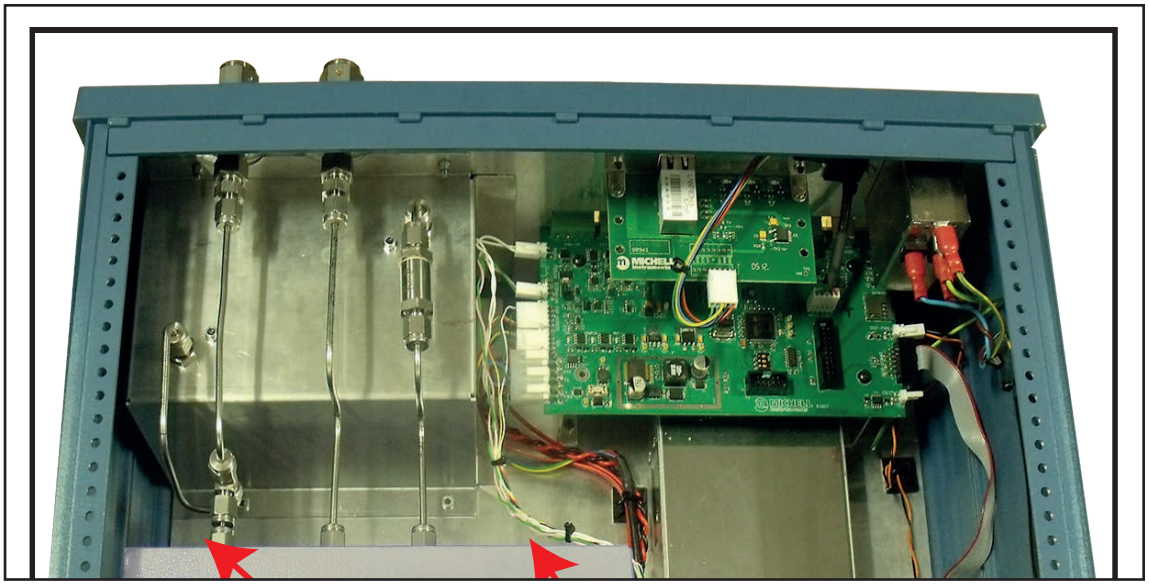
4.1 Removal of the QMA601 Oven

1. Remove the QMA601 lid, display and oven lid as set out in Sections 3.1 and 3.2.

2. Disconnect the wiring loom connectors (three black & two red crimps).



3. Using a pozi screwdriver, remove the 4 screws that hold the oven onto the chassis plate.



! 4. The oven will now lift out of the housing. Be careful not to damage the PCB's when taking out the oven. There will be some resistance when lifting out the oven as there is thermal paste on the base.

5. Clean the thermal paste off the base of the oven and the base of the skid plate.

4.2 Replacement of the QMA601 Oven

1. Fit 1mm T-flex (65885) onto to base of the Oven Assembly (83939) before securing it into position on the QMA601 Base Plate (65068).

! 2. Fit the oven onto the base plate and push down firmly. Secure the oven in place with the 4 screws. **Do not fully tighten screws.**

3. Reconnect the connectors on the wiring loom inside the oven.

4. Re-fit the three nuts onto the outside of the oven. The oven will move back and forth - use this to help put the tubes into the bulkheads. Tighten the nuts using a 7/16” spanner/wrench - refer to Swagelok instructions in Appendix B. Tighten up the screws to secure the oven in place.

4.3 Replacement of the QMA601 Lid and Pressure Testing

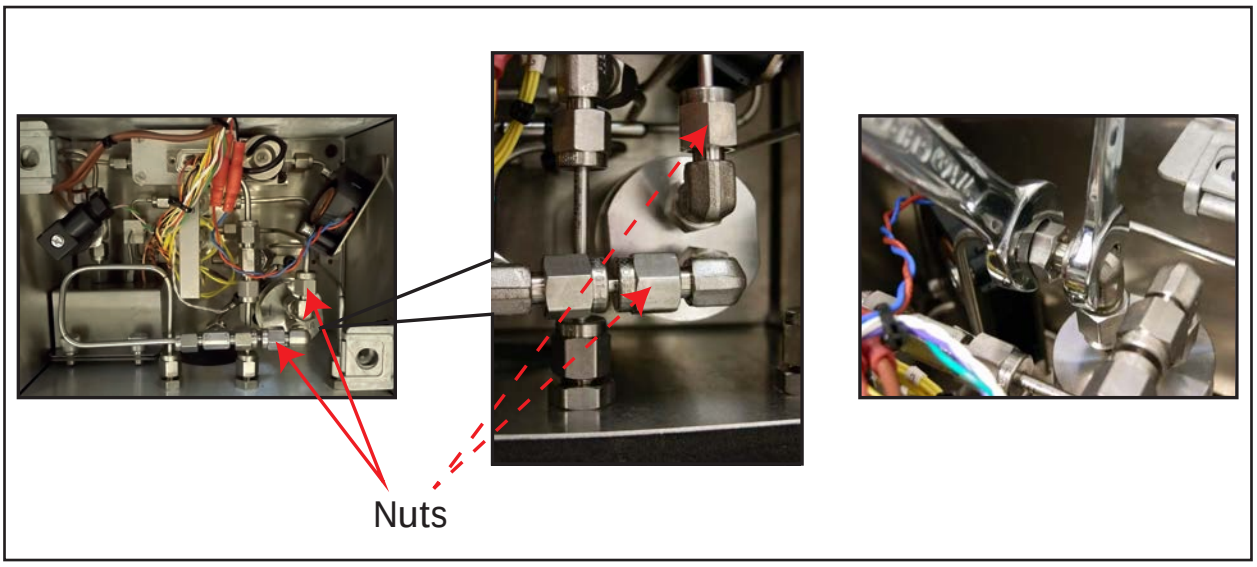
Go to Section 10 - QMA601 Lid Replacement

and Section 11 - Pressure Testing

5 QMA601 MOISTURE GENERATOR REPLACEMENT

5.1 Removal of the QMA601 Moisture Generator

1. Remove the QMA601 lid, display and oven lid as set out in Sections 3.1 and 3.2.
2. Wait for the oven to cool for at least **one hour** before disconnecting any of the tube work.
3. Disconnect the 2 nuts that are connected to the 2 Swagelok 1/8” elbows, using a 7/16 spanner/wrench. Use an adjustable or 3/8” spanner/wrench to hold the body of the elbow while disconnecting.



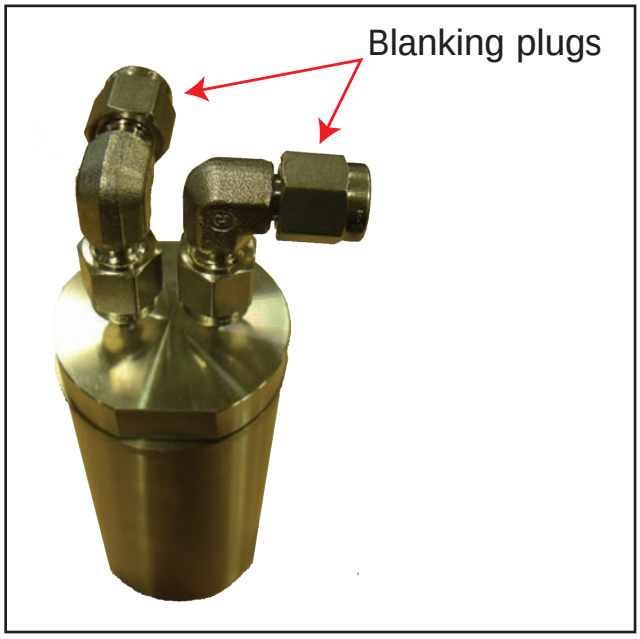
4. The moisture generator will now be free to lift out.

5.2 Replacement of the QMA601 Moisture Generator

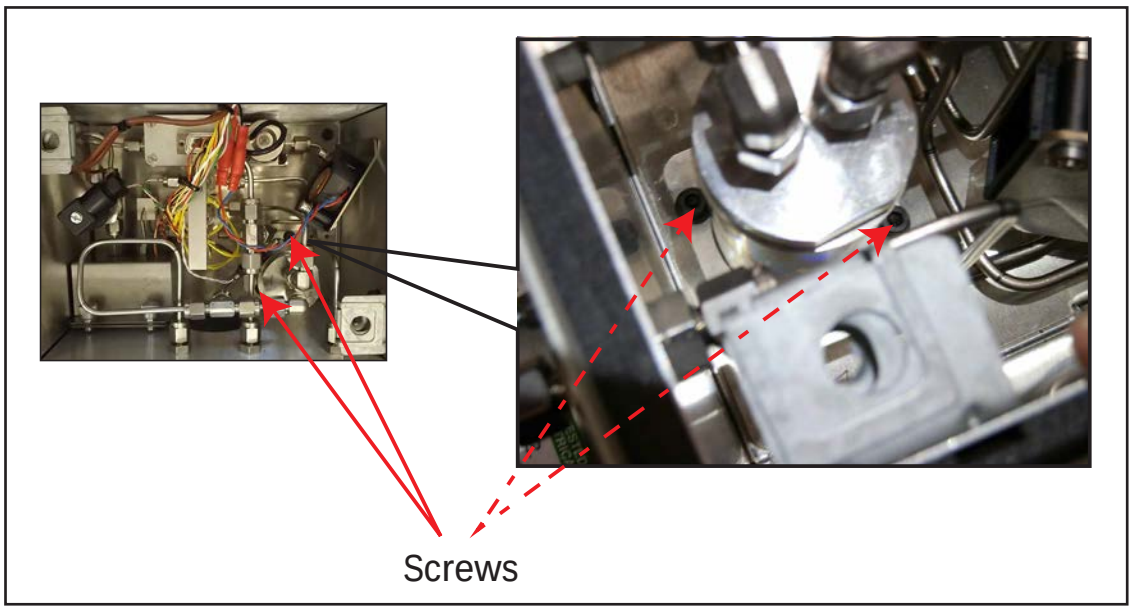
1. Depending which moisture generator you have removed, replace it with the same PPM value:

   - 0.5PPM – (QMA-SMG-0.5P)
   - 5 PPM – (QMA-SMG-5P)
   - 50 PPM – (QMA-SMG-50P)

2. Make sure that the 1/8” elbows on the moisture generator are set to the correct position.
3. Remove the 2 blanking plugs before attempting to fit the moisture generator.
4. Position the new moisture generator in place. Reconnect the tube nuts on the oven tube work.



5. If the moisture generator will not go back into its mounting plate, gently loosen the 2 screws using a 3mm hex key. The moisture generator should then fit back in. Tighten the 2 screws.



6. Tighten the nuts back onto the tube work using a 7/16” spanner/wrench - refer to Swagelok instructions in Appendix B. Use an adjustable or 3/8” spanner/wrench to hold the body of the elbow while reconnecting.

7. The moisture generator value must now be programmed into the analyzer, and the moisture generator capacity value reset. Refer to Section 19 for instructions.

8. The instrument should be purged with dry gas for at least 6 hours to remove any ambient moisture introduced into the system when changing the moisture generator.

9. Finally, an internal calibration cycle should be run. Refer to Appendix E for a detailed guide of how to get the best results during calibration.

