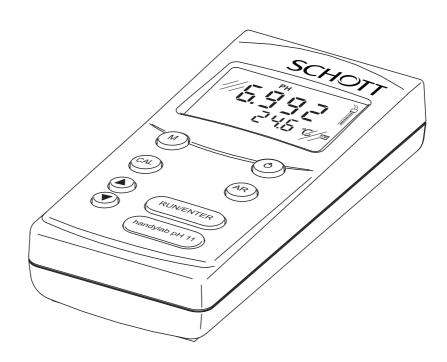


handylab pH 11



pH Meter

Accuracy when going to press

The use of advanced technology and the high quality standard of our instruments are the result of continuous development. This may result in differences between this operating manual and your instrument. Also, we cannot guarantee that there are absolutely no errors in this manual. Therefore, we are sure you will understand that we cannot accept any legal claims resulting from the data, figures or descriptions.

Warranty

We guarantee the instrument described for 3 years from the date of purchase.

The instrument warranty covers manufacturing faults that are discovered within the warranty period. The warranty does not cover components that are replaced during maintenance work, e.g. batteries.

The warranty claim extends to restoring the instrument to readiness for use but not, however, to any further claim for damages. Improper handling or unauthorized opening of the instrument invalidates any warranty claim.

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handylab pH 11 List of contents

handylab pH 11 - List of contents

1	Ove	erview	5
	1.1	Keypad	6
	1.2	Display	7
	1.3	Jack field	7
	1.4	Technical Data	8
2	Safe	ety	11
	2.1	Authorized use	11
	2.2	General safety instructions	12
3	Con	mmissioning	13
	3.1	Scope of delivery	13
4	Оре	eration	15
	4.1	Switching on the measuring instrument	15
	4.2	Measuring	
		4.2.1 General information	
		4.2.2 Measuring the pH value	
	4.3	4.2.3 Measuring the ORP voltage	
	4.3	Calibrating	
		4.3.2 AutoCal DIN	
		4.3.3 ConCal	
	4.4	Configuration	32
	4.5	Reset	34
5	Mai	ntenance, cleaning, disposal	35
	5.1	Maintenance	35
	5.2	Cleaning	36
	5.3	Disposal	36
6	Wha	at to do if	37
7	Lict		11

List of contents handylab pH 11

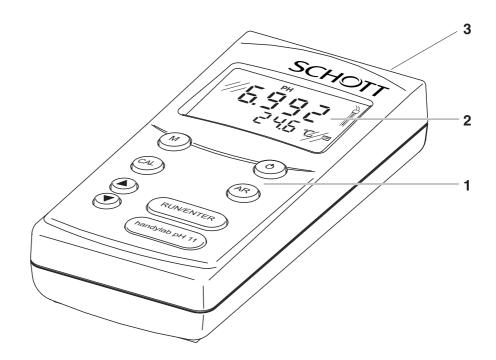
handylab pH 11 Overview

1 Overview

The compact precision handheld meter handylab pH 11 enables you to carry out pH measurements rapidly and reliably.

The handylab pH 11 provides the maximum degree of operating comfort, reliability and measuring certainty for all applications.

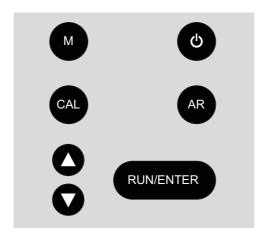
The proven calibration procedures and the special *AutoRead* function support you in your work with the handylab pH 11.



1	Keypad
2	Sample display
3	Jack field

Overview handylab pH 11

1.1 Keypad

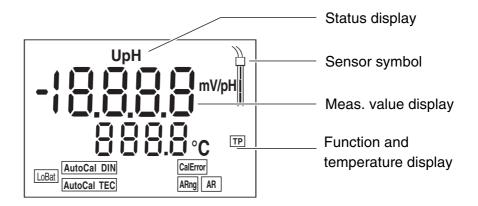


Key functions

M	Select the measuring mode < M >: - pH value - ORP voltage
(b)	Switch measuring instrument on/off <on off=""></on>
CAL	Calibration of the current measured variable <cal></cal>
AR	Activate/deactivate the AutoRead function <ar></ar>
•	Select the measuring mode Increase values, scroll <a>
•	Select the measuring mode Decrease values, scroll <▼>
RUN/ENTER	Confirm entries, start AutoRead <run enter=""></run>

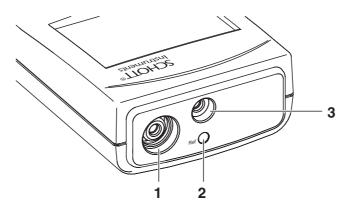
handylab pH 11 Overview

1.2 Display



1.3 Jack field

The meter has either a DIN socket or a BNC socket. The figure shows a meter with DIN socket (1).



pH electrode or single-rod measuring electrode
 Reference electrode
 Temperature probe



Caution

Only connect electrodes to the measuring instrument that cannot return any voltages or currents that are not allowed

(> SELV and > current circuit with current limiting).

Nearly all electrodes - especially SI Analytics electrodes - fulfill these conditions.

