70 NEX

MADE IN ITALY

pH - Cond - PC

INSTRUCTION MANUAL

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1. Introduction

XS Instruments, globally recognised as a leading brand in the field of electrochemical measurements, has developed this new line of portable instruments, manufactured entirely in Italy, finding the perfect balance between performance, attractive design and ease of use.
The robustness and integrity of the case, the compact dimensions that allow for one-handed use and the practical carrying case make this instrument ideal for measurements directly in the field.
The innovative high-definition graphic display shows all the necessary information, such as the measurement, temperature, buffers used for the last calibration, stability status and GLP data, to offer the user an exceptional measurement experience.
Anyone can use these instruments thanks to the instructions that appear directly on the display. Calibration is guided step-by-step, and the instrument's configuration menu is multilingual, intuitive and easy to navigate. In low-light conditions, the full-screen measurement display can be activated.
pH calibrations of up to 5 points can be performed using the USA, NIST and DIN buffer series. It is also possible to use user-defined values. The measurement resolution is to the thousandth, and three different levels of signal stability can be selected.
It is also possible to perform a guided calibration using a pH simulator.
Using the ORP parameter, the offset of a redox sensor can be adjusted using a known standard value.
The instrument automatically recognises 5 conductivity standard solutions, and one can be entered manually. In the COND 73 NEX instrument, the 4-ring conductivity sensor ensures accuracy across the entire measurement range.
Various conversion factors are available for TDS to allow for different types of analysis.
Unique in its kind is the innovative multi-parameter display. The user can choose to display up to 4 parameters along with their corresponding temperature. The choice of parameters to display is entirely at the discretion of the instrument user.
Calibration reports can always be consulted, and the calibration due date feature makes the calibration process more efficient.
Automatic or manual data logger function with values storable in various GLP formats on the internal memory (1000 measurements) or on a PC.
Each saved measurement can be associated with an identifier for the sensor used, the user and the sample.
The ideal solution for an accurate and precise measurement is to use an *XS Instruments* device with an electrochemical sensor from the extensive *XS Sensor* range and to perform calibrations using certified *XS Solution* calibration solutions.

2. Safety information

Definitions of Warning Words and Symbols

The safety information contained in this manual is of the utmost importance to prevent personal injury, damage to the instrument, malfunctions or incorrect results due to failure to comply with it. Read this manual carefully in its entirety and ensure you are familiar with the instrument before putting it into operation and starting to work with it. This manual must be kept near the instrument so that the operator can consult it when necessary.
Safety instructions are indicated by warning symbols:



Warning
This symbol indicates a potential risk and warns you to proceed with caution



Warning
This symbol draws attention to a potential hazard due to **electric current**.



Caution
The instrument must be used in accordance with the instructions in the user manual. Read the instructions carefully.



Notice
This symbol draws attention to possible damage to the instrument or individual instrument parts.



Notes
This symbol highlights further information and tips.



Additional Documents Providing Safety Information

The following documents can provide the operator with additional information to work with the measuring system safely:

- operating manual for electrochemical sensors;
- safety data sheets for buffer solutions and other maintenance solutions (e.g. storage solution);
- specific product safety notes.

Intended Use

This instrument is designed exclusively for electrochemical measurements, both in the laboratory and directly in the field. Pay special attention to the technical specifications listed in the INSTRUMENT SPECIFICATIONS / TECHNICAL DATA table; any other use outside these specifications is to be considered unauthorised.
This instrument has been manufactured and tested in accordance with EN 61010-1 safety standards for electronic instruments and left the factory in perfect technical and safety condition (see the test report included in each package). The proper functioning of the device and the safety of the operator are guaranteed only if all standard laboratory safety regulations are respected and if all the specific safety measures described in this manual are followed.



Essential Requirements for Safe Use

The proper functioning of the device and the safety of the operator are guaranteed only if all the following instructions are followed:

- the instrument may only be used in accordance with the specifications mentioned above;
- when using the instrument with the power supply, use only the original model. For further information please contact your local distributor;

- The instrument must be operated exclusively under the environmental conditions specified in this manual.
- The only part of the instrument that can be opened by the user is the battery compartment.

Do not carry out any other operations unless explicitly authorised by the manufacturer.

Unauthorised Use



The instrument must not run if:

- it is visibly damaged (e.g. due to transportation);
- it has been stored for a long period of time under adverse conditions (exposure to direct light, heat sources or environments saturated with gases or vapours) or in environments with conditions different from those mentioned in this manual.

Maintenance of the Device



When used correctly and in a suitable environment, the instrument does not require any special maintenance procedures. It is recommended to occasionally clean the instrument case with a damp cloth and a mild detergent. This operation must be carried out with the instrument switched off and disconnected from the power supply, and only by qualified and authorised personnel. The housing is made of ABS/PC (acrylonitrile butadiene styrene/polycarbonate). This material is sensitive to certain organic solvents, such as toluene, xylene and methyl ethyl ketone (MEK). If liquids enter the housing, they could damage the instrument. If the device is not to be used for an extended period, cover the BNC connectors with the protective cap provided. Do not open the instrument housing: it contains no parts that can be maintained, repaired or replaced by the user. If you experience any problems with the instrument, please contact your local distributor. We recommend using only original spare parts. Contact your local distributor for further information. The use of non-original spare parts may lead to malfunction or permanent damage to the instrument. Furthermore, the use of spare parts not guaranteed by the supplier may be dangerous for the user. For the maintenance of electrochemical sensors, please refer to the documentation included in their packaging or contact the supplier.

Responsibility of the Instrument Owner



The person who owns and uses the instrument, or authorises its use by others, is the owner of the instrument and, as such, is responsible for the safety of all users of the instrument and of third parties. The instrument owner must inform users about the safe use of the instrument in the workplace and the management of potential risks, whilst also providing the necessary protective equipment. When using chemicals or solvents, follow the manufacturer's safety data sheets.

3. Instrument Specifications



Parameters



pH 70 NEX: pH, mV, ORP, Temp



Cond 73 NEX: Cond, TDS, Sal, Temp



PC 70 NEX: pH, mV, ORP, Cond, TDS, Sal, Temp

Technical Data

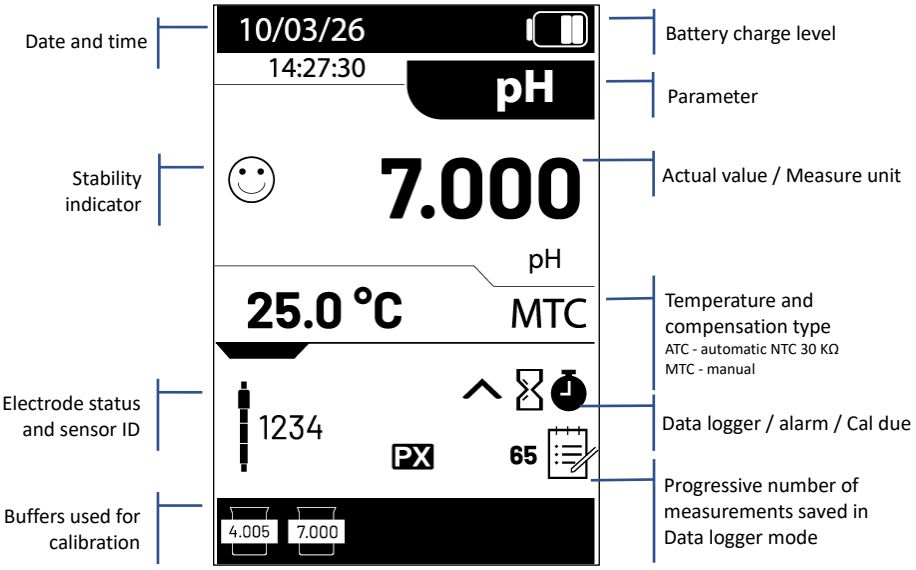


	70 NEX Series
pH	**pH 70 NEX - PC 70 NEX**
Measuring range	- 2…16
Resolution / Accuracy	0.1, 0.01, 0.001 / ± 0.005
Calibration points and recognised buffers	**AUTO:** 1…5 / USA, NIST, DIN **CUS:** 2 user values
Buffer indication	Yes
Calibration report	Yes
DHS sensor recognition	Yes
Stability criteria	Low – Normal – High
MIN/MAX value alarms	Yes
mV	**pH 70 NEX - PC 70 NEX**
Range / Resolution	Range: - 1000…+ 1900 / Resolution: 0.1 / 1
ORP	**pH 70 NEX - PC 70 NEX**
Calibration points	1 value / 475 mV
Conductivity	**COND 73 NEX - PC 70 NEX**
Range / Resolution	0.00 – 20.00 – 200.0 – 2000 µS / 2.00 – 20.00 – 500.0 mS *(1000 mS **COND 73 NEX**)* Automatic range
Calibration points and recognised buffers	1…5 / *(5.0 **COND 73 NEX**)* 84, 1413 µS, 12.88, 111.8 mS, 1 user value
Reference temperature	15…30 °C
Temperature coefficient	0.00…10.00 %/°C
TDS	**COND 73 NEX - PC 70 NEX**
Measuring range	0.1 mg/l…200 g/l (500 g/l ***COND 73 NEX***)
Conversion factor	Linear (0.4…1) / NaCl / KCl / 442
Salinity	**COND 73 NEX - PC 70 NEX**
Measuring range	0.1 ppm…100 ppt
Temperature	
Measuring range	- 10.0…110.0 °C
Resolution / Accuracy	0.1 / ± 0.5 °C
Temperature compensation ATC (NTC 30 KΩ) and MTC	0…100 °C
Data Logger	
Mode	Manual / Automatic (seconds – minutes – hours)
Internal memory	1000 measurements with ID saving, in non-volatile memory
System	
GLP with calibration timer	Yes
Password	Yes, numeric
Display	High-definition TFT, backlit
Simultaneous display screen	Yes, up to 4 parameters
HOLD function	Yes, on all parameters
Multilingual	Yes, 5 languages
Auto power off	Yes
Sleep mode	Off / 1–20 mins
IP protection	IP 65
Power supply	3 x 1.5 V AA batteries / 5 V adapter with USB cable
Sound level during standard operation	< 80 dB
Operating environmental conditions	0…+ 60 °C
Maximum permissible humidity	< 95 % non-condensing

Maximum operating altitude	2000 m
Instrument dimensions	160 x 75 x 45 mm
System weight	323 g
Relevant standards	EMC 2014/30/EU RoHS 2011/65/EU EN 61326-1 EN 61010-1

4. Instrument Description

Display



Keypad



5. Installation



Supplied Components

The instrument is always supplied in its own carrying case.

