



Honeywell BW
2018 CSTW

CONNECTED WORKER

BW Portable Gas Detection Certified Service Training

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S.P.A.C.E.R.

Safety

Site regulations; identify emergency exits; washrooms; escort required badge; smoking policy; when working with calibration gas cylinders it is important to lay the cylinders down to avoid accidents.

Purpose

Improve your knowledge of portable safety gas detectors; sensor technology; increase your product service capability; and, provide a service certificate for the BW product line.

Agenda

Discuss the core sensor technologies, provide hands on operations, maintenance, bump testing and calibration experience.

Code of Conduct

Please have phones on vibrate or off, breaks will be provided throughout the session. Recording or taping training session is not permitted.

Expectations

Be on time; learn something new.

Roles

Participate and ask questions.

General Repair Guidelines

Prior to returning a monitor to customer always

- Calibrate
- Bump test and check for stability

Following rules of intrinsic safety

- NO SOLDERING permitted

Sensor Warranty

- NH₃, ETO, ClO₂, Cl₂, O₃, PID sensors - 1 year warranty
- 3 year BW Clip - 3 year warranty
- GasAlertMicroClip X3 O₂ sensor - 3 year warranty
- All other sensors - 2 year
- Any product replaced under warranty will have a pro-rated warranty period

Corroded monitors are not covered by warranty

- Not to be repaired

Universal Repair Tips

If monitor display is missing segments

- Clean zebra strips

Replace sensor if

- Sensor shows fail
- Fails to bump and calibrate
- Values constantly float up and down

If unit has erratic toxic sensor

- Try airing out over a weekend and then recalibrating
- Often fixes poisoned sensors

When reassembling a monitor

- Always turn counter clockwise until a click is felt then tighten
- If monitor has more than three stripped screws replace case

180 days is typical calibration interval - exceptions:

- BW Clip – calibration not required
- GasAlert Extreme HCN – 90 days

Factors Affecting Battery Life

Alarm activity

Backlight use

Operating Temperature

- Colder temperatures significantly reduce battery runtime

Age of rechargeable battery

Initial charge/discharge cycle

- Rechargeable batteries should be fully discharged then fully charged again 3 times to ensure maximum life

Monitor Cleaning

- Approved cleaners for BW monitors
 - ACL Staticide
 - Warm water
 - Do not use any other cleaners such as Econoclean, citrus-based cleaners or Armor All
- To clean monitor
 - Apply cleaner of choice to clean cloth and wipe unit clean
- Avoid exposing sensor screens to cleaning liquid



Passcodes

MicroDock II	532
GasAlert Extreme	871
GasAlertMicro	898
GasAlertMicro 5 Series	1007
Fleet Manager II	Admin

Current Firmware

Product	Firmware
BW Clip	2.000
BW Clip RT	2.000
BW Clip4	1.33
GasAlert Extreme	N/A (not upgradeable in the field)
GasAlertMicroClip XT/XL	*40H / 50A
GasAlertMicroClip X3	50A
GasAlertMax XT II	12
GasAlertQuattro	4
GasAlertMicro 5 Series	40
MicroDock II	M2BF-02W
Fleet Manager II software	4.4.20
Intellidox	8.000 (select correct version for detector)

* **IMPORTANT:** 40E & 40F must be upgraded to 40H before proceeding to 50A

NOTE: as of 2017.11.20

Prior to use

- Understand the operation of the detector
- Understand and Follow appropriate regulations and/or corporate safety procedures
- Visually inspect the gas detector to ensure there are no cracks in the display or housing – cracks may compromise intrinsic safety and ingress protection - ensure sensor and alarm ports are clean and unobstructed
- Verify sensor response and alarm activation *before each day's use at a minimum – BUMP test Calibrate prior to first time use and then as recommended by the manufacturer at a minimum
- Be aware of the operating specifications for the detector
- Only turn the detector on, or zero sensors in “fresh air” – (0 ppm toxic gas; 0% combustible, 20.9% O₂)

* Bump test recommendation may vary for non-direct reading monitors

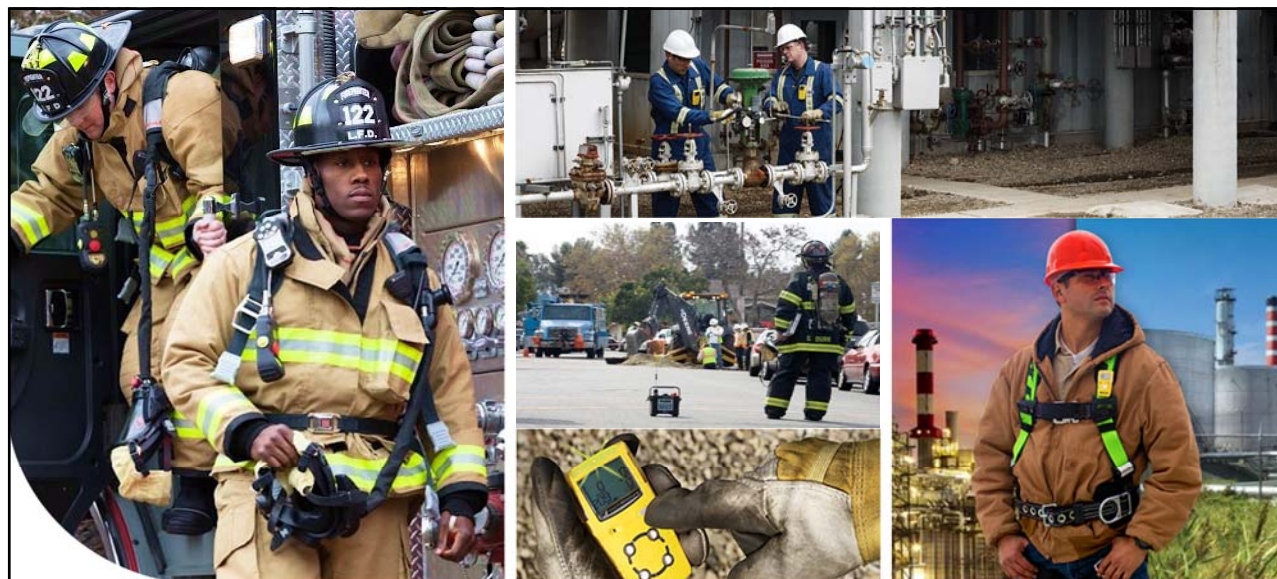
Cautions

- Over exposure can permanently damage sensors – anytime a sensor goes Over Limit the sensor performance should be verified – these are not leak detectors
- Avoid exposing sensors to airborne compounds that can affect sensor performance – eg: volatile silicone vapours; alcohols such as methanol; volatile citrus vapours...see slide “Substances to Avoid”
- If a detector fails a BUMP test do not use without further diagnosis
- Portable safety gas detectors should not be left in vehicles 24/7/365
- Take appropriate action to an alarm condition – do not ignore alarms if you don't believe what the gas detector is telling you
- Minimize use of detectors under conditions that exceed the operating specifications
- Use only recommended battery types

Common Gas Detection Acronyms

LEL/LFL	Lower Explosive Limit/ Lower Flammable Limit (synonymous)
UEL/UFL	Upper Explosive Limit/Upper Flammable Limit (synonymous)
%LEL	Percent of the Lower Explosive Limit
% v/v	Percent by volume (also expressed as % VOL)
ppm	Parts Per Million (10,000 ppm = 1% v/v)
VOC	Volatile Organic Compounds
PID	Photoionization Detection
TWA	Time Weighted Average
STEL	Short Term Exposure Limit
IDLH	Immediately Dangerous to Life and Health toxic gas concentration
IP	Ionization Potential
IP	Ingress Protection
IS rating	Intrinsic Safety Rating (device will not generate enough energy to be the source of ignition in a combustible atmosphere)
RFI/EMI	Radio Frequency Interference / Electro-Magnetic Field Interference
T90	Refers to sensor response time - time sensor takes to reach 90% of full response
LDL	Lowest Detectable Limit

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GasAlertMicro 5 Series
 Certified Service Technical Workshop

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Specifications

<u>Gas</u>	<u>Detection Range</u>	<u>Resolution</u>
O ₂	0 to 30.0 %	0.1 %
CO	0 to 1000 ppm	1 ppm
CO (dual COSH)	0 to 500 ppm	1 ppm
H ₂ S	0 to 100 ppm	1 ppm/0.1 ppm
H ₂ S (dual COSH)	0 to 100 ppm	1 ppm
Combustible gases	0 to 100% LEL	1.0% LEL
Methane	0 to 5% v/v CH ₄	0.1% CH ₄
PH ₃	0 to 5.0 ppm	0.1 ppm
SO ₂	0 to 150 ppm	1 ppm
Cl ₂	0 to 50.0 ppm	0.1 ppm
NH ₃	0 to 100 ppm	1 ppm
NO ₂	0 to 99.9 ppm	0.1 ppm
HCN	0 to 30.0 ppm	0.1 ppm
ClO ₂	0 to 1.0 ppm	0.01 ppm
O ₃	0 to 100.0 ppm	0.01 ppm
VOC	0 to 1000 ppm	1 ppm
CO ₂ (IR)	0 to 50,000 ppm / 0 to 5% v/v	50 ppm

NOTE: Some sensor combinations may not be compatible in the same gas detector.

Specifications

Operating Temperature: VOC: -10°C to +40°C (+14°F to +104°F)
 Others: -20°C to +50°C (-4°F to +122°F)
 Combustible gas sensor certified by CSA to +/- 3% LEL accuracy from -10°C to +40°C (+14°F to +104°F)

Operating Humidity: O₂: 0% to 99% RH (non-condensing)
 VOC/CO₂: 0 to 95% RH (non-condensing)
 Combustible: 5 to 95% RH (non-condensing)
 Cl₂: 10% to 95% RH (non-condensing)
 HCN, ClO₂: 15% to 90% RH (non-condensing)
 Others: 15% to 90% RH (non-condensing)

Pressure: 95 to 110 kPa

Instrument Dimensions: 14.5 x 7.4 x 3.8 cm (5.7 x 2.9 x 1.5 in)

Weight: 370 gm/13.1 oz.

Factory Default Alarm Set Points

Sensor	LOW	HIGH	TWA	STEL
H ₂ S	10 ppm	15 ppm	10 ppm	15 ppm
CO	35 ppm	200 ppm	35 ppm	50 ppm
Combustible	10% LEL	20% LEL	N/A	N/A
O ₂	19.5% v/v	23.5% v/v	N/A	N/A
SO ₂	2 ppm	5 ppm	2 ppm	5 ppm
NH ₃	25 ppm	50 ppm	25 ppm	35 ppm
Cl ₂	0.5 ppm	1.0 ppm	0.5 ppm	1.0 ppm
NO ₂	2.0 ppm	5.0 ppm	2.0 ppm	5.0 ppm
HCN	4.7 ppm	10.0 ppm	4.7 ppm	10.0 ppm
PH ₃	0.3 ppm	1.0 ppm	0.3 ppm	1.0 ppm
ClO ₂	0.1 ppm	0.3 ppm	0.1 ppm	0.3 ppm
O ₃	0.1 ppm	0.1 ppm	0.1 ppm	0.1 ppm
VOC	50 ppm	100 ppm	50 ppm	100 ppm
CO ₂	5,000 ppm	30,000 ppm	5,000 ppm	30,000 ppm

GasAlertMicro 5 Sensor Positions

1. Toxic 1
 - H₂S, CO, SO₂, PH₃, NH₃, NO₂, HCN, Cl₂, ClO₂, O₃, dummy sensor
2. Toxic 2
 - COSH (CO/H₂S), H₂S, CO, SO₂, PH₃, NH₃, NO₂, HCN, Cl₂, ClO₂, O₃, dummy sensor
3. O₂
 - O₂, dummy sensor
4. Catalytic Bead
 - Filtered catalytic bead combustible sensor, unfiltered catalytic bead combustible sensor, dummy sensor



GasAlertMicro 5 PID Sensor Positions

1. Toxic 1
 - VOC PID, dummy sensor
2. Toxic 2
 - COSH (CO/H₂S), H₂S, CO, SO₂, PH₃, NH₃, NO₂, HCN, Cl₂, ClO₂, O₃, dummy sensor
3. O₂
 - O₂, dummy sensor
4. Catalytic Bead
 - Filtered catalytic bead combustible sensor, unfiltered catalytic bead combustible sensor, dummy sensor



GasAlertMicro 5 IR Sensor Positions

1. Toxic 1
 - CO₂ NDIR, dummy sensor
2. Toxic 2
 - COSH (CO/H₂S), H₂S, CO, SO₂, NH₃, O₃, dummy sensor
3. O₂
 - O₂, dummy sensor
4. Catalytic Bead
 - Filtered catalytic bead combustible sensor, unfiltered catalytic bead combustible sensor, dummy sensor



Diffusion or Pump?

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GasAlertMicro 5 Series Diffusion Version

GasAlertMicro 5 Series portable safety gas detectors are available as a standard diffusion detector or with built in rotary vane pump for drawing atmospheric samples from remote locations.



GasAlertMicro 5 Series Pump Version

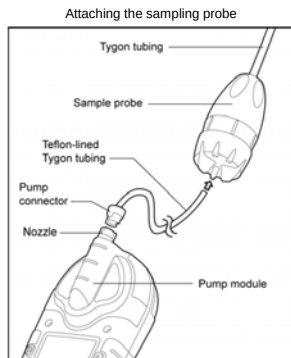
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Remote Sampling

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- It is essential to do a leak test on the sample tubing and components connected to the pump before use – leaks in the tubing will dilute the sample from the remote location
- For the GasAlertMicro 5 Series pump allow 3 seconds per foot of tubing for sample to reach sensors and then at least 60 seconds for readings to stabilize; or, continue sampling until readings stabilize.



To perform a leak test block the probe/tubing inlet – the detector must go into Pump Flow alarm

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Remote Sampling

Maximum hose length for sampling: w/sample probe 3 m (10 ft); w/particulate filter 20 m (66 ft)

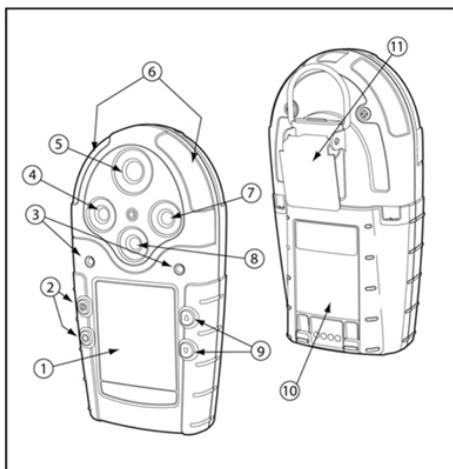


Sample Probe (0.3 m/1 ft) with hydrophobic and particulate filters



Metallic sintered particulate filter

Get to Know the GasAlertMicro 5



Item	Description
1	Liquid crystal display (LCD)
2	Pushbuttons
3	Audible alarms
4	Toxic 2 sensor
5	Toxic 1/PID sensor or Toxic 1/IR (CO2)
6	Visual alarm indicators (LEDs)
7	LEL sensor
8	Oxygen sensor
9	Pushbuttons
10	Battery pack
11	Alligator clip

Get to Know the GasAlertMicro 5



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Get to Know the GasAlertMicro 5

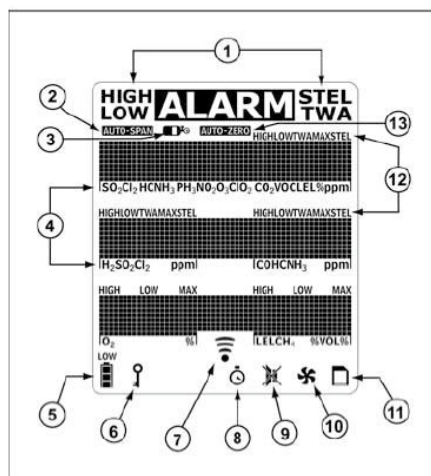
The GasAlertMicro 5 Series can be powered by an alkaline or rechargeable lithium battery pack.



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GasAlertMicro 5 Display



Item	Function
1	Alarm condition
2	Automatically span sensor
3	Gas cylinder
4	Gas identifier bars
5	Battery life indicator
6	Pass code lock
7	Data transmission
8	Clock
9	Stealth mode
10	Pump indicator (optional)
11	MMC indicator (optional)
12	Alarm condition (low, high, TWA, STEL, or multi alarm) or view TWA, STEL and peak (MAX) gas exposures
13	Automatically zero sensor

Operation Basics

Turn On: press and hold the **ON/OFF** (1) button in a "fresh air" location (0 ppm toxic gases; 0% LEL; 20.9% O₂); release (1) once detector activates.

Turn Off: when in standard operating mode press and hold **ON/OFF** (1) button; continue holding until Turning Off countdown reaches 0; release (1) button.

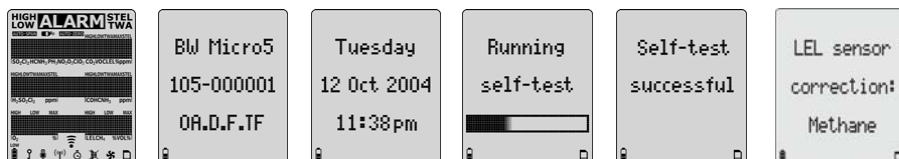
To view TWA, STEL, and MAX readings: when in standard operating mode press the **FUNCTION** (2) button.

To clear TWA, STEL and MAX values: when in standard operating mode press and hold the **FUNCTION** (2) and **UP** (3) button simultaneously until countdown is complete. **NOTE:** Resetting TWA, STEL and PEAK reading values will clear those readings. The information will be retained in the datalog files. Datalog files are overwritten once the memory reaches capacity; data is replaced on a FIFO basis. Confirm with your supervisor before clearing any readings.

To view Date, Time, Alarm Setpoints and CF setting: when in standard operating mode press the **UP** (3) button.

To perform an auto zero: when in standard operating mode press and hold the **FUNCTION** (2) and **DOWN** (4) buttons simultaneously; hold until display indicates Starting Calibration and release; once the auto zero is complete push the **ON/OFF** (1) button to advance to the standard operating mode.

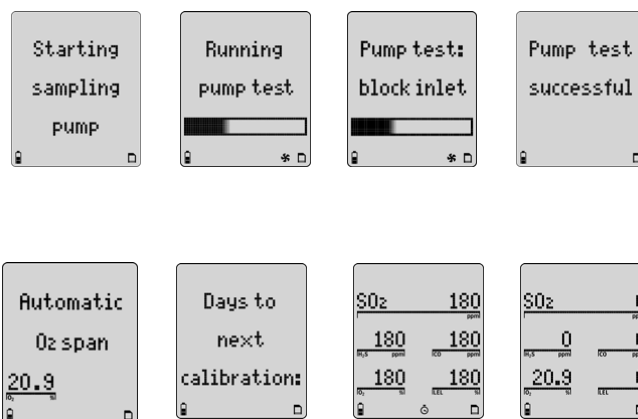
Typical Startup Sequence



For diffusion version
GasAlertMicro 5 skip
to Automatic O₂ span

Typical Startup Sequence 2

If the pump module is
attached the following
screen will display.



GasAlertMicro 5 Alarms

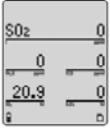
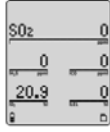
Alarms	Screen	Alarms	Screen
Low Alarm - Fast beep - Slow flash ALARM and gas type flash - Vibrator alarm activates		TWA Alarm - Fast beep - Slow flash ALARM and gas type flash - Vibrator alarm activates	
High Alarm - Constant beep - Fast flash ALARM and gas type flash - Vibrator alarm activates		STEL Alarm - Constant beep - Fast flash ALARM and gas type flash - Vibrator alarm activates	

GasAlertMicro 5 Alarms

Alarms	Screen	Alarms	Screen
Multi Alarm - Alternating low and high alarm beep and flash ALARM and gas types flash - Vibrator alarm activates		Over Limit (OL) Exposure Alarm - Fast beep and flash ALARM and gas type flash - Vibrator alarm activates	
Sensor Alarm - One beep every 15 seconds FAIL flashes above the failed sensor		Automatic Deactivation Alarm - Eight beeps and flashes LOW displays - Vibrator alarm temporarily activates	
Low Battery Alarm - One beep and two flashes every 25 seconds LOW flashes		Normal Deactivation Three beeps and flashes	

GasAlertMicro 5 Alarms

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Alarms	Screen	Alarms	Screen
Confidence Beep One beep, one flash, and one vibrate every 10 seconds		MMC/SD Fail Alarm - One beep every 5 seconds □ flashes	
Alarms		Screen	
Pump Alarm - Two fast beeps and alternating flashes - Vibrator alarm activates - ALARM and ✱ flash			

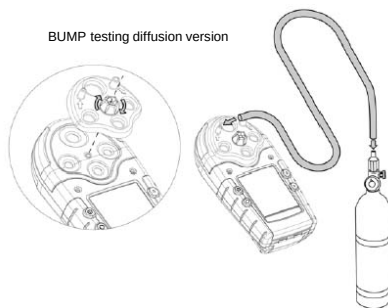
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GasAlertMicro 5 Manual BUMP Test

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- Perform a BUMP test prior to each day's use at a minimum
- Perform a BUMP test in "fresh air" (0 ppm toxic gases; 0% LEL; 20.9% O₂)
- To perform a BUMP test simply apply a concentration of target gas capable of activating detector alarms while in standard operating mode
- Visually observe all sensors respond to gas and verify alarms activate!
- Close the regulator, remove the calibration cap from the detector; the detector will remain in alarm until gas clears from sensors.



For the pump version connect the tubing quick connect fitting to the pump inlet. It is possible to use either a Demand Flow Regulator (DFR) or a standard fixed orifice regulator. NOTE: if using the fixed orifice regulator be sure to open the valve prior to attaching the tubing to avoid putting the pump into LOW FLOW alarm.



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GasAlertMicro 5 Manual Calibration

GasAlertMicro 5 - Calibration					
Procedure	Display	Procedure	Display	Procedure	Display
1. In a clean atmosphere, press and hold and simultaneously (as the detector beeps and flashes to the corresponding countdown) to enter calibration. The detect or then reads Starting calibration.		4. This option allows the user to select which sensor to span. Use and to scroll to a sensor and press to deselect it. Sensors should be spanned in the following order: exotics (NH3, ClO2, O3, and Cl2), single gas, quad gas (H2S, CO, O2, and LEL), and lastly PID.		7. Press or to change the calibration due date and press to accept this value and proceed to the next due date. (If a sensor failed or did not span, you cannot change the calibration due date for that sensor.) The display then advises to press to set or to bypass the alarm setpoints.	
2. flashes while the detector zeroes all of the sensors and calibrates the oxygen sensor. If a sensor failed to auto zero, it will bypass the span.		5. Attach the calibration cap and apply gas at a flow rate of 500 ml/min. flashes as the unit senses which gas is being applied. After 30 seconds, flashes and a countdown appears while the unit completes the span.		8. Press or to change the alarm setpoint and press to save the displayed value and proceed to the next setpoint. Set the remaining setpoints. The detector beeps twice at the end of the alarm setpoint stage.	
3. Next, the following three screens appear: - Apply span gas now to calibrate - or press to select sensor(s) - or press to skip calibration If no button is pressed, proceed to step #5. If is pressed, go to step #4. If is pressed, go to the end of step #6.		6. Once span is complete, the following three screens appear: - Calibration successful - Press to apply a new cal gas - Press to end span Repeat steps #3-6 to calibrate the remaining sensors. The display then advises to press to set or to bypass the calibration due dates.		9. Saving calibration is displayed to indicate that calibration is complete. <i>Note</i> <i>The calibration cap should only be used during the calibration process.</i>	

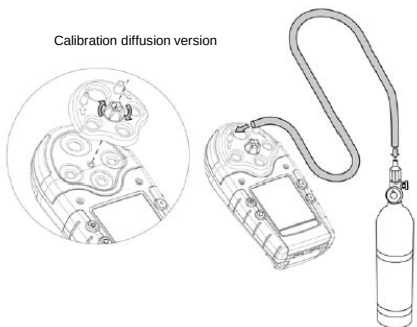
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GasAlertMicro 5 Manual Calibration

1. Put instrument into Cal mode.
2. Auto Zero
3. Auto Span
4. Apply Gas
5. Instrument beeps (4) & goes to alarm set Points
6. Remove Gas
7. Pressing the **ON/OFF** button will advance the detector to complete calibration

Calibration diffusion version



For the pump version connect the tubing quick connect fitting to the pump inlet. It is possible to use either a Demand Flow Regulator (DFR) or a standard fixed orifice regulator. **NOTE:** if using the fixed orifice regulator be sure to open the valve prior to attaching the tubing to avoid the pump going into LOW FLOW alarm.



