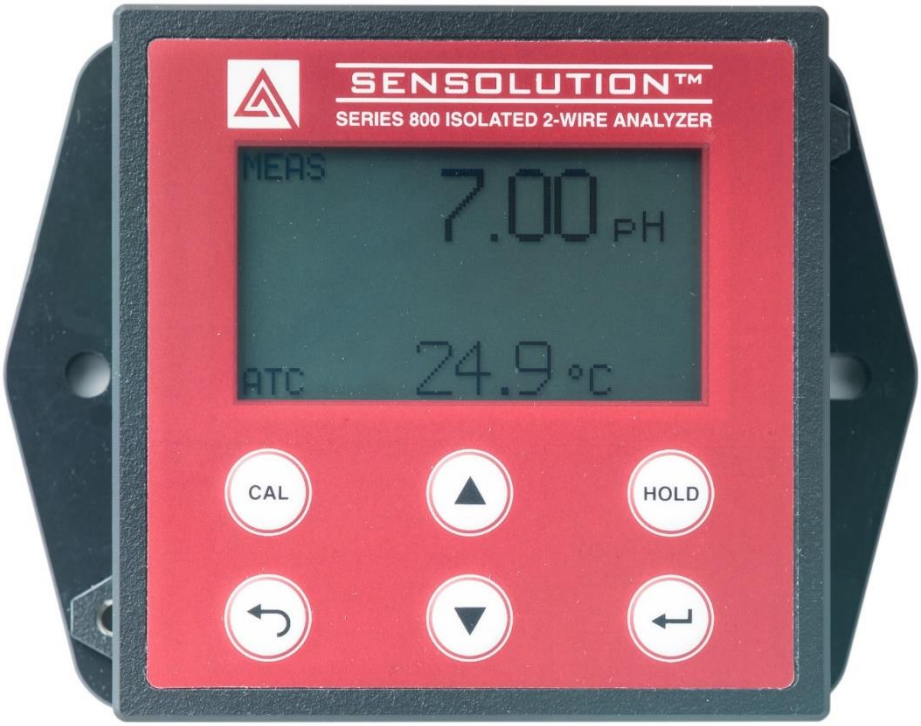
SENSOLUTION™ pH800 Analyser
Operating Manual



Installation and Operating Instructions

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pH800 Analyser Operating Manual

Contents

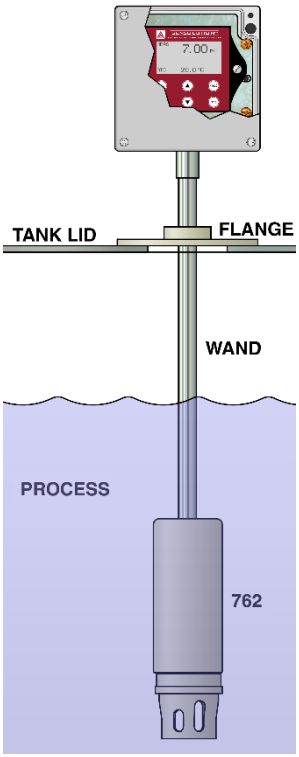
1. Introduction

Thank you for selecting a pH800 pH/ORP Analyser. The analyser converts an input from an electrochemical sensor to a 4-20mA signal for a PLC or chart recorder. The pH800 is a microprocessor-based instrument that is designed to be sturdy and user-friendly.

This analyser has many user-friendly features – all of which are completely accessible through the water-resistant membrane keypad.

Please read this manual thoroughly before operating your analyser.

2. Mechanical Installation



The pH800 may be supplied in a Model 762 probe assembly or as a stand-alone unit.

To install the sensor:

- Cut a 90mm diameter hole in the tank lid.
- Insert the 762 assembly through the hole and allow the assembly to rest on the flange.
- Loosen the grub screw in the flange to adjust the depth of the 762 assembly.

There is normally no need to bolt the flange down.

2.1. Open Installation

If the analyser is to be mounted separately, use an Astles Control Systems universal mounting kit (500/9501) to fix it to a pipe or wall. To attach the analyser to the mounting kit use M6 bolts, washers, and nuts.

2.2. Blind Enclosure Installation

To install the analyser into a blind enclosure it should be secured using two screws either side of the analyser, fixing it to the backplate, as can be seen below.