Overview handylab pH 11

1.4 Technical Data

Dime	nsions
and	weight

Length [mm]	172
Width [mm]	80
Height [mm]	37
Weight [kg]	Approx. 0.3

Mechanical structure

Type of protection IP 66

Electrical safety

Protective class III

Test certificates

cETLus, CE

Ambient conditions

Storage	- 25 °C + 65 °C
Operation	-10 °C + 55 °C
Relative atmospheric humidity	< 90 % of annual average

pH/ORP measuring ranges

	Measuring range	Resolution
pH	- 2.000 + 19.999	0.001
	- 2.00 + 19.99	0.01
U [mV]	- 999.9 + 999.9	0.1
	- 1999 + 1999	1
T [°C]	- 5.0 + 105.0	0.1

Precision of pH/ORP (± 1 digit)

pH (± 2 pH units from the calibration point)	± 0.005 at + ± 0.01	- 15 °C + 35 °C
U [mV]	[mV] ± 0.3 at + 15 °C + 35 °C ± 1	
T [°C]	NTC 30: Accuracy	± 0.1
	PT 1000: Accuracy ± 0.5 ± 0.1	Operating temperature 0 °C 15 °C 15 °C 35 °C 35 °C 55 °C

handylab pH 11 Overview

Correction	Temperature input	
function	Manually [°C]	- 20 + 130
Power supply	Batteries	4 x 1.5 V alkali-manganese batteries, Type AA
	Operational life	Approx. 5000 operating hours
Applicable guidelines and norms	EMC	EC guideline 2004/108/EC EN 61326-1 EN 61000-3-2 EN 61000-3-3 FCC Class A
	Instrument safety	EC guideline 2006/95/EC EN 61010-1 ANSI/UL 61010-1 CAN/CSA-C22.2 No. 61010-1
	Climatic class	VDI/VDE 3540
	Type of protection	EN 60529

FCC Class A Equipment Statement

Note: 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.

Overview handylab pH 11

handylab pH 11 Safety

2 Safety

This operating manual contains basic instructions that you must follow during the commissioning, operation and maintenance of the pH meter. Consequently, all responsible personnel must read this operating manual before working with the measuring system. The operating manual must always be available within the vicinity of the measuring system.

Target group

The measuring instrument was developed for work in the field and in the laboratory.

We assume that, as a result of their professional training and experience, the operators will know the necessary safety precautions to take when handling chemicals.

Safety instructions

The individual chapters of this operating manual use safety instructions such as the label shown below to indicate various hazards or dangers:



Caution

indicates instructions that must be followed precisely in order to avoid the possibility of slight injuries or damage to the instrument or the environment.

Further notes



Note

indicates notes that draw your attention to special features.



Note

indicates cross-references to other documents, e.g. operating manuals.

2.1 Authorized use

The authorized use of the measuring instrument consists exclusively of the pH and ORP measurement in the field and laboratory.

The technical specifications as given in section 1.4 TECHNICAL DATA must be observed. Only the operation and running of the measuring instrument according to the instructions given in this operating manual is authorized. Any other use is considered to be **unauthorized**.

Safety handylab pH 11

2.2 General safety instructions

This instrument is built and inspected according to the relevant guidelines and norms for electronic measuring instruments (see section 1.4 TECHNICAL DATA).

It left the factory in a safe and secure technical condition.

Function and operating safety

The smooth functioning and operational safety of the measuring instrument can only be guaranteed if the generally applicable safety measures and the specific safety instructions in this operating manual are followed during operation.

The smooth functioning and operational safety of the measuring instrument can only be guaranteed under the environmental conditions that are specified in section 1.4 TECHNICAL DATA.

If the instrument was transported from a cold environment to a warm environment, the formation of condensate can lead to the faulty functioning of the instrument. In this event, wait until the temperature of the instrument reaches room temperature before putting the instrument back into operation.

Safe operation

If safe operation is no longer possible, the instrument must be taken out of service and secured against inadvertent operation! Safe operation is no longer possible if the measuring instrument:

- has been damaged in transport
- has been stored under adverse conditions for a lengthy period of time
- is visibly damaged
- no longer operates as described in this manual.

If you are in any doubt, please contact the supplier of the instrument.

Obligations of the purchaser

The purchaser of the measuring instrument must ensure that the following laws and guidelines are observed when using dangerous substances:

- EEC directives for protective labor legislation
- National protective labor legislation
- Safety regulations
- Safety datasheets of the chemical manufacturers.

handylab pH 11 Commissioning

3 Commissioning

3.1 Scope of delivery

- Handheld meter, handylab pH 11
- Operating manual and short operating manual
- 4 batteries, 1.5 V Mignon type AA (in the instrument)

Commissioning handylab pH 11

4 Operation

4.1 Switching on the measuring instrument

1 Press the **<ON/OFF>** key.

The display test appears briefly on the display. Subsequently, the slope and asymmetry used appear for approx. one second one after the other. In addition, the calibration procedure of the last calibration is shown (*AutoCal TEC* or *AutoCal DIN* or no display in the delivery state or following initialization).

The measuring instrument then automatically switches to the measuring mode that was last selected.



Note

The measuring instrument has an energy saving feature to avoid unnecessary battery depletion. The energy saving feature switches the measuring instrument off if no key has been pressed for an hour. The energy saving feature is not active when the AutoStore function is active.

