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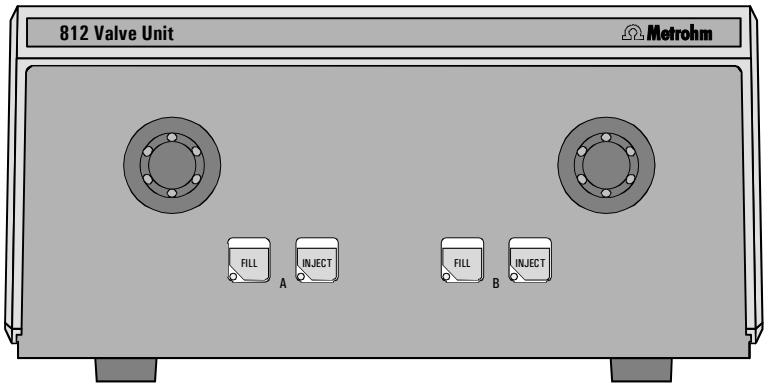
812 Valve Unit



8.812.1003 Instructions for Use

16.11.2001 / dö

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1 Introduction

1.1 Instrument description

The **812 Valve Unit** is an instrument with one or two electrically driven ein 6-port injector valves. Two different versions of the 812 Valve Unit are available:

2.812.0010 Valve Unit with 1 valve

2.812.0020 Valve Unit with 2 valves

Valve parts in contact with the eluent are manufactured out of PEEK material. The instrument is equipped with an external power supply so it can be operated as a stand alone unit and is independent of other Metrohm devices.

The 812 Valve Unit can be used for a variety of different applications:

- In combination with the 817 Bioscan or the 791 VA Detector, the 812 Valve Unit is used as the injector for the systems.
- With the 812 Valve Unit, a 761 Compact IC can be upgraded to be a combined anion an cation system.
- In combination with the 816 Eluent Selector, the 2-port version can be used for automatic column switching with an intermediate rinsing step.
- The 812 Valve Unit can also be used in a large variety of sample preparation techniques, like for cutting techniques, or switching between different sample streams.

