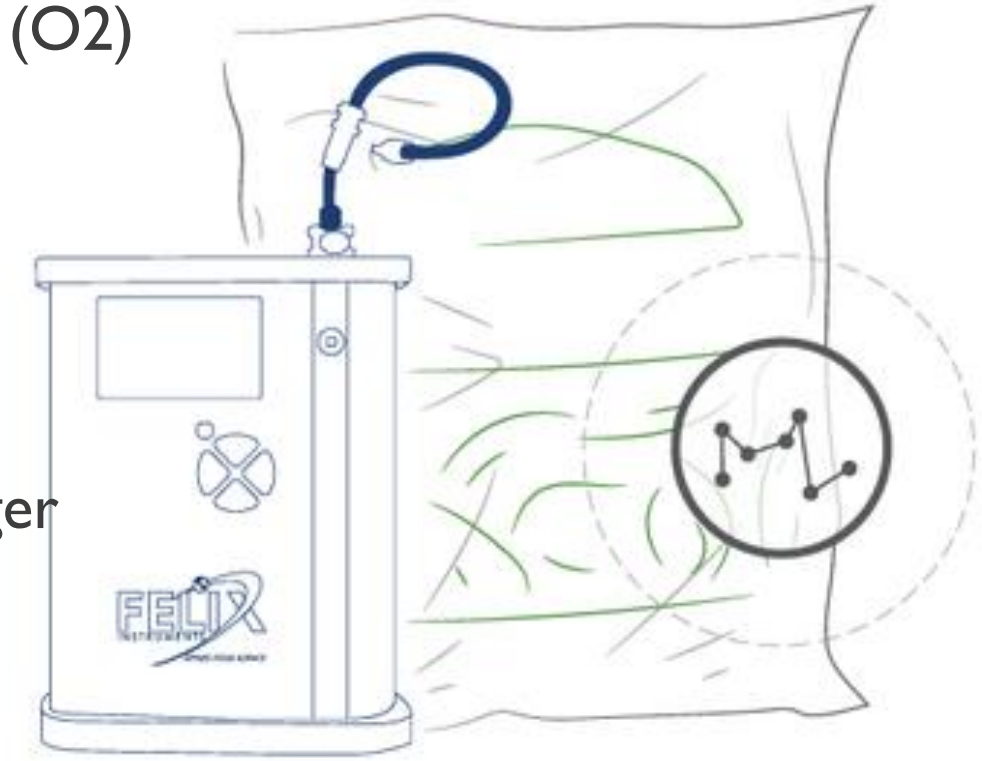
INTRODUCTION TO THE F-920

AGENDA

- F-920 Introduction
- Specs
- Using the F-920
  - Measurement modes
- Calibration
- Data transfer
- Controller Software

F-950 FEATURES

- Measures carbon dioxide (CO2) and oxygen (O2) levels
- Portable, lightweight and easy to operate
- Rapid response time, data points saved every second in continuous measurement mode
- Two modes of operation: continuous or trigger mode
- Removable, re-chargeable batteries



F-920 SPECS

	Oxygen (O2)	Carbon Dioxide (CO2)
Sensor Type	Electrochemical	Infrared Sensor
Measurement range	0-100%	0-100%
Operating Temperature	0-50 C	0-50 C
Operating Relative humidity*	0-99%	0-99%
Operating Atmospheric pressure	500-1200mbar	500-1200mbar
Calibration interval	6 months	12 months
Zero interval	weekly	weekly
Sensor lifetime	2 years	5 years
Sensor replaceable (by user)	yes	no
Sampling flow rate	70ml/min	70ml/min

F-950 SPECS CONTINUED

Trigger Mode:	O2	CO2
Accuracy, absolute*	0.30%	0.50%
Accuracy, relative*	2%	3%
Typical sampling volume	10 ml	10 ml
Typical response time	10 seconds	10 seconds

Continuous Mode:	O2	CO2
	0.10%	0.01%
	2%	3%
	5 seconds	10 seconds

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F-920 COMMON USES

- Inspection of storage and packing environments
- Quality assurance for MAP

F-920 BASIC OPERATION

- Operation of the F-920 is designed to be very simple
- There are three available menu options: Measure, Setup, and File

