INSTALLATION MANUAL

Rev. F | 2025.04

Critical Environment Technologies

cGas-SC

Self Contained Controller

WWW.CETCI.COM

NEED MORE INFORMATION?

This is the **Installation Manual** for the cGas-SC Self Contained Controller.

NOTE: This manual includes AO Step Mode functionality that was released in Firmware v2.14. Prior firmware versions will not have this functionality. If you would like to upgrade your firmware, please contact help@cetci.com

For information on the following topics, please refer to the **cGas-SC Operation Manual**:

- Modbus® and BACnet® Configuration
- 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
- Enable/Disable/Override Relays, Set Relay ON/OFF Delays
- Strobe/Horn Operation
- Logic / Priority Settings & Configuration
- How to Order a Replacement Smart Sensor
- How to Install a Replacement Smart Sensor
- How to Add a New Smart Sensor
- Calibration

If you would like to view or download the **cGas-SC Operation Manual** from our website click here

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

The most up-to-date version of any 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 that is considered accurate. However, no warranty is expressed or implied regarding the accuracy of this data.

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 the 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

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 meets 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
Email:	sales@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 damage 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-SC complies with:

- CSA-C22.2 No 61010-1
- UL 61010-1 (Edition 3)
- Overvoltage Category II, Pollution Degree 2
- 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.

2.1 General Safety Warnings

The cGas-SC requires no assembly and virtually no maintenance other than regular calibration and replacement 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 smart sensor boards.

The cGas-SC is intended for indoor use, permanently mounted upright at a height that is appropriate for the type of gas being monitored. Care should be taken to ensure that excess water or dust are not somehow entering the enclosure and physically damaging the circuit board or internal components. Should the cGas-SC be mounted outside, it should be protected from extreme weather conditions.

2.2 Protection Against Electrical Risks

Caution

ISO 7000- 0434B (2004-01)
Caution, possibility of electric shock

Disconnect all power before servicing. There may be multiple power sources.

Power supply shall 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-SC supply (disconnecting power to the cGas-SC). Appropriate markings should be visible at the circuit breaker / switch that is supplying power to the cGas-SC.

If the equipment is used in a manner not specified in this manual, the protection provided by the instrument may be impaired.

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.

2.3 Protection Against Mechanical Risks

The door of the enclosure can be removed if absolutely necessary to facilitate installation of the base, but it is not recommended. Extreme care and caution must be exercised when removing the door to avoid damaging the hinges. The door should only be removed when absolutely required. Any damage occurring from the removal of the door will not be covered under warranty.

Grasp the door with one hand, being careful not to make contact with any of the internal components (circuit board) and grasp the base with your other hand. Tug on the base and pull straight apart. **DO NOT TWIST**. The section of the hinges located on

the base should "snap" apart from the part of the hinges located on the door.

After installation, simply locate the lid hinges over the installed base hinges and pull toward you. The hinges should easily "snap" back into place.

The enclosure has two screws securing the door to the base for electrical safety and provides an opening to allow the user to apply a padlock or tie wrap if they desire the enclosure to be locked.

Be aware that the hinged door that could potentially pinch fingers and the sharp edges and/or jumper pins on the board could potentially prick or cut fingers if not handled carefully.

3 INSTRUMENT SPECIFICATIONS

3.1 Technical Specifications

The cGas-SC system offers up to 3 gas channels for monitoring toxic, combustible and refrigerant gases in commercial and light industrial, non-hazardous (non-explosion rated) environments.

Gas sensor configurations include:

- One or two internal sensors
- One internal + one remote or two remote sensors
- Two internal + one remote sensor
- Two remote sensors
- Three remote sensors

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

MECHANICAL	
Enclosure	ABS / Polycarbonate, IP54 rating with splash guard installed.
Weight	682 g / 1.5 lbs
Size	20.3 x 15.42 x 8 cm / 8 x 6.07 x 3.16 in

USER INTERFACE	
Display (standard)	2-line by 16 character LCD with LED panel indicating alarm status 1, 2 and 3 for any channel and FAULT
Display (Option -LT)	Optional OLED display for improved usability in low temperature applications, 2-line by 16 character

USB Port	Internal port for USB memory stick for configuration changes and firmware upgrades
Push Buttons	Initiate calibration and menu options with external UP, DOWN and OK push buttons

ELECTRICAL

Power Requirement	Low Voltage (standard): 16-30VDC / 12-28 VAC, 50/60 Hz, 10W, Class 2 Line Voltage (Option -DV): 100-240V AC +/-10%, 50/60 Hz, 10W, 1-phase
Overvoltage Category	Category II
Wiring	Low Voltage (standard): 24VDC or 24VAC two-conductor shielded 14-18 awg stranded within conduit Line Voltage (Option -DV): VAC three-conductor (Line, Neutral, Ground) shielded 14-18 awg stranded within conduit
Distance of ESH-A Remote Sensor	Maximum 200 ft using minimum 18 gauge wire stranded within conduit
Distance of Remote Transmitter	For transmitter distance, refer to the specific transmitter manual
Fuses	Thermal, resetting

INPUT/OUTPUT

Input	4-20 mA analog
Output	Up to two 4 - 20 mA analog outputs for VFD control Jumper selectable 0 - 10 volts, 2 - 10 volts output User selectable BACnet® MS/TP or Modbus® RTU RS-485 Horn/strobe output terminal
Modbus® Output WAN (output to BAS)	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 (default, configurable)

BACnet® Output WAN (output to BAS)	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) MAC Address: 100 (default, configurable) Parity: no parity Stop bits: 1 Data bits: 8
Relays	Two SPDT dry contact relays rated 5 amps @ 240 VAC
Audible Alarm	Standard internal buzzer, or Optional loud, side mounted buzzer (Option -A), rated 90 dB @ 30 cm / 1 ft, or Optional watertight, side mounted buzzer (Option -WA), rated 85 dB @ 60.96 cm / 2 ft
RH and Temperature	Optional RH and Temperature sensor (Option -RHT) User selectable units DegC or DegF Not available on all models

ENVIRONMENTAL

Operating Temperature	-20°C to 40°C / -4°F to 104°F (standard) -40°C to 40°C / -40°F to 104°F (with Option -LT)
Operating Humidity	15 - 90% RH non-condensing
Pollution Degree	Degree 2
Altitude	below 2,000 m

CERTIFICATION

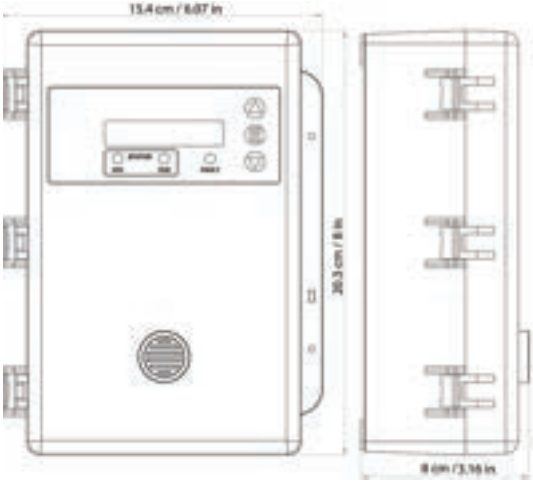
Model: CGAS-SC-XXX-XXX-XX-XX
S/N: CGASSC2405F00001