1.2 Parts and controls

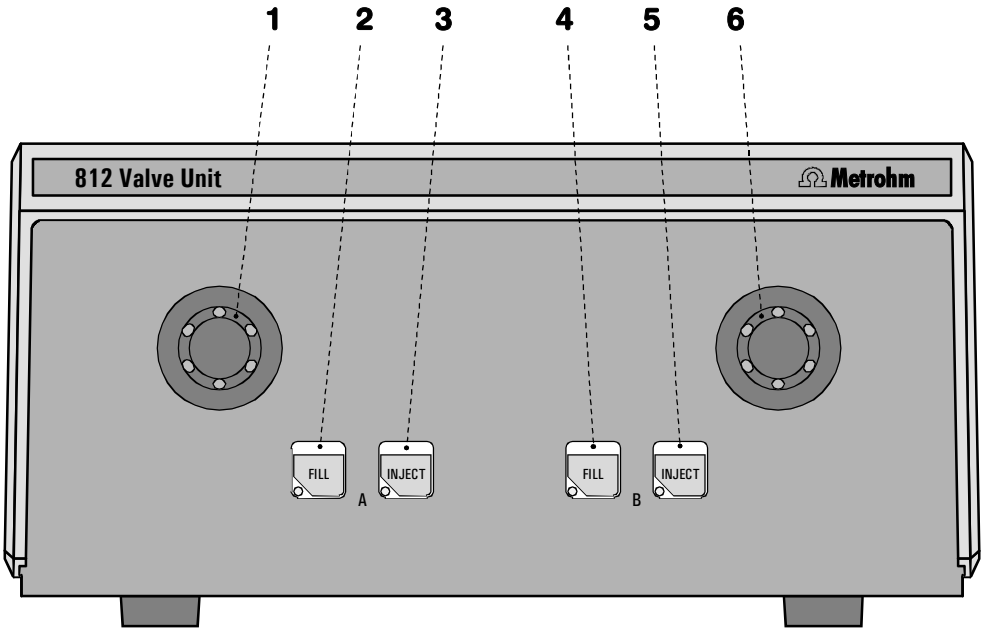


Fig. 1: Front of 812 Valve Unit

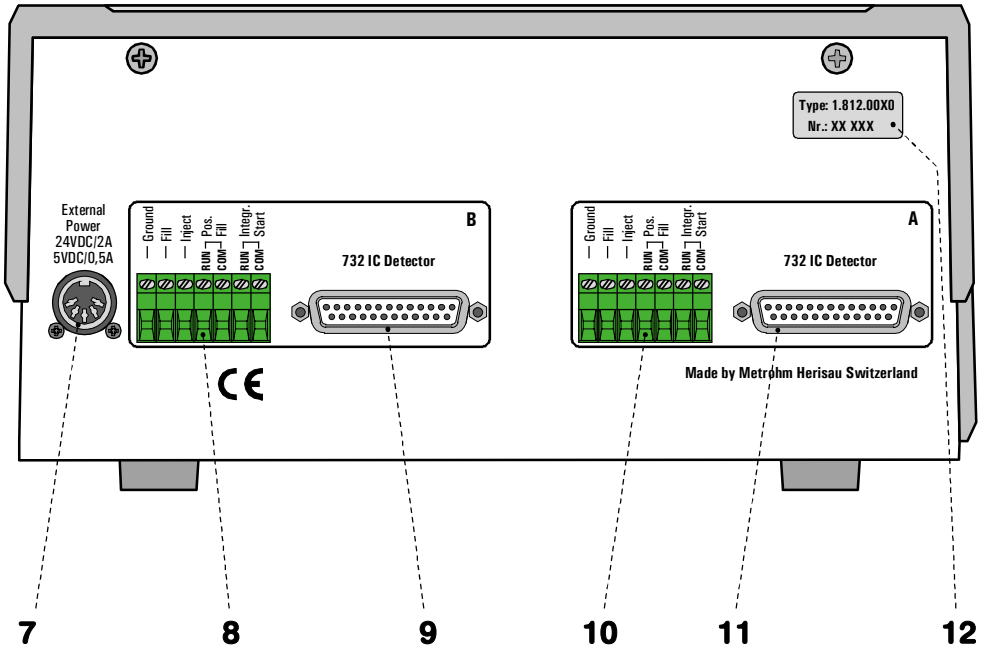


Fig. 2: Rear of 812 Valve Unit

1	**Valve A**	**7**	**Connection for external supply** connection of power supply unit (5 V, 0.5 A / 24 V, 2 A)
2	**"FILL" key for valve A**	**8**	**Terminal block for valve B** (without function for 2.812.0010 instrument version) Ground, Fill, Inject: inputs for control of the valve Pos.Fill: output signal on switching of the valve to position "FILL" Integr.Start: output signal on switching of the valve to position "INJECT"
3	**"INJECT" key for valve A**	**9**	**Connection for 732 IC Detector B** (without function for 2.812.0010 instrument version)
4	**"FILL" key for valve B** (without function for 2.812.0010 instrument version)	**10**	**Terminal block for valve A** Ground, Fill, Inject: inputs for control of the valve Pos.Fill: output signal on switching of the valve to position "FILL" Integr.Start: output signal on switching of the valve to position "INJECT"
5	**"INJECT" key for valve B** (without function for 2.812.0010 instrument version)	**11**	**Connection for 732 IC Detector A**
6	**Ventil B** (not available for 2.812.0010 instrument version)	**12**	**Model plate** with serial number

1.3 Information on the Instructions for Use

Please read through these Instructions for Use carefully before you put the 812 Valve Unit into operation. The Instructions for Use contain information and warnings to which the user must pay attention in order to assure safe operation of the instrument.

1.3.1 Organization

These **8.812.1003 Instructions for Use** for the 812 Valve Unit provide a comprehensive overview of the installation, startup procedure, operation and technical specifications of this instrument. The Instructions for Use are organized as follows:

Section 1 **Introduction**
General description of instrument, parts and controls and safety notes

Section 2 **Installation**
Mains connection, electrical connection, connection of accessories

Section 3 **Operation**
Manual operation and operation via «IC Net»

Section 4 **Appendix**
Technical data, standard equipment, options, warranty, declarations of conformity, index

To find the required information on the instruments you will find it an advantage to use either the **Table of contents** or the **Index** at the back.

