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# 1 Introduction

Thank you for purchasing this high quality METTLER TOLEDO portable meter. Everywhere you measure pH, conductivity or dissolved oxygen - the Seven2Go™ portables are designed to offer you fast quality data, one-handed operation and an investment that lasts. Whether you work in the laboratory, at-line or outdoors, the Seven2Go™ meters will provide you with high quality measurement everywhere you go. The Seven2Go™ offers many exciting features, including:

- Simple and intuitive menus that shorten steps needed for setting up measurements and calibration
- T-pad hard keys for comfortable and fast navigation
- Rubber side-guards for comfortable, one-handed operation
- IP67 rating for the entire measurement system, including meter, sensor and the connection cables
- Useful accessories such as the electrode clip, the meter base stabilizing unit, the wrist strap and the uGo™ carrying case with hermetically sealed interior for easy cleaning

## 2 Safety Measures

### 2.1 Definition of signal warnings and symbols

Safety notes are marked with signal words and warning symbols. These show safety issues and warnings. Ignoring the safety notes may lead to personal injury, damage to the instrument, malfunctions and false results.

#### Signal words

<b>WARNING</b>	for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
<b>CAUTION</b>	for a hazardous situation with low risk, resulting in damage to the device or the property or in loss of data, or minor or medium injuries if not avoided.
<b>Attention</b>	(no symbol) for important information about the product.
<b>Note</b>	(no symbol) for useful information about the product.

#### Warning symbols



General hazard



Toxic substance



Inflammable or explosive substance

### 2.2 Product specific safety notes

Your instrument represents state-of-the-art technology and complies with all recognized safety rules, however, certain hazards may arise in extraneous circumstances. Do not open the housing of the instrument; it does not contain any parts that can be maintained, repaired or replaced by the user. If you ever have problems with your instrument, contact your authorized METTLER TOLEDO dealer or service representative.

#### Intended use



This instrument is designed for a wide range of applications in various areas and is suitable for measuring pH (S2, S8), conductivity (S3, S7) or dissolved oxygen (S4, S9).

The use therefore requires knowledge and experience in working with toxic and caustic substances as well as knowledge and experience working with application-specific reagents, which may be toxic or hazardous.

The manufacturer shall not be held liable for any damage resulting from incorrect usage divergent to the operating instructions. Furthermore, the manufacturer's technical specifications and limits must be adhered to at all times and in no way exceeded.

#### Location



The instrument has been developed for indoor and outdoor operation and may not be used in explosive environments.

Use the instrument in a location which is suitable for the operation, protected from direct sunlight and corrosive gases. Avoid powerful vibrations, excessive temperature fluctuations and temperatures below 0 °C and above 40 °C.

## Protective Clothing

It is advisable to wear protective clothing in the laboratory when working with hazardous or toxic substances.



A lab coat should be worn.



Suitable eye protection such as goggles should be worn.



Use appropriate gloves when handling chemicals or hazardous substances, checking their integrity before use.

## Safety notes

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### WARNING

#### Chemicals

All relevant safety measures are to be observed when working with chemicals.

- a) Set up the instrument in a well-ventilated location.
  - b) Any spills should be wiped off immediately.
  - c) When using chemicals and solvents, comply with the instructions of the producer and the general lab safety rules.
- 



### WARNING

#### Flammable solvents

All relevant safety measures must be observed when working with flammable solvents and chemicals.

- a) Keep all sources of flame away from the workplace.
  - b) When using chemicals and solvents, comply with the instructions of the producer and the general lab safety rules.
-

**FCC Rules**

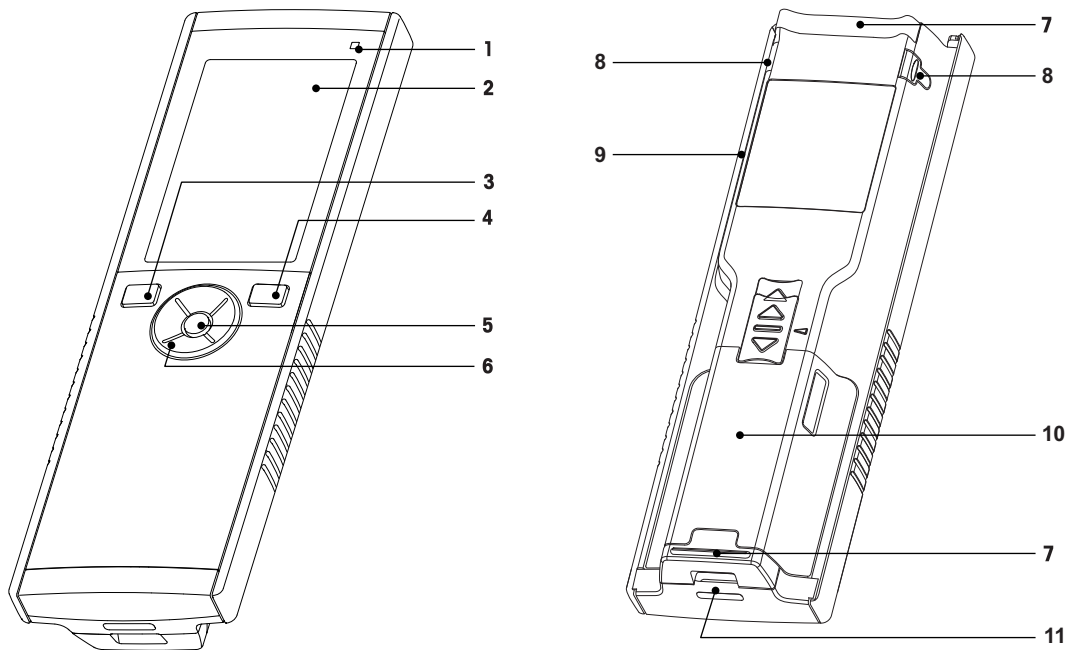
This device complies with Part 15 of the FCC Rules and Radio Interference Requirements of the Canadian Department of Communications. Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



### 3 Design and Function

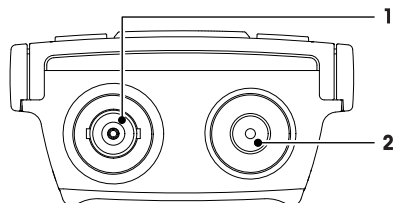
#### 3.1 Overview



- 1** Status LED (only Pro-series)
- 2** Display
- 3** Calibration key
- 4** On/Off key
- 5** Read key
- 6** T-Pad

