Kele K-O2-S5 Oxygen Detectors Sensors and Transmitter User Manual

K-O2-S5
Oxygen Sensor/Transmitter and
Two-Stage Alarm Controller
User Manual

K-O2-S5 (5 year sensor)
K-O2-S10 (10 year sensor)

K-O2-H5 (5 year sensor)
K-O2-H10 (10 year sensor)

PRODUCT ORDERING INFORMATION

This Manual covers the Kele K-O2-xx oxygen concentration and sensor family. The family comprises 4 models with common features and functionality, available in two enclosure styles and two sensor lifetime options as shown in Table 1.

Description	Kele Part Number
Screw down enclosure with 5-year sensor life	K-O2-S5
Screw down enclosure with 10-year sensor life	K-O2-S10
Lockable, hinged enclosure with 5-year sensor life	K-O2-H5
Lockable, hinged enclosure with 10-year sensor life	K-O2-H10

Table 1: K-O2 family Part numbers

All K-O2-xx models are shipped with either 5-year life (K-O2-x5) or 10-year life (K-O2-x10) factory calibrated oxygen concentration sensor modules installed. At the end of sensor life this plug-in, calibrated, easily field-replaceable sensor modules are available from Kele.

Description	Kele Part Number
The 5-year calibrated replacement sensor module	KMOD-O2-25
The 10-year calibrated replacement sensor module	KMOD-O2-50

Table 2: K-O2 Family Replacement Sensor Module Part Numbers

A calibration kit containing the accessories required to calibrate any of the K-O2 family sensors is available from Kele under the part number UCK-1.

Contents

SPECIFICATIONS

Mechanical	
Chassis Construction	Industrial strength, 18 Ga. Gray powder-coated steel. Pad-lockable hinged or screw-on cover style available.
Weight	2.0 lbs
Operating Temperature	4 to 40°C
Operating Humidity	15 – 90 %RH, non-condensing
Storage Temperature	-20 to 20°C (to minimize sensor degradation)
Case Dimensions (H x W x D)	K-O2-Hx: 6.4” x 5.9” x 2.4” (163.5 x 150.8 x 60.7 mm) K-O2-Sx: 6.3” x 5.8” x 2.1” (160.0 x 147.3 x 52.0 mm)
Sensor Vents	Natural ventilation through 18, 0.1” (2.54 mm) diameter vents
External Indicators	Tri-color LED indicates the operational status of the sensor.
Knockouts	4 trade ½” knockouts (1 per side)

Table 3: Mechanical Specifications

Electrical	
Operating Power Voltage	14 – 30 VAC (RMS) or DC Isolated power supply; separate transformer not required.
Power Consumption	< 5W
Control Relays	2 separate SPDT line-voltage-capable relays for warning/ventilation and alarm outputs. UL-rated: 10 Amps max at 120/277 VAC or 30 VDC. (E43203)
Concentration Reporting Output	Isolated, powered 4 – 20 mA current loop output. 4 mA output => 0 % concentration. 20 mA => 25% Maximum loop resistance: 510Ω
Termination	Pluggable screw terminals for use with 12 AWG or thinner wire

Table 4: Electrical Specifications

Oxygen Sensor (O2)	
Sensor Type	Galvanic cell
Measurement Range	0 – 25% (by volume)
Analog Output Range	4-20mA (corresponds to 0 to 25%)
Accuracy	±0.3% O_2 (typical after calibration)
Calibration Interval	6 Months (to maintain specified accuracy)
Sensor Life	K-O2-x5: 5 years (typical) K-O2-x10: 10 years (typical)
Recommended calibrated FieldReplaceable Sensor	KMOD-O2-25 (5 years) or KMOD-O2-50 (10 years)
Calibration Kit	UCK-1 kit
Calibration gases	Span (20.9% oxygen, balance nitrogen): Kele PN: GAS-O2-20.9 Zero (100% nitrogen) Kele PN: GAS-N2

Table 5: Oxygen Sensor Specifications

MECHANICAL INSTALLATION

The Model K-O2 is available in two versions of an industrial-strength, 18 Gauge, gray, powder-coated steel enclosure. The pad-lockable, hinged-cover version is shown in Figure 1 and the removable, screw-down cover version is shown in Figure 2. All electronics are attached to the front cover. There are trade ½" conduit knock-outs on all sides for electrical connections. In potentially damp locations the knock-out on the bottom of the case should be used to minimize the possibility of water entry. DO NOT USE THE VENT HOLES FOR WIRE ENTRY.

1. This unit is designed to mount to a rigid, vibration-free surface near the middle of the area to be monitored about 5 feet above the floor.
2. It should be located where there is free airflow – avoid corners or recesses.
3. The air vents on the sides of the enclosure should not be closer than 1 foot from the nearest perpendicular wall and must not be obstructed or painted over.
4. May be mounted
    1. Vertically with the status LED in the lower left or lower right corner.
    2. Horizontally in any orientation.
5. Mounting holes are made for direct wall screws for the surface encountered. (Mounting screws not provided) or switch box spacing.

