DOC024.52.93057

POLYMETRON Model 8810 ISE Analyzer

User Manual

02/2020, Edition 21

Table of Contents

Section 1 Specifications 3
1.1 Dimensions 4

Section 2 General information 7
2.1 Safety information 7
2.2 Use of hazard information 7
2.3 Precautionary labels 7

Section 3 Product overview 9
3.1 Operating principle—Titrimetry 9
3.2 Analyzer overview 9
3.3 Measurement chamber 10
3.4 Features 11

Section 4 Installation 13
4.1 Unpacking 13
4.2 Mechanical installation 13
4.2.1 Mounting the analyzer 13
4.2.1.1 Panel mounting 13
4.2.1.2 Wall mounting 13
4.3 Hydraulic connections 14
4.4 Compressed air connection 14
4.5 Electrical installation 14
4.5.1 Wiring procedures and cable preparation 14
4.5.1.1 Cable preparation 15
4.5.1.2 Connecting peripherals 16
4.5.1.3 Electrode connections 18
4.5.2 Mains power supply 19
4.5.3 Input/Output connections 20
4.5.3.1 Alarms 23
4.5.3.2 Analog outputs 23
4.5.3.3 Sample level detector 23
4.5.3.4 Reagent level detector 23
4.5.3.5 RS232 connection 24
4.5.4 Additional accessories 25

Section 5 User interface 27
5.1 Front panel description 27
5.2 Function keys 27
5.3 Analyzer modes 27
5.4 Displays 27

Section 6 Menu overview 29
6.1 System configuration (PM XXXX option) 29
6.2 Calibration (CALIBRATION option) 30
6.2.1 Calibration in READING mode 30
6.2.2 Calibration in PROGRAMMING mode 30
6.2.2.1 Manual calibration 30
6.2.2.2 Process calibration 31
6.2.2.3 Automatic calibration 31
6.2.3 Calibration results 32
6.3 Analog outputs (ANALOG-OUT option) 32
6.4 Set the alarms and thresholds (ALARM option) 33
6.5 Measurement mode (SEQUENCE option) 34
6.6 Test analyzer and accessories (SERVICE option) 34

6.7 Chemical cleaning (CLEANING option) 34
6.8 Sample conditioning (SAMPLE COND option) 35
6.9 View calibration details (CAL PARAMETER option) 35
6.10 Measurement cycle parameters (TIMING option) 35

Section 7 Maintenance and Troubleshooting 37
7.1 Maintenance 37
7.1.1 General 37
7.1.2 Maintenance schedule 37
7.1.3 Software upgrade 37
7.1.4 Cleaning and decontamination 37
7.1.5 Shutdown 38
7.2 Troubleshooting 38

Section 8 Additional options 41
8.1 Automatic calibration 42
8.1.1 One point calibration with a volumetric pump 42
8.1.2 Two point calibration with a micro piston pump 43
8.1.3 Two point calibration with a pulse pump 43
8.2 Chemical cleaning 43
8.3 Conditioning 44
8.4 Dilution or decantation 44
8.5 External sample 47
8.6 Heating system 48
8.7 Extra channel 48
8.8 Reagent pumps 49
8.8.1 Peristaltic pump 50
8.8.2 Micro piston pump 51
8.8.3 Pulse pump 52
8.9 Canister kit 52

Section 9 Spare parts 53

Section 10 User configuration 57

Section 1 Specifications

Specifications are subject to change without notice.

Specification	Details
Ambient temperature	5 - 40 °C (41 - 104 °F)
Relative humidity	10 to 80%
Operating altitude	From 0 to 2,000 m. (6,550 ft.) above sea level
Mains power supply	110/220/240 VAC, 50/60 Hz, ± 10% For US and Canada: 110 VAC, 60 Hz, ± 10% Fuses: 110 to 120V, T630mAL250V; 220V to 240V, T1.25AL250V
Max. consumption	110 VA
Overvoltage category	2 (according to standard EN 61010-1)
Pollution degree	2
CE compliance	EN61326-1: EMC Directive ***Note:*** *This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.* EN61010-1: LVD Directive
ETL approved	ETL, conforming to UL 61010-1 and CSA 22.2 No. 61010-1
Korean certification	**User Guidance for EMC Class A Equipment** 업무용을 위한 EMC 등급 A 장치에 대한 사용자 지침 사용자안내문 A 급 기기 (업무용 방송통신기자재) 이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며 , 가정외의 지역에서 사용하는 것을 목적으로 합니다.
Compressed air	4 - 7 bar, filtered and dried
Rinse water pressure	0.5 - 6 bar
Reagents	10 liter storage canister (supplied)
Analog outputs	Number: 2; 0 - 20 or 4 - 20 linear, logarithmic, or dual programmable
Alarms	2 x Relay (concentration); 1 x Warning or System alarm
Exchangeable sensors	ISE, reference electrode, Pt100
Level control	Sample; Reagents; Calibration solution; Chemical cleaning
Pumps	Peristaltic, micro piston, pulse or volumetric pumps for calibration and conditioning reagents
Tubing	Tygon®; Polyethylene
Reagent consumption	Application specific
Cycle time	Programmable up to 999 minutes
Accuracy	< ± 2 to 4% (application specific)
Reproducibility	< ± 2 to 4% (application specific)
Sample lines	1
Sample temperature	0 - 50 °C (32 - 122 °F)
Sample pressure	0.5 - 6 bar
Sample flow rate	40 - 300 liters/hour
Sample volume/cycle	200 - 1000 mL (adjustable)

Specification	Details
Panel mount	743 x 482 x 122 mm (H x W x D); < 20 kg
Cabinet (IP 54)	1900 x 600 x 400 mm (H x W x D); < 100 kg
Maximum sound power level	≤ 80 dBA

1.1 Dimensions

Refer to Figure 1 and Figure 2 for instrument dimensions.

Figure 1 Panel dimensions (mm [inches])

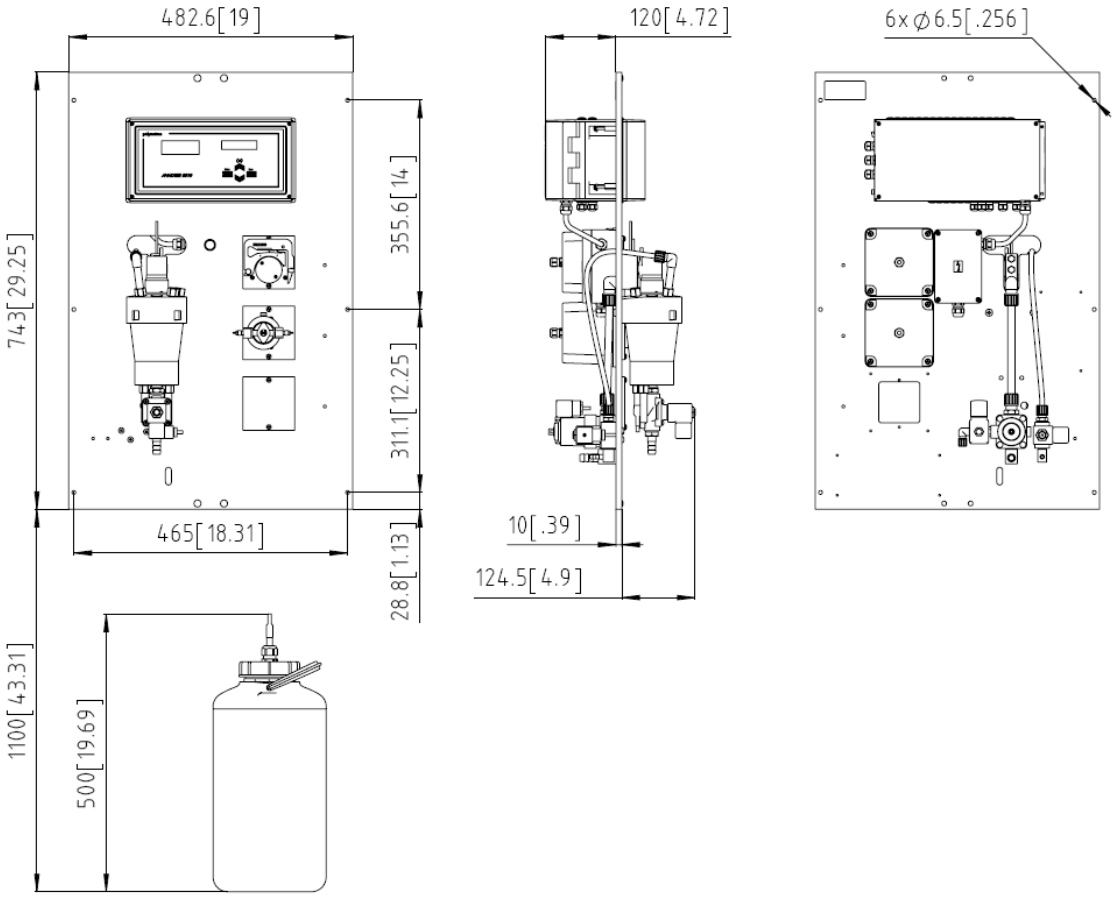
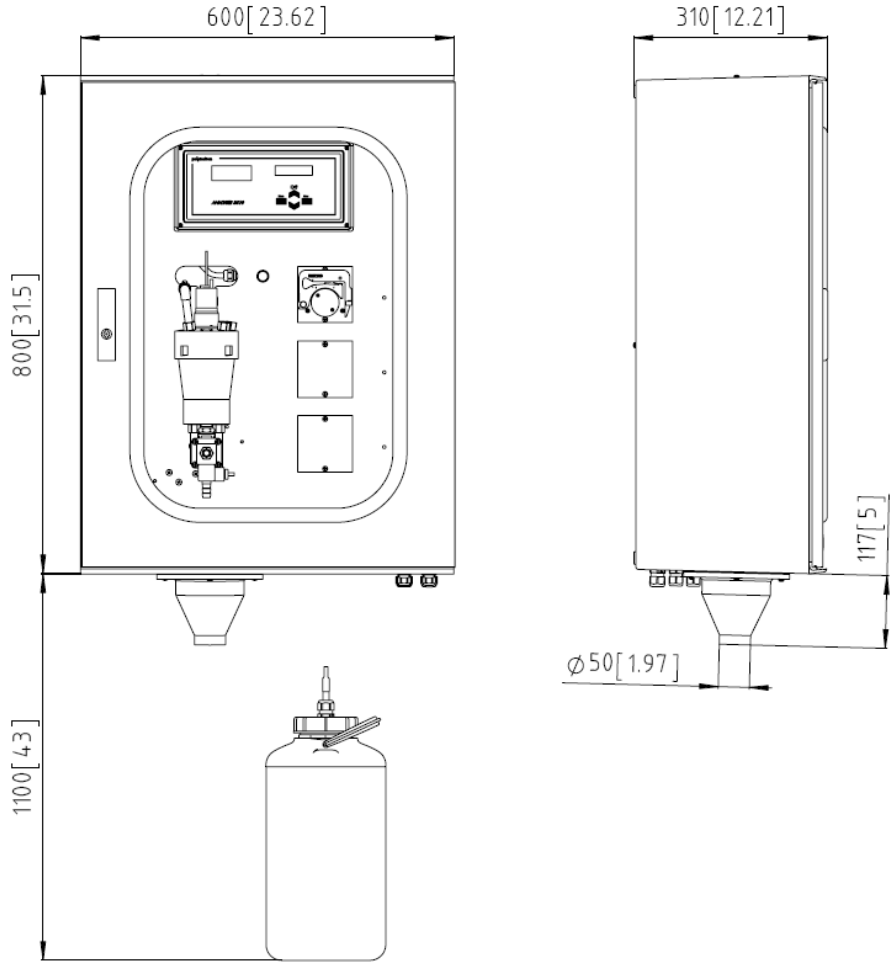


Figure 2 Cabinet dimensions (mm [inches])



Section 2 General information

In no event will the manufacturer be liable for direct, indirect, special, incidental or consequential damages resulting from any defect or omission in this manual. The manufacturer reserves the right to make changes in this manual and the products it describes at any time, without notice or obligation. Revised editions are found on the manufacturer's website.

2.1 Safety information

NOTICE

The manufacturer is not responsible for any damages due to misapplication or misuse of this product including, without limitation, direct, incidental and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is solely responsible to identify critical application risks and install appropriate mechanisms to protect processes during a possible equipment malfunction.

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

2.2 Use of hazard information

⚠DANGER

Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING

Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION

Indicates a potentially hazardous situation that may result in minor or moderate injury.

NOTICE

Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

2.3 Precautionary labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.

	This is the safety alert symbol. Obey all safety messages that follow this symbol to avoid potential injury. If on the instrument, refer to the instruction manual for operation or safety information.
	This symbol indicates that a risk of electrical shock and/or electrocution exists.
	This symbol identifies the presence of a strong corrosive or other hazardous substance and a risk of chemical harm. Only individuals qualified and trained to work with chemicals should handle chemicals or perform maintenance on chemical delivery systems associated with the equipment.

	This symbol indicates a potential pinch hazard.
	This symbol indicates the presence of devices sensitive to Electro-static Discharge (ESD) and indicates that care must be taken to prevent damage with the equipment.
	This symbol, when noted on a product, indicates the instrument is connected to alternate current.
	Electrical equipment marked with this symbol may not be disposed of in European domestic or public disposal systems. Return old or end-of-life equipment to the manufacturer for disposal at no charge to the user.
	Products marked with this symbol indicates that the product contains toxic or hazardous substances or elements. The number inside the symbol indicates the environmental protection use period in years.
	Products marked with this symbol indicates that the product conforms to relevant South Korean EMC standards.
	This symbol indicates the need for protective eye wear.
	This symbol indicates the need for protective hand wear.

Section 3 Product overview

3.1 Operating principle—Titrimetry

The instrument operation is based on titrimetric volumetric analysis.

A titrant reagent solution (titrant), whose chemical composition is tailored to the sample to be analyzed, is continuously added to a constant volume of sample solution until the chemical reaction is completed. The chemical reaction is completed at the endpoint (EP). The EP shows the point of the reaction where the two concentrations, the sample and the titrant, are equivalent to each other. Titrimetric procedure uses the formula that follows:

$V_s \cdot C_s = V_r \cdot C_r$

$C_s = V_r \cdot C_r / V_s$

V_s, C_r = Constant

$C_s = k \cdot V_r$

Where:

V_s = sample volume

C_s = sample concentration

V_r = titrant volume

C_r = titrant concentration

The periodic instrument calibration gets the constant k and records it in the instrument memory. Based on the application, two different endpoint detection procedure are available with the instrument.