The version without a sensor always includes:

Instrument with batteries, USB A-C cable, 1 m S7/BNC connection cable, NT55 temperature probe, buffer solutions in single-dose bottles and/or sachets, screwdriver, beaker, electrode holder – *for multi-parameter only* – quick manual and test report. Versions with the sensor(s) already included are also available. Please contact your local distributor to be updated on the correct composition of the sales kit.

Commissioning

- The device leaves the factory ready to be used by the user.
- The batteries are already included.

Power Supply Connection



- In addition to batteries, the instrument can be powered through the mains supply;
- check that the electrical specifications of the circuit on which the device is to be installed comply with the voltage and operating frequency of the power supply;
- connect the 5 V power supply (not included, cod.50001612) to the USB cable and the other end of the cable (Type C) to the USB port on the side of the device;
- connect the power supply to an electric socket that is easily accessible.

In addition to the mains supply, power can also be drawn directly from a PC's USB port.

WARNING

Risk of death or serious injury due to electric shock .

Contact with live components can result in injury or death.

- **Use only the cable supplied and the original power supply unit.**
- **Do not allow the power supply to come into contact with liquids or to be placed in a damp environment.**
- **Avoid thermal shocks.**
- **All electrical cables and connections must be kept away from moisture or liquids.**
- **Check that the cables and plugs are not damaged; if they are, replace them.**
- **Do not cover the power supply and/or place it inside any containers whilst in use.**

Power on

Switch on the system by pressing the  button. The display initially shows the NEX logo along with the device model and software version. Then, the settings for the most important parameters and any information regarding the DHS sensor appear.

Batteries Replacement



The device operates on 3 x 1.5 V AA batteries. To replace them:

1. Switch off the device.
2. Turn the device over so that the display is facing downwards, ensuring you protect the display and keypad with a cloth.
3. Using the screwdriver provided, unscrew the 4 screws on the cover.
4. Slide the cover off; the screws are captive.
5. Remove the 3 used batteries and insert the new ones. Ensure the polarity is correct.
6. Reinsert the cover and tighten the 4 screws.

Instrument Transport



The instrument is always supplied with a dedicated carrying case. Use only the original case to transport the instrument. If you need to purchase a replacement, contact your local distributor.

Button Functions

Button	Press	Function
	Short	Press to switch the device on or off.
MODE	Short	In measurement mode, press to scroll through the different parameters: • **pH 70 NEX**: pH→ mV→ ORP→ MultiView • **COND 70 NEX**: Cond→ TDS→ Sal→ MultiView • **PC 70 NEX**: pH/EC→ pH→ mV→ ORP→ Cond→ TDS→ Sal→ MultiView In the general setup and on the ID keypad, move the cursor to the right.
CAL	Short	In calibration, setup and memory recall modes, press to return to measurement mode.
	Long press (3s)	In measurement mode, press and hold to start calibration.
SETUP	Short	In measurement mode, press to enter setup. In the setup menus, press to select the desired program and/or value. During calibration, press to confirm the value.
	Long press (3s)	In measurement mode, press and hold to access full-screen display. Press again to return to the standard display.
	Short	In the setup and sub-setup menus, press to scroll. In the setup submenus, press to change the value. In memory recall mode, press to scroll through the saved values. In MTC and customer calibration mode, press to change the value. : In measurement mode, press to save the data (Manual Data Logger) or to start and stop recording (Automatic Data Logger). : In measurement mode, press to recall saved data.
	Long press (3s)	In measurement mode, press and hold one of the two buttons to adjust the temperature in MTC mode (manual compensation, without probe). When the value starts flashing, the user can adjust the temperature value by entering the correct one. Then confirm with .

IMPORTANT:

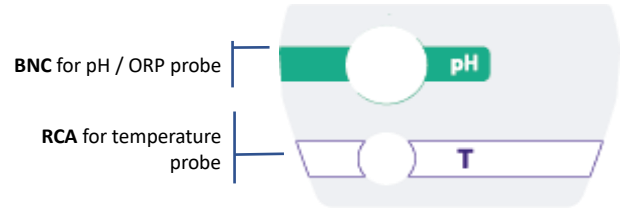
- When Sleep mode is active (by default after one minute of inactivity), press any button to reactivate the display backlight.
- Only at this point do the buttons regain their function.

Inputs / Outputs Connections

Use only original accessories guaranteed by the manufacturer.

If necessary, contact your local distributor. The BNC connectors are protected by a plastic cap at the time of delivery. Remove the cap before connecting the probes.

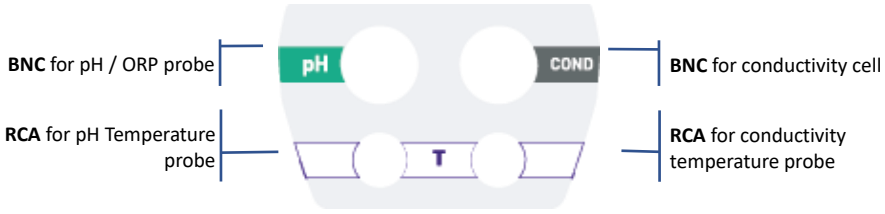
PH 70 NEX top panel



COND 73 NEX top panel



PC 70 NEX top panel



Side panel



READ THE MANUAL BEFORE CONNECTING PROBES OR PERIPHERAL DEVICES



Symbols and Icons on the Display

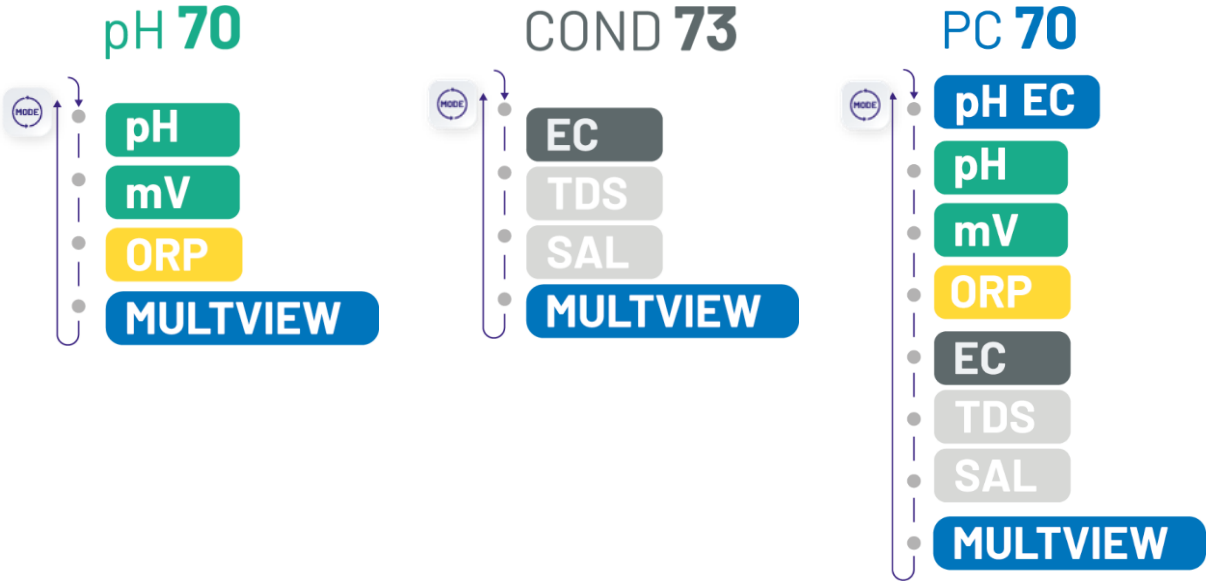
Symbol	Description	Symbol	Description
65	Number of measurements stored in Data Logger mode on the instrument's memory.		FIXED: MIN/MAX alarm for pH set. FLASHING: MIN/MAX alarm for pH in operation.
PX	pH calibration performed with simulator.		FIXED: Automatic Data Logger set. FLASHING: Automatic Data Logger in operation.
	FIXED: Calibration deadline date set for that parameter. FLASHING: Calibration deadline active for that parameter.		Password entered.
1234	Sensor ID and status.		Battery charge indicator.
	Measurement stability indicator.	HOLD	HOLD mode, reading locked when stable.

6. How the Device Works



- After switching on, the instrument enters measurement mode with the last parameter used.
- **To scroll through the different parameter screens, press the MODE button**; the current measurement parameter is shown in the bar at the top right of the display.

Sequence of parameters in measurement mode:

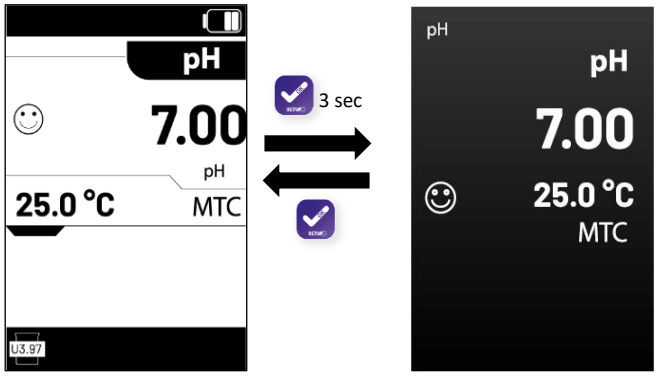


Note: *Pressing the button after the last parameter causes the instrument to automatically restart from the first.*

On the measurement screens for the **pH, ORP and Conductivity** parameters, press and hold the button for 3 seconds to start calibrating the active parameter.

Full-screen View

To obtain a clearer view of the measured value, in measurement mode (excluding the pH/EC and MultiView screens), press and hold the button for 3 seconds to activate full-screen view. Press again to return to the standard view.

