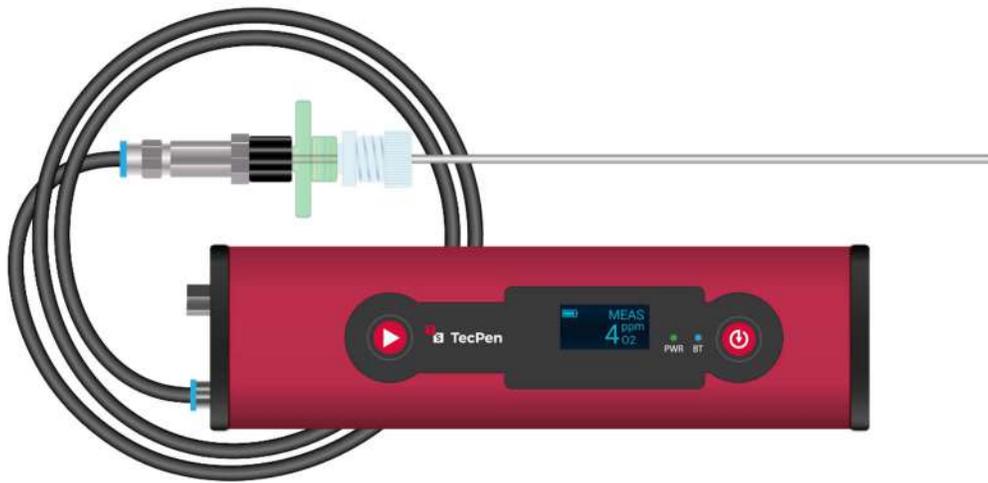


# TecWeld 0-2000ppm O2 Analyzer



## User Manual

Version 8

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# Quick Start Guide

To perform a measurement:

1. Acclimatize the device to the surrounding temperature (1-2 hours).



2. Press ON/OFF to switch on the TecPen.



3. The PWR LED will light up green.

4. The TecPen will indicate the battery status and oxygen level with \*\*\*\*%.

5. The TecPen will take 2 minutes to warm up.

6. Connect the gas lance to the gas lance adapter, then the filter, then the tubing, and connect the tubing to the TecPen using the hose adapter.

7. Insert the lance into the gas-filled space to be measured.



8. Press START.



9. The "MEAS" will appear on the display. The oxygen value, will change continuously during measurement.

10. If "\*\*\*\*\*" appears your measured value is outside the measuring range.



11. Once the measurement stops changing, press START again to stop the measurement.



12. Press SAVE to save the measured value. The saving process is indicated by "LOG" on the display. The value is stored in the internal memory.

13. Press ON/OFF again for 2 seconds to turn the TecPen off.

For additional settings and features refer to the sections in this manual.

# Introduction

The TecPen Weld Purge Monitor is designed to provide fast, accurate measurements of 0-2,000ppm oxygen content in air during welding. It uses an optochemical gas sensor with LED display as well as USB connectivity.

