G460
Multi-gas Detector

Field Operation Manual

smart
GasDetection
Technologies

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Warranty

GfG Instrumentation warrants our products to be free from defects in material and workmanship when used for their intended purpose, and agrees to remedy such defect or to furnish a new part (at the option of GfG Instrumentation) in exchange for any part of any product we manufacture that under normal use is found to be defective; provided that the product is returned by the purchaser to GfG's factory, intact, for our examination, with all transportation costs prepaid, and provided that such examinations reveals, in our judgment, that it is defective.

This warranty does not extend to any products that have been subjected to misuse, neglect, accident or unauthorized modifications; nor does it extend to products used contrary to the instructions furnished by us or to products that have been repaired or altered outside of our factory or by a non-authorized service center. No agent or reseller of GfG Instrumentation may alter the above statement.

This warranty is expressly in lieu of any and all other warranties and representations, express or implied, including but not limited to, the warranty of fitness for a particular purpose. GfG will not be liable for loss or damage of any kind connected to the use of its products or failure of its products to function or operate properly.

The G460 has a limited lifetime warranty to the original purchaser (as long as the instrument is in service). Accessories (battery packs and chargers, sampling pumps and other components), which by their design are consumed or depleted during normal operation, or which may require periodic replacement are warranted for one year from the date of purchase. O_2, LEL, CO, H_2S, COSH and CO_2 sensors are covered for 3 years from date of purchase. PID and all other sensors are warranted from 6 months to 2 years.

Introduction

The purpose of this manual is to provide day-to-day basic information for the G460. Please refer to the accompanying CD-ROM to access the complete user's manual. The G460 is a handheld detector for personal protection from gas hazards. The instrument measures continuously in diffusion mode and gives visual and audible alarms if a gas-induced danger arises.

The G460 is a safety device and it is up to the user to ensure proper action is taken in the event of an alarm.

The following signal words, as defined by ANSI Z535.4-1998, are used in this guide.
⚠**DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠**WARNING** indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠**CAUTION** indicates a potentially hazardous situation, which if not avoided, may result in moderate or minor injury.

Safety Information

The G460 must only be operated as specified in this manual, otherwise the instrument's protection may be diminished. Please refer to ISA-RP12.13, Part II-1987 for guidance in use of this instrument.

Warnings
⚠**WARNING** Never substitute any component as this may compromise the G460s intrinsic safety.
⚠**AVERTISSEMENT** Ne jamais remplacer les composants, car cela pourrait compromettre la sécurité intrinsèque du G460.
⚠**WARNING** For safety reasons, this equipment must be operated and serviced by qualified personnel only. Read and understand the instruction manual completely before operating or servicing the G460.
⚠**AVERTISSEMENT** Pour des raisons de sécurité, cet équipement doit être utilisé et entretenu par du personnel qualifié. Lire et comprendre le manuel d'utilisation avant de faire fonctionner ou de réparer cet appareil.
⚠**WARNING** Instrument should be calibrated before first time use and then on a regular basis. Length of interval will depend on frequency of use and contaminants and/or poisons being exposed to the sensors.
⚠**AVERTISSEMENT** étalonner le détecteur avant la première utilisation, puis à intervalles réguliers, en fonction de l'utilisation et de l'exposition du capteur aux poisons et des contaminants.
⚠**WARNING** If the combustible sensor may be exposed to a known poison (silicon, sulfur, halogenated compounds, etc), GfG recommends

checking it against a known concentration of calibration gas before use.
⚠ **AVERTISSEMENT** Si le capteur de gaz combustible peut être exposé à un poison connu (silicium, le soufre, les composés halogénés, etc) GfG recommande de vérifier contre une concentration connue de gaz d'étalonnage avant utilisation.

Special Conditions for Safe Use

"WARNING – READ AND UNDERSTAND INSTRUCTION MANUAL BEFORE OPERATING OR SERVICING."

"WARNING – EXPLOSION HAZARD – USE ONLY BATTERY PACK 1450-202, 1450-211 OR 1450-212. DO NOT MIX OLD BATTERIES WITH USED BATTERIES. REPLACE OR RECHARGE BATTERIES ONLY IN A NON-HAZARDOUS LOCATION." (or equivalent warnings)

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 in a pocket or 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, for example, the use of anti-static footwear. Additionally, the equipment shall be carried at the body while in the hazardous location, and must not be laid down unattended.