Rating: 16-30V / 12-28 Vac, 50/60 Hz 10W
100-240V VAC, 50/60 Hz 10W 1-phase

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 61010-1, UL 61010-1 (Edition 3)
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



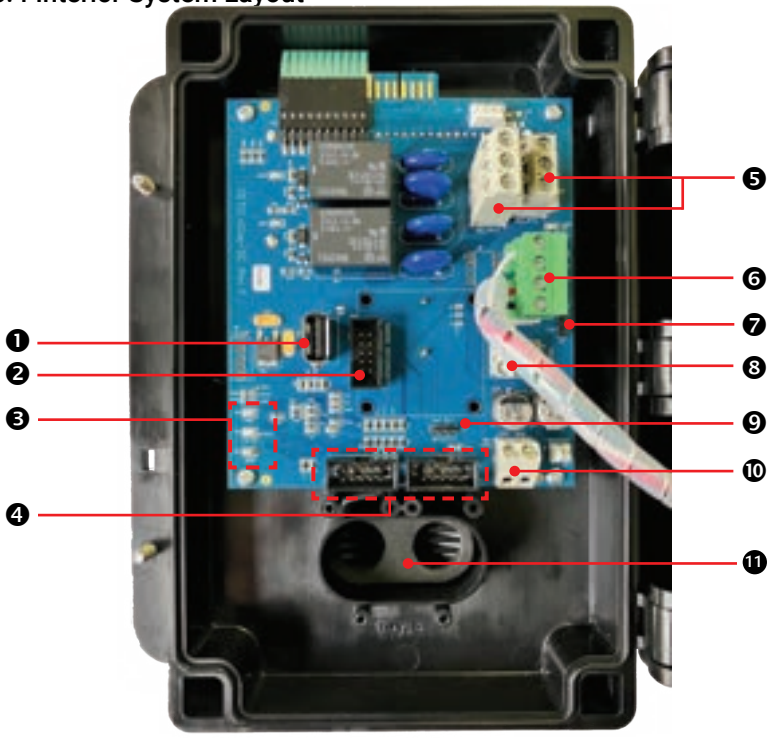
Note: Drawing above is shown without a splash guard. With the standard splash guard (Option -S), the thickness of the unit is 8.9 cm / 3.5 in and IP54 rated. With the splash guard for sticky gases, (Option -SN), the thickness of the unit is 12.6 cm / 5.02 in.

NOTE: During calibration, the sensor response time will be slower with the splash guard installed.

3.3 Exterior Enclosure

NUMBER	FEATURE	FUNCTION
❶	Door Hinge	Secures door to base and allows easy opening and closing
❷	Display	LCD display (standard display shown)
❸	Status 1 & 2 LEDs	Indicate alarm status 1, 2 and 3 for any channel and FAULT
❹	Sensor Opening	Allows gas diffusion into sensor
❺	Push Buttons for menu operation	ARROW up - Press to scroll up through menu OK - Press to select menu choice ARROW down - Press to scroll through menu
❻	Door Screw	Secures door shut
❼	Fault LED	Indicates unit fault condition
❽	Lock Slot	For security padlock or tie

3.4 Interior System Layout



NUMBER	FEATURE	FUNCTION
❶	USB Connection	For firmware and configuration upgrades
❷	Pluggable Socket	Connection for various Options boards including remote sensor and analog output
❸	TP1, TP2 and TP3	TP1 and TP2 are test points to confirm voltage registers are working. TP1 should be +5V and TP2 should be 3.3V. TP3 is a ground point to clip to when using a voltmeter to measure TP1 and TP2.
❹	Plug & Play Sockets	Connections for smart sensor boards and single wide Options boards
❺	Relay Terminals	NO/COM/NC connections for each relay

❻	WAN Terminal	Connection to a BAS (Modbus® or BACnet®) Connection for providing 24VAC/VDC to low voltage models
❼	WAN End of Line Jumper	120 ohm digital network line termination jumper
❽	Horn/Strobe Output Terminal	Connection for a remote 24 VDC horn and/or strobe combination (ie. RSH-24VDC), 0.5 Amps max.
❾	Jumper J27	Select position for sounding internal buzzer or externally mounted buzzer.
❿	24V Power Supply	Power connection for any remote sensor, provides 24VDC
⓫	Sensor Opening	Shown with foam gasket in place. Gasket configuration will change based on which board(s) are plugged into the 2 sockets.

3.5 Single Channel Internal Gas Sensors

4 Series Electrochemical Sensors	Part Numbers	Range	Lifespan
Carbon Monoxide (CO)	CGAS-SC-CO	0 - 200 ppm	~3 years
Hydrogen Sulphide (H_2S)	CGAS-SC-H2S	0 - 50 ppm	~2 years
Nitrogen Dioxide (NO_2)	CGAS-SC-NO2	0 - 10 ppm	~3 years
Oxygen (O_2)	CGAS-SC-O2	0 - 25% Vol	~3 years
Sulphur Dioxide (SO_2)	CGAS-SC-SO2	0 - 20 ppm	~2 years

7 Series Electrochemical Sensors	Part Numbers	Range	Lifespan
Carbon Monoxide (CO)	CGAS-SC-7CO	0 - 200 ppm	~5 years
Ethylene (C_2H_4)	CGAS-SC-7C2H4	0 - 200 ppm	~2 years
Hydrogen Sulphide (H_2S)	CGAS-SC-7H2S	0 - 50 ppm	~5 years
Nitrogen Dioxide (NO_2)	CGAS-SC-7NO2	0 - 10 ppm	~5 years

Infrared Sensors	Part Numbers	Range	Lifespan
Carbon Dioxide (CO_2)	CGAS-SC-CO2-2K	0 - 2,000 ppm	~8 yrs
	CGAS-SC-CO2-5K	0 - 5,000 ppm	
	CGAS-SC-CO2-5%	0 - 5% vol	
	CGAS-SC-CO2-100%	0 - 100 %vol	

3.6 Dual Channel Internal Gas Sensors

Two Internal Electrochemical Sensors	Part Numbers	Range	Lifespan
Carbon Monoxide (CO) and Nitrogen Dioxide (NO_2)	CGAS-SC-CO-NO2	0 - 200 ppm 0 - 10 ppm	~3 years
Carbon Monoxide (CO) and Ethylene (C_2H_4)	CGAS-SC-CO-7C2H4	0 - 200 ppm	~3 years ~2 years
Carbon Monoxide (CO) and Hydrogen Sulphide (H_2S)	CGAS-SC-CO-H2S	0 - 200 ppm 0 - 50 ppm	~3 years ~2 years
Carbon Monoxide (CO) and Oxygen (O_2)	CGAS-SC-CO-O2	0 - 200 ppm 0 - 25% vol	~3 years ~3 years
Carbon Monoxide (CO) and Nitric Oxide (NO)	CGAS-SC-CO-NO	0 - 200 ppm 0 - 100 ppm	~3 years ~2 years

