



Start-up Guide for 9065 Dissolved Oxygen Analyzers



Cautions and Warnings

Note: This presentation is not intended to replace the Waltron Instruction Manual!

Please observe proper safety and handling precautions when installing, operating, maintaining, and servicing this product. The following should be noted and adhered to:

- Read and understand manual before working with analyzer.
- Pay special attention to warning labels on enclosures, containers, packages and chemicals.
- Only qualified personnel should be involved in the installation, operation, and servicing of the analyzer.
- Follow safety precautions when operating analyzer in conditions of high pressure and/or temperature.



Specifications - 9065 DO

Range:	0 - 2000ppb
Accuracy:	+/- (1ppb + 2% of the measured value)
Response Time:	T90 < 15 sec
Units:	ppb, ppm, ug/l, mg/l, %O2, % a.s.
Current Outputs:	Two configurable 4-20mA current (analog) outputs
Alarms:	General alarm, temperature alarm, two concentration alarms

Power:	90VAC – 250VAC ~ 50-60 Hz, 25 W
Sample:	Temperature: 23-113F (-5-45C)
Ambient Temp:	32-131F (0-55C)
Sample Pressure:	Maximum of 145 psig (10 bar)
Sample Inlet Fitting:	¼" Swagelok
Sample Outlet Fitting:	¼" Swagelok



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Click on a Topic or
Start From the
Beginning.



