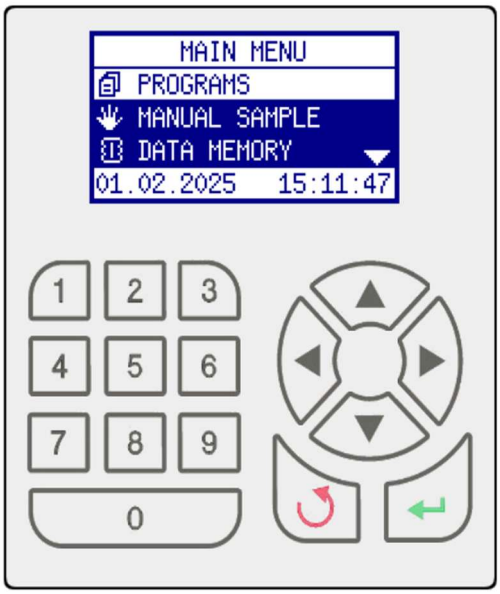
MAXX®
Mess- und Probenahmetechnik GmbH

Programming instructions

Software Version 5



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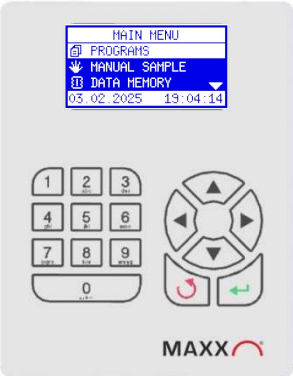
PROGRAMMING



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

NOTE: Please note that not all menu items of this manual are absolutely relevant for your device. According to the equipment supplied, these may differ!

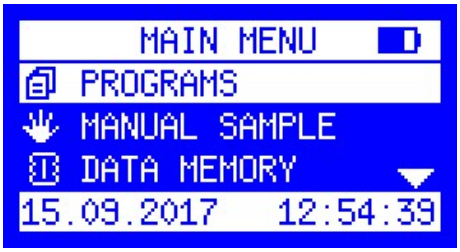
Assignment and function of keys

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 or Enter key	↺ or ↵ 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).

Displayscroll-Function: At the end of the menu the cursor scrolls to the beginning and vice versa!

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.

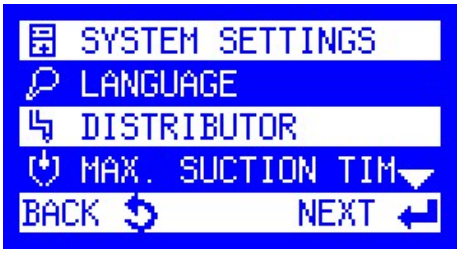
Here you can set a parameter. The top line shows which value is to be set. The next line indicates the possible range of values. An entry is possible directly by means of the number keys or by selecting the digit with the right / left arrow keys and by setting them with the up / down arrow keys. The 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.

