DOC024.52.93122

POLYMETRON Model 8811 Sequencer

User Manual

07/2016, Edition 12

Table of Contents

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	100 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.
Inputs	8 logic inputs galvanically isolated
Analog outputs	8 outputs programmable 0-20 or 4-20 mA; 900 Ω maximum: • 6 outputs for the concentration values • 1 output for the temperature • 1 output for the direct measure in mV, pH, µA, mΩcm, kΩ.cm, µS/cm or mS/cm
Alarms	6 limit relays: normally open contacts, 250 VAC, 6 A, 1500 VA; 1 warning relay (warning): normally open contacts, 250 VAC, 6 A, 1500 VA; 1 System Alarm Relay: normally open or closed contact, 250 VAC, 8 A, 2000 VA;
Interface	2 RS232 serial interfaces: • One connected onto the analyzer • One for the external communication (printer, computer)
Enclosure	Noryl HF185
Protection	IP65
Dimensions (W x D x H)	288 x 172 x 144 mm; < 20 kg
Panel cut-out (W x H)	282 x 139 mm
Cable glands	1 PG9 38, PG7 in nickel-pated brass
Sample lines	6 with one measurement per channel on the analyzer 3 with two measurements per channel on the analyzer
Compressed air	4 - 7 bar (58 - 102 psi), filtered and dried

Specification	Details
Sample pressure	0.5 - 6 bar (7 - 87 psi)
Cycle time	Programmable up to 999 minutes
Sample flow rate	40 - 300 liters/hour (10 - 80 gallons/hour)
Sample temperature	0 - 60 °C (32 to 140 °F)
Suspended solids	< 2 mm and < 10% v/v
Low or high density polyethylene tube fittings	Sample loops: 10 x 12 mm Compressed air: 4 x 6 mm
Maximum sound power level	≤ 80 dBA

1.1 Dimensions

Figure 1 Sequencer for discontinuous analyzers (mm [inches])

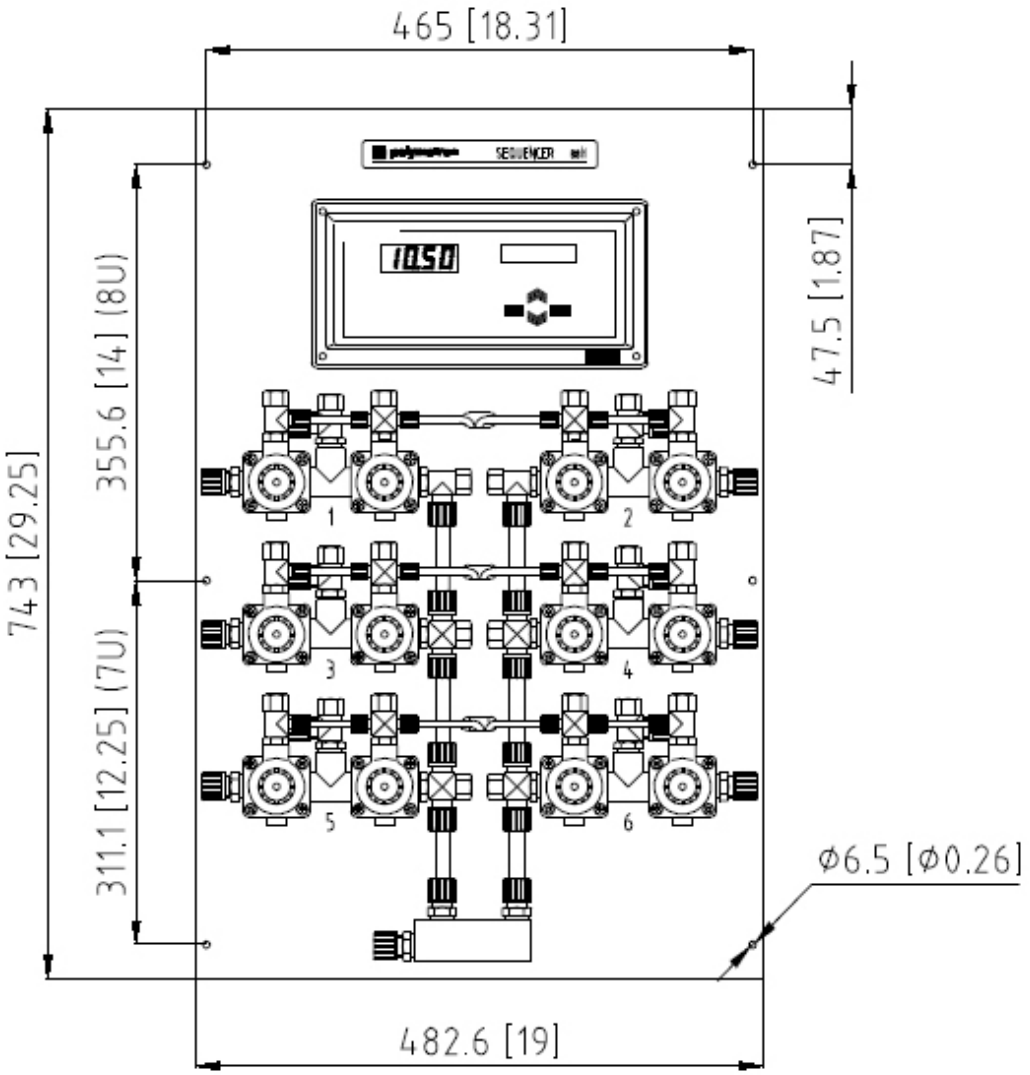
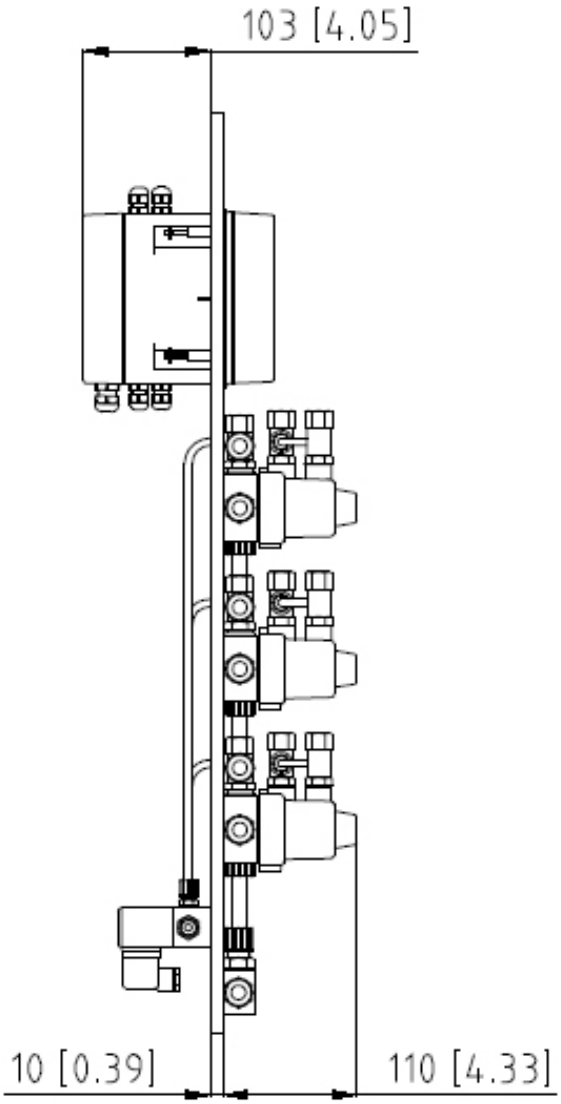


Figure 2 Side view of the sequencer



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 product. Personal injury or damage to the product could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.

	This symbol, when noted on a product, indicates a potential hazard which could cause serious personal injury and/or death. The user should reference this instruction manual for operation and/or safety information.
	This symbol, when noted on a product enclosure or barrier, indicates that a risk of electrical shock and/or electrocution exists and indicates that only individuals qualified to work with hazardous voltages should open the enclosure or remove the barrier.
	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.

	Products marked with this symbol indicates a risk of finger pinch.
	This symbol, when noted on the product, indicates the presence of devices sensitive to electrostatic discharge and indicates that care must be taken to prevent damage to them.
	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, if noted on the product, indicates the need for protective eye wear.
	This symbol indicates the need for protective hand wear

Section 3 Product overview

3.1 Introduction

The 8811 sequencer facilitates the transformation of a one channel analyzer into a multi channel analyzer:

- Up to 6 channels with one measurement per channel on the analyzer
- Up to 3 channels with 2 measurements per channel on the analyzer (e.g. 8810 M and P alkalinity)

The 8811 ensures the following functions:

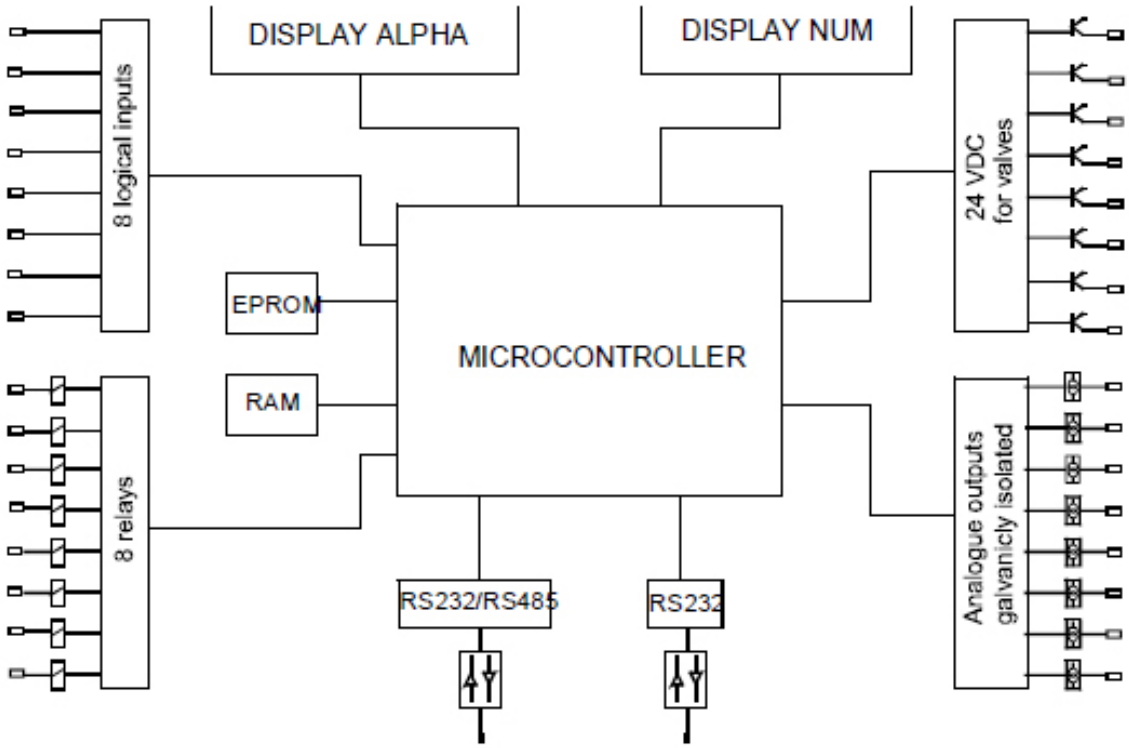
- Programmable cycle time between channels
- Programmable sequencing of channels
- Individual 0/4 - 20 mA output per measurement and per channel
- One alarm relay per channel for low/high concentration
- Two additional alarm relays for warning and system alarms (e.g. no sample, no reagent, etc.)
- If no sample is available on one channel, the sequencer switches automatically to the next one in the programmed sequence

NOTICE
This functionality is not available if coupled with an 8810-ISE analyzer

- 2 end-point titration for the 8810 analyzer (e.g. free and total alkalinity, free and total acidity)
- Remotely activate or deactivate analysis per channel
- Auto Start/Standby relay as a standard item

3.2 Electronic unit

Figure 3 Synoptic 8811



The controller unit is made up of 3 boards which ensure the following functions:

- Power supply board
- Micro-controller board
- Display board

Power supply

This module gives the required supplies to the instrument and auxiliary equipment.