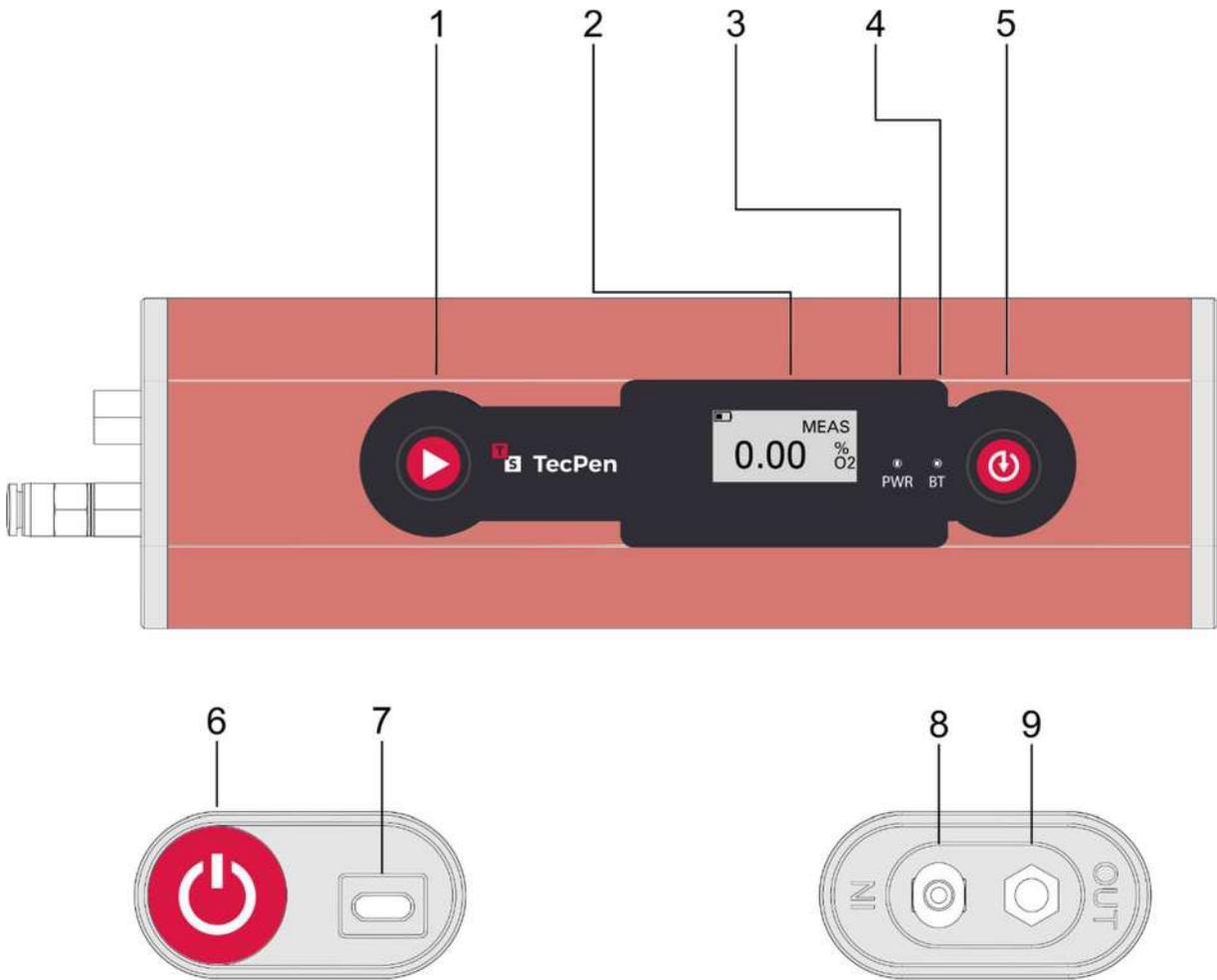
# Package Contents



Item	Description
1	TecPen
2	Intake Line / Pneumatic Hose 4mm
3	USB Stick
4	Particulate Filters (2)
5	USB Cable
6	Gas Lance
7	Gas Lance Adapter
8	Hose Adapter
	Calibration Certificate

**IMPORTANT!** The rating plate must not be removed or modified without the consent of CO2Meter, Inc. - Ensure that the rating plate remains legible.

# Layout & Controls



1. START Button – press to start and stop measurements
2. OLED Display
3. PWR (Power) LED – Lights when the TecPen is turned on
4. BT LED – Lights when charging if turned on
5. SAVE Memory Button – Press to save measurement
6. On/Off Button – press briefly to turn on, hold to turn off.
7. USB Port – Copy data log files to a PC
8. Sampling Gas Inlet for 4mm hose
9. Gas Outlet

# Operation

## Before You Begin

The TecPen can be charged with any 5V USB cable and adapter. Full charging takes place in under 2 hours. If the device is taken to a room with a significantly different ambient temperature, an acclimatization period of 1-2 hours is required.

Always use a filter to protect the sensor from particles inside the measuring area.