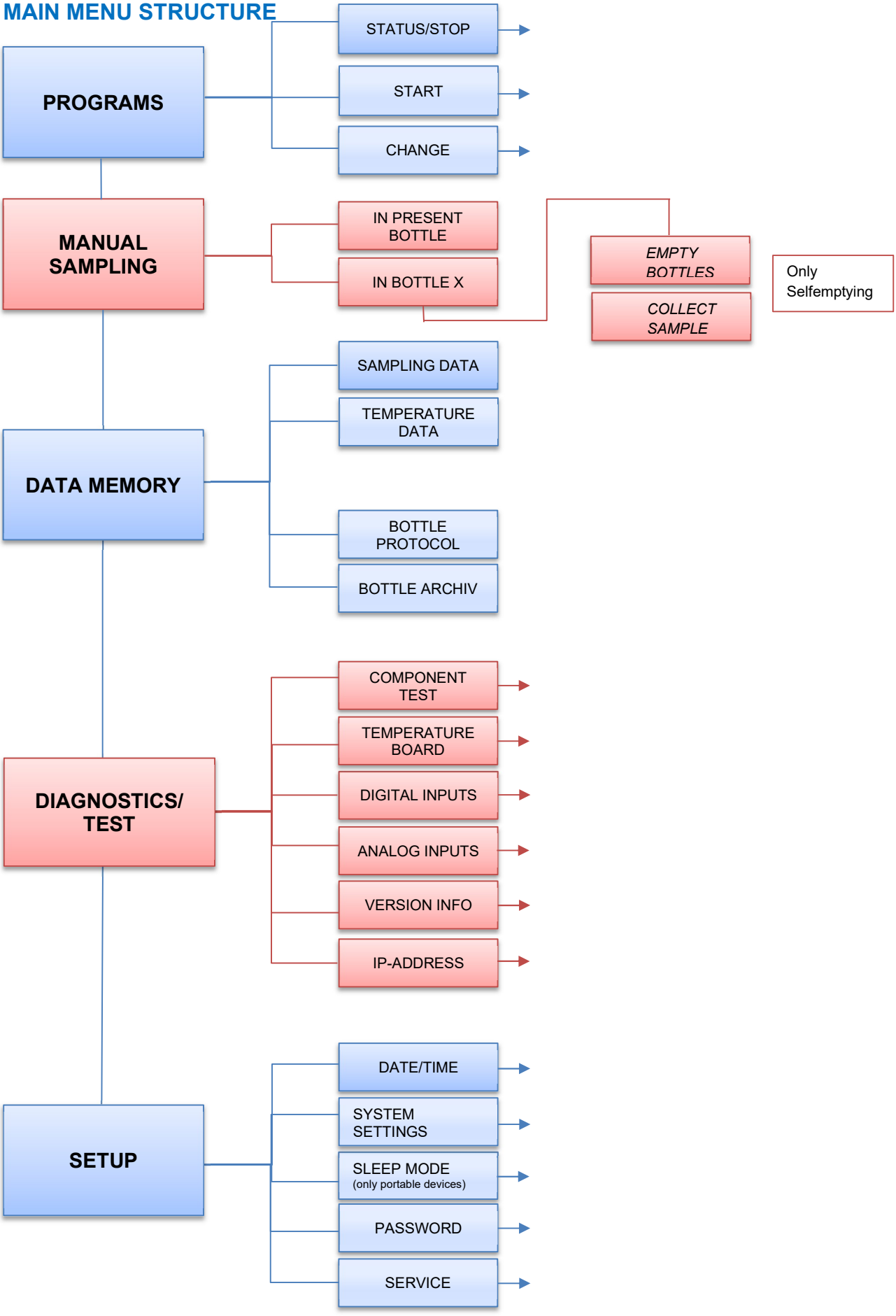


Selection of individual menu points

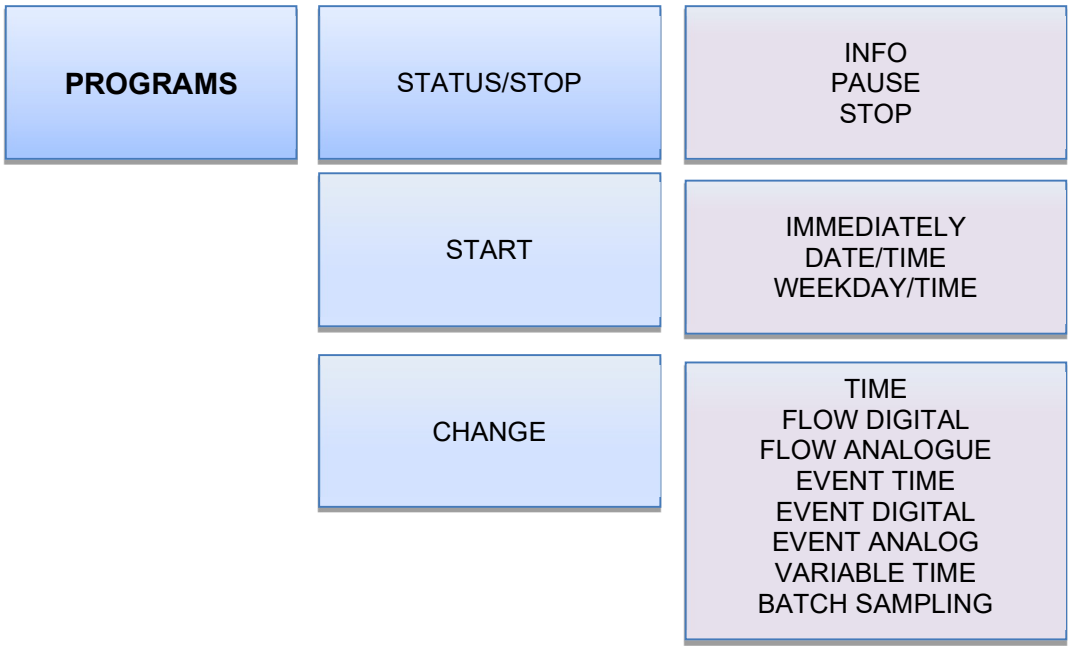
In the selection menus, additional program settings

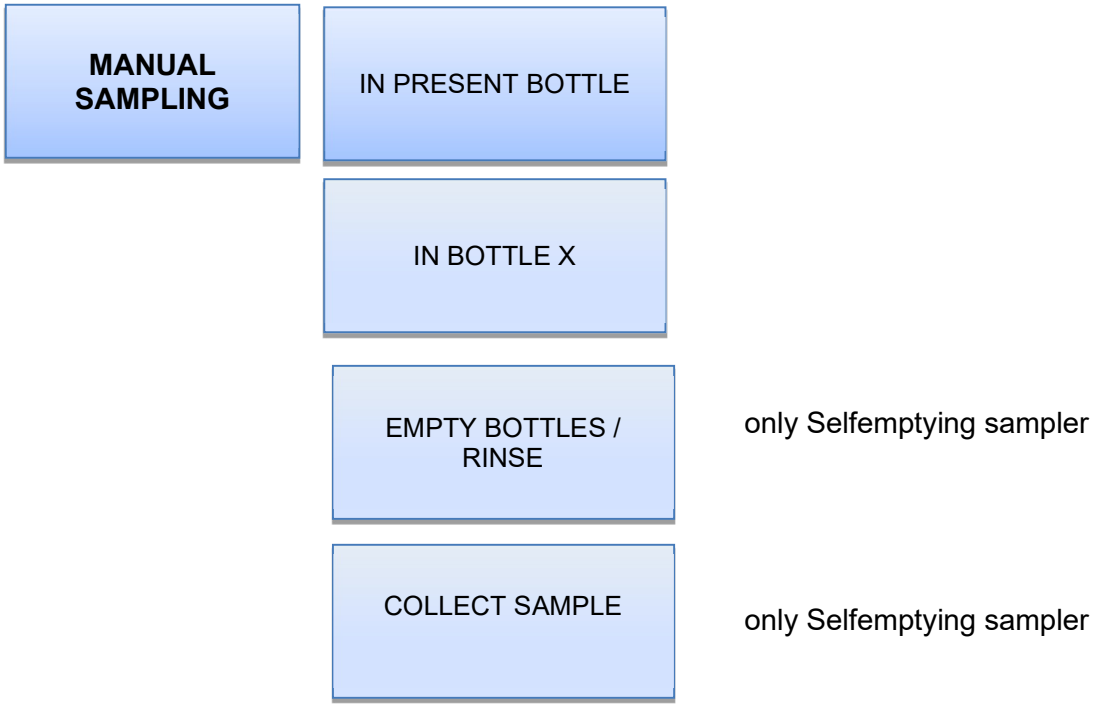
are displayed. All the settings which have been activated by pressing the ENTER key or which are already active are marked with the symbol ✓.

