Operating Instructions
Liquiline Control CDC90
Automated cleaning and calibration of Memosens sensors
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1 About this document

<table>
<thead>
<tr>
<th>Structure of information</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DANGER</strong></td>
<td>This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation <strong>will</strong> result in a fatal or serious injury.</td>
</tr>
<tr>
<td>Causes / consequences</td>
<td>If necessary, Consequences of non-compliance (if applicable)</td>
</tr>
<tr>
<td>Corrective action</td>
<td></td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td>This symbol alerts you to a dangerous situation. Failure to avoid the dangerous situation <strong>can</strong> result in a fatal or serious injury.</td>
</tr>
<tr>
<td>Causes / consequences</td>
<td>If necessary, Consequences of non-compliance (if applicable)</td>
</tr>
<tr>
<td>Corrective action</td>
<td></td>
</tr>
<tr>
<td><strong>CAUTION</strong></td>
<td>This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or more serious injuries.</td>
</tr>
<tr>
<td>Causes / consequences</td>
<td>If necessary, Consequences of non-compliance (if applicable)</td>
</tr>
<tr>
<td>Corrective action</td>
<td></td>
</tr>
<tr>
<td><strong>NOTICE</strong></td>
<td>This symbol alerts you to situations which may result in damage to property.</td>
</tr>
<tr>
<td>Cause/situation</td>
<td>If necessary, Consequences of non-compliance (if applicable)</td>
</tr>
<tr>
<td>Action/note</td>
<td></td>
</tr>
</tbody>
</table>

1.1 Symbols

- Additional information, tips
- Permitted or recommended
- Not permitted or not recommended
- Reference to device documentation
- Reference to page
- Reference to graphic
- Result of a 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 which are available on the complement these Brief Operating Instructions Operating Instructions:

- 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
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. The system is fully equipped with power supply cables and a hose system.

2.2.1    Non-intended use

Use of the device for any purpose other than that described, poses a threat to the safety of people and of the entire measuring system and is therefore not permitted.

The manufacturer is not liable for damage caused by improper or non-designated 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:
  - Products must be taken out of service and protected against unintentional operation.
**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 before you remove sensors from the assembly.
- If you need to test the cleaning function while cleaning is in progress, wear protective clothing, goggles and gloves or take other suitable measures to protect yourself.
2.5  Product safety

2.5.1  State-of-the-art technology
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
- Pneumatic control unit
- Canister pump unit
- Ethernet switch

The system is available in different versions. Here is a complete overview comprising all of the system's modules.

![Total view of CDC90](image)

1. **CDC90 control unit**
2. **Mounting plate**
3. **Ethernet switch**
4. **Pneumatic control unit**
5. **Canister for buffer solutions and cleaner**
6. **Canister holder**
7. **Float switch**
8. **Pumps**
3.1.1 Overview of pneumatic control unit

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

![Diagram of pneumatic control unit](image)

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

3  Pneumatic control unit for a 2nd measuring point

1  Extension of the output interface terminals for a 2nd measuring point

2  Extension of the pilot valves for a 2nd measuring point
4. **Incoming acceptance and product identification**

4.1 **Incoming acceptance**

1. Verify that the packaging is undamaged.
   - Notify the supplier of any damage to the packaging.
   - Keep the damaged packaging until the issue has been resolved.
2. Verify that the contents are undamaged.
   - Notify the supplier of any damage to the delivery contents.
   - Keep the damaged goods until the issue has been resolved.
3. Check that the delivery is complete and nothing is missing.
   - Compare the shipping documents with your order.
4. Pack the product for storage and transportation in such a way that it is protected against impact and moisture.
   - The original packaging offers the best protection.
   - Make sure to comply with the permitted ambient conditions.

If you have any questions, please contact your supplier or your local Sales Center.

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 **Product identification**

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

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.

4.3 Scope of delivery

The scope of delivery comprises:
- 1 CDC90 control unit in the version ordered
- 1 pneumatic control unit
- Up to 3 pumps for supplying cleaner and buffer with canisters
- Up to 3 float switches, complete with cable to canisters
- 1 rinsing block with bracket for mounting on the process assembly
- 2 hose packages for compressed air and liquid; 3 hose packages if there is more than one measuring point
- 1 x Brief Operating Instructions (hard copy)
- Conduit adapter G 1/4" for hose 6/8 mm (ID/OD) for the assembly rinse connections: x 2 for 1 measuring point/ x 4 for 2 measuring points
- USB stick
- In the case of 2 measuring points: 1 changeover valve to control the supply of medium to the two assemblies

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

- If you have any queries:
  Please contact your supplier or local sales center.
5 Mounting

5.1 Mounting requirements
The device is intended for wall mounting.
Wall mounting as:
Panel

5.1.1 Installation site
Note the following when erecting the device:
1. Make sure that the wall 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
Dimensions of CDC90 control unit

Dimensions of field housing in mm (in)
Mounting

Liquiline Control CDC90

Dimensions of pneumatic control unit

Dimensions of canister holder

\[ \text{Dimensions of pneumatic control unit in mm (in)} \]

\[ \text{Dimensions of canister holder in mm (in)} \]
Dimensions of canister with pump in mm (in)

Dimensions of rinsing block and changeover valve

Dimensions of rinsing block PVDF, in mm (in)

Dimensions of changeover valve, 2nd measuring point in mm (in)
5.2 Mounting the system

5.2.1 Wall mounting

**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.

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  Maximum hose and cable length for one measuring point

- The maximum length of the multihose is 10 m (32.8 ft) ⇒ 28.

- Shorten the hoses if necessary.

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 empty.

- Always mount the rinsing block and the assembly above the canisters.

5.2.3  Multihose bracket

- Brackets for the multihoses are included in the scope of delivery. The wall plugs, screws and washers must be provided by the customer.

![Multihose bracket](image)

12  Multihose bracket

- Screw the bracket of the multihose onto the wall with washers.

5.2.4  Securing the rinsing block on the assembly

⚠️ CAUTION

Risk of injury
Crush injuries or other injuries may occur.

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

Rinsing block bracket on assembly

![Mounting the rinsing block bracket](image)

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.
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.

Fixing multihose on rinsing block

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

Connecting the individual hoses in the multihose to the rinsing block valve

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  Mounting the changeover valve for the 2nd measuring point

1. Guide the mounting plate with the changeover valve along the holder of the rinsing block.

2. Connect the two parts using the screws provided.

5.2.6  Mechanical connection

⚠️ CAUTION
Very loud pumps
The noise from the pumps can hurt the ears.
- Wear ear protectors in the vicinity of the pumps.

Connecting the medium and compressed air

*Hose connection diagram*

The system contains a hose package comprising:
Compressed air and rinsing hoses

⚠️ 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).
Hose connection diagram for medium and compressed air for one measuring point

1  Pumps 1-3
2  Canister 1-3
3  Multihose M2
4  Assembly (connection I = measure, connection O = service)
5  Rinsing block
6  Multihose M1
7  Pilot valve manifold in pneumatic control unit (view from below)
8  Process valve
9  Water connection
10  Liquid
11  Compressed air
12  Hose name

The individual hoses are grouped together in multihoses.

