STARTER 3000C
Bench Conductivity Meter
Instruction Manual

Table of Contents

1 Introduction

Thank you for purchasing this high quality OHAUS meter. Please read the manual completely before using the STARTER 3000C portable conductivity meter to avoid incorrect operation.

The STARTER 3000C has an excellent price/performance ratio and are designed with many useful features. You will find much helpful functionality in the meter. A few of the many existing features are:

- White backlit liquid crystal screen which make the display more clearly
- Auto/manual endpoint which could help users freeze the stable reading value
- The flexible standalone electrode holder
- Ohaus' renowned user friendly software

1.1 Safety measures

Measures for your protection

- Never work in an environment subject to explosion hazards! The housing of the instrument is not gas tight (explosion hazard due to spark formation, corrosion caused by the ingress of gases)

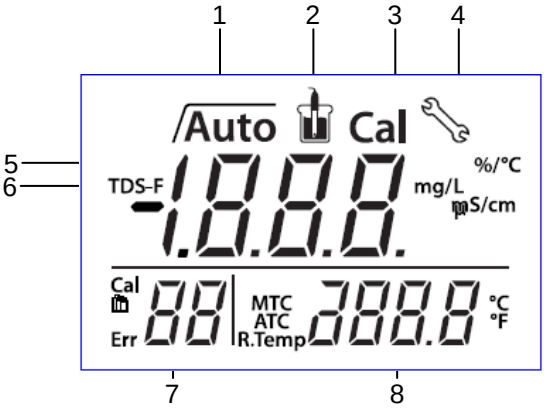
- When using chemicals and solvents, comply with the instructions of the producer and the general lab safety rules

Measures for operational safety

- Do not unscrew the two halves of the housing
- Dry off any liquid spills immediately! The instrument is not watertight
- Exclude the following environmental influences:
  - Powerful vibrations
  - Direct sunlight
  - Atmospheric humidity greater than 80%
  - Corrosive gases present
  - Temperatures below 5 °C and above 40 °C
  - Powerful electric or magnetic fields

1.2 Display and controls

Displays



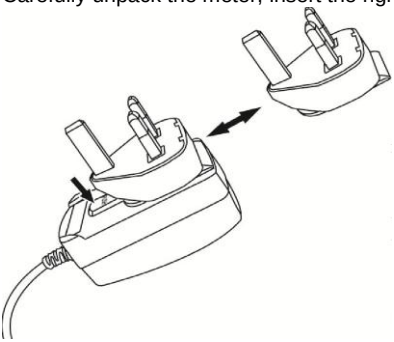
1 Endpoint stability / Auto endpoint
2 Measurement icon - measurement or calibration is running
3 Calibration icon - calibration in progress
4 Setup icon - instrument is in the setup mode
5 TDS factor in the setup mode
6 Conductivity / TDS / Cell Constant
7 Standard / Error index **Err**
8 Temperature during measurement or reference temperature in setup mode

Controls

Button	Press & release	Press & hold for 3 seconds
Read	- Start or endpoint measurement - Confirm setting, store entered value	- Turn auto endpoint on / off Auto,
Cal	- Start calibration	- Review the latest calibration data
⏻	- Meter on - Back to measurement screen	- Meter off
∧	- Increase value during setting	
∨	- Decrease value during setting	
Mode	- Switch between conductivity and TDS measuring modes	- Enter setup mode
Cal + Read	- Start self-diagnosis	

2 Installation

Carefully unpack the meter, insert the right adapter clip into the power adapter slot.



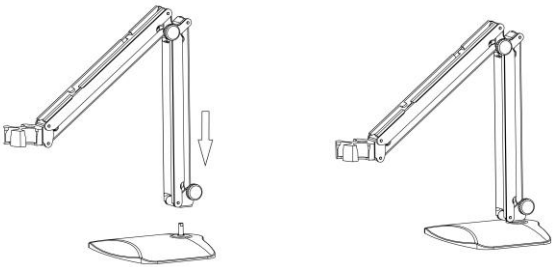
2.1 Package contents

The model ST3000C has the following items

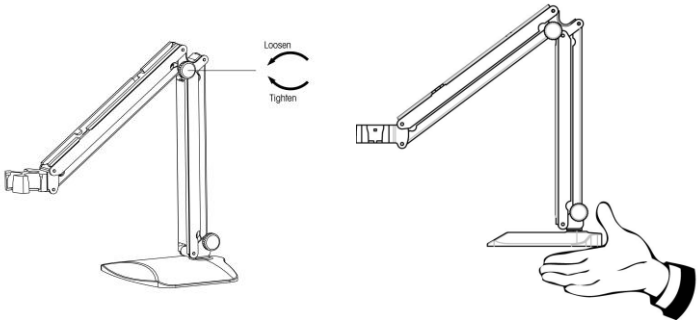
ST3000C	**Units**
STARTER 3000C meter	1
Standalone electrode holder	1
1413 µS/cm standard solution	1 bottle (about 20ml)
12.88 mS/cm standard solution	1 bottle (about 20ml)
STCON3	1

2.2 Installing the electrode arm

Install the electrode holder on the base.