Display/keyboard

This module allows user programming and interrogation:

- 4 keys for programming
- 1 numeric display
- 1 alphanumeric display (display of the programming messages)

Microprocessor

INTEL 80C51 type, associated to memory, peripherals; allows the control of the analyzer function.

Memory

2 types of memory:

- EPROM: program storage memory
- RAM: data memory (battery backup)

Logic inputs

The instrument has 8 logic inputs allowing level detection of samples or channel inhibition.

Accessory controls

The accessories are controlled by transistors 24V DC. 8 relays are available for the limits and alarms.

Serial communication

The 8811 has 2 serial interfaces (RS232):

- One for the communication with the analyzer
- One for the external communication which can be configured also as an RS485

Section 4 Installation

⚠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.

⚠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.

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 Mounting

The instrument requires the following connections:

- Samples
- Drain
- Compressed air
- Mains power supply

4.3 Location

The sequencer should be placed as near as possible to the sample inlet. The analyzer should be located in an easily accessible area to facilitate the periodic checking of the sample flow rate and for regular maintenance.

4.4 Connections

4.4.1 Hydraulic equipment

⚠CAUTION

Be aware that the sample can be very hot.

Please comply with generic 8811 specifications indicated in Specifications on page 3.

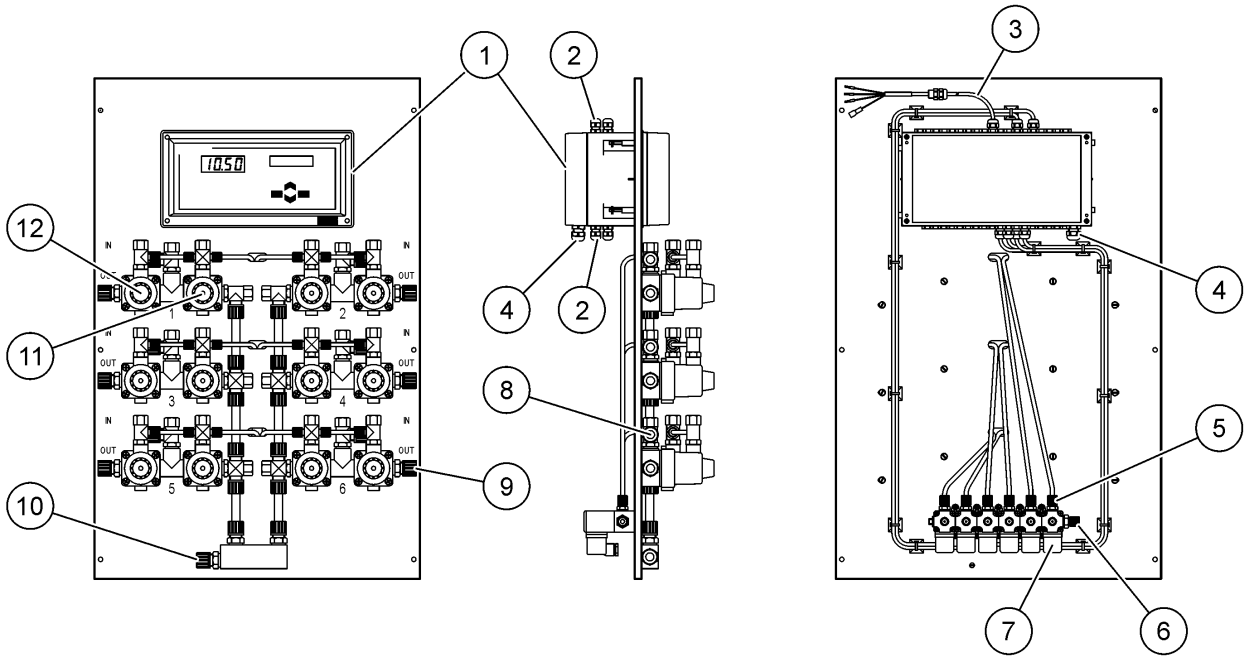
Specifications are very extended for the 8811 sequencer itself. Moreover, you should refer to the exact specifications coming from the analyzer itself (e.g. 8810 or TOC analyzers).

All inlet and outlet of sample lines are 10/12 mm tubing (or 1/2" upon request). Tube sizes between sequencer and analyzer vary depending on analyzer.

On the sequencer, each channel is equipped with:

- Sample inlet connector
- A T-piece connecting a system of two valves (normally open + normally closed) equipped with a flow adjustment nut under the black box
- NC valve going to the analyzer
- NO valve for the "Fast Loop" / return process line / outlet

Figure 4 Hydraulic layout of the sequencer



1 Electronic unit	**7** Pilot solenoid valve
2 Outputs (cable gland Pg7): analog outuputs, interface outputs, alarms. Ca	**8** Sample inlet connector
3 Serial interface cable	**9** Sample outlet to "Fast Loop"
4 Mains connection (cable gland Pg9)	**10** Sample outlet to analyzer
5 Compressed air to the NO and NC valves	**11** NC valve
6 Compressed air inlet connector (one inlet for all channels)	**12** NO valve

4.4.1.1 Mounting an extra channel

Figure 5 Installation of channels 3 or 5 (left) (08811=A=2010)

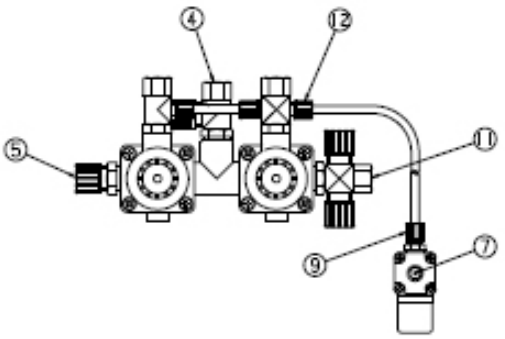
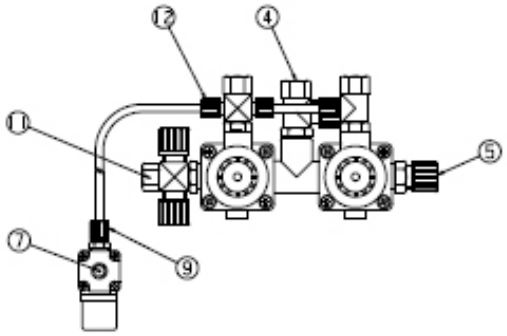


Figure 6 Installation of channels 4 or 6 (right) (08811=A=2020)



Installation procedure

1. Add the pilot valve (7) to the valve block on the rear side of the instrument.
2. Mount the sample valve block on the front side of the instrument, in the appropriate location.
3. Connect the sample with the fittings 4, 5 and 11 with the 10 x 12 PE tubing.
4. Connect also the fittings 9 and 12 with the 4 x 6 PE tubing.
5. Finish the installation with the electrical connexion of the pilot valve (7).

4.4.2 Compressed air connection

The sample valve requires dry and filtered compressed air supplied at a pressure from 4 to 7 bar. The pressurized air should be supplied through a suitable tubing of 4/6 mm.

4.4.3 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.

The analyzer is supplied with a 1 m cable length connected to the power supply box. The cable has a Binder male connector on the other side. Use the supplied female Binder connector to energize the system. Refer to Power supply connection on page 14.

4.4.3.1 Power supply connection

High voltage instruments (100-240 VAC) have a 4-pin male connector pre-wired internally with a male BINDER connector ready for mains connection. A compatible female connector is supplied with the instrument. If this female connector was supplied with a mains power plug already pre-attached then the female connector can be plugged directly into the instrument power connector. The two connectors are grooved to avoid an incorrect fitting. Tighten the female connector to the instrument power connector finger-tight.

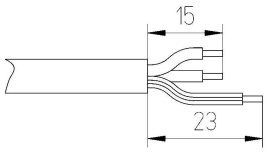
If no power cable was ordered with the equipment, a mains power plug must be connected to the supplied female connector as described in the following procedure. User-supplied power cable specifications:

- 3-wire (live, neutral and earth)
- cable Ø ≥ 7mm; ≤ 9.5mm
- wire selection ≥ 1mm^2, AWG18; ≤ 2.5mm^2, AWG14

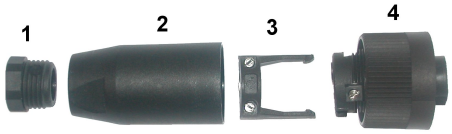
⚠DANGER

Before preparing the user-supplied cable and wiring the connector, ensure the cable is not connected to the mains power supply.

1.

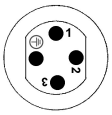


Strip off 23 mm (0.9 ins.) of shielding from the power cable. Cut back the live and neutral wires to 15 mm (0.6 ins.) in length but leave the earth wire as is. Strip off a small amount of external insulation from the three wires as required.

2. 

Take the narrow end of the connector (**4**) in one hand and the main body (**2**) in the other and unscrew the two. Pull away the cable clamp (**3**) and unscrew the end plug (**1**) to reveal the four parts that make up the connector.

3. Loosen the screws on the cable clamp (**3**) to allow enough room to pass the power cable through. Pass the power cable through the end plug (**1**), the main body (**2**), and the cable clamp (**3**), and then connect the three wires (live, neutral and earth) to the connector (**4**) as follows:



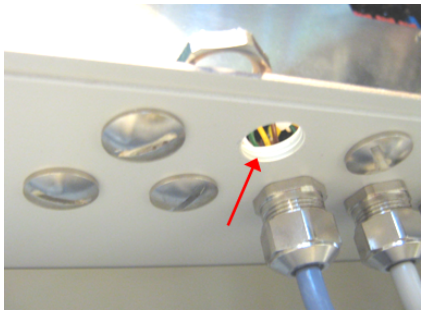
1. Live (brown)
2. Neutral (blue)
3. Not used
Earth - Earth (green and yellow)

Note: *The numbers and earth symbol are stamped on the end of the connector. Ensure it is connected correctly.*

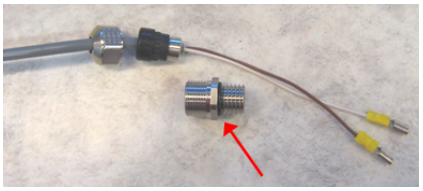
4. Slide the cable clamp (**3**) back onto the connector (**4**) and tighten the screws on the clamp to secure the cable. Screw the two parts (**4**) and (**2**) back together.
5. Secure the power cable by screwing the end plug (**1**) back in place.
6. The female connector can now be plugged directly into the instrument power connector. The two connectors are grooved to avoid an incorrect fitting. Tighten the female connector to the instrument power connector finger-tight.

