



MIC-6 Instruction Manual

Multi-Instrument Calibrator

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Chapter 1

Introduction

The Thermo Scientific™ MIC-6 Multi Instrument Calibrator is designed specifically to assist with EPA mandated Leak Detection and Repair (LDAR) compliance monitoring. It has been optimized to calibrate the TVA2020 Toxic Vapor Analyzer with minimal user interaction. It can also be used in a manual mode to calibrate the legacy TVA1000B or similar instruments.

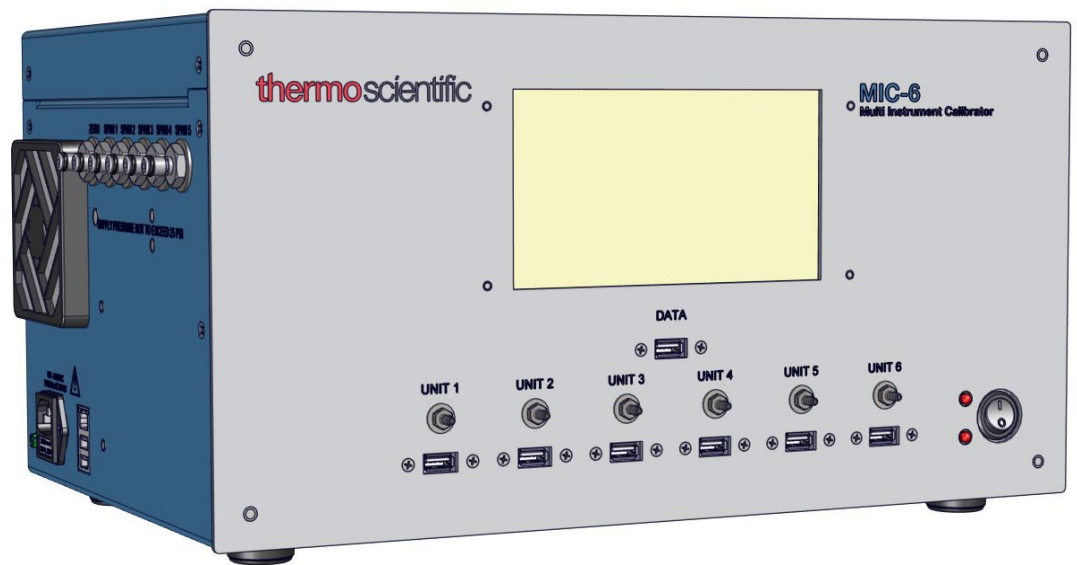


Figure 1–1. MIC-6 Front

Theory of Operation

The purpose of the MIC-6, Multi Instrument Calibrator, is to simultaneously calibrate, in approximately 15 minutes, up to six TVA2020 instruments, with zero air and up to 5 different span concentrations at a preset flow rate to each instrument of approximately 2 LPM. The calibrator design and data storage are optimized for LDAR compliance monitoring.

The MIC-6 has two calibration modes, manual and auto. Auto mode is designed specifically for the TVA2020. Manual mode can be used to calibrate up to six legacy TVA1000B or other similar instruments eliminating the need for Tedlar bags or similar gas delivery systems. In auto mode, the calibrator will communicate with the TVA2020 through the USB connection eliminating the need for user interaction during the calibration. During the calibration, each span gas, starting with zero air, is delivered to the instruments in increasing concentration. Immediately after calibration the gases are reintroduced to the instruments to confirm the calibration and set the reference point for the drift check.

The calibrator can also perform a manual or automatic drift check of the instruments. In auto drift check mode the calibrator compares the most recent calibration data to the current instrument reading and reports the percent difference. Manual drift check mode, like the calibration mode, can be used with TVA1000B or similar instruments.

The calibration gas tank information must be entered into the calibrator to perform the automated features. The MIC-6 will use the tank information, specifically the expiration date, to alert the user that the tank is due to expire within a month of the expiration date.

The MIC-6 also contains a Calibration Precision feature that automatically performs a calibration precision test for the TVA2020. The MIC-6 will calculate the average concentration and response time based on the data obtained. The data is available for download via USB or Bluetooth. Only one instrument at a time can be attached to the MIC-6 via the USB cable to activate this feature.

The MIC-6 has sufficient memory to store 6 years' worth of daily calibration and drift data on over 100 instruments. The number of individual instruments that can be calibrated on a daily basis is only limited by the amount of time available. The data is stored in the order it is received in memory thereby eliminating the possibility of postdating entries. If this were attempted by altering the calibrator's date and time the downloaded data file would contain non-sequentially dated data.

The data stored in the internal memory can be downloaded via a USB memory device or through a user supplied Bluetooth connection. In either case the file is in a .CSV format.

Specifications

Table 1–1 lists the specifications for the MIC-6.

Table 1–1. MIC-6 Specifications

Approvals and Certifications	CE/UKCA, TUV-SUD Safety
Input Pressure (Zero and 5 Span Gases)	15 to 25 psi (40 psi max)
Flow Rate	1 instrument – approximately 2.5 LPM @ 25 psi 6 instruments – approximately 1.5 LPM/instrument @ 25 psi
Operating Temperature	0–40 °C
Physical Dimensions	24 in (D) x 16.75 in (W) x 8.72 in (H) [609 mm (D) 425.45 mm (W) x 221.48 mm (H)]
Weight	15 lbs
Mounting Options	Table top (Tilt feet allow 30° viewing angle) Rear Panel VESA mount pattern (bracket user supplied)
Power Requirements	100–240 VAC 50/60 Hz 50 W
Storage Temperature	-20 to 60 °C

Dimensions

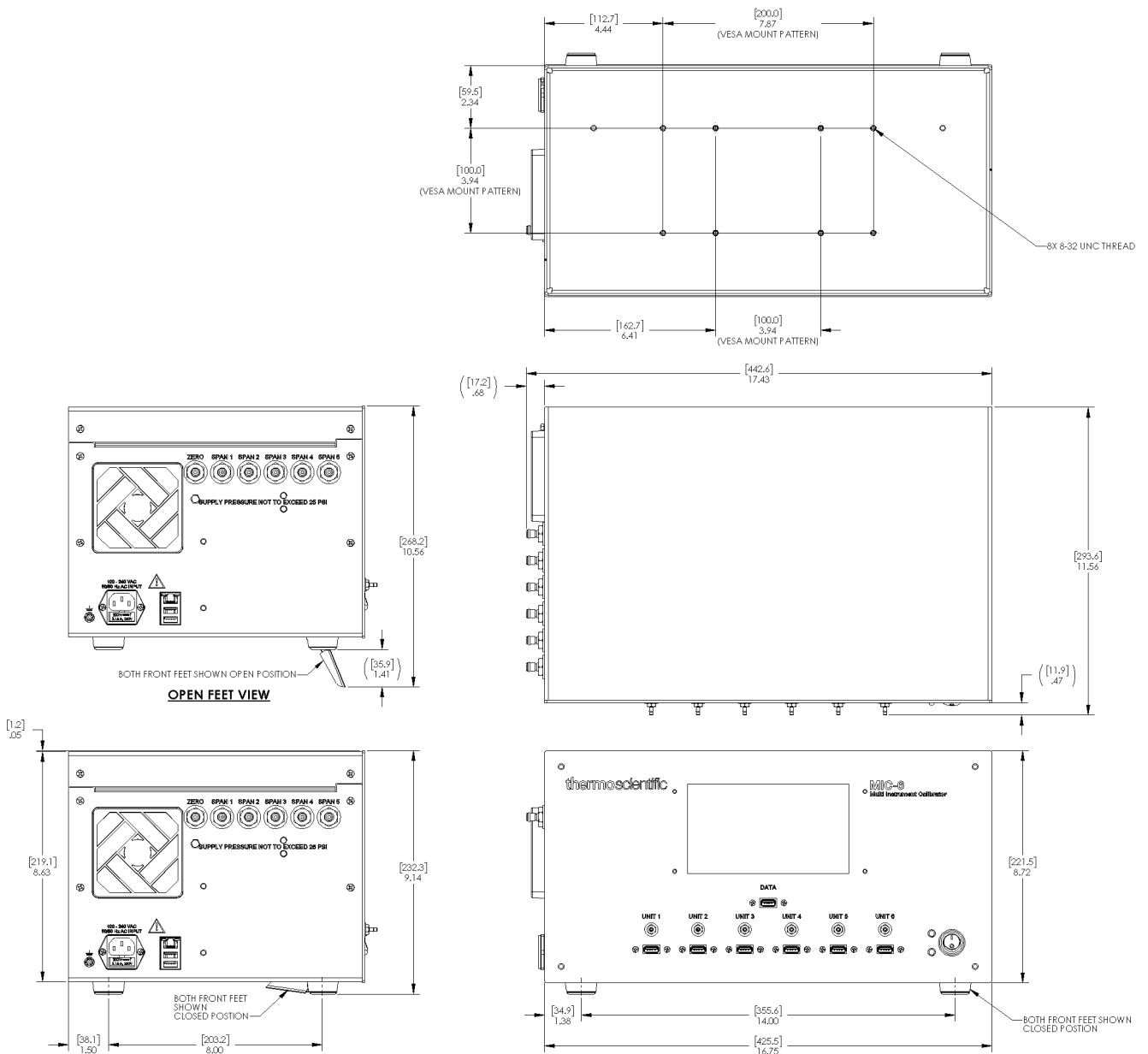


Figure 1-2. MIC-6 Appearance and Dimensions

Chapter 2

Installation and Setup

Installation of the MIC-6 includes unpacking the instrument, wall mounting if needed, connecting the gas supply lines, connecting the output gas line and attachment to suitable AC power.



Equipment Damage Do not attempt to lift the instrument by the cover or other external fittings. ▲

Unpacking and Inspection

The MIC-6 is shipped in one container. If there is obvious damage to the shipping container when you receive the instrument, notify the carrier immediately and hold for his inspection. The carrier is responsible for any damage incurred during shipment. Use the following procedure to unpack and inspect the instrument.

1. Remove the instrument from the shipping container and set it on a table or bench that allows easy access to both the front and rear.
2. Remove the cover to expose the internal components. (See “Figure 2–1” on page 2-2.)
3. Check for possible damage during shipment.
4. Check that all connectors and circuit boards are firmly attached.
5. Re-install the cover.
6. Remove any protective plastic material from the case exterior.

Cover Removing and Replacing

Use the following procedure to remove and replace the cover.

Equipment required:

Phillips screwdriver, #2

1. Unfasten the six 8-32 screws securing the cover.
2. Lift cover upwards.

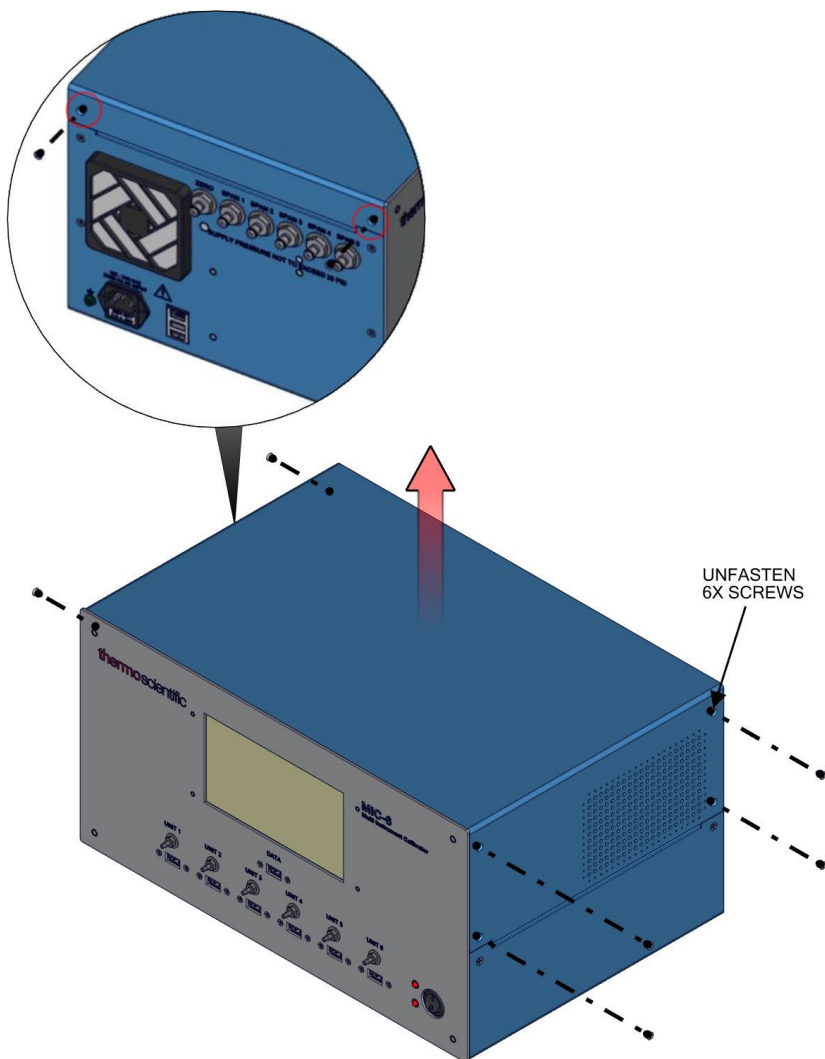


Figure 2-1. Removing the Cover

LCD Viewing Position

The instrument can be installed in the following configurations:

- Closed position, LCD viewed parallel
- Angled position, LCD viewed angled
- Extract front legs outwards for angled position

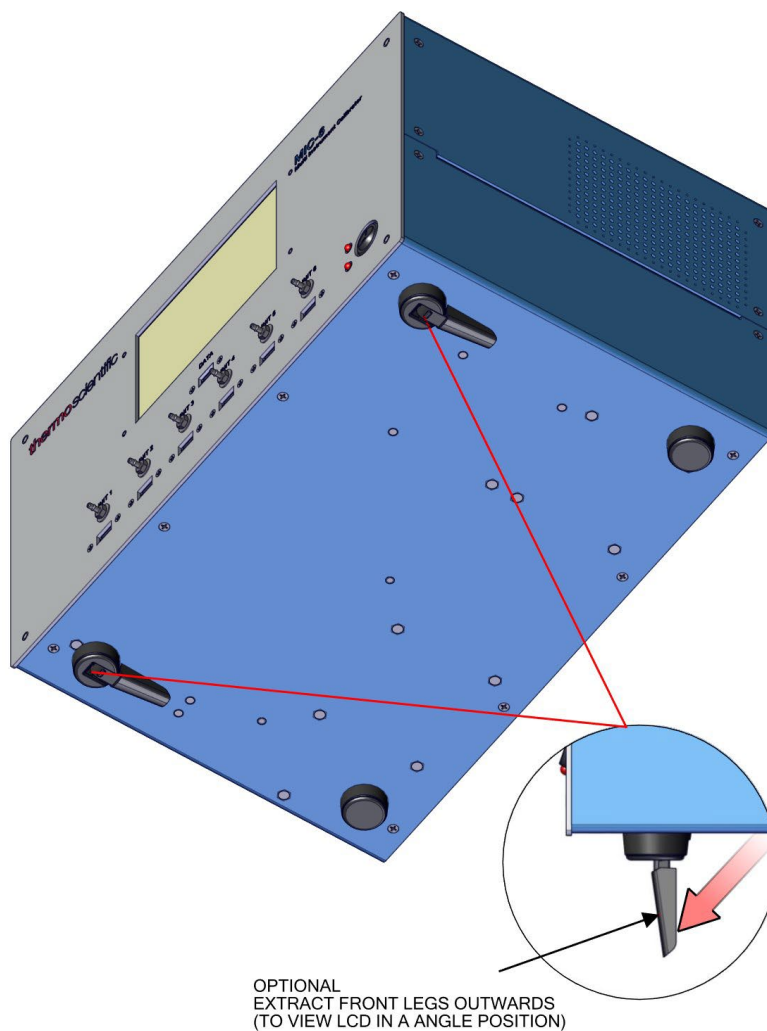


Figure 2–2. Installing Feet

Setup Procedure

Use the following procedure to assemble the instrument.

1. Determine where the instrument will be located and wall mount first, if desired, before attaching plumbing lines.
2. Locate the 6 quick connect mating connectors shipped with the instrument.
3. Attach a suitable tubing capable of withstanding the 25 psi supply pressure to the quick connect fittings. Heavy wall 1/8-inch ID Tygon tubing is recommended.
4. For simplicity, the span concentrations should increase from Span 1 to Span 5 however this is not necessary as the span concentrations for each connection must be entered into the instrument (see the Input Cylinder Setup procedure in the Operation section). In the auto mode, the instrument will apply the span gases in increasing order of concentration, thereby opening the correct valve in the appropriate sequence.
5. Plug the AC line cord into an appropriate power source. The unit will accommodate all voltages 115–240 VAC.



The MIC-6 is supplied with a three-wire grounding cord. Under no circumstances should this grounding system be defeated. ▲

Startup

Use the following procedure when starting the instrument.

1. Toggle the front panel power switch.
2. The pressure in the supply lines should be set @ 15-25 psi (max). The components can withstand up to 40 psi but the flow will be more than required resulting in excessive gas usage.
3. Enter the calibration gas cylinder information in the Input Cylinder Setup menu located in Settings>Input Cylinder Setup. For more information about this menu, see the “[Operation](#)” chapter.
4. Connect the TVA2020, or other instruments, as needed for the desired operation (Auto Calibration, Manual Calibration, Calibration Precision or Drift Check). For more information about connecting instruments, see the “[Operation](#)” chapter.
5. Perform the required calibration or drift check, for more information about these features (Auto Calibration, Manual Calibration, Calibration Precision or Drift Check), see the corresponding section of the “[Operation](#)” chapter.

Chapter 3

Operation

This chapter describes the functionality of the touchscreen user interface. The Instrument Display consists of a Title Bar, a User Interface, and a Status Bar. The Title Bar, located at the top, includes the Home button, instrument name, instrument mode, and Help button. The User Interface, located in the middle, is where the Home Screen and all other screens are accessed. The Home Screen has three Main Menu buttons, located on the left side, which include Calibration, Drift Check, and Settings, while the user interface to the right of the buttons displays the current test status of connected instruments. The Status Bar, located at the bottom, includes the Back button, Access Levels, Health Check, Favorites, Date and Time, and Contact Information.

Home Screen



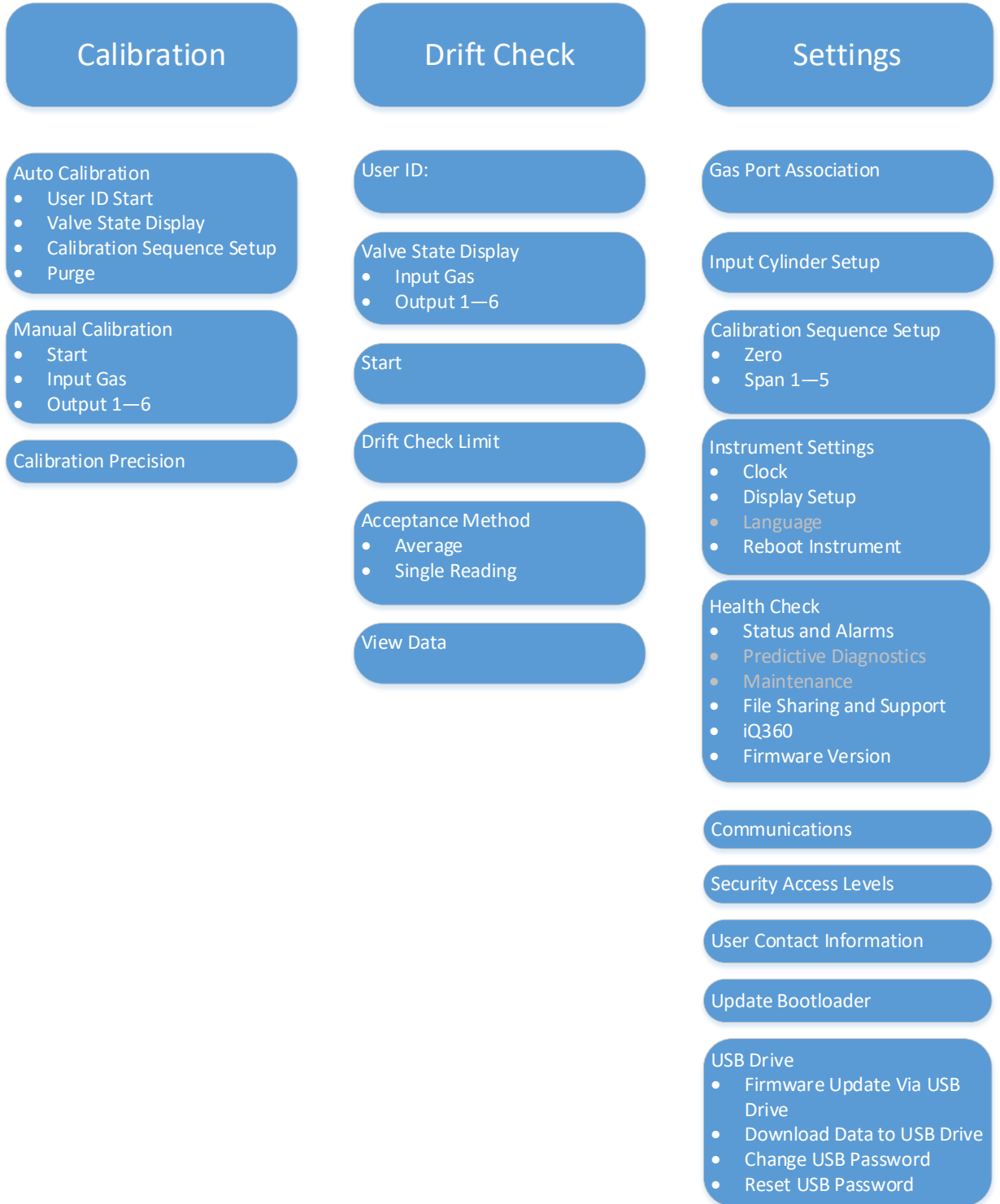
The Instrument Display contains the following information:

- Title Bar:
 - *Home button*: When pressed, it brings you to the Home Screen.
 - *Title Text*: Displays instrument name and operation status in all screens.
 - *Help button*: When pressed, brings you to the help screens.
- User Interface:
 - *Calibration button*: Allows the user to choose between automatic and manual calibration modes.
 - *Drift Check Button*: Allows the user to begin a drift check of previously calibrated instruments.
 - *Settings button*: Shows real-time status and alarms, also predictive diagnostics and maintenance history. Contains controls for operating the instrument, communications, and sets instrument options.
 - *Unit 1-6*: Displays the TVA2020 serial number(s) connected to the USB port(s).
- Status Bar:
 - *Back button*: When pressed, it displays the previous screen.
 - *Access Levels button*: Allows the user to set security access levels, and allows/restricts access to functionality depending on the selected access level.
 - *Health Check button*: Brings the user to the Health Check screen.
 - *Favorites button*: Allows user-selectable favorite buttons. To add to the favorites screen, user presses the desired screen button for 2 seconds. The user will be directed to the favorites screen where the user chooses the button position. To remove a favorite button from the favorites screen, press and hold button for 2 seconds.
 - *Clock*: Displays current date and time.
 - *Thermo Scientific Information button*: Shows contact information.

Main Menus and Keypads

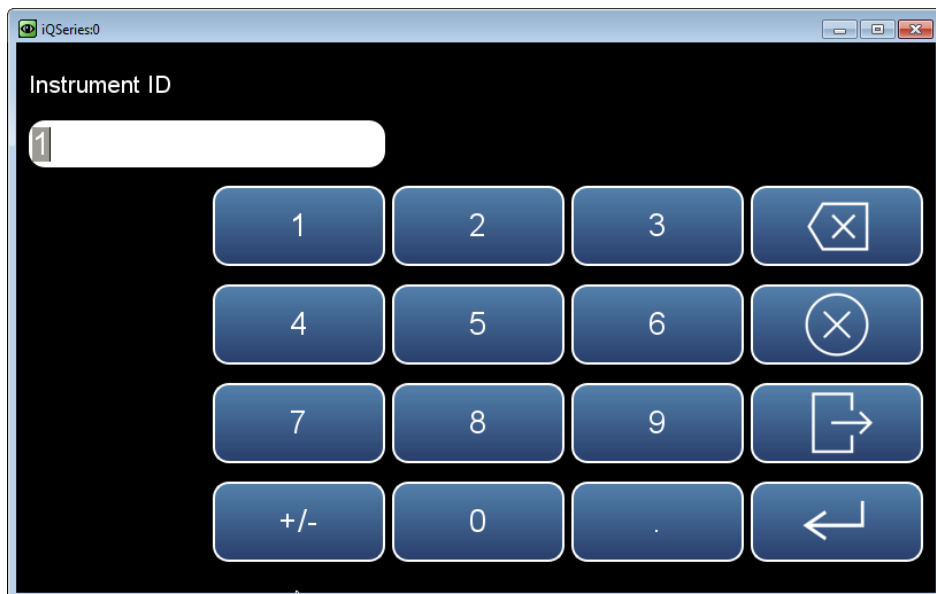
The Main Menu buttons, located on the Home Screen, contains three submenus. Each submenu contains related instrument settings. This chapter describes each submenu and screen in detail. Refer to the appropriate sections for more information.

Note Features not implemented yet are greyed out. ▲



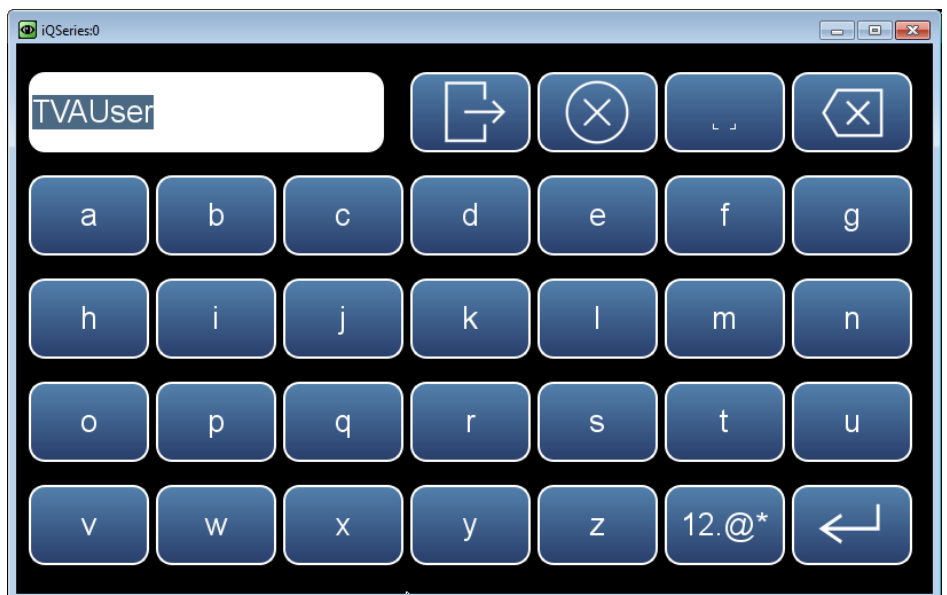
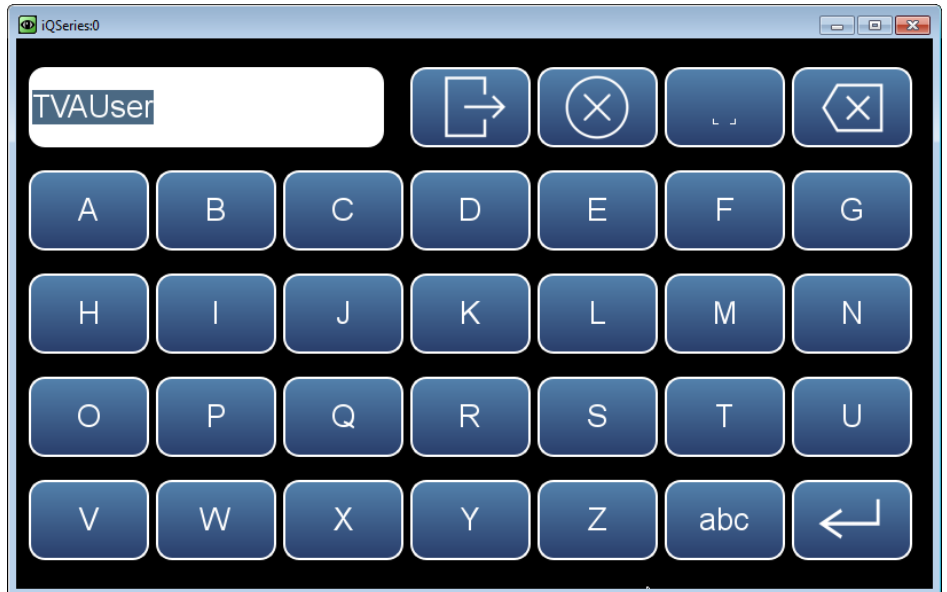
Numeric Keypad

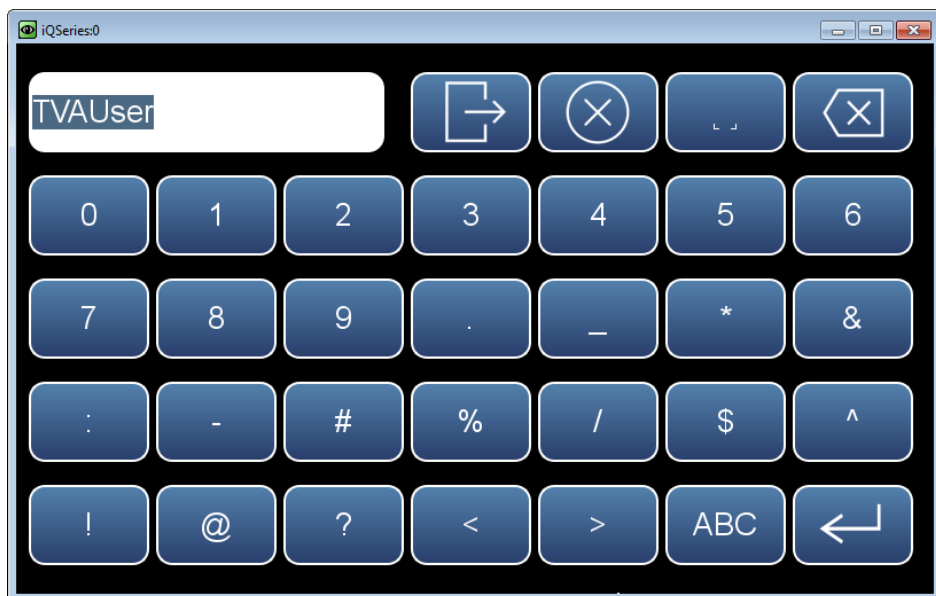
User enters a value into the box using the number keypad. When the user needs to change a value, such as for flow rates, temperatures or pressures, the keypad screen will automatically display. Initially, the box above the keypad will display the current value. Enter a new value using the keypad, and then select the **Enter** button to set the new value or press the **Cancel** button to exit the keypad screen and return to the previous screen without saving the value.