<table>
<thead>
<tr>
<th>Multihose</th>
<th>Function</th>
<th>Hose numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1 (compressed air hose)</td>
<td>Compressed air control for process valve, water</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Compressed air control for assembly, measuring position, 1st measuring point</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Compressed air control for process valve, purge air</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Compressed air control for assembly, service position, 1st measuring point</td>
<td>2</td>
</tr>
<tr>
<td>M2 (liquid hose)</td>
<td>Pump 1 / canister 1 (left)</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Pump 2 / canister 2 (center)</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>Pump 3 / canister 3 (right)</td>
<td>C</td>
</tr>
<tr>
<td>M3</td>
<td>Compressed air control for changeover valve, 2nd measuring point</td>
<td>8, 11</td>
</tr>
</tbody>
</table>
Connecting compressed air supply

Compressed air supply
When connecting, pay attention to the following:
- 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 (50 μm) and free from oil and condensate.
- The internal diameter must be at least 6 mm (0.24 in).
- The outer diameter must be at least 8 mm (0.31 in).

Hose specification

<table>
<thead>
<tr>
<th>Hose</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water connection via hose barb</td>
<td>For water hose with internal diameter 12 mm (0.47 in)</td>
</tr>
<tr>
<td>Compressed air</td>
<td>D 6/8 mm (0.24/0.31 in)</td>
</tr>
</tbody>
</table>

Connection in the pneumatic control unit

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

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

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

*M1 - air hoses from the pneumatic control unit to the rinsing block and assembly*

**M1 connection in the pneumatic control unit**

The air hoses for the pilot valves in the pneumatic control unit are already connected at the factory.

The air hoses for the pilot valves are located in the hose package of the M1 multihose.

1. Guide hoses 1, 2, 3 and 4 of the M1 multihose into the cable gland provided on the pneumatic control unit.

2. Connect the hoses to the pilot valve manifold as follows:

<table>
<thead>
<tr>
<th>Pilot valve</th>
<th>Function</th>
<th>Hose number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compressed air control for assembly, measuring position</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Compressed air control for assembly, service position</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Compressed air control for process valve, water</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>Compressed air control for process valve, purge air</td>
<td>4</td>
</tr>
</tbody>
</table>

**M1 connection on rinsing block and assembly**

3. Connect hose 1 to the connection for moving the assembly in the measuring position.
4. Connect hose 2 to the connection for moving the assembly in the service position.
5. Connect hose 3 to the compressed air control unit for the process valve for water on the rinsing block.
6. Connect hose 4 (compressed air control unit for the process valve for purge air) to the valve for purge air on the rinsing block.
**Connection on assemblies CPA87x and CPA471/472/472D/475**

<table>
<thead>
<tr>
<th>Hose number:</th>
<th>Connection on assembly:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPA87x</td>
<td></td>
</tr>
<tr>
<td>Hose 1</td>
<td>I, measure position</td>
</tr>
<tr>
<td>Hose 2</td>
<td>O, service position</td>
</tr>
<tr>
<td>CPA471/472/472D/475</td>
<td></td>
</tr>
<tr>
<td>Hose 1</td>
<td>Upper connection</td>
</tr>
<tr>
<td>Hose 2</td>
<td>Lower connection</td>
</tr>
</tbody>
</table>

**Connecting assembly CPA473/474**

- Connect the hoses as follows:

<table>
<thead>
<tr>
<th>Hose number:</th>
<th>Connection on assembly:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hose 1</td>
<td>2 on block, measuring</td>
</tr>
<tr>
<td>Hose 2</td>
<td>3 on block, service</td>
</tr>
</tbody>
</table>

**M2- liquid hoses from pumps to rinsing block**

**M2 connection to pumps**

The hoses for supplying liquid to the rinsing block are located in the hose package of the M2 multihose.

1. Connect the hoses to the pumps from left to right as follows:

<table>
<thead>
<tr>
<th>Hose number</th>
<th>Pump</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pump 1 (left)</td>
<td>Liquid, canister 1</td>
</tr>
<tr>
<td>B</td>
<td>Pump 2 (center)</td>
<td>Liquid, canister 2</td>
</tr>
<tr>
<td>C</td>
<td>Pump 3 (right)</td>
<td>Liquid, canister 3</td>
</tr>
</tbody>
</table>

2. Connect the hoses as follows for the transportation of cleaner and buffer at the pump:
## Connection of media

### M2 connection to rinsing block
- Connect the hoses from the pumps to the valves of the rinsing block as follows:

<table>
<thead>
<tr>
<th>Hose number</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Liquid, canister 1</td>
</tr>
<tr>
<td>B</td>
<td>Liquid, canister 2</td>
</tr>
<tr>
<td>C</td>
<td>Liquid, canister 3</td>
</tr>
</tbody>
</table>
Liquiline Control CDC90

Mounting

*M3 (2nd measuring point) - air hoses from the pneumatic control unit to the changeover valve and assembly of the 2nd measuring point*

**M3 connection in the pneumatic control unit**

The hoses on the pilot valves in the pneumatic control unit are already connected at the factory.

The hose package of the M3 multihose contains the following hoses:
- Changeover valve activation
- Assembly retraction

1. Guide the hoses of the M3 multihose into the cable gland provided on the pneumatic control unit.

2. Connect the hoses on the pilot valves in the pneumatic control unit as follows:

<table>
<thead>
<tr>
<th>Pilot valve</th>
<th>Function</th>
<th>Hose number</th>
</tr>
</thead>
<tbody>
<tr>
<td>9, 10</td>
<td>Compressed air control for changeover valve, top, 1st measuring point</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Compressed air control for changeover valve, bottom, 2nd measuring point</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>Compressed air control for assembly, measuring position, 2nd measuring point</td>
<td>9</td>
</tr>
<tr>
<td>12</td>
<td>Compressed air control for assembly, service position, 2nd measuring point</td>
<td>10</td>
</tr>
</tbody>
</table>

**M3 connection to changeover valve and assembly of 2nd measuring point**

3. Connect hose 8 to the upper connection of the changeover valve (to control the supply of medium to the first measuring point).

4. Connect hose 11 to the lower connection of the changeover valve (to control the supply of medium to the second measuring point).
5. Connect hose 9 to the connection for moving the assembly to the measuring position.
6. Connect hose 10 to the connection for moving the assembly to the service position.

**Connection to assemblies CPA87x and CPA47x**

<table>
<thead>
<tr>
<th>Hose number:</th>
<th>Connection on assembly:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPA87x</td>
<td></td>
</tr>
<tr>
<td>Hose 9</td>
<td>I, measure position</td>
</tr>
<tr>
<td>Hose 10</td>
<td>O, service position</td>
</tr>
<tr>
<td>CPA47x</td>
<td></td>
</tr>
<tr>
<td>Hose 9</td>
<td>Upper connection</td>
</tr>
<tr>
<td>Hose 10</td>
<td>Lower connection</td>
</tr>
</tbody>
</table>

**Connecting assembly CPA473/474**

- Connect the hoses as follows:

<table>
<thead>
<tr>
<th>Hose number:</th>
<th>Connection on assembly:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hose 9</td>
<td>2 on block, measuring</td>
</tr>
<tr>
<td>Hose 10</td>
<td>3 on block, service</td>
</tr>
</tbody>
</table>

**Rinse pipe on rinsing block**

1. Liquid, pump/ canister 1
2. Liquid, pump/ canister 3
3. Outlet rinse connection to assembly
4. Liquid, pump/ canister 2
5. Air rinsing block (pilot valve 4)
6. Water connection
7. Air process valve (pilot valve 3)
Connecting the rinse water

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).

