Operator Manual

POLYMETRON 9185

221=191=085 - Revision E - 10/12/2007

EXCELLENCE IN PROCESS ANALYTICS

SUMMARY

This instrument conforms to the European Directives :

- 89/336/CEE modified by the directive 93/68/CEE
- 73/23/CEE modified by the directive 93/68/CEE

Warning !

There are no user-serviceable parts in either the transmitter or sensor. Only Hach Ultra Analytics personnel or their authorized representative should attempt repair of the system and only components expressly approved by the manufacturer should be used. Any attempt to repair the instrument in contradiction of these guidelines may result in damage to the instrument and injury to the person making the repair. It will also void the warranty and may compromise the safe operation, electrical integrity or CE compliance of the instrument.

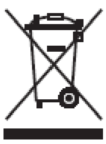
Note :

This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Precautionary Labels :

Read all labels and tags attached to the instrument. Personal injury or damage to this instrument could occur if not observed.

This symbol, if noted on the instrument, references the instruction manual for operation and / or safety information.



Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after 12 August of 2005. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of life equipment to the Producer for disposal at no charge to the user.

Note : *For return for recycling, please contact the equipment producer or supplier for instructions on how to return end-of-life equipment for proper disposal.*

Important document. Retain with product records.

Restriction of Hazardous Substances

Note:
The following only applies to exports of the product into the People's Republic of China.

Marking 标记

Products contain toxic or hazardous substances or elements.
含有有毒或者危险物质及成分的产品。

Environment Protection Use Period Marking (years).
环保使用期限标记（年）

Part Name 部件名称	Toxic or Hazardous Substances and Elements 有毒或者危险物质和成分					
	Lead (Pb) 铅	Mercury (Hg) 汞	Cadmium (Cd) 镉	Hexavalent Chromium (Cr VI) 六价铬	Polybrom Biphenyls (PBB) 多溴联苯	Polybrom Diphenyls (PBDE) 多溴联苯醚
Transmitter box	X					
CPU PCB	O				O	
Power PCB	O				O	
Relay PCB	O				O	
Module	O					
Probes	O					
Cable	O					

O: Indicates that this toxic or hazardous substance contained in all homogeneous material for this part is below the limit requirement
表示所有此类部件的材料中所含有毒或危险物质低于限制要求

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement
表示至少有一种此类部件材料中所含有毒或危险物质高于限制要求

1. Presentation of the instrument

Introduction

The oxidative properties of ozone are used for disinfecting water in a large number of industrial installations. Continuous monitoring of dissolved ozone levels is therefore essential in order to guarantee the bacteriological quality of water.

The OZONMAT 9185 is an industrial single channel analyser for the in-line and selective measurement of dissolved O_3 in potable and pure water treatment units, along with all applications requiring ozone level monitoring.

Reminders

Ozone chemistry

Ozone is a gas that is highly soluble in water (13 times more than oxygen). It is unstable when dissolved in water. A certain number of parameters can influence this stability, such as:

<u>Temperature</u>

The solubility of ozone in water decreases rapidly with temperature:

This solubility **S** is expressed by the following ratio:

$$S = \frac{X_G}{X_L}$$

Where:

X_G = ozone concentration of the gas in contact with water (g/m^3) at a pressure of 1 atm.

XL = ozone concentration of water (g/m^3).

T°C	0	5	10	15	20	25	30	35
S	0.64	0.5	0.39	0.31	0.24	0.19	0.15	0.12

for example, for an ozoniser generating a concentration of 2 g/m^3, the maximum concentration X_M in water, at P = 1 atm, will be as follows:

T°C	0	5	10	15	20	25	30	35
X_M (ppm)	1.28	1	0.78	0.62	0.48	0.38	0.3	0.24

It appears that this concentration is divided by 2 between 5 and 20 °C.

pH

Ozone reacts with OH^- hydroxide ions: the greater the number of these ions (high pH), the greater the degree of breakdown. Conversely, at a low pH, breakdown will be slower:

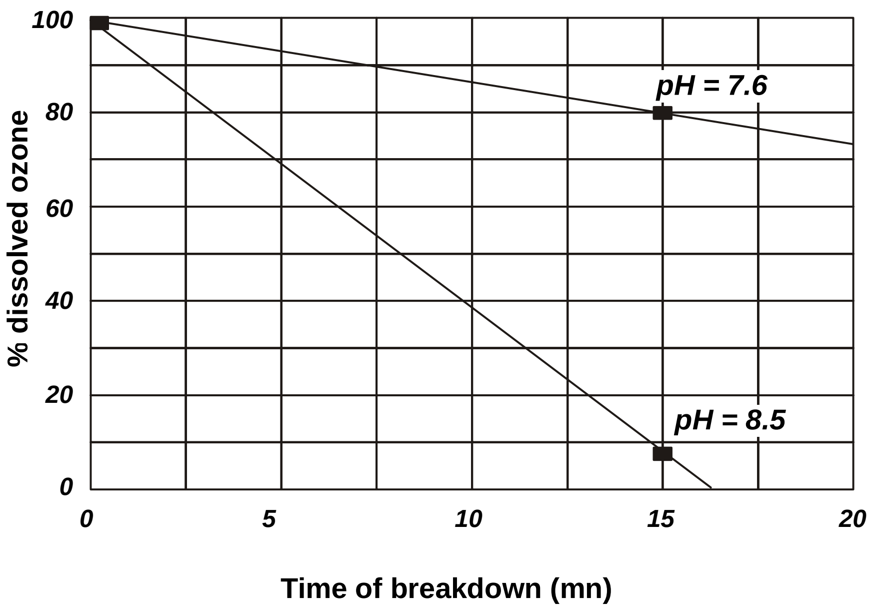


Figure 1.1

Finally, it is worth noting that, as the OH^- ion is a by-product of ozone breakdown in water, the reaction between OH^- and O_3 can be sustained until complete disappearance of the ozone.

The presence of oxidisable materials

This results in the decrease in the value of dissolved ozone.

The presence of air in the conduits

The exposure to free air of highly ozone-loaded water results in significant degassing: as the ozone content of ambient air is very low compared to that of the sample, exchange therefore occurs, with rapid loss of ozone in the sample.

This problem is even more pronounced if air/water mixing occurs.

All of these phenomena, therefore, require that certain precautions be taken concerning the sampling line (c.f. instrument installation).

Measurement principle

Measurement is performed using the amperometric method, after diffusion of ozone molecules through a gas permeable membrane.

Ozone measurement is based on the Clark cell principle.

This amperometric sensor is made up of:

- a gold work electrode where the main reaction occurs,
- a silver counter-electrode,
- an electrolyte, which is an ionic conductor,
- a membrane that isolates the electrochemical cell from the sample and through which ozone diffuses:

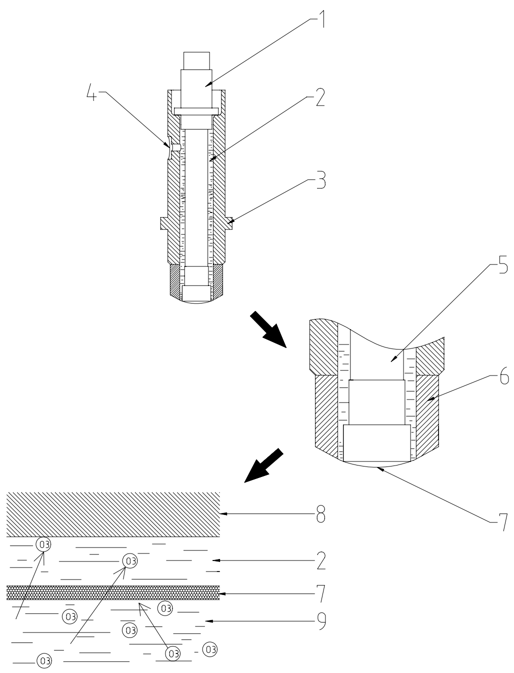


Figure 1.2

- 1 Assembled electrode
- 2 Electrolyte
- 3 Probe body
- 4 Filling orifice
- 5 Anode
- 6 Membrane holder
- 7 Membrane
- 8 Cathode
- 9 Sample

The ozone molecules contained in the sample diffuse through the membrane. O_3 is therefore located in a very thin electrolyte layer between the membrane and the cathode.

A constant work potential is applied to the work electrode (cathode) where O_3 is reduced to oxygen.

At the silver electrode (anode) the silver is oxidised to Ag^+ ions.

Ozone reduction at the cathode generates a current which is directly proportional to the partial pressure of ozone in the sample.

The electrochemical reaction and diffusion through the membrane are dependent upon temperature, a consequently the measurement cell is fitted with a temperature sensor that allows the automatic compensation of measurement variations according to temperature.

2. Description of the OZONMAT

Synoptic of the instrument

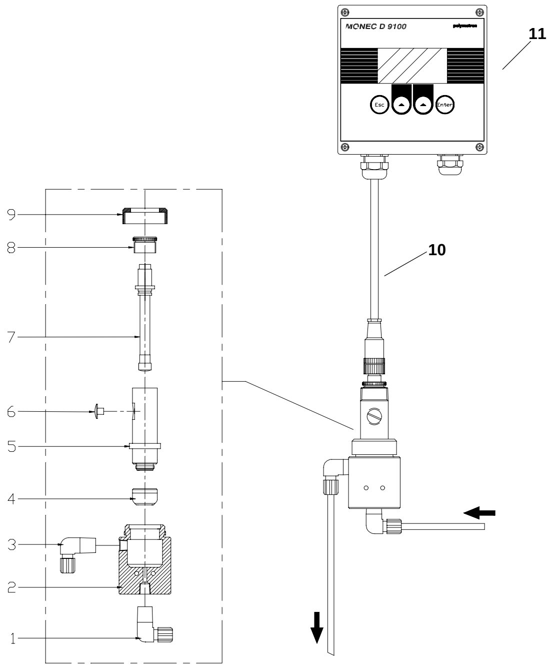


Figure 2.1

- **- 1** Inlet connector (for DN4/6 tube)
- **- 2** Cell
- **- 3** Outlet connector (for DN6/8 tube)
- **- 4** Membrane
- **- 5** Electrode body
- **- 6** Filling stopper
- **- 7** Electrode
- **- 8** Clamping nut
- **- 9** Cell cap
- **- 10** Probe cable
- **- 11** Transmitter

3. Technical specifications

Transmitter dimensions

Dimensions are given in mm and in inches.

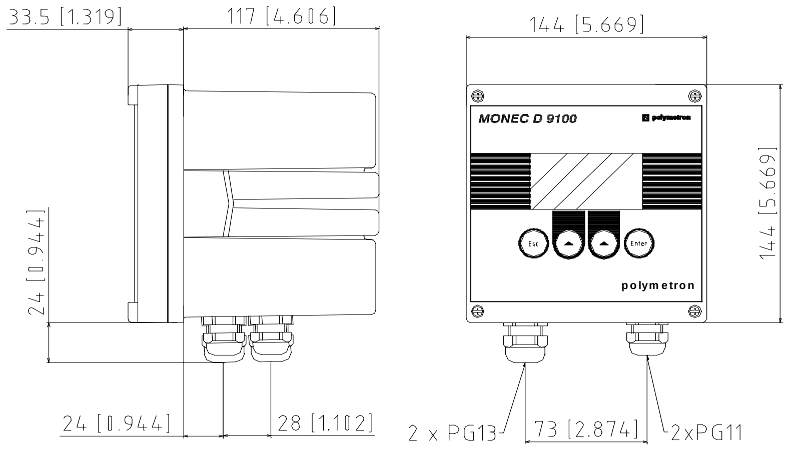


Figure 3.1

Cell dimensions

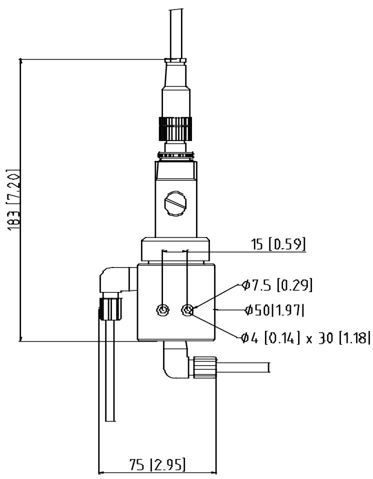


Figure 3.2

(Dimensions are given in mm and in inches).

