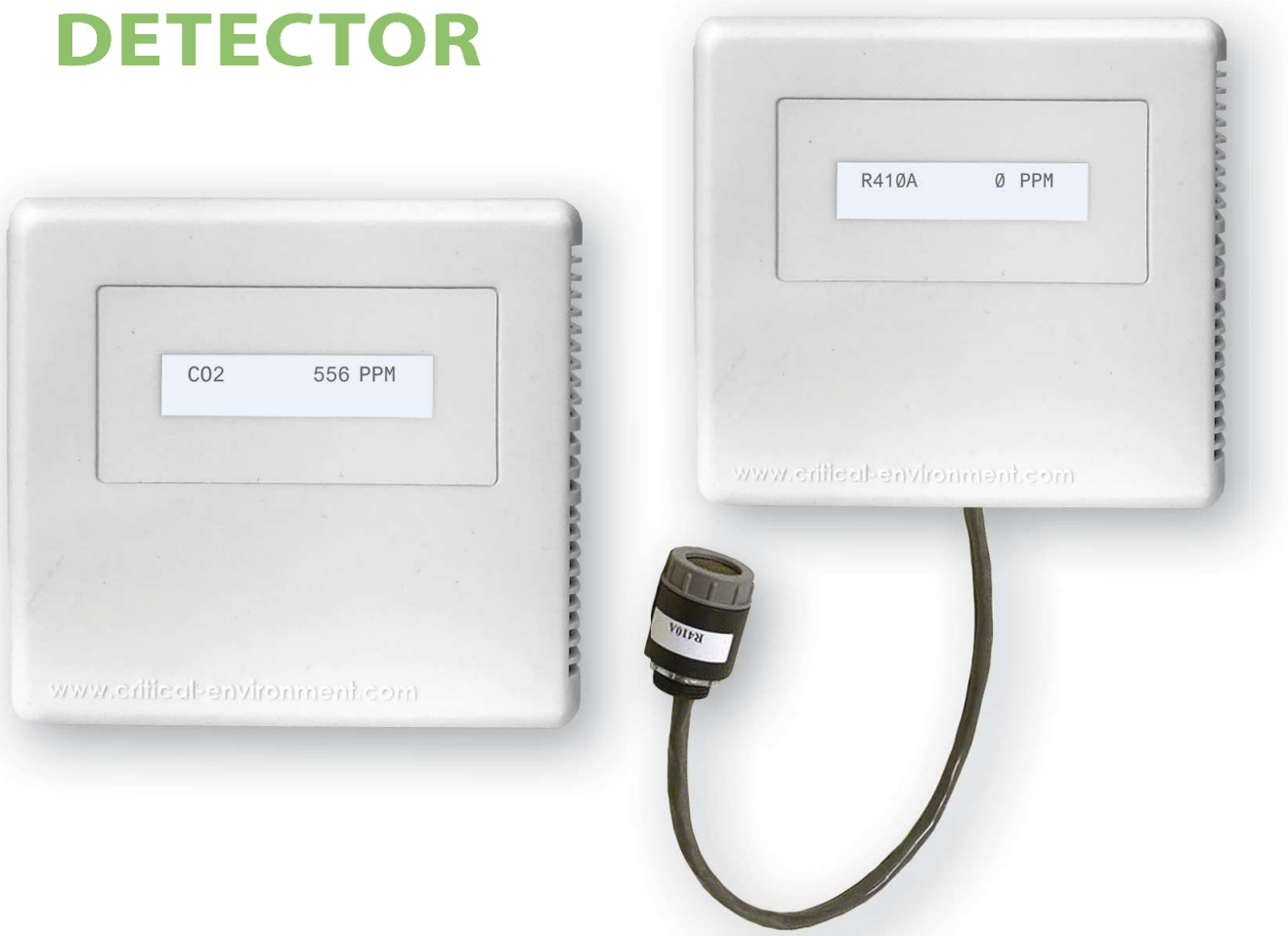
Critical Environment Technologies™

Installation Manual

For Indoor Public Spaces

cGas™ DETECTOR



Rev. A | 2019.10

CGAS-AP & CGAS-DP Transmitters

www.critical-environment.com

NEED MORE INFORMATION?

This is the **Installation Manual** for the cGas Detector models CGAS-AP and CGAS-DP for indoor public spaces.

The **Operation Manual** can be downloaded/viewed on our website: https://www.critical-environment.com/media/download/manuals/CGAS-AP-and-CGAS-DP-Operation-Manual.pdf

Or scan this QR code to open the pdf version of the manual:

The Operation Manual includes:

- Adjusting Display Settings
- Alarm Status, Fault Detection and Communication Failure Notifications
- Setting Channel Alarm Setpoints, Direction and Hysteresis
- Relay Operation
- Enable/Disable Channels
- How to Install a Replacement Smart Sensor
- How to Add a New Smart Sensor
- Calibration
- Accessories
- Maintenance
- Troubleshooting

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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. (the manufacturer) warrants this gas monitoring instrument, (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**. The sensors have a warranty period of **one year on a pro-rated basis from the date of purchase from our facility**. This warranty is limited to the mechanics of the physical sensor components and as such, should the sensor become defective within this warranty period, we will repair or replace it at our discretion. This warranty does not extend to sensors that have been poisoned by external compounds such as, but not limited to, extreme gas concentrations, paint fumes, excessive dust, debris, etc. or to sensors that have been improperly zeroed, calibrated or altered in any way. If it is determined **within 90 days of purchase** that a sensor is malfunctioning or unable to remain calibrated due to no fault of its placement or treatment, the instrument may be sent back to the factory for a free calibration service.

The warranty status may be affected if the instrument has not been operated, calibrated or maintained as per the instructions in the instrument's Operation Manual or if the instrument has been abused, damaged or altered in any way. This instrument is only to be used for purposes stated herein. The manufacturer is not liable for auxiliary interfaced equipment or consequential damage.

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.

All goods must be shipped to the manufacturer by **prepaid freight**. All returned goods (whether under warranty or not) must be pre-authorized by obtaining a return merchandise authorization (RMA) number. Contact the manufacturer for an RMA number and the procedures required for product transport.

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 must be accompanied with an RMA number.

If CETCI is to do the repair work, you may send the instrument, prepaid, to:

Attention: Service Department
Critical Environment Technologies Canada Inc.
Unit 145, 7391 Vantage Way
Delta, BC, V4G 1M3

Always include your Returned Merchandise Authorization (RMA) number, address, telephone number, contact name, shipping / billing information, and a description of the defect as you perceive it. You will be contacted with a cost estimate for expected repairs, prior to the performance of any service work.

For liability reasons, CETCI has a policy of performing all needed repairs to restore the instrument to full operating condition.

Pack the equipment well (in its original packing if possible), as we cannot be held responsible for any damage incurred during shipping to our facility.

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
Fax: +1.604.940.8745
Email: marketing@cetci.com
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.

2 INTRODUCTION

2.1 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. It is secured by a mounting plate that can be mounted proud of the wall or flush with the wall using a junction box.

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 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.

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 9 m / 29.5 ft dongle cable that is ideal for use in packaged terminal air conditioner (PTAC) applications.

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

2.2 Key Features

- 1 or 2 gas channel operation (depends on model)
- One 4-20 mA analog output or user configurable Modbus® RS-485 RTU or BACnet® MS/TP communication protocols for communication with a Controller or Building Automation System (BAS)
- Easy Plug & Play Smart Sensor replacement at end of life
- Customizable sensor and Option combinations to meet specific application requirements

- 24 volt DC or (ground referenced) AC power
- In field upgradable firmware/configuration via USB connection
- Bright LCD display
- Option -RLY: One SPDT dry contact, rated 30 volts, 2 amps max
- Option -RHT *: Relative Humidity and Temperature sensor
- Internal PM2.5 particulate sensor available
- Low profile to reduce noticeability in public spaces
- RoHS compliant circuit boards
- Auto resetting fuse

NOTE: * Analog models have one analog output. Factory default analog output is the gas reading

If after reading through the manual, you have any questions, please do not hesitate to contact our service department for technical support.

