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QCC Quad Channel Controller

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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 installed 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. (CETCI), also referred to as the manufacturer, warrants this 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**. If the product should become defective within this warranty period, we will repair or replace it at our discretion.

The warranty status may be affected if the instrument has not been used and maintained per the instructions in this manual or has been abused, damaged, or modified 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 must be pre-authorized by obtaining a Returned Merchandise Authorization (RMA) number. Contact the manufacturer for a number and 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 a Returned Merchandise Authorization (RMA) number. 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 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 and Registered Trademarks

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.

All software which CETCI utilizes and / or distributes holds a proprietary interest and is also subject to copyright protection and all rights are reserved. No party may use or copy such software in any manner or format, except to the extent that CETCI grants them a license to do so. IF SOFTWARE IS BEING LOADED ONTO MORE THAN ONE COMPUTER, EXTRA SOFTWARE LICENSES MUST BE PURCHASED.

Modbus® is a registered trademark of Gould Inc. Corporation. BACnet® is a registered trademark of American Society of Heating, Refrigerating and Air-Conditioning Engineers (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 foregoing 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. Revised copies of this manual can be obtained by contacting CETCI or visiting www.critical-environment.com

Should you detect any error or omission in this manual, 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

NOTE: For installation information (mounting, wiring, etc.), for the QCC, QCC-RDM and the remote and peripheral devices, please refer to the *QCC Installation Manual* and /or the individual product manual for the specific device.

2.1 General Description

Thank you for purchasing our QCC Quad Channel Controller. The QCC is a fixed system controller that offers up to four gas channel configurations for monitoring toxic, combustible and/or refrigerant gases for non-hazardous, non-explosion rated, commercial applications.

The QCC is designed to accept inputs from up to four remote digital and/or analog transmitters using Modbus® RTU RS-485 or 4-20 mA analog input.

The QCC is available in two models:

1. **QCC-M** with Modbus® RTU RS-485 wide area network (WAN) output to Building Automation System (BAS) or Direct Digital Control (DDC) system
2. **QCC-B** with BACnet® MS/TP WAN output to BAS or DDC

Both models of the QCC feature:

- Three configurable SPDT dry contact relays with field configurable time delays and trigger levels
- LCD display and three LED indicators for alarm status and fault condition
- A USB port for firmware upgrades (and data logging if the optional onboard Analog Output module is installed).
- With the Analog Output module (Option -AO) installed, the QCC can be configured to generate two separate 4-20 mA outputs for VFD control or useable by any other device requiring a signal representing the levels of gases detected.
- A door mounted, loud audible alarm that is ideal for noisy environments. Water tight option available.
- Additional application specific options include: a manual shutoff switch, a top mounted strobe and a water tight, door mounted audible alarm.
- The QCC can be connected to an RSH-24VDC Remote Strobe/Horn combo, a QCC-RDM Remote Display and the following peripheral devices: LNK-AO Analog Output, LNK-XT Network Extender, RLY-4 Remote Relay and an RPS-24VDC Remote Power Supply.

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

2.2 Key Features

- Four gas channel operation with any combination of up to 4 analog and/or digital transmitters
- Modbus® RTU RS-485 LAN communications for controlling Peripherals and digital transmitters
- Modbus® RTU RS-485 (QCC-M) or BACnet® MS/TP (QCC-B) WAN output for communicating with a Building Automation System (BAS)
- Two configurable 4-20 mA outputs and data logging (Option -AO)
- 4-line, 20 character LCD display and LED indicators for alarm STATUS 1, 2, 3 and Fault conditions
- Three 5-amp SPDT dry contact relays @ 120 / 240 volts each
- Six conduit entry ports
- Thermal resetting fuses
- RoHS compliant circuit boards

3 INSTRUMENT SPECIFICATIONS

3.1 Technical Specifications

GAS TYPE

No internal gas sensors

MECHANICAL

Enclosure	ABS / Polycarbonate, rated UL94-HB. Copper coated interior to reduce RF interference. IP54 rated with door mounted, water tight buzzer installed.
Weight	1.7 kg (3.78 lbs)
Size	254 mm x 226 mm x 113 mm (10.0" x 8.9" x 4.44")

USER INTERFACE

Display	4-line, 20 character LCD display and LED indicators for "STATUS 1, 2 and 3", "FAULT"
Manual Shutoff Switch (Option -SW)	Required in refrigeration applications to meet B52 code requirements.

INPUT/OUTPUT

Inputs	<ul style="list-style-type: none"> - Modbus® RTU RS-485 - 4-20 mA analog
Outputs	<ul style="list-style-type: none"> - Modbus® RTU RS-485 (model: QCC-M) - BACnet® MS/TP to BAS (model: QCC-B) - Two 4-20 mA analog outputs with data logging (Option -AO) - Remote and Peripheral devices on a Modbus® RTU RS-485 network - One 24 VDC drive output for strobe/horn
Relays	Three internal SPDT dry contact relays, rated 5A @ 240 VAC
Audible Alarm	<ul style="list-style-type: none"> - Door mounted audible alarm rated 90 dB @ 30 cm (0.98 ft) - High Alarm, 5 min Silence interval (default, configurable) - Optional door mounted water tight buzzer (Option -WA), rated 85 dB @ 60.96 cm (2 ft)
Top Mounted Strobe (Option -L)	7 cm dia x 12.7 cm H (2.75 in dia x 5 in H), 24 V

ELECTRICAL

Power Requirement

Line Voltage 90 - 240 VAC, 50 - 60 Hz, 75 W

Power Distribution	Total power available to Remote & Peripheral Devices and Options 65 W @ 24 VDC
Wiring	<ul style="list-style-type: none"> - VAC (line voltage) three-conductor (Line, Neutral, Ground) shielded minimum 18 awg stranded within conduit - LAN Modbus® RTU RS-485 4-conductor, 16 AWG, shielded, stranded - WAN (output to BAS): 4-conductor, 16 AWG, stranded shielded Modbus® RTU (version 1.1b3) RS-485 or BACnet® MS/TP (version 1 rev 14) RS-485
LAN / WAN Communication: Modbus® RTU over RS-485	LAN Baud rate: 19,200 (default, configurable) WAN Baud rate: 19,200 (default, configurable) WAN Modbus ID: 100 (factory default) Data bits: 8 Stop bits: 1 Parity: none
WAN Communication: BACnet® MS/TP	Baud rate: 76,800 (default, configurable) Base Address: 270 (factory default) MAC Address: 100 (factory default) Instance ID: 270100 (the Base Address x 1000 + the MAC Address) Data Bits: 8 Stop Bits: 1 Parity: none
Fuses	Automatic resetting thermal

ENVIRONMENTAL

Operating Temperature	-20°C to 40°C (-4°F to 104°F) with optional internal heater -40°C to 40°C (-40°F to 104°F)
Operating Humidity	15 - 90% RH non-condensing

CERTIFICATION

Model: QCC-M-xx or QCC-B-xx
 S/N: QCCM1603B00001 (example)
 Rating: 90-240 VAC, 50-60 Hz, 94W



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 17):2007

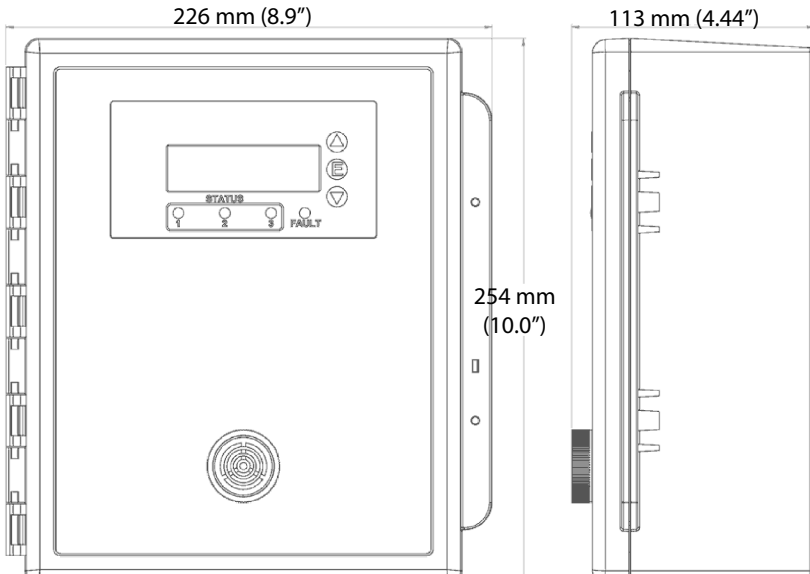
Conforms to: EMC Directive 2004/108/EC, EN 50270:2006, Type 1, EN61010

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.

NOTES:

- System is configured such that all relays are “FAIL SAFE” (relay coils are always energized in non-alarm state).
- Relays are activated by multiple alarm conditions.

3.2 Enclosure Dimensions



4 LIST OF COMPATIBLE DEVICES

NOTE: The QCC does not have internal gas sensors. It is strictly a controller that can accept inputs from up to 4 remote digital and/or analog transmitters and/or peripheral devices.

