MAXX®

Mess- und Probenahmetechnik GmbH

Operating instructions
Water sampler

MAXX SP 5 - Zone 2

II 3G EEX nC/R/ic IIB T3 Gc

CE

QUALITÄTS-MANAGEMENT
Wir sind zertifiziert
Regelmäßige freiwillige Überwachung nach ISO 9001

R e m a r k

MAXX 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.

Subject to changes!

Access code for program changes or changes of system settings

Password: **6 2 9 9**

Your password:

Contents

General information

General information

The product described in this manual has left the factory in a perfect and tested condition as regards safety. In order to retain this state and to achieve correct and safe operation of this product, it must only be used in the manner described by the manufacturer. In addition, correct and safe operation of this product is dependent on proper transport, storage and installation as well as careful operation and maintenance.

This manual contains the information required for approved use of the product described in it. The manual has been prepared for technically qualified personnel who have been specially trained or who possess appropriate knowledge in the field of sampling technology and in using the product in hazardous areas.

Knowledge of the safety information and warnings present in this manual and their technically correct implementation are prerequisites for safe installation and commissioning as well as for safety during operation and maintenance of the described product. Only qualified personnel possess the required expert knowledge to correctly interpret the general safety information and warnings present in this manual and to put them into practice in each individual case.

This manual is included in the delivery. For clarity reasons this manual cannot cover all possible details of all versions of the described product and cannot describe every possible case regarding the installation, the operation, the maintenance or the use in systems. Should you require further information or should particular problems occur which are not described in a sufficient manner in this manual, help can be requested through your local MAXX office or representative.

We have examined the document for compliance with the described hardware and software. Nevertheless, discrepancies cannot be completely ruled out so that we cannot guarantee full compliance.

Observe the local safety regulations and the rules for prevention of accidents as well as the rules concerning the handling of hazardous substances.

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.

Only use original spare parts or spare parts approved by the manufacturer.

General information

Notes on using this manual

This manual describes the applications of the equipment and how it can be put into operation, operated and serviced.

Of particular importance are the **warning and information texts.** These are separated from the remaining text, specially identified and will help you to avoid any operating errors.

Danger information

The following safety information and warnings serve to prevent danger to the life and health of users or maintenance personnel and to prevent damage to the products described or to equipment connected to it. They are emphasized in this manual by the terms defined here and are additionally identified by warning symbols. The terms used in this manual and the information on the product itself have the following meaning:

Danger
means that death, severe personal injury and/or substantial damage to property will occur if the appropriate safety precautions are not observed.

Warning
means that death, severe personal injury and/or substantial damage to property can occur if the appropriate safety precautions are not observed.

Caution
means that slight personal injury and/or damage to property can occur if the appropriate safety precautions are not observed.

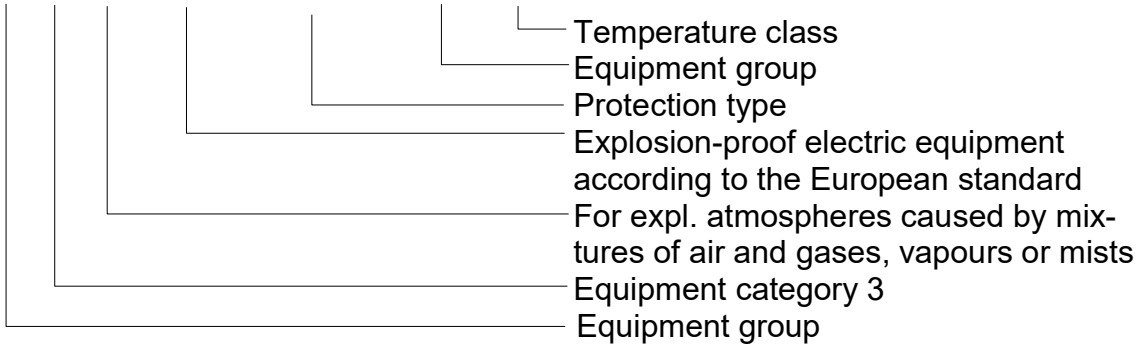
Remark
is an important information on the product itself, the handling of the product or the respective part of the manual to which particular attention should be paid.

General information

Permissible application

The permissible application of the water sampler consists of the extraction of liquid, aqueous substances, temperature range 0°C to 40°C. Please refer to the technical specifications in chapter «Technical data».
All other applications are not allowed!
The apparatus can be used in hazardous areas of Zone II. Please pay attention to the explosion protection marking on the device.

II 3 G EEX nC/R/ic IIB T3



Application areas:

Equipment category	Potentially explosive mixtures of air and gases (G)
Category 1	Zone 0, 1 or 2
Category 2	Zone 1 or 2
Category 3	Zone 2

General information

Qualified personnel

Severe personal injury and/or extensive damage to property may occur in case of unqualified works at the device/system or in case of the non-observance of the warnings described in this manual or written on the device/system cabinet.
Therefore only suitably qualified personnel may work on this device/system.
Qualified persons in the sense of the safety information present in this annual or on the product itself are persons:

- who are part of the project planning staff and thus are familiar with the safety concepts
- or who have been trained as operators in the use of the equipment and who know the contents of this manual relating to the operation of the equipment
- or who have been appropriately trained as commissioning and/or maintenance
  personnel for repair of such equipment or are authorized to put into operation, to earth and to tag circuits and devices/systems according to the standards of safety engineering
- or who have received a training or instructions or do have the authorization to perform work on electric circuits at devices where there is a risk of explosion.

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 Zone II hazardous areas
- the fixed site sampler with cooling/heating can be operated at ambient temperatures from -20°C to +40°C
- sampling from pressurised lines is <u>not</u> possible with samplers having a vacuum or variable (VAR) sample extraction system.
- the device is weather-proof and suitable for outside operation

Disposal

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

•Device **(according to EU directive 2002/96/EC)**

In conformity with the local and national legal regulations (EU directive 2002/96/EC), MAXX GmbH undertakes the obligation for the free disposal of old units.

Remark: It is not allowed to dispose of the instrument using municipal waste disposal services. Please talk to your contact person at MAXX GmbH if you have to dispose of a unit.

General information

Safety instructions

Danger

- Install the device according to the manufacturers` instructions as well as according to the standards and regulations valid for you!
- Never disconnect electric connections when there is explosive atmosphere!
- Never remove any fuses as long as the device is connected to the mains!
- Avoid any electrostatic charging. Only use damp cloths to clean plastic surfaces!
- The device has to be earthed safely and thoroughly!
- To avoid danger of ignition by lightning, the device has to be integrated into the local lightning protection measures!
- Open and close housings with special diligence as otherwise the protection class might be impaired!
- The flow-restricting protective enclosure must not be opened or the tightness has to be verified after the closure.
  The tightness of the housing should be regular tested. The test interval must be set by the operator. Usually it is between 1 to 3 years.

Certificate of conformity

MAXX®

Mess- und Probenahmetechnik GmbH

EG - KONFORMITÄTSERKLÄRUNG
EC - Certificate of Conformity
EC - Certificat de conformité

Hersteller:/*manufacturer/fabricant* **MAXX Meß- und Probenahmetechnik GmbH**
Hechinger Str. 41
D-72414 Rangendingen

Dokument Nr./*document No./document n°*: DOK129/07-14

Produkt/*Product/Produit*:
Probenehmer / *Sampler /Echantillonneur*
Typ / *model / modèle*:

SP5 - Zone2 1002 000

II 3G EEX nC/R/ic IIB T3 Gc

Wir bestätigen die Übereinstimmung mit folgenden Europäischen Richtlinien:
We declare the conformity with the following European Directives:
Nous déclarons la conformité avec les directives européenne suivantes:

Niederspannungs-Richtlinie/*Low voltage directive/ Directive de basse tension*:	**2006/95/EG**
EG-Richtlinie / *EC directive / directive EC*	**94/9/EG (ATEX)**
EMV-Richtlinie / ***EMC directive / directive CEM*:**	**2004/108/EG**

Die Übereinstimmung des bezeichneten Produktes mit den Vorschriften der oben angegebenen Richtlinie wird nachgewiesen durch die Übereinstimmung mit folgenden Normen:
The conformity of the named product with the regulations of the above mentioned directive is proved by the conformity with the following standards:
La conformité du produit indiqué avec les prescriptions de la directive mentionnée ci-dessus est prouvée par la conformité avec les normes suivantes:

EN 61010-1:2010
Sicherheitsbestimmungen für elektrische Meß-, Steuer-, Regel- und Laborgeräte.
Safety regulations for electric measuring, control and laboratory instruments.
Prescriptions de sécurité pour les appareils électriques de mesure, de contrôle et de laboratoire.

EN 60079-14:2008-10
Projektierung, Auswahl, und Errichtung elektrischer Anlagen
Electrical installations design, selection and erection
Conception, sélection et construction des installations électriques

EN 60079-15
Elektrische Betriebsmittel für gasexplosionsgefährdete Bereiche-Teil 15: Zündschutzart „n"
Electrical apparatus for explosive gas atmosphere-part 15: Type of portection „n"
Matériel électrique pour atmosphères explosives gazeuses-Partie 15: Mode de protection „n"

Anbringung der CE-Kennzeichnung / *Year of declaration / Année de déclaration*: 2014

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften
This declaration certifies the conformity with the mentioned directives, however, does not include any assurance of properties.
Cette déclaration certifie la conformité avec les directives mentionnées, cependant, ne comprend aucune assurance de propriétés.

Rangendingen 04.07.2014

Unterschrift / Technische Leitung
Signature / Technical direction
Signature / Direction technique

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Warranty and liability

The manufacturer guarantees that the product supplied possesses the stipulated properties and is free of any faults in material and manufacturing defects and undertakes the obligation to repair or replace any defective parts free of cost.

The warranty period is 12 months from the delivery date resp. the invoice date. Wear parts and damages caused by improper use, poor installation or applications other than those permitted are excluded from this clause.

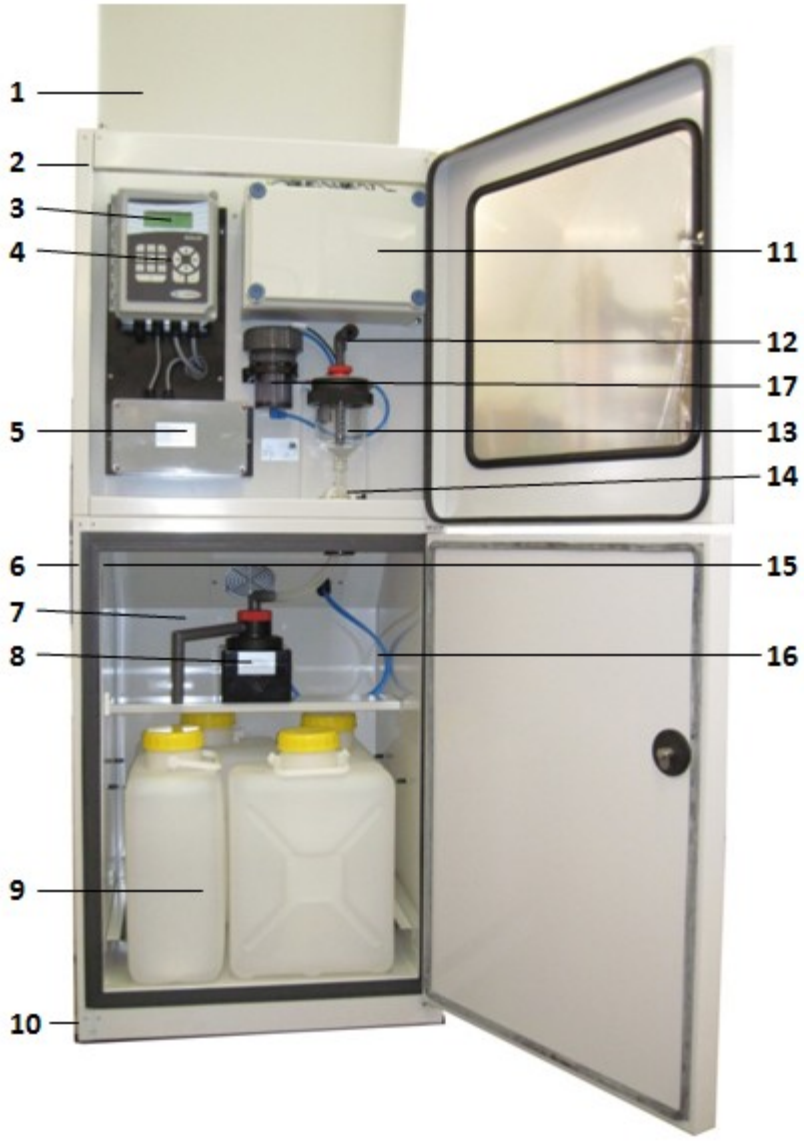
Any further claims, in particular claims for compensation of consequential damages, cannot be asserted. If the manufacturer stipulates that during the warranty period instrument-specific maintenance works have to be carried out by the customer or inspections have to be made by the manufacturer's service engineers and these instructions are not observed, no liability or claims under warranty will be accepted in respect of any damages arising from the non-observance of these instructions.

Installation

Characteristics

The device consists of the following component parts:

1. Protective top (can be opened)
2. Upper part of housing
3. Back lit LC display
4. Keyboard
5. Flow-restricting protective enclosure
6. Lower part of housing – cooled sample compartment
7. Heating (explosion-proof)
8. Distributor with pneumatic drive
9. Bottles
10. Fixing bar
11. Terminal box
12. Filling tube with hose connection
13. Dosing unit
14. Pneumatic pinch-valve
15. Type plate
16. Air connection of pneumatic distributor
17. Waterstop



Remark: According to the sampler version, some components such as dosing unit or distributor/bottles can be different!

Installation

Installing the apparatus

- We recommend to install the apparatus as near as possible to the point of extraction. If installed outside, the device should be fixed on a solid flat base (e.g. plinth). The fixing bars do already have the necessary fixing holes.

Caution

- If the device is equipped with castors (mobile version), please make sure that the two lock-type castors are locked during operation.
- For better deaeration / ventilation install the apparatus with a distance of approx. 10 cm to the wall.
- The hose has to be laid with a continuous fall from the apparatus to the point of extraction, without fail. Lower lying points can lead to deposits in the hose which may freeze up in winter.
- To fix the suction hose, we recommend to use the extraction unit available as accessory.
- Fix the hose in such a way that the suction aperture lies in the direction of flow, so that coarse matter and fibres cannot be forced into the suction aperture.

Remark:

To open the top cover both front screws (left + right) have to be removed. Then the top cover can be lifted up to the point where the retention bars snap-in. To close the cover again, the two retention bars have to be lifted slightly. After having closed the cover, the two screws (left + right) have to be screwed in again.

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

Connect/disconnect — Has to be prepared by the customer. Please pay attention to the explosion protection standards.

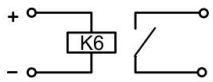
Cable/hose routing — The apertures for the suction hose are on the left and on the right at the front.