4.2 Measuring

4.2.1 General information

You can measure the following variables:

- pH value
- ORP voltage

Preparatory activities

Perform the following preparatory activities when you want to measure:

1	Connect the electrode to the measuring instrument.
2	Adjust the temperature of the buffer solutions or test solutions, or measure the current temperature, if you measure without a temperature sensor.
3	In conjunction with the electrode, check or calibrate the measuring instument. How to calibrate is described in section 4.3.
4	Select the measuring mode with <m>.</m>



Note

Incorrect calibration of pH electrodes leads to incorrect measured values. Calibrate regularly before measuring.

Temperature sensor

You can measure with or without a temperature sensor. If a temperature sensor is connected, it is indicated on the display by *TP*.



Note

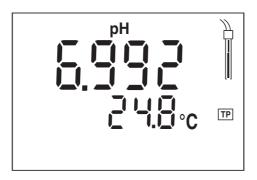
The measuring instrument automatically recognizes the type of the temperature sensor used. Therefore, you can connect temperature sensors of the NTC30 or Pt1000 type.

The temperature measurement is absolutely essential for a reproducible pH measurement. If the measurement is made without a temperature sensor, proceed as follows:

- 1 Measure the current temperature of the test sample using a thermometer.
- 2 Enter the temperature on the instrument: Set the temperature value of the test sample using <▲ > <▼>.

4.2.2 Measuring the pH value

1	Perform the preparatory activities according to section 4.2.1.
2	Immerse the pH electrode in the test sample.
3	Press the <m></m> key until <i>pH</i> appears on the status display. The pH value appears on the display.



Setting the resolution

The measuring instrument shows the pH value with a resolution of 0.01 or 0.001. (Default setting is 0.01). To change the resolution, press the **<M>** key while pressing the **<RUN/ENTER>** key.

AutoRead (drift control)

The AutoRead function (drift control) checks the stability of the measurement signal. The stability has a considerable impact on the reproducibility of the measured values.

For identical measurement conditions, the following criteria apply:

Reproducibility	Response time
Better than 0.02	> 30 seconds

1	Call up the pH measuring mode with <m></m> and <a> <▼> .
2	Activate the AutoRead function with <ar></ar> . The current measured value is frozen (hold function).
3	Start AutoRead with <run enter=""></run> . AR flashes until a stable measured value is reached. This measured value is transmitted to the interface.
4	If necessary, start the next AutoRead measurement with <run enter="">.</run>
5	To terminate the AutoRead function: Press the <ar></ar> key.



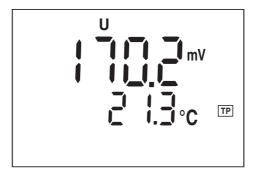
Note

The current AutoRead measurement can be terminated at any time (accepting the current value) by pressing **<RUN/ENTER>**.

4.2.3 Measuring the ORP voltage

In conjunction with an ORP electrode, e.g. BlueLine 31Rx, the measuring instrument can measure the ORP voltage (U) of a solution.

- Perform the preparatory activities according to section 4.2.1.
 Immerse the ORP electrode in the test sample.
 Press the <M> key until U appears on the status display.
- 3 Press the <M> key until U appears on the status display. The ORP voltage (mV) of the test sample appears on the display.
- 4 Wait for a stable measured value.





Note

ORP electrodes are not calibrated. However, you can check ORP electrodes using a test solution.

4.3 Calibrating

Why calibrate?

pH electrodes age. This changes the asymmetry (zero point) and slope of the pH electrode. As a result, an inexact measured value is displayed. Calibration determines the current values of the asymmetry and slope of the electrode and stores them in the measuring instrument.

Thus, you should calibrate at regular intervals.

When to calibrate?

- After connecting another electrode
- after a voltage interruption, e. g. after changing the batteries

You can select between 3 calibration procedures:

termines the asymmetry of the electrode.

AutoCal TEC

is specially adapted to the SI Analytics technical buffer solutions as a fully automatic **two-point** or **three-point calibration**. The buffer solutions are automatically recognized by the measuring instrument. Depending on the instrument setting (see section 4.4 CONFIGURATION), the instrument displays the relevant buffer nominal value or the current electrode voltage in mV. The calibration can be terminated after the first buffer solution. This corresponds to a **single-point calibration**. For this, the instrument uses the Nernst slope (-59.2 mV/pH at 25 °C) and determines the asymmetry of the electrode.

AutoCal DIN

is specially adapted to the permanently programmed buffer solutions in accordance with DIN19266 as a fully automatic **two-point** or **three-point calibration**. The buffer solutions are automatically recognized by the measuring instrument. Depending on the instrument setting (see section 4.4 Configuration), the instrument displays the relevant buffer nominal value or the current electrode voltage in mV. The calibration can be terminated after the first buffer solution. This corresponds to a **single-point calibration**. For this, the instrument uses the Nernst slope (-59.2 mV/pH at 25 °C) and de-

ConCal

This function is a conventional **two-point calibration** using two buffer solutions (pH 7.0 ± 0.5 and any other buffer solution) or a **single-point calibration** using any buffer solution and is used as a high-speed method.

AutoRead

When calibrating with AutoCal TEC and AutoCal DIN, the *AutoRead* function is automatically activated.

The current AutoRead measurement can be terminated at any time (accepting the current value) by pressing **<RUN/ENTER>**.

