

Operating Instructions

Liquiline Control CDC90

Automated cleaning and calibration of Memosens sensors











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

1 About this document

Structure of information	Meaning
<p>⚠ DANGER</p> <p>Causes (/consequences) If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> ▶ Corrective action 	<p>This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation will result in a fatal or serious injury.</p>
<p>⚠ WARNING</p> <p>Causes (/consequences) If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> ▶ Corrective action 	<p>This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation can result in a fatal or serious injury.</p>
<p>⚠ CAUTION</p> <p>Causes (/consequences) If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> ▶ Corrective action 	<p>This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries.</p>
<p>ℹ NOTICE</p> <p>Cause/situation If necessary, Consequences of non-compliance (if applicable)</p> <ul style="list-style-type: none"> ▶ Action/note 	<p>This symbol alerts you to situations which may result in damage to property.</p>

1.1 Symbols

-  Additional information, tips
-  Permitted
-  Recommended
-  Not permitted or not recommended
-  Reference to device documentation
-  Reference to page
-  Reference to graphic
-  Result of an individual step

1.1.1 Symbols on the device

-  Reference to device documentation
-  Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

1.2 Documentation


The following manuals complement these Operating Instructions and are available on the product pages on the Internet:

- Brief Operating Instructions for Liquiline Control CDC90
- Operating Instructions for Memosens, BA01245C
 - Software description for Memosens inputs
 - Calibration of Memosens sensors
 - Sensor-specific diagnostics and troubleshooting
- For more detailed information on fieldbus communication:
 - Ethernet/IP (adapter) via Modbus TCP - Ethernet/IP gateway: [BA02241C](#)
 - Modbus TCP (server): [BA02238C](#)
 - PROFIBUS DP (slave) via Modbus TCP - PROFIBUS DP gateway: [BA02239C](#)
 - PROFINET (device) via Modbus TCP - PROFINET gateway: [BA02240C](#)

2 Basic safety instructions

2.1 Requirements for the personnel

- Installation, commissioning, operation and maintenance of the measuring system may be carried out only by specially trained technical personnel.
- The technical personnel must be authorized by the plant operator to carry out the specified activities.
- The electrical connection may be performed only by an electrical technician.
- The technical personnel must have read and understood these Operating Instructions and must follow the instructions contained therein.
- Faults at the measuring point may only be rectified by authorized and specially trained personnel.

 Repairs not described in the Operating Instructions provided must be carried out only directly at the manufacturer's site or by the service organization.

2.2 Intended use

Liquiline Control CDC90 is a fully automatic measuring, cleaning and calibration system for Memosens sensors.

2.2.1 Non-intended use

Any use other than that intended puts the safety of people and the measuring system at risk. Therefore, any other use is not permitted.

The manufacturer is not liable for harm caused by improper or unintended use.

2.3 Workplace safety

As the user, you are responsible for complying with the following safety conditions:

- Installation guidelines
- Local standards and regulations
- Regulations for explosion protection

Electromagnetic compatibility

- The product has been tested for electromagnetic compatibility in accordance with the applicable international standards for industrial applications.
- The electromagnetic compatibility indicated applies only to a product that has been connected in accordance with these Operating Instructions.

2.4 Operational safety

Before commissioning the entire measuring point:

1. Verify that all connections are correct.
2. Ensure that electrical cables and hose connections are undamaged.
3. Do not operate damaged products, and protect them against unintentional operation.
4. Label damaged products as defective.

During operation:

- ▶ If faults cannot be rectified, take products out of service and protect them against unintentional operation.

2.5 Product security

2.5.1 State-of-the-art

The product is designed to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate. The relevant regulations and international standards have been observed.

2.6 IT security

We only provide a warranty if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

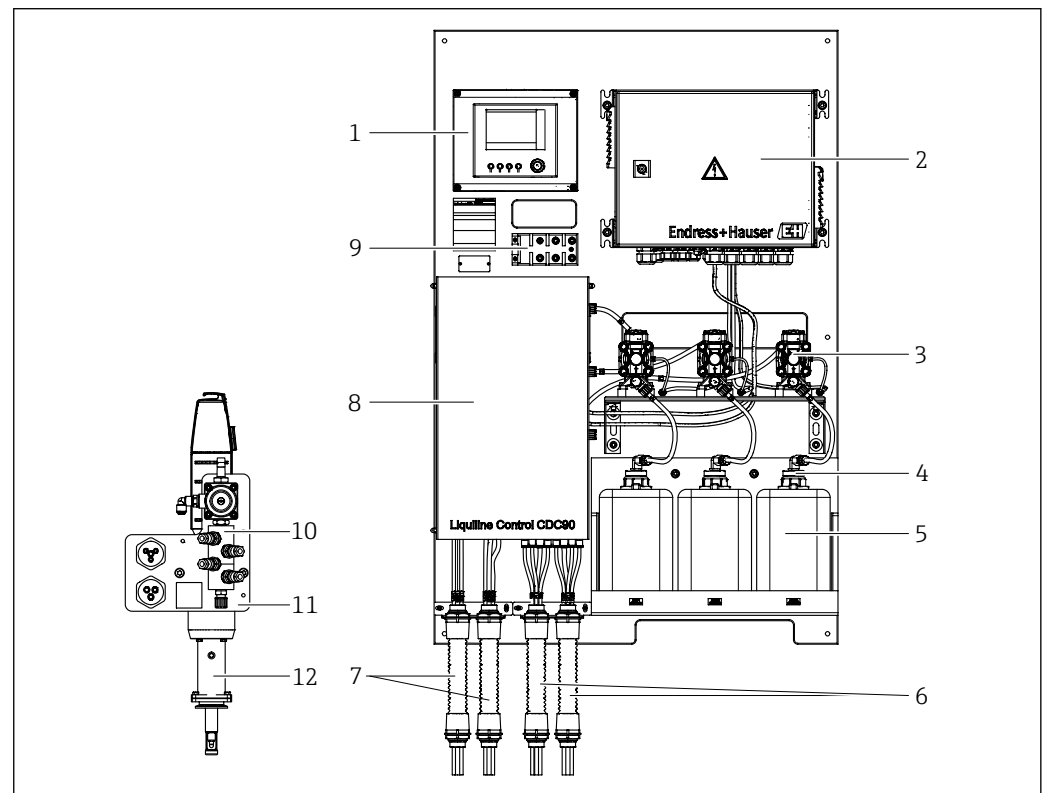
IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

3 Product description

3.1 Product design

The complete Liquiline Control CDC90 consists of the following components:

- CDC90 control unit
- Ethernet switch
- Pneumatic control unit
- Pumps
- Canisters for buffer solutions and cleaner
- Multihoses for medium control
- Rinsing block

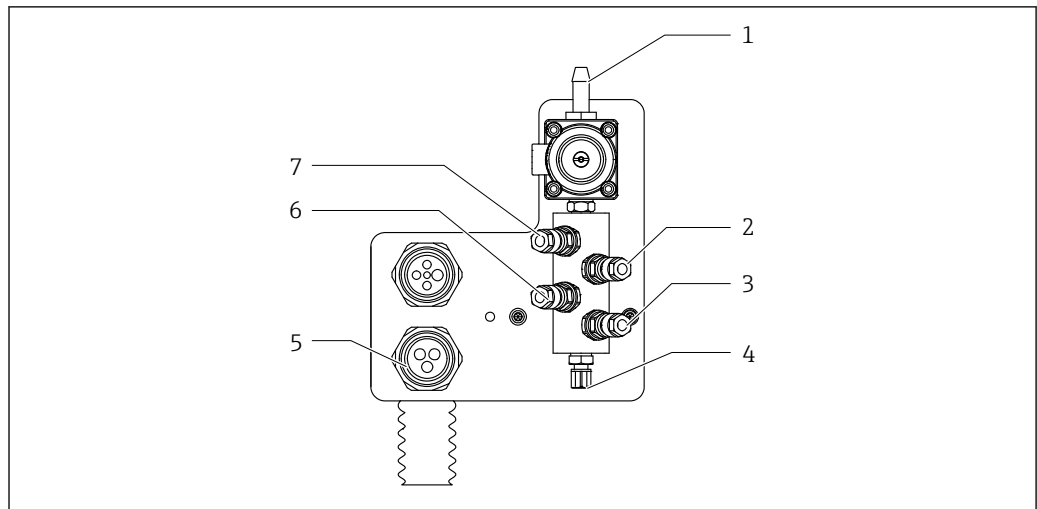


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1 Overview of CDC90

- | | | | |
|---|---|----|-------------------------------------|
| 1 | CDC90 control unit | 7 | M1/M3 multihoses |
| 2 | Pneumatic control unit | 8 | Cover |
| 3 | Pumps | 9 | Ethernet switch |
| 4 | Float switch | 10 | Rinsing block |
| 5 | Canister for buffer solutions and cleaner | 11 | Rinsing block bracket |
| 6 | M2/M4 multihoses | 12 | Assembly (not included in delivery) |

3.1.1 Overview of rinsing block

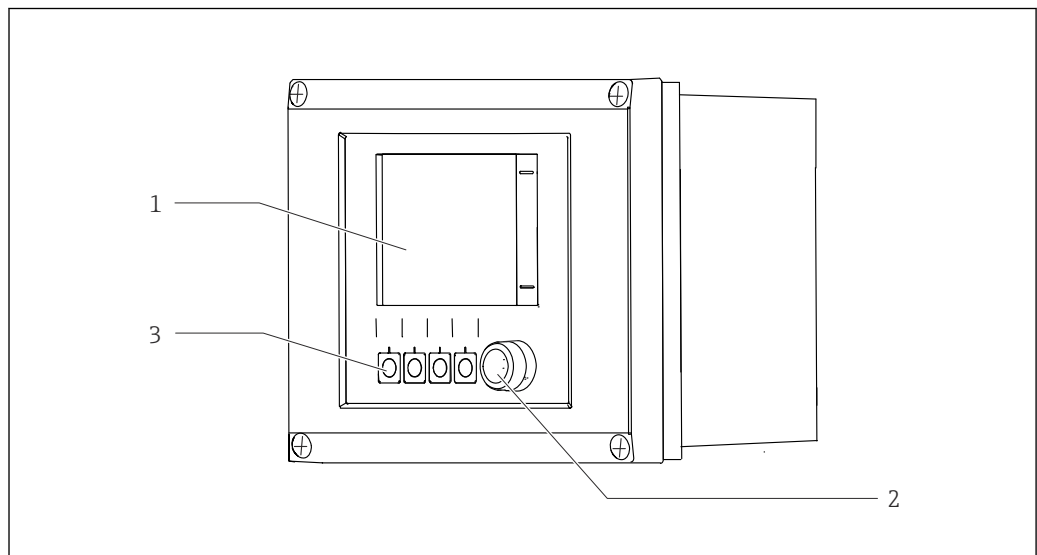


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2 Rinsing block

- | | | | |
|---|--|---|-----------------------------------|
| 1 | Water connection (hose connector D12 PP) | 5 | Multihose connection |
| 2 | Liquid, pump A | 6 | Liquid, pump B |
| 3 | Liquid, pump C | 7 | Air rinsing block (pilot valve 4) |
| 4 | Outlet rinse connection to assembly | | |

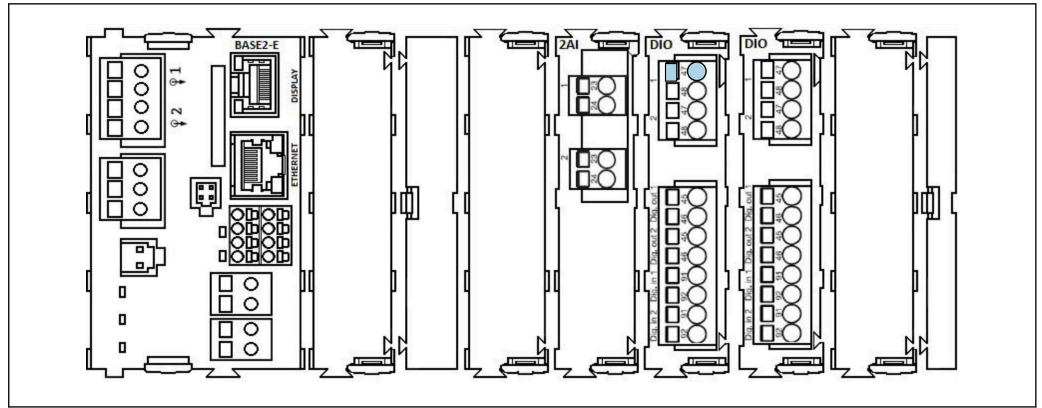
3.1.2 Overview of CDC90 control unit



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3 CDC90 control unit, outside

- | | |
|---|---|
| 1 | Touchscreen display |
| 2 | Status LED |
| 3 | Soft keys 1-4 (4 functions can be configured) |

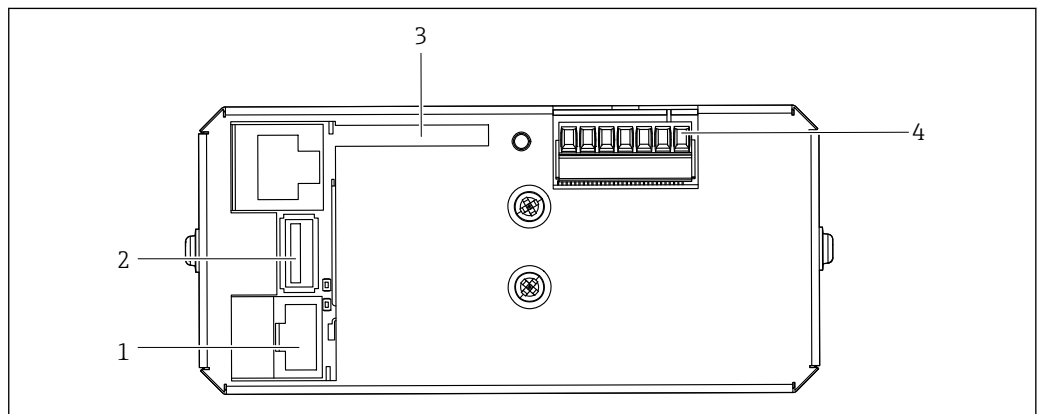


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4 CDC90 control unit, inside depending on order version

Modules from left to right depending on order version:

- Base module BASE2-E
- Empty
- 2AI module
- 2x DIO module
- 4AO module (optional, not shown)



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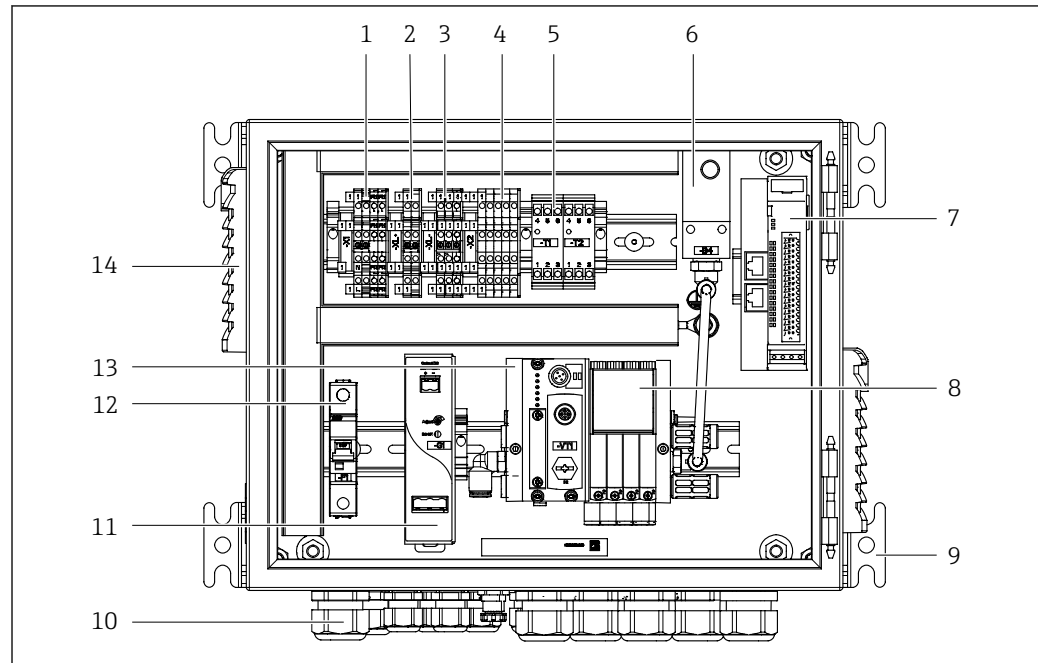
5 CDC90 control unit, IPC

- 1 Connection to Ethernet switch
- 2 USB port
- 3 SD card
- 4 Supply voltage

3.1.3 Overview of pneumatic control unit

1-channel

The pneumatic control unit controls air, liquids and electricity. The supply voltage is applied here, for example.

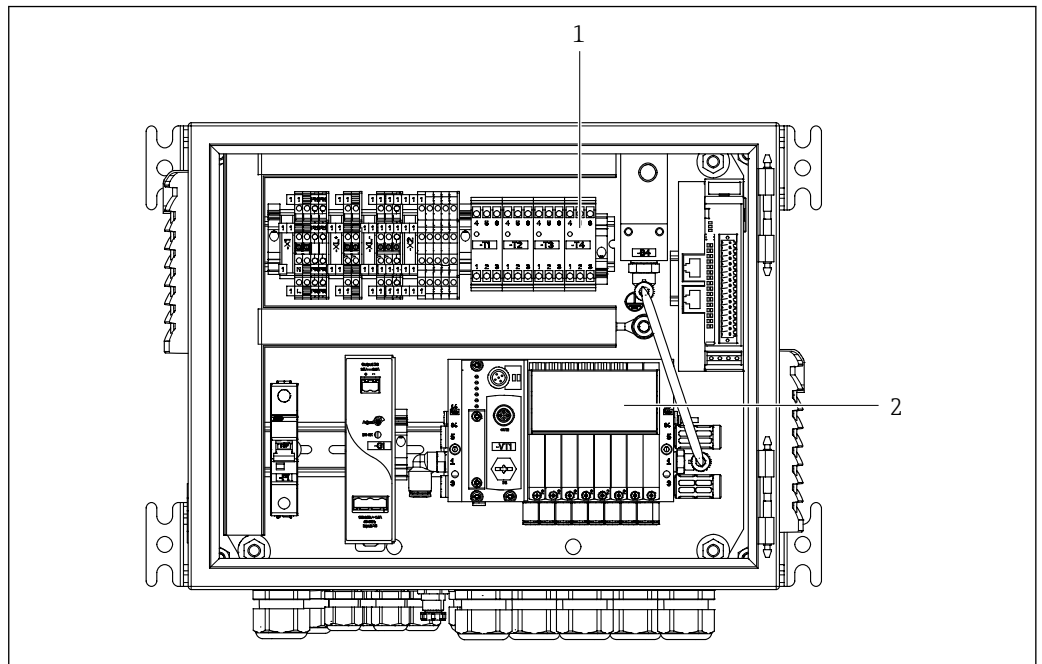


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6 Pneumatic control unit for a single channel

1	100 / 230 VAC terminal	8	Pilot valves
2	+24 V terminal	9	Mounting
3	0 V terminal	10	Cable gland
4	Terminals for float switches and pressure switches	11	24 VDC power unit
5	Output interface terminal for assemblies, limit position switch	12	F1 system fuse
6	Pressure switch	13	Pilot valve manifold, bus node
7	External remote IO, DIO	14	Ventilation slot

2-channel



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7 Pneumatic control unit for 2 channels


- 1 Extension of the output interface terminals for a 2nd measuring point
- 2 Extension of the pilot valves for a 2nd channel

4 Incoming acceptance and product identification

4.1 Incoming acceptance

On receipt of the delivery:

1. Check the packaging for damage.
 - ↳ Report all damage immediately to the manufacturer.
Do not install damaged components.
2. Check the scope of delivery using the delivery note.
3. Compare the data on the nameplate with the order specifications on the delivery note.
4. Check the technical documentation and all other necessary documents, e.g. certificates, to ensure they are complete.

 If one of the conditions is not satisfied, contact the manufacturer.

4.2 Product identification

4.2.1 Nameplate

The nameplate provides you with the following information on your device:

- Manufacturer identification
 - Order code
 - Serial number
 - Ambient and process conditions
 - Input and output values
 - Safety information and warnings
- ▶ Compare the information on the nameplate with the order.

4.2.2 Identifying the product

Product page

www.endress.com/cdc90

Interpreting the order code

The order code and serial number of your product can be found in the following locations:

- On the nameplate
- In the delivery papers

Obtaining information on the product

1. Go to www.endress.com.
2. Page search (magnifying glass symbol): Enter valid serial number.
3. Search (magnifying glass).
 - ↳ The product structure is displayed in a popup window.
4. Click the product overview.
 - ↳ A new window opens. Here you fill information pertaining to your device, including the product documentation.

4.2.3 Manufacturer address

Endress+Hauser Conducta GmbH+Co. KG
Dieselstraße 24
70839 Gerlingen
Germany

4.3 Scope of delivery

The scope of delivery comprises:

Basic version

- 1 Liquiline Control CDC90 unit in the version ordered
- 1 x Brief Operating Instructions (hard copy)
- USB stick for data transmission and backup, software update
- Gateway (optional, only for Ethernet/IP, PROFIBUS DP, Profinet version)
- Control cabinet key for pneumatic control unit
- Ethernet cable
- Spacer sleeves for wall mounting

Version with single channel

- 2 hose packs for compressed air and liquid
- 1 rinsing block with bracket for mounting
- 2x hose connectors G 1/4" to 6/8 mm hose (ID/OD) for rinse connectors of assembly

Version with 2 channels

- 4 hose packs for compressed air and liquid
 - 2 rinsing blocks with bracket for mounting
 - 4x hose connectors G 1/4" to 6/8 mm hose (ID/OD) for rinse connectors of assembly
- If you have any queries:
Please contact your supplier or local sales center.

5 Mounting

5.1 Mounting requirements

The device is designed for wall mounting or for mounting on a suitable structure, e.g. steel beam.

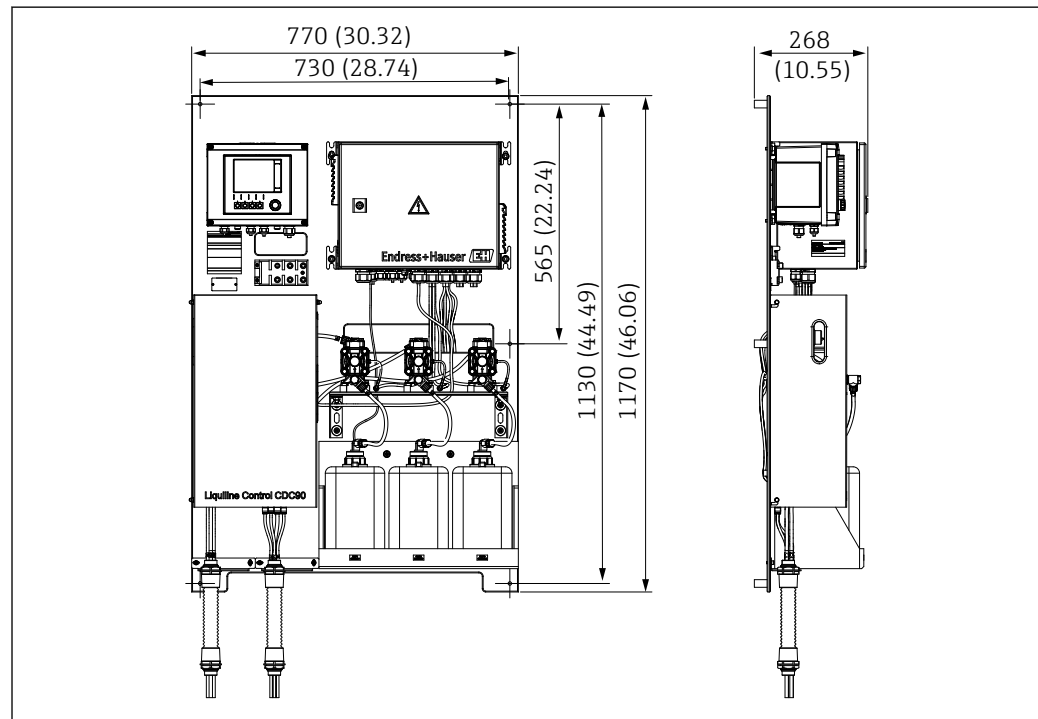
5.1.1 Installation site

Note the following when erecting the device:

1. Make sure that the wall or steel beam has sufficient load-bearing capacity and is fully perpendicular.
2. Protect the device against additional heating (e.g. from heaters).
3. Protect the device against mechanical vibrations.