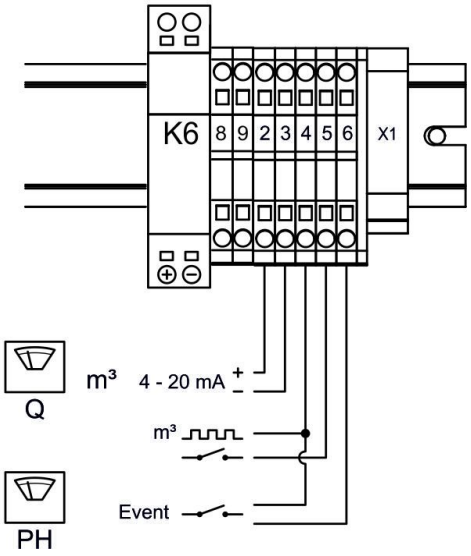
Signal inputs — The signal inputs (e.g. for flow meter) are located on the „fold-out“ plate and can be connected according to the plan of terminal connections.

Danger
By connecting external signals the explosion protection can be put at risk. If necessary, use separation barriers!

Signal inputs

In: DC 12V
Out: AC 250V / 2x 8A





Installation

Troubleshooting

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	Chapter
Sampler does not function at all	- Mains connection - Fuse defective	- Check mains cable - Check all fuses and replace them if necessary	Characteristics
Cooling system does not function	- Power supply - Wrong adjustment of thermostat - Cooling system leaking	- Check mains connection of cooling machine - Check adjustment of thermostat - Contact service department	Characteristics

Warning
Please absolutely observe the rules for working in hazardous areas!

Installation

Accessories

The following bottle variants are available:

Description	Quantity (pce)	Order No.
Version with 1 container (1x25 L) Composite container 25 L PE	 1	 0060046
Version with 2 containers (2x10 L) 10 L PE container with cap Distributor	 2 1	 0060081 0900574
Version with 4 containers (4x14 L) 14 L PE container with cap Distributor	 4 1	 0060334 0900575
Version with 12 bottles (12x2,9 L PE/12x2,0 L glass) Bottle tray for 12 x 2,9 L bottles 2,9 L PE bottle Cap for PE bottle Distributor Version with glass bottles: 2,0 L glass bottle Cap for glass bottle	 1 12 12 1 12 12	 0040034 0060034 0060035 0900569 0030013 0060161

Installation

For all fixed site samplers:

Order number	Designation
0030004	350 ml Duran 50 glass replacement metering vessel
0900012	Suction hose with screw connection, length 5 metres
0069304	Suction hose, running metre
0050025	V2A stainless steel sinker weight, 180 mm long
0900014	Extraction unit
0030009	Plinth
0900017	Mounting kit
	Possible messages
	Message „distributor advance“
	Message „program active“
	Message „sample extraction“
	Message „program end“
	Message „collective malfunction“

Spare parts list

Order number	Designation	Application
0091883	SP III power pack	Fixed site sampler
0060004	Profile half-cylinder	Fixed site sampler
0069401	O-Ring	Fixed site sampler
0069402	Quad ring (ring with 4 sealing lips)	Fixed site sampler
0069304	PVC hose 12, 7x20	Fixed site sampler
0069403	Flat seal 25x15x2 EPDM	Fixed site sampler/ suction hose
0060050	Hose nozzle 3/4" x 13	Fixed site sampler/ suction hose

Installation

Technical data

Connecting data

Remark: **When connecting or inquiring messages with supply voltage, please make sure that the leads in the upper terminal box are laid in such a way that a spatial separation between secondary and primary voltage is guaranteed!**

Power supply:	230 V / 50 Hz / 2,5 A Flexible power supply lead, length 1,5 m. Connection by means of explosion-proof plug or with separation possibility according to the corresponding regulations for explosion protection
Main fuse of sampler:	Fuse for feeble currents 230V with T 8A 5x20 on fold-out plate

Warning Only use ceramic fuses with a maximum current of 1500 A

Signal connections:	Connections for flow signal analogue / digital and event proportional mode are in the terminal box
Optional messages:	Connections resp. relays are in the terminal box
Sample inlet:	Hose connection at top of metering unit. Union nut R 3/4", hose ID 9 mm
Sample outlet:	Hose connection at metering unit. Silicone hose 12x2; is only slid on

Installation

Data sheet

Data sheet	
Housing	Double-walled stainless steel (material 1.4301) with 40 mm insulation and 2 lockable doors. Upper door with plexiglass window. Protective heating in upper part. Protective top which can be opened for connection and maintenance works.
Self-contained thermostatic control	Automatic cooling and heating of the sample compartment at +4° C independent of the programmable controller
Control	Microprocessor control with 4 MB Flashrom , 32KB RAM (battery-buffered), 32 KB EEprom, 3 digital inputs and 8 digital outputs, 1 configurable analogue input, battery-buffered real-time clock. Operation by means of a waterproof foil keyboard (with keys 0-9, ESC, ENT, cursor) and 4 x 20-character back lit LC-display.
Programming	Time display: Hours, minutes, seconds Weekday, day, month, year Time delay: Date and time Sampling: •time-related •flow-related (analogue (0/4-20mA) or digital) •event-related or in combination. •interval 1 min to 15 h •bottle filling 1 min to 99 h 59 min •programs 6 user programs (for free editing) •data memory logging of sample extraction and messages. *optional*: storage of external data
Languages	Multi-language, selectable
Status messages	Optional: Sampling, distributor, program active, program end and collective malfunction message.
Dosing system	**Vacuum system** Metering vessel made of glass Duran 50, adjustable volume 20 - 350 ml (*optional:* 20 – 500 ml). Diaphragm pump 12 V / 4 A, vacuum 7,5 m, pressure 1 bar, suction hose ID 9 mm
Sample bottles	1 x 25 L PE 2 x 10 L PE 4 x 14 L PE 12 x 2,9 L PE 12 x 2,0 L glass
Overall dimensions	1.470 (2.106*) x 690 x 645 mm (hxwxd) *) with opened roof
Weight	Approx. 120 kg
Power supply	230 V / 50 Hz., fuse protection 16 A, cable 1,5 m
Power requirement	Approx. 250 VA
Optoelectronic coupler input	Analogue, minimum voltage approx. 3 V
Ambient temperature	-20°C to + 40 °C
All devices are according to **ISO 5667**	

Subject to technical changes.

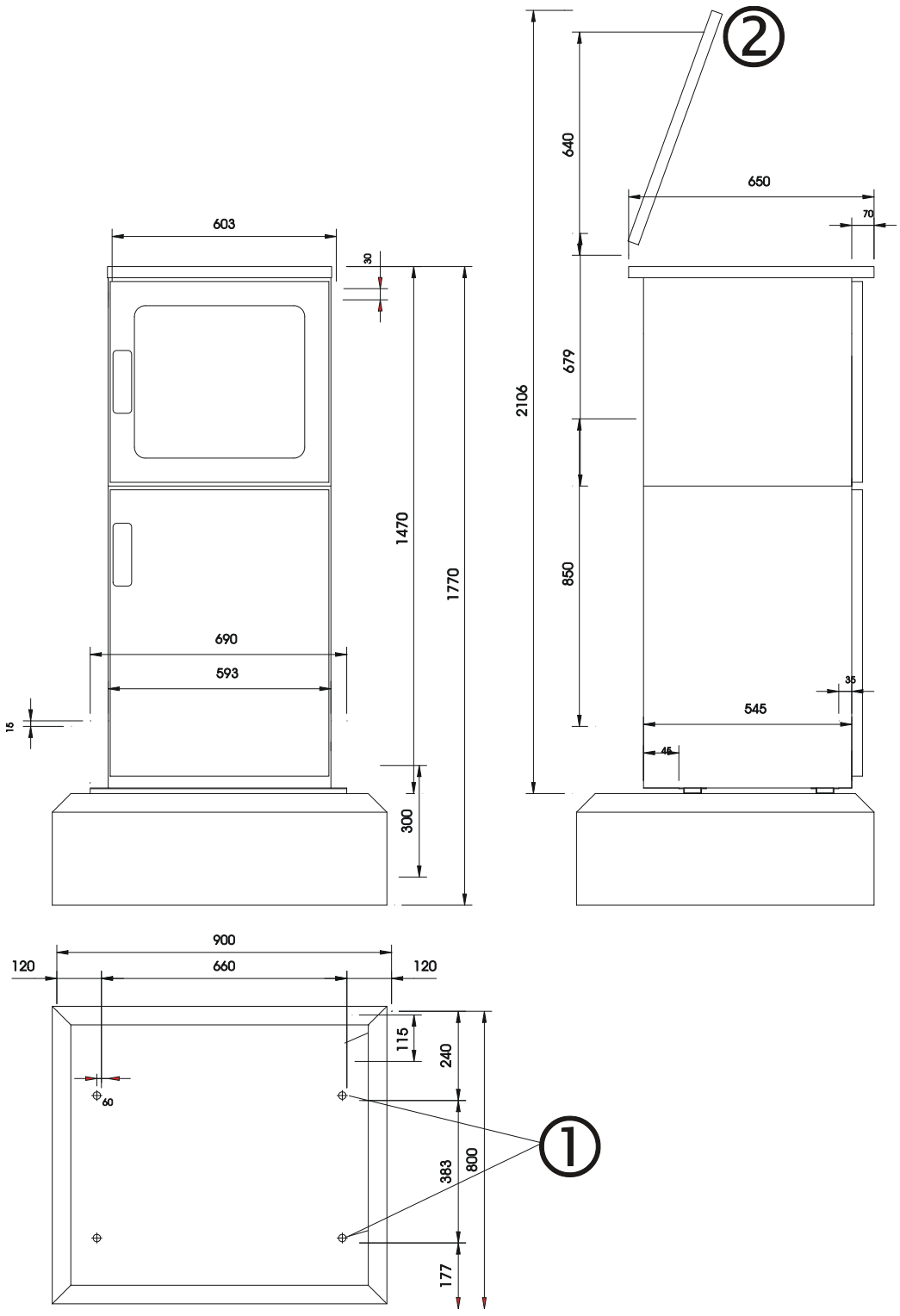
CE

Installation

Dimensioned drawing – device / plinth -

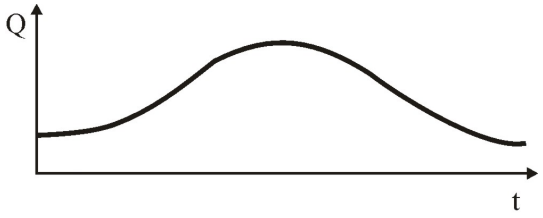
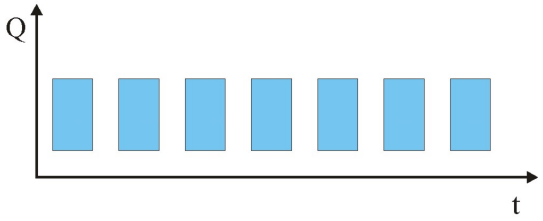
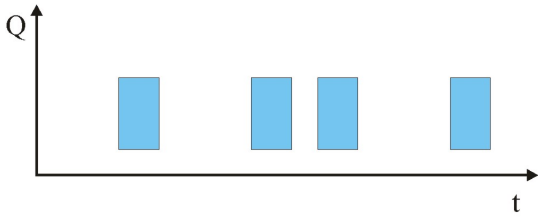
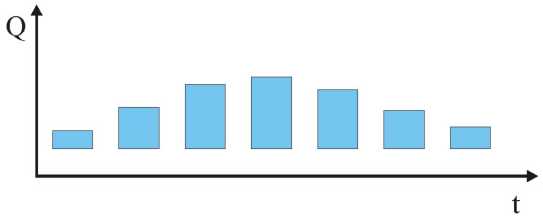
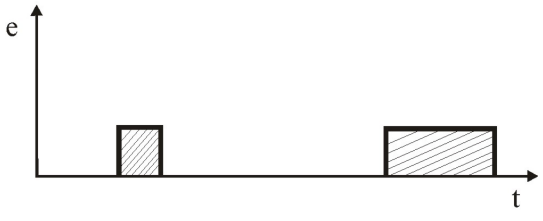
1. Fixing holes for dowels, diameter 12 mm

2. Sampler with opened top



Sampling modes

Graphical representation of sampling modes TIME-FLOW-EVENT

Flow graph		
Time-proportional		A sample is extracted in ***fixed*** time intervals (e.g. every 10 minutes) with a **fixed** sample volume (e.g. 50 ml).
Flow-dependent		A sample is extracted in **variable** time intervals (depending on the flow (Q)) with a ***fixed*** sample volume
Flow-proportional		A sample is extracted in **fixed** time intervals (e.g. every 10 min.), however, with a ***variable*** sample volume (the sample volume is directly depending on the flow (Q) = mA signal).
Event signal		The sampler is waiting for an event (e.g. the exceeding of a pH limit value). A sample is extracted in ***fixed*** time intervals (e.g. every 10 min.) with a ***fixed*** volume (e.g. 50 ml) **as long as an event is present**.
Event-proportional		

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 are 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 depending on the programmed bottle filling time.	Values to program: Sampling interval e.g. 00:05 hh:mm Bottle filling time e.g. 02:00 hh:mm

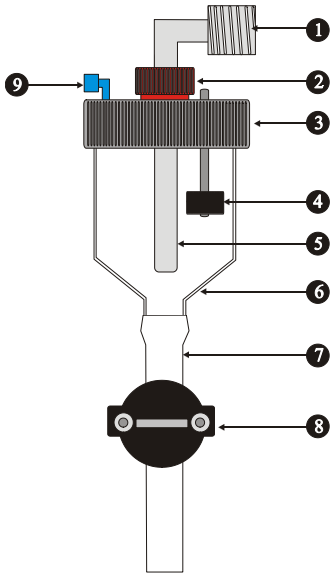
Operation

Vacuum sampling system

Vacuum metering vessel with pinch-valve

- pneumatic pinch-valve which closes the dosing hose below the metering vessel.
- no sensor, thus almost no wear.
- easy disassembly of metering vessel for cleaning.
- the sample volume can be adjusted between 20 and 350 ml by displacing the filling tube.
  For volumes bigger than 200 ml the filling tube has to be shortened.

Metering vessel – structure -

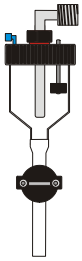


1. Hose connection
2. Screwed connection
3. Screw cap
4. Float switch
5. Dosing tube
6. Metering vessel
7. Silicone discharge hose
8. Pneumatic pinch-valve
9. Air connection

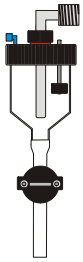
Cleaning:
To clean the **metering vessel** (6) open the screw cap (3), pull the **silicone discharge hose** (7) to the front and remove the **metering vessel**.

Method of operation:

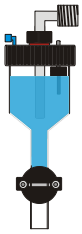
- To adjust the desired **sample volume,** loosen the **screw connection** and displace the **filling tube** vertically.
- The **pinch-valve** is closed.
- A pressure (air produced by the diaphragm pump) is applied to the **metering vessel** via the **air connection**. Thus the hose is purged if a purge has been programmed. A purge is only necessary if the hose is not laid with a continuous fall.
- Now, the solenoid valves switch 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 **metering vessel** is filled with sample medium until the **float switch** is activated. The diaphragm pump is switched off immediately and the solenoid valves change to aeration. Thus a suction develops in the suction hose which extracts any surplus sample quantity from the **metering vessel**. The sample volume is automatically adjusted to the level of the **filling tube**. After a pre-programmed aeration time, the **pinch-valve** opens in two steps and the sample is filled into a container.



