EFS

MEASUREMENT PROBE

UV-Probe 254+

User manual

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CONTENTS

Chapter 1
INTRODUCTION

1. INTRODUCTION

The **UV-Probe 254+** is a multi-parameter online measurement probe for continuous and independent quality control of water and effluent. It measures the SAC 254 and the SAC 560 directly. It also provides an estimation of the **TOC** or **COD** or **BOD** and the **suspended solids** through correlation of the SAC measurements and laboratory measurements.

1.1. PARAMETERS ANALYZED

- **TOC (mgC/L): Total Organic Carbon**
  Total quantity of organic carbon by chemical means.
- **COD (mgO2/L): Chemical Oxygen Demand**
  Total quantity of oxygen consumed by chemical means.
- **BOD (mgO2/L): Biochemical Oxygen Demand**
  Total quantity of oxygen consumed by chemical means.
- **Suspended Solids: (mg/L)**
  Mass of non-soluble particles found in the water with a dimension of between 1 and 100 μm.
- **SAC 254 (UA/m): Spectral Absorption Coefficient**
  Optical absorption of the effluent at a wavelength of 254 nm.
- **SAC 560 (UA/m): Spectral Absorption Coefficient**
  Optical absorption of the effluent at a wavelength of 560 nm.
- **COLOR (mgPt/l :** color measured at 560 nm.

1.2. APPLICATION FIELDS

• Natural water
• Used water
• Industrial effluent

1.3. MEASUREMENT PRINCIPLE

The sample to be analyzed undergoes to separate radiations. The first is emitted in the ultra-violet range at a precise wavelength of 254 nm, the second is generated in the visible range of the electromagnetic spectrum at a wavelength of 560nm. Depending on its chemical composition, the sample will absorb different degrees of radiation at these two wavelengths. The quantity of light absorbed in the UV at 254 nm is termed the SAC 254 and the proportion of light absorbed at 560 nm is termed the SAC 560.

Beer-Lambert's law defines the relation between the measured absorption (SAC) and the sample concentration. The calibration is calculated automatically by the device which determines line of regression between the SAC and the values obtained in a laboratory setting for the different samples.
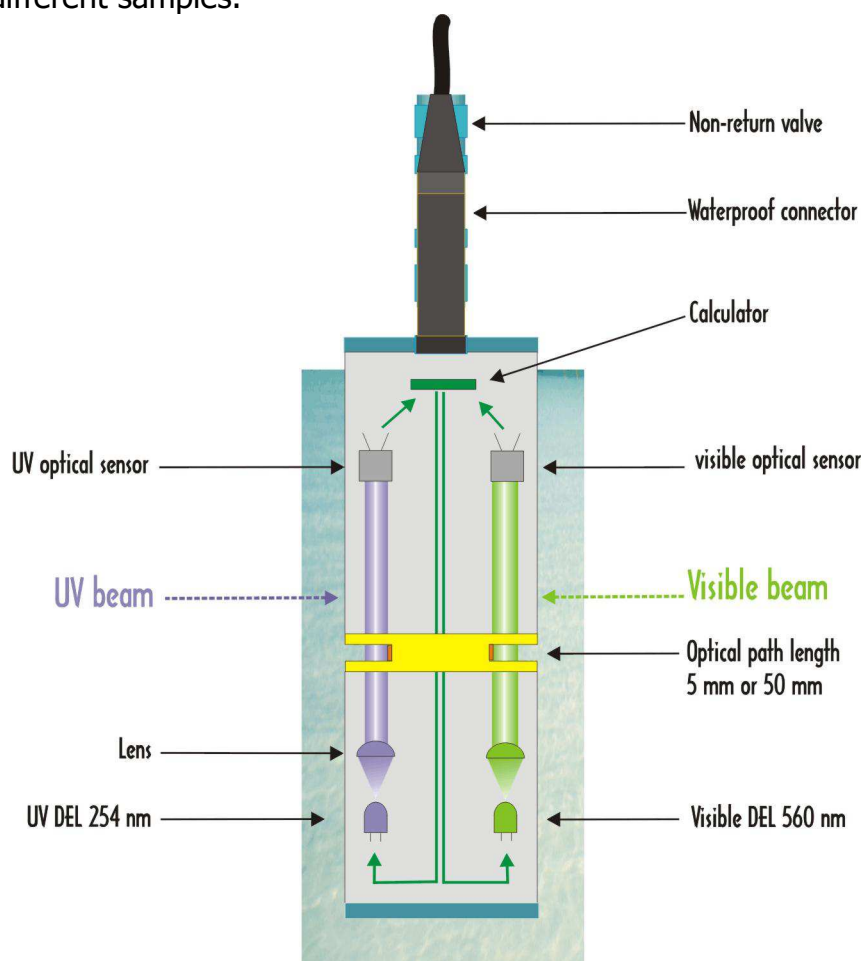
1.4. EQUIPMENT DESCRIPTION

The **UV-Probe 254+** system is made up of a measurement probe, a transmitter and an optional module for compressed air cleaning (E8492 - **UV-Probe 254+ Cleaning Box**).

1.4.1. The transmitter

This is an IP65 electronic box with dimensions of 130 x 130 x 100mm. It collects the digital signals coming from the probe and processes them in order to determine the SAC and the concentrations in COD and Suspended Solids.

The transmitter includes a "datalogger" function allowing several years' worth of data to be stored at the maximum measuring frequency. This data can easily be transferred to a USB flash drive.

The front panel of the transmitter features the following elements:

- a 132x64 rear-lit **LCD display** providing optimal visibility and displaying the results in large easy-to-read characters.
- two **alarm** lights that show red when an alarm threshold set up by the user is exceeded.
- a **tactile 8-key keypad** for setting up the parameters.

The **lower part** features 4 cable inputs equipped with cable glands for the following connections:

- the power supply (110V-220V)
- the measurement probe
- the optocoupled inputs and the relay outputs
- the 4-20mA current outputs
- the E8492 cleaning module

On the side, a hermetic USB port allows the user to retrieve the data recorded by the device quickly and easily using a USB flash drive.

1.4.2. The probe
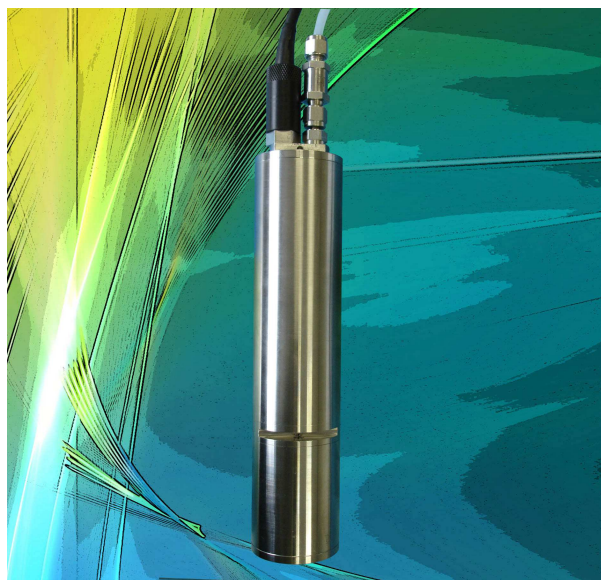
This is a 316L stainless steel tube that is 25 cm long and 55 mm wide.

The lower part has two grooves in which the liquid to be analyzed will circulate. On the upper part there is an electric cable for connection to the transmitter and also a non-return valve. The valve serves as a connector for the E8492 compressed air cleaning module.

The optical measurements are carried out directly inside the probe by a microprocessor system. The optical signals are immediately converted into digital values and are relayed to the transmitter.

1.4.3. <u>The cleaning module</u>

Compressed air cleaning system is optional but recommended in order to keep the measurement optics clean the longest and minimize the maintenance frequency. The compressed air cleaning module offers two versions: E8492-P and E8492-E.
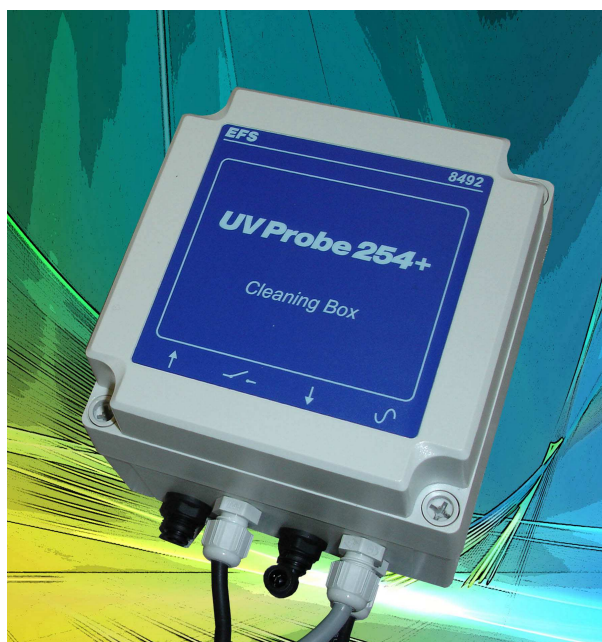
- **E8492-P**: this module features an independent compressed air generator system driven by the transmitter. This system is dedicated for installations without a compressed air network close by. Yet, the pressure of the generated compressed air cannot exceed 1.2 bar what limits the immersion depth of the probe to a maximum of 10 meters.
  <u>Maximal pressure</u>
  - Input: forbidden, must stay at atmospheric pressure.
  - Output: maximum pressure generated by the module: 1.2 bar.

- **E8492-E**: This model features a normally closed electrovalve driven by the transmitter during the cleaning periods/times. The module air input is directly connected to the local compressed air network and at the output of the non-return valve on the probe.
  <u>Maximal pressure</u>
  - Input: 5 bar max
  - Output: 5 bar maxi

⚠️ If you do not use the cleaning module E8492 (P or E), the maximum allowed pressure on the probe compressed air connection is 5 bar.

Chapter 2
INSTALLATION

2. **INSTALLATION**


List of material provided:

- an E8489 stainless steel probe complete with 10 metres of cable
- an E8490 transmitter
- an E8492 cleaning module (optional)
- 10 metres of plastic tubing for the compressed air (optional)
- the cabling connections
  - 3 x 2-pin female screw terminals,
  - 5 x 3-pin female screw terminals,
  - 1 x 4-pin female screw terminal
- a cleaning brush
- a USB flash drive
- a user manual

2.1. INSTALLATION SYNOPTIC
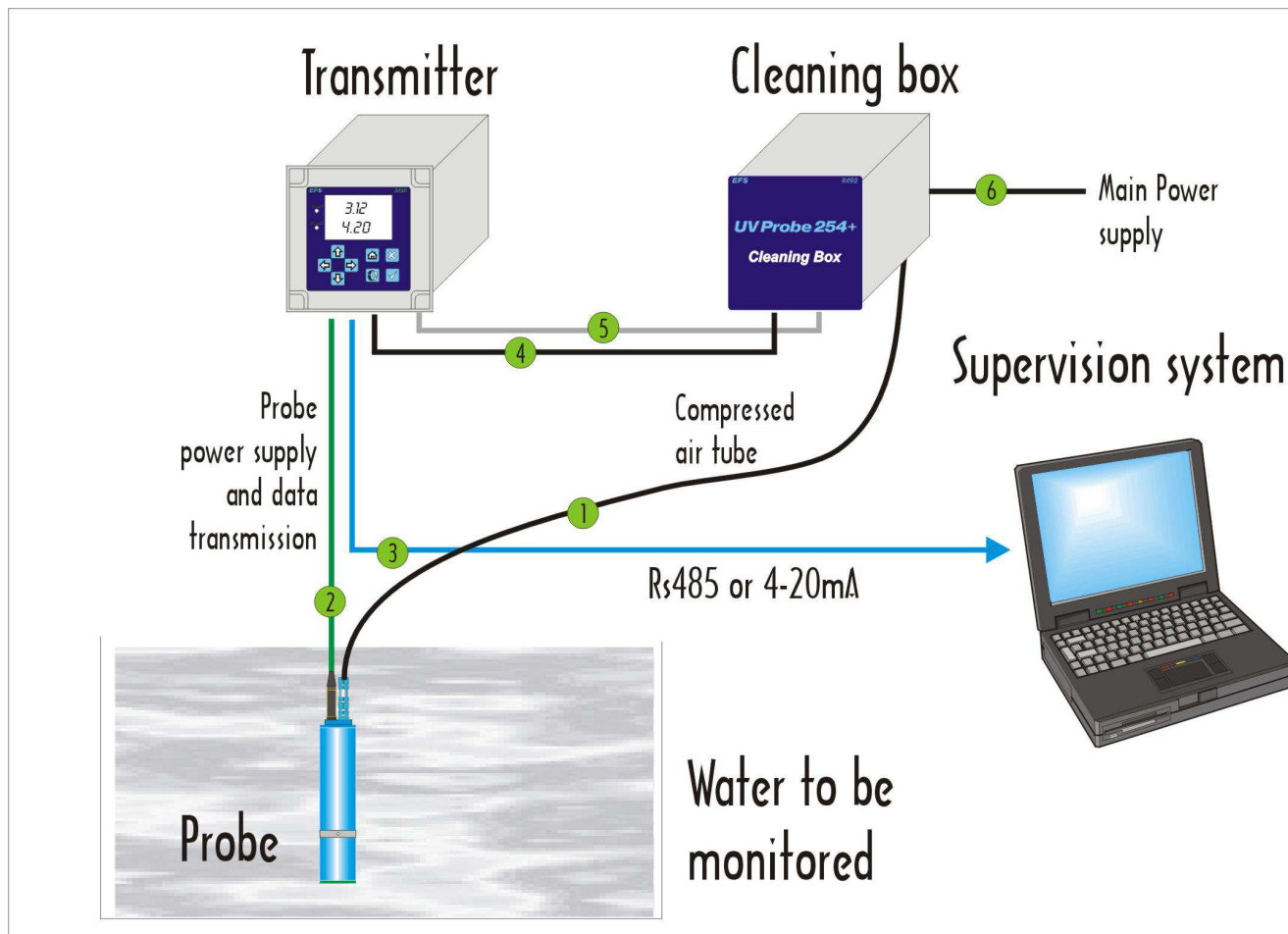
1	Compressed air tube	∅ ext. 6 mm ∅ int. 4 mm	Type : Legris Ref : 8492-P01-V1	length : 10 m
2	Transmitter to probe link	∅ ext. 8 mm max	Ref: E8489-C01-V2	length : 10 m
3	Communication link	RS485 link	Customer equipment	
4	Cleaning box command link	∅ ext. 7,8 mm max 2x 1.5²	Ref: E8492-C01-V1	length : 400 mm
5	Main power cable to connect E8490	∅ ext. 7,8 mm max 3G 1.5²	Ref: E8492-C02-V1	length : 400 mm
6	Main power cable	∅ ext. 7,8 mm max	Customer equipment	