2.3. Sighted Enclosure Installation

To install the analyser into a sighted enclosure, the glands must be removed before passing the box through the window, and the screen gasket must be in place. The analyser should be secured to the front of the enclosure using two screws either side of the analyser, shown below.

3. Electrical Installation

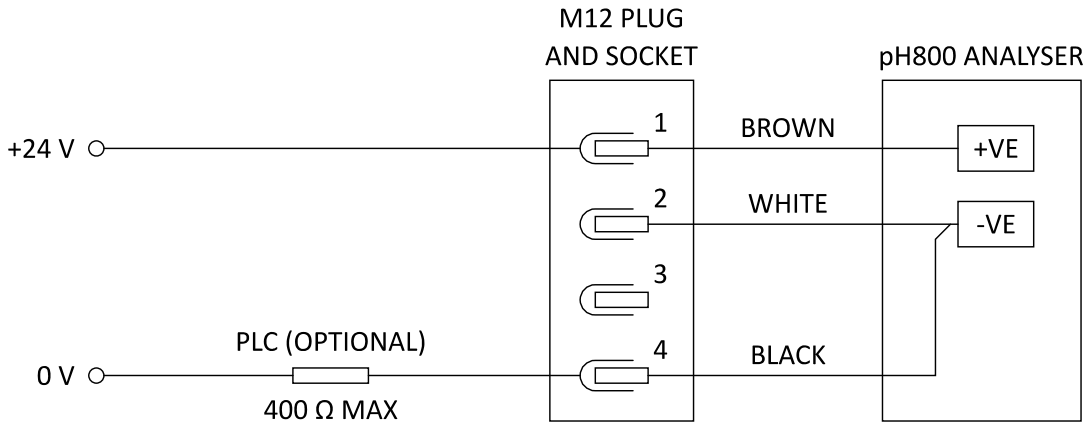
3.1. Power supply Requirements

The pH800 requires a 24V ±10% dc supply. Other devices such as chart recorders and PLCs may be connected in series. Use screened cable if the 4-20mA pH signal is required.

3.2. 24V Supply Wiring

3.2.1. Connection via an M12 Socket

To connect the analyser via an M12 socket, wire it as shown:



All three wires from the M12 socket must pass through a gland in the bottom of the analyser.

3.2.3. Direct Connection to Analyser

To wire directly to an external power source, wire +24V into the **+ve** terminal and 0V to the **-ve** terminal. Use 2-core screened cable, such as Belden 8760, through a gland in the bottom of the analyser. Only connect the cable screen at the power source, not in the analyser.

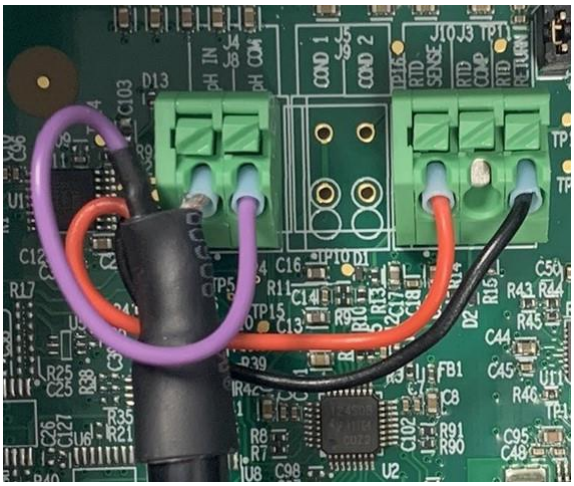
3.3. Sensor Wiring

3.3.1. pH/ISE with TC

Connect a pH or ISE sensor using a pH/TC cable, such as part numbers 500/9048 (105 cm) or 500/9043 (500 cm), through a gland in the bottom of the analyser.

Connection	Terminal	500/9043, 500/9048 Wire Colour
pH/ISE Signal	pH IN	Clear
Reference	pH COM	Purple
Pt100 Temperature	RTD SENSE	Red
Pt100 Temperature	RTD RETURN	Black
Pt100 Wire Compensation (Optional)	RTD COMP	N/A

If you are using a 3-wire temperature compensator, connect the cable compensation wire to **RTD COMP** and remove jumper **J1**.



