



Galaxy[®] O₂ Sensor Setup

Operating manual

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1 Galaxy O₂ sensor setup

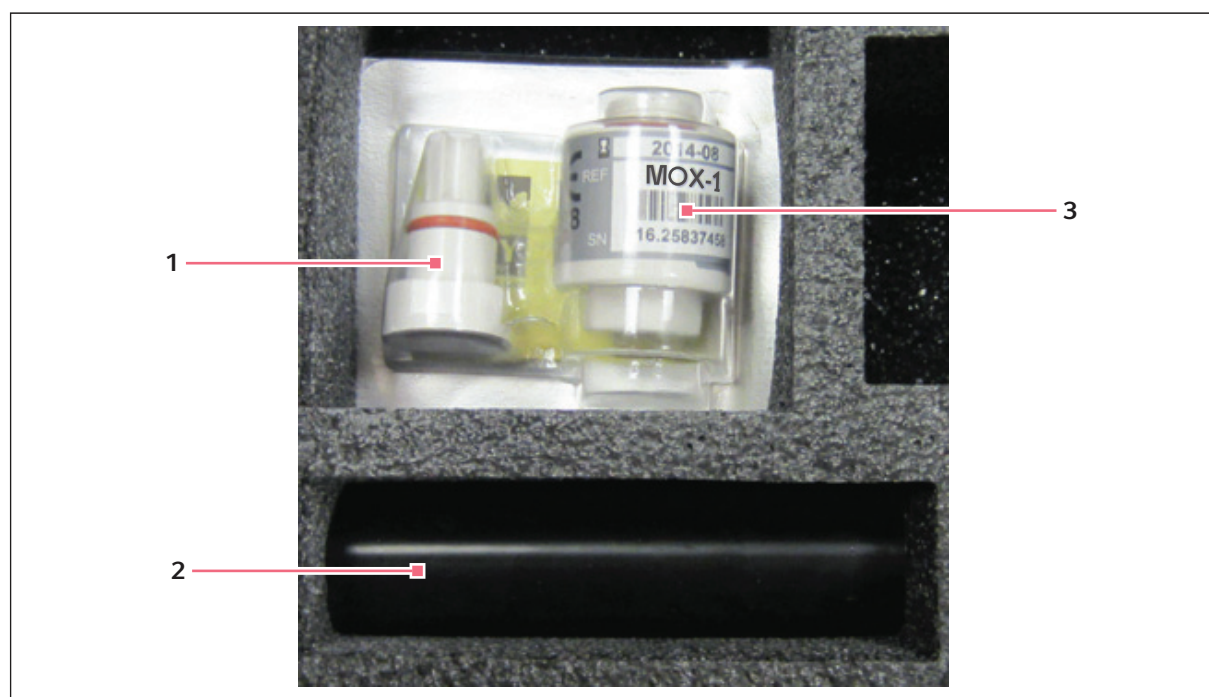
The O₂ sensor used on Eppendorf incubators equipped with the O₂ option is a sensitive, self-powered, electrochemical cell, with a typical life span of 12 months.

To ensure the maximum shelf life of the O₂ sensor, this incubator is equipped with a placeholder O₂ sensor. Use the following instructions to replace the supplied O₂ sensor:

- During initial setup of new incubators.
- After the sensor shelf life has expired.
- Sensor is unusable.

1.1 Delivery package

Quantity	Description
1	O ₂ sensor
1	O ₂ sensor tool



- 1 Discard, not required for installation or replacement 3 O₂ sensor
- 2 O₂ sensor tool

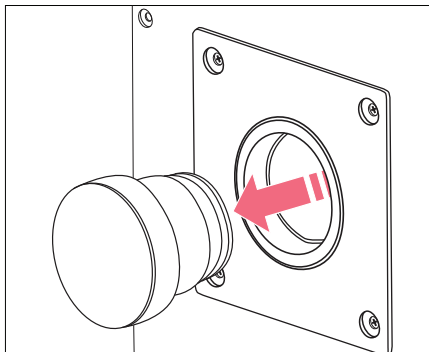


Only use the O₂ sensor part marked as MOX-1, discard the smaller piece (see above).