4.4.4 Wiring procedure

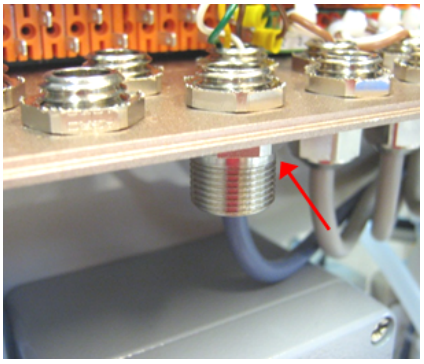
The following procedure must be followed for all cables connecting peripherals (e.g. pumps, level detectors, alarms, etc.) with the electronic unit. Refer to Figure 4 on page 12. Some cables will be supplied ready for use. Other cables which are supplied locally by the user must be prepared according to the procedure that follows before connecting to the electronic unit.



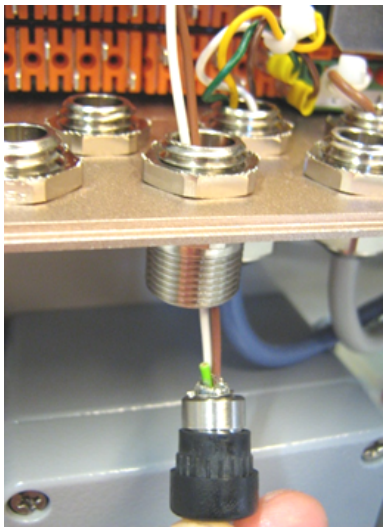
1. Select an unused opening nearest to the cable connection on the electronic board. Remove the screw and nut combination and set aside the screw for later use.



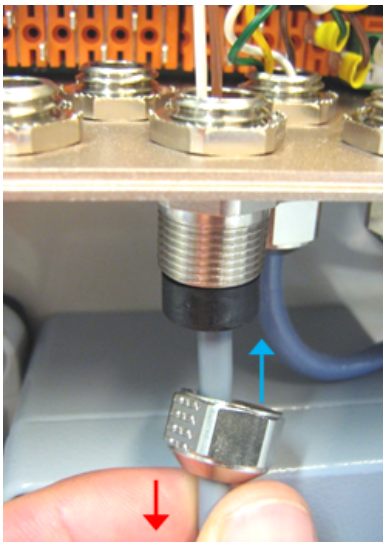
2. Take the cable, unscrew the threaded part and remove it.



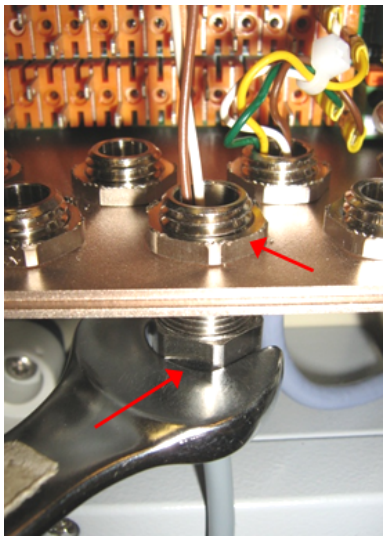
3. Screw the threaded part into the electronic unit opening selected in step 1 using the nut removed in step 1 to secure in place.



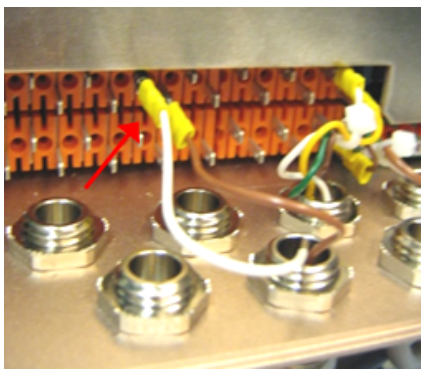
4. Pass the rest of the cable through the gland.



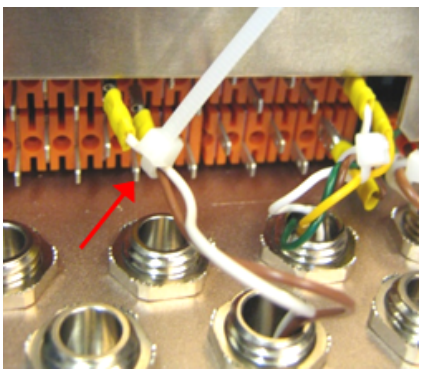
5. Pull the cable slightly with one hand until the inner shield comes into contact with the gland. Tighten the nut onto the gland with the other hand.



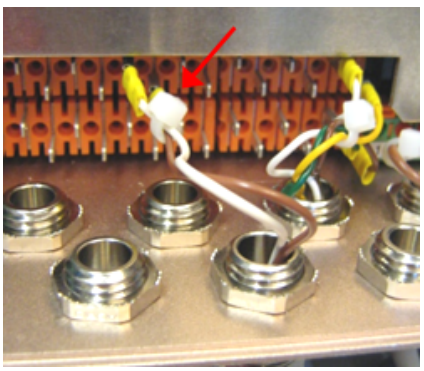
6. Tighten the nut with a wrench to secure in place. It may be necessary to use a second wrench to hold the top nut in place.



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.

4.4.5 Input/Output connections

⚠DANGER

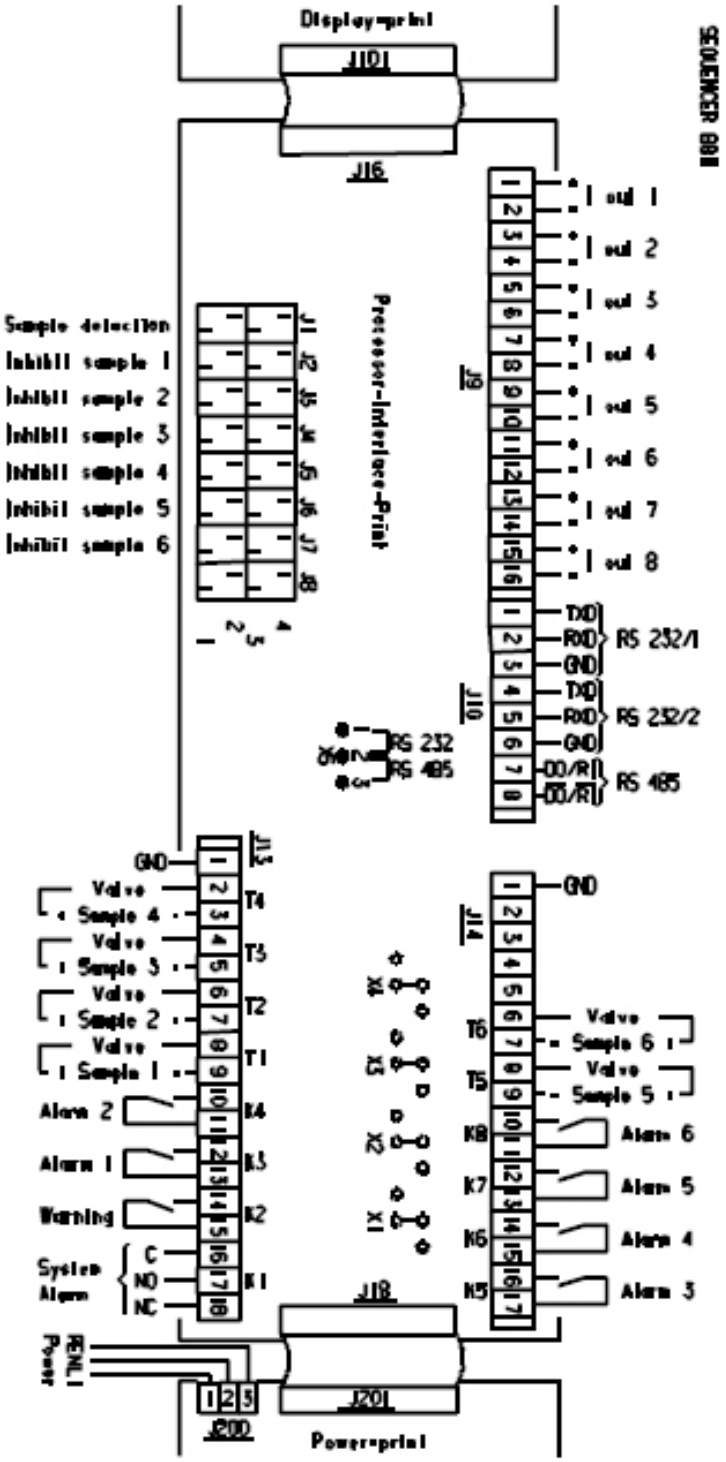
Electrocution hazard. Always make sure the analyzer is turned off and power is disconnected before making any of the connections in this section.

⚠WARNING

To conform with security standards and to respect the EMC compliancy of the analyzer, follow the procedures defined in Wiring procedure on page 15 for all connections to the electronic unit of the analyzer.

The electronic unit (Refer to Figure 4 on page 12) 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 7 for terminal locations and the following tables for the functions.

Figure 7 Electrical connections



1. Open the electronic unit from the rear panel (2 screws on the left side).
2. Rotate the bottom of the unit.
3. Put the cable into the cable glands.

4.4.5.1 Alarm connection

Relays R1 and R7 allocated to the thresholds and warning, and are normally open (NO). R8 is connected to the system alarm and can be normally open (NO: 16-17) or normally closed (NC: 16-18).

4.4.5.2 Analog output connection

The current outputs 0-20 mA or 4-20 mA are galvanically insulated.

4.4.5.3 Logic inputs

There are 8 logic inputs (J1 to J8, all galvanically insulated). Each logic input has four pins with the following characteristics:

Pin number	Characteristics
	Ground
	Input signal
	Photodiode current supply
	5V supply

Logic input number	Allocated to	Strap pins 3 and 4
J1	Level sample detection (in 8810 reactor vessel)	***Note:*** *Only if the analyzer is an 8810* Otherwise, display shows NO SAMPLE alarm.
J2 to J7	Inhibition of channel 1 to 6	Inhibit channel analysis. A new cycle with the next channel in the programmed sequence starts immediately (IMPORTANT: This functionality is not available if coupled with an 8810-ISE analyzer).
J8	Remotely acknowledge system alarm	Acknowledge the system alarm. A new cycle with the next channel in the programmed sequence starts immediately (IMPORTANT: This functionality is not available if coupled with an 8810-ISE analyzer).