1.3.2 Notation and pictograms

The following notations and pictograms (symbols) are used in these Instructions for Use:

Range	**Menu item, parameter or entry value** in «IC Net» program
SYSTEM STATE	**Program window** in «IC Net» program
<OK>	**Button** in «IC Net» program
[FILL]	**Switch or key**
7	**Part or control of 812**
	**Hazard** This symbol draws attention to a possible danger to life or of injury if the associated directions are not followed correctly.
	**Warning** This symbol draws attention to possible damage to instruments or instrument parts if the associated directions are not followed correctly.
	**Caution** This symbol marks important information. First read the associated directions before you continue.
	**Comment** This symbol marks additional information and tips.

1.4 Safety notes

While electrical safety in the handling of the 812 Valve Unit is assured in the context of the specifications IEC 61010-1 (protection class 1), the following points should be noted:

- **Mains connection**

*The **mains connection** must be effected in accordance with the instructions in section 2.2.*

- **Opening the instrument**

Inside the instrument there are no parts which must be set or adjusted by the user.

*If the 812 Valve Unit is connected to the power supply, the instrument must not be opened nor must parts be removed from it. Hence, before opening the instrument, always ensure that the **power supply unit is disconnected from connection 7**!*

- **Protection against static charges**

Electronic components are sensitive to static charging and can be destroyed by discharges. Before you touch any of the components inside the 812 Valve Unit, you should earth yourself and any tools you are using by touching an earthed object (e.g. housing of the instrument or a radiator) to eliminate any static charges which exist.

2 Installation

2.1 Setting up the instrument

2.1.1 Packaging

The 812 Valve Unit is supplied together with the separately packed accessories in special packagings containing shock-absorbing foam linings designed to provide excellent protection. The instrument itself is packed in an evacuated polyethylene bag to prevent the ingress of dust. Please store all these special packagings as only they assure transport of the instrument free from damage.

2.1.2 Check

After receipt, immediately check whether the shipment is complete and has arrived without damage (compare with delivery note and list of accessories in *section 4.2*). In the case of transport damage, see instructions in *section 4.4.1* "Warranty".

2.1.3 Location

Position the instrument in the laboratory at a location convenient for operation, free from vibrations and protected against a corrosive atmosphere and contamination by chemicals.

2.1.4 Arrangement of the instruments

The 812 Valve Unit can be piled up together with other IC instruments (e.g. 732, 733, 709).

2.2 Mains connection

The 812 Valve Unit is operated with the **6.2152.000 Power supply unit** which automatically adjusts itself to the existing mains voltage (100…240 V) and frequency (50…60 Hz).

The power supply unit is connected to the mains using one of the following mains cables

- 6.2122.020 with plug SEV 12 (Switzerland, …)
- 6.2122.040 with plug CEE(7), VII (Germany, …)
- 6.2133.070 with plug NEMA 5-15 (USA, …)

which are three-cored and fitted with a plug with an earthing pin.

The cable permanently mounted to the power supply unit is plugged into connection **7** at the 812 Valve Unit (see *Fig. 2*). The operational readiness is shown by the LEDs lighting up on the "FILL" or "INJECT" keys.

2.3 Electrical connection

2.3.1 Connection at the 762 IC Interface

Always switch off 762 IC Interface and 812 Valve Unit before you connect the two instruments.

The connection of the 812 Valve Unit at the 762 IC Interface enables the three following functions:

- **Control of valve A** by the 762 IC Interface via remote line
- **Control of valve B** by the 762 IC Interface via remote line
- Automatic **start of data acquisition** at the 762 IC Interface by switching valve A or valve B to the "INJECT" position

For instrument connection proceed as follows (see *Fig. 3*):

1 Connection for control of valve A

- Connect the plugs inscribed with "**GND**", "**INJECT**" and "**FILL**" of the 6.2128.100 cable to the connections "**Ground**", "**Fill**" and "**Inject**" on the terminal block **10** of the 812 Valve Unit (see *Fig. 2*).
- Connect the plug inscribed with "**Inject NO**" of the 6.2128.100 cable to the desired remote line 1...7 "**Events - Run**" at the 762 IC Interface and the plug inscribed with "**Inject COM**" to the same remote line "**Events - COM**" (see *Fig. 5 Instructions for use 762*).