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GasAlertMicro 5 Manual BUMP/Calibration

For the pump version connect the tubing quick connect fitting to the pump inlet. It is possible to use either a Demand Flow Regulator (DFR) or a standard fixed orifice regulator. NOTE: if using the fixed orifice regulator be sure to open the valve prior to attaching the tubing to avoid putting the pump into LOW FLOW alarm.



Fixed Orifice Regulator



Demand Flow Regulator

GasAlertMicro 5 Calibration Notes

- **When calibrating Chlorine**
 - Use a 1LPM regulator with no more than 10cm of hose
 - Always calibrate chlorine **after** H₂S
- **When prompted to zero CO₂ sensor use nitrogen not fresh air**
- **Do not use LEL correction factor unless monitor is calibrated to methane**
- **Do not use VOC correction factor unless monitor is calibrated to isobutylene**
- **Ensure span values match calibration gas concentration* (*understand any exceptions)**
- **If toxic 2 sensor (9 o'clock) is ammonia, chlorine, chlorine dioxide or ozone use single gas calibration cap**
- **NH₃ and SO₂ cannot be present in same instrument**

GasAlertMicro 5 Setup Options

Language	<i>Controls the language used for instrument status messages.</i>	<i>English French German Spanish Portuguese</i>	<i>English</i>
Automatic Backlight	<i>Allows or prevents the instrument from automatically activating the backlight in dark areas.</i>	<i>Enabled Disabled</i>	<i>Auto-backlight Enabled</i>
Confidence Beep	<i>Causes the unit to emit a beep once each few seconds.</i>	<i>Enabled Disabled</i>	<i>Beep Disabled</i>
Force Calibration For Overdue Unit	<i>Prevents the user from using an instrument that is over due for calibration until it is re-calibrated.^[1]</i>	<i>Enabled Disabled</i>	<i>Forced Cal Disabled</i>
Calibration Due Lockout	<i>Prevents the user from using an instrument that is over due for calibration, unless the pass code is entered. <u>[1]</u></i>	<i>Enabled Disabled</i>	<i>Pass Code Lock Disabled</i>

GasAlertMicro 5 Setup Options

Latching Alarms	<i>Unit holds alarm-generating readings until OK is pressed.</i>	<i>Enabled Disabled</i>	<i>Latching alarms off</i>
Pass Code	<i>User can not access calibration or user options unless pass code is entered.</i>	<i>Enabled Disabled</i>	<i>Pass code lock disabled</i>
Safe Mode	<i>Unit shows "Safe" when gas readings are normal, and reverts to normal operation when gas is detected. <u>[1]</u></i>	<i>Enabled Disabled</i>	<i>Safe off.</i>
Individual Sensor Enable	<i>Allows the user to enable or disable an installed sensor.</i>	<i>Sensor on Sensor off</i>	<i>Varies by unit configuration</i>
Calibration Span Gas Setting	<i>Allows user to set the concentration of gas used for sensor calibration.</i>	<i>Varies by sensor <u>Low limit:</u> as low as possible <u>High limit:</u> nominal sensor range</i>	<i>Varies by sensor</i>

[1] "Safe" mode and "Stealth" mode are mutually exclusive and can not be used together.

GasAlertMicro 5 Setup Options

STEL Period (toxics only)	Sets STEL calculation interval	5 to 15 minutes.	15 minutes.
TWA Method	Selects TWA calculation method OSHA = 8 hour rolling average ACGIH = continuous accumulation	OSHA ACGIH	OSHA
Resolution	Sets precision of displayed reading.	ClO2 and O3: 0.1 ppm 0.01 ppm All others: 1 ppm 0.1 ppm	Lowest precision setting
%-by-volume CH4	Switches combustible sensor from %LEL measurement to %CH4 measurement.	Disabled Enabled	Disabled (measure %LEL)
Automatic Calibration of O2 Sensor	Controls automatic calibration of oxygen sensor on startup	Enabled Disabled	Auto-cal enabled
Datalogger Interval	Sets recording interval of logger	1 to 127 sec	5 sec
Real Time Clock	Sets internal clock	Jan 1, 2004 to Dec 31, 2099	Varies by target country

GasAlertMicro 5 LEL Correction Factors

Gas:	CF – Relative to CH₄ Calibration:
Acetone	2.2
Benzene	2.1
Butane	2.0
Cyclohexane	2.5
Ethanol	1.7
Ethyl Acetate	2.2
Gasoline	2.1
Heptane	2.4
Hexane	2.3
Hydrogen	1.2
Isobutylene	1.7
Isopropanol	1.6
Methy Ethyl Ketone	1.7
Methane	1.0
Methanol	1.4
Octane	2.9
Pentane	1.8
Propane	1.5
Toluene	2.5
Turpentine	2.9
Custom	0.1 to 15.0

* Based on the catalytic bead combustible sensor without enhanced silicone resistant filter

GasAlertMicro 5 PID Correction Factors

Gas: **CF – Relative to C₄H₈ Calibration:**

Acetaldehyde	4.6
Acetone	1.2
ammonia	10.6
Diesel	0.9
Ethanol	13.3
Ethylene	9.1
Gasoline	0.7
Hexane	4.6
Isobutylene	1.0
JP-8	0.5
Kerosene	1.1
Methy Ethyl Ketone	0.9
Naphtha	1.0
Styrene	0.5
Toluene	0.5
Turpentine	0.5
Xylene	0.5
Custom	0.1 to 15.0

Downloading Data

- The GasAlertMicro 5 Series detectors store datalogs on a MMC/SD card
- To transfer the datalog files from the detector to Fleet Manager II software:
 - Deactivate the detector
 - Release and remove the battery pack
 - Remove the MMC/SD card

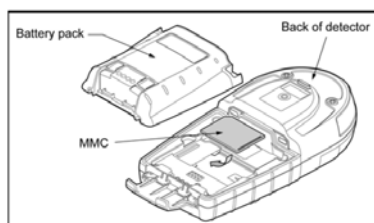
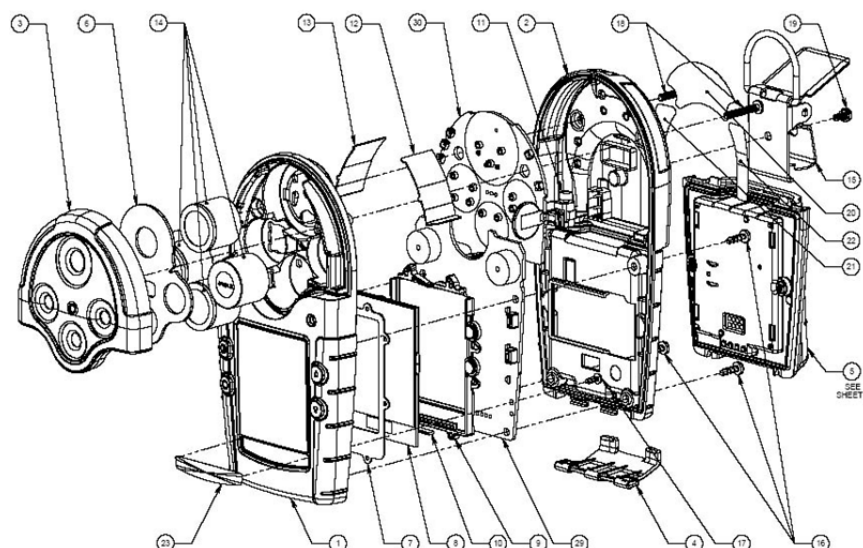


Figure 12. Inserting/Removing the MMC/SD Card

- Insert the MMC/SD card into a card reader and import the data to Fleet Manager II Software
- The datalogs cannot be downloaded through the MicroDock II system

GasAlertMicro 5 Components



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Replacing the Alkaline Batteries

Replacing the Alkaline Batteries

To replace the alkaline batteries, refer to [Figure 13](#), [Table 18](#), and the following steps 1-6.

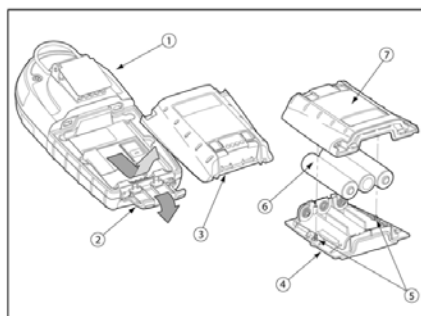


Figure 13. Replacing the Alkaline Batteries

Table 18. Replacing the Alkaline Batteries

Item	Description
1	Detector
2	Latch
3	Battery pack
4	Battery tray
5	Captive screws (2)
6	Alkaline batteries (3)
7	Battery shell

1. Open the latch on the bottom of the detector.
2. Remove the battery pack by lifting the bottom of the pack away from the detector.
3. On the battery pack, remove the two captive screws. Remove the battery shell from the battery tray.
4. Replace the three alkaline batteries.
5. Replace the battery pack and the captive screws.
6. Reinsert the battery pack and secure the latch.

*Use alkaline batteries that are recommended by BW Technologies by Honeywell: Duracell MN1500; Energizer E91VP

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Replacing the Lithium Battery Pack

Replacing the Lithium Battery Pack

To replace the lithium battery pack, refer to [Figure 14](#), and the following steps 1-4.

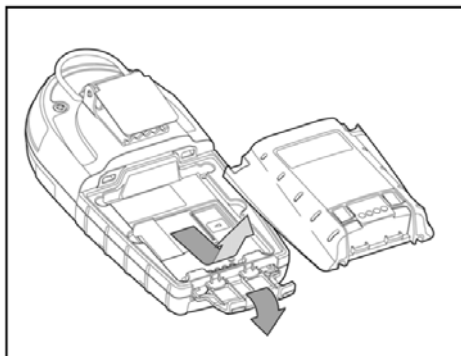


Figure 14. Replacing the Lithium Battery Pack

1. Open the latch on the bottom of the detector.
2. Remove the battery pack by lifting the bottom of the pack upward from the detector.
3. Replace the battery pack with a fully charged lithium battery pack; or assembled alkaline battery pack.
4. Close the latch

Do not disassemble the lithium battery pack.

Rechargeable lithium battery charging

- only use a BW recommended charging equipment for charging the lithium battery pack
- the lithium battery pack can be charged while installed in the detector or separately.
- if in the detector, deactivate the detector before placing in charger
- once the battery is charged it can be left in the charger – the battery will not be damaged
- accidentally placing the alkaline battery pack in the charger will not damage the battery pack or charger
- operating temperature range for the charger is 10 to 35°C (50 to 95°F)
- charger is approved for use in ordinary locations only



Important: Press sensors down firmly into place to ensure adequate connection.

1 Series 4 or 7 Toxic Sensors can be used.

2

3

4

5 Gasket side faces down

6

7 Torque 4-4.5 in-lbs

Press firmly on cover to

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Advanced Assembly - Part 1

1

Remove front and back protective films before assembling

Note 1

score line

Bend at score line and locate tabs in slots. Ensure that shiny side faces out and ink mark faces in.

2

3

Note 1

Use Glove or Tweezer when handling Zebra strip

Assemble first

4

5

6

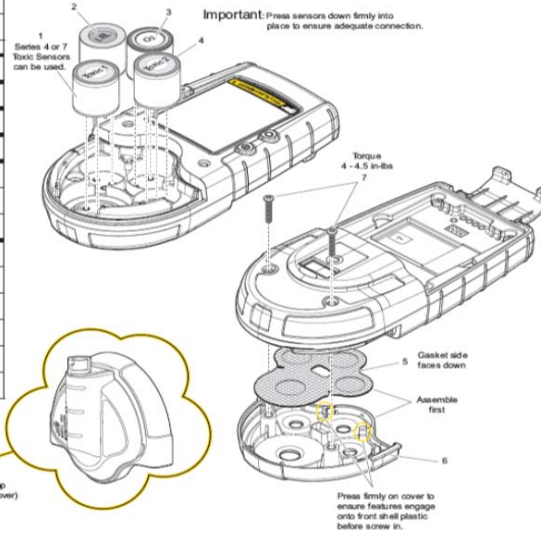
7

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Advanced Assembly - Part 4

50

GasAlertMicro 5 - Assembly Procedure			
Doc Rev	A	Sheet	4 of 6
Order#	Item	Qty	Description
See Page 10 Replacement Sensors	1	1	Toxic Sensor #1 - 4 Series or Toxic 7 Series Sensor
See Page 10 Replacement Sensors	2	1	LEL Sensor
See Page 10 Replacement Sensors	3	1	Oxygen Sensor
See Page 10 Replacement Sensors	4	1	Toxic Sensor #2
MS-DC-1	5	1	Gasket - Sensor Gasket, GasAlertMicro 5
	6	1	Sensor Cover, Yellow, GasAlertMicro 5
	7	2	Screw - #4-40 x 3/4" machine screw, stainless steel, phillips



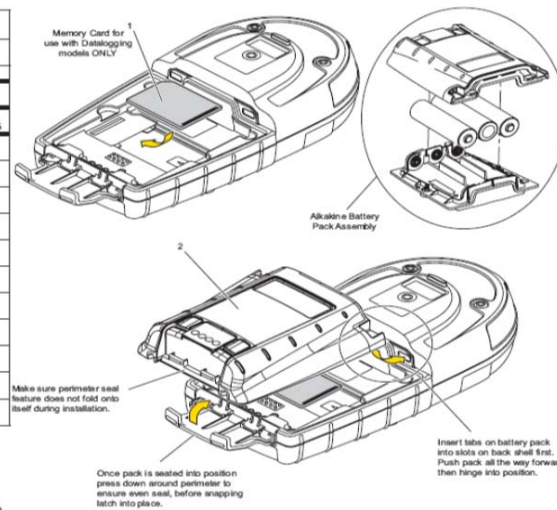
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Advanced Assembly - Part 5

51

GasAlertMicro 5 - Assembly Procedure			
Doc Rev	A	Sheet	5 of 6
Order#	Item	Qty	Description
MMC32	1	1	Memory Card - 32MB Infratech Multimedia Card (MMC)
MS-BAT02	2	1	Unit - Alkaline Battery Pack, North American, GasAlertMicro 5



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Technician Mode

Use Tech Mode to

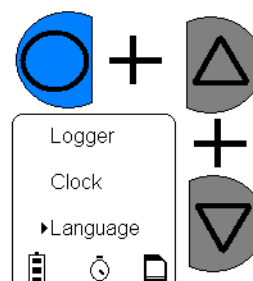
- Change toxic sensor configuration
- Reset monitor
- Enable stealth
- Bump daily and force cal

Note

- IR, PID and toxic sensors are not interchangeable

To activate techmode

- Go to user options scroll down to Language
- Press down+up+blue - "DUB"



Technician Mode settings

Sensors

- Change sensor type in Toxic 1 and Toxic 2 location

Pump

- Alter pump speed

Initialize

- Reset GasAlertMicro 5 to factory default condition
- Use when sensors will not zero

Force Cal

- Calibration can only be initialized in MicroDock II

Bmp Daily

- Set BUMP daily requirement – daily based on a 24 hour period

Stealth

- Turn on/off Stealth mode

Replacing or Changing Sensors

Remove two bolts near alligator clip
 Remove pump or diffusion cover
 Remove problem sensor
 Install new
 Power up and calibrate

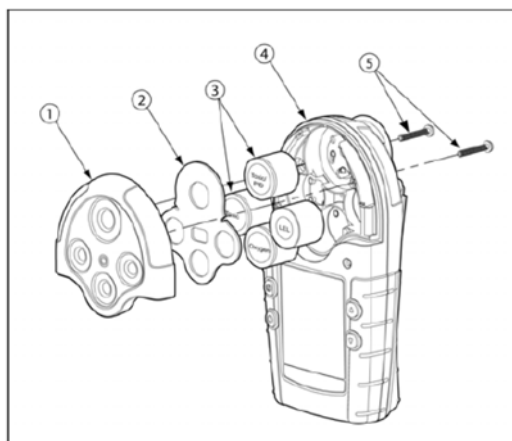


Figure 15. Replacing a Sensor or Sensor Filter

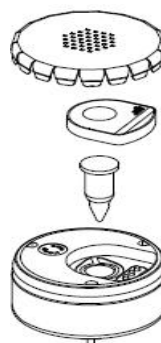
Note

Detectors that are configured for 1, 2, 3, or 4 gases may contain a dummy sensor in one of the four sensor locations.

PID Sensor Maintenance

When PID sensor fails

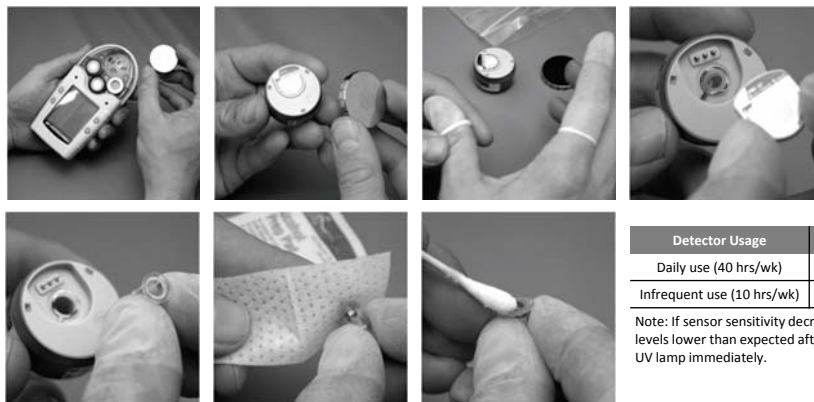
- Clean lamp
- Replace electrode stacks
- Replace lamp
 - Carries one year warranty
- If all else fails replace sensor



PID Cleaning and PID Disassembly

If lens surface is scratched or contaminated

- Sensor sensitivity will be greatly reduced

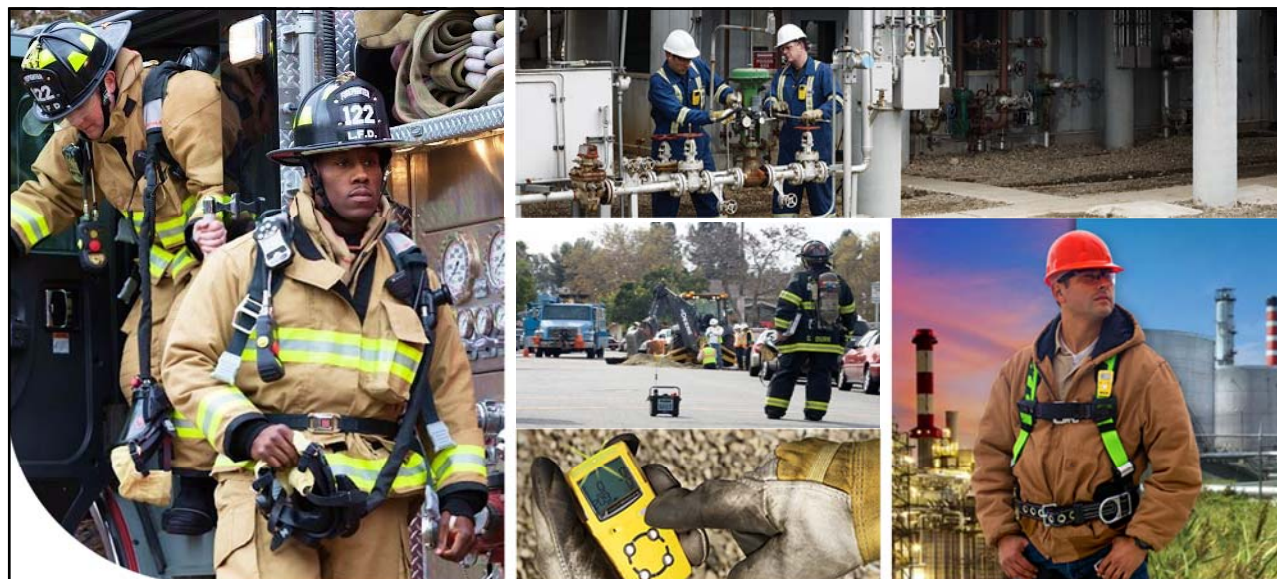


Detector Usage	Cleaning Frequency
Daily use (40 hrs/wk)	Every 60 days
Infrequent use (10 hrs/wk)	Every 90 days

Note: If sensor sensitivity decreases such as ppm levels lower than expected after calibration, clean UV lamp immediately.

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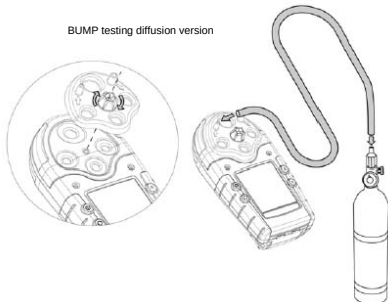
GasAlertMicro 5 IR
Certified Service Technical Workshop

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GasAlertMicro 5 IR Manual BUMP Test

- Perform a BUMP test prior to each day's use at a minimum
- **Only** perform a BUMP test in “fresh air” (0 ppm toxic gases; 0% LEL; 20.9% O₂)
- To perform a BUMP test simply apply a concentration of target gas capable of activating detector alarms while in standard operating mode (Quint Gas Cylinder available).
- Visually observe all sensors respond to gas and verify alarms activate!
- Close the regulator, remove the calibration cap from the detector; the detector will remain in alarm until gas clears from sensors.

BUMP testing diffusion version

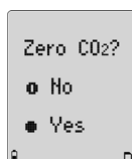


For the pump version connect the tubing quick connect fitting to the pump inlet. It is possible to use either a Demand Flow Regulator (DFR) or a standard fixed orifice regulator. NOTE: if using the fixed orifice regulator be sure to open the valve prior to attaching the tubing to avoid putting the pump into LOW FLOW alarm.



GasAlertMicro5 IR Manual Calibration

- **To access calibration mode:** when in standard operating mode press and hold the **FUNCTION**  and **DOWN**  buttons simultaneously; hold until display indicates Starting Calibration and release
- The detector will auto zero once calibration starts - **AUTO-ZERO** flashes while all sensors except the CO₂ sensor auto zero (since “fresh air” naturally contains CO₂ this sensor is not zeroed at this time)
- For the GasAlertMicro 5 IR model a second auto zero procedure will be initiated when auto zero for the other sensors is complete – the following screen will display

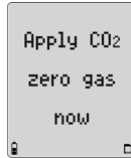


- Press **FUNCTION**  Yes to zero the CO₂ sensor; or, Press **ON/OFF**  No to bypass the CO₂ auto zero and proceed to Auto Span

GasAlertMicro5 IR Manual Calibration

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- If **FUNCTION** ☐ Yes is pressed the following screen displays



- Use nitrogen N₂ to zero the CO₂ sensor – apply N₂ – the following screen will display
- For the GasAlertMicro 5 IR model a second auto zero procedure will be initiated when auto zero for the other sensors is complete – the following screen will display



- **AUTO-ZERO** flashes while the detector zeroes the CO₂ sensor (approximately 30 seconds)

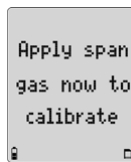
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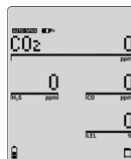
GasAlertMicro5 IR Manual Calibration

61

- When auto zero is complete the following screen will display



- Attach the calibration cap for the diffusion model, or attach tubing to the pump inlet for the pump model; as the sensors detect gas the following screen displays



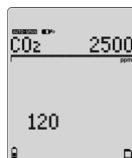
- **AUTO-SPAN** flashes while spanning until a sufficient concentration of gas is detected to complete calibration

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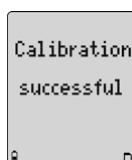
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GasAlertMicro5 IR Manual Calibration

- While the detector is spanning the sensors a countdown of time remaining to complete calibration will appear in the lower left of the screen

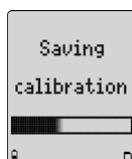


- When span is complete the following screen displays



GasAlertMicro5 IR Manual Calibration

- Press the **ON/OFF** (ⓘ) button to bypass Due Dates and Gas Alarms. The detector displays the following screen to indicate calibration is complete



- Once calibration is complete the detector will return to normal operation.

GasAlertMicro 5 IR Manual Calibration

1. Put instrument into Cal mode.
2. Auto Zero
3. Auto Span
4. Apply Gas
5. Instrument beeps (4) & goes to alarm set Points
6. Remove Gas
7. Pressing the **ON/OFF**  button will advance the detector to complete calibration



For the pump version connect the tubing quick connect fitting to the pump inlet. It is possible to use either a Demand Flow Regulator (DFR) or a standard fixed orifice regulator. NOTE: if using the fixed orifice regulator be sure to open the valve prior to attaching the tubing to avoid the pump going into LOW FLOW alarm.



