

Installation Manual



Rev. C | D | 2024.09



cGas Detector Indoor Public Spaces
Analog Transmitter | Digital Transmitter

www.critical-environment.com

NEED MORE INFORMATION?

This is the **Installation Manual** for the cGas Detector models CGAS-AP Analog Transmitter and CGAS-DP Digital Transmitter for indoor public spaces. If you would like to make sure you have the most current version or want to save it in pdf form, [click here](#) to view or download from our website.

If you need more information, refer to the **cGas Detector Public Spaces Operation Manual**, which covers topics such as:

- Relay Operation
- Alarm Status, Fault Detection and Communication Failure Notifications
- Setting Channel Alarm Setpoints, Direction and Hysteresis
- Enable/Disable Internal Buzzer
- Enable/Disable Alarm Blink
- Enable/Disable Channels
- Delete Channels
- Replacing Plug & Play Smart Sensors
- Calibration
- Accessories
- Maintenance
- Troubleshooting

If you would like to view or download the **cGas Detector Public Spaces Operation Manual** from our website [click here](#)

The most up-to-date version of the manual will always be on our website.

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1 POLICIES

1.1 Important Note

Read and understand this manual prior to using this instrument. Carefully read the warranty policy, service policy, notices, disclaimers and revisions on the following pages.

This product must be installed by a qualified electrician or factory trained technician and according to instructions indicated in this manual. This instrument should be inspected and calibrated regularly by a qualified and trained technician.

This instrument has not been designed to be intrinsically safe. For your safety, **do not** use it in classified hazardous areas (explosion-rated environments).

INSTRUMENT SERIAL NUMBER:

PURCHASE DATE:

PURCHASED FROM:

1.2 Warranty Policy

Critical Environment Technologies Canada Inc. warrants the products we manufacture (excluding sensors, battery packs, batteries, pumps, and filters) to be free from defects in materials and workmanship for a period of two years from the date of purchase from our facility. Sensors are consumable items and once they leave our factory, we cannot reuse or resell them. As such, all sensor sales are final. Should the sensor itself be faulty, there is a one-year pro-rated warranty that would apply from the date of purchase from our facility.

The warranty status may be affected if the instrument has not been used and maintained as per the instructions in the manual or has been abused, damaged, or modified in any way. The product is only to be used for the purposes stated in the manual. Critical Environment Technologies is not liable for auxiliary interfaced equipment or consequential damage.

Prior to shipping equipment to CETCI, contact our office for an RMA #. All returned goods, regardless of reason, must be accompanied with an RMA number. Please read our Warranty and Returns Policy and follow our RMA Instructions and Form.

Due to ongoing research, development, and product testing, the manufacturer reserves the right to change specifications without notice. The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of this data.

For our full Terms & Conditions of Sale go to
<https://www.critical-environment.com/about/policies>

1.3 Service Policy

CETCI maintains an instrument service facility at the factory. Some CETCI distributors / agents may also have repair facilities; however, CETCI assumes no liability for service performed by anyone other than CETCI personnel.

Repairs are warranted for 90 days after date of shipment (sensors have individual warranties). Should your instrument require non-warranty repair, you may contact the distributor from whom it was purchased or you may contact CETCI directly.

Prior to shipping equipment to CETCI, contact our office for an RMA #. All returned goods, regardless of reason, must be accompanied with an RMA number. Please read our Warranty and Returns Policy and follow our RMA Instructions and Form.

If the product is deemed repairable, for liability reasons, CETCI will perform all necessary repairs to restore the instrument to its full operating condition.

1.4 Copyrights

This manual is subject to copyright protection; all rights are reserved. Under international and domestic copyright laws, this manual may not be copied or translated, in whole or in part, in any manner or format, without the written permission of CETCI.

Modbus® is a registered trademark of Gould Inc. Corporation.
BACnet® is a registered trademark of American Society of Heating, Refrigeration and Air Conditioning (ASHRAE).

1.5 Disclaimer

Under no circumstances will CETCI be liable for any claims, losses or damages resulting from or arising out of the repair or modification of this equipment by a party other than CETCI service technicians, or by operation or use of the equipment other than in accordance with the printed instructions contained within this manual or if the equipment has been improperly maintained or subjected to neglect or accident. Any of the forgoing will void the warranty.

Under most local electrical codes, low voltage wires cannot be run within the same conduit as line voltage wires. It is CETCI policy that all wiring of our products meet this requirement. It is CETCI policy that all wiring be within properly grounded (earth or safety) conduit.

1.6 Revisions

This manual was written and published by CETCI. The manufacturer makes no warranty or representation, expressed or implied including any warranty of merchantability or fitness for purpose, with respect to this manual.

All information contained in this manual is believed to be true and accurate at the time of printing. However, as part of its continuing efforts to improve its products and their documentation, the manufacturer reserves the right to make changes at any time without notice. In addition, due to improvements made to our products, there may be information in this manual that does not exist in the version of the product the user has. Should you detect any error or omission in this manual, or should you want to inquire regarding upgrading the device's firmware, please contact CETCI at the following address:

Critical Environment Technologies Canada Inc.
Unit 145 - 7391 Vantage Way,
Delta, BC V4G 1M3 Canada

Toll Free: +1.877.940.8741
Telephone: +1.604.940.8741
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Website: www.critical-environment.com

In no event will CETCI, its officers or employees be liable for any direct, special, incidental or consequential damages resulting from any defect in any manual, even if advised of the possibility of such damages.

The most up-to-date version of the manual will always be on our website.

2 SAFETY INFORMATION

The CGAS-AP and CGAS-DP comply with:

- CSA-C22.2 No. 205-12
- UL508 (Edition 18):2018
- EMC Directive 2014/30/EU
- EN 50270:2015, Type 1, EN61010
- FCC. This device complies with part 15 of the FCC Rules, Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- CERTIFIED FOR ELECTRIC SHOCK & ELECTRICAL FIRE HAZARD ONLY. LA CERTIFICATION ACNOR COUVRE UNIQUEMENT LES RISQUES DE CHOC ELECTRIQUE ET D'INCENDIE D'ORIGINE ELECTRIQUE.
- CO and NO2 Sensors UL2075, 2nd Edition, Standard for Gas and Vapour Detectors and Sensors
- Listed by BTL (CGAS-D only)
- RoHS compliant circuit boards

2.1 General Safety Warnings

The cGas Public Space Detector is intended for indoor use, permanently mounted at a height that is appropriate for the type of gas being monitored. Refer to Section 4.2 *Mounting the Transmitter*. The cGas Detector should be protected from extreme weather conditions.

The cGas Detector requires no assembly and virtually no maintenance other than regular calibration of the internal and/or remote sensors. There are no serviceable elements other than the calibration instructions outlined in this manual. There are no replaceable components except the sensors.

It is important to ensure that excess water and/or dust is not somehow entering the enclosure and physically damaging the circuit board or internal

components. Keep the gas detector, including the vents free of dirt, dust and debris. If in a damp location, source of water should be shielded from entering the enclosure.

Check for physical damage, tampering, etc. on a consistent basis.

If painting is to be done in the same area, the gas detector needs to be protected from overspray and the sensor vent should be covered so as to not receive paint fumes. Paint fumes may damage and / or reduce the life of the sensor.

2.2 Protection Against Electrical Risks

Disconnect all power before servicing. There may be multiple power sources. The power supply may have a building installed circuit breaker / switch that is suitably located and easy to access when servicing is required and should be labelled as cGas Detector supply (disconnecting power to the cGas Detector). Appropriate markings should be visible at the circuit breaker / switch that is supplying power to the cGas Detector.

