AG SELECT SR
pH – Rx – Cl Controller

Table of contents

1. General information

Electronic instruments controlling electrochemical parameters such as pH, Redox or Chlorine are widely used in swimming pools, waterworks and water treatment plants.

The SR Series Controllers stand out for the following features:

- Capability of performing the most possible measurements with just one type of electronic board: pH, Redox (mV), Cl (ppm).
- Simple and easy to learn programming procedure providing two types of menu: a BASIC menu allowing the user to control indispensable functions, and a FULL menu giving the user the full capability of setting all functions.
- Galvanically isolated electronics providing a high level of immunity to disturbances.

2. Technical data

Parameter	Value	
Input voltage	24 - 230 VAC 50/60 Hz 12-24 VDC	-10 / +15% Voltage range
Power consumption	6 W (1 A peak current)	
Operating temperature range	0 – 40°C	
SETPOINT relay output terminals max current	16 ampere with resistive load 3 ampere with inductive load	2 setpoints
Alarm relay output terminals max current	5 ampere with resistive load 0.7 ampere with inductive load	1 alarm output
Current output	4 - 20 mA (dynamic 0..500 Ω)	2 current outputs
TTL output	0 – 999 pulse/min	2 open collector TTL outputs
pH range	0 … 14	0.01 pH resolution
Rx range (mV)	- 1000 ….+1400	± 1 mV Rx resolution
Chlorine range	0÷2; 0÷20; 0÷200; 0÷2000 ppm	0,001/0,01/0,1/1 ppm Cl resolution
Temperature range	0 – 10°C	0.1°C
Level control – PT100 connection		