5.3 Replacement of the QMA601 Lid and Pressure Testing

Go to Section 10 - QMA601 Lid Replacement

and Section 11 - Pressure Testing

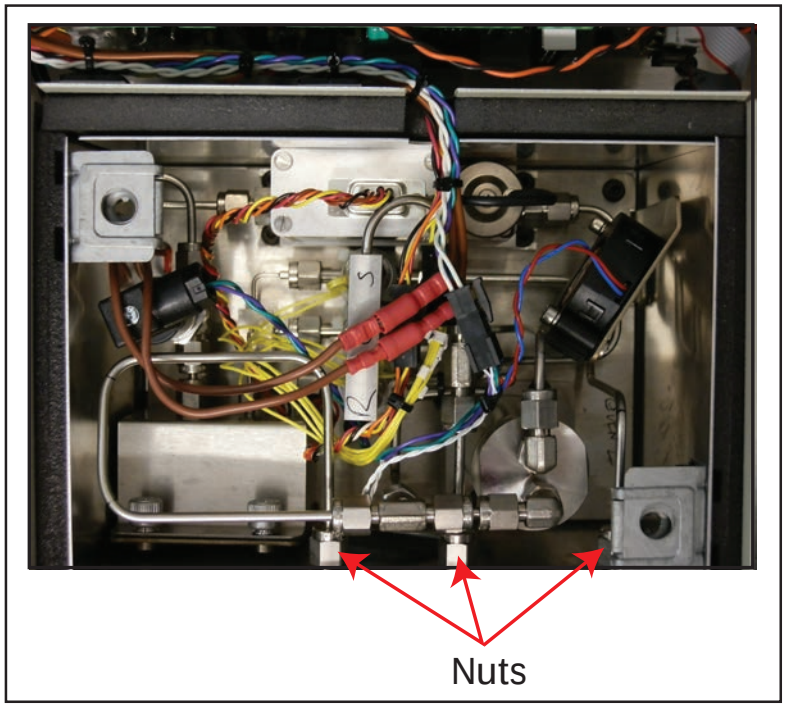
6 QMA601 CRYSTAL SENSOR REPLACEMENT

6.1 Removal of the QMA601 Sensor Block and Oscillator PCB

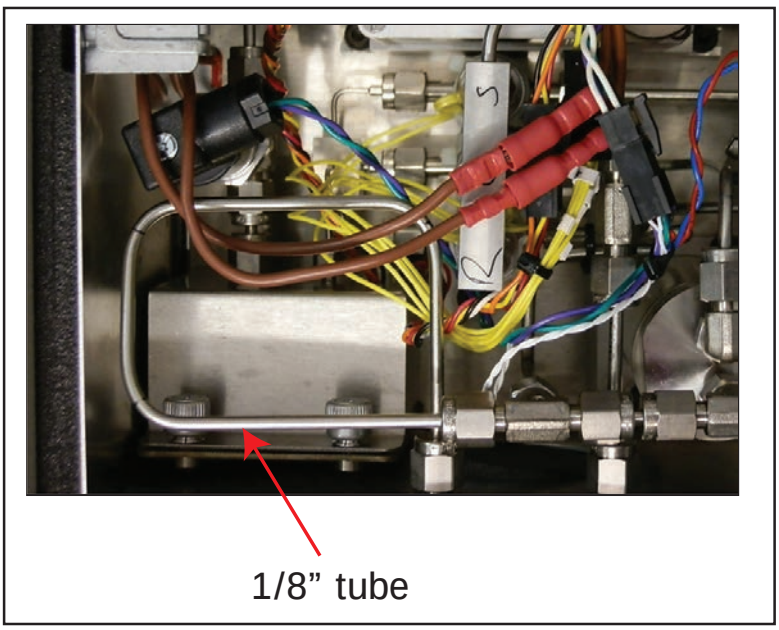
1. Remove the QMA601 lid, display and oven lid as set out in Sections 3.1 and 3.2.

2. Wait for the oven to cool for at least **one hour** before disconnecting any of the tube work.

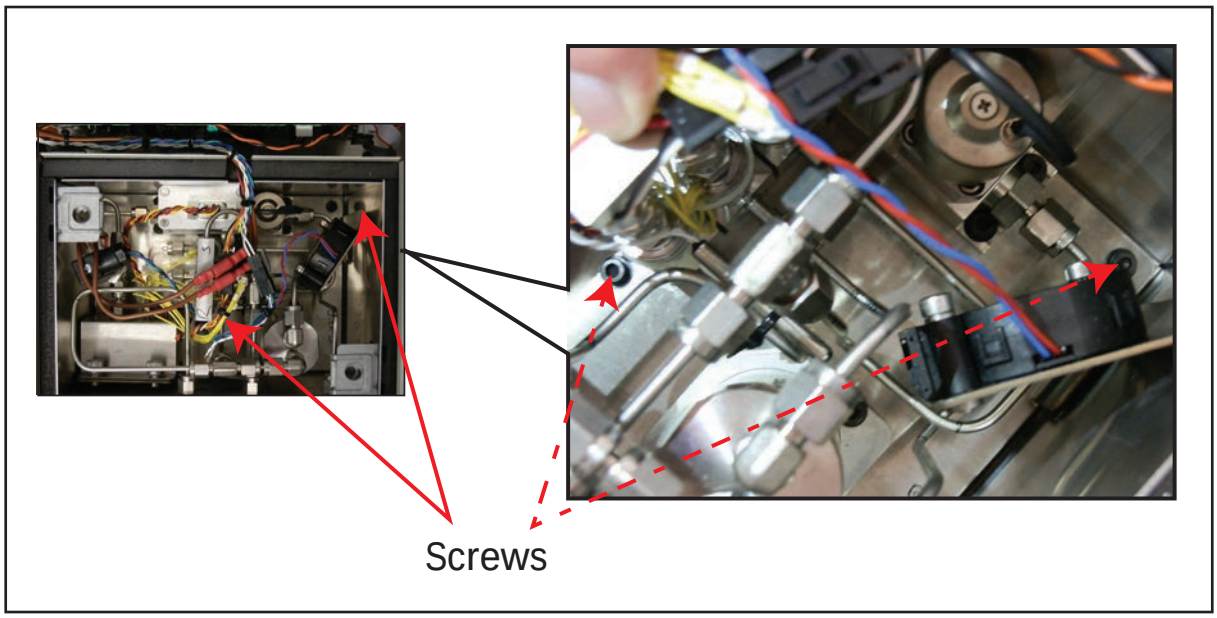
3. Loosen the 3 nuts on the bulkheads on the inside of the oven using a 7/16” spanner/wrench.



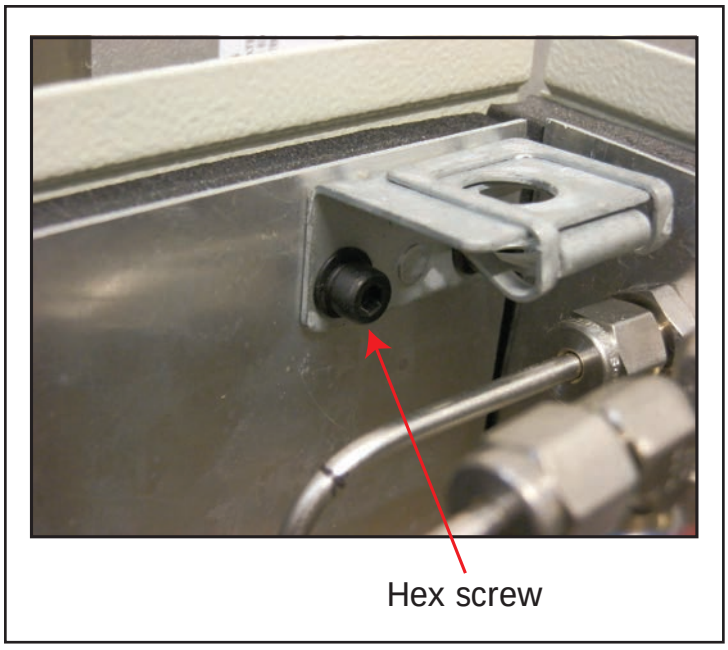
4. Remove the 1/8” tube that is directly above the sensor block and oscillator PCB. This tube is attached to the end of the 1/8” tee - hold the tee with a 3/8” spanner/wrench and loosen the nut with a 7/16” spanner/wrench.



5. Using a 3mm hex key, remove the 2 screws that hold the oven base plate in place.



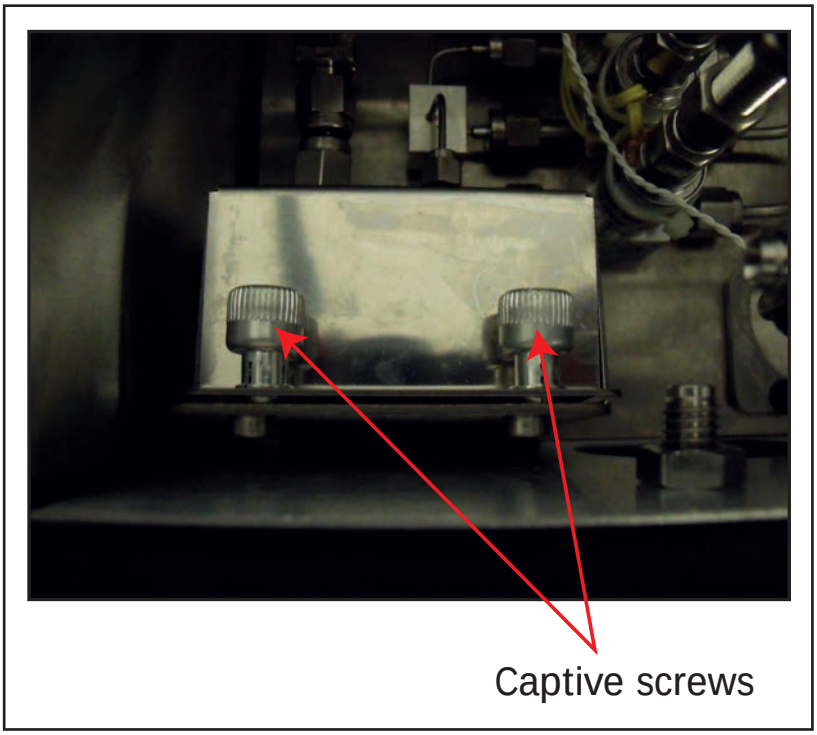
6. Remove the 2 Panex receptacle side mounts that are used to hold the lid in place, using a 3mm hex key to remove the screws.



7. Disconnect the wiring loom.

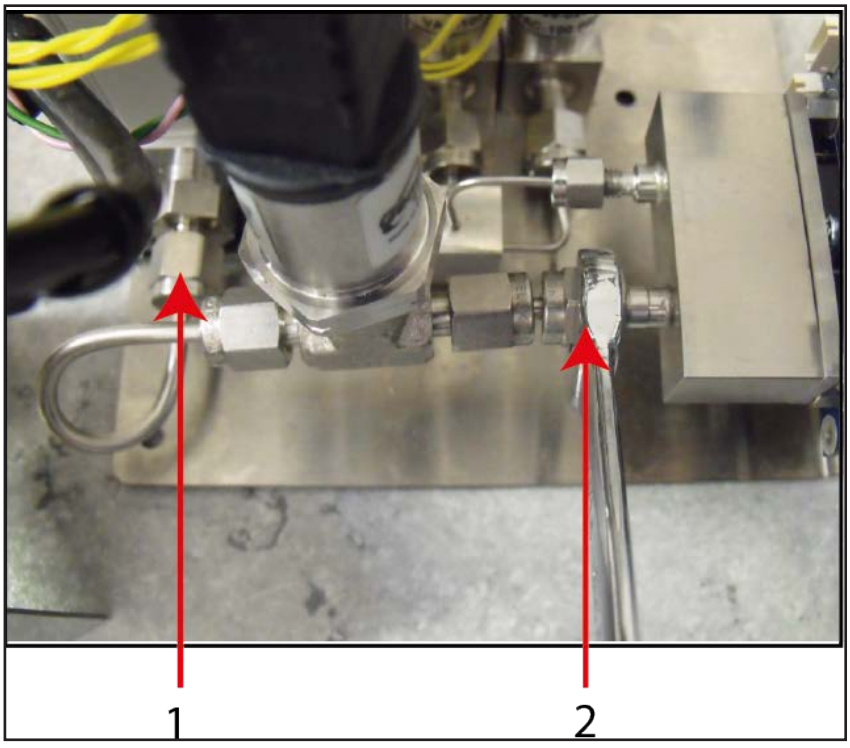
8. Lift out the entire base plate from the oven.

