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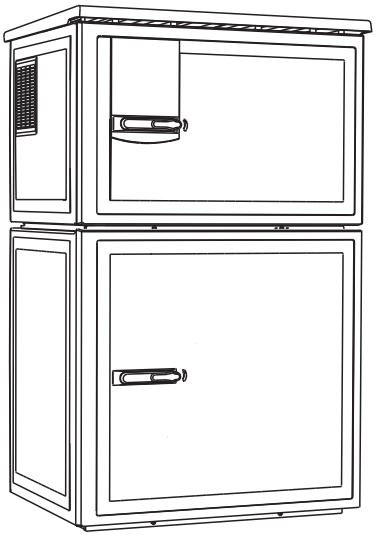
Valid as of:
Softwareversion 01.04.00

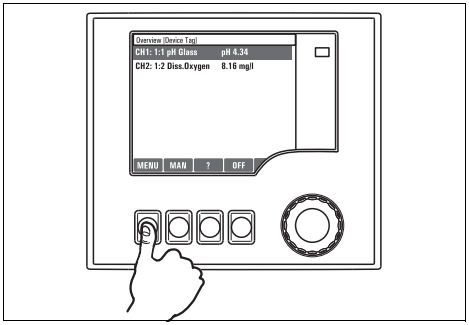
Operating Instructions
Liquistation CSF33

Automatic sampler for liquid media
Operation & settings



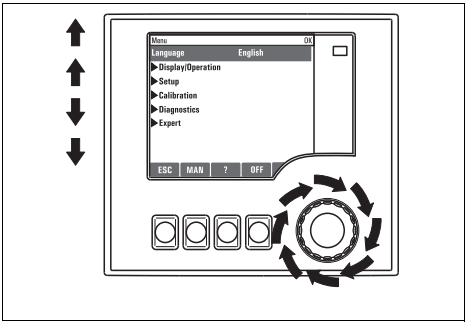
Endress+Hauser
People for Process Automation

Operation concept



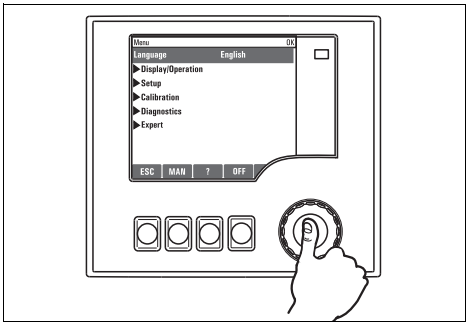
a0013353-en

Fig. 1: Pressing the soft key: selecting the menu directly



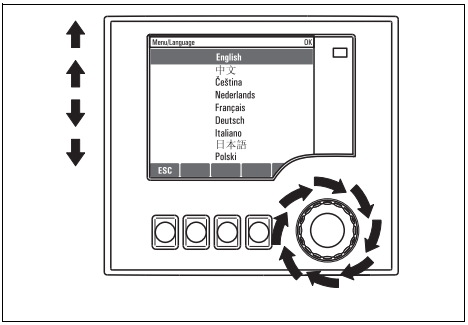
a0013354-en

Fig. 2: Turning the navigator: moving the cursor in the menu



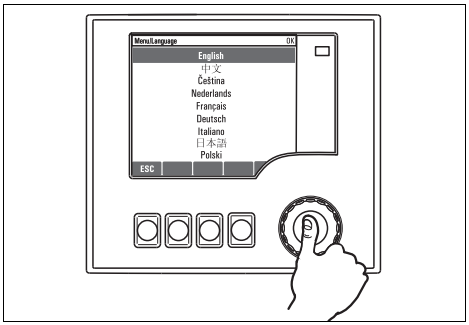
a0013355-en

Fig. 3: Pressing the navigator: launching a function



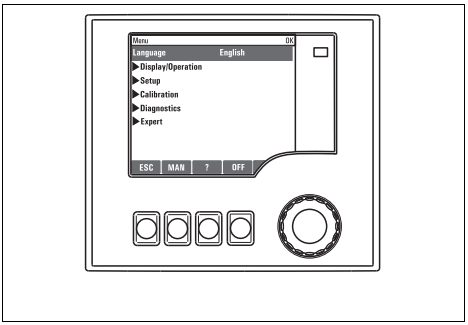
a0013356-en

Fig. 4: Turning the navigator: selecting a value (e.g. from a list)



a0013357-en

Fig. 5: Pressing the navigator: accepting the new value



a0013358-en

Fig. 6: Result: new setting is accepted

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1 About this manual

This manual gives a detailed account of all the configuration options **in the "Setup" menu**.

A description of the following menus is provided here:
- Inputs
  - Input configuration
  - Split into separate sections based on the different types of sensor that can be connected

    Some submenus are identical for all sensor types.
    These submenus are repeated in each input-specific section to make sure you can find the information you need quickly and easily.
- Outputs
  - Output configuration
  - Split into separate sections based on the different output types
- Sampling programs
  - Creating sampling programs
  - Configuring different types of programs
- Additional functions
  - Settings for the alarm sensor
- Data management
  - Firmware updates
  - Saving and loading configurations

This manual does not include the following:
- Setup/General settings
  --> Operating Instructions BA00479C "Commissioning"
- Display/Operation
  --> Operating Instructions BA00479C "Commissioning"
- Calibration
  --> Operating Instructions BA00489C "Calibration"
- Diagnostics
  --> Operating Instructions BA00488C "Maintenance & diagnostics"
- Expert
  --> Internal Service Manual

2 General settings

Many settings are not visible when a program is running.
If a program is running, stop the program before making any settings!

2.1 Basic settings

Path: Menu/Setup/General settings

Function	Options	Info
Device tag	Customized text, 32 characters	Select any name for your controller. Use the TAG name for example.
Temperature unit	Options ▪ ℃ ▪ ℉ ▪ K **Factory setting** ℃	
Alarm delay	0 to 9999 s **Factory setting** 0 s	The system only displays the errors that are present longer than the set delay time. This makes it possible to suppress error messages that only occur briefly and are caused by normal process-specific fluctuations.
Device Hold	Options ▪ Disabled ▪ Enabled **Factory setting** Disabled	You can enable an immediate, general hold here. The function has the same effect as the "HOLD" soft key in the measuring screens.

2.2 Date and time

Path: Menu/Setup/General settings/Date/Time

Function	Options	Info
Set date	Depends on the format	Editing mode: DD (day): 01 to 31 MM (month): 01 to 12 YYYY (year): 1970 to 2106
Set time	Depends on the format	Editing mode: hh (hour): 00 to 23 / 0 am to 12 pm mm (minutes): 00 to 59 ss (seconds): 00 to 59
▶ Extended setup		
Date format	Options ▪ DD.MM.YYYY ▪ YYYY-MM-DD ▪ MM-DD-YYYY **Factory setting** DD.MM.YYYY	Decide which date format you want to use.
Time format	Options ▪ HH:MM am (12h) ▪ HH:MM (24h) ▪ HH:MM:SS (24h) **Factory setting** HH:MM:SS (24h)	Decide whether you want to use the 12-hour or 24-hour clock. Seconds can also be displayed with the latter version.
Time zone	Options ▪ None ▪ Choice of 35 time zones **Factory setting** None	If no time zone is selected, then Greenwich Mean Time is used (London).
DST	Options ▪ Off ▪ Europe ▪ USA ▪ Manual **Factory setting** Off	The controller adapts the summertime/normal time changeover automatically if you choose European or American daylight saving time. Manual means that you can specify the start and end of daylight saving time yourself. Here, two additional submenus are displayed in which you specify the changeover date and time.

2.3 Automatic hold

Path: Menu/Setup/General settings/Automatic hold

Function	Options	Info
▶ Device specific hold		
Setup menu Diagnostics menu	Options ▪ Disabled ▪ Enabled **Factory setting** Disabled	Decide whether a hold should be output at the current output when the particular menu is opened.
Calibration active	**Factory setting** Enabled	
Hold release time	0 to 600 s **Factory setting** 0 s	The hold is maintained for the duration of the delay time when you switch to the measuring mode.

If a device-specific hold is enabled, any cleaning that was previously started is stopped. You can only start a manual cleaning if a hold is active.

2.4 Logbooks

Logbooks record the following events:
- Calibration/adjustment events
- Operation events
- Diagnostic events
- Programming events

Here you define how the logbooks should store the data.
In addition, you are also able to define individual data logbooks. Assign the logbook name and select the measured value to be recorded. You can configure the recording rate (Scan time) individually for every data logbook.
More information on the logbooks is provided in BA00488C "Maintenance & diagnostics", "Diagnostics menu" section.

Path: Menu/Setup/General settings/Logbooks

Function	Options	Info
Logbook ident	Customized text	Part of the file name when exporting a logbook
Event logbook	Options ▪ Off ▪ Ring buffer ▪ Fill up buffer **Factory setting** Ring buffer	All diagnostic messages are recorded **Ring buffer** If the memory is full, the latest entry automatically overwrites the oldest entry. **Fill up buffer** If the memory is 80% full, the device displays a diagnostic message. If the memory is full, there is an overflow, i.e. no new values can be saved. The controller displays a corresponding diagnostic message. The memory then has to be cleared manually.
Logbook program	Options ▪ Off ▪ Ring buffer ▪ Fill up buffer **Factory setting** Ring buffer	All program messages are recorded **Ring buffer** If the memory is full, the latest entry automatically overwrites the oldest entry. **Fill up buffer** If the memory is 80% full, the device displays a diagnostic message. If the memory is full, there is an overflow, i.e. no new values can be saved. The controller displays a corresponding diagnostic message. The memory then has to be cleared manually.
▶ Overflow warnings *Event logbook="Fill up buffer"*		
Calibration logbook Diagnostic logbook Configuration logbook	Options ▪ Off ▪ On **Factory setting** Off	Decide whether you want to receive a diagnostic message from the controller in the event of memory overrun of the logbook in question.

Path: Menu/Setup/General settings/Logbooks

Function	Options	Info
Overflow warnings *Logbook program="Fill up buffer"*	Options ▪ Off ▪ On **Factory setting** Off	If the fill-up buffer overruns, you can decide whether you want to receive a diagnostic message from the controller or not for each individual logbook.
▶ Data logbooks		
▶ New		You can create a maximum of 8 data logbooks.
Logbook name	Customized text, 20 characters	
Source of data	Options ▪ None ▪ Binary input 1 ▪ Binary input 2 ▪ Analog input 1 ▪ Analog input 2 ▪ Temperature **Factory setting** None	Select the input that should be the data source of the logbook entries.
Measured value	Options ▪ Depends on Source of data **Factory setting** None	You can record different measured values depending on the source of data.
Scan time	00:00:01 to 01:00:00 **Factory setting** 00:01:00	Minimum interval between two entries Format: HH:MM:SS
Data logbook	Options ▪ Off ▪ Ring buffer ▪ Fill up buffer **Factory setting** Off	**Ring buffer** If the memory is full, the latest entry automatically overwrites the oldest entry. **Fill up buffer** If the memory is 80% full, the device displays a diagnostic message. If the memory is full, there is an overflow, i.e. no new values can be saved. The controller displays a corresponding diagnostic message. The memory then has to be cleared manually.
Overflow warning *Data logbook="Fill up buffer"*	Options ▪ Off ▪ On **Factory setting** Off	If the fill-up buffer overruns, you can decide whether you want to receive a diagnostic message from the controller or not for each individual logbook.
▷ Add another logbook	Action	*Only if you want to create another data logbook immediately.* You add a new data logbook at a later data using ▶ New.
▷ Finished	Action	This allows you to exit the menu ▶ New.

Path: Menu/Setup/General settings/Logbooks

Function	Options	Info
▷Start/stop simultaneously	Action	Appears if you have created more than one data logbook. With one click, you can start or stop recording for all the data logbooks.
▶ "Logbook name"		The name of this submenu is based on the name of the logbook and only appears once you have created a logbook.
This menu appears several times if you have several data logbooks.		
Source of data	Read only	This is for information purposes only. If you want to record another value, delete this logbook and create a new data logbook.
Measured value		
Log time left *Data logbook="Fill up buffer"*	Read only	Displays the days, hours and minutes remaining until the logbook is full.
Log size *Data logbook="Ring buffer"*	Read only	Displays the number of entries remaining until the logbook is full.
Logbook name	Customized text, 20 characters	You can change the name here again.
Scan time	00:00:01 to 01:00:00 **Factory setting** 00:01:00	As above Minimum interval between two entries Format: HH:MM:SS
Data logbook	Options ▪ Off ▪ Ring buffer ▪ Fill up buffer **Factory setting** Off	**Ring buffer** If the memory is full, the latest entry automatically overwrites the oldest entry. **Fill up buffer** If the memory is 80% full, the device displays a diagnostic message. If the memory is full, there is an overflow, i.e. no new values can be saved. The controller displays a corresponding diagnostic message. The memory then has to be cleared manually.
▶ Line plotter		Menu to define the graphic display
Axes	Options ▪ Off ▪ On **Factory setting** On	Should the axes (x, y) be displayed (On) or not (Off)?
Orientation	Options ▪ Horizontal ▪ Vertical **Factory setting** Horizontal	You can choose whether the value curves should be displayed from left to right ("Horizontal") or from top to bottom ("Vertical"). If you want to display two data logbooks simultaneously, make sure that both logbooks have the same settings here.