3.7 ESH-A- Remote Sensors

Catalytic Sensors	Part Numbers	Range	
Acetylene (C_2H_2)	ESH-A-CC2H2-100	0 - 100% LEL	~5 years
Hydrogen (H_2)	ESH-A-CH2-100	0 - 100% LEL	~5 years
Methane (CH_4)	ESH-A-CH2-100	0 - 100% LEL	~5 years
Propane (C_3H_8)	ESH-A-CH2-100	0 - 100% LEL	~5 years

PID Sensors	Part Numbers	Range	
TVOC	ESH-A-SPL	0 - 30 ppm	~5 yrs usage / application dependent
TVOC	ESH-A-SPH	0 - 300 ppm	

Infrared Sensors	Part Numbers	Range	
Propane (C_3H_8)	ESH-A-JET	0 - 100% LEL	~8 yrs

3.8 Compatible CET Remote Analog Transmitters

- CGAS-A Analog Detector
- LPT Low Power
- CXT2-A Analog Explosion Proof Transmitter

3.9 Calibration Extending Firmware (CEF) and Sensor Aging

cGas-SC systems with integral electrochemical sensors have been programmed with our Calibration Extending Firmware. This firmware takes into consideration the aging of the electrochemical CO and NO_2 sensors so that less frequent calibrations are required in less-critical applications such as parking garages. The system tracks the age of the sensor and automatically compensates for the reduced output of the sensor as it ages.

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 warmup period. The length of warm up time will depend on the type of gas, sensor type, environment, and other factors. CETCI recommends 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-SC with an Ammonia sensor, it should be left to warm up for at least 48 hours.
- After installing a cGas-SC 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-SC 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.

After a substantial warm up period, an Ethylene Oxide sensor should be zeroed on site if the ambient temperature is above 22°C (71.6°F). This sensor has a drift factor that can be as much as 1 ppm if the temperature rises to 25°C (77°F). With the low set point you could experience false alarms.

Ozone sensors are sensitive and may be reactive to temperature changes causing them to drift.

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 cGas-SC

The cGas-SC should be installed vertically and upright on a flat surface like a wall or a column. Do not mount it upside down, sideways or flat on the floor or other surface. Care should be taken to ensure that the face of the cGas-SC is not obstructed to maximize the sensor's exposure to the environment being monitored.

4.2.1 Wet Environment Considerations

If the cGas-SC is to be installed in a potential hose-down application or any application whereby liquid could be directed towards the sensor opening, the cGas-SC should be ordered with an optional attached splash guard (factory installed).

If used in a wet or wash down application, the conduit hub entering the cGas-SC enclosure must be liquid tight type. Any water or physical damage to the cGas-SC that occurs from the installer drilling their own installation holes will not be covered under warranty.

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 types 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. Confirm the devices are properly grounded using conduit and shielded cabling.
3. Inform operators and technical staff working in the surrounding area to be aware of these possible conditions and that two-way radios may interfere with the response of the gas detectors.

4.2.3 Mounting Height (Sensor and application dependent)

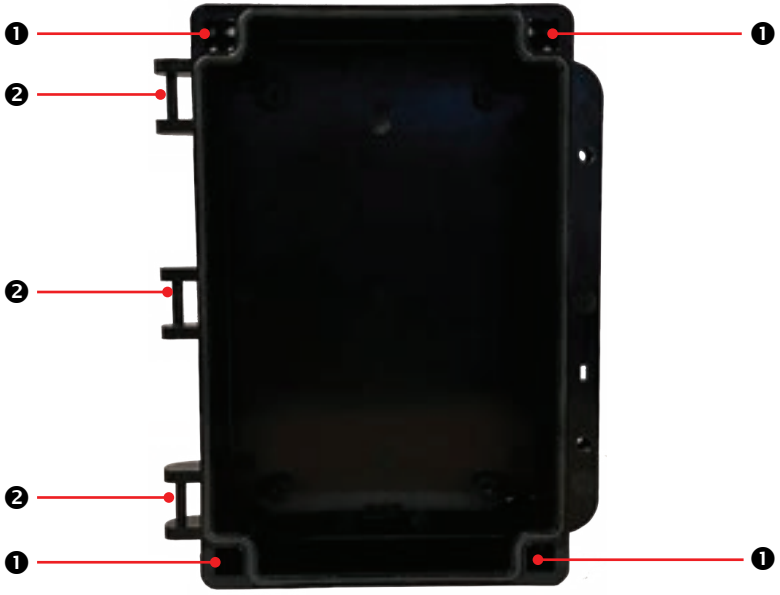
The sensor mounting height depends on the molecular weight of the gas relative to air. Heavier than air gases should be detected 6 in / 15 cm from the floor, lighter than air gas sensors should be placed on or near the ceiling, and gases which have a molecular weight close to that of air should have sensors installed in the "breathing zone" 4 - 6 f / 1.2 - 1.8 m from the floor. The breathing zone refers to the area 4 - 6 ft / 1.2 - 1.8 m 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.

GAS	APPLICATIONS / TYPES	SUGGESTED MOUNTING HEIGHT
Carbon Monoxide (CO)	Fire Halls, Parking Garages	4 - 6 ft above the floor
Nitrogen Dioxide (NO_2)	Diesel Powered Equipment	4 - 6 ft above the floor
Nitric Oxide (NO)	Welding	4 - 6 ft above the floor
Oxygen (O_2)	Hospitals	4 - 6 ft above the floor
Hydrogen Sulphide (H_2S)	Oil and Gas Industry	4 - 6 ft above the floor
Ethylene (C_2H_4)	Fruit Ripening Rooms	4 - 6 ft above the floor
Sulphur Dioxide (SO_2)	Pulp and Paper Mills	4 - 6 ft above the floor
Refrigerants	Chiller rooms	6” above the floor
Propane (C_3H_8)	Ice Arenas	6” above the floor
Hydrogen (H_2)	Battery Charging Rooms	On or near the ceiling
Methane (CH_4)	Waste Water Treatment Plants	On or near the ceiling

For more examples, visit: www.critical-environment.com/support/faq/at-what-height-should-sensors-be-mounted

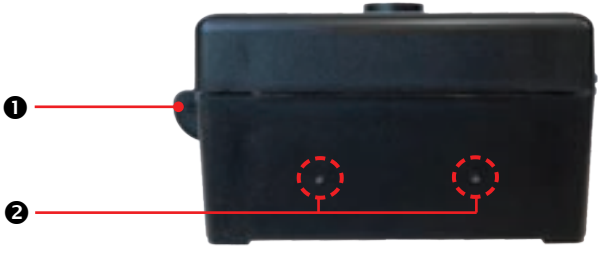
4.3 Enclosure Mounting Components

4.3.1 Enclosure Interior Base



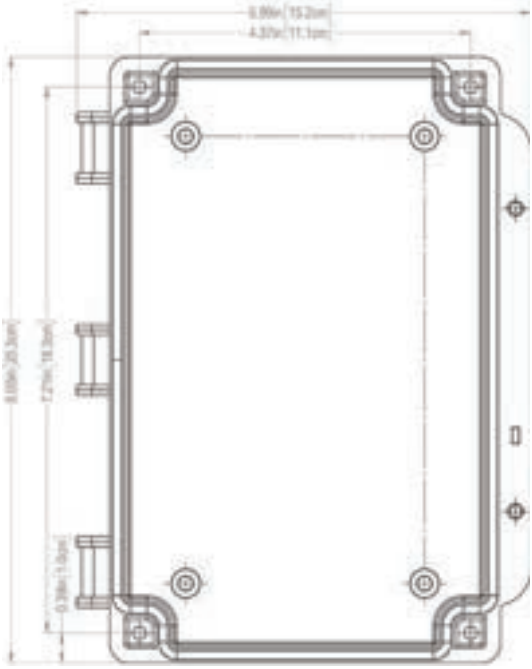
NUMBER	FEATURE
1	Mounting Holes
2	Door Hinge

