



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services



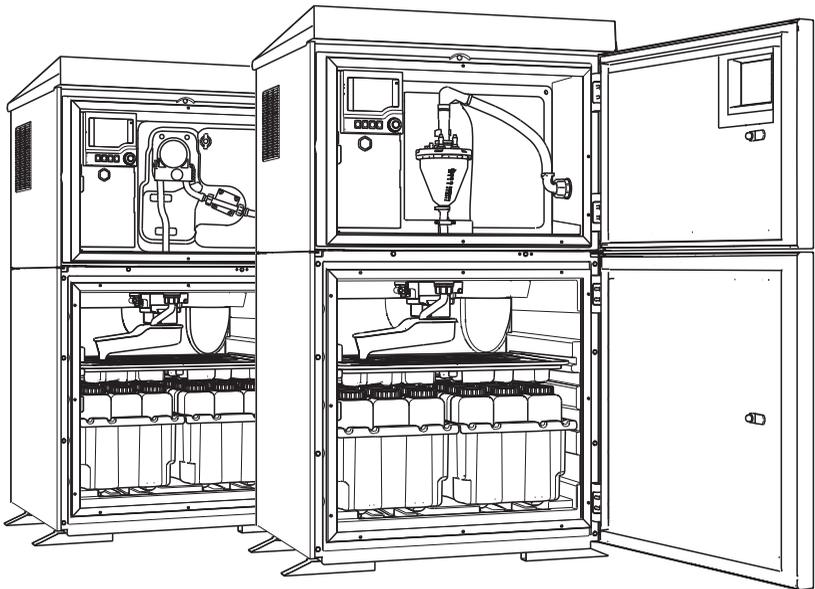
Solutions

Operating Instructions

# Liquistation CSF33

Automatic sampler for liquid media

## Maintenance & diagnostics



Liquistation CSF33  
BA488C/07/EN/14.11  
71134632

Valid as of:  
Software version 01.02.00

**Endress+Hauser**



People for Process Automation

## About this manual

This manual describes all the tasks you must perform for maintenance, diagnostics and troubleshooting.

A description of the following is provided here:

- "Diagnostics" menu
  - Diagnostics list
  - Logbooks
  - System information
  - State of Outputs
  - Systemtest/Reset
  - Term information
  - Simulation
- Cleaning and maintenance
- Troubleshooting
- Accessories and spare parts

### **This manual does not include the following:**

- Setup/General settings
  - Operating Instructions BA479C "Commissioning"
- Display/Operation
  - Operating Instructions BA479C "Commissioning"
- Inputs
  - Operating Instructions BA487C "Operation&settings"
- Outputs
  - Operating Instructions BA487C "Operation&settings"
- Sampling programs
  - Operating Instructions BA487C "Operation&settings"
- Data management
  - Operating Instructions BA487C "Operation&settings"
- Calibration
  - Operating Instructions BA489C "Calibration"
- Expert
  - Internal Service Manual

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# 1 Maintenance

## **⚠ WARNING**

### **Process pressure and temperature, contamination, electrical voltage**

Risk of serious or fatal injury

- ▶ De-energize the device before removing the rear panel.
- ▶ Power can be supplied to switching contacts from separate circuits. De-energize these circuits before working on the terminals.
- ▶ If a sensor has to be removed during maintenance work, avoid hazards posed by pressure, temperature and contamination.

## **NOTICE**

### **Electrostatic discharge (ESD)**

Risk of damaging the electronic components

- ▶ For your own safety, only use genuine spare parts. With genuine parts, the function, accuracy and reliability are also ensured after maintenance work.
- ▶ Take personal protective measures to avoid ESD.

## 1.1 Recommended maintenance

Maintenance work has to be carried out at regular intervals to ensure the efficient operation of the sampler.

The maintenance work comprises:

- Replacing the wear parts
- Cleaning the device

The cleaning intervals depend heavily on:

- The medium
- The ambient conditions of the sampler (dust etc.)
- The programming intervals

For this reason, adapt the cleaning intervals to your specific requirements but always ensure that these cleaning tasks are performed regularly.

### **Replacing wear parts**

Wear parts are replaced by Endress+Hauser Service at one- and two-year intervals. Please contact your local sales center in this regard.

- i** Endress+Hauser offers its customers a maintenance contract. With a maintenance contract, you can increase your level of operational safety and relieve your operating staff of some of their workload. Ask your Endress+Hauser Service Organization for detailed information on maintenance contracts.

## 1.2 Replacing the pump tube

### **⚠ CAUTION**

#### **Danger of injury due to rotating parts**

- ▶ Take the sampler out of service before opening the peristaltic pump.
- ▶ Safeguard the sampler against accidental operation while working on the open peristaltic pump.

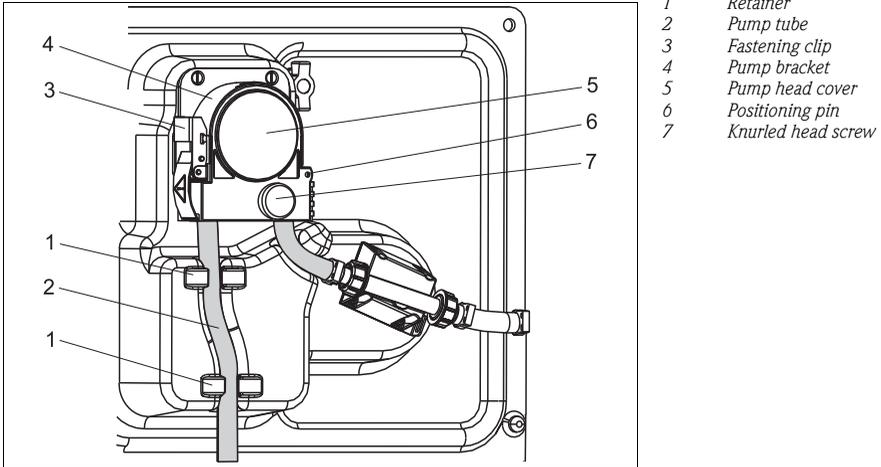
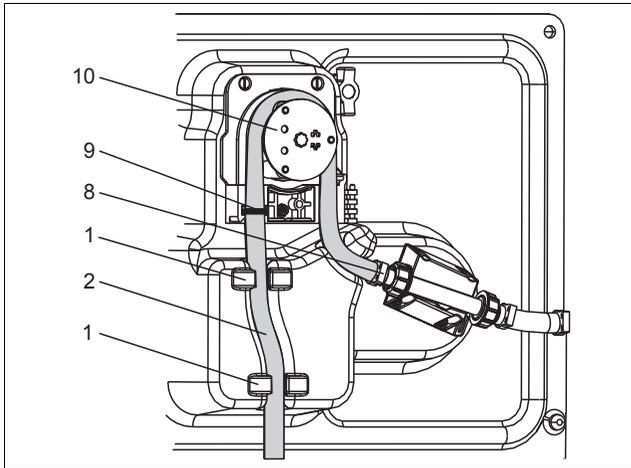


Fig. 1: Opening the peristaltic pump

Open the peristaltic pump as follows:

1. Take the sampler out of service by pausing a program that is currently running.
2. Open the fastening clip (item 3) and push the pump bracket (item 4) upwards.
3. Remove the knurled head screw (item 7) and open the pump head cover (item 5) to the right.



- 1 Retainer
- 2 Pump tube
- 8 Clamp
- 9 Marking ring
- 10 Roller

Fig. 2: Replacing the pump tube

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1. Remove the clamp (item 8) and remove the pump tube (item 2) from the pump.
2. Remove any silicone deposits on the roller (item 10) and the flexible pump bracket.
3. Make sure the roller and all the rolls turn smoothly and evenly.
4. Apply some lubricant to the roller.
5. Secure the new pump tube to the pressure sensor with the clamp (item 8).
6. Guide the pump tube around the roller and insert the marking ring into the groove (item 9), see →  2.
7. Close the pump head cover and screw it tight. Close the pump bracket.
8. Under Menu/Diagnostics/Term information/Pump tube life reset the tube life to zero by selecting "Reset".

 Calibrate the sample volume each time you replace a pump tube. → See Operating Instructions BA489C "Calibration".

## NOTICE

### Incorrect sample volume

- ▶ Only reset the tube life counter to zero once you have successfully replaced the pump tube in order to avoid incorrect dosing of the medium.

## 1.3 Cleaning

### 1.3.1 Housing

Clean the housing with commercially available cleaning agents.

#### **NOTICE**

##### **Prohibited cleaning agents**

Damage to the housing surface or housing seal

- ▶ For cleaning purposes, never use concentrated mineral acids or bases.
- ▶ Never use organic cleaners such as benzyl alcohol, methanol, methylene chloride, xylene or concentrated glycerol cleaner.
- ▶ Never use high-pressure steam for cleaning purposes.