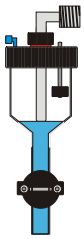
1. Inoperative position



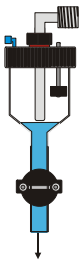
2. Pinch-valve closes



3. Metering vessel is filled up to the float switch



4. Dosing system is aerated



5. Pinch-valve opens and sample drains off in bottle

Replacement of dosing hose

The silicone hose (0069301) is only slid on the lip of the metering vessel. A hose clamp is not required. Humidify the hose a little bit, fix it at one point and slide it on 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!

Diaphragm pump (manufacturer: KNF-Neuberger / order No. 0091671)
Please see the attached operating instructions from KNF-Neuberger.

Solenoid valves (manufacturer: Bürkert / order No. 0091645)
Please see the attached operating instructions from Bürkert.

Spare parts list – vacuum sampling system

Article No.	Designation	Component
0030004	Metering vessel 350 ml	Dosing system
0030005	Metering vessel 500 ml (only standard vacuum)	Dosing system
0060457	Black air filter (pneumatic unit)	Dosing system
0069301	Silicone hose 12 x 2	Dosing system
0069401	O-ring 16 x 4, NBR	Dosing system
0069402	Quad-ring 81, 92x5, 33, NBR	Dosing system
0091648	Solenoid valve	Dosing system

Troubleshooting – vacuum 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
Float switch does not react, system flooded	Float switch is dirty (mechanically blocked)	Check in service menu
	Failure on power board	Replace power board
	Defective cable connection	Check connections
Sampler does not extract samples	System is leaking	Check whether the silicone hoses are tight
	Pump / diaphragm defective	Check pressure/vacuum of pump
	Metering vessel not tight, no vacuum	Check whether metering vessel is tight (union nut + filling tube)
	Float switch dirty (mechanically blocked)	Clean
	Valve system does not work correctly	Check valve system
No pressure/vacuum at pump	Diaphragm is defective	Replace diaphragm
	Silicone hoses are squeezed	Check the silicone hoses

Sample distribution

1. Cooled sample compartment
2. Circulation fan
3. Distributor head
5. Explosion-proof heating
5. Distributor housing with pneumatic distributor drive
6. Distributor traverse
7. Dosing hose
8. Distributor discharge tube
9. Air connection for distributor (aeration)
10. Fixing bar for distributor
11. Sample bottle

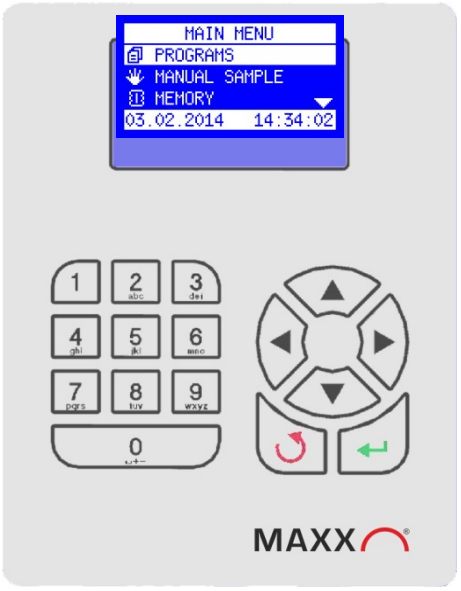
- **Distributor / bottle variants**
  - 1 x 25 L PE composite container
  - 2 x 10 L PE containers
  - 4 x 14 L PE containers
  - 12 x 2,9 L PE bottles / 12 x 2,0 L glass bottles
  - 24 x 0,5 L PE bottles

Troubleshooting - distributor

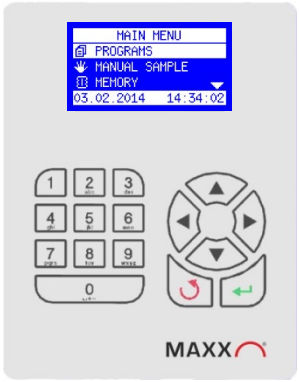
If a fault develops in your sampler, we can only provide prompt assistance if you give us the type and serial number of the apparatus concerned. You will find these data on the type plate. The more precise your description of the fault is, the better our fault diagnosis will be.

Symptom	Possible cause	Action	Chapter
No function	Solenoid valve is not activated Pneumatic line defective	Check solenoid valve Check pneumatic line	Distributor
Wrong positioning of distributor	Wrong distributor type selected	Check programming	Distributor

Programming instructions
Software Version 5



PROGRAMMING

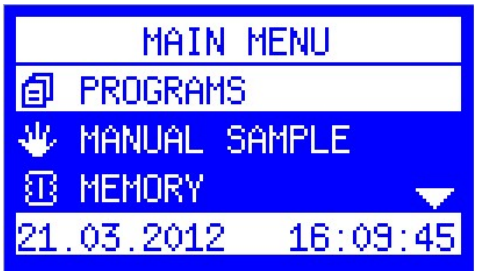


The menu structure is similar to a directory tree and is split up in main menus and submenus.
NOTE: Pleasenote that notall menu items of thismanualare absolutelyrelevant for your device.According to thesupplied equipment, thesemay differ!
Assignment and function of keys

The apparatus is interactively programmed by the user.
Function of the 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 (only portable samplers)	Back key	Press for at least 5 sec.
RESET / reset to factory settings (**NOTE:** all settings and data will be deleted!)	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:
Press the “DOWN” arrow key two times to select the line DATA MEMORY.
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.

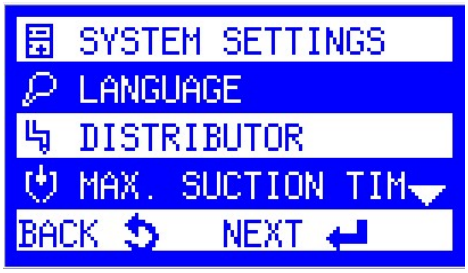
Menu variants:

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 next line indicates the possible range of values. An entry is possible directly by means of the number keys or by selecting the digit with the right / left arrow keys and by setting them 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.

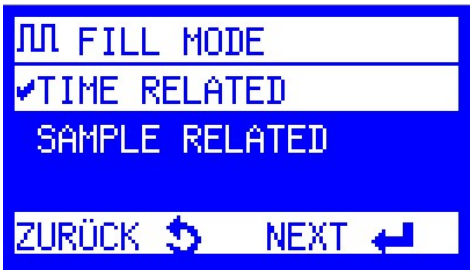
Settings with selection menus

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.



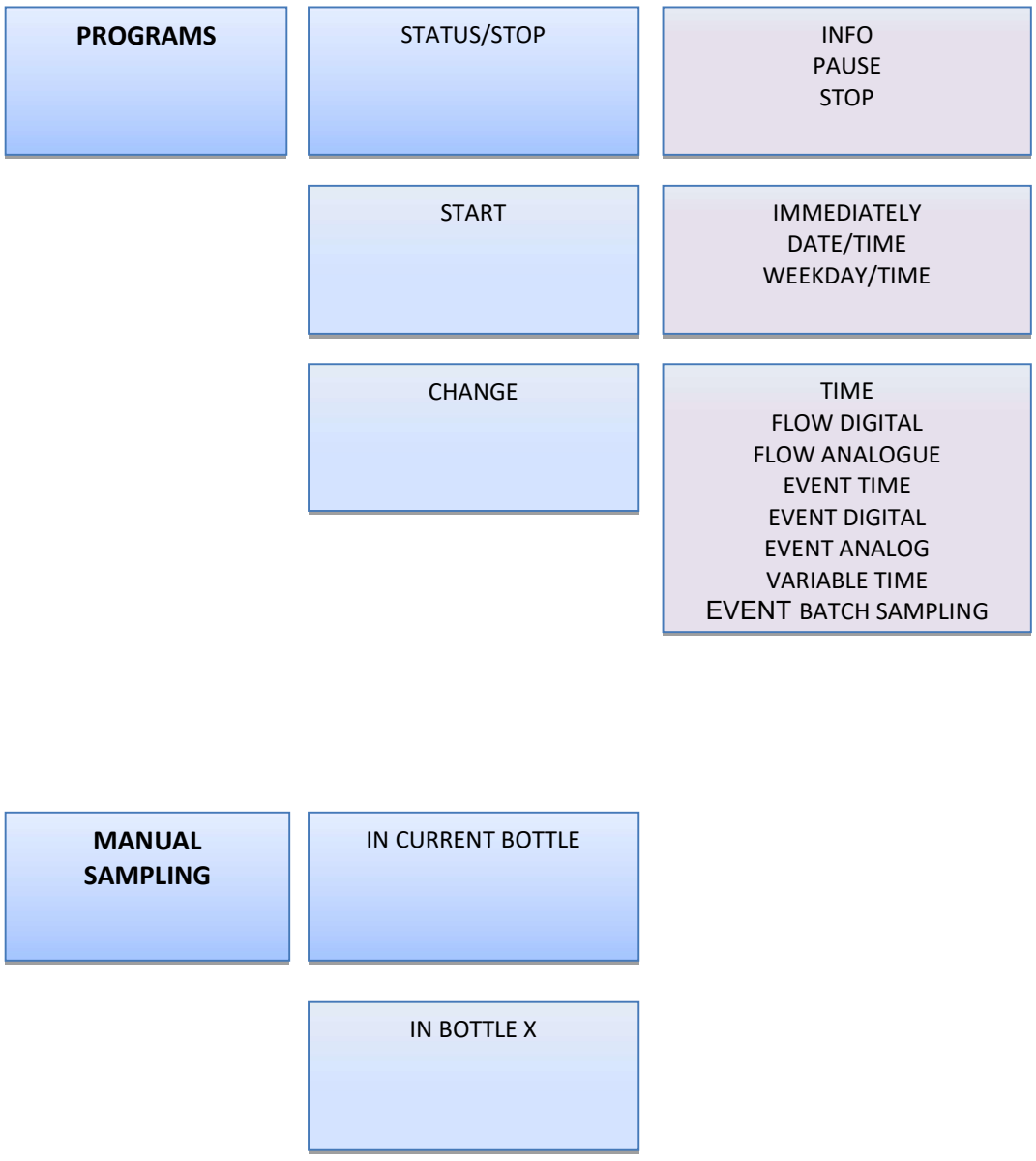
Selection of individual menu points

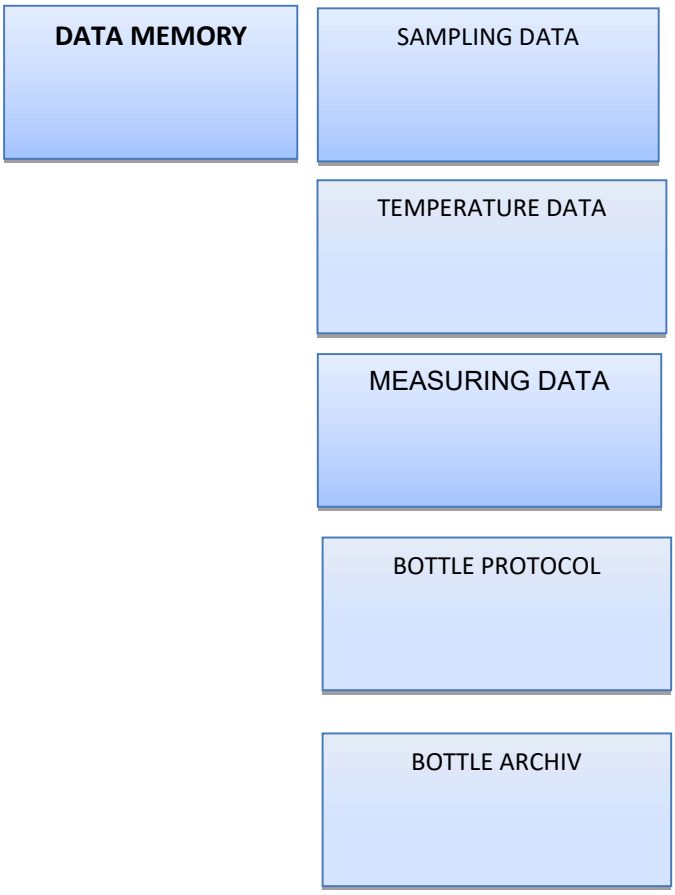
In the selection menus, additional program settings are displayed. All the settings which have been activated by pressing the ENTER key or which are already active are marked with a symbol.



MAIN MENU STRUCTURE

Description of the main menu structure with submenu levels 2 and 3




DATA MEMORY
SAMPLING DATA
TEMPERATURE DATA
MEASURING DATA
BOTTLE PROTOCOL
BOTTLE ARCHIV

DIAGNOSIS/ TEST	COMPONENTTEST	• PUMP • PINCH VALVE • VALVE SYSTEM • DISTRIBUTOR • DIGITAL OUTPUTS
	OUTPUTS TEMPCARD	LOWER HEATING : COOLING : UPPER HEATING :
	DIGITAL INPUTS	FLOW DIGITAL; EVENT DI3 DI4 DI5 DI6 DI7 DI8 (only if I/O board is installed) DI 9-12
	ANALOG INPUTS	ANALOG 1: ANALOG 2: ELECTRODES 1: ELECTRODES 2: PT 1000 SENSOR OP.VOLTAGE.: 13,8 V FLOW: xxx l/s (m3/h)
	VERSION INFO	-SOFTWARE VERSION -SERIAL NO. PLC -START VALUES -DATALOGGER VERS. -TEMP.CARD VERSION
	IPADDRESS	Display of IP address (only if WEB-Board is installed)

SETTINGS	DATE/TIME	DD.MM.YYYY hh:mm 15.08.2013 13:56
	DEVICE SETTINGS	• LANGUAGE • DISTRIBUTOR • MAX. SUCTION TIME • PRE-PURGE • POST-PURGE • RINSE BEFORE SAMPL. • CALIBRATE VAR SYSTEM • AERATION TIME • PUMP POWER • LOG ENTRIES • INTERNAL TEMP. • ANALOG SIGNAL • DISPLAY • STATUS LED • PAUSE DURATION • FREELY PROG. INPUTS • OUTPUT SIGNALS • MAX. SAMPLE VOLUME • MIN. SAMPLE VOLUME
	SLEEP MODE (only portable devices)	• ACTIVE • INACTIVE
	PASSWORD	• CHANGE PASSWORD • CHANGE PROGRAMS • CHANGE SETTINGS • PROGRAM STOP
	SERVICE	Setting of base parameters (only for service technicians) Password protected