Displaying calibration data

Each time the instrument is switched on, the calibration data are shown on the display for a short time (see section 4.1 SWITCHING ON THE MEASURING INSTRUMENT). In order to view the calibration data, switch the measuring instrument off and switch it on again.

Calibration evaluation

After the calibration, the measuring instrument automatically evaluates the current status of the electrode. The asymmetry and slope are evaluated separately. The worst evaluation appears on the display.

Display	Asymmetry [mV]	Slope [mV/pH]
	-15 +15	-60.558
	-20 +20	-5857
	-25 +25	-6160.5 or -5756
	-30 +30	-6261 or -5650
Clean the electrode according to the electrode operating manual		
Eliminate the error according to chapter 6 WHAT TO DO IF	< -30 or > 30	< -62 or > -50

Preparatory activities

1	Switch on the measuring instrument with <on off=""></on> .
2	Connect the pH electrode to the measuring instrument.
3	Keep the buffer solutions ready.
4	Adjust the temperature of the solutions and measure the current temperature if the measurement is made without temperature sensor.

4.3.1 AutoCal TEC

For this procedure, use any two or three technical buffer solutions in ascending or descending order

(pH values at 25 °C: 2.00 / 4.01 / 7.00 / 10.01).



Note

The calibration for pH 10.01 is optimized for the SI Analytics technical buffer solution pH 10.01. Other buffer solutions can lead to an erroneous calibration. The correct buffer solutions are given in the SI Analytics catalog or in the Internet.



Note

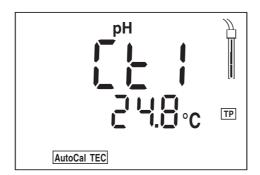
The buffer solutions are automatically recognized by the measuring instrument. Depending on the instrument setting (see section 4.4 CONFIGURATION), the instrument displays the relevant buffer nominal value or the current electrode voltage in mV.



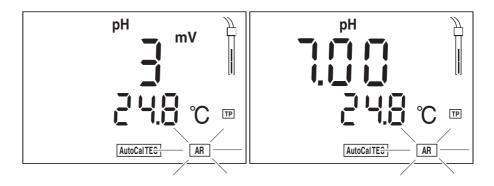
Note

Skip the steps 2, 7 and 14 if you use a temperature sensor.

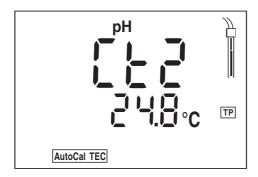
Press the **<CAL>** key repeatedly until the *Ct1* display indicator and the function display *AutoCal TEC* appears. The sensor symbol displays the evaluation of the last calibration (or no sensor symbol in the delivery state or after the measurement parameter has been reset).



- If necessary, enter the temperature of the first buffer solution with $<\Delta><\nabla>$.
- 3 Immerse the pH electrode in the first buffer solution.
- 4 Press the <RUN/ENTER> key.
 The AR display indicator flashes.
 The electrode voltage (mV) or the buffer nominal value appears on the display. Example:



5 When the measured value is stable, *Ct2* appears.

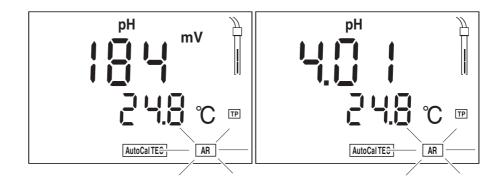




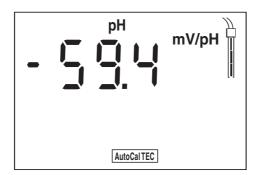
Note

At this point, the AutoCal TEC calibration can be terminated with <M>. This corresponds to a **single-point calibration**. For this, the instrument uses the Nernst slope (-59.2 mV/pH at 25 °C) and determines the asymmetry of the electrode.

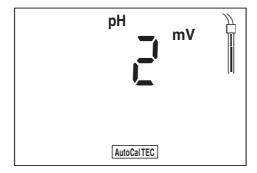
To continue the two-point calibration, thoroughly rinse the electrode with deionized water.
If necessary, enter the temperature of the second buffer solution with <▲> <▼>.
Immerse the pH electrode in the second buffer solution.
Press the <RUN/ENTER> key.
The AR display indicator flashes.
The electrode voltage (mV) or the buffer nominal value appears on the display. Example:



When the measured value is stable, *AR* disappears. The instrument displays the value of the slope (mV/pH) and the evaluation of the calibration in calibration range I.



11 Press the **<RUN/ENTER>** key. The instrument displays the value of the asymmetry in calibration range I.





Note

At this point, the AutoCal TEC calibration can be terminated with <M>. This corresponds to a **two-point calibration**.

The instrument uses the slope and asymmetry of the calibration range I.

Three-point calibration

12	Press the <run enter=""> key to continue the three-point calibration. Ct3 appears on the display.</run>
13	Thoroughly rinse the electrode with distilled water.
14	If necessary, enter the temperature of the third buffer solution with $<\Delta><\nabla>$.
15	Immerse the pH electrode in the third buffer solution.
16	Press the <run enter=""> key. The AR display indicator flashes. The electrode voltage (mV) or the buffer nominal value appears on the display. When the measured value is stable, AR disappears. The instrument displays the value of the slope (mV/pH) and the evaluation of the calibration in calibration range II.</run>
17	Press the <run enter=""></run> key. The instrument displays the value of the asymmetry in calibration range II. The three-point calibration is completed.
18	To return to the measuring mode: Press the <m></m> key.