This device may interfere with pacemakers. Modern pacemakers have built-in features to protect them from most types of interference produced by other electrical devices you might encounter in your daily routine. If you have a pacemaker, follow your healthcare provider's instructions about being around this type of equipment.

3 INSTRUMENT SPECIFICATIONS

3.1 General Description

Thank you for purchasing our low profile cGas Detector Transmitter. The cGas Detector is designed for use in publicly occupied spaces:

- Where integrated demand controlled ventilation (DCV) is used for air

quality and energy savings

- For continuous monitoring of refrigerants where high-efficiency, high volume refrigerant cooling and heating systems (VRF) are used to keep the indoor environment comfortable
- For other continuous monitoring of hazardous gases in publicly frequented areas

The low profile, aesthetically pleasing enclosure is designed to reduce the noticeability of the device by the public eye.

Both the analog and digital models are powered by 24 VDC or ground referenced AC, come with an LCD display, temperature compensation and thermal resetting fuse. Sensor replacement is easy with true Plug & Play smart sensors that arrive pre-calibrated. The firmware and configuration can be upgraded in the field using the USB connection.

The digital models (CGAS-DP) are user configurable in the field for BACnet® MS-TP RS-485 or Modbus® RTU RS-485 output for communicating with a controller, Building Automation System or other control panel.

The analog models (CGAS-AP) have one analog output signal or a jumper selectable 0-10 volt, 2-10 volt, etc. output.

Both the analog and digital models may be configured with an internal gas sensor or a remote refrigerant sensor (dongle). The internal sensor model is ideal for mounting flush with the wall. The remote refrigerant sensor model has a 9m / 29.5 ft dongle cable that is ideal for use in packaged terminal air conditioner (PTAC) applications.

The sensors utilized in this device are accurate enough to measure to Occupational Health & Safety (OHS) hazardous levels for toxic gases. The transmitter operates by diffusion.

3.2 Technical Specifications

MECHANICAL

Enclosure	Polycarbonate, white, low profile
Weight	400 g / 14 oz
Size	124.9 mm x 124.9 mm x 50 mm 4.9 in x 4.9 in x 2.0 in
Dongle Cable Length	9 m / 29.5 ft (only available with the CGAS-AP-RD and CGAS-DP-RD models)

USER INTERFACE

Display	2-line by 16 character graphic LCD
Push Buttons	Initiate calibration and menu options with internal UP, DOWN and ENTER push buttons
USB Port	Internal port for USB memory stick connection for field configuration/firmware upgrades
Audible Alarm	Rated 90dB @ 10 cm / 4in, user enable/disable Comes standard with all 7 series electrochemical and IR refrigerant sensor models. Can be added as Option -RBZ to other models.

ELECTRICAL

Power Requirement	16 - 30 VDC, 3 W*, Class 2 12 - 27 VAC, 50-60 Hz, 3 VA, Class 2 24V recommended. <i>Refer to Section 4.4 Wiring Connections</i> <i>*dependent on sensor type. Refer to Section 4.5 Power Draw Requirements</i>
Digital Wiring	VDC or VAC (ground referenced) four-conductor shielded 16 AWG stranded within conduit, network wiring (daisy-chain)
Analog Wiring	VAC (ground referenced) three-conductor shielded 18 AWG (or larger) stranded
Fuses	Automatic resetting thermal

INPUT/OUTPUT

Digital Output (CGAS-DP models)	Modbus® ID*: 100 (default, configurable) Baud rate: 19,200 (default, configurable)
Communication	Data bits: 8
Modbus® RTU (version 1.1b3)	Start bits: 1
RS-485	Stop bits: 1
	Parity: none, odd or even

Digital Output (CGAS-DP models) Communication BACnet® MS/TP (version 1 rev 14) RS-485	BACnet® MS/TP ANSI/ASHRAE standard 135 BACnet® Communication protocol: 135-2012 Baud Rate: 76,800 (default, configurable) Base Address: 270 (default, configurable) MAC Address*: 100 (default, configurable) Parity: no parity (default, configurable) Stop bits: 1 Data bits: 8 *100 is the default for transmitters only *101 increasing sequentially is the default for a system controller and transmitters
Analog Output (CGAS-AP models)	One Linear 4 - 20 mA output or jumper selectable 0-10, 2-10 volts, etc. output
Relay & Buzzer (Standard and Option -RBZ)	1 SPDT relay rated 30 volts, 2 amp max with internal buzzer rated 90 dB @ 10 cm / 4 in, enable/disable
Relay (Option -RLY)	1 SPDT relay rated 30 volts, 2 amp max
RH and Temperature (Option -RHT)	User selectable units (°C or °F), user selectable display or hide readings

ENVIRONMENTAL

Operating Temperature	0°C to 40°C / 32°F to 104°F (standard)
Operating Humidity	15 - 90% RH non-condensing
Pollution Degree	Degree 2
Altitude	below 2,000 m

CERTIFICATION

Model: CGAS-DP-XXX
S/N: CGASDP1909A0010

Model: CGAS-AP-XXX
S/N: CGASAP1909A0010

Rating: 16-30 VDC, 3W, Class 2
12-27 VAC, 50-60 Hz, 3VA, Class 2



CERTIFIED FOR ELECTRIC SHOCK & ELECTRICAL FIRE HAZARD ONLY. LA CERTIFICATION ACNOR COUVRE UNIQUEMENT LES RISQUES DE CHOC ELECTRIQUE ET D'INCENDIE D'ORIGINE ELECTRIQUE.

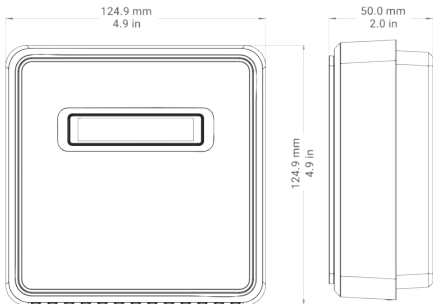
Conforms to: CSA-C22.2 No. 205-12, UL508 (Edition 18):2018

Conforms to: EMC Directive 2014/30/EU, EN 50270:2015, Type 1, EN61010

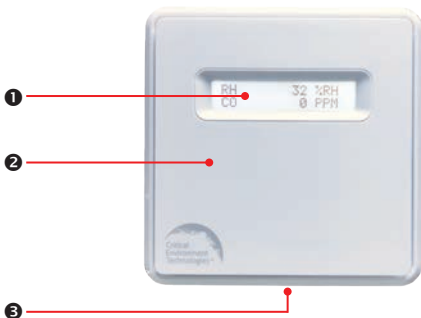
Conforms to: FCC. This device complies with part 15 of the FCC Rules,

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

3.3 Enclosure Dimensions

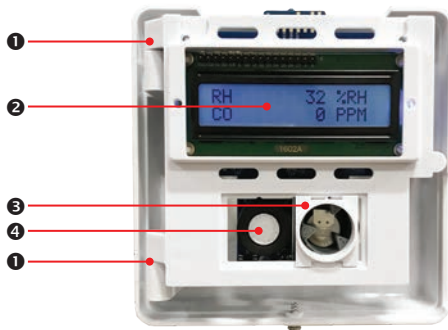


3.4 Exterior Enclosure



NUMBER	FEATURE	FUNCTION
1	Display	2-line by 16 character graphic LCD, user configurable
2	Removable front cover	Pull from bottom and push up to open and remove
3	Sensor Vents and Cover Screw	Vents allows gas diffusion into sensor and the screw secures the front cover