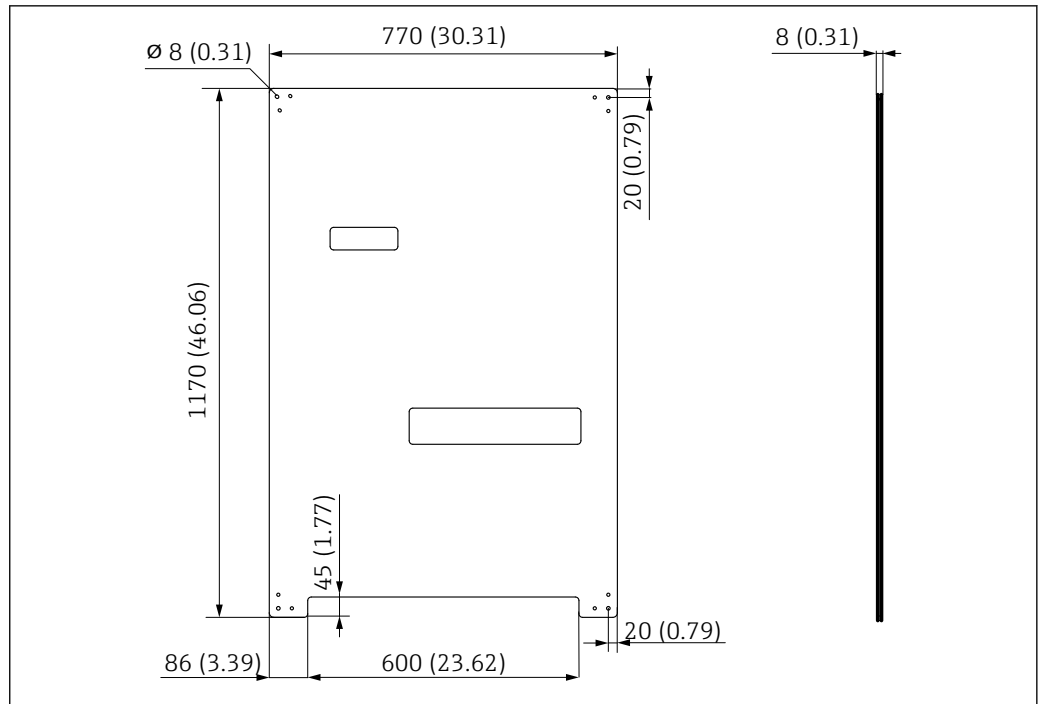
5.1.2 Dimensions

CDC90 panel



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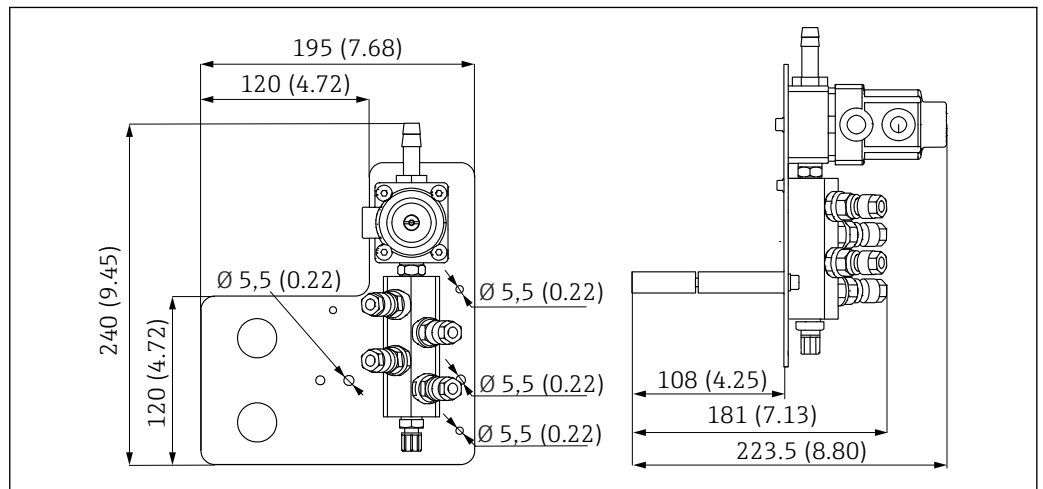
8 Panel dimensions. Unit of measurement mm (in)



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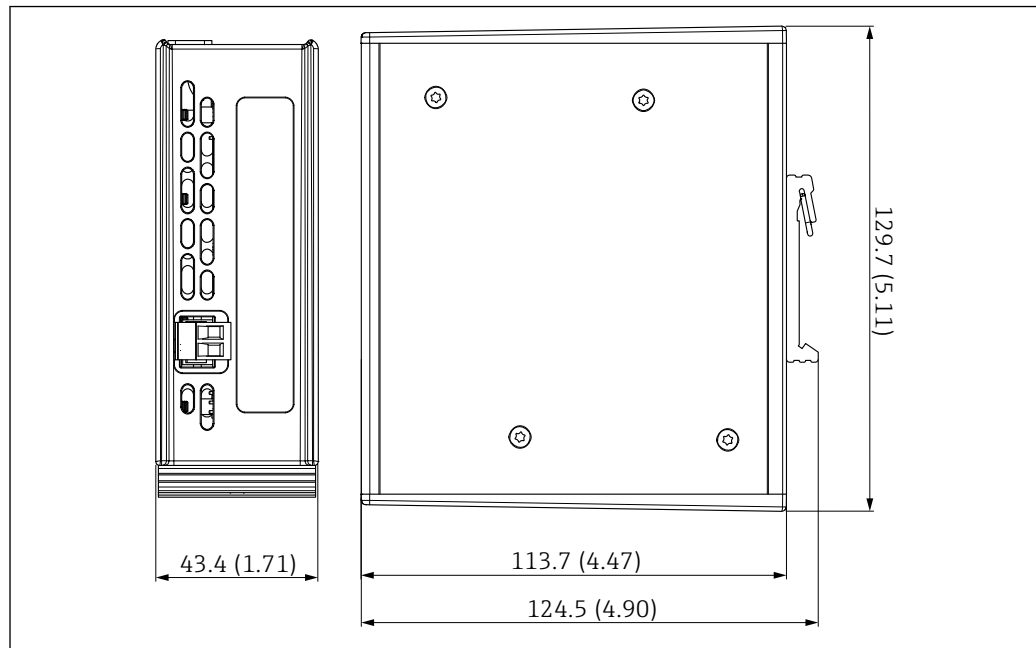
9 Dimensions of mounting plate. Unit of measurement mm (in)

Rinsing block



A0032267

10 Dimensions of PVDF rinsing block. Unit of measurement mm (in)

Gateway (optional)

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11 Gateway dimensions. Unit of measurement mm (in)

5.2 Mounting the system

5.2.1 Mounting the panel on the wall or steel beam

CAUTION

Risk of injury

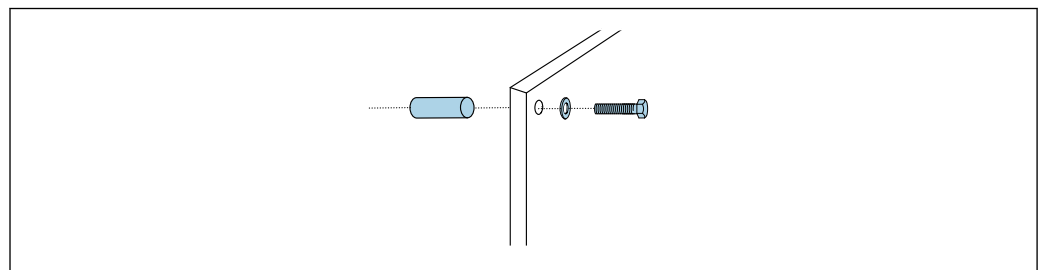
The weight of the unit may result in crush injuries or other injuries.

- ▶ Mount the device in pairs.
- ▶ Use a suitable mounting tool.



The assemblies are pre-assembled on a mounting plate and pre-wired.

Distance sleeves (30 mm (1.2 in) distance) are included in the scope of delivery to secure the mounting plate on the wall.



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12 Wall mounting

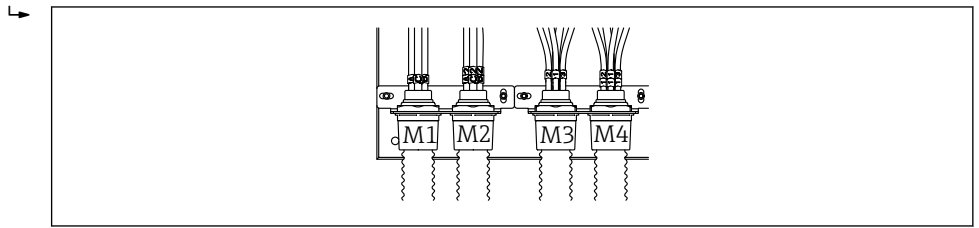
The mounting plate features drill holes for the bracket on the wall. The wall plugs and screws must be provided by the customer.

- ▶ Mount the mounting plate at the securing holes provided for this purpose and using the enclosed distance sleeves.

5.2.2 Connecting the multihoses to the panel

Depending on the order code, the multihoses are pre-mounted on the bracket on delivery. The bracket with multihoses still need to be screwed onto the mounting plate.

1. Using the screws provided, secure the bracket of the multihoses to the mounting plate to a torque of 3 Nm. Threaded holes are provided on the mounting plate.
2. Mount the bracket with multihoses M3 and M4 first for better positioning.



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Depending on the configuration (single-channel/two-channel), the individual hoses on the system are connected at the factory:

Multihose	Function	Hose name Single-channel/two-channel	Panel terminal name Single-channel/two-channel
M1/M3 (compressed air hose)	Compressed air control for assembly, measure position	1/11	1/11
	Compressed air control for assembly, service position	2/12	2/12
	Compressed air control for water valve on rinsing block	3/13	3/13
	Compressed air control for purge air on rinsing block (check valve)	4/14	4/14
M2/M4 (liquid hose)	Pump A/canister A (left)	A/A2	A/A2
	Pump B/canister B (middle)	B/B2	B/B2
	Pump C/canister C (right)	C/C2	C/C2

Maximum multihose length

i The maximum length of the multihose is 10 m (32.8 ft).

Shortening the multihoses

The hoses in the multihose must be altered depending on the distance.

NOTICE

The individual hoses cannot be assigned.

- ▶ Do not remove the hose markings.
1. Unscrew the coupling from the corrugated hose and pull the corrugated hose to the back.
 - ↳ The plug releases itself from the coupling of the corrugated hose when the coupling is pulled back.
 2. Shorten the corrugated hose to the desired length using a hose cutter.

3. Guide the coupling of the corrugated hose over the corrugated hose and screw into place.
4. Then push the plug back into the coupling of the corrugated hose and press it firmly into the coupling.
5. If the individual media/air hoses are to be adapted, they can now be shortened and connected.

5.2.3 Securing the rinsing block to the assembly or pipe

⚠ CAUTION

Risk of injury

Crush injuries or other injuries may occur.

- ▶ Use a suitable mounting tool, e.g. an Allen key.

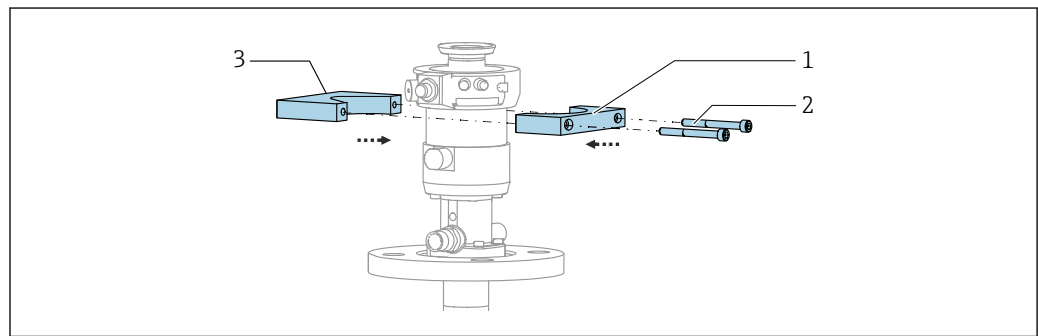
NOTICE

The rinsing block runs dry.

If the rinsing block is mounted below the canisters, the valves of the rinsing block open due to the pressure of the liquid and the canisters drain uncontrolled.

- ▶ Always mount the rinsing block and the assembly above the canisters.
- ▶ Keep the distance between the rinsing block and retractable assembly and the length of the connecting hose from the rinsing block to the assembly as short as possible to minimize media consumption.

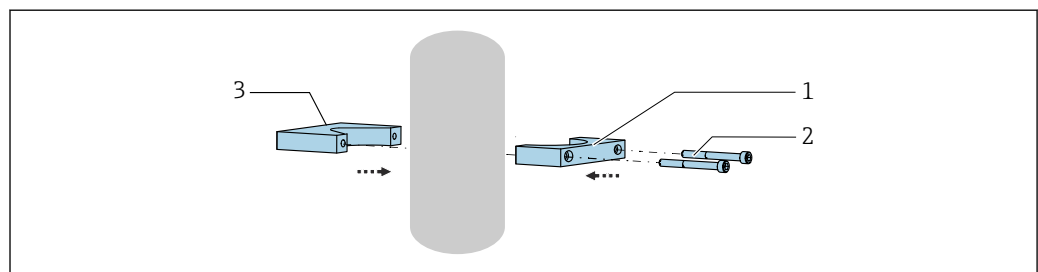
Rinsing block bracket on assembly



A003269

13 Mounting the rinsing block bracket

1. Fit one half of the rinsing block bracket (1) on the assembly cylinder.
2. Fit the counterpart (3) on the assembly cylinder from the other side.
3. Connect the rinsing block bracket using the screws (2) provided.

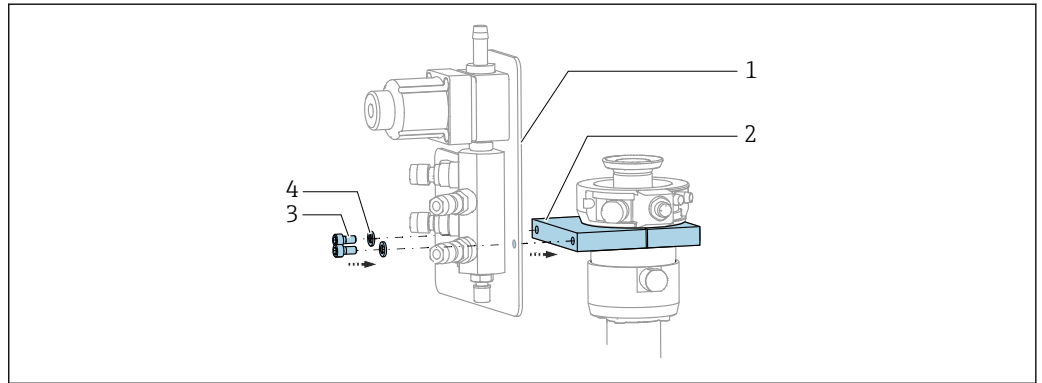


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Alternatively, the rinsing block can also be mounted on a pipe. The outer diameter of the pipe must be at least 60.3 mm (2.38 in) and max. 80 mm (3.15 in).

1. Fit one half of the rinsing block bracket (1) on the pipe.
2. Fit the counterpart (3) on the pipe from the other side.
3. Connect the rinsing block bracket using the screws (2) provided.

Rinsing block on rinsing block bracket

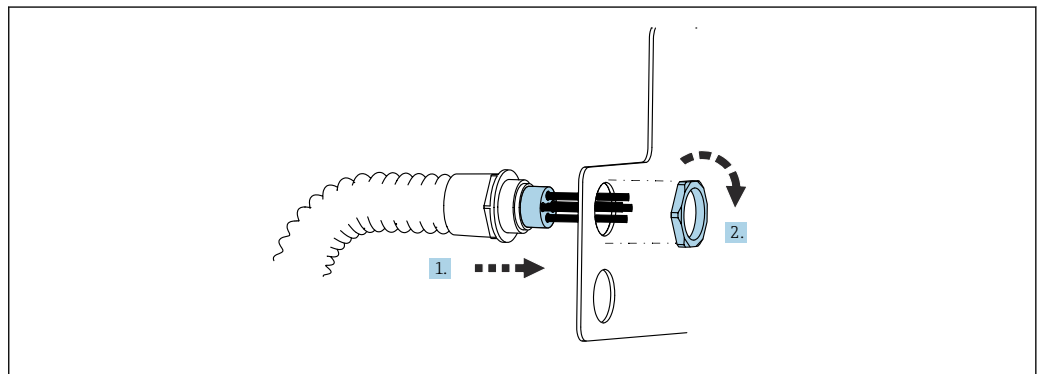


- ▶ Secure the rinsing block panel (1) to the rinsing block bracket (2) using the screws (3) and washers (4) provided.

5.2.4 Connecting compressed air and media to the rinsing block

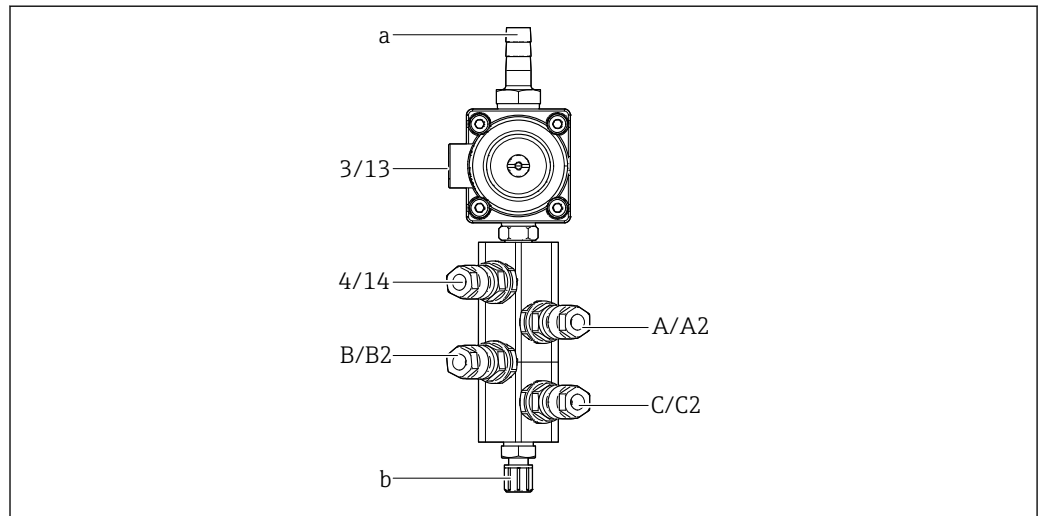
Depending on the configuration, a distinction is made between one and two-channel devices and is indicated with a "/".

Securing the M1/M3 multihose to the rinsing block bracket



1. Guide the hoses through the opening on the rinsing block plate.
2. Use the counterpart to secure the cable gland.

Assigning individual hoses from the M1/M3 multihose to the rinsing block



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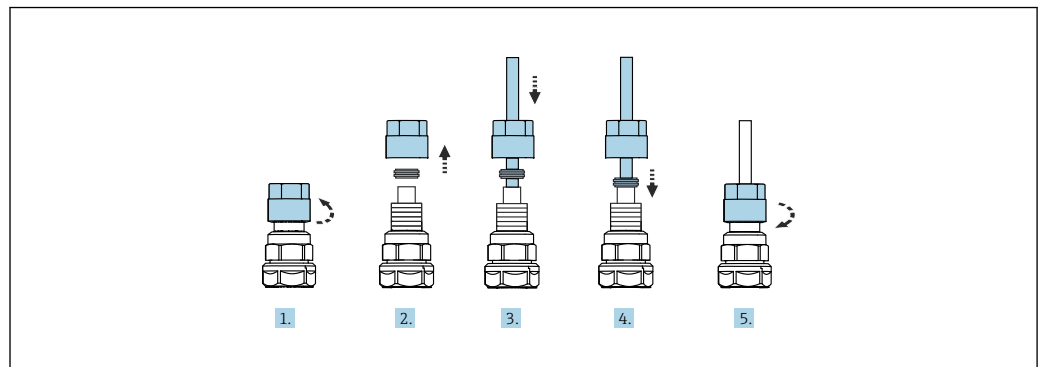
14 Rinsing block, labeling depending on system configuration

- a Water connection
- b Rinse connection outlet to assembly

► Connect the individual hoses on the system as follows:

Multihose	Function	Hose name Single-channel/two-channel	Rinsing block position Single-channel/two-channel
M1/M3 (compressed air hose)	Compressed air control for water valve on rinsing block	3/13	3/13
	Purge air on rinsing block	4/14	4/14
M2/M4 (liquid hose)	Pump A/canister A (left)	A/A2	A/A2
	Pump B/canister B (middle)	B/B2	B/B2
	Pump C/canister C (right)	C/C2	C/C2

Connecting the individual hoses



A0032739

1. Unscrew the union nut of the valve.
2. Remove the union nut and the clamping ring located underneath it.
3. Guide the hose through the union nut and the clamping ring into the valve.

4. Using the clamping ring, secure the hose to the valve by pressing lightly on it.
5. Screw the union nut back onto the valve.
 - ↳ The hose is now firmly positioned in the valve.

5.2.5 Connecting rinse water to the rinsing block

CAUTION

Excessive water temperatures will damage the rinsing hoses.

Risk of injury due to water vapor discharge.

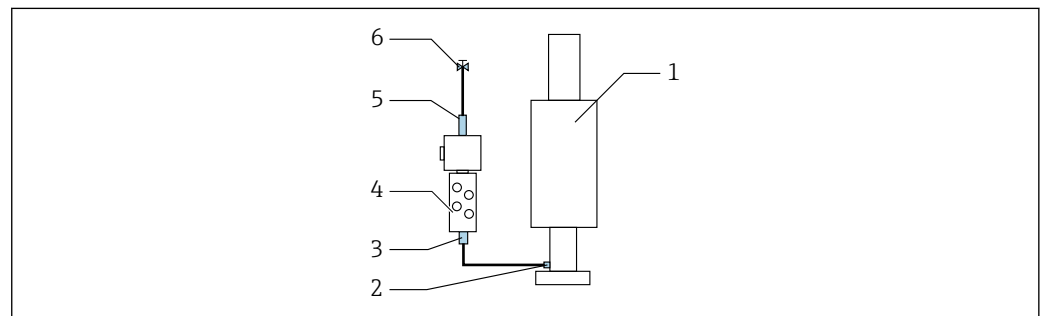
- ▶ Ensure that the water temperature does not exceed 60 °C (140 °F).

When connecting the water, pay attention to the following:

- The rinse water pipe is to be provided by the customer.
- The water pressure must be 3 to 6 bar (44 to 87 psi).
- The internal diameter of the rinse water hose must be 12 mm (0.47 in); interface to rinsing block: hose connector = d12 mm (0.47 in).
- If using an assembly with sealing water function, the sealing water pressure must be greater than the process pressure. The sealing water function is described in the Operating Instructions of the relevant assembly.

- i** Pay attention to the quality of the rinse water. Particles larger than 100 µm must be filtered using a water filter.

Two G1/4" adapters to a 6/8 mm hose are enclosed to adapt the rinse connections of the assembly. The assembly must have G 1/4" rinse connections.



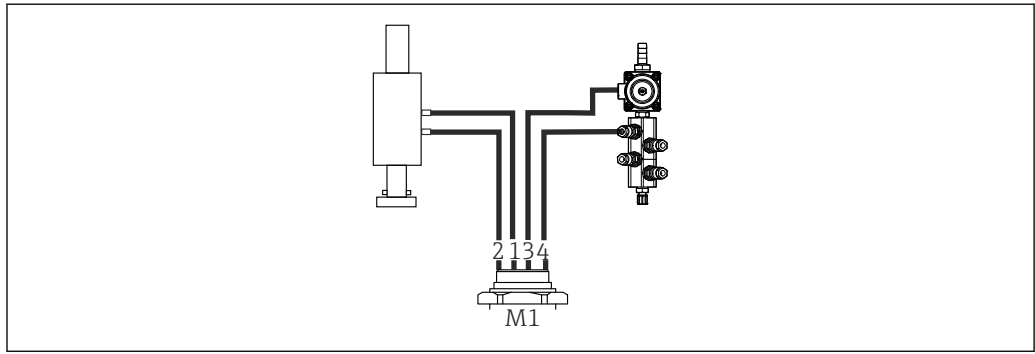
15 Rinsing block with one assembly

1. Rinse the pipe thoroughly.
2. Connect the rinse water (6) to the water connection (5) of the rinsing block (4). The hose must be secured on site using state-of-the-art methods, e.g. by using a hose clamp.
3. Connect the rinse chamber connection (3) on the rinsing block to the rinse connection (2) of the assembly (1).

5.2.6 Connecting compressed air to the assembly

Depending on the configuration, a distinction is made between a single-channel and two-channel device and is indicated with a "/".