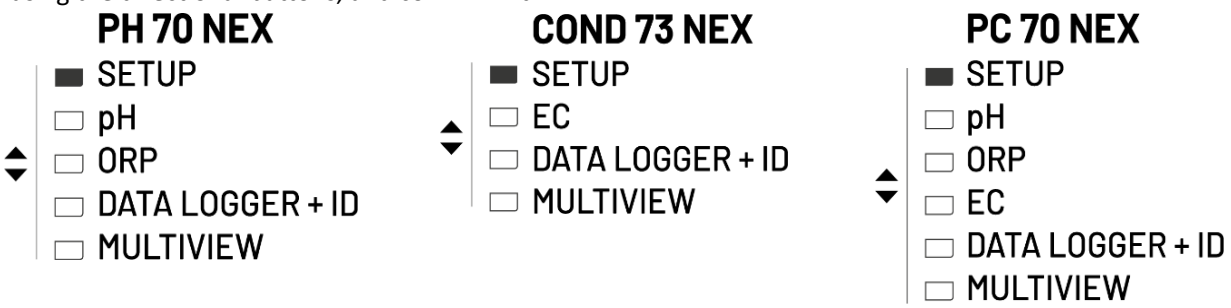


Sleep Mode

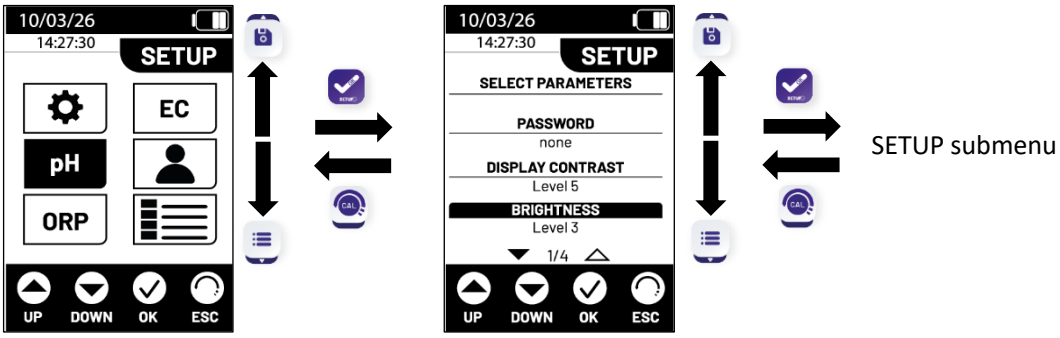
When Sleep mode is active (*see **Instrument Configuration Menu** section*), the display brightness is reduced to a minimum, significantly saving battery power. To exit Sleep mode and return the display to normal brightness, press any key. Once the display brightness has been restored, the buttons will resume their normal functions (*see the **"Button Functions"** section*).

7. Setup Menu

- In measurement mode, press the button to enter **SETUP** mode, select the parameter you wish to change using the directional buttons, and confirm with .



- Within the selected menu, move between the different programs using the directional buttons and press the button to access the submenu you want to edit.
- **Use the and buttons to select the desired option or change the numerical value, then confirm with .**
- Press the button to return to the previous menu.
- **In menus where the alphanumeric keypad appears on the display for entering IDs, move the cursor using the buttons , , , and press to confirm the character.**
- **Select the buttons ESC respectively to exit without saving and to exit whilst confirming the entered identifier.**

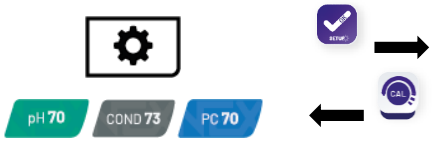


SETUP submenu

IMPORTANT: *the alphanumeric keypad for entering IDs is NOT a touchscreen; use the appropriate buttons (see the* ***'Button Functions'*** *section).*

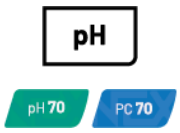
Setup Menu Structure for the PC 70 NEX Instrument

GENERAL SETTINGS



SELECT PARAMETERS PC 70
PASSWORD
DISPLAY CONTRAST
BRIGHTNESS
SLEEP MODE
READING WITH HOLD
DATE FORMAT
DATE SETTINGS
TIME SETTINGS
CALIBRATION DUE MODE
TEMPERATURE MEASUREMENT UNIT
SELECT LANGUAGE
AUTO OFF
RESET SETTINGS

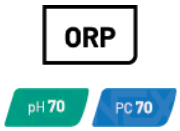
pH SETTINGS





- CALIBRATION BUFFER SELECTION
- RESOLUTION
- CALIBRATION DATA
- SET CALIBRATION DUE
- SET STABILITY CRITERIA
- SET ALARMS
- PROBE ID
- PX SIM CALIBRATION
- TEMPERATURE CALIBRATION
- RESET SETTINGS

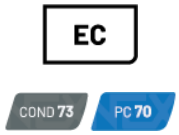
ORP SETTINGS





- CALIBRATION DATA
- SET CALIBRATION DUE
- PROBE ID
- PX SIM CALIBRATION
- TEMPERATURE CALIBRATION
- RESET SETTINGS

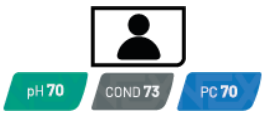
EC SETTINGS





- CELL CONSTANT PC 70
- CALIBRATION SOLUTION
- CALIBRATION DATA
- SET CALIBRATION DUE
- REFERENCE TEMPERATURE
- TEMPERATURE COEFFICIENT
- PROBE ID
- TDS FACTOR
- TDS U.M.
- SALINITY U.M.
- TEMPERATURE CALIBRATION
- RESET SETTINGS

DATA LOGGER + ID





- DATA LOGGER TYPE
- DELETE MEMORY
- SAMPLE ID
- PROGRESS SAMPLE ID
- USER ID
- VIEW ID
- PX SIM SN pH 70 PC 70

MULTIVIEW





Select which parameters to display in MULTIVIEW

8. ATC – MTC Temperature Measurement



pH 70 COND 73 PC 70

- **ATC**: The direct measurement of the sample temperature for all parameters is carried out via the NTC 30KΩ probe, which can be either integrated into the sensor (electrode and/or cell) or external.
- **MTC**: If no temperature probe is connected, the value must be changed manually: hold down or until the value starts flashing; then adjust it using the directional buttons; press to confirm.

***Note**: In the **COND 73 NEX** instrument, temperature compensation is always automatic as the temperature sensor cannot be separated from the cell.*

9. pH Parameter

pH

pH 70 PC 70

On this series of devices, you can use pH sensors with an integrated temperature probe or connect two different sensors. Connect the pH electrode to the green BNC connector. Connect the temperature probe to the RCA/CINCH T connector below. The instrument can also recognise the DHS sensor, an innovative electrode capable of storing calibration data so that it can then be used immediately on any other compatible instrument.

Setup for the pH Parameter

- In measurement mode, press to access the **SETUP** menu.
- Use the directional buttons and confirm with to access the **PH SETTINGS** menu pH .
- Use the directional buttons or to move to the program you wish to access and press .

Setup Menu Structure for the pH Parameter

The table below shows the structure of the setup menu for the pH parameter; for each program, the options available to the user and the default value are listed:

Program	Description	Options	Factory settings
pH	CAL BUFFER SELECTION	USA – NIST – DIN – User	USA
	RESOLUTION	0.1 – 0.01 – 0.001	0.01
	CALIBRATION DATA	VIEW	VIEW
	SET CALIBRATION DUE	NO – HOURS – DAYS	NO
	SET STABILITY CRITERIA	LOW – MED – HIGH	MED
	SET ALARM	NO – MIN – MAX	NO
	PROBE ID	-	-
	PXSIM CAL	START	START
	TEMPERATURE CAL	-	-
	RESET SETTINGS	NO - YES	NO

CAL BUFFER SELECTION (Buffer family selection)

- Access this setup to select the buffer family to be used for calibrating the pH electrode.
- By using buffers with automatic recognition**,** you can perform **1 to 5-point** calibration lines. **During calibration, press to exit and save the calibration points set so far.**

- The instrument automatically recognises 3 buffer families (**USA**, **NIST** and **DIN**); furthermore, the user has the option to perform a **manual** calibration of up to 2 points with customisable values.
- **USA** buffers: 1.68 - 4.01 - 7.00* - 10.01 - 12.45 - Default setting -
- **NIST** buffers: 1.68 - 4.00 - 6.86* - 9.18 - 12.46
- **DIN** buffers: 1.68 – 4.01 - 6.86* - 9.18 - 12.45

**The neutral point is always required as the first point.*

- In measurement mode, a series of beakers at the bottom left of the display, each containing the buffer value, indicates the solutions used for the last calibration, whether automatic or manual.

RESOLUTION (Measurement resolution)

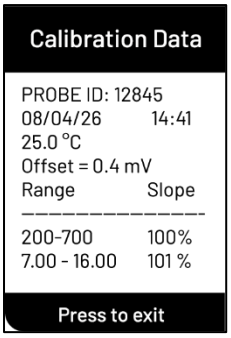
Access this menu to select the desired resolution for the pH reading:

- **0.1**
- **0.01** – default setting –
- **0.001**

CALIBRATION DATA (Calibration data for pH parameter)

Access this menu to view information about the last calibration performed. A report appears on the display containing the following information regarding the calibration currently in use: PROBE ID USED (or DHS model and batch) / CALIBRATION DATE / CALIBRATION TIME / TEMPERATURE / OFFSET / SLOPE % FOR EACH RANGE.

***Note**: The instrument only accepts calibrations with pH electrodes with a Slope % between 80 – 120 %.*



SET CALIBRATION DUE (Select pH calibration due date)

Access this menu to set a calibration deadline; this option is essential in GLP protocols:

- By default, no calibration deadline is set. Use the arrow buttons to select the hours or days that must elapse between two calibrations and confirm with .
- When a calibration deadline is set, the icon appears on the display in measurement mode.
- When the calibration has expired, the icon starts to flash.

In the **GENERAL SETTING** menu**,** under → **CALIBRATION DUE MODE**, the user can choose whether, once the calibration has expired:

- Only display the alert that the calibration has expired (flashing icon) but continue to display the measurements on the screen.
- Block the measurement until a new calibration is performed.