### 1.3.2 Wetted parts

**i** After cleaning, rinse all wetted parts thoroughly with clear water to ensure that all cleaning agent residue has been removed so it cannot affect subsequent medium samples.

#### Version with vacuum pump

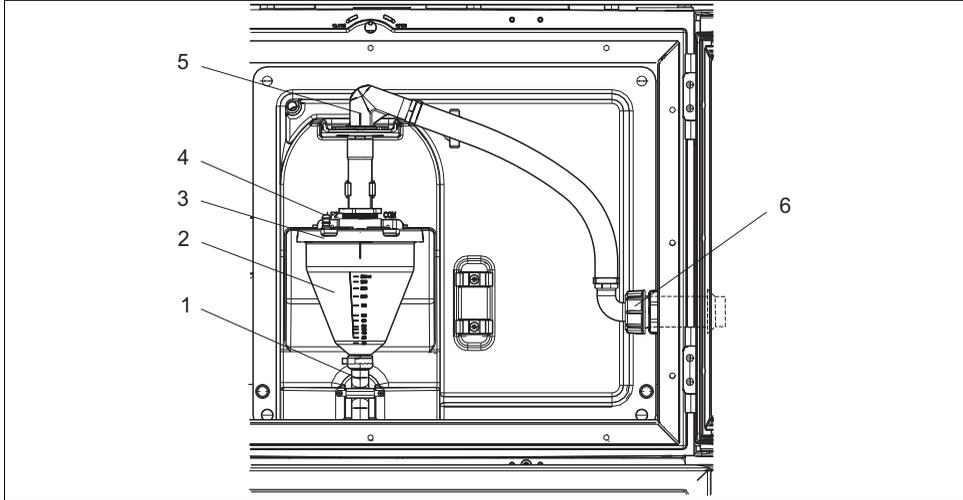


Fig. 3: Version with vacuum pump

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- 1 Outlet hose
- 2 Dosing chamber
- 3 Dosing chamber cover
- 4 Air hose connection
- 5 Lock for intake hose
- 6 Thread adapter nut for intake hose

Clean the wetted parts as follows:

1. Release the thread adapter nut on the intake hose (item 6).
2. Turn the intake hose to the "open" position at the hose lock (item 5) and remove the hose from above.
3. Release the air hose (item 4) and remove the dosing chamber (item 2) from the front along with the outlet hose (item 1).
4. Open the bayonet lock (item 3) and open the dosing chamber.
5. Clean these parts (hoses, dosing chamber etc.) with water or soapsuds. Use a bottle brush if necessary.

**i** You can wash the dosing chamber and dosing chamber cover in a dishwasher at 60 °C.

6. Make sure the dosing pipe is set correctly.
7. Reinstall the cleaned parts in reverse order.

## Version with peristaltic pump

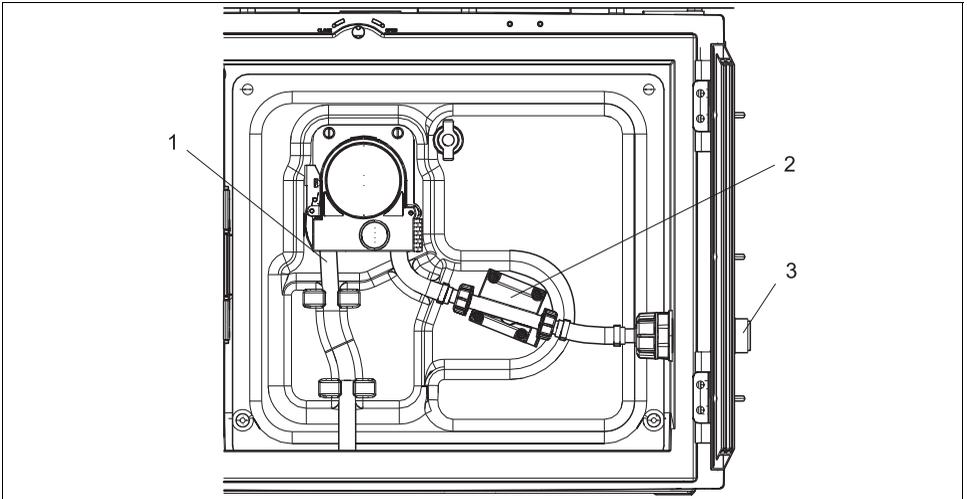


Fig. 4: Version with peristaltic pump

- 1 Pump tube
- 2 Pressure sensor
- 3 Tube connection

Clean the wetted parts as follows:

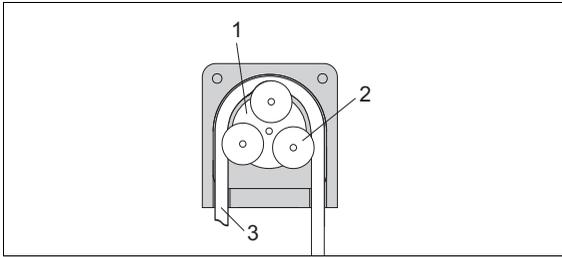
1. Release the sample supply at the tube connection (item 3).
2. Connect a container containing clear water to the tube connection.
3. Remove the bottles from the sample compartment.
4. Rinse the wetted parts with clear water by taking a manual sample or by performing a pump test (under Menu/Diagnostics/Systemtest/Reset/Peristaltic pump -> Pump forward/Pump reverse).
5. Release the couplings to the left and right of the pressure sensor (item 2). Clean the tube piece carefully with a bottle brush.
6. Reconnect the sample supply to the tube connection and put the bottles back in the sample compartment.

## Interior of peristaltic pump

### ⚠ CAUTION

#### Danger of injury due to rotating parts

- ▶ Take the sampler out of service before opening the peristaltic pump.
- ▶ Safeguard the sampler against accidental operation while working on the open peristaltic pump.



- 1 Pump rotor
- 2 Roller
- 3 Pump tube

Fig. 5: Interior view of the peristaltic pump

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1. Take the sampler out of service by pausing a program that is currently running.
2. Open the peristaltic pump as described in the "Replacing the pump tube" section.
3. Remove the pump tube.
4. Remove any silicone deposits on the roller and the flexible pump bracket.
5. Make sure the roller turns smoothly and evenly.

## Cleaning the distribution arm

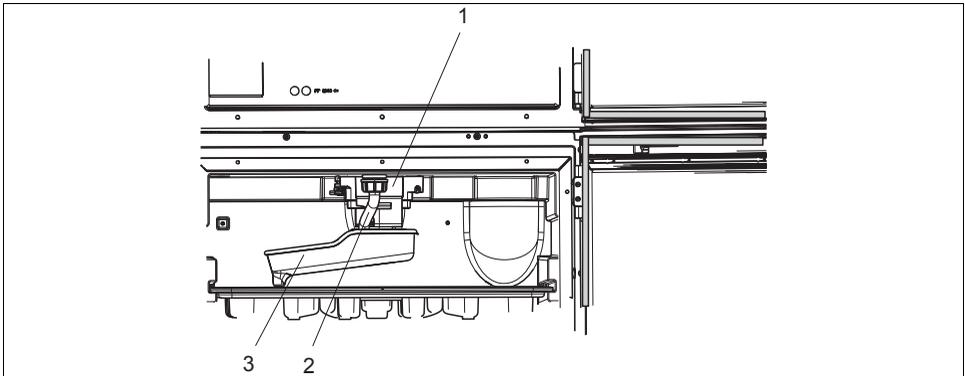


Fig. 6: Sample compartment

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- 1 Distribution arm motor
- 2 Outlet pipe
- 3 Distribution arm

Clean the distribution arm as follows:

1. Release the outlet pipe (item 2).
2. Push up the splash guard.
3. Remove the distribution arm from the front.
4. Remove the cover.
5. Clean these parts with water or soapsuds. Use a bottle brush if necessary.
6. Reinstall the cleaned parts in reverse order.

### 1.3.3 Sample compartment

The sample compartment has a fully integrated plastic inner lining.