3.5 Enclosure with Front Cover Removed



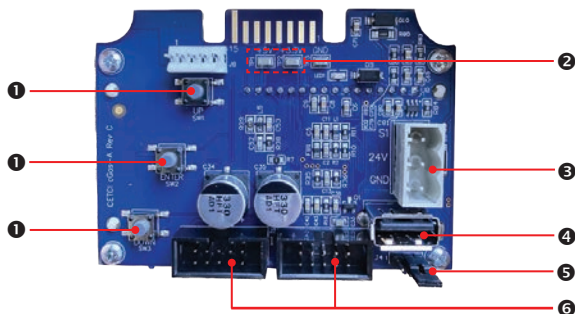
NUMBER	FEATURE	FUNCTION
❶	Hinge Assembly	Allows the interior board system to swing out to the left to see the other side to access push buttons and smart boards
❷	Display	2-line by 16 character graphic LCD, user configurable
❸	Sensor Opening	Shown with sensor installed. Dual gas channel configurations use a sensor in both openings. May also house an option smart board.
❹	Calibration Slide Adapter	Slides back and forth in front of the both sensor openings. Used to calibrate with the standard calibration adapter plug with O-ring and two zeroing port plugs.

3.6 Enclosure Bottom



NUMBER	FEATURE
1	Vents for diffusion of gas over sensor(s)
2	Screw that secures the front cover

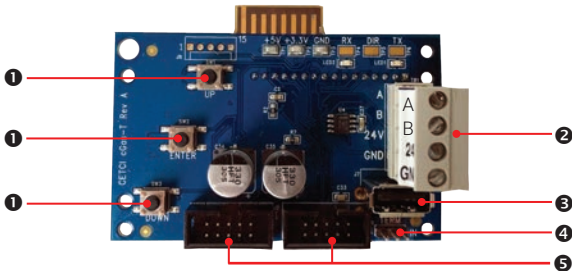
3.7 CGAS-AP Analog - Interior System Layout



NUMBER	FEATURE	FUNCTION
1	Programming Buttons	Access menu options and program functions using buttons inside the enclosure. (Arrow up, Enter, Arrow down)
2	Test Points: TP1 & TP2	For measuring voltage output

3	TB1 Wiring Terminal	Pluggable terminal for Power & signal output
4	USB Connection	For firmware and configuration upgrades
5	J4 Output Jumper	For changing analog output from current to voltage
6	Sockets for smart sensor board	The gas smart sensor board plugs into the main board using these sockets

3.8 CGAS-DP Digital - Interior System Layout



NUMBER	FEATURE	FUNCTION
1	Programming Buttons	Access menu options and program functions using buttons inside the enclosure. (Arrow up, Enter, Arrow down)

②	RS-485 Communication Terminals	Pluggable power and signal terminal for connection to controller and next transmitter.
③	USB Connection	For firmware and configuration upgrades
④	Termination Resistor	Network termination resistor. "IN" position includes 120 ohm resistor.
⑤	Sockets for sensors and Options boards	Sensor boards and Options boards plug into the main board using these sockets

3.9 Single Channel Gas Sensor Options

Internal 4 Series Electrochemical Sensors	Part Number		Range	Life Span
Carbon Monoxide (CO)	CGAS-DP-CO ¹	CGAS-AP-CO ¹	0 - 200 ppm	~3 yrs
Formaldehyde (CH ₂ O)	CGAS-DP-CH2O	CGAS-AP-CH2O	0 - 5 ppm	~3 yrs
Oxygen (O ₂)	CGAS-D-O2	CGAS-AP-O2	0 - 25% Vol	~3 yrs

Internal 7 Series Electrochemical Sensors	Part Number		Range	Life Span
Carbon Monoxide (CO)	CGAS-DP-7CO	CGAS-AP-7CO	0 - 200 ppm	~5 yrs

Internal Infrared Sensors	Part Number		Range	Life Span
Carbon Dioxide (CO ₂)	CGAS-DP-CO2-2K	CGAS-AP-CO2-2K	0 - 2,000 ppm	~8 yrs
	CGAS-DP-CO2-5K	CGAS-AP-CO2-5K	0 - 5,000 ppm	
	CGAS-DP-CO2-10K	CGAS-AP-CO2-10K	0 - 10,000 ppm	
	CGAS-DP-CO2-5%	CGAS-AP-CO2-5%	0 - 5% vol	
Carbon Dioxide (CO ₂)	CGAS-D-CO2-20%	CGAS-AP-CO2-20%	0 - 20% vol	~8 yrs
	CGAS-D-CO2-100%	CGAS-AP-CO2-100%	0 - 100% vol	
Refrigerants: R134A, R143A, R22, R32, R227ea, R402A, R404A, R407A, R407C, R407F, R410A, R417A, R422A, R422D, R427A, R434A, R438A, R442A, R448A, R449A, R450A, R452A, R453A, R454A, R454B, R455A, R507A, R513A, R514A, R1234YF, R1234ZE, R1233ZD				
	CGAS-DP-IR134A CGAS-DP-IR143A etc.	CGAS-AP-IR134A CGAS-AP-IR143A etc.	0 - 2,000 ppm	~5 yrs

Internal Solid State Sensors	Part Numbers		Range	Life Span
Refrigerants: R134A, R22, R32, R402A, R404A, R407C, R407F, R410A, R422A, R422D, R427A, R438A, R448A, R449A, R450A, R452A, R507A, R513A, R514A	CGAS-DP- SR134A CGAS-DP- SR410A etc.	CGAS-AP- SR134A CGAS-AP- SR410A etc.	0 - 2,000 ppm	~5 yrs
TVOC (Isobutylene)	CGAS-DP- STVOC	CGAS-AP- STVOC	0 - 500 ppm	~5 yrs
Internal Catalytic (Combustible) Sensors	Part Number		Range	Life Span
Methane (CH ₄)	CGAS-DP- CCH4-100	CGAS-AP- CCH4-100	0 - 100% LEL	~5 yrs
Propane (C ₃ H ₈)	CGAS-DP- CC3H8-100	CGAS-AP- CC3H8-100	0 - 100% LEL	~5 yrs
Internal PID Sensors	Part Number		Range	
TVOC	CGAS-DP-SPL	CGAS-AP-SPL	0 - 30 ppm	usage / application dependent
TVOC	CGAS-DP-SPH	CGAS-AP-SPH	0 - 300 ppm	
Other Sensors	Part Number			
Particulate sensor	CGAS-DP-PM	CGAS-AP-PM		

Relative Humidity and Temperature	CGAS-D-RHT
-----------------------------------	------------

No Internal Sensor	Part Number	
Add a remote ESH-B sensor	CGAS-DP-RD+ ESH-B-SR410A	CGAS-AP-RD+ ESH-B-SR410A