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GasAlertMicro 5 IR Manual BUMP/Calibration

For the pump version connect the tubing quick connect fitting to the pump inlet. It is possible to use either a Demand Flow Regulator (DFR) or a standard fixed orifice regulator. NOTE: if using the fixed orifice regulator be sure to open the valve prior to attaching the tubing to avoid putting the pump into LOW FLOW alarm.



Fixed Orifice Regulator



Demand Flow Regulator

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Firmware Upgrade

Updating Firmware

- Contact Honeywell to obtain MMC with current Version 40 Firmware upgrade
- Ensure rechargeable batteries are fully charged or new alkaline batteries
- Remove datalogging memory card
- Install upgrade memory card
- Turn on monitor and enter passcode 1007
- Press blue button and allow upgrade to complete
- Remove upgrade memory card and re-install datalogging memory card

NOTE:

- Green PCB GasAlertMicro 5 Series detectors are no longer supported and must be replaced with a new GasAlertMicro 5.

M5 Repair Tips

Problem	Repair
CO ₂ shows negative	Properly zero sensor using N ₂
Monitor keeps failing PID even with new sensor	Replace sensor board
Monitor clicks instead of starting up or does not start up at all	Remove PID sensor (can happen to any M5), replace LCD Screen
Battery pins don't properly make contact	New Main PCB
M5 Fails Different sensors every time I bump it in the dock	Install diffusion adapter in dock module
CO and H ₂ S are always drifting	Install an M5-BAT07/M5-BAT08 or charge battery separate from detector or use initialize in tech mode to clear all calibration data
Monitor Fails audible but seems to still be ringing	One buzzer is likely broken, mute buzzers with your thumb to see if this is the case
Pumps are always failing	Try new pump

LCD Changes

Replacement LCD screens are not compatible with older M5 Units

- Customers with serial numbers of Sx313-004000 or less will have to purchase a new PCB which includes the new LCD screen
- Calgary service can retrofit existing M5 units to take the new LCD screen
- Retrofitting can only be done at the factory

Trouble Shooting

Problem	Possible Cause	Solution
Startup Troubleshooting		
The detector does not activate.	No batteries	Refer to Replacing the Alkaline Batteries or Replacing the Lithium Battery Pack .
	Depleted batteries	Refer to Replacing the Alkaline Batteries , or Replacing the Lithium Battery Pack .
	Damaged or defective detector	Contact BW Technologies by Honeywell.
The detector immediately enters alarm mode when activated.	Sensor needs to stabilize	Used sensor: wait 60 seconds. New sensor: wait 5 minutes.
	Low battery alarm	Refer to Battery Cautions , Replacing the Alkaline Batteries , Replacing the Lithium Battery Pack .
	Sensor alarm	Refer to Replacing a Sensor or Sensor Filter .
	Pump alarm	If the sampling hose is attached, determine if it is obstructed. If not, clean or replace the pump filter. If the pump alarm persists, refer to the "Pump Operation" section in Troubleshooting.
The startup self-test fails.	General fault	Ensure that the sensors and battery pack are installed correctly and then reactivate the detector. If the fault persists, record the error message and contact BW Technologies by Honeywell.

Trouble Shooting

Problem	Possible Cause	Solution
Detector Operation Troubleshooting		
Detector does not display normal ambient gas readings after startup self-test.	Sensor not stabilized	Used sensor: wait 60 seconds New sensor: wait 5 minutes
	Detector requires calibration	Calibrate the sensors. Refer to Calibration and Setting Alarm Setpoints .
	Target gas is present	Detector is operating properly. Use caution in suspect areas.
Detector does not respond to buttons.	Batteries are depleted	Refer to Replacing the Alkaline Batteries or Replacing the Lithium Battery Pack .
	Detector is performing operations that do not require user input	Button function restores automatically when the operation ends.
Detector does not accurately measure gas.	Detector requires calibration	Calibrate the sensors. Refer to Calibration and Setting Alarm Setpoints .
	Detector is colder/hotter than ambient gas	Allow the detector to adjust to ambient temperature before using.
	Sensor filter is blocked	Clean the sensor filter. Refer to Replacing a Sensor or Sensor Filter .

Trouble Shooting

Problem	Possible Cause	Solution
MMC/SD Card Troubleshooting		
	The MMC/SD card is not inserted.	Insert the MMC/SD card. Refer to Inserting the MMC/SD Card .
	The MMC/SD card that is inserted in the detector has a storage size that is not supported by the detector.	Insert an approved MMC/SD card: • 128 MB Delkin MMC • 128 MB Delkin SD card • 128 MB Transcend SD card • 64 MB Unigen SD card
	The detector has lost communication with the MMC/SD card.	Retry communication
		Insert a new approved MMC or SD card. Refer to Inserting the MMC/SD Card .
		Reformat the MMC or SD card in windows and then reinsert into the detector.
		Contact BW Technologies by Honeywell.

Trouble Shooting

Problem	Possible Cause	Solution
Alarms Troubleshooting		
Detector does not enter alarm mode.	Alarm setpoint(s) are set incorrectly.	Reset alarm setpoints. Refer to Calibration and Setting Alarm Setpoints .
	Alarm setpoint(s) are set to zero.	Reset alarm setpoints. Refer to Calibration and Setting Alarm Setpoints .
	Detector requires calibration.	Calibrate the sensors. Refer to Calibration and Setting Alarm Setpoints .
Detector intermittently enters alarm without any apparent reason.	Ambient gas levels are near alarm setpoint or the sensor is exposed to a puff of the target gas.	Detector is operating normally. Use caution in suspect areas. Check MAX gas exposure reading.
	Alarms setpoints are set incorrectly.	Reset alarm setpoints. Refer to Calibration and Setting Alarm Setpoints .
	Missing or faulty sensor.	Refer to Replacing a Sensor or Sensor Filter .
Detector enters alarm with LEL reading displaying as OL (over limit).	Pump flow rate is set too high.	Refer to the last solution in Pump Operation troubleshooting on the following page.
Automatic Deactivation Troubleshooting		
Detector automatically deactivates.	Automatic shutdown activated because of weak batteries.	Refer to Charging the Battery .
	Calibration is overdue and the Due-lock (calibration user lock-out) option is enabled.	Enter the password to enter calibration. Calibrate the sensor(s). Refer to Calibration Procedure .

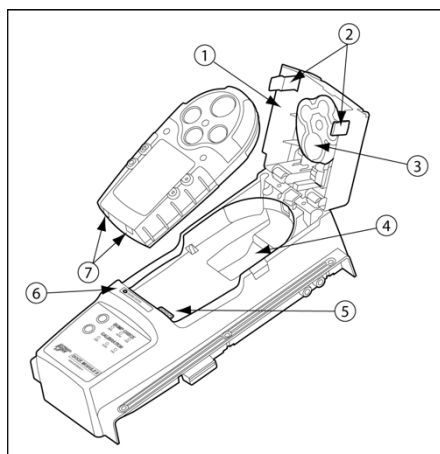
Trouble Shooting

Problem	Possible Cause	Solution
Pump Operation Troubleshooting		
	There is an obstruction in the tubing.	Generation 1: 116885-L3 (yellow) and 118933-L3 (black) on page 64 If using tubing that is attached to the sample probe, determine if it is obstructed. If not, replace the pump filter. Refer to Attaching the Auxiliary Filter on page 68 .
		Generation 2: 130916-L3 (yellow) and 130917-L3 (black) on page 65 If using tubing that is attached to the sample probe, determine if it is obstructed. If not, clean or replace the pump filter. Refer to Replacing the Pump Filter (Generation 2 Pump) on page 67.
	Filter needs to be cleaned or replaced.	Generation 1: 116885-L3 (yellow) and 118933-L3 (black) on page 64 If using tubing that is attached to the sample probe, determine if it is obstructed. If not, replace the pump filter. Refer to Attaching the Auxiliary Filter on page 68 .
		Generation 2: 130916-L3 (yellow) and 130917-L3 (black) on page 65 If using tubing that is attached to the sample probe, determine if it is obstructed. If not, clean or replace the pump filter. Refer to Replacing the Pump Filter (Generation 2 Pump) on page 67.

Trouble Shooting

Problem	Possible Cause	Solution
Clock Errors Troubleshooting		
Clock icon is flashing.	The clock has failed.	Contact BW Technologies by Honeywell.
	There is communication failure.	Contact BW Technologies by Honeywell.
The detector displays a clock error message using last recorded time.	General fault.	Reactivate the detector. If the same error message displays, reset the clock in the user options menu. Reactivate the detector.
		If the error message still displays, contact BW Technologies by Honeywell.

Inserting the Detector



Inserting a GasAlertMicro 5 Series detector

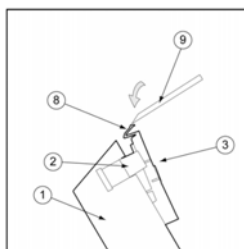
Item	Description
1	Docking module lid
2	Release tabs
3	Diffusion adapter
4	Detector bay
5	Connector pins (charging model only)
6	Charge status indicator (charging model only)
7	Connector outlets
8	Diffusion adapter release tab
9	Tool used to push down on diffusion adapter release tab

*8 & 9 on next slide

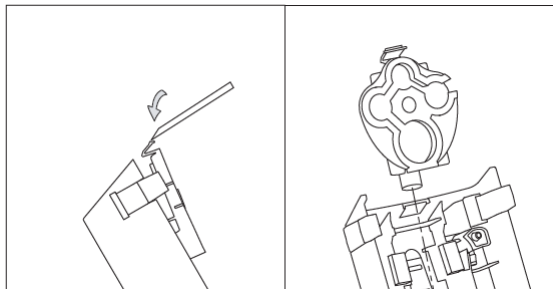
Inserting the Detector

IMPORTANT: If the GasAlertMicro 5 Series detector is fitted with a pump, the diffusion adapter may need to be removed from the docking module lid.

Removing the Diffusion Adapter

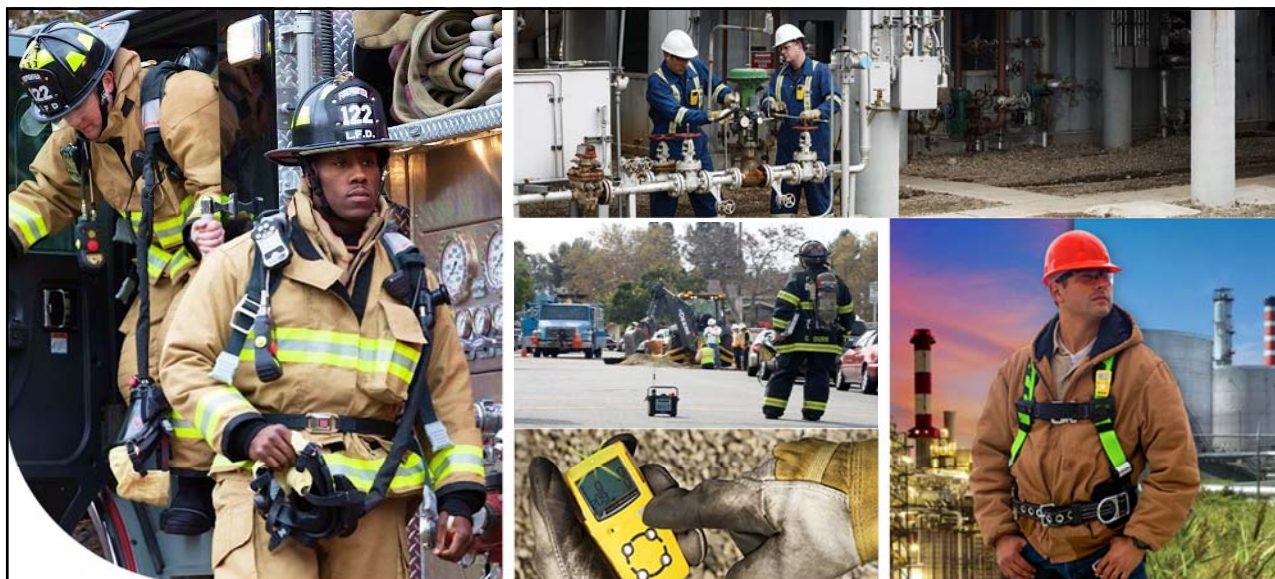


Using a small flathead screwdriver, press the release tab downward. Pull the adapter forward slightly and then lift upward to remove.



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Specifications

<u>Gas</u>	<u>Detection Range</u>	<u>Resolution</u>
H ₂ S	0 to 100 ppm	1 ppm
H ₂ S (high range)	0 to 500 ppm	1 ppm
CO	0 to 1000 ppm	1 ppm
CO (H ₂ resistant)	0 to 1000 ppm	1 ppm
O ₂	0 to 30.0 %	0.1 %
SO ₂	0 to 150.0 ppm	0.1 ppm
NH ₃	0 to 100 ppm	1 ppm
NH ₃ (high range)	0 to 400 ppm	1 ppm
PH ₃	0 to 5.0 ppm	0.1 ppm
Cl ₂	0 to 50.0 ppm	0.1 ppm
ClO ₂	0 to 1.0 ppm	0.01 ppm
NO	0 to 250 ppm	1 ppm
NO ₂	0 to 100.0 ppm	0.1 ppm
HCN	0 to 30.0 ppm	0.1 ppm
ETO	0 to 100.0 ppm	0.1 ppm
O ₃	0 to 1.00 ppm	0.01 ppm

Specifications

Operating Temperature:	H ₂ S, SO ₂ , HCN: -40°C to +50°C (-40°F to +122°F) CO: -30°C to +50°C (-22°F to +122°F) NH ₃ (high range): -20°C to +40°C (-4°F to +104°F) Others: -20°C to +50°C (-4°F to +122°F)
Operating Humidity:	Cl ₂ : 10% to 95% RH (non-condensing) ClO ₂ : 15% to 90% RH (non-condensing) O ₂ : 0% to 99% RH (non-condensing) Others: 15% to 90% RH (non-condensing)
Instrument Dimensions:	2.8 x 5.0 x 9.5 cm (1.1 x 2.0 x 3.75 in)
Weight:	82 gm/2.9 oz.

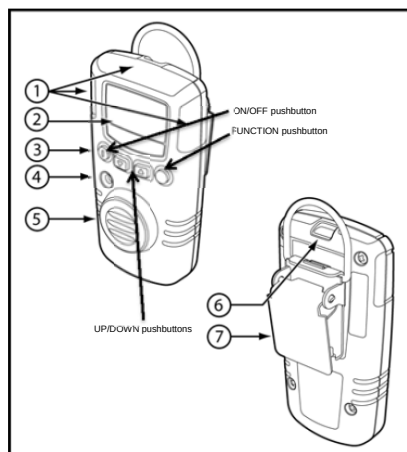
Factory Default Alarm Set Points

Sensor	LOW	HIGH	TWA	STEL
H ₂ S	10 ppm	15 ppm	10 ppm	15 ppm
CO	35 ppm	200 ppm	35 ppm	200 ppm
O ₂	19.5% v/v	22.5% v/v	N/A	N/A
SO ₂	2.0 ppm	5.0 ppm	2.0 ppm	5.0 ppm
NH ₃	25 ppm	50 ppm	25 ppm	35 ppm
Cl ₂	0.5 ppm	1.0 ppm	0.5 ppm	1.0 ppm
NO ₂	2.0 ppm	5.0 ppm	2.0 ppm	5.0 ppm
HCN	4.7 ppm	10.0 ppm	4.7 ppm	10.0 ppm
PH ₃	0.3 ppm	1.0 ppm	0.3 ppm	1.0 ppm
ClO ₂	0.1 ppm	0.3 ppm	0.1 ppm	0.3 ppm
O ₃	0.10 ppm	0.20 ppm	0.10 ppm	0.10 ppm
ETO	1.0 ppm	5.0 ppm	1.0 ppm	5.0 ppm
NO	25 ppm	25 ppm	25 ppm	25 ppm

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Get to Know the GasAlert Extreme

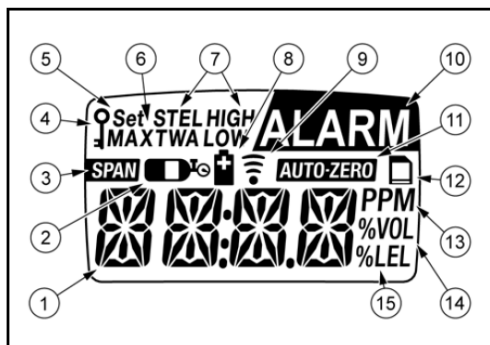


Item	Description
1	Visual alarm indicators (LEDs)
2	Liquid crystal display (LCD)
3	Pushbuttons
4	Audible alarm
5	Sensor and sensor screen
6	Infrared (IR) communication port
7	Alligator clip

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GasAlert Extreme Display



Item	Description
1	Numeric value
2	Gas cylinder
3	Automatically span sensor
4	Passcode lock
5	Set alarm setpoints and user options
6	Maximum gas exposure
7	Alarm conditions
8	Battery
9	Data transmission
10	Alarm or alarm setpoint
11	Automatically zero sensor
12	Optional datalogger indicator
13	Parts per million (ppm)
14	Percentage by volume (% vol.)
15	Percentage by lower explosive limit (% LEL) (future use)

Operation Basics

Turn On: press and hold the **ON/OFF** (1) button in a "fresh air" location (0 ppm toxic gases; 0% LEL; 20.9% O₂); release (1) once detector beeps and display activates.

Turn Off: press and hold **ON/OFF** (1) button; continue holding until display indicates OFF; release (1) pushbutton. **NOTE:** Deactivating the detector clears the TWA, STEL and PEAK readings. The information will be retained in the datalog files. Datalog files are overwritten once the memory reaches capacity; data is replaced on a FIFO basis. Follow the safety procedures as outlined by your employer.

To view TWA, STEL, and MAX readings: press the **UP** (2) and **FUNCTION** (3) buttons simultaneously while in standard operating mode.

To clear TWA, STEL and MAX values: press and hold **FUNCTION** (3) for 6 seconds. **NOTE:** Resetting TWA, STEL and PEAK reading values will clear those readings. The information will be retained in the datalog files. Datalog files are overwritten once the memory reaches capacity; data is replaced on a FIFO basis. Confirm with your supervisor before clearing any readings.

Typical Start Up Sequence

1. Self Test: once activated the detector tests display elements, alarm function, battery life



2. Date and Time displayed on LCD: year, month, day of month, day of week, hour/minute



3. Sensor Test



4. Gas Type



5. Alarm Set Points



6. Calibration Due Date



7. Standard Operating Mode



*actual sequence may vary

GasAlert Extreme Alarms

Alarm	Display	Alarm	Display
Low Alarm: • Slow beep • Slow flash • ALARM flashes • Slow vibrations		TWA Alarm: • Slow beep • Slow flash • ALARM flashes • Slow vibrations	
High Alarm: • Fast beep • Fast flash • ALARM flashes • Fast vibrations		STEL Alarm: • Fast beep • Fast flash • ALARM flashes • Fast vibrations	
Sensor Alarm: • Slow beep • Slow flash • ALARM flashes • Slow vibrations		Low Battery Alarm: • One beep and one flash every 5 seconds, and one quick vibration every minute (when confidence beep is disabled). • If confidence beep is enabled no beeps, flashes, or vibrations • LOW displays	

GasAlert Extreme Alarms

Alarm	Display	Alarm	Display
Automatic Shutdown Alarm: (Low battery) • Eight beeps, flashes, and vibrations • LOW  displays		Automatic Shutdown Alarm: (Calibration past) • Eight beeps, flashes, and vibrations	
Automatic Shutdown Alarm: (After Automatic Shutdown Alarm) • No beep • No flash or vibrations •  displays for a short time		Confidence Beep: • One beep every 5 seconds • One quick vibration per minute <i>Note</i> <i>If the detector enters low battery alarm, the confidence beep deactivates.</i>	

Manual BUMP Test

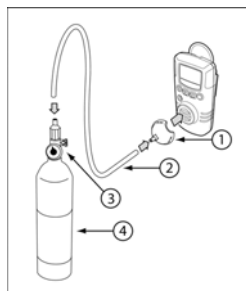
Perform a BUMP test prior to each day's use at a minimum

Perform a BUMP test in "fresh air" (0 ppm toxic gases; 0% LEL; 20.9% O₂)

To perform a BUMP test simply apply a concentration of target gas capable of activating detector alarms to detector in standard operating mode

Visually observe all sensors respond to gas and verify alarms activate!

Close the regulator remove the calibration cap from the detector; the detector will remain in alarm until gas clears from sensors.



Item	Description
1	Test cap
2	Hose
3	Regulator
4	Gas cylinder

* 0.5 lpm fixed orifice regulator (except NH₃, Cl₂, ETO: 1.0 lpm)

Manual BUMP Test – Oxygen Sensor

Perform a BUMP test prior to each day's use at a minimum

Perform a BUMP test in "fresh air" (0 ppm toxic gases; 0% LEL; 20.9% O₂)

It is possible to perform a qualitative BUMP test on the oxygen sensor by simply exhaling forcefully on the sensor for approximately 3 seconds while the detector is in standard operating mode; hold the detector approximately 2.5 cm (1.0 inch) from the mouth; the CO₂ in exhaled breath will displace O₂

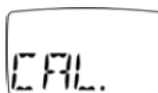
Visually observe the sensor responds and verify alarms activate!



Manual Span Calibration

Perform calibration in "fresh air" (0 ppm toxic gases; 0% LEL; 20.9% O₂)

To access manual calibration press the **FUNCTION**  pushbutton and the **DOWN**  pushbutton simultaneously; hold while detector beeps, vibrates and flashes 4 times; release when the CAL. screen displays



(NOTE: manual calibration instructions for GasAlert Extreme oxygen detector will follow)

The detector will beep once and the AUTO ZERO function begins NOTE: do not apply span gas during AUTO ZERO function; the detector auto zero will fail



Manual Span Calibration

When auto zero is complete the detector beeps 2X and moves on to the Set Span function; if span value displayed matches concentration of calibration gas press the **FUNCTION**  pushbutton and the detector will advance to SPAN screen; or do nothing and detector will advance on its' own



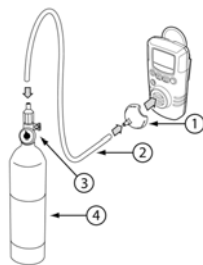
(if the SPAN value does not match the concentration of the calibration gas, adjust the value using the **DOWN**  or **UP**  pushbuttons; confirm the change by pressing the **FUNCTION**  pushbutton)

Normally the detector will proceed following a few seconds, or after pressing the **FUNCTION**  pushbutton to the SPAN screen



Manual Span Calibration

To continue with span calibration attach the calibration cap to the detector; open the regulator valve and apply calibration gas



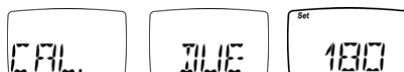
Item	Description
1	Test cap
2	Hose
3	Regulator*
4	Gas cylinder

* 0.5 lpm fixed orifice regulator (except NH₃, Cl₂, ETO: 1.0 lpm)

Once the detector detects application of the appropriate gas within 30 seconds span calibration of the sensor begins; span calibration is microprocessor controlled. Most gases take approximately 2 minutes; NH₃, Cl₂, and ETO can take up to 5 minutes. ClO₂ should be calibrated using the appropriate electrochemical gas generator; O₃ should be calibrated using an O₃ generator.

Manual Span Calibration

The detector beeps 3X when span calibration is complete. The detector will display the revised calibration due date will flash. Press the **FUNCTION**  pushbutton to skip to next display; or do nothing and detector will advance on it's own. DO NOT ADJUST VALUE!



The display advances to the ALARM setpoint screens. Press the **FUNCTION**  pushbutton to skip to next display; or do nothing and detector will advance on it's own. DO NOT ADJUST VALUES!

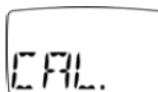


The detector beeps 3X when span calibration is complete and returns to normal operating mode.

