User Manual

SPI-P170 II

Peroxide

Version V3

Foreword:

The manual for the SPI-P170 is meant for the following authorized employees:

- Electrotechnical staff
- Watertechnical staff
- Laboratory staff

This manual is intended for the proper installation and operation of the SPI-P170.

- Please read this manual carefully;
- Only allow authorised personnel to work with the SPI-P170;
- Ensure that the manual is accessible to every user;
- In case of emergency, please contact your supplier

1. Introduction

1.1 Purpose of the SPI-P170

The SPI-P170 is designed for correctly measuring controlling and monitoring a water treatment process.

The SPI-P170 is suitable for the following sectors:

- Water companies
- Other locations that measure and regulate peroxide levels

1.2 Important specifications

The most important specifications of the SPI-P170 are:

- Measuring the Peroxide level
- Measuring the pH level
- Measuring the flow
- Controlling the dosing pumps for Peroxide and acid
- Flow protection **(No flow, no dosing)**
- Monitoring of Circulation contact input
- A supply voltage of 12VDC

Specifications of the measurable parameter:

- Free available peroxide in an aqueous solution method: reagent colour
- pH in an aqueous solution, method: pH electrode (potentiometric)
- Flow of a circulation system, method: with pulse- generating or flow- emitting flow sensor

Measurement	Method	Range	Accuracy
Peroxide	Reagents colour	0 – 100 ppm	± 3 %
pH	Electrode	2,00 - 12,00 pH	± 0.05 pH
Flow	Pulse or Current	0 – 100 %	± 5%

The accuracies are based on strict adherence to the procedures in this manual.

1.3 Warnings

The SPI-P170 has been developed and manufactured with the utmost care.
Before starting to assemble, please note:

- The SPI-P170 uses harmful chemicals.
- Please ensure that higher voltages than 12Vac/dc or 24Vac/dc are not fed inside the SPI-P170.
- Possible damage due to transport. Report transport damage within 3 working days

1.4 Background information

After years of collaboration with a team of specialists in the field of water treatment, the SPI measure and control system was introduced. The SPI-P170 is the fourth generation of its kind. The SPI-P170 is a water control system based on the colorimetric measuring method that utilizes reagents colour discoloration. The intensity of the discoloration after a measurement with the reagent is a measurement of the quantity of Peroxide in the water. The greatest advantage of colorimetric measuring is that it is not affected by external factors like pH and flow.

1.5 Conditions of use

- Surroundings free of aggressive vapours
- Temperature of the room housing the SPI-P170 is between 5°C - 40°C
- Relative humidity lower than 80%
- No condensation

2. Description and operation

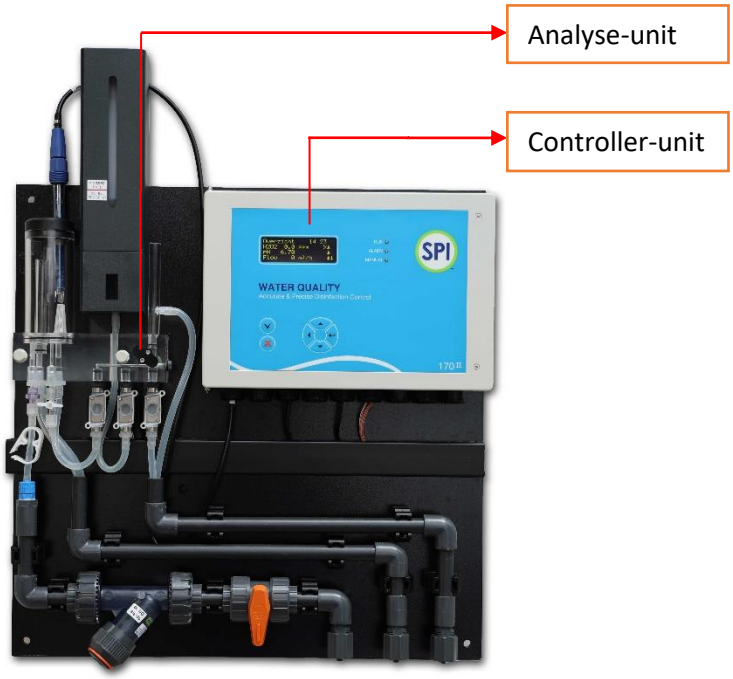
2.1 Description of the SPI-P170

The SPI-P170 is supplied and preassembled on one assembly plate provided with:

- 1 Control-unit
- 1 Analysis-unit
- Sample water connections, sample water valve and strainer
- Dimensions (L x W x H) = 485 x 485 x 100 mm

All parts are preinstalled either water technical or electro technical.

.

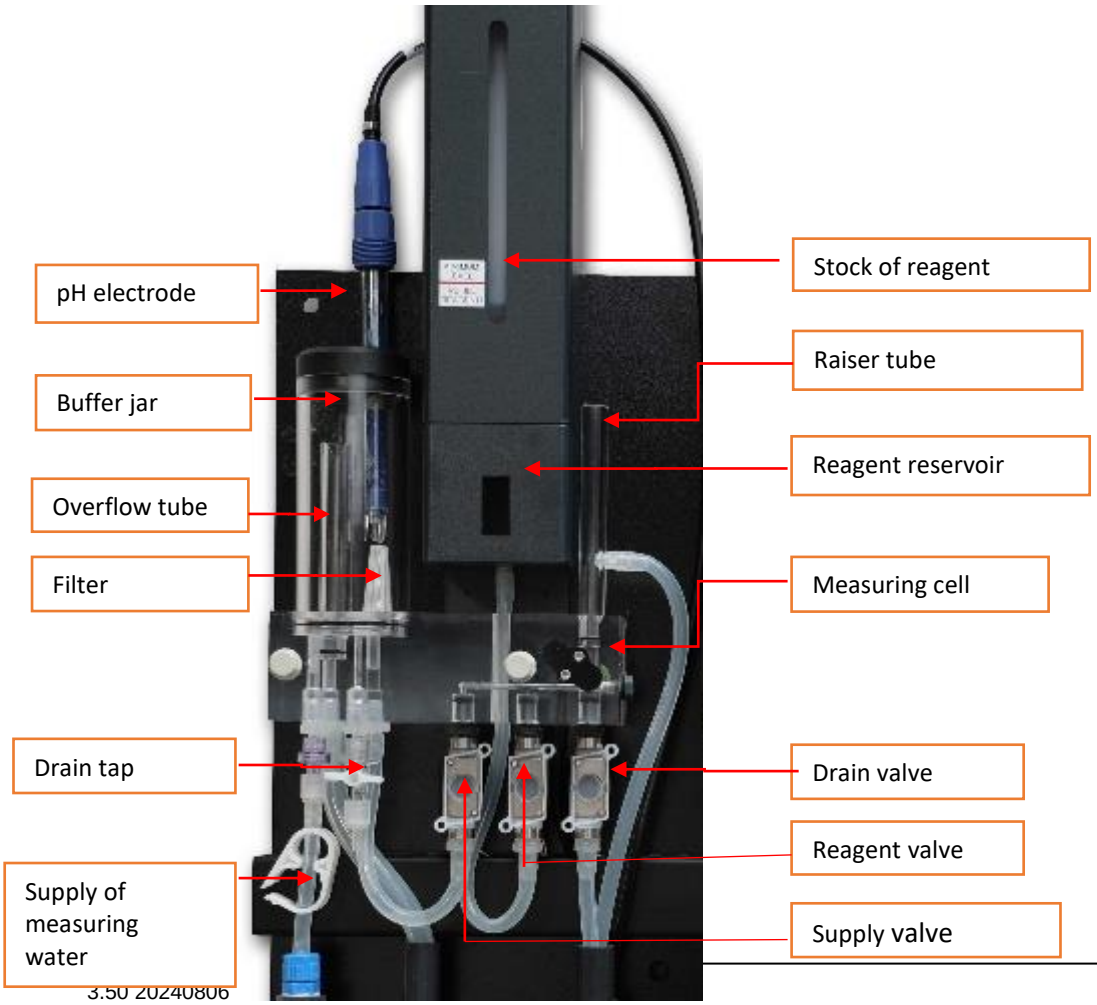


2.2 Operation of the SPI-P170

The sample water is fed into the buffer jar. The buffer serves, as the name implies, as a buffer from where the water can flow to the measuring cell. The surplus water will flow back to the pool's buffer system. The SPI-P170 will run the measurements of the water within a freely adjustable time.
The measuring cycle of the SPI-P170 is as following:

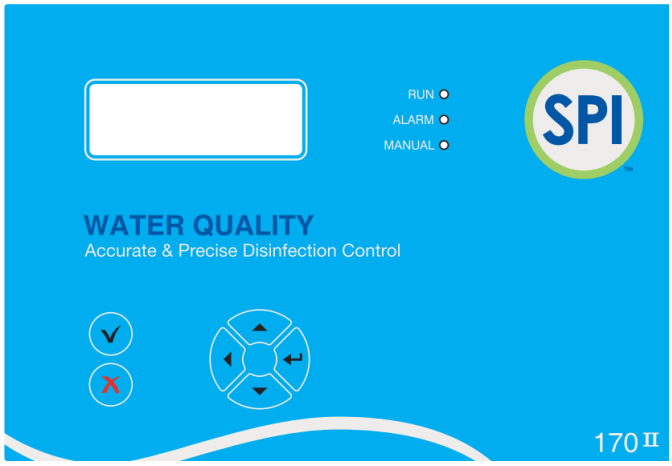
1. Empty cell of previous measurement
2. Fill cell with the sample water and empty once more (rinse)
3. Fill cell with to be measured water and start measuring the zero value and empty again
4. Provide a shot of reagent, and fill the cell with a limited supply of water, measure the discoloration
5. Fill the cell with some extra water and measure the discoloration again (2nd measurement to check the saturation of the reagent, and to adapt the reagent valve time to save reagent), then empty cell
6. Fill cell with the to be measured water and empty once more (rinse)
7. Fill cell fully with water, *whereby the measuring water from the measuring cell is transported to the sewer via the fill pipe. Due to the additional connection to the fill pipe, the measuring cell flows continuously.*

The drain valve empties the cell after every step. That water exiting the cell is led to the sewer.

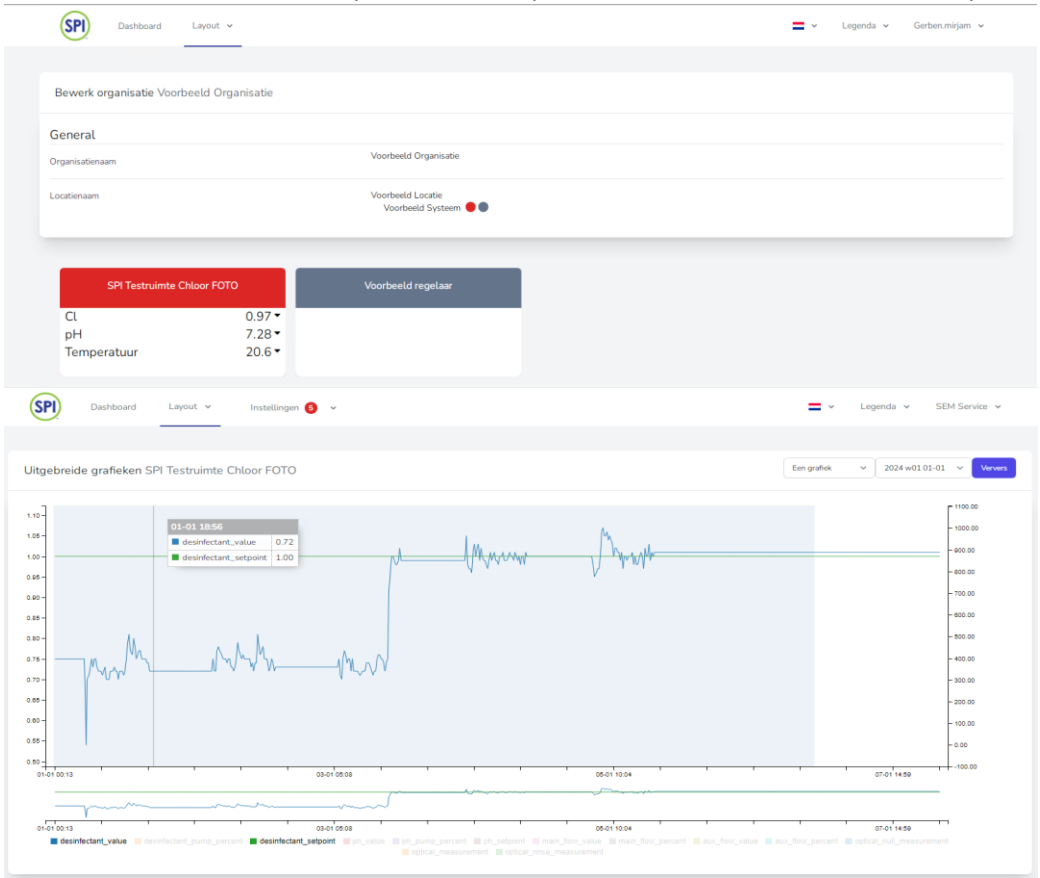


2.3 Software structure of the SPI-P170

Full operation is performed on the front panel (with keypad and display) of the system. The display shows the measured values and other important information. The hardware has an internal memory in which data, reports and calibrations are stored. This data is retrievable and provided with date and time. An internal real-time clock with backup battery is provided for this purpose.



Optional is the use of SPI Webmonitor. This makes it possible to read the SPI remotely via a web page and download all data and view it in graph form. To use this functionality, the optional communication module is required. *See chapter 16.4.* real-time clock with backup battery provided.



3. Safety

3.1 Safety regulations

The SPI-P170 is as careful as possible designed with the eye on safety. We tried to reduce the safety risks to a minimum.

- The SPI-unit is supplied with a 12VDC adapter via a power outlet.
- While the SPI-unit and the analysis-unit are placed next to each other, the water is not interfering with the electrical systems.
- Using the remote software (optional) youre dealer is ableto provide remote assistance

3.2 Risks

To provide risks, be caurefull with:

- Refilling the reagent
- Cleaning spilled compound
- Store reagent in a cool, dark environment, provided with instructions.
- Keep the SPI-unit and the analysis-unit clean from any remaining reagent, because this will create stains with time.

3.3 Personal protective equipment

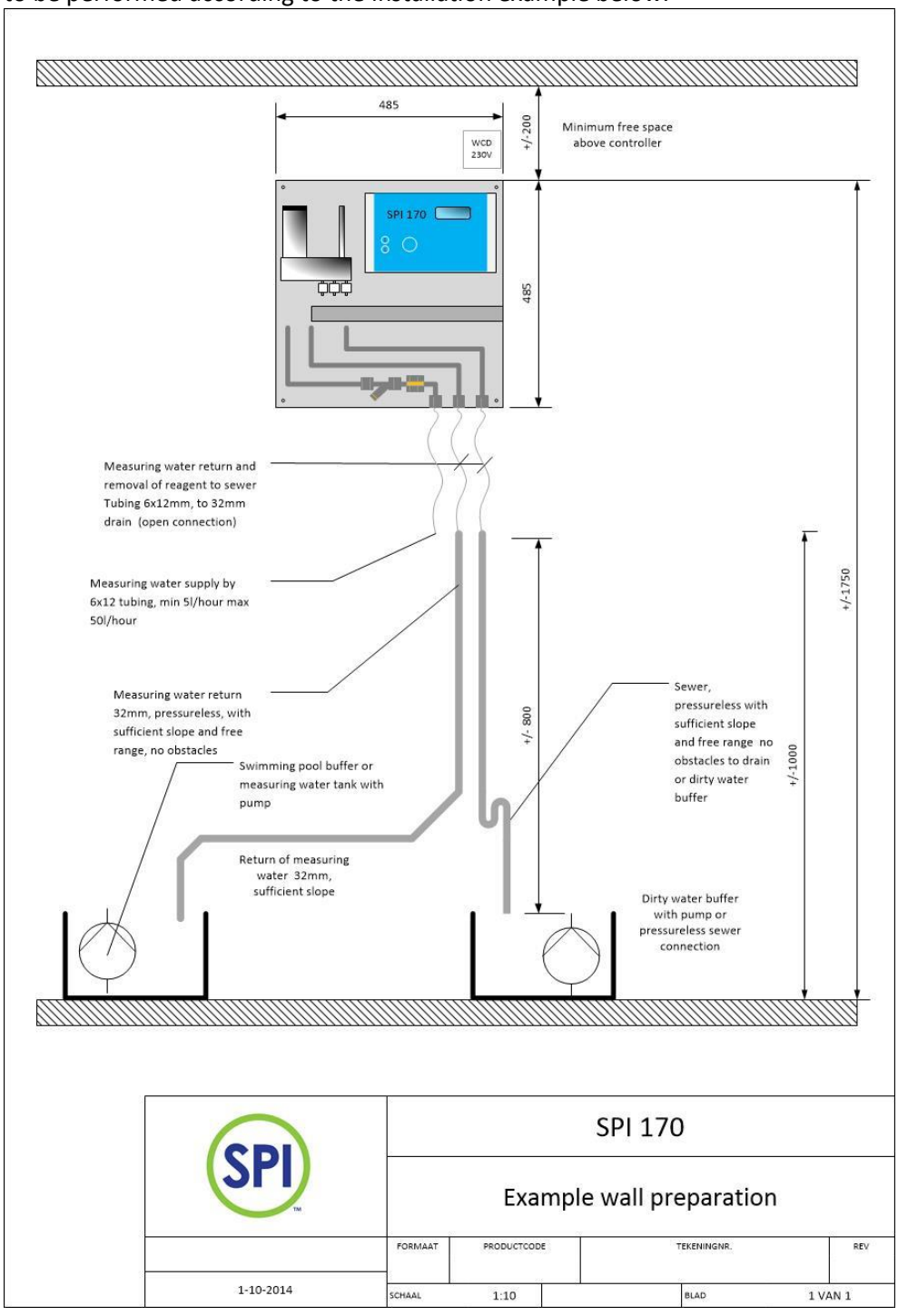
While in direct contact with the reagent, wear safety glasses, latex gloves and protective clothing.

4. Installation

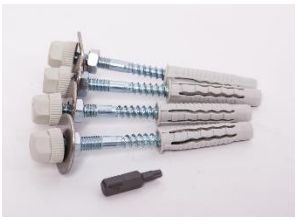
The following sections describe the structure and installation of the SPI-P170.

4.1 Mounting and water-side connection

The SPI-P170 is complete preassembled on a pannel provided with the units. The installation needs to be performed according to the installation example below.



1. Remove the SPI from the box.
2. Check if the cables are installed correctly in the cable glands
3. Mount the pannel. Use the included connection materials. Drill 8mm holes in the wall. Push the plugs in the wall and turn the M6 threaded ends with the included torx bit in the plugs. Place the pannel over the wire ends and place the included washers and cap nuts M6. Optionally there is a special mounting frame available. With the frame, the SPI can be mounted from 100 to 150 mm from the wall. See chapter 19 Accessories SPI 170



4.2 Water-side connection

1. Connect the water supply to the water supply connection with reinforced tube 6x12mm,
   Bring the return measuring water without pressure to the bath, (intermediate) buffer, skimmer or sewer. Optionally, return the measuring water to a tank with a submersible pump that pumps out the water. See chapter 19 Accessories SPI regulator.
   Make sure there is enough slope, so no air bubbles can accumulate that impede the flow.

