CONFINED SPACE MULTI GAS MONITOR

Gas Detection For Life

GX-2012 Model

Features

- Monitors ppm LEL, and % volume methane, O2, CO and H2S
- 0 to 100% volume methane option
- Auto-ranging display of % LEL and % volume
  3 Operating modes: Normal, leak check, & bar hole
- Leak check mode:
  - PPM leak detector, detects down to 100 ppm CH4
  - Adjustable display ranges: 500/1000/2000/5000 ppm
  - Visual / audible pulses change with gas concentration
  - CO display in leak check mode, ideal for residential investigations
- Barhole test mode for underground leak checks
- Status indicators: Pump active, microprocessor status and battery level
- Internal sample drawing pump with up to 50 foot range
- Vibration, visual, and audible alarms
- Automatic backlight during alarms
- Bump test and calibration reminder with lock out option
- Lithium ion or alkaline battery packs (interchangeable)
- Alarm latching or non-latching
- High impact, dust and water resistant design
- Up to 600 hours of datalogging with alarm trends
- Snap-logging - on demand data recording
- TWA and STEL readings with lunch-break mode
- Intrinsically safe, ATEX/IECEx/CE or CSA/CE (Optional)
- 2 year warranty

With the GX-2012, you have multiple tools in one instrument. Having 3 operating modes, the GX-2012 can be used for confined space, safety monitoring in it's Normal Operating mode; for leak investigation in Leak Check mode; and for underground leak checking in Bar Hole mode. When equipped with an optional TC sensor, the GX-2012 can measure 100% volume methane and dynamically auto range from % LEL to % volume. This is ideal for line purge testing.

Built around high-quality micro-sensor technology, the GX-2012 is RKI's smallest personal 1-5 sensor gas monitor with a built in sample pump. Weighing only 12.3 ounces, the GX-2012 can monitor the standard confined space gases (LEL combustibles, Oxygen content, Carbon Monoxide, and Hydrogen Sulfide).

The GX-2012's large LCD display shows all gas readings, battery level, current time, and will automatically backlight in alarm conditions. Standard alarm types include vibration, visual, and audible alarms, which can be set to latching or non-latching. Controlled by a microprocessor, the GX-2012 continuously checks itself for sensor connections, low battery, circuit trouble, low flow, and calibration errors. The GX-2012 can interchangeably operate on either a Li-ion battery pack or an alkaline battery pack. The batteries are simple to replace requiring no tools to access the removable battery compartment or pack.

Calibration and bump test intervals and reminders are user adjustable and can be set to either go into alarm or to lock the user out of normal measurement mode once a calibration period has expired. Calibrations can be performed automatically or individually in single calibration mode. The GX-2012 is also compatible with the economical SDM-2012 single channel calibration station.

RKI Instruments, Inc. • 33248 Central Ave. Union City, CA 94587 • Phone (800) 754-5165 • (510) 441-5656 • Fax (510) 441-5650

GX-2012 Model

Gas Detected	Combustible Gases (Methane as standard)	% Volume Methane	Oxygen (O2)	Hydrogen Sulfide (H2S)	Carbon Monoxide (CO)
Detection Principle	Catalytic combustion	Thermal conductivity	Galvanic cell	Electrochemical cell	
Detection Range	0 ~ 100% LEL 0 ~ 500 / 1,000 / 2,000 / 5,000 ppm	0 ~ 100% Vol.	0 ~ 40% Vol.	0 ~ 100 ppm	0 ~ 500 ppm
Accuracy Statement (whichever is greater)	± 5% of reading or ± 2% LEL (LEL mode only)	± 5% of reading or ± 2% of full scale	± 0.5% O2	± 5% of reading or ± 2 ppm H2S	± 5% of reading or ± 5 ppm CO
Sampling Method	Internal sample pump, flow rate nominal 0.5 LPM, includes hydrophobic filter				
Display	Digital LCD with 7 segments, auto backlight during alarm				
Preset Alarms (User Adjustable)	1st alarm 10% LEL 2nd alarm 50% LEL Over alarm 100% LEL	No alarms for % Vol. CH4	Low alarm 19.5% High alarm 23.5% Over alarm 40.0%	1st 5 ppm 2nd 30 ppm TWA 10 ppm STEL 15 ppm Over 100 ppm	1st 25 ppm 2nd 50 ppm TWA 25 ppm STEL 200 ppm Over 500 ppm
Alarms Types	Gas alarms: 1st and 2nd, STEL, TWA (user adjustable) and OVER Trouble alarms: Sensor connection, low battery, low flow, circuit trouble and calibration error				
Alarm Methods	Gas alarms: Flashing lights, two tone buzzer, and vibration Trouble alarms: Flashing lights, trouble displayed, intermittent buzzer, and vibration				
Operating Temp. & Humidity	-20°C to +50°C (-4°F to 122°F) 0 to 95% RH, non-condensing				
Response Time	Within 30 seconds (T90)				
Continuous Operation	Alkaline battery: 15 hours Li-Ion battery: 10 hours 70°F (21°C)				
Power Source	Li-Ion battery pack, or 3 “AA” Alkaline battery pack; interchangeable				
Safety Rating	ATEX, TIIS, IECEx, and CE or optionally: CSA classified as intrinsically safe. Class I, Division 1, Groups A, B, C, D, and CE **Note**: Either ATEX (USA and worldwide) or CSA (Canada) version must be specified when ordering.				
Dimension & Weight	Approx. 143 (H) x 71 (W) x 43 (D) mm (5.6” H x 2.8” W x 1.6” D), approx. 350 g (12.3 ounces)				
Case Material	High dust & water resistant design. RFI shielded high impact plastic with protective rubber overmolding				
Controls	Five buttons: POWER / ENTER, DISPLAY, AIR, RESET, SHIFT				
Standard Accessories	• Belt clip • 10” Probe • 10’ Hose	• Rubber nozzle, 3.5” • Manual • Training CD	• Datalogging software • Quick reference card		
Optional Accessories	• SDM-2012 calibration stations • Li-Ion battery pack • Sample draw hoses (10’ standard, up to 50’ max. available)	• Calibration kit • AC or DC Charger • Carrying case			
Configurations	1, 2, 3, 4, or 5 sensor units Li-Ion or alkaline battery pack options				
Warranty	Two years material and workmanship				

Specifications subject to change without notice.

