Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

Liquiport 2000

Automatic sampler for liquid media

Application

Municipal and industrial sewage treatment plants:
- Self-monitoring
- Process monitoring
- Monitoring of indirect dischargers
- Manhole monitoring

Authorities and Water Conservancy Boards:
- Water protection and water quality
- Monitoring of indirect/direct dischargers
- Labs and hydrological institutes
- Sampling of liquid media

Your benefits

Simple and user-friendly:
- Menu-guided operation with "Quick-Setup" for rapid commissioning
- Parts conveying media can be mounted easily and without tools, for easy cleaning and maintenance
- Sampler compartment can be sealed and carried separately, for easy and safe sample transportation

Communicative:
- Integrated data logger for recording measured values and sample statistics
- RS232 interface for configuring and for data transmission
- Multi-parameter probes can be connected (optional)

Safe:
- Lockable sample base prevents sample manipulation
- ATEX II2G certification (optional) for safe operation in Ex areas, Zone 1

Innovative:
- Zeolite cooling (optional), for battery-powered and mobile sample cooling

TI084R/09/en
No. 51002728

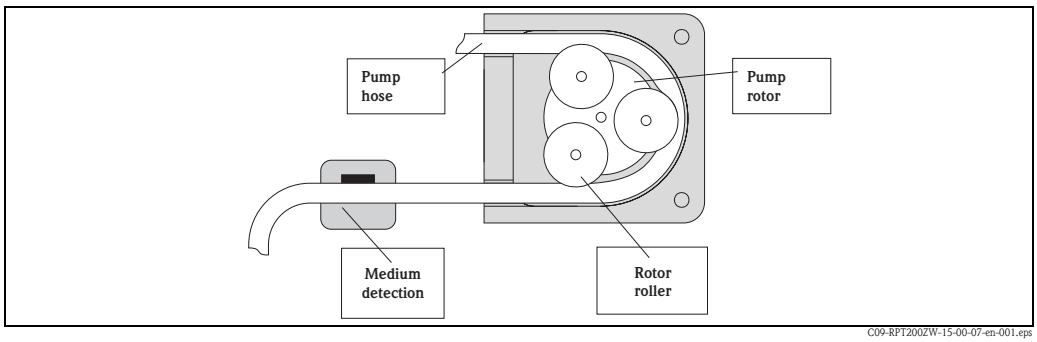
Endress+Hauser
People for Process Automation

Function and system design

Measuring principle

The Liquiport 2000 is a portable sampler for fully automated sampling and distribution of liquid media.

Sampling principle



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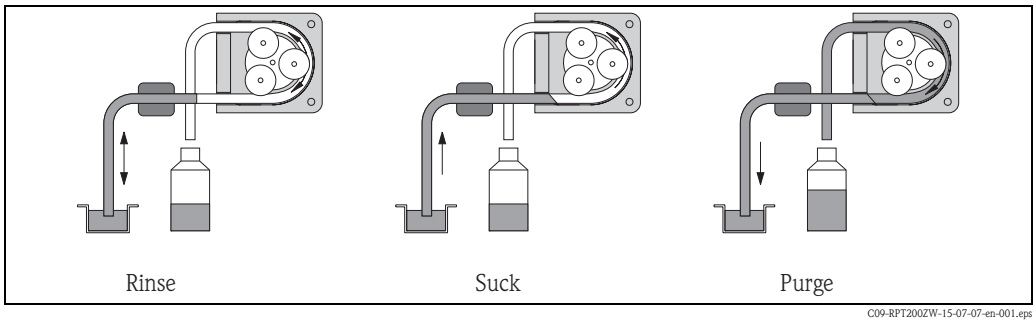
The functional principle of the peristaltic pump involves squeezing a flexible pump hose at one or several points and moving the squeezed point in the desired direction of fluid delivery. Moving the squeezed point is implemented by a pump rotor with rotor rollers on its circumference. The medium detection system controls the electronic volume calculation.
The medium detection system is a new system developed by Endress+Hauser. A pressure sensor is at the heart of the system. The pressure sensor detects the difference between a full and empty pump tube.