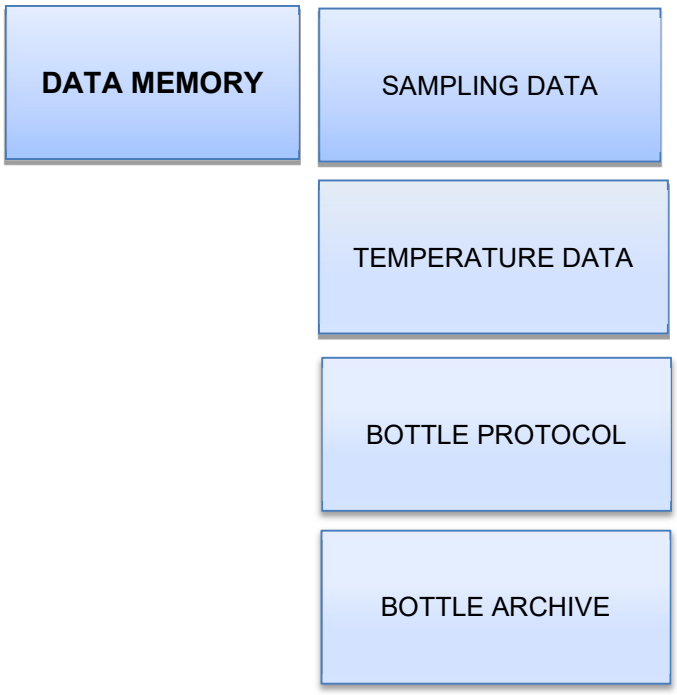
MAIN MENU STRUCTURE

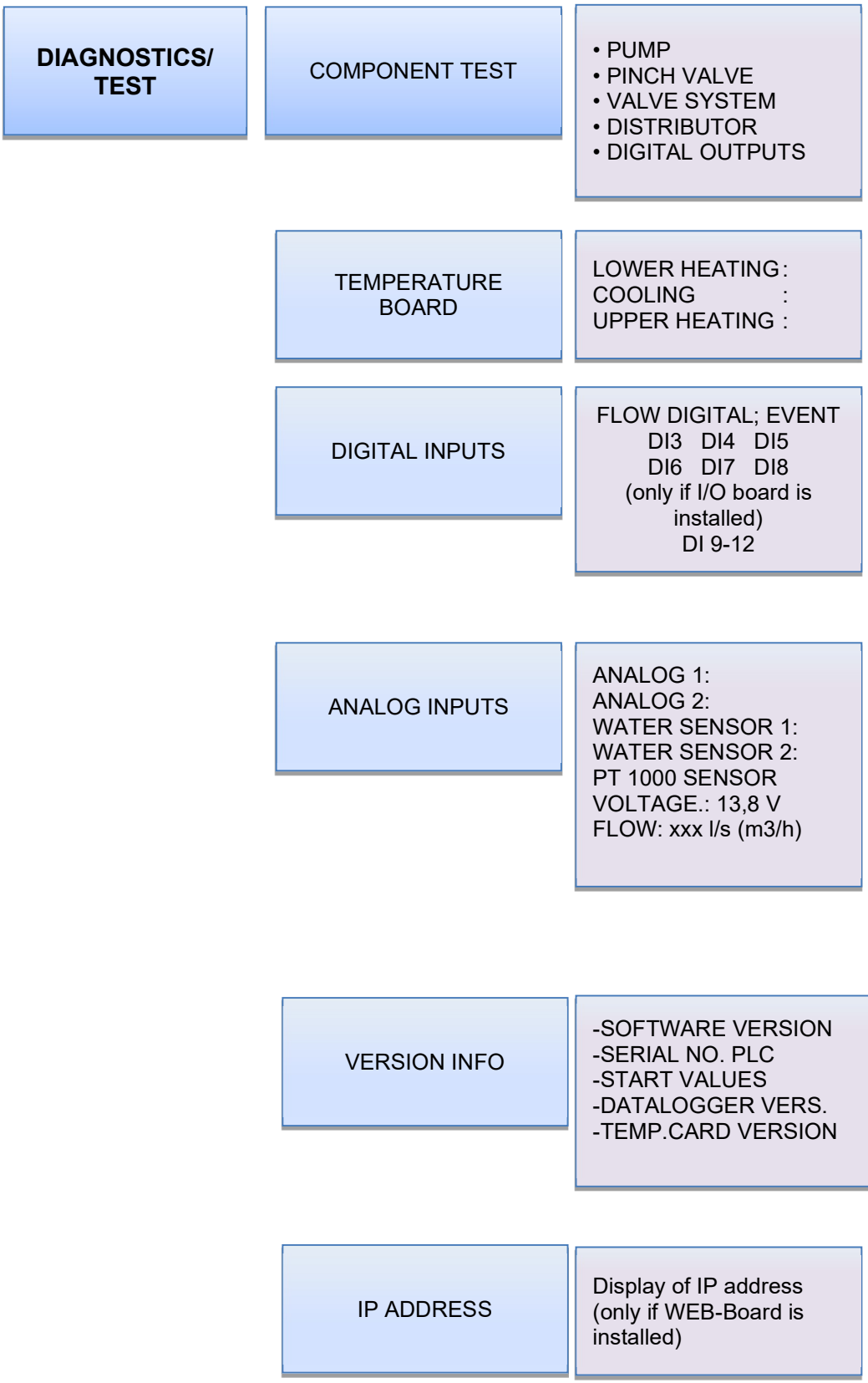


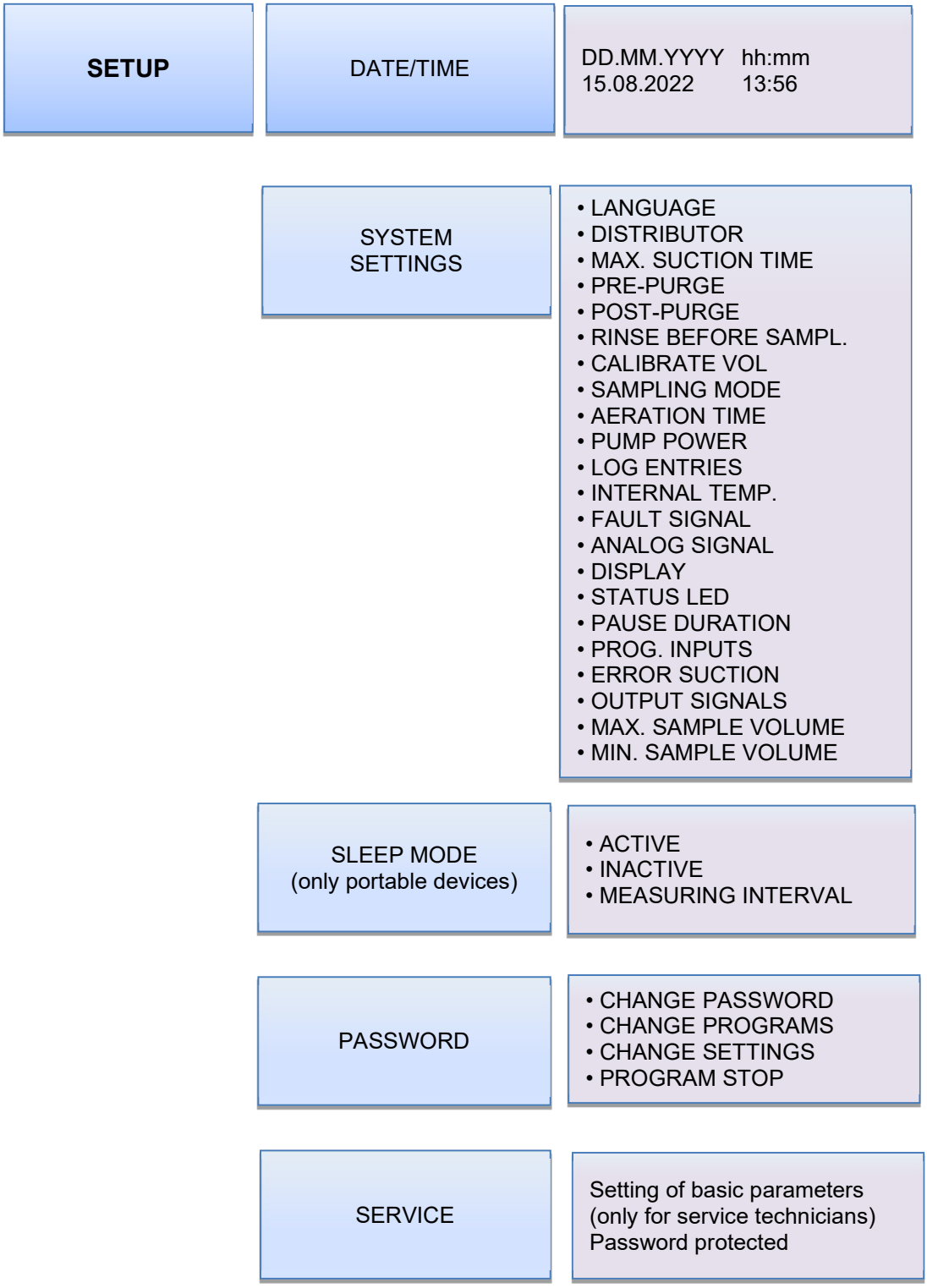
Description of the main menu structure with submenu levels 2 and 3






DATA MEMORY
SAMPLING DATA
TEMPERATURE DATA
BOTTLE PROTOCOL
BOTTLE ARCHIVE


DIAGNOSTICS/ TEST
COMPONENT TEST
• PUMP
• PINCH VALVE
• VALVE SYSTEM
• DISTRIBUTOR
• DIGITAL OUTPUTS
TEMPERATURE BOARD
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:
WATER SENSOR 1:
WATER SENSOR 2:
PT 1000 SENSOR
VOLTAGE.: 13,8 V
FLOW: xxx l/s (m3/h)
VERSION INFO
-SOFTWARE VERSION
-SERIAL NO. PLC
-START VALUES
-DATALOGGER VERS.
-TEMP.CARD VERSION
IP ADDRESS
Display of IP address (only if WEB-Board is installed)