Water supply	Return water	Drain reagent

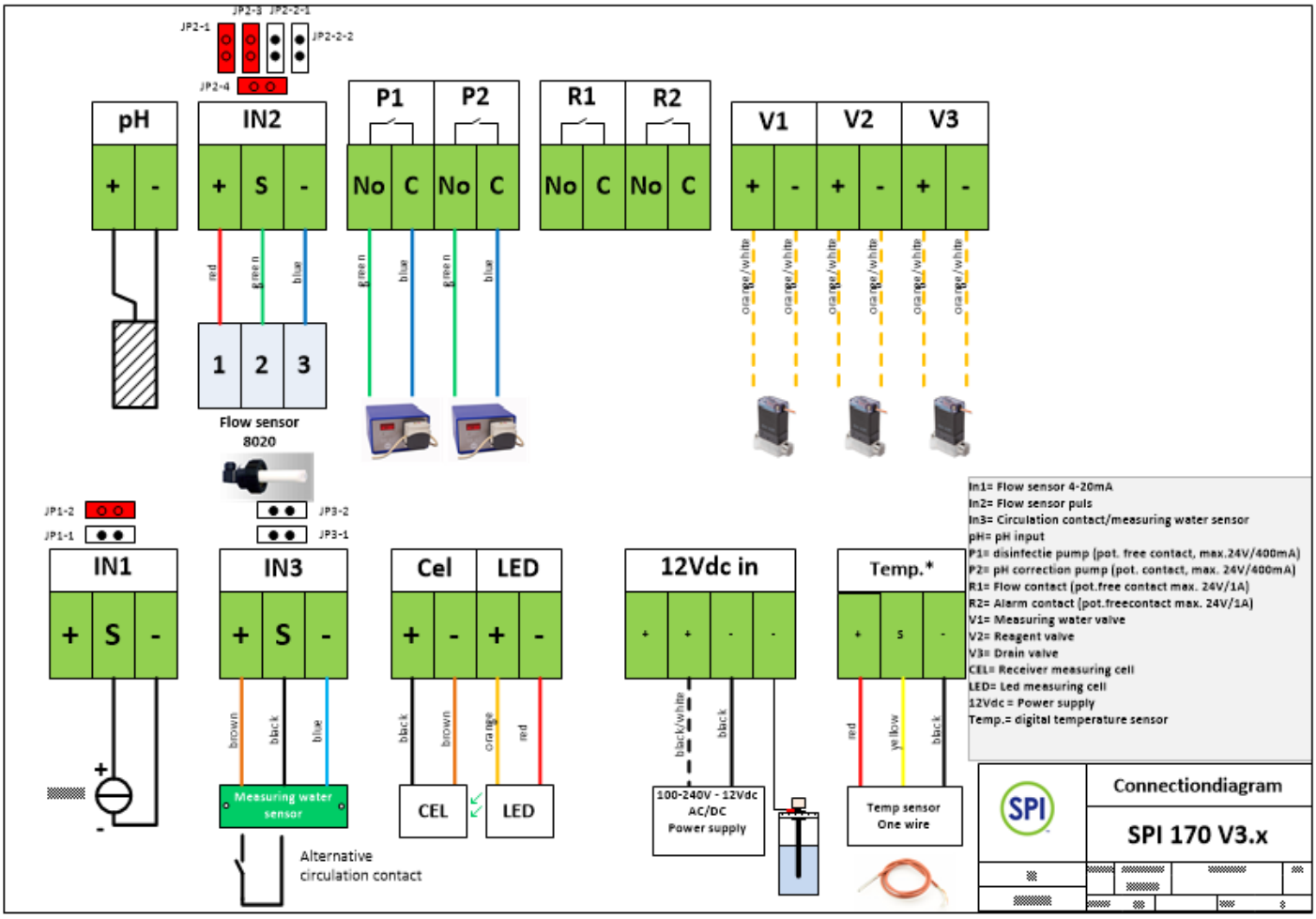
2. Connect the drain reagent with reinforced tube 6x12mm to a drain. Make sure there is enough slope.
3. Remove the red plugs in the measuring pot and the raiser tube before commissioning. If the SPI is not immediately operational, leave the red plugs in place. Be sure the SPI measuring cell and measuring pot is protected against dust or dirt. Dust or dirt can damage the valves and measuring cell.
4. If the supply and return line are connected, the measuring water supply can be opened. Ensure for sufficient flow (minimum 5 l / h). If the water runs off quietly via the overflow pipe the flow is sufficient. Advice is about 20-50l / hour for sufficient flow
   in the measuring water pipes.
5. The SPI can now be connected electrically, *see chapter 5*
6. Put the SPI into operation, *see chapter 6*

5. Electrical connection

5.1 Connecting SPI controller (default configuration)

Connect the cables of the control unit according to the connection diagram below.

When the SPI 170 is delivered, a standard configuration of the inputs is used. The table on the next page details all connection points



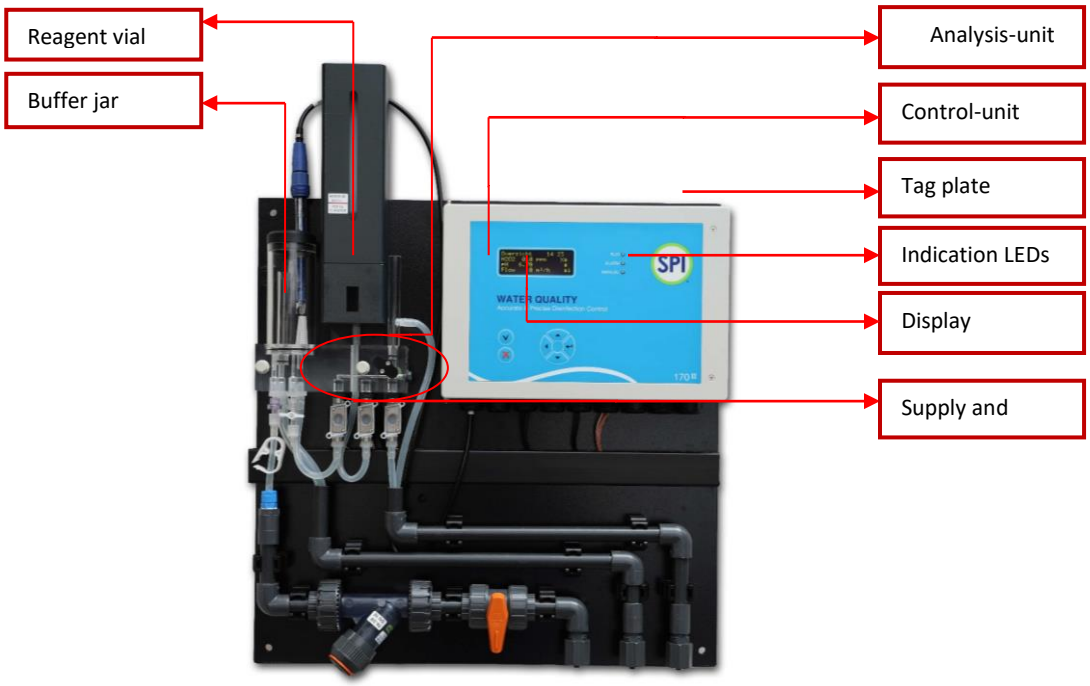
Clamp	connection	description
	Supply 12VDC	Black/white= +, black = - This is the connection for the 12V power adapter. Note: only use the supplied adapter.
pH	pH electrode	Core (transparent cable) = +, shield (black cable) = -
In1	Flow measurement 4-20 mA signal	An external flow sensor can be connected to this input, with a 4-20mA signal and a power supply 12V max 100mA. Then use the +, S and terminal. This sensor measures the flow of the filter system. It is also possible to connect a 4-20mA signal from an external system. Then use the S and the clamp. Use only one of the two flow inputs! This signal is scalable in the system configuration menu.
In2	Flow measurment pulse signal	A flow sensor with pulse signal (30Hz per m / s) can be connected to this input, such as the 8020 sensor. This sensor is powered by the SPI (12V / max 100mA). This sensor measures the flow of the filter system. Use one of the two flowing angles. This signal is scalable in the system configuration menu.
In 3	Circulation contact	Potential free contact between + and S, or when measuring water sensor brown = + 12V, black = S, Blue = -) With this input, the SPI detects whether or not measuring water is being offered. A closed contact means that there is measuring water and then the SPI will start measuring and controlling. With a closed contact, the SPI starts a new measuring cycle for the peroxide measurement. An open contact means that there is no measuring water and then the SPI will stop measuring and controlling. A beep will sound and the SPI will indicate a fault (circulation error). The contact can come from a circulation pump, a flow meter or the optional measuring water sensor (see wiring diagram below this table). A wire bridge has been installed at the factory. An adjustable delay time is available in the system configuration menu
P1	Disinfection pump (Peroxide)	Solid state contact, this contact is used for controlling a dosing pump by pulses or on-off control. This output is configurable in the system configuration menu. (Contact load max 24V / 400mA)
P2	Acid/lye pump	Solid state contact, this contact is used for controlling a dosing pump by pulses or on-off control. This output is configurable in the system configuration menu. (Contact load max 24V / 400mA)

R1	Flow alarm contact	Relay contact max 24V / 500mA. This relay contact can be used for the release of metering pumps and heating (protection at low flow). The contact closes as soon as the flow is sufficiently high. The contact can be configured as normally opened or normally closed by means of a jumper. This contact is open at low flow at the factory. Use this contact to switch an auxiliary relay with 12V or 24V coil voltage. Note: this relay contact is not protected by a fuse.
R2	Alarm contact	Relay contact max 24V / 500mA. This relay contact can be used as a general fault contact (for example for reporting on a building management system or controlling a fault indicator on the lifeguard station). The relay is attracted under normal conditions. In the event of a fault, the relay drops out and the contact is closed. In this way, the power failure of the inverter is also reported as a fault. The contact can be configured as normally opened or normally closed by means of a jumper. This contact is closed at the factory in the event of a malfunction. Use this contact to switch an auxiliary relay with 12V or 24V coil voltage. Note: this relay contact is not protected by a fuse.
Led/Cel	Peroxide cell input	Measuring cell connection contacts Receiver: **GND:** brown (old coding brown) **BPW_in**: black (old coding white) Transmitter (LED): **LED**: red (old coding green) **+12V**: orange (old coding yellow)
V1/V2/V3	Valve connections	Measuring water valve: orange/white Reagentvalve: orange/white Drainvalve: orange/white
Temp	Temperature	Temperature input for an optional temperature sensor *(see chapter 18 Spare parts and accessories)*

After the electrical connection, the SPI can be commissioned, *see chapter 6 Commisioning*

For advanced configuration settings, see chapter 16 Configuration

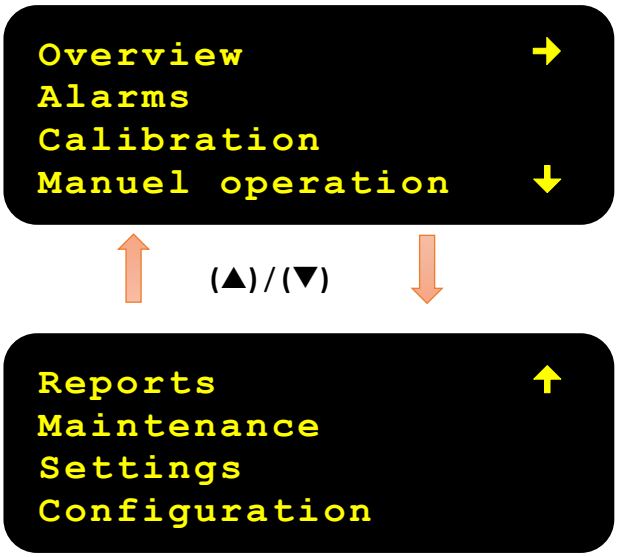
6. Commissioning



The following operations must be carried out to put the SPI-P170 into operation:

1. Ensure that the SPI is clean before commissioning. Dust, drilling debris etc. in the measuring water pot, hoses or measuring cell can damage the valves and lead to malfunctions. Thoroughly flush the measuring water hoses first when commissioning for the first time.
2. Start the measuring panel water flow by opening the supply tap. Adjust the flow with the white hose clamp to approx. 15-50 litres per hour. The water now flows gently into the measuring water pot and out again via the overflow pipe.
3. Mix the SPI P170 reagent by adding the powder (component B) to the liquid (component A) and shake the solution. Do not leave any powder residue in the jar. After this, fill the reagent bottle (250ml) and place it in the reagent container. The reagent reservoir will now fill up.
4. Plug the adapter into a wall socket.
5. The display will then show the intro screen. This also shows the current software version.

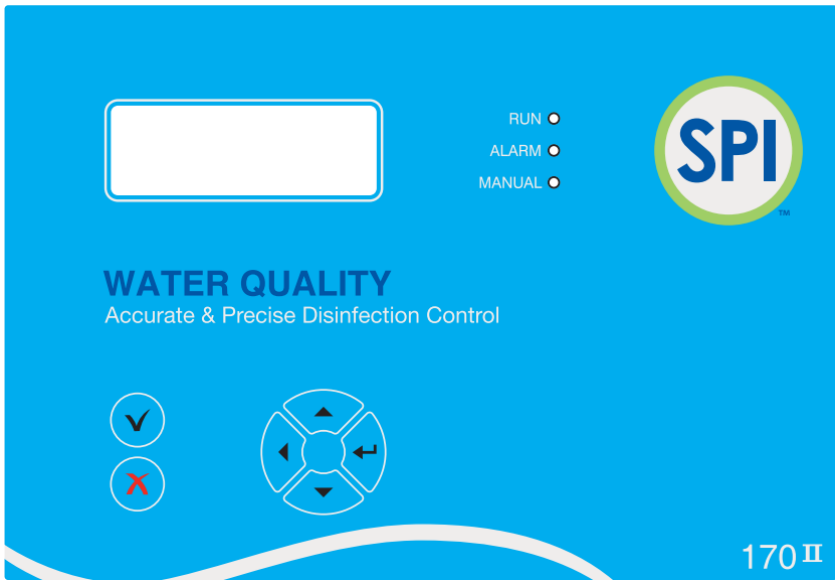
6. After the intro screen, the main menu will be displayed (NL), with the choices:



7. The SPI-P170 can be set in 3 different languages, English, Dutch and French. Setting the desired language is done via the **[Configuration]** menu **[User settings.], [Language].** For most applications, the factory settings are sufficient. *See chapter 16* Configuration for more information on configuring the controller.
8. Now the reagent aspiration procedure can be started. To do this, go to the **[Maintenance]** menu, **[Cell maintenance]**, **[Refill reagent]**,
9. After aspirating the reagent, the peroxide measurement is ready for use Check the measured peroxide value using a peroxide manual measurement and in the case of deviations the SPI P-170 can be calibrated, go to **[Calibration], [peroxide],** *see chapter 10 Calibration, peroxide*
10. Place the pH electrode in the measuring pot according to the illustration. Now the pH reading can be calibrated. To do this, go to **Calibration]**,**[pH]**, *see chapter 10 Calibration, pH*.
11. The controller is ready for operation. Now set the desired control parameters *see chapter 11 Settings*.
12. Finally, test whether the dosing pumps are controlled correctly.

- **By default, the flow measurement of the SPI device is enabled (pulse sensor), see section 5. If no flow sensor is connected, it should be switched off.** ***See chapter 16 Configuration,Systemconfig. , Flow.***
- **By default, the EXPERT MODE of the SPI device is ON. If a simple display of alarms is desired without letters but by means of an icon, the EXPERT MODE can be switched off.** ***See chapter 16 Configuration, Users. Setting.***
- **There is a possibility to set an access restriction.** ***See chapter 16 Configuration, System config, Access restriction***

7. Operation



7.1 Navigation

Using the keyboard, you can perform all operations. You simply follow the options through the menu structure on the display.

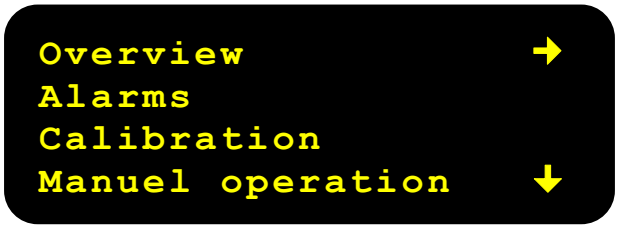
Navigating through the menu structure is done using the arrow buttons. The display displays a maximum of 4 lines a time. The menus often contain more information or possible choices. To display these, you can browse through using the arrow buttons.

Key	Description
(▲)	cursor up
(▼)	cursor down
(◀)	a step back or move cursor to the left
(↵)	"Enter" confirm the selection or place cursor to the right
(✓)	confirm change. *
(×)	go back to main menu or cancel change

* Only in the [Overview] menu this key has a 2nd function, the manual start of a peroxide measurement.

7.2 Selecting a choice

Choices in the various menus can be made by moving the cursor (blinking arrow " → " at the end of a line) with one of the navigation keys **(▲)** en **(▼)**.



Confirm the selection by pressing 'enter' key **(↵) .** In the above example, the choice is to go to the **[Overview]** menu. Going back one screen can be done with the **(◀)** key.

7.3 Changing a value or setting

Changing a setting is done by placing the cursor on the relevant parameter (value) with the navigation keys.

Go to the relevant parameter and press the 'enter' key **(↵).**Around the relevant parameter, 2 brackets will be placed **>30.0<** and the cursor starts flashing at the first position of the parameter.

- Position the cursor **(_)** on the digit to be changed using the **(◀)** and **(↵).**
- Increase or decrease the value with the **(▲)** and **(▼)**
- Confirm the change with **(✓)**
- Cancel the change with (×). This is only possible if the change has not yet been confirmed with **(✓)** .
- If the change has been confirmed **(✓)** the 2 brackets around the parameter will disappear again.

7.4 LED indication

There are 3 LEDs on the front panel:

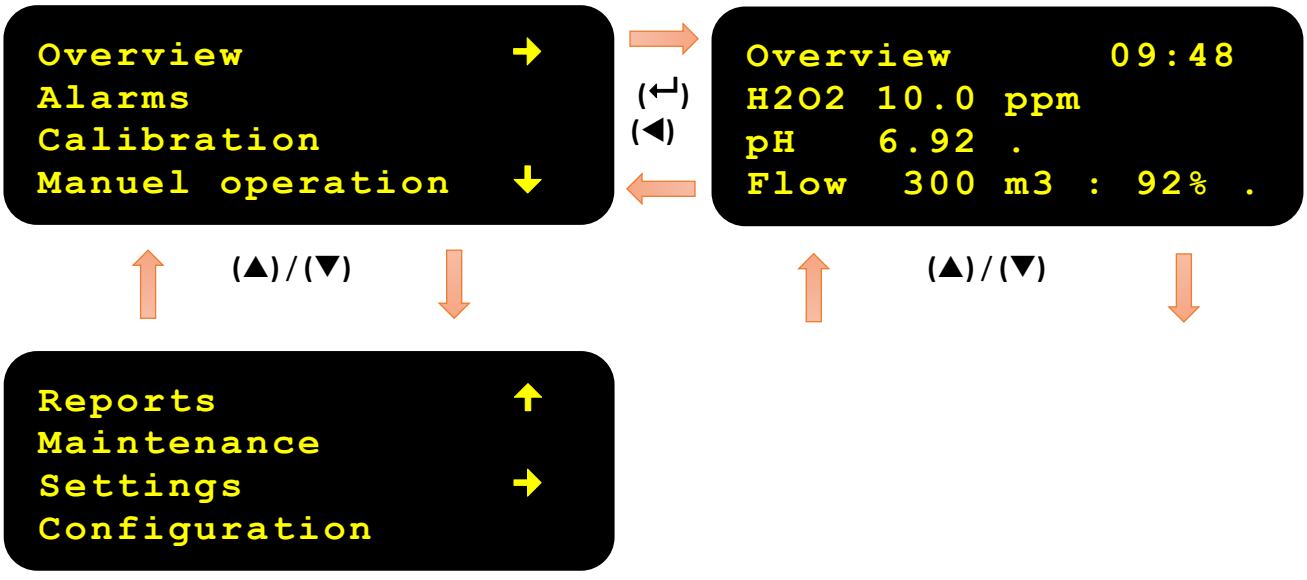
LED	Description
RUN	Flashing during normal operation
ALARM	Flashing during active alarm Fire continuously during adjusted alarm
MANUAL	Fire continuously if one of the control channels (peroxide, pH or flow) is on manual mode.

8. Main menu

The main menu allows access to all major functions of the SPI P170. The main menu consists of the following items:

Menu	Explanation
Overview	Most important information such as current measured values, alarms, dosing pump control and time.
Alarms	The active alarms as soon as they occur. All alarms can be adjusted in this menu.
Calibration	Calibrate the controller (Peroxide, pH) for precise measurement
Manual operation	In this menu, automatic, manual or semi-manual operation can be enabled, disabled and adjusted.
Reports	The historical reporting of alarms, calibrations, maintenance and measurement data (data logger).
Maintenance	An operating mode in which no alarms are reported if maintenance is set to ON. This menu contains the functions Reagent refill, measurement cell settings and controller restart (Reboot).
Settings	Setting all control parameters and alarm limits.
Configuration	Configuration shows all system and user settings. Access only by code

The main menu consists of 8 submenus. Move the cursor **(▲) / (▼)** up or down to move through the different menus.



The following sections explain all menus in more detail.

