



Rev. B | 2018.09

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. For more information, refer to Section 12 *Maintenance* of this manual.

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: The *QCC Installation Manual* outlines the basic features and functionality of the QCC and includes information about installing and wiring the system. If you require more in depth information about how the QCC can be configured (channels, relays, strobe/audible and analog input and output settings), using passcodes, logic and priority settings and the Modbus® Holding Registers, please download the *QCC Operation Manual* from our website:

www.critical-environment.com/support/product-library/operation-manual.html

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 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 a total of 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 -A0)
- 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 | - 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 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" dia x 5" H), 24 V |

ELECTRICAL

| | |
|---|--|
| Power Requirement | Line Voltage 90 - 240 VAC, 50 - 60 Hz, 75 W Line Voltage |
| Power Distribution | Total power available to Remote & Peripheral and Options 65 W @ 24 VDC |
| Wiring | <ul style="list-style-type: none"> - VAC (line voltage) 3-conductor (Line, Neutral, Ground) shielded minimum 18 AWG stranded within conduit - LAN Modbus® RTU RS-485, 4-conductor, 16 AWG, stranded shielded - 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 Data bits: 8 Stop bits: 1 Parity: none |
| WAN Communication: BACnet® MS/TP | Baud rate: 76,800 (default, configurable) Base Address: 270 MAC Address: 100 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, 94 W



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

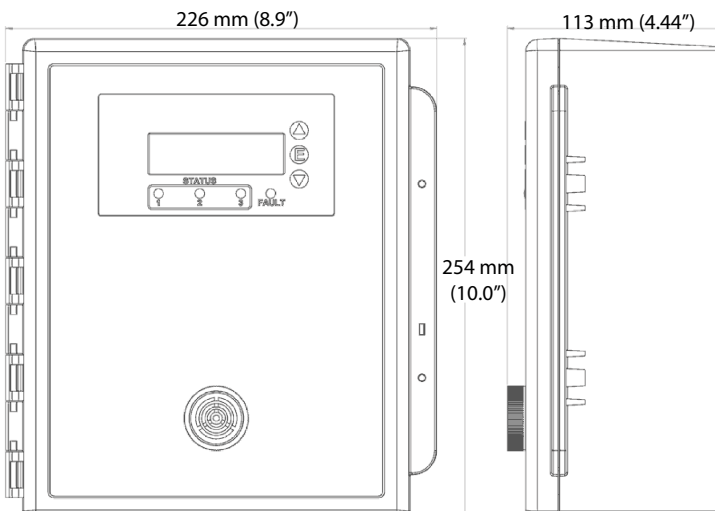
Conforms to: EMC Directive 2004/108/EC, EN 50270:2006, Type 1, EN61010

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 ₈ , C ₃ H ₄ O, CH ₄ , 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

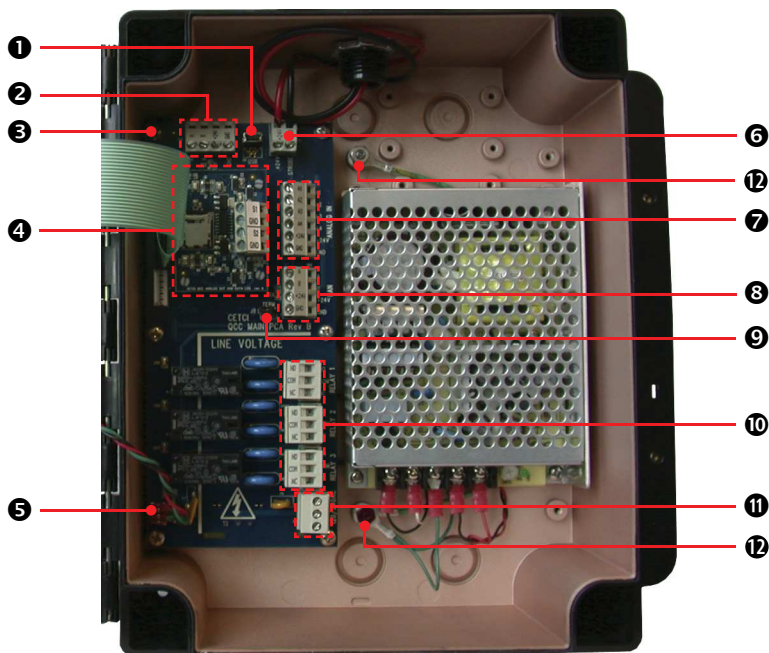
5.1 Front Exterior Enclosure



| NUMBER | FEATURE | FUNCTION |
|--------|---------------------|--|
| 1 | Display | 4x20 characters. Indicates controller operation. |
| 2 | Status 1, 2, 3 LEDs | Indicates channel alarm status. |
| 3 | ARROW UP | Press to scroll up through menu. |

| | | |
|----------|---------------------|---|
| 4 | ENTER | Press to select menu choice. |
| 5 | ARROW DOWN | Press to scroll down through menu. |
| 6 | Fault LED | Indicates unit fault condition. |
| 7 | Door Screws | Secures the door of the enclosure. |
| 8 | Door Mounted Buzzer | Audible buzzer that sounds when a channel has gone into alarm. Factory default is set for high alarm. |