Adjust the tension knob as required.



To move the standalone electrode holder, please take the base of the holder.

3 STARTER 3000C operation

3.1 Calibration

3.1.1 Selecting a standard

When using the STARTER 3000C conductivity meter, you have to select a standard for calibration.

Press and hold the **Mode** until the setup icon appears on the display and the current standard blinks. Use **up** or **down** buttons to select another standard and press **Read** to confirm your selection. Press **on/off** to leave the setup mode.

The three predefined standards are:

84 µS/cm	1413 µS/cm	12.88 mS/cm

Tables for automatic temperature compensation are programmed in the meter for each standard (see also appendix).

3.1.2 Performing a calibration

Place the conductivity sensor in the defined calibration standard and press **Cal**.

The calibration icon **Cal** and the measurement icon appear on the display. The measurement icon is blinking during calibration measurement. The meter endpoints according to the preselected endpoint mode after the signal has stabilized or after pressing **Read**.

When the calibration is finished, the standard value is displayed and stored; the measurement icon blinks 3 times and disappears. Then, the endpoint stability and auto endpoint icons **Auto** blink 3 times and freeze on the display. If the calibration was endpointed manually, then only endpoint stability icon blinks 3 times and freezes on the display.

To finish the calibration and return to the sample measurement, press **Read**. The cell constant is then shown on the display for 3 seconds.

To reject the calibration, press **on/off** before the meter automatically returns to the measurement screen.

Note:

To ensure the most accurate conductivity readings, you should verify your cell constant with a standard solution once a day and recalibrate if necessary. Always use fresh standards.

3.2 Sample measurement

Place the conductivity sensor in the sample and press **Read** to start the measurement. The measurement icon appears on the display. The measurement icon is blinking during measurement and the display shows the conductivity of the sample. The automatic endpoint Auto is the default setting of the meter. When the signal has stabilized, the sample reading freezes, the measurement icon blinks 3 times and disappears. Then, the endpoint stability and auto endpoint icons Auto blink 3 times and freeze on the display.

By pressing and holding **Read**, you can switch between the auto and manual endpoint modes. To manually endpoint a measurement, press **Read**: the sample reading freezes, the measurement icon blinks 3 times and disappears. Then, the endpoint stability icon blinks 3 times and freezes on the display.

Stability criterion for conductivity measurement: The sensor input signal of the meter may not change by more than 0.4% from the measured average conductivity of the probe in 6 seconds.

4 Setup

4.1 Set temperature correction coefficient

Press and hold **Mode** until the setup icon appears on the display and the current standard blinks. Press **Read** to ignore standard setting; the meter changes to the α-coefficient setting automatically. Use **up** or **down** buttons to increase or decrease the temperature correction value. Press **Read** to confirm your setting. Continue with temperature unit setting or press **on/off** to go back to the measurement screen.

4.2 Set temperature unit

After confirming the temperature correction coefficient, the temperature unit appears on the display. Use **up** or **down** buttons to switch between °C and °F. Press **Read** to confirm your selection. Continue with reference temperature setting or press **on/off** to go back to the measurement screen. Note: °C = 5/9 (°F -32)

4.3 Set reference temperature

After confirming the temperature unit, the reference temperature appears on the display. Use **up** or **down** buttons to switch between 25 °C and 20 °C (77°F and 68°F). Press **Read** to confirm your selection. Continue with TDS factor setting or press **on/off** to go back to the measurement screen.

4.4 Set TDS factor

After selecting the reference temperature, the current TDS factor blinks. Use **up** or **down** buttons to increase or decrease the value. Press **Read** to confirm your setting. The meter will exit automatically to the measurement screen.

