



SERVICE MANUAL

QGM

Multi Gas Detector



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READ BEFORE OPERATING

This manual must be carefully read by all individuals who have or will have the responsibility of using, maintaining or servicing this product. The product will perform as designed only if it is used, maintained and serviced in accordance with the manufacturer's instructions. The user should understand how to set the correct parameters and interpret the obtained results.



CAUTION

- Remove monitor cover only in area known to be non-hazardous.
- Recharge battery only in an area known to be non-hazardous.
- Use only WatchGas rechargeable lithium battery (PN: MGTBAT, article number: 7189184, 3.7V, 2000mAh)
- Use of non-WatchGas components will void the warranty and can compromise the safe performance of this product
- Substitution of components may impact intrinsic safety.



WARNINGS

- Only the combustible gas detection portion of this instrument has been assessed for performance.
- Uniquement, la portion pour détecter les gaz combustibles de cet instrument a été évaluée.

CAUTION

***Before each day's use, the sensitivity of the combustible gas sensor must be tested on a known concentration of methane gas equivalent to 20 to 50% of fullscale concentration.**

***Accuracy must be within 0 and +10% of actual.**

***Accuracy may be corrected by a calibration procedure.**

***Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**



SPECIAL CONDITIONS FOR SAFE USE

- The QGM detector must be calibrated if it does not pass a bump test, when a new sensor has been installed, or at least once every 180 days, depending on use and sensor exposure to poisons and contaminants
- No precautions against electrostatic discharge are necessary for portable equipment that has an enclosure made of plastic, metal or a combination of the two, except where a significant static-generating mechanism has been identified. Activities such as placing the item on a belt, operating a keypad or cleaning with a damp cloth, do not present a significant electrostatic risk. However, where a static-generating mechanism is identified, such as repeated brushing against clothing, then suitable precautions shall be taken, e.g., the use of anti-static footwear.

PROPER PRODUCT DISPOSAL AT THE END OF LIFE



- The Waste Electrical and Electronic Equipment (WEEE) directive (2002/96/EC) is intended to promote recycling of electrical and electronic equipment and their components at end of life. This symbol (crossed-out wheeled bin) indicates separate collection of waste electrical and electronic equipment in the EU countries. This product may contain one or more Nickel-metal hydride (NiMH), Lithium-ion, or Alkaline batteries. Specific battery information is given in this user guide. Batteries must be recycled or disposed of properly. At the end of its life, this product must undergo separate collection and recycling from general or household waste. Please use the return and collection system available in your country for the disposal of this product.

1. General information

The QGM is a portable multigas monitor designed to warn the user about the presence of dangerous gases in the atmosphere. The detector indicates the concentration of 4 types of gases (Oxygen, carbon monoxide, hydrogen sulfide, combustible gas) simultaneously on the LCD monitor.

CAUTION


Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment and void product warranty.

1.1 SOFTWARE


The WatchGas QGM can be configured using an IR link and IR link software. Visit www.WatchGas.eu for the latest version of the software. To connect the QGM to the IR link software, use the WatchGas IR link (P/N: 7189170).

File Tools Help

Tool

READ WRITE LOG  Firm

IR Link

 COM8

CLOSE

Basic Option

Serial Number	SI0126017	Low Alarm	LEL 10.0	O2 19.0	CO 25	H2S 5
Firmware	2.6	High Alarm	10	23.0	25	5
User ID/Message	WatchGas	STEL Alarm			100	3.2
		TWA Alarm			20	1.6

Advanced Option

TWA Method	OSHA	Sensor	<input checked="" type="checkbox"/> LEL	<input checked="" type="checkbox"/> O2	<input checked="" type="checkbox"/> CO	<input checked="" type="checkbox"/> H2S
TWA Interval	8 hr	Cal Interval	180	180	180	180
STEL Interval	15 min	Bump	180	180	180	180
100% LEL	4.4 %Vol	Calibration	50.0	18.0	50	10

Check Option

<input type="checkbox"/> SAFE Display	<input type="checkbox"/> Maintenance Notifica	<input type="checkbox"/> Dock Lock	<input type="checkbox"/> Auto Zero
<input type="checkbox"/> Auto Hold	<input type="checkbox"/> OFF Lock	<input type="checkbox"/> LEL By %vol CH4	<input type="checkbox"/> Stealth

File

- Load: Open the installed settings. (*.cfg)
- Save: Save the current settings. (*.cfg)
- Exit: Close the program.