Pay attention to the quality of the rinse water. Particles larger than 100 μm should be filtered using a water filter.

1st measuring point

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.

1. Rinse the pipe thoroughly.
2. Connect the rinse water (6) to the water connection (5) of the rinsing block (4).
3. Connect the rinse chamber connection (3) on the rinsing block to the rinse connection (2) of the assembly (1).

2nd measuring point

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

The supply of medium for both assemblies is regulated by the changeover valve.

1. Rinse the pipe thoroughly.
2. Connect the rinse water (7) to the water connection (6) of the rinsing block.
3. Connect the rinse chamber connection (4) on the rinsing block (5) to the rinse connection (3) of the changeover valve (2).
4. Connect the rinse connections of the assemblies (1) to the rinse connections of the changeover valve, 1st measuring point on right, 2nd measuring point on left.

**Shortening the multihoses**

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

1. Unscrew the M3 multihose from the rinsing block.
2. Remove the corrugated hose (outer sheathing of the multihose) from the fastener and the plug.
3. Guide the hoses and cables further inside the corrugated hose so that they can be pulled out at the other end.
4. Pull out the hoses and cables to the point where the corrugated hose should be shortened.
5. Carefully cut into the corrugated hose. Take care not to damage the inner hoses or cables.
6. Shorten the corrugated hose to the desired length.
7. Pull the hoses through the fastener and the plug.
8. Secure the corrugated hose to the bracket.

The total length of the hoses to measuring points 1 and 2 may not exceed 10 m (32.8 ft).

**Installation option 1**

```
A = Pneumatic control unit
B = Rinsing block and changeover valve
MS1 = Measuring point 1
MS2 = Measuring point 2
```

```
A+B= max 10 m
```

**Installation option 2**

```
A = Length of multihose M2 for media to the rinsing block.
B = Length of the connecting hose from the changeover valve to measuring point 2.
A+B = Length of individual hoses 9 and 10 from multihose M3 for air to control measuring point 2.
```

```
A+B = max 10 m
A+C = max 10 m
```

```
1 = Length of individual hoses 3 and 4 from multihose M1 for air to control the water valve and purge air.
2 = Length of individual hoses 8 and 11 from multihose M3 for air to control the changeover valve.
B, C = Length of the connecting hose from the changeover valve to measuring point 1 or measuring point 2.
A, B, A+C = Length of individual hoses 1 and 2 from multihose M1 for air to control measuring point 1.
```
Connecting the pump

Compressed air control

The compressed air control of the pumps is already connected ex works.

- For the compressed air control of the pumps, connect the 4 mm (0.16 in) tube piece provided and the 4 to 6 mm (0.16 to 0.24 in) conduit adapter as follows:

## 22 Connecting the compressed air control

<table>
<thead>
<tr>
<th>Pilot valve</th>
<th>Function</th>
<th>Hose number</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Pump 1, liquid canister 1 (left)</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Pump 2, liquid canister 2 (center)</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>Pump 3, liquid canister 3 (right)</td>
<td>7</td>
</tr>
</tbody>
</table>

### 5.3 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

**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 made before all other connections. If the protective ground is disconnected, this can be a source of danger.
- The circuit breaker must be located near the device.

1. Make sure to establish a sufficient connection of at least 0.75 mm² (0.029 in²) to the housing protective ground system.
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, designated 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 ± 10 %.

6.2 Connecting the CDC90 control unit

**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.

6.2.1 Cable gland assignment

The CDC90 control unit is already wired at the factory.
### 6.2.2 Modules of the CDC90 control unit

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

The unique terminal name is derived from:
- Slot no. : Port no. : Terminal

**Example of terminal name:**

<table>
<thead>
<tr>
<th>Wiring</th>
<th>Designation</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC90 control unit supply voltage</td>
<td>W11</td>
<td>H</td>
</tr>
<tr>
<td>Ethernet cable from IPC to Ethernet switch</td>
<td>W23</td>
<td>5</td>
</tr>
<tr>
<td>Sensor, 1st measuring point</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Sensor, 2nd measuring point</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Ethernet cable from BASE2-E to Ethernet switch</td>
<td>W24</td>
<td>8</td>
</tr>
<tr>
<td>Sensor, float switch, pressure switch, IPC power supply</td>
<td>W8</td>
<td>G</td>
</tr>
</tbody>
</table>
6.2.3 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 suitable Phillips screwdriver.

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

6.2.4 Connecting the cable shield

**Tip** Only use terminated original cables where possible. The sensor cable, fieldbus cable and Ethernet cable must be shielded cables.

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)

1. Outer shield (exposed)
2. Cable cores with ferrules
3. Cable sheath (insulation)
4. Grounding clamp

1) Please pay attention to the instructions in the ‘Ensuring the degree of protection’ section

1. Loosen a suitable cable gland on 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.

6.2.5 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.
6.2.6 Connecting the supply voltage for the CDC90 control unit

"H" cable gland

The supply voltage for the CDC90 control unit is already wired at the factory.

- Guide the cable of the supply voltage through the cable gland "H" provided.

6.3 Connecting the sensors

6.3.1 Sensor types

Sensors with Memosens protocol

<table>
<thead>
<tr>
<th>Sensor types</th>
<th>Sensor cable</th>
<th>Sensors</th>
</tr>
</thead>
</table>
| Digital sensors without additional internal power supply | With plug-in connection and inductive signal transmission | - pH sensors  
  - ORP sensors  
  - Combined pH/ORP sensors |
Guide the sensor cable of the 1st measuring point through cable gland "6" provided.

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

**Connecting the sensor cable**

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

2. When connecting via M12 connector:
   Connect the sensor connector to an M12 sensor socket which has been previously installed or is supplied on delivery.

30  **Direct connection of sensors without additional supply voltage**

### 6.4 Connecting additional inputs and outputs

**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.

- If additional shields are required, connect them with PE centrally in the control cabinet via terminal blocks supplied by the customer.
6.4.1 Digital inputs and outputs

For monitoring the compressed air and the float switches.