Analog and/or Digital Transmitters	Output Signal	Gases	Sensor Type
ART Infrared Refrigerant	4-20 mA, Modbus®	R123, R134A, R404A, R407A, R407C, R407F, R410A, R427A, R507, HF01233ZD, R422A, R422D, HR01234YF, HF01234ZE, R22	Infrared
AST-IS18-M CO ₂ Transmitter	Modbus®	CO ₂	Infrared
AST-IS12 CO ₂ Transmitter	Modbus®	CO ₂	Infrared

all other AST-IS CO ₂ Transmitters	4-20 mA	CO ₂	Infrared
CXT Explosion Proof	4-20 mA Modbus®	NH ₃ , CO, CO ₂ , H ₂ , H ₂ S, NO ₂ , O ₂ , PH ₃ , SO ₂ , CH ₄ , C ₃ H ₈ , C ₅ H ₁₂	Electrochemical, Infrared, Catalytic
LPT Low Power	4-20 mA	NH ₃ , CO, NO ₂ , Cl ₂ , O ₂ , O ₃	Electrochemical
LPT-A Analog	4-20 mA	NH ₃ , CO, NO ₂ , ClO ₂ , Cl ₂ , C ₃ H ₄ , C ₂ H ₄ O, CH ₂ , H ₂ , H ₂ S, HCl, HCN, NO, O ₂ , O ₃ , PH ₃ , SiH ₄ , SO ₂ , CH ₄ , C ₃ H ₈ , TVOCs, Refrigerants	Electrochemical, Solid State, Catalytic
LPT-M Modbus®	Modbus®	same as LPT-A	same as LPT-A
LPT-P Digital Car Park	Modbus®	CO, NO ₂ , H ₂ , CH ₄ , C ₃ H ₈	Electrochemical and Catalytic
LPT-M Modbus®	Modbus®	same as LPT-A	same as LPT-A
LPT-P Digital Car Park	Modbus®	CO, NO ₂ , H ₂ , CH ₄ , C ₃ H ₈	Electrochemical and Catalytic

CETCI Peripheral and Remote Devices	Output Signal		# of Devices Limit
LNK-AO Analog Output	Modbus®	Four 4-20 mA outputs	1
LNK-XT Network Extender	Modbus®	Network BUS Extender	4
QCC-RDM Remote Display	Modbus®	Mirrors QCC display	4
RLY-4 Remote Relay	Modbus®	Four, 5 Amp, 120/240 VAC	1
RPS-24VDC Remote Power Supply	Modbus®	24 VDC, 2 Amp	4
RAA-90 Remote Audible Alarm			1
RAA-90-W Remote Audible Alarm (water tight)		24 VDC, 2-wire	(one or the other)
RSH-24VDC Remote Strobe/Horn (with mounting enclosure)		Using strobe drive	
RSH-24V Remote Strobe/Horn (no enclosure)		Using strobe drive	1
RSH-TMR Remote Strobe/Horn with Timer		Using strobe drive	(one of the three)

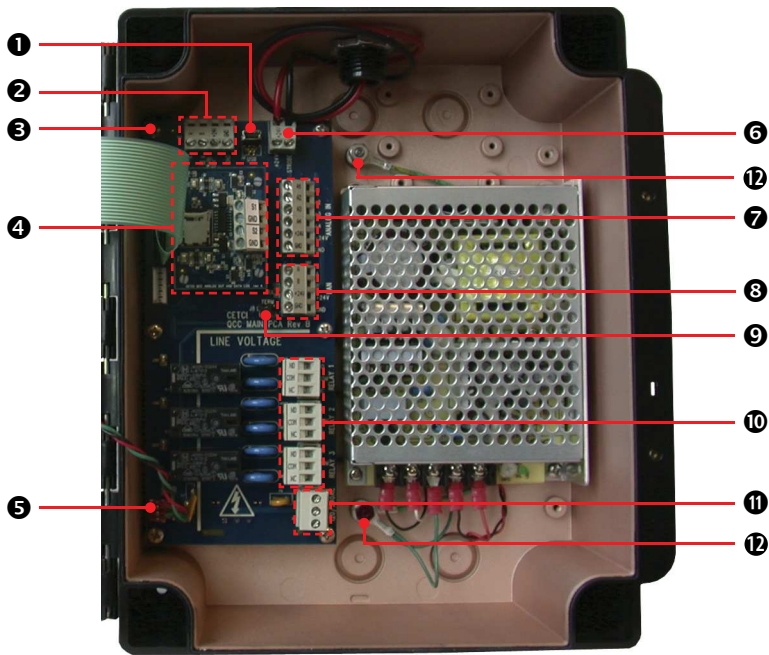
5 INSTRUMENT FEATURES

5.1 Front Exterior Enclosure



NUMBER	FEATURE	FUNCTION
❶	Display	4x20 characters. Indicates controller operation.
❷	Status 1, 2, 3 LEDs	Indicates channel alarm status.
❸	ARROW UP	Press to scroll up through menu.
❹	ENTER	Press to select menu choice.
❺	ARROW DOWN	Press to scroll down through menu.
❻	Fault LED	Indicates unit fault condition.
❼	Door Screws	Secures the door of the enclosure.
❽	Door Mounted Buzzer	Audible buzzer that sounds when a channel has gone into alarm. Factory default is set for high alarm.

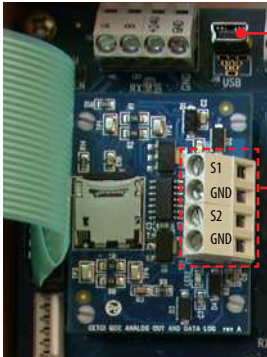
5.2 Interior System Layout (shown with Option -AO)



NUMBER	FEATURE	FUNCTION
❶	USB Connector	Logging download and system updates
❷	WAN Terminal	For connection to BAS (Modbus® or BACnet®)
❸	WAN End of Line Jumper	120 ohm line termination
❹	Option: -AO	Optional daughter board with 2 Analog Outputs and Data Logging capabilities
❺	Buzzer Terminal	Connection for door mounted buzzer
❻	Remote Strobe Horn Terminal	Connection for Remote 24 VDC horn or strobe combination (RSH-24VDC) 0.5 amps max.
❼	Analog IN Terminal	Connection for up to four 4-20 mA transmitters
❽	LAN Terminal	Connection of up to four digital (Modbus®) transmitters and/or peripheral devices
❾	LAN End of Line Jumper	120 ohm line termination
❿	Dry Contact Relay Terminals 1, 2 & 3	Three SPDT relays, rated 5 amps @ 240 V

⑪	Line Voltage Terminal	120 or 240 VAC input
⑫	Earth Ground	Earth/safety ground connection

5.3 Optional Analog Output with Data Logging Board Layout (Option -AO)



Micro USB connection for downloading data logging files.

4-20 mA Output Terminal with two analog outputs

6 INSTALLATION

Please refer to the **QCC Installation Manual** for information regarding:

- General Safety Warnings
- Protection Against Electrical Risks
- Protection Against Mechanical Risks
- Location of System Installation
- Enclosure Mounting Components
- Wiring Power Supply Connections
- Wiring a Remote Power Supply (RPS-24VDC)
- Wiring Internal Analog Inputs
- Wiring Internal Analog Outputs (Option-AO)
- Wiring LNK-AO Peripheral Device Analog Outputs
- Wiring Digital Inputs (LPT-P & LPT-M Transmitters)
- Wiring LNK-XT Network Extender Peripheral Device
- Wiring to a Building Automation System (BAS)

- Wiring the Remote Strobe / Horn Output Terminal
- Wiring Internal Relay Connections
- Wiring RLY-4 Remote Relay Connections
- Wiring QCC-RDM Remote Display
- Wire gauge vs Run Length

7 SYSTEM OPERATION

7.1 Navigating the Menu Structure

There are three push-button keys to the right of the display that are used to navigate through the QCC menu structure. To enter the menu structure, press E.



ARROW UP - used for going up through the menus or incrementing values or selecting an alpha character

ENTER - used primarily as an enter key, either for getting to the next screen or stepping through a numeric or alpha value

ARROW DOWN - used for scrolling down through the menus or decrementing values or selecting an alpha character

After entering the menus, pressing the ARROW UP key will normally take you to the Exit screen. Most menus are circular and will bring you back to the Exit screen.

7.2 Accessing the Menu with Passcodes

The main menu structure is broken down by the passcode access entry. These passcodes allow for direct access to the parts of the menu system of interest.

CODE	NAME	DESCRIPTION
0001	Test Mode	Test Audible Test Strobe Test Relays View Priorities
1001	Basic	Set LCD Contrast Set Clock (only present with Option -AO installed) Data Logger (only present with Option -AO installed) Change Remote Modbus ID Change Remote Baud Rate (WAN) Change Local Baud Rate (LAN) Set Number of Remote Displays Set Number of Remote Relays Set Number of Remote Outputs

1014	Display	Normal On Alarm Splash Only
2012	Alarms	Set Channel Alarms (LOW, MID, HIGH) Channel Override Enable/Disable Relay, Audible, Strobe Set Relay, Audible, Strobe ON/OFF Delays Set Relay Mode Override Relay, Audible, Strobe Set STEL, TWA and IDLH Alarms Enable/Disable STEL and TWA Display
3022	Configure	Configure Channel Hardware <ul style="list-style-type: none"> • Enable/Disable Channels • Set Channel Communication Type • Set Channel ID • Assign Sensor Number Configure Channel Config <ul style="list-style-type: none"> • Set Channel Name • Set Channel Units • Set Channel Decimals • Set Channel Range Configure Channel Logic Assign Channel Priority Levels Assign Relay, Audible, Strobe Priority Levels Configure Relay, Audible, Strobe Logic Configure Priority Logic Disable Priority Settings Override Priority Settings
3032	Analog	Analog Input Calibration Analog Output Calibration Analog Output Logic
2044	Save	Save current configuration
4044	Restore	Restore to the saved configuration

7.3 Power Up and Warm-up

Upon power up, the QCC will show the Splash Screen for about 4 seconds of warm-up:



Then it will show the Normal Display:



After the warm up period, the system may exhibit gas alarm condition(s) if any of the sensors have 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. (if this is undesirable, a UPS system should be installed). After warm up, only the display should be active, indicating normal operation, and the relays should be energized indicating normal "Fail-safe" status.