3.3.2. Redox

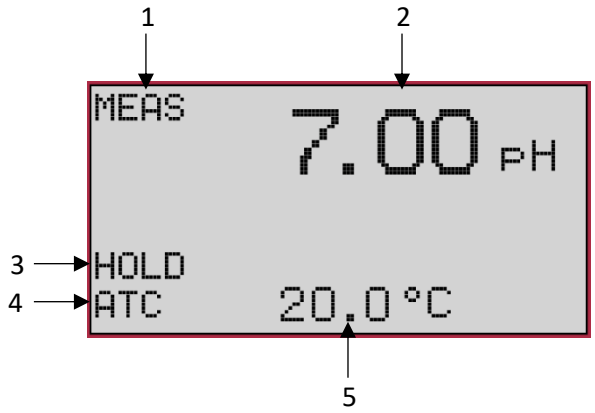
When connecting to a redox probe you will be using either a 500/9044 (250 cm) or 500/9039 (500 cm) cable. Both cables have the same internal wiring.

Run the cable goes through one of the glands at the bottom of the analyser. Connect the short white wire to **pH IN** and the longer purple wire to **pH COM**.

There is no connection to the temperature compensator terminals.

4. Display and Keypad Functions

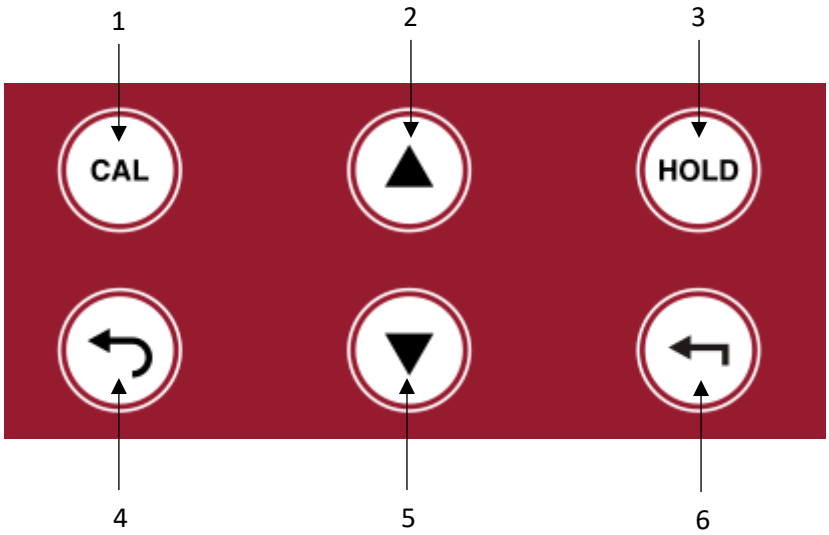
4.1. Display



1. Measurement mode indicator
2. Measurement reading
3. Hold mode indicator
4. Automatic Temperature Compensator indicator
5. Temperature Reading

4.2. Keypad Description

The pH800 analyser has 6 buttons on the keypad allowing for easy and quick operation of the analyser.



1. **CAL**: Takes you directly to the calibration menu. See section 8.
2. ▲ (**Up-Arrow):** Allows you to scroll through various menus or increment calibration values.
3. **HOLD**: Will enable the hold function. See section 6.

4. ⮌ **(Back):** Navigates to the previous screen. Hold the button for 2 seconds to return to the primary display.
5. ▼ (**Down-Arrow):** Allows you to scroll through various menus or decrease calibration values.
6. ↵ **(Enter):** Will confirm selections in menus and calibration values. Pressing this button when on the primary display will navigate to the main menu.

5. Pin Code

The pH800 analyser pin code is “2000”. This code is required to access the instrument functions.

6. Hold Mode

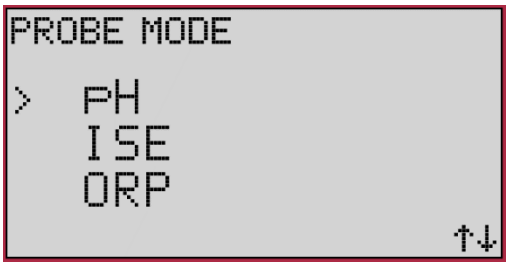
The hold mode on the pH800 analyser will fix the output current at the level it was at when the button was pressed.