Connecting the DIO

*Digital I/O connection to the actuator terminal in the pneumatic control unit*

<table>
<thead>
<tr>
<th>Cable wire</th>
<th>CDC control unit: DIO module</th>
<th>Pneumatic control unit: terminal X2, bottom</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>W8, 5</td>
<td>Slot 5 (24V DC - 1) – terminal 47</td>
<td>1</td>
<td>Pressure switch BK, float switch, pump 1 BK</td>
</tr>
<tr>
<td>W8, 6</td>
<td>Slot 5 DI 1 terminal 91</td>
<td>2</td>
<td>Float switch, pump 1 BN</td>
</tr>
<tr>
<td>W8, 7</td>
<td>Slot 5 DI 2 terminal 91</td>
<td>3</td>
<td>Pressure switch BN</td>
</tr>
<tr>
<td>W8, 8</td>
<td>Slot 6 (24V DC - 1)</td>
<td>4</td>
<td>Float switch, pump 3 BK</td>
</tr>
<tr>
<td>W8, 9</td>
<td>Slot 6 DI 1 terminal 91</td>
<td>5</td>
<td>Float switch, pump 3 BN</td>
</tr>
<tr>
<td>W8, 10</td>
<td>Slot 6 (24V DC - 2) terminal 47</td>
<td>6</td>
<td>Float switch, pump 2 BK</td>
</tr>
<tr>
<td>W8, 11</td>
<td>Slot 6 DI 2 terminal 91</td>
<td>7</td>
<td>Float switch, pump 2 BN</td>
</tr>
</tbody>
</table>
6.4.2 Current inputs

2AI module

![Diagram of 2AI module]

Input for control signal from soft keys.
1. Input for control signal from soft keys.
2. Input for control signal from control station to control the implementation of the program remotely.

6.4.3 Current outputs

Module BASE2-E, 2AO

![Diagram of Module BASE2-E, 2AO]

Transmission of the status signals from the measuring point to the control system.
1. Output to control the status LED on the CDC90 control unit
2. Output to transmit the status signals from the measuring point to the control system

Optional: additional 4AO module for measured values.
Transmission of the measured values (user-definable) from the measuring point to the control system.

### 6.5 Connecting digital communication

#### 6.5.1 Connecting the Ethernet

**CAUTION**

Electric shock!

- The connected external devices must be insulated against dangerous voltages that may occur.

**Connecting the Ethernet switch communication cable to the CDC90 control unit**

The communication between the CDC90 control unit and the Ethernet switch is already wired at the factory.

1. In the CDC90 control unit, connect the Ethernet adapter cable W19 to the Ethernet connection of the BASE2-E module (3).
Connect the Ethernet adapter cable W24 to cable gland "8" provided.  
† The W19 and W24 cables form a bridge.

3. Connect the EtherNet adapter cable at the EtherNet switch (1) to the connection (2) provided for this purpose.

**Connecting the Ethernet switch communication cable to the pneumatic control unit**

The Ethernet cable for internal communication between the Ethernet switch and the pneumatic control unit is already wired at the factory.

1. Connect the communication cable (W22) at the Ethernet switch (2) to the connection (1).

2. Connect the W22 cable to cable gland "4" of the pneumatic control unit (3) from below.  →  41

3. Connect the W20 cable in the pneumatic control unit (3) to cable gland "4" from the inside.  
   † The W22 and W20 cables form a bridge.
4. Connect the W20 cable in the pneumatic control unit (3) to the fieldbus interface IN1 of the bus node (4).

**Connecting the supply voltage of the Ethernet switch**

The supply voltage of the Ethernet switch is already wired in the pneumatic control unit at the factory.

1. Connect the supply voltage (W9) at the Ethernet switch (1) to the connection (2).
2. Guide the W9 cable into the cable gland “9” of the pneumatic control unit.
3. Connect the wires as follows (3):

<table>
<thead>
<tr>
<th>Terminal -XL+</th>
<th>Cable wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>+2</td>
<td>Brown</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terminal -XL-</th>
<th>Cable wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>Blue</td>
</tr>
<tr>
<td>PE</td>
<td>Gray</td>
</tr>
</tbody>
</table>

**6.5.2 Connecting the IPC**

The IPC is already connected to the Ethernet switch at the factory.
1. Open the CDC90 control unit.
2. Connect the W18 adapter cable in the CDC90 control unit to cable gland '8' from the inside.
3. In the CDC90 control unit, connect the W18 adapter cable to IPC (1).
4. Connect the W23 cable on the outside of the CDC90 control unit to cable gland '8'.
   The W18 and W23 cables form a bridge.
5. Connect cable W23 at the Ethernet switch to the connection (2) provided.

6.6 Connecting the pneumatic control unit

6.6.1 Cable gland assignment

The hoses in the pneumatic control unit are already connected at the factory.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Wiring</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connecting cable to CDC90 control unit</td>
<td>W8</td>
</tr>
<tr>
<td>2</td>
<td>Power supply cable of pneumatic control unit</td>
<td>W11</td>
</tr>
<tr>
<td>3</td>
<td>Not assigned</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ethernet cable of valve manifold</td>
<td>W20-&gt;W22</td>
</tr>
<tr>
<td>5</td>
<td>Hose number 8/black in valve manifold M1 1x hose 6/8 mm from M1 in valve manifold 1x hose 6/8 mm compressed air supply (at the installation location)</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>M3 hoses</td>
<td>8, 9, 10, 11</td>
</tr>
</tbody>
</table>
The multi-core signal cable between the CDC90 control unit and the pneumatic control unit is routed into the pneumatic control unit via the actuator terminals and is prewired. See → 46.

### 6.6.2 Connecting float switches and compressed air switches

1. Guide the wires of cables W4, W5 and W6 through cable gland "8" provided.
2. Connect the cable wires to the actuator terminal in the pneumatic control unit as follows:

<table>
<thead>
<tr>
<th>Terminal X2, top</th>
<th>Cable wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>W4, BK</td>
<td>Float switch, cleaner</td>
</tr>
<tr>
<td></td>
<td>W5, BK</td>
<td>Float switch, buffer 1</td>
</tr>
<tr>
<td>2</td>
<td>W4, BN</td>
<td>Float switch, cleaner</td>
</tr>
<tr>
<td>3</td>
<td>W5, BN</td>
<td>Float switch, buffer 1</td>
</tr>
<tr>
<td>4</td>
<td>W6, BK</td>
<td>Float switch, buffer 2</td>
</tr>
<tr>
<td>5</td>
<td>W6, BN</td>
<td>Float switch, buffer 2</td>
</tr>
<tr>
<td>6</td>
<td>W7, BK</td>
<td>Pressure switch</td>
</tr>
<tr>
<td>7</td>
<td>W7, BN</td>
<td>Pressure switch</td>
</tr>
</tbody>
</table>

### 6.6.3 Assemblies

CDC90 is designed for the following assemblies:
- Cleanfit CPA47x
- Cleanfit CPA871/CPA875

#### Limit position switches

*Cleanfit CPA471/472/472D/475*

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

Connect the connections for the position feedback signal in the pneumatic control unit as follows:

**Connection at output interface terminal in the pneumatic control unit**

<table>
<thead>
<tr>
<th>Output interface terminal T1, bottom</th>
<th>Cable wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>W26, BN</td>
<td>Upper limit position switch</td>
</tr>
<tr>
<td>Pin 2</td>
<td>W26, BU</td>
<td>Upper limit position switch</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output interface terminal T2, bottom</th>
<th>Cable wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>W25, BN</td>
<td>Lower limit position switch</td>
</tr>
<tr>
<td>Pin 2</td>
<td>W25, BU</td>
<td>Lower limit position switch</td>
</tr>
</tbody>
</table>

**Cleanfit CPA473/474**

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

41 Compressed air control CPA473/474

Connect the connections for the position feedback signal in the pneumatic control unit as follows:

Connection at output interface terminal in the pneumatic control unit

<table>
<thead>
<tr>
<th>Output interface terminal T1, bottom</th>
<th>Limit position switches</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>Pos 2, BN limit position switch on ball valve</td>
<td>Limit position switch, service feedback signal</td>
</tr>
<tr>
<td>Pin 2</td>
<td>Pos 2, BU limit position switch on ball valve</td>
<td>Limit position switch, service feedback signal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output interface terminal T2, bottom</th>
<th>Cable wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>Pos 1, BN limit position switch on assembly</td>
<td>Limit position switch, measuring feedback signal</td>
</tr>
<tr>
<td>Pin 2</td>
<td>Pos 1, BU limit position switch on assembly</td>
<td>Limit position switch, measuring feedback signal</td>
</tr>
</tbody>
</table>
**Cleanfit CPA8x**

**Assembly monitoring**

1. Limit position switch, service position
2. Limit position switch, measuring position
3. Connector, M12, solder side (inside of assembly)
4. Coding
5. Connector, pin side (outside of assembly)

**42 Position feedback signal, CPA87x**

- **W2 Feedback cable**

**43 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. Connect the connections for the position feedback signal as follows:
Connection at output interface terminal in the pneumatic control unit

<table>
<thead>
<tr>
<th>Output interface terminal T1, bottom</th>
<th>Cable wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>W2, BK</td>
<td>Limit position switch, position feedback signal</td>
</tr>
<tr>
<td>Pin 2</td>
<td>W2, BU</td>
<td>Limit position switch, position feedback signal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output interface terminal T2, bottom</th>
<th>Cable wire</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin 1</td>
<td>W2, BN</td>
<td>Limit position switch, position feedback signal</td>
</tr>
<tr>
<td>Pin 2</td>
<td>W2, WH</td>
<td>Limit position switch, position feedback signal</td>
</tr>
</tbody>
</table>

### 6.7 Remote IO assignment

<table>
<thead>
<tr>
<th>DI</th>
<th>Description</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>Assembly 1</td>
<td>Position feedback signal, internal</td>
</tr>
<tr>
<td>3, 4</td>
<td>Assembly 2</td>
<td>Position feedback signal, internal</td>
</tr>
<tr>
<td>13-16</td>
<td>Soft keys</td>
<td>Signal to start programs that are assigned to the 4 soft keys</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DO</th>
<th>Description</th>
<th>Assignment</th>
</tr>
</thead>
</table>
| 11  | Operating mode       | Setting, if DO11 = 0 and DO12 = 0  
Manual, if DO11 = 0 and DO12 = 1  
Automatic, if DO11 = 1 and DO12 = 0  
Remote access, if DO11 = 1 and DO12 = 1 |
| 12  |                      |                                                              |
| 13  | Assembly 1           | Service = 0  
Measure = 1                                                   |
| 14  | Assembly 2           | Service = 0  
Measure = 1                                                   |
| 15  | Program              | No program = 0  
Program running = 1                                             |
| 16  | Error status         | Alarm = 0  
No alarm = 1                                                     |

### 6.8 Connecting the main supply voltage

The cable for the supply voltage must be provided by the customer onsite 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 made before all other connections. If the protective ground is disconnected, this can be a source of danger.
- A 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. Guide the cable of the main supply voltage through cable gland "3" of the pneumatic control unit.
2. Connect the wires to the actuator terminal as follows:

<table>
<thead>
<tr>
<th>Terminal X1, bottom</th>
<th>Cable wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>L1, BN</td>
</tr>
<tr>
<td>PE</td>
<td>PE, GN-YE</td>
</tr>
<tr>
<td>N</td>
<td>N, BU</td>
</tr>
</tbody>
</table>

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

**6.9 Ensuring the degree of protection**

Only the mechanical and electrical connections which are described in these instructions and which are necessary for the required, designated use, may be carried out 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, Ex protection) 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)
- Loose or insufficiently tightened cables/cable ends
- Conductive cable strands are left in the device
6.10 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

<table>
<thead>
<tr>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>A program is active</td>
</tr>
<tr>
<td>Red</td>
<td>System error. Programs (e.g. cleaning or calibration programs) do not start.</td>
</tr>
<tr>
<td>Flashing red</td>
<td>The system has a Function Check (e.g. Hold), an Out of Spec or a maintenance message. The system can still be operated to a limited extent.</td>
</tr>
<tr>
<td>No light</td>
<td>No program is active and no errors are pending.</td>
</tr>
</tbody>
</table>
7.2 Access to the operating menu via the local display

7.2.1 Operating concept

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. → 66

7.2.3 Menu overview

<table>
<thead>
<tr>
<th>Item</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time</td>
</tr>
<tr>
<td>2</td>
<td>Display and fast access to the most important error message</td>
</tr>
<tr>
<td>3</td>
<td>Display and navigation to measuring point 1 and display of pH value or ORP value in mV</td>
</tr>
<tr>
<td>4</td>
<td>For one measuring point: second measured value of measuring point 1 and temperature value. For two measuring points: display and navigation to measuring point 2 and display of pH value or ORP value in mV</td>
</tr>
<tr>
<td>5</td>
<td>User profile display and log-in</td>
</tr>
<tr>
<td>Item</td>
<td>Function</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
</tr>
<tr>
<td>6</td>
<td>Operating mode</td>
</tr>
<tr>
<td>7</td>
<td>Overview of main menu</td>
</tr>
<tr>
<td>8</td>
<td>Navigation</td>
</tr>
</tbody>
</table>

**Operation is via four main menus:**

<table>
<thead>
<tr>
<th>Menu</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guidance</td>
<td>• Guided operation to schedule and execute programs.</td>
</tr>
<tr>
<td></td>
<td>• Import and export files and settings.</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>Contains information about device operation, diagnostics, troubleshooting and simulation.</td>
</tr>
<tr>
<td>Application</td>
<td>Device data for detailed measuring point adjustment.</td>
</tr>
<tr>
<td></td>
<td>Setting for communication with the distributed control system.</td>
</tr>
<tr>
<td>System</td>
<td>These menus contain parameters for configuring and managing the overall system.</td>
</tr>
</tbody>
</table>

**7.3 Access to the operating menu via the Web browser**

The same menu options are available via the Web server as for the onsite display.

- Enter the following path: **192.168.0.1:8080/cdc90.htm**

  If the IP address of the IPC has changed:
  
  The correct IP address of the IPC followed by :8080/cdc90.htm
8 System integration

8.1 Integrating the measuring device in the system

8.1.1 Web server

Establishing the data connection

NOTICE
Depending on the load on the network, EtherCat can cause failures in the CDC90 IPCs if several CDC 90 devices are integrated.

- In the case of Modbus without a gateway, a physical separation must be established at the installation location with a VLAN-capable switch, e.g. Layer 2 Managed Switch (VLAN Capable).

The Ethernet settings of the DHCP parameter must be switched off for the device to have a valid IP address. (Menu/Setup/General settings/Extended setup/Ethernet/Settings)

The IP address can be assigned manually in the same menu (for point-to-point connections).

1. Start the PC.
2. First, configure a manual IP address in the network connection settings of the operating system.
3. Start the 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 the device (192.168.0.1:8080/cdc90.htm) in the address line.
   - The system takes a few moments to establish the connection and then the Web server starts.