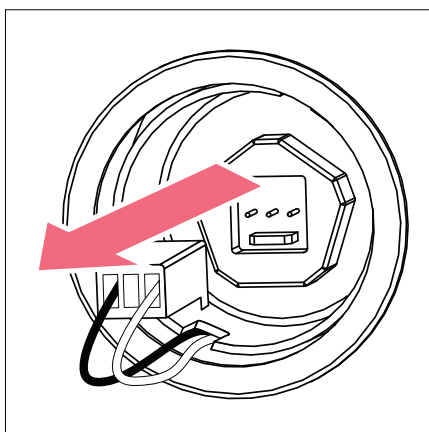
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1.2 Removing existing O₂ sensor



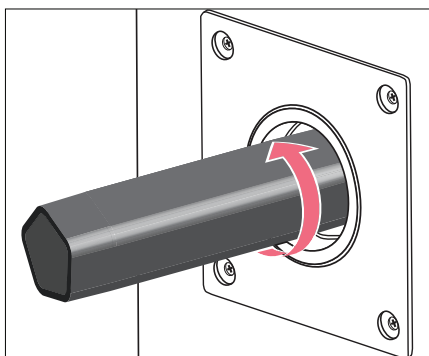
1. Remove the rear access cover plug to gain access to the O₂ sensor, (On older models, the O₂ sensor can be accessed by removing the six M4 x 12 screws or the four M4 x 12 screws)



2. Unplug the connector to disconnect the sensor.



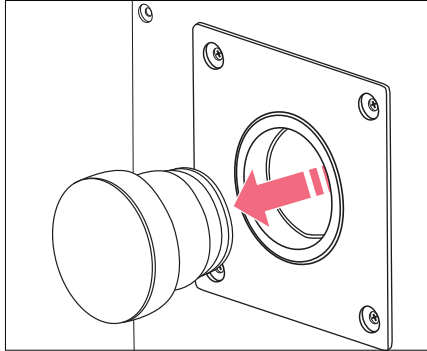
Avoid pulling the wire leads. Hold the white connector body when disconnecting the sensor.



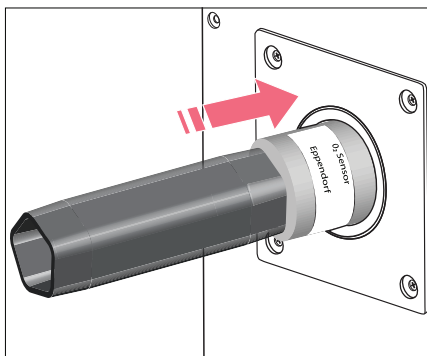
3. Insert sensor tool and turn counter-clockwise to remove O₂ sensor.

O₂ sensor removal completed.

1.3 Installing O₂ sensor on Galaxy 170 liter or 48 liter incubators



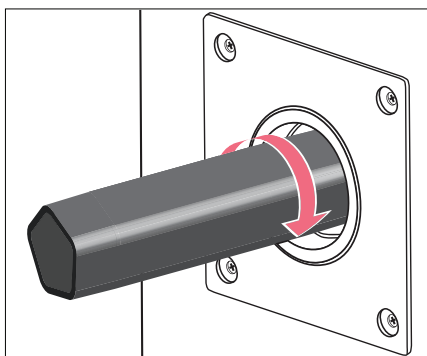
1. Remove the rear access cover plug to gain access to the O₂ sensor, (On older models, the O₂ sensor can be accessed by removing the six M4 x 12 screws or the four M4 x 12 screws)



2. Insert the O₂ sensor into the access port using the O₂ sensor tool.



Push O₂ sensor into access port; ensuring the connector and wire have been taken out and held to the side.



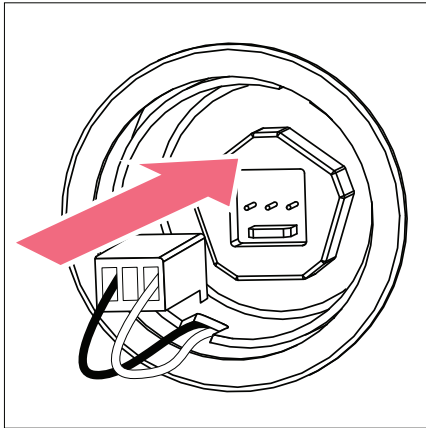
3. Turn clockwise to secure.



Finger tighten the O₂ sensor only, **do not** use metal tools or excessive force.

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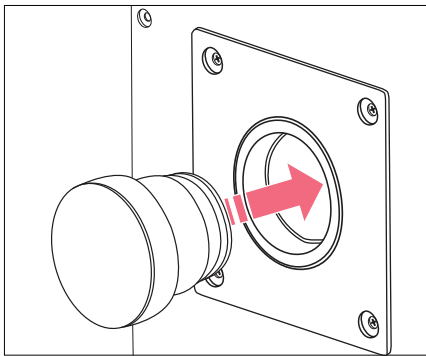
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4. Connect the sensor by plugging in the connector.