Under certain extreme circumstances, the non-metallic cover may generate an ignition-capable level of electrostatic charge; therefore, the equipment shall not be used in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. In addition, the equipment shall only be cleaned with a damp cloth.

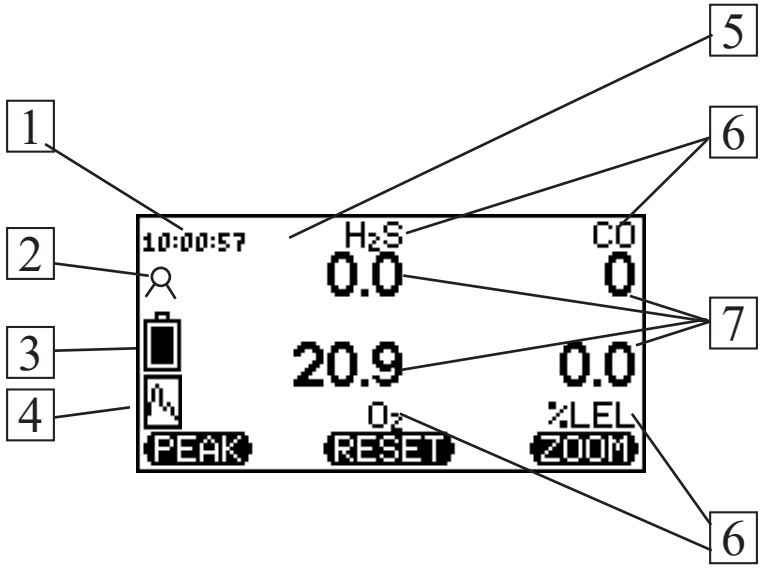
If a charge-generating mechanism is present, the exposed metallic part on the enclosure is capable of storing a level of electrostatic charge that could become incendive for IIC gases. Therefore, the user / installer shall implement precautions, for example, those listed above, to prevent the build-up of electrostatic charge. This is particularly important if the equipment is brought into a Zone 0 location.

The equipment shall only be charged when in the non-hazardous area using a charger specifically supplied for use with the unit (for example part number 4001-650, manufactured by GfG), approved as SELV or Class 2 equipment against IEC 60950, IEC 61010-1 or an equivalent IEC standard. The maximum voltage and current from the charger shall not exceed 12 Vdc and 1.25 A respectively.

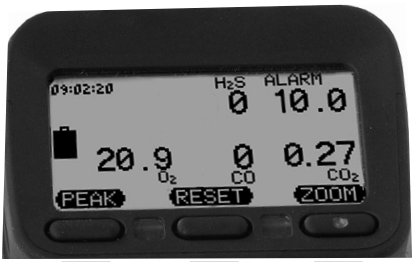
Design

Item	Description
1	Hook for carrying strap
2	Alarm LEDs
3	Horn
4	Screw connectors for pump
5	Display
6	Push buttons
7	Diffusion inlets
8	Contacts for accessories
9	Battery pack screws
10	Battery pack (accessible from back)

Display



Item	Description
1	Clock
2	Flashlight indicator
3	Battery charge level indicator
4	Peak indicator
5	Alarm Status (backlight) Green - No alarms Orange - Alarm 1 Red - Alarm 2 or 3
6	Gases
7	Gas readings



1 2 3

Push Button	Description
1	Activate Peak Hold to turn on optional flashlight
2	Reset latching alarm Hold to enter service mode
3	View one gas at a time or STEL/TWA Press to turn on monitor (when off) Hold to turn off monitor (approximately 5 seconds)
1 + 3	Rotate the display 180°
2 + 3	Enter calibration mode
1 + 2	% Vol measurement (if equipped)

Battery Installation

Batteries must not be replaced in hazardous locations. Replace only in non hazardous locations.

Piles ne doivent pas être remplacés dans des endroits dangereux. Remplacez uniquement dans des endroits non dangereux.

Turn the detector off before you replace the batteries. To replace the batteries or battery pack, unscrew the two screws on the front of the detector and pull the whole pack backwards or insert the allen wrench through one of the screw holes to push the pack backwards.