3 INSTRUMENT SPECIFICATIONS

3.1 Technical Specifications

MECHANICAL	
Enclosure	White ABS / Polycarbonate, low profile with mounting plate
Weight	400 g / 14 oz
Size	127.7 mm x 119 mm x 40 mm / 5.0 in x 4.7 in x 1.6 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	none

ELECTRICAL

Power Requirement	16 - 30 VDC, 3 W, Class 2 12 - 27 VAC, 50-60 Hz, 3 VA, Class 2 24V recommended. Refer to Section *6.5 Wiring Connections*
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) Communication Modbus® RTU (version 1.1b3) RS-485	Modbus® ID: 100 (default, configurable) Baud rate: 19,200 (default, configurable) Data bits: 8 Start bits: 1 Stop bits: 1 Parity: none
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) Base Address: 270 (default) MAC Address: 100 (default) Parity: no parity Stop bits: 1 Data bits: 8
Analog Output (CGAS-AP models)	One linear 4 - 20 mA output
Relay (Option - RLY)	One SPDT dry contact, rated 30 volts, 2 amps max
RH and Temperature (Option -RHT)	Available with CO or CO_2 gas configurations User selectable units Selectable analog output (default is gas reading)

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

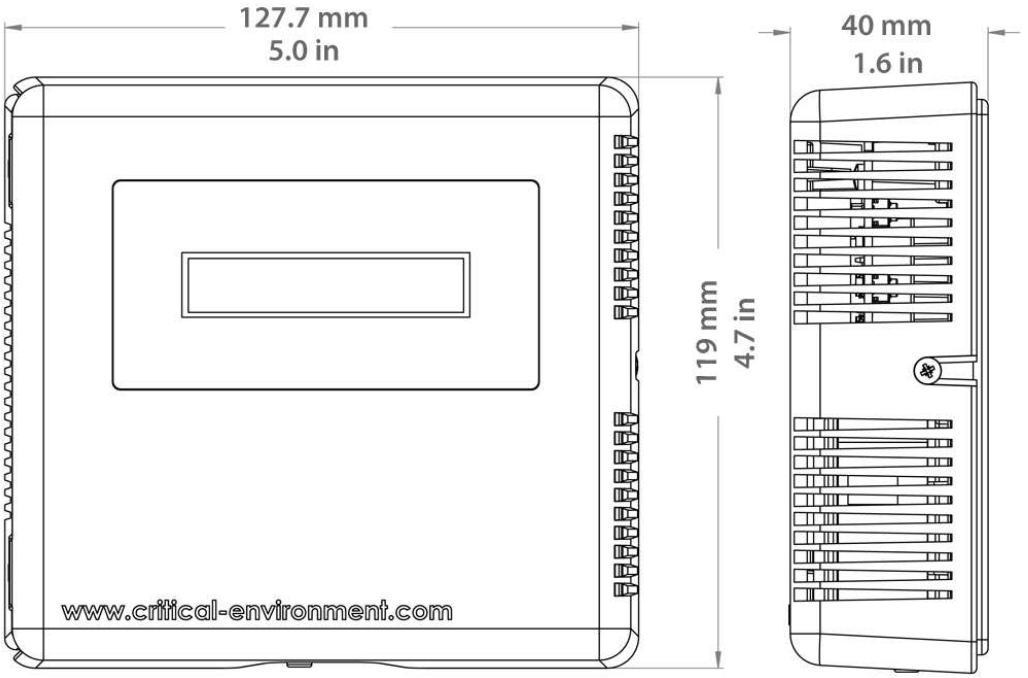
CERTIFICATION

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.

3.2 Enclosure Dimensions



4 SENSOR SPECIFICATIONS

4.1 Analog - Single Channel Sensors

PART NUMBER	SENSOR	RANGE	LIFESPAN
CGAS-AP-CO2-5K	Infrared Carbon Dioxide (CO_2)	0 - 5,000 ppm	± 8 years
CGAS-AP-CO2-5%	Infrared Carbon Dioxide (CO_2)	0 - 5% vol	± 8 years
CGAS-AP-LCO	Electrochemical Carbon Monoxide (CO)	0 - 200 ppm	± 6 years
CGAS-AP-SR410A *	Solid State R410A Refrigerant (internal)	0 -2,000 ppm	± 5 years

CGAS-AP-RD + ESH-B-SR410A *	Solid State R410A Refrigerant (remote dongle)	0 -2,000 ppm	± 5 years
CGAS-AP-PM	PM2.5 Particulate sensor	2.5 µg/m^3	

4.2 Digital - Single Channel Sensors

PART NUMBER	SENSOR	RANGE	LIFESPAN
CGAS-DP-CO2-5K	Infrared Carbon Dioxide (CO_2)	0 - 5,000 ppm	± 8 years
CGAS-DP-CO2-5%	Infrared Carbon Dioxide (CO_2)	0 - 5% vol	± 8 years
CGAS-DP-LCO	Electrochemical Carbon Monoxide (CO)	0 - 200 ppm	± 6 years
CGAS-DP-SR410A *	Solid State R410A Refrigerant (internal)	0 -2,000 ppm	± 5 years
CGAS-DP-RD + ESH-B-SR410A *	Solid State R410A Refrigerant (remote dongle)	0 -2,000 ppm	± 5 years
CGAS-DP-PM	PM2.5 Particulate sensor	2.5 µg/m^3	

*Other Refrigerants may be available upon request.

4.3 Digital - Dual Channel Sensors

PART NUMBER	SENSOR	RANGE	LIFESPAN
CGAS-DP-LCO-CO2-5K	Electrochemical Carbon Monoxide (CO) and Infrared Carbon Dioxide (CO_2)	0 - 200 ppm 0 - 5,000 ppm	± 6 years ± 8 years
CGAS-DP-LCO-CO2-5%	Electrochemical Carbon Monoxide (CO) and Infrared Carbon Dioxide (CO_2)	0 - 200 ppm 0 - 5% vol	± 6 years ± 8 years
CGAS-DP-CO2-5K-PM	Infrared Carbon Dioxide (CO_2) and PM2.5 Particulate sensor	0 - 5,000 ppm 2.5 µg/m^3	± 8 years
CGAS-DP-CO2-5%-PM	Infrared Carbon Dioxide (CO_2) and PM2.5 Particulate sensor	0 - 5% vol 2.5 µg/m^3	± 8 years
CGAS-DP-LCO-PM	Electrochemical Carbon Monoxide (CO) and PM2.5 Particulate sensor	0 - 200 ppm 2.5 µg/m^3	± 6 years

4.4 RH & Temperature Sensor (Option -RHT)

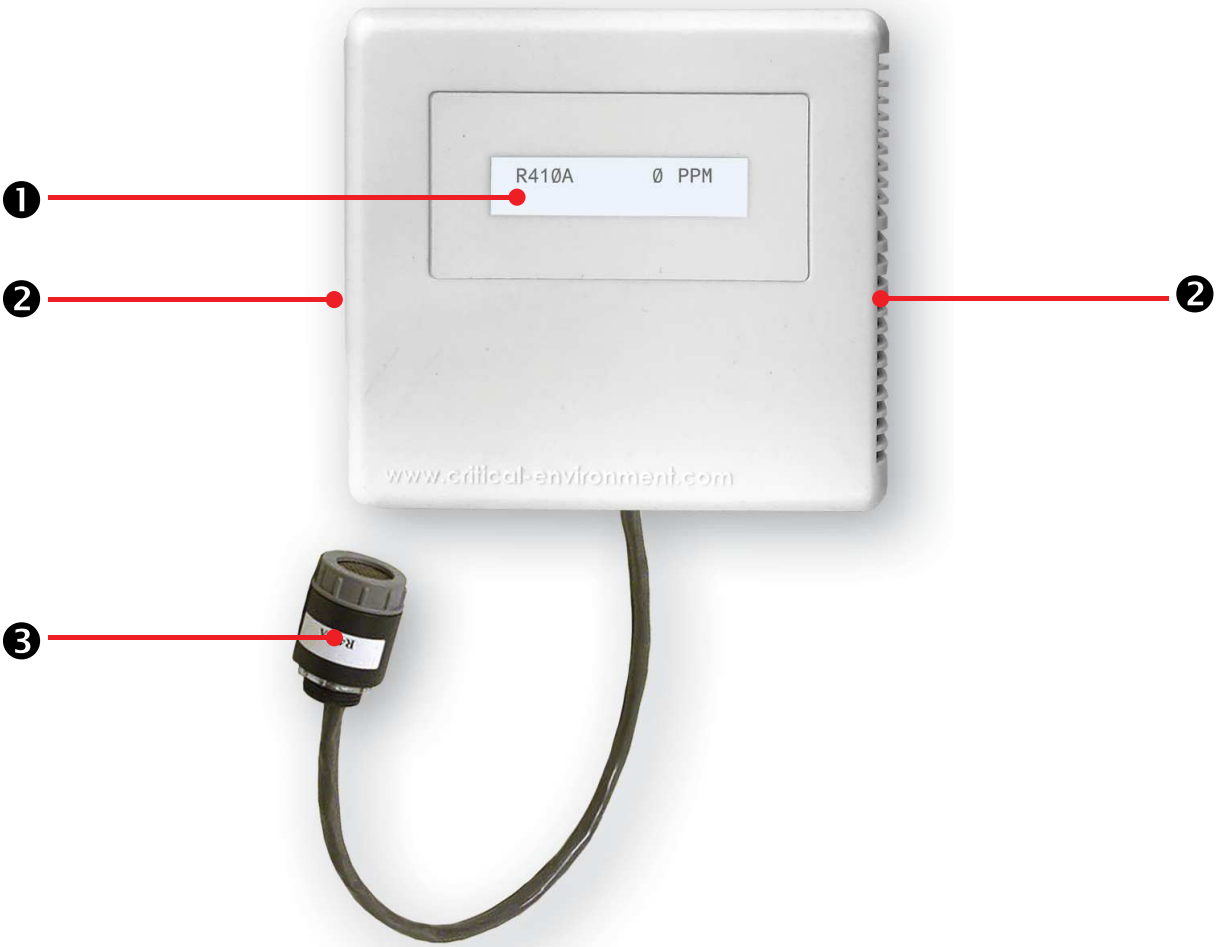
NOTE: The optional RH & temperature sensor is only available with analog or digital models that have a Carbon monoxide (CO) or a Carbon dioxide (CO_2) gas sensor.