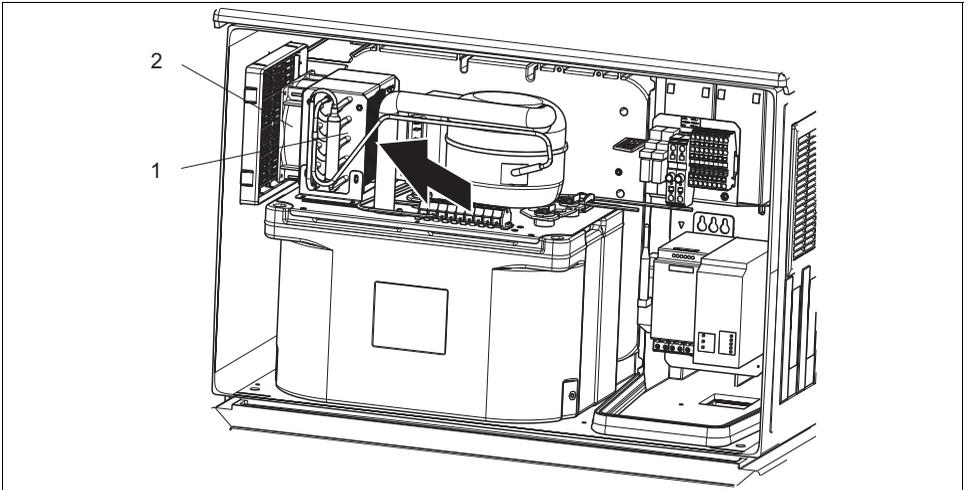
Clean the sample compartment as follows:

1. Remove the bottle trays and the distribution pan.
2. Remove the distribution arm.
3. Spray-clean the sample compartment with a water hose.



You can wash the PE and glass bottles in a dishwasher at 60 °C.

### 1.3.4 Ventilator and liquefier



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Fig. 7: Cleaning the climate control module

- 1 Liquefier  
2 Ventilator

Clean the liquefier and ventilator with compressed air.

## 1.4 Calibration



All information on calibration is provided in BA489C "Calibration".

The position of the distribution arm is set at the factory.

The sample volume of the peristaltic pump is also calibrated at the factory. The dosing volume of the vacuum pump is preset to 200 ml at the factory.

## 2 Diagnostics menu

The Diagnostics menu contains all the information on the device status. Furthermore, various service functions are available.

The following messages are directly displayed every time you enter the menu:

- "Most important message"  
Diagnostics message recorded with the highest criticality level
- "Last message"  
Last diagnostics message recorded

All the other functions in the Diagnostics menu are described in the following chapters.

Diagnostics messages associated with sampling are deleted under the following conditions:

- Diagnostics messages caused by sampling are deleted automatically with the next successful sampling.
- Diagnostics messages caused by the level of medium in the bottle are deleted the next time the program is started.

 If diagnostics message "F313 Liquidsensor 1" appears five times in succession when running a program, the active program is aborted for reasons of safety. This behavior on the part of the device cannot be modified by deactivating the diagnostics message under Menu/Setup/General settings/Diagnostics.

### 2.1 Diagnostics list

All the current diagnostics messages are listed here.

A time stamp is available for each message. Furthermore, the system also displays the configuration and description of the message as saved in "Menu/Setup/General settings/Diagnostics/Device behavior". For this purpose, select the appropriate message and press the navigator.

## 2.2 Logbooks

Types of logbooks

- Logbooks physically available (all apart from the overall logbook)
- Database view of all logbooks (=overall logbook)

Logbook	Visible in	Max. entries	Can be disabled <sup>1)</sup>	Logbook can be deleted	Entries can be deleted	Can be exported
Program logbook	Program logbook	5000	Yes	No	Yes	Yes
Overall logbook	All events	1000	Yes	No	Yes	No
Diagnostics logbook	Diagnostic events	250	(Yes)	No	Yes	Yes
Calibration logbook	Calibration events	75	(Yes)	No	Yes	Yes
Operation logbook	Configuration events	250	(Yes)	No	Yes	Yes
Version logbook	All events	50	No	No	No	Yes
Hardware version logbook	All events	125	No	No	No	Yes
Data logbook	Data logbooks	150,000	Yes	Yes	Yes	Yes
Debugging logbook	Only accessible with the special activation code (Service)	1000	Yes	No	Yes	Yes

1) Data in brackets means this depends on the overall logbook

### Diagnostics/Logbooks

Function	Options	Info
▶ Program logbook		Chronological list of the programming events.
▶ Show	Events are displayed	Select a particular event to display more detailed information.
▶ Go to date	User input <ul style="list-style-type: none"> <li>■ Go to date</li> <li>■ Time</li> </ul>	Use this function to go directly to a specific time in the list. In this way, you avoid having to scroll through all the information. The complete list is always visible, however.
▷ Delete all entries	Action	You can delete all the program logbook entries here.
▶ All events		Chronological list of all the logbook entries, with information on the type of event.
▶ Show	Events are displayed	Select a particular event to display more detailed information.
▶ Go to date	User input <ul style="list-style-type: none"> <li>■ Go to date</li> <li>■ Time</li> </ul>	Use this function to go directly to a specific time in the list. In this way, you avoid having to scroll through all the information. The complete list is always visible, however.

**Diagnostics/Logbooks**

Function	Options	Info
▶ Calibration events		Chronological list of the calibration events.
▶ Show	Events are displayed	Select a particular event to display more detailed information.
▶ Go to date	User input <ul style="list-style-type: none"> <li>■ Go to date</li> <li>■ Time</li> </ul>	Use this function to go directly to a specific time in the list. In this way, you avoid having to scroll through all the information. The complete list is always visible, however.
▷ Delete all entries	Action	You can delete all the calibration logbook entries here.
▶ Configuration events		Chronological list of the configuration events.
▶ Show	Events are displayed	Select a particular event to display more detailed information.
▶ Go to date	User input <ul style="list-style-type: none"> <li>■ Go to date</li> <li>■ Time</li> </ul>	Use this function to go directly to a specific time in the list. In this way, you avoid having to scroll through all the information. The complete list is always visible, however.
▷ Delete all entries	Action	You can delete all the calibration logbook entries here.
▶ Diagnostic events		Chronological list of the diagnostics events.
▶ Show	Events are displayed	Select a particular event to display more detailed information.
▶ Go to date	User input <ul style="list-style-type: none"> <li>■ Go to date</li> <li>■ Time</li> </ul>	Use this function to go directly to a specific time in the list. In this way, you avoid having to scroll through all the information. The complete list is always visible, however.
▷ Delete all entries	Action	You can delete all the calibration logbook entries here.

You can view your data logbook entries graphically on the display ("Show plot").

You can also adapt the display to suit your individual requirements:

- If you press the navigator button in the graphic display, you are given additional options such as the zoom function and x/y movement of the graph.
- Furthermore, you can also define a cursor. If you select this option, you can move along the graph with the navigator and view the logbook entry (data stamp/measured value) in text form for every point in the graph.

**Diagnostics/Logbooks**

Function	Options	Info
▶ Data logbooks		Chronological list of the data logbook entries.
▶ Show	Events are displayed	Select a particular event to display more detailed information.
▶ Show plot	Graphic display of the logbook entries	The entries are displayed according to your settings in the General settings/Logbooks menu.

**Diagnostics/Logbooks**

Function	Options	Info
▶ Go to date	User input <ul style="list-style-type: none"> <li>■ Go to date</li> <li>■ Time</li> </ul>	Use this function to go directly to a specific time in the list. In this way, you avoid having to scroll through all the information. The complete list is always visible, however.
▷ Delete all entries	Action	You can delete all the calibration logbook entries here.
▶ Save logbooks	Options <ul style="list-style-type: none"> <li>■ All event logbooks</li> <li>■ Calibration logbook</li> <li>■ Diagnostic logbook</li> <li>■ Configuration logbook</li> <li>■ HW version logbook</li> <li>■ Version logbook</li> </ul>	Use this function to save the logbook to an SD card. You can then open the file you saved (.csv) at the PC and process it in MS-Excel for example. Insert the SD card into the controller card reader and select the logbook to be saved.
File format	Options <ul style="list-style-type: none"> <li>■ CSV</li> <li>■ FDM</li> </ul>	Save the logbook in the preferred file format. You can then open the CSV file you saved on the PC in MS Excel, for example, and process it further <sup>1)</sup> . You can import the FDM files into Fieldcare and archive them so they are tamper-proof.
 The file name is made up of the "Logbook ident" (Menu/Setup/General settings/Logbooks), an abbreviation for the particular logbook and a time stamp.		

- 1) CSV files use international number formats and separators. Therefore they must be imported into MS Excel as external data with the correct format settings. If you double-click the file to open it, the data are only displayed correctly if MS Excel is installed with the US country setting.

## 2.2.1 Program logbook

The following table shows an overview of the exported program logbook and explains the most important terms in the program logbook.