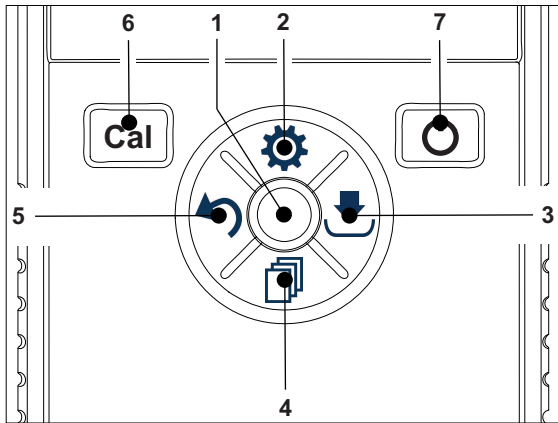
- 7** Rubber feet
- 8** Fixing points for electrode holder
- 9** Micro-USB port (only Pro-series)
- 10** Battery compartment
- 11** Slot for wrist strap

#### 3.2 Sensor connections



- 1** BNC socket for the current signal input
- 2** RCA (Cinch) socket for temperature input

### 3.3 T-Pad and hard keys

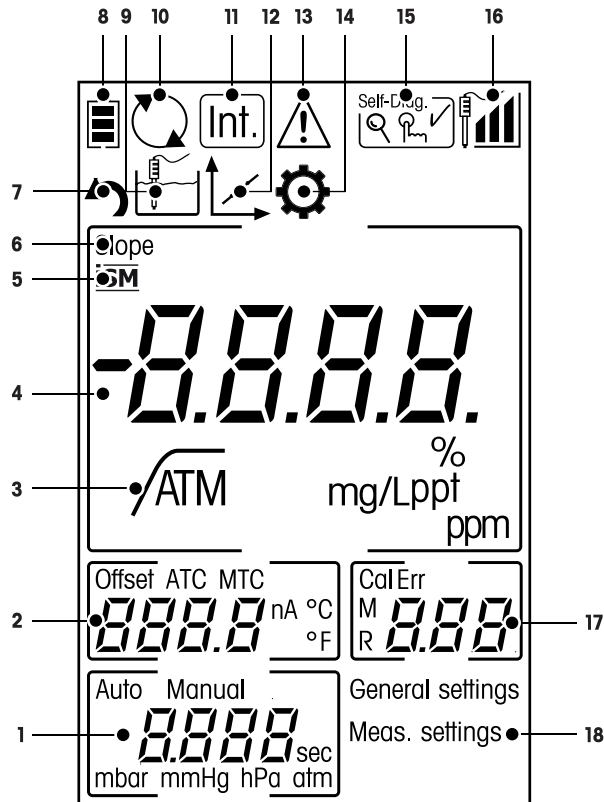


	Name	Function	Press (in measurement screen)	Press (other screens)
1	Read	Read/Take manual endpoint	•	
		Confirm		•
2	⚙️	Open Setup menu	•	
		Edit value (Increase)		•
3	⬇️	Save	•	
		Direction Right		•
4	📄	Switch measurement mode	•	
		Edit value (Decrease)		•
5	⬅️	Recall last measurement data	•	
		Exit		• • > 1 s (editing mode) • > 1 s to exit (calibration mode)
		Direction Left		•
6	Cal	Enter Calibration Mode	•	
		Calibration Recall	• > 1 s	
7	⏻	On/Off	• 1 s for on • 3 s for on	• 1 s for on • 3 s for on







### 3.4 Display and icons

When turning on the instrument, the startup screen appears for 3 seconds. The startup screen shows all icons which can appear on the display. In the following table you find a short description about these icons.

#### Startup screen





	Icon	Description
1	---	Measurement settings
2	---	Offset reading
3		Endpoint format $\sqrt{A}$ Automatic $\sqrt{T}$ Timed $\sqrt{M}$ Manual
4	---	Dissolved oxygen reading
5		ISM sensor is detected
6	SLOPE	Slope is one of two quality indicators for the attached sensor and is determined during calibration. Refer to the InLab® sensor's quality certificate for more information.
7		Recall mode
8		Power status fully charged, half-charged, lowly-charged fully discharged
8		Measurement mode
9		Hot power on (Never shut down automatically until power is used up or press shut down manually)

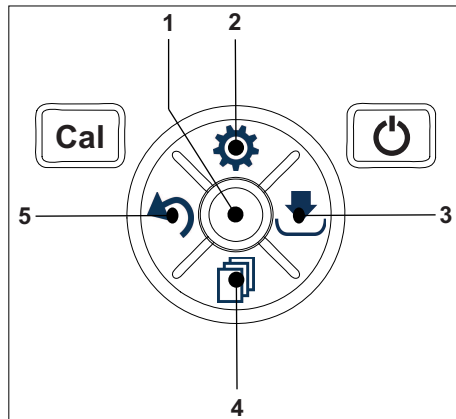
	Icon	Description
10	Int.	Interval reading is on
11		Calibration mode Indicates calibration mode and appears whenever you are performing a calibration or reviewing calibration data.
12		Error occurred
13		Setup mode
14	Self-Diag. 	Self-diagnosis mode  Self-diagnosis indicator ♀ Indication to press key ✓ Self-diagnosis passed
15		Electrode performance ▣ Slope: 80-125% (Electrode in good condition) ▣ Slope: 70-79% (Electrode needs cleaning) ▣ Slope: 60-69% (Electrode is faulty)
16	---	Memory indicator/calibration point
17	---	Main Menu structure





## 3.5 Setup menu

### 3.5.1 Navigation

For general navigation in the setup menu read the following information:

- Press  to enter the setup menu.
- Press and hold  to exit the setup menu.
- Press **Read** to confirm a change.
- Press and hold **Read** to exit the setup menu and return directly to the measurement screen from every position in the setup menu.



- 1 --- Read**
  - Read / save cal data
  - Confirm entered values
- 2  Setup / Up**
  - Enter the setup menu.
  - Move up in the menu structure.
  - Edit value (increase).
- 3  Save / Right**
  - Save measurement data.
  - Store last calibration point to end calibration.
  - Go right.
- 4  Mode / Down**
  - Change measurement mode.
  - Move down in the menu structure.
  - Edit value (decrease).
- 5  Recall / Left**
  - Recall data / recall the last step.
  - Go left.
  - For menu or data memory exit (press >1 s).