To initiate the hold mode either press the **HOLD** button or navigate to the **HOLD** menu and enable it there. There is a 20 minute timer which can be restarted by pressing the **HOLD** button twice.

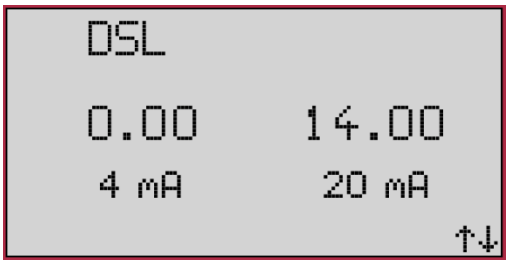
The displayed measurement will be unaffected by the hold mode.

7. Basic Setup

7.1. pH Setup



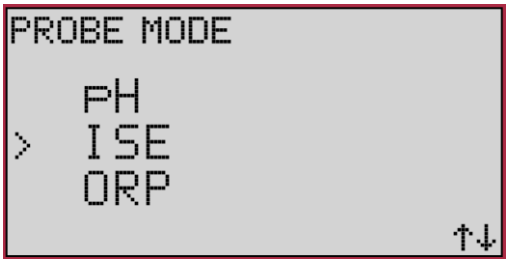
To prepare the analyser for use with a pH probe, navigate to **Probe Mode** and ensure the analyser is set to **pH** mode.



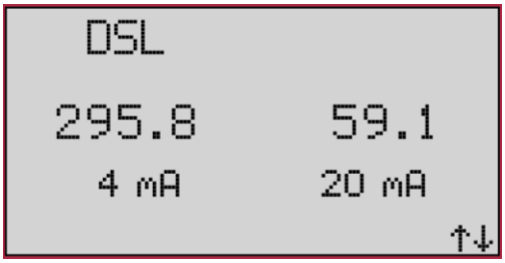
By default the scaling is set to 0.00 to 14.00 for 4 and 20 mA respectively. Use the **DSL-DSH** menu to adjust this if required.

The analyser is now set up for measuring pH.

7.2. ISE Setup



To prepare the analyser for use with an ISE (Ion Selective Electrode, such as fluoride) probe, navigate to **Probe Mode** and ensure the analyser is set to **ISE** mode.



By default the scaling is set to 295.8 to 59.1 for 4 and 20 mA respectively. Use the **DSL-DSH** menu to adjust this if required.

For an RmV probe adjust DSL and DSH to 236.6 and 0.0 for 4 and 20 mA respectively.

The analyser is now set up for ISE.

7.3. Redox Setup

To prepare the analyser for use with a redox probe, navigate to **Probe Mode** and ensure the analyser is set to **ORP** mode.

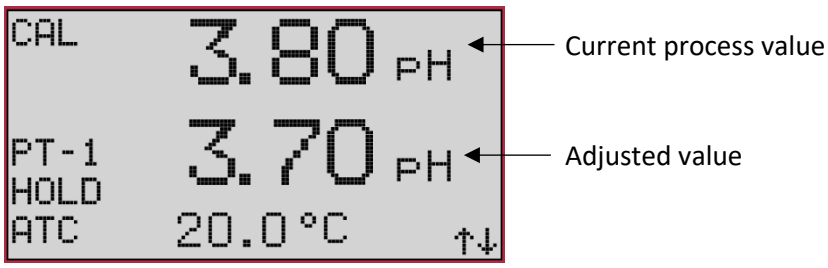
By default the scaling is set to 0 to 1000 for 4 and 20 mA respectively. Use the **DSL-DSH** menu to adjust this if required.

The analyser is now set up for measuring redox.

8. Calibration

Before starting calibration ensure the analyser is set up correctly by referring to section 7. To perform calibration you will require pH buffers or fluoride standards. pH buffers and fluoride standards are available for purchase by emailing sales@astles.co.uk.

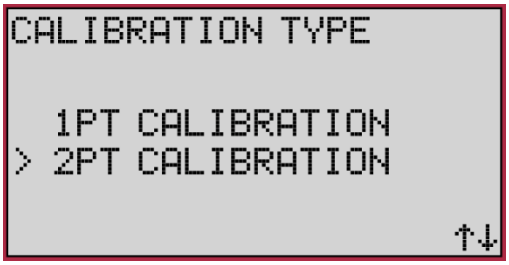
When calibration has started the analyser will go into a temporary hold mode until the calibration is complete.