## Turning the TecPen On

Press the On/Off button on the end of the TecPen to turn on the unit. The TecPen shows the battery status and the oxygen level at \*\*\*\*. This is a placeholder and not an actual measurement result.

1. After turning it on let the TecPen warm up for 2 minutes to insure accuracy.
2. The TecPen can only be switched on when it is not connected to the charging cable.
3. If no buttons are pressed after five minutes, the TecPen will switch itself off.

## Selecting a New Configuration (optional)

Different product configurations called “recipes” can be selected if you are using multiple TecPens and need each to have a unique product name in the data file for statistical analysis. To select:

1. Press the SAVE button for two seconds.
2. A list of pre-set configurations appears on the screen.
3. Press the SAVE button to scroll down or the START button to scroll up through the list
4. Press the SAVE button for two seconds to select a new recipe
5. After selection, the screen automatically switches back to measurement mode.

## Taking a Measurement

1. Insert the gas lance into the gas-filled space to be measured.
2. Press the START button to take a continuous measurement.
3. The measured value is continuously updated on the display.
4. If \*\*\*\* is displayed the oxygen level is outside the measuring range. The display will always show \*\*\*\* if a measurement is taken in normal room air.

## Saving a Measurement

Press the SAVE button. The measured value currently on the display is saved in the TecPen's internal memory.

A separate file is created for each day on which a measurement is taken. This contains the measured values with a time stamp.

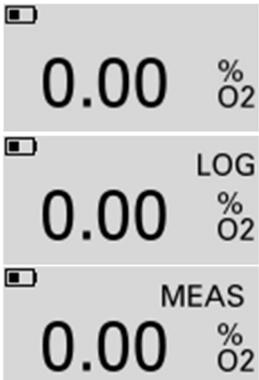
**IMPORTANT!** If you press and hold the SAVE button the display will switch to the menu display.

## Turning the TecPen Off

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

# Menu Display

Press and hold the memory SAVE button to bring up the menu display. It is not possible to switch between the screens in reverse order.

<p>Screen 1: main screen</p>		<p>battery level measured value</p> <p>Temporary Memory/Log Indicator</p> <p>Indicator for current measurement</p>
<p>Screen 2: Recipe settings</p>	<p>1234 Produktname 1234567891234</p>	<p>Consecutive / internal number product name, EAN code</p>
<p>Screen 3: Date &amp; time</p>	<p>2018-01-01 12:12:12</p>	<p>date time (24 hour clock) for data logs</p>
<p>Screen 4: Measurement data display</p>	<p>Ampl.[Isb]: 0 Tau[us]: 0.00 Temp.[°C]: + 0.0</p>	<p>Amplitude &amp; Tau (internal status codes) Current temperature</p>
<p>Screen 5: Device Information</p>	<p>Device info: TPV3DD20180 605IMTN001 Device state: 0</p>	<p>Device status codes</p>
<p>Screen 6: Zero Point Calibration</p>	<p>Recalibrate 0%? Yes / No</p>	<p>Select calibration start</p> <p><b>NOTE:</b> 100% Nitrogen only</p>

## Menu Options

In addition to the main screen the TecPen has 6 menu option screens that can be accessed by pressing and holding the memory SAVE button.

### Change Data File Format (Recipes)

1. Hold the SAVE button for 2 seconds to access the menu.
2. A list of preset product recipe/configurations will appear on the display.
3. Tap the SAVE button to scroll down or the START button to scroll up to select a recipe.
4. Press the SAVE button for 2 seconds to confirm and save the setting.

### Set Date and Time

1. Press SAVE for two seconds. Repeat this step until the date and time display appears.
2. Press START for two seconds.
3. The year will be underlined.
4. To scroll down or decrease number press SAVE
5. To scroll up or increase number press START
6. After setting the year, press START for two seconds.
7. The year is saved when the month is underlined.
8. Repeat steps 4-7 until everything is set.
9. Press SAVE for 2 seconds to save the settings.