Hold the white plug and NOT the wires; connect the Incubator to the O₂ sensor and ensure that the connector is fully inserted and oriented correctly



5. Replace the rear access cover.



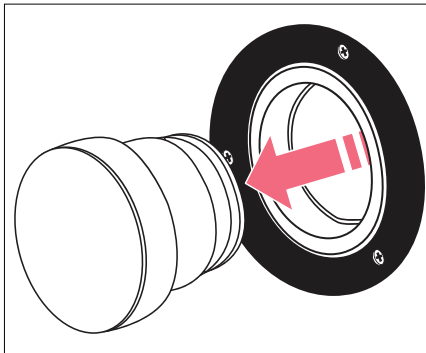
Ensure that access port cover plug is fully pushed into place.

6. Allow the humidified incubator to stabilize overnight.

1.4 Installing O₂ sensor on Galaxy 14 liter incubator



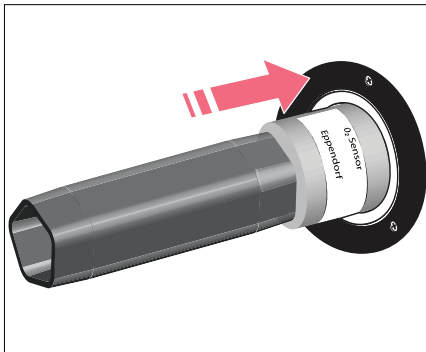
- Before replacing the O₂ sensor disable the O₂ control as follows:
 - a Press and hold the ▲ key, then press the ● key; *O2.cont* should appear on the display (if it does not, press the ▲ or ▼ key until it appears).
 - b Press the **enter** key.
 - c Press ▲ or ▼ key to toggle to *OFF* and press the **enter** key.



1. Remove the O₂ sensor access plug at the rear of the incubator.



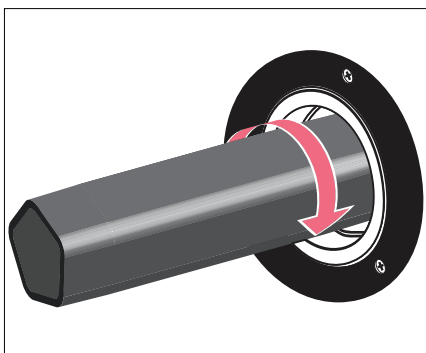
Twist and Pull access cover plug to remove.



2. Insert the O₂ sensor into the access port using the O₂ sensor tool.



Push O₂ sensor into access port; ensuring the connector and wire have been taken out and held to the side



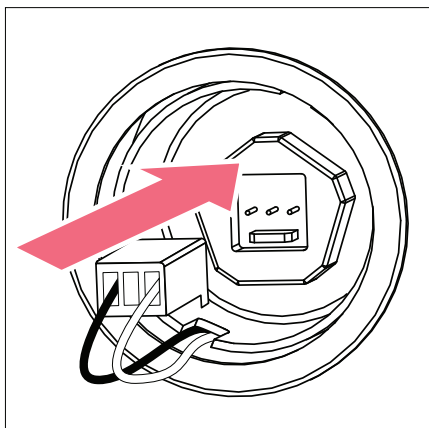
3. Turn clockwise to secure.

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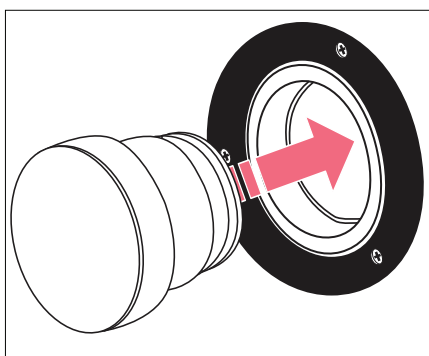
Finger tighten the O₂ sensor only, **do not** use metal tools or excessive force.



4. Connect the sensor by plugging in the connector.



Hold the white plug and **NOT** the wires; connect the Incubator to the O₂ sensor and ensure that the connector is fully inserted and oriented correctly



5. Replace the rear access cover.



Ensure that access port cover plug is fully pushed into place.

6. Allow the humidified incubator to stabilize overnight.

1.5 Referencing the O₂ sensor for Galaxy 170 liter and 48 liter incubators

This process should be carried out once the incubator has been humidified and left overnight to stabilize.

Reference the O₂ sensor to atmospheric O₂ levels as follows:

1. Select '**O₂ sensor - REF TO ATMOSPHERE**' which can be located in the **USER** Menu.
2. Follow the on-screen instructions.