SETUP
DATE/TIME
DD.MM.YYYY hh:mm
15.08.2022 13:56
SYSTEM SETTINGS
• LANGUAGE
• DISTRIBUTOR
• MAX. SUCTION TIME
• PRE-PURGE
• POST-PURGE
• RINSE BEFORE SAMPL.
• CALIBRATE VOL
• SAMPLING MODE
• AERATION TIME
• PUMP POWER
• LOG ENTRIES
• INTERNAL TEMP.
• FAULT SIGNAL
• ANALOG SIGNAL
• DISPLAY
• STATUS LED
• PAUSE DURATION
• PROG. INPUTS
• ERROR SUCTION
• OUTPUT SIGNALS
• MAX. SAMPLE VOLUME
• MIN. SAMPLE VOLUME
SLEEP MODE
(only portable devices)
• ACTIVE
• INACTIVE
• MEASURING INTERVAL
PASSWORD
• CHANGE PASSWORD
• CHANGE PROGRAMS
• CHANGE SETTINGS
• PROGRAM STOP
SERVICE
Setting of basic parameters
(only for service technicians)
Password protected

Description of the displays with explanation

DISPLAY	DISPLAY	EXPLANATION / FUNCTION
PROGRAMS		
STATUS/STOP	• INFO • PAUSE • STOP	Display of program details Interruption of the running program (max. 120 min) Stop the current program or all programs
START	• IMMEDIATELY • DATE/TIME • WEEKDAY/TIME	Program start can be: • immediately • with date/time (dd:mm:yyyy hh:mm) • with weekday/time (day; hh:mm)
CHANGE	PROGRAM No. [xx]	Change the program parameters like mode of operation (time, flow, event…), interval etc. Selectable operating modes: • TIME • FLOW DIGITAL • FLOW ANALOG • EVENT TIME • EVENT DIGITAL • EVENT ANALOG • VARIABLE TIME • BATCH SAMPLING
MANUAL SAMPLING		
IN PRESENT BOTTLE IN BOTTLE X		Sample extraction into current bottle Sample extraction into selectable bottle X
EMPTY BOTTLES/RINSE		Select bottle to empty/rinse
COLLECT SAMPLE		Select bottle to take the sample
DATA MEMORY		
SAMPLING DATA TEMPERATURE DATA BOTTLE PROTOCOL		Display of data of the single bottles Temp. sampling compartment. Temp. Ambient, PT1000 Temp. 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
TEMPERATURE BOARD	OUTPUTS TEMPCARD TEMP.DISPLAY	Display STATUS of: - Lower heating (OFF / ON) - Cooling (OFF / ON) - Upper heating (OFF / ON) - INTERNAL TEMP - EVAPORATOR TEMP - AMBIENT TEMP:
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

SETUP		
DATE/TIME		Setting of date/time
SYSTEM 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.
	• CALIBRATION VOL	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.)
	FAULT SIGNAL	Free configurable via selection menu. **Default**: all are activated Selection: ➢ Not inverted ➢ Inverted ➢ Configure ○ Standard ○ User-defined
	• 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 (continuous): if program is active Green (blinking): program finished
		Red (continuous): 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. 3 inputs are available in conjunction with the I/O extension.
	• 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. sWith 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:** The sleep mode is activated automatically. A beep sounds when displaying a pop-up window before automatic activation. This can be prevented by pressing a button (see attachment) 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 • CHANGE SETTINGS • CHANGE PROGRAMS • STOP PROGRAMS	- In general the password can be changed. - A password for settings can be entered. - A password for changing programs can be entered - A password for stopping programs can be entered
SERVICE		Setting of base parameters (only to be done by a service technician) (Password protected)

The following program modes are available:

1. **TIME**

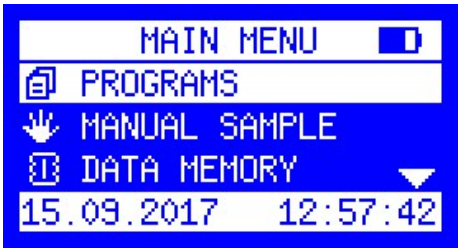
2. **FLOW**
   - **FLOW DIGITAL**
   - **FLOW ANALOG**

3. **EVENT**
   - **EVENT TIME**
   - **EVENT DIGITAL**
   - **EVENT ANALOG**
   - **EVENT CHARGE**

4. **VARIABEL TIME**

TIME Mode

Example how to program a *time-proportional* sampling program



Select PROGRAMS in the main menu

Select CHANGE

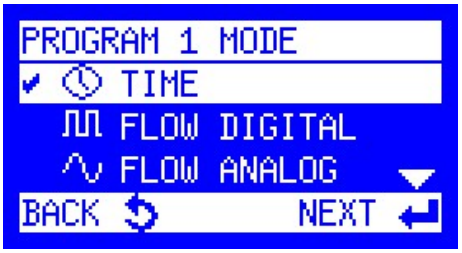
Select PROGRAM NO. 1 (out of 12).

Program 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 SETUP ➡ SYSTEM SETTINGS

➡ MIN. SAMPLE VOLUME

➡ MAX. SAMPLE VOLUME

Set the BOTTLE FILL TIME
each bottle of your bottle set will be filled 2 hours, before distributor switches to the next bottle. If your bottle set consists e.g. of 12 bottles, the whole sampling cycle would be 12x 2h = 24h

Range: 00:02 up to 168:00 (hhh:mm)

Programming can be terminated…..

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

Besides standard programming there are several special program functions which can be activated selectively with each operating mode.

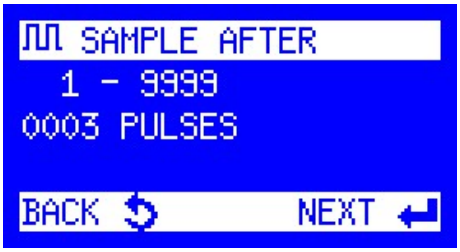
In the menu „MORE SETTINGS“, you can find a list with all special functions available. Please find a detailed description at “SPECIAL PROGRAM FUNCTIONS”

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.

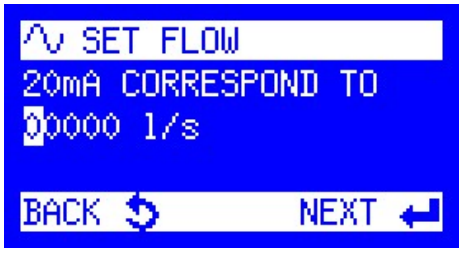
FLOW DIGITAL

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).



FLOW ANALOG

The only difference between the programming of the flow analog mode and the flow digital mode is the definition of the sampling interval. Point of reference in the flow analog setting is the maximum flow at 20 mA, which can be set as l/s or m3/h.



FLOW ANALOG – set resp. calibrate -

Under „SETUP“ -> „SYSTEM SETTINGS ->ANALOG SIGNAL“ 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.

EVENT-PROPORTIONAL SAMPLE EXTRACTION

When selecting this sampling mode, the sampler will be triggered from an **external “event” signal** (**digital pulse**), e.g. from a connected pH-meter, level sensor etc..
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 (trigger) 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

In this mode, the sample extraction will be **time-based, e.g. 2 minute Interval**. This means, that after the **event** (**digital signal**) has triggered the sampler, the samples will be taken in a 2 minute interval.

EVENT DIGITAL

In this mode, the sample extraction will be **flow-based** **(digital pulse from a flow-meter)**. This means, that after the **event (digital signal)** has triggered the sampler, the samples will be taken after e.g. 5 pulses from the flow meter.