Entry	Example	Info
Timestamp	05.05.2010 12:40	Time stamp - the start time in the case of sampling
Event	BasicPrgStart	<p><b>Power on</b> → Time the device was started</p> <p><b>Power failure</b> → Time the power failed (to the minute)</p> <p><b>BasicPrgStart, StdPrgStart</b> → Time the program was started</p> <p><b>BasicSampling, StdSampling</b> → Entry made during sampling</p> <p><b>PrgPartStart, PrgPartStop</b> → Time a subprogram is enabled and disabled</p> <p><b>PrgStop</b> → Time the program was ended</p>
Name	Program1	<p>In the case of <b>BasicPrgStart, StdPrgStart, BasicSampling or PrgStop</b> → the name of the program appears</p> <p>In the case of <b>StdSampling, PrgPartStart or PrgPartStop</b> → the name of the subprogram appears</p>
Bottle configuration	12x+6x PE/glass plate distribution	The selected bottle configuration is displayed
Left bottle volume	1000	The bottle volume is displayed → "Right bottle volume" remains empty for bottle configurations with different volumes
Right bottle volume	3000	
Sampling mode	Time-paced CTCV	<p><b>Time-paced CTCV</b> → in proportion to time</p> <p><b>Flow-paced VTCV</b> → in proportion to volume</p> <p><b>Time/flow-paced CTVV</b> → in proportion to flow</p> <p><b>Single sample</b> → single sample</p> <p><b>Sample table</b> → single sample</p> <p>→ the sampling mode is displayed</p>
Sampling interval/unit	10 min	→ The interval and unit are displayed
Samples/bottle	4	<p><b>With bottle change</b> → Number of samples per bottle</p>
Bottles/sample	0	Multiple bottles
Sampling volume/unit	100 ml	Sample volume when sampling

Entry	Example	Info
Start mode	Immediate	Field only populated for <b>PrgPartStart</b> , <b>BasicPrgStart</b> and <b>Std-PrgStart</b> : → The program start setting is displayed - <b>Immediate</b> → immediately - <b>Date/time</b> → after date/time - <b>Volume</b> → with a volume - <b>Event</b> → when an event occurs - <b>Interval</b> → after an interval - <b>Individual dates</b> → individual timetable - <b>Multiple date</b> → multiple dates
Start date	05.05.2010	Field only populated if <b>Start mode = Date/Time</b> : → The start date is displayed
Stop mode	Program end	The program stop setting is displayed - <b>Program end</b> → when the program ends - <b>Continuous</b> → continuous operation - <b>Bottles full</b> → when bottles are full - <b>Date/time</b> → after date/time - <b>Event</b> → when an event occurs
Stop date	06.05.2010	Field only populated if <b>Program end = Date/Time</b> : → The time the program was stopped is displayed
Start flow sum/unit	100 m <sup>3</sup>	Field only populated if <b>Start mode = Volume</b> : → The starting volume is displayed
Bottle number	1	The field is only populated for <b>BasicSampling</b> or <b>StdSampling</b> : → The bottle which was filled with the sample is displayed
Sample nbr	2	Number of samples transferred to the current bottle
Sampling result	Sampling Ok	<b>Sampling Ok</b> → sampling ok <b>Sampling nOk</b> → sampling failed → For detailed diagnostics messages, see the diagnostics logbook
Running sample number	1	Running sample number in the current program
Flow sum since last sampling	1	For <b>flow-paced</b> and <b>time/flow-paced</b> sampling: → Flow since the last sampling For all other types of sampling: → Display: 0

## 2.3 System information

### Diagnostics/System information

Function	Options	Info
Device tag	Read only	Individual device tag, → "General settings"
Order code	Read only	You can order identical hardware with this code. This code changes on account of changes to the hardware and you can enter the new code you received from the manufacturer here <sup>1)</sup> .
 To find out what device version you have, enter the order code in the search screen at the following address: <a href="http://www.products.endress.com/order-ident">www.products.endress.com/order-ident</a>		
Order code extended	Read only	Complete order code resulting from the product structure. This code changes on account of changes to the hardware and you can enter the new code here.
Serial number	Read only	The serial number allows you to access device data and documentation on the Internet: <a href="http://www.products.endress.com/device-viewer">www.products.endress.com/device-viewer</a>
Software version	Read only	Current version
Sw version FMSY1	Read only	Current version
FMSY1-proj. version	Read only	Current version
▶ SD card	Read only <ul style="list-style-type: none"> <li>■ Total</li> <li>■ Free</li> </ul>	Total memory and space available
▶ System modules		
Depends on the electronics module available, e.g.:  Base	Read only <ul style="list-style-type: none"> <li>■ Description</li> <li>■ Serial number</li> <li>■ Order code</li> <li>■ Hardware version</li> <li>■ Software version</li> </ul>	This information is provided for every electronics module available. Specify the serial numbers and order codes when servicing, for example.
▶ Save system information		
▷ Save to SD-card	File name assigned automatically (includes a time stamp)	The information is saved on the SD card in a "sysinfo" subfolder. The csv file can be read and edited in MS Excel for example. This file can be used when servicing the device.

1) Provided you give the manufacturer all the information about changes to the hardware.

## 2.4 Status of inputs/outputs

The following measured values are listed (read only):

- Binary inputs
  - Current function state: on or off
- Current inputs
  - Actual current values of all the current inputs available
- Binary outputs
  - Current function state: on or off
- Temperature sensors
  - Current value is displayed: S:1 (cooling system)

## 2.5 Systemtest/Reset

### Diagnostics/Systemtest/Reset

Function	Options	Info
Power supply	Read only	The current supply voltage is displayed.
▶ Cooling system (only for version with sample chamber temperature regulation)		
▶ Check cooling		
Power supply	Read only	The current supply voltage is displayed. 24 V ±0.5 V
Overcurrent	Read only	No: no error Yes: the fan in the climate control module is defective -> Contact the Service Department
Temp. sample room	Read only	The <b>current</b> temperature of the sample compartment is displayed.
Temp. sample room	Read only	When you start the cooling test, the temperature at the start time is displayed
Cooling test off or Cooling test on -> progress of test is displayed		
▶ Start Test	Action	Start the cooling test.
▶ Stop test	Action	End the cooling test.
▶ Check heating		
Power supply	Read only	The current supply voltage is displayed. 24 V ±0.5 V
Overcurrent	Read only	No: no error Yes: the heating is defective -> Contact the Service Department
Overcurrent	Read only	No: no error Yes: the fan is defective -> Contact the Service Department

**Diagnostics/Systemtest/Reset**

Function	Options	Info
Temp. sample room	Read only	The <b>current</b> temperature of the sample compartment is displayed.
Temp. sample room	Read only	When you start the heating test, the temperature at the start time is displayed
Heating test off or Heating test on -> progress of test is displayed		
▷ Start Test	Action	Start the heating test.
▷ Stop test	Action	End the heating test.
▶ Manual sampling		
Bottle configuration	Read only	
Bottle volume	Read only	
Distributor position	Options <ul style="list-style-type: none"> <li>■ Front</li> <li>■ Bottle 1</li> <li>...</li> <li>■ Back</li> </ul>	Select which bottle should be filled with the sample.
Sample volume	50 to 2000 ml <b>Factory setting</b> 100 ml	You can change the sample volume in the version with the peristaltic pump.
Sample volume	<b>Factory setting</b> 200 ml	The sample volume is preset at the factory in the version with the vacuum pump.
▷ Start sampling	Action	
▶ Peristaltic pump (only for version with peristaltic pump)		
▷ Pump forward	Action	
Pump function forward, to stop press ESC	Read only	
Current pump run time	Read only	
Power supply	Read only	The current supply voltage is displayed. 24 V ±0.5 V
Current	Read only	The current consumption of the pump is displayed.
Vacuum	Read only	The vacuum is an indicator of the suction height. -> 100 mbar is equivalent to a suction height of approx. 1 m.
Probe detected	Read only	Yes: the medium was detected No: no medium was detected
▷ Pump reverse	Action	
Pump function reverse, to stop press ESC	Read only	

## Diagnostics/Systemtest/Reset

Function	Options	Info
Current pump run time	Read only	
Power supply	Read only	The current supply voltage is displayed. 24 V $\pm$ 0.5 V
Current	Read only	The current consumption of the pump is displayed.
Vacuum	Read only	The vacuum is an indicator of the suction height. -> 100 mbar is equivalent to a suction height of approx. 1 m.
Probe detected	Read only	Yes: the medium was detected No: no medium was detected
▷ Vacuum pump (only for version with vacuum pump)	Action	
Bottle configuration	Read only	
Bottle volume	Read only	
Distributor position	Options <ul style="list-style-type: none"> <li>■ Front</li> <li>■ Bottle 1</li> <li>...</li> <li>■ Back</li> </ul>	Select which bottle should be filled with the sample.
Sample volume	<b>Factory setting</b> 200 ml	The sample volume is preset at the factory.
▷ Start sampling	Action	Perform sampling manually.
Action message	Read only	The progress of the sampling operation is displayed.
Power supply	Read only	The current supply voltage is displayed. 24 V $\pm$ 0.5 V
Current	Read only	The current consumption of the pump is displayed.
Medium LF1	Read only	<ul style="list-style-type: none"> <li>■ Medium detection conductivity 1 switchoff</li> <li>■ Medium detection conductivity 2 disconnection from protective circuit</li> </ul> -> Both "No" at the start -> If "Yes", clean conductivity 2
Medium LF2	Read only	
▷ Distribution arm	Action	Only for bottle configurations with more than one bottle.
Test distribution arm	Read only	When the menu item is activated, the distribution arm undergoes a test run. Afterwards, the system moves to each position in succession and the position is displayed. In the case of plate distribution, the arm moves left and right to ensure the bottles are numbered consecutively.  Calibrate the distribution arm if the arm is not positioned precisely over the bottles.
Position	Read only	