Connecting the individual hoses from the M2/M4 multihose to the assembly



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16 M1 connections on assembly and rinsing block, example with single-channel device

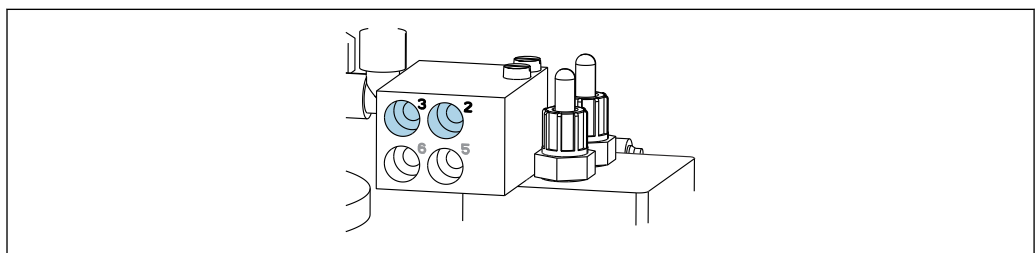
1. Connect hose 1/11 to the connection for moving the assembly in the measure position.
2. Connect hose 2/12 to the connection for moving the assembly in the service position.
3. Connect hose 3/13 to the compressed air control unit for the water valve of the rinsing block.
4. Connect the hose 4/14 to the connection for the purge air on the rinsing block.

Connecting the assembly for CPA87x and CPA472D assemblies

► Connect the hoses as follows:

Hose number:	Connection on assembly:
CPA87x	
Hose 1/11	I, measure position
Hose 2/12	O, service position
CPA472D	
Hose 1/11	Upper connection
Hose 2/12	Lower connection

Connecting assembly CPA473/474



A0033220


► Connect the hoses as follows:

Hose number:	Connection on assembly:
Hose 1/11	2 on block, measuring
Hose 2/12	3 on block, service


5.2.7 Connecting compressed air supply

Compressed air supply

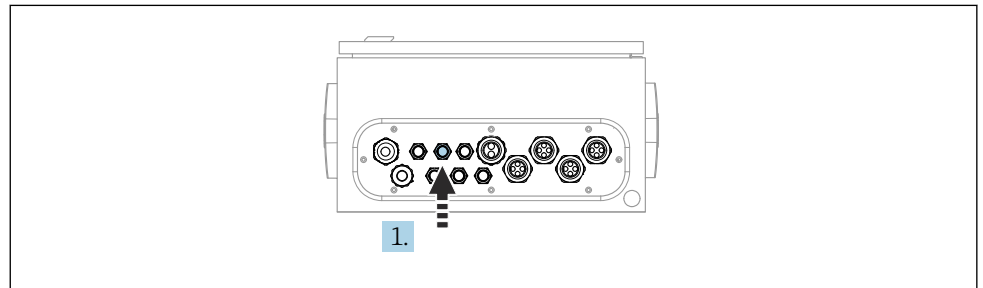
When connecting, pay attention to the following:

- Hose specifications according to the technical data →  98
- The compressed air line is to be provided by the customer.
- The compressed air is 4 to 6 bar (58 to 87 psi).
- The optimum operating air pressure is 6 bar (87 psi).
- The air must be filtered (maximum pore size 50 µm) and free from oil and condensate.
- The internal diameter must not exceed 6 mm (0.24 in).
- The outer diameter must not exceed 8 mm (0.31 in).

Connection in the pneumatic control unit

 The hose system for the internal compressed air supply in the pneumatic control unit is already connected at the factory.

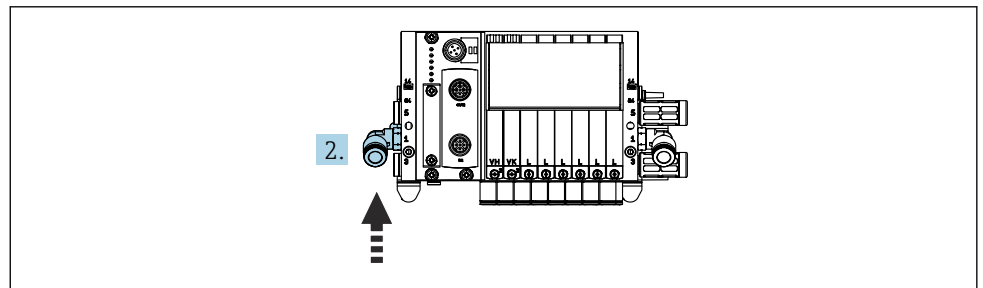
1.



A0033429

Guide the hose for the external compressed air supply into the cable gland provided on the pneumatic control unit.

2.



A0033430

Connect the hose for the compressed air supply to the supply for the pilot valve manifold.

5.3 Mounting the gateway (optional)

The optional gateway is supplied when the following digital communication types are ordered:

- Ethernet/IP
- PROFIBUS DP
- Profinet

The gateway has to be installed on site by customer.

- ▶ Mount the gateway on a TS 35/7.5 mounting rail. See the manufacturer's documentation.

5.4 Post-mounting check

1. Following the installation, check all devices for damage.

2. Verify that the specified installation clearances have been observed.
3. Ensure that the temperature limits are observed at the mounting location.
4. Verify that all hoses are securely mounted and leak-tight.
5. Verify that all multihoses are positioned in such a way that they are protected.

6 Electrical connection

6.1 Connecting requirements

⚠ WARNING

Device is live!

Incorrect connection may result in injury or death!

- ▶ The electrical connection may be performed only by an electrical technician.
- ▶ The electrical technician must have read and understood these Operating Instructions and must follow the instructions contained therein.
- ▶ **Prior** to commencing connection work, ensure that no voltage is present on any cable.

NOTICE

The device does not have a power switch

- ▶ A fuse with a maximum rating of 16 A must be provided by the customer. Observe the local regulations for installation.
- ▶ The circuit breaker must be a switch or power switch, and must be labeled as the circuit breaker for the device.
- ▶ The protective ground connection must be established before all other connections. Danger may arise if the protective ground is disconnected.
- ▶ The circuit breaker must be located near the device.

1. Ensure a sufficient connection to the building's protective conductor system of at least 0.75 mm² (0.029 in²).
2. Ensure the mechanical loading capacity of the feed cables complies with the conditions at the place of installation.

Only the mechanical and electrical connections which are described in these instructions, and which are necessary for the required intended use, may be established on the device delivered.

- ▶ Exercise care when carrying out the work.

Supply voltage:

100 to 230 V AC

Fluctuations in the line voltage may not exceed $\pm 10\%$.

6.2 Setting up the CDC90 control unit

6.2.1 Overview of CDC90 control unit

Modules:

- Slot 1: base module BASE2-E (contains 2 sensor inputs, 2 current outputs)
- Slot 2 and 3: empty
- Slot 4: 2AI module (2 current inputs)
- Slot 5 and 6: 2x DIO module
- Slot 7: optional: module 4AO (4 current outputs)

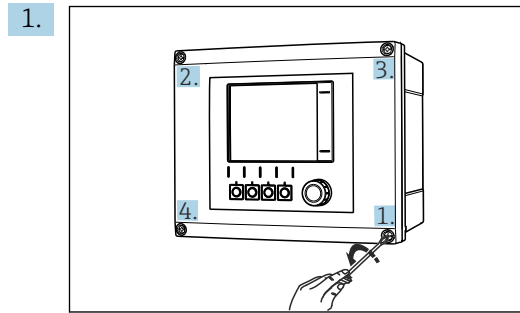
6.2.2 Opening the CDC90 control unit

NOTICE

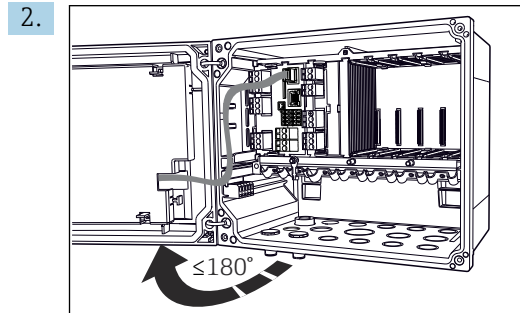
Pointed or sharp tools

The use of unsuitable tools can cause scratches on the housing or damage to the seal, and therefore negatively affect the leak-tightness of the housing!

- ▶ Do not use any sharp or pointed objects, e.g. a knife, to open the housing.
- ▶ Only use a PH2 Phillips screwdriver.



Loosen the housing screws crosswise with a PH2 Phillips head screwdriver.



Open the display cover, max. opening angle 180° (depends on installation position).

3. To close the housing: tighten the screws in a similar step-by-step, crosswise sequence.

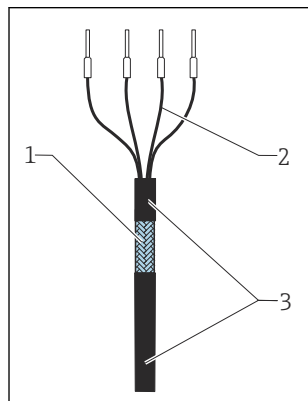
6.2.3 Connecting the cable shield

The device cables must be shielded cables.

Only use terminated original cables where possible.

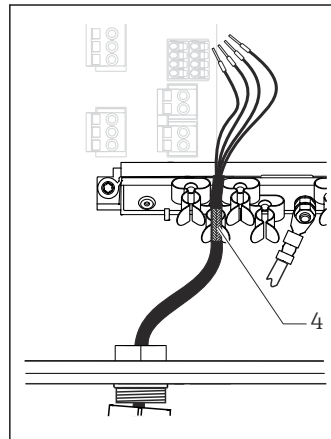
Clamping range of cable clamps: 4 to 11 mm (0.16 to 0.43 in)

Sample cable (does not necessarily correspond to the original cable supplied)



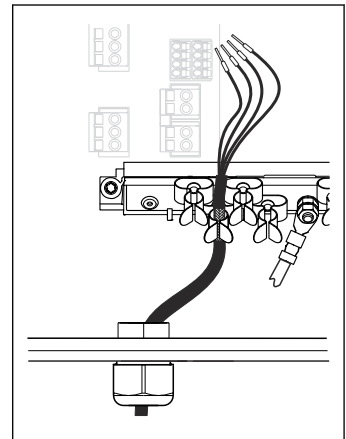
17 Terminated cable

- 1 Outer shield (exposed)
- 2 Cable cores with ferrules
- 3 Cable sheath (insulation)



18 Connect the cable to the grounding clamp

- 4 Grounding clamp



19 Press the cable into the grounding clamp

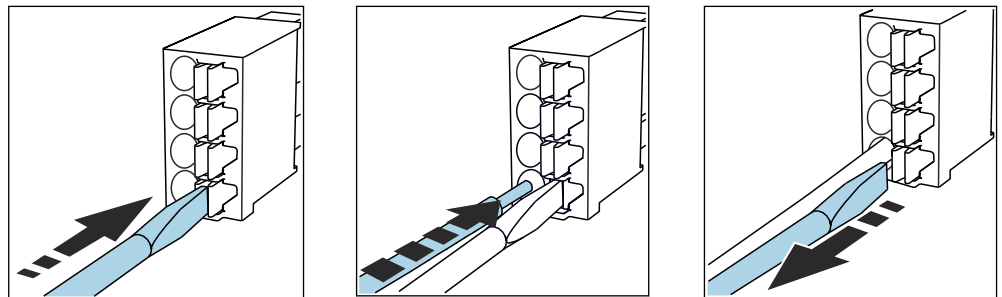
The cable shield is grounded by the grounding clip

1. Loosen a suitable cable gland at the bottom of the housing.
2. Remove the dummy plug.
3. Attach the gland to the cable end, making sure the gland is facing the right direction.

4. Pull the cable through the gland and into the housing.
5. Route the cable in the housing in such a way that the **exposed** cable shield fits into one of the cable clamps and the cable cores can be easily routed as far as the connection plug on the electronics module.
6. Connect the cable to the cable clamp.
7. Clamp the cable.
8. Connect cable cores as per the wiring diagram.
9. Tighten the cable gland from outside.

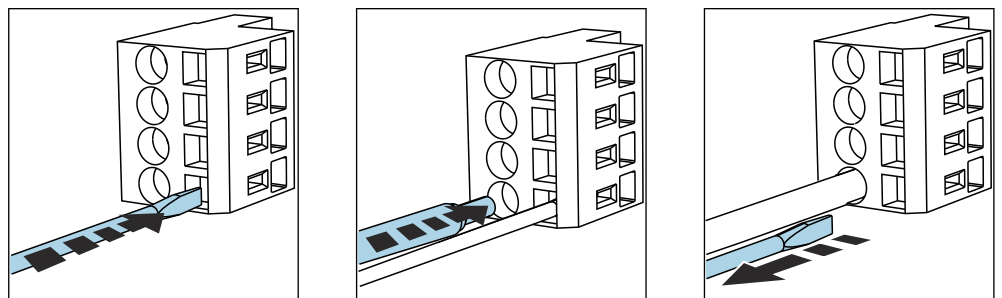
6.2.4 Cable terminals

Plug-in terminals for Memosens connections



- ▶ Press the screwdriver against the clip (opens the terminal).
 - ▶ Insert the cable until the limit stop.
 - ▶ Remove the screwdriver (closes the terminal).
- ▶ After connection, make sure that every cable end is securely in place. Terminated cable ends, in particular, tend to come loose easily if they have not been correctly inserted as far as the limit stop.

All other plug-in terminals



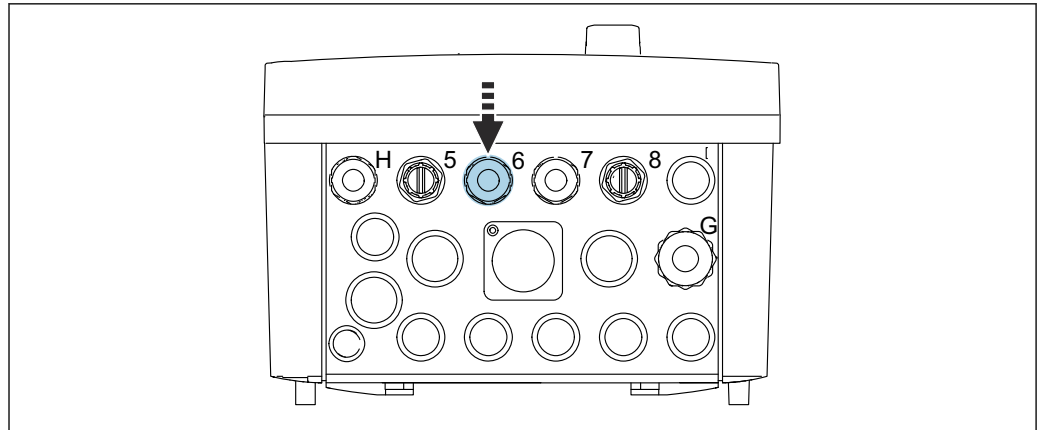
- ▶ Press the screwdriver against the clip (opens the terminal).
- ▶ Insert the cable until the limit stop.
- ▶ Remove the screwdriver (closes the terminal).

6.3 Connecting the sensors

6.3.1 Sensor types

Sensors with Memosens protocol

Sensor types	Sensor cable	Sensors
Digital sensors without additional internal power supply	With plug-in connection and inductive signal transmission	<ul style="list-style-type: none"> ▪ pH sensors ▪ ORP sensors ▪ Combined pH/ORP sensors



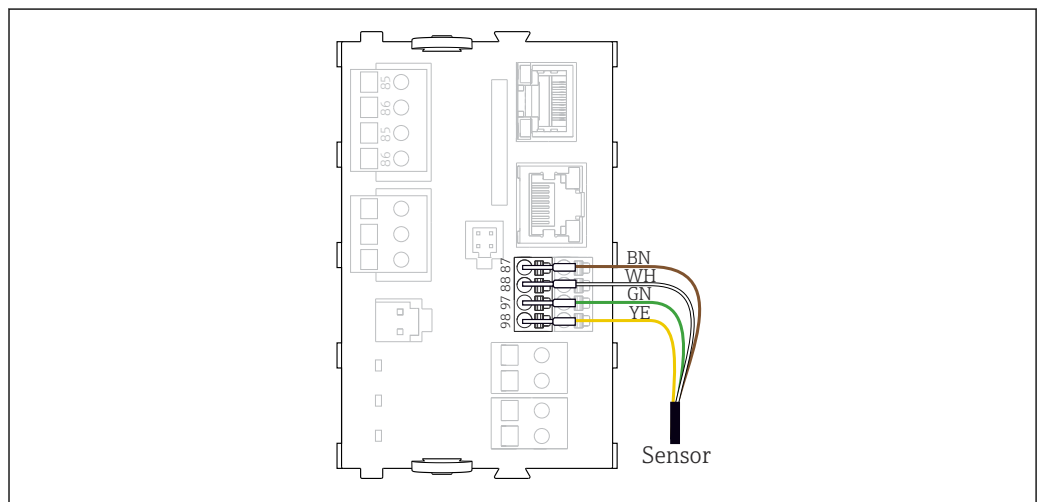
A0033455

- ▶ Guide the sensor cable of the 1st measuring point through cable gland "6" provided.

i Cable gland "7" is provided for the sensor of the 2nd measuring point.

Connecting the sensor cable

- ▶ Sensor cable connected directly
Connect the sensor cable to the terminal connector of the BASE2-E module.



A0039629

20 Direct connection of sensors without additional supply voltage

6.4 Connecting the communication

The following communication options are available in the CDC90 control unit:

- Analog current inputs and outputs
 - Activation is via the analog current input (AI).
 - Signal feedback is via the analog current output (AO).
 - The settings can be made via the web server of the transmitter (default IP address 192.168.0.4) or local display.
- Modbus TCP (server). For the connection between Modbus TCP and the device. The following protocols from the process control system are enabled with a preconfigured gateway.
 - PROFIBUS DP (slave)
 - Ethernet/IP
 - PROFINET (device)
- Digital communication

6.5 Connecting analog communication

⚠ WARNING

Module not covered

No shock protection. Danger of electric shock!

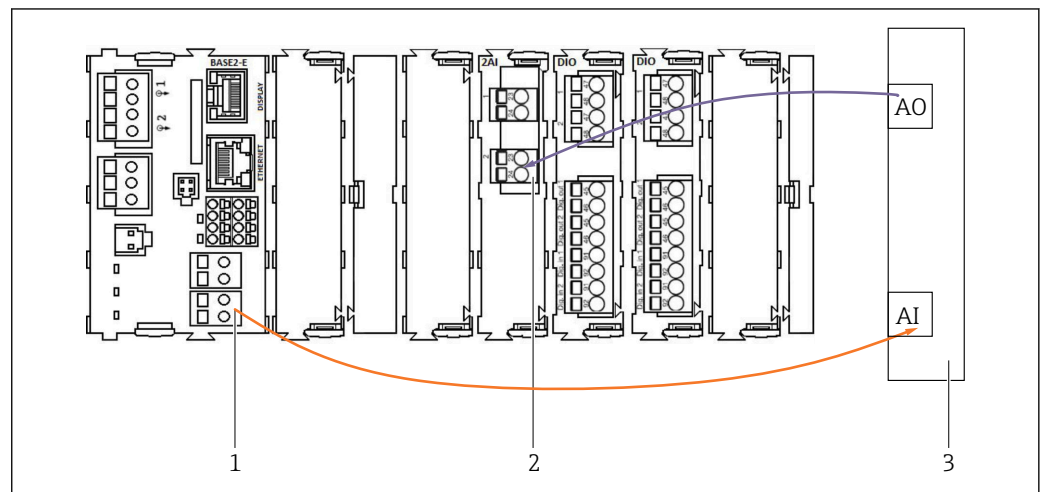
- ▶ Only the 4AO module can be retrofitted at slot 7. Other hardware must not be modified.

1. If additional shields are required, connect them with PE centrally in the control cabinet via terminal blocks supplied by the customer.
2. Follow the connection of the terminals here: → 📄 27

Connection of analog communication

For analog communication, attach the signal line to the following connections:

- The analog output 1:2 on the BASE2-E module is used for communication with the CDC90.
- The analog input 4:2 (2AI module) is used for communication with the CDC90.



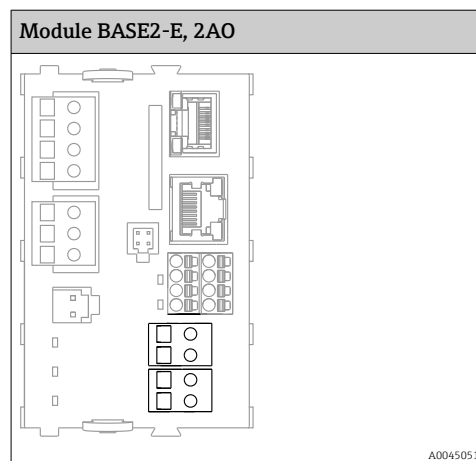
A0044848

- 1 Analog output in BASE2-E
- 2 Analog input 2AI
- 3 Process control system, PCS

Status signals

Transmission of the status signals from the measuring point to the control system:

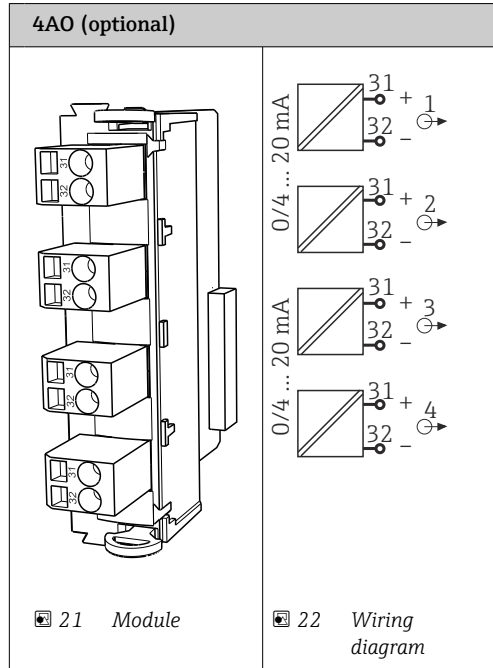
- 2. Output to transmit the status signals from the measuring point to the control system
- Optional: additional 4AO module for measured values.



A0045051

Measured value transmission

Measured values are transmitted from the measuring point to the control system via the optional analog current output module. The analog outputs are configured via the CDC90 control unit. To do this, either access the internal control module via the web server (BA01225C) or using an optionally available external display.



6.6 Connecting fieldbus communication

Modbus TCP connection to Ethernet switch

A gateway is not required for Modbus communication.

1. To connect to the CDC90, connect the Ethernet cable to the Ethernet switch at port 5.
2. Connect the end piece to the process control system.

Assignment of Ethernet cable

RJ45	Stand. cable		Ind. cable	M12
1	Orange	TxD-	Orange	3
2	Amber/White	TxD+	Yellow	1
3	Green	RxD-	Blue	4
4	Green/White	RxD+	White	2

Assignment of M12 connection

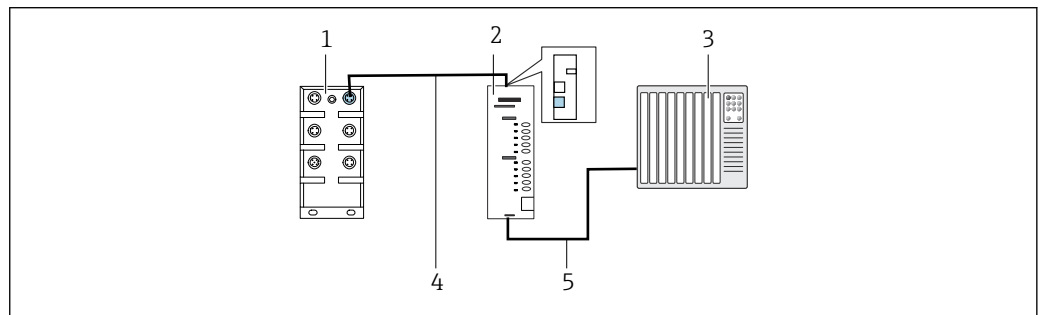
M12		M12
1	Yellow	1
2	White	2
3	Orange	3
4	Blue	4

RJ45 assignment to M12 connection

RJ45		M12
1	Yellow	1
3	White	2
2	Orange	3
6	Blue	4

Connection of PROFINET and PROFIBUS DP via gateway

The gateway must be installed externally. A 3 m (3.28 ft) Ethernet cable is provided. The cable to the process control system must be provided by the customer.



A0044818

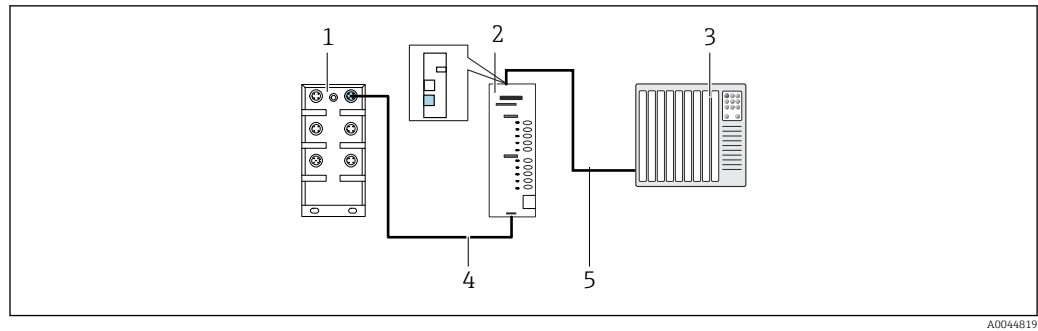
23 *PROFINET and PROFIBUS DP communication connection*

- 1 Ethernet switch on the CDC90
- 2 Gateway
- 3 Process control system (PCS)
- 4 Ethernet cable, CDC90/gateway communication
- 5 Communication connection, gateway/process control system (PCS)

1. For connection to the CDC90, connect the Ethernet cable (4) at the top of the gateway.
2. Connect the end piece to the Ethernet switch (1) at port 5.
3. To connect to the process control system, connect the communication cable (5) to the bottom of the gateway.
4. Connect the end piece to the process control system (3).

