UNITED FOR WATER QUALITY

Operating instructions
Water sampler

BÜHLER
2000 / 1027





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Remarks

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Subject to changes!

Access code for programming, system settings, key lock

Password:	6299
Your password:	

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General information

We are glad that you have chosen this product.
When developing this device, we combined approved technique with innovative detail solutions. Greatest importance has also been attached to the design of an apparatus which provides easy access for connection and maintenance works.

Safety remarks

Disconnect the mains power connections before carrying out any connection, maintenance or repair works.

Before putting into service

- Please read these operating instructions and special remarks thoroughly before putting the device into service.
- Familiarize yourself with the safety and operating requirements in order to safeguard personnel and equipment.
- The apparatus has been subjected to exhaustive quality inspections before dispatch.
- Any service and maintenance works required may only be carried out by trained service personnel.
- Observe the local safety regulations and the rules for prevention of accidents.
- Observe the rules concerning the handling of hazardous substances.
- Do only use original spare parts or spare parts authorised by the manufacturer.
- No liability or claims under guarantee will be accepted in respect of any modifications or conversions of the apparatus, other than those carried out by us or by persons authorised by us or for which we have given express permission (in a written form)! This also refers to any damage due to incorrect operation and/or improper use of the equipment.

Permissible application

The permissible application of the water sampler consists in the extraction of liquid, aqueous substances, temperature range 0°C to 40°C. The device must only be installed in areas free from explosion hazard and must only be used for sampling of non-explosive substances. Please refer to the technical specifications in chapter “Specifications”. Other applications are not allowed!

Permissible operating and ambient conditions

- Sample extraction of liquid aqueous substances, temperature range: 0°C to 40°C.
- The sampler is designed for operation in non-hazardous areas (no explosion risk).
- The sampler can be operated at ambient temperatures from 0°C to +45°C.
- Sampling from pressurised lines is not possible.
- The device is weather-proof and suitable for outside operation.

Redelivery for repair

Before returning any appliances to us, please pay attention to the following to avoid unnecessary cost and repair delays:

- Redeliveries only after agreement by the supplier
- All appliances or parts returned to us for repair must be cleaned and free of any hazardous substances whatsoever (acids, alkaline solutions, solvents, etc.) as in Germany official regulations regarding waste stipulate that persons in possession of hazardous waste are responsible for its disposal and that, at the same time, employers are responsible for protecting their employees against hazardous materials.
- Any cleaning or disposal required to be carried out by us will be charged for accordingly.

All packing materials can be disposed of as usual.
Packing materials are: cardboard, wood, PS and PE.
If the packing is returned free of cost, we will take care of its disposal.

General information

Safety information

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.
To ensure 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.

Use of hazard information

DANGER
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.

Important Note: Information that requires special emphasis.

Note: Information that supplements points in the main text.

Precautionary labels

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

	This symbol, if noted on the instrument, references the 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.
	This symbol, if noted on the product, indicates the need for protective eye wear.
	This symbol, when noted on the product, identifies the location of the connection for Protective Earth (ground).
	This symbol, when noted on the product, identifies the location of a fuse or current limiting device.
	Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after 12 August 2005. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of life equipment to the Producer for disposal at no charge to the user. **Note:** For all electrical products (marked or unmarked) which are supplied or produced by Hach-Lange, please contact the local Hach-Lange sales office for instructions for proper disposal.

Specifications

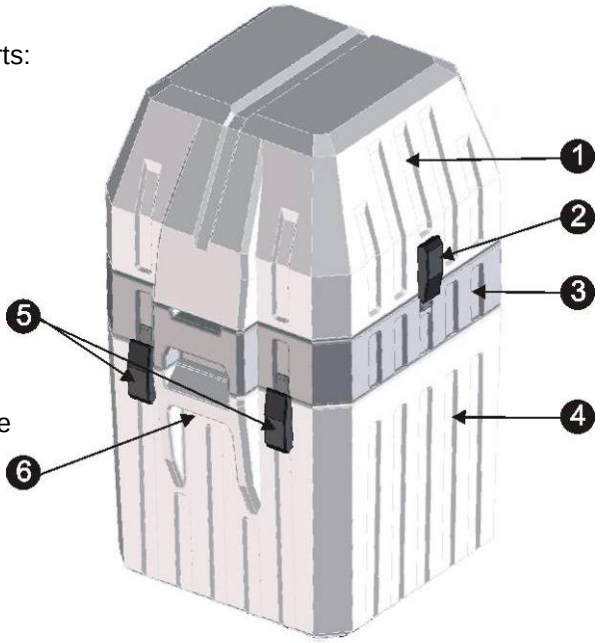
Device designation	**Bühler 2000**
Housing	PE/PC(GF10)
Thermostatic control	Insulated sample compartment (40 mm insulating layer) Option: freezer packs (200x10x8 mm) Option: compressor cooling (12V/115V/230V)
Control	Microprocessor control, foil keyboard, graphical display (128*64 Pixel), back lit
Data memory	Non-volatile data memory: storage of sampling and malfunction data like sample extractions, bottle changes, messages, external signals
Programming	12 user programs (can be edited freely)
Program start options	Immediately, at a certain time, by an external signal
Program stop options	End of sampling program after one program run, continuous operation or x-runs
Pause mode	Interruption of program at any time
Overfilling protection	Adjustable from 1–999 samples/bottle
Interval setting	1 min. to 99 h 59 min. in steps of 1 minute
Pulse setting	1 to 9999 pulses/sample
Manual sample extraction	Possible at any time without interrupting the current program run
Program protection	Up to 5 years after voltage loss
Interface	Mini-USB, RS422/485, RS 232
Communication	Optional: TCP/IP RJ45 WEB board, 4-32GB SD/SDHC memorycard Upon request
Languages	Multi-language, selectable
Signal inputs	• 2x analogue: 0/4-20 mA, • 8x digital (flow, event, 1x free programmable) Optional: expansion 4x digital, 3 free programmable and 8x Analogue Inputs 0-20mA / 0-10 V Pulse-length min. 60 ms u. switch-level 7-24V, max. working resistance 500 Ohm signal-length max. 30 m
Signal outputs / status messages	Max. 8 digital outputs, 1x collective message Optional: expansion 8x digital, 5 are free programmable
Sampling method	Vacuum system 20-350 ml
Single sample volume accuracy	< 2,8 %
Suction height	Max. 6,5 m (at 1013hPa)
Pumping speed	>0,5 m/s at a suction height of up to at least 5 m (at 1013hPa); pump capacity can be adjusted **electronically**
Suction hose	PVC, L=5 m, ID=9 mm (ID 16 mm at flow-proportional option). Max. hose length 30 m.
Sampling modes	Time-related, flow-dependent, flow-proportional (option), event-related, manual sample
Bottle variants	24 x 1 L PE (standard) 13 L composite container 25 L composite container 4 x 5 L PE 16 x 1 L with freezer packs
Overall dimensions	(Hxwxd) 787 x 510 x 468 mm 1030 x 548 x 470 mm with compressor cooling
Weight	22,4 kg 24x1 L version 34 kg 24x1 L version with compressor cooling (sampler incl. battery, without suction hose, empty bottles)
Power supply	12 V/ 10 Ah lead gel battery (maintenance-free, sealed, leak proof) 115V or 230V mains-operation by means of battery charger in buffer

Specifications

	mode (float charge); power requirement max. 30 W
Number of samples	Approx. 2000 samples per battery charge [determined at an ambient temp. of 20° C, 1,5 m suction height, sampling interval of 1 min.] incl. distributor advance
Ambient temperature	0 to + 45°C
Sample temperature	0 – 40°C
Standards	Device meets ISO 5667 standard
Wetted materials	PVC, Silicone, PS, PE

Characteristic features of the BÜHLER 2000 sampler

The device consists of the following component parts:



1. Sampler upper part
2. Snap-on lock of upper part
3. Intermediate bottom with distributor plate
4. Sampler lower part
5. Four snap-on locks at lower part (two on opposite side)
6. Recessed grip

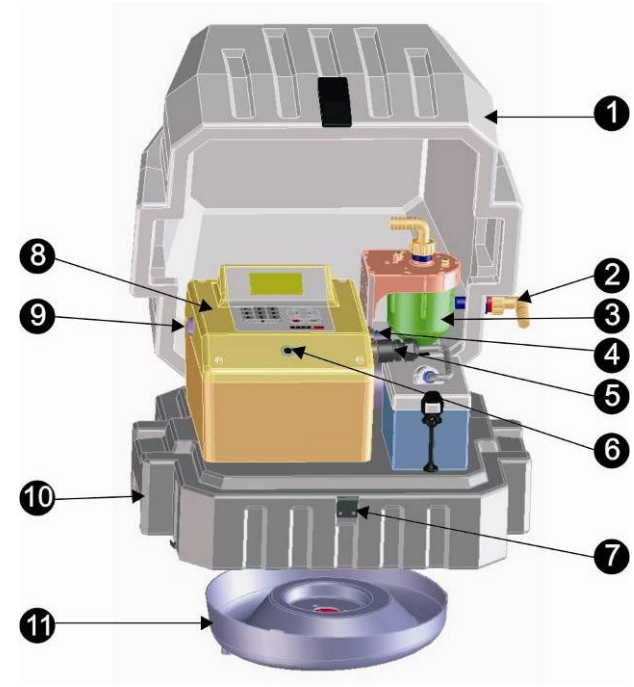


Lower part with inserted distributor plate

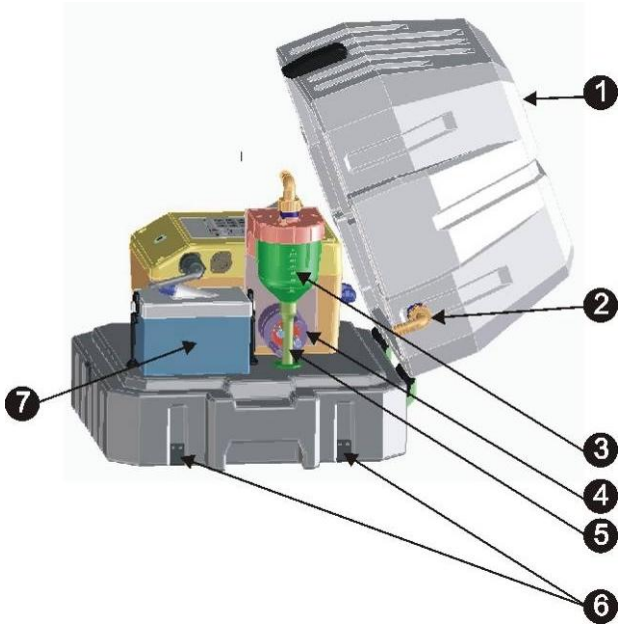


Opened lower part with bottles

1. Lid
2. Suction hose connector ¾“
3. Metering vessel
4. Signal connector
5. Battery connector
6. MINI-USB interface
7. Lid latch
8. Control unit with keyboard and display
9. ON / OFF switch
10. Intermediate bottom of housing
11. Distributor tray



1. Lid
2. Suction hose connector ¾“
3. Metering vessel
4. Pinch valve
5. Discharge hose
6. Latches of intermediate part
7. Storage battery



Installation

Installing the apparatus

- We recommend to install the apparatus as close to the sampling point as possible. If installed outside, the device should be positioned on a solid flat surface.
- The hose has to be laid with a constant fall from the sampler to the sampling point as lower lying points can lead to deposits in the hose which may freeze in winter or result in cross-contaminations.
- To fix the suction hose, we recommend to use the extraction unit available as accessory.
- Immerse the end of the hose at the sampling point with the open end facing downstream (direction of flow) so that coarse matter and fibres cannot be forced into the suction aperture

Mains connection / external power supply
A battery charger (option) is available to charge the battery.

Mains powered float charge option
The integral storage battery can be charged by means of the mains powered battery charger. In case of a higher energy demand, the battery charger can be permanently connected to the mains, so that the integral storage battery of the sampler is left permanently on charge (float charge).

Integral storage battery
A fully charged battery will, under ideal conditions, be sufficient for up to 2000 sample extractions.