The advantages of the Endress+Hauser system:
- Intelligent: the suction height is automatically detected and does not have to be configured
- Maintenance-free: ceramic membrane

Sampling takes place in three steps:



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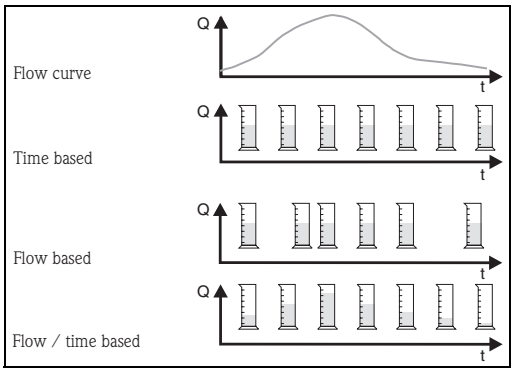
- ❑ Rinsing the suction line: the sampling liquid is sucked in until the medium detection system is triggered. Then the pump runs backwards and pushes the liquid back to the sampling point. The rinsing process can be repeated up to three times.
- ❑ Sucking the sampling liquid: the sampling liquid is sucked from the sampling point to the sampler and the sample volume is calculated electronically.
- ❑ Emptying the suction line: after sampling, the liquid left over in the suction line is pumped back to the sampling point.

Sampling methods

The timer function in the control system makes sampling at defined times possible.
Depending on the measured flow, samples can be taken in proportion with the quantity or flow.
Sampling can also be triggered by an external signal, for event pacing at alarm values.



Time based:
A constant sample volume is taken at constant time intervals.

Flow based:
A constant sample volume is taken at variable time intervals.

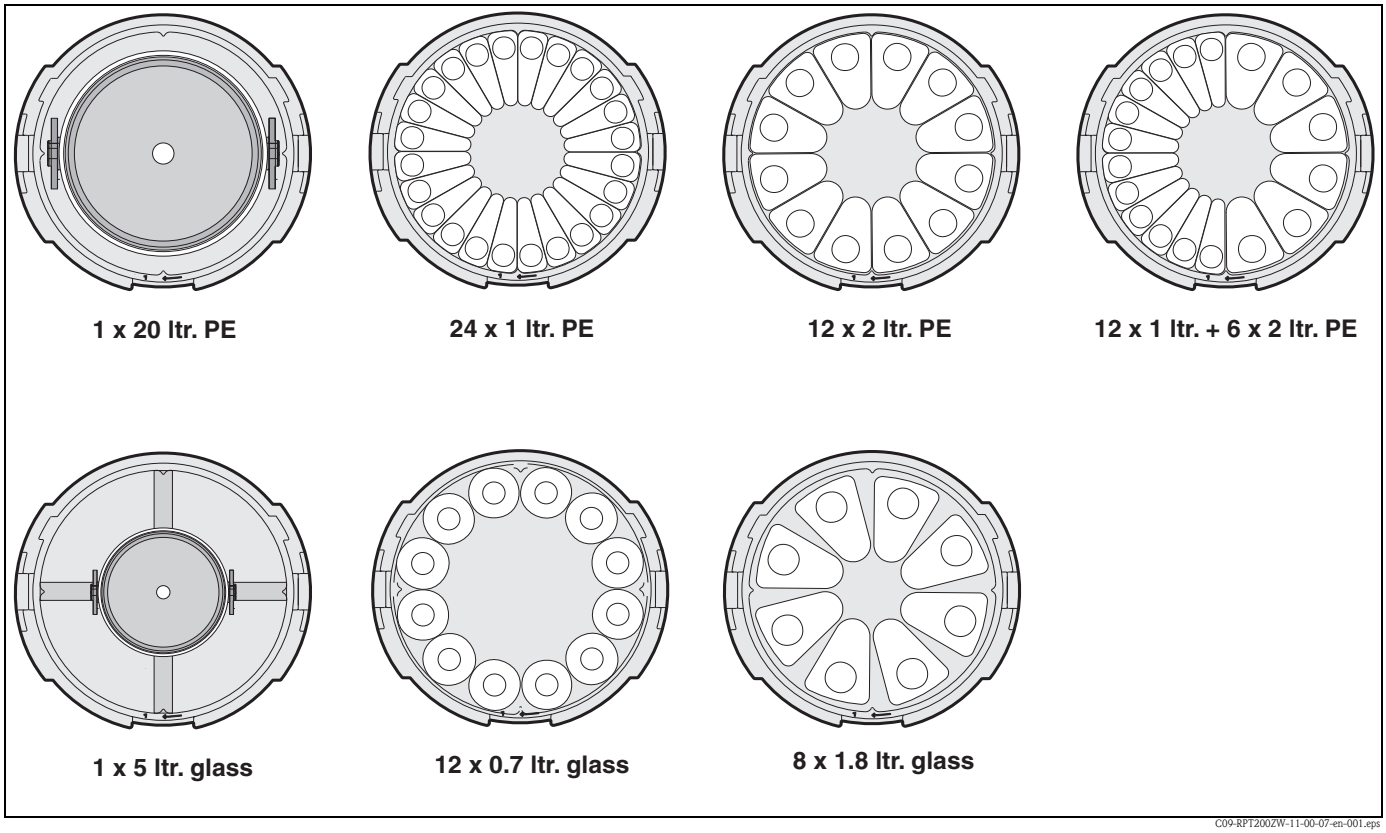
Flow / time based:
A variable sample volume is taken at the same time intervals.