Note

You can prematurely terminate the three-point calibration by pressing **<M>**. The values of the two-point calibration for slope and asymmetry will then remain stored.

4.3.2 AutoCal DIN

For this procedure, use two or three different standard buffer solutions according to DIN 19266 in ascending or descending order (type A, C, D or F with pH values at 25 °C of: 1.679 / 4.006 / 6.865 / 9.180).



Note

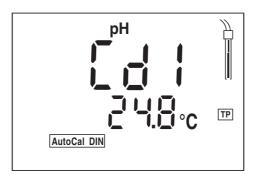
The buffer solutions are automatically recognized by the measuring instrument. Depending on the instrument setting (see section 4.4 CONFIGURATION), the instrument displays the relevant buffer nominal value or the current electrode voltage in mV.



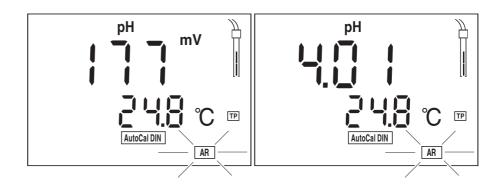
Note

Skip the steps 2, 7 and 14 if you use a temperature sensor.

Press the **<CAL>** key repeatedly until the display *Cd1* and the function display *AutoCal DIN* appear. The sensor symbol displays the evaluation of the last calibration (or no sensor symbol in the delivery state or after the measurement parameter has been reset).



- 2 If necessary, enter the temperature of the buffer solution with <**△**> <**▼**>.
- 3 Immerse the pH electrode in the first buffer solution.
- 4 Press the <RUN/ENTER> key.
 The AR display indicator flashes.
 The electrode voltage (mV) or the buffer nominal value appears on the display. Example:

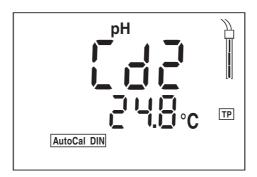


5 When the measured value is stable, *Cd2* appears.

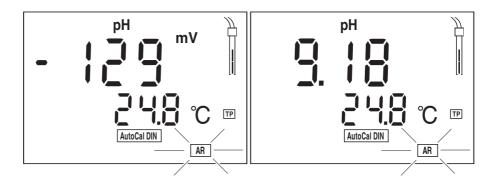


Note

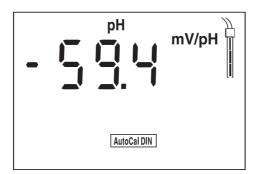
At this point, the AutoCal DIN calibration can be terminated with <M>. This corresponds to a **single-point calibration**. For this, the instrument uses the Nernst slope (-59.2 mV/pH at 25 °C) and determines the asymmetry of the electrode.



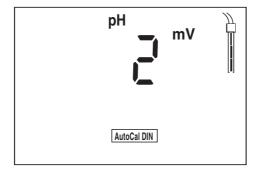
- To continue the **two-point calibration**, thoroughly rinse the electrode with deionized water.
- If necessary, enter the temperature of the second buffer solution with $\langle \blacktriangle \rangle \langle \blacktriangledown \rangle$.
- 8 Immerse the pH electrode in the second buffer solution.
- Press the <RUN/ENTER> key.
 The AR display indicator flashes.
 The electrode voltage (mV) or the buffer nominal value appears on the display. Example:



When the measured value is stable, *AR* disappears. The instrument displays the value of the slope (mV/pH) and the evaluation of the calibration in calibration range I.



11 Press the **<RUN/ENTER>** key. The instrument displays the value of the asymmetry in calibration range I.





Note

At this point, the AutoCal DIN calibration can be terminated with <M>. This corresponds to a **two-point calibration**.

The instrument uses the slope and asymmetry of the calibration range I.

Three-point calibration

12	Press the <run enter=""></run> key to continue the three-point calibration . <i>Cd3</i> appears on the display.
13	Thoroughly rinse the electrode with distilled water.
14	If necessary, enter the temperature of the third buffer solution with $<\Delta><\nabla>$.
15	Immerse the pH electrode in the third buffer solution.
16	Press the <run enter=""> key. The AR display indicator flashes. The electrode voltage (mV) or the buffer nominal value appears on the display. When the measured value is stable, AR disappears. The instrument displays the value of the slope (mV/pH) and the evaluation of the calibration in calibration range II.</run>
17	Press the <run enter=""> key. The instrument displays the value of the asymmetry in calibration range II. The three-point calibration is completed.</run>
18	To return to the measuring mode: Press the <m></m> key.



Note

You can prematurely terminate the three-point calibration by pressing **<M>**. The values of the two-point calibration for slope and asymmetry will then remain stored.

4.3.3 ConCal

Single-point calibration

Use any buffer solution for this rapid method.

The calibration will be the more exact the nearer the pH value of the buffer solution is to that of the test sample.

Two-point calibration

For this procedure, use two buffer solutions:

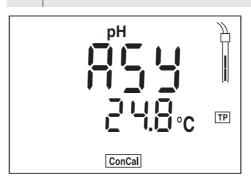
- pH 7.0 ± 0.5
- any other buffer solution



Note

Skip the steps 2 and 9 if you use a pH electrode with a temperature sensor.