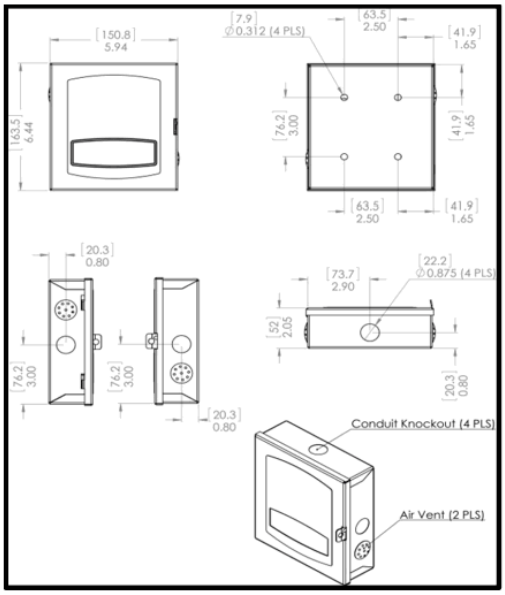


Figure 1: Hinged Front Panel Enclosure Dimensions (K-O2-Hx)

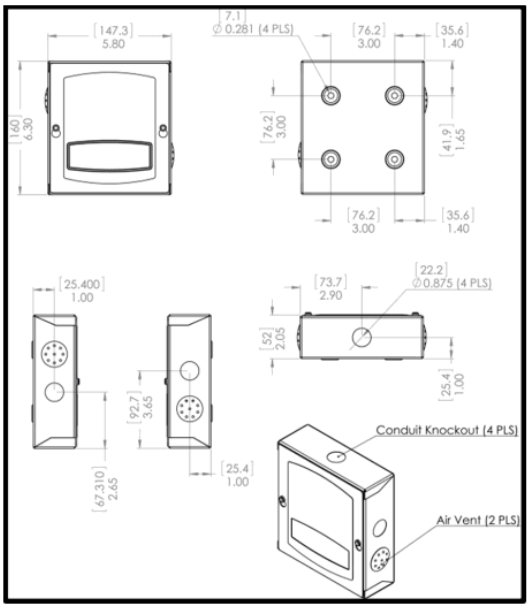


Figure 2: Screw-Down Front Panel Enclosure Dimensions (K-O2-Sx)

2.1 ENCLOSURE DIMENSIONS

Case Style	Mtg hole diameter	Distance from center	
		Horizontal	Vertical
K-O2-Hx (Hinged)	5/16” (7.94 mm)	1.25” (31.75 mm)	1.50” (38.10 mm)
K-O2-Sx (Screw-down)	9/32” (7.14 mm)	1.50” (38.10 mm)	1.50” (38.10 mm)

ELECTRICAL INSTALLATION

The controller is not equipped with a power switch; it is operational whenever sufficient power is applied to the power input terminals.
All electrical connections to the controller are made through screw terminals that can be unplugged for the easy landing of wires. The controller’s enclosure contains conduit knockouts on all sides for flexibility during installation; refer to Figure 1 and Figure 2 for details and dimensions of the enclosures.

3.1 ANALOG OUTPUT CONNECTIONS

The sensor’s readings are reported at the controller’s powered 420mA analog utput connections. Current flows out of the ‘+’ terminal and returns to the ‘-‘ terminal.

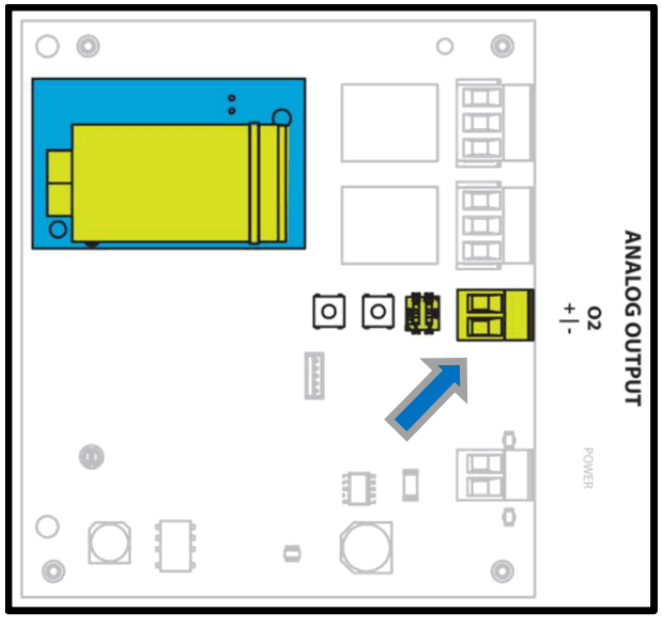


Figure 3: Analog Output

The oxygen sensor output is provided at the terminal highlighted in Figure 3. Analog output connection has polarity as labeled on the controller silkscreen: care must be taken to ensure proper connection. To wire the analog output connections:

1. Power down the controller, this can be done by unplugging the controller power terminal (see Figure 6).
2. Unplug the analog output screw terminal labeled O1.
3. Attach the signal wires, paying close attention to the polarity.
4. Plug the analog output screw terminal back into the controller.

3.2 RELAY CONNECTIONS

The controller has two, 10 Amp, 120/277 VAC UL-rated, SPDT dry contact relay output connections (shown in Figure 4) that can directly control loads up to 10 Amps through the normally-open terminal.
The relay connections have three-terminal screw connectors that allow devices to be wired to the controller in either normally-open (NO) or normally-closed (NC) configuration. These outputs are activated when ambient air oxygen concentration falls below the controller threshold settings (refer to Section 4.2 for more information).