When the alkaline batteries have to be replaced, use the allen wrench to push the two battery cells out through the PCB holes. When inserting new batteries, check for the correct polarity (see plastic holder). Use only size AA batteries, Duracell MN1500 LR6. Secure the supply module by replacing the two screws.

NOTE: Failure to use Duracell AA batteries will void the warranty.
Utilisez uniquement des piles AA, Duracell MN 1500 LR6.

Maintenance and Inspection

Maintenance includes service, calibration and adjustment, as well as repair if it is necessary. Gas monitoring devices can react differently depending on environmental conditions. It is important, independent from maintenance duties, to test the device before putting it into operation each day. Bump testing before each use is highly recommended. The casing can be cleaned with a damp cloth. Never use solvents or detergents!

Service

Removing the battery pack

1. Use the hex wrench tool to loosen and remove the two screws securing the battery pack to front of the instrument housing.
2. GENTLY remove the battery pack from the instrument.
3. USE YOUR FINGERS TO REMOVE THE BATTERY PACK FROM THE INSTRUMENT.
4. DO NOT USE A SCREWDRIVER OR OTHER HARD TOOLS TO REMOVE THE BATTERY PACK.

Dismantling

1. Make sure the instrument is turned off.
2. Remove the battery pack.
3. Using a star tool, loosen the four screws holding the front and back of the instrument housing together.
4. GENTLY remove the back cover.
5. DO NOT USE A SCREWDRIVER OR OTHER HARD TOOLS TO PRY APART THE CASE SECTIONS!

Assembling

1. Reattach the back of the instrument housing.
2. SQUEEZE THE CASE SECTIONS FIRMLY TOGETHER BEFORE TIGHTENING THE FOUR SCREWS.
3. Tighten the four screws in diagonal sequence (just like tightening the lug nuts on a tire).
4. TIGHTEN THE FOUR SCREWS SECURELY BUT DO NOT OVERTIGHTEN!

Calibration Procedure

Calibration is a two step procedure. The first step is the Fresh Air AutoCal® adjustment. In this step the readings of the sensors are automatically adjusted to equal the values expected in fresh air, (20.9% O2, 0% LEL combustible gas, and 0 PPM (parts per million) for toxic sensors such as CO and H2S).

To perform a Fresh Air AutoCal® adjustment:

1. Make sure the instrument is located in fresh air (20.9% oxygen, and no measurable flammable or toxic contaminants)
2. Turn the instrument on and allow the readings to stabilize fully.
3. Attach the calibration adapter to the instrument.
4. The instrument will automatically recognize that the adapter is attached, and display the AutoCal® menu screen.
5. Push the “Air” button to initiate the Fresh Air adjustment.
6. The instrument will automatically count down, then begin the adjustment process.
7. The display will list the sensors installed, and show a checkmark by each sensor as the adjustment is completed.
8. After completing the Fresh Air adjustment the instrument will return to normal operation.
9. Make sure to remove the calibration adapter before using the instrument to detect gas.

The second step in a full calibration is the AutoCal® Gas adjustment. In this step the sensitivity of the sensors is automatically adjusted while the sensors are exposed to known concentration calibration gas.

A single cylinder of all-in-one (Quad Mix) calibration gas may be used to automatically calibrate CO, H2S and LEL sensors all at the same time. Other types of sensors must be calibrated one sensor at a time using the calibration gas that is appropriate for that sensor.

To initiate AutoCal® Gas calibration using all-in-one (Quad-Mix) calibration gas:

1. Make sure the instrument has been properly Fresh Air adjusted before proceeding to the Gas calibration.

2. Attach the calibration adapter to the instrument. (If the adapter is already attached, momentarily remove and replace the adapter to display the AutoCal® menu screen,)
3. Turn the regulator on to begin flowing calibration gas to the sensors and press “Gas”.
4. You will be prompted to verify that gas has been applied. Press “Yes” to continue.
5. Allow the instrument to count down.
6. The display will show an hourglass icon by each sensor while it is being adjusted, then a check mark when the adjustment is complete.
7. Continue the calibration procedure for any remaining sensors using the Single Sensor calibration procedure below.
8. Make sure to remove the calibration adapter before using the instrument to detect gas.