REFERENCE O₂ SENSOR

THIS PROCESS ADJUSTS THE O₂ READING TO
ATMOSPHERIC O₂ LEVEL AUTOMATICALLY.
THE CHAMBER IS DEGASSED BY FULLY OPENING
THE INNER DOOR FOR 60 SECONDS.
THIS IS FOLLOWED BY A DWELL PERIOD OF
10 MINUTES TO ALLOW TEMPERATURE AND
HUMIDITY TO EQUILIBRIATE.
A MESSAGE THEN APPEARS ON THE SCREEN
ALLOWING THE INCUBATOR TO BE USED.
PRESS ENTER TO PROCEED.

PROG USER ENTER EXIT

CHAMBER TEMP 37.0°C
CO₂ LEVEL 5.0%CO₂
RH 95.0% 19.0%O₂
PROGRAMMED TO: 37.0°C 5.0%CO₂ 19.0%CO₂
OPEN DOOR

O₂ REFERENCING IN PROGRESS

08/09/08
13:12:19

CANCEL

CHAMBER TEMP 37.0°C
CO₂ LEVEL 5.0%CO₂
RH 95.0% 19.0%O₂
PROGRAMMED TO: 37.0°C 5.0%CO₂ 19.0%CO₂
OPEN DOOR COUNT 58

O₂ REFERENCING IN PROGRESS

08/09/08
13:12:30

CANCEL



60 second countdown begins when user opens door.

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```

CHAMBER TEMP 37.0°C
CO2 LEVEL    5.0%CO2
RH 95.0%      19.0%O2
PROGRAMMED TO: 37.0°C  5.0%CO2  19.0%CO2
CLOSE DOOR

O2 REFERENCING IN PROGRESS
                                08/09/08
                                13:13:31
[ ] [ ] [ ] [CANCEL] [ ]
  
```

```

CHAMBER TEMP 37.0°C
CO2 LEVEL    5.0%CO2
RH 95.0%      19.0%O2
PROGRAMMED TO: 37.0°C  5.0%CO2  19.0%CO2
DWELL PERIOD 09:58

O2 REFERENCING IN PROGRESS
                                08/09/08
                                13:12:51
[ ] [ ] [ ] [CANCEL] [ ]
  
```



10 minute countdown begins when user closes door.