Connection of Ethernet/IP via gateway

The gateway must be installed externally. A 3 m (3.28 ft) Ethernet cable is provided. The cable to the process control system must be provided by the customer.



A0044819

24 Ethernet/IP communication connection

- 1 Ethernet switch on the CDC90
- 2 Gateway
- 3 Process control system (PCS)
- 4 Ethernet cable, CDC90/gateway communication
- 5 Communication connection, gateway/process control system (PCS)

1. For connection to the CDC90, connect the Ethernet cable (4) at the bottom of the gateway.
2. Connect the end piece to the Ethernet switch (1) at port 5.
3. For connection to the process control system, connect the cable for communication (5) at the top of the gateway.
4. Connect the end piece to the process control system (3).

More detailed information on fieldbus communication is provided on the product pages on the Internet:

- Ethernet/IP (adapter) via Modbus TCP - Ethernet/IP gateway: [BA02241C](#)
- Modbus TCP (server): [BA02238C](#)
- PROFIBUS DP (slave) via Modbus TCP - PROFIBUS DP gateway: [BA02239C](#)
- PROFINET (device) via Modbus TCP - PROFINET gateway: [BA02240C](#)

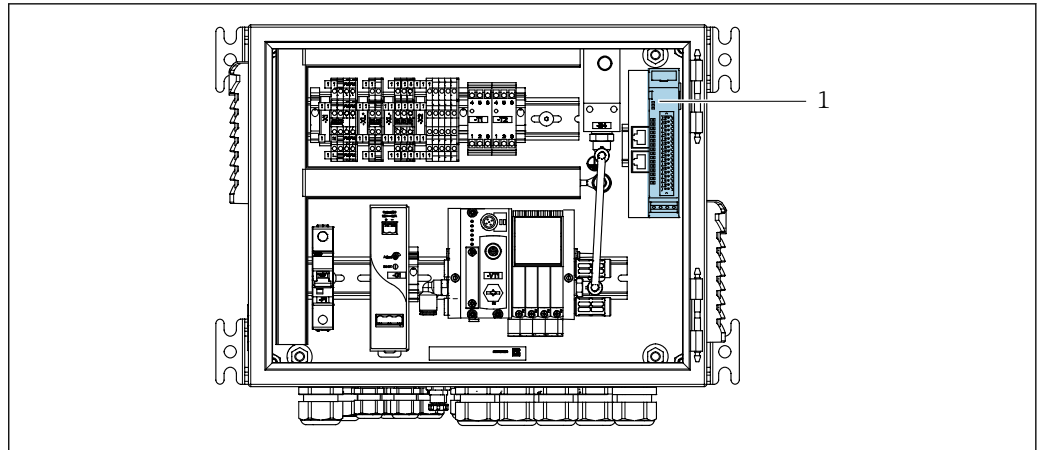
6.7 Connecting digital communication

6.7.1 Connecting additional inputs and outputs

The wiring of external inputs and outputs, such as a flowmeter for example, is carried out on the remote IO/DIO (1) in the pneumatic control unit.

i These external inputs and outputs can be evaluated during program configuration and activated or deactivated.

The configuration must be carried out by Endress+Hauser specialist staff.

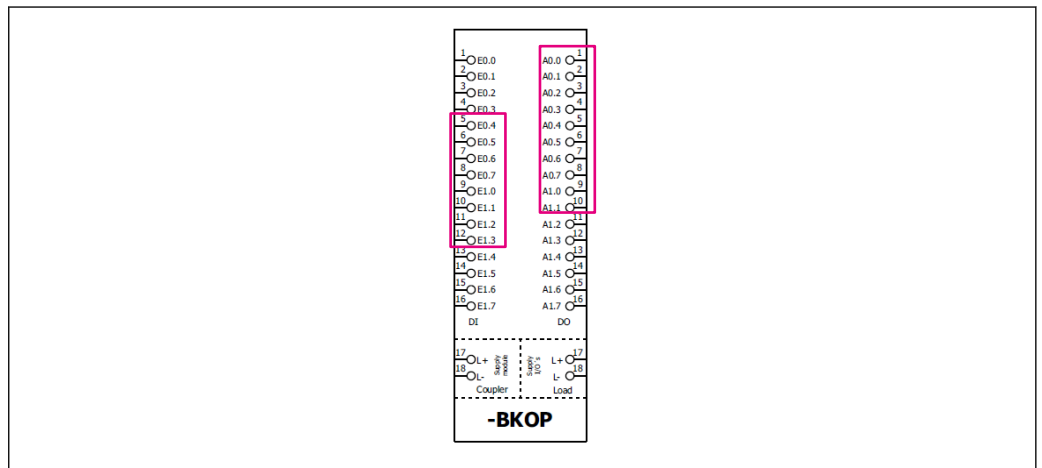


A0055123

25 Remote IO/DIO in the pneumatic control unit

1 Remote IO/DIO

1. Guide the cables through the cable gland at the bottom of the pneumatic control unit.
2. Wire the cables to the desired terminal on the remote IO/DIO (1). The terminals on the remote IO/DIO are preconfigured as follows:



A0055909

26 Free terminals of the remote IO/DIO

Terminal assignment:

DI	Function	Program
5-12	Can be used freely	
13	Soft key 1	801
14	Soft key 2	802
15	Soft key 3	803
16	Soft key 4	804

DO	Function	Assignment
1-10	Can be used freely	
11	Operating mode	Setting, if DO11 = 0 and DO12 = 0
12		Manual, if DO11 = 0 and DO12 = 1 Automatic, if DO11 = 1 and DO12 = 0 Remote access, if DO11 = 1 and DO12 = 1

DO	Function	Assignment
13	Assembly 1	Service = 0 Measure = 1
14	Assembly 2	Service = 0 Measure = 1
15	Program status	No program = 1 Program running = 0
16	Error status	Alarm = 0 No alarm = 1

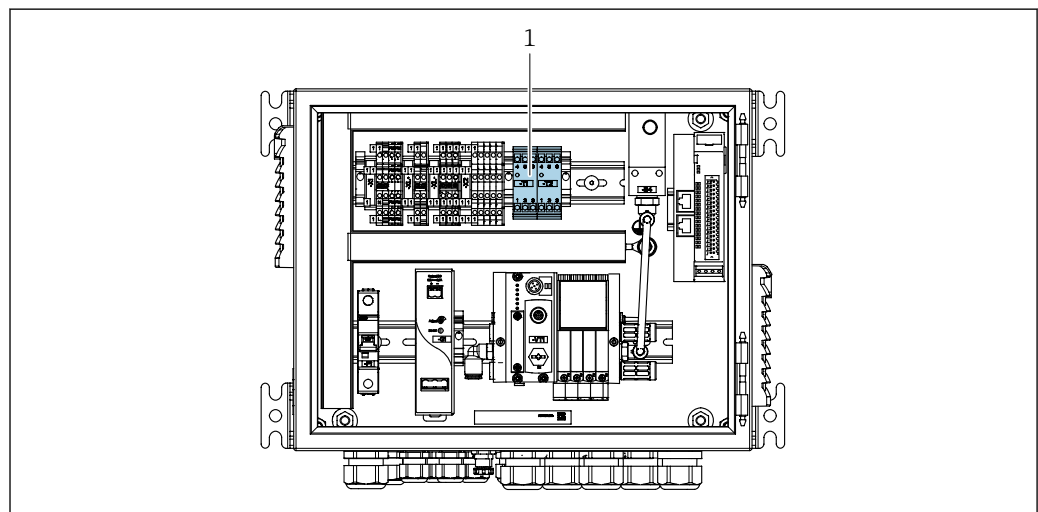
6.8 Connecting the position indicators of the assemblies

CDC90 is designed for the following assemblies:

- Cleanfit CPA4xx
- Cleanfit CPA871/CPA875

Monitoring of assembly position

The wiring for confirmation of assembly position is carried out in the pneumatic control unit at the output interface terminal (1).



A0055126

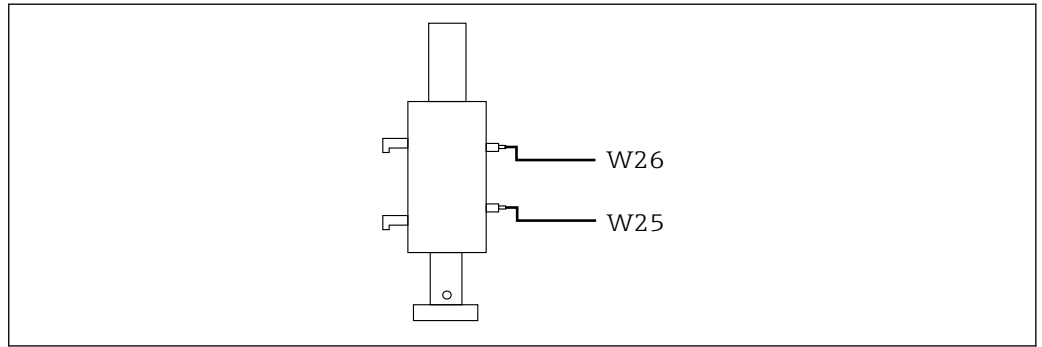
▣ 27 Output interface terminal in the pneumatic control unit

1 Output interface terminal

6.8.1 Cleanfit CPA472D

Assemblies with pneumatic limit position switches must be converted to electrical limit position switches.

Monitoring of assembly position



A0032747

28 Assembly position feedback CPA472D

1. Guide the cables for confirmation of position through the cable gland at the bottom of the pneumatic control unit.
2. Wire the cables to the output interface terminal. The terminals at the output interface terminal are preassigned as follows:

The connections on the output interface terminal in the pneumatic control unit for single-channel device

Output interface terminal T1, bottom	Cable wire	Function
Pin 1	W26, BN	Upper limit position switch
Pin 2	W26, BU	Upper limit position switch

Output interface terminal T2, bottom	Cable wire	Function
Pin 1	W25, BN	Lower limit position switch
Pin 2	W25, BU	Lower limit position switch

The connections on the output interface terminal in the pneumatic control unit for 2-channel device

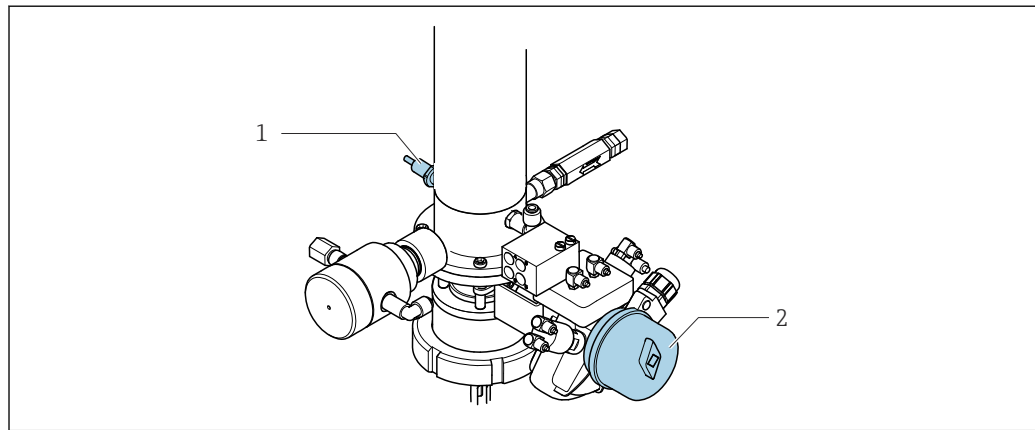
Output interface terminal T3, bottom	Cable wire	Function
Pin 1	W27, BN	Upper limit position switch
Pin 2	W27, BU	Upper limit position switch

Output interface terminal T4, bottom	Cable wire	Function
Pin 1	W28, BN	Lower limit position switch
Pin 2	W28, BU	Lower limit position switch

6.8.2 Cleanfit CPA473/474

Assemblies with pneumatic limit position switches must be converted to electrical limit position switches.

Monitoring of assembly position



A0033325

29 Compressed air control CPA473/474

- Attach the connections for confirmation of position in the pneumatic control unit as follows:

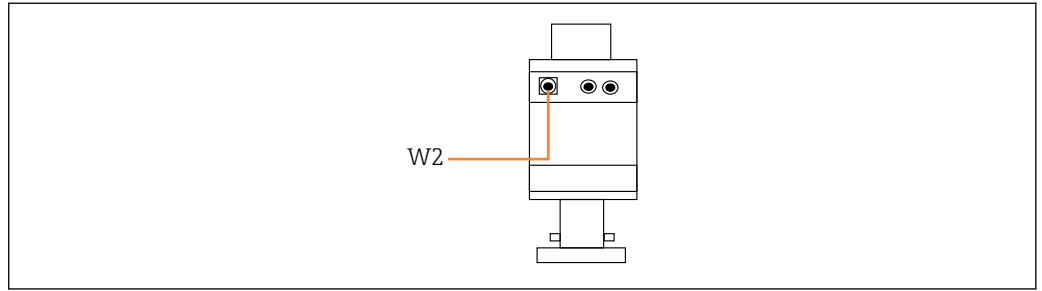
Connections on the output interface terminal in the pneumatic control unit

Output interface terminal T1, bottom	Limit position switches	Function
Pin 1	Pos 2, BN limit position switch on ball valve	Limit position switch, service feedback signal
Pin 2	Pos 2, BU limit position switch on ball valve	Limit position switch, service feedback signal

Output interface terminal T2, bottom	Cable wire	Function
Pin 1	Pos 1, BN limit position switch on assembly	Limit position switch, measuring feedback signal
Pin 2	Pos 1, BU limit position switch on assembly	Limit position switch, measuring feedback signal

6.8.3 Cleanfit CPA87x

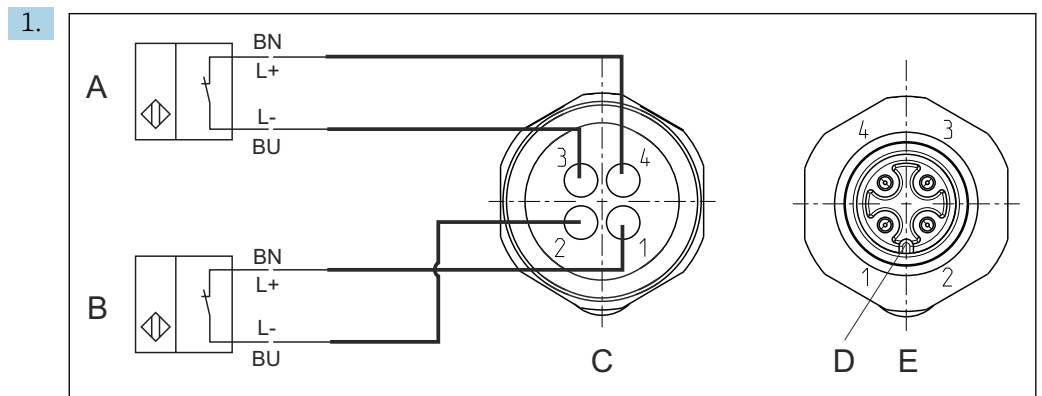
Assembly monitoring



A0032753

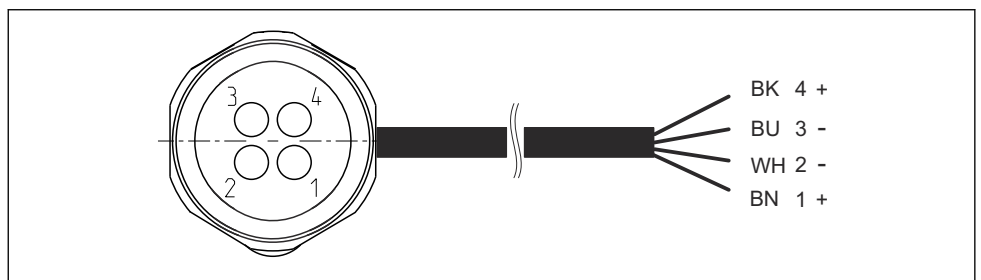
30 Position feedback signal, CPA87x

W2 Feedback cable



A0017831

- A Limit position switch, service position
- B Limit position switch, measure position
- C Connector, M12, solder side (inside of assembly)
- D Coding
- E Connector, pin side (outside of assembly)



A0022163

31 Connecting cable for limit position switch on transmitter, switching amplifier, output interface terminal etc.

- 1 "Measuring" position
- 2 "Measuring" position
- 3 "Service" position
- 4 "Service" position

Attach the cables to the pins provided, as described in the graphic.

2. Attach the connections for confirmation of position as follows:

The connections on the output interface terminal in the pneumatic control unit for single-channel device

Output interface terminal T1, bottom	Cable wire	Function
Pin 1	W2, BK	Limit position switch, confirmation of position
Pin 2	W2, BU	Limit position switch, confirmation of position

Output interface terminal T2, bottom	Cable wire	Function
Pin 1	W2, BN	Limit position switch, confirmation of position
Pin 2	W2, WH	Limit position switch, confirmation of position

The connections on the output interface terminal in the pneumatic control unit for 2-channel device

Output interface terminal T3, bottom	Cable wire	Function
Pin 1	W3, BN	Upper limit position switch
Pin 2	W3, BU	Upper limit position switch

Output interface terminal T4, bottom	Cable wire	Function
Pin 1	W28, BN	Lower limit position switch
Pin 2	W28, BU	Lower limit position switch

6.9 Connecting the main supply voltage

i The cable for the supply voltage must be provided by the customer on site and is not included in the scope of delivery.

NOTICE

The device does not have a power switch

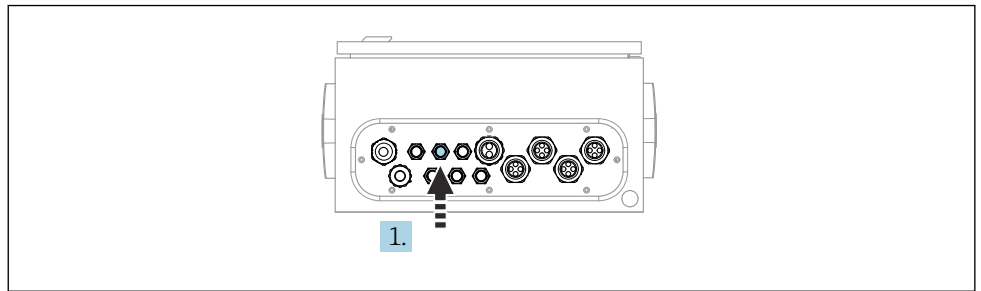
- ▶ A fuse with a maximum rating of 16 A must be provided by the customer. Observe the local regulations for installation.
- ▶ The circuit breaker must be a switch or power switch, and must be labeled as the circuit breaker for the device.
- ▶ The protective ground connection must be established before all other connections. Danger may arise if the protective ground is disconnected.
- ▶ The circuit breaker must be located near the device.

Preparing the main supply voltage

1. Ensure an adequate connection to the protective grounding system of the building.
2. Use a ground cable with min. 0.75 mm² (corresponding to 18 AWG), not included in the scope of delivery.

Connecting the main supply voltage

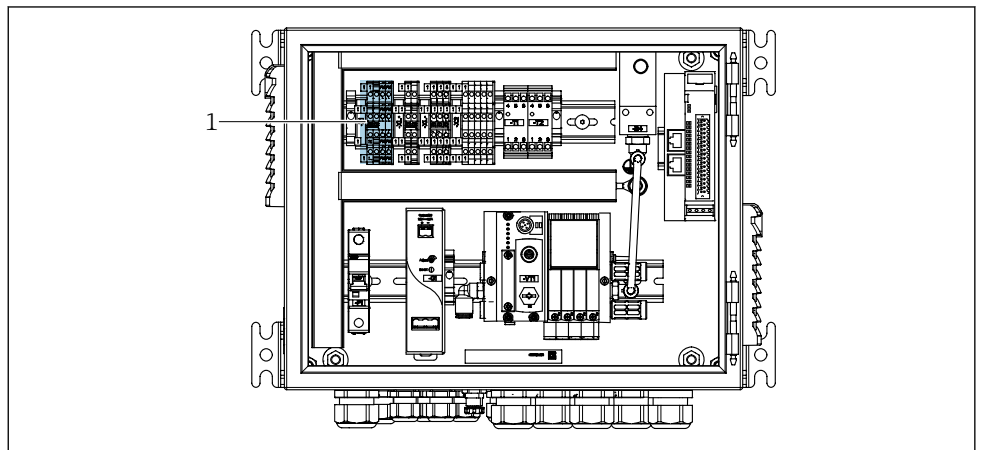
1.



A0033429

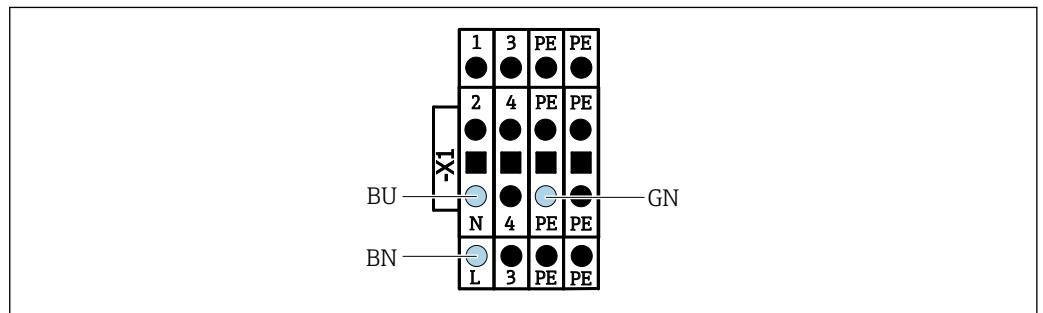
Guide the cable of the main supply voltage through cable gland "3" of the pneumatic control unit.

2.



A0055125

Connect the wires to the actuator terminal (1) as follows:



A0055338

32 Terminal diagram of main supply voltage of actuator terminal X1 in the pneumatic control unit

Terminal X1, bottom	Cable wire
L	L1, BN
PE	PE, GN-YE
N	N, BU

6.10 Connecting the gateway (optional)

Connecting the power supply to the gateway

The power supply to the gateway is provided on site by the customer. See the manufacturer's documentation.

- ▶ Assign the 2.5mm² 2-pin terminal block for the power supply at the top of the gateway:

Pin	Signal
1	+ 24 VDC
2	Grounding



More detailed information on fieldbus communication is provided on the product pages on the Internet:

- Ethernet/IP (adapter) via Modbus TCP - Ethernet/IP gateway: [BA02241C](#)
- Modbus TCP (server): [BA02238C](#)
- PROFIBUS DP (slave) via Modbus TCP - PROFIBUS DP gateway: [BA02239C](#)
- PROFINET (device) via Modbus TCP - PROFINET gateway: [BA02240C](#)

6.11 Ensuring the degree of protection

Only the mechanical and electrical connections which are described in these instructions, and which are necessary for the required intended use, may be established on the device delivered.

- ▶ Exercise care when carrying out the work.

Individual types of protection permitted for this product (impermeability (IP), electrical safety, EMC interference immunity) can no longer be guaranteed if, for example:

- Covers are left off
- Different power units to the ones supplied are used
- Cable glands are not sufficiently tightened (must be tightened with 2 Nm (1.5 lbf ft) for the permitted level of IP protection)
- Unsuitable cable diameters are used for the cable glands
- Modules are not fully secured
- The display is not fully secured (risk of moisture entering due to inadequate sealing)
- Cables/cable ends are loose or insufficiently tightened
- Conductive cable strands are left in the device

6.12 Post-connection check

WARNING

Connection errors

The safety of people and of the measuring point is at risk! The manufacturer does not accept any responsibility for errors that result from failure to comply with the instructions in this manual.

- ▶ Put the device into operation only if you can answer **yes** to **all** the following questions.

Device condition and specifications

- ▶ Are the device and all the cables free from damage on the outside?