***Note:** in both cases, when the calibration has expired, the measurement is not saved when using the data logger.*

SET STABILITY CRITERIA (pH measurement stability criteria)

To ensure a reading is accurate, it is recommended to wait for the measurement to stabilise, indicated by the icon. Access this menu to change the measurement stability criteria:

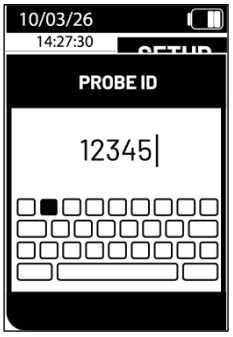
- **LOW**: select this option to display the stability icon even under conditions of low stability. Readings within 1.2 mV.
- **MEDIUM** – default setting – readings within 0.6 mV.
- **HIGH**: select this option to display the stability icon only when the measurement is highly stable; readings within 0.3 mV.

***Note:** In the **GENERAL SETTINGS** menu **-> READING WITH HOLD,** the user can choose to freeze the reading on the display once stability has been reached.*

SET ALARMS (Setting threshold alarms)

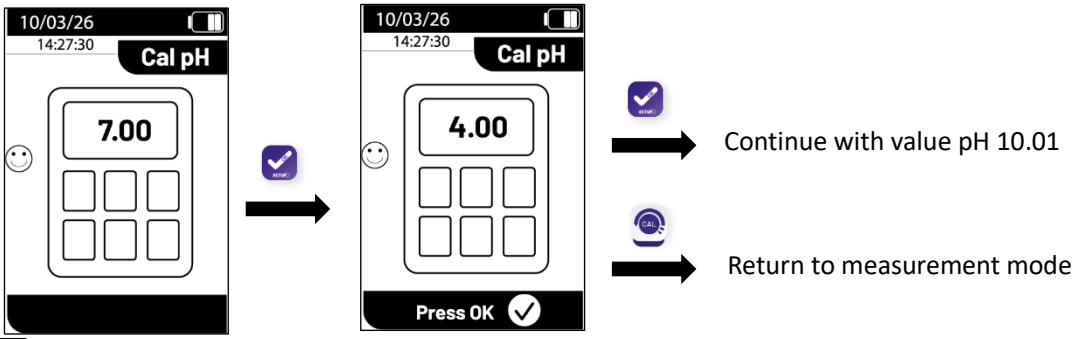
- Access this to set a threshold alarm for the minimum and/or maximum pH value.

- This option is indicated by a fixed icon on the display: MIN MAX . When the threshold value is exceeded, the corresponding icon begins to flash.



PROBE ID (Probe ID)
Access this to set a pH probe identifier. Maximum length allowed: 5 alphanumeric characters. Use the , , and buttons to navigate the alphanumeric keypad. Press the button to confirm the selected character. Use the **ENTER** button to confirm the assigned identifier; use the **ESC** button to exit without saving.

PXSIM CAL (Automatic calibration with simulator)
Access this setup menu to start instrument calibration using the **XS PX SIM** pH/mV simulator (cod.50111312 - contact your local distributor for information). The instrument automatically requests the values pH 7.00 / pH 4.01 / pH 10.01. Use the low-impedance simulator, connected with the appropriate BNC/BNC cable, to perform automatic calibration. Press to move to the next value, to save the calibrated values up to that point and return to measurement mode.



The PX next to the beakers indicates that the calibration was performed using a simulator rather than a pH electrode.

Note: *in the* **DATA LOGGER + ID** *menu* **-> PX SIM SN,** *you can enter the serial number of the simulator used for calibration.*

TEMPERATURE CAL (Temperature probe calibration)
All instruments in this series are pre-calibrated for accurate temperature readings. However, if there is a noticeable difference between the measured and actual temperatures (usually due to a probe malfunction), an offset adjustment of ± 5 °C can be made. After connecting the temperature probe, use the and buttons to correct the temperature offset value and confirm with .

RESET SETTINGS (pH parameter reset)

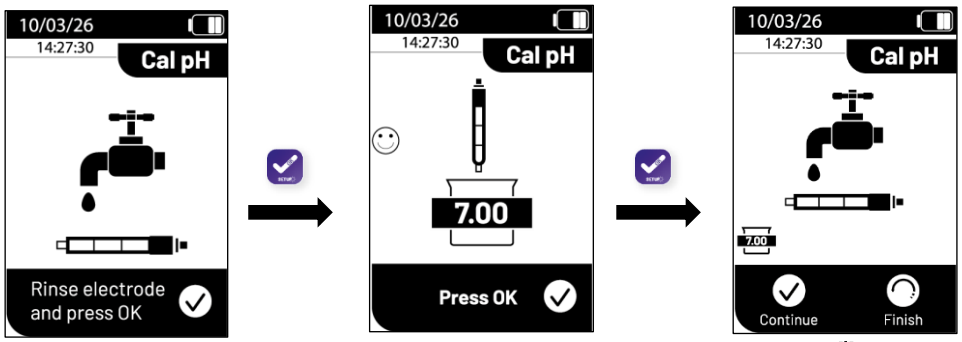
If the instrument is not performing optimally or incorrect calibrations have been carried out, press the button to confirm **'YES'** and reset all parameters in the pH menu to their default settings.
IMPORTANT: *Resetting to factory settings does* ***NOT*** *delete stored data.*

Automatic pH Calibration

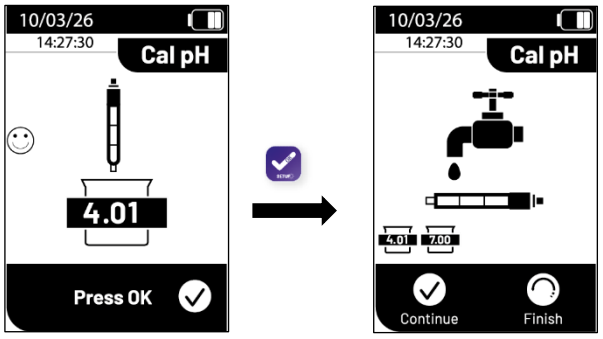
Example of three-point calibration using USA-type buffers (7.00 / 4.01 / 10.01)

- In **pH** measurement mode, press and hold the button for 3 seconds to enter calibration mode. Rinse the electrode with distilled water and gently dab it dry with a paper towel .
- Press and dip the electrode in the pH 7.00 buffer (as indicated by the beaker on the display).

- When the appears, confirm the first point by pressing the button. The actual measured value flashes on the display, and the pH 7.00 beaker icon 7.00 then appears in the bottom left corner, indicating that the instrument is calibrated to the neutral point.



- Remove the electrode, rinse with distilled water and gently dab with a paper towel.
- Press to continue the calibration and dip the electrode in the pH 4.01 buffer. All the pH values that the instrument is capable of recognising scroll through the beaker.
- When the beaker stabilises at pH 4.01 and appears, confirm by pressing the button. The actual measured value flashes on the display and then, next to the pH 7.00 beaker, the pH 4.01 beaker icon 4.01 appears, indicating that the instrument is calibrated in the acid range.



For a two-point calibration line, press to complete the calibration process and return to measurement mode.

- Remove the electrode, rinse with distilled water and gently dab with a paper towel.
- Press to continue the calibration and dip the electrode in the pH 10.01 buffer. All the pH values that the instrument can recognise will scroll through the beaker.
- When the beaker stabilises at pH 10.01 and appears, confirm by pressing the button. *The transition from an acidic to a basic pH may take a few seconds longer to stabilise.* The actual measured value flashes on the display; subsequently, the icon for the pH 10.0 beaker appears next to the pH 7.00 and pH 4.01 beakers, indicating that the instrument is also calibrated in the alkaline range.
- Although the device can accept two further calibration values, stop and confirm this three-point calibration line by pressing .

Note: *electrode calibration is essential for the quality and accuracy of a measurement. Therefore, ensure that the buffers used are new, uncontaminated and at the same temperature. To ensure accurate results, the instrument manufacturer recommends using* ***XS Solution*** *buffer solutions and* ***XS Sensor*** *pH electrodes. Please contact your local distributor to obtain these.*

WARNING: *Before proceeding with calibration, carefully consult the safety data sheets for the substances involved:*
Calibration buffer solutions.
pH electrode storage solution.
Filling solution for pH electrodes.
Careful reading of the safety data sheets for the solutions used helps to eliminate residual risks associated with skin contact, ingestion, inhalation or eye contact with these substances, which may cause possible but unlikely minor harm.

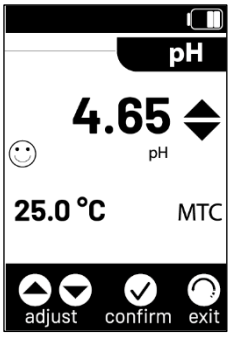
Calibration with Manual Values

Example of two-point calibration at pH 6.79 and pH 4.65 (DIN 19267)

- Access the **pH SETTINGS** menu [pH] and select **CAL BUFFER SELECTION -> User;** return to measurement and switch to **pH** mode.
- Hold down the button for 3 seconds to enter calibration mode.
- Rinse the electrode with distilled water and gently dab with a paper towel.
- Press and dip the electrode in the first buffer solution (e.g. pH 6.79).
- Wait for the pH value on the display to stabilise; when the icon appears, use the and buttons to adjust the value by entering the buffer value.

Note: *Check the buffer value according to the temperature.*

- When the icon reappears, press the button to confirm the first point; the display will flash the actual measured value and show the beaker icon with the entered buffer value (the letter "U" indicates **"user value, entered manually**").
- Remove the electrode, rinse it with distilled water, and gently dab it dry with a paper towel.
- Press to continue the calibration and dip the sensor in the next buffer (e.g. pH 4.65).
- Wait for the pH value on the display to stabilise; when the icon appears, use the and buttons to adjust the value by entering the buffer value.
- When the icon reappears, press the button to confirm the second point; the actual measured value will flash on the display.
- Once the second calibration point is complete, the process ends automatically with the calibration report being displayed. Press to return to measurement mode.