General properties

- Measurement range: 0 to 2 mg/l
- Temperature compensation
- Programmable thresholds, relay outputs
- 4-20 mA and 0-20 mA outputs, standard alarm relays and optional RS 485

This instrument complies with the following standards:

- Immunity to electromagnetic disturbances	EN 61326-1997 and EN 61326 A1-1998 (Industrial level for immunity)
- Low voltage standard	IEC61010-1
- UL and CSA agreement	File E226594

SAMPLE	
Number of channels	1
Temperature	0-45 °C (32-113 °F)
Operating pressure	atmospheric pressure
Output	12-30 l/h (15l/h recommended)

CONNECTIONS	
Sample inlet	∅ 4/6 PE tube
Sample evacuation	∅ 4/6 PE tube

CONDITIONS OF USE	
Ambient temperature	-20 to +60°C
Relative humidity	10 to 90 %
Power supply voltage fluctuation	± 10 %
Over voltage category	2
Pollution degree	2 (as CEI 664)
Altitude	< 2000 m
Measurement category	I (overvoltage less than 1500 V)

ANALYSIS	
Measured quantity	O_3
Measurement range	0 .. 2 mg/l
Repeatability	± 5 μg/l or ± 2 % the greater of the 2 values
Detection limit	< 10 μg/l
Response time (90 %)	< 90 s
Ambient temperature	0-45 °C (32-113 °F)
Interference	No chlorine interference

Analogue outputs	Maximum load 800 Ohms 2 x 0/4... 20 Ma galvanically, insulated, assigned to measurement or to temperature, linear, bi-linear, precision: 0,1 mA
Alarms	Number: 4 Functions: threshold system alarm - timer Hysteresis: 0-10 % Delay: 0-999 s Breaking power: 250 VAC, 3A maximum 30 VDC, 0,5A maximum Use a cable (rated 105°C and AWG22 to 14). The external cable insulation should be cut as close as possible from the terminal block.
Temperature compensation	Automatic in the 0-45°C range (32-113 °F)
RS485 (option)	Speed : 300-9600 bauds Galvanic insulation Number of stations: max. 32
Transmitter seal	IP65 NEMA 4X
Measurement category	I (overvoltage less than 1500 V)
Error indication	0 < cell current > 999 µA Sample temperature > 45 °C (113 °F) or < 0 °C (32 °F)
Maintenance	No specific maintenance is required. The instrument may be cleaned with a soft cloth and without any abrasive products

MATERIALS

Work electrode	Cathode : gold
Counter-electrode	Anode : silver
Membrane holder	PVC
Membrane	PFA
Transmitter	Aluminium with polyester paint
Probe body	PVC

MAINTENANCE	
Approximately sample life membrane	Between one and six months according to sample
Units	µA, ppb-µg/l, ppm-mg/l, °C, °F
Calibration	Electrical zero, chemical zero with ozone--free water, process calibration of the slope by comparison with a laboratory measurement

TRANSMITTER	
Display	Concentration unit indicator Direct display of concentration or cell current in µA Sample temperature display in °C, °F menu--assisted programming

Using the mounting plate (optional) and other accessories (optional)

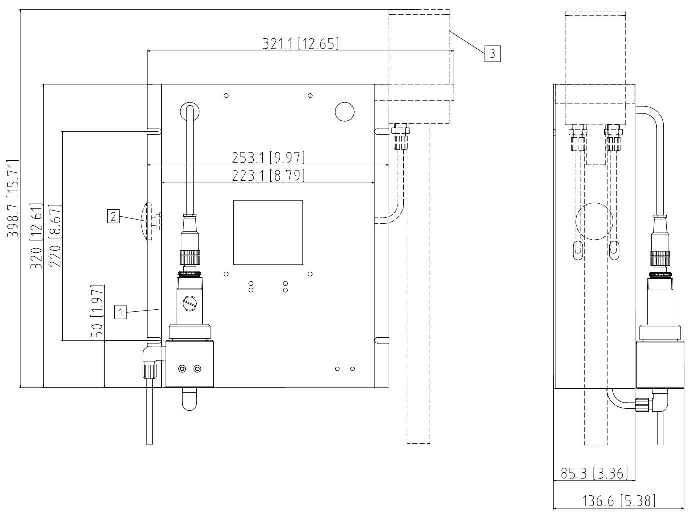


Figure 3.3

- **- 1** Mounting plate: 09184=C=2700 (optional)
- **- 2** Control valve 696=069=001 (optional)
- **- 3** Overflow vessel 09185=A=1700 (optional)

Chemical cleaning kit (optional)

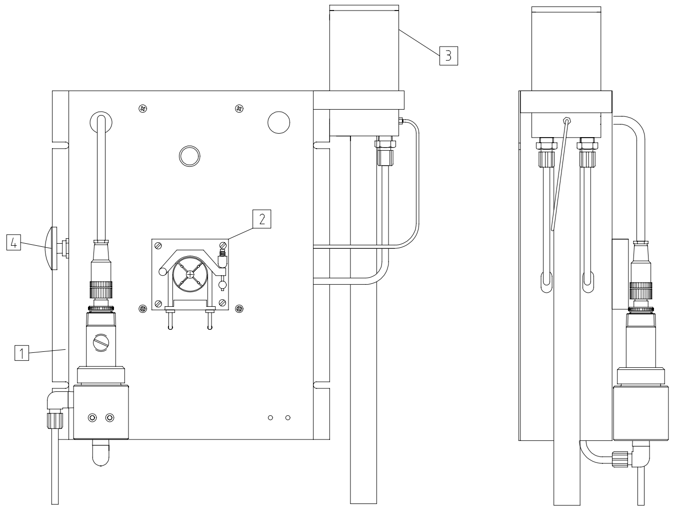


Figure 3.4

The complete kit possesses the following reference (220 V version): 09185=A=7100

It is comprised of the following elements:

- **1** Mounting plate (09184=C=2700)
- **2** Acidification pump + tubing + tub (09184=A=2500)
- **3** Overflow vessel for acidification: 09185=A=1800

The no. 4 control valve: 696=069=001 is provided separately.
This kit is available in 24 V and 110 V
(c.f. spare parts list, appendix 2).

Transmitter section

Presentation of the transmitter

Figure 3.5

The transmitter amplifies the signal generated by the amperometric measurement cell and converts it to a direct digital read-out in ppm, mg/l, ppb, mg/l, °C and °F. The transmitter is made up of the following elements:

- Potentiostat controlling the potential of the work electrode.

- Amperometric measurement module.

- Multiplexer.

- Microprocessor.

The analogue multiplexer allows measurements to be made at the cell, temperature sensor and at the instrument’s internal control points. Next, the microprocessor controls the relays, the RS485 serial interface (optional) and the analogue outputs.

The unit possesses an integrated automatic range switch, along with microprocessor-controlled calibration.

The potentiostat output is continuously controlled by the microprocessor in order to detect any anomalies. This condition may arise with open cell connections, inoperative electrodes or a faulty anode.

The transmitter synoptic is as follows:

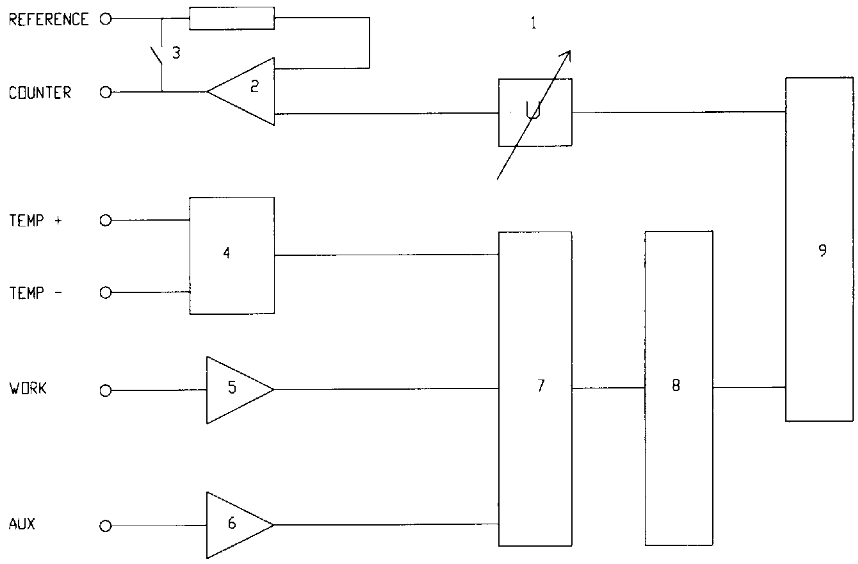


Figure 3.6

- 1 Programmable potentiostat
- 2 Polarising voltage amplifier
- 3 Switch for 2- or 3-electrode operation
- 4 Temperature measurement circuit
- 5 Measurement circuit current amplifier
- 6 Auxiliary input
- 7 Multiplexer
- 8 A/D converter
- 9 Microprocessor

Fields of use

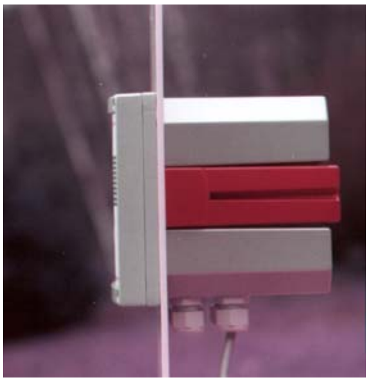
Simple to use (installation, programming), this microprocessor instrument can be used for the following applications:

- potable water treatment,

- pure water circuits.

Standard transmitter mounting possibilities (use of the red clamp)

The housing complies with the DIN 43700 standard.



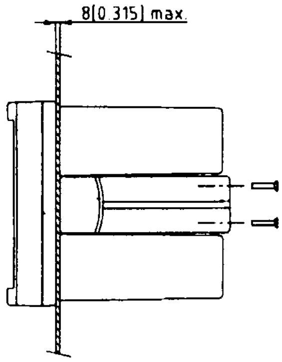


Figure 3.7

Fitting onto a specific panel

Panel cut-out:	138 × 138 mm
Front dimensions:	144 × 144 mm
Panel thickness:	1 à 8 mm

⇒ **2 M 4 mm screws, width 18 countersunk heads (provided)**

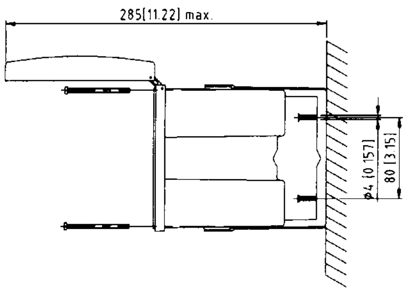
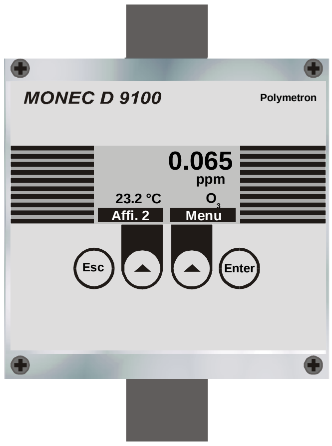


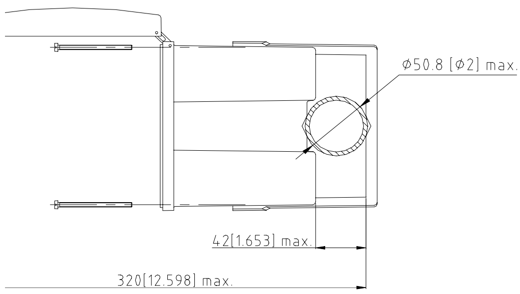
Figure 3.8

Wall mounting

⇒ **2 M 4 mm screws, width 60 countersunk heads (not supplied)/ 1 80 mm base**



Vertical tube mounting
⇒ ∅ 2" maximum - 2 M 4 mm screws width (not supplied)



Horizontal tube mounting
⇒ ∅ 2" maximum - 2 M 4 mm screws width (supplied)

Figure 3.9

4. Installation

Unpacking

The instrument should be unpacked carefully. Make sure that no accessories are lost during unpacking.

WARNING:

The instrument should only be assembled by qualified staff. Mains power should only be connected once installation has been completed and checked.

Inspection

The instrument has been factory tested and checked prior to shipping. We nevertheless recommend that you perform a visual inspection in order to ensure that it has not been damaged. Any marked packaging is a potential sign of damage that may not be immediately visible. Keep all packaging in the event of claims. If any parts or accessories are missing, refer to your distributor or to:

Hach Ultra Analytics

6 route de Compois - CP212

CH-1222 Vesenaz Geneva

Assembly

The instrument simply requires connection of the sample, cell outlet and mains power supply.

Implantation

The analyser should be placed in an accessible location.

The sample supply line should be as short as possible. Avoid, as far as possible, any abrupt bends or brutal cross-section changes.

Do not place the instrument next to a heat source, which would cause degassing of the ozone present in the sample.

