TecPen Dissolved Oxygen Meter

Manual

Version 1.3.1

Table of Contents

1. Safety and Security

1.1. 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 not described in this manual, 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 drop the appliance from a great height.

1.2.   Purpose of Use

Measurement of oxygen content of beverages under pressure via a sampling valve or pump.

The device may only be used for measuring the oxygen content in liquids.

Under no circumstances must the instrument come into contact with corrosive gases, organic solvents or 70% ethanol.

1.3.   Modifications

1.3.1.   Disclaimer

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

The operator must obtain the opinion of the manufacturer in order to make significant modifications. As manufacturers, they have the legal responsibility for all these measures. Accordingly, the original manufacturer is released from his liability.

1.3.2.   Original & Spare Parts

The use of spare parts and wearing parts from other manufacturers can be a risk and considerably impair the measuring performance.
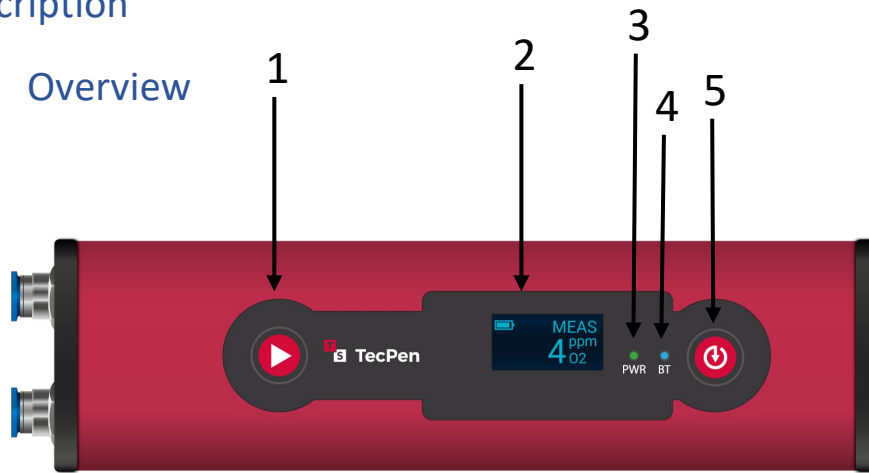
Only use original TecSense spare and wear parts.

TecSense GmbH does not assume any guarantee or warranty for damages caused by the use of spare and wear parts of other manufacturers than TecSense GmbH.

Product	TecSense ID
USB Cable	TS R1 HH03
Pneumatic hose	TS R1 HH15
Case BaseTech	TS R1 HH29

2. Description

2.1. Overview

1.	**START button**	Press button: start measurement
		Press button again: stop measurement
2.	**Display**	
3.	**LED POWER (PWR)**	Lights up when the device is switched on
4.	**LED BATTERY (BT)**	Lights up when the device is connected to the charger during Power ON mode.
		Will not light up if the device is connected to charger during Power OFF mode.
5.	**SAVE button**	Press button: save measurement
6.	**ON/OFF button**	Press briefly: switch on device
		Hold down: switch off device
7.	**USB port**	
8.	**Liquid inlet /connection for 6mm pneumatic hose**	
9.	**Liquid outlet**	

2.2.   Operating Principle

The principle of optochemical oxygen detection using the TecPen is based on the varied emission of fluorescence radiation of the fluorescent dye depending on the oxygen concentration. The dye is excited at 507 nm and the resulting fluorescence event recorded at 650 nm. The duration of this fluorescence event – known as lifetime – depends on the quantity of adsorbed oxygen in the sensor layer and can thus be used to determine the oxygen concentration.

IMPORTANT! The label of the device must not be removed or modified without the consent of TecSense. Ensure that the label remains legible.