Charging the storage battery
The integral battery is a maintenance-free sealed lead-acid battery.
Charge the storage battery for at least 14 -16 hours prior to the first use.
This charging time is also necessary if the storage battery is empty. To avoid a total discharge, a protective mechanism is built-in which automatically switches off the device when the voltage is too low.
The storage battery cannot be overcharged as the battery charger switches to compensation charge as soon as the battery is fully charged.
For longer periods of non-use, top up the charge regularly (connect the battery to the charger).
In any case, avoid a total discharge as otherwise the storage battery will be damaged.

Switch on / off
The device is switched on and off by the ON / OFF switch.
Option: mains operation. In case of exclusive mains operation, the device is switched on by means of the mains plug of the battery charger.

Hose connection
The inlet hose is connected at the side of the housing upper part (screw thread ¾“).

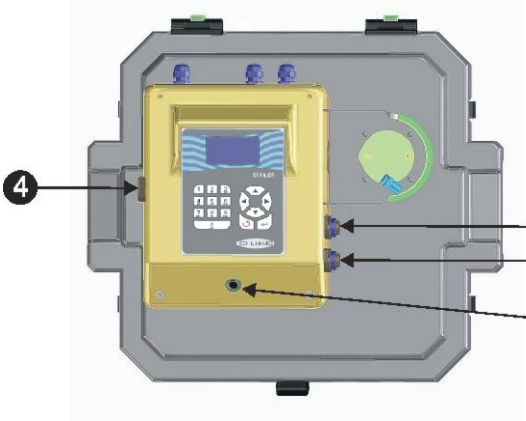
Signal connections
The signal connector (e.g. for a flow meter) is in front of the control**.**

Connection to a PC
The sampler is connected to a PC by means of an 3 m MiniUSB interface cable (art. No. BM69793)

Remark:
The apparatus ***must be*** cleaned regularly in accordance with the degree of contamination present. In view of the quality of samples, we recommend to clean thoroughly especially the wetted parts like dosing unit, electrodes, distributor, bottles and inlet hose. Failure to do so could result in damage or destruction to the equipment, device that are not covered by warranty.

Connections Bühler 2000

1. Input signals connector
2. Battery connector 12V/10 Ah
3. MINI-USB interface
4. ON / OFF switch



Connector assignment – **input signals (plug)**

Pin assignment:

1 = Flow analogue +

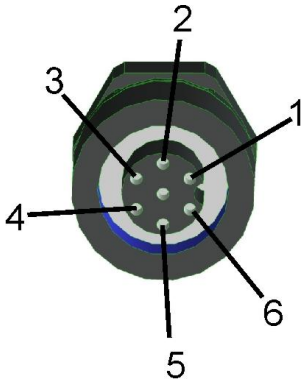
2 = Flow analogue -

3 = COM

4 = Flow digital (pulse)

5 = Event

6 = Volt-free



Connector assignment – **battery connection (device)**

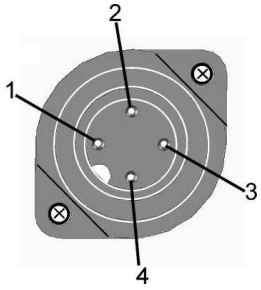
Pin assignment:

1 = +

2 = -

3 = Volt-free

4 = Volt-free



Installation

Connector assignment – message



• **Message**

Connection at relay as normally open or normally closed contact.

Troubleshooting - general

If a fault develops in your sampler, we can only provide prompt assistance if you give us the type and serial number of the apparatus concerned. You will find these data on the type plate.
The more precise your description of the fault is, the better our fault diagnosis will be.

Symptom	Possible cause	Action
No function	Fuse defective	Check all fuses and replace them if necessary
	Battery discharged	Charge battery for at least 14 hours
	Exhaustive discharge of battery	Replace battery

Sampling modes

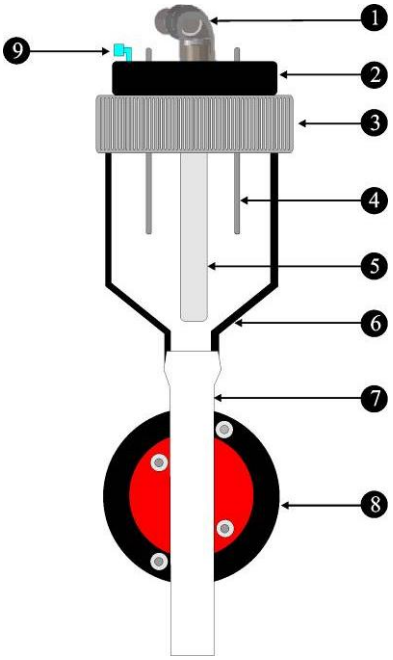
The following sampling modes can be programmed:

Sampling mode	Description	Example
Time-proportional	In this sampling mode, the single sample extractions as well as the bottle change are effected in fixed time intervals.	Values to program: sampling interval e.g. 00:05 hh:mm bottle filling time e.g. 02:00 hh:mm
Flow-dependent - digital	In this sampling mode the sample extraction is triggered by flow pulses. The bottle change is effected in fixed time intervals or after a certain number of sample extractions.	Values to program: pulse divider e.g. 100 (that means that a sample is extracted after each 100th pulse). Bottle filling time e.g. 02:00 hh:mm or bottle change after X sample extractions e.g. 100
Flow-dependent - analogue	In this sampling mode samples are extracted according to the analogue flow signal (0-20 mA or 4-20 mA). The sample extraction is started when the programmed flow is reached. Thus the interval between the sample extractions varies according to the flow signal. The bottle change is effected in fixed time intervals or after a certain number of sample extractions.	Values to program: Flow per sample extraction e.g. 1 m³ Bottle filling time e.g. 02:00 hh:mm or bottle change after X sample extractions e.g. 100
Event-proportional	In this sampling mode the sample extraction is depending on an external event signal (potential-free make contact). The sample is only extracted as long as the signal is present. The sampling interval as well as the bottle change is programmed. The bottle is changed at each new event signal. If an event is longer than the programmed bottle filling time, two or more bottles will be filled for this event.	Values to program: Sampling interval e.g. 00:05 hh:mm Bottle filling time e.g. 02:00 hh:mm

Sampling system

Vacuum sampling system

Metering vessel -structure-

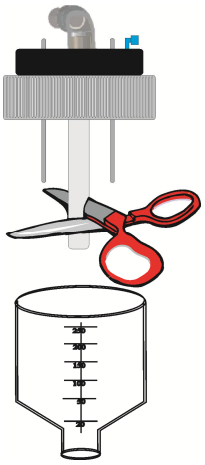


1. Hose connector
2. Flange
3. Screw cap
4. Electrodes
5. Volume control tube
6. Metering vessel
7. Silicone discharge tube
8. Motor-driven pinch-valve
9. Air connection

Cleaning:
- **Glass metering vessel**: unscrew the screw cap (3) and remove the flange. Now, the metering vessel together with the silicone discharge tube (7) can be detached.
- **Plastic metering vessel**: Turn the plastic metering vessel anticlockwise (bayonet fitting) and remove.

Adjustment of sample shot volume at samplers with glass metering vessel:
To adjust the desired sample volume, loosen the knurled screw and displace the volume control tube vertically.

Adjustment of sample shot volume at samplers with plastic metering vessel:
The sampler is always delivered with the volume control tube in full length.
To adjust the sample shot volume, the volume control tube (5) has to be cut to length.

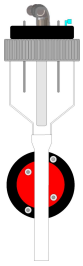


Procedure
1. There is a graduation in millilitres on the volume control tube.
2. Remove the metering vessel (6).
3. Cut the volume control tube to the desired length with scissors or a knife.
4. Reinstall the metering vessel (6) and tighten.
5. Check the sample volume by starting a manual sample extraction.
6. Now the device is ready for operation.

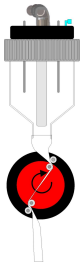
Remark: If you need to work with different sample volumes, you can cut to size several tube pieces. As the volume control tube (5) is only slipped on the hose connector (1), it is very easy to change the tube.

Operation

Operation principle:



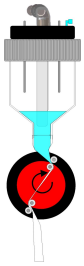
1. Inoperative position



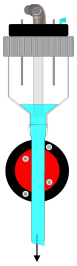
2. Pinch-valve closes



3. Metering vessel is filled up to the electrodes



4. Dosing system is aerated



5. Pinch valve opens and sample drains off in bottle

Replacement of the silicone discharge hose
The silicone hose (BM69301) is only pushed over the lip of the metering vessel. A hose clamp is not required. Humidify the hose a little bit, fix it at one point and push it over the lip.

Remark:
Do only use original spare parts from the manufacturer. The use of a wrong hose type can lead to malfunctions at the system or may even damage the pinch valve!

Remark:
Conductivity of the sample medium
There are two conductive level electrodes in the metering vessel. Their sensitivity can be adjusted in the service menu. In the factory the electrodes are adjusted to tap water (this adjustment does not have to
be changed under normal operating conditions). Minimum conductivity 50 µS/cm.
Please note that a wrong adjustment can lead to a flooding of the pneumatic system and to the damage of component parts.

The sampler is not suitable for extraction of distilled water due to low conductivity.

Conductivity at 25°C
Rain water 50 µS/cm
Drinking water 500 µS/cm
Waste water 5000 µS/cm (5 mS/cm)
Seawater 50000 µS/cm (50 mS/cm)

ATTENTION:
Wrong operating conditions can lead to malfunctions or may even damage the apparatus. No liability or claims under guarantee will be accepted in respect of any damage arising from the non-observance of these operating instructions.

Troubleshooting – vacuum system

If a fault develops in your sampler, we can only provide prompt assistance if you give us the type and serial number of the apparatus concerned. You will find these data on the type plate.
The more precise your description of the fault is, the better our fault diagnosis will be.

Symptom	Possible cause	Action
Electrodes do not react, system flooded	Adjustment of conductivity too low. Distilled water has been used as sample medium.	Contact service department
	No contact to electrodes	Check cable connection
Sampler does not extract samples	System is leaking	Check whether all hoses and connections are tight
	Pump/diaphragm defective	Check pressure/vacuum of pump
	Metering vessel not tight, no vacuum	Check whether metering vessel is tight (screw cap)
	Filling level electrodes bridged	Clean electrodes
	Valve system/pinch valve does not function correctly	Check valve system/pinch valve or contact service department
No pressure / vacuum at pump	Defective diaphragm	Renew diaphragm
	Hoses are squeezed	Check hoses

Flow-proportional sampling system

The characteristic features of the flow-proportional sampling are:

• **fixed** sampling interval (e. g. every 10 min) with
• **variable** sample volume (related to the mA-signal (flow))

At the **variable** dosing system, the sample volume is automatically changed according to the analogue flow signal.

Example: - the selected range is 4 to 20 mA (option 0 – 20 mA)
- the maximum sample volume at **20 mA** is fixed to **200 ml.**
That means at an analogue signal of e.g. **10 mA,** a **100 ml** sample would be extracted. Thus the sample extraction is always proportional to the flow.

This sampling mode supplies very good, representative results as even if flow is very low (e.g. discharges at night) a sample extraction is still carried out in fixed time intervals.

For comparison a short description of the **flow-dependent** sampling mode:

The characteristic features of the flow-dependent sample extraction are:

• **variable** sampling interval (according to the mA-signal (flow)) with
• **fixed** sample volume (e.g. 100 ml)

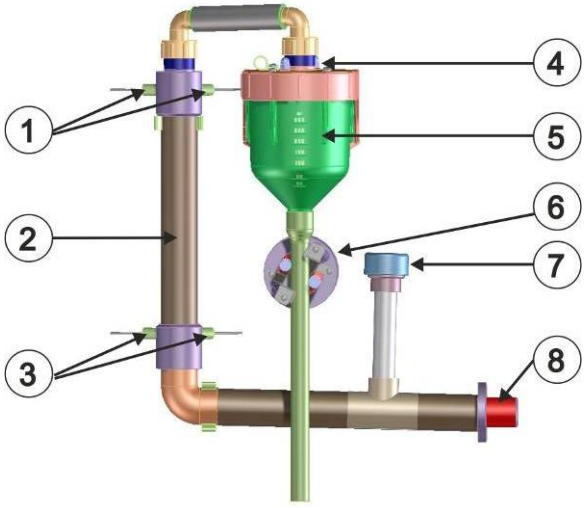
In the flow-dependent sampling mode, a sample is e.g. always extracted after **10 m³**, that means the signal of the flow meter is totalized.
In case of very low flow quantities (e.g. discharges at night) it is possible that e.g. 2-3 hours pass until the set 10 m³ are reached again and a sample is extracted.