Intake and outtake

Measure button

Power button to turn instrument on and off

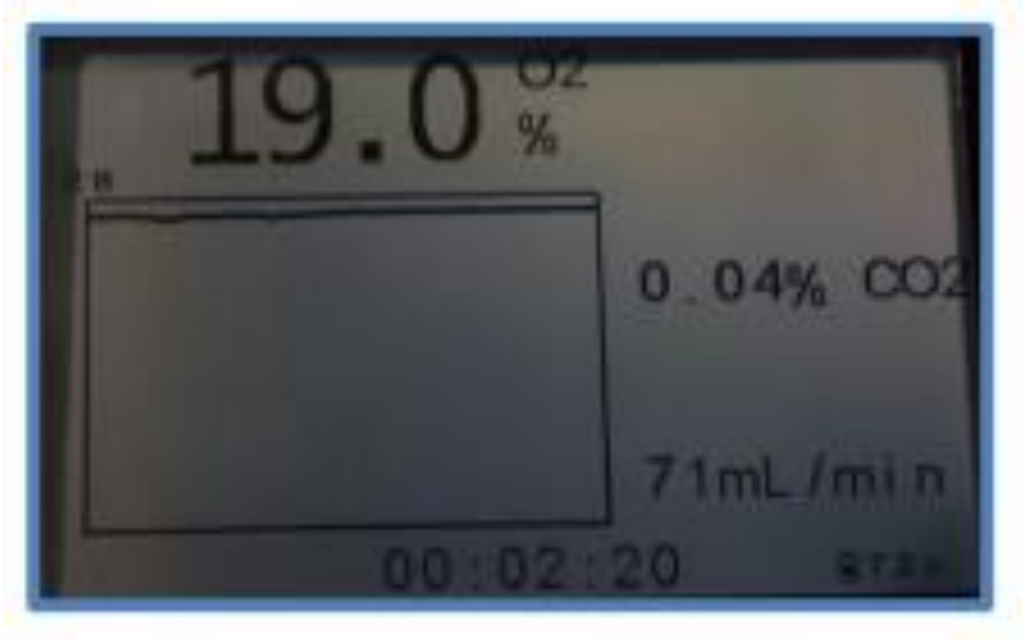
Directional keys allow the user to navigate through the menu options

F-920 MEASUREMENT MODES

- There are two measurement modes with use of the F-920
  - Continuous mode-measures the air entering through the input of the instrument, data is saved to the file every one second
  - Trigger mode-measures the air entering through the input of the instrument. The pump will run and the sample will enter until a stable reading has been achieved. The pump will then turn off until the user initiates a new measurement.

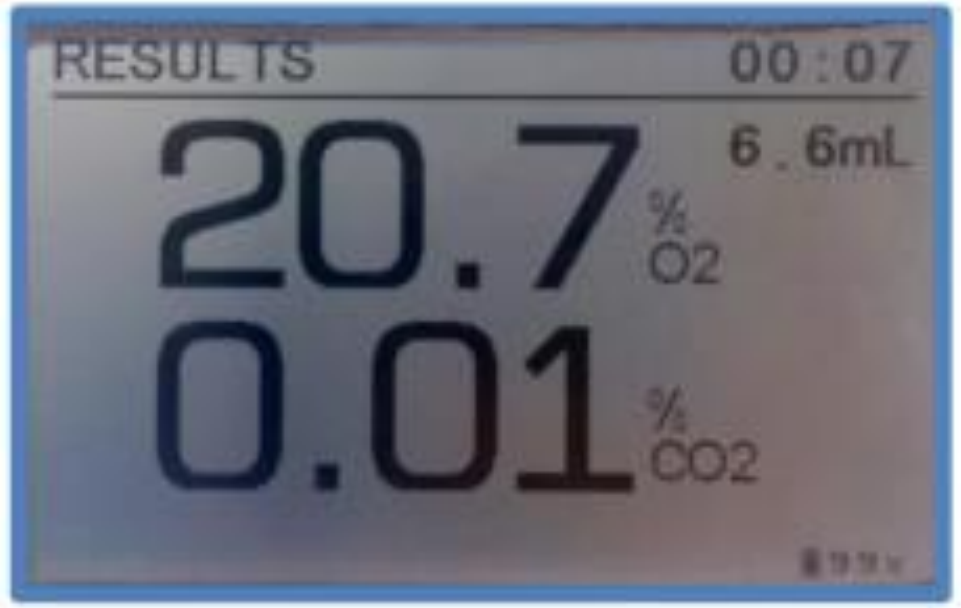
F-920 MEASUREMENT MODES: CONTINUOUS MODE

- While in continuous mode, a graph of the concentration of each gas can be viewed over time.
  - X-axis is time.
  - Y-axis of the graph displays the range of concentration in % for CO2 and O2



F-920 MEASUREMENT MODES: TRIGGER MODE

- A measurement in trigger mode will initiate a small volume sample taken over several seconds until the reading is stable. The display shows the digital values of CO2 and O2.