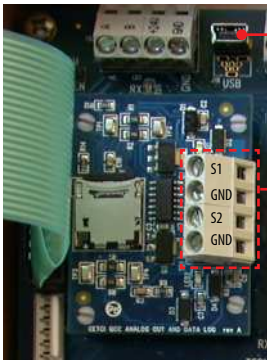
5.2 Interior System Layout (shown with Option -AO)



| 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. |

| | | |
|----|---|---|
| 7 | Analog IN Terminal | Connection for up to four 4-20 mA transmitters |
| 8 | LAN Terminal | Connection of up to four digital (Modbus®) transmitters and/or peripheral devices |
| 9 | LAN End of Line Jumper | 120 ohm line termination |
| 10 | 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

6.1 General Safety Warnings

The QCC is intended for indoor use, permanently mounted in a locked electrical room. It should be protected from extreme weather conditions.

The QCC requires no assembly and virtually no maintenance other than configuration of the channels and ensuring that excess water or dust is not somehow entering the enclosure and physically damaging the circuit board or internal components.

6.2 Protection Against Electrical Risks

Warning High Voltage. Indicates hazardous voltage may be present in the area inside the QCC enclosure

marked with this symbol.



Disconnect all power before servicing. There may be multiple power sources. Power supply must have a building installed circuit breaker /switch that is suitably located and easy to access when servicing is required and should be labelled as QCC supply (disconnecting power to the QCC). Appropriate markings should be visible at the circuit breaker / switch that is supplying power to the QCC. The relays may be connected to alternate circuit breakers and these should be appropriately marked.

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

6.3 Protection Against Mechanical Risks

Be aware that the QCC enclosure has a 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.

6.4 Location of System Installation

The QCC should be installed on a flat vertical surface using the four 0.175" (4.4 mm) diameter mounting holes provided to maintain water tight status. There are also four areas that can be drilled out for mounting to a double gang electrical box.

There are six conduit entry points for the standard mounting setup (against a flat surface). Three entry points are located along the top of the enclosure and three are located along the bottom. These points must be drilled out as needed. If mounting to a double gang electrical box there is an entry point provided that must also be drilled out of the back of the enclosure. Some disassembly is required to access this entry point. Refer to Section 6.5 *Standard Enclosure Mounting Components*.

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

When finished installing or servicing it is recommend you perform a test to ensure the unit and all relays are working properly. See Section 7.7 *Test Functions* (passcode 0001).

6.4.1 Wet Environment Considerations

If the QCC is to be installed in a potential hose-down application or any application whereby liquid could be directed towards the buzzer, the QCC should be ordered with an optional watertight door mounted buzzer (factory installed).

If used in a wet environment application, the QCC should be ordered with the optional watertight door mounted alarm and the conduit hub entering the QCC enclosure must be a

liquid tight type.

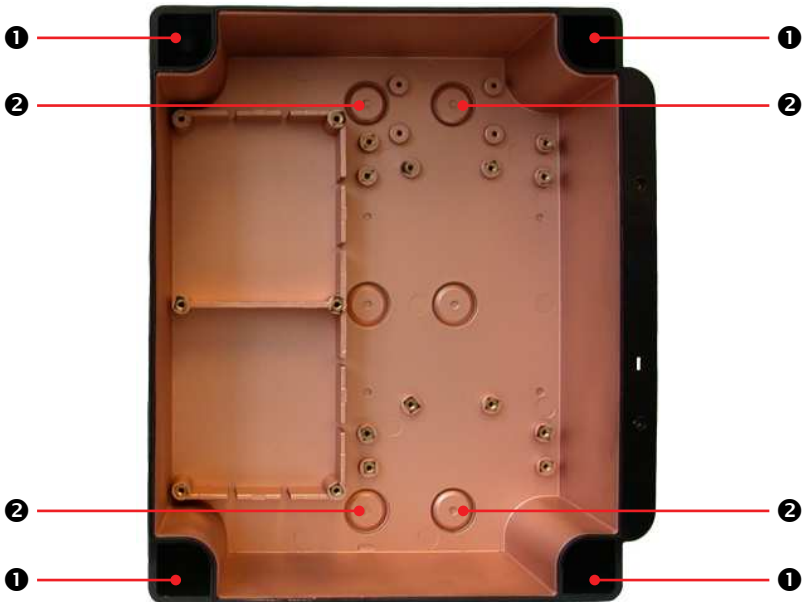
Any water or physical damage to the QCC that occurs from the installer drilling their own installation holes will not be covered under CETCI's warranty.

6.4.2 EMI and RF Interference Considerations

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

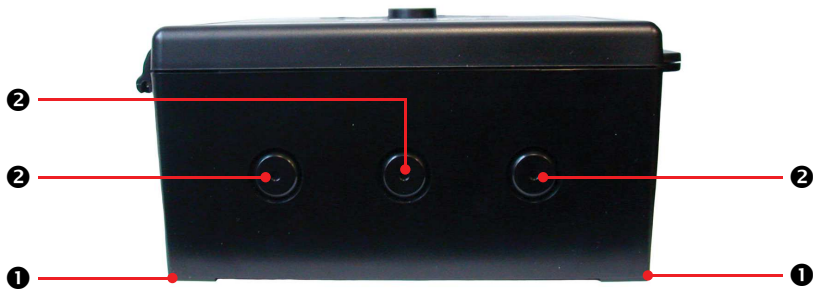
There are some installation procedures that will reduce the likelihood of getting faulty readings:

1. Locate the detectors and controllers out of the way from normal foot traffic and high energy equipment.
2. 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, Bluetooth enabled devices, cell phones and other electrical equipment may interfere with the response of the gas detectors.