Remark: That means if there is an accident (e.g. discharge of chemicals) during this period, there will be no sample. However, a sample would have been very important for an analysis and the taking of countermeasures.

Flow-proportional sampling system - structure

Structure:

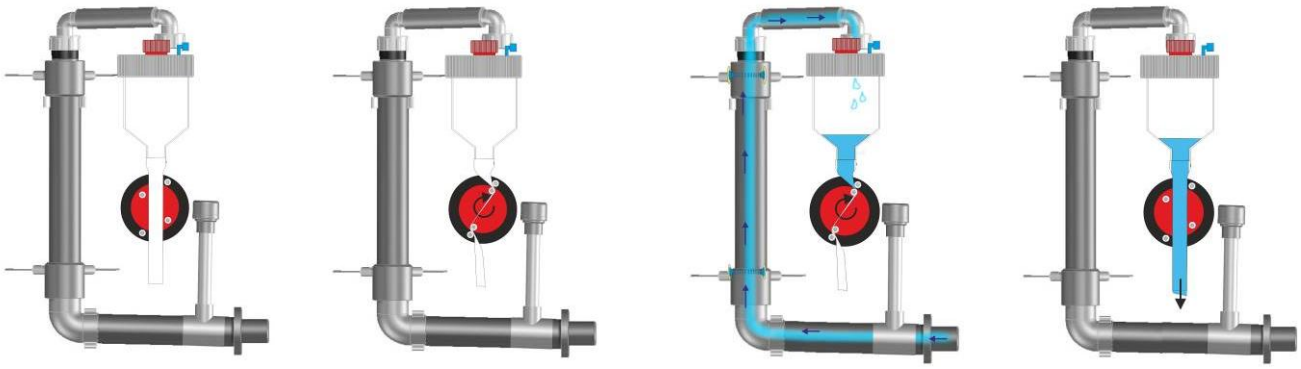
1. Electrodes 2
2. Measuring tube
3. Electrodes 1
4. Connection for aeration
5. Dosingvessel
6. Pinsch Valve
7. Cleaning cap of gas drap
8. Inlet connection



Function of the VAR Flow-proportional sampling system

- Before the system can be used, it must be calibrated. In the automatic calibration cycles (5 cycles), the respective volumes must entered.
- At the flow-proportional (variable) sampling system the sample volume is directly entered in ml by means of the keys at the control when editing a sampling program.
- After the program start the pinch valve is closed.
- A pressure (air produced by the diaphragm pump) is applied to the metering vessel via the air connection. Thus the hose is purged.
- Now, the valve system switches to vacuum and the depression generated by the diaphragm pump withdraws the air from the metering vessel. A vacuum is generated and leads to the drawing-off of sample medium at the connected hose.
- The medium is sucked into the Dosingvessel over the Measuring tube (2).
- during inlet, the sample volume already will be measured in the measuring tube(2) and only the requested volume remains in the vessel.
- After measuring is done, the system is ventilated by opening the air inlet (4) so that the water in the suction hose can flow back to the extraction point.
- After a pre-programmed aeration time, the pinch valve (6) opens in two steps and the sample is filled into a container.

Cleaning:
To clean the metering vessel (5), open the screw cap (glass) or turns to the left (plastic, bayonet shutter), pull the silicone discharge hose to the front and remove the metering vessel.
The measuring tube (2) can be cleaned with a bottle brush BM60560 .



1. Inoperative position

2. Pinch valve closes

3. during inlet the sample volume already will be measured in the measuring tube . Only the requested volume is droping in the vessel.

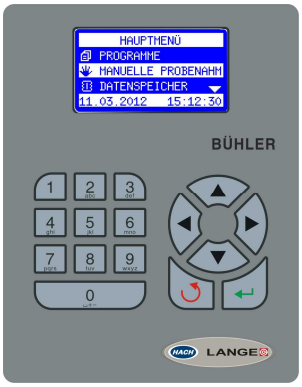
4. Pinch valve opens, allowing sample to drop into sample container

Troubleshooting – flow-proportional sampling system

If a fault develops in your sampler, we can only provide prompt assistance if you give us the type and serial number of the apparatus concerned. You will find these data on the type plate.
The more precise your description of the fault is, the better our fault diagnosis will be.

Symptom	Possible cause	Action
Level electrodes do not react, system is flooded	Adjustment of conductivity is too low. Distilled water is used as sample medium	Contact service department
	No contact to electrodes	Check cable connections
Sampler does not extract samples	System is leaking	Check whether all hoses and connections are tight
	Pump/diaphragm defective	Check pressure/vacuum of pump
	Metering vessel not tight, no vacuum	Check whether metering vessel is tight (union nut)
	Level electrodes are bridged	Clean electrodes
	Valve system/pinch valve does not work correctly	Check valve system/pinch valve or contact service dept.
Pump does not produce pressure/vacuum	Diaphragm defective	Replace diaphragm
	Hoses are kinked	Check hoses
Inaccurate sample volume	System has been initialized or hardware has been changed	Calibrate

Programming



The menu structure is similar to a directory tree and is split up in main menus and submenus.

Assignment and function of keys

The apparatus is interactively programmed by the user.

Function of keys:

Display of help texts. To activate the help text when selecting a new display, first press the arrow key pointing to the left.	Arrow key	◀
Move from one to the next menu	Arrow keys	▼ ▲
Select the desired menu	Enter key	↵
Move within the menu	Arrow keys	▼ ▲
Selection within the menu or scrolling within the data memory or bottle memory	Arrow keys	◀ ▶
Confirm the choice (is automatically marked with a ✓)	Enter key	↵
Entry/change of values	Arrow keys	◀ ▶ ▼ ▲
Confirmation of entered values	Enter key	↵
Return to higher menu level	Back key	↺
Initialization (reset) display	Back key + Enter	Press both keys at the same time ↺ ↵
Terminate sleep mode	Back key	↺ Press for at least 5 sec.
RESET / reset to factory settings	Back key	↺ Keep pressed when switching on

Navigation

The sampler can be operated by means of the control unit. With the ARROW KEYS, the ENTER KEY and the BACK KEY you can move from one screen to another. An arrow on the display shows that there are further selection possibilities (see illustration).



Example:

1. Press the “DOWN” arrow key two times to select the line DATA MEMORY.

2. Now press the ENTER KEY to display the data memory or to choose another selection possibility.

Remark: The arrow pointing downward on the right side (bottom) of the display indicates that there are further selection possibilities.

Menu variants:

The top line indicates that you can navigate to the right or to the left by pressing the arrow keys.
The bottom line indicates with which key the action is executed or terminated.

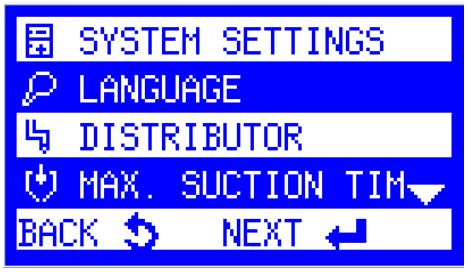


Here you can set a parameter. The top line shows which value is to be set. The bottom line indicates the possible range of values. The entry is possible directly by means of the number keys or the digit is selected with the right / left arrow keys and changed with the up / down arrow keys. The selected digit is displayed inversely (cursor). Confirm the entry by pressing the ENT key or abort it by pressing the BACK key (in this case the initial value is not changed).
The arrows show that a digit can be changed.



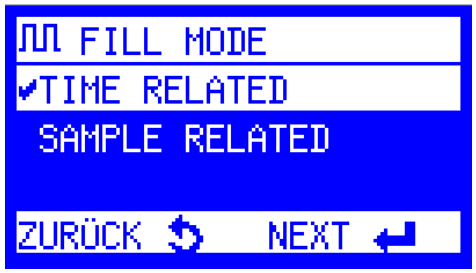
Settings with selection menu

The cursor is positioned on the current selection line (inversely) and can be moved up or down.
The arrow on the right side of the window indicates that there are further entries which can be displayed by scrolling up or down.
Depending on the menu, the display will show in which direction you can scroll.



Definition of individual menu points

In the selection menus, additional program settings are displayed. All the settings which have been activated by pressing the ENTER key are marked with a ✔ .



MAIN MENU STRUCTURE
The following list shows the main menu level with the menu points of the submenus:

DISPLAY	DISPLAY	FUNTION
PROGRAMS		
	STATUS/STOP	• INFO • PAUSE • STOP
	START	• IMMEDIATELY • DATE/TIME • WEEKDAY/TIME
	CHANGE	Time,Flow, Event
MANUAL SAMPLE EXTRACTION	INTO CURRENT BOTTLE INTO BOTTLE X	
DATA MEMORY		
	INFO MEMORY	SET FILTER
	BOTTLE PROTOCOL	
DIAGNOSTICS/TEST		
	COMPONENT TEST	• DIAPHRAGM PUMP • PINCH VALVE • VALVE SYSTEM • DISTRIBUTOR • DIGITAL OUTPUTS
	DIGITAL INPUTS	FLOW DIGITAL 0 EVENT 0 DI3 DI4 DI5 DI6 DI7 DI8
	ANALOG INPUTS	ANALOGUE 1: ANALOGUE 2: ELECTRODES 1: ELECTRODES 2: PT 1000 SENSOR VOLTAGE.:
	VERSION INFO	

SETTINGS

DATE/TIME	
SYSTEM SETTINGS	• LANGUAGE • DISTRIBUTOR • MAX. SUCTION TIME • PRE PURGE • POST PURGE • AERATION TIME • PUMP POWER • ANALOGUE SIGNAL • DISPLAY • PAUSE DURATION • PROG. INPUT • OUTPUTSIGNAL
SLEEP MODE (Only portable sampler)	• DATE/TIME • WAKEUP WITH 5s ESC • NO SLEEP MODE
PASSWORD	• CHANGE PASSWORD • CHANGE SETTINGS • CHANGE PROGRAMS
SERVICE MENU	Setting of base parameters (to be done by a service technician) Password protected.

Description of the menus

DISPLAY	DISPLAY	EXPLANATION / FUNCTION
PROGRAMS		
STATUS/STOP	• INFO • PAUSE • STOP	Display of program details Interruption of the running program (max. 120 min.) Stop /abort the program
START	• IMMEDIATELY • DATE/TIME • WEEKDAY/TIME	Program start can be: • immediately • with date/time (dd:mm:yyyy hh:mm) • with weekday/time (day; hh:mm)
CHANGE	PROGRAM No. [xx]	Change the program parameters like mode of operation (time, flow, event…), interval etc. Selectable Modes: • TIME • FLOW DIGITAL • FLOW ANALOGUE • EVENT TIME • EVENT DIGITAL • EVENT ANALOGUE
MANUAL SAMPLE EXTRACTION		
IN CURRENT BOTTLE		Sample extraction into current bottle
IN BOTTLE X		Sample extraction into selectable bottle X
DATA MEMORY		
INFO MEMORY		Data can be displayed with filter
BOTTLE MEMORY		Display of data of the single

		bottles
DIAGNOSIS/TEST		
COMPONENT TEST	• DIAPHRAGM PUMP • PINCH VALVE • VALVE SYSTEM • DISTRIBUTOR • DIGITAL OUTPUTS	Functional check of the components
OUTPUTS TEMPCARD		Displays status of: - Lower heating (OFF / ON) - Cooling (OFF / ON) - Upper heating (OFF / ON)
DIGITAL INPUTS		Display of (DI=Digital Input): - Flow digital Event (digital) DI3 DI4 DI5 DI6 DI7 DI8
ANALOG INPUTS		Display of: - ANALOGUE 1 - ANALOGUE 2 - Electrodes 1 - Electrodes 2 - PT1000 temperature sensor (option) - Operating voltage
DISPLAY OF VERSION		Display of the firmware version
SETTINGS		
DATE/TIME		Setting of date / time
SYSTEM SETTINGS	• LANGUAGE • DISTRIBUTOR • MAX. SUCTION TIME • PRE PURGE • POST PURGE	Setting of device-specific parameters 1.PRE Purge=purging of suction hose before sampling 2. Post purge= active purging of dosing vessel to adjust dosing volume