9. Undo the 2 screws that hold the sensor housing screen plate in place - this can be done with your fingers.



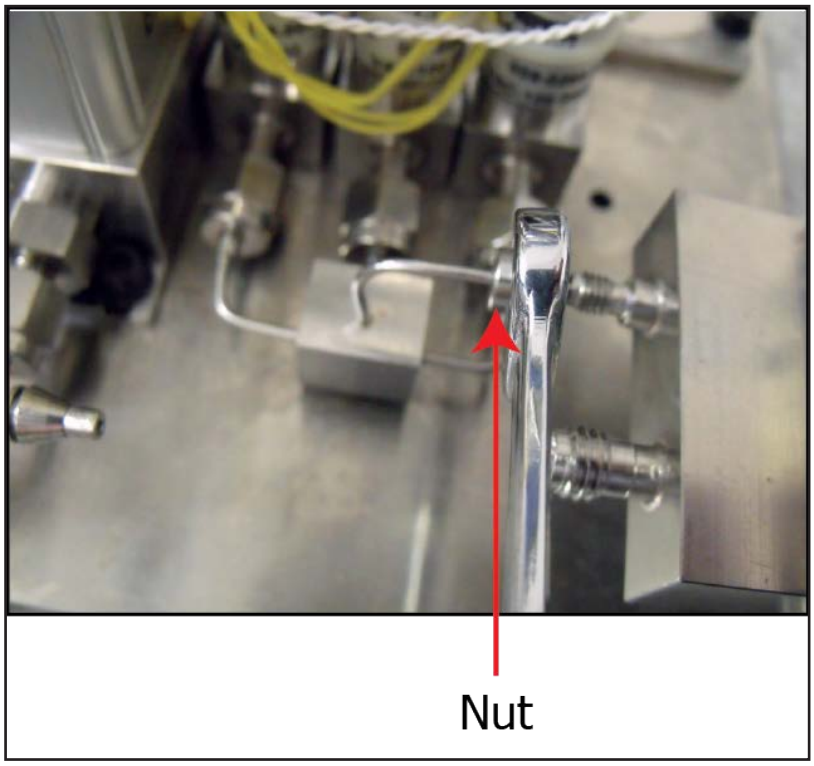
! 10. Remove the sensor housing screening plate. **Be careful not to damage the PCB under the screening plate.**

11. Using a 7/16" spanner/wrench remove the nut (2) that is fitted to the sensor block and the nut (1) that is on the input of the MFC.



12. Remove the complete tube with the pressure transducer.

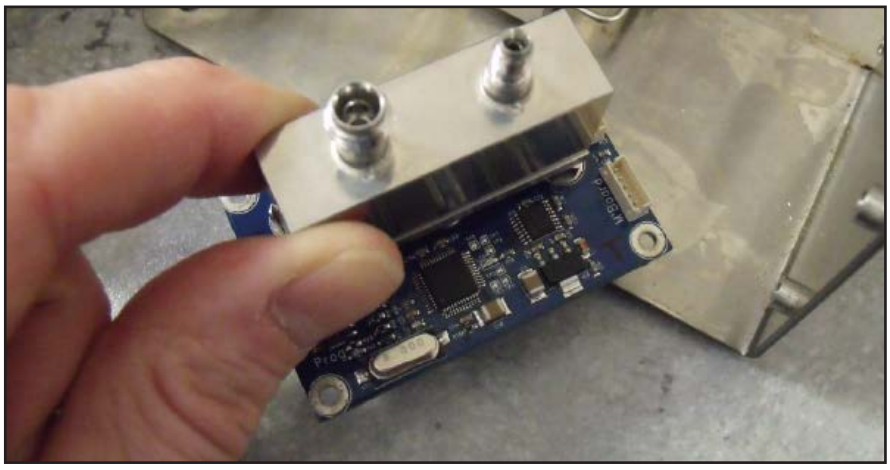
13. Remove the nut that is on the input of the sensor block using a 5/16” spanner/wrench. Remove the tube from the block.



! 14. Carefully remove the 2 connectors that are on the oscillator PCB. **Do not pull on the wires as this will render the wiring loom unusable.**

15. Remove the 4 screws that hold the PCB in place using a long handle pozi screwdriver.

16. The PCB and sensor block can now be removed.



6.2 Replacement of the QMA601 Sensor Block

1. Place the new QMA-SSA against the base plate and secure in position with the 4 screws.
2. Fit the 1/16” tube back to the sensor block, tighten the nut- refer to Swagelok instructions in Appendix B.
3. Fit the connectors back to the PCB - make sure they are in the correct position.
4. Fit the 1/8” tube with the pressure transducer to the sensor block and MFC, tighten the nuts- refer to Swagelok instructions in Appendix B.
5. Fit the sensor housing screening plate and secure the 2 screws.
6. Refit the base plate assembly into the internal oven, be careful not to trap the heater wires when fitting the plate.
7. Reconnect the wiring loom.
8. Fit the 2 Panex receptacle side mounts to the side of the internal oven, secure these with the 2 screws in each mount.
9. Secure the base plate with the 2 screws.
10. Re-attach the tube work that was removed above the sensor block. Reconnect the 1/8” tubes to the bulkheads and tighten the nuts - refer to Swagelok instructions in Appendix B.

6.3 Replacement of the QMA601 Lid and Pressure Testing

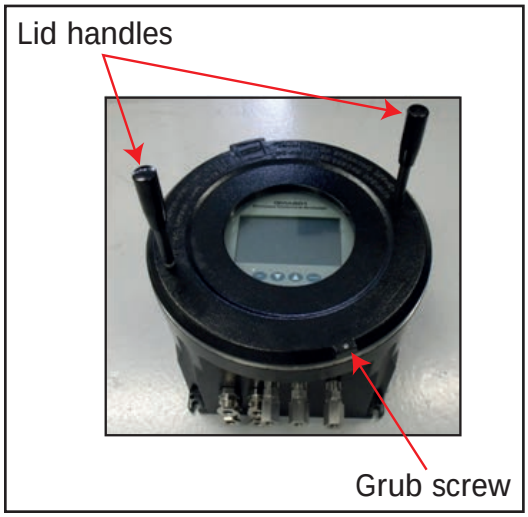
Go to Section 10 - QMA601 Lid Replacement

and Section 11 - Pressure Testing

7 QMA601 O-RING REPLACEMENT

7.1 Removal of the QMA601 Lid and O-Ring

1. Isolate the gas supply to the QMA601 and depressurize the system.
2. Isolate the power to the QMA601.
3. Loosen the grub screw in the lid using a 2mm hex key. Screw in the analyzer lid handles (Michell Part Number QMA601-SH) and turn the lid anti-clockwise - this may take some force to start the lid moving. Remove the lid. **NOTE: Be careful when the lid is removed as it is heavy.**



4. Remove the housing handles and carefully turn the lid upside down.
5. Remove the O-ring from the lid. **NOTE: Wear latex gloves when removing the O-ring from the lid as the threads have grease on them.**
6. Place a small screwdriver under the O-ring and prise it gently off its recess. **NOTE: Be careful not to scuff the threads as this is a flame path.**

7.2 Replacement of the O-Ring and QMA601 Lid

1. Whilst wearing gloves take the new O-ring and gently place it into the lid recess where the old O-ring came from. **NOTE: Be careful not to scuff the threads as this is a flame path.**
2. Make sure all of the O-ring is seated correctly.
3. Carefully turn the lid over. **NOTE: Be careful as the lid is heavy.**
4. Refit the lid using the QMA601 lid handles, turning the lid clockwise until it is fully fitted to the base.
5. Remove the lid handles.

NOTE: There is no need for pressure testing

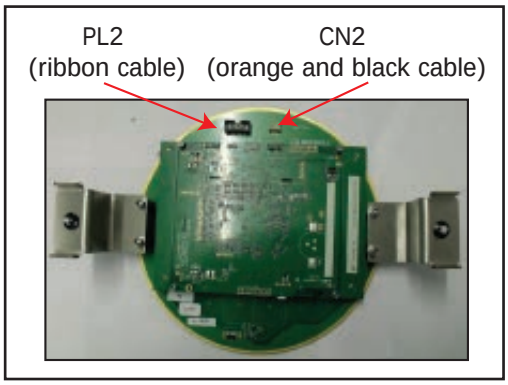
8 QMA601 HMI REPLACEMENT

8.1 Removal of the QMA601 Lid and HMI Assembly

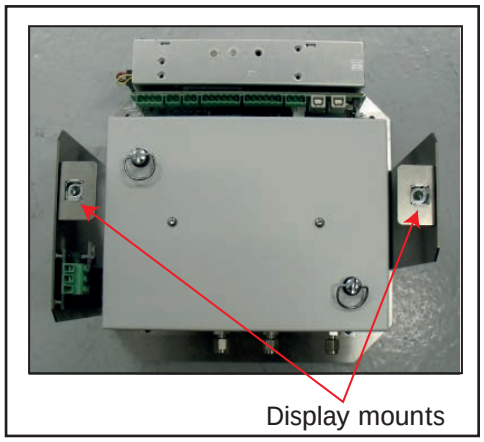
1. Remove the QMA601 lid and display assembly as set out in Section 3.1.

8.2 Replacement of the QMA601 HMI Assembly

1. Refit the display assembly by attaching the orange and black cable to Display CN2 and the ribbon cable to Display PL2.



! 2. Place the display assembly onto the display mounts, the correct way up.



3. Twist the 1/4 turn wing nuts until the display assembly locks into position.

8.3 Replacement of the QMA601 Lid

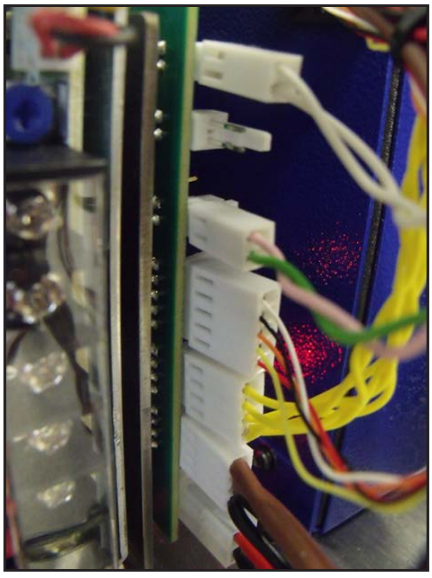
Go to Section 10 - QMA601 Lid Replacement