**Diagnostics/Systemtest/Reset**

Function	Options	Info
▷ Device Reset	Options <ul style="list-style-type: none"> <li>■ OK</li> <li>■ ESC</li> </ul>	Restart and keep all the settings
▷ Factory default	Options <ul style="list-style-type: none"> <li>■ OK</li> <li>■ ESC</li> </ul>	Restart with factory settings Settings that have not been saved are lost.
▶ Power supply	Display <ul style="list-style-type: none"> <li>■ Supply Voltage 1V2</li> <li>■ Supply Voltage 3V3</li> <li>■ Supply Voltage 12V5</li> <li>■ Supply Voltage 24V</li> <li>■ Temperature</li> </ul>	

## 2.6 Term information

The following information is displayed:

- **Operating hours device:**  
Displays the total operating hours of the device in days, hours and minutes
- **Operating hours cooling** (only for the version with a climate control module):  
Displays the total operating hours of the compressor in days, hours and minutes
- **Overfill sensor** (for version with vacuum pump):  
Number of times a safety switchoff has been caused by conductivity 2
- **Dosing valve** (for version with vacuum pump):  
Number of times the dosing valve is actuated; -> corresponds to the number of samples taken
- **Vacuum pump** (for version with vacuum pump):  
Displays the pump operating time in hours and minutes
- **Sample totalizer** (for version with peristaltic pump):  
Number of all samples taken and sample errors
- **Pump tube life** (for version with peristaltic pump):  
Displays how old the tube is in days, hours and minutes  
 This counter must be reset when a tube is replaced.

Set the specific counter reading to zero with "Reset".

## 2.7 Simulation

You can simulate values at inputs and outputs for testing purposes:

- Current values at current outputs
  - Measured values at inputs
  - Relay contact opening or closing
-  Only current values are simulated. It is not possible to use the simulation function to calculate the totalized value for the flow or rainfall.

## Diagnostics/Simulation

Function	Options	Info
▶ Current output x:y		Simulation of an output current This menu appears once for each current output.
Simulation	Options <ul style="list-style-type: none"> <li>■ On</li> <li>■ Off</li> </ul> <b>Factory setting</b> Off	If you simulate the value at the current output, this is indicated on the display by a simulation icon in front of the current value.
Current	2.4 to 23.0 mA <b>Factory setting</b> 4 mA	Set the desired simulation value.
▶ Alarm relay ▶ Relay x:y		Simulation of a relay state This menu appears once for each relay.
Simulation	Options <ul style="list-style-type: none"> <li>■ On</li> <li>■ Off</li> </ul> <b>Factory setting</b> Off	If you simulate the relay state, this is indicated on the display by a simulation icon in front of the relay display.
State	Options <ul style="list-style-type: none"> <li>■ Low</li> <li>■ High</li> </ul> <b>Factory setting</b> Low	Set the desired state. The relay switches in accordance with your setting when you switch on the simulation. The display shows "On" (= "Low") or "Off" (= "High") for the simulated relay state.
▶ Meas. inputs		Simulation of a measured value This menu appears once for each measuring input.
▶ Channel : parameter		
Sim. main value	Options <ul style="list-style-type: none"> <li>■ On</li> <li>■ Off</li> </ul> <b>Factory setting</b> Off	If you simulate the measured value, this is indicated on the display by a simulation icon in front of the measured value.
Main value	Depends on the sensor <b>Factory setting</b> Depends on the sensor	Set the desired simulation value.
Sim. temperature	Options <ul style="list-style-type: none"> <li>■ On</li> <li>■ Off</li> </ul> <b>Factory setting</b> Off	If you simulate the temperature measured value, this is indicated on the display by a simulation icon in front of the temperature.
Temp. value	-50.0 to +250.0 °C (-58.0 to 482.0 °F) <b>Factory setting</b> 20.0 °C (68.0 °F)	Set the desired simulation value.

## 3 Troubleshooting

### 3.1 Troubleshooting

The sampler continuously monitors its own functions.

The color of the display background changes to red if a diagnostics message for error category "F" occurs.

The LED beside the display flashes red if a diagnostics message for error category "M" occurs.

### 3.2 System error messages

 System error messages are the controller diagnostics messages that are output on the display or via the current output.

1. See the Diagnostics menu for details on the error message. Follow the instructions to rectify the problem.
2. If this does not help:
  - a. Using the message number shown on the display, locate the diagnostics message in the error tables in this manual. Ignore the letters indicating the Namur error category.
  - b. Follow the troubleshooting instructions provided in the last column of the error tables.
3. Contact the Service Department if you cannot rectify the error yourself. Only cite the error number.

#### 3.2.1 Classification of diagnostics messages

More detailed information on the current diagnostics messages displayed is provided in the DIAG/Diagnostics list menu.

In accordance with Namur specification NE 107, the diagnostics messages are characterized by:

- Message number
- Error category (letter in front of the message number)
  - **F** = Failure. A malfunction has been detected.  
The cause of the malfunction is to be found in the sampling point/measuring point. Any controller connected should be set to manual mode.
  - **M** = Maintenance required. Action may have to be taken soon.  
The device still measures/takes a sample correctly. Immediate measures must not be taken. However, proper maintenance efforts would prevent a possible malfunction in the future.
  - **C** = Function check. (No error)  
Maintenance work is being performed on the device. Wait until the work has been completed.
  - **S** = Out of specification. The measuring point is being operated outside specifications.  
Operation is still possible. However, you run the risk of increased wear, shorter operating life or lower accuracy levels. The cause of the problem is to be found outside the measuring point.
- Message text

 If you contact the Service Department, please cite the message number only. Since you can individually change the assignment of an error to an error category, the Service Department cannot use this information.

### 3.2.2 Adjusting the device behavior

All the diagnostics messages are assigned to specific error categories at the factory. Since other settings might be preferred depending on the application, error categories and the effect errors have on the measuring point can be configured individually. Furthermore, every diagnostics message can be disabled.

#### Example

The controller returns diagnostics message 531 "Logbook full". You want to change this message so that an error is not indicated on the display for example.

1. Go to:
  - Menu/Setup/General settings/Diagnostics/Device behavior for device-specific diagnostics messages (as in this example)
  - Menu/Setup/Inputs/.../Diag. settings/Diag. behavior for sensor-specific diagnostics messages.
2. Select the diagnostics message and press the navigator button.
3. Decide:
  - a. Should the message be deactivated?
  - b. Do you want to change the error category?
  - c. Should an error current be output?
  - d. Do you want to trigger a cleaning program?
4. Deactivate the message, for example (Diagnostics message to "Off").

#### Configuration options

 This branch, along with the same functions, can be found in different "Extended setup" menus. 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

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 <ul style="list-style-type: none"> <li>■ On</li> <li>■ Off</li> </ul> <b>Factory setting</b> Depends on the message	You can deactivate or reactivate a diagnostics message here. Deactivating means: <ul style="list-style-type: none"> <li>■ No error message in the measuring mode</li> <li>■ No error current at the current output</li> </ul>
Error current	Options <ul style="list-style-type: none"> <li>■ On</li> <li>■ Off</li> </ul> <b>Factory setting</b> Depends on the message	Decide whether an error current should be output at the current output if the diagnostic message display is activated.

**Path:** ... /Extended setup/Diagnostics settings/Diag. behavior

Function	Options	Info
Status signal	Options <ul style="list-style-type: none"> <li>■ Maintenance (M)</li> <li>■ Out of specification (S)</li> <li>■ Function check (C)</li> <li>■ Failure (F)</li> </ul> <b>Factory setting</b> Depends on the message	The messages are divided into different error categories in accordance with NAMUR NE 107. → BA488C "Maintenance & diagnostics"
Diag. output	Options <ul style="list-style-type: none"> <li>■ None</li> <li>■ Alarm relay</li> <li>■ Relay 1 to n (depends on the device version)</li> </ul> <b>Factory setting</b> None	You can use this function to select an output to which the diagnostic message should be assigned.
Cleaning program (optional)	Options <ul style="list-style-type: none"> <li>■ None</li> <li>■ Cleaning 1</li> <li>■ Cleaning 2</li> <li>■ Cleaning 3</li> <li>■ Cleaning 4</li> </ul> <b>Factory setting</b> 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.