4.3.2 Enclosure Bottom



NUMBER	FEATURE
❶	Door Hinge
❷	Indentations for drilling 0.5 in / 12.7 mm conduit entry points

4.3.3 Mounting Hole Locations and Dimensions



Secure the cGas-Sc using the four 0.175in / 4.4mm diameter mounting holes provided to maintain watertight status. The maximum head diameter is 0.32in / 8mm, use a #8 or 4 mm screw.

Several indentations are provided as markers on the top, bottom and backside of the base of the enclosure for drilling conduit entry points. The clearance from the PCA to the base enclosure is 0.5 in / 12.7 mm. **Do not use a conduit connector that has more than 0.5 in / 12.7 mm thread length.** If the Line Voltage Option DV is installed in the device the backside mounting points are not available for use.

NOTE: When mounting the enclosure, allow enough room to allow the end user to open the door fully to access the internal adjustments.

4.4 Wiring Connections

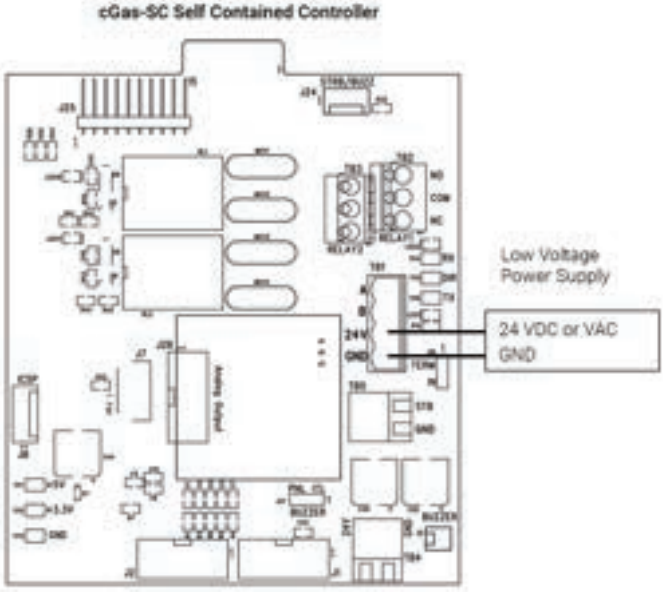
The cGas-SC Self-Contained Controller is designed to be very versatile. It comes standard with low voltage supply power and may be ordered with line voltage supply power (Option -DV).

LOW VOLTAGE SUPPLY POWER

Drill out one or more of the PVC conduit entry hole plugs located on the top or the bottom of the cGas-SC Self-Contained enclosure base. Refer to Section 4.3 Enclosure Mounting Components.

All wiring should be run within properly grounded (earth or safety) conduit. 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-SC. Low voltage wiring must not be within the same conduit as line voltage wiring.

NOTE: WARRANTY MAY BE VOID IF DAMAGE OCCURS TO CIRCUIT BOARD COMPONENTS FROM THE USE OF SOLID CORE WIRE ATTACHED DIRECTLY TO THE WIRING TERMINALS. When using solid core wiring for distribution (in the conduit), use stranded wire pigtails 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 the warranty.



A class 2 or better transformer must be used. The stated max current draw of the cGas-SC in this mode is 0.5A.

Double check wiring connections prior to powering connected remote sensors or transmitters. Damage from incorrect wiring connections is not covered under warranty.

LINE VOLTAGE SUPPLY POWER (OPTION -DV)

Drill out one or more of the PVC conduit entry hole plugs located on the top or the bottom (NOT the back) of the cGas-SC Self-Contained enclosure base. Refer to Section 4.3 Enclosure Mounting Components

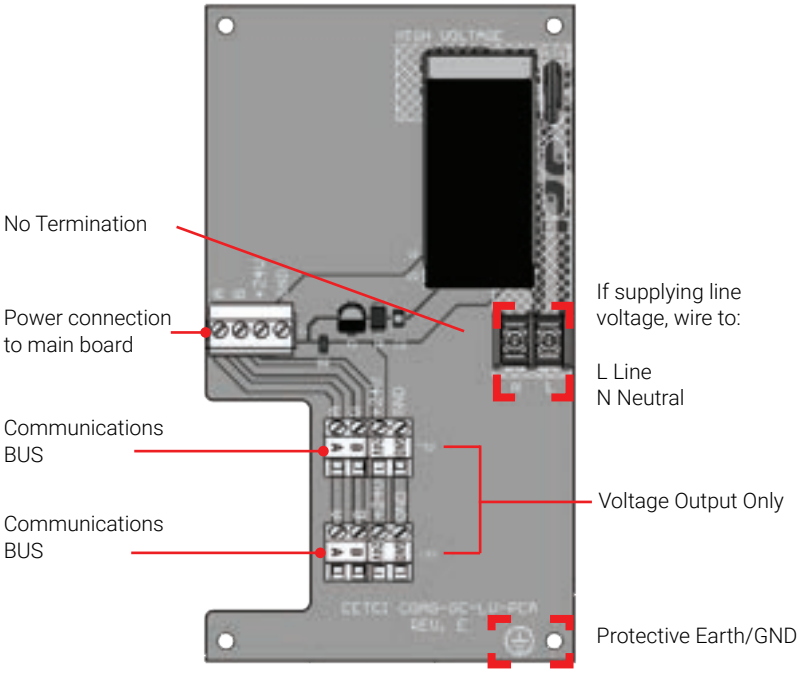
All wiring should be run in EMT (or better) conduit properly grounded (earth or safety). Building code requires low voltage wiring not to be within the same conduit as line voltage wiring. All communications (network) wiring must be in shielded cabling. Wire shielding must be connected at each device and taped off so it cannot cause a short on the circuit board when the door is closed. The wire shielding should be connected to earth ground close to the primary supply connection only and must have a contiguous connection throughout the network. It should be left taped and floating at the last device in the network.

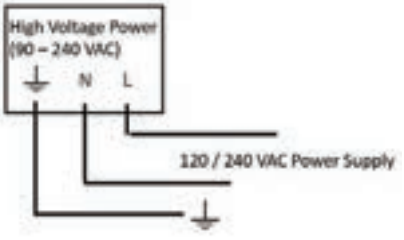
Wire the field wiring to the Line Voltage terminal N and L on the board in the base of the enclosure and wire the protective earth ground to the bottom right corner of the board indicated with the Protective Earth symbol. These are the power connections and should be supplied with a minimum of 3-conductor, 18 AWG stranded wiring.