6.5 Standard Enclosure Mounting Components**6.5.1 Enclosure Interior Base**

| NUMBER | FUNCTION |
|--------|--------------------------|
| ① | Molded-in mounting holes |
| ② | Conduit entry |

6.5.2 Enclosure Top and Bottom



| NUMBER | FUNCTION |
|--------|--------------------------|
| ① | Molded-in mounting holes |
| ② | Conduit entry |

6.6 Wiring Power Supply Connections

The QCC requires a 90 - 240 VAC power supply (line voltage power). This source should be on an independent breaker that is properly marked.

Very carefully, drill out one or more of the PVC conduit entry hole plugs located on the top, bottom or back of the system enclosure base. Refer to Section 6.5 *Standard Enclosure Mounting Components* for the locations of the conduit entry holes.

Wire the field wiring to the Line Voltage Terminal (J15), refer to Section 5.2 *Interior System Layout*. These are the power connections and should be supplied with a minimum 3-conductor, 18 AWG stranded wiring.

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. The shield should be connected to earth ground close to the primary supply connection only, and must have a contiguous connection throughout the network. Communication uses a daisy chain configuration.

6.7 Wire Gauge vs Run Length

It is important to use the appropriate gauge of wire for the required length of the run to ensure sufficient available voltage, noise reduction, dissipation of heat, and overall optimum performance along the entire wire run. Large wire sizes will have less voltage drop than smaller wires sizes of the same length. Similarly,

shorter wire lengths will have less voltage drop than longer wires for the same wire size. The longer the wire run, the more attention there should be made to preventing voltage drop.

CETCI highly recommends 4-conductor, 16 AWG, shielded, stranded wire cable types such as AlphaWire 79220, Alphawire 5534, Belden 9954 or equivalent.

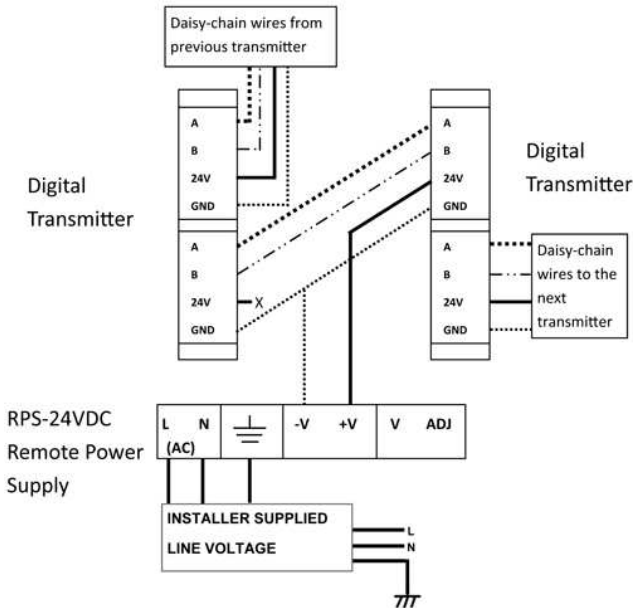
Minimum Cable Length vs Size (AWG) for Modbus® and Power Supply

| Cable Length | | # of Sensors | 4 | 6 | 8 | 10 | 12 | 14 | 16 |
|--------------|----------------|--------------|----|----|----|----|----|----|----|
| Meters | Feet | | | | | | | | |
| 0.3 to 1552 | 1 to 500 | AWG # | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| 153 to 305 | 501 to 1,000 | AWG # | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| 306 to 457 | 1,001 to 1,500 | AWG # | 18 | 18 | 18 | 16 | 16 | 16 | 16 |
| 458 to 914 | 1,501 to 3,000 | AWG # | 18 | 16 | 16 | 16 | 16 | 16 | 16 |

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.

6.8 Wiring a Remote Power Supply (RPS-24VDC)

The RPS-24VDC is a remote power supply that converts 90 - 240 VAC power to 24 VDC power, providing a renewed amount of power to compensate for voltage drops. Projects that consist of very long wire runs may require a remote power supply to boost the voltage to the last transmitter on the network run and to reinforce the voltage provided by the Controller to the first line of transmitter.



NOTE: Observe polarity when connecting DC load to the output of the power supply.

For more information about the RPS-24VDC, refer to the *RPS-24VDC Remote Power Supply Operation Manual*.

