

TecPen Handheld Oxygen Sensor



User Manual

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Safety and Security

General Safety Instructions

- Before operating this device, read the operating instructions very carefully and keep them in a safe place.
- Use the device exclusively for commercial use and the intended purpose. This device is not intended for personal use. Do not use it outdoors (unless it is intended for conditional outdoor use). Keep it away from heat, direct sunlight, moisture (never immerse in liquid) and sharp edges. Do not use the device with wet hands. If the device has become damp or wet, switch off the device immediately and, if connected, disconnect the mains plug from the power supply. Don't reach into the water.
- Always turn off the appliance and unplug the appliance from the wall outlet (pull the plug, not the cable) when not in use, attaching accessories, for cleaning or in case of malfunction.
- Check the device and cable regularly for damage. Do not put a damaged device into operation.
- Do not repair the device yourself, but visit an authorized specialist company. In order to avoid hazards, only have the defective device or power supply replaced or exchanged by the manufacturer or our customer service.
- Only use original accessories.
- The device must not be opened during operation.
- Never immerse the device in water or other liquids.
- The device must be kept out of the reach of children.
- Do not fill with solvents, alcohol or cleaning agents, you may damage the device.
- If the device is brought into a room with a large temperature difference to the environment, an acclimatization period of 1-2 hours should be observed.
- Protect the device from dirt.
- Never store the cannula without protection.
- Be careful when using the cannula. Risk of injury!
- Never drop the appliance from a great height.
- The device is designed for the invasive measurement of closed containers. The object to be measured is subsequently damaged and must not be reused.

This device may not be modified, neither in terms of its construction nor with regard to the safety devices without the express written consent of the manufacturer. CO2Meter, Inc. is not liable for damage resulting from unauthorized modifications.

The operator must obtain the opinion of the manufacturer in order to make any modifications. As manufacturers, they have the legal responsibility for all these measures. Accordingly, the original manufacturer is released from his liability for any modifications made without express written consent.

Warning Symbols

Warnings used throughout this document can be classified according to the extent of a hazardous situation. The classification is based on an assumption as to how probable the occurrence of a hazardous situation is and what consequences are associated with it.

There are four classes of warnings.

Danger!

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Warning!

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Watch Out!

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor injury.

Watch your step!

CAUTION indicates a situation which, if not avoided, may result in machinery damage.



Reference

This symbol draws your attention to important, useful and helpful information.

Introduction

The TecPen Handheld 0-5% Oxygen Sensor is designed to provide fast, accurate measurements of oxygen content in closed or pierceable containers. It uses an optical gas sensor with LED display as well as Bluetooth and USB connectivity. This makes it an excellent tool for:

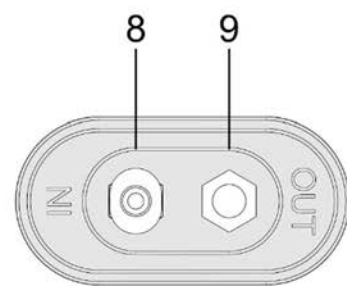
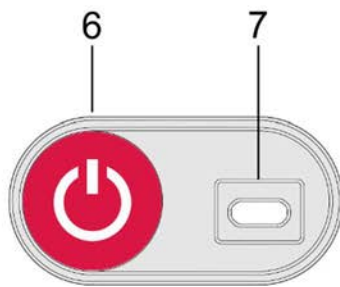
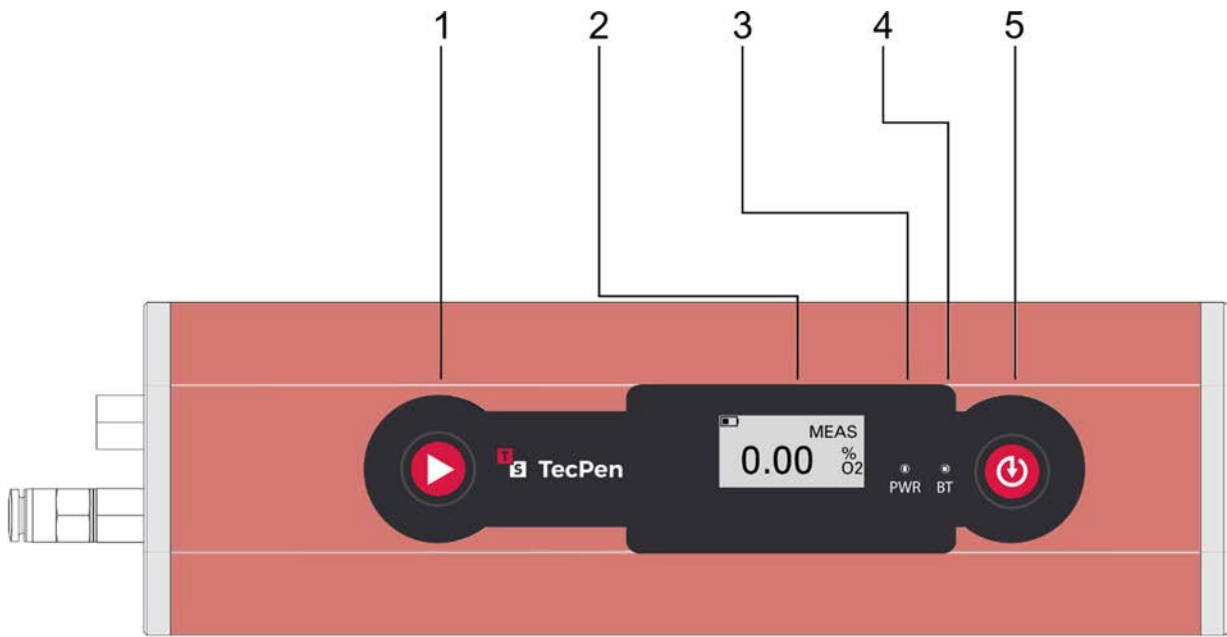
- Food packaging in protective gas atmosphere (MAP packaging)
- Headspace of vials, cell breeding vessels, infusion containers, syringes
- Micro-bioreactor systems