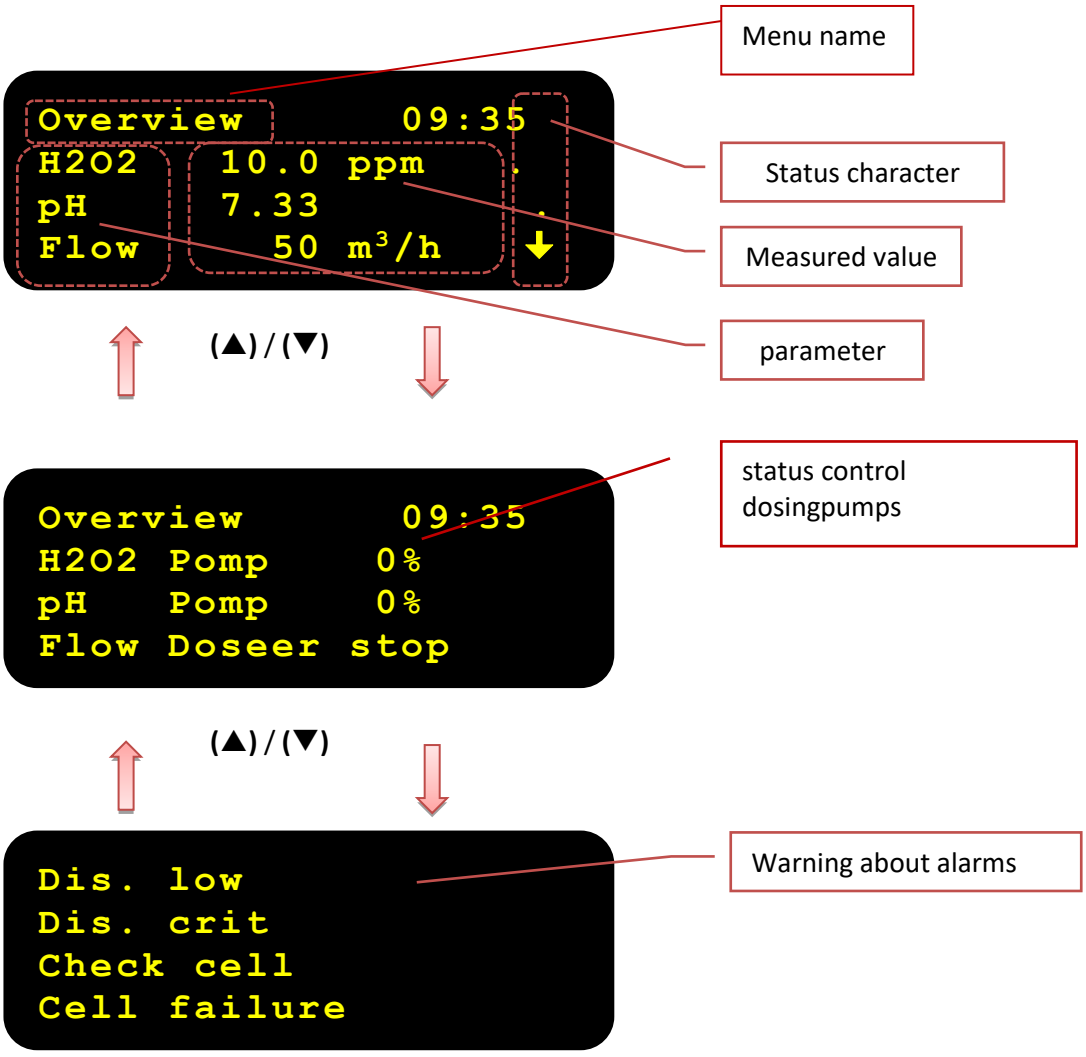
NOTE: There may be an access restriction that requires code entry. ***See section 16.1.7 Access restriction.***

9. Overview

In the overview menu as shown below, the most relevant information concerning the operation of the SPI-P170 is shown.

You will go through this menu to choose in the main menu **[Overview].**

Press (×) in the overview screen to return to the main menu.



Show on display	Description
Overview 09:35 x	Name of current menu
H2O2 10.0 ppm XA	Measured peroxide value of 10.0 ppm
pH 6.92	Measured pH value of 6.92
Flow 50 m3/h 92%/A	Measured flow 50m³ / hour, which corresponds to 92% of the nominal flow (100% defined in the configuration menu).

By default, the SPI 170 is delivered in EXPERT MODE (ON)
The following status characters can occur (*for more info see chapter 12 Alarms*)

Character	Description
.	No alarm available
v	Pre-alarm, an alarm value that has been exceeded, but the alarm delay time has not yet been exceeded.
A	Alarm, an alarm value that has been exceeded and also exceeded the alarm delay time.
a	Adjusted alarm, an alarm confirmed by the user in the menu **[alarms],** but still present
M	Manual mode active
X	Blocked
x	Blocked by maintenance function
c	Measuring cell becomes contaminated
C	Measuring cell is contaminated

By default, EXPERT MODE is enabled on the SPI device. If a simple display of alarms is desired without letters but by means of an icon (🔔) EXPERT MODE can be disabled. ***see chapter 16 Configuration, Users. Setup.***

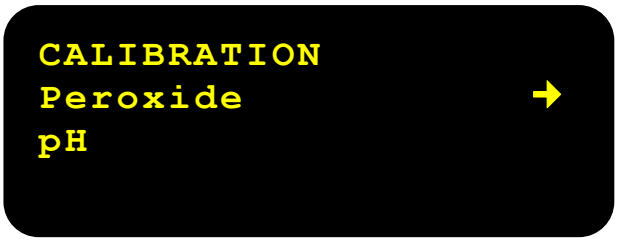
10.Calibration

The measurements of the SPI-P170 must be checked (regularly) and, where necessary, corrected by calibration against a known value. Calibration is done with a hand-held meter. This benefits the quality of the measurements.
CAUTION: only perform a calibration if the peroxide value is between 5-50ppm!

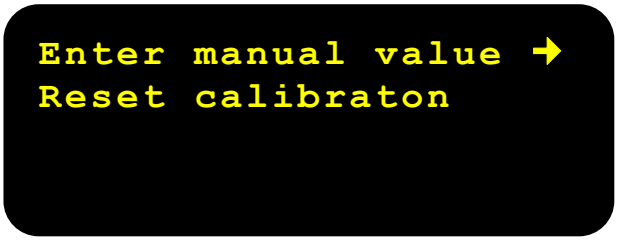
Press (×) in the overview screen to return to the main menu.

From the main menu, select **[Calibration].** The following channels can be calibrated:

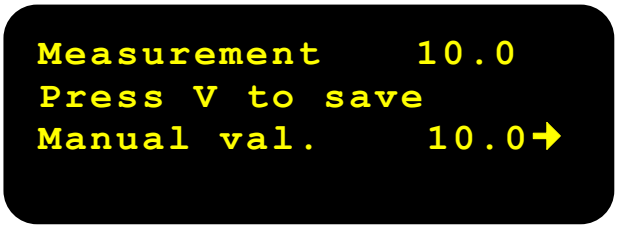
- Choose **[Peroxide]**, calibrate peroxide channel
- Choose **[pH],** calibration of pH channel



10.1 Peroxide
Peroxide calibration is done by taking a hand measurement.

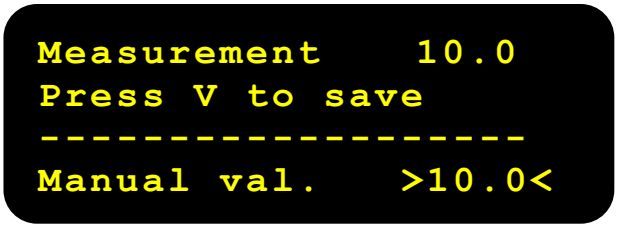


10.1.1 Manual measurement
Select **[Enter manual value**] and the following menu will be displayed.



Now perform the following actions:

1. Take a water sample at the drain valve.
2. Determine the free peroxide value of this water sample with the handheld meter.
3. Compare the value of the handmeter with the dispenser.
4. If the values differ, press enter at **[Manual val] (↵)**.
   Next screen appears :



5. Increase or decrease the displayed value with the **(▲)** and **(▼)** to the measured value with handmeter. (in this example >10.0<)
6. Confirm the set value with **(✓)** , the brackets disappear
7. Press **(✓)** again to save the calibration, the controller displays **"Saved"**
8. The measurement is now calibrated.

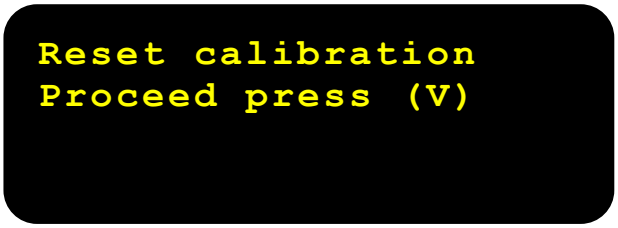
Calibration can be interrupted with (✗) Controller returns to the main menu.

- **Calibrate the measurement only after at least one measurement has been taken by the SPI 170. Otherwise, a wrong calibration may result.**
- **Calibration of the SPI is only possible for peroxide values between 1 and 100 ppm. If the measurement is lower than 1 ppm and higher than 100 ppm, the calibration cannot be carried out.**
- **It is recommended to carry out a calibration at a peroxide value of 10 – 50 ppm.**

10.1.2 Reset calibration

With **[reset calibration],** the controller is reset to the factory calibration. This allows a wrong calibration to be quickly restored. The factory calibration already gives a sufficiently reliable measurement result for most applications. A proper calibration with a handmeter ensures a minimal difference between the SPI 170's measurement and the handmeter.

Move the cursor to **[Reset calibration]** and press enter **(↵)**. The screen below appears:



- Confirm with the **(✓)** key and the factory calibration will be loaded.

10.2 pH

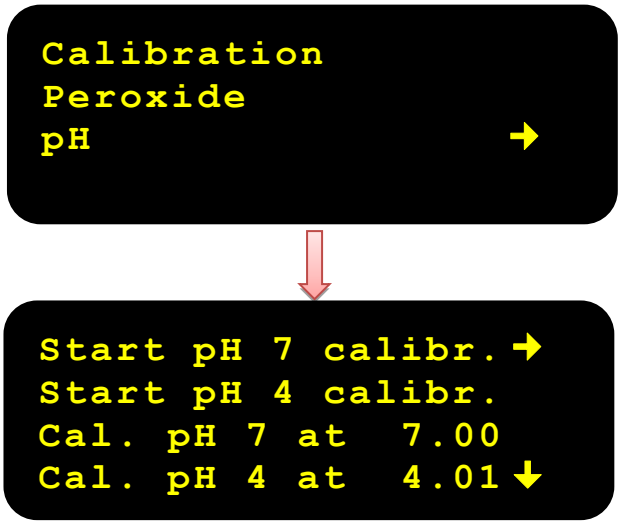
Calibration of the pH value is done with 2 different buffer solutions (pH 7.00 and pH 4.01). A pH electrode is subject to wear and tear. A periodic check is necessary. In case of deviation, the SPI must be calibrated

Press (✗) in the overview screen to return to the main menu.

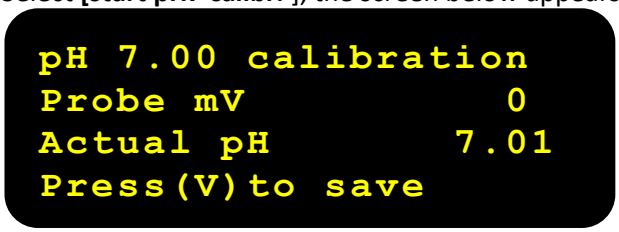
10.2.1 pH calibration

Calibration of pH is done as follows:

1. Prepare 2 cuvette with buffer 7.00 and 4.00 and make sure the pH buffers are at an appropriate temperature.
2. Go to the pH calibration menu via **[Calibrate], [pH]**, and press **(↵).** The screen below appears:

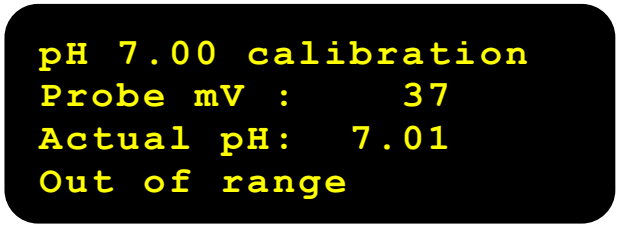


3. Select **[start pH7 calibr.**], the screen below appears



4. Remove the pH electrode from the measuring buffer jar. Place the pH probe in a cuvette containing buffer 7 solution. Wait until the pH value stabilises and does not change (approx. 1 minute). Save the calibration with **(✓)**

The SPI displays an 'out of range' message on the screen if the calibration is incorrect. Signal from pH electrode deviates too much. Check electrode and/or buffer.



5. Leave the menu with (◀)
6. Select **[start pH4 calibr.],** press **(↵)** onderstaand scherm verschijnt:

```
pH 4.01 calibration
Probe mV     :   174
Actual pH    :  3.99
Press(V)to save
```

7. Remove the pH electrode from the pH 7 buffer, rinse it with (tap) water. Place the pH probe in a cuvette with buffer 4 solution. Wait until the pH value stabilises and no longer changes (approx. 1 minute). Save the calibration with **(✓)**

The SPI displays an 'out of range' message on the screen if the calibration is incorrect. Signal from pH electrode deviates too much. Check electrode and/or buffer.

```
pH 4.00 calibration
Probe     mV :   114
Actual pH    :  4.01
Out of range
```

8. Leave the menu with (◀);

9.Press **(×)** toets, go to overview. Rinse the electrode with (tap) water. Place the electrode in the pH 7 buffer again and check the pH. It should now be at 7.00 (+/- 0.05). If not, repeat points 2 to 9.

10. The calibration is now complete.
11. Place the probe back in the buffer jar.
12. Discard the used buffer solution; this is a consumable.

If calibration with buffer 7 and 4 fails or has gone wrong, [reset Calibration] can be used to return to the factory setting. See chapter 10.2.3. Reset Calibration

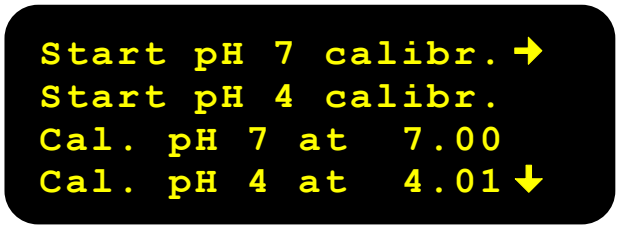
Note

Always pour a small amount of buffer liquid from the bottle into a cuvette. After use, discard the contents of the cuvette. Buffer fluid is a consumable product.

Do not store buffer solution in the refrigerator. After opening the container, buffer solution has a limited shelf life. Replace it regularly!

10.2.2 Changing buffer values

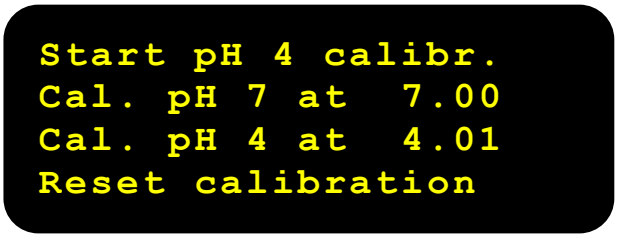
If the buffers differ from the values 7.00 and 4.01, the value of the benchmarks can be changed. Go via **[calibraion], [pH]** to the screen below:



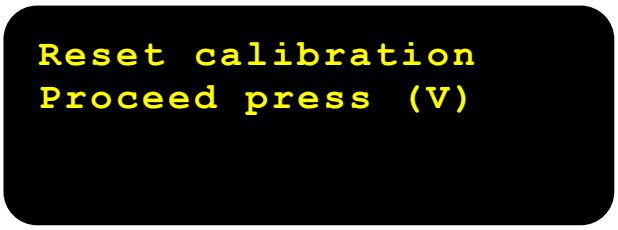
- Go with **(▼)** to the calibration value (7.00 or 4.01) to be adjusted and press **(↵)**
- The calibration value is placed between brackets
- Increase or decrease the displayed value with **(▲)** and **(▼)** to the desired value (in this example >7.00< of >4.01<) en druk op **(↵)**
- Then perform a calibration via **[start pH7 calibration]** or **[start pH4 calibration]** to apply the new calibration value(s).

10.2.3 Reset calibration

With [reset calibration], the controller is reset to the factory calibration. This allows a wrong calibration to be quickly restored. The factory calibration already gives a sufficiently reliable measurement result for most applications. A good calibration with a handmeter ensures a minimal difference between the SPI 170's measurement and the handmeter.



Move cursor to **[Reset calibration]** and press enter **(↵)**. The following screen appears:



- Confirm with the **(✓)** key and the factory calibration will be loaded.

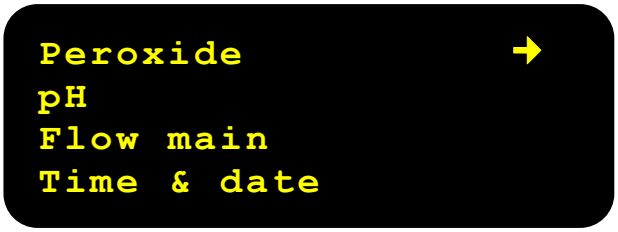
11.Settings

In the **[Settings]** menu, all control, and alarm parameters are available. These define the control characteristics and alarm limits of the SPI. These may be different for each situation. The factory settings are a good basis for most pool applications. By changing the values, the control can be adapted to a specific installation.

From the main menu, select **[Settings]** to view and/or change the SPI's settings related to:

- Peroxide
- pH
- Flow main
- Time & date

Onderstaand menu verschijnt:

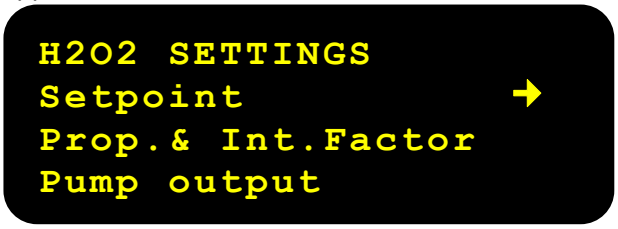


If a day and night setpoint is selected, an adjustable night setpoint is available (with associated alarm values). *see chapter 16 Configuration*

Note:
Consult local legislation for the correct parameters and alarm settings!

11.1 Peroxide settings

Select [peroxide] to view and/or change the peroxide channel settings. The following screen appears:



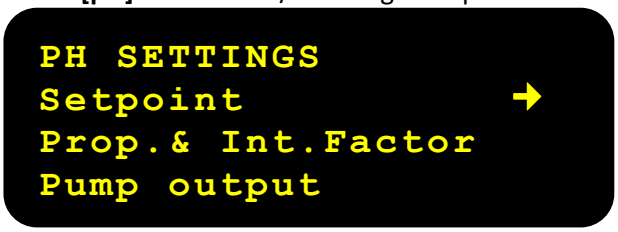
The following parameters can be set :

Menu	Parameter	Explanation	Ex factory
Setpoint	**Setpoint day**	Display which setpoint is displayed in the menu.	-
	Target value	Desired peroxide value to be controlled	30.0
	Hi alarm	Limit for high alarm peroxide value	60.0
	Lo alarm	Limit for Low alarm peroxide value	20.0
	Critical alarm	Limit for critical low alarm. If the peroxide value falls below this value, the controller will stop. This is because the controller does not know if that the peroxide value is really low, or if the peroxidecolor liquid may have run out or if there is fading.	5.0
	Alarm delay s.	Delay time in seconds. An (pre-)alarm becomes an active alarm after the alarm delay time has elapsed. This prevents short over- or under-running of an alarm value from immediately leading to an active alarm.	1200
Prop.& Int. Factor	**P factor**	This setting affects the proportional gain of the control. The higher this P-factor is set, the faster the maximum output of the control. (adjustable between 0.00-10.00, disabled at 0.00)	1.00
	I factor	The integration factor ensures that the difference between the setpoint and the measured value becomes as small as possible (zero). If the I factor is set to 0.00, this function is disabled. (adjustable between 0.00-1.00)	0.00
	I time	This is the sample interval in seconds. For this, select the minimum value of the measurement time. Minimum time is the sample time of the SPI 170 (measurement cycle). If the I factor is set to 0.00, the I time is automatically disabled (adjustable between 0-1999)	600
Pump output	**Pump Timeout**	The maximum time the dosing pump is allowed to be driven before a dosing pump alarm is triggered. This is also called response protection. If the pump is driven for 2 hours (7200s) consecutively at maximum power without the peroxide value increasing, the control will fall into alarm and stop the pump. This usually means a defect on the dosing pump, blocked injection valve, defective transport hose or empty peroxide tank. Setting the setting to "0" disables this function.	7200
	Pump min%	Minimum control of the dosing pump (in percentage of maximum pulse rate).	0
	Pump max%	Maximum control of the dosing pump (in percent of maximum pulse frequency)	100

Use the keys (▲) / (▼) to scroll through the different parameters.
P and I factor are advanced measurement and control settings, which can only be set perfectly after seeing a graph. They affect how effectively the system is regulated. There are no fixed guidelines for these settings, as each application is different. The above parameters are already set at the factory.