3. Connection diagram

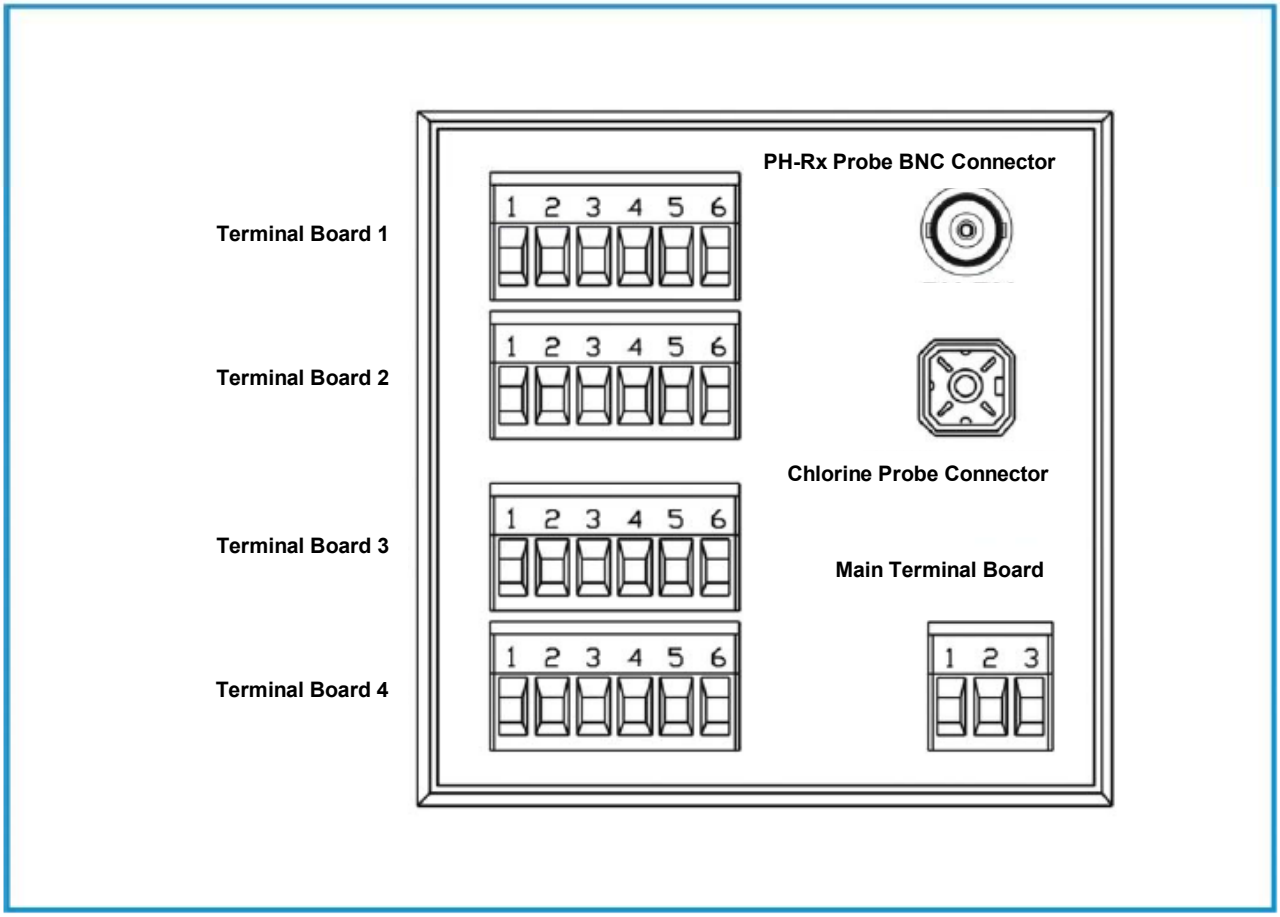


Fig. 1

3.1. Chlorine probe connections

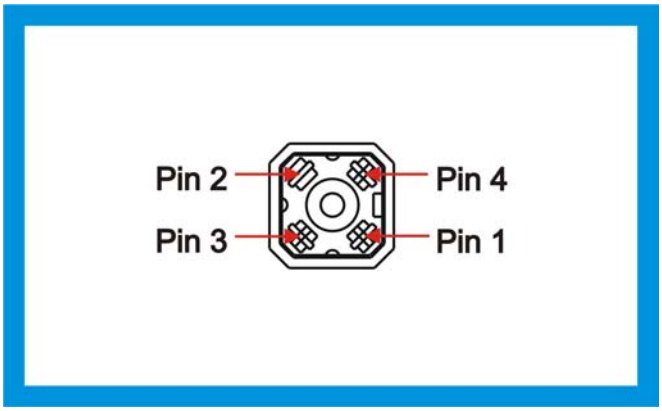


Fig. 2

Pin 1 – Chlorine probe positive supply (+5 V)
Pin 2 – Chlorine probe supply GND
Pin 3 – N.C.
Pin 4 – Chlorine probe negative supply (-5 V)

3.2. Main terminal board

Terminal No.	Description
1	**Phase 1** of electrical mains (brown)
2	**Phase 2** of electrical mains (blue)
3	**Ground** of electrical mains (yellow/green)

3.3. Terminal board 1

Terminal No.	Description
1	PT 100 cold terminal
2	PT 100 cold terminal
3	PT 100 hot terminal
4	Level 2
5	Level 1
6	Common to levels

3.4. Terminal board 2

Terminal No.	Description
1	4-20 mA positive output 1
2	4-20 mA positive output 2
3	4-20 mA common
4	Serial common
5	+12 VDC service (10 Ma)
6	RX/TX serial

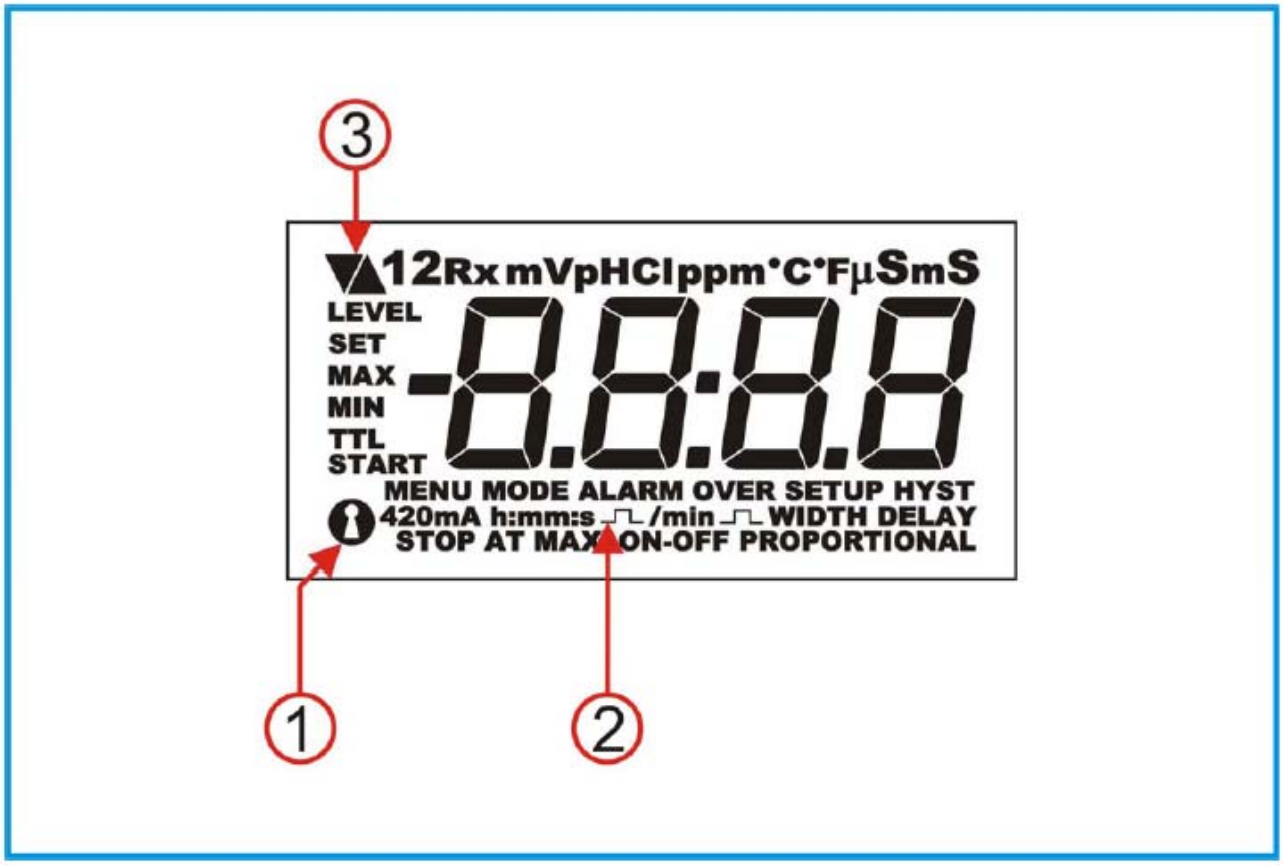
3.5. Terminal board 3

Terminal No.	Description
1	SET2 normally closed
2	SET2 common
3	SET2 normally open
4	SET1 normally closed
5	SET1 common
6	SET1 normally open