Example: Microsoft Windows 10

6. 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").
7. Select the link to this Ethernet connection.
8. In the pop-up window select the 'Properties' button.
10. Select 'Use the following IP Address'.
11. Enter the desired IP address. This address must be in the same subnet as the IP address of the device, e.g.:
   - IP address CDC90: 192.168.0.1
   - IP address for the PC: 192.168.0.99.
12. Start the Internet browser.
13. If you use a proxy server to connect to the Internet:
   - Disable the proxy (browser settings under "Connections/LAN settings").
14. Enter the IP address of your device in the address line.
   - The system takes a few moments to establish the connection and then the Web server starts.
Operation

The menu structure of the web server corresponds to the onsite operation.

8.1.2  Fieldbus systems

NOTICE

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

- To reduce the network load in the event of a Modbus TCP connection, the networks must be separated. A physical separation with a VLAN-capable switch, e.g. Layer 2 Managed Switch (VLAN Capable), or a software-based separation are possible.

Connection

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

- Analog current inputs and outputs
  - Activation is via the analog current input (AI).
  - Feedback is via the analog current output (AO).
  - The settings must be implemented via the Web server or the local display.
- EtherNet/IP (adapter)
- PROFIBUS DP (slave)
- Modbus TCP (server)
- PROFINET (device)

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 distributed control system must be provided by the customer.

![PROFINET and PROFIBUS DP communication connection](image)

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).
3. For connection to the DCS, connect the cable for communication (5) at the bottom of the gateway.
4. Connect the end piece to the DCS (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 distributed control system must be provided by the customer.
48 EtherNet/IP communication connection

1. Ethernet switch on CDC90
2. Gateway
3. Distributed control system DCS
4. Ethernet cable, CDC90/gateway communication
5. Communication connection, gateway/distributed control system DCS

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).
3. For connection to the DCS, connect the cable for communication (5) at the top of the gateway.
4. Connect the end piece to the DCS (3).

Modbus TCP connection to Ethernet switch

1. For connection to the CDC90, connect the Ethernet cable to the Ethernet switch.
2. Connect the end piece to the DCS.

Ethernet cable assignment

<table>
<thead>
<tr>
<th>RJ45</th>
<th>Stand. cable</th>
<th>Ind. cable</th>
<th>M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Amber</td>
<td>TxD-</td>
<td>Amber</td>
</tr>
<tr>
<td>2</td>
<td>Amber/White</td>
<td>TxD+</td>
<td>Yellow</td>
</tr>
<tr>
<td>3</td>
<td>Green</td>
<td>RxD-</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Green/White</td>
<td>RxD+</td>
<td>White</td>
</tr>
</tbody>
</table>

Assignment of M12 connection

<table>
<thead>
<tr>
<th>M12</th>
<th>M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yellow</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>Amber</td>
</tr>
<tr>
<td>4</td>
<td>Blue</td>
</tr>
</tbody>
</table>

RJ45 assignment to M12 connection

<table>
<thead>
<tr>
<th>RJ45</th>
<th>M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yellow</td>
</tr>
<tr>
<td>3</td>
<td>White</td>
</tr>
</tbody>
</table>
More detailed information on fieldbus communication is provided on the product pages on the Internet:

- EtherNet/IP (adapter) via gateway Modbus TCP - EtherNet/IP: BA02241C
- Modbus TCP (server): BA02238C
- PROFIBUS DP (slave) via gateway Modbus TCP - PROFIBUS DP: BA02239C
- PROFINET (device) via gateway Modbus TCP - PROFINET: BA02240C
9 Commissioning

9.1 Preliminaries

9.1.1 Filling the canisters

▸ Fill the canisters as follows from left to right:

<table>
<thead>
<tr>
<th>Canister (left to right)</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Liquid 1 (e.g. cleaner, for version &quot;Cleaning and calibration of pH sensors&quot;)</td>
</tr>
<tr>
<td>2</td>
<td>Liquid 2 (e.g. buffer 1, for version &quot;Cleaning and calibration of pH sensors&quot;)</td>
</tr>
<tr>
<td>3</td>
<td>Liquid 3 (e.g. buffer 2, for version &quot;Cleaning and calibration of pH sensors&quot;)</td>
</tr>
</tbody>
</table>

1. We recommend you replace the buffers every 6 months. Pay attention to the expiry date on the canisters.

1. Unscrew the float switch.
2. Remove the float switch with the cover and pump.
3. Fill the empty canister or replace it with a full one. Use a funnel when filling the canister.
4. Fit the cover with the pump and loose float switch onto the canister.
5. Screw the float switch into the canister.

9.2 Function check

⚠️ 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 installation and function check.
- Ensure that all moving parts are correctly mounted.

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

1. Mount the device and install it.
2. Connect the sensor with Memosens technology, which is precalibrated at the factory, to the assembly.

9.3 Switching on the measuring device

Preparation:
1. Familiarize yourself with the operation of the device before it is first switched on.
2. Pay attention to the "Basic safety instructions" section → 5.

Switching on the device

1. Energize the device. → 46
   ➔ After power-up, the device performs a self-test and then goes to the measuring mode.
2. Watch out for possible effects on any actuators which may be connected.

During the device startup phase, the current outputs have an undefined status for a few seconds prior to initialization.
- Watch out for possible effects on any actuators which may be connected.

1. Fill the rinse chambers of the assembly with medium. See the documentation of the connected assembly.
   ➔ The saved sensor-specific calibration data are automatically transmitted to the transmitter as soon as the transmitter is switched on.
   The measured value is displayed.
2. Check the transfer of the measured value to the distributed control system or the evaluation unit.

Normally, you can accept this value without calibrating the sensor. Calibration is only required in the following cases:
- When very strict accuracy requirements apply.
- When the sensor has been in storage for longer than 3 months.

Out of Specifications message active at start-up. This is because in a 1-channel system, the default programs for the second channel are also loaded. The message disappears automatically if the customized programs are imported per USB during commissioning.
9.3.1 Start screen

<table>
<thead>
<tr>
<th>Item</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Measuring or service position of assembly</td>
</tr>
<tr>
<td>2</td>
<td>Next page</td>
</tr>
<tr>
<td>3</td>
<td>Display of pumps for canisters 1-3</td>
</tr>
<tr>
<td>4</td>
<td>Valve (water or air) closed or open.</td>
</tr>
<tr>
<td>5</td>
<td>Visualization of the active medium, depending on the program.</td>
</tr>
</tbody>
</table>
| 6    | Play symbol visible when program is running  
      Stop button active and can be activated when program is running  
      Control only possible when program is running. |

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

9.4 Configuring the measuring device

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

- 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.
9.4.3 Configuring system settings of the measuring points

