WatchGas
Detection

User Manual

QGM Multi Gas Detector

Contents

Description

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. It is simple to operate. The QGM alerts the workers of the danger by alarm, LED, vibration when the concentration exceeds the safety gas levels. The device shows the gas concentration in real time and identify the maximum and minimum concentration. The settings values can be modified through WATCHGAS IR-LINK (option).

⚠ Warning

- Please do not replace or change the parts. In this case, we do not guarantee the warranty and safety even though it is under warranty.
- Please remove any debris on the surfaces of the sensor, LED or buzzer hole before use.
- Test the performance of the gas sensor through the gas beyond the alarm level regularly.
- Test the device on a regular basis whether its LED, alarm and vibration function properly.
- Use the device under the conditions instructed, including the temperature, humidity and pressure range. The use environment outside the instruction may cause malfunction or failure.
- The sensors inside the device may indicate the gas concentration differently according to the environment such as temperature, pressure and humidity. Please make sure to calibrate the detector under the same or similar environment to the specification.
- Extreme changes in temperature may cause drastic changes of the gas concentration. (e.g. using the detector where there is a huge gap between the inside and outside temperature) Please use the device when the concentration becomes stable.
- Severe pressure or impact may cause drastic changes of the gas concentration. Therefore, please use the device when the concentration is stable. Severe pressure or impact may cause also malfunction in the sensor or the device.
- The alarms are set according to the international standard and must be changed by an authorized expert.
- Charging or replacing the battery should be done in a safe area where there is no risk of explosion or fire. Changing the sensor or battery with improper replacements, which are not authorized by the manufacturer, may invalidate the warranty.
- IR communication should be done in a safe area where there is no risk of explosion or fire.
- Changing settings in the available software with IR-link may pose a risk, which can result in trauma or death.

⚠ Caution

- Please only use the device after reading the manual carefully!
- The device is not a measurement device, but a gas detector.
- Please stop using and consult the manufacturer if the calibration fails continuously.
- Please test the device every 30 days under the atmospheric environment of clean air without gases.
- Clean the exterior of the device with soft cloth and do not clean it with chemical detergent.

1. Product Overview

DETECTOR COMPONENTS
1. Gas Sensor (O_2)
2. Gas Sensor (LEL)
3. Gas Sensor (Dual: CO & H_2S)
4. Key
5. IR Port
6. Alarm LEDs
7. LCD display
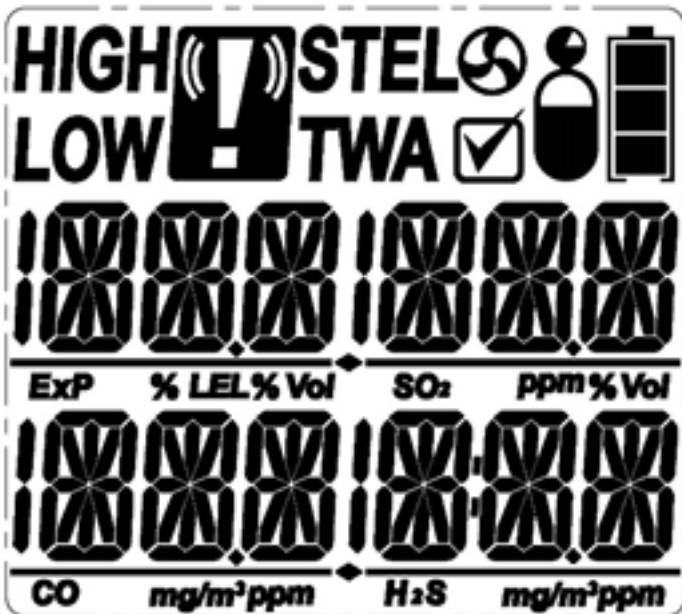
DISPLAY SYMBOLS

Symbol	Meaning
HIGH	High Alarm
LOW	Low Alarm
(!)	Alarm Condition
STEL	STEL Alarm
TWA	TWA Alarm
☉	Fresh Air Calibration
☑	Device Stabilisation & Calibration Succeeded
⦙	Standard Gas Calibration
▯	Remaining Battery

2. Activation

2.1 SWITCH ON

Press and hold down the KEY button ( ) for three seconds, after the three second countdown the monitor will turn on.
The device will be switched on only when you keep pressing the button for longer than three seconds.