Alphanumeric Keypad

User enters a value into the box using the keypad. When the user needs to change an alphanumeric value, this keypad will automatically display. Initially, the box above the keypad will display the current value. Enter a new value using the keypad, and then select the **Enter** button to set the new value or press the **Cancel** button to exit the keypad screen and return to the previous screen without saving the value. The alphanumeric keypad is only available when the user needs to enter alphabet characters.

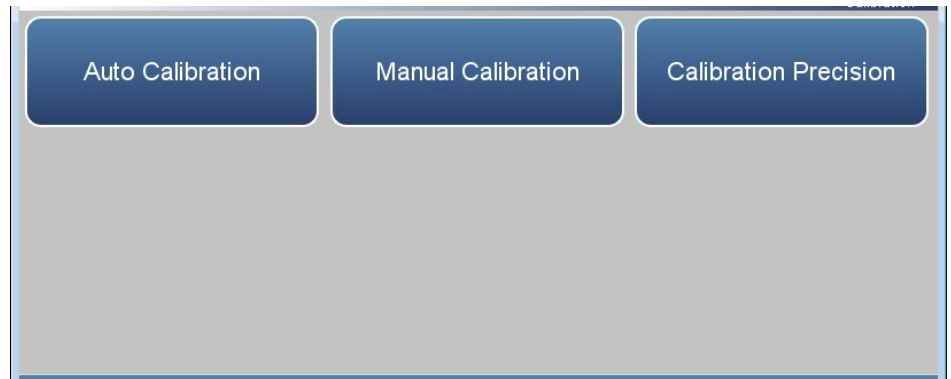




Calibration

The Calibration screen allows the user to simultaneously calibrate up to 6 TVA2020s in the automatic mode. The manual mode can be used to supply calibration gases to the TVA2020 or other similar instruments for a manual calibration.

Home Screen>Calibration



The Calibration screen contains the following information:

- *Auto Calibration:* Operates only with the TVA2020. Performs automatic calibration of zero gas and up to 5 span gases on up to 6 TVA2020 instruments. Automatically saves the calibration information in the TVA2020(s) as well as the MIC-6 internal memory. A post calibration concentration reading is also saved for each instrument.
- *Manual Calibration:* Supplies the selected gas to up to 6 instruments to allow manual calibration of TVA2020(s) or other similar instruments such as the TVA1000B.
- *Calibration Precision:* Automatically performs a calibration precision test for the TVA2020. Calculates the average concentration and response time based on the data obtained from three consecutive calibration response checks. Only one instrument at a time can be attached to the MIC-6 via the USB cable to activate this feature.

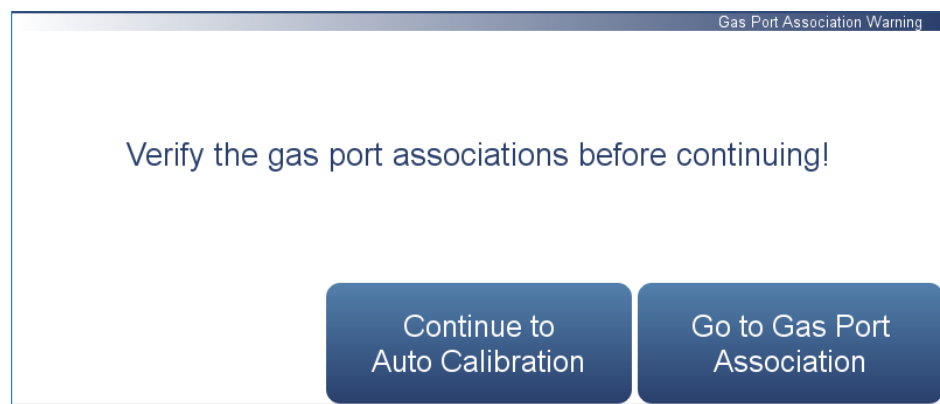
Auto Calibration

Auto Calibration only operates with TVA2020 instruments connected via USB. Please note that the TVA2020 must be running firmware version 0100055S or later for the MIC-6 to operate in auto calibration mode. The following steps must be followed in sequence to allow the MIC-6 to perform an auto calibration with TVA2020 instruments.

Note The gas cylinder information must be entered in the Settings>Input Cylinder Setup screen before an auto calibration can be performed. ▲

Note For more information on “Gas Port Association”, see page 3-30. ▲

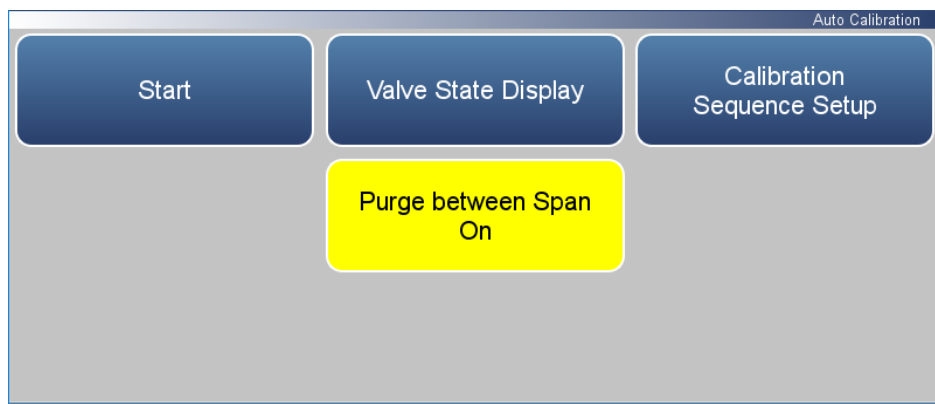
Home Screen>Calibration>Auto Calibration



Home Screen>Calibration>Auto Calibration>Go to Gas Port Association

Serial Number	Gas Port	Probe Type	Probe Info	Gas Port Setup
202015010932	1	Standard	Probe0001	▲
202016051293	2	Standard	Probe0002	▼
REVxCxMB	4	Standard	Probe0003	◀
202014120349	0	Standard	Probe0004	▶
x	0	Standard	Probe0005	
x	0	Standard	Probe0006	

Home Screen>Calibration>Auto Calibration>Continue to Auto Calibration

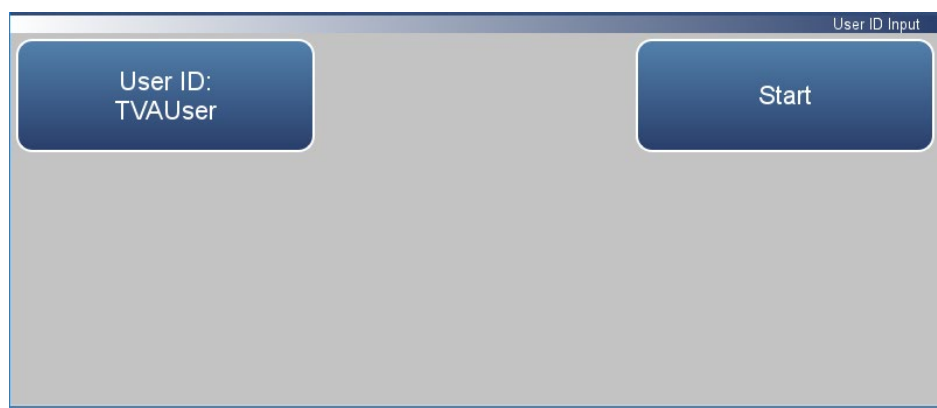


The Auto Calibration screen contains the following information:

- *Start*: Allows USER ID entry and contains a second level start button to confirm initiating the auto calibration sequence.
- *Valve State Display*: Indicates which valves are open at any moment during auto calibration sequence.
- *Calibration Sequence Setup*: Selects the zero and/or span gases to be applied during the auto calibration sequence.
- *Purge between Span*: Purges between each span point with zero air.

Start This start button opens a second level start menu where the USER ID can be entered or confirmed and contains a second start button to confirm the auto calibration sequence should be initiated.

Home Screen>Calibration>Auto Calibration>Continue to Auto Calibration>Start



The Start screen contains the following information:

- *User ID:* Allows USER ID entry and displays the entered ID on the second line of text. The user ID is logged along with the calibration data in the MIC-6 memory.
- *Start:* Initiates the auto calibration function.

Use the following procedure to start an auto calibration.

1. The TVA2020 should be ignited and warmed up for at least 30 minutes prior to performing any calibrations. Please refer to the TVA2020 operating manual for reference.
2. From the TVA2020 Main Menu press 5=Comm.
3. Press 2=Serial.
4. From the TVA2020 Main Menu press 1=Run.

IMPORTANT The TVA2020 must remain in the RUN mode for the duration of the Auto Calibration Procedure. ▲

5. Use the A/B USB cables provided with the TVA2020 along with the USB barrier box to connect the TVA2020 to the MIC-6.

IMPORTANT The TVA2020 must be in SERIAL mode before connecting to the MIC-6. Otherwise, the MIC-6 will not detect the TVA2020 connection. ▲

6. The MIC-6 will automatically detect the TVA2020 serial number and display 'Idle' to the right of 'Unit 1' on the Home Screen.

Note The instruments are detected in the order that they are connected. For example, if the USB cable is connected to USB connection under the Unit 6 front panel label first, the 'Idle' will still appear to the right of Unit 1 on the MIC-6 Home Screen. For the sake of simplicity it is highly recommended to connect the instruments in order on the MIC-6 front panel from 1 to 6. ▲

7. Once all the USB connections have been made the Gas Ports must be assigned to the correct serial number. See the Settings>Gas Port Association section of the operation chapter for more information.
8. Navigate to Home>Calibration>Auto Calibration>Continue to Auto Calibration>Calibration Sequence Setup to select the needed gases for the calibration to be performed.

9. Navigate to Home>Calibration>Auto Calibration>Continue to Auto Calibration>Start. If the User ID needs to be changed press the button and an alphanumeric keypad will appear for the data entry.
10. Press the 'Start' button from this menu to begin the Auto Calibration Routine. The 'Start' button will be greyed out until at least one span gas button is chosen, each instrument is associated with a gas port, and each instrument's warm up counter reads 00:00.

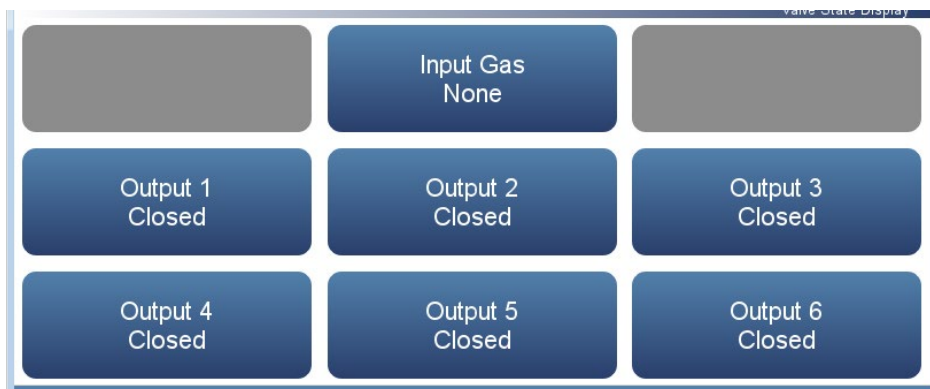
Note The MIC-6 will automatically zero, set the number of span points, calibrate each span point, and confirm the ppm reading for each span point after the calibration is complete. This data is stored in the MIC-6 and retrievable through the USB or Bluetooth connection. For more information about stored data see the USB section in the 'Operation' chapter. ▲

11. The MIC-6 will flow each gas for the selected amount of time (min-3 sec, max-60 sec) as entered in the Settings>Input Cylinder Setup screen. After the purge time the MIC-6 reads the TVA2020 detector counts every 2 seconds and will continue to flow the gas until the counts are stable to within 10%. The recommended purge time is 20-30 seconds.
12. If the Purge between Span option is ON, the purge time is used as the duration of zero air to flush any calibration gas between spans.

Valve State Display

The Valve State Display indicates which valves are open at any moment while the auto calibration sequence is running.

Home Screen>Calibration>Auto Calibration>Valve State Display



The Valve State Display screen contains the following information:

- *Input Gas*: Displays which of the five span gases or zero air is being delivered during auto calibration.
- *Output 1–6*: Displays which of the six outputs are open or closed during auto calibration.

Calibration Sequence Setup

The Calibration Sequence Setup screen is used to select which gases will be used for the auto calibration sequence. The button will turn from blue to yellow to indicate it has been chosen. The gases will be applied automatically in increasing order of concentration. Therefore, any concentration can be connected to any of the span ports but for simplicity it is recommended to attach them from Span 1 to Span 5 in increasing order of concentration.

Home Screen>Calibration>Auto Calibration>Calibration Sequence Setup



The Calibration Sequence Setup screen contains the following information:

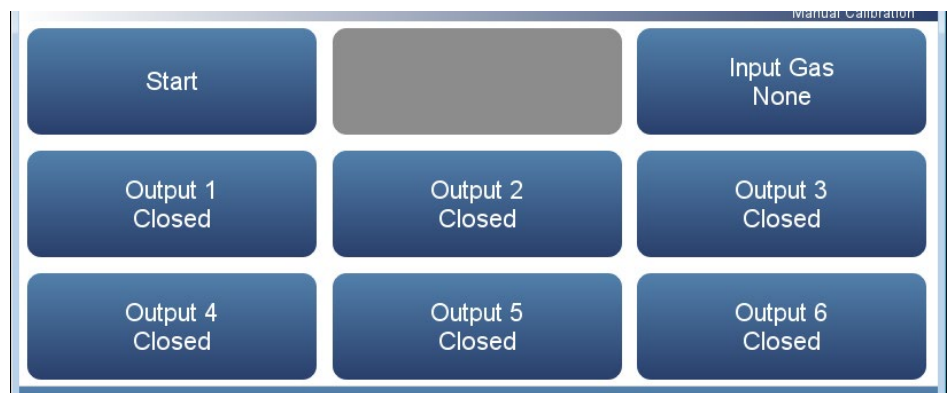
- *Zero*: Pressing this button turns it from blue to yellow to indicate zero air will be delivered during the calibration.
- *Span 1–5*: Choose which of the 5 span gases to deliver during the auto calibration. The button will turn yellow to indicate it will be delivered at the appropriate time.

Manual Calibration

In manual calibration mode the only required connection is to the gas port. This mode can be used to manually calibrate the TVA2020, TVA1000B, or any other type of instrument that requires no more than 1.5 LPM of flow. To perform a manual calibration, follow the steps listed below.

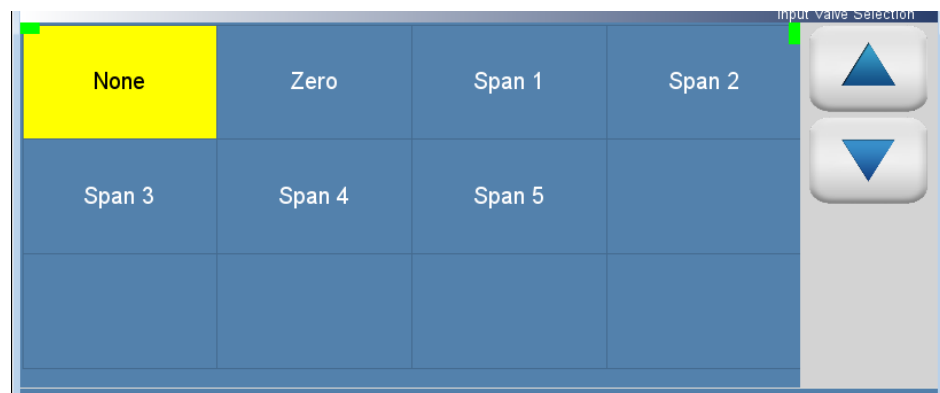
1. The instrument to be calibrated should be warmed up for at least the time recommended by the manufacturer.
2. The instrument probe should be attached to the gas delivery connector provided with the MIC-6.
3. Press the 'Manual Calibration' button to display the screen shown below.

Home Screen>Calibration>Manual Calibration



4. Select the 'Input Gas' button to open the 'Input Valve Selection' screen shown below.

Home Screen>Calibration>Manual Calibration>Input Gas



5. Choose one of the Span gases or zero gas as needed. Press the back arrow and the selected gas will be displayed below the 'Input Gas' text.

Note Only one gas at a time can be selected to be delivered to the instrument(s). ▲

6. Select as many 'Output #' as needed depending on the number of instruments connected. Or they can be opened one at a time if needed depending on the desired type of calibration.

Note The MIC-6 will automatically close the input valve after it has been open for 15 minutes. This is to prevent inadvertent gas usage by forgetting to close the output(s) when complete. ▲

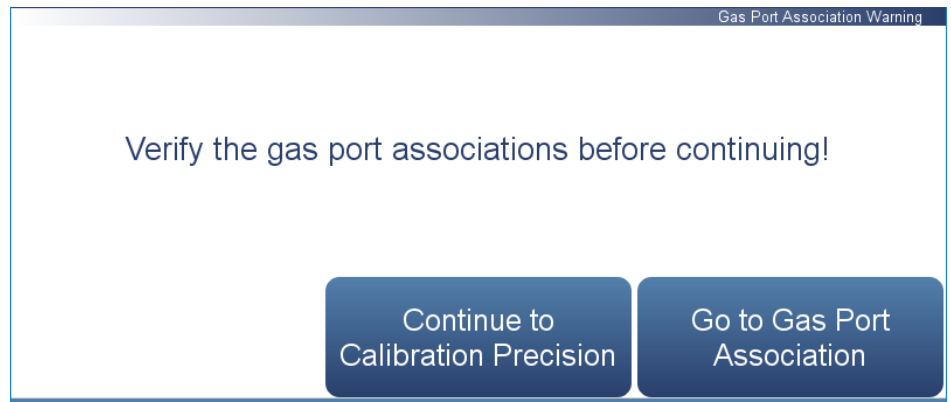
Calibration Precision

This feature automatically performs a calibration precision test for the TVA2020. The MIC-6 will calculate the average concentration and response time based on the data obtained from three consecutive calibration response checks. The data is available for download via USB or Bluetooth. Only one instrument at a time can be attached to the MIC-6 via the USB cable to activate this feature.

IMPORTANT The TVA2020 must be running firmware version 0100055S or later and must be placed into serial communications mode before connecting to the MIC-6. To do this choose 5 = Comm on the TVA2020 Main Menu. Then choose 2 = Serial. ▲

Note For more information on “Gas Port Association”, see page 3-30. ▲

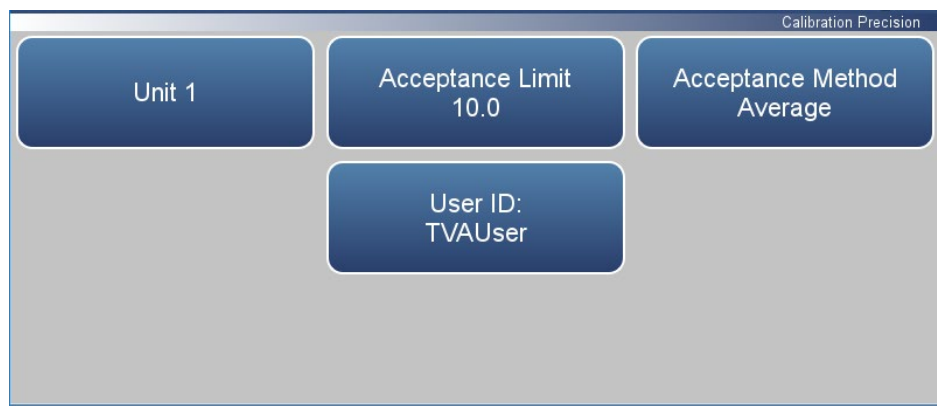
Home Screen>Calibration>Calibration Precision



Home Screen>Calibration>Continue to Gas Port Association

				Gas Port Setup
Serial Number	Gas Port	Probe Type	Probe Info	
202015010932	1	Standard	Probe0001	▲
202016051293	2	Standard	Probe0002	▼
REVxCxMB	4	Standard	Probe0003	
202014120349	0	Standard	Probe0004	◀
x	0	Standard	Probe0005	
x	0	Standard	Probe0006	▶

Home Screen>Calibration>Calibration Precision>Continue to Calibration Precision



The Calibration Precision screen contains the following information:

- *Unit 1:* This button should be blue if a TVA2020 is installed. If this button is greyed out, proper communications has not been set up between the MIC-6 and the TVA2020 under test. Other possible reasons for the button to be greyed out are more than one TVA2020 connected to the MIC-6, failure to choose a span gas, or failure to assign a gas port in the Gas Port Association screen.
- *Acceptance Limit:* This button opens a numeric keypad which is used to select the acceptable limit for the Calibration Precision procedure. The acceptable set points are between 2 and 10%. The default is 10%.
- *Acceptance Method:* This button allows you to select which acceptance method to use for the test. Average will fail acceptance if the average test readings are over the acceptance set point. Individual Reading will fail acceptance if any individual reading is over the acceptance set point.
- *User ID:* Pressing the button opens an alpha numeric keypad that allows entry of the User ID information that is logged along with the Calibration Precision results. The entry allows a maximum of 20 characters. The entered ID displayed on the second line of text.

Note The gas cylinder information must be entered in the Settings>Input Cylinder Setup screen before a Calibration Precision can be performed. ▲

Use the following procedure to start a Calibration Precision.

1. The TVA2020 should be ignited and warmed up for at least 30 minutes prior to performing this procedure. Please refer to the TVA2020 operating manual for reference.
2. From the TVA2020 Main Menu press 5=Comm.
3. Press 2=Serial.
4. From the TVA2020 Main Menu press 1=Run.

IMPORTANT The TVA2020 must remain in the RUN mode for the duration of the Calibration Precision Procedure. ▲

5. Use the A/B USB cables provided with the TVA2020 along with the USB barrier box to connect the TVA2020 to the MIC-6 Unit 1 input.
6. The MIC-6 will automatically detect the TVA2020 serial number and display 'idle' to the right of 'Unit 1' on the Home Screen.
7. Once the USB connection has been made insure that Unit 1 has gas port 1 assigned. Navigate to Main Menu>Settings>Gas Port Association and refer to that section of the Operation chapter for more information.
8. Navigate to Home Screen>Calibration>Calibration Precision>Continue to Calibration Precision>Unit 1.

Home Screen>Calibration>Calibration Precision>Continue to Calibration Precision>Unit 1



9. Select the 'Choose span Gas' button and select which Span Gas Source will be used for the Calibration Precision Procedure. Return to previous menu.
10. From Home Screen>Calibration>Calibration Precision>Continue to Calibration Precision>Unit 1: Select the 'Start' button. The button should turn yellow and read 'Stop'.

Once the "Start" button is pressed for the calibration precision, the MIC-6 steps through three repetitions of zero gas and the chosen span gas, as follows:

- Open the zero gas valve and the chosen TVA2020's assigned valve
- Poll the TVA2020 for readings, waiting until stabilization, with a timeout of 30 seconds
- Close the zero gas valve and open the chosen span gas valve
- Poll the TVA2020 for concentration readings until the reading is greater than 90% of the entered span gas concentration, with a timeout of 30 seconds
- Continue polling the TVA2020 for concentration readings until stabilization, with a timeout of 30 seconds beginning at the original span gas valve opening
- Close the span gas valve.
- Open the zero gas valve and all of the output valves for 10 seconds to flush the span gas from the manifold.
- Repeat two more times.

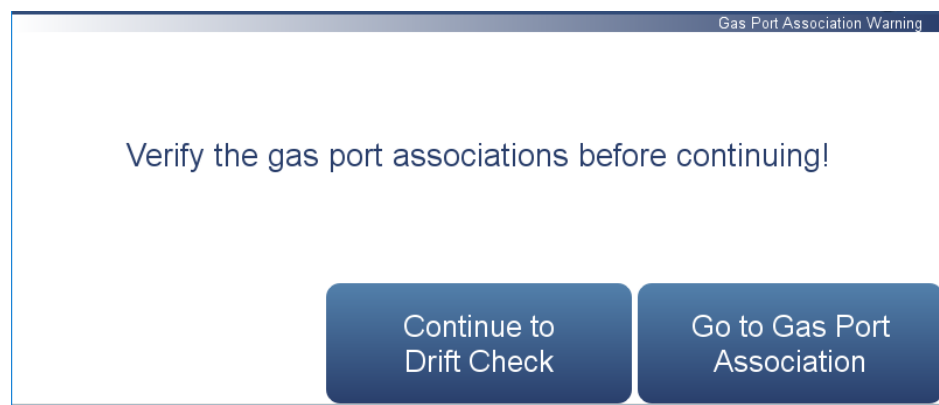
- Calculate the response times and determine whether the concentration readings taken after stabilization meet the PASS/FAIL criteria
 - Record the results in the database for screen viewing or file download.
11. When the procedure is completed, from the Home Screen Unit 1 will read either Calibration Passed or Failed. User can then navigate to: Home Screen>Calibration>Calibration Precision>Continue to Calibration Precision>Unit 1>View data, to view last Calibration Precision run. User can also download all Precision Calibration records via USB or Bluetooth.

Drift Check

The drift check feature compares the current span gas readings to the most recently saved auto calibration data for the instruments being evaluated. The drift check will apply each span gas that was used for the calibration and calculate the percent error relative to the instrument reading taken at the end of the auto calibration routine.