2.2. ASSEMBLING THE TRANSMITTER
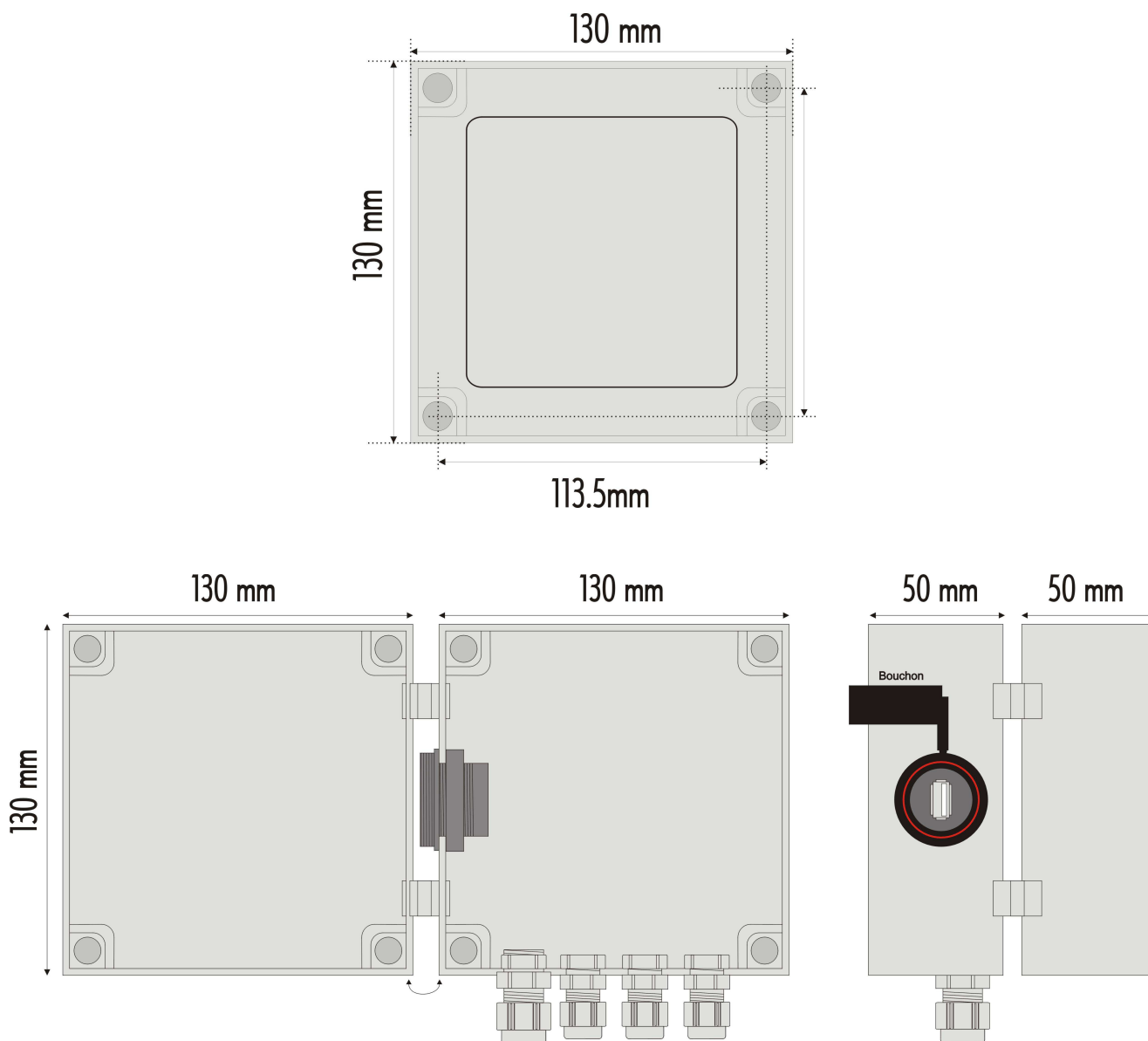
2.3. POWER SUPPLY CONNECTION

⚠️ If both transmitter and cleaning box are used, main power should be connected first to the cleaning box. Then a second electrical cable must link the Cleaning box supply to the transmitter supply connector.

2.4. POSITIONING THE PROBE

⚠️ **IMPORTANT**

The probe carries out optical measurements so **it is important to protect the measurement head from direct light**. Sunlight or lamplight close to the measurement orifices may have an impact on the results.

When the cleaning module is used, it is recommended that the probe be inclined at least 30° degrees from its vertical position to prevent air bubbles from becoming trapped in the measurement grooves.

30°
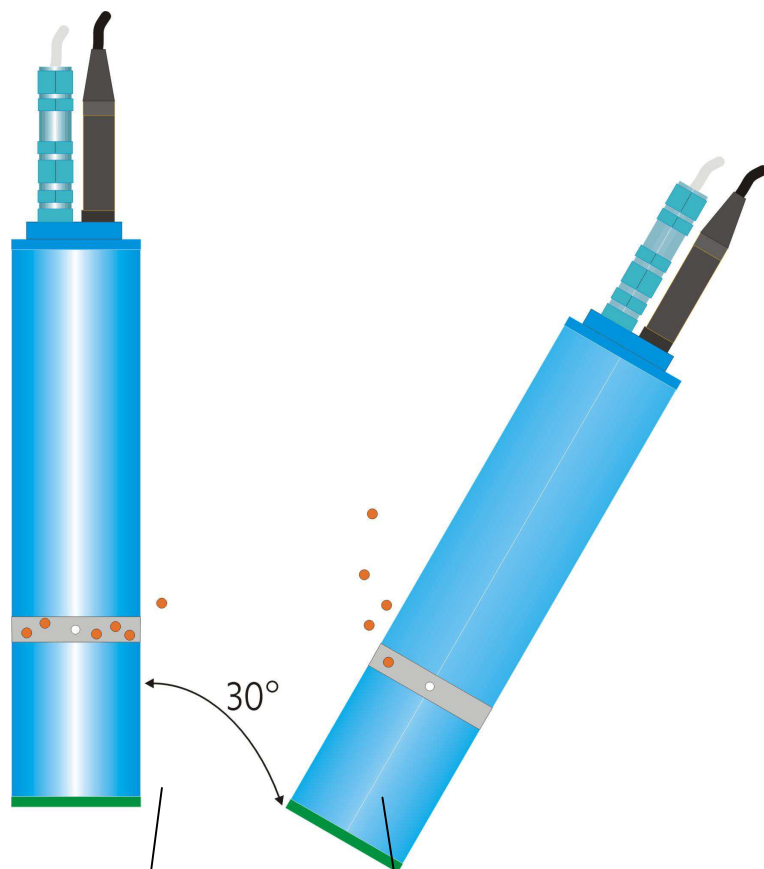
When vertical, air bubbles can remain lodged and throw off the measurements

Tilted by 30° or more, the bubbles can escape easily and will have no incidence on the measurements

2.4.1. ELECTRIC CONNECTIONS

2.4.2. overall view of the connectors
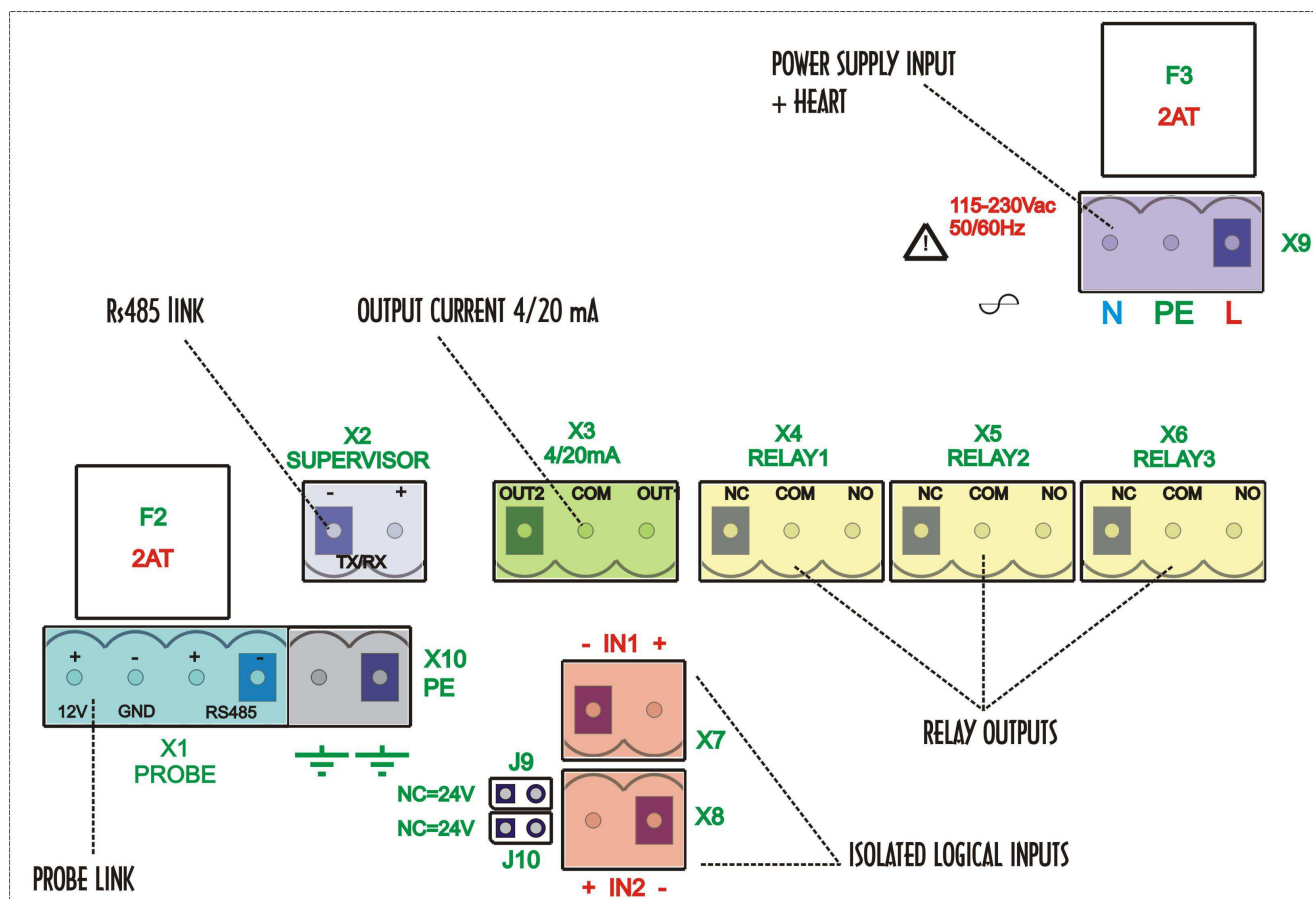
X1	Link with the probe (E8490C01V1)
X2	RS485 link with the Supervisor PC
X3	Two 4/20mA current outputs
X4	Relay output 1
X5	Relay output 2
X6	Relay output 3(links with E8492)
X7	Opto-coupled input 1
X8	Opto-coupled input 2
X9	Mains + earth
X10	Earth
J9	Jumper to select logical input level (5V : ON or 24V : OFF)
J10	Jumper to select logical input level (5V : ON or 24V : OFF)
F3	Protective fuse on the mains input
F2	Protective fuse on the probe power supply

2.4.3. Mains connection

The transmitter requires an AC sinusoidal power supply (50 to 60Hz) of between 115V and 230V using connector X9.

X9 wiring		
Pin	Name	Description
1	Phase	Mains phase
2	Earth	Earth
3	Neutral	Mains neutral

2.4.4. ModBus Link

The ModBus link of the *UV-Probe 254+* is designed for use in RS485 mode: 1 differential pair (2 wires).

With 2-wire cabling, the same pair of wires is used to transmit requests from the supervisor to the *UV-Probe 254+* and to transmit the devices responses.

	RS485 Supervisor	Transmitter 1	Transmitter 2	Transmitter n
	TX+ / RX+ (A)	TX+ / RX+	TX+ / RX+	TX+ / RX+
	TX- / RX- (B)	TX- / RX-	TX- / RX-	TX- / RX-
Terminal resistor	Yes	No	No	Yes
Terminal resistor	Une seule paire sur tout le réseau, généralement au niveau du superviseur.			

RS485 : 1 master (supervisor) and several slaves (transmitters)

X2 wiring		
Point	nom	Description
1	TX - / RX -	Negative signal
2	TX+ / RX+	Positive signal

2.4.5. 4/20mA current ouputs

4/20 mA current outputs
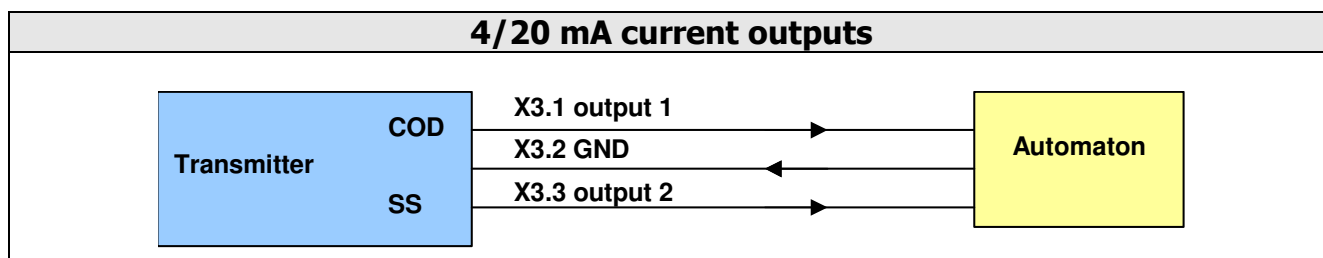
X3 wiring		
Pin	Name	Description
1	Output 1	Current loop output 1
2	GND	Current loop 1 and 2
3	Output 2	Current loop output 1

4-20mA outputs are isolated from the ground.

2.4.6. Isolated logical inputs

Isolated logical inputs wiring
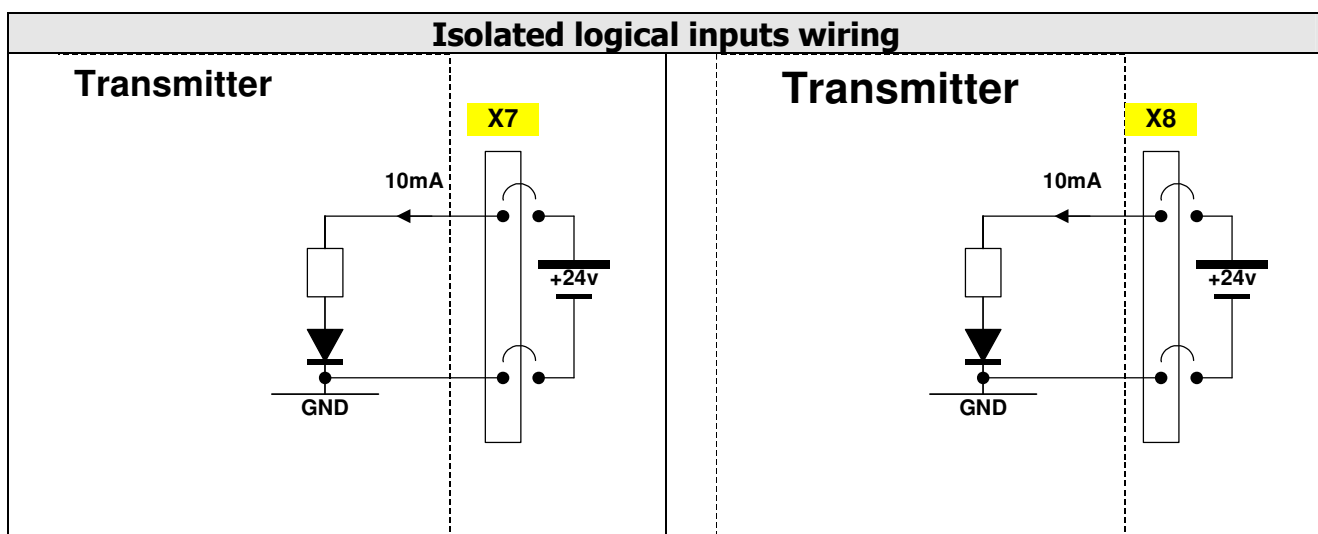
X7 wiring		
Pin	Name	Description
1	GND	Ground
2	IN1	24 V or 5 V input

X8 wiring		
Pin	Name	Description
1	GND	Ground
2	IN1	24 V or 5 V input

Jumpers configuration		
J9	NC	24 V input
	C	5 V input
J10	NC	24 V input
	C	5 V input

2.4.7. Isolated relay outputs

The 3 **UV-Probe 254+** relay outputs transmit alarms to the external world. Each threshold is settable independently. The 3 relays are isolated together. They can each short-circuit a line with 8 amps and 240 V AC maximum. The relay 3 is dedicated to the cleaning box. It starts and stops the cleaning following the setting.