User role: Maintenance
Operating mode: Setup

Path: System/Information/Measuring point

<table>
<thead>
<tr>
<th>Function</th>
<th>Options</th>
<th>Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring point</td>
<td>• Serial number:</td>
<td>General information: Apart from the tag name of the order number, all the settings are preconfigured and cannot be modified.</td>
</tr>
<tr>
<td></td>
<td>• Firmware</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Original extended order code</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Current extended order code</td>
<td></td>
</tr>
<tr>
<td>Assembly</td>
<td>Choice of assemblies:</td>
<td>Assembly: Select the assembly that is used in the measuring point. The signals of the limit position switches vary. This setting is used for the correct interpretation of the signals.</td>
</tr>
<tr>
<td></td>
<td>• CPA4xx</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CPA8xx</td>
<td></td>
</tr>
<tr>
<td>Buffer value for ORP</td>
<td></td>
<td>mV value of the ORP buffer used for calibration. Enter the buffer value that is indicated on the canister. If activated, every new calibration/adjustment result is compared with the previous adjustment result and an alarm is triggered if the limit values are exceeded.</td>
</tr>
<tr>
<td>Verification</td>
<td>Options:</td>
<td>The verification is activated by setting the limit values. After activation, calibration with adjustment is required. These determine the reference points of the verification. The verification is disabled again by setting all the limit values to 0.</td>
</tr>
<tr>
<td></td>
<td>• Min. offset Deviation between zero point/operating point</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Max. offset Deviation between zero point/operating point</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Min. delta slope</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Max. delta slope</td>
<td></td>
</tr>
</tbody>
</table>

9.4.4 Configuring the system communication

User role: Maintenance
Operating mode: Setup
9.4.5 Sensors

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

9.4.6 Monitoring pilot valves

User role: Maintenance
Operating mode: Setup
9.4.7 Assembly

User role: Maintenance
Operating mode: Setup

Path: System/Operating counter/Assemblies

<table>
<thead>
<tr>
<th>Function</th>
<th>Options</th>
<th>Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly 1 or Assembly 2</td>
<td>Assembly 1 or Assembly 2</td>
<td>Settings of the warning limit for the number of assembly strokes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Options</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of strokes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warning limit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9.4.8 Pumps and canisters

User role: Maintenance
Operating mode: Setup

Path: System/Operating counter/Canister and Pump

<table>
<thead>
<tr>
<th>Function</th>
<th>Options</th>
<th>Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canister 1...3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Expiry date</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Filling level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Max. filling level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Warning limit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pump 1 ...3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Flow rate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pumped volume</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Warning limit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Operating time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pump operating time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Warning limit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Settings for the expiry date, the maximum level, the flow and the warning limits for the canisters and pumps.

If level monitoring is used, the flow must be calculated after the installation of the system. For this, fill the canister to full capacity, start the pump by simulation and stop the time when the canister is completely empty. Flow = volume of canister/time in l/min

9.4.9 Calibration during commissioning

- Sensors with Memosens protocol are calibrated at the factory.
- Users must decide whether the process conditions present require calibration during initial commissioning.
- Additional calibration is not required in many standard applications.
Calibrate sensors at sensible intervals depending on the process.

Operating Instructions "Memosens", BA01245C

9.4.10 Starting commissioning

Initial commissioning is performed by Endress+Hauser specialists.
10 Operation

10.1 Reading off measured values

![Sample overview of a measuring point](image)

<table>
<thead>
<tr>
<th>Item</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shortcut to measuring point overview</td>
</tr>
<tr>
<td>2</td>
<td>Measuring point 1 or 2</td>
</tr>
<tr>
<td>3</td>
<td>Main values</td>
</tr>
<tr>
<td>4</td>
<td>Assembly position</td>
</tr>
<tr>
<td>5</td>
<td>Assembly type CPA87x or CPA47x</td>
</tr>
</tbody>
</table>

10.2 Adapting the measuring device 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 deactivate user management.

Logged-in users can change their own password.

The user must log in as **Admin**.

1. Under **System/Setup/ go to User Management**.
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. If necessary, repeat the steps again and change the PIN for other users.
## User management

<table>
<thead>
<tr>
<th>Function</th>
<th>Operator</th>
<th>Maintenance</th>
<th>Admin</th>
<th>User</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch user management on and off</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Change own password</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Change all passwords</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Change the operating mode</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starting the programs</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule programs</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Import/export data</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Settings in the System</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Settings in the Application menu</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simulation of outputs</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 10.2.2 Changing the operating mode

**Operating modes:**
- **Setup**
- **Manual**
- **Automatic**
- **Remote**

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

### Operation mode

#### Setup
- **Function:**
  - 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 operating mode.
  - *This mode is used to perform maintenance activities. This mode ensures that no hardware activation can take place.*

#### Manual
- **Function:**
  - 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 operating mode.
  - No settings can be made.

#### Automatic
- **Function:**
  - 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 operating mode.
  - Soft keys cannot be activated here.

#### Remote
- **Function:**
  - 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 operating mode.
  - The soft keys cannot be activated here.
10.2.3 Managing soft keys

Programs can be assigned to the individual soft keys. They are preassigned with the program IDs:
- 801: Service assembly 1
- 802: Measure assembly 1
- 803: Service assembly 2
- 804: Measure assembly 2

See in the "CDC90 program configuration tool" configuration tool under Programs.

If the programs for the IDs are changed, the assignment of the soft keys also changes.

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.

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.

Assigning programs to soft keys

Application/In-/Outputs/Softkeys:

1. Select the soft key.
2. Select the program under Program selection.
   - The assignment of the soft key is displayed under Selected Program.

Starting the program via the soft keys

Operating mode: manual

- Press the soft key for 3 seconds until the program starts.
  - The LED lights up green once the program starts.

Assign the soft keys in the local display

Required user role: maintenance

Operating mode: configuration

Path: Application/In-/Outputs/Softkeys

- Under soft key 1-4, select the desired program for Program selection
  - The program name appears under Selected Program.

Soft keys can be started remotely via DI13-16:

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

10.2.4 Configuring cleaning and calibration steps

The configuration is performed via an Excel-based configuration tool.

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 preset, but users can define their own customized steps in steps 17-26.
Sequences
The sequences comprise the order and duration of the steps. The configuration tool contains pre-defined sequences (Seq1-8). User-defined sequences are possible from Seq9Cust1 to Seq15Cust7. Predefined sequences can be integrated into the user-defined sequences.

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

This section explains the configuration of the individual cleaning and calibration steps for sensors or calibrations. Some steps are already defined (default factory setting).

Other customized steps can be modified or added. This step configuration must be performed outside the device software using a configuration tool.