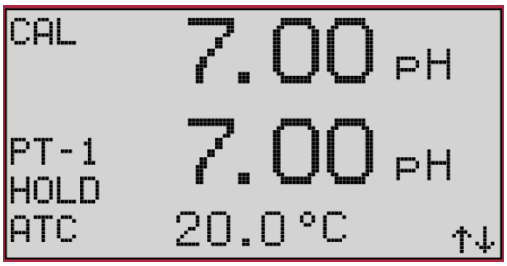
In each of the following sections calibration failure conditions will be stated. If there is a failure when calibrating, the analyser will retain the previous calibration data.

8.1. pH Calibration

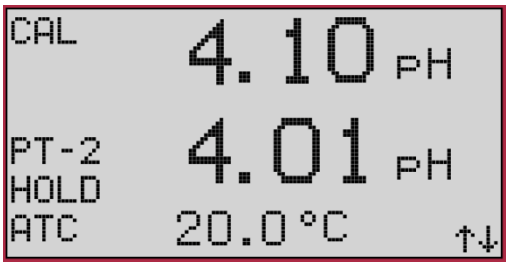
To calibrate the analyser for pH, perform a 2-point calibration using pH buffers and then, if necessary, a 1-point calibration to a grab sample. The calibration will fail either if the slope is less than 80% or above 110%, or if the offset is greater than ±120mV.



To start a 2-point calibration press the **CAL** button, then select **2PT CALIBRATION.**

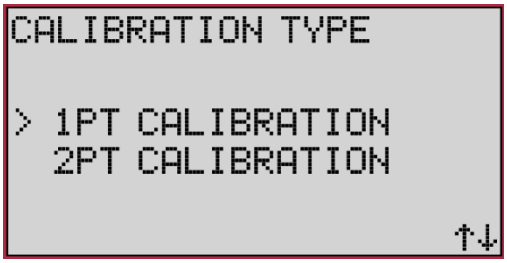


Gently rinse and dry the electrodes. Place the probe in pH 7.00 buffer, wait for the value to settle, and press the ↵ button.

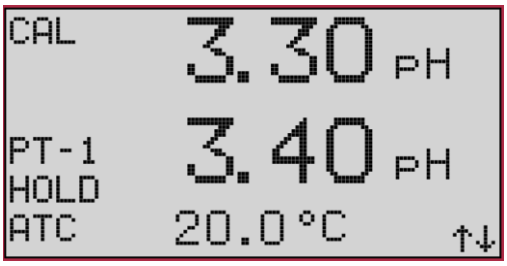


Remove the probe from pH 7.00 buffer, gently rinse and dry the electrodes. Now place the probe in pH 4.01 buffer, wait for the value to settle, and press the ↵ button.

Press ↵ again to confirm the slope and the offset. The analyser will then ask if you would like to reset the runtime, select **NO** for this.



In some applications, a 1-point calibration to a grab sample is required. Initiate this calibration by selecting **1PT CALIBRATION** in the calibration menu.



Place the probe in the process and allow to settle. Input the grab sample pH measurement using the arrows and press ↵.

Press ↵ again to confirm the slope and the offset. The analyser will ask if you would like to reset the runtime, select **NO**.

The probe is now calibrated for measuring pH.

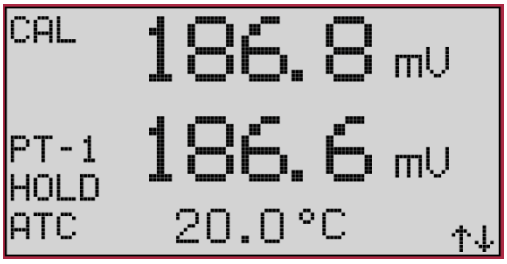
8.2. Fluoride ISE Calibration

To calibrate the analyser for fluoride, the analyser requires a 1-point calibration to a grab sample. The calibration will fail if the offset is greater than ±120mV.

To start the calibration press the **CAL** button. This will start a 1-point calibration.