11.2 pH settings

Select **[pH]** to view and/or change the pH channel settings. The following screen appears:



The following parameters can be set :

Menu	Parameter	Explanation	Ex Factory
Setpoint	**Setpoint day**	Display which setpoint is displayed in the menu.	-
	Target value	Desired pH value to be controlled	7.30
	High alarm	Limit for high alarm pH value	7.60
	Lo alarm	Limit for low alarm pH value	7.00
	Critical alarm	Limite for critical low alarm. If the pH value falls below this value, the controller will stop the peroxide channel. This is a protection against dosing peroxide when pH is too low.	6.80
	Alarmvert sec.	Delay time in seconds. An (pre-)alarm becomes an active alarm after the alarm delay time has elapsed. This prevents short over- or under-running of an alarm value from immediately leading to an active alarm.	1200
Prop.& Int. Factor	**P factor**	This setting affects the proportional gain of the control. The higher this P-factor is set, the faster the maximum output of the control. (adjustable between 0.00-10.00, disabled at 0.00)	1.00
	I factor	The integration factor ensures that the difference between the setpoint and the measured value becomes as small as possible (zero). If the I factor is set to 0.00, this function is disabled. (adjustable between 0.00-1.00)	0.00
	I tijd	This is the sample interval in seconds. For this, select the minimum value of the measurement time. Minimum time is the sample time of the SPI 170 (measurement cycle). If the I factor is set to 0.00, the I time is automatically disabled (adjustable between 0-1999)	600
Pump output	**Pump timeout**	The maximum time the dosing pump is allowed to be driven before a dosing pump alarm is triggered. This is also called response protection. If the pump is driven for 2 hours (7200s) consecutively at maximum power, without the pH value dropping (rising with base dosing), the regulation will fall into alarm and stop the pump. Usually this means a fault on the dosing pump, blocked injection valve, faulty transport hose or empty vessel. Setting the setting to "0" disables this function.	7200
	Pump min %	Minimum control of the dosing pump (in percentage of minimum pulse rate).	0
	Pump max %	Maximum control of the dosing pump (in percent of maximum pulse frequency)	100

Use the keys (▲) / (▼) to scroll through the different parameters.
P and I factor are advanced measurement and control settings, which can only be set perfectly after seeing a graph. They affect how effectively the system is regulated. There are no fixed guidelines for these settings, as each application is different. The above parametersare already set at the factory.

11.3 Flow main

Select **[Flow main]** to view and/or change the flow channel settings. In the default configuration, a pulse flow sensor is configured on In2. The following parameters are adjustable:

```
FLOW MAIN
Alarm        %    60→
Alarm delay  s    300
Dose  stop   %    50↓
```

(▲) / (▼)

```
Dose   stop %     50→
Dose stop delay   1
Pipesize [mm]     50
m3/h at 100%      10
```

Parameter	Explanation	Ex factory
Alarm %	Limit for alarm notification low flow.	60
Alarm delay s	Alarm delay time in seconds. When this delay is exceeded, an (pre-)alarm becomes active.	300
Dose stop %	Dose stop limit. If the flow falls below this limit, the dosing pumps will be blocked (stop) after the expiry of the dosing stop delay time.	50
Dose stop delay	Dose stop delay time in seconds.	1
Pipe size [mm]	The pipe size (outer diameter) of the pipe in which the flow sensor is placed is entered here.	50
m³/h at 100%	Nominal flow of the installation.	10

To turn flow measurement on or off, *see chapter 16 Configuration*

Note:
Consult local legislation for the correct parameters and alarm settings!

Note:

If the manufacturer has set the flow channel to Input1 (4-20mA) flow sensor then the table below applies:

Parameter	Explanation	Ex factory
Alarm %	Limit for alarm notification low flow.	60
Alarm delay s	Alarm delay time in seconds. When this delay is exceeded, an (pre-)alarm becomes active.	300
Dose stop %	Dose stop limit. If the flow falls below this limit, the dosing pumps will be blocked (stop) after the expiry of the dosing stop delay time.	50
Dose stop delay	Dose stop delay time in seconds.	1
m³/h at 20mA	Here, the flow is set at 20mA output from the sensor.	10
m³/h at 100%	Nominal flow of the installation.	10

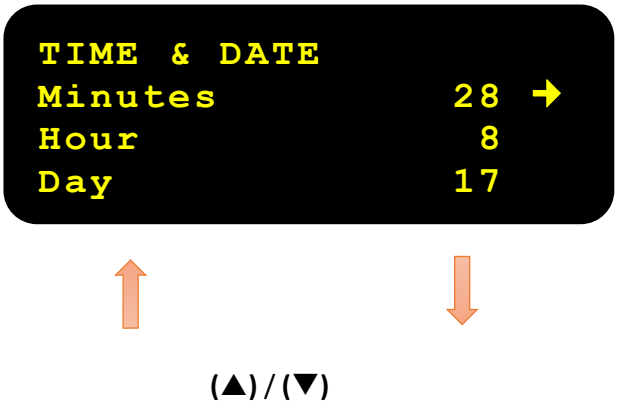
11.4 Time & date settings

Select the **[time & date]** option to set the date and time correctly. The following parameters are adjustable:

Parameter	Explanation	Setting
Minutes	Minutes from current time	0..59
Hour	Hours from current time	0..23
Day	Day of the month	1..31
Month	Month of the year	1..12
Year	Year	20..

Setting the correct time is important because the SPI's operation largely depends on it. If the time is not set correctly, the system will not perform the day and night settings correctly. Also, the date and time of the reports and data logger will not be correct.

The SPI 170 contains 1 CR2032 battery as power reserve for the real time clock. If it runs low, the date and time are reset in case of power failure.

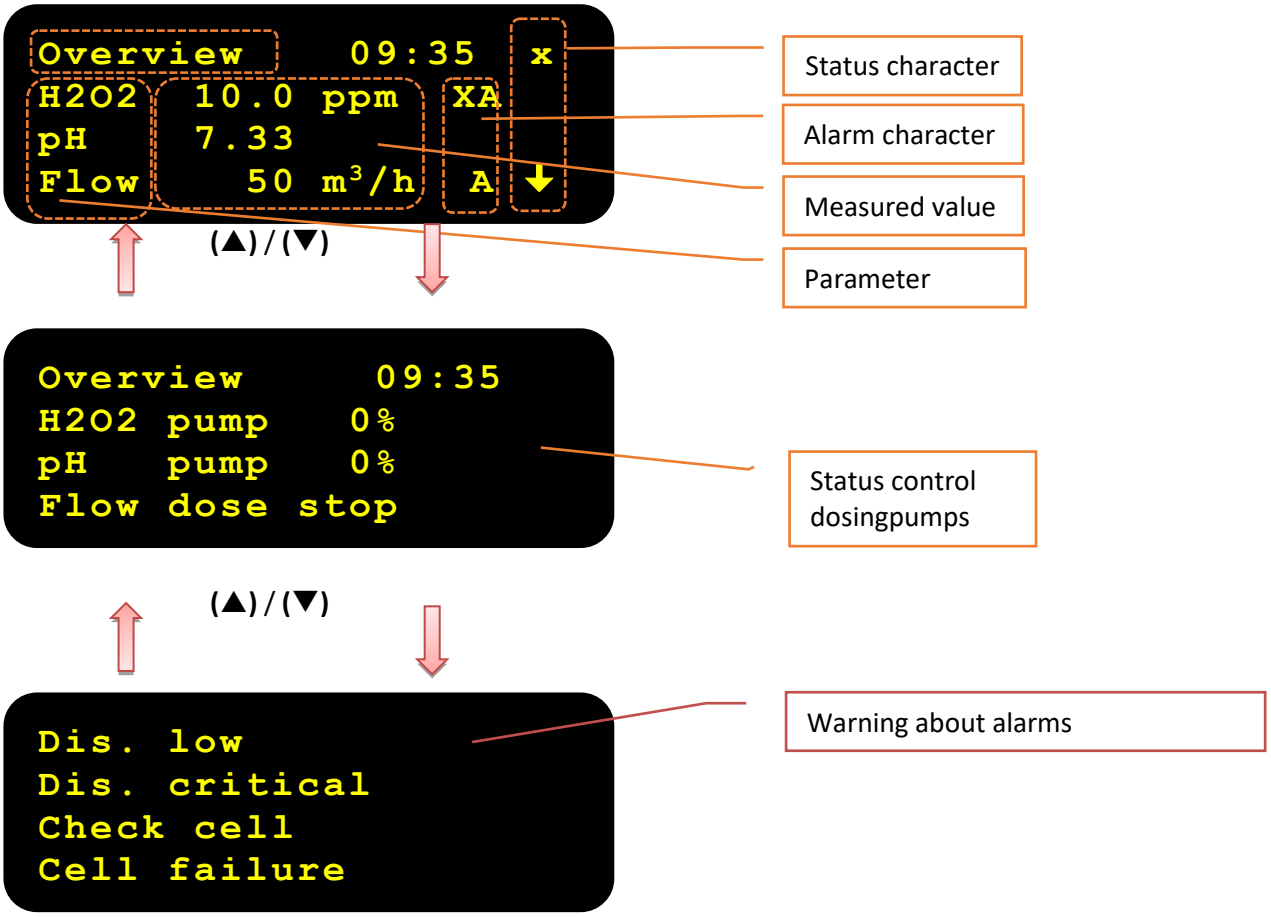


(▲) / (▼)

The default configuration of the SPI 170 is equipped with a day setpoint. If a night setpoint is desired, this must be activated in the configuration menu *see chapter 16*

12.Alarms

If any of the measured values exceeds or drops below an alarm limit, an alarm message will be displayed. In the standard configuration, this is shown by a status character behind the measured value (peroxide, pH, flow) or dosing pump (peroxide pump, acid pump). A character is also displayed behind the time entry. This is a general message.



12.1 Alarm codes and characters

By default, the SPI 170 is delivered with EXPERT MODE (ON)

The following characters may appear on the display:

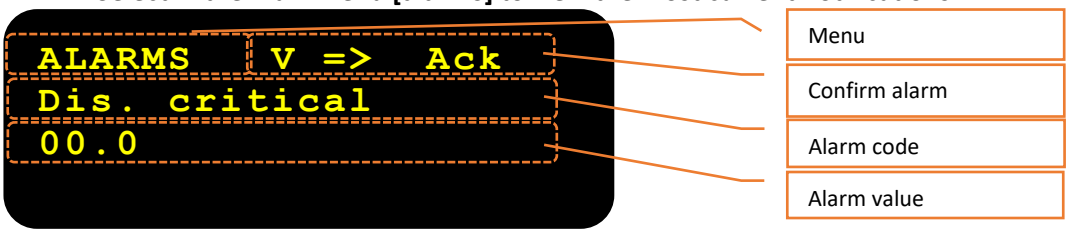
Character	Description	Explanation	Expert mode ON	Expert mode OFF
.	No alarm present	The measurement is within alarm limits. The alarm screen displays that there are no alarms.	X	-
v	Pre alarm	The measurement has exceeded or fallen below an alarm limit. The pre-alarm is now made active and the alarm delay time starts. When the measurement comes within the alarm limits, the pre-alarm disappears.	X	-
A	Alarm active	The measurement has exceeded or fallen below an alarm limit and the alarm delay time has been exceeded. An alarm is then created. The red alarm LED flashes and the alarm relay switches. This alarm is reflected in the *Alarms menu*. A report is also created.	X	-
a	Alarm adjusted	The alarm has been seen by the user and confirmed in the *alarms menu.* The red alarm LED lights up continuously. The alarm is under attention and a solution can be worked on. When the measurement comes back within limits, the alarm expires and the alarm LED turns off. The alarm relay also switches.	X	-
M	Manual	The channel is operated manually. This applies to the dosing pumps, but this can also apply to the flow channel. In this case, flow protection is switched off. More on this in chapter 13.	X	X
X	Controller deactivated	The controller is deactivated by means of an external signal on the disable input (see input configuration chapter 16) Blue LED indication will no longer flash	X	X
x	System off (Controller deactivated)	The controller is deactivated by putting it into maintenance via the [Maintenance] menu. This means that the controller is disabled for maintenance and does not emit alarms.	X	X
c	Measurement cell becomes contaminated	The measurement cell begins to foul and the zero readings become lower. The cell needs to be cleaned, but the controller still operates normally.	X	X
C	Measurement cell is contaminated Circulation failure	So much contamination has developed in the measuring cell that it noticeably affects the measurements. The cell urgently needs to be cleaned. The controller stops measuring and regulating. A C is also displayed if the measuring water circulation stops. The controller stops measuring and regulating and a warning signal sounds.	X	X
S	Semi Automatic	Dosing pumps are controlled at the [manual %] until the desired value is reached. After that, the SPI automatically returns to the [auto] position.	X	X
🔔	Alarm bell (simple display)	The measurement has exceeded or fallen below an alarm limit and the alarm delay time has been exceeded. When the measurement comes back within the limits, the alarm expires and the alarm LED turns off. The alarm relay also switches. A pre-alarm is not displayed.	-	X

By default, the EXPERT MODE of the SPI device is on. If a simple display of alarms is desired without letters but by pictogram (🔔) EXPERT MODE can be deactivated. ***see chapter 16 Configuration, Users. Setting.***

12.2 Confirm alarm (adjust)

If there is an alarm notification, the red status LED on the control panel will flash.

- Select in the main menu **[alarms]** to view the most current notifications.



This menu displays alarm messages in the following format (see screen above):

1. The possibilty to confirm an alarm (adjust).
2. Description of alarm.
3. The value at which the alarm was activated.

- Confirm the alarm with **(✓).** The alarm is then adjusted and the red alarm LED is then continuously on. Once the alarm is resolved (measured values within the alarm limits), the alarm LED goes off.

- The alarm is recorded in the alarm report *see chapter 14 Reports*
- If all alarms are confirmed, the screen below will appear:

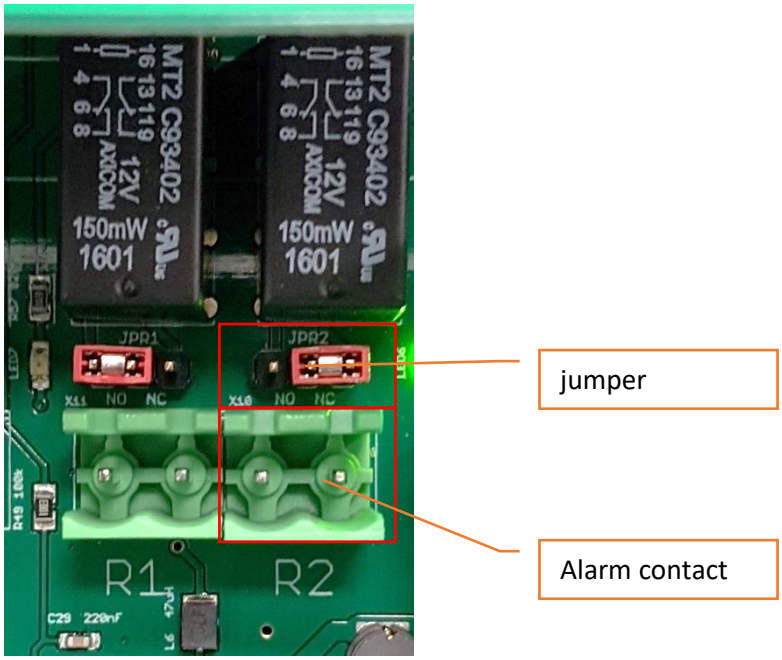
Depending on the alarm, action will need to be taken. See the table below for the explanation of the different codes:

Alarm	Description
Dis high	Disinfection (peroxide) value higher than alarm value
Dis low	Disinfection (peroxide) value lower than alarm value
Dis. critical	Peroxide value very low (too low for reliable measurement)
Dis. Pump	Maximum dosing time (pulse time) peroxide pump exceeded (pump stops)
Check cell	Low zero value of measuring water, measuring cell becomes contaminated
Cell failure	Error in peroxide measuring cell (incorrect zero measurement), controller stops measuring and controlling
pH high	pH value higher than alam value
pH low	pH value lower than alarm value
pH critical	pH value so low that peroxide dosing stops
Acid pump	Maximum dosing time (pulse time) acid pump exceeded (pump stops)
Low flow	Flow lower than alarm value, dosing pumps remain in operation
Dose stop	Flow lower than dosing stop value, dosing pumps are switched off
Circ. Failure	No circulation through measuring cell (no measuring water)

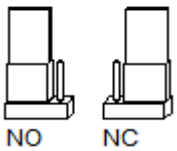
Optional alarms	These are only applicable if configured
Reag. low	Stock of reagents in reagent holder has reached low level
Sys. Disable	System blocked by external signal
Temp. high	If temperature higher than alarm value setting
Temp. low	If temperature lower than alarm value setting

12.3 Alarm contact

The SPI-P170 includes an alarm contact. This is a potential-free contact that can be used to report an alarm to external equipment such as BMS or alarm centre.
See *chapter 5* for electrical connection of this contact.



With jumper CONN21, the choice can be made to use the contact as a normally open (NO) or normally closed (NC) contact. The advantage of a normally closed contact is that voltage failure of the SPI is also detected (failure safe). The contact can be set so that no alarm can be triggered at night. See *chapter 16 Configuration*



12.4 Resolve alarms

With correct use and timely regular maintenance, the fewest hardware-related failures will occur.
For maintenance, see chapter 15.

Problem solving goes as follows:

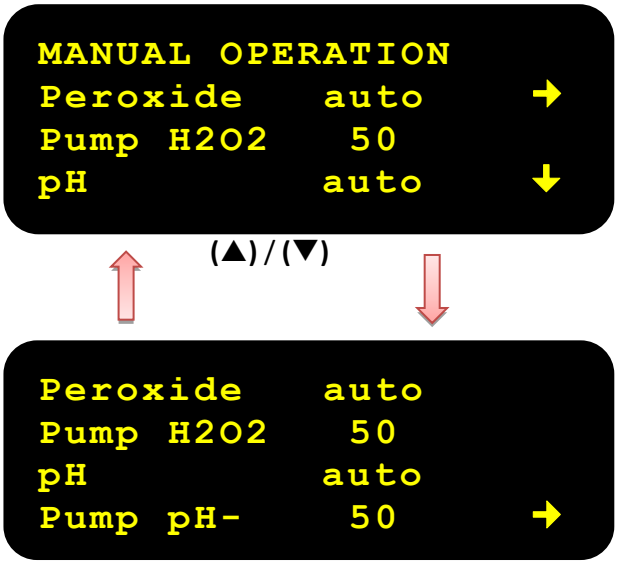
1. Identify the problem, look in the menu **[alarms]** for an active alarm. If the alarm has already been acknowledged, check the menu **[reports]** and then select **[alarm log]**
2. Then, using the list below, investigate what could be causing the malfunction:

Alarm	Possible cause
Dis. high	- Peroxide pump: dosing pump is on manual dosing or pump siphoning - Wrong control settings (P too high)
Dis. low	- Pump settings not correct - Incorrect control settings - Peroxide tank empty - Default in peroxide supply , hose or injection valve blocked, air in hose
Dis. crit	- Dosing pump settings or dosing pump malfunction. - Wrong control settings - Peroxide tank empty - Default in peroxide supply - Reagent tank empty
Dis. pump	- Dosing pump malfunction or dosing pump settings - Peroxide tank empty - Fault in peroxide supply, injection valve blocked
pH high	- Pump settings incorrect, acid pump at fault, leach pump on manual control - Wrong control settings - Acid tank empty - Default in acid supply, hose or injection valve blocked, air in hose
pH low	- Pump fault, dosing pump is on manual dosing or pump siphoning - Invalid control settings - pH electrode or cable defective
pH crit	- Pump fault, dosing pump is on manual dosing or pump siphoning - Invalid control settings - pH electrode or cable defective
Acid pump	- Dosing pump settings or dosing pump malfunction - Acid tank empty - Defect in the acid supply - pH electrode defective
Low flow	- Circulation fault , circulation pump failed, filter clogged - Flow sensor defective - Incorrect flow settings
Dose stop	- Default in circulation , circulation pump failed, filter clogged - Flow sensor defective - Incorrect flow settings
Check cell	-Measurement cell begins to foul -Measurement cell is contaminated
Cell failure	- Measurement cell is contaminated - Measurement water supply defective - Reagent valve is leaking - Cell is defective
Circ failure	- Circulation pump or measuring water pump is off - Pre filter is clogged, blockage in measuring water supply, valve closed

13.Manual operation

The SPI 170 can control the dosing pumps fully automatically. However, it is also possible to choose manual or semi-automatic control. This can be practical for testing the control of the dosing pumps or in case of calamities.