NOTE: THERE IS NO NEED FOR PRESSURE TESTING

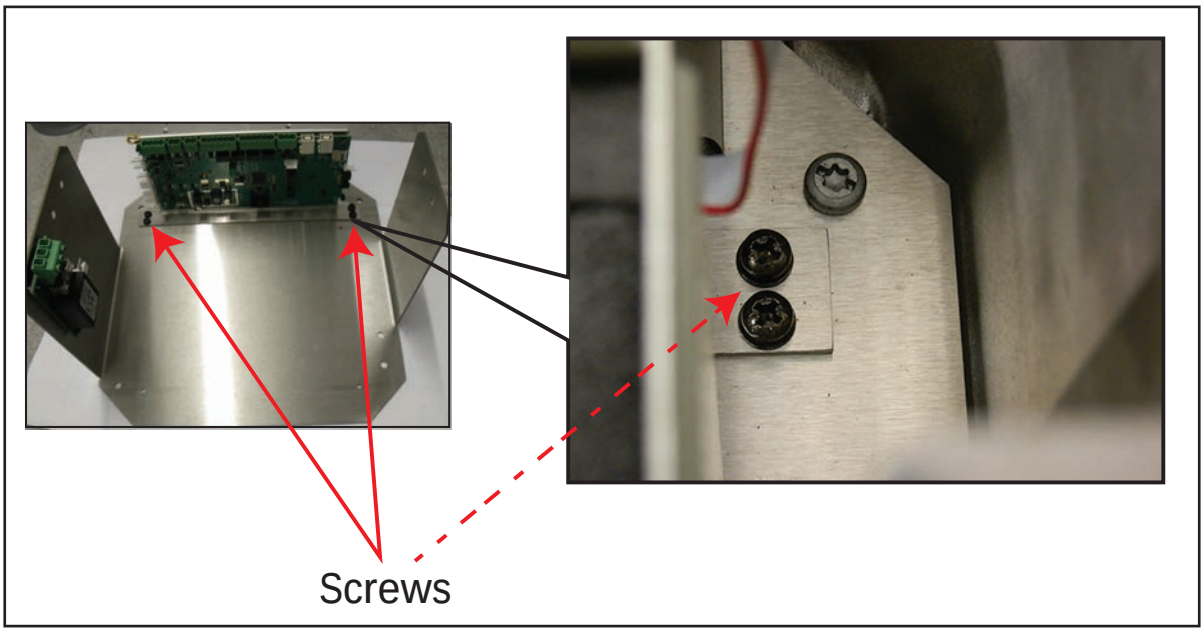
9 QMA601 CONTROL PCB & FUSE REPLACEMENT

9.1 Removal of the QMA601 Lid, Control PCB and Fuse

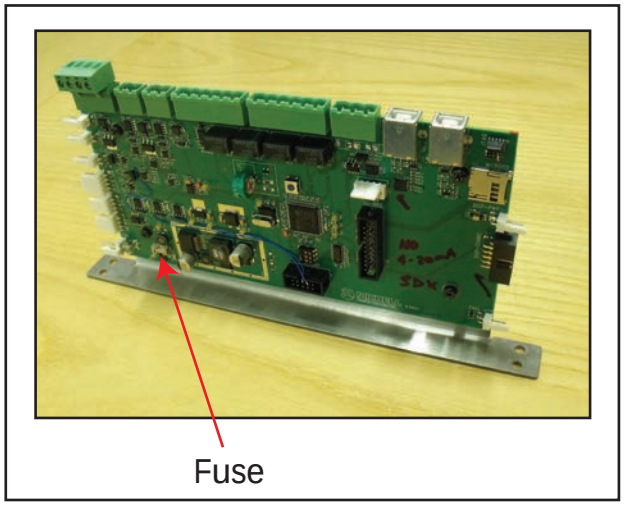
1. Remove the QMA601 lid and display assembly as set out in Section 3.1.
2. Remove all of the connectors from the control PCB.



3. Using a pozi screwdriver undo the 4 screws until the main PCB mounting plate comes away from the base plate - the mounting plate and the Control PCB should still be attached to each other.



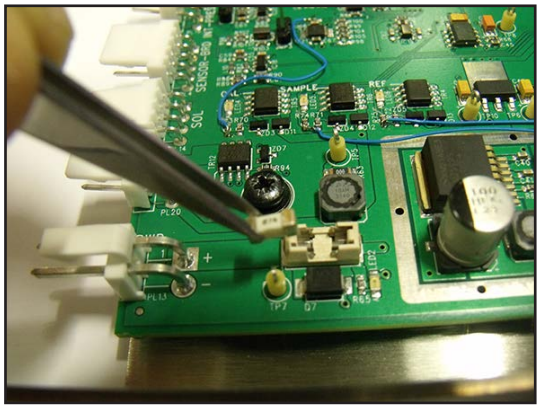
4. Lay the PCB flat and locate the fuse.



! 5. Using tweezers remove the old fuse - **be careful not to crush it in the tweezers.**

9.2 Replacement of the Fuse and QMA601 Control PCB

1. Using tweezers, carefully place the new fuse in the vacant hole in the control PCB.



2. When the fuse is in position make sure it is firmly located into the fuse housing.
3. Refit the Control PCB into the QMA601 - use a pozi screwdriver and the 4 screws removed earlier.
4. Reconnect all of the crimp housings to the correct terminals on the control PCB using Wiring Diagram 90571/W.

9.3 Replacement of the QMA601 Lid and Pressure Testing

Go to Section 10 - QMA601 Lid Replacement

NOTE: There is no need for pressure testing

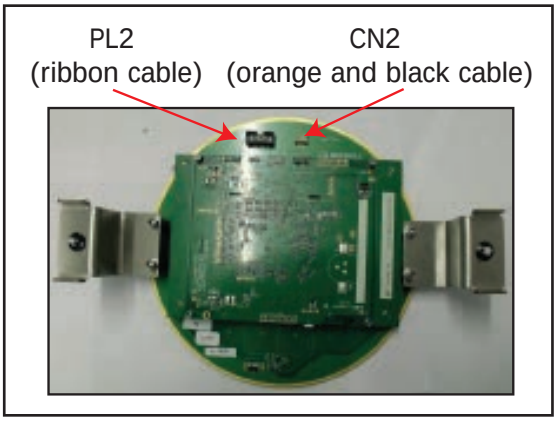
10 QMA601 LID REPLACEMENT

10.1 Replacement of the QMA601 Oven Lid

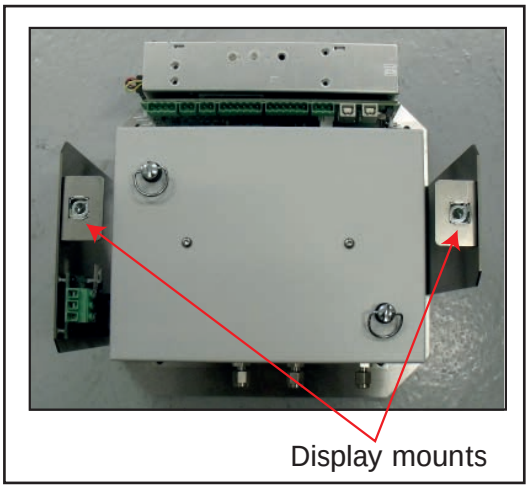
1. Refit the oven lid and secure with the 1/4 turn screws.

10.2 Replacement of the QMA601 Lid

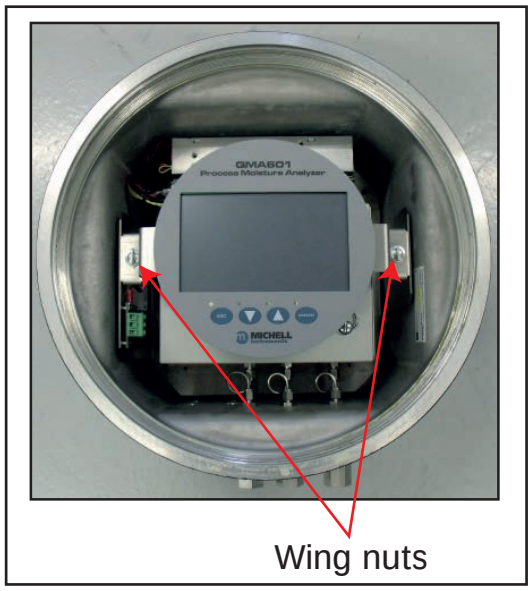
1. Refit the display assembly by attaching the orange and black cable to Display CN2 and the ribbon cable to Display PL2.



! 2. Place the display assembly onto the display mounts, the correct way up.



3. Twist the 1/4 turn wing nuts until the display assembly locks into position.

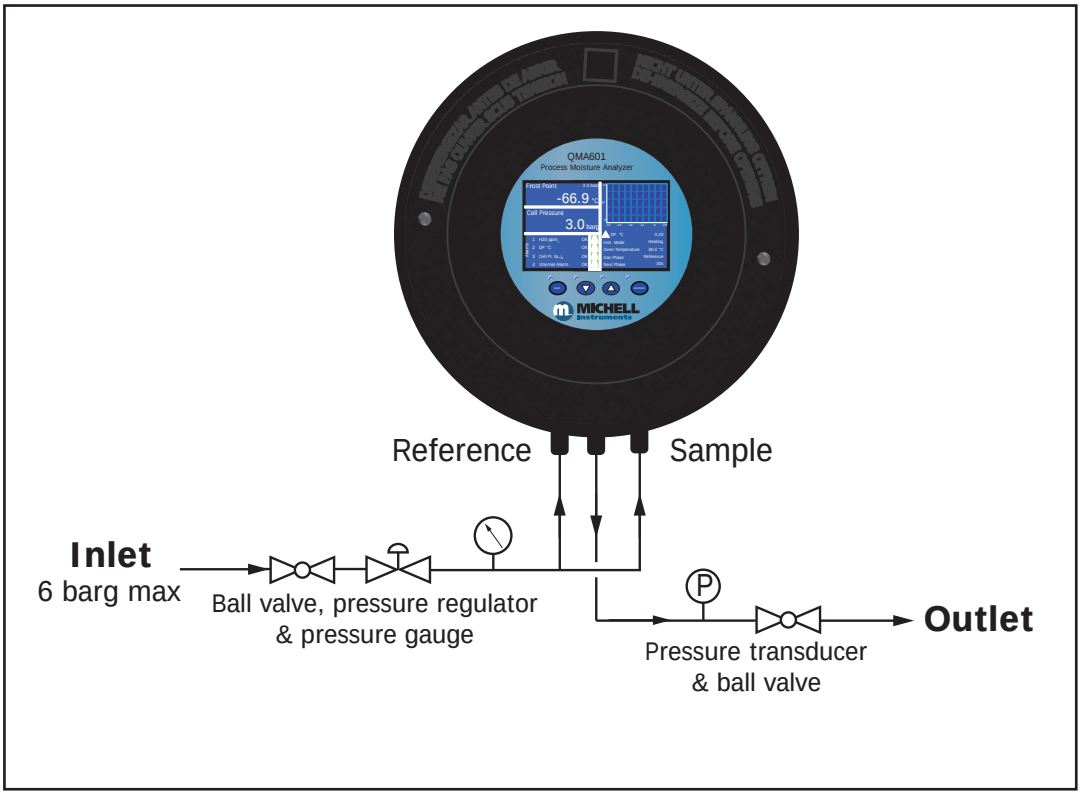


! 4. Check the QMA601 analyzer lid O-ring for any signs of damage. If the O-ring is undamaged, carefully refit the lid using the QMA601 lid handles, turning the lid clockwise until it is fully fitted to the base. If the O-ring needs replacing, replace with Michell Part QMA601-SORING (see Section 7). Remove the lid handles.

11 QMA601 PRESSURE TESTING

! **NOTE: IT IS MANDATORY TO CARRY OUT A PRESSURE TEST AFTER ANY GAS CONNECTIONS HAVE BEEN DISCONNECTED.**

1. If the pressure testing equipment cannot be provided by the customer or service engineer then Michell Instruments' QMA601-SPTK (Pressure Test Kit) must be used.
2. To complete the pressure test the gas should be attached to the reference and the sample inlets using a 1/8" tee, via a pressure regulator which has a pressure gauge attached and a 2-way ball valve. The 2-way ball valve is used so that when the system is pressurized the ball valve can be closed to hold the pressure for leak testing.
3. Attach a pressure transducer with ball valve to the outlet - check that the transducer is calibrated and of a suitable range.
4. ! Using a 7/16" spanner/wrench and a small adjustable spanner/wrench tighten all fittings, **do not over-tighten**.
5. Apply power to the unit.
6. Apply pressure in 2 barg increments, check for leaks at each increment, and repeat until 6 barg is reached. Make sure that the 2-way ball valve is in the closed position on the input and outlet.
7. Leak check for 10 minutes.
8. If the unit has remained at the set pressure after 10 minutes it has passed. Remove the old pressure/leak test label and add a new one (supplied).