3.6. Terminal board 4

Terminal No.	Description
1	TTL 1
2	Common
3	TTL 2
4	Alarm – normally open
5	Alarm – common
6	Alarm – normally closed

4. Description of display icons



Icon 1 – Password
Icon 2 – Pulse/pulses
Icon 3 – Meaning of action (up arrow increases value, down arrow decreases value)

5. Control panel description

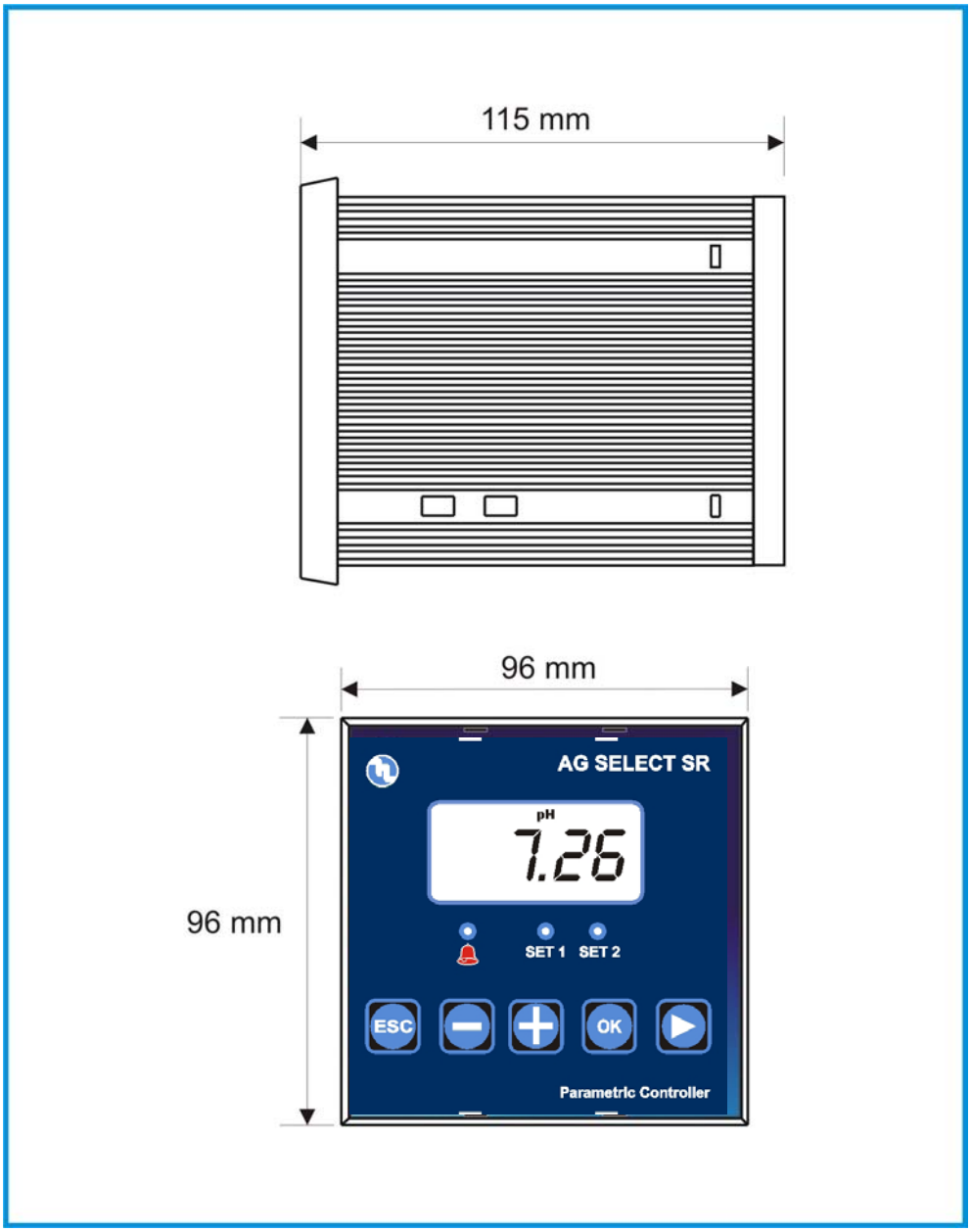
5.1. Light signs

	SET 1 active
	SET 2 active
	ALARM signal

5.2. Keyboard

	**ESC** – Comes one step back in the programming procedure.
	**Minus symbol** – Decreases numbers and defines functions within specific programming menus. E.g.: when selecting the type of measurement allows the user to shift between pH, Rx and Chlorine.
	**Plus symbol** – Increases numbers and defines functions within specific programming menus. E.g.: when selecting the type of measurement allows the user to shift between pH, Rx and Chlorine.
	**Shift right** – Used to select the digit to modify when setting passwords or times.
	**SET** – Allows the user to proceed by confirming the selections made.