### 3.5.2 Menu structure

<b>1.</b>	<b>General Settings</b>
1.	<b>Temperature Settings</b>
1.1	<b>Set MTC Temperature</b>
2.	<b>Endpoint Formats</b>
2.1	<b>Automatic</b>
2.2	<b>Timed</b>
2.3	<b>Manual</b>
3.	<b>Enter Baro. Pressure</b>
3.1	<b>Automatic</b>
3.2	<b>Manual</b>
<b>2.</b>	<b>Measurement Settings</b>
1.	<b>Interval Readings</b>
2.	<b>Salinity</b>

### 3.6 Measurement modes

With the Seven2Go™ Polarographic DO it is possible to measure the following units of a sample:

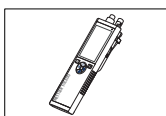
- ppm
- mg/L
- %

To change the unit, press  on the measurement screen until the desired appears.

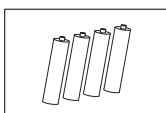
## 4 Putting into Operation

### 4.1 Scope of delivery

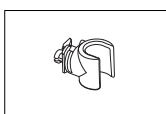
Check the completeness of the delivery. The following accessories are part of the standard equipment of your new instrument:



S4 instrument  
for dissolved oxygen (DO) measurement



Battery LR3/AA 1.5V  
4 pcs.

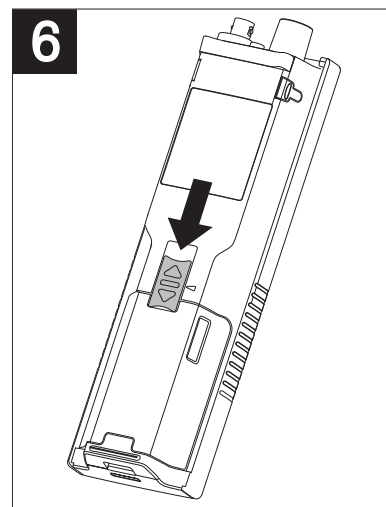
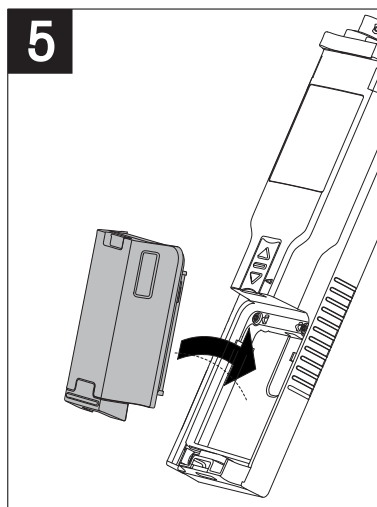
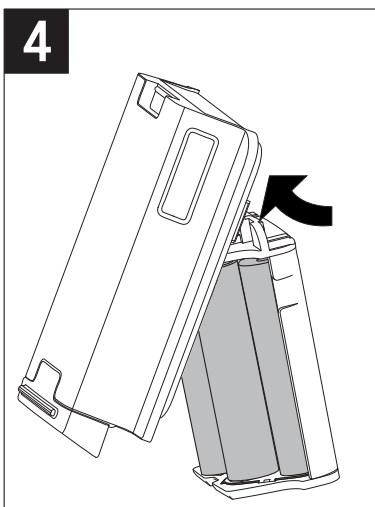
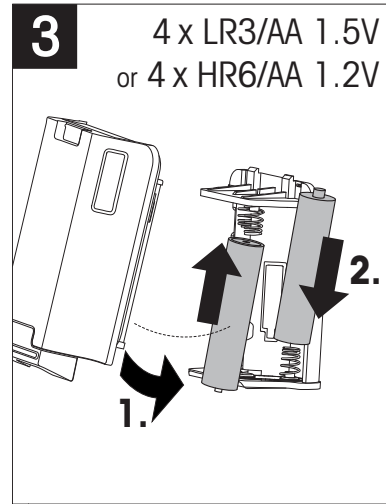
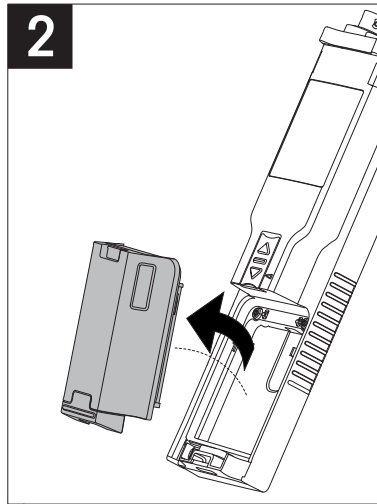
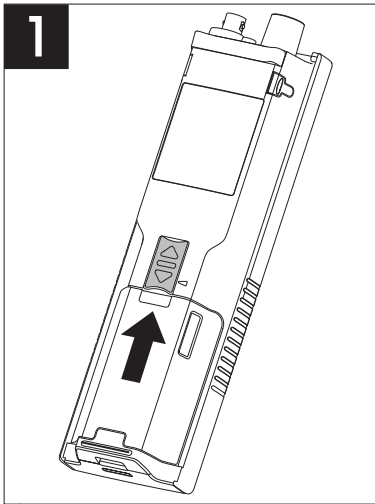


