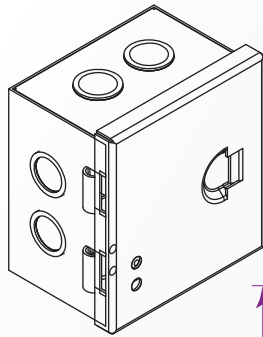
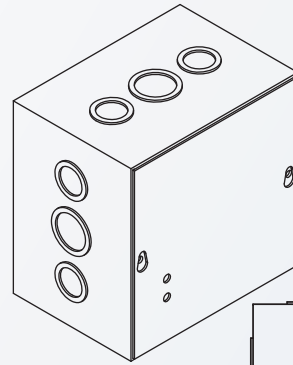
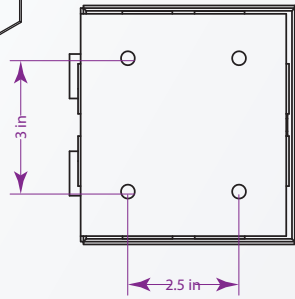




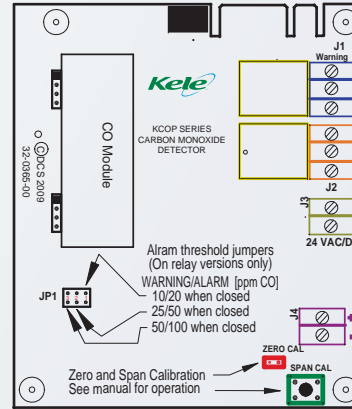
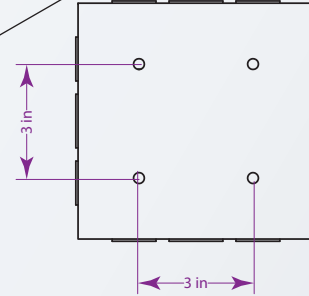
KCOP Wiring and Calibration Instructions



KCOP with hinged cover



KCOP with screw cover



Dry contact output

Present on relay (KCOP) version only
rated: 240 VAC, 1A

Warning

Alarm

Power input

20-30 VAC/VDC

4-20 mA output

Present on analog (KCOPA)

output version only
20 mA => 200 ppm

<4 mA => sensor failed

Electrical installation

- Always install in accordance with local and national electrical codes. If in doubt about the code requirements of your application, consult a licensed electrician.
- Both KCOP enclosure styles have standard 1/2" and 3/4" conduit knockouts on all sides for power and signal wiring. Do not use the vent openings for wiring.

Power connection

- The KCOP Series of sensors can be powered from 20 to 30 Volts AC or DC. The operating power is connected to the two-position screw terminal connector marked "24 VAC/DC"
- The KCOP has a non-isolated bridge input. Circuit ground is not electrically isolated from the input power.

Calibration Kit

KCOP Calibration Procedure



Your sensor comes factory-calibrated and does not need to be calibrated upon initial installation. Calibration kits are available.

Calibration setup

- Calibration should only be attempted when the ambient temperature is above 10 deg C (50 deg F).
- Zero calibration should be done before span calibration.
- Apply cal gas to the sensing cell using the calibration cap supplied in the cal kit.

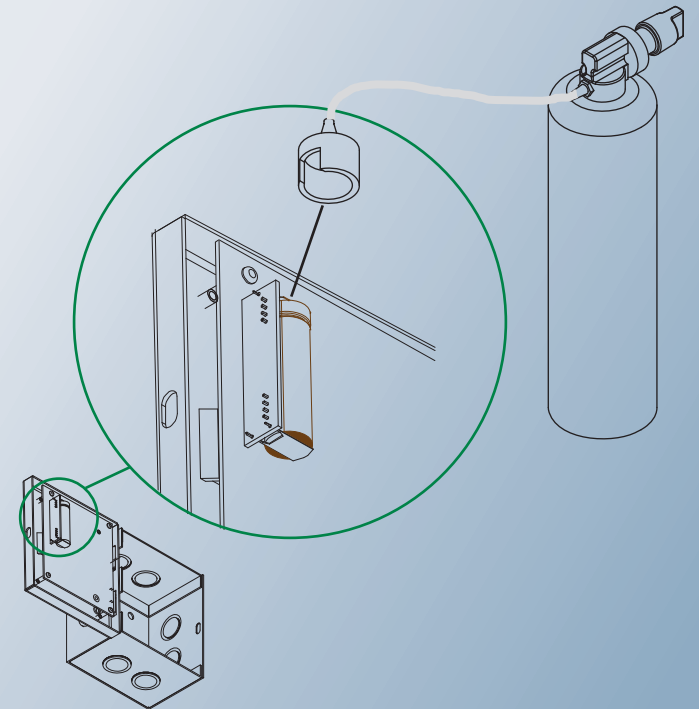
Zero calibration

Zero Calibration MUST be done with air, NOT nitrogen.

- If it is certain that the ambient CO concentration is below 1 ppm, zero cal can be done in ambient conditions. If unsure of ambient CO concentration, zero cal gas (air, not nitrogen) should be applied to the sensing cell.
- Close zero cal jumper for 10 seconds until bottom LED illuminates red and upper LED illuminates yellow.
- Open zero cal jumper within 5 seconds after bottom LED illuminates, or calibration will be canceled.
- Wait approximately 5 minutes until upper LED blinks alternately green and yellow to indicate completion of calibration.
- Acknowledge calibration by closing zero cal jumper for 5 seconds until bottom LED goes out and upper LED lights steady green. If calibration is not acknowledged within 10 minutes after upper LED blinks, the calibration is aborted and no change is made.