Description of the displays with explanation

DISPLAY	DISPLAY	EXPLANATION / FUNCTION
PROGRAMS		
STATUS/STOP	• INFO	Display of program details
	• PAUSE	Interruption of the running program (max. 120 min)
	• STOP	Stop the current program or all programs
START	• IMMEDIATELY	Program start can be: • immediately • with date/time (dd:mm:yyyy hh:mm)
	• DATE/TIME • WEEKDAY/TIME	• with weekday/time (day; hh:mm)
CHANGE	PROGRAM No. [xx]	Change the program parameters like mode of operation (time, flow, event…), interval etc. Selectable operating modes: • TIME • FLOW DIGITAL • FLOW ANALOG • EVENT TIME • EVENT DIGITAL • EVENT ANALOG • EVENT BATCH SAMPLING
MANUAL SAMPLING		
IN CURRENT BOTTLE		Sample extraction into current bottle
IN BOTTLE X		Sample extraction into selectable bottle X
DATA MEMORY		
SAMPLING DATA		Display of data of the single bottles
TEMPERATURE DATA		Temp. sampling compartment. Temp. Ambient, PT1000 Temp.
MEASURING DATA		Option: data of external sensors like pH, Cond., Temp °C if connected
BOTTLE PROTOCOL		data of each bottle, like start/end of filling time, requested/taken samples
BOTTLE ARCHIV		data archive "bottle protocol" of the last 50 program cycles

DIAGNOSIS/TEST		
COMPONENT TEST	• PUMP • PINCH VALVE • VALVE SYSTEM • DISTRIBUTOR • DIGITAL OUTPUTS	Possibility of a functional check of the components
OUTPUTS TEMPCARD		Display STATUS of: - Lower heating (OFF / ON) - Cooling (OFF / ON) - Upper heating (OFF / ON)
DIGITAL INPUTS		Display of (DI=digital input): Flow digital: 0 Event: 0 DI3 DI4 DI5 DI6 DI7 DI8 (only if I/O board is installed) DI 9-12
ANALOG INPUTS		Display of: ANALOG 1 ANALOG 2 ELECTRODES 1 ELECTRODES 2 PT 1000 SENSOR (Option) OPERATING VOLTAGE FLOW: xxxx l/s (m3/h)
DISPLAY OF VERSION		• Display of the firmware version • Serial No. PLC • No. of startvalues • Software version of datalogger • Software version of Temp. Board
IP ADDRESS		Display of IP address (only if WEB-Board is installed) Default IP: **192.168.1.1** Default PORT: 47234

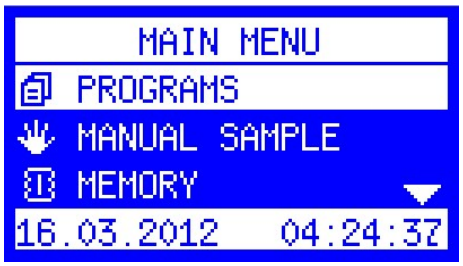
SETTINGS		
DATE/TIME		Setting of date/time
DEVICE SETTINGS	• LANGUAGE	Setting of the language
	• DISTRIBUTOR	Selection of distributor type
	• MAX. SUCTION TIME	Setting of the maximum suction time (0-600 sec.)
	• PRE-PURGE	Pre-purge = purge of suction hose **PRIOR** of the sample extraction (0 - 99,99 sec.)
	• POST-PURGE	Post-purge = active purging of the metering vessel **AFTER** the sample extraction (0 - 99,99 sec.)
	RINSE BEFORE SAMPLING	Option to rinse intake line with source liquid prior to each sample, 1 to 3 rinses.
	• VAR CALIBRATION	Volume calibration for Peristaltic Pump or option:VAR Vacuum system for flow-proportional sampling
	• AERATION TIME	Time until pinch valve is opened for drain off of sample
	• PUMP POWER	Adjustable from 70 % to 100% (not available for Peristaltic Pump)
	LOGENTRIES	set of the Log entries. Log interval for Temp.-board and PT1000 can be adjusted 1….60 min
	• INTERNAL TEMPERATURE	-Via NTC
		-Via PT1000
		-Limit value (1 - 20 °C)
		-Delay time (1 - 60 min.)
		(Example: limit value 7°C, delay time 10 min. An alarm message is sent if the limit value is exceeded for 10 min.)
	• ANALOG SIGNAL	Selection:
		0-20 mA
		4-20 mA
		Calibration (adjustment with signal of plant)
	• DISPLAY	- always switched on
		- switch off after certain time (0-999 sec.)
		- contrast
		- max. brightness
		- min. brightness
	STATUS-LED (Option)	Option only for P6. LED at handle flashes green: if program is active red: indicates any ERROR
	•DURATION OF PAUSE	Program can be interrupted for 10-120 min. for example for cleaning .After expiry of the time entered the program is automatically resumed.

	• PROG. INPUTS	Programmable inputs: input signal to start a program e.g. via an external pulse. Four inputs are available.
	• OUTPUT SIGNALS	REMARK: **this feature is only available if the optional I/O add-on board is connected** (5 output signals).
		In the basic version (without the add-on board) **1** fixed output is available for the collective malfunction message which can be used via an optional signal relay. With this feature, however, the possible (malfunction) messages can be configured individually for each of the 5 signals.
	MIN. SAMPLE VOLUME	**only for Peristaltic or VacuumVAR system!** setting of the **min. sample volume** which shall be taken
	MAX. SAMPLE VOLUME	**only for Peristaltic or VacuumVAR system!** setting of the **max. sample volume** which shall be taken
SLEEP MODE	•ACTIVE	**Only at portable samplers:** If the sleep mode has been activated and the program is to be started in 20 min. at the earliest, the message „Attention device switches to sleep mode“ is displayed for 30 sec. Thereafter the display is switched off and only activated again 2 min. prior to the program start.
	• INACTIVE	Sleep mode is deactivated
PASSWORD	• CHANGE PASSWORD	- In general the password can be changed.
	• CHANGE SETTINGS	- A password for settings can be entered.
	• CHANGE PROGRAMS	- A password for changing programs can be entered
	• STOP PROGRAMS	- A password for stopping programs can be entered
SERVICE		Setting of base parameters (only to be done by a service technician) (Password protected)

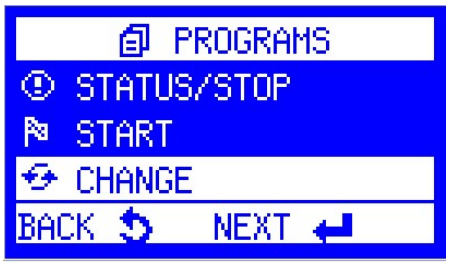
Examples of programming

Programming of a time-proportional sampling program

Select PROGRAMS in the main menu

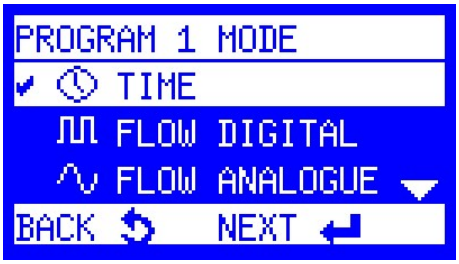


Select CHANGE



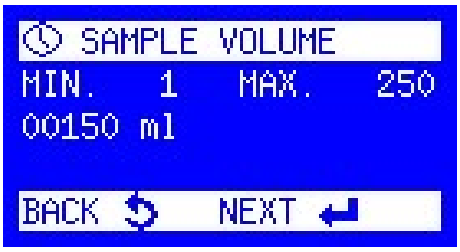
Select PROGRAM NO. 1 (out of 12).
Programs No. 2-12 can be selected by pressing the left or right arrow key.
Press ENTER to edit the program.

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



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

Setting of sample volume (ml) (only for Peristaltic Pump and VAR Vacuum)
The min. and max. sample volume can be predefined in DEVICE SETTINGS➡ MIN. SAMPLE VOLUME
➡ MAX. SAMPLE VOLUME



Set the BOTTLE FILL TIME
(here: each bottle is filled for 2 hours.)
Range: 00:02 up to 168:00 (hhh:mm)

Programming can be terminated…..

..... and the program can be started directly.

Besides the standard programming there are several special program functions which can be activated selectively with each operating mode.
In the menu „MORE SETTINGS“, you can find a list with all special functions available.
Please find following a detailed description.

SPECIAL PROGRAM FUNCTIONS

Beside the standard programming features the unit also offers the following special functions:
PROGRAMS ⇨ CHANGE⇨ TIME/FLOW/EVENT⇨ **MORE SETTINGS**

SPECIAL FUNCTIONS

If "**MORE SETTINGS**" has been chosen, the following special functions are available depending on the single operating modes:

- PROGRAMMING OK

  When all the desired settings have been entered, and this function is selected all settings are confirmed and the display returns to the START menu.

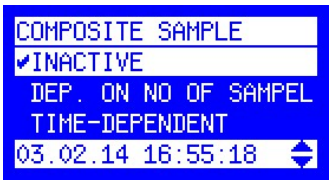
- SERIAL SAMPLES

  Number of samples per sample extraction means that each requested sample extraction consists of x samples. If e.g. the value 3 is entered, 3 samples are extracted successively. When activating this function, particular attention has to be paid to the bottle volume in order to avoid overfilling. This function is useful if several single sample extractions shall be effected in a very short time
  to obtain a bigger sample volume.

- BOTTLE ASSIGNMENT

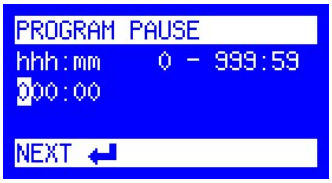
  (First bottle / last bottle)
  The first and the last bottle of a sampling cycle can be defined. With this function a **group of bottles** can be assigned to a certain program. An activation of this function is recommended if the function “Program linkage” is
  used. The bottle group is always defined by the settings “first bottle” and ”last bottle”.
  Example:
  In program 1 bottle **1** up to bottle **6** and
  in program 2 bottle **7** up to bottle **12** are selected.
  Thus, after the start of program 1, bottles 1 – 6 are filled accordingly and after the start of program 2, bottles 7 – 12 are filled.

- MIXED SAMPLE



(This menu is only available if thedistributor variant with “mixed sample bottle” is already factory set.)
The mixed sample is always filled into a separate bottle and can be effected time- or sample-related.
Time-related:
If the time-related sample extraction is selected, an interval in minutes has to be entered.
Sample-related:
If a sample-related sample extraction is selected, the number of samples after which a mixed sample is to be taken has to be entered.

- PROGRAMPAUSE



(Programpause=delayed program start:
Delay between the end of program X and the start of the next program. Defers the program cycle in the continuous mode by the time entered.
This function is only possible if a program has been started in the „**continuous operation**“ mode and leads to a deferred start (by the time entered) of the next program.
Example: program 1 is edited with a program pause of 1 hour and is started at 8.00 h (24-hour cycle). Thus the program will be terminated at 8.00 h the next day and the program cycle will only be started again at 9.00 h due to the entered program pause of 1 hour. So, every day the program start will be deferred by 1 hour.

- QT-AUTOMATIC (Q= flow, T=time)

(this feature is **only** available**at flow-dependent programs!**)
Time-flow automatic (MINIMUM and/or MAXIMUM Qt-TIME have to be set)
This function enables that in the flow mode (**independently** of the flow signal) a sample is extracted at least after xxx minutes or at the earliest after xxx minutes. Both functions can be activated separately or together.
Minimum QT-time: minimum time between two sample extractions.
An activation of this function is reasonable if there is only a weak flow signal and thus the sampling interval would be very long. Thus a sample extraction is quasi enforced to obtain at least a minimum sample volume**.**
Maximum QT-time: maximum time between two sample extractions.
An activation of this function is reasonable if there is a strong flow signal (e.g. due to rain) and thus the sample interval would be very short. Sample extractions are quasi inhibited in order to avoid the very quick filling of the bottles. If the bottles would be filled within a very short time there would be no bottles left to be filled within the remaining runtime of the sampling cycle.

- COMBINED EVENT MODE

This function enables the combination of a **time-dependent** resp. **flow-dependent program** with an **event program (**e.g.in case of an exceedance of a limit value) andcan be activated or deactivated**.**
For the event program the sampling interval and the bottle filling time have to be defined in hours and minutes (hh:mm).

Program run:
As soon as there is an event signal, the distributor moves to the next empty bottle (is recorded in the memory as event bottle). The sample extraction is effected according to the set values as long as the signal is present. If the signal is active longer than the bottle filling time set, further bottles are filled. When the signal fades, the distributor moves to the next empty bottle and resumes the initially started sampling mode (time or flow). All this data is logged in the info memory.

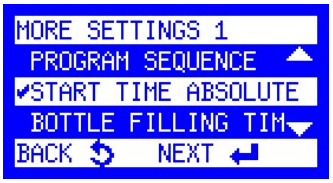
- PROGRAM LINKAGE

(End of program 1 will start program 2. End of program 2 will start program x. The last program will start program 1 again or program x = CONTINUOUS OPERATION)
With this function it is possible to link one or several programs to each other (e.g. for weekend operation with different programs per day).

Program run:
End of Program 1 can trigger the start of Program 2. End of Program 2 can trigger the start of Program X.

The last entered program starts Program 1 again or any other Program X.
In addition, the number of cycles can be set for each program.

• ABSOLUTE START TIME

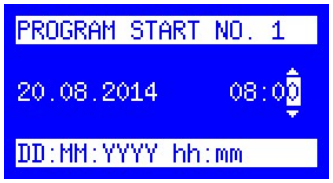


By means of an **external pulse**(e.g. a palm button) a program is always started **at a fixed time** (e.g. 8°° h).

The program run time always results from the value set as bottle filling time.

Example: Number of bottles = 12
Bottle fill time = 2 h
Program run time = 24 h

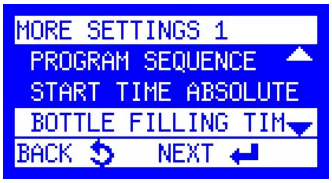
The program is automatically stopped after the entered run time (here: 24 h) and waits for the next external pulse (e.g. by means of a palm button).
This program feature ensures that the sampler always stays in the same time interval (here: 24 hours) and uses the same bottle assignment, independently of whether the start (external pulse) is before or after the programmed start time (here: 8.00 h).



• External pulse is triggered **before**the end of the program run time.
Example: you would like to change the bottles already before the expiry of the program run time and thus you trigger an external pulse at 6:30 h.Therefore the program stops at 6:30 hand starts again automatically at 8.00 h.
• External pulse is triggered **after**the end of the program run time.
Example: you can only go to the sampler after the program run time has expired e.g. 9:45 h. When you changed the bottles and trigger an external pulse, the program **automatically**calculates on which bottle the distributor has to be placed at the start time, moves to that bottle and starts sampling into this bottle.

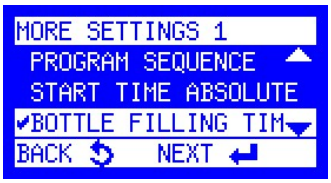
Remark: If the function „ABSOLUTE START TIME“ is activated /deactivated, also the first programmable input (PIN 40 to X5) is automaticallyactivated/deactivated!

- BOTTLE FILLING PAUSE (SÜV program)



Setting range: between 0-10080 min. (7 days).
This function enables a deferred sample extraction (filling pause) related to the bottles before the next bottle is filled.
The pause is entered in minutes.
Example:
Sampler with 24-bottle distributor system.
Bottle fill time: 2 hours.