Electrode holder



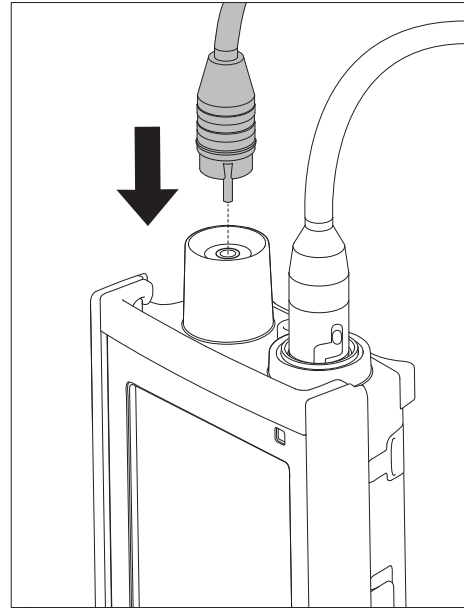
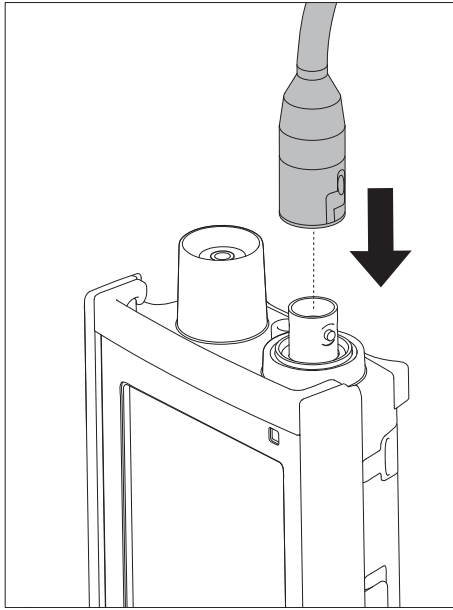
CD-ROM including operating instructions

## 4.2 Installing the batteries





## 4.3 Connecting sensors



### ISM® sensor

When connecting an ISM® sensor to the meter, one of the following conditions has to be met for the calibration data to be transferred automatically from the chip of the sensor into the meter and usage for further measurements. After attaching the ISM® sensor the following steps must be followed:

- Switch on the meter.
- Press **Read** key or press **Cal** key.

The icon **ISM** appears on the display. The sensor ID of the sensor chip is registered and appears on the display.

The calibration history and the sensor-data can be reviewed in the data menu.

### Note

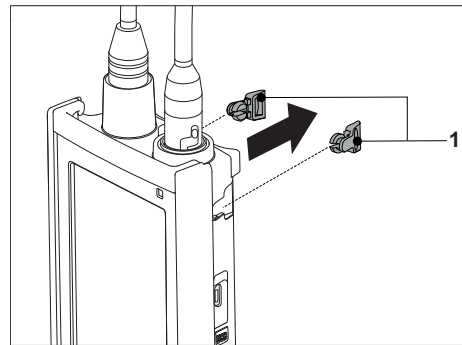
- We strongly recommend to switch off the meter when disconnecting an ISM sensor! In doing so, you make sure that the sensor is not removed while the instrument is reading data from or writing data to the ISM-chip of the sensor.

## 4.4 Installing optional equipment

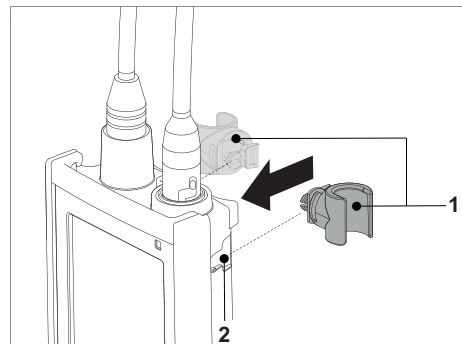
### 4.4.1 Electrode holder

For a safe placing of the electrode you can mount an electrode holder on the side of the instrument. The electrode holder is part of delivery. You can mount it on either sides of the instrument for your personal handling.

- 1 Remove the protective clips (1).



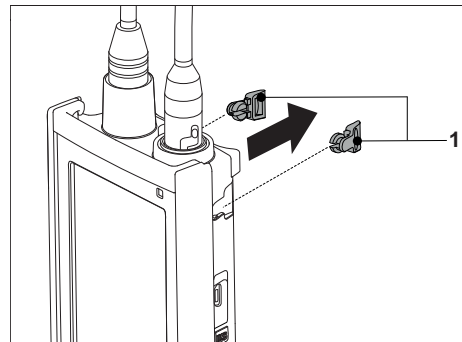
- 2 Push the electrode holder (1) into the recess (2) of the instrument.



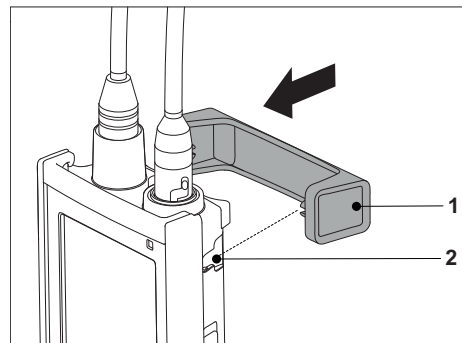
### 4.4.2 Meter base stabilizing unit

The meter base stabilizing unit should be mounted when using the instrument on a desk. It ensures a more firm and secure stand when pressing the keys.

- 1 Remove the protective clips (1).