Ensure that there are no air inlets in the supply line.

Sample properties

Supply pressure must be sufficient to ensure analyser supply. A minimum pressure of approximately 15 mbar is sufficient to provide the correct flow rate.

In the case of very hard water (high °TH), it may be necessary to fit an acidification system (c.f. options) in order to prevent the formation of deposits on the instrument.

Sample throughput must not vary too brutally, or measurement variations may occur.

In the case of such instabilities, the use of a overflow vessel (c.f. options) should allow normal operation to be restored.

Electrical connections

MONEC

Do not provide power to the instrument before its complete installation.

An aluminium shielding plate inside the Monec provides details of the role of the various terminal strip contacts, along with their connection to external elements.

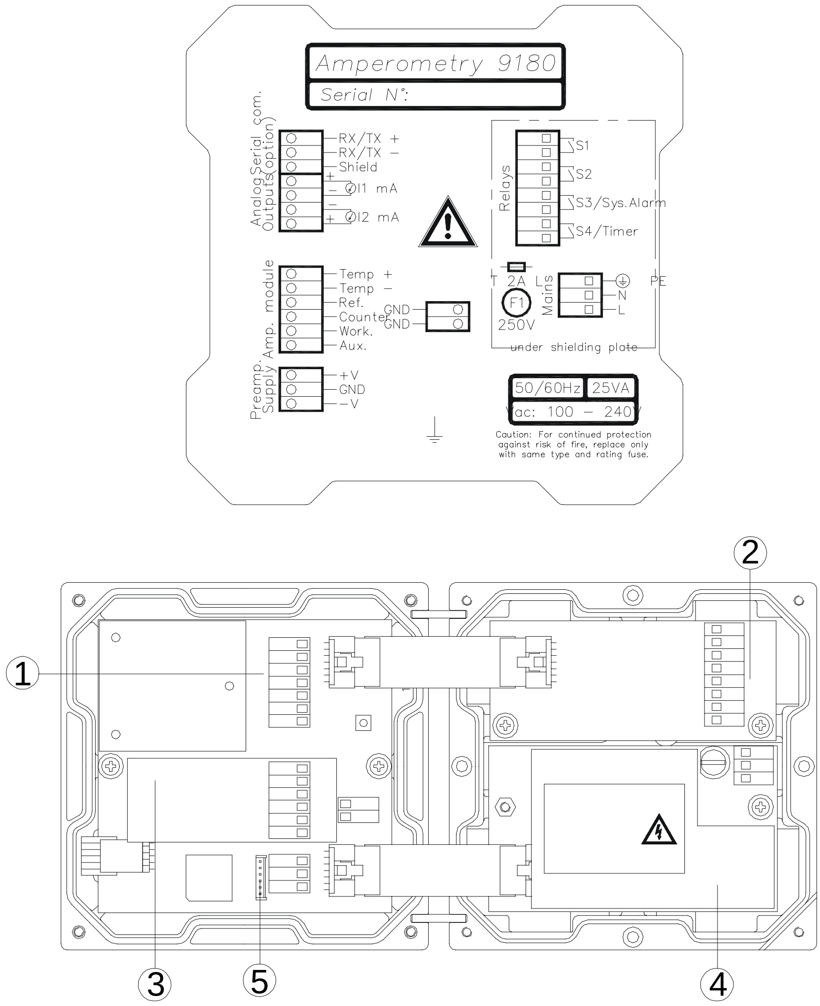


Figure 4.1

- **- 1** Microprocessor board
- **- 2** Relay board
- **- 3** Amperometric board
- **- 4** Power supply board
- **- 5** Program update connector

☛ The various terminal strips represented on the right are accessible by removing this shielding plate.

Refer to appendix 6 for connection details.

☛ **Electrical connections must always remain dry and clean in order to ensure reliable instrument operation. Ensure that the cables are positioned correctly when opening the transmitter.**

☛ **We recommend the use of shielded cables. Shielding should be connected to the earth terminal of the central shielding.**

Mains connection

Electrical installation should be performed by duly qualified staff. A main voltage of 100-240 VCA ± 10% is acceptable without altering the configuration. The power supply terminal strip can be removed from its housing in order to facilitate connection.

For safety reasons, it is essential that the following precautions for use are respected:

- Use a three wire mains supply cable (2 core + PE) with a cross section between 0.35 and 2 mm² (AWG 22 to 14) rated at 105°C minimum. The external cable insulation should be cut as close as possible from the terminal block.

- The instrument should be connected to the mains by means of a circuit breaker or fuse whose value should be inferior or equal to à 20 A. It should be positioned close to the transmitter and identified.

- This protection should cut off the phase and neutral in the even of an electrical problem or if the user wishes to access the inside of the instrument. The protective earth connector, on the other hand, must always be connected.

Mains power should always be cut off prior to working inside the instrument.

Transmitter start-up

Prior to powering up, ensure that the site's voltage corresponds to that stated on the instrument's identification plate.

Adjusting display contrast

If your display's contrast is too low, you can adjust it using the P1 potentiometer (blue). This potentiometer is located in the upper right hand corner of the CPU board, accessible after having opened the housing (see figure page 19).

5. Programming

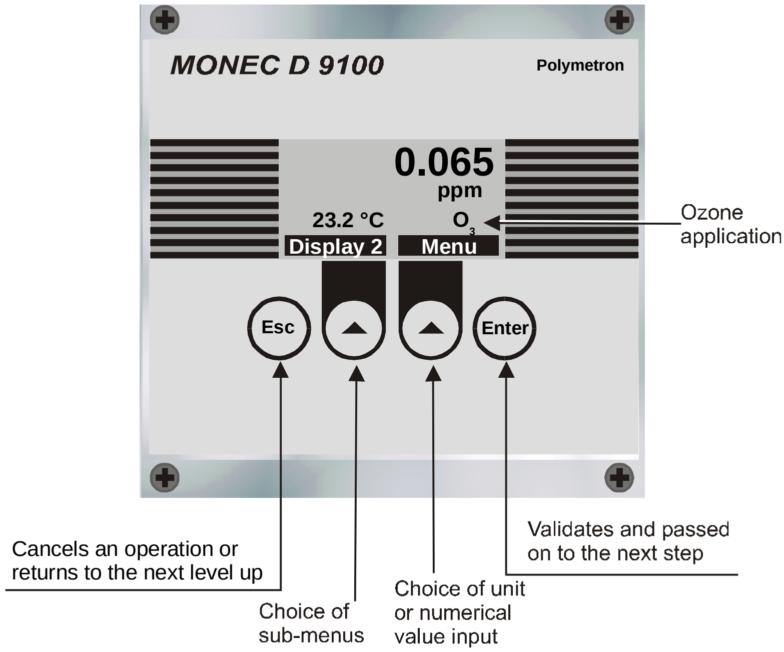


Figure 5.1

The display can be controlled to show:

- Sample concentration
- Sample temperature
- Diffusion current
- Programming codes
- Programming parameters

General

Programming structure

The programming structure of the 9185 comprises 3 levels:

LEVEL 1 : Display mode

LEVEL 2 : Menu mode

LEVEL 3 : Programming and operating mode

Passage from level 1 to 2 is achieved by pressing the function key under the highlighted ”menu”.

Make your selection using the function key under the highlighted ”SELECT” option.

Passage from level 2 to 3 is available only for the **PROGRAMMING** and **SERVICE** menus, using the ”Enter” key.

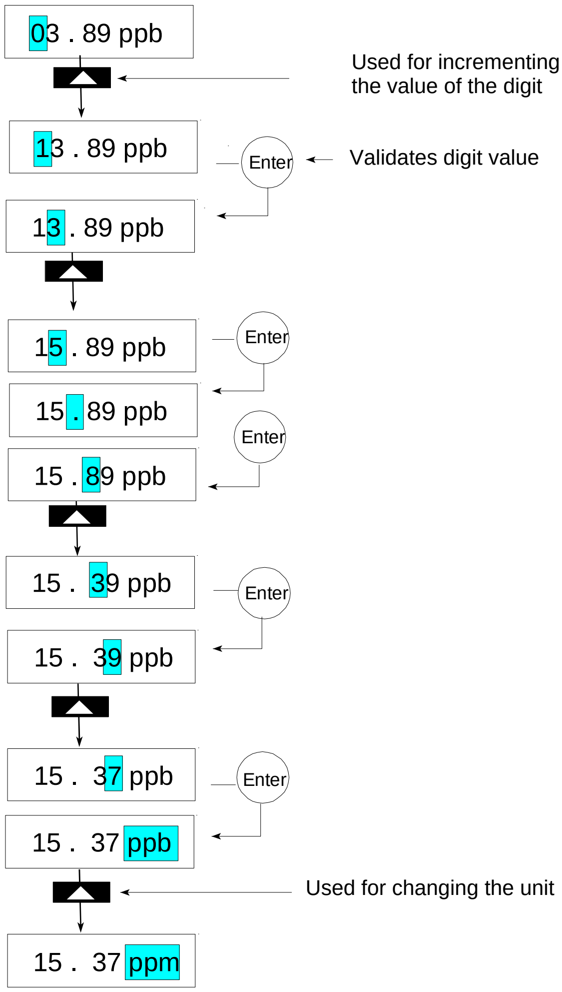
Press ”SELECT” to select a sub-menu.

Entering or changing a value:

The highlighted digit can be altered using the function key.

Validate each digit using the ”Enter” key. Repeat these two operations for the other digits.

Example :

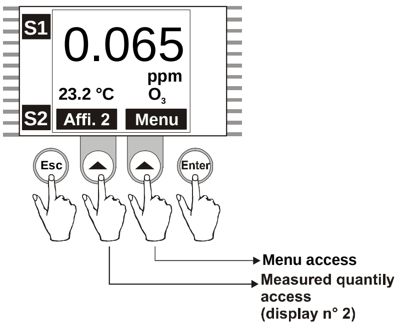


On the 1er digit: ability to display the ” - ” sign
On the other digits: ability to display a ” . ”

Remarks:

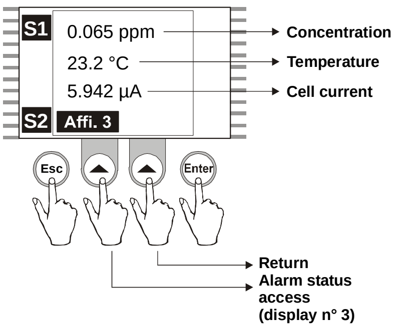
- If you do not touch any keys for over 10 minutes, the instrument returns to the main display.
- An access code for programming and maintenance can be defined (c.f. CODE menu §) in order to protect the configuration.
- An access code is systematically requested to access the "Polymetron menu".

Programming synoptic



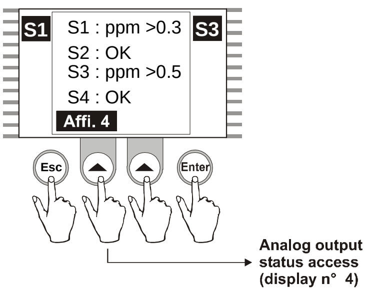
- **Start-up display**

0.065 ppm	:	concentration measurement (unit: ppm)
23.2 °C	:	temperature measurement
O_3	:	application : ozone
S1...S4	:	alarm status (invisible is alarms deactivated)



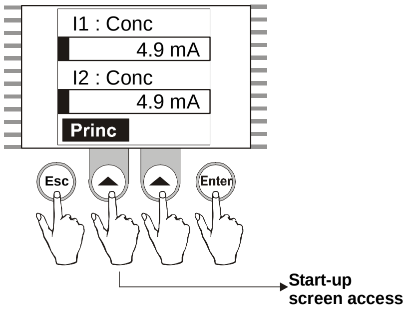
- **Measured quantities**

Display of measured quantities



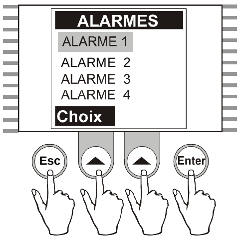
- **Alarm status**

S1...S4 : Alarm status
In this case, relays S1 and S3 are activated.



- **Analog output status**

Analog output status

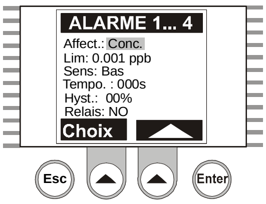


- **Alarms menu**

Relays S1..S4 may be assigned to threshold, system alarm and timer functions.
Relay S3 can also be assigned to the system alarm.
Relay S4 can also be assigned to the timer.