Contact J1 is used for the sample detection. Please make sure at this point of the installation that the contact J1 is configured as stated in the table below:

J1 configuration	No strap	Strap between 3 and 4
Discontinuous		*

4.4.5.4 Serial interface connection

The 8811 has two serial interfaces:

- The first one for the communication with a logging device (computer, printer, etc.)
- The second is dedicated to the communication with the analyzer

Connexion between the sequencer and a logging device: RS232/1

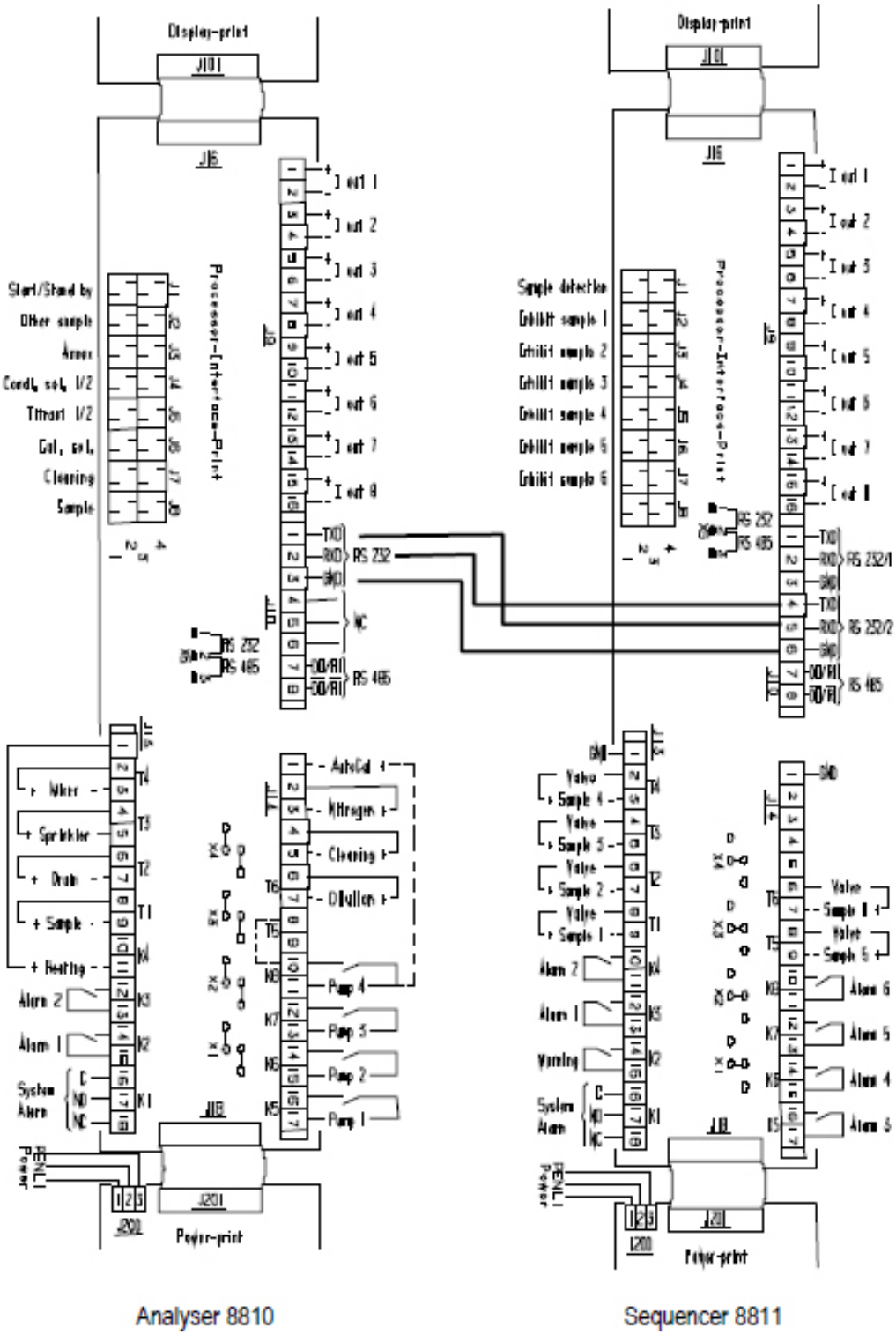
SEQUENCER	LOGGING DEVICE	
Terminal J10	**DB9 connector**	**DB25 connector**
TXD: 1	RXD: 2	RXD: 2
RXD: 2	TXD: 3	TXD: 3
GND: 3	COM: 5	COM: 7

Connexion between the sequencer and the analyzer: RS232/2

SEQUENCER	ANALYZER
Terminal J10	**Analyzer 8810 Terminal J10**
TXD: 4	RXD: 2
RXD: 5	TXD: 1
GND: 6	GND: 3

Please refer to Serial interface on page 25 for the communication protocol.

Figure 8 Link 8810/8811



Analyser 8810 Sequencer 8811

4.4.6 Cleaning and decontamination

The analyzer does not normally require any cleaning or decontamination.

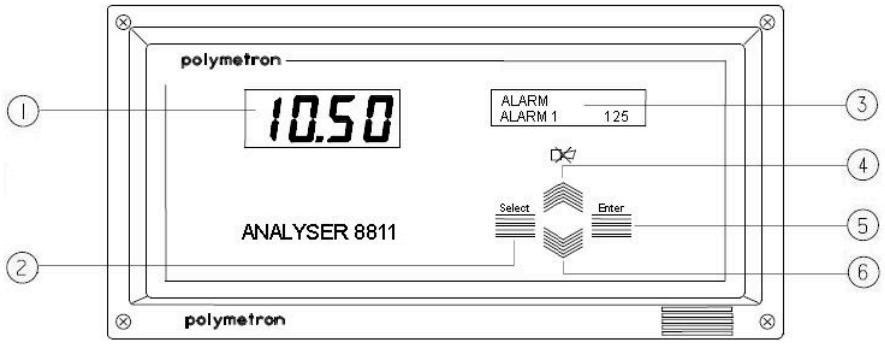
If needed, clean the exterior of the instrument with a moist cloth and a mild soap solution. Never use cleaning agents such as turpentine, acetone or similar products to clean the instrument, including the display and any accessories.

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 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 Serial interface

The 8811 has two serial interfaces:

- The first one for the communication with a logging device (computer, printer, etc.) can be configured as RS 232 or RS 485
- The second is dedicated to the communication with the analyzer

On a technical note, the sequencer is the "Master" and the analyzer operates as a "Slave".

6.1 Data received by the sequencer

The data are sent in ASCII format as follows:

M1: XXXXXE±XX XXX.X°C XXXXXxxxxxXXX

M1:	XXXXX	E±XX	XXX.X°C	XXXXX	XXXXX	XXX
M1 or M2 according to the measurement number	the measurement can be sent with or without the decimal point or minus sign and ≤ 9999	concentration unit or E±XX or double space or with unit	temperature in °C	direct measurement	unit of the direct measurement pH, mV, µA, mΩ.cm, kΩ.cm, µS/cm or mS/cm	checksum

Both serial interfaces are configured as follows:

- transmission speed 9600 baud
- 8 data bits
- 1 stop bit

On the analyzer side, configuration of the RS232 shall respect the same parameters.

STATUS MESSAGES

The status messages are sent according to the following format and are displayed on the second line of the alphanumerical display:

A : XX CHK

Table 1 Status messages

Sequencer display	Description	Analyzer message
ready	ready	A : 00
measure	measurement mode	A : 01
titration	8810 titration mode	A : 02
calibration	calibration mode	A : 03
cleaning	chemical cleaning	A : 04
fix-time	break time	A : 05
stopped	stop	A : 06
standby	standby	A : 07
cal measure	measurement with calibration	A : 08
other sample	external sample	A : 09
programming	programming mode	A : 10
plot pH	titration plot	A : 11
plot ORP	titration plot	A : 12
standing by	standby mode	A : 13

ERROR MESSAGES

The error messages are sent according to the following format and are displayed on the second line of the alphanumerical display:

ER : Nb E1 ... Enb CHK

- Nb: number of errors
- E_1 - E_{nb}: list of errors
- CHK: checksum

Table 2 Error messages

Sequencer display	Description	Analyzer message
Mes. overrange	Measurement superior to the limit	ER : 01
Mes. underrange	Measurement inferior to the limit	ER : 02
Ratio error	Ratio 8921 error	ER : 03
Faraday cell err.	Faraday cell error	ER : 04
Pot. overdrive	Output overdrive	ER : 05 (ER02 w/ a 8980)
No sample	Lack of sample	ER : 06*
ADC error	Photometer error	ER : 07
T°C overrange	Temperature (in°C) exceed the programmed upper limit	ER : 11
T°C underrange	Temperature (in°C) is below the programmed lower limit	ER : 12
Compensat. error	Compensation impossible	ER : 13
Convert. error	Conversion concentration<->conductivity impossible	ER : 16 (ER21 w/ CIP)
Convert over	Conversion error	ER : 17 (ER22 w/ CIP)
Calibrat. error.	Conc. after 1st addition is under 3 times the original concentration of the sample [C inj.1] < 3 x [Co]	ER : 21
Calibrat. error.	Conc. after 2nd addition is under expected value [C inj. 2] < 3 x Co + [C inj.1]	ER : 22
Calibrat. error.	Conc. after 2nd addition is under 5 times the original concentration of the sample [C inj. 2] < 5 x Co	ER : 23
Calibrat. error.	Non convergent research	ER : 24
Calibrat. error.	Offset error	ER : 25
Calibrat. error.	Slope error	ER : 26
Calibrat. error.	Flow-rate error during calibration	ER : 27
Error 29	Flow-rate error in measuring mode	ER : 29*
Level sample	Level in the 8810 reactor vessel	ER : 30*
Over tit time	Titration time exceed programmed "Limit time" value in "TIMING" menu	ER : 31
Calibrat. error	Calibration error	ER : 32
Level reagent	Reagent level	ER : 33
Level Cal. Sol.	Calibration solution	ER : 34
Level Cond. Sol.	Conditioning solution	ER : 35
Level Clean. Sol.	Chemical cleaning	ER : 36
Slope calibrat.	Slope error	ER : 37

Table 2 Error messages (continued)

Sequencer display	Description	Analyzer message
Point not found	Final point not found	ER : 38
Return process	After a "grab sample" analysis, the waiting time is exceeded (10mn). Please return to "Process sample" analysis	ER : 39

* All these alarms are immediately and automatically followed by the 8811 with a switch to the next channel in the programmed sequence (IMPORTANT: This functionality is not available if coupled with an 8810-ISE analyzer).

6.2 Data sent by the sequencer

The sequencer sends the following data:

- ?=: to configure the analyzer
  - 9600 transmission speed
  - 8 data bits
  - 1 stop bit
  - transmission mode on demand
- MX=: to send measurement data (X=1/2)
- A=: to send the analyzer status
- E=: to send error messages
- S=: to start a measurement cycle
- P=: to put the analyzers in standby

The analyzers send: "M0: CKS" response to the command "MX" when the measurement is not ready.

All messages are sent with a checksum which enables to check the transmission.