Initial Setting Mode   Gas Measuring Mode
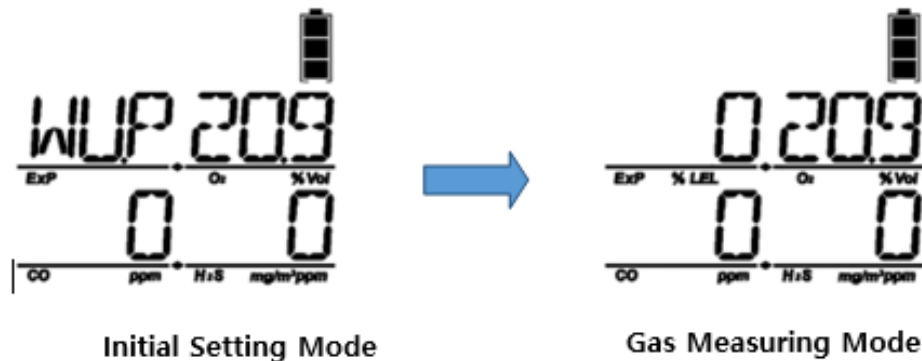
Once activated, the device will enter the warm up stage to stablize sensors. The warm up process is completed, the device is ready to detect gases.

Caution

A proper calibration is always required before using the device at the work site. The user shall check whether the device is properly sensing the levels of dangers of gases and make sure whether the detecting section of the device is not blocked with materials impairing the detection.

2.2. SWITCH OFF

Press and hold down the KEY button ( ) for three seconds, after the three second countdown the monitor will turn off.

The device will not be switched off only unless you keep pressing the button for longer than three seconds.

3.　　Mode

3.1.　MEASURING MODE

If the device goes into the normal measuring mode after stabilizing, the gas concentration and the battery power level are displayed on the LCD monitor. Oxygen is displayed in %^{VOL}, combustible gases in %LEL and H$_2$S and CO in ppm unit. When the concentration levels change, the value is displayed in real time, and when the levels exceed the threshold for either LOW alarm or HIGH alarm (or TWA/STEL), the display icons of **LOW**, **HIGH**, **TWA** or **STEL** blinks regularly and the alarm, LED and vibration activates.

When the device goes to a safe area, the concentrations detected by the device declines and the alarm stops. If the alarm does not clear on its self please acknowledge the alarm by pressing the KEY button (⬬) once. **Alarm latching options can be configured with the IR-Link software.**

3.2.　DISPLAY MODE
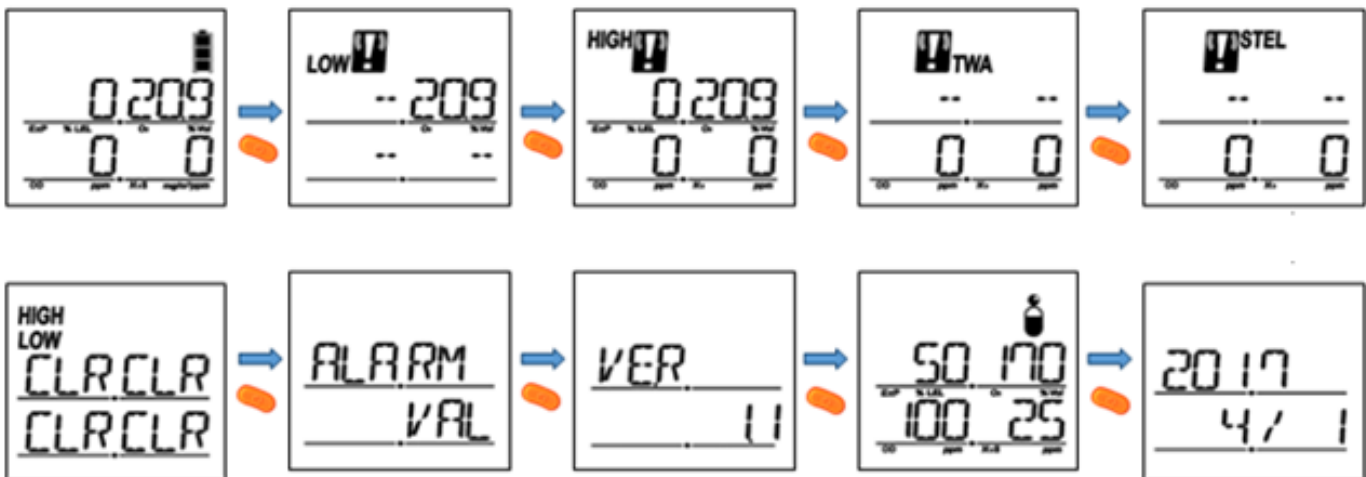
The displays in ten different modes as above are shown in the measuring mode every time when you press the KEY button (⬬).
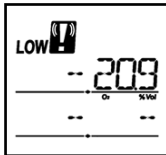
The display mode consists of ten different informational screens, containing values for low, high, TWA and STEL alarms, option for viewing and/or clearing peak values, show device information and calibrate the instrument. Cycling through the different screens is done by pushing the KEY-button once.