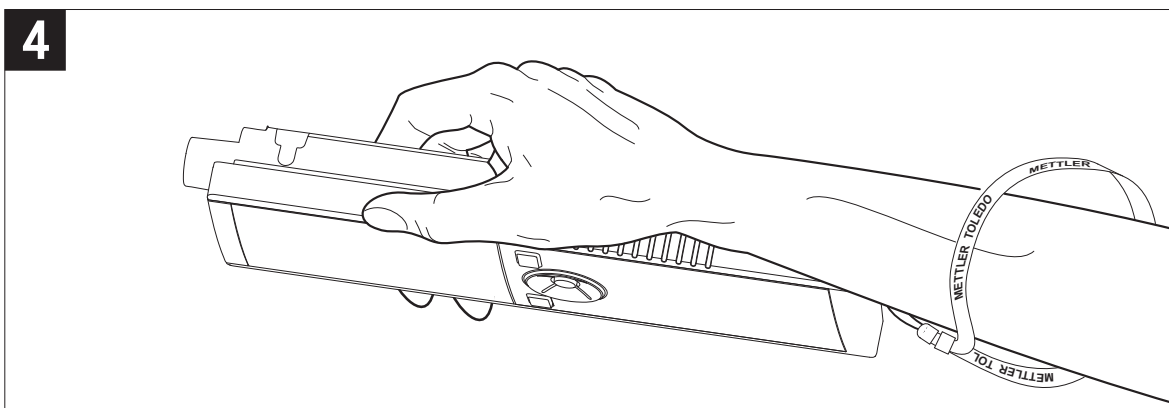
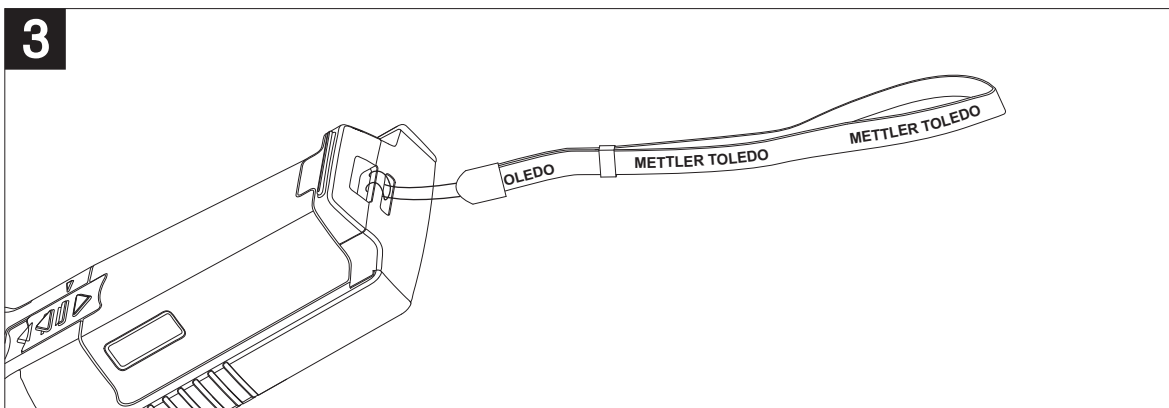
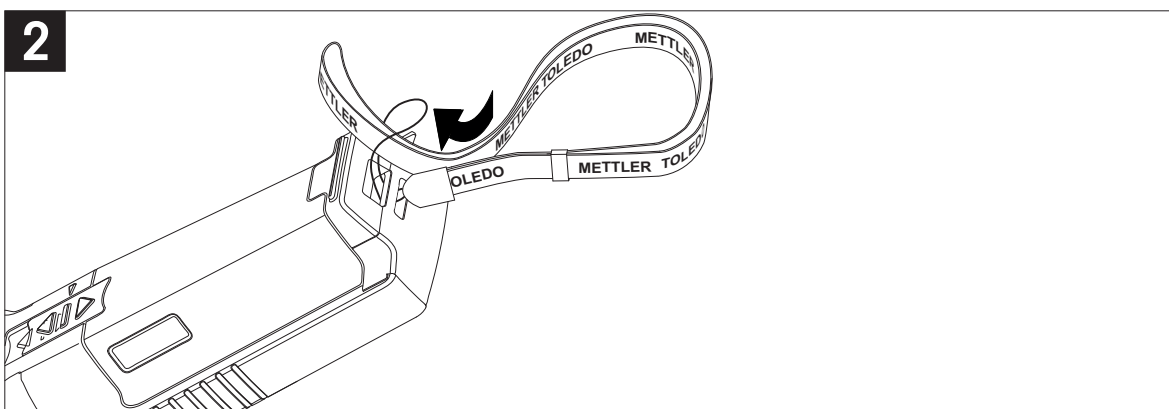
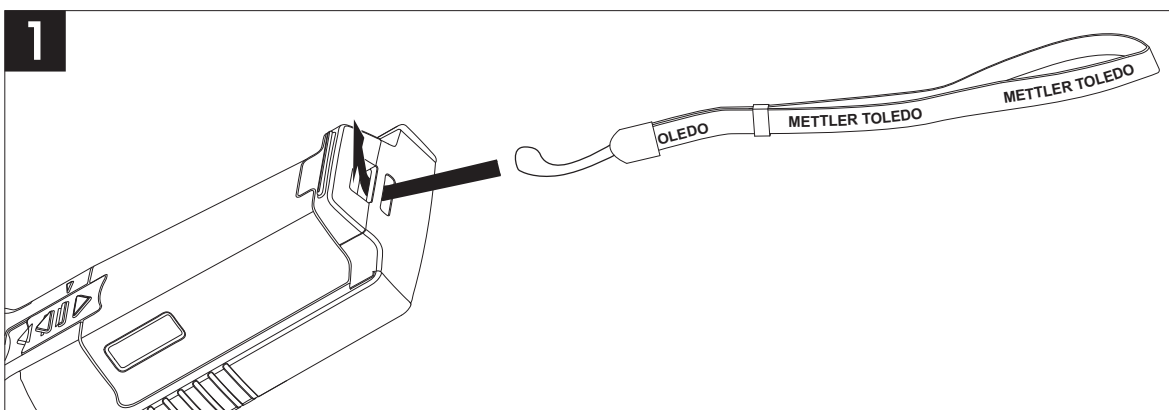


- 2 Push the meter base stabilizing unit (1) into the recesses (2) of the instrument.





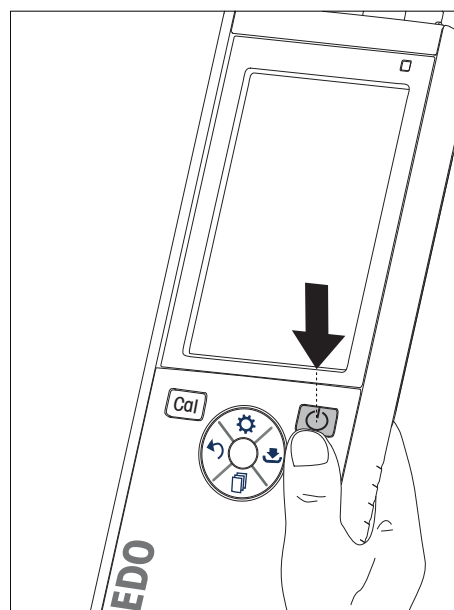
### 4.4.3 Wrist strap

For better protection against damage caused by dropping, you can mount the wrist strap as shown in the following diagrams.



## 4.5 Switching the instrument on and off

- 1 Press and release  to switch on the instrument.
  - ⇒ All segmented digital numbers and icons are displayed for 2 seconds. After that the installed software version appears (e.g. 1.00) and the instrument is ready for use.
- 2 Press  for 2 seconds and release to switch off the instrument.



### Note

- By default after 10 minutes not in use, the instrument shuts down automatically. The auto-off function can be turned on/off in the setup menu, under **General settings**.