Press the **CAL**> key repeatedly until the display *ASY* and the function display *ConCal* appears. The sensor symbol displays the evaluation of the last calibration (or no sensor symbol in the delivery state or after the measurement parameter has been reset).



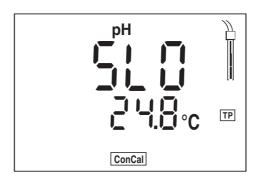
- 2 If necessary, enter the temperature of the first buffer solution with <**△**> <**▼**>.
- Immerse the pH electrode in the first buffer solution (pH 7.0 \pm 0.5 in two-point calibration).
- 4 Press the **<RUN/ENTER>** key.
 The measured pH value appears on the display.
- 5 Set the measured value to the nominal pH value of the buffer solution (at the current temperature) with <**▲**> <**▼**>.
- 6 Press the **<RUN/ENTER>** key. The value of the asymmetry (mV) and the sensor symbol appear on the display.
- 7 Press the **<RUN/ENTER>** key. *SLO* appears on the display.



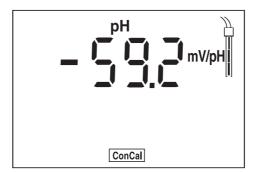
Note

At this point, the ConCal calibration can be broken off with <M>. This corre-

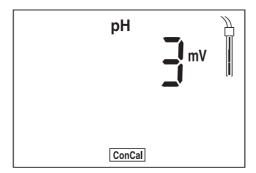
sponds to a **single-point calibration**. For this, the instrument uses the Nernst slope (-59.2 mV/pH at 25 $^{\circ}$ C) and the specified asymmetry of the electrode.



- 8 To continue the **two-point calibration**, thoroughly rinse the electrode with deionized water.
- 9 If necessary, enter the temperature of the second buffer solution with <▲> <▼>.
- 10 Immerse the pH electrode in the second buffer solution.
- 11 Press the **<RUN/ENTER>** key. The second pH value appears on the display.
- Set the measured value to the nominal pH value of the buffer solution (at the current temperature) with <**△**> <**▼**>.
- When the measured value is stable, press the **<RUN/ENTER>** key. The value of the slope (mV/pH) appears on the display. The probe symbol shows the evaluation of the current calibration.



Press the **<RUN/ENTER>** key. The value of the asymmetry (mV) appears on the display.



15 To return to the measuring mode: Press the **<M>** key.

4.4 Configuration

You can adapt the measuring instrument to your individual requirements. To do this, the following parameters can be changed (the status on delivery is marked in bold):

Display during the pH calibration	Buffer nominal value , or current electrode voltage
pH resolution	0.01 or 0.001

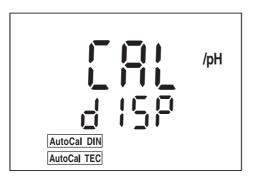


Note

You can leave the configuration menu at any time with <M> . The parameters that have already been changed are stored.

1	Switch off the measuring instrument.
2	Press the < M > key and hold it down.
3	Press the <on off=""></on> key. The display test appears briefly on the display. <i>CAL diSP</i> appears on the display.

Display during the pH calibration



4 Select the required display during the pH calibration with <**△>** <**▼**>.

mV: Display of the current electrode voltage /pH: Display of the buffer nominal value.

5 Confirm with <RUN/ENTER>.
The measuring instrument automatically switches to the pH measuring mode.

Setting the resolution

1	Press the <run enter=""> key and hold it down.</run>
2	Press the < M > key. The measured values are displayed with a high resolution, e.g. pH = 4.012.
3	Press the <run enter=""></run> and <m></m> keys once more. The measured values are displayed with a low resolution, e.g. pH = 4.01.

4.5 Reset

You can reset (initialize) the measurement parameters and the configuration parameters separately from one another.

Measurement parameters

The following measured parameters (pH InI) are reset to the default condition:

Measuring mode	рН
Asymmetry	0 mV
Slope	-59.16 mV/pH
Calibration procedures	AutoCal TEC
Temperature, manual	25 °C
Resolution (pH display)	0.01 (low resolution)
Display during the pH calibration	Buffer nominal value

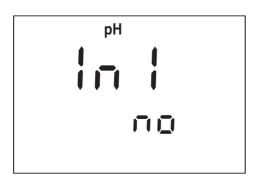


Note

The calibration data gets lost when the measuring parameters are reset. Recalibrate after performing a reset.

Resetting the measuring parameters

- 1 Press the **<RUN/ENTER>** key and hold it down.
- 2 Press the **<CAL>** key.



- 3 Using <▲> <▼>, switch between *no* and *YES*. *YES*: Resetting the measuring parameters *no*: Retaining settings.
- 4 Confirm with **<RUN/ENTER>**.

 The measuring instrument automatically switches to the pH measuring mode.