3.2.1   DISPLAY MODE IN DETAIL
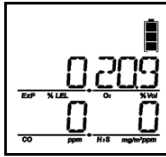
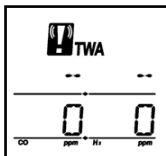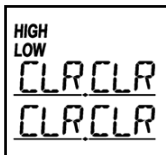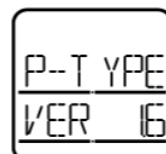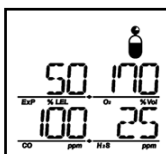|	
0.209 0 0	Measuring Mode (Basic Display) Display the current gas levels of the atmosphere and the battery power level
LOW -- 209 -- --	Shows the minimum concentration in this session for the Oxygen sensor. *In an ambient air, the Oxygen level normally indicates 20.9 %^{VOL}.
HIGH 0.209 0 0	Shows the maximal concentrations detected in this session for all sensors.
TWA -- -- 0 0	Shows the calculated TWA value for this session (Time Weighted Average 8 hours).
STEL -- -- 0 0	Shows the average concentrations for toxic gases for the last 15 minutes (Short Term Exposure Limit).
HIGH LOW CLR.CLR CLR.CLR	Clear the previous Low, High (Peak), TWA, STEL values.
ALARM VAL	Check the current setting values manually. (Low alarm, High alarm, TWA, STEL)
P--TYPE VER 16	Check the firmware version and type (N type or P type)
50 170 100 25	Check on set SPAN calibration levels Mode for ZERO calibration and SPAN calibration
2017 4/1	Current Date and Time (format: YYYY/MM/DD)
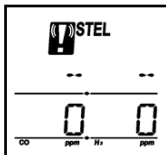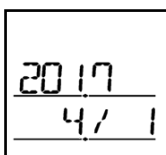
3.3　ALARM DISPLAY

Type	Set-Off Condition	LCD Display	Alarm Sound & Vibration Display
LOW Alarm	Exceed LOW alarm value	**LOW** icon & gas concentration levels displayed	Buzzer, LED / Vibration
HIGH Alarm	Exceed HIGH alarm value	**HIGH LOW** icon & gas concentration levels displayed	Buzzer,LED / Vibration
TWA Alarm	Exceed TWA alarm value	**TWA** icon and gas concentration time-weighted average displayed	Buzzer,LED / Vibration
STEL Alarm	Exceed STEL alarm value	**STEL** icon & average gas concentration levels displayed	Buzzer,LED / Vibration
Bump Test	Due Date for performing Bump Test	LEL BUM DUE	Stops after Bump Test
Execute Calibration	Due Date for performing Calibration	LEL CAL DUE	Stops after Calibration

LOW Alarm Sets Off : When the user presses Key after noticing that the LOW alarm sets off, the sound stops, but the vibration and LED alarm remain.

HIGH Alarm Sets Off : The user must leave the area immediately, and the sound alarm/vibration/LED alarm stops when the device goes to a safe area where the concentrations are normal.