7.4 Normal Display, Splash Screen and On Alarm Display

You can choose the type of display you would like to see - Normal, Splash Screen or On Alarm.

To enter the Display menu, press the E key. Use the ARROW keys and the E key to enter the code 1014 on the password screen.

Use the ARROW keys to scroll through the menu and select the type of display you prefer. Press E to select and exit the menu.

With the Splash Screen setting the display will only show the Splash Screen (this setting is used if the QCC is placed in a location where the public or unauthorized persons should not be monitoring the gas levels).



With the On Alarm Screen setting the display will show the Splash Screen unless there is an active alarm condition, then the screen will show the Normal display indicating the alarm condition. The On Alarm display mode may be useful in some locations where minimal amounts of gas are always being detected and showing the measurement could become a distraction to the public or employees.

With the Normal Display, the QCC will display the channel numbers with their corresponding gas type and level. If fewer than 4 channels are being used, there will be a blank line for each channel not being used.

For example, the image below shows 2 channels in use:



At the end of each line a letter may be displayed that provides information about the status of the Channel:

Letter	Description
none	System working normally
d	Channel disabled
F	Channel is in Fault condition
C	Channel cannot communicate with transmitter
c	Channel Configuration Fault
L	Channel is in low alarm
M	Channel is in mid alarm
H	Channel is in high alarm
S	Channel has a STEL alarm
T	Channel has a TWA alarm
I	Channel has an IDLH alarm

Example of a Fault condition:



NOTE: The display may show additional information related to the channels and relays dependent on additional settings that can be enabled. Some of these setting are Override and ON/OFF Delays. These will show a counter indicating how much time is remaining until the action will end or start.

NOTE: You can temporary view the Splash Screen when the device is set to Normal Display by pressing the ARROW UP button once. This allows you to check the model and firmware version of the QCC. The screen will display this information and then return to the Normal Display. **If the Analog Output (Option -A0) board is installed the system time and date will be displayed on the bottom line of the splash screen.**



NOTE: If the QCC is connected to a QCC-RDM, whatever display configuration is chosen will be mimicked on the QCC-RDM display.

7.5 Display Relay Status and Strobe / Audible Status

The QCC has three SPDT dry contact relays labeled R1, R2 and R3. A normal status for each relay will display FAILSAFE (not in alarm). The Strobe/Audible is labeled S1 and for a normal status will display NORMAL. The relay status and the strobe/audible status will be displayed as well as any active delays.

NOTE: If an RLY-4 Remote Relay device is connected to the QCC, the status of those relays will also be displayed.

From the normal display, press the ARROW DOWN button to scroll to view the screen that displays the status of the relays and strobes.



7.6 Door Mounted Audible Alarm Operation

The QCC comes with an external, door mounted, audible alarm. Unless otherwise specified at time of order, the alarm is factory configured to sound when the high alarm is reached.

The QCC has an extensive range of programming functions for alarm conditions. Please refer to Section 9 *Channel Settings and Configurations* for channel alarm settings and Section 13 *STEL and TWA Settings* for STEL and TWA alarm settings.

To silence the alarm, push any button on the front of the QCC enclosure and the buzzer will stop for a preconfigured amount of time (the factory default is 5 minutes).

7.7 Test Functions

To enter the Test menu, press the E key and use the ARROWS to enter the code 0001 on the password screen.

In the Test menu, you can test the audible alarm, strobe and relays to ensure they are working correctly.

For each test you can set the length of time for the test to last. The maximum length of time each test can be set to last is:

	Enter Length of Time	Maximum Length of Time
Audible Test	0 to 999 seconds	16 minutes
Strobe Test	0 to 999 seconds	16 minutes
Relays Test	0 to 9999 seconds	2.7 hours

When the test starts, it will continue as long as the time was set. You can exit the Test mode without affecting the time. **If you want to end the test before the time is up, you must re-enter the Test**

Menu and enter a value of “0” for the test length of that function.

7.7.1 Test Audible (Buzzer)

NOTE: Before testing the audible alarm, warn people in the vicinity of the sound so unnecessary distress or response is not caused.

In the Test menu (passcode 0001), use the ARROW keys to scroll through the menu and select Test Audible.



Press E to enter the Test Audible menu. Use the ARROW keys to find the audible device you want to test. Press E to select and enter the length of time (in seconds: 0 to 999) you want the test to last. Press E to save the entry and start the test.



7.7.2 Test Strobe

NOTE: Before testing the strobe, warn people in the vicinity of the sound so unnecessary distress or response is not caused.

In the Test menu (passcode 0001), use the ARROW keys to scroll through the menu and select Test Strobe.



Press E to enter the Test Strobe menu. Use the ARROW keys to find the strobe you want to test. Press E to select and enter the length of time (in seconds: 0 to 999) you want the test to last. Press E to save the entry and start the test.



7.7.3 Test Relays

NOTE: Before testing the relays, notify the appropriate people so unnecessary distress or response is not caused.

In the Test menu (passcode 0001), press the ARROW keys to scroll through the menu and select Test Relays.



Press E to enter the Test Relays menu. Use the ARROW keys to scroll through the menu to find the relay you want to test. Press E to select and enter the length of time (in seconds 0 to 9999) you want the test to last. Press E to save the entry and start the test.



NOTE: Relay ON delays do NOT apply in test mode, however Relay OFF delays will apply when test mode times out. If the relays were tested (tripped) they will remain so after test mode for the duration of their respective OFF delay. (Refer to Section 10 Relay, Strobe and Audible Settings and Configurations for more information on RELAY ON/OFF DELAYS).

8 BASIC SETTINGS AND CONFIGURATIONS

8.1 Factory Default Settings

The channel/gas operation type settings are configured at the factory according to the specifications at time of order. The remaining settings are usually configured in the factory according to the default settings listed below. (There may be some differences in the default settings depending on application.) If changes to the default settings are desired, the settings can be changed in the field as indicated in the table below.

ITEM	DEFAULT SETTING	FIELD CONFIGURABLE SETTINGS
Display	Normal	Splash Screen, Alarm On
Door Mounted Buzzer	Enabled - Normal	Enable, Disable - Normal, Failsafe
Alarm Level	High	Low, Mid, High
Silence Interval	300 seconds (5 minutes)	0 to 9999 seconds
Strobe	Enabled - Normal	Enable, Disable - Failsafe, Normal
ON Delay	10 seconds	value is application dependant
Silence Interval	300 seconds (5 minutes)	0 to 9999 seconds
Data Logger (if installed)	5 minutes	1 to 1440 (24 hrs)
Relay 1	Low - Failsafe	Low, Mid, High - Failsafe, Normal
Relay 2	Mid - Failsafe	Low, Mid, High - Failsafe, Normal
Relay 3	High - Failsafe	Low, Mid, High - Failsafe, Normal
ON Delay (each relay)	10 seconds	value is application dependant
OFF Delay (each relay)	10 seconds	value is application dependant

Alarm Setpoints	values are gas dependant Ascending	values are gas dependant Ascending, Descending (ie. O ₂)
LAN Modbus® Baud Rate	19,200	changing is not recommended
WAN Modbus® Baud Rate Modbus ID	19,200 100	Refer to Section 8.5 for list of baud rates 1 to 127
WAN BACnet® Baud Rate Base Address MAC Address Instance ID	76,800 270 100 270100	Refer to Section 8.5 for list of baud rates 1 to 999 1 to 127 Base Address x 1000 + MAC Address
Analog Input Calibration	4 - 20 mA	0 - 20 mA
Analog Output Calibration	4 - 20 mA	0 - 20 mA
STEL/TWA Display Alarm	Off Disabled	On, Off Disable, Enable

8.2 Set LCD Display Contrast

In the Basic menu (passcode 1001), use the ARROW keys to scroll through the menu and select Set LCD Contrast. Press E to select.



Use the ARROW buttons to change the numbers according to your preferred brightness/darkness of the display. Press E to save the entry. The minimum value is 15 and the maximum is 85. The display cannot be made completely blank.



8.3 Set Clock (included with Option -AO)

NOTE: The Set Clock function will only be available if the on board Analog Output (Option -AO) is installed.

In the Basic menu (passcode 1001), use the ARROW keys to scroll through the menu and select Set Clock.

The first step is to set the year. Press E to select and use the ARROW keys to change the numbers to the

correct last two digits of the year.



```
Set Year (0-99)
  17
  ^
ENTER Accept / EXIT
```

Press E to save the entry and continue to the Set Month screen.



```
Set Month (1-12)
  05
  ^
ENTER Accept / EXIT
```

Continue using the ARROW keys to enter the information required and press E to save and continue through the Set Day, Set Hour, Set Minutes and Set Seconds screens.



```
Set Day (1-31)
  01
  ^
ENTER Accept / EXIT
```



```
Set Hour (0-23)
  07
  ^
ENTER Accept / EXIT
```

NOTE: This is a 24 hour clock (ie. 9am = 09 and 1pm = 13).



```
Set Minutes (0-59)
  06
  ^
ENTER Accept / EXIT
```



```
Set Seconds (0-59)
  29
  ^
ENTER Accept / EXIT
```

8.4. Data Logging (included with Option -AO)

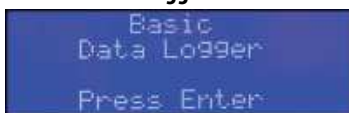
NOTE: The Data Logging function will only be available if the on board Analog Output (Option -AO) is installed.

