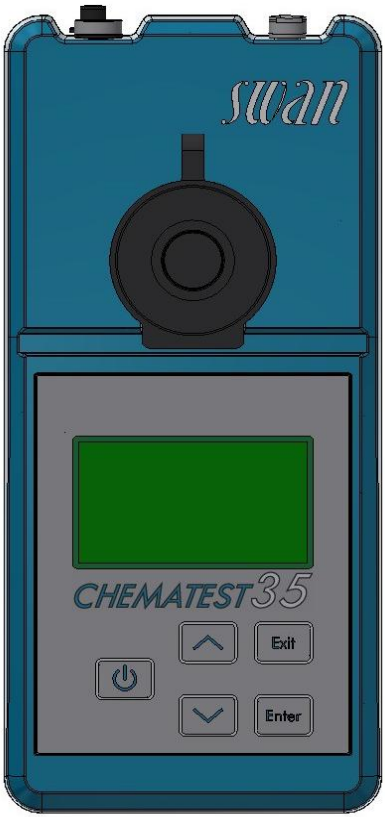
swan
ANALYTICAL INSTRUMENTS

Chematest 35

Version 1.03 and higher



Operator's Manual

Customer Support
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Table of Contents

Chematest 35 – Operator's Manual

1. Safety Instructions

For safe instrument operation, you must read and understand the instructions in this manual.

Warning notices

The symbols used for safety-related notices have the following meaning:

WARNING

Severe injuries or damage to the equipment can occur if such warnings are ignored.

- Follow the prevention instructions carefully.

CAUTION

Damage to the equipment, minor injury, malfunctions or incorrect process can be the consequence if such warnings are ignored.

- Follow the prevention instructions carefully.

Reagents

WARNING

Health hazard
For safe handling of the reagents, you must read and understand the corresponding Material Safety Data Sheets (MSDS). These can be downloaded from **www.swan.ch**.

Electronics

CAUTION

Observe the following instructions during operation and when charging the instrument:

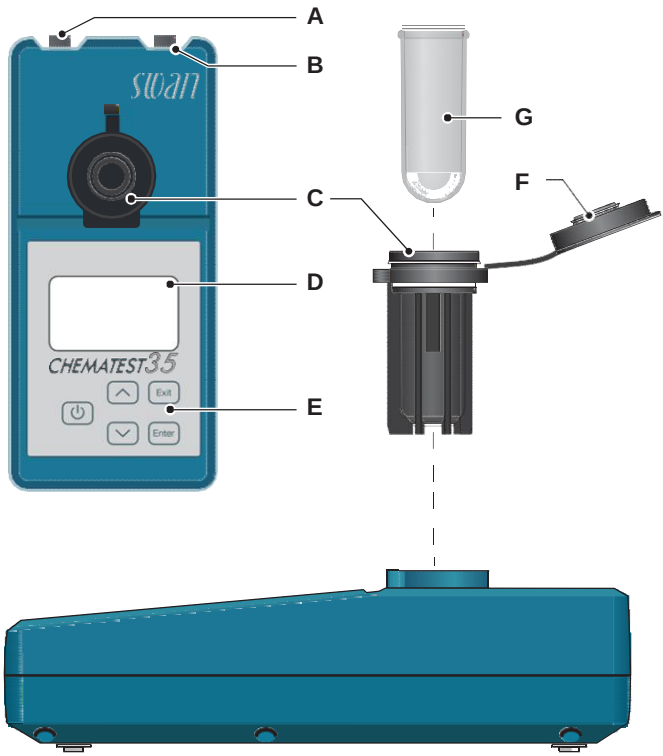
- Only charge the instrument using a standard type A USB socket and the supplied USB cable.
- Protect from heat and splash water during charging (not IP67).
- Do not expose the instrument to direct sunlight or other sources of heat, especially when charging.

CAUTION

The housing must not be opened except for the housing parts specified in the maintenance chapter.

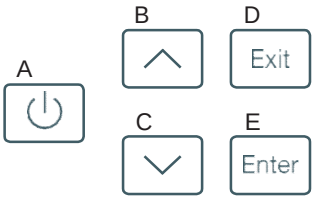
2. Parts and Controls

2.1. Instrument Overview



A *Sensor socket*
B *Charging socket*
C *Cuvette adapter*
D *Display*
E *Keypad*
F *Cuvette cap*
G *Cuvette*

2.2. Keys



A POWER
to power on or off the instrument

B ARROW UP
to move up in a menu list and to increase digits

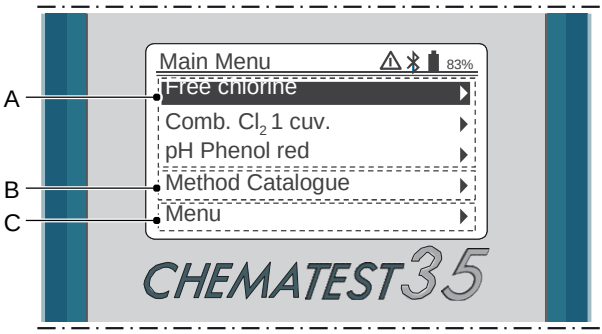
C ARROW DOWN
to move down in a menu list and to decrease digits

D EXIT
to exit a menu or command
to move back to the previous menu level

E ENTER
to open a selected sub-menu
to accept an entry

2.3. Display

Once the instrument has started up, the main menu is displayed. The main menu is organized as follows:



A Quick start list
Provides quick access to the most important methods. By default, the last three methods selected from the method catalogue are displayed. The list is automatically adjusted each time a method is selected from the method catalogue.
Alternatively, it is also possible to setup a fixed quick start list, see Initial Setup, p. 8.

B Method catalogue
List of all available methods.

C Menu
Access to further instrument functions (e.g. display of stored measurements). Detailed descriptions of all menu functions can be found in chapter Menu Explanations, p. 27.