F-920 MEASUREMENT MODES: PROBE ATTACHMENT

- Either continuous or trigger mode measurements can be made with the needle probe attachment for jar headspace gases or modified atmosphere packaging

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F-920 CALIBRATION

- The firmware on the F-920 allows for on-device calibration
- Every calibration involves three steps:
  - Set zero
  - Span
  - Verification

	CO2	O2
Set zero	Soda Lime or 100% N2 gas	100% N2 gas
Span calibration	95% CO2	50% O2
Verification	16% CO2	Ambient air

F-920 CALIBRATION

- On-device span calibration can be completed for any of the sensors following the standard operating procedures below:
  - 1. Navigate to setup>calibration and selected desired sensor to calibrate
  - 2. Set up the zero gas and press measure button when ready
  - 3. Display will prompt you to connect span gas when set zero is completed
  - 4. Let run 3-5 minutes, until the value displayed seems to stabilize
  - 5. Adjust the value on the screen with the up/down arrows to match the concentration of span gas
  - 6. NEXT DAY: Verify the calibration by measuring the verification gas and assuring it falls within reported accuracy range

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F-920 TRANSFERABLE DATA

- Data is saved to the SD card in the instrument
- Data is easily transferable from the F-920 to a PC in a few different ways:
  - Wirelessly through Bluetooth or Wifi enabled SD card
  - SD card reader
- Data can be opened and manipulated in Excel (.csv files)
  - Can also be opened in G.A.S. software

F-920 DATA

Date	Time	Meas. Mode	VOCs (ppm)	O2 (%)	CO2 (%)	RH (%)	Temperature (C)	Flow (mL)	Longitude	Latitude	Raw output

Date	Time	Mode	C2H4(ppm	O2(%)	CO2(%)	RH(%)	Temperat	FLow(ml)	GPS_Lon	GPS_Lat	Raw
4/18/2016	8:08:15	Continuou	N/A	50.2	0.04	32.1	25.6	0	N/A	N/A	0 41282 30719 92933 25833 256 321 744
4/18/2016	8:08:16	Continuou	N/A	50.2	0.04	32.1	25.6	35	N/A	N/A	0 41315 30717 92932 25817 256 321 742
4/18/2016	8:08:17	Continuou	N/A	50.2	0.04	32.1	25.6	73	N/A	N/A	0 41317 30762 92929 25814 256 321 744
4/18/2016	8:08:18	Continuou	N/A	50.2	0.04	32.2	25.6	84.5	N/A	N/A	0 41297 30813 92933 25822 256 322 743
4/18/2016	8:08:19	Continuou	N/A	50.2	0.04	32.2	25.6	89.5	N/A	N/A	0 41320 30813 92941 25832 256 322 744
4/18/2016	8:08:20	Continuou	N/A	50.2	0.04	32.3	25.6	89	N/A	N/A	0 41346 30795 92947 25826 256 323 742
4/18/2016	8:08:21	Continuou	N/A	50.2	0.04	32.3	25.6	89	N/A	N/A	0 41292 30810 92945 25813 256 323 742
4/18/2016	8:08:22	Continuou	N/A	50.2	0.04	32.3	25.6	89	N/A	N/A	0 41348 30850 92939 25817 256 323 744
4/18/2016	8:08:23	Continuou	N/A	50.1	0.04	32.3	25.6	86	N/A	N/A	0 41198 30846 92937 25814 256 323 742
4/18/2016	8:08:24	Continuou	N/A	50.1	0.04	32.3	25.6	84.5	N/A	N/A	0 41207 30818 92954 25837 256 323 744
4/18/2016	8:08:25	Continuou	N/A	50.3	0.04	32.3	25.6	80.5	N/A	N/A	0 41373 30807 92965 25815 256 323 743
4/18/2016	8:08:26	Continuou	N/A	50.3	0.04	32.2	25.6	81.5	N/A	N/A	0 41377 30777 92967 25826 256 322 744