- **without** programmed bottle filling pause:
A bottle change is made every 2 hours, that means after **24 hours**all the 12 bottles are filled.
- **with** programmed **bottle filling pause** of24 hours (1440min.):
Bottle 1 is filled for 2 hours. Thereafter there is a bottle filling pause of 24 hours and only then the distributor changes to bottle No. 2. Thus there is a delayed bottle filling of 24 hours between each of the individual bottles. The whole program cycle in this example would be: 12 bottles x 26 h = 312 hours (2 hours fill time + 24 hours filling pause).



As a result of this setting, each bottle is filled with a delay of 26 hours per day.

PROGRAM START

After selection of the menu point “Program Start”, 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.

• Program STARTOPTIONS

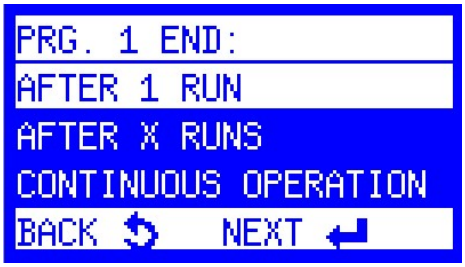
There are several possibilities to start the program:

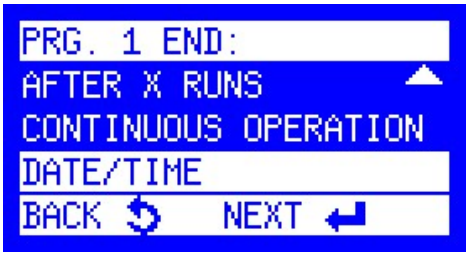
- IMMEDIATELY
  The program is started immediately.
- DATE/TIME
  The program start is effected on the selected date and at the selected time in the format: dd:mm:yyyy hh:mm. (Also in the past or in the future!)
  Important remark: Fixed assignment of bottle number and time of day!
  With this start option the program can also be started in the past/futurefor example to stay in *a* 24-hour daily cycle. Thus a fixed assignment of bottle number and time of day is achieved.
  Example:10th of May, 12 bottles, 2 h bottle fill time:
  - desired: 24-hour cycle with start at 8°° h
  - however, the program is only started at 11:20 h. The setting would be:
  10.05.yyyy 08:00
  - the software automatically calculates on which bottle position the distributor has to be placed (according to our example it would be bottle 2) and automatically changes to this position at the first requested sample extraction!
- WEEKDAY/TIME
  The program start is effected on the selected weekday and at the selected time in the format: day; hh:mm.

• PROGRAM ENDOPTIONS

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
  The program is repeated indefinitely.
- DATE/TIME
  The program can be terminated at a certain date/time.





• Program STATUS / STOP

Here the status (active/inactive) of programs is displayed.
The status of programs 1 – 12 can be checked by pressing the arrow keys (right/left).

- STATUS / STOP
  When pressing the Enter key, the following is displayed:
  STATUS ACTIVE = Program has been started/ is activeor
  STATUS INACTIVE = Program has not been started

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

  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.

- PAUSE

  The program can be interrupted for a period of 10-120 minutes (e.g.for cleaning). The exact time can be entered in the menu “SETTINGS”. The pause can be terminated manually or it is automatically terminated after the entered xxx minutes.

- STOP

  An active program can be stopped/aborted.

If several programs are active all these programs can be stopped at the same time.

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.

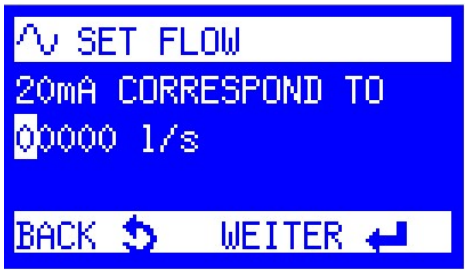
FLOW ANALOG – set resp. calibrate -

Under „SETTINGS“ ->„SAMPLER SETTINGS ->ANALOGSIGNAL“ the analog input can be set to the default values 4-20 or 0-20 mA or it can be adjusted/calibrated to the plant’s signal. To ensure that the sample extraction is effected according to the plant’s signal we recommend a calibration.

Calibration of the analog input 0/4-20 mA:
Connect the sampler to the plant’s signal. Set 0/4 and 20 mA by means of the SPS or an analog signal transmitter
and confirm these values according to the menu instructions.
1.Connect 0/4 mA and confirm.
2.Connect 20 mA and confirm.
3.Calibration OK, confirm.

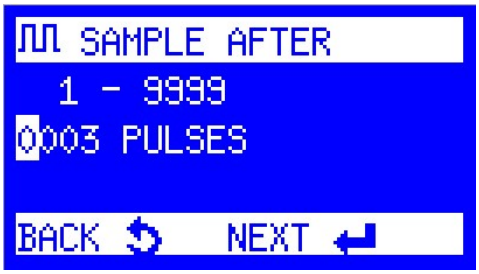
FLOWANALOG

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 in the flow analog setting is the maximum flow at 20 mA, which can be set as l/s or m3/h.



FLOW DIGITAL

In the FLOW DIGITAL mode, the sampling interval results from the incoming pulses. The filling time can either be **time-related** or related to a **certain number of samples**. If **time-related** is selected there is a further menu to limit the number of samples (samples/bottle) to avoid overfilling (overfill protection).



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 drops; 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.
The following settings are possible in the event mode:

EVENT TIME / DIGITAL / ANALOG / BATCH SAMPLING

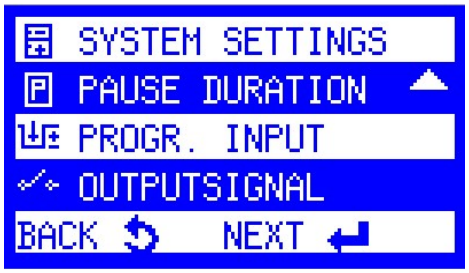
In the event mode the sample extraction can be time or flow dependent (analog and digital). The programming is effected as described before (sampling mode time, flow digital).

BATCH SAMPLING

Other than at the „classic“ event sampling, the bottle change is **not**effected with each signal but according to the programmed time (e.g. every 2 hours). Thus the bottles are always assigned to a fixed time pattern.

Example:
When a tank is discharged by means of a pump, each switch-on/switch-off of the pump would lead to a bottle change in the classic event mode. In the batch sampling mode, however, this is not requested and thus can be avoided by activating the batch sampling function which means that samples are only extracted as long as the signal is active (the pump is running). During the bottle filling time of 2 hours there can thus be several pump cycles which activate the sample extraction, however, are only considered as 1 event.

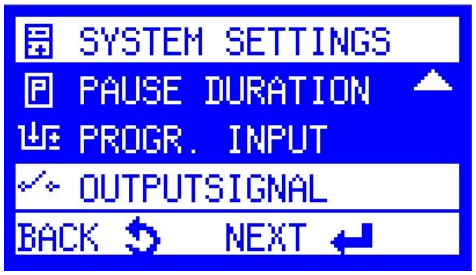
FREELY PROGRAMMABLE INPUTS:
PROGR. INPUT
ADDITIONAL INPUT 1
ADDITIONAL INPUT 2
ADDITIONAL INPUT 3



There is **1** programmable input in the basic version.
With the option "I/O extension board" further **3** inputs are available.
Each input can be programmed individually according to the following list:

- **NO FUNCTION**
  reset of setting
- **PROGRAMSTART PULSE**
  if selected, program x can be started (**external start)**
- **PROGRAMSTOP PULSE**
  if selected, program x will be stopped (terminate with ESC)
- **PROGRAM RUN DURING PULSE**
  A program is executed as long as there is a continuous signal. If the signal drops, the program will be stopped.
- **BOTTLE CHANGE PULSE**
  Pulse signal: **<= 3sec** means “advance to next bottle”
  >= 5 sec means “move to bottle No. 1”
- **SAMPLING PULSE**
  A pulse triggers the sample extraction
  The pulse signal has to be > 50ms!
  Remark: This function is only possible if **no** program is running. In this case the unit is controlled externally (e.g. via SPS).
- **MANUAL SAMPLE**
  A manual sample is triggered.
  There is no registration in the info memory (ideal for official samples or tests).
- **ACKNOWLEDGE ERROR**
  Accumulated error messages can be acknowledged.

OUTPUT SIGNALS



In the basic version (without extension board) a collective malfunction message is **always** available on output 8 (Pin 12/ 23). This message can be processed via an optional signal relay.

With the option "I/O extension board" further 5 freely configurable output signals are available.

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

Each output signal (1-5) can be programmed individually according to the following list:

• PROGRAMACTIVE

Selection: „PROGRAMACTIVE" or
„PROGRAM XX ACTIVE"

• PROGRAM TERMINATED

Selection: "PROGRAM TERMINATED" or
"PROGRAMXX TERMINATED"

• ERROR ACTIVE

Selection: „DELETE ERROR“
„GENERAL FAILURE“
„ERROR ELECTRODES“
„ERROR SUCTION“
„ERROR DISTRIBUTOR“
„ MAX. SPL/BOTTLE „
„ERROR ANALOG SIGNAL A1“
„POWER FAILURE“
„DOOR OPEN“
„INTERNAL TEMPERATURE“
„EMERGENCY CUTOFF“
„ SUCTION TIME“

• SAMPLING ACTIVE
• BOTTLE CHANGE
• DISTRIBUTOR ON POS. 1
• MESSAGE INVERTED
• OUTPUT SIGNAL OFF(switch off/reset of the output signal)

MESSAGES – description -

	Text / meaning	Description
	PROGRAM ACTIVE	When program is started a contact is activated for the whole duration of the program
	PROGRAM TERMINATED	Contact at program end
	ERROR ACTIVE	Contact in case of an error
	SAMPLING ACTIVE	Contact at each sample extraction
	BOTTLE CHANGE	Contact at each bottle change
	DISTRIBUTOR ON POS. 1	Contact when distributor moves on position 1
	MESSAGE INVERTED	Permanent contact (high). Only when there is an interruption (e.g. cable break) a message is triggered.
	OUTPUT SIGNAL OFF	Deactivation of output signal

ERROR MESSAGES

Error code	Text / meaning	Description
1	ERROR DISTRIBUTOR	Distributor is blocked, pulse generator or light barrier are defective.
2	ERROR SUCTION	No water, hose clogged, no vacuum (check system)
4	ERROR ELECTRODES andere Übersetzung	Electrodes are soiled with deposits or there is still water in the metering vessel.
5	SPANNUNGSAUSFALL ENDE	Datum/ Uhrzeit wann Spannungsausfall bei laufenden Programm eintrat
6	CHARGE STORAGE BATTERY	If battery voltage is lower than 11,95 V in idle operation or lower than 11,10 V with switched on pump
7	STORAGE BATTERY EMPTY	If battery voltage is lower than 11,10 V in idle operation or lower than 10,40 V with switched- on pump
10	ERROR ANALOG SIGNAL A1	Error message if the calibrated limit values are exceeded by 2 mA for at least 2 min.
11	DOOR OPEN	Door of sample bottle compartment is not closed (only possible with door contact option)
12	INTERNAL TEMPERATURE	If the temperature in the sample compartment rises over a certain (adjustable) limit value for a certain (adjustable) period of time (only possible if a temperature board is installed)
13	ERROR PINCH VALVE	If the pinch valve does not reach the cutoff current e.g. if it is not plugged in (only in VAR or pneumatic operation)

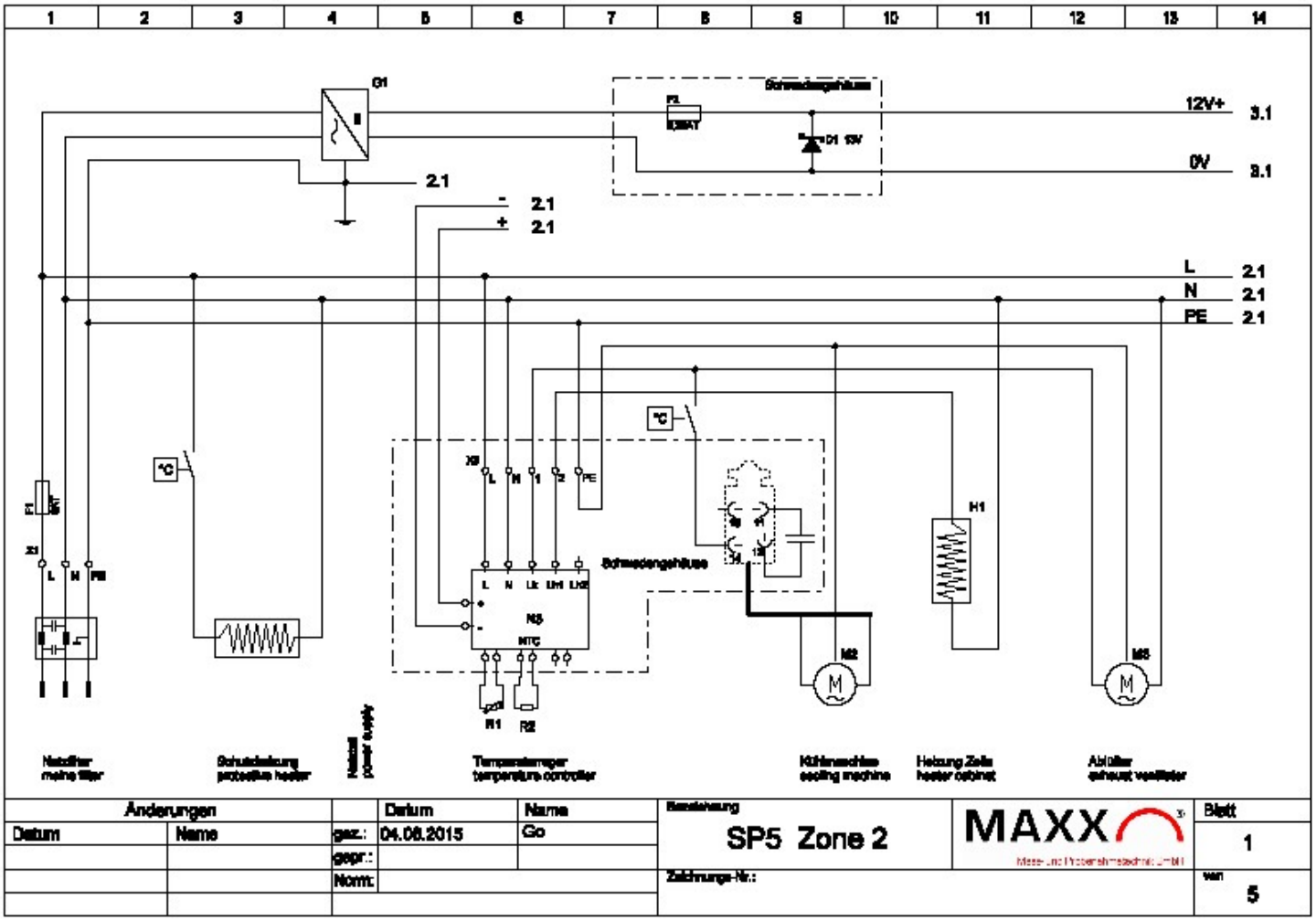
14	ERROR VALVE SYSTEM	If the valve system does not reach the cutoff current e.g. if it is not plugged in (only in VAR or pneumatic operation)
15	EMERGENCY CUTOFF	Current flow at an output of the controller is too high or there is a short circuit 1= error at a digital output 2=pinch valve/valve system error 3=over-current pump /distributor hardwaremessage 4=motor current distributor, software message 5=pump current too high, software message
17	STORAGE BATTERY DEFECTIVE	If battery voltage is lower than 10,40 V in idle operation or with switched on pump.
19	NO ANALOG SIGNAL	Error message if the calibrated limit values of analog inputs 2-9 are exceeded by 2 mA for x minutes (has to be ordered separately by the customer!).
20	POS1 NOT FOUND	If distribution reference position is not recognized
21	ERROR BOTTLEVALVE	If bottlevalve reference position is not recognized
28	PUMP BLOCKED	Ifpumpdoes not start
29	Water sensor (only Peristaltic Pump)	1 = upper before lower Sensor 2 = maximum time between the sensors exceeded 3 = Time between pump "ON" to the lower sensor too long
30	PUMP TUBE (only Peristaltic Pump)	If the pump hose is damaged and water enters the pump housing
31	PROGRAM PARAMETERS	Program System: Configuration error, Program cannot be started. (1-12)