Note For more information on “Gas Port Association”, see page 3-30. ▲

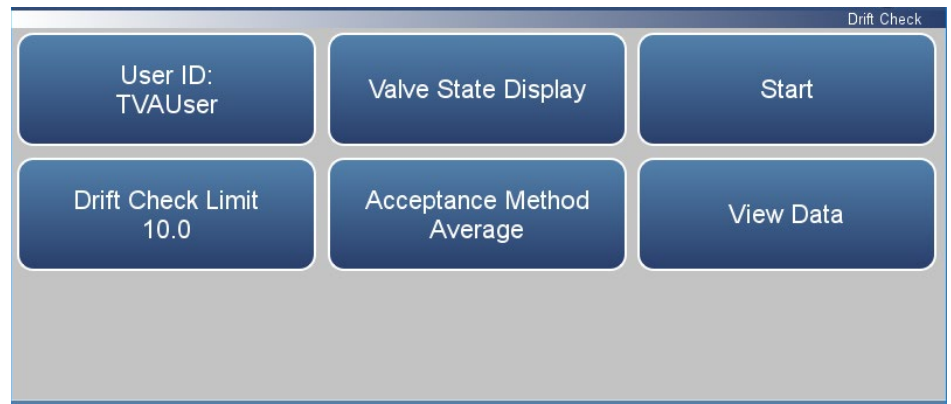
Home Screen>Drift Check



Home Screen>Drift Check>Go to Gas Port Association

Serial Number	Gas Port	Probe Type	Probe Info	Gas Port Setup
202014090200	4	Standard	Probe0005	▲
202014120349	5	Standard	Probe0002	▼
REVxCxMB	6	Standard	Probe0003	◀
202015010932	1	Standard	Probe0004	▶
202016051293	2	Standard	Probe0005	
Pilot01	3	Standard	Probe0006	

Home Screen>Drift Check>Continue to Gas Drift Check



The Continue to Drift Check screen contains the following information:

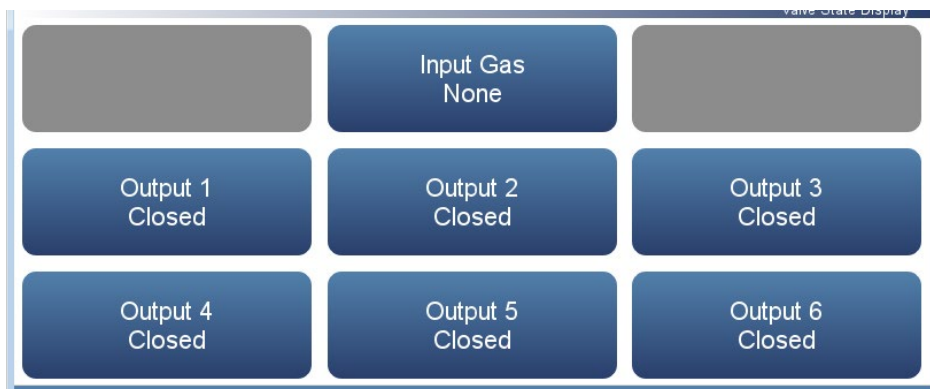
- *User ID*: Allows user ID entry and displays the entered ID on the second line of text. The user ID is logged along with the drift data in the MIC-6 memory.
- *Valve State Display*: Indicates which valves are open at any moment during the drift check sequence.
- *Start*: Initiates the drift check function.
- *Drift Check Limit*: Can be set anywhere from 2% to 10%. This limit is used to determine pass/fail criteria for the drift check.
- *Acceptance Method*: This button allows you to select which acceptance method to use for the test. Average will fail acceptance if the average test readings are over the acceptance set point. Individual Reading will fail acceptance if any individual reading is over the acceptance set point.
- *View Data*: Allows the user to view the results of the drift check span(s) verification compared to the auto calibration value(s).

User ID: Pressing this button opens an alpha numeric keypad that allows entry of the user ID information that is logged along with the drift check results. The entry allows a maximum of 20 characters. The entered ID is displayed on the second line of text.

Valve State Display

The Valve State Display indicates which valves are open at any moment while the auto calibration sequence is running.

Home Screen>Calibration>Auto Calibration>Valve State Display



The Valve State Display screen contains the following information:

- *Input Gas*: Displays which of the five span gases or zero air is being delivered during auto calibration.
- *Output 1–6*: Displays which of the six outputs are open or closed during auto calibration.

View Data The View Data screen shows data from the current drift check.

Use the ▲ and ▼ buttons to move up and down and the ◀ and ▶ buttons to move left and right.

Home Screen>Drift Check>Continue to Drift Check>View Data

Serial Number	202014090200	202014120349	REVxCxMB	Drift Check Data
Date	09/24/2019 11:23:41	09/24/2019 11:23:41	09/24/2019 11:23:41	▲
User Id	TVAUser	TVAUser	TVAUser	▼
Cylinder	Span 1	Span 1	Span 1	◀
Compared Concentration	500	499	500	▶
Measured Concentration 1	497	492	497	
Measured Concentration 2	498	492	497	
Measured Concentration 3	500	493	500	
Average	498	492	498	
Result	PASS	PASS	PASS	

The View Data screen contains the following information:

- Across:
 - *Serial Number*: This column lists items associated with the span gas connecting on the side of the instrument.
- Down:
 - *Date*: Displays date/time of the performed drift check.
 - *User Id*: Displays ID chosen by the user.
 - *Cylinder*: Displays gas cylinder associated with the chosen span.
 - *Compared Concentration*: Compares from the auto calibration span.
 - *Measured Concentration 1*: Displays 1st measured concentration.
 - *Measured Concentration 2*: Displays 2nd measured concentration.
 - *Measured Concentration 3*: Displays 3rd measured concentration.
 - *Average*: Displays the average of the measured concentration 1–3.
 - *Result*: Displays a PASS/FAIL result.

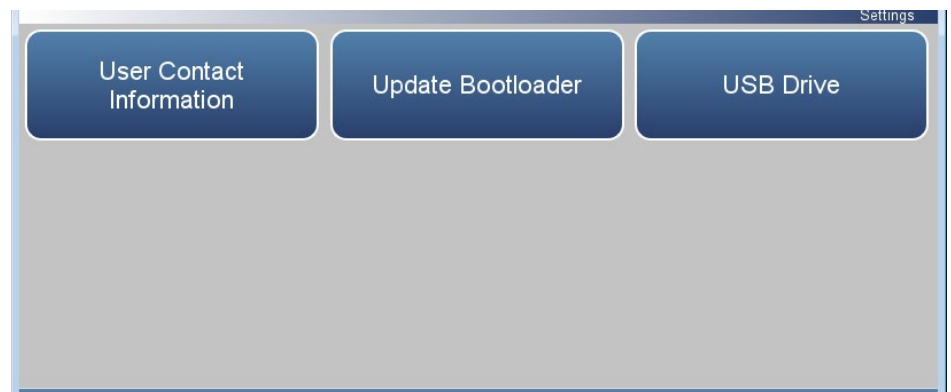
Settings

The Settings screen allows the user to view the status and alarms, set up user preferences, communicate with outside devices and computers, download files to USB, and sets security protocol.

Home Screen>Settings



Home Screen>Settings>More



The Settings screen contains the following information:

- *Gas Port Association*: Associate instrument serial numbers with front panel gas ports. Used with the Auto Calibration feature.
- *Input Cylinder Setup*: Opens a data entry screen to log the specifics of the span gases connected to the span ports.
- *Calibration Sequence Setup*: Selects the zero and/or span gases to be applied during the auto calibration sequence.
- *Instrument Settings*: Allows the user to setup the clock, display brightness, and manually reboot the instrument.
- *Health Check*: View instrument status and alarms, predictive diagnostics, preventive maintenance alerts, maintenance history, email,

health check report files, and contact Thermo Fisher Scientific technical support.

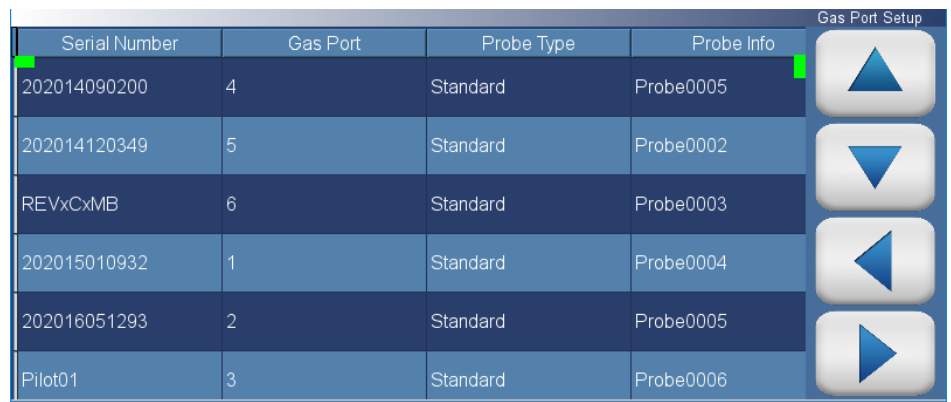
- *Communications:* Allows the user to communicate with outside devices.
- *Security Access Levels:* User selects security protocol. User can also change security passwords.
- *User Contact Information:* User sets up their contact information.
- *Update Bootloader:* Used to update bootloader when an update to the bootloader is available.
- *USB Drive:* User can update instrument firmware, download data, and change USB password.

Gas Port Association

The Gas Port Association screen is used to associate the front panel gas port connections, Units 1-6, with the correct instrument serial number. It also contains a data entry field for the type of probe that is being used with each instrument. The final column is for entering the measured flow rate of each instrument. The flow rate is determined independently by a user supplied flow meter. Each front panel connection is supplied gas through a valve/orifice restrictor combination. If the connected instrument is not associated in this screen no gas will be supplied during the auto calibration routine. This feature allows for conservation of zero/span gases so they are not wasted by flowing when no instrument is attached. For example, the gas connection for the instrument connected to USB Unit 6 could be attached to any of the 6 gas ports. With multiple instruments connected, it may be challenging to correctly map the connections. It is highly recommended to connect the instrument gas port and USB connection to the same front panel Unit #.

Use the ▲ and ▼ buttons to move up and down and the ◀ and ▶ buttons to move left and right.

Home Screen>Settings>Gas Port Association



Serial Number	Gas Port	Probe Type	Probe Info
202014090200	4	Standard	Probe0005
202014120349	5	Standard	Probe0002
REVCxMB	6	Standard	Probe0003
202015010932	1	Standard	Probe0004
202016051293	2	Standard	Probe0005
Pilot01	3	Standard	Probe0006

The Gas Port Association screen contains the following information:

- *Serial Number*: Automatically detected and displayed in the first column.
- *Gas Port*: Press the box column/row intersection to open a number keypad. Enter the front panel gas port associated with that serial number.
- *Probe Type*: Allows selection of either 'Standard' or 'Extended' probe types.

- *Probe Info:* The standard sample probe is the simple or enhanced probe with the standard probe tip. The extended probe is the telescoping extended probe attachment.
- *Flow Rate:* Opens a numeric keypad for optional entry of user measured instrument flow rate

Input Cylinder Setup

The information entered on this screen is used during the auto calibration routine. The tank concentration is sent to the TVA2020 as part of the set up prior to performing the calibration. The purge time is the amount of time the MIC-6 waits after the flow to the instruments starts. The tank expiration month and date are used to create a warning one month prior to the expiration date. The User ID is meant to record the technician involved in setting up the tanks. This tank information is stored in the MIC-6 memory and is available for download via USB or Bluetooth.

Use the ▲ and ▼ buttons to move up and down and the ◀ and ▶ buttons to move left and right.

Home Screen>Settings>Input Cylinder Setup

Cylinder	Concentration	Min Purge (sec)	Tank Exp. Month	Tank Exp. Day	Tank Exp. Year	
Zero	0.0	10	January	1	2018	▲
Span #1	500.0	10	January	1	2018	▼
Span #2	0.0	10	January	1	2018	◀
Span #3	0.0	10	January	1	2018	▶
Span #4	0.0	10	January	1	2018	
Span #5	0.0	10	January	1	2018	

The Input Cylinder Setup screen contains the following information:

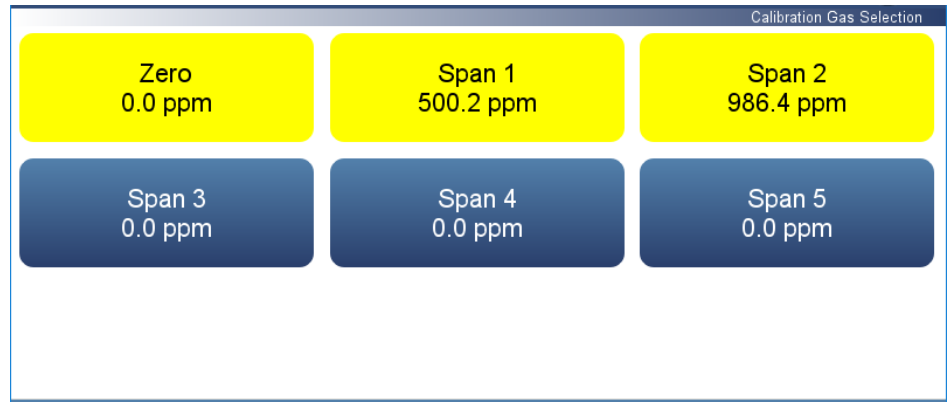
- Across:
 - *Cylinder*: This column lists items associated with the span gas connecting on the side of the instrument.
 - *Concentration*: The user enters the PPM tank concentration. Enter only as PPM.
 - *Min Purge (sec)*: The user enters the amount of time to purge the MIC-6 and TVA2020 prior to starting to read the counts or concentration from the TVA2020.
 - *Tank Exp. Month*: Displays the month the tank will expire.
 - *Tank Exp. Day*: Displays the day the tank will expire.
 - *Tank Exp. Year*: Displays the year the tank will expire.
 - *User ID*: The user enters the ID for the person changing/entering the tank information.

- Down:
 - *Zero*: Indicates zero gas information.
 - *Span #1–Span #5*: Indicates gas information for the spans 1–5.

Calibration Sequence Setup

The Calibration Sequence Setup screen is used to select which gases will be used for the auto calibration sequence. The button will turn from blue to yellow to indicate it has been chosen. The gases will applied automatically in increasing order of concentration. Therefore any concentration can be connected to any of the span ports but for simplicity it is recommended to attach them from Span 1 to Span 5 in increasing order of concentration.

Home Screen>Settings>Calibration Sequence Setup



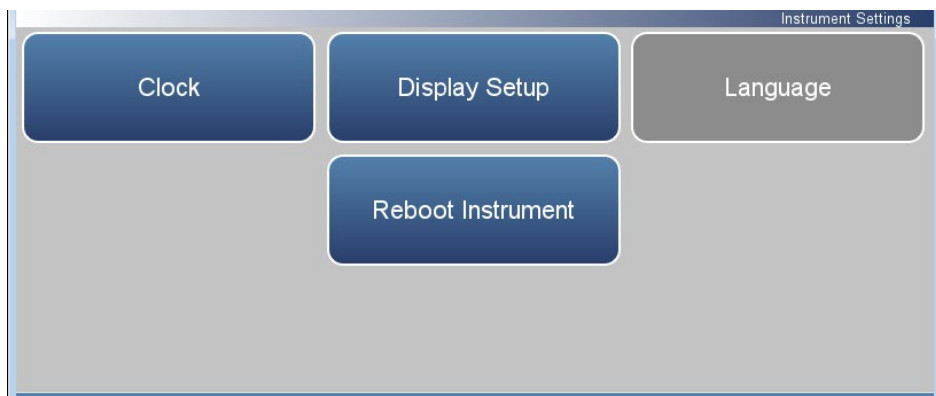
The Calibration Sequence Setup screen contains the following information:

- *Zero*: Pressing this button turns it from blue to yellow to indicate zero air will be delivered during the calibration.
- *Span 1–5*: Choose which of the 5 span gases to deliver during the auto calibration. The button will turn yellow to indicate it will be delivered at the appropriate time.

Instrument Settings

The Instrument Settings screen allows the user to configure various instrument settings.

Home Screen>Settings>Instrument Settings

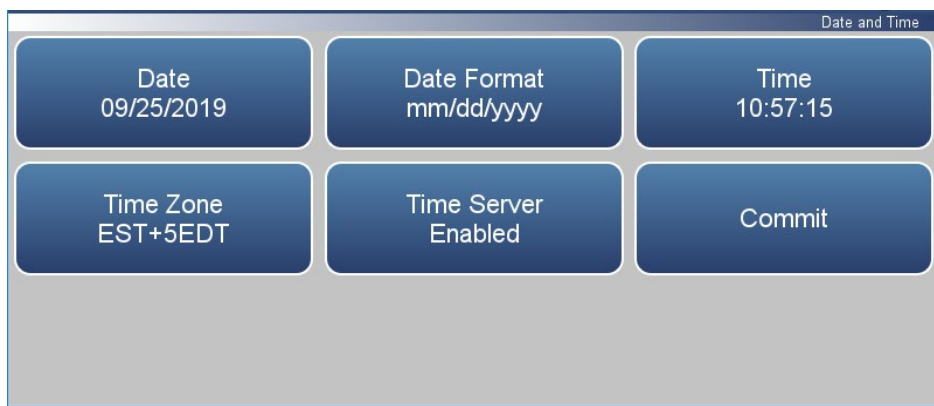


The Instrument Settings screen contains the following information:

- *Clock*: Sets date and time.
- *Display Setup*: Sets touchscreen display settings.
- *Language*: Read only.
- *Reboot Instrument*: Reboots the instrument.

Clock The Clock screen allows the user to set the instrument's date and time, choose date/time format, time zone, and time server.

Home Screen>Settings>Instrument Settings>Clock



The Clock screen contains the following information:

- *Date*: User sets date.
- *Date Format*: User selects date format.
- *Time*: User sets time.
- *Time Zone*: User chooses time zone.
- *Time Server Enabled/Disabled*: User can enabled/disable the time server to get periodic clock updates.
- *Commit*: When pressed, date and time are saved.

Date The Date screen allows the user to set the date.

Use the ◀ and ▶ buttons to move left and right to select month and year.

Home Screen>Settings>Instrument Settings>Clock>Date

◀		September					▶	
Sun	Mon	Tue	Wed	Thu	Fri	Sat		
25	26	27	28	29	30	31		
1	2	3	4	5	6	7		
8	9	10	11	12	13	14		
15	16	17	18	19	20	21		
22	23	24	25	26	27	28		
29	30	1	2	3	4	5		

Date Format The Date Format screen allows the user to choose from the following formats: mm/dd/yyyy, dd/mm/yyyy or yyyy-mm-dd.

Use the ▲ and ▼ buttons to select.

Home Screen>Settings>Instrument Settings>Clock>Date Format



The Date Format screen contains the following information:

- U.S. Format mm/dd/yyyy
- European Format dd/mm/yyyy
- ISO 8601 yyyy-mm-dd

Time The Time screen allows the user to choose from the following formats: mm/dd/yyyy, dd/mm/yyyy or yyyy-mm-dd.

Use the ▲ and ▼ buttons to select.

Home Screen>Settings>Instrument Settings>Clock>Time



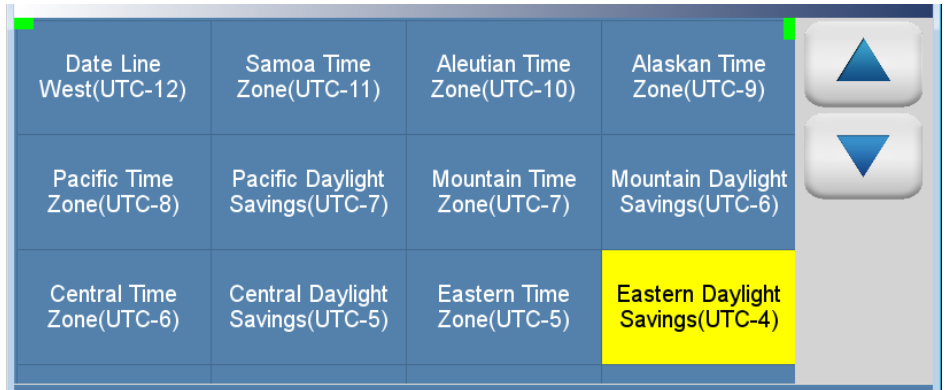
The Time screen contains the following information:

- Hours
- Minutes
- Seconds

Time Zone The Time Zone screen allows the user to set the time zone for the Network Time Protocol (NTP) server. This should be set to the time zone that the instrument is located in.

Use the ▲ and ▼ buttons to select.

Home Screen>Settings>Instrument Settings>Clock>Date / Time Parameters>Time Zone



The Time Zone screen contains the following information:

- Date Line West(UTC-12)
- Samoa Time Zone(UTC-11)
- Aleutian Time Zone(UTC-10)
- Alaskan Time Zone(UTC-9)
- Pacific Time Zone(UTC-8)
- Pacific Daylight Savings(UTC-7)
- Mountain Time Zone(UTC-7)
- Mountain Daylight Savings(UTC-6)
- Central Time Zone(UTC-6)
- Central Daylight Savings((UTC-5)
- Eastern Time Zone(UTC-5)
- Eastern Daylight Savings(UTC-4)
- Atlantic Time Zone(UTC-4)
- Mid-Atlantic(UTC-3)
- South Georgia(UTC-2)

- Cape Verde Time(UTC-1)
- Coordinated Universal Time(UTC-0)
- Central European Time(UTC+1)
- Eastern European Time(UTC+2)
- Further-Eastern European Time(UTC+3)
- Gulf Standard Time(UTC+4)
- Yekaterinburg Time(UTC+5)
- Omsk Time(UTC+6)
- Indochina Time(UTC+7)
- ASEAN Common Time(UTC+8)
- Japan Standard Time(UTC+9)
- Chamorro Time Zone(UTC+10)
- Sredmnekolymsk Time(UTC+11)
- New Zealand Standard Time(UTC+12)

Time Server The Time Server screen allows the user to enable/disable the time server to get periodic clock updates.

Home Screen>Settings>Instrument Settings>Clock>Date / Time Parameters>Time Server

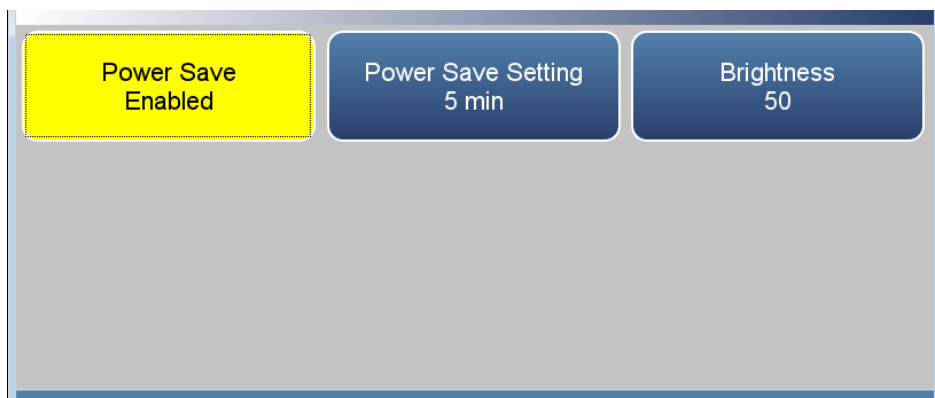


The Time Server screen contains the following information:

- *Time Server:* Enables/Disables periodic clock updates from an NTP (Network Time Protocol) source.
- *Set Time Server:* User can choose specific time server.
- *Set Default:* When pressed, default time server will be used.

Display Setup The Display Setup allows the user to change the brightness of the display and choose power save option.

Home Screen>Settings>Instrument Settings>Display Setup





The Display Setup screen contains the following information:

- *Power Save*: Minutes before screen times out. Toggles enable/disable.
- *Power Save Setting*: Option whereby the user can display a black screen after a set amount of inactivity.
- *Brightness*: Sets the brightness of the display.

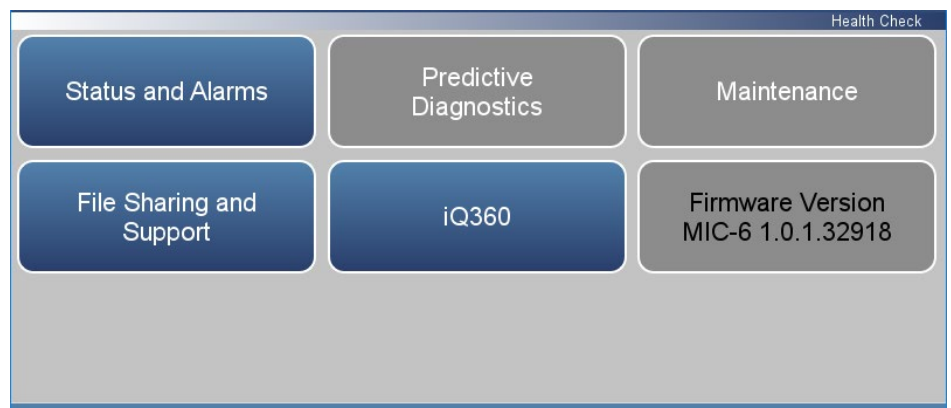
Health Check

The Health Check screen is used for viewing instrument status and alarms, predictive diagnostics, preventive maintenance schedules, maintenance history, emailing files describing the health/status of the instrument, and viewing the instrument's firmware version.

Note  This symbol denotes there is an active alarm in the module. ▲

Note  This symbol denotes there is an active maintenance alarm or condition in the module. ▲

Home Screen>Settings>Health Check




The Health Check screen contains the following information:

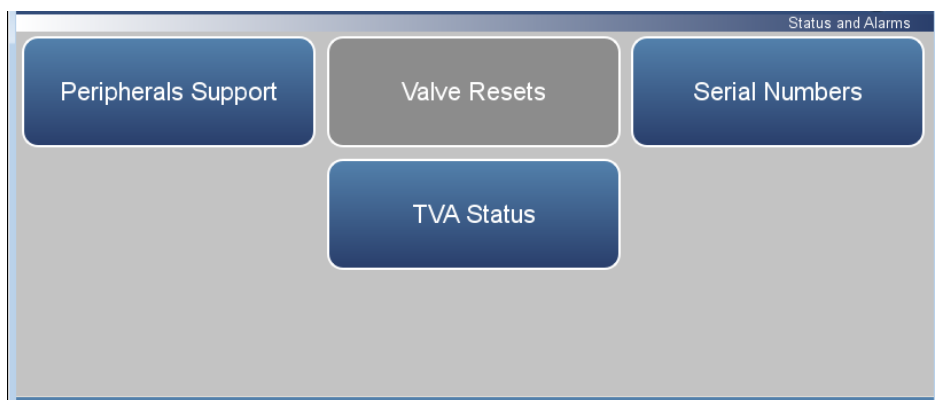
- *Status and Alarms*: Allows the user to view the status and alarm menus. Menus are broken down according to modules where the user can view instrument readings, setpoints and alarms.
- *Predictive Diagnostics*: This feature is not implemented yet.
- *Maintenance History*: This feature is not implemented yet.
- *File Sharing and Support*: File sharing via email. Support through Thermo Fisher Scientific technical support.
- *iQ360*: The iQ360 feature is a paid subscription enabling or disabling the instrument to send automated emails to technical support when an alarm or alert is triggered.
- *Firmware Version*: Shows the instrument's firmware version.

Status and Alarms

The Status and Alarms screen provides information with respect to module alarms. In each screen, instrument readings, setpoints, and low/high alarm values are displayed.

Note  This symbol denotes there is an active alarm in the module. ▲

Home Screen>Settings>Health Check>Status and Alarms



The Status and Alarms screen contains the following information:

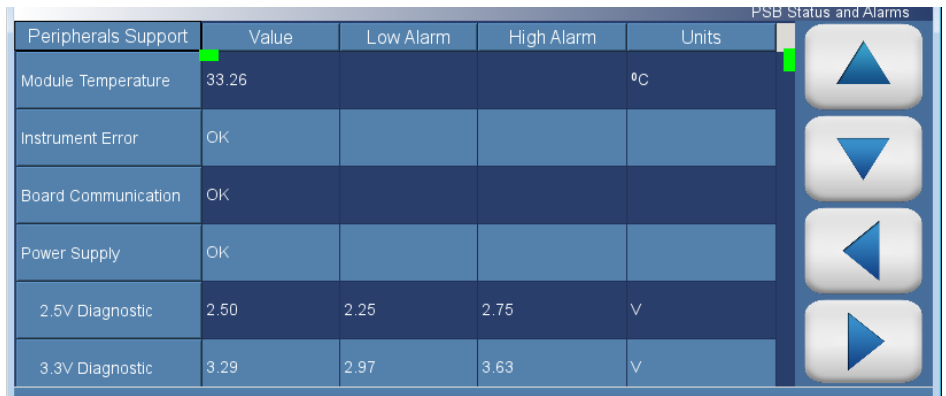
- *Peripherals Support*: Displays peripherals support alarms and faults.
- *Valve Resets*: This feature is not implemented yet.
- *Serial Numbers*: Displays all the serial numbers for the instrument.
- *TVA Status*: Displays alarms associated with connected TVA2020 instruments.