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.

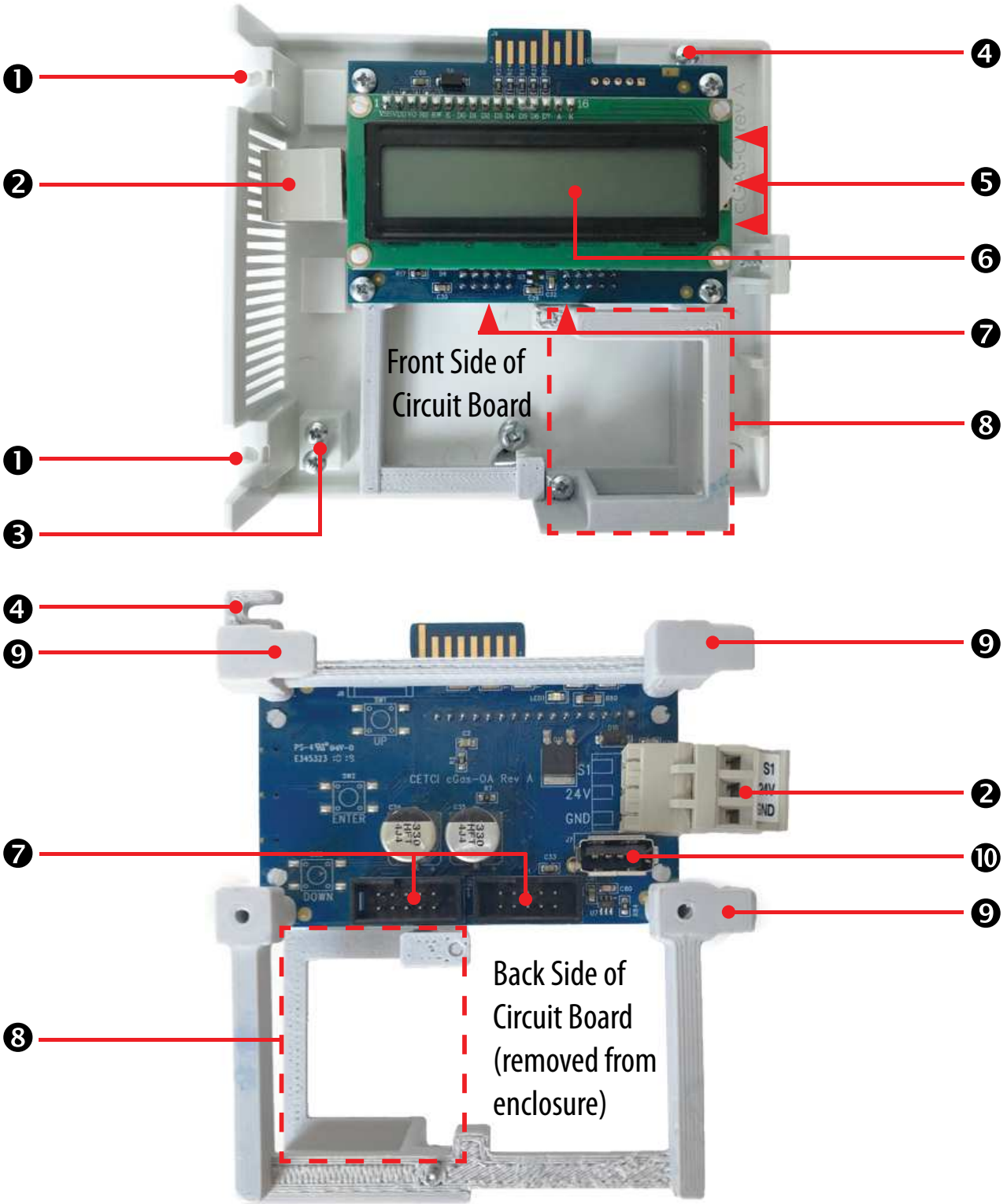
5 INSTRUMENT FEATURES

5.1 Exterior Enclosure



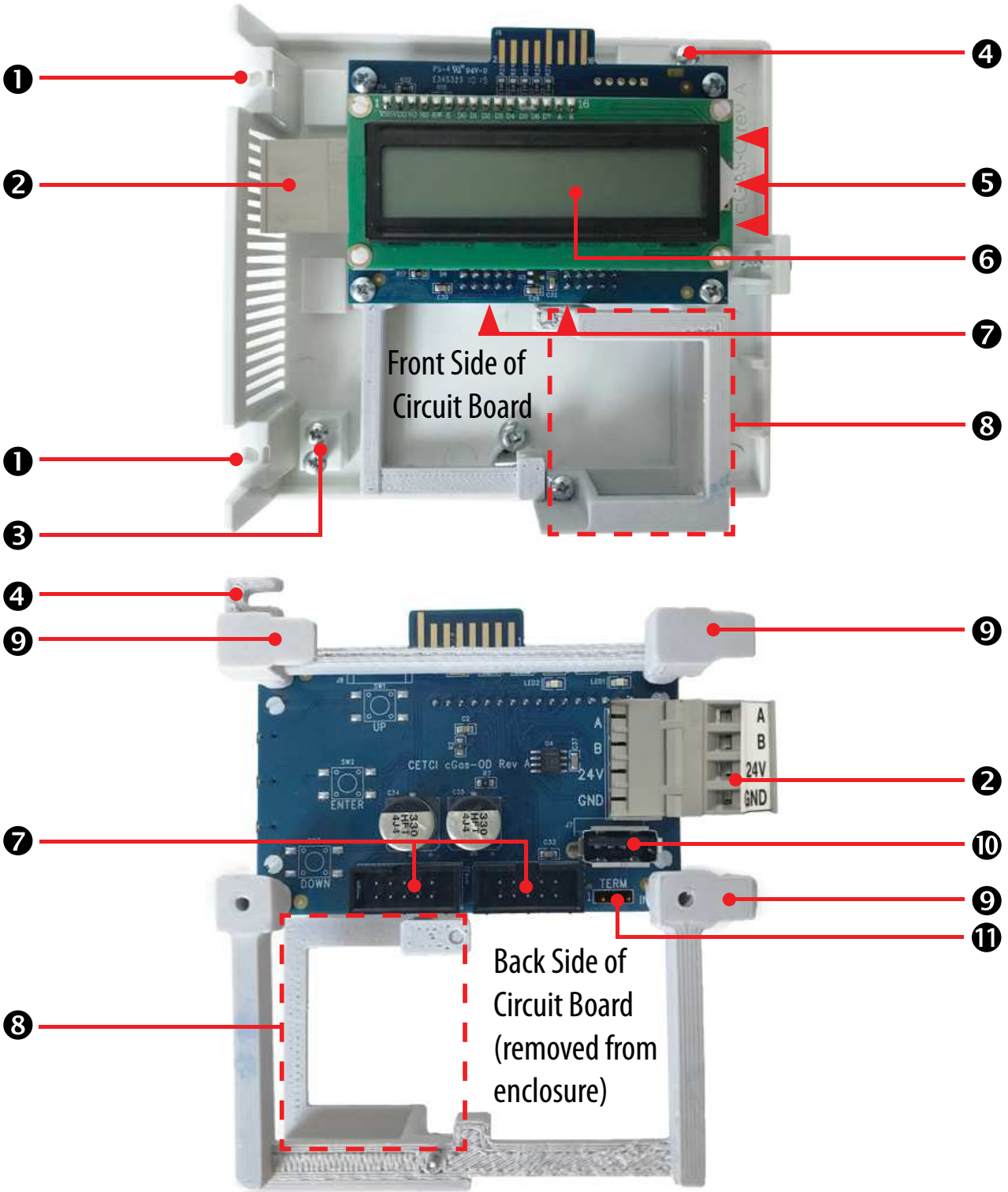
NUMBER	FEATURE	FUNCTION
❶	Display	LCD Display
❷	Sensor Vents	Allows gas diffusion into sensor
❸	Remote Dongle (ex. ESH-B-SR410A)	Remote refrigerant sensor for hotel applications *(for CGAS-AP-RD and CGAS-DP-RD models only)*