From the main menu, select **[Manual operation]** and the following screen appears:



13.1 Modes and settings

The SPI P170 has 3 operating modes by which the dosing pumps can be controlled:

[Automatic mode] (auto) default setting
In automatic mode, the unit controls the dosing of chemicals to the pool according to the measurements taken and the desired setpoint and other control parameters.

[Manual mode] (hand)
In manual mode, the user sets the dosing of chemicals to the pool. This is a useful tool if the dosing pumps need to be tested or if a problem has occurred with the automatic measurement.

Please note that in this case, the dosing pumps are not controlled automatically and therefore an additional manual check of the water quality is necessary. The recommendation is to use the semi-automatic mode.

[Semi automatic mode] (semi)
In semi automatic mode, the unit controls the dosing pumps at a fixed speed (0-100%), but once the setpoint is reached, the control will switch to automatic mode. When manual or semi-automatic operation is in progress, the yellow MANUAL LED on the control panel will illuminate.

Changing the operating mode is as follows:

- Place the cursor (→) behind “Peroxide ” and press **(↵)** until the desired mode (auto/ semi/ hand) appears.

```
MANUAL OPERATION
Chloor      auto    →
Pump Cl      50
pH          auto    ↓
```

Changing the pump control (setting the pulse rate) is done as follows:

- The manual dosing capacity (in %) can be set by placing the cursor **(→)** behind “Pump Cl’’ and press **(↵)**.

Next screen appears :

```
MANUAL OPERATION
Chlorin     auto
Pump Cl     >50<    →
pH          auto    ↓
```

- Increase or decrease the value between **>….<** with **(▲)** , **(▼)** , **(↵)** and **(◀)** to the desired dosing capacity (0 - 100%)
- Cancel the change with (×) (only possible if the change has not been confirmed with **(✓)**).
- Confirm the selection with **(✓)**.

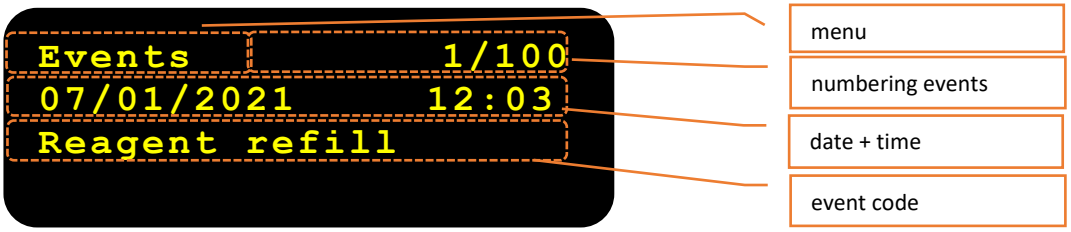
14.Reports

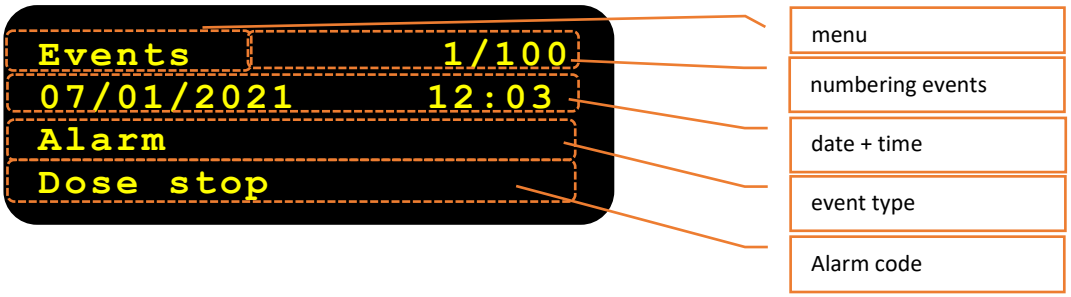
The **[Reports]** menu stores some important data in a logbook. This data is very useful in troubleshooting faults and or alarms. The SPI-P170 creates the following reports:

1. Events
2. Alarm log
3. Cal. log
4. Data log (measurement data)

14.1 Events

Select **[Events]** to view the history of events. The screen below will appear:





Scrolling back to previous records can be done with **(▲).**
To quickly scroll to the oldest record, press (in the screen with the most recent record) the **(▼)**.

See table below for the explanation of the different events:

Events	Explanation
System boot	Reset SPI (equal with on and off power supply)
System disabled	System stopped (via menu or external signal)
System enabled	System activated
System disabled timeout	System activated after being stopped for 1800 sec
Alarm	Aktive alarm
Alarm ack	Alarm confirmed
Calibration dis.	Calibration disinfectant (Peroxide or peroxide)
Calibration dis. reset	Calibration reset (Peroxide or peroxide)
Calibration pH	Calibration pH
Calibration pH reset	Calibration pH reset
Calibration Cell	Cell adjustment
Refill	Reagent aspiration procedure initiated
Changed Acces	Access code changed
Changed Var ……X……	Change of specified parameter X = relevant variable/setting

14.2 Alarm log

Select **[Alarm log]** to view the history of alarms. The screen below will appear:

The log screen shows the most recent notifications with date and time and description.

Scrolling back to previous alarms can be done using the **(▲).**
To quickly scroll to the oldest record, press (in the screen with the most recent record) the **(▼)**. Keep pressing the button to move to a more recent record each time.

See Chapter 12.2 for the alarm codes

14.3 Calibration log

Select **[Cal. log]** to view the history of calibrations (last 10 calibrations).
The log screen shows the most recent record with date and time and a description below it.

Scrolling back to previous alarms can be done using the **(▲).** To quickly scroll to the oldest record, press (in the screen with the most recent record) the **(▼)**. Keep pressing the button to move to a more recent record each time.

Reading out the calibration report:
Below the time and date are the following values:

1. Null (zero value of the sample water)
2. Set (entered value of the current manual measurement)
3. ACT (actual measured value of the SPI)

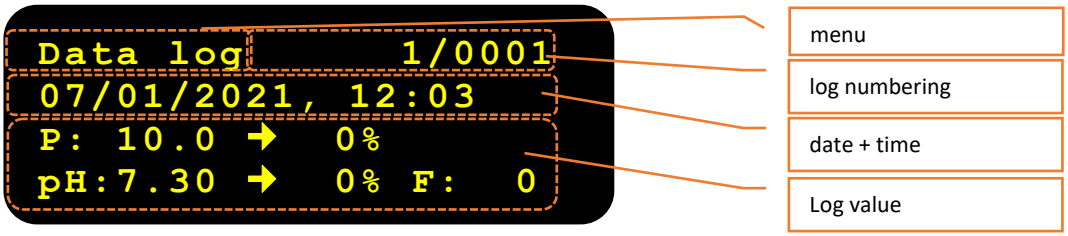
After a calibration, the ACT value (actual value of SPI) will be adjusted to the value of Set (manual measurement).

The screens below may appear :

IJk log	Explantion	Screen
H2O2 calibration	Manual calibration performed	Cal. log 1/10 07/01/2023 11:53 Null: 1001 Set: 10.0 ACT: 10.0
Calibration cell	Cell adjusted	Cal. log 4/10 23/12/2020 11:53 Cell: 0
Reset H2O2 calibration	Reset Peroxide Calibration factors	Cal. log 6/10 07/01/2023 11:53 Null: 1000 Set: 10.0 ACT: 10.0
pH calibration	Calibration pH	Cal. log 7/10 23/12/2020 11:53 pH = 4.01 191 mV pH = 7.00 - 3 mV
Reset pH calibration	Reset pH Calibration factors	Cal. log 10/10 23/12/2020 11:53 pH = 4.01 191 mV pH = 7.00 0 mV

14.4 Data log

Select **[Data log]** to view the history of measured values and associated control of the dosing pumps.



The log screen shows the most recent message with date and time and below it the measurement values peroxide, pH, flow and pump control (%).

Scrolling back to previous alarms can be done using the **(▲).**
To quickly scroll to the oldest record, press (in the screen with the most recent record) the **(▼)**. Keep pressing the button to move to a more recent record each time.

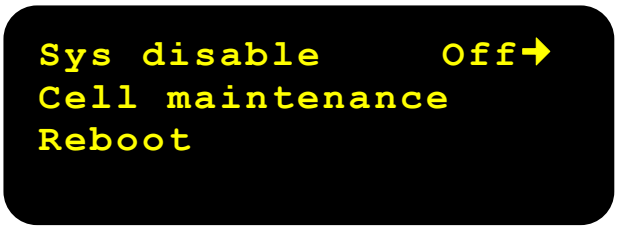
The log period can be set in the menu **[configuration], [Log interval], [Log period].** Factory setting is 900 seconds. This means that a new measurement is logged every 900 seconds (15 minutes).

See Chapter 16.1.6 Log interval

15.Maintenance

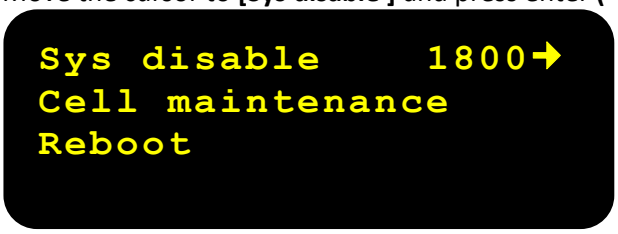
The **[Maintenance]** menu gives access to a number of specific parameters related to the photometric measurement cell. If maintenance is going to be performed on the SPI, the SPI can be stopped. A notification is also made in the SPI's event log. This makes it possible to look back to see when maintenance was performed

Select **[Maintenance] (↵)** and the following menu will be displayed



15.1. System disable

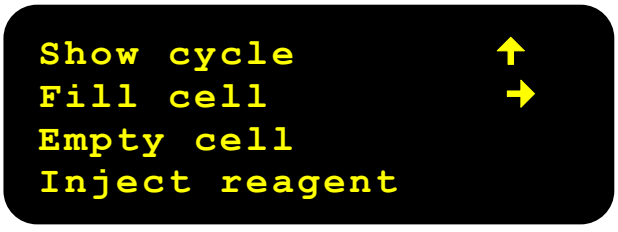
Move the cursor to **[Sys disable]** and press enter **(↵)**. The following screen appears:



The SPI P170 will now stop for 1800 sec and after 1800 sec the SPI will start measuring and controlling again. If you want to stop the timer in the meantime and set **[System off]** to Off again press enter **(↵)**

15.2. Cell maintenance

The cell maintenance submenu provides access to a number of specific parameters related to the photometric measurement cell. Select **[Cell maintenance]** and press enter **(↵)** and the screen below appears:



15.2.1. Refill reagent

When the reagent supply has been completely empty (or at first start-up), it is necessary to start the priming process.

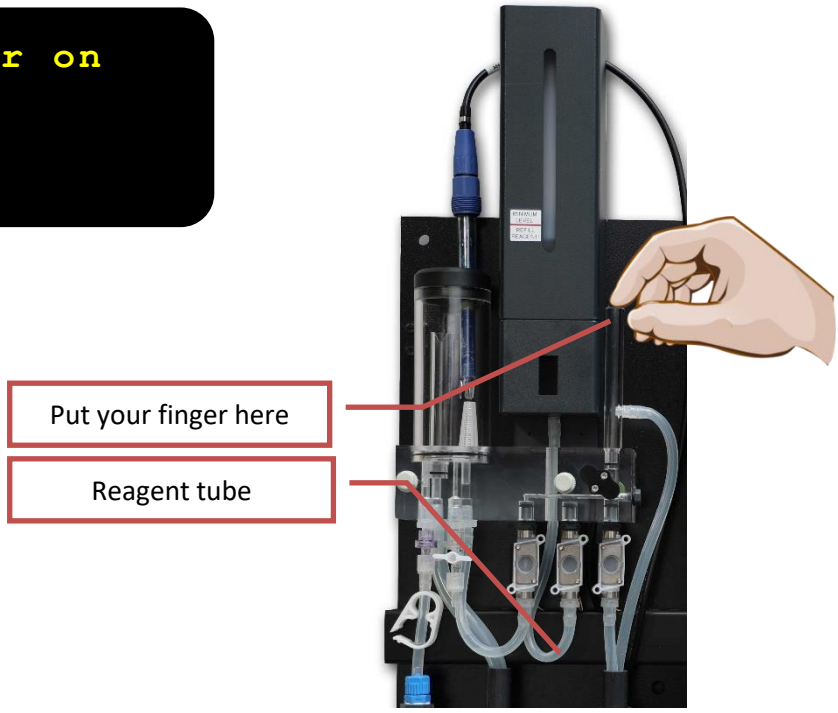
Check before whether the supply hose still contains reagent. If the hose is still completely full (without air bubbles), just filling the reagent supply bottle is sufficient.

1. Fill the reagent bottle completely and place it in the reagent holder. The reagent reservoir now fills up.
2. Select in menu **[Cell Maintenance]** , the **[Refill Reagent]** option and confirm with **(↵)**. The screen below appears. The measuring cell is now prepared.

```
Preparing cell
----------------
Wait     :       10
```

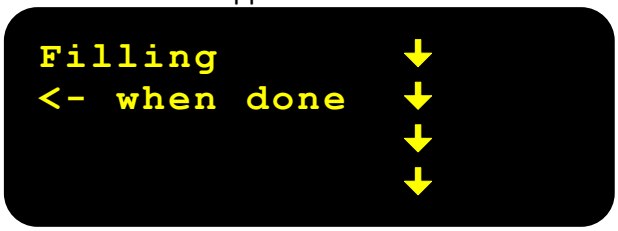
3. After the 10-second preparation time, you will be asked to place a finger on the booster tube so that it is sealed airtight. Do this carefully. The delivery tube is fragile..

```
Put your finger on
top of tube.
Press (V).
```



4. Press **(✓)**.

   The screen below appears.

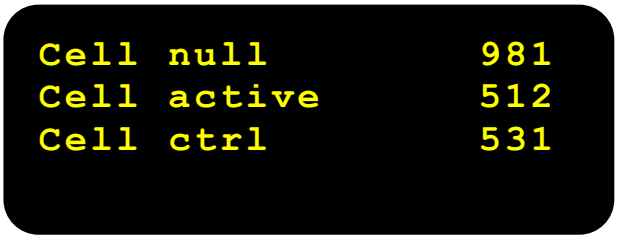


5. After 10 seconds, the procedure will be terminated and the SPI will jump back to the **[Refill Reagent]** start screen.
6. If there is still air in the reagent hose, repeat this procedure until all air is removed.
7. the SPI-P170 is now ready for use.

15.2.2 Cell values

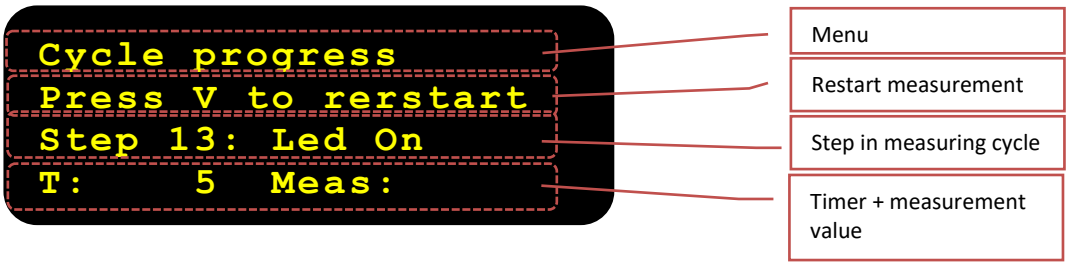
The **[cell values]** menu shows the results of the last measurement performed:

- Cell null: the zero values of the measuring water (between 0 and 1000, should be >700)
- Cell active: the measured value with reagent added
- Cell ctrl: the measured value with reagent added after refilling additional measuring water



15.2.3 Show cycle

The [show cycle] menu shows the progress of the measurement cycle. Each step of the measurement cycle can be followed here. The timer (T) runs down and shows how long the step is still to run.



To restart the cycle select **(✓).** The full cycle will restart with step 1.

15.2.4 Manual cell operation

With submenus **[Fill cell], [Empty cell] and [Inject reagent]** each valve can be manually operated separately.

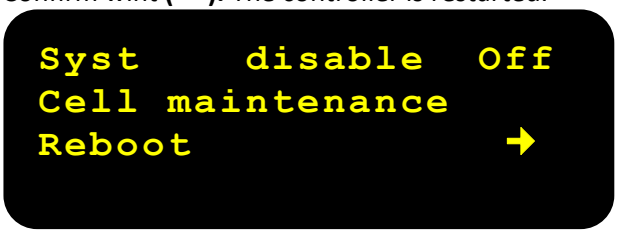
Use **(▲)** or **(▼)** to scroll through the menu and select with (→) the desired action and press **(↵)**. After pressing **(↵)** will switch the corresponding valve.

Menu	Description
Fill cell	Measuring water valve is opened and measuring cell is filled
Empty cell	Drain valve is opened and the measuring cell empties into the drain
Inject reagent	Reagent valve opens and reagent is injected into measuring cell

15.3 Reboot

The SPI can be restarted by the option **[reboot].**

Confirm wiht **(↵).** The controller is restarted.



Alternatively, you can unplug it and put it back after 20 seconds.

15.4 Regular maintenance

For the SPI to work properly, it is important to carry out periodic inspection and maintenance of the device. Preventive maintenance can prevent malfunctions. In particular, the parts in contact with the measuring water can foul depending on the contamination in the measuring water.

The following maintenance points are important:

1. Keeping the measuring water panel clean and dry;
2. Refill reagent reservoir, wipe off any spilled reagent immediately with a dry cloth;
3. Cleaning filters and measuring cell, reagent reservoir;
4. Adjust measurement cell, calibrate peroxide and pH channel ;
5. Replace wear parts such as pH electrode, O-rings, silicone hoses, filters, valves;

15.5 Maintenance schedule

The maintenance schedule below can serve as a guide and is derived from a swimming pool application. The frequency of some maintenance points depends on the application of the SPI, the measurement frequency and the environment in which the unit is placed. As a result, a different maintenance schedule may be necessary.

Frequenty	Description of control point
Daily	• Compare measurements of SPI with handmeter (if deviations with handmeter then perform calibration) • Faults on display • Measuring water flow • Reagent level (measuring liquid) • Peroxide measuring cell cycle*
Weekly	• Refill reagent (approx 1800 readings per 100ml) approx 1x14 days 250ml • Check pH electrode in buffer solution • Cleaning measuring water filter • Wipe the panel with a dry cloth
Montly	• Check cell values peroxide measuring cell and if cell zero value is lower than 700 clean measuring cell (with brush) or if SPI indicates this • Check valves*
Yearly	• Replace pH electrode and buffer fluid; • Replace O-ring set • Replace silicone hose set • Replace non-return valve • Replace measuring water filter • Clean reagent reservoir/flush with demineralised water • Check cell adjustment (see configuration menu), adjust zero value to 1000
NOTE	Fit only original SPI replacement parts. See annex for a complete overview of all parts of the SPI P170.

* Control measurement cycle:

The measuring cycle of the SPI's peroxide measuring cell will only run correctly if both the measuring water valve, reagent valve and drain valve function correctly. A correct cycle has the following characteristics:

- At each zero measurement, the cell including the raiser tube should be completely filled with clear water. The level in the raiser tube should then be equal to the level in the measuring water pot;
- During an active measurement, the level stands still and only the cell is filled, not the raiser tube;
- After a (zero) measurement and flush, the cell empties completely;
- At the end of the cycle, the cell and raiser tube fill up and the cell will flow continuously

15.6 Valve maintenance instruction

The valves must not dry with residues of pool water, reagent or other liquids containing contain chemical substances. Follow the instruction in *chapter 17.1* if the SPI is to be is not used.
Problems with valves can be recognised as follows:

	Cause
measuring water valve	A faulty measuring water valve will cause the raiser tube to not fill completely or to fill very slowly. A leaking valve will cause a rising level in the cell during active measurement.
Reagent valve	A faulty reagent valve will turn the water in the raiser tube pink during the zero measurement or, on the contrary, will not allow any reagent through.
Drain valve	A defective drain valve will prevent the measurement cell from being fully filled as water continuously drains. A clogged valve will not drain the measuring tube or will drain it very slowly
NOTE	Always replace valves complete. Measuring water valve, reagent valve and drain valve are of the same type. If in doubt, contact the SPI dealer.