Relay output wiring
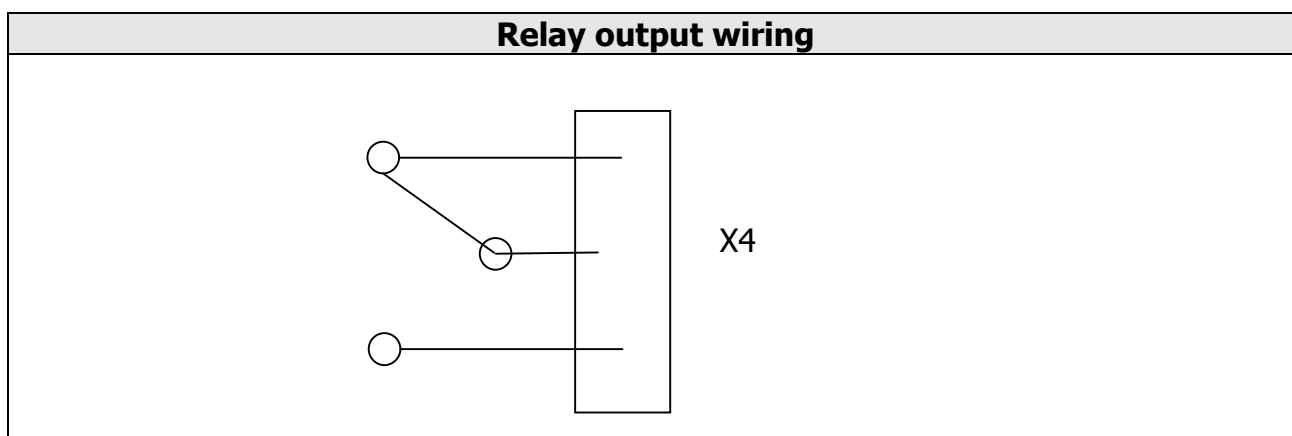
X4 wiring		
1	NF	Normally closed contact
2	COM	Common
3	NO	Normally opened contact

X5 wiring		
1	NF	Normally closed contact
2	COM	Common
3	NO	Normally opened contact

Relay output #3 is dedicated to the cleaning module driving n°3 (X6).

X6 wiring		
1	NF	Normally closed contact
2	COM	Common
3	NO	Normally opened contact

2.4.8. Probe connection (X1)

X1 wiring		
1	RX/TX-	Serial link (black)
2	RX/TX+	Serial link (white)
3	GND	Ground (red)
4	+12V	Probe power supply 12V DC (green)

2.4.9. Cleaning module wiring E8492
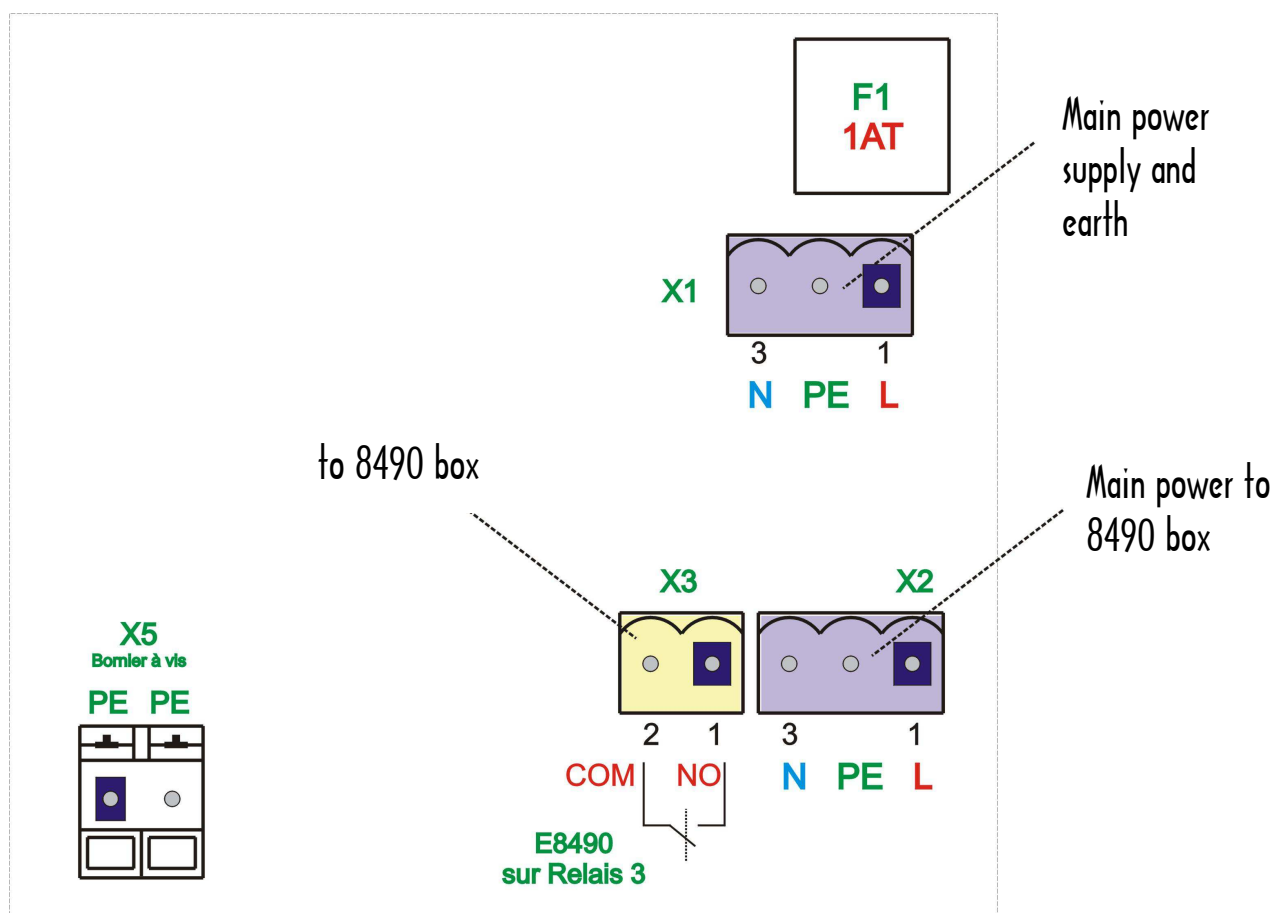
X1	Main power supply 115-230Vac
X2	Main power to E8490 via 3G1.5² cable reference **E8492C02V1**
X3	Cleaning box command connection, thanks to transmitter relay 3 and via **cable** reference **E8492C01V1**
X5	Earth connection
F1	Main power fuse 1AT

Chapter 3
CONFIGURATION

3. SETTING UP THE PROBE

3.1. NAVIGATING BETWEEN MENUS

The arrows ⬅️ ➡️ ⬇️ ⬆️ enable you to navigate between the menus to access a function, to move from one field to another or to adjust the value of a field.

The ✅ key enables you to access the sub-menus and to confirm values you have entered.

The ❌ key enables you to quit the sub-menus or to cancel a value you have entered.

3.2. ENTERING NUMBERS AND LETTERS

Numbers are always entered in a special data entry box. A dialogue box will enable you to enter either just numbers or numbers and letters.

3.2.1. Entering numbers

⬇️⬆️	scroll through the digits 0 to 9 and the symbols "+" "-" and "."
✅	validates the entry.

3.2.2. Entering numbers and letters

⬇️⬆️	scroll through the digits 0 to 9, the symbols "+" "-" "." and the letters A-Z
✅	validates the entry.

3.2.3. During data entry

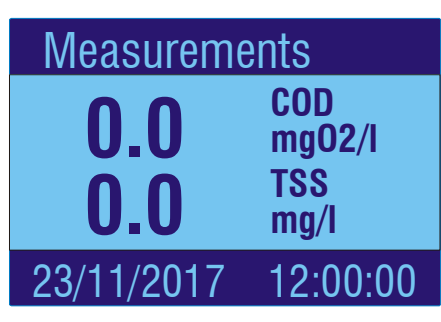|	
⬅️	erases the last character entered, assuming that the entry box is not empty.
➡️	moves on to the next character.
❌	cancels the parameter editing process if nothing has been entered in the box.
✅	confirms the data entry.

3.3. ICON BARS ON THE SCREEN

Default icon
!: should any error occur
X: communication error between the probe and the transmitter

Name of the page being displayed

Measurements

0.0   **COD mgO2/l**

0.0   **TSS mg/l**

23/11/2017   12:00:00

Date in the format DD/MM/YYYY
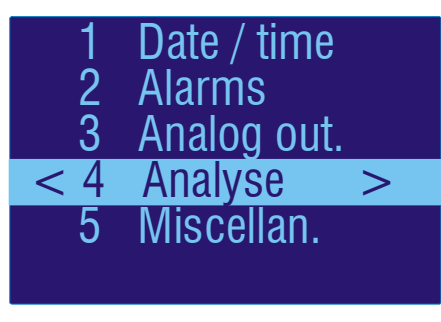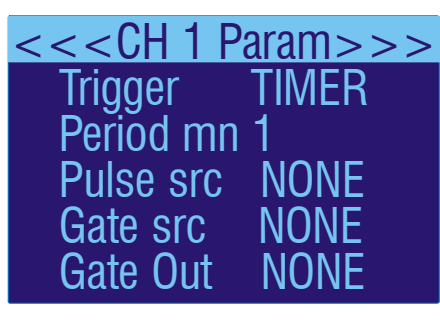
Current time HH/MM/SS
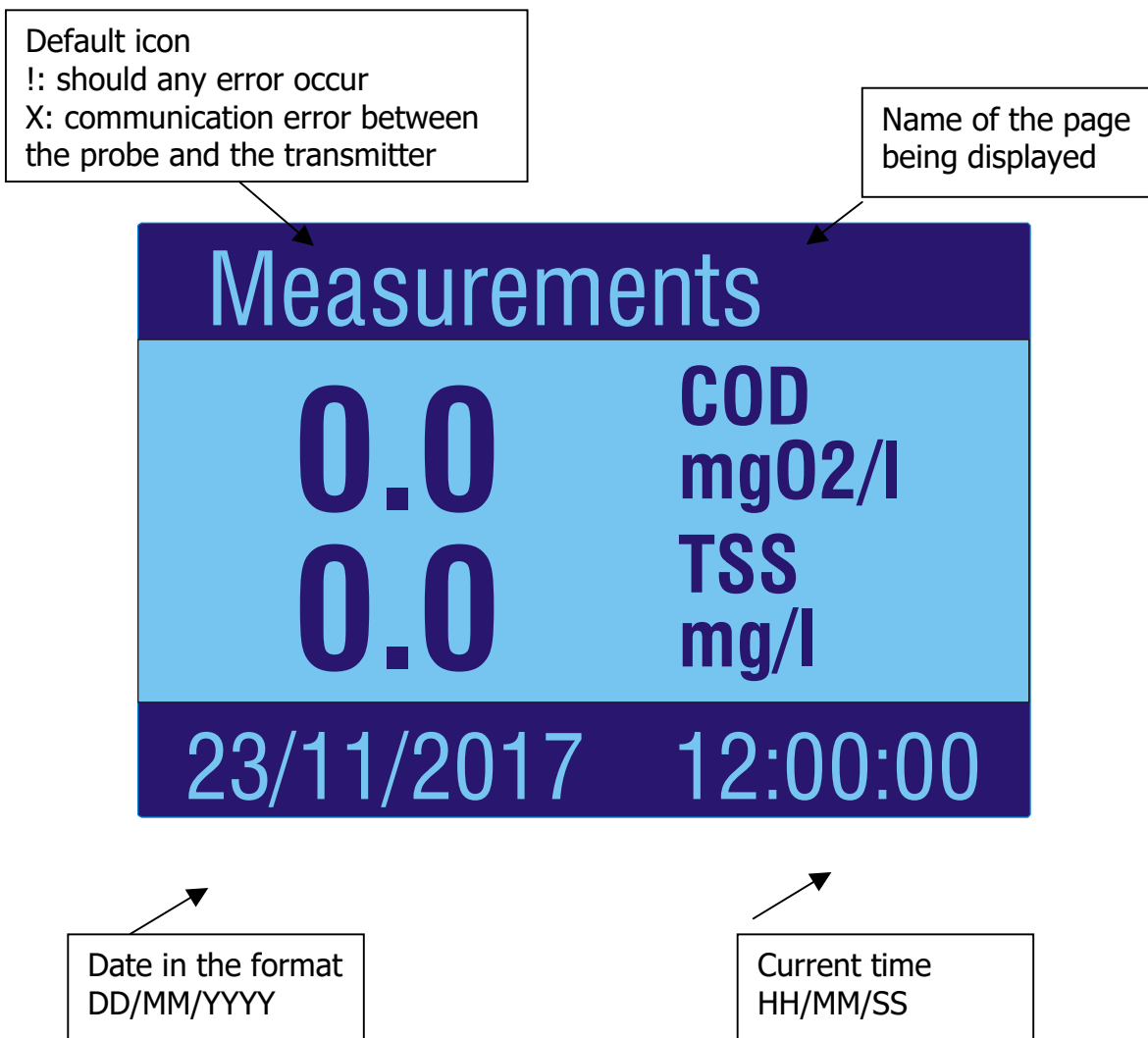
Press 🏠 then "**setup**"

Once the probe has been installed, the probe must be set up in order to take into account all the specifics of the installation so as to obtain the best performance possible.

Similarly, we recommend verifying the set-up after software update so as to best take advantage of any new functions.