5.2 Analog - Interior System Layout



NUMBER	FEATURE	FUNCTION
❶	Hinge Assembly	Screws hold hinges together, fastened from the back of the enclosure
❷	Wiring Terminal	Pluggable terminal for 3-wire power and analog signal output
❸	Two Extra Screws	Just in case you need them
❹	Circuit Board Mount Connection	Remove this screw and slide the mount to the right to remove the entire circuit board with display and smart boards attached
❺	3 Programming Buttons	Access menu options and program functions using buttons inside the enclosure at the side of circuit board. (Arrow up, Enter, Arrow down)
❻	LCD Display	Indicates transmitter operations
❼	Sockets for sensors and Options boards	Smart sensor boards and Options boards plug into the main board using these sockets
❽	Particulate Sensor Mount	Holds the PM2.5 Particulate Sensor in place inside the enclosure
❾	Circuit Board Mount Tabs	Slide into matching openings on interior back of the enclosure to keep the circuit board mount connected to the enclosure, secure with singular screw (see ❹)
❿	USB Connection	For firmware and configuration upgrades

5.3 Digital - Interior System Layout



NUMBER	FEATURE	FUNCTION
❶	Hinge Assembly	Screws hold hinges together, fastened from the back of the enclosure
❷	Wiring Terminal	Pluggable terminal for 4-wire daisy chain power and digital signal output
❸	Two Extra Screws	Just in case you need them
❹	Circuit Board Mount Connection	Remove this screw and slide the mount to the right to remove the entire circuit board with display and smart boards attached
❺	3 Programming Buttons	Access menu options and program functions using buttons inside the enclosure at the side of circuit board. (Arrow up, Enter, Arrow down)
❻	LCD Display	Indicates transmitter operations
❼	Sockets for sensors and Options boards	Smart sensor boards and Options boards plug into the main board using these sockets
❽	Particulate Sensor Harness	Holds the PM2.5 Particulate Sensor in place inside the enclosure
❾	Circuit Board Mount Tabs	Slide into matching openings on interior back of the enclosure to keep the circuit board mount connected to the enclosure, secure with singular screw (see ❹)
❿	USB Connection	For firmware and configuration upgrades
⓫	Termination Jumper	End of line termination jumper/network termination resistor

6 INSTALLATION

The sensor(s) in the cGas Detector go through a burn in period at our factory prior to shipping so it is ready for operation upon arrival. When installing the cGas Detector for the first time, the sensor may require a long warm up time (approximately 48 hours) to stabilize and provide accurate readings.

NOTE: CETCI suggests that upon power-up, all sensors be left to warm up for a minimum of 24 hours prior to considering the gas readings to be accurate.

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

NOTE: Temperature affects calibration. It is important to ensure the gas is at the appropriate temperature during calibration. If the sensor is being used in an extreme temperature range, calibration should be done in that same temperature range.

If the cGas Detector is being installed in an environment that is different than ambient room temperature, you may want to do a zero calibration. This will allow for the device to compensate for the new environment in which it is being installed.

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.

6.1 General Safety Warnings

The cGas Detector is intended for indoor use, permanently mounted at an appropriate height for the monitoring of the target gas. Refer to Section *6.3 Mounting the Transmitter*.

The cGas Detector requires no assembly and virtually no maintenance other than regular calibration

of the internal and/or remote sensors. Care should be taken to ensure that water or dust does not enter the enclosure and physically damage the circuit board or internal components. There are no serviceable elements other than the calibration instructions outlined in this manual. There are no replaceable components except the sensors.

6.2 Protection Against Electrical Risks

Disconnect all power before servicing. There may be multiple power sources. 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 a have a pacemaker, follow your healthcare provider's instructions about being around this type of equipment.

6.3 Mounting the Transmitter

The cGas Detector should be installed 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 *6.4 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.

6.3.1 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.

6.3.2 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.

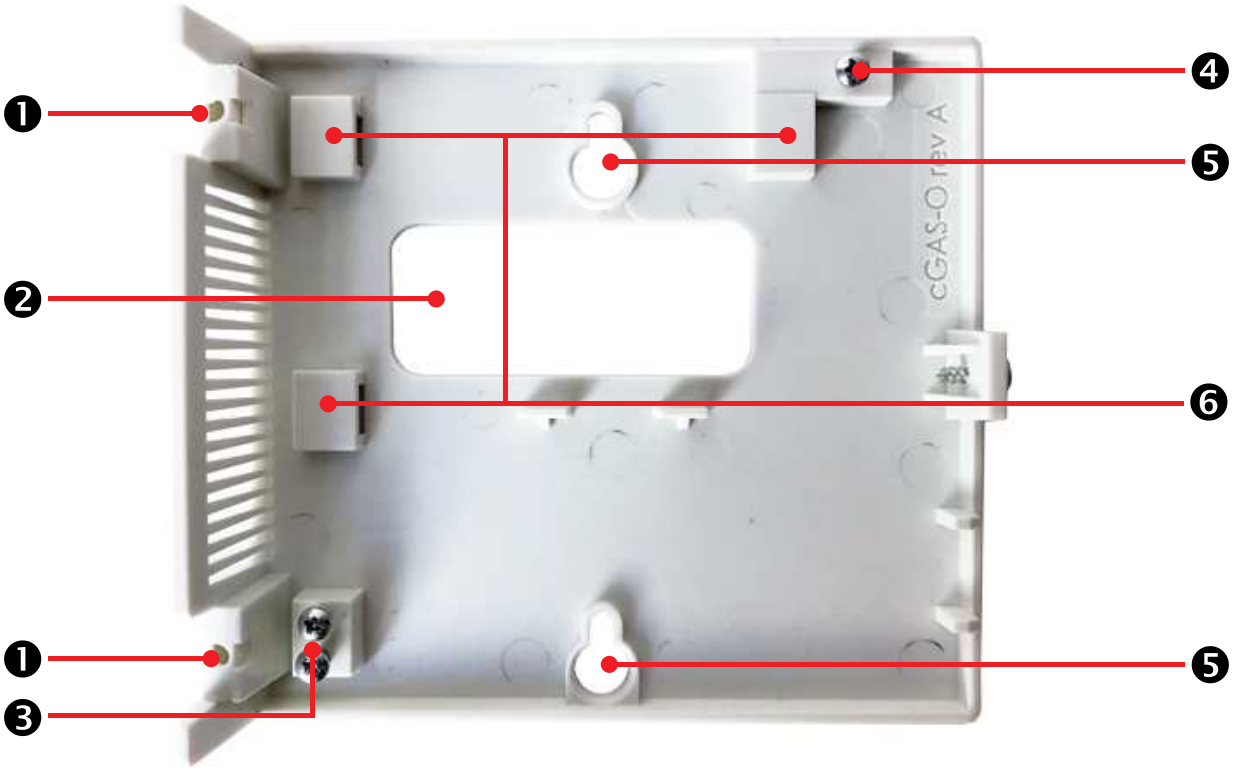
6.3.3 Mounting Height (Sensor Dependent)

The sensor mounting height depends on the molecular weight of the gas in relation to the molecular weight of air. Both Carbon monoxide and Carbon dioxide have a molecular weight close to that of air and should be installed in the "breathing zone". The breathing zone refers to the area 4 - 6 f / 1.2 - 1.8 m from the finished floor. This range is where most human breathing takes place.

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.