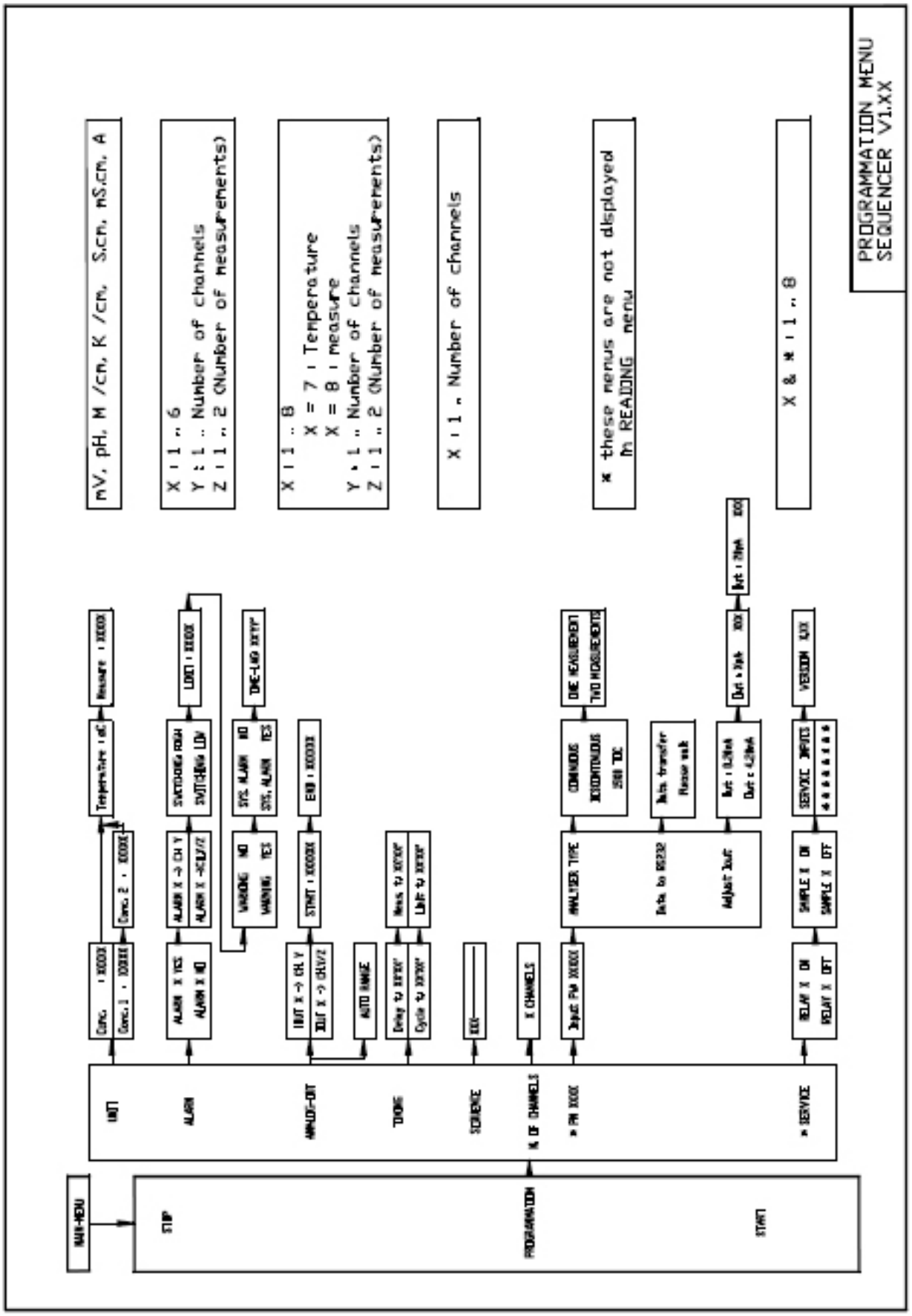
After the reception the analyzer or the sequencer should send the following character: A>≡.

Stopping the OPERATING mode

Press **SELECT**, the **STOP** command is displayed; confirm with **ENTER**. "If sure ENTER" is then displayed: reconfirm with **ENTER**.

COMMAND mode:

- READING: for reading preset parameters
  Entering READING. The analyzer must be in **OPERATING** mode, press **SELECT**, the **STOP** command is displayed. Using the scroll keys, select the **READING** menu and press **ENTER** for approximately 3 seconds.
- PROGRAMMING: for programming parameters and testing functions (SERVICE menu)
  Entering PROGRAMMING. The analyzer must be stopped. The **SELECT** key switches between the stopped action and the **STOP** command. Using the scroll keys, select the **PROGRAMMING** menu and press **ENTER** for approximately 3 seconds.


PROGRAMMATION MENU
SEQUENCER V1.XX
mV, pH, M /cm, K /cm, S.cm, mS.cm, A
X : 1 .. 6
Y : 1 .. Number of channels
Z : 1 .. 2 (Number of measurements)
X : 1 .. 8
X = 7 : Temperature
X = 8 : measure
Y : 1 .. Number of channels
Z : 1 .. 2 (Number of measurements)
X : 1 .. Number of channels
* these menus are not displayed in READING menu
X & * : 1 .. 8
MAIN-MENU
STEP
PROGRAMMATION
START
UNIT
ALARM
ANALOG-OUT
TIMING
SEQUENCE
N OF CHANNELS
* PIN XXXX
* SERVICE

7.1 Menu overview

The following messages explaining the functions or the menus are useful to the user:

MAIN MENU	From the MAIN MENU the various submenus may be invoked
STOP	Pressing ENTER causes the titration to stop immediately
START	Pressing ENTER initiates the titration
PROGRAMMING	To access programming mode
READING	To read parameters

When the PROGRAMMING or READING commands are confirmed the following commands can be selected using the scroll keys:

N. OF CHANNELS	Choose the number of channels
SEQUENCE	Programming the sequence
TIMING	Adjustment of the measuring time
ANALOG- OUT	Adjustment of the analogue outputs
ALARM	Select the alarm conditions
UNIT	Choose the measurement units
SERVICE	Used to check the operation and to verify the software version
PM XXXX	Used to program the application-specific parameters to configure the system; a special code is required to access this menu

7.2 MAIN menu

DISPLAY	DESCRIPTION	SUB-MENUS
MAIN-MENU	Main menu and display of the sub-menus	STOP START PROGRAMMING / READING

The submenus can be invoked using the **SCROLL UP/DOWN** keys, the **ENTER** key selects a submenu and the **SELECT** key returns to the main menu.

7.2.1 STOP menu

MAIN-MENU STOP	Stops the instrument.

Press **ENTER**.

XXXXX ready	Measurement unit. The instrument is ready for the programming. All the valves are closed.

7.2.2 START menu

MAIN-MENU START	Launch a new measurement cycle.

Press **ENTER**.

XXXXX CH XX titration (Y)	Measurement unit. The instrument displays the analyzer status: the analyzer is in measuring mode. X: number of channel Y: number of the channel in use Z: number of measurement

7.2.3 Programming menu

DISPLAY	DESCRIPTION	SUB-MENUS
MAIN-MENU PROGRAMMING/ READING	Pressing **ENTER** for approximately 3 seconds accesses the programming submenus	N. OF CHANNELS SEQUENCE TIMING ANALOG-OUT ALARM UNIT SERVICE PM XXXX

The submenus can be invoked using the **SCROLL UP/DOWN** keys, the **ENTER** key selects a submenu and the **SELECT** key returns to the main menu.

In reading mode, the programming parameters can not be changed.

7.3 PROGRAMMING/READING sub-menus

7.3.1 N. OF CHANNELS menu

DISPLAY	DESCRIPTION
PROGRAMMING N. OF CHANNELS	Adjust the number of channels

Press **ENTER**.

N. OF CHANNELS X CHANNELS	X is the number of the channel selected (1 to 6)

The number of the channel can be chosen with the **SCROLL UP/DOWN** keys.

Press **ENTER**.

7.3.2 SEQUENCE menu

DISPLAY	DESCRIPTION
PROGRAMMING SEQUENCE	Choice of the sequence (16 max.)

Press **ENTER**.

SEQUENCE XXXXXXXXXXXXXXXX	X represents any figure from 1 to 6. Full pattern up to 16 steps.

Press **ENTER**.

Example:

Figure 10 SEQUENCE - Illustration 1

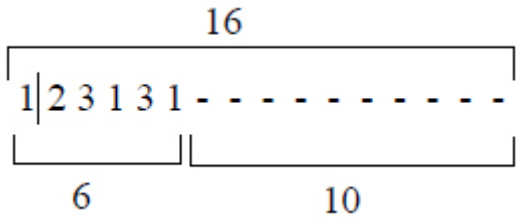
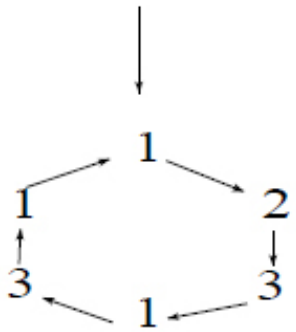


Figure 10 corresponds to the 16 possible steps of the SEQUENCE menu as show on the 8811 display.

With:

- 6 first steps are filled with a channel number (1, 2 or 3); the corresponding valve(s) of the channel is open
- 10 following steps are filled with "-" sign because, in this example, the full pattern sequence is only 6 steps; No valve(s) opening correspondence

Figure 11 SEQUENCE - Illustration 2



In Figure 11 the sequence starts with channel 1, then 2, then 3, then 1, then 3, then 1; and starts again on the first step (channel 1).

Remark:

- Switch from one step of the sequence to the next one with the **SELECT** key
- To add a new step in the pattern:
  - Place the flashing cursor on the first "-" sign
  - Adjust the channel number with the **SCROLL UP/DOWN** key
- To suppress one step in the pattern:
  - Place the blinking cursor on the last channel number
  - Press on **SCROLL UP/DOWN** key until display shows "-" sign
- Only press on the **ENTER** key when the full sequence pattern is complete

7.3.3 TIMING menu

DISPLAY	DESCRIPTION
PROGRAMMING TIMING	Adjust the different timings of each analysis cycle

Press **ENTER**.

Programming procedure is always the same:

- XX and YY are adjusted with the **SCROLL UP/DOWN** keys (from 0 to 99)

- Adjust the YY block first (and press **ENTER**)
- Then adjust the XX block (and press **ENTER**)

- The display automatically shows the next step in programming

7.3.3.1 Discontinuous analyzer

With this combination, the 8811 receives an instruction (to open the next channel of the programmed sequence) by the analyzer itself at the exact same time than the analyzer open its sample valve.

The cycle time corresponds to the period for the analyzer to send its instruction. It can be seen also as the time between two valves opening.

TIMING Cycle t. XX YY	One measurement every XX minutes and YY seconds

For programming procedure, see above

The "Cycle Time" enables to operate the analyzer on a regular time basis even if the duration of the titration vary with the concentration of the sample. An extendable waiting time (called "Fix-time") is automatically calculated to compensate the variation of the titration time (called "Measure"). Sum "Measure" and "Fix-time" equals "Cycle time".

Analog outputs and alarms are refreshed just after the end of "Measure"

Program "Cycle Time" to "00 00" and (8810 / SEQUENCE = LOOP) to operate the analyzer with immediate succession of batch analysis (no waiting time).

TIMING Limit t. XX YY	Maximum time limit for the "Measure"

For programming procedure, see above

If "Measure" time exceeds this programmi8ng, a system alarm (ER 31) is generated:

- "Over tit. Time" message sent on display and 1st RS232
- System Alarm relay switches from position NO to closed (or vice-versa)
- Analyzer and sequencer will remain in alarm until manual or remote (J8) acknowledgement of the System Alarm

7.3.4 ANALOG OUT menu

The 8811 is equipped in standard with 8 analog outputs:

- Analog outputs 1 to 6 are allocated to the concentrations
- Analog output 7 is allocated to the temperature measurement
- Analog output 8 is allocated to the direct measurement

DISPLAY	DESCRIPTION
PROGRAMMING ANALOG-OUT	Analog outputs scale programming

Press **ENTER**.

The ANALOG OUTPUT menu shows.

7.3.4.1 Operation with discontinuous analyzer

Analog outputs 1 to 6 allocated to the concentrations:

ANALOG-OUT IOUT X -> CH. Y/Z	Analog output X allocated to channel Y. Z is the measurement number when there are 2 measurements/channel.

The value of Y from 1 to 6 and the value of Z from 1 to 2 can be adjusted with the **SCROLL UP/DOWN** keys. Switching from Y to Z is possible by using **SELECT**.

Press **ENTER**.

Example: IOUT3 -> 4/2 means that the third analog output is allocated to the second measurement of the fourth channel.

IOUT X -> Y/Z START: XXXX	Analog output X allocated to the measurement Z of channel Y. Beginning of scale corresponding to a current of 0/4 mA. XXXX is between 0 and 9999

Press **ENTER**.

IOUT X -> Y/Z END: XXXX	Output X allocated to measurement Z of channel Y. End of scale corresponding to a current of 20 mA. XXXX is between 0 and 9999

Press **ENTER**.