NOTE: The correct time and date should be set prior to commencing data logging. Refer to Section 8.3 *Set Clock* for more information.

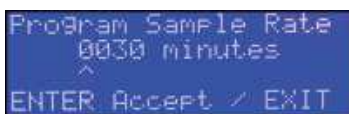
Data logging includes internal logging memory that will store over one year's worth of readings (when set at a rate of logging once per minute). Data is saved in a format and can be extracted from the unit with a standard USB connection. Once the data is downloaded, change the file extension from .cet to .csv. Users can then analyze and graph data using Microsoft® Excel® or any program that works with .csv files. The files are stored in directories organized by months and years.

The data logging functionality will only be relevant for use if it is maintained on a regular basis. While the SD card can store many months of data (depending on the sample rate set), at some point the data will be overwritten. That history can only be maintained if downloaded before it gets overwritten.

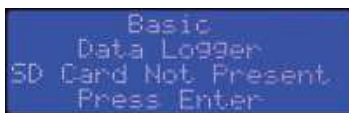
To set the Program Sample Rate, enter the Basic menu (passcode 1001), use the ARROW keys to scroll through the menu and select Data Logger.



Use the ARROW keys to change the Program Sample Rate and the Enter button to select and move forward.



NOTE: If the message “SD Card Not Present” shows on the display, either the hardware is not installed or the SD card is missing or dislodged. Data logging is only available if the Analog Output board (Option -AO) is installed. If your unit has this option, but this message appears, check to make sure the SD card is properly installed.



If the SD card is missing or dislodged, UNPOWER the QCC before gently depressing the card slot door and slide up to open. Put in the SD card or fix the position of the card and close the slot door. Power the QCC back on.

8.5. Modbus® Setup / BACnet® Setup

NOTE: If the QCC Controller is an QCC-B with BACnet® WAN output, see the QCC default WAN BACnet® communications settings further along in this section.

NOTE: All devices on each network must be set to the same baud rate.

The QCC can be configured for the following baud rates:

- 9,600 (LAN Modbus® for AST-IS18-M)
- 14,400
- 19,200 (LAN / WAN Modbus® factory default)
- 38,400

- 57,600
- 76,800 (WAN BACnet® factory default)
- 115,200

There are two networks on the QCC. The first is the local area Modbus® RTU RS-485 network (LAN) used for communications with connected CETCI digital transmitters and peripheral devices.

QCC default LAN Modbus® communications parameters:

- Baud rate = 19,200
- BUS Controller is the QCC
- Parity = no parity
- Stop bits = 1
- Data bits = 8

NOTE: The QCC has been designed to operate with these parameters and any changes made could affect its ability to work as intended. If these values are changed, CETCI will not troubleshoot the system for communication faults until they are returned to factory defaults.

The second network is the wide area Modbus® or BACnet® network (WAN) used for communications with building automation systems.

QCC default WAN Modbus® RTU (version 1.1b3), RS-485 communications parameters:

- Baud rate = 19,200
- BUS Controller is the BAS/DDC
- Modbus® ID of QCC = 100
- Parity = no parity
- Stop bits = 1
- Data bits = 8

NOTE: It is the customer's responsibility to supply the correct wiring for the communication back to their BAS. The baud rate and Modbus® ID can be changed to match the BAS system.

QCC default WAN BACnet® MS/TP (version 1 rev 14), RS-485 communication parameters:

- Baud rate = 76,800
- Base address = 270
- MAC address = 100

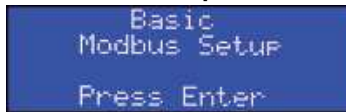
- Instance ID = 270100 (the Base Address x 1000 + the MAC Address)
- Parity = no parity
- Stop bits = 1
- Data bits = 8

NOTE: For Modbus® network communications wiring, use 4-conductor, 16 AWG stranded shielded wire.

As per the requirements of the RS-485 protocol, a termination resistor must be installed / enabled on the last device at the end of the network wiring. This includes the Building Management System (if used).

8.5.1 Remote Modbus® ID

To set the Remote Modbus® ID, enter the Basic menu (passcode 1001), use the ARROW keys to scroll through the menu and select Modbus® Setup.



Use the ARROW keys to change the Remote Modbus® ID and press the E button to select and move forward.



8.5.2 Remote Baud Rate (WAN)

Use the ARROW keys to change the Remote (WAN) Baud rate and press the E button to select and move forward.



8.5.3 Local Baud Rate (LAN)

Use the ARROW keys to change the Local (LAN) Baud rate and press the E button to select and move forward.



If the hardware for BACnet® is installed then you can configure the BACnet® base Address and the MAC address. The Default Base address is CETCI's BTL manufacturer's code of 270 x 1000 + 100 (CETCI's MAC

address) for the building automation system. This would look like an Instance ID of 270100.

8.6. Number of Connected Remote / Peripheral Devices

To set the number of each type of remote device connected to the QCC, such as QCC-RDM remote displays, RLY-4 Remote Relays and/or LNK-AO Analog Output devices, enter the Basic menu (passcode 1001) and use the ARROW keys to scroll through the menu to select the desired type remote or peripheral device.

Select Number of Remote Displays. Use the ARROW keys to scroll to Number of Remote Displays and press the E button to select. Use the ARROW keys to enter the number of Remote Displays (QCC-RDM) and press the E button to select and move forward. There can be a maximum of four QCC-RDMs.

```
Basic
Number of Remote
Displays
Press Enter
```

```
# Remote Displays
1
^
ENTER Accept / EXIT
```

Select Number of Remote Relays. Use the ARROW keys to scroll to Number of Remote Relay Modules and press the E button to select. Use the ARROW keys to enter the number of Relay Modules (RLY-4) and press the E button to select and move forward. There can be a maximum of one (1) RLY-4 Remote Relay device connected to the QCC.

```
Basic
Number of Remote
Relay Modules
Press Enter
```

```
# Relay Modules
1
^
ENTER Accept / EXIT
```

Select Number of Remote Output Devices. Use the ARROW keys to scroll to Number of Remote Output Devices and press the E button to select. Use the ARROW keys to enter the number of Analog Output devices (LNK-AO) and press the E button to select and move forward. There can be a maximum of one (1) remote LNK-AO peripheral device.

```
Basic
Number of Remote
Output Modules
Press Enter
```

```
Analog Out Modules
1 modules
^
ENTER Accept / EXIT
```

9 CHANNEL SETTINGS AND CONFIGURATIONS

The QCC has 4 channels that can be enabled/disabled, named, defined, assigned alarm levels, priority levels and relay and priority logic parameters.

9.1 Enable / Disable Channels, Assign ID, Channel Number & Communication Type

This setting allows you to enable or disable each of the 4 channels, and specify the channel ID number, communication type and channel sensor number.

Enter the Configure menu (passcode 3022). The first menu option is Channel Hardware. Press E to select.

```

Configure
Channel Hardware
Press Enter

```

If you want to review the current settings for each channel or go to a specific channel, keep pressing the ARROW keys to scroll through the summary screen of each channel.

```

CH  NAME      ENABLED
1    CO        Yes
ID   TYPE      SENSOR
1    Analog    1

```

To change the settings, Press E when the desired channel information shows on the display. For each of the 4 channels you can select:

- ENABLED or DISABLED

```

Channel 1 Enable
ENABLED
^
ENTER Accept / EXIT

```

If a channel is disabled, it will show on the normal display with a “d” at the end of the line, unless the line has been removed from showing on the display.

NOTE: A disabled channel acts as if it does not exist - it will not show gas readings and there will be no data logging information gathered or saved while it is disabled.

- Com Type ANALOG or DIGITAL (communication type between the QCC and the Transmitter assigned to that channel). ANALOG should be assigned to 4-20 mA transmitters and DIGITAL to digital (Modbus) transmitters.

```

Channel 1 Com Type
ANALOG
^
ENTER Accept / EXIT

```

- Channel ID No (enter up to 3 digits). Analog transmitters have an ID starting at 1. Digital transmitters have an ID starting at 101.

```

Channel 1 ID No:
001
^
ENTER Accept / EXIT

```

- Channel Sensor No (choice of 1, 2, 3 or 4). Single channel analog transmitters or other 4-20 mA analog inputs are assigned to No 1 through 4 on a one to one basis. Digital transmitters with more than one gas sensor, each sensor will need to be assigned to a No. For example, if connecting two LPT-M transmitters both with two internal gas sensors, each transmitter would take up 2 of the 4

Channel Sensor No. So there would be two transmitters connected to the QCC using all 4 channel inputs.



```

Channel 1 Sensor No:
      1
      ^
ENTER Accept / EXIT
  
```

Use the ARROW keys to find your selection and press E to select and move forward to the next channel and configure as required.

9.2 Configure Channel Name, UOM and Gas Range Values

This setting enables you to give each of the 4 channels a name, specify the units of measure, number of decimal places and enter a value for the Zero and the Range.