3.4. STEP BY STEP CONFIGURATION
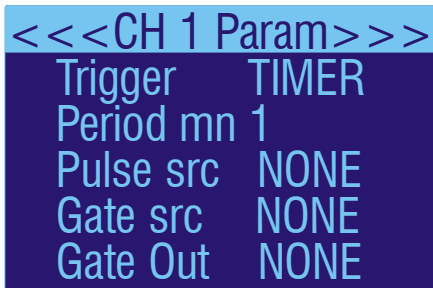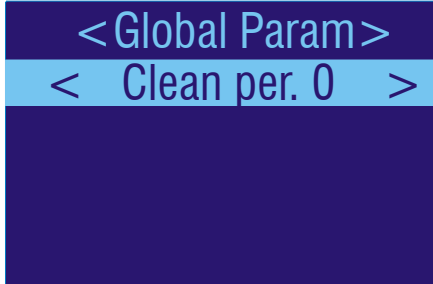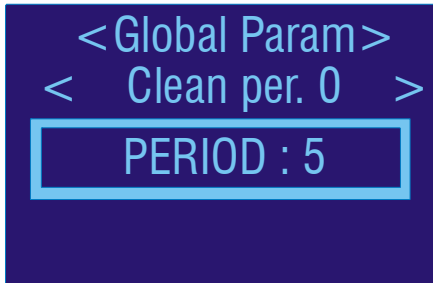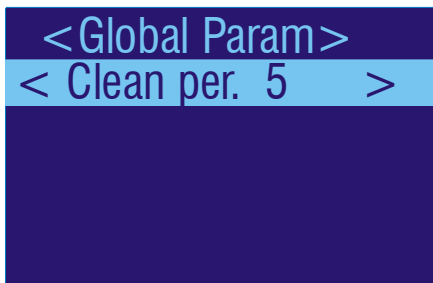
It is not necessary to set up all the parameters of the device since a large proportion of these parameters are the settings for the inputs/outputs, alarms and advanced functions. It is always possible to refine the set-up at a later date.
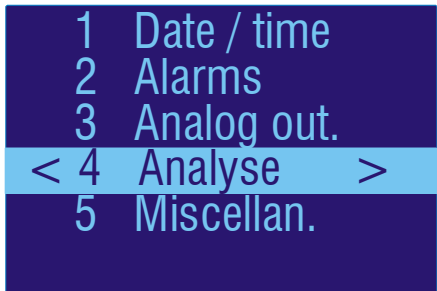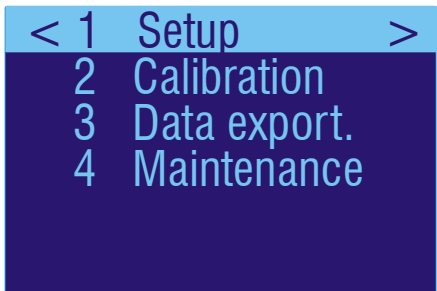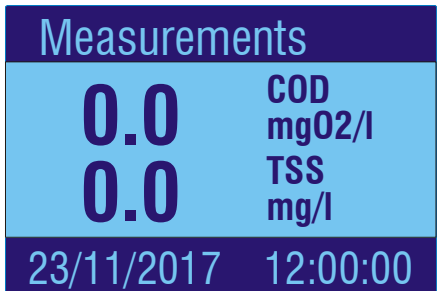
The "typical configuration" given below outlines the main parameters.

Once the device has been switched on, the set-up mode can be accessed from any measurement screen. • Press ☒	**Measurements** **0.0** COD mgO2/l **0.0** TSS mg/l 23/11/2017 12:00:00
• Choose **SETUP** from the menu ☑	< 1 Setup > 2 Calibration 3 Data export. 4 Maintenance
• Choose **ANALYSE** from the menu ⬇ and ☑	1 Date / time 2 Alarms 3 Analog out. < 4 Analyse > 5 Miscellan.
	<<<CH 1 Param>>> Trigger TIMER Period mn 1 Pulse src NONE Gate src NONE Gate Out NONE
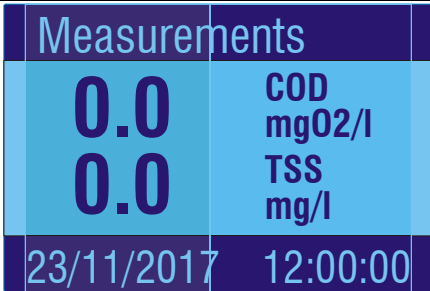
• Set the parameter **TRIGGER** to **TIMER** ⬇ + ✓ **(NONE-TIMER-PULSE).**	**<<CH 1 Param >>** **< Trigger TIMER >** Period mn 1 Pulse src NONE Gate src NONE Gate Out NONE
• Set the **TIMER PERIOD** to the required measurement frequency (one analysis every minute in the example opposite). ⬇ + ✓ + ⬆ + ✓	**<<CH 1 Param>>** Trigger TIMER **PERIOD : 1** Gate Out NONE
• Set the **PULSE SOURCE** to NONE. ⬇ + ✓	**<<CH 1 Param>>** Trigger TIMER Period mn 1 **< Pulse src NONE >** Gate src NONE Gate Out NONE
• Set the **GATE SOURC**E to NONE. ⬇ + ✓ **(DI1 – DI2 - NONE)**	**<<CH 1 Param>>** Trigger TIMER Period mn 1 Pulse src NONE **< Gate src NONE >** Gate Out NONE
• Set the **GATE OUT** to NONE. ⬇ + ✓ **(DI1 – DI2 - NONE)**	**<<CH 1 Param>>** Trigger TIMER Period mn 1 Pulse src NONE Gate src NONE **<Gate Out NONE >**
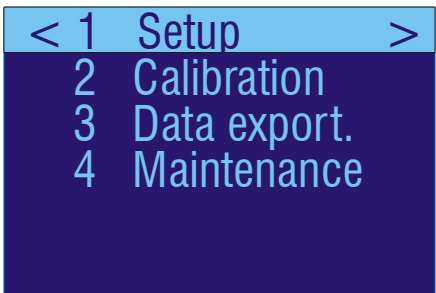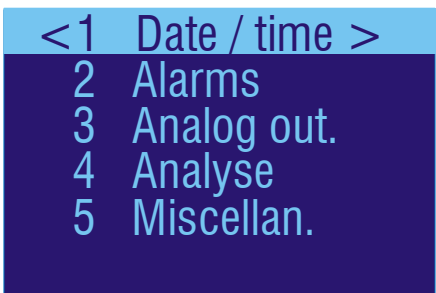
• Select the line **CHANNEL1 PARAMETERS** with ⬆ then validate with ✓ The set-up common to all the analysis channels is displayed.	**<<<CH 1 Param>>>** Trigger TIMER Period mn 1 Pulse src NONE Gate src NONE Gate Out NONE
• Choose **CLEANING PERIOD** ⬇ + ✓	**<Global Param>** < Clean per. 0 >
• Set **CLEANING PERIOD** 5 mins. (for example one cleaning every 5 minutes). ⬆ + ✓	**<Global Param>** < Clean per. 0 > PERIOD : 5
	<Global Param> < Clean per. 5 >

• Press ![icon] to return to the ANALYSE menu	1 Date / time 2 Alarms 3 Analog out. < 4 Analyse > 5 Miscellan.
• Press ![icon] to return to the SETUP menu	< 1 Setup > 2 Calibration 3 Data export. 4 Maintenance
• Press ![icon] to return to the MEASUREMENT screens. **Message "Saving parameters please wait …"**	Measurements 0.0 COD mgO2/l 0.0 TSS mg/l 23/11/2017 12:00:00

3.5. CONTRAST SETTINGS

![icon]	

To change the contrast settings of the screen: • Hold down the ![icon] key • Adjust with the arrow keys ![down] and ![up] .	Measurements 0.0 COD mgO2/l 0.0 TSS mg/l 23/11/2017 12:00:00

3.6. SETTING THE DATE AND TIME

🏠	➜ setup ➜ date / time

• Choose SETUP from the menu ✓	< 1 Setup >
	  2 Calibration
	  3 Data export.
	  4 Maintenance

• Choose DATE / TIME with ✓	<1 Date / time > 2 Alarms 3 Analog out. 4 Analyse 5 Miscellan.
• Use the arrow keys ← and → to move the cursor around • Adjust with the arrow keys ↓ and ↑. • Validate with ✓.	Hour Min sec 14 03 52 Day Month Year 10 01 17
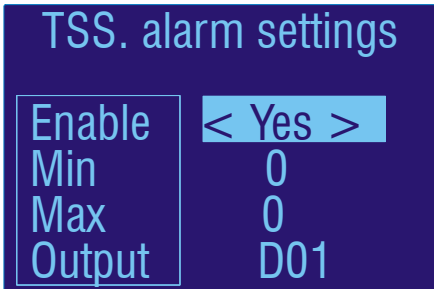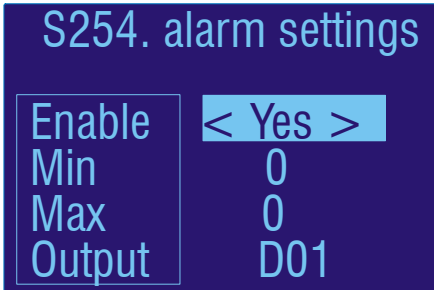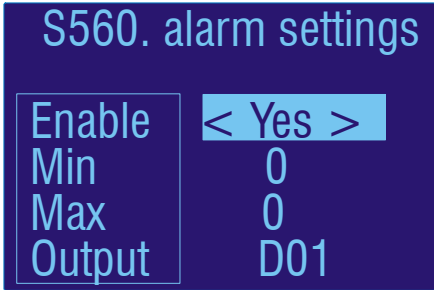
> **Don't forget to change the time on the transmitter for the hour change between summer and winter, where appropriate**

3.7. SETTING UP THE ALARM THRESHOLDS

🏠	➔ setup ➔ Alarms

The **UV-Probe 254+** can only monitor the parameters measured within a pre-determined range and will alert the user if this range is exceeded. • Choose **SETUP** from the menu ✓	< 1 Setup > 2 Calibration 3 Data export. 4 Maintenance
To set up this surveillance, select the parameter required and validate. • Choose **ALARMS** ⬇ + ✓	1 Date / time < 2 Alarms > 3 Analog out. 4 Analyse 5 Miscellan.

ALARM SETTINGS	
COD ALARM SETTINGS	

COD: Chemical Oxygen Demand • Press the key ✓	Name Min Max Out < DCO --- --- -- > TSS --- --- -- S254 --- --- -- S560 --- --- -- Global Alarm N
Enable: active surveillance YES, inactive NO. • Use ✓ to choose Yes or NO	DCO Alarm settings Enable < Yes > Min 0 Max 0 Output D01

Min: Minimum thresholds. • Press the keys ⬇ + ✓	**DCO Alarm settings** Enable — Yes Min — < 0 > Max — 0 Output — D01
• Press the keys ⬆ and ➡ • Validate with ✓	**DCO Alarm settings** Enable — Yes **Min DCO : 100** Output — D01
Max: maximum thresholds. • Press the keys ⬇ + ✓	**DCO Alarm settings** Enable — Yes Min — 100 Max — < 0 > Output — D01
• Press the keys ⬆ and ➡ • Validate with ✓.	**DCO Alarm settings** Enable — Yes **Max DCO : 500** Output — D01
Output: Relay output to be activated if a threshold is exceeded (min. or max.) • Press the keys ⬇ • Use ✓ to choose DO1, DO2 or NONE	**DCO Alarm settings** Enable — Yes Min — 100 Max — 500 Output — <D01 >

DCO ALARMS SETTINGS	
Alarm settings for DCO parameter - Mimimum: 100 - Maximum: 500 - Out: DO1 Quit this menu with ☒	Name Min Max Out < DCO --- --- -- > TSS --- --- -- S254 --- --- -- S560 --- --- -- Global Alarm N
TSS ALARMS SETTINGS	
TSS = suspended solids TSS: mass of non soluble particles to be found in the water whose dimension is between 1 and 100 µm. • To setting up the TSS alarms, use the same procedure.	TSS. alarm settings Enable < Yes > Min 0 Max 0 Output D01
S254 ALARMS SETTINGS	
SAC 254: Optical absorption of the effluent at a wavelength of 254 nm. • To setting up the SAC 254 alarms, use the same procedure.	S254. alarm settings Enable < Yes > Min 0 Max 0 Output D01
S560 ALARMS SETTINGS	
SAC 560: Optical absorption of the effluent at a wavelength of 560 nm. • To setting up the SAC 560 alarms, use the same procedure.	S560. alarm settings Enable < Yes > Min 0 Max 0 Output D01

GLOBAL ALARMS SETTINGS	

Global alarm : This function is used to assign the general error to one of the 4 relay outputs (any error arising from either the transmitter or the probe).

```
Name  Min  Max Out
DCO   100  500  1
TSS   ---  ---  --
S254  ---  ---  --
S560  ---  ---  --
<Global Alarm   N>
```
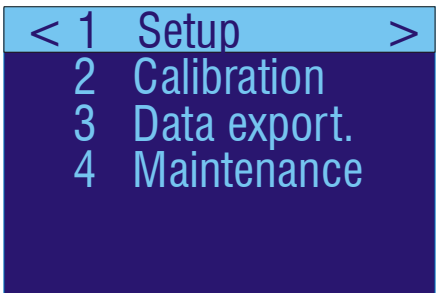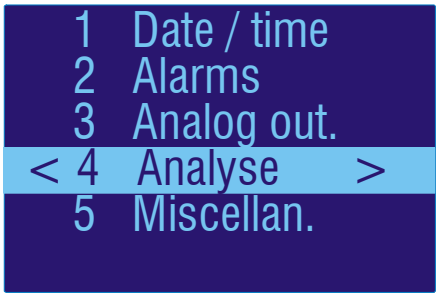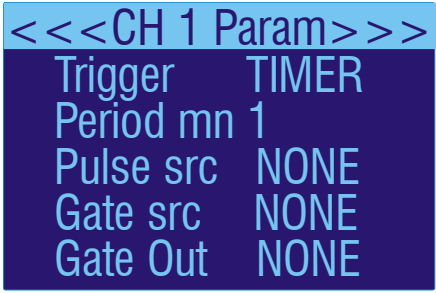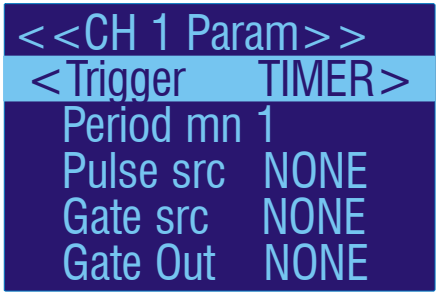
- Use the keys ⬇ and ⬆ to choose between NONE, DO1 or DO2

- Validate with ✓

```
Global Alarm settings

   < None >
     DO1
     DO2
```

3.8. SETTING UP THE ANALYSIS CYCLES

🏠 ➔ setup ➔ Analyse

Setting up the analysis cycles enables you to set up your transmitter according to your requirements and to your particular installation.
 	