Sample distribution

The sampling liquid is distributed into the individual bottles by using a rotating distributing arm. In addition to a 20 litre PE composite container, various bottle configurations are available:
The distribution version can be changed easily without the need of tools. The Liquiport 2000 allows flexible configuration of the sample distribution. Individual bottles and bottle groups can be free defined for the main, switching and event programmes.

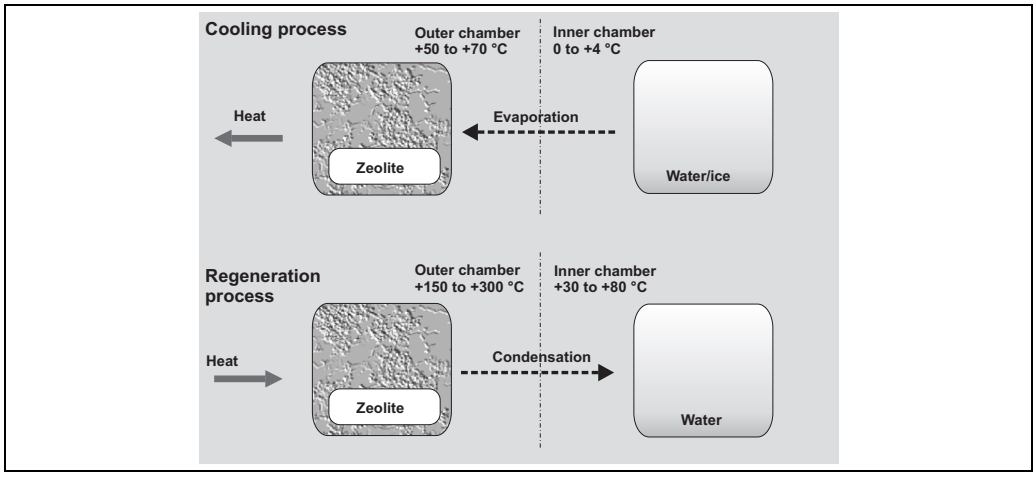
Sample preservation

The sample bottles are located in the lower compartment of the sampler. They can be cooled with crushed ice. The bottle base can be sealed with a cover and transported separately from the upper sampler section.



Sample cooling (optional)

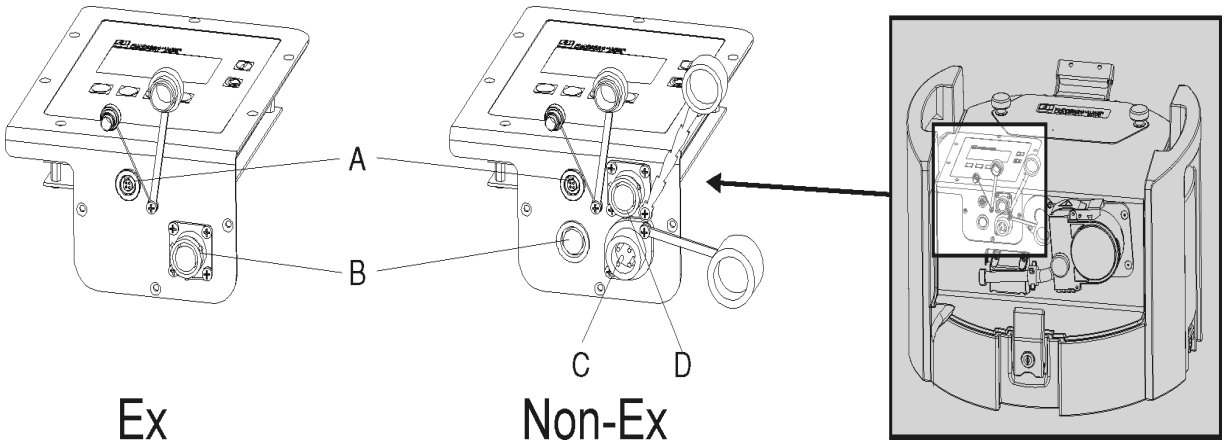
The Liquiport 2000 can be equipped with a stainless steel cooling element as an option. This means that the samples can be stored for 48 hours at +4 °C even without any power supply. The sample cooling container of the Liquiport 2000 has zeolite in the outer of two chambers which are connected by means of a valve. Zeolite, a natural mineral, adsorbs water vapour, incorporating it into its internal structure, while releasing large quantities of heat at the same time. As a result of the evaporative cooling, energy is taken from the water in the inner chamber. The water cools dramatically and freezes to form ice. This is the process used to cool the samples. Following a cooling cycle, the cooling tank is regenerated in a special oven and then used again for cooling.