Manual Calibration - Oxygen Sensor

Perform calibration in "fresh air"(0 ppm toxic gases; 0% LEL; 20.9% O₂)

To access manual calibration press the **FUNCTION**  pushbutton and the **DOWN**  pushbutton simultaneously; hold while detector beeps, vibrates and flashes 4 times; release when the CAL. screen displays



The detector will beep once and the AUTO ZERO function begins; press the **FUNCTION**  pushbutton and the detector will advance to Set Span; or wait and the detector will advance by itself

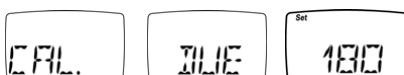


Manual Calibration - Oxygen Sensor

When auto zero is complete the detector beeps 2X and moves on to the Set Span function; for oxygen the span value cannot be changed from 20.9; press the **FUNCTION**  pushbutton and the detector will advance to SPAN screen; or do nothing and detector will advance by itself



NOTE: The oxygen sensor calibrates to the fresh air oxygen, 20.9 % VOL; calibration will take approximately 30 seconds; no need to hook up any gas; the detector will beep 2X when calibration is complete; CAL DUE 180 will display; press the **FUNCTION**  pushbutton to advance to Set LOW Alarm



Manual Calibration - Oxygen Sensor

The Set LOW Alarm screen will display; DO NOT change this value without consulting your supervisor; press the **FUNCTION**  pushbutton to advance



The Set HIGH alarm will display; DO NOT change this value without consulting your supervisor; press the **FUNCTION**  pushbutton to advance



The detector will return to standard operating mode



Downloading Data

The datalogs from a GasAlert Extreme detector can be downloaded and imported to Fleet Manager II software one of two ways:

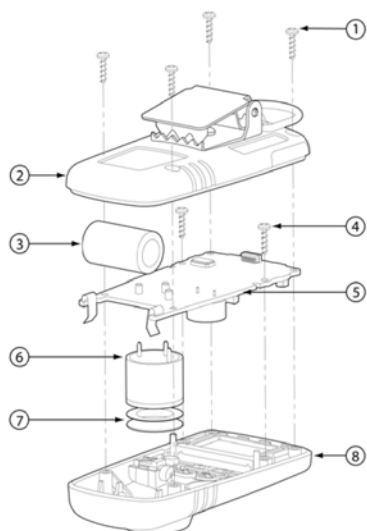
- Using the IR DATALINK



- through the MicroDock II system by selecting **DATA TRANS**



Assembly



Item	Description
1	Rear shell machine screws (4)
2	Rear shell
3	Battery
4	PCB machine screws (2)
5	PCB
6	Sensor
7	Sensor screen
8	Front shell

PCB Replacement

Obtain replacement board

- Replacement board P/N GAXT-__-PCB1
 - Fill blank with monitor order number
 - Example: Model GAXT-A-DL would use GAXT-A-DL-PCB1

Disassemble monitor

- Discard old PCB install new PCB

Reassemble unit

- Apply new serial number labels to back shell

Power monitor

- Set date and calibrate

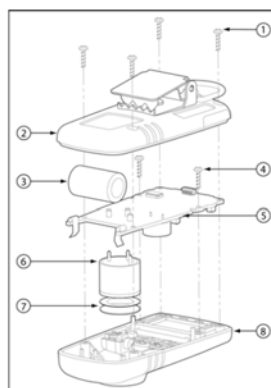
Replacing the Battery

The GasAlert Extreme detector is powered by a 3V lithium Panasonic CR-2PE battery. Replace the battery only in “fresh air”:

- Deactivate the detector
- Remove the four machine screws on the rear housing and remove
- Remove the battery and replace

Internal Parts of the GasAlert Extreme

Item	Description
1	Detector rear screws
2	Rear shell
3	Battery
4	Main PCB screws
5	Main PCB
6	Sensor
7	Sensor screen
8	Front shell

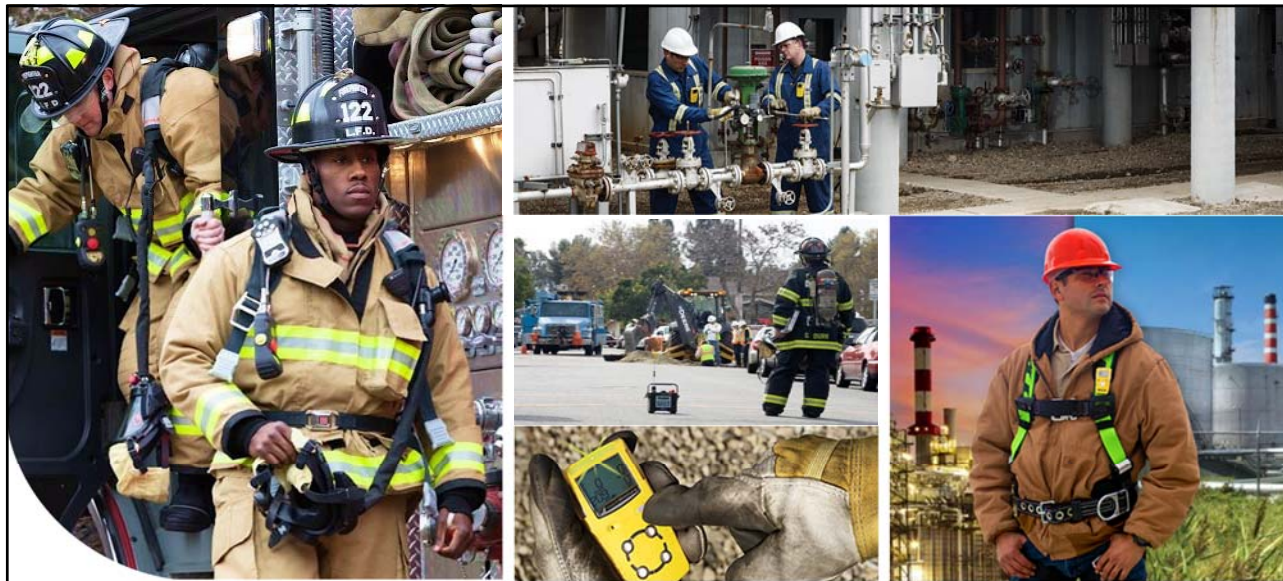


Troubleshooting Guide

Problem	Possible Cause	Solution
Detector does not activate	No battery	Install battery
	Depleted battery	Replace battery
	Damaged or defective detector	Contact BW Technologies by Honeywell
	Reversed battery	Reinstall the battery correctly
Detector enters alarm mode immediately when it is activated	Sensor needs to stabilize	Used sensor: wait 60 seconds. New sensor: wait 5 minutes
	Low battery alarm	Replace battery
	Sensor alarm	Replace sensor
Start up self-test fails during checks	General fault	Contact BW Technologies by Honeywell
	Alarm setpoints incorrect	Reset alarm setpoints
Detector does not display a normal ambient gas reading after activation self-test	Target gas is present	Detector is operating properly. Use caution in suspect areas
	Detector requires calibration	Calibrate detector
	Sensor not stabilized	Used sensor: wait 60 seconds New sensor: wait 5 minutes
	Battery is depleted	Replace battery
Detector does not respond to the push-buttons	Detector is performing operations that does not require user input	Pushbutton operation restores automatically when operation ends

Troubleshooting Guide

Problem	Possible Cause	Solution
Detector does not accurately measure gas	Detector requires calibration	Calibrate sensor
	Detector is colder/hotter than ambient gas	Allow detector to acquire ambient temperature before use
	Sensor screen is blocked	Clean sensor screen
Detector does not enter alarm mode	Alarm setpoint(s) are set incorrectly	Reset alarm setpoints
	Alarm setpoint(s) set to zero	Reset alarm setpoints
	Detector is in calibration mode	Complete calibration
Detector intermittently enters alarm mode without apparent reason	Ambient gas levels are near alarm setpoint or sensor is exposed to a puff of the target gas	Detector is operating normally. Use caution in suspect areas. Check MAX gas exposure reading
	Alarms set incorrectly	Reset alarm setpoints
	Missing or faulty sensor	Replace sensor
Detector automatically deactivates	Automatic shutdown feature activated due to depleted battery	Replace battery
Detector does not auto zero or calibrate	Sensor may be expired	Change sensor
O2 sensor reading is erratic	Sensor may be expired	Change sensor



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GasAlertMicroClip Series
Certified Service Technical Workshop

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GasAlertMicroClip XL Specifications

103

Gas:	Detection Range:	Resolution:
Hydrogen sulphide	0 to 100 ppm	1 ppm/0.1 ppm
Carbon monoxide	0 to 500 ppm	1 ppm
Oxygen	0 to 30.0 % v/v	0.1 %
Combustible gases	0 to 100% LEL	1.0% LEL
Methane	0 to 5% / Vol. CH ₄	0.1% CH ₄
Operating Temperature:	-20°C to +50°C (-4°F to +122°F)	
Operating Humidity:	0% to 95% relative humidity (non-condensing)	
Instrument Dimensions:	11.25 x 6.0 x 3.09 cm (4.4 x 2.4 x 1.2 in)	
Ingress Protection:	IP68	
Weight:	190 g (6.7 oz)	

GasAlertMicroClip X3 Specifications

Gas:	Detection Range:	Resolution:
Hydrogen sulphide	0 to 100 ppm	1 ppm/0.1 ppm
Carbon monoxide	0 to 500 ppm	1 ppm
Oxygen	0 to 30.0 % v/v	0.1 %
Combustible gases	0 to 100% LEL	1.0% LEL
Methane	0 to 5% / Vol. CH ₄	0.1% CH ₄

Operating Temperature: -20°C to +50°C (-4°F to +122°F)

Operating Humidity: 0% to 95% relative humidity (non-condensing)

Instrument Dimensions: 11.25 x 6.0 x 3.09 cm (4.4 x 2.4 x 1.2 in)

Ingress Protection: IP68

Weight: 179 g (6.3 oz)

GasAlertMicroClip XL / X3 Specifications

Battery Type: Rechargeable lithium-ion polymer

Battery Charge Time: 5 - 6 hours

Typical Battery Operating Time: 18 hours @ 20°C
 *12 hours @ -20°C (-4°F)

***NOTE:** the GasAlertMicroClip XL and X3 rechargeable battery is guaranteed to have a minimum 12 hour runtime during the 2 year warranty period under the normal operating temperature range of -20°C (-4°F) to 50°C (122°F)

Factory Default Alarm Set Points

Sensor	LOW	HIGH	STEL	TWA
H ₂ S	10 ppm	15 ppm	10 ppm	15 ppm
CO	35 ppm	200 ppm	50 ppm	35 ppm
Combustible	10% LEL	20% LEL	N/A	N/A
O ₂	19.5% v/v	23.5% v/v	N/A	N/A

*Factory default alarm set points can be adjusted. Fleet Manager II software required.

GasAlertMicroClip Series O₂ Sensors

Oxygen Sensors Compared

Consumable Anode (GasAlertMicroClip XL)



Lifetime limited by consumable anode –
approximately 24 months (2 year warranty)

Oxygen Pump (GasAlertMicroClip X3)



Long lifetime up to 5 years(3 year
warranty) – no consumable anode

GasAlertMicroClip X3

Sensor Warranty

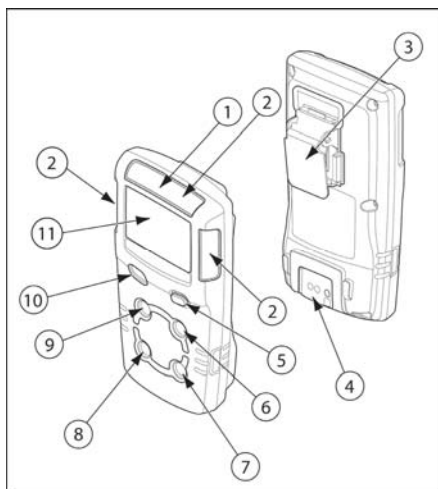
- All sensors shipped in the original X3 monitor will be covered by the 3 year warranty
- Replacement sensors will be available with the following warranties:

Order Number	Description	XL	X3	Warranty
SR-X3P	Replacement 3 year O ₂ Sensor		X	3 years
SR-W-MP75C	Replacement LEL Sensor	X	X	2 years
SR-H-MC	Replacement H ₂ S Sensor	X	X	
SR-M-HC	Replacement CO Sensor	X	X	
SR-X32V	Replacement 2 year O ₂ Sensor	X		



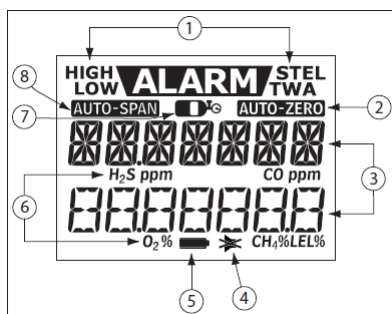
SR-X3P long life, lead free O₂ sensor

Get to Know the GasAlertMicroClip Series



Item	Description
1	IntelliFlash
2	Visual alarm indicators (LEDs)
3	Alligator clip
4	Charging connector / IR interface
5	Pushbutton (○)
6	Carbon monoxide (CO) sensor
7	Hydrogen sulfide (H ₂ S) sensor
8	Oxygen (O ₂) sensor
9	Combustible (LEL) sensor
10	Audible alarm
11	Liquid crystal display (LCD)

Display ICON Symbols



Item	Description
1	Alarm condition
2	Automatically zero sensor
3	Numeric value
4	Stealth mode
5	Battery life indicator
6	Gas identifier bars
7	Gas cylinder
8	Automatically span sensor

GasAlertMicroClip XL/X3 Operation

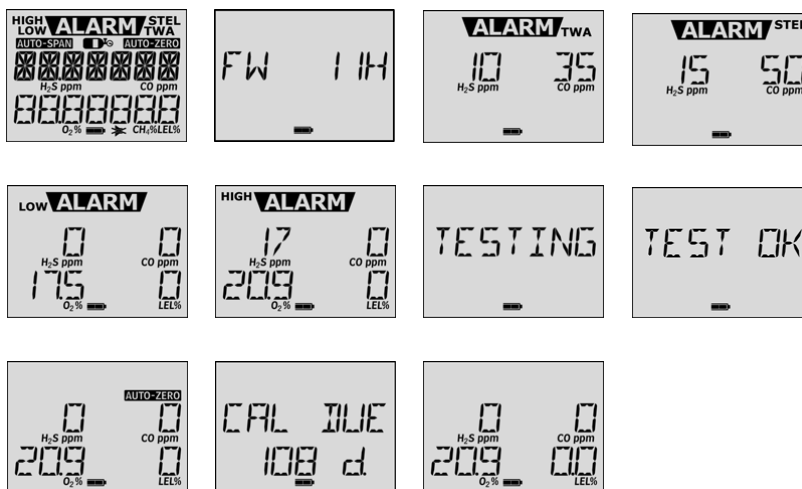
Turn On: press and hold pushbutton in a “fresh air” location (20.9% v/v O₂, 0 ppm toxic gases, 0% LEL combustible gases)

Once the unit is powered and in standard operating mode, the blue button performs many additional tasks:

- **Turn the unit off**
 - Press and hold the button until the countdown is complete and the display goes blank
- **View and clear TWA, STEL and MAX readings**
 - Press the button **twice**
 - Clear the TWA, STEL and MAX values when display shows **RESET**
- **Access CALIBRATION MODE/Fresh Air Auto Zero**
 - Turn the unit off by pressing and holding the button down until the countdown is complete then continue holding the button until the **CAL** countdown begins, release the button when the countdown is complete
- **Activate the backlight while in operation**
 - Press the button to activate the backlight

NOTE: DO NOT CLEAR OR RESET TWA, STEL OR MAX VALUES WITHOUT THE APPROVAL OF YOUR SUPERVISOR.

Typical Startup Sequence



*Actual sequence may vary.

GasAlertMicroClip XL / X3 Alarms

Alarm	Screen	Alarm	Screen
Low Alarm • Slow siren • Slow alternating flash • ALARM and gas bar flash • Vibrator alarm activates		TWA Alarm • Slow siren • Slow alternating flash • ALARM and gas bar flash • Vibrator alarm activates	
High Alarm • Fast siren • Fast alternating flash • ALARM and gas bar flash • Vibrator alarm activates		STEL Alarm • Fast siren • Fast alternating flash • ALARM and gas bar flash • Vibrator alarm activates	

GasAlertMicroClip XL / X3 Alarms

Alarm	Screen	Alarm	Screen
Multi-Gas Alarm - Sequence alternating low and high alarm siren and flash ALARM and gas bars flash - Vibrator alarm activates		Over Limit (OL) Alarm - Fast siren and alternating flash ALARM and gas bar flash - Vibrator alarm activates - OL displays	
Sensor Alarm - During startup sequence Error [sensor name] displays - During normal operation Err displays (must be acknowledged by press $\odot$)		Confidence Beep and IntelliFlash One beep and flash every second <i>Note</i> The detector is shipped with Confidence Beep disabled and IntelliFlash enabled	
Low Battery Alarm - Sequence of 10 rapid sirens and alternating flashes with 7 seconds of silence in between (continues for 15 minutes) $\Rightarrow$ and ALARM flash, LOW BAT displays, and the vibrator alarm activates - After 15 minutes, of the Low Battery alarm, the Automatic Shutdown Alarm sequence begins - OFF displays before deactivating		Automatic Shutdown Alarm - Sequence of 10 rapid sirens and alternating flashes with 1 second of silence in between (sequence reactivates seven times) - LOW BAT and ALARM display - Vibrator alarm activates - OFF displays before deactivating	
		Normal Shutdown - Sequence of two sirens and alternating flashes - Vibrator alarm activates - Countdown initiates - OFF displays	

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Manual BUMP Test

BUMP test confirms sensor response to gas

- When in standard operating mode apply gas exceeding low alarm setpoint of installed sensors

Gas Cylinder Guidelines (Bump Test)

- To ensure an accurate bump check, use a premium-grade gas. Use gases approved by the National Institute of Standards and Technology.
- Do not use a gas cylinder that is past its expiration date.

Gas Cylinder Connection

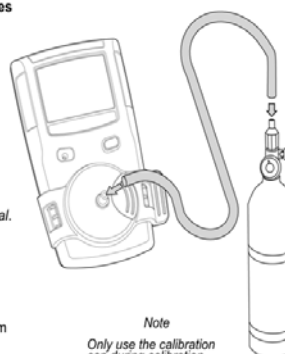
- Connect the calibration hose to the 0.5 l/min regulator on the gas cylinder. For use with the MicroDock II, use a demand flow regulator.

NOTE: Cylinders that are used with a demand flow regulator must meet the following maximum inlet pressure specifications:

- Disposable cylinders 0-1000 psig/70 bar
- Refillable cylinders 0-3000 psig/207 bar

To perform an automated bump check, refer to the *MicroDock II User Manual*.

- Connect the calibration hose to the calibration cap.
- Attach the calibration cap to the detector.
- Apply gas. Verify the visual and audible alarms activate.
- Close the regulator and remove the calibration cap from the detector.
NOTE: The detector will temporarily remain in alarm until the gas clears from the sensors.
- Disconnect the hose from the calibration cap and the regulator.



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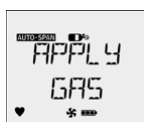
Manual Calibration

Perform calibration in “fresh air”(0 ppm H₂S; 0 ppm CO; 0% LEL; 20.9% O₂)

To access manual calibration press the pushbutton and hold while detector performs the Powering Off countdown; continue holding the pushbutton when OFF displays; the detector will display calibration countdown; release pushbutton when detector displays **AUTO-ZERO**



Do not apply gas until Apply Gas appears on display

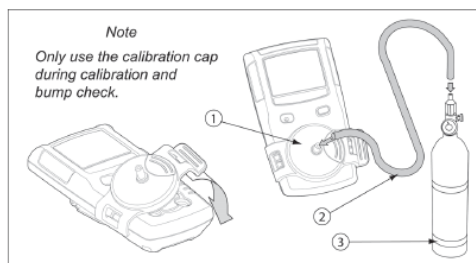


Manual Calibration

Connect the calibration hose to the regulator on the gas cylinder

Attach the hose to the regulator and calibration cap; open regulator to let gas flow

Once 50% of the expected gas value is detected by all sensors (within 30 seconds) - **AUTO-SPAN** continues to flash while the detector completes the span calibration – approximately 2 minutes



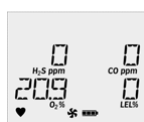
Item	Description
1	Calibration cap
2	Calibration hose
3	Gas cylinder with 0.5 ml/min regulator

Manual Calibration

When the span calibration is completed successfully the audible alarm beeps and the following screens will appear; remove the calibration cap and close the regulator valve.

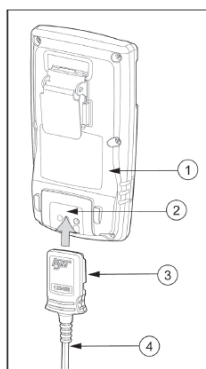


The GasAlertMicroClip XL / X3 will return to normal operating mode



Charging Battery

- Turn the detector OFF
- Charge the battery in a safe area that has "fresh air" and temperature between 0°C to 40°C (32°F to 104°F)
- Plug the charging adapter into the back of the detector and into an appropriate power outlet; charging adapters are voltage specific for the region of use.



Item	Description
1	Detector
2	IR and charger interface
3	Charging adapter
4	Charging cable

Charging Battery

- Allow the battery to charge for 6 hours. While charging the battery status indicator on the display will continuously flash between low, mid and full.



low mid full

- When the charge is complete the battery status icon will stop flashing and remain on the full charge indication.



- The battery may be warm immediately following charging; this is normal.

Assembly

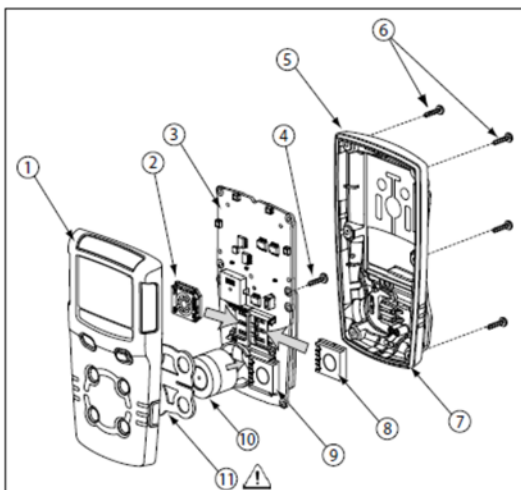
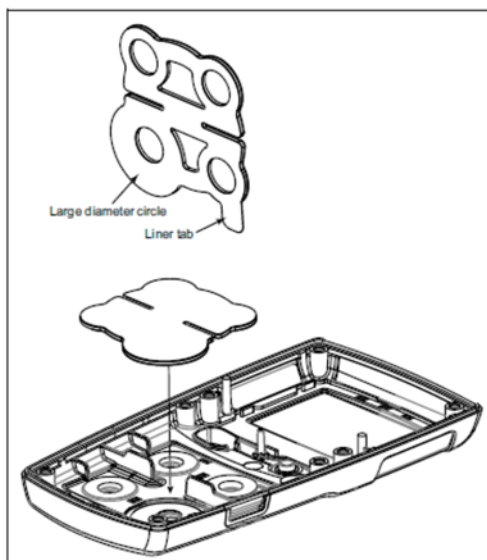


Figure 9. Replacing a Sensor or Sensor Filter

Item	Description
1	Front shell
2	Combustible (LEL) sensor
3	PCB
4	PCB screws (2)
5	Rear shell
6	Machine screws (6)
7	Sealing rib
8	Carbon monoxide (CO) sensor
9	Hydrogen sulfide (H ₂ S) sensor
10	Oxygen (O ₂) sensor
11	Sensor filter

Sensor Filter Replacement



- Disassemble the detector
- Remove old sensor filter – it may be stuck to the sensors
- Pull the liner tab if present to remove the sensor filter from the sensors
- When replacing ensure the black gasket is facing the front shell and the large diameter circle is aligned with the large circle on the front shell
- Place the gasket and press lightly in place
- Reassemble the detector

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Sensor Replacement

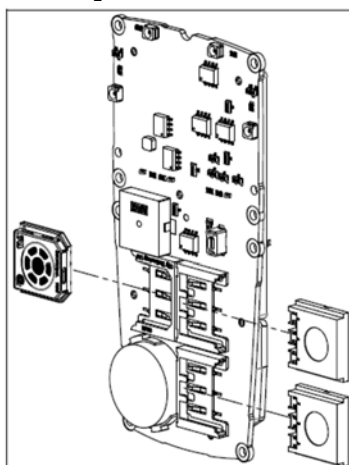
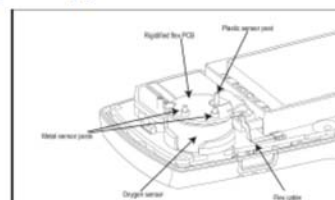
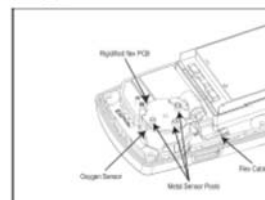
 H_2S , CO and LEL


Figure 11. Sensor Positioning

Replacing the Oxygen Sensor XT and XL



Replacing the Oxygen Sensor X3



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Trouble Shooting

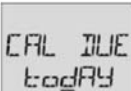
Problem	Possible Cause	Solution
Detector Operation		
Detector does not display expected gas readings after activation self-test.	Sensor not stabilized	Used sensor: wait 60 seconds New sensor: wait 5 minutes (The oxygen sensor in the X3 needs 60 minutes to stabilize)
	Sensor(s) requires calibration	Calibrate the sensor(s). Refer to Calibration .
	Target gas is present	Detector is operating properly. Use caution in suspect areas.
Detector does not respond to pushbutton.	Battery is depleted	Charge battery. Refer to Charging the Battery .
	Detector is performing operations that do not require user input	Pushbutton operation restores automatically when the operation ends.
Detector does not accurately measure gas.	Sensor(s) requires calibration	Calibrate the sensors. Refer to Calibration .
	Detector is colder/hotter than ambient gas	Allow the detector to attain ambient temperature before use.
	Sensor filter is blocked	Replace the sensor filter. Refer to Replacing a Sensor or Sensor Filter .
Detector does not enter into alarm.	Alarm setpoint(s) defined incorrectly	Reset alarm setpoints. Refer to Factory Gas Alarm Setpoints and Sensor Configuration .
	Alarm setpoint(s) set to zero	Reset alarm setpoints. Refer to Factory Gas Alarm Setpoints and Sensor Configuration .
	Detector is in calibration mode	Complete the calibration procedure.