Path: Menu/Setup/General settings/Logbooks

Function	Options	Info
X-Description	Options ▪ Off ▪ On **Factory setting** On	Decide whether a description should be displayed for the axes and whether grids should be shown. In addition, you can also decide whether a pitch should be displayed.
Y-Description		
Grids		
Pitches		
X Pitch/Grid distance	10 to 50% **Factory setting** 10 %	Specify the pitch.
Y Pitch/Grid distance		
▷ Remove	Action	This action removes the data logbook. Any data that have not been saved are lost.

Example for setting up a new data logbook

1. Menu/Setup/General settings/Logbooks/Data logbooks/New:
   a. Logbook name: Assign a name, e.g. "01".
   b. Source of data: Select a data source, e.g. the sensor connected to binary input 1.
   c. Measured value: Select the measured value that you want to record.
   d. Scan time: Specify the interval between two logbook entries.
   e. Data logbook: Activate the logbook. Specify the type of memory, "Ring buffer" or "Fill up buffer".
2. ../Finished: Execute this action.
   --> Your new logbook now appears in the list of data logbooks.
3. Select the data logbook with the name "01".
4. If you selected "Fill up buffer", you can also decide whether you want to receive a diagnostic message in the event of memory overrun.
5. Depending on the type of memory selected, you receive information about the memory space (for "Ring buffer") or the time remaining until memory overrun (for "Fill up buffer").
6. Define the graphic display mode in the "Line plotter" submenu.

2.5 Configuring the sampling depending on the device version

The list of functions displayed depends on the device version selected.
Functions marked [1)] are available in device versions with a vacuum pump.
Functions marked [2)] are available in device versions with a peristaltic pump.
Functions marked [3)] are available in device versions with a distribution arm drive.

Path: Menu/Setup/General settings

Function	Options	Info
▶ Sampling		
Number of bottles	Choice of all possible bottle combinations	The bottle configuration you ordered is preset in the device.
Bottle volume	0 to 100000 ml **Factory setting** Depends on the bottle configuration	
Distribution reference [3)]	Options ▪ Pre sampling ▪ Pre bottle change ▪ Pre program start **Factory setting** Pre sampling	The distribution arm goes through a reference point depending on the option selected. **Pre sampling:** This means that the distribution arm performs a reference test before each individual sampling. **Pre bottle change:** This means that the distribution arm performs a reference test in every subprogram. **Pre program start:** This means that a single reference test is performed before the program starts.
Power failure	Options ▪ Resume program ▪ Stop program **Factory setting** Resume program	Decide how the sampler should react when it is energized after a power failure. **Resume program:** ▪ Time and flow-paced The program calculates the omitted samples and enters them in the logbook as failed. When the program is restarted, it continues where it was interrupted. ▪ Flow-paced No samples are entered in the logbook during the power failure. When the program is restarted, it continues where it was interrupted.
Sample retries	0 to 3 **Factory setting** 0	If sampling is started and no sample is drawn in, sampling can be repeated up to 3 times.
Sampling delay	0 to 99 s **Factory setting** 0 s	The start of the sampling cycle can be delayed by up to 99 s. The binary output is switched without any delay.

Path: Menu/Setup/General settings

Function	Options	Info
Liquid detection [1]	Options ▪ Automatic ▪ Semi automatic **Factory setting** Automatic	If "Semiautomatic" is selected, the purge times and intake times can be defined separately.
Dosing volume [1]	[1]20 to 350 ml **Factory setting** 200 ml	[1]Adjust the dosing tube in the dosing chamber to change the dosing volume. The level in the bottle is calculated using the set dosing volume.
Conductive sensor [1]	Options ▪ Low sensitivity ▪ Medium sensitivity ▪ High sensitivity **Factory setting** Medium sensitivity	The switching behavior can be set with the liquid detection function. Use the high sensitivity setting if the sample has a low conductivity, for example.
Dosing chamber [1]	Options ▪ Dose without pressure (A) ▪ Dose with pressure (B) **Factory setting** Dose without pressure (A)	Dosing with pressure e.g. in conditions with low suction heights and slight counterpressure or low volumes.
Liquid detection [2]	Options ▪ Automatic ▪ Semi automatic ▪ Off **Factory setting** Automatic	If "Semiautomatic" is selected, the purge times and intake times can be defined separately. **Off:** The definition of the purge times and intake times is completely time-controlled. **Automatic:** The last intake time determined is the new purge time. **Semi automatic:** If the suction heights tend to vary greatly.
Rinse cycles [2]	0 to 3 **Factory setting** 0	The suction line is rinsed with the sample up to 3 times.
▶ Diagnostics settings		
▶ Sensor fouling[1]		
Warning	0 to 10 **Factory setting** 7	Indicates maintenance work must be performed on the conductivity sensors. If there is conductive fouling between the conductivity 1 and conductivity 2 electrode, a diagnostic message is displayed when this level of fouling is reached.
Alarm	7 to 10 **Factory setting** 10	If there is conductive fouling between the conductivity 1 and conductivity 2 electrode, a diagnostic message is displayed when this level of fouling is reached.

Path: Menu/Setup/General settings

Function	Options	Info
▶ Pump tube life [2]		
Control	Options ▪ Off ▪ On **Factory setting** On	Indicates the pump hose has to be exchanged.
Warning	10 to 50 h **Factory setting** 30 h	When the tube has been in operation for this length of time, a diagnostic message is displayed to indicate that the tube should be replaced in time.
Alarm	30 to 200 h **Factory setting** 50 h	
Totalizer	00-00:00 to 49710-06:28 **Factory setting** 00-00:00	Operating time of the current pump hose in days, hours and minutes
▷ Reset	Action	The tube life counter is reset to 0:00 h.
▶ Sample temperature		
Temp. control	Options ▪ Off ▪ On **Factory setting** On	Switch the temperature control of the sample compartment on or off here.
Economy operation	Options ▪ Off ▪ On **Factory setting** Off	On: Cooling is not enabled until the program takes the first sample. After this, the cooling regulator runs until the program is restarted.
Sample temperature	2 to 20 °C **Factory setting** 4 °C	Set the sample compartment temperature.
Cooling control	Options ▪ Standard operation ▪ Quick cool down **Factory setting** Standard operation	The temperature regulator is switched off for a certain time if quick cool-down is selected.

2.6 Extended setup

2.6.1 Diagnostics settings

The list of diagnostic messages displayed depends on the path selected. There are device-specific messages, and messages that depend on what sensor is connected.

Path: ... /Extended setup/Diagnostics settings/Diag. behavior (optional)

Function	Options	Info
List of diagnostic messages		Select the message to be changed. Only then can you make the settings for this message.
Diag. code	Read only	
Diagnostic message	Options ▪ On ▪ Off **Factory setting** Depends on the message	You can deactivate or reactivate a diagnostic message here. Deactivating means: ▪ No error message in the measuring mode ▪ No error current at the current output
Status signal	Options ▪ Maintenance (M) ▪ Out of specification (S) ▪ Function check (C) ▪ Failure (F) **Factory setting** Depends on the message	The messages are divided into different error categories in accordance with NAMUR NE 107. Decide whether you want to change the status signal assignment for your application.
Diag. output	Options ▪ None ▪ Alarm relay ▪ Relay 1 to n (depends on the device version) **Factory setting** None	You can use this function to select a relay output and/or binary output to which the diagnostic message should be assigned.
Cleaning program (optional)	Options ▪ None ▪ Cleaning 1 ▪ Cleaning 2 ▪ Cleaning 3 ▪ Cleaning 4 **Factory setting** None	Decide whether the diagnostic message should trigger a cleaning program. You can define the cleaning programs under: Menu/Setup/Additional functions/Cleaning.
Detail information	Read only	Here you can find more information on the diagnostic message and instructions on how to resolve the problem.

2.6.2 Data management

Firmware update

Please contact your local sales office for information on firmware updates available for your controller and its compatibility with earlier versions.
Your **current firmware version** can be found at: Menu/Diagnostics/System information/Software version.

First save your current setup on an SD card since a firmware update overwrites your settings with the factory settings. After updating the firmware, you can restore your setup by uploading it from the SD card.

To install a firmware update, you must have the update available on an SD card.
1. Insert the SD card into the controller card reader.
2. Go to: Menu/Setup/General settings/Extended setup/Data management/Firmware update.
   --> The update files on the SD card are displayed.
3. Select the desired update and select yes when the following question is displayed: The current firmware will be overwritten. After this the device will reboot. Do you want to proceed?
   --> The firmware is loaded and the device is then started with the new firmware.

Saving the setup

Saving the setup gives you the following advantages:
- Quick and easy to restore a setup following a firmware update
- Copying settings for other devices
- Quick and easy switching between various setups, e.g. for different user groups or for recurring sensor type change
- Restoring a tried-and-tested setup, e.g. if you have changed a lot of settings and no longer know what the original settings were

1. Insert the SD card into the controller card reader.
2. Go to: Menu/Setup/General settings/Extended setup/Data management/Save setup.
3. Assign a file name (Name).
4. Then select "Save".
5. If you have already assigned the file name, you will be asked whether you want to overwrite the existing setup.
   Select "OK" to confirm, or cancel the action and give the file a new name.

--> Your setup is stored on the SD card and you can upload it quickly to the device at a later date.

Loading the setup

You can load a setup you have saved quickly and easily:
1. Insert the SD card into the controller card reader.
2. Go to: Menu/Setup/General settings/Extended setup/Data management/Load setup.
   --> A list of all the setups on the SD card is displayed.
3. Select the desired setup.
   The device then displays the following message:The current parameters will be overwritten and the device will reboot. Warning: Please note that cleaning and controller programs can be active. Do you want to proceed?
4. Select "OK" to confirm or cancel the action.

--> The desired setup is restored after restarting the device.

Exporting the setup

Exporting the setup gives you the following advantages
- Export in xml format
- Import the data e.g. into MS Excel (drag&drop the xml file in an open Excel window)

1. Insert the SD card into the controller card reader.
2. Go to: Menu/Setup/General settings/Extended setup/Data management/Export setup.
3. Assign a file name (Name).
4. Then select "Export".
5. If you have already assigned the file name, you will be asked whether you want to overwrite the existing setup.
   Select "OK" to confirm, or cancel the action and give the file a new name.

--> Your setup is saved on the SD card.

Activation code

You require activation codes for:
- Additional functions, e.g. other inputs
- Software upgrades

Enter the activation code:
- ▶ Menu/Setup/General settings/Extended setup/Data management/Activation code.
- ▶ Confirm your entry. Your new hardware or software function is then activated and can be configured.

If activation codes are available for your device, these codes are provided on the inner nameplate. The corresponding device functions are activated at the factory. You only require the codes if servicing the device.

3 Inputs

Liquistation CSF33 has 2 binary inputs and 2 current inputs as standard. All inputs are galvanically isolated from one another.

3.1 Binary inputs

The binary inputs are used to control the sampler using external signals.
With the CSF33, the auxiliary voltage of 24 V DC from the terminal block in the connection compartment of the sampler can be used for floating contacts (see BA00479C "Commissioning").