NOTE: Single Sensor calibration is a Security Protected mode of operation. The choices available in the Single Sensor calibration mode permit users to change alarm levels as well as to change the range and type of gas used to calibrate the sensor. Advanced functions available in the Service Menu should only be accessed and used by qualified individuals. Please call GfG for the correct calibration gas and concentration to use for the sensors installed in your instrument.

To initiate Single Sensor AutoCal® Gas calibration:

1. Be sure to calibrate the standard sensors as indicated previously.
2. Make sure that the calibration adapter is still attached to the instrument, and that the instrument is in the normal operation mode showing readings for each installed sensor.

   NOTE: If the calibration adapter is not already attached, when you attach the adapter the instrument will display the AutoCal® menu screen. Press the “Exit” button to display the normal operation screen and continue as below.

3. Enter the service menu by pressing and holding down the “Reset” button.
4. The instrument will display the Main Menu choices.

5. Scroll down to the “Service” choice, then press “Select”.
6. Enter “1100” as the Security Code when prompted.
7. The display will show the Service Menu screen.
8. Highlight the “Sensors” choice, then press “Select”.
9. Use the down arrow key to choose the desired sensor, then press “Select”.
10. The instrument will display the choices available for that particular type of sensor.
11. Highlight the “Calibrate” choice, then press “Select”.
12. Turn the regulator on to begin flowing calibration gas to the sensor, THEN press “Start”.
13. The display will show the sensor readings, the concentration of “CalGas” being used to adjust the sensor, an hourglass icon while the sensor is adjusted, and “OK” when the adjustment is successfully completed.

    NOTE: Make sure that the concentration of gas in the cylinder matches the “CalGas” concentration shown on the instrument display.

14. Repeat this process for each additional sensor as necessary, or press “Exit” to return to normal operation. It will be necessary to push “Exit” several times to get back to the main reading screen.
15. You will be prompted to “SAVE NEW ADJUSTMENT”. You MUST press the “Yes” button for the new calibration date and values to be updated to the instrument’s memory.
16. Make sure to remove the calibration adapter before using the instrument to detect gas.

NOTE: It may take a few minutes for the sensors to re-stabilize at their normal fresh air values. Wait for the sensors to stabilize completely before using the instrument to detect gas. If the sensors fail to stabilize it may be necessary to make a Fresh Air AutoCal® adjustment as explained previously.

Sensors may initially fail the Fresh Air or Gas Calibration adjustment. It is usually worthwhile to repeat the failed procedure at least once.

1. Make sure that the sensors (especially the combustible sensor) have had a chance to warm up completely before beginning the Fresh Air or Cal Gas adjustment. Five minutes is usually sufficient.
2. Before making a Fresh Air adjustment, make sure that the calibration adapter and tubing do not contain trapped calibration gas.
3. Make sure the air used for the Fresh Air adjustment does not contain measurable contaminants such as solvent vapors, cigarette smoke or engine exhaust.
4. Make sure that the calibration gas cylinder has not run out of gas.
5. Make sure the calibration gas cylinder, tubing and adapter are properly connected to the instrument.
6. If the sensor still fails calibration, contact GfG Instrumentation for additional advice.
7. Any sensor that fails to calibrate properly must be replaced before using the instrument.

Alarms

If the measured gas concentration exceeds a pre-set threshold, the monitor will give audible and visual alarms.

Alarm Type	Sensors	# of Alarms	Description
Instantaneous Value (AL)	Oxygen Combustibles Toxic gases	3 3 2	An instantaneous alarm is activated immediately if the gas concentration exceeds or falls below a pre-set threshold. The alarm values are adjustable.
Short Term Value (STEL)	Toxic gases	1	The short-term exposure limit (STEL) is the average concentration over a short period of time (e.g. 15 minutes). The STEL alarm is not latching; it resets automatically as soon as the concentration falls below the threshold.*
Long Term Value (TWA)	Toxic gases	1	The time weighted average (TWA) refers to an 8-hour shift and calculates the average concentration. The TWA alarm cannot be reset. It is only de-activated if the detector is switched off.*
Over Range	All	1	The screen will display ↑↑↑
Under Range	All	1	The screen will display ↓↓↓

***Note**: To avoid possible personal injury, do not turn off the detector during a work shift. TWA, STEL and Max readings are reset when the G460 is turned off.

