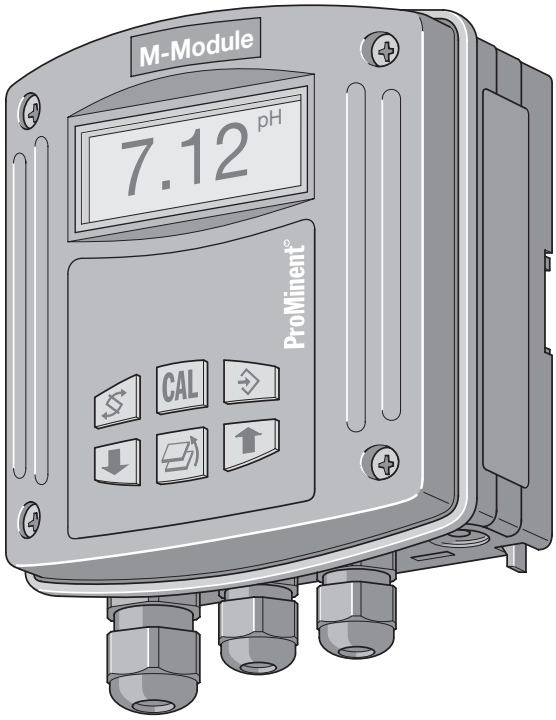
Supplementary Instructions
DULCOMARIN® II, M Module
(Measurement module for pH,
redox/ORP, temperature)
DXMaM: Operation



Cover page_DXCa

DXMa ___ ___ ___ ___ ___ ___

Please enter the identcode of your module!

This Operating Instruction apply only in conjunction with the „Operating Instructions DULCOMARIN® II, Pool Controller, Part 1, Mounting and Installation“ and the „Supplementary Instructions DULCOMARIN® II, M Module (Measurement module for pH, redox/ORP, temperature), Connection“

Please carefully read these operating instructions before use! · Do not discard!
The operator shall be liable for any damage caused by installation or operating errors!

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Imprint:
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(Measurement module for pH, redox/ORP, temperature)
DXMaM: Operation

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General user information

Please read through the following user guidelines! Familiarity with these points ensures optimum use of the operating instructions.

Key points in the text are indicated as follows:

- enumerated points

▶ hints

Working guidelines:

NOTE

Notes are intended to make your work easier.

and safety guidelines:

IMPORTANT

Characterizes a possibly hazardous situation.
There is a danger of damage to property if these notes are disregarded!

1 Safety chapter

In the following, some facts are pointed out which are not expected because of the new technology!

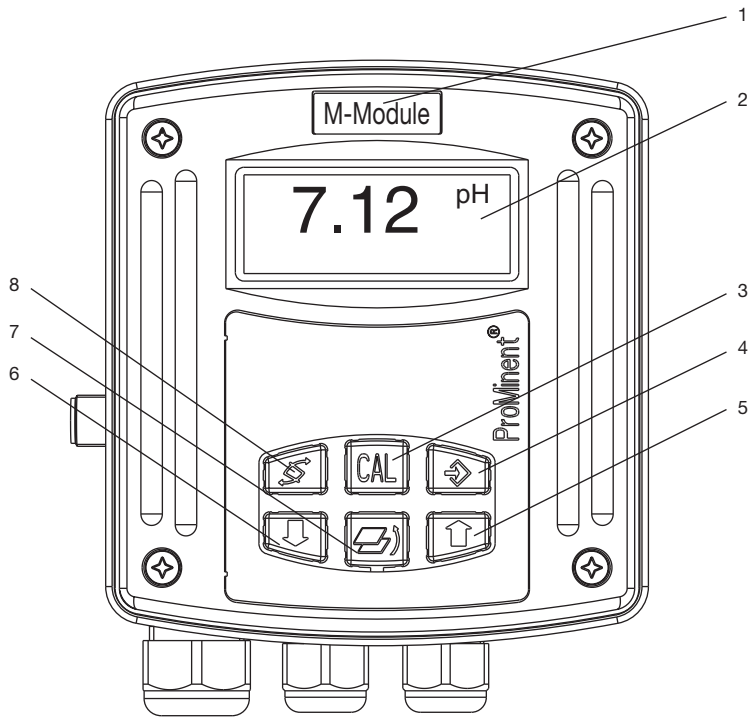
IMPORTANT

After the chlorine sensor has been detected by the DULCOMARIN® II, it cannot be simply exchanged with another chlorine sensor!
Please read the bus-related operating instructions DULCOMARIN® II, Pool Controller, Part 1!