Dosing

Sample volume	20 to 9999 ml, programmable in ml increments
Dosing accuracy	± 5 ml or ± 5 % of the set volume
Intake velocity	> 0.5 m/s, to EN 25667
Suction lift	6 metres; 8 metres (optional)
Intake lenght	30 metres

Inputs and outputs



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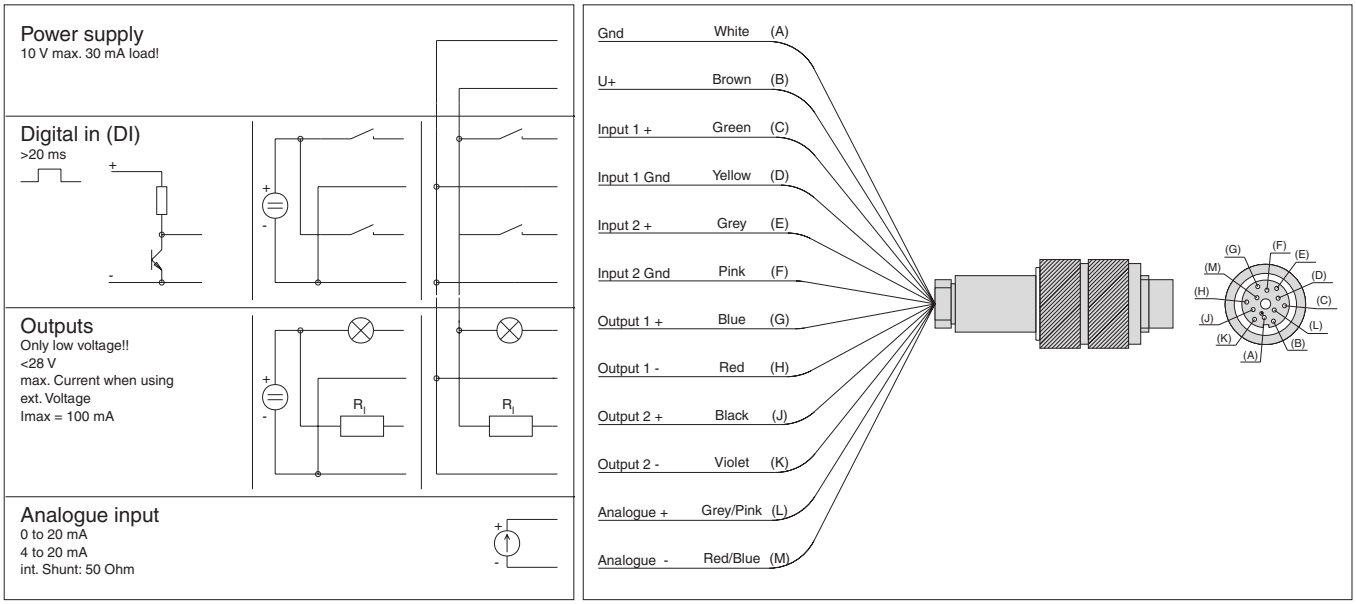
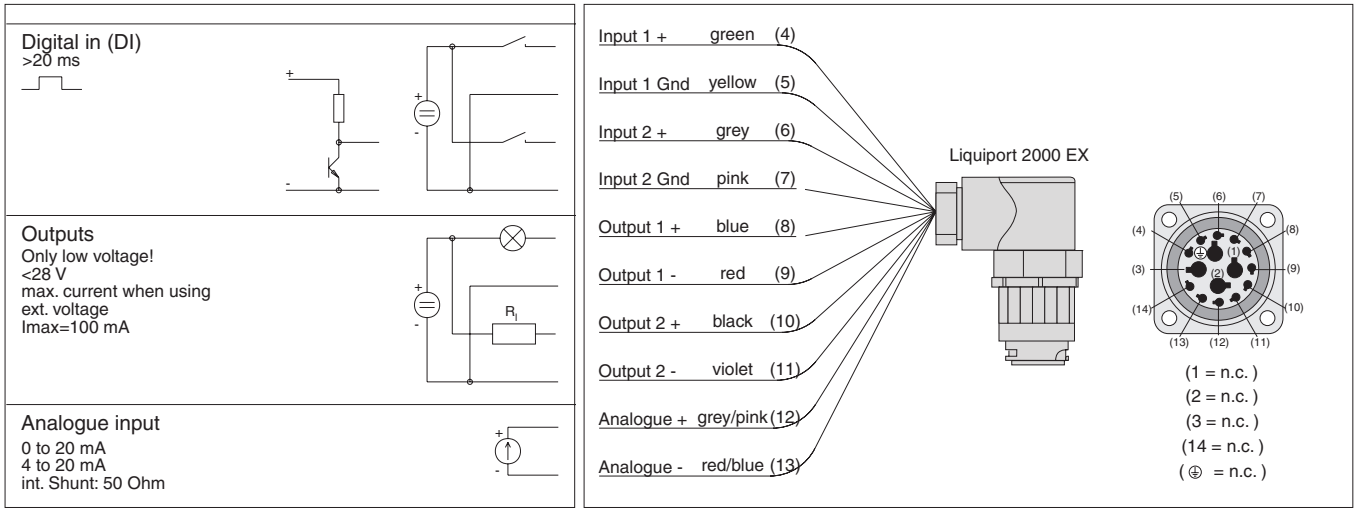
Electrical connections of the device
- *A = Connection socket for the digital interface RS232*
- *B = Connection socket for the signal cable*
- *C = Connection socket for the charger (not on Liquiport 2000 Ex)*
- *D = Optional: Connection socket for the multi-parameter probe (not on Liquiport 2000 Ex)*