Peripherals Support

Displays the status of the three step pol boards and the valves connected to them. A loss of communication or voltage error may indicate a problem which will prevent the valves from operating correctly.

Use the ▲ and ▼ buttons to move up and down and the ◀ and ▶ buttons to move left and right.

Home Screen>Settings>Health Check>Status and Alarms>Peripherals Support



The screenshot shows a table titled "PSB Status and Alarms" with the following data:

Peripherals Support	Value	Low Alarm	High Alarm	Units
Module Temperature	33.26			°C
Instrument Error	OK			
Board Communication	OK			
Power Supply	OK			
2.5V Diagnostic	2.50	2.25	2.75	V
3.3V Diagnostic	3.29	2.97	3.63	V

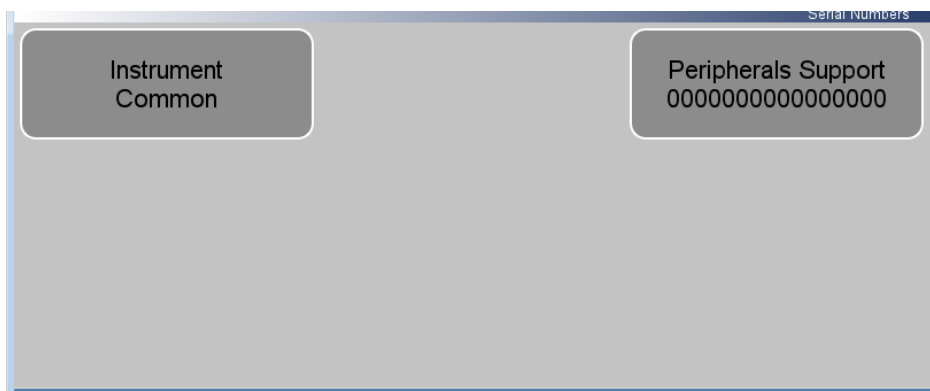
The Peripherals Support screen contains the following information:

- Across:
 - *Peripherals Support*: This column lists items associated with the peripherals support module.
 - *Value*: Displays the current value for each item.
 - *Low Alarm*: Displays low alarm status for each item.
 - *High Alarm*: Displays high alarm status for each item.
 - *Units*: Displays units for each item.
- Down:
 - *Module Temperature*: Displays the current module temperature of the module.
 - *Instrument Error*: Displays OK/Fail for PCP, datalogging, streaming, serial server, and Modbus protocols.
 - *Board Communication*: Displays OK/Fail for board communication status.

- *Power Supply*: Displays OK/Fail of power supplies. Power supply goes red if any voltages are outside their limits. No voltage rows ever get highlighted.
 - *2.5V Diagnostic*: Displays current voltage readings. Alarm limits are not changeable.
 - *3.3V Diagnostic*: Displays current voltage readings. Alarm limits are not changeable.
 - *5.0V Diagnostic*: Displays current voltage readings. Alarm limits are not changeable.
 - *24V Diagnostic*: Displays current voltage readings. Alarm limits are not changeable.
- *5.0V Step Board 1*: Displays current voltage readings. Alarm limits are not changeable.
- *24V Step Board 1*: Displays current voltage readings. Alarm limits are not changeable.
- *5.0V Step Board 2*: Displays current voltage readings. Alarm limits are not changeable.
- *24V Step Board 2*: Displays current voltage readings. Alarm limits are not changeable.
- *5.0V Step Board 3*: Displays current voltage readings. Alarm limits are not changeable.
- *24V Step Board 3*: Displays current voltage readings. Alarm limits are not changeable.

Serial Numbers The Serial Numbers screen displays the serial number of modules installed in the instrument. (Not currently active in the MIC-6.)

Home Screen>Settings>Health Check>Status and Alarms>Serial Numbers



The Serial Numbers screen contains the following information:

- *Instrument:* Instrument serial number.
- *Peripherals Support:* Peripherals support serial number.

TVA Status The TVA Status screen displays any alarms that are active in the TVA instruments currently connected to the MIC-6.

Home Screen>Settings>Health Check>Status and Alarms>TVA Status

TVA	Errors		TVA Status
1	no error	no error	▲
2	no error	no error	▼
3	no error	no error	◀
4	no error	no error	▶
5	no error	no error	
6	no error	no error	

File Sharing and Support

The File Sharing and Support screen allows the user to send health check report files to Thermo Fisher Scientific technical support or user emails. The Health Report file includes: Status and Alarms, PM Alerts, Activity Log, Service Database, Cal History, and Data Log (last 24 hours).

Note To create email list, go to Settings>User Contact Information. To configure email, go to Settings>Communications>Email Server (SMTP). ▲

Home Screen>Settings>Health Check>File Sharing and Support

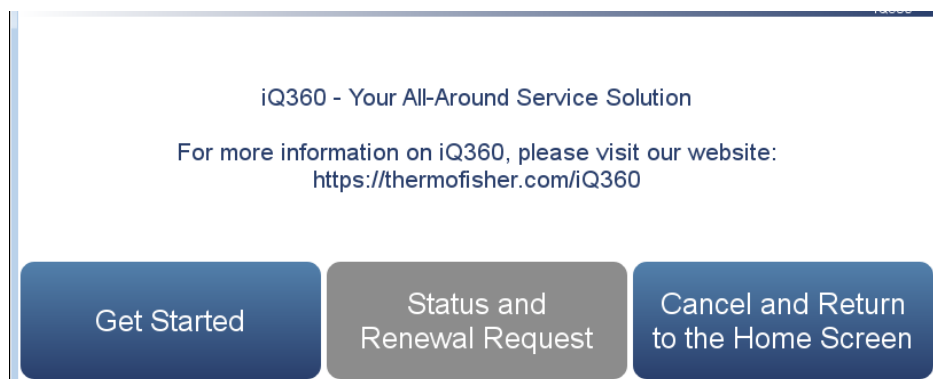


The File Sharing and Support screen contains the following information:

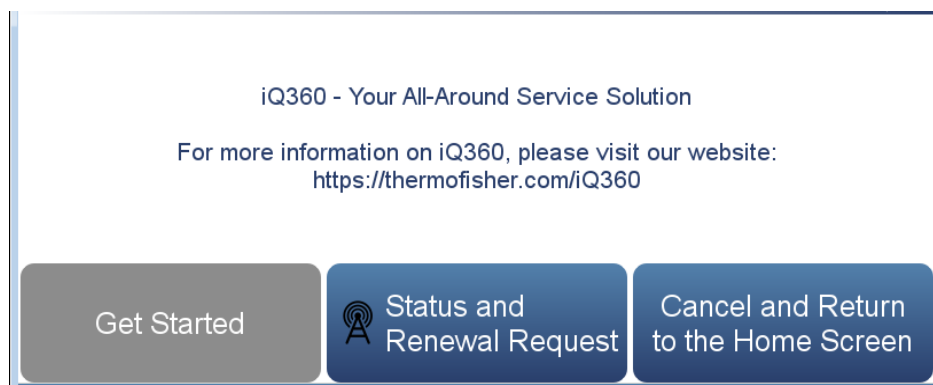
- *Download Health Check Report to USB Drive:* Sends the health report to USB drive.
- *Email Health Check Report File to Technical Support:* Sends the health report file to technical support and the customer email addresses via email.
- *Email Health Check Report to User Email Accounts:* Sends the health report file to a personal account via email.
- *3rd Party Services:* The 3rd party services feature is a paid subscription, which allows a service provider to enable or disable automated email notifications when an alarm or alert is triggered.

iQ360 The iQ360 is a paid subscription enabling or disabling the instrument to send automated emails to technical support when an alarm or alert is triggered.

Home Screen>Settings>Health Check>iQ360 (Get Started)



Home Screen>Settings>Health Check>iQ360 (Status and Renewal Request)

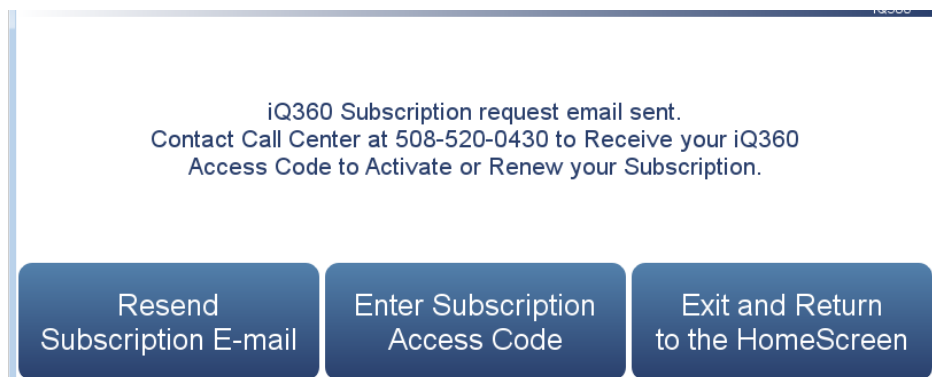


The iQ360 screen contains the following information:

- *Get Started*: Allows the user to access the menu where the subscription passcode is entered.
- *Status and Renewal Request*: Allows the user to access the iQ360 menu once the subscription has been enabled.
- *Cancel and Return to the Home Screen*: Exits screen and returns to the Home Screen.

Get Started The Get Started screen allows the user to access the menu where the subscription passcode is entered.

Home Screen>Settings>Health Check>iQ360>Get Started



The Get Started screen contains the following information:

- *Resend Subscription E-mail:* Allows the user to request another subscription passcode if the email was never received.
- *Enter Subscription Access Code:* Allows the user to enter the subscription passcode to enable an iQ360 subscription.
- *Exit and Return to the Home Screen:* Exits screen and returns to the Home Screen.

Status and Renewal Request

The Status and Renewal Request screen allows the user to access the iQ360 menu once the subscription has been enabled.

Home Screen>Settings>Health Check>iQ360>Status and Renewal Request



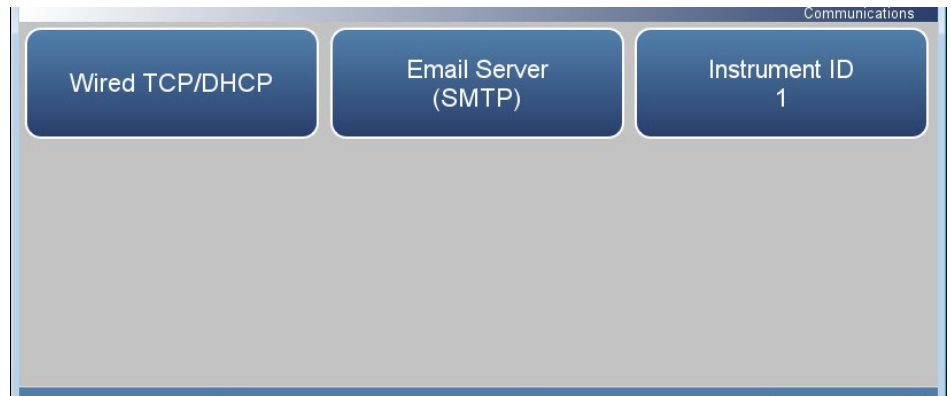
The Status and Renewal Request screen contains the following information:

- *iQ360 Status*: Informs the user if the subscription is enabled.
- *iQ360 Subscription Expiration Date*: Informs the user when the subscription will expire.
- *iQ360 Test Connection*: Allows the user to verify the network connection is working.
- *iQ360 Subscription Renewal*: Allows the user to request a subscription renewal via email.

Communications

The Communications screen allows the user to set TCP/DHCP parameters, Email Server, and Instrument ID. Buttons are grayed out if not selected in Settings>**Configuration**.

Home Screen>Settings>Communications



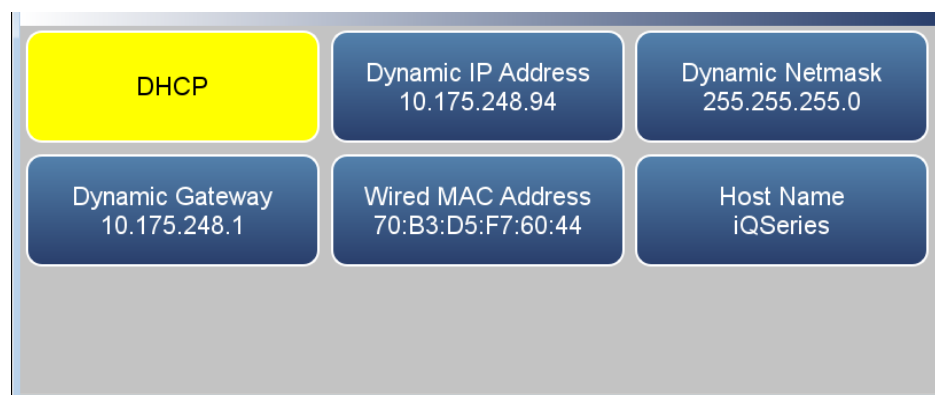
The Communications screen contains the following information:

- *Wired TCP/DHCP*: Settings for communicating with the instrument through wired Ethernet.
- *Email Server (SMTP)*: Settings for communication with email.
- *Instrument ID*: Allows the user to edit the instrument identification number (ID). The ID is used to identify the instrument when using protocols to control the instrument or collect data. It may be necessary to edit the ID number if two or more of instruments of the same model are connected to one computer. Valid instrument ID numbers are from 0 to 127. The MIC-6 has a default instrument ID of 1.

Wired TCP/DHCP The Wired TCP/DHCP screen allows the user to communicate with the instrument via wired TCP/IP settings.

Note When DHCP is enabled, the dynamic IP address is used. When DHCP is disabled, the static IP address is used. ▲

Home Screen>Settings>Communications>Wired TCP/DHCP (with DHCP enabled)



Home Screen>Settings>Communications>Wired TCP/DHCP (with DHCP disabled)



The Wired TCP/DHCP screen contains the following information:

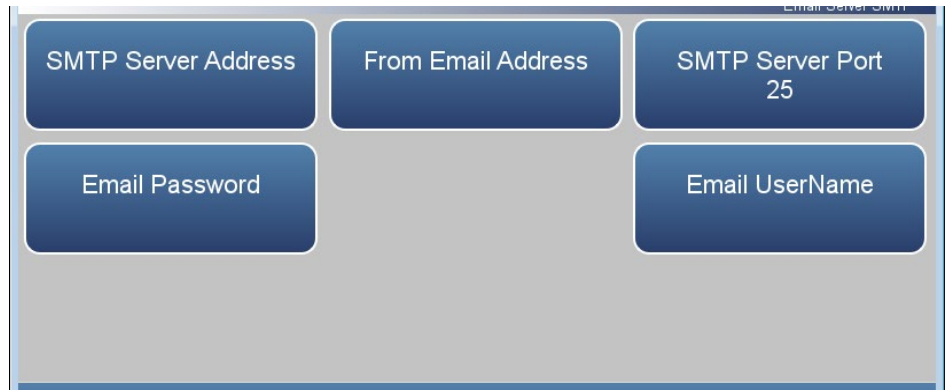
- *DHCP*: Toggles DHCP enabled/disabled.
- *Dynamic IP Address*: Dynamic IP address of the instrument.
- *Dynamic Netmask*: Dynamic Netmask of instrument.
- *Dynamic Gateway*: Dynamic Gateway of instrument.

Operation
Settings

- *Static IP Address*: Static IP address of the instrument. This is settable when DHCP is disabled.
- *Static Netmask*: Static Netmask of instrument. This is settable when DHCP is disabled.
- *Static Gateway*: Static Gateway of instrument. This is settable when DHCP is disabled.
- *DNS Server Address*: DNS IP address of instrument. This is settable when DHCP is disabled.
- *Wired MAC Address*: Instrument MAC address.
- *Host Name*: Host name of instrument.

Email Server (SMTP) The Email Server (SMTP) screen allows the user to configure their email preferences.

Home Screen>Settings>Communications>Email Server (SMTP)



The Email Server (SMTP) screen contains the following information:

- *SMTP Server Address:* Address of the user's email server.
- *From Email Address:* The email address that goes in the From field in emails.
- *SMTP Server Port:* Server port of user's email server.
- *Email Password:* Password for SMTP server.
- *Email UserName:* User name that is authorized to send email through SMTP server.

Security Access Levels

The Access Levels screen allows the user to set the instrument to either View Only or Full Access. When in Full Access, the user will have access to all screens. When set to View Only, user will not be able to change any values.

Home Screen>Settings>Security Access Levels (Full Access)



Home Screen>Settings>Security Access Levels (View Only Access)



The Security Access Levels screen contains the following information:

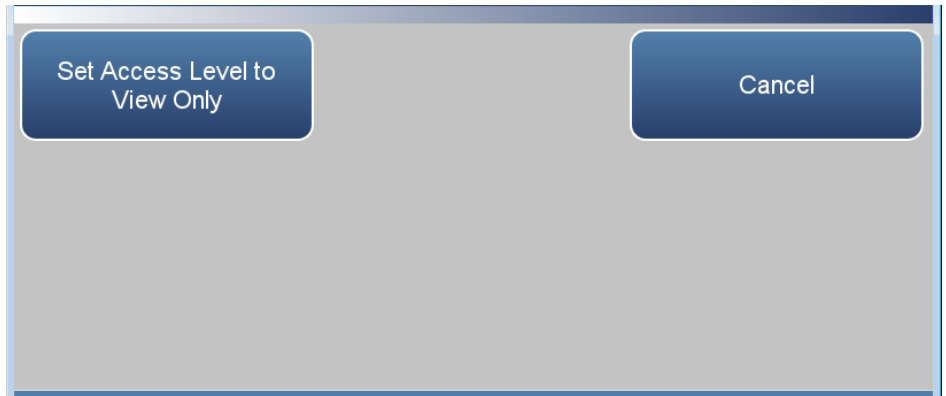
- *Current Security Access Full Access*: Read only. User will be able to change all values. Password is needed for full access.
- *Current Security Access View Only*: Read only. User won't be able to change any values. Password is not needed for view only.
- *Change Security Access to View Only*: User can switch to view only mode. Password not needed to change settings to view only access.
- *Change Security Access to Full Access*: User can switch to full access mode. Password is needed to change settings to full access.

- *Change Full Access Security Password:* Full access password can have a blank value or user selected password.
- *Change Instrument Password:* User can change instrument password.
- *Reset Instrument Password:* User can reset the instrument password.

Change Security to View Only Access

The Change Security to View Only Access screen allows the user to set the instrument to view only.

Home Screen>Settings>Security Access Levels>Change Security Access to View Only Access



The Change Security to View Only Access screen contains the following information:

- *Set Access Level to View Only*: Programs the instrument to be in the view only access level, where the user won't be able to change any values.
- *Cancel*: Exit screen.

Note To change security access from view only access to full access, a keypad will be displayed where the user can enter full access password. ▲

Change Full Access Security Password

The Change Full Access Security Password screen allows the user to set a new password for allowing full access.

Home Screen>Settings>Security Access Levels>Change Full Access Security Password

To Change the Security Access Password perform the following steps using the graphical user interface only (do not use an external USB keyboard):

1. Enter the Current Security Access Password
2. Enter the New Security Access Password
3. Confirm the New Security Access Password
4. Commit the New Security Access Password Change

Note: To clear the Full Access Password, follow the steps above using blank values for the New Password.

Continue Cancel and Return to the Home Screen

Home Screen>Settings>Security Access Levels>Change Full Access Security Password>Continue

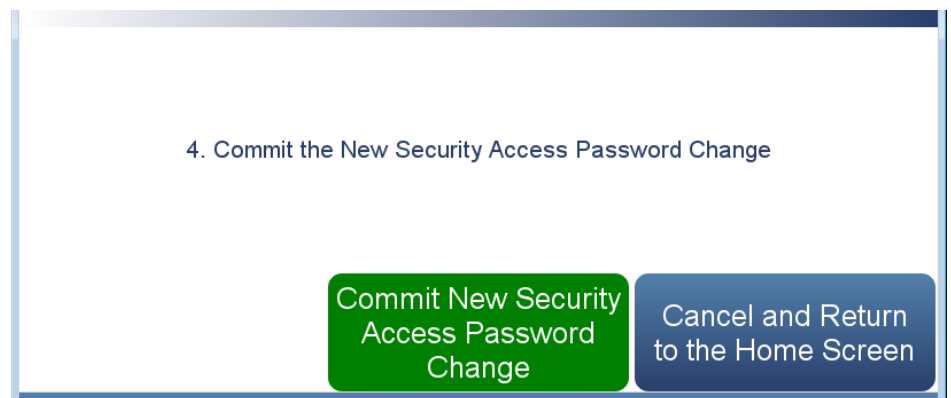
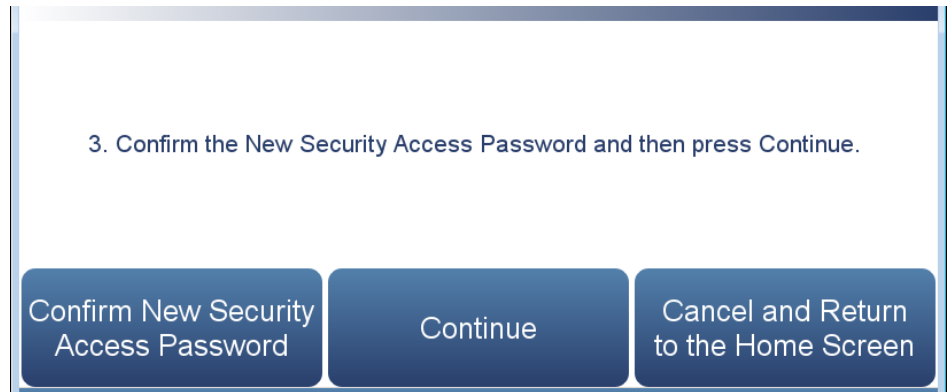
Security Access Levels

1. Enter the Current Security Access Password and then press Continue.
If there is no Current Full Access Password then press Continue.

Enter Current Security Access Password Continue Cancel and Return to the Home Screen

2. Enter the New Security Access Password and then press Continue.

Set New Security Access Password Continue Cancel and Return to the Home Screen



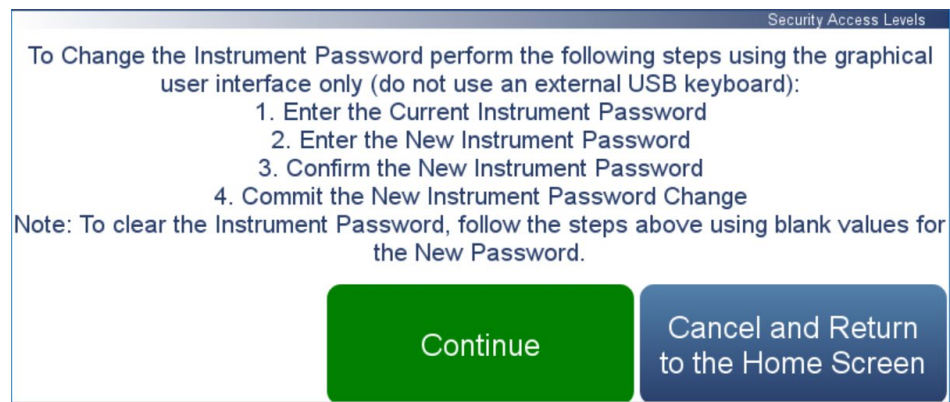
The Change Full Access Security Password screens contain the following information:

- *Enter Current Security Access Password:* User enters current security access password.
- *Continue:* Proceeds to next screen.
- *Enter New Security Access Password:* User enters new security password.
- *Confirm New Security Access Password:* User confirms new security password for spelling confirmation.
- *Commit New Security Access Password Change:* Commits new security password.
- *Cancel and Return to the Home Screen:* Exits screen and returns to the Home Screen without changing password.

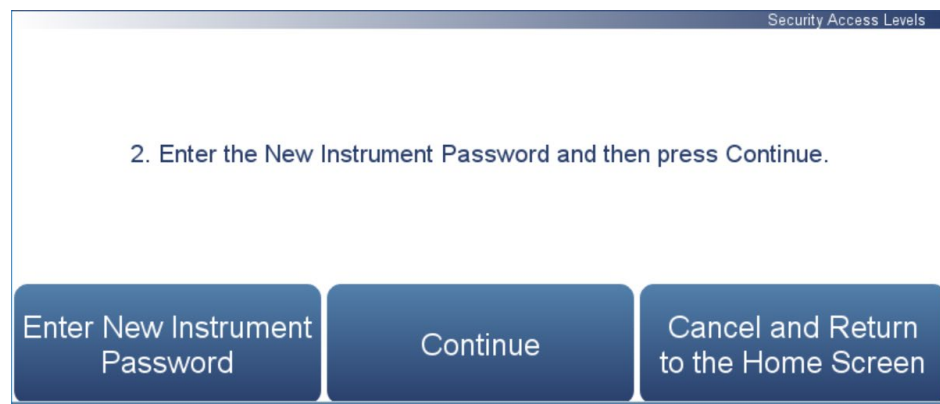
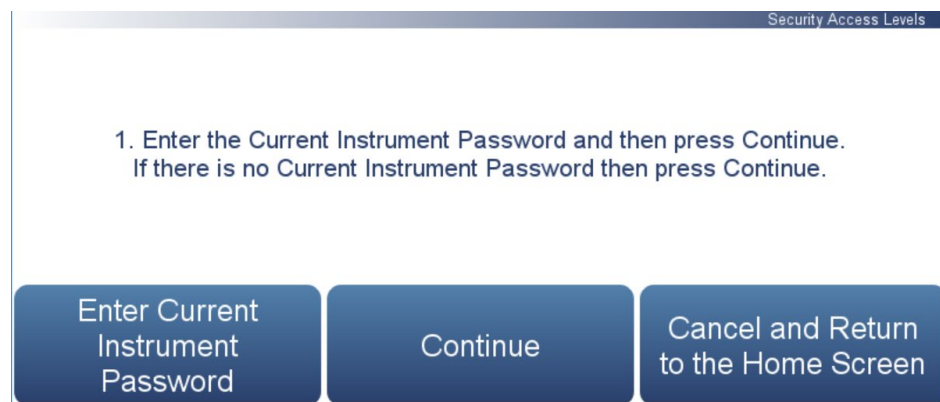
Change Instrument Password

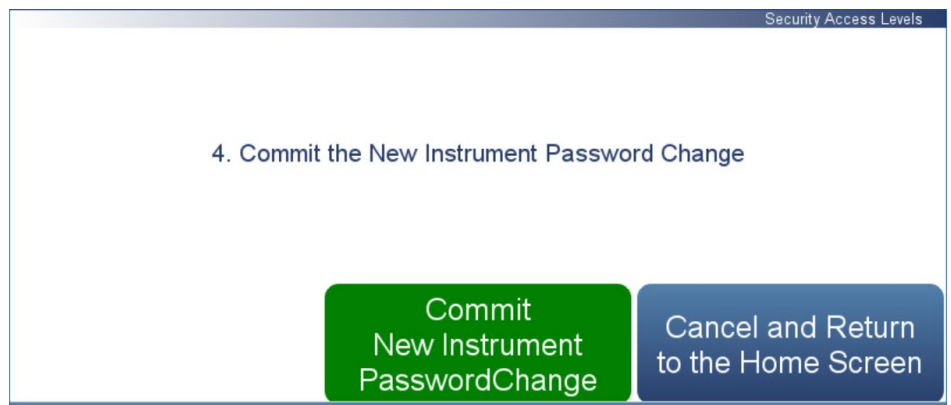
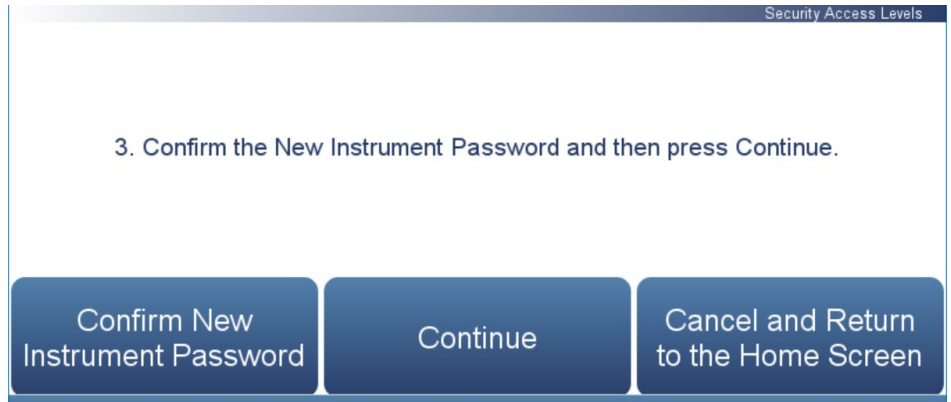
The Change Instrument Password screen allows the user to change the instrument password.