- **Threshold function**

The alarm relays are activated if the comparison of the measured value with the programmed limitmeets the alarm function condition (high or low). Set points are programmed from the following programming steps:

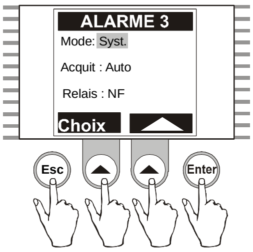


ALARMS 1 … 4 (THRESHOLD)		
ASSIGN	- Conc. - No - °C/°F	Used for selecting a temperature or concentration threshold, or relay not used
LIM	xxxx	Used for entering the threshold value
DIRECTION	- Up - Down	Selection of the up or down direction
TEMPO	xxxs	Definition of delay in seconds prior to relay triggering
HYST.	XX%	Definition of threshold hysteresis in % (max. 10%) Hysteresis only functions on the set point side. It is located below the set point for the upper alarm and above the lower alarm
RELAYS	- NO - NF	Relay normally open or normally closed

- **System alarm function**

The S3 relay can be used to indicate a malfunction detected by the analyser. We recommend connecting the S3 relay to an external alarm device in order to control faults detected by the instrument.

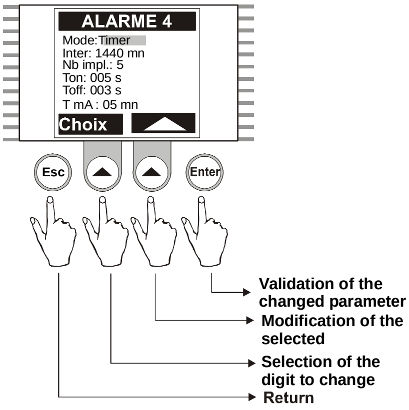
When a fault occurs, the S3 relay is activated. In the event of manual acknowledgment, the relay remains activated even if the fault disappears. You must press ENTER to deactivate the relay and accompanying error message. In the event of automatic acquittal, the relay and message are deactivated once the fault disappears.



ALARM 3 (SYSTEM ALARM)		
MODE	- No - Threshold - Syst.	For alarm 3, you have a choice between a threshold function (see following paragraph) and a system alarm function
ACQUIT	- Auto - Man.	In the system alarm case, you can choose between manual acquittal (ENTER key) or automatic acknowledgment
RELAYS	- NO - NF	Allows selection of S3 normally open or normally closed

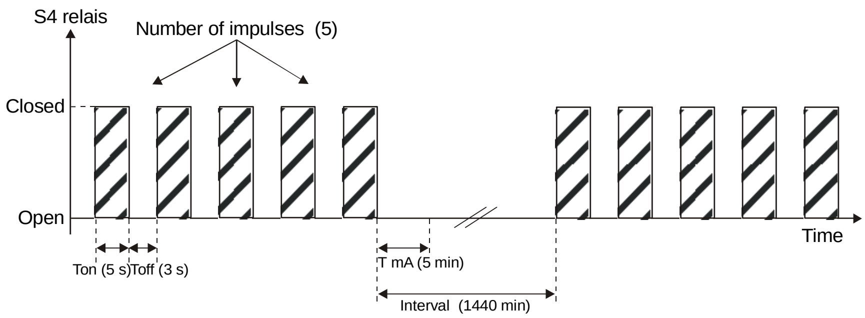
- **Programming - timer**

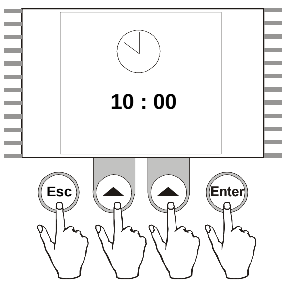
The S4 relay can be used for cyclical operation.
The operating cycle is defined using the following programming steps:



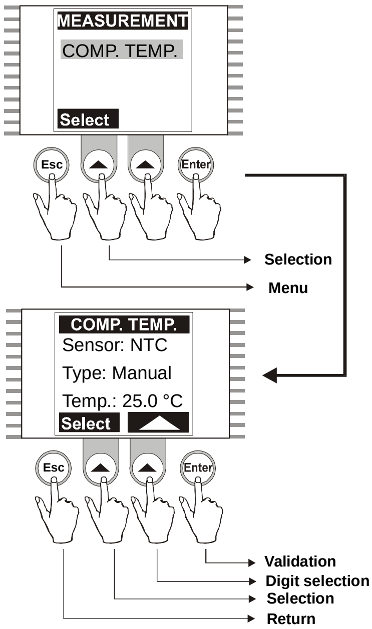
ALARM 4 (TIMER)		
MODE	- No - Threshold - Timer	For alarm 4, you have the choice between a threshold function (see previous paragraph) or a timer function
INTERV	XXXXmn	Setting of the time interval between two active cycles (in minutes)
Nb IMPUL.	X	Definition of the number of impulses during the active cycle
Ton	XXXs	Setting of the activation time in seconds for each impulse
Toff	XXXs	Setting of the deactivation time in seconds for each impulse
TmA	XXmn	Input of holding time for analogue outputs at the end of each cycle.

Timer operating cycle:





When the S4 relay is used as a Timer, a countdown is displayed for the start of the relay execution cycle. This countdown is expressed in hours: minutes, with the exception of the last ten minutes, where it is expressed in hours: minutes: seconds.



- **Temperature compensation**

Available from “Menu”, then “Programming”

TEMPERATURE COMPENSATION		
Sensor	NTC AD590	Type of temperature sensor. The NTC (default value) must be programmed
TYPE	- Auto - Manual	Used for selecting a temperature measurement with automatic or manual compensation **WARNING :** **If you select manual temperature compensation, the TEMP. CONTROL menu is no longer available**
TEMP.	xx.x °C	Used for entering the sample temperature during manual compensation

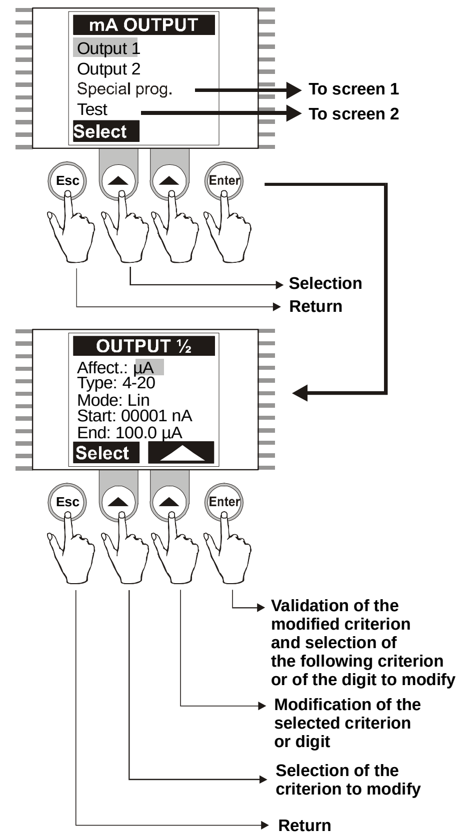
• Programming - mA outputs

The signals generated by the analogue outputs allow the measurements made by the analyser to be transmitted to any external control or recording device.

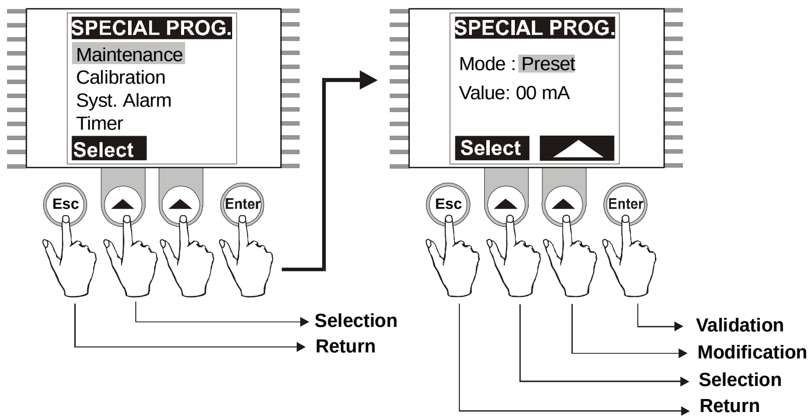
For output signals, we strongly recommend using a shielded cable. This shielding should be connected to the earth terminal on the shielding plate.

Select the digit to alter using the ”SELECT” key then alter it suing the key

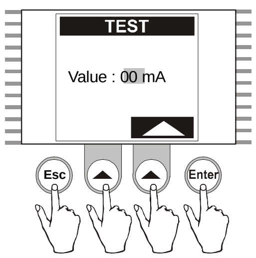
Validate using the ”Enter” key.



Screen 1



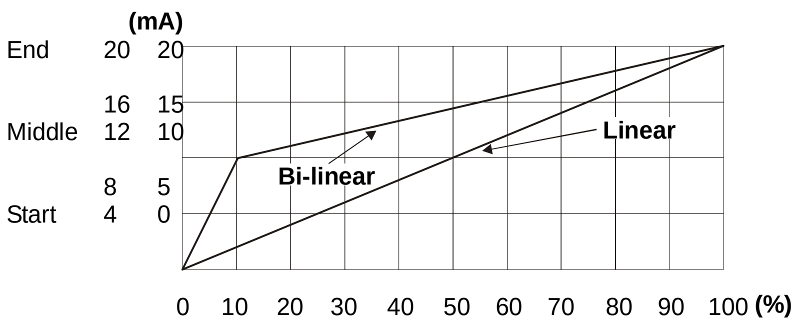
Screen 2

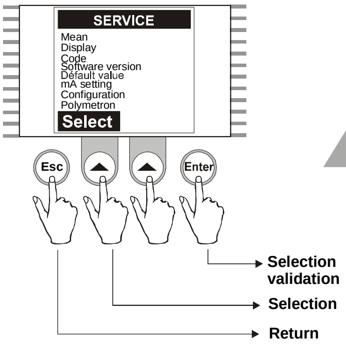


Change the value using the key
then validate with the ”Enter” key.

OUTPUTS 1/2		
ASSIGN.	- Conc. - µA - °C/°F	Used to determine whether the analogue output is assigned to current, concentration or tempera-ture measurement
TYPE	0/20 4/20	Used for selecting the type of analogue output
MODE.	- Lin - Bi-lin	Choice between linear and bi-linear scale (see diagram at bottom of page)
START	XXXX	Scale starting value
MIDDLE	XXXX	Scale middle value (bi-linear)
END	XXXX	Scale ending value
SPECIAL PROG.		
MODE	- preset - last - live preset = last = live =	Behaviour of the analogue output during calibration, system alarm, maintenance or active timer cycles: Preset = return to a preset value Last = return to the last value before the event Live = live measurement
VALUE	XX	Used for defining the return value (0 to 21 mA)
TEST		Used for testing analogue outputs in 1 mA steps (0...21 mA)

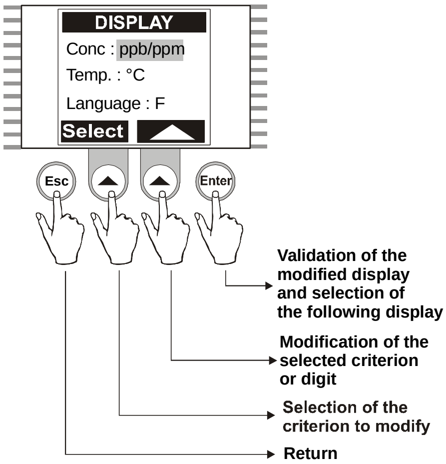
Illustration of linear / bi-linear output loops:





- **Programming - Service**

You may be required to enter an access code.



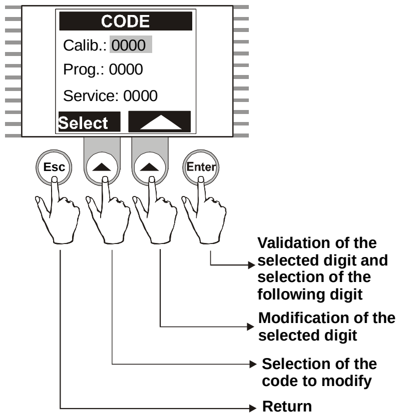
- **Programming display**

Accessible from “Menu” then “Service”, then “Display”.

DISPLAY		
CONC	- ppb/pppm - µg-mg/l	Used for selecting the concentration unit
TEMP.	- °C - °F	Used for selecting the temperature unit
LANGUAGE	- F - GB - D - SP - I	Used for defining the working language: - French - English - German - Spanish - Italian

Warning

The factory-defined programming language is English.
This also applies after a software version change and after changing the default values.



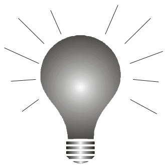
• Programming - Code

Accessible from “Menu”, then “Service”.