Symbols

The symbols displayed in the top right corner have the following meaning:

- ⚠ Alarm active. See <Menu>/<Diagnostics>/<Alarms> for details.
- Bluetooth activated
- 83% Battery status (remaining capacity in %)
- Instrument is charging

3. Initial Setup

3.1. Select language

Navigate to <Menu>/<Settings>/<Miscellaneous>/<Language> and select the applicable language from the list.

3.2. Set time and date

Set time and date under <Menu>/<Maintenance>/<Set Time>.

3.3. Optional: Activate expert mode

The user can choose between two types of method guidance:

- Expert mode inactive (default setting):
  In this mode, the Chematest 35 guides the user step-by-step through each measurement. The user has to confirm each step before the next step is displayed.
- Expert mode active:
  The expert mode is intended for experienced users who are already familiar with the respective measurement methods and want a faster workflow. Only the most necessary information (e.g. required reagents, reaction times) is displayed on the screen.

This setting can be changed under menu item <Menu>/<Settings>/<Miscellaneous>/<Expert mode>.

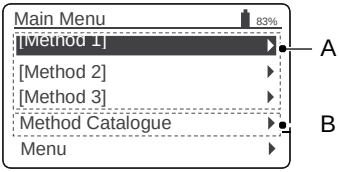
3.4. Optional: Set up user and/or ID list

Navigate to <Menu>/<Settings>/<Identification>/<Attribute> and select which attributes should be saved with each measurement (none/user/ID/user and ID).

If applicable, enter the user and/or ID list under <Menu>/<Settings>/<Identification> /<ID List> and <Menu>/<Settings>/<Identification> /<List of Users>.

3.5. Optional: Set up a fixed quick start list

By default, the instrument is configured to display the last three methods selected from the method catalogue [B] in the quick start list [A], with the last selected method at the topmost position, then the second last, then the third last.



A *Quick start list*
B *Method catalogue*

Alternatively, it is possible to set up a fixed quick start list. To do this, proceed as follows:

1. Select the required methods from the method catalogue [B] in reverse order: First number 3, then number 2, then number 1 (the measurement can be cancelled immediately after selecting the method by pressing [Exit]).
2. Navigate to <Menu> / <Settings> / <Miscellaneous> / <Method save> and select "No".
   ⇒ *The quick start list contains the three methods just selected and will no longer change.*

3.6. Further settings

Detailed descriptions of all instrument settings can be found in chapter Menu explanation, subsection 4 Settings, p. 30.

3.7. Sensor calibration

Before first use, calibrate your pH and/or redox sensors, see Calibration of the pH Sensor, p. 22 and Calibration of the Redox Sensor, p. 22.

NOTICE: *The transport cap that the sensor comes with can be disposed of. Only use the specially designed protection caps for the storage of sensors (see Basic Rules for pH and Redox, p. 16 for details).*

4. Measuring

4.1. Photometry

4.1.1 Basic Rules for Photometric Determinations

The precision and repeatability of a photometric determination depends greatly on the operator's technique. Please observe the following rules:

Always use clean utensils

Residues from previous measurements can falsify the results. All utensils such as syringes, cuvettes or similar and the cuvette cap must be rinsed with clean water after each measurement. Rinse the cuvette with the sample 2 to 3 times before each measurement.

Position cuvettes correctly

Cuvettes must always be positioned in the same way. Keep the cuvette free of fingerprints and dry the outside of the cuvette before inserting it into the cuvette adapter.

Wipe off condensation

If condensation occurs on the cuvette (cold sample in a warm environment), wipe it off and carry out the measurement as quickly as possible.

Observe proper sampling

Take the water samples about 10 cm below the water surface and about 50 cm from the edge of the pool. Allow as little time as possible to elapse between taking the sample and making the measurement.

Observe proper dosing and mixing

Use the 10 ml syringe for exact dosing of the sample. Rinse the syringe several times with the sample. When filling the syringe, make sure that there are no air bubbles and that the volume is 10 ml.

The order in which sample and reagents are added to the cuvette varies from method to method. If the reagents are added to the cuvette after the sample, special care must be taken to ensure that

the sample and the reagents mix well. For this purpose, carefully turn the closed cuvette over, but do not shake it.

Observe reaction times

With most methods, the measurement can be carried out immediately after the reagents have been added and mixed with the sample. If a reaction time is required, this is indicated to the user on the screen.

4.1.2 How To Use Reagents

Whenever possible, Swan supplies reagents in liquid form, as used in professional laboratories. We believe that the disadvantage of shorter shelf life is more than compensated for by the ease of use compared to tablets or powders.

The OXYCON-DPD reagent is delivered in two small bottles to increase shelf life. One contains DPD as powder (DPD 1a), the other contains the solvent (DPD 1b). Before use, fill the contents of DPD 1b into DPD 1a, close the bottle with the drop counter and shake firmly until the DPD powder has completely dissolved. Write the mixing date on the bottle. The prepared reagent can be stored at room temperature for 2 months.

The reagents OXYCON START and OXYCON 2 have a shelf life of at least 6 months. They will last a year if handled carefully and stored at 5 °C. With the blister pack, all reagents can be taken out of the case at once and placed in the refrigerator.

To dispense the necessary number of drops, hold the bottle at a 45° angle. Before proceeding with the measurement, make sure that the reagents are well mixed with the sample.

The Chematest 35 is calibrated against Swan's OXYCON reagents. Accuracy may suffer severely, when reagents from other sources are used.