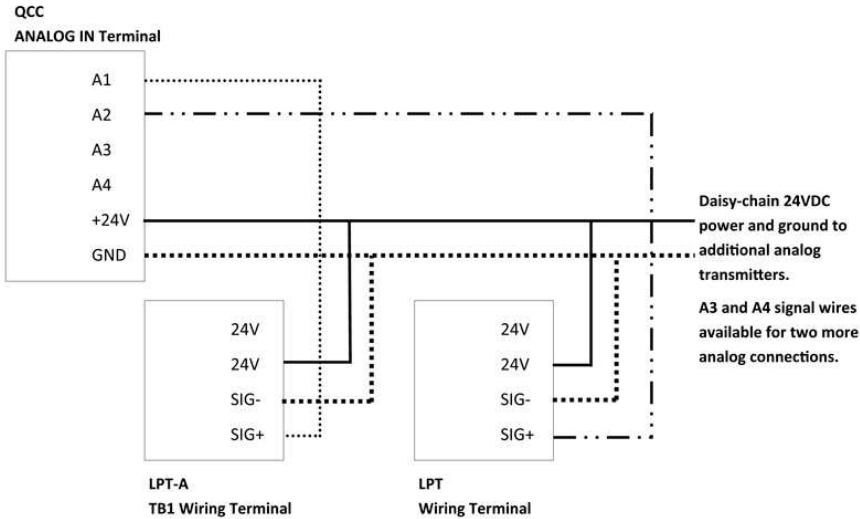
6.9 Wiring Internal Analog Inputs

The QCC provides 24 VDC (low voltage power) at the Analog IN Terminal for connecting analog transmitters. A maximum of four remote transmitters can be connected, using the analog input and/or digital input connections in any combination. When connecting analog transmitters, the 24 VDC power supply and GND can be daisy-chained to the next transmitter/sensor. Each signal wire is connected directly from the QCC to each transmitter.

A1 through A4 on the Analog IN terminal provides up to four connections for analog inputs such as the LPT and/or the LPT-A transmitters. Three-conductor, 16-18 gauge wire / cable must be shielded when connecting to a remote analog transmitter. The voltage supplied by the QCC Controller to each remote analog transmitter should measure approximately 24 VDC nominal at the transmitter(s). If this voltage is not attained after installation, the wrong gauge wire may have been used or the wiring run is too long.

Common wire colours for positive, negative and signal VDC wires are:

- Red for positive
- Black for negative
- White or Yellow for signal

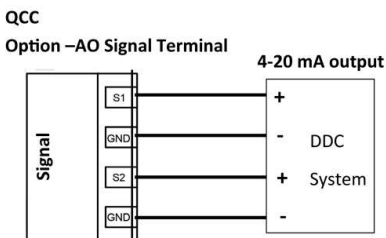
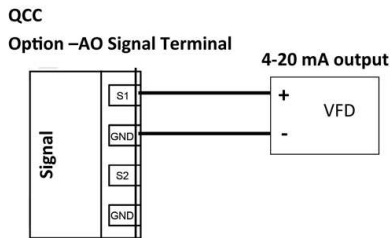


NOTE: DO NOT use solid-core wire for connection to wiring terminal strip. Any damage caused by using solid-core wire will void warranty. Use stranded wire ONLY. Under most local electrical codes, low voltage wires cannot be run within the same conduit as line voltage wires.

WARNING: Maximum distance information between the QCC and a remote analog transmitter can be found in that particular analog transmitter's Operation Manual.

6.10 Wiring Internal Analog Outputs (Option -AO)

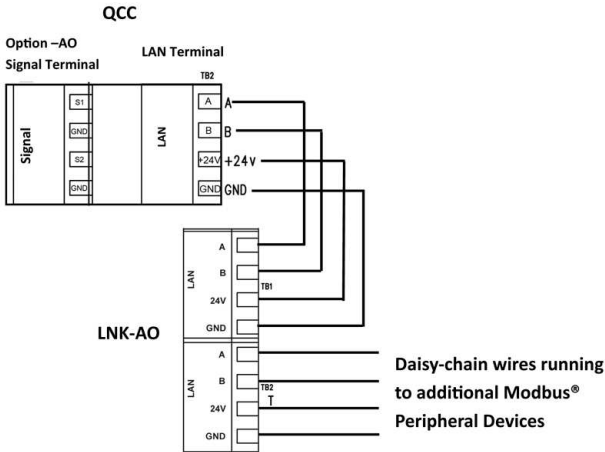
The QCC does not have any analog outputs unless the optional Analog Output board (Option -AO) has been installed on the main board by the factory at the time of order. When installed, QCC provides 24 VDC (low voltage power) to the Analog Output Terminal on the optional -AO board, which offers two analog outputs and one SPDT dry contact relay. The analog outputs can be used for the control of VFDs (Variable Frequency Drives).



6.11 Wiring LNK-AO Peripheral Device (additional Analog Outputs)

If more than two analog outputs are required, an LNK-AO Peripheral Device can be connected to the QCC.

The LNK-AO Peripheral Device offers four analog outputs and connects to the QCC through the LAN Terminal on the main board. A maximum of one LNK-AO Peripheral Device can be connected to the QCC. For more information on the LNK-AO, refer to the *LNK-AO Analog Output Peripheral Device Operation Manual*.