TWA Alarm Sets Off : The alarm sets off when the hourly average levels of the gas concentration for the last eight hours exceed the TWA concentration, and the sound alarm/vibration/LED alarm stop when the gas concentration levels reach the alarm set-off value as the user goes to a safe area.

STEL Alarm Sets Off : The alarm sets off when the hourly average levels of the gas concentration for the last 15 minutes exceed the STEL concentration, and the sound alarm/vibration/LED alarm stop when the gas concentration levels reach the alarm set-off value as the user goes to a safe area.

Bump Test Interval (WATCHGAS IR-LINK Options): Notices the user on a regular basis to check the device. Calibration Interval (WATCHGAS IR-LINK Options): Notices the user on a regular basis to calibrate the sensor.

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3.4. INITIALIZATION OF DETECTED CONCENTRATIONS
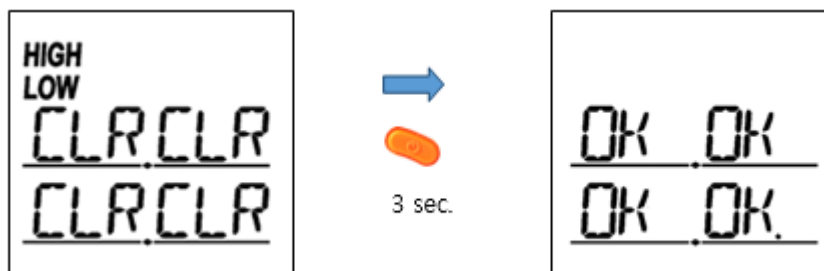

You can see the minimum and maximum values for the concentration levels detected by the device as well as the high TWA and STEL value on the display, and the values can be initialized. Press KEY button ( ) for three seconds on the CLR(Clear) mode on the LCD monitor, and the OK will appear on the LCD monitor to notify the completion of the initialization.

3.5. CHECK ON ALARM VALUE
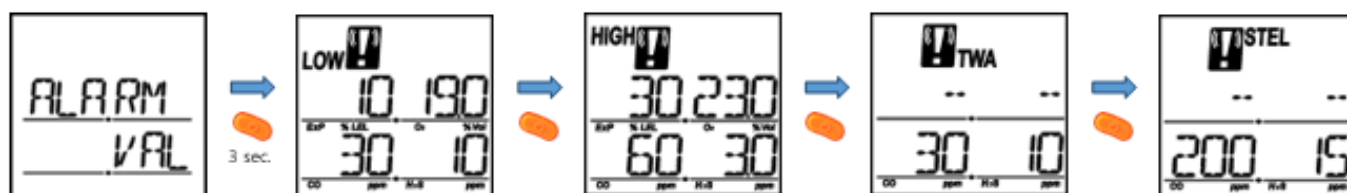
Press the KEY button ( ) for three seconds under the ALARM VAL mode and the set value for the LOW alarm is displayed. Press the KEY button one time each to set the alarm set-off value for HIGH alarm, LOW alarm, TWA and STEL alarm in the mentioned order.

3.5.1. INITIAL SETTING CONCENTRATION LEVELS

	Flammables (Ex)	Oxygen (O_2)	Carbon Monoxide (CO)	Hydrogen Sulfide (H_2S)
LOW	10 %LEL	19,5 %^{VOL}	35 ppm	10 ppm
HIGH	20 %LEL	23,5 %^{VOL}	200 ppm	15 ppm
TWA	N/A	N/A	35 ppm	10 ppm
STEL	N/A	N/A	50 ppm	15 ppm

The set values can be modified on PC through the optional WATCHGAS IR-LINK.

Caution
The values of different gases in the device are set based on the international standards. As such, the alarm set-off values for each gas can be modified upon the approval and monitoring of the supervisor. The modification may be done through the optional WATCHGAS IR-LINK.