• Choose **SETUP** from the menu ✓
	< 1 Setup >
	   2 Calibration
	   3 Data export.
	   4 Maintenance

The main parameters concern: - triggering the analyses: either periodically or via an external pulse. - setting up the validation gate: authorizing and preventing measurements. - cleaning cycle frequency. • Choose **ANALYSE** ⬇ + ✓	1 Date / time 2 Alarms 3 Analog out. < 4 Analyse > 5 Miscellan.
Channel selection: **CHANNEL** • Press ✓ to scroll through the set-up pages for the input channels in turn, as well as the general parameters page. Each measurement channel can be set up separately.	<<<CH 1 Param>>> Trigger TIMER Period mn 1 Pulse src NONE Gate src NONE Gate Out NONE
Analysis triggering type: **TRIGGER** **NONE**: no analysis of this channel. **TIMER**: periodical analysis triggering. **PULSE**: triggering via an external contact.	<<CH 1 Param>> <Trigger TIMER> Period mn 1 Pulse src NONE Gate src NONE Gate Out NONE

Measurement frequency: **PERIOD**. • Press ✓ to enter the analysis frequency of this measurement channel in minutes. this menu is only active if **Trigger** is set to **PERIOD**. The measurement frequency **PERIOD** cannot exceed 99 minutes.	<<CH 1 Param>> Trigger TIMER < Period mn 1 > Pulse src NONE Gate src NONE Gate Out NONE
External triggering: **PULSE SRC**. • Press ✓ to scroll through the 2 On-Off inputs in turn. This menu is only active if **TRIGGER** is set to **PULSE**. See the chapter 2.4.6	<<CH 1 Param>> Trigger TIMER Period mn 1 < Pulse src NONE > Gate src NONE Gate Out NONE
Validation gate: **GATE SRC**. • Press ✓ to scroll through the 2 inputs in turn. This function enables you to temporarily inhibit measurements on a channel depending on the status of an on-off input on the transmitter. See chapter 2.4.6	<<CH 1 Param>> Trigger TIMER Period mn 1 Pulse src NONE < Gate src NONE > Gate Out NONE
Analysis relay outputs: **GATE OUT**. • Choose the relay output to be activated during the analysis cycles.	<<CH 1 Param>> Trigger TIMER Period mn 1 Pulse src NONE Gate src NONE <Gate Out NONE >
Cleaning period: **CLEAN PER. (page 2)** • Choose the cleaning frequency of the measurement cell using compressed air.	<Global Param> < Clean per. 5 >

3.9. CONTROL SIGNALS

Example of how control signals are used.

Supposing that the probe is analyzing an effluent in a tank equipped with a dry contact level sensor. If the tank is empty, then the contact is open and the probe should not be measuring. The analyses are triggered by a dry contact output on the automated system every 30 minutes. The result of the COD measurement is transmitted to a 4-20mA output.
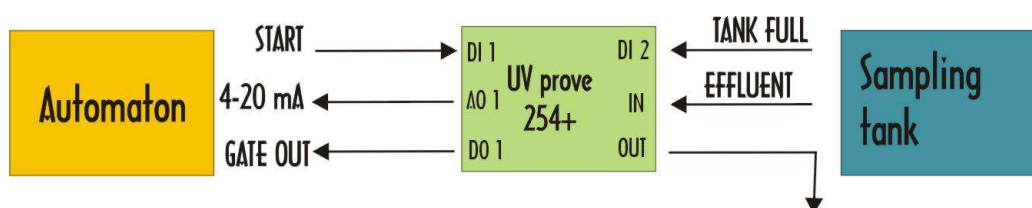
The three control signals used are:

- **PULSE SOURCE (DI1)**: input for triggering an analysis
- **GATE SOURCE (DI2)**: validation gate input of an analysis (takes priority over PULSE SOURCE)
- **ANALYSE GATE OUT (DO1)**: analysis gate output (active when an analysis is underway).
- **OUTPUT 4-20 N°1 (A01)**: monitoring of the COD measurement to the automated system.

Device set-up screens	
The output START of the automated system is connected to the input DI1 of the transmitter (Trigger = PULSE, PULSE SRC = DI1) and the signal indicating the presence of water to the input DI2 (GATE SRC = DI2).	<<CH 1 Param>> Trigger PULSE Period mn ---- Pulse src DI1 < Gate src DI2 > Gate Out NONE
The automated system is informed that an analysis is underway by the signal GATE OUT which is directed to the output DO1 (ANALYSE GATE OUT = DO1).	<<CH 1 Param>> Trigger PULSE Period mn ---- Pulse src DI1 Gate src DI2 < Gate Out DO1 >

3.10. ANALOG OUTPUTS

🏠	➔ **setup** ➔ **Analog output**

The two analog outputs will enable you to transmit the measurements in analog form (current loop) to an external device (eg: an automated system).

Each output can be separately associated with one of the parameters being measured, in the range desired. If the measurement associated with a 4-20 mA output is not available, this output will indicate 4 mA.

The analog outputs are initialized at 4 mA:

- when the device starts up
- if a measurement error should occur
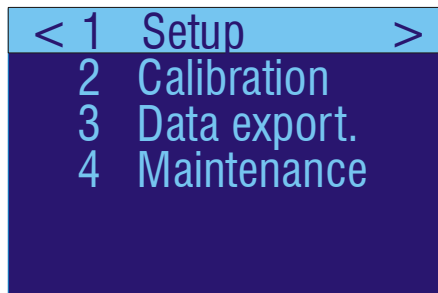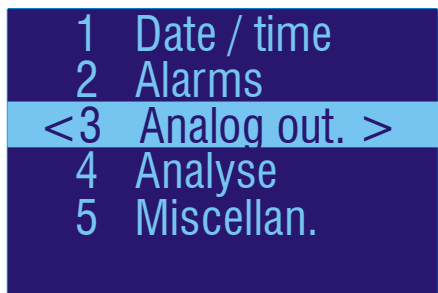
The analog outputs keep the same value:

- during the measurement cycles
- during and after the cleaning cycles
- if an analysis gate is set up and the measurement is ignored.

The analog outputs are refreshed pro-rata with the associated measurement:

- at the end of each measurement cycle
- always before the end of the signal "**analyse Gate out**" (if used)

If necessary, use the output "**analyse Gate out**" to synchronize your external equipment with the analysis cycle.

• Choose **SETUP** from the menu ✓	< 1 Setup > 2 Calibration 3 Data export. 4 Maintenance
• Choose **ANALOG OUT**	1 Date / time 2 Alarms <3 Analog out. > 4 Analyse 5 Miscellan.

The analog outputs are respectively associated with the COD and TSS measurements of channel 1. The output range will represent the ranges 0-1000 for the COD and 0-500 for the suspended solids.
    AO: output 1 or 2
    P: measurement assigned to the 4/20mA output.
    Ch: use the measurements from channel 1.
    Min: COD value for 4mA.
    Max: COD value for 20mA.
	Analog Outputs Set.
	AO P Ch Min Max
	
	< 1 C 1 0 1000 >
	   2 S 1 0 500

• Use ✓ to select between DCO, suspended solids ...	AO1 settings Param. < COD > Channel 1 LO range 0 HI range 1000
• Select LO range with ✓ • Enter the value with ⬆ and ➡ • Valid with ✓	AO1 settings Param. COD LO range: 0 HI range 1000
• Select HI range with ✓ • Enter the value with ⬆ and ➡ • Valid with ✓	AO1 settings Param. COD HI range: 0 HI range 1000
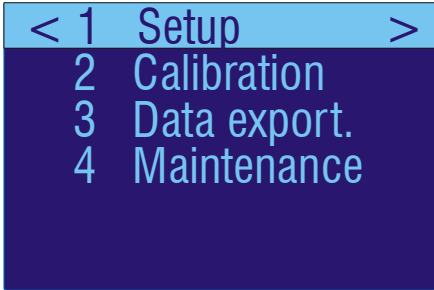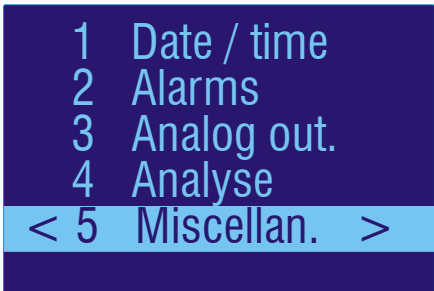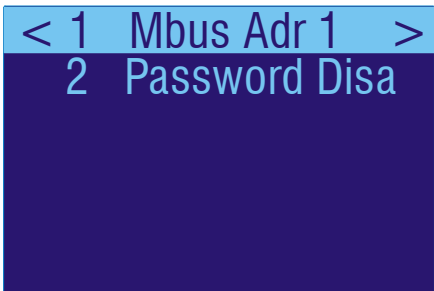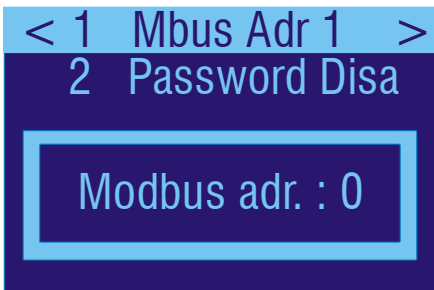
3.11. MODBUS LINK

🏠	➔ **setup** ➔ **Miscellaneous**

• Choose **SETUP** from the menu ✓	< 1 Setup >
	   2 Calibration
	   3 Data export.
	   4 Maintenance

• Choose **MICELLANEOUS**	1 Date / time
	   2 Alarms
	   3 Analog out.
	   4 Analyse
	< 5 Miscellan. >

Setting up the ModBus RS485 link. **ModBus Address**: address of the probe on the ModBus network. This address must be unique on the ModBus network.	< 1 Mbus Adr 1 > 2 Password Disa
Communication settings: - Modbus RTU protocol - 9600 bauds - 8 bits data - 1 stop bit - even parity	< 1 Mbus Adr 1 > 2 Password Disa Modbus adr. : 0

A supervisor software must use MODBUS function code 03 to read the data and code 16 to write the data.

Refer to Modicon Modbus Reference Guide for complete information about Modbus communication standard.

All registers are **READ ONLY** and encoded as 32 bits floating datas. This means that two 16 bits registers are used to encode one 32 bits data. (For more information, refer to IEEE Standard for Floating-Point Arithmetic (IEEE 754) which is a technical standard established by the Institute of Electrical and Electronics Engineers (IEEE) and the most widely used standard for floating-point computation).

EXAMPLE:

To display COD value, supervisor as to read 16 bits registers 5 and 6.
Register 5 contains the 16 LSB of the floating data and register 6 contains the 16 MSB of the floating data.

Register 5 value: 0x0000
Register 6 value: 0x4120

32 bits floating register is: 0x41200000 which represent IEEE754 decimal value 10.0

MODBUS REGISTER TABLE				
Address		Acces (*)	Unit	Function
DEC	HEX			
0	0	R		Reserved
1	1	R		Global_alarm (0=no alarm 1=alarm)
2	2	R		Reserved
3	3	R		Reserved
4	4	R		Reserved

5	5	R	(mg/l)	COD → 16 LSB
6	6	R	(mg/l)	COD → 16 MSB
7	7	R	(mg/l)	TSS → 16 LSB *(see page 44)*
8	8	R	(mg/l)	TSS → 16 MSB
9	9	R	UA/cm	SAC 254 → 16 LSB *(see page 58)*
10	A	R	UA/cm	SAC 254 → 16 MSB
11	B	R	UA/cm	SAC 560 → 16 LSB *(see page 58)*
12	C	R	UA/cm	SAC 560 → 16 MSB
13	D	R		Reserved
14	E	R		Reserved
15	F	R		Reserved
149	95	R		Mode (0=measurements 1=settings)

(*) R = Read   W = Write

3.12. PASSWORD PROTECTION

You can choose to limit access to the set-up functions of the device by using a password. This will allow any user to visualize the measurements while restricting access to complex functions except for qualified personnel. • Choose SETUP from the menu ☑	< 1 Setup > 2 Calibration 3 Data export. 4 Maintenance
• Choose MICELLANEOUS ☑	1 Date / time 2 Alarms 3 Analog out. 4 Analyse < 5 Miscellan. >
• Press the keys ⬇ + ☑ to choose PASSWORD The password is a 4-digit number. Example of a password: 1234	< 1 Mbus Adr 1 > 2 Password Disa

3.12.1. Enter a password

1 Mbus Adr 1 <2 Password Disa> New Pwd: 1234	1 Mbus Adr 1 <2 Password Disa> Conf. Pwd: 1234	1 Mbus Adr 1 <2 Password Disa> Pwd modified
❶ enter the password	❷ confirm the password	❸ password modified

1 Mbus Adr 1   > <2 Password Enab>
4 – password enabled

3.12.2.Modify a password

1 Mbus Adr 1 <2 Password Enab> Password: 1234	1 Mbus Adr 1 <2 Password Enab> New Pwd: 9999	1 Mbus Adr 1 <2 Password Enab> New Pwd: 9999
❶ Enter the initial password	❷ **Enter a NEW password**	❸ Confirm the new password

1   Mbus Adr 1   >
<2   Password Enab>

❹ Password Enab is displayed

3.12.3.Invalidate a password

1 Mbus Adr 1 <2 Password Enab> Password: 1234	1 Mbus Adr 1 <2 Password Enab> New Pwd: 0	1 Mbus Adr 1 <2 Password Enab> Conf. Pwd: 0
❶ Enter the initial password	❷ **Enter 0 as a password.**	❸ confirm 0 as the password

1 Mbus Adr 1 <2 Password Enab> Pwd disabled	< 1 Mbus Adr 1 > 2 Password Disa
❹ The password is invalided	❹ – Password *Disa* is displayed

Chapter 4
CALIBRATION - procedure N°1

4. CALIBRATION - PROCEDURE N°1

4.1. PRINCIPLE

The calibration procedure is what allows the correlation coefficients to be determined between the optical measurements **CAS 254** and **CAS 560** and the overall pollution measurements **TOC, COD, BOD** and **TSS**.

The *UV-Probe 254+* measures the concentration in organic matter of the effluent and from this calculates the equivalent in COD. This correlation depends on the composition of the samples analyzed. The calibration procedure allows the device to calculate this relationship (calibration coefficients) for your effluent by comparing the optical measurements to laboratory measurements.

> This calibration should be carried out at least once after the device has been installed and may be repeated from time to time to ensure that the system is working properly.
> Before beginning, check the *UV-Probe 254+* probe set-up and that it is working normally.

This procedure is used to calibrate parameters displayed on "MEASUREMENT" screen.

Parameters are chosen before ordering.
- one parameter between TOC, COD, BOD (line 1)
- The TSS parameter (line 2)

Measurements	
0.0	COD mgO2/l
0.0	TSS mg/l
24/11/2017	12:00:00
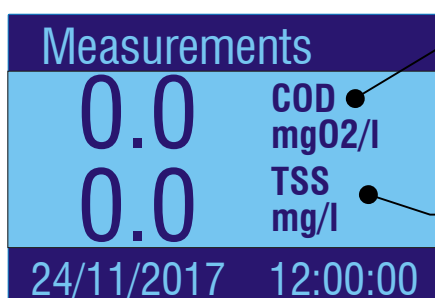
Line 1
(UV measurement parameters)

Ligne 2
(visible measurement parameters

Parameters	Parameters displayed
TOC: Total Organic Carbon	= TOC
COD: Chemical Oxygen Demand	= COD
BOD: Biochemical Oxygen Demand	= BOD
TSS: Suspended Solids	= TSS
CAS 254: Spectral Absorption Coefficient	= SAC 254
CAS 560: Spectral Absorption Coefficient	= SAC 560
COLOR	= COLOR

4.2. EQUIPMENT REQUIRED

- a container filled with 2 litres of clear water for rincing the probe
- a sample of approximately 5 litres of the effluent
- an appropriate container for the sample that will go to the laboratory.