Note*: If you are using manual temperature compensation (MTC), update the value before calibrating the instrument.*

Perform a pH Measurement

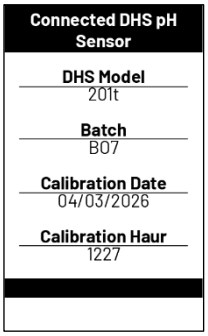
In measurement mode, press the button to scroll through the parameter screens until **pH** is activated (see section **"How the device works"**):

- Connect the electrode to the instrument's pH / ORP BNC connector (green band).
- Connect the temperature sensor to the corresponding RCA connector. If the user is not using an electrode with a built-in temperature probe or an external 30KΩ NTC probe, it is recommended to manually update the temperature value (MTC).
- Remove the electrode from its tube, rinse with distilled water and gently dab it dry with a paper towel.
- Check for and remove any air bubbles present in the membrane bulb by shaking vertically (as with a clinical thermometer). If present, open the side cap.
- Immerse the electrode in the sample, while keeping it in gentle motion.
- Only consider the measurement accurate when the stability icon appears. To eliminate any errors due to user interpretation, you can use the "HOLD" function (see the section **GENERAL SETTINGS** [⚙] → **READING WITH HOLD**), which allows you to lock the reading as soon as it stabilises.
- Once the measurement is complete, rinse the electrode with distilled water and store it in the appropriate storage solution (STORAGE). Never store the sensors in any type of water or in a dry state.

IMPORTANT: *The graphical representation of the electrode shown at the bottom left of the display indicates the slope of the current calibration. The closer the slope is to 100 %, the "fuller" the electrode will be. Always ensure that the buffers used for calibration are visible on the display; the ability to consult calibration data at any time or to set an expiry date are useful tools for obtaining accurate measurements. The use of the wide range of XS Sensor electrodes is preferable and is the solution recommended by the manufacturer for highly accurate analysis.*

Please read carefully the instructions and advice on use and maintenance, which are always included inside the XS Sensor electrode packaging.

Sensors with DHS Technology



Electrodes equipped with DHS technology can save a calibration line in their memory. The calibrated sensor is automatically recognised by any instrument capable of DHS recognition, which then acquires its calibration.

- Connect the DHS electrode to the instrument's BNC and RCA connectors.
- The device automatically recognises the chip; the DHS sensor calibration report, including the identification number and batch, appears on the display.
- Once the DHS electrode is recognised, the active calibration on the instrument becomes that of the sensor.
- The DHS icon next to the sensor symbol on the display indicates that the connection has been successfully established.
- If the calibration is satisfactory (check the calibration data in the pH -> Calibration Data menu), the electrode is ready to start taking measurements. If not, recalibrate the electrode; the data will be updated automatically.
- The DHS electrode calibrated with a pH 70 NEX or PC 70 NEX device is ready for use on any pH meter capable of DHS recognition, and vice versa.
- When the electrode is disconnected, a message on the display informs the user that the sensor has been deactivated; the instrument reverts to its previous calibration and no data is lost!
- The DHS electrode does not require batteries and, if used on pHmeters not equipped with chip recognition, functions as a standard analogue electrode.

***Note**: As this is a digital pH measurement, only consider the readings accurate when measuring within the **pH** range.*

10. mV Parameter

pH 70 PC 70

- In measurement mode, press MODE and scroll to the **mV** parameter.
- The display shows the pH sensor's reading in mV.
- Only consider the reading accurate when the stability icon appears.

***Note**: This measurement is recommended for assessing the sensor's efficiency.*

11. ORP Parameter (Oxidation-Reduction Potential)

ORP

pH 70 PC 70

On this series of devices, ORP sensors can be used to measure the oxidation-reduction potential. Connect the Redox electrode to the BNC connector marked in green; if necessary, connect the temperature probe to the RCA/CINCH Temp connector, which is also marked with a green background. You can calibrate the sensor offset by performing an automatic calibration at a predefined point. The instrument automatically recognises the **475 mV / 25 °C Redox** solution; please contact your local distributor to purchase this.
The instrument can correct the sensor offset by ± 75 mV.

Setup for the ORP Parameter

- In measurement mode, press SETUP to access the **SETUP** menu.
- Use the arrow buttons and confirm with SETUP to access the **ORP SETTINGS** menu ORP.
- Use the directional buttons to navigate to the program you wish to access and press SETUP.

Setup Menu Structure for the ORP Parameter

The table below shows the structure of the setup menu for the ORP parameter; for each program, the options available to the user and the default value are shown:

Program	Description	Options	Factory settings
ORP	CALIBRATION DATA	VIEW	VIEW
	SET CALIBRATION DUE	NO – HOURS – DAYS	NO
	PROBE ID	-	-
	PXSIM CAL	START	START
	TEMPERATURE CAL	-	-
	RESET SETTINGS	NO – YES	NO

CALIBRATION DATA (Calibration data for ORP parameter)

Access this menu to view information about the last calibration performed. A report appears on the display containing the following information regarding the current calibration: PROBE ID USED / CALIBRATION DATE / CALIBRATION TIME / TEMPERATURE / OFFSET.

SET CALIBRATION DUE (Select ORP calibration due date)

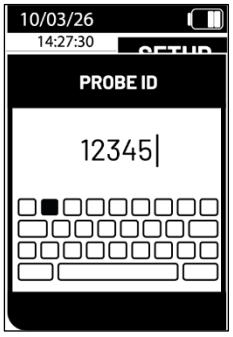
Access this menu to set a calibration deadline; this option is essential in GLP protocols:

- By default, no calibration deadline is set. Use the arrow buttons to select the hours or days that must elapse between two calibrations and confirm with .
- When a calibration deadline is set, the icon appears on the display in measurement mode.
- When the calibration has expired, the icon starts to flash.

In the **GENERAL SETTINGS** menu, under → **CALIBRATION DUE MODE**, the user can decide what happens when the calibration expires:

- Display only the alert that the calibration has expired (flashing icon) but continue to show the measurements on the display.
- Prevent further measurement until recalibration.

Note: *in both cases, if the calibration has expired, data will not be saved when using the data logger.*



PROBE ID

Access to set an ORP probe identifier. Maximum length allowed: 5 alphanumeric characters. Use the buttons , , , to navigate the alphanumeric keypad. Press the button to confirm the selected character. Use the **ENTER** button to confirm the assigned identifier; use the **ESC** button to exit without saving.

PXSIM CAL (Automatic calibration with simulator)

Access this setup menu to start instrument calibration using the **XS PX SIM** pH / mV simulator (cod. 50111312 - contact your local distributor for information). The instrument automatically requests the value 475 mV. Use the low-impedance simulator, connected with the appropriate BNC/BNC cable, to perform automatic calibration. Press to confirm and return to measurement mode. The PX indicates that the calibration was performed using a simulator rather than an ORP electrode.

Note: *in the* **DATA LOGGER + ID** *menu* **-> PX SIM SN,** *you can enter the serial number of the simulator used for calibration.*

TEMPERATURE CAL (Temperature probe calibration)

All instruments in this series are pre-calibrated for accurate temperature readings. However, if there is a noticeable difference between the measured and actual temperatures (usually due to a probe malfunction), an offset adjustment of ± 5 °C can be made. After connecting the temperature probe, use the and buttons to correct the temperature offset value and confirm with .

RESET SETTINGS (Reset of the ORP parameter)
If the instrument is not working optimally or incorrect calibrations have been performed, confirm **YES** using the button to reset all parameters in the ORP menu to their default settings.
IMPORTANT: *Restoring factory settings does* ***NOT*** *delete stored data.*

Automatic ORP Calibration

Automatic calibration with 475 mV solution

- In **ORP** measurement mode, press and hold the button for 3 seconds to enter calibration mode.
- Rinse the electrode with distilled water and gently dab it dry with a paper towel.
- Press and dip the electrode in the 475 mV Redox buffer solution.
- When the icon appears, confirm by pressing .
- The actual measured value flashes on the display, followed by the calibration report.
- Press the button to return to measurement mode.

WARNING: *Before proceeding with sensor calibration, carefully consult the safety data sheets for the substances involved:*

- *Redox standard solutions.*
- *Redox electrode storage solution.*
- *Filling solution for Redox electrodes.*

IMPORTANT: *The ability to access and manage all information regarding sensor calibration and status immediately allows the user to work whilst maintaining high quality standards. The use of ORP XS Sensor electrodes is preferred and is the solution recommended by the manufacturer to achieve highly accurate analyses. The manufacturer can supply a wide range of sensors to cover various fields of application.*

12. Conductivity Parameter

EC

COND 73 PC 70

On the **PC 70 NEX** instrument, connect the conductivity probe to the grey-coloured BNC connector and any temperature probe to the RCA/CINCH Temp connector, also on a grey background. On the **COND 73 NEX** instrument, however, use the dedicated MULTIPIN connector, which is shared for both conductivity and temperature. Conductivity is defined as the ability of the ions contained in a solution to conduct an electric current. This parameter provides a quick and reliable indication of the quantity of ions present in a solution.

Setup for the Conductivity Parameter

- In measurement mode, press to access the **SETUP** menu.
- Use the arrow buttons and confirm with to access the **EC SETTINGS** menu EC .
- Use the directional buttons to navigate to the program you wish to access and press .

Setup menu structure for the EC parameter

The table below shows the structure of the setup menu for the conductivity parameter; for each program, it lists the options available to the user and the default value:

Program	Description	Options	Factory settings
EC	CELL CONSTANT (**PC 70 NEX**)	0.1 - 1 - 10	1
	CALIBRATION SOLUTION	STANDARD - USER	STANDARD
	CALIBRATION DATA	VIEW	VIEW
	SET CALIBRATION DUE	NO – HOURS – DATE	NO
	REFERENCE TEMPERATURE	15.0…30.0 °C	25 °C
	TEMPERATURE COEFFICIENT	0.00…10.00 %/°C	1.91 %/°C
	PROBE ID	-	-
	TDS FACTOR	LINEAR / KCl / NaCl / 442	LINEAR 0.71
	TDS U.M.	(mg/l – g/l) – (ppm – ppt)	mg/l – g/l
	SALINITY U.M.	(ppm – ppt) - (mg/l – g/l)	ppm – ppt
	TEMPERATURE CAL	-	-
	RESET SETTINGS	NO – YES	NO

CELL CONSTANT (Cell constant selection)

Choosing the right conductivity cell is crucial for obtaining accurate and reproducible measurements. For two-electrode sensors, one of the key parameters to consider is using a sensor with the correct cell constant for the solution being analysed.