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Authorized Distributor:

Quick Reference Guide For Model GX-2012

Note: Turn on and adjust the GX-2012 gas monitor in a known fresh air area.

1. Turning the GX-2012 ON

Note: This start up sequence assumes the following maintenance mode items are turned on: LNCH BRK, ID DISP, CL RMNDR, and BP RMNDR Set to CONFIRM

a. Attach the rubber nozzle or sample hose to the GX-2012's quick connect inlet fitting.

b. If a hose is used, attach probe to hose.

c. To turn on the GX-2012, press and briefly hold the POWER ENTER button until you hear a beep. The GX-2012 will begin its warm up sequence. The following screens may appear during the warm up sequence:

CAL TIME REMAINING (factory set to appear)

- If the instrument if overdue for calibration, the GX-2012 displays CAL. Press the RESET SILENCE button to continue.
- Calibration should be performed as soon as possible.

BUMP TIME REMAINING (does not appear with factory setting)

- If the instrument is overdue for bump testing, the GX-2012 displays "tESt B--Limit". Press the RESET SILENCE button to continue.
- A bump test should be performed as soon as possible.

SENSOR FAILURE

- If the GX-2012 experiences a sensor failure during start up, the LCD will display FAIL and indicate which sensor(s) failed. To continue operation press and release RESET SILENCE to acknowledge the failure. Gas readings for that sensor will be replaced by "- - -".
- It is necessary to replace the sensor and recalibrate before the GX-2012 is used.

2. Measuring Mode Screen

a. After warm up the GX-2012 will display the following: CH4 0%LEL, OXY 20.9%, CO 0ppm, H2S 0.0ppm (some readings may not appear if sensors are not installed).

b. If the readings are not displaying fresh air values as above, you must perform a Fresh Air Adjustment.

Quick Reference Guide For Model GX-2012

3. Performing a Fresh Air Adjustment

a. Performing a Fresh Air Adjustment will set the CH4, CO, and H2S channels to 0 and the OXY channel to 20.9%.

b. Take the instrument to a fresh air area where the air is free of toxic or combustible gas and has normal oxygen (20.9%).

c. Press and hold the AIR button. The display will prompt you to continue holding the AIR button.

d. The display will prompt you to release the AIR button. The GX-2012 will automatically set the fresh air readings for all channels.

e. The GX-2012 is now ready for use.

Note: If fresh air adjustment fails, refer to user's manual.

4. Flow Integrity Test

a. Place finger over end of probe or rubber tip. The GX-2012 should go into flow fail in a few seconds.

b. Press the RESET SILENCE button to restart the pump.

c. If the instrument fails to indicate flow failure, check probe and hose connections for leaks.

5. Breath Test (for instruments equipped with oxygen sensor)

a. If connected, remove hose and probe.

b. Exhale near the inlet fitting of the unit. Observe that the oxygen reading drops below the alarm setting of 19.5% and the audible and visual alarms are activated.

c. Press the RESET SILENCE button to reset the alarms the reconnect hose and probe.

6. Turning the GX-2012 OFF

Press and hold the POWER ENTER button until TURN OFF has disappeared from the bottom of the screen.
The GX-2012 is now off.

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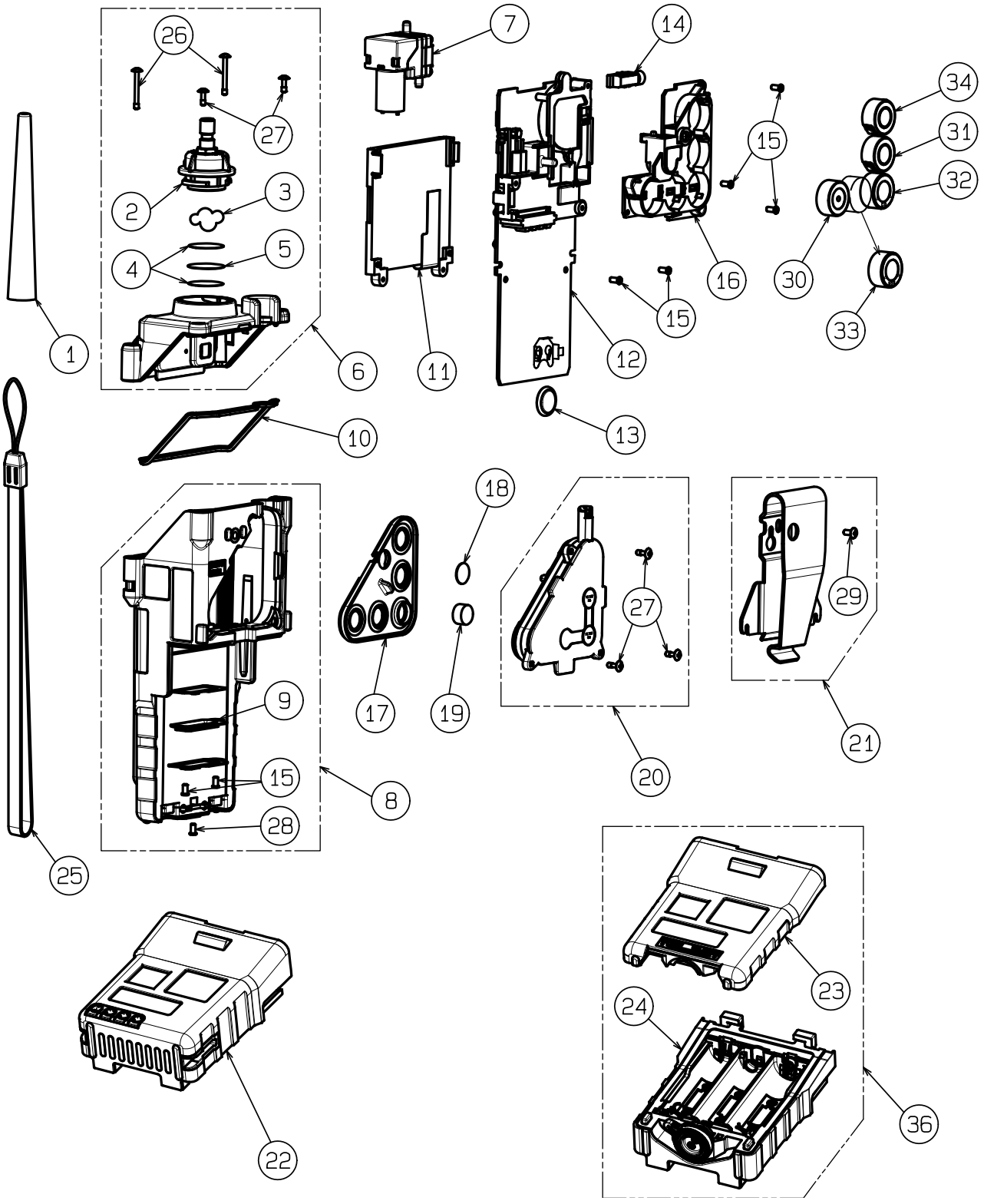
120110/1000 PN 71-0249RK Rev 0