4.3. CALIBRATION PROCEDURE

The calibration procedure can be broken down into 4 steps:

Step 1	**Sampling the effluent to be analyzed.** • Take a sample of the effluent as close as possible to the *UV-Probe 254+*. This sample will be used both for the laboratory measurements and the probe measurements (take 2 litres for the probe plus the volume necessary for the laboratory. • Verify that the sample is homogenous: if necessary, shake the container gently without creating an emulsion.
Step 2	**Laboratory analysis of the sample.** • Put the quantity required for the laboratory analysis into an appropriate container. • If the analysis cannot be carried out quickly, maintain the sample at temperature of 4°C.
Step 3	**Analysis by the *UV-Probe 254+* of the sample.** • The remainder of the sample will be analyzed by the *UV-Probe 254+*: follow the procedure outlined in chapter 4.4.
Step 4	**Enter the laboratory measurement.** • Enter the measurement obtained from the laboratory into the *UV-Probe 254+*: follow the procedure outlined in chapter 4.5.
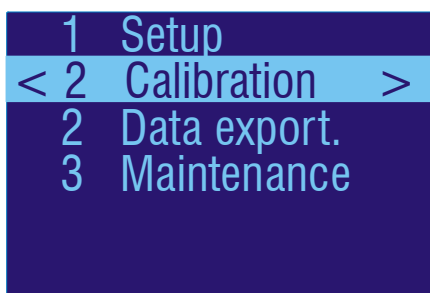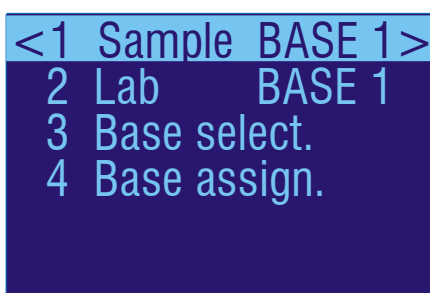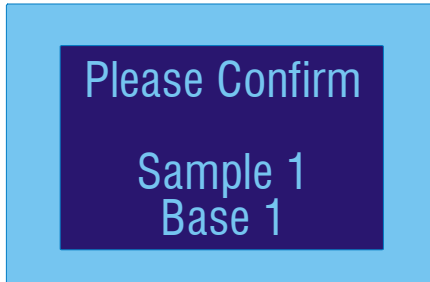
4.4. SAMPLE ANALYSIS
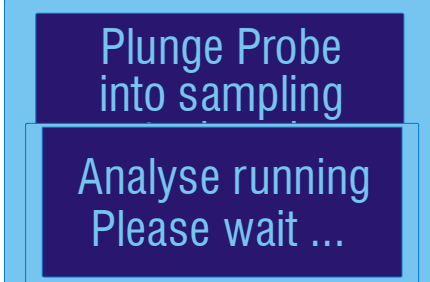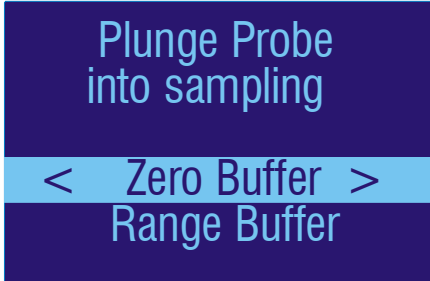
⌂	→ calibration → Sample

Before starting to analyze a sample, make sure that you have followed the right calibration procedure.

The calibration of the **UV-Probe 254+** is based on the comparison between the laboratory measurements and those of the probe. The analysis of the sample is an essential step in the calibration process. The system will guide you through the different phases so as to reduce as much as possible the risk of user error.

• Choose **CALIBRATION** from the menu	1 Setup < 2 Calibration > 2 Data export. 3 Maintenance
This command allows you to analyze a sample and obtain the values measured by the device. In this example, the analysis of the sample will be added to the correlation base number 1 • Choose **SAMPLE BASE1** from the menu	<1 Sample BASE 1> 2 Lab BASE 1 3 Base select. 4 Base assign.
The **UV-Probe 254+** numbers the samples automatically. This number increases each time a new sample analysis is added. • Confirm the analysis ☑ or abandon with ☒.	Please Confirm Sample 1 Base 1

The measurement of the « white » takes a few seconds.	
Analyze the sample • Place the probe in the tank containing the sample to be analyzed, • then validate the analysis with ☑ .	Plunge Probe into sampling tank and Confirm the operation
The sample analysis takes a few seconds.	Plunge Probe into sampling Analyse running Please wait ...

Reference the sample If the measurement is carried out correctly, the device will ask you to specify whether the sample analyzed is a reference solution for calibrating the zero setting or a point of a known concentration.	Plunge Probe into sampling < Zero Buffer > Range Buffer
	Saving parameters please wait ...

After the analysis and with the exception of zero setting, the *UV-Probe 254+* displays the references of the sample. This is made up of a number, and the date and time of the analysis.

Make a note of this information because it will make it easier to find this particular analysis in the list of measurements when you enter the laboratory measurements.

- Finish with

> Please Reference
> Sample 3
> 12/12/16
> 12:11:59
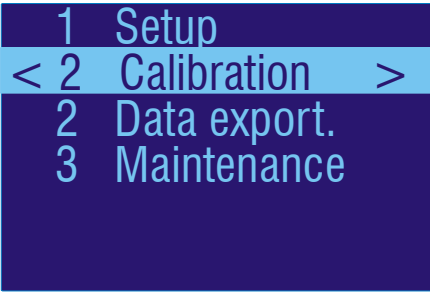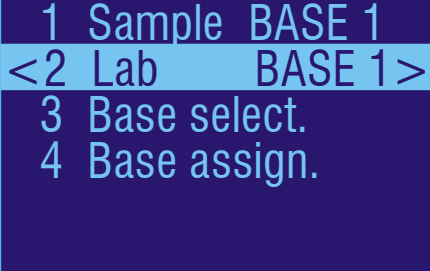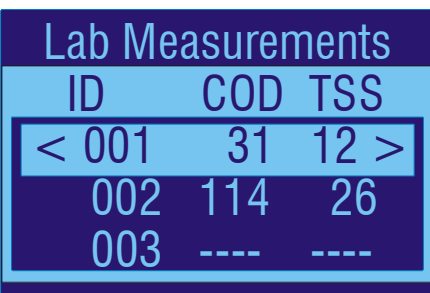
If the absorption of the sample is too high to allow a correct measurement (saturation), the *UV-Probe 254+* will indicate this with an error message. The sample must then be diluted in order to carry out the calibration.
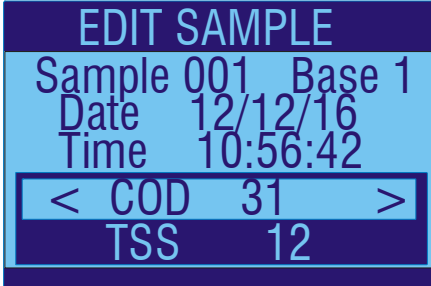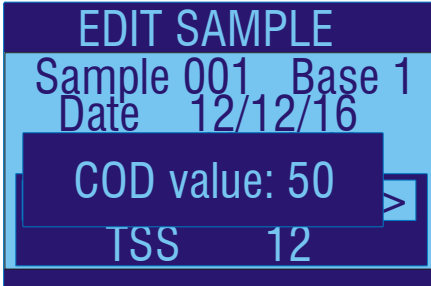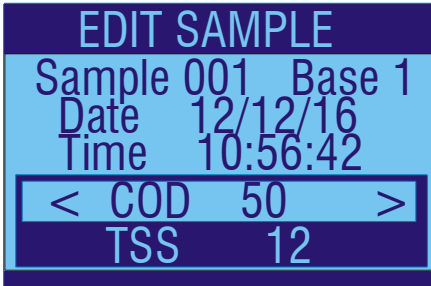
4.5. ENTERING THE LABORATORY MEASUREMENTS

🏠	➔ calibration ➔ Lab ➔ Edit

After analyzing a sample of your *UV-Probe 254+*, you must enter the "laboratory" measurements corresponding to the sample.

• Choose **CALIBRATION** from the menu Press the keys ⬇ + ☑	1 Setup < 2 Calibration > 2 Data export. 3 Maintenance
• Choose **LAB BASE1** from the menu Press the keys ⬇ + ☑	1 Sample BASE 1 <2 Lab BASE 1> 3 Base select. 4 Base assign.
• From the list, choose the sample whose information you are adding and valid with ☑ *In the example opposite, the laboratory values of COD and TSS have been entered for samples 1 and 2.*	Lab Measurements ID COD TSS < 001 31 12 > 002 114 26 003 ---- ----
• Press ☑ to select **Edit**	< 1 Edit > 2 Delete

• Enter the laboratory measurements of COD and SS corresponding to the sample. If a field is left empty, it will not be taken into account in the correlation.	EDIT SAMPLE Sample 001 Base 1 Date 12/12/16 Time 10:56:42 < COD 31 > TSS 12
• Enter COD value then validate ✓	EDIT SAMPLE Sample 001 Base 1 Date 12/12/16 COD value: 50 > TSS 12
• To quit, Press ✗ .	EDIT SAMPLE Sample 001 Base 1 Date 12/12/16 Time 10:56:42 < COD 50 > TSS 12

4.6. DELETING A SAMPLE

⌂	➜ **calibration** ➜ **Lab** ➜ **Delete**
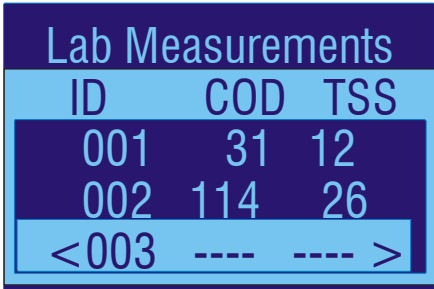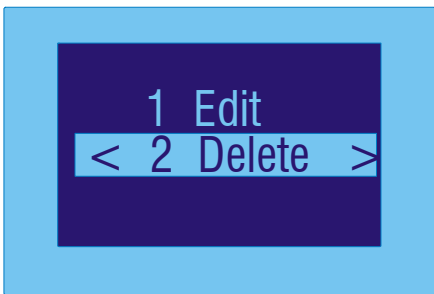
📌 **If necessary, you can delete the measurements of a sample analyzed by the *UV-Probe 254+*.**

This procedure may be necessary for deleting a test sample, eliminating a sample that is not representative of the effluent, doing the correlation again of the device at the beginning. You can work with two independent correlation bases. Each one can contain up to 10 samples.

It is preferable to change the correlation base in the following cases, rather than deleting the samples if your goal is to:
- Calibrate the device for a different effluent.
- Compensate for a temporary change in the nature of the effluent.

• Choose the sample you wish to delete from the list	**Lab Measurements** ID COD TSS 001 31 12 002 114 26 ‹003 ---- ---- ›
• Select "**Delete**". ⚠ **ATTENTION**: the deletion of a sample is definitive.	1 Edit ‹ 2 Delete ›
• Once you have confirmed that you wish to delete, the sample is removed from the list.	Delete Sample 3 Base 1 ?

Analysis 003 has been deleted.	**Lab Measurements** ID COD TSS 001 31 12 002 114 26 <003 ---- ---- >

4.7. MANAGING THE CALIBRATION BASES
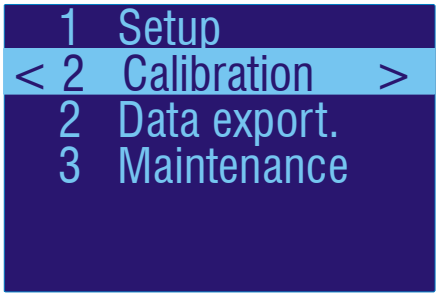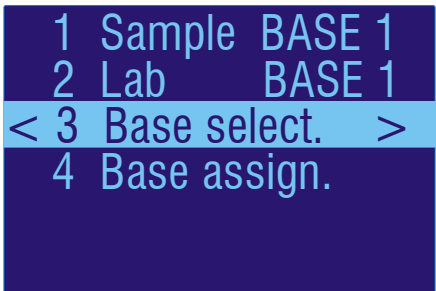
The **UV-Probe 254+** allows you to work with 2 independent calibration bases. In this way, you can calibrate your device for two different types of effluent or use a different calibration depending on the time of year.

The active base is the one in which all the results of the sample analyses will be placed, which you will then be able to edit using the menu **Lab measurements**.
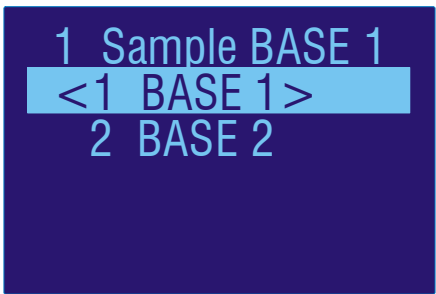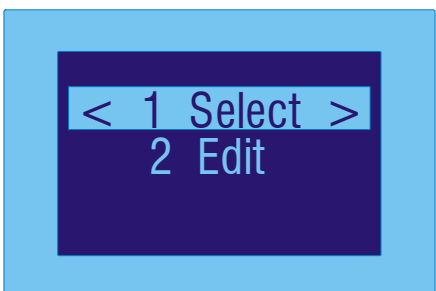
The calibration used during automatic mode analyses is independent of the active base. See chapter 4.10 .