6.4 Enclosure Mounting Components

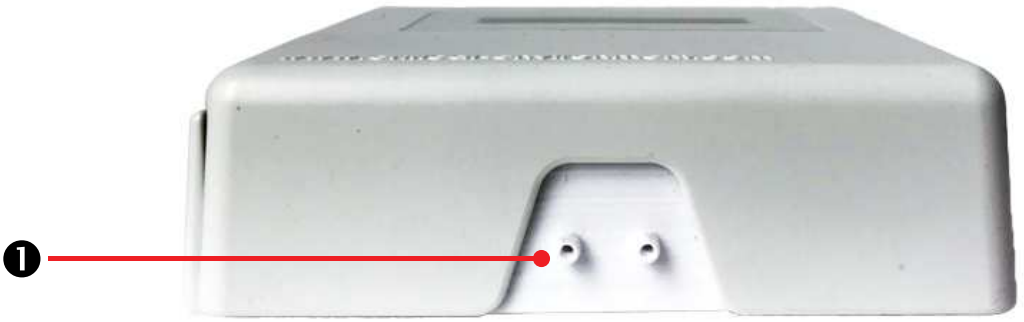
6.4.1 Enclosure Base



NUMBER	FEATURE
❶	Holes for the screws to hold hinges together, secured from the back of the enclosure
❷	Entry Point 6 x 2 cm / 2.35 x 0.8 in
❸	Two extra screws just in case you need them
❹	Screw used to secure circuit board in place. Slide circuit board harness into the slots (see ❻) and tighten this singular screw, loosen to remove circuit board
❺	Mounting Key Holes 9.5 cm / 3.75 in apart

❻	Slots for the circuit board harness tabs to slide into, secure with the singular screw (see ❹)

6.4.2 Enclosure Bottom



NUMBER	FEATURE
❶	Sensor shroud with small barb hose fitting to attach to standard or Teflon tubing during calibration

6.5 Wiring Connections

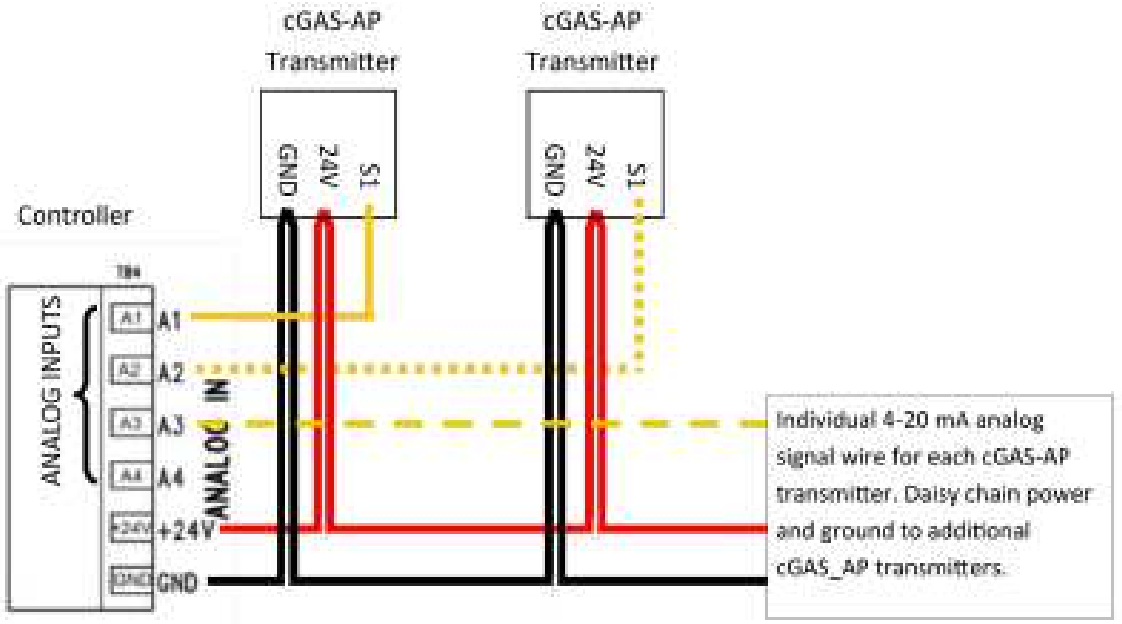
The cGas Detector transmitter is a low voltage powered device. Any application of operating voltages higher than indicated in the specification may result in damage. Double check wiring connections prior to powering the transmitter. Damage from incorrect wiring connections or from too much voltage applied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

6.5.1 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 cGas Detector is being connected to either a QCC or FCS the supply voltage will either be supplied by the QCC or FCS and any additional power requirements of the system will 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.



If the 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 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.

6.5.2 Analog Wire Gauge vs Run Length

The table below shows the maximum cable length between the 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	20	4,400
		18	7,100
		16	10,700
16 VDC	216 (assume a 200 Ω termination resistor)	20	700
		18	1,200
		16	1,800
24 VAC	1,060	20	27,000
		18	43,200
		16	65,500
12 VAC	316 (assume a 200 Ω termination resistor)	20	5,600
		18	8,900
		16	13,583

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.

6.5.3 Digital Wiring Connections

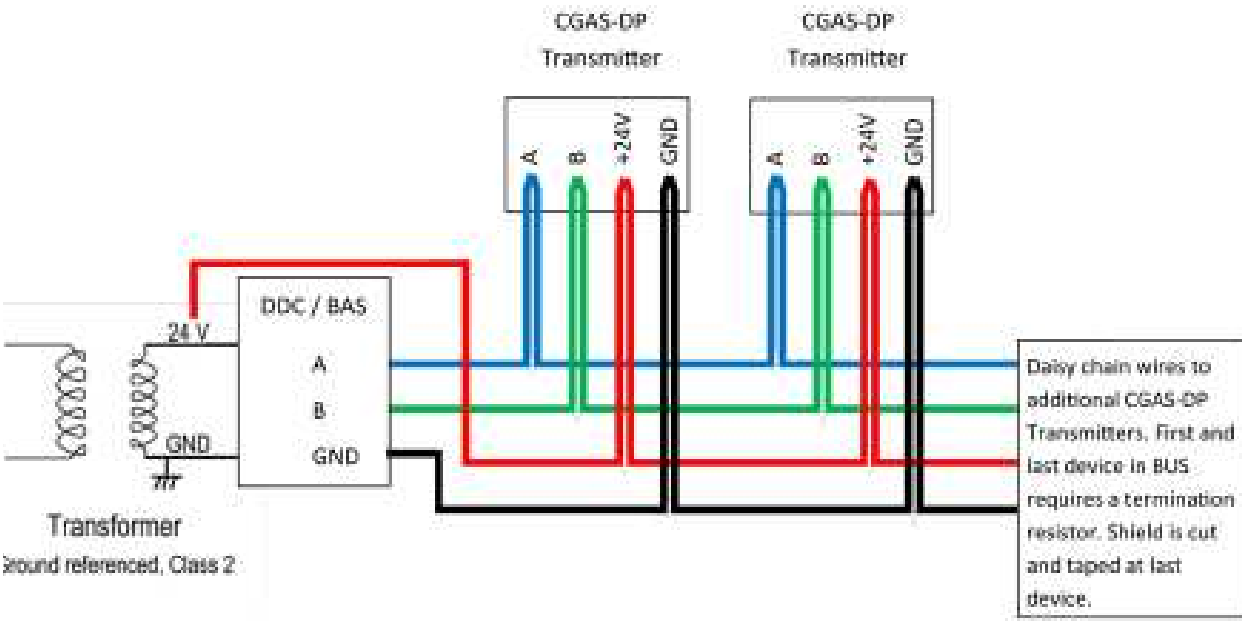
All communications (network) wiring must be in shielded cabling. Wire shielding must be connected together at each device and taped off so it cannot cause a short on the circuit board when the door is closed. The wiring shield should be connected to ground only at the controller, have a contiguous connection throughout the network and be left taped and floating at the last device in the network. The recommended 4 conductor, 16 AWG, shielded stranded wire cable types are 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 enable the 120 ohm resistor on the IN (or sometimes labelled EN) termination jumper position ON the TERM jumper bank 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.

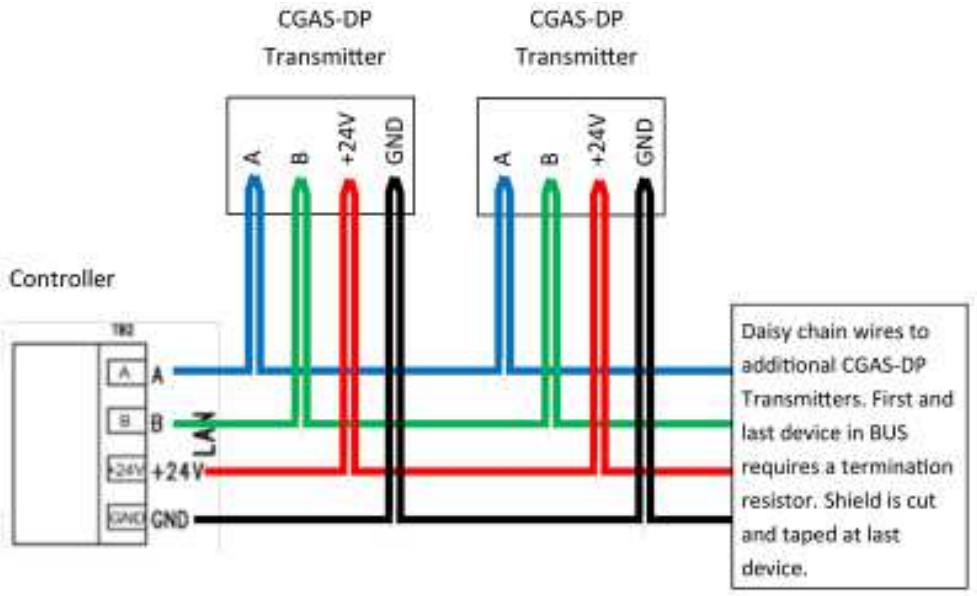
Wiring Example: 4-Wire VAC

If the 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

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



6.5.4 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 wires 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 highly suggests 4-conductor, 16 AWG, shielded, stranded wire cable types such as AlphaWire 79220, AlphaWire 5534, Belden 9954 or equivalent. Do not use solid core wire.