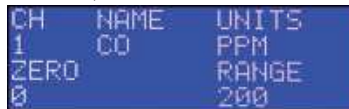
In the Configure menu (passcode 3022), use the ARROW keys to scroll through the menu and select Channel Config. Press E to select.



```

Configure
Channel Config
Press Enter
  
```

If you want to review the current settings for each channel or go to a specific channel, keep pressing the ARROW keys to scroll through the summary screen of each channel.



```

CH  NAME  UNITS
1   CO    PPM
ZERO RANGE
0   200
  
```

To change the settings, Press E when the desired channel information shows on the display. For each of the 4 channels you can select:

- Channel Name (up to 5 characters)



```

Chanel 1 Name
      CO
      ^
ENTER Accept / EXIT
  
```

If #NC is entered as the Channel Name, the channel will automatically be disabled and the entire line for that channel will not be visible on the display. To make the channel information visible on the display, enter a valid Channel Name, such as the gas ie. CO.

- Channel Units (up to 5 characters) ie. LEL, PPM



```

Channel 1 Units
  PPM
  ^
ENTER Accept / EXIT

```

- Channel Decimals (up to 2 decimal places)

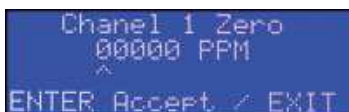


```

Channel 1 Decimals
  0
  ^
ENTER Accept / EXIT

```

- Channel Zero (up to 5 numbers)



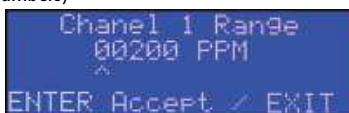
```

Channel 1 Zero
00000 PPM
  ^
ENTER Accept / EXIT

```

For most gas detection applications, where the channel is a gas channel, the Channel Zero value will be set to 0. If the channel is a temperature sensor, the Channel Zero value would be set to the low end of the temperature sensor range (for example, -20).

- Channel Range (up to 5 numbers)



```

Channel 1 Range
00200 PPM
  ^
ENTER Accept / EXIT

```

For most gas detection applications, where the channel is a gas channel, the Channel Range value is the sensor range as specified by CETCI for that sensor. For example, if the channel was being configured for monitoring CO, a CO sensor from CETCI has a range of 0 to 200 ppm. The Channel Range value to enter in this example would be 200.

Use the ARROW keys to scroll to the next channel and configure as required.

9.3 Set Channel Alarm Setpoints

This setting allows you to set ascending and descending LOW, MID and HIGH alarm setpoints for each channel. The number entered as the setpoint is the exact number at which the alarm will be triggered.

Enter the Alarms menu (passcode 1012), press the ARROW keys to scroll through the menu and select Channel Alarms. Press E to select.



```

Alarms
Channel Alarms
Press Enter

```

If you want to review the current settings for each channel, press the ARROW keys to scroll through the summary screen of each channel.

```

CH LOW-ASC MID-ASC
1 25 50
HIGH-ASC Hysteresis
100 2
  
```

To change the settings, Press E when the desired channel and information shows on the display. For each LOW, MID and HIGH alarm you can select:

- ASCENDING or DESCENDING

```

Low Alarm
ASCENDING
^
ENTER Accept / EXIT
  
```

- Gas reading level at which the alarm is triggered

```

Program Low Alarm
00025 PPM
^
ENTER Accept / EXIT
  
```

- Hysteresis value. Hysteresis is the difference between the ON point and OFF point of the alarm. For example, if the alarm is set to come on at 100 ppm and the hysteresis is set for 10 ppm, the alarm will not turn off until the gas is below 90 ppm. This prevents the alarm from chattering on and off repetitively if the gas fluctuates just above and just below 100 ppm.

```

Program Hysteresis
00002 PPM
^
ENTER Accept / EXIT
  
```

Use the ARROW keys to find your selection and press E to select and move forward.

9.4 Channel Override

The Channel Override feature is useful during maintenance when you don't want the alarms to trigger or during testing when you want to test the alarms, relays or force the system to respond in a specific way regardless of how it is configured and what is actually happening with regards to the gas level readings.

Override CLEAR means no alarms will be triggered for the amount of time indicated, even if there is an increase (or decrease) in the gas level that would normally trigger an alarm.

Override SET means all alarms will be triggered for the amount of time indicated even though there is no gas level increase (or decrease) that would cause an alarm.

Enter the Alarms menu (passcode 1012), press the ARROW keys to scroll through the menu and select Channel Override. Press E to select.



```

Alarms
Channel Override
Press Enter
  
```

Use the ARROW keys to choose your selections and press E to select for each entry:

- Select Channel



```

Select Channel
1
^
ENTER Accept / EXIT
  
```

- Choose Override CLEAR or Override SET



```

Set or Clear ch 1
Override CLEAR
^
ENTER Accept / EXIT
  
```

- Select Time (length of time in minutes). For the Select Time value, enter the length of time in number of minutes (up to 999, this equals 16.65 hours) for which you want the override to be in effect. The countdown will start immediately. If you go back to the normal display, the line for the channel you have overridden will show the countdown of the time left for the override condition to be in effect.



```

Select Time
005 minutes
^
ENTER Accept / EXIT
  
```

NOTE: You cannot override a disabled channel.

10 RELAY, STROBE AND AUDIBLE SETTINGS AND CONFIGURATIONS

The QCC has three on board relays that can be configured to be enabled or disabled, operate in a failsafe or not failsafe manner, and be configured with ON delays and/or OFF delays. Relays can be overridden for a forced, timed action such as during maintenance or testing.

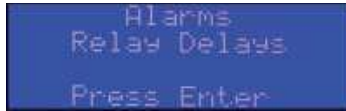
10.1 Enable / Disable Relays, Strobe & Audible and Set ON/OFF Delays

This setting allows you to enable or disable the relays, strobe and audible. You can set ON and OFF relay delays, select the mode of operation (normal or failsafe) and set the ON delay and silence values for the strobe and audible buzzer.

ON Delay is the length of time *before* the relay is activated after an alarm condition has been triggered. This is useful for example, if you want the audible buzzer and strobe to come on at different times, or if the monitored area has frequent gas level readings that could trigger an alarm but not last very long (such as an idling car in a parking garage/car park).

OFF Delay is the length of time *after* the alarm condition has gone back to normal and the relay continues to be activated. This is useful for example if you want to allow extra time for ventilation of the area or if you have fans you want to keep on for a longer period of time to reduce the wear and tear on equipment that is being turned on and off at a rate that could damage it.

Enter the Alarms menu (passcode 2012), press the ARROW keys to scroll through the menu and select Relay Delays. Press E to select.



```

Alarms
Relay Delays
Press Enter
  
```

If you want to review the current settings for each relay press the ARROW keys to scroll through the summary screen for relay 1, 2 and 3, etc.



```

Relay = 1 Enabled
Operation = Failsafe
On Delay = 1
Off Delay = 1
  
```

NOTE: If a Remote Relay Modules (RLY-4) is connected to the QCC (and enabled, refer to Section 8.6 *Number of Connected Remote / Peripheral Devices*), its relays will also be visible in this menu.

To change the settings, Press E when the desired relay information shows on the display. For each relay you can:

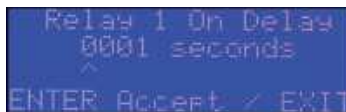
- Choose ENABLED or DISABLED



```

Relay 1 Enable
ENABLED
ENTER Accept / EXIT
  
```

- Set an ON Delay (length of time in seconds)



```

Relay 1 On Delay
0001 seconds
ENTER Accept / EXIT
  
```

- Set an OFF Delay (length of time in seconds)

```

Relay 1 Off Delay
  0001 seconds
  ^
ENTER Accept / EXIT

```

- Choose FAILSAFE or NORMAL

```

Relay 1 Mode
  FAILSAFE
  ^
ENTER Accept / EXIT

```

To change the settings for the strobe and audible, Press E when the appropriate screen is displayed.

```

Strobe = 8 Enabled
Operation = Normal
On Delay = 1
Silence = 300

```

```

Audible = 9 Enabled
Operation = Normal
On Delay = 1
Silence = 300

```

For the strobe or the audible you can:

- Choose ENABLED or DISABLED

```

Strobe 8 Enable
  ENABLED
  ^
ENTER Accept / EXIT

```

- Set an ON Delay (length of time in seconds)

```

Strobe 8 On Delay
  0001 seconds
  ^
ENTER Accept / EXIT

```

- Choose NORMAL. FAILSAFE mode is not recommended for the strobe or audible. The strobe and audible should both be set to NORMAL.

```

Strobe 8 Mode
  NORMAL
  ^
ENTER Accept / EXIT

```

- Silence (in seconds). The Silence value is like a delay; it is a specified length of time that the buzzer will remain silent or the strobe stop flashing after one of the ARROW or E buttons are pushed on the QCC Lexan panel to silence an alarm. This allows the alarm to be temporarily turned off or the strobe to be still while the alarm condition is looked into. If the alarm condition is not fixed within the number of seconds entered for the Silence value, the alarm and/or strobe will turn back on once the time has expired. If the alarm condition is fixed within the specified length of time, the unit will return to normal operation.



```

Strobe & Silence
  0300 seconds
  ^
ENTER Accept / EXIT
  
```

10.2 Relay, Strobe and Audible Override

The Relay Override feature is useful during maintenance when you don't want a relay or strobe or audible buzzer to activate or during testing when you want to test the relay, strobe or audible buzzer by forcing the system to respond in a specific way regardless of how it is configured and what is actually happening with regards to the gas level readings.