4.8. SELECTING THE ACTIVE CALIBRATION BASE
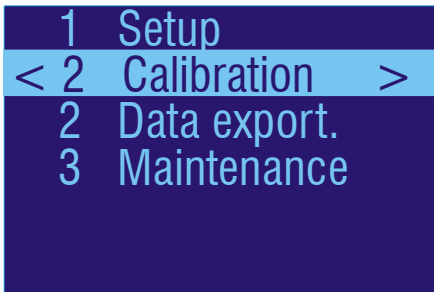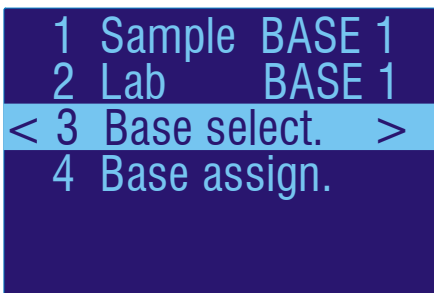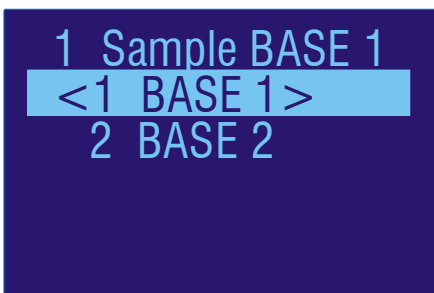
🏠	➜ calibration ➜ base selection➜Select

| • Choose **CALIBRATION** from the menu | ```
  1   Setup
< 2   Calibration    >
  2   Data export.
  3   Maintenance
``` |
| • Select the calibration base to be used for the sample analyses and for entering the laboratory measurements and choose **Select** | ```
  1  Sample  BASE 1
  2  Lab       BASE 1
< 3  Base select.   >
  4  Base assign.
``` |

📝 **NOTE: this base will be the one used for the sample analyses and for entering the lab measurements, but it will not modify the calibration base used for the measurement cycles.**

| | ```
  1  Sample BASE 1
 <1  BASE 1>
  2  BASE 2
``` |
| | ```
< 1  Select  >
  2  Edit
``` |

4.9. MANUAL ENTRY OF CALIBRATION COEFFICIENTS

🏠	➔ calibration ➔ base selection➔Edit

• Choose **CALIBRATION** from the menu Press the keys ⬇ + ✓	1 Setup < 2 Calibration > 2 Data export. 3 Maintenance
• Select the base you wish to edit and choose **Edit.** Press the keys ⬇ + ✓	1 Sample BASE 1 2 Lab BASE 1 < 3 Base select. > 4 Base assign.
• For example, choose BASE 1	1 Sample BASE 1 <1 BASE 1> 2 BASE 2
• Press ✓ to select **Edit**	1 Select < 2 Edit >

In this way, you can visualize or modify manually the calibration coefficients of this base. • Select the coefficient you wish to modify (COD or TSS coefficient) • validate with ☑.	**DataBase coefficients** **Base 1** GAIN COD 2.57 GAIN TSS 1.00 G TOC 1.00 G COLOR 1.00
	DataBase coefficients **Base 1** COD gain 10.1

You cannot modify a coefficient calculated by the device using sample analyses and laboratory measurements.

In order to enter a coefficient manually, there must be no laboratory measurements for this parameter in the calibration base. • The calibration is either **automatic**: in this case, the coefficients between the sample analyses and the laboratory measurements are calculated by the **UV-Probe 254+**, • or the calibration is **manual**: you enter the coefficients for each parameter manually.	**DataBase coefficients** **Base** Can't modify coef automaticaly calculated with DataBase Sample

4.10. ASSIGNING CALIBRATION BASES TO MEASUREMENT CHANNELS

🏠	➔ calibration ➔ channel assignment
• Choose **CALIBRATION** from the menu	1 Setup < 2 Calibration > 2 Data export. 3 Maintenance
• Choose which calibration base should be used by the measurement probe.	1 Sample BASE 1 2 Lab BASE 1 3 Base select. < 4 Base assign. >
• In the example opposite, the UV-Probe 254+ is using the no. 2 calibration base. • Then validate with ☑	< Ch 1 Base 2 >

Chapter 5
CALIBRATION – procedure n°2

5. CALIBRATION - PROCEDURE N°2

5.1. PRINCIPE

The calibration procedure is what allows the correlation coefficients to be determined between the optical measurements SAC 254 and SAC 560 and the overall pollution measurements **COD or BOD or TOC and COLOR.**

> This calibration should be carried out at least once after the device has been installed and may be repeated from time to time to ensure that the system is working properly. Before beginning, check the *UV-Probe 254+* probe set-up and that it is working normally.

For measurements SAC254 and SAC560, no calibration is needed. Only measurements **TOC, COD, BOD** ou **COLOR** needs calibration.

Unlike calibration 1 procedure which determines calibration coefficients automatically, coefficients are calculated manually.

This procedure is used to calibrate parameters displayed on "ABSORPTION" screen.

Parameters are chosen before ordering.
- one parameter between TOC / COD / BOD / SAC 254 parameter
- one parameter between SAC 560 / COLOR / TSS parameter.

Absorption

0.0 TOC mgO2/l

0.0 COLOR mgPt/l

12/12/2016 08:10:37

Line 1
(UV measurement parameters)

Line 2
(visible measurement parameters)

Parameters	Parameters displayed
TOC: Total Organic Carbon	= TOC
COD: Chemical Oxygen Demand	= COD
BOD: Biochemical Oxygen Demand	= BOD
TSS: Suspended Solids	= TSS
SAC 254: Spectral Absorption Coefficient	= SAC 254
SAC 560: Spectral Absorption Coefficient	= SAC 560
COLOR	= COLOR

5.2. EQUIPMENT REQUIRED

- a container filled with 2 litres of clear water for rincing the probe
- a sample of approximately 5 litres of the effluent
- an appropriate container for the sample that will go to the laboratory.

5.3. CALIBRATION PROCEDURE

The calibration procedure can be broken down into 4 steps:

Step 1	**Before starting calibration, coefficients must be set to 1.** • Set to value 1.0 the calibration gain on the third and fourth line. *Use the the procedure on the next page*

DataBase coefficients
Base 1
GAIN COD   2.57
GAIN TSS   1.00
G TOC   1.00
G COLOR   1.00

Step 2	**Sampling the effluent to be analyzed.** • Take a sample of the effluent as close as possible to the **UV-Probe 254+**. This sample will be used both for the laboratory measurements and the probe measurements (take 2 litres for the probe plus the volume necessary for the laboratory. • Verify that the sample is homogenous: if necessary, shake the container gently without creating an emulsion.

Step 3	**Laboratory analysis of the sample.** • Put the quantity required for the laboratory analysis into an appropriate container. If the analysis cannot be carried out quickly, maintain the sample at temperature of 4°C.

Step 4	**Analysis by the UV-Probe 254+ of the sample.** • Plunge the probe into the sample and let the probe make several measurements in normal mode operation (1 measurement each 2 minutes). Record date and time. If you have several samples, repeat the analyze for each sample.

➔ **calibration** ➔ **base selection** ➔ **Edit**

• Choose **CALIBRATION** from the menu. • Press the keys ⬇ + ✓	1 Setup < 2 Calibration > 2 Data export. 3 Maintenance
• Select the base to edit • Press the keys ⬇ + ✓	1 Sample BASE 1 2 Lab BASE 1 < 3 Base select. > 4 Base assign.
• For example, choose the BASE 1	1 Sample BASE 1 <1 BASE 1> 2 BASE 2
• Use ✓ to choose **Edit**	1 Select < 2 Edit >
You can visualize or modify manually the calibration coefficient for this procedure.	DataBase coefficients Base 1 GAIN COD 2.57 GAIN TSS 1.00 G TOC 1.00 G COLOR 1.00

- Select the coefficient you want to modify (DCO coefficient or suspended solid),

- Validate with ☑ .

DataBase coefficients
Base 1
COD gain 10.1

5.4. COEFFICIENTS DETERMINATION

1 - export measurement data file and read samples measurements values

date	hour	channel	COD (mg02/l)	TSS (mg/L)	TOC (mgO2/L)	COLOR (mgPt/L
27/10/2016	14:18:52	1	244.7	0.6	95.931	0.555
27/10/2016	14:20:51	1	244.7	0.6	95.939	0.579
27/10/2016	14:22:51	1	244.6	0.6	95.929	0.575
27/10/2016	14:24:51	1	244.4	0.6	95.839	0.567

Sample

Absorption
95.8 TOC mgO2/l
0.6 COLOR mgPt/l
12/12/2016   08:00:37

2 - enter gain coefficients for each parameter

DataBase coefficients
Base 1
GAIN COD   2.57
GAIN TSS   1.00
G TOC   1.00
G COLOR   1.00

Here, for example, we enter gain of 2 for TOC and gain of 5 for COLOR.

date	hour	channel	COD (mg02/l)	TSS (mg/L)	TOC (mgO2/L)	COLOR (mgPt/L
27/10/2016	14:18:52	1	244.7	0.6	95.931	0.555
27/10/2016	14:20:51	1	244.7	0.6	95.939	0.579
27/10/2016	14:22:51	1	244.6	0.6	95.929	0.575
27/10/2016	14:24:51	1	244.4	0.6	95.839	0.567
27/10/2016	14:29:34	1		0.6	191.693	2.804
27/10/2016	14:31:34	1		0.6	191.658	2.886
27/10/2016	14:33:34	1		0.6	191.458	2.959

Calibrated values

Absorption
192 TOC mgO2/l
3.0 COLOR mgPt/l
12/12/2016   08:10:37

Chapter 6
USE

6. USING THE TRANSMITTER

6.1. MEASUREMENT DISPLAYS

⌂	→ **measurement**

Once switched on, the UV-Probe 254+ displays measurement page 1.The measurements of the probe cover 4 pages.

- To **change the active page**, use ⬆ and ⬇

- To **choose the measurement channel** to be displayed, use ⬅ and ➡

Page 1: overall parameters	
COD (mgO2/l): **C**hemical **O**xygen **D**emand **TSS**: **S**uspended **S**olids Each measurement displayed on screen "measurement" must be calibrated using "Calibration 1 procedure.	**Absorption** **0.0** COD mgO2/l **0.0** TSS mg/l 24/11/2017 12:00:00
Page 2: Absorptions	
SAC 254: absorption of the effluent by cm in the UV zone. **SAC 560**: absorption of the effluent by cm in the visible zone. Each measurement displayed on screen "Absorption" must be calibrated using "Calibration 2 procedure.	**Absorption** **0.0** SAC254 AU/m **0.0** SAC560 AU/m 12/12/2016 08:10:37
Page 3: Optical Power	
UV Power indicates the power of the UV LED **VIS Power** indicates the power of the Visible LED.	**Optical Power** UV Power ▭ VIS Power ▭ 12/12/2016 08:00:37

Page 4: Status	
Information on the system status are displayed on this page: - time of the next analysis - temperature of the probe in °C - wait mode, analysis or cleaning (waiting, running, cleaning) - date and time	**Status** Next: 00:02:28 0.0°C Di1 □ DO1 □ Running Di2 □ DO2 □ DO3 □ AO1 [_____] AO2 [_____] 12/12/2016 08:00:37

- status of the on-off inputs DI1 and DI2
 	
    DI1 ■ activated,
    DI2 □ not activated
	Di1 ■ DO1 □ Running
	Di2 □ DO2 □ DO3 □

- Status of the relay outputs DO1, DO2, DO3
 	
    DO1 ■ activated,
    DO2 ■ activated,
    DO3 □ not activated
	Di1 □ DO1 ■ Running
	Di2 □ DO2 ■ DO3 □

- bar graph indicating the level of the 4-20mA outputs Example AO1 : 10 mA AO2 15 mA 	

6.2. SAVING MEASUREMENTS TO A USB FLASH DRIVE

	→ **data exportation**
The data exportation function allows you to save the data from the *UV-Probe 254+* onto a USB flash drive in order to work on them with a PC. The *UV-Probe 254+* can store several years' worth of measurements. We recommend that copying these measurements regularly onto a USB flash drive. • Choose **DATA EXPORT** from the menu	1 Setup 2 Calibration < 3 Data export > 4 Maintenance
• Define the period of measurements you wish to save onto the USB flash drive (start and end date).	FROM Year month 08 04 TO 09 04
• Insert the flash drive into the port situated on the left hand side of the transmitter, then validate with ✓.	Please insert USB
• The data will be copied onto the flash drive. The device creates a data file for each month so as to avoid files becoming to voluminous. The file names are given in the format **Y2008M11.xls**. They can be used directly with Microsoft Excel © or a compatible spreadsheet.	Copying files ... File: Y2008M11.xls

If the data is not recognized by your computer, verify the configuration of the decimal point.

6.3. DISPLAYING THE DATA USING MICROSOFT EXCEL©

To display the data in a curve using Microsoft Excel:

- Open the data file and click on column **D** (COD).

Microsoft Excel - ficher Y2017M11.xls

Fichier Edition Affichage Insertion Format Outils Données Fenêtre ? Adobe PDF

D1 = COD (mgO2/l)