When used with a PC500 system, stage 2 fluoride ppm can be converted to mV using the following table:

Fluoride ppm	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	15.0	20.0
mV	218.8	208.4	201.0	195.3	190.6	183.2	177.5	172.8	167.1	159.7



Place the probe in the process and allow to settle. Use the arrows to input the required mV value from the grab sample measurement and press the ↵ button.

Press ↵ to confirm the slope and the offset. The analyser will ask if you would like to reset the runtime, select **NO**.

The probe is now calibrated for measuring fluoride.

8.3. Relative mV Calibration

To calibrate the analyser for relative mV, perform a 1-point calibration to a process sample. The calibration will fail if the offset is greater than ±120mV. Note this calibration is for a probe on stage 4 of an aluminium can washer.

To start the calibration press the **CAL** button. This will start a 1-point calibration.

When used with a PC500 system, stage 4 relative mV can be converted to displayed mV using the following table:

Fluoride RmV	-40	-50	-55	-60	-65	-70	-75	-80	-85	-90	-100
mV	146.6	136.6	131.6	126.6	121.6	116.6	111.6	106.6	101.6	96.6	86.6

Place the probe in the process and allow to settle. Use the arrows to input the required mV value from the grab sample measurement and press the ↵ button.

Press ↵ to confirm the slope and the offset. The analyser will ask if you would like to reset the runtime, select **NO**.

The probe is now calibrated for measuring fluoride using relative mV.

8.4. Redox Calibration

The analyser is pre-calibrated for redox measurements.

If a grab sample is outside of specification, adjust the concentration of reducing/oxidising agent by adjusting the PC500 setpoint, see below.

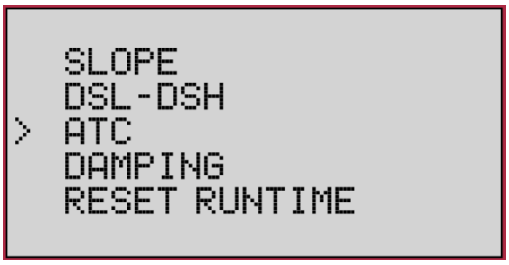
Grab Sample	Reducing Agent	Oxidising Agent (e.g. Sodium Hypochlorite)
Too Strong	Increase SP	Decrease SP
Too Weak	Decrease SP	Increase SP

If required, a 1-point calibration can be performed using an appropriate redox standard.

8.5. Temperature Calibration

Automatic Temperature Compensation (ATC) is only available when the analyser is in pH or ISE mode. By default ATC mode is enabled.

Temperature calibration is only possible when an ATC probe is fitted. The ATC calibration offset is limited to ±10 °C.



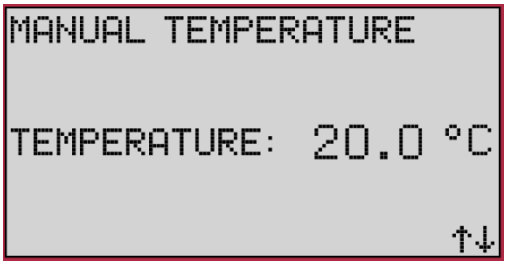
To calibrate the temperature, navigate to **ATC** in the main menu.

ATC must be enabled.

Place the ATC probe into a solution of stable temperature. Adjust the offset, with the arrows, so that the temperature reads the correct value and press ↵ to confirm.

The analyser is now calibrated for automatic temperature readings.

If there is no ATC probe fitted, disable ATC mode and manually set the process temperature.

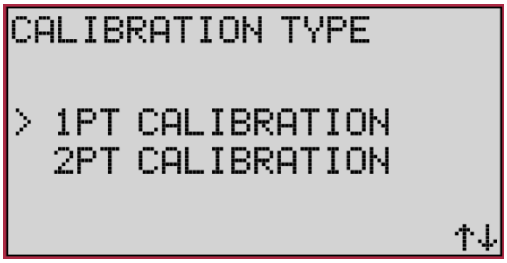


Set the manual temperature to the desired value and press ↵ to confirm. The default value for manual temperature is 20.0 °C but it can be set between 0 – 100 °C.