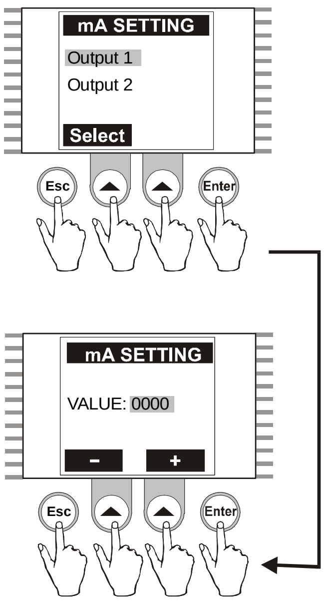
Protection codes can be defined for accessing the PROGRAMMING, CALIBRATION and SERVICE menus.

This code can be deactivated by entering the figure 0000.

CODE		
CALIB.	XXXX	Calibration access code
PROG.	XXXX	”PROGRAMMING” menu access code
SERVICE	XXXX	”SERVICE” menu access code



If you forget a protection code, press ESC and ENTER simultaneously to access the menu .



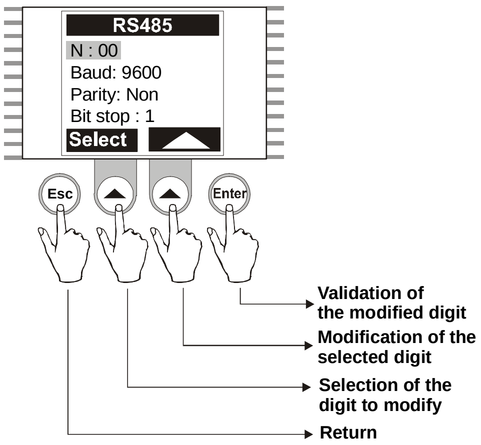
• Programming - mA setting

The analogue output signals are factory set (end of scale: 20 mA). However, if you notice a drift in the 20 mA on one or other output, you must use the following menu. Connect an ammeter to the terminals of the analogue outputs and adjust the value until 20.0 mA is displayed on the ammeter.

Warning

The value represents a drift and does not, under any circumstances, correspond to the value in mA.

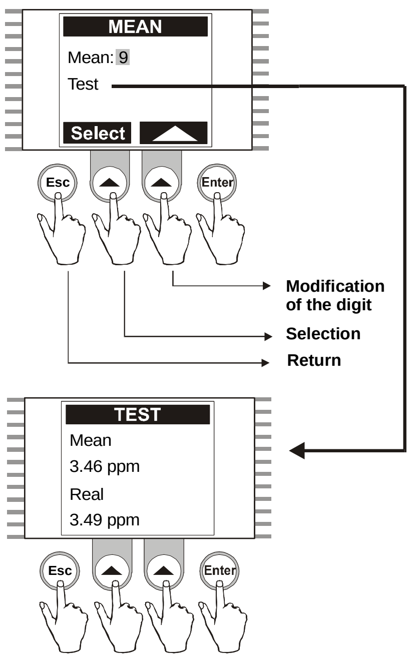
• Programming - RS485 menu



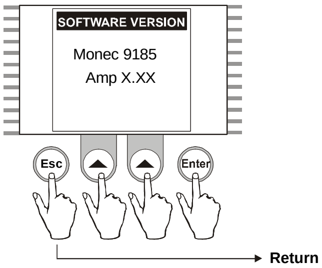
If you possess the RS485 option, set the parameters of the following menu. The optional RS485 board allows you to connect the analyser to a digital communication system. The com-munication protocol used is MODBUS/JBUS. See the “JBUS/MODBUS” instructions (reference 621=991=000) for more details and to appendix 4 for the list of addresses.

RS485		
N°	XX	Monec number (0...32)
BAUD	- 300 - 600 - 1200 - 2400 - 4800 - 9600	Transmission speed in bauds
PARIT.	- No - Even - Odd	No parity bit With even parity bit With off parity bit
STOP BIT	- 1 - 2	1 stop bit 2 stop bits

• Programming - Mean

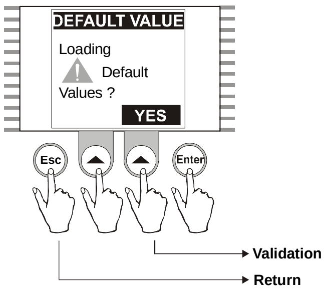


MEAN		Used for programming a sliding mean for concentration measurement
MEAN	X	Number of measurements made for mean calculation
TEST		Used for viewing the difference between a measurement with or without mean



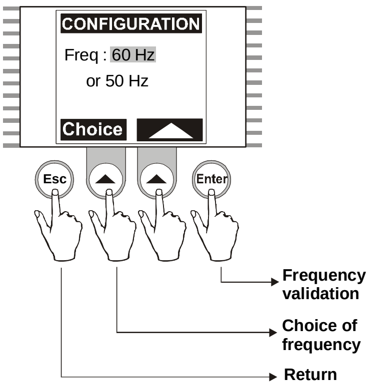
• Programming - Software version

This menu displays the version number of the software installed on the instrument.



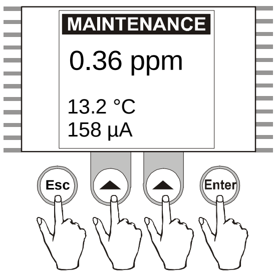
• Programming - Default value

If you press Yes, you will reload the default values and will lose any programmed values, along with calibration parameters.



• Programming - Frequency

You can set the frequency of the electrical mains using this menu, accessed using the ”SELECT” key. Validate using the ”Enter” key.



• Maintenance display

Menu used for all instrument maintenance operations. The instrument continues to display the measured quantities, but relays 4-20 are frozen.

<u>Warning</u>

You may be required to enter an access code if one has been previously defined (See CODE menu).

6. Calibration

<u>Reminder</u>

See chapter 6 for details of command programming.

<u>REMARK</u>:

All results (calibration or measurements) are always brought back to the reference temperature (25 °C, 77 °F). If the sample's temperature is different to the reference temperature, temperature compensation must be performed, which can be automatic or manual.

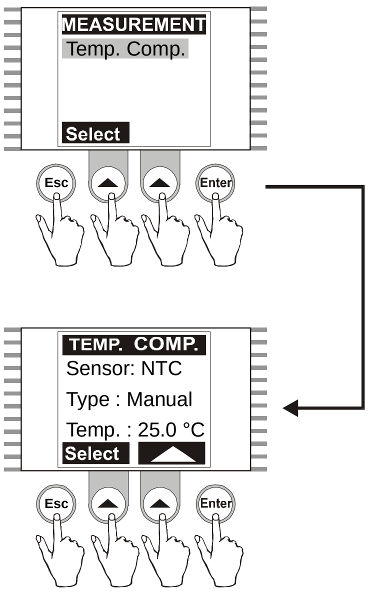
Calibrating the temperature sensor

The temperature sensor is located in the ozone measurement probe. It is factory pre-set and requires on-site calibration in the sample. This calibration must be performed prior to calibration of ozone measurement.

Automatic temperature compensation

The sensor permanently measured the sample temperature. Concentration values are automatically brought back to a reference temperature (25°C) by means of an algorithm programmed into the transmitter.

The procedure to follow is as follows:



- **Program**

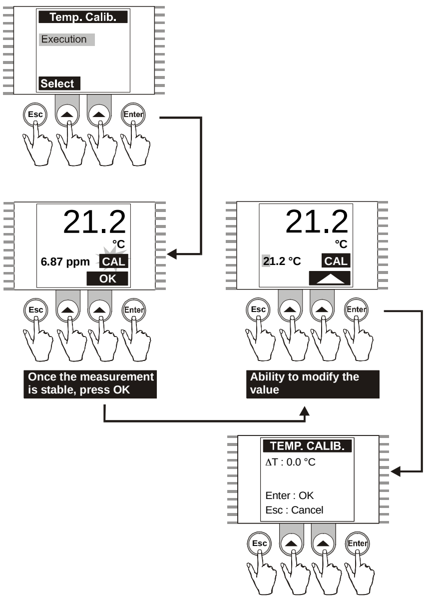
Select **automatic** temperature compensation.

Select the digit to alter using the "SELECT" key then change it with the key 
Validate with the "Enter" key.

- ## Execution

Execution is triggered from the CALIBRATION menu.

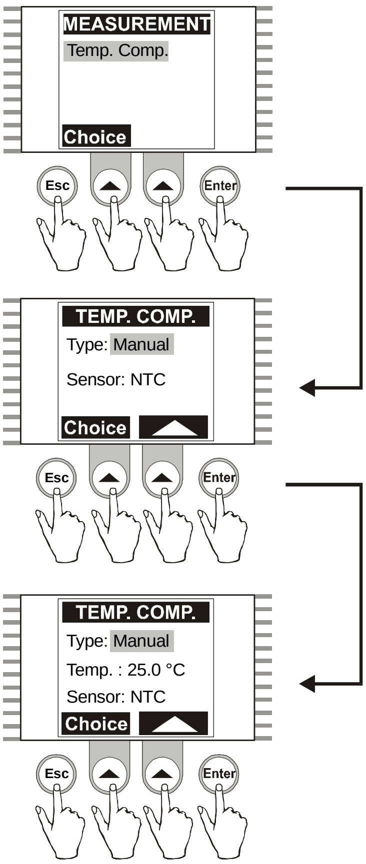
Enter the value of the sample temperature in °C.



Press OK to adjust the displayed temperature to the actual value of the sample, measured with a high precision thermometer.

The deviation between the calibration and the sensor theoretical response curve is given for information purposes.

- ## Manual temperature compensation



Select **manual** temperature compensation using the key 

Enter a value for the sample temperature using the key  after having selected “Temp.:” with the “SELECT” key.

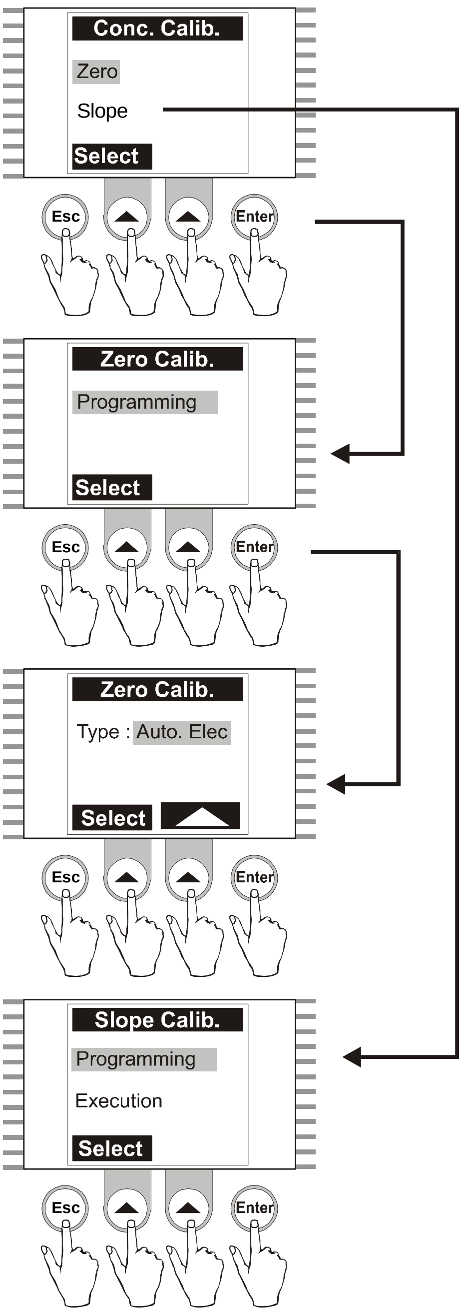
- **Execution**

There is no execution in manual compensation.

Measurement calibration

Slope calibration is performed by comparison with a laboratory measurement, with the chemical zero, or with the electrical zero.

Electrical zero calibration



- **Programming**

Choice of slope or electrical zero calibration using the ”SELECT” key, then validation with the ”Enter” key.