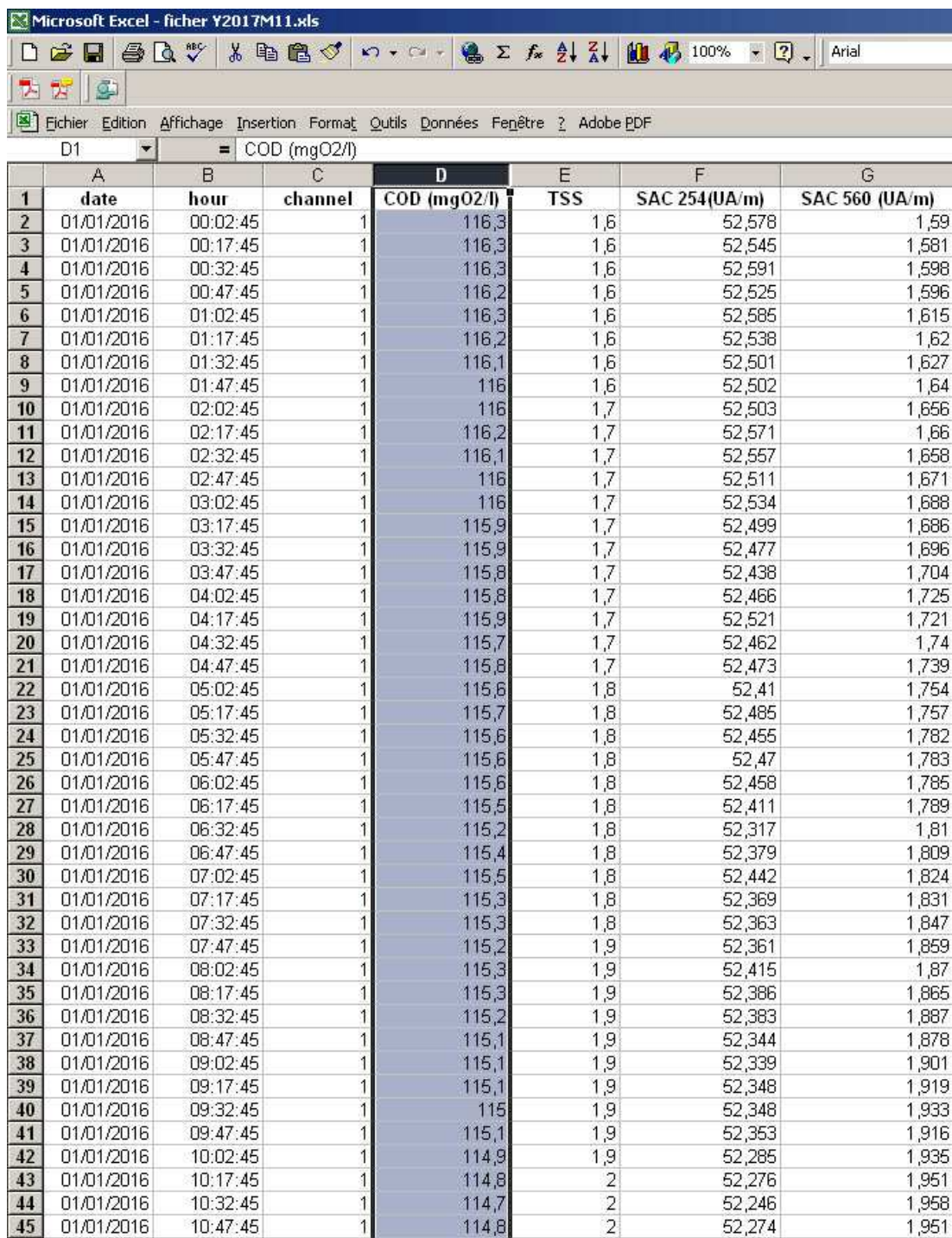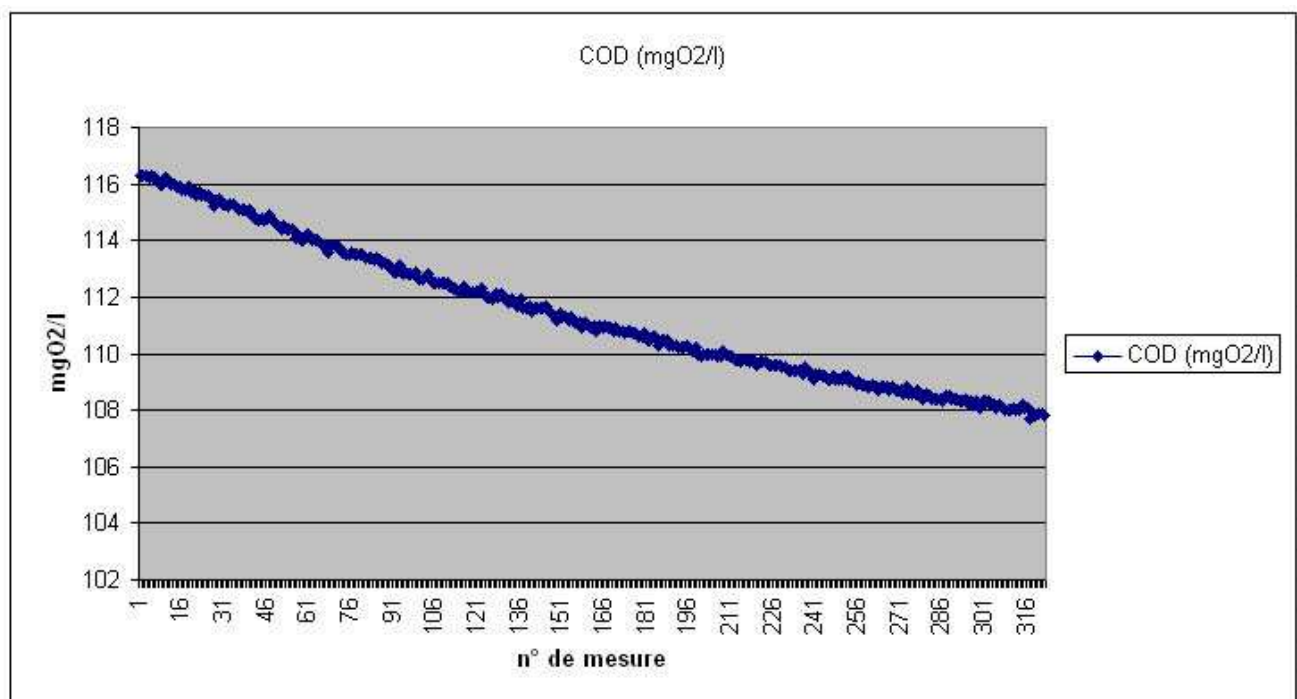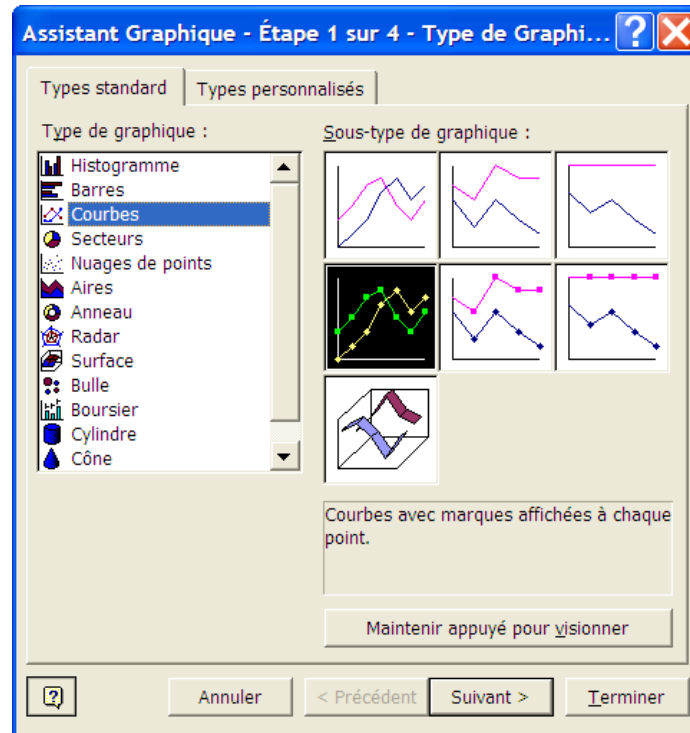|	A	B	C	D	E	F	G
1	date	hour	channel	COD (mgO2/l)	TSS	SAC 254(UA/m)	SAC 560 (UA/m)
2	01/01/2016	00:02:45	1	116,3	1,6	52,578	1,59
3	01/01/2016	00:17:45	1	116,3	1,6	52,545	1,581
4	01/01/2016	00:32:45	1	116,3	1,6	52,591	1,598
5	01/01/2016	00:47:45	1	116,2	1,6	52,525	1,596
6	01/01/2016	01:02:45	1	116,3	1,6	52,585	1,615
7	01/01/2016	01:17:45	1	116,2	1,6	52,538	1,62
8	01/01/2016	01:32:45	1	116,1	1,6	52,501	1,627
9	01/01/2016	01:47:45	1	116	1,6	52,502	1,64
10	01/01/2016	02:02:45	1	116	1,7	52,503	1,656
11	01/01/2016	02:17:45	1	116,2	1,7	52,571	1,66
12	01/01/2016	02:32:45	1	116,1	1,7	52,557	1,658
13	01/01/2016	02:47:45	1	116	1,7	52,511	1,671
14	01/01/2016	03:02:45	1	116	1,7	52,534	1,688
15	01/01/2016	03:17:45	1	115,9	1,7	52,499	1,686
16	01/01/2016	03:32:45	1	115,9	1,7	52,477	1,696
17	01/01/2016	03:47:45	1	115,8	1,7	52,438	1,704
18	01/01/2016	04:02:45	1	115,8	1,7	52,466	1,725
19	01/01/2016	04:17:45	1	115,9	1,7	52,521	1,721
20	01/01/2016	04:32:45	1	115,7	1,7	52,462	1,74
21	01/01/2016	04:47:45	1	115,8	1,7	52,473	1,739
22	01/01/2016	05:02:45	1	115,6	1,8	52,41	1,754
23	01/01/2016	05:17:45	1	115,7	1,8	52,485	1,757
24	01/01/2016	05:32:45	1	115,6	1,8	52,455	1,782
25	01/01/2016	05:47:45	1	115,6	1,8	52,47	1,783
26	01/01/2016	06:02:45	1	115,6	1,8	52,458	1,785
27	01/01/2016	06:17:45	1	115,5	1,8	52,411	1,789
28	01/01/2016	06:32:45	1	115,2	1,8	52,317	1,81
29	01/01/2016	06:47:45	1	115,4	1,8	52,379	1,809
30	01/01/2016	07:02:45	1	115,5	1,8	52,442	1,824
31	01/01/2016	07:17:45	1	115,3	1,8	52,369	1,831
32	01/01/2016	07:32:45	1	115,3	1,8	52,363	1,847
33	01/01/2016	07:47:45	1	115,2	1,9	52,361	1,859
34	01/01/2016	08:02:45	1	115,3	1,9	52,415	1,87
35	01/01/2016	08:17:45	1	115,3	1,9	52,386	1,865
36	01/01/2016	08:32:45	1	115,2	1,9	52,383	1,887
37	01/01/2016	08:47:45	1	115,1	1,9	52,344	1,878
38	01/01/2016	09:02:45	1	115,1	1,9	52,339	1,901
39	01/01/2016	09:17:45	1	115,1	1,9	52,348	1,919
40	01/01/2016	09:32:45	1	115	1,9	52,348	1,933
41	01/01/2016	09:47:45	1	115,1	1,9	52,353	1,916
42	01/01/2016	10:02:45	1	114,9	1,9	52,285	1,935
43	01/01/2016	10:17:45	1	114,8	2	52,276	1,951
44	01/01/2016	10:32:45	1	114,7	2	52,246	1,958
45	01/01/2016	10:47:45	1	114,8	2	52,274	1,951

- Click on the icon ▉,
- Select [Courbes] and Validate by clicking on [terminer].

Chapter 7
MAINTENANCE

7. MAINTENANCE

🏠	➔ **maintenance**

Maintenance operations are necessary to keep the device functioning correctly. They ensure that the measurements made are sound as well as prolonging the lifespan of the device.

The *UV-Probe 254+* only requires minimum maintenance.

7.1.   ROUTINE MAINTENANCE

Care of the measurement head

- Remove the probe from the liquid in which it is immersed
- Rinse the probe with clean water
- Clean the measurement windows with a fine brush
- Reposition the probe

Condition of the UV LED and the Visible LED

The luminosity levels of the LEDs should be verified every two months to ensure that they do not need replacing. To do this, access the STATUS pag of the measurement menu.

The "UV Power" level bar indicates the power of the UV LED.
The "VIS Power" level bar indicates the power of the VIS LED.

7.2. CURRENT OUTPUT CALIBRATION

• Choose **SETUP** from the menu	**< 1 Setup >**
	  2 Calibration
	  3 Data export.
	  4 Maintenance

• Choose **MAINTENANCE**	1 Setup 2 Calibration 3 data export **< 4 maintenance >**

• Choose **AO CALIB.**	**<1 AO calib.>**
	  2 Sys. files
	  3 Upgrade
	  4 Manufacturer

• Choose the **CURRENT OUTPUT NO.**1 or **CURRENT OUTPUT NO.2.**	**<Current out.1>** Current out.2
Once the channel has been selected, the transmitter generates a first current value close to 8mA on the output. • Measure this current with an ammeter and enter the exact value into the dialogue box.	4-20mA CALIBRATION value 1: 8.12

The transmitter will then generate a second current of close to 16 mA on the output.

- Measure this current with an ammeter and enter the exact value into the dialogue box to 2 decimal places

4-20mA CALIBRATION

value 2: 16.29

Once the two values of the currents measured have been entered, the device calculates the calibration and asks for verification.

- Verify the 8 mA value

4-20mA CALIBRATION

Check 8mA Value

- Verify the 16 mA value

- If the two points are correct, then the calibration is finished.
- If there is too large a gap (> ± 0.04mA) between the value measured and the value displayed by the transmitter, the calibration procedure must be repeated.

4-20mA CALIBRATION

Check 16mA Value

7.3. SYSTEM FILES

• Choose **SETUP** from the menu	< 1 Setup >
	  2 Calibration
	  3 Data export.
	  4 Maintenance

• Choose **MAINTENANCE**	1 Setup 2 Calibration 3 data export < 4 maintenance >
• Choisir **SYS. FILES.** Le menu SYS. FILES. menu is used to generate a file that will be used by EFS in case of maintenance operation.	1 AO calib. < 2 Sys. files > 3 Upgrade 4 Manufacturer
• Enter the start and end date of the file	FROM Year month 16 08 TO 17 01
• Insert the flash drive into the port situated on the left hand side of the transmitter, then validate with ☑ .	Please insert USB

7.4.   SOFTWARE UPGRADES

🏠	→ **maintenance** → **Upgrade**

• Choose **SETUP** from the menu	```< 1 Setup >
2   Calibration
3   Data export.
4   Maintenance```
• Choose **MAINTENANCE**	``` 1 Setup
2   Calibration
3   data export
< 4   maintenance >```
The **Upgrade** menu will enable you to install the software updates provided by the manufacturer. Select this line from the menu and initiate the update process.	``` 1 AO calib.
2 Sys. files
< 3 Upgrade >
4 Manufacturer```
Steps involved in an update: 1. the system reinitializes 2. the transmitter searches for a USB flash drive containing the update file (during this phase, the alarm 1 signal light flashes at approximately twice a second). 3. if the flash drive is not present or if the update file is not found on the flash drive, the system restarts as usual with the same version of the software. 4. if the flash drive is detected and the update file is found, the update begins (during the update process, the alarm signal lights 1 and 2 flash alternately several times a second). 5. when the update is complete, the system restarts with the new version of the software.	*UV Probe 254 +* 1.17

Probe 1 detected
type: 8489
serial: Aa00
Software: 1.0
Cell 5mm

Note 1: When you start up the transmitter, you can find out which version of the software is being used. The version is shown at the bottom right of the start-up screen.

Note 2: When starting up, the transmitter also detects the presence of the measurement probe and indicates its characteristics.

7.5. MANUFACTURER

Function reserved to EFS.

1 AO calib.
2 Sys. files
3 Upgrade
<4 Manufacturer>

Chapter 8
APPENDICES

8. APPENDICES

8.1. TECHNICAL SPECIFICATIONS

	Min	Typical	Max	Unit
Relay outputs				
Maximum current			8	Amp
Maximum voltage			250	Volt AC
24V or 5V inputs				
Voltage contact open (depending on jumper position J9/J10)		24/5	30/8	V
Current contact closed		13		mA
4-20mA Outputs				
Output current	4		20	mA
Output voltage			7	V
Load	0	250	350	ohms
ModBus Liaison				
Theoretical range at 9600bps on an adapted twisted pair		1000		metres
Line termination impedance (can be disactivated)		120		Ohms
Line polarization impedance (can be disactivated)		470		Ohms
Housing				
Height		130		mm
Width		130		mm
Depth		100		mm
Weight		1kg		Kg
Protection IP66 (NEMA 4X)				
Probe				
Height		250		mm
Diameter		55		mm
Weight		5		Kg
Protection IP68 16 bars			10	bars
Measurement range				
Measurement range	0		2500	/m
Absorption resolution		0.1		/m
COD measurement range on solution $KC_8H_5O_4$	0		1000	mg/l
COD resolution on solution $KC_8H_5O_4$		1.0		mg/l
Environment				
Ambient temperature	5	25	45	°C
Power supply				
Current	110		230	V AC
Voltage	50		60	Hz

Information pertaining to a probe UV-prob-254+ equipped with software version 1.00. The characteristics of the equipment, as well as its documentation may be modified by the manufacturer without prior consultation.

8.2. MAINTENANCE SHEET

Intervention					
Maintenance date					
User name					
Serial number of the probe					
Verifications					
Transmitter condition		Good		Average		Problem
Probe linking cable condition		Good		Average		Problem
Cleanliness of probe head		Good		Average		Problem
Cleanliness of measurement cell		Good		Average		Problem
Cleaning module condition		Good		Poor		Problem
UV LED level		Good		Poor		Problem
VISIBLE LED Level		Good		Poor		Problem
Cleaning					
Probe head cleaning		Yes		No		
Long term disuse					
		Yes		No		
Notes					
		Yes		No		

•••