5 Maintenance, cleaning, disposal

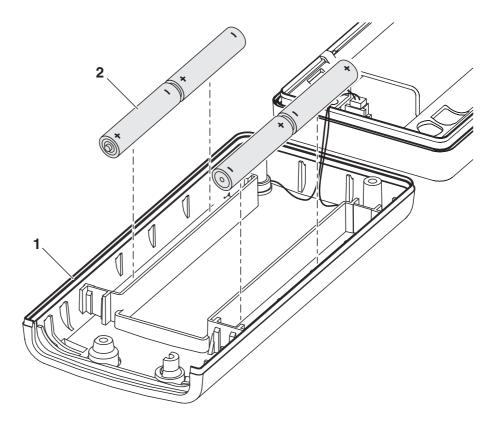
5.1 Maintenance

The measuring instrument is almost maintenance-free.

The only maintenance task is replacing the batteries.

LoBat indicates that the batteries should be changed. The batteries are then largely depleted.

Replacing the batteries



- 1 Open the housing after the instrument has been switched off:
 - Undo the four screws on the underside of the instrument
 - Pull down the lower cover (1).
- 2 If necessary, take the four depleted batteries (2) out of the battery compartment.
- Place four new batteries (type Mignon AA) in the battery compartment.
- 4 Close the lower cover (1).



Caution

Make sure that the poles of the batteries are the right way round.

The \pm signs on the batteries must correspond to the \pm signs in the battery compartment.

Only use leakproof alkaline manganese batteries.



Note

For the maintenance of the electrodes, follow the corresponding operating manual.

5.2 Cleaning

Occasionally wipe the outside of the measuring instrument with a damp, lint-free cloth. Disinfect the housing with isopropanol as required.



Caution

The housing is made of a synthetic material (ABS). Thus, avoid contact with acetone and similar detergents that contain solvents. Remove any splashes immediately.

5.3 Disposal

Packing

This measuring instrument is sent out in a protective transport packing. We recommend: Keep the packing material. The original packing protects the instrument against damage during transport.

Batteries

This note refers to the battery regulation that applies in the Federal Republic of Germany. We would ask end-consumers in other countries to follow their local statutory provisions.



Note

This instrument contains batteries. Batteries that have been removed must only be disposed of at the recycling facility set up for this purpose or via the retail outlet.

It is illegal to dispose of them in household refuse.

Measuring instrument

Dispose of the measuring instrument as electronic waste at an appropriate collection point. It is illegal to dispose of the instrument in household refuse.

handylab pH 11 What to do if...

6 What to do if...

Error message OFL

Cause	Remedy
pH electrode:	
Not connected	- Connect electrode
Air bubble in front of the diaphragm	Remove air bubble
Air in the diaphragm	Extract air or moisten diaphragm
- Cable broken	- Replace electrode
Gel electrolyte dried out	Replace electrode

Error message E3

Cause	Remedy
Electrode	
Diaphragm contaminated	- Clean diaphragm
Membrane contaminated	- Clean membrane
Moisture in the plug	- Dry plug
Electrolyte out of date	Replenish electrolyte or replace electrode
Electrode worn out	Replace electrode
Electrode broken	- Replace electrode

Measuring instrument:	
Incorrect calibration procedure	Select correct procedure
 Incorrect solution temperature (without temperature sensor) 	Set up correct temperature
- Socket damp	- Dry socket

What to do if... handylab pH 11

Buffer solutions	
 Incorrect buffer solutions 	Change calibration procedure
Buffer solutions too old	Use only once. Note the shelf life
Buffer solutions depleted	- Change solutions

No stable measured value

Cause	Remedy
pH electrode:	
Diaphragm contaminated	- Clean diaphragm
Membrane contaminated	- Clean membrane
Test sample:	
 pH value not stable 	Measure with air excluded if necessary
Temperature not stable	Adjust temperature if necessary
	,
Electrode + test sample:	
Conductivity too low	Use suitable electrode
Temperature too high	Use suitable electrode
Organic liquids	Use suitable electrode

LoBat display

Cause	Remedy		
 Batteries almost empty 	Replace batteries (see section 5.1 MAINTENANCE)		

handylab pH 11 What to do if...

Obviously incorrect measured values

Cause	Remedy
pH electrode:	
pH electrode unsuitable	Use suitable electrode
Temperature difference between buffer and test sample too high	Adjust temperature of buffers or test samples
Measurement procedure not suitable	Follow special procedure

Instrument does not react to keystroke

Cause	Remedy
Operating condition undefined or EMC load unallowed	 Processor reset: Press the <cal> and</cal> <on off=""> keys at the same time and release them again.</on> The software version is displayed.

Display **Ło**

Cause	Remedy
Time-out of the interface	Check the instrument that is connected

What to do if... handylab pH 11

handylab pH 11 Lists

7 Lists

This chapter provides additional information and orientation aids.

Abbreviations

The list of abbreviations explains the indicators and the abbreviations that appear on the display and in the manual.

Specialist terms

The glossary briefly explains the meaning of the specialist terms. However, terms that should already be familiar to the target group are not described here.

Index

The index will help you to find the topics that you are looking for.