6.12 Wiring Digital Inputs (LPT-P & LPT-M Transmitters)

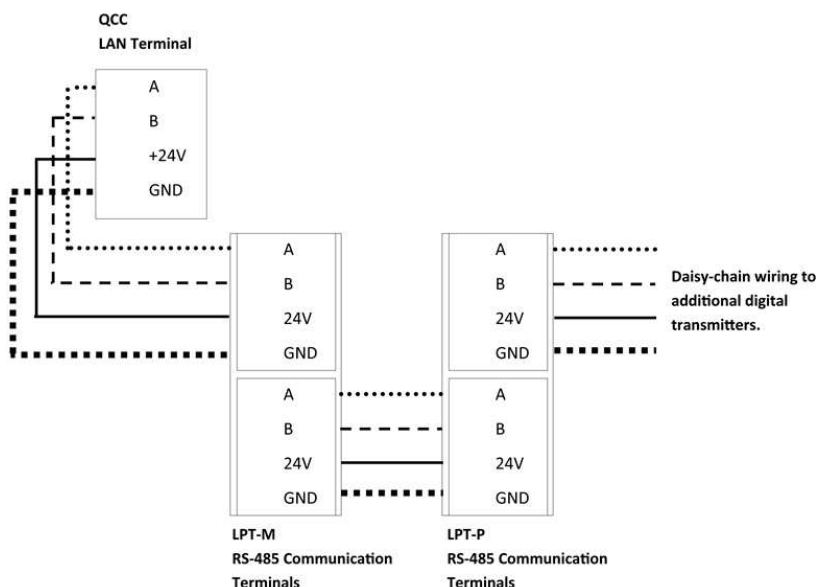
The QCC provides 24 VDC (low voltage power) at the LAN Terminal for connecting digital transmitters. A maximum of four remote transmitters can be connected, using the analog input and/or digital input connections in any combination. In a digital network, the 24 VDC power supply, GND and signal wires are run in a daisy-chain fashion to the remote transmitters/sensors.

The LAN terminal offers an A and B connection for up to a total of 4 digital transmitters in a daisy-chain configuration. Four-conductor, 16 gauge wire / cable must be stranded, shielded when connecting to digital transmitters. The voltage supplied by the QCC Controller to the remote digital transmitter should measure approximately 24 VDC nominal at the transmitter(s). If this voltage is not attained after installation, the wrong gauge wire may have been used, or the wiring run is too long.

The LPT series of digital transmitter enclosures have several conduit entry locations (general purpose enclosures). Under most local electrical codes, low voltage wires cannot be run within the same conduit as line voltage wires.

Common wire colours for positive, negative and digital wires are:

- Red for positive
- Black for negative
- White for Data A



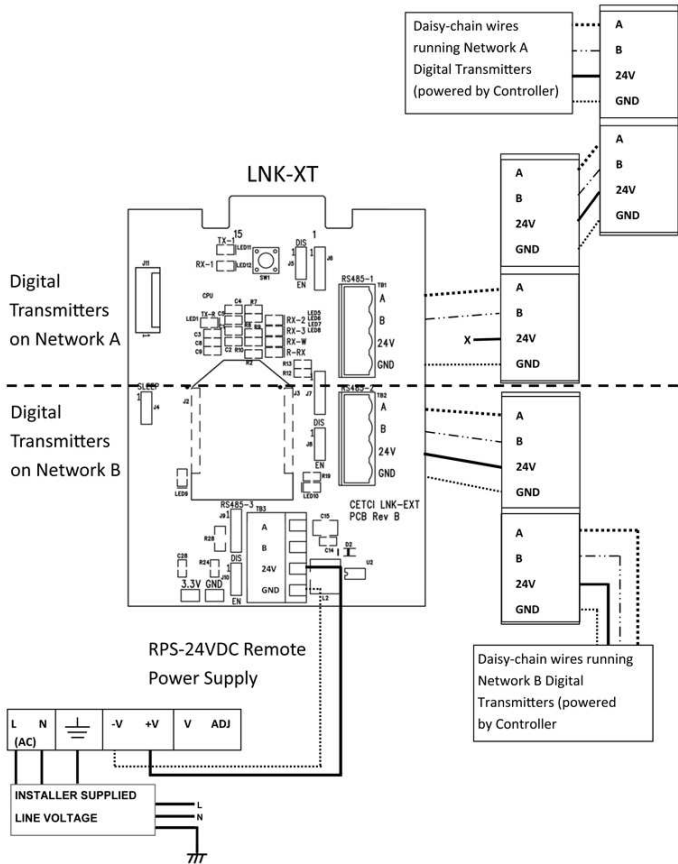
NOTE: DO NOT use solid-core wire for connection to wiring terminal strip. Any damage caused by using solid-core wire will void warranty. Use stranded wire **ONLY**.

WARNING: Maximum distance information between the QCC and a remote digital transmitter can be found in the digital transmitter's Operation Manual. If signal lines to digital transmitters need to be extended, the LNK-XT Network Extender Peripheral Device can be used to boost the signal. Likewise, if required, an RPS-24VDC Remote Power Supply can be added to increase the available power.

6.13 Wiring LNK-XT Network Extender Peripheral Device

The LNK-XT Network Extender Peripheral Device works as a signal booster, allowing transmission and receipt of gas readings over a larger total area. It extends the range of the Modbus® communication network allowing a longer distance between the Controller and the gas detectors. The micro controller quickly passes Modbus® information packets from the master side of the LNK-XT to the extension side, seamlessly without interruption.