Tools

- Calibration: Perform the zero/span calibration.
- Log Read: Retrieve the log events.
- Log Erase: Erase the log events.
- Self Test: Test if LED, LCD, Buzzer, vibration, battery and temperature works properly.
- FW Upgrade Users can upgrade firmware.
- The up- to-date firmware is available at our WatchGas website
- Factory Fault: Remove all data and restore the initial factory settings.

Help

About: Display a brief company profile.

Tool

- **READ:** Retrieve the settings.
- **WRITE:** Update the adjusted settings. LOG: Display the saved log events.
- **CALIBRATION:** Perform the zero and span calibration.
- **FIRMWARE UPGRADE:** Upgrade firmware.

IR Link

- **OPEN:** In order to interact the IR Link with QGM and PDM click on 'OPEN'.
- When the read is activated successfully. Users will see "Read Complete".



Options

- **SERIAL NUMBER:** Display a preset serial number.
- **FIRMWARE VERSION:** Display a firmware version (EX. 1.x.x) .
- **USER ID/MESSAGE:** Users can program a desired message/ID.
- **DISPLAY:** Users can choose to display either the real time "Sensor Reading" or "Sensor Life remaining".
- **STEALTH (OPTION):** Users can turn off the buzzer, LED, and vibration.
- **SELF TEST (HOUR):** Set an interval of the self-test alert.
- **SENSOR TYPE:** Display a sensor type of the device.
- **LOW ALARM:** Adjust the low alarm set point in compliance with international or local standards.
- **HIGH ALARM:** Adjust the high alarm set point in compliance with the international or local standards.
- **CAL CONCENTRATION:** Set a standard calibration value.
- **CAL TIME (SEC):** Set a standard calibration time.
- **CAL INTERVAL (DAY):** Set an interval of the calibration alert.
- **BUMP INTERVAL (DAY):** Set an interval of the bump test alert.
- **SAFE DISPLAY:** Display only SAFE. Gas reading will only be displayed if above alarm limits
- **MAINTENANCE NOTIFICATION:** Notice when detector needs maintenance
- **DOCK LOCK:** Manual calibration disabled. Calibration can only be preformed by docking station.
- **AUTO ZERO:** Preform zero calibration on start-up.
- **AUTO HOLD:** Device will be in alarm mode until button is pressed.
- **OFF LOCK:** Device cannot be turned off (not recommended for catalytic type).
- **LEL BY VOL CH₄:** Change 100 %LEL to vol% value.
- **STEALTH:** Stealth mode. Warning: device will not give any alarm if concentrations exceed alarm limits!

1.2 FIRMWARE

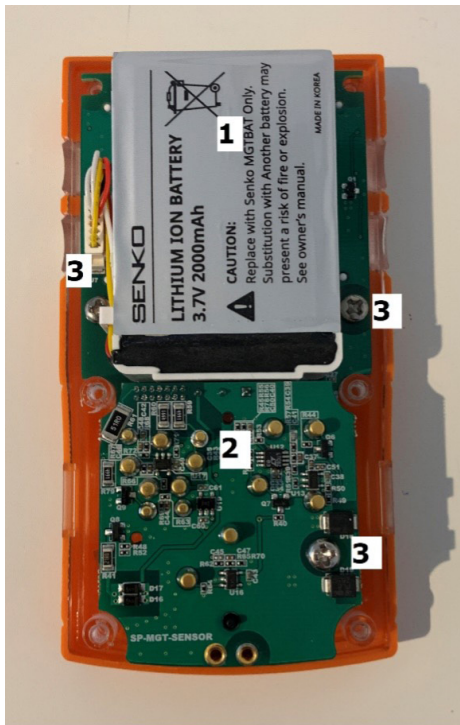


It is recommended to always run a QGM on the latest firmware, which can be downloaded from www.WatchGas.eu. Firmware upgrades can be performed by the IR link software. Simply click the "Firm" button, and then select the right firmware file. Do not remove the QGM from the IR link during firmware upgrade.