GX-2012 Spare Parts

	Part #	Description
1.	**17-1001RK**	Tapered rubber inlet nozzle, 4”, RP-6 / GX-2003 / GX-2012 / Gas Tracer
2.	**21-1833RK**	Filter holder, clear plastic, GX-2003
3.	**33-1031RK**	Cotton balls, filters for probe, bag of 25
4.	**33-0159RK**	Teflon filter disc, 10 pieces, RP-6 / GX-2003
5.	**33-1112RK**	Wire mesh disk filter, RP-6 / GX-2003 / GX-2012, 10 pack
6.	**21-1890RK**	Top cover assembly, GX-2012 / Gas Tracer
7.	**30-0022RK**	Pump replacement for GX-2012 and RP-2009, with cable and connector
8.	**21-1889RK**	Main case assembly, GX-2012
9.	**07-6024RK**	Battery pack gasket, GX-2012 / Gas Tracer
10.	**07-6025RK**	Main case gasket, GX-2012 / Gas Tracer
11.	**51-1125RK**	LCD display, GX-2012 / Gas Tracer
12.	**57-2043RK**	CPU PC board assembly, GX-2012
13.	**49-1406RK**	Battery, lithium, CR 1220, for main PCB, GX-2012 / Gas Tracer
14.	**30-1053RK**	Vibration motor, GX-2003 / GX-2012 / Gas Tracer
15.	**10-1090RK**	Tap tight screw M2x4.5 mm, phillips self-tapping
16.	**57-2041RK**	Sensor PC board assembly, GX-2012
17.	**07-6026RK**	Sensor gasket, GX-2012 / Gas Tracer
18.	**33-7114RK**	Filter disk, H2S scrubber, 5 pack, for combustible diffusion port
19.	**33-7102RK**	Filter, charcoal, for CO sensor, pack of 5 GX-2009 / GX-2012 / Gas Tracer / GX-2001
20.	**21-1892RK**	Sensor cap assembly, GX-2012
21.	**13-0118RK**	Belt clip, GX-2012 / Gas Tracer
22.	**49-1615RK**	Batter pack, lithium ion, GX-2012 / Gas Tracer
23.	**49-1616RK-01**	Alkaline Battery pack cover with gasket, GX-2012 / Gas Tracer
24.	**49-1616RK-02**	Alkaline Battery pack without cover with gasket, GX-2012 / Gas Tracer
25.	**13-0112RK**	Wrist strap
26.	**10-1108RK**	Screw M2 x 16
27.	**10-1093RK**	Screw M2 x 6 SUS304
28.	**10-1091RK**	Screw M2 x 5 SUS
29.	**10-1092RK**	Truss screw M2 x 5
30.	**OS-BM2**	O2 sensor OS-BM2
31.	**NC-6264A**	LEL sensor NC-6264AS
32.	**ES-1821**	CO sensor ES-1821
33.	**ES-1827I**	H2S sensor ES-1827I
34.	**TE-7561**	VOL sensor TE-7561
35.	**SH-8641**	PPM sensor SH-8641, Gas Tracer
36.	**49-1616RK**	Alkaline Battery pack without batteries with gasket, GX-2012 / Gas Tracer

GX-2012 Spare Parts



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GX-2012

Service Training Module

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Scope

- **Calibration**
  - Auto/Single Cal
- **Maintenance**
  - Inlet filter/Battery replacement
  - Scrubber/Sensor Replacement
  - Internal component replacement
- **Modes**
  - Display/Maintenance/Factory
- **Low Flow Adjustment**
- **Common troubleshooting techniques**

2

Calibration - Required Equipment

1. Demand Flow Regulator
2. Cylinder(s) of calibration gas
   - If you have a 4-gas unit, you can get a 4-gas cylinder mix
   - If your unit is a 5-gas unit, you will require the 4-gas mix AND a 100%vol or 50%vol cylinder
3. Tubing To go from regulator to GX-2012 inlet

3

Auto Calibration Mode

- Enter Calibration Mode
  - From Normal Operation press and hold the (SHIFT)▼button, then press the DISPLAY(ADJ) button.
- If the unit prompts you for the password, enter it by using the ▲AIR and (SHIFT)▼ buttons to select each password number and then pressing and releasing POWER ENTER to confirm it.

4

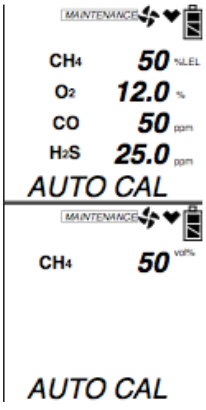
Auto Calibration Mode

- MAINTENANCE will appear along the top of the screen.
- AIR CAL will be displayed.
- Press POWER to enter and perform an air adjust

5

Auto Calibration Mode

- Use the ▲AIR and (SHIFT)▼ buttons to display the AUTO CAL menu item, press and release the POWER ENTER button to display the calibration values screen.
  - Use the ▲AIR or (SHIFT)▼ buttons to view the vol% calibration concentration.
- The gas concentrations displayed in the calibration values screen must match the gas concentrations listed on the calibration cylinder.



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Auto Calibration Mode

If concentrations do not match, continue with the following:

- To adjust the values on the screen, hold down the (SHIFT)▼ button, then press the DISPLAY(ADJ) button and release both.
  - The value for the combustible gas channel begin to flash.
- If necessary, use the ▲AIR or (SHIFT)▼ buttons to set the correct combustible gas units (vol% or %LEL).
  - Once value is set, press ENTER.