Override CLEAR means that relay, strobe or buzzer will NOT be triggered for the amount of time indicated, even if there is an increase (or decrease) in the gas level that would normally trigger an alarm.

Override SET means that relay, strobe or buzzer WILL be triggered for the amount of time indicated even though there is no gas level increase (or decrease) that would cause an alarm.

You can re-enter the screen to override multiple relays or the strobe or the buzzer at the same time.

Enter the Alarms menu (passcode 1012), press the ARROW keys to scroll through the menu and select Relay Override. Press E to select.



```

Alarms
Relay Override
Press Enter
  
```

Use the ARROW keys to choose your selections and press E to select for each entry:

- Select Relay ONE, TWO, THREE OR STROBE or AUDIBLE



```

Select Relay
  ONE
  ^
ENTER Accept / EXIT
  
```

- Choose Override CLEAR or Override SET



```

Override Relay 1
  CLEAR
  ^
ENTER Accept / EXIT
  
```

- Select Time (length of time in minutes). For the Select Time value, enter the length of time in number of minutes (up to 999) for which you want the override to be in effect. The countdown will start immediately. If you go back to the normal display (second screen), the line for the R1, R2, R3 or S1 you have overridden will show the countdown of the time left for the override condition to be in effect.

•



```

Select Time
005 minutes
^
ENTER Accept / EXIT

```

NOTE: You cannot override a disabled relay.

11 LOGIC AND PRIORITY SETTINGS AND CONFIGURATIONS

11.1 Assign Priority Levels to Channels

This setting enables you to assign priority levels (up to 8 levels) to each channel. One channel can be assigned to none through 8 priority levels and multiple channels can be assigned to the same or different priority levels. A priority level can indicate a physical location (zoning) or a set of logic (if this happens, do this or if that happens, do that).

In the Configure menu (passcode 3022), use the ARROW keys to scroll through the menu and select Channel Logic. Press E to select.




```

Configure
Channel Logic
Press Enter

```

If you want to review the current priority settings for each channel or go to a specific channel, keep pressing the ARROW keys to scroll through the summary screen of each channel.



```

CH 1 Priority Levels
8765 4321
0000 0001

```

To change the settings, Press E when the desired channel information shows on the display.

For each channel you can assign up to 8 priority levels. **1 indicates the channel is assigned to that priority and 0 indicates it is not.**



```

Set Ch 1 Priority
8765 4321
0000 0001
^

```

Use the ARROW keys to assign the required priorities and press E to select and move forward. Use the ARROW keys to scroll to the next channel and set the channel logic as required.

11.2 Assign Priority Levels to Relays, Strobe and Audible

This setting enables you to assign priority levels to each relay, strobe and/or audible buzzer. One relay, strobe or audible can be assigned to three priorities in combinations of:

- AND (both priorities must be met to activate the relay)

- OR (either priority can activate the relay)

Using this AND and OR logic, the priorities can be combined in multiple ways, increasing the number of possible configurable relay combinations.

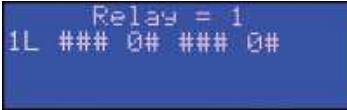
NOTE: If you have a requirement that needs combinations of multiple channels and timing, contact CETCI Service with an explanation of your needs.

In the Configure menu (passcode 3022), press the ARROW keys to scroll through the menu and select Relay Logic. Press E to select.




```
Configure
Relay Logic
Press Enter
```


If you want to review the current priority settings for each relay, strobe or buzzer or go to a specific relay or the strobe or the buzzer, keep pressing the ARROW keys to scroll through the summary screen of each one.



```
Relay = 1
1L ### 0# ### 0#
```




```
Relay = 2
1M ### 0# ### 0#
```



```
Relay = 3
1H ### 0# ### 0#
```



```
Strobe
1H ### 0# ### 0#
```



```
Buzzer
1H ### 0# ### 0#
```

To change the settings, Press E when the desired relay, strobe or audible information shows on the display.


Assign the desired relay, strobe or audible a priority level (1 through 8).



Then choose a condition upon which it will be activated such as LOW, MID, HIGH, STEL, TWA, IDHL Fault or Dig alarm.



Next assign the priority logic. Up to three levels of logic can be assigned to each. Choose from ###, OR, AND.



- If no additional condition needs to be met, choose ##.
- If one OR another condition needs to be met, use OR.
- If one AND another condition needs to be met, choose AND.

Repeat for each priority level that the relay, strobe and/or audible are assigned to.

Use the ARROW keys to assign the required priorities and press E to select and move forward. Use the ARROW keys to scroll to the next relay, strobe or audible and set the logic as required.

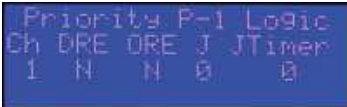
11.3 Configure Priority Logic & Remote Disable

This setting allows you to configure how many channels are required to trigger a priority, allow / disallow remote disable / remote override and set a timer that will escalate to a higher priority if required.

In the Configure menu (passcode 3022), press the ARROW keys to scroll through the menu and select Priority Logic. Press E to select.



If you want to review the current priority settings or go to a specific priority, keep pressing the ARROW keys to scroll through the summary screen of each priority.



To change the settings, Press E when the desired priority information shows on the display.

Set the Channel Qty. This is the number of channels that need to be in alarm before the priority will be triggered.



```
Set Channel Qty.  
  1  
  ^  
ENTER Accept / EXIT
```

In standard toxic gas configurations this number would normally be 1. Higher values can be used to reduce the possibility of false triggers.

Set the Allow Remote Disable (DRE = Disable Remote Enable). If the gas detection system is not connected to a remote interface such as a DDC, BAS, FIRE PANEL etc., the flag should be set to NO. If set to YES, it means the priorities can be enabled from a remote device (such as a BAS or DDC system).



```
Allow Remote Disable  
  NO  
  ^  
ENTER Accept / EXIT
```

Set the Allow Remote Override (ORE = Override Remote Enable). If set to Y means the remote enable can be overridden.



```
Allow Remote Override  
  NO  
  ^  
ENTER Accept / EXIT
```

Set the Jump to level. J = jump (forward) to the priority level specified if the length of time set in JTimer runs out.



```
Jump to Level  
  0  
  ^  
ENTER Accept / EXIT
```

Set the Jump Timer. This is the length of time before the priority escalates to the next level (0 - 999 minutes)



```
Jump Timer  
000 minutes  
  ^  
ENTER Accept / EXIT
```

The J and JTimer can be used to trigger additional actions if the first priority has not generated resolution to the alarm condition. The priority being jumped too normally will not monitor any channels but will be assigned to a Relay or Strobe or Audible or Analog Output. The timer will normally be set to a value large

enough to give the first Priority time to complete or resolve the cause of the issue. The jump to priority is used as an escalation tool.

11.4 Disable Priority Settings

Each priority can be disabled individually.

In the Configure menu (passcode 3022), use the ARROW key to scroll through the menu and select Priority Disable. Press E to enter the menu.

```

Configure
Priority Disable
Press Enter
  
```

Use the ARROW keys to choose the priority you want to disable (1 through 8). Press E to select. Confirm by selecting YES. To reverse a disabled priority, select NO.

```

Select Priority
  1
  ^
ENTER Accept / EXIT
  
```

```

Disable Priority 1?
  NO
  ^
ENTER Accept / EXIT
  
```

11.5 Override Priority Settings

Each priority can be overridden individually.

Enter the Configure menu (passcode 3022), use the ARROW keys to scroll through the menu and select Priority Override. Press E to select.

```

Configure
Priority Override
Press Enter
  
```

Use the ARROW keys to choose your selections and press E to select for each entry.

- Select Priority. Choose the priority (1 through 8) that you want to override.

```

Select Priority
  1
  ^
ENTER Accept / EXIT
  
```

- Choose Override CLEAR or Override SET.

```

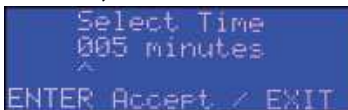
Override Priority 1?
  Override CLEAR
  ^
ENTER Accept / EXIT
  
```

Override CLEAR means the priority will clear ALL of its alarm levels for the amount of time indicated, even

if there is an increase (or decrease) in the gas level that would normally trigger an alarm or relay. This is useful for service work.

Override SET means the priority will set ALL of its alarm levels for the amount of time indicated even though there is no gas level increase (or decrease) that would cause an alarm. This is useful for testing systems or fire alarm drills.

Select Time. This is the length of time in minutes (up to 999) for which you want the override to be in effect. The countdown will start immediately.



11.6 Example of Using Priorities

There are several gas detectors covering an area monitoring the levels of CO gas. Each gas detector has one CO gas sensor and has been assigned a channel number on the QCC. The gas detectors have been configured to control the exhaust fan using the relay connection. There are several workers in this area and it is company policy that the CO levels should never be allowed to reach the standard 25 ppm for occupancy. However, you do not want the fans continuously running.

In the Configure Menu / Channel Logic, (refer to Section 11.1 *Channel Logic*):

- Assign each sensor (channel) to Priority Level 1 and Priority Level 2.