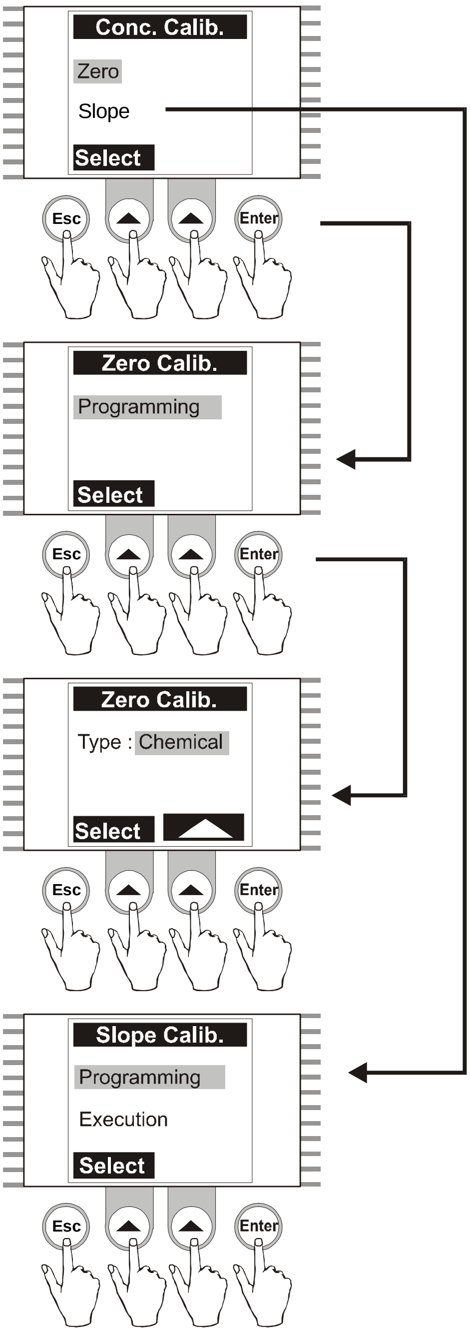
Setting validation with the ”Enter” key, to access the calibration type selection screen.

Choice of type of zero calibration using the key : ”Auto-Elec”, then validation return using the ”Enter” key and return with the ”Esc” key.

Selection between ”Programming” and ”Execution” with the ”SELECT” key, then validation with the ”Enter” key.

The analyser will automatically compensate, at a regular frequency, for any electronic drift.

Chemical zero calibration



• Programming

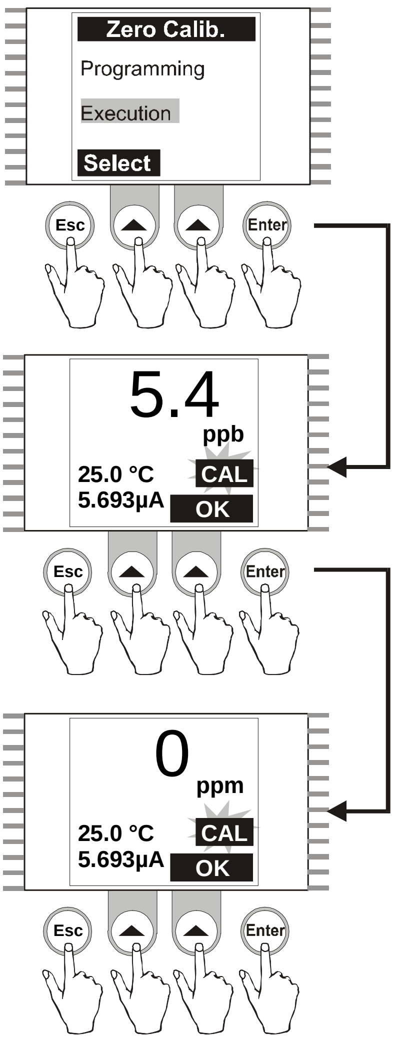
The zero is obtained with a sample of ozone-free water.
Ensure that there is sufficient flow rate or mixing.

Choice of chemical zero: in the CALIBRATION menu, select CONC. CALIBRATION. Choice of slope or electrical zero calibration using the ”SELECT” key, then validation with the ”Enter” key.

Validate settings with the ”Enter” key to return to the calibration type selection screen.

Choice of type of zero calibration using the key  : ”Chemical”, then return.
Validate using the ”Enter” key and return with the ”Esc” key.

Selection between ”Programming” and ”Execution” using the ”SELECT” key, then validation with the ”Enter” key.



- ## Execution

Execution of the chemical zero. The CAL message flashes, indicating that the instrument is in calibration mode. Wait for **current stabilisation** and press ”**OK**”.

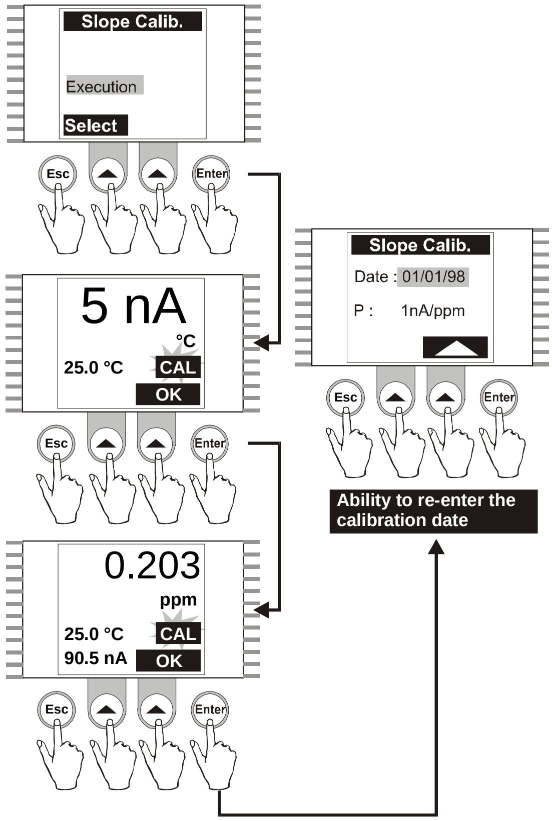
The instrument displays the zero for a few seconds, then returns to the previous level.

Calibrating the slope: proceed as stated in Slope + electrical zero calibration.

Remark:

Calibration can be interrupted at any time by pressing ESC. The instrument will then retain the parameters of the previous calibration.

Slope calibration



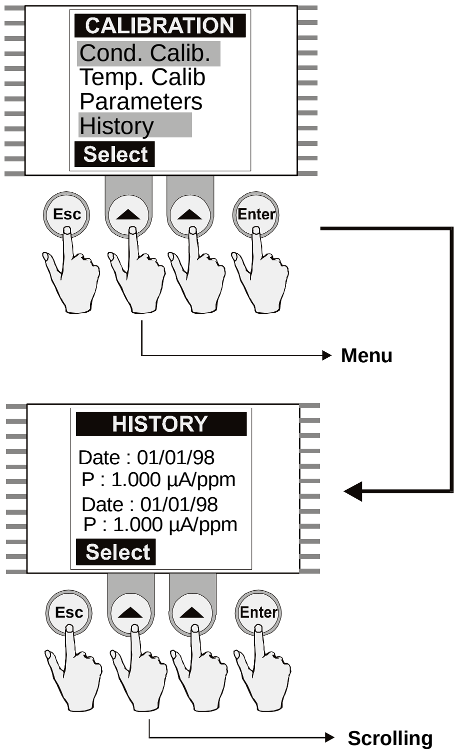
- ### Execution

From the CALIBRATION menu, select CALIBRATION, followed by CONC. and SLOPE. The CAL message flashes, indicating that the instrument is in calibration mode. Wait for **current stabilisation** and press "**OK**", then immediately take a sample for reference analysis. Next, enter digit by digit the value stated in the reference method, using the and "Enter" keys.

The analyser then displays the date of the last calibration, along with the calculated slope. Alter the date if necessary.

NOTE

We strongly recommend collecting the sample for reference analysis from the analyser outlet. Indeed, a significant proportion of the ozone is consumed during passage through the measurement cell.



• History

Accessible from ”Menu”, then ”Calibration”

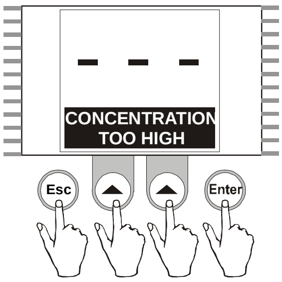
PARAMETERS		
DATE	xx/xx/xx	Date of the last calibration. The programmed date is not automatically updated.
P	x.xxx µA/ppm	Slope value
ZERO	x.xxx nA	Offset value
ΔT	x.x °C	Deviation between theoretical temperature (sensor curve) T_h and measured temperature T_m : $\Delta T = T_h - T_m$
HISTORY		
DATE	xx/xx/xx	Date of calibration n-1
P	x.xxx nA/ppm	Value of slope n-1
DATE	xx/xx/xx	Date of calibration n-2
P	x.xxx nA/ppm	Value of slope n-2

7. Processing anomalies

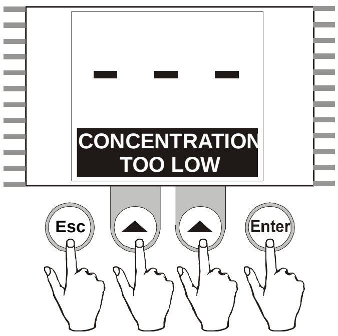
Remark:

If an error occurs, the measurements are replaced by dashes "- - - ".

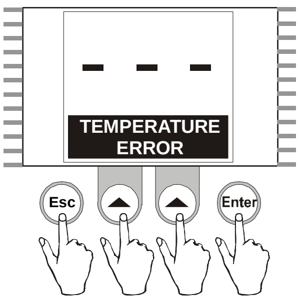
Measurement-related error messages



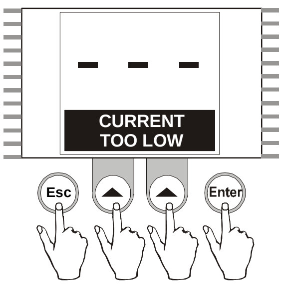
☛ Positive measurement range overflow. Check the current value, along with the calibration parameters.



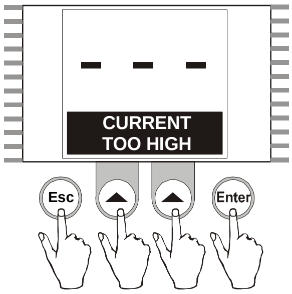
☛ Negative measurement range overflow. Check the current value, along with the calibration parameters.



☛ Sample temperature range overflow. Check for short-circuit or open circuit.

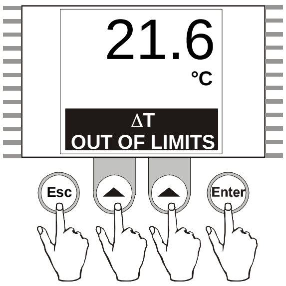


☛ Measurement range overflow (negative current). Check the electrode (electrolyte and membrane).

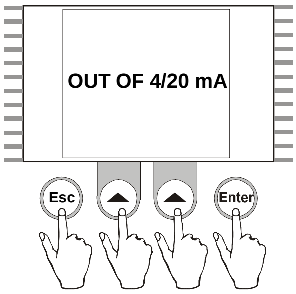


☛ Measurement range overflow. Ensure that there are no short-circuits on the measurement chain. Check the polarising voltage

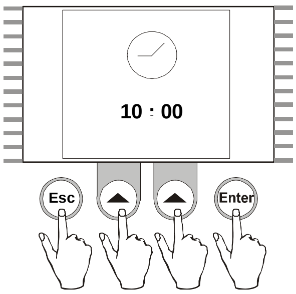
Calibration-related error messages



The temperature difference between calibration and the theoretical sensor response is greater than the authorised limit.
Limits : ± 20 °C.



The ”Out of 4/20 mA” error message is displayed when the measured value is out of the programmed scale start and end range for analogue outputs 1 and 2 (PROGRAMMING/ mA OUTPUTS / OUTPUT 1 or 2).



When the S4 relay is used as a Timer, a countdown is displayed for the start of the relay execution cycle. This countdown is expressed in hours: minutes, with the exception of the last ten minutes, where it is expressed in hours: minutes: seconds.