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Auto Calibration Mode

- Use the (SHIFT)▼ button to scroll to the oxygen channel settings.
  - Use the ▲AIR or (SHIFT)▼ buttons to set the oxygen zero setting.
  - Press the ENTER button when done.
- NOTE: The RKI Four Gas Cylinder typically contains 12% O2 by volume. Be sure to set the “OXY” reading to agree with the concentration listed on the cylinder’s label, not zero. Also, DO NOT use calibration gas cylinders with O2 concentration values greater than 19% by Volume.

8

Auto Calibration Mode

- Repeat steps above to set the correct values for the remaining channels. Use the ▲AIR button to scroll through the different channels. After the last channel is set, use the ▲AIR button to scroll to ESCAPE and press ENTER.

9

Auto Calibration Mode

- With the calibration values screen displayed, press the POWER/ENTER button. AUTO CAL begins to flash and the current gas readings are displayed.
  - If you want to exit back to the main menu without completing a calibration, press and release the DISPLAY (ADJ) button.
- You may only calibrate either the standard 4 gases or the % volume combustible gas sensor at a time.
- Once you are finished, you are returned to the initial AUTO CAL screen and must begin the auto calibration process again.

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Auto Calibration Mode

- Connect the tubing from the gas cylinder to the inlet fitting of the instrument.
  - Allow the gas to flow for 2 minutes or until the readings stabilize
- Press and release the POWER/ENTER button to set the calibration to programmed values.
- If all channels passed calibration, PASS displays along the bottom of the screen, then the calibration menu displays.

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Auto Calibration Mode

- If any of the sensors cannot calibrate to the proper value, FAIL displays along the bottom of the screen and the GX-2012 lists the sensor(s) that failed to calibrate. The buzzer and alarm lights activate.
  - Press and release the RESET SILENCE button to reset the alarm and return to the calibration menu. Attempt to calibrate again. If the failure continues, investigate the cause.

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Auto Calibration Mode

- Disconnect the tubing from the inlet fitting of the unit.
- Unscrew the demand flow regulator from the calibration cylinder.
- If you have a 5 sensor unit and wish to calibrate the % volume sensor, go back to the first step and repeat the process.
- Once you are finished calibrating, use the (SHIFT)▼ button to navigate to the NORMAL menu item, then press and release the POWER ENTER button to return to Measuring Mode.

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Single Calibration Mode

- While in the calibration menu, use the ▲AIR or (SHIFT) ▼ button to navigate to the ONE CAL menu option.
- Press and release the POWER/ENTER button to display the single calibration menu.
  - CH4 and --- will be displayed.

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Single Calibration Mode

- Use the ▲AIR or (SHIFT)▼ button to display the channel you want to calibrate (in this example the combustible gas % LEL sensor). If you have a 5 sensor unit, pressing the ▲AIR button will display %vol and allow you to calibrate that sensor.

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Single Calibration Mode

- Press and release the POWER/ENTER button. The single calibration screen displays for the sensor you selected. The gas reading flashes.
- Connect the tubing from the demand flow regulator to the inlet fitting of the instrument. Allow the calibration gas to flow for 2 minutes or until the readings stabilize.

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Single Calibration Mode

- If necessary, use the ▲AIR and (SHIFT)▼ buttons to adjust the reading to match the concentration listed on the calibration cylinder.
- Press and release the POWER ENTER button to save the span value. The LCD will indicate that the calibration has ended, then will return to the ONE CAL screen.

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Single Calibration Mode

- Repeat previous steps for any other channels you want to calibrate. Make sure you use an appropriate calibration cylinder for each channel.
- After the last channel is calibrated, disconnect the calibration tubing from the inlet fitting, then remove the demand flow regulator from the calibration cylinder.
- Use the (SHIFT)▼ button to scroll to ESCAPE then press the POWER button.

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Single Calibration Mode

- With the ONE CAL menu option displayed, press the (SHIFT)▼ button until the NORMAL menu option is displayed.
- Press and release the POWER ENTER button to return to Measuring Mode.

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GX-2012 Maintenance

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Alarm Types and Indications

Alarm Type	Visual Indications	Other Indications
Low Alarm (Concentration of gas rises above the Warning level, or falls below the Low Alarm level for O2)	WARNING appears below the gas list Reading for the gas in alarm flashes Alarm LED arrays flash Backlight turns on	Buzzer sounds alternating between a low and high pitch Vibrator pulses
High Alarm (Concentration of gas rises avoce the Alarm level, or rises above the High Alarm level for O2)	ALARM appears below the gas list Reading for the gas in alarm flashes Alarm LEDs flash faster than warning indication Backlight turns on	Buzzer sounds alternating between a low and high pitch faster than warning indication Vibrator pulses faster than warning indication
TWA of STEL (Concentration of CO or H2S rises above the TWA or STEL alarm point setting)	TWA or STEL appears below the gas list Alarm LED arrays flash Backlight turns on	Buzzer sounds alternating between a low and high pitch at the same rate as the warning indication Vibrator pulses at the same rate as warning indication
Over Range	Gas readin greplaced by brackets flashing at same rate as alarm indication Alarm LEDs flash ate the same rate as alarm indication Back light turns on OVER appears below the gas	Buzzer sounds alternating between a low and high pitch at the same rate as the alarm indication Vibrator pulses at the same rate as alarm indication

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Alarm Types and Indications

Alarm Type	Visual Indications	Other Indications
Low Flow*	The display indicates FAIL LOW FLOW The Alarm LEDs flash	Buzzer sounds a double pulsing tone (two pulses in quick succession)
Low Battery Warning*	Battery icon blinks	None
Dead Battery Alarm*	Gas readinsg replaced by FAIL Fan symbol disappears BATTERY displayed along bottom of the screen Alarm LED arrays flash	Buzzer sounds a double pulsing tone (two pulses in quick succession)
Clock Failure*	FAIL CLOCK appears on the display Alarm LED arrays flash	Buzzer sounds a double pulsing tone (two pulses in quick succession)
System Failure*	FAIL SYSTEM appears on the display Alarm LED arrays flash	Buzzer sounds a double pulsing tone (two pulses in quick in quick succession) A failure code appears
Microprocessor Failure* (Note: the unit will not operated if this alarm occurs)	Heart indicator is steadily on or not on at all	None

*This alarm can also occur in Bar Hole Mode

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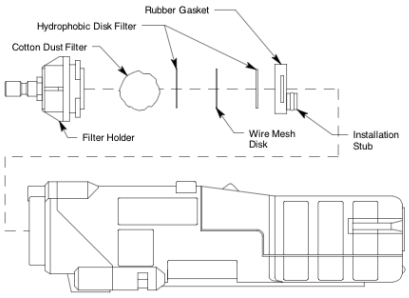
Replacing the Filters

- Verify that the GX-2012 is off.
- Locate the filter holder at the top of the unit.
- Grasp the filter holder and turn it 1/4 turn counterclockwise.
- Pull the filter holder away from the case.
- Remove and replace hydrophobic filters and cotton ball if dirty.