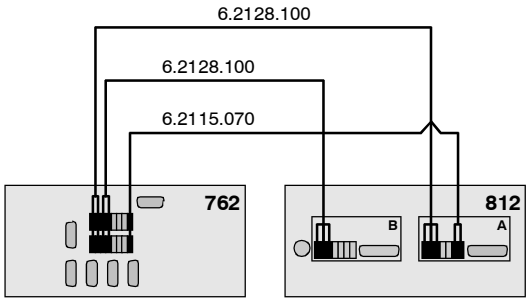


***Fig. 3*: Connection of 812 Valve Unit 812 at 762 IC Interface**

- Connect the plug inscribed with "**LOAD NO**" of the 6.2128.100 cable at the desired remote line 1...7 "**Events - Run**" at the 762 IC Interface and the plug inscribed with "**LOAD COM**" to the same remote line "**Events - COM**" (see *Fig. 5 Instructions for use 762*).

2 Connection for control of valve B

- Connect the plugs inscribed with "**GND**", "**INJECT**" and "**FILL**" of the 6.2128.100 cable to the connections "**Ground**", "**Fill**" and "**Inject**" on the terminal block **8** of the 812 Valve Unit (see *Fig. 2*).
- Connect the plug inscribed with "**Inject NO**" of the 6.2128.100 cable to the desired remote line 1...7 "**Events - Run**" at the 762 IC Interface and the plug inscribed with "**Inject COM**" to the same remote line "**Events - COM**" (see *Fig. 5 Instructions for use 762*).
- Connect the plug inscribed with "**LOAD NO**" of the 6.2128.100 cable at the desired remote line 1...7 "**Events - Run**" at the 762 IC Interface and the plug inscribed with "**LOAD COM**" to the same remote line "**Events - COM**" (see *Fig. 5 Instructions for use 762*).

3 Connection for external start (option)

- Connect the 6.2115.070 cable to the connections "**Integr. Start - RUN**" and "**Integr. Start - COM**" on the terminal block **10** (valve A) or **8** (valve B) of the 812 Valve Unit (see *Fig. 2*).
- Connect the other end of the 6.2115.070 cable to the remote lines "**Events - Start - Run**" and "**Events - Start - Com**" at the 762 IC Interface (see *Fig. 5 Instructions for use 762*).

2.3.2 Connection at 817 Bioscan

The connection of the 812 Valve Unit to the 817 Bioscan is described in detail in the Instructions for Use 817.

2.4 Connections at injection valve

2.4.1 General information

The two six-way valves at the 812 Valve Unit each have 6 connections for capillaries which are switched as follows:

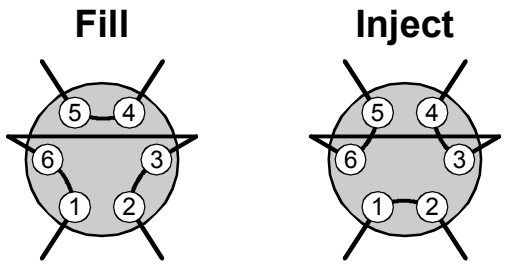


Fig. 4: Switching of injection valves

Connections **1** and **2** of the valve are normally used for supply of sample solution, connections **4** and **5** for eluent supply, and connections **3** and **6** for sample loop installation. For solution supply in the low pressure range (sample feed by use of a syringe or a peristaltic pump), the 6.1803.020 PTFE capillary (i.d. 0.97 mm) is used; in the high pressure range, the 6.1831.010 PEEK capillary (i.d. 0.25 mm) is used. For both capillaries, a 6.2744.010 PEEK compression fitting is used as connector.

2.4.2 Attaching standard accessories

The standard accessories supplied with the 812 Valve Unit can be used to equip one valve for manual filling of the sample loop. Proceed as follows (see *Fig. 5*):

1 Connecting the syringe

- Cut off a piece of the 6.1803.020 PTFE capillary to the desired length (at best using the optionally available 6.2621.080 tubing cutter) and fit it on both sides with a 6.2744.010 PEEK compression fitting (do not tighten too firmly).
- Screw one end of the PTFE capillary **13** to connection **1** of the injection valve.
- Screw the other end of the PTFE capillary **13** to the 6.2744.120 coupling.
- Push 6.2816.020 syringe (without needle) as far as it will go into the connection of the 6.2744.120 coupling.