Start From the Beginning

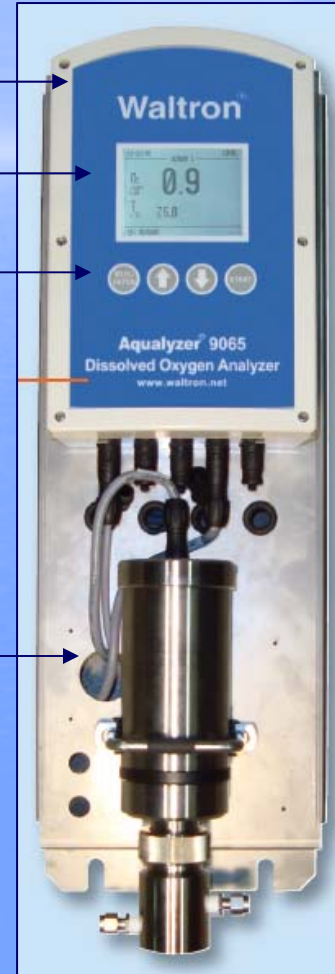
The Analyzer Layout

Transmitter Compartment

Display Screen

Keyboard Interface

Wet Section



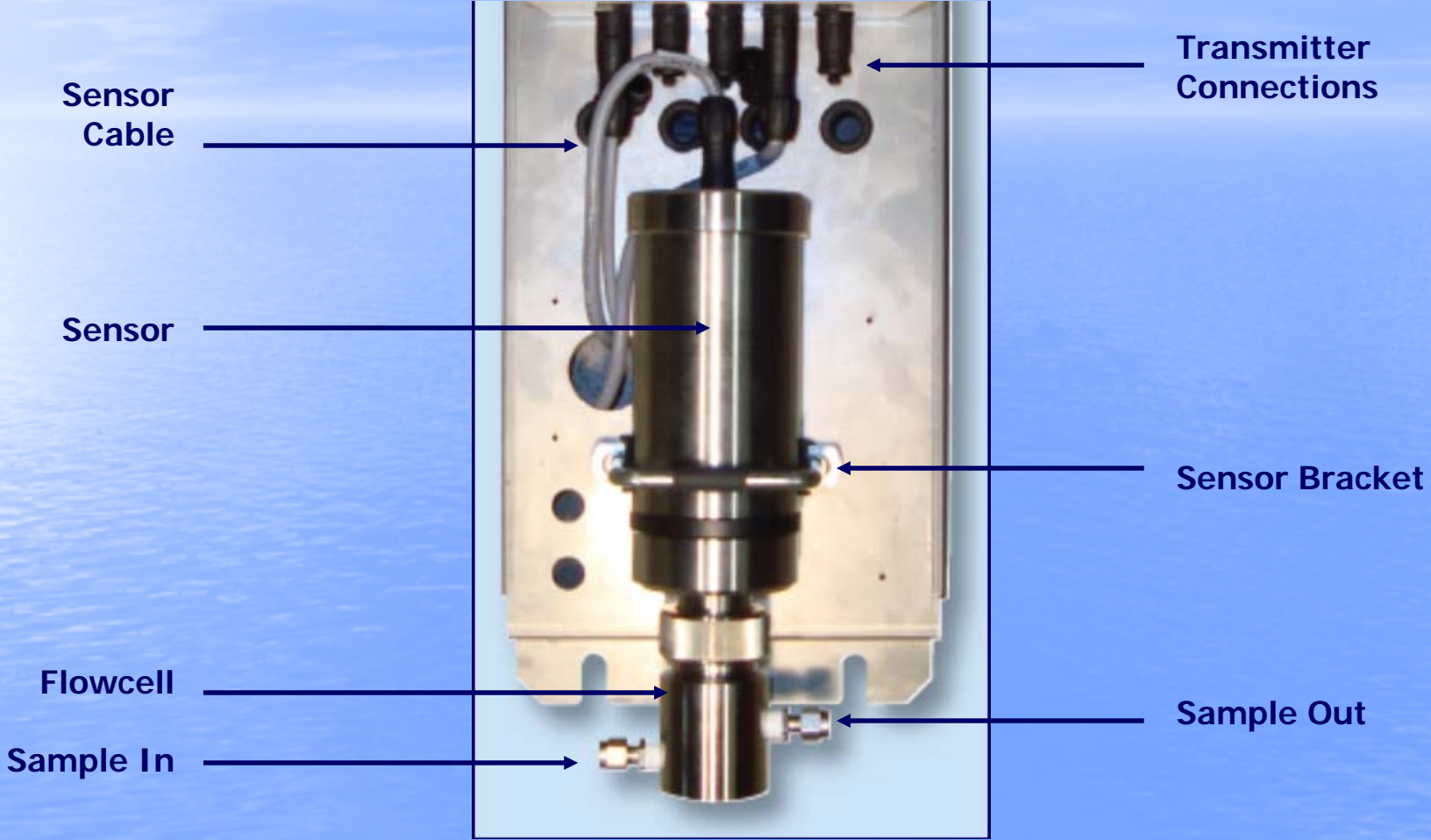
More information on the components of the analyzer can be found in Section 2.3 and 2.4 of the manual.

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Layout - Wet Section

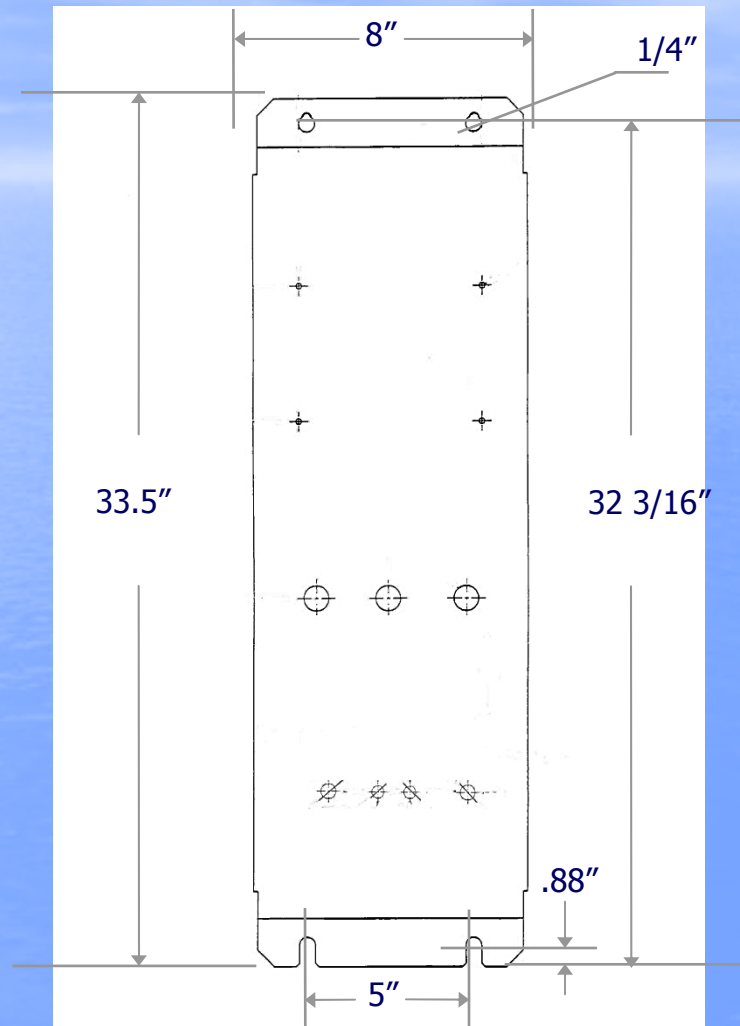


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Mounting the Analyzer



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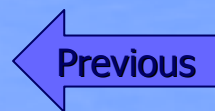
Connections – Sample Lines