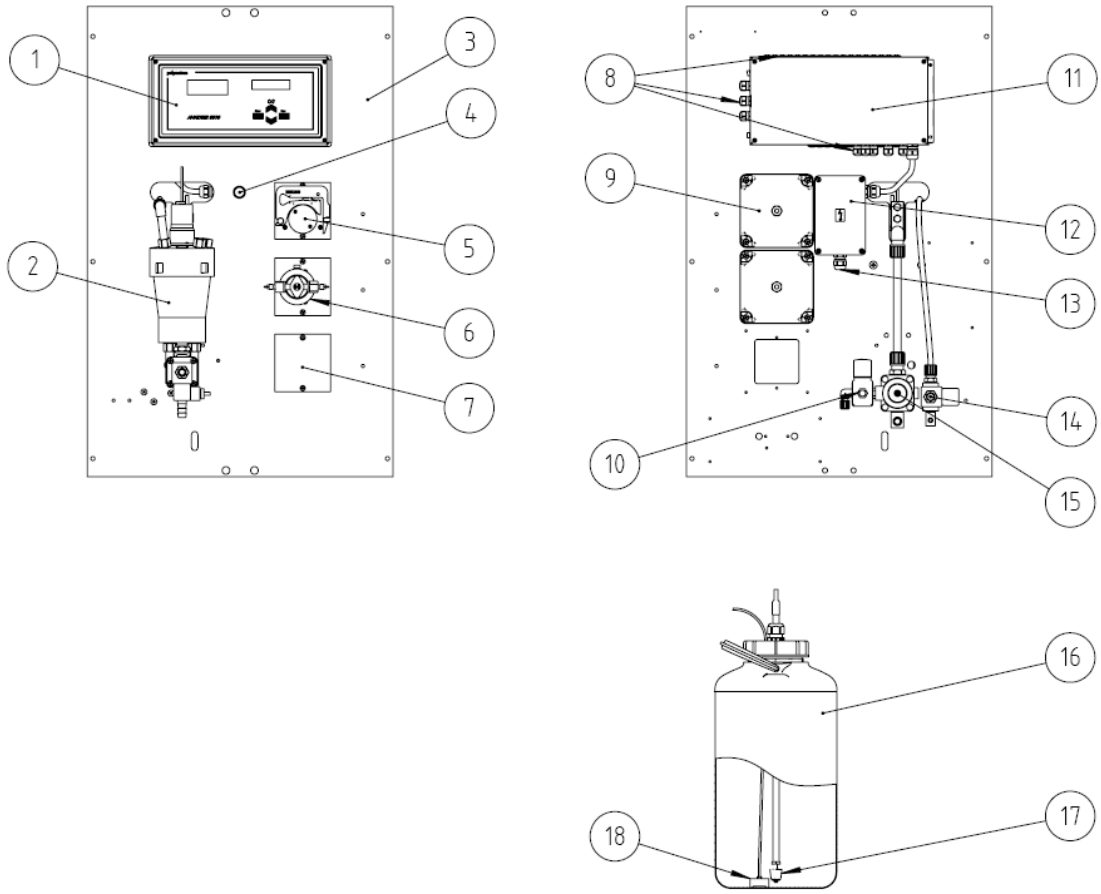
3.2 Analyzer overview

The analyzer POLYMETRON Model 8810 ISE is a modular system used for ISE measurements in a wide range of industrial on–line applications. The analyzer automatically collects on–line samples, adds the applicable chemicals (such as reagents, buffers, masking agents) and completes the analysis. The analyzer applies for heavy–duty, industrial on–line environments.

Note: *The standard analyzer POLYMETRON Model 8810 ISE for chloride measurement supplied is a low range version (0.02 - 5 mg/L chloride). For the high range version (0.5 - 500 mg/L chloride) make sure to include in the order the related reference electrode (item number 368483,00000) for use with the analyzer.*

There is a standard panel-mounted version. A wall–mounted polyester cabinet and a free–standing cabinet to house the analyzer with the necessary reagents are also available. Liquid modules are installed below the electronic control unit for protection, easy access and service tasks. The hinged panel tilts forward to access to the rear. Refer to Figure 3 for product overview.

Figure 3 Front and rear view (panel mount illustrated)

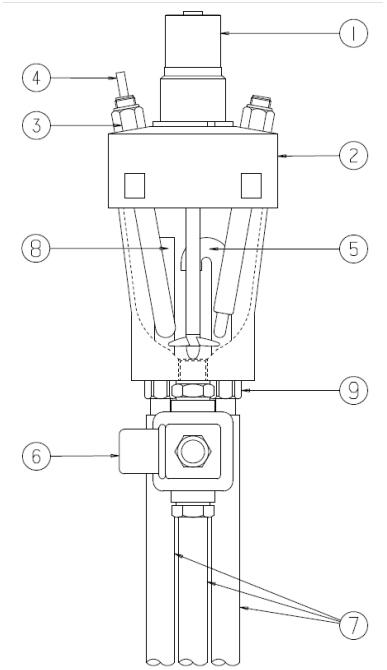


1 Electronic unit	**7** Space for additional pump	**13** Power supply connection
2 Measurement chamber (refer to Figure 4 on page 11)	**8** Input/Output connections	**14** Rinse valve
3 19 inch panel	**9** Reagent pump cover	**15** Sample valve
4 Main switch	**10** Compressed air valve	**16** Reagent canister
5 Peristaltic pump	**11** Electronic unit (rear)	**17** Level detector
6 Micro piston pump	**12** Power supply box	**18** Tube weight

3.3 Measurement chamber

Refer to Figure 4 for measurement chamber components.

Figure 4 Measurement chamber components



1 Stirrer motor	**4** Electrode cable	**7** Drain tubing
2 Measurement chamber cover	**5** Siphon	**8** Overflow pipe
3 Electrode	**6** Drain valve	**9** Threaded fittings

3.4 Features

The measurement chamber has mounting locations for:

- Selective electrode: Measurement of potential.
- Combined electrode: Single combined selective and reference electrode.
- Reference electrode: Measurement of potential.
- Pt 100: Temperature measurement.
- Sprinkler: Uses rinse water to clean the measurement chamber between measurements.
- Chemical cleaning (option): The cleaning can be improved with the addition of a chemical reagent to the rinse water.
- Siphon: Used to ensure a constant and reproducible volume of sample in the measurement chamber.
- Overflow pipe: To avoid any sample overflow from the measurement chamber.
- Reagent additions: Reagents and calibration solutions are added to the measurement chamber by peristaltic or micro piston pumps.
- Stirrer: Mixes the liquids present in the measuring cell.
- Dilution system (option): Used to dilute samples of high concentration.
- Heating system (option): Used to heat the sample to a defined temperature before measurement.

⚠DANGER

Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document. Mains power should only be connected once installation has been completed and checked.

4.1 Unpacking

Carefully remove the analyzer and its accessories from the box and packing material, referring to the packing list included to confirm that everything has been delivered. Please visually inspect the analyzer for shipping damage. If anything is missing or damaged, contact the manufacturer or your dealer immediately.

You may want to retain the box and other packing material in case later you need to ship the analyzer. Please dispose safely and ecologically of the box and packing material (if not stored for future use).

Please read through this manual thoroughly before carrying out the installation.

4.2 Mechanical installation

⚠CAUTION

Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

4.2.1 Mounting the analyzer

NOTICE

The analyzer should be mounted as near as possible to the sample inlet, and should be located in an easily accessible area to facilitate periodic checking of the sample flow rate, and for regular maintenance. In an environmental enclosure that supplies protection from precipitation and direct sunlight, good ventilation and temperature control if installed outdoors. Wherever the analyzer is to be mounted, it is important to note that it must be placed in an upright position with the electronic unit (**No. 1** in Figure 3 on page 10) at the top. It is recommended to use a spirit level to ensure that the analyzer is correctly positioned and not leaning to one side or forward. This is essential to guarantee the accuracy of the analyzer.

4.2.1.1 Panel mounting

This model is designed as a 19 inch (48.26 cm) rack system. Delivery includes six M6 screws for mounting the panel onto a rack. All internal connections are factory prepared. Canisters for reagents can be fitted onto an optional storage tray.

4.2.1.2 Wall mounting

All internal connections are factory prepared. Cables and tubing are threaded through the cable glands located on the bottom right side of the cabinet. Canisters for reagents can be fitted onto an optional storage tray.

To open the cabinet, push the handle lid upwards, press the lock button, then open the door with a 45° left turn of the handle. To access the cabinet interior, remove the knurled screw on the right side of the panel and carefully turn the panel sideways to the left taking care not to squeeze any tubing.

4.3 Hydraulic connections

⚠DANGER

Chemical or biological hazards. If this instrument is used to monitor a treatment process and/or chemical feed system for which there are regulatory limits and monitoring requirements related to public health, public safety, food or beverage manufacture or processing, it is the responsibility of the user of this instrument to know and abide by any applicable regulation and to have sufficient and appropriate mechanisms in place for compliance with applicable regulations in the event of malfunction of the instrument.

Sample

The sample enters the analyzer through a 12/14 mm hose (**No. 15** in Figure 3 on page 10). Flow rate should be between 40 and 300 liters/hour under a pressure of 0.5 to 6 bar.

Rinse water

The rinse water enters the analyzer through a 6/8 mm hose (**No. 14** in Figure 3 on page 10). Water pressure must be between 1 and 6 bar.

Reagents

The reagent containers are connected to the pumps according to the instructions corresponding to the application.

Drain

The analyzed sample is drained at atmospheric pressure through a 12 mm hose (**No. 7** in Figure 4 on page 11) delivered with the analyzer for initial startup. Make sure that no backflow occurs in this tube or the other two drainage tubes (overflow **No. 8** in Figure 4 on page 11 and siphon **No. 5** in Figure 4 on page 11).

Note: *With the cabinet model, all three tubes drain into a receptacle with a 50 mm outlet.*

4.4 Compressed air connection

The analyzer requires dry and filtered compressed air at a pressure of 4 to 7 bar. It should be supplied to the valve (**No. 10** in Figure 3 on page 10) using a suitable plastic tube of 4/6 mm diameter.

4.5 Electrical installation

⚠DANGER

Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before making electrical connections.

⚠DANGER

Electrocution hazard. Protective Earth Ground (PE) connection is required.

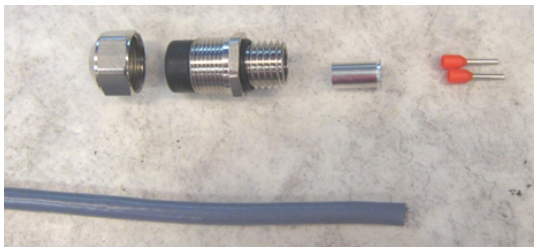
4.5.1 Wiring procedures and cable preparation

The following procedure must be followed for all cables connecting peripherals (e.g. pumps, level detectors, alarms, etc.) with the electronic unit (**No. 11** in Figure 3 on page 10). Some cables will be supplied ready for use. Other cables which are supplied locally by the user must be prepared according to the procedure explained in Cable preparation on page 15 before connecting to the electronic unit.

4.5.1.1 Cable preparation

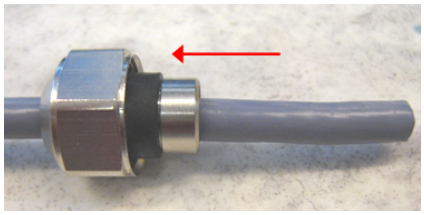
⚠WARNING

To conform with security standards and to respect the EMC compliancy of the analyzer, this procedure must be followed for all user supplied cables before connecting them to the electronic unit of the analyzer.



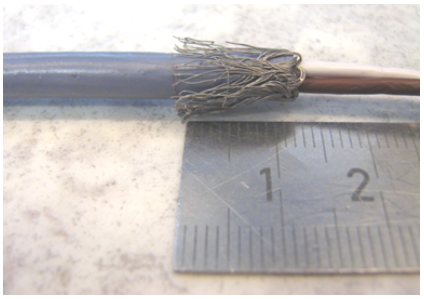
Materials required:

- Shielded cable (diameter minimum 4.5 mm - maximum 6 mm) with 2 or 3 wires depending on function (RS232 = 3 wires, Alarm = 2 wires, etc.)
- Metal cable gland
- Grounding ferrule
- 2 or 3 protective plugs for the exposed wires
- Clamp for the grounding ferrule
- Crimping pliers for the protective plugs

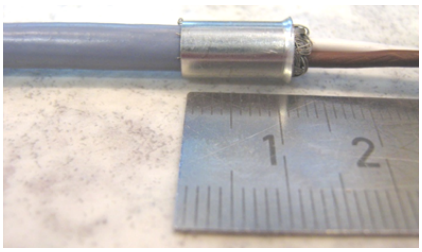


1. Place the nut and metal seal of the cable gland onto the shielded cable.

2. Remove 8 cm of the outer cabling to reveal the braided shielding.

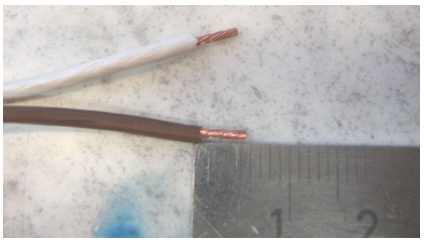


3. Remove all but 12 mm of the shielding to reveal the interior wires, then roll the remainder of the shielding back over the cable.

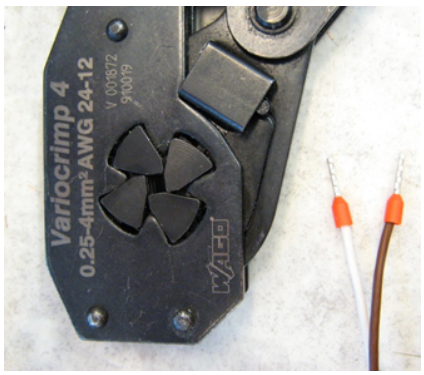


4. Insert the grounding ferrule over the shielding.

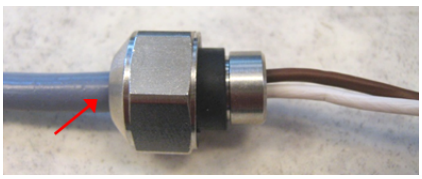
5. Use the clamp to fix the ferrule securely to the cable.