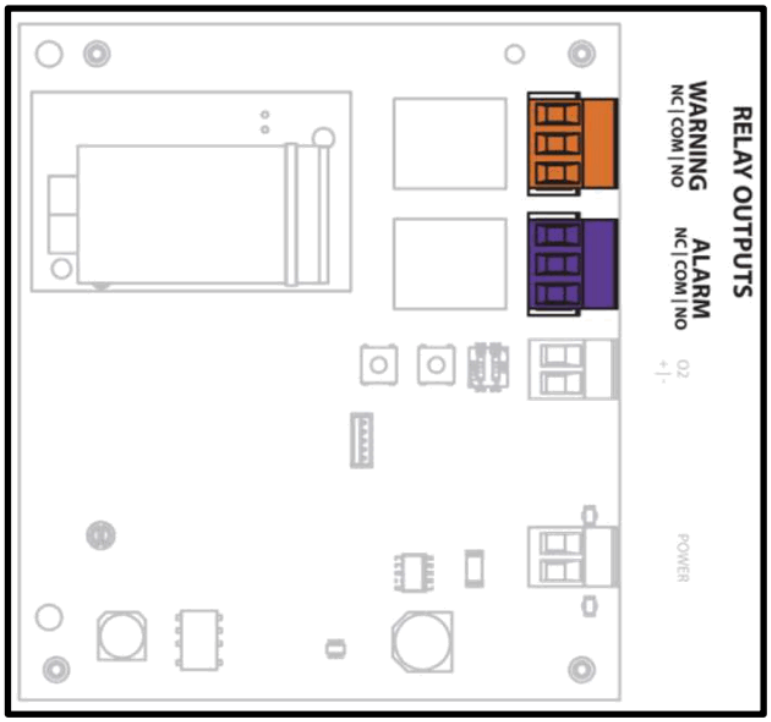


Figure 4: Relay Outputs

In the NO Configuration, the voltage attached to the NO terminal will be present at the COM terminal only when the relay output is activated.
In the NC Configuration, the voltage attached to the NC terminal will be present at the COM terminal only while the relay output is deactivated: the voltage attached to the NC terminal is removed when the relay output is activated.
Example wiring diagrams for relay connection are provided in Figure 5. To wire the Warning/ventilation and Alarm relay outputs:

1. Determine if the device is attached to the relay output should be wired in NO or NC configuration.
2. Unplug the relay output screw terminal.
3. Connect a supply voltage for the device being attached to the controller's relay output to either the NO or NC location of the screw terminal (see Figure 4).
4. Wire the power input of the device being attached to the controller's relay output to the COM location of the screw terminal.
5. Plug the relay output screw terminal back into the correct location on the controller board.

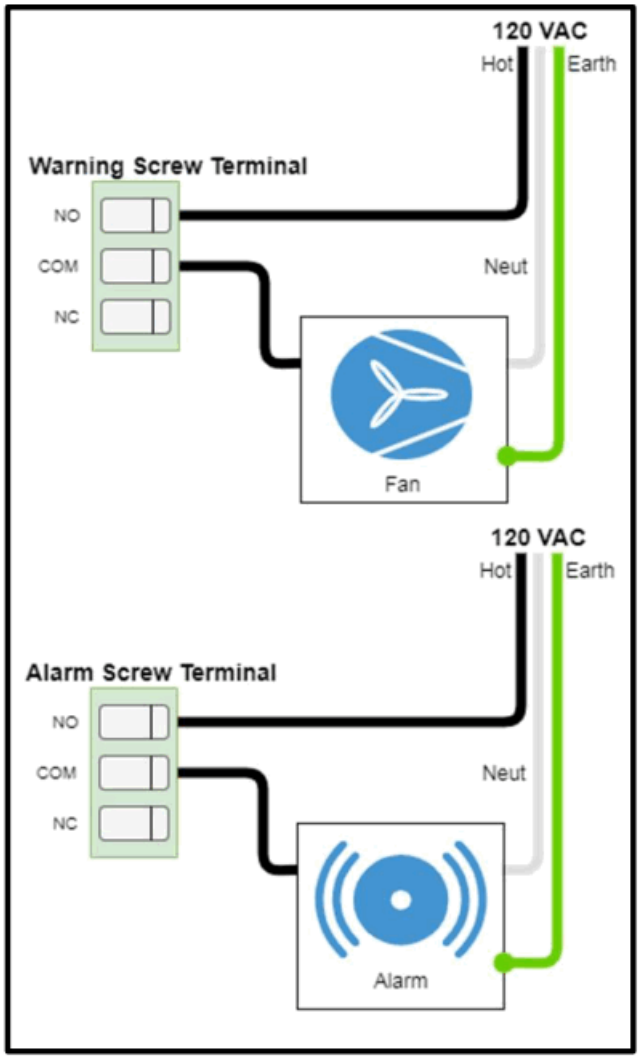


Figure 5: Example Wiring Diagram for Normally Open Operation

3.3 POWER CONNECTION

The K-O2 has a fully isolated, unpolarized power input; either AC or DC operating power can be connected in either polarity. Multiple K-O2 units can operate on the same transformer (up to its load limit) even when they are not connected with the same positive/negative or hot/common polarity.

Power connection to the controller is made at the two-terminal screw connector located at the bottom-right side of the board (highlighted in Figure 6). Power to the controller can be either AC or DC voltage; DC voltage can be connected in either polarity (see Section 1.0 for more details). To wire power:

1. Open the controller's enclosure and unplug the screw terminal labeled POWER on the controller board.
2. Attach power wires to the screw terminal ensuring the connection is snug.
3. Plug the screw terminal back into the POWER receptacle on the controller board: this will cause the controller to power up and begin operation.