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3.6.   DATES AND TIME
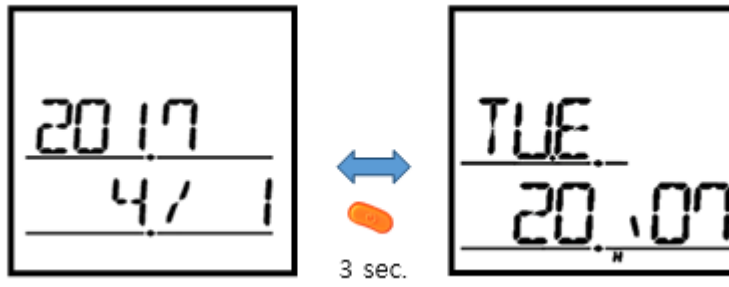
Press KEY button ( ) under the (YY/MM/DD) mode for 3 seconds and the day/time mode will appear. Press the KEY button ( ) again for 3 seconds under the (D/T) mode and it will go back to previous mode.
* The current time shall be automatically synched with that of the PC when linked with WATCHGAS IR-LINK.

3.7.   SELF TEST
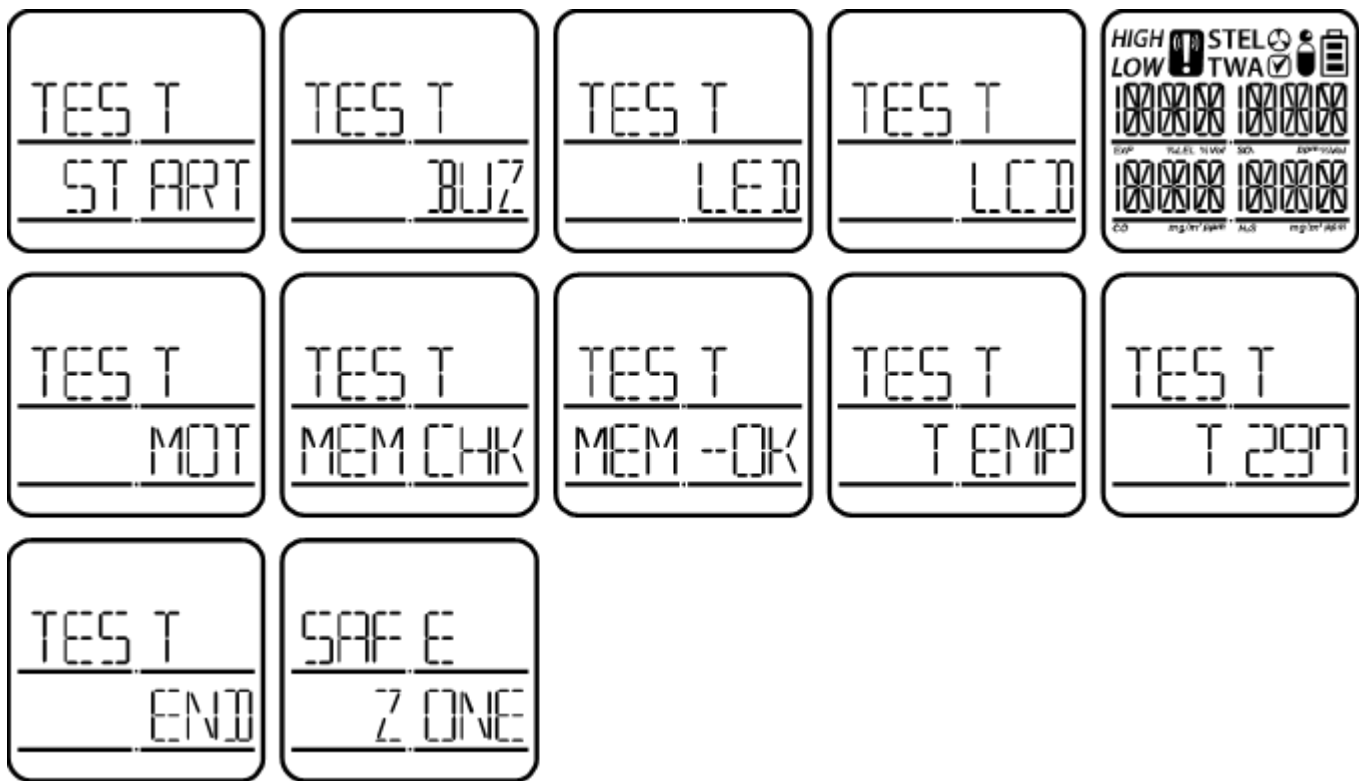
Press and hold the button for 3 seconds. The device will start the self test checking buzzer, LED, LCD, Motor, Memory, and Temperature.