Home Screen>Settings>Security Access Levels>Change Instrument Password



Home Screen>Settings>Security Access Levels>Change Instrument Password>Continue





The Change Instrument Password screen contains the following information:

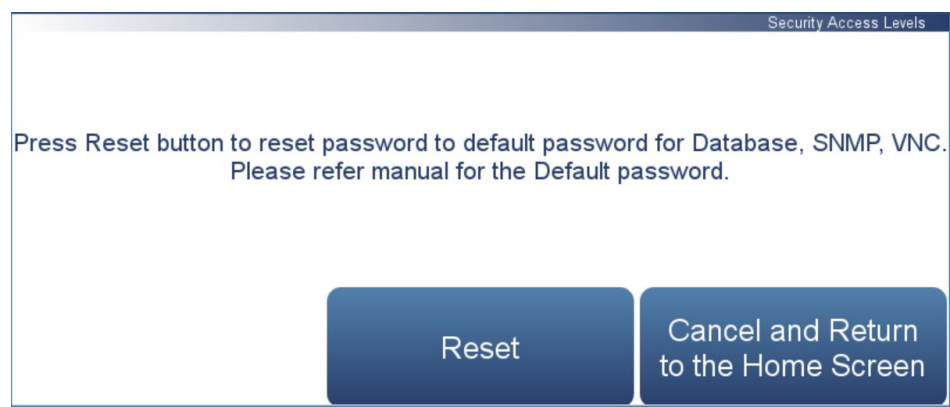
- *Enter Current Instrument Password:* User enters current instrument password.
- *Continue:* Proceeds to next screen.
- *Enter New Instrument Password:* User enters new instrument password.
- *Confirm New Instrument Password:* User confirms new instrument password for spelling confirmation.
- *Commit New Instrument Password Change:* Commits new instrument password.
- *Cancel and Return to the Home Screen:* Exits screen and returns to the Home Screen without changing password.

Reset Instrument Password

The Reset Instrument Password screen allows the user to reset the instrument password for Database, SNMP, and VNC.

The default instrument password format is an alternating combination of instrument serial number and installed firmware build number. For example if your instrument serial number is 123456789 and the instrument firmware version is 1.6.8.ABCDE where the last five digits are the build number, then the default instrument password number will be 1A2B3C4D5E6789.

Home Screen>Settings>Security Access Levels>Reset Instrument Password



The Reset Instrument Password screen contains the following information:

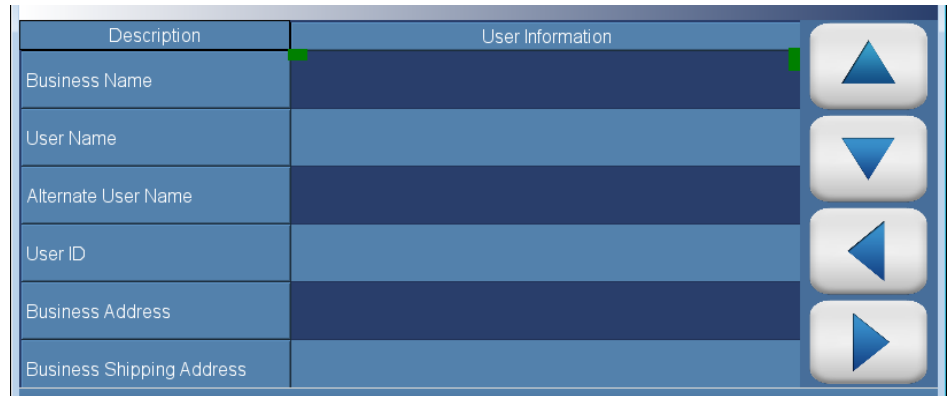
- *Reset*: Allows the user to reset the instrument password.
- *Cancel and Return to the Home Screen*: Exits screen and returns to the Home Screen without changing password.

User Contact Information

The User Contact Information screen allows the user to enter their contact information. This is useful when contacting technical support through emails found at the screen Health Check>File Sharing and Support.

Home Screen>Settings>More>User Contact Information

Description	User Information
Business Name	
User Name	
Alternate User Name	
User ID	
Business Address	
Business Shipping Address	



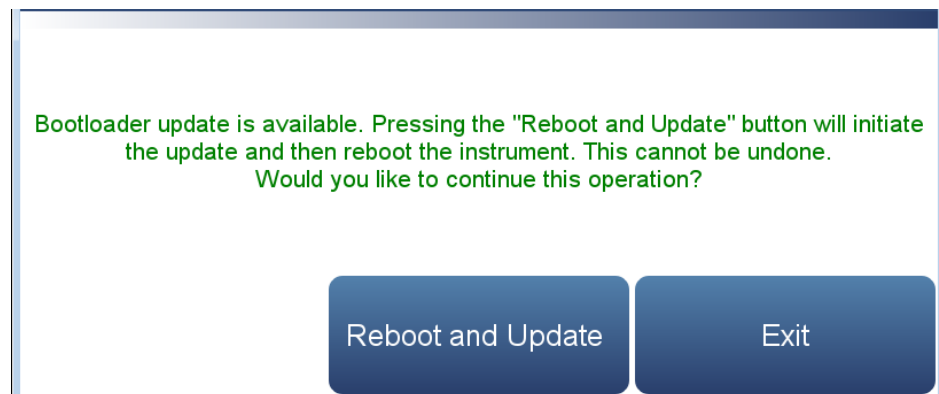
The User Contact Information screen contains the following information:

- Business Name
- User Name
- Alternate User Name
- User ID
- Business Address
- Business Shipping Address
- To: User Email Address
- CC: User Email Address 1–10
- User Phone Number
- Alternate User Phone Number
- Shelter / Lab Phone Number

Update Bootloader

The Update Bootloader screen allows the user to update bootloader and reboot the instrument. The bootloader is a small program that interfaces with our hardware and runs our operating system on power-up. The bootloader may change to optimize hardware settings or if there are changes to the hardware. If the button is blue, an update to the bootloader is available. If button is greyed out, no update is needed.

Home Screen>Settings>More>Update Bootloader



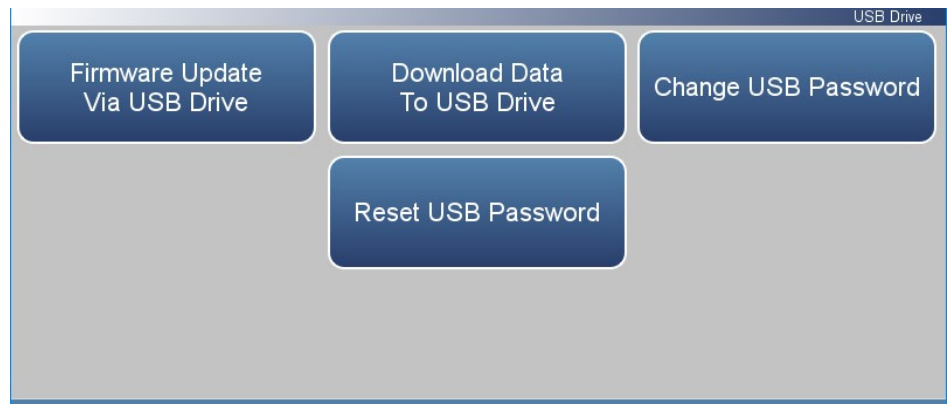
The Update Bootloader screen contains the following information:

- *Reboot and Update:* Update bootloader and reboot instrument.
- *Exit:* Exits screen.

USB Drive The USB Drive screen allows the user to update firmware, download/upload information, and change the USB password.

Note The USB drive screen only is useable when a USB drive is inserted into the USB port. When a USB drive is inserted, the user is prompted to enter the password if a password has been set. ▲

Home Screen>Settings>More>USB Drive



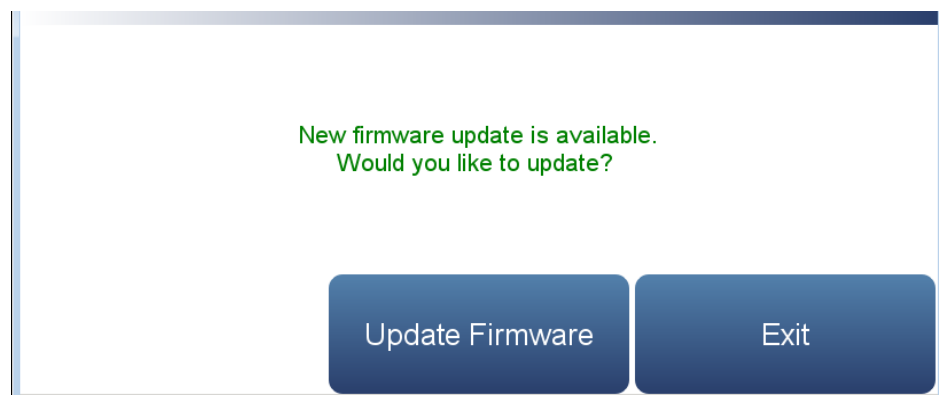
The USB Drive screen contains the following information:

- *Firmware Update Via USB Drive:* If USB is mounted, user can update instrument firmware.
- *Download Data To USB Drive:* User can download/upload information.
- *Change USB Password:* User can change the USB password.
- *Reset USB Password:* User can reset the USB password.

Firmware Update Via USB Drive

The Firmware Update Via USB Drive screen allows the user to update instrument firmware from the USB drive.

Home Screen>Settings>More>USB Drive>Firmware Update Via USB Drive



The Firmware Update Via USB Drive screen contains the following information:

- *Update Firmware:* User chooses firmware file from USB and updates instrument firmware. Instrument reboots when update is finished.
- *Exit:* User exits without updating firmware.

Use the following procedure to update firmware using the USB connection.

1. Copy the update*.zip file onto the USB FLASH drive using Windows Explorer or another means. The file must be copied into the root directory of the USB stick's file system otherwise it won't be recognized. Also, make sure the USB stick is formatted using the FAT or FAT32 file system.
2. Plug a USB flash drive into the data port on the front panel of the unit or into one of the USB ports on the side near the power cable. A pop-up box will appear, acknowledging that a flash drive has been detected. If a USB password has been previously set, you will be prompted to enter the USB password to continue. Press **Enter** to continue.



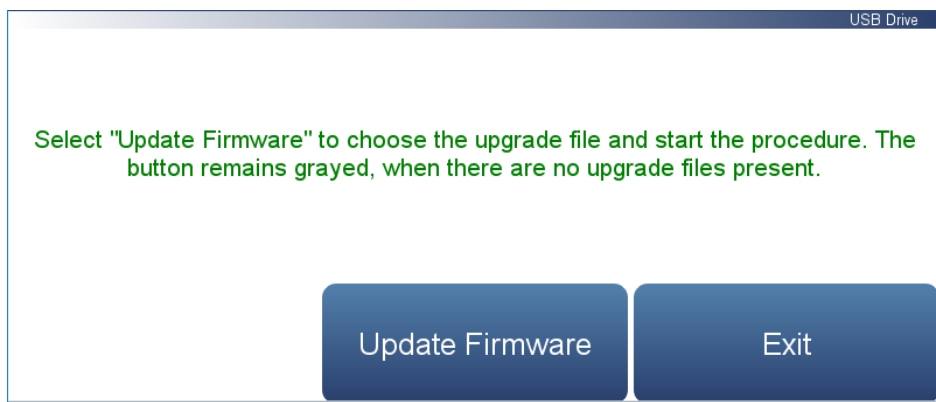
3. Press the OK button on the pop-up box to go to the Firmware Update Via USB Drive screen.



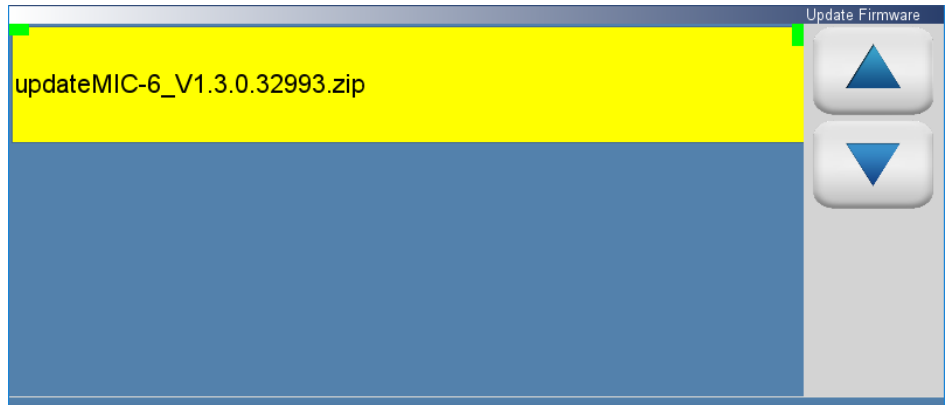
4. Press the **Firmware Update Via USB Drive** button to start the firmware update process.



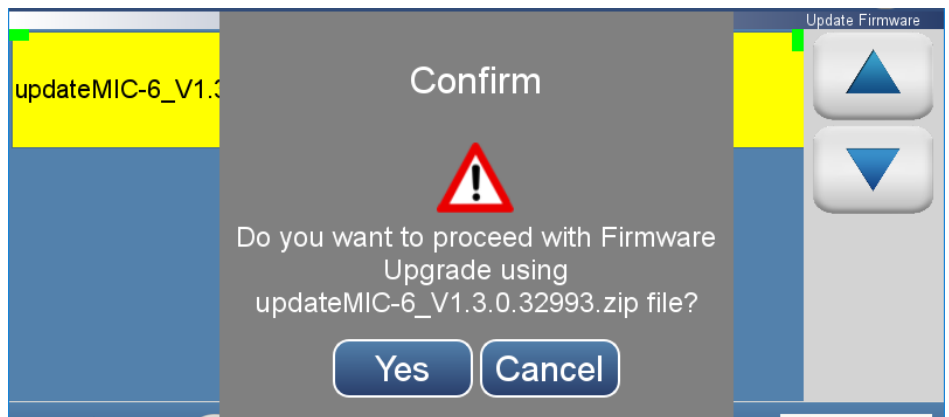
5. Press the **Update Firmware** button.



6. The on-screen instructions will prompt the user to select the firmware update file and display what it is doing at each step and some steps may take several minutes to complete.

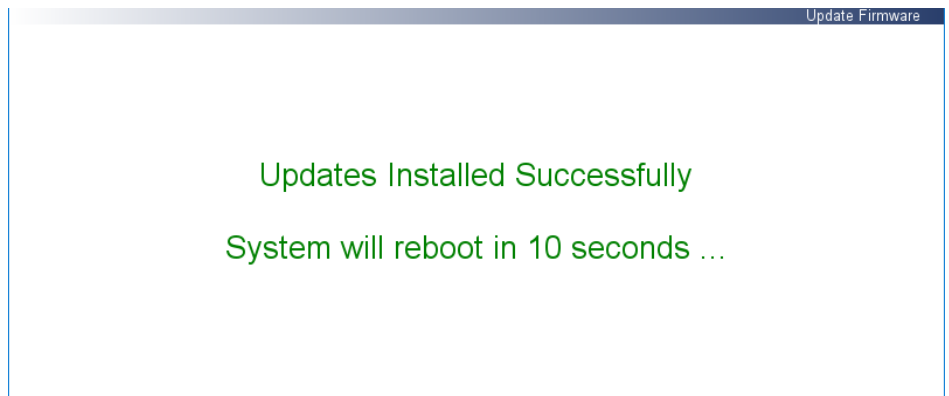


7. Press **Yes** to confirm and proceed with the firmware upgrade.



Note Do not power off the instrument while the firmware update is in progress. ▲

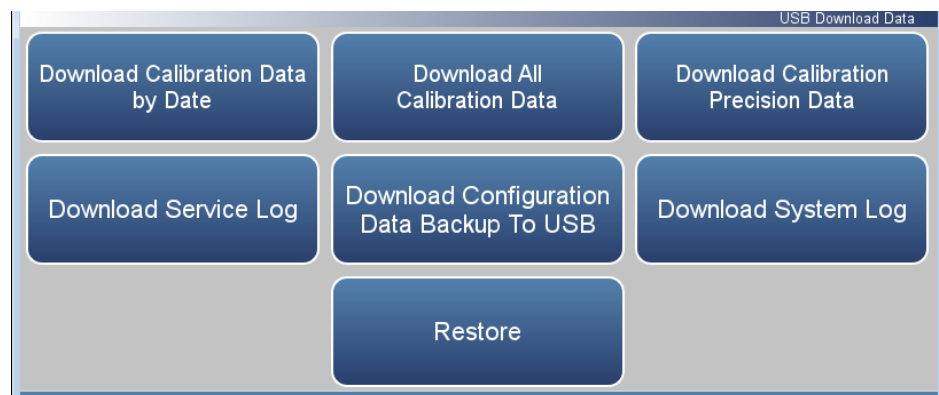
8. The instrument should reboot automatically and should have the new firmware installed. To check that the firmware was installed, go to the **Settings>Health Check** screen and view the Firmware Version button.



Download Data To USB Drive

Calibration Data and Calibration Precision Data for the preceding 6 years can be obtained from the MIC-6 via USB flash drive. The data is saved in csv format files, which are described in Appendix D, “Data File Formats”. Data files downloaded to USB will be placed into the /Thermo/ folder on the root of the flash drive, and the time and date of the file creation will be part of the file name.

Home Screen>Settings>More>USB Drive>Download Data To USB Drive



The Download Data to USB Drive screen contains the following information:

- *Download Calibration Data by Date:* Select calibration data within a range of dates.
- *Download All Calibration Data:* Downloads all calibration data.
- *Download Calibration Precision Data:* Downloads calibration precision data.
- *Download Service Log:* Downloads service log.
- *Download Configuration Data Backup To USB:* Allows the user to download the configuration file from the instrument to the USB.
- *Download System Log:* Consists of system log text files, which include a listing of system errors.
- *Restore:* Allows the user to upload the configuration files from the USB to the instrument.

Use the following procedure to download data using the USB connection.

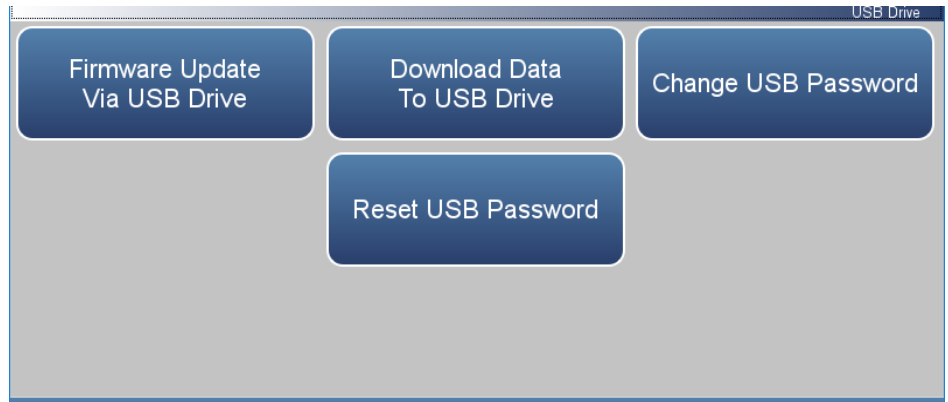
1. Plug a USB flash drive into the data port on the front panel of the unit or into one of the USB ports on the side near the power cable. A pop-up box will appear, acknowledging that a flash drive has been detected. If a USB password has been previously set, you will be prompted to enter the USB password to continue.



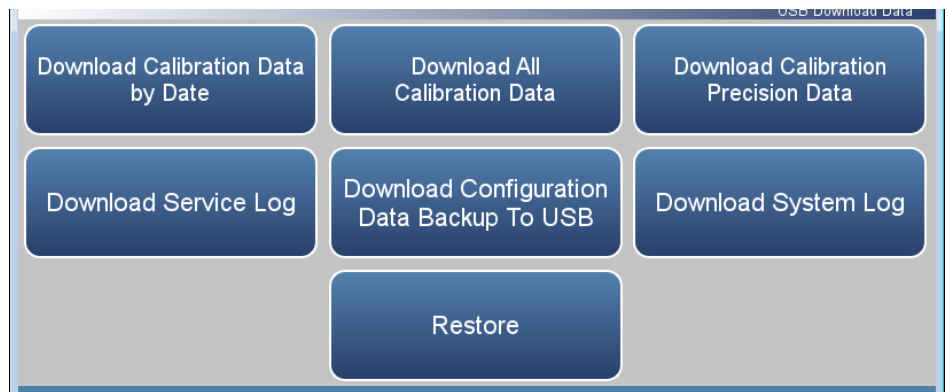
2. Press the OK button on the pop-up box to go to the USB Drive screen.



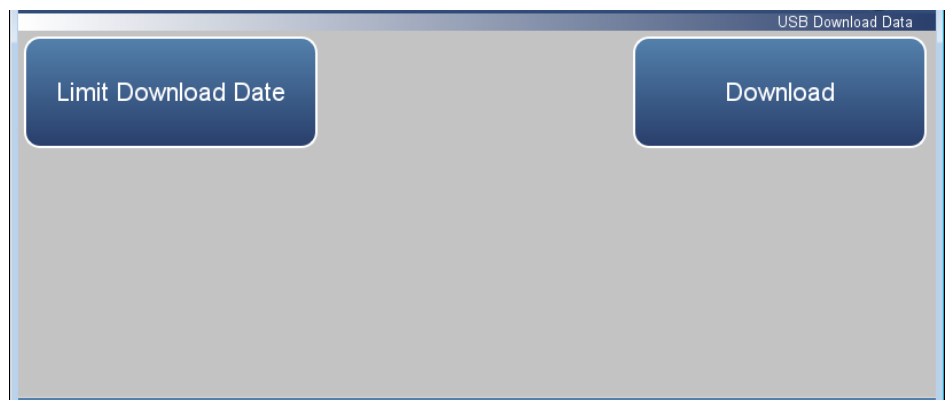
3. Press the Download Data To USB Drive button to go to the USB Download Data screen.



4. Press the Download Calibration Data button to go to the Download Calibration Data screen.



5. To download Calibration Data (file name will start with "CalibrationData_" and then the date/time):
 - a. Press the Download Calibration Data by Date button:

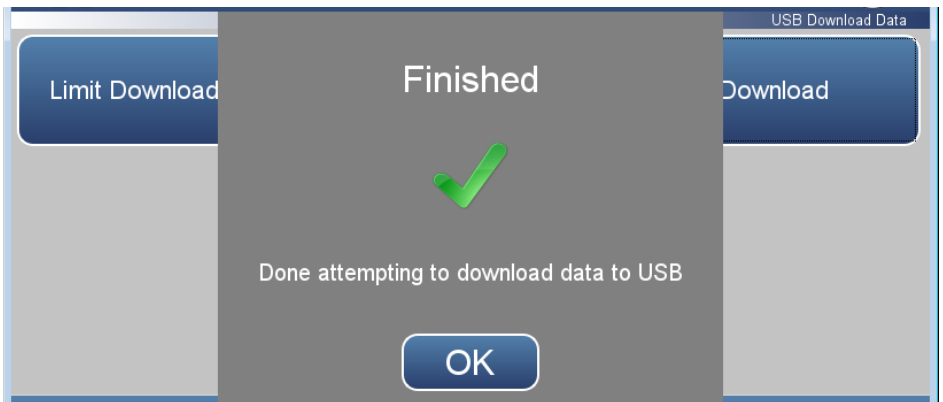


- i. Press the Limit Download Date button and enter the beginning and end dates for the portion of the data you wish to download.



ii. Press the Back arrow to go back to the previous screen.

iii. Press the Download button to download the data file to the USB drive. The button will turn yellow, and when the download is finished it will turn back to blue.



b. Press the Download All Calibration Data button to download all of the previous six years of data in one file. The button will turn yellow, and when the download is finished it will turn back to blue.

6. To download Calibration Precision Data (file name will start with "CalibrationPrecision_" and then the date/time):

a. Press the Download Calibration Precision Data button. The button will turn yellow, and when the download is finished it will turn back to blue.

Note Do not remove the USB drive from the instrument while the data is downloading. ▲

Change USB Password

The Change USB Password screen allows the user to set a new password for accessing USB.

Home Screen>Settings>USB Drive>Change USB Password

To Change the USB Access Password perform the following steps using the graphical user interface only (do not use an external USB keyboard):

1. Enter the Current USB Access Password
2. Enter the New USB Access Password
3. Confirm the New USB Access Password
4. Commit the USB Access Password Change

Note: To clear the USB Password, follow the steps above using blank values for the New Password.

Continue **Cancel and Return to the Home Screen**

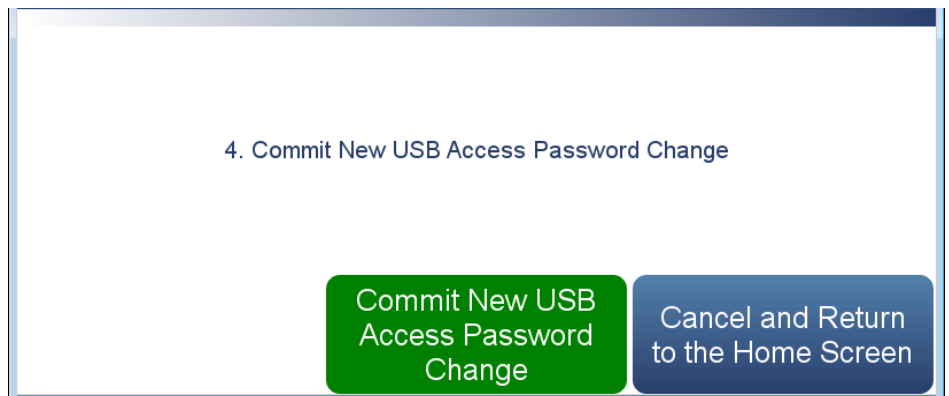
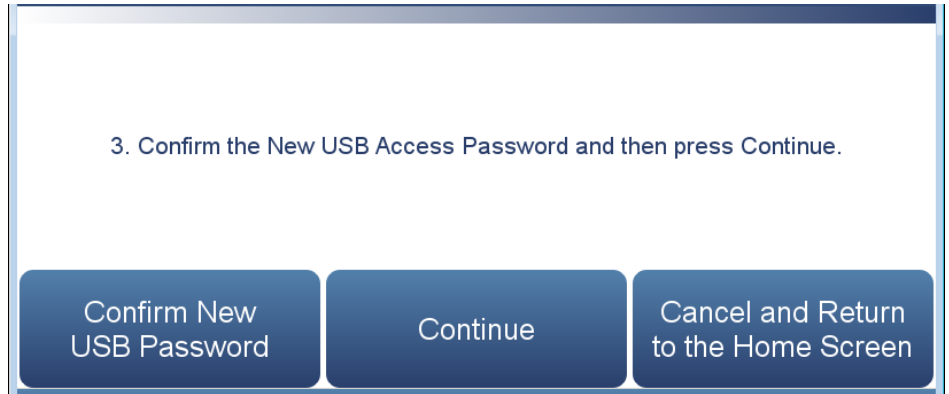
Home Screen>Settings>USB Drive>Change USB Password>Continue

1. Enter the Current USB Access Password and then press Continue.
If there is no Current USB Password then press Continue.