It is recommended that all wired connections are made prior to providing power to the controller.

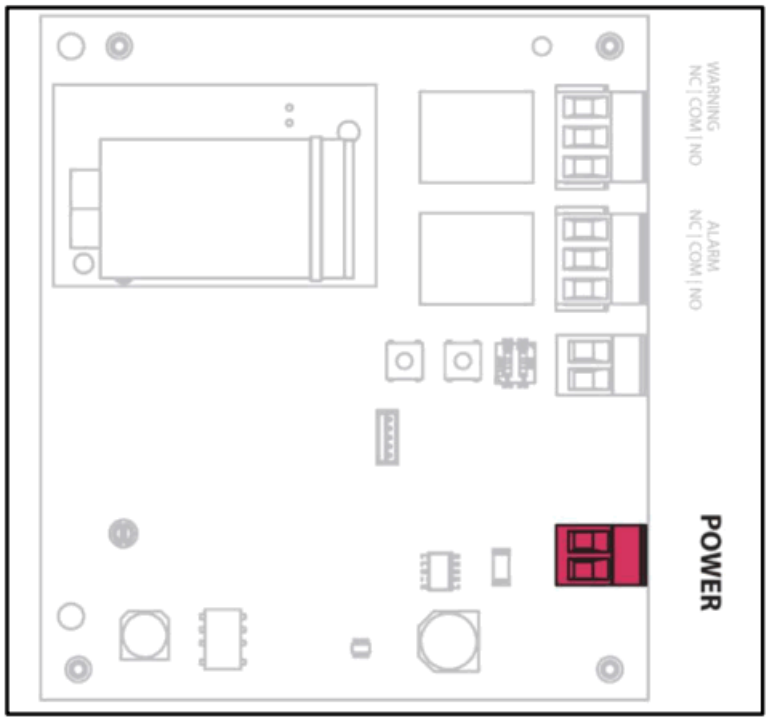


Figure 6: Location of Power Connector

OPERATIONAL DESCRIPTION

The K-O2 is a two-stage ventilation and alarm controller that senses the oxygen concentration in the ambient space around it and operates a Warning/Ventilation contact closure that can be used to operate ventilation fans when reduced levels of oxygen are detected. If the oxygen concentration approaches unsafe levels, a second contact closure is operated; typically to trigger an alarm.

The gas sensor is a calibrated module that can be replaced with minimal effort when it reaches end-of-life (EOL) while leaving the main control mounted and wired (refer to Section 7.1).

The front cover has an LED status indicator that illuminates in different colors to indicate normal (green), Warning/Ventilation (yellow), and Alarm (red) conditions. Blinking red indicates that the sensor is NOT operational. While the LED is blinking red, the analog output is delivering 4 mA to indicate the error. The concentration of oxygen in the ambient air is reported at the controller's analog current-loop output as percent by volume. The analog output ranges from 4 to 20mA (refer to Table 4 and Table 5).

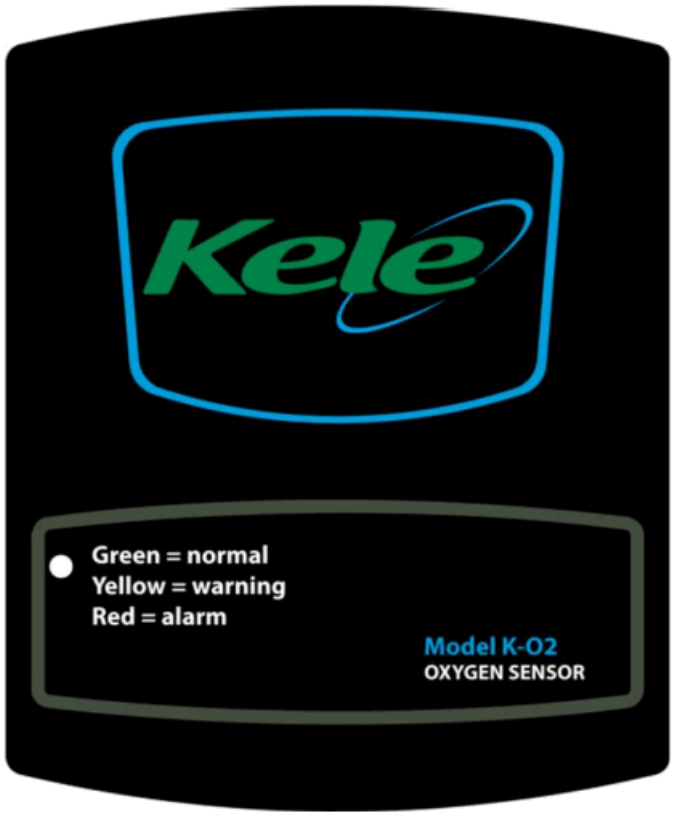


Figure 7: Front Cover Status Led

Status LED Color	Operational Status Description
GREEN	Concentration is above the warning/ventilation threshold. No relay outputs are active.
YELLOW	Concentration is below the warning/ventilation threshold and above the alarm threshol d. The warning/ventilation relay is active.
RED	Concentration is below the alarm threshold. Both warning/ventilation and alarm relays are active.
BLINKING YELLOW	End of Life warning. The sensor has reached the end of its rated service life and shoul d be replaced. Relays and analog outputs continue to function normally.
BLINKING RED	Sensor Expired. The warning/ventilation relay is active and the analog output is 4 mA. (refer to Section 7)

Table 7: Front Panel Status LED Indications During Normal Operation.