### See also

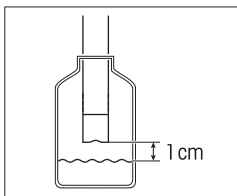
- Hot power on/off (page 25)

## 5 Operation of the instrument

### 5.1 Calibration

#### 5.1.1 Performing a 1-point calibration

- ▶ The sensor has to be connected to the meter for at least 6 hours (polarization time).
  - ▶ The membrane must be examined for damage or contamination. Rinse the sensor after using. If the membrane is dirty, clean carefully with a soft, moist cloth.
- 1 For calibration in vapor-saturated air (100% O<sub>2</sub>) place the sensor in a bottle 1 cm above the water surface as shown in the graphic.



- 2 Press **Cal**.
  - ⇒ The calibration icon and the measurement icon appear on the display.
- 3 The automatic endpoint **A** is the default setting of the meter. When the signal has stabilized, the display freezes automatically,  $\sqrt{A}$  appears and the measurement icon disappears.
  - or -
  - To manually endpoint a measurement, press **Read**. The display freezes and  $\sqrt{M}$  appears.
- 4 Press **Read** to accept the calibration and return to sample measurement.
- 5 Press **Exit** to reject the calibration.

#### 5.1.2 Performing a 2-point calibration

##### Note

While a 1-point calibration in vapor-saturated air suffices to calibrate the InLab® 605 sensors, it is also possible to perform a 2-point calibration if needed. To perform the second calibration, immerse the polarographic InLab® 605-ISM sensor in 0% oxygen solution, which can be created using tap water and METTLER TOLEDO zero-oxygen tablets (A/N: 51300140). Then, follow the same steps as described for the 1-point calibration.

##### See also








- Performing a 1-point calibration (page 21)

## 5.2 Sample measurement

### 5.2.1 General settings

#### 5.2.1.1 Temperature settings

You can choose between **Manual** (MTC) or **Automatic** (ATC) temperature compensation. To enter the MTC, follow these steps:

- 1 Press  to enter the setup menu.
- 2 Select **General Settings** and press **Read**.
- 3 Change the temperature by using  or .
- 4 Press **Read** to confirm.
- 5 Press  and choose the unit (**°C** or **F**) by using  or .
- 6 Press **Read** three times.
- 7 Press and hold  to exit the setup menu.

#### 5.2.1.2 Endpoint format

The Seven2Go™ offers three different endpoint formats:

**Automatic endpoint:**





With the automatic endpoint the selected stability criterion (fast, normal) determines the end of an individual reading depending on the behavior of the sensor used. This ensures an easy, quick, and precise measurement.

**Timed endpoint:**

The measurement stops after a user-defined period of time (5 s - 3600 s).









**Manual endpoint:**

Unlike Auto, user interaction is required to stop the measurement reading in manual mode. The three different endpoint formats can be selected in the General settings.

- 1 Press  to enter the setup menu.
- 2 Select **General Settings** and press **Read** twice.
- 3 Choose the endpoint format by using  or .
- 4 Press **Read** to confirm.
- 5 Press and hold  to exit the setup menu.

#### 5.2.1.3 Barometric Pressure Settings





As default, the S4 automatically compensates for pressure readings in the environment. To change this setting to manual barometric pressure compensation follow these steps:

- 1 Press  to enter the setup menu.
- 2 Select **General Settings** and press **Read** three times.
- 3 Choose between **Automatic** or **Manual** compensation by using  or .
- 4 Press **Read** to confirm  
-or-  
Press  to change the **Manual** barometric pressure.
- 5 Change the barometric pressure by using  or .
- 6 Press  to change the unit (mbar, mmHg, hPa, atm).
- 7 Press **Read** to confirm.
- 8 Press and hold  to exit the setup menu.

## 5.2.2 Measurement settings





### 5.2.2.1 Interval reading

A reading is taken every time after a certain interval (1 - 200 s) defined in the menu has elapsed. When working in the **Timed Interval Readings** mode, the interval can be defined by entering the seconds. The measurement series stops according to the selected endpoint format (**Automatic**, **Manual**, or **Timed**). When **Timed Interval Readings** is **On**,  $\text{int.}$  appears on the screen.

- 1 Press  to enter the setup menu.
- 2 Select **Measurement Settings** and press **Read**.
- 3 Choose interval time by using  or .
- 4 Press **Read** to confirm.
- 5 Press and hold  to exit the setup menu.

### 5.2.2.2 Salinity correction factor

The salinity correction factor defines the sample's salinity and can be entered manually. A salinity correction factor between 0.0 and 70.0 can be entered. To enter the Salinity correction factor follow these steps:

- 1 Press  to enter the setup menu.
- 2 Select **Measurement Settings** and press **Read** twice.
- 3 Enter the salinity correction factor by using  or .
- 4 Press **Read** to confirm.
- 5 Press and hold  to exit the setup menu.

#### See also

- Dissolved Oxygen in relation to temperature and salinity (page 32)

### 5.2.3 Performing a DO measurement

- ▶ A sensor is connected to the instrument.
  - ▶ The measurement parameters are fully set.
- 1 Place the sensor in the sample and press **Read** to start the measurement:
    - ⇒ The measurement icon appears on the display and the decimal point blinks. The display shows the value of the sample.
  - 2 The automatic endpoint **A** is the default setting of the meter. When the signal has stabilized, the display freezes automatically,  $\sqrt{A}$  appears and the measurement icon disappears.
    - or -
    - To manually endpoint a measurement, press **Read**.
    - ⇒ The display freezes and  $\sqrt{M}$  appears.


#### Note

- Press **Read** to switch between the automatic and manual endpoint modes.


## 5.3 Using the memory

### 5.3.1 Storing a measurement result

The Seven2Go™ can store up to 200 endpointed results.

- Press  when the measurement has endpointed.
  - ⇒ **M0001** indicates that one result has been stored, and **M2000** that the maximum of 200 results have been stored.




#### Note

- If you press  when **M2000** is displayed, **FUL** indicates that the memory is full. To store further data you will have to clear the memory.





#### See also

- Clearing the memory (page 24)

### 5.3.2 Recalling from memory


- 1 Press  to recall the stored values from memory when the current measurement has endpointed.
- 2 Press  or  to scroll through the stored results.
  - ⇒ **R0001** to **R2000** indicates which result is currently displayed.
- 3 Press **Read** to exit.