5 Maintenance

5.1 Error message

Error 0	Memory access error	Reset to factory settings
Error 1	Self-diagnosis failed	Repeat the self-diagnosis procedure and make sure that you finish pressing all five keys within two minutes.
Error 2	Measured values out of range	Make if the electrode is properly connected and placed in the sample solution
Error 3	Measured standard temperature out of range (5 ... 35 °C)	Keep the standard temperature within the range for calibration
Error 4	Measuring temperature out of range (0 ... 100 °C)	Check if the electrode is properly connected and keep the sample temperature within the range

5.2 Meter maintenance

Never unscrew the two halves of the housing!
The STARTER 3000C meter does not require any maintenance other than occasional wipe with a damp cloth.
The housing is made of acrylonitrile butadiene styrene (ABS). This material is attacked by some organic solvents, such as toluene, xylene and methyl ethyl ketone (MEK). Any spillage should be immediately wiped off.

5.3 Self diagnosis

Press and hold **Read** and **Cal** simultaneously until the meter displays the full screen. Each icon blinks one after the other. This way you may check whether all icons are correctly shown. The next step is to check that the keys are functioning correctly. This requires user interaction.

When **b** blinks, five icons are displayed. Press the 6 keys in any order. Each time you press a key an icon disappears from the screen, continue to press the other keys until all the icons have disappeared.

When the self-diagnosis has been completed successfully, **PAS** appears. If self-diagnosis fails, error message **Err 1** appears .

Note:
You have to finish pressing all five keys within two minutes, otherwise **Err 1** appears and you will have to repeat the procedure.

6 Specifications

	STARTER 3000C
Measuring range	0.0 µS/cm…199.9 mS/cm 0.1 mg/l…199.9 g/l (TDS) 0 °C…100 °C
Resolution	Automatic range 0.1 °C
Error limits	± 0.5 % of the measured value ± 0.3 °C

Calibration	1 point 3 predefined standards
Power supply	9 V DC, 100-240 V/50Hz
Size/weight	Approximately 160 W x 200 D x 60 H mm / 0.65 kg
Display	White backlit Liquid crystal
Input	Mini-Din
Temperature-compensation	Linear: 0.00 %/°C…10.00 %/°C Reference temperature: 20 & 25 °C
Housing	ABS

7 Appendix

7.1 Conductivity standards

T(°C)	84 µS/cm	1413 µS/cm	12.88 mS/cm
5	53 µS/cm	896 µS/cm	8.22 mS/cm
10	60 µS/cm	1020 µS/cm	9.33 mS/cm
15	68 µS/cm	1147 µS/cm	10.48 mS/cm
20	76 µS/cm	1278 µS/cm	11.67 mS/cm
25	84 µS/cm	1413 µS/cm	12.88 mS/cm
30	92 µS/cm	1552 µS/cm	14.12 mS/cm
35	101 µS/cm	1667 µS/cm	15.39 mS/cm

7.2 Examples of temperature coefficients (α-value)

Substance at 25 °C	**Concentration [%]**	**Temperature coefficient α [%/°C]**
HCl	10	1.56
KCl	10	1.88
CH3COOH	10	1.69
NaCl	10	2.14
H2SO4	10	1.28
HF	1.5	7.20

α-coefficients of conductivity standards for a calculation to reference temperature of 25°C

Standard	**Measurement temp.: 15°C**	**Measurement temp.: 20°C**	**Measurement temp.: 30°C**	**Measurement temp.: 35°C**
84 µS/cm	1.95	1.95	1.95	2.01
1413 µS/cm	1.94	1.94	1.94	1.99
12.88 mS/cm	1.90	1.89	1.91	1.95

7.3 Conductivity to TDS conversion factors

Conductivity	**TDS KCl**		**TDS NaCl**	
At 25 °C	ppm value	Factor	ppm value	Factor
84 µS	40.38	0.5048	38.04	0.4755
447 µS	225.6	0.5047	215.5	0.4822
1413 µS	744.7	0.527	702.1	0.4969
1500 µS	757.1	0.5047	737.1	0.4914
8974 µS	5101	0.5685	4487	0.5000
12.88 µS	7447	0.5782	7230	0.5613
15 µS	8759	0.5839	8532	0.5688
80 mS	52.168	0.6521	48.384	0.6048

7.4 Error Limits

Message	Description	Range not accepted
Err 2	Measured values out of range	C: > 199.9 mS/cm TDS: < 0.1 mg/L or > 199.9 g/L SAL: > 19.99 psu
Err 3	Calibration standard temperature out of range	T: < 5 °C or > 35 °C
Err 4	Temperature out of range	T: < 0 °C or > 100 °C

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