Explanation:

In the case of one measurement by channel, Y varies from 1 to 6.

In the case of two measurements by channel, Y/Z varies according to the following values:

- Y = 1 to 3
- Z = 1 to 2
- Y/Z = 1/1, 2/1, 3/1, 1/2, 2/2, 3/2

Example:

TA/TAC measurement:

- Y/1 for the TA
- Y/2 for the TAC

For output 7 allocated to the temperature measurement

IOUT 7 -> °C START: XXXX	Beginning of scale. XXXX is between 0 and 9999

Press **ENTER**.

IOUT 7 -> °C END: XXXX	End of scale. XXXX is between 0 and 9999

Press **ENTER**.

For output 8 allocated to the direct measurement

IOUT 8 -> YYY START: XXXX	YYY: unit of the direct measure. Beginning of scale. XXXX is between 0 and 9999

Press **ENTER**.

IOUT 8 -> YYY END: XXXX	YYY: unit of the direct measure. End of scale. XXXX is between 0 and 9999

Press **ENTER**.

7.3.5 ALARM menu

DISPLAY	DESCRIPTION
PROGRAMMING ALARM	Alarm and threshold programming.

Press **ENTER**.

- For relay 1 to 6 allocated to the concentrations:

ALARM ALARM X YYY	Alarm relay activated. X: Number of the relay YYY: YES/NO

Press **ENTER**.

ALARM ALARM X -> CH. Y/Z	Relay X allocated to channel Y/Z is the measurement number in case there are 2 measurements/channel.

The value of Y from 1 to 6 and the value of Z from 1 to 2 are adjusted using the **SCROLL UP/DOWN** keys. The **SELECT** key enables to adjust Z or Y.

Press **ENTER**.

ALARM X -> Y/Z SWITCHING XXXX	Rising and falling alarm X allocated to the measurement Z of channel Y which enables to choose the direction between HIGH and LOW XXXX = HIGH/LOW

Press **ENTER**.

ALARM X -> Y/Z LIMIT XXXX	Relay X allocated to the measurement Z of channel Y. Adjustment of the alarm threshold. XXXX: 0 - 9999

Press **ENTER**.

- For relay 7 allocated to the warning:

ALARM WARNING: XXX	Activates the warning XXX: YES/NO

Press **ENTER**.

- For relay 8 allocated to the system alarm:

ALARM SYS. ALARM: XXX	Activates the system alarm XXX: YES/NO

Press **ENTER**.

When a warning or a system alarm occurs, the corresponding message is displayed and flashes (refer to Table 2 on page 26).

Table 3 System and warning messages

N° #	Sequencer display	Description	System alarm	Warning
1	Mes. overrange	Measurement superior to the limit	*	
2	Mes. underrange	Measurement inferior to the limit	*	
3	Ratio error	Ratio 8921 error		

Table 3 System and warning messages (continued)

N° #	Sequencer display	Description	System alarm	Warning
4	Faraday cell err.	Faraday cell error		
5	Pot. overdrive	Output overdrive	*	
6	No sample	Lack of sample	*	
7	ADC error	Photometer error	*	
11	T°C overrange	Temperature (in°C) exceed the programmed upper limit	*	
12	T°C underrange	Temperature (in°C) is below the programmed lower limit	*	
13	Compensat. error	Compensation impossible	*	
16	Convert. error	Conversion concentration<->conductivity impossible	*	
17	Convert over	Conversion error	*	
21	Calibrat. error.	Conc. after 1st addition is under 3 times the original concentration of the sample [C inj.1] < 3 x [Co]		*
22	Calibrat. error.	Conc. after 2nd addition is under expected value [C inj. 2] < 3 x Co + [C inj.1]		*
23	Calibrat. error.	Conc. after 2nd addition is under 5 times the original concentration of the sample [C inj. 2] < 5 x Co		*
24	Calibrat. error.	Non convergent research		*
25	Calibrat. error.	Offset error		*
26	Calibrat. error.	Slope error		*
27	Calibrat. error.	Flow-rate error during calibration		*
29	Error 29	Flow-rate error in measuring mode		*
30	Level sample	Level in the 8810 reactor vessel		*
31	Over tit time	Titration time exceed programmed "Limit time" value in "TIMING" menu	*	
32	Calibrat. error	Calibration error	*	
33	Level reagent	Reagent level		*
34	Level Cal. Sol.	Calibration solution		*
35	Level Cond. Sol.	Conditioning solution		*
36	Level Clean. Sol.	Chemical cleaning		*
37	Slope calibrat.	Slope error		*
38	Point not found	Final point not found		*
39	Return process	After a "grab sample" analysis, the waiting time is exceeded (10mn). Please return to "Process sample" analysis	*	

NOTICE

Alarms ER6, ER29 and ER30 indicate a lack of sample to the sequencer. The following actions will occur:

- **NO SAMPLE (X= 1 - 6)** message send on display and 1st RS232
- **System alarm** relay switch from position N.O. to close (or vice - versa)
- 8811 automatically launches a new analysis on the next channel programmed in the sequence menu.

7.3.6 UNIT menu

DISPLAY	DESCRIPTION
PROGRAMMING UNIT	Measuring unit programming.

Press **ENTER**.

- One measurement/channel

UNIT CONC: XXXXX	Programming the concentration unit.

The user can write the unit using the **SCROLL UP/DOWN** keys.
Press **ENTER**.

- Two measurements/channel

UNIT CONC X: YYYYYY	Both measures can have different units. X = 1 or 2; Y = alphanumeric.

The user can write the unit using the **SCROLL UP/DOWN** keys.
Press **ENTER**.

UNIT MEASURE: XXX	Programming the direct measurement unit.

The unit of the direct measurement can be chosen between the following units:

- mV for the potential
- pH
- mΩ.cm or kΩ.cm for resistivity
- µS/cm or mS/cm for conductivity
- µA for the current

7.3.7 SERVICE menu

This menu controls the accessories.

DISPLAY	DESCRIPTION
PROGRAMMING SERVICE	Control the 8811 functions.

Press **ENTER**.
Switching on and off the accessories is possible using the **SCROLL UP/DOWN** keys.

SERVICE RELAY X: XXX	Control of relays 1 - 8 XXX: ON/OFF

Press **ENTER**.

SERVICE SAMPLE X: XXX	Control of the sample valves XXX: ON/OFF

Press **ENTER**.

SERVICE XXXXXXXX	Control of the different logic inputs. X has the number of the logic input in open contact and "*" if the contact is closed.

Press **ENTER**.

Example:

*2**5**8 - inputs 2, 5, 8 are in open contact and inputs 1, 3, 4, 6, 7 are in closed contact.

SERVICE VERSION X.XX	Display of the software version.

These commands are stopped when exiting this menu.

7.3.8 PM XXXX menu

This menu is accessible by password only.

DISPLAY	DESCRIPTION
PROGRAMMING PM XXXX	Access reserved.

Press **ENTER**.

DISPLAY	DESCRIPTION	SUB-MENUS
PM XXXX INPUT PW: XXXX	Password requested	ANALYZER TYPE Data to RS232 Adjust Iout

Enter the password with the **SCROLL UP/DOWN** keys and **SELECT**. **SCROLL UP/DOWN** enable to choose the sub-menus.

Press **ENTER**.

7.3.8.1 ANALYZER TYPE menu

PMXXXX ANALYZER TYPE	Choice of the analyzer

Press **ENTER**.

ANALYZER TYPE DISCONTINUOUS	For the discontinuous analyzers

Press **ENTER**.

SCROLL UP/DOWN to choose the number of measures by channel

ANALYZER TYPE ONE MEASURE	For one measure by channel

or

ANALYZER TYPE TWO MEASURES	For two measures by channel

7.3.8.2 DATA TO RS232 menu

This menu enables to send the last 100 measurements to the RS232 under the following format:

CH X/Z	XX.XXE±XXX	XX.X	XXXX	XX:XX:XX
number of the channel and number of the measurement	concentration value	temperature value	direct measurement value	time of the measurement (00:00:00 when starting the sequencer)

PM XXXX DATA TO RS232	Data sending.

Press **ENTER**.

DATA TRANSFER PLEASE WAIT	The 8811 sends the last 100 measurements.

This message is displayed for about one minute.

7.3.8.3 ADJUST IOUT menu

PM XXXX ADJUST IOUT	Output calibration.

Press **ENTER**.

ADJUST IOUT OUT: x - 20mA	Choice between 0 - 20mA or 4 - 20mA.

SCROLL UP/DOWN enable to choose between 0 - 20mA or 4 - 20mA. This is common for the 8 outputs.

Press **ENTER**.

ADJUST IOUT OUT: 0/4mA XXXX	Plug a recorder (or an amperemeter) and adjust the output current with the **SCROLL UP/DOWN** keys to the right value (0/4mA).

Press **ENTER**.

ADJUST IOUT OUT: 20mA XXXX	Plug a recorder (or an amperemeter) and adjust the output current with the **SCROLL UP/DOWN** keys to the right value (20mA).

Press **ENTER**.

Section 8 Operating the sequencer

The sequencer has the following functions:

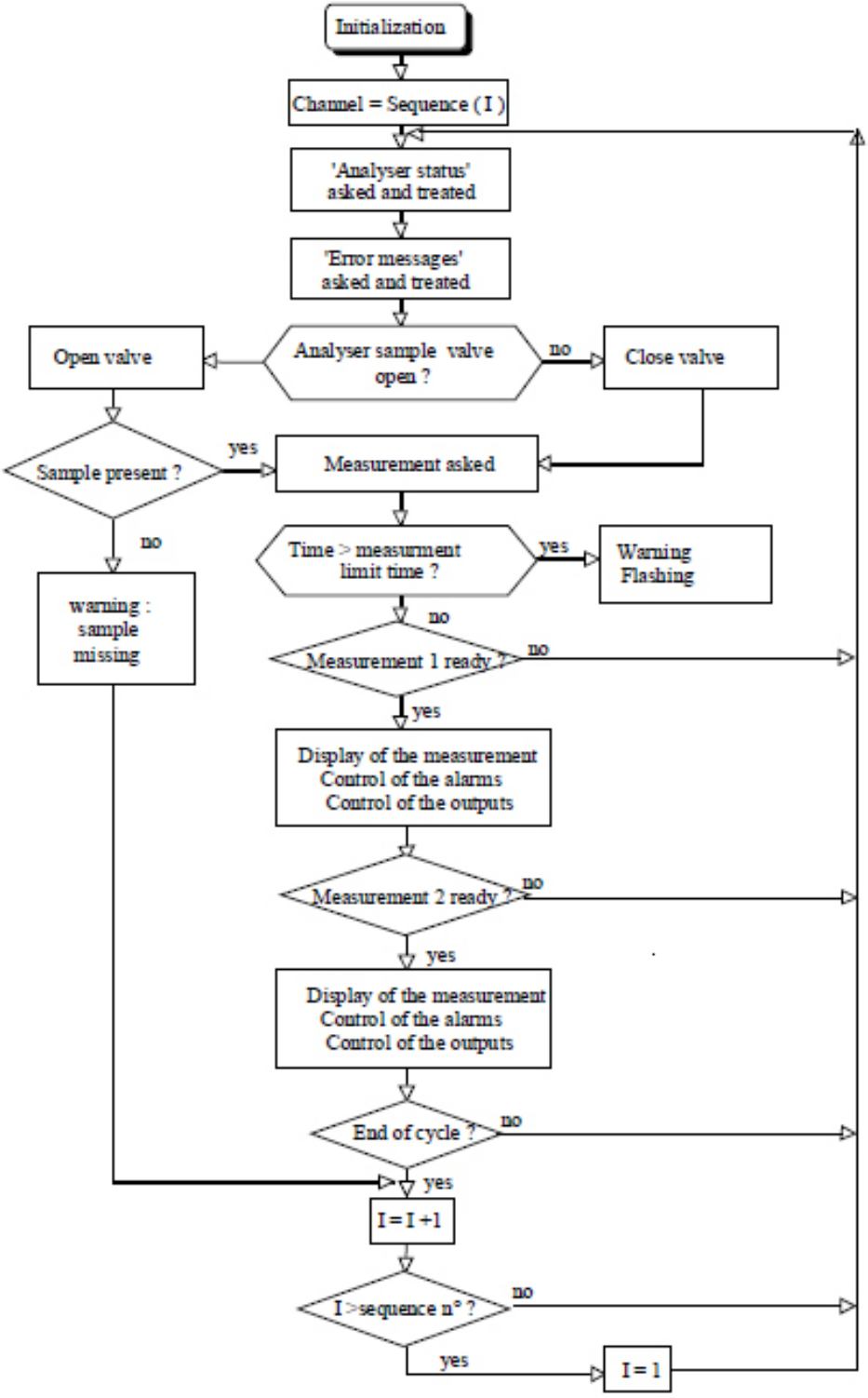
- Programmable sequence with a 16 steps pattern
- Measurement display
- Alarm and limit control
- Analog output control
- Data sent via RS232
- Switch to the next channel (I + 1) in the programmed sequence if:
    - the sample of channel I is missing (the warning relay and a message on display are simultaneously activated until next access of channel I in the programmed sequence). IMPORTANT: This functionality is not available if coupled with an 8810-ISE analyzer