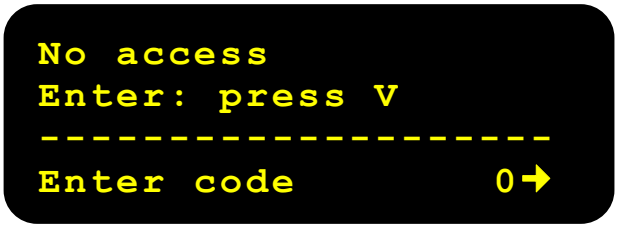
Opening/dismantling the valves will void the manufacturer's warranty

16. Configuration

Go to the **[Configuration]** menu to adjust the configuration of the SPI controller. These are settings that are often done only once to set up the controller optimally for the application.

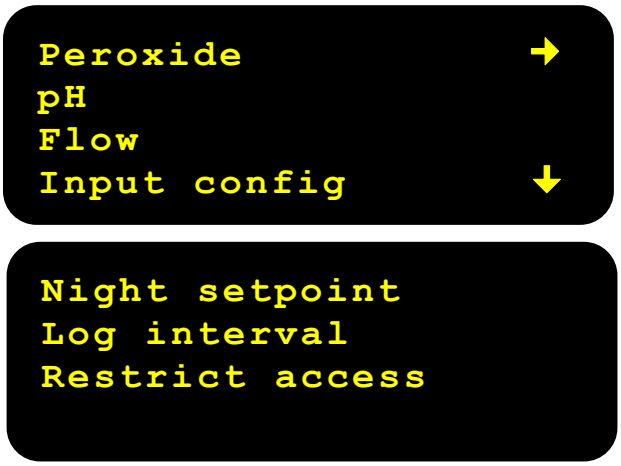
The following items are available in the configuration menu:

1. System setup
2. User settings
3. System info

Choice	Explanation
System setup *Chapter 16.1*	System setup, here inputs and outputs can be configured. This menu can only be accessed with a dealer code On selecting this option, the screen below will appear: 
User settings *Chapter 16.2*	Here the user settings of the SPI 170 can be changed.
System info *Chapter 16.3*	Here the system info is displayed from the SPI 170

16.1 System setup

In the configuration menu, select **[System setup]** and the items below will be available:



Parameter	Explanation
Peroxide	Menu to change settings in the peroxide controller
pH	Menu to change settings in the pH controller
Flow	Menu to change settings in the Flow controller
Night setpoint	Menu to change settings for additional night setpoint and alarms
Log Interval	Menu to set the event log period
Restrict access	Menu to set an access restriction.

A number of inputs and outputs can be configured in the system configuration menu.
A factory **default configuration** will be delivered according to the table below:

Controller	Setting	Description
Peroxide	On	Peroxide controller for the peroxide measurement
pH	On	pH Controller for the pH measurement
Flow	On	Flow measurement

Input	Setting	Description
In1	None	Disabled, hardware prepared Flow measurement 4-20 mA signal
In2	Pulse	Flow measurement puls signal
In 3	Circ.	Circulation contact

If you want a different configuration for input In1 / In2 / In3, please contact SEM Waterbehandeling BV. If inputs need to be configured differently, it is possible that hardware changes to the jumpers on the SPI print are also required.

A configuration adjustment must be carried out by SEM Waterbehandeling BV. This must be specified in advance when ordering. If this must be done on location, there are costs involved.

16.1.1 Peroxide controller

Select option **[Peroxide]** to change the settings of the peroxide controller.
The screen below will appear:

```
PEROXIDE CONTROL.
Active          On
Type            P-I↓
Pump config     PPM→
```

Parameter	Explanation	Ex works
Active	Off = does not measure peroxide (peroxide channel disabled) On = does measure peroxide (peroxide channel enabled)	On
Type	P – I = proportional control with pulses On/ Off = on/off control	P-I

Pump config *	**PPM :** Pulses per minute function where the dosing pump is controlled with pulses. **(recommended default setting)**
	
	`Pump output  1`
	`Type  PPM→`
	`Max puls/m  100`
	
	Max puls/m: maximum pulse frequency adjustable 0-100 pulses per minute.
	PWM: Pulse width modulation function, period time is 60 sec.
	
	`Pump output 1`
	`Type  PWM→`
		PPM
		
		100

*** This setting is not available if peroxide control type is set to ON/OFF. The peroxide control is ex works set to P-I control (PPM)**

16.1.2 pH controller

Select option **[pH]** to change the settings of the pH controller.
The screen below will appear:

```
PH CONTROLLER
Active          On →
Type            P-I
Pump config     PPM↓
```

```
Dosing          pH-
```

Parameter	Explanation	Ex works
Active	Off = does not measure pH (pH channel disabled) On = does measure pH (pH channel enabled)	On
Type	P – I = proportional control with pulses On/ Off = on/off control	P-I

Pump config PPM *	**PPM :** Pulses per minute function where the dosing pump is controlled with pulses. **(recommended default setting)**
	
	`Pump output 1`
	`Type PPM→`
	`Max puls/m 100`
	
	Max puls/m: maximum pulse frequency adjustable 0-100 pulses per minute.
	
	PWM: Pulse width modulation function, period time is 60 sec.
	
	`Pump output 1`
	`Type PWM→`
		PPM
		
		100

Dosing	pH - = pH controller dosage is adjusted downwards (ACID) pH + = pH controller dosage is adjusted upwards (LYE)	pH-

*** This setting is not available if peroxide control type is set to ON/OFF. The peroxide control is ex works set to P-I control (PPM)**

16.1.3 Flow measurement

Select option **[flow]** to change the settings of the flow measurement.
The screen below will appear:

Parameter	Explanation	Ex works
Active	Off = does not measure flow (flow channel disabled) On = does measure flow (flow channel enabled)	On

If the Flow measurement is ON, the flow settings can be set via **[Settings], [Flow Main]** *see chapter 11.3*

The flow measurement ensures that there is no dosing if there is no or too little flow.
It is advisable to always have the flow measurement switched on.

Note: if the flow measurement is OFF, this means that the dosing pumps do not switch off when the flow is too low.

16.1.4 Input config

Select option **[Input config]** to change the input channel settings. The screen below will appear:

```
Input channels  →
Measurement Cell
pH measurement
```

Parameter	Explanation

Input channels *	Input configuration
	
	This menu is not accessible for installer or user. This can only be adjusted by SEM Waterbehandeling!
	
	`Input 1: None`
	`Input 2: Flow Main`
	`Input 3: Circ.`
	`OneWire : No devices`

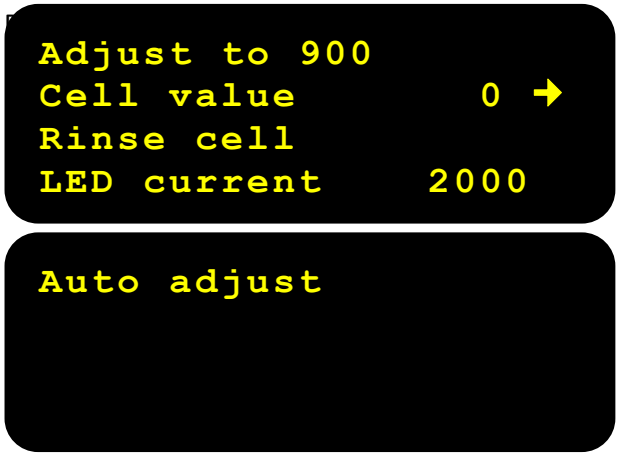
Measurement cell	Adjustment cell input
	
	Select option **[Measurement cell]** to be able to adjust the measuring cell. In the cell adjustment menu a number of settings of the measuring cell can be made. The measuring cell can also be adjusted (calibrated) here.
	The screen below will appear:
	
	`Cell adjustement  →`
	`Cycle config`

pH measurement *	Adjustment pH input This menu is not accessible for installer or user. This can only be adjusted by SEM Waterbehandeling!

*** When selecting this option the screen below will appear:**

```
No access
Enter: press V
--------------------
Enter code        0→
```

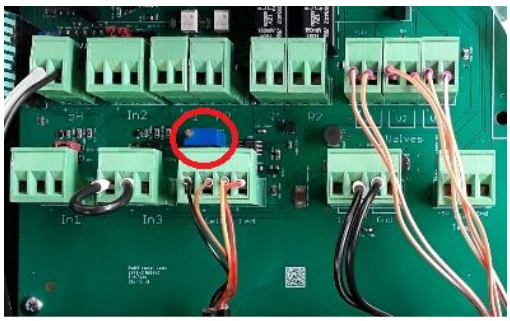
16.1.4.1 Cel adjustment
Select the option **[cel adjustment]** and the screen below will appear:



1. **[Cell value]** The value generated by a measurement of the receiver. This must be adjusted to 900 (between 850 and 950). If this value deviates, please contact your installer.
2. **[Rinse cell]** By selecting this option you can manually flush the measuring cell
3. **[LED current mA]** The amount of mA that is sent through the LED during a measurement. (only change on advice of the manufacturer, ex works 2000)
4. **[Auto adjust]** Automatic adjustment of the measuring cell, this function is not recommended! Advice to perform manual adjustment.

Cel adjustment (measuring cell zero value calibration)
When the zero measurement deviates greatly from the standard value (1000) it is important to check the cell for any contamination or defects. If after cleaning the measuring cell value is still not OK, or if the cell or parts have been replaced, it is necessary to re-adjust the measuring cell.
Adjusting the cell is done as follows:

1. Note that the zero value is less than 900 (with a clean cell)
2. Go to the menu **[cell adjustment].**
3. The display will show “Wait”, the cell will now be automatically rinsed a number of times and the cell will eventually remain full of water and the cell value will be displayed.
4. Adjust the cell to 900 with the potentiometer. (see image)
5. If the displayed value is between 850 and 950, the measurement can be confirmed by pressing (✓). If an adjustment between 850 and 950 is not possible, please contact your SPI dealer.



16.1.4.2 Cycle config

The **[Cycle config]** menu gives access to important parameters of the peroxide measuring cell. The SPI will now stop measuring. When leaving this menu the controller will immediately start a measurement.

```
Cycle timing
Press V to test
Supply valve    1.20→
Reagent valve   0.40↓
```

```
Draine valve    4.00
Rinse time      6.00→
Sample time      180
LED time          15↓
```

```
Rinse cycles       3
```

For each function, the time that the valve in question will open can be set and tested. By placing the cursor on the line, a setting can be adjusted. If only a test is performed, you can press (✓) directly.

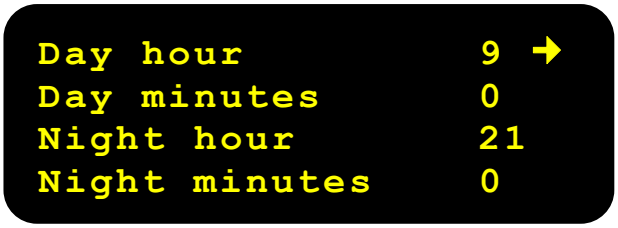
The following functions can be set or tested:

Parameter	Explanantion	Ex works
Supply valve	Time (sec.) that the measuring water valve opens to fill the cell	1.20
Reagent valve	Time (sec.) that the reagent valve opens.	0.40
Drain valve	Time (sec.) that the drain valve opens.	4.00
Rinse time	Time (sec.) that the measuring water valve opens to flush the cell.	6.00
Sample time	Interval time (sec.) at which the SPI starts a measurement. This is the waiting time and the measurement time (approx. 90 sec.) together. A low value means more frequent measurements, so also a higher reagent consumption. A high value is the opposite.	180
LED time	Time for the LED to burn.	15
Rinse cycles	Number of flushes before a new measurement starts.	3

The above parameters are already set ex works. Changing them is not recommended.

16.1.5 Night Setpoint

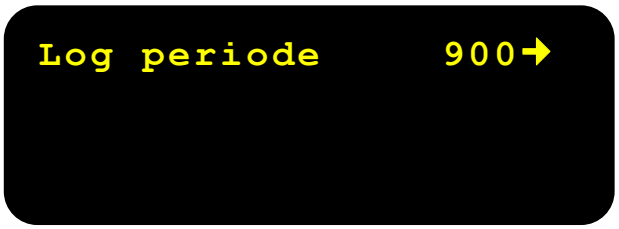
Select **[Night setpoint]** to be able to change the settings of the times for the night setpoint. The screen below will appear:

Parameter	Explanation	Ex works
Night setpoint	Off = night setpoint disabled On = night setpoint enabled	Off
Edit times	If night setpoint is set to Off this menu is not available If night setpoint is set to On the following screen will appear:  This menu sets when the day starts (pool is opened) and the night starts (pool is closed). With this setting, different setpoints and alarm values can be used during the day and at night. See *chapter 11.1 peroxide settings 11.2 pH settings for the setpoint and alarm* In the example above, the pool opens at 9:00 and closes at 21:00, then the 'day' settings apply.	

16.1.6 Log interval

Select option **[Log interval]** to adjust the time interval for data storage of the measurement data.

The screen below will appear:

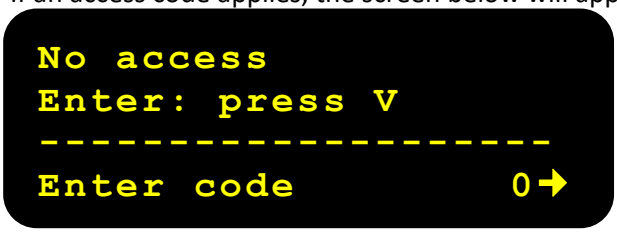


16.1.7 Restrict access

The SPI 170 is secured by default with one code that gives access to the configuration menu (installer). All other menus are accessible as a user. If this is not desirable, an access restriction can be set by activating a user code.
This imposes the following restrictions:

Menu	User	Dealer
Overview	Fully accessible	Fully accessible
Alarms	Fully accessible	Fully accessible
Calibration	Not accessible	Fully accessible
Manual operation	Fully accessible	Fully accessible
Reports	Fully accessible	Fully accessible
Maintenance	Fully accessible	Fully accessible
Settings	Accessible, read-only	Fully accessible
Configuration	Limited access - user settings accessible - system info accessible - reboot menu accessible - system setup. not accessible	Limited access - user settings accessible - system info accessible - reboot menu accessible - system setup. restricted access

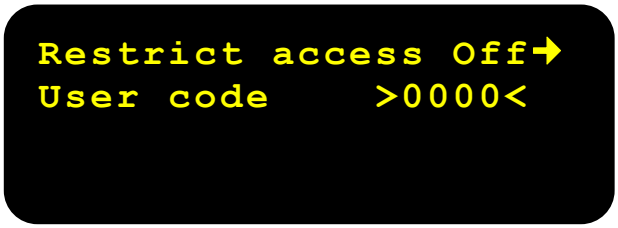
If an access code applies, the screen below will appear:



Entering the access code will give you access to the menu.

Select option **[Restrict access]** to set an access restriction (user code).

In the menu the limitation can be switched on and off (OFF/ON). Also a 4-digit code can be set.
Ex works the restriction is disabled and the code is set to '0000'.

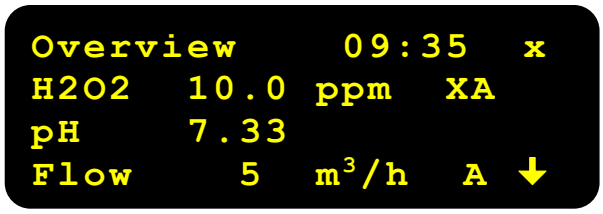
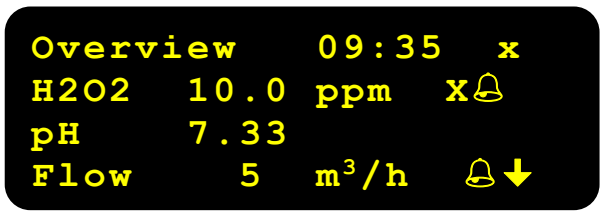


The dealer code is supplied to installers separately from the manual with the SPI 170.

16.2 User settings

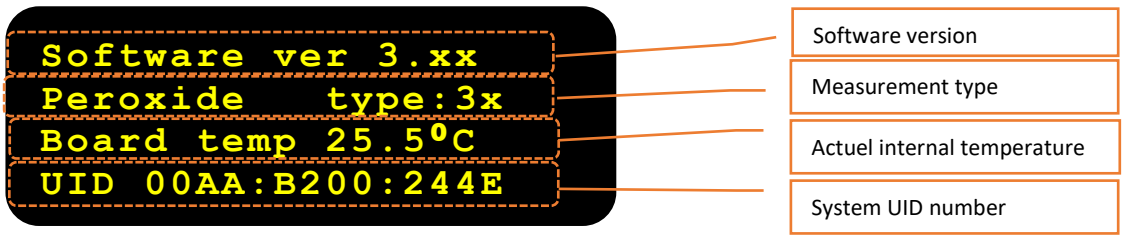
Select **[User settings]** to view or change them.

All settings in this menu can be adjusted by moving the cursor to the relevant setting and changing it with enter **(↵)** . The following settings are possible:

Setting	Explanation	Ex works
Language	There are 3 languages selectable, English (Eng), Dutch (Nl) and French (Fr). The selected language will be visible directly on the screen.	NL
Key beep	Beep (On/Off) when operating the keys on the front foil.	Off
Alarm beep	Alarm beep (On/Off) during an alarm.	On
BL timeout	Backlight (On/Off) for LCD screens. (not applicable for OLED screen)	On
Expert mode	By enabling or disabling this function, an extended display or a simple display of the alarms is possible. See below the different screen options: **EXPERT MODE ON:**  **EXPERT MODE OFF:**  For the meaning of the letters in Expert mode *see chapter 12.1 Alarm codes and characters*	Off

16.3 System info

Select the option **[System info]** to view the system info. The screen below will appear:



16.4 Options and expansion modules

The SPI can optionally be equipped with additional sensors and expansion modules.

- Analog module
- Modbus communication module
- Measuring water sensor
- Temperature sensor

16.4.1 Expansion modules

There are 2 different expansion modules available for the SPI 170:

- Analogue module (for BMS, salt electrolysis or other application)
- Modbus communication module (for communication with MODBUS Master devices, such as BMS, PLC or other systems and SPI Webmonitor via internet)

The SPI has 2 expansion slots and thus space for 2 expansion modules. It is not possible to place two identical modules. It is possible to place both an analog and a modbus communication module.