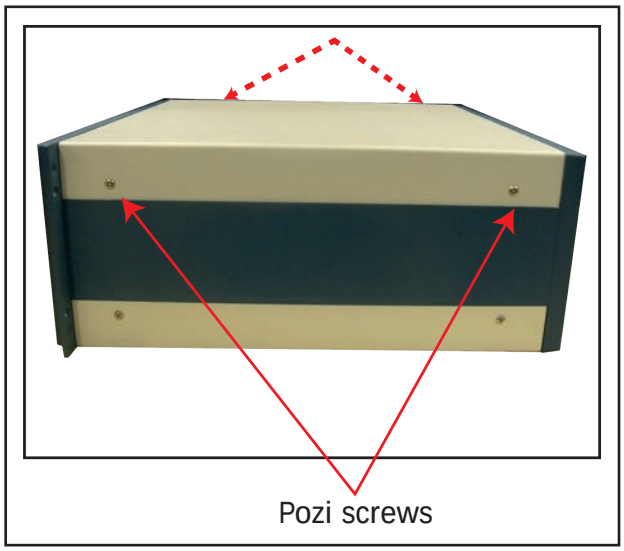
12 QMA401

Sections 12.1 and 12.2 must be completed before replacing the following:

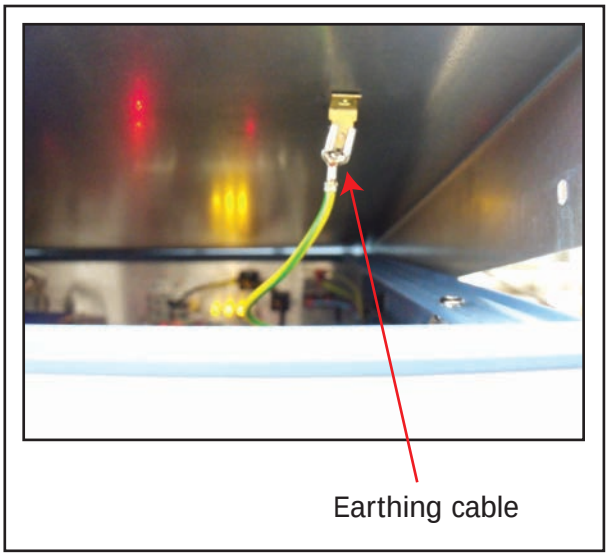
QMA401 Oven Assembly
QMA401 Moisture Generator
QMA401 Crystal Sensor

12.1 Removal of the QMA401 Cover

1. Isolate the gas supply to the QMA401 and depressurize the system.
2. Remove the power lead from the QMA401.
3. Undo the 4 screws (2 on either side of the cover) using a pozi screwdriver.



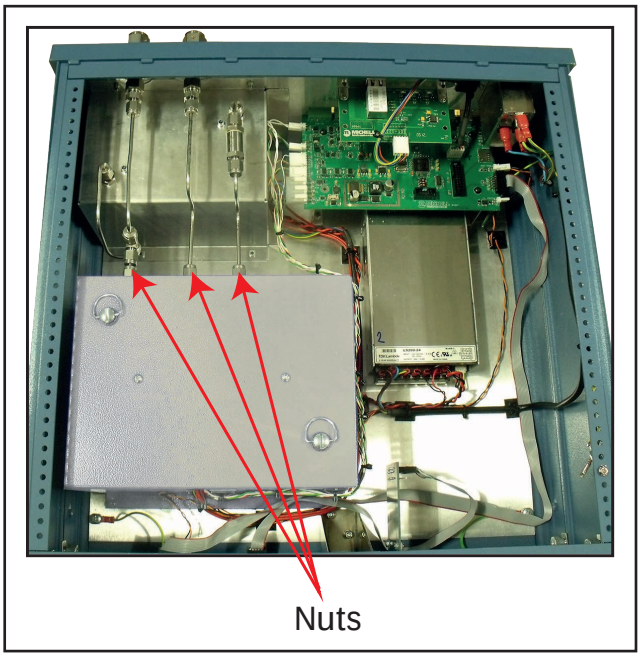
4. Carefully lift the top cover and remove the earthing cable attached.



5. Remove the cover and store safely.

12.2 Removal of the QMA401 Oven Lid

1. Remove the oven lid by by loosening the 1/4 turn screws, and lift off.



For QMA401 Oven Assembly Replacement go to Section 13

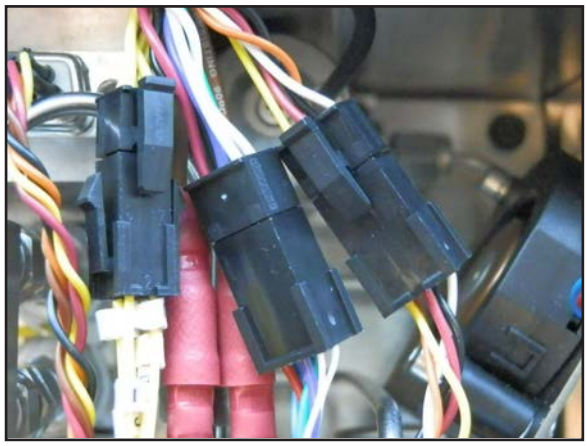
For QMA401 Moisture Generator Replacement go to Section 14

For QMA401 Crystal Sensor Replacement go to Section 15

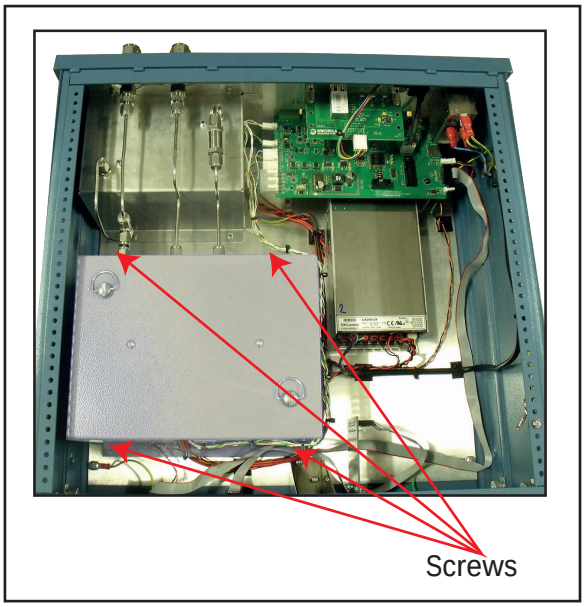
13 QMA401 OVEN REPLACEMENT

13.1 Removal of the QMA401 Oven

1. Remove the QMA401 lid and oven lid as set out in Sections 12.1 and 12.2.
2. Disconnect the wiring loom connectors (three black & two red crimps).



3. Using a pozi screwdriver, remove the 4 screws that hold the oven onto the chassis plate.
4. Remove the 3 nuts on the input and output of the oven using a 7/16” spanner.



5. The oven will now lift out of the housing. There will be some resistance when lifting out the oven as there is thermal paste on the base.
6. Clean the thermal paste off the base of the oven and the base of the skid plate.

13.2 Replacement of the QMA401 Oven

1. Fit 1mm T-flex (65885) onto to base of the Oven Assembly (83939) before securing it into position on the QMA401 Base Plate (65320).

2. Fit the oven onto the base plate and push down firmly. Secure the oven in place with the 4 screws. **Do not fully tighten the screws.**
3. Re-fit the three nuts onto the outside of the oven. Tighten the nuts using a 7/16” spanner/wrench - refer to Swagelok instructions in Appendix B. Tighten up the screws to secure the oven in place.
4. Reconnect the wiring looms inside the oven.

13.3 Replacement of the QMA401 Lid and Pressure Testing

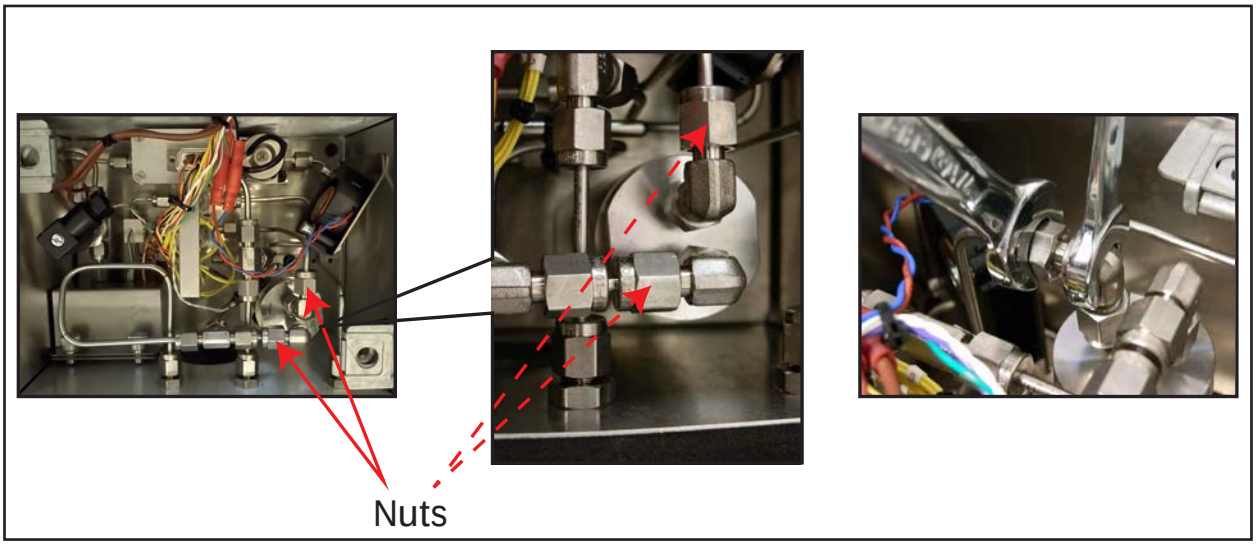
Go to Section 17 - QMA401 Lid Replacement

and Section 18 - Pressure Testing

14 QMA401 MOISTURE GENERATOR REPLACEMENT

14.1 Removal of the QMA401 Moisture Generator

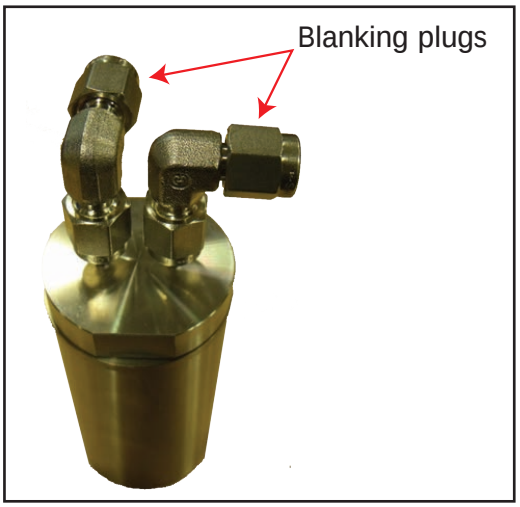
1. Remove the QMA401 lid and oven lid as set out in Sections 12.1 and 12.2.
2. Wait for the oven to cool for at least **one hour** before disconnecting any of the tube work.
3. Disconnect the 2 nuts that are connected to the 2 Swagelok 1/8” elbows, using a 7/16 spanner/wrench. Use an adjustable or 3/8” spanner/wrench to hold the body of the elbow while disconnecting.