Enter Current USB Password **Continue** **Cancel and Return to the Home Screen**

2. Enter the New USB Access Password and then press Continue.

Enter New USB Password **Continue** **Cancel and Return to the Home Screen**



The Change USB Password screens contain the following information:

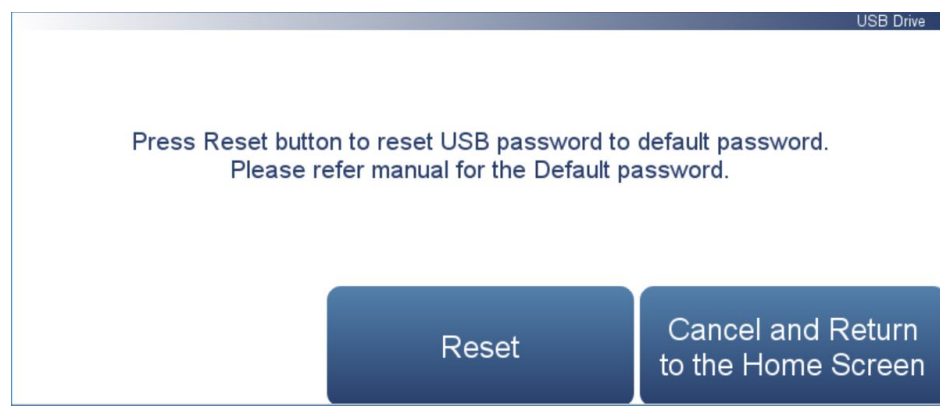
- *Enter Current USB Password:* User enters current USB access password.
- *Continue:* Proceeds to next screen.
- *Enter New USB Password:* User enters new USB access password.
- *Confirm New USB Password:* User confirms new USB access password for spelling confirmation.
- *Commit New USB Password Change:* Commits new USB access password.
- *Cancel and Return to the Home Screen:* Exits screen and returns to the Home Screen without changing password.

Reset USB Password

The Reset USB Password screen allows the user to reset the USB password.

The default USB password format is an alternating combination of instrument serial number and installed firmware build number. For example if your instrument serial number is 123456789 and the instrument firmware version is 1.6.8.ABCDE where the last five digits are the build number, then the default USB password number will be 1A2B3C4D5E6789.

Home Screen>Settings>Security Access Levels>Reset USB Password



The Reset USB Password screen contains the following information:

- *Reset*: Allows the user to reset the USB password.
- *Cancel and Return to the Home Screen*: Exits screen and returns to the Home Screen without changing password.

Chapter 4

Maintenance

This chapter describes the periodic maintenance procedures that should be performed on the instrument to ensure proper operation. Since usage and environmental conditions vary greatly, you should inspect the components frequently until an appropriate maintenance schedule is determined.

Safety Precautions



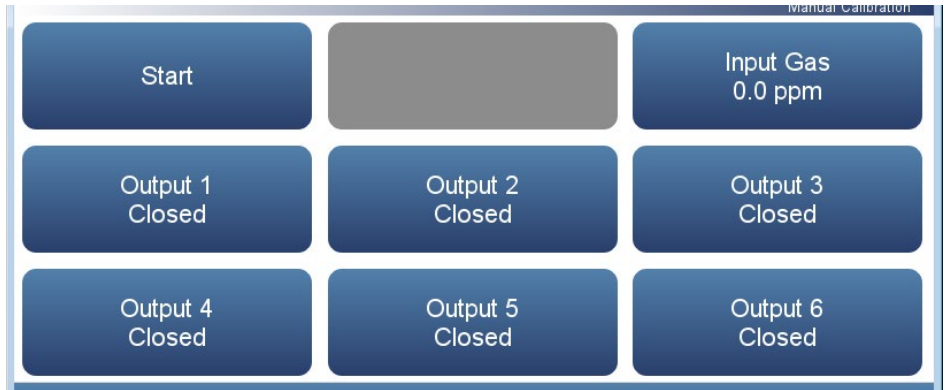
Read the safety precautions before beginning any procedures in this chapter.

Equipment Damage Some internal components can be damaged by small amounts of static electricity. A properly grounded antistatic wrist strap must be worn while handling any internal component. For more information about appropriate safety precautions, see the “Servicing” chapter. ▲

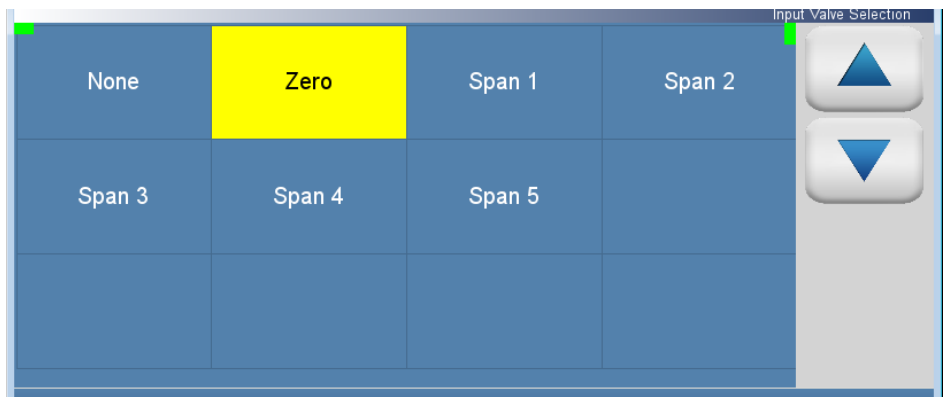
Leak Test

Use the following procedure to perform a leak test.

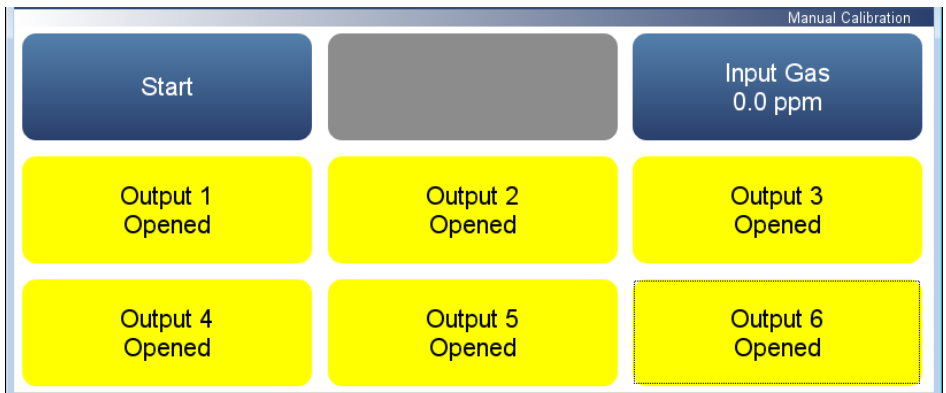
1. Plug all six of the Front panel Output fittings.
2. Connect clean pressurized Zero Air to gas port “Zero” and adjust pressure to 25.0 psi.
3. From the Instrument Front Panel Navigate to Manual Calibration:
Home>Calibration>Manual Calibration



4. Set Input Gas to “Zero”.



5. Set all six Outputs to “Opened”. Then select “Start”.



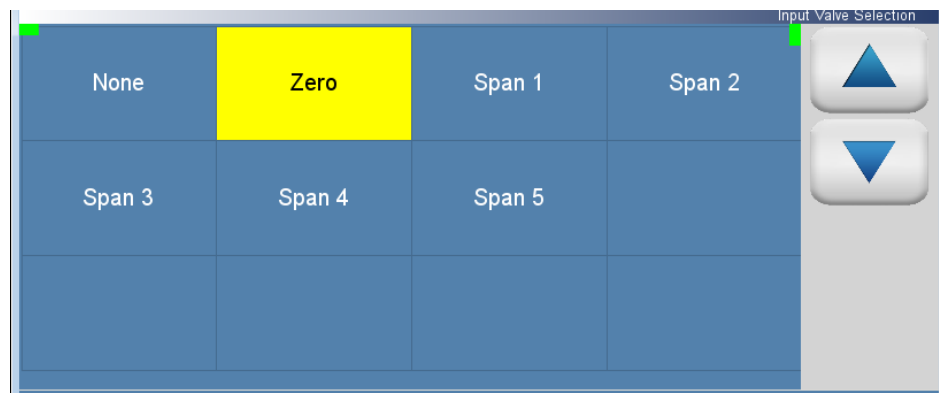
6. With an external valve isolate the Zero Air from the unit.
7. Utilizing an external pressure gauge observe gas pressure of the unit for five minutes.
8. Pressure drop should be less than 1.0 psi over 5 minutes.

- Remove plugs from all Output connections.

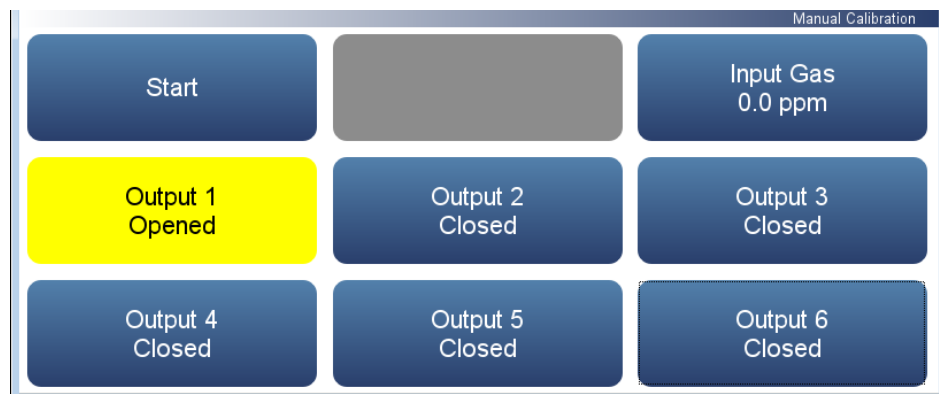
Flow Test

Use the following procedure to perform a flow test.

- Set Input Gas to “Zero”.



- From the Manual Calibration Menu: Set Output 1 to “Opened” and Outputs 2 thru 6 to “Closed”. Measure and record flow at Output 1.



- Disconnect Zero Air from “Zero” and connect to “Span 1”. From the Manual Calibration Menu: set the Gas Mode to “Span 1”, Output 2 to “Opened” and Outputs 1,3,4,5,6 to “Closed”. Measure and record flow at Output #2.
- Disconnect Zero Air from “Span 1” and connect to “Span 2”. From the Manual Calibration Menu: set the Gas Mode to “Span 2”, Output 3 to “Opened” and Outputs 1,2,4,5,6 to “Closed”. Measure and record flow at Output 3.

Maintenance

Flow Test

5. Disconnect Zero Air from “Span 2” and connect to “Span 3”. From the Manual Calibration Menu: set the Gas Mode to “Span 3”, Output 4 to “Opened” and Outputs 1,2,3,5,6 to “Closed”. Measure and record flow at Output 4.
6. Disconnect Zero Air from “Span 3” and connect to “Span 4”. From the Manual Calibration Menu: set the Gas Mode to “Span 4”, Output 5 to “Opened” and Outputs 1,2,3,4,6 to “Closed”. Measure and record flow at Output.
7. Disconnect Zero Air from “Span 4” and connect to “Span 5”. From the Manual Calibration Menu: set the Gas Mode to “Span 5”, Output 6 to “Opened” and Outputs 1,2,3,4,5 to “Closed”. Measure and record flow at Output 6.
8. All flows should be between 1.5 and 2.8 LPM.

Chapter 5

Troubleshooting

This chapter presents guidelines for diagnosing analyzer failures, isolating faults, and includes recommended actions for restoring proper operation.

Safety Precautions

Read the safety precautions in Appendix A, “[Safety](#)” before performing any actions listed in this chapter.

Troubleshooting Guide

Table 5–1 provides general troubleshooting information for the common platform and indicates the checks that you should perform if you experience an instrument problem. It also lists MIC-6 specific troubleshooting information and alarm messages you may see on the graphics display and provides recommendations about how to resolve the alarm condition.

Table 5–1. MIC-6 Troubleshooting Guide

Problem	Possible Cause	Action
Instrument does not start (LEDs on front panel do not come on and display is blank)	No power	Verify that the power cord is plugged in, power is available and that it matches the voltage and frequency configuration of the instrument.
	Fuse is blown or missing	Disconnect power and check fuses with a volt meter.
	Bad switch or wiring connection to switch	Check for 24V @ J9 on the Backplane board (middle pins). Check all wiring connections.
Front panel display does not start (LEDs on front panel are off)	Disconnected ribbon cable	Power down and evaluate connections of display ribbon cable.
Front panel display does not start (LEDs on front panel are on)	Defective Display	Connect to the instrument using ePort. Select “Remote Interface”. If normal GUI is displayed, replace defective display.
Front panel display stays white after power up (LEDs on front panel are on)	Unseated or missing Micro SD card	Power off, re-seat Micro SD or install if missing.

Problem	Possible Cause	Action
	Micro SD Card Programming	If Micro SD card was just replaced, re-install the old one. If the problem is fixed, request a replacement Micro SD card.
Solenoid current out of range (option)	Sticking or damaged solenoid	Reset solenoid via Settings>Health Check>Status and Alarms>Valve and Pump Resets screen. If damaged, replace solenoid valve block.
Alarm – 5V/24V Step Board	Cable connection	Check the cable connection to that Step POL board.
Alarm – Instrument Temperature	Fan failure	Replace fan if not operating properly.
	Dirty fan filter	Clean or replace filter.
	Overheating PCB	Locate defective PCB reporting the error and replace if needed.
Display shows “disconnected”	No instrument connected	Connect instruments.
	Instrument not in serial mode	Place instrument in serial mode.
	USB barrier box not being used	Connect barrier box between analyzer and MIC-6.
	USB not connected	Check USB connections.
Connected analyzer does not zero or span	Gas supply not connected	Connect gases to supply fittings.
	Gas supply pressure too low	Confirm gas supply pressure is set correctly.
	Analyzer probe not connected to delivery connection	Check analyzer probe is connected.
	Valves are not opening	Check gas port association is correct. Check flow rate at expected ports.
Auto calibration or drift check start button is greyed out	Gas ports not associated with connected analyzers	Confirm gas port association is correct.

Chapter 6

Servicing

This chapter describes the periodic servicing procedures that should be performed on the instrument to ensure proper operation and explains how to replace the MIC-6 subassemblies.

Safety Precautions

Read the safety precautions before beginning any procedures in this chapter.



The service procedures in this manual are restricted to qualified service representatives. ▲



If the equipment is operated in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. ▲



CAUTION If the LCD panel breaks, do not let the liquid crystal contact your skin or clothes. If the liquid crystal contacts your skin or clothes, wash immediately using soap and water. ▲

Do not remove the LCD panel or frame from the LCD module. ▲

The LCD polarizing plate is very fragile, handle it carefully. ▲

Do not wipe the LCD polarizing plate with a dry cloth, as it may easily scratch the plate. ▲

Do not use alcohol, acetone, MEK or other Ketone based or aromatic solvents to clean the LCD module, but rather use a soft cloth moistened with a naphtha cleaning solvent. ▲

Do not place the LCD module near organic solvents or corrosive gases. ▲

Do not shake or jolt the LCD module. ▲



Equipment Damage Some internal components can be damaged by small amounts of static electricity. A properly grounded antistatic wrist strap must be worn while handling any internal component. For more information about appropriate safety precautions, see “[Safety](#)”. ▲

Note If an antistatic wrist strap is not available, be sure to touch the instrument chassis before touching any internal components. When the instrument is unplugged, the chassis is not at earth ground. ▲

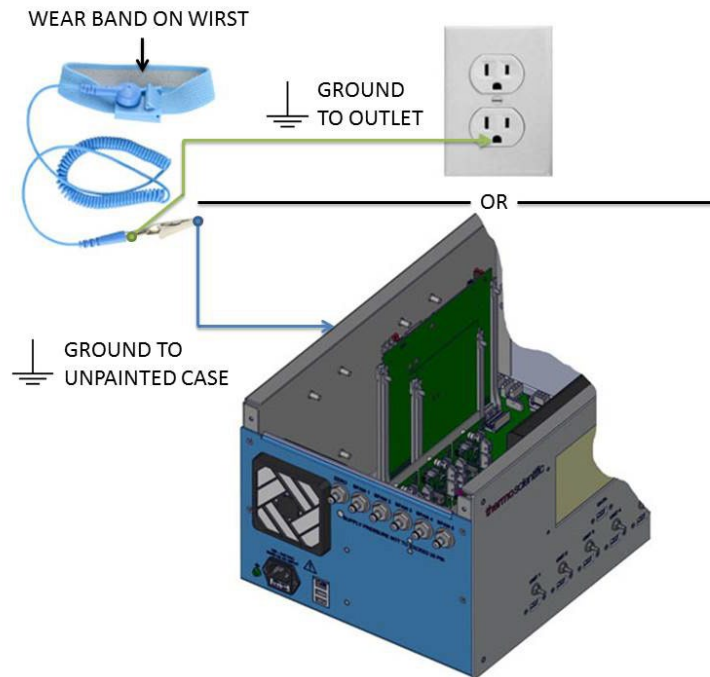


Figure 6–1. Properly Grounded Antistatic Wrist Strap

Note Ground to unpainted case or outlet as shown. ▲

Firmware Updates

New versions of the instrument software are periodically made available via a USB flash drive only.

For more information on installing new firmware, see “[Firmware Update Via USB Drive](#)” on page 3-69.

Replacement Parts List

Table 6–1 lists the replacement parts for the MIC-6 major subassemblies. Refer to [Figure 6–2](#) through [Figure 6–4](#) to identify component location.

Table 6–1. MIC-6 Replacement Parts

Part Number	Description
115360-00	Display, 24 bit
116651-00	Calibration cap barbed fitting
119416-00	Calibration cap, probe tip
22-000485-1008	O-ring, probe tip
119502-00	Feet
116752-00	Fan assembly
117004-00	Fuse, inlet
113371-90	SCB board
113844-00	PSB Board
115635-01	Power supply, 24V
119408-00	Power cord, USB
119527-00	Cable, USB, 2 ft
119505-00	USB hub, 7 port
119541-00	Fuse, 1.25A, 250V USB
119504-00	Tubing PVC (internal sold by foot)
114664-00	Step POL board
119351-01	Valve assembly, gas out
119351-00	Valve assembly, gas in
119360-16	Valve
117871-00	Fan guard
117872-00	Filter, fan (pkg of 5)

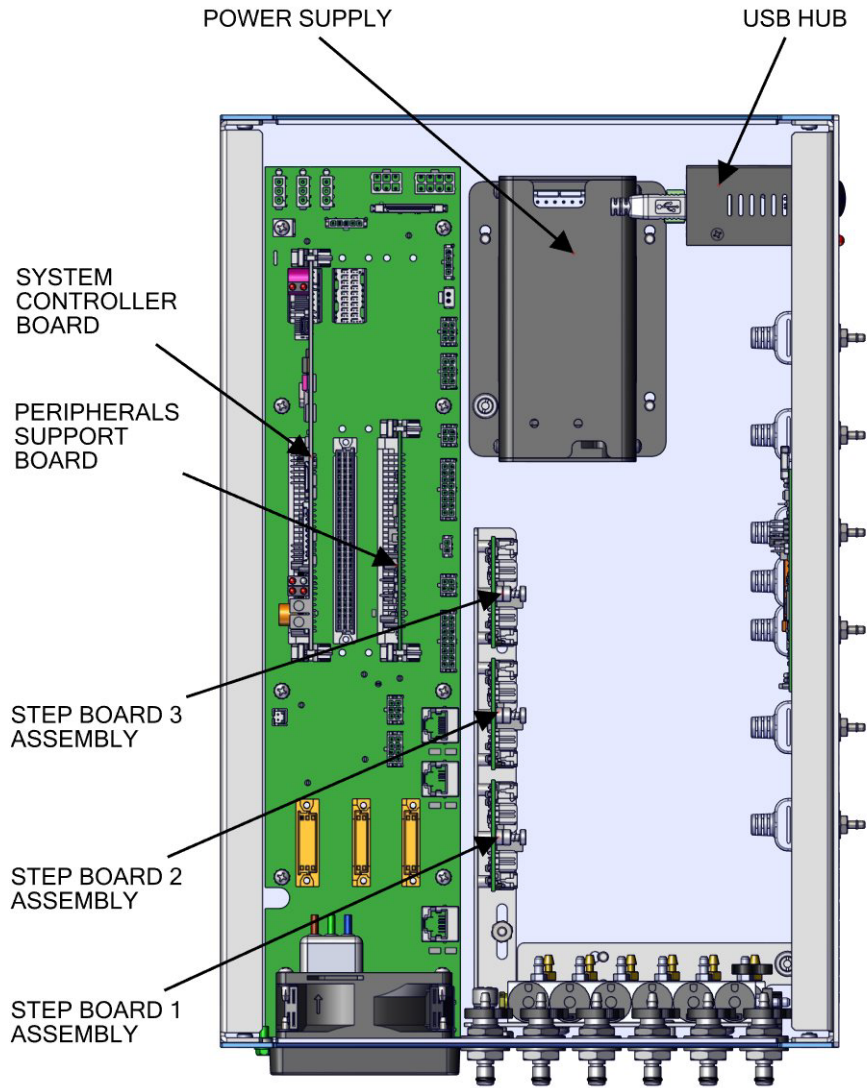


Figure 6-2. MIC-6 Component Layout Top View

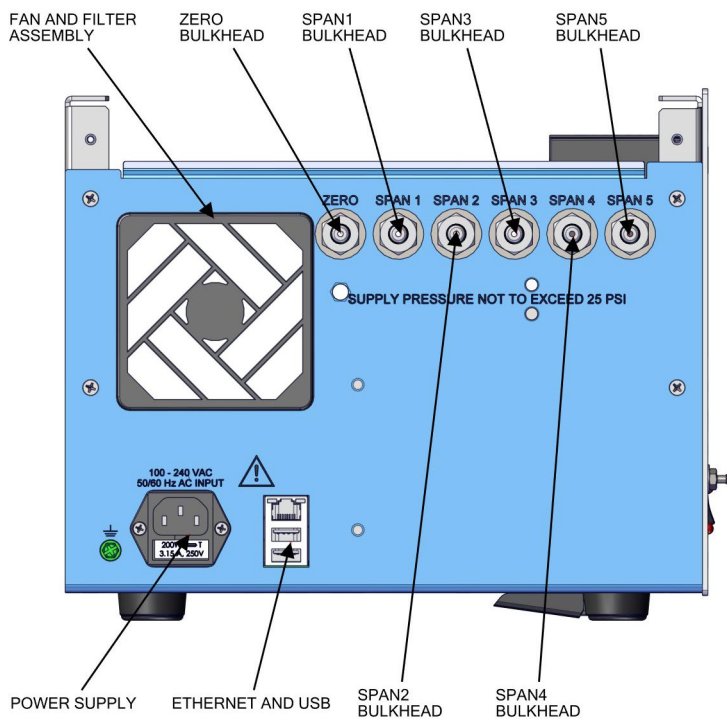


Figure 6-3. MIC-6 Component Layout Side View

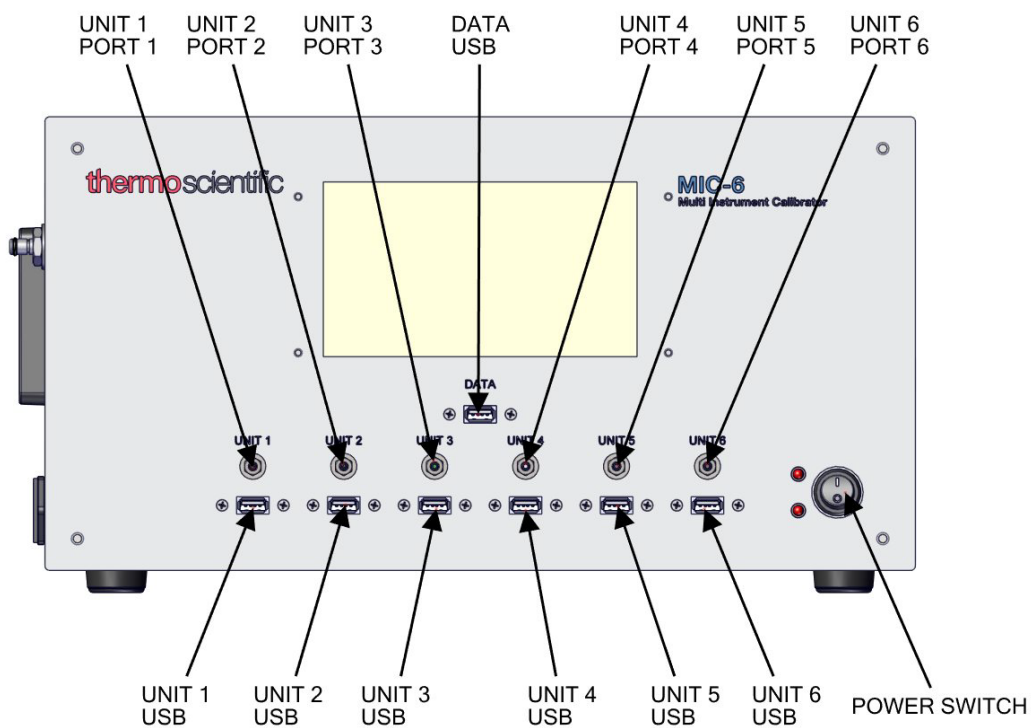


Figure 6-4. MIC-6 Component Layout Front View

Fuse Replacement

Use the following procedure to replace the fuses.

1. Turn instrument OFF and unplug the power cord.
2. Remove fuse drawer, located on the AC power connector.
3. If either fuse is blown, replace both fuses.
4. Insert fuse drawer and reconnect power cord.

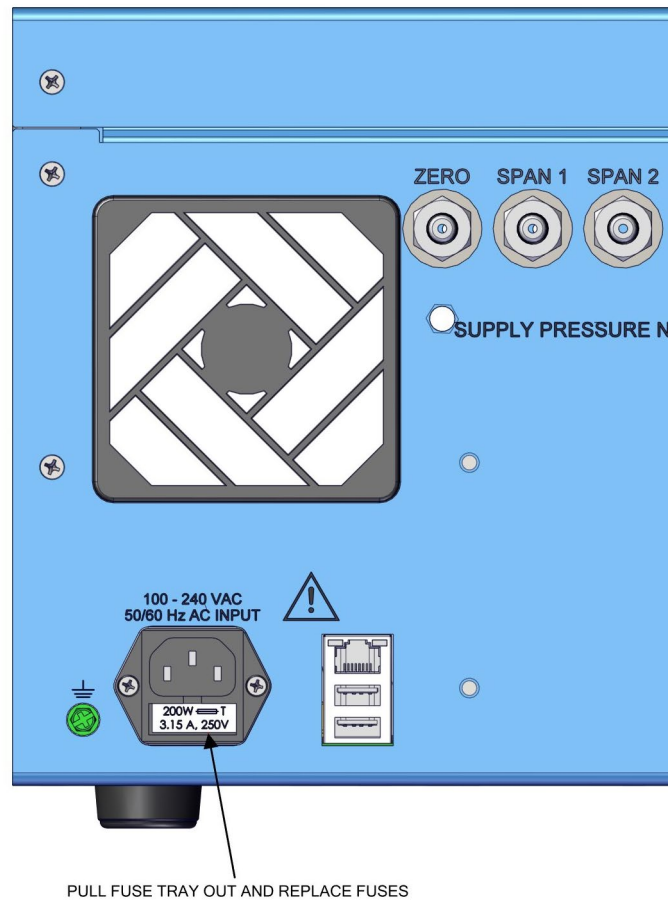


Figure 6–5. Replacing the Fuses

Filter Replacement

Use the following procedure to replace the filter.