Trouble Shooting

Problem	Possible Cause	Solution
Detector intermittently enters alarm without reason.	Ambient gas levels are near alarm setpoint or the sensor is exposed to a puff of the target gas	Detector is operating normally. Use caution in suspect areas. Check the peak (maximum) gas exposure reading.
	Alarm setpoints defined incorrectly	Reset alarm setpoints. Refer to Factory Gas Alarm Setpoints and Sensor Configuration .
	Detector requires calibration	Calibrate the sensors. Refer to Calibration .
	Missing or faulty sensor(s)	Replace the sensor. Refer to Replacing a Sensor or Sensor Filter .
Features and options are not operating as expected.	Changes have been made in Fleet Manager II	Verify settings in Fleet Manager II are correct.
Charging		
Battery has been charging for 3+ hours (XT model) or 6+ hours (XL-X3 models). The charging indicator on the detector LCD shows the battery is still charging.	Battery is trickle charging	Battery is fully charged and ready for operation.
Battery indicator does not display when charging.	Detector is depleted below normal levels	Charge the battery for 8 hours. Detector LEDs may light during first 5 hours. This is normal. If the battery indicator does not light after charging for 8 hours, contact BW Technologies by Honeywell .
When detector is activated after charging, the battery indicator does not display.	Battery is defective	Contact BW Technologies by Honeywell .

Trouble Shooting

Startup Troubleshooting

Error Screen	Problem	Solution	Error Screen	Problem	Solution
	Sensor Error The sensor failed during the self-test.	Calibrate the sensor(s). Refer to Calibration . Reactivate the detector. If error displays again, replace the sensor. Refer to Replacing a Sensor or Sensor Filter .		IR Lock Enabled If the IR Lock screen displays, an IR device is required to calibrate the sensors.	Perform calibration using the IR Link with Fleet Manager II software, or insert the detector into the MicroDock II station. Refer to Cal Lock (Calibration IR Lock) in User Options and Calibration .
	Calibration Overdue Displays when calibration is overdue. If the Force Calibration When Overdue option is enabled, the sensor(s) must be calibrated to enter normal operation.	Press  to continue and calibrate the sensor(s) immediately. Refer to Calibration . If the IR Lock enabled screen displays, the MicroDock II station or the IR Link with Fleet Manager II must be used to calibrate.		Bump Test Fail A bump test has just been performed. The detector is prompting for another bump test because a sensor(s) has failed.	Perform another Bump Test . Ensure the cylinder is not empty and that the cylinder is not past the expiry date. Ensure the regulator is fully opened to apply gas. If Bump Check Today displays again, calibrate the sensors. Refer to Calibration . If the calibration is unsuccessful, refer to Replacing a Sensor or Sensor Filter .
	Forced Calibration If Force Calibration When Overdue is enabled, the sensors must be calibrated to enter normal operation.	Press and hold  to calibrate the sensors, or press  and release to deactivate the detector. Refer to Calibration . If the IR Lock enabled screen displays, an IR device must be used to calibrate.		Sensor Fail A sensor has failed during the startup self-test.	Perform a Bump Test and reactivate the detector. If the sensor fails again, perform Calibration . Reactivate the detector again. If the sensor still does not pass, refer to Replacing a Sensor or Sensor Filter .

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Trouble Shooting

Calibration Troubleshooting

Error Screen	Problem	Solution	Error Screen	Problem	Solution
	Auto-zero Unsuccessful H ₂ S, CO, or LEL sensor fails to auto-zero, or O ₂ sensor fails to calibrate.	Attempt calibration again. Refer to Calibration . If ERROR displays again, replace the sensor. Refer to Replacing a Sensor or Sensor Filter .		No Gas Detected If the gas is not detected about 30 seconds after the APPLY GAS message is displayed, the detector fails the calibration.	Ensure the sensor is enabled. Verify gas cylinder is not empty or past the expiration date. Check/replace the regulator. Attempt calibration again. If the calibration fails again, refer to Replacing a Sensor or Sensor Filter .
	Auto Span Unsuccessful H ₂ S, CO, or LEL, or O ₂ sensor fails to auto-span.	Ensure sensor is enabled. Verify gas cylinder is not empty or past the expiration date. Check/replace the regulator. Attempt calibration again. If the sensor fails the span again, refer to Replacing a Sensor or Sensor Filter .		Calibration Due Date Overdue A sensor displays a negative number for a next due date after calibration is performed.	Calibration for the sensor was unsuccessful. The due date will not reset. Attempt calibration of the sensor again. If still unsuccessful, refer to Replacing a Sensor or Sensor Filter . Calibrate the new sensor immediately.
	IR Lock Enabled IR-Lock displays when calibration is attempted.	Perform calibration using the IR Link with Fleet Manager II software, or insert the detector into the MicroDock II station. Refer to Cal Lock (Calibration IR Lock) in User Options and Calibration .			

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PCB Replacement

Obtain replacement board

- Replacement board P/N GAXT-__-PCB1
 - Fill blank with monitor order number
 - Example: Model GAXT-A-DL would use GAXT-A-DL-PCB1

Disassemble monitor

- Discard old PCB install new PCB

Reassemble unit

- Apply new serial number labels to back shell

Power monitor

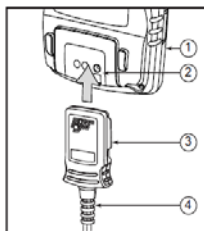
- Set date and calibrate

NOTE: The GasAlertMicroClip Series rechargeable battery is not field replaceable – it is necessary to replace the PCB

Digital Interface

The datalogs from a GasAlertMicroClip Series detector can be downloaded and imported to Fleet Manager II software using:

IR Connectivity Kit



Item	Description
1	Detector
2	IR and charger interface
3	IR Link
4	USB cable

MicroDock II



Intellidox





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GasAlertMax XT II Specifications

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Gas:	Detection Range:	Resolution:
Hydrogen sulphide	0 to 200 ppm	1 ppm/0.1 ppm
Carbon monoxide	0 to 1000 ppm	1 ppm
Oxygen	0 to 30.0 % v/v	0.1 %
Combustible gases	0 to 100% LEL	1.0% LEL
Methane	0 to 5% / Vol. CH ₄	0.1% CH ₄
Operating Temperature:	-20°C to +50°C (-4°F to +122°F)	
Operating Humidity:	10% to 100% relative humidity (non-condensing)	
Instrument Dimensions:	13.1 x 7.0 x 5.2 cm (5.1 x 2.8 x 2.0 in)	
Ingress Protection:	IP68	
Weight:	328 g (11.6 oz)	
Maximum hose sampling length:	22 m (75 ft)	

Factory Default Alarm Set Points

Sensor	LOW	HIGH	STEL	TWA
H ₂ S	10 ppm	15 ppm	10 ppm	15 ppm
CO	35 ppm	200 ppm	50 ppm	35 ppm
Combustible	10% LEL	20% LEL	N/A	N/A
O ₂	19.5% v/v	23.5% v/v	N/A	N/A

*Factory default alarm set points can be adjusted. Fleet Manager II software required.

Remote Sampling

- It is essential to do a leak test on the sample tubing and components connected to the pump before use – leaks in the tubing will dilute the sample from the remote location
- For the GasAlertMax XT II pump allow 2 seconds per foot of tubing for sample to reach sensors and then at least 60 seconds for readings to stabilize; or, continue sampling until readings stabilize.

sampling tubing attachment



To perform a leak test block the probe/tubing inlet – the detector must go into Pump Flow alarm

Get to Know the GasAlertMax XT II

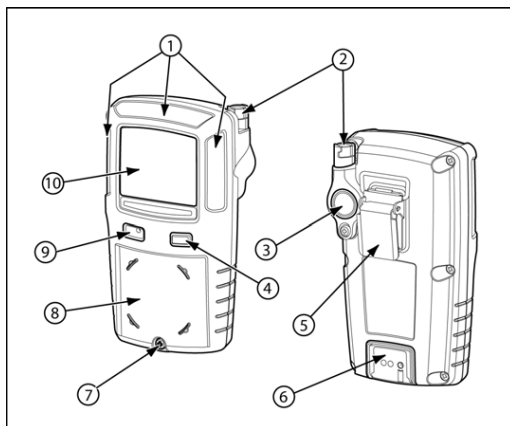
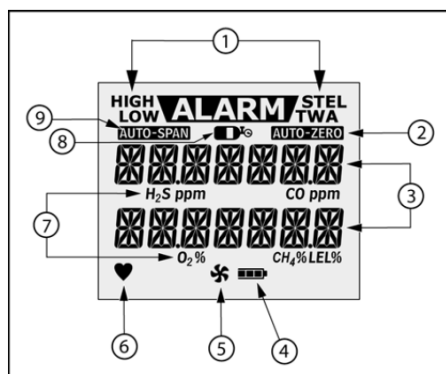


Table 3. Parts of the GasAlertMax XT II

Item	Description
1	Visual alarm indicators (LEDs)
2	Pump quick connector
3	Pump filter and moisture filter
4	Pushbutton
5	Alligator clip
6	Charging connector and IR interface
7	Diffusion cover locking screw
8	Diffusion cover
9	Audible alarm
10	Liquid crystal display (LCD)

Display ICON Symbols



Item	Description
1	Alarm condition
2	Automatically zero sensor indicator
3	Numeric values
4	Battery life indicator
5	Pump indicator
6	Heartbeat indicator
7	Gas type identifiers
8	Gas cylinder indicator
9	Automatically span sensor indicator

GasAlertMax XT II Operation

Turn On: press and hold pushbutton in a “fresh air” location (20.9% v/v O₂, 0 ppm toxic gases, 0% LEL combustible gases) – block pump flow when prompted

Once the unit is powered and in standard operating mode, the blue button performs many additional tasks:

- **Turn the unit off**
 - Press and hold the button until the countdown is complete and the display goes blank
 - **View and clear TWA, STEL and MAX readings**
 - Press the button **twice**
 - Clear the TWA, STEL and MAX values when display shows **RESET**
- NOTE: DO NOT CLEAR OR RESET TWA, STEL OR MAX VALUES WITHOUT THE APPROVAL OF YOUR SUPERVISOR.**
- **Access CALIBRATION MODE/Fresh Air Auto Zero**
 - Turn the unit off by pressing and holding the button down until the countdown is complete then continue holding the button until the **CAL** countdown begins, release the button when the countdown is complete
 - **Activate the backlight while in operation**
 - Press the button to activate the backlight

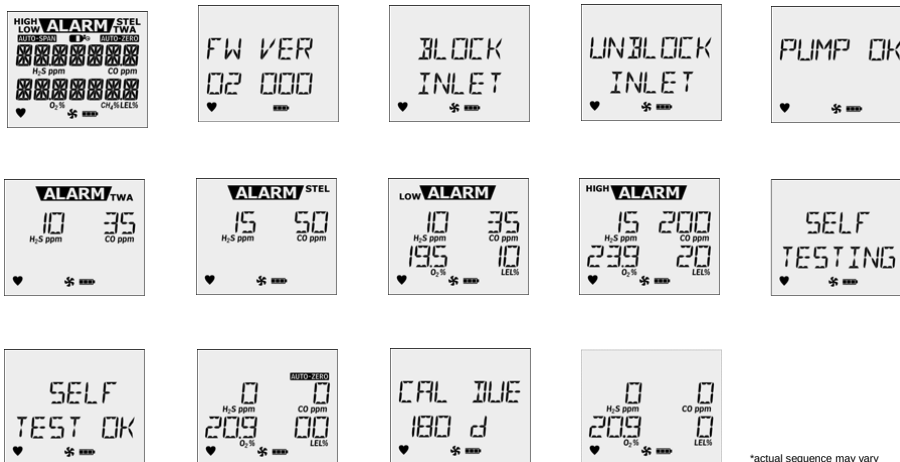
Operation Basics

Turn Off: press and hold pushbutton; continue holding through powering off countdown; release pushbutton when OFF displays. **NOTE:** Deactivating the detector clears the TWA, STEL and PEAK readings. The information will be retained in the datalog files. Datalog files are overwritten once the memory reaches capacity; data is replaced on a FIFO basis. Follow the safety procedures as outlined by your employer.

To view the date/time, current battery power, calibration due date, bump test due date, TWA, STEL, and peak readings: press the pushbutton twice sharply while in standard operating mode. **NOTE:** Resetting TWA, STEL and PEAK reading values will clear those readings. The information will be retained in the datalog files. Datalog files are overwritten once the memory reaches capacity; data is replaced on a FIFO basis. Confirm with your supervisor before clearing any readings.

To turn the backlight on: press the pushbutton once while in standard operating mode.

Typical Start Up Sequence



GasAlertMax XT II Alarms

Alarm	Screen	Alarm	Screen
Low Alarm - Slow siren - Slow alternating flash - ALARM and target gas bar flash - Vibrator alarm activates		TWA Alarm - Fast siren - Fast alternating flash - ALARM and target gas bar flash - Vibrator alarm activates	
High Alarm - Fast siren - Fast alternating flash - ALARM and target gas bar flash - Vibrator alarm activates		STEL Alarm - Fast siren - Fast alternating flash - ALARM and target gas bar flash - Vibrator alarm activates	

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Manual BUMP Test

Perform a BUMP test prior to each day's use at a minimum

Perform a BUMP test in "fresh air" (0 ppm toxics; 0% LEL; 20.9% O₂)

To perform a BUMP test simply apply a concentration of target gas capable of activating detector alarms while in standard operating mode

Visually observe all sensors respond to gas and verify alarms activate!

Close the regulator remove the calibration cap from the detector; the detector will remain in alarm until gas clears from sensors.



NOTE: use either a Demand Flow Regulator or a 0.5 lpm fixed orifice regulator * if using a fixed orifice regulator open the regulator valve prior to connecting tubing to the pump inlet to avoid putting the pump in to "Low Flow" alarm!

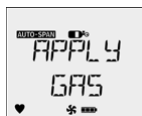
Manual Calibration

Perform calibration in "fresh air" (0 ppm H₂S; 0 ppm CO; 0% LEL; 20.9% O₂)

To access manual calibration press the pushbutton and hold while detector performs the Powering Off countdown; continue holding the pushbutton when OFF displays; the detector will display calibration countdown; release pushbutton when detector displays **AUTO-ZERO**



Do not apply gas until Apply Gas appears on display

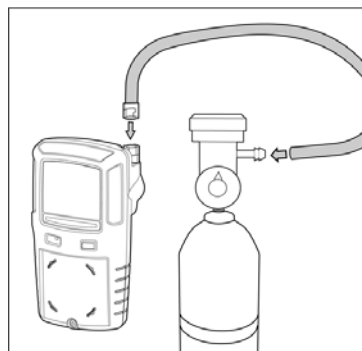


Manual Calibration

Connect the calibration hose to the regulator on the gas cylinder

Attach the hose quick connector to the pump quick connector to apply gas – use a demand flow regulator of 0.5 lpm fixed orifice regulator * if using a fixed orifice regulator open the regulator valve prior to connecting tubing to the pump inlet to avoid putting the pump in to Low Flow alarm

Once 50% of the expected gas value is detected by all sensors (within 30 seconds) **AUTO-SPAN** continues to flash while the detector completes the span calibration – approximately 2 minutes

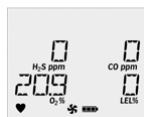


Manual Calibration

When the span calibration is completed successfully the audible alarm beeps and the following screens will appear



The GasAlertMax XT II will return to normal operating mode



GasAlertMax XT II Manual BUMP/Calibration

Connect the tubing quick connect fitting to the pump inlet. It is possible to use either a Demand Flow Regulator (DFR) or a standard fixed orifice regulator. NOTE: if using the fixed orifice regulator be sure to open the valve prior to attaching the tubing to avoid putting the pump into LOW FLOW alarm.



Fixed Orifice Regulator



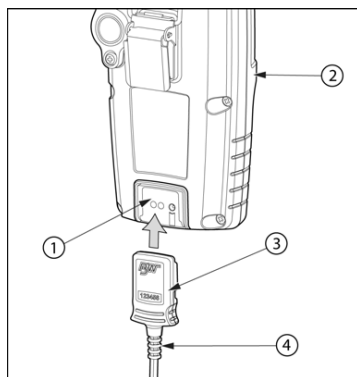
Demand Flow Regulator

Charging Rechargeable Battery

Turn the detector OFF

Charge the battery in a safe area that has "fresh air" and temperature between 0°C to 40°C (32°F to 104°F)

Plug the charging adapter into the back of the detector and into an appropriate power outlet; charging adapters are voltage specific for the region of use.



Item	Description
1	IR and charger interface
2	GasAlertMax XT II
3	Charger adapter
4	Charger cable

Charging Rechargeable Battery

Allow the battery to charge for 6 hours. While charging the battery status indicator on the display will continuously flash between low, mid and full.



low mid full

When the charge is complete the battery status icon will stop flashing and remain on the full charge indication.



The battery may be warm immediately following charging; this is normal.

Charging Options



Multi-Unit Power Adaptor



Multi-Unit Cradle Charger



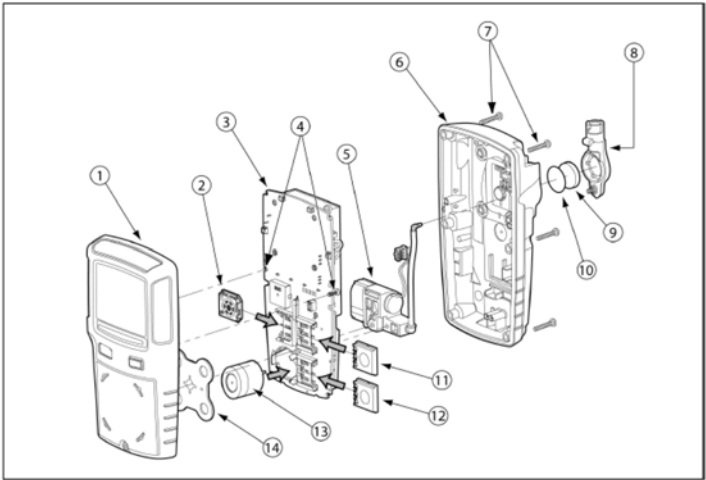
Vehicle Power Adaptor – with cigarette lighter adaptor or direct wire



Standard 110 VAC Power Adaptor

Maintenance

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Item	Description
1	Front shell
2	LEL sensor
3	PCB
4	PCB screws (2)
5	Pump
6	Rear shell
7	Machine screws (6)
8	Pump inlet
9	Pump filter (particulate)
10	Moisture filter
11	CO sensor
12	H ₂ S sensor
13	O ₂ sensor
14	Sensor filter

Maintenance

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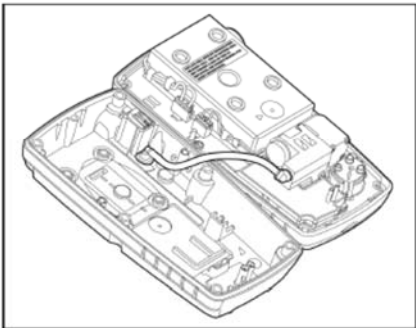


Figure 10. Front and Rear Shells Side by Side

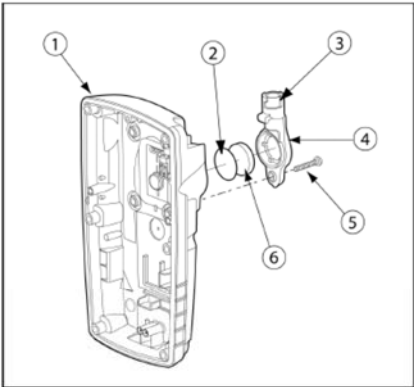


Figure 12. Replacing the Pump Filters



Figure 13. Removing the Pump Filters

Trouble Shooting

Problem	Possible Cause	Solution
The detector does not activate.	Depleted battery	Charge the battery. Refer to Charging the Battery .
	Damaged or defective detector	Contact BW Technologies by Honeywell .
Detector automatically deactivates.	Automatic deactivation due to depleted battery	Charge the battery. Refer to Charging the Battery .
	Lockout on Self-Test Error is enabled and a sensor(s) has failed the startup self-test	Refer to Lockout on Self-Test Error and Replacing a Sensor or Sensor Filter .
The detector enters alarm immediately when activated.	Sensor needs to stabilize	Used sensor: Wait 60 seconds New sensor: Wait 5 minutes
	Low battery alarm	Charge the battery. Refer to Charging the Battery .
	Sensor(s) requires calibration	Calibrate the sensor(s). Refer to Calibration .
	Hazardous environment	Leave the area immediately. Deactivate and reactivate the detector in a safe area that is free of hazardous gas.
The activation startup self-test fails.	General fault	Contact BW Technologies by Honeywell .
	Sensor error	Replace the sensor. Refer to Replacing a Sensor or Sensor Filter .

Trouble Shooting

Problem	Possible Cause	Solution
Detector does not display normal ambient gas reading after startup tests.	Sensors not stabilized	Used sensor: Wait 60 seconds New sensor: Wait 5 minutes
	Sensor(s) requires calibration	Calibrate the sensor(s). Refer to Calibration .
	Target gas is present	Detector is operating properly. Use caution in suspect areas.
Detector does not respond to pushbutton.	Battery is depleted	Charge the battery. Refer to Charging the Battery .
	Detector is performing operations that do not require user input	Pushbutton operation restores automatically when the operation ends.
Detector does not accurately measure gas.	Sensor(s) requires calibration	Calibrate the sensor(s). Refer to Calibration .
	Detector is colder/hotter than gas temperature	Allow the detector to attain ambient temperature before use.
	Sensor filter is blocked	Replace the sensor filter. Refer to Replacing a Sensor or Sensor Filter .
Detector does not enter alarm.	Alarm setpoint(s) are set incorrectly	Reset the alarm setpoints. Refer to Resetting Gas Alarm Setpoints .
	Alarm setpoint(s) set to zero	Reset the alarm setpoints. Refer to Resetting Gas Alarm Setpoints .
	Detector is in calibration mode	Complete the calibration procedure.

Trouble Shooting

Problem	Possible Cause	Solution
Detector intermittently enters alarm without reason.	Ambient gas levels are near alarm setpoint or the sensor is exposed to a puff of the target gas	Detector is operating normally. Use caution in suspect areas. Check the peak (maximum) gas exposure reading.
	Alarm setpoints defined incorrectly	Reset alarm setpoints. Refer to Factory Gas Alarm Setpoints and Sensor Configuration .
	Detector requires calibration	Calibrate the sensors. Refer to Calibration .
	Missing or faulty sensor(s)	Replace the sensor. Refer to Replacing a Sensor or Sensor Filter .
Features and options are not operating as expected.	Changes have been made in Fleet Manager II	Verify settings in Fleet Manager II are correct.
Charging		
Battery has been charging for 3+ hours (XT model) or 6+ hours (XL-X3 models). The charging indicator on the detector LCD shows the battery is still charging.	Battery is trickle charging	Battery is fully charged and ready for operation.
Battery indicator does not display when charging.	Detector is depleted below normal levels	Charge the battery for 8 hours. Detector LEDs may light during first 5 hours. This is normal. If the battery indicator does not light after charging for 8 hours, contact BW Technologies by Honeywell .
When detector is activated after charging, the battery indicator does not display.	Battery is defective	Contact BW Technologies by Honeywell .