If the detection range of the LEL sensor is exceeded, the display will read "↑↑↑", indicating it is over range, instead of a value for gas concentrations above 110% LEL. To protect the sensor from damage, the device turns off the sensor. However, the audible and visual alarms and the "↑↑↑" message remain active. The alarms must be reset by pushing the RESET key. The display will read: "Fresh air?" **If you have made sure that there is no combustible gas in the vicinity of the CH_4 sensor**, press yes to resume detection.

Service

Service consists of the maintenance, inspection and repair of the gas monitoring device. A function test should be performed before each day's use.

- Status of the zeropoint
- Charging status of the battery
- Pump and diffusion inlet
- Display with zero gas and standard test gas and adjustment, if necessary
- Alarm signal release, e.g. with alarm test gas
- Constantly amplified signal with standard test gas
- Response time

Any repair of the G460 must be done according to the manufacturer's instructions and with genuine parts.

Troubleshooting

Symptom	Solution
No power	Check/charge battery
No gas response	Check/replace sensor (see complete user manual)
Alarms in clean (fresh) air	Perform autozero

Specifications

Dimensions: 2.95x4.33x2.17 in (75x110x55 mm)

Weight: 10 oz (280 g) with O_2/LEL/CO/H_2S sensors, 14 oz (380 g) with above plus IR, CO_2 or PID

Climate conditions:
- Temperature: -4 to +131°F (-20 to +55°C)
- Humidity: 5 to 95% r.h. (non-condensing)
- Pressure: 700 to 1300 hPa

Detection Range: Please refer to complete operating manual “Sensor Types and Detection Ranges”

Sensor type: Please refer to complete operating manual “Sensor Types and Detection Ranges”

Alarm Conditions: Alarm 1, Alarm 2, Alarm 3, TWA, STEL, battery, confidence blip

Vibrating alarm: standard

Audible alarm: 103 dB at 30 cm

Display: Illuminated LCD full graphic display
Visual alarm: Bright, 360° wraparound LEDs plus heterochromatic (green/orange/red) backlight display

Backlight: Automatic when a button is pressed or any alarm condition is activated

Self-test: Initiated upon start up.

Calibration: Manual or automatic.

User options: Location ID, User ID, Confidence blip, audible alarm levels (103 dB, 95 dB, or 0 dB), display contrast, time, next inspection date, language selection, adjustable alarm levels, disable vibrating alarm, latching alarm 2, sensor deactivation, combustible sensor (0-100% LEL or 0-5% vol), set span values, autosave and datalogging (mode and interval)

Battery operating time: Up to 25 hours with LEL and toxic sensors; up to 18 hours with IR CO_2 or PID sensors

Approved batteries: GfG NiMH rechargeable battery pack or Duracell MN1500 LR6

Battery charger: GfG cradle charger

Charge: up to 6 hours

Warranty: Limited lifetime on instrument and electronics; 3 yrs from date of purchase for O2, LEL, CO, H2S, COSH and CO2 sensors. PID and all other sensors are between 6 months to 2 years.

Approvals: cCSAus

Approved: Class I, Division 1, Groups A, B, C and D T3
Ex ia IIC T3
Class I, Zone 0 AEx ia IIC T3
Ex db eb ia IIC T3/T4 Gb (NiMH = T3) -20 ≤ Ta ≤ +45 / +50 °C
08.1934905X

Standards: IEC 60079-0:2011 (Ed.6)
IEC 60079-7:2015 (Ed.5)
IEC 60079-1:2014 (Ed.7)
IEC 60079-11:2011 (Ed.6)
CSA C22.2 No. 152-M1984
UL 913
ANSI / ISA-12.13.01-2000

EMI/RFI resistance: EMC directive 89/336/EEC

Caution

⚠**WARNING** Never substitute any components as this may compromise the G460s intrinsic safety.

⚠**AVERTISSEMENT** Ne jamais remplacer les composants, car cela pourrait compromettre la sécurité intrinsèque du G460.

⚠**WARNING** For safety reasons, this equipment must be operated and serviced by qualified personnel only. Read and understand the user manual completely before operating or servicing this device.

⚠**AVERTISSEMENT** Pour des raisons de sécurité, cet équipement doit être utilisé et entretenu par du personnel qualifié. Lire et comprendre le manuel d'utilisation avant de faire fonctionner ou de réparer cet appareil.