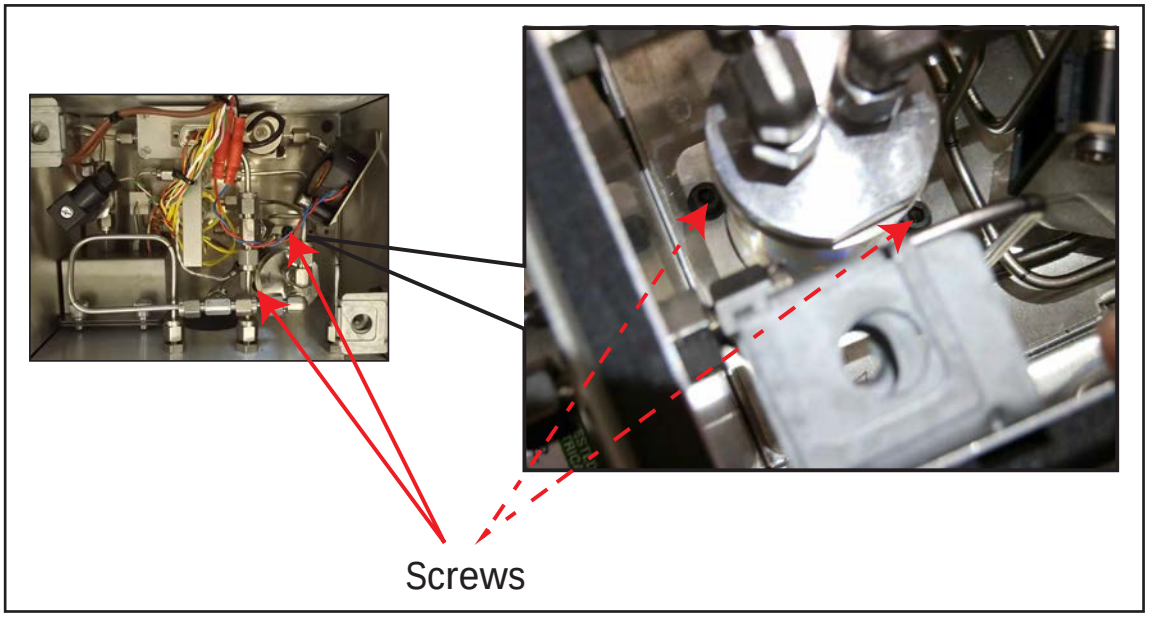
4. The moisture generator will now be free to lift out.

14.2 Replacement of the QMA401 Moisture Generator

1. Depending which moisture generator you have removed, replace it with the same PPM value;
   - 0.5PPM – (QMA-SMG-0.5P)
   - 5 PPM – (QMA-SMG-5P)
   - 50 PPM – (QMA-SMG-50P)
2. Make sure that the 1/8” elbows on the moisture generator are set to the correct position.
3. Remove the 2 blanking plugs before attempting to fit the moisture generator.
4. Position the new moisture generator in place. Reconnect the tube nuts on the oven tube work.



5. If the moisture generator will not go back into its mounting plate, gently loosen the 2 screws using a 3mm hex key. The moisture generator should then fit back in. Tighten the 2 screws.



6. Tighten the nuts back onto the tube work using a 7/16” spanner/wrench - refer to Swagelok instructions in Appendix B. Use an adjustable or 3/8” spanner/wrench to hold the body of the elbow while reconnecting.

7. The moisture generator value must now be programmed into the analyser, and the moisture generator capacity value reset. Refer to Section 19 for instructions.

8. The instrument should be purged with dry gas for at least 6 hours to remove any ambient moisture introduced into the system when changing the moisture generator.

9. Finally, an internal calibration cycle should be run. Refer to Appendix E for a detailed guide of how to get the best results during calibration.

14.3 Replacement of the QMA401 Lid and Pressure Testing

Go to Section 17 - QMA401 Lid Replacement

and Section 18 - Pressure Testing

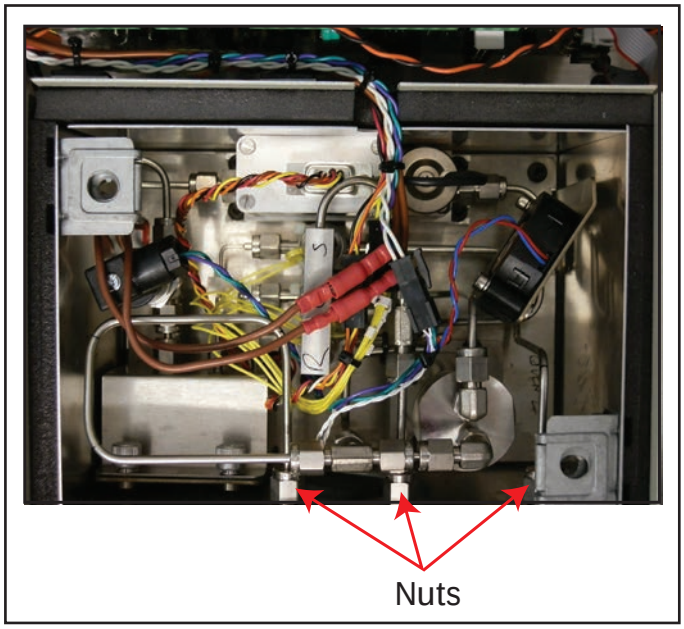
15 QMA401 CRYSTAL SENSOR REPLACEMENT

15.1 Removal of the QMA401 Sensor Block and Oscillator PCB

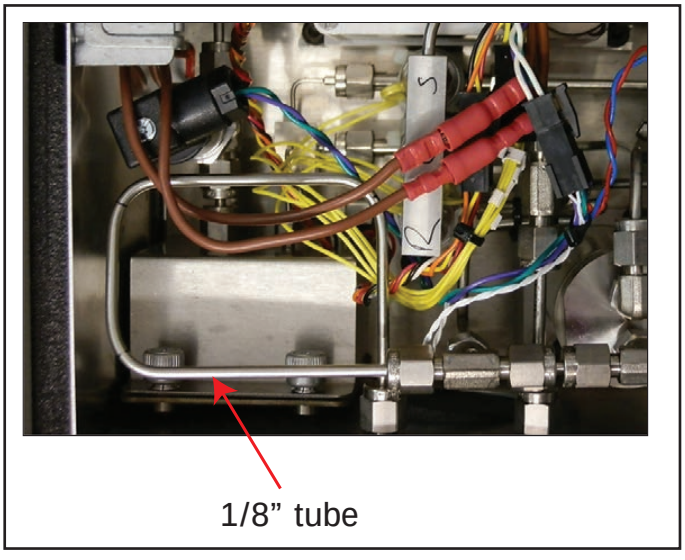
1. Remove the QMA401 lid and oven lid as set out in Sections 12.1 and 12.2.

2. Wait for the oven to cool for at least **one hour** before disconnecting any of the tube work.

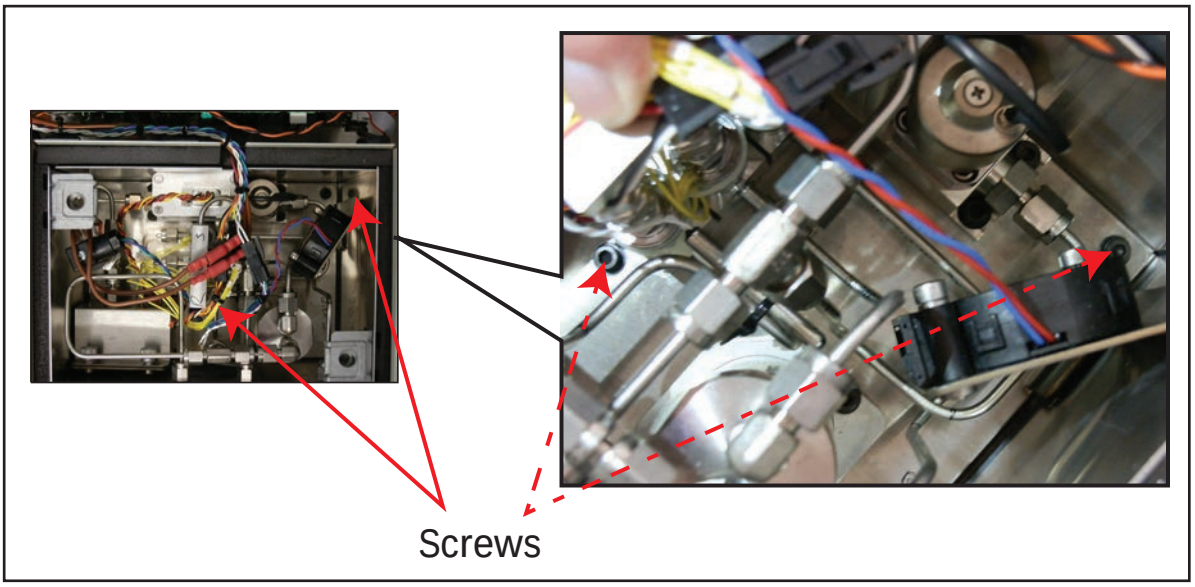
3. Loosen the 3 nuts on the bulkheads on the inside of the oven using a 7/16” spanner/wrench.



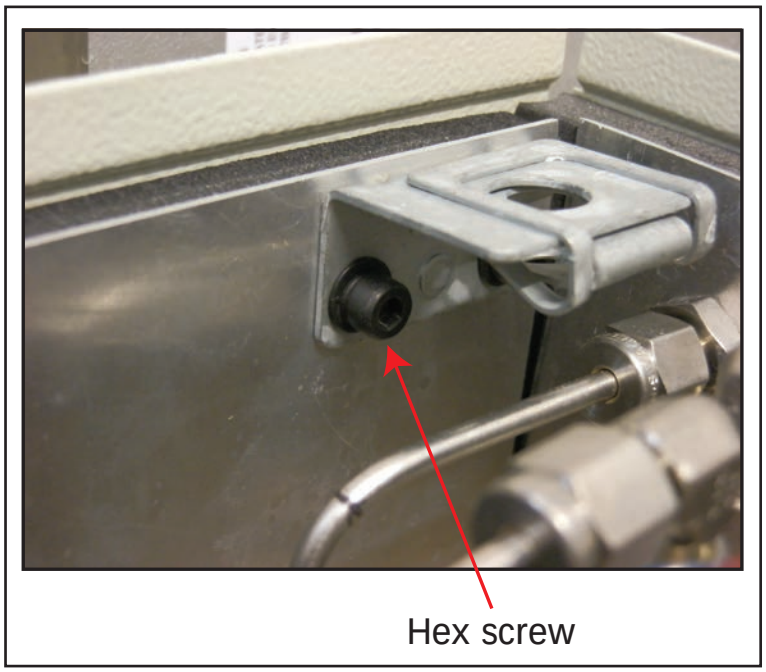
4. Remove the 1/8” tube indicated below by loosening the nuts on either end - hold the tee with a 3/8” spanner/wrench and loosen the nut with a 7/16” spanner/wrench.



5. Using a 3mm hex key, remove the 2 screws that hold the oven base plate in place.



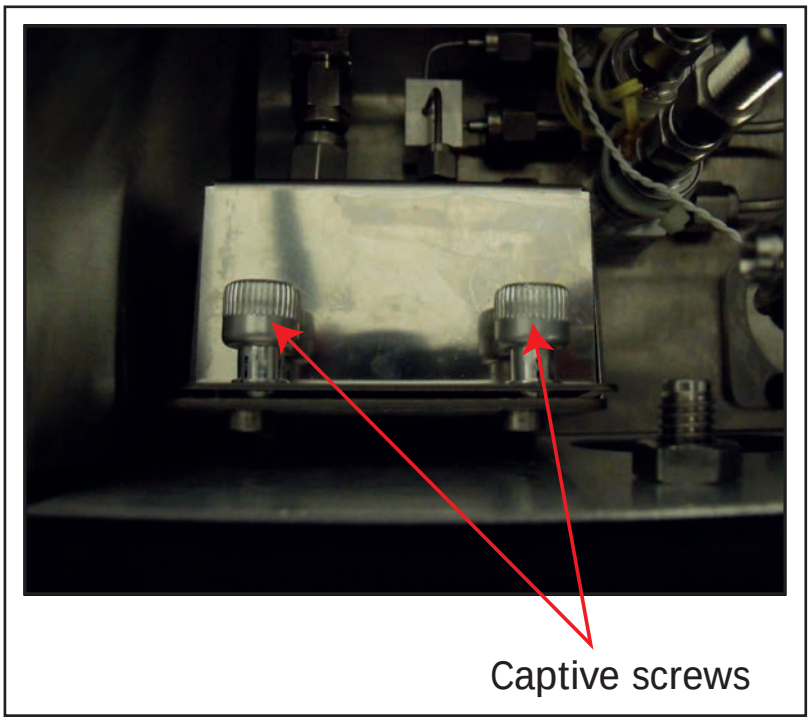
6. Remove the 2 Panex receptacle side mounts that are used to hold the lid in place, using a 3mm hex key to remove the screws.