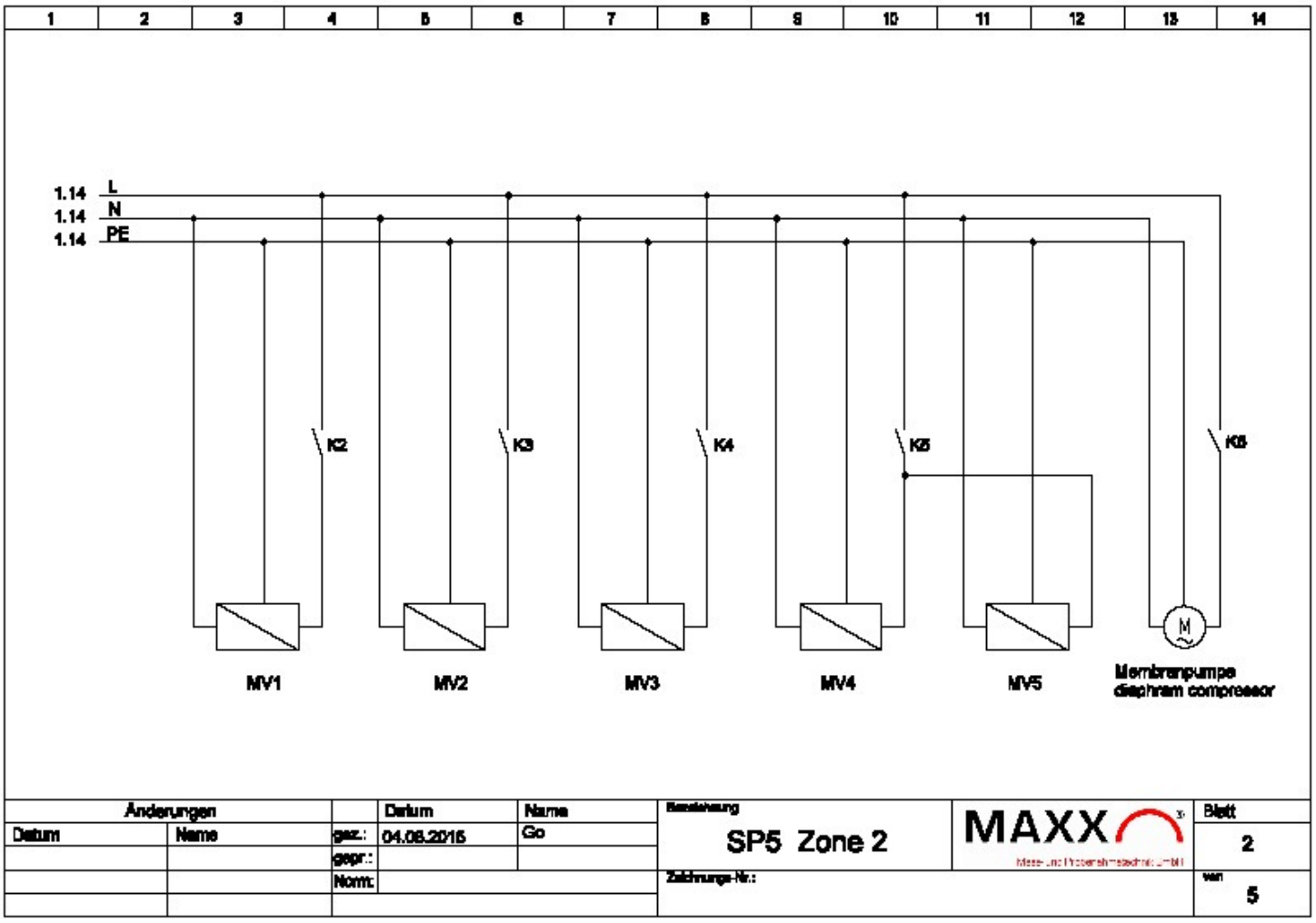
LOGMESSAGES (MEMORY)

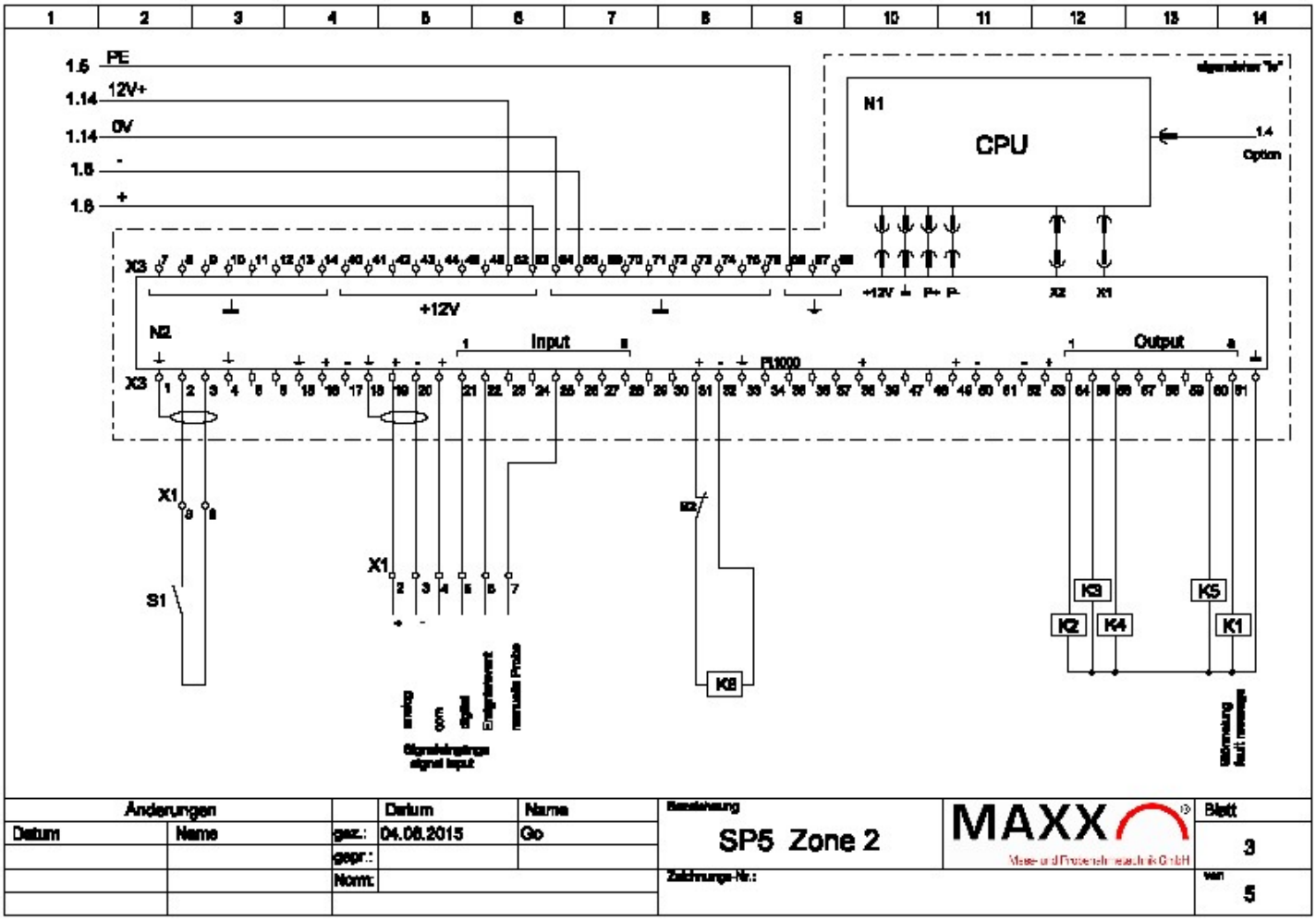
Logcode	**Meaning**	**Description**
1	ERROR	Logcode 1 includes all error codes
2	PROGRAMSTART	Date/time as well as the number of the started program
3	PROGRAM END PROG.	Date/time of the terminated program
4	START PROGRAMPAUSE	Date/time of program pause start
5	END OF PROGRAMPAUSE	Date/time of program pause end
6	SYSTEMSTART	Date/time of device start or restart after a power failure
9	BOTTLE CHANGE	Date/time of a bottle change
10	SAMPLE EXTRACTION	Date/time of a sample extraction triggered by a program
12	BTLE CHANGE REQUESTED (REMOTE)	Bottle change triggered via a programmable input (only possible if no program is active)

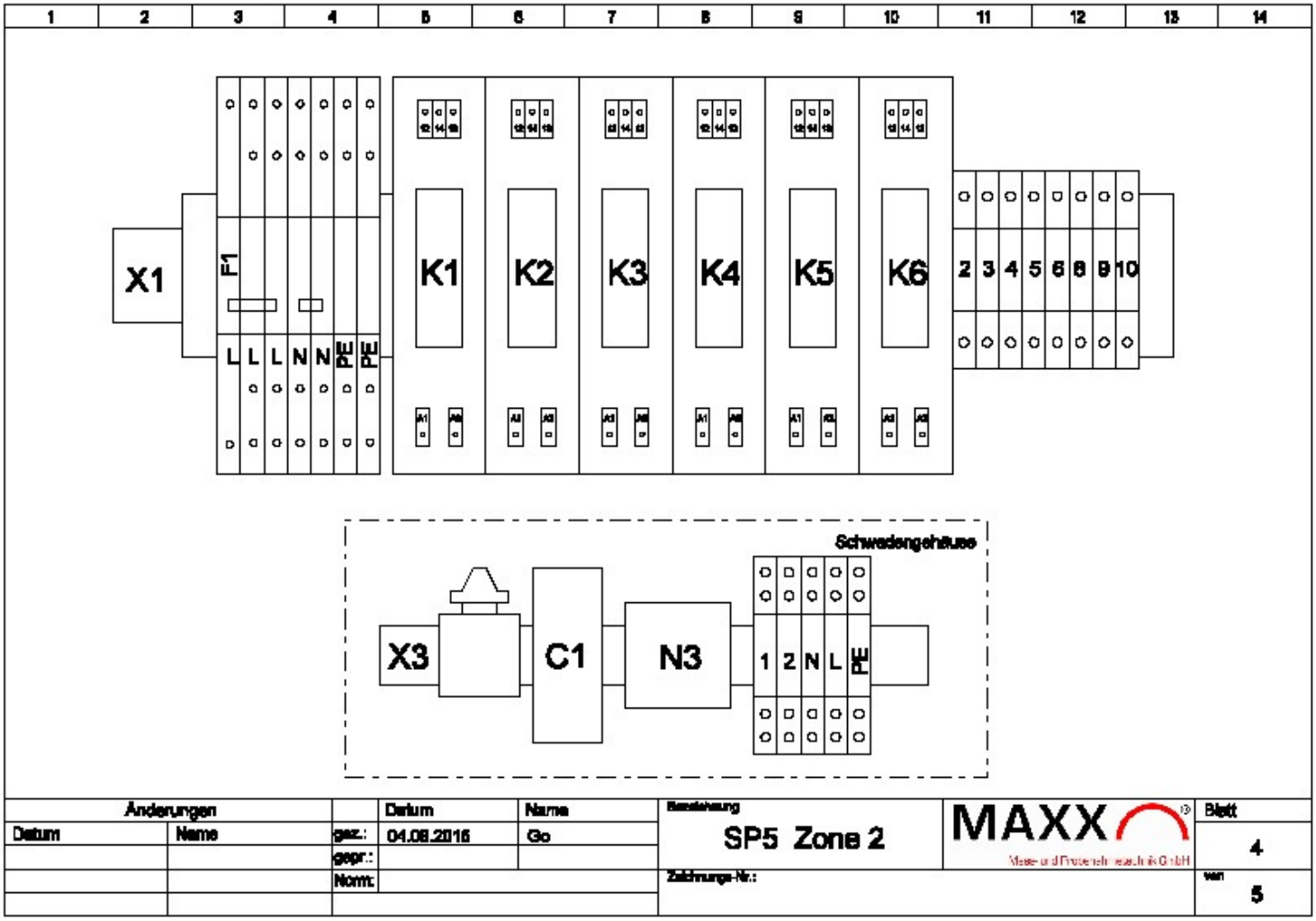
14	VOLTAGE LOSS START	Date/time of the start of a power failure
15	EVENT START	Date/time of the start of an event
16	END OF EVENT	Date/time ofthe end of an event
18	END OF SLEEP MODE	Date/time of the end of the sleep mode, only possible at portable samplers
19	CONDUCTIVITY SAMPLE MEDIUM	- 1stvalue: CV of pair of electrodes 1 when detecting water - 2ndvalue: CV after pre-purge -3rdvalue: limit value for water detection at pneumatic module or CV for pair of electrodes 2 at VAR module
20	TEMPERATURE REGULATION	1st value: internal temperature 2nd value: temperature of evaporator plate 3rd value: ambient temp. around control housing
21	BOTTLE STATISTICS	No. of samples requested, total No. of samples taken during program run time. This data is logged after a program has been terminated.
22	SINGLE STATISTIC	Data of abottlewill be logged after the bottle change
23	ACCESS WITH PASSWORD	Date/time of access to a menu which requires the extended password, e.g. service menu, stop program, change settings etc.
24	PT1000 °C/U-BATT	Temperature values of the PT1000 sensors as well as the operating voltage of the controller. Logging interval: every 10minutes.
26	SPL REQUESTED (REMOTE)	Sample extraction requested via a programmable input (only possible if no program is active)
27	SPL REQUESTED (EVENT)	Sample extraction triggered via an event program
28	ANALOG VALUE A1	mA signal values, (logging interval can be set in DEVICE SETTINGS -> LOGENTRIES) (log of current value, no average value calculation) 1st value: measured value at logging time 2nd value: lower limit value 3rd value: upper limit value
29	ANALOG VALUE X	mA signal values. Logging interval: each x-minutes. 1st value: No. of channel 2nd value: average value of logging interval 3rd value: upper limit value (has to be ordered separately by the customer)