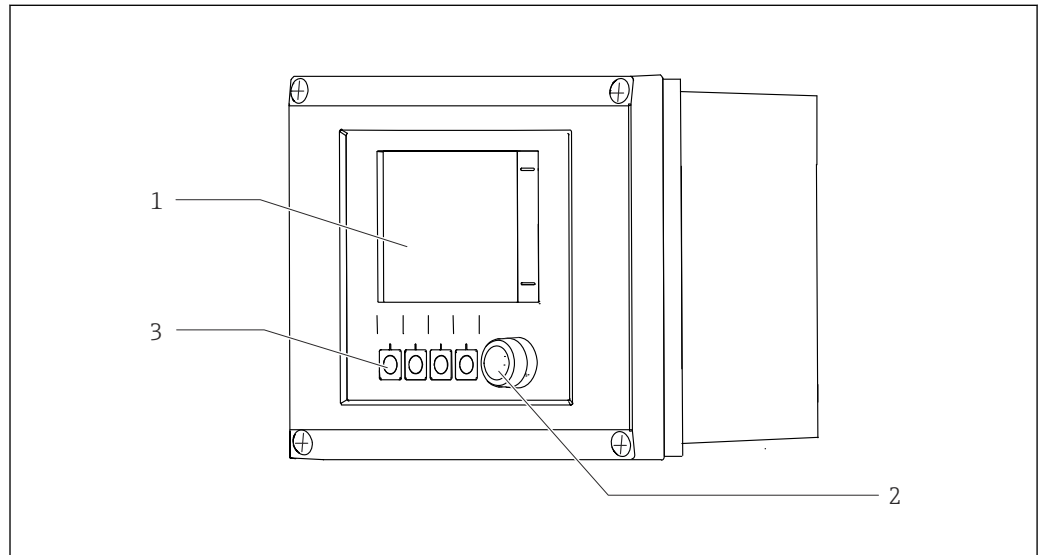
Electrical connection

- ▶ Are the mounted cables strain relieved?
- ▶ Are the cables routed without loops and cross-overs?
- ▶ Are the signal cables correctly connected as per the wiring diagram?
- ▶ Have all the other connections been established correctly?
- ▶ Are unused connection wires connected to the protective ground connection?
- ▶ Are all plug-in terminals securely engaged?
- ▶ Are all the connection wires securely positioned in the cable terminals?
- ▶ Are all cable entries mounted, tightened and leak-tight?
- ▶ Does the supply voltage match the voltage indicated on the nameplate?

7 Operation options

7.1 Overview of operation options

7.1.1 Display and operating elements



A0031833

33 Overview of operation

- 1 Touchscreen display
- 2 Status LED
- 3 Soft keys (function selectable)

Status according to NAMUR

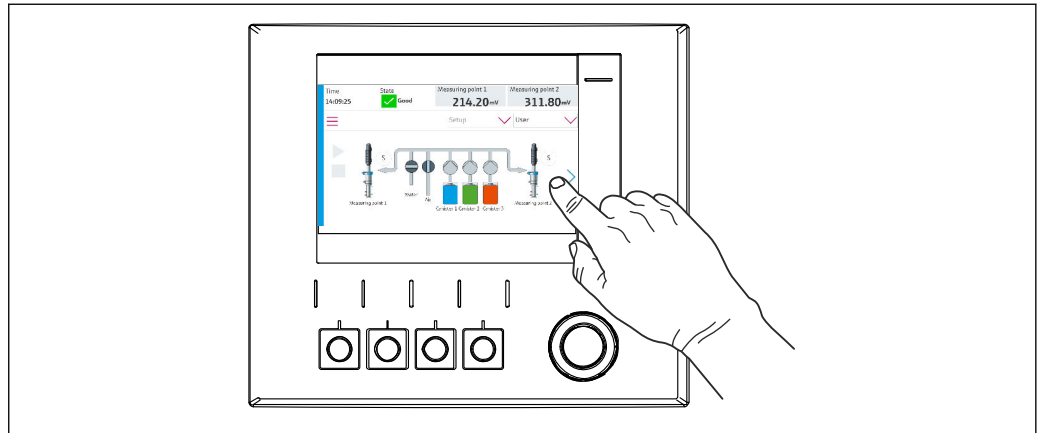
Category	Description	LED status
NAMUR category F (Failure)	F (Failure): No programs are started until it is fixed. The cause of the malfunction is to be found in the measuring point or in the system.	Status LED continuously red
NAMUR category S (Out of specification)	Outside the specification: The measuring point is operated outside its specification. It is still possible to start programs. However, you run the risk of increased wear, a shorter operating life or lower accuracy levels. The cause of the problem is to be found outside the measuring point.	Red flashing status LED
NAMUR category C (check function)	Function check: Hold function, calibration active	Red flashing status LED
NAMUR category M (Maintenance required)	Maintenance request: The device still measures correctly. Immediate measures are not necessary. However, proper maintenance efforts would prevent a possible malfunction in the future, e.g. pump service life. The message should be acknowledged so that other programs can be started. After a restart, the M message returns until the counters are set to ZERO.	Green flashing status LED
If there is no diagnostic message (OK)		Continuously green status LED

See the diagnostic list for information on remedial measures for individual categories:

→ 70.

7.2 Access to operating menu via local display

7.2.1 Operation concept



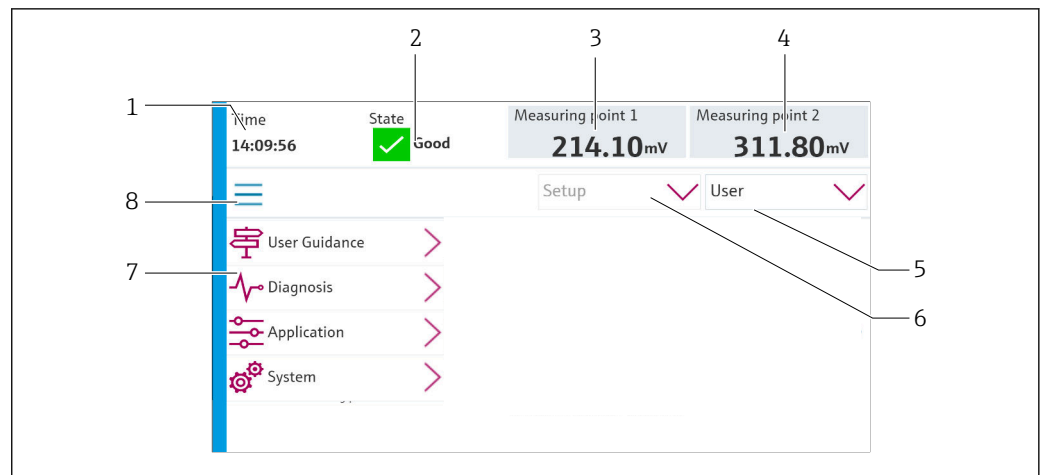
34 Touchscreen display

The CDC90 can be operated via a touchscreen display. Soft keys are also available for program operation.

7.2.2 Soft keys

You can start programs with the soft keys. The keys are preset and can be configured. Soft keys only work in the "Manual" operating mode. → 65

7.2.3 Menu overview



Item	Function
1	Time
2	Display and fast access to the most important error message
3	Navigation to measuring point 1 and display of: <ul style="list-style-type: none"> ▪ pH sensor: pH value ▪ ORP sensor: ORP value in mV ▪ Combined pH/ORP sensor: pH value

Item	Function
4	For one measuring point: <ul style="list-style-type: none"> ■ pH sensor: Temperature in °C ■ ORP sensor: Or ORP value in mV ■ Combined pH/ORP sensor: Temperature in °C For two measuring points: Navigation to measuring point 2 and display of: <ul style="list-style-type: none"> ■ pH sensor: pH value ■ ORP sensor: ORP value in mV ■ Combined pH/ORP sensor: pH value
5	User profile display and log-in
6	Operating mode
7	Overview of main menu
8	Navigation

Operation is via four main menus:

Menu	Function
Guidance	<ul style="list-style-type: none"> ■ Guided operation to schedule and execute programs. ■ Import and export files and settings.
Diagnostics	Contains information about device operation, diagnostics, troubleshooting and simulation.
Application	Device data for detailed measuring point adjustment. Setting for communication with the distributed control system.
System	These menus contain parameters for configuring and managing the overall system.

7.3 Access to the operating menu via the web server

Web server via control system is only available with the Modbus TCP communication type.

The web server enables full access to the visualization of the CDC90. When the web server is active, on-site visualization at the CDC90 is disabled.



The menu structure of the web server corresponds to on site operation.

8 System integration

8.1 Integrating the measuring instrument in the system

The device can be integrated into the control system by means of the following options:

- Web server
- Fieldbus systems

8.1.1 Web server

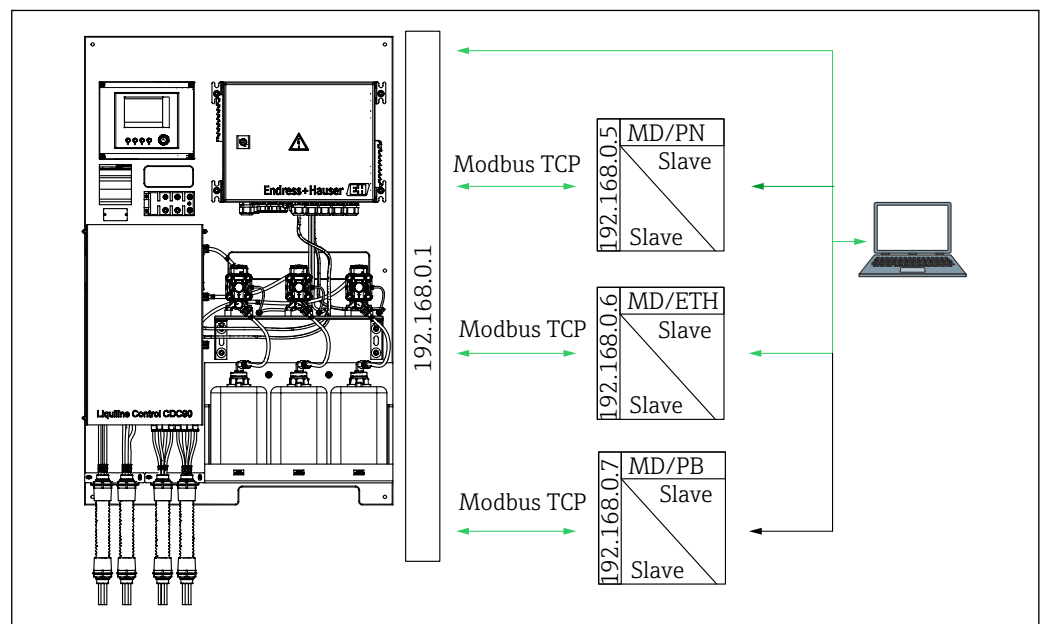
The web server enables full access to the visualization of the CDC90. When the web server is active, on-site visualization at the CDC90 is disabled.

NOTICE

Data are lost.

- ▶ Cancel the connection to the web server before restarting the IPC.

Establishing a connection to the web server



A0055930

MD Modbus TCP
 ETH Ethernet/IP
 PN Profinet
 PB Profibus DP

The web server is only available with the Modbus TCP protocol. If the PROFINET, Ethernet/IP and Profibus DP protocols are used, operation of the web server is not possible.

The IP address of the transmitter's web server must be in the same subnet as the IP address of the CDC90 <IP address +3 >.

Example:


IP address for PC (set as default):	192.168.0.1
IP address, Liquiline:	IP address for the PC + 3 = 192.168.0.4

1. Connect the computer's communication cable to the Ethernet interface of the Ethernet switch.

2. Start the PC.
3. Start the Internet browser.
4. If you use a proxy server to connect to the Internet:
Disable the proxy (browser settings under "Connections/LAN settings").
5. Enter the IP address of your device in the address line. Pay attention to the ending of the address (in the example: 192.168.0.4).
 - ↳ The system takes a few moments to establish the connection and then the web server starts. You might be asked for a password. The factory setting is "admin" for the user name and "admin" for the password.

Example: Microsoft Windows 10

1. Open Network and Sharing Center.
 - ↳ Apart from your standard network, it should also be possible to see an additional Ethernet connection (e.g. as "Unidentified network").
2. Select the link to this Ethernet connection.
3. In the pop-up window select the "Properties" button.
4. Double-click "Internet Protocol Version 4 (TCP/IPv4)".
5. Select "Use the following IP Address".
6. Enter the desired IP address. This address must be in the same subnetwork as the IP address of the device. Example:
 - ↳ IP address: 192.168.0.11
Subnet mask: 255.255.255.0


 If the IP address of the IPC has changed, enter the default IP address:
http://:<IP-Adress>8080/cdc90.htm

8.1.2 Fieldbus systems

NOTICE

The device uses an EtherCat connection for internal communication. Depending on the network load, EtherCAT may cause failures in the CDC90 IPCs if multiple CDC90 devices are integrated in the same network.

- ▶ To reduce the network load in the case of a Modbus TCP connection, the networks must be separated. Physical separation with a VLAN-enabled switch, e.g. Layer 2 managed switch, or software-based separation is possible.

 More detailed information on fieldbus communication is provided on the product pages on the Internet:

- Ethernet/IP (adapter) via Modbus TCP - Ethernet/IP gateway: [BA02241C](#)
- Modbus TCP (server): [BA02238C](#)
- PROFIBUS DP (slave) via Modbus TCP - PROFIBUS DP gateway: [BA02239C](#)
- PROFINET (device) via Modbus TCP - PROFINET gateway: [BA02240C](#)

9 Commissioning

9.1 Preliminaries

⚠ WARNING

Incorrect connection, incorrect supply voltage

Safety risks for staff and device malfunctions!

- ▶ Check that all connections have been established correctly in accordance with the wiring diagram.
- ▶ Ensure that the supply voltage matches the voltage indicated on the nameplate.

NOTICE

Uncontrolled activation of pumps, valves or similar.

Damage to devices.

- ▶ Perform the post-installation and function check.
- ▶ Ensure that all moving parts are correctly mounted.

9.1.1 Filling the canisters

⚠ CAUTION

Moving assembly

Risk of injury

- ▶ Set the operating mode to configuration before commencing the maintenance work.

⚠ CAUTION

Automatic operation during calibration.

Risk of injury from the movement of the assembly, chemicals or contaminated media.

- ▶ Before hoses are removed, make sure that no operation is currently running or about to start.
- ▶ Set the device to the configuration mode.
- ▶ Wear protective clothing, goggles and gloves or take other suitable measures to protect yourself.
- ▶ In the case of remote control, set the device to the configuration mode and make sure that no other actions are running.
- ▶ Fill the canisters as follows from left to right:

Canister (left to right)	Contents
A	Liquid 1 (e.g. cleaner, for version "Cleaning and calibration of pH sensors")
B	Liquid 2 (e.g. buffer 1, for version "Cleaning and calibration of pH sensors")
C	Liquid 3 (e.g. buffer 2, for version "Cleaning and calibration of pH sensors")

i We recommend you replace the buffers every 6 months at the latest. Ensure compliance with the expiration date on the canisters which can be configured in the **System/Operating counter/Canisters and pumps** menu. See: → 53

1. Unscrew the float switch.
2. Remove the float switch.
3. Fill the empty canister or replace it with a full one. Use a funnel when filling the canister.
4. Screw the float switch into the canister.


9.2 Post-installation and function check

Put the device into operation only if you can answer **yes** to **all** the following questions:

1. Is the device securely mounted and installed?
2. Have all the hose systems been correctly implemented according to the plans?
3. Has all wiring been carried out correctly according to the wiring diagram?
4. Is the assembly mounted and connected to the rinsing block?
5. Is the sensor that has been precalibrated in the factory with Memosens technology connected in the assembly?
6. Does the supply voltage match the voltage indicated on the nameplate?


9.3 Switching on the measuring instrument

Energizing the device

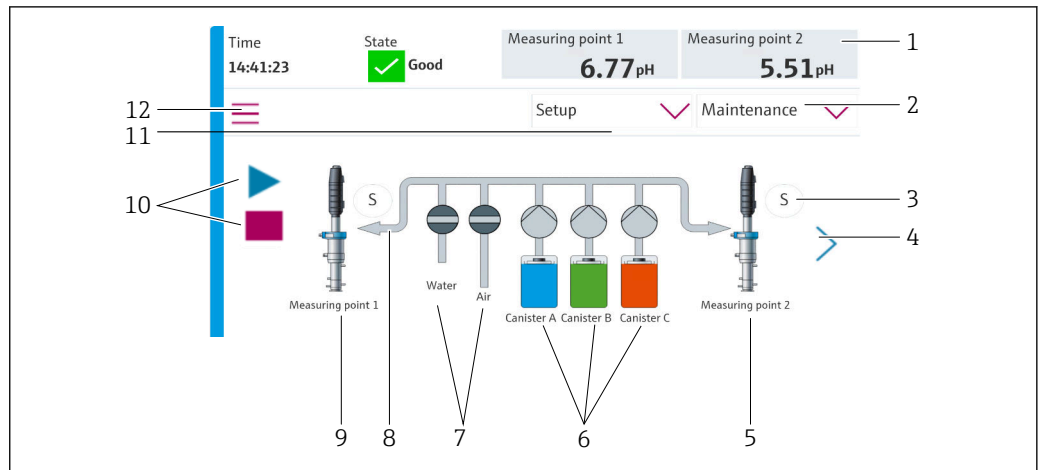
1. Energizing the device. →  38
 - ↳ After power-up, the device performs a self-test and then goes to the **Setup** operating mode.
2. Watch out for possible effects on any actuators which may be connected.

Filling the rinse chamber of the assembly

During the device startup phase, the current outputs have an undefined status for a few seconds prior to initialization.

1. Watch out for possible effects on any actuators which may be connected.
2. Fill the rinse chamber of the assembly with water following the steps below:
Operating mode: Select **Setup**.
3. Go to **Diagnosis/Simulation** in the menu.
4. For valve 3: Set **Water channel 1** to **On** or for valve 13: **Water channel 2**
 - ↳ The saved sensor-specific calibration data are automatically transmitted to the CDC90 control unit as soon as the control unit is switched on.
The measured value is displayed.
5. After filling the rinse chamber of the assembly, end the function with **Off**.
6. Carry out initial calibration of the sensor. An initial calibration is necessary to transfer the sensor data to the system. →  51

9.3.1 Start screen



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35 Start screen

Item	Function
1	Header with time, status and measured value display
2	User guidance
3	Measure or service position of assembly
4	Next page
5	Visualization of measuring point 2
6	Display of pumps for canisters 1-3
7	Valve (water or air) closed or open.
8	Visualization of the active medium, depending on the program.
9	Visualization of measuring point 1
10	Play symbol visible when program is running. Stop button active and can be operated when program is running. Control only possible when program is running.
11	Operating mode
12	Main menu

To return to the home screen, go to the home icon in the menu path.

9.4 Configuring the measuring instrument

9.4.1 Configuring the language

The language can be configured and changed at all times on the local display, also during live operation.

- ▶ Select the desired language in the **System/Setup/Language** menu.
 - ↳ The user interface immediately appears in the selected language.

9.4.2 Setting the date and time

User role: **Maintenance**

Operating mode: **Setup**


→  55

► Change the **Date and Time** under: **System/Setup/Date and Time**

or

► Click directly on the time.

↳ It can take a few seconds for the setting to be accepted.

 The device does not support automatic summer/wintertime changeover. These settings can be made manually in the software, e.g. in the event of time-dependent program versions.

9.4.3 Configuring system settings of the measuring points

User role: **Maintenance**

Operating mode: **Setup**

→  55

Path: System/Information/Measuring point		
Function	Options	Info
Measuring point	<ul style="list-style-type: none"> ▪ Serial number: ▪ Firmware ▪ Original extended order code ▪ Current extended order code 	<p>General information: Apart from the tag name of the order number, all the settings are preconfigured and cannot be modified.</p>

9.4.4 Configuring the system communication

External communication is always disabled at the factory even if fieldbus communication has been ordered. This communication must be enabled if the connection to the gateway or process control system has been established. As soon as the fieldbus is enabled, the communication is checked. If the communication is not working, the message S1003 is displayed.

Types of communication

- Analog
- Ethernet/IP
- Modbus TCP
- PROFIBUS DP
- PROFINET

User role: **Maintenance**

Operating mode: **Setup**

1. Go to **Application/Communication** in the menu.
 - ↳ The configured communication protocol is visible under **Selected communication**.
2. Select the desired communication protocol under **Communication selection**.
3. Click Apply.

Connectivity can be viewed here for Modbus TCP and Ethernet/IP:

Path: System/Connectivity		
Function	Options	Info
Modbus	Communication to DCS Byte order	Modbus information transmission to the control station when Modbus is used as a fieldbus protocol. For detailed information on "Modbus communication", see the product pages on the Internet.
Ethernet	InformationEthernet <ul style="list-style-type: none"> ■ IP address ■ Used address area ■ Subnetmask ■ Gateway address 	Ethernet adapter settings The device occupies 7 consecutive IP addresses. These addresses must be free in the network. Example: configured IP address: 192.168.0.1 IP addresses 192.168.0.2 - 192.168.0.7 are also occupied.

9.4.5 Configuring the current outputs

The current outputs for transmitting measured values on an additional analog card can only be configured with an external display or via the web server of an external transmitter.

The current outputs are configured during initial commissioning by Endress+Hauser specialist staff.

9.4.6 Configuring the sensor type

The device is preconfigured for the use of pH glass sensors.

If another sensor type is used (pH ISFET, ORP), another configuration file must be uploaded to the transmitter using an external display. This is performed by Endress +Hauser specialists during initial commissioning.

User role: **Maintenance**

Operating mode: **Setup**

→  55

Path: System/Information/Sensor		
Function	Options	Info
Channel 1 or Channel 2	Sensor 1 or Sensor 2 <ul style="list-style-type: none"> ▪ Sensor type ▪ Serial number: ▪ Measuring point ▪ Hardwareversion ▪ Software version ▪ Date of commissioning Operating time <ul style="list-style-type: none"> ▪ Total ▪ Over max. operating temperature ▪ Below min. operating temperature Measured value: <ul style="list-style-type: none"> ▪ Number of sterilizations ▪ Number of calibrations ▪ Last calibration ▪ Last zero point calibration method Sensor specifications: Max. temperature:	List of sensor-specific information

9.4.7 Monitoring pilot valves

User role: **Maintenance**Operating mode: **Setup**→  55

Path: System/Operating counter/Valves		
Function	Options	Info
Valves	Number of switching operations and warning limits for channel 1 and/or channel for: <ul style="list-style-type: none"> ▪ Water ▪ Air 	Warning limit settings for the switching operations of the pilot valves: <ul style="list-style-type: none"> ▪ V 3: Water for channel 1 ▪ V 4: Air for channel 1 ▪ V 8: Valves for channel 1 ▪ V 9: Valves for channel 2 ▪ V 10: User-configurable valve ▪ V 13: Water for channel 2 ▪ V 14: Air for channel 2 ▪ V 15 to 16: User-configurable valves

9.4.8 Assembly

User role: **Maintenance**Operating mode: **Setup**→  55


Path: System/Operating counter/Assemblies		
Function	Options	Info
Assembly 1 or Assembly 2	Assembly 1 or Assembly 2 <ul style="list-style-type: none"> ▪ Number of strokes ▪ Warning limit 	Settings of the warning limit for the number of assembly strokes.

9.4.9 Pumps and canisters

User role: **Maintenance**

Operating mode: **Setup**

→  55

Path: System/Operating counter/Canisters and pumps		
Function	Options	Info
Canister and Pump A to C	<p>Canister A to C</p> <ul style="list-style-type: none"> ▪ Expiry date ▪ Filling level ▪ Max. filling level ▪ Warning limit <p>Pump 1 to C</p> <ul style="list-style-type: none"> ▪ Flow rate ▪ Pumped volume ▪ Warning limit ▪ Operating time 	<p>Settings for the expiry date, the maximum level, the flow and the warning limits for the canisters and pumps.</p> <p> If level monitoring is used, the flow must be calculated after the installation of the system. Fill the canister to full capacity for this purpose, start the pump by simulation and stop the time when the canister is completely empty. Flow = volume of canister/time in l/min</p>

9.4.10 Calibrating the sensor

- Sensors with the Memosens protocol are calibrated at the factory.
 - A calibration is necessary during initial commissioning of the sensor to load the calibration data into the CDC90 logbook.
 - An additional calibration is not required in many standard applications.
- ▶ Calibrate sensors at sensible intervals depending on the process.

 Operating Instructions "Memosens", BA01245C

9.4.11 Starting commissioning

Initial commissioning is performed by Endress+Hauser specialists.