2.3.   Technical Specifications

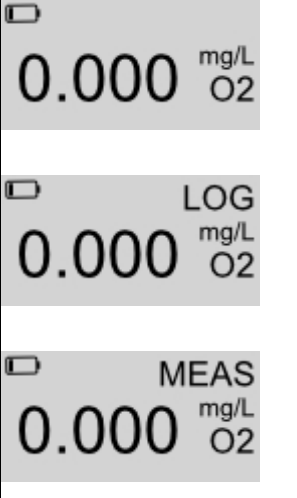| TS-System	TecPen Fluid	
Measurement range	0 – 2000 ppb or 0-2 mg/L	
	Range	Accuracy
	0-200 ppb	± 2% Mev**
	200-1000 ppb	±3% Mv*
	1000-2000 ppb	±5% Mv*
Resolution	1ppb or 0,001 mg/L	
Max. Pressure	5 bar	
Response time at 25°C/ 77°F	<150 ms	
Temp. range Min./Max	-10°C/ +60°C	
	14°F/140°F	
Medium	Fluids	
Power supply	5V USB and LiPo Akku	
Rechargeable battery lifetime	> 3h per charge	
Data Interface	USB	
Temperature compensation	4-30°C	
	39,2-86°F	
Display	OLED Display	
Cleaning housing	No organic solvents, 40% EtOH	
Cleaning sample line	Water, 40% EtOH, Mild detergents, no organic solvents	
Parts touching sample	St. 1.4404/PTFE/Glass	
Case	aluminium anodized	
Protection	IP 65	
Main service interval (Service including necessary retrofitting)	3 years	
Sensor cap replacement interval	1 year	
Recommended adjustment by customer	3 months	
Warranty	1 Year ex works Grambach	

*Mv = measured value

**Mev = measured end value

2.4. Software Description

In normal use, TecPen has 4 screens that can be viewed by pressing and holding the MEMORY button. It is not possible to switch through the screens in reverse order.

Note: Zero-point adjustment may only be carried out by TECSENSE Service.

Screen 1 Main screen	0.000 mg/L O2	Battery level Measured value
	LOG 0.000 mg/L O2	Temporary: Log Indicator
	MEAS 0.000 mg/L O2	Indicator for current measurement

| Screen 2 Recipe administration | 1234 Produktname 1234567891234 | Consecutive / internal number Product name EAN code |
| Screen 3 Date & Time | 2018-01-01 12:12:12 | Date Time |

| Screen 4 Measurement data display | Ampl.[lsb]: 0 Tau[us]: 0.00 Temp.[°C]: + 0.0 | Amplitude Life Temperature |
| Screen 5 Info screen | Device info: TPV3DD20180 605IMTN001 Device state: 0 | Serial number Device status code |

| Additional screen Zero-point adjustment | Adjustment to 0%? NO | Selection option YES / NO |

3.   Operation

3.1.   Settings Prior To Start Of Measurement

Acclimatization	**IMPORTANT!** If the device is taken to a room with a significantly different ambient temperature, an acclimatization period of 1-2 hours is required
Connecting TecPen to the computer	Switch on the TecPen. Use the USB cable to connect it to a computer. **IMPORTANT!** Before disconnecting the USB cable, the TecPen must be ejected properly to avoid damaging the file system. If it is not properly ejected, all data still on the device will be irretrievably lost.
Loading the recipe data	All products/recipes are saved in the "Rezepte.csv" file provided on the USB Stick. This CSV file is stored in the internal memory of the TecPen and can be opened when the device is restarted. *NOTE: we recommend that you change products/recipes in the csv-spreadsheet provided by us, as all fields that are required have already been submitted in this spreadsheet. Do not rename the "Rezepte.csv" as the TecPen is not able to read other names.*
Setting the time and date	Press SAVE for two seconds. Repeat this step until the date and time display appears. Press START for two seconds. ►► The year is underlined. To scroll down/decrease number: SAVE To scroll up/increase number: START After setting the year, press START for two seconds. ►► The year is saved and the next field is highlighted on the display. For month, day and time, follow points 3 and 4. Press SAVE for two seconds to save all the settings.