Span calibration

- Apply 25 ppm CO, balance air (balance nitrogen calibration gas will give erroneous results) to the sensing cell using the calibration cap supplied in the Calibration Kit.
- Press and hold the 'CAL' switch for 10 seconds until the lower LED illuminates red and the upper LED illuminates green.
- Release the 'CAL' switch within 5 seconds after the lower LED illuminates or the calibration will be canceled.
- Wait 5 minutes until the upper LED blinks green. The calibration gas must have been continuously applied during this time or an erroneous calibration will result.
- Acknowledge the calibration by pressing and holding the 'CAL' switch until the lower LED goes out and the upper LED illuminates steady green. If calibration is not acknowledged within 10 minutes after upper LED turns green, the calibration is aborted and no change is made.
- Turn off the cal gas flow and remove the calibration cap from the sensor.



Relay connection (KCOPR models only)

There are two SPDT, dry contact relay outputs rated 240 VAC at 1A maximum. Each relay has a three-position screw terminal. The middle terminal is the common connection. The upper terminal is the NC (normally closed) contact and the lower terminal is the NO (normally open) contact.

The Warning Relay connected at the upper three terminals actuates whenever the detected Carbon Monoxide concentration is above the warning threshold. When the relay is actuated, the 'NO' and 'COM' terminals are connected. The front panel 'STATUS' LED is yellow whenever the Warning Relay is actuated.

The Alarm Relay connected at the lower three terminals actuates whenever the detected Carbon Monoxide concentration is above the alarm threshold. When the relay is actuated, the 'NO' and 'COM' terminals are connected. The front panel 'STATUS' LED is red whenever the Warning Relay is actuated.

Current Loop Connection (KCOPA models only)

The 4 – 20 mA current loop output appears at the two-position screw terminal connector labeled '4-20 mA OUT', located below the power connector.

The KCOP is NOT a loop powered device. Attempting to power the device through the current loop connector will void the warranty and likely damage the unit.

The loop current flows out of the upper terminal marked '+' and returns to the lower terminal marked '-'.

Because the KCOP uses a non-isolated power supply, a separate power transformer for each unit is the safest configuration when the current loop output is used. The current-loop outputs from multiple units powered from the same transformer must be connected to fully isolated inputs to avoid potentially destructive current loops.



CARBON MONOXIDE SENSOR (CO)		
Parameter	Value	Comments
Sensor type	Electrochemical	
Measurement range	0 – 200 ppm CO	
Accuracy	± 2.5% of full scale	0 – 50 °C
	± 4% of full scale	-30 – 0 °C
Sensor Life	5 year typical	Actual life depends on ambient humidity and temperature
Power Consumption	.2 Arms	At 24 VAC
	1.1 Arms	At 24 VAC with heaters on
Status Indication	Tri-color status LED	Green -> Normal level Yellow -> Warning level Red -> Alarm level
	Red LED	Sensor unavailable
Operating temperature	0 – 50 °C	
	-30 to 50 °C	With Low Temperature (LT) option
Storage temperature	-10 to 60 °C	
Relay outputs (R option only)	2 SPDT dry contacts	Separate warning and alarm relays. Each rated 240 VAC, 1A
Warning/Alarm thresholds	10/20, 25/50, or 50/100	Jumper selectable
Analog output (A option only)	4-20 mA	600 Ohm max loop resistance output < 4 mA => sensor unavailable

Operation

The KCOP has no power switch and is operational whenever it has sufficient operating power. Operation is indicated by a lit LED on the front cover.

Operational status is indicated by a pair of LEDs on the front cover as shown in the table below:

STATUS	SERVICE NEEDED	Operational Status
Green	OFF	Normal operation, CO concentration below warning threshold
Yellow		Normal operation, CO concentration above warning threshold
Red		Normal operation, CO concentration above alarm threshold
OFF	Red	ERROR, Sensor not reporting, contact Kele for service

Response to Carbon Monoxide

Current-loop output

The analog output always reflects the present sensor reading. The output is scaled so that 4 mA corresponds to a concentration of 0 ppm, and 20mA corresponds to the full scale reading of 200 ppm CO.

Concentrations above 200 ppm CO will always report 200 ppm.

A current-loop output below 4 mA indicates that the sensor reading is not available, either because the sensor failed or a calibration is in progress.

Warning/Alarm indications

Whenever the detected CO concentration has been continuously at or above the warning threshold for 30 seconds, the 'STATUS' LED on the front cover turns yellow, and the 'WARNING' relay actuates. Once actuated, the WARNING relay will stay actuated for a minimum of 3 minutes.

Whenever the detected CO concentration has been continuously at or above the alarm threshold for 10 minutes, the 'STATUS' LED on the front cover turns red, and the 'ALARM' relay actuates. The 'WARNING' relay remains actuated while the 'ALARM' relay is actuated. The 'ALARM' relay releases immediately when the concentration drops below the alarm threshold.

Setting Warning/Alarm thresholds

The Warning/Alarm thresholds are set to three pre-determined levels by closing jumpers as shown. Only one jumper may be closed at any time.

Jumper (JP) Closed	Thresholds (ppm CO)	
	Warning	Alarm
JP1	10	20
JP2	25	50
JP3	50	100
No jumper closed	25	50

