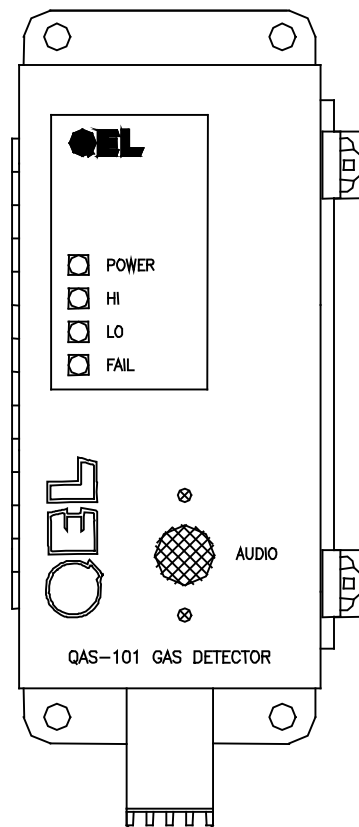


QAS-101 SERIES SINGLE CHANNEL CONTROLLERS



INSTALLATION OPERATION AND MAINTENANCE MANUAL

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GENERAL SPECIFICATIONS:

MODEL NUMBER: _____

SERIAL NUMBER: _____

OPERATING RANGE:

GAS TYPE	ALARM SETTING	
	LOW	HIGH
<input type="checkbox"/> Carbon Monoxide	50 ppm/VE	100 ppm/VE
<input type="checkbox"/> Propane	10% LEL	20% LEL
<input type="checkbox"/> Ammonia	35 ppm	300 ppm
<input type="checkbox"/> Freon_____	500 ppm	1000 ppm
<input type="checkbox"/> Other_____	_____	_____

SENSOR: Solid State Semiconductor

Onboard Switch Setting:	OFF	ON
1. Low relay delay	_____	_____
2. High relay delay	_____	_____
3. Audio active on high alarm	_____	_____
4. Low relay active during fail	_____	_____
5. High relay active during fail	_____	_____
6. Buzzer	_____	_____

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**QAS-101 SERIES
SINGLE CHANNEL CONTROLLERS**

1. SPECIFICATIONS:

Power Supply: 100 to 120VAC, 60Hz
8 Watts

Relays: Two DPDT dry contacts
10 Amps @ 240 VAC/30 VDC
Not-normally energized
Field configurable time delays

Audio Alarm: 85 dB at 1 foot

Panel Indicators:	Power ON	Green LED
	High Set point	Red LED
	Low Set point	Yellow LED
	Sensor Fail indication	Red LED

Sensor: Solid State Semiconductor

Calibration: Recommended once per year.

Expected Sensor Life: In excess of 5 years

Environment: Temperature -30 C to 40 C
Humidity 0 to 90 % non-condensing

Recommended mounting height:	Carbon Monoxide	4 to 6 feet above floor
	Propane	1 foot above floor
	Ammonia	9" to 18" below ceiling
	Freon	1 foot above floor
	Other	Consult Factory

Do not mount near fans or doors where high velocity drafts occur, or where clean air enters area.

2. THEORY OF OPERATION:

The QAS-101 series is a stand-alone hydrocarbon detector/controller designed for general-purpose applications. The QAS-101 series detects hydrocarbons and controls two relays (DPDT) that may be used to actuate fans, alarms, etc. An internal audio alarm will sound if the sensor fails and if a high alarm state exists (disable switch on board). Fail may, at the user's setting actuate either, or both relays.

The sensor is a broad spectrum, economical, highly reliable sensor, with a practical life expectancy of five years minimum. The semiconductor material in the sensing element is heated to about 300 C. In the presence of a reactant gas a chemical reaction occurs at the surface, altering the quantity of Oxygen atoms adsorbed onto the surface of the semiconductor. This causes a change in the resistance of the material. The change in resistance is measured and compared to the set points to actuate relays.