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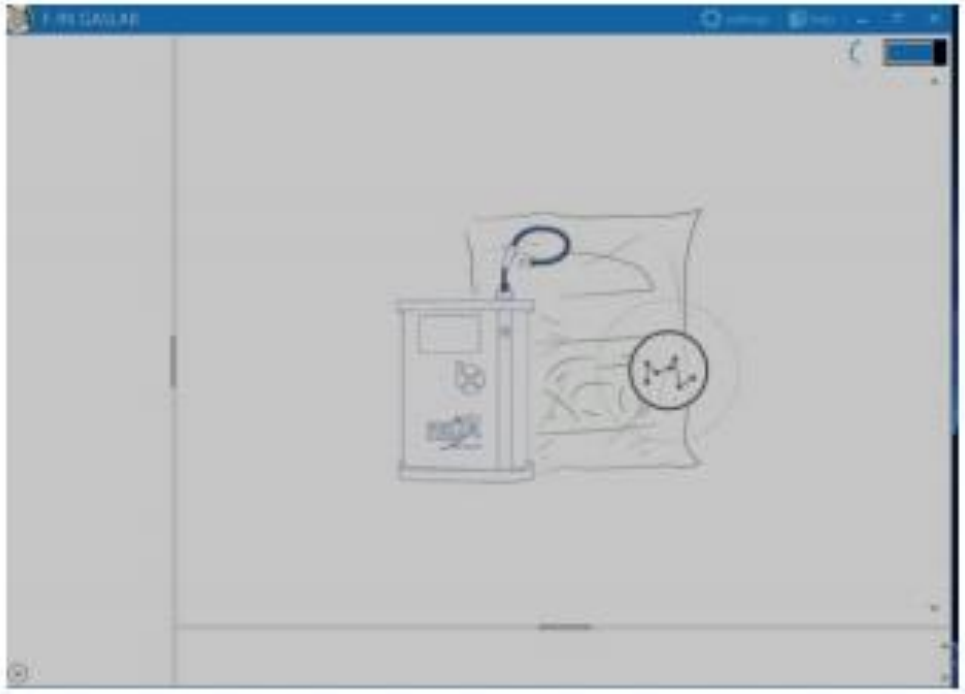
GAS ANALYSIS SOFTWARE (G.A.S.)

GAS software enables the user to:

- View graphic displays of measurements
- Download, edit and add notes to files
- Create upper and lower thresholds for quality monitoring
- Remotely navigate through the F-920 menu system

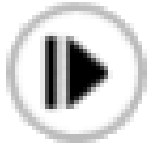


Connection via Bluetooth or USB cable connection

G.A.S.