4.1.3 Notes on Individual Methods

Free chlorine

When free chlorine is determined in the presence of cyanuricacid, two forms of chlorine are measured: free chlorine and chlorine bound to cyanuric acid. To determine the disinfection capacity of the water, the concentration of cyanuric acid must also be measured and the result of the chlorine determination must be corrected as follows:

Cyanuric acid	20 mg/l	30 mg/l	50 mg/l	70 mg/l
Percentage of free chlorine in the measured value	50%	43%	26%	19%

Combined chlorine

The method catalogue of the Chematest 35 contains two options for measuring combined chlorine: with one cuvette or with two cuvettes. Apart from the fact that one or two cuvettes are used, the two methods are identical. Measuring with only one cuvette is faster and requires less reagents. However, some standards require measurement with two cuvettes. The selection of the method should be based on the site-specific requirements.

Ozone

Ozone decomposes in a very short time and is usually only present in traces. It is essential to rinse the cuvette three times with the ozone-containing water before filling in the actual sample. Carry out the further steps as quickly as possible, but workmeticulously.

4.1.4 Performing a Photometric Measurement

WARNING

Health hazard
For safe handling of the reagents, you must read and understand the corresponding Material Safety Data Sheets (MSDS). These can be downloaded from **www.swan.ch**.

Explanation of photometric measurements

The basic procedure is largely the same for all photometric measurements and is briefly outlined below. A photometric measurement consists of the following steps:

- Step 1: Zero measurement
- Step 2: The actual measurement
- Step 3: Display and storage of the measured results. For details on the result screen, see example on 15.

The methods differ mainly in the following points:

- Different reagents are required depending on the method.
- Some methods require a reaction time. If this is the case for the selected method, this will be indicated on the screen during the measurement.
- Some methods (e.g. combined chlorine) perform two different measurements in a row and calculate the required values from them.

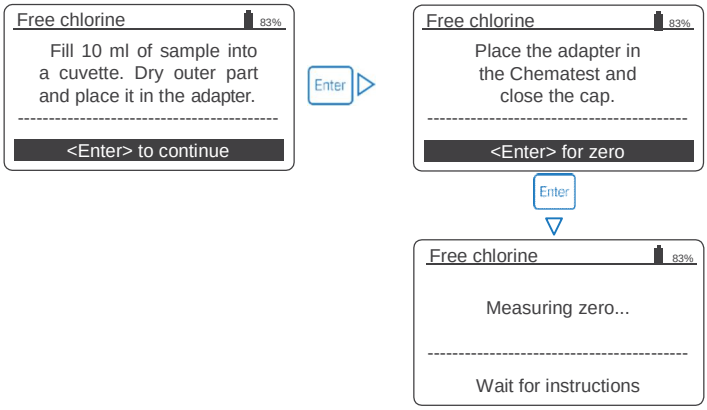
Starting a measurement

To start a measurement, select the corresponding method from the main screen. If it is not available there, select it from the method catalogue.

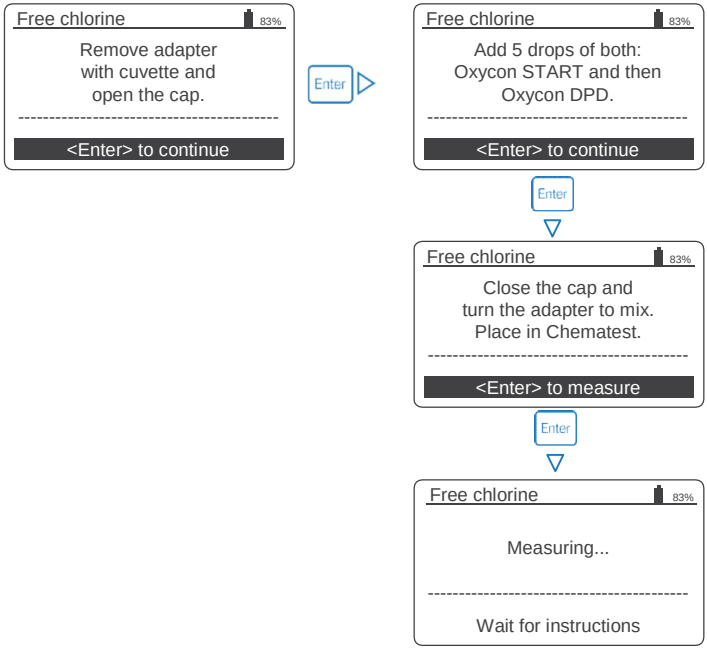
The measurement itself is menu-driven. Follow the instructions on the screen.

Example: Measurement of free chlorine

Step 1: Zero measurement



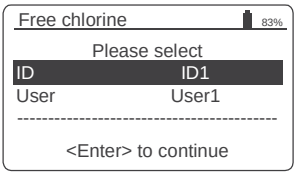
Step 2: The actual measurement



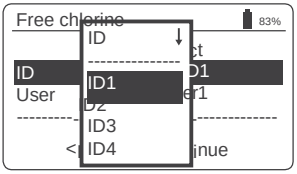
Step 3: Display of the results

- Pressing [Enter] saves the measurement in the data history
  ⇒*The measurement is initially saved without ID and user.*

  ***NOTICE:** Pressing [Exit] discards the measurement.*

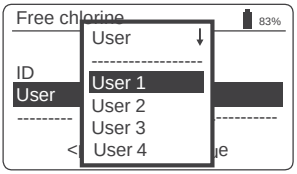


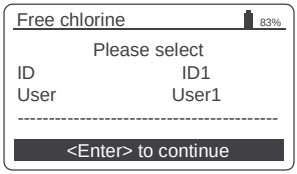
⇒ *Depending on the configuration, a selection dialog for user and/or ID is displayed or the summary screen is displayed directly. This can be set under Attribute, p. 31.*



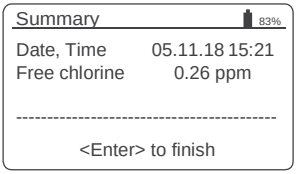
- Optional:
  – Select an ID from the list.
  – Select a user from the list.