23

Replacing the Batteries

- Turn off the GX-2012
- Push the latch on the bottom of the GX-2012 toward the front of the instrument to release the battery pack.

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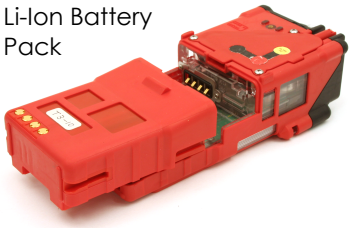
Replacing the Batteries

- Slide the battery pack away from the instrument
- Insert a new battery pack
- Push the battery pack into the instrument until you hear a click as it locks in place.

Alkaline Battery Pack

Li-Ion Battery Pack



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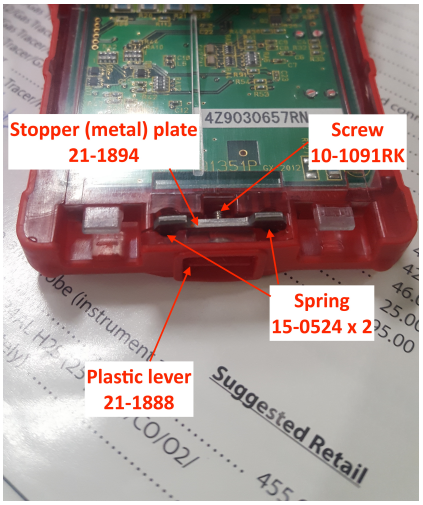
Replacing battery locking parts

Battery locking components can get lost when customers unnecessarily remove the screw on the plastic lever to change a battery.

See figure on right for these replacement part numbers.



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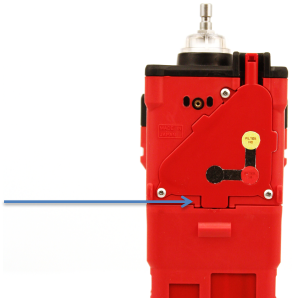
Replacing the Sensors

- Use a screwdriver to remove the three screws holding the belt clip on
- There will be one screw left holding the flow chamber to the instrument. Remove.
- Remove the battery pack getting access to tab.
- Grab the exhaust port and using a flat blade screwdriver on exposed tab, lift up on tab and port to remove flow chamber from unit.



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Replacing the Scrubbers

Place the charcoal filter over the CO sensor

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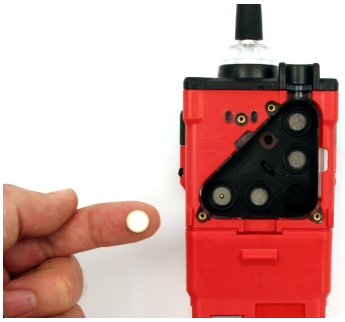
Replacing the Scrubbers



Place the H2S Scrubber over the LEL sensor

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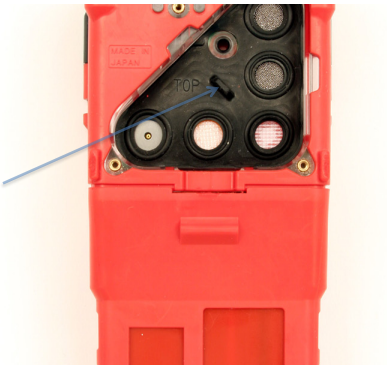
Replacing the Sensors



Gently pull the tab of the sensor gasket to remove it and expose sensors.

Do not lose any of the scrubber filters that are currently installed.

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Replacing the Sensors

Remove the sensors from their sockets

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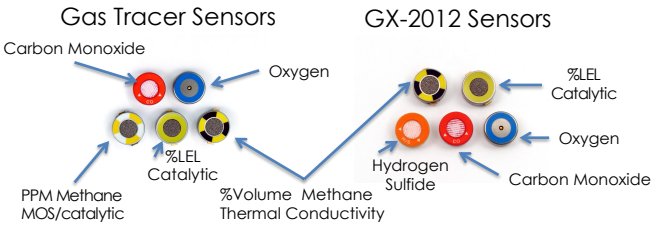
Replacing the Sensors



Carefully insert the replacement sensor in the correct key color coded socket.

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Replacing the Sensors

Place the sensor gasket and scrubbers back into the chamber.

Carefully tuck edge of sensor gasket inside case to seal.

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Replacing the Sensors

Place the flow chamber in position over the sensor area and press it into the case until it is flush with the back of the case.

Tighten the top screw of the flow chamber completely.

Place the belt clip into position and tighten the three screws retaining it.

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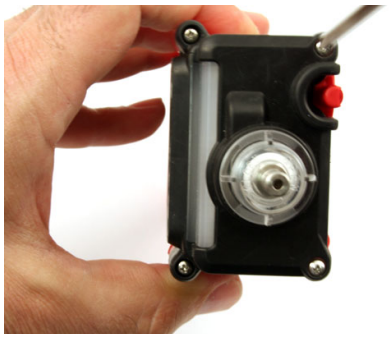
Replacing the Pump



Unscrew the 4 screws in the top of the unit

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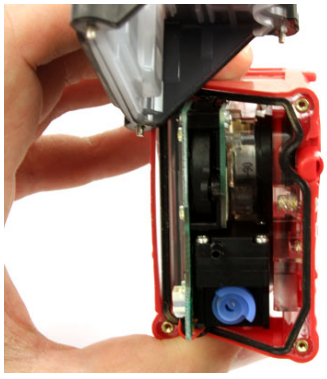
Replacing the Pump



Take off the top cover by pulling straight up

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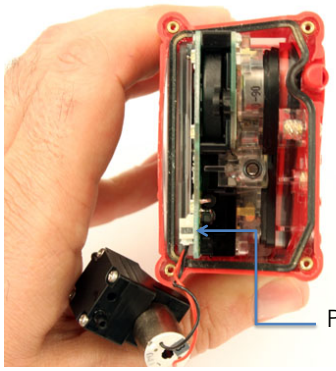
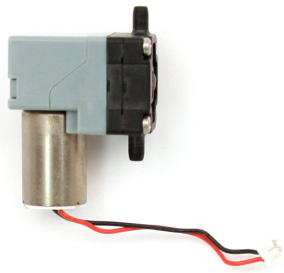
Replacing the Pump



Grasp the pump and gently pull it out of the unit.
Unplug the connector from the circuit board.