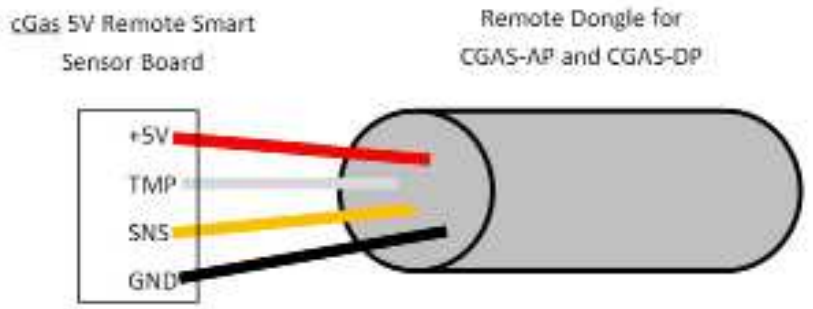
Minimum Cable Length vs Size (AWG) for Digital Communication and Power Supply

Cable Length		# of Sensors	4	6	8	10	12	14	16
Meters	Feet								
0.3 to 1552	1 to 500	AWG #	18	18	18	18	18	18	18
153 to 305	501 to 1, 000	AWG #	18	18	18	18	18	18	18
306 to 457	1,001 to 1,500	AWG #	18	18	18	16	16	16	16
458 to 914	1,501 to 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 waning signal strength. One LNK-XT extends the network length by an additional 610 m (2,000 ft). It is recommended that an LNK-XT be installed approximately every 32 connected devices, or when a drop in signal strength is detected.

6.5.5 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.



6.5.6 Wiring the Relay Smart Board (Option -RLY)

The cGas Detector can be ordered with Option -RLY, an SPDT dry contact relay rated 30 volts, 2 amps max. The relay components are connected to a circuit board that plugs into one of the plug & play smart sensor sockets. The system does not provide any power from the relay terminal. A dry contact relay operate like a switch to simply activate (switch on) or de-activate (switch off) equipment to be controlled, such as fan starters.

The cGas Detector is designed to be fail-safe, any equipment to be controlled by the system relays 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 connection relay will close. The relay coils are normally energized in a non-alarm state for failsafe operation.

7 BASIC SYSTEM OPERATION

The cGas Detector continuously monitors target gas concentrations on one or two configured channels. It must be connected to a controller, control panel or BAS / BMS / DDC system; the cGas Detector is not a standalone gas detection system.

FOR THE FULL SYSTEM OPERATION INSTRUCTIONS, INCLUDING CALIBRATION AND SENSOR REPLACEMENT, **REFER TO THE OPERATION MANUAL**.

7.1 Power Up and Warm-up Process From Factory

Upon application of power to a cGas Detector received from the factory, the LCD display will turn on and rotate through several info screens that differ depending on the configuration of the transmitter (number of channels used, type of communication, etc.). The warm-up period takes between 2 and 5 minutes depending on the gas sensor type.

NOTE: The cGas Detector will be visible on the controller / BAS / DDC system during the warm-up countdown but a correct reading will not show up until 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.

7.2 Navigating the Menu Structure

The three programming push-buttons inside the enclosure to the right of and on the edge of the display are used to navigate through the cGas Detector menu structure. Refer to *Section 5.1 Exterior Enclosure* for location photo.

ENTER begins a process or moves you to the next screen in the same menu.

The UP or DOWN buttons are used to enter characters/numbers and to navigate to the next menu item. For simplicity's sake, directions in this manual use the UP button.

A line under a character or number indicates that is the space into which you are entering a character or number. Use the ENTER button to move to the next space. Or use the UP or DOWN button to change the value in that space.

The > symbol indicates that you can edit the menu line item.

After entering and confirming a value you can either Exit the menu or press the UP button to move to the next item in that menu. All menus are circular and will bring you back to the Exit screen. Press ENTER to Exit.

7.3 Accessing the Menu with Passcodes

You have to enter a passcode to access the menu. From the normal operation screen, press ENTER to access the password entry screen. Use the UP or DOWN arrow to scroll to the desired number. Press ENTER to move to the next position. Continue until the full code is entered and press ENTER when finished.

Legend:
[d] for digital models only
[a] for analog models only
* Option must be installed

CODE	NAME	DESCRIPTION
0001	Test Menu	• Test Digital Output [d] • Test Analog Output [a] • Test Relay *
1001[d]	Basic Menu	If configure as a Modbus® device • Comm Type • Comm Mac • Comm Baud If configured as a BACnet® device • Comm Type • Comm Mac • Comm Baud • Instance ID
1014	Display Menu	• Display Type • Brightness • Display Line 1 • Display Line 2
2012	Alarms Menu	• Selected Channel • Selected Alarm Level • Set Alarm Setpoint • Set Alarm Direction (Ascending/Descending) • Set Alarm Hysteresis
3022	Config Menu	• Selected Channel • Enable/Disable Channel • Read from Sensor • Write to Sensor

3032	Calibrate Menu	• Selected Channel • Set Calibration Gas • Calibrate Zero • Calibrate Span • Set Analog Output Mode [a] • Set Analog Output Priority [a] • Calibrate Analog Output [a] • Set Analog Output Zero [a] • Set Analog Output Range [a] • Temperature Offset * • Humidity Offset * • Temperature Units *

7.4 Change Units (°C or °F) of 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.

IMPORTANT: Analog models have one analog output. If an analog model is ordered with Option -RHT, the information is for display purposes only; the one analog output would be used for the gas readings, not the RH and temperature readings.

From the main display, press ENTER.
Enter passcode 3032 using the UP button and ENTER button.

```
Enter Password
3Ø32
```

Press ENTER to access the Calibrate Menu.

```
Calibrate Menu
Press Enter
```

In the Selected Channel menu, if Temperature is not displayed, press ENTER and use the UP button to scroll to find Temperature. Press ENTER.

```
Selected Channel
CO
```

```
Selected Channel
>Temperature
```

Use the UP button to find Temperature Unit. If you want to change the unit type, press ENTER.

```
Temperature Unit
Celsius
```

Press the UP button to choose Fahrenheit press ENTER and ENTER to exit.

```
Temperature Unit
>Fahrenheit
```

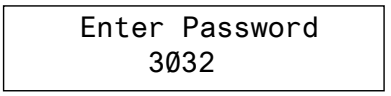
7.5 Temperature and/or Relative Humidity Offset

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

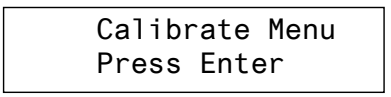
Depending on the configuration, the device will show the temperature in either Celsius or Fahrenheit. The units can be changed at any time, refer to Section *7.4 Change Units (^{0}C or ^{0}F) of Temperature Readings*.

There is no way to calibrate a temperature or relative humidity sensor. However, if you find that the temperature or humidity reading on the cGas Detector is 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 or 100).

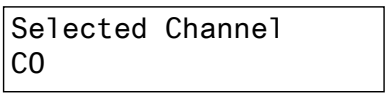
From the main display, press ENTER.
Enter passcode 3032 using the UP button and ENTER button.

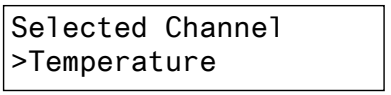


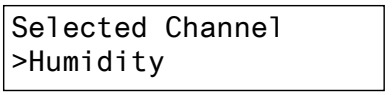
Press ENTER to access the Calibrate Menu.



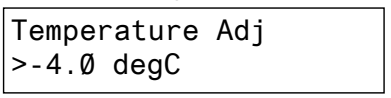
In the Selected Channel menu, if Temperature (or Humidity) is not displayed, press ENTER and use the UP button to scroll to find the item you are looking for. Press ENTER.