### 5.3.3 Clearing the memory



- 1 Press  to recall the stored values.
- 2 Press  or  to scroll through the stored results until **ALL** appears.
- 3 Press **Read**.
  - ⇒ **CLr** blinks on the display.
- 4 Press **Read** to confirm the deletion or long-press  to cancel.





## 5.4 Hot power on/off

Generally the instrument shuts down automatically after 10 minutes of not in use. This is for saving battery life. With **hot power on** you can deactivate this setting. If **hot power on** is active, the instrument will never power off until battery power is used up or the user presses  manually.

### Activate hot power on:

- Press  and **Read** simultaneously.
  - ⇒ **Hot power on** is activated,  appears on the display.




### Deactivate hot power on:

- Press  and **Read** simultaneously.
  - ⇒ **Hot power on** is deactivated,  disappears from the display.

### Note

On delivery and after doing a factory reset, the **hot power on** function is OFF.

## 5.5 Instrument self-test

- 1 Press **Read** and **Cal** simultaneously until  appears.
  - ⇒ First that each icon blinks one after the other whereby you can check if all icons are correctly shown on the display. After that, the full screen will be displayed.
  - ⇒ After that,  starts to blink and the 7 hardkey-icons are shown on the display.
- 2 Press any hardkey.
  - ⇒ The specific icon disappears from the display.
- 3 Press each hardkey one time.
  - ⇒ When the self-diagnosis is completed successfully, **PAS** and  appears. If the self-diagnosis is failed, **Err 1** appears.

### Note

- You must press all hardkeys within 2 minutes. Otherwise **Err 1** appears and the self-diagnosis has to be redone.




## 5.6 Factory reset



### Note

#### Loss of data!

With a factory reset all user-specific settings will be set to standard. Also all data memories (e.g. sample IDs, User IDs) will be deleted.

- ▶ The instrument is switched on.
- 1 Press **Read** and  simultaneously.
  - ⇒ **RST** appears on the display.
- 2 Press .
  - ⇒ The instrument switches off.
  - ⇒ All settings are reset.
- 3 Press  to switch on the instrument.

## 6 Maintenance

### 6.1 Electrode maintenance

When used in water applications, the sensor is designed to require minimal service. However in some case it can be necessary to recalibrate the sensor or to change the electrolyte or the membrane.

### 6.2 Error messages

<b>Error 0</b>	Error to access memory	<ul style="list-style-type: none"> <li>• Switch Seven2Go off and on again.</li> <li>• If this error persists, call METTLER TOLEDO Service.</li> </ul>
<b>Error 1</b>	Self-diagnosis failed: Not all key presses recognized within 2 minutes	<ul style="list-style-type: none"> <li>• Repeat the self-diagnosis procedure and make sure that you finish pressing all seven keys within two minutes.</li> <li>• If the error appears again, call METTLER TOLEDO Service.</li> </ul>
<b>Error 2</b>	Oxygen concentration or saturation reading is outside specified range (see technical data in chapter 9)	<ul style="list-style-type: none"> <li>• Make sure that the sensor's green protection cap has been removed.</li> <li>• Make sure the sensor placed in the sample solution.</li> <li>• Check the calibration data. If needed, re-calibrate the sensor.</li> <li>• Check if the sensor is properly connected. Neither the electrode plug nor the instrument's connector must be oxidized.</li> <li>• Verify that all pins of the sensor cable plugs are straight (not bent).</li> <li>• To exclude a problem with the meter, disconnect the sensor and measure oxygen concentration; it must be 0.00 mg/L.</li> <li>• Check if the sensor is well maintained as described in its operating instructions.</li> </ul>
<b>Error 3</b>	Measured temperature during calibration is outside range 0...+60 °C	<ul style="list-style-type: none"> <li>• Keep the calibration standard temperature within the range for calibration.</li> <li>• To check the temperature reading, perform a measurement in air at room temperature and verify correct reading.</li> </ul>
<b>Error 4</b>	Calculated offset value after calibration is outside range -2...+2 mV	<ul style="list-style-type: none"> <li>• Make sure the sensor is properly connected to the meter.</li> <li>• Make sure the sensor placed in the zero oxygen solution.</li> <li>• Check if the sensor is well maintained as described in its operating instructions.</li> <li>• Clean or replace the sensor.</li> </ul>
<b>Error 5</b>	Calculated slope value after calibration is outside range 60...125%	<ul style="list-style-type: none"> <li>• Make sure the sensor is properly connected to the meter.</li> <li>• Make sure no water droplets are on the sensor's tip.</li> <li>• Check if the sensor is well maintained as described in its operating instructions.</li> <li>• Clean or replace the sensor.</li> </ul>

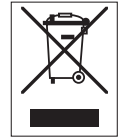
<b>Error 9</b>	Measurement data cannot be stored twice	<ul style="list-style-type: none"> <li>• Measured value has already been stored.</li> </ul>
<b>Error 10</b>	Memory is full	<ul style="list-style-type: none"> <li>• Already 200 results have been saved.</li> <li>• Delete some results or clear the memory.</li> </ul>

### 6.3 Disposal

In conformance with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions, please contact the responsible authority or the distributor from which you purchased this device. Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.



## 7 Product Portfolio

Meter and Kits	Order No.
Seven2Go™ polarographic DO meter S4 ONLY	30207958
S4-Standard Kit Seven2Go™ polarographic DO meter S4-Standard Kit with InLab® 605-ISM	30207959
S4-Field Kit Seven2Go™ polarographic DO meter S4-Field Kit with InLab® 605-ISM and uGo™ carrying case	30207960

## 8 Accessories

<b>Parts</b>	<b>Order No.</b>
uGo™ carrying case	30122300
Seven2Go™ meter benchtop stabilizing base	30122303
Seven2Go™ electrode clip and electrode clip covers (4 pcs.)	30137805
Seven2Go™ wrist strap	30122304
InLab®605-ISM O <sub>2</sub> sensor (2m)	51340291
InLab®605-ISM O <sub>2</sub> sensor (10m)	51340292
InLab®605 membrane kit (3 pcs. & electrolyte, 25 mL)	51340293
InLab®605 electrolyte (25 mL)	51340294
InLab®605 sealing kit	51340295
InLab®605 calibration bottle	51340296
uPlace electrode arm	30019823
<b>Solutions</b>	<b>Order No.</b>
Zero oxygen solutions standard tablets (20 pcs.)	51300140