Sample Specifications:

Medium: Liquid or Gas
Max.Pressure: 145 psi (10 bar)
Temperature: 23-113F (-5-45C)

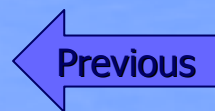
Warning: Hard materials, such as woodchips and/or grindings, may damage the 9065 measuring head.



Connections - Electrical



Refer to the manual for a detailed description of the electrical connections.



Analyzer Operation

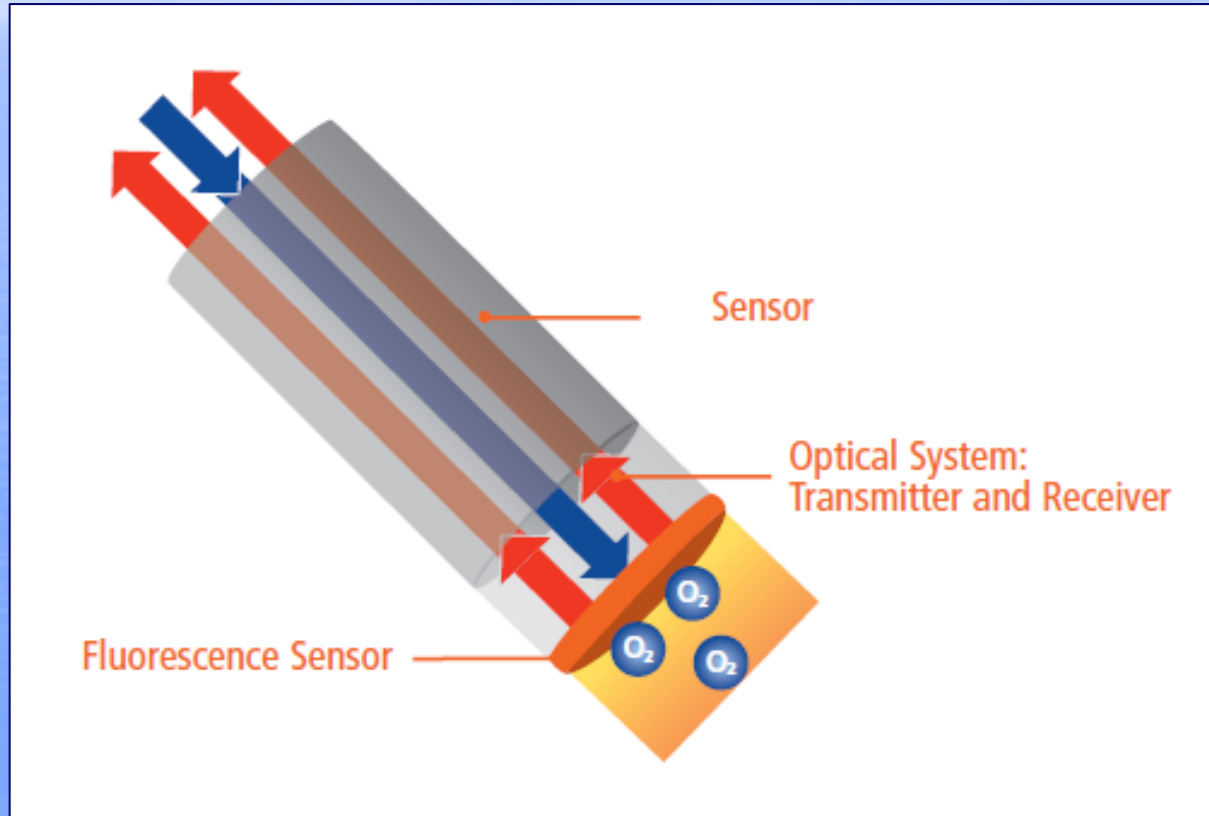
Principal of Operation:

Sample enters the flowcell and comes into contact with the active fluorescence sensor spot.