NOTE

If a limit value criteria for chlorine was violated, the left LED at the chlorine sensor is flashing in red!

2 Controls



1 Label type of module
2 LCD display
3 CAL key
4 ENTER key
5 UP key
6 DOWN key
7 ESC key
8 Change key

Function of the keys

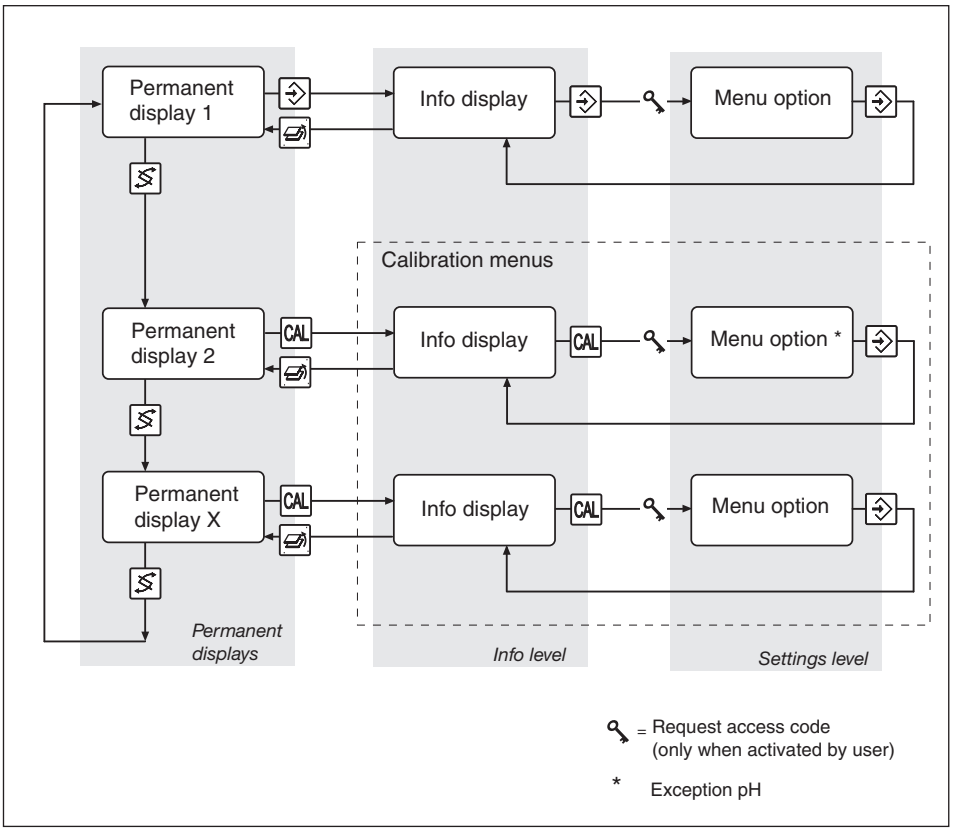
The settings of the DULCOMARIN® II can be changed using the keys.
The keys are assigned the following functions:

	in the permanent display or in the info displays	**in the menu options**
Change key	toggle between permanent displays	toggle between the adjustable parameters in the present menu option
ESC key	return from the info displays to the permanent displays	return to the info display without saving of the adjustable parameters
Enter key	go to a menu option (from an info display)	saving of the adjustable parameters of the present menu option and go to the info display
CAL key	go to an info display of the calibration menu (from the permanent display)	execution of the calibrating steps in the calibration menu (only for pH)
Down key Up key	-	changing of an adjustable parameter

3 Layout of the operating menu

The operating menu comprises:

- the permanent displays (permanent display level)
- the info displays (info level)
  for viewing the set calibration parameters or general settings
- the calibration menus
- the menu options (setting level)
  for changing the calibration parameters or general settings