37

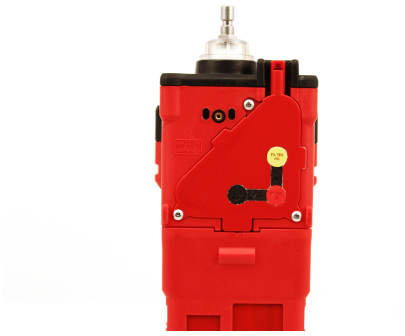
Replacing the Pump



Pump maintenance consists of cleaning diaphragm, valves, replacing diaphragm or replacing the entire pump assy.

38

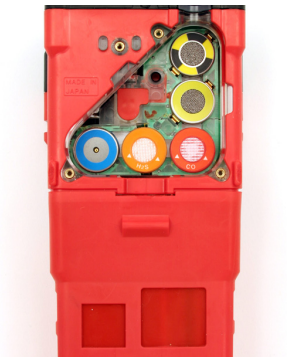
Replacing the LCD



Remove the three screws holding the flow chamber and remove flow chamber from unit.

39

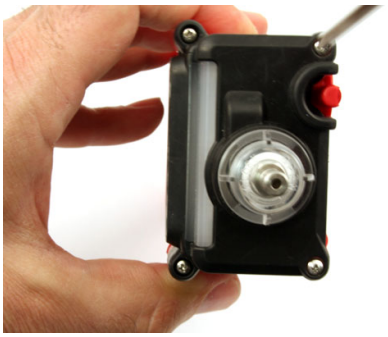
Replacing the LCD



Remove the sensors from their sockets

40

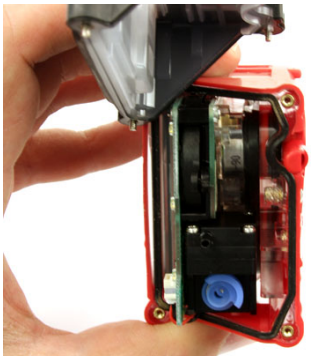
Replacing the LCD



Unscrew the 4 screws in the top of the unit.

41

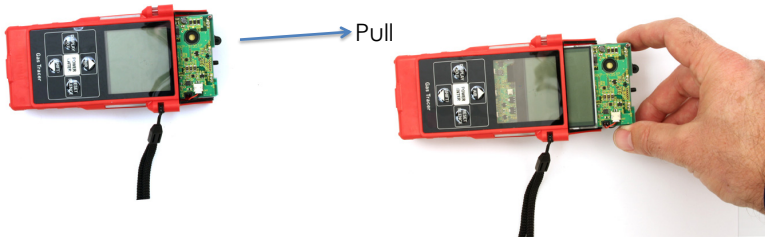
Replacing the LCD



Take off the top cover by pulling straight up.

42

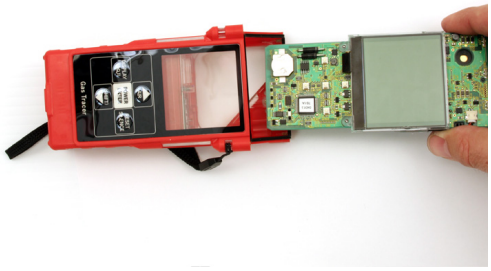
Replacing the LCD



Once the top is off the unit, gently pull the board out of the top of the unit

43

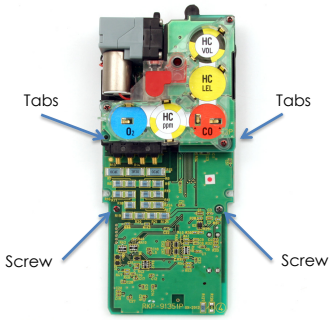
Replacing the LCD



The board should slide out easily.

44

Replacing the LCD

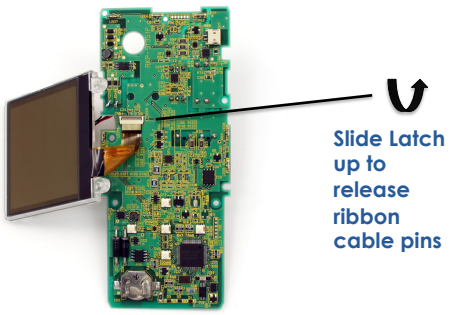


Unscrew the 2 screws holding in the bottom of the LCD. Next locate the two tabs on the side of the board, under sensor board.

Use a flat head screw driver to gently unlock tabs from PCB.

45

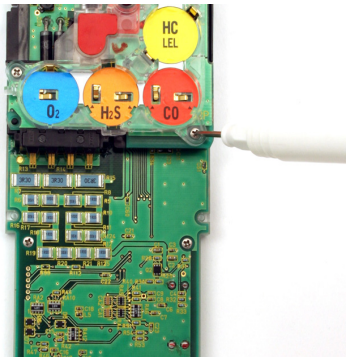
Replacing the LCD



The next step is to remove the ribbon cable and install the new LCD. Install in reverse order.

46

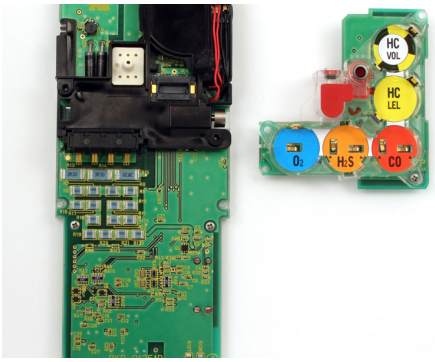
Replacing the Sensor Board



Remove the 3 screws holding in the Sensor board.

47

Replacing the Sensor Board



The next step is to remove the sensor board and install new one. Look for corrosion on the gold sensor contacts.