In the Configure Menu / Relay Logic (refer to Section 11.2 and 11.3):

- Priority 1, set the number of channels to 3
- Priority 2 set the number of channels to 1
- Relay 1 Alarm 1 assign Priority 1 Low alarm
- Relay 1 Logic 1 assign OR
- Carry on to Relay 1 Alarm 2 and assign Priority 2 Mid alarm
- For Relay 1 Logic 2 leave as ###

In the Alarms Menu / Set Channel Alarms (refer to Section 9.3 *Set Channel Alarms*), for each channel (sensor) set:

- Alarm point at 5 ppm
- Mid Alarm point at 25 ppm

This configuration will keep the standard occupancy CO levels below 25 ppm and the exhaust fan will keep the average CO level below 5 ppm. If the CO levels reach 5 ppm, and all 3 channels go into Low Alarm, OR if the CO level reaches 25 ppm and 1 channel goes into Mid Alarm, the exhaust fan will be turned on.

12 ANALOG INPUT AND OUTPUT SETTINGS

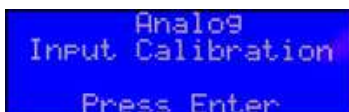
The QCC is designed to accept inputs from up to four digital and/or remote analog transmitters. Configuring the input and output settings and applying priority levels as desired prepares the QCC for 4-20 mA communication with the analog transmitters.

NOTE: CETCI does NOT recommend you change the Analog Input Calibration settings unless you have specific requirements that have changed since ordering the QCC. This setting is factory configured as per the system specifications at the time of order. **Changing this setting incorrectly may result in the device not operating properly.** Contact CETCI Service prior to changing the Analog Input Calibration settings.

12.1 Set Analog Input Calibration *(requires a 4-20 mA source)*

This setting enables you to set the preferred 4-20 mA current value for the Zero gas and Span gas. This sets the correlation between the amount of gas sensed and the amount of current sent to the QCC for zero gas readings and span gas readings.

Enter the Analog menu (passcode 3032). The first menu option is Input Calibration. Press E to select.

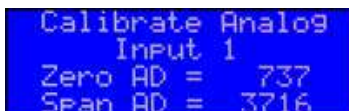


```

      Analog
Input Calibration
Press Enter

```

If you want to review the current settings for each analog input, keep pressing the ARROW keys to scroll through the summary screen of each input.

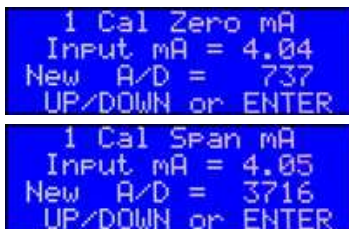


```

Calibrate Analog
Input 1
Zero AD = 737
Span AD = 3716

```

To change the settings, Press E when the desired input information shows on the display.



```

1 Cal Zero mA
Input mA = 4.04
New A/D = 737
UP/DOWN or ENTER

1 Cal Span mA
Input mA = 4.05
New A/D = 3716
UP/DOWN or ENTER

```

Use the ARROW keys to set the Input mA to the current value you want Zero gas to be correlated with. Press E to select and move forward. Do the same for the Span gas. Repeat for each input as required.

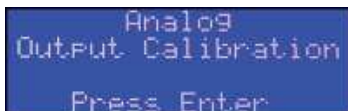
NOTE: You cannot change the AD count. The AD count will change automatically as you increase or decrease the 4 - 20 mA value.

12.2 Set Analog Output Calibration

NOTE: This setting is only configurable if the Analog Output (Option -AO) is installed and/or a remote LNK-AO peripheral device is connected to the QCC. If the Analog Output (Option -AO) is installed there will be up to 2 analog outputs to configure. If the Analog Output (Option -AO) is not installed, but a LNK-AO peripheral device is connected, there will be up to 4 analog outputs to configure. If both are installed/connected, there will be up to 6 analog outputs to configure.

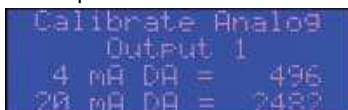
The output mode is a current loop. By default, Zero concentration gas will output 4.0 mA and full scale gas concentrations will output 20 mA. This setting enables you to set a new AD count for the Zero 4.0 mA output and the Span 20 mA output for each analog output.

In the Analog menu (passcode 3032), use the ARROW keys to scroll through the menu and select Output Calibration. Press E to select.



```
Analog
Output Calibration
Press Enter
```

If you want to review the current settings for each analog output, keep pressing the ARROW keys to scroll through the summary screen of each output.



```
Calibrate Analog
Output 1
4 mA DA = 496
20 mA DA = 2482
```

To physically check the settings, attach a multi-meter or other gauge that reads mA to S1 and ground for CH 1 or S2 and ground for CH2, etc. Press E when the desired output channel information shows on the display. The Zero output should be 4 mA and the Span should be 20 mA.

If you want to use a different mA output value, use the ARROW keys to select the New AD value you want the Zero 4.0 mA output to be. Press E to select and move forward.



```
1 Cal 4.00 mA
Zero D/A = 496
New D/A = 496
ENTER to Accept
```

Do the same for the Span 20 mA output. Repeat for each output channel as necessary.



```
1 Cal 20.00 mA
Span D/A = 2482
New D/A = 2482
ENTER to Accept
```

12.3 Assign Priority Level and Condition to Analog Outputs

This setting enables you to assign a priority level (1 to 8) to each analog output. Each analog output can be assigned to only one priority level and one condition.

In the Configure menu (passcode 3032), use the ARROW keys to scroll through the menu and select Analog Output Logic. Press E to select.

```

Analog
Output Logic
Press Enter
  
```

If you want to review the current priority settings for each output, keep pressing the ARROW keys to scroll through the summary screen of each analog output.

```

Analog Output Logic
Output 1
Priority = 1
Logic = Peak
  
```

To change the settings, Press E when the desired analog output information shows on the display. Use the ARROW keys to assign the desired analog output a priority level (1 through 8). Press E to move to the next screen.

```

A/O 1 Priority is
1
ENTER Accept / EXIT
  
```

Use the ARROW keys to choose a condition such as PEAK, AVERAGE, CHANNEL, OFF, MANUAL.

```

A/O 1 Mode is
Peak
ENTER Accept / EXIT
  
```

- PEAK is the highest gas concentration indicated by the channels assigned to the chosen priority level
- AVERAGE is the average gas concentration reading indicated by the channels assigned to the chosen priority level
- CHANNEL allows you to choose a specific channel (1 through 4) to monitor.
- OFF will result in a 0 current output.
- MANUAL allows you to choose any current value (0 to 20 mA) which will be output if any alarm is triggered in the priority level chosen

Do this for each analog output as required.

13 STEL AND TWA SETTINGS

STEL (Short-term Exposure Limit)

The STEL is the acceptable average exposure over a short period of time, usually 15 minutes as long as the time-weighted average is not exceeded at any time or so many times in succession (depends on local regulations) during a workday. The concentrations are given in ppm. For example, for CO, the STEL is 100 ppm.

TWA (Time Weighted Average)

The TWA indicates a time-weighted average concentration for up to an 8 hour (OSHA) or a 10 hour (NIOSH) workday during a 40 hour week. The concentrations are given in ppm. For example, for CO, the TWA is 25 ppm.

IDLH (Immediately Dangerous to Life and Health)

IDLH is defined by NIOSH and OSHA as exposure to airborne contaminants that is "likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment".

NOTE: IDHL level for a particular gas may be above the measurement range. For example, the measurement range for CO is 0 to 200 ppm. The IDHL is 1,000ppm.

13.1 Set STEL, TWA and IDLH Alarms

Enter the Alarms menu (passcode 2012), use the ARROW keys to scroll through the menu and select STEL & TWA. Press E to select.

```

Alarms
STEL & TWA
Press Enter
  
```

If you want to review the current STEL, TWA and IDLH settings for each channel, use the ARROW keys to scroll through the summary screen of each channel.

```

CH STEL-ASC TWA-ASC
1 40 35
CH IDLH-ASC
1 50
  
```

To change the settings, Press E when the desired channel and information shows on the display. For each STEL, TWA and IDLH alarm you can enter the gas reading level at which the alarm will be triggered.

```

Program STEL Alarm
00040 PPM
^
ENTER Accept / EXIT

Program TWA Alarm
00035 PPM
^
ENTER Accept / EXIT
  
```



```
Program IDLH Alarm
00050 PPM
^
ENTER Accept / EXIT
```

13.2 Enable / Disable STEL and TWA Display

This setting allows you to choose to see or not see the STEL and TWA values on the normal display.

Enter the Alarms menu (passcode 2012), use the ARROW keys to scroll through the menu and select STEL & TWA Display Enable/Disable. Press E to select.



```
Alarms
STEL & TWA Display
Enable/Disable
Press Enter
```

Choose ON or OFF. If the ON is set, the STEL and TWA levels will be displayed on the normal display when you scroll through the display screens with ARROW keys.



```
STEL & TWA Display
OFF
^
ENTER Accept / EXIT
```


NOTE: Disabling the STEL and TWA display also disables any configured STEL and TWA alarms and their activations of relays and/or analog outputs.

14 SAVING AND RESTORING A CONFIGURATION

You can save the settings for ONE configuration you have applied to the QCC system and if necessary, you can restore the settings back to that saved configuration if you change something afterwards.

14.1 Save Settings and Configuration

To enter the Save Configuration menu, press E and then enter the passcode "2044".



```
Save Configuration
Press Enter
```

Press E to save the configuration. If you do not want to save the configuration and would like to exit the screen, press one of the ARROW keys to exit.

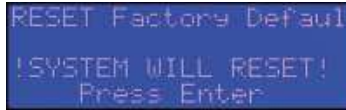
NOTE: When you save a configuration it overrides any previously saved configurations.