Path: Menu/Setup/Inputs

Function	Options	Info
▶ Binary input S:x		
Mode	Options ▪ Off ▪ On **Factory setting** Off	Switches the function on or off
Input mode	Options ▪ Flow rate ▪ Rainfall ▪ External event **Factory setting** Flow rate	▪ Pulse input for connected flowmeters or rain gages ▪ Control of sampling functions via external signals
If Input mode **Flow rate** is selected:		
Signal slope	Options ▪ Low-High ▪ High-Low **Factory setting** Low-High	Preselect the level change of the signal.
Unit	Options ▪ m^3 ▪ l ▪ cf ▪ gal **Factory setting** m^3	Select the unit.
Meas. value format	**Factory setting** **#.#**	Specify the number of decimal places for the flow.
1 Impulse =	0 to 1000 m^3 **Factory setting** 10 m^3	Definition of the pulse value, limits are calculated depending on the unit

Path: Menu/Setup/Inputs

Function	Options	Info
▶ Unit of totalized flow		
Current totalized flow	- - -	The totalized flow values are displayed.
Reset totalizer	Options ▪ Manual ▪ Automatic ▪ At program start **Factory setting** Manual	**Manual:** Reset the counter manually. **Automatic:** The counter is reset automatically at intervals. **At program start:** The counter is reset at program start.
If counter reset **Manual** is selected:		
▷ Reset totalized flow	Action	The totalized flow currently calculated is set to zero when the counter is reset.
If counter reset **Automatic** is selected:		
Interval	Options ▪ Daily ▪ Weekly ▪ Monthly **Factory setting** Daily	**Daily:** If a daily interval is selected, set the Time in the menu item that follows. **Weekly:** If a weekly interval is selected, set the Day of week and the Time in the menu items that follow. **Monthly:** If a monthly interval is selected, set the Day of month and the Time in the menu items that follow.
Time	00:00:00 to 23:59:59 HH:MM:SS **Factory setting** 12:00:00 HH:MM:SS	
If Input mode **Rainfall** is selected:		
Signal slope	Options ▪ Low-High ▪ High-Low **Factory setting** Low-High	Preselect the level change of the signal.
Unit	Options ▪ mm ▪ inch **Factory setting** mm	Select the unit.
Meas. value format	**Factory setting** #.#	Specify the number of decimal places.
1 Impulse =	0.00 to 5.00 mm **Factory setting** 1.0 mm	Definition of the pulse value, limits are calculated depending on the unit. The correct switch value is provided in the Operating Instructions of your rain gage.

Path: Menu/Setup/Inputs

Function	Options	Info
Intensity	Options ▪ mm/min ▪ mm/h ▪ mm/d **Factory setting** mm/min	Select the intensity per minute, hour or day according to your requirements.
▶ Totalized rainfall		
Totalized rainfall	- - -	The totalized rainfall is displayed.
Reset totalizer	Options ▪ Manual ▪ Automatic ▪ At program start **Factory setting** Manual	**Manual:** Reset the counter manually. **Automatic:** The counter is reset automatically at intervals. **At program start:** The counter is reset at program start.
If counter reset **Manual** is selected:		
▷ Reset totalized rainfall	Action	The totalized rainfall currently calculated is set to zero when the meter is reset manually.
If counter reset **Automatic** is selected:		
Interval	Options ▪ Daily ▪ Weekly ▪ Monthly **Factory setting** Daily	**Daily:** If a daily interval is selected, set the Time in the menu item that follows. **Weekly:** If a weekly interval is selected, set the Day of week and the Time in the menu items that follow. **Monthly:** If a monthly interval is selected, set the Day of month and the Time in the menu items that follow.
Time	00:00:00 to 23:59:59 HH:MM:SS **Factory setting** 12:00:00 HH:MM:SS	
If Input mode **External event** is selected:		

Path: Menu/Setup/Inputs

Function	Options	Info
Operation	Options ▪ No operation ▪ Start sampling ▪ Program start ▪ Program stop ▪ Program duration ▪ Program pause ▪ Partprogram activation ▪ Change bottle ▪ Bottle synchronization ▪ External hold ▪ Start cleaning **Factory setting** No operation	**No operation**: No action is executed. **Start sampling**: A pulse triggers sampling. **Program start**: A pulse starts a program. **Program stop**: A pulse stops the program running. **Program duration**: A program is active as long as the input signal is present. The signal is a level signal, i.e. the action takes effect as long as the level is present. The level that triggers the action is configured in the Signal slope menu item that follows. **Program pause**: The input signal stops the program running. The programs continue running when the signal disappears. The signal is a level signal, i.e. the action takes effect as long as the level is present. The level that triggers the action is configured in the Signal slope menu item that follows. **Partprogram activation**: A pulse triggers a subprogram. **Change bottle**: A pulse triggers a changeover to the next bottle. **Bottle synchronization**: A pulse triggers a changeover to the set bottle position. --> Then select the bottle position (depends on the bottle configuration). **External hold**: The input signal triggers an external hold. The signal is a level signal, i.e. the action takes effect as long as the level is present. The level that triggers the action is configured in the Signal slope menu item that follows. **Start cleaning**: A pulse triggers the cleaning.
Signal slope	Options ▪ Low-High ▪ High-Low **Factory setting** Low-High	Preselect the level change of the signal. --> If Low-High is selected, the high level brings about the corresponding setting.
▷ Binary input assignment view		

3.2 Current inputs

The current input must be assigned an analog signal for the functions described. Active and passive current inputs are available to connect two-wire or four-wire devices.

For the correct wiring of the current inputs, see:
BA00479C "Commissioning"

Path: Menu/Setup/Inputs

Function	Options	Info
▶ Current input S:x		
Mode	Options ▪ Off ▪ 0 to 20 mA ▪ 4 to 20 mA **Factory setting** Off	Enter the output signal of the connected device: 0 to 20 mA or 4 to 20 mA.
Input mode	Options ▪ Flow rate ▪ Parameter ▪ Current **Factory setting** Current	Select the input variable. **Flow rate:** The input can be used as the source for time/flow-paced or flow-paced sampling programs. **Parameter:** The input can be used as the source for limit switches, logbooks and enabling and disabling events for sampling programs. **Current:** The input can be used as the source for limit switches, logbooks and enabling and disabling events for sampling programs. A unit name cannot be specified.
If Input mode **Flow rate** is selected:		
Unit of flow	Options ▪ l/s ▪ m^3/s ▪ m^3/h ▪ m^3/d ▪ cfs ▪ cfm ▪ gpm ▪ gph ▪ mgd **Factory setting** l/s	Select the unit.
Unit of totalized flow	Options ▪ l ▪ m^3 ▪ cf ▪ gal **Factory setting** m^3	Select the unit for the totalized flow.

Path: Menu/Setup/Inputs

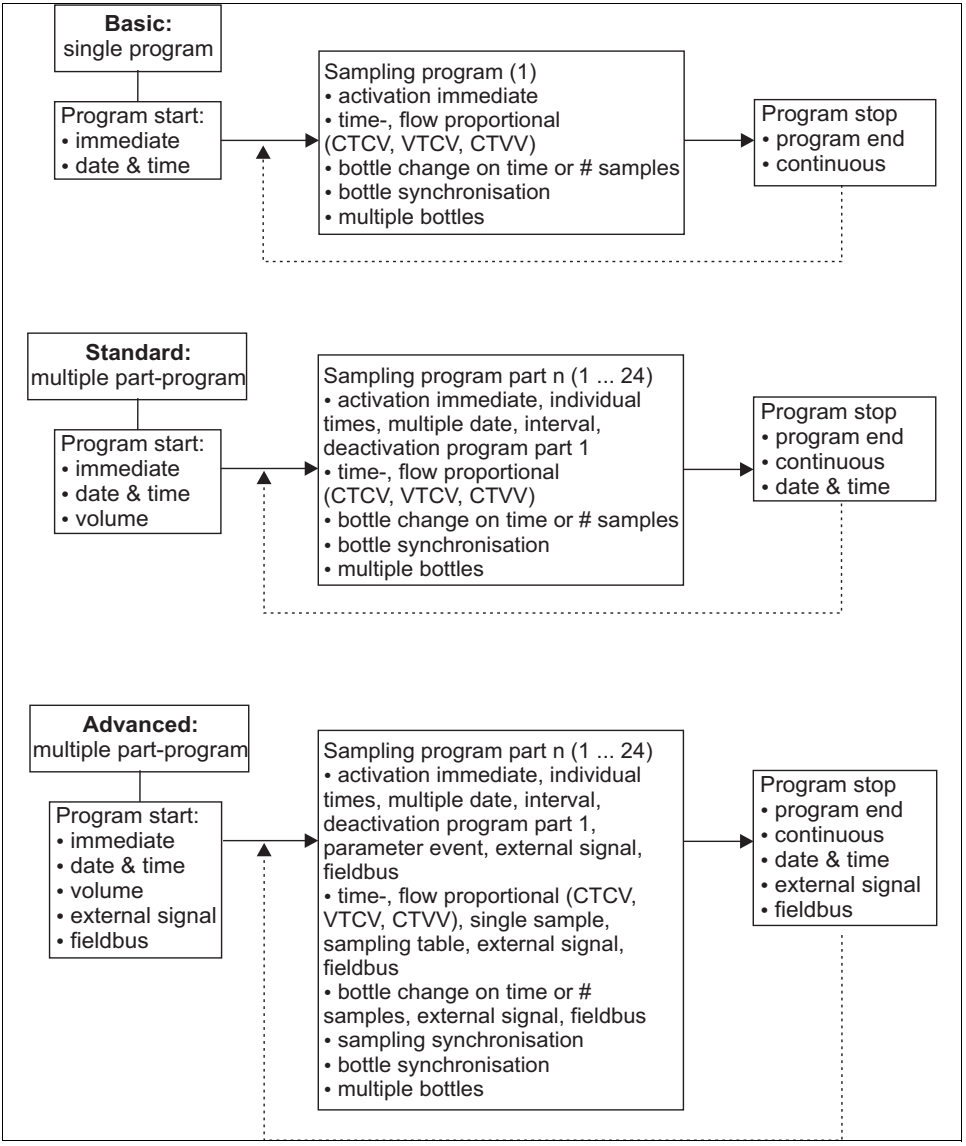
Function	Options	Info
Meas. value format	**Factory setting** #.#	Specify the number of decimal places for the flow.
Minimum flow	0 to 10000 l/s **Factory setting** 0 l/s	The set limit value prevents sampling if the flow falls below this value (only for time/flow-paced sampling)).
Lower range value	0 to 10000 l/s **Factory setting** 0 l/s	Enter a value for the start of the measuring range. 0/4 mA is assigned to this value as per your specifications.
Upper range value	0 to 10000 l/s **Factory setting** 100000 l/s	Enter a value for the end of the measuring range. 20 mA is assigned to this value as per your specifications.
Damping	0 to 60 s **Factory setting** 0 s	The damping causes a floating average curve of the measured values over the time specified.
▶ Totalized flow The totalized flow is calculated when the program is started if you use a sampling program with volume, flow-paced sampling or time/flow-paced sampling as the start condition. The samples are taken based on this value. The current totalizer is used for calculating purposes if the totalized flow is used as the measured value for an enabling or disabling event.		
Current totalized flow	- - -	The totalized flow values are displayed.
Reset totalizer	Options ▪ Manual ▪ Automatic ▪ At program start **Factory setting** Manual	**Manual:** Reset the counter manually. **Automatic:** The counter is reset automatically at intervals. **At program start:** The counter is reset at program start.
Flow rate	- - -	The current flow rate is displayed.
If counter reset **Manual** is selected:		
▷ Reset totalized flow	Action	The totalized flow currently calculated is set to zero when the counter is reset.
If counter reset **Automatic** is selected:		
Interval	Options ▪ Daily ▪ Weekly ▪ Monthly **Factory setting** Daily	**Daily:** If a daily interval is selected, set the Time in the menu item that follows. **Weekly:** If a weekly interval is selected, set the Day of week and the Time in the menu items that follow. **Monthly:** If a monthly interval is selected, set the Day of month and the Time in the menu items that follow.

Path: Menu/Setup/Inputs

Function	Options	Info
If Input mode **Parameter** is selected:		
Meas. value format	**Factory setting** #.#	Specify the number of decimal places.
Parameter name	Customized text	Assign a name.
Unit of measure	Customized text	Enter the engineering unit.
Lower range value	-20 to 10000 **Factory setting** 0	Enter a value for the start of the measuring range. 0/4 mA is assigned to this value as per your specifications.
Upper range value	-20 to 10000 **Factory setting** 10	Enter a value for the end of the measuring range. 20 mA is assigned to this value as per your specifications.
Damping	0 to 60 s **Factory setting** 0 s	The damping causes a floating average curve of the measured values over the time specified.
If Input mode **Current** is selected:		
Meas. value format	**Factory setting** #.#	Specify the number of decimal places.
Damping	0 to 60 s **Factory setting** 0 s	The damping causes a floating average curve of the measured values over the time specified.

4 Programming

The Liquistation CSF33 offers users a wide range of options for configuring individual sampling programs. The 3 different program types (Basic, Standard and Advanced) make it easy for you to find the right program for your application.