EVENT ANALOG

In this mode, the sample extraction will be **flow-based** **(analogue signal from a flow-meter)**. This means, that after the **event (digital signal)** has triggered the sampler, the samples will be taken according the analogue signal from the flow meter

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.

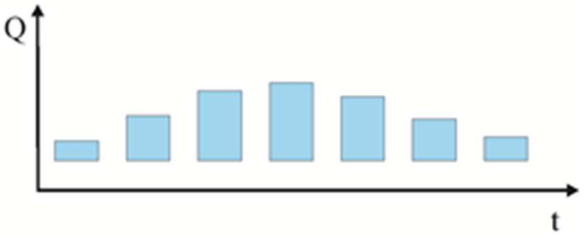
Example:

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.

VARIABEL TIME Sampling (CT, VV)

(**C**onstant**T**ime, **V**ariable**V**olume)

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).



To measure the sample quantity, the flow rate is determined between two capacitive sensors. This requires calibration of the measuring section. **See Appendix 3.**

SPECIAL PROGRAM FUNCTIONS

Beside the standard programming features the unit also offers the following special functions:

PROGRAMS → CHANGE → TIME/FLOW/EVENT → **MORE SETTINGS**

MORE SETTINGS

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**

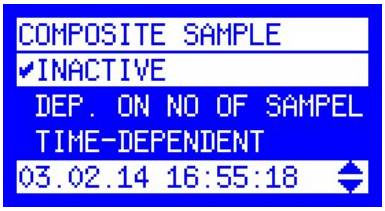
  Number of samples per sample extraction means that each requested sample extraction consists of x samples. If e.g. the value 3 is entered, 3 samples are extracted successively. When activating this function, particular attention has to be paid to the bottle volume in order to avoid overfilling. This 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 the distributor 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.

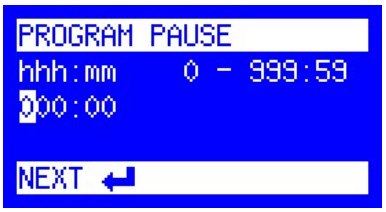
Time-related:

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.

- **PROGRAM PAUSE**



(Program pause = 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 (**Range is 0 – 999 minutes)**
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**

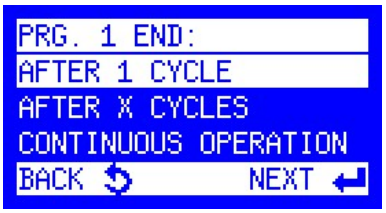
This function enables the combination of a **time-dependent** resp. **flow-dependent program** with an **event program (**e.g. in case of an exceedance of a limit value) and can be activated or deactivated**.**For the event program the **sampling interval** and the **bottle filling time** have to be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

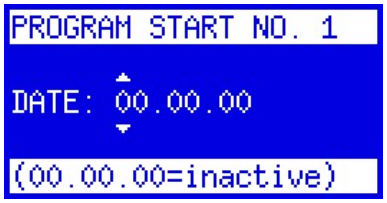
The program is automatically stopped after the entered run time (here: 24 h) and waits for the next external pulse (e.g. by means of a palm button).

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 h and 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 automatically activated/deactivated!**



- **Absolut Start time**:
  - if a date is stored, take this. If you enter the date 00.00.00 start will be on the current day.

- **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** of 24 hours (1440 min.):
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.

- **FLOW PRG. START (Analog Signal)**

Background: After starting an analogue program, it can take a very long time before the first sample is taken. Depending on the present mA-signal.

In order to shorten this time and thus be able to check for example, whether the device is working correctly, you can enter any % value as the starting value for the analog signal. If you enter 95% as in the example menu, the device starts with this value and counts up to 100%.

- **PULSES PRG. START (Digital Signal)**

Background: After starting a digital flow program, it can take a very long time before the first sample is taken. Depending how fast the pulses are coming.

To be able to check whether the device is working correctly, you can also specify here a start value for the digital pulses in order to shorten the time until the first sampling will be taken.

IMPORTANT: The value that you previously entered as the number of pulses in the programming of FLOW DIGITAL, appears here now as the maximum value.

In our example, it was therefore previously entered, that a sample should always be taken after 6 pulses.

If you now enter 2 pulses as in the example here, the device starts after 4 more pulses with the first sampling.

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 START OPTIONS
There are several possibilities to start the program:

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

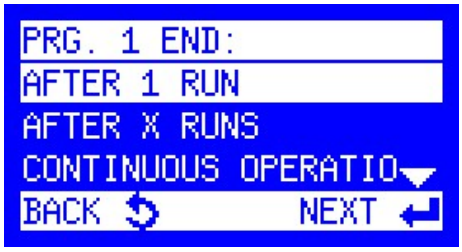
- **DATE/TIME**
  The program start is effected on the selected date and at the selected time in the format: dd:mm:yyyy hh:mm. (Also in the past or in the future!)

  Important remark: **Fixed assignment of bottle number and time of day!**
  With this start option the program can also be started in the past/future for 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.

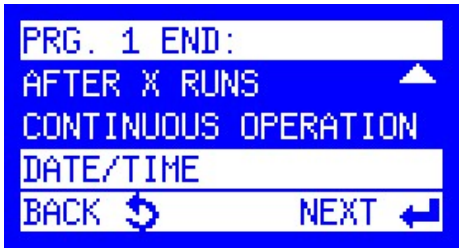
• PROGRAM END OPTIONS

ATTENTION: If END options are defined, START CONDITIONS will be overwritten.



- **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 active or
  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.

The program **pause** affects all programs, means active parallel programs are also paused!

- **STOP**

An active program can be stopped/aborted.

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

FREE PROGRAMMABLE INPUTS:
PROGR. INPUT
(PIN3 (+) / PIN 25) but is not wired yet!

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

- **PROGRAM START PULSE**
  if selected, program x can be started (**external start**)

  The external program start via key 0
  the "external program start" function is already programmed. The program can now be started directly by pressing the "**0**" **key** for **3 seconds**. The external program start is displayed in the menu

- **PROGRAM STOP 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

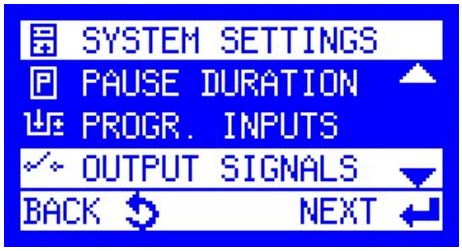
  The pulse signal has to be > 50 ms!

  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.

In case of an error message, a message appears on the display and there is also a short beep.

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:

• PROGRAM ACTIVE
Selection: „PROGRAM ACTIVE" or
„PROGRAM XX ACTIVE"

• PROGRAM TERMINATED
Selection: "PROGRAM TERMINATED" or
"PROGRAM XX TERMINATED"

• ERROR ACTIVE
Selection: „ ERROR RESET “
„ GENERAL FAILURE“
„ SENSORS DIRTY“
„ ERROR SUCTION“
„ FAILURE DISTRIBUTOR“
„ NO WATER DETECTED“
„ ERROR ANALOG A1“
„ POWER FAILURE“
„ BATTERY EMPTY“
„ INTERNAL TEMPERATURE“
„ EMERGENCY CUTOFF“
„ ERROR PINCH VALVE“
„ ERROR VALVE SYSTEM“
„ POS1 NOT FOUND“
„ ERROR BOTTLE VALVE“
„ ERR. WATERSENSOR 1“
„ ERR. WATERSENSOR 2“
„ CALIBRATION NEEDED.“

- **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
	SAMPLING OK	
	SAMPLING ERROR	

ERROR MESSAGES

If there is an error message, it will appear in the display and will be automatically stored in the data-memory.

