PX vio

pH - mV SIMULATOR

USER MANUAL

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Index

1. Introduction

XS Instruments, globally recognised as a leading brand in the field of electrochemical measurements, has developed this new instrument that is ideal for the verification and calibration of pH and mV meters.
The instrument is designed to be used with hand-held, bench-top and panel-mounted instruments.
The robustness and integrity of the device housing, the brightness adjustment options of the display and the practical carrying case, complete with all accessories, make this instrument suitable for using in the laboratory, in an industrial environment or for field tests. The keyboard layout and the innovative high-definition colour LCD display make the instrument extremely practical, quick to operate and easy to use.
The XS PX Vio instrument performs the signal simulation of a conventional pH, ORP or ISE electrode in the field with:
pH: -2 ... +16 with 0,01 resolution
mV: -1999 ... +1999 with 1 resolution
For pH simulation, the user can choose between selecting predefined values or moving freely within the entire measurement range. If the default values do not meet the user's needs, it is also possible to manually enter up to 5 values.
According to the NERST equation, the temperature can be changed between 0 and 100 °C.
Even for mV simulation, the user can choose from a range of predefined values designed specifically for the control of electrochemical measurements or move within the entire measurement range.
The portable XS PX Vio instrument is also capable of simulating the most common ORP solutions, even at different temperatures.

2. Security information

- ***Definitions of warning words and symbols***

The safety information in this manual is very important in order to avoid personal injury, damage to the instrument, malfunction or incorrect results due to non-compliance. Please read this manual carefully in its entirety and make sure you familiarise yourself with the instrument before you start working with it.
This manual must be kept close to the instrument so that the operator can refer to it if necessary.
Safety instructions are indicated by warning terms or symbols.

- ***Warning terms:***

WARNING For a medium-risk hazardous situation, which could lead to serious injury or death if not avoided. For a hazardous situation with low risk which, if not avoided, may result in minor or moderate material damage, loss of data or injury.

NOTICE For important product information.

NOTE For useful product information.

Warning symbols:

Attention
This symbol indicates a potential risk and warns to proceed with caution.

Attention
This symbol indicates potential danger from an electric current.

Attention
The instrument must be used according to the instructions in the reference manual. Read the instructions carefully.

Notice
This symbol indicates possible damage to the instrument or to the instrument parts.

Notes
This symbol highlights further information and tips.

- ***Intended use***

This instrument is exclusively designed to simulate electrochemical measurements both in the laboratory and directly in the field. Any other use outside these is considered unauthorised. Pay particular attention to the technical specifications in the table **INSTRUMENT CHARACTERISTICS / TECHNICAL DATA**. This instrument was 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 test report in each package).
The proper functioning of the device and the safety of the operator are only guaranteed if all normal laboratory safety regulations are observed and if all the specific safety measures described in this manual are followed.

- ***Basic requirements for safe use***

The proper functioning of the device and the safety of the operator are only guaranteed if the following points are observed:

- the instrument may only be used in accordance with the above-mentioned specifications;
- the instrument must only operate under the environmental conditions described in this manual;
- the only part of the instrument that can be opened by the user is the battery compartment.

other operations should be carried out only if explicitly authorised by the manufacturer.

- ***Unauthorised use***

The instrument must not be operated if:

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

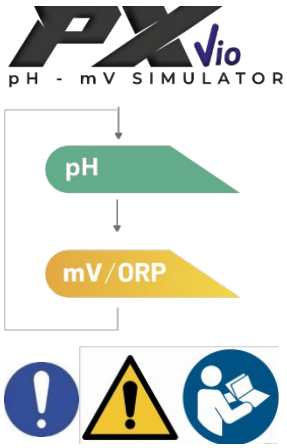
- ***Device maintenance***

If used correctly and in a suitable environment, the instrument requires no special maintenance procedures. It is recommended to occasionally clean the instrument with a damp cloth and a mild detergent. This operation should be carried out when the instrument is switched off and only by experienced and authorised personnel. The instrument housing is made of ABS/PC (acrylonitrile butadiene styrene/polycarbonate). This material is sensitive to certain organic solvents, e.g. toluene, xylene and methyl ethyl ketone (MEK). If liquids were to enter the instrument housing, they could damage the instrument. In the event of prolonged non-use of the device, cover the BNC connectors with the cap provided in the kit. Do not open the instrument housing as it contains no parts that can be serviced, repaired or replaced by the user. In the case of problems with the instrument, please contact your local distributor.
It is recommended to use only original spare parts. Contact your local distributor for information. The use of non-original spare parts can lead to malfunction or permanent damage to the instrument. Furthermore, the use of spare parts not guaranteed by the supplier can be dangerous for the user.