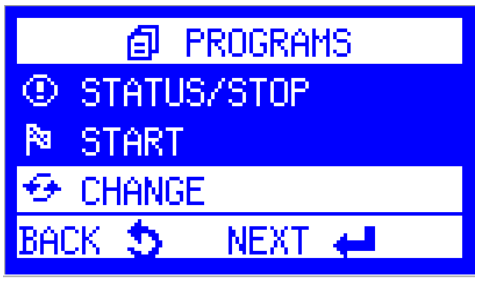
	• AERATION TIME • PUMP POWER • ANALOGUE SIGNAL • DISPLAY • PAUSE DURATION • PROGR. INPUT • OUTPUT SIGNAL	The program can be interrupted for a period of 10-120 minutes Inputsignal to start e.g. a program Only active if the add-on board is connected
SLEEP MODE	• DATE/TIME • WAKEUP WITH 5s ESC • NO SLEEP MODE	ONLY FOR PORTABLE SAMPLER
PASSWORD	• CHANGE PASSWORD • CHANGE SETTINGS • CHANGE PROGRAMS	Setting / activation of the password
SERVICE		Setting of base parameters (to be done by a service technician) (Password protected)

Examples of programs
Programming of a time-proportional sampling program

Select PROGRAMS in the main menu



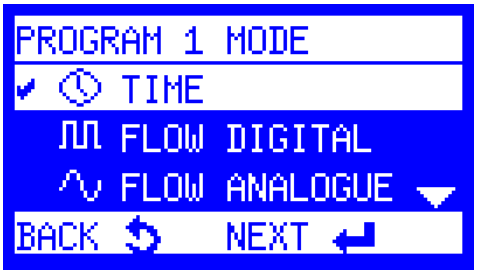
Select CHANGE



Select PROGRAM NO. 1 (out of 12).
Programs No. 2-12 can be selected by pressing the left or right arrow key.
Press ENTER to edit the program.



Select the sampling mode TIME
(Sampling is effected in fixed time intervals)



Set the sampling interval
(time interval between the single sample extractions)



Set the BOTTLE FILL TIME
(here: each bottle is filled for 1 hour).



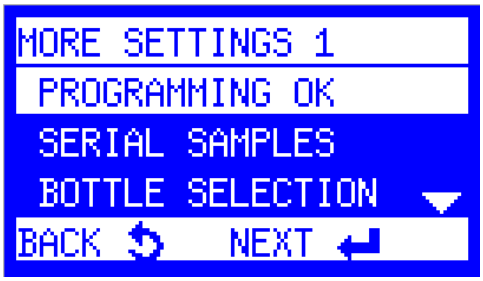
Terminate programming.



Now, the program can be started directly.



If selected "MORE SETTINGS ", the additional settings are available:



- PROGRAMMING OK
  (Set of selection and back to the START-Menue)

- SERIAL SAMPLES
  (samples/extraction)
  means that each requested extraction consists of x-samples. This is useful for a larger sample volume.

- BOTTLE SELECTION
  (first Bottle / last Bottle)
  The first and the last bottle can be defined for a cycle.

- PROGRAM PAUSE
  (Prg.Pause=Timeshift of program start. Timeshift between end of program x and start of next program. Moves the program cycle for continuous operation with that time.

- QT-AUTOMATIC (Selection is only available for Flow program)
  (Set of MIN. QT-TIME and/or MAX. QT-TIME)

- COMBINED EVENT SAMP.
  (Combination of time- resp. Flow program with event; can be activated
or deactivated)

- PROGRAM SEQUENCE
  (End of Prg1 can start Prog2....End of Prg.2 can start Prg x, last Prg. starts Prg. 1 again or xx = endless run)

Program Start

After selection of the menu point “Start Program”, the program to be started (1-12) has to be selected with the left or right arrow key and has to be confirmed by pressing the Enter key.



There are three resp. four possibilities to start the program.

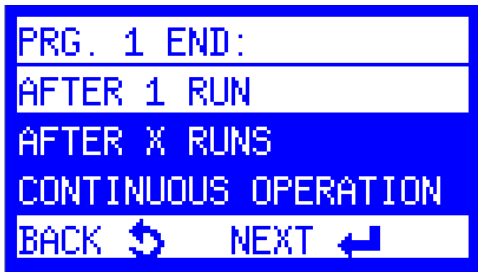


- **IMMEDIATELY** The program is started immediately.

- **DATE/TIME** The program start is effected on the selected date and at the selected time. Format:dd:mm:yyyy hh:mm.

- **WEEKDAY/TIME** The program start is effected on the selected weekday and at the selected time. Format: day; hh:mm

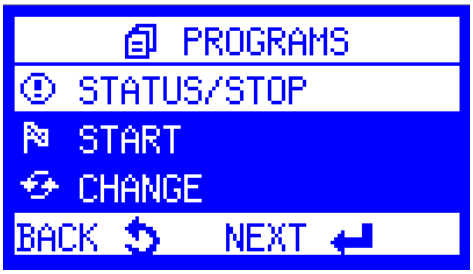
Program end
After having defined the start conditions, the program end can be set as follows:



- AFTER 1 RUN — Program is terminated after 1 run
- AFTER X RUNS — Program is terminated after X runs
- CONTINUOUS OPERATION — Program is continued indefinitely

Display of PROGRAM STATUS/STOP
Shows Status of programs. Programs can be paused or stopped.

The status of all programs can be checked by pressing the arrow keys (right/left).



When pressing the Enter key, the following is displayed:

ACTIVE = Program is started
or
INACTIVE = Program is not started





- INFO Display of information regarding the currently running program: current bottle, samples requested and samples taken, next sample extraction or bottle change.

- PAUSE The program can be interrupted for a period of 10-120 minutes. The period can be entered in the menu “SETTINGS”. The pause can be terminated manually or it is automatically terminated after the entered xxx minutes.

- STOP The program can be stopped directly.

INFORMATION on program

After selection of INFO all details regarding the running program are shown. The single screens can be displayed by pressing the up/down arrow keys.

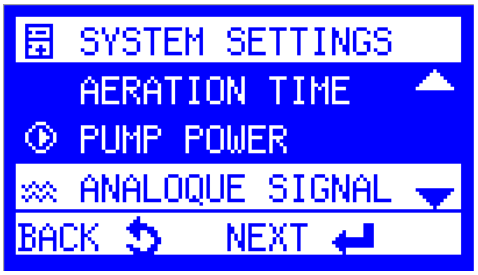


STOP -Stop Program

Active program can be stopped.
All running programs can be stopped at once as well.



FLOW-PROPORTIONAL sample extraction



According to the output signal of your flow meter either the operating mode flow analog or flow digital can be selected in the program settings.
.

IMPORTANT: If an analogue signal (0/4-20 mA) is used, it is absolutely necessary to calibrate the input prior to the first use.

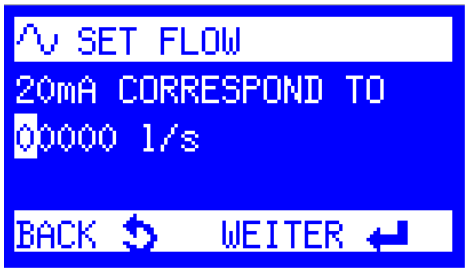
FLOW ANALOG



Calibrate the analog input 0/4-20 mA

The analog input can be calibrated in „SAMPLER SETTINGS" ->FLOW SIGNAL. Just follow the menu instructions.
1st step: connect 0/4 mA and confirm
2nd step: connect 20 mA and confirm
3rd step: Calibration ok, confirm
Remark: The analogue input is already calibrated to 0-20 mA in the factory.

FLOW ANALOG



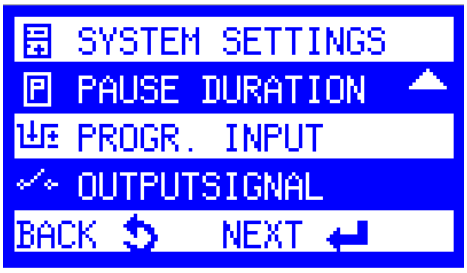
The only difference between the programming of the flow analog mode and the flow digital mode is the definition of the sampling interval. Point of reference is the maximum flow at 20 mA.

Event-proportional sample extraction



When selecting this sampling mode, the sampler is waiting for an external "event" signal, e.g. from a connected pH-meter. A sample is extracted according to the programming as long as the signal is present. When the signal is deactivated the sampler waits for the next signal and then fills the next empty bottle.
Which „event" sample has been filled into which bottle is recorded in the info memory.
In the event mode the sample extraction can be time or flow dependent. The programming is effected as described before (sampling mode time, flow digital).

FREE PROGRAMMABLE INPUTS



- PROGR. INPUT
- ADDITIONAL INPUT 1
- ADDITIONAL INPUT 2
- ADDITIONAL INPUT 3

In the basic version 1 programmable input is available.
As an option with the "I / O expansion board" are another 3 Inputs available. Thus the sampler can be controlled with a digital pulse (eg with external PLC).

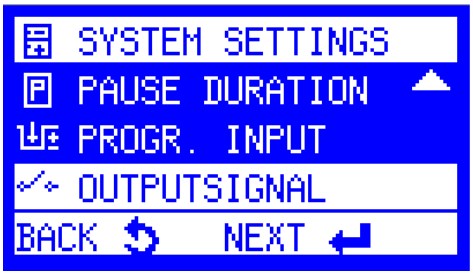
Each INPUT (1-3) can be programmed out of the following list:

- NO FUNCTION
  (turn off of the Input)
- PRG. START PULSE
  (if selected, Program x will be started)
- PRG. STOP PULSE
  (if selected, Program x will be stopped) (Back with ESC)
- PRG. RUN DURING PULSE
  (During continuous signal, Program is running. If Signal drops down, program stops.)
- DISTRIBUTOR PULSE
  Pulse signal: **<= 3sec** means "next bottle"
  >= 5 sec means "move to bottle 1"
- SAMPLE PULSE
  Pulse means "take a sample"
  Pulse signal must be > 50ms!

Remark: This feature is only available if no program is running. The unit is in this case completely controlled externally (eg PLC)

OUTPUT SIGNALS

As an option are 5 Output signals available, which are free configurable.



OUTPUTSIGNAL

- OUTPUT SIGNAL 1
- OUTPUT SIGNAL 2
- OUTPUT SIGNAL 3
- OUTPUT SIGNAL 4
- OUTPUT SIGNAL 5

Each Output signal (1-5) can be programmed out of the following list:

- PROGRAM ACTIVE
  Selection of "PROGRAMS ACTIV" or "PROGRAM XX ACTIV"
- PROGRAM END
- Selection "PROGRAMS END" oder "PROGRAM XX END"
- ERROR
  Selection:
  - GENERAL FAILURE
  - FAILURE ELECTRODES
  - ERROR SUCTION
  - FAILURE DISTRIBUTOR
  - MAX. SPL/BOTTLE
  - mA FAILURE
  - POWER FAILURE
  - DOOR OPEN
  - INTERNAL TEMPERATURE
  - EMERGENCY CUTOFF
  - SUCTION TIME
- SAMPLING ACTIVE
- BOTTLE CHANGE
- DISTRIBUTOR ON POS.1
- SIGNAL REVERSED
- SIGNAL OFF
  ("switch off" of the output signal)

ERROR MESSAGES

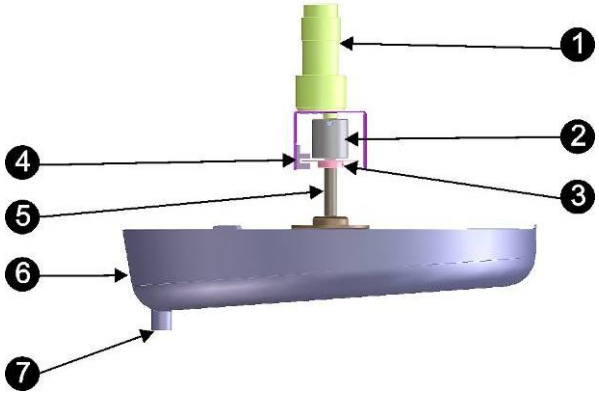
Error code	Text / meaning
1	Error distributor
2	Error suction
4	Error electrodes
5	End of voltage loss
6	Charge storage battery
7	Storage battery empty
10	Error analog signal A1
15	Emergency cutout
17	Storage battery defective
19	Error analog signal

LOG MESSAGES

Log code	Meaning
1	Error
2	Program start
3	Program end prog. xx
4	Start program pause
5	End program pause
6	System start
9	Bottle change
10	Sample extraction
14	Voltage loss start
15	Start of event
16	End of event
18	Terminate sleep mode
19	Conductivity sample medium (resistance)
20	Temperature regulation
21	Bottle statistics
22	Single bottle statistics
23	Password for service menu
24	PT1000 temperature sensor / operating voltage
28	Analog value A1 protocol
30	Overfill protection, Parameter **1**= Drop sample Parameter **2**= Switch over to new bottle

Rotating distributor

1. Geared motor
2. Safety clutch
3. Split washer for position 1 recognition
4. Forked light barrier
5. Drive axle
6. Distributor tray
7. Discharge



Remark: position 1
After the program start, the distributor always searches for position 1. Position 1 is recognised by means of a forked light barrier.
In case of a malfunction (voltage loss, battery change) during a running program, the distributor first always runs over position 1 again so that a correct positioning is guaranteed.