6. Dimensions



7. Parameter defaults

No.	Function	pH default	Rx default mV	Cl default ppm
1	Setpoint 1	7.2	600	1
2	Setpoint 2	6.8	450	0.5
3	Type of action	Acid	Oxidising	Direct
4	Hysteresis	0.05	10	0.05
5	SETPOINT 1 and 2 actuation delay	00:03 m:s	00:03 m:s	00:03 m:s
6	TTL 1 and 2 outputs max frequency	120	120	120
7	Measurement at TTL 1 and 2 max frequency	14.00	1400	14
8	mA output 1 and 2, measurement at 4 mA	0.00	0	0
9	mA output 1 and 2, measurement at 20 mA	14.00	1400	10
10	Alarm – high threshold	14.00	1400	10
11	Alarm – low threshold	0.00	0	0
12	Alarm – overdosage (OVER)	99:59 h:m	99:59 h:m	99:59 h:m
13	Menu mode	BASIC	BASIC	BASIC
14	Password	OFF	OFF	OFF
15	Temperature unit	°C	°C	°C
16	Temperature compensation mode	Manual 25°C	Manual 25°C	Manual 25°C
17	Calibration menu delay	5’	5’	5’
18	Actuation delay when switching on	5”	5”	5”

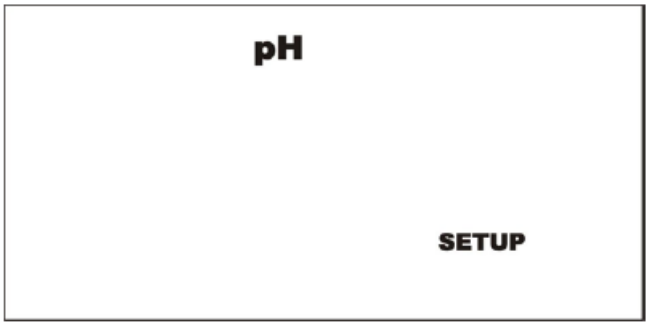
8. Programming the controller

All programming parameters and modes of operation of the controller can be set by using its keyboard and dedicated display.

8.1. Starting controller operation

The instrument, according to its initial configuration, can be set to control three distinct types of measurements: pH, Rx or Chlorine.

To perform that, when switching on the controller for the first time, the operator is requested to select the intended type of measurement by operating as follows:

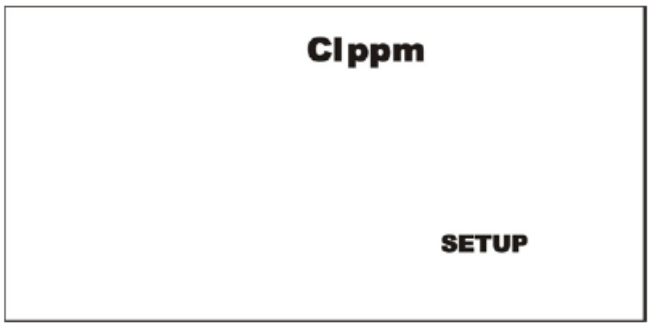


Upon switching on the instrument, the display shows the message “SETUP pH"; press the  or  key to select the measurement that the instrument is intended to control: pH, Rx, Cl.

When the indication of the measurement that the instrument is intended to control shows up, press the  key to confirm the selection.

Using  and 

you can select the scale for misuring the Cl value.



The request for setting the type of measurement that the instrument is intended to control is made only when the instrument is switched on for the first time; that selection can be modified afterwards by using the SETUP menu.

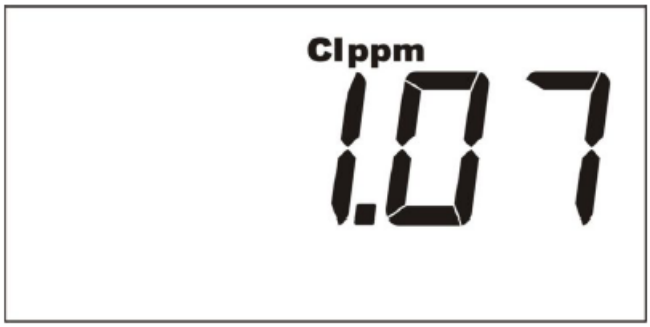
8.2. The display in the various operation modes (Ph – Rx – Cl)

When the instrument is switched on, the display shows the measurement value and the type of measurement; three display modes are used depending on the type of measurement.

The display in **pH** mode

The display in **Redox** mode

The display in **Chlorine** mode



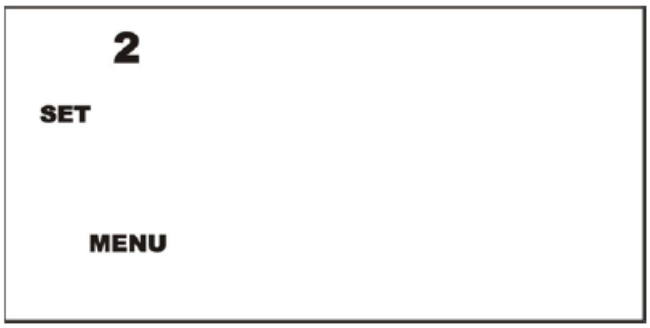
8.3. Programming procedure

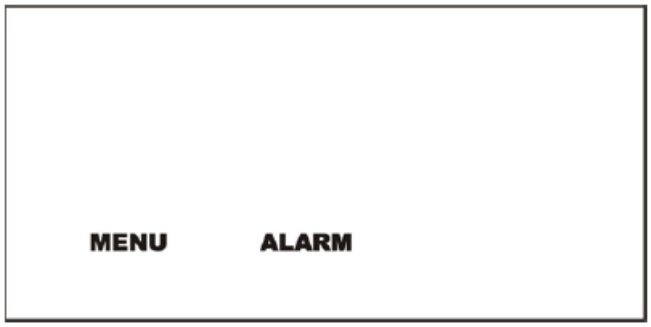
When the instrument is installed for the first time, it must be set according to the type of measurement and control that must be carried out.