4.1 Overview of the possible program types

Sampling mode	Basic program type	Standard program type	Advanced program type
Vacuum/peristaltic pump	Time-paced	Time-paced	Time-paced
	Flow-paced	Flow-paced	Flow-paced
			Single sample
			Sampling table
			External signal
Peristaltic pump	Time/flow-paced	Time/flow-paced	Time/flow-paced

The graphic below explains the various ways sampling can be controlled on the basis of a flow curve.

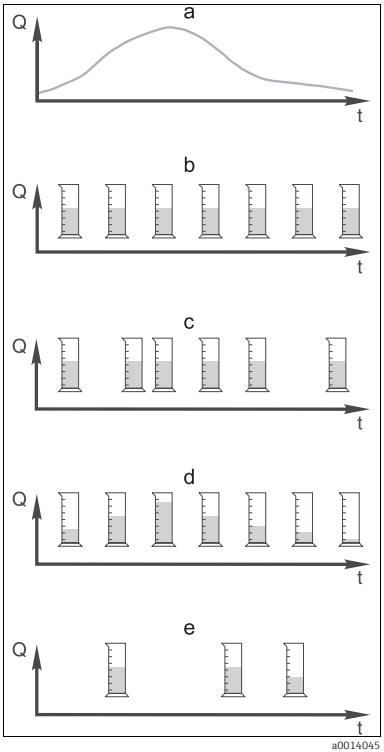


Fig. 7: Sampling control

a. Flow curve
b. **Time-paced sampling**
   A constant sampling volume (e.g. 50 ml) is taken at steady intervals (e.g. every 5 min).
c. **Flow-paced sampling**
   A constant sampling volume is taken at variable intervals (depending on the inflow volume).
d. **Time/flow-paced sampling**
   A variable sampling volume (the sampling volume depends on the inflow) is taken at steady time intervals (e.g. every 10 min).
e. **Event-controlled sampling**
   Sampling is triggered by an event (e.g. pH limit value). Sampling can be time-paced, flow-paced, or time/flow-paced, or single samples can be taken.

The following table explains the various types of sampling using specific examples.

Type of sampling	Example	Info
Time-paced	▪ Sampling interval: 5 min ▪ Sampling volume: 50 ml ▪ Bottle change mode: 2 h With this setting, a 50 ml sample is taken every 5 minutes. 12 samples are thus taken every hour. Each bottle is filled over a period of 2 hours. This results in a total sampling volume of 24 samples per bottles x 50 ml = 1200 ml.	This type of sampling remains constant over time and does not take changes in flow or polluting load into account. It is possible to take a representative sample if the intervals are brief (e.g. 5 min).
Flow-paced	**Controlled via current input** ▪ Signal: 0 to 20 mA = 0 to 600 m^3/h ▪ Sampling volume: 50 ml ▪ Sampling interval: 20 m^3 ▪ Bottle change mode: 2 h If 20 mA = 600 m^3/h, a sample is taken every 2 minutes (smallest sampling interval with maximum flow). The total number of samples amounts to 60 samples per bottle. With a flow of 300 m^3/h, a sample is taken every 4 minutes. **Controlled via binary input** ▪ Signal pulse: 5 m^3 ▪ Sampling volume: 50 ml ▪ Sampling interval: 20 m^3 ▪ Bottle change mode: 2 h The pulses are scaled at the flowmeter. By multiplying the pulses at the sampling interval, the shortest sampling interval at the maximum pulse frequency can be set. Example: Given a maximum flow of 600 m^3/h, the pulse frequency at 5 m^3 is 120 pulses/h or 2 pulses/min. With a sampling interval of 20 m^3, sampling takes place after 4 pulses = 2 minutes.	▪ The current inputs can be configured for the current range of 0 to 20 mA or 4 to 20 mA. ▪ The binary inputs require power (24 V DC) for floating contacts. In the case of flow-paced sampling, the sampling interval is calculated on the basis of the volume flow. The same sampling volume is take at variable intervals. **Advantage:** Good, representative results in the event of minor fluctuations in flow. **Disadvantage:** Longer intervals when the level of water is low mean that malfunctions cannot be detected.

Type of sampling	Example	Info
Time/flow-paced (only possible with peristaltic pump)	**Controlled via current input** ▪ Signal: 0 to 20 mA ▪ Sampling interval: 10 min ▪ Sampling volume: variable The maximum sampling volume is defined at the maximum flow rate. Example: The maximum flow rate at 20 mA at the current input is 160 l/s, and the maximum sampling volume is 200 ml. When transferring samples into a 30l mixed sample container, 144 samples are taken per day with a maximum sampling volume of 28.8 l. With a flow rate of 80 l/s, a sampling volume of only 100 ml would be grabbed, and a sampling volume of 50 ml would be grabbed at a flow rate of 40 l/s. The sampling volume is always calculated based on the flow. **Controlled via binary input** ▪ Binary input (pulse per flow unit) ▪ Sampling interval: 10 min ▪ Sampling volume: variable The sampling volume is defined for a flow pulse, e.g.: 1 pulse is 20 ml. For instance, if 5 flow pulses are counted between the sampling intervals, this results in a sampling volume of 5 x 20 = 100 ml, and a volume of 8 x 20 = 160 ml for 8 pulses. If a binary input is used for time/flow-paced sampling, the sampling volume is calculated per sample as a percentage of the specified sampling volume.	Samples are taken at set intervals with a variable sampling volume. The sampling volume is calculated from the **flow rate**. More volume is grabbed when the flow is high than when it is low. Since the flow normally fluctuates and the maximum flow is only rarely a constant variable, the sampling volume transferred to the container will depend on the daily average. **Advantage:** Very good, representative sampling given large fluctuations in the flow and constant time intervals. **Disadvantage:** Too little sampling volume is made available for analysis when the flow is low. **Advantage with current input:** For the sampling interval, either the current flow rate or the average value between the last and current flow rate is used to calculate the exact sampling volume (depending on the presetting). **Disadvantage with binary input:** For the sampling interval, the pulses counted since the last sampling are multiplied by a volume. If this is too high - e.g. 100 ml - the composition of the sample is not representative for analysis.
Event	Event-based sampling is controlled via the current input, binary input and/or sensor input. The subprogram created waits to be activated by an event that can consist of up to 3 individual events. Every possible condition can be created using logical "and" / "or" links. For example, the information from a flowmeter connected to the current input can be linked to a rain gage and a pH sensor signal connected to the binary input. An event is defined as limit value violation (exceeded or undershot), range monitoring within or outside a range, or a rate of change. Users can decide whether additional sampling is started when the event starts and/or ends. For the duration of the event, users can choose from time-paced, flow-paced or time/flow-paced sampling, or can take single samples, use a sampling table or the external control system.	The sampler waits for an event. This event takes place via internal sensor signal processing or via devices connected externally. As bottle assignment is possible when using several bottles, events can be assigned to individual bottles. A maximum of 24 subprograms can be started simultaneously and assigned to individual bottles.

4.1.1 Bottle synchronization

The bottle synchronization setting is possible with all types of program. In addition, bottle synchronization can be switched via an external signal.
Bottle synchronization is only possible with a bottle change after a specific time and not with a bottle change after a number of samples.

Specific bottles can be assigned specific filling times with the bottle synchronization function. For example, bottle 1 is to be filled from midnight to 2 a.m., bottle 2 from 2 a.m. to 4 a.m. etc.. The following options are available for this:

- None: The time of sampling and bottle change are not synchronized.
- 1. bottle change time: Sampling starts with the first bottle. The changeover to the next bottles is synchronized. For example, a time of 2 hours was set for bottle changeover, and 00:00 was set for the synchronization. If the program is started at 5:23 a.m., for example, bottle 1 is initially filled. The system switches for the first time to bottle 2 at midnight (00:00), to bottle 3 at 2 a.m. etc.
- 1. Time of change + bottle number: A specific filling time is assigned to every bottle. For example, midnight to 2 a.m. for bottle 1; 2 a.m. to 4 a.m. for bottle 2; 4 a.m. to 6 a.m. for bottle 3 etc. If the program is started at 10 a.m., for example, the device starts filling bottle 6.
  It is also possible to start synchronization on a specific day of the week.
  For example, a time of 24 hours was set for bottle changeover, Monday 00:00 was the time set for synchronization, and Tuesday 8 a.m. was set for starting the program. The system fills bottle 2 until 00:00 on Wednesday and then switches to bottle 3.
- External signal: The system changes to the next bottle when an external signal is received. The external signal first has to be configured via the binary input. The binary input can then be selected as the source.

4.2 Program type: Basic

With the Basic program type, you can create simple sampling programs quickly based on time, volume and flow. In the case of volume- and flow-controlled sampling, the inputs have to be configured appropriately beforehand. If you want to create a program and use it immediately, you have to check the configuration of the sampler before programming. You can make the settings under "Menu/Setup/General settings/Sampling": e.g. the bottle configuration, and the bottle volume, as well as the correct dosing volume for the device version with a vacuum pump. The dosing volume setting makes it possible to correctly calculate the level in the bottle and is a reliable way of preventing the bottles from being overfilled.

You can go to the Setup program either via the overview under "Select sampling program" or via the path "Menu/Setup/Sampling programs".

Path: Menu/Setup/Sampling programs

Function	Options	Info
Current program:	Read only	The last sampling program to be created or used is displayed.
Status	Read only	Display "Active": The sampling program has been started and the device takes a sample as per the set parameters. Display "Inactive": No sampling program has been started, or a program that was running has been paused. Display "Pause": Sampling program paused.
▶ Setup program		
New		A list of all the programs created is displayed. For this reason, it is often helpful to add a "B" for Basic in the program name.
Program1, which is supplied with the device, is displayed, as is a list of all the programs already created (Basic, Standard or Advanced programs). You can either create a new program or select an existing one. If you select an existing program, you can edit, delete, start or duplicate it. Furthermore, you can also see whether this program is a Basic, Standard or Advanced program. If you are creating a new program, select the Basic, Standard or Advanced program type.		
▶ Basic		
Program name	Customized text	Use a distinct name for your sampling program. The program name can be up to 16 characters long.
Bottle configuration	Choice of all possible bottle combinations **Options:** - 1x - PE direct distribution - 4x - PE direct distribution - 12x - PE/glass distributor plate - 24x - PE/glass distributor plate	The ordered bottle configuration is preset or the configuration selected in the setup is displayed.

Path: Menu/Setup/Sampling programs

Function	Options	Info
Bottle volume	0 to 100000 ml **Factory setting** 30000 ml	Set the bottle volume. The preset value depends on the bottle configuration configured. The bottle volume is always 30 l for individual containers.
Sampling mode	Options ▪ Time paced CTCV ▪ Flow paced VTCV ▪ Time/flow paced CTVV ▪ External signal **Factory setting** Time paced CTCV	The following functions depend on the option selected. These versions are illustrated individually in the following section to provide a clearer understanding of the options. **Time paced CTCV:** A constant sampling volume is taken at steady intervals. **Flow paced VTCV:** A constant sampling volume is taken at variable intervals. **Time/flow paced CTVV (only for version with peristaltic pump):** A variable sampling volume is taken at steady intervals.

4.2.1 Settings with a time-paced Basic program

Settings with the Basic program type with 1 bottle
Sampling mode = "Time paced CTCV"

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Sampling interval	00:01:00 to 99:59:00 HH:MM:SS **Factory setting** 00:10:00 HH:MM:SS	Set the sampling interval.
Dosing volume (for version with vacuum pump) Sampling volume (for version with peristaltic pump)	Vacuum pump: 20 to 350 ml Peristaltic pump: 10 to 10000 ml **Factory setting** Vacuum pump: 200 ml Peristaltic pump: 100 ml	Set the dosing volume or the sampling volume. In the version with a vacuum pump, the volume is taken from the setup and can only be modified there. The dosing accuracy and the repeatability of a sample volume < 20 ml can vary, depending on the specific application.
Multiplier (for version with vacuum pump)	1 to 10 **Factory setting** 1	You can change the sampling volume using the multiplier. For example, if the dosing volume is set to 200 ml, set the multiplier to 2 for a sampling volume of 400 ml. 2 samples are taken in succession when sampling.
Bottle change mode	Options ▪ Number of samples ▪ Time ▪ External signal **Factory setting** Number of samples	The bottle can be changed after a specific number of samples, after a time or by an external signal.
If Bottle change mode **Number of samples** is selected:		
Samples per bottle	1 to 9999 **Factory setting** 1	Set the number of samples. If the bottle is full beforehand based on the calculated level, the system prevents more samples being added to the bottle. Such samples are logged as failed samples in the program logbook. At the same time, the diagnostics message "Overfill check" (F353) is also triggered.
If Bottle change mode **Time** is selected:		
Time interval	00-00:02 to 31-00:00 DD-HH:MM **Factory setting** 00-01:00 DD-HH:MM	Set the time (days, hours and minutes) after which the system should change to the next bottle.