48

GX-2012

Display / Maintenance / Factory Modes

49

Display Mode

While in Normal Operation, push DISPLAY(ADJ) to cycle through

- HC Range
  - Only visible if %vol TC sensor installed
    - Switch between %LEL/%vol/autorange for combustible units
- Peak readings (reset when turned off and back on)
- STEL - Short Time Exposure Limit (15min)
- TWA – Time Weighted Average (8hr)
- Alarm Points/full scale/STEL/TWA limits
- Operation Time
- Date/Time
- Remaining Log Time
- Clear Data Log
- Pump Off
- User/Station ID
- Snap Log View
- Peak Bar

50

Maintenance Mode

- Take the GX-2012 to a non-hazardous location, and turn it off if it is on.
- Press and hold the AIR▲ and (SHIFT)▼ buttons, then press and hold the POWER ENTER button. When you hear a beep, release the buttons. The unit will prompt you for a password.

51

Maintenance Mode

- Enter the password by using the AIR▲ and (SHIFT)▼ buttons to select each password number and then press and release POWER ENTER to move on to the next one.
  - A password is always needed to enter Maintenance Mode even if the **PASSWORD** menu item in Maintenance Mode has been turned off (factory setting). The factory set password is 2102. You may change this password by entering the **PASSWORD** menu item in Maintenance Mode.

52

Maintenance Mode

- Once you enter Maintenance Mode, MAINTENANCE will appear along the top of the screen and DATE appears on the bottom of the LCD.
- Use the (SHIFT)▼ button to move through the menu item screens.

53

Maintenance Mode

- DATE – updating the date and time settings
- AIR CAL – perform a fresh air adjustment
- AUTO CAL – perform an automatic calibration on LEL/O2/CO/H2S at once or on %vol
- ONE CAL – manual calibration of one sensor at a time
- BUMP - The BUMP menu item will not appear unless BUMP DSP is set to “ON” (the factory setting is “OFF”).

54

Maintenance Mode

- LNCH BRK - on/off
  - With LNCH BRK “OFF” (factory setting), the GX-2012 automatically starts new TWA and PEAK reading collection and resets the time in operation at startup
  - With LNCH BRK “ON”, the Resume Measurements Screen displays during startup. From this screen, you can choose to continue accumulating TWA and PEAK readings and the time in operation from the last time the GX-2012 was used or start collecting new readings and reset the time in operation.

55

Maintenance Mode

- LATCHING - latching/non-latching
  - With LATCHING set to ON (factory setting), the GX-2012 remains in alarm condition until the alarm condition passes *and the POWER ENTER button is pressed.*
  - With LATCHING set to OFF, the GX-2012 automatically resets an alarm when the alarm condition passes.

56

Maintenance Mode

- ALM SLNC - on/off
  - With ALM SLNC set to ON (factory setting), pressing and releasing the RESET SILENCE button silences the buzzer when the GX-2012 is in alarm. The LEDs continue to flash and the display continues to show the alarm until the reset button is pushed after the alarm condition has passed.
  - With ALM SLNC set to OFF, you cannot silence the buzzer. If an alarm condition occurs, and you enter Display Mode, the buzzer will not be silenced and the LEDs will continue to flash until the reset button is pushed after the alarm condition has passed.

57

Maintenance Mode

- LG INTVL - interval trend time setting
  - 10 minutes, 5 minutes (factory set), 3 minutes, 1 minute, 30 seconds, 20 seconds, or 10 seconds

58

Maintenance Mode

- ALARM--P - alarm point setting
- DLOG DSP - data logger clear screen display setting
- BUMP DSP - bump feature setting
  - If “OFF”, the bump menu item in Calibration Mode and Maintenance Mode does not appear. In addition, the BUMP—SET, BP INTVL, BP RMNDR, and BP EXPRD menu items will not display in Maintenance Mode (the factory setting is OFF)

59

Maintenance Mode

- POFF DSP - When set to ON, the Pump Off Screen appears in Display Mode and the user can turn off the pump in order to conserve battery power. If set to OFF (factory setting), the Pump Off Screen does not appear in Display Mode and the user cannot turn the pump off.

60

Maintenance Mode

- BUMP -- SET - used to adjust the bump test parameters
  - Press and release the POWER ENTER button. The values displayed are for GAS TIME, CHECK (bump test tolerance), CAL TIME, and AUTO CAL. The cursor on the left of the screen shows which setting is associated with the parameter shown at the bottom of the screen. Use the AIR or (SHIFT) buttons to scroll up or down along the list

61

Maintenance Mode

- BEEP. SET – updating the confirmation beep setting
  - With BEEP. SET set to ON, the GX-2012 beeps once every 5 minutes to verify that it is operating.
  - With BEEP. SET set to OFF (factory setting), the GX-2012 does not sound a confirmation beep.
- OVER WRT - data logging over write setting
  - With OVER WRT set to ON (factory setting), the GX-2012 writes over the oldest data with new data when the data logger memory is full.
  - With OVER WRT set to OFF, the GX-2012 stops saving data to the data logger when the data logger memory is full.

62

Maintenance Mode

- CL INTVL - calibration interval setting
  - The minimum setting is 1 day and the maximum setting is 255 days (The factory setting is 90 days).
- CL RMNDR - calibration reminder on/off
  - If “ON” (factory setting), the GX-2012 will give an indication at start up if it is due for calibration
- CL EXPRD - calibration expired performance setting
  - Confirm, Not Use, or No Effect (if CL RMNDR is set to “ON”)

63

Maintenance Mode

- C--CHECK - calibration reminder 4 gas/ALL setting.
- BP INTVL – minimum setting is 0 days and the maximum setting is 30 days.
- BP RMNDR – With BP RMNDR set to ON, the GX-2012 will give an indication at start up if it is due for bump testing. The type of indication will depend on the BP EXPRD setting.

64

Maintenance Mode

- BP EXPRD – CONFIRM, NOT USE, or NO EFFECT
- B--CHECK - BUMP reminder 4 gas/ALL setting
- ID DISP - on/off
  - If ID DISP set to “ON”, the User ID Screen and Station ID Screens display during start up and in Display Mode (The ID’s can be updated in Display Mode).
  - If ID DISP set to “OFF” (factory setting), the User ID Screen and Station ID Screens do not display during start up or in Display Mode.