When installing, the incoming Protective Earth/GND needs to be secured before attaching other Ground lines to the same stud.

All wiring should be run within properly grounded (earth or safety) conduit. Signal output and supply should be in shielded cable. Low voltage wiring must not be within the same conduit as line voltage wiring.

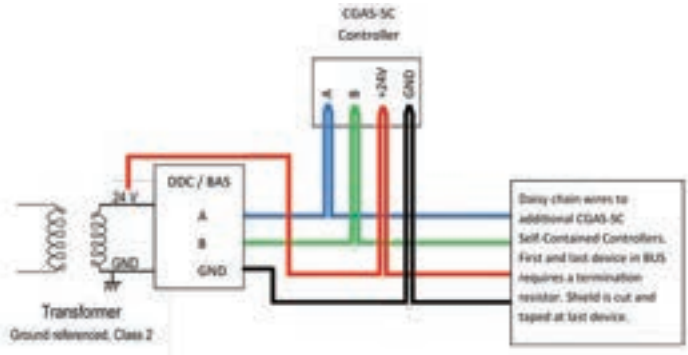
Total max power consumption of all connected peripheral devices is 10 watts.





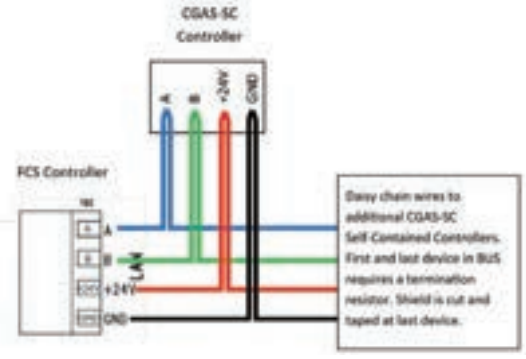
Wiring Example: 4-Wire VAC

If the cGas-SC 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-SC is being connected to an FCS Multi Channel Controller, 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.



NOTE: WARRANTY MAY BE VOID IF DAMAGE OCCURS TO CIRCUIT BOARD COMPONENTS FROM THE USE OF SOLID CORE WIRE ATTACHED DIRECTLY TO THE WIRING TERMINALS. When using solid core wiring for distribution (in the conduit), use stranded wire pigtails 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.

The wiring between the cGas-SC and a controller or BAS/DDC or multiple cGas-SC devices, should be 4-conductor shielded 16 awg stranded within conduit in a network wiring (daisy-chain) configuration. Suggested 4-conductor, 16 AWG, shielded

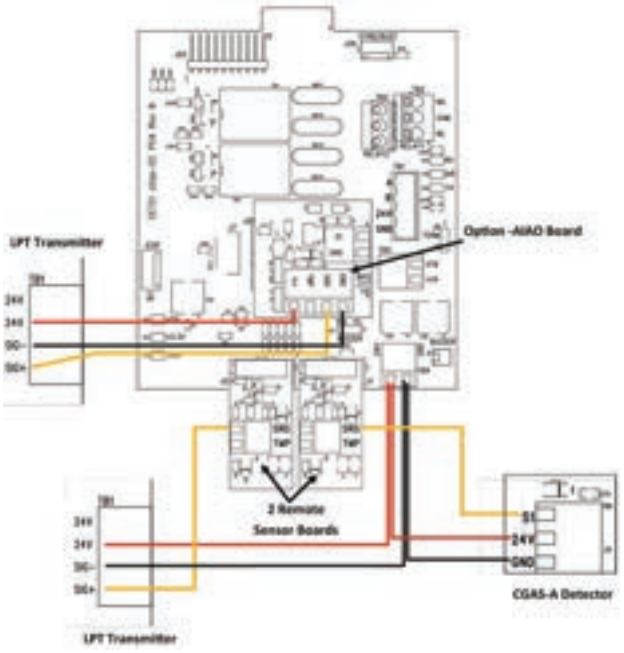
stranded wire cable types are AlphaWire 79220, Belden 5202FE 008500 or equivalent.

All communications (digital network) wiring must be in shielded cabling. Wire shielding must be connected 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.

An end of line jumper must be installed at both ends of the digital network. To terminate, you must place the supplied 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 is disabled.

4.5 Wiring Connections to Analog Transmitters

The cGas-SC can be configured with up to a maximum of three analog 4-20 mA inputs by using two remote sensor boards and the Option -AIAO board.



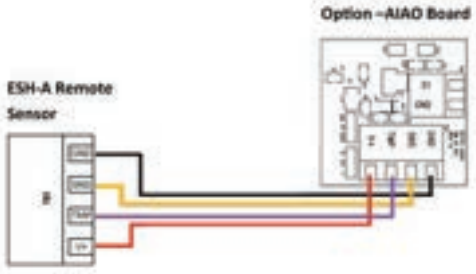
Three-conductor, 16 - 18 gauge wire / cable must be shielded when connecting to a remote analog transmitter. The LPT and CGAS-A series of remote analog transmitter enclosures have several conduit entry locations (general purpose enclosure).

NOTE: WARRANTY MAY BE VOID IF DAMAGE OCCURS TO CIRCUIT BOARD COMPONENTS FROM THE USE OF SOLID CORE WIRE ATTACHED DIRECTLY TO THE WIRING TERMINALS. 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. Under most local electrical codes, low voltage wires cannot be run within the same conduit as line voltage wires.

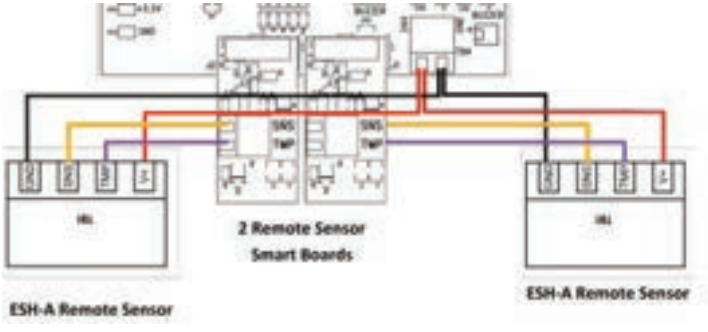
4.6 Wiring Connections to ESH-A Remote Sensors

The cGas-SC can be configured with up to a maximum of three analog 4-20 mA inputs by using two remote sensor boards and the Option -AIAO board. Any of these three analog input connection points can be used to connect an ESH-A Remote Sensor.

ESH-A Remote Sensor Connected to Option -AIAO



ESH-A Remote Sensor Connected to Plug & Play Remote Sensor Boards



NOTE: The ESH-A Remote Sensor has a temperature sensor which should be wired to the TMP position.

Each ESH-A is given the same serial number as the device it is being connected to. Make sure to connect the ESH-A to the CGAS-SC that has the same serial number or the CGAS factory calibration will be void.

Three-conductor, 16 - 18 gauge wire / cable must be shielded when connecting to a remote analog transmitter. CET's analog transmitter enclosures have several conduit entry locations.

The maximum length of wire between the ESH-A Remote Sensor and the cGas-SC should not exceed 61 m (200 ft).