ATTENTION:
The distributor is driven by a geared motor. The distributor must under no circumstances be turned by hand! In case of non-observance, the gear will be damaged!

Cleaning
To clean the distributor tray, loosen the screw connection in the middle and pull out the tray.

Troubleshooting - distributor

If a fault develops in your sampler, we can only provide prompt assistance if you give us the type and serial number of the apparatus concerned. You will find these data on the type plate.
The more precise your description of the fault is, the better our fault diagnosis will be.

Symptom	Possible cause	Action
No function	Connections Water penetrated in distributor drive	Check connections Dismantle distributor head and check for water penetration. Contact service department
Program cannot be started	Wrong distributor has been entered	Correct entry
Distributor is continuously turning	Forked light barrier defective Pulse generator defective	Contact service department, return defective part if necessary
Wrong positioning of distributor	Interfering pulses. Pulse generator does not function correctly	Contact service department

Maintenance

The apparatus should be cleaned regularly in accordance with the degree of contamination present. In view of the quality of samples, we recommend to clean thoroughly especially the wetted parts like dosing unit, electrodes, distributor, bottles and inlet hose.

Remark:
There is a health hazard if the device is used in biologically or chemically contaminated areas. Please take the necessary precautionary measures when cleaning or servicing the device.

Attention:
Disconnect the power connections before carrying out any maintenance or repair works. Repair works must only be carried out by specially trained and authorised service personnel.

Remark: For cleaning of the metering vessel: see chapter „Operation – sampling systems“.

Pumping capacity: The **pumping capacity** (patented method) can be adjusted in the service menu between 70 and 100 %.

Remark: The adjusted pumping capacity has **no effect** on the suction height but **only on the average suction speed** when extracting the sample. The lower the pumping capacity, the longer the life of the pump

Spare parts, accessories, circuit diagrams

Spare parts / accessories

Article No.	Designation
BM900625	Drive unit BÜHLER 2000/
BM900300	Suction hose, length 7,5 m, with screw connection
BM69304	Suction hose, running metre
BM50025	Stainless steel sinker weight, length 180 mm
BM900026	Battery charger, protection category IP 20
BM900033	Battery charger, protection category IP 65 (splash-proof)
BM60486	1 L PE bottle
BM60045	13 L PE composite container
BM60046	25 L PE composite container
BM60038	5 L PE bottle
BM60251	Replacement freezer pack
BM69644	Flow signal cable, length 10 m (with open cable end)
BM900116	Replacement storage battery 12V/10Ah
BM900680	Retaining bracket for use in sewers
	Messages
BM900910	Hardwareerweiterung für MELDUNGEN (beinhaltet Steuererweiterung + 1 Melderelais)
BM900911	MELDERELAIS: Je Meldung ist je ein Melderelais erforderlich. Insgesamt sind bis zu 8 Meldungen (Softwarekonfigurierbar) (nur in Verbindung mit BM900910)
BM10200	Switching power pack, input voltage 110 - 240 V, 50/60 Hz, 60 W
Spare parts: vacuum sampling system	
BM30004	Glass metering vessel 350 ml
BM80044	Plastic metering vessel 350 ml
BM69401	O-ring 16x4, NBR (only at glass metering vessel)
BM69402	Quad-ring 81, 92x5, 33, NBR (only at glass metering vessel)
BM69452	Flat packing 86x96x3 silicone (only at plastic metering vessel)
BM60457	Folded paper filter (pneumatic unit)
BM69330	Silicone hose 12x4, red fabric inlay
BM69301	Silicone dosing tube 12x2
BM69302	Silicone tube for valve system 4x1,5
BM900898	Valve system BÜHLER 2000
BM900909	Pinch valve BÜHLER 2000
BM900156	Complete glass dosing unit 350 ml
BM900621	Complete plastic dosing unit 350 ml
BM60489	Diaphragm compressor 1420VP LC 12V / ASF
BM10004	Geared motor 12V
BM60428	Double-head diaphragm compressor type 7010 ASF
BM69793	3 m MiniUSB cable (interface cable)

Warranty and liability

The manufacturer warrants that the product supplied is free of material and manufacturing defects and undertakes the obligation to repair or replace any defective parts at zero cost.
The warranty period for instruments is 24 months. If a service contract is taken out within 6 months of purchase, the warranty period is extended to 60 months.
With the exclusion of the further claims, the supplier is liable for defects including the lack of assured properties as follows: all those parts that, within the warranty period calculated from the day of the transfer of risk, can be demonstrated to have become unusable or that can only be used with significant limitations due to a situation present prior to the transfer of risk, in particular due to incorrect design, poor materials or inadequate finish will be improved or replaced, at the supplier's discretion. The identification of such defects must be notified to the supplier in writing without delay, however at the latest 7 days after the identification of the fault. If the customer fails to notify the supplier, the product is considered approved despite the defect. Further liability for any direct or indirect damages is not accepted.
If instrument-specific maintenance and servicing work defined by the supplier is to be performed within the warranty period by the customer (maintenance) or by the supplier (servicing) and these requirements are not met, claims for damages due to the failure to comply with the requirements are rendered void. Any further claims, in particular claims for consequential damages cannot be made.
Consumables and damage caused by improper handling, poor installation or incorrect use are excluded from this clause.
The manufacturer process instruments are of proven reliability in many applications and are therefore often used in automatic control loops to provide the most economical possible operation of the related process.
To avoid or limit consequential damage, it is therefore recommended to design the control loop such that a malfunction in an instrument results in an automatic change over to the backup control system; this is the safest operating state for the environment and the process.

Immunity

This equipment was tested for Industrial level EMC per:
EN 61000-6-2 (EMC Requirements for Electrical Equipment for Measurement, Control and Laboratory Use) **per 2004/108/EEC**
EMC: Supporting test records by Hach Company, certified compliance by Hach Company.
Standards include:
IEC 1000-4-2:08.02 (EN 61000-4-2:08.02) Electrostatic Discharge Immunity (Criteria B)
IEC 1000-4-3:12.06 (EN 61000-4-3:12.06) Radiated RF Electromagnetic Field Immunity (Criteria A).

Emissions

This equipment was tested for Radio Frequency Emissions as follows:
Per **2004/108/EEC** EMC: **EN 61000-6-4:08.05** (Electrical Equipment for measurement, control and laboratory use—EMC requirements)
Class “A” emission limits.
Supporting test records by Hach Company, certified compliance by Hach Company.

Additional Emissions Standard/s include:
EN 55011:08.03 (CISPR 11), Class “A” emission limits

OPERATING INSTRUCTIONS WATER SAMPLER BU 1027

BÜHLER 1027



Remarks

HACH LANGE GmbH is not liable for possible faults in this documentation. Any liability for direct or consequential damages in connection with the delivery or the use of this device is excluded as far as it is legal.

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Subject to changes!

Access code for programming, system settings, key lock

Password:	6299
Your password:	

General information

We are glad that you have chosen this product.
When developing this device, we combined approved technique with innovative detail solutions. Greatest importance has also been attached to the design of an apparatus which provides easy access for connection and maintenance works.

Safety remarks

Disconnect the mains power connections before carrying out any connection, maintenance or repair works.

Before putting into service

- Please read these operating instructions and special remarks thoroughly before putting the device into service.
- Familiarize yourself with the safety and operating requirements in order to safeguard personnel and equipment.
- The apparatus has been subjected to exhaustive quality inspections before dispatch.
- Any service and maintenance works required may only be carried out by trained service personnel.
- Observe the local safety regulations and the rules for prevention of accidents.
- Observe the rules concerning the handling of hazardous substances.
- Do only use original spare parts or spare parts authorised by the manufacturer.
- No liability or claims under guarantee will be accepted in respect of any modifications or conversions of the apparatus, other than those carried out by us or by persons authorised by us or for which we have given express permission (in a written form)! This also refers to any damage due to incorrect operation and/or improper use of the equipment.

Permissible application

The permissible application of the water sampler consists in the extraction of liquid, aqueous substances, temperature range 0°C to 40°C. The device must only be installed in areas free from explosion hazard and must only be used for sampling of non-explosive substances. Please refer to the technical specifications in chapter “Specifications”. Other applications are not allowed!

Permissible operating and ambient conditions

- Sample extraction of liquid aqueous substances, temperature range: 0°C to 40°C.
- The sampler is designed for operation in non-hazardous areas (no explosion risk).
- The sampler can be operated at ambient temperatures from 0°C to +43°C.
- Sampling from pressurised lines is not possible.
- The device is weather-proof and suitable for outside operation.

Redelivery for repair

Before returning any appliances to us, please pay attention to the following to avoid unnecessary cost and repair delays:

- Redeliveries only after agreement by the supplier
- All appliances or parts returned to us for repair must be cleaned and free of any hazardous substances whatsoever (acids, alkaline solutions, solvents, etc.) as in Germany official regulations regarding waste stipulate that persons in possession of hazardous waste are responsible for its disposal and that, at the same time, employers are responsible for protecting their employees against hazardous materials.
- Any cleaning or disposal required to be carried out by us will be charged for accordingly.

All packing materials can be disposed of as usual.
Packing materials are: cardboard, wood, PS and PE.
If the packing is returned free of cost, we will take care of its disposal.

General information

Safety information

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.
To ensure 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.

Use of hazard information

DANGER
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.

Important Note: Information that requires special emphasis.

Note: Information that supplements points in the main text.

Precautionary labels

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

	This symbol, if noted on the instrument, references the 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.
	This symbol, if noted on the product, indicates the need for protective eye wear.
	This symbol, when noted on the product, identifies the location of the connection for Protective Earth (ground).
	This symbol, when noted on the product, identifies the location of a fuse or current limiting device.
	Electrical equipment marked with this symbol may not be disposed of in European public disposal systems after 12 August 2005. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of life equipment to the Producer for disposal at no charge to the user. **Note:** For all electrical products (marked or unmarked) which are supplied or produced by Hach-Lange, please contact the local Hach-Lange sales office for instructions for proper disposal.