Contact your local dealer for information on the different conductivity cells supplied by the manufacturer.

The following table shows the relationship between the sensor's cell constant, the measurement range and the standard against which it is preferable to calibrate:

4-ring cell	**C=0.55**			
2-ring cell	**C=0.1**	**C=1**		**C=10**
Standard (25 °C)	84 µS	1413 µs	12.88 mS	111.8 mS
Ideal measurement range	0 – 500 µs	500 – 5000 µS	5 – 50 mS	50 – f.s mS

Access this setup menu to select the cell constant for the sensor you are using:

- **0.1**
- **1 –** default setting –
- **10**

For each of the 3 selectable cell constants, the instrument stores the calibrated points. By selecting the cell constant, it automatically recalls the calibration points previously performed.

Note: *For the* **COND 73 NEX** *instrument, which operates with a 4-ring cell and a fixed constant of 0.55, no adjustment of the constant is required.*

CALIBRATION SOLUTION (Calibration method)

Access this setup menu to select automatic or manual recognition of the standards to be used for calibration:

- **AUTOMATIC**: -default- the device automatically recognises the following standards **84** µS/cm, **1413** µS/cm, **12.88** mS/cm and **111.8** mS/cm.
  The **COND 73 NEX** instrument also automatically recognises the value **5.0** µS/cm.
- **CUSTOM**: the device can be calibrated to a point with a manually entered value.

Note: *To obtain accurate results, it is advisable to calibrate the device using standards close to the theoretical value of the solution to be analysed. Temperature compensation in conductivity measurement should not be confused with pH compensation:*

- *In a conductivity measurement, the value shown on the display is the conductivity calculated at the reference temperature. The effect of temperature on the sample is therefore corrected.*
- *In pH measurement, on the other hand, the display shows the pH value at the displayed temperature. In this case, temperature compensation involves adjusting the electrode's slope and offset to the measured temperature.*

CALIBRATION DATA (Calibration data for conductivity parameter)

Access this menu to obtain information on the last calibration performed. A report appears on the display with the following information regarding the calibration currently in use: PROBE ID USED / CALIBRATION DATE / CALIBRATION TIME / TEMPERATURE / CELL CONSTANT FOR EACH RANGE.

***Note**: The instrument only accepts calibrations with a maximum tolerance of 40 % of the nominal value of the cell constant.*

SET CALIBRATION DUE (Select calibration due date for conductivity)

Access this menu to set a calibration deadline; this option is essential in GLP protocols:

- By default, no calibration deadline is set. Use the arrow buttons to select the hours or days that must elapse between two calibrations and confirm with .
- When a calibration deadline is set, the icon appears on the display in measurement mode.
- When the calibration has expired, the icon starts to flash.

In the **GENERAL SETTING** menu → **CALIBRATION DUE MODE,** the user can decide what happens when the calibration expires:

- Display only the alert that the calibration has expired (flashing icon) but continue to show the readings on the display.
- Prevent further measurement until recalibration.

***Note:** in both cases, if the calibration has expired, data will not be saved when using the data logger.*

REFERENCE TEMPERATURE (Select the reference temperature)

The conductivity measurement is highly temperature dependent. If the temperature of a sample increases, its viscosity decreases, leading to an increase in ion mobility and the measured conductivity, even though the concentration remains constant. For each conductivity measurement, the reference temperature must be specified; otherwise, the result is without value. Generally, the reference temperature is 25 °C or, more rarely, 20 °C.

This device measures conductivity at the actual temperature (ATC or MTC) and then converts it to the reference temperature using the selected correction factor:

- Access this setup menu to set the temperature to which you want to refer the conductivity measurement.
- The device can report conductivity from **15 to 30** °C. The factory setting is **25 °C**, which is correct for most analyses.

TEMPERATURE COEFFICIENT (Temperature compensation factor)

It is important to know the temperature dependence (% change in conductivity per °C) of the sample being measured:

- Access this menu to change the temperature compensation factor.
- The default setting is 1.91 %/°C, which is suitable for most analyses. Press the button and use the arrow buttons to enter the new coefficient. Confirm with .

Compensation coefficients for special solutions and groups of substances are listed in the following table:

Solution	(%/°C)	Solution	(%/°C)
NaCl Saline solution	2.12	1.5 % Hydrofluoric acid	7.20
5 % NaOH solution	1.72	Acids	0.9–1.60
Diluted ammonia solution	1.88	Bases	1.7 – 2.2
10 % hydrochloric acid solution	1.32	Salts	2.2–3.0
5 % sulphuric acid solution	0.96	Drinking water	2.0

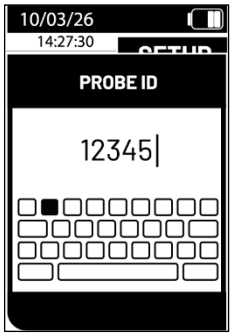
Compensation coefficients for calibration standards at different temperatures for T_{ref} 25 °C are shown in the following table:

°C	0.001 mol/l KCl (147 µS)	0.01 mol/l KCl (1413 µS)	0.1 mol/l KCl (12.88 mS)
0	1.81	1.81	1.78
15	1.92	1.91	1.88
35	2.04	2.02	2.03
45	2.08	2.06	2.02
100	2.27	2.22	2.14

To determine the calibration coefficient for a particular solution, the following formula is applied:

$$tc = 100x\frac{C_{T2} - C_{T1}}{C_{T1}\,(T_2 - 25) - C_{T2}\,(T_1 - 25)}$$

Where *tc* is the temperature coefficient to be calculated, $C_{T1}$and $C_{T2}$are the conductivity at temperature 1 *(T1)* and temperature 2 *(T2). Every result with a "corrected" temperature is subject to an error caused by the temperature coefficient. The better the temperature correction, the smaller the error. The only way to eliminate this error is not to use the correction factor, but to act directly on the sample temperature.* Select 0.00 %/°C as the temperature coefficient to disable compensation. The displayed Conductivity value refers to the temperature measured by the probe and is not related to a reference temperature.



PROBE ID (Probe ID)

Access this to set an EC probe identifier. Maximum length allowed: 5 alphanumeric characters. Use the buttons , , , to navigate the alphanumeric keypad. Press the button to confirm the selected character. Use the **ENTER** button to confirm the assigned identifier; use the **ESC** button to exit without saving.

TDS FACTOR (TDS conversion factor)

Access this menu to change the conversion factor from conductivity to TDS:

- **Linear 0.4…1.00** – default setting **0.71** –
- **KCl**
- **NaCl**
- **442** *(40 % Sodium Sulphate / 40 % Sodium Bicarbonate / 20 % Sodium Chloride)*

TDS U.M. (TDS units of measurement)

Access this menu to select which units of measurement to use for TDS detection:

- **mg/l – g/l** – default setting –
- **ppm – ppt**

SALINITY U.M. (salinity units of measurement)

Access this menu to select which units of measurement to use for salinity detection:

- **ppm – ppt** -default setting-
- **mg/l – g/l**

TEMPERATURE CAL (Temperature probe calibration)

All instruments in this series are pre-calibrated for accurate temperature readings. However, if there is a noticeable difference between the measured and actual temperatures (usually due to a probe malfunction), an offset adjustment of ± 5 °C can be made. After connecting the temperature probe, use the and buttons to correct the temperature offset value and confirm with .

RESET SETTINGS (Reset of the EC parameter)

If the instrument is not working optimally or incorrect calibrations have been performed, confirm YES using the button to reset all parameters in the EC menu to their default settings.

IMPORTANT: *Restoring factory settings does* ***NOT*** *delete stored data.*

Automatic Conductivity Calibration

Example of single-point calibration (1413 µS/cm) using a two-ring sensor with a cell constant of 1 or a four-ring sensor with a cell constant of 0.55

- In **EC** measurement mode, press and hold the button for 3 seconds to enter calibration mode.
- Rinse the cell with distilled water and gently dab it with a paper towel. Fill with a few ml of standard solution.
- Press and dip the sensor in the 1413 µS/cm standard, keeping it slightly stirred and ensuring there are no air bubbles in the cell.
- All the conductivity values that the instrument can automatically recognise will alternate in the beaker.
- When the value stabilises at 1413 and the icon appears, confirm by pressing.
- The actual measured value flashes on the display, followed by the calibration report showing the cell constant for each range. Press to return to measurement mode.
- *Single-point calibration is sufficient if measurements are taken within the measurement range. For example, the 1413 µS/cm standard solution is suitable for measurements between approximately 500 and 5000 µS/cm.*
- **To calibrate the instrument at multiple points, once you have returned to measurement mode, repeat all the calibration steps.** The beaker for the new calibration point will be added alongside the previous one. It is advisable to start the calibration with the least concentrated standard solution and then proceed in order of increasing concentration.
- When a previously calibrated point is recalibrated, the previous calibration is overwritten and the cell constant is updated**.**
- For each cell constant, the instrument stores the calibration, so that users employing multiple sensors with different constants are not required to recalibrate each time.

Important: *Standard conductivity solutions are more vulnerable to contamination, dilution and the direct influence of CO_2 than pH buffers, which, thanks to their buffering capacity, tend to be more resistant. Furthermore, a slight change in temperature, if not adequately compensated for, can have a significant effect on accuracy. Therefore, pay particular attention to the conductivity cell calibration process to ensure accurate measurements. Always rinse the cell with distilled water before calibration and when switching from one standard solution to another to prevent contamination. Replace standard solutions frequently, especially those with low conductivity. Contaminated or expired solutions can affect the accuracy and precision of the measurement.*

WARNING: *Before proceeding with calibration, carefully consult the safety data sheets for the substances involved:*

- *Calibration buffer solutions.*

Calibration with Manual Value

Example: calibration at 10.00 µS/cm using a two-ring sensor with a cell constant of 0.1 for the **PC 70 NEX** *instrument*

- Access the **EC SETTINGS** menu [EC] and select **CELL CONSTANT→ 0.1** and **CALIBRATION SOLUTION→ User,** return to measurement and switch to **EC** mode.
- Hold down the button for 3 seconds to enter calibration mode.
- Rinse the cell with distilled water and gently dab it dry with a paper towel.
- Fill with a few ml of standard solution, press and immerse the sensor in the 10.00 µS/cm conductivity standard.
- Wait for the conductivity value on the display to stabilise; when the icon appears, use the and buttons to adjust the value by entering that of the standard solution (e.g. 10.00 µS/cm).