The sensor spot is intensely illuminated by a light source which causes it to become excited and react with the oxygen molecules.

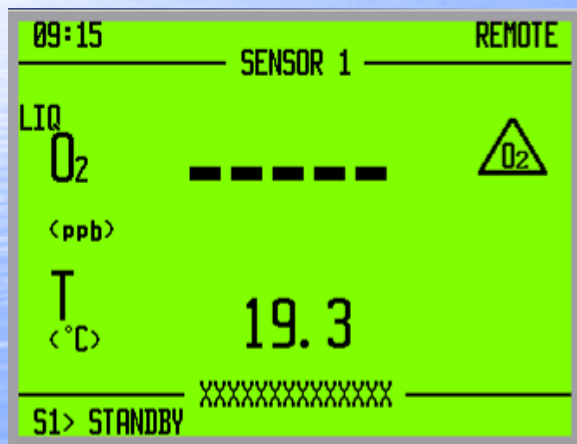
Fluorescence intensity is reduced and is proportional to the oxygen partial pressure.

This difference in intensity is measured and displayed as an oxygen concentration value.

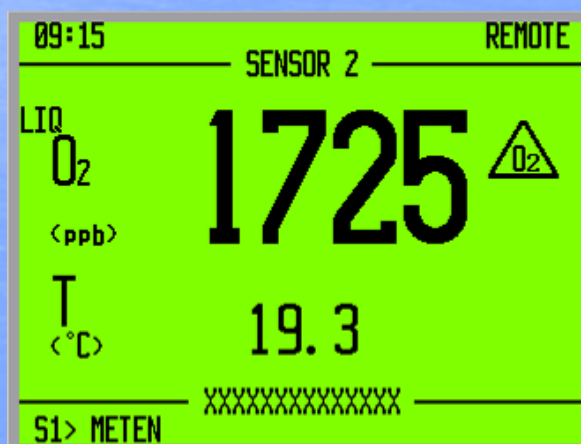


Preparation and Start-up

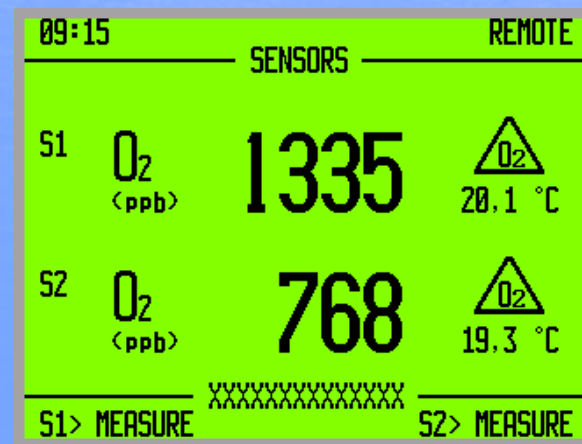
The 9065 must be connected as shown in the previous slides. The power supply can be turned on after all the cables have been connected. The 9065 will start immediately and the main measurement screen will be displayed after three seconds.



Sensor Standby



One Sensor Connected



Two Sensors Connected



Operation – Start-Up

The analyzer has the following possible operation modes:

- INIT** Directly after the start up sequence from the control box the INIT-message will appear at the bottom of the screen. The INIT-message means: The control box is receiving the calibration data from the sensor(s). This will take between 30 and 60 seconds.
- MEASURING** In measuring mode, the analyzer displays the current oxygen concentration value and the temperature.
- STANDBY** In Standby mode, an O₂ measurement is not taken and a dotted line is displayed instead of the O₂ value. The sensor's temperature is still displayed.
- CALIBRATION** The measurement cell will be calibrated when the Calibration mode is activated. During calibration mode it is not possible to take a measurement.



Operation - Menu

Main Menu:

If the Enter button is pressed for 3 seconds while the measurement screen is displayed, then the main menu screen will be displayed.

Shortcut Menu:

For a quick overview, the ↑ button can be used to scroll to the SHORTCUT menu for additional measurement values, graphs and alarms.

Operator Level:

The default settings can be changed to the preferred user settings before the 9065 is used for the first time. The 9065 has two operator levels:

- Operator level (A)
- Supervisor level (B)

Refer to Appendix B (Software structure) in the manual for a full description of the screens to access both levels.