3.10 Dual Channel Gas Sensors (CGAS-DP only)

Two Internal Electrochemical Sensors (4 Series)	Part Number	Range	Lifespan
Carbon Monoxide (CO) and Infrared Carbon Dioxide (CO ₂)	CGAS-DP-CO-CO2-2K	0 - 200 ppm 0 - 2,000 ppm	~ 3 years ~ 8 years
Carbon Monoxide (CO) and Infrared Carbon Dioxide (CO ₂)	CGAS-DP-CO-CO2-5K	0 - 200 ppm 0 - 5,000 ppm	~ 3 years ~ 8 years
Carbon Monoxide (CO) and Infrared Carbon Dioxide (CO ₂)	CGAS-DP-CO-CO2-5%	0 - 200 ppm 0 - 5% vol	~ 3 years ~ 8 years
Infrared Carbon Dioxide (CO ₂) and Particulate sensor	CGAS-DP-CO2-2K-PM	0 - 2,000 ppm user selectable	~ 8 years

Infrared Carbon Dioxide (CO ₂) and Particulate sensor	CGAS-DP-CO2-5K-PM	0 - 5,000 ppm user selectable	~ 8 years
Infrared Carbon Dioxide (CO ₂) and Particulate sensor	CGAS-DP-CO2-5%-PM	0 - 5% vol user selectable	~ 8 years
Electrochemical Carbon Monoxide (CO) and Particulate sensor	CGAS-DP-CO-PM	0 - 200 ppm user selectable	~ 3 years

3.11 RH & Temperature Sensor (Option -RHT)

For analog CGAS-AP models with an internal gas sensor and the optional RH & Temperature sensor, the analog output default is the gas reading. Because the CGAS-AP is a single channel device (it has only one analog output), the RH and temperature readings are for display purposes only; there is no current output or signal back to a controller or BAS/DDC for RH or temperature readings.

For digital models the gas, RH and temperature readings can be sent to a controller or BAS/DDC via the Modbus® or BACnet® communication protocol.

4 INSTALLATION

4.1 Sensor Warm Up Time

Sensors go through a burn in period at our factory prior to shipping so they are ready for operation upon arrival, after a warm up period. The length of warm up time will depend on the type of gas, sensor type, environment, and other factors. As a general rule, CETCI suggests that upon power-up, all sensors be left to warm up for a minimum of 24 hours to stabilize before they can be considered to provide accurate gas readings.

Exceptions:

- After installing a cGas Detector with an Oxygen sensor, leave it to warm up for 2 to 6 hours before looking at the readings. If after a minimum of 24 hours the gas reading is not 20.9%, you should do a span calibration.
- If the cGas Detector is being installed in an environment that is greater than +/- 10 degrees from ambient (22°C (71.6°F) then a calibration should be done in that same temperature range.

Silicone, lead, paint fumes, solvents and chlorinated hydrocarbon vapours can poison catalytic sensors (ie. C3H8, CH4) and solid state sensors (SR410A, etc.)

All sensors are calibrated in the factory and should not require calibration at the time of a routine installation or replacement.

A bump test will help you determine if a sensor requires calibration. If the sensor still does not respond as it should after a successful calibration, it probably requires replacing.

4.2 Mounting the Transmitter

The cGas Detector should be installed, upright on a flat vertical surface using the two mounting key holes provided in the top and bottom of the base. The holes have been designed to line up with a junction box which typically comes with #6-32 screws. A large entry point is provided in back of the enclosure. Refer to Section 4.3 Enclosure Mounting Components. **Care should be taken to ensure that the vents of the cGas Detector are not obstructed in order to maximize the sensor's exposure to the environment being monitored. Do not mount the transmitter upside down, sideways, or flat on the floor or other surface.**

4.2.1 Wet Environment Considerations

The cGas Detector for public spaces is not designed for use in wet environments. The sensor venting will allow water to enter the enclosure.

4.2.2 EMI and RF Interference Considerations

All electronic devices are susceptible to EMI (Electromagnetic Interference) and RFI (Radio Frequency Interference). Our detectors have been designed to reduce the effects of these interferences and we meet CSA FCC and CE requirements for these type of devices. However there are still circumstances and levels of interference that may cause our equipment to respond to these interferences and cause them to react as if there has been gas detected.

There are some installation procedures that will reduce the likelihood of getting faulty readings:

1. Locate the detectors and controllers out of the way from normal foot traffic and high energy equipment.
2. Inform operators and technical staff working in the surrounding area to be aware of these possible conditions and that two way radios, Bluetooth enabled devices, cell phones and other electrical equipment may interfere with the response of the gas detectors.

4.2.3 Mounting Heights (sensor and application dependent)

The gas detector needs to be mounted where it will best detect the target gas. Some applications may require some adjustments, but generally speaking, the mounting height will depend on the density of the target gas relative to air.

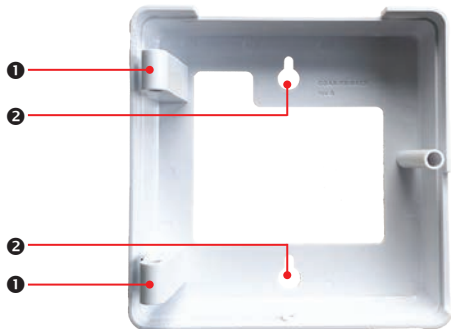
Heavier than air gases fall towards the floor and collect in low lying areas requiring the gas detector to be mounted 6 in / 15 cm from the floor. Lighter than air gases float upwards and collect at the ceiling. Lighter than air sensors should be placed on or near the ceiling. Gases that have a density close to that of air should have the sensors installed in the breathing zone. The breathing zone refers to the area 1.2 - 1.8 m / 4 - 6 ft from the floor, where most human breathing takes place. This is a good default location for sensors, as many gases are often well dispersed in air.

Typical Mounting Height by Gas:

GAS TYPE	MOUNTING HEIGHT	COVERAGE (ft²)	COVERAGE (m²)
Carbon Dioxide (CO ₂)	breathing zone	3000	279
Carbon Monoxide (CO)	breathing zone	5000 - 7500	465 - 697
Methane (CH ₄) (combustible)	on or near the ceiling	5000	465
Formaldehyde (CH ₂ O)	breathing zone	3000	279
Oxygen (O ₂)	breathing zone	5000	465
Freon refrigerants	12 in (30 cm) from floor	3000	279
TVOCs	target gas dependent	3000	279

For monitoring refrigerant gas with the remote dongle sensor, place the sensor as close to the potential leak area as possible. The maximum length of wire between the remote sensor and the cGas Detector should not exceed 50 ft (15 m). For monitoring refrigerant gas with an internal sensor, place the cGas Detector as close to the potential leak area as possible, taking into consideration that refrigerants are heavier than air and will concentrate closer to the floor and in areas with less air current.

4.3 Enclosure Mounting Components



NUMBER	FEATURE
1	Hinge receptacle for interior board.
2	Mounting Key Holes 8.25 cm / 3.25 in apart

4.4 Wiring Connections

The cGas Detector transmitter is a low voltage powered device. Any application of operating voltages higher than indicated in the specification may result in damage. Double check wiring connections prior to powering the transmitter. Damage from incorrect wiring connections or from too much voltage applied is not covered under warranty.

The cGas Detector Transmitter can operate on both 24 VAC and 24 VDC.

During installation, care needs to be taken to make sure that the grounding is consistent. The problem isn't powering the transmitter but ensuring reliable communication. If grounds are inconsistent, communication signals vary from one device to another, leading to potential data corruption and system malfunction.

In a 24 VAC system, if multiple small VA transformers are used without tying the grounds together properly, the system can experience inconsistent grounding. This leads to issues because the communication chips output signals are based on their transmitter's ground. When these grounds are not uniform, the signal references differ, causing data corruption.

When using 24 VDC, installers tend to naturally connect all grounds together, ensuring consistent grounding across the system. This reduces the risk of communication issues. Additionally, using a 4-conductor cable often includes a dedicated wire for grounding, further improving reliability.