Note: *Check the buffer value at the given temperature.*

- When the icon reappears, confirm the calibration point by pressing the button.
- The calibration report appears automatically on the display. Press the button to return to measurement mode.

- The beaker icon appears in the bottom left corner with the buffer value entered (the letter "U" stands for **"user value, entered manually**").
- For each cell constant, the instrument stores the calibration so that users employing multiple sensors with different constants are not required to recalibrate each time.

***Important**: Always rinse the cell with distilled water before calibration and when switching from one standard solution to another to avoid contamination. Replace standard solutions frequently, especially those with low conductivity. Contaminated or expired solutions may affect the accuracy and precision of the measurement.*

Perform a Conductivity Measurement

- Access the **EC SETTINGS** menu [EC] to check the calibration and verify and, if necessary, update the reading parameters; press CAL to return to measurement mode.
- Press MODE to scroll through the different parameter screens until the **EC** parameter is activated**.**
- Connect the conductivity cell to the instrument's BNC connector for Cond (grey) or to the multi-pin connector if you are using the **COND 73 NEX** instrument. For the **PC 70 NEX** instrument, connect the temperature sensor to the corresponding RCA connector. If the user is not using a cell with a built-in temperature probe or an external NTC 30KΩ, it is recommended to manually update the temperature value (MTC).
- Remove the cell from its tube, rinse with distilled water, and gently dab it dry **taking care not to scratch the electrodes.**
- Immerse the sensor in the sample; the measuring cell and any relief holes must be completely immersed. Keep the sample gently stirred and remove any air bubbles that might affect the measurement by gently shaking the sensor.
- Only consider the measurement accurate when the stability icon appears .

For a highly accurate measurement, the instrument uses five different measurement scales and two units of measurement (µS/cm and mS/cm) depending on the value; the device switches scales automatically.

- Once the measurement is complete, rinse the cell with distilled water. The conductivity sensor does not require any special maintenance; the main aspect is to ensure that the cell is clean. The sensor must be rinsed with plenty of distilled water after each analysis and, if it has been used with samples that are insoluble in water, it must be cleaned by immersing it in ethanol or acetone before performing this operation. **Never clean it mechanically, as this would damage the electrodes and compromise their functionality.** For short periods, store the cell in distilled water; for longer periods, store it in a dry place.

13. Other Measurements Carried out with the Conductivity Cell

COND 73 PC 70

The conductivity measurement can be converted into **TDS** and **Salinity** parameters.

- In measurement mode, press the MODE button to scroll through the various parameters: **TDS -> Salinity.**
- These parameters use the conductivity calibration; therefore, refer to the previous section to calibrate the sensor.

TDS Parameter

Total Dissolved Solids (TDS) correspond to the total weight of solids (cations, anions and undissociated substances) in one litre of water. Traditionally, TDS is determined using a gravimetric method, but a simpler and faster method involves measuring Conductivity and converting it to TDS by multiplying it by the TDS conversion factor. Access the **EC SETTINGS** menu [EC] **-> TDS FACTOR** to select the conversion factor. The default setting is linear 0.71; the user can modify the coefficient or use the non-linear curves NaCl, KCl, 442 *(40 % Sodium Sulphate / 40 % Sodium Bicarbonate / 20 % Sodium Chloride)* already stored in the instrument's memory.

Salinity

The UNESCO 1978 definition is usually used for this parameter, which specifies the use of the unit of measurement psu (Practical Salinity Units), corresponding to the ratio between the conductivity of a seawater sample and that of a standard KCl solution consisting of 32,4356 g of salt dissolved in 1 kg of solution at 15 °C. The ratios are dimensionless, and 35 psu is equivalent to 35 g of salt per kg of solvent. Therefore, approximately 1 psu is equivalent to 1 g/l of salt and, considering the density of water, is equivalent to 1 ppt. The UNESCO 1966b definition may also be used, which provides that salinity in ppt is expressed with the following formula:

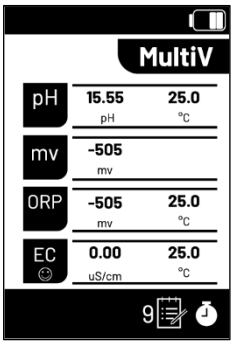
$S_{ppt} = -0.08996 + 28.2929729R + 12.80832R^2 - 10.67869R^3 + 5.98624R^4 - 1.32311R^5$

Where R = conductivity sample (at 15°C) / 42.914 mS/cm (Conductivity of Copenhagen Seawater Standard).

14. Multi-parameter Display

pH 70 COND 73 PC 70

Up to 4 parameters can be displayed simultaneously on the screen, at the user's discretion.



- In measurement mode, press to access the **SETUP** menu.
- Use the arrow buttons and confirm with to access the **MULTIVIEW** menu .
- The display shows a list of all parameters managed by the instrument. Use the and buttons to scroll and to select them. The user can select up to 4 parameters.
- Press to return to measurement mode and use to move to the **MultiView** screen.
- For each selected parameter, the corresponding temperature (ATC or MTC) and / HOLD are also displayed as a stability indicator.

15. Data Logger Function

pH 70 COND 73 PC 70

This series of devices can record values in GLP format to the instrument's internal memory. For each value, it is also possible to associate the IDs of the sensor, the user and the sample being analysed. The instrument can store up to 1000 measurements in total. Once the memory is full, the values are NOT overwritten. In measurement mode, the number of measurements stored for that parameter appears next to 65 . You can then recall and view the values on the display or download them to a PC using the dedicated software. If you can work directly connected to a PC, the data is automatically saved in the software without any memory limitations. Recordings can be acquired **manually** (MANUAL) or **automatically at preset intervals** (HOURS – MINUTES – SECONDS).

PC connection: *connect the USB cable included in each package to the USB port on the top panel of the instrument and the other end to a COM port on the computer. Use only the USB cable supplied with each instrument.*

Setup for the Data Logger+ID Parameter

- In measurement mode, press to access the **SETUP** menu.
- Use the directional buttons and confirm with to access the **DATA LOGGER + ID** menu .
- Use the directional buttons to move to the program you wish to access and press .

Setup Menu Structure for the Data Logger Menu

The table below shows the structure of the setup menu for Data Logger mode; for each program, the options available to the user and the default value are shown:

Program	Description	Options	Factory settings
	DATA LOGGER TYPE	MANUAL – SECONDS – HOURS – MINUTES	MANUAL
	DELETE MEMORY	YES – NO	NO
	SAMPLE ID	-	-
	PROGRESS SAMPLE ID	YES – NO	NO
	USER ID	-	-
	VIEW ID	VIEW	VIEW
	PX SIM SN		

DATA LOGGING TYPE

Access this menu to select the data acquisition mode:

- **MANUAL**: **Data is acquired only when the user presses the button**.
- **SECONDS - HOURS - MINUTES: Set an interval for automatic data acquisition.** Use the directional buttons to move from MANUAL to SECONDS, MINUTES or HOURS. Press to enter, then use the and buttons to change the acquisition time. Confirm the setting by pressing the button.

DELETE MEMORY (Clear memory)

Access this setup menu and confirm **YES** using to delete all data stored in the instrument's internal memory.

SAMPLE ID

Access to set an identifier for the sample being analysed. Maximum length allowed: 6 alphanumeric characters. Use the buttons , , and to navigate the alphanumeric keypad. Press the button to confirm the selected character. Use the **ENTER** button to confirm the assigned identifier; use the **ESC** button to exit without saving.

PROGRESS SAMPLE ID (Sample ID in progressive mode)

Access this setup menu and confirm YES with to increment the SAMPLE ID by one each time you save.
Example: SAMPLE ID: ABCDEF / **PROGRESS SAMPLE ID: YES**
Save 1: ABCDEF 1
Save 2: ABCDEF 2
Save 3: ABCDEF 3
Note: *The sequence continues until the SAMPLE ID is changed or NO is selected in the PROGRESS SAMPLE ID.*

USER ID

Access to set a user ID. Maximum length allowed: 5 alphanumeric characters. Use the buttons , , , to move through the alphanumeric keypad. Press the button to confirm the selected character. Use the **ENTER** button to confirm the assigned identifier; use the **ESC** button to exit without saving.

VIEW ID

Press the button to view all entered IDs (pH / ORP / EC _ Sample _ User probes). During the data saving process, the IDs are saved together with the analytical data.

PX SIM SN (serial number for PX SIM simulator)

Access this setup menu to optionally enter the serial number of the pH/mV Simulator used for automatic pH and ORP calibrations (PX SIM Calibration). Use the arrow buttons to select the number and confirm with. The serial number is recorded in the calibration report.

Use of the automatic data logger

During measurement, press to start and stop automatic recording. When automatic data saving is active, the icon flashes on the display. When it is set but not active, the icon on the screen remains fixed. When a total of 1000 values is reached, an alert appears informing you that the memory is full. Data is not overwritten.
Note: *Scrolling through the parameters interrupts the recording.*

Example of Automatic Data Logging Mode

Example of automatic pH recording to internal memory every 2 minutes

- Access the **LOG SETTING** setup menu .
- Enter the **DATA LOGGER TYPE** menu and use the arrow buttons to move to **MINUTES**. Press the button again and use the and buttons to change the number of minutes. Enter "2" and confirm with . Return to measurement mode and go to the **pH** screen.
- The fixed icon is displayed in the bottom row of the screen, indicating that an automatic data logger has been set up. Press to start recording; the icon begins to flash, indicating that data is being stored. The number next to the 65 indicates how much data has been saved for that parameter.
- Press again to stop recording.

Note*: automatic recording is paused when the measurement parameter is changed.*

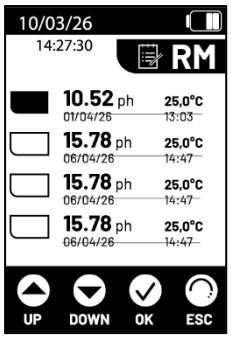
Example of Manual Data Logging Mode

Example of recording a Conductivity value in manual mode

- **Access** the **LOG SETTING** setup menu .
- Enter the **DATA LOGGER TYPE** menu**,** press and use the arrow buttons to select **MANUAL**.
- Confirm with and return to measurement mode, then go to the **EC** screen. Press to save the value. The number next to 65 indicates how much data has been saved for that parameter.