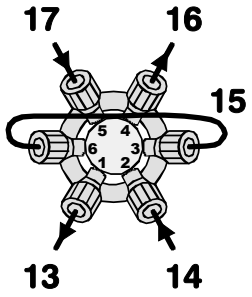


Fig. 5: Connection at injection valve

13	**Syringe tubing** 6.1803.020 PTFE tubing with 6.2744.120 coupling and 6.2816.020 syringe	**16**	**Eluent outlet** 6.1831.010 PEEK capillary
14	**Aspirating tubing** 6.1803.020 PTFE tubing for aspirating the sample	**17**	**Eluent inlet** 6.1831.010 PEEK capillary
15	**Sample loop** 6.1825.210 PEEK sample loop (20 µL)		

2 Connecting the aspirating tubing

- Cut off a piece of the 6.1803.020 PTFE capillary to the desired length (at best using the optionally available 6.2621.080 tubing cutter) and fit it on one side with a 6.2744.010 PEEK compression fitting (do not tighten too firmly).
- Screw this end of the aspirating tubing **14** to connection **2** of the injection valve.

3 Connecting the sample loop

- Fit the 6.1825.210 sample loop on both sides with a 6.2744.010 compression fitting.
- Screw the sample loop **15** (20 µL) to connections **3** and **6** of the injection valve.

4 Connecting the eluent supply

- Screw the PEEK capillary **17** for eluent supply from the high pressure pump to connection **5** of the injection valve.

5 Connecting the separating column

- Screw the PEEK capillary **16** for eluent supply to the separating column to connection **4** of the injection valve.

2.5 Software installation

The PC program **«IC Net 2.1»** is required for the operation of the 812 Valve Unit by a PC. This program runs under Windows 95, Windows 98, Windows NT and Windows 2000 operating systems and is installed according to *section 1.4.2* of the *«IC Net» Instructions for Use*.

The installation of the 812 Valve Unit is described in *section 6.11* of the *«IC Net» Instructions for Use*.

3 Operation

3.1 Manual operation

Switch instrument on/off

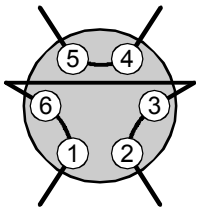
The 812 Valve Unit is switched on and off by connecting/disconnecting the 6.2152.000 power supply unit attached to connection **7** (see *section 2.2*).

After the instrument has been connected to the mains the LEDs on the "FILL" or "INJECT" keys light up and show that the instrument is ready for use.

Switch to "FILL" position

By pressing the "FILL" key, the injection valve A or B is switched to the "FILL" position.

Fill

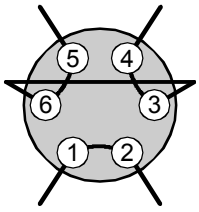


Lighting up of the LED in the "FILL" key indicates the "FILL" position.

Switch to "INJECT" position

By pressing the "INJECT" key, the injection valve A or B is switched to the "INJECT" position.

Inject

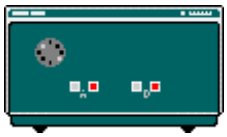


Lighting up of the LED in the "INJECT" key indicates the "INJECT" position.

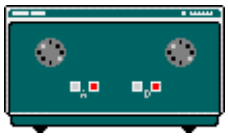
3.2 Operation via «IC Net»

This section describes only the most important points concerning the operation of the 812 Valve Unit. For further details please refer to the «IC Net» Instructions for Use and to the on-line help in the PC program.

3.2.1 812 Valve Unit icon



2.812.0010 Valve Unit with 1 injector



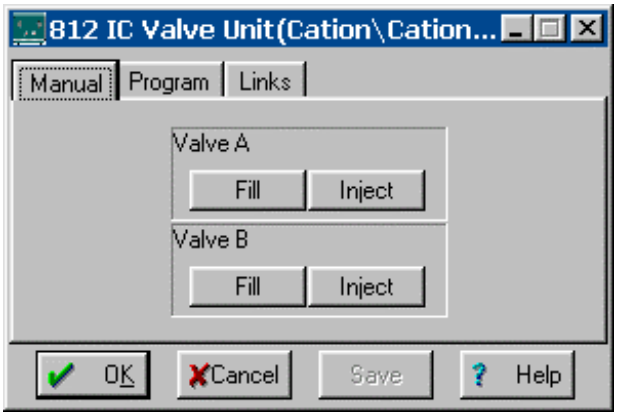
2.812.0020 Valve Unit with 2 injectors

3.2.2 Settings in the "812 Valve Unit" window

The **812 Valve Unit** window for parameter settings is opened by selecting the **Open** menu option with the right mouse button or by double-clicking the 812 icon in the system window. It consists of the three tabs **Manual**, **Program** and **Links**.