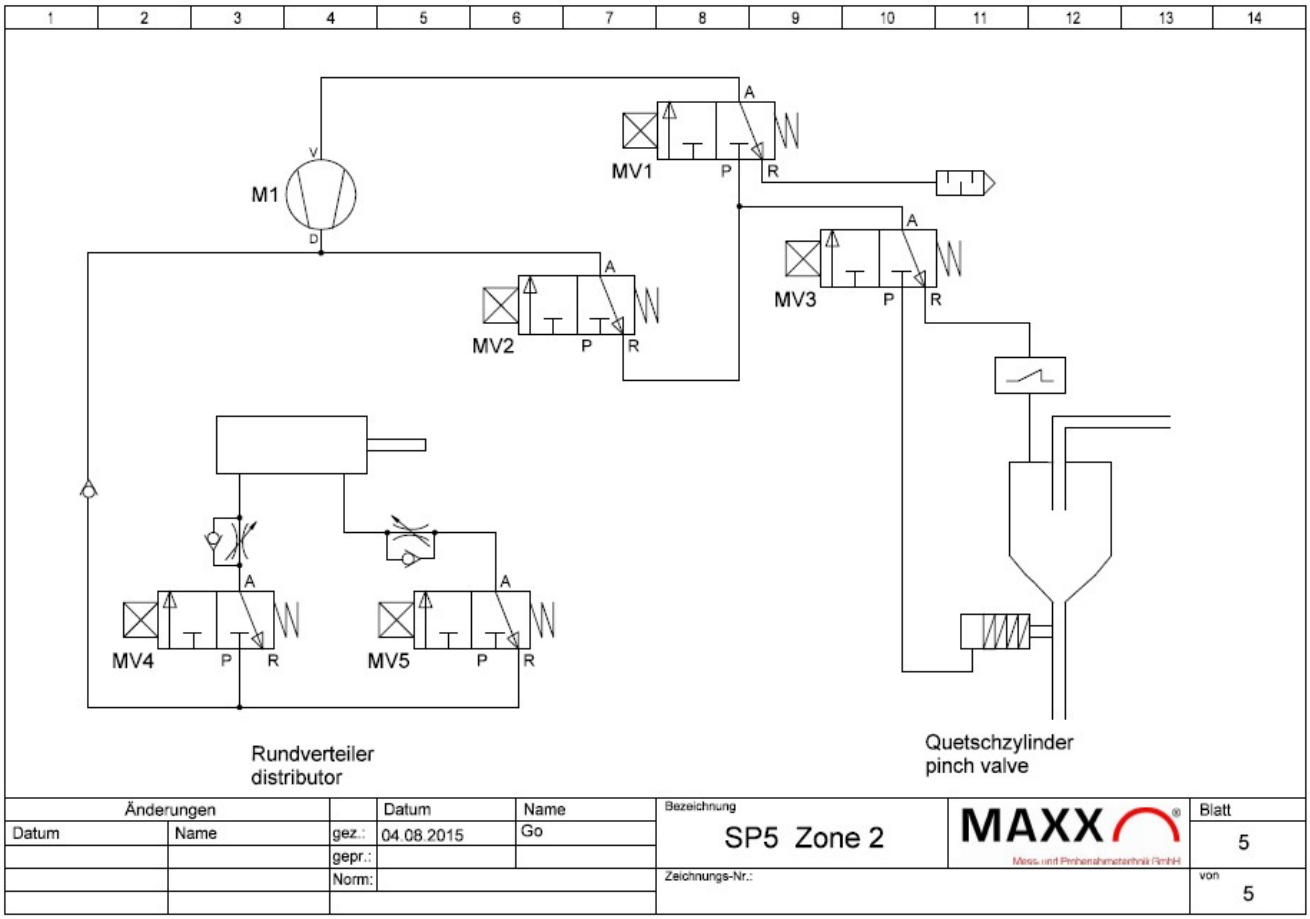
30	OVERFILL PROTECTION Value **1**= Drop sample **2**= Switch to next bottle	The overfill protection function has been activated in flow-dependent sampling mode 1st value: the requested sample was dropped. 2nd value: the requested sample was filled into the next bottle.
31	SAMPLING SUPPRESSED	**only with activeQ/T-function!** Samples aresuppressed when**flow**is too **HIGH**
32	SAMPLING ENFORCE	**only with activeQ/T-function!** Samples areenforced when**flow**is too **LOW**
35	TOTAL VOLUME	At the program stop the total volume of all samples requested during the program run is added up (only at VAR and peristaltic pump systems)
36	FLOW WHEN SAMPLING	Logging of flowat the time a sample extraction has been triggered (only at VAR and peristaltic pump systems)
37	RWA-DWA STATUS	Values are logged when the rain weather pulse divider is activated or deactivated. Selection is made per weekday from 00:00 – 23:59. (Only available at the Limburg sampler version)


12V+ 3.1
0V 3.1
2.1
L 2.1
N 2.1
PE 2.1
Schweißgehäuse
Netzfilter mains filter
Schutzleiter protective heater
Netzteil power supply
Temperaturregler temperature controller
Kühlmaschine cooling machine
Heizung Zelle heater cabinet
Abluftlüfter exhaust ventilator
Änderungen
Datum
Name
Datum
Name
gez.: 04.06.2015 Go
gepr.:
Norm:
Benennung
SP5 Zone 2
Zeichnungs-Nr.:
Blatt 1
von 5


1 2 3 4 5 6 7 8 9 10 11 12 13 14
1.14 L
1.14 N
1.14 PE
K2
K3
K4
K5
K6
MV1
MV2
MV3
MV4
MV5
M
Membranpumpe
diaphram compressor
Änderungen
Datum
Name
Datum
Name
gez.:
04.08.2015
Go
gepr.:
Norm:
Benennung
SP5 Zone 2
Zeichnungs-Nr.:
MAXX
Blatt
2
von
5


1.5 PE
1.14 12V+
1.14 0V
1.5 -
1.5 +
N1
CPU
1.4
Option
X3
+12V
N2
Input
Output
PI1000
X1
S1
K8
K3
K5
K2
K4
K1
analog
com
digital
Ereignisrelevant
manuelle Probe
Signaleingänge
signal input
Störmeldung
fault message
Änderungen
Datum
Name
Datum
Name
gez.: 04.08.2015 Go
gepr.:
Norm:
Benennung
SP5 Zone 2
Zeichnungs-Nr.:
MAXX
Blatt
3
von
5


1 2 3 4 5 6 7 8 9 10 11 12 13 14
X1
F1
L L L N N PE PE
K1 K2 K3 K4 K5 K6
2 3 4 5 6 8 9 10
Schwadengehäuse
X3
C1
N3
1 2 N L PE
Änderungen
Datum Name
gez.: 04.08.2016 Go
gepr.:
Norm:
SP5 Zone 2
MAXX
Blatt 4
von 5


1 2 3 4 5 6 7 8 9 10 11 12 13 14
M1
V
D
MV1
A
P
R
MV2
MV3
MV4
MV5
Rundverteiler
distributor
Quetschzylinder
pinch valve
Änderungen
Datum
Name
gez.:
04.08.2015
Go
gepr.:
Norm:
Bezeichnung
SP5 Zone 2
MAXX
Zeichnungs-Nr.:
Blatt
5
von
5

Operating instructions of the manufacturer KNF-Neuberger

INNOVATIVE TECHNOLOGY WORLDWIDE

KNF NEUBERGER

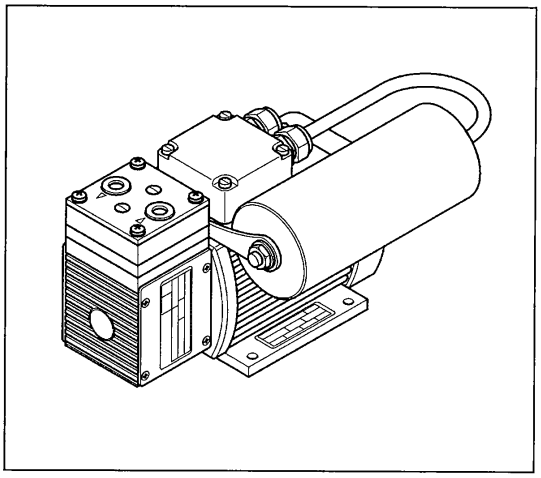
N 87 TTE Diaphragm Vacuum Pump and Compressor Explosion-proof

Operating instructions

Read and observe these operating instructions!

For pumps with a drive motor: Read and comply with the operating instructions for the drive motor. It must be seen as part of the operating instructions for the pump.

The mechanical part (pump part) and electrical part (drive motor) are certified separately. Hence, the device has two type plates. Each type plate relates only to that part of the device which it is mounted on.



CE
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0151e Ex 04/05

Keep for future use!

Appendix

Operating instructions of the manufacturer KNF-Neuberger

2. Use

2.1. Proper use

The pump is exclusively intended for transferring gases and vapors.

Owner's responsibility

Operating parameters and conditions

Only install and operate the pump under the operating parameters and conditions described in Chapter 4, Technical data, and Section 2.3, Use in hazardous areas.

Requirements for transferred medium

Before using a medium, check the compatibility of the materials of the pump head, diaphragm and valves with the medium.

Before using a medium, check whether the medium can be transferred danger-free in the specific application case.

Make sure that even when extreme operating conditions (temperature, pressure) occur and in the case of system malfunctions, there is no risk of explosion.

Only transfer gases which remain stable under the pressures and temperatures occurring in the pump.

2.2. Improper use

The pump is not suitable for transferring liquids.

2.3. Use in hazardous areas

In hazardous areas (zones), only operate pumps and motors of the corresponding equipment category and temperature class.

The pump has the following explosion protection marking:

Marking	Description
	Symbol for explosion-proof pumps
II	Equipment group (see Section 2.4.1)
2 G	Equipment category (see Section 2.4.2)
II A and II B	Explosion group (see Section 2.4.4)
T4	Temperature class (see Section 2.4.3)

Tab. 2

The explosion protection marking is also applied at the following location:

- Pump type plate

Drive motor

The pump drive motor must have at least the same explosion protection rating as the pump.

Operating instructions of the manufacturer KNF-Neuberger

2.4.4. Explosion groups

Flammable gases and vapors are classified according to explosion groups (I, IIA, IIB and IIC) and temperature classes. Tab. 5 shows the classification of the most common flammable gases and vapors.

	T1	T2	T3	T4	T5	T6
I	Methane	–	–	–	–	–
IIA	Acetone Ethane Ethyl acetate Ammonia Ethyl chloride Benzole Acetic acid Carbon monoxide Methanol Methyl chloride Naphthalene Phenol Propane Toluene	i-Amyl acetate n-Butane n-Butyl alcohol Cyclohexanon 1.2-Dichloroethane Acetic acid-anhydride	Gasoline Diesel fuel Jet fuel Heating oil n-Hexane	Acetaldehyde	–	–
IIB	City gas	Ethylene Ethyl alcohol	Hydrogen sulfide	Ethyl ether	–	–
IIC	Hydrogen	Acetylene	–	–	–	Carbon disulfide

Tab. 5

The classification of gases and vapors in groups with regard to their explosion group and temperature class applies both to the medium transferred and to the pump environment.

Transferred medium: The pump may only be used to transfer gases and vapors which are not explosive or belong to the explosion groups II A or II B and the temperature class T4 (and below) (marked range in Tab. 5).

Pump environment: The pump may only be operated in an environment which contains an atmosphere which is not explosive or belongs to the explosion groups II A or II B and the temperature class T4 (or below) (marked range in Tab. 5).

Operating instructions of the manufacturer KNF-Neuberger

4. Technical data

Pump materials

Assembly	Material*
Pump head	PVDF
Structured diaphragm	Coated PTFE
Valve	FFPM

Tab. 6 **according to DIN ISO 1629 and 1043.1*

Pneumatic values

Parameter	Value
Max. permissible operating pressure [bar g]	1.5
Ultimate vacuum [mbar abs.]	140
Delivery rate at atm. pressure [l/min]*	7.5

Tab. 7 **Liters in standard state (1,013 mbar)*

Other parameters

Parameter	Value
Permissible ambient temperature	See pump type plate
Permissible media temperature	+ 5 °C to + 40 °C
Electrical data	See drive-motor type plate

Tab. 8

Operating instructions of the manufacturer KNF-Neuberger

6. Installation and connection

Only install and operate the pumps under the operating parameters and conditions described in Chapter 4, Technical data, and Section 2.3, Use in hazardous areas.

Observe the safety precautions (see Chapter 3).

6.1. Installation

➔ Before installation, store the pump at the installation location for 3 hours to bring it up to room temperature.

Mounting dimensions
➔ See the data sheet for the mounting dimensions.

Cooling air supply
➔ Install the pump so that the motor fan can intake sufficient cooling air.

Installation location
➔ Make sure that the installation location is dry and the pump is protected against rain, splash, hose and drip water.

➔ Install the pump at the highest point in the system to prevent condensate from collecting in the pump head.

➔ Protect the pump from dust.

➔ Protect the pump from vibrations and jolts.

6.2. Electrical connection

DANGER

Extreme danger from electrical shock!

➔ Only have the pump connected by an authorized specialist.

➔ Only have the pump connected when the power supply is disconnected.

WARNING

Danger of explosion from electrostatic charging!

➔ Connect the pump so that the danger of ignition from electrostatic charging is prevented.

➔ Carefully ground the pump.

Drive motor
➔ Observe the drive-motor operating instructions.

Hazardous areas
➔ Only position the electrical equipment in hazardous areas which is required there for pump operation.

➔ Take lightning protection measures.

Operating instructions of the manufacturer KNF-Neuberger

7. Operation

➔ Only operate the pump under the operating parameters and conditions described in Chapter 4, Technical data, and in Section 2.3, Use in hazardous areas.

➔ Make sure the pumps are used properly (see section 2.1).

➔ Make sure the pumps are not used improperly (see section 2.2).

➔ Observe the safety precautions (see Chapter 3).

WARNING

Danger of explosion due to an excessive pressure and temperature increase!

➔ Do not exceed max. permissible operating pressure (see Chapter 4, Technical data).

➔ Monitor pressure and immediately shut down pump if pressure exceeds the maximum permissible operating pressure. Eliminate fault (see Chapter 9. Troubleshooting).

➔ Only throttle or regulate the air or gas quantity in the suction line to prevent the maximum permissible operating pressure from being exceeded.

➔ If the air or gas quantity in the pressure line is throttled or regulated, make sure that the maximum permissible operating pressure is not exceeded.

➔ Monitor temperature and observe upper pressure limits for compression heat.

WARNING

Danger of explosion due to increased ambient temperature!

➔ Monitor ambient temperature (compression heat, motor heat).

➔ Ensure sufficient supply of cooling air.

Pump standstill

➔ With the pump at a standstill, open pressure und suction lines to normal atmospheric pressure.

7.1. Information on switching pump on and off

Switching pump on

i The pump may not start up against pressure or vacuum during switch-on. This also applies in operation following a brief power failure.

➔ Make sure that normal atmospheric pressure is present in the lines during switch-on.

Operating instructions of the manufacturer KNF-Neuberger

8. Servicing

8.1. Servicing schedule

WARNING

Danger of explosion due to wear!