4.7 Analog Wire Gauge vs Run Length

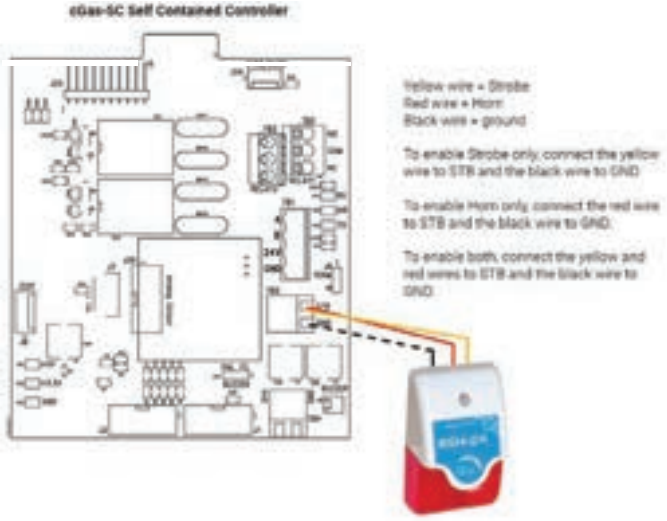
The table below shows the maximum cable length between the cGas-SC Self-Contained Controller and the CGAS-A or LPT transmitters for normal installations (a separate signal line from the controller for each analog transmitter is required).

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.

4.8 Wiring to a Remote Strobe/Horn

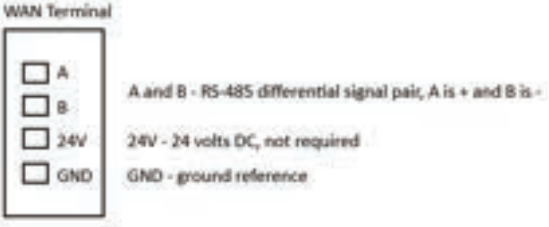
The cGas-SC has a horn/strobe terminal for connecting a remote 24 VDC horn and/or strobe combination (ie. RSH-24V-R, RSH-24V-B or RSH-24V-A), 0.5 Amps max.



Alternatively, the remote horn/strobe can be connected to one of of the cGas-SC relays, especially if multiple remote horn/strobes are needed. Note: This method requires a separate power source as the relays DO NOT supply power. See Section 4.10 Relay Connections for more information.

4.9 Wiring to a Building Automation System (BAS)

The WAN Terminal is used to connect the cGas-SC to a Building Automation System (BAS) or other type monitoring system or control panel. Refer to Section 3.4 Interior System Layout for the location of the WAN Terminal.

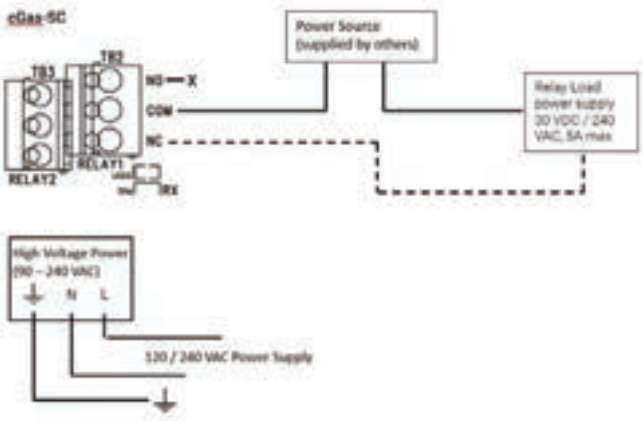


The wiring between the cGas-SC and a controller or BAS/DDC or multiple cGas-SC devices, should be 4-conductor shielded 16 awg stranded within conduit in a network wiring (daisy-chain) configuration. Suggested 4-conductor, 16 AWG, shielded stranded wire cable types are AlphaWire 79220, Belden 5202FE 008500 or equivalent.

4.10 Relay Connections

The cGas-SC has two internal dry contact relays that are designed to operate fan starters or coils to control equipment that draws no more than 5 amps @ 240 V start-up and / or operational current.

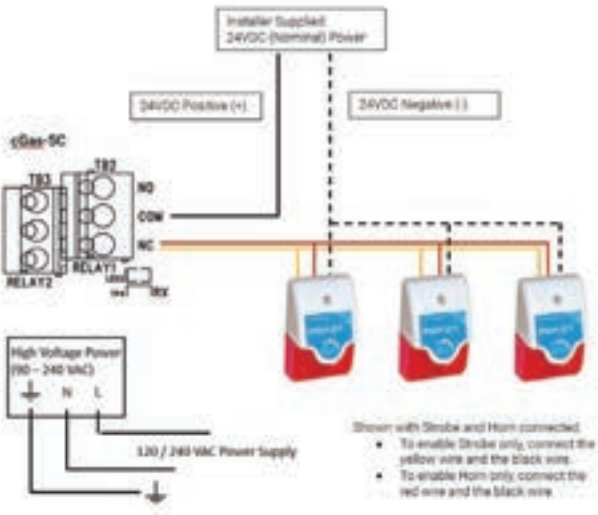
The system relays are SPDT (single pole, double throw) thereby providing one set of usable dry contacts for each relay. Because the cGas-SC systems are designed to be fail-safe, any equipment to be controlled by the system relays should be wired to the "NC" (Normally closed) and "COM" (Common) terminals. 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 non-alarm state for failsafe operation.**



NOTE: If the Option RBZ is installed a third relay is available. This relay is a SPDT dry contact relay, rated at 30 volts, 2 amps max.

The system does not provide any power from these terminals. Dry contacts operate like a switch to simply activate (switch on) or de-activate (switch off) equipment to be controlled, such as fan starters.

Wiring Multiple Remote Strobe/Horn Devices to the Relay



5 BASIC SYSTEM OPERATION

The cGas-SC continuously monitors target gas concentrations on up to three configured channels. It can operate as a standalone system or connect to another controller, control panel or BAS / BMS / DDC system.

Upon application of power to a cGas-SC shipped from the factory, the LCD display will turn on and rotate through several info screens that differ depending on the configuration of the device. The cGas-SC will be visible on the controller / BAS / DDC system during the power up countdown and will output a default value to prevent alarms until the system is fully powered up. After that time, the system may exhibit gas alarm condition(s) if the sensor(s) have not gone through the recommended warm up time. The time it takes for a sensor to warm up and stabilize is dependent on several factors. **Read Section 4.1 Sensor Warm Up Time for more information on the length of time it takes for sensors to warm up and the cGas-SC to provide accurate gas readings.**

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 pushbuttons on the outside of the enclosure are used to navigate through the cGas-SC menu structure. Refer to Section 3.3 Exterior Enclosure 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 OK 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 OK 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 OK 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 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 OK.

Once in a Parent Menu a list of available Menu Items is 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 Menu Items that are displayed will depend on your device's configuration as well as the currently selected channel or relay.

Pressing OK 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 OK 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 cGas-SC will return to the normal operation.

NOTE: Except when conducting test functions, the gas detection and alarm reactions of the cGas-SC will continue to function as normal during menu use.

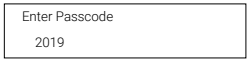
5.3 Display Settings

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.