Manual

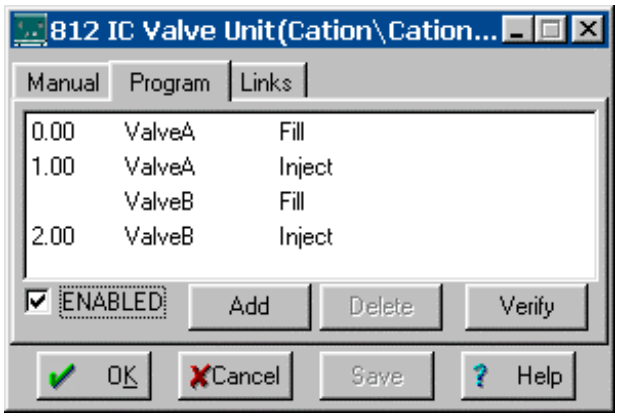
The **Manual** tab of the **812 Valve Unit** window is used for manual operation of the injection valves.



Valve A	
<Fill>	Switch valve A to "FILL" position.
<Inject>	Switch valve A to "INJECT" position.
Valve B	
<Fill>	Switch valve B to "FILL" position.
<Inject>	Switch valve B to "INJECT" position.

Time program

On the **Program** tab of the **812 Valve Unit** window a user-defined time program can be entered. This program starts automatically as defined in the **Start mode** window either at the moment the determination is started (**Start with determination**) or at the moment the sample is injected (**Start with inject**).



Time (1st column)	Time at which program instruction is applied. Range: **0.0 ... 999.9 min** If no time is entered, the program instruction is applied together with the last instruction with time entry.
Instruction (2nd column)	Program instruction (see below).
Parameter (3rd column)	Parameter for program instruction (see below).
ENABLED	Enable program start (a disabled program is not started).
<Add>	Add new program instruction.
<Delete>	Delete selected program instruction.
<Verify>	Test the time program (error messages are displayed if program is wrong).

List of program instructions

The following program instructions can be added to the time program on the **Program** page:

Instruction	*Parameter entry*	*Meaning*
ValveA	**fill, inject**	Switch injection valve A to "**inject**" or "**fill**" position.
ValveB	**fill, inject**	Switch injection valve B to "**inject**" or "**fill**" position.

Links

The **Links** tab of the **812 Valve Unit** window is used for COM port selection and settings (details see *IC Net Instructions for Use*).

4 Appendix

4.1 Technical data

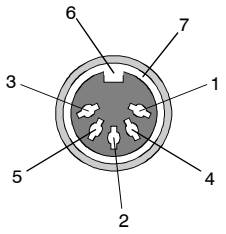
Parts and controls

Keypad — Chemically resistant membrane keypad made of polyester with function keys

Indicators — LEDs for display of valve position

Power supply

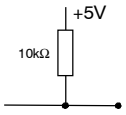
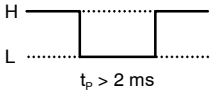
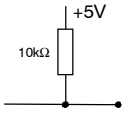
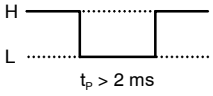
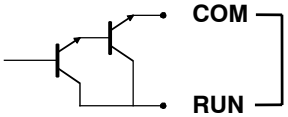
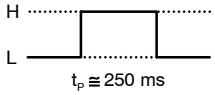
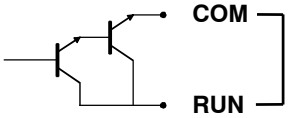
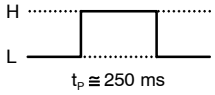
External — External supply via DIN connector:
5 V / 0.5 A
24 V / 2 A (transient, 200…300 ms)



1	+5 V DC / 0.5 A
2	not assigned
3	+24 V DC / 2 A
4	0 V (digital) *
5	0 V (analog) *
6	Ground
7	Ground

* Pin 4 and Pin 5 must be connected in the vicinity of the power source ("zero point of star")

Valve interfaces

Connection	*Function*
Inputs	
Ground	**Ground**
 **Fill**	**Valve → "FILL"** Valve is switched to the "FILL" position 
 **Inject**	**Valve → "INJECT"** Valve is switched to the "INJECT" position 
Outputs	
	**Position "Fill"** A pulse is outputted when the valve is switched to the "FILL" position. 
	**Integrator Start** A pulse is outputted when the valve is switched to the "INJECT" position. 