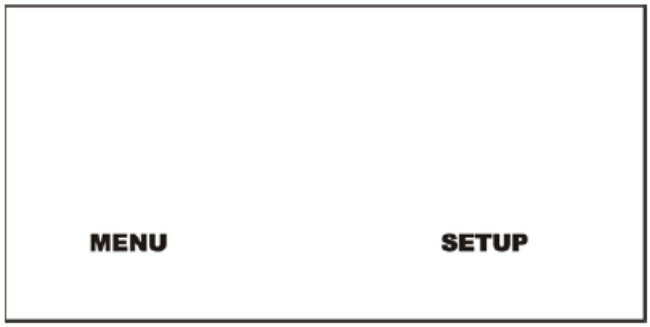
When setting the instrument, it is advisable to follow the programming procedure outlined below. Conversely, if only a single parameter must be changed, it is advisable to go directly to the menu comprising the concerned function, and perform the necessary changes or settings.

Press the 

key to go to the main menu, and press the  or  key to select the menu that needs programming.







The **4 20 mA** and **ALARM** menus are comprised only within the “FULL” mode.

The MAIN menu is comprised of 6 submenus, by using which all instrument’s functions can be set:

SETPOINT 1 – SETPOINT 2 - 4 20 mA – CAL – ALARM - SETUP.

8.3.1. Setting up the controller

To access the SETUP menu press the OK key. Two types of programming are available: the advanced mode (FULL) allows the experienced user to set all parameters affecting pH control; the simplified mode (BASE) allows control of only a few parameters essential for controlling the measured value.

To shift between FULL and BASE selections use the − or + key and press the OK key to confirm the selection.

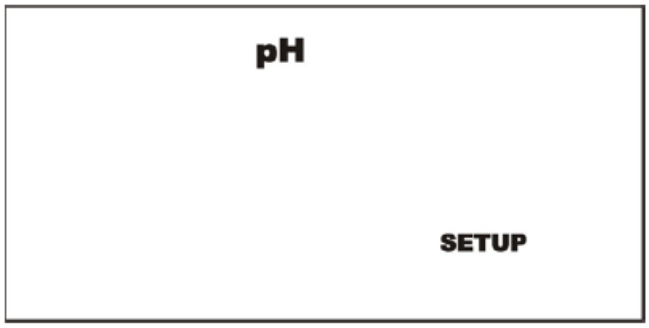
BEWARE

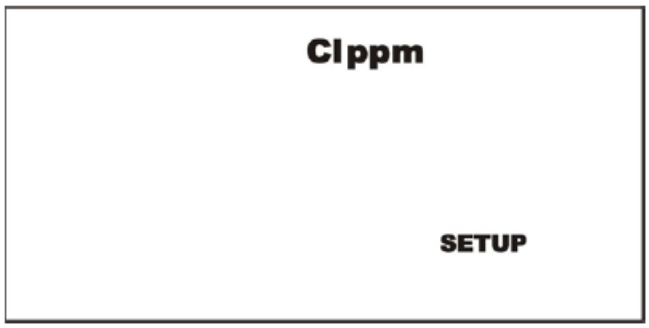
The instrument can carry out three distinct types of measurement: pH, Redox or Chlorine; that means that, depending on the requirements of the system and type of probe connected, the user can decide what type of measurement to control.

To outline the programming procedure, the example shows the pH control setting, however the procedure is the same for controlling the Redox potential or Chlorine.

As soon as the type of programming is defined, the type of measurement that the instrument is to control can be set: pH, Redox or Cl-ppm.

Use the following keys to select the type of measurement:  or  , and press the  key to confirm the selection.





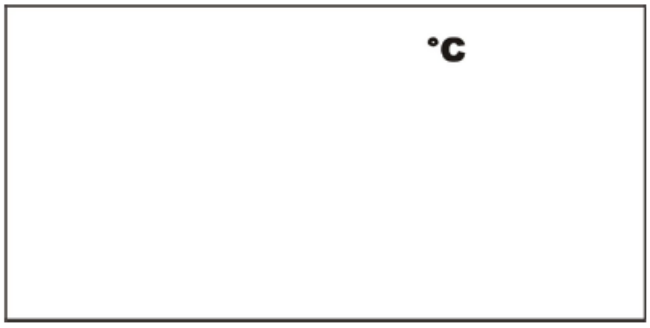
The selection of the type of measurement needs to be changed only when the type of probe is changed.

As soon as the measurement is selected, proceeding within the SETUP menu, the user can decide to activate the password security and the relating 4 digits code.

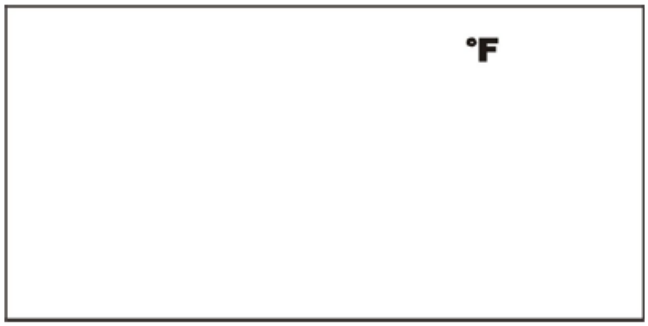
The password can be any number between 0000 and 9999: press the key  to select the digit to set, and press the keys  to set the selected digit; press the key  at end to confirm the digit.