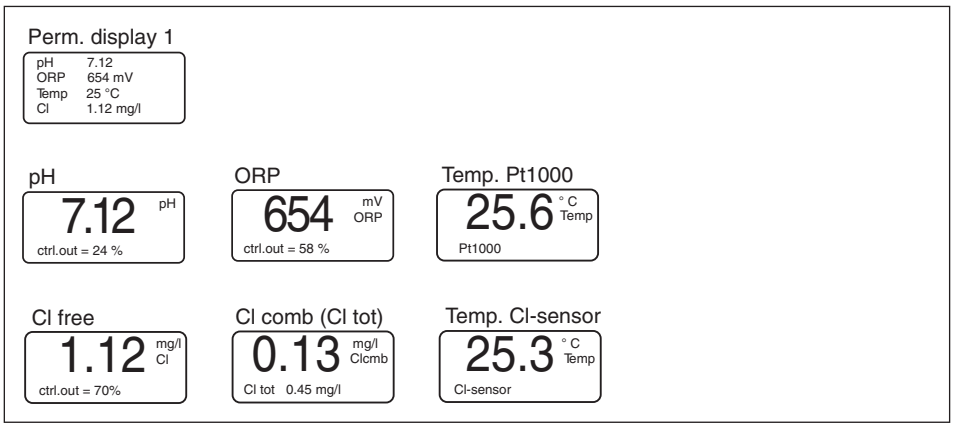


3.1 Negotiating the operating menu

NOTE

- ***In principle, cancelling is possible in any window of the operating menu by pressing the ESC key. Depending on where you are positioned in the operating menu, the display returns either to the corresponding permanent display or to the info display.***
- ***The display will automatically return to permanent display if no key is pressed for 5 min. (changes to values are not saved).***
- ***If the user activated an access code, the menu options of the setting level are locked. To "unlock", the access code has to be entered in the corresponding query and confirmed by pressing the Enter key. As soon as the DXMaM returns to the permanent display, this "lock" is cancelled.***
  The access code is factory set to 0000 and therefore inactive.

3.1.1 Permanent displays



During operation, the measuring values of the corresponding pool can be monitored. The type of permanent display of the DXMaM depends on the sensors configured and connected to the DULCOMARIN® II .
The permanent display 1 can show up to four measured variables.
Each measured variable is also shown on a further, own permanent display.

The permanent displays show the following values:

- measured variables pH, redox/ORP, Cl free, Cl comb. (Cl total in bottom line), temperature (separate Pt100 and Cl sensor)
- activity of the controlling of a measured variable and the controller output

3.1.2 Info displays

Pressing the Enter key or CAL key from any permanent display accesses the corresponding info display (info level).

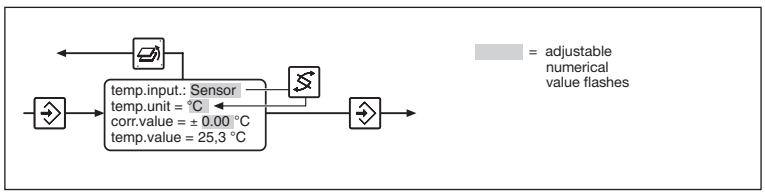
3.1.3 Calibration menu

Pressing the CAL key in any permanent display accesses the corresponding calibration menu (special case of 3.1.1.)

3.1.4 Menu options

Pressing the Enter key in any info display accesses the pertinent menu options (setting level).

3.1.5 Negotiating the menu options



Press the ESC key to activate all adjustable values in a menu option. Flashing values can be altered. Use the arrow keys to alter numerical values or text.

This means:

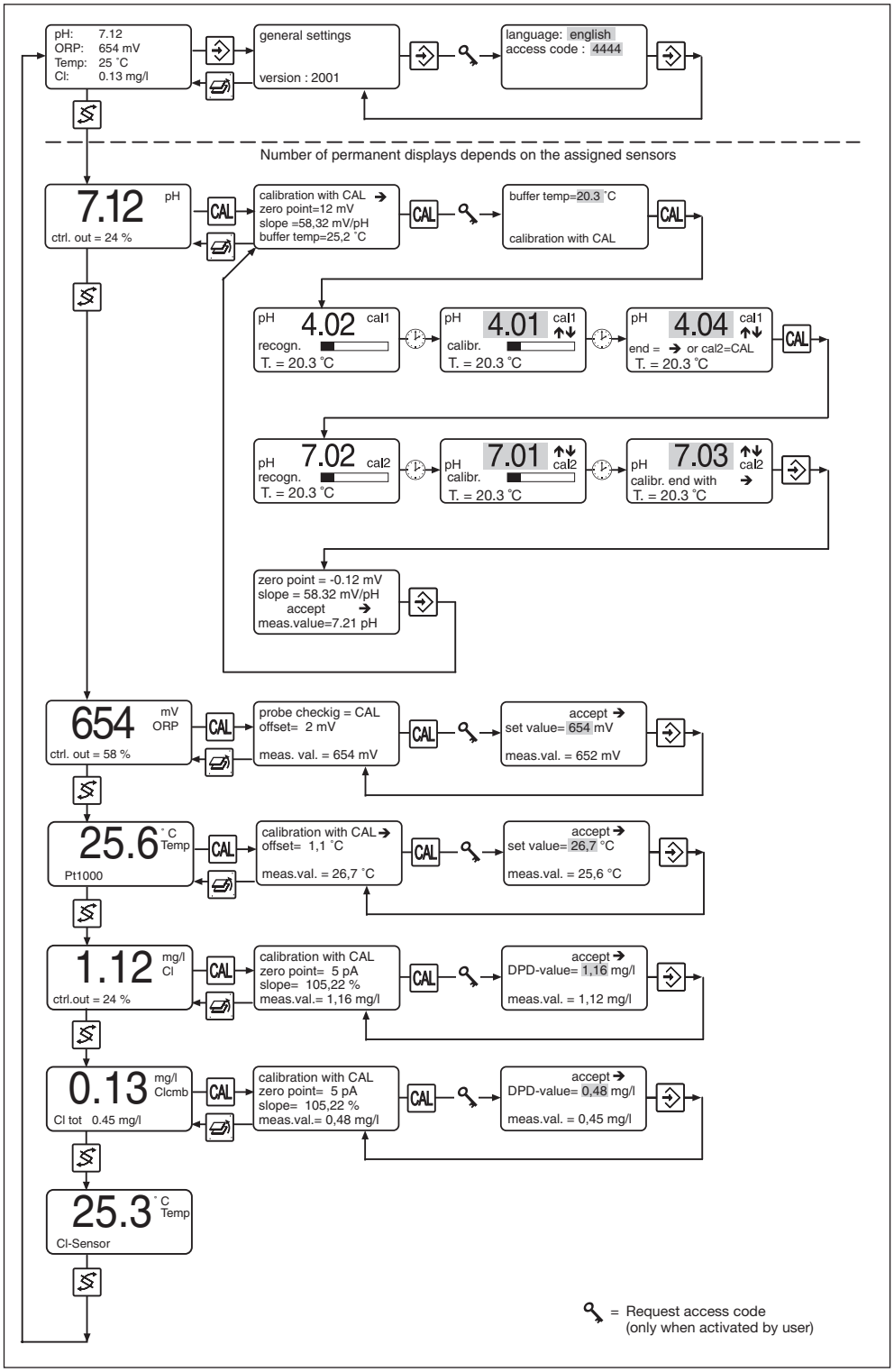
- 1x short keystroke reduces/increases a numerical value by one increment or alters a text
- holding the key down for longer alters numerical values more rapidly.
  Use the Enter key to save changed values in the menu option.
  You will automatically enter the next info display.

NOTE

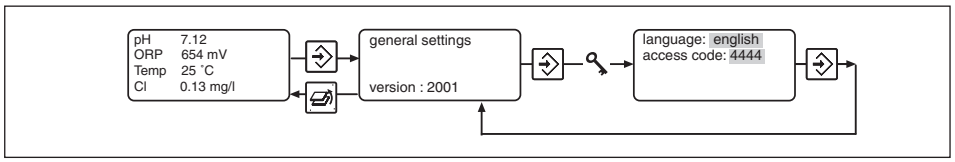
- ***Your entries become active immediately and are stored permanently when you press the enter key.***
- ***If you do not wish to save changes, exit the menu option using the ESC key. You will then return to the info display for that menu.***

4 Setting

Menu overview



4.1 General settings



The settings for language and access code can be made in the menu “general settings”:

- ▶ Press the Enter key twice in the permanent display 1
- ▶ Select the desired language in “language” using the arrow keys
- ▶ Go to the selection “password” using the change key
- ▶ Enter the desired access code in “password” using the arrow keys
- ▶ Press the ENTER key to save the values or press the ESC key to cancel. The display goes to the info display.
- ▶ Press the ESC key to return to the permanent display (the menus are password-protected again).

Access code (password)

The access to the controller can be limited by setting an access code.