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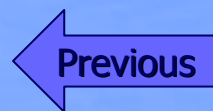


Operation – User Level

To access the Supervisor level:

1. In the main measurement menu, press the Enter button for three seconds.
 - The main menu will be displayed.
2. Use the cursor keys to select 'User' and press the Enter button.
 - The password menu will be displayed.
3. Use the cursor keys to select 'Password' and press the Enter button.
4. Use the cursor keys to enter the correct password [6848] and press the Enter button to confirm the password.
5. 'Correct entry' or 'Incorrect entry' will be displayed after the code has been entered and confirmed.
6. Next, use the cursor keys to select the  sign and press the Enter button to confirm the selection.
7. All the screens for the Operator level and the Supervisor level will now be visible.

If you forget to log out or if a button is not pressed within 30 minutes when in the Supervisor level, the software will automatically switch to the Operator level. This time cannot be altered.



A blue oval button with the text "Return to Table of Contents" inside it.



Operation - Configuration

The **CONFIGURATION** Menu has the following sub-menus:

Units: Select the desired units for gas or liquid application.

Info: Displays software and serial number information.

Date: The arrow buttons can be used to change the date values and the Enter button will set the value and cycle to the month and year.

Time: The arrow buttons can be used to change the time values and the Enter button will set the value and cycle to the minutes and seconds.

Language: Select Dutch, German, or English as the desired language.

Contrast: Used to alter the contrast of the display.

Sensor Settings: Used to select which sensors are connected and choose the sample time. Auto sample mode will automatically adjust the sample time based on the deviations between consecutive measurements as follows:

- If the deviation is $> 10\%$ for the following measurement, then the sample time is changed to 60 → 30 → 15 → 8 → 4 → 2 seconds, respectively.
- If the deviation is $< 5\%$ for the following measurement, then the sample time is changed to 2 → 4 → 8 → 15 → 30 → 60 seconds, respectively.



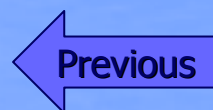
Operation – Analog Outputs

Analog Outputs:

A maximum of two analog outputs can be configured as desired. After selecting and confirming 'Config. Output', the corresponding settings for the unit will be displayed automatically. The settings depend on the unit that has been selected in 'Units'. The range will be altered accordingly if the unit is changed. An overview of the settings and the default settings is given below.

Item	Setting options	Default setting
Configure output 1	O ₂ sensor 1, O ₂ sensor 2, Temp. Sensor 1, Temp. Sensor 2	O ₂ sensor
Configure output 2	O ₂ sensor 1, O ₂ sensor 2, Temp. Sensor 1, Temp. Sensor 2	Temp. sensor

Item	Range	Default	Unit
Minimum value (if O ₂ sensor)	0 45,000	0	ppb; ppm; mg/l; ug/l; % as; %
Maximum value (if O ₂ sensor)	0 45,000	2,000	ppb; ppm; mg/l; ug/l; % as; %
Minimum value (if temperature sensor)	- 10 ... 150	0	° C; ° F
Maximum value (if temperature sensor)	- 10 ... 150	100	° C; ° F



Operation – Alarm Settings

Alarm outputs:

An overview is given below of the alarm outputs and the corresponding activation conditions. See Appendix C in the manual for an overview of the physical I/O connections.

General alarm (A1):

- All faults; All error messages; Temperature alarms for sensor 1 and/or sensor 2; O₂ alarms for sensor 1 and/or sensor 2.

Digital output A1 (Normally Close, NC) is zero if there has been an alarm during two measurements. The alarm can be reset by selecting 'ACK/RESET ALARM' in the Shortcut menu. The digital output is then high (and remains high during the alarm signal).

O₂ alarm (A2):

- If the O₂ value of sensor 1 and/or sensor 2 is greater than the set value, then output A2 is zero. N.B. output 1 is also zero in the case of an O₂ alarm.

These outputs can be reset by selecting 'ACK/RESET ALARM' in the Shortcut menu and will then remain high (if the alarm signal continues).

O₂ extra (alarm) for sensor 1 (A3):

If the O₂ value of sensor 1 is greater than this value, then output A3 is zero.

O₂ extra (alarm) for sensor 2 (A4):

If the O₂ value of sensor 2 is greater than this value, then output A4 is zero.



Operation – Start Measurement

If the Start button is pressed, the 9065 will start the measurement and the red LED on the Start button will be lit. The measurement frequency depends on the sample time that has been selected during the configuration. Below is an overview for different functions of the start button.