1. Turn instrument OFF and unplug the power cord.
2. Starting with top right corner, pull out to remove fan cover.

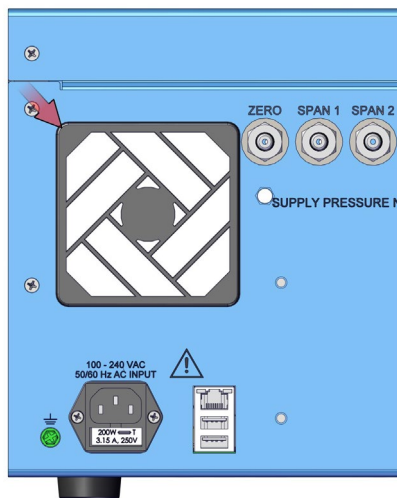


Figure 6–6. Start with Top Right Corner of Fan Cover

3. Replace filter and snap fan cover back in place.

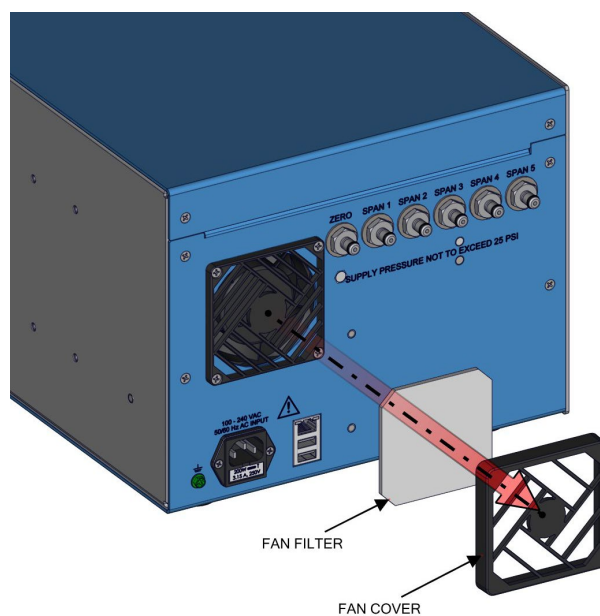


Figure 6–7. Removing the Fan Cover

Fan Replacement

Use the following procedure to replace the fan.

Equipment required:

Phillips drive, #2

1. Turn instrument OFF, unplug power cord, and remove the cover (Figure 2–1).
2. Unplug the fan cable J18.

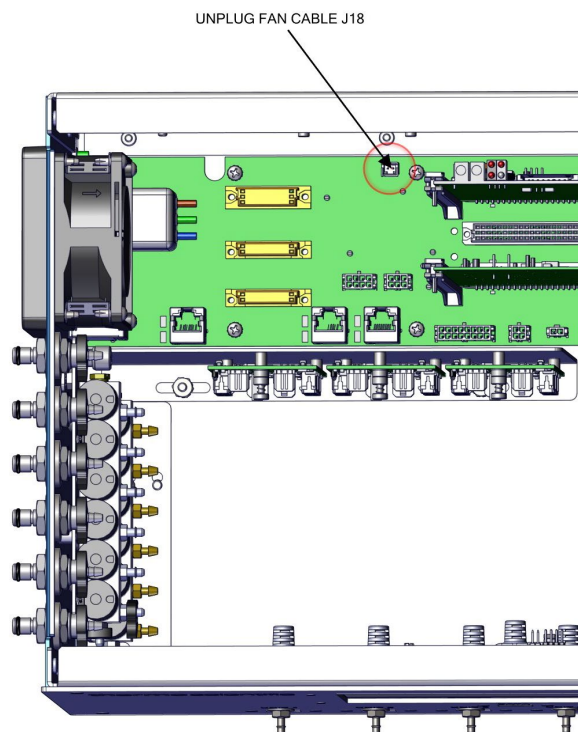


Figure 6–8. Unplugging the Fan Cable

3. Starting with top right corner, pull out to remove fan cover.
4. Unhook the four latches of the fan cover.
5. Unfasten the four 6-32 screws from the fan housing.
6. Replace fan and reassemble in reverse order.

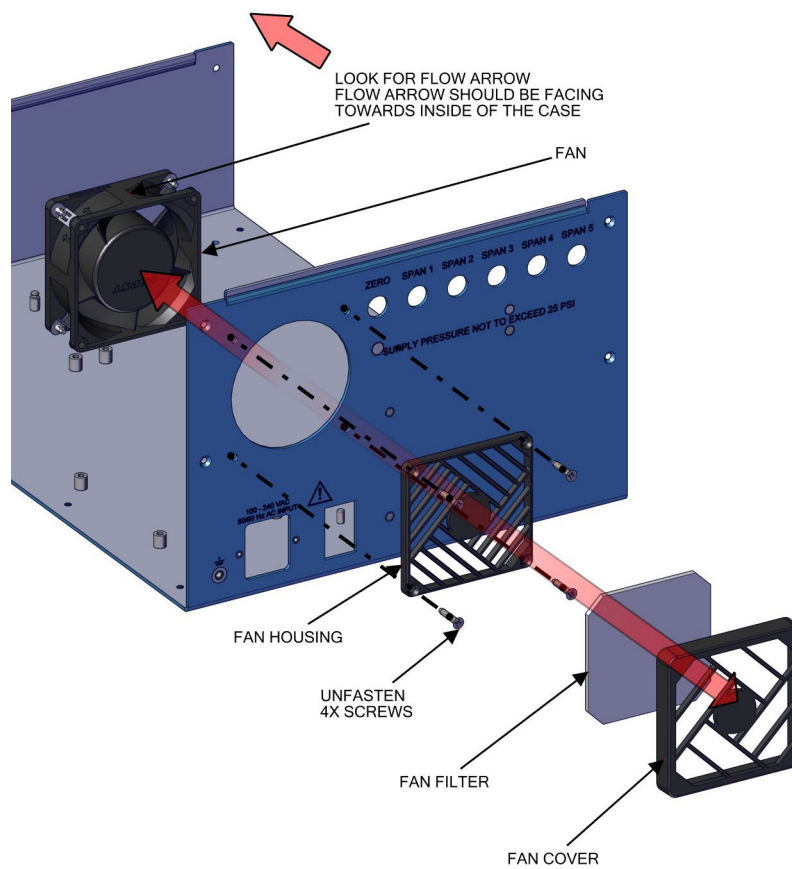


Figure 6–9. Replacing the Fan

LCD Module Replacement

Use the following procedure to replace the LCD module.

Equipment required:

Wrench, 1/4-inch

1. Turn instrument OFF and unplug the power cord.
2. Remove top cover.
3. Unplug LCD board cable.
4. Using 1/4-inch wrench, unfasten four #4-40 nuts on the LCD housing.

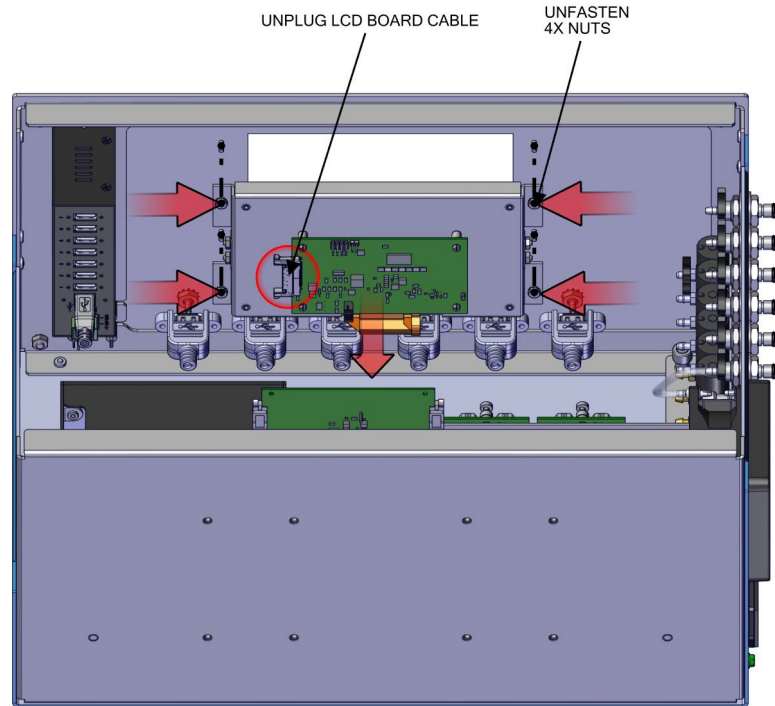


Figure 6–10. Replacing the LCD Module

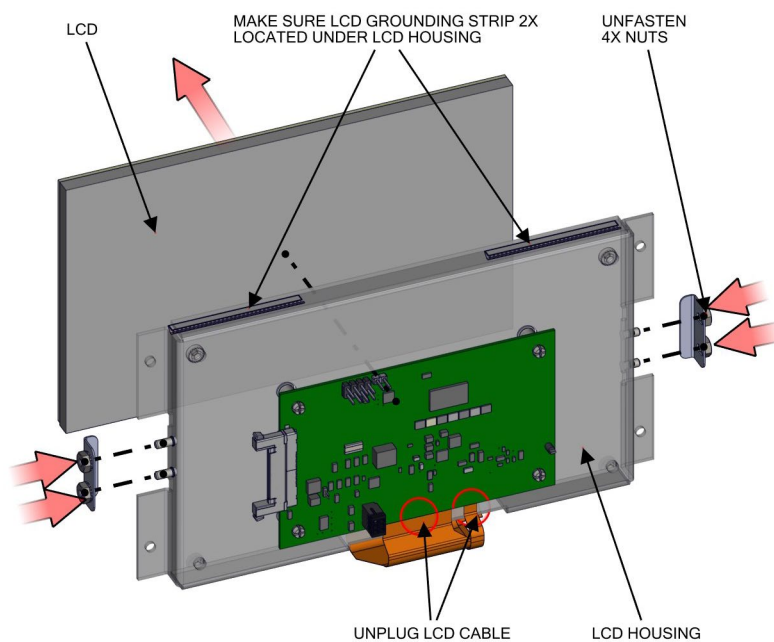


Figure 6–11. Replacing the LCD Module pt 2

5. Unplug LCD cables bottom side of the board.
6. Using 1/4 wrench, unfasten four #4-40 nuts of the LCD mounting clamps and remove the LCD module.
7. Pull LCD outwards from the LCD housing.

Note Make sure LCD grounding strap 2X is located under LCD housing during replace and reassembly. ▲

LCD Board Replacement

Use the following procedure to replace the LCD board.

1. Turn instrument OFF and unplug the power cord.
2. Unplug board cable and LCD cables from the bottom of the board.
3. Pull LCD board off the standoffs and replace.

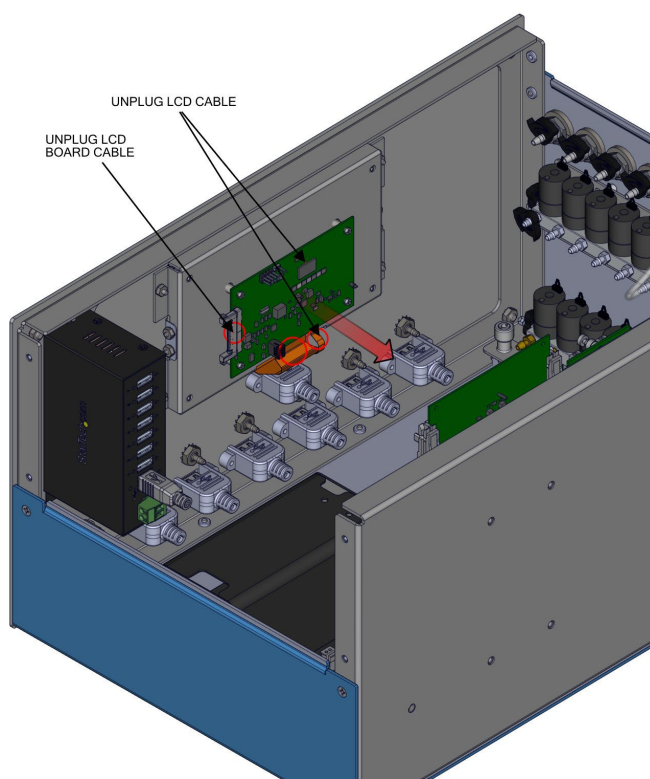


Figure 6-12. Removing Electrical Cables from LCD

4. Replace LCD board and reassemble in reverse order.

Peripherals Support Board and System Controller Board Replacement

Use the following procedure to replace the peripherals support board or system controller board.

1. Turn instrument OFF, unplug power cord, and remove the cover (Figure 2-1).
2. Pull tab out (two per board).
3. Pull board out.

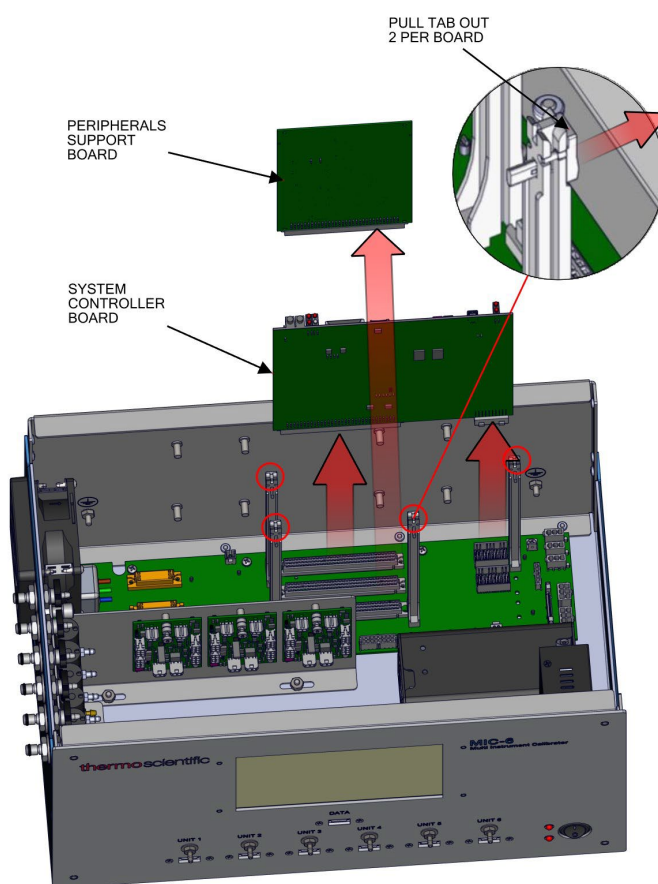


Figure 6-13. Replacing the Peripherals Support Board

4. Replace board and reassemble in reverse order.

Power Supply Replacement

Use the following procedure to replace the power supply.

Equipment required:

Phillips drive, #2

1. Turn instrument OFF, unplug power cord, and remove the cover (Figure 2–1).
2. Unplug all electrical shown J9, J10, J24, J25, J26, and ground.
3. Unfasten captive hardware.
4. Slide power supply left, clearing three case floor plate keyways.

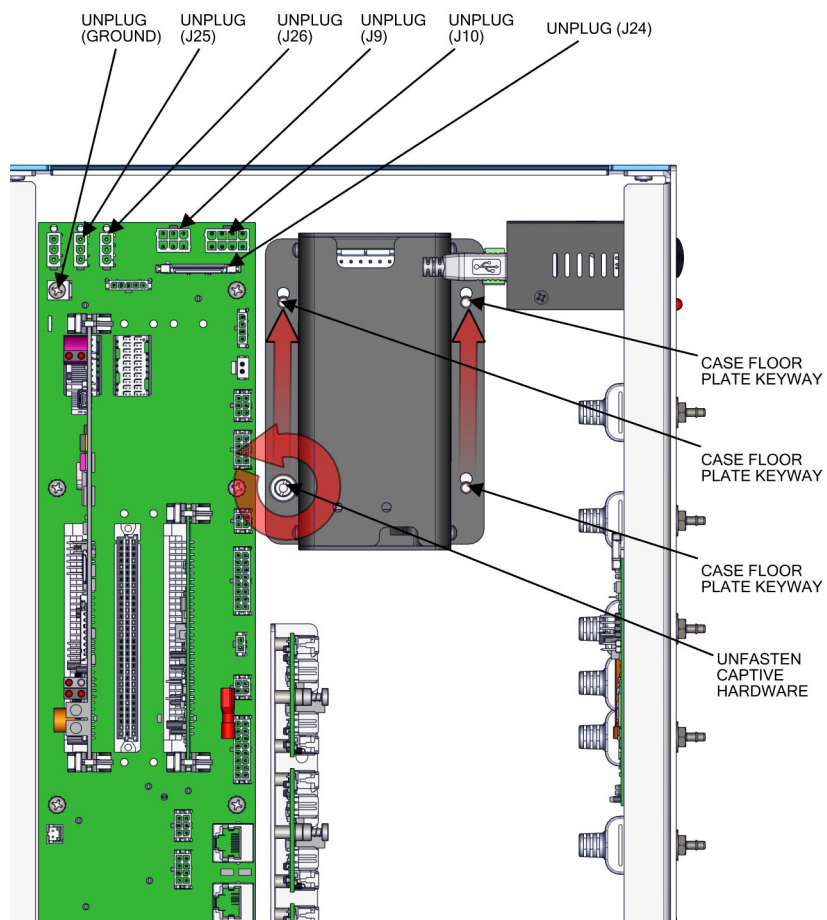


Figure 6–14. Removing Power Supply

5. Pull power supply up.
6. Replace power supply and reassemble in reverse order.

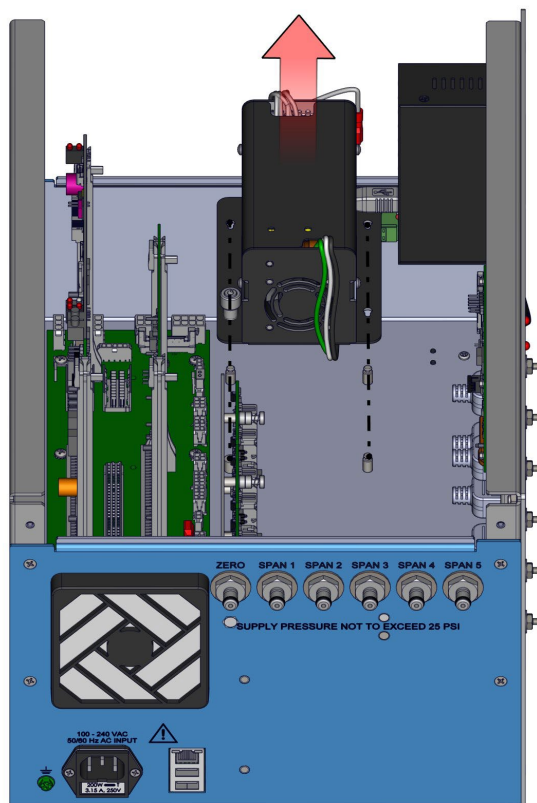


Figure 6–15. Replacing Power Supply

Step POL Board Replacement

Use the following procedure to replace the Step POL Board.

Equipment required:

Torque screwdriver, T15 or Slot screwdriver, 3/16-inch

1. Turn instrument OFF, unplug power cord, and remove the cover (Figure 2–1).
2. Unplug Step POL power cable J4.
3. Unplug Step POL signal cable J2.
4. Unplug pump cable J7.
5. Unfasten captive hardware.

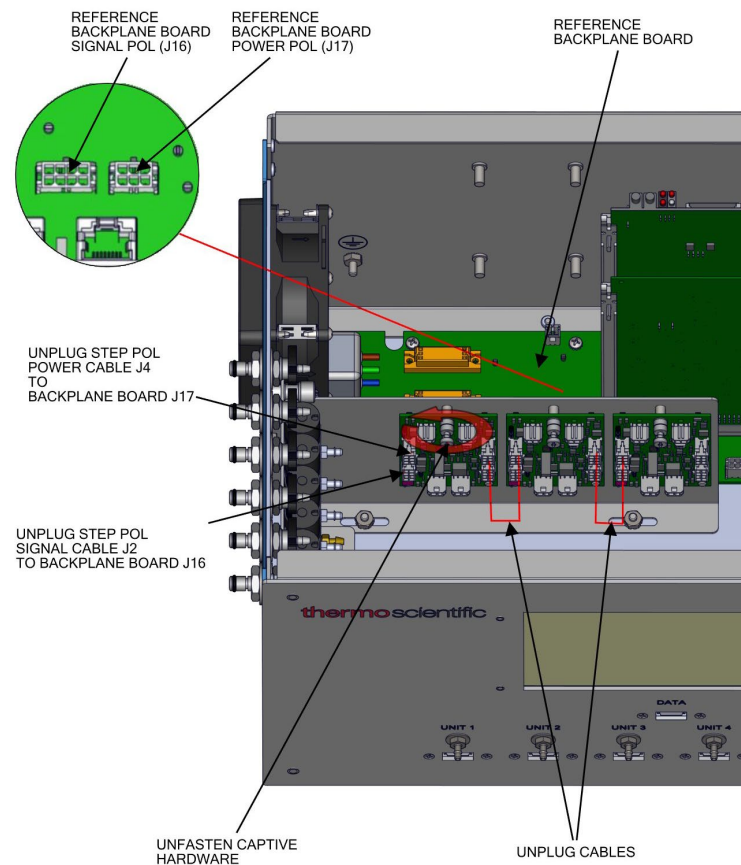


Figure 6–16. Unplug and Unfasten Step POL Board

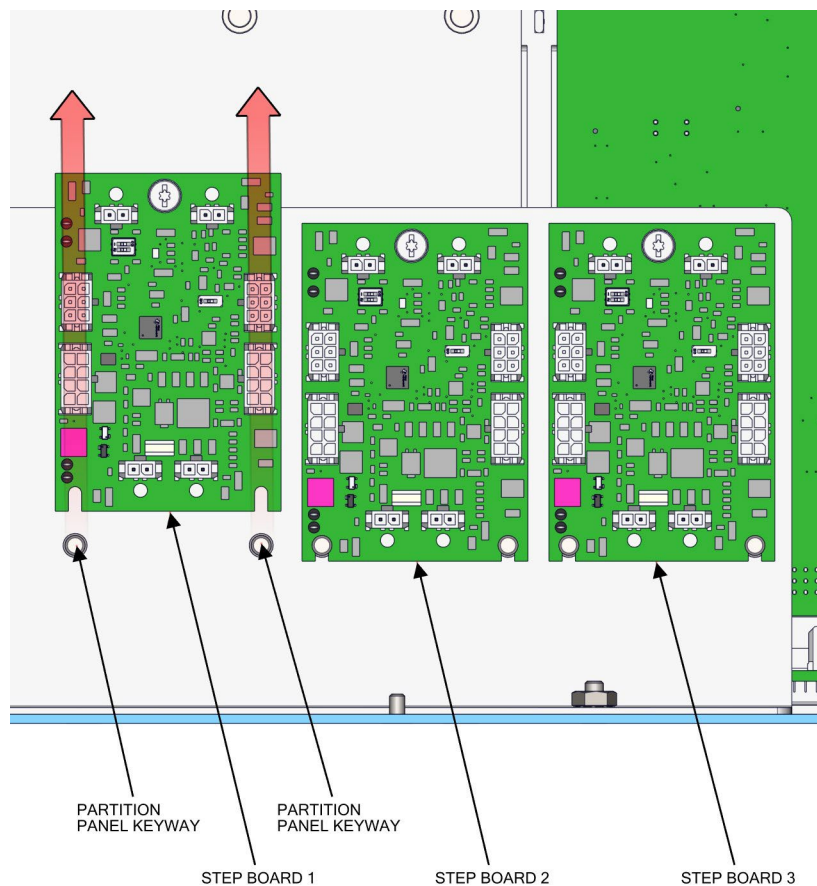


Figure 6–17. Clear Partition Keyway Step POL Board

6. Slide step board 1 upwards clearing the partition panel keyway.
7. If replacing step board 1, make sure switch 1 and 2 are pointed away from ON (Figure 6–18). If replacing optional step board 2, make sure switch 1 is pointed towards ON and switch 2 is pointed away from ON (Figure 6–19).
8. Refer to “[Replacing Valves on the Manifold](#)” page 6-20 for electrical connections to manifold valve, is unplugged.
9. Replace Step POL board and reassemble in reverse order.

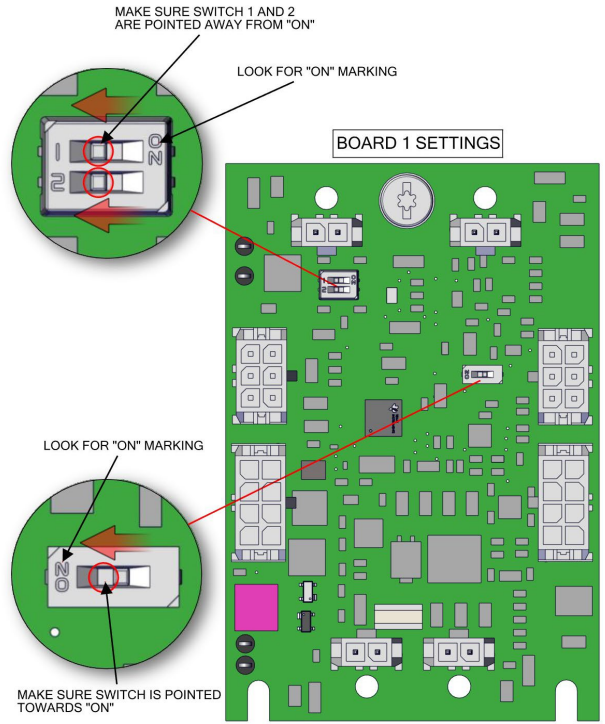


Figure 6–18. Step POL Board 1 Switch Settings

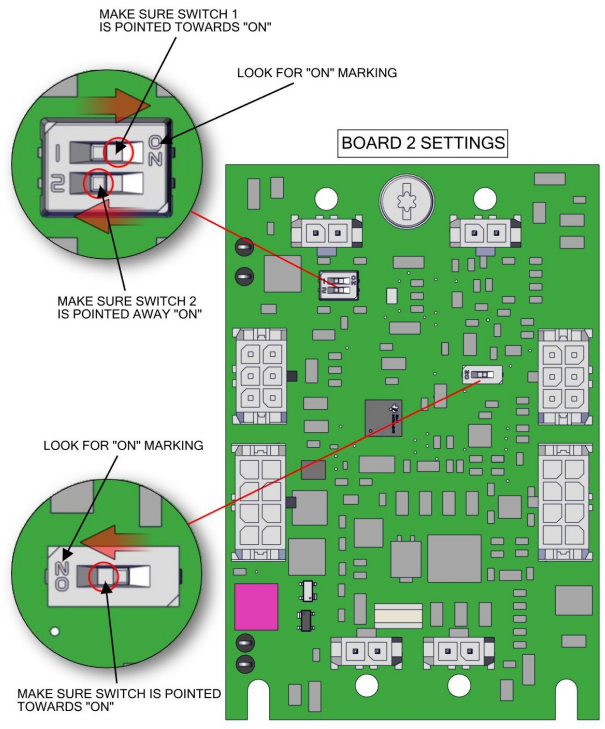


Figure 6–19. Step POL Board 2 Switch Settings

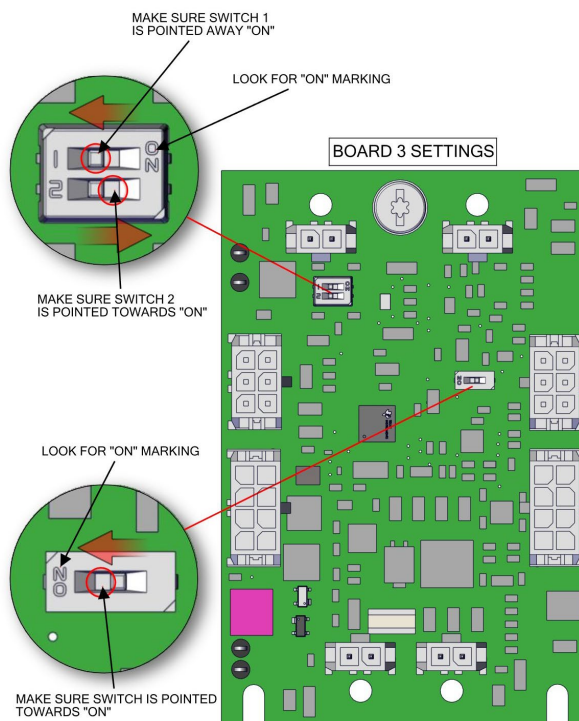


Figure 6–20. Step POL Board 3 Switch Settings

Note The procedure shown above can be used on any Step POL replacement. ▲

Replacing Valves on the Manifold

Use the following to replace the valves on the manifold.

Equipment required:

Hex drive, 1/8-inch

1. Turn the instrument OFF, unplug the power cord, and remove the cover (Figure 2–1).
2. Determine which valve to replace from this plumbing diagram.