## 9 Technical data

### Measurement

<b>Parameters</b>	Dissolved oxygen (polarographic)	
<b>Sensor inputs</b>	DO	BNC ( $> 10^{12} \Omega$ )
	Temperature	RCA cinch
<b>Dissolved Oxygen</b>	Measuring range	0.00...99.9 mg/L (ppm)
	Display Resolution	0.01
	Accuracy (with sensor)	$\pm 0.2$ mg/L 0...15 mg/L $\pm 10\%$ 15...60 mg/L
	Units	mg/L, ppm
<b>DO Saturation</b>	Measuring range	0.0...600%
	Resolution	0.1
	Accuracy (with sensor)	$\pm 10\%$
<b>Pressure</b>	Measuring range	500...1100 mbar
	Resolution	1
	Limits of error	$\pm 2\%$
	Pressure units	mbar, hPa, mmHg, Atm
	Automatic/Manual pressure compensation	Yes
<b>Temperature</b>	Measuring range	0...60 °C
	Resolution	0.1
	Accuracy	$\pm 0.2$
	ATC/MTC	Yes
<b>Calibration</b>	Calibration points	2
	Predefined oxygen standards	2
<b>Date security/storage</b>	ISM® (light version)	Yes
	Memory size	200

### General

<b>Power requirements</b>	Batteries	4 x LR6/AA 1.5 V Alkaline - or - 4 x HR6/AA 1.3 V NiMH rechargeable
	Battery life	250...400 h
<b>Dimensions</b>	Height	222 mm
	Width	70 mm
	Depth	35 mm
	Weight	270 g
<b>Display</b>	LCD	Segmented LCD, b/w
<b>Ambient conditions</b>	Operating temperature	0...40°C
	Relative humidity	5%...85% (non-condensing) at 31 °C, linearly descending to 50% at 40 °C
	Overvoltage category	Class II
	Pollution degree	2
	Maximum operating altitude	Up to 2000 m
	Range of application	For indoor and outdoor use
<b>Materials</b>	Housing	ABS/PC reinforced
	Window	Polymethyl methacrylate (PMMA)
	IP Protection class	IP67

## 10 Appendix

### 10.1 Algorithm for oxygen concentration measurement

The (reading in ppm or mg/L) is given by the following equation:

$$c = \frac{I - I_0}{S_L} \cdot \frac{[c_s(p_n) - (\text{Sal} \cdot F(T))]}{X_{O_2} \cdot (p_n - p_w)}$$

I	Converted sensor current during measurement
I <sub>0</sub>	Sensor residual current (assumed to be zero)
c	O <sub>2</sub> concentration (ppm or mg/L)
c <sub>s</sub>	O <sub>2</sub> solubility in water (mg/L) at p <sub>n</sub> , (see section 8.3)
p <sub>n</sub>	Standard pressure (1013 mbar)
p <sub>w</sub>	Water vapor pressure at calibration temperature (mbar)
X <sub>O<sub>2</sub></sub>	Molar ratio of O <sub>2</sub> in calibration gas (in air equal to 0.2095)
S <sub>L</sub>	Sensor slope (pA/mbar)
Sal	Salinity of measuring solution (g/kg)
F(T)	Temperature-dependant salinity correction factor (see "Solubility of oxygen in water as a function of temperature and salinity")

To calculate the saturation [%], the term

$$[c_s(p_n) - (\text{Sal} \cdot F(T))]$$

is replaced by 100%

S<sub>L</sub> the sensor slope is determined in the calibration using the following equation:

$$S_L = \frac{(I_{\text{cal}} - I_0)}{X_{O_2} \cdot [p_{\text{cal}} - (rH \cdot p_w)]}$$

S <sub>L</sub>	Sensor slope (pA/mbar)
I <sub>cal</sub>	Converted sensor current during calibration
I <sub>0</sub>	Sensor residual current (assumed to be zero)
X <sub>O<sub>2</sub></sub>	Molar ratio of O <sub>2</sub> in calibration gas (in air equal to 0.2095)
p <sub>cal</sub>	Pressure of calibration gas (air pressure, in mbar)
rH	Relative humidity of calibration gas
p <sub>w</sub>	Water vapor pressure at calibration temperature (mbar)

## 10.2 Dissolved Oxygen in relation to temperature and salinity

The solubility of oxygen in water changes with temperature, the DO content reducing sharply with increase in temperature.

Table according to EN 25814 and UNESCO (partly extrapolated)

Temperature T [°C]	O <sub>2</sub> solubility [mg/L]	Salinity correction factor F(T) [mg/L]
0	14.62	0.0875
1	14.22	0.0843
2	13.83	0.0818
3	13.46	0.0789
4	13.11	0.0760
5	12.77	0.0739
6	12.45	0.0714
7	12.14	0.0693
8	11.84	0.0671
9	11.56	0.0650
10	11.29	0.0632
11	11.03	0.0614
12	10.78	0.0593
13	10.54	0.0582
14	10.31	0.0561
15	10.08	0.0545
16	9.87	0.0532
17	9.66	0.0514
18	9.47	0.0500
19	9.28	0.0489
20	9.09	0.0475
21	8.91	0.0464
22	8.74	0.0453
23	8.58	0.0443
24	8.42	0.0432
25	8.26	0.0421
26	8.11	0.0407
27	7.97	0.0400
28	7.83	0.0389
29	7.69	0.0382
30	7.56	0.0371
31	7.43	0.0365
32	7.30	0.0353
33	7.18	0.0345
34	7.06	0.0339
35	6.95	0.0331
36	6.83	0.0323
37	6.72	0.0316
38	6.61	0.0309
39	6.51	0.0302
40	6.41	0.0296
41	6.32	0.0289
42	6.23	0.0283
43	6.14	0.0277
44	6.05	0.0272



<b>Temperature T [°C]</b>	<b>O<sub>2</sub> solubility [mg/L]</b>	<b>Salinity correction factor F(T) [mg/L]</b>
45	5.96	0.0266
46	5.88	0.0261
47	5.79	0.0256
48	5.71	0.0251
49	5.63	0.0247
50	5.55	0.0242
51	5.47	0.0238
52	5.39	0.0234
53	5.31	0.0231
54	5.24	0.0228
55	5.16	0.0225
56	5.08	0.0222
57	5.00	0.0220
58	4.91	0.0218
59	4.83	0.0216
60	4.74	0.0215





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