10 Operation

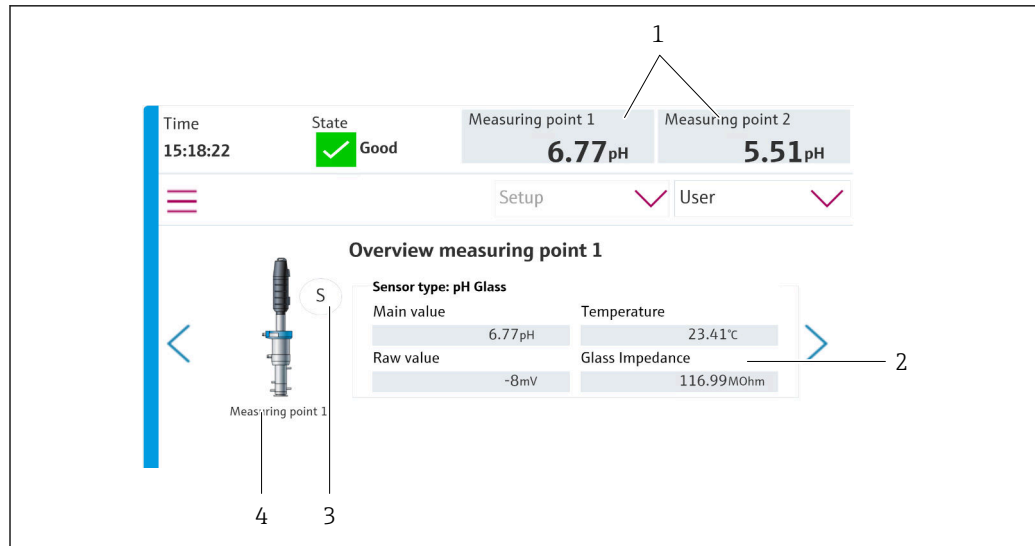
⚠ CAUTION

Very loud pumps

The noise from the pumps can hurt the ears.

- ▶ Wear ear protectors in the vicinity of the pumps.

10.1 Reading off measured values



36 Overview of measuring points

Item	Function
1	Shortcut to measuring point overview
2	Main values
3	Assembly position
4	Measuring point 1 or 2

10.2 Adapting the measuring instrument to the process conditions

10.2.1 User management

You can assign a password to all users in the **Admin** user role. You can also activate and deactivate user management.

Logged-in users can change their own password.

Default user name	Default password
A (Admin)	0
M (Maintenance)	1
O (Operator)	2

User management

	Operator	Maintenance	Admin	User
Switch user management on and off			x	Read only rights to system (cannot make any settings apart from changing the language)
Change own password	x	x	x	
Change all passwords			x	
Change the operation mode	x	x		
Starting the programs	x	x		
Schedule programs		x		
Import/export data		x		
Settings in the System		x		
Settings in the Application menu		x		
Simulation of outputs	x	x		
Device restart		x		

Configuring usersUser role: **Admin**Operation mode: **Setup**→  55


1. Go to **User Management** under **System/Setup/**.
2. Under **User name:** select the user role.
3. Assign a password to the user role under **PIN:**.
4. Enter the PIN again under **Acknowledge PIN:**.
5. Select **OK** to save the changed password for the selected user.
6. Repeat the steps again if necessary and change the PIN for other users.

10.2.2 Changing the operation mode

The different operation modes are necessary to separate tasks and to prevent operating and maintenance tasks, as well as routines, from being carried out simultaneously.

Operation modes:

- Setup
- Manual
- Automatic
- Remote

Operation mode	Function
Setup	Used to configure the device and the application. Import/export programs, device configuration, system configuration, logbooks For example, the device addresses or the time can be changed. Changes to the scheduling of programs. No hardware is controlled in this operation mode.  This mode is used to perform maintenance activities. This mode ensures that no hardware activation can take place.
Manual	Used to manually operate the device. For example, configured programs can be started manually and outputs can be simulated. Operation of the soft keys is possible. The hardware is only controlled manually in this operation mode. No settings can be made.
Automatic	Used to control the device according to a defined schedule. Configured programs are started automatically at the scheduled time/date. The hardware is only controlled automatically in this operation mode. Soft keys cannot be activated here.
Remote	Used to control the device remotely. Configured programs can be controlled remotely via a selected protocol. The hardware is controlled exclusively by remote access in this operation mode. The soft keys cannot be activated here.

The **Operation Mode** can be changed via the menu or directly via the start screen.

Changing operation mode via the menu

- ▶ Go to the **System/Setup/Operation Mode** menu.

Changing operation mode via the start screen

- ▶ Change the operation mode via the drop-down menu on the start screen.

10.2.3 The structure of the cleaning and calibration programs

The cleaning and calibration program is configured via the local display. Customer-specific programs can be created by Endress+Hauser specialist staff. Programs are divided into steps, sequences and programs.

Steps

- Certain actions concerning sensor cleaning and/or calibration are divided into individual steps.
A step defines:
 - The state of the outputs (valves, DO).
 - The state of the inputs (DI).
- Steps 1-16 are preconfigured, while steps with IDs 17-26 can be tailored to customer requirements.

Sequences

The sequences comprise the order and duration of the steps. User-specific sequences can be defined. Predefined sequences can be integrated into the user-defined sequences. Predefined sequences are preconfigured on delivery.

Programs

A program is a sequence that has been assigned to a specific channel.

Schedules

You can assign a schedule to the programs; the program is then executed automatically at a defined frequency based on this schedule.

10.2.4 Cleaning and calibration steps

List of steps for cleaning

The device contains preconfigured steps:

ID	Name	Function
1	Service Position	Sets the valves of the implicit channel to move the sensor to the service position. End condition: the step ends when it is possible to detect that the service position has been reached. A timeout should trigger an error. The timeout can be configured under Application/Operating type and units/Measuring Point 1 or Measuring Point 2
2	Measure Position	Sets the valves of the implicit channel to move the sensor to the measure position. End condition: the step ends when it is possible to detect that the measure position has been reached. A timeout should trigger an error. The timeout can be configured under Application/Operating type and units/Measuring Point 1 or Measuring Point 2
3	H2O + Service Pos.	Switches the water valve on and sets the valves of the implicit channel in such a way that the sensor is moved to the service position. Switches the water valve off once the sensor has reached the service position. The preconfigured step switches the outputs off again. The preconfigured step cannot be edited. A timeout should trigger an error. The timeout can be configured under Application/Operating type and units/Measuring Point 1 or Measuring Point 2
4	H2O + Measure Pos.	Switches the water valve on and sets the valves of the implicit channel in such a way that the sensors are moved to the measure position ("sealing water"). Switches the water valve off once the sensor has reached the measure position. A timeout should trigger an error. The timeout can be configured under Application/Operating type and units/Measuring Point 1 or Measuring Point 2
5	Hold On	If the HOLD function is switched on, this causes the measured values to "freeze" or a predefined measured value to be displayed. This concerns the analog and fieldbus outputs. This makes sense during a calibration. The HOLD behavior can be configured.
6	Hold Off	"Unfreezes" the frozen measured values.
7	Abort + Service Pos.	In the event of an error, the program is aborted and the sensor goes to the service position
8	Abort + Measure Pos.	All the valves for media are closed and the sensor goes to the measure position
9	Abort + Service Pos. + Hold On	Like Abort+Service with the Hold On function
10	Abbruch + Measure Pos. + Hold Off	Like Abort + Measure Pos with the Hold Off function
11	Air	Switches the air valve on for the indicated period of time and off again.
12	Water	Switches the water valve on for the indicated period of time and off again.

ID	Name	Function
13	Liquid Pump A	Pumps the medium out of canister 1 for the time indicated.
14	Liquid Pump B	Pumps the medium out of canister 2 for the time indicated.
15	Liquid Pump C	Pumps the medium out of canister 3 for the time indicated.
16	Wait	Delays the processing of the following step by the time indicated.
17 to 26	CustomStep1 to CustomStep10	Configurable steps

List of steps for calibration

The device contains preconfigured program steps for the calibration. The steps with the ID 5xx are used to send the command to the transmitter. These steps cannot be modified.

ID	Name	Function
500	Check Stability Criterion	The sensor is immersed in the buffer. The system can continue the calibration. Confirm in order to check the stability criteria of the sensor.
501	Start 1pt cal pH w/o adj	Starts a 1-point pH calibration without adjustment.
502	Start 2pt cal pH w/o adj	Starts a 2-point pH calibration without adjustment.
503	Start 2pt cal pH + adj	Starts a 2-point pH calibration with adjustment.
504	Start cal ORP w/o adj	Starts a 1-point ORP (mV) calibration without adjustment.
505	Start cal ORP + adj	Starts a 1-point ORP (mV) calibration with adjustment.

10.2.5 Cleaning and calibration sequences

Sequence list for cleaning

The sequences contain multiple steps in a defined sequence and duration. Sequences can contain a level of subsequences.

Overview of sequences in devices with cleaning function

ID	Name	Function
Sequences with IDs 1001-1003 contain preconfigured basic functions		
1001	Service	The assembly moves to the service position.
1002	Measure	The assembly moves to the measure position.
1003	Cleaning	The sensor is pre-rinsed with water, cleaned with the cleaner and rinsed again with water.
The sequence with ID 1004 contains a preconfigured cleaning procedure.		
1004	Cleaning programm	Procedure for cleaning the sensor consists of: <ul style="list-style-type: none"> ■ Movement to the service position ■ Cleaning the sensor ■ Movement to the measurement position
Sequences with IDs 1005-1015 can be created according to customer requirements.		

In the event of an error, the system stops the sequence and moves the sensor to the service position

All sequences can be modified/optimized and reused within sequences.


Sequence list for calibration

Overview of sequences for devices with calibration function

ID	Name	Function
Sequences with IDs 1001-1008 contain preconfigured basic functions		
1001	Service	The assembly moves to the service position.
1002	Measure	The assembly moves to the measure position.
1003	Cleaning	The sensor is pre-rinsed with water, cleaned with the cleaner and rinsed again with water.
1004	pH 2 Pt adjustment	Perform a two-point adjustment of a pH sensor.
1005	pH 2 Pt calibration	Execution of a two-point calibration of a pH sensor.
1006	ORP 1 Pt adjustment	Execution of a one-point adjustment of an ORP sensor.
1007	ORP 1 Pt calibration	Execution of a one-point calibration of an ORP sensor.
1008	pH 1 Pt calibration	Execution of a one-point calibration of a pH sensor without adjustment.
Sequences with IDs 1009-1014 contain preconfigured cleaning procedures.		
1009	Cleaning program	Procedure for cleaning the sensor consists of: <ul style="list-style-type: none"> ▪ Movement to the service position ▪ Cleaning the sensor ▪ Movement to the measurement position
1010	2 Pt pH adjustment program	Execution of a two-point adjustment of a pH sensor, consisting of: <ul style="list-style-type: none"> ▪ Movement to the service position ▪ Cleaning the sensor ▪ 2-point adjustment of a pH sensor ▪ Movement to the measurement position
1011	2 Pt pH calibration program	Execution of a two-point calibration of a pH sensor, consisting of: <ul style="list-style-type: none"> ▪ Movement to the service position ▪ Cleaning the sensor ▪ Two-point calibration of a pH sensor ▪ Movement to the measurement position
1012	1 Pt pH calibration program	Execution of a one-point calibration of a pH sensor, consisting of: <ul style="list-style-type: none"> ▪ Movement to the service position ▪ Cleaning the sensor ▪ One-point calibration of a pH sensor ▪ Movement to the measurement position
1013	1 Pt ORP ADI program	Execution of a one-point adjustment of an ORP sensor, consisting of: <ul style="list-style-type: none"> ▪ Movement to the service position ▪ Cleaning the sensor ▪ One-point adjustment of an ORP sensor ▪ Movement to the measurement position
1014	1 Pt ORP CAL program	Execution of a one-point calibration of an ORP sensor, consisting of: <ul style="list-style-type: none"> ▪ Movement to the service position ▪ Cleaning the sensor ▪ One-point calibration of an ORP sensor ▪ Movement to the measurement position
The sequence with ID 1015 can be created according to customer requirements.		

In the event of an error, the system stops the sequence and moves the sensor to the service position.

All sequences can be modified/optimized and reused within sequences.

-  Default buffer 1 is Endress+Hauser's pH 7 buffer.
- Default buffer 2 is Endress+Hauser's pH 4 buffer.
- Please contact Endress+Hauser specialist staff to adapt the calibration buffers.

Editing and creating sequences

User role: **Maintenance**

Operation mode: **Setup**

→  55

1. Go to the **User Guidance/Configuration/Sequences** menu.
2. Click **Start assistant**.
3. Select the desired sequence from the list.
4. Click **Next**.
5. Select the desired row.
6. A new step can be added using the "+" button in empty rows. If rows have already been configured, the step can be edited via "+ ". A row can be emptied using "-".
7. Select the step or sequence from the list.
8. If necessary, specify the duration of the step for the measuring points and confirm by accepting
9. Add more steps in the next row.
10. Click **Next** when all steps are added.
11. The settings are accepted.
12. Press **Complete** to finish.

If there is an empty row before an inserted step, you cannot click the **Next** button.

10.2.6 Cleaning and calibration programs

Program list for cleaning

A program is a sequence that has been assigned to a specific channel.

The following programs are already preconfigured on delivery

Overview of programs for single-channel devices with cleaning function

ID	Program name	Sequence name	Channel	Function
Programs with IDs 801-803 include preconfigured programs				
801	Service1	1001 - Service	1	The assembly of channel 1 moves to the service position This program is assigned to soft key 1 on delivery
802	Measure1	1002 – Measure	1	The assembly of channel 1 moves to the measure position. This program is assigned to soft key 2 on delivery
803	Cleaning1	1004 – Cleaning Program	1	Channel 1 performs sensor cleaning. This program is assigned to soft key 3 on delivery
Programs with IDs 804–820 can be created according to customer requirements.				

Overview of programs for two-channel devices with cleaning function

ID	Program name	Sequence name	Channel	Function
Programs with IDs 801-806 include preconfigured programs				
801	Service1	1001 - Service	1	The assembly of channel 1 moves to the service position This program is assigned to soft key 1 on delivery
802	Measure1	1002 - Measure	1	The assembly of channel 1 moves to the measure position. This program is assigned to soft key 2 on delivery
803	Service2	1001 - Service	2	The assembly of channel 2 moves to the service position. This program is assigned to soft key 3 on delivery
804	Measure2	1002 - Measure	2	The assembly of channel 2 moves to the measure position. This program is assigned to soft key 4 on delivery
805	Cleaning1	1004 - Cleaning Program	1	Channel 1 performs sensor cleaning.
806	Cleaning2	1004 - Cleaning Program	2	Channel 2 performs sensor cleaning.
Programs with IDs 807-820 can be created according to customer requirements.				

Program list for cleaning and calibration function

The following programs are already preconfigured on delivery:

Overview of programs for single-channel devices with cleaning and calibration function

ID	Program name	Sequence name	Channel	Function
Programs with IDs 801-808 include preconfigured programs				
801	Service1	1001 - Service	1	The assembly of channel 1 moves to the service position This program is assigned to soft key 1 on delivery
802	Measure1	1002 - Measure	1	The assembly of channel 1 moves to the measure position. This program is assigned to soft key 2 on delivery
803	Cleaning1	1004 - Cleaning Program	1	Channel 1 performs sensor cleaning. This program is assigned to soft key 3 on delivery
804	2Pt pH ADJ1	1010 - 2 Pt pH adjustment program	1	Channel 1 performs a two-point adjustment of a pH sensor. This program is assigned to soft key 4 on delivery.
805	2Pt pH CAL1	1011 - 2 Pt pH calibration program	1	Channel 1 performs a two-point calibration of a pH sensor.
806	1Pt pH CAL1	1012 - 1 Pt pH calibration program	1	Channel 1 performs a one-point calibration of a pH sensor.

ID	Program name	Sequence name	Channel	Function
807	1Pt ORP ADJ1	1013 - 1 Pt ORP ADI program	1	Channel 1 performs a one-point adjustment of an ORP sensor.
808	1Pt ORP CAL1	1014 - 1 Pt ORP CAL program	1	Channel 1 performs a one-point calibration of an ORP sensor.
Programs with IDs 809–820 can be created according to customer requirements.				

Overview of programs for two-channel devices with cleaning and calibration function

ID	Program name	Sequence name	Channel	Function
Programs with IDs 801-816 include preconfigured programs				
801	Service1	1001 - Service	1	The assembly of channel 1 moves to the service position This program is assigned to soft key 1 on delivery
802	Measure1	1002 – Measure	1	The assembly of channel 1 moves to the measure position. This program is assigned to soft key 2 on delivery
803	Cleaning1	1001 - Service	2	The assembly of channel 2 moves to the service position This program is assigned to soft key 3 on delivery
804	2Pt pH ADJ1	1002 – Measure	2	The assembly of channel 2 moves to the measure position. This program is assigned to soft key 4 on delivery
805	2Pt pH CAL1	1009 – Cleaning Program	1	Channel 1 performs sensor cleaning.
806	1Pt pH CAL1	1009 – Cleaning Program	2	Channel 2 performs sensor cleaning.
807	1Pt ORP ADJ1	1010 - 2 Pt pH adjustment program	1	Channel 1 performs a two-point adjustment of a pH sensor.
808	1Pt ORP CAL1	1010 - 2 Pt pH adjustment program	2	Channel 2 performs a two-point adjustment of a pH sensor.
809	2Pt pH CAL1	1011 - 2 Pt pH calibration program	1	Channel 1 performs a two-point calibration of a pH sensor.
810	2Pt pH CAL2	1011 - 2 Pt pH calibration program	2	Channel 2 performs a two-point calibration of a pH sensor.
811	1Pt pH CAL1	1012 - 1 Pt pH calibration program	1	Channel 1 performs a one-point calibration of a pH sensor.
812	1Pt pH CAL2	1012 - 1 Pt pH calibration program	2	Channel 2 performs a one-point calibration of a pH sensor.
813	1Pt ORP ADJ1	1013 - 1 Pt ORP ADI program	1	Channel 1 performs a one-point adjustment of an ORP sensor.

ID	Program name	Sequence name	Channel	Function
814	1Pt ORP ADJ2	1013 - 1 Pt ORP ADI program	2	Channel 2 performs a one-point adjustment of an ORP sensor.
815	1Pt ORP CAL1	1014 - 1 Pt ORP CAL program	1	Channel 1 performs a one-point calibration of an ORP sensor.
816	1Pt ORP CAL2	1014 - 1 Pt ORP CAL program	2	Channel 2 performs a one-point calibration of an ORP sensor.
Programs with IDs 817–820 can be created according to customer requirements.				

Editing programs

Once created, programs cannot be modified in the local display. To change a program, it must be deleted and then created again.

Generating the program

User role: **Maintenance**

Operation mode: **Setup**

→  55

1. Go to the **User Guidance/Configuration/Programs** menu.
2. Click **Start assistant**.
3. Select empty row (ID 0) and click +.
4. Enter **Name of program** and **Channel**.
5. Select the desired sequence from the list.
6. Click **Accept**.
7. The new program is added.
8. Click **Next**.
 - ↳ The settings are accepted.
9. Press **Complete** to finish.

Removing the program

User role: **Maintenance**

Operation mode: **Setup**

→  55

1. Go to the **User Guidance/Configuration/Programs** menu.
2. Click **Start assistant**.
3. Select the program to be deleted and click "-".
4. Click **Next**.
 - ↳ The settings are accepted.
5. Press **Complete** to finish.

No empty rows may remain before the **Next** button is pressed.

10.2.7 Schedules

Schedules for devices with cleaning function

You can assign a schedule to the programs; the program is then executed automatically at a defined frequency based on this schedule.

The following schedules are already preconfigured on delivery.

Overview of schedules for single-channel devices with cleaning function

ID	Schedule name	Program name	Days	Start	End	Period	Function
The schedule with ID 1 includes a preconfigured schedule							
1	Cleaning1	803 – Cleaning1	Mon, Tue, Wed, Thu, Fri	0:00	23:59	30	Channel 1 is cleaned every 30 minutes on all working days
Schedules with IDs 2–20 can be created according to customer requirements.							

Overview of schedules for two-channel devices with cleaning function

ID	Schedule name	Program name	Days	Start	End	Period	Function
The schedule with ID 1 includes a preconfigured schedule							
1	Cleaning1	805 – Cleaning1	Mon, Tue, Wed, Thu, Fri	0:00	23:59	30	Channel 1 is cleaned every 30 minutes on all working days
2	Cleaning2	806 – Cleaning1	Mon, Tue, Wed, Thu, Fri	0:15	23:59	30	Channel 1 is cleaned every 30 minutes on all working days
Schedules with IDs 3–20 can be created according to customer requirements.							

Schedules for devices with cleaning and calibration function

The following schedules are already preconfigured on delivery.

Overview of schedules for single-channel devices with cleaning and calibration function

ID	Schedule name	Program name	Days	Start	End	Period	Function
The schedule with ID 1 includes a preconfigured schedule							
1	Cleaning1	803 – Cleaning1	Mon, Tue, Wed, Thu, Fri	0:00	23:59	30	Channel 1 is cleaned every 30 minutes on all working days
Schedules with IDs 2–20 can be created according to customer requirements.							

Overview of schedules for 2-channel devices with cleaning and calibration function

ID	Schedule name	Program name	Days	Start	End	Period	Function
The schedule with ID 1 includes a preconfigured schedule							
1	Cleaning1	805 – Cleaning1	Mon, Tue, Wed, Thu, Fri	0:00	23:59	30	Channel 1 is cleaned every 30 minutes on all working days

ID	Schedule name	Program name	Days	Start	End	Period	Function
2	Cleaning2	806 – Cleaning1	Mon, Tue, Wed, Thu, Fri	0:15	23:59	30	Channel 1 is cleaned every 30 minutes on all working days
Schedules with IDs 3–20 can be created according to customer requirements.							

Creating schedules

Once created, schedules cannot be modified on the local display. To change a schedule, delete it and create it again.

Creation of a schedule

User role: **Maintenance**

Operation mode: **Setup**

→  55

1. Go to the **User Guidance/Configuration/Schedules** menu.
2. Click **Start assistant**.
3. Select an empty row (prog. ID 0) and click on +.
4. Select the desired **Program** from the list.
5. Select the desired **Days of week** from the list.
6. Specify the desired start time and end time. The end time must be later than the start time.
7. Enter the **Period** in minutes.
8. Click **Accept**.
 - ↳ The new program is scheduled
9. Click **Next**.
 - ↳ The settings are accepted.
10. Press **Complete** to finish.

Removing a schedule

User role: **Maintenance**

Operation mode: **Setup**

→  55

1. Go to the **User Guidance/Configuration/Schedules** menu.
2. Click **Start assistant**.
3. Select the program to be deleted and click "-".
4. Click **Next**.
 - ↳ The settings are accepted.
5. Press **Complete** to finish.

No empty rows may remain before the **Next** button is pressed.

10.2.8 Assigning programs to soft keys

The configuration of the soft keys is carried out by Endress+Hauser as part of the commissioning phase.

Programs can be assigned to the soft keys of the CDC90 control unit in order to quickly start the programs manually without calling up User Guidance.

IDs 801-804 are preassigned for the soft keys. If the programs for the IDs are changed, so too does the assignment of the soft keys.

If the program sequence is changed, this affects the assignment of the program to the soft key. The soft keys then need to be reassigned.

User role: **Maintenance**

Operation mode: **Setup**

→  55

Application/In-/Outputs/Softkeys:

1. Select the soft key.
2. Under soft key 1-4, select the desired program for **Program selection**
 - ↳ The program name appears under **Selected Program**.
3. Press **Accept** to confirm.

The programs that are assigned to the soft keys can also be started remotely via DI13-16:

- DI13 = Soft key 1
- DI14 = Soft key 2
- DI15 = Soft key 3
- DI16 = Soft key 4

10.2.9 Executing the programs

User role: **Maintenance** or **Operator**

Operation mode: **Manual**

→  55

Executing the program manually

Programs can be started manually in the **Operation mode** if no errors are pending.

1. Go to the **User Guidance/Configuration/Sequences** menu.
2. Start the **Program Assistant**.
3. Follow the instructions of the **Program Assistant**.
 - ↳ An overview of the programs is displayed.
4. Select the desired program and click **Next**.
5. Click the play button to start the program.
 - ↳ An overview of the steps is displayed.
6. Select **Next** and then **Complete** to quit the wizard.
 - ↳ The program is not stopped.

Explanation of buttons

Play button magenta	The program can be started
Play button blue	The program is running
Stop button magenta	The program can be stopped
Stop button gray	Cannot currently be selected

Starting programs via digital inputs

Programs with IDs 801-804 can be started remotely via DI13-16.

- ▶ Start the following IDs via the digital inputs:

Digital input	Program	Soft key
13	ID801 Service1	1
14	ID802 Measure1	2
15	ID803 Service2	3
16	ID804 Measure2	4

Starting the program via the soft keys

- ▶ Press the soft key for 3 seconds until the program starts.

10.2.10 Creation of autostart programs

An autostart program makes it possible to create a program that is automatically executed following a failure or reboot.

User role: **Maintenance**

Operation mode: **Setup**

→  55

1. Navigate to: **Application/Operating type and units/Measuring point 1 or Measuring point 2.**
2. In the **Autostart**, select the desired program.

10.2.11 Selecting communication

User role: **Maintenance**

Operation mode: **Setup**

→  55

External communication is always disabled at the factory even if fieldbus communication has been ordered. This communication must be enabled if the connection to the gateway or process control system has been established. As soon as the fieldbus is enabled, the communication is checked. If the communication is not working, the message S1003 is displayed.