⚠**WARNING** Do not use the detector if it is damaged. Before you use the detector, inspect the case for cracks or missing parts.

⚠**AVERTISSEMENT** Ne pas utiliser le détecteur s'il est endommagé. Avant d'utiliser le détecteur, inspectez le cas de fissures ou de pièces manquantes.

⚠**WARNING** If the detector is damaged or something is missing, contact GfG Instrumentation, Inc. immediately.

⚠**AVERTISSEMENT** Si le détecteur est endommagé ou qu'il manque quelque chose, contactez GfG Instrumentation Inc. immédiatement.

⚠**WARNING** Calibrate the detector before first-time use and then on a regular schedule, depending on use and sensor exposure to poisons and contaminants.

⚠**AVERTISSEMENT** étalonner le détecteur avant la première utilisation, puis à intervalles réguliers, en fonction de l'utilisation et de l'exposition du capteur aux poisons et des contaminants.

⚠**WARNING** GfG recommends that you "bump test" the sensors before each use to confirm their ability to respond to gas. To do this, expose the detector to a gas concentration that exceeds the alarm set points. Manually verify that the

audible and visual alarms are activated. Calibrate if the readings are not within the specified limits.

⚠**AVERTISSEMENT** GfG vous recommande de “test cogner” les capteurs avant chaque utilisation afin de confirmer leur capacité à répondre à gaz. Pour ce faire, exposer le détecteur à une concentration de gaz qui dépasse les points de consigne d’alarme. Vérifier manuellement que les alarmes sonores et visuelles sont activées. Calibrer si les lectures ne sont pas dans les limites spécifiées.

⚠**WARNING** It is recommended that the combustible sensor be checked with a known concentration of calibration gas after any known exposure to catalyst contaminants/poisons (sulfur compounds, silicon vapors, halogenated compounds, etc).

⚠**AVERTISSEMENT** Il est recommandé que le capteur de gaz inflammables être vérifié avec une concentration connue de gaz d’étalonnage après une exposition connue à catalyseur contaminants / poisons (composés soufrés, des vapeurs de silicium, composés halogénés, etc)

⚠**WARNING** The combustible sensor is factory calibrated to 50% LEL methane. If monitoring a different combustible gas in the % LEL range, calibrate the sensor using the appropriate gas.

⚠**AVERTISSEMENT** Le capteur de gaz combustible est calibré en usine à 50% LIE méthane. Si le suivi d’un autre gaz combustible dans la gamme de% LEL, étalonner le capteur en utilisant le gaz approprié.

⚠**WARNING** High off-scale readings may indicate an explosive concentration.

⚠**AVERTISSEMENT** Haute lectures hors échelle peut indiquer une concentration explosive.

⚠**WARNING** Only the combustible gas detection portion of this instrument has been assessed for performance by CSA International.

⚠**AVERTISSEMENT** Seule la partie de détection de gaz combustible de cet instrument a été évaluée pour la performance par CSA International.

⚠**WARNING** Protect the combustible sensor from exposure to lead compounds, silicones and chlorinated hydrocarbons. Although certain organic vapors (such as leaded gasoline and halogenated hydrocarbons) may temporarily inhibit sensor performance, in most cases the sensor will recover after calibration.

⚠**AVERTISSEMENT** Protégez le capteur de gaz combustible à partir de l’exposition au plomb, composés silicones et des hydrocarbures chlorés. Bien que certaines vapeurs organiques (comme l’essence au plomb et les hydrocarbures halogénés) peuvent inhiber temporairement les performances du capteur, dans la plupart des cas, le capteur va récupérer après calibration.

⚠**WARNING** For use only in hazardous locations where oxygen concentrations do not exceed 20.9% volume (v/v).

⚠**AVERTISSEMENT** A utiliser uniquement dans des endroits dangereux où les concentrations d’oxygène ne dépasse pas 20,9% en volume (v / v).

⚠**WARNING** Any rapidly increasing reading followed by a declining or erratic reading may indicate a gas concentration beyond the upper scale limit, which may be hazardous.

⚠**AVERTISSEMENT** Toute lecture augmente rapidement suivie par une lecture diminution ou irrégulière peut indiquer une concentration de gaz au-delà de la limite supérieure de l’échelle, ce qui peut être dangereux.