IMPORTANT

Replace the factory-set access code by your own code!
Otherwise the following menus are not sufficiently protected!

NOTE

When returning to the permanent display, the DULCOMARIN® II automatically resets the access.

4.2 Calibration

4.2.1 Calibration of pH measurement

The condition of a pH sensor is decisive for the quality of the measurement. All pH sensors must thus regularly be re-calibrated using buffer solutions. The DXMaM is equipped with an automatic buffer detection.

Automatic buffer detection

The following buffer table is stored in the programme memory:

Temperature buffer table

°C		pH	
0	4.05	7.13	10.26
5	4.04	7.07	10.17
10	4.02	7.05	10.11
15	4.01	7.02	10.05
20	4.00	7.00	10.00
25	4.00	6.98	9.94
30	4.00	6.98	9.90
40	4.00	6.97	9.82
50	4.00	6.96	9.75
60	4.00	6.97	9.68
70	4.01	6.98	9.62
80	4.02	6.99	9.55

It is recommended only to use ProMinent® buffer solutions for calibration.

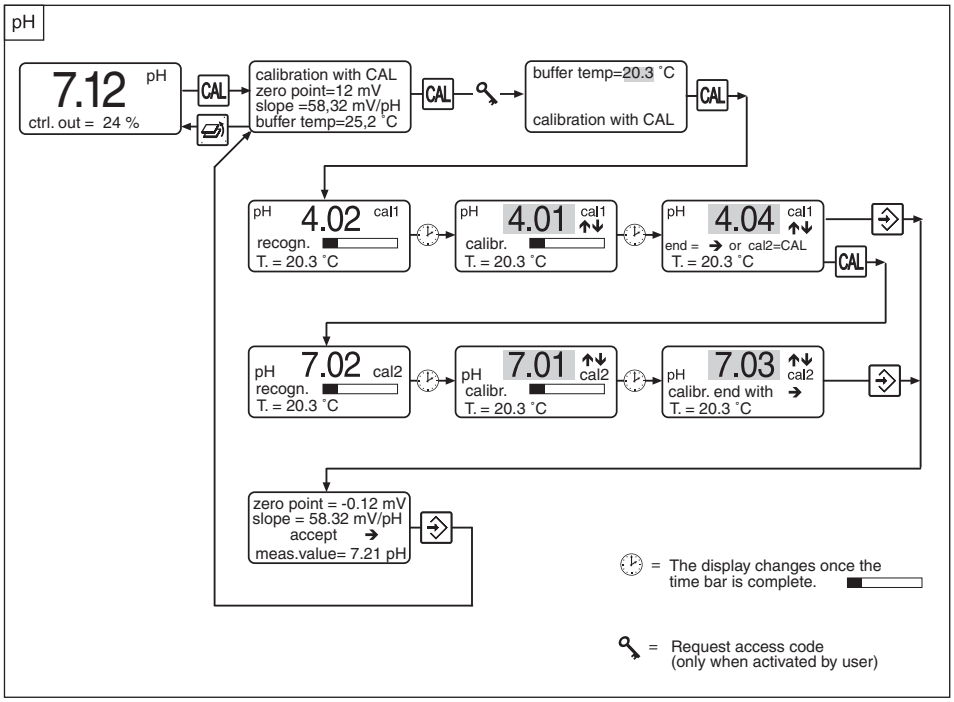
Calibration procedure

NOTE

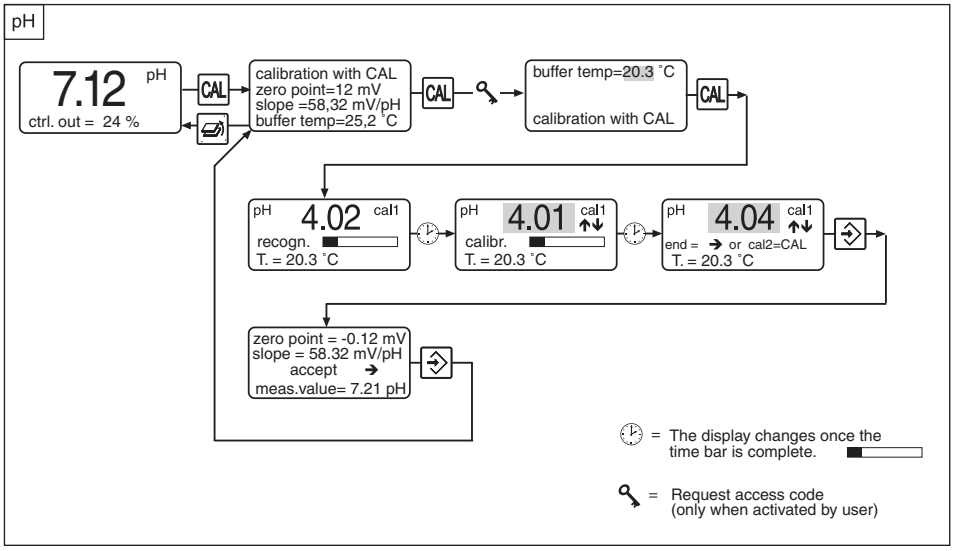
- ***In principle, cancelling is possibly in any menu option of the calibration menu by pressing the ESC key. The menu returns to the permanent display.***
- ***The controller output is frozen to the last value (HOLD) during the calibration.***
- ***Inadmissible values invalidate the current calibration. The previous calibration values are maintained.***
- ***Discard used buffer solutions!***

Menu overview of calibration menu

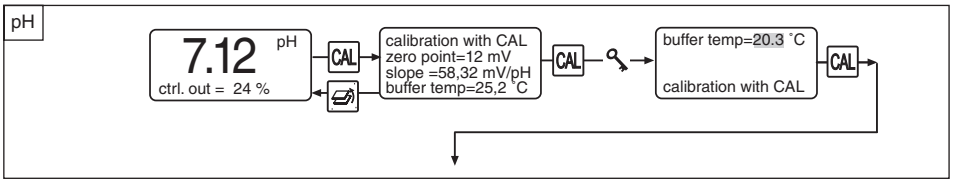
2-point calibration