One sensor connected:

- Function start button → Start/Stop measurement

Two sensors connected:

- Measurement screen sensor 1: Function start button → Start/Stop measurement sensor 1
- Measurement screen sensor 2: Function start button → Start/Stop measurement sensor 2
- Measurement screen sensor 1+2: Function start button → Start/Stop measurement sensor 1 + 2

Note: The red LED is lit if one or both of the sensors take a measurement.

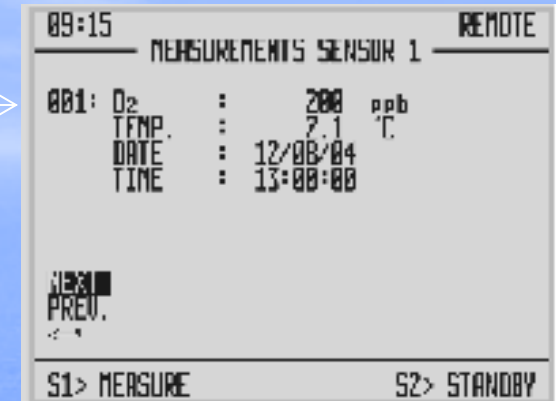
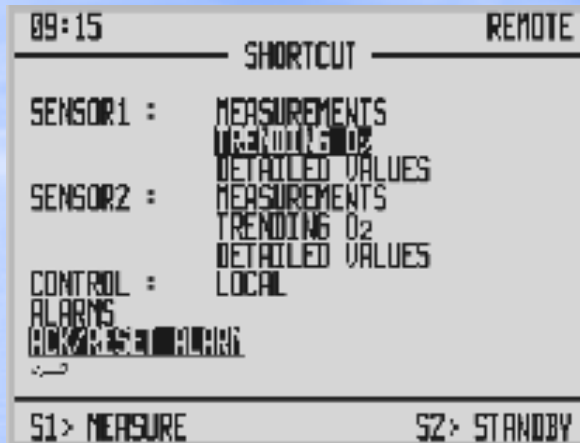
The last 500 measurements of each sensor are saved in the memory. When the memory is full, the oldest measurements are deleted and the most recent measurements are saved.



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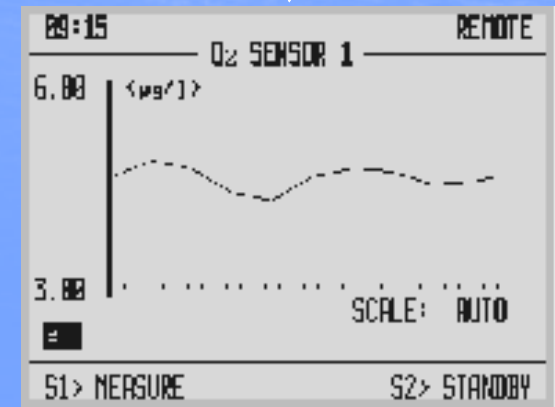
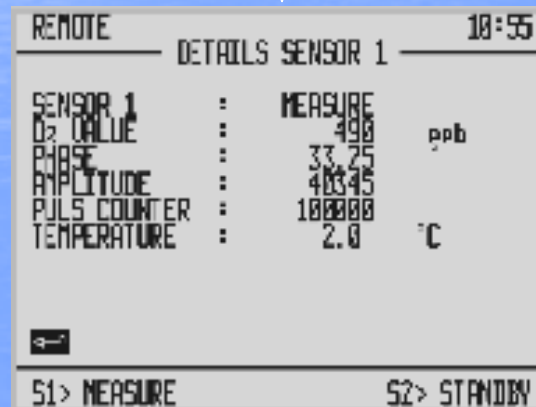


Operation – Shortcut Menu



The down arrow key can be used to access the Shortcut menu.

From this menu, it is possible to immediately switch to the measurement values, trend lines and sensor-specific values.



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Operation – Logbook

The logbook can be selected from the Main Menu and has the following options:

Measurement Values: The previous 500 measurements for each sensor are stored in the memory.

Trending: A graph that shows a trendline for a maximum of 150 measured values.

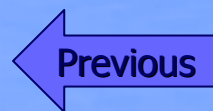
Operating Hours: Shows the measurement and standby hours for the current sensor.

Extremes: Shows the extreme values for both the oxygen concentration and the temperature.

Calibration: The last three calibration dates for the sensor are shown.