8. Start-up, cleaning and maintenance

Start-up

Probe assembly

The probe is made up of the following elements:

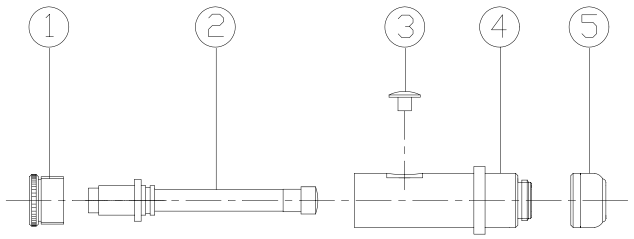


Figure 8.1

- **- 1** Clamping nut
- **- 2** Measurement electrode
- **- 3** Filling cap
- **- 4** Probe body
- **- 5** Membrane

To assemble the probe, proceed as follows:

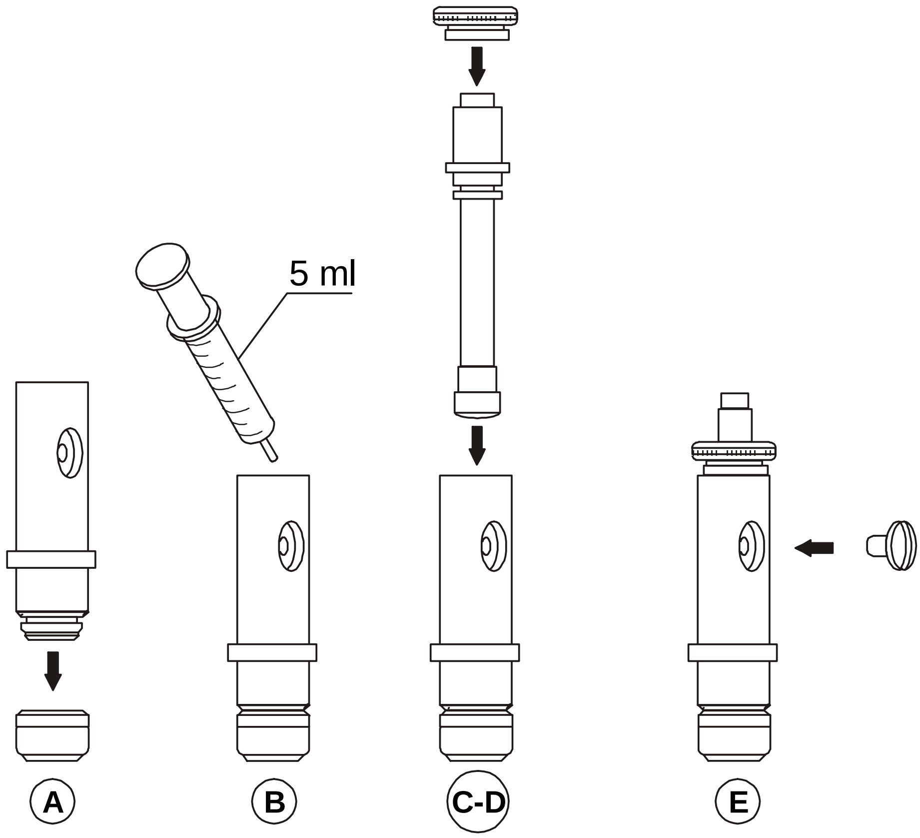


Figure 8.2

A - Screw on the membrane, it should push up against the body of the probe.
B - Fill with 5 ml of electrolyte.
C-D - Insert the electrode, screw on the clamping nut.
E - Insert the filling screw.

Recommandations:

- **Ensure that no air bubbles are trapped when inserting the electrode.**
- **The membrane must be perfectly screwed on.**
- **Ensure that no impurities are trapped in the electrolyte.**
- **The electrode should be inserted slowly, without forcing.**

Placing the probe in the cell

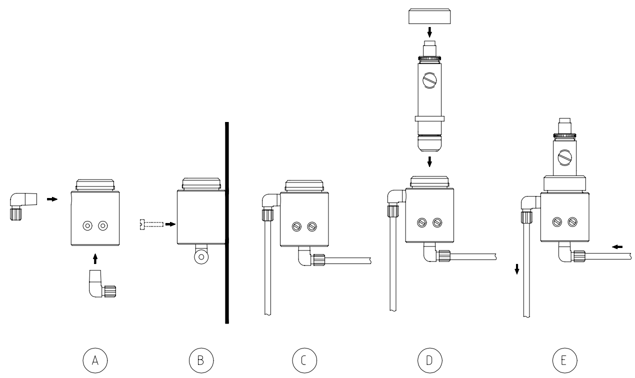


Figure 8.3

A - Position the connectors.

B - After positioning the connectors, fix the cell (M4 screws, thread length: min. 35 mm).

C - Insert the inlet and outlet tubing. The recommended dimensions are:

Inlet tube: ∅ int./ext.: 4/6
Outlet tube: ∅ int./ext.: 6/8

Evacuation should be as direct as possible (gravitational).

D - Position the probe and block it with the cap.

Filling the instrument

Once the instrument has been installed, it can be filled with water: for this, progressively open the supply valve until the recommended flow rate of 15 l/h is reached.

Stabilisation time

Prior to calibration, you must wait approximately 3 hours for the instrument to stabilise completely.

Connecting the probe

See § 4 for electrical connections. The standard cable length is 10 m.

Mains connection

Place the mains supply and transmitter ferrite and connect according to figure 4.1 page 22.

Starting the analyser

The analyser performs an automatic test and displays an initial value. Wait for the measurement to stabilise. You can calibrate the analyser once the temperature and concentration are stable.

Note:

The probe contains electrolyte, we recommend that you keep it upside down when removing from water.

Replacing the membrane

Proceed as follows:

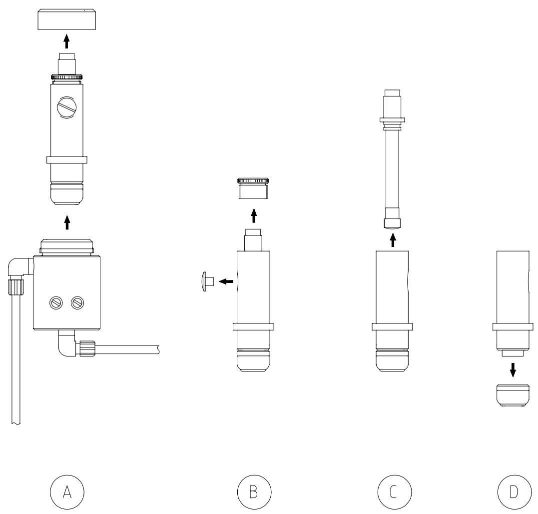


Figure 8.4

Cut off the water supply, remove the probe connector.

Ensure that the alarms generated by this procedure have no effect. If this is not the case, switch to maintenance mode before the operating.

A - Unscrew the cell cap, remove the sensor.
B - Unscrew the electrode cap and filling cap.
C - Remove the electrode, pour off the electrolyte.
D - Unscrew the worn membrane, replace it with a new one.

For re-assembly, proceed in reverse order (c.f. electrode assembly), taking care not to trap any air bubbles when inserting the electrode.

Recommandations:

- **Each membrane change should be followed by a calibration operation.**
- **Never pull on the electrode when the filling screw is in place.**
- **Avoid touching the active part of the membrane.**
- **Do not re-use a worn membrane.**
- **When inserting the electrode, pre-position it without forcing; this latter should position itself by simple gravitational effect.**
- **Membrane changes should be followed by a stabilisation period of approximately 3 hours.**
- **The membrane should be screwed as far as the mechanical stop.**

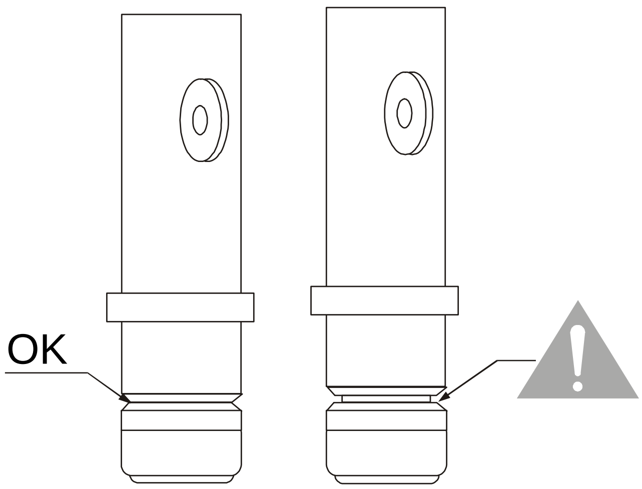


Figure 8.5

Electrode regeneration procedure

After several months of use (from 3 to 12 months depending on the sample ozone concentration), a dark deposit may cover part of the silver anode.

This deposit only affects measurements at a contamination of 90 % of the surface and above.

When replacing the electrolyte and membrane, visually inspect the silver anode. If over 2/3 of its surface are covered with deposit, it will need regenerating according to the procedure described below:

- Soak the anode in 10 % ammonium for approximately 1 hour, rinse in deionised water and wipe with a soft cloth.

Mechanical regeneration:

Using an abrasive paper (fine grain, 600 to 1,000) and water, sand down until the initial surface appearance is restored.

WARNING !

This operation should be performed at a low speed or manually, with continuous rinsing in clean water in order to avoid any heating of the part or the abrasive, which could lead to the incrustation of abrasive granules into the silver of the anode.

Re-calibration is then required following stabilisation of the measurement.

Detection of functional faults

High instability in measurement mode	
CAUSES	**SOLUTIONS**
- There is water in the probe connector	- Dry the connector and check that it is correctly screwed on
- Poor connection	- Check the transmitter to probe connections
- High degree of electromagnetic disturbance near the cable, probe or transmitter	- Find a better position for the cable and check the EMC level
- Bubbles in the sample	- Check the sample supply line
- Flow rate too low (min. 15 l/h recommended)	- Increase sample flow rate
- Flow rate too unstable	- Use a overflow vessel (c.f. options)

Lack of precision	
CAUSES	**SOLUTIONS**
- Membrane permeability has been altered (fouling)	- Calibrate the analyser and check that concentration has returned to normal. In the event of important carbonate deposits (high iron or manganese °TH), the use of the acidification kit (c.f. options) may be required
- Instrument drift	- Initial calibration was performed before the instrument had stabilised: → re-calibrate the instrument
- Abrupt measurement shift	- Bubbles in the sensor → dismantle the electrode
- Error during calibration or poor calibration (see above)	- Repeat the calibration to check the parameters. If the error is confirmed, check the calibration current (too high, too low, or unstable)
- The temperature has not been calibrated	- Check the temperature displayed by the Monec and calibrate it (see pages 42-43) If manual compensation was selected, check that the value entered was correct
- Flow rate too low (15 l/h recommended)	- Check the sample supply circuit
- Temperature or pressure are out of specifications	- Change the position of the probe or change the sample such that it falls within the specifications
- The potential is not at + 150mV	- Enter the correct value
- The membrane is poorly screwed on	- Screw the membrane on correctly

Miscellaneous problems	
CAUSES	**SOLUTIONS**
- Probe current is null during measurement	- There is no electrolyte in the probe (leak)
- Probe current is negative	- Anode circuit connection problem (intermittent contact) - Leakage of electrolyte at the membrane: replace the membrane - Inappropriate electrolyte: replace the electrolyte with OZONMAT-specific electrolyte
- Sample temperature does not fit the specifications	- There may be a short-circuit in the temperature connection or an error may have occurred during temperature calibration
- The displayed concentration drops abnormally	- The membrane is fouled - Replace the membrane and renew the electrolyte

Detection of electrical faults

WARNING !

Never open the instrument before unplugging it

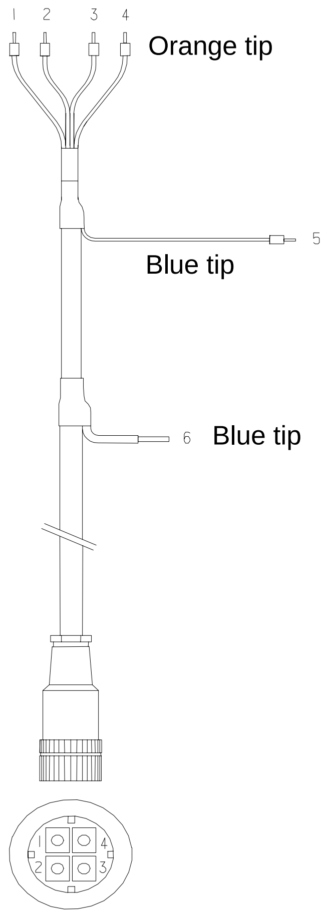
PROBLEM	SYMPTOM	SOLUTION
No display	No power Poorly connected instrument	Check the mains and the connection
	Faulty fuse	Check the fuse
	The instrument's mains voltage is incorrect	Check the voltage terminals
	The cable connecting the mains board to the CPU board is poorly connected	Check that the terminal strips are connected
	Incorrect connection between the CPU board and measurement module	Check connections
	Short-circuit in the mains board	Visually inspect the mains board
	Faulty hardware	Call the technical department
The display shows undefined characters	Poor CPU board or processor operation	Using the instruction manual, program the instrument to load the default values
	CPU board hardware	Re-initialise by switching of the instrument for 5 to 10 seconds. Call the technical department
The keyboard doesn't work; the keys are inactive	Poor CPU board operation, external interference	If there is no response, reinitialise the instrument by switching it off for 5 to 10 seconds. Check the keys once more. If there is no change, call the technical department