1-point calibration

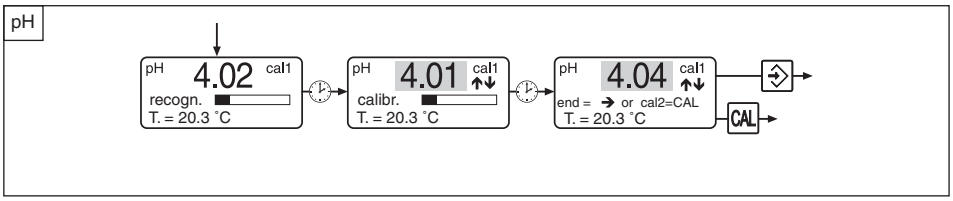


Follow the steps described below to access the calibration menu:



Start calibration

- ▶ Press the CAL key twice in the permanent display “pH” while the pH sensor is still in the sample water.
- ▶ In “buffer temp.” set the buffer temperature using the arrow keys.
- ▶ This setting is only valid during the calibration.
- ▶ Remove the pH sensor from the sample water, clean the sensor and dip it into the first buffer solution (in this case with pH 4).
- ▶ Press the CAL key to start the automatic buffer detection:



The progress of the buffer detection is shown by a time bar.

After the buffer detection, the calibration parameters are automatically calculated (calibration). This, too, is shown by a time bar.

In “T”, the manually set buffer temperature is displayed.

During calibration, the buffer value can be corrected using the arrow keys.

If the sensor signal is instable, the time bar is held until the signal is stable again.

- ▶ After calibration, the final menu option of the 1-point calibration is shown:

  In this option, the buffer value can be corrected again using the arrow keys.

The further steps depend on the fact whether a 1-point calibration or a 2-point calibration (recommended) is desired:

1-point calibration

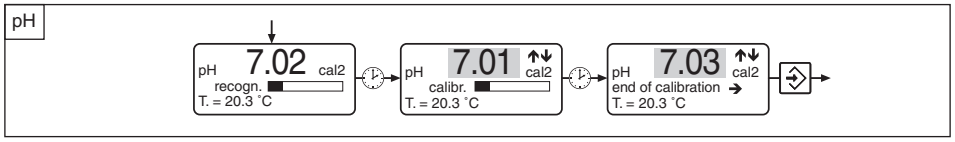
▶ Press the ENTER key to stop the 1-point calibration. The zero point is calibrated if the buffer value ranges between 5.5 pH and 8.0 pH.

▶ Continue as described in “Complete calibration”.