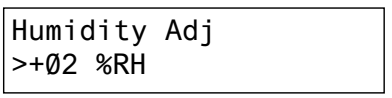




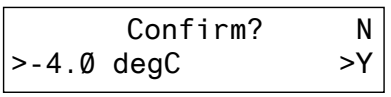


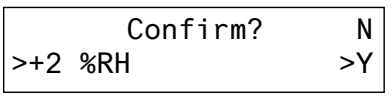
Use the UP button to find Temperature Adj (or Humidity Adj). If you want to change the offset value, press ENTER. Change the offset value using the UP or DOWN and ENTER buttons.





Press ENTER to confirm the value is correct. If you entered the wrong value, press the UP button to move the cursor to N and press ENTER and reenter the value.





7.6 Test Functions

7.6.1 Test Analog Output

For analog cGas Detector models (CGAS-AP), you can send a predetermined analog signal to the DDC or BAS to test that the correct signal is being sent out and the configured outcome occurs (ie. if the analog output is configured for VFD control, the fans operate as expected). This allows you to determine if the installation was successful.

From the main display, press ENTER.
Enter passcode 0001 using the UP button and ENTER button.

```
Enter Password
    0001
```

Press ENTER to access the Test Menu.

```
Test Menu
Press Enter
```

In the Test AO menu, the default entry is 4 mA. Press ENTER.

```
Test AO
4.0 mA
```

Enter the preferred output value between 0 and 30 mA by using the UP, DOWN and ENTER buttons, or to continue with 4 mA press ENTER to the end.

```
Test AO
>14.0 mA
```

When finished, press ENTER and then again to Confirm Y.

```
      Confirm?     N
>14.0 mA          >Y
```

```
Test AO
4.0 mA
```

The test will start as soon as you press ENTER to confirm and will remain in the test mode as long as the Test AO screen remains untouched. To stop the test, press the UP or DOWN button. To test another analog output value repeat the process by pressing ENTER.

7.6.2 Test Digital Output

For digital models, 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.

From the main display, press ENTER.
Enter passcode 0001 using the UP button and ENTER button.

```
Enter Password
    0001
```

Press ENTER to access the Test Menu.

```
    Test Menu
    Press Enter
```

In the Selected Channel menu, confirm the correct channel is showing.

```
Selected Channel
CO
```

If you want to choose a different channel, press ENTER and use the UP button to scroll to the next value. Press ENTER and continue.

```
Selected Channel
>NO2
```

The list to choose from will depend on included sensors and options:

- Gas Type (ie. CO)
- Gas Type (ie. NO2)
- Temperature
- Humidity

Press the UP button to find Test Reading. To make a change, press ENTER and then use the UP, DOWN and ENTER buttons to enter the value.

```
Test Reading
0 PPM NO2
```

```
Test Reading
>10.0 PPM NO2
```

Press ENTER and then again to Confirm Y.

```
      Confirm?     N
>10.0 PPM NO2     >Y
```

```
Test Reading
10.0 PPM NO2
```

The test will start as soon as you press ENTER to confirm and will remain in the test mode as long as the Test Reading screen remains untouched. To stop the test, press the UP or DOWN button. Test another reading value or press ENTER to Exit.

7.6.3 Test Relay (models with Option -RLY installed)

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

From the main display, press ENTER.
Enter passcode 0001 using the UP button and ENTER button.

```
Enter Password
    0001
```

Press ENTER to access the Test Menu.

```
Test Menu
Press Enter
```

In the Test Relay menu, the default entry is Untripped. Press ENTER and use the UP button to change to Tripped. Press ENTER. You will hear a soft click and the relay will activate accordingly, respecting its failsafe setting and ON/OFF delays.

```
Test Relay:SB
Untripped
```

```
Test Relay:SB
>Tripped
```

To stop the relay test, Press ENTER and the UP button to change to Untripped. Press ENTER. You will hear a soft click and the relay will deactivate.

```
Test Relay:SB
>Untripped
```

When finished, press ENTER and then UP to Exit.

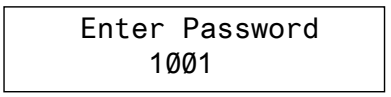
8 MODBUS & BACNET CONFIGURATION

The digital cGas Detector models (CGAS-DP) can be changed from Modbus® to BACnet® or vice versa in the field.

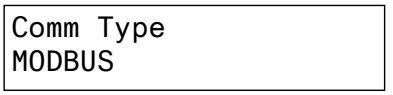
8.1 Changing Communication Type (Modbus®/ BACnet®) in the Field

When the communication type is changed, the device will reset, which will briefly interrupt communications on the network it is connected to.

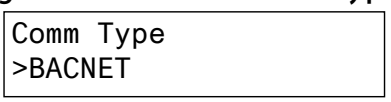
From the main display, press ENTER.
Enter passcode 1001 using the UP button and ENTER button.

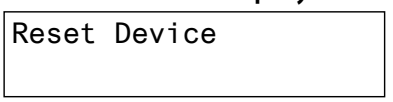


Press ENTER to access the Basic Menu.



Press ENTER. Use the UP or DOWN buttons to choose MODBUS or BACNET or Cancel. Press ENTER. If you have changed the communication type, the device will display Reset Device.





Press ENTER and the cGas Detector will power off and on. This will cause a brief interruption in communications if the cGas Detector is on a network.

NOTE: If you change the Comm Type, make sure you make the necessary changes to the corresponding MAC, Baud and Instance ID as appropriate. Refer to the following Sections *8.2 Configuring Modbus® Settings* or *8.3 Configuring BACnet® Settings*.

8.2 Configuring Modbus® Settings

If a complete system (controller with digital transmitters and peripherals) is ordered from the factory, it will be shipped preconfigured with the appropriate Modbus® settings.

Factory Default Modbus® Settings

- Modbus® ID = 100 (default, configurable)
- Baud rate =19,200 (default, configurable)
- Data bits = 8
- Stop bits = 1
- Parity = none

If you adding it to an existing system the transmitters may require changes to the default Modbus® settings in order for communication to be successful between devices. Make sure your network connection is complete, the network termination switches are set appropriately and all the devices are configured with the same baud rate, character format, etc. Each device must have its own unique Modbus® ID.

8.2.1 Change Modbus® MAC Address

All devices on the same network must have a unique Modbus ID. The range of numbers that can be used as a Modbus® MAC address is 100 to 255.

From the main display, press ENTER.
Enter passcode 1001 using the UP button and ENTER button.

```
Enter Password
    1001
```

Press ENTER to access the Basic Menu.

```
Basic Menu
Press Enter
```

The Comm Type displayed should be MODBUS. Press the UP button until you see Comm MAC.

Comm Type MODBUS	Comm MAC ØØØ

Press ENTER. Use the UP or DOWN buttons to change the numeric value. Move to the next digit by pressing ENTER. When finished, press ENTER to confirm and again to Exit.

Comm MAC >1Ø1	Confirm? N >1Ø1 >Y

8.2.2 Change Modbus® Baud Rate

All devices on the same network must have the same baud rate. The default Modbus® baud rate for all CETCI Modbus® devices is 19,200.

From the main display, press ENTER.
Enter passcode 1001 using the UP button and ENTER button.

Enter Password 1Ø01

Press ENTER to access the Basic Menu.

Basic Menu Press Enter

The Comm Type should be Modbus. Press the UP button until you see Comm Baud.

Comm Type MODBUS	Comm Baud 19,2ØØ

Press ENTER. Use the UP or DOWN buttons to scroll through the baud rates to choose from:

- 9,600
- 14,400
- 19,200 (default, configurable)
- 38,400
- 57,600
- 76,800
- 115,200

Select the preferred baud rate by pressing ENTER to save and Exit.

8.2.3 Modbus® Holding Registers

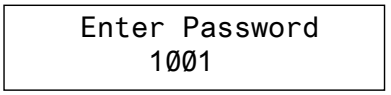
If you have specific requirements, have any questions or require clarification about the Modbus® holding registers, please contact CETCI for assistance.

8.3 Configuring BACnet® Settings

8.3.1 Change BACnet® MAC Address

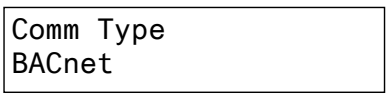
The factory set default BACnet® MAC address is 100. The MAC ID along with the Instance ID make up the complete ID for the device. Each device requires a unique ID in order to communicate with the BAS / DDC. A MAC address should be set for each digital cGas Detector during installation.

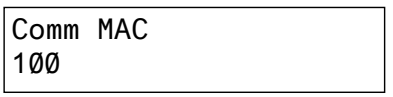
From the main display, press ENTER.
Enter passcode 1001 using the UP button and ENTER button.