Alarms: Stores the alarm history; up to a maximum of 50 alarms.

Reset: The reset can be used to delete all stored measurements.



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Calibration

Calibration Frequency:

It is recommended to recalibrate the sensor after 1 million exposures. If the default sample time (1 measurement/30 seconds) is used, the sensor must be recalibrated once a year, assuming that the sensor is in operation 24 hours a day, seven days a week.

There is a light pulse counter integrated in the software that counts the number of light exposures. Once the sensor has been exposed to light 1 million times, the warning 'Calibrate or replace the O₂ sensor' is displayed and the sensor must be recalibrated or replaced.

The following methods are described for calibrating the oxygen sensor:

- Calibration with two gasses
 - This method is recommended to ensure the specified accuracy over the whole oxygen measuring range.
- One point calibration
 - This method is recommended if high accuracy for low ppb concentration is required.



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Calibration with Two Gases

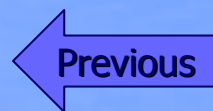
During the calibration, both the zero point and the high calibration point can be calibrated using a certified oxygen concentration. The calibration gases must be dry gases.

- The zero point must be calibrated using a gas with a guaranteed oxygen content of $\leq 0.001\%$ O₂. We recommend the use of nitrogen or carbon dioxide with a purity of 99.9990 % (Class 5.0).
- The high calibration point must be calibrated with an accuracy of $\pm 1\%$ using a gas with a certified oxygen content of up to 4%. For example, N₂ or CO₂ with a 4% or 1% O₂ content can be used for this.

The sensor tip must be dry during calibration with a gas. Rinse the sensor for approximately 15 minutes with N₂, CO₂ or oil-free compressed air.

During the calibration process, the % unit or the % a.s. unit must be used. Since the oxygen sensor measures the partial oxygen pressure, the oxygen content measured in the gas during the calibration process depends on the actual air pressure. The manually entered actual air pressure in the 'P-atm' parameter in the Calibration menu is taken into consideration when determining the oxygen content in the % O₂ and % a.s. gas units.

Note! For an accurate calibration, the calibration gas and the sensor must acclimatize for 4 hours in the same room.



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Calibration with Two Gases

1. Place the sensor in the correct calibration beaker.
2. From the main measurement screen, press the Enter button for longer than 3 seconds.
 - The main menu will be displayed.
3. Use the cursor keys to select 'Calibration' and press the Enter button to confirm the selection. (Note: the Calibration menu is a level B Supervisor level.)
4. Select the sensor that you wish to calibrate and press the Enter button to confirm the selection. ('Last calibrations' shows you when the previous calibration took place.)
5. Select 'Calibration' and press the Enter button to confirm the selection.

```
09:15          CALIBRATION          REMOTE
-----
CALIBRATE SENSOR 1
CALIBRATE SENSOR 2

LAST CALIBRATIONS
SENSOR 1 :    15/03/04    10:41:17
SENSOR 2 :    17/09/03    14:25:36

[Left Arrow]

S1> MEASURE          S2> STANDBY

09:15          CALIBRATE SENSOR 1    REMOTE
-----
CALIBRATION
FIXED CALIBRATION

LIGHT PULSE COUNTER :    9999999
TOTAL PULSE COUNTER :    99999999

[Left Arrow]

S1> STANDBY          S2> STANDBY
```

Calibration with Two Gases

6. Enter the current air pressure.
Use an air pressure gauge that is accurate to one millibar.

```
09:15 CALIBRATION SENSOR 1 REMOTE
O2 SENSOR TYPE : LHO
ATM. PRESSURE : 1013 mbar
O2 LOW : 0.00 %
O2 HIGH : 2.00 %
ACTUAL O2 VALUE : 1.23 %
PHASE / AMPLITUDE : 69.72 / 12345
ACTUAL TEMPERATURE : - 1.3 °C
EXCHANGE COATING : NO
STORE CALIBRATION
←

S1> CALIBR S2> STANDBY
```