1. Navigate to: **Application/Communication**
 - ↳ The configured communication protocol is visible under **Selected communication.**
2. Select the desired communication protocol under **Communication selection.**
3. Click **Accept.**

Communication protocols

- Analog
- Ethernet/IP
- Modbus TCP
- PROFIBUS DP
- PROFINET

10.3 Exporting csv files

User role: **Maintenance**


Operation mode: **Setup**

→  55

The following files can be exported:

Programs	csv files
System configuration	Data for system configuration, e.g. serial number. System configuration is specific for every device.
Device configuration	Settings, e.g. warning limits, for the devices
Operating data	All data that are measured and determined
Logbook	Data from the event logbook and calibration logbook

Exporting the configuration

1. Open the display cover of the control unit. →  25
2. Plug the USB stick into the port provided on the IPC.
3. In the software, navigate to **User Guidance/Service/Import / Export**.
4. Once the USB stick is recognized (this can take up to 30 seconds), follow the instructions of the **Import / Export Assistant**.
 - ↳ The **Start assistant** button appears in magenta.
5. If the USB stick is not recognized, the **Start** button is gray and the **Reboot** button is enabled. The system can then be rebooted with the USB stick and the USB stick will be recognized afterwards.
6. Select **Export** and click on **Next**.
7. Select the data to be exported and click **Next**.
 - ↳ The data to be exported are automatically imported.
8. As soon as the import is finished, click **Complete** to exit User Guidance.
9. Remove the USB stick once the dialog box closes.
10. Close the display cover.
11. Repeat the steps above if reading/writing is unsuccessful.

11 Diagnostics and troubleshooting

11.1 General troubleshooting

11.1.1 Monitoring inputs and outputs

User role: **Maintenance**

Operation mode: **Setup**

→  55

► Open the following menu to monitor or troubleshoot the inputs and outputs:

Application/In-/Outputs.

↳ The following signals and their states are displayed:

Digital inputs

- DI 1: assembly 1 end position 1
- DI 2: assembly 1 end position 2
- DI 3: assembly 2 end position 1
- DI 4: assembly 2 end position 2
- Configurable DI 5 to DI 12
- Soft key 1 to soft key 4
- Pressure monitoring
- Canisters A-C

Digital outputs

- DO 1 to DO 10: user-configurable DO
- DO 11 and DO 12 for operation mode
 - 0 / 0 = setting
 - 1 / 0 = manual
 - 0 / 1 = automatic
 - 1 / 1 = remote access
- DO 13: position of assembly 1 (0 = service, 1 = measure)
- DO 14: position of assembly 2 (0 = service, 1 = measure)
- DO 15: program status (1 = no program active, 0 = program active)
- DO 16: alarm status (0 = alarm, 1 = no alarm)

Analog outputs

Process control system output current value

Pilot valves

Compressed air control in:

- V 1: assembly 1 measure position (NC contact)
- V 2: assembly 1 service position (NO contact)
- V 3: water for channel 1
- V 4: air for channel 1
- V 5: pump A
- V 6: pump B
- V 7: pump C
- V 8: valves for channel 1
- V 9: valves for channel 2
- V 10: user-configurable valve
- V 11: assembly measure position for channel 2 (NC contact)
- V 12: assembly service position for channel 2 (NO contact)
- V 13: water for channel 2
- V 14: air for channel 2
- V 15 to 16: user-configurable valves

11.1.2 Simulating the inputs and outputs

NOTICE

The simulation of valves and outputs can cause the assembly to move or data transmission.

- ▶ Ensure safe operation.

For test purposes, the individual pilot valves and outputs can be simulated (enabled), e.g.:

- Opening or closing of the pilot valves for the assembly position or the pumps
- Program and alarm status

User role: **Maintenance** or **Operator**

Operation mode: **Manual**

→  55

Configuring the simulation

1. Navigate to: **Diagnosis/Simulation**.
2. Set or disable the following values:

Pilot valves


- Positions of assemblies
- Water
- Pressure
- Pump A to C
- Configurable valves

Move assembly to the measure position:

1. Switch on the pilot valve **Assembly 1 measuring position (NC)**.
2. Shortly after this, switch off the pilot valve **Assembly 1 service position (NO)**

Move assembly to the service position:

1. First switch off the pilot valve **Assembly 1 service position (NO)**
2. Shortly after this, switch off the pilot valve **Assembly 1 measuring position (NC)**

-  Pilot valves 1 and 2 for assembly 1
Pilot valves 11 and 12 for assembly 2

Digital outputs

Configurable DO 1 to DO 10

11.2 Overview of diagnostic information

11.2.1 Diagnostic list

All the current diagnostic messages are listed here. A time stamp is available for each message. In addition, the configuration and the description of the message are displayed.

Path 1: **Diagnosis/Current**, most important message pending

Path 2: **Diagnosis/Diagnosis list**, list of all the messages currently pending (if several are active simultaneously)

The following values are determined:

- Description of message
- Measuring Point
- Component
- Description

- State
- Date and time of **Message appears**
- Date and time of **Message disappears**

11.2.2 Device-specific, general diagnostic messages

Namur status	Error number	Error message	Troubleshooting
F Failure	1000		Communication between the controller and pilot valve manifold is interrupted ▶ Check the connection between the devices.
F Failure	1001		Communication between the pilot valve manifold and the remote IO is interrupted. ▶ Check the connection between the devices.
F Failure	1002		Communication between the valve manifold and the remote IO is interrupted. ▶ Check the connection between the devices.
S Out of Spec	1003		The communication between the controller and the process control system (for Modbus TCP) or the gateway (for Profibus, Profinet, Ethernet/IP) is interrupted. ▶ Check the connection between the devices.
F Failure	1100		No float switch signal. 1. Fill the canisters. 2. Replace the float switch. 3. Check the cable connection.
M Maintenance	1101		Limit for residual volume of liquid reached. ▶ Fill the canisters.
M Maintenance	1102		Canisters past expiry date. ▶ Replace the canisters.
M Maintenance	1200		Warning limit of dosing volume of the pump reached. ▶ Service or replace pump.
M Maintenance	1201		Operating time of pump exceeded. ▶ Service or replace pump.
F Failure	1300		Compressed air below the limit value is not measured. Check if all air pipes are leak-tight. ▶ Check pressure supply unit.
M Maintenance	1301		Number of switching operations of the purge air valve is exceeded.
M Maintenance	1302		Number of switching operations of the water valve is exceeded.
M Maintenance	1304		Number of switching operations of the customer valve is exceeded.
M Maintenance	1305		Number of switching operations of valve 8 (valves channel 2) is exceeded.

Namur status	Error number	Error message	Troubleshooting
M Maintenance	1306		Number of switching operations of valve 9 (valves channel 1) is exceeded.
S Out of Spec	1400		Error in program file. Invalid program loaded. E.g.: Program for channel 2 although it is a single-channel device. In the case of single-channel devices, this message is always active during initial commissioning as programs for the second channel are also loaded at the factory. The message disappears automatically when the customer programs have been uploaded. <ol style="list-style-type: none"> 1. Check the file path. 2. Check the file.
S Out of Spec	1401		Invalid step in program. <ul style="list-style-type: none"> ▶ Correct the program.
S Out of Spec	1402		Invalid command sent. For example, if an attempt is made to start a program even though an error is currently active on this channel. The message disappears automatically when a program is started again successfully. <ol style="list-style-type: none"> 1. Check the channel number. 2. Check the program ID.
F Failure	1403		Error in calibration. <ol style="list-style-type: none"> 1. Check the shelf life of the buffer. 2. Remove the sensor and check for dirt. 3. Check hose connections. 4. Make sure enough buffer is pumped in the assembly. 5. Calibrate again and if the error persists replace the sensor.
F Failure	1404	Step precondition breached.	The preconditions requested in the program step (e.g. status of the digital inputs) have not been satisfied. <ul style="list-style-type: none"> ▶ Check inputs.
S Out of Spec	1405		Collision of multiple program starts. <ul style="list-style-type: none"> ▶ Check the scheduling.
S Out of Spec	1407		The limit value of the one-point calibration is exceeded. pH 1-point calibration: +- 0.5ph ORP 1-point calibration: +- 30 mV
M Maintenance	1500		Warning limit for movements exceeded. The assembly must be serviced.
F Failure	1501		Assembly position not defined. <ol style="list-style-type: none"> 1. Check the configuration of the assembly type in the system settings. 2. Check whether the assembly can insert/retract freely. 3. Check pneumatic connections. 4. Check limit position switches

Namur status	Error number	Error message	Troubleshooting
C Function check	216	Hold active	Output values and status of the channel are on hold.
F Failure	374	Sensor check	No measurement signal from sensor <ol style="list-style-type: none"> 1. Check sensor connection. 2. Check sensor. 3. Replace sensor if necessary.
C Function check	951	Hold active CH1	Output values and status of the channels are on hold. <ul style="list-style-type: none"> ▶ Wait until the hold is deactivated again.
C Function check	952	Hold active CH2	
F Failure	992	pH calc. range	pH calculation outside the measuring range
F Failure	993	rH calc. range	rH calculation outside the measuring range
F Failure	002	Sensor unknown	▶ Replace the sensor.
F Failure	004	Sensor defective	▶ Replace the sensor.
F Failure	005	Sensor data invalid	<ol style="list-style-type: none"> 1. Check firmware compatibility for sensor and transmitter. 2. Set the sensor to the factory settings, disconnect the sensor and reconnect it. 3. Update transmitter data. 4. Replace the sensor.
F Failure	010	Sensor scanning	▶ Wait for initialization to be finished.
F Failure	013	Sensor type wrong	Sensor does not suit the device configuration or device configuration must be changed to new type of sensor. <ol style="list-style-type: none"> 1. Change to a sensor of the type that is configured. 2. Adapt the device configuration to the connected sensor.
F Failure	018	Sensor not ready	Sensor communication blocked <ol style="list-style-type: none"> 1. Sensor fails tag check. Replace. 2. Internal software error. Contact the Service Department.
F Failure	022	Temperature sensor	Temperature sensor defective <ul style="list-style-type: none"> ▶ Replace the sensor.
F Failure	061	Sensor electronic	Sensor electronics defective <ul style="list-style-type: none"> ▶ Replace the sensor.
F Failure	062	Sensor connection	<ol style="list-style-type: none"> 1. Check sensor connection. 2. Contact Service Department.
F Failure	100	Sensor communication	Sensor not communicating. <ol style="list-style-type: none"> 1. Check sensor connection. 2. Check sensor connector. 3. Contact Service Department.
F Failure	101	Sensor incompatible	<ol style="list-style-type: none"> 1. Update sensor firmware 2. Replace the sensor. 3. Contact Service Department.


Namur status	Error number	Error message	Troubleshooting
C Function check	107	Calibration active	► Wait for calibration to be finished.
F Failure	120	Sensor reference	Reference warning, impedance of reference too low
M Maintenance	121	Sensor reference	Measuring can continue until the alarm (120) occurs. <ol style="list-style-type: none"> 1. Check reference for clogging/contamination. 2. Clean reference/junction. 3. Replace the sensor.
F Failure	122	Sensor glass	Impedance limit values exceeded/undershot
M Maintenance	123	Sensor glass	Measuring can continue until the alarm (122, 124) occurs. <ol style="list-style-type: none"> 1. Inspect sensor for hair-line cracks and breakage. 2. Check or change limit values. 3. Replace the sensor.
F Failure	124	Sensor glass	
M Maintenance	125	Sensor glass	
M Maintenance	126	Sensor check	Sensor condition check (SCC), poor sensor condition Glass membrane fouled or dry, junction blocked <ol style="list-style-type: none"> 1. Clean sensor, regenerate 2. Replace the sensor.
M Maintenance	127	Sensor check	Sensor condition check (SCC), adequate sensor condition
F Failure	128	Sensor leakage	Leak current alarm Defective due to abrasion or damage Damage to the gate (only ISFET) ► Replace the sensor.
M Maintenance	129	Sensor leakage	Leak current warning Measuring can continue until the alarm occurs.
F Failure	130	Sensor supply	Poor sensor power supply <ol style="list-style-type: none"> 1. Check sensor connection. 2. Replace the sensor.
M Maintenance	179	Operating time	Operating hours > 300 mV, measurement can still take place. <ol style="list-style-type: none"> 1. Replace the sensor. 2. Change monitoring limit. 3. Disable monitoring.
M Maintenance	180	Operating time	Operating hours < -300 mV, measurement can still take place <ol style="list-style-type: none"> 1. Replace the sensor. 2. Change monitoring limit. 3. Disable monitoring.
M Maintenance	193	Operating time	Operating hours > 80 °C (176 °F), measurement can still take place <ol style="list-style-type: none"> 1. Replace the sensor. 2. Change monitoring limit. 3. Disable monitoring.

Namur status	Error number	Error message	Troubleshooting
M Maintenance	194	Operating time	Operating hours > 100 °C (212°F), measurement can still take place <ol style="list-style-type: none"> 1. Replace the sensor. 2. Change monitoring limit. 3. Disable monitoring.
M Maintenance	199	Operating time	Total operating hours
M Maintenance	408	Calibration aborted	Calibration aborted
M Maintenance	500	Sensor calibration	Calibration aborted, measured value varies. Reasons: sensor too old, sensor occasionally dry, calibration value not constant. <ol style="list-style-type: none"> 1. Check sensor. 2. Check calibration solution.
M Maintenance	501	Sensor calibration	Calibration aborted, temperature measured value varies Reasons: sensor too old, sensor occasionally dry, temperature of calibration solution not constant. <ol style="list-style-type: none"> 1. Check sensor. 2. Regulate calibration solution temperature.
M Maintenance	505	Sensor calibration	Max. zero point warning, measurement can still take place Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated <ol style="list-style-type: none"> 1. Check or replace sensor. 2. Check or replace calibration solution. 3. Repeat calibration.
M Maintenance	507	Sensor calibration	Min. zero point warning, measurement can still take place. Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated. <ol style="list-style-type: none"> 1. Check or replace sensor. 2. Check or replace calibration solution. 3. Repeat calibration.
M Maintenance	509	Sensor calibration	Min. slope warning, measurement can still take place. Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated. <ol style="list-style-type: none"> 1. Check or replace sensor. 2. Check or replace calibration solution. 3. Repeat calibration.

Namur status	Error number	Error message	Troubleshooting
M Maintenance	511	Sensor calibration	<p>Max. slope warning, measurement can still take place.</p> <p>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated.</p> <ol style="list-style-type: none"> 1. Check or replace sensor. 2. Check or replace calibration solution. 3. Repeat calibration.
M Maintenance	515	Sensor calibration	<p>Max. operating point warning, measurement can still take place.</p> <p>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated.</p> <ol style="list-style-type: none"> 1. Check or replace sensor. 2. Check or replace calibration solution. 3. Repeat calibration.
M Maintenance	517	Sensor calibration	<p>Min. operating point warning, measurement can still take place.</p> <p>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated.</p> <ol style="list-style-type: none"> 1. Check or replace sensor. 2. Check or replace calibration solution. 3. Repeat calibration.
M Maintenance	518	Sensor calibration	<p>Delta slope warning, measurement can still take place.</p> <p>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated.</p> <ol style="list-style-type: none"> 1. Check or replace sensor. 2. Check or replace calibration solution. 3. Repeat calibration.
M Maintenance	520	Sensor calibration	<p>Delta zero point warning, measurement can still take place.</p> <p>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated.</p> <ol style="list-style-type: none"> 1. Check or replace sensor. 2. Check or replace calibration solution. 3. Repeat calibration.

Namur status	Error number	Error message	Troubleshooting
M Maintenance	522	Sensor calibration	Delta operating point warning, measurement can still take place. Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated. <ol style="list-style-type: none">1. Check or replace sensor.2. Check or replace calibration solution.3. Repeat calibration.
F Failure	722		Impedance of reference membrane too low. <ol style="list-style-type: none">1. Check or replace sensor.2. Check/correct reference limit value.

11.2.3 Process errors without messages

 Operating Instructions "Memosens", BA01245C

11.3 Event logbook

11.3.1 Calibration results

All the current calibration events are listed here. A time stamp is available for each event.

User role: **Maintenance**


Operation mode: **Setup**

→  55

Logbooks as SQLite database

The logbooks can be exported as an SQLite database.

► Select the **User Guidance/Import / Export** menu.

 The wizard button can only be enabled if a USB stick is connected.

View the calibration results

The following values are displayed:

- Time stamp
- Measuring point
- Parameter
- Procedure with program name and ID
- Sensor serial number
- Result area of the calibration data
- Buffer 1: pH value, expiration date
- Buffer 2: pH value, expiration date

► Select the **Diagnosis/Logbook/Calibration events** menu.

11.3.2 Diagnostic events

Lists of diagnostic events. Select a particular event to display more detailed information.

Path: **Diagnosis/Logbook/Diagnosis events**

Details of the diagnostic message:

- Message ID
- Category
- Short description
- Time stamp
- Measuring point affected
- Status of the message

11.4 Resetting the measuring instrument

- ▶ Contact Endress+Hauser specialist staff to reset the device.

11.5 Firmware history

Version	Changes to firmware	Date
03.00.00	Extension: Implementation of a second rinsing block for 2nd measuring point. Improvement: <ul style="list-style-type: none"> ■ Optimization of the local display ■ Improved logbooks ■ Automatic collision detection in schedule of programs ■ Improved processing of sequences in the local display ■ Status LED control according to NAMUR ■ Bug fixing 	01.08.2024
02.02.02	Improvement: <ul style="list-style-type: none"> ■ The pipes for a two-channel system with 2 canisters are displayed. ■ Diagnostics > Simulation of pump 3 works for systems with 2 canisters. ■ When importing schedules via User Guidance > Service > Import/Export, the upcoming programs are updated. 	06.07.2022
02.02.01	Improvement: <ul style="list-style-type: none"> ■ The conversion from integer to time is defined. ■ User guidance displays the duration in seconds. 	09.03.2022
02.02.00	Extension: <ul style="list-style-type: none"> ■ Verification for calibration procedures ■ Auto start program after restart ■ Multiple languages are possible ■ New languages: Spanish, Polish, Italian, French (updated), Dutch, Czech ■ Alarm on schedule collision ■ User guidance for editing sequences ■ User guidance for processing programs ■ Import *.csv files in Excel ■ User guidance for commissioning ■ User guidance for fieldbus Improvement: <ul style="list-style-type: none"> ■ Response time of the local display (completely revised) ■ Menu structure as per E+H Standard 121 ■ Scroll bars replaced by scroll-up and scroll-down buttons ■ Link in the system overview frame for the tank maintenance frame ■ Auto scroll to program overview table ■ The main frame can be replaced ■ Digital outputs DO15/16 are now high active for failsafe ■ Digital output DO16 only displays only one AlarmClass error ■ Digital outputs DO11/12 represent the OpMode ■ Message prompt when acknowledging alarms 	01.10.2021

Version	Changes to firmware	Date
02.01.01	Improvement: <ul style="list-style-type: none"> ▪ Programs are started automatically in "Automatic" operation mode after 5 days. ▪ The preview list of the programs shows a vast amount of time remaining (over 40 days). 	28.05.2021
02.01.00	Extension: Channel alarm: Channel-specific alarms do not block the entire system Improvement: <ul style="list-style-type: none"> ▪ pH one-point calibration ▪ Scheduler cyclic: Programs could run hourly, for example ▪ Combined sensor ▪ Operation mode can be modified remotely ▪ Increased number of user-definable steps ▪ Increased number of programs ▪ Increased number of user-definable sequences ▪ Differential current as analog signal Improvement: <ul style="list-style-type: none"> ▪ Predefined sequences revised in Excel sheet ▪ Some improvements in handling the Excel table ▪ Error feedback of the module in the simulation, most important alarm redefined ▪ Counter-assembly movements ▪ Calculation of canister level ▪ FTP access is password-protected 	25.11.2020

11.5.1 Update

- ▶ Contact Endress+Hauser specialist staff.

12 Maintenance

⚠ CAUTION

Programs not switched off during maintenance activities.

Risk of injury due to medium or cleaning agent!

- ▶ Quit any programs that are active.
- ▶ If testing the cleaning function while cleaning is in progress, wear protective clothing, goggles and gloves or take other suitable measures to protect yourself.

⚠ WARNING

Process pressure and temperature, contamination, electrical voltage

Risk of serious or fatal injury

- ▶ If the sensor has to be removed during maintenance work, avoid hazards posed by pressure, temperature and contamination.
- ▶ Before opening, ensure the device is de-energized.
- ▶ Power can be supplied to switching contacts from separate circuits. De-energize these circuits before work is performed on the terminals.

⚠ CAUTION

Moving assembly

Risk of injury

- ▶ Set the operation mode to configuration before commencing the maintenance work.

⚠ CAUTION

Automatic mode during calibration or maintenance work

Risk of injury from the movement of the assembly, chemicals or contaminated media

- ▶ Before hoses are removed, make sure that no operation is currently running or about to start.
- ▶ Set the device to the configuration mode.
- ▶ Wear protective clothing, goggles and gloves or take other suitable measures to protect yourself.
- ▶ In the case of remote control, set the device to the configuration mode and make sure that no other actions are running.

⚠ CAUTION

Failure to observe the maintenance intervals

Risk of personal injury and damage to property

- ▶ Comply with the recommended maintenance intervals.

NOTICE

Electrostatic discharge (ESD)

Risk of damaging the electronic components

- ▶ Take personal protective measures to avoid ESD, such as discharging beforehand at PE or permanent grounding with a wrist strap.
- ▶ For your own safety, only use genuine spare parts. With genuine parts, the function, accuracy and reliability are also ensured after maintenance work.

12.1 Maintenance intervals

Weekly	Annually
<ol style="list-style-type: none"> 1. Verify the leak-tight condition of compressed air connections on: <ul style="list-style-type: none"> ▪ Pilot valves ▪ Pumps 2. Check the level of buffer and cleaning solution, top up if necessary. 3. Verify that the multihose connections are leak-tight. 4. Check pumps for leaks. 	<ol style="list-style-type: none"> 1. Check if interior is clean, dry and free from corrosion. <ul style="list-style-type: none"> ▪ Clean and dry the interior area. ▪ Verify that seals, couplings and pumps are leak-tight and undamaged. ▪ In the event of corrosion, replace the affected parts. 2. Tighten terminals. 3. Test the level measurement for the buffer and cleaning canisters. 4. Check air filter, depending on ambient conditions.

12.2 Cleaning

- ▶ Clean surfaces using only a damp cloth. Observe the warning notices on the devices.
- ▶ Clean the front of the housing using commercially available cleaning agents only.

The front of the housing is resistant to the following in accordance with DIN 42 115:

- Ethanol (for a short time)
- Diluted acids (max. 2% HCl)
- Diluted bases (max. 3% NaOH)
- Soap-based household cleaning agents

NOTICE

Cleaning agents not permitted

Damage to the housing surface or housing seal

- ▶ Never use concentrated mineral acids or alkaline solutions for cleaning.
- ▶ Never use organic cleaners such as acetone, benzyl alcohol, methanol, methylene chloride, xylene or concentrated glycerol cleaner.
- ▶ Never use high-pressure steam for cleaning.

12.2.1 Sensors

-  Make sure to refer to the sensor operating instructions for information on servicing and troubleshooting the sensor.

CAUTION

Programs not switched off during maintenance activities.

Risk of injury due to medium or cleaning agent!

- ▶ Quit any programs that are active.
- ▶ Switch to the service mode.
- ▶ If testing the cleaning function while cleaning is in progress, wear protective clothing, goggles and gloves or take other suitable measures to protect yourself.

Replacing the sensor while ensuring measuring point availability

If an error occurs or the maintenance schedule stipulates that the sensor has to be replaced, use a new sensor, or a sensor that has been precalibrated in the laboratory.

- A sensor is calibrated in the laboratory under optimum external conditions, thereby ensuring better quality of measurement.
- You must perform onsite calibration if you use a sensor that is not precalibrated.

1. Pay attention to the safety instructions regarding the removal of the sensor that are provided in the Operating Instructions for the sensor.
2. Remove the sensor that requires maintenance.

3. Install the new sensor.
 - ↳ The sensor data are automatically accepted by the transmitter. A release code is not required. Measurement is resumed.
4. Take the used sensor back to the laboratory.
 - ↳ In the laboratory get the sensor ready for reuse while ensuring the availability of the measuring point.

Prepare the sensor for reuse

1. Clean sensor.
 - ↳ For this purpose, use the cleaning agent specified in the sensor manual.
2. Inspect the sensor for cracks or other damage.
3. If no damage is found, regenerate the sensor. Where necessary, store the sensor in a regeneration solution (→ sensor manual).
4. Recalibrate the sensor for reuse.

12.2.2 Assemblies



Refer to the assembly operating instructions for information on servicing and troubleshooting the assembly. The assembly operating manual describes the procedure for mounting and disassembling the assembly, replacing the sensors and seals, and contains information on the material resistance properties, as well as on spare parts and accessories.