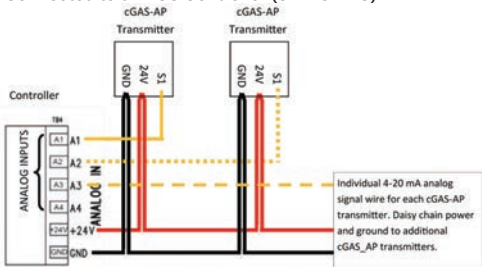
For large jobs (30+ cGas transmitters) that are not connected to a CET Controller and Remote Power Supplies, we recommend using 4 conductor wiring and 24 VDC power supplies to provide a consistent ground.

4.4.1 CGAS-AP Analog Wiring Connections

Signal output and supply should be in shielded cable. The cable shield should be connected to earth ground at the controller/power supply that is providing power for the cGas.

If the analog cGas Detector is connected to an FCS, the supply voltage will be supplied by the FCS and if required, additional power can be supplied by RPS-24VDC Remote Power Supply devices. In an analog configuration, a dedicated 4-20 mA signal wire is connected to each transmitter and only the ground and power wires are daisy chained.

CGAS-AP Connected to an FCS Controller (3-wire VDC)



If the analog cGas Detector is being connected to a BAS, DDC or other control panel then either a 24 VDC power supply or 24 VAC Class 2 or better transformer need to be used.

In all cases the voltage supply to the analog cGas Detector should never drop below 16 VDC or 12 VAC.

NOTE: WARRANTY VOID IF SOLID-CORE WIRE IS USED AT THE WIRING TERMINAL STRIP.

When using solid core wiring for distribution (in the conduit), use stranded wire pigtails 18 AWG within the enclosure to connect to the circuit board. The rigidity of solid-core wire can pull a soldered terminal strip completely off a circuit board and this will not be covered under warranty.

4.4.2 CGAS-AP Analog Wire Gauge vs Run Length

The table below shows the **maximum cable length between the analog cGas Detector and the Controller** for normal installations (a separate signal line from the controller for each cGas Detector is required).

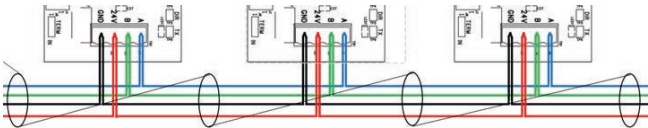
SUPPLY VOLTAGE	MAXIMUM LOAD (Wire + Termination Resistor) (ohms)	WIRE GAUGE (awg)	MAXIMUM CABLE LENGTH (feet)
24 VDC	592 (assume a 500 Ω termination resistor)	18	7,100
		16	10,700
		14	20,000
16 VDC	216 (assume a 200 Ω termination resistor)	18	1,200
		16	1,800
		14	3,500
24 VAC	1,060 (assume a 500 Ω termination resistor)	18	43,200
		16	65,500
		14	100,000
12 VAC	316 (assume a 200 Ω termination resistor)	18	8,900
		16	13,583
		14	25,000

NOTE: The termination resistor could be as high as 500 Ω (10 volt measurement at 20 mA). A poor quality 24 VAC transformer might supply as little as 14 volts at low line conditions.

4.4.3 CGAS-DP Digital Wiring Connections

All wiring should be run in EMT (or better) conduit properly earth grounded. All communications (network) wiring must be in shielded cabling. Wire shielding must be connected together at each device and taped off so it cannot cause a short on the circuit board when the door is closed. The wiring shield should be connected to ground only at the controller, have a contiguous connection throughout the network and be left taped and floating at the last device in the network. **CETCI recommends 4 conductor, 16 AWG, shielded stranded wire cable types like AlphaWire 79220, Belden 5202FE 008500 or equivalent.**

To ensure robust data communications, a daisy chain wiring configuration must be used. No tee taps. No star configurations. This means, four wires run from one end of the digital network to the other, through the same connections along the entire run. From one digital device to the next digital device, A goes to A; B goes to B; GND goes to GND; 24V goes to 24V. Do not mix up the individual wires or the two groups of four wires.

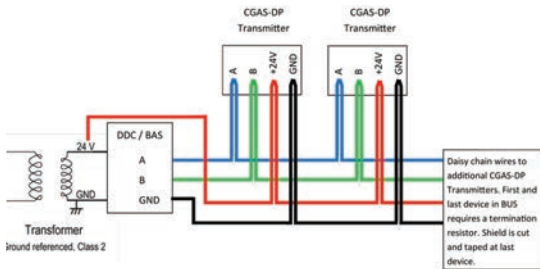


An end of line jumper must be installed at both ends of the digital network. To terminate, you must place a 120 ohm resistor on the IN (or sometimes labelled EN) termination jumper position ON the TERM jumper on the FIRST DIGITAL DEVICE (which might not be the Controller) and the LAST DIGITAL DEVICE in the wire run. The termination resistor jumper on all other digital devices in the network should be in the disabled position. Every CETCI digital device has a termination resistor jumper. The factory default setting of the termination resistor on all digital devices disabled.

The wiring should be 4-conductor shielded 16 awg stranded within conduit in a network wiring (daisy-chain) configuration. Suggested 4-conductor, 16 AWG, shielded stranded wire cable types are AlphaWire 79220, Belden 5202FE 008500 or equivalent.

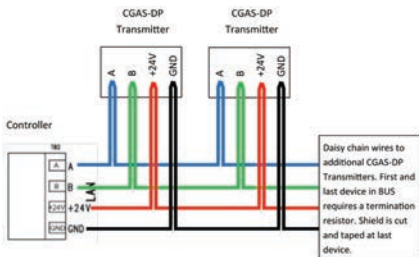
Wiring Example: 4-Wire VAC (CGAS-DP)

If the digital cGas Detector is being connected to a BAS, DDC or other control panel then either a 24 VDC power supply or 24 VAC Class 2 or better transformer needs to be used.



Wiring Example: 4-Wire VDC (CGAS-DP)

If the digital cGas Detector is being connected to an FCS the supply voltage will be supplied by the FCS and any additional power requirements of the system will be supplied by RPS-24VDC Remote Power Supply devices.



4.4.4 CGAS-DP Digital Wire Gauge vs Run Length

It is important to use the appropriate gauge of wire for the required length of the run to ensure sufficient available voltage, noise reduction, dissipation of heat, and overall optimum performance along the entire wire run. Large wire sizes will have less voltage drop than smaller wire sizes of the same length. Similarly, shorter wire lengths will have less voltage drop than longer wires for the same wire size. The longer the wire run, the more attention there should be made to preventing voltage drop. The addition of an RPS-24VDC Remote Power Supply may be required.

CETCI strongly recommends a 4-conductor, 16 AWG, shielded, stranded wire cable type such as AlphaWire 79220, AlphaWire 5534, Belden 9954 or equivalent.

NOTE: When wiring transmitters or the FCS WAN to a third party controller / control panel / BAS / DDC and there is a discrepancy between CETCI's recommended wire gauge and the third party specifications, we recommend following the recommendations of the third party.

NOTE: WARRANTY VOID IF SOLID-CORE WIRE IS USED AT THE WIRING TERMINAL STRIP.

When using solid core wiring for distribution (in the conduit), use stranded wire pigtailed 14 - 18 AWG within the enclosure to connect to the circuit board. The rigidity of solid-core wire can pull a soldered terminal strip completely off a circuit board and this will not be covered under warranty.