4.1 SPECIAL MODES

The K-O2 operates in several modes as shown in Table 9. Table 9: K-O2 Operating Modes
Normal operation is as described above. During standby mode, the sensor is stabilizing and analog output is held at 20 mA.
During span calibration, the sensor's sensitivity is compared to its sensitivity at initial factory calibration. If its sensitivity has fallen below the manufacturer's specification the K-O2 goes into Sensor Expired mode with the analog output held at 4 mA and only the Warning/Ventilation relay activated.

Mode	Front Cover LED	Analog Output	Relays Actuated	Comment
Normal	Steady Green, Yellow or Red	4 – 20 mA	Depends on concentration	During normal operation
Standby	Various	20 mA	NONE	During start-up interval or any time during calibration
EOL warning	Slow Blinking Yellow	4 – 20 mA	Depends on concentration	Sensor nearing the end of its rated service life. Relays and analog output function normally.
Sensor Expired	Slow Blinking Red	4 mA	Warning / Ventilation	After calibration of the expired sensor. The sensor is no longer operational.

Table 9: K-O2 Operating Modes

	O_2
Federal OSHA Personal Exposure Limit (PEL).	19.50%

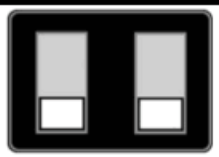
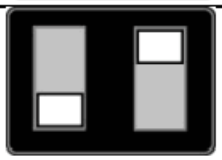
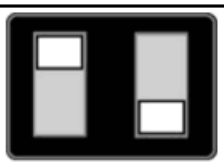
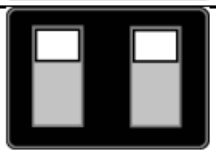
Dip switch Setting	OXYGEN % Warn	Alarm
	19.8	19.5
	20.0	19.5
	20.3	20.0
	20.5	20.0

Table 8: Concentration Threshold Settings.

4.2 WARNING /VENTILATION AND ALARM CONDITIONS

Two, 10 Amp, 120/277 VAC rated, dry-contact, SPDT relays activate during warning/ventilation and alarm conditions: refer to Section 3.2 for wiring information.

When the concentration of oxygen falls below its configured warning/ventilation threshold, the

WARNING/VENTILATION relay output is activated. When the concentration falls below the alarm threshold, the controller's ALARM relay is also activated. When the oxygen concentration
rises above the alarm threshold, the ALARM relay is deactivated; when it rises above the ventilation threshold the WARNING/VENTILATION relay is also deactivated.

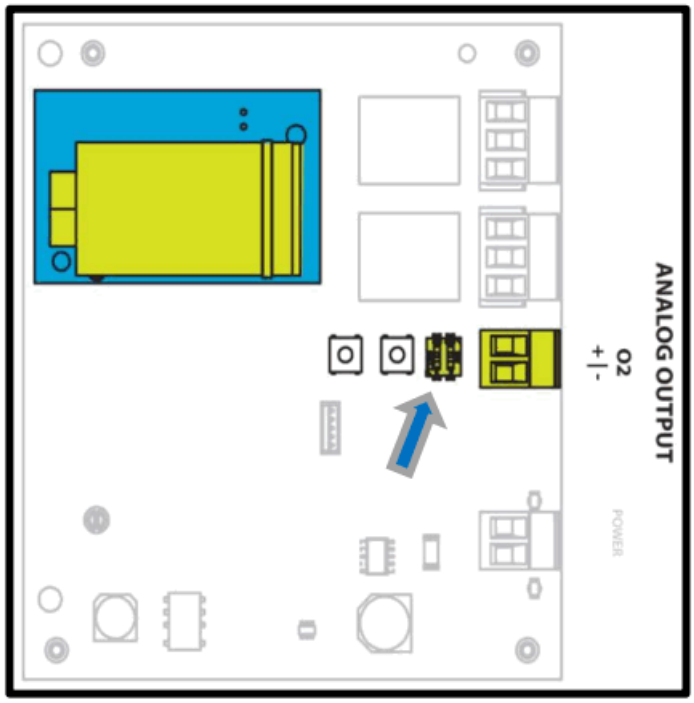


Figure 8 DIP Switch Locations

4.3 SETTING VENTILATION AND ALARM THRESHOLDS

The four, factory-preset pairs of ventilation and alarm levels are shown in Table 8. Each setting determines both the controller's warning/ventilation and alarm thresholds.

The active threshold values are selected by setting the two DIP switches on the main board (see Figure 8) as shown in the first column of Table 8 for the desired setting.

4.4 CONCENTRATION REPORTING

In normal mode, oxygen concentration readings from the sensor are reported by the controller's powered 4 – 20mA current loop output. The output connector location is shown in Figure 6. Output scaling is as shown in Table 5.

ENSOR CALIBRATION

The sensitivity of the galvanic oxygen sensor used on the K-O2 series decreases as the sensor ages. Over the sensor's lifetime, its accuracy decreases by about 30%. Without intervening calibrations, the sensor will typically indicate about 14.7 % oxygen concentration in fresh air after 5 (for the K-O2-x5) or 10 (for the K-O2-x10) years.

Required calibration frequency depends on the accuracy requirement of the application. To maintain the accuracy specified in Table 5 over the full operating range of the K-O2 series, a full calibration interval of 6 months is recommended. Annual calibration will typically maintain accuracy within about 0.5% O2 (for K-O2-x5) and about 0.3% O2 (for K-O2-x10).