Repeat the procedure for every digit to be set.

As soon as the password is set, the unit of measure for temperature can be selected (°C or °F). Press the  or  key to set the unit, and the  key to confirm the selection.



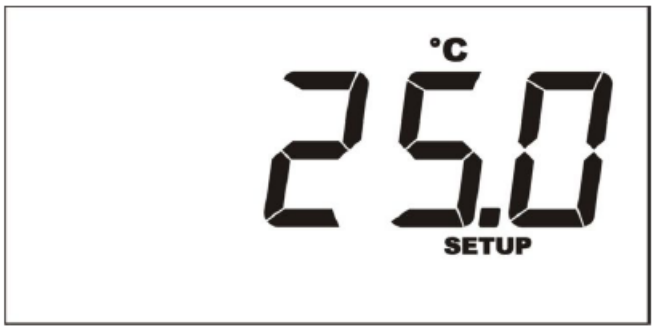
As soon as the unit of measure is set, the instrument allows two distinct modes of temperature compensation to be defined: through a PT100 probe to be connected to terminal board 1 in the back panel, or setting manually the temperature at which the system is presumably to work.



In case the **SenS off** function is selected, the reference value will be requested, while if the **SenS on** function is selected, the instrument will read directly the temperature value from the probe connected to the terminal board.

Press the  or  key to select the desired function and the  key to confirm the selection.

If the manual function (SenS off) is selected, the instrument's display shows the default temperature (25°C); by pressing the  or  key, the temperature value can be set in the range between 0 and 99.9°C. Press the  key to confirm the setting.

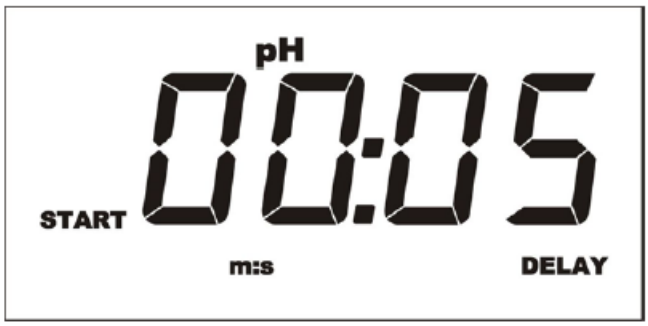


Proceeding with the SETUP menu, two time values can be set:
DELAY CAL, representing the exit delay time from the programming menu in case no keys are pressed during the probe calibration stage;
DELAY START, defining the delay time of measurement actuation from switching on the instrument.

Press the  or  key to set the intended delay time (m:s) and the  key to shift from minutes to seconds and back, and lastly press the  key to confirm the setting.

Follow the same procedure to set the startup delay time.

Press the  or  key to set the intended delay time (m:s) and the  key to shift from minutes to seconds and back, and lastly press the  key to confirm the setting.



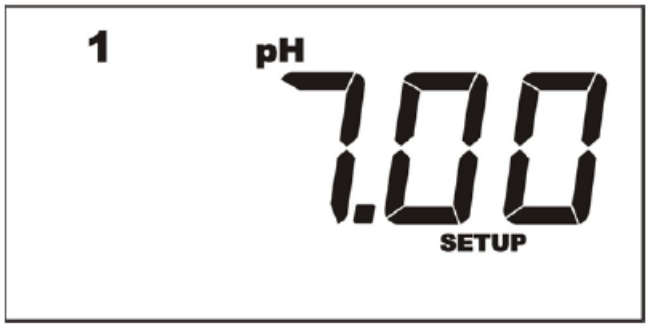
8.3.2. Calibration menu

The menu CAL allows the user to calibrate the probe using reference solutions.

Dipping the probe in the pH 7 buffer solution is the calibration procedure's first step.

Select the CAL (calibration) function from the main menu by pressing the OK key.

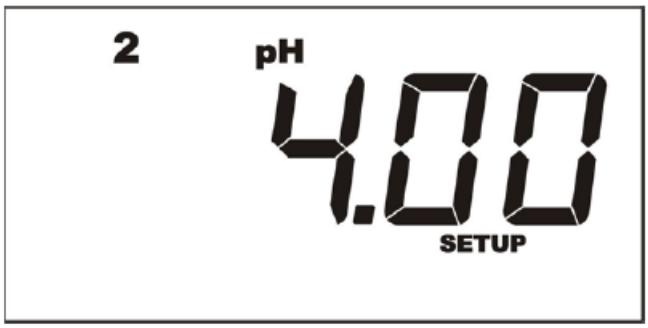
Once in the calibration function, the display shows the message 1 – pH – SETUP; at this point press the − or + key until the value 7.00 shows up, then press the OK key to confirm the operation; the display shows the message 2 – pH – SETUP.