      Remotely inhibit channel I (J2 to J7 contacts)

      Remotely acknowledge system alarm (J8 contact)

If all samples are missing (or inhibited), the sequencer stops and the system alarm is activated.

Figure 12 Discontinuous analyzer



8.1 Treatment of the analyzer status

The sequencer reacts accordingly to the analyzer status (refer to the list of status messages in Table 1 on page 25) and follow very precise succession of operation. Several cases are described below.

8.1.1 At startup

When switching power ON, a 30 seconds waiting time on the 8811 allows a correct phase-in of both systems (8811 + analyzer):

- 8811 display will show "Please wait" for 30 seconds
- On the RS232, the message "Sequencer 8811 00:00:00 V X.XX" with X.XX as the firmware version

8.1.2 "Measure" mode

Analyzer and sequencer are both started in normal operating mode:

- 8811 display shows all analyzer status (measure (I), concentration, temperature, mV, etc. per channel)
- 8811 follows the programmed sequence of channels

8.1.3 The analyzer is stopped manually

Each time the analyzer is stopped from its keyboard (for example, the analyzer is stopped for its preventive maintenance. Also when the analyzer is in "Programming", "Titration plot pH or ORP", or "Grab sample analysis"), the 8811 sequencer will be forced into "standby" mode:

- The 8811 display shows "stopped" sign and the channel number of the interruption "(I)"
- All analog outputs and alarms are maintained to the last status before interruption
- A message "stopped" is sent on the external RS232 (1st RS232)

When the analyzer starts back:

- The 8811 will sample again the channel which was interrupted

After a length of time (programmable, see below), if the analyzer is not started back in "measure" mode, the sequencer will go in system alarm:

- Display will show "RETURN TO PROCESS" message
- System alarm relay will switch from NO to closed (or vice-versa)
- Specific message "RETURN TO PROCESS" sent on the external RS232 (1st RS232)

Programmable in "TIMING" menu and corresponds to:

- Twice LIMIT time: XX YY for a discontinuous analyzer (8810)

8.1.4 The analyzer automatically forces the sequencer into "Stand-by" mode

As with the previous section, each time the analyzer goes automatically in "fix-time, or "cleaning", the sequencer will be driven in "stand-by" mode.

The "measure" mode will resume right after "fix-time" or "cleaning" is finished, and:

- The 8811 will sample the next channel in the programmed sequence

After a length of time (programmable, see below), if the analyzer is not started back in "measure" mode, the sequencer will go in system alarm:

- Display will show "RETURN TO PROCESS" message
- System alarm relay will switch from NO to closed (or vice-versa)
- Specific message "RETURN TO PROCESS" sent on the external RS232 (1st RS232)

Programmable in "TIMING" menu and corresponds to:

- Twice LIMIT time: XX YY for a discontinuous analyzer (8810)

8.1.5 Automatic calibration

Auto cal frequency is programmed on the analyzer.

For all calibrations using process sample as a matrix (known addition technique), channel 1 is automatically selected.

The "measure" mode will resume right after "calibration" is finished, and:

- The 8811 will sample the next channel in the programmed sequence

After a length of time (programmable, see below), if the analyzer is not started back in "measure" mode, the sequencer will go in system alarm:

- Display will show "RETURN TO PROCESS" message
- System alarm relay will switch from NO to closed (or vice-versa)
- Specific message "RETURN TO PROCESS" sent on the external RS232 (1st RS232)

Programmable in "TIMING" menu and corresponds to:

- Three times the LIMIT time: XX YY for a discontinuous analyzer (8810)

8.2 Treatment of the error messages

Error messages sent by the analyzer to the 8811 sequencer will be considered either as:

- A warning
- A system alarm

The split between these two types of alarm is explained in Table 3 on page 36.

Different type of actions can happen even with a same type of alarm.

8.2.1 Warning

Example 1: ER 34 indicates a lack of calibration solution to the sequencer.

Following actions will occur:

- "Level Cal. Sol." message sent on display and 1st RS232
- "Warning" relay switches from position NO to closed until the level of the calibration solution comes back OK
- No specific actions on valves

Example 2: Contacts J2 to J7 are used to inhibit channel analysis.

Following actions will occur:

- "XXXXXX INHIBITED (X: 1 - 6)" message sent on display and 1st RS232
- "Warning" relay switches from position NO to closed until the contact is open
- The 8811 automatically launches a new analysis on the next channel programmed in the sequence menu

8.2.2 System alarm

Example 1: ER6, ER29 and ER30 (respectively NO SAMPLE, ERROR 29 and LEVEL SAMPLE) indicates a lack of sample to the sequencer.

Following actions will occur:

- "NO SAMPLE X (X= 1 - 6)" message sent on display and 1st RS232
- "System alarm" relay switches from position NO to closed (or vice-versa)
- The 8811 automatically launches a new analysis on the next channel programmed in sequence menu

Example 2: to continue on the previous scenario, if there is a lack of sample on all channels, a system alarm is generated:

- "NO SAMPLE" message sent on display and 1st RS232
- "System alarm" relay switches from position NO to closed (or vice-versa)

- The analyzer and sequencer stop and remain in alarm until a manual or remote acknowledgement of the system alarm occurs

8.3 Use of contacts J1 - J8

There is 8 logic inputs (J1 to J8, all galvanically insulated). Each logic input has four pins with the following characteristics:

Pin number	Characteristics
	Ground
	Input signal
	Photodiode current supply
	5V supply

Logic input number	Allocated to	Strap pins 3 and 4
J1	Level sample detection (in 8810 reactor vessel)	
J2 to J7	Inhibition of channel 1 to 6	Inhibit channel analysis. A new cycle with the next channel in the programmed sequence starts immediately (IMPORTANT: This functionality is not available if coupled with an 8810-ISE analyzer).
J8	Remotely acknowledge system alarm	Acknowledge the system alarm. A new cycle with the next channel in the programmed sequence starts immediately (IMPORTANT: This functionality is not available if coupled with an 8810-ISE analyzer).

Contact J1 is used for the sample detection. Please make sure at this point of the installation that the contact J1 is configured as stated in the table below:

J1 configuration	No strap	Strap between 3 and 4
Discontinuous		*

Note: *If terminals 3 and 4 are not connected according to the table above, the 8811 displays the alarm "NO SAMPLE"*

Contacts **J2** to **J7** are used to inhibit sampling of associated stream:

- A strap between 3 and 4 of J2 - J7 inhibits sampling of stream 1 - 6

Following actions will occur:

- "XXXXXX INHIBITED (X: 1 - 6)" message sent on display and 1st RS232
- "Warning" relay switches from position NO to closed until the contact is open
- The 8811 automatically launches a new analysis on the next channel programmed in the sequence menu

Sampling inhibition and all actions explained above are maintained until the associated contact is re-opened.

Contact J8 releases remotely the system alarm: a short closing between 3 and 4 of J8 deactivates the system alarms.

Section 9 Messages

Message	Description
ADC error	Message from the analyzer indicating a photometer error.
Adjust Iout	Enables output calibration and their range (0 - 20 mA or 4 - 20 mA).
ALARM	8 different alarms available: SYSTEM ALARM 1 - 6 or WARNING. They can be active. When an alarm is activated it can be released separately with the **SCROLL UP** key. The relay is flipped back but the alarm is displayed till it is cancelled.
ANALOG-OUT	The 8 analog outputs can be adjusted only on 0 - 20 mA or 4 - 20 mA (PM XXXX menu). The beginning and end of scale can be chosen between 0 and 9999.
ANALYZER TYPE	Enables to choose the type of analyzer.
Calibrat. error	Message from the analyzer and indicating a calibration error.
calibration	Message from the analyzer and indicating the analyzer is in calibration mode.
cleaning	Message from the analyzer and indicating the analyzer is in chemical cleaning mode.
cal. measure	Message from the analyzer and indicating the analyzer is in measuring mode with calibration.
Compensat. error	Message from the analyzer and indicating the temperature compensation is impossible.
Convert error	Message from the analyzer indicating a conversion is impossible between concentration and conductivity.
Conc	Invites the user to enter the concentration unit.
COMMUNIC. ERROR	Message indicating a communication error between the analyzer and the sequencer.
Cycle t.	Programming the measuring cycle time between 0 to 99 mins and 0 to 99 secs.
DISCONTINUOUS	Type of analyzer.
Data to RS232	Sends the last 100 measurements by the second RS232 output.
Data transfer	This message indicates the 8811 is sending 100 measurements.
Faraday cell	Message from the analyzer indicating a Faraday cell error.
fix-time	Message from the analyzer indicating the analyzer is in pause mode.
if sure: ENTER	Invites the user to press **ENTER** for the last confirmation.
IOUT X - > Y/Z	Message from the ANALOG menu. Analog output allocated to the measurement of the channel chosen.
INPUTS	Control of the different logic inputs (SERVICE menu).
Input Error	Message displayed when the user enters wrong data (out of limits).
input PM XXXX (4760)	Invites the user to enter the password reserved in the PM XXXX menu.
Level Sample	Message from the analyzer indicating a level error.
Level reagent	Message from the analyzer indicating a reagent level error.
Level cond.	Message from the analyzer indicating a conditioning solution error.
Level cleaning	Message from the analyzer indicating a chemical cleaning error.
LIMIT t.	Message from the TIMING menu indicating a limit time for the measurement.
MAIN-MENU	From the MAIN MENU, the sub-menus are selected using the **SCROLL UP/DOWN** keys. Pressing **SELECT** returns to the action mode.
Meas. t.	Message from the TIMING menu indicating the measurement time.
measure	Message from the analyzer indicating the analyzer is in measuring mode.
mes. overrange	Message from the analyzer indicating a measuring error.
mes. underrange	Message from the analyzer indicating a measuring error.