5.3.1 Adjust Display Brightness

The brightness of the display can be changed in increments of 10. The factory default is 50 (50%). 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 OK button.



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

Enter the numeric value as desired and press OK.

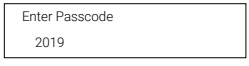
5.3.2 Display Configurations

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

Normal

Minimal

Enter passcode 2019 and press the OK button.



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

Choose the preferred display setting and press OK.

5.4 Alarm Status, Fault Detection and Communication Failure Notifications

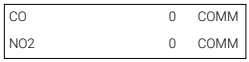
If a channel is in alarm, the following letters will be displayed at the end of the line for that channel.

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

The cGas-SC has built in fault detection, and in the event of a problem with the measurement circuitry it will indicate a fault condition on the display and the display backlight will blink. Normal operation will resume once the fault condition has been corrected.

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.

If there is a communication failure between the cGas-SC and the controller or BAS, the screen will display COMM at the end of the line.



For a list of Fault Codes, refer to Section 6 Troubleshooting.

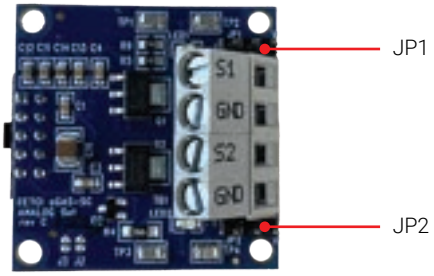
5.5 Analog Output Settings

The cGas-SC does not have analog outputs unless it is ordered with Option -2AO or it has 3 gas channels installed. 3 channel models inherently have 1 analog output and cannot have Option -2AO.

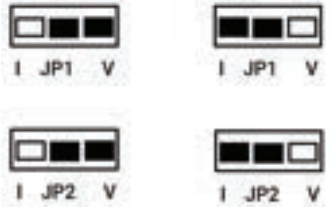
5.5.1 Change Analog Output (Milliamps / Voltage)

Option -2AO provides two 4-20 mA analog outputs that can be user configured for current output or voltage output. The factory default setting is 4 - 20 mA. The analog output type can be changed in the field using jumpers.

Option 2AO Board



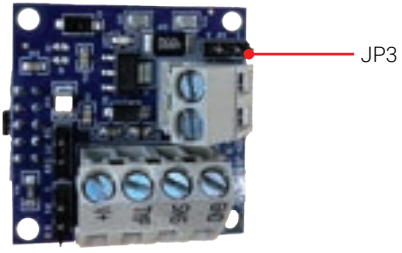
Find JP1 and JP2 on the 2AO board and move the jumpers as indicated by the black area for current and voltage.



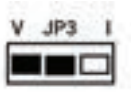
voltage output current output

All 3 channel cGas-SC models come with 1 analog output. It is located on the remote sensor daughter board in the middle of the main board. The factory default is 4 - 20 mA. The analog output can be changed to voltage in the field using the jumpers on jumper bank 3.

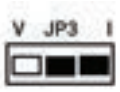
Remote Sensor Board (AIAO board)



Find JP3 on the board and move the jumpers as indicated by the black area for current and voltage.



voltage output



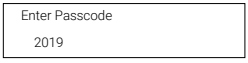
current output

5.5.2 Set Analog Output Type

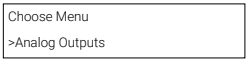
The factory default analog output type is current. The analog output type can be changed from current to voltage and vice versa in the field.

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

Enter passcode 2019 and press the OK button.



Navigate to the Analog Outputs parent menu and press OK.



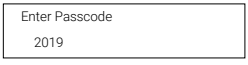
Navigate to the Set AO Type menu item and change the Current (mA) to Voltage (V). Press OK.

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 5.5.3 Set the Analog Output Range.

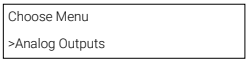
5.5.3 Set the Analog Output Range

The factory default analog output for the cGas-SC 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.

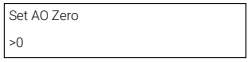
Enter passcode 2019 and press the OK button.

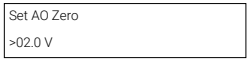


Navigate to the Analog Outputs parent menu and press OK.



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

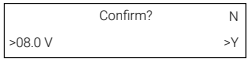




Press OK to confirm the value is correct.

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

Press OK to confirm the value is correct.



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.

NOTE: When changing the AO limits the firmware automatically calibrates itself to the new limits. If the values aren't as accurate as desired, refer to Calibrating the Analog Output in the cGas-SC Operation Manual.

5.5.4 Set Analog Output Mode

The factory default analog output mode is PEAK with the analog output following a single channel. You can set the analog output to OFF which will result in a 4mA current output and will stop the analog output from sending a signal to the controller or control panel. This may be useful if you need to perform maintenance on or replace the device. Or you can set the analog output mode to STEP which is useful for controlling variable speed fans (VFD) and electrically commutated motors (ECM) used in many applications including variable refrigerant flow (VRF) systems.

Mode Settings:

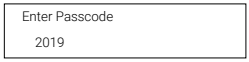
- PEAK - factory default, each analog output is attached (through priorities) to a single channel*
- STEP - for each analog output there are 5 steps that can be configured to output a specific real-world value (mA or V) when triggered by Low, Mid, High alarms or a Fault or when no alarms are present (None)
- OFF - the analog output will have 4mA current output

*It is possible for one analog output to be set to track two channels and the analog output will transmit a signal according to the highest gas concentration as a percentage of range. ie. an NO2 reading of 5 ppm is 50% range and would override a CO reading of 50 ppm which is 25% range.

NOTE: If the analog output mode is OFF, the cGas-SC will still detect gas and display readings. It will not send an analog signal back to the controller but will send the digital output signal.

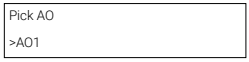
NOTE: While in Step Mode the AO will take NO ACTION during a Fault unless a step has been set to react to the Fault flag. The factory default setting is Step4: 20mA output on any Fault.

Enter passcode 2019 and press the OK button.



Navigate to the Analog Outputs parent menu and press OK.

Choose the analog output you want to configure and press OK.

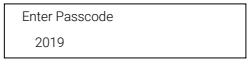


Navigate to the Set AO Mode menu item and press OK. Choose the mode desired and press OK.

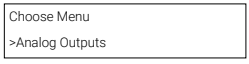
5.5.5 Configuring PEAK Mode

The peak mode can reference any of the 8 priorities the cGas-SC contains. Each of those priorities can have any or all of the 5 possible channels reporting to them. The priority calculates a “peak” value as a percentage that the analog output then converts to an output in its range (4-20mA or 0-10V).

Enter passcode 2019 and press the OK button.



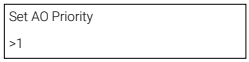
Navigate to the Analog Outputs parent menu and then to the Pick AO menu item and press OK.



Choose the analog output you would like to assign a priority to and press OK.

Navigate to the Set AO Priority menu item and press OK.

Choose the priority the analog output will respond to (1 to 8) and press OK.



Press OK and go back to Pick AO item menu to repeat the process for the second analog output.