Package Contents



Quantity	Item	Part number
1	TecPen	
1	Belt Bag	
2	Particulate Filters	TS R1 HH 001
2	Cannula 25/0.8	TS R1 HH 008
1	USB Cable	TS R1 HH 003
1	USB Protection Cover	TS R1 HH 004
1	USB Flash Drive	
1	Instruction Manual	On flash drive
12	Septum	TS R1 HH 006
1	Flexible Extension	TS R1 HH 007
1	Calibration Certificate	On flash drive
	DIN ISO Service	TS R1 HH 009

Layout & Controls



1. Start Button
2. OLED Display
3. PWR (Power) LED
4. BT (Bluetooth) LED
5. Memory Button
6. On/Off Button
7. USB Port
8. Sampling Gas Inlet (Cannula)
9. Gas Outlet

Operation

Operating Principle

The principle of opto-chemical oxygen detection using TecPen is based on the change in emission of fluorescent radiation from the fluorescent dye depending on the oxygen concentration. The dye is excited and the resulting fluorescence event is absorbed. The duration of this fluorescence event - the so-called lifetime - depends on the amount of adsorbed oxygen in the sensor layer and can therefore be used to determine the oxygen concentration.

Before You Begin


In a known gas with no particulate matter and no condensation the cannula (syringe) may be connected directly to the TecPen. However, in most cases before taking a measurement the hose and filter must be attached to the TecPen to prevent contamination of the gas chamber. To do this, place the hose on the gas inlet (8) and fasten the filter to the other end of the hose. Attach the cannula to the front of the filter.



Watch Your Step!


The back of the filter has a Luer lock closure. This must be turned into the intended connection of the hose for proper installation.

Turning the TecPen On

Press the On/Off button  to turn on the unit. The TecPen shows the battery status and an oxygen value of 0.00%. This is a placeholder and not an actual measurement result.

The unit can be switched off by pressing the On/Off button  for at least two seconds.

Taking a Measurement

The cannula is used to puncture the packaging to be measured. After inserting the cannula briefly press the start button to  to take a measurement. The measurement is automatically terminated after 10 seconds. If the measuring time needs to be extended after the first measurement has been completed press the start button again.

Watch Out!


After each measurement is completed put the protective cap on the cannula to avoid injury.

Turning the TecPen Off

The unit can be switched off by pressing the On/Off button  for at least two seconds.

Saving Data

Default Operation

After each measurement is completed, the currently displayed measured value can be stored in the internal memory of the TecPen by briefly pressing the memory key . By default a new CSV-format Excel file is created each day measurements are taken using the date as the file name and the measured oxygen level and a time stamp as data.


Output Data File

The TecPen outputs a comma-delimited TXT data with a header row that can be imported into any spreadsheet program. The data file format is as follows:

Data Label	Example
Date	2019-03-15
Time	14:33:30 (hours:minutes:seconds 24 hr. clock)
Product_Number	123456
Product_Name	NAME56789ABCD
Product_EAN	0123456789ABC
Product_Oxygen_Value	0.53472
Amplitude	14016
Tau	64.610248
Temperature[°C]	25.187500 (Centigrade only)
Battery_Level[%]	86
Device Status	0=Normal (see device status codes)

Exporting Saved Data

All data files can be exported via USB:

1. Connect the TecPen to a PC using the supplied USB cable.
2. Press the On/Off button  to turn on the unit.
3. Copy the files from the TecPen using your PC's file manager.
4. Remove the TecPen USB device following the operating system instructions.