For best accuracy, the full two-step calibration process provides the sensor module with oxygen-free 'zero' gas, and then a 21% 'span' gas is required. Two calibration buttons (ZERO and SPAN) are provided on the main board to initiate each calibration operation as shown in Figure 8.

For applications between 18% and 21% oxygen, a span-only calibration is often adequate and requires no calibration gas. All that's required is the certainty of fresh air around the sensor. For accuracy at lower oxygen percentages, a zero calibration before the span calibration is recommended.

To perform a gas-less span calibration: Follow the procedure in section 5.4, ignoring all instructions regarding the application or removal of calibration gas or fittings.

The 'sensor expired' test will be performed at the end of a span calibration. If the sensor's sensitivity has fallen

below the manufacturer's end-of-life specification, the K-O2 goes into Sensor Expired mode with the front cover LED slowly blinking **RED,** the analog output at a constant 4 mA, and the warning/ventilation relay activated. The oxygen sensor is no longer operational and must be replaced (See section 6).
The status of the calibration process is indicated by the flash pattern of the front cover LED as shown below.

Blinking Green	Successful sampling. Waiting for user to confirm cal gas removal.
Blinking Red	Failed calibration attempt. Waiting for the user to acknowledge with either a re-try or an exit.
Green/Yellow	During the ambient equilibration period after successful calibration. The new calibration is app lied.
Red/Yellow	During the ambient equilibration period after failed sampling. The old calibration is unchanged.

Table 10: Meaning of Status LED Blink Patterns During Calibration.

5.1 CALIBRATION GASES

Pure nitrogen zero gas and a precise mixture of 20.9% oxygen, and balance nitrogen (see Table 11) are required to fully calibrate the oxygen sensor for maximum accuracy.
A calibration kit that includes all the required accessories (but not the gas itself) in a convenient carrying case is available from Kele.com as part number UCK-1. The calibration gases are ordered separately using the part numbers shown in Table 11.

Type	Mixture (by volume)	Kele Part No.
Zero gas	Pure nitrogen	GAS-N2
Span gas	20.9% oxygen balance nitrogen	GAS-O2-20.9

Table 11: Required Calibration Gases

All K-O2 sensors include an orifice oxygen sensor calibration cap stored in the lower left corner of the enclosure as shown in Figure 10. Calibration gas is supplied through the tube-barb flow restrictor fitted to the narrow end of the cal cap at a pressure of 10 psi.

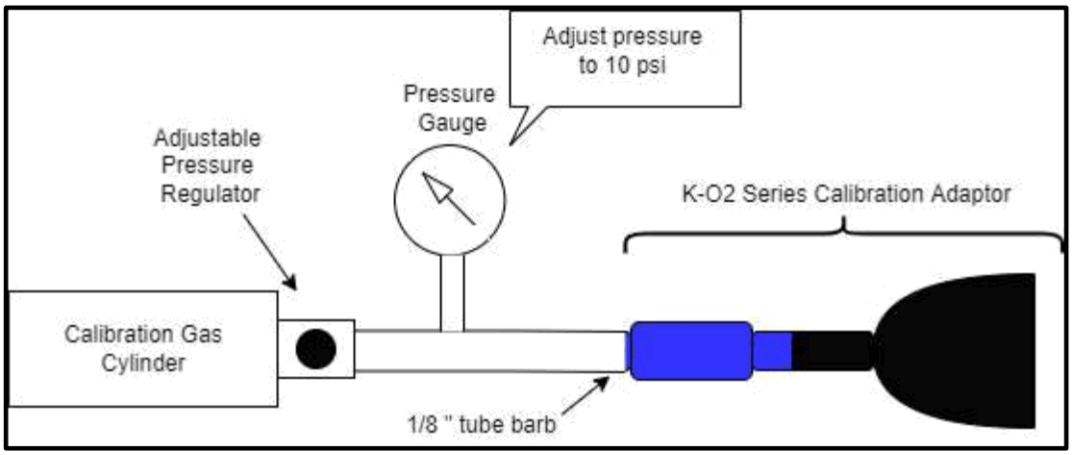


Figure 9: Schematic of Calibration Gas Connection to oxygen sensor calibration adapter.

5.2 CALIBRATION GAS CONNECTION

A schematic of the calibration gas tubing connection between the regulator and the calibration cap is shown in Figure 9. After connecting the
calibration gas supply hose to the calibration cap, slip the open end of the cap over the hexagonal white gas port on the oxygen sensor. Verify that the cap completely covers the gas port; there should be no white showing at the bottom of the cap.

When ready to start the calibration, adjust the calibration gas regulator so that the pressure gauge reads 10 psi.

Figure 10: Oxygen sensor calibration cap, stored in the lower right of the enclosure

5.3 ZERO CALIBRATION PROCEDURE

For maximum accuracy below 18%, the Zero calibration procedure must be done before the Span calibration.

The progress and status of the calibration process are indicated by the color and flash-state of the front cover status LED (see Table 10).

Apply the nitrogen (zero) calibration gas to the sensor using the included calibration cap. Ensure that gas is flowing to the sensor, then press and hold the 'ZERO' button (see Figure 8) for 3 seconds until the front cover LED starts blinking **YELLOW,** indicating that gas sampling is in progress.