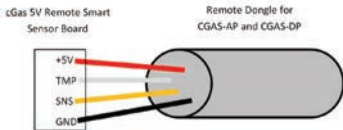
Cable Length, Size (AWG) and Maximum Number of Sensors for Digital Communication and Power Supply between the cGas Detector and the Controller:

Cable Length		# of Sensors	4	6	8	10	12	14	16
Meters	Feet								
0 - 152	1 - 500	AWG #	18	18	18	18	18	18	18
153 - 305	501 - 1,000	AWG #	18	18	18	18	18	18	18
306 - 457	1,001 - 1,500	AWG #	18	18	18	16	16	16	16
458 - 914	1,501 - 3,000	AWG #	18	16	16	16	16	16	16

In large system applications, if the recommended maximum cable length needs to be exceeded, an LNK-XT Network Extender can be used to boost the decreasing signal strength. One LNK-XT extends the network length up to an additional 914 m (3,000 ft). It is recommended that an LNK-XT be installed when a drop in signal strength is detected.

4.4.5 Wiring the Remote (Dongle) Refrigerant Sensor to the Remote 5V Smart Sensor Board

The refrigerant sensor is socketed into a conduit fitting that is connected to a 9 m / 29.5 ft length of cable. The cable then connects to the cGas 5V Remote Smart Board. The connection is made in the field during installation.



4.4.6 Wiring the Relay (if installed)

The cGas does not provide any power from the relay terminal.

The relay is single pole, double throw thereby providing one set of usable dry contacts for the relay. A dry contact relay operates like a switch to simply activate (switch on) or de-activate (switch off) equipment to be controlled, such as a remote horn and fan starters.

If the relay and buzzer are installed, the SPDT dry contact relay is rated 30 volts, 2 amps max and the internal buzzer is rated 90dB @ 10 cm / 4in.

cGas sensors that come standard with relay and buzzer:

- 7 series electrochemical toxic gas sensors
- IR refrigerant gas sensors

cGas models that **do not** come standard with a relay and buzzer. If a relay and buzzer is required, you must add **Option RBZ**:

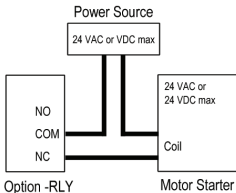
- 4 series electrochemical toxic gas sensors
- Combustible (catalytic) gas sensors

- CO2 gas sensors
- Solid state refrigerant gas sensors
- PID TVOC gas sensors

If only a relay is needed, **Option RLY** can be added to a single channel model with a:

- 4 series electrochemical toxic gas sensor
- Combustible (catalytic) gas sensor
- Solid state refrigerant gas sensor
- PID TVOC gas sensor

The cGas Detector is designed to be fail-safe. Equipment to be controlled by the relay should be wired to the "NC" (Normally closed) and "COM" (Common) terminals. With this wiring, the connection will be open under normal, low gas concentration conditions. When the gas concentration rises to the configured alarm point or if there is a power failure, the relay NC connection will close to the relay COM. The relay coils are normally energized in a non-alarm state for failsafe operation. Refer to *cGas Detector Public Spaces Operation Manual* for more information on the operation of the relay.



4.5 Power Draw Requirements

CGAS MODEL	PEAK POWER CONSUMPTION
CGAS-AP-CO	1.68 watts
CGAS-DP-CO	1.2 watts
CGAS-AP-CO2	1.8 watts
CGAS-DP-CO2	1.5 watts
CGAS-AP-PM	2.5 watts
CGAS-DP-PM	1.6 watts
CGAS-AP-RD + ESH-B-SR refrigerant	2.6 watts
CGAS-DP-RD + ESH-B-SR refrigerant	2.1 watts
CGAS-AP with internal solid state or catalytic sensor	2 watts
CGAS-DP with internal solid state or catalytic sensor	1.5 watts
CGAS-AP-IR refrigerant sensor	2.3 watts
CGAS-DP-IR refrigerant sensor	1.8 watts
CGAS-DP-CO-CO2	1.9 watts
CGAS-DP-CO2-PM	1.9 watts
CGAS-DP-CO-PM	1.7 watts
Add to Peak Power Consumption if installed:	
CGAS Buzzer + Relay (Option -RBZ)	0.7 watts
CGAS Relay (Option -RLY)	0.15 watts

5 BASIC SYSTEM OPERATION

The cGas Detector is a low maintenance, continuous gas monitoring device that offers flexible customization options with the purpose of meeting your specific application and budgetary requirements. It is ideal for use where integrated demand controlled ventilation (DCV) is used for air quality and energy savings; for continuous monitoring of refrigerants where high-efficiency, high volume refrigerant cooling and heating systems (VRF) are used to keep the indoor environment comfortable and for other continuous monitoring of hazardous gases in publicly frequented areas. It can be connected to a controller (FCS, cGas-SC), a control panel or a BAS / BMS / DDC system. If the relay and buzzer is installed, the cGas Detector can operate as standalone device.

NOTE: For functions that do not appear in this section, refer to the *cGAS Detector Public Spaces Operation Manual*.

Upon application of power to a cGas Detector shipped from the factory, the LCD display will turn on and rotate through several info screens that differ depending on the configuration of the transmitter. The warm-up period takes between 2 and 5 minutes depending on the gas sensors type.

The cGas Detector will be visible on the controller / BAS / DDC system during the warm-up countdown and will output a default value to prevent alarms. The accurate reading will show up when the unit has finished the warm-up period and the sensor(s) has stabilized.

All alarms will be disabled during the system warm-up period. After the warm-up period, the system may exhibit gas alarm condition(s) if one or both of the sensors has not completely stabilized during the warm up period. This is normal and the length of time the gas alarms exist is dependent upon the length of time since the unit was last powered up, and the state of the environment it is installed in. Refer to *Section 4.1 Sensor Warm Up time* for more information.

Upon power-up, all sensors* should be left to warm up for 24 hours prior to considering the gas readings to be accurate.

*except, Ammonia, which should be left to warm up for 48 hours.

NOTE: All sensors are calibrated in the factory prior to shipping and should not require calibration at the time of a routine installation or replacement.

5.1 General Info Screens

Pressing the UP or DOWN buttons during normal operation allows you to scroll through a series of information screens showing the model name and firmware version; the gas type and AD counts; the communications ID number, gas type and gas level; and temperature and relative humidity (if option -RHT is installed).

5.2 Navigating the Menu Structure

The three programming push-buttons inside the enclosure are used to navigate through the cGas Detector menu structure. Refer to Sections 3.7 & 3.8 *Interior System Layout* for location photo.

Push-Button Operation

The UP and DOWN buttons are used to scroll through screens, menus or setting choices depending on the screen displayed. The ENTER button is used to initiate menu operation, choose a setting or confirm a choice depending on the screen displayed.

Numeric Entry

On any screen where a number will be directly entered (such as passcode entry) the following operation applies. Numbers are entered left to right 1 digit at a time with an underline/cursor indicating the digit currently being edited. Use the UP/DOWN buttons to change the currently selected digit. Press ENTER to move to the next digit. Except for where you enter the passcode, all other settings requiring numeric entry will be followed with a Yes/No confirmation once the

entire number is entered in case any mistakes were made.

5.2.1 Accessing the Menu with Passcodes

From any normal operation screen press ENTER to bring up the passcode entry screen. Enter one of the following passcodes using the Numeric Entry method described in the previous section.