7. Disconnect the wiring loom.

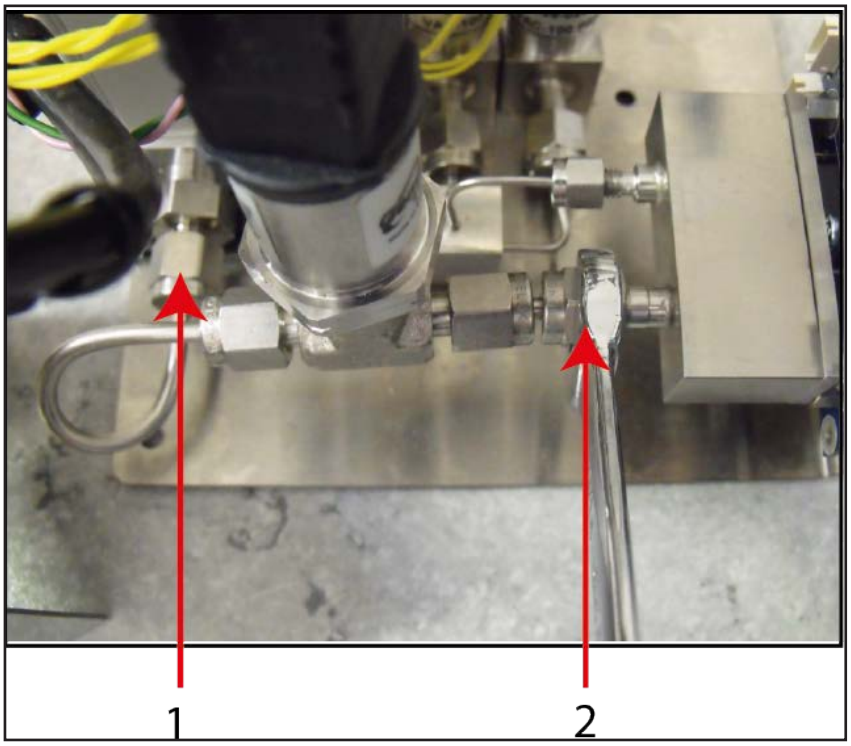
8. Lift out the entire base plate from the oven.

9. Undo the 2 screws that hold the sensor housing screen plate in place - this can be done with your fingers.



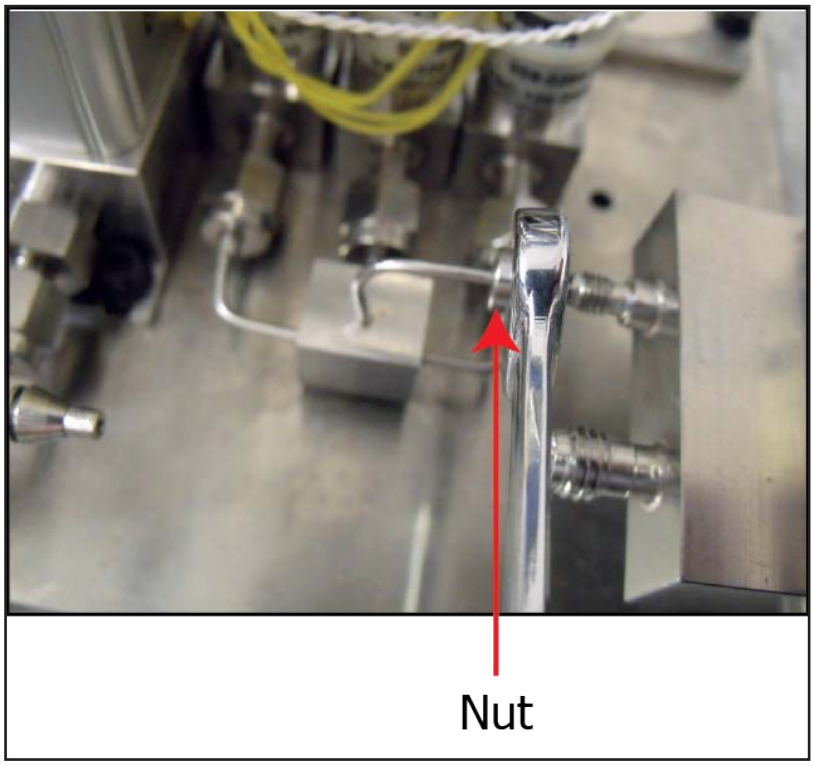
! 10. Remove the sensor housing screening plate. **Be careful not to damage the PCB under the screening plate.**

11. Using a 7/16" spanner/wrench remove the nut (2) that is fitted to the sensor block and the nut (1) that is on the input of the MFC.



12. Remove the complete tube with the pressure transducer.

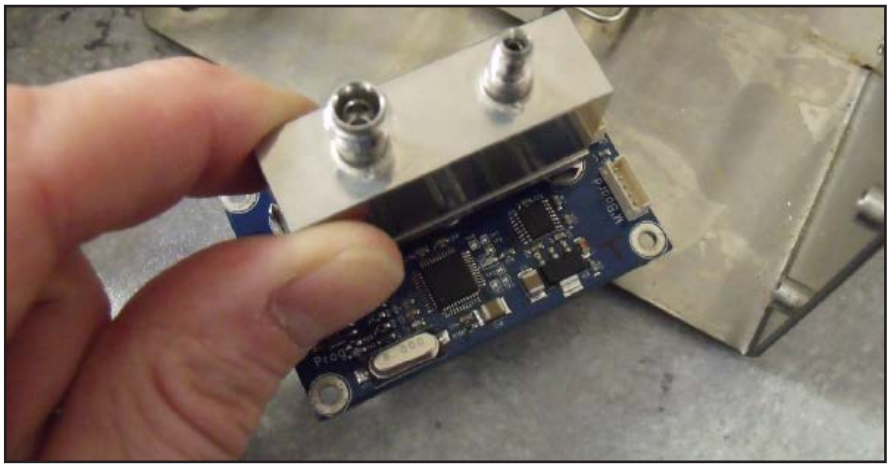
13. Remove the nut that is on the input of the sensor block using a 5/16” spanner/wrench. Remove the tube from the block.



! 14. Carefully remove the 2 connectors that are on the oscillator PCB. **Do not pull on the wires as this will render the wiring loom unusable.**

15. Remove the 4 screws that hold the PCB in place using a long handle pozi screwdriver.

16. The PCB and sensor block can now be removed.



15.2 Replacement of the QMA401 Sensor Block

1. Place the new QMA-SSA against the base plate and secure in position with the 4 screws.
2. Fit the 1/16” tube back to the sensor block - tighten the nut - refer to Swagelok instructions in Appendix B.
3. Fit the connectors back to the PCB, make sure they are in the correct position.
4. Fit the 1/8” tube with the pressure transducer to the sensor block and MFC - tighten the nuts - refer to Swagelok instructions in Appendix B.
5. Fit the sensor housing screening plate and secure the screws.
6. Refit the base plate assembly into the internal oven, be careful not to trap the heater wires when fitting the plate.
7. Reconnect the wiring loom.
8. Fit the 2 Panex receptacle side mounts to the side of the internal oven, secure these with 2 screws in each mount.
9. Secure the base plate with the 2 screws.
10. Re-attach the tube work that was removed above the sensor block. Reconnect the 1/8” tubes to the bulkheads and tighten the nuts - refer to Swagelok instructions in Appendix B.

15.3 Replacement of the QMA401 Lid and Pressure Testing

Go to Section 17 - QMA401 Lid Replacement

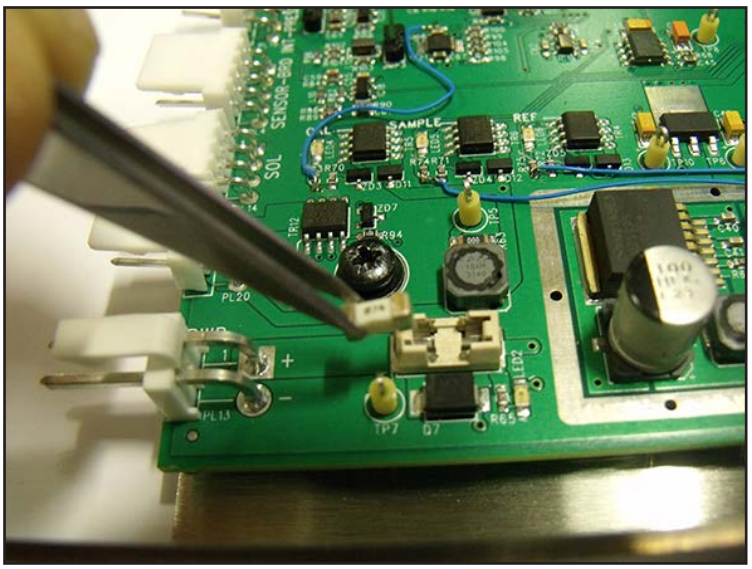
and Section 18 - Pressure Testing

16 QMA401 FUSE REPLACEMENT

16.1 Removal of the Fuse in the QMA401 Control PCB

1. Remove the QMA401 lid as set out in Section 12.1.

! 2. Using tweezers remove the old fuse - **be careful not to crush it in the tweezers.**



16.2 Replacement of the QMA401 Fuse

! 1. Using tweezers carefully place the new fuse in the vacant hole in the control PCB.

2. When the fuse is in position make sure it is firmly located into the fuse housing.

16.3 Replacement of the QMA401 Lid and Pressure Testing

Go to Section 17 - QMA401 Lid Replacement

NOTE: There is no need for pressure testing

17 QMA401 OVEN LID AND COVER REPLACEMENT

17.1 Replacement of the QMA401 Oven Lid

1. Replace the oven lid and secure with the 1/4 turn screws.

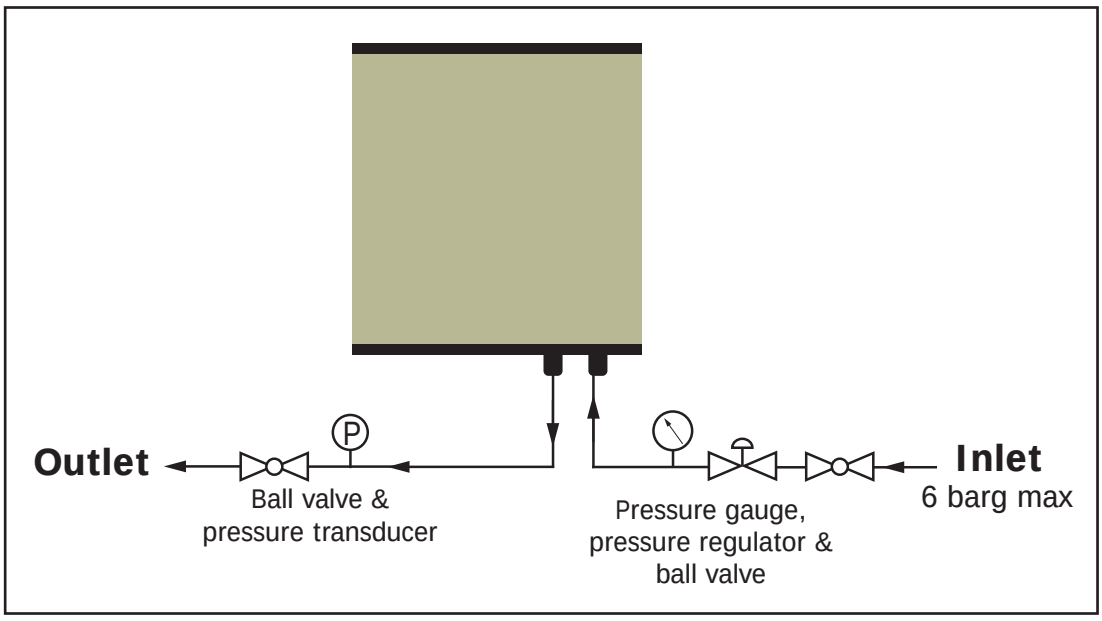
17.2 Replacement of the QMA401 Cover

1. Re-attach the earthing tag to the top cover. Place the cover back onto the QMA401 chassis.
2. Secure the cover with the 4 screws and tighten.