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Bottle synchronization	Options ▪ None ▪ 1. bottle change time ▪ 1. Time of change + bottle number **Factory setting** None	None: The time of sampling and bottle change are not synchronized. 1. bottle change time: Sampling starts with the first bottle. Set the synchronization time. 1. Time of change + bottle number: Each bottle is assigned to a specific fill time. Set the synchronization time and the weekday.
Start condition	Options ▪ Immediate ▪ Date/time **Factory setting** Immediate	The sampling program can be started either immediately or at a specific, configurable time.
If Start condition **Date/time** is selected:		
Start date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the start date for the sampling program. The format depends on the option configured under general settings.
Start time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is started. The format depends on the option configured under general settings.
Stop condition	Options ▪ Program end ▪ Continuous **Factory setting** Program end	**Program end:** The device stops sampling automatically once it has run through the set program. **Continuous:** The device runs through the set program continuously in an infinite loop. Do not forget to empty the bottles.
Assignment bin. output	Options ▪ No binary output config. for state reporting ▪ Binary output S:x **Factory setting** No binary output config. for state reporting	Assignment of the binary output to the program cycle.
▶ Inputs		Settings for the inputs can be made as described in the "Inputs" section.

Settings with the Basic program type with multiple bottles

Sampling mode = "Time paced CTCV"

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Sampling interval	00:01:00 to 99:59:00 HH:MM:SS **Factory setting** 00:10:00 HH:MM:SS	Set the sampling interval.
Dosing volume (for version with vacuum pump) Sampling volume (for version with peristaltic pump)	Vacuum pump: 20 to 350 ml Peristaltic pump: 10 to 10000 ml **Factory setting** Vacuum pump: 200 ml Peristaltic pump: 100 ml	Set the dosing volume or the sampling volume. The volume is taken from the setup in the version with a vacuum pump. The dosing accuracy and the repeatability of a sample volume < 20 ml can vary, depending on the specific application.
Multiplier (only for version with vacuum pump)	1 to 10 **Factory setting** 1	You can change the sampling volume using the multiplier. For example, if the dosing volume is set to 200 ml, set the multiplier to 2 for a sampling volume of 400 ml. 2 samples are taken in succession when sampling.
Bottle change mode	Options ▪ Number of samples ▪ Time ▪ External signal **Factory setting** Number of samples	The bottle can be changed after a specific number of samples, after a time or by an external signal.
If Bottle change mode **Number of samples** is selected:		
Samples per bottle	1 to 9999 **Factory setting** 1	Set the number of samples. If the bottle is full beforehand based on the calculated level, the system prevents more samples being added to the bottle. Such samples are logged as failed samples in the program logbook.
If Bottle change mode **Time** is selected:		
Time interval	00-00:02 to 31-00:00 DD-HH:MM **Factory setting** 00-01:00 DD-HH:MM	Set the time (days, hours and minutes) after which the system should change to the next bottle.
Multiple bottles	0 to 23 The configuration options depend on the current number of bottles **Factory setting** 0	Multiple bottles: "Simultaneous" transfer of two samples to separate bottles.

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Bottle synchronization	Options ▪ None ▪ 1. bottle change time ▪ 1. Time of change + bottle number **Factory setting** None	None: The time of sampling and bottle change are not synchronized. 1. bottle change time: Sampling starts with the first bottle. Set the synchronization time. 1. Time of change + bottle number: Each bottle is assigned to a specific fill time. Set the synchronization time and the weekday.
If Bottle change mode **External signal** is selected:		
Bottle change signal input	Options ▪ No bottle change input configured ▪ Binary input S:x **Factory setting** No bottle change input configured	The bottle change input can be configured under ▶ Inputs .
Multiple bottles	0 to 23 The configuration options depend on the current number of bottles **Factory setting** 0	Multiple bottles: "Simultaneous" transfer of two samples to separate bottles.
Start condition	Options ▪ Immediate ▪ Date/time **Factory setting** Immediate	The sampling program can be started either immediately or at a specific, configurable time.
If Start condition **Date/time** is selected:		
Start date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the start date for the sampling program. The format depends on the option configured under general settings.
Start time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is started. The format depends on the option configured under general settings.

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Stop condition	Options ▪ Program end ▪ Continuous **Factory setting** Program end	**Program end:** The device stops sampling automatically once it has run through the set program. **Continuous:** The device runs through the set program continuously in an infinite loop. Do not forget to empty the bottles. The bottle level is reset once a program loop has been run through.
Assignment bin. output	Options ▪ No binary output config. for state reporting ▪ Binary output S:x **Factory setting** No binary output config. for state reporting	Assignment of the binary output to the program cycle.
▶ Inputs		Settings for the inputs can be made as described in the "Inputs" section.

4.2.2 Settings with a flow-paced Basic program

Settings with the Basic program type with 1 bottle
Sampling mode = "Flow paced VTCV"

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Flowmeter input	Options ▪ No flow input configured ▪ Binary input S:x ▪ Current input S:x **Factory setting** No flow input configured	Select the flow input. The binary input or the current input must be configured for this function. Only the inputs configured as a flow input are displayed.
Sampling interval	1.000 to 9999.000 m^3 **Factory setting** 10.000 m^3	Set the sampling interval. The unit and the number of decimal places are displayed as configured under Setup/Inputs.
Dosing volume (for version with vacuum pump) Sampling volume (for version with peristaltic pump)	Vacuum pump: 20 to 350 ml Peristaltic pump: 10 to 10000 ml **Factory setting** Vacuum pump: 200 ml Peristaltic pump: 100 ml	Set the dosing volume or the sampling volume. The volume is taken from the setup in the version with a vacuum pump. The dosing accuracy and the repeatability of a sample volume < 20 ml can vary, depending on the specific application.
Multiplier (only for version with vacuum pump)	1 to 10 **Factory setting** 1	You can change the sampling volume using the multiplier. For example, if the dosing volume is set to 200 ml, set the multiplier to 2 for a sampling volume of 400 ml. 2 samples are taken in succession when sampling.
Bottle change mode	Options ▪ Number of samples ▪ Time ▪ External signal **Factory setting** Number of samples	The bottle can be changed after a specific number of samples, after a time or by an external signal.
If Bottle change mode **Number of samples** is selected:		
Samples per bottle	1 to 9999 **Factory setting** 1	Set the number of samples.
If Bottle change mode **Time** is selected:		
Time interval	00-00:02 to 31-00:00 DD-HH:MM **Factory setting** 00-01:00 DD-HH:MM	Set the time (days, hours and minutes) after which the system should change to the next bottle.

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Bottle synchronization	Options ▪ None ▪ 1. bottle change time ▪ 1. Time of change + bottle number **Factory setting** None	None: The time of sampling and bottle change are not synchronized. 1. bottle change time: Sampling starts with the first bottle. Set the synchronization time. 1. Time of change + bottle number: Each bottle is assigned to a specific fill time. Set the synchronization time and the weekday.
Start condition	Options ▪ Immediate ▪ Date/time **Factory setting** Immediate	The sampling program can be started either immediately or at a specific, configurable time.
If Start condition **Date/time** is selected:		
Start date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the start date for the sampling program. The format depends on the option configured under general settings.
Start time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is started. The format depends on the option configured under general settings.
Stop condition	Options ▪ Program end ▪ Continuous **Factory setting** Program end	**Program end:** The device stops sampling automatically once it has run through the set program. **Continuous:** The device runs through the set program continuously in an infinite loop. Do not forget to empty the bottles.
Assignment bin. output	Options ▪ No binary output config. for state reporting ▪ Binary output S:x **Factory setting** No binary output config. for state reporting	Assignment of the binary output to the program cycle.
▶ Inputs		Settings for the inputs can be made as described in the "Inputs" section.

Settings with the Basic program type with multiple bottles

Sampling mode = "Flow paced VTCV"

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Flowmeter input	Options ▪ No flow input configured ▪ Binary input S:x ▪ Current input S:x **Factory setting** No flow input configured	Select the flow input. The binary input or the current input must be configured for this function. Only the inputs configured as a flow input are displayed.
Sampling interval	1.000 to 9999.000 m^3 **Factory setting** 10.000 m^3	Set the sampling interval. The unit and the number of decimal places are displayed as configured under Setup/Inputs.
Dosing volume (for version with vacuum pump) Sampling volume (for version with peristaltic pump)	Vacuum pump: 20 to 350 ml Peristaltic pump: 10 to 10000 ml **Factory setting** Vacuum pump: 200 ml Peristaltic pump: 100 ml	Set the dosing volume or the sampling volume. The volume is taken from the setup in the version with a vacuum pump. The dosing accuracy and the repeatability of a sample volume < 20 ml can vary, depending on the specific application.
Multiplier (only for version with vacuum pump)	1 to 10 **Factory setting** 1	You can change the sampling volume using the multiplier. For example, if the dosing volume is set to 200 ml, set the multiplier to 2 for a sampling volume of 400 ml. 2 samples are taken in succession when sampling.
Bottle change mode	Options ▪ Number of samples ▪ Time ▪ External signal **Factory setting** Number of samples	The bottle can be changed after a specific number of samples, after a time or by an external signal.
If Bottle change mode **Number of samples** is selected:		
Samples per bottle	1 to 9999 **Factory setting** 1	Set the number of samples.
If Bottle change mode **Time** is selected:		
Time interval	00-00:02 to 31-00:00 DD-HH:MM **Factory setting** 00-01:00 DD-HH:MM	Set the time (in days, hours and minutes) after which the system should change to the next bottle.

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Multiple bottles	0 to 23 The configuration options depend on the current number of bottles. **Factory setting** 0	Multiple bottles: "Simultaneous" transfer of two samples to separate bottles.
Bottle synchronization	Options ▪ None ▪ 1. bottle change time ▪ 1. Time of change + bottle number **Factory setting** None	None: The time of sampling and bottle change are not synchronized. 1. bottle change time: Sampling starts with the first bottle. 1. Time of change + bottle number: Each bottle is assigned to a specific fill time.
If Bottle change mode **External signal** is selected:		
Bottle change signal input	Options ▪ No bottle change input configured **Factory setting** No bottle change input configured	The bottle change input can be configured under ▶ Inputs .
Multiple bottles	0 to 23 The configuration options depend on the current number of bottles **Factory setting** 0	Multiple bottles: "Simultaneous" transfer of two samples to separate bottles.
Start condition	Options ▪ Immediate ▪ Date/time **Factory setting** Immediate	The sampling program can be started either immediately or at a specific, configurable time.
If Start condition **Date/time** is selected:		
Start date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the start date for the sampling program. The format depends on the option configured under general settings.
Start time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is started. The format depends on the option configured under general settings.

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Stop condition	Options ▪ Program end ▪ Continuous **Factory setting** Program end	**Program end:** The device stops sampling automatically once it has run through the set program. **Continuous:** The device runs through the set program continuously in an infinite loop. Do not forget to empty the bottles.
Assignment bin. output	Options ▪ No binary output config. for state reporting ▪ Binary output S:x **Factory setting** No binary output config. for state reporting	Assignment of the binary output to the program cycle.
▶ Inputs		Settings for the inputs can be made as described in the "Inputs" section.