Lists handylab pH 11

Abbreviations

AR	AutoRead (drift control)		
ARng	Automatic range switching Measuring instrument measures with highest resolution		
ASY	Asymmetry		
AutoCal DIN	Automatic pH calibration with buffer solutions prepared according to DIN 19266		
AutoCal TEC	Automatic pH calibration with SI Analytics technical buf- fer solutions according to DIN 19267		
°C	Temperature unit, degrees Celsius		
Cal	Calibration		
Cd	Display indicator during calibration for pH measure- ments. Indicates the selection of the buffer data record for buffer solutions prepared according to DIN 19266		
ConCal	Conventional single-point or two-point calibration for pH measurements		
Ct	Display indicator during calibration for pH measure- ments. Indicates the selection of the buffer data records for SI Analytics technical buffer solutions		
Inl	Initialization Resets individual basic functions to the status they had on delivery		
LoBat	Batteries almost empty(Low Battery)		
mV	Voltage unit		
mV/pH	Unit of the electrode slope (internat. mV)		
OFL	Display range exceeded (Overflow)		
рН	pH value		
S	Slope (internat. k)		
SELV	Safety Extra Low Voltage		
SLO	Slope setting on calibration		
TP	Temperature measurement active (Temperature Probe)		
U _{ASY}	Asymmetry		

handylab pH 11 Lists

Glossary

Adjusting To manipulate a measuring system so that the relevant value (e. g. the

displayed value) differs as little as possible from the correct value or a value that is regarded as correct, or that the difference remains with-

in the tolerance.

Asymmetry Designation for the offset potential of a pH electrode. It is the measur-

able potential of a symmetrical electrode, the membrane of which is immersed in a solution with the pH of the nominal electrode zero point

(electrodes: pH = 7).

AutoRange Name of the automatic selection of the measuring range.

AutoRead Name for a function to check the stability of the measured value.

Calibration Comparing the value from a measuring system (e. g. the displayed value) to the correct value or a value that is regarded as correct. Of-

ten, this expression is also used when the measuring system is adjust-

ed at the same time (see adjusting).

DiaphragmThe junction is a porous body in the housing wall of reference elec-

trodes or electrolyte bridges. It forms the electrical contact between two solutions and makes electrolyte exchange more difficult. The expression, junction, is also used for ground or junction-less transitions.

Electrode zero point The zero point of a pH electrode is the pH value at which the electrometry force of the pH electrode at a position temperature is zero.

motive force of the pH electrode at a specified temperature is zero.

Normally, this is at 25 °C.

Electromotive force ofThe electromotive force U of the electrode is the measurable electromotive force of an electrode in a solution. It equals the sum of all the

motive force of an electrode in a solution. It equals the sum of all the galvanic voltages of the electrode. Its dependency on the pH results in the electrode function which is characterized by the parameters,

slope and zero point.

Measured parameter The measured parameter is the physical dimension determined by

measuring, e. g. pH, conductivity or D. O. concentration.

Measured value The measured value is the special value of a measured parameter to

be determined. It is given as a combination of the numerical value and

unit (e. g. 3 m; 0.5 s; 5.2 A; 373.15 K).

Measuring system The measuring system comprises all the devices used for measuring,

e. g. measuring instrument and probe. In addition, there is the cable

and possibly an amplifier, terminal strip and armature.

Molality Molality is the quantity (in Mol) of a dissolved substance in 1000 g sol-

vent.

MultiCal® Name stating that a measuring instrument provides several calibration

procedures.

Lists handylab pH 11

Offset potential The measurable potential of a symmetrical electrode, the membrane

of which is immersed in a solution with the pH of the nominal electrode

zero point. The asymmetry is part of the offset potential.

ORP voltage The ORP is caused by oxidizing or reducing substances dissolved in

water if these substances become effective on an electrode surface

(e. g. a gold or platinum surface).

pH value The pH is a measure of the acidic or basic effect of an aqueous solu-

tion. It corresponds to the negative decadic logarithm of the molal hydrogen ions activity divided by the unit of the molality. The practical pH

value is the value of a pH measurement.

Potentiometry Name of a measuring technique. The signal (depending on the mea-

sured parameter) of the electrode is the electrical potential. The elec-

trical current remains constant.

Reset Restoring the original condition of all settings of a measuring system.

Resolution Smallest difference between two measured values that can be dis-

played by a measuring instrument.

Slope The slope of a linear calibration function.

Standard solution The standard solution is a solution where the measured value is

known by definition. It is used to calibrate a measuring system.

Test sample Designation of the sample ready to be measured. Normally, a test

sample is made by processing the original sample. The test sample and original sample are identical if the test sample was not processed.

handylab pH 11 Index

Index

Α

Asymmetry 19 Authorized use 11 AutoCal DIN 19, 25 AutoCal TEC 19, 21 AutoRead 17

C

Calibration evaluation 20 Calibration procedures 19 ConCal 19, 29

D

Default condition 34
Display 7
Displaying calibration data
20
Drift control 17

Ε

Energy saving feature 15

ı

Initialization 34

K

Keys 6

L

LoBat 38

M

Measuring ranges pH/ORP 8

0

Operating safety 12 ORP electrode 18 ORP voltage 18

R

Replacing the batteries 35 Reset 34

S

Safety 11
Safety precautions 11
Scope of delivery 13
Setting the resolution 33
Setting the resolution (pH) 17
Single-point calibration 19
Single-point calibration (pH)
22, 23, 26, 27, 30
Slope 19

T

Temperature sensor 16
Three-point calibration 19
AutoCal DIN 28
AutoCal TEC 24
Two-point calibration 19
ConCal 29
Two-point calibration (pH)
19, 22, 23, 26, 27, 30

Index handylab pH 11

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