Watch Your Step!

Before unplugging the USB cable the TecPen must be ejected properly like any other standard USB device to avoid damaging the TecPen's internal file system. If the TecPen is unplugged from the USB port without first selecting the "Safely Remove Hardware and Eject Media" option all data still on the device will be irretrievably lost.








Menu Options

In addition to the main screen the TecPen has 4 menu options screens that can be accessed by pressing and holding the memory button.




Change Data File Format

1. Hold the memory button  for 2 seconds to access the menu.
2. Tap the memory button  to scroll down or the start  button to scroll up to select a recipe.
3. Press the memory button  for 2 seconds to confirm and save the setting.




Set Date and Time

1. Hold the memory button  for 2 seconds to access the menu.
2. Press the memory button  to switch to the date and time screen.
3. Press the start button  for 2 seconds; the year is underlined.
4. Press the memory button  to scroll down or the start button  to scroll up to select the year.
5. Press the start button  for 2 seconds to save and go to the next field
6. Press the memory button  for 2 seconds to confirm and save the setting.

View Measurement Data Display






1. Hold the memory button  for 2 seconds to access the menu.
2. Press the memory button  to switch to the View Data Display screen.
3. Press the memory button  for 2 seconds to confirm and save the setting.

View Device Status

1. Hold the memory button  for 2 seconds to access the menu.
2. Press the memory button  to switch to view the Device Status code (see below).
3. Press the memory button  for 2 seconds to confirm and save the setting.

Calibration

The TecPen uses pure nitrogen gas for zero point calibration.

1. In order to adjust the zero point, a gas volume with overflow must be pierced and the TecPen purged with nitrogen.
2. Press and hold the start button  and the memory button  alternately until the pump is activated
3. A screen will appear with the text "Recalibration 0%?" followed by "NO".
4. Briefly press the start button  to switch between "YES" and "NO".
5. If "NO" is selected, the operation is aborted by pressing and holding the memory key .
6. If "YES" is selected, let the unit calibrate for at least 5 minutes.
7. Press and hold the memory key to  confirm.

Watch your step!

Calibration may only be carried out with class 5.0 or purer nitrogen or the quality of the oxygen measurement results cannot be guaranteed.

Watch your step!

After zero-point calibration the original calibration values are overwritten. If the calibration has not been carried out correctly, the original values can only be restored by CO2Meter support.



Reference

While calibration can be carried out by the user, adjusting the zero-point may only be carried out by CO2Meter Service.

Display

Screen 1 main screen		battery level measured value Temporary: Memory/Log Indicator Indicator for current measurement
Screen 2 recipe administration		Consecutive / internal number product name, EAN code
Screen 3 Date & Time		date time (24 hour clock)
Screen 4 measurement data display		amplitude life temperature
Screen 5 info screen		serial number device status code
Additional screen Zero point adjustment		Selection option YES / NO

Maintenance

Cleaning

- The unit can be cleaned externally with isopropanol and a fine, soft cloth. Never immerse the device in water or other liquids.
- Do not clean the unit with ultrasonic cleaner.
- Do not fill with solvents, alcohol or cleaning agents, they may damage the device.

ISO Certification

The instrument must be returned annually to the manufacturer for recalibration in accordance with ISO:9000 certification.

Device Status Codes

0. normal operation
1. UART buffer overrun
2. Temperature sensor error
3. Not specified
4. SD card not recognized

Watch your step!

If the TecPen displays one of the error codes above during operation turn off the device and contact the manufacturer immediately.

Specifications

TS System	TecPen
Measuring range	0.0-5.0%
Precision	
Range 0.0-0.5%	+/- 0.01%
Range 0.5-1.0%	+/-0.03%
Range 1.0- 5.0%	+/-0.05%
Response time at 25°C	<150ms
Maximum pressure	10 bar
Temperature range+ Min./Max.	-10°C / +50°C
Medium	Gaseous, no solvents
Power supply	Battery, charged via USB
Data interface	USB and BT4.0 via Android
Withdrawal volume	< 5ml
Temperature compensation	Yes, 10 to 30°C
Pressure compensation	N/A
Industry certificates	On request
Cleaning	No organic solvents 70% ethanol
Wetted parts	Needle stainless steel
Degree of protection	St.1.4404 IP54

Support

The quickest way to obtain technical support is via email. Please include a clear, concise definition of the problem and any relevant troubleshooting information or steps taken so far, so we can duplicate the problem and quickly respond to your inquiry.

Warranty

The sensor comes with a ninety (90) day warranty starting from the date it was shipped to the buyer. For more information visit our website:

<https://www.co2meter.com/pages/terms-conditions>



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