In the display you always will see the last happened error.

To **“quit”** a message(s), just press the ENT-key, for each message. You either can see them in the samplers Data-memory or you can read them out via the “maxxwareConnect” software. In maxxwareConnect you can save the data as an Excel file or as PDF.

The error and the Log codes are helpful if they e.g. are to be evaluated via a PLC-System.

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 WATER SENSOR	**Vacuum system:** Sensors are soiled with deposits or there is still water in the metering vessel. **Peristaltic pump:** if there is any dirt in the tube in front of the sensors
5	VOLTAGE LOST - END	DATE/TIME end of voltage lost
6	CHARGE STORAGE BATTERY	If battery voltage is lower than 11,5 V
7	STORAGE BATTERY EMPTY	If battery voltage is lower than 11,1 V
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 hardware message 4=motor current distributor, software message 5=pump current too high, software message

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 bottle valve reference position is not recognized
28	PUMP BLOCKED	If pump does not start
29	ERROR WATER SENSOR 1	Only with peristaltic pump: Occurs when sensor 2 detects water but sensor 1 does not. (Not in MAXX mode)
31	PROGRAM PARAMETERS	Program System: Configuration error, Program cannot be started. (1-12)
32	ERROR WATER SENSOR 2	Only with peristaltic pump. Occurs when sensor 2 does not detect water after sensor 1 detects water. (Not in MAXX mode)
33	CALIBRATION NEEDED.	Device needs to be calibrated.
34	OVERFILL PROTECTION	Overfill protection active.
35	NO WATER DETECTED	Only Flow-through-system: No water when sampling

LOG MESSAGES (MEMORY)

In **SETUP** -> **SYSTEM SETTINGS** ->**LOG ENTRIES** you can choose, which Messages of the list below, shall be logged

Log code	Meaning	Description
1	ERROR	Log code 1 includes all error codes
2	PROGRAM START	Date/time as well as the number of the started program
3	PROGRAM END PROG.	Date/time of the terminated program
4	START PROGRAM PAUSE	Date/time of program pause start
5	END OF PROGRAM PAUSE	Date/time of program pause end
6	SYSTEM START	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 of the 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	- 1st value: CV of pair of electrodes 1 when detecting water - 2nd value: CV after pre-purge -3rd value: 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 a bottle will 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 10 minutes.
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

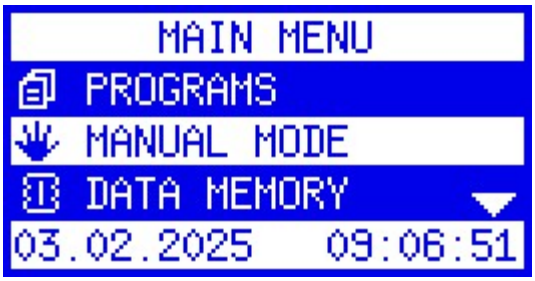
28	ANALOG VALUE A1	mA signal values, (logging interval can be set in SYSTEM SETTINGS -> LOGENTRIES) (log of current value, no average value calculation) 1st value: measured value at logging time 2nd value: lower limit value 3rd value: upper limit value
29	ANALOG VALUE X	mA signal values. Logging interval: 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 active Q/T-function!** Samples are suppressed when **flow** is too **HIGH**
32	SAMPLING ENFORCE	**only with active Q/T-function!** Samples are enforced 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 flow at 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)
38	SET POINT EXCEEDED	
39	SET POINT OK	

40	SENSORS DIRTY	Allows the evaluation of the peristaltic pump sensors. (See ANNEX peristaltic pump software)
41	STATUS OF SENSOR	Allows the evaluation of the peristaltic pump sensors. (See ANNEX peristaltic pump software)
42	AUTO ADJ. PINCH POWER	Occurs when the pinch-/or valve system learns new current values due to motor current changes

ANNEX 1 – SELFEMPTYING SAMPLER

The special functions and menu items that are different for this device are described below.

MANUAL SAMPLE
Various manual functions are possible via this menu:



IN PRESENT BOTTLE
Manual sample will be taken in the actual bottle

INTO BOTTLE X
Manual sample will be taken in the bottle X

EMPTY BOTTLES/RINSE
Here you can select which bottle should be emptied and rinsed.

Options:

ALL BOTTLES =
all bottles are automatically emptied and rinsed

ACTUAL BOTTLE =
only the current bottle is automatically emptied and rinsed

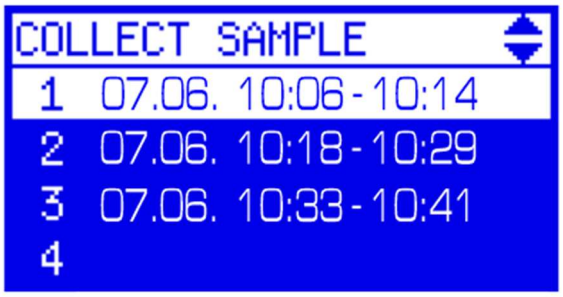
BTL. X EMPTY/RINSE **=**
any bottle X can be emptied and rinsed.

For each bottle that has already been filled, the date and time from when to when it was filled is displayed. This allows you to immediately see which bottle contains an event sample, for example. This makes it easier to prevent the "wrong" bottle from being accidentally emptied/rinsed.

COLLECT SAMPLE

Under this menu item you can move each bottle forward to the emptying position to take the sample out for the laboratory

This menu also shows the date and time from which each bottle was filled. This allows you to quickly see or check whether the selected bottle contains the desired sample before taking it.



DIAGNOSTICS/TEST

Under diagnostic test, all components such as pump, distributor, rinse, emptying valve, etc. can be easily checked for correct function. This is very helpful for error diagnosis in the event of a fault.

In particular here:

INLET DISTRIBUTOR

Is the combined rinsing dosing head

By pressing the arrow key ► it moves INWARD if it is functioning correctly.

If the arrow key ◄ is working correctly, it will move OUTWARDS.

DRAIN TAP

Der Drain tap is responsible for opening the bottle valve for emptying/rinsing.

Press the arrow key ◄ to switch it on. It is an eccentric drive that only runs in one direction. The valve is first opened and then closed again

RINSING

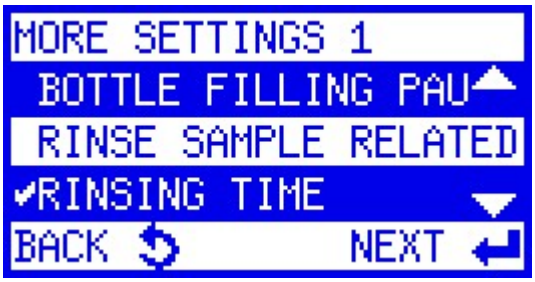
The bottle rinsing can be activated/tested via this menu item.

ANNEX 2 – FAEKO/SLUDGE SAMPLER

The menu items described here are only available if a FAEKO distributor has been configured.