  ***NOTICE:** If you press [Exit] at this point, you return to the main screen, saving the measurement without user and ID.*





- Select "<Enter> to continue" and confirm with [Enter].
  ⇒ *The ID and the user are added to the measurement in the data history.*



- Press [Enter] to return to the main screen.

4.2. Sensors

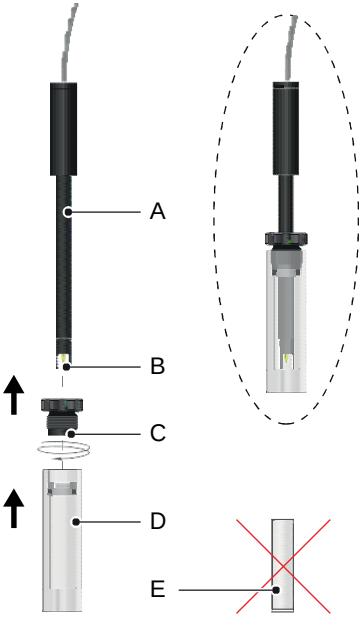
A pH and a redox sensor are available as accessories for the Chematest 35. Please observe the following recommendations to take full advantage of the sensor performance:

4.2.1 Basic Rules for pH and Redox

Cover the sensor tip while the sensor is not in use

After use, store the sensor in the supplied protection cap [D]. To create a humid atmosphere, add a few drops of water to the protection cap. Then slide the knurled nut [C] onto the sensor shaft, push the sensor shaft into the protection cap as far as it will go and screw the knurled nut [C] tightly to seal it.

Swan's maintenance-free pH and redox sensors must not be refilled with electrolyte.



A *Sensor shaft*
B *Sensor tip*
C *Knurled nut*
D *Protection cap*
E *Transport cap*

NOTICE: *The transport cap [E] that the sensor comes with is not intended for daily use and can be disposed of.*

Calibrate electrodes periodically

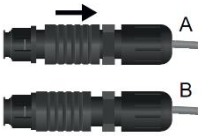
During their lifetime, all electrodes slowly change their properties. To ensure correct measurement, calibrate your electrodes monthly. The sensors also need to be calibrated before their first use.

Handling calibration standards

Use the standards at room temperature. Rinse the sensors with clean water before dipping them into the standards. Be careful not to interchange the bottle caps of the standards.

4.2.2 Unlocking the sensor plug

Before plugging in or out the sensor, unlock the plug as shown in the picture below.



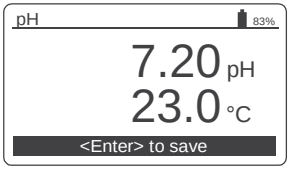
A *Plug unlocked*
B *Plug locked*

4.2.3 Performing a Sensor-Based Measurement

To start a measurement, plug the sensor cable into the sensor socket and then select the corresponding method from the main screen. If it is not available there, select it from the method catalogue.

pH determination

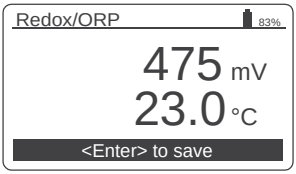
Remove the protection cap from the sensor, rinse the sensor tip with clean water and dip the sensor into the sample. Move the sensor gently several times before letting it stand. The displayed pH and temperature values are updated continuously.



Wait until both the pH value and the temperature value are stable. Then press [Enter] to save the result. Next you can optionally select an ID and/or a user name. This procedure is described in detail on 15.

Redox determination

Remove the protection cap from the sensor, rinse the sensor tip with clean water and dip the sensor into the sample. Move the sensor gently several times before letting it stand. The displayed redox and temperature values are updated continuously. It may take 15–20 minutes until the reading is stable. With freshly calibrated electrodes, it might even take more time.



Wait until both the redox value and the temperature value are stable. Then press [Enter] to save the result. Next you can optionally select an ID and/or a user name. This procedure is described in detail on 15.

4.3. Automatic Shutoff

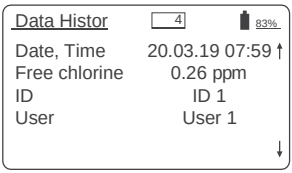
If the instrument is waiting for a user input (e.g. if the measurement result is displayed) and no key is pressed for 10 minutes, the instrument shuts off automatically to save power. The automatic shutoff has the same effect on the saving of measurement results as pressing the [Exit] key. See Step 3: Display of the results, p. 15 for details.

5. Recalling Stored Measurements

Data history

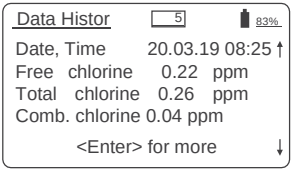
Previous measurements can be displayed under the menu item <Menu> / <Data Storage> / <Data History>.

Scrolling through the data history

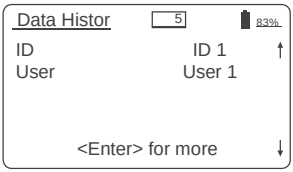


- Press the ARROW DOWN and ARROW UP keys to scroll through the data history.

Two-page entries



- If the text “<Enter> for more” is displayed on the bottom, the selected entry consists of two pages. Use the ENTER key to toggle between the pages.



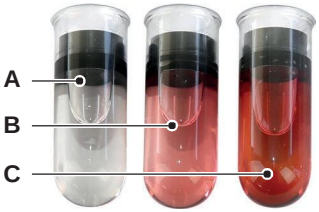
Storage capacity

Up to 2700 measurements are memorized. Then the oldest measurement is deleted to save the newest one (circular buffer).

6. Maintenance

6.1. Photometer Verification

The verification kit contains two reference cuvettes (labeled “Low” and “High”) with certified reference absorptions of approximately 0.3 and 1.5 and an additional cuvette for zero point determination. The exact values are specified in the enclosed calibration certificate. The absorption values of the reference cuvettes simulate approximately 1 ppm and 4.5 ppm of free chlorine.