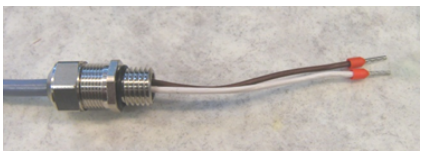
6. Remove 5 mm of the external insulation of the wires.



7. Use the crimping pliers to attach the protective plugs to the wires.



8. Bring the metal shield up over the ferrule and lock the two together making sure the ferrule is not exposed at the cable end of the shield. Bring up the nut to cover the shield.

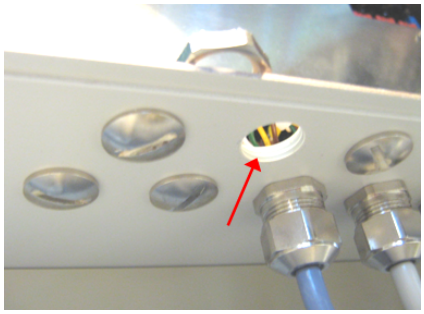


9. Pass the threaded part of the cable gland over the wires and screw into the nut on the cable. The cable is now ready to be connected following the procedure described in Connecting peripherals on page 16.

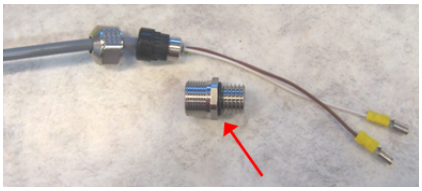
4.5.1.2 Connecting peripherals

⚠WARNING

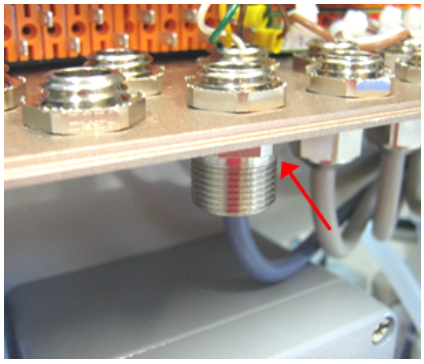
To conform with security standards and to respect the EMC compliancy of the analyzer, this procedure must be followed for connecting all peripherals to the electronic unit of the analyzer.



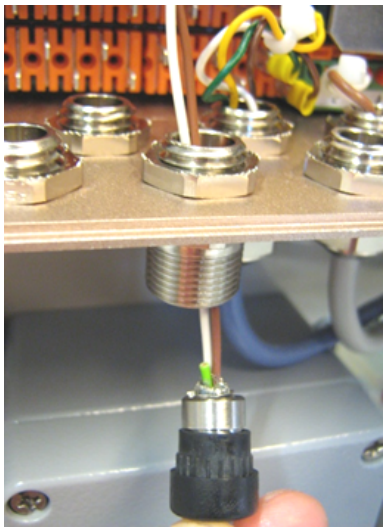
1. Select an unused opening nearest to the cable connection on the electronic board. Remove the screw and nut combination and set aside the screw for later use.



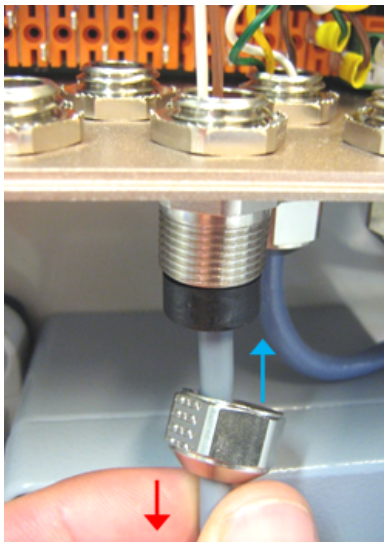
2. Take the cable, unscrew the threaded part and remove it.



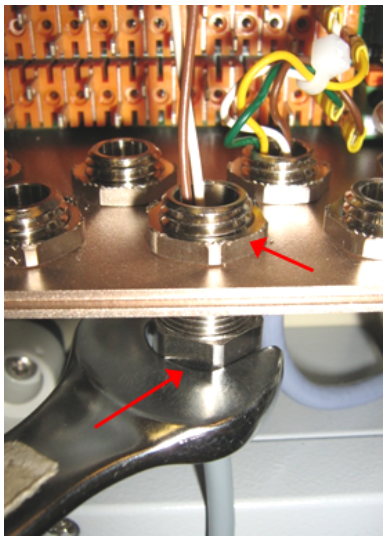
3. Screw the threaded part into the electronic unit opening selected in step 1 using the nut removed in step 1 to secure in place.



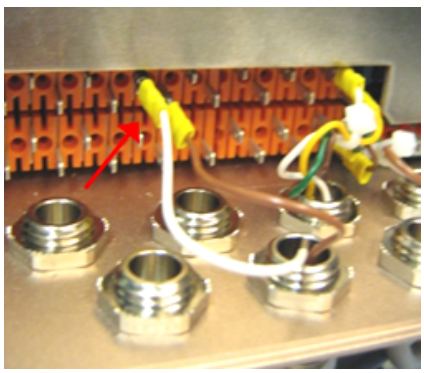
4. Pass the rest of the cable through the gland.



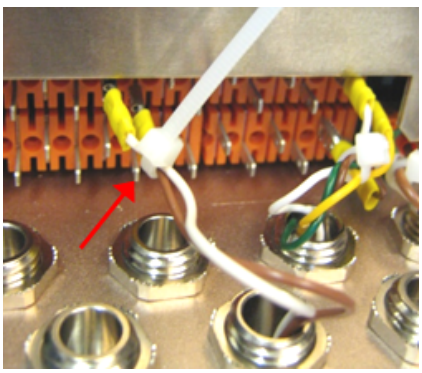
5. Pull the cable slightly with one hand until the inner shield comes into contact with the gland. Tighten the nut onto the gland with the other hand.



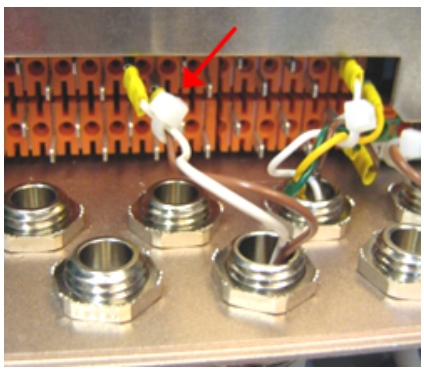
6. Tighten the nut with a wrench to secure in place. It may be necessary to use a second wrench to hold the top nut in place.



7. Connect the wires to the correct terminals.



8. Secure the wires with a cable tie.



9. Cut the cable tie as near as possible to the wires.

4.5.1.3 Electrode connections

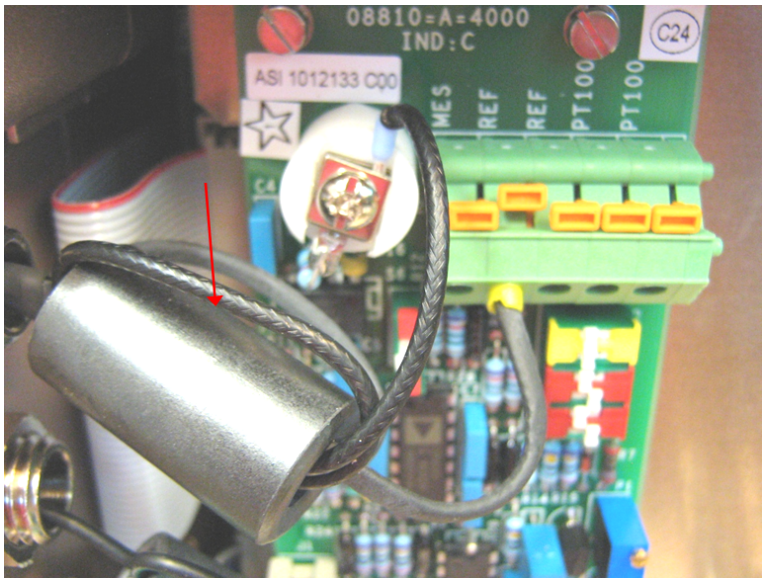
⚠WARNING

To conform with security standards and to respect the EMC compliancy of the analyzer, this procedure must be followed when connecting selective, reference, combined and temperature electrodes to the electronic unit of the analyzer.

Before being connected to the terminal block of the measurement board, electrode cables must pass through ferrite blocks to minimize the risk of outside interferences that could cause erroneous measurement data.

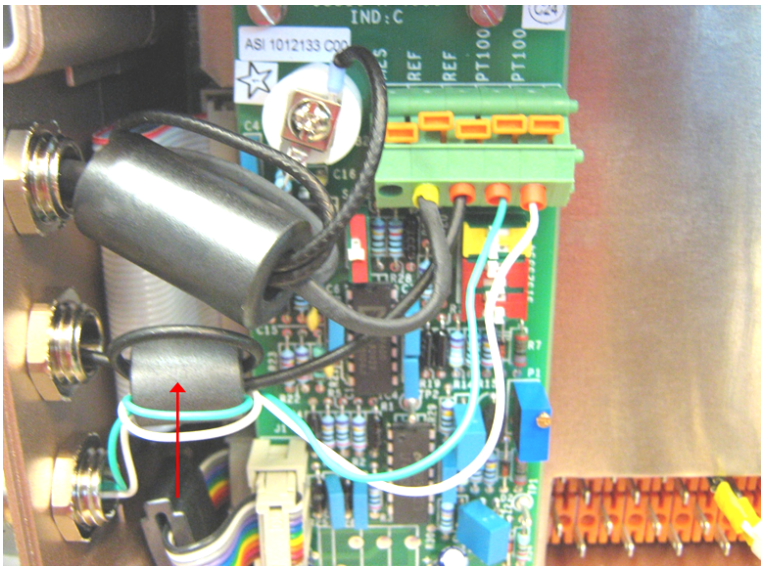
For the selective or combined electrode, install the cable gland and pass the cable of into the electronic unit in the same way as for all other cables (as described in Connecting peripherals on page 16). Once both wires (measurement and shield) are in place, pass them both through the ferrite block. Make a loop by passing them through a second time before connecting them to their respective inputs as illustrated in Figure 5.

Figure 5 Selective or combined electrode connection



For the reference electrode (not applicable in the case of a combined electrode) and the temperature sensor, install the cable glands and pass the cables into the electronic unit in the same way as for all other cables (as described in Connecting peripherals on page 16). Once the reference electrode wire and the two temperature sensor wires are in place, pass them all through the second ferrite block. Make a loop by passing them through a second time before connecting them to their respective inputs as illustrated in Figure 6 (the temperature sensor has no polarity).

Figure 6 Reference electrode and temperature sensor connections



4.5.2 Mains power supply

⚠DANGER

Electrocution hazard. Always remove power to the instrument before making electrical connections.

⚠DANGER

Electrocution hazard. Protective Earth Ground (PE) connection is required.

⚠DANGER

Electrical shock and fire hazards. Make sure to identify the local disconnect clearly for the conduit installation.

⚠WARNING

Potential Electrocution Hazard. If this equipment is used outdoors or in potentially wet locations, a **Ground Fault Interrupt** device must be used for connecting the equipment to its mains power source.

⚠CAUTION

Multiple hazards. Only qualified personnel must conduct the tasks described in this section of the document.

NOTICE

Install the device in a location and position that gives easy access to the disconnect device and its operation.

NOTICE

The analyzer is factory configured to either 110/120 VAC or 220/240 VAC. Make sure to connect the correct power supply to the analyzer.

Connect equipment in accordance with local, state or national electrical codes. Obey all codes and regulations for wiring. Install cables into the instrument enclosure through the supplied cable glands.

Use screened and screen earthed cable for the mains connection. The mains wire specifications are: diameter between 7 and 9.5 mm, 3 cores, 10 Amps minimum current rating, between 1 mm^2 (AWG18) and 2.5 mm^2 (AWG14) minimum CSA (Cross Sectional Area). For all other signal connections use screened instrument cable. Use also screen earthed cable for the signal connections.

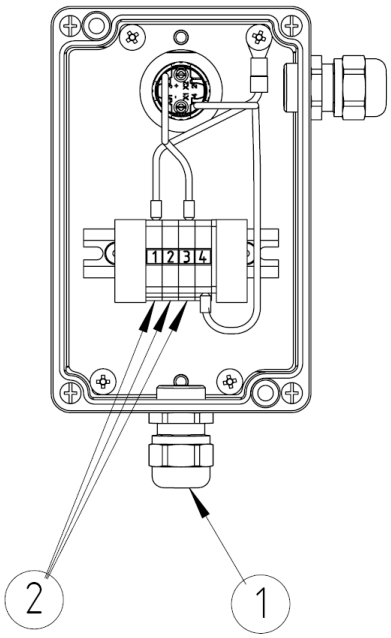
Note: *Equipment intended for permanent connection to the MAINS must have provision for connection of a wiring system in accordance with ANSI/NFPA 70, NEC, with CSA C22.1*

Make sure that a 2 pole circuit breaker with a minimum breaking capcity of 20 A is installed in the power line. Install a local disconnect for the instrument within 3 m (10 ft) of the instrument. Put a label on the disconnect that identifies it as the main disconnect device for the instrument.

When the wiring of the system is completed, do the steps that follow to energize the system:

1. Open the power supply box (**No. 12** in Figure 3 on page 10).
2. Pass the power cable through the cable gland and connect the earth, neutral and live wires to terminals 1, 2 and 3 respectively as indicated in Figure 7.

Figure 7 Power supply box



1 Mains power cable gland	**2** Connection terminals (1 = Earth, 2 = Neutral, 3 = Live)

4.5.3 Input/Output connections

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before making any of the connections in this section.

⚠WARNING

To conform with security standards and to respect the EMC compliancy of the analyzer, follow the procedures defined in Wiring procedures and cable preparation on page 14 for all connections to the electronic unit of the analyzer.