- ***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 third parties.
The owner of the instrument must inform users about the safe use of the instrument in their workplace and the management of potential risks and provide the required protective equipment. When using chemicals or solvents, follow the manufacturer's safety data sheets.

3. Instrument characteristics



- ***Parameters PX Vio***

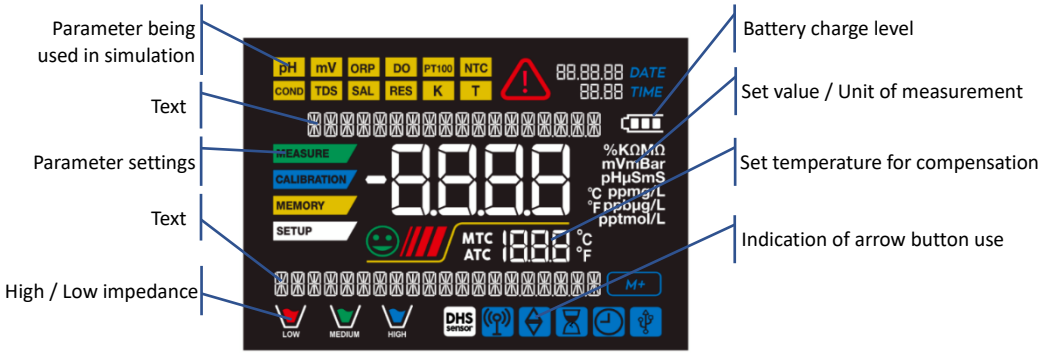
PX Vio: pH, mV

- ***Technical data***

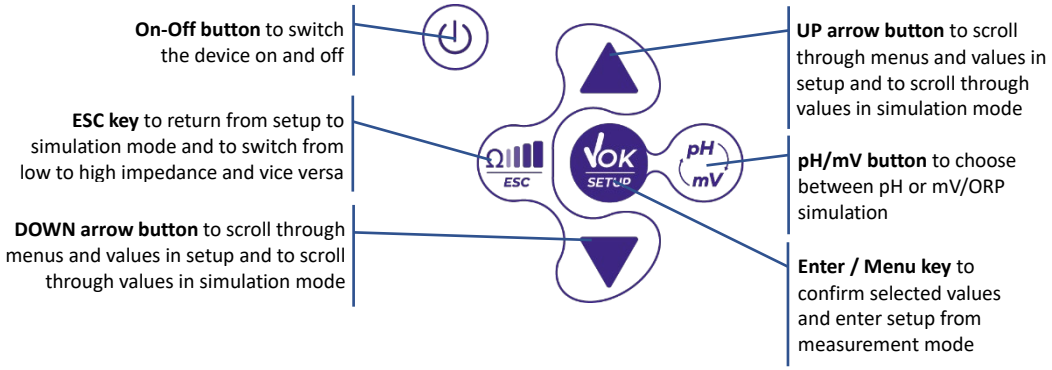
PX Vio	
pH	
Simulation range	-2 ... +16 pH
Resolution / Accuracy	0,01 / ±0,02
Predefined values	*USA*: 1,68 / 4,01 / 7,00 / 10,01 / 12,45 *NIST*: 1,68 / 4,00 / 6,86 / 9,18 / 12,46
Adjustable values	Up to 5 values
Temperature compensation	0 ... 100 °C, according to Eq. Nerst
mV	
Simulation range	-1999 ... +1999 mV
Resolution / Accuracy	1 mV / ±1 mV
Predefined values	1900 / 900 / 177 / 0 / -177 / -900 / -1900 mV
Adjustable values	Up to 5 values
ORP	
Predefined values	200 / 250 / 468 / 475 / 650 mV
Temperature compensation	15 ... 50 °C, ORP buffers' thermal tables
System	
Low/High impedance	Low: <100 KΩ / High: 1 GΩ
Connector	BNC
Display	High-definition colour LCD
Brightness and contrast management	Manual
Sleep Mode	Yes
Auto-off	Yes
Fast scrolling through values	Yes
IP rating	IP 57
Power supply	4 AA batteries 1,5 V
Environmental operating conditions	0 ... +60 °C
Maximum permissible humidity	<95 % non-condensing
System dimensions	185 * 85 * 45 mm
System weight	400 g
Reference standards	EMC 2014/30/EU RoHS 2011/65/EU EN 61326-1 EN 61010-1