Signal cable connection, Liquiport 2000 (item B):



Signal cable connection, Liquiport 2000 Ex (item B):



Multi-parameter probe connection (optional for standard sampler; item D):

As an added option, the Liquiport 2000 has an additional RS232 connection socket for a multi-parameter probe. The following multi-parameter probes can be connected to this connection socket:

- Multi-parameter probe "MultiSens C600" from Endress+Hauser
- YSI 600R, YSI 600 XL, YSI 600 XLM, YSI 6920, YSI 6820, YSI 6600

Note!
All explosion protection data are given in a separate documentation which is available upon request (see "Documentation").

Power supply

Supply voltage

Sampler: internal 12 V_{DC}, 12 Ah lead gel battery

Note!
The sampler cannot be operated without the battery. The battery must be installed before operation.

Charger for Liquiport 2000:

Standard IP20	230 V_{AC}; charge current 2.7 A; only suitable for charging operation
Field-suitable IP65	230 V_{AC}; charge current 3.0 A; also suitable for buffer charging operation
Wide range IP30	110 V_{AC} to 230 V_{AC}; charge current 2.0 A; also suitable for buffer charging operation

Note!
Buffer charging operation means that the sampler is in operation during the charging process.

Charger for Liquiport 2000 Ex:

Standard IP20	230 V_{AC}; charge current 2.7 A
Wide range IP30	110 V_{AC} to 230 V_{AC}; charge current 2.0 A

Note!
The unit can only be charged outside Ex-areas. In the case of Liquiport 2000 Ex, you must remove the battery for connecting to the charger.

Power consumption

Max. 29 W

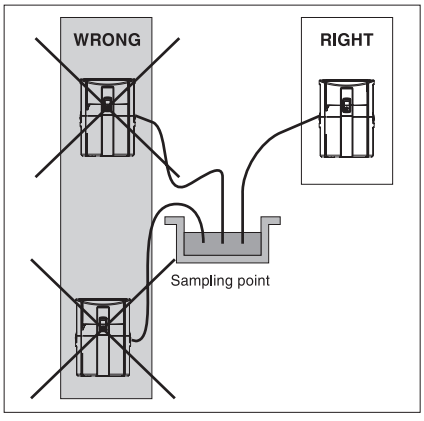
Capacity of battery

94 hours (at a sampling interval of 15 minutes, a sampling volume of 100 ml and a suction height of 4 metres) ≙ 376 samples.

Installation conditions

Installation instructions

The suction line must be routed downhill continuously to the sampling source, this helps to drain the line during purges and avoids siphoning!



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Environment

Ambient temperature range

0 °C to +40 °C
Do not install the sampler in areas with high temperature and direct sunlight!

Storage temperature

-20 °C to +60 °C

Degree of protection

Sampler:		IP65
Charger:	Standard:	IP20
	Option:	IP65

Electromagnetic compatibility (EMC)

To EN 61 326

Process

Medium temperature range

0 °C to +50 °C

Operating pressure range

No pressure

Sampling media

The sampling media must be free of abrasive substances. Pay particular attention to the material resistances of the device parts conveying media!