- Service Passcode: 2020
- Admin Passcode: 2019

NOTE: Service Passcode 2020 is ideal for service technicians or anyone who only needs quick access to Testing and Calibration.

The CGAS menu structure is broken into the following 3 levels:

- Top Menu
- Parent Menu
- Menu Items

The Top Menu will allow you to choose a Parent Menu that lists specific settings and operations that you want to access. For example, Testing, Calibration, Alarm, Relays, etc. Navigate to the desired Parent Menu and press ENTER.

Once in a Parent Menu a list of available Menu Items are shown. Each Menu Item will have a title on the top line and the current setting on the bottom line. Use the UP/DOWN buttons to scroll through the available Menu Items. The currently displayed items will depend on your device's configuration as well as the currently selected channel or relay.

Pressing ENTER on any Menu Item screen will add a > to the bottom line. This indicates that you are now able to change the setting. Use the UP/DOWN buttons to change the value and ENTER to select. Once a selection is made the > will disappear indicating that you are back in the Parent Menu.

NOTE: After 5 minutes of inactivity in any of the menus, the display will return to the normal operation.

5.3 Display Settings

The LCD display can display up to 2-lines of 16-characters. After warm-up and upon normal operation, the display will show the current gas level reading for each channel that it has been configured. Pressing the UP or DOWN buttons allows you to scroll through a series of information screens showing the model name and firmware version; the gas type and AD counts; the communications ID number, gas type and gas level; and temperature and relative humidity (if option -RHT is installed).

5.3.1 Adjust Display Brightness

The brightness of the display can be changed in increments of 10. The factory default is full brightness (100). You cannot enter a number higher than 100. Entering a value of 0 turns the backlight off completely but with ambient light the text can still be read on the display.

Enter passcode 2019 and press the ENTER button.

Enter Passcode 2019

Navigate to the Display parent menu and then to the Brightness menu item.

Choose Menu >Display	Brightness 100
-------------------------	-------------------

Enter the numeric value as desired and press ENTER.

Brightness >050	Brightness 50
--------------------	------------------

5.3.2 Display Configurations

The factory default display setting is Normal, which displays the gas type, gas reading and gas units for CH1. The information can be reduced to just the gas type by changing the setting to the minimal mode display.

Normal	Minimal
CO2 536 PPM	CO2

Enter passcode **2019** and press the ENTER button.

Enter Passcode 2019

Navigate to the Display parent menu and then to the Display Type menu item and press ENTER.

Choose Menu >Display	Display Type Normal
-------------------------	------------------------

Choose the preferred display setting and press ENTER.

Display Type >Minimal	Display Type Minimal
--------------------------	-------------------------

5.4 Alarm Status, Fault Detection and Communication Failure Alerts

If a channel is in alarm, the following letters will be displayed at the end of the line for that channel.

- low for low alarm
- mid for mid alarm
- high for High alarm

CO2 800 low	CO2 1000 mid	CO2 1200 high
----------------------------------	-----------------------------------	------------------------------------

The cGas Detector has built in fault detection, and in the event of a problem with the measurement circuitry the transmitter will indicate a fault condition on the display. Normal operation will resume once the fault condition has been corrected. For a list of Fault Codes, refer to *Section 6 Troubleshooting*.

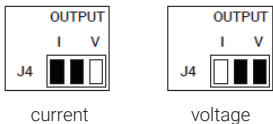
NOTE: If a question mark ? is displayed, the system is reading slightly negative but not enough to adversely affect the alarm functionality; a re-zeroing is recommended.

5.5 Change Analog Output (Milliamps - Voltage) (CGAS-AP only)

The factory default analog output for the cGas detector is 4-20 mA. The analog output can be changed to voltage in the field.

Begin by moving the Output Jumper on jumper bank J4. It is located on the bottom right corner of the main circuit board from I to V. Refer to Section 3.7 *Interior System Layout* for location photo.

The black area in the following image represents the positions of the jumper for current and voltage.

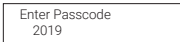


5.5.1 Set the Analog Output Type

The factory default analog output type is current. The analog output type can be changed from current to voltage and vice versa in the field.

NOTE: Make sure the jumper is in the correct position for the output you are choosing.

Enter passcode 2019 and press the ENTER button.



Navigate to the Analog Outputs parent menu and press ENTER.

Choose Menu
>Analog Outputs

Navigate to the Set AO Type menu item and change the Current (mA) to Voltage (V). Press ENTER.

Set AO Type
>Current (mA)

Set AO Type
>Voltage (V)

If you want 0-10 volt output, you are finished. If you want 2-10 volt output or other values you need to set the analog output range. Refer to Section 5.5.2 Set the Analog Output Range.

5.5.2 Set the Analog Output Range

The factory default analog output for the cGas detector is 4-20 mA. The default voltage output value is 0-10 volts. The output range can be changed, for example to 0-20 mA or 2-10 volts. The maximum level of output for voltage is 10 volts and the maximum for current output is 23 mA.

Enter passcode 2019 and press the ENTER button.

Enter Passcode
2019

Navigate to the Analog Outputs parent menu and press ENTER.

Choose Menu
>Analog Outputs

Navigate to Set AO Zero menu item. Press ENTER and enter the value as required.

Set AO Zero
>0

Set AO Zero
>02.0 V

Press ENTER to confirm the value is correct.

Confirm? N
>02.0 V >Y

Navigate to Set AO Range menu item. Press ENTER and enter the value as required.

Set AO Range
>10

Set AO Range
>08.0 V

Press ENTER to confirm the value is correct.

Confirm? N
>08.0 V >Y

Set AO Range
8.0 V

The Set AO Zero value is the current or voltage at which the device signals no (zero) gas. The Set AO Range value is the current or voltage at which the device signals maximum gas.

5.6 Change Units °C or °F Temperature Readings

NOTE: This menu item only applies if the cGas Detector has the -RHT option installed.

You can change the factory configured temperature unit type from Celsius to Fahrenheit (or vice versa) very easily.

Enter passcode 2019 and press ENTER.

Enter Passcode
2019

Navigate to the Calibration parent menu and then to the Selected Channel menu item.

Choose Menu
>Calibration

Make sure Temperature is selected and navigate to the Temperature Unit menu item and press ENTER.

Selected Channel
CO2

Selected Channel
>Temperature

Change the value to the desired unit type and press ENTER.

Temperature Unit
>Celsius

Temperature Unit
Fahrenheit

NOTE: All settings for the Temperature channel will automatically update to the equivalent value in the chosen unit. For example: an alarm point of 0°C will change to 32°F.

5.7 Temperature and / or Relative Humidity Offset

NOTE: This menu item only applies if the cGas Detector has the -RHT option installed.

NOTE: Depending on the configuration, the device will show the temperature in either Celsius or Fahrenheit. The units can be changed at any time, refer to Section 5.6 *Change Units (°C or °F) of Temperature Readings*.

The temperature and relative humidity sensor are calibrated prior to shipping. If the readings on the cGas Detector are higher or lower than another device measuring the ambient temperature or relative humidity, you can adjust the reading by setting an offset value so the reading is more accurate. The Temperature offset value is a number of degrees in either direction of 0 and the Humidity offset value is a percentage between 0 and 100.

Enter passcode 2019 and press ENTER.

Enter Passcode
2019

Navigate to the Calibration parent menu and then to the Selected Channel menu item.