Specifications

Device designation	**Bühler 1027**
Housing	Sampler for wall mounting PS/PC(GF10)
Thermostatic control	Optionally available sample cabinet with self-contained cooling for indoor installation. Temperature in sample compartment: 4°C
Control	Microprocessor control, foil keyboard, graphical display (128*64 Pixel), back lit
Data memory	Non-volatile data memory: storage of sampling and malfunction data like sample extractions, bottle changes, messages, external signals
Programming	12 user programs (can be edited freely)
Program start options	Immediately, at a certain time, by an external signal
Program stop options	End of sampling program after one program run, continuous operation or x-runs
Pause mode	Interruption of program at any time
Overfilling protection	Adjustable from 1–999 samples/bottle
Interval setting	1 min. to 99 h 59 min. in steps of 1 minute
Pulse setting	1 to 9999 pulses/sample
Manual sample extraction	Possible at any time without interrupting the current program run
Program protection	Up to 5 years after voltage loss
Interface	Mini-USB, RS422/485, RS 232
Communication	Optional: TCP/IP RJ45 WEB board, 4-32GB SD/SDHC memorycard Upon request
Languages	Multi-language, selectable
Signal inputs	• 2x analogue: 0/4-20 mA, • 5x digital (flow, event, 1x free programmable) Optional: expansion 4x digital, 3 free programmable and 8x Analogue Inputs 0-20mA / 0-10 V Pulse-length min. 60 ms u. switch-level 7-24V, max. working resistance 500 Ohm signal-length max. 30 m
Signal outputs / status messages	Max. 8 digital outputs, 1x collective message Optional: expansion 8x digital, 5 are free programmable
Sampling method	Vacuum system 20-350 ml
Single sample volume accuracy	< 2,8 % at standard vacuum system
Suction height	Max. 8 m (at 1013hPa and stagnant medium)
Pumping speed	>0,5 m/s at a suction height of up to at least 4,5 m (at 1013hPa); pump capacity can be adjusted electronically, higher with optional diaphragm pumps
Suction hose	PVC, L=5 m, ID=12 mm. Max. hose length 30 m.
Sampling modes	Time-related, flow-dependent, flow-proportional (option), event-related, manual sample
Bottle variants	Plastic composite container (10 L, 25 L etc.) In combination with cooled sample cabinet: 1 x 10 L, 1 x 25 L
Overall dimensions	(Hxwxd) 362 x 442 x 222 mm Sampler without sample container
Weight	10 kg (sampler without sample container)
Power supply	230 V / 115 V AC
Power requirement	Approx. 25 VA sampler, approx. 250 VA cooled sample cabinet
Ambient temperature	0 to + 43°C
Sample temperature	0 – 40°C
Standards	Device meets ISO 5667 standard
Wetted materials	PVC, Silicone, PS, PE, EPDM (optional: Duran 50 glass metering vessel, stainless steel SS304 sinker weight

CE

Installation

Characteristic features: BÜHLER 1027 sampler

The device consists of the following component parts:

1. Housing/protective top
2. Suction hose connector
3. Metering vessel
4. Pinch Valve
5. Discharge tube
6. Control unit with back-lit LC-display
7. Keypad
8. MiniUSB interface
9. Cable feedthrough for mains cable
10. Cable feedthrough for air inlet/outlet
11. Signal connector



Installing the apparatus

- We recommend to install the apparatus as close to the sampling point as possible.
- The hose has to be laid with a constant fall from the sampler to the sampling point as lower lying points can lead to deposits in the hose which may freeze in winter or result in cross-contaminations.
- To fix the suction hose, we recommend to use the extraction unit available as accessory.
- Immerse the end of the hose at the sampling point with the open end facing downstream (direction of flow) so that coarse matter and fibres cannot be forced into the suction aperture

Mains connection — The device is equipped with a power supply lead. The connecting data can be found in chapter “Specifications”.

Switch on / off — The device is switched on and off by means of the shock-proof plug.

Hose connection — The opening for connection of the suction hose is top right beside the dosing unit.

Signal connections — The connector for signals (e.g. flow meter) is located at the bottom of the control housing

Messages — Collective malfunction message (is directly connected to the relay).

Remark:
The apparatus ***must be*** cleaned regularly in accordance with the degree of contamination present. In view of the quality of samples, we recommend to clean thoroughly especially the wetted parts like dosing unit, electrodes, distributor, bottles and inlet hose. Failure to do so could result in damage or destruction to the equipment, device that are not covered by warranty.

Replacement of fuses

1. Fuse protection of sampler (main fuse)
The fuse (1,6 A T) is installed above the power supply lead input at the control housing and thus it is easily accessible from outside.



2. Fuse protection of CPU-board
by means of an automatic fuse. The fuse is reactivated by disconnecting the device from the mains.

Troubleshooting - general

If a fault develops in your sampler, we can only provide prompt assistance if you give us the type and serial number of the apparatus concerned. You will find these data on the type plate. The more precise your description of the fault is, the better our fault diagnosis will be.

Symptom	Possible cause	Action
No function	Mains connection	Check power supply lead
	Fuse defective	Check all fuses and replace them if necessary

Connections

Connector assignment – **input signals (plug)**

Pin assignment:

1 = Flow analogue +

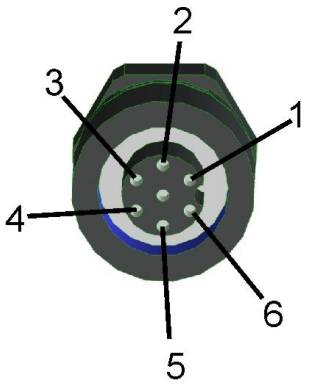
2 = Flow analogue -

3 = COM

4 = Flow digital (pulse)

5 = Event

6 = Volt-free



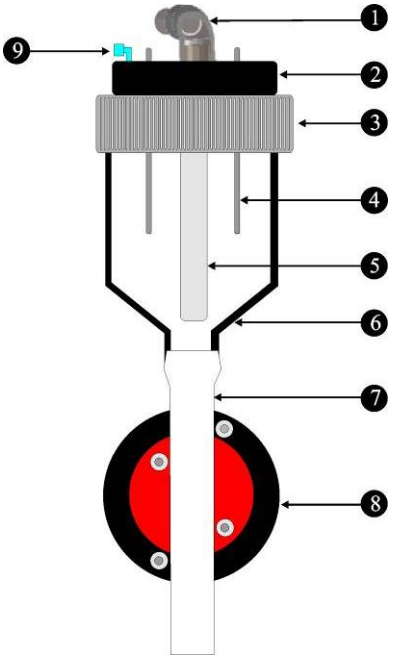
Connector assignment – message

• **Message**

Connection at relay as normally open or normally closed contact.



Vacuum sampling system



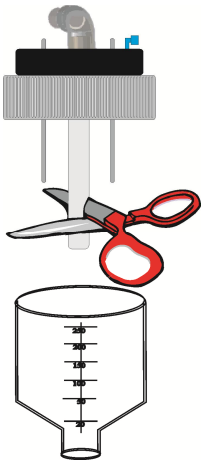
Metering vessel -structure-

1. Hose connector
2. Flange
3. Screw cap
4. Electrodes
5. Volume control tube
6. Metering vessel
7. Silicone discharge tube
8. Motor-driven pinch-valve
9. Air connection

Cleaning:
- **Glass metering vessel**: unscrew the screw cap (3) and remove the flange. Now, the metering vessel together with the silicone discharge tube (7) can be detached.
- **Plastic metering vessel**: Turn the plastic metering vessel anticlockwise (bayonet fitting) and remove.

<u>Adjustment of sample shot volume at samplers with glass metering vessel</u>:
To adjust the desired sample volume, loosen the knurled screw and displace the volume control tube vertically.

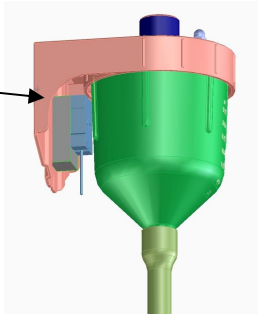
<u>Adjustment of sample shot volume at samplers with plastic metering vessel</u>:
The sampler is always delivered with the volume control tube in full length.
To adjust the sample shot volume, the volume control tube (5) has to be cut to length.



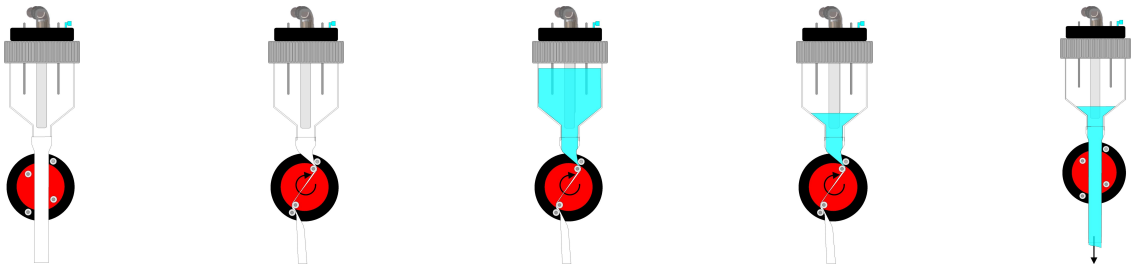
Procedure
7. There is a graduation in millilitres on the volume control tube.
8. Remove the metering vessel (6).
9. Cut the volume control tube to the desired length with scissors or a knife.
10. Reinstall the metering vessel (6) and tighten.
11. Check the sample volume by starting a manual sample extraction.
12. Now the device is ready for operation.

Remark: If you need to work with different sample volumes, you can cut to size several tube pieces. As the volume control tube (5) is only slipped on the hose connector (1), it is very easy to change the tube.

Option: Metering vessel with capacitive level sensor (non-contact)



Operation principle:



1. Inoperative position
2. Pinch-valve closes
3. Metering vessel is filled up to the electrodes
4. Dosing system is aerated
5. Pinch valve opens and sample drains off in bottle

Replacement of the silicone discharge hose
The silicone hose (BM69301) is only pushed over the lip of the metering vessel. A hose clamp is not required. Humidify the hose a little bit, fix it at one point and push it over the lip.

Remark:
Do only use original spare parts from the manufacturer. The use of a wrong hose type can lead to malfunctions at the system or may even damage the pinch valve!

Remark:
Conductivity of the sample medium
There are two conductive level electrodes in the metering vessel. Their sensitivity can be adjusted in the service menu. In the factory the electrodes are adjusted to tap water (this adjustment does not have to
be changed under normal operating conditions). Minimum conductivity 50 µS/cm.
Please note that a wrong adjustment can lead to a flooding of the pneumatic system and to the damage of component parts.

The sampler is not suitable for extraction of distilled water due to low conductivity.

Conductivity at 25°C
Rain water 50 µS/cm
Drinking water 500 µS/cm
Waste water 5000 µS/cm (5 mS/cm)
Seawater 50000 µS/cm (50 mS/cm)

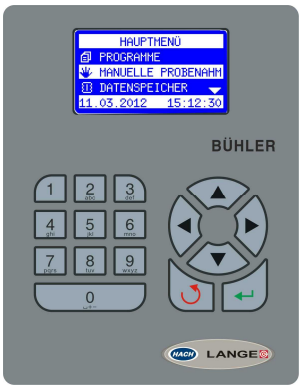
ATTENTION:
Wrong operating conditions can lead to malfunctions or may even damage the apparatus. No liability or claims under guarantee will be accepted in respect of any damage arising from the non-observance of these operating instructions.

Troubleshooting – vacuum system

If a fault develops in your sampler, we can only provide prompt assistance if you give us the type and serial number of the apparatus concerned. You will find these data on the type plate.
The more precise your description of the fault is, the better our fault diagnosis will be.

Symptom	Possible cause	Action
Electrodes do not react, system flooded	Adjustment of conductivity too low. Distilled water has been used as sample medium.	Contact service department
	No contact to electrodes	Check cable connection
Sampler does not extract samples	System is leaking	Check whether all hoses and connections are tight
	Pump/diaphragm defective	Check pressure/vacuum of pump
	Metering vessel not tight, no vacuum	Check whether metering vessel is tight (screw cap)
	Filling level electrodes bridged	Clean electrodes
	Valve system/pinch valve does not function correctly	Check valve system/pinch valve or contact service department
No pressure / vacuum at pump	Defective diaphragm	Renew diaphragm
	Hoses are squeezed	Check hoses

Programming



The menu structure is similar to a directory tree and is split up in main menus and submenus.

Assignment and function of keys

The apparatus is interactively programmed by the user.

Function of keys:

Display of help texts. To activate the help text when selecting a new display, first press the arrow key pointing to the left.	Arrow key	◀
Move from one to the next menu	Arrow keys	▼ ▲
Select the desired menu	Enter key	↵
Move within the menu	Arrow keys	▼ ▲
Selection within the menu or scrolling within the data memory or bottle memory	Arrow keys	◀ ▶
Confirm the choice (is automatically m✓ked with a)	Enter key	↵
Entry/change of values	Arrow keys	◀ ▶ ▼ ▲
Confirmation of entered values	Enter key	↵
Return to higher menu level	Back key	↺
Initialization (reset) display	Back key + Enter	Press both keys at the same time ↺ ↵
Terminate sleep mode	Back key	↺ Press for at least 5 sec.
RESET / reset to factory settings	Back key	↺ Keep pressed when switching on

Navigation

The sampler can be operated by means of the control unit. With the ARROW KEYS, the ENTER KEY and the BACK KEY you can move from one screen to another. An arrow on the display shows that there are further selection possibilities (see illustration).