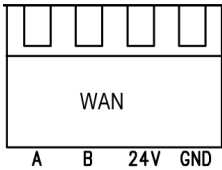
NOTE: This wiring diagram shows how to wire the LNK-XT between daisy-chained digital transmitters, with the RPS-24VDC connected to it.



For more information about the LNK-XT, refer to the *LNK-XT Peripheral Device Operation Manual*.

6.14 Wiring to a Building Automation System (BAS)

The WAN Terminal is used to connect the QCC to a Building Automation System (BAS) or other type monitoring system or control panel. Refer to Section 5.2 *Interior System Layout* for the location of the WAN Terminal.



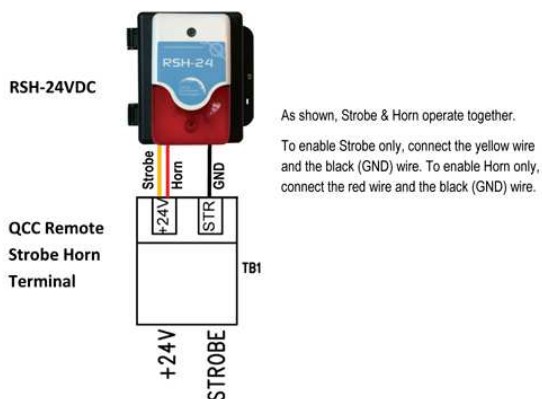
A and B - RS-485 differential signal pair, A is + and B is -

24V - 24 volts DC, not required, no connection on board

GND - ground reference

6.15 Wiring to the Remote Strobe / Horn Output Terminal

The QCC provides 24 VDC @ 500 mA for connecting a remote horn/strobe (such as the RSH-24VDC) at the Remote Strobe & Horn Terminal. This will nominally allow for one remote horn/strobe.



Multiple horn/strobe devices can be accommodated by using the relays. A remote power supply may be required.

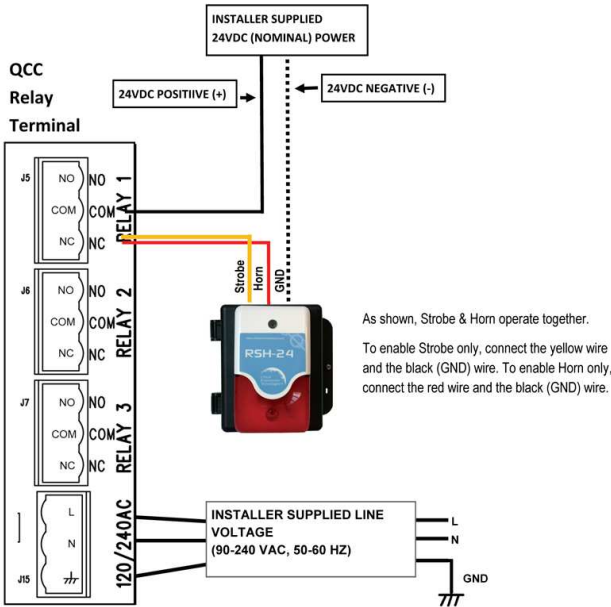
6.16 Internal Relay Connections

The QCC has three internal SPDT dry contact relays rated MAX 5A at 240 VAC or 30 VDC each. These relays can be used to control fan starters or coils used for HVAC equipment. The contacts can also be used for signaling other equipment like fire panels or alarm systems. Terminal blocks are provided to connect to the three MAX 5A / 250 VAC - 30 VDC relays.

NOTES:

- 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.
- System relays are SPDT (single pole, double throw) thereby providing one set of usable dry contacts. Because the QCC series systems are designed to be fail-safe. **The relay coils are normally energized in non-alarm state for failsafe operation.** If required, the QCC can be configured for normal Relay operation. Refer to the *QCC Operation Manual* for more information.

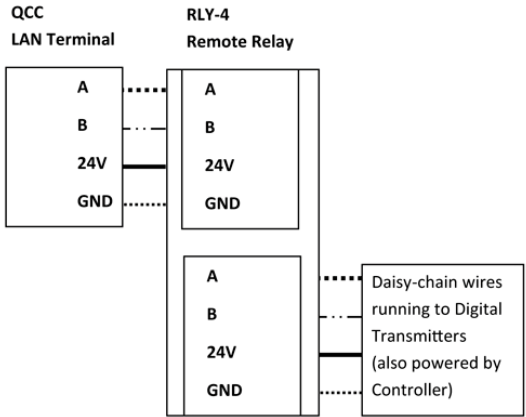
NOTE: DO NOT USE solid core wire for connection to relay terminal strip. Use stranded wire only.



6.17 Remote Relay Connections (RLY-4)

The RLY-4 is a remote relay offers up to four additional SPDT dry contact relays to a fixed gas detection system. The RLY-4 communicates with QCC using Modbus® communications protocol. In the event that the connection is lost between the controller and the remote relay, a factory configurable default state can be set to ensure the relays continue to operate as required. The relays are rated 5 amps @ 240 VAC each and can be used to control remote alarms, strobes, exhaust fan starters, make up air fan contactors, or signaling other equipment like fire panels or alarm systems, etc.