The electronic unit (**No. 11** in Figure 3 on page 10) must be opened from the rear to make these connections. Unscrew the four screws holding the unit rear panel and gently swing open from left to right. Refer to Figure 8 for terminal locations and the following tables for the functions.

Note: *The terminal connectors diagram is also physically located on the rear of the electronic unit.*

Figure 8 Terminal connectors

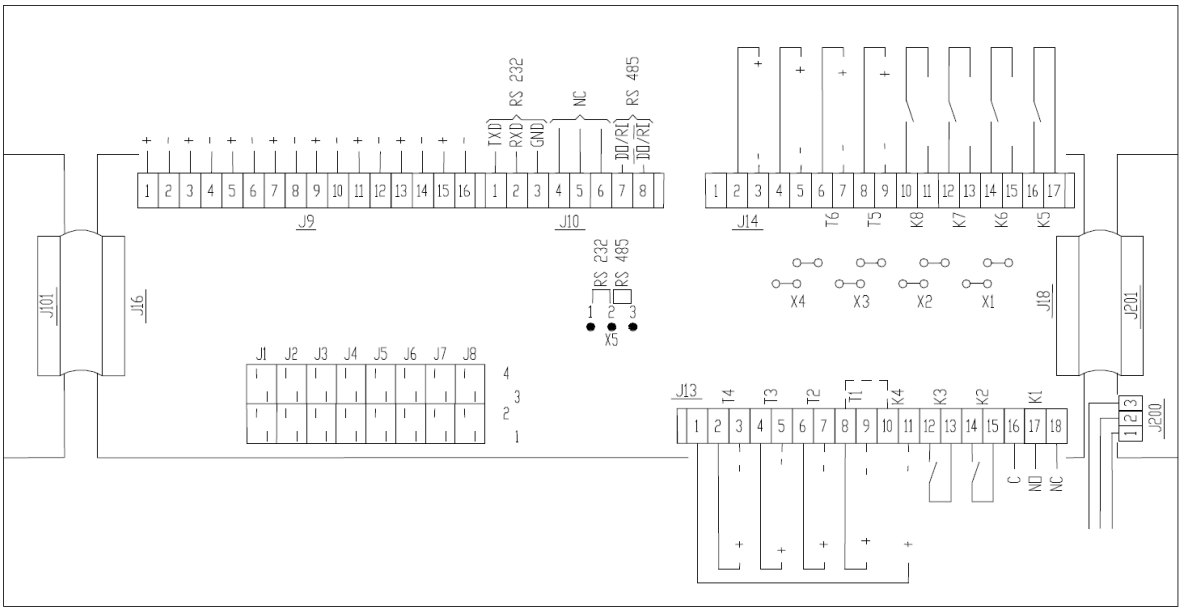


Table 1 Microprocessor board

Terminal	Description
X1 - X4	Relay configurations K5 - K8 • 2-3: Dry contact relay • 1-2 and 3-4: 24 VDC
X5	Serial interface • 1-2: RS 232 • 2-3: RS 485

Table 2 Level detector and external commands (J1 - J8)

Terminal	Use
J1	Start / Standby
J2	External sample
J3	Not used
J4	Conditioning solution
J5	Titration solution
J6	Calibration solution

Table 2 Level detector and external commands (J1 - J8) (continued)

Terminal	Use
J7	Chemical cleaning
J8	Sample

Table 3 Analog outputs (J9)

Terminal	Use
1-2	Analog output 1
3-4	Analog output 2
5-6	Analog output 3
7-8	Analog output 4
9-10	Analog output 5
11-12	Analog output 6
13-14	Analog output 7
15-16	Analog output 8

Table 4 Serial interface (J10)

Terminal	Use	
1	TXD	RS 232 user configured with X5
2	RXD	
3	GND	
4, 5, 6, 7, 8	Not used	

Table 5 Accessories 1 (J13)

Terminal	Use
1-11	Heating system
2-3	Mixer
4-5	Rinse valve
6-7	Flush valve
8-9	Sample valve
12-13	Alarm 2
14-15	Alarm 1
16-17-18	System alarm (16-17 for NO or 16-18 for NC)

Table 6 Accessories 2 (J14)

Terminal	Use
1-11 (8-10)	Automatic calibration or external sample pump (connect 8 and 10 and set jumper X4 at 2-3)
2-3	Extra channel
4-5	Chemical cleaning valve
6-7	Dilution valve
8-9	Not used

Table 6 Accessories 2 (J14) (continued)

Terminal	Use
10-11	Pump 4
12-13	Pump 3 (X3 set at 1-2 and 3-4)
14-15	Pump 2 (X2 set at 1-2 and 3-4)
16-17	Pump 1 (X1 set at 1-2 and 3-4) / Automatic calibration

Table 7 Pump functions 1 - 4

Pump 1	Pump 2	Pump 3	Pump 4
Automatic calibration	Conditioning solution 1	Conditioning solution 2	External sample
X1 - X3 set at 1-2 and 3-4 X4 set at 2-3 and connect 8 and 10 of J14			

4.5.3.1 Alarms

Refer also to Figure 8 on page 21 and Table 5 on page 22. Alarm threshold relays (K2 and K3) are set to normally open (NO). The system alarm relay (K1) can be set to normally open (terminals 16 and 17) or normally closed (terminals 16 and 18).

4.5.3.2 Analog outputs

Refer also to Figure 8 on page 21 and Table 3 on page 22. The analog outputs 0-20 mA or 4-20 mA are galvanically insulated. The following table shows the allocation of the different outputs:

		1 channel analyzer	2 channel analyzer
I out 1	Terminal 1-2 of J9	Channel 1	
I out 2	Terminal 3-4 of J9	Measurement potential	
I out 3	Terminal 5-6 of J9	Not used	Channel 2

4.5.3.3 Sample level detector

Refer also to Figure 8 on page 21 and Table 2 on page 21. The reactor is equipped with a sample level detector. Wire the connection to J8 as follows:

J8 Terminal number	Color
1	Brown
2	Green
3	Yellow
4	White

4.5.3.4 Reagent level detector

Refer also to Figure 8 on page 21 and Table 2 on page 21. Each reagent canister is equipped with a level detector. For each reagent, wire the connections to J4, J5, J6 and J7 as follows:

J4, J5, J6 and J7 Terminal number	Color
1	Not used
2	Not used
3	Brown
4	White

4.5.3.5 RS232 connection

Refer also to Figure 8 on page 21 and Table 4 on page 22. Wire the connection to J10 as follows:

J10 Terminal number	DB9 Plug	DB25 Plug
1 (TXD)	RXD: 2	RXD: 2
2 (RXD	TXD: 3	TXD: 3
3 (GND)	COM: 5	COM: 7

The 8810 configuration is:

- Speed: 9600 baud
- Data: 8 bits
- Stop bit: 2
- Parity: none

On startup the analyzer sends the name and software version:

- **ANALYZER 8810 : 00 : 00 : 00 :**
- **ISE X.XX : 00 : 00 : 00 :**

In measurement mode, the analyzer sends the following data:

- **Measure HH : MM : SS**
- **M1 XXXXEXX XX.X°C XXX**

Where:

- MX = M1 for channel 1 or M2 for channel 2
- XXXXEXX = concentration measurement value
- XX.X°C = temperature
- XXX = value of the potential

Where appropriate, the analyzer also sends the following messages with a time stamp (HH : MM : SS):

ACTIONS	
Cleaning	Chemical cleaning
Stopped	Analyzer stopped
Fix-time	Time between two cycles
Standby	Analyzer in standby
AUTO SYS CAL	Automatic calibration
PROCESS SYS CAL	Process calibration
MANUAL SYS CAL	Manual calibration

SYSTEM ERRORS	
LEVEL SAMPLE	Sample missing from measuring cell
OVER TITR TIME	Titration time is too long
ERROR CALIB	Automatic calibration error

WARNINGS	
LEVEL REAGENT	Titration reagent missing
LEVEL COND	Conditioning reagent missing
LEVEL CALIB	Calibration solution missing
LEVEL CLEANING	Cleaning solution missing
RETURN PROCESS	After an external sample measurement, this message indicates a return to process measurement
SLOPE CALIB 1/2	Automatic calibration error

4.5.4 Additional accessories

Any accessories that have been purchased but that have not been factory installed, can be installed now. Instructions for the installation and wiring are given in the section entitled Additional options on page 41. Once everything has been installed, check the following in the measurement chamber:

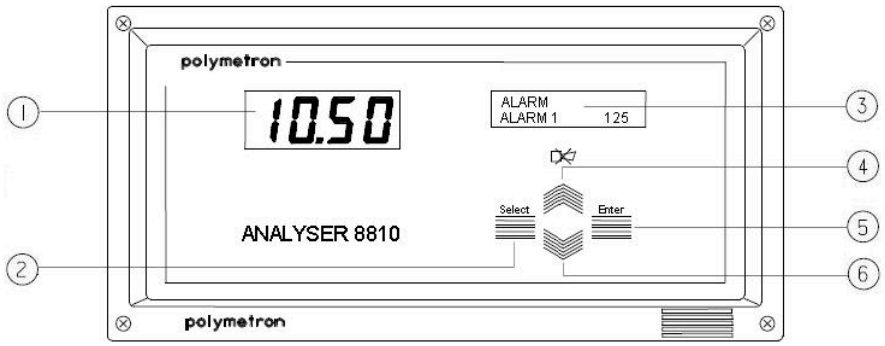
- Nothing is in contact with the stirrer
- The upper part of the overflow pipe is about 2 cm above the siphon
- The level detector is about 1 cm below the bottom of the siphon inlet
- If not connected, connect the measuring electrode to the thicker cable and the reference electrode to the thinner cable.

Section 5 User interface

5.1 Front panel description

The interface is via a 4-key keyboard, a 4-digit numeric display and an alphanumeric display of 2-lines of 16 characters.

Figure 9 Front panel



1 Numeric display	**4** Scroll up key
2 Select key	**5** Enter key
3 Alphanumeric display	**6** Scroll down key

5.2 Function keys

- **Enter**: Invoke functions or confirm parameters.
- **Select**: Select menu options, adjust parameters, exit submenus, and switch between command and operating mode.
- **Scroll down**: Adjust variables, scroll through displays in operating mode and submenus in command mode.
- **Scroll up**: Same as scroll down but in reverse order, and cancel the system alarm.

5.3 Analyzer modes

The analyzer functions in **Operating** mode or **Command** mode. In **Operating** mode the analyzer performs standard actions such as measurement, calibration, etc. A limited number of parameters can also be displayed using the scroll keys. In **Command** mode the analyzer can be programmed, parameters displayed and analyzer functions tested. By default, the analyzer is in **Command** mode when first switched on.

To enter **Operating** mode from **Command** mode, select **START** from the **MAIN MENU**.

To enter **Command** mode from **Operating** mode, press **Select** to display the **STOP** command, then

- if you only wish to display currently defined parameters, from the **STOP** command use the scroll keys to select **READING** and press **Enter** for approximately 3 seconds.
- if you wish to program the analyzer or test analyzer functions, from the **STOP** command press **Enter** and then **Enter** again to confirm. Then use the scroll keys to select **PROGRAMMING** and press **Enter** for approximately 3 seconds.

5.4 Displays

Numeric display: This display shows concentration (default), potential or temperature measurements.

Alphanumeric display: This display provides messages on status and programming. Messages are different according to the mode:

- **Operating** mode: The top line indicates units, measurement type and any activated alarms. The bottom line indicates the analyzer status, e.g. calibration, titration, etc.
- **Command** mode: The top line indicates the main menu. The bottom line indicates submenus and data settings.

Section 6 Menu overview

MAIN MENU

The main menu gives access to the following functions:

- **STOP** - Pressing **Enter** causes the measurement process to stop immediately
- **START** - Pressing **Enter** initiates the measurement process
- **STAND-BY** - Pressing **Enter** puts the analyzer in standby
- **PROGRAMMING** - Program the analyzer (**Command** mode only)
- **READING** - View parameters (**Operating** mode only)

In **PROGRAMMING** or **READING** mode the following options can be selected using the scroll keys:

- **CALIBRATION** - Calibrate the analyzer
- **ANALOG-OUT** - Analog output parameters
- **ALARM** - Alarm limit parameters
- **SEQUENCE** - Measurement mode
- **SERVICE** - Check the analyzer and accessory operations
- **CLEANING** - Chemical cleaning parameters
- **SAMPLE COND.** - Sample conditioning parameters
- **CAL PARAMETER** - View the primary and last calibration details
- **TIMING** - Titration cycle parameters
- **PM XXXX** - System configuration (only available in **PROGRAMMING** mode and requires a valid password)

Note: *Some of the above options are only available if the relevant accessory has been installed.*

6.1 System configuration (PM XXXX option)

Refer also to any **Installation Procedure** documents delivered with the analyzer for application specific information.

1. Select **PM XXXX** with the scrolling keys and press **Enter**. Using the **Select** key to move from one digit to the next, enter the special code and press **Enter**.

Option	Description
ELECTRODE	Define the electrode parameters: • Name • Slope • (Uiso) Isothermal point potential • (E) Reference point potential adjusted to 25°C • (C) Reference point concentration adjusted to 25°C The E and C parameters are used to calculate the standard potential (**E_{025} = E - S.logC**)
UNIT	Select the unit of concentration from the list available. Selecting **USER** allows you to define your own, and requires a 5 character description.
Adjust ADC	This option is reserved for Hach Lange service technicians.
CAL TEMPERATURE	Two-point temperature calibration. Use a temperature simulator for each of the two points. Wait until the measurement stabilizes before accepting each calibration point.
Adjust Iout	Select the output type (0-20mA or 4-20mA). Place a multimeter in series with the analog output and make any small adjustments to the signal as required.