4. Instrument description

- ***Display***



- ***Keyboard***



- ***LED***

All instruments are equipped with a two-colour LED (red and green) that provides the user with important information on the status of the instrument:

Function	LED	Description
Switch on	GREEN	*Fixed*
Switch off	RED	*Fixed*
Low impedance activation	GREEN	*Fixed*
High impedance activation	GREEN	*Blink*

5. Installation

- ***Supplied components***

The instrument is supplied in its own carrying case complete with batteries, BNC/BNC connection cable, single dose buffer solutions, test report and manual. Contact your local distributor to be updated on accessories and sales codes.

- ***installation***

- The device leaves the factory ready for use by the user.
- Batteries are included.

- ***Switching on and off***

Switch on the instrument by pressing the button. When switched on:

- the last parameter that was used is displayed;
- to switch off the instrument, press the button in simulation mode.

- ***Replacing batteries***

The instrument uses 4 AA 1,5V batteries. To replace the batteries:

1. Switch off the device.
2. Turn the instrument upside down, with the connector part resting on a tabletop, so that the battery stopper is facing upwards, towards the user.
3. While holding the battery cap in place with two fingers, use a screwdriver to unscrew the screw near the battery symbol.
4. Remove the battery stopper with the help of the supplied lanyard.
5. Remove the old batteries and insert the new ones. Pay attention to the correct polarity (follow the diagram on the back of the instrument).
6. Reinsert the battery stopper, hold it in place with two fingers, insert the screw and screw it in.

- ***Transporting the instrument***

The instrument comes with its own carrying case. Only use the original carrying case to transport the instrument. In case you need to repurchase it, contact your local distributor.
The inside of the case is specially shaped to safely accommodate the instrument and its accessories.

- ***Button function***

Key	Pressure	Function
	Brief	Press to switch the device on or off.
ESC	Brief	In the setup menu, press to return to measurement mode. In simulation mode, press to activate/deactivate the high impedance function.
OK SETUP	Brief	In simulation mode, press to enter setup. In the setup menu, press to select the desired programme and/or value.
pH mV	Brief	In simulation mode, press to switch from pH to mV simulation.
▲ ▼	Brief	In **AUTO** mode simulation, press to scroll through the default values. In **CONTINUOUS** mode simulation, press to change the value. In the setup menu, press to scroll through the programmes and change values.
	Prolonged (3 sec)	In **CONTINUOUS** mode simulation, press and hold to quickly change the value. In the setup menu where value entry is required, press and hold to quickly edit.

IMPORTANT:

- When sleep mode is active (after two minutes of inactivity) press any key to reactivate the display brightness.
- Only at this point do the buttons regain their function.

- ***Connections inputs / outputs***

Only use original accessories guaranteed by the manufacturer.
If necessary, contact your local distributor.
The BNC connector at the time of sale is protected by a plastic cap.
Remove the cap before connecting cables.

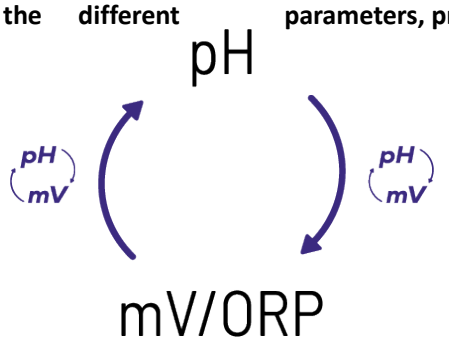
Simulator PX Vio upper panel

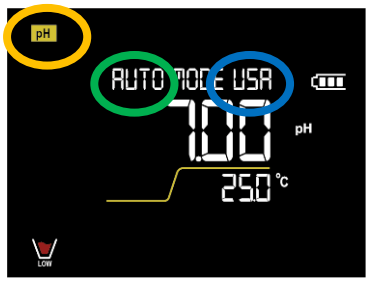
- ***Display symbols and icons***

Symbol	Description	Symbol	Description
	Press the arrow keys to change the parameter or value on the display		Battery charge indication
LOW	Low impedance signal simulation	HIGH	High impedance signal simulation