Interval	Activities
Weekly	<ol style="list-style-type: none"> 1. Check the top section of the assembly for compressed air leaks and mechanical damage. 2. Check that the process connection is leak-tight in relation to the process and check for mechanical damage. 3. Check compressed air pipes and connections for leaks and mechanical damage.
Monthly	<ol style="list-style-type: none"> 1. Check the retraction of the assembly to the measuring and service position. 2. Clean and lubricate the retraction pipe of the assembly regularly.
Annually and as required	<ol style="list-style-type: none"> 1. Clean the assembly on the outside if necessary. To replace the seal, the assembly must be clean, dry and decontaminated. 2. For inductive feedback, check switching distance. <ol style="list-style-type: none"> 1. If necessary, set the switching distance. 2. Replace the seals that are not in contact with the medium (recommended: if necessary, at least 1x annually). 3. Replace the seals that are in contact with the medium (at least 1x annually, no other recommendations possible as this depends greatly on the process, material and actuation frequency of the assembly). 4. Once maintenance work has been completed, perform the following final inspection: <ul style="list-style-type: none"> ▪ Assembly moves to measure and service position? ▪ Service and measure feedback signals present? ▪ Process connection and compressed air connections leak-tight? ▪ Does measurement indicate plausible values?

The replacement of sealing elements depends on the assembly type. The replacement instructions are included in the relevant service kit. The required service kit can be found in the Operating Instructions for your assembly.

12.2.3 Canister

If the canister is empty, proceed as follows:

1. Loosen the bracket on the inlet side of the pump so that the canister can be replaced.
2. Unscrew and remove the float switch.
3. Fill the empty canister or replace it with a full canister. Use a funnel when filling the canister.
4. Screw the float switch into the canister.
5. Enter the expiry date of the new canister in the local display in menu: **System/ Operating counter/Canister and pumps/Canister and PumpA to C**

12.2.4 Rinsing block

- ▶ Replace the check valves on the rinsing block every 2 years.

12.2.5 Cables, connections and power supply lines

Weekly	Monthly	Biannually
<ul style="list-style-type: none"> ▶ Check the leak-tight condition of: <ul style="list-style-type: none"> ▪ Compressed air hoses and connections, ▪ Pressurized water hoses and connections ▪ Hoses and connections of buffer and cleaner vessels ▪ Multihose connections at control unit and assembly 	<ol style="list-style-type: none"> 1. If the assembly is located in a wet environment or outdoors and you are using analog sensors, check the sensor plug-in head for leaks or moisture. 2. Check sensor cables for damage, in particular to the external insulation. Sensor cables that have become damp inside must be replaced! It is not enough to simply dry them. 3. Verify that cable connections are tight (no leaks). 	<ol style="list-style-type: none"> 1. Check if the interior and circuit boards are clean, dry and free from corrosion. If not: <ul style="list-style-type: none"> ▪ Clean and dry the interior and the circuit boards. ▪ In the event of corrosion, replace the affected circuit boards. ▪ Verify that seals and couplings are leak-tight and undamaged. 2. Tighten the terminals. 3. If the assembly is located in a dry environment and you are using analog sensors, check the sensor plug-in head for leaks or moisture.

Replacing the hoses

1. Rinse the system with water.
2. Replace the hoses with hoses of the same diameter and length.
3. Attach hose labels to the new hoses.
4. Attach hoses to the relevant pilot valves, pumps, rinsing block and assembly.

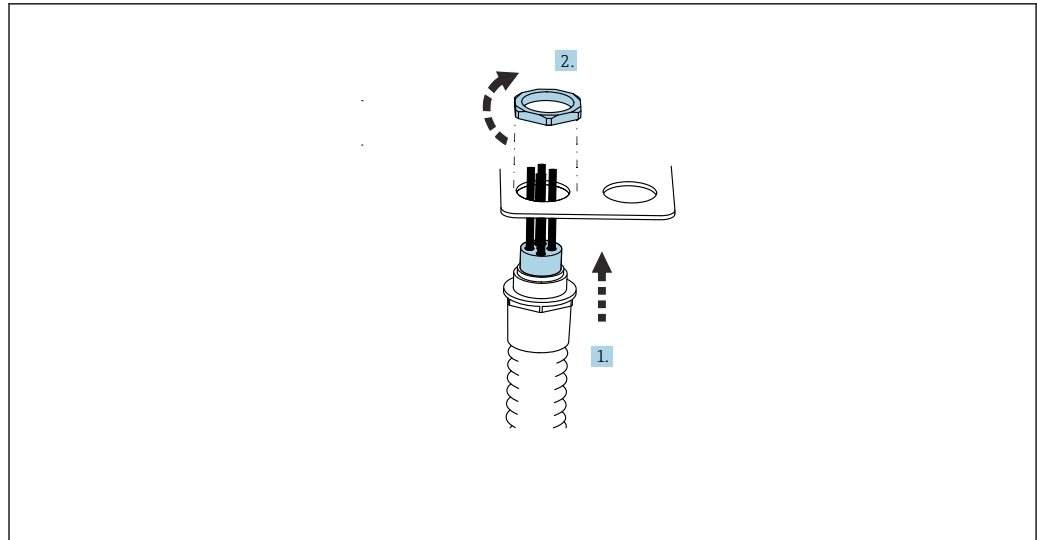
12.3 Maintenance tasks

12.3.1 Mounting the multihoses on the panel after maintenance

If necessary, the multihoses and individual hoses must be mounted again after cleaning or maintenance work.

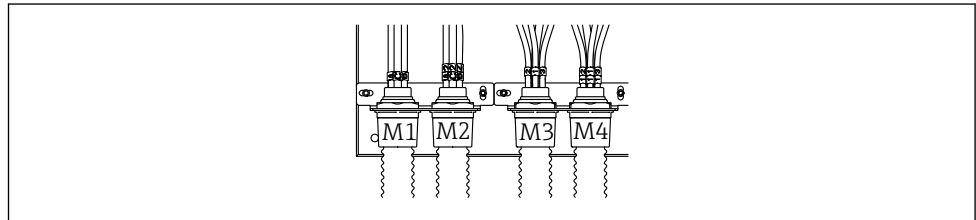
Depending on the configuration, a distinction is made between one and two-channel devices and is indicated with a "/".

The multihoses combine the individual pressure and liquid hoses.



A0055094

1. Guide the hoses through the opening of the multihose bracket on the panel.
2. Use the counterpart to secure the cable gland.
- 3.



A0055095

Mount the multihoses depending on the configuration: From left to right: position 1 = M2 (hoses A-C), position 2 = M4 (hoses A2-C2), position 3 = M1 (hoses 1-4), position 4 = M3 (hoses 11-14)

Connecting the individual hoses

- Depending on the configuration (one/two channel), connect the individual hoses as follows:

Multihose	Function	Hose name Single-channel/two-channel	Panel terminal name Single-channel/two-channel
M1/M3 (compressed air hose)	Compressed air control for assembly, measure position	1/11	1/11
	Compressed air control for assembly, service position	2/12	2/12
	Compressed air control for water valve on rinsing block	3/13	3/13
	Compressed air control for purge air on rinsing block (check valve)	4/14	4/14
M2/M4 (liquid hose)	Pump A/canister A (left)	A/A2	A/A2
	Pump B/canister B (middle)	B/B2	B/B2
	Pump C/canister C (right)	C/C2	C/C2

13 Repair

13.1 General information

The repair and conversion concept provides for the following:

- The product has a modular design
- Spare parts are grouped into kits which include the associated kit instructions
- Only use original spare parts from the manufacturer
- Repairs are carried out by the manufacturer's Service Department or by trained users
- Certified devices can only be converted to other certified device versions by the manufacturer's Service Department or at the factory
- Observe applicable standards, national regulations, Ex documentation (XA) and certificates

1. Carry out the repair according to the kit instructions.
2. Document the repair and conversion and enter, or have entered, in the Life Cycle Management tool (W@M).

Device spare parts that are currently available for delivery can be found on the website:

<https://portal.endress.com/webapp/SparePartFinder>

- ▶ Quote the serial number of the device when ordering spare parts.
- ▶ Following repairs, check that the device is complete, in a safe condition and functioning correctly.

13.2 Return

The product must be returned if repairs or a factory calibration are required, or if the wrong product was ordered or delivered. As an ISO-certified company and also due to legal regulations, Endress+Hauser is obliged to follow certain procedures when handling any returned products that have been in contact with medium.

To ensure the swift, safe and professional return of the device:

- ▶ Check the website www.endress.com/support/return-material for information on the procedure and general conditions.

13.3 Disposal

The device contains electronic components. The product must be disposed of as electronic waste.

- ▶ Observe the local regulations.



If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

Dispose of batteries correctly

- ▶ Always dispose of batteries in accordance with local regulations on battery disposal.

14 Accessories

The following are the most important accessories available at the time this documentation was issued.

Listed accessories are technically compatible with the product in the instructions.

1. Application-specific restrictions of the product combination are possible.
Ensure conformity of the measuring point to the application. This is the responsibility of the operator of the measuring point.
2. Pay attention to the information in the instructions for all products, particularly the technical data.
3. For accessories not listed here, please contact your Service or Sales Center.

14.1 Assemblies

Cleanfit CPA472D

- Robust retractable assembly for pH, ORP and other industrial sensors
- Heavy-duty version made of durable materials
- For manual or pneumatic, remote-controlled operation
- Product Configurator on the product page: www.endress.com/cpa472d



Technical Information TI00403C

Cleanfit CPA473

- Stainless steel process retractable assembly with ball valve shutoff for particularly reliable separation of the medium from the environment
- Product Configurator on the product page: www.endress.com/cpa473



Technical Information TI00344C

Cleanfit CPA474

- Plastic process retractable assembly with ball valve shutoff for particularly reliable separation of the medium from the environment
- Product Configurator on the product page: www.endress.com/cpa474



Technical Information TI00345C

Cleanfit CPA871

- Flexible process retractable assembly for water, wastewater and the chemical industry
- For applications with standard sensors with 12 mm diameter
- Product Configurator on the product page: www.endress.com/cpa871



Technical Information TI01191C

Cleanfit CPA875

- Retractable process assembly for sterile and hygienic applications
- For in-line measurement with standard sensors with 12 mm diameter, e.g. for pH, ORP, oxygen
- Product Configurator on the product page: www.endress.com/cpa875




Technical Information TI01168C

14.2 Sensors

14.2.1 Glass electrodes

Memosens CPS11E

- pH sensor for standard applications in process and environmental engineering
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps11e

 Technical Information TI01493C

Memosens CPS31E

- pH sensor for standard applications in drinking water and swimming pool water
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps31e

 Technical Information TI01574C


Memosens CPS71E

- pH sensor for chemical process applications
- With ion trap for poison-resistant reference
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps71e

 Technical Information TI01496C

Memosens CPS91E

- pH sensor for heavily polluted media
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps91e

 Technical Information TI01497C

14.2.2 ORP sensors


Memosens CPS12E

- ORP sensor for standard applications in process and environmental engineering
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps12e

 Technical Information TI01494C

Memosens CPS42E

- ORP sensor for process technology
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps42e

 Technical Information TI01575C

Memosens CPS72E

- ORP sensor for chemical process applications
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps72e

 Technical Information TI01576C

Memosens CPS92E

- ORP sensor for use in heavily polluted media
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps92e



Technical Information TI01577C

14.2.3 pH ISFET sensors**Memosens CPS47E**

- ISFET sensor for pH measurement
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps47e



Technical Information TI01616C

Memosens CPS77E

- Sterilizable and autoclavable ISFET sensor for pH measurement
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps77e



Technical Information TI01396

Memosens CPS97E

- ISFET sensor for pH measurement
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps97e



Technical Information TI01618C

14.2.4 Combined sensors**Memosens CPS16E**

- pH/ORP sensor for standard applications in process technology and environmental engineering
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps16e



Technical Information TI01600C

Memosens CPS76E

- pH/ORP sensor for process technology
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps76e



Technical Information TI01601C

Memosens CPS96E

- pH/ORP sensor for heavily polluted media and suspended solids
- Digital with Memosens 2.0 technology
- Product Configurator on the product page: www.endress.com/cps96e



Technical Information TI01602C

14.3 Additional functionality

14.3.1 Hardware extension modules

Kit, extension module 4AO

- 4 x analog output 0/4 to 20 mA
- Order number: 71135633

14.4 Other accessories

14.4.1 Cable

Memosens data cable CYK10

- For digital sensors with Memosens technology
- Product Configurator on the product page: www.endress.com/cyk10



Technical Information TI00118C

14.4.2 Storage options

- Industrial Flash Drive, 1 GB
- Order number: 71110815

CDC90 USB stick kit

- 64 GB
- Order No. 71518248

14.4.3 Cable glands

Kit CM44x: gland M

- Set, 6 pieces
- Order number: 71101768

Kit CM44x: gland NPT

- Set, 6 pieces
- Order number: 71101770

Kit CM44x: gland G

- Set, 6 pieces
- Order number: 71101771

Kit CM44x: dummy plug for cable gland

- Set, 6 pieces
- Order number: 71104942

14.4.4 M12 built-in socket and cable junction with Velcro strip

CM442/CM444/CM448/CSF48 kit: M12 built-in socket for digital sensors

- Pre-terminated
- Order number: 71107456

CM442/CM444/CM448/CSF48 kit: M12 built-in socket for Ethernet

- Only for devices with BASE-E module
- D-coded, pre-terminated
- Order number: 71140893

CDC90 Ethernet cable kit, M12-RJ45 90°

For devices with BASE2-E module:
Order number: 71518244

Kit: external CDI socket, complete

- Retrofit kit for CDI interface, with terminated connecting cables
- Order number: 51517507

Cable junction with Velcro strip

- 4 pieces, for sensor cable
- Order number: 71092051

Graphic display

- For installation in the control cabinet door or panel
- Order number: 71185295

Service display

- Portable, for commissioning
- Order number: 71185296

14.4.5 Buffer solutions

High-quality buffer solutions from Endress+Hauser - CPY20

Solutions that are produced in the production laboratory and bottled for testing in the calibration laboratory are used as secondary reference buffer solutions. This test is carried out on a partial sample in accordance with the requirements of ISO 17025.

Product Configurator on the product page: www.endress.com/cpy20

ORP buffer solution CPY3

- 220 mV, pH 7
- 468 mV, pH 0.1

Product Configurator on the product page: www.endress.com/cpy3

15 Technical data

15.1 Input

Measured variables	→ Documentation of the connected sensor
Measuring ranges	→ Documentation of the connected sensor
Types of input	<ul style="list-style-type: none"> ▪ Digital sensor inputs for sensors with Memosens protocol (Base-E module in the CDC90 control unit) ▪ Digital inputs (DIO module in the CDC90 control unit) ▪ Digital inputs, Namur (pneumatic control unit) ▪ Analog inputs (AI module in the CDC90 control unit)
Input signal	<p>Depending on version:</p> <ul style="list-style-type: none"> ▪ Max. 2 x binary sensor signal ▪ Standard: 2 x 0/4 to 20 mA ▪ 0 to 30 V DC
Digital sensor inputs, passive in the CDC90 control unit	<p>Span</p> <p>> 0 to 20 mA</p> <p>Signal characteristic</p> <p>Linear</p> <p>Internal resistance</p> <p>Non-linear</p> <p><i>Test voltage</i></p> <p>500 V</p>
Digital inputs, passive in the CDC90 control unit	<p>Electrical specification</p> <ul style="list-style-type: none"> ▪ Drawing power (passive) ▪ Galvanically isolated <p>Span</p> <ul style="list-style-type: none"> ▪ High: 11 to 30 V DC ▪ Low: 0 to 5 V DC <p>Nominal input current</p> <p>max. 8 mA</p> <p>PFM function</p> <p>Minimum pulse width: 500 µs (1 kHz)</p> <p>Test voltage</p> <p>500 V</p>

Cable specificationMax. 2.5 mm² (14 AWG)

Digital inputs, passive in
the pneumatic control unit

Span

- High: 11 to 30 V DC
- Low: 0 to 5 V DC

Nominal input current

max. 8 mA

Cable specificationMax. 2.5 mm² (14 AWG)

Analog inputs, passive in
CDC90 control unit

Span

> 0 to 20 mA

Signal characteristic

Linear

Internal resistance

Non-linear

15.2 Output

Output types

- Analog outputs, on the Base-E module, active in the CDC90 control unit
- Digital outputs, on the External Remote IO, DIO, active in the pneumatic control unit

Analog outputs, active in CDC90 control unit

Signal on alarm

Adjustable, as per NAMUR Recommendation NE 43

- In measuring range 0 to 20 mA:
failure current from 20 to 23 mA
- In measuring range 4 to 20 mA:
failure current from 2.4 to 23 mA
- Factory setting for failure current for both measuring ranges:
22.5 mA

The failure current of 22.5 mA represents "Failure-category" alarms of the transmitter. More detailed information is available in the Operating Instructions for the transmitter.

In addition, a failure current of 10 mA represents "Failure-category" alarms of the overall system. More detailed information is available in the Special Documentation on Analog Communication. [SD02527C](#)

Load

Max. 500 Ω

Linearization/transmission behavior

Linear

Electrical specification

- Passive
- Open collector, max. 30 V, 15 mA
- Maximum voltage drop 3 V

PFM function

Minimum pulse width: 500 μ s (1 kHz)

Digital outputs, active in the pneumatic control unit

Electrical specification

- Outputs:16
- Max. current: 0.5 A per output
- Total current: max. 8A

Cable specification

Max. 2.5 mm² (14 AWG)

Protocol-specific data

IPC output signals

	Modbus TCP	EtherNet/IP (via gateway)	PROFIBUS DP (via gateway)	PROFINET (via gateway)
Signal encoding	IEEE 802.3 (Ethernet)	IEEE 802.3 (Ethernet)	PROFIBUS-DP-compliant as per IEC 61158	IEEE 802.3 (Ethernet), IEC 61131-3-Code
Data transmission rate	10 / 100 Mbit/s	10 / 100 Mbit/s	9.6 kBit/s - 12 MBit/s autodetect	10 / 100 Mbit/s
Galvanic isolation	Yes	Yes	Yes	Yes
Connection	M12	See gateway	See gateway	See gateway
IP address	192.168.0.1	192.168.0.6	192.168.0.5	192.168.0.7
Address			77	

Modbus TCP

TCP port	502	
TCP connections	3	
Log	TCP	
Function codes	03, 04, 06, 08, 16, 23	
Broadcast support for function codes	06, 16, 23	
Supported features	Address can be configured using DHCP or software	
IO data	Input (T → O)	Program control
	<ul style="list-style-type: none"> ▪ Output (O → T) ▪ System Information ▪ Measured values and status ▪ IO Feedback 	<ul style="list-style-type: none"> ▪ Program feedback ▪ Status signals ▪ Measured values ▪ Sensor calibration

Web server

The Liquiline Control's IPC features a web server that allows users to configure the device, visualize measured values and check the status of the entire system.

The web server of the CDC90 control unit enables the direct configuration of the connected sensor and peripheral modules for digital/analog inputs and outputs. The two web servers can be accessed via separate IP addresses.

Liquiline transmitter

TCP port	80
Supported features	<ul style="list-style-type: none"> ▪ Remote-controlled device configuration ▪ Save/restore device configuration (via SD card) ▪ Export as SQLite database ▪ Access to web server via Internet browser

IPC

TCP port	8080
Supported features	<ul style="list-style-type: none"> ▪ Remote-controlled device configuration ▪ Access to web server via Internet browser

15.3 Power supply

Supply voltage	100 to 230 V AC Fluctuations in the mains voltage may not exceed ± 10 percent of the nominal voltage.
Frequency	50/60 Hz
Power consumption	Max. 50 VA
Cable specification	Power supply cable (mains) Cable cross-section: <ul style="list-style-type: none">■ Minimum cross-section 3 x 0.75 mm² to 10 m length■ Minimum cross-section 3 x 1.5 mm² to 20 m length
Overvoltage protection	Integrated overvoltage protection according to EN 61326 Protection category 1 and 3
Electrical connection	Electrical safety IEC 61010-1, Class I equipment Low voltage: overvoltage category II Environment < 2000 m (< 6562 ft) above MSL

15.4 Performance characteristics

Response time	<p>Current outputs t_{90} = max. 500 ms for an increase from 0 to 20 mA</p> <p>Current inputs t_{90} = max. 330 ms for an increase from 0 to 20 mA</p> <p>Digital inputs and outputs t_{90} = max. 330 ms for an increase from low to high</p>
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Reference temperature	25 °C (77 °F)
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Measurement error for sensor inputs	→ Documentation of the connected sensor
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Measurement error for current inputs and outputs	<p>Typical measured errors: < 20 µA (with current values < 4 mA) < 50 µA (with current values 4 to 20 mA) at 25 °C (77 °F) each</p> <p>Additional measured error depending on the temperature: < 1.5 µA/K</p>
--	---

Frequency tolerance of digital inputs and outputs	≤ 1%
---	------

Resolution of current inputs and outputs	< 5 µA
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Repeatability	→ Documentation of the connected sensor
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15.5 Mounting

Installation instructions	Rinse water supply
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Hose barb connection	D12 PP for hoses with internal diameter 12 mm (0.47 in)
Pressure	3 to 6 bar (44 to 87 psi)
Temperature	Max. 60 °C (140 °F)
Quality	Particle size 100 µm max.

Compressed air supply

Connection	ID 6 mm (0.24 in)/OD 8 mm (0.31 in)
Pressure	4 to 6 bar (58 to 87 psi)
Temperature	Max. 60 °C (140 °F)
Quality	Particle size 50 µm max. Oil-free Condensate-free


15.6 Environment

Operate the system only using liquids with a conductivity of > 10 nS/cm.

This device may only be used indoors.

Ambient temperature range	0 to 45 °C (32 to 113 °F)
Storage temperature	-20 to 70 °C (-4 to 158 °F)
Relative humidity	10 to 90 %, non-condensating
Operating altitude	Max. altitude above MSL < 2000 m (< 6562 ft) above MSL
Degree of protection	This product is designed for indoor use only and should not come into contact with any wetness or be used in a wet environment. CDC90 control unit IP66/Type 4X Pneumatic control unit IP54/Type 12
Climate class	As per IEC 60654-1: B2
Electromagnetic compatibility	Interference emission and interference immunity as per EN 61326-1, class A for industrial areas
Pollution degree	The product is suitable for pollution degree 2.

15.7 Mechanical construction

Dimensions	See: →  14
Weight	Complete device on mounting plate: Approx. 71 Kg (156.528 lbs)

Materials

Device	Material
CDC90 control unit	
Module housing	PC (polycarbonate)
Soft keys	TPE (thermoplastic elastomers)
LED	POM
Cable mounting rail	Stainless steel 1.4301 (AISI 304)
Display glass	Plastic capacitive touchscreen
Cable glands	PA (polyamide) V0 as per UL94
M12 cable glands	PA (polyamide)
Housing seals	EPDM
Cable gland O-ring	EPDM
Pneumatic control unit	
Housing	Stainless steel 1.4301 (AISI 304), painted steel
Housing seals	EPDM (ethylene propylene diene rubber)
Cable glands	PA (polyamide) V0 as per UL94
Housing seals	EPDM
Pumps + canister unit	
Pump	PVDF+CF/PP/NBR+PTFE/PTFE/PP
Canister	PE
Float switch	PVC/EPDM/PE
Bracket M5 L110*B40 W8	PP
O-ring	EPDM
Coupling DMG/8*6 1/4	PP
Canister shelf	PP
Rinsing block	
Process valve	EPDM/PP/stainless steel:1.4408/PTFE
Rinsing body	PVDF/1.4401
Rinse connection	PP
Check valves	PVDF+FKM/PVDF+FFKM/1.4571+FKM
Bracket, metal plate	1.4571
Bracket, clamp	1.4404
Hose bracket/cable gland	PA
Sealing plug	Teflon
Double nipple	PVDF
O-ring	FKM/FFKM
Hoses	
Compressed air	PUN-A
Liquid	PUN-A+/PTFE

Hose specification

Medium hoses

Max. 6 bar (87 psi)

Compressed air hoses

Pressure ratings of pilot valve manifold:

Max. 10 bar (145 psi)

Pressure switch:
Max. 12 bar (174 psi)

Pump

Vacuum pump:
Max. 6 bar (87 psi) (6 bar corresponds to 6 l/min delivery rate, depending on the control air)

Lines

Max. 10 bar (145 psi)

Operating air pressure

Max. 6 bar (87 psi)

Connections

Water connection	Size
Water connection via hose barb	Hose barb D12 PP for hoses with internal diameter 12 mm (0.47 in)
Water connection, rinsing block	
Assembly inlet and outlet	Hose coupling D6/8 mm (0.24/0.31 in) PVDF

Hose diameter	Size
Medium	ID 6 mm (0.24 in)/ OD 8 mm (0.31 in)
Compressed air	Compressed air supply, purge air: ID 6 mm (0.24 in)/OD 8 mm (0.31 in) Compressed air of assemblies, valves, pumps: ID 4 mm (0.16 in)/OD 6 mm (0.24 in) Pump inlet, air: ID 2.5 mm (0.1 in)/OD 4 mm (0.16 in)
Multihoses	Maximum length: 10 m (32.8 ft) OD of the union nut: 60 mm (2.36 in)

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