14.2 Restore to Saved Configuration

NOTE: It is recommended that you warn the appropriate people before restoring the saved configuration

in case the BAS system, alarm systems, etc. trigger a call to an emergency response or other unintended safety alarms.

To enter the Restore menu, press E and then enter the passcode “4044”.



Press E to confirm the reset. If you do not want to reset to the saved configuration, press one of the ARROW keys to exit.

When you press E to confirm the reset, the Status LEDs will blink once and within a few seconds the QCC will click off and then click on. The QCC Controller Initializing display screen will briefly appear and then the normal display will show, indicating the QCC is ready.

15 QCC MODBUS® HOLDING REGISTERS

15.1 Introduction

The QCC Controller is configured to communicate with a Building Automation System or Direct Digital Control System on an RS-485 network using Modbus® RTU protocol. In order for communication to be successful between devices, be 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 will have its own unique Modbus® ID.

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

15.2 Discrete Outputs (Relays, Buzzer, Strobe)

The discrete outputs registers are the present state of the relays, strobe, buzzer and remote relays. These reflect the alarm condition. 0 = Normal (non-active). 1 = alarm (active). They are read only.

Register	Description	Range
1	Relay 1	0 or 1
2	Relay 2	0 or 1
3	Relay 3	0 or 1
5	Strobe	0 or 1
6	Buzzer	0 or 1
7	Remote_Relay 1	0 or 1
8	Remote_Relay 2	0 or 1

9	Remote_Relay 3	0 or 1
10	Remote_Relay 4	0 or 1

15.3 Analog Input Registers

Analog input registers are the present channel/sensor readings. They are read only.

The scaler is $10^{(\text{decimals} + 1)}$ (see Channel 1 holding register 50,004. Every channel has its own scaler value). Units are defined in the configuration holding registers for each channel (for example, Channel 1 registers are 50,028, 50,029 and 50,030) .

Register	Description	Range	Units
30,001	Channel_[1].reading	present gas reading x scaler	LEL, ppm, % vol, etc.
30,002	Channel_[1].stel	present STEL reading x scaler	LEL, ppm, % vol, etc.
30,003	Channel_[1].twa	present TWA reading x scaler	LEL, ppm, % vol, etc.
30,004	Channel_[1].alarms	bit encoded contact CETCI for bit allocation	LEL, ppm, % vol, etc.
30,005	Channel_[2].reading	repeat functionality of 30,001 to 30,004 for sensor 2, 3 and 4.	
30,006	Channel_[2].stel		
30,007	Channel_[2].twa		
30,008	Channel_[2].alarms		
30,009	Channel_[3].reading		
30,010	Channel_[3].stel		
30,011	Channel_[3].twa		
30,012	Channel_[3].alarms		
30,013	Channel_[4].reading		
30,014	Channel_[4].stel		
30,015	Channel_[4].twa		
30,016	Channel_[4].alarms		

15.4 Priority Status Registers

Priority Status registers are the present status of the priorities. They are read only.

Register	Description	Range
31,001	Priority_[0].status	
31,002	Priority_[1].status	
31,003	Priority_[2].status	
31,004	Priority_[3].status	bit encoded contact CETCI for more details
31,005	Priority_[4].status	
31,006	Priority_[5].status	
31,007	Priority_[6].status	
31,008	Priority_[7].status	

15.5 Analog Output Registers

Analog output registers are the present value being output to the analog output channels and are read only. They are scaled 0 to 2000 (mA x 100). Value is dependent on the present status and configuration of the system.

Register	Description	Range	Units
40,001	Analog Output Value 1 (mA)	0 to 20 (scaled 0- 2000)	mA
40,002	Analog Output Value 2	0 to 20 (scaled 0- 2000)	mA
40,003	Analog Output Value 3	0 to 20 (scaled 0- 2000)	mA
40,004	Analog Output Value 4	0 to 20 (scaled 0- 2000)	mA

15.6 Remaining Holding Registers

These registers are for the remaining configurations. They are read only.

16 OPTIONS AND ACCESSORIES

16.1 Top Mounted Strobe (Option -L)

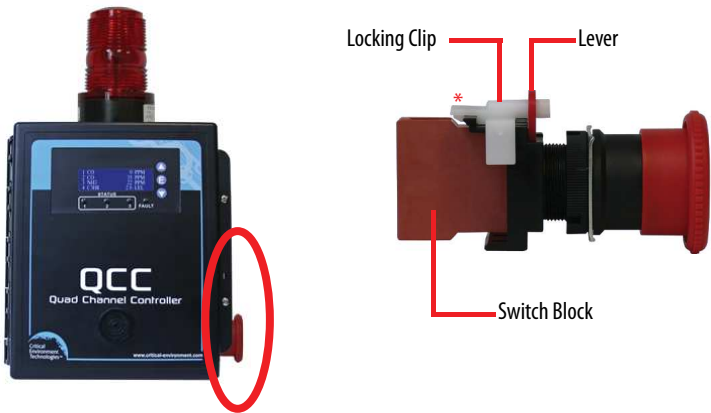
High powered, red LED flashing beacon factory installed on the top of the QCC enclosure. Offers excellent flash intensity, durable vibration resistant construction and a long life 100,000 hour LED technology. Made of tough Lexan spun welded to the base to completely seal out moisture. NEMA 4X and UL recognized. Ideal for refrigeration applications; when combined with the Manual Shutoff Switch, meets B52 code requirements.



Voltage	12 - 80 VDC
Amperage	200 mA @ 24 VDC
Size	114 mm (4.5 in) H x 76 mm (3 in) dia
Lens Colour	Red (other colours may be available upon request)
# of Flashes	75 Neobe® flashes per minute
Flash Pattern	each flash consists of 7 rapid bursts of light
Operating Temperature	-40°C to 65°C (-40°F to 149°F)

16.2 Manual Shutoff Switch (Option -SW)

An optional emergency stop, push button switch that is factory installed on the side of the QCC enclosure. Allows manual shutdown of equipment in the event of an emergency such as a gas leak. Ideal for refrigeration applications; when combined with the Top Mounted Strobe, meets B52 code requirements.



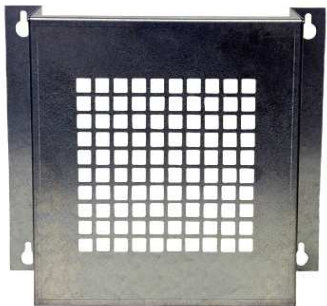
To Remove For Wiring:

Remove the white locking clip by pulling up gently on the bottom clip part (see * in diagram above) and twist slightly to remove. Rotate the red lever and remove the switch block. Connect the wires. Put the switch block back on, rotate the lever back in place and replace the locking clip.

For detailed instructions, refer to the *Manual Shutoff Switch Datasheet*.

Voltage Rating	1100 VAC, 24 VDC
Current Rating	10A (AC/DC)
Button Size	40 mm (1.57 in) diameter
Mode of Operation	1 NC contact, SPST-NC
Switch Function	ON-OFF
Features	Push-Lock, Turn-Reset

16.3 Metal Protective Guard (p/n: SCS-8000-SPG)



The metal protective guard is made of heavy duty metal and helps to protect against abrasive damage, theft or vandalism to the controller. It is made from 16-gauge galvanized steel and has 13 mm (½") square openings in the front to allow gas and air to flow through to the sensor. With only four slotted mounting holes, installation and removal for equipment servicing is easy.

NOTE: The metal guard will not fit over a QCC that has a Manual Shutoff Switch installed.

Enclosure	16 gauge galvanized steel
Weight	1.7 kg (3.8 lbs)
Size	254 mm W x 241 mm H x 121 mm D (10.0" W x 9.5" H x 4.8" D)

16.4 Calibration Kit (p/n: CET-715A-CK1)

The Calibration Kit contains the items necessary for common field and shop calibration. It comes in a durable, hard plastic carrying case.



Gas cylinders are not included in the Kit. They must be ordered separately from the CETCI factory. Many gases are carried in inventory but not all. Check with any CETCI authorized distributor for availability of specific gas types. **Gas cylinders cannot be shipped from Canada to other countries, including the USA.**

17 MAINTENANCE

The QCC requires no assembly and virtually no maintenance. It is important to ensure that water and/or dust is not somehow entering the enclosure and physically damaging the circuit board or internal components.

18 TROUBLESHOOTING

QCC won't power up.

Is the power properly connected? Check the connections. Refer to the *QCC Installation Manual* Section 6.6 *Wiring Power Supply Connections* for more information.

On the normal display, one of the channels shows a C at the end of the line, indicating the QCC cannot communicate with the transmitter assigned to that channel.

- Check to make sure the Com Type ANALOG or DIGITAL is correctly set for the type of transmitter (analog or digital) assigned to that channel. Refer to Section 9.1 *Enable / Disable Channels, Assign ID, Channel Number & Communication Type* for more information.
- 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 that the remote device is working properly itself.

QCC-RDM constantly shows "Connection Lost". Check that the number of Remote Devices is set correctly. Refer to Section 8.6 *Number of Connected Remote / Peripheral Devices* for more information.

For more information on installing the QCC, and wiring instructions, refer to the *QCC Installation Manual*. Should you require further help, please contact our Service Department:

Critical Environment Technologies Canada Inc.

Unit 145, 7391 Vantage Way, Delta, BC, V4G 1M3, Canada

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Telephone: +1.604.940.8741

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Email: service@cetci.com

Website: www.critical-environment.com

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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