6. Device operation

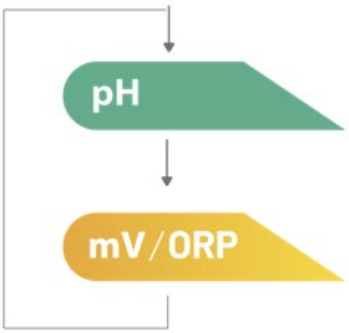
- When the device is switched on, the instrument enters measurement mode in the last parameter that was used.
- **To scroll through the different parameters, press the pH/mV button.**





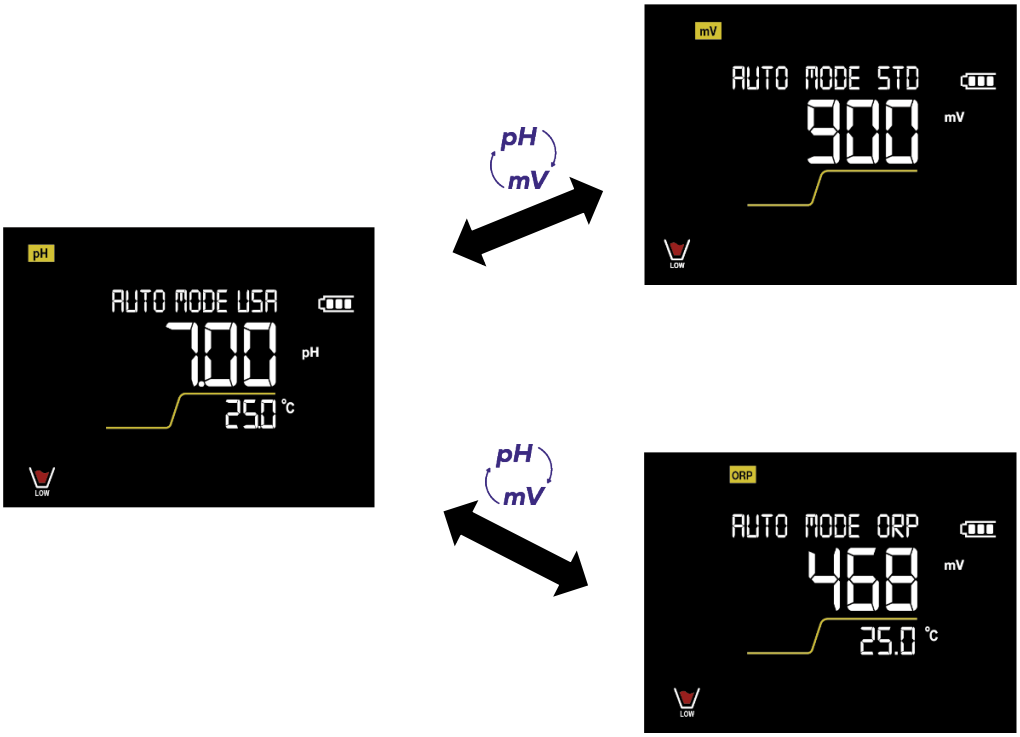
IMPORTANT:
In simulation mode, the active measurement parameter is indicated in the top left-hand of the display (e.g. pH). Above the parameter value, the parameter settings are shown.
EXAMPLE: simulated parameter pH / AUTOMATIC mode (default values) / USA buffer group

Sequence of parameters in measurement mode:



IMPORTANT: In simulation mode there is no link between pH and mV / ORP values.
pH simulation and mV / ORP simulation are independent of each other and are set and run separately.

Press the pH / mV button to switch between pH simulation and mV / ORP simulation.



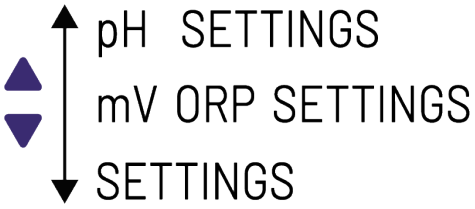
On the left-hand side of the display, the instrument mode is shown.

String	Meaning
SETUP	The user is in the configuration menu. In this menu, parameter characteristics or general instrument settings can be controlled.
NO TEXT	The instrument is in simulation mode.

7. Setup menu

SETUP

- In measurement mode, press the OK SETUP button to enter **SETUP** mode, choose the desired setting by pressing the arrow buttons and confirming with OK SETUP .