Option	Description
OPTION	From the list available, select **YES** for those additional options that have been installed and **NO** for those not installed. For correct operation of the analyzer, any hardware installations must have been completed before setting the option to **YES**. 1. **AUTOMAT.CAL** - Automatic calibration. Define if the automatic calibration is a 1 point or 2 point calibration. If set to 1 point, no further input is required. For 2 points, set **PULSE PUMP** to **YES** if a pulse pump has been installed or **NO** if a micro piston pump has been installed and define the flow rate for the type of pump selected. Next define the volume of the measurement cell and if the calibration solution (**STD ADDITION**) is of known concentration (**YES** or **NO**). 2. **CLEANING** - Chemical cleaning 3. **SAMPLE COND.** - Sample conditioning 4. **MANUAL** - External sample. Set the injection time (in seconds) of the external sample 5. **HEATING** - Sample heating before measurement. Set the sample temperature required 6. **DILUTION** - Sample dilution before measurement 7. **2 CHANNELS** - Additional sample channel. If this option is installed, measurements are taken alternatively on each channel but calibrations are always made on channel 1
DATE and TIME	Set the analyzer date and time parameters.

6.2 Calibration (CALIBRATION option)

6.2.1 Calibration in READING mode

The **CALIBRATION** option is available for viewing the calibration parameters. Scroll through the list of parameters as they are displayed.

6.2.2 Calibration in PROGRAMMING mode

1. From the **PROGRAMMING** menu, select **CALIBRATION** with the scrolling keys and press **Enter**.

Option	Description
MANUAL CAL	This calibration requires two laboratory prepared calibration solutions with known concentration.
PROCESS CAL	This calibration uses the process solution, with known concentration, as the calibration solution.
AUTOMAT. CAL	This is only available if this option has been installed.

6.2.2.1 Manual calibration

1. Select **MANUAL CAL** and press **Enter**. The measurement chamber is then cleaned in preparation for a calibration.
2. **FILL BUFFER 1** is displayed. Pour the first calibration solution into the measurement chamber and press **Enter**.
3. **CONC 1 XX.XXEXX** is displayed. Enter the calibration solution concentration and press **Enter**. The solution is then measured before the measurement chamber is cleaned in preparation for the second calibration solution.

4. **FILL BUFFER 2** is displayed. Pour the second calibration solution into the measurement chamber and press **Enter**.
5. **CONC 2 XX.XXEXX** is displayed. Enter the calibration solution concentration and press **Enter**. The solution is then measured before the measurement chamber is then cleaned.

6.2.2.2 Process calibration

1. Select **PROCESS CAL** and press **Enter**.
2. **Slope: XXX.XX** is displayed. Enter the slope value of the process solution. Press **Enter** to confirm.
3. After measurement the concentration of the process solution is displayed **CONC 1/2 XX.XXEXX**. This value can be adjusted if necessary. Press **Enter** to confirm.

6.2.2.3 Automatic calibration

This is only available if the analyzer has this option installed. It allows for an automatic calibration at pre-programmed intervals, using a calibration solution of known concentration.

1. Select **AUTOMAT. CAL** and press **Enter**.
2. **FREQUENCY** is displayed. This defines the number of measurements that are made before an automatic calibration takes place. Enter the number and confirm with **Enter**.
3. If the **AUTOMAT CAL1 PT** option has been selected:

Option	Description
INJ. TIME	Enter the injection time of the calibration solution in seconds and confirm with **Enter**.
CONC	Enter the concentration of the calibration solution and press **Enter**.
IMMEDIATE	Select **YES** or **NO** followed by **Enter**. If **YES** is selected an automatic calibration will start immediately. No more input is required.

4. If the **AUTOMAT CAL 2PTS** option has been selected, select **CAL PUMP YES** to start a pump calibration (pulse or micro system), **CAL PUMP NO** if no calibration is required or **Use Default Parameters** to use the parameters defined in **PMXXX-OPTION-AUTOMAT.CAL** and press **Enter**.
5. If the **CAL PUMP YES** option has been selected:

Option	Description
INJ.TIME or INJECT	Enter the injection time (micro system pump) in seconds or the number of pulses (pulse pump) and press **Enter**.
ADD C	Enter the concentration of the addition and press **Enter**. The pump calibration starts.
Fill C. PUMP SOL	Press **Enter** for the introduction of the solution with known concentration. The concentration of the solution in the measurement chamber is then measured, followed by an injection of the calibration solution, followed by another measurement of the solution in the measurement chamber.

Option	Description
C. Ini	Adjust the concentration of the solution before the addition if necessary.
C. End	Adjust the concentration of the solution after the addition if necessary.

6. If the **CAL PUMP NO** or the **Use Default Parameters** option has been selected:

Option	Description
ADD C	Enter the concentration of the addition and press **Enter**. The pump calibration starts.
INJ.TIME1 or INJECT1	Enter the injection time (micro system pump) in seconds or the number of pulses (pulse pump) for the first calibration solution and press **Enter**.
INJ.TIME2 or INJECT2	Enter the injection time (micro system pump) in seconds or the number of pulses (pulse pump) for the second calibration solution and press **Enter**.
IMMEDIATE	Select **YES** or **NO** followed by **Enter**. If **YES** is selected an automatic calibration will start immediately. No more input is required.

6.2.3 Calibration results

The following tolerances are defined for calibrations:

- Zone 1: The new calibration parameters are between 70% and 130% of the current calibration parameters
- Zone 2: The new calibration parameters are between 50% and 70% or 130% and 150% of the current calibration parameters
- Zone 3: The new calibration parameters are between <50% and >150% of the current calibration parameters

If the new calibration parameters are in **Zone 1**, the calibration is considered successful and the new parameters are used for all future measurements.

If the new calibration parameters are in **Zone 2**, it is necessary to **CONFIRM** the new parameters. If **YES** is selected the new parameters are used for all future measurements. If **NO** is selected the new parameters are rejected and the previous values are used for all future measurements.

If the new calibration parameters are in **Zone 3**, the message **ERROR CALIBRAT.** is displayed. Press **Enter** to continue then select **RETRY** to repeat the calibration or **ABORT** to abort the calibration.

These messages only appear for a manual calibration, a process calibration, or if **IMMEDIATE YES** was selected for an automatic calibration.

In a standard automatic calibration, or when **IMMEDIATE NO** was selected, the analyzer will not ask for confirmation. If the calibration parameters are within **Zone 1** the calibration is considered successful and the new parameters are used for all future measurements. If the calibration parameters are within **Zone 2** an error message **SLOPE CALIB** appears on the display and the new calibration parameters are rejected. f the calibration parameters are within **Zone 3** an error message **ERROR CALIB** appears on the display and the new calibration parameters are rejected.

6.3 Analog outputs (ANALOG-OUT option)

The analyser has two analog outputs which are allocated according to the application:

- One connected to the concentration
- The other connected to the potential electrode line

For logarithmic and bilinear outputs, the minimum range is 1/100 of the maximum range. The minimum range cannot be adjusted.

1. Select **ANALOG-OUT** with the scrolling keys and press **Enter**. Select the type of analog output:

Option	Description
LINEAR	Linear output
LOGARITHMIC	Logarithmic output
DUAL RANGE	Bilinear output

2. If linear output is selected:

Option	Description
START XX.XXEXX	Define the concentration corresponding to the 0 or 4 mA current for the start of output scale 1.
END XX.XXEXX	Define the concentration corresponding to the 20 mA current for the end of output scale 1.
START XXX.XmV	Define the potential corresponding to the 0 or 4 mA current for the start of output scale 2.
END XXX.XmV	Define the potential corresponding to the 20 mA current for the end of output scale 2.

The choice between 0 and 4mA is available in the **PMXXXX**, **Adjust Iout** menu option.

3. Define the output:

Option	Description
OUT: Conc	Output corresponds to the last measured values.
OUT: Full	Output is set to 20 mA.
OUT: Zero	Output is set to 0 or 4 mA.

Note: *You can only exit this menu when the option* ***Conc*** *is displayed.*

6.4 Set the alarms and thresholds (ALARM option)

The analyzer has three alarms which are allocated according to the definition of **WARNING/R1**:

	WARNING/R1 set to NO	WARNING/R1 set to YES
System alarm	System and warning alarm	System alarm only
Alarm 1	Alarm 1	Warning alarm
Alarm 2	Alarm 2	Alarm 1 and 2

The alarms are allocated to the channel depending on the number of channels in operation:

	2 Channels = NO	2 Channels = YES
Alarm 1	Channel 1	Channel 1
Alarm 2		Channel 2

1. Select **ALARM** with the scrolling keys and press **Enter**.

Option	Description
SYS.ALARM ON/OFF	Activate or deactivate the system alarm.

Option	Description
WARNING/R1 YES/NO	Define the alarm allocation (refer to table above).
ALARM 1/2 ON/OFF	Activate or deactivate alarms 1 and 2.
ALARM 1/2 HIGH/LOW	If activated, define if the trigger is a high or low measurement value.
ALARM 1/2 XXX	Enter the threshold value. If the alarm is set to **HIGH** any measured value above this threshold will trigger the alarm, or if the alarm is set to **LOW** any measured value below this threshold will trigger the alarm.

6.5 Measurement mode (SEQUENCE option)

Define the measurement mode.

1. Select **SEQUENCE** with the scrolling keys and press **Enter**. Use the scrolling keys to select the required mode.

Option	Description
FIX TIME	A fixed interval between measurements. The interval is defined in Measurement cycle parameters (TIMING option) on page 35.
LOOP	Continuous measurement. No further input is required.

2. If **FIX TIME** is selected:

Option	Description
Inj. Time PX: YYs	Adjust the pump action time: X: pump number 1 to 4 YY: time in seconds. Adjustable between 0 and 99 seconds.

6.6 Test analyzer and accessories (SERVICE option)

Check various physical options (e.g. pumps) are working correctly. The option to view the version number of the latest installed software is also available from the list.

1. Select **SERVICE** with the scrolling keys and press **Enter**.
2. Select the option to test from the list available and set to **ON** to start it, check it functions correctly, and then set back to **OFF** to stop it.

6.7 Chemical cleaning (CLEANING option)

This option is displayed only if the **CLEANING** option has been activated.
Define the parameters required for a chemical cleaning of the system.

1. Select **CLEANING** with the scrolling keys and press **Enter**.

Option	Description
FREQUENCY	Enter the number of measurements between each chemical cleaning.
SPRINKLER	Define the duration (in seconds) for rinsing the measurement chamber.

Option	Description
REAG. INJ	Define the duration (in seconds) that the cleaning solution is injected into the measurement chamber.
RESIDENC.	Define the duration (in seconds) that the cleaning solution remains in the measurement chamber.

6.8 Sample conditioning (SAMPLE COND option)

This option is displayed only if the **SAMPLE COND** option has been activated.
Define the parameters required for conditioning the sample prior to measurement. It is possible to define 1 or 2 conditioning reagents.

1. Select **SAMPLE COND** with the scrolling keys and press **Enter**.

Option	Description
REAGENT 1/2 OFF/ON	Set to **ON** if the conditioning is made using this reagent.
INJ. REAG. 1/2	Define the duration (in seconds) that the reagent is injected into the measurement chamber.
TIME REAG. 1/2	Define the duration (in seconds) that the reagent remains in the sample before measurement.

6.9 View calibration details (CAL PARAMETER option)

This option lets you view the details of the primary and last calibrations made by the analyzer.

1. Select **CAL PARAMETER** with the scrolling keys and press **Enter**.
2. Use the scroll keys to select **LAST CAL** or **PRIMARY CAL**, then scroll through the details by pressing **Enter**.

6.10 Measurement cycle parameters (TIMING option)

Define the parameters for each measurement.

1. Select **TIMING** with the scrolling keys and press **Enter**.

Option	Description
SAMPLE TIME	Define the time (in seconds) the sample is injected into the measuring chamber.
SPRINKLER N	Define the number of rinses required.
SPRINKLER t	Define the duration (in seconds) of each rinse.
CYCLE TIME	Define the duration (in minutes) of the measurement cycle.
DELAY t	Define the time (in seconds) between each injection.
DEVIATION	Define the electrode potential.
MEASURE t	Define the measurement time. The final measurement is the average of all measurements taken during this time.

Section 7 Maintenance and Troubleshooting

7.1 Maintenance

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before carrying out any maintenance on the analyzer.

7.1.1 General

For periodic maintenance, all the elements are freely accessible on the front panel.

For installation of accessories and specialized service work the analyzer is easily accessible from all sides with some simple manipulations. The electronic control and analytical units can be accessed and removed after opening the front of the analyzer with the special key provided.

7.1.2 Maintenance schedule

The schedule is dependent on the type of application. In general we can say that a monthly maintenance is required to perform the following tasks:

- Check all reagent and chemical containers. Refill if necessary
- Disconnect the tubing and replace the other way round
- Every 2 months replace all the tubing
- Check the measurement chamber and electrodes for any deposits. Clean if visibly contaminated
- Check all tube connections for any leaks
- Check the system is running smoothly. Calibrate if necessary

7.1.3 Software upgrade

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before upgrading the software.

If a new software version is made available it should be installed as follows:

1. Open the electronic unit from the rear and disconnect the data cable from terminal J1 on the measurement board.
2. Unscrew the three screws on the metal shielding plate (on which the measurement board is attached) and lift out. Do **not** remove the measurement board from the shielding plate.
3. Remove the old EEPROM (referenced **8810 ISE XXX.X**) from position IC19.
4. Install the new EEPROM with the latest software in the same position IC19.
5. Replace the metal shielding plate and screw back the three screws.
6. Reconnect the data cable to terminal J1 on the measurement board.
7. Close the electron unit.
8. Reconnect power to the analyzer.
9. Switch the analyzer on using the red switch on the front, while simultaneously pressing on the **Select** and **Enter** keys to load the new software with default values.
10. Program the analyzer with the your parameters noted on User configuration on page 57 to reflect your user configuration.

7.1.4 Cleaning and decontamination

The analyzer does not normally require any cleaning or decontamination.

If needed, clean the exterior of the instrument with a moist cloth and a mild soap solution. Never use cleaning agents such as turpentine, acetone or similar products to clean the instrument, including the display and any accessories.

7.1.5 Shutdown

Stopping the measurement cycle

Select **STOP** in the main menu and press **Enter**. The message **stopped** is displayed.

Short shutdown (e.g. weekend)

Select **STAND BY** in the main menu and press **Enter** to put the system in a defined standby condition. The measurement chamber is drained, rinsed, and refilled with rinse water.

Prolonged shutdown

If the system is shut down for a long period of time the electrodes must be cleaned and the measurement chamber rinsed. It is preferable to then remove the electrodes and store them in a buffer solution until the system is restarted. Under no condition must the electrodes be left in an empty measurement chamber as this will cause them to dry out and become damaged. Finally, turn the power off.