**3.2.3 Device-specific, general diagnostics messages**

No.	Message	Factory settings			Tests or remedial measures
		Cat.	Diag. on/off	Error current	
202	Selftest active	C	On	Off	Wait for self-test to be finished
215	Simul. active	C	On	Off	Simulation active
216	Hold active	C	On	Off	Output values and status of the channel are on hold
241	Internal error	F	On	On	Internal device error 1. Update the software 2. Contact the Service Department 3. Replace the backplane (E+H Service)
242	Software incomp.	F	On	On	
243	Internal error	F	On	On	
261	Electr. module	F	On	On	Electronics module defective 1. Replace the module 2. Contact the Service Department

No.	Message	Factory settings			Tests or remedial measures
		Cat.	Diag. on/off	Error current	
262	Module connect.	F	On	On	Electronics module not communicating 1. Check cable connection, replace if necessary 2. Check the power supply of the sampling control module 3. Contact the Service Department
263	Electr. module	F	On	On	Wrong kind of electronics module 1. Replace the module 2. Contact the Service Department
284	Firmware update	M	On	Off	Update completed successfully
285	Update error	F	On	On	Firmware update failed 1. Repeat update 2. SD card error → use another card 3. Incorrect firmware → repeat with suitable firmware 4. Contact the Service Department
302	Battery low	M	On	Off	Buffer battery of real time clock is low The date and time are lost if the power is interrupted. → Contact the Service Department (battery replacement)
304	Module data	F	On	On	At least 1 module has incorrect configuration data 1. Check the system information 2. Contact the Service Department
305	Power consumption	F	On	On	Total power consumption too high 1. Check installation 2. Remove sensors/modules
306	Software	F	On	On	Internal firmware error → Contact the Service Department
310	Temp. sensor	F	On	On	Sensor for climate control module 1. Check the sensor has been fitted correctly 2. Replace sensor
311	Temp. sensor	F	On	On	Sensor for sample temperature regulation 1. Check the sensor has been fitted correctly 2. Replace sensor
312	Temp. sensor	F	On	On	Sensor for outside temperature 1. Check the sensor has been fitted correctly 2. Outside temperature inside specified range (not > - 30 °C) 3. Replace sensor
313	Liquidsensor 1	F	On	On	Contact electrodes fouled Reliable sample detection not possible 1. Clean the sensors 2. Contact the Service Department

No.	Message	Factory settings			Tests or remedial measures
		Cat.	Diag. on/off	Error current	
314	No sample	F	On	On	No inflow of sample → Check pump tube for leaks
315	Refrigeration	F	On	On	Refrigeration regulation not possible → Contact the Service Department
316	Heating	F	On	On	Heating regulation not possible → Contact the Service Department
317	Sensor	F	On	On	Sensor conductivity 1 fouled → Clean sensor
318	Sensor	F	On	On	Sensor conductivity 1 defective → Replace sensor
319	Sensor	F	On	On	Sensor conductivity 2 fouled → Clean sensor
320	Sensor	F	On	On	Sensor conductivity 2 defective → Replace sensor
321	Sensor	F	On	On	Capacitance sensor defective → Replace sensor
322	Read subprogram	F	On	On	Selected subprogram cannot be read from the program memory → Create new subprogram
323	Write subprg.	F	On	On	Subprogram created cannot be saved → Reset the software
324	Delete subprg.	F	On	On	Selected subprogram cannot be deleted from the program memory → Reset the software
325	Read subprg. list	F	On	On	Subprogram list cannot be read from the program memory → Reset the software
326	Membrane pump	F	On	On	Vacuum pump defective → Contact the Service Department
327	Air-Manager	F	On	On	Runtime error has occurred <ul style="list-style-type: none"> <li>■ Photoelectric barrier defective</li> <li>■ Cable defective</li> </ul> → Contact the Service Department
328	Distribution arm	F	On	On	Distribution arm zero point not found <ol style="list-style-type: none"> <li>1. Perform distribution arm test</li> <li>2. Contact the Service Department</li> </ol>
329	Pump error	F	On	On	Vacuum pump defective → Contact the Service Department
330	Membrane pump	F	On	On	Vacuum pump control defective → Contact the Service Department

No.	Message	Factory settings			Tests or remedial measures
		Cat.	Diag. on/off	Error current	
331	Peristaltic pump	F	On	On	Peristaltic pump defective → Contact the Service Department
332	Peristaltic pump	F	On	On	Control of peristaltic pump defective → Contact the Service Department
333	Liquid detector	F	On	On	Pressure sensor defective → Contact the Service Department
334	Heating	F	On	On	Heating defective → Contact the Service Department
335	Fan	F	On	On	Fan defective → Contact the Service Department
336	Cooling	F	On	On	Cooling defective → Contact the Service Department
337	Pump tubing	M	On	Off	Pump tube operating time reached shortly - Default values from diagnostic settings are displayed
338	Pump tubing	M	On	Off	Pump tube operating time reached - Default values from diagnostic settings are displayed → Change the pump tubing
339	Sensor	M	On	Off	Sensor conductivity 1 fouled - Default values from diagnostic settings are displayed → Clean sensor
340	Sensor	M	On	Off	Sensor conductivity 1 fouled - Default values from diagnostic settings are displayed → Clean sensor
341	Sealing	M	On	Off	Process seal operating time reached shortly - Default values from diagnostic settings are displayed
342	Sealing	M	On	Off	Process seal operating time reached - Default values from diagnostic settings are displayed → Replace O-rings
343	Power supply	M	On	Off	Power supply failure
344	Program pause	C	On	Off	Sampling program paused
345	Time changeover	M	On	Off	Daylight saving time/winter time setting Normal time (winter time) active.
346	Time changeover	M	On	Off	Daylight saving time/winter time setting Daylight saving time active

No.	Message	Factory settings			Tests or remedial measures
		Cat.	Diag. on/off	Error current	
347	Sampling	F	On	On	Sampling command not processed 1. Check internal connection 2. Reset the software
348	Read program	F	On	On	Selected program cannot be read from the program memory → Create new program
349	Write program	F	On	On	Program created cannot be saved Hardware error has occurred → Contact the Service Department
350	Module connect.	F	On	On	Cannot communicate with internal module FMSY1 → Check internal connecting cable
351	Delete program	F	On	On	Selected program cannot be deleted from the program memory → Reset the software
352	Read prog. list	F	On	On	Program list cannot be read from the program memory → Reset the software
353	Overfill check	M	On	Off	Total capacity of bottle reached ■ No further sampling to current bottle is triggered
354	Bottle check	M	On	Off	No empty bottles available for current program ■ No further sampling
355	Start time over	M	On	Off	Start time entered is in the past ■ Enter a new start time
356	Overfill check	S	On	Off	Volume of sample does not fit in the sample bottle → Change the sample volume
357	No sampling	M	On	Off	Too many events at the current sampling time; up to 24 sampling events can be triggered simultaneously → Change the program settings so that samples are taken at different times
358	Configuration	F	On	On	Program configuration does not match the current device configuration → Adjust the configuration
359	Winter operation	M	On	Off	■ Winter operation active ■ Outside temperature too low ■ No sampling
360	No sample	F	On	On	Intake hose blocked → Clean or replace the hose
361	Analog input	F	On	On	Current at analog input S:1 or S:2 too low 1. Check current loop for error current 2. Contact the Service Department

No.	Message	Factory settings			Tests or remedial measures
		Cat.	Diag. on/off	Error current	
370	Intern. Voltage	F	On	On	Internal voltage outside the valid range → Check supply voltage
371	Intern Voltage	F	On	On	
373	Electr. temp.	M	On	Off	High electronics temperature → Check ambient temperature and energy consumption
374	Sensor check	F	On	Off	No measurement signal from sensor 1. Check sensor connection 2. Check sensor, replace if necessary
401	Reset to default	F	On	On	Factory reset is performed
406	Param. active	C	On	Off	→ Wait for configuration to be finished
407	Diag. active	C	Off	Off	→ Wait for maintenance to be finished
412	Writing backup	M	On	Off	→ Wait for the write process to be finished
413	Reading backup	C	On	Off	→ Wait
460	Curr. under-run	F	On	On	Reasons <ul style="list-style-type: none"> <li>■ Sensor in air</li> <li>■ Air pockets in assembly</li> <li>■ Sensor fouled</li> <li>■ Incorrect flow to sensor</li> </ul> Measures 1. Check sensor installation 2. Clean sensor 3. Adjust assignment of current outputs
461	Current overrun	F	On	On	
502	No text catalog	F	On	On	→ Contact the Service Department
503	Language change	M	On	Off	Language change failed → Contact the Service Department
530	Logbook at 80%	M	On	Off	1. Save the logbook to the SD card and then delete the logbook in the device 2. Set memory to ring memory 3. Deactivate logbook
531	Logbook full	M	On	Off	
532	License error	M	On	Off	→ Contact the Service Department
910	Limit switch	S	On	Off	Limit switch activated
963	Parameter save	M	On	Off	Configuration saving has failed, → repeat
965	Parameter load	M	On	Off	Configuration successfully loaded
966	Parameter load	M	On	Off	Configuration loading has failed, → repeat
967	Parameter load	M	On	Off	Configuration loading aborted
969	Parameter reset	M	On	Off	Factory default successful
971	Parameter reset	M	On	Off	Factory default failed