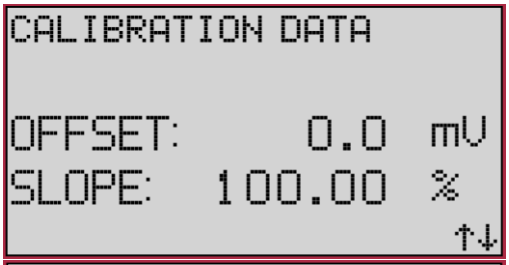
The analyser is now set up with a manual temperature.

9. Main Menu

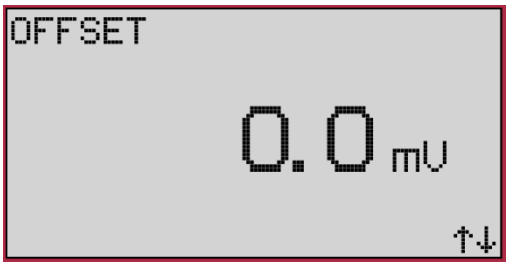
The main menu can be accessed by pressing the ↵ button and contains 12 different options. This section will give an explanation to those options.



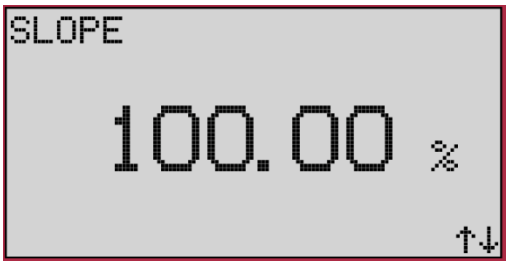
CALIBRATE – This takes you to the calibration menu. This has the same function as pressing the **CAL** button. See section 4.2 for further information.



CAL.DATA – This shows the raw data from the last calibration.



OFFSET – This shows the offset calculated from the most recent calibration. On this screen you can also edit the offset to anywhere between ±240mV.



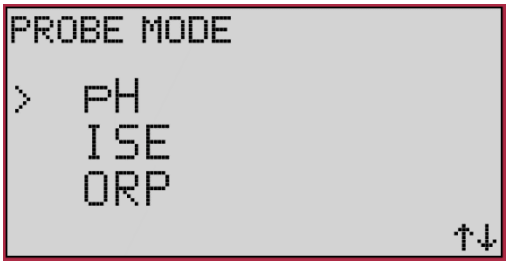
SLOPE – This shows the slope calculated from the most recent 2-point calibration. On this screen you can also edit the slope from +60% to +120%.

DSL-DSH – This allows the user to set the low and high process values that correspond to 4 and 20mA respectively. Initially the arrows will adjust DSL, then after pressing ↵ DSH.

ATC – This allows the user to enable or disable the automatic temperature compensator and calibrate the temperature probe. See section 8.5 for further information. By default, ATC is enabled. This option will not be available if the analyser is in **ORP** mode.

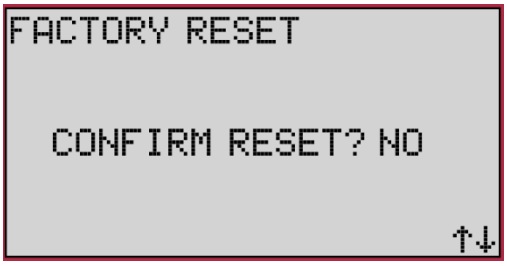
DAMPING – This "dampens" the primary value by allowing only half the detected change per time interval (in seconds). Damping is adjustable between 0 and 10 seconds in intervals of 0.1. By default, this is set to 0.2 seconds.

RESET RUNTIME – This will display the current runtime and allows the user to reset the runtime of the analyser. Only reset this value if the probe has been serviced.



PROBE MODE – This allows the user to change the probe mode of the analyser depending on what it is going to be used for. The probe has 3 different modes: **pH**, **ISE**, and **ORP**. By default, the analyser is set to pH mode.

HOLD – This allows the user to enable or disable hold mode. This has the same functionality as pressing the **HOLD** button. See section 6.



SYSTEM INFO – This displays system information for the analyser:

- Raw mV input
- Loop current
- Runtime
- Runtime accumulator
- ATC resistance
- Serial number
- Firmware version
- Hardware version

FACTORY RESET – This resets the analyser to its default settings including clearing calibration data.

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