Mechanical construction

Design, dimensions

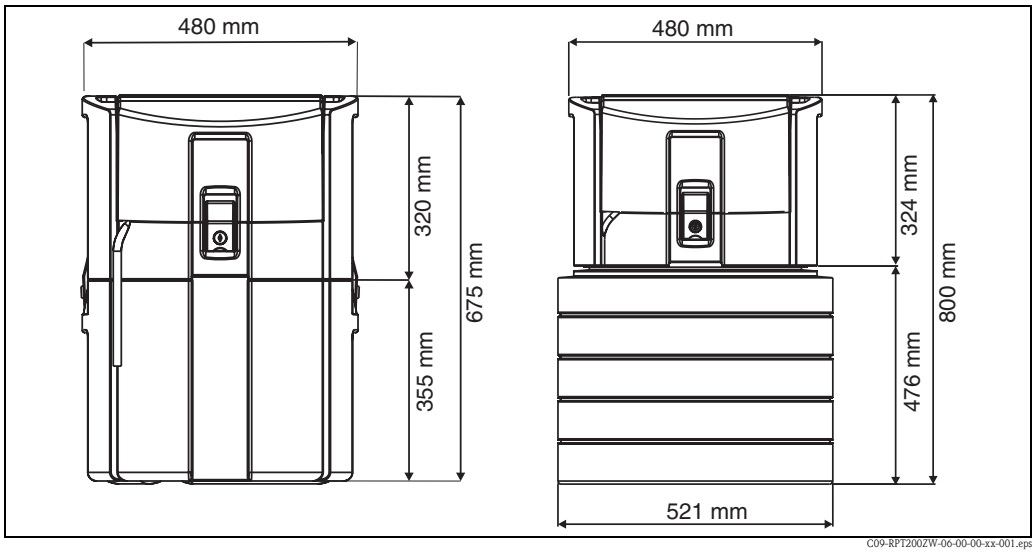


Fig. left: Liquiport 2000; Fig. right: Liquiport 2000 with "zeolite" active cooling compartment

Weight

	Liquiport 2000	Liquiport 2000 ATEX II2G
Empty weight	15 kg	21.5 kg
Overall weight incl. battery, with 24 x 1 l bottles	19 kg	25.5 kg
Upper compartment with battery	10 kg	16.5 kg
Lower compartment with 8 x 1.8 l glass bottles	15.2 kg	15.2 kg
Lower compartment with 24 x 1 l bottles	9 kg	9 kg
Zeolite active cooling compartment	35 kg	35 kg

Materials

	Liquiport 2000	Liquiport 2000 ATEX II2G
Housing	PE (polyethylene)	PE (polyethylene) with graphite mixture

	Liquiport 2000	Liquiport 2000 ATEX II2G
Housing parts	PE (polyethylene)	PE (polyethylene) with graphite mixture; stainless steel 1.4301 (AISI 304)
Bottles	PE (polyethylene) glass (optional)	PE (polyethylene) glass (optional)
Distributor arm	PE (polyethylene)	PE (polyethylene)
Sensor housing	PP (polypropylene)	PP (polypropylene)
Pump tubing	Silicone	Silicone
Zeolite active cooling compartment	Stainless steel 1.4301 (AISI 304)	Stainless steel 1.4301 (AISI 304)

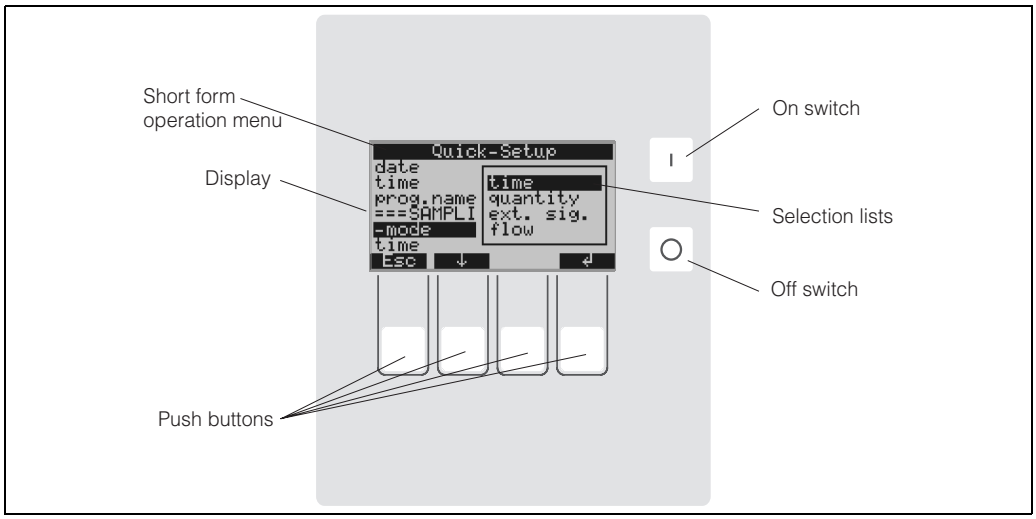
Human interface

Display elements

Liquid crystal display: illuminated (only for Liquiport 2000 Standard), 128X64 dot; 32 characters, 8 lines.