A *Zero*
B *Low absorption*
C *High absorption*

Reference values

Prior to performing the first verification and after each recertification, the reference values for the cuvettes “Low” and “High” need to be set in menu <Settings>\<Sensors>\<Photometer>. The reference values are specified in the enclosed calibration certificate.

Verification procedure

Before each use, check the expiration date on the calibration certificate. If the expiration date has passed, send the verification kit to Swan for recertification.

To start a verification, navigate to <Menu>/<Maintenance>/<Verification>/<Photometer>. Select cuvette “Low” and follow the instructions on the screen. Repeat the same procedure with the cuvette “High”.

Verification history

Can be reviewed in <Menu>/<Data Storage> /<Ver. History>.

Up to 32 verifications are memorized. Then the oldest verification is deleted to save the newest one (circular buffer).

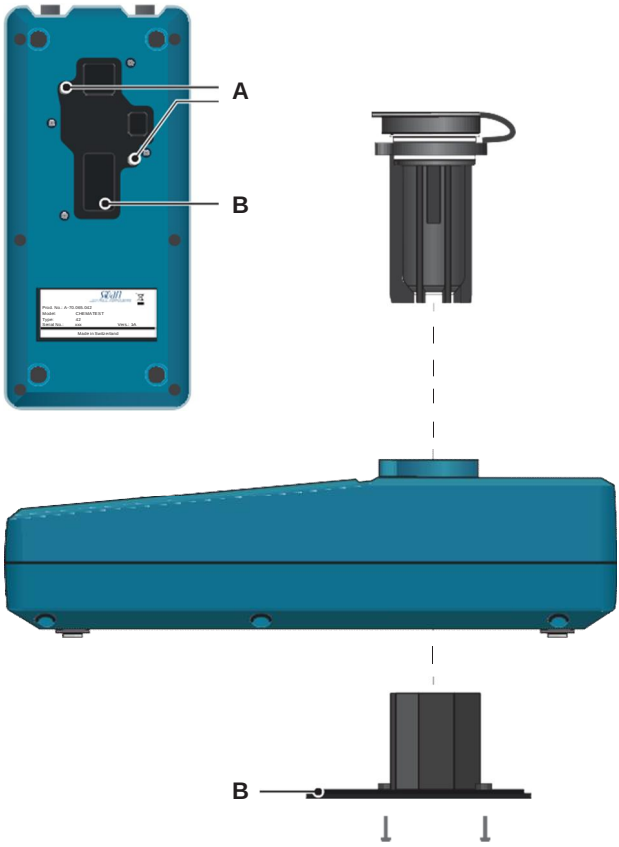
6.2. Cleaning

Outside of the housing

If reagents drip onto the housing, wipe them off quickly with a soft cloth moistened with water.

Photometer compartment

The photometer compartment can be easily cleaned if water or reagents have been spilled. Turn the unit to the rear, loosen the two screws [A] and remove the cover [B]. Use a soft, lint-free cloth moistened with water to clean the photometer compartment.



A *Screws* ***B*** *Photometer cover*

6.3. Calibration of the pH Sensor

To start a calibration, navigate to <Menu>/<Maintenance>/ <Calibration>/<Electrode> /<pH> and follow the instructions on the screen.

Calibration solutions

The calibration is carried out using two calibration solutions. The instrument is factory programmed for the use of calibration solutions with pH 7 (standard 1) and 9 (standard 2) supplied by Swan. If other calibration solutions are used, the corresponding temperature curves can be entered under <Settings>/<Sensors>/<Electrode>/ <pH>/<Standards>.

Calibration errors

If the calibration is aborted with the message “Offset error!” or “Slope error!”:

- Make sure that the correct standard solutions have been measured in the correct order. The programmed values can be viewed under <Menu>/<Settings>/<Sensors>/<Electrode>/ <pH>/<Standards>.
- Carefully clean the sensor tip with a paper tissue.
- Repeat the calibration with new standard solutions.

If the above steps do not help, the sensor is defective and must be replaced.

Calibration history

Can be reviewed in <Menu>/<Data Storage> /<Calibration History>/<Sensors>/<pH>. Up to 32 calibrations are memorized. Then the oldest calibration is deleted to save the newest one (circular buffer).

6.4. Calibration of the Redox Sensor

To start a calibration, navigate to <Menu>/<Maintenance>/ <Calibration>/<Electrode> /<Redox/ORP> and follow the instructions on the screen.

Standard solution

The instrument is factory programmed to use the 475 mV standard solution supplied by Swan. If another standard solution is used, the mV value can be set under <Settings>/<Sensors>/<Electrode>/ <Redox/ORP>/<Standards>.

Calibration errors

If the calibration is aborted with the message “Offset error!”:

- Make sure that the correct standard solution has been measured. The programmed value can be viewed under <Menu>/<Settings>/<Sensors>/<Electrode>/<Redox/ORP>/<Standard>.
- Carefully clean the sensor tip with a paper tissue.
- Repeat the calibration with a new standard solution.

If the above steps do not help, the sensor is defective and must be replaced.

Calibration history

Can be reviewed in <Menu>/<Data Storage>/<Calibration History>/<Sensors>/<Redox/ORP>. Up to 32 calibrations are memorized. Then the oldest calibration is deleted to save the newest one (circular buffer).

6.5. Setting Time and Date

The correct setting of the clock is important for the identification of stored measurements. It is therefore recommended to check the date and time setting regularly.

The time and date can be set under the menu item <Menu>/<Maintenance>/<Set Time>.

7. Troubleshooting

This chapter contains some hints to facilitate troubleshooting. For detailed information on handling and cleaning parts, see Maintenance, p. 20. For detailed information on programming the instrument, see Menu Explanations, p. 27.

7.1. Device Errors

⚠ When this symbol is displayed at the top of the screen, a device error has occurred. Navigate to <Menu>/<Diagnostics>/<Alarms>/<Pending errors> to see the error message.