7.2 Troubleshooting

Malfunction		Possible cause	Corrective action
High fluctuation of results	Irregular sample volume in the measurement cell	Siphon working intermittently because of erratic sample flow (rinse water when diluting)	Check sample flow > 40 L/minute
			Check air pressure 4 - 7 bars
			Make sure the siphon drain tubing is as short, direct and as vertical as possible
			Make sure the top of the overflow is higher than the top of the siphon by about 2 cm
		Volume of sample is too low	Check the sample time parameters
		Drain valve	Check for leaks and dirt on the valve seal
	Regular sample volume in the measurement cell	Drainage	Check the drainage is free flowing
		Air bubbles in the reagent tubing	Check the tube connections
		Sample conditioning	Regular maintenance
			Check all the tubing
			Check the sample conditioning parameters

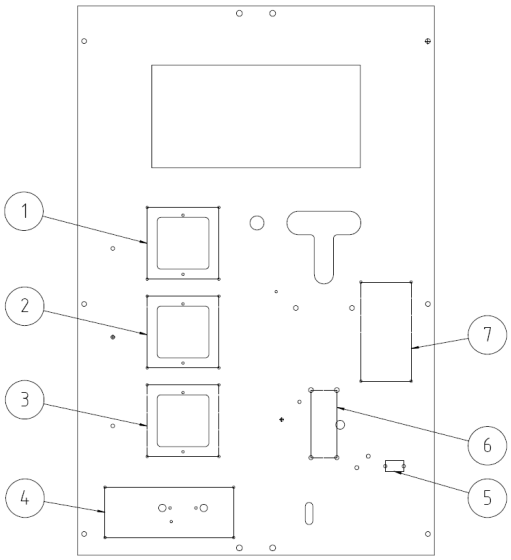
Malfunction		Possible cause	Corrective action
No analysis results		Sample flow or no sample flow in the measurement cell	Check sample flow > 40 L/minute
			Check air pressure 4 - 7 bars
			Check the valves are working
		Electrode connections	Check all electrode connections
		Programming	Check measurement cycle parameters
			Check the sample conditioning parameters
			Check measurement sequence parameters
		Analog outputs	Check the analog outputs
Results drift	Measurement cell dirty	Chemical cleaning	Check the level and quality of the chemical cleaning solution
			Check all the sample conditioning solution tubes
			Check the cleaning parameters
			Check valves are not leaking
			Check all tubing for any constriction
		Sample conditioning	Check the quality of the sample conditioning solution
			Check the sample conditioning parameters
	Measurement cell clean	Conditioning reagents	Check the quality of the sample conditioning solution
		Automatic calibration	Increase the frequency of calibrations
Stable results with incorrect values		Automatic calibration	Check the automatic calibration system for air bubbles, tube connections, etc.
			Calibrate the system
			Check the automatic calibration parameters
		Analog outputs	Check analog output parameters
No display on the screen		Mains power	Check or change the fuse: 220/240 V - 630 mA 110/120 V - 1.25 A

Section 8 Additional options

The following options can be added to the analyzer to increase performance. Refer to Figure 10.

- Reagent pump - 2 point automatic calibration
- Reagent pump - 1 point automatic calibration
- Reagent pump - Sample conditioning 1
- Reagent pump - Sample conditioning 2
- Chemical cleaning
- Dilution system
- External sample measurement or automatic calibration
- Heating system
- Extra channel
- Reagent canister kit

Figure 10 Option locations on rear panel



1 Reagent pump	**4** External sample pump or automatic calibration (1 point version)	**7** Chemical cleaning
2 Reagent pump or automatic calibration (2 point version)	**5** Control valve for the dilution system	
3 Reagent pump or automatic calibration (2 point version)	**6** Extra channel	

Installation instructions for these additional options are described in the following sections.

NOTICE

A cable gland is provided for each option that must be connected inside the analyzer. The cable glands are designed so that the cable shields attach directly to the analyzer housing as a ground.

⚠WARNING

To conform with security standards and to respect the EMC compliancy of the analyzer, follow the procedures defined in Wiring procedures and cable preparation on page 14 for all connections to the electronic unit of the analyzer.

8.1 Automatic calibration

This option allows the analyzer to perform an automatic calibration at programmed intervals and with a known calibration solution. Three different kits are available, each including a 10 liter canister equipped with level detector and strainer:

1. 1 point calibration with a volumetric pump.
2. 2 point calibration with a micro piston pump.
3. 2 point calibration with a pulse pump.

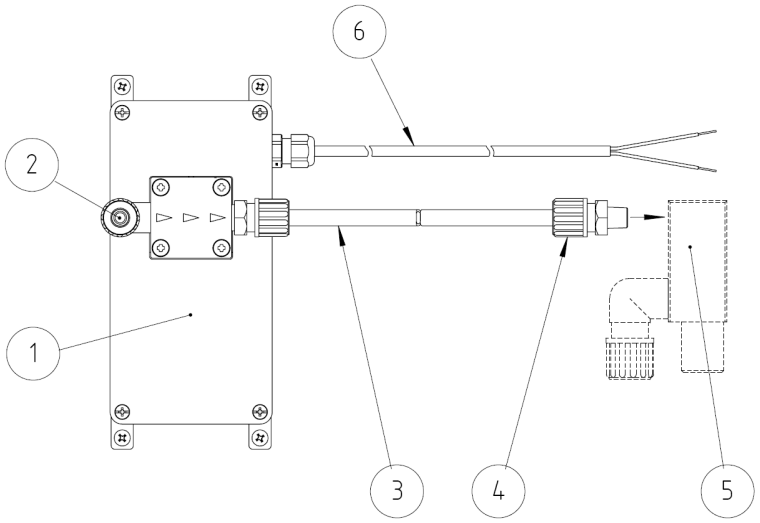
For information regarding the programming and use of this option, refer to the section entitled Calibration (CALIBRATION option) on page 30.

8.1.1 One point calibration with a volumetric pump

⚠ DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

Figure 11 Automatic calibration option



1 Pump	**3** Polyethylene tubing	**5** Input block (already installed on the analyzer)
2 Elbow fitting	**4** Connection to attach to top of input block	**6** Electric cable

Install the pump as follows (the numbers in brackets refer to Figure 11):

1. Mount the pump (1) in position 4 on the rear of the panel (refer to Figure 10 on page 41).
2. Connect the tubing (3) between the pump (2) and the input block (5) installed on the measurement cell cover using the fitting (4).
3. Connect the cable (6) to terminals 1 and 11 of J14 in the electronic unit, and make sure that jumper X4 is installed between terminals 2 and 3 and a strap placed between terminals 8 and 10 of J14 (refer also to Figure 8 on page 21 and Table 6 on page 22).

To install the 10 liter canister, refer to Canister kit on page 52.

8.1.2 Two point calibration with a micro piston pump

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

To install the pump, refer to Micro piston pump on page 51.

To install the 10 liter canister, refer to Canister kit on page 52.

8.1.3 Two point calibration with a pulse pump

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

To install the pump, refer to Pulse pump on page 52.

To install the 10 liter canister, refer to Canister kit on page 52.

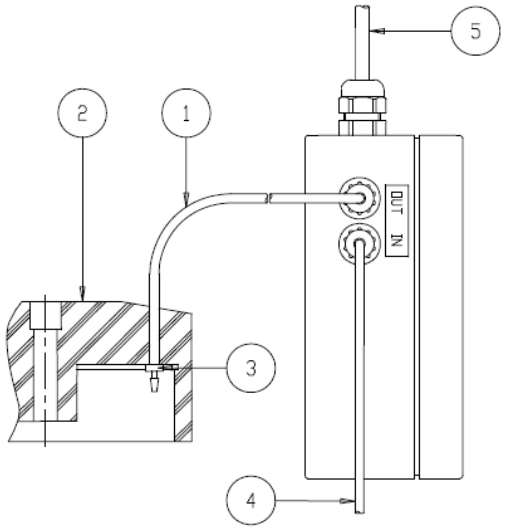
8.2 Chemical cleaning

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

This option allows the addition of a chemical cleaning solution during rinsing. The kit includes a pump and a 10 liter canister equipped with a level detector and strainer.

Figure 12 Chemical cleaning option



1 Tygon® tubing	**3** Plastic nipple	**5** Electric cable
2 Measurement cell cover	**4** Tygon® tubing	

Install the option as follows (the numbers in brackets refer to Figure 12):

1. Install the pump on the rear of the panel (position 7 in Figure 10 on page 41).
2. Dismount the transparent cell from its cover.
3. Insert the Tygon® tubing (1) into one of the 5 holes in the measurement cell cover (2).
4. Insert the plastic nipple (3) into the end of the tube under the cell cover.

5. Connect the other end of the Tygon® tubing to the connector marked **OUT** on the pump box.
6. Remount the transparent cell to its cover.
7. Connect Tygon® tubing (4) between the connector marked **IN** on the pump box and the canister of cleaning solution.
8. Connect the cable (5) to terminals 4 and 5 of J14 in the electronic unit (refer also to Figure 8 on page 21 and Table 6 on page 22).

Note: *Make sure that the Tygon® tubing (1) does not come into contact with the sample in the measurement cell.*

Reconnect power to the analyzer and proceed as follows:

1. From the **PROGRAMMING** menu select **SERVICE**.
2. Select the **CLEANING** option and select **ON** to start it.
3. Check the pump functions correctly and then select **OFF** to stop it.
4. From the **PROGRAMMING** menu select **CLEANING** and set the parameters as required (refer to Chemical cleaning (CLEANING option) on page 34).

8.3 Conditioning

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

This option allows for the addition of one or two reagents to prepare the sample before measurement. The kit includes one or two reagent pumps (peristaltic or micro piston) and one or two 10 liter canisters equipped with level detector and strainer.

To install the pump(s), refer to Reagent pumps on page 49.

To install the 10 liter canister(s), refer to Canister kit on page 52.

Reconnect power to the analyzer and proceed as follows:

1. From the **PROGRAMMING** menu select **SERVICE**.
2. Select the **PUMP 2** option and select **ON** to start it.
3. Check the pump functions correctly and then select **OFF** to stop it.
4. Select the **PUMP 3** (if installed) option and select **ON** to start it.
5. Check the pump functions correctly and then select **OFF** to stop it.
6. From the **PROGRAMMING** menu select **SAMPLE COND** and set the parameters as required (refer to Sample conditioning (SAMPLE COND option) on page 35).

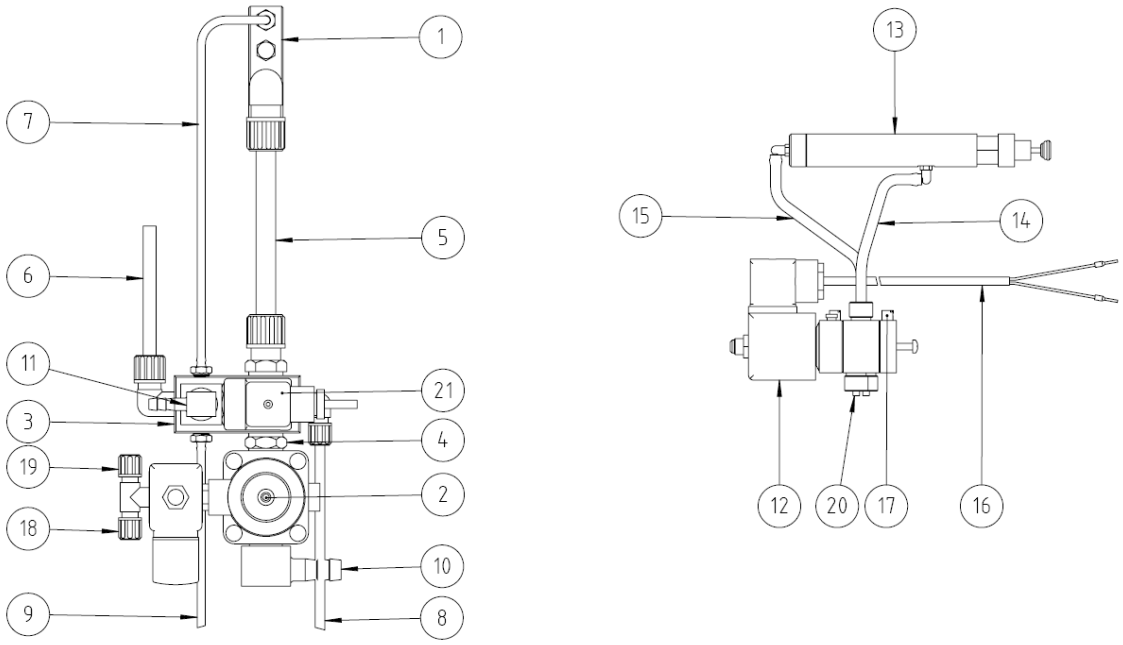
8.4 Dilution or decantation

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

This option is used for the measurement of high concentration samples. The sample is diluted using water from the rinser, which must be free of any compound being analyzed in order to avoid any interference. The kit includes one dilution assembly and one rinsing assembly.

Figure 13 Rinsing and dilution assembly



In the above illustration the rinsing system is shown on the left and the dilution system on the right.

1 Input block (already installed on the analyzer)	**8** PE tubing 4/6	**15** PE tubing 3.2/6.4
2 Sample valve (already installed on the analyzer)	**9** Outlet tubing 3/5	**16** Electric cable
3 Flow block	**10** Barbed elbow fitting, sample inlet (already installed on the analyzer)	**17** Flow rate adjustment screw
4 Male/male fitting G3/8	**11** Barbed elbow fitting, rinse water inlet (already installed on the analyzer)	**18** Compressed air inlet
5 PE tubing 10/12 (already installed on the analyzer)	**12** Control valve	**19** Compressed air outlet to (20)
6 PE tubing 6/8 (already installed on the analyzer)	**13** Dilution assembly	**20** Compressed air inlet from (19)
7 PE tubing 3/5	**14** PE tubing 3.2/6.4	**21** Rinse valve (already installed on the analyzer)

Install the rinsing assembly as follows (the numbers in brackets refer to Figure 13):

1. Remove the rinse valve (21).
2. Unscrew the sample valve (2) from the panel.
3. Install the sample valve (2) on the flow block (3) using the supplied fitting (4).
4. Screw the new assembly (2 and 3) back on the panel using the two screws from the sample valve.
5. Install the rinse valve (21) on the flow block (3) using the supplied fitting.
6. Install the PE tubing 10/12 (5) between the flow block (3) and the input block (1).
7. Install the PE tubing 6/8 (6) between the flow block (3) and the sprinkler.
8. Install the PE tubing 3/5 (7) between the flow block (3) and the input block (1) for rinsing, using the supplied fitting.
9. Install the PE tubing 4/6 (8) on the flow block (3) for sample drainage.
10. Install the PE tubing 3/5 (9) on the flow block (3) for rinse water drainage.