1. Ensure that the calibration adapter remains correctly seated and calibration gas continues to flow for the 2-minute sampling period.
2. At the end of the sampling period, the sensor's status LED blinks **GREEN** if the sampling was successful or RED if not.
3. **A. If successful (blinking GREEN):**

The gas sampling was completed successfully. Turn off the calibration gas flow, remove the calibration cap then press and hold the 'ZERO' calibration button until the LED blinks **GREEN/YELLOW** indicating that the calibration gas has been removed, the calibration has been applied and the unit is on standby for two minutes while the sensor re-equilibrates to the ambient atmosphere before normal operation resumes. The calibration is complete when the status LED returns to steady **GREEN.**

OR

B. If NOT successful (blinking RED):

The most likely cause of zero calibration sampling failure is insufficient gas flow or leaks around the calibration adapter failing to completely immerse the sensor in nitrogen. Verify that calibration gas is still flowing at the required rate (pressure gauge reads 10 psi) and the calibration adapter is properly positioned.

The calibration sampling can be re-started while the LED is blinking **RED** by again pressing and holding the 'ZERO' button until the LED blinks **YELLOW,** then return to step 1 above.

To exit the zero-calibration routine preserving the original calibration: turn off the calibration gas flow and remove the calibration adapter, then press and quickly release the 'ZERO' button. The status LED will blink **RED/YELLOW** indicating that the calibration gas has been removed, the original calibration has been kept and the unit is on standby for two minutes while the sensor re-equilibrates to the ambient atmosphere before normal operation resumes. The original calibration is completely restored when the status LED returns to steady GREEN.

5.4 SPAN CALIBRATION PROCEDURE

For best accuracy, the Zero calibration procedure in section 5.2 should be done before the Span calibration.
Ignore steps in light blue highlight if doing a no-gas span calibration.

The progress and status of the calibration process are indicated by the color and flash-state of the front cover status LED (see 10).

1. [Start the calibration gas flowing,] press and hold the 'SPAN' button (see Figure 8) for 3 seconds until the status LED starts blinking **YELLOW,** indicating that gas sampling is in progress.
2. [Ensure that the calibration adapter covers the sensor completely for the 2-minute sampling period].
   At the end of the sampling period, the sensor's status LED blinks **GREEN** if the sampling was successful or **RED** if not.
3. **A.** If successful (blinking **GREEN):**
   The sampling was completed successfully. [Turn off the calibration gas flow, remove the calibration adapter then] press and hold the 'SPAN' calibration button until the LED blinks **GREEN/YELLOW** indicating that [the calibration gas has been removed,] the new calibration has been applied and the unit is in standby for two minutes while the sensor re-equilibrates to the ambient atmosphere before normal operation resumes. The calibration is complete when the status LED returns to steady **GREEN.**

   OR

   3B. If NOT successful (blinking **RED):**

   The most likely causes of span gas sampling failure are:

   [Insufficient gas flow or leaks around the calibration adapter not completely immersing the sensor in the calibration gas. Verify that the calibration gas cylinder has not run out and the calibration adapter is properly positioned.]

   The oxygen concentration at the sensor is NOT between 20.8 and 21.0 percent (by volume).

The calibration sampling can be re-started while the LED is blinking **RED** by again pressing and holding the 'SPAN' button until the LED blinks **YELLOW,** then go to step 1 above.
To exit the span calibration preserving the original calibration, press and quickly release the 'SPAN' calibration button. The status LED will blink **RED**/**YELLOW** indicating that the calibration gas has been removed, the original calibration will be preserved and the unit is on standby for two minutes while the sensor re-equilibrates to the ambient atmosphere before normal operation resumes. The calibration is complete when the status LED returns to steady **GREEN.**

At the conclusion of a successful Span calibration, the sensitivity of the sensor is compared to its sensitivity during the initial factory calibration. If its sensitivity has fallen below the manufacturer's end-of-life specification, the K-O2 goes into Sensor Expired mode with the front cover LED slowly blinking RED, the analog output at a constant 4 mA, and the warning/ventilation relay activated. The oxygen sensor is no longer operational and must be replaced (See section 6).

SENSOR MODULE REPLACEMENT

Calibrated sensor modules are available from Kele.

Calibrated Oxygen Sensor	Cal Kit
5 year: KMOD-O2-25	UCK-1 KIT
10 year: KMOD-O2-50	

6.1 FIELD REPLACEMENT OF SENSOR MODULES

Sensor modules can be replaced when they reach the end of their service life.
Some early serial numbers have sensor modules with the sensor rotated 90 degrees from the orientation shown in
To replace a sensor module with a new factory-calibrated one, follow the steps below:

1. Open the controller's front cover.
2. Unplug the controller's power connector (refer to Figure 6).
3. Unplug the sensor module by pulling the sensor module firmly away from the main board (Figure 11).
4. Plug the new sensor module into the vacant 'Sensor 1' location, then press the module firmly until the nylon standoff (shown in Figure 11) has 'snapped' into the hole in the bottom-left side of the module board
5. Plug in the controller's power connector.
6. Observe that the front cover indicator is no longer flashing red, and then close the controller's enclosure.