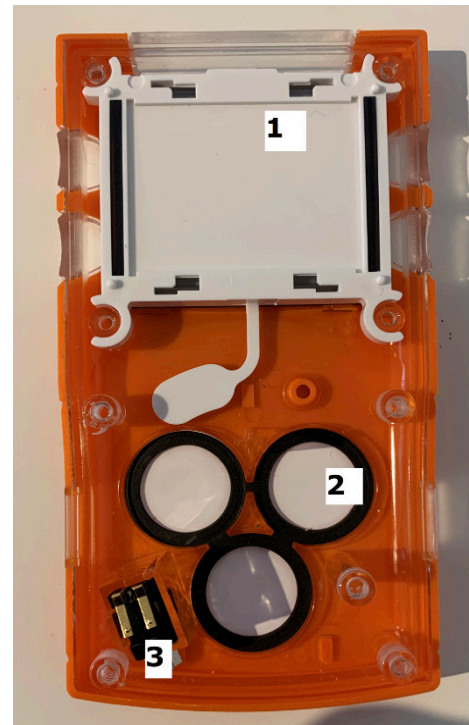
2. Maintenance

IMPORTANT

Always perform a full calibration after any maintenance of the detector.



1. Battery
2. Sensor PCB
3. Internal screws



1. Display
2. Internal filters
3. Vibrational motor

IMPORTANT

Replacing the battery should only be done by trained technicians or authorized service center.

Replace battery only in non-hazardous locations.

2.1 BATTERY REPLACEMENT

Only charge and/or replace battery in a non-hazardous environment free of toxic and explosive gas.

1. Open the QGM
2. Remove battery from PCB by disconnecting the cable
3. Replace battery, only use original WatchGas QGM battery 3.7V 2000mAh (P/N: 7189184). Reconnect battery to PCB.
4. Assemble QGM and restart.
5. Check settings using WatchGas IR link 1.7.3 or higher
6. Perform calibration and bump test prior to use

Apart from battery charging and calibration, it could be required to replace certain parts, which are stated below:

2.2 INTERNAL FILTERS

Depending on operation conditions the internal hydrophobic filters could become dirty. This could (partially) prevent gas reaching the sensor, so it's important that only clean filters are used. To replace these filters:

1. Open the detector and take out the sensor PCB.
2. The filters can be found on the inside of the front cover.
3. Replace dirty filters with new clean filters (P/N: 7189186).
4. Re-assemble the detector.
5. Perform a calibration prior to use.

2.3 FRONT HOUSING

The QGM Front cover is made of durable polycarbonate rubber, which is able to withstand most mechanical shocks. A broken front cover will void the IP rating and safety certification, so it should be replaced:

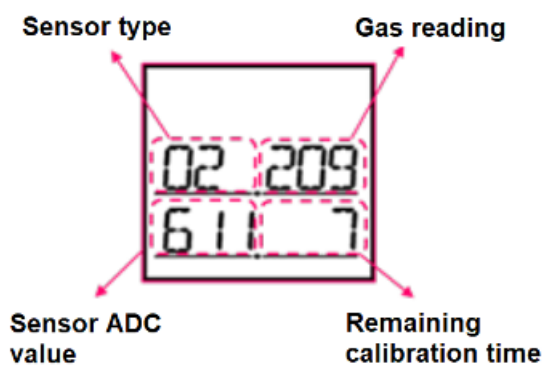
IMPORTANT

There are two variants of front covers, QGM-CAT (P/N: 7177206) or QGM-IR (P/N: 7177206).