4. Event Log

Up to 30 events may be saved and when the list exceeds 30, the oldest data will be automatically deleted. The saved data can be checked when transmitting it to PC through WATCHGAS IR-LINK.
Data log records the operation status every second and normal data logs do not last more than 2 months.

| Log Categories	Log Details
EVENT (High, Low, TWA, STEL) Alarm	Occurrence time, Duration, Alarm Type, Gas Concentration, Serial Number
BUMP TEST Log	Test date, Pass/non-pass, Calibration Gas Concentration, Detected Concentration
Calibration Log	Date of the Calibration, Type, Calibration Gas Concentration, Detected Concentration
Data Log	Time, Date of executing IR-LINK, Concentration, Alarm Types, Options

5. Calibration

Caution

The initial calibration is executed at WATCHGAS B.V. before device release. The calibration values are saved in the device which means inaccurate calibration may impair the accuracy of the device performance. Normally, the calibration should be done once a year after the purchase and regularly every six months thereafter.
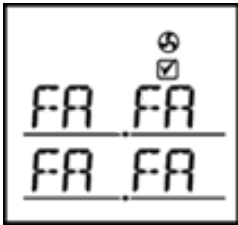
5.1. FRESH AIR CALIBRATION
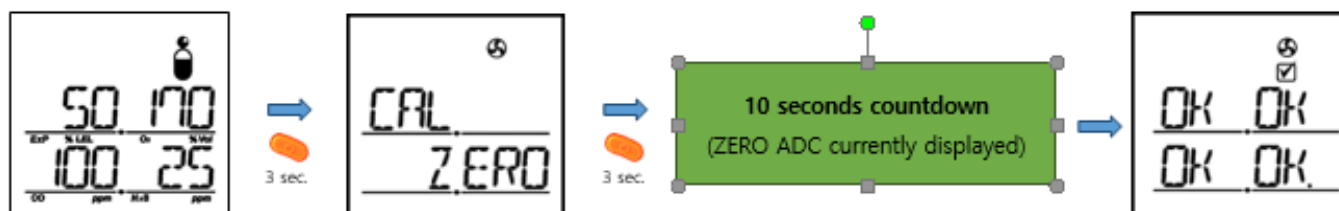
Press KEY button ( ) for 3 seconds under the gas calibration value mode and the icon 🌀 signifying fresh air calibration will appear on the LCD monitor with the phrase "CAL ZERO." Press for another 3 seconds to do fresh air calibration and it takes 10 seconds to calibrate. Press the button during the calibration process to stop the calibration. If you press the button upon the completion, It will return to the fresh air calibration mode, and if you don't press the button, it automatically enters the measure mode.

Caution

Because it is calibrated on the assumption that oxygen concentration is 20.9%vol, the combustible gas is 0%LEL, and the toxic is 0ppm in the normal fresh atmosphere, fresh air calibration must be conducted in the absolutely clear air without any impact of other gases. Fresh air calibration in the airtight spaces therefore is not recommended. Make sure to avoid operation under the work environment where people may inhale gases.

5.1.　FRESH AIR CALIBRATION *(CONTINUED)*

If the calibration fails, FA (fail) will appear on the display instead of ok. Press the button to enter the initial fresh air calibration mode and it changes into the measure mode if you do not press the button for 3 seconds. If FA continues, please consult Watchgas or the store you purchased the device as it may require the replacement of the sensor or repairs in the device.

5.2.　STANDARD GAS CALIBRATION

Press KEY button (⬭) under the fresh air calibration mode and the icon 🔋 signifying standard gas calibration will appear on the LCD monitor with the phrase "CAL SPAN." Press for 3 seconds to do the standard gas calibration and it will be completed automatically in 90 seconds. Press the button during the calibration to stop. If you press the button upon the completion, It will return to the initial standard gas calibration mode, and if you don't press the button, it automatically enters the measure mode.
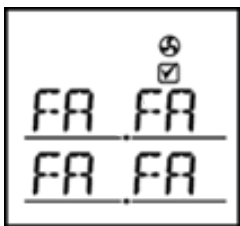

If the calibration fails, FA (fail) will appear on the display instead of ok. Press the button to enter the initial fresh air calibration mode and if you do not press the button, it changes into the measuring mode. If FA continues, please consult WATCHGAS or the store you purchased as it may require the replacement of the sensor or repair of the device.