Example:

3. Press the “DOWN” arrow key two times to select the line DATA MEMORY.

4. Now press the ENTER KEY to display the data memory or to choose another selection possibility.

Remark: The arrow pointing downward on the right side (bottom) of the display indicates that there are further selection possibilities.

Menu variants:

The top line indicates that you can navigate to the right or to the left by pressing the arrow keys.
The bottom line indicates with which key the action is executed or terminated.

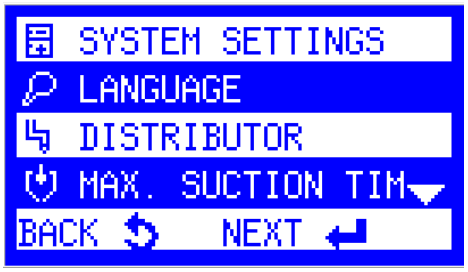


Here you can set a parameter. The top line shows which value is to be set. The bottom line indicates the possible range of values. The entry is possible directly by means of the number keys or the digit is selected with the right / left arrow keys and changed with the up / down arrow keys. The selected digit is displayed inversely (cursor). Confirm the entry by pressing the ENT key or abort it by pressing the BACK key (in this case the initial value is not changed).
The arrows show that a digit can be changed.



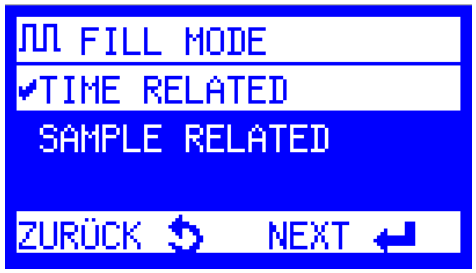
Settings with selection menu

The cursor is positioned on the current selection line (inversely) and can be moved up or down.
The arrow on the right side of the window indicates that there are further entries which can be displayed by scrolling up or down.
Depending on the menu, the display will show in which direction you can scroll.



Definition of individual menu points

In the selection menus, additional program settings are displayed. All the settings which have been activated by pressing the ENTER key are marked with a ✔ .



MAIN MENU STRUCTURE
The following list shows the main menu level with the menu points of the submenus:

DISPLAY	DISPLAY	FUNTION
PROGRAMS		
	STATUS/STOP	• INFO • PAUSE • STOP
	START	• IMMEDIATELY • DATE/TIME • WEEKDAY/TIME
	CHANGE	Time,Flow, Event
MANUAL SAMPLE EXTRACTION	INTO CURRENT BOTTLE INTO BOTTLE X	
DATA MEMORY		
	INFO MEMORY	SET FILTER
	BOTTLE PROTOCOL	
DIAGNOSTICS/TEST		
	COMPONENT TEST	• DIAPHRAGM PUMP • PINCH VALVE • VALVE SYSTEM • DISTRIBUTOR • DIGITAL OUTPUTS
	DIGITAL INPUTS	FLOW DIGITAL 0 EVENT 0 DI3 DI4 DI5 DI6 DI7 DI8
	ANALOG INPUTS	ANALOGUE 1: ANALOGUE 2: ELECTRODES 1: ELECTRODES 2: PT 1000 SENSOR VOLTAGE.:
	VERSION INFO	

SETTINGS

DATE/TIME	
SYSTEM SETTINGS	• LANGUAGE • DISTRIBUTOR • MAX. SUCTION TIME • PRE PURGE • POST PURGE • AERATION TIME • PUMP POWER • ANALOGUE SIGNAL • DISPLAY • PAUSE DURATION • PROG. INPUT • OUTPUTSIGNAL
SLEEP MODE (Only portable sampler)	• DATE/TIME • WAKEUP WITH 5s ESC • NO SLEEP MODE
PASSWORD	• CHANGE PASSWORD • CHANGE SETTINGS • CHANGE PROGRAMS
SERVICE MENU	Setting of base parameters (to be done by a service technician) Password protected.

Description of the menus

DISPLAY	DISPLAY	EXPLANATION / FUNCTION
PROGRAMS		
STATUS/STOP	• INFO • PAUSE • STOP	Display of program details Interruption of the running program (max. 120 min.) Stop /abort the program
START	• IMMEDIATELY • DATE/TIME • WEEKDAY/TIME	Program start can be: • immediately • with date/time (dd:mm:yyyy hh:mm) • with weekday/time (day; hh:mm)
CHANGE	PROGRAM No. [xx]	Change the program parameters like mode of operation (time, flow, event…), interval etc. Selectable Modes: • TIME • FLOW DIGITAL • FLOW ANALOGUE • EVENT TIME • EVENT DIGITAL • EVENT ANALOGUE
MANUAL SAMPLE EXTRACTION		
IN CURRENT BOTTLE		Sample extraction into current bottle
IN BOTTLE X		Sample extraction into selectable bottle X
DATA MEMORY		
INFO MEMORY		Data can be displayed with filter

BOTTLE MEMORY		Display of data of the single bottles
DIAGNOSIS/TEST		
COMPONENT TEST	• DIAPHRAGM PUMP • PINCH VALVE • VALVE SYSTEM • DISTRIBUTOR • DIGITAL OUTPUTS	Functional check of the components
OUTPUTS TEMPCARD		Displays status of: - Lower heating (OFF / ON) - Cooling (OFF / ON) - Upper heating (OFF / ON)
DIGITAL INPUTS		Display of (DI=Digital Input): - Flow digital Event (digital) DI3 DI4 DI5 DI6 DI7 DI8
ANALOG INPUTS		Display of: - ANALOGUE 1 - ANALOGUE 2 - Electrodes 1 - Electrodes 2 - PT1000 temperature sensor (option) - Operating voltage
DISPLAY OF VERSION		Display of the firmware version
SETTINGS		
DATE/TIME		Setting of date / time
SYSTEM SETTINGS	• LANGUAGE • DISTRIBUTOR • MAX. SUCTION TIME	Setting of device-specific parameters

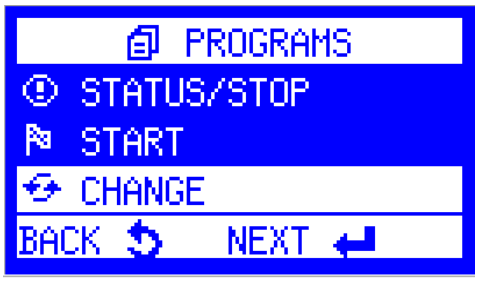
	• PRE PURGE	1.PRE Purge=purging of suction hose before sampling
	• POST PURGE	2. Post purge= active purging of dosing vessel to adjust dosing volume
	• AERATION TIME	
	• PUMP POWER	
	• ANALOGUE SIGNAL	
	• DISPLAY	
	• PAUSE DURATION	The program can be interrupted for a period of 10-120 minutes
	• PROGR. INPUT	Inputsignal to start e.g. a program
	• OUTPUT SIGNAL	Only active if the add-on board is connected
SLEEP MODE	• DATE/TIME • WAKEUP WITH 5s ESC • NO SLEEP MODE	ONLY FOR PORTABLE SAMPLER
PASSWORD	• CHANGE PASSWORD • CHANGE SETTINGS • CHANGE PROGRAMS	Setting / activation of the password
SERVICE		Setting of base parameters (to be done by a service technician) (Password protected)

Examples of programs
Programming of a time-proportional sampling program

Select PROGRAMS in the main menu



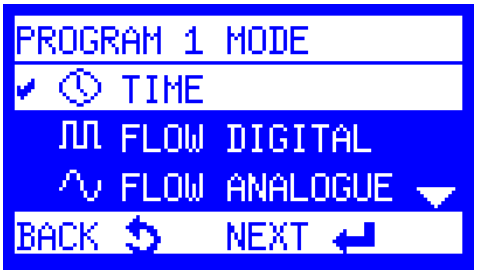
Select CHANGE



Select PROGRAM NO. 1 (out of 12).
Programs No. 2-12 can be selected by pressing the left or right arrow key.
Press ENTER to edit the program.



Select the sampling mode TIME
(Sampling is effected in fixed time intervals)



Set the sampling interval
(time interval between the single sample extractions)



Set the BOTTLE FILL TIME
(here: each bottle is filled for 1 hour).



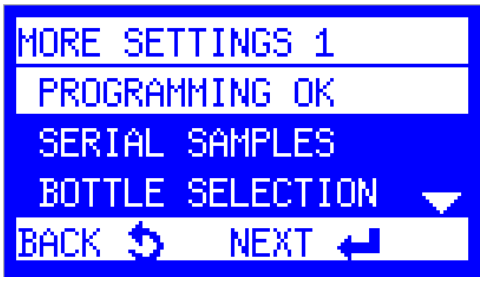
Terminate programming.



Now, the program can be started directly.



If selected "MORE SETTINGS ", the additional settings are available:



- PROGRAMMING OK
  (Set of selection and back to the START-Menue)

- SERIAL SAMPLES
  (samples/extraction)
  means that each requested extraction consists of x-samples. This is useful for a larger sample volume.

- BOTTLE SELECTION
  (first Bottle / last Bottle)
  The first and the last bottle can be defined for a cycle.

- PROGRAM PAUSE
  (Prg.Pause=Timeshift of program start. Timeshift between end of program x and start of next program. Moves the program cycle for

continuous operation with that time.

- QT-AUTOMATIC (Selection is only available for Flow program)
  (Set of MIN. QT-TIME and/or MAX. QT-TIME)

- COMBINED EVENT SAMP.
  (Combination of time- resp. Flow program with event; can be activated
or deactivated)

- PROGRAM SEQUENCE
  (End of Prg1 can start Prog2....End of Prg.2 can start Prg x, last Prg. starts Prg. 1 again or xx = endless run)

Program Start

After selection of the menu point “Start Program”, the program to be started (1-12) has to be selected with the left or right arrow key and has to be confirmed by pressing the Enter key.



There are three resp. four possibilities to start the program.

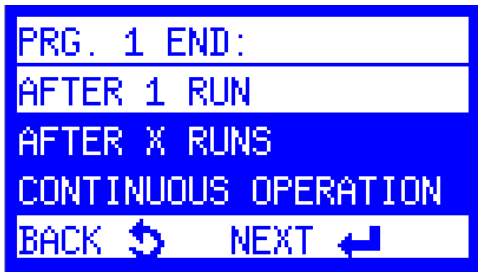


- **IMMEDIATELY** The program is started immediately.

- **DATE/TIME** The program start is effected on the selected date and at the selected time. Format:dd:mm:yyyy hh:mm.

- **WEEKDAY/TIME** The program start is effected on the selected weekday and at the selected time. Format: day; hh:mm

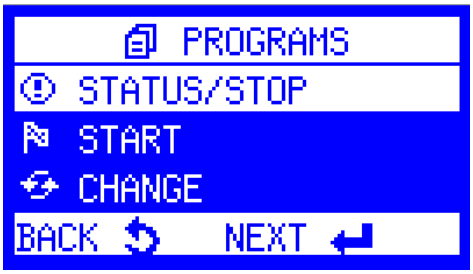
Program end
After having defined the start conditions, the program end can be set as follows:



- AFTER 1 RUN — Program is terminated after 1 run
- AFTER X RUNS — Program is terminated after X runs
- CONTINUOUS OPERATION — Program is continued indefinitely

Display of PROGRAM STATUS/STOP
Shows Status of programs. Programs can be paused or stopped.

The status of all programs can be checked by pressing the arrow keys (right/left).



When pressing the Enter key, the following is displayed:

ACTIVE = Program is started
or
INACTIVE = Program is not started





- INFO Display of information regarding the currently running program: current bottle, samples requested and samples taken, next sample extraction or bottle change.