Downloading Data

The datalogs from a GasAlertMax XT II detector can be downloaded and imported to Fleet Manager II software one of two ways:

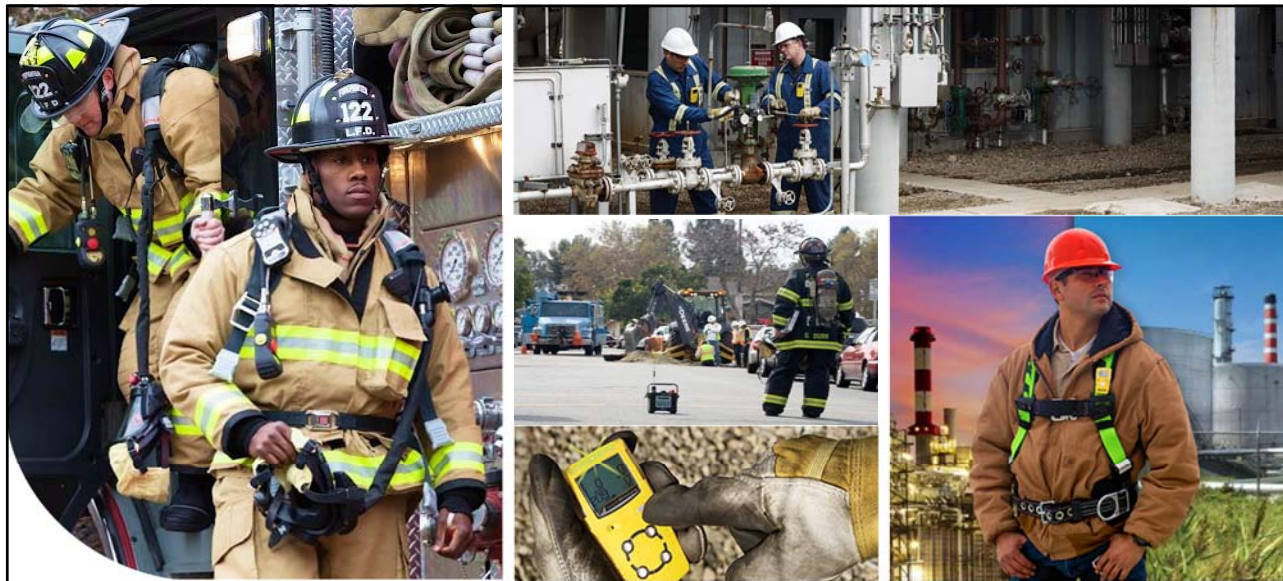
- Using the IR Connectivity Kit



Figure 3. Connecting the IR Link

- through the MicroDock II system by selecting DATA TRANS





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Specifications

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Detection Range:

Hydrogen sulphide	0 to 200 ppm	1 ppm/0.1 ppm
Carbon monoxide	0 to 1000 ppm	1 ppm
Oxygen	0 to 30.0 %	0.1 %
Combustible gases	0 to 100% LEL	1.0% LEL
Methane	0 to 5% / Vol. CH ₄	0.1% CH ₄

Operating Temperature: -20°C to +50°C (-4°F to +122°F)

Operating Humidity: 10% to 100% relative humidity (non-condensing)

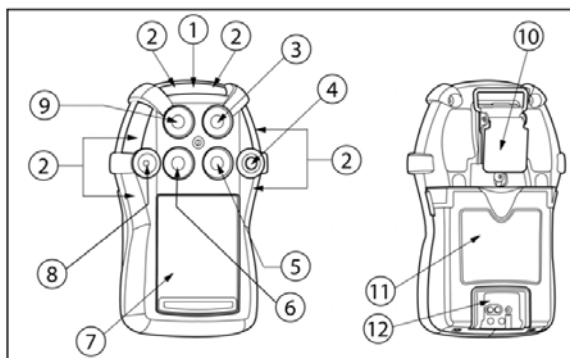
Instrument Dimensions: 13 x 8.1 x 4.7 cm (5.1 x 3.2 x 1.9 in)

Weight: 316 gm/11.15 oz. (with rechargeable battery pack)
338 gm/11.92 oz. (with alkaline battery pack)

Factory Default Alarm Set Points

Sensor	LOW	HIGH	TWA	STEL
H ₂ S	10 ppm	15 ppm	10 ppm	15 ppm
CO	35 ppm	200 ppm	35 ppm	50 ppm
Combustible	10% LEL	20% LEL	N/A	N/A
O ₂	19.5% v/v	23.5% v/v	N/A	N/A

Get to Know the GasAlertQuattro



Item	Description	Item	Description	Item	Description	Item	Description
1	IntelliFlash (green LED)	4	Pushbutton	7	Liquid crystal display (LCD)	10	Alligator clip
2	Visual alarm indicator (red LED)	5	Combustible (LEL) sensor	8	Audio alarm	11	Battery pack
3	Hydrogen sulfide (H ₂ S) sensor	6	Carbon monoxide (CO) sensor	9	Oxygen (O ₂)	12	Charging connector and IR interface

Display ICON Symbols

Screen Elements

	Calibration gas cylinder		Displays during startup to indicate audio and visual alarm pass or fail during a MicroDock II bump test		Displays if calibration is initiated and the Cal IR Lock option is enabled
	Bump test gas cylinder		Displays when the Stealth option is enabled		Displays during calibration and when startup is complete
	Indicates pass for startup, sensors, calibrations, and bump tests		Displays when the detector is in alarm (not applicable to TWA and STEL)		Battery — full charge
	Indicates fail for startup, sensors, calibrations, and bump tests		Displays when there is a warning, failure, error, or low battery		Battery — half charge
	Pushbutton displays when screen provides an option to end or skip		Heartbeat pulses continually during normal operation to verify the detector is operating correctly		Low battery warning
	Reading displays with white background during normal operation		Displays for STEL alarms and setpoints		Displays when the detector is connected to an IR Link
	Reading displays with alternating black background when the sensor is in alarm		Displays for TWA alarms and setpoints		Displays when the detector is communicating with Fleet Manager II
	Grey check box displays during bump tests or calibration when a gas is not due		Displays during peak gas exposure information screens		Displays when the detector's firmware is being updated
	Displays when the most recent calibration or bump test failed but a previous calibration or bump test is still valid within the due date. Also displays during auto-zero.		Displays during an operation such as auto-zeroing		Displays when gas should no longer be applied after a bump test or calibration

Operation Basics

Turn On: press and hold pushbutton in a “fresh air” location (20.9% v/v O₂, 0 ppm toxic gases, 0 % LEL combustible gases)

Turn Off: press and hold pushbutton; continue holding through powering off countdown; release pushbutton when OFF displays. **NOTE:** Deactivating the detector clears the TWA, STEL and PEAK readings. Follow the safety procedures as outlined by your employer.

To view the date/time, current battery power, calibration due date, bump test due date, TWA, STEL, and peak readings, press the pushbutton twice sharply while in standard operating mode. **NOTE:** Resetting TWA, STEL and PEAK reading values will clear those readings. Confirm with your supervisor before clearing any readings.

To turn the backlight on press the pushbutton once while in standard operating mode.

Typical Start Up Sequence



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GasAlertQuattro Alarms

Alarm	Screen	Alarm	Screen
Low Alarm - Slow siren (upward tone) - Slow flash - Black box around gas flashes - Vibrator alarm activates		TWA Alarm - Fast siren (downward tone) - Fast flash - Black box around gas flashes - Vibrator alarm activates	
High Alarm - Fast siren (downward tone) - Fast flash - Black box around gas flashes - Vibrator alarm activates		STEL Alarm - Fast siren (downward tone) - Fast flash - Black box around gas flashes - Vibrator alarm activates	

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GasAlertQuattro Alarms

Alarm	Screen	Alarm	Screen
Multi-Gas Alarm - Alternating low and high alarm siren and flash - Black box around gas flashes - Type of alarm alternates - Vibrator alarm activates		Over Limit (OL) Alarm - Fast siren (downward tone) - Fast flash - Black box around gas flashes - Vibrator alarm activates <i>Note: LCD may also display an under-limit reading (-OL)</i>	
Low Battery Alarm - Sequence of 10 rapid sirens and alternating flashes with 7 seconds of silence in between (continues for 15 minutes) - flashes and the vibrator activates - After 15 minutes, of the low battery alarm sequence, the detector enters critical battery alarm. Refer to Critical Battery Alarm.		Critical Battery Alarm - Fifteen minutes after the low battery alarm activates, a sequence of 10 rapid sirens and alternating flashes with 1 second of silence in between (sequence reactivates seven times) - Vibrator alarm pulses - Low Battery Powering Off displays and the detector deactivates	

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GasAlertQuattro Alarms

Alarm	Screen	Alarm	Screen
Heartbeat ♥ pulses every second to verify detector is operating correctly.		Normal Deactivation - Sequence of alternating beeps and flashes - Vibrator alarm activates - Countdown initiates - OFF displays	
IntelliFlash One flash (green LED) every 1-120 seconds (flash frequency is defined with the IntelliFlash Interval option) <i>Note: IntelliFlash automatically deactivates during a low battery alarm, calibration fail, bump test fail, self-test fail, and an alarm condition.</i>		Sensor Failure Alarm ✕ displays	
Confidence/Compliance Beep One beep every 1-120 seconds (beep frequency is defined with Confidence/Compliance Beep Interval option) <i>Note: (Confidence/compliance beep automatically deactivates during a low battery alarm, calibration fail, bump test fail, self-test fail, and an alarm condition.</i>		<i>Note: If Low Alarm Acknowledge is enabled, the audible alarm can be disabled during a low alarm condition. The visual, audible, and vibrate alarms remain active until the alarm condition changes or the detector deactivates. Press () to acknowledge and deactivate the audible alarm. If the alarm escalates to a high, TWA, or STEL alarm, the audible alarm reactivates.</i> <i>If enabled, during an alarm condition Latching Alarms causes the low and high gas alarms (audible, visual, and vibrator) to persist until the alarm is acknowledged by pressing () and the gas concentration is below the low alarm setpoint. The peak concentrations display continually until the alarm condition no longer exists. Local regulations may require Latching Alarms be enabled.</i>	

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Manual BUMP Test

Perform a BUMP test prior to each day's use at a minimum

Perform a BUMP test in "fresh air"(0 ppm toxic gases; 0% LEL; 20.9% O₂)

To perform a BUMP test simply apply a concentration of target gas capable of activating detector alarms while in standard operating mode

Visually observe all sensors respond to gas and verify alarms activate!

Close the regulator remove the calibration cap from the detector; the detector will remain in alarm until gas clears from sensors.

Item	Description
1	Gas cylinder and regulator
2	Calibration hose
3	Knob
4	Calibration cap

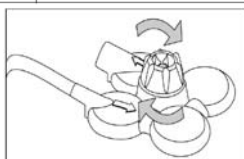


Figure 9. Tightening the Calibration Cap

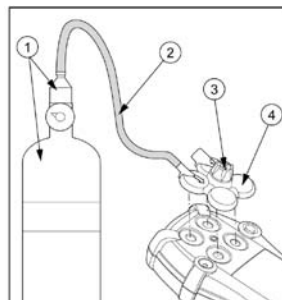
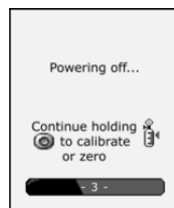


Figure 8. Bump Test Installation

Manual Calibration

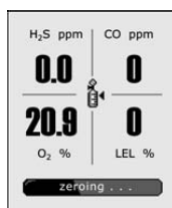
Perform calibration in "fresh air"(0 ppm toxic gases; 0% LEL; 20.9% O₂)

To access manual calibration press the pushbutton and hold while detector performs the Powering Off countdown; continue holding the pushbutton when OFF displays; the detector will display calibration countdown; release pushbutton when detector displays Calibration started.



Manual Calibration

The detector will enter the sensor zero function; once the zeroing function is complete the screen will display Apply Calibration gas now...; if zeroing sensors only press the pushbutton and the calibration will be aborted and detector will return to normal operation.



Manual Calibration

To continue with calibration attach the calibration cap to the detector; open the regulator valve and apply gas.

Item	Description
1	Gas cylinder and regulator
2	Calibration hose
3	Knob
4	Calibration cap

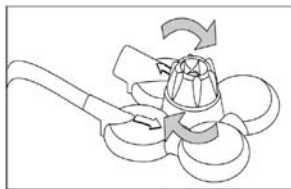


Figure 9. Tightening the Calibration Cap

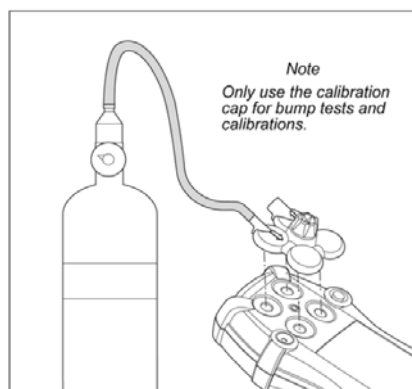
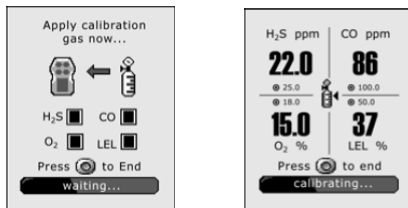


Figure 11. Connecting the Gas Cylinder to the Detector

Manual Calibration

When a sufficient concentration of gas is detected the detector will begin calibrating the sensors.

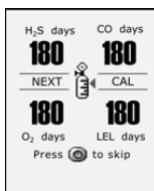


When the calibration is complete the following screen will be displayed; close the regulator valve and remove the calibration cap.

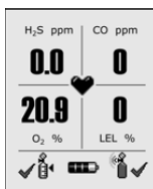


Manual Calibration

Once calibration has been completed successfully the number of days to calibration will be reset to preset value

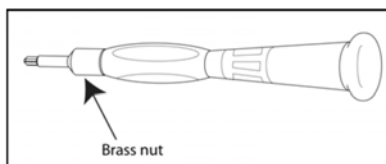


The detector will now return to normal operation

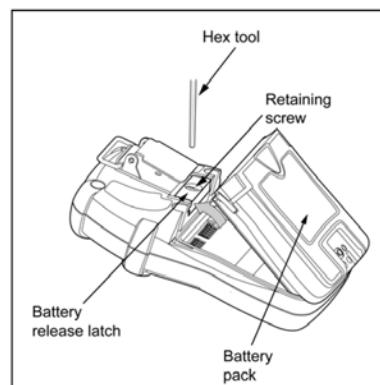


Removing the Alkaline Battery Pack

- Press and hold  to deactivate the detector
- If required, loosen the battery pack retaining screw using the hex end of the screwdriver provided – 1 to 2 turns (it is not necessary to remove the screw completely – loosen only to prevent loss of screw)
- Push up on the release latch



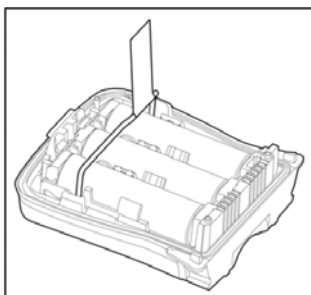
BW screwdriver – loosen brass nut to invert tool



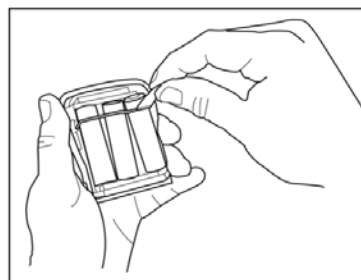
Remove alkaline battery pack

Replacing the Alkaline Batteries

- From the top of the battery pack, lift the battery pack upward to remove the alkaline battery pack
- Using the tab, unhook the ejector bar from the release clasp and move the ejector bar so that it is aligned horizontally over the batteries
- Using the tab, pull up on the ejector bar



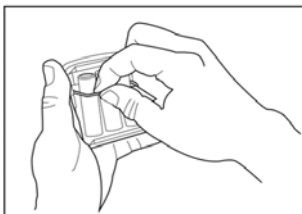
Ejector bar unhooked from release clasp



Using the tab to pull up on the ejector bar

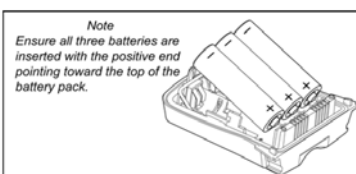
Replacing the Alkaline Batteries

- To the left of the tab, pull up on the ejector bar to release the AA alkaline batteries



Pulling up on the ejector bar

- Remove the existing spent batteries
- Reset the ejector bar to the original flat position – ensure the ejector bar engages the release clasp
- Insert the new batteries using proper orientation – position the + end first and push into place from the – end of the batteries



Inserting the AA alkaline batteries

Replacing the Alkaline Batteries

- Replace the battery pack into the detector – insert bottom end first (ensure the tab is tucked in before inserting battery pack into the detector)
- Lower the top end of the battery pack into place and push down until release latch clicks.
- If required tighten the retaining screw to lock the battery pack in place

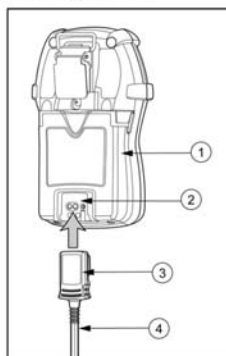
Charging Rechargeable Battery

Turn the detector OFF

Charge the battery in a safe area that has “fresh air” and temperature between 0°C to 40°C (32°F to 104°F)

Plug the charging adapter into the back of the detector and into an appropriate power outlet; charging adapters are voltage specific for the region of use.

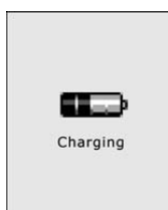
Charging the Rechargeable Battery



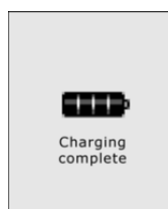
Item	Description
1	Detector
2	IR and charger interface
3	Charger adapter
4	Charger cable

Charging Rechargeable Battery

While charging the LCD displays the battery icon

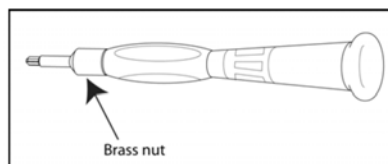


When the battery is fully charged the following screen displays on LCD



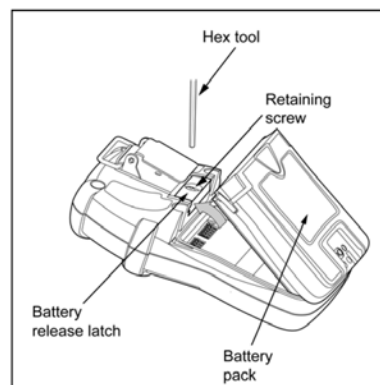
Removing the Rechargeable Battery Pack

- Press and hold  to deactivate the detector
- If required, loosen the battery pack retaining screw using the hex end of the screwdriver provided – 1 to 2 turns (it is not necessary to remove the screw completely – loosen only to prevent loss of screw)
- Push up on the release latch



Brass nut

BW screwdriver – loosen brass nut to invert tool



Remove rechargeable battery pack

Charging Options



Multi-Unit Power Adaptor



Multi-Unit Cradle Charger

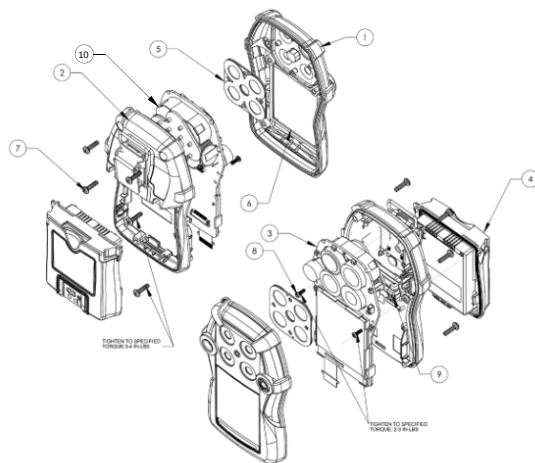


Vehicle Power Adaptor – with cigarette lighter adaptor or direct wire



Standard 110 VAC Power Adaptor

Assembly Procedure



1	Front Shell	QT-FC1 QT-FC1B
2	Back Shell	QT-BC1 QT-BC1B
3	Main Board	QT-MPCB1
4	Battery Pack	QT-BAT-A01 QT-BAT-R01
5	Sensor Gasket	QT-SS QT-SS-K1
6	LCD Gasket	QT-LCD-K1
7	Screw #4-40 x 7/16"	QT-SCREW-K1
8	Screw #2-56 x 1/4"	
9	Motor	GA-VM-2
10	Sensor Board	QT-SPCB1

Assembly Procedure

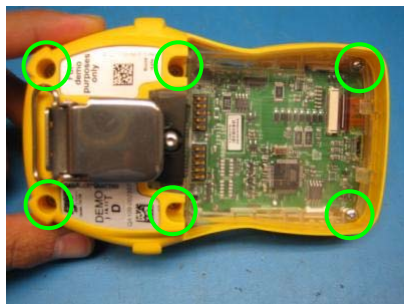
Disassembly

- When unit is off, remove battery pack
 - NOTE: Removing battery pack while unit is on will corrupt the clock



Assembly Procedure

- Disassembly (cont'd)
 - Remove 6 screws



- Pull off front shell and sensor gasket



Assembly Procedure

- Disassembly (cont'd)
 - Remove 2 smaller screws

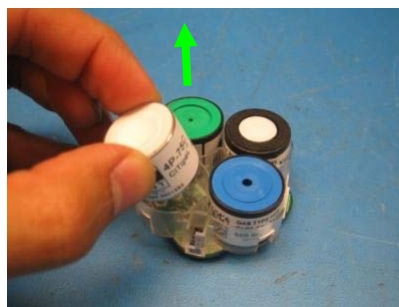
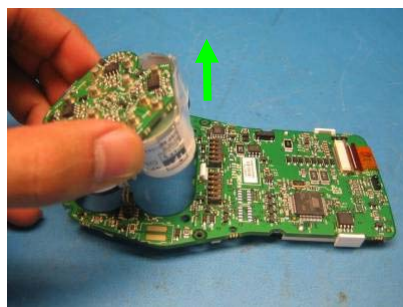


- Pull off back shell



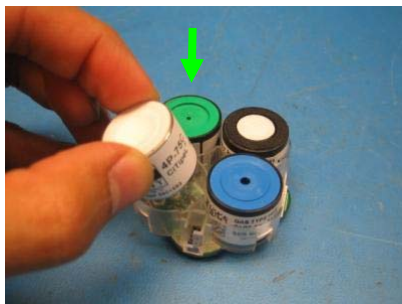
Assembly Procedure

- Disassembly (cont'd)
 - Carefully separate sensor board
 - Remove sensor(s)



Assembly Procedure

- Reassembly
 - Install sensor(s)
 - Carefully connect sensor board to main board
 - Notice connectors are orientated differently that it only be connected one way



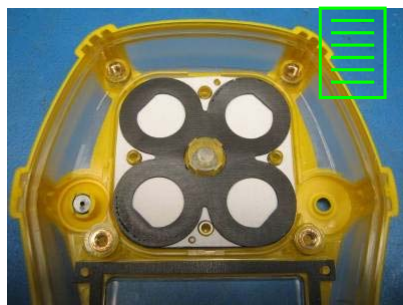
Assembly Procedure

- Reassembly (cont'd)
 - Place boards in back shell
 - Install 2 smaller screws



Assembly Procedure

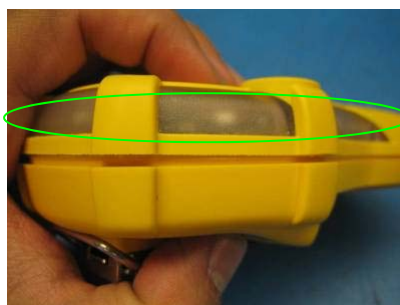
- Reassembly (cont'd)**
- Place sensor gasket on front shell
 - Line up gasket holes with posts on front shell



Assembly Procedure

Reassembly (cont'd)

- Place front shell on back shell and boards
 - Ensure rubber doesn't get pinched between front and back shells

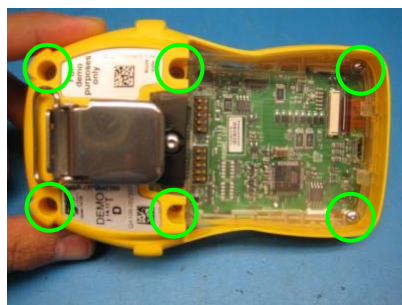


Assembly Procedure

• Reassembly (cont'd)

- Install 6 screws

- Install battery pack



Troubleshooting

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Beeper does not sound	Visually check beeper cavity. Replace beeper should solve problem. Replace main board if problem persists.
Vibrator does not work	Visually check vibrator condition and contact pads on main board. Replace vibrator or main board to solve problem.
LCD does not work properly	Visually check LCD glass/cable and connector on main board. Replace LCD or main board to solve problem.