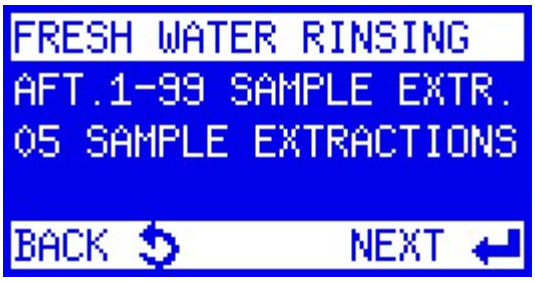
With this distributor variant, a flushing of the dosing system and also of the suction hose can be programmed

RINSING DOSINGSYSTEM:

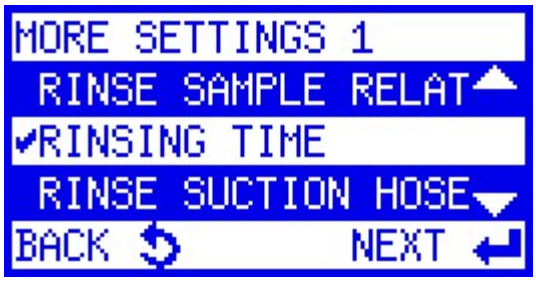


Sample-dependent rinsing

After selecting ACTIVE / SETTING two further menu items follow



Enter the value after how many samples the rinsing should take place



Setting the rinsing time “Dosing system“

Value between 1 to 60 seconds is possible

RINSING SUCTION HOSE:

After selecting the menu “Rinse suction hose” the function can be activated (deactivated).

The “hose” rinsing time can be set between 1 – 60 seconds

PAUSE AFTER RINSING

In addition, a pause after rinsing can be programmed:

This is to ensure that the rinsing water can still flow out of the dosing system within this time before another action is started.

ANNEX 3– CALIBRATION OF VACUUM VAR variable sampling system-

The VAR variable sampling system enables a flow-proportional sample extraction for the *Vacuum system*, that means the sample volume varies automatically according to an analog flow signal (0/4 - 20mA).

Example:
- the selected range is 0 to 20 mA
- the max. sample volume at **20 mA** is fixed to **200 ml.**

That means at an analog signal of e.g. **10 mA,** a **100 ml** sample would be extracted. Thus the sample extraction is always proportional to the flow.
At this system the sampling interval is **fixed** (e.g. every 10 min.) and the sample volume **varies** (the volume changes according to the mA signal).

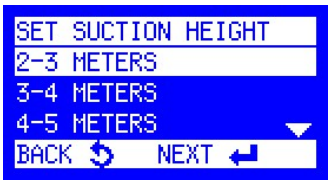
Thus a sample extraction **proportional** to the flow is guaranteed.

When putting the sampler into service, the system has to be **calibrated.** How to do the calibration is described in the following:

SET UP ⇨ SYSTEM SETTINGS ⇨ VAR CALIBRATION

• CALIBRATION VAR Vacuum

1. Setting of suction height (range)



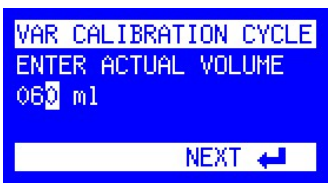
2. Start lower value

There are 3 consecutive calibration cycles which are started automatically.

Please collect the samples of all 3 cycles in a measuring glass!

(Volume of the measuring glass >= 2000 ml)

3. ACTUAL VALUE lower value



Please enter the total volume of the 3 cycles.

4. INFO after the completion of the calibration of the lower value.

The displayed value has no relation to the volume.

5. Start upper value

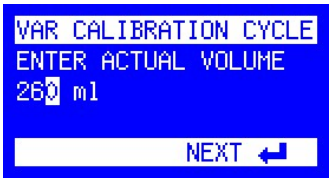
Again there are 3 consecutive calibration cycles which are started automatically.

Please also collect the samples of all 3 cycles in a measuring glass!

6. ACTUAL VALUE upper value

Here the total volume of all 3 cycles of the upper value calibration is entered.

(Volume of the measuring glass >= 500 ml)



7. INFO after the completion of the calibration of the upper value

This value corresponds to the average volume in ml.

Now, the system is calibrated and can be operated.

REMARK:
A correct functioning is only possible when the analog input has been synchronized/calibrated to the signal of the plant! Otherwise there might be wrong sample volumes!

ANNEX 4 – Calibration Volume of PERISTALTIC PUMP -

The single sample volume is defined by 2 capacitive sensors and a measuring tube and is highly accurate.

We recommend to calibrate the system every time a new sampling point and from time to time, depending on the customer-specific accuracy requirement.

The Peristaltic Pump enables as well a flow-proportional sample extraction, that means the sample volume varies automatically according to an analog flow signal
(0/4 - 20mA).

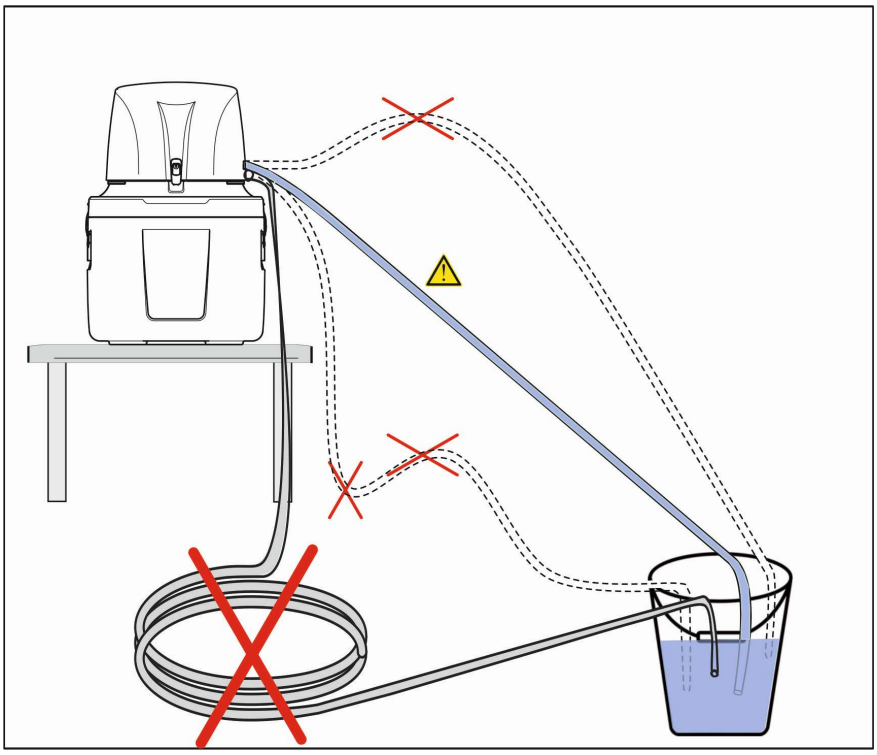
Example:
- the selected range is 0 to 20 mA
- the max. sample volume at **20 mA** is fixed to **200 ml.**

That means at an analog signal of e.g. **10 mA,** a **100 ml** sample would be extracted. Thus the sample extraction is always proportional to the flow.
At this system the sampling interval is **fixed** (e.g. every 10 min.) and the sample volume **varies** (the volume changes according to the mA signal).