5.5.5 Configuring AO STEP Mode

For each analog output there are 5 steps that can be configured with an analog output value and set to be activated by the following step flags:

- None - the step is active when no alarm or fault is present and outputs the configured value
- Low - the step is triggered on the Low Alam and outputs the configured value
- Mid - the step is triggered on the Mid Alarm and outputs the configured value
- High - the step is triggered on the High Alarm and outputs the configured value
- Fault - the step is triggered on a Fault and outputs the configured value
- Unused Step - the step is not being used, it is completely disabled

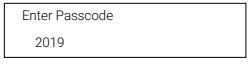
Each step number takes precedence over the step before it regardless of the output value with step 5 being the highest precedence and step 1 being the lowest.

There are 8 priorities to which each step can be set to reference. The priorities are not exclusive, each step could have the same priority number if desired. For the specified priority, for example, if a channel reporting to that priority goes into Low Alarm, the step set to that prority and the Low Alarm flag will show the output value.

The factory default priority settings are:

- Pri 1-5 track single channels 1-5
- All Channels report to Pri 8

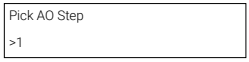
Enter passcode 2019 and press the OK button.



Navigate to the Analog Outputs parent menu and then to the Pick AO menu item and press OK.

Choose the analog output you would like to configure the step for and press OK.

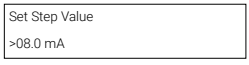
Navigate to the Pick AO Step menu item and choose the step (1 to 5) you want to configure.

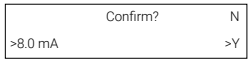


Navigate to the Set Step Pri menu item and press OK. Choose the priority number (1 to 8, with 8 being the highest priority) you want the step to react to and press OK.

Navigate to the Set Step Flag menu item and press OK. Choose the flag (None, Low, Mid, High, Fault, Unused Step) within the priority that will trigger that step and press OK.

Navigate to the Set Step Value menu item and press OK. Enter a real-world value (mA or V) with 1 decimal place to output when the step is active and press OK.





NOTE: If the analog output is type is voltage the display will show the correct unit of measure (ie. 2.0 V).

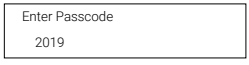
Press OK and go back to Pick AO item menu to repeat the process for the second analog output.

5.6 Change Units (°C or °F) of Temperature Readings

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

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

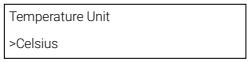
Enter passcode 2019 and press OK.

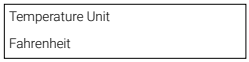


Navigate to the Calibration parent menu and then to the Selected Channel menu item.

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

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





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.

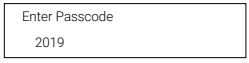
5.7 Temperature and / or Relative Humidity Offset

NOTE: This menu item only applies if the cGas-SC 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 is calibrated prior to shipping. If the readings on the cGas-SC 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 and humidity offset value is a number +/-0 that represents degrees or percentage.

Enter passcode 2019 and press OK.



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

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

Enter the desired offset value and press OK.

Press OK to confirm the value is correct.

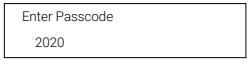
5.8 Test Functions

The available test functions will depend on the configuration of the individual cGas-SC.

5.8.1 Test Digital Output

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-SC 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 OK.

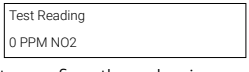


Navigate to the Testing parent menu and then to the Selected Channel menu item and press OK.

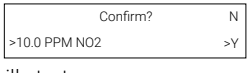
Confirm the correct channel is showing. The list to choose from will depend on how many channels there are and what options are included:

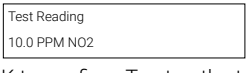
- Gas Type (ie. CO)
- Gas Type (ie. NO2)
- Temperature
- Humidity

Enter the desired value and press OK.



Press OK to confirm the value is correct.





The test will start as soon as you press OK to confirm. To stop the test, press any button.

5.8.2 Test Analog Output

NOTE: This functionality is available only when Option -2AO is installed or the cGas-SC has 3 gas channels.

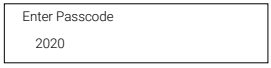
Testing the analog output allows you to determine if the installation was successful. The test forces the cGas-SC to output a predetermined signal to the controller or DDC/BAS to test that the correct signal is being transmitted and the controller responds as configured (ie. if analog output is configured 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 OK.



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

Selected the desired AO, enter the value and press OK.

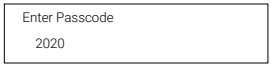
Press OK to confirm the value is correct.

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

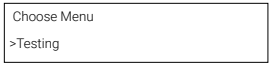
5.8.3 Test Relay, Buzzer and/or Strobe

NOTE: Before testing the relay, buzzer or strobe 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 OK.

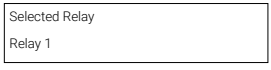


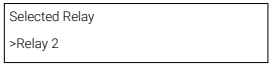
Navigate to the Testing parent menu and then to the Selected Relay menu item and press OK.



Confirm the correct relay is showing.

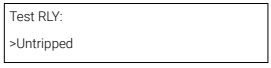
- Relay 1
- Relay 2
- Buzzer
- Strobe





Navigate to the Test RLY:2 menu item change Untripped to Tripped and press OK. 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, or the strobe will turn on.

To stop the relay test, press any button. You will hear a soft click, and the relay will deactivate, the buzzer will go quiet or the strobe will turn off.



NOTE: The OFF Delay will apply if it is set.

6 TROUBLE SHOOTING

cGas-SC won't power up. (blank display) Is the power properly connected? Check the wiring connections. Refer to Section 4.4 Wiring Connections.

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.

Frequent, unexpected alarm reading reported to BAS/DDC. Check to see if EMI and RF interference is causing the equipment to react this way.

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

List of Possible cGas-SC Error Codes

CODE		DESCRIPTION
COMM	Communication Fault	The controller or BAS has not read the current gas concentrations in more than the preset time (default 5 minutes). Could be an address miss-matched between cGas-SC and controller / BAS. MAC value on MODbus or MAC value or Device ID on BACnet Check for wiring problems. A and/or B wires broken at somewhere in the network or ground connection between cGas-SC and controller / BAS (using cable shield as ground is not recommended).
F01	Negative Fault Reading	Check to make sure the smart sensor board is present and installed properly in the socket. If installed, the cGas-SC 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-SC 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-SC detected an error in the smart board ID. Use "Write to Sensor" for the indicated channel (passcode 2019, Configuration menu).
F06	SB ID Mismatch	Firmware expected a different smart board than what is in the sensor socket. Confirm the correct smart board is installed in the correct socket. ie. CH1 gas should be in the left socket. When confirmed, if still in error, use "Write to Sensor" for the indicated channel (passcode 2019, Configuration menu).

F07	RH & Temp Fault	cGas-SC cannot communicate with the sensor. Ensure the smart board is installed correctly. If unresolved, contact our Technical Support Department.
F08	ADC COMM	This is a daughter board hardware failure. Contact our Technical Support Department.
F80-99	Internal Memory Faults	The cGas-SC has detected a critical memory failure of the main board. This can be corrected by boot loading a valid configuration onto the unit. If unresolved, contact our Technical Support Department.

NOTES

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