### View Measurement Data Display

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

### View Device Status

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

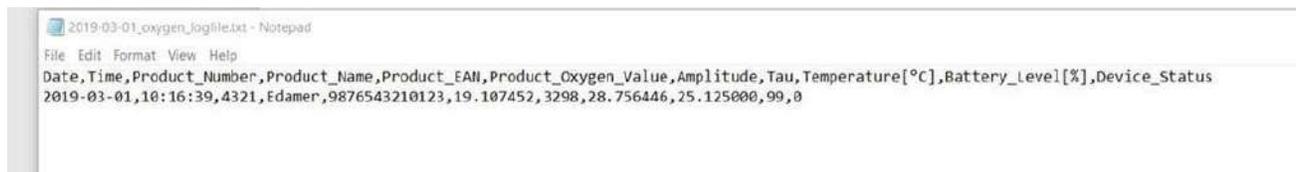
# Saving Data

## Default Operation

After each measurement is completed and the pump stops running, the currently displayed measured value can be stored in the internal memory of the TecPen by briefly pressing the SAVE button. By default, a new data file is created each day using the date as the file name and the measured oxygen level and a time stamp as data.

## Output Data File Format

The TecPen outputs a comma-delimited text file (.txt) with that can be imported into a spreadsheet program. The file name is YYYY-MM-DD\_oxygen\_logfile.txt. The data file format is as follows:



Data Label	Example
Date	2019-03-15 (YYYY-MM-DD format)
Time	14:33:30 (hours:minutes:seconds 24 hr. clock)
Product_Number	123456 (user defined)
Product_Name	NAME56789ABCD (user defined)
Product_EAN	0123456789ABC (user defined)
Product_Oxygen_Value	0.53472 (range 0-2,000ppm)
Amplitude	14016 (signal strength for error checking)
Tau	64.610248 (signal lifetime)
Temperature[°C]	25.187500 (Centigrade only)
Battery_Level[%]	86 (range 0-100%)
Device Status	0=Normal (see device status codes)

## Exporting Saved Data Files

1. Press the ON/OFF button to turn on the unit.
2. Connect the TecPen to a PC using the supplied USB cable.
3. The TecPen appears on your PC like a USB drive with one or more saved data files.
4. Copy the files from the TecPen using your PC's file manager.
5. Disconnect the TecPen properly before removing the USB device from your PC

## USB Data Safety

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 may be lost.

## Customizing the Data File Format

The Product\_Number, Product\_Name and Product\_EAN fields can be customized so that multiple TecPens can be used and all will have different names in the data files. All data files can be further customized by selecting different “recipes” from the menu.

To get started, you must have a file named exactly **Rezepte.csv** loaded on the TechPen’s internal memory card. The sample file may be modified, or you can create a new Rezepte.csv file in any spreadsheet program that can save a .csv file. For example:

	A	B	C
1	100ABC	Scanner1	12345
2	200DEF	Scanner2	67890

The 3 alpha-numeric fields (do not use commas) in the table will replace the Product\_Number, Product\_Name and Product\_EAN fields in your output data files. By default, the first row will be used. If you want to select a different recipe use the menu option before you begin collecting data.

## Zero Point Adjustment

The TecPen uses 100% 5.0 pure nitrogen gas for zero adjustment. To calibrate the TecPen, it must be first be purged of any remaining gas from previous use by running the pump for several seconds until the device is filled with pure nitrogen. Follow the steps below:

1. Connect the TecPen to pure nitrogen at 1L/min flow and perform 2 measurements to insure the device is completely devoid of oxygen.
2. Press and hold the START button, then press the SAVE button until the calibration screen appears.
3. A screen will appear with the text "Recalibration 0%?" followed by "NO".
4. Press SAVE to switch to "YES".
5. If "NO" is selected, the operation is aborted.
6. If "YES" is selected, let the unit calibrate for at least 5 minutes.
7. Hold the the SAVE button until the screen shows “recalibrated.” The oxygen level on the screen should now show 0.00%. If not, set the zero point again.