- Within the selected menu, move between the different programmes using the arrow buttons and press OK SETUP to access the submenu you wish to edit.
- **Use ▼ and ▲ to choose the desired option or to change the numerical value and confirm with OK SETUP.**
- The value or parameter being changed is recognisable as it **flashes** on the display.

  The icon ◆ indicates that the value or parameter to be chosen can be selected using the arrow keys.

Note: *In the setup menu where entry of a value is required, hold down the arrow buttons to quickly scroll through the numerical value.*

- Press Ω ESC to return to the previous menu.

- ***Setup menu structure***

SETUP

P1.0	PH SETTINGS	P1.1	Mode of use
		P1.2	Cal buffer select
		P1.3	Custom value
		P1.4	Temp value
		P1.5	Reset setting
P2.0	MV ORP SETTINGS	P2.1	Mode of use
		P2.2	Value selection
		P2.3	Custom value
		P2.4	Temp value ORP
		P2.5	Reset setting
P3.0	SETTINGS	P3.1	Temperature Unit
		P3.2	Backlight mode
		P3.3	Brightness
		P3.4	Sleep Mode
		P3.5	Reset setting
		P3.6	Auto off

8. pH parameter

pH

The XS PX Vio simulator can simulate the known pH values of the most widely used calibration buffer solutions. If the default values are not what the user needs, up to 5 can be entered via the programming menu. In **CONTINUOUS** operation mode, use the arrow buttons to quickly move over the entire instrumental range from -2,00 to +16,00 pH. Use the Ω ESC button to activate the high impedance function to check the input current of the connected device or connection cable.

- ***pH parameter setup***

SETUP

- In measurement mode, press OK SETUP to enter the **SETUP** menu.
- Press the OK SETUP button to access the **PH SETTINGS P1.0** menu.
- Use ▼ and ▲ to select the programme you wish to access.

The table below shows the structure of the setup menu for the pH parameter, the options that the user can choose and the default setting:

pH parameter setup menu

Programme	Description	Options	Factory setting
P1.1	MODE OF USE	AUTO - CONTINUOUS	AUTO
P1.2 [1]	CAL BUFFER SELECT	USA - NIST - CUSTOM	USA
P1.3 [2]	CUSTOM VALUE	INS - MOD - DEL	INS
P1.4	TEMP VALUE	0 ... 100 °C	25°C
P1.5	RESET SETTINGS	YES - NO	NO

IMPORTANT:

[1] This setup menu is only active in P1.1 AUTO mode.

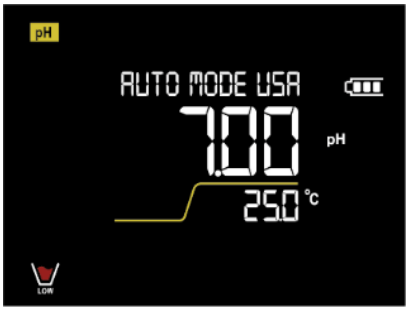
[2] This setup menu is only active in P1.1 AUTO / P1.2 CUSTOM mode.

P1.1 Modes of Use

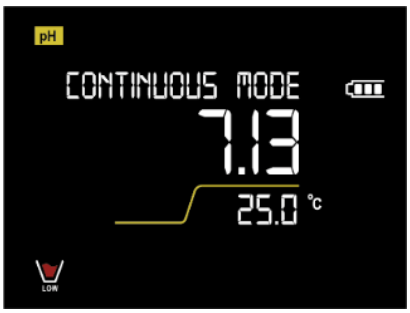
Use this setup menu to select:

- **AUTO** (factory setting): when using this setting, only the default values will appear in simulation mode. To choose the values see setup menu **P1.2.**
  In simulation mode, use the arrow buttons to scroll through the different simulated values of the selected buffer group.
  Note: *This function is particularly useful for the quick use of the instrument, especially if work procedures always require the same values.*
- **CONTINUOUS**: when using this setting in simulation mode the user can move across over the entire pH scale in the range (-2,00 ... +16,00).
  In simulation mode, pressing the arrow buttons will change the value by 0,01 each time. Press and hold to change values faster.

EXAMPLE:



pH simulation in AUTO mode with USA buffer group.
Pressing the arrow buttons will scroll through the default values of the selected buffer



pH simulation in CONTINUOUS mode.
Each press of the arrow button will change the simulated value by 0,01. Press and hold to scroll by a value of 0,1 and then 1

P1.2 Selecting Values

In setup **P1.1** and **AUTO** mode, this setup menu is accessed using the arrow keys.
Select which set of predefined values will be active in simulation mode.