➔ Have pump bearings replaced by KNF according to servicing schedule.

➔ Have motor bearings replaced according to motor manufacturer's specifications.

Component	Servicing interval
Pump	Regular inspection for external damage or leaks
Structured diaphragm and valve plates/ sealings	Replace at the latest, when pump output decreases
Pump bearings (at drive shaft and connecting rod)	Have them replaced after 17,000 operating hours or 24 months at the latest
Motor bearings	See motor operating instructions or ask motor manufacturer

Tab. 9

8.2. Cleaning

8.2.1. Flushing pump

WARNING

Danger of explosion when flushing pump with air!

➔ In hazardous areas, or in cases when the pump is used with explosive media, only have pump flushed with inert gas by specially trained personnel.

➔ KNF recommends: Flush the pump for several minutes with inert gas under atmospheric conditions before switching it off.

i If there is no danger of explosion, air can also be used for flushing.

8.2.2. Cleaning pump

WARNING

Danger of explosion from electrostatic charging of components!

➔ Only clean pump with a damp cloth.

➔ Only clean the pump with a damp cloth and non-flammable cleaning agents.

➔ If compressed air is available, blow out the components.

Operating instructions of the manufacturer KNF-Neuberger

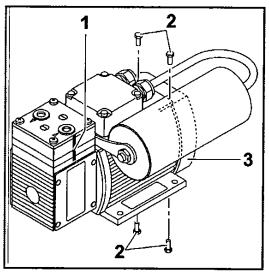


Fig. 3: Marking with felt-tip pen

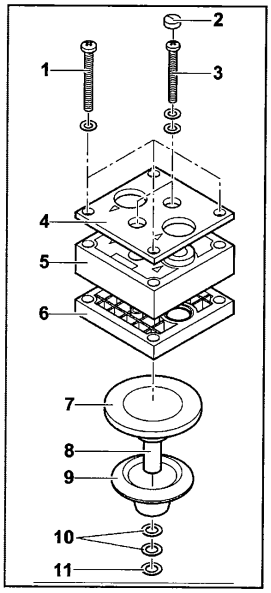


Fig. 4: Replacing structured diaphragm

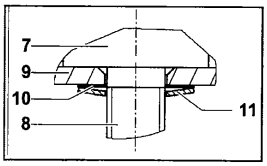


Fig. 5: Aligning disk spring

Removing pump head

1. Mark the top plate, head plate, intermediate plate and housing with a felt-tip pen (**1**) to ensure proper assembly.
2. Remove fan cover:

WARNING

Hazard of explosions caused by damage

There is no explosion prevention and protection if fan cover is damaged.

➔ Perform the step carefully and without applying force.

Unscrew the four mounting screws (**2**) and remove the fan cover (**3**).

The fan is visible.

3. Unscrew the four screws (Fig. 4/**1**) and remove the top plate (Fig. 4/**4**).
4. Remove the screw covers (Fig. 4/**2**), unscrew the two screws (Fig. 4/**3**) and take off the head plate (Fig. 4/**5**) and intermediate plate (Fig. 4/**6**).

The structured diaphragm is visible.

Replacing structured diaphragm

1. Put the pump on its side. This prevents diaphragm spacer(s) (**10**) and disk spring (**11**) from falling into the pump housing while the structured diaphragm is removed.
2. Move the structured diaphragm (**7**) to the upper point by turning the fan.
3. Lift the structured diaphragm (**7**) by the opposing side edges, grasp it and unscrew it in the counter-clockwise direction.
4. Remove the diaphragm support (**9**), diaphragm spacer(s) (**10**) and disk spring (**11**) from the threaded pin (**8**) of the structured diaphragm and keep in a safe place.
5. Check all parts for soiling and clean if necessary.
6. Push the diaphragm support (**9**), diaphragm spacer(s) (**10**) and disk spring (**11**) in this order onto the threaded pin (**8**) of the new structured diaphragm (**7**) (see Fig. 5).

i The disk edge of the disk spring (**11**) must be facing the structured diaphragm (**7**).

7. Move the connecting rod (connecting piece between drive shaft and structured diaphragm, see Fig. 2/**6**, Page 8) to the upper point by turning the fan.
8. Screw the structured diaphragm with the diaphragm support, diaphragm spacer(s) and disk spring clockwise onto the connecting rod and tighten hand-tight.

bürkert

EC DECLARATION OF CONFORMITY

As manufacturer, **Bürkert Werke GmbH & Co. KG** herewith declares that these products comply with the requirements of the Directives of the Committee for the Harmonization of the Legal Regulations of Member States concerning

in respect of electrical equipment with rated voltages of 50-1000 V/AC or 75-1500 V/DC (Low Voltage Guideline 73/23/EEC).
in respect of electromagnetic compatibility (89/336/EEC)
equipment and protective systems intended for use in potentially explosive atmospheres (ATEX, 94/9/EU).

For the assessment of the products in respect of compliance with the Low Voltage Guideline, the following standards were applied:

EN 50178: 04/98	Equipment of heavy current installations with electronic equipment
EN 60730-1: 01/96	Automatic electrical control devices
DIN VDE 0110-1: 04/97	Insulation co-ordinates for electrical equipment in low voltage installations
EN 60529: 11/92	Types of protection provided by the housing (IP code)
DIN VDE 60204-1: 06/93	Safety of machines
VDE 0580: 10/94	Electromagnetic devices, general regulations

For the assessment of the products in respect of electromagnetic compatibility, the following standards were applied:

EN 50081-2: 03/94	Basic engineering standard for interference emission; Part 2: Industrial domain
EN 61000-6-2: 03/00	Basic engineering standard for interference resistance; Part 2: Industrial domain

The following standards were consulted with resprect to the compliance with the **ATEX-Directives**:

EN 50014: 1997+A1+A2	Electrical apparatus for potentially explosive atmospheres. General requirements
EN 50018: 2000	Electrical apparatus for potentially explosive atmospheres. Flameproof enclosure „d"
EN 50019: 2000	Electrical apparatus for potentially explosive atmospheres. Increased safety „e"
EN 50028: 1987	Electrical apparatus for potentially explosive atmospheres. Encapsulation type „m"
EN 50020: 1994	Electrical apparatus for potentially explosive atmospheres. Intrinsic saftey „i"

Otto Walch

Ingelfingen, 08.03.2004
Place and date

Otto Walch
Certifications Manager

bürkert

GENERAL NOTES

The EC Design Type Inspection Certificate **PTB 03 ATEX 1030 X** was issued and the production audited (CE0102) by the
Physikalisch Technischen Bundesanstalt
Bundesallee 100
38116 Braunschweig.

NOTE For EC Design Test Certificate **PTB 03 ATEX 1030 X**, see annex. For temperature classes and electrical data see "Technical Data".

INTENDED USE

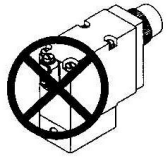
Please observe the notes in these operating instructions as well as the conditions of use and permitted data specified on the data sheet of the device in use, in order that the device will function perfectly and have a long service life.

- On non-observance of these notes and unauthorized interference with the device, we will refuse all liability and the guarantee on device and accessories will become void!
- The device serves exclusively as a solenoid valve for the media stated in the data sheet and for use in Explosion Group II, Category 2G and Temperature Class T4 or T5 (see data on the Ex approval plate).
- The types of explosion protection used are flameproof enclosure „d" with increased safety „e". The fuse incorporated in version K is executed in explosion protection encapsulation type „m". The proximity switch which can be optionally incorporated in all versions is executed in explosion protection Intrinsic saftey „ia". The composition of the explosion protection code follows the explosion protection types of the components used in each case.
- Any other use or use exceeding the specific scope is considered to be **non-intended use**.
  Bürkert will not be liabler for any damage resulting therefrom. The risk will be borne solely by the user.

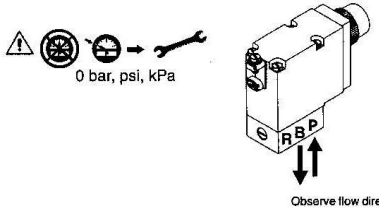
SAFETY NOTES

⚠ ATTENTION!

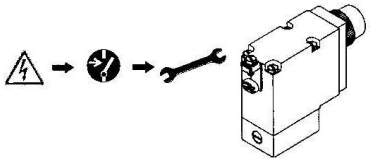
- Keep to generally recognized technical safety rules in planning the use of and operating the device!
- Take suitable precautions to prevent inadvertent operation or damage by unauthorized action!
- The valve may not be disassembled!



- Note that in systems under pressure, piping and valves may not be loosened!



- Before interfering with the system, always switch off the voltage!

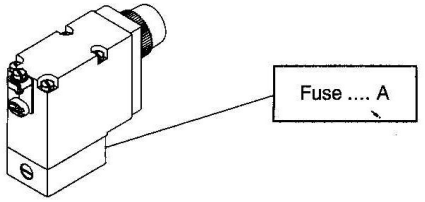


OPERATING CONDITIONS OF THE COILS

Special conditions

Short-circuit protection

Each solenoid must be connected in series with a fuse (max. 3 x I_b to IEC 60127-2-1) or motor contactor with rapid short-circuit and thermal triggering corresponding to its pick-up current (the contactor being adjusted to this pick-up current). With very small rated currents of the solenoids, a fuse with the lowest current according to the stated IEC standard is adequate. This fuse may be placed in the associated supply device or must be connected separately in series. The rated voltage of the fuse must be equal to or greater than the stated rated voltage of the solenoid. The cutoff capacity of the fuse cartridge must be equal to or greater than the maximum expected short-circuit current at the point of installation (usually 1500 A).
In the case of versions A and L of the solenoid, short-circuit protection must be assured by the operator. In the case of version K of the solenoid, the fuse is installed in the terminal box of the device. More detailed descriptions of versions A, L and K are to be found in the section „Technical Data".

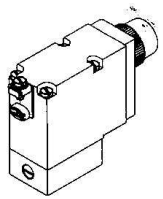


Maximum permissible ambient temperature range

Version	Maximum permissible ambient temperature range
7.-.....	- 40 °C ... + 60 °C

Fixing the solenoid

The solenoid is fixed to the valve housing with 4 cap screws.



Version with a terminal box

The solenoid coils may also be executed with a terminal box, with or without fuse/contactor (to separate Design Type Inspection Certificate) as desired.

For protection against inadvertent opening of the cover, the latter bears the marking:
Open only when the voltage is switched off!

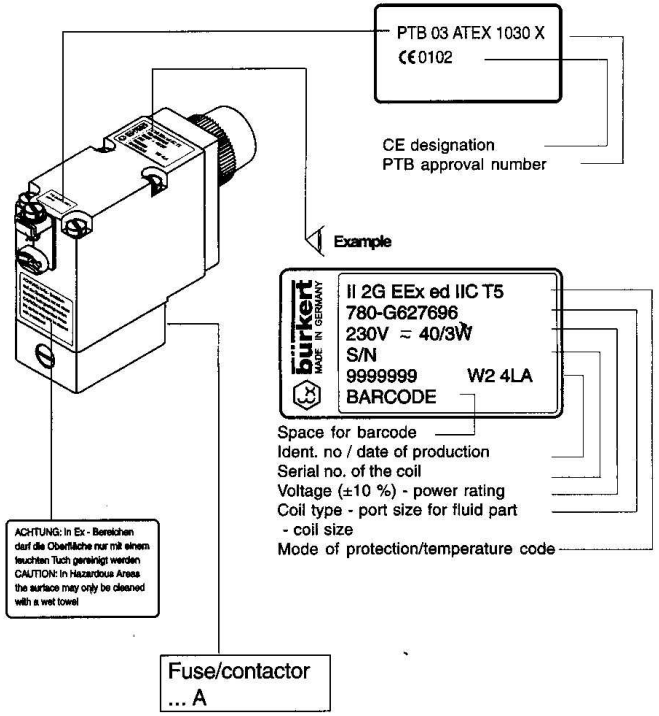
ATTENTION

- Only permanently laid cables and wiring may be inserted.
- The operator must provide suitable stress relief.
- Wires with an outside diameter of 6 to 13 mm may be used. Observe the maximum thermal loading of the cables or wires to be inserted.
- The inserted break-off seal must be matched to the diameter of the cable or wire.
- The rated cross-section of the cable or wire strands must be at least 0.75 mm² and may not exceed 2.5 mm².
- The screws for fixing the cover of the terminal box must be tightened with a torque of 100 Ncm (±5%).

TECHNICAL DATA

General notes on the technical data of the device

ATTENTION The technical data stated on the rating plate of each device shall not be exceeded!



Electrical data

Type	77.-....-...-.	78.-....-...-.
Temperatur class	T4	T5
Type of current	universal	universal
Rated voltage	24 - 240 V	
Voltage tolerance	+ 10 % / - 10 %	
Rated current	0.085 A - 0.014 A	
Pick-up current	1.66 A - 0.166 A	
Pick-up power	40 W	40 W
Power consumption for holding in equilibrium	3 W	3 W
Max. number of switching actuations ca.	20 / min	10 / min

Electrical connection

Marking	Execution	Internal code
A *	Permanently installed rubber sheathed cable of Type H05 RN-F3G0,75	none
L	** Terminal box with cable bushing M20 x 1.5 without fuse	JA02
	Terminal box with threaded nipple M20 x 1.5, without fuse	JA08
	Terminal box with threaded nipple NPT 1/2, without fuse	JA09
	Terminal box with threaded nipple G 1/2, without fuse	JA10
K ***	** Terminal box with cable bushing M20 x 1.5 and fuse	JA01
	Terminal box with threaded nipple M20 x . 1.5 and fuse	JA05
	Terminal box with threaded nipple NPT 1/2 and fuse	JA06
	Terminal box with threaded nipple G 1/2 and fuse	JA07

* The connecting cable of solenoid Type 7..- must be laid permanently such that it is adequately protected from mechanical damage.

** Cable bushing to separate Design Type Inspection Certificate

*** Fuse/contactor to separate Design Type Inspection Certificate

NOTE The minimum rated cross-section of the conductor strands is 0.75 mm².

Explosion protection types

- Solenoid Type 7..-..... in version with or without terminal box
  - Flameproof enclosure „d" to EN 50 014 and EN 50 018 as well as
  - Increased safety „e" to EN 50 014 and EN 50 019
- Fuse protection (to separate Design Inspection Certficate)
  - Encapsulation type „m" to EN 50 014 and EN 50 028
- Proximity switch (to separate Design Inspection Certficate)
  - Intrinsic saftey „ia" to EN 50 014 and EN 50 020

The composition of the explosion protection code follows the explosion protection types of the components used in each case:

Solenoid with or without terminal box	II 2G EEx ed IIC T4 or T5
Solenoid with terminal box and fuse	II 2G EEx edm IIC T4 or T5
Solenoid without terminal box with proximity switch	II 2G EEx ed ia IIC T4 or T5
Solenoid with terminal box, fuse and proximity switch	II 2G EEx edm ia IIC T4 or T5

Dimensions

Connection type	Length (mm)	Width (mm)	Height (mm)
Electrical connection A	96	32	56
Electrical connections L&K	123	60	113

Notes

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