Error	Description	Corrective action
E001	Bluetooth	– Switch the instrument on and off and check if the error disappears. – Call support.
E002	IC ADC	– Call support. – Send the instrument back to Swan.
E003	Factory data	– Call support. – Send the instrument back to Swan.
E004	Invalid time	– Set time and date under <Menu>/<Maintenance>/<Set Time>.
E017	Events erased	– No action necessary. – This message informs that the measured data have been deleted by calling the function “Set to factory defaults”.

7.2. Errors During Measurement

Measurement cannot be started

Error message: Operation not possible! Consult the manual.

Possible cause	Corrective action
Error E002, E003 or E004 is present	◆ See Device Errors, p. 24.

Zero measurement fails

Error message: Operation not possible! Signal out of range. Consult the manual.

Possible cause	Corrective action
Extraneous light	◆ Make sure that the cuvette cap is properly closed.
Cuvette dirty	◆ Clean and rinse the cuvette.
Residues of reagents	◆ Clean and rinse the cuvette.
Lenses dirty	◆ Open the photometer compartment and clean all lenses, see Cleaning, p. 21.
Turbid or bubble-containing sample	◆ Avoid formation of bubbles when filling the sample into the cuvette. ◆ Check sample / sampling point. ◆ Repeat measurement.

Measurement fails

Error message: Operation not possible! Signal out of range. Consult the manual.

Possible cause	Corrective action
Extraneous light	◆ Make sure that the cuvette cap is properly closed.
Cuvette dirty	◆ Clean and rinse the cuvette.
Concentration or pH value outside the measuring range of the instrument	◆ Consult Instrument Specifications, p. 39. ◆ Repeat measurement.
Reagents expired	◆ Use new reagents.
Measured value below zero value	◆ Avoid formation of bubbles when filling the sample into the cuvette. ◆ Repeat measurement.

No connection to sensor

Error message: Operation not possible! Sensor not connected! Consult the manual

Possible cause	Corrective action
Sensor not connected.	◆ Check if the sensor is properly plugged in.
Wrong sensor connected.	◆ Check if the connected sensor corresponds to the selected method.
Cable or sensor defective	◆ Call support.

Sensor calibration invalid

Error message: Operation not possible! Invalid calibration data! Consult the manual

Possible cause	Corrective action
Sensor not calibrated.	◆ Calibrate the sensor as described in Maintenance, p. 20.

Sensor failure

Error message: Operation not possible! Sensor failure! Consult the manual

Possible cause	Corrective action
The sensor was disconnected from the instrument while a measurement was running.	◆ Do not disconnect the cable from the instrument until the measurement is finished.
Cable or sensor defective	◆ Call support.

8. Menu Explanations

Selecting <Menu> on the main screen displays the following sub-menus:

- Menu 1 Data Storage
- Menu 2 Diagnostics
- Menu 3 Maintenance
- Menu 4 Settings

The functions and settings of each menu are explained in the following sections.

1 Data Storage

1.1 Data History

Displays saved measurement data. Each record includes the following data:

- Date, time
- Measured value(s)
- ID
- User

If the fields ID and User contain the text "<Empty>", the assignment of the attributes to the measurement was skipped by the user or deactivated under 4.2 Identification, p. 31.

Up to 2700 measurements are memorized. Then the oldest measurement is deleted to save the newest one (circular buffer).

1.2 Verification History

Photometer

Displays previous photometer verifications. Each record includes the following data:

- Date, time
- Reference value
- Deviation
- User
- Verification passed/failed

Up to 32 verifications are memorized. Then the oldest verification is deleted to save the newest one (circular buffer).

1.3 Calibration History

Sensors — Displays previous calibrations of the pH, redox and conductivity sensors.

Each record includes the following data:

- Date, time
- Measured values depending on sensor:
  - pH: Offset and slope in mV
  - Redox: Offset in mV
  - Conductivity: not yet available
- User
- Calibration passed/failed

NOTICE: *For better traceability, both successful and failed attempts are stored in the calibration history. However, if a calibration fails, the instrument will continue to use the last valid calibration.*

Up to 32 calibrations are memorized for each sensor. Then the oldest verification is deleted to save the newest one (circular buffer).

2 Diagnostics

2.1 Alarms

Pending errors — Provides the list of active errors with their status (active, acknowledged). If an active error is acknowledged, it is moved to the Message List.

Message List — Shows the error history: Error code, date and time of issue and status (active, acknowledged, cleared). 64 errors are memorized. Then the oldest error is cleared to save the newest error (circular buffer).

The meaning of each error message is explained in section Device Errors, p. 24.

2.2 Identification

Designation: Designation of the instrument, e.g. Chematest 35.

S/N: Serial number of the instrument.

Version: Installed firmware version (e.g. V1.03-04/19).

Bootloader: Installed bootloader version (e.g. V.1.01).

Factory test: Test date of the instrument.

2.3 Sensors

Photometer	Displays the raw value of the photo diode in volts.
Electrode	Displays the raw values of the connected sensor.
Battery	Displays information about the state of the battery.

2.4 Bluetooth

Device name	ID that is visible to other Bluetooth-enabled devices.
State	Status of Bluetooth communication. ◆ *Disabled:* Bluetooth is switched off. ◆ *Advertising*: The instrument is searching for other devices. ◆ *Connected:* A connection with another device has been established.
MAC	Hardware address of the Chematest 35, which serves as a unique identification feature during Bluetooth communication.
Fw ver	Firmware version of the Bluetooth module.
Hw ver	Hardware version of the Bluetooth module.

3 Maintenance

3.1 Simulation

For test purposes a measurement can be made with one or both LEDs on. The results are displayed as raw values in volts. In case of problems in the field, Swan Support may ask for these values.