Operating elements

Menu-guided operation using 4 keys on the device. Picklists and short operating menu ("Quick-Setup") for easy commissioning.



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Remote operation

Interface/PC software ReadWin® 2000

It is especially easy to configure the Liquiport 2000 (and other E+H instruments) with the PC software ReadWin® 2000. Programmes can be created on the PC and transmitted by means of the RS232 interface.

Benefits for the user:
- ❑ Uniform user interface at the PC under Windows
- ❑ Device settings saved in a database
- ❑ Instantaneous value display
- ❑ Device settings read out
- ❑ Internal memory read out with measured flow rate, sample quantity taken, etc.

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Certificates and approvals

CE-Mark

The sampler system fulfils the requirements demanded by the EU regulations. Endress+Hauser acknowledges successful unit testing by adding the CE mark.

Ex approval

Liquiport 2000 is optionally available with the **ATEX II2G EEx dem[ib] IIC T4** certificate for operation in Ex-areas, Zone 1.

Ordering information

Liquiport 2000 portable sampler
Portable, battery-powered sampler with time, flow or event-controlled sampling of liquid media from 20..9999 ml using peristaltic pump. Menu-guided operation with "Quick-Setup", 2 digital inputs/outputs, 1 analog input. External diameter/height 480 mm x 700 mm; empty weight: approx. 19 kg; sampling height: 6 m, max. 8 m, length: max. 30 m, line connection ID 10 mm, supplied accessories: 6 m / 8 m suction line, ID 10 mm

	Control unit
A	1x user mode
B	7x user mode
C	7x user mode, Interface Multisens C600R/XL

		Power supply
3		Accumulator by customer supplied
1		Accumulator 12V 12Ah + charger 230VAC, IP20, NC=Not for buffer charging operation
2		Accumulator 12V 12Ah, w/o charger
4		Accumulator 12V 12Ah + charger 230VAC,IP65 (adapted for buffer charging operation)
5		Accumulator 12V 12Ah + charger 100-230VAC, IP30 (adapted for buffer charging operation)

			Operation language
A			German
B			English
C			French
D			Italian
E			Spanish
F			Dutch
G			Danish
K			Czech
P			Polish

				Sample distribution
A				1 x 20 litre composite container, PE (not with active cooling)
B				12 x 2 litre bottle, PE
C				24 x 1 litre bottle, PE
D				12 x 1 litre + 6 x 2 litre bottle, PE
E				8 x 1.8 litre bottle, glass (not with active cooling)
F				12 x 0.7 litre bottle, glass
G				1 x 5 litre composite container, glass (not with active cooling)

					Electrical version
1					Basic version
2					Basic version + RS232 cable + ReadWin® 2000

						Peristaltic Pump
A						6 m suction height
B						8 m suction height
C						Suction height 6 m + active cooling, Regeneration unit RPT20A-HC Order separatly
D						Suction height 8 m + active cooling, Regeneration unit RPT20A-HC Order separatly

RPT20-								⇐ **Order code**

Liquiport 2000 Ex portable sampler
Portable, battery-powered sampler for use in Ex areas with time, flow or event-controlled sampling of liquid media from 20 to 9999 ml using peristaltic pump. Menu-guided operation with "Quick-Setup", 2 digital inputs/outputs, 1 analog input, standard outer diameter/height 480 mm x 700 mm, standard empty weight: approx. 25.5 kg, sampling height: 6 m, max. 8 m, length: max. 30 m, line connection ID 10 mm, supplied accessories: 6 m / 8 m suction line, ID 10 mm

Approval											
A	ATEX II2G EEx dem[ib] IIC T4										
		Control unit									
		A	1x user mode								
		B	7x user mode								
				Power supply							
				1	Ex-accumulator 12V 12Ah + charger						
				2	Ex-accumulator 12V 12Ah						
				3	Ex-accumulator 12V 12Ah + charger 100-240VAC						
					Operation language						
					A	German					
					B	English					
					C	French					
					D	Italian					
					E	Spanish					
					F	Dutch					
					G	Danish					
					K	Czech					
					P	Polish					
						Sample distribution					
					A	1 x 20 litre composite container, PE (not with active cooling)					
					B	12 x 2 litre bottle, PE					
					C	24 x 1 litre bottle, PE					
					D	12 x 1 litre + 6 x 2 litre bottle, PE					
					E	8 x 1.8 litre bottle, glass (not with active cooling)					
					F	12 x 0.7 litre bottle, glass					
					G	1 x 5 litre composite container, glass (not with active cooling)					
							Peristaltic pump				
							1	6 m suction height			
							2	8 m suction height			
								Housing			
								1	Lower part PE, antistatic		
								2	Lower part stainless steel, active cooling, (35kg, d=521mm), Regeneration unit RPT20A-HC order separatly		
									Electrical version		
									1	Basic version	
									2	Basic version + RS232 cable + ReadWin 2000	
										Mechanical version	
										A	Basic version
RPT22-											⇐ **Order code**