3.2.   Performing A Measurement

Press ON/OFF to turn on the unit.	The PWR LED lights up green. TecPen indicates battery status and oxygen level with ****mg/L or ppm. After the unit has been turned on, it will take approximately 2 minutes to warm up to ensure an accurate measurement. The device can only be switched on when it is not connected to the charging cable. If the instrument does not receive any input after 5 minutes, it switches off automatically.
Choosing a recipe / product	Press the SAVE button for 2 seconds. A list of preset products/recipes will appear on the display. Use the SAVE button or the START button to select the desired product/recipe. To select a product/recipe, press the SAVE button again for 2 seconds. After choosing, you will automatically return to the main screen.
Connecting the TecPen to the site of measurement	Insert the pneumatic hose to the Inlet connection and a pneumatic hose to the outlet connector. Make sure that the outlet hose is in a sink or a bottle to collect the fluid. Let the liquid flow through the device via the inlet hose. **IMPORTANT!** Without a flow you can't get correct measurement results. **ATTENTION:** Do not apply more than 5bar of pressure.
Starting the measurement	Press START to start the measurement. (If you have a smaller volume you can start the measurement before you connect the TecPen to the site of measurement.

MEAS" appears on the display, below the O2 value, which changes continuously.

If "****" appears instead of a measured value, your measured value is outside the measuring range.

Optional:

If you want to save the measurement continuously start the measurement with LOG.

Stopping the measurement	Press START to stop the measurement.
	Optional: Press LOG when you started your measurement with LOG
Saving the measurement	Press SAVE to save the measured value. The saving process is indicated by "LOG" on the display.
	The values are stored in the internal memory. A separate data file is generated for each day a measurement is started. This file contains measurement data and time stamps.
Transfer of saved data	Switch on your TecPen.
	Connect the TecPen to your computer using the USB cable.
	TecPen appears on your PC like a USB drive and can be transferred as a .txt file.
	IMPORTANT! Before removing your TecPen from the PC, make sure that it has been ejected correctly.

3.3.   Performing a Zero-Point Adjustment

ATTENTION: DO NOT EXCEED A FLOW OF 1L/MIN WHEN YOUR TECPEN IS CONNECTED TO A GAS FLASK

TecSense recommend using Nitrogen for the zero-point adjustment. Alternatively, also Argon gas is useable.

Connect your TecPen gas inlet to your 0%-O_2 gas (in the following called "GAS") hose

Switch on the GAS and make sure that the flow of gas will not exceed 1L/min

Flush the TecPen for 5 min with the GAS

Switch on the TecPen

Press and hold START and immediately press and hold SAVE for two seconds. The pump is activated and you will see the Zero-point adjustment screen with the text "Adjustment to 0%?" with a "NO" underlined.

Adjustment to 0%?
<u>NO</u>

Briefly press START or SAVE to switch to YES
OR: press the SAVE button to select NO, if you want to abort the adjustment.

Press the SAVE button to select YES and start the adjustment

Wait at least 5 minutes to guarantee a correct adjustment.

After 5 minutes press and hold the SAVE button for 2 seconds to confirm.

Note:

With a zero-point adjustment, the original calibration values are overwritten. If the adjustment has not been carried out correctly, the original values can only be restored by resetting the data with the original calibration file included as "config.txt" on the supplied USB Stick.

The adjustment may only be carried out with class 5.0 or purer nitrogen, otherwise the quality of the measurement results cannot be guaranteed.

3.4.   Resetting the Calibration Data

In case the zero-point adjustment was not performed in the right way you have the possibility to reset your TecPen. Therefore, you will need the original configuration file which is provided on the supplied USB Stick.

Connect the USB Stick with your computer

Open the USB Drive on your computer and find the "config.txt" file

Switch on the TecPen.

Use the USB cable to connect it to a computer.

Open the TecPen Drive on your computer

Drag and drop the "config.txt." file from the USB Stick to the TecPen Drive.

Eject the TecPen properly.