Safety specifications

Safety notes	The Instructions for Use include information and warnings, which must be heeded by the user to assure safe operation of the instrument.

Electromagnetic compatibility (EMC)

Emitted interference	Standards met: EN 50081-1/2, EN55022 (class B)
Immunity to interference	Standards met: EN50082-1 IEC61000-4-2 (class 3) IEC61000-4-4 (class 4) IEC61000-4-11 IEC61000-4-14 (class 3)

Ambient temperature

Nominal operating range	+5…+45°C (at 20…80 % atmospheric humidity)
Storage, Transport	–40…+70°C

Housing

Material of cover	Polyurethane rigid foam (PUR) with fire protection for fire class UL94VO, FCH-free
Material of base	Steel, enameled

Dimensions

Width	255 mm
Height	128 mm
Depth	365 mm
Weight (with accessories)	2.812.0010: 4.3 kg 2.812.0020: 5.1 kg

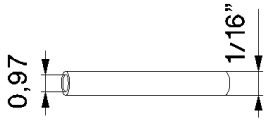
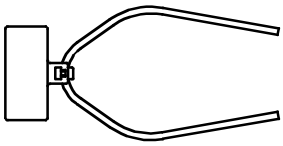
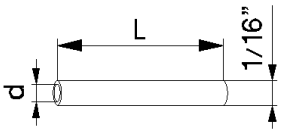
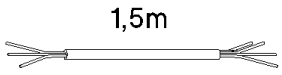
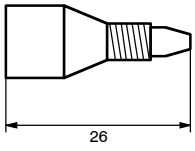
4.2 Standard equipment

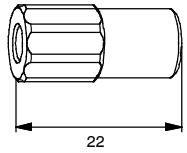
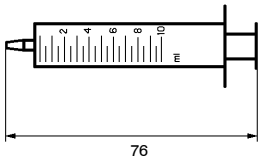
Subject to changes !
All dimensions are given in mm.

The 812 Valve Unit is available in two versions:

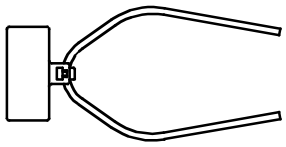
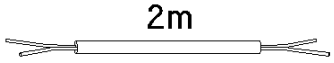
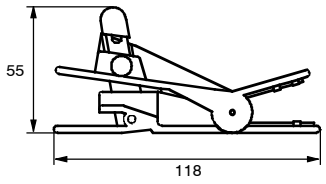
- **2.812.0010 Valve Unit with 1 valve**
- **2.812.0020 Valve Unit with 2 valves**

These instruments include the following parts:

Quant.		*Order No.*	*Description*
2.812.0010	**2.812.0020**		
1	**-**	**1.812.0010**	**Valve Unit with 1 valve**
-	**1**	**1.812.0020**	**Valve Unit with 2 valves**
1	**1**	**6.1803.020**	**PTFE capillary** Length L = 5 m 
1	**1**	**6.1825.210**	**Sample loop aus PEEK (20 µL)** for injection valve; incl. 2 PEEK compression fittings (6.2744.010) 
1	**1**	**6.1831.010**	**PEEK capillary** Length L = 3 m Diameter d = 0.25 mm 
1	**1**	**6.2122.0X0**	**Mains cable** to customer's specifications: Cable socket / Cable connector Type IEC 320/C 13 — Type SEV 12 (CH…) ..... 6.2122.020 Type IEC 320/C 13 — Type CEE (7), VII (D…) ..... 6.2122.040 Type CEE (22), V — Type NEMA 5-15 (USA…) 6.2122.070
1	**2**	**6.2128.100**	**Connecting cable** For connection 812 – 762/817 
1	**1**	**6.2152.000**	**Power supply unit**
1	**2**	**6.2744.010**	**PEEK compression fitting** For the connection of 6.1831.010 PEEK capillaries or 6.1803.020 PTFE capillaries, set of 5 