- **USA** - factory setting: 1,68 / 4,01 / 7,00 / 10,01 / 12,45 pH
- **NIST**: 1,68 / 4,00 / 6,86 / 9,18 / 12,46 pH
- **CUSTOM**: up to 5 pH values can be entered manually by the user (setup **P1.3**).

IMPORTANT: If **CONTINUOUS** mode is selected, the menu for selecting automatic values to be simulated is not displayed.

P1.3 Manual Value Entry

Selecting **AUTO** in setup **P1.1** and **CUSTOM** in setup **P1.2** allows 1 to 5 customised pH values to be added.

- **INS**: select this option to enter the manual value. Use the arrow buttons to change the value and then confirm with OK SETUP. The instrument will already be waiting for the next value to be entered. Press Ω ESC to confirm the set value(s) or OK SETUP to add further values.
- **MOD**: select this option to modify a previously entered custom value.
- **DEL**: select this option to delete a previously entered custom value.

In simulation mode pH, after with the values have been entered manually, the display screen will indicate that values have been entered (e.g. if the user has entered 3 values, in display mode it will show: 1 VALUE OF 3, 2 VALUE OF 3 etc.).

IMPORTANT: If **CONTINUOUS** or **AUTO** mode is selected, but with **USA** or **NIST** predefined values, this custom value entry menu is not displayed.
***Note**: If the options **P1.1 AUTO** and **P.1.2 CUSTOM** are set but no manual value is entered, an error message will appear in simulation mode ("ERROR NO VALUES").*

P1.4 Temperature value

Use this setup menu to set the temperature at which the pH value is simulated. By default, the predefined values are simulated at 25 °C.

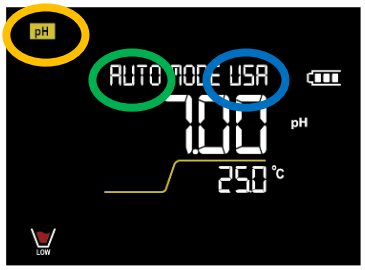
- **0 ... 100 °C** - factory setting: 25 °C

Compensation occurs in accordance with the Nerst equation.
***Note**: The use of this function is recommended for experienced users.*

P1.5 Reset pH parameter

Use this menu to reset all setup menu options of **P1.0 PH SETTINGS** to factory settings.

<u>IMPORTANT: In simulation mode, there are no links between pH and mV / ORP values. pH simulation and mV/ORP simulation are independent of each other and are set up and operated separately.</u>



Press the pH / mV button to switch between pH simulation and mV / ORP simulation. The icon in the top left of the display shows the parameter in use and the text above the value shows the parameter settings.
EXAMPLE: pH parameter / AUTOMATIC mode (default values) / USA buffer group

9. mV / ORP parameter

The PX Vio simulator can simulate the most common mV values to perform electrochemical measurements. If the default values are not what the user needs, up to 5 can be entered via the programming menu.
In **CONTINUOUS** mode, using the arrow buttons, the user can move quickly over the entire mV range from -1999 to +1999 mV. The instrument is also able to simulate the most popular REDOX / ORP verification solutions, even at different temperatures thanks to the stored temperature tables. Use the Ω ESC button to activate the high impedance function to check the input current of the connected device or connection cable.

- ***mV / ORP parameter setup*** SETUP

- In measurement mode, press OK SETUP to enter the **SETUP** menu.
- Use the arrow keys to move to **MV/ORP SETTINGS P2.0** and access the menu by pressing OK SETUP .
- Use ▼ and ▲ to select the programme you wish to access.

The table below shows the structure of the setup menu for the mV/ORP parameter, the options that the user can choose and the default setting:

mV/ORP parameter setup menu

Programme	Description	Options	Factory setting
P.2.1	MODE OF USE	AUTO - CONTINUOUS	AUTO
P2.2 [1]	VALUE SELECTION	STD - ORP - CUSTOM	STANDARD
P2.3 [2]	CUSTOM VALUE	INS - MOD - DEL	INS
P2.4	TEMP VALUE ORP	15 ... 50 °C	25°C
P2.5	RESET MV SETTING	YES - NO	NO

IMPORTANT:
[1] This setup menu is only active in P2.1 AUTO mode.
[2] This setup menu is only active in P2.1 AUTO / P2.2 CUSTOM mode.