7. Rinse the calibration beaker with Class 5.0 nitrogen or CO2. Allow the gas to flow for 15 minutes at a maximum flow rate of 30 l/h. Press the Enter button so that the value reads 0.00%. Press the Enter button again to save the calibration value for the zero point. The calibration value will now be saved in the memory. If a stable value is not reached, the message 'O2 value instable' will be displayed.

```
09:15 CALIBRATION SENSOR 1 REMOTE
O2 SENSOR TYPE : LHO
ATM. PRESSURE : 1013 mbar
O2 LOW : 0.00 %
O2 HIGH : 2.00 %
ACTUAL O2 VALUE : 1.23 %
PHASE / AMPLITUDE : 69.72 / 12345
ACTUAL TEMPERATURE : - 1.3 °C
EXCHANGE COATING : NO
STORE CALIBRATION
←


S1> CALIBR S2> STANDBY
```

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Calibration with Two Gases

- Next, calibrate the high calibration point. Connect the calibration gas to the calibration beaker and allow the gas to flow for 15 minutes at a maximum flow rate of 30 l/h. Press the Enter button, enter the oxygen content of the calibration gas and then press the Enter button again. The calibration value will now be saved in the memory. If a stable value is not reached, the message 'O2 value instable' will be displayed.
- Indicate whether or not you have changed the coating. If you enter 'Yes', the 'Total pulse counter' will be reset to zero.
- Select 'Store calibration' to permanently save the data in the sensor. Press  to return to the Calibration menu.

```
09:15 CALIBRATION SENSOR 1 REMOTE
O2 SENSOR TYPE : LHO
ATM. PRESSURE : 1013 mbar
O2 LOW : 0.00 %
O2 HIGH : 2.00 %
ACTUAL O2 VALUE : 1.23 %
PHASE / AMPLITUDE : 69.72 / 12345
ACTUAL TEMPERATURE : - 1.3 °C
EXCHANGE COATING : NO
STORE CALIBRATION
←

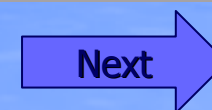
S1> CALIBR S2> STANDBY

09:15 CALIBRATION SENSOR 1 REMOTE
O2 SENSOR TYPE : LHO
ATM. PRESSURE : 1013 mbar
O2 LOW : 0.00 %
O2 HIGH : 2.00 %
ACTUAL O2 VALUE : 1.23 %
PHASE / AMPLITUDE : 69.72 / 12345
ACTUAL TEMPERATURE : - 1.3 °C
EXCHANGE COATING : NO
STORE CALIBRATION
←

S1> CALIBR S2> STANDBY

09:15 CALIBRATION SENSOR 1 REMOTE
O2 SENSOR TYPE : LHO
ATM. PRESSURE : 1013 mbar
O2 LOW : 0.00 %
O2 HIGH : 2.00 %
ACTUAL O2 VALUE : 1.23 %
PHASE / AMPLITUDE : 69.72 / 12345
ACTUAL TEMPERATURE : - 1.3 °C
EXCHANGE COATING : NO
STORE CALIBRATION
←

S1> CALIBR S2> STANDBY
```

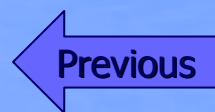


One Point Calibration

For most applications in the low oxygen measuring range a calibration of the zero point is sufficient.

To do so, follow the instructions provided for the calibration with two gasses in Section 7.2.3.

Note: The atmospheric pressure and the concentration of the high calibration do not have to be entered again. Therefore, skip steps 6, 8, and 9.



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Cleaning and Maintenance

Daily Maintenance:

Visual Inspection:

- Make sure there is no dirt or dust on the instrument.
- Check whether the plugs and cables have been inserted correctly.
- Connectors that are not used must be covered.

Cleaning:

Regular CIP of the process pipes with a suitable cleaning product.

- Required cleaning products:
 - Product- Alkaline cleaner with an NaOH or KOH base.
($\leq 95^{\circ}\text{C}$, $\leq 5\%$ NaOH or KOH)
 - Acid cleaner with an HNO₃ or H₃PO₄ base.
($\leq 60^{\circ}\text{C}$, $\leq 3\%$ HNO₃ or H₃PO₄)
- Flow 0 – 10 m/s
- Only use water (or water with a detergent) to clean the sensor or the outside of the control box.

Warning: Never aim the powerful water jet at the control panel or other instruments.

Warning: Never use tools to clean the coating. Touching the coating may cause serious damage to the instrument.



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Thank You

The 9065 Dissolved Oxygen Analyzer requires no regular periodic maintenance.

For additional troubleshooting tips and techniques, please consult the manual and the troubleshooting guide.

For additional technical service, or to order spare parts and reagents, please contact Waltron at:

1-800-242-7353

or visit the website at www.waltron.net



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