Quant.		Order No.	Description
2.812.0010	2.812.0020		
1	1	6.2744.120	**Coupling 1/16" – Luer** Coupling between 6.2744.010 PEEK compression fitting and 6.2816.020 Syringe 
1	1	6.2816.020	**Syringe** made of PP, volume = 10 mL; for manual filling of the sample loop 
1	1	8.812.1003	**Instructions for Use (English)** for 812 Valve Unit

4.3 Optional accessories

Order No.	Description
6.1825.XXX	**Sample loop made of PEEK** For injection valve; incl. 2 PEEK compression fittings (6.2744.010) 6.1825.230: volume = 10 µL 6.1825.210: volume = 20 µL 6.1825.220: volume = 100 µL 
6.2115.070	**Cable** Connection cable 812/762 for external start 
6.2621.080	**Capillary tubing cutter** for 6.1831.010 PEEK capillaries and 6.1803.020 PTFE capillaries incl. 5 additional blades 

4.4 Warranty and conformity

4.4.1 Warranty

The warranty on our products is limited to defects that are traceable to material, construction or manufacturing error that occur within 12 months from the day of delivery. In this case, the defects will be rectified in our workshops free of charge. Transport costs are to be paid by the customer.

For day and night operation, the warranty is limited to 6 months.

Glass breakage in the case of electrodes or other parts is not covered by the warranty. Checks, which are not a result of material or manufacturing faults, are also charged during the warranty period. For parts of outside manufacture insofar as these constitute an appreciable part of our instrument, the warranty stipulations of the manufacturer in question apply.

With the regard to the guarantee of accuracy, the technical specifications in the instruction manual are authoritative.

Concerning defects in material, construction or design as well as the absence of guaranteed features, the orderer has no rights or claims except those mentioned above.

If damage of the packaging is evident on receipt of a consignment or if the goods show signs of transport damage after unpacking, the carrier must be informed immediately and a written damage report demanded. Lack of an official damage report releases Metrohm from any liability to pay compensation.

If any instruments and parts have to be returned, the original packaging should be used if at all possible. This applies above all to instruments, electrodes, burette cylinders and PTFE pistons. Before embedment in wood shavings or similar material, the parts must be packed in a dust-proof package (for instruments, use of a plastic bag is imperative). If open assemblies are enclosed in the scope of delivery that are sensitive to electromagnetic voltages (e.g. data interfaces etc.) these must be returned in the associated original protective packaging (e.g. conductive protective bag). (Exception: assemblies with built-in voltage source belong in a non-conductive protective packaging). For damage, which arises as a result of non-compliance with these instructions, no warranty responsibility whatsoever will be accepted by Metrohm.

4.4.2 EU Declaration of conformity

CE

EU Declaration of Conformity

The METROHM AG company, Herisau, Switzerland hereby certifies, that the instrument:

812 Valve Unit

meets the requirements of EC Directives 89/336/EEC and 73/23/EEC..

Source of the specifications:

EN 50081-1/2	Electromagnetic compatibility, basic specification; Emitted Interference
EN 50082-1	Electromagnetic compatibility, basic specification; Interference Immunity

Description of the instrument:

Instrument with 1 or 2 electrically driven six-way valves.

Herisau, April 4, 2001

Dr. J. Frank	Ch. Buchmann
Development Manager	Production and Quality Assurance Manager

4.4.3 Certificate of conformity and system validation

Certificate of Conformity and System Validation

This is to certify the conformity to the standard specifications for electrical appliances and accessories, as well as to the standard specifications for security and to system validation issued by the manufacturing company.

Name of commodity:	**812 Valve Unit**	
Name of manufacturer:	Metrohm Ltd., Herisau, Switzerland	
Principal technical information:	Voltages:	100-240 V
	Frequency:	50-60 Hz

This Metrohm instrument has been built and has undergone final type testing according to the standards:

EN50081-1/2, EN50082-1, EN55022 (class B), IEC61000-4-2 (class 3), IEC61000-4-4 (class 4), IEC61000-4-11, IEC61000-4-14 (class 3)
— *Electromagnetic compatibility*

It has also been certified by the Swiss Electrotechnical Association (SEV), which is member of the International Certification Body (CB/IEC).

The technical specifications are documented in the instruction manual.

Metrohm Ltd. is holder of the SQS-certificate of the quality system ISO 9001 for quality assurance in design/development, production, installation and servicing.

Herisau, April 4, 2001

Dr. J. Frank	Ch. Buchmann
Development Manager	Production and Quality Assurance Manager

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