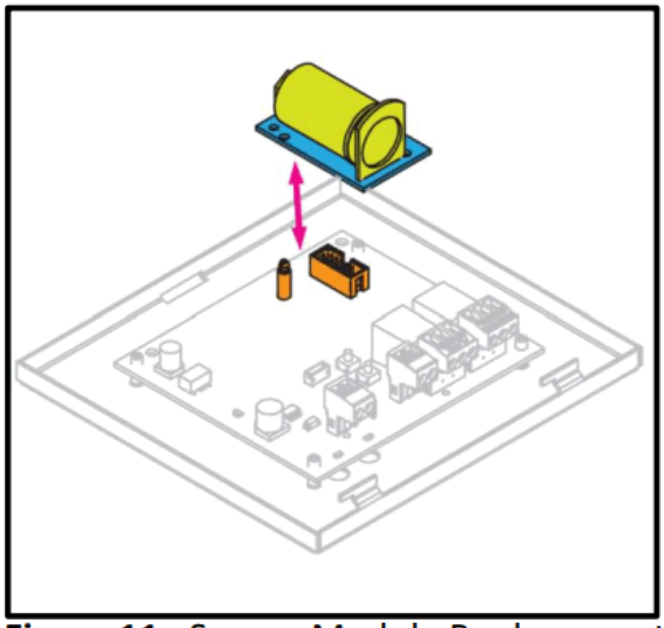


Figure 11: Sensor Module Replacement.

WARRANTY

7.1 DURATION

Component / Class	Duration of Warranty
Enclosure & main board	7 years
Sensor modules	1 year

7.2 LIMITED WARRANTY AND REMEDIES.
KELE warrants to the Buyer that for the duration stated in the “Duration of Warranty” section above from the date of shipment of Products to the Buyer that Products will substantially conform to the product specifications agreed to by KELE. This warranty is not transferable.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. KELE EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
KELE IS NOT RESPONSIBLE IN ANY WAY FOR DAMAGE TO A PRODUCT, PROPERTY DAMAGE, OR PHYSICAL INJURY RESULTING IN WHOLE OR IN PART FROM (1) IMPROPER OR CARELESS USE, (2) UNAUTHORIZED USE OR MODIFICATIONS, OR (3) OTHER CAUSES BEYOND KELE’S CONTROL.
IN NO EVENT IS KELE LIABLE TO THE BUYER OR ANY OTHER PERSON FOR THE COST OF PROCUREMENT OF SUBSTITUTE GOODS, LOSS OF PROFITS, OR FOR ANY OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES.
This warranty does not cover:

- Defects due to misuse, abuse, or improper or inadequate care, service, or repair of Products;
- Defects due to modification of Products, or due to their alteration or repair by anyone other than KELE;
- Problems that arise from lack of compatibility between KELE’s Products and other components used with those Products or the design of the product into which Products are incorporated. Buyer is solely responsible for determining whether Products are appropriate for Buyer’s purpose, and for ensuring that any product into which Products are incorporated, other components used with KELE’s Products, and the purposes for which Kele’s Products are used are appropriate and compatible with those Products.

Unless KELE agrees otherwise, to obtain service under this warranty, the Buyer must pack any nonconforming Product carefully, and ship it, postpaid or freight prepaid, to Kele, Inc. at

3300 Brother Blvd. • Memphis, TN 38133

before the expiration of the warranty period. The buyer must include a brief description of the nonconformity. Any actions for breach of this warranty must be brought within one year of the expiration of this warranty.
If Kele determines that a returned Product does not conform to this warranty it will, at Kele's sole discretion, either repair or replace that Product, and will ship the Product back to the Buyer free of charge. At KELE's option, KELE may choose to refund to the Buyer the purchase price for a nonconforming Product instead of repairing or replacing it.

DISCLAIMERS

8.1 INSPECTION AND MAINTENANCE

In order to maintain the specified accuracy of this device over its full operating range, its sensor should be calibrated at least every 6 months. During calibration, the sensitivity of the sensor is compared to its sensitivity during initial factory calibration. If the sensitivity has fallen below the manufacturer's specification, the sensor has reached the end of its operating life and must be replaced. Contact Kele for a calibrated replacement module.
In harsh environments, a sensor may fail prematurely. During normal operation, the sensor is regularly tested to detect common failures. If a failure is detected, the front cover status LED will blink slowly RED, the warning relay will be activated and the concentration-reporting analog output will stay at 4 mA until the sensor is replaced.

NEITHER Kele NOR ANY OF ITS SUPPLIERS IS RESPONSIBLE IN ANY WAY FOR DAMAGE TO A PRODUCT, PROPERTY DAMAGE, OR PHYSICAL INJURY RESULTING IN WHOLE OR IN PART FROM (1) IMPROPER OR CARELESS USE, (2) UNAUTHORIZED USE OR MODIFICATIONS, OR (3) OTHER CAUSES BEYOND Kele OR ITS SUPPLIERS CONTROL.
IN NO EVENT ARE Kele OR ANY OF ITS SUPPLIERS LIABLE TO THE BUYER OR ANY OTHER PERSON FOR COST OF PROCUREMENT OF SUBSTITUTE GOODS, LOSS OF PROFITS, OR FOR ANY OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

8.2 LIFE SAFETY

This unit is not designed, certified, sold, or authorized for use in applications where the failure of this device could be reasonably expected to result in personal injury or death.

Kele, Inc.
• 3300 Brother Blvd.
• Memphis, TN 38133
www.kele.com
5/20/2022

Documents / Resources

	Kele K-O2-S5 Oxygen Detectors Sensors and Transmitter [pdf] User Manual K-O2-S5, Oxygen Detectors Sensors and Transmitter, K-O2-S5 Oxygen Detectors Sensors and Transmitter, K-O2-S10, K-O2-H5, K-O2-H10

References

- kele.com - Building Automation Products and Solutions
- kele.com - Building Automation Products and Solutions