Message	Description
N. OF CHANNELS	Message from the PROGRAMMING menu which enables to choose the number of channels.
NO SAMPLE	Message from the analyzer indicating sample is missing.
Ok !	Indicates the instrument has taken the application into account.
ONE MEASURE	Message indicating one measure per channel (PMXXXX menu).
other sample	The analyzer measures with an external sample.
OUT: 0/4 - 20 mA	Enables to choose the output range between 0 - 20 mA or 4 - 20 mA (PM XXXX - Adjust Iout menu).
Over Tit. Time	Message from the analyzer indicating the discontinuous analyzer has exceeded the time limit.
OVER TIME	Error message displayed when the measuring time is exceeded according to the time defined in Limit. t: and releases a system alarm.
Plot pH	Message from the analyzer indicating a titration curve plot.
PM XXXX	Menu reserved. Enables to program the analyzer type, Sends data to RS232 and adjusts the analog output
press ENTER	Invites the user to press **ENTER** to confirm an action.
please wait	Invites the user to wait till the end of the preparation of the measuring cell.
plotting mV	Message from the analyzer indicating it is in titration curve plot mode.
PROGRAMMING	Menu to access to the programming.
point not found	Error message from the analyzer indicating the final point has not been found.
READING	In action mode it is not possible to program the instrument but only possible to read the parameters.
ready	Starting the instrument for the first time, the instrument is in "ready" state after loading the default values.
ratio error	Message from the analyzer indicating a ratio error of the 8921.
RETURN MEASURE	Invites the user to come back to the measuring mode.
RELAY X	Message from the SERVICE menu to control the relays.
RETURN PROCESS	Invites the user to come back to the process measuring mode.
SAMPLE X (X: 1 - 8)	Message from the SERVICE menu to control the sample valves.
SEQUENCER 8811	Name of the instrument when starting the instrument.
SEQUENCE	Message from the PROGRAMMING menu to choose the sequence.
SERVICE	In the SERVICE menu, different components can be tested activating or deactivating them.
Stand by	Message from the analyzer indicating the analyzer is in stand-by.
Standing by	Message from the analyzer indicating the analyzer is in stand-by mode.
Slope calib.	Message from the analyzer indicating a slope error.
START	START enables to start the sequencer.
STOP	Immediate stop of the 8811. All actions are stopped. The message "ready" is displayed after confirmation of the question "if sure ENTER".
SYS. ALARM	In the ALARM sub-menu, the system alarm can be activated or not in use SYS ALARM ON/OFF. Any type of system alarm alert the end-user that a major problem has happen on the analyzer.
SWITCHING	Message from the ALARM menu indicating the relay allocation to the channel measurement chosen and enables to choose rising or falling alarms individually.
TIMING	Enables to adjust the different times necessary for a measuring cycle, such as cycle time.
Titration	Message which indicates the instrument is in titration mode.

Message	Description
T °C overrange	Message from the analyzer indicating a temperature error.
T °C underrange	Message from the analyzer indicating a temperature error.
UNIT	Message from the PROGRAMMING menu to program the measuring unit.
Version	The software revision is stored in the SERVICE menu, "VERSION 1. XX" or higher.
WARNING	Message from the ALARM menu which activates the warning.

Section 10 User configuration

			User configuration	
		Default value	**Date**	**Date**
N. OF CHANNELS: Number of channels				
X CHANNELS	Number of channels	3		
SEQUENCE: Choice of the sequence				
XXXXXXXXXXXXXXXX	Programming the sequence	123		
TIMING				
Continuous analyzer: Delay t. Meas. t.	 Measurement stabilization Measurement time	 00'30" 02'00"		
Discontinuous analyzer: Cycle t. Limit t.	 Cycle time Limit time for the measurement	 03'00" 03'00"		
ANALOG OUT				
IOUT 1 -> CHY/Z START XXXX END XXXX	Allocation to channel/measure Beginning of range End of range	IOUT 1 ->CH1 00 100		
IOUT 2 -> CHY/Z START XXXX END XXXX	Allocation to channel/measure Beginning of range End of range	IOUT 2 ->CH2 00 100		
IOUT 3 -> CHY/Z START XXXX END XXXX	Allocation to channel/measure Beginning of range End of range	IOUT 3 ->CH3 00 100		
IOUT 4 -> CHY/Z START XXXX END XXXX	Allocation to channel/measure Beginning of range End of range	IOUT 4 ->CH4 00 100		
IOUT 5 -> CHY/Z START XXXX END XXXX	Allocation to channel/measure Beginning of range End of range	IOUT 5 ->CH5 00 100		
IOUT 6 -> CHY/Z START XXXX END XXXX	Allocation to channel/measure Beginning of range End of range	IOUT 6 ->CH6 00 100		
IOUT 7 ->C START END	Output 7 reserved for temperature Beginning of range End of range	 00 55		
IOUT 8 -> XXX START END	Output 8 reserved for direct measure Beginning of range End of range	 0 100		
ALARM: Control of the alarms				
ALARM 1 NO/YES ALARM 1 -> CH Y/Z SWITCHING LIMIT	Alarm 1 activated Allocation to channel/measure Rising or falling Limit value	NO Alarm 1 ->CH1 HIGH 100		

			User configuration	
		Default value	Date	Date
ALARM 2 NO/YES ALARM 2 -> CH Y/Z SWITCHING LIMIT	Alarm 2 activated Allocation to channel/measure Rising or falling Limit value	NO Alarm 2 -> CH2 HIGH 100		
ALARM 3 NO/YES ALARM 3 -> CH Y/Z SWITCHING LIMIT	Alarm 3 activated Allocation to channel/measure Rising or falling Limit value	NO Alarm 3 -> CH3 HIGH 100		
ALARM 4 NO/YES ALARM 4 -> CH Y/Z SWITCHING LIMIT	Alarm 4 activated Allocation to channel/measure Rising or falling Limit value	NO Alarm 4 -> CH4 HIGH 100		
ALARM 5 NO/YES ALARM 5 -> CH Y/Z SWITCHING LIMIT	Alarm 5 activated Allocation to channel/measure Rising or falling Limit value	NO Alarm 5 -> CH5 HIGH 100		
ALARM 6 NO/YES ALARM 6 -> CH Y/Z SWITCHING LIMIT	Alarm 6 activated Allocation to channel/measure Rising or falling Limit value	NO Alarm 6 -> CH6 HIGH 100		
WARNING	Warning activated	NO		
SYS. ALARM	System alarm activated	NO		
TIME-LAG	Time in seconds before triggering relay	0		
UNIT: Choice of the unit				
CONC (or CONC 1)	Concentration unit (or unit of the 1st conc. measurement)	ppm		
CONC 2	Unit of the 2nd concentration measurement	ppm		
MEASURE	Unit of the direct measurement	pH		
ANALYZER TYPE: Type of analyzer chosen				
DISCONTINUOUS	Analyzer type	Discontinuous		
ONE MEASURE /TWO MEASURES	Number of measures	One measure		
Adjust Iout: Analog output adjustment				
OUT X - 20 mA	Choice of beginning of scale	0 - 20 mA		

If a complete reset is ever recommended by a Hach Lange technician, note carefully the complete programming using above table and proceed to the reset:

1. Switch off the analyzer
2. Press **ENTER** and **SELECT** keys at the same time and maintain pressure for the next step
3. Switch on the analyzer
4. Display will show: "Loading default parameters"
5. Program the analyzer with the previous inputs

Table 4 Jumpers configuration for the microprocessor board

Jumpers	Description
X1 - X4	Relays configuration K5 - K8 2-3: single pole contact relay 1-2 and 3-4: 24 VAC mains supply
X5	User serial interface configuration 1-2: RS232 2-3: RS485

Table 5 Input level detector terminals or external commands J1 - J8/Flow rate detector

Terminals	Use
J1	Sample detection
J2	Sampling of stream 1 inhibited
J3	Sampling of stream 2 inhibited
J4	Sampling of stream 3 inhibited
J5	Sampling of stream 4 inhibited
J6	Sampling of stream 5 inhibited
J7	Sampling of stream 6 inhibited
J8	Remote acknowledgment of system alarm release

J1 configuration	No strap	Strap between 3 and 4
Discontinuous		*

Note: *If terminals 3 and 4 are not connected according to the table above, the 8811 displays the alarm "NO SAMPLE".*

Table 6 J13 terminal = connection of accessories

J13	Use
1	Ground
2-3	Not used
4-5	Not used
6-7	Sample valve 6
8-9	Sample valve 5
10-11	Alarm 6 configurable by jumper X4
12-13	Alarm 5 configurable by jumper X3
14-15	Alarm 4 configurable by jumper X2
16-17	Alarm 3 configurable by jumper X1

Table 7 Analog output terminal J9

J9	Use
1-2	Analog output 1
3-4	Analog output 2
5-6	Analog output 3

Table 7 Analog output terminal J9 (continued)

J9	Use
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 8 Serial interface jumper J10

J10	Use	
1	TXD	User RS232/1 configurable by X5
2	RXD	
3	GND	
4	TXD	Internal RS232/2 (communication between the sequencer and the analyzer)
5	RXD	
6	GND	
7	DO/RI	User RS485 configurable by X5
8	DO/RI	

Section 12 Spare parts

⚠WARNING

Personal injury hazard. Use of non-approved parts may cause personal injury, damage to the instrument or equipment malfunction. The replacement parts in this section are approved by the manufacturer.

Sequencer

Description	Item no.
2 channel sequencer	08811=A=20X2[1]
3 channel sequencer	08811=A=20X3[1]
4 channel sequencer	08811=A=20X4[1]
5 channel sequencer	08811=A=20X5[1]
6 channel sequencer	08811=A=20X6[1]
Kit for a extra channel (left)	08811=A=2010
Kit for an extra channel (right)	08811=A=2020
19" panel (discontinuous sequencer)	08811=C=2000
NC pneumatic valve (for discontinuous sequencer)	359 110, 02000
NO pneumatic valve (for discontinuous sequencer)	696=038=112
Pilot valve (for NC or NO pneumatic valve)	359103, 02560
TE fitting: 2 males-1 fem. 3/8" threads	387=800=303
1.0100.31 3/8" DN 10/12 mm fitting	359 103, 10052
Banjo 3/8" DN 10/12 mm elbow fitting	587=112=003
TE banjo 3/8" DN 10/12 mm fitting	587=312=003
Banjo 1/4" DN 4/6 mm elbow fitting	587=106=002
TE banjo 1/4" DN 4/6 mm fitting	587=306=002
PE 10/12 mm tubing	151400, 22390
PE 4/6 mm tubing	151575, 00006

Electronic unit

Description	Item no.
Command unit (upper spindle includes the display, microprocessor and power supply boards)	08811=A=0000
Display board	08810=A=7000
Microprocessor board	08811=A=1000
Complete power supply board for 8810 Version 1 analyzer and 8811 sequencer, order fuse P/N 295=100=123 separately	Z_359110,20000
Complete power supply board for 8810 Version 2 analyzer and 8811 sequencer (110/120 V)	Z_359110,40000
Complete power supply board for 8810 Version 2 analyzer and 8811 sequencer (220 V)	Z_359110,40001

[1] X=1: 110V/50 Hz
X=2: 110V/60 Hz
X=3: 220V/50 Hz
X=4: 240V/50 Hz

Electronic unit (continued)

Description	Item no.
Complete power supply board for 8810 Version 2 analyzer and 8811 sequencer (240 V)	Z_359110,40002
3 conductor serial interface cable (with cable glands and terminal strips)	08811=A=0010

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