2-point calibration

▶ For a 2-point calibration, remove the sensor from the first buffer solution, rinse it and dip it into the second buffer solution.

▶ Press the CAL key to re-start the automatic buffer detection:



Buffer detection and calibration will be made as described above.

▶ After calibration, the final menu option of the 2-point calibration is shown:
In this option, the buffer value can be corrected again using the arrow keys.

▶ Press the ENTER key to stop the 2-point calibration.

▶ Continue as described in “Complete calibration”.

Complete calibration

The calibration value (zero point and slope) is now displayed:

In “measuring value”, the present pH value is shown for control.

▶ Press the ENTER key to accept the values or press the ESC key to cancel the values. The display goes to the info display and the calibration is completed.

▶ Press the ESC key to return to the permanent display (the menus are password-protected again).

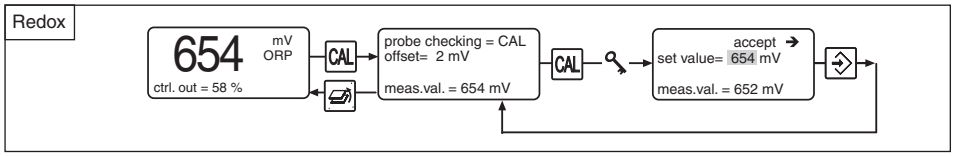
NOTE

Inadmissible values invalidate the current calibration. The previous calibration values are maintained.

Error messages

Error message	Cause	Effect
Zero point < -60 mV !!! Calibration invalid	N < -60 mV	previous zero point and slope are maintained, replace sensor
Zero point > 60 mV !!! Calibration invalid	N > +60 mV	”
Slope < 40 mV/pH ! Calibration invalid	S < 47 mV/pH	”
Slope > 65 mV/pH ! Calibration invalid	S > 63 mV/pH	”
Puffer difference too small ! Calibration invalid	Δ Puffer < 2 pH	re-calibrate buffer 2

4.2.2 Verification of the redox/ORP sensor



NOTE

The controller output is frozen to the last value (HOLD) during the verification of the ORP sensor.

The sensor can be verified by measuring the redox potential of a buffer solution:

- ▶ Press the CAL key in the permanent display “ORP”.
- ▶ Press the CAL key after the “measuring value” has stabilised.
- ▶ Enter the stated redox potential of the buffer solution in “setting value” (arrow keys).
- ▶ Press the ENTER key - the controller compares the buffer value and the measuring value and the “offset” is displayed in the next menu option. The offset may not exceed ± 40mV.
- ▶ Press the ESC key to return to the permanent display (the menus are password-protected again).

Error messages	Cause	Effect
Calibration invalid Offset too high	Redox/ORP potential difference > 40 mV	replace sensor

4.2.3 Calibration of a temperature sensor

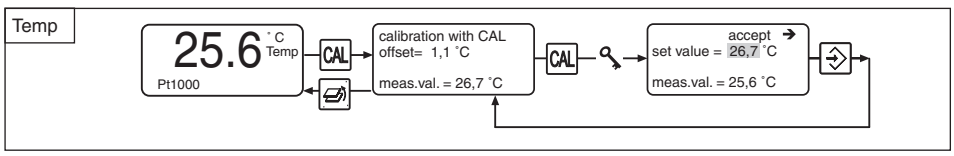
NOTE

- ***The temperature sensors of the chlorine sensors do not have to be calibrated (this permanent display is not shown for chlorine sensors).***
- ***The temperature sensor should only be calibrated if you have:***
  - a temperature sensor of the type Pt100
  - a precision-reference measuring device

Do not exchange the temperature sensor while calibrating!

- ***The temperature measuring value can only be adjusted within the range of ± 4°C around the factory-set calibration value.***
- ***For the permanent display “Temperature, Cl sensor”, there is no calibration menu.***

Follow the steps described below to access the calibration menu:



- ▶ Press the CAL key in the permanent display “Temperature, Pt1000”.
- ▶ Take a sample water sample of at least 250 ml.
- ▶ Immediately immerse the external temperature sensor Pt100 of the DULCOMARIN® II and the sensor of the reference measuring device.
- ▶ Press the ENTER key after the “measuring value” has stabilised.
- ▶ Enter the value of the reference measuring device in “setting value” (arrow keys) and press the ENTER key.
- ▶ Press the ESC key to return to the permanent display (the menus are password-protected again).