The procedure for placing the modules is as follows:

- Switch off the mains power;
- Gently press the module into the black connector, making sure all pins of the module fit into the connector on the mainboard;
- Place the white spacers in the expansion module and the corresponding holes of the mainboard;
- Connect the necessary wiring;
- Switch on the mains power;

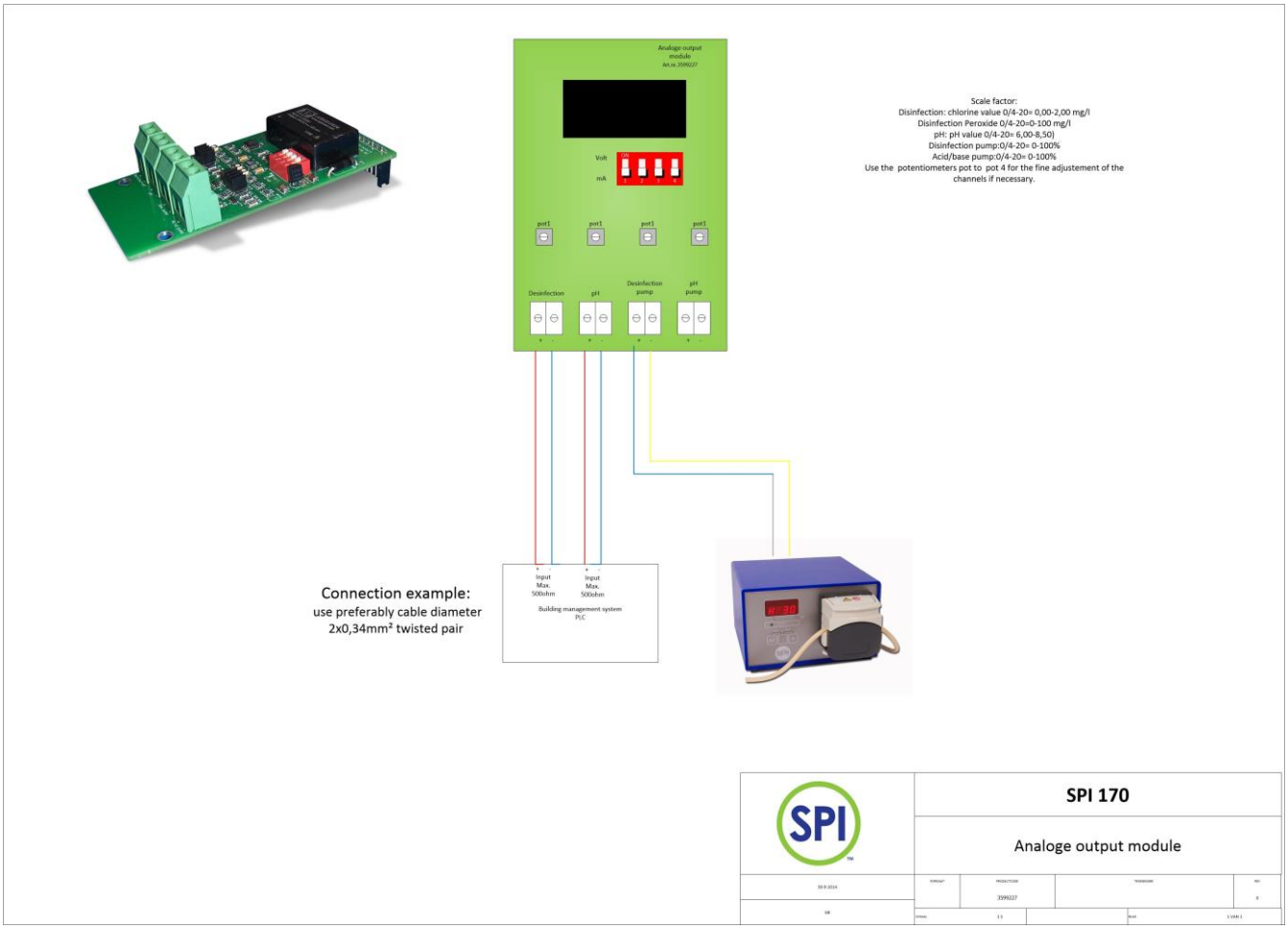
16.4.1.1. Analog module

The analog module contains 4 analog outputs 0/4-20mA or 0-10V.
2 Analog outputs for measured values (pH and peroxide)
2 Analog outputs for dosing pump control signal (pH correction and peroxide)

When connecting the analog outputs, pay attention to the maximum load of the signals:
Maximum load mA range (250 Ohm);
Maximum load 0-10V 10kohm;

Selection of the output signal is done via dip switches.
The analog module is placed in expansion slot 2 of the SPI 170. The module is automatically recognized. The menu is shown if the module is placed.

NOTE: When inserting the module, the SPI 170 power supply must be switched off!



For analog module settings, go to **[Configuration], [System setup]** the screen below will appear:

```
Peroxide              →
pH
Flow
Input config          ↓
```

```
Night setpoint
Log interval
mA module             →
Restrict access
```

A dealer code is required to access this menu!

Select **[mA module]** to view and/or change the settings of the analog module. The following screen will appear:

```
Outp. 1:  Dis input →
Outp. 2:  pH input
Outp. 3:  Dis pump
Outp. 4:  pH pump
```

Select the desired output and the following screen will appear:

```
mA module: Output 1
Type   :  Dis input →
0/4mA  :  0
min    :  0.00
```

```
Type   :  Dis input
0/4mA  :  0
min    :  0.00
max    :  100.0
```

Output	Parameter	Explanation	Af fabriek
1	**0/4**	Minimum output current 0 or 4 mA	4
	min	Lower limit of scaling at 0/4 mA	0.00
	max	Upper limit of scaling at 20 mA	100.0
2	**0/4**	Minimum output current 0 or 4 mA	4
	min	Lower limit of scaling at 0/4 mA	6.00
	max	Upper limit of scaling at 20 mA	8.50
3	**0/4**	Minimum output current 0 or 4 mA	4
	min	Lower limit of scaling at 0/4 mA	0
	max	Upper limit of scaling at 20 mA	100
4	**0/4**	Minimum output current 0 or 4 mA	4
	min	Lower limit of scaling at 0/4 mA	0
	max	Upper limit of scaling at 20 mA	100

Use the (▲) / (▼) keys to scroll through the different parameters.

A configuration adjustment for the mA module must be carried out by SEM Waterbehandeling BV. This must be specified in advance when ordering. If this must be done on location, there are costs involved.

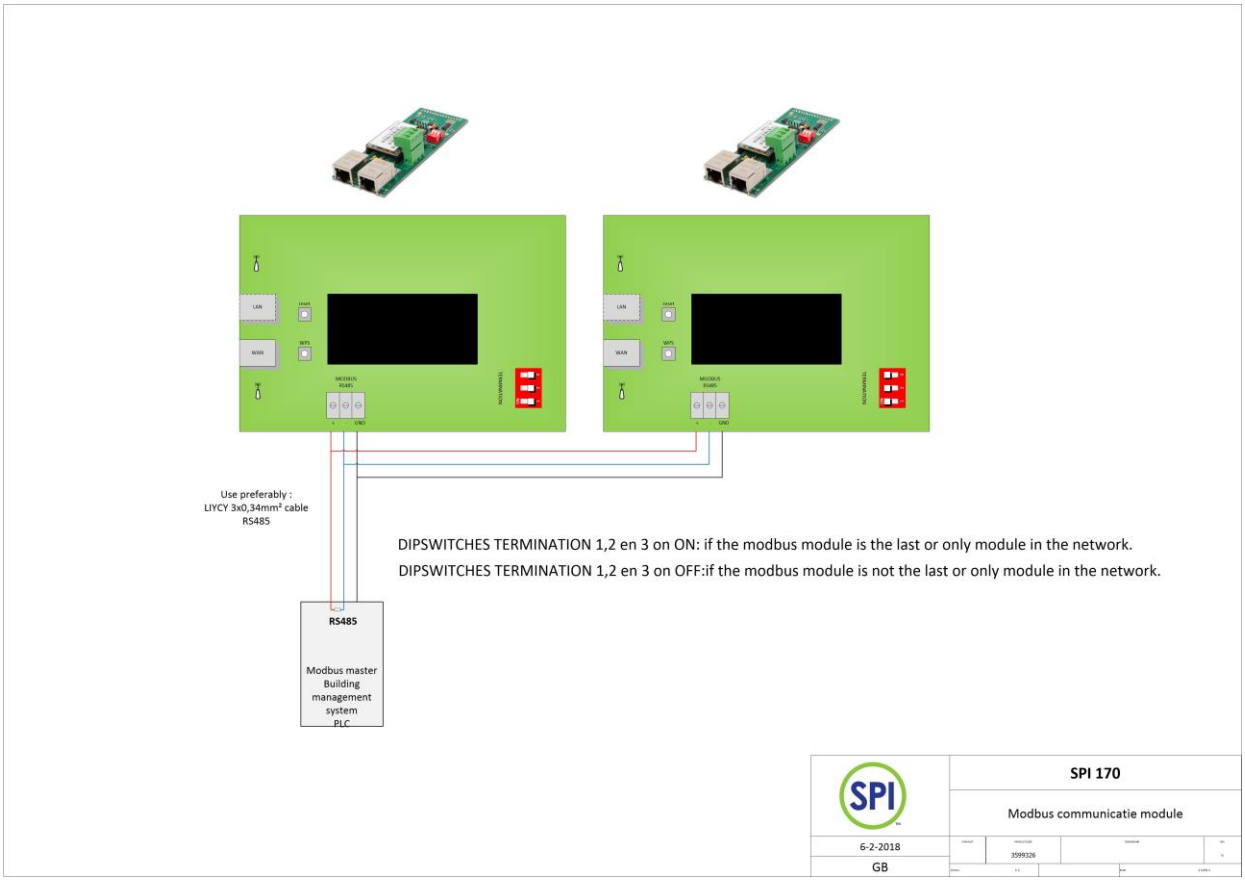
16.4.1.2. MODBUS communication module

The modbus module is connected according to the connection diagram below:

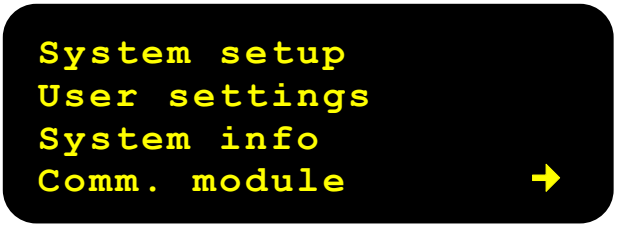
The SPI Modbus module manual, which is supplied with the module, contains all information about configuring and using the module.

The Modbus module is placed in expansion slot 1 of the SPI 170. The module is automatically recognized. The menu is displayed if the module is placed.

NOTE: When inserting the module, the SPI 170 power supply must be switched off!

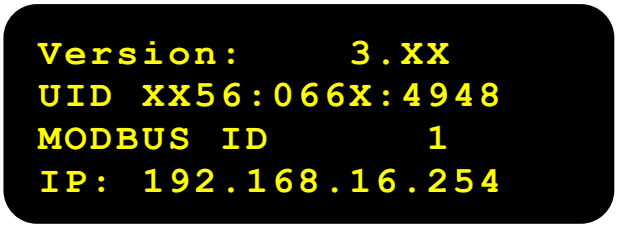


For Modbus module settings, go to **[Configuration]** the screen below will appear:



A dealer code is required to access this menu!

Select **[Comm module]** and the sreen below will appear:

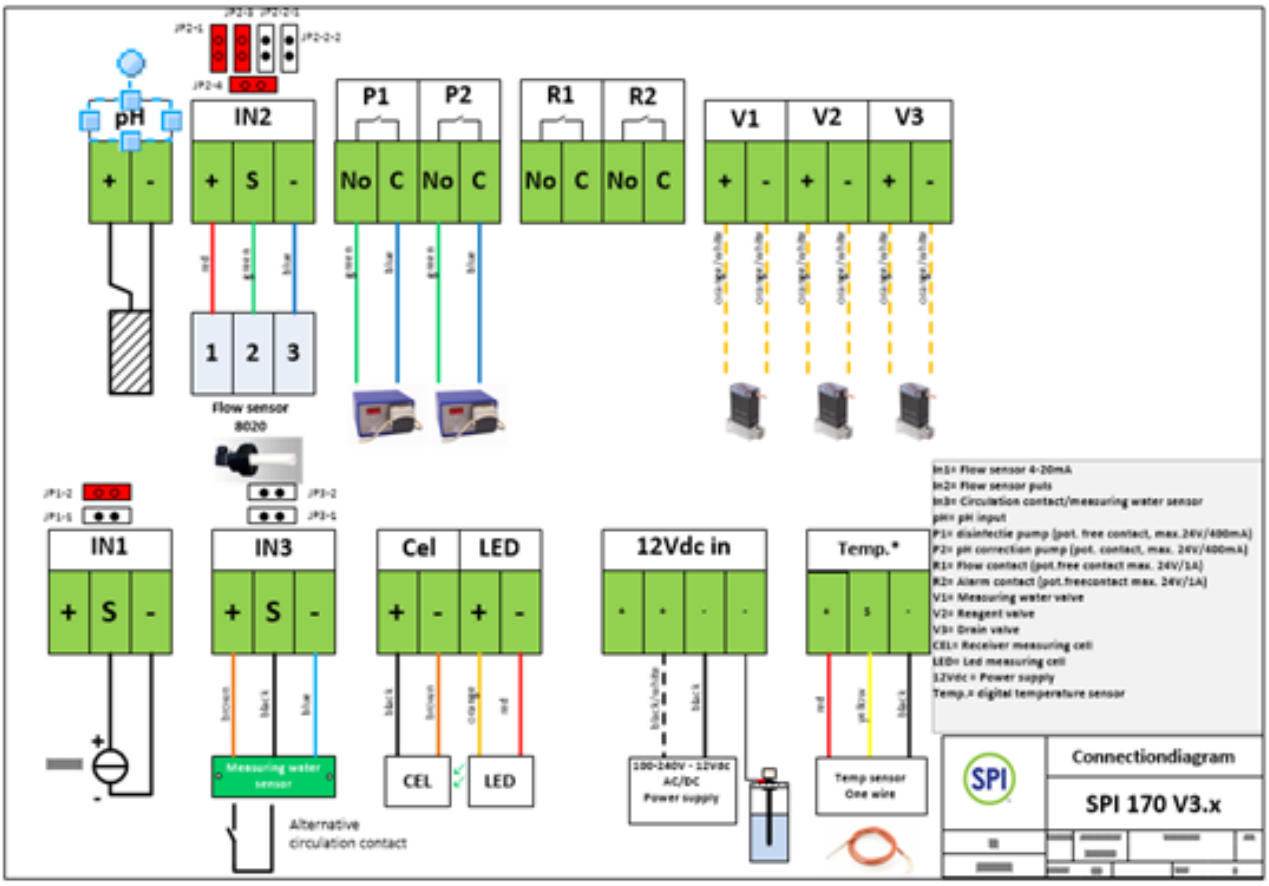


Item	Explanation	Ex works
Version	Modbus module version	-
UID	Unique ID number is shown here	-
MODBUS ID	Modbus ID of the module in combination with controller.	1
IP	If there is a network connection, the IP address will be shown here. If there is no connection, 'NO IP' will be shown here.	-

16.4.2 Optional measuring water sensor

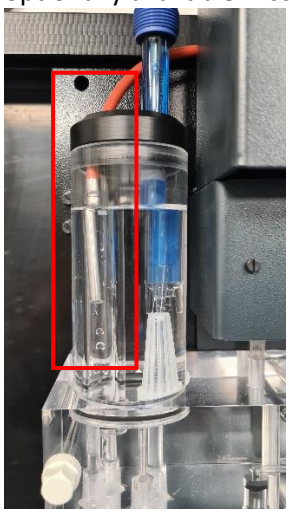
Optionally, a capacitive measuring water sensor is available that monitors the flow of the measuring water. If this is mounted on the panel (see image below), the yellow LED on the sensor will light up when there is sufficient flow.

The connection diagram below shows how the measuring water sensor is connected. Remove the factory-fitted wire bridge between + and S on the circulation input (IN3 is intended for this).



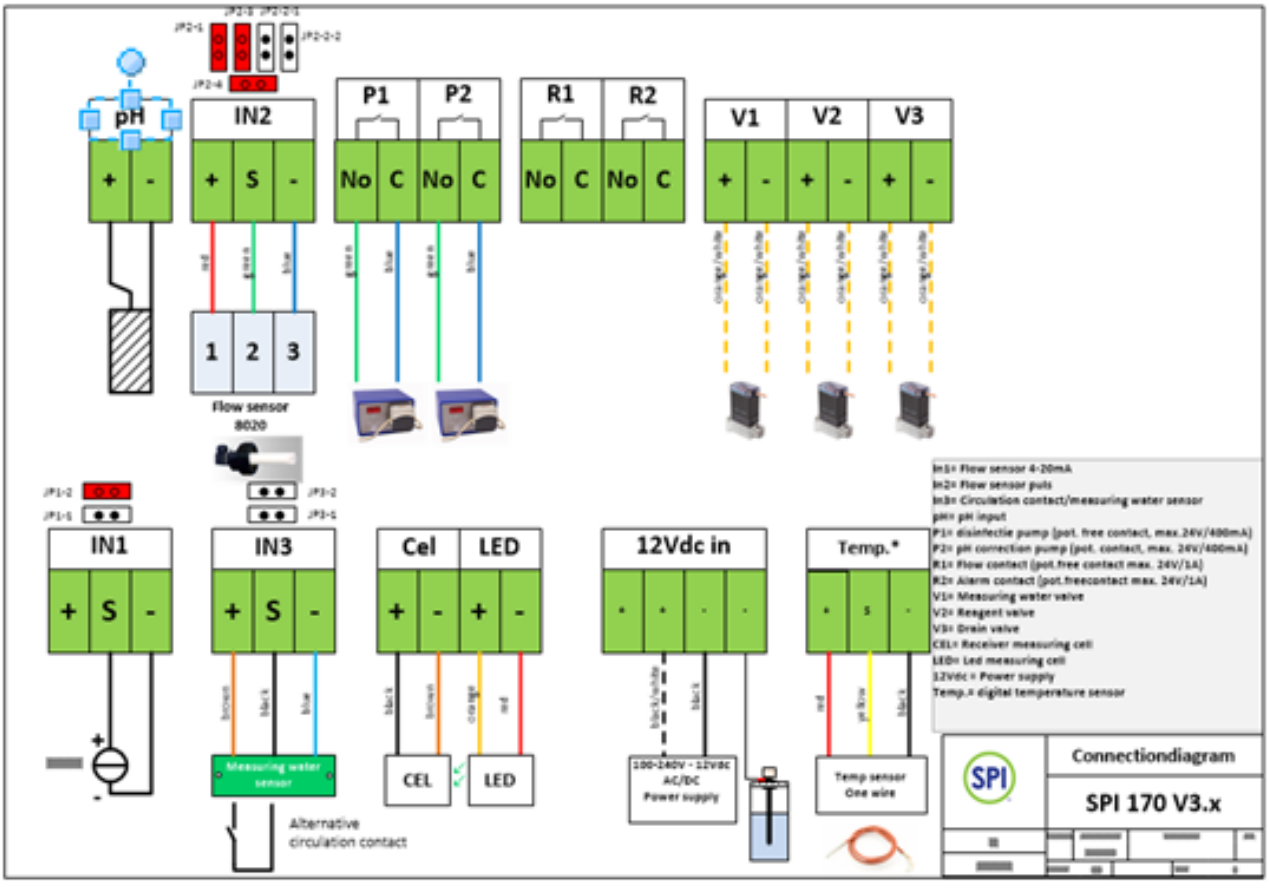
16.4.3 Temperature sensor

A temperature sensor that measures the temperature of the water in the measuring water pot is optionally available. According to the illustration below, the sensor can be installed :

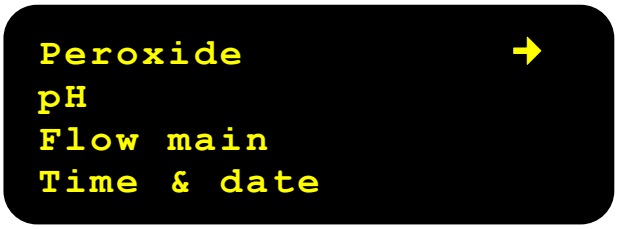


Procedure for electrically connecting the temperature sensor:Schakel de netspanning uit;

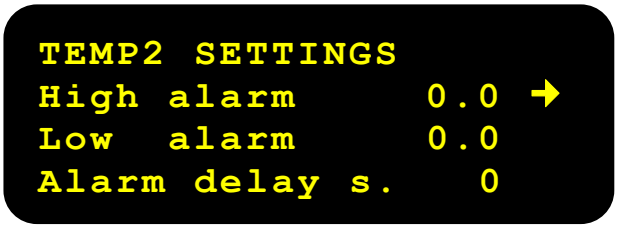
- Switch off the mains voltage;
- The temperature sensor (one wire) is connected according to the wiring diagram below;
- Switch on the mains voltage.



Select the menu **[Settings]**. The **[Temp 2]** menu is displayed if the temperature sensor is inserted.



Select **[Temp 2]** to view and/or change the temperature input settings. The following screen appears:



The following parameters can be set :

Parameter	Explanation	Ex works
High alarm	Limit for High alarm temperature value	0.0
Low alarm	Limit for Low alarm temperature value	0.0
Alarm delay sec.	Delay time in seconds. An (pre-)alarm becomes an active alarm after the alarm delay time has elapsed. This prevents short over- or under-running of an alarm value from immediately leading to an active alarm.	0

Use the (▲) / (▼) keys to scroll through the various parameters.

NOTE: If the [TEMP 2] menu is not visible, the SPI 170 should be de-energised. When power is switched on, this sensor will be automatically detected.