A maximum of one (1) RLY-4 device (offering a maximum of four (4) remote relays) can be connected to the QCC. The RLY-4 can be wired directly to the QCC followed by digital transmitters connected in a daisy-chain configuration. Or it can be wired anywhere along the digital network in a daisy-chain configuration as required.



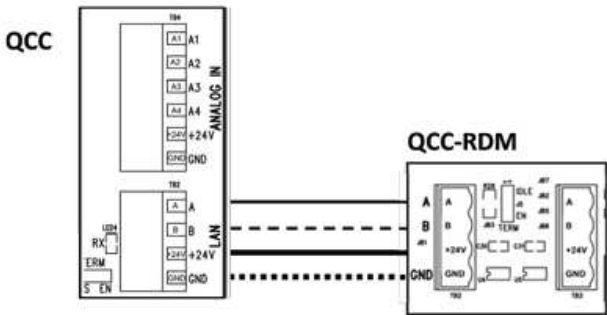
Note: This diagram shows the RLY-4 connected directly to the QCC, followed by digital transmitters connected in a daisy-chain fashion. The RLY-4 could be connected anywhere along the digital network in a daisy-chain fashion as necessary.

For more information on the RLY-4, refer to the *RLY-4 Remote Relay Operation Manual*.

6.18 Wiring the QCC-RDM Remote Display

The QCC-RDM Remote Display is designed to communicate with the QCC Quad Channel Controller using Modbus® communication protocol. It displays the same information as the QCC. The QCC-RDM is ideal for refrigeration (or other) applications where there are two entrances to the room. The QCC can be mounted outside one entrance and the QCC-RDM outside the other to provide visual confirmation of the gas level readings inside the room at both entrances prior to entry.

24VDC power is supplied to the QCC-RDM from the QCC. Four-conductor, 16 gauge wire / cable must be shielded when connecting the QCC to the QCC-RDM.



Either TB2 or TB3 can be used to connect the QCC to the QCC-RDM. Both are Modbus® connections. The QCC-RDM will automatically broadcast the display information to Modbus® ID 253. This is the common

Modbus® ID for all QCC-RDMs on the network and is used to listen for broadcasts from the QCC and receive screen updates from the QCC. The read and write default QCC-RDM Modbus® ID is 230.

Once the QCC-RDM is wired to the QCC, the QCC needs to be told that the QCC-RDM exists as a remote device. Refer to the *QCC Operation Manual* for instructions on how to add the QCC-RDM as a Remote Display device.

In order for the QCC to communicate with the QCC-RDM, the two devices must have the same baud rate. Refer to the *QCC Operation Manual* for instructions on how to set the Remote Baud rate.

For more information on the QCC-RDM, refer the *QCC-RDM Operation Manual*.

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 Relays, Strobe, Audible Alarm |
| 1001 | Basic | Display Contrast, Set Clock, Data Logging Sample Rate |
| 1014 | Display | On Alarm, Splash Screen |

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 the *QCC Operation Manual* for channel alarm settings and 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 set 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 Menu 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 Audible Test.



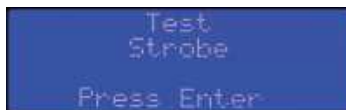
Press E to enter the Test Audible menu. Use the ARROW keys to find the audible device you want to test. Press E to select and enter the length of time (in seconds: 0 to 999) you want the test to last. Press E to save the entry and start the test.



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 Strobe Test.



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.

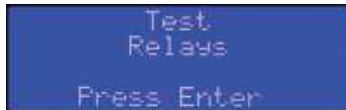


```
Select Test Length
000 seconds
^
ENTER Accept / EXIT
```

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.



```
Test
Relays
Press Enter
```

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.



```
Select Relay to Test
ONE
^
ENTER Accept / EXIT
```



```
Select Time Delay
0000 seconds
^
ENTER Accept / EXIT
```

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 the *QCC Operation Manual* for more information on Relay ON/OFF DELAYS).

8 BASIC SETTINGS AND CONFIGURATIONS

The Basic menu allows you to set parameters such as the display contrast, date and time, data logging sample rate, Modbus® ID, baud rates and the number of remote devices (remote displays, relays and output devices), connected to the QCC.

8.1 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.



```
Basic
Set LCD Contrast
Press Enter
```


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.

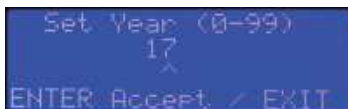


8.2 Set Clock (included with Option -AO)

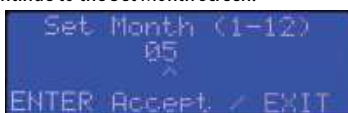
NOTE: The Set Clock function will only be available if the on board Analog Output (Option -AO) is installed.

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.



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



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.



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





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

8.3. 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 8.2 *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.



```
Basic
Data Logger
Press Enter
```

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



```
Program Sample Rate
  0030 minutes
  ^
ENTER Accept / EXIT
```

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.



```
Basic
Data Logger
SD Card Not Present
Press Enter
```

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.