18 QMA401 PRESSURE TESTING

NOTE: IT IS MANDATORY TO CARRY OUT A PRESSURE TEST AFTER ANY GAS CONNECTIONS HAVE BEEN DISCONNECTED.

1. If the pressure testing equipment cannot be provided by the customer or service engineer then Michell Instruments' QMA401-SPTK must be used.
2. To complete the pressure test the gas should be attached to the inlet, via a pressure regulator which has a pressure gauge attached and a 2-way ball valve. The 2-way ball valve is used so that when the system is pressurized the ball valve can be closed to hold the pressure for leak testing. Place a new ¼" VCR gasket seal onto the fitting.
3. To the outlet attach a pressure transducer with ball valve. Place a new 1/4" VCR gasket seal onto the fitting and check that the transducer is within calibration date.
4. Use a 3/4" spanner/wrench to tighten the fittings. **Do not over-tighten fittings.**
5. Apply power to the unit.
6. Apply pressure in 1 barg increments, check for leaks and repeat until 3 barg is reached. Make sure that the 2-way ball valve is in the closed position on the inlet and outlet.
7. Leak check for 10 minutes.
8. If the unit has remained at the set pressure after 10 minutes it has passed. Remove the old pressure/leak test label and add a new one.



19 RESETTING MOISTURE GENERATOR / DRYER REMAINING LIFETIME

1. From the HMI navigate to “Settings > About > Service (Code: 7316) > Diagnostics”.
2. At the bottom of the screen the currently selected “Command” is displayed.
3. To cycle through the different diagnostic commands press the currently selected command.
4. To run the command, press the “Apply” button.
5. Select the “Reset MG Capacity” command and press the “Apply” button to reset Moisture Generator Capacity.
6. Select the “Reset Dryer Capacity” command and press the “Apply” button to reset Dryer Capacity.
7. The moisture generator value (MGV) must be set from the “Service->Calibration Values” screen. The value of the calibrated moisture generator can be found on the certificate.

Appendix A Environmental Responsibility

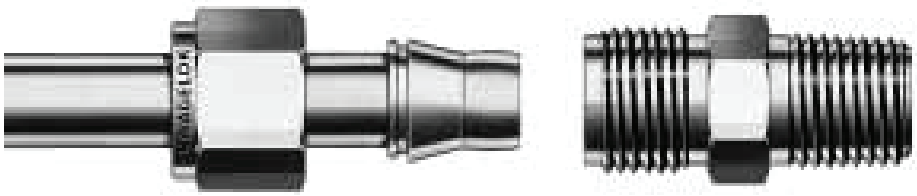
There is a responsibility, when carrying out operations within this Guide, of avoiding the introduction of substances into the environment, resulting in effects of such a nature as to endanger human health, harm living resources and ecosystems and impair or interfere with amenities and other legitimate uses of the environment.

Take care to:

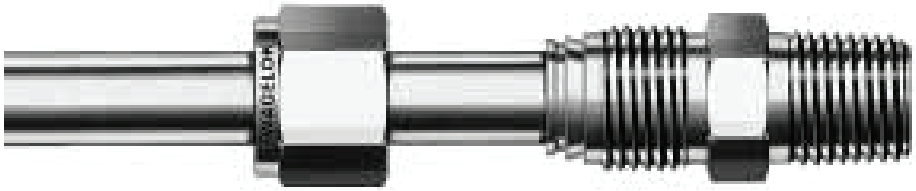
- Recycle plastic materials where applicable.
- Dispose of sharp's waste properly.
- Take the proper precautions when using machinery, glues and solvents.

Appendix B Swagelok Fitting Instructions

Connections can be disconnected and retightened many times. The same reliable, leak-proof seal can be obtained every time the connection is remade.



Fitting shown in disconnected position.



Insert tubing with pre-swaged ferrules into fitting body until front ferrule seats, then finger-tighten the nut.

Rotate nut to previously pulled up position with a wrench. At this point, an increase in resistance will be encountered. Then tighten slightly with the wrench. (Smaller tube sizes will take less tightening to reach the original position, while larger tube sizes will require more tightening. The wall thickness will also have an effect on tightening.)

Appendix C F0121 Decontamination Certificate

Decontamination Certificate

IMPORTANT NOTE: Please complete this form prior to this instrument, or any components, leaving your site and being returned to us, or, where applicable, prior to any work being carried out by a Michell engineer at your site.

Instrument			Serial Number	
Warranty Repair?	YES	NO	Original PO #	
Company Name			Contact Name	
Address				
Telephone #			E-mail address	
Reason for Return /Description of Fault:				

Has this equipment been exposed (internally or externally) to any of the following? Please circle (YES/NO) as applicable and provide details below		
Biohazards	YES	NO
Biological agents	YES	NO
Hazardous chemicals	YES	NO
Radioactive substances	YES	NO
Other hazards	YES	NO

Please provide details of any hazardous materials used with this equipment as indicated above (use continuation sheet if necessary)		
Your method of cleaning/decontamination		
Has the equipment been cleaned and decontaminated?	YES	NOT NECESSARY

Michell Instruments will not accept instruments that have been exposed to toxins, radio-activity or bio-hazardous materials. For most applications involving solvents, acidic, basic, flammable or toxic gases a simple purge with dry gas (dew point <-30°C) over 24 hours should be sufficient to decontaminate the unit prior to return.
Work will not be carried out on any unit that does not have a completed decontamination declaration.

Decontamination Declaration

I declare that the information above is true and complete to the best of my knowledge, and it is safe for Michell personnel to service or repair the returned instrument.

Name (Print)		Position	
Signature		Date	

MICHELL Instruments

F0121, Issue 2, December 2011

Appendix D F0131 Hazardous Area Customer Service Declaration

Hazardous Area/Hazardous Location Product Servicing: Customer Report & Declaration.

Product Title/Type	Product Serial Number:	
Title of Service Spare	New Service Spare fitted (YES/NO)	Service Spare Serial number or Acknowledgement number.(As appearing on packaging label)
Please add any additional comments or information pertinent to the service work undertaken in the box below.		

IMPORTANT NOTES:
TO ENSURE WARRANTY IS MAINTAINED THE DECLARATION BELOW MUST BE SIGNED AND RETURNED.

By signing and returning this declaration I confirm that:

The work undertaken in servicing the above product has been done so only in full accordance with the Instructions supplied by Michell Instruments Ltd.

The instructions provided have been followed accurately and in full, in the order they are written and all of the instructions have been completed in their entirety. No adaptations or truncations of the provided instructions have been applied.

I understand and accept that *any* departure from, or failure to entirely comply with, the servicing instructions provided by Michell Instruments Ltd. will invalidate any warranty this product would otherwise hold.

The work has been carried out by suitably trained & approved personnel and the work undertaken is verified by independent inspection.

F0131 June 2014 Page **1** of **2**

Appendix E Field Performance Verification of QMA401/601

Field Performance Verification of QMA401/QMA601

Introduction

Two types of measurement verification and adjustment are possible with the QMA series analysers:

- Calibration using internal moisture source
- Calibration using external moisture source

This document describes the correct procedure to follow for each.

Calibration using internal moisture source

To maintain the precision of the analyser, the unit can self calibrate vs an internal moisture generator and adjust its internal reference table based on the result. The internal moisture generator is fed by the outlet of the dryer column, and will always output a constant value, which was quantified at the time of factory calibration.

1. The analyser should be measuring normally in a typical sample stream prior to starting the calibration.
2. Determine the value of the internal generator, by entering the 'Monitor' screen. The value is shown as 'MGV', in terms of ppm_V.
3. Note the current Sensor Correction Factor ('SCF') from the monitor screen.
4. Ensure that the MGV is representative of the typical values measured during operation (value of interest). i.e. if your process gas nominally contains 0.7ppm_V H_2O, then an analyser fitted with a 0.5 ppm_V generator will give the best results.
   If the MGV is significantly different to the value of interest (>100% of value), then it may be better to consider using an external moisture source.
5. Enter the 'Calibrate' screen, pay attention to the number of 'settling cycles' and 'cal cycles'
6. If the MGV is higher than the currently measured value, (which should also be approximately the value of interest), but within 100% of value, then the standard 10 settling/cal cycles will be sufficient. If the MGV is lower than the currently measured value, refer to table A.
7. Ensure that 'Cal Method' is set to 'Manual', and 'Cal Source' is set to 'Internal', then press 'Start'.
8. Once the calibration cycle is complete, the Sensor Correction Factor (SCF) will be revised and applied automatically.
9. The formula for adjustment is: $current\ reading \times SCF = displayed\ reading$. Where the current reading is based on the original factory calibration. This formula can be used to determine the effect of a change in SCF on previously collected readings.

MGV	0.5
measured value (ppmV)	settling & cal cycles
0	10/10
0.1	10/10
0.2	10/10
0.3	10/10
0.4	10/10
0.5	10/10
0.6	10/10
0.7	15/15
0.8	15/15
0.9	15/15
1	20/20
1.1	20/20
1.2	20/20
1.3	25/25
1.4	25/25
1.5	25/25
1.6	25/25
1.7	25/25
1.8	25/25
1.9	25/25
2	25/25
>2	use external moisture source

MGV	5
measured value (ppmV)	settling & cal cycles
<1	use external moisture source
1	10/10
2	10/10
3	10/10
4	10/10
5	10/10
6	10/10
7	15/15
8	15/15
9	15/15
10	15/15
11	20/20
12	20/20
13	20/20
14	20/20
15	20/20
16	25/25
17	25/25
18	25/25
19	25/25
20	25/25
>20	use external moisture source

MGV	50
measured value (ppmV)	settling & cal cycles
<25	use external moisture source
30	10/10
35	10/10
40	10/10
45	10/10
50	10/10
55	10/10
60	15/15
65	15/15
70	15/15
75	15/15
80	20/20
85	20/20
90	20/20
95	20/20
100	20/20
105	25/25
110	25/25
115	25/25
120	25/25
125	25/25
130	use external moisture source

Table A

Calibration using external moisture source

An alternative method for verifying and correcting the analyser is to use an externally sourced gas from a reputable supplier with a certified moisture content. Note that any inaccuracies in the measured moisture content of the bottle vs actual moisture content will be passed on to the QMA.

1. The gas should be introduced to the analyser inlet, and the inlet pressure and Flow Correction Factor (FCF) set as per any normal sample.
2. Note the current Sensor Correction Factor ('SCF') from the monitor screen.
3. Ensure that the certified cylinder value is representative of the typical values measured during operation (value of interest).
4. Enter the 'Calibrate' screen, pay attention to the number of 'settling cycles' and 'cal cycles'
5. If the certified cylinder value is higher than the currently measured value, (which should also be approximately the value of interest), but within 100% of value, then the standard 10 settling/cal

cycles will be sufficient. If the certified cylinder value is lower than the currently measured value, pay attention to the table below:

$\left(\frac{\text{Currently measured value} - \text{Certified cylinder value}}{\text{Certified cylinder value}}\right)$	Recommended Settling & Cal Cycles
<-0.25	10/10
-0.26/-0.50	15/15
-0.51/-0.75	20/20
-0.76/-1.00	25/25
>1.01	Use external moisture source

6. Set 'Cal Source' to 'External' and 'Ext. Ref' to the moisture content of the cylinder used in ppm_V.
7. Ensure that 'Cal Method' is set to 'Manual', then press 'Start'.
8. Once the calibration cycle is complete, the Sensor Correction Factor (SCF) will be revised and applied automatically.
9. The formula for adjustment is: $current\ reading \times SCF = displayed\ reading$. Where the current reading is based on the original factory calibration. This formula can be used to determine the effect of a change in SCF on previously collected readings.

NOTES:

http://www.michell.com