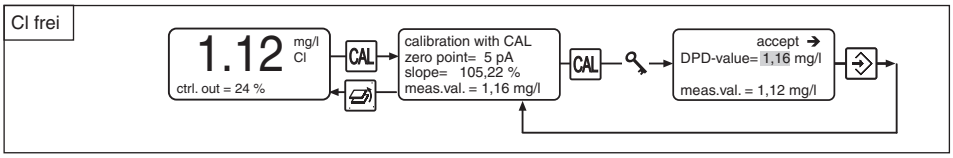
Error message	Cause	Effect
Calibration invalid Offset too high	Temperature difference > 4 °C	replace sensor

4.2.4 Calibration of a chlorine sensor for free chlorine

The condition of a chlorine sensor is decisive for the quality of the measurement. Thus, all chlorine sensors must regularly be re-calibrated using DPD measuring tools.

IMPORTANT

Please also read the operating instructions for measuring sensors and in-line probe!



Follow the steps described below to access the calibration menu:

- ▶ Close the shut-off valves of the sample water.
- ▶ Press the CAL key in the permanent display “Cl”.
- ▶ Press the CAL key after the “measuring value” has stabilised.
- ▶ Directly after, take a sample water sample at the in-line probe.
- ▶ Directly after this step, determine the chlorine content of the sample water using a photometer and a suitable measuring tool (e.g. DPD 1 for free chlorine (chlorine sensor CLE)).
- ▶ Immediately enter the measured chlorine content in „DPD value“ (arrow keys).
- ▶ Press the Enter key - the new calibration values are displayed.
- ▶ Press the ESC key to return to the permanent display (the menus are password-protected again).
- ▶ If total chlorine is also to be measured, calibrate this measured variable, too (next chapter).
- ▶ Otherwise, open the shut-off valves for the sample water again.

Repeat the calibration the next day!

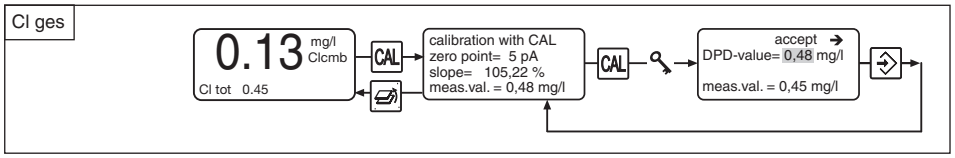
Error message	Cause	Effect
Calibration invalid!!!	error during calibration	previous zero point and slope are maintained

4.2.5 Calibration of a chlorine sensor for total chlorine

The condition of a chlorine sensor is decisive for the quality of the measurement. Thus, all chlorine sensors must regularly be re-calibrated using DPD measuring tools.

IMPORTANT

- ***The chlorine sensor CTE for total chlorine is calibrated in this step!***
- ***The DULCOMARIN® II calculates the displayed values for combined chlorine as difference of the measuring values of the chlorine sensors for free chlorine and total chlorine!***
- ***For the purposes of the differential measurement, the chlorine sensor for free chlorine must be the sensor CLE 3.1!***
- ***Please also read the operating instructions for chlorine sensor and in-line probe!***



Follow the steps described below to access the calibration menu:

- ▶ Close the shut-off valves of the sample water.
- ▶ Press the CAL key in the permanent display “Cl comb”.
- ▶ Press the CAL key after the “measuring value” has stabilised.
- ▶ Directly after, take a sample water sample at the in-line probe.
- ▶ Directly after this step, determine the chlorine content of the sample water using a photometer and a suitable measuring tool (e.g. DPD 1 for free chlorine (chlorine sensor CLE)).
- ▶ Immediately enter the measured chlorine content in „DPD value“ (arrow keys).
- ▶ Press the Enter key - the new calibration values are displayed.
- ▶ Press the ESC key to return to the permanent display (the menus are password-protected again).
- ▶ Open the shut-off valves for the sample water again.

Repeat the calibration the next day!

Error messages	Cause	Effect
Calibration invalid!!!	Error during calibration	previous zero point and slope are maintained, calibrate again

4.2.6 Temperature of the chlorine sensor

There is only a permanent display for the temperature of the chlorine sensor. The temperature sensor of the chlorine sensor cannot be calibrated - the permanent display is not followed by a calibration menu.

Subject to technical alterations.

Addresses and delivery information from the manufacturer:

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