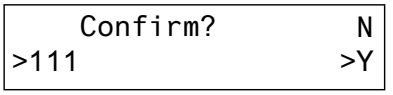
Press ENTER to access the Basic Menu.

The Comm Type should be BACnet. Press the UP button until you see Comm MAC.





Press ENTER. Use the UP button to change the numeric value. Move to the next digit by pressing ENTER. When finished, press ENTER to confirm and Exit.



8.3.2 Change BACnet® Instance ID

Every device on a BACnet® network must have a unique Instance ID. An Instance ID is the Vendor ID

(or Base ID) followed by the device's MAC address. CETCI's Vendor ID is 270. If the device's MAC ID is 100, then the Instance ID would be 270100.

From the main display, press ENTER.
Enter passcode 1001 using the UP button and ENTER button.

```
Enter Password
    1001
```

Press ENTER to access the Basic Menu.

```
Basic Menu
Press Enter
```

The Comm Type should be BACnet. Press the UP button until you see Instance ID.

```
Comm Type
BACnet
```

```
Instance ID
270100
```

Press ENTER. Use the UP button to enter the numeric value. Move to the next digit by pressing ENTER. When finished, press ENTER to confirm and Exit.

```
Instance ID
>0270111
```

```
   Confirm?        N
>270111          >Y
```

8.3.3 Change BACnet® Baud Rate

All devices on the same BACnet® network must have the same baud rate. The default BACnet® baud rate is 76,800.

From the main display, press ENTER.
Enter passcode 1001 using the UP button and ENTER button.

```
Enter Password
    1001
```

Press ENTER to access the Basic Menu.

```
Basic Menu
Press Enter
```

The Comm Type should be BACnet. Press the UP button until you see Comm Baud.

Comm Type BACnet	Comm Baud 76,800

Press ENTER. Using the UP or DOWN buttons, scroll through the baud rates to choose from:

- 9,600
- 14,400
- 19,200
- 38,400
- 57,600
- 76,800 (default, configurable)
- 115,200

Select the preferred baud rate by pressing ENTER to save.

8.3.4 BACnet® PICS Information

Critical Environment Technologies Canada Inc. (CETCI) has been granted the BACnet® Testing Laboratories (BTL) certification for the CGAS Detector Family upon passing the BTL requirements for the BACnet® Smart Actuator (B-SA) designation. To follow is the BACnet® Protocol Implementation Conformance Statement (PICS) information that can also be found on the BACnet® International website at http://www.bacnetinternational.org

Date: April 2019
Vendor Name: Critical Environment Technologies Canada Inc.
Product Name: CGAS Detector Family
Product Model Numbers: CGAS-D, CGAS-DP, CGAS-SC
Application Software Version: 1.1
Firmware Revision: 3.7.12.0
BACnet® Protocol Version/Revision: 14
Product Description:

The CGAS Detector product line is a group of customizable two channel gas detectors featuring a range a possible gases and options. The various gases are added to the device using plug and play "smart sensor" boards, which attach to the main board within the enclosure. The main board handles communication back to a controller or building management system via field configurable Modbus® RTU or BACnet® MS/TP.

BACnet® Standardized Device Profile (Annex L):

☐BACnet® Operator Workstation (B-OWS)
☐BACnet® Building Controller (B-BC)
☐BACnet® Advanced Application Controller (B-AAC)
☐BACnet® Application Specific Controller (B-ASC)
☑BACnet® Smart Sensor (B-SS)
☑BACnet® Smart Actuator (B-SA)

List all BACnet® Interoperability Building Blocks Supported (Annex K):

BIBB	Service	Responds to
DS-RP-B	ReadProperty-B	X
DS-WP-B	WriteProperty-B	X
DM-DDB-B	Dynamic Object Device Binding-B	X
DM-DOB-B	Dynamic Object Binding-B	X

Segment Capability:

Segment requests supported Window Size 480
Segment requests supported Window Size 480

Standard Object Types Supported:

An object type is supported if it may be present in the device. For each standard Object Type supported provide the following data:

1. Whether objects of this type are dynamically creatable using the CreateObject service
2. Whether objects of this type are dynamically deletable using the DeleteObject service
3. List of the optional properties supported
4. List of all properties that are writable where not otherwise required by this standard
5. List of proprietary properties and for each its property identifier, datatype, and meaning
6. List of any property range restrictions

NOTE: None of the object types listed in this section is dynamically creatable or dynamically deletable.

NOTE: The BACnet conformance codes are as follows:
O - Optional (may be required under some conditions)
R - Required, but not required to be writable (may be required to be writable under some conditions)
W - Not only required, but also required to be writable

The following codes are used in this document to describe how the properties are implemented:

R/W	Read/write
R/O	Read-only
R/O=value	Implemented as a read-only with the indicated value

Device Object

Property	Conf Code	Implementation
Object_Identifier	R	R/0
Object_Name	R	R/0
Object_Type	R	R/0=”device”
System_Status	R	R/0=”operational”
Vendor_Name	R	R/0
Vendor_Identifier	R	R/0
Model_Name	R	R/0
Firmware_Revision	R	R/0
Application_Software_Version	R	R/0
Location	O	R/W
Protocol_Version	R	R/0=1
Protocol_Revision	R	R/0=14
Protocol_Services_Supported	R	R/0
Protocol_Object_Types_Supported	R	R/0
Object_List	R	R/0
Max_APDU_Length_Accepted	R	R/0=480
Segmentation_Supported	R	R/0=”none”
APDU_Timeout	R	R/W=7000
Number_Of_APDU_Retries	R	R/W=1
Max_Master	O	R/0=127
Device_Address_Binding	R	R/0=empty list
Data_Base_Revision	R	R/0
Max-Info-Frames	O	R/0=1

Analog Input

Property	Conf Code	Implementation
Object_Identifier	R	R/O
Object_Name	R	R/O
Object_Type	R	R/O=”analog input”
Present_Value	R	R/O
Status_Flags	R	R/O
Event_State	R	R/O=”normal”
Out_Of_Service	R	R/O=FALSE
Units	R	R/O
Property_List	R	R/O
Description	O	R/W

Analog Output

Property	Conf Code	Implementation
Object_Identifier	R	R/O
Object_Name	R	R/O
Object_Type	R	R/O=”analog-output”
Present_Value	W	R/W
Status_Flags	R	R/O=”all normal”
Event_State	R	R/O=”normal”
Out_Of_Service	R	R/O=FALSE
Units	R	R/O
Priority_Array	R	R/O
Relinquish_Default	R	R/W
Property_List	R	R/O
Description	O	R/W

Binary Output

Property	Conf Code	Implementation
Object_Identifier	R	R/O
Object_Name	R	R/O
Object_Type	R	R/O="binary-output"
Present_Value	W	R/W
Status_Flags	R	R/O="all normal"
Event_State	R	R/O="normal"
Out_Of_Service	R	R/O=FALSE
Polarity	R	R/W
Priority_Array	R	R/O
Relinquish_Default	R	R/O
Description	O	R/W

Data Link Layer Options:

☐BACnet® IP, (Annex J)
☐BACnet® IP, (Annex J), Foreign Device
☐ISO 8802-3, Ethernet (Clause 7)
☐ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
☐ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s) _____
☑MS/TP Master Node (Clause 9), baud rate(s): 9600, 19200, 38400, 57600, 76800, 115200
☐MS/TP Slave (Clause 9), baud rate(s):
☐Point-To-Point, EIA 232 (Clause 10), baud rate(s):
☐Point-To-Point, modem, (Clause 10), baud rate(s):
☐LonTalk, (Clause 11), medium: _____
☐Other:

Device Address Binding:

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.) ☑Yes ☐No

Networking Options:

☐Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.

☐Annex H, BACnet Tunneling Router over IP

☐BACnet®/IP Broadcast Management Device (BBMD)

Does the BBMD support registrations by Foreign Devices? ☐Yes ☑No

Character Sets Supported:

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

☑ANSI X3.4 ☐IBM™/Microsoft™ DBCS ☐ISO 8859-1 ☐ISO 10646 (UTF-8)

☐JIS C 6226 ☐ISO 10646 (UCS-2) ☐ISO 10646 (UCS-4)

Network Security Options:

☑Non-secure Device - is capable of operating without BACnet® Network Security

BACnet® Communications Defaults:

Baud rate =78,800 (default, configurable)
Base address = 270 (default, configurable)
MAC address = 100 (default, configurable)
Parity = no parity
Stop bits = 1
Data bits = 8

If you have specific requirements, have any questions or require clarification about the BACnet® PICS information, please contact CETCI for assistance.

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