⚠**WARNING** Extended exposure of the G460 to certain concentrations of combustible gases and air may stress detector elements, which can seriously affect the device's performance. If an alarm occurs due to a high concentration of combustible gases, recalibration should be performed, or if needed, the sensor replaced.

⚠**AVERTISSEMENT** Une exposition prolongée de la G460 à certaines concentrations de gaz combustibles et d'air peut souligner éléments détecteurs, qui peuvent sérieusement affecter les performances de l'appareil. Si une alarme se produit en raison d'une forte concentration en gaz combustibles, l'étalonnage doit être effectué, ou en cas de besoin, le capteur remplacé.

⚠**WARNING** Do not test the combustible sensor's response with a butane cigarette lighter; doing so can damage the sensor.

⚠**AVERTISSEMENT** Ne pas tester la réponse des capteurs combustible avec un briquet au butane, cela peut endommager le capteur.

⚠**WARNING** Do not expose the detector to electrical shock and/or severe continuous mechanical shock.

⚠**AVERTISSEMENT** Ne pas exposer le détecteur de choc électrique et / ou sévère choc mécanique continue.

⚠**WARNING** Do not attempt to disassemble, adjust or service the detector unless instructions for that procedure are contained in the manual and/or that part is listed as a replacement part.

⚠**AVERTISSEMENT** N'essayez pas de démonter, modifier ou réparer le détecteur à moins que des instructions pour que la procédure se trouvent dans le manuel et / ou la partie est répertorié comme une pièce de rechange.

⚠**WARNING** Electromagnetic interference (EMI) signals may cause incorrect operation of this detector.

⚠**AVERTISSEMENT** interférence des signaux électromagnétiques (EMI) peut entraîner un mauvais fonctionnement de ce détecteur.

⚠**WARNING** The G460 with IR-EX 005 Sensor complies with the performance requirements of CSA C22.2 No. 152 over the temperature range of 0 to 55 °C. Outside this range, it exceeds the standard's minimum tolerance requirements of ±3% of full scale. At -10°C it is -4% and at -20°C it is -5%."

⚠**AVERTISSEMENT** Le G460 avec IR-EX capteur 005 est conforme avec les exigences de performance de la norme CSA C22.2 No. 152 au cours de la plage de température de 0 à 55 C. En dehors de cette gamme, il dépasse les exigences de tolérance aux minimales les normes de 3% la pleine échelle. A -10 ° C, il est de -4% et à -20 ° C, il est de -5%.

Sensor Specifications

MK376-5 Electrochemical sensor for oxygen O2

Response time:		t50: <10 sec	t90: <20 sec
Pressure:	800...1200 hPa:	max. ±0.2Vol.% or ±2.5% of range	(referred to 1000 hPa)
Humidity:	0%...90% r.h.:	max. ±0.2Vol.% or ±2.5% of range	(referred to 50% r.F.)
Temperature:	-20...+50°C:	max. ±0.5Vol.% or ±2.5% of display	(referred to 20°C)
Expected lifetime:		3 years in air	

MK344-5/-6 Electrochemical sensor for carbon monoxide CO

Response time:		t50: <15 sec	t90: <45 sec
Pressure:	800...1200 hPa:	max. ±3ppm or ±7% of display	(referred to 1000 hPa)
Humidity:	15%...90% r.h.:	max. ±3ppm or ±7% of display	(referred to 50% r.F.)
Temperature:	-10...+40°C:	max. ±3ppm or ±7% of display	(referred to 20°C)
Temperature:	-20...+50°C:	max. ±3ppm or ±15% of display	(referred to 20°C)
Cross sensitivities:		C2H4<100%; C2H2<90%; Cl2<40%; H2<30%; NO<30%; NO2<30%; H2S=0%; SO2=0%; NH3=0%; C2H6O=0% (*1)	
Expected lifetime:		3 years	
(*1): Displayed value with reference to the supplied gas concentration in the range of maximum allowable concentration (MAC).			