1. Open the detector
2. Unscrew the sensor PCB and Main PCB from the front cover
3. Take out the display and place it in the new front cover
4. Place (new) hydrophobic filters in the front cover
5. Re-assemble main PCB and sensor PCB. Then, re-assemble detector
6. Perform a calibration prior to use

2.4 SENSOR REPLACEMENT

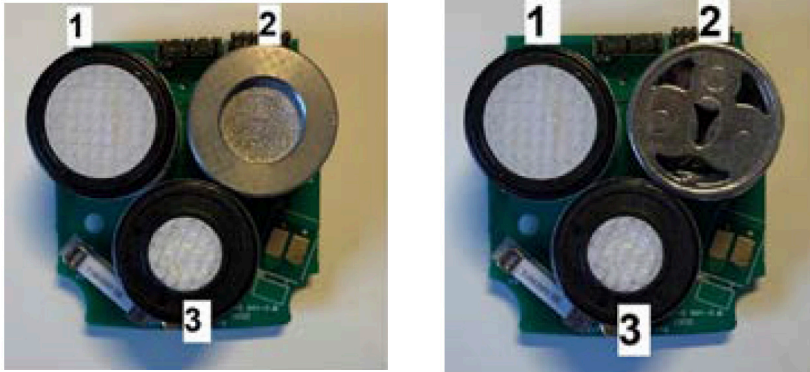
When calibration fails multiple times it's advised to check the sensors. First perform a visual inspection for any damage, dirt or water to the filters or sensors. Damaged or dirty sensors require replacement.



WARNING

Replace sensors only in non-hazardous locations.

SENSOR REPLACEMENT



1. CO/H₂S sensor
2. Catalytic LEL sensor (Left) or Infrared LEL sensor (Right)
3. Oxygen sensor

Sensors can be replaced by following the steps below:

1. Open the detector and take out the sensor PCB.
2. Take out the defective sensor and place the replacement sensor.
3. Re-assemble the detector.
4. Some sensors require a stabilization time before the device can be calibrated, see table below.
5. Always preform a calibration after installation and stabilization.

Sensor	Stabilization time
O ₂	15-60 minutes
LEL-P	-
LEL-IR	-
CO	2-3h
H ₂ S	2-3h

NOTE: Do not change catalytic LEL sensor for Infrared LEL sensor or vice versa, as this void intrinsic safety, device certification and warranty. Contact WatchGas if you want to switch to a different LEL sensor type.

2.5 DISPLAY REPLACEMENT

1. Open the QGM
2. Remove battery from PCB by disconnecting the cable.
3. Remove all internal screws.
4. Disconnect sensor PCB and main PCB
5. Replace display
6. Assemble main PCB and sensor PCB
7. Place all internal screws.
8. Reconnect battery and re-assemble QGM
9. Check settings using WatchGas IR link 1.7.3 or higher
10. Preform calibration and bump test prior to use