No.	Message	Factory settings			Tests or remedial measures
		Cat.	Diag. on/off	Error current	
972	Current > 20 mA	M	On	Off	Current output range exceeded
973	Current < 4 mA	M	On	Off	Current output range undershot
974	Diag. confirmed	C	Off	Off	User has acknowledged the message displayed in the measuring menu.
974	Diag. confirmed	C	Off	Off	User has acknowledged the message displayed in the measuring menu.
990	Deviation limit	F	On	On	Redundancy: limit value of percentage deviation exceeded
991	CO <sub>2</sub> conc. range	F	On	On	CO <sub>2</sub> concentration (degassed conductivity) outside the measuring range
992	pH calc range	F	On	On	pH calculation outside the measuring range
993	rH calc range	F	On	On	rH calculation outside the measuring range
994	Dual cond range	F	On	On	Dual conductivity outside the measuring range

### 3.3 Device-specific errors

Problem	Possible cause	Tests and/or remedial measures
The device cannot be switched on/display remains dark	No supply voltage	Check if voltage supplied
	Basic module defective	Replace basic module
Values appear on display but: – Display does not change and / or – Device cannot be operated	Module not wired correctly	Check modules and wiring
	Impermissible operating system condition	Switch off device and switch it on again
Control signals are not accepted or outputs do not switch	Incorrect program setting	Check program setting
	Incorrect wiring	Check wiring
	Electronics failure	Replace basic module

Problem	Possible cause	Tests and/or remedial measures
Sample not representative	Siphon in sampling hose	Check sampling hose
	Connection not air-tight/sampling hose taking in air	<ul style="list-style-type: none"> <li>- Check tubes/connections</li> <li>- Check the sampling hose is routed correctly</li> </ul>
	Bottles not being filled correctly	<ul style="list-style-type: none"> <li>- Incorrect distribution selected in the controls</li> <li>- Calibrate the distribution arm</li> </ul>
	Distribution arm does not move	<ul style="list-style-type: none"> <li>- Incorrect distribution selected in the controls</li> <li>- Check distribution arm connection</li> <li>- Distributor defective, replace distributor or</li> <li>- Have repaired by E+H Service</li> </ul>
	Incorrect bottle filled	<ul style="list-style-type: none"> <li>- Incorrect distribution selected in the controls</li> </ul>
	No sample cooling	<ul style="list-style-type: none"> <li>- Check the setting for the sample chamber temperature in the controls</li> <li>- Cooling system defective</li> <li>-&gt;Have repaired by E+H Service</li> </ul>
	Wrong pump tube	Only use genuine pump tube
	Faulty sensory mechanism	Replace sensory mechanism (contact E+H Service)
No sampling	Connection leaking	Check tubes/connections for leaks
	Sampling hose taking in air	Check the sampling hose is routed correctly
	Air manager defective	Have repaired by E+H Service
	Vacuum pump defective	Have repaired by E+H Service
	Wrong pump tube	Only use genuine pump tube
	Faulty sensory mechanism	Replace sensory mechanism (contact E+H Service)
Current output, incorrect current value	Incorrect adjustment	Check with integrated current simulation, connect mA meter directly to current output.
	Load too large	
	Shunt / short to ground in current loop	
No current output signal	Basic module defective	Check with integrated current simulation, connect mA meter directly to current output.

### 3.4 Return

The Liquistation CSF33 is repaired on site.  
 Contact your Endress+Hauser Service Department.

### 3.5 Disposal

The device contains electronic components and must therefore be disposed of in accordance with regulations on the disposal of electronic waste.  
 Please comply with local regulations and guidelines.

### 3.6 Software history

Date	Version	Changes to software	Documentation: edition
04/2011	01.02	Extension <ul style="list-style-type: none"> <li>■ HART communication</li> <li>■ Mathematics functions</li> </ul> Improvement <ul style="list-style-type: none"> <li>■ Modified software structures</li> <li>■ Adapted factory settings</li> <li>■ User-defined measuring screens</li> </ul>	BA479C/07/EN/14.11 BA487C/07/EN/14.11 BA488C/07/EN/14.11 BA489C/07/EN/14.11
04/2010	01.00	Original software	BA479C/07/EN/04.10 BA487C/07/EN/04.10 BA488C/07/EN/04.10 BA489C/07/EN/04.10

## 4 Accessories



The most important accessories available at the time this document went to print are listed below. Contact your Service Department or sales center for accessories that are not listed here.

### 4.1 Accessories for Liquistation CSF33

Order No.	Bottle tray + bottles + cap
71111152	Bottle tray + 6 x 3 liter (0.79 US gal.) PE+ cap
71111154	Bottle tray + 12 x 1 liter (0.26 US gal.) PE + cap
	<b>Distributor plate; Locating insert</b>
71111158	Distributor plate for 2 x 6 bottles
71111159	Distributor plate for 2 x 12 bottles
	<b>Bottles + caps</b>
71111164	1 liter (0.26 US gal.) PE + cap, 24 pcs.
71111167	3 liter (0.79 US gal.) PE + cap, 12 pcs.
71111169	13 liter (3.43 US gal.) PE + cap, 1 pc.
71111172	30 liter (7.92 US gal.) PE + cap, 1 pc.
	<b>Complete suction line</b>
71111233	Suction line ID 10 mm (3/8"), reinforced fabric, PVC, clear, length 10 m (33 ft), strainer V4A
71111235	Suction line ID 13 mm (1/2"), reinforced spiral wire, PVC, length 10 m (33 ft), strainer V4A
	<b>Suction line coil</b>
71111482	... m, suction line ID 10 mm (3/8"), PVC
71111485	... m, suction line ID 13 mm (1/2"), PVC
	<b>Strainer</b>
71111184	Strainer V4A for ID 10 mm (3/8"), 1 pc.
71111185	Strainer V4A for ID 13 mm (1/2"), 1 pc.
	<b>Tubing customized; Vacuum pump</b>
71111188	Dosing tubing to distributor, 2 pcs.
71111189	Dosing tubing to distributor, 25 pcs.
	<b>Tubing customized; Peristaltic pump</b>
71111191	Pump tubing, long and short tubing included, 2 pcs. of each
71111192	Pump tubing, long and short tubing included, 25 pcs. of each

## 5 Spare parts

 Contact your Endress+Hauser Service if you have any further questions regarding spare parts.

### 5.1 Peristaltic pump

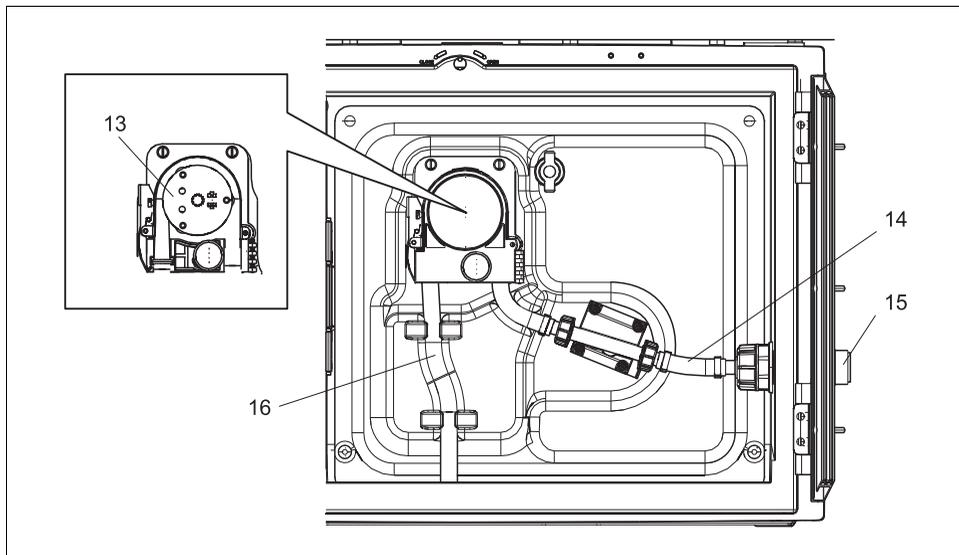


Fig. 8: Spare parts for version with peristaltic pump

a0013813

Item No.	Designation and contents	Order number Spare parts kit
13	Roller	71103288
14	Connecting tube with connection	71110972
15	Feedthrough, sample infeed ID 10 with cylinder pin	71110857
	Seal set: O-ring ID=12.42 W=1.78 OD=15.98 EPDM, 2 pcs O-ring ID=20.92 W=2.62 OD=25.53 EPDM, 2 pcs O-ring ID=13.00 W=4.00 OD=21.00 NBR, 1 pc	71110928
16	Pump tube, 2 pc. set Pump tube, 25 pc. set	71111191 71111192