- The ‘Files’ menu allows viewing of all files saved to the F-920

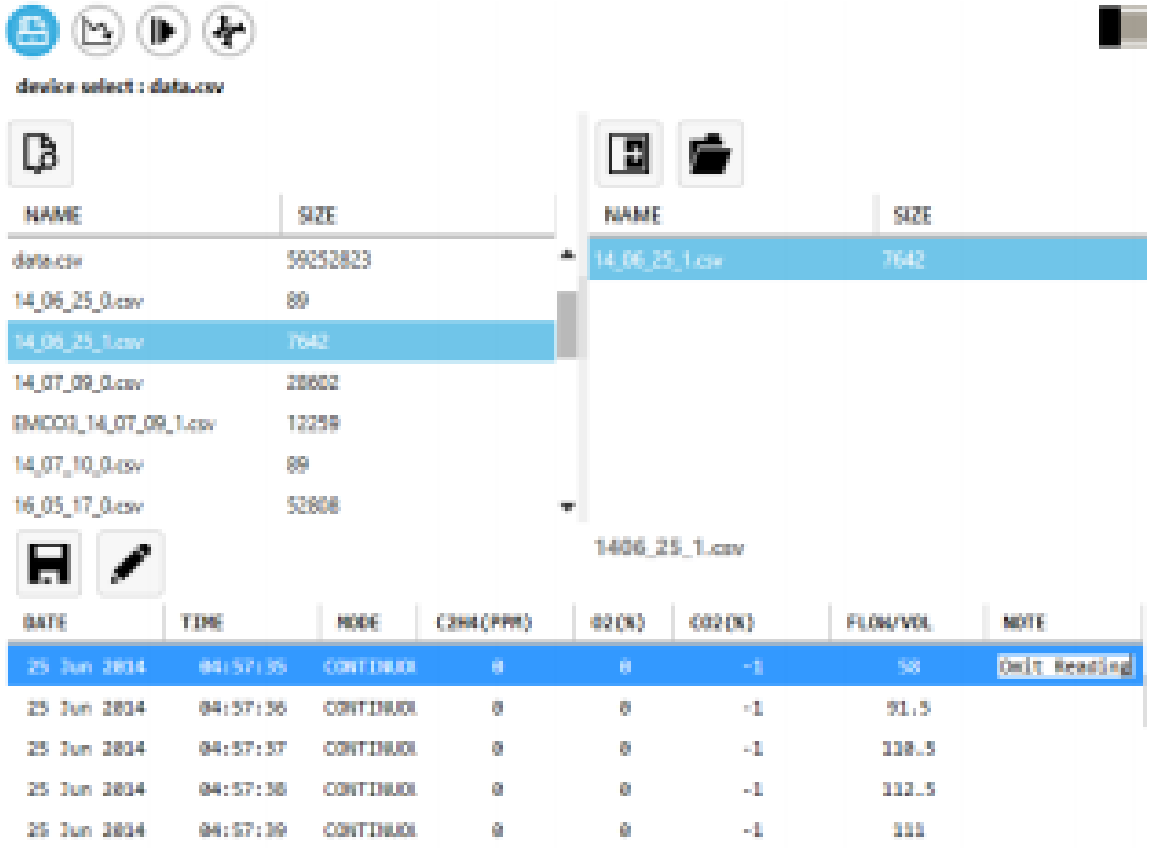
- The ‘Measurement Monitor’ menu displays measurements graphically in real time



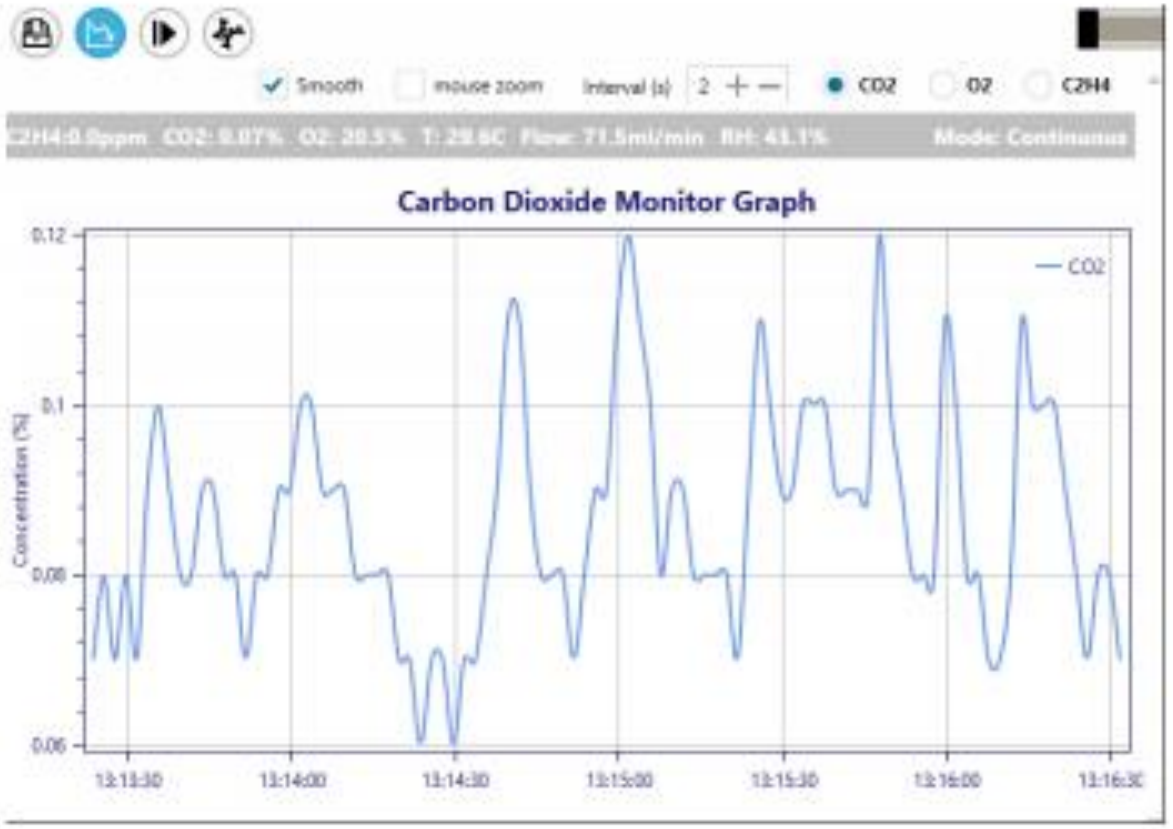
- The ‘Control Panel’ menu displays toggle keys which allow the user remote control of the F-920