P2.1 Modes of Use
Use this setup menu to select:

- **AUTO** (factory setting): when using this setting, only the default values will appear in simulation mode. To choose values see setup menu **P2.2.** In simulation mode, use the arrow buttons to scroll through the different simulated values.

Note: *This function is particularly useful for the quick use of the instrument, especially if work procedures always require the same values.*

- **CONTINUOUS**: when using this setting in simulation mode the user can move across the entire mV scale in the range -1999 ... +1999 mV. In simulation mode, pressing the arrow buttons will change the value by one unit each time. Press and hold to change values faster.

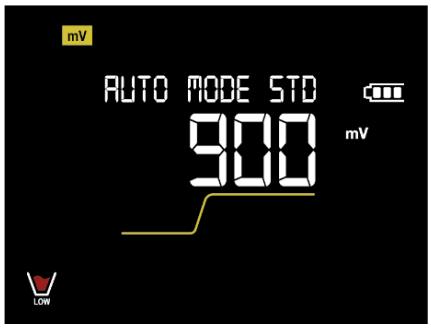
P2.2 Selecting Values
In setup **P2.1** and **AUTO** mode, this setup menu is accessed using the arrow keys. Select which set of predefined values will be active in simulation mode:

- **STANDARD** - factory setting: 1900 / 900 / 177 / 0 / -177 / -900 / -1900 mV
- **ORP**: 200 / 250 / 468 / 475 / 650 mV
- **CUSTOM**: up to 5 values entered manually by the user (setup **P2.3**).

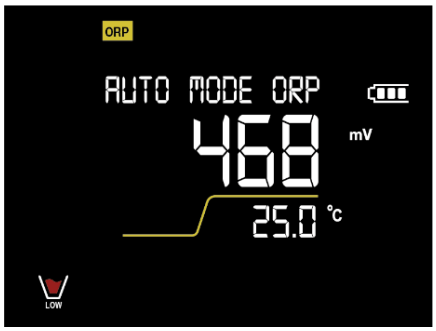
IMPORTANT: If **CONTINUOUS** mode is selected as the operating mode, the menu for selecting automatic values to be simulated is not displayed.

***Note**: In simulation mode, the following settings will show the icon* mV *on the display screen:*
P2.1 AUTO / P2.2 STANDARD
P2.1 AUTO / P2.2 CUSTOM
P2.1 CONTINUOUS
In simulation mode, the following setting will show the icon ORP *on the display screen:*
P2.1 AUTO / P2.2 ORP

EXAMPLE:



Simulation of mV in AUTO mode, with standard default values for meter control



mV simulation of the most popular ORP solutions.
It is also possible to change the working temperature

P2.3 Manual Value Entry

Selecting **AUTO** in setup **P2.1** and **CUSTOM** in setup **P2.2,** allows 1 to 5 customised mV values to be added:

- **INS**: select this option to enter the manual value. Use the arrow buttons to change the value and then confirm with OK SETUP.
- The instrument will already be waiting for the next value to be entered. Press Ω ESC to confirm the set value(s) or OK SETUP to add further values.
- **MOD**: select this option to modify a previously entered custom value.
- **DEL**: select this option to delete a previously entered custom value.

In simulation mode mV, after with the values have been entered manually, the display screen will indicate that values have been entered (e.g. if the user has entered 3 values, in display mode it will show: 1 VALUE OF 3, 2 VALUE OF 3 etc.).

IMPORTANT: If **CONTINUOUS** or **AUTO** is selected, but with preset **STANDARD** or **ORP** families, this custom value entry menu is not displayed.
***Note**: If options P2.1 **AUTO** and P2.2 **CUSTOM** are set but no manual value is entered, an error message will appear in simulation mode ('ERROR NO VALUES').*

P2.4 Temperature value for ORP parameter

Standard solutions simulated with the ORP parameter can be expressed at different temperatures.
By default, the values of these solutions are expressed at 25 °C.