17. Decommissioning, transport and storage

17.1 Decommissioning

If you'd like to decommission the SPI-P170 for (longer) periods, follow the below procedure:

1. Remove the reagent supply bottle from the reagent holder.
2. Empty both the bottle and the reservoir.
3. Empty the measuring water pot using the drain valve and remove the dirt trap to allow all the water to drain out of the panel.
4. Remove the pH electrode and store it carefully (remember the protective cap with KCl solution or water).
5. Flush the valves with clean water or when possible with demineralised water. Do this by filling the measuring water jar with this. In particular, the reagent valve should be cleaned thoroughly. This is because the reagent will crystallise as it dries. Do this by filling the reagent reservoir with clean (demineralised) water. Now control the valves a few times. *See chapter 15.2.4. Manual cell operation.*
6. Thoroughly rinse the analysis unit with clean water or demi water and dry it.
7. Clean all hoses with clean water and dry.
8. Before unscrewing the SPI from the wall, all water-carrying parts should be dry.
9. Remove the adapter from the electricity so that SPI no longer has voltage.
10. Dismantle all input cables in the control unit.
11. Dismantle the attached hoses.
12. Unscrew the SPI panel from the wall.

17.2 Transport

- After disassembly, the SPI can be placed in a box with the front of the plate facing up.
- Protect the corners of the mounting plate well against impacts.
- Cover the upward facing parts with padding or bubble wrap.
- Seal the box with tape.
- Make sure the box remains undamaged.

17.3 Storage

During storage of the SPI unit, the space must comply with:

- Moisture free area
- Frost-free area
- Space free of aggressive vapours.
- Room temperature between 5°C - 40°C

17.4 Disposal

The SPI-P170 contains electronic components. Inform to the possibilities to seperate and recycle these components during discarding.

Remove possible chemical remains like Peroxide or the corresponding reagents colour and discard these as chemical waste.

When in doubt, contact your supplier. They are able to serve you with advise.

18. Spare parts

18.1 Spare parts

Part	Description	number
9920500	Torx bit for mounting set SPI-170	1,000
9903590	Washer M6x25mm stainless steel	4,000
9601003	SEM Buffer solution pH 4, 50ml	1,000
9601001	SEM Buffer solution pH 7, 50 ml	1,000
8916001	pH elektrode Hamilton Polyplast, PG13,5 (with cable connector)	1,000
8556110	Box SPI 170 500x500x150 (amperometric + photometric)	1,000
8006008	Delta plug 8 mm	4,000
7106092	Galvanized stud M6x60	4,000
3816440	pH cable for SPI 170 (without plug) 1,0m	1,000
3606525	Reagent bottle 250ml round	1,000
3599314	Plug red 14mm for SPI-170	3,000
3599313	Plug red 8,5mm for SPI-170	3,000
3599274	SPI 170 SPI 170 parker 3,5x10mm	4,000
3599268	Cap with silicone hose for SPI	1,000
3599264	Collar for connecting supply with water	2,000
3599263	Sample water supply connection 4mm	2,000
3599262	SPI 170 Luer connection blue faucet and check valve	2,000
3599261	SPI 170 afdop plug measuring cell	1,000
3599260	SPI170 connection de tube 4mm x 1/8"-27 NPT (for SPI-117 valve)	4,000
3599253	O-ring 170 PVC valve connection for SPI	3,000
3599237	SPI-170 Cap nut M6	4,000
3599294	SPI 170 connection europe power supply 12 VDC (2018)	1,000
3599292	SPI 170 power supply 12 VDC (2018)	1,000
3599210	SPI 170 Check valve	1,000
3599208	SPI-170 valve connection	3,000
3599127	Selonoid valve SPI 127 12Vdc (inlet+outlet)	3,000
3599032	SPI 170 measuring filter conical	1,000
3599026	SPI 170 hose clamp (3-10mm)	1,000
3599024	SPI 170 connection return bufferjar	1,000
3599019	SPI 170 faucet for water/reagent measuring unit	1,000
3599016	SPI 170 knee for hose 4mm	1,000
3599014	SPI 170 silicone tubing 12x8mm	1,000
3599013	Silicone tubing 7x4 mm	1,000
3540181	SPI-170 Controller	1,000
3540180	SPI 170 measuring cell Peroxide (measuring block with LED and photodiode)	1,000
3540177	SPI-170 Measuring water panel complete (Fotometric)	1,000
3530305	Reagent bottle 100ml round	1,000
3530316	Peroxidecolor 1000 ml for SPI-P170	1,000
1910914	Inox nut M6	4,000

18.2 Accessoiries

Image	Article	Description	
	3119010	Flow sensor 8020	1,000
	3540166	SEM SPI 170 sample water return pump(plactic)	1,000
	3540167	SEM SPI 170 sample water return pump(metal)	1,000
	3599520	SEM SPI 170 measuring water sensor (flow protection) capacitive	1,000
	3599518	SEM SPI 170 Temperature sensor 3 wire with 2m cable	1,000
	3599519	SPI-170 DPD/peroxidecolor sensor (leveldetection) capacitive	1,000
	3599299	SPI 170 Replacement Kit (Photometric)	1,000
	3599326	SPI 170 MODBUS module	1,000
	3599227	SPI 170 Analog module	1,000
	2513031	Measuring pump set with prefitler and connection kit	1,000

Annex A : Menu structure

Main menu

```
Overview
Alarms
Calibration
Manual operation
Reports
Maintanance
Settings
Configuration
```

Overview

```
Overview  10:28  X
H2O2  0.00  ppm    A
pH    7.00          A
Flow     0 m³/h 234% ↓
```

```
H2O2 pump      100%↑
pH pump        100%
Flow:           OK
                  ↓
```

```
H2O2
 ppm    60.0   pump
0.00->  40.0  ->100%
*rinse  20.0   100p
```

```
pH
        7.60    pump
7.33-> 7.30 -> 100%
        7.00    100p
```

```
Flow
   0m³/h          0%
Alarm            60%
Dose stop  50%
```

```
Ethernet:  Idle
Modbus:    Idle
```

```
H2O2 P: 0 %  ->  100%
     I: 0 %
pH   P: 0 %  ->  100%
     I: 0 %
```

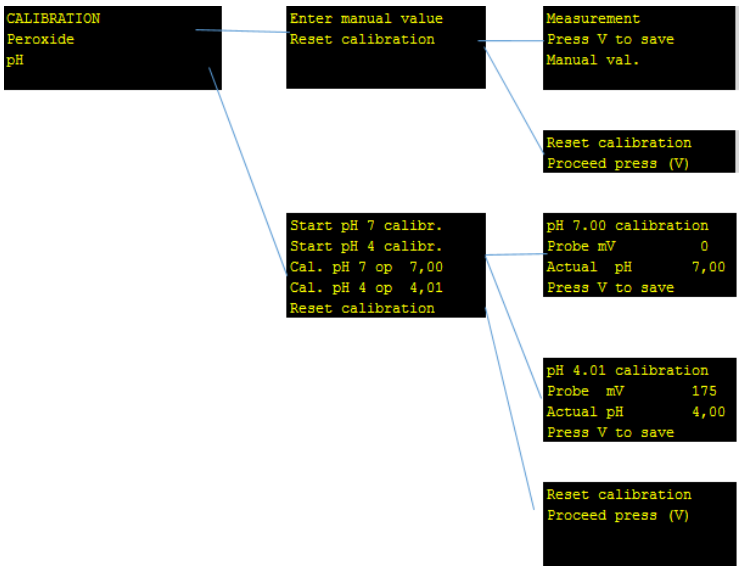
```
VAC    0.00 mg/l
Temp 1  26.0 °C
Temp 2  26.0 °C
```

```
Dis. Low              ↑
Dis. crit
low flow
Dose stop
Circ failure
```

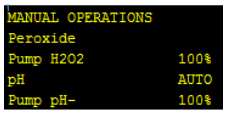
Alarms

```
Alarms      V=> Ack
Dis. Low
    0.00
```

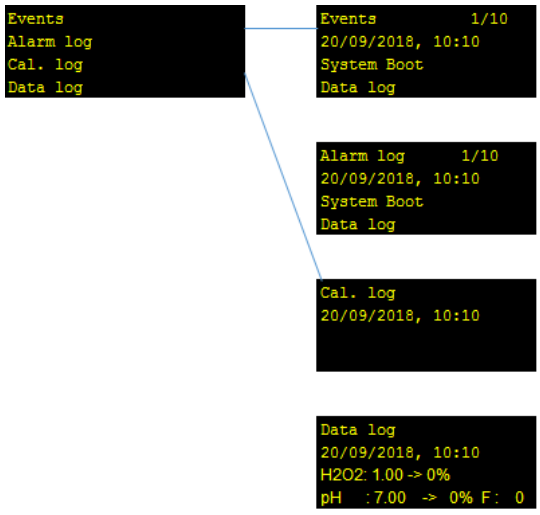
Calibration



Manual operations



Reports



Maintenance

```
Sys disable        Off
Cell maintenance
Reboot
```

```
Refill reagent
Cell values
Show cycle
Fill cell
Empty cell
Inject reagent
```

```
Prepairing cell
------------------
Wait:
```

```
Put your finger on
top of tube.
Press (V).
```

```
Cell null        1000
Cell active      1000
Cell ctrl        1000
```

```
Cycle progress
Press V to restart
Step 19: Wait
T:    31
```

Settings

```
Peroxide
pH
Flow
Time & Date
Temp1
Temp2
```

```
H2O2 SETTINGS:
Setpoint
Prop. & Int. Factor
Pump output
```

```
Settings day
Target Value      30.0
Hi alarm          60.0
Lo alarm          20.0
Critical alarm     5.0
Alarm delay s.    1200
```

```
Settings day
Target Value      30.0
Hi alarm          60.0
Lo alarm          20.0
Critical alarm     5.0
Alarm delay s.    1200
```

```
P factor          1.00
I factor          0.00
I time             600
```

```
pump Timeout      7200
pump Min %           0
pump max %         100
```

```
PH SETTINGS:
Setpoint
Prop. & Int. Factor
Pump output
```

```
settings day
Target Value      7.30
Hi alarm          7,60
Lo alarm          7.00
Critical alerm    6,80
Alarm delay s.    1200
```

```
settings night
Target Value      7.30
Hi alarm          7,60
Lo alarm          7.00
Critical alerm    6,80
Alarm delay s.    1200
```

```
P factor          1.00
I factor          0.00
I time             600
```

```
Pump Timeout      7200
Pump Min %           0
Pump Max %         100
```

```
FLOW MAIN
Alarm       %     60
Alarm delay s    300
Dose stop   %     50
Dose stop delay s  1
```

```
Input 1 settings
Pipe size [mm]    50
m3/h at 100%      10
```

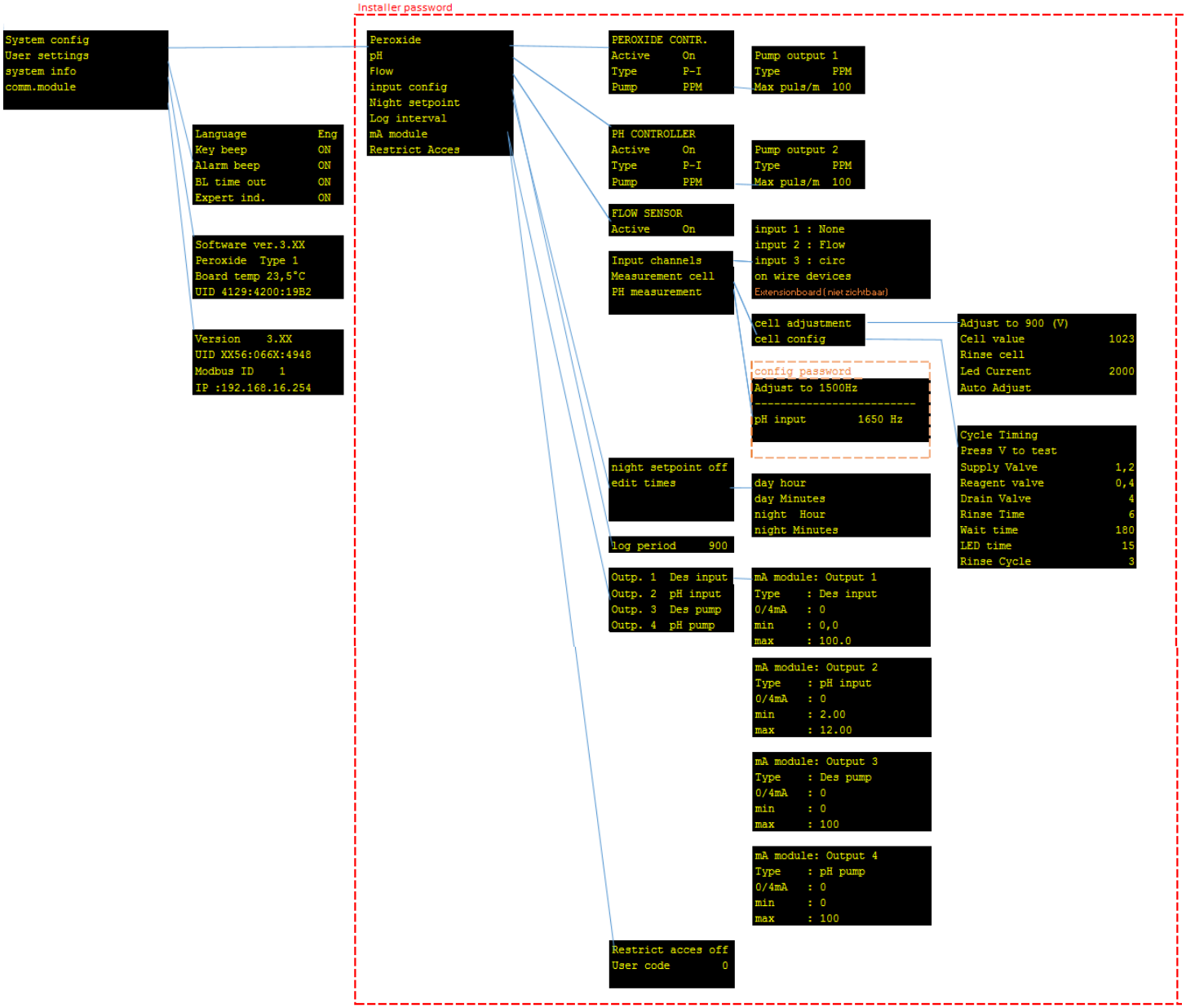
```
Input 2 settings
m3/h at 20mA      50
m3/h at 100%      10
```

```
TIME & DATE
Minutes
Hour
Day
Month
Year
```

```
TEMP1 SETTINGS
Hi Alarm          0.0
Lo Alarm          0.0
Critical alarm      0
```

```
TEMP2 SETTINGS
Hi Alarm          0.0
Lo Alarm          0.0
Critical alarm      0
```

Configuration



Annex B: Parameter list

		Factory	MIN	MAX	Settings customer
Calibration/Peroxide	Manuel value	>10.0<	1.0	99.9	
Calibration/pH	Cal pH 7 at 7,00	7.00	6,5	7,49	
Calibration/pH	Cal pH 4 at 4,01	4.01	3,5	4,49	
Manual operation	Pump H2O2	50%	0	100	
Manual operation	Pump pH-	100%	0	100	
Settings/Peroxide/Setpoint	Target value	30.0	0.00	199.9	
Settings/Peroxide/Setpoint	Hi alarm	60.0	0.00	199.9	
Settings/Peroxide/Setpoint	Lo alarm	20.0	0.00	199.9	
Settings/Peroxide/Setpoint	Critical alarm	0.0	0.00	199.9	
Settings/Peroxide/Setpoint	Alarm delay s.	1200	0	7200	
Settings/Peroxide/Prop. & Int. Factor	P factor	1,00	0.01	9.99	
Settings/Peroxide/Prop. & Int. Factor	I factor	0,00	0	99	
Settings/Peroxide/Prop. & Int. Factor	I time	600	0	1999	
Settings/Peroxide/Pump output	Pump Timout	7200	10	7200	
Settings/Peroxide/Pump output	Pump Min %	0	0	99	
Settings/Peroxide/Pump output	Pump max %	100	1	100	
Settings/pH/Setpoint	Target value	7,30	0.00	199.9	
Settings/pH/Setpoint	Hi alarm	7,60	0.00	199.9	
Settings/pH/Setpoint	Lo alarm	7,00	0.00	199.9	
Settings/pH/Setpoint	Critical alarm	6,80	0.00	199.9	
Settings/pH/Setpoint	Alarm delay s.	1200	0	7200	
Settings/pH/Prop. & Int. Factor	P factor	1,00	0.01	9.99	
Settings/pH/Prop. & Int. Factor	I factor	0,00	0	99	
Settings/pH/Prop. & Int. Factor	I time	600	0	1999	
Settings/pH/Pump output	Pump Timout	7200	10	7200	
Settings/pH/Pump output	Pump Min %	0	0	99	
Settings/pH/Pump output	Pump max %	100	1	100	
Settings/Flow Main	Alarm %	60	0	100	
Settings/Flow Main	Alarm delay s	300	0	7200	
Settings/Flow Main	Dose stop %	50	0	100	
Settings/Flow Main	Dos stop delay	1	0	7200	
	Input 1 instelling				
Settings/Flow Main	Pipesize [mm]	50	0	315	
Settings/Flow Main	m3/h at 100%	10	0	999	
	Input 2 instelling				
Settings/Flow Main	m3/h at 20mA	50	0	999	
Settings/Flow Main	m3/h at 100%	10	0	999	
Settings/Time & date	Minutes		0	59	
Settings/Time & date	Hour		0	23	
Settings/Time & date	Day		0	31	
Settings/Time & date	Month		1	12	
Settings/Time & date	Year		2000	2999	

		Fabriek	MIN	MAX	Klantinstelling
Settings/Temp 1	Hi alarm	0.0	0	50	
Settings/Temp 1	Lo alarm	0.0	0	50	
Settings/Temp 1	Alarm delay s	0	0	50	
Settings/Temp 2	Hi alarm	0.0	0	50	
Settings/Temp 2	Lo alarm	0.0	0	50	
Settings/Temp 2	Alarm delay s	0	0	50	
Configuration/System setup/Peroxide/ Pump config	Max puls/m	100	0	249	
Configuration/System setup/pH/ Pump config	Max puls/m	100	0	249	
Configuration/System setup/mA module/Outp. 1 Dis input	0/4mA :	4	0	4	
Configuration/System setup/mA module/Outp. 1 Dis input	min :	0.00	0.00	100.0	
Configuration/System setup/mA module/Outp. 1 Dis input	max :	100.1	0.00	100.1	
Configuration/System setup/mA module/Outp. 2: pH input	0/4mA :	4	0	4	
Configuration/System setup/mA module/Outp. 2: pH input	min :	2.00	2.00	12.00	
Configuration/System setup/mA module/Outp. 2: pH input	max :	12.00	2.00	12.00	
Configuration/System setup/mA module/Outp. 3: Dis pump	0/4mA :	4	0	4	
Configuration/System setup/mA module/Outp. 3: Dis pump	min :	0	0	100	
Configuration/System setup/mA module/Outp. 3: Dis pump	max :	100	0	100	
Configuration/System setup/mA module/Outp. 4: pH pump	0/4mA :	4	0	4	
Configuration/System setup/mA module/Outp. 4: pH pump	min :	0	0	100	
Configuration/System setup/mA module/Outp. 4: pH pump	max :	100	0	100	
Configuration/System setup/Night setpoint/Edit times	Day hour		0	23	
Configuration/System setup/Night setpoint/Edit times	Day minutes		0	59	
Configuration/System setup/Night setpoint/Edit times	Night hour		0	23	
Configuration/System setup/Night setpoint/Edit times	Night minutes		0	59	
Configuration/System setup/Input config/Meaurement cell/Cycle config	Supply valve	1.20	0.00	9.99	
Configuration/System setup/Input config/Meaurement cell/Cycle config	Reagent valve	0.40	0.00	9.99	
Configuration/System setup/Input config/Meaurement cell/Cycle config	Drain valve	4.00	0.01	9.99	
Configuration/System setup/Input config/Meaurement cell/Cycle config	Reagent valve	6.00	0.02	9.99	
Configuration/System setup/Input config/Meaurement cell/Cycle config	Rinse time	180	0.03	9.99	
Configuration/System setup/Input config/Meaurement cell/Cycle config	Led time	15	0.04	9.99	
Configuration/System setup/Input config/Meaurement cell/Cycle config	Rinse cycles	3	0.05	9.99	

Notes

SPI Europa
SEM Waterbehandeling B.V.
www.semwaterbehandeling.nl
info@semwaterbehandeling.nl

SPI Canada en Noord Amerika
Sanecotec
www.sanecotec..com
sales@sanecotec.com