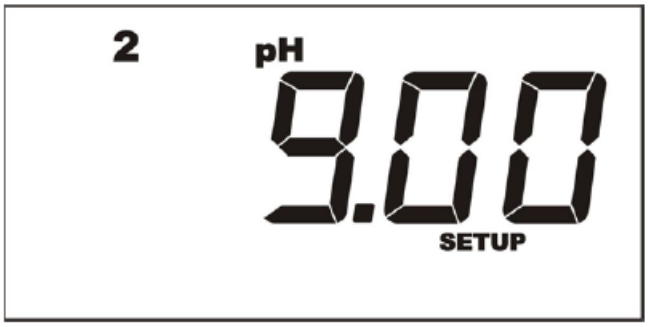
Dip the probe in a pH 4 or pH 9 buffer solution.

Press the − or + key until the value 4.00 or 9.00 shows up,

then press the OK key to confirm the operation.

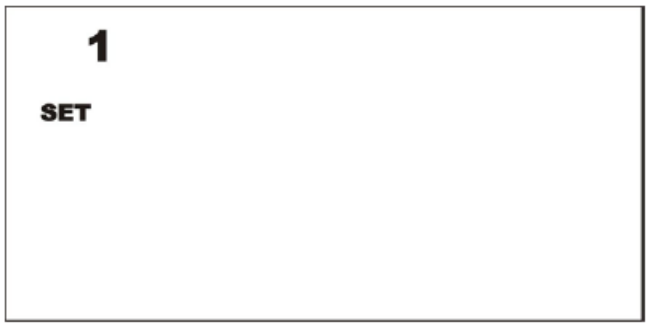


The instrument is so calibrated.



8.3.3. Setting setpoints

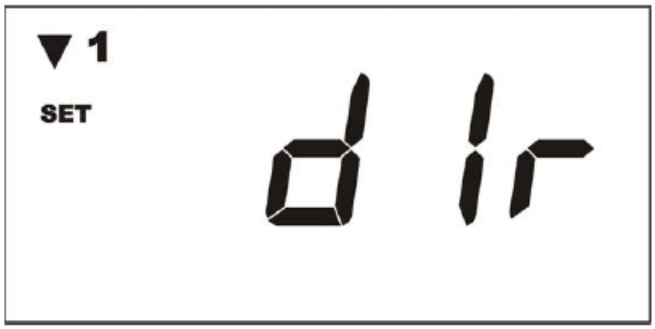
After setting up and calibrating the instrument, the SETPOINT values must be set: the instrument features two independent SETPOINTs actuating two relating relay outputs.
The reference values to be adopted as target values for the system can be set by programming the SET 1 or 2 menu.



Choosing the SET (1 or 2) by pressing the OK key is the first operation to carry out.

At this point in the programming procedure the intended value must be set by pressing the − or + key. Confirm the operation by pressing the OK key.

Defining the type of actuation is the next step: the down arrow indicates that the action tends to lower the measurement value (in the case of pH it represents an actuation of the acid type), the up arrow indicates that the actuation tends to increase the measurement value (in the case of pH it represents an actuation of the alkaline type).

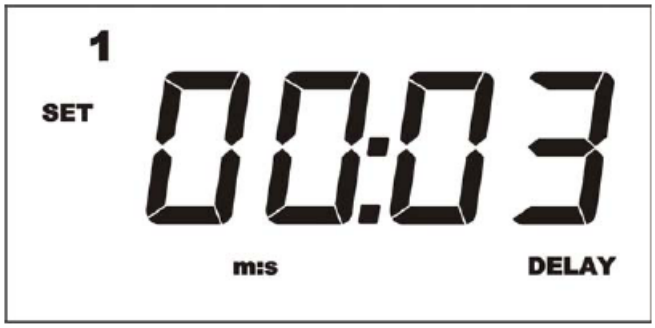


Press the − or + key to define the direction of the arrow, and press the OK key to confirm the choice.

After defining the type of actuation, setting the hysteresis value is the next step.

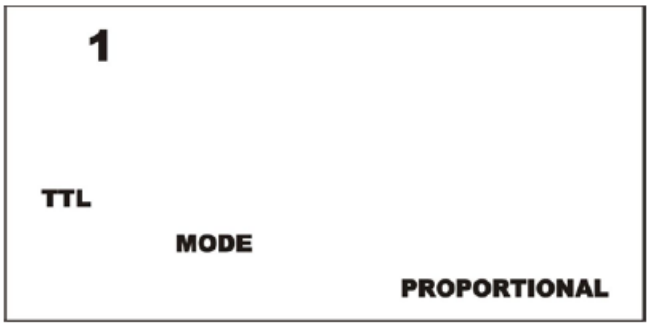
Press the  or  key to set the value, and press the  key to confirm the selection.

The instrument allows the user to define a delay time relating to SETPOINT actuation. Set the following value to activate that function.

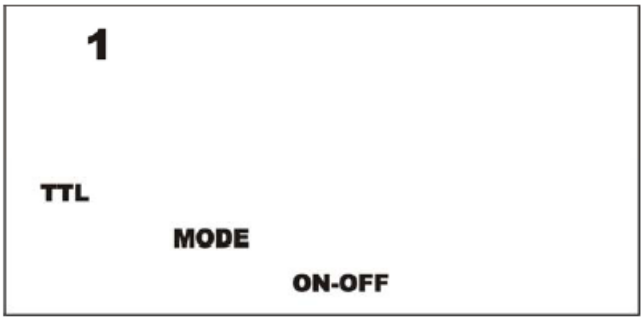


Press the  or  key to set the minutes or seconds, press the  key to select the field to change (minutes or seconds) and confirm the choice by pressing the  key.