```

CHAMBER TEMP 37.0°C
CO2 LEVEL    5.0%CO2
RH 95.0%      19.0%O2
PROGRAMMED TO: 37.0°C  5.0%CO2  19.0%CO2
O2 REFERENCE OK

PRESS ENTER TO PROCEED
                                08/09/08
                                13:23:53
[ ] [ ] [ ] [CANCEL] [ ]
  
```

The oxygen reading is automatically adjusted to 19.7 % which is the true reading taking into account the Relative Humidity level.

The incubator is now ready for use with O₂ control.



Additional calibration is required for 170 liter and 48 liter incubators with the 0.1 - 19 % option, for calibration instructions (see *Calibrating the O₂ sensor for Galaxy 170 liter and 48 liter 0.1 - 19 % O₂ option on p. 13*).

1.6 Referencing the O₂ sensor for Galaxy 14 liter incubator

This process should be carried out once the incubator has been humidified and left overnight to stabilize.

Reference the O₂ sensor to atmospheric O₂ levels as follows:

To enter the OXYGEN CONTROL Menu

1. Press and hold the ▲ key, then press the ● key; *O2.cont* should appear on the display (if it does not, press the ▲ or ▼ key until it appears).
2. Select '*-O2.rEF*' using the ▼ and ▲ keys, then press the **enter** key to begin the O₂ reference.
3. Perform the following on-screen instructions:
 - '*OPEn - dOOr*', open the incubator door.
 - '*cd 59*', a 60 second countdown timer is displayed.
 - Close door when prompted.

The control system will allow the sensor to stabilize for 10 minutes.

Once stabilized, the control system will reference the sensor to atmospheric oxygen level. The reading is automatically adjusted to 19.7 % which is the true reading taking into account the Relative Humidity in the chamber.



- Set O₂ control to ON before using, follow the steps below to enable O₂ control:
 - a Press and hold the ▲ key, then press the ● key; *O2.cont* should appear on the display (if it does not, press the ▲ or ▼ key until it appears).
 - b Press the **enter** key.
 - c Press ▲ or ▼ key to toggle to *ON* and press the **enter** key.

1.7 Calibrating the O₂ sensor for Galaxy 170 liter and 48 liter 0.1 - 19 % O₂ option

Prerequisites

- Nitrogen source capable of supplying clean gas at 5 PSI (0.35 Bar)
- 6 mm bore PVC tubing
- O₂ calibration kit (P0628-7540)



0.1 - 19 % O₂ calibration option should be performed if low levels of O₂ under 1 % (such as 0.1, 0.2) is required.

The following instructions applies to all incubators equipped with the 0.1 - 19 % O₂ option.

1. Re-reference the O₂ sensor (see *Referencing the O₂ sensor for Galaxy 170 liter and 48 liter incubators on p. 11*).
2. Program the incubator for 0 % O₂.
3. Disable O₂ control.

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- Perform the following steps to disable O₂ Control:
 - a Press 'USER'.
 - b Scroll down to Manual Disable, Press 'ENTER'.
 - c Move the Flashing arrow to 'O₂ CONTROL'.
 - d Press Left or right arrow to 'DISABLE'.
 - e Press 'EXIT' twice to return to the main menu.

4. Remove the white hydrophobic filter (if installed) from the O₂ sensor, (see Fig. 1-1 on p. 14).

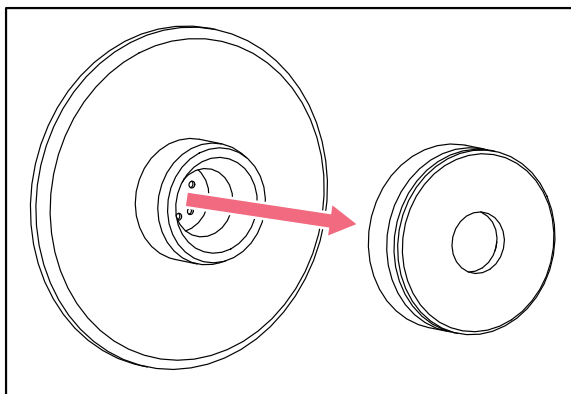


Fig. 1-1: White Hydrophobic Filter

5. Carefully screw the calibration plug onto the O₂ sensor (finger tighten only), (see Fig. 1-2 on p. 14).

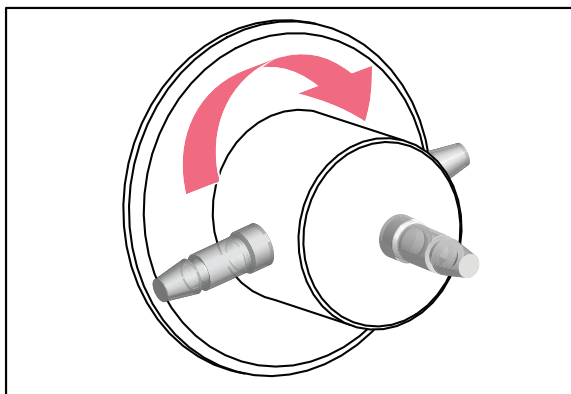


Fig. 1-2: Connect Calibration Plug to O₂ Sensor

6. Coil the 3 m tube on a shelf to warm the incoming gas.
7. Run the inlet/outlet tubes through the seal and gently close the outer door of the incubator.
8. Connect the tubing from the gas supply/regulator to the black plastic flow restrictor fitted at the end of the long tube attached to the calibration plug.
9. Ensure that the gas pressure is set to 5 PSI (0.35 Bar), then switch on (N₂) gas and allow to flow for 30 - 45 minutes purging all atmospheres from the sensor.
10. View the O₂ sensor offset from the 'ENG' menu.



- Perform the following steps to view the O₂ sensor offset:
 - a Press 'DIAG', then select 'ENG'.
 - b Enter access code (default code 1973), then press 'ENTER'.
 - c Select 'SYSTEM', then press 'ENTER'.
 - d Select 'O₂ CALIBRATION', then press 'ENTER'.

11. Verify 'O₂ PERCENT' reading is 0.01 %.

If 'O₂ PERCENT' reading is not 0.01 %, adjust the O₂ 'ZERO OFFSET' until the correct reading is obtained.

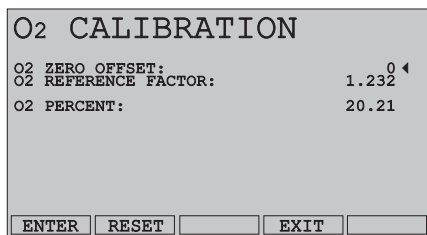


Fig. 1-3: O₂ Calibration Screen

12. Allow the incubator to stabilize for 10 - 15 minutes and check for drift.
13. Repeat steps 10 - 12 until you are satisfied that the sensor is stable.
14. Press EXIT 4 times to return to the main menu.
15. Turn off the gas supply and remove calibration plug.
16. Reprogram the CO₂ level (see operating manual) and enable O₂ control (see step 3).

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Eppendorf AG · 22331 Hamburg · Germany

eppendorf@eppendorf.com · www.eppendorf.com