- PAUSE The program can be interrupted for a period of 10-120 minutes. The period can be entered in the menu “SETTINGS”. The pause can be terminated manually or it is automatically terminated after the entered xxx minutes.

- STOP The program can be stopped directly.

INFORMATION on program

After selection of INFO all details regarding the running program are shown. The single screens can be displayed by pressing the up/down arrow keys.

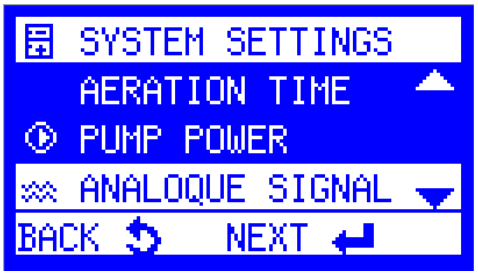


STOP -Stop Program

Active program can be stopped.
All running programs can be stopped at once as well.



Flow-proportional sample extraction



According to the output signal of your flow meter either the operating mode flow analog or flow digital can be selected in the program settings.
.

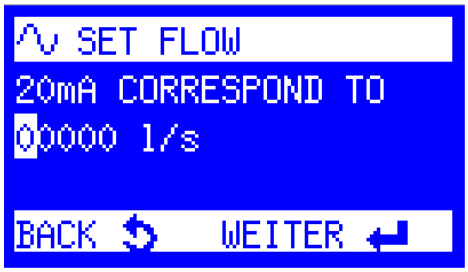
IMPORTANT: If an analogue signal (0/4-20 mA) is used, it is absolutely necessary to calibrate the input prior to the first use.

FLOW ANALOG
Calibrate the analog input 0/4-20 mA



The analog input can be calibrated in „SAMPLER SETTINGS" ->FLOW SIGNAL. Just follow the menu instructions.
1st step: connect 0/4 mA and confirm
2nd step: connect 20 mA and confirm
3rd step: Calibration ok, confirm
Remark: The analogue input is already calibrated to 0-20 mA in the factory.

FLOW ANALOG
The only difference between the programming of the flow analog mode and the flow digital mode is the definition of the sampling interval. Point of reference is the maximum flow at 20 mA.

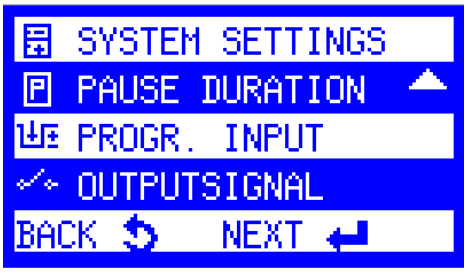


Event-proportional sample extraction



When selecting this sampling mode, the sampler is waiting for an external "event" signal, e.g. from a connected pH-meter. A sample is extracted according to the programming as long as the signal is present. When the signal is deactivated the sampler waits for the next signal and then fills the next empty bottle.
Which „event" sample has been filled into which bottle is recorded in the info memory.
In the event mode the sample extraction can be time or flow dependent. The programming is effected as described before (sampling mode time, flow digital).

FREE PROGRAMMABLE INPUTS



- PROGR. INPUT
- ADDITIONAL INPUT 1
- ADDITIONAL INPUT 2
- ADDITIONAL INPUT 3

In the basic version 1 programmable input is available.
As an option with the "I / O expansion board" are another 3 Inputs available. Thus the sampler can be controlled with a digital pulse (eg with external PLC).

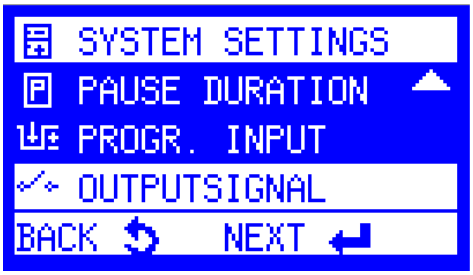
Each INPUT (1-3) can be programmed out of the following list:

- NO FUNCTION
  (turn off of the Input)
- PRG. START PULSE
  (if selected, Program x will be started)
- PRG. STOP PULSE
  (if selected, Program x will be stopped) (Back with ESC)
- PRG. RUN DURING PULSE
  (During continuous signal, Program is running. If Signal drops down, program stops.)
- DISTRIBUTOR PULSE
  Pulse signal: **<= 3sec** means "next bottle"
  >= 5 sec means "move to bottle 1"
- SAMPLE PULSE
  Pulse means "take a sample"
  Pulse signal must be > 50ms!

Remark: This feature is only available if no program is running. The unit is in this case completely controlled externally (eg PLC)

OUTPUT SIGNALS

As an option are 5 Output signals available, which are free configurable.



OUTPUTSIGNAL

- OUTPUT SIGNAL 1
- OUTPUT SIGNAL 2
- OUTPUT SIGNAL 3
- OUTPUT SIGNAL 4
- OUTPUT SIGNAL 5

Each Output signal (1-5) can be programmed out of the following list:

- PROGRAM ACTIVE
  Selection of "PROGRAMS ACTIV" or "PROGRAM XX ACTIV"
- PROGRAM END
- Selection "PROGRAMS END" oder "PROGRAM XX END"
- ERROR
  Selection:
  - GENERAL FAILURE
  - FAILURE ELECTRODES
  - ERROR SUCTION
  - FAILURE DISTRIBUTOR
  - MAX. SPL/BOTTLE
  - mA FAILURE
  - POWER FAILURE
  - DOOR OPEN
  - INTERNAL TEMPERATURE
  - EMERGENCY CUTOFF
  - SUCTION TIME
- SAMPLING ACTIVE
- BOTTLE CHANGE
- DISTRIBUTOR ON POS.1
- SIGNAL REVERSED
- SIGNAL OFF
  ("switch off" of the output signal)

ERROR MESSAGES

Error code	Text / meaning
1	Error distributor
2	Error suction
4	Error electrodes
5	End of voltage loss
6	Charge storage battery
7	Storage battery empty
10	Error analog signal A1
15	Emergency cutout
17	Storage battery defective
19	Error analog signal

LOG MESSAGES

Log code	Meaning
1	Error
2	Program start
3	Program end prog. xx
4	Start program pause
5	End program pause
6	System start
9	Bottle change
10	Sample extraction
14	Voltage loss start
15	Start of event
16	End of event
18	Terminate sleep mode
19	Conductivity sample medium (resistance)
20	Temperature regulation
21	Bottle statistics
22	Single bottle statistics
23	Password for service menu
24	PT1000 temperature sensor / operating voltage
28	Analog value A1 protocol
30	Overfill protection, Parameter **1**= Drop sample Parameter **2**= Switch over to new bottle

Maintenance

The apparatus should be cleaned regularly in accordance with the degree of contamination present. In view of the quality of samples, we recommend to clean thoroughly especially the wetted parts like dosing unit, electrodes, distributor, bottles and inlet hose.

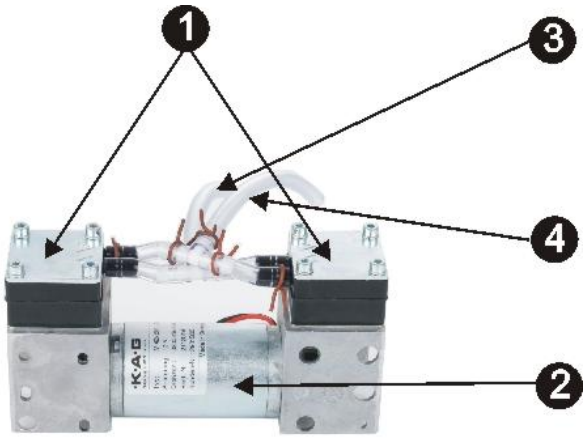
Remark:
There is a health hazard if the device is used in biologically or chemically contaminated areas. Please take the necessary precautionary measures when cleaning or servicing the device.

Attention:
Disconnect the power connections before carrying out any maintenance or repair works. Repair works must only be carried out by specially trained and authorised service personnel.

Remark: For cleaning of the metering vessel: see chapter „Operation – sampling system“.

Double-head pump BM60428

1. Pump head
2. Motor
3. Connection vacuum
4. Connection pressure



Pumping capacity: The **pumping capacity** (patented method) can be adjusted in the service menu between 20 and 100 %.

Remark: The adjusted pumping capacity has **no effect** on the suction height but **only on the average suction speed** when extracting the sample. The lower the pumping capacity, the longer the life of the pump!

Spare parts / accessories Bühler 1027

Article No.	Designation
BM900300	Suction hose, length 7,5 m, with screw connection
BM69304	Suction hose, running metre
BM50025	Stainless steel sinker weight, length 180 mm
BM60045	13 L PE composite container
BM60046	25 L PE composite container
BM69644	Flow signal cable, length 10 m (with open cable end)
	Possible messages
BM10200	Switching power supply, input voltage 110-240 V, 50/60 Hz, 60 W
Spare parts: vacuum sampling system	
BM30004	Glass metering vessel 350 ml
BM69401	O-ring 16x4, NBR (only at glass metering vessel)
BM69402	Quad-ring 81, 92x5, 33, NBR (only at glass metering vessel)
BM80044	Plastic metering vessel 350 ml
BM69452	Flat packing 86x96x3 silicone (only at plastic metering vessel)
BM60457	Folded paper filter (pneumatic unit)
BM69301	Silicone dosing tube 12x2
BM69302	Silicone tube for valve system 4x1,5
BM900627	Valve system BÜHLER 2000/1027
BM900626	Pinch valve BÜHLER 2000/1027
BM900156	Complete glass dosing unit 350 ml
BM900621	Complete plastic dosing unit 350 ml
BM60428	Double-head diaphragm compressor 7010 12V / ASF
BM60489	Diaphragm compressor 1420VP LC 12V / ASF
BM10004	Geared motor 12V
BM10251	Capacitive level sensor (non-contact) for industrial applications

Warranty and liability

The manufacturer warrants that the product supplied is free of material and manufacturing defects and undertakes the obligation to repair or replace any defective parts at zero cost.
The warranty period for instruments is 24 months. If a service contract is taken out within 6 months of purchase, the warranty period is extended to 60 months.
With the exclusion of the further claims, the supplier is liable for defects including the lack of assured properties as follows: all those parts that, within the warranty period calculated from the day of the transfer of risk, can be demonstrated to have become unusable or that can only be used with significant limitations due to a situation present prior to the transfer of risk, in particular due to incorrect design, poor materials or inadequate finish will be improved or replaced, at the supplier's discretion. The identification of such defects must be notified to the supplier in writing without delay, however at the latest 7 days after the identification of the fault. If the customer fails to notify the supplier, the product is considered approved despite the defect. Further liability for any direct or indirect damages is not accepted.
If instrument-specific maintenance and servicing work defined by the supplier is to be performed within the warranty period by the customer (maintenance) or by the supplier (servicing) and these requirements are not met, claims for damages due to the failure to comply with the requirements are rendered void. Any further claims, in particular claims for consequential damages cannot be made.
Consumables and damage caused by improper handling, poor installation or incorrect use are excluded from this clause.
The manufacturer process instruments are of proven reliability in many applications and are therefore often used in automatic control loops to provide the most economical possible operation of the related process.
To avoid or limit consequential damage, it is therefore recommended to design the control loop such that a malfunction in an instrument results in an automatic change over to the backup control system; this is the safest operating state for the environment and the process.

Immunity

This equipment was tested for Industrial level EMC per:
EN 61000-6-2 (EMC Requirements for Electrical Equipment for Measurement, Control and Laboratory Use) **per 2004/108/EEC**
EMC: Supporting test records by Hach Company, certified compliance by Hach Company.
Standards include:
IEC 1000-4-2:08.02 (EN 61000-4-2:08.02) Electrostatic Discharge Immunity (Criteria B)
IEC 1000-4-3:12.06 (EN 61000-4-3:12.06) Radiated RF Electromagnetic Field Immunity (Criteria A).

Emissions

This equipment was tested for Radio Frequency Emissions as follows:
Per **2004/108/EEC** EMC: **EN 61000-6-4:08.05** (Electrical Equipment for measurement, control and laboratory use—EMC requirements)
Class “A” emission limits. Supporting test records by Hach Company, certified compliance by Hach Company. **Additional Emissions Standard/s include:** EN 55011:08.03 (CISPR 11), Class “A” emission limits

Contact

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