Retrieving Saved Data

- In measurement mode, for the parameter of interest, press to access **RECALL MEMORY** mode and view the data stored for that specific parameter on the display.
- Use the and buttons to scroll through the various data pages.
- **Press to view the IDs associated with the saved data.**
- Press to return to measurement mode.



Note*: If data is saved whilst the calibration has expired, no values will be recorded.*

- When retrieving data stored in Multiview mode, a screen is reserved for each acquisition.

  The values displayed will be those active at the time of saving. **Press to view the IDs associated with the saved data.**

Deleting Saved Data

- To delete data stored in the instrument memory, access the **DELETE MEMORY** setup menu and select **YES.**

16. Instrument Configuration Menu

pH 70 COND 73 PC 70

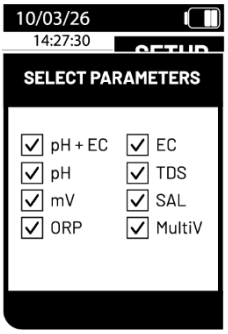
- In measurement mode, press to access the **SETUP** menu.
- Use the arrow buttons and confirm with to access the **GENERAL SETTINGS** menu .
- Use the directional buttons to move to the program you want to access and press .

Setup Menu Structure for the Configuration Menu

The table below shows the structure of the setup menu for the instrument's general settings; for each program, the options available to the user and the default value are shown:

Program	Description	Options	Factory settings
	SELECT PARAMETERS*	YES – NO for each parameter	YES
	PASSWORD	NEW PASSWORD	-
	DISPLAY CONTRAST	LEVEL 1…9	LEVEL 5
	BRIGHTNESS	OFF – LEVEL 1…4	LEVEL 2
	SLEEP MODE	OFF – ON (1…20 min)	ON (1 min)
	READING WITH HOLD	YES – NO	NO
	DATE FORMAT	yyyy/mm/dd – mm/dd/yyyy – dd/mm/yyyy	dd/mm/yyyy
	DATE SETTINGS	-	-
	TIME SETTING	-	-
	CALIBRATION DUE MODE	LOCK - ALERT	ALERT
	TEMPERATURE UNIT	°C - °F	°C
	SELECT LANGUAGE	ENG – ITA – FRA – ESP – DEU	ENG
	AUTO OFF	YES - NO	NO
	RESET SETTINGS	YES - NO	-

** Function available only for* **PC 70 NEX**



SELECT PARAMETERS

Access this menu to select which parameters to display or hide in measurement mode. By default, no parameters are hidden.

- Use the button to flag the parameters you wish to keep active and display in measurement mode.
- **If you uncheck the box, the parameter will NOT be displayed in measurement mode**.

Example: *For a specific period, the user is only interested in viewing and using the pH, mV and EC parameters, as well as the MultiView screen. Access the "Select parameters" menu and use the button to deselect the remaining parameters. Return to measurement mode by pressing ESC.*

PASSWORD (Password management)

Use this setup menu to enable, set or disable the password:

- The active password is indicated on the display by the icon.
- The password is required to perform the following tasks:
  - calibrating the device;
  - deleting saved data;
  - changing the device's date and time;
  - changing or deactivating the calibration expiry date;
  - changing the CALIBRATION DUE MODE menu;
  - reset the settings for the various parameters.
- The password consists of 4 numeric characters; use the and buttons to change the number and move to the next field by pressing V.

- **To disable the password, enter "0 0 0 0" as the new password.**

***Note**: If the password is lost, contact Technical Support.*

DISPLAY CONTRAST (Display contrast management)
Access this setup menu to adjust the 9 display contrast levels.
Level 1 (low contrast) **-> Level 9** (high contrast).
The instrument is set by default to a medium contrast level (level 5).

BRIGHTNESS (Display brightness control)
Access this setup menu to adjust the 5 display brightness levels.
Off (no brightness) **-> Level 4** (maximum brightness).
The instrument is set by default to a medium brightness level (level 2).
***Note**: For outdoor use, especially on sunny days, it is advised to set the brightness to "Off".*

SLEEP MODE (Display mode with minimum brightness)
Access this setup menu to manage the device's standby mode:

- **OFF**: Sleep mode disabled, brightness always on.
- **ON (1…20 min)**: Use the directional buttons to select the number of minutes of keyboard inactivity after which standby mode should be activated. By default, it activates after one minute.

***Note:** Standby mode affects only the display brightness. All other instrument functions continue to operate normally (e.g. data logging). To exit standby mode and return the display to normal brightness, press any button.*

READING WITH HOLD (Activating the HOLD function)
Access this setup menu to enable or disable the **HOLD** stability criteria:

- **NO**: -default option- The reading is not held.
- **YES**: When this option is enabled, the reading is locked on the display as soon as it reaches stability.

To unlock and restart the measurement until the next stabilisation, press .

DATE FORMAT
Access this setup menu to change the date format:

- **yyyy/mm/dd**
- **mm/dd/yyyy**
- **dd/mm/yyyy** – default option –

DATE SETTINGS

Access this setup menu to update the device's date. Use the arrow buttons to change the year, confirm with  and repeat the same procedure for the month and day.

TIME SETTINGS

Access this setup menu to update the device's time. Use the arrow buttons to change the hour, confirm with  and repeat the same procedure for the minutes and seconds.

CALIBRATION DUE MODE
Access this setup menu to manage the effects of the calibration due date (*see the* **SET CALIBRATION DUE** *section for the various parameters*):

- **Lock measurement:** The values are no longer shown on the display, preventing the user from working until a new calibration is performed.
- **One-time alert:** ⧖ flashes as an alert on the display until a new calibration is performed; the user can keep working.

***Important:** In both cases, it is not possible to save data.*

TEMPERATURE UNIT (Temperature measurement unit)
Access this setup menu to select the temperature unit of measurement. Use:

- **°C** -default-
- **°F**

SELECT LANGUAGE
Access this setup menu to select the device's operating language:

- **English** – default option –
- **Italian**
- **French**
- **Spanish**
- **German**

AUTO OFF (Auto-shutdown)
Access this setup menu to enable or disable the instrument's auto-shutdown:

- **YES:** The instrument switches off automatically after **20 minutes** of inactivity.
- **NO** – default option – The instrument always remains on, even when not in use.

Note: *The instrument's auto-shutdown function is disabled when data is being recorded using the automatic data logger mode* .

RESET SETTINGS (General reset)
Access this setup menu to restore the instrument to its factory settings.
IMPORTANT: *Restoring factory settings does not delete stored data.*

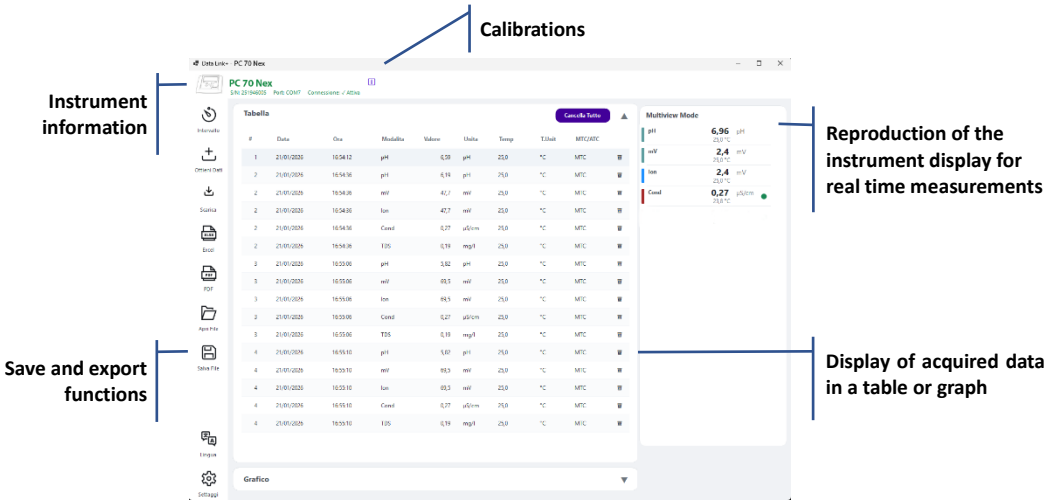
17. DataLink Software + (for Windows 10/11)

You can connect the 70 NEX Series instruments to a PC and then use the DataLink+. (and later versions) to download data, access the Data Logger directly on the PC and export data to xls (Excel) and .pdf. The software can be downloaded free of charge from the website (please ensure the drivers are installed correctly):

- https://www.giorgiobormac.com/it/download-software_Download.htm.
- Connect the USB cable included in each package to the USB port on the side panel of the instrument and the other end to a COM port on the computer.
- Use only the USB cable supplied with each instrument.
- Launch the program and then switch on the instrument.

Functions

- **Download**: the data saved in the instrument's memory are downloaded to the PC and displayed in a table for processing.
- **M+**: instantaneous acquisition of a value (equivalent to the manual Data Logger option).
- **Logger**: automatic acquisition at a set frequency.
- **Empty**: clears the data in the table. If a password is set, it will be requested.
- **Export to Excel** / **Export to PDF:** export of all data on the DataLink+ screen to PDF and Excel. The graph is exported only in PDF format, not in Excel.
- **Save to file** / **Open from file**: saves the data in the table and allows you to reload it for processing or to continue recording.
- **Select language**: set the interface language (Eng – Ita – Deu – Esp – Fra – Cze).
- **Table** / **Graph**: display mode for acquired data. The graphs are divided by parameter and can be printed separately.



18. Warranty

Warranty Period and Limitations

- The manufacturer of this device offers the end user of the new device a three-year warranty from the date of purchase, provided the device is maintained and used in accordance with best practice.
- During the warranty period, the manufacturer will repair or replace any defective components.
- This warranty applies only to the electronic components and does not apply if the product has been damaged, used incorrectly, exposed to radiation or corrosive substances, if foreign materials have entered the product, or if modifications not authorised by the manufacturer have been made.

19. Disposal



This equipment is subject to the regulations for electronic devices.
Dispose of in accordance with current local regulations.