DISPLAY FOR CALIBRATION COUNT
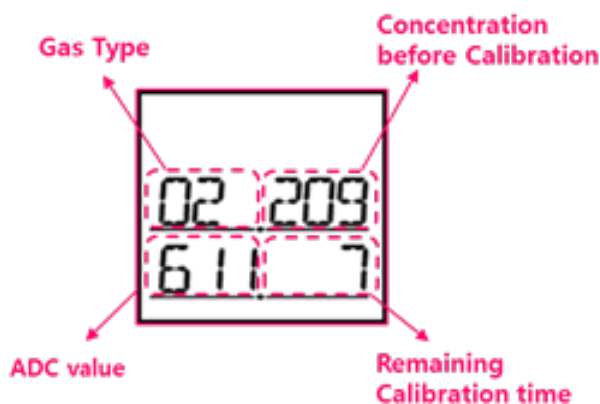
INITIAL STANDARD GASES CONCENTRATION FOR CALIBRATION

Combustible	2.2 %^{VOL} CH$_4$ (= methane 50 %LEL)
Oxygen	18 %^{VOL}
Carbon Monoxide	50 ppm
Hydrogen Sulfide	10 ppm

* The concentration for calibration may be modified on PC through the optional WATCHGAS IR-LINK.

DOCKING STATION

Standard gas calibration can be easily done through Docking Station (option), which holds gas inside.

* Docking Station is used to determine whether the devices functions properly by the bump test before using QGM in the work site.

6. Technical specifications

Model	QGM			
	LEL	**O$_2$**	**CO**	**H$_2$S**
Measuring type	Diffusion			
Measuring method	Catalytic [QGM-CAT] Infrared [QGM-IR]	Electrochemical		
Measuring range	0-100 %LEL	0-30 %^{VOL}	0-500 ppm	0-100 ppm
Resolution	1 % LEL	0.1 %^{VOL}	1 ppm	0.1 ppm
Sensor life time	> 2 year	2 year	> 2 year	> 2 year
Response time	< 15sec/90%scale	< 15sec/90%scale	< 30sec/90%scale	< 30sec/90%scale
Operation	Single Button			
Alarm Display	Digital LCD display, LCD Backlight, indicator LEDs, flashing alarm			
Operation mode display	Visual: LCD alarm display, LCD Backlight, Indicator LED Acoustic: buzzer (90 db @ 10 cm) and vibrating alarm			
Event log	Data log 2 months or more Event log / calibration log / bump log: 30 event			
Mounting type	Stainless steel belt clip			
Programming	WatchGas IR Link with PC software			
Operation temperature	-20 to +50° C			
Operating Humidity	10 to 95% RH, non-condensing			
Battery	Type: Lithium-ion rechargeable battery Charging time < 6h			
Operation time	QGM-CAT: 24 hours, QGM-IR: 2 months			
Housing	Rugged durable housing with impact proof coating IP67			
Dimensions	60 x 40 x 118 mm (WxDxH)			
Weight	< 240 g			
Approval	**QGM-IR:** Class I, Division 1, Groups A,B,C, and/or D, T4 Ex ia IIC T4 Ga Class 1, Zone 0, AEx ia IIC T4 Ga Sira 18ATEX2059X EAN-13: 8719992974877 (LEL/O₂/ CO/h₂S) EAN-13: 8719992974894 (LEL/O₂) EAN-13: 8719992974900 (LEL)	**QGM-CAT:** Class I, Division 1, Groups A,B,C, and/or D, T4 Ex da ia IIC T4 Ga Class 1, Zone 0, AEx da ia T4 Ga Sira 18ATEX2059X EAN-13: 8719992974917 (LEL/O₂/CO/h₂S) EAN-13: 8719992974724 (LEL/O₂) EAN-13: 8719992974931 (LEL)		
Option	WatchGas IR Link, WatchGas Docking Station			

Compatible products

WatchGas IR-Link

Docking station

Gas sampling pump

7. 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.

In the event that a product should fail 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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