Switch off the TecPen.

Switch on the TecPen again.
The TecPen needs to be rebooted by switching off and on again after the resetting.

The TecPen is reset

Perform a Zero-point adjustment exactly according the manual

IMPORTANT! Before disconnecting the USB cable, the TecPen must be ejected properly to avoid damaging the file system.
If it is not properly ejected, all data still on the device will be irretrievably lost.

3.5.　　Cleaning Your Tecpen Fluid

The cleaning procedure is important if you use other fluids than water or carbonated water.

IMPORTANT: The cleaning procedure has to be done in the exact order as shown in the table below.

Rinsing	After you have done your measurements rinse the TecPen Fluid with 1L of normal water.
Washing solution	Use one or two drops of the commercial detergent in 1L of water. Mix it without producing foam. Rinse the TecPen with 1L of the washing solution.
Rinsing	After you have done your measurements rinse the TecPen Fluid with 1L of normal water.
Ethanol	500mL of a 40% Ethanol solution can be used to rinse the TecPen Fluid.
Rinsing	After you have done your measurements rinse the TecPen Fluid with 1L of normal water.

4.   Warranty

TecSense assumes the warranty for the proper functioning of this device, provided that it is connected and used properly and in accordance with the guidelines of the operating instructions. The warranty expires if the device is opened or manipulated without authorization!

The legal warranty period is 2 years according to §922 to §933 ABGB and §8 and §9 KSchG.

Faulty parts will be repaired or replaced free of charge if there is evidence of material or manufacturing faults in the event of a fault or defect.

We grant a guarantee of 1 year on the measuring accuracy of our sensor. After one year we recommend a maintenance of the sensor with which the sensor is subjected to a new calibration.

5.   Battery

LiPo batteries are used for the entire TecPen family. The duration per battery charge depends on how and under what circumstances the devices are used. Charge the battery using the supplied USB cable. Once the battery is fully charged, remove the battery from the charging cable.
Do not charge the battery longer than necessary (overnight). This may cause the charging capacity to decrease more quickly, the battery to overheat or become defective.

Should the charging capacity decrease unusually quickly within one year or with a maximum of 300 charge cycles (whichever is reached first) due to a production error, please contact TecSense.

6. Cleaning

Clean the device only as described in this manual. The outside of the unit can be cleaned with a fine soft cloth moistened with isopropanol.

Never immerse the device in water or other liquids. Do not expose your device to any radiation. Do not clean the device with an ultrasonic cleaner or dry it in a microwave oven. Do not fill with organic or other solvents, alcohol or cleaning agents, as they may damage the device.

7. Maintenance

7.1. Safety

Anyone using mobile gas detection equipment, either in gaseous or as dissolved gas, must receive training / information on their use by a qualified person with knowledge and experience in gas detection technology. Furthermore, such training/information must be documented.

TecSense GmbH does not assume any warranty or guarantee whatsoever if the device has been used for a purpose other than that for which it was intended or if it has not been used in accordance with this manual.

7.2. Local Regulations

The machine operator must find out about and heed country-specific statutory regulations on gas detection devices, and their operation and maintenance, which are not stipulated in the Operating Instructions.

This relates primarily to regulations concerning:

- Accident prevention
- Product safety
- Protection of personnel (protective equipment)
- Environmental protection
- Electrical systems

7.3.   Inspection Before Each Use

Before putting the device into operation, check the TecPen for visible defects.

Check both valve openings.

Check the status of the battery.

7.4.   Recommended Calibration

TecSense recommends maintenance with included calibration once a year. There is also the possibility of a maintenance contract. For further information please contact TecSense.

7.5.   Order Details

When ordering spare and wear parts, please indicate the following parameters in your order form:

- Model name of your device (TecPen Fluid)

- Serial number (in your manufacturer certificate or on the device, by pressing the SAVE button for 2 seconds)

- Exact designation of the spare or wear part (see section 2.3.2)

8.   Displayed Status Codes

Status codes   0   Normal operation

                      1   UART buffer overrun

                      2   Temperature sensor faults

                      4   SD card not recognized

IMPORTANT! If error codes 1, 2 or 4 appear, switch off the device, wait a few moments and then switch it back on.