4.2.3 Settings with a time/flow-paced Basic program (only for version with peristaltic pump)

Settings with the Basic program type with 1 bottle
Sampling mode = "Time/flow paced CTVV"

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Sampling volume input	Options ▪ No flow input configured ▪ Binary input S:x ▪ Current input S:x **Factory setting** No flow input configured	Select the sampling volume input. The binary input or the current input must be configured for this function. Only the inputs configured as a sampling volume input are displayed.
Sampling interval	00:01:00 to 99:59:00 HH:MM:SS **Factory setting** 00:10:00 HH:MM:SS	Set the sampling interval.
If Sampling volume input **Binary input** is selected:		
Sampling volume / pulse	10 to 1000 ml **Factory setting** 20 ml	Set what sampling volume should be grabbed per pulse. The dosing accuracy and the repeatability of a sample volume < 20 ml can vary, depending on the specific application.
If Sampling volume input **Current input** is selected:		
Sampling volume 20mA	10 to 10000 ml **Factory setting** 100 ml	Set what sampling volume should be grabbed at 20 mA. The dosing accuracy and the repeatability of a sample volume < 20 ml can vary, depending on the specific application.
Flow calculation	Options ▪ Current ▪ Average flow **Factory setting** Current	**Current:** The current flow is converted to the sampling volume at the time of sampling. **Average flow:** The system calculates the mean between the last and the current sample and sets the sampling volume accordingly.
Bottle change mode	Options ▪ Number of samples ▪ Time ▪ External signal **Factory setting** Number of samples	The bottle can be changed after a specific number of samples, after a time or by an external signal.
If Bottle change mode **Number of samples** is selected:		

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Samples per bottle	1 to 9999 **Factory setting** 1	Set the number of samples.
If Bottle change mode **Time** is selected:		
Time interval	00-00:02 to 31-00:00 DD-HH:MM **Factory setting** 00-01:00 DD-HH:MM	Set the time (days, hours and minutes) after which the system should change to the next bottle.
Bottle synchronization	Options ▪ None ▪ 1. bottle change time ▪ 1. Time of change + bottle number **Factory setting** None	None: The time of sampling and bottle change are not synchronized. 1. bottle change time: Sampling starts with the first bottle. Set the synchronization time. 1. Time of change + bottle number: Each bottle is assigned to a specific fill time. Set the synchronization time and the weekday.
Start condition	Options ▪ Immediate ▪ Date/time **Factory setting** Immediate	The sampling program can be started either immediately or at a specific, configurable time.
If Start condition **Date/time** is selected:		
Start date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the start date for the sampling program. The format depends on the option configured under general settings.
Start time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is started. The format depends on the option configured under general settings.
Stop condition	Options ▪ Program end ▪ Continuous **Factory setting** Program end	**Program end:** The device stops sampling automatically once it has run through the set program. **Continuous:** The device runs through the set program continuously in an infinite loop. Do not forget to empty the bottles.

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Assignment bin. output	Options ▪ No binary output config. for state reporting ▪ Binary output S:x **Factory setting** No binary output config. for state reporting	Assignment of the binary output to the program cycle.
▶ Inputs		Settings for the inputs can be made as described in the "Inputs" section.

Settings with the Basic program type with multiple bottles

Sampling mode = "Time/flow paced CTVV"

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Sampling volume input	Options ▪ No flow input configured ▪ Binary input S:x ▪ Current input S:x **Factory setting** No flow input configured	Select the sampling volume input. The binary input or the current input must be configured for this function. Only the inputs configured as a sampling volume input are displayed.
Sampling interval	00:01:00 to 99:59:00 HH:MM:SS **Factory setting** 00:10:00 HH:MM:SS	Set the sampling interval.
If Sampling volume input **Binary input** is selected:		
Sampling volume / pulse	10 to 1000 ml **Factory setting** 20 ml	Set what sampling volume should be grabbed per pulse. The dosing accuracy and the repeatability of a sample volume < 20 ml can vary, depending on the specific application.
If Sampling volume input **Current input** is selected:		
Sampling volume 20mA	10 to 10000 ml **Factory setting** 100 ml	Set what sampling volume should be grabbed at 20 mA. The dosing accuracy and the repeatability of a sample volume < 20 ml can vary, depending on the specific application.
Flow calculation	Options ▪ Current ▪ Average flow **Factory setting** Current	**Current:** The current flow is converted to the sampling volume at the time of sampling. **Average flow:** The system calculates the mean between the last and the current sample and sets the sampling volume accordingly.

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Bottle change mode	Options ▪ Number of samples ▪ Time ▪ External signal **Factory setting** Number of samples	The bottle can be changed either after a specific number of samples, after a time or by an external signal.
If Bottle change mode **Number of samples** is selected:		
Samples per bottle	1 to 9999 **Factory setting** 1	Set the number of samples.
If Bottle change mode **Time** is selected:		
Time interval	00-00:02 to 31-00:00 DD-HH:MM **Factory setting** 00-01:00 DD-HH:MM	Set the time (in days, hours and minutes) after which the system should change to the next bottle.
Multiple bottles	0 to 23 The configuration options depend on the current number of bottles **Factory setting** 0	Multiple bottles: "Simultaneous" transfer of two samples to separate bottles.
If Bottle change mode **External signal** is selected:		
Bottle change signal input	Options ▪ No bottle change input configured ▪ Binary input S:x **Factory setting** No bottle change input configured	The bottle change input can be configured under ▶ Inputs .
Multiple bottles	0 to 23 The configuration options depend on the current number of bottles **Factory setting** 0	Multiple bottles: "Simultaneous" transfer of two samples to separate bottles.
Start condition	Options ▪ Immediate ▪ Date/time **Factory setting** Immediate	The sampling program can be started either immediately or at a specific, configurable time.

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
If Start condition **Date/time** is selected:		
Start date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the start date for the sampling program. The format depends on the option configured under general settings.
Start time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is started. The format depends on the option configured under general settings.
Stop condition	Options ▪ Program end ▪ Continuous **Factory setting** Program end	**Program end:** The device stops sampling automatically once it has run through the set program. **Continuous:** The device runs through the set program continuously in an infinite loop. Do not forget to empty the bottles.
Assignment bin. output	Options ▪ No binary output config. for state reporting ▪ Binary output S:x **Factory setting** No binary output config. for state reporting	Assignment of the binary output to the program cycle.
▶ Inputs		Settings for the inputs can be made as described in the "Inputs" section.

4.2.4 Settings with a Basic program and external signal

Settings with the Basic program type with 1 bottle
Sampling mode = "External signal"

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Sampling volume	10 to 1000 ml **Factory setting** 100 ml	Enter the sample volume.
Sampling signal input	Options ▪ No sampling input configured **Factory setting** No sampling input configured	Select the input for the sampling signal. The fieldbus must be configured for this function. The sampling input can be configured under ▶ Inputs .
Bottle change mode	Options ▪ Number of samples ▪ Time ▪ External signal **Factory setting** Number of samples	The bottle can be changed after a specific number of samples, after a time or by an external signal.
If Bottle change mode **Number of samples** is selected:		
Samples per bottle	1 to 9999 **Factory setting** 1	Set the number of samples.
If Bottle change mode **Time** is selected:		
Time interval	00-00:02 to 31-00:00 DD-HH:MM **Factory setting** 00-01:00 DD-HH:MM	Set the time (days, hours and minutes) after which the system should change to the next bottle.
Bottle synchronization	Options ▪ None ▪ 1. bottle change time ▪ 1. Time of change + bottle number **Factory setting** None	None: The time of sampling and bottle change are not synchronized. 1. bottle change time: Sampling starts with the first bottle. Set the synchronization time. 1. Time of change + bottle number: Each bottle is assigned to a specific fill time. Set the synchronization time and the weekday.

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Start condition	Options ▪ Immediate ▪ Date/time **Factory setting** Immediate	The sampling program can be started either immediately or at a specific, configurable time.
If Start condition **Date/time** is selected:		
Start date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the start date for the sampling program. The format depends on the option configured under general settings.
Start time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is started. The format depends on the option configured under general settings.
Stop condition	Options ▪ Program end ▪ Continuous **Factory setting** Program end	**Program end:** The device stops sampling automatically once it has run through the set program. **Continuous:** The device runs through the set program continuously in an infinite loop. Do not forget to empty the bottles.
Assignment bin. output	Options ▪ No binary output config. for state reporting ▪ Binary output S:x **Factory setting** No binary output config. for state reporting	Assignment of the binary output to the program cycle.
▶ Inputs		Settings for the inputs can be made as described in the "Inputs" section.

Settings with the Basic program type with multiple bottles

Sampling mode = "External signal"

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Sampling volume	10 to 1000 ml **Factory setting** 100 ml	Enter the sample volume.
Sampling signal input	Options ▪ No sampling input configured **Factory setting** No sampling input configured	Select the input for the sampling signal. The fieldbus must be configured for this function. The sampling input can be configured under ▶ Inputs .
Bottle change mode	Options ▪ Number of samples ▪ Time ▪ External signal **Factory setting** Number of samples	The bottle can be changed either after a specific number of samples, after a time or by an external signal.
If Bottle change mode **Number of samples** is selected:		
Samples per bottle	1 to 9999 **Factory setting** 1	Set the number of samples.
If Bottle change mode **Time** is selected:		
Time interval	00-00:02 to 31-00:00 DD-HH:MM **Factory setting** 00-01:00 DD-HH:MM	Set the time (in days, hours and minutes) after which the system should change to the next bottle.
If Bottle change mode **External signal** is selected:		
Bottle change signal input	Options ▪ No bottle change input configured **Factory setting** No bottle change input configured	The bottle change input can be configured under ▶ Inputs .
Multiple bottles	0 to 23 The configuration options depend on the current number of bottles **Factory setting** 0	Multiple bottles: "Simultaneous" transfer of two samples to separate bottles.

Path: Menu/Setup/Sampling programs/Setup program/New/Basic

Function	Options	Info
Start condition	Options ▪ Immediate ▪ Date/time **Factory setting** Immediate	The sampling program can be started either immediately or at a specific, configurable time.
If Start condition **Date/time** is selected:		
Start date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the start date for the sampling program. The format depends on the option configured under general settings.
Start time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is started. The format depends on the option configured under general settings.
Stop condition	Options ▪ Program end ▪ Continuous **Factory setting** Program end	**Program end:** The device stops sampling automatically once it has run through the set program. **Continuous:** The device runs through the set program continuously in an infinite loop. Do not forget to empty the bottles.
Assignment bin. output	Options ▪ No binary output config. for state reporting ▪ Binary output S:x **Factory setting** No binary output config. for state reporting	Assignment of the binary output to the program cycle.
▶ Inputs		Settings for the inputs can be made as described in the "Inputs" section.

4.3 Program types: Standard and Advanced

A Standard program can comprise a maximum of 5 subprograms. An Advanced program can comprise a maximum of 24 subprograms. These subprograms can be run simultaneously or consecutively.
Each event subprogram can consist of up to 3 conditions.
As the device contains dual bottle trays, you can assign a program easily, and easily detect a change in the program.

4.3.1 Settings for the Standard program

Path: Menu/Setup/Sampling programs

Function	Options	Info
▶ Setup program		
New		A list of all the programs created is displayed. For this reason, it is often helpful to add an "S" for Standard in the program name.
▶ Standard		
Program name	Customized text	Use a distinct name for your sampling program. The program name can be up to 16 characters long.
Bottle configuration	Choice of all possible bottle combinations	The ordered bottle configuration is preset or the configuration selected in the setup is displayed.
Bottle volume	0 to 100000 ml **Factory setting** 30000 ml	Set the bottle volume. The preset value depends on the bottle configuration configured. The bottle volume is always 30 l for individual containers. In the case of asymmetric distribution, e.g. 6 x 3 l + 2 x 13 l, you can set the bottle volume on the left and right in the menu items that follow.
Start condition	Options ▪ Immediate ▪ Date/time ▪ Volume **Factory setting** Immediate	The sampling program can be started either immediately, at a specific, configurable time, or when a certain totalized flow is reached.
If Start condition **Date/time** is selected:		
Start date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the start date for the sampling program. The format depends on the option configured under general settings.
Start time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is started. The format depends on the option configured under general settings.
If Start condition **Volume** is selected:		

Path: Menu/Setup/Sampling programs

Function	Options	Info
Start volume input	Options ▪ No flow input configured ▪ Binary input S:x ▪ Current input S:x **Factory setting** No flow input configured	Select the start volume input. The binary input or the current input must be configured for this function. Only the inputs configured for flow measurement are displayed.
Start flow sum	1.000 to 9999.000 m^3 **Factory setting** 10.000 m^3	Set the start volume.
Stop condition	Options ▪ Program end ▪ Continuous ▪ Date/time **Factory setting** Program end	**Program end:** The device stops sampling automatically once it has run through the set program. All the assigned bottles are filled. **Continuous:** The device runs through the set program continuously in an infinite loop. Do not forget to empty the bottles. **Date/time:** The device stops the set program at a specific time.
If Stop condition **Date/time** is selected:		
Stop date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the stop date for the sampling program. The format depends on the option configured under general settings.
Stop time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is stopped. The format depends on the option configured under general settings.
▶ Setup subprogram		
New		
Programpart		Use a distinct name for your subprogram. The program name can be up to 16 characters long.
Sampling mode	Options ▪ Time paced CTCV ▪ Flow paced VTCV ▪ Time/flow paced CTVV ▪ External signal **Factory setting** Time paced CTCV	**Time paced CTCV:** A constant sampling volume is taken at steady intervals. **Flow paced VTCV:** A constant sampling volume is taken at variable intervals. **Time/flow paced CTVV(only for version with peristaltic pump):** A variable sampling volume is taken at steady intervals. **External signal** A pulse at the binary input starts a sampling cycle