## 5.2 Vacuum pump

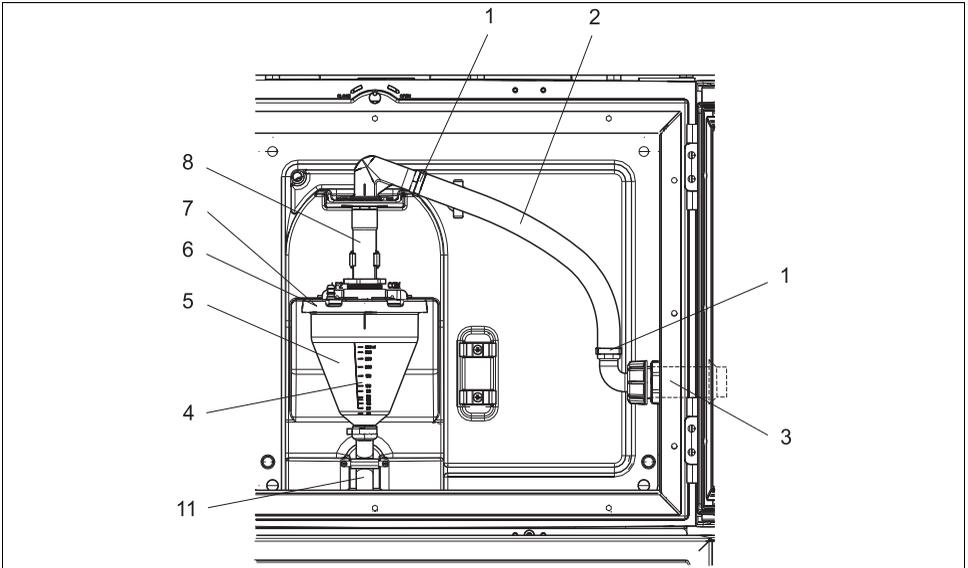


Fig. 9: Spare parts for version with vacuum pump (view in front of pump holder)

a0013811

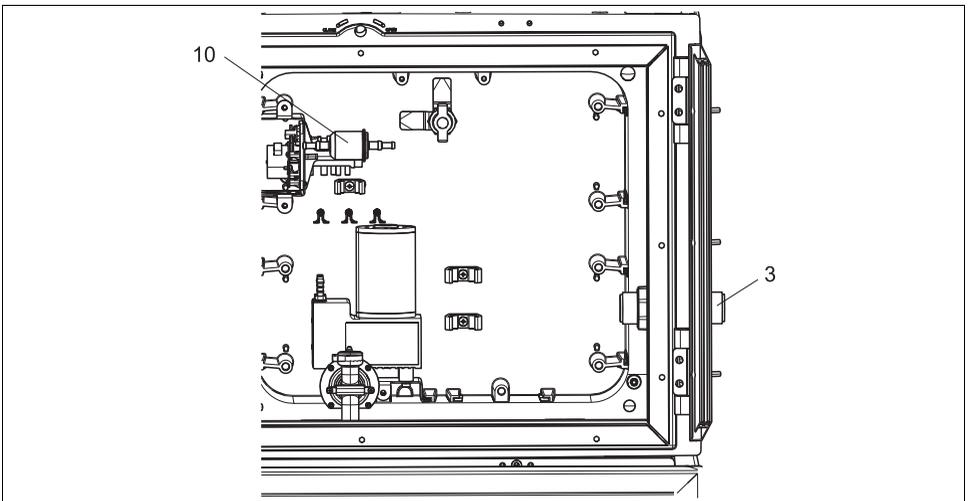
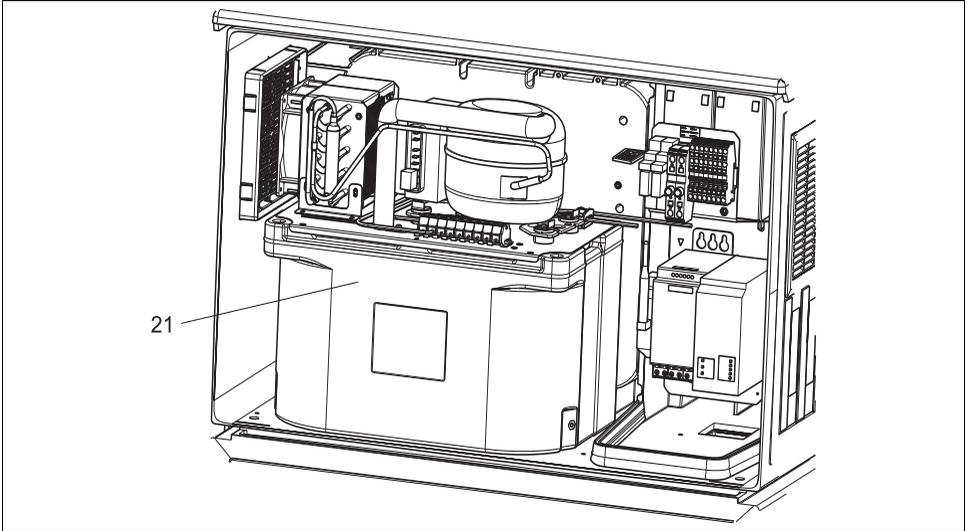


Fig. 10: Spare parts for version with vacuum pump (view behind pump holder)

a0013812

Item No.	Designation and contents	Order number Spare parts kit
1	Fastening clips for suction hose, 10 pcs	71113508
2	Internal intake hose, complete, including 110° angular piece, 90° hose connection nipple, thread adapter nut 1" PP, 2 x fastening clips, 3 x O-rings	71111048
3	Feedthrough, sample infeed ID 13 with cylinder pin	71110853
4	Dosing pipe 350 ml with O-ring	71110628
5	Glass dosing chamber, 350 ml, with fixing ring and O-ring	71103168
	Plastic dosing chamber, 350 ml, with O-ring	71103173
6	Conductive dosing chamber flange, with conductivity sensors, insulation sleeves and O-ring	71102985
7	Capacitance dosing chamber flange, complete	71103166
8	Dosing chamber inlet with sealing ring, intermediate ring and pipe clamp	71111006
10	Air filter for vacuum pump, 2 pcs Hose, silicone, 320 mm (12.6")	71103283
	Seal set for dosing chamber: O-ring ID=102.00 W=3.00 OD=108.00 NBR, 1 pc O-ring ID=15.00 W=2.00 OD=19.00 EPDM, 1 pc O-ring ID=20.00 W=2.00 EPDM, 1 pc O-ring ID=18.00 W=2.00 OD=22.00 EPDM, 1 pc	71103176
11	Dosing hose to distributor, 2 pc set. Dosing hose to distributor, 25 pc set.	71111188 71111189

### 5.3 Climate control module



a0013808

Fig. 11: Spare parts, view of climate control module

Item No.	Designation and contents	Order number Spare parts kit
21	Complete climate control module, unpainted	71092603
	Complete climate control module, painted	71113854

## 5.4 Sample compartment

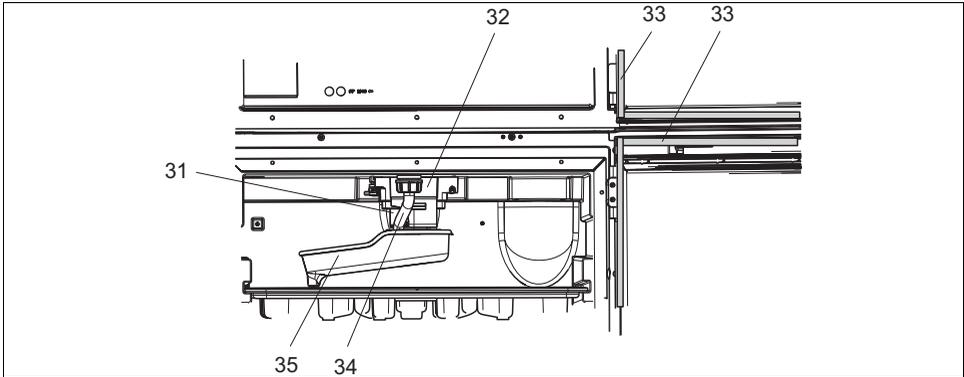


Fig. 12: Sample compartment, upper part

a0013809

Item No.	Designation and contents	Order number Spare parts kit
31	Complete distribution arm drive shaft	71113519
32	Distribution arm motor with housing and securing screws	71101959
33	Gasket for dosing chamber door and sampling chamber door	71103293
34	Outlet pipe with thread adapter nut	71110970
35	Distribution arm with adapter plate and splashguard	71098113



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