If the same error message appears after switching it back on, contact the manufacturer immediately.

9. Scope Of Delivery

Amount	Name
1	TecPen Fluid
1	USB-cable
1	USB-Drive
1	User Guide
1	Certificate of calibration
2	Pneumatic hose 2m

10. Problem Finder List

	Problem	What to do
1	The Display shows **** after measurement	Value is above calibration range
2	The PWR lights do not light up after switching on	Does the display show the main screen? Yes: The LED light might be broken. No: Battery is empty? Display has an error.
3	The Display shows BATT	Battery is empty
4	The Display remains black after switching on	Charge the device and try to switch it on again
		Did you disconnect your device properly from the Computer the last time? Yes: The battery might be empty. No/ I don't know: Please contact TecSense.
	If your device is not working at all also after charging and proper disconnecting from your PC it might that there is a leak in the device. Contact TecSense for further information.	
6	The device is connected to the power supply but the BT light do not light up	If the device is switched off during connected to a power outlet, the BT light do not light up but the device is charged.
7	The device is connected to the Computer but I cannot find it	You have to switch on the device before connecting to the computer. (Manual) If the device is switched on you cannot find it either, please contact TecSense.
8	The measured value is not saved	Did you press the LOG button (Chapter 4.2)? Did you observe the LOG sign on the display? Yes: Please contact TecSense No: Read chapter 4.2
9	The log file shows a wrong date	Check screen 3, of the date and time on the device is

	The log file shows a wrong time	set.
10	The measured value varies between two measurements	Was the measurement in a room with a different temperature and did the device has time to acclimatize?
11	The device is not measuring	Is the display showing ***** (see 1. In Problem Finder List) Is the display showing MEAS? Yes: Check screen 4 if there is a value of amplitude (higher 0) No: Contact TecSense

11. Declaration Of Conformity

TecSense
unique solutions in sensor technology

CE, FCC and ISED — Conformity declaration

The producer: **TecSense GmbH**
Teslastraße 4
A - 8074 Grambach
Tel.: +43 (0)316 40 35 80

declares herewith that the following products:

Product notation: TecPen MAP/WELD/DOT/FIBER/FLUID – Optochemical Oxygen Sensors
Type designation: TecPen MAP/WELD/DOT/FIBER/FLUID
Serial number:
Year of manufacture: from 2017 ongoing

are in agreement with the regulations of the EG instruction (2014/30/EU) about the electromagnetic compatibility, are in agreement with directive 2014/53/EU Radio Equipment and directive 2011/65/EU RoHS, are in agreement with FCC class A and FFC class B and are in agreement with ISED regulations.

Following harmonised norms were applied:

ÖVE/ÖNORM EN 61326-1, FCC class A, FCC class B

The electromagnetic compatibility was tested by Seibersdorf Labor GmbH.

FCC, ISED, Radio Equipment and RoHS directives where tested at CAMPUS 02 Fachhochschule der Wirtschaft GmbH.

Name of the person responsible for this document: Dr. Johannes Krottmaier
Adress: identical with the address of manufacturer

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office@tecsense.com

Grambach / 17.08.2018 / Dr. Johannes Krottmaier, CEO TecSense
Location / Date / *Person*

12.   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.

13.   Warranty

The sensor comes with a 1-year warranty starting from the date it was shipped to the buyer. The TecPen sensor cap comes with a 90 day warranty. For more information visit our website: https://www.gaslab.com/pages/terms-conditions

14.   Contact Us

If the troubleshooting guide above does not help you solving your problem or for more information, please contact us using the information below.

Info@GasLab.com

(386) 872-7668 (M-F 9:00am–
5:00pm EST)

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unique solutions in sensor technology