65

Maintenance Mode

- BCK LGHT - back light lighting time setting
  - The minimum setting is 0 seconds; the maximum setting is 255 seconds (the factory setting is 30 seconds).
- AUTOZERO - on/off
  - If “ON”, the GX-2012 will automatically perform a fresh air adjust when it is turned on (the factory setting is “OFF”).

66

Maintenance Mode

- DEMAND Z - Demand Zero on/off
  - If “ON”, allows you to manually perform a fresh air adjust in normal operation by pressing the AIR▲ button (the factory setting is ON).
- L./B. MODE - LB Mode setting
  - If “OFF” (factory setting), the GX-2012 will automatically enter Normal Mode when it is turned on.
  - If you wish to use this feature, you can choose between: BH, LC, BH LC

67

Maintenance Mode

- B.H. TIME - Bar Hole measuring time setting
  - 30 seconds, 45 seconds or 60 seconds
- PORTUGAL
  - Changes instrument language to Portuguese
- CO DISP
  - Updating the Leak Check Mode CO channel display setting.

68

Maintenance Mode

- ROM/SUM – Instrument's firmware version and checksum
- PASSWORD - password setting on/off
  - If "ON", the GX-2012 prompts you for a password when you enter Calibration Mode
  - If "OFF" (factory setting), no password is required to enter Calibration Mode.
- FLOW ADJ - low flow set point adjustment
- START – Press POWER ENTER to return to normal operation.

69

Using Factory Mode

- Press and hold the RESET/SILENCE, (SHIFT)▼ and DISPLY/(ADJ)buttons, then press and hold the POWER ENTER button. When you hear a beep, release the buttons. The unit will prompt you for a password.
- Enter the password (1994) by using the AIR▲ and (SHIFT)▼ buttons to select each number.

70

Using Factory Mode

- Once you enter Factory Mode, MAINTENANCE will appear along the top of the screen. The DATE Screen displays.
- Use the AIR▲ or (SHIFT)▼ button to move through the menu item screens as needed.

71

Factory Mode

- DATE – updating the date and time setting
- GAS COMB - allows the user to turn on/off gas channels
- HC SEL. – Select combustible gas
  - (CH4, i-C4H10)
- HC RANGE – Select combustible range
  - LEL, VOL, Auto ranging
- LATCHING - latching/non-latching
- L./B. MODE - LB Mode setting
- B.H. TIME - Bar Hole measuring time setting
- ZR FLLWR - on/off

72

Factory Mode

- ALM SLNC - on/off
- LNCH BRK - on/off
- LG INTVL - Interval trend time setting
- DLOG DSP - data logger clear screen display setting
- BUMP DSP - bump feature setting
- ROM/SUM - ROM Number
- A/D VAL
- FLOW ADJ -low flow set point adjustment

73

Factory Mode

- DSP AL--P - Full scale/Alarm point (alarm test)
- DEFAULT – reverts to a 5-gas
- START - Start Measurement

74

Setting Flow Alarm

75

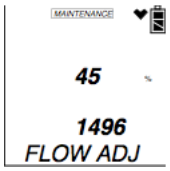
Setting Flow Alarm

- Entering Maintenance Mode
  - Press and hold the AIR and SHIFT buttons, then press the POWER ENTER button and release all when the unit beeps
  - First screen will prompt you for the password- Enter 2102
  - Press ENTER

76

Setting Flow Alarm

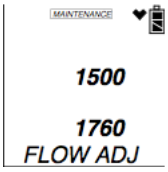
- Use the Air key to scroll through the menu items
- Select FLOW ADJUSTMENT by pressing ENTER
- Two values will be displayed
  - The top value is a percentage
  - The bottom value is the current low flow alarm point (this is the value we are most concerned with.)



1

Setting Flow Alarm

- Using the AIR or SHIFT button to set bottom value as close to 1500 then press ENTER.
- The pump will turn on and two new values will be displayed. The top will be a reference value and the bottom will reflect the pump's current draw.
- Connect a flow meter to the inlet of the instrument and adjust it to 0.6 SCFH ± 0.1 SCFH. This will be the low flow set point.
- Press the POWER ENTER button to set the trip point.
- Use the SHIFT button to select START MEASURMENT then press POWER to exit.



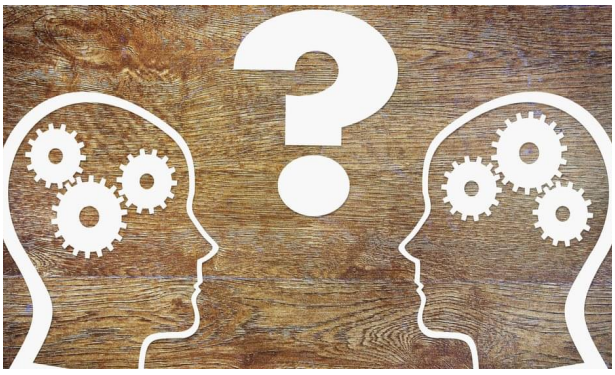
2

Common troubleshooting techniques

- Fail cal
  - Gas expired - Old sensor
  - Old filter - Auto cal value
  - Correct regulator
- Low Flow
  - Sensor / filter missing / misplaced
  - Gasket seated square
  - Clogged inlet / hose / probe
- Clock won't reset / Fail clock
  - Replace memory retention battery
- Cal interval not reset
  - Did a full cal? (4-gas vs 5-gas)
  - Replace memory retention battery

3

Questions?



4

INSTRUMENTS
Gas Detection For Life

GX-2012
Hands-on Worksheet

Objective:

Carefully evaluate your GX-2012 and list below any problems you have found with the instrument and what would be required to bring the instrument back to proper working order.

1) Instrument Serial Number: _____

2) Sensor Date Codes: LEL _____, O2 _____, CO _____, H2S _____

3) What is the voltage of the O2 sensor? _____ Is it in spec? (yes or no)

4) Are any of the sensors under warranty? _____ (List sensors that are still under warranty)

5) Inspect the CO and LEL scrubbers. Are they installed? Yes/No Are they in good condition? Yes/No

6) Calibrate all sensors using One Cal method. What is the maximum span on LEL, CO and H2S for your unit? LEL _____ CO _____ H2S _____

7) Calibrate your GX-2012 using Auto Cal method.

8) What is the condition of the inlet filters?

9) What is the flow rate of your pump?

10) Check your low flow setting. At what point does your instrument trip? _____

INSTRUMENTS

Gas Detection For Life

Training Notes