Choose Menu
>Calibration

Make sure Temperature (or Humidity) is selected and navigate to the Temperature Adj (or Humidity Adj) menu item and press ENTER.

Selected Channel
CO2

Selected Channel
>Temperature

Selected Channel
>Humidity

Enter the desired offset value and press ENTER.

Temperature Adj >-4.0 degC	Humidity Adj >+02 %RH
-------------------------------	--------------------------

Press ENTER to confirm the value is correct.

Confirm? N >-4.0 degC >Y	Confirm? N >+2 %RH >Y
-----------------------------	--------------------------

5.8 Test Functions

Use the test functions to make sure the connection and configured responses are working as expected.

5.8.1 Test Analog Output (CGAS-AP only)

Testing the analog output allows you to determine if the installation was successful. The test forces the cGas Detector to output a predetermined signal to the controller or DDC/BAS to test that the correct signal is being transmitted and the controller responds as configured (ie. if analog output is configured for VFD control, the fans operate as expected).

NOTE: The factory configured default entry is 4 mA. If the analog output type has been changed to voltage, the default entry is 0.0 volts.

NOTE: The minimum and maximum output values are 0 to 30 mA (or 0 to 10 volts).

Enter passcode 2020 and press ENTER.

Enter Passcode 2020

Navigate to the Testing parent menu and then to the Test AO menu item and press ENTER.

Choose Menu >Testing

Enter the desired value and press ENTER.

Test AO 4.0 mA	Test AO >14.0 mA
-------------------	---------------------

Press ENTER to confirm the value is correct.

>14.0 mA	Confirm? N >Y	Test AO 14.0 mA
----------	------------------	--------------------

The test will start as soon as you press ENTER to confirm. To stop the test, press the UP or DOWN button. To test another analog output value repeat the process by pressing ENTER.

5.8.2 Test Digital Output (CGAS-DP only)

For each gas channel, you can manually enter a gas reading value of your choice (within the range of the sensor) that will be sent over the digital network to test the connection and configured responses between the cGas Detector and the DDC/BAS. You can do the same for relative humidity and temperature if the -RHT option is installed.

Enter passcode 2020 and press ENTER.

Enter Passcode 2020

Navigate to the Testing parent menu and then to the Selected Channel menu item and press ENTER.

Choose Menu >Testing

Confirm the correct channel is showing. The list to choose from will depend on how many channels there are and what options are included:

- Gas Type (ie. CO)
- Gas Type (ie. CO2)
- Temperature
- Humidity

Selected Channel
CO

Selected Channel
>CO2

Enter the desired value and press ENTER.

Test Reading
0 PPM CO2

Test Reading
>1000 PPM CO2

Press ENTER to confirm the value is correct.

Confirm? N
>1000 PPM CO2 >Y

Test Reading
1000 PPM CO2

The test will start as soon as you press ENTER to confirm. To stop the test, press the UP or DOWN button.

5.8.3 Test Relay and / or Buzzer (if installed)

NOTE: Before testing the relay, notify the appropriate people so unnecessary distress or response is not caused by activating fans or equipment or inadvertently calling the fire department or other emergency response team.

Enter passcode 2020 and press ENTER.

Enter Passcode
2020

Navigate to the Testing parent menu and then to the Selected Relay menu item and press ENTER.

Choose Menu
>Testing

If you want to test the relay, make sure the relay item is chosen. Change the value to the buzzer item if that is what you want to test.

Selected Relay
Left SB Relay

Selected Relay
>Left SB Buzzer

Navigate to the Test RLY menu item change Untripped to Tripped and press ENTER. You will hear a soft click and the relay will activate accordingly, respecting its failsafe setting. Or the internal buzzer will sound if you are testing the buzzer.

Test RLY: LSB RLY
Untripped

Test RLY: LSB RLY
>Tripped

To stop the relay test change the value to Untripped. You will hear a soft click and the relay will deactivate or the buzzer will go quiet.

Test RLY:
>Untripped

6 TROUBLE SHOOTING

cGas Detector won't power up. (blank display)

Is the power properly connected? Check the wiring connections. Refer to Section 4.4 *Wiring Connections*.

Display shows "SPAN FAULT" message.

Check all connections and possible interferences and try a complete calibration procedure from the beginning again to see if this corrects the fault. If a second calibration does not resolve the fault then the sensor needs to be replaced. Check to make sure the gas cylinder isn't empty.

Frequent, unexpected alarm signal sent to BAS/DDC.

Check to see if EMI and RF interference is causing the equipment to react this way. Refer to Section 4.2.2 *EMI and RF Interference Considerations* for more information.

Display shows "COMM" message. Modbus® or BACnet output signal has not been connected properly; will also occur if no requests are being made from the controller to the transmitter, ie addressing is not proper. Check the wiring connections and the network settings.

Device cannot be seen by the Controller and/or the BAS / DDC on the Modbus® network. Check the Baud rate. All devices in the network must have the same Baud rate.

- Check that local area network wiring is correct, especially the A and B lines to make sure they are not swapped between devices on the network.
- Check the Modbus® ID. Each device must have a unique ID assigned to it.

Device cannot be seen by the Controller and/or the BAS / DDC on the BACnet® network.

- Check the Baud rate. All devices in the network must have the same Baud rate.
- Check to make sure the device has a unique ID assigned to it, the factory default is made up of the MAC ID and the Base ID.
- Check that local area network wiring is correct, especially the A and B lines to make sure they are not swapped between devices on the network.

Error Codes. The error code will appear on the display in place of the units for a channel.

List of Possible cGas Error Codes: The error code will appear on the display in place of the units for a channel. See the resolutions provided in the List of Possible cGas Error Codes.

List of Possible cGas Error Codes

Code		Description
		The controller or BAs has not read the current gas concentrations in more than the preset time (default 5 minutes).
COMM	Communication Fault	<p>Could be an address Miss-matched between cGas and controller / BAS. MAC value on MODbus or MAC value or Device ID on BACnet</p> <p>Check for wiring problems. A and/or B wires broken at somewhere in the network or ground connection between cGas & controller / BAS (using cable shield as ground is not recommended).</p>
F01	Negative Fault Reading	Check to make sure the smart sensor board is present and installed properly in the socket. If installed, the cGas detects the sensor signal is too far below its zeroAD. May be caused by a sensor that is temperature or humidity sensitive or the device wasn't warmed up for a minimum 24 hours. After an appropriate warm up period, zeroing the sensor will normally resolve this.
F03 F07 F11 F12	Sensor Faults	cGas cannot communicate with the sensor. Ensure the smart board is installed correctly. If unresolved, contact our Technical Support Department.

F02 F04 F09 F20	Smart Board Faults	Ensure the smart board is seated properly and installed on the correct side (left) if a single channel unit. If a power cycle does not resolve this, replace the sensor smart board.
F05	Error in reading Smart Board	cGas detected an error in the smart board ID. Use "Write to Sensor" for the indicated channel.
F06	SB ID Mismatch	Firmware expected a different smart board than what is in the sensor socket.
F07	RH & Temp Fault	cGas cannot communicate with the sensor. Ensure the smart board is installed correctly. If unresolved, contact our Technical Support Department
F08	DAC COMM	This is a hardware fault. Contact our Technical Support Department.
F30	AO DAC is not responding	cGas has detected a problem with its configuration or analog output (4-20 mA) a main board replacement may be required. Contact our Technical Support Department.
F80-99	Internal Memory Faults	The cGas has detected a configuration mismatch between cGas and installed sensors. Contact our Technical Support Department.

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