The instrument features two TTL (1-2) outputs that can operate in the proportional or ON-OFF mode.



Press the  or  key to choose the operation mode of the TTL output selected: PROPORTIONAL or ON-OFF.
In the proportional mode the frequency of pulses decreases approaching the SETPOINT until the minimum set value is reached, whilst in the ON-OFF mode the TTL output is actuated when the corresponding SETPOINT relay changes its position. Press the  key to confirm the choice.



When choosing the proportional mode, three parameters must be set to allow the TTL output to operate correctly, as follows:

1. Measurement value at maximum frequency
2. Maximum frequency value (between 0 and 999 pulse/min)
3. Frequency value corresponding to the SETPOINT.

To set the measurement value at maximum frequency press the  or  key, then press the  key to confirm the choice.

At this point the instrument asks the maximum frequency value; press the  or  key, then press the  key to confirm the choice.

As soon as the maximum frequency value is set, the minimum frequency value, corresponding to SETPOINT actuation must be set.

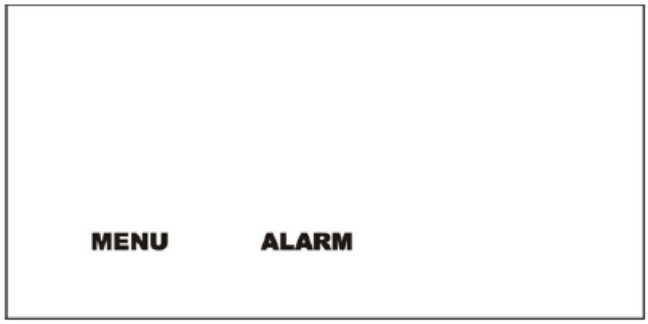
To set that value, press the  or  key, then press the  key to confirm the choice.

8.3.4. Configuring alarms

The instrument features various alarms that can be configured by the user; three types of alarm can be set:

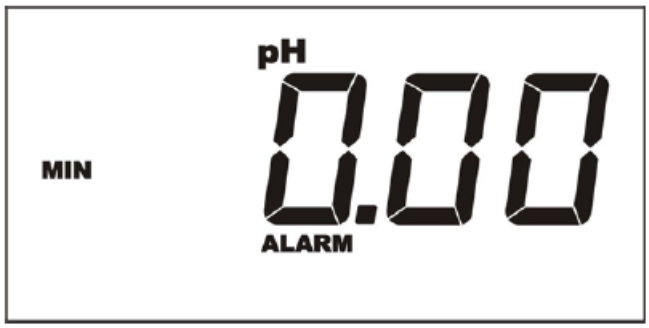
MAX – The instrument raises an alarm above a given measurement value.
MIN – The instrument raises an alarm below a given measurement value.
OVER – The instrument raises an alarm when a given time interval has elapsed and the measurement has not come back to the intended setpoint values.

In the main menu press OK when the message "MENU ALARM" shows up.



At this point the MAX alarm can be set; press the − or + key to set the pH value above which the instrument must raise an alarm, and press the OK key to confirm the choice.

Proceeding with the ALARM menu, the MIN alarm can be set; press the − or + key to set the pH value below which the instrument must raise an alarm, and press the OK key to confirm the choice.



The instrument can raise an OVER alarm when the measurement value does not come back to the setpoint value within the established time interval; to activate that function proceed as follows:

Press the  or  key to set the hours or minutes, press the  key to select the field to change (hours or minutes), and confirm the choice by pressing the 

key.

8.3.5. Current outputs menu

The instrument is equipped with two current outputs settable by the user; the measurement value corresponding to 4 or 20 mA can be set for every output.

In the main menu press OK when the message "MENU 420mA" shows up.

Press the − or + key to set the pH value for the first current output, corresponding to 4 mA.

Press OK to confirm the choice.

Press the − or + key to set the pH value for the first current output, corresponding to 20 mA.

Press OK to confirm the choice.

Press the − or + key to set the pH value for the second current output, corresponding to 4 mA.

Press OK to confirm the choice.

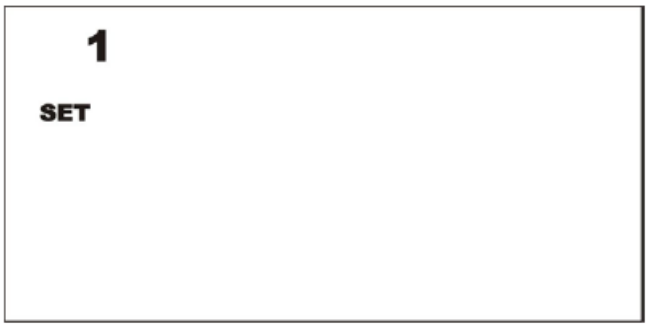
Press the  or  key to set the pH value for the second current output, corresponding to 20 mA.

Press  to confirm the choice.

9. Reset procedure

Switch off the instrument, then switch it on again.

Enter the main menu.



Simultaneously press the keys  and  within 15” from the time of switching on the instrument.

The display shows the message DEF.

At this point, in order to perform a **partial RESET** (saving the calibration of the instrument), press the following keys in the order indicated:

 **(1)**
 **(2)**
 **(3)**

Conversely, to perform a **full RESET** press the following keys in the order indicated:

 **(1)**
 **(2)**
 **(3)**

Beware: after 15” from entering the main menu, the RESET procedure can no longer be activated.