Thus, a sample extraction **proportional** to the flow is guaranteed.

When putting the sampler into service, the system has to be **calibrated.** How to do the calibration is described in the following section:

Please take care, that the suction hose is going straight down to avoid air bubbles!



Sampling Modes

Now you have **3 different sampling modes** available.

The required sampling mode can be set in → **SETUP → SYSTEM SETTINGS:**

The default setting is 1 Sensor.

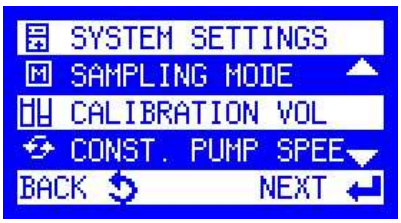
- ***ONE SENSOR*:**
  - This mode uses only one sensor for water detection.
    It is less sensitive to dirt in the suction hose and the risk of sampling errors is almost zero. If the water level varies, you have to be aware that it cannot be guaranteed the same accuracy as when using the two-sensor mode.

- ***TWO SENSORS*:**
  - This is the initial and known mode, which uses the two sensors for water detection. It enables the highest volume accuracy and ensures this even under changing environmental conditions. However, this mode requires a very accurate and precise handling of the system. If the hose is heavily dirty, errors in water detection may occur. Thus, the risk of error messages during sampling is therefore much higher and, this means, no sample will be taken.

- ***TIME*:**
  This sampling mode is only **time-dependent** without any sensors.
  Thus no sensor signals will be evaluated. In principle, sampling is always guaranteed as long as water is available because with this mode it´s not possible to detect, when there is no water. Also changes in the water level cannot be recognized and compensated. This mode is suitable for constant environmental conditions and also achieves very good volume accuracy in these cases.

Calibration

Calibration is always based on the selected sampling mode. If this is changed after calibration, a new calibration may be necessary. This is indicated by the sampler. If no calibration is done in this case, the sampler will use the last available calibration values. In this case, the accurate sample volume cannot be guaranteed. Calibration is possible at any time.



PRECISE:

Two samples are to be dosed. The first with approx. 500 ml, the second with approx. 50 ml. After starting the calibration cycle, the pump automatically begins the first purging.

Once this is complete you will see the following menu:

Pressing the right arrow key starts suction. The button must be held down until the desired volume has been taken. As soon as the button is released, the pump stops.

After a short time, the 2nd purging begins automatically. The taken volume must be measured and entered. The process must then be repeated, approx. 50 ml must be taken.

FAST:

With the quick calibration, **only one sample** needs to be taken. The process corresponds to that of precise calibration. It makes sense to take the volume that is desired, directly as the sample volume. Quick Calibration is **not** available in Time sampling mode.

Volume - Offset

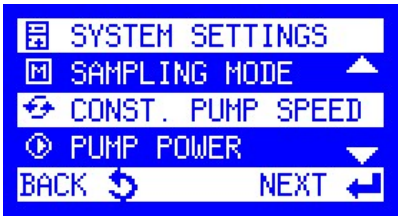
If the sampling deviates from the desired volume, a **positive** or **negative volume offset** can be set. This allows correction without the need for recalibration. The running program does not have to be ended to set the volume offset. If the device will be recalibrated, the volume offset will be also reset.

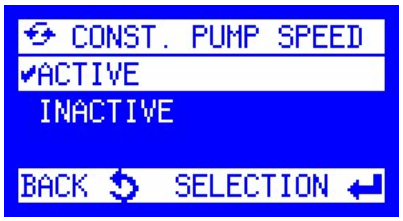
PWM function (PulsWidthModulation)

If the device is equipped with a PWM control board, further functions are available. The hardware selection is made in the setup menu.

CONSTANT SPEED

This option is activated by default if the PWM board is installed. The present voltage is read out and the pump output is then adjusted. If the voltage drops (e.g., during battery operation), the dropped supply voltage can be compensated so that the pump always maintains the same speed. If the option is **deactivated**, the pump will be always operated with the set power. In this case, a constant supply voltage should be ensured, or operation should take place with the two-sensor mode.





PUMP PERFORMANCE

The speed of the pump can be reduced in the “**Pump Power**” menu.
If the "**constant speed**" option is **deactivated**, the speed depends on the supply voltage.

ERRORMESSAGES :

- **SENSORS DIRTY:** One of the sensors notifies water after 1. prepurge.
- **Err. Watersensor 1:** Sensor 2 detects Water before Sensor 1.
- **Err. Watersensor 2:** Sensor 1 detects Water, but not Sensor 2.
- **Error Suction:** No sensor signal after reaching the maximum suction time.

ANNEX 5 SLEEPMODE

- **Activate:** Sleep mode is now automatically activated when no program or exactly one time program is active**.**
- A beep sounds when a pop-up window is displayed, before automatic activation. This can be prevented by pressing a button

- Each button press locks the automatic system again for 5 minutes
- A connected USB cable prevents sleep mode (regardless of whether data is being transferred)
- After a cold start (i.e. manual switching on), the sleep mode is always locked for 5 minutes
- You can **wake up** by pressing the ENT or ESC key for about 5 seconds.
- After waking up while the program is running, you will be taken directly to the second program information menu

- **Program modes that work in conjunction with sleep mode:**
  - **TIME**
  - **EVENT TIME:** Event signal must be present until sampler has woken up (>5 sec.)
  - While an event is pending, sleep mode is not activated.
  - Program Start via external start signal (pulse). If sleep mode is active and a start signal (pulse) is present, the device wakes up and the program is started. Once the program has been started via a start signal, the free programmable input is ignored until the device is switched off and on again. This ensures that, when using a float switch and wave movement e.g., new programs do not constantly start.

ANNEX 6– CONNECTION TO A PC-

• Direct connection via mini USB cable

1. In order to establish a connection to the sampler, the Maxxware Connect Software has to be installed **first** (see installation remarks on next page).
2. Thereafter the sampler can be connected directly to a PC by means of a standard mini USB interface. Select „USB“ as connection type in the connect software.

• IP connection via RJ45 cable

Default IP-Adresse of the Web-Board:

192.168.1.1

Default Router access:
User: **maxx**
Passwort: **6299**

Default Webserver access:
User: **maxx**
Password: **6299**

1. Setting of ports:

Pay attention that the ports are set correctly when establishing a network connection:

Ports:

maxxware Connect:	http:	**47234**
Router:	http:	**80**
	https:	**443**

example how to connect to **the router**:
http://192.168.1.1
https://192.168.1.1

example how to connect to **maxxware connect**:
http://192.168.1.1:47234

2. Check the IP-address at the sampler
The IP address can be displayed on the sampler display in the menu
“DIAGNOSTICS/TEST", "IP- ADDRESS".

3. Direct connection of a Notebook/PC at the sampler via **RJ45** cable
(only possible with installed WEB board)

For direct connection the IP address at the PC has to be set in the range of 1 – 254, **except** the number 1, for example: 192.168.1.**2**

Now, enter the following login data at the PC under „**Network connection** „ -> „**LAN connection**“-> „**Properties**“->“ **Internet protocol version 4 (TCP/IPv4)**“-> „**Properties**“->**Use the following IP address**“-

IP address: 192.168.1.x (x = 1 - 254, **except 1**)
Subnet mask: 255.255.255.0
Standard gateway: not required