These sensors are 'broad spectrum' sensors in that they respond to virtually all hydrocarbons. They are also affected to a much lesser amount by humidity and temperature.

The solid-state sensor responds to all components of vehicle exhaust. Although Carbon Monoxide is a major factor in vehicle exhaust, recent research has show that the unburnt fuel has long-term exposure hazards. With a sensor response relationship of 1 part CO signal to 3 parts hydrocarbon signal, we use a times 4 compensation factor for calibration gases when this sensor is used for vehicle exhaust e.g. 200 ppm CO calibration gas calibrates for 50 ppm CO in vehicle exhaust. This calibration ensures that the atmosphere remains clean of carbon monoxide and of fuel residuals.

3. INSTALLATION:

CO: Automobile-parking garages:
Mount 4 to 6 feet above the floor.

Bus and truck barns: Mount where vehicles exhaust upwards, it is often useful to mount the units on the ceiling.

C3H8: Propane is heavier than air. Mount close to the floor and take note of any low points where gas may pool or collect.

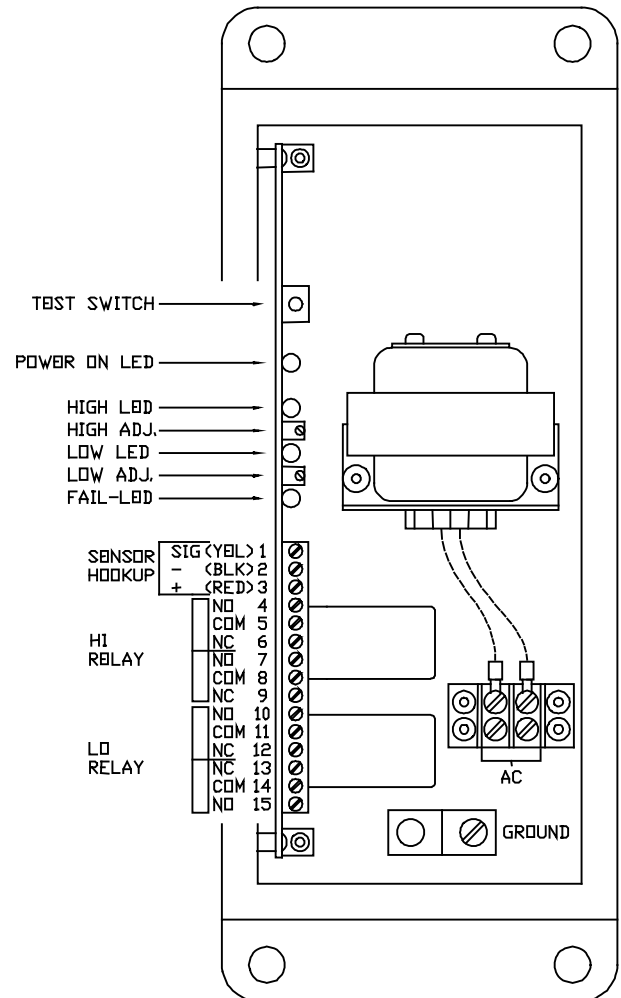
NH3: Mount at ceiling height. For high ceilings, two sensors are recommended, the second about 6 feet above the floor.

Freon: Freon gases are heavier than air. Mount near the floor and take note of any low points where gas may pool or collect.

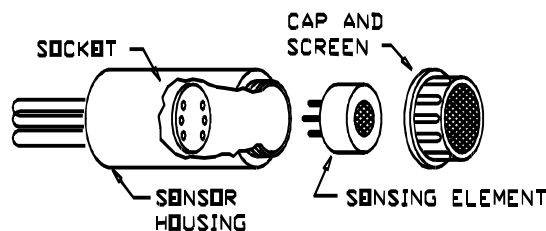
Always try to mount the unit with sensor pointing downwards.