8.4. 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:

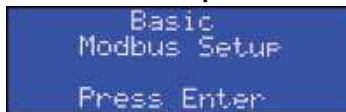
- Baud rate = 76,800
- Base address = 270
- MAC address = 100
- Instance ID = 270100 (the Base Address x 1000 + the MAC Address)
- Parity = no parity
- Stop bits = 1
- Data bits = 8

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).

8.4.1 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.



8.4.2 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.

```
Remote Baud (^ - v)
19,200
^
ENTER Accept / EXIT
```

8.4.3 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.

```
Local Baud (^ - v)
19,200
^
ENTER Accept / EXIT
```

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.

8.5. 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

```

Chanel 1 Units
  PPM
  ^
ENTER Accept / EXIT
    
```

- Channel Decimals (up to 2 decimal places)

```

Chanel 1 Decimals
  0
  ^
ENTER Accept / EXIT
    
```

- Channel Zero (up to 5 numbers)

```

Chanel 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)

```

Chanel 1 Range
  00200 PPM
  ^
ENTER Accept / EXIT
    
```

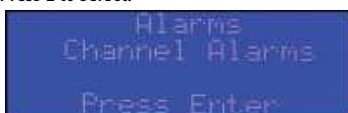

For most gas detection applications, where the channel is a gas channel, the Channel Range value is the sensor range as specified by CETCI for that sensor. For example, if the channel was being configured for monitoring CO, a CO sensor from CETCI has a range of 0 to 200 ppm. The Channel Range value to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

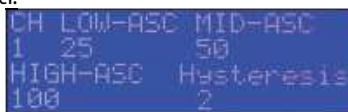
Enter the Alarms menu (passcode 2012), press the ARROW keys to scroll through the menu and select Channel Alarms. Press E to select.



```

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.

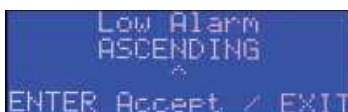


```

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:

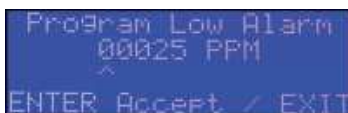
- ASCENDING or DESCENDING



```

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 2012), 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.

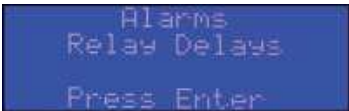
10.1 Enable / Disable Relays, Strobe & Audible and Set ON/OFF Delays

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 1012), 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 8.5

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)



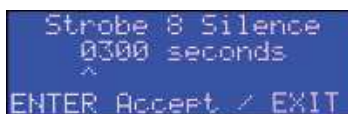
```
Strobe 8 On Delay
  0001 seconds
  ^
ENTER Accept / EXIT
```

- 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 8 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 2012), 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 OPTIONS AND ACCESSORIES

11.1 Top Mounted Strobe (Option -L)

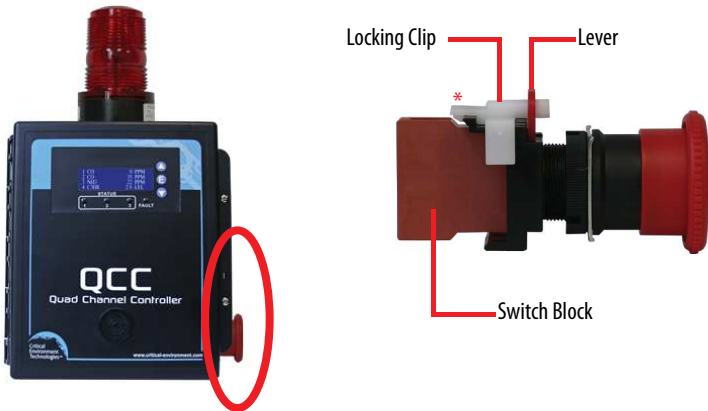
High powered, red LED flashing beacon factory installed on the top of the QCC enclosure. Offers excellent flash intensity, durable vibration resistant construction and a long life 100,000 hour LED technology. Made of tough Lexan spun welded to the base to completely seal out moisture. NEMA 4X and UL 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) |

11.2 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.



| | |
|----------------|------------------|
| Voltage Rating | 1100 VAC, 24 VDC |
|----------------|------------------|

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

To Remove For Wiring:

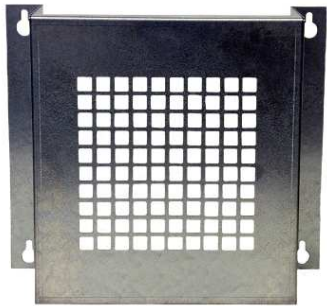
Remove the white locking clip by pulling up gently on the bottom clip part (see * in diagram on previous page) and twist slightly to remove. Rotate the red lever and remove the switch block. Connect the wires. Put the switch block back on, rotate the lever back in place and replace the locking clip.

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

11.3 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) |

11.4 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.**

12 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.

13 TROUBLESHOOTING

QCC won't power up.

Is the power properly connected? Check the connections. Refer to *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 the *QCC Operation Manual* for more information on how to configure channel hardware.
- 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 the *QCC Operation Manual* for more information on how to set the number of connected

remote / peripheral devices.

For more information on configuring the QCC, refer to the *QCC Operation Manual*.

Should you require further help, please contact our Service Department:

Critical Environment Technologies Canada Inc.

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NOTES

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