LED Green	Performs a test measurement with the green LED on.
LED IR	Performs a test measurement with the IR LED on.
Both LEDs	Performs three consecutive measurements: ◆ both LEDs off ◆ green LED on ◆ IR LED on

3.2 Calibration

Electrode	pH: See Calibration of the pH Sensor, p. 22. Redox/ORP: See Calibration of the Redox Sensor, p. 22 Conductivity: Sensor not yet available

3.3 Verification

Photometer	See Photometer Verification, p. 20.

3.4 Set Time

Adjust date and time.

4 Settings

4.1 Sensors

Photometer
Enter the reference values of the verification cuvettes according to the enclosed calibration certificate.
Range: 0.000– 2.000

Electrode pH

Filter time constant
Used to damp noisy signals. The higher the filter time constant, the slower the system reacts to changes of the measured value.
Range: 5–300 s

Temp. Comp.
Choose the compensation model which fits best to your application.

Temp. Comp.
None
Nernst
Coefficient

- **None**: no temperature compensation.
- **Nernst**: for potable water, waste water, swimming pools.
- **Coefficient**: for high purity water
  Range: −0.100–0.100 pH unit per °C

NOTICE: *For this setting the unit °C is always used, regardless of the setting under* *4.3 Units, p. 32**.*

Standards
A temperature curve is programmed for SWAN standard 1, pH 7 and SWAN standard 2, pH 9. If you want to use your own standards you can readjust the temperature curve according to your standards.

- **Standard 1**: Assign the measured pH value to the according temperature from 0–50 °C in steps of 5 °C.
- **Standard 2**: Assign the measured pH value to the according temperature from 0–50 °C in steps of 5 °C.

Electrode Redox/ORP

Filter time constant
Used to damp noisy signals. The higher the filter time constant, the slower the system reacts to changes of the measured value.
Range: 5–300 s

Standard
Enter the mV value of the redox/ORP standard.
Range: 200–900 mV

Electrode Conductivity (not yet available)

Temp. Compensation: Choose the compensation model which fits best to your application.

Temp. Compensation
None
Coefficient
Non-linear DIN

- **None**: No temperature compensation.
- **Coefficient**: The temperature coefficient for saline solutions is 2.00%. If the coefficient of the solution is known, it can be set here. Range: 0.00%–3.00%.
- **Non-linear DIN**: the non-linear temperature compensation should be set for the conductivity measurement of natural waters (EN 27888, ISO 7888).

Filter time constant: Used to damp noisy signals. The higher the filter time constant, the slower the system reacts to changes of the measured value.
Range: 5–300 s

Cell constant: Enter the cell constant printed on the sensor label.
Range: 0.0050–1.0000 cm^{-1}

Factor TDS: Factor for the calculation of TDS.
Range: 0.00–10.00

4.2 Identification

Optionally, each measurement can be assigned an ID (e.g. for sampling points) and/or a user name. If activated, the ID and/or user is queried at the end of each measurement.

Attribute: Select which attributes are to be queried:

Attribute
None
ID
User
ID&User

ID List: Enter up to 10 IDs.

List of Users: Enter up to 10 user names.

4.3 Units

Disinfectants — Set the unit for disinfectants (all except ozone).

Disinfectants
ppm
mg/l

Ozone — Set the unit for ozone.

Ozone
ppb
µg/l
ppm
mg/l

Temperature — Set the unit for temperature.

Temperature
Celsius
Fahrenheit

Cond. Concentration — Set the unit for the concentration calculated from conductivity.

Cond. Concentration
ppm
mg/l

4.4 Miscellaneous

Language — Select the language from the list (the choice of languages may vary depending on the sales region):

Language
German
English
French
Spanish
Italian

Factory Setting

The instrument can be reset to factory default values in three different ways:

Set defaults
No
Cal. + Ver.
Data History
Completely

- **Cal. + Ver.**: Deletes the user calibration of all electrodes and all recorded verification measurements. All other values are kept in memory.
- **Data History**: Deletes all recorded measurements. All other values are kept in memory.
- **Completely**: Sets all settings and calibration values back to default and deletes all recorded measurements and verifications.

Load Firmware

Initiates a firmware upload.

NOTICE: *Firmware updates should be done by instructed service personnel only.*

Load Firmware
No
Yes

Expert mode

Choose between detailed instructions and expert mode for fast workflow.

Expert Mode
Inactive
Active

- **Inactive**: The user is guided step by step through each measurement.
- **Active**: The steps are displayed in shortened form and the instrument requires as few inputs from the user as possible.

Method save

By default, the quick start list on the main screen contains the last three methods selected from the method catalogue. Alternatively, a fixed quick start list can be set up, see Initial Setup, p. 8 for details.

Method save
No
Yes

- **No**: As soon as "no" is selected, the quick start list no longer changes. Select this setting if you want a fixed quick start list.
- **Yes**: With this setting, the quick start list is automatically adjusted every time a method is selected from the method catalogue. The last selected method appears at the topmost position, then the second last, then the third last.

Password

Password: Select a password different from 0000 to prevent unauthorized access to the following menus:

- Maintenance
- Settings

Each menu can be protected by a different password. If you forgot the passwords, contact the closest SWAN representative.

4.5 Bluetooth

Bluetooth

Activates the Bluetooth connection to connect to an external app (not yet available).

Bluetooth
Active
Inactive

9. Part Numbers

9.1. Reagents

Reagent sets

Part no.	Product name	Methods
A-85.590.200	Oxycon Pool	◆ Free chlorine ◆ pH (phenol red)
A-85.590.300	Oxycon Chlor	◆ Free chlorine ◆ Total chlorine ◆ Combined chlorine
A-85.590.400	Oxycon Des	◆ Free chlorine ◆ Free chlorine in presence of chlorine-dioxide or bromine ◆ Chlorine-dioxide ◆ Bromine ◆ Iodine
A-85.590.500	Oxycon Ozone	◆ Ozone ◆ Ozone in presence of free chlorine
A-85.580.300	Oxycon CA	◆ Cyanuric acid
A-85.580.100	Oxycon pH	◆ pH (phenol red)

Reagents

Part no.	Product name	Description
A-85.510.100	Oxycon Start	Buffer solution
A-85.510.200	Oxycon DPD (1a + 1b)	DPD
A-85.510.300	Oxycon 2	Potassium iodide
A-85.580.200	Oxycon GL	Reagent for masking of free chlorine and ozone

Download MSDS

The current Material Safety Data Sheets (MSDS) for the above listed reagents are available for downloading at **www.swan.ch**.