Path: Menu/Setup/Sampling programs

Function	Options	Info
The settings that depend on the sampling mode are listed in the "Program type: Basic" section.		
Enable subprogram	Options ▪ Immediate ▪ Individual dates ▪ Repeating date ▪ Interval ▪ Deactivation **Factory setting** Immediate	**Immediate:** The subprogram is enabled immediately. **Individual dates:** Set the start and stop dates for enabling the subprogram. **Repeating date:** Set the start condition, activity time and repetition interval for the subprogram. **Interval:** Set the start condition, activity time and inactivity time for the subprogram. **Deactivation:** Only visible if there is more than one subprogram
If Enable subprogram **Individual dates** is selected:		
▶ Individual dates Set the start and stop times for the subprogram. Enter a new date via "INSERT". Delete a date via "DELETE". You can assign a maximum of 25 start and stop dates.		
If Enable subprogram **Repeating date** is selected:		
Start condition	Options ▪ No delay ▪ Date/Time ▪ Time **Factory setting** No delay	**No delay:** The subprogram is started when the program is enabled. **Date/Time:** Set the start date and start time for enabling the subprogram. **Time:** Set the start time for enabling the subprogram.
Activity time	00:01 to 99:59 HH:MM **Factory setting** 00:01 HH:MM	Specify how long the subprogram should be active in hours and minutes. The time to be selected depends on the setting for the repetition mode.
▶ Multiple date		
Repetition mode	Options ▪ Daily interval ▪ Weekly interval ▪ Days of week **Factory setting** Daily interval	**Daily interval**: Specify whether the subprogram should be repeated every day. **Weekly interval**: Specify whether the subprogram should be repeated every week. **Days of week**: Specify whether the subprogram should be repeated on certain days of the week. --> Select the days of the week in the subsequent menu item.

Path: Menu/Setup/Sampling programs

Function	Options	Info
Repetition interval (only for Daily interval and Weekly interval)	1 to 999 **Factory setting** 1	Specify for how many days or weeks the subprogram should be active. Example: Repetition mode = daily interval Repetition interval = 2 The subprogram is enabled every second day from the start condition.
If Enable subprogram **Interval** is selected:		
Start condition	Options ▪ No delay ▪ Date/Time ▪ Time **Factory setting** Date/Time	**No delay:** The subprogram is started when the program is enabled. **Date/Time:** Set the start date and start time for enabling the subprogram. **Time:** Set the start time for enabling the subprogram.
Start date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the start date for the 1st interval. The format depends on the option configured under general settings.
Start time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time for the 1st interval. The format depends on the option configured under general settings.
Activity time	00-00:01 to 31-00:00 DD-HH:MM **Factory setting** 00-00:01 DD-HH:MM	Specify how long the subprogram should be active in days, hours and minutes. The subprogram always begins with an activation.
Inactivity time	00-00:01 to 31-00:00 DD-HH:MM **Factory setting** 00-00:01 DD-HH:MM	Specify how long the subprogram should be inactive in days, hours and minutes.
Sample at enable	Options ▪ No ▪ Yes **Factory setting** Yes	Specify whether the first sample should be taken directly when the subprogram is enabled. For example, with intervals, a sample is taken at the start of every activation interval.
Sample at disable	Options ▪ No ▪ Yes **Factory setting** No	Specify whether a sample should be taken when the subprogram is disabled. For example, with intervals, a sample is taken at the end of every activation interval.

Path: Menu/Setup/Sampling programs

Function	Options	Info
New bottle at disable	Options ▪ No ▪ Yes **Factory setting** Yes	
Bottle synchronization	Options ▪ None ▪ 1. bottle change time ▪ 1. Time of change + bottle number ▪ External BC sync input **Factory setting** None	Specific bottles can be assigned specific filling times with the bottle synchronization function. For example, bottle 1 is to be filled from midnight to 2 a.m., bottle 2 from 2 a.m. to 4 a.m. etc.. **None** The time of sampling and bottle change are not synchronized. **1. bottle change time** Sampling starts with the first bottle. The changeover to the next bottles is synchronized. **1. Time of change + bottle number** A specific fill time is assigned to each bottle. **External BC sync input** The system changes to the next bottle when an external signal is received. The external signal first has to be configured via the binary input. The binary input can then be selected as the source.
Assignment bin. output	Options ▪ No binary output config. for state reporting ▪ Binary output S:x **Factory setting** No binary output config. for state reporting	Assignment of the binary output to the program cycle.
Use "SAVE" to save the subprogram setup. Then press "ESC" to return to the main program. A prompt to save the program appears if you have not yet saved the subprogram. You can avoid saving the program by pressing "ESC".		
▶ Inputs		Settings for the inputs can be made as described in the "Inputs" section.
Bottle assignment (only possible with multiple bottles) This menu item appears when more than one bottle is available, regardless of the number of subprograms.	Options ▪ No bottle assignment ▪ Dynamical bottle assignment ▪ Statical bottle assignment **Factory setting** Dynamical bottle assignment	**No bottle assignment:** Each subprogram fills the same bottle until the bottle is full. All the subprograms then change to the next bottle. Only visible if there is more than one subprogram. **Dynamical bottle assignment:** When the subprogram changes, the system switches to the next empty bottle. **Statical bottle assignment:** A table can be used to assign a subprogram to each bottle.

Path: Menu/Setup/Sampling programs

Function	Options	Info
Via the "Bottle change" menu item, the bottle change can be configured after a certain time or number of samples if bottle distribution with more than one bottle has been selected and either dynamic or static bottle assignment has been selected.		
If Bottle assignment **Statical bottle assignment** is selected:		
▶ Bottle assignment table Select a bottle and assign it a subprogram.		

4.3.2 Settings for the Advanced program

Path: Menu/Setup/Sampling programs

Function	Options	Info
▶ Setup program		
New		A list of all the programs created is displayed. For this reason, it is often helpful to add an "A" for Advanced in the program name.
▶ Advanced		
Program name	Customized text	Use a distinct name for your sampling program. The program name can be up to 16 characters long.
Bottle configuration	Choice of all possible bottle combinations	The ordered bottle configuration is preset or the configuration selected in the setup is displayed.
Bottle volume	10 to 100000 ml **Factory setting** 30000 ml	Set the bottle volume. The preset value depends on the bottle configuration configured. The bottle volume is always 30 l for individual containers.
Start condition	Options ▪ Immediate ▪ Date/time ▪ Volume ▪ External start ▪ External duration **Factory setting** Immediate	**Immediate** The sampling program is started immediately. **Date/time** The sampling program is started at a specific time that can be configured. **Volume** The sampling program is started when a certain totalized flow is reached. **External start** The sampling program is started by a pulse at the configured binary input. **External duration** The sampling program is active as long as the configured input has the corresponding level.
If Start condition **Date/time** is selected:		

Path: Menu/Setup/Sampling programs

Function	Options	Info
Start date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the start date for the sampling program. The format depends on the option configured under general settings.
Start time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is started. The format depends on the option configured under general settings.
If Start condition **Volume** is selected:		
Start volume input	Options ▪ No flow input configured ▪ Binary input S:x ▪ Current input S:x **Factory setting** No flow input configured	Select the start volume input. The binary input or the current input must be configured for this function. Only the inputs configured for flow measurement are displayed.
Start flow sum	1.000 to 9999.000 m^3 **Factory setting** 10.000 m^3	Set the start volume.
If Start condition **External start** is selected:		
Start signal input	Options ▪ No program start input configured ▪ Binary input S:x **Factory setting** No program start input configured	Select the program start input. The binary input must be configured for this function. Only the inputs configured as a program start input are displayed.
If Start condition **External duration** is selected:		
Start signal input	Options ▪ No program duration input configured ▪ Binary input S:x **Factory setting** No program duration input configured	Select the program duration input. The binary input must be configured for this function. Only the inputs configured as a program duration input are displayed.

Path: Menu/Setup/Sampling programs

Function	Options	Info
Stop condition (not for External start)	Options ▪ Program end ▪ Continuous ▪ Date/time ▪ External signal **Factory setting** Program end	**Program end:** The device stops sampling automatically once it has run through the set program. **Continuous:** The device runs through the set program continuously in an infinite loop. Do not forget to empty the bottles. **Date/time:** The device stops the set program at a specific time. **External signal:** The device stops the set program if a pulse is sent to a binary input configured accordingly.
If Stop condition **Date/time** is selected:		
Stop date	01.01.2000 to 31.12.2099 **Factory setting** DD.MM.YYYY	Set the stop date for the sampling program. The format depends on the option configured under general settings.
Stop time	00:00:00 to 23:59:59 **Factory setting** HH:MM:SS (24h)	Set the time when the sampling program is stopped. The format depends on the option configured under general settings.
If Stop condition **External signal** is selected:		
Stop signal input	Options ▪ No program stop input configured ▪ Binary input S:x **Factory setting** No program stop input configured	Select the program stop input. The binary input must be configured for this function. Only the inputs configured as a program stop input are displayed.
▶ Setup subprogram		
New		
Programpart		Use a distinct name for your subprogram. The program name can be up to 16 characters long.

Path: Menu/Setup/Sampling programs

Function	Options	Info
Sampling mode	Options ▪ Time paced CTCV ▪ Flow paced VTCV ▪ Time/flow paced CTVV ▪ Single sample ▪ Sampling table ▪ External signal **Factory setting** Time paced CTCV	**Time paced CTCV:** A constant sampling volume is taken at steady intervals. **Flow paced VTCV:** A constant sampling volume is taken at variable intervals. **Time/flow paced CTVV (only for version with peristaltic pump):** A variable sampling volume is taken at steady intervals. **Single sample:** The device takes a single sample with a specific volume. **Sampling table:** The time and the sampling volume is assigned to a certain bottle in the sampling table. **External signal:** A sample is taken when an external signal is received.
The settings that depend on the sampling mode (time-paced, flow-paced and time/flow-paced sampling) are listed in the "Program type: Basic" section.		
If Sampling mode **Single sample** is selected:		
Dosing volume (for version with vacuum pump) Sampling volume (for version with peristaltic pump)	Vacuum pump: 20 to 350 ml Peristaltic pump: 10 to 10000 ml **Factory setting** Vacuum pump: 200 ml Peristaltic pump: 100 ml	Depending on the version, set the dosing volume or the sampling volume. The volume is taken from the setup in the version with a vacuum pump. The dosing accuracy and the repeatability of a sample volume < 20 ml can vary, depending on the specific application.
If Sampling mode **Sampling table** is selected:		
▶ Sampling table Assign the time and sampling volume to a certain bottle. Add a new entry via "INSERT". Delete an entry via "DELETE". You can make a maximum of 24 entries.		
Example: - Bottle: 1 - Bottle: 2 ...	 - Delta (=waiting time): 01:00:00 - Delta (=waiting time): 00:10:00	 - Volume: 100 ml - Volume: 100 ml
1st sampling one hour after program start: 100 ml in bottle 1 2nd sampling 10 minutes later: 100 ml in bottle 2 The sampling table indicates: After the defined "Delta time" (column 2) the volume of column 3 will be dosed into the bottle of column 1.		