- The ‘Calibration’ menu navigates the user through the calibration process for both set zero and span

Download or open previously saved files. Add notes to separate measurements.



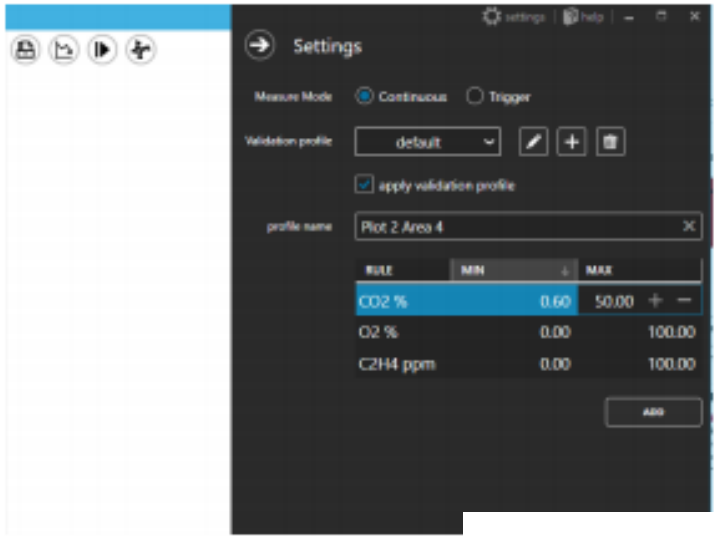
View your measurement data in real time

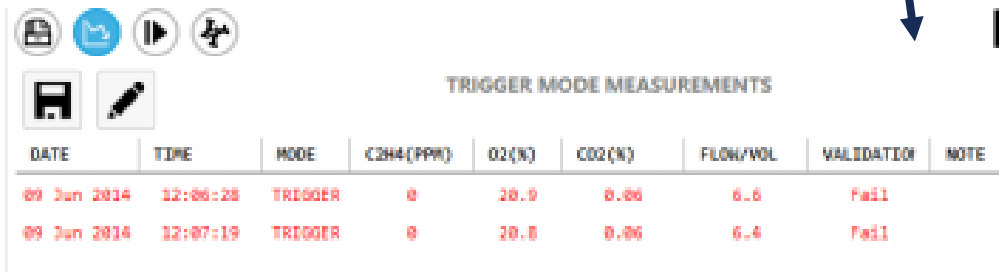



Zero Calibration
Span Calibration
Sensor
Gas Source
N2 or 0% Concentration
Timer : 3 minutes
Status
Ready
start
Instructions
1. Connect standard gas source to device inlet
Note: use a T Connection if running gas from pressurized tank via pressure regulator to vent excess gas and prevent damage to device
2. Put device in Continuous Monitor Mode
3. Specify sensor, gas source for calibration
4. Specify gas running duration for steady state measurement (Typically: 3 minutes).
5. Click start to begin calibration
6. Upon calibration completed, check sensor reading to verify if calibration is successful

Create a custom validation profile with unique names and threshold values for each gas of interest.

Results will indicate whether they pass or fail the validation profile





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AUTHORIZED DISTRIBUTOR
GasDetectorsUSA.com - Houston, Texas USA
sales@GasDetectorsUSA.com - 281-643-0080