Do not mount near fans or doors where high velocity drafts occur, or where clean air enters area.

Most users will find it useful to have a time delay on fan starting of 5 to 10 minutes to prevent 'nuisance' alarms.



SENSOR INSTALLATION:



3-wire sensor. Shipped attached to the unit the sensor may be removed and placed remote from the unit.

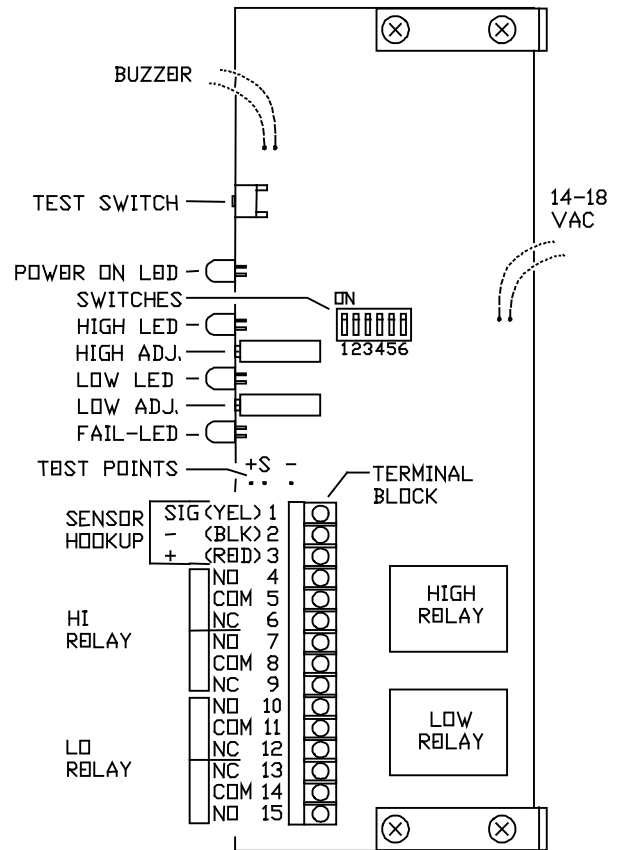
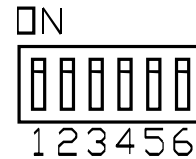
- : Red to sensor '+' (Terminal 3)
- : Black to sensor '-' (Terminal 2)
- : Yellow to signal 'sig' (Terminal 1)

Maximum loop resistance is 35 ohms for remote sensor placement (over 4000 ft for 16 AWG wires)

FUNCTION CONTROL SWITCHES:

The QAS-101 series has switches on the circuit board for controlling a number of functions: relay time delays, buzzer enable, relay actuation in case of sensor failure.

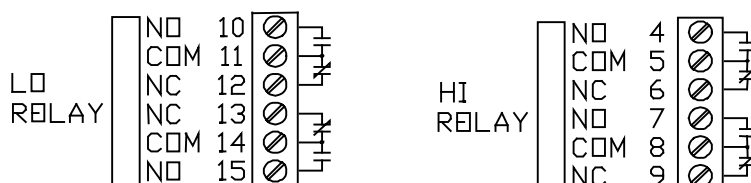
1. Low relay
ON: immediate actuation
OFF: 5 minutes delay
2. High relay
ON: immediate actuation
OFF: 10 minutes delay
3. Audio
ON: audible alarm on high and fail
OFF: audible alarm on fail only
4. Fail
ON: fail operates low relay
OFF: fail low relay disabled
5. Fail
ON: fail operates high relay
OFF: fail high relay disabled
6. Buzzer
ON: enable
OFF: disable



The LED's will always turn on immediately, regardless of switch settings.

RELAY WIRING:

The relays are double pole, double throw, meaning that each relay is two relays in one. Each "side" having one normally open contact, and one normally closed contact arranged about a common center pin.