Trouble Shooting

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Problem	Possible Cause	Solution
Startup		
The detector does not activate.	Depleted battery.	Replace alkaline batteries. Refer to Replacing the Alkaline Batteries . Charge the rechargeable battery pack. Refer to Charging the Rechargeable Battery .
	Damaged detector.	Contact BW Technologies by Honeywell.
Detector automatically deactivates.	Automatic deactivation due to critical low battery.	Replace alkaline batteries. Refer to Replacing the Alkaline Batteries . Charge the rechargeable battery pack. Refer to Charging the Rechargeable Battery .
	Lockout on Self-Test Error is enabled and a sensor(s) has failed the startup self-test.	Refer to Lockout on Self-Test Error and Replacing the Sensors.
	Sensor(s) requires calibration.	Refer to Calibration Procedures.

Trouble Shooting

Problem	Possible Cause	Solution
The detector enters alarm immediately when activated.	Sensor needs to stabilize.	Used sensor: Wait 60 seconds New sensor: Wait 5 minutes
	Low battery or critical low battery alarm.	Replace alkaline batteries. Refer to Replacing the Alkaline Batteries .
		Charge the rechargeable battery pack. Refer to Charging the Rechargeable Battery .
	Hazardous environment.	Leave the area immediately. Deactivate and reactivate the detector in a safe area that is free of hazardous gas, in an atmosphere of 20.9% oxygen.
The activation startup self-test fails.	A new sensor has been inserted	Calibrate the sensor.
	General fault.	Contact BW Technologies by Honeywell .
	Sensor error.	Refer to Startup Troubleshooting. If required, refer to Replacing the Sensors.

Trouble Shooting

Problem	Possible Cause	Solution
Detector Operation		
Detector does not display normal gas reading after startup sequence.	Sensors not stabilized.	Used sensor: Wait 60 seconds New sensor: Wait 5 minutes
	Sensor(s) requires calibration.	Refer to Calibration Procedures .
	Target gas is present.	Detector is operating properly. Use caution in suspect areas.
Detector does not respond to push-button.	Battery is in critical low battery state or is completely depleted.	Replace alkaline batteries. Refer to Replacing the Alkaline Batteries . Charge the rechargeable battery pack. Refer to Charging the Rechargeable Battery .
	Detector is performing operations that do not require user input.	Button operation restores automatically when the operation ends.
Detector does not accurately measure gas.	Sensor(s) requires calibration.	Refer to Calibration Procedures .
	Detector is colder/hotter than gas temperature.	Allow the detector to attain ambient temperature before use.
	Sensor filter is blocked.	Refer to Replacing the Sensor Filter .

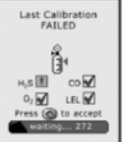
Trouble Shooting

Problem	Possible Cause	Solution
Detector does not enter alarm.	Alarm setpoint(s) are set incorrectly.	Refer to Sample Gas Alarm Setpoints . Define the alarm setpoints in Fleet Manager II.
	Alarm setpoint(s) set to zero.	Refer to Sample Gas Alarm Setpoints . Define the alarm setpoints in Fleet Manager II.
	Detector is in calibration mode.	Complete the calibration procedure.
Detector intermittently enters alarm without reason.	Ambient gas levels are near alarm setpoint or the sensor is exposed to a puff of the target gas.	Detector is operating normally. Use caution in suspect areas. Check peak gas exposure reading.
	Alarm setpoints are set incorrectly.	Refer to Sample Gas Alarm Setpoints . Define the alarm setpoints in Fleet Manager II.
	Sensor(s) requires calibration.	Refer to Calibration Procedures .
	Missing or faulty sensor(s).	Refer to Replacing the Sensors .
Features and options are not operating as expected.	Changes in Fleet Manager II.	Verify that the settings in Fleet Manager II are correct.

Trouble Shooting

Problem	Possible Cause	Solution
Charging		
Battery has been charging for 6 hours. Charging indicator on LCD shows the battery is still charging.	Battery is trickle charging.	Battery is fully charged and is ready for operation.
Battery indicator does not display when charging.	Battery is depleted below normal levels	Charge the battery for 8 hours. If the battery indicator does not light after charging, contact BW Technologies by Honeywell .

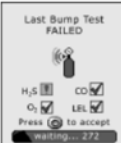
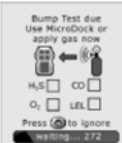
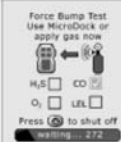
Trouble Shooting

Error Screen	Problem	Solution	Error Screen	Problem	Solution
	Auto-zero Error Sensor(s) failed to auto-zero	Calibrate the sensor.		Last Calibration Failed Displays when the last calibration failed. If the Force Calibration option is enabled, the sensors must be calibrated.	Press  and calibrate the sensor(s) immediately. Refer to Calibration Procedures . If Cal IR Lock is enabled, an IR device (IR Link or Micro-Dock II) must be used to calibrate.
	Self-test Failed Sensor(s) fails the self-test during startup.	Press  to accept the failed sensor(s). The Sensor self test error accepted screen displays. Replace the sensor when startup is complete. Refer to Replacing the Sensors .		Force Calibration If the Force Calibration option is enabled, the sensors must be calibrated to enter normal operation.	Press and hold  to calibrate the sensors, or press  and release to deactivate the detector. Refer to Calibration Procedures . If Cal IR Lock is enabled, an IR device (IR Link or Micro-Dock II) must be used to calibrate.
	All Sensors Fail If the Lockout on Self-test Error option is enabled and all sensors fail, the detector automatically deactivates.	A failure of all sensors can be caused by poisoning (alcohol and silicon). Allow sensors to recover for 1 hour. If sensors fail startup again, refer to Replacing the Sensors .		Calibration Overdue Displays when calibration is past due. If the Force Calibration option is enabled, the sensor(s) must be calibrated to enter normal operation.	Press  to continue and calibrate the sensor(s) immediately. Refer to Calibration Procedures . If Cal IR Lock is enabled, an IR device (IR Link or Micro-Dock II) must be used to calibrate.

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Trouble Shooting

Error Screen	Problem	Solution	Error Screen	Problem	Solution
	Last Bump Test Failed If the last bump test failed and the Force Bump Test option is enabled, a bump test must be performed.	Use the MicroDock II station to perform a bump test, otherwise press  to deactivate the detector. If you do not have a MicroDock II, change the bump interval in Fleet Manager II to Refer to Bump Test .		Bump Test Overdue Screen displays when sensors are overdue for a bump test and the Force Bump test option is disabled.	Apply gas directly or use the MicroDock II, otherwise press  to enter normal operation with the bump test overdue. Refer to Bump Test .
	Force Bump Test If the Force Bump Test option is enabled, the sensors must be bump tested to enter normal operation.	Apply gas immediately or use the MicroDock II station, otherwise press  to deactivate the detector. Refer to Bump Test .	 Caution BW Technologies by Honeywell recommends to bump test the sensors before each day's use to confirm their ability to respond to gas by exposing the detector to a gas concentration that exceeds the alarm setpoints.		

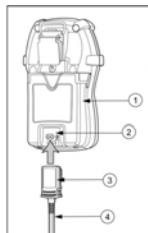
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Downloading Data

The datalogs from a GasAlertMax XT II detector can be downloaded and imported to Fleet Manager II software one of two ways:

- Using the IR Connectivity Kit



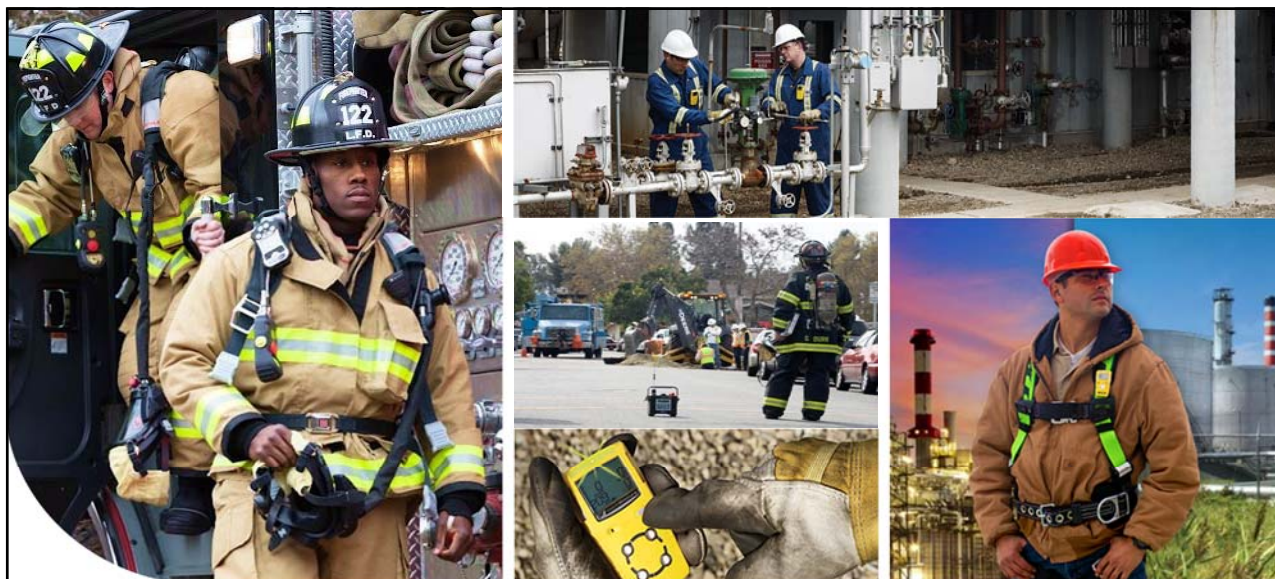
Item	Description
1	Detector
2	IR and charger interface
3	IR Link
4	USB cable

- through the MicroDock II system by selecting DATA TRANS



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2018 CSTW

BW Clip / BW Clip RT
Certified Service Technical Workshop

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Specifications

Gas Detection Range

H₂S	0 to 100 ppm
CO	0 to 300 ppm
SO₂	0 to 100 ppm
O₂	0 to 25.0 % v/v

Operating Temperature

-40°C to +50°C (-40°F to +122°F)
-30°C to +50°C (-22°F to +122°F)
-30°C to +50°C (-40°F to +122°F)
-20°C to +50°C (-4°F to +122°F)

Shelf Life: H₂S, CO, SO₂: 12 months before activation
O₂: 6 months before activation

Operating Humidity: 5 to 95% rH (non-condensing)

Instrument Dimensions: 4.1 x 5.0 x 8.7 cm (1.6 x 2.0 x 3.4 in)

Weight: 92 gm/3.2 oz.

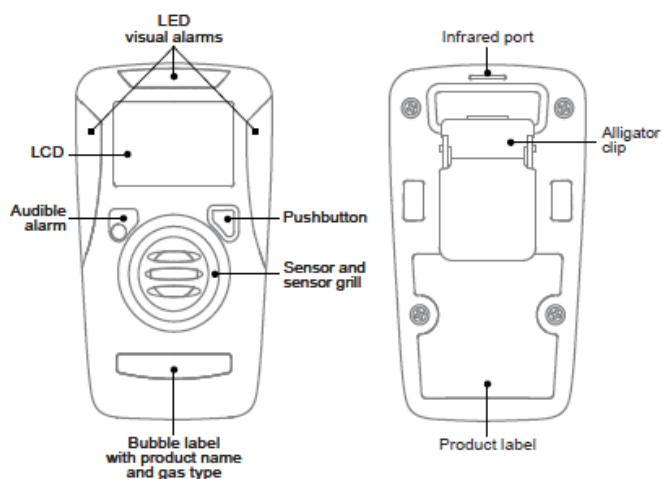
Event logging: 35 most recent gas events and bump test results

Factory Default Alarm Set Points

Sensor	LOW	HIGH
H ₂ S	10 ppm	15 ppm
CO	35 ppm	200 ppm
Combustible	10% LEL	20% LEL
O ₂	19.5% v/v	23.5% v/v
SO ₂	5 ppm	10 ppm

*Factory default alarm set points can be adjusted.

Get to Know the BW Clip / BW Clip RT



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Display Icon Symbols



BW Clip RT version

	Pushbutton prompt. When this symbol is displayed, press and hold the pushbutton until the symbol disappears.
	BW Clip O ₂ models only. Oxygen concentration is measured as percent by volume.
	BW Clip H ₂ S, CO and SO ₂ models only. Toxic gas concentration is measured in parts per million.
	Low alarm and high alarm. These symbols are displayed when a gas concentration that exceeds alarm setpoints is detected.
	Non-compliance warning. This symbol is displayed when a diagnostic or compliance test fails; when the operating life countdown reaches 24 hours or less; and for up to 30 days after operating life expiry. It is also displayed when certain notifications are enabled through Fleet Manager II via an IntelliDoX station.
	Real-time clock. This symbol is displayed when real-time clock is enabled through Fleet Manager II via an IntelliDoX station.
	End of operating life warning. This symbol is displayed when the operating life countdown reaches 24 hours or less.
	Peak reading. This symbol is displayed when a maximum gas exposure event has occurred within the past 24 hours.
	Bump test reminder. If the detector is configured to display a bump test reminder, this symbol is displayed when a bump test is due. X indicates a failed test.
	BW Clip O ₂ models only. This symbol is displayed when more than 24 hours have elapsed since the last successful zero procedure was performed. X indicates a failed test.
	Operating life remaining in months (MM) or days (DD).
	This symbol is displayed when more than 24 hours have elapsed since the last successful zero procedure was performed (O ₂ models) or indicates a sensor calibration is due (H ₂ S, CO and SO ₂ models).
	X indicates a failed calibration (H ₂ S, CO and SO ₂ models) or a failed zero procedure (O ₂ models).

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BW Clip / BW Clip RT

Maintenance Free Single-Gas Detector

- Once activated the detector cannot be deactivated – can operate up to 3 years maintenance free
- 24 month version H₂S and CO can be put into a hibernation state to extend life

24 Month Version

- H₂S
- CO
- SO₂
- O₂

36 Month Version

- H₂S
- CO



BW Clip / BW Clip RT

BW Clip Series Standard Features

- Compact / light weight / easy to use
- 2 year & 3 year maintenance-free
- Sensors: H₂S, CO, O₂ or SO₂
- SureCell™ Sensor Technology
- Compatible with MicroDock, and Fleet Manager II Software
- Automated internal test
- Hibernation for extended life
- Expanded event log capability

Configurable features

- Adjustable alarm set points
- Non-compliance indicator
- Configuration without activation
- Bump test reminder
- Next Calibration Due – BW Clip RT

BW Clip RT Standard Features

- Real time gas reading
- Ability to calibrate sensor



BW Clip Basics

- Activate the BW Clip before the activation date on the package
- Only activate the detector in a fresh air environment (20.9% v/v O₂, 0 ppm toxic gas)
- To activate press and hold the pushbutton until a 5 second countdown displays – continue to hold until the countdown is complete
- The LCD and alarm LEDs turn on and the detector will perform a start up process – when the type of gas and operating life value are displayed the detector is in normal operating mode; for the RT the detector is normal operating mode when the gas type and concentration are displayed



Alarms and Warnings

- An gas alarm is initiated when the sensor is exposed to a concentration of gas that exceeds the detector preconfigured alarm setpoint. The gas alarm condition will stop when the readings drop below the alarm setpoint. An alarm condition decreases battery life. Other operational alarms can occur.

Gas Alarms:

Low Alarm



Audible: 1 beep per second
Visual: 1 flash per second
Vibration: 1 vibration per second

High Alarm



Audible: 2 beeps per second
Visual: 2 flashes per second
Vibration: 2 vibrations per second



Alarms and Warnings

Other Alarms and Warnings:

Over-Limit and Under-Limit Alarms



If the gas concentration is beyond the sensor range, **OL** (over-limit) or **-OL** (under-limit) is displayed.

Audible: 2 beeps per second



Visual: 2 flashes per second

Vibration: 2 vibrations per second

Automatic Zero Reminder for O₂ Models



For O₂ models only, the **Automatic Zero Reminder** is displayed when more than 24 hours have elapsed since the last successful zero procedure was performed.

Alarms and Warnings

Other Alarms and Warnings:

BW Clip:

Peak Readings



The peak readings symbol is displayed when the sensor is exposed to a gas concentration that exceeds the alarm setpoints. It is no longer displayed when more than 24 hours have passed since the last alarm, or when a successful bump test is performed via an IntelliDoX or MicroDock II station.

BW Clip RT:

Peak Readings



The peak readings symbol is displayed when the sensor is exposed to a gas concentration that exceeds the alarm setpoints. It is no longer displayed when more than 24 hours have passed since the last alarm, or when a successful bump test is performed via an IntelliDoX or MicroDock II station.

Non-Compliance Indicator

The Non-Compliance Indicator  is initiated if:

- an internal diagnostic test fails
- A bump test or zero procedure fails (add calibration for RT)
- A bump test is due – if enabled (add calibration for RT)
- The sensor is exposed to a gas concentration that exceeds the alarm set point(s) – if enabled

When initiated, a RED LED will flash every 30 seconds and the exclamation mark symbol will display



Information Screens

To view Events and Settings

With the detector in normal operating mode press the pushbutton to scroll through information screens:

Peak Reading, detector will display maximum gas exposure that has occurred within the past 24 hours

Time of Peak Reading, only displayed if Real-Time Clock is enabled

Low Alarm Setpoint

High Alarm Setpoint

Real-Time, if enabled

Firmware Version

Next Bump Due, if enabled

Next Calibration Due, if enabled (BW Clip RT)

Hibernation, for 2 year version of H₂S and CO models only

Zero the Sensor

Performing a sensor zero periodically maintains baseline stability.

Zero Procedure



1. Move to a normal atmosphere (20.9% v/v O₂) that is free of hazardous gas.
2. Press and hold the pushbutton until a 5 second countdown is displayed, and then continue to hold until the countdown is complete.
3. When the countdown is complete, the **Zero** procedure begins and **ZEro** is displayed.
4. When **Zero** is successful, **PASS** is displayed, and then the detector returns to normal operation.
5. If **Zero** is not successful, the non-compliance LED flashes. **FAIL** and the non-compliance warning symbol are displayed. Press the pushbutton to acknowledge the result and return to normal operation. The non-compliance warning symbol is displayed and the non-compliance LED flashes. Perform the **Zero** procedure again. If the procedure fails again, contact BW.

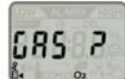
Manual Calibration – BW Clip RT

Calibration

By default, BW Clip Real Time is configured to use the following calibration gas mixtures:

H ₂ S: 20 ppm balance N ₂	CO: 100 ppm balance N ₂	SO ₂ : 20 ppm balance N ₂	O ₂ : 18.0 % v/v O ₂
--	---------------------------------------	--	--

You can use Fleet Manager II software via an IntelliDOx station to change a detector's default calibration gas mixtures. If the detector's default calibration mixtures were changed,



use the gas mixture values from Fleet Manager II to calibrate the detector.

1. Move to a normal atmosphere (20.9% v/v O₂) that is free of hazardous gas.
2. Connect the calibration hose to the gas cylinder and to the intake inlet on the calibration cap.
3. Press and hold the pushbutton until a 5 second countdown is displayed, and then continue to hold until the countdown is complete. The zero procedure begins and **ZEro** is displayed. When Zero is successful, **PASS** is displayed.
4. When **CAL ?** is displayed, press the pushbutton to begin calibration.
5. Put the calibration cap on the sensor grill.
6. When **GAS ?** is displayed, apply calibration gas for two minutes at a recommended flow rate of 500 ml/min. When calibration is successful, **PASS** is displayed and the detector returns to normal operating mode.

If calibration fails, non-compliance warning symbols are displayed. Press the pushbutton to acknowledge. Repeat calibration. If it fails again, contact BW.

Manual BUMP Test

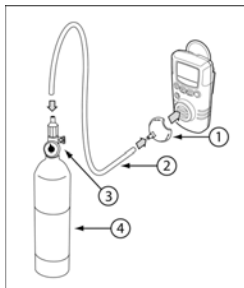
Perform a BUMP test prior to each day's use at a minimum

Perform a BUMP test in "fresh air" (0 ppm toxic gases; 0% LEL; 20.9% O₂)

To perform a BUMP test simply apply a concentration of target gas capable of activating detector alarms to detector in standard operating mode

Visually observe all sensors respond to gas and verify alarms activate!

Close the regulator remove the calibration cap from the detector; the detector will remain in alarm until gas clears from sensors.



Item	Description
1	Test cap
2	Hose
3	Regulator*
4	Gas cylinder

* 0.5 lpm fixed orifice regulator

Manual BUMP Test – Oxygen Sensor

- Perform a BUMP test prior to each day's use at a minimum
- Perform a BUMP test in "**fresh air**" (0 ppm toxic gases; 0% LEL; 20.9% O₂)
- It is possible to perform a BUMP test on the oxygen sensor by simply exhaling forcefully on the sensor for approximately 3 seconds while the detector is in standard operating mode; hold the detector approximately 2.5 cm (1.0 inch) from the mouth; the CO₂ in exhaled breath will displace O₂
- Visually observe the sensor responds and verify alarms activate!



BW Clip Series Hibernation Sleeve

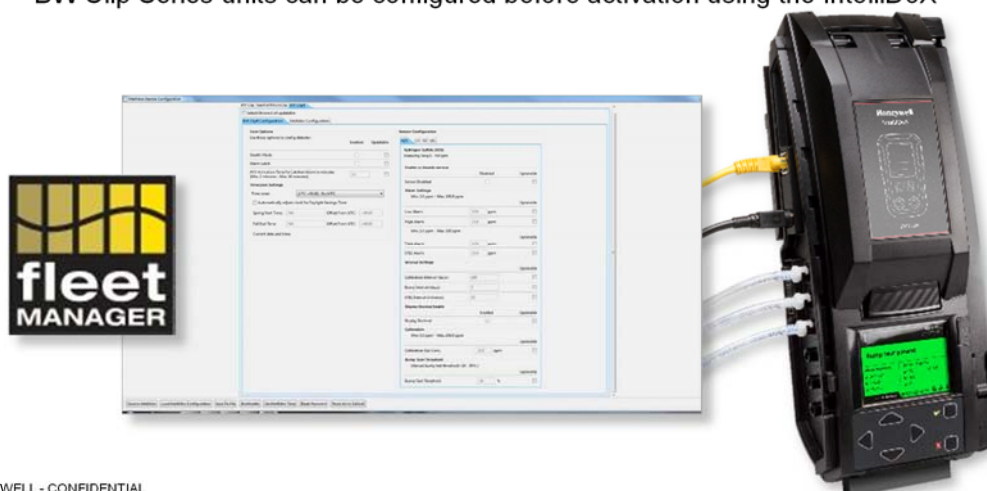
- ✓ Required for manual hibernation of the BW Clip - extend the life of H₂S and CO 24 month version up to 12 additional months. Press the pushbutton to access the HIB function go into the information screens – enter hibernation before inserting into the hibernation sleeve (20 second countdown)



NOTE: the detector must be in hibernation for a minimum of 7 consecutive days for hibernation to take effect.

Configuration

- FM II Software to configure alarm set-points and instrument settings
- Configuration can only be done through IntelliDoX
- BW Clip Series units can be configured before activation using the IntelliDoX



BW Clip Series Intellidox

Automated Instrument Management System



Quickest Bump Test in the industry!

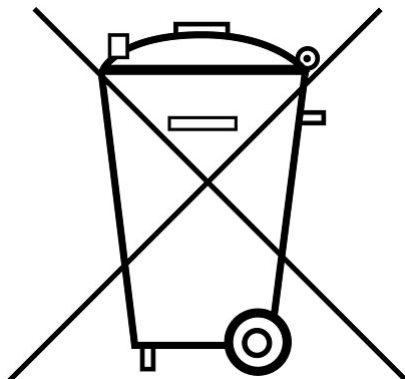
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End of Operating Life Warning

The Non-Compliance Indicator will activate when the operational service life of the detector reaches 24 hours or less and remain in effect until detector shuts down permanently.

DO NOT dispose of an expired gas detector in the general solid waste stream. The detector contains a lithium battery, the oxygen sensor may contain lead, and sensors typically use an acid as electrolyte solution. Be sure to dispose of spent detectors with a qualified recycler or hazardous materials handler.