Path: Menu/Setup/Sampling programs

Function	Options	Info
If Sampling mode **External signal** is selected:		
Sampling signal input	Options ▪ No sampling input configured ▪ Binary input S:x **Factory setting** No sampling input configured	Select the input for the sampling signal. The binary input must be configured for this function. Only the configured inputs are displayed.
Enable subprogram	Options ▪ Immediate ▪ Individual dates ▪ Repeating date ▪ Interval ▪ Event ▪ External start ▪ Deactivation **Factory setting** Immediate	**Immediate:** The subprogram is enabled immediately. **Individual dates:** Set the start and stop dates for enabling the subprogram. **Repeating date:** Set the start condition, activity time and repetition interval for the subprogram. **Interval:** Set the start condition, activity time and inactivity time for the subprogram. **Event:** The subprogram is enabled by an event. Up to 3 measuring signals are linked to form a start signal using And/Or logic. **External start:** The subprogram is enabled by a pulse at a binary input configured accordingly. **Deactivation:** Subprogram 2 or 2+n is started as soon as subprogram 1 is disabled. (Only possible with multiple subprograms)
The settings (Immediate, Individual dates, Repeating date and Interval) that depend on the activation of the subprogram are listed in the "Program type: Standard" section.		
If Enable subprogram **Event** is selected:		
Start condition	Options ▪ No delay ▪ Date/Time ▪ Time **Factory setting** No delay	**No delay:** The subprogram is started when the program is enabled. **Date/Time:** Set the start date and start time for enabling the subprogram. **Time:** Set the start time for enabling the subprogram.
▶ Activation event		

Path: Menu/Setup/Sampling programs

Function	Options	Info
Number of events	Options ▪ 1 ▪ 2 ▪ 3 **Factory setting** 1	Specify how many measuring inputs (1-3) you want to link to generate an activation signal.
▶ Event Editor 1 If you have more than one event editor, the "Event editor" menu item appears often. Use the "Link" menu item to configure the logical link between the signals.		
Source of data	Options ▪ None ▪ Binary input S:x ▪ Current input S:x ▪ Temperature input (depending on the version and sensor) **Factory setting** None	Select the input via which the activation event is to be output. The inputs are configured in the "Setup/Inputs" menu. The binary inputs are only visible if they have been configured accordingly (rainfall or flow).
Measured value	Options (depends on sensor/data source) ▪ None ▪ Totalized flow **Factory setting** None	
Operating mode	Options ▪ Upper limit ▪ Lower limit ▪ Within range ▪ Out of range ▪ Rate of change **Factory setting** Upper limit	Type of limit value monitoring: ▪ Limit value overshoot or undershoot ▪ Measured value within or outside a range ▪ Rate of change
Limit value	**Range of adjustment and factory setting** Depends on the measured value	*Operating mode="Above limit check" or "Below limit check"* ▪ The event is triggered if the limit value + hysteresis is exceeded for the switch-on duration. ▪ The event is reset again if the limit value - hysteresis is undershot for the duration of the switch-off delay at least.
Range lower value Range upper value	**Range of adjustment and factory setting** Depends on the measured value	*Operating mode="In range check" or "Out of range check"* ▪ The event is triggered if the range lower value + hysteresis is exceeded for the switch-on duration. ▪ The event is reset again if the range upper value - hysteresis is undershot for the duration of the switch-off delay at least.

Path: Menu/Setup/Sampling programs

Function	Options	Info
Hysteresis	**Range of adjustment and factory setting** Depends on the measured value	The hysteresis is the difference between the switch-on point and the switch-off point if values, which cause the limit switch to pick up, become closer or move further apart. It is needed to ensure a stable switching behavior.
Start delay	0 to 9999 s **Factory setting** 0 s	Synonyms: pick-up and drop-out delay
Switch off delay		
Delta value	**Range of adjustment and factory setting** Depends on the measured value	*Operating mode="Change rate"* The event is triggered if the measured value changes by at least the delta value (both positive and negative) within the set delta time. The event is deleted as soon as the rate of change is lower than the set value and the auto confirmation time has elapsed.
Delta time	00:01 to 23:59 **Factory setting** 01:00	
Auto Confirm	00:01 to 23:59 **Factory setting** 00:01	
If Enable subprogram **External start** is selected:		
Activation input	Options ▪ No program part start input configured ▪ Binary input S:x **Factory setting** No program part start input configured	Select the input for start of the subprogram. The binary input must be configured for this function. Only the configured inputs are displayed.
Sample at enable (not for single sample and sampling table)	Options ▪ No ▪ Yes **Factory setting** Yes	Specify whether the first sample should be taken directly when the subprogram is enabled.
Sample at disable (not for single sample and sampling table and also not for "Immediate" and event)	Options ▪ No ▪ Yes **Factory setting** No	Specify whether a sample should be taken when the subprogram is disabled.

Path: Menu/Setup/Sampling programs

Function	Options	Info
Deactivation	Options ▪ Bottles full ▪ Enable invalid ▪ Deactivation with event **Factory setting** Enable invalid	Select the disable function of the subprogram: **Bottles full** The subprogram is disabled once all the assigned bottles have been filled. **Enable invalid** Disable via limit value **Deactivation with event** New parameter can be defined
Bottle change mode	Options ▪ No ▪ Yes **Factory setting** Yes	**No:** The bottle is changed following a disable/enable **Yes:** When the cycle is finished, the system continues filling the last bottle.
Synchronize samplings	Options ▪ To subprogram start ▪ To clock **Factory setting** To subprogram start	**To subprogram start** The intervals defined in the sampling mode are enabled when the subprogram is started. **To clock** The intervals defined in the sampling mode are enabled after a specific time. For example, if 30 min is entered this means that the interval is only activated at a time of xx:30. --> You configure this time in the "Offset synchronization" menu item.
Bottle synchronization	Options ▪ None ▪ 1. bottle change time ▪ 1. Time of change + bottle number ▪ External BC sync input **Factory setting** None	Specific bottles can be assigned specific filling times with the bottle synchronization function. For example, bottle 1 is to be filled from midnight to 2 a.m., bottle 2 from 2 a.m. to 4 a.m. etc.. **None** The time of sampling and bottle change are not synchronized. **1. bottle change time** Sampling starts with the first bottle. The changeover to the next bottles is synchronized. **1. Time of change + bottle number** A specific fill time is assigned to each bottle. **External BC sync input** The system changes to the next bottle when an external signal is received. The external signal first has to be configured via the binary input. The binary input can then be selected as the source.
Assignment bin. output	Options ▪ No binary output config. for state reporting ▪ Binary output S:x **Factory setting** No binary output config. for state reporting	Assignment of the binary output to the program cycle.

Path: Menu/Setup/Sampling programs

Function	Options	Info
Use "SAVE" to save the subprogram setup. Then press "ESC" to return to the main program.		
▶ Inputs		Settings for the inputs can be made as described in the "Inputs" section.
Bottle assignment (only possible with multiple bottles) This menu item does not appear unless 2 or more bottles are available.	Options ▪ No bottle assignment ▪ Dynamical bottle assignment ▪ Statical bottle assignment **Factory setting** No bottle assignment	**No bottle assignment:** Each subprogram fills the same bottle until the bottle is full. All the subprograms then change to the next bottle. **Dynamical bottle assignment:** When the subprogram changes, the system switches to the next bottle. **Statical bottle assignment:** A table can be used to assign a subprogram to each bottle.
Via the "Bottle change" menu item, the bottle change can be configured after a certain time or number of samples if more than 1 subprogram is available and either dynamic or static bottle assignment has been selected.		
If Bottle assignment **Statical bottle assignment** is selected:		
▶ Bottle assignment table Select a bottle and assign it a subprogram.		

4.4 Selecting and executing the program

In the overview, you can see all the programs created under "Select sampling program". Here, you also have the possibility of creating a new program with "New". Using the navigator, you can select the program you want to execute here and then choose from the following items: "Edit", "Delete", "Start", "Duplicate or "Cancel".

Path: Setup program

Function	Info
▶ Edit	The selected program is displayed and can be edited. Press the "SAVE" key to save the changes.
▶ Delete	The selected program is deleted following a confirmation prompt.
▶ Start	The selected program is started immediately. The program can be canceled or paused by pressing the "OFF" key. If there are differences between the setup and the selected program, the "Program configuration contains errors!" message appears, e.g. the bottle configuration in the program does not match the configuration in the setup. The program is not started. In this example, the actual bottle configuration must be checked against the configuration in the setup and the program and changed accordingly. Only the bottle configuration entered in the setup is valid for the program to be executed.
▶ Duplicate	The selected program is duplicated and saved with an ID.
▶ Cancel	Back to the overview.

The "Setup program" display contains the "ESC", "MAN", "?" and "OFF" soft keys.

Path: Setup program

Function	Info
▶ ESC	Back to the overview. Any program currently running is canceled.
▶ MAN	Manual sampling can be configured and started here. Any program currently running is paused. -> See BA00479C "Commissioning", Sampling program/Manual sampling section
▶ ?	A help text is displayed for the item.
▶ OFF	If no program is enabled, the device can be switched off here. If a program is enabled, the following options appear: **Power down sampler:** Following a confirmation prompt, the device is set to the standby mode. Power continues to be supplied to the device and the LED flashes green. **Stop program %0V:**[1)] Stops a program currently running following a confirmation prompt. The overview display appears. **Pause program %0V:**[1)] Is selected if maintenance work is pending. The program is paused and the pause time is entered in the logbook. The current program is resumed when the "Resume program" button is pressed.

Path: <emphasis/>Program active

Function	Info
▶ ESC	Back to the overview. Any program currently running is canceled.
▶ STAT	For selecting statistics about measured values, sampling and inputs See "Display settings" section in BA00479C.
▶ OFF	If no program is enabled, the device can be switched off here. If a program is enabled, the following options appear: **Power down sampler:** Following a confirmation prompt, the device is set to the standby mode. Power continues to be supplied to the device and the LED flashes green. **Stop program %0V:**[1)] Stops a program currently running following a confirmation prompt. The overview display appears. **Pause program %0V:** Is selected if maintenance work is pending. The program is paused and the pause time is entered in the logbook. The current program is resumed when the "Resume program" button is pressed.

1) "%0V" here stands for text that depends on the context. This text is generated automatically by the software and inserted in place of %0V. In the simplest situations, the generated text could be the name of the measuring channel, for example.

5 Outputs

5.1 Binary outputs

The basic version of the device always has two binary outputs.

Possible application
--> For outputting a manipulated variable to connected actuators

The binary output must be assigned in the program or subprogram before it can be activated.

Path: Menu/Setup/Outputs

Function	Options	Info
▶ OutputBinary		
Function	Options ▪ Off ▪ Event ▪ Limit value ▪ Diagnostics message ▪ Cleaning (only for version with sensors with the Memosens protocol) **Factory setting** Off	The following functions depend on the option selected. Function = "Off" switches off the function of the binary output and means no further settings are required.
If Function: **Event** is selected:		
Signal slope	Options ▪ Low-High ▪ High-Low **Factory setting** Low-High	Select the level change of the signal

Path: Menu/Setup/Outputs

Function	Options	Info
Event	Options ▪ Program enabled ▪ End of program ▪ Sampling start ▪ End of sampling ▪ Dosing ▪ Sampling cycle ▪ Bottle change ▪ External stop ▪ No sample ▪ Sub program enabled **Factory setting** Sampling cycle	**Program enabled:** A permanent signal is switched when the sampling program starts. **End of program:** A pulse or permanent signal is switched when the sampling program ends. **Sampling start:** A pulse is switched when a sample is taken. **End of sampling:** A pulse is switched when sampling has ended. **Dosing:** A pulse is switched while the device doses a sample. **Sampling cycle:** The output signal is switched for the duration of the sampling cycle. **Bottle change:** A pulse is switched when a bottle is changed. **External stop:** A pulse is switched when an external stop is performed. **No sample:** The output signal is switched if no sample was taken. **Sub program enabled:** The output signal is switched if this subprogram is active.
If Function: **Limit value** is selected:		
Signal slope	Options ▪ Low-High ▪ High-Low **Factory setting** Low-High	Select the level change of the signal
Source of data	Options ▪ None ▪ Limit switch 1-8 **Factory setting** None	Select the limit switch via which the status of the relay is to be output. The limit switches are configured in the "Setup/Additional functions/LimitSwitch" menu.
If Function: **Diagnostics message** is selected:		
Signal slope	Options ▪ Low-High ▪ High-Low **Factory setting** Low-High	Select the level change of the signal

Path: Menu/Setup/Outputs

Function	Options	Info
Operating mode	Options ▪ as assigned ▪ Namur M ▪ Namur S ▪ Namur C ▪ Namur F **Factory setting** as assigned	**as assigned:** If this option is selected, the diagnostics messages which you have individually assigned to the binary output are output via the binary output. **Namur M - F:** If you decided to use one of the Namur classes, all the messages that are assigned to the individual class are output via the binary output. You can also change the Namur class assignment for every diagnostics message. (Menu/Setup/General settings/Diagnostics/Device behavior or Menu/Setup/Inputs/../Diagnostics settings/Diag. behavior)
▷ Attributed diagnostic messages	Read only List of diagnostic messages	All the messages assigned to the relay output appear on the display. You do not have the option of editing the information here.
If Function: **Cleaning** is selected: (only for version with sensors with the Memosens protocol)		
Signal slope	Options ▪ Low-High ▪ High-Low **Factory setting** Low-High	Select the level change of the signal
Assignment	Options ▪ None ▪ Cleaning 1-4 **Factory setting** None	Use this function to choose the cleaning instance which should be started when the binary output is active.

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