4. TURN-ON AND TROUBLE SHOOTING:

Upon unit power up, there is a characteristic turn-on cycle. As the sensor comes up to operating temperature and stabilizes, the signal may rise to high alarm before settling again to zero. This takes two or three minutes. (If relay time delays are turned on, this phase should pass without activating the relays). If the unit has been off for more than three days, it is best to wait three days before calibration to ensure that it has stabilized fully. If the unit has been off for only an hour or two wait at least an hour before calibrating.

TEST SWITCH:

Pressing the test switch on the circuit board will simulate a high alarm condition. This tests the LED and relay actuation. If time delay switches 1 and 2 are off, (time delay active) then the relays will activate after their proper delays.

SENSOR FAIL DETECTION:

The fail circuit detects when the sensor fails or connecting wiring is broken.

The audio alarm will sound during fail, providing that switch 6 (audio enable) is on. Switches 4 and 5 may be turned on to cause the low and high relays respectively, to engage, during a fail condition.

5. CALIBRATION PROCEDURE:

NOTE: Switching relays to delays mode (switches 1 and 2 off) during calibration prevents devices connected to the relay from switching on and off during calibration.

a) The gas sample must be humidified by passing the gas through a small wet sponge or bubbler. QEL supplies a humidifying cap with its calibration kit, which should be wetted. **NOTE:** The humidifying cap can dry out quite quickly, and should be rewetted every 1/2 hour or so.

b) The monitor must be powered up for three days minimum before calibration, to allow the sensor to stabilize.

c) Calibrate low set point by applying the appropriate low gas to sensor and adjust low set point control potentiometer until low relay closes and the yellow LED comes on. Turning control potentiometer counter clockwise causes the LED to come on. If the relay doesn't close immediately when the LED comes on, check switch 1, as a delay may be active.

d) Calibrate high set point by applying the appropriate high gas to sensor and adjusting high set point control potentiometer until the high relay closes and the red LED comes on. Turning the control potentiometer counter clockwise causes the LED to come. If the relay doesn't close immediately when the LED comes on, check switch 2 as a delay may be active.

e) If power is lost momentarily integrity of the most recent calibration remains. If power is off for longer periods (days or weeks) the sensor must be allowed to stabilize for 2 days before calibration will be accurate.

6. WARRANTY STATEMENT:

The information contained in this manual is based upon data considered accurate; however, no warranty is expressed or implied regarding the accuracy of this data. All QEL equipment is warranted against defects in material and workmanship for a period of two years from date of shipment with the following exceptions:

Electrochemical Sensors (Toxic)	Six Months
Catalytic Sensors (Combustible)	One Year

During the warranty period we will repair or replace, at our discretion, any components or complete units that prove, in our opinion, to be defective. We are not liable for consequential or incidental damage to auxiliary interfaced equipment.

A returned material authorization number should be obtained from the factory prior to returning any goods. All return shipments must be shipped freight prepaid and a copy of the maintenance records should accompany the unit concerned.

Warranty should be considered F.O.B. the factory. Labour and travel time are chargeable for any field site visits required for warranty work.

LIMITED LIABILITY

All QEL systems shall be installed by a qualified technician/electrician and maintained in strict accordance with data provided for individual systems in the form of installation/maintenance manuals. QEL assumes no responsibility for improper installation, maintenance, etc., and stresses the importance of reading all manuals. QEL shall not be responsible for any liability arising from auxiliary interfaced equipment nor any damage resulting from the installation or operation of this equipment.

QEL's total liability is contained as above with no other liability expressed or implied, as the purchaser is entirely responsible for installation and maintenance of systems.

This warranty is in lieu of all other warranties, expressed or implied, and no representative or person is authorized to represent or assume for QEL any liability in connection with the sales of our products other than that set forth herein.

NOTE: Due to on-going product development, QEL reserves the right to change specifications without notice and will assume no responsibility for any costs as a result of modifications.

For further information or assistance, contact:

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