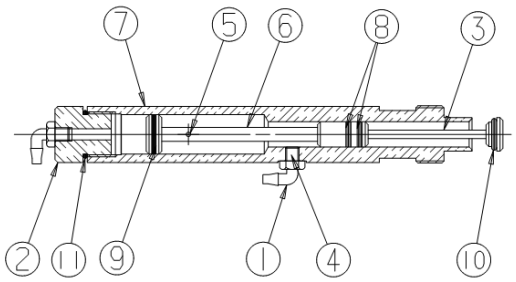
Note: *For optimal performance, the minimum rinse water pressure should be 2.5 bar.*

Install the dilution assembly as follows (the numbers in brackets refer to Figure 13):

1. Install the control valve on the panel (position 4 in Figure 10 on page 41).
2. Remove the overflow pipe (position 8 in Figure 4 on page 11) and install the dilution assembly (13) in its place in the measurement cell using the PTFE washer and O-ring.
3. Install the PE tubing 3.2/6.4 (14) between the control valve (12) and output A of the dilution reservoir.
4. Install the PE tubing 3.2/6.4 (15) between the control valve (12) and output B of the dilution reservoir.
5. Connect the cable (16) to terminals 6 and 7 of J14 in the electronic unit (refer also to Figure 8 on page 21 and Table 6 on page 22).
6. Connect the compressed air between the outlet (19) and inlet (20) connections.
7. Adjust the opening and closing pressures of the system using the adjustment screw (17). The system should close as slowly as possible.
8. Connect the sample to the input (10) with 12 mm internal diameter tubing (pressure 0.5 - 6 bar)
9. Connect the rinse water to the input (11) with 6 mm internal diameter tubing (pressure 2.5 - 6 bar)
10. Connect input P on the T connection (18) to the compressed air supply (pressure 4 - 7 bar)

Dilution reservoir

Figure 14 Dilution reservoir



1 Elbow fitting	**5** Locking hole	**9** Gasket
2 Reservoir stopper	**6** Plunger	**10** O-ring
3 Hydraulic plunger	**7** Reservoir	**11** O-ring
4 Connector opening	**8** Gasket	

Disassemble the reservoir as follows (the numbers in brackets refer to Figure 14):

1. Remove the connector (1) by unscrewing it from the reservoir.
2. Remove the stopper (2).
3. Pull and turn the plunger (3) until you see the locking hole (5) through the connector opening (4).
4. Block the plunger (6) through the openings (4) and (5).
5. Unscrew the plunger (3).
6. Remove the plunger (6) by pushing on it.
7. Clean the two plungers (3) and (6).
8. Clean the inside of the reservoir (7) using a soft non-abrasive cloth.
9. Lubricate the gaskets (8) and (9) or change them if necessary.

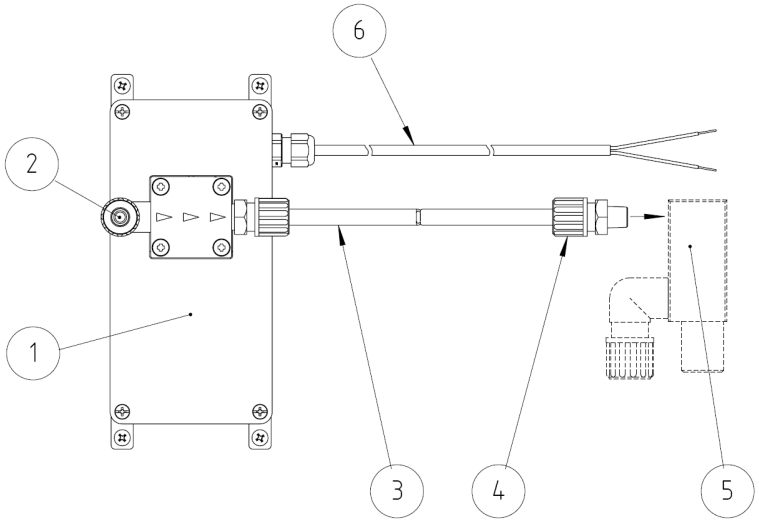
8.5 External sample

⚠ DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

This option allows the analyzer to measure an external sample without modifying the process parameters. The external sample is taken from a beaker (user supplied) instead of the process sample. A switch is supplied to switch between sample measurement and external sample measurement.

Figure 15 External sample option



1 Pump	**3** Polyethylene tubing	**5** Input block (already installed on the analyzer)
2 Elbow fitting	**4** Connection to attach to top of input block	**6** Electric cable

Install the option as follows (the numbers in brackets refer to Figure 15):

1. Mount the pump (1) in position 4 on the rear of the panel (refer to Figure 10 on page 41).
2. Connect the tubing (3) between the pump (2) and the input block (5) installed on the measurement cell cover using the fitting (4).
3. Connect the cable (6) to terminals 1 and 11 of J14 in the electronic unit, and make sure that jumper X4 is installed between terminals 2 and 3 and a strap placed between terminals 8 and 10 of J14 (refer also to Figure 8 on page 21 and Table 6 on page 22).
4. Install the beaker holder (mounted externally).
5. Connect the switch to terminals 3 and 4 of J2 in the electronic unit (refer also to Figure 8 on page 21 and Table 2 on page 21).

Reconnect power to the analyzer and proceed as follows:

1. From the **PROGRAMMING** menu, select **PM XXXX** and enter the special code.
2. Select the **OPTION** menu.
3. Select the **MANUAL** option and select **YES** to turn this option on.
4. It is recommended to verify the time it takes to fill the measuring cell with sample from the beaker (usually between 10 and 20 seconds). This time should then be entered into the system using the option **SAMPLE TIME XXXs** from the menu above.

To invoke the external sample measurement, use the switch provided. At the end of the measurement, if the switch has not been reset to its initial status, a warning message is displayed.

8.6 Heating system

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

The analyzer can be programmed to heat the sample prior to measurement, to make sure measurements are made at a constant and regular temperature.

Install the option as follows:

1. Insert the heating cartridge into an empty threaded location in the top of the measurement chamber (**No. 2** in Figure 3 on page 10) and screw in finger tight. For optimal operation of the heater system, the sample in the measurement chamber should cover at least 3 cm of the heating cartridge.
2. Connect the cable to terminals 1 and 11 of J13 in the electronic unit (refer also to Figure 8 on page 21 and Table 5 on page 22).

Reconnect power to the analyzer and proceed as follows:

1. From the **PROGRAMMING** menu, select **PM XXXX** and enter the special code.
2. Select the **OPTION** menu.
3. Select the **HEATING** option and select **YES** to turn this option on.
4. Adjust the temperature to between 0 and 70°C as required.

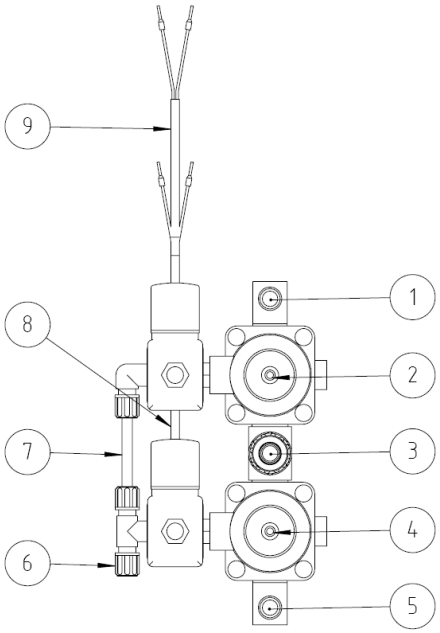
8.7 Extra channel

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

This option allows the analyzer to measure two different samples.

Figure 16 Extra channel option



1 First sample input	**4** Second sample valve	**7** Tubing to link the two channels
2 First sample valve (already mounted on the analyzer)	**5** Second sample input	**8** Electric cable for second sample valve
3 T-bar connection for both sample outlets	**6** Compressed air inlet connector	**9** Electric cable for first sample valve

Install the option as follows (the numbers in brackets refer to Figure 16):

1. Remove the existing sample valve (2) by unscrewing the 2 screws on the front panel.
2. Disconnect the 10 x 12 PE tubing from the valve and remove the output connector.
3. Mount the second sample valve (4) on the existing valve using the T-bar connector (3). Check the assembly is watertight.
4. Make the pneumatic link between the two valves using the 4 x 6 PE tubing (7).
5. Install the assembly on the rear of the panel using the 4 screws.
6. Connect the 10 x 12 PE tubing to the output connection of the two valves (3).
7. Connect the new cable (8) to terminals 2 and 3 of J14 in the electronic unit (refer also to Figure 8 on page 21 and Table 6 on page 22).

Reconnect power to the analyzer and proceed as follows:

1. From the **PROGRAMMING** menu, select **PM XXXX** and enter the special code.
2. Select the **OPTION** menu.
3. Select the **2 CHANNELS** option and select **YES** to turn this option on.

8.8 Reagent pumps

There are three types of reagent pumps which can be used:

- Peristaltic
- Micro piston
- Pulse

The installation of these pumps are described in the following sections.

Each kit includes a pump and a 10 liter canister equipped with a level detector and strainer. To install the canister, refer to Canister kit on page 52.

8.8.1 Peristaltic pump

⚠ DANGER

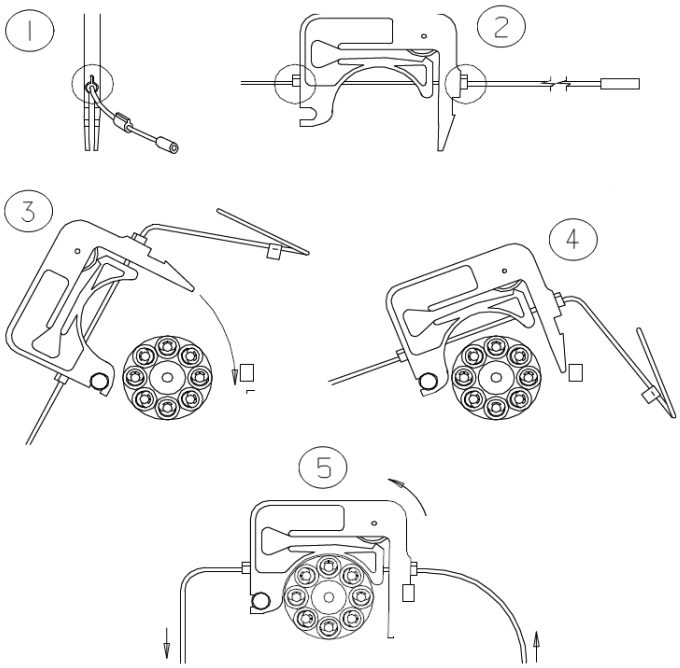
Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

The peristaltic pump is a compact tubular pump with a constant output. The flow rate is determined by the diameter of the tube being used (refer to Table 8). It is constructed in a manner that ensures a constant and accurate flow rate, ideal for tasks requiring an accurate dosing of reagent.

Cassette

The Delrin® cassette can be easily raised and adapted to the size of the tubing. The bottom is equipped with 2 lateral ridges to prevent any excessive crushing of the pump tubes. The cassette is not resistant to acids or high concentration reagents. In the event of leakage, remove and rinse thoroughly with water.

Figure 17 Peristaltic pump cassette



Tubing

The Tygon® tubing has been specially designed for use with this cassette. The smaller diameter tubes have fittings on the ends for easy connection to larger tubes. The tubing is supplied with 3 fixations in order to secure the tubing in the cassette and prevent it from twisting. The tube diameter is color coded:

Table 8 Clamp tubing sizes

Color code	Interior diameter (mm)	Flow rate (mL/minute)
Grey-Grey	1.3	1.90
Green-Green	1.85	3.80
Violet-Violet	2.06	4.40

Install the pump as follows:

1. Remove the pump cover.
2. Mount the pump on the front of the panel in one of the available slots (refer to Figure 10 on page 41) using the 2 screws.
3. Replace the cover on the back of the panel using the 4 screws.
4. Mount the clamp with the Tygon® tubing relevant to the application (refer also to Figure 17).
5. Connect the Tygon® tubing to the measuring cell.
6. Connect the Tygon® tubing to the reagent canister.
7. Connect the pump cable to the electronic unit according to the pump function (refer to Table 6 on page 22 and Table 7 on page 23).

Tube replacement

⚠DANGER

Multiple hazards. Always make sure the analyzer is turned off and power is disconnected before replacing the tubes.

1. Separate the pump tubing and the fixations by pulling apart.
2. Free the cassette from the pump by pressing laterally on the catch (refer also to Figure 17).
3. Remove the pump tubing.
4. Install new tubing into the cassette.
5. Attach the color-coded label to the new tubing.
6. Install the cassette on the pump and press until the catch engages.
7. Submerge the free end of the tubing into the reagent canister.
8. Reconnect power to the analyzer.

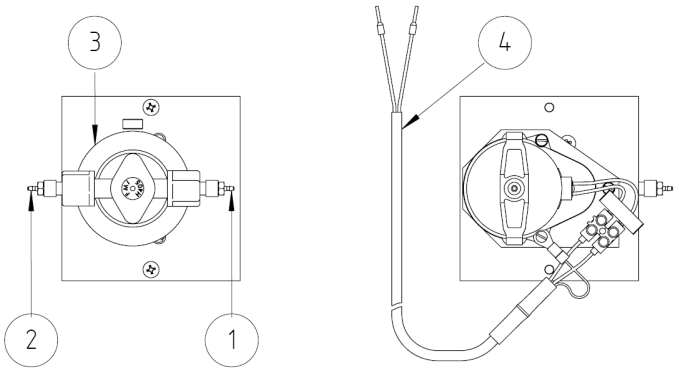
8.8.2 Micro piston pump

⚠DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

The micro piston pump has a better accuracy than the peristaltic pump and does not require any specific maintenance. The flow rate is adjustable between 0 and 3 mL/minute.