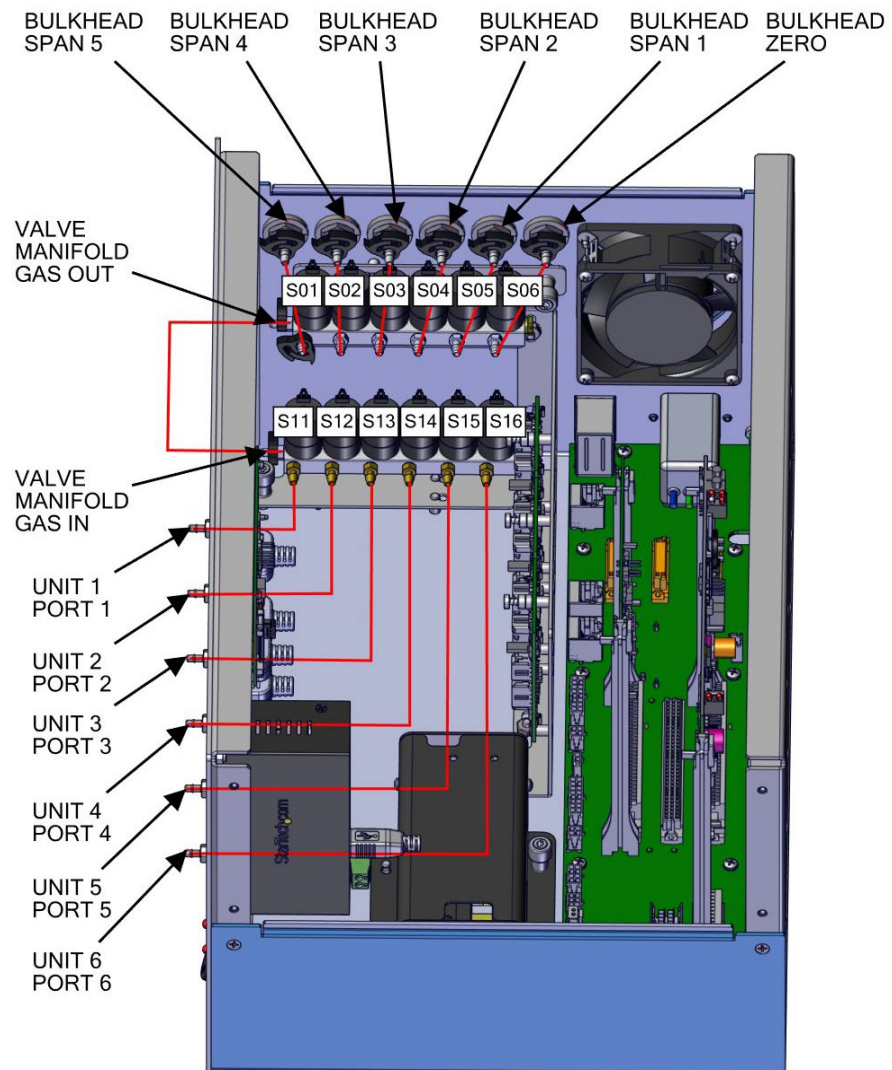


Figure 6–21. Replacing Valves on the Manifold

3. Unfasten screw with 1/8-inch hex drive.
4. Pull valve upwards and replace.
5. During assembly, **do not over-tighten** 4-10 inch pound (.45-1.13 Newton meter).
6. Refer to [Figure 6-24](#) for electrical connections.

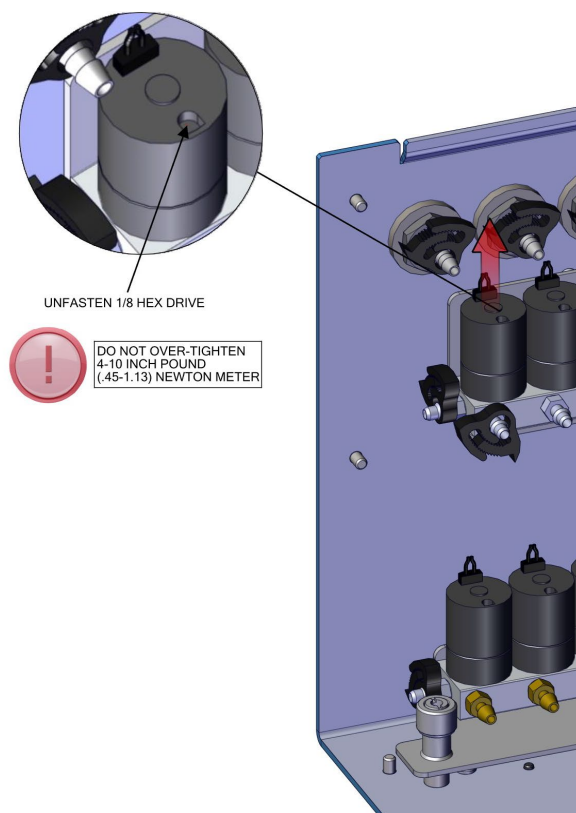


Figure 6-22. Replacing Valves on the Manifold pt 2

Note If tubing needs replacement to release clamp, follow these instructions. ▲

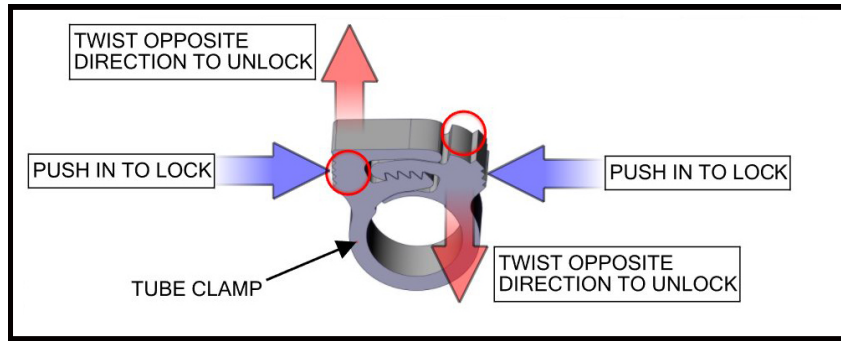


Figure 6–23. Tube Clamp Detail

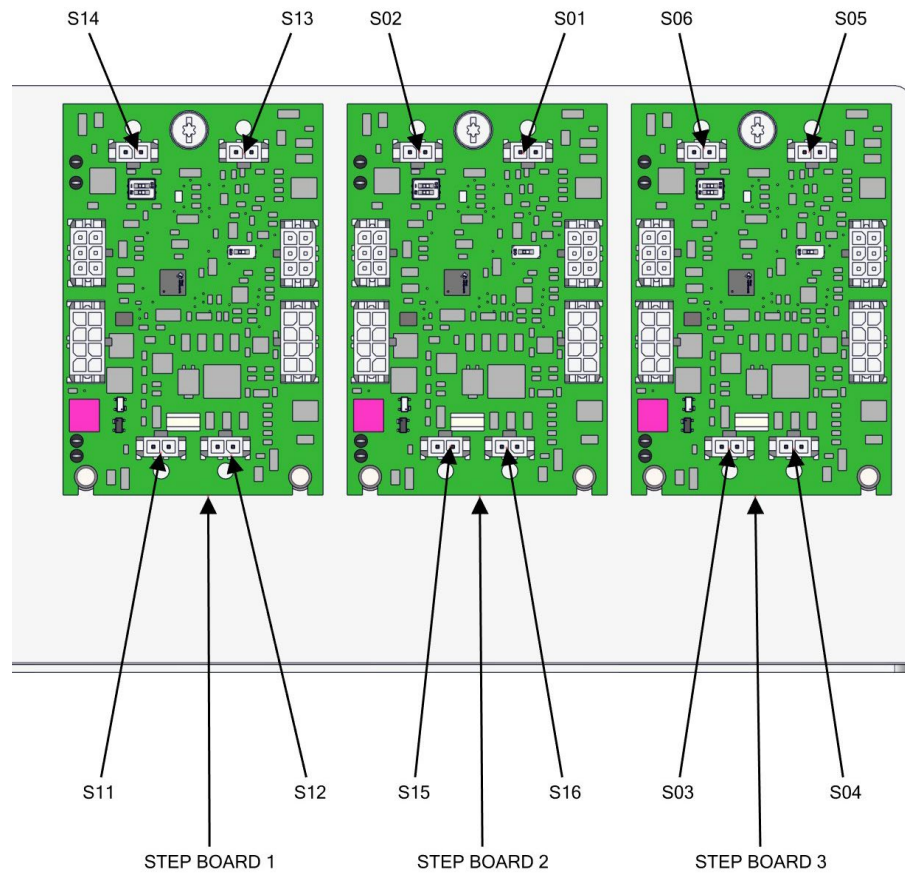


Figure 6–24. Manifold Valve Electrical Connections

USB Hub Replacement

Use the following to replace the USB Hub.

Equipment required:

Wrench or nut driver, 5/16-inch

1. Turn the instrument OFF, unplug the power cord, and remove the cover (Figure 2-1).
2. Unplug all USB cables from the hub.
3. Unplug the Hub Power connector.
4. Remove the two 5/16-inch hub mounting nuts.
5. Pull hub out. Replace USB hub and reassemble in reverse order.

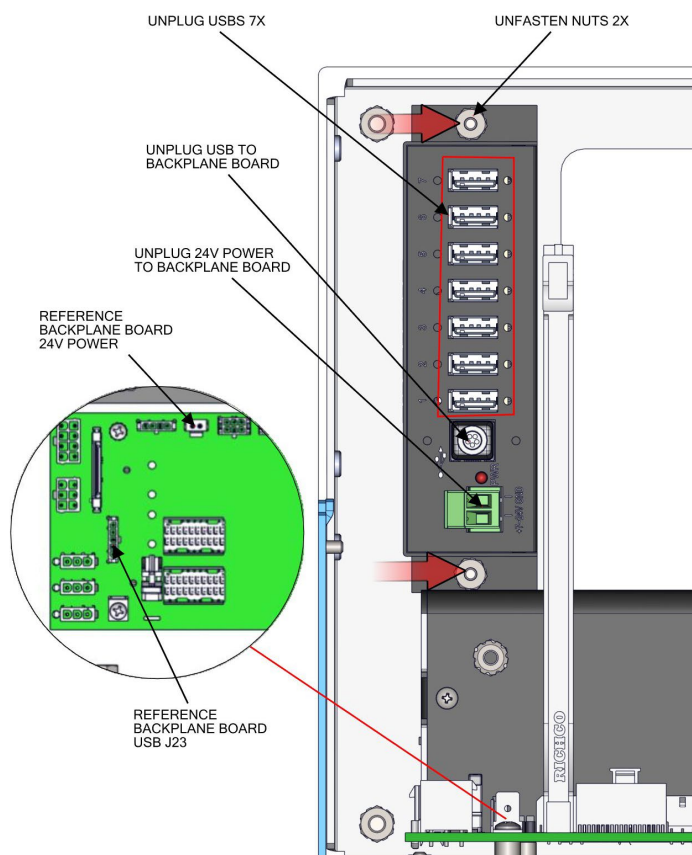


Figure 6-25. Removing the USB Hub Assembly

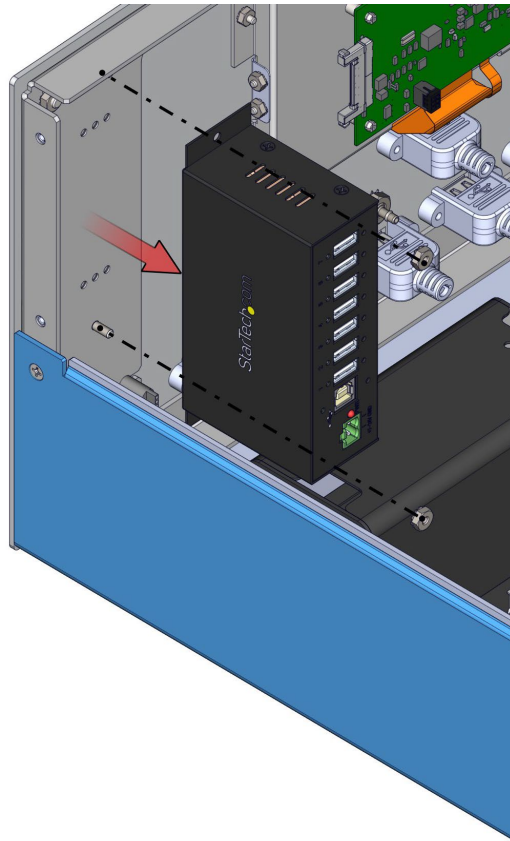


Figure 6–26. Replacing the USB Hub Assembly pt 2

Chapter 7

Optional Equipment

Bluetooth

Calibration Data for the previous 6 years and Calibration Precision Data can be obtained from the MIC-6 via Bluetooth connection, using any commercially available OBEX file transfer app on the Bluetooth device. Bluetooth connection to the MIC-6 can be achieved via a USB Bluetooth dongle, by plugging the dongle into either the USB Data Port on the front panel of the MIC-6 or into one of the USB ports on the side of the unit near the power connection. The Bluetooth dongle chosen must meet the minimum requirements of Bluetooth 4.0. Each time a Bluetooth connection is made to the MIC-6 with a file transfer app, the MIC-6 generates two files: the Calibration Data file and the Calibration Precision Data file. These files are in the same format as those downloaded via USB, as described in Appendix D. Unlike USB download, the Calibration Data file generated always includes the entire previous 6 years of data, thus file size could become rather large.

Use the following procedure to download data via Bluetooth.

1. Plug the Bluetooth Dongle into the MIC-6. The MIC-6 may need to be restarted in order to recognize the new device.
2. Pair the dongle with your device (PC, tablet, phone, etc.). The Device will be named as "MIC-6-XXXXXX" where XXXXXX is the serial number of the MIC-6. If prompted to enter a pairing code or not, select the option that does not use a pairing code.
3. Using the file transfer app, connect to the MIC-6.
4. In the folder that appears on the MIC-6, there will be files containing the Calibration Data and the Calibration Precision Data. These will be dated as of the time of the connection. If no files new enough appear, refresh the connection. Transfer the files to your device to download them. If the folder doesn't come up as "/tmp", change to that folder.

Optional Equipment

Bluetooth

Note Note that there may be older data files present in the folder, as well as files that are not associated with the Calibration or Calibration Precision data. These files can be safely ignored. You may want to remove older data files in order to make finding the latest ones easier. ▲

Appendix A

Safety, Warranty, and WEEE





Safety

Review the following information carefully before using the instrument. This manual provides specific information on how to operate the instrument, however if the instrument is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



Safety and Equipment Damage Alerts

This manual contains important information to alert you to potential safety hazards and risks of equipment damage. Refer to the following types of alerts you may see in this manual.

Safety and Equipment Damage Alert Descriptions

Alert	Description
	<ul style="list-style-type: none"> A hazard is present that will result in death or serious personal injury if the warning is ignored. ▲
	<ul style="list-style-type: none"> A hazard is present or an unsafe practice can result in serious personal injury if the warning is ignored. ▲
	<ul style="list-style-type: none"> The hazard or unsafe practice could result in minor to moderate personal injury if the warning is ignored. ▲
 Equipment Damage	<ul style="list-style-type: none"> The hazard or unsafe practice could result in property damage if the warning is ignored. ▲

Safety and Equipment Damage Alerts in this Manual

Alert	Description
	<ul style="list-style-type: none"> If the equipment is operated in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. ▲ The service procedures in this manual are restricted to qualified service personnel only. ▲
 Equipment Damage	<ul style="list-style-type: none"> Do not attempt to lift the analyzer by the cover or other external fittings. ▲ This adjustment should only be performed by an instrument service technician. ▲

Warranty

Seller warrants that the Products will operate or perform substantially in conformance with Seller's published specifications and be free from defects in material and workmanship, when subjected to normal, proper and intended usage by properly trained personnel, for the period of time set forth in the product documentation, published specifications or package inserts. If a period of time is not specified in Seller's product documentation, published specifications or package inserts, the warranty period shall be one (1) year from the date of shipment to Buyer for equipment and ninety (90) days for all other products (the "Warranty Period"). Seller agrees during the Warranty Period, to repair or replace, at Seller's option, defective Products so as to cause the same to operate in substantial conformance with said published specifications; provided that (a) Buyer shall promptly notify Seller in writing upon the discovery of any defect, which notice shall include the product model and serial number (if applicable) and details of the warranty claim; (b) after Seller's review, Seller will provide Buyer with service data and/or a Return Material Authorization ("RMA"), which may include biohazard decontamination procedures and other product-specific handling instructions; and (c) then, if applicable, Buyer may return the defective Products to Seller with all costs prepaid by Buyer. Replacement parts may be new or refurbished, at the election of Seller. All replaced parts shall become the property of Seller. Shipment to Buyer of repaired or replacement Products shall be made in accordance with the Delivery provisions of the Seller's Terms and Conditions of Sale. Consumables, including but not limited to lamps, fuses, batteries, bulbs and other such expendable items, are expressly excluded from the warranty under this warranty.

Notwithstanding the foregoing, Products supplied by Seller that are obtained by Seller from an original manufacturer or third party supplier are not warranted by Seller, but Seller agrees to assign to Buyer any warranty rights in such Product that Seller may have from the original manufacturer or third party supplier, to the extent such assignment is allowed by such original manufacturer or third party supplier.

In no event shall Seller have any obligation to make repairs, replacements or corrections required, in whole or in part, as the result of (i) normal wear and tear, (ii) accident, disaster or event of force majeure, (iii) misuse, fault or negligence of or by Buyer, (iv) use of the Products in a manner for which they were not designed, (v) causes external to the Products such as, but not limited to, power failure or electrical power surges, (vi) improper storage and handling of the Products or (vii) use of the Products in combination with equipment or software not supplied by Seller. If Seller determines that Products for which Buyer has requested warranty services are not covered by the warranty hereunder, Buyer shall pay or reimburse Seller for all costs of investigating and responding to such request at Seller's then

prevailing time and materials rates. If Seller provides repair services or replacement parts that are not covered by the warranty provided in this warranty, Buyer shall pay Seller therefor at Seller's then prevailing time and materials rates. ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS.

THE OBLIGATIONS CREATED BY THIS WARRANTY STATEMENT TO REPAIR OR REPLACE A DEFECTIVE PRODUCT SHALL BE THE SOLE REMEDY OF BUYER IN THE EVENT OF A DEFECTIVE PRODUCT. EXCEPT AS EXPRESSLY PROVIDED IN THIS WARRANTY STATEMENT, SELLER DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, ORAL OR WRITTEN, WITH RESPECT TO THE PRODUCTS, INCLUDING WITHOUT LIMITATION ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE PRODUCTS ARE ERROR-FREE OR WILL ACCOMPLISH ANY PARTICULAR RESULT.

WEEE Compliance


This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the following symbol:



Thermo Fisher Scientific has contracted with one or more recycling/disposal companies in each EU Member State, and this product should be disposed of or recycled through them. Further information on Thermo Fisher Scientific's compliance with these Directives, the recyclers in your country, and information on Thermo Fisher Scientific products which may assist the detection of substances subject to the RoHS Directive are available at: www.thermoscientific.com/WEEERoHS.

WEEE Symbol

The following symbol and description identify the WEEE marking used on the instrument and in the associated documentation.

Symbol	Description
	Marking of electrical and electronic equipment which applies to electrical and electronic equipment falling under the Directive 2002/96/EC (WEEE) and the equipment that has been put on the market after 13 August 2005. ▲

Appendix B

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Appendix C

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Version 2.1, February 1999

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Furthermore, you are not required to apply this additional permission to a modified version of the Library.

Appendix D

Data File Formats

The following section describes the format of the csv (comma-separated values) file downloaded via Bluetooth or the Download Data To USB Drive->Download Calibration Data ->Download Calibration Data By Date, or ->Download Calibration Data from Last Year buttons. The file generated has two sections, the top section contains the data for the calibration gases attached to the calibrator (as entered in the Settings->Input Cylinder Setup screen) and the lower section contains the details of the calibrations performed within the selected time period

Calibration Gas Cylinder Table

The top section of the Calibration Data file holds the calibration gas information for the gases currently attached to the calibrator (as entered in the Settings->Input Cylinder Setup screen).

```
Input_Cylinder,Concentration,User ID,Expiration Date,Cylinder ID
1,Cylinder ID 2
Zero,0,Cylinder1User,2018-01-01,CylinderID1Zero,CylinderID2Zero
Span 1,10055,Cylinder2User,2018-01-01,CylinderID1Span1,CylinderID2Span1
Span 2,500.5,Cylinder3User,2018-01-01,CylinderID1Span2,CylinderID2Span2
Span 3,0, ,0000-00-00,;N,;N
Span 4,0, ,0000-00-00,;N,;N
Span 5,0, ,0000-00-00,;N,;N
```

Description of the columns in the Columns in each record:

1. Input_Cylinder: the connection point on the MIC-6, as entered in the Input Cylinder Setup screen.
2. Concentration: the entered concentration value, in ppm.
3. Min purge the entered amount of purge the MIC-6 and TVA2020 prior to starting to read counts.
4. Expiration Date: the entered expiration date, month, day, and year.
5. User ID: the entered User ID for the cylinder.

6. Cylinder ID 1: User entered descriptive data.
7. Cylinder ID 2: Additional user entered descriptive data.

Calibration Data Table

The lower section of the Calibration Data file contains the individual records for each calibration action performed by the MIC-6 during the period specified when downloading the file.

```
Serial Number ,Cal_Date ,Span Count ,Procedure Type ,Compared
Concentration ,Measured Concentration 1 ,Measured Concentration 2
,Measured Concentration 3 ,Average Concentration ,Input Cylinder ,User ID
,Result ,Probe Type ,Flow , Probe Info , Threshold_Percent
REVxCxMB,2019-11-14
06:03:04,2465,Calibration,n/a,0.000000,n/a,n/a,n/a,Zero,TVAUser,Successfu
l,Standard,0.000,Probe0001,n/a
REVxCxMB,2019-11-14
06:03:04,101156,Calibration,n/a,509.520996,n/a,n/a,n/a,Span
2,TVAUser,Successful,Standard,0.000,Probe0001,n/a
REVxCxMB,2019-11-14
06:03:04,2088256,Calibration,n/a,10098.304688,n/a,n/a,n/a,Span
1,TVAUser,Successful,Standard,0.000,Probe0001,n/a
202015010932,2019-11-14
06:03:04,3913,Calibration,n/a,0.000000,n/a,n/a,n/a,Zero,TVAUser,Failure:
detector Calibration bad flow low (pump PID maxed
out),Standard,0.000,Probe0002,n/a
202015010932,2019-11-14
06:03:04,46313,Calibration,n/a,46.500999,n/a,n/a,n/a,Span
2,TVAUser,Failure: detector Calibration bad flow low (pump PID maxed
out),Standard,0.000,Probe0002,n/a
202015010932,2019-11-14
06:03:04,942752,Calibration,n/a,939.942993,n/a,n/a,n/a,Span
1,TVAUser,Failure: detector Calibration bad flow low (pump PID maxed
out),Standard,0.000,Probe0002,n/a
REVxCxMB,2019-11-14
06:13:38,n/a,Drift,509.000,502.000,503.000,505.000,504.000,Span
2,TVAUser,pass,Standard,0.000,Probe0001,10.000
REVxCxMB,2019-11-14
06:13:38,n/a,Drift,10098.000,10034.000,10039.000,10029.000,10034.000,Span
1,TVAUser,pass,Standard,0.000,Probe0001,10.000
202015010932,2019-11-14
06:13:38,n/a,Drift,0.000,45.000,42.000,41.000,43.000,Span
2,TVAUser,fail,Standard,0.000,Probe0002,10.000
202015010932,2019-11-14
06:13:38,n/a,Drift,0.000,873.000,905.000,922.000,900.000,Span
1,TVAUser,fail,Standard,0.000,Probe0002,10.000
```

Description of the columns in the Gas Cylinder Table:

1. Serial Number: the serial number of the instrument to which the record applies.
2. Cal_Date: the date and time of the record (taken from the instrument clock).

Note Records are output in the order in which they were created; changing the instrument clock time will not affect the output order. ▲

3. Span Count: the detector counts for the span point, if the record is a calibration. Not applicable to Drift Check records, which will show “n/a” in this column.
4. Procedure Type: “Calibration” or “Drift Check”.
5. Compared Concentration: used during drift check as the baseline value to determine the percentage drift. The most recent Measured Calibration 1 value from a ‘Successful’ calibration procedure is used. If the calibration result is ‘Failure’, ‘0’ is entered as the value.
6. Measured Concentration 1: for Procedure Type = Calibration; reports the measured value of span gases directly after calibration. For procedure type = Drift; the first of three successive readings used to calculate the average concentration.
7. Measured Concentration 2: the second reading used to calculate the drift test average concentration.
8. Measured Concentration 3: the third reading used to calculate the drift test average concentration.
9. Average Concentration: The average of Measured Concentrations 1, 2 and 3.
10. Input Cylinder: the gas input used for the calibration or drift check in this record.
11. User ID: the user ID entered at the start of the calibration or drift check for this record.
12. Result: for Procedure Type = Calibration; Successful or Failure and any error flags triggered in the TVA2020. For Procedure Type = Drift; Pass or Fail and any error flags triggered in the TVA2020. If the procedure was stopped before completion for any reason, this column will show “Interrupted...”. For the “Failure:” and “Interrupted” results, they will be accompanied by error flags if there are any.
13. Probe Type: Standard or Extended as entered in the Gas Port Setup screen.

Data File Formats

Calibration Precision Data File Format

14. Flow: Manually entered instrument flow as measured by the user and entered in the Gas Port Setup screen.
15. Probe Info: User entered identification data for the probe in use.
16. Threshold Percent: The percentage error allowed during the drift test (min value 2%, max value 10%).

Calibration Precision Data File Format

The following section describes the format of the csv format Calibration Precision Data file downloaded via Bluetooth or the Download Data To USB Drive->Download Calibration Data->Download Calibration Precision Data screen. This data is manually entered into the MIC-6 in the Calibration->Calibration Precision->Unit X screens, as described elsewhere in the manual. Data can only be entered for units connected to the MIC-6, as that is how the unit serial number is determined

```
Serial_Number,Cal_Date,Cal_User,Span_Concentration,Reading 1,Reading 2,Reading 3,Reading Average,Response Time 1,Response Time 2,Response Time 3,Response Time Average,Threshold,Fail Mode,Pass or Fail
202014050033,2/7/2019 16:45,TVAUser,500,500.576,499.778,499.113,499.822,11.042,10.978,9.997,10.672,2,individual,pass
202014050033,2/8/2019 10:48,TVAUser,500,566.909,569.679,570.166,568.918,13.002,14.003,11.001,12.669,2,individual,fail
202014050033,2/18/2019 12:08,TVAUser,500,500.078,498.906,499.16,499.381,11.991,12.023,13.016,12.344,2,average,pass
202014050033,2/19/2019 14:13,TVAUser,500,506.249,505.058,505.331,505.546,14.034,12.962,12.976,13.324,2,average,pass
```

Description of Columns in file:

1. Serial_Number: the serial number of the unit associated with the data. Will show “Disconnected” if the serial number of the data is not available, such as when the TVA2020 has been disconnected from the MIC-6 after data entry but before saving the data.
2. Cal_Date: the date on which the calibration was performed. This is entered as a 16 character string and does not need to be in any particular format.
3. Cal_User: the entered user ID.
4. Span_Concentration: the nominal span concentration of the gas used for the Calibration Precision test.
5. Reading 1, 2, and 3: the three individual readings of the calibration gas, as manually entered by the user.

6. Reading Average: the average of three readings.
7. Response Time 1, 2, and 3: the three individual response time measurements, as manually entered by the user.
8. Response Time Average: the average of the three response times.
9. Threshold: the percentage error allowed to determine “Pass” or “Fail”, user adjustable from 2 to 10%.
10. Fail Mode: if set to individual, will fail if any of the three readings exceed the threshold.
11. Pass or Fail: result of the test based on threshold and fail mode.



USA

27 Forge Parkway
Franklin, MA 02038
Ph: (866) 282-0430
Fax: (508) 520-2800
orders.aqi@thermofisher.com

India

G/327, TTC Industrial Area
MIDC Pawane
New Mumbai 400 705, India
Ph: +91 22 4157 8800
india@thermofisher.com

China

8/F Bldg C of Global Trade Ctr,
No.36, North 3rd Ring Road,
Dong Cheng District
Beijing, China 100013
Ph: +86 10 84193588
info.eid.china@thermofisher.com

Europe

Ion Path, Road Three,
Winsford, Cheshire CW73GA UK
Ph: +44 1606 548700
Fax: +44 1606 548711
sales.epm.uk@thermofisher.com

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