Accessories

Liquiport 2000 and Liquiport 2000 Ex accessories

Order code	Accessory
51004744	2 x Spare pump hose ZP6M
51004745	2 x Spare pump hose ZP8M
51002425	Suction filter cpl., for use with 10 mm line
50053928	Suction line, PVC meshed, clear, ID 10 mm
50070341	Suction line, NBR, black, ID 10 mm
51003971	Line connection nipple kit
51003198	Suction strainer V2A, 500 mm

Order code	Accessory
51003193	Distributer arm with locking screws
RPT20A-RA	Composite container conversion kit 20 l, PE
51003410	Composite container 20 l with cap
RPT20A-HD	Bottle base with active cooling
RPT20A-KA	Freezer cartridge for 12 x 2 l PE and 24 x 1 l PE

Liquiport 2000 accessories

Order code	Accessory
51003199	Battery 12 V 12 Ah
51003191	Suspension harness kit
RPT20A-FA	Bottles PE 12 x 2 l with cap
RPT20A-FB	Bottles PE 24 x 1 l with cap
RPT20A-FC	Bottles glass 8 x 1.8 l with cap
RPT20A-FD	Bottle PE 2 l with cap
RPT20A-FE	Bottle PE 1 l with cap
RPT20A-FF	Bottle glass 1.8 l with cap
RPT20A-FG	Bottle glass 0.7 l with cap
RPT20A-FH	Composite container 5.0 l, glass with cap
RPT20A-LA	Charger 230V, 12V/2.7A, IP20 (**not** adapted for buffer charging operation
RPT20A-LB	Charger 230V, 12V/3A, IP65 (adapted for buffer charging operation)
RPT20A-LC	Charger (wide range) 100 to 240 V, 12 V/2.0 A, IP30 (adapted for buffer charging operation)
RPT20A-LL	Cable adapter charger-accumulator
RPT20A-LK	Spare accumulator with charger adapter cable
RPT20A-RB	12 bottles PE conversion kit
RPT20A-RC	24 bottles PE conversion kit
RPT20A-RD	8 bottles glass conversion kit (from software V3.03)
RPT20A-RE	12 bottles glass conversion kit
RPT20A-RF	Composite container conversion kit 5 l, glass
RPT20A-HC	Regeneration oven for zeolite cooling base

Liquiport 2000 Ex accessories

Order code	Accessory
RPT22A-LA	Charger 12 V/ 2.7 A IP20 for Ex battery
RPT22A-LC	Charger (wide range) 100 to 240 V, 12 V/2.0 A, IP30, for Ex battery
RPT22A-LK	Ex battery 12 V 12 Ah lead gel
RPT22A-LL	Ex battery cable adapter - standard charger RPT20
RPT22A-FA	Bottles PE 12 x 2 l with cap
RPT22A-FB	Bottles PE 24 x 1 l with cap
RPT22A-FC	Bottles glass 8 x 1.8 l with cap
RPT22A-FD	Bottle PE 2 l with cap
RPT22A-FE	Bottle PE 1 l with cap
RPT22A-FF	Bottle glass 1.8 l with cap
RPT22A-FG	Bottle glass 0.7 l with cap
RPT22A-FH	Composite container 5.0 l, glass with cap

Order code	Accessory
RPT22A-RB	12 bottles PE conversion kit
RPT22A-RC	24 bottles PE conversion kit
RPT22A-RD	8 bottles glass conversion kit (from software V3.03)
RPT22A-RE	12 bottles glass conversion kit
RPT22A-RF	Composite container conversion kit 5 l, glass

Documentation

- ❑Sampler brochure (FA013C/09/en)
- ❑"Liquiport 2000" Operating Instructions (BA116R/09)
- ❑"Liquiport 2000 Ex" Operating Instructions (BA165R/09)
- ❑"Liquiport 2000 active cooling" additional Operating Instructions (BA166R/09)
- ❑Technical Information "MultiSens C600" multi-parameter probe (TI371C/07/en)
- ❑ATEX safety instructions (XA037R/09/a3)

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People for Process Automation

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