A video with these instructions is available at <https://www.youtube.com/watch?v=FYy08FOLNYc>

### **IMPORTANT!**

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

After zero point adjustment the original factory values are overwritten. If the adjustment has not been carried out incorrectly, the original factory values can be restored by following the instructions on this video

<https://www.youtube.com/watch?v=FYy08FOLNYc>

# Maintenance

## Cleaning

- The unit can be cleaned externally with 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.

## Battery

The TecPen uses LiPo batteries. The duration per battery charge depends on how and under what circumstances the device is 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, and the battery to overheat or become defective.

## ISO Certification

The instrument must be returned annually to the manufacturer for recalibration in order to satisfy continuing 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

## IMPORTANT

If error codes 1, 2, 4 or 5 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

If the TecPen displays error code 3 during operation turn off the device and contact CO2Meter immediately.

## Troubleshooting Guide

Problem	Solution
The display shows *** after measurement	Oxygen level is out of range, You cannot measure oxygen in fresh air (21%).
The PWR light does not come on after switching on	Does the display show the main screen? Yes: The LED light may be broken No: Recharge the battery
The display shows BATT or is black after switching on.	Recharge the battery and turn on.  Did you disconnect your device properly from the Computer the last time? Yes: The battery might be discharged. No/ I don't know: Please contact CO2Meter.
The TecPen is connected to the power supply but the BT light does not light up.	The BT light does not light up during charging if the device is turned off.
The TecPen is connected to a PC via USB but the PC cannot find it as a drive.	You must turn the TecPen on before connecting it to a PC.  If the device is switched on but you still cannot find it, check you have an available USB COM port.
The measured Oxygen value is not saved.	Did you press the LOG button? Did you observe LOG on the display? If yes for both, please contact us.
The log file shows an incorrect date or time	Check in the menu to see if the date and time are correct. Set the correct date and time.
The measured value varies between 2 measurements	If the temperature has changed, verify the TecPen has time to acclimatize.
The TecPen is not measuring anything	Please refer to the startup procedure.  Can you hear the pump? If not, contact us.  Is the display showing ****? The gas level is out of range.  Is the display showing MEAS? Check screen 4. If the amplitude value is greater than 0 contact us.

# Specifications

	<b>TecPen Weld O2</b>	
<b>Measurement range</b>	0-2,000ppm	
	Range	Accuracy
	0-500 ppm	±2% Mev**
	500-1000 ppm	±3% Mv*
	1000-2000ppm	±4% Mv*
<b>Resolution</b>	1 ppm	
<b>Response time at 25°C/ 77°F</b>	<15s	
<b>Pump flow max.</b>	400mL/min	
<b>Temp. range Min./Max</b>	-10°C/ +60°C	
	14°F/140°F	
<b>Medium</b>	Gas	
<b>Power supply</b>	5V USB and LiPo battery	
<b>Rechargeable battery lifetime</b>	> 3 hours per charge	
<b>Data Interface</b>	USB	
<b>Temperature compensation</b>	10-30°C	
	50-86°F	
<b>Display</b>	OLED Display	
<b>Cleaning housing</b>	No organic solvents. 40% EtOH	
<b>Parts touching sample</b>	St.1.4404 / PTFE / glass	
<b>Case</b>	aluminium anodized	
<b>Protection</b>	IP65	
<b>Full service interval by Manufacturer (includes necessary retrofitting)</b>	3 years	
<b>Life time of sensor cap (protective atmosphere under welding conditions; 0-60°C; with proper gas filtering)</b>	24 months	
<b>Sensor cap replacement interval</b>	2 years	
<b>Recommended zero-point adjustment interval by customer</b>	6 months	
<b>Warranty</b>	1 Year ex works	

\*\*Mev = measured end value

\*Mv = measured value

## 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 TecPen comes with a (1) one year warranty starting from the date it was shipped. For more information visit our website:

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

## Contact Us

We are here to help! For information or technical support, please contact us.

Sales@CO2Meter.com

(877) 678 - 4259

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