Figure 18 Micro piston pump



Install the pump as follows:

1. Remove the pump cover.
2. Mount the pump on the front of the panel in one of the available slots (refer to Figure 10 on page 41) using the 2 screws.
3. Replace the cover on the back of the panel using the 4 screws.

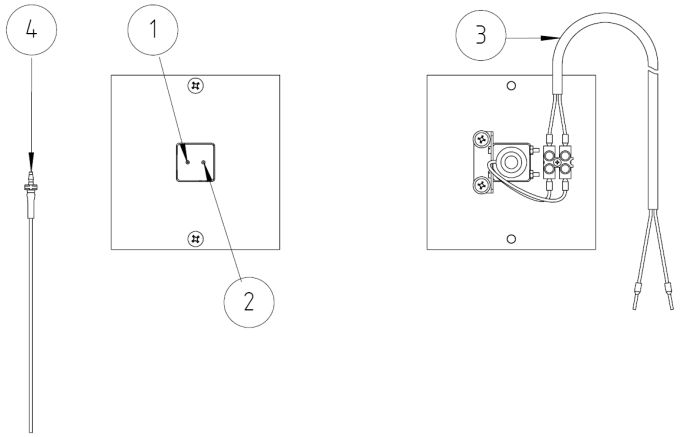
4. Connect Tygon® tubing from the pump (2) to the measuring cell.
5. Connect Tygon® tubing from the pump (1) to the reagent canister.
6. Connect the pump cable (4) to the electronic unit according to the pump function (refer to Table 6 on page 22 and Table 7 on page 23).
7. Reconnect power to the analyzer.
8. Adjust the flow rate as required (3).

8.8.3 Pulse pump

⚠ DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

Figure 19 Pulse pump



Install the pump as follows:

1. Install the pump on the front of the panel in one of the available slots (refer to Figure 10 on page 41) using the 2 screws.
2. Connect the pump cable (3) to the electronic unit according to the pump function (refer to Table 6 on page 22 and Table 7 on page 23).
3. Replace the cover on the back of the panel using the 4 screws.
4. Connect the outlet **OUT** (1) to the tube (4) using Tygon® 1.6 x 3.2 tubing and insert into one of the five slots in the measurement chamber cover.
5. Connect the inlet **IN** (2) to the reagent canister using Tygon® 1.6 x 3.2 tubing.

8.9 Canister kit

⚠ DANGER

Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before installing this option.

The reagent pumps, automatic calibration and the chemical cleaning options can all be delivered with a 10 liter canister equipped with a level detector, strainer, and tubing for connection to the pumps.

Refer to Reagent level detector on page 23 for information on wiring the level detector to the analyzer.

Section 9 Spare parts

Note: *Where mentioned in the following tables,* ***Version 1*** *refers to any 8810 analyzer delivered before June 2012 and* ***Version 2*** *to any 8810 analyzer delivered after 1st June 2012.*

Controller

Description	Item no.
Version 1 complete controller	359110,30000
Version 2 complete controller (110/120 V)	359110,50000
Version 2 complete controller (220 V)	359110,50001
Version 2 complete controller (240 V)	359110,50002
Display board	08810=A=7000
ISE EPROM board	08810=A=3001
Complete power supply board for 8810 Version 1 analyzer and 8811 sequencer, order fuse P/N 295=100=123 separately	359110,20000
Complete power supply board for 8810 Version 2 analyzer and 8811 sequencer (110/120 V)	359110,40000
Complete power supply board for 8810 Version 2 analyzer and 8811 sequencer (220 V)	359110,40001
Complete power supply board for 8810 Version 2 analyzer and 8811 sequencer (240 V)	359110,40002
Measurement board	08810=A=4000
Version 1 user connection box in plastic	08810=A=4500
Version 2 user connection box in metal	08810=A=4600
Kit of 30 metallic caps and counter-nuts	427=010=070

Measurement chamber

Description	Item no.
Vessel	359110,01300
Siphon	359110,01400
Overflow tube	359110,01500
Sample level detector	359110,02400
Reagent / calibration solution level sensor	08810=A=6250
Complete stirrer	359110,01650
Complete sprinkler	359110,01810
Electrolyte bridge	08810=A=8308
Electrolyte reservoir	08810=A=8500
Diaphragm assembly	363700,74106

Reagent pumps

Description	Item no.
24 VAC 50 Hz peristaltic pump equipped (batch, level detector, reagent tubing)	368810,70050
24 VAC 60 Hz peristaltic pump equipped (batch, level detector, reagent tubing)	368810,70060
24 VAC 50 Hz peristaltic pump only	08810=A=7050
24 VAC 60 Hz peristaltic pump only	08810=A=7060
Tube cassette	359090,80000

Reagent pumps (continued)

Description	Item no.
Grey pump tubing	359090,70015
Green pump tubing	359090,70020
Violet pump tubing	359090,70021
24 VAC 50 Hz micro pump equipped (batch, level detector, reagent tubing)	368810,71050
24 VAC 60 Hz micro pump equipped (batch, level detector, reagent tubing)	368810,71060
24 VAC 50 Hz micro pump only	08810=A=7150
24 VAC 60 Hz micro pump only	08810=A=7160

Cables

Description	Item no.
Electrode cable, AS7 connector, reference electrode	359016,10102
Electrode cable, AS9 connector, working or combination electrodes	359016,10103
Cable ending kit for version 2	427=010=060

Valves

Description	Item no.
2/2 way solenoid valve 610 NW 12 G 3/8 PP (sample)	359110,02000
3/2 way solenoid valve M 311 NW 2 G 1/8 (sample-air valve)	359110,02100
2/2 way solenoid valve 24 VDC INOX (sprinkler water)	689=112=031
2/2 way solenoid valve 333 PVDF (drain)	359110,02200
4/2 way solenoid valve (dilution-air)	599990,04300

Tubing

Description	Item no.
Tygon® tubing 1.6 x 3.2	151399,90002
Polyethylene tubing 10/12	151400,22390
Polyethylene tubing 6/8	151400,22387
Polyethylene tubing 4/6	151575,00006
Propylene ethylene fluoride tubing 1.65 x 3.17	359110,04110
Silicone tubing 12/17	359110,52012
Canister equipped (canister, level detector, tubing)	368810,75000
10 ltr container	148645,10000

Connections

Description	Item no.
Fitting X210-6	359500,12106
Viton O-Ring 4 x 0.6	356094,00406
E-fitting G1/8 4/6	359103,10070

Connections (continued)

Description	Item no.
E-fitting G3/8 6/8	359103,10050
E-fitting 1:8 NPT 6/8	359103,10132
Screw in socket G3/8 PP	359110,02300
Fitting	359500,11106
E-fitting G3/8 10/12	359103,10077
PTFE tape	502614,66121
Complete tubing level detector	359110,05000

Electrodes

Description	Item no.
Pt 100 for temperature measurement, fixed cable	368495,10000
Reference electrode, low-level chloride	368429,00000
Reference electrode, high-level chloride	368483,00000
Low concentration cyanide electrode	368474,00000
Fluoride electrode	368470,00000
Ammonia electrode	125=000=003
Low-level chloride electrode	125=000=007
High-level chloride electrode	368471,00000

Tubing and connection kit (368810,95000)

Description	Quantity	Item no.
PTFE tubing complete	2	359110,04200
Tygon® tubing 1.6 x 3.2	2 meters	151399,90002
FEP tubing 1.65 x 3.17	0.35 meters	359110,04110
Slotted fitting	5	359500,11106
Threaded sleeve PG 13.5 red	3	359015,20035
Viton O-ring 2.62 x 10.77	3	356099,20107
PTFE washer	3	359012,00070
Spacer	1	08810=C=5000

2 Years spare parts kit

Description	Item no.
High-level chloride	368810,93001
Low-level chloride	368810,93008
Ammonia	368810,93006
Fluoride	368810,93002
Cyanide	368810,93000

Description	Quantity	Item no.
Complete stirrer	1	359110,01650
Tubing holder cassette	2	359090,80000
Siphon	1	359110,01400
Flow tubing	1	359110,01500
Threaded sleeve PG 13.5 red	3	359015,20035
Viton O-ring 11 x 4	2	429=110=040
PTFE tubing	2	359012,00070
Fitting 1/4 DN 6/8	1	587=008=002
E-fitting G 1/4 DN 6	1	587=108=002
E-fitting G 1/8 DN 4/6	1	359103,10070
E-Fitting G 3/8 DN 10/12	1	359103,10077
Slotted fitting G 3/8 DN 12	1	587=114=003
Slotted fitting DN 1/16"	10	359500,11106
Fitting NPT 1/8 DN 6/8	1	359103,10132
Barbed nipple	1	359110,02300
Tygon® pump tubing (12) grey	4	359090,70015
Tygon® tubing 1.6 x 3.1 lg 2000	3 meters	151399,90002
PTFE tubing complete	3	159399,04200
FEP tubing 1.65 x 3.17 lg 350	3 meters	359110,04110

Options

Description	Item no.
Wall-mounted cabinet complete	368810,40000
Storage canister holder	368810,00100
Free-standing cabinet complete	368810,45000
Automatic dilution	08810=A=5060
Automatic dilution without valve or tubing	08810=A=5300
Chemical cleaning for pump	368810,56000
Heating system	368810,76000
pH/ORP automatic calibration	368810,60000
ISE automatic calibration	368810,71050
ISE automatic calibration pulse pump complete	368810,72000
Container kit with level detector and filter	368810,75000
Tubing + opaque canister equipment	368810,84000
External sample equipment	368810,65000

Section 10 User configuration

			User configuration	
		Default value	User value	Date
ELECTRODE				
NAME	Name	GLASS		
Slope	Slope	+059.16		
Uiso	Isothermal potential	+0000.0 mV		
E	Reference potential	+0000.0 mV		
C	Reference concentration	10E-8		
OPTION				
AUTOMAT. CAL YES/NO	Automatic calibration	NO		
AUTO. CAL 1PT/2PTS	Type of automatic calibration	2 PTS		
With sample / With rinse water	Calibration with sample or rinse water	With sample		
PULSE PUMP YES/NO	Calibration with pulse pump	NO		
Flow: XX.X ml/mn or l/puls	Flowrate of the pump	2 ml/minute		
Cell Vol.: XXX.X ml	Volume of the cell	100 ml		
STD ADDITION	Measurement with a known addition	NO		
CLEANING YES/NO	Chemical cleaning	NO		
SAMPLE COND YES/NO	Chemical conditioning	NO		
MANUAL YES/NO	External sample measurement	NO		
SAMPLE TIME	Sample injection time	10 seconds		
HEATING YES/NO	Regulation in temperature	NO		
Tc	Temperature value	25°C		
DILUTION YES/NO	Dilution	NO		
2CHANNELS YES/NO	Measurement of 2 different samples	NO		
ADJUST Iout				
OUT 4-20/0-20 mA	Output current	0-20 mA		
	Minimum value corresponding to 0 mA	0		
	Value 4 mA	795		
	Value 20 mA	3896		
UNIT				
ppb/ppm/USER	Unit	ppb		
CLEANING: chemical cleaning				
CLEAN. FREQ: XXX	Number of measurements between cleaning cycles	5		
SPRINKLER t: XXXs	Duration of the cleaning water sprinkler	5 seconds		
REAG. INJ. t: XXXs	Duration of cleaning solution injection	5 seconds		
RESIDENC. t: XXXs	Length of time the cleaning solution remains in the reactor	5 seconds		

			User configuration	
		Default value	User value	Date
SAMPLE COND: sample conditioning				
REAGENT 1: XXX	Conditioning activated by reagent 1	OFF		
REAGENT 2: XXX	Conditioning activated by reagent 2	OFF		
INJ. REAG. 1: XXXs	Duration of reagent 1 injection	10 seconds		
INJ. REAG. 2: XXXs	Duration of reagent 2 injection	10 seconds		
TIME REAG. 1: XXXs	Length of time reagent 1 remains in the reactor	20 seconds		
TIME REAG. 2: XXXs	Length of time reagent 2 remains in the reactor	20 seconds		
TIMING				
SAMPLE TIME	Injection sample time	001 seconds		
SPRINKLER N	Rinse number	3		
SPRINKLER t	Rinse time	2 seconds		
CYCLE TIME	Cycle time	15 minutes		
DELAY TIME	Stabilization time before measurement	001 seconds		
MEASURE t	Measurement time	001 seconds		
SEQUENCE				
FIX TIME/LOOP	Measurement sequence	LOOP		
ALARM				
SYS.ALARM ON/OFF	System alarm	OFF		
WARNING/R1 YES/NO	Warning alarm on alarm relay 1	NO		
ALARM 1 ON/OFF	Alarm 1 activation	OFF		
ALARM 1 HIGH/LOW	High or low alarm	HIGH		
ALARM 1 XXX	Threshold value	0		
ALARM 2 ON/OFF	Alarm 2 activation	OFF		
ALARM 2 HIGH/LOW	High or low alarm	HIGH		
ALARM 2 XXX	Threshold value	0		
ANALOG OUT				
OUT LINEAR/LOGARITHMIC/DUAL	Output current type	LINEAR		
START XX.XXEXX	Beginning of concentration range	00.E00		
END XX.XXEXX	End of concentration range	10.00E01		
START XXX.XmV	Beginning of potential range	000.0 mV		
END XXX.XmV	End of potential range	100 mV		

HACH COMPANY World Headquarters
P.O. Box 389, Loveland, CO 80539-0389 U.S.A.
Tel. (970) 669-3050
(800) 227-4224 (U.S.A. only)
Fax (970) 669-2932
orders@hach.com
www.hach.com

HACH LANGE GMBH
Willstätterstraße 11
D-40549 Düsseldorf, Germany
Tel. +49 (0) 2 11 52 88-320
Fax +49 (0) 2 11 52 88-210
info-de@hach.com
www.de.hach.com

HACH LANGE Sàrl
6, route de Compois
1222 Vésenaz
SWITZERLAND
Tel. +41 22 594 6400
Fax +41 22 594 6499