Calibration solutions

Part no.	Description
A-85.119.010	pH calibration set consisting of: ◆ 1x pH buffer 7 (40 ml) ◆ 1x pH buffer 9 (40 ml)
A-85.112.300	pH buffer 4 (40 ml)
A-85.113.300	pH buffer 7 (40 ml)
A-85.114.300	pH buffer 9 (40 ml)
A-85.121.300	Redox buffer 475 mV (40 ml)

9.2. Accessories

Part no.	Description
A-85.153.580	Veri-Kit Transmission
A-87.160.014	Swansensor pH CT
A-87.460.014	Swansensor Redox CT

9.3. Spare Parts and Consumables

Part no.	Description
A-70.065.205	Carrying case for Chematest 35/42
A-70.065.634	Protection cap for sensor
A-70.065.630	Cuvette adapter with cap
A-70.065.631	Glass cuvettes (10-pack)
A-70.065.633	Spare part set consisting of: ◆ 1 dropper bottle 125 ml ◆ 3 disposable syringes 10 ml ◆ 3 disposable syringes 20 ml

Part no.	Description
C-85.520.040	Cleaning wipes for cuvette (100-pack)
A-70.065.600	Brush for cuvette cleaning
C-88.917.200	USB charging cable
C-89.511.010	Blister pack for reagent bottles

10. Technical Data

10.1. List of Supported Methods

Photometry The Chematest 35 supports the following photometric methods:

	Method	Range	Issued values	Displayed as
Chlorine	◆ Free chlorine	0–10 ppm	Free chlorine	ppm or mg/l
	◆ Total chlorine	0–10 ppm	Total chlorine	ppm or mg/l
	◆ Combined chlorine using one cuvette	0–10 ppm	Free chlorine (fac), total chlorine (tc), combined chlorine (cc)	ppm or mg/l
	◆ Combined chlorine using two cuvettes	0–10 ppm	Free chlorine (fac), total chlorine (tc), combined chlorine (cc)	ppm or mg/l
	◆ Free chlorine in presence of chlorine-dioxide or bromine	0–10 ppm	Free chlorine	ppm or mg/l
Other disinfectants	◆ Ozone	0–4000 ppb	Ozone	ppb, µg/l, ppm or mg/l
	◆ Ozone in presence of free chlorine	0–4000 ppb	Ozone	ppb, µg/l, ppm, mg/l
	◆ Bromine	0–23 ppm	Bromine	ppm, mg/l
	◆ Iodine	0–35 ppm	Iodine	ppm, mg/l
	◆ Chlorine-dioxide	0–19 ppm	Chlorine-dioxide	ppm, mg/l
Other parameters	◆ Cyanuric acid	0–100 ppm	Cyanuric acid	ppm
	◆ pH (phenol red)	6.5–8.0	pH	n/a

Sensors

The pH and redox sensors available as separate accessories measure in the following ranges:

Method	Range	Issued values	Displayed as
◆ pH	1.00–13.00	pH, temperature	n/a
◆ Redox/ORP	−400–1200 mV	Redox potential, temperature	mV

10.2. Instrument Specifications

Housing

IP67 rated

Power supply

Rechargeable lithium-ion battery.

Only charge the instrument using a standard type A USB socket and the supplied USB cable. Protect from heat and splash water during charging (not IP67).

Charging time: approximately 3 hours

Battery life: approximately 5000 measurements or one week of standby operation

Automatic shutoff after 10 minutes of inactivity.

Conditions for operation

Temperature: 0–45 °C
Humidity: 0–100% relative humidity (non-condensing)

Conditions for storage:

Temperature: −20–60 °C
For reagents and sensors, separate storage conditions apply.
Reagents: See label on packaging.
Sensors: 0–50 °C.

Dimensions and weight

Instrument:
10 x 7 x 22 cm, 390 g

10.3. Sensor Specifications

10.3.1 pH and redox

Swansensor pH CT

Measuring range:	1–13
Resolution	0.01

Automatic temperature compensation with integrated sensor.
DIN/NIST or technical buffers.

Swansensor Redox CT

Pt-redox electrode with integrated temperature sensor for consistent data records.

Measuring range:	−400–1200 mV
Resolution:	1 mV

General characteristics

Poisoning-protected reference systems with solid electrolyte and robust open junction diaphragm

Temperature range:	0–50 °C
Pressure:	≤ 2 bar
Conductivity of sample:	≥ 100 µS/cm
Reference system:	Ag/AgCl
Solid electrolyte:	3.5 M KCl (AgCl-free)
Diaphragm:	open junction
Connection:	1 m cable with 4-pin connector

11. Regulatory Information

This product contains a third party Bluetooth module, which has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.
Contains FCC ID: T9JRN4020

This product meets all requirements of the relevant EU directives. The declaration of conformity is available from Swan on request.

According to EU legislation, this product must not be disposed of with household waste. Observe the local regulations for the disposal of electronic equipment.

12. Notes

SWAN

is represented worldwide by subsidiary companies and distributors.

cooperates with independent representatives all over the world.

SWAN Products

Analytical Instruments for:

- High Purity Water
- Feedwater, Steam and Condensate
- Potable Water
- Pool and Sanitary Water
- Cooling Water
- Waste Water and Effluents

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