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BW Clip4
Certified Service Technical Workshop

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BW Clip4 Specifications

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Gas:

Hydrogen sulphide
Carbon monoxide
Oxygen
Combustible gases
Methane

Detection Range:

0 to 100 ppm
0 to 1000 ppm
0 to 25.0 % v/v
0 to 100% LEL
0 to 5% / Vol. CH₄

Resolution:

1 ppm/0.1 ppm
1 ppm
0.1 %
1.0% LEL
0.1% CH₄

Performance Operating Temperature:

-20°C to +50°C (-4°F to +122°F)

Intrinsic Safety Temperature Certification:

-40°C to +55°C (-40°F to +131°F)

Operating Humidity:

0% to 95% relative humidity (non-condensing)

Shelf Life:

6 months before activation date

Maximum Operating Life:

2 years based on activate by date and 2 minutes alarm per day

Dimensions:

12.0 x 6.8 x 3.2 cm (4.7 x 2.7 x 1.3 in)

Ingress Protection:

IP68

Weight:

233 g (8.2 oz)

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Factory Default Alarm Set Points

Sensor	LOW	HIGH	STEL	TWA
H ₂ S	10 ppm	15 ppm	10 ppm	15 ppm
CO	35 ppm	200 ppm	50 ppm	35 ppm
Combustible	10% LEL	20% LEL	N/A	N/A
O ₂	19.5% v/v	23.5% v/v	N/A	N/A

*Factory default alarm set points can be adjusted.

BW Clip4

Its On!

- 2 year continuous run time O₂, LEL, CO, H₂S multi-gas monitor
- No Charging - Reduced downtime
- Minimal Service

Easy to Wear

- Small Size. Does not get in the way

Easy to Use

- Take and go. Always on. Minimal training. One button operation.

Easy to Manage Fleet

- Integrated with Honeywell's leading Fleet Management System
- IntelliDox Automated Docking Station



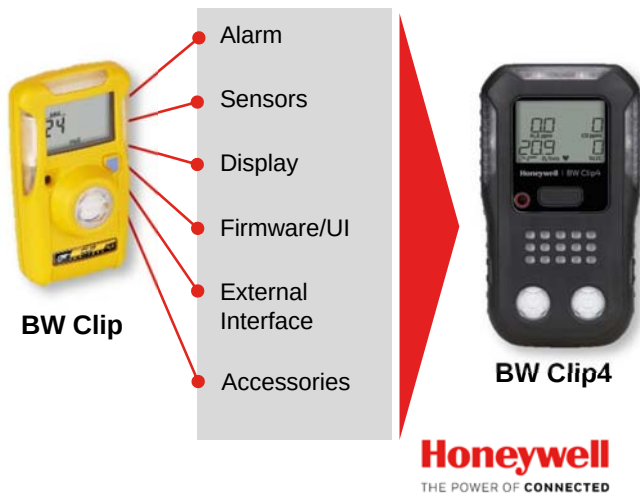
How Do We Do It?

Ultra Low Power IR LEL Sensor

- LED IR Technology
- 1,000x Less Power than Cat Bead



Re-Use of Proven Low Power Circuitry/Design



NDIR LEL Positives and Limitations

Positives

- ✓ Ultra Low Power Consumption
- ✓ Cannot be poisoned
- ✓ Capable of detecting combustible gases in the absence of O₂ (Inert Applications)



Limitations

- **Cannot See Some Combustible Gases**
 - Hydrogen, Acetylene and Others
- **Temperature and Humidity Effects**
- **Methane Target Gas**
 - Methane Calibration Only
 - Non-linear response to other Combustible Gases
 - No Built-in Correction Factors

NDIR LEL Positives and Limitations

Can Detect
Cannot Detect



Combustible Gas	BW Clip4 (LED IR)
Methane	Can Detect
Propane	Can Detect
Butane	Can Detect
Pentane	Can Detect
Hexane	Can Detect
Ethane	Can Detect
Methanol/Ethanol	Can Detect
Ethylene	Can Detect
Cyclohexane	Can Detect
Hydrogen	Cannot Detect
Acetylene	Cannot Detect
Carbon Disulfide	Cannot Detect

Applications to Target with BW Clip4

• Applications typically Without Hydrogen & Acetylene

- Oil and Gas Upstream and Midstream
- Oil & Gas Well Operator
- Drilling Rig
- Transportation of oil and gas
- Construction
- Petrochemical
- Confined Space entry
- Agriculture
- Electric Utilities - Underground
- Telecommunication
- Manufacturing
- Water / wastewater treatment
- Pulp and paper
- Pipeline Purge
- Inert applications

• Applications With Hydrogen and Acetylene

- Chemical Plants - Hydrogen is used in large quantities as a raw material in the chemical synthesis of ammonia, methanol, hydrogen peroxide, polymers, and solvents.
- Metal Production - Hydrogen is mixed with inert gases to obtain a reducing atmosphere, which is required for many applications in the metallurgical industry, such as heat treating steel and welding. It is often used in annealing stainless steel alloys, magnetic steel alloys, sintering and copper brazing.
- Refinery - In refineries, hydrogen is used to remove the sulfur that contained in crude oil. Hydrogen is catalytically combined with various intermediate processing streams and is used, in conjunction with catalytic cracking operations, to convert heavy and unsaturated compounds to lighter and more stable compounds.
- Nuclear Power Plants - The nuclear fuel industry uses hydrogen as a protective atmosphere in the fabrication of fuel rods
- Electric Utility - Transformers produce Hydrogen during the end of their life.
- Welding - Oxy Acetylene welding uses acetylene gas with the welding process.
- Food and beverage - It is used to hydrogenate unsaturated fatty acids in animal and vegetable oils, producing solid fats for margarine and other food products.
- Power Plants - Generators in large power plants are often cooled with hydrogen, since the gas processes high thermal conductivity and offers low friction resistance.
- Back up Batteries - used in the telecommunication industries and other areas where a back up battery is required. Off Gassing of Hydrogen can occur from the batteries
- Steam Reforming - Steam reforming is a method for producing hydrogen from hydrocarbon fuels such as natural gas. This is achieved in a processing device called a reformer which reacts steam at high temperature with the fossil fuel.
- LPG processing plant -

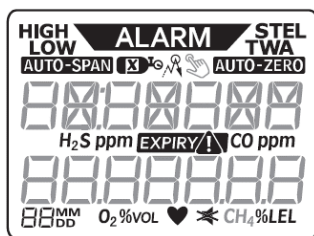
Get to know the BW Clip4



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UI Layout and Screen Icons



ALARM	This symbol is displayed when a gas alarm occurs
HIGH	A gas concentration exceeds the high alarm threshold
LOW	A gas concentration exceeds the low alarm threshold
STEL	A short term gas accumulation that exceeds the STEL (Short Term Exposure Level) alarm threshold
TWA	A long term gas accumulation that exceeds the TWA (Time Weighted Average) alarm threshold
	This is displayed when user's input is needed. It could be either a single press or a press-and-hold

AUTO-SPAN	A span calibration is in progress or overdue
AUTO-ZERO	A zero calibration is in progress
	A bump test or calibration is overdue
	A bump test or calibration fails
	Peak readings are recalled
	A functional error occurs
EXPIRY!	The remaining lifetime is less than 24 hours
88MM	This is the remaining period of lifetime
	This flashes as long as the detector works normally without any gas alarms and functional errors
	Stealth mode is enabled. In stealth mode, the detector generates only vibration when a gas alarm occurs
ppm	H ₂ S and CO concentrations are expressed in parts per million.
%VOL	O ₂ concentration is expressed in percent by volume
%LEL	Combustible gas concentration is expressed in percent by lower explosive limit

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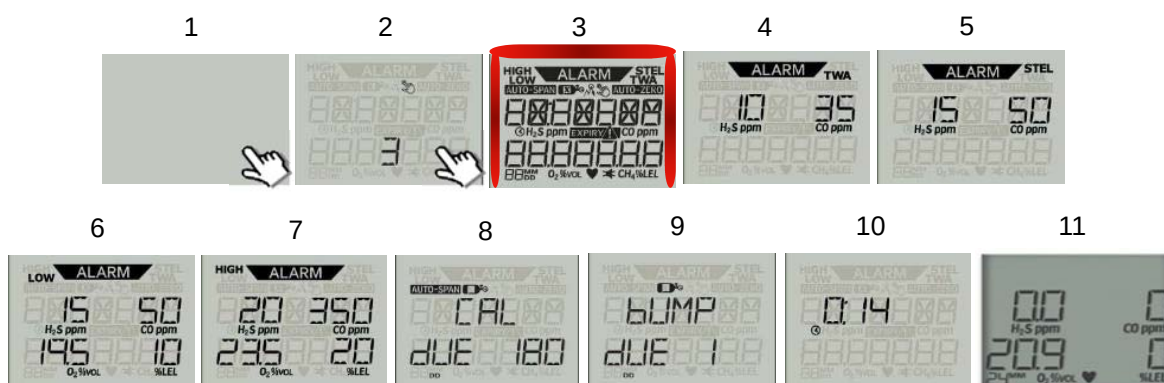
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Activating the BW Clip4

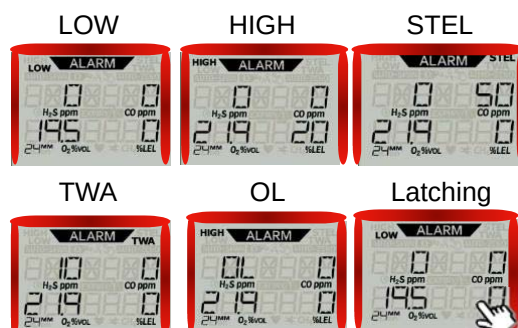


1. Press and Hold until Countdown Starts

Activating the BW Clip4



BW Clip4 Alarms

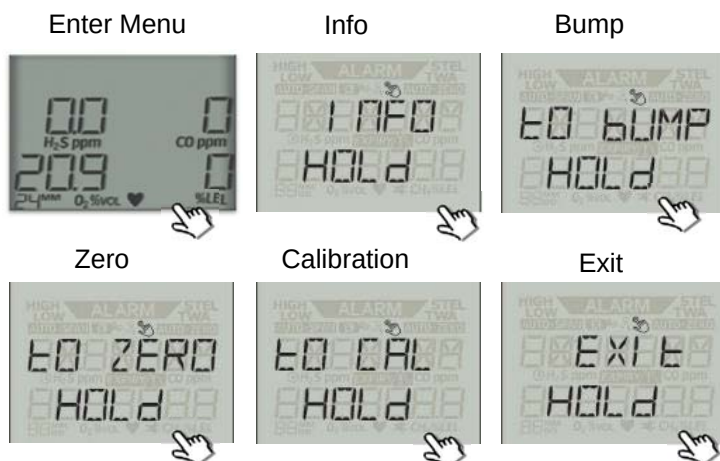


Menu Navigation



1. To enter the menu, press the button twice in rapid succession

Menu Navigation



NOTE: the most current firmware version includes "Travel Mode"

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Non-Compliance Flash

- Flashing red light indicating that the BW Clip4 does not meet the compliance standards assigned by the administrator
- Activated when:
 - Bump or Calibration is due
 - Last Bump or Calibration Failed
 - Latched Alarm where alarm activation time is over
 - Remaining life is less than 24 hours
 - The units has any acknowledged non-critical faults
- The non-compliance flash will blink every 30 seconds.
- Will flash until the compliance issue is addressed.



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Remaining Life

- The remaining life of the BW Clip4 can be seen during normal operating mode at the bottom left hand corner of the screen. It can also be viewed when cycling through info mode
- The remaining life will count down in monthly increments until there are 90 days left. It will then count down in daily increments

4MM 90DD

- Once the BW Clip4 goes below 24 hours remaining, 00DD will flash on the LCD along with the Expiry Icon. The unit will activate the Non-Compliance flash and alarm to notify the user



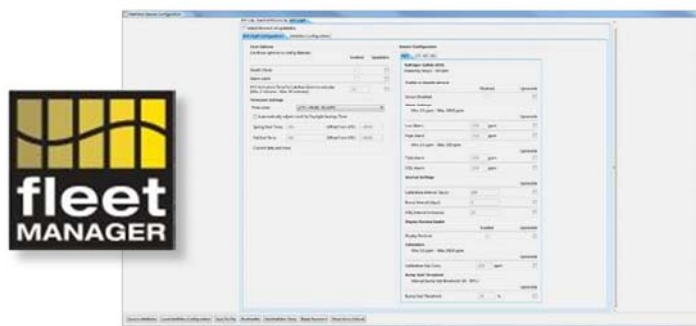
» Once the BW Clip4 is expired, the 00DD and the Expiry icon will remain on the screen until the battery can no longer power those LCD segments



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Configuration

- FM II Software to configure alarm set-points and instrument settings
- Configuration can only be done through IntelliDoX
- BW Clip4 units can be configured before activation using the IntelliDoX



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Inside the BW Clip4

- Front Shell
- Back Shell
- PCB, Battery and Sensor Assembly

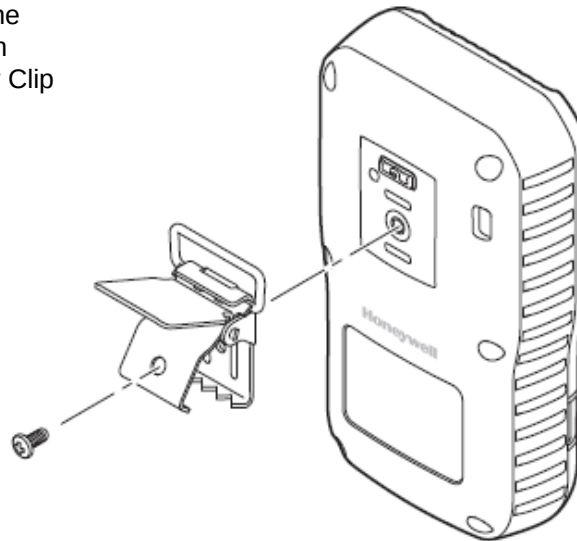


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Alligator Clip

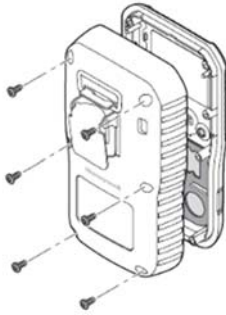
- Insert screwdriver through the hole in the clamp and loosen screw to detach the Alligator Clip
- Put the new Alligator Clip in place and fasten it



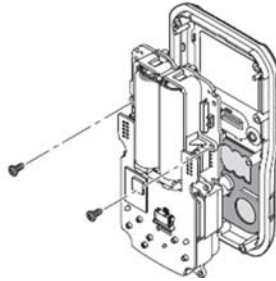
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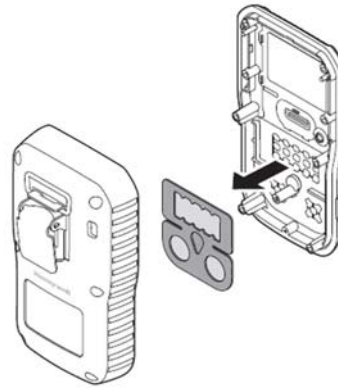
Sensor Screen Replacement



- Loosen the six screws on the back of the detector to separate the front panel



- Loosen the two screws on the PCB to re-move it from the front panel



- Remove the sensor filter from the inside of the front panel
- Reassemble the detector in the reverse order

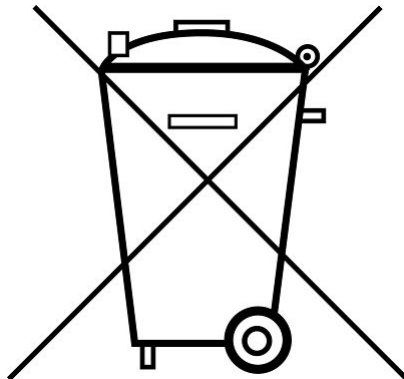
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End of Operating Life

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DO NOT dispose of an expired gas detector in the general solid waste stream. The detector contains a lithium battery, the oxygen sensor may contain lead, and sensors typically use an acid as electrolyte solution. Be sure to dispose of spent detectors with a qualified recycler or hazardous materials handler.



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2018 CSTW

Getting Started with Fleet Manager II

Certified Service Technical Workshop

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Getting Started with Fleet Manager II

243

Download Fleet Manager II software and the IR Link Driver at:

<http://www.honeywellanalytics.com/en-ca>

The current software, v4.2.20 download is free, but you must complete the form.

Start Fleet Manager II

- Click desktop icon



- If shortcut is not available, click Start>All Programs>BWTechnologies>Fleet Manager II>BW Technologies Fleet Manager II

Getting Started with Fleet Manager II

- Fleet Manager II starts in operator mode
 - Operator level toolbar and menu options displayed



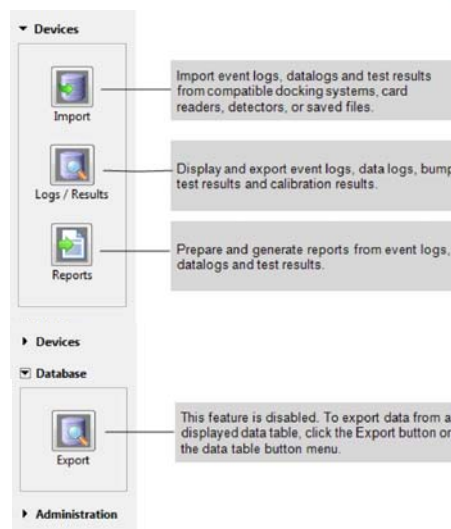
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Getting Started with Fleet Manager II

When starting Fleet Manager II

- Operator level toolbar and menu options displayed
- Operator level not password protected
- Menu options limited to basic operations
- Available operations:
 1. Import data from docking systems and connected devices
 2. Create custom views for event logs, data logs, bump test results and calibration results
 3. View, archive and export event logs, datalogs, bump test results and calibration results
 4. Generate bump test and calibration certificates
 5. Prepare, generate and export standard reports from available templates
 6. Generate custom reports



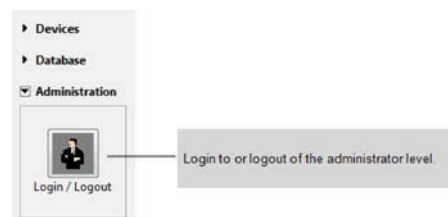
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Getting Started with Fleet Manager II

Administrator Level

- Administrator level operations password protected
- Start Fleet Manager II then login via **Login/Logout** on **Administration** toolbar
 - Administrator level toolbar and menu options displayed
- These advanced operations are available:
 1. Prepare, save, and manage docking system, detector and sensor configurations
 2. Manage firmware updates for docking systems and detectors
 3. Prepare, manage and archive Fleet Manager II databases
 4. Create and manage import and archive schedules
 5. Manage inventory information for docking systems and detectors
 6. Add and manage user information for detectors
 7. Change Fleet Manager II settings



Getting Started with Fleet Manager II

Login/Logout

- Administrator level operations are password protected
- When starting Fleet Manager II then login via **Login/Logout** on **Administration** toolbar
 - Administrator level toolbar and menu options displayed
- In administrator level, these advanced operations are available:
 1. Prepare, save, and manage docking system, detector and sensor configurations
 2. Manage firmware updates for docking systems and detectors
 3. Prepare, manage and archive Fleet Manager II databases
 4. Create and manage import and archive schedules
 5. Manage inventory information for docking systems and detectors
 6. Add and manage user information for detectors
 7. Change Fleet Manager II settings



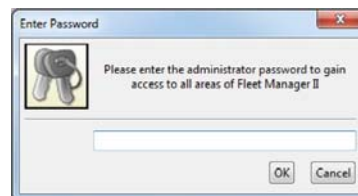
Default Password

- Default password for administrator level is **Admin**
 - Password is case sensitive
- Recommended: Change default password when installing Fleet Manager II
 - Recommended: Change password periodically to ensure administrator access remains secure

Getting Started with Fleet Manager II

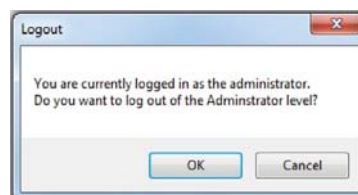
Login

1. Start Fleet Manager II
2. Click **Administration** on the toolbar, and then select **Login/Logout**
 - **Enter Password** dialog box displayed
3. Type password in text box provided, then click **OK**
4. Administrator level toolbar and menus displayed



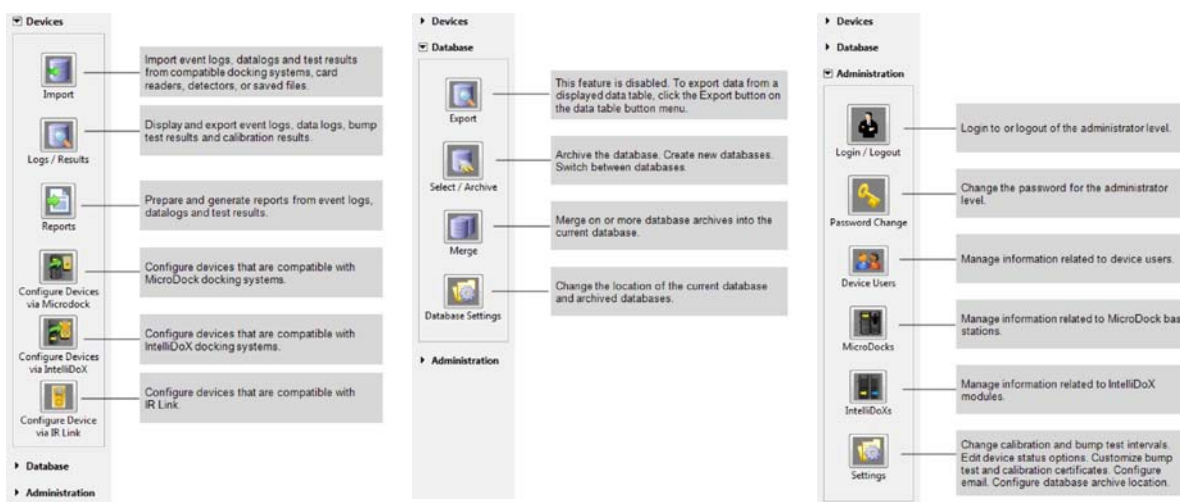
Logout

1. Click **Administration** on toolbar
 - **Logout** dialog box displayed
2. Click **OK** to logout of administrator level and return to operator level



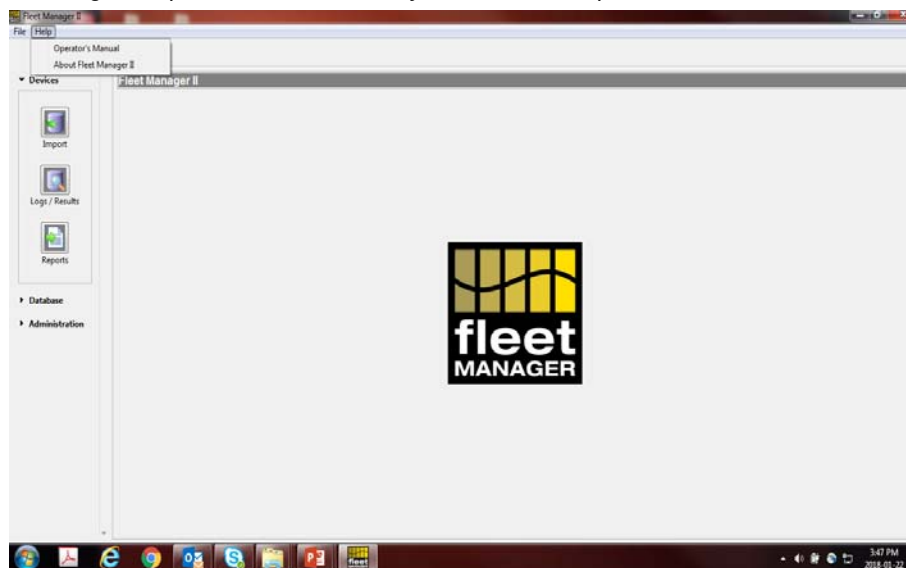
Getting Started with Fleet Manager II

Administrator Level



Fleet Manager II Software

The Fleet Manager II Operator Manual is easily found in the Help menu



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Accessories?



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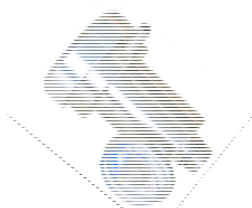
Consider the Accessories!



58 and 34 L cylinder carrying case
CK2-CASE1



Particulate Filter
GA-MFILTER



Demand flow regulator
REG-DF-1



Auxiliary Filter Kit
MC-AF-K1



Vehicle power adaptor 12 – 24 VDC
GA-VPA-1



Wall mount for 34, 58 and 103 L cylinders
MK-CG2-58



Calibration gas regulator 0.5 lpm
REG2-0.5



Quad Gas Cylinder 34 L
CG-Q34-4

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Gas Detection Americas**

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