MK429-5/-6 Electrochemical sensor for hydrogen sulfide H2S

Response time:		t50: <15 sec	t90: <45 sec
Pressure:	800...1200 hPa:	max. ±2ppm or ±10% of display	(referred to 1000 hPa)
Humidity:	15%...90% r.h.:	max. ±2ppm or ±10% of display	(referred to 50% r.h.)
Temperature:	-10...+40°C:	max. ±2ppm or ±10% of display	(referred to 20°C)
Temperature:	-20...+50°C:	max. ±2ppm or ±15% of display	(referred to 20°C)
Cross sensitivities:		SO2≈ 20%; NO2<-20%; CO<1%; NO<0,2%; H2<0,1%; (*1)	
Expected lifetime:		3 years	

MK211-7 Catalytic combustion sensor for combustible gases and vapors

Response time:	t90: <30 sec		
Pressure:	950....1100 hPa:	max. ±5% of range or ±15% of display	(referred to 1000 hPa)
Humidity:	5%...90% r.h.:	max. ±5% of range or ±15% of display	(referred to 55% r.h.)
Temperature:	-20...+ 50°C:	max. ±3% of range or ±10% of display	(referred to 20°C)
Cross sensitivities :	2.00Vol.% H2: approx.140%;0.70Vol.% C4H10: approx.72%;		
at 50%LEL:	2.20Vol.% CH4: 100%;0.70Vol.% C5H12: approx.71%;		
	0.85Vol.% C3H8: approx.85%;0.50Vol.% C6H14: approx.55%;		
The above information refers to the detection range for methane. It may vary from sensor to sensor and depends on the gas concentration and on the age of the sensor.			
Expected lifetime:		3 years	

MK222-2/-3 Photo-ionisation sensor for toxic combustible vapors Isobutylene i-C4H8

Response time:	t90: <30 sec	
Ionisation potential:	10.6 eV	
Cross sensitivities:	Kerosene: approx.250%; C8H8: 250%; C7H8: 190%; C6H6: 190%;	
	Diesel: approx.110; Benzine: approx.90%; C3H60: 83%; C8H18:	
	45%; C7H16: 40%; H2S: 30%; C6H14: 22%; NO: 14%; NH3: 11%;	
	C5H12: 10%; C4H10=C3H8=CH4=H2=0%	
Expected lifetime:	3 years	

MK224-5/MK231-5 Infrared sensor for carbon dioxide CO2

Response time:	t50: <20 sec t90: <50 sec t10 <50 sec @ CO2		
Pressure:	70...130 hPa:	<1.6% of display per 1% pressure change	(referred to 100 hPa)
Humidity:	0%...95% r.h.:	max. ±0.01Vol% or ±2% of display	(referred to 50% r.h. @20°C)
Temperature:	-20...+55°C:	max. ±0.02Vol% or ±10% of display	(referred to 20°C)
Cross sensitivities:		max. ±0.01Vol% or ±2% of display	(under laboratory conditions)
Expected lifetime:		6 years	

MK227-5/MK231-5 Infrared sensor for combustible gas

Response time:	t50: <20 sec	t90: <45 sec	@ CH4 (Methane)
	t50: <25 sec	t90: <66 sec	@ C3H8 (Propane)
	t50: <30 sec	t90: <99 sec	@ C6H14 (n-Hexane)
	t50: <55 sec	t90: <371 sec	@ C9H20 (n-Nonane)
Pressure:	70...130 hPa:	<1.5% of CH4 -display per 1% pressure change	(referred to 100 hPa)
		<1.2% of C3H8 -display per 1% pressure change	(referred to 100 hPa)
Humidity:	0%...95% r.h.:	max. ±2.0%Vol or ±15% of display	(referred to 0% r.h. @40°C)
Temperature	-20...+50°C:	max. ±2.0%Vol or ±10% of C3H8 display	(referred to 20°C)
Expected lifetime:		6 years	

Accessories and Replacement Parts

	Part Number
Batteries, alkaline (AA)	4002-001
Battery hardware kit (includes 6 screws and hex key)	4003-450
Battery pack, alkaline (without batteries) with vibrator	1450-202
Battery pack, rechargeable NiMH with vibrator	1450-211
Battery pack, rechargeable NiMH with vibrator and lights	1450-212
Cable, data downloading / USB interface (for PC)	1650231
Calibration adapter with tubing	7771-450
Calibration connector	1450225
Charger, plug-in (110 VAC) wall pack (for use with drop-in charger)	4001-650
Charger, vehicle	4001-650V

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