3. Troubleshooting

Problem/observations	Possible reason(s)	Solutions
Gas readings abnormally high	Dirty filters	Replace filters
	Dirty sensors	Check ADC values, replace sensor if needed.
	Moisture	
	Incorrect calibration	(Manually) calibrate the device.
Gas readings abnormally low	Dirty filters	Replace filters
	Dirty sensors	Check ADC values, replace sensor if needed.
	Weak sensors	Check ADC values, replace sensor if needed.
	Incorrect calibration	(Manually) calibrate the device
No buzzer	Device in 'Stealth Mode'	Use IR link to check if device is in 'Stealth Mode'
	Defective buzzer	Contact WatchGas
Device will show 'SLP' in display	Firmware upgrade was interrupted and the QGM has entered a protected state	Manually upgrade to the latest firmware version using the IR link and IR link software
IR link does not recognise QGM	Incorrect calibration	Install latest driver. Link
	Defective IR link	Try to connect another device. Replace IR link if needed.
	Defective IR connector	Contact WatchGas
No display or only partial display is shown	Insufficient pressure from housing onto display	Tighten all 6 screws of the QGM back housing
	Defective display	Replace display
Serial number not readable on backside label	Serial number on backside label	Contact WatchGas
O ₂ sensor reading showing 0.0 vol%	Defective O ₂ sensor	Replace O ₂ sensor. Stabilize O ₂ sensor for at least 60 minutes before calibrating the unit.
Error on LEL sensor, combined with ticking sound.	Defective LEL-IR sensor	Replace LEL-IR sensor
Freshly placed O ₂ sensor showing <20 vol% reading sometime after calibration	O ₂ sensor insufficiently stabilized	Re-calibrated O ₂ sensor (using WatchGas IR link)
		Stabilize O ₂ sensor for at least 60 minutes before calibrating the unit.
QGM in alarm mode, unable to calibrate or configure manually	Menu cannot be entered when in alarm state	Calibrate/configure QGM using WatchGas IR link and IR link software

NOTE

For any information or technical support regarding the WatchGas QGM feel free to contact WatchGas at +31 (0)85 01 87 709 or info@watchgas.eu.

4. Order information and accessoires

ESSENTIAL ACCESSORIES

Part number	Description
7189170	WatchGas IR Link communication module w/USB cable
7189185	QGM Charging adapter
7189199	QGM Hoesje (plastic)
7189191	QGM Hoesje (rubber)
7177213	QGM 5-way stackable charger
7177212	QGM single charger
7177203	QGM vehicle charger

CALIBRATION

Part number	Description
7189182	WatchGas QGM 4-way Docking station
7189181	WatchGas QGM MonoDock
500-0036-100	WatchGas QGM MonoDock AC adapter
A0177744	WatchGas QGM MonoDock Demand flow regulator 0-3 L/min
7189183	QGM Calibration Cap
CAL-A1095339	0.5 L/min fixed flow regulator
CAL-CO17064	OFCH mix gas cylinder 116L 18% O ₂ 2,2% CH ₄ 50ppm CO 10 H ₂ S
CAL-C018365	OFC mix gas cylinder 116L 18% O ₂ 2,2% CH ₄ 50ppm in N ₂
411-0018-038	Gas sampling hose 3x5mm

REPLACEMENT PARTS

Part number	Description
7177300	Replacement O ₂ sensor (2 year)
7177309	Replacement LEL-CAT sensor
7177310	Replacement LEL-IR sensor
7177305	Replacement CO/H ₂ S sensor
7189184	Replacement QGM battery 3.7V 2000mAh
7189192	QGM Alligator clip
7189186	QGM Internal filter (3ps)
7189196	QGM Display
7189197	QGM Sensor PCB
7177206	Front housing QGM-CAT
7177204	Front housing QGM-IR



QGM
Multi Docking Station



QGM
Mono Docking Station



QGM
5-way horizontal
stackable charger



QGM
Mono Cradle



QGM Holster



IR-Link



Calibration Gases



Sensors

5. Limited Warranty

WATCHGAS warrants this product to be free of defects in workmanship and materials-under normal use and service-for two years from the date of purchase from the manufacturer or from the product's authorized reseller.

The manufacturer is not liable (under this warranty) if its testing and examination disclose that the alleged defect in the product does not exist or was caused by the purchaser's (or any third party's) misuse, neglect, or improper installation, testing, or calibrations. Any unauthorized attempt to repair or modify the product, or any other cause of damage beyond the range of the intended use, including damage by fire, lightening, water damage or other hazard, voids liability of the manufacturer.

Any maintenance that fails to perform up to manufacturer specifications during the applicable warranty period, please contact the product's authorized reseller or WATCHGAS service center at +31 (0)85 01 87 709 for repair/return information.



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