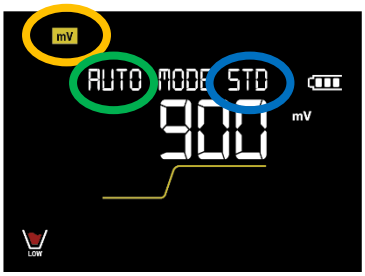
- **15 ... 50 °C** - factory setting: 25 °C

Below is an extract of the stored temperature tables:

20 °C	209 mV	**250 mV**	463 mV	471 mV	640 mV
25 °C	**200 mV**	243 mV	**468 mV**	**475 mV**	**650 mV**
30 °C	191 mV	236 mV	474 mV	479 mV	659 mV
40 °C	173 mV	221 mV	485 mV	485 mV	678 mV

P2.5 Reset parameter mV
Use this menu to reset all setup menu options of **P2.0 MV/ORP SETTING** to factory settings.

IMPORTANT: In simulation mode, there are no links between pH and mV / ORP values. pH simulation and mV / ORP simulation are independent of each other and are set up and operated separately.



Press the pH/mV button to switch between pH simulation and mV / ORP simulation. The icon in the top left of the display shows the parameter in use and the text above the value shows the parameter settings.
EXAMPLE: mV parameter / AUTOMATIC mode (default values) / standard values

10. High impedance testing

In simulation mode, use the Ω ESC button to choose the output impedance setting.

LOW **Low impedance signal**: < 100 KΩ. Ideal for calibrations.

HIGH **High impedance signal**: 1 GΩ. Ideal for checking the input current of instruments and transmitters and the functionality of connecting cables.

11. Instrument configuration menu

SETUP

- In measurement mode, press OK SETUP to enter the **SETTINGS** menu.
- Use the arrow buttons to move to **SETTINGS P3.0** and access the menu by pressing OK SETUP .
- Use ▼ and ▲ to select the programme you wish to access.

The table below shows the structure of the setup menu for general instrument settings, the options that the user can choose and the default setting:

Settings menu structure

Programme	Description	Options	Factory setting
P3.1	TEMPERATURE UNIT	°C - °F	°C
P3.2	BACKLIGHT MODE	INDOOR - OUTDOOR	INDOOR
P3.3	BRIGHTNESS	LOW - NORMAL - HIGH	NORMAL
P3.4	SLEEP MODE	OFF - 2 MIN - 5 MIN	2 MIN
P3.5	RESET SETTINGS	YES - NO	NO
P3.6	AUTO OFF	YES - NO	YES

P3.1 Units of Measurement for Temperature
Use this setup menu to select which unit of temperature to use.

- **°C** - factory setting
- **°F**

P3.2 Backlight Mode
Use this setup menu to select which contrast mode to use for the display backlight.

- **INDOOR (In)** - factory setting: this is the recommended option if the device is being used in a laboratory or other closed environment
- **OUTDOOR (Out)**: this is the recommended option if the device is being used outdoors

P3.3 Brightness
Use this setup menu to choose between three different display brightness levels.

- LOW
- **NORMAL** - factory setting: medium
- HIGH

***Note**: Keeping the display at a high brightness negatively affects battery life.*

P3.4 Sleep Mode
Use this setup menu to manage the device's sleep mode.

- **OFF**: Sleep mode is switched off. The display brightness will always remain as set in **P3.3**, even if the instrument is switched on but not in use.
- **2 MIN** - factory setting: the instrument enters sleep mode after 2 minutes of inactivity.
- **5 MIN**: the instrument enters sleep mode after 5 minutes of inactivity.

When the device is in sleep mode, the display brightness is reduced to a minimum, which saves battery consumption significantly.
To exit sleep mode and return the display to normal brightness, press ANY button. Once the brightness of the display is restored, the buttons regain their function (paragraph “Button function”).

P3.5 General Reset
Use this setup menu to reset the instrument to factory settings.

P3.6 Automatic Shutdown
Use this setup menu to activate or deactivate the instrument's auto switch-off.

- **YES** - factory setting: the instrument automatically switches off after **20 minutes** of inactivity.
- **NO:** the instrument always remains switched on even if it is not being used.

***Note**: The correct and systematic use of **P3.2 / P3.3 / P3.4 / P3.6** will significantly extend battery life.*

12. Warranty

- ***Warranty duration and limitations***

The manufacturer of this appliance offers the end user a three-year warranty from the date of purchase in the event of proper maintenance and use.
During the warranty period, the manufacturer will repair or replace defective components.
This warranty applies only to the electronic part of the appliance and does not apply if the appliance has been damaged, misused, exposed to radiation or corrosive substances, if foreign materials have penetrated the product, or if modifications have been made that were not authorised by the manufacturer.

13. Disposal

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