Incorrect measurement	The instrument has not been correctly programmed	Check the program parameters. Do they match the probe properties?
	System, including the probe, in correctly programmed	Calibrate the whole system (probe connected)
	Probe poorly connected	Check all probe connections
	Probe functions poorly, may be incompatible with the application	Check probe condition visually. Does the application match the probe's specifications?
	Faulty CPU board	If the error persists, call the technical department
Unstable measurement	Faulty probe	Check probe condition. Is it fouled?
	Probe poorly connected	Check that the probe is properly connected
	Interference	Check that there is no external source of chemical, temperature or pressure interference
	Poorly connected cable shielding	Check and connect
	Faulty CPU board	If the problems persist, call the technical department
Incorrect temperature measurement	Poorly connected probe	Is the probe properly connected? Check
	Temperature not calibrated	Calibrate temperature
	Faulty CPU board	If the problems persist, call the technical department

Read-out is blocked and cannot be altered	Faulty CPU board and/or another piece of transmitter hardware	Check that the probe is properly connected
		Reinitialise
		Reprogram the instrument
		If the problem persists, perform a reset: cut the power for 5 to 10 seconds
		If problems persist, call the technical department
The alarm relays do not trigger	The instrument has not been correctly programmed	Check that the relay parameters have been programmed
	Faulty hardware	Check that the alarm thresholds are compatible
		Check relay properties with an ohmmeter
		If problems persist, call the technical department
Poor output current, the output current remains at 0 or 20 mA	Poorly programmed instrument	Check the output current parameters
	Poor or faulty MONEC connection with peripheral devices	Check the cables
	Faulty hardware	Compare the measured value with the output current measurement
		If problems persist, call the technical department
The polarising voltage is incorrect	Poor configuration (3-electrode mode)	Check that the terminals under the conductimetric board are in the ON position
	Poor programming	

APPENDIX 1

Cable connection details



VUE INTERNE CONNECTEUR
INTERNAL VIEW OF CONNECTOR

Mark	Colour	Function	Connector mark
1	Black	T +	1
2	Blue	T -	2
3	White	Work (orange tip)	3
4	Red	Counter	4
5	White	GND (blue tip)	
6	White	Earth (blue tip)	

APPENDIX 2

Accessories and options

Standard 9180 transmitter	09180=A=0300
24 V 9180 transmitter	09180=A=0320
Ozonmat EPROM	09180=A=6200
Conductimetric board	09180=A=1501
Relay board	09125=A=4000
Microchip board	09125=A=1001
10 m probe cable	09180=A=8010
Electrode	09185=A=1000
Probe body	09078=C=1010
Filling screw	09078=C=1020
Sealing washer	09078=C=1030
Probe nut	08878=A=1020
Membrane box	09078=A=3500
Bottle of electrolyte	09185=A=3600
Set of 1/4”NPT PN 4/6-6/8 connectors	09184=A=4510
Cell	09181=C=4500
OZONMAT 9185 technical instructions, French	621=091=085
OZONMAT 9185 technical instructions, English	621=191=085
Sampling valve	696=246=001

Accessories and options

Mounting plate	09184=C=2700
Fitted overflow vessel	09185=A=1700
Control valve	696=046=001
220 V 50/60Hz chemical cleaning kit	09185=A=7100
110 V 50/60Hz chemical cleaning kit	09185=A=7110
24 V 50/60Hz chemical cleaning kit	09185=A=7124
Overflow vessel for chemical cleaning kit	09185=A=1800
220 V 50/60Hz chemical cleaning pump	09184=A=2500
110 V 50/60Hz chemical cleaning pump	09184=A=2510
24 V 50/60Hz chemical cleaning pump	09184=A=2524
Set of 5 spare tubes for chemical cleaning pump	590=514=200

APPENDIX 3

Temperature conversion table

Conversion from °C to °F : °F = 1.8 x °C + 32
Conversion from °C to °K : °K = °C + 273.15

°C	°F	°K	°C	°F	°K
0	32	273.15	24	75.2	297.15
1	33.8	274.15	25	77	298.15
2	35.6	275.15	26	78.8	299.15
3	37.4	276.15	27	80.6	300.15
4	39.2	277.15	28	82.4	301.15
5	41	278.15	29	84.2	302.15
6	42.8	279.15	30	86	303.15
7	44.6	280.15	31	87.8	304.15
8	46.4	281.15	32	89.6	305.15
9	48.2	282.15	33	91.4	306.15
10	50	283.15	34	93.2	307.15
11	51.8	284.15	35	95	308.15
12	53.6	285.15	36	96.8	309.15
13	55.4	286.15	37	98.6	310.15
14	57.2	287.15	38	100.4	311.15
15	59	288.15	39	102.2	312.15
16	60.8	289.15	40	104	313.15
17	62.6	290.15	41	105.8	314.15
18	64.4	291.15	42	107.6	315.15
19	66.2	292.15	43	109.4	316.15
20	68	293.15	44	111.2	317.15
21	69.8	294.15	45	113	318.15
22	71.6	295.15			
23	73.4	296.15			

APPENDIX 4

RS485 MODBUS-JBUS addressing

CALIBRATION MENU		
	/CONC. CALIBRATION	
/ZERO		
/PROGRAMMING		
/Type	(0:AutoElec, 1: Chem.)	0121
/EXECUTION		
/SLOPE		
/PROGRAMMING		
/Type	(0:Process)	0221
/P		0222
/Tamb		0223
/EXECUTION		
/TEMP. CALIBRATION		
/EXECUTION		
/PARAMETERS		
MEASUREMENT MENU		
/TEMP. COMP.		
/Type	(0: Manual, 1: Auto)	1220
/Temp.		1230
ALARMS MENU		
/ALARM1		
/Assign.	(0:conc, 1:°C/°F, 2:No)	2120
/Threshold		2130
/Direction	(0:Down, 1:Up)	2140
/Tempo.		2150
/Hyst.		2160
/Relays	(0:N.O., 1:N.F.)	2170
/ALARM2		
/Assign	(0:conc, 1:°C/°F, 2:No)	2220
/Threshold		2230
/Direction	(0:Down, 1:Up)	2240
/Tempo.		2250
/Hyst.		2260
/Relays	(0:N.O., 1:N.F.)	2270
/ALARM3		
/Mode	(0:Threshold, 1:Syst, 2:No)	2310
/Assign	(0:conc, 1:°C/°F, 2:No)	2320
/Threshold		2330
/Direction	(0:Down, 1:Up)	2340
/Temp.		2350
/Hyst.		2360
/Relays	(0:N.O., 1:N.F.)	2370
Acquit	(0:Man., 1:Auto)	2380

/ALARM4 /Mode /Assign /Threshold /Direction /Tempo. /Hyst. /Relays /Interv. /Nb impul. /Ton /Toff /TmA	 (0: Threshold, 1:Timer, 2:No) (0:conc, 1:°C/°F, 2:No) (0:Down, 1:Up) (0:N.O., 1:N.F.)	 2410 2420 2430 2440 2450 2460 2470 2401 2402 2403 2404 2405
OUTPUTS MENU mA		
/OUTPUT1 /Assign /Type /Mode /Start /Middle /End /OUTPUT2 /Assign /Type /Mode /Start /Middle /End	 (0:µ A, 1:°C/°F, 2:conc.) (0:0/20mA, 1:4/20mA) (0:lin, 1:bi-lin) (0: µA, 1:°C/°F, 2:conc.) (0:0/20mA, 1:4/20mA) (0:lin, 1:bi-lin)	 4110 4120 4150 4130 4160 4140 4210 4220 4250 4230 4260 4240
/SPECIAL PROG. /MAINTENANCE /Mode /Value /CALIBRATION /Mode /Value /ALARME SYST. /Mode /Value /TIMER /Mode /Value /TEST	 (0:Live. 1:Memo. 2:Return) (0:Live. 1:Memo. 2:Return) (0:Live. 1:Memo. 2:Return) (0:Live. 1:Memo. 2:Return)	 4311 4312 4321 4322 4331 4332 4341 4342
RS485 MENU		
/N° /Baud /Parity /Stop bit	 (0:300, 1:600, 2:1200, 3:2400, 4:4800, 5:9600) (0:No, 1:Odd, 2:Even) (0:1bit, 2:2bits)	5100 5200 5300 5400

SERVICE MENU		
/MEAN		
/Mean	(0:0...10:10)	7210
/TEST		
/DISPLAY		
/Conc.	(0:ppb-ppm,1: µg-mg/l)	7360
/Temp.	(0:°C, 1:°F)	7320
/Language	(0:F, 1:GB, 2:D, 3:Sp, 4:I)	7330
/CODE		
/Control		7410
/Program		7420
/Service		7430
/SOFT VERSION		
/DEFAULT VAL.		
/mA SETTING		
/OUTPUT1		
OUTPUT2		
/CONFIGURATION		
/Freq	(0:60Hz, 1:50Hz)	7810
Measured values: Adr 0000 : concentration value Adr 0002 : temperature value Adr 0004 : current value Adr 0004 : secondary measured value		

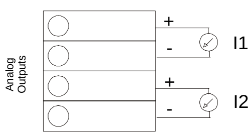
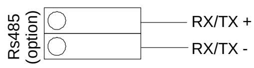
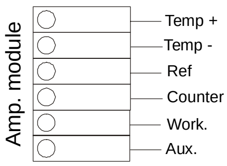
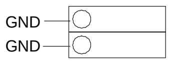
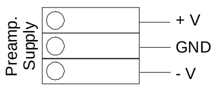
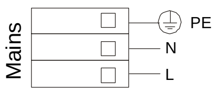
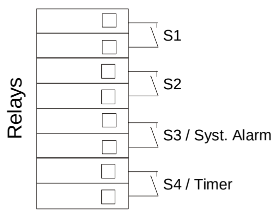
APPENDIX 5

Default values

CALIBRATION	
CONTROL CONC. OFFSET Type : ElecAuto SLOPE Tamb :20.0 °C	**PARAMETERS** DATE : 01/01/99 ΔT : -0.0°C 200 nA/ppm
PROGRAMMING	
MEASUREMENT	
COMP. TEMP. TYPE : Auto	
ALARMS	
ALARM S4 ASSIGN. : Conc. THRESHOLD : 0.00 ppb DIRECTION : Down TEMPO. : 000 s HYST. : 00% RELAYS : NO	**ALARM S3** ASSIGN. : System ACQUIT : Auto RELAYS : NF
mA OUTPUTS	
OUTPUT 1 ASSIGN. : Conc. TYPE : 4-20 MODE : Lin. START : 0.00 ppm END : 2.000 ppm	**OUTPUT 2** ASSIGN. : Conc. TYPE : 4-20 MODE : Lin. START : 0.00 ppm END : 2.000 ppm
SPECIAL. PROG.	
MAINTENANCE MODE : Memo **TIMER** MODE : Memo	**CALIBRATION** MODE : Memo **SYSTEM ALARM** MODE : Memo
RS485	
N° : 0 BAUD : 9600 PARITE : No STOP BIT : 1	
SERVICE	
MEAN	
MEAN : 1	
DISPLAY	
CONC. : ppb/ppm TEMP. : °C LANGUAGE : GB	
CODE	
CONTROL. : 0000 TEMP. : 0000 SERVICE : 0000	
CONFIGURATION	
FREQ. : 50Hz	

APPENDIX 6

Description of the various terminal strip functions

insulated 0/4-20 mA output galvanic	**Description**		**Wiring**
	0-20 mA or 4-20 mA (n° 1) [+]		user
	0-20 mA or 4-20 mA (n° 1) [-]		user
	0-20 mA or 4-20 mA (n° 2) [-]		user
	0-20 mA or 4-20 mA (n° 2) [+]		user
	RS485 option		user
			user
Conductimetric module	**Description**	**Colour**	**Wiring**
	Temperature sensor [+]	black	temp +
	Temperature sensor [-]	blue	temp -
	Reference if 3 electrodes used	no used with OXISTAT 9183	
	Counter-electrode (anode)	red	counter
	Working electrode (cathode)	white (orange tip)	work
	Auxiliary input		aux.
	External shielding	white (blue tip)	shielding plate
	Internal shielding	white (blue tip)	GND
	Not used for ozone measurements		n.c.
	Main power supply VAC 90-265 50/60 Hz or 24 V (speciale AC/DC version)		
	**Description**		**Wiring**
	Alarm 1, simple contact		user
	Alarm 2, simple contact		user
	Alarm 3 or alarm, system simple contact		user
	Alarm 4 or timer, simple contact		user

APPENDIX 7

Electrolyte toxicity sheet for OZONMAT 9185

This solution is not recorded as being dangerous in the European directive 67/548/CEE and its amendments.