List of steps for cleaning
The device contains preconfigured steps:

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Service position</td>
<td>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</td>
</tr>
<tr>
<td>2</td>
<td>Measuring position</td>
<td>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</td>
</tr>
<tr>
<td>3</td>
<td>H₂O + Service Pos.</td>
<td>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. Then 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</td>
</tr>
<tr>
<td>4</td>
<td>H₂O + Measure Position</td>
<td>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 (&quot;sealing water&quot;). 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</td>
</tr>
<tr>
<td>5</td>
<td>Hold On</td>
<td>If the HOLD function is switched on, this causes the measured values to &quot;freeze&quot; 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.</td>
</tr>
</tbody>
</table>
### Operation

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Hold Off</td>
<td>&quot;Unfreezes&quot; the frozen measured values.</td>
</tr>
<tr>
<td>7</td>
<td>Abort + Service Pos.</td>
<td>In the event of an error, the program is aborted and the sensor goes to the service position</td>
</tr>
<tr>
<td>8</td>
<td>Abort + Measure Pos.</td>
<td>All the valves for media are closed and the sensor goes to the measuring position</td>
</tr>
<tr>
<td>9</td>
<td>Abort + Service Pos. + Hold On</td>
<td>Like Abort+Service with the Hold On function</td>
</tr>
<tr>
<td>10</td>
<td>Abort + Measure Pos. + Hold Off</td>
<td>Like Abort + Measure Pos with the Hold Off function</td>
</tr>
<tr>
<td>11</td>
<td>Air</td>
<td>Switches the air valve on for the indicated period of time and off again.</td>
</tr>
<tr>
<td>12</td>
<td>Water</td>
<td>Switches the water valve on for the indicated period of time and off again. The water valve then closes.</td>
</tr>
<tr>
<td>13</td>
<td>Pump 1</td>
<td>Pumps the medium out of canister 1 for the time indicated. Then stops afterwards</td>
</tr>
<tr>
<td>14</td>
<td>Pump 2</td>
<td>Pumps the medium out of canister 2 for the time indicated. Then stops afterwards</td>
</tr>
<tr>
<td>15</td>
<td>Pump 3</td>
<td>Pumps the medium out of canister 3 for the time indicated. Then stops afterwards</td>
</tr>
<tr>
<td>16</td>
<td>Wait</td>
<td>Delays the processing of the following step by the time indicated.</td>
</tr>
<tr>
<td>17 to 26</td>
<td>CustomStep1 to CustomStep10</td>
<td>Configurable steps</td>
</tr>
</tbody>
</table>

### 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.

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

### Programming a verification

**Verification for pH**

1. Go to the System/Information/Measuring Point menu.
2. Change the limits for Delta Slope or Zero Point <> 0.
3. Start a pH program with adjustment to determine the reference values for the verification.
4. Start the pH program without adjustment.
   - The differences compared to the last adjustment are calculated in the logfile and the message S1406 is displayed if the indicated values are exceeded or undershot.

Verification for ORP

1. Go to the System/Information/Measuring Point menu.
2. Change the buffer limits for ORP <> 0.
3. Start an ORP program with adjustment to determine the reference values for the verification.
4. Start an ORP program for adjustment.
   - The differences compared to the last adjustment are calculated in the logfile and the message S1406 is displayed if the indicated values are exceeded or undershot.

The verification is activated by setting the limit values. After activation, calibration with adjustment is required.

Assigning valves, inputs and outputs to the steps

In this section, the user specifies which preconditions must be met so that a step can be executed, and defines which outputs are set to which state as a result of the step. It is possible to enter additional values in order to switch additional outputs, for example, or to define customized steps in the "CustomSteps" section.

Applications:
- Definitions of the outputs for assembly retraction via the valves.
- Open and close valves statically.
- Delay switching operations until a certain state is reached.

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Output/valves</th>
<th>Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>Is set to 'ON' at the start of a step. Returns to the original state at the end of the step.</td>
<td>Step triggers an error if the input is not set to 'ON' at the start.</td>
</tr>
<tr>
<td>OFF</td>
<td>Is set to 'OFF' at the start of a step. Return to the original state at the end of the step.</td>
<td>Step triggers an error if the input is not set to 'OFF' at the start.</td>
</tr>
<tr>
<td>S:ON</td>
<td>Is set to 'ON' at the start of a step and remains 'ON' after the step. Is only set to 'OFF' again by S:OFF. (Static 'ON')</td>
<td></td>
</tr>
<tr>
<td>S:OFF</td>
<td>Switches off a static 'S:ON'.</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Assembly moves to the service position at the start of the step. At the end of the step, the assembly moves back to the position before the step.</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Assembly moves to the measure position at the start of the step. At the end of the step, the assembly moves back to the position before the step.</td>
<td></td>
</tr>
</tbody>
</table>
### 10.2.5 Cleaning/calibration steps and sequences

A sequence consists of steps but can also contain sequences.

#### Specifying the step duration in the sequence

1. Open the configuration tool.
2. Select the desired Sequenz.
3. Specify the step duration in seconds in the step line under columns Ch1 and Ch2. The step duration for measuring points Ch1 and Ch2 is now assigned.
4. Configure the step to be performed in the event of an error.
5. Continue with the measuring point assignment. → 71
6. Export to CSV if no additional configurations are made in the tool.

#### Overview of the sequences

<table>
<thead>
<tr>
<th>ID</th>
<th>Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>Service</td>
<td>The assembly moves to the service position</td>
</tr>
<tr>
<td>1002</td>
<td>Measure</td>
<td>The assembly moves to the measure position</td>
</tr>
<tr>
<td>1003</td>
<td>Cleaning</td>
<td>The sensor is rinsed with water, cleaned and remains in the service chamber.</td>
</tr>
<tr>
<td>1004</td>
<td>pH 2 Pt cal + adj</td>
<td>2-point calibration pH with adjustment</td>
</tr>
<tr>
<td>1005</td>
<td>pH 2 Pt cal w/o adj</td>
<td>2-point calibration pH without adjustment</td>
</tr>
<tr>
<td>1006</td>
<td>ORP 1 Pt cal + adj</td>
<td>1-point calibration ORP with adjustment</td>
</tr>
<tr>
<td>1007</td>
<td>ORP 1 Pt cal w/o adj</td>
<td>1-point calibration ORP without adjustment</td>
</tr>
<tr>
<td>1008</td>
<td>pH 1 Pt cal w/o adj</td>
<td>1-point calibration pH without adjustment</td>
</tr>
<tr>
<td>1009-1015</td>
<td>Custom 1-7</td>
<td>Freely available</td>
</tr>
</tbody>
</table>
All sequences can be modified/optimized and reused within sequences. Non-configured sequences are also available.

1. **Standard buffer 1** is Endress+Hauser's pH 7 buffer.
   - Standard buffer 2 is Endress+Hauser's pH 4 buffer.
   - These are default values. They can be modified.

### Measuring point assignment of sequences

The assignment of the sequences to a measuring point is controlled via the "Program" function in the configuration tool.

#### Programming in the configuration tool

<table>
<thead>
<tr>
<th>ID</th>
<th>Program ID</th>
<th>Name</th>
<th>Sequence contained in the program</th>
<th>Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>801</td>
<td>Service1</td>
<td>1001</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>802</td>
<td>Measure1</td>
<td>1002</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>803</td>
<td>Service2</td>
<td>1001</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>804</td>
<td>Measure2</td>
<td>1002</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>805</td>
<td>Cleaner1</td>
<td>1009</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>806</td>
<td>Cleaner2</td>
<td>1009</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

1. Open the configuration tool.
2. Select the **Programs** tab.
3. Under **Programs**, select the desired sequence in **Sequence**.
4. Assign a measuring point to the sequence under **Channel**.
   - As a result of the assignment to a measuring point, a program is created.
5. Give the program a name.
   - The programs are displayed in the device together with the ID.
6. To prepare the automatic mode: continue with the scheduling of the programs.
   - Export to CSV if no additional configurations are made in the tool.
7. The programs are assigned via the **ID**, which cannot be changed.

### Scheduling of sequences

The scheduling of the sequences is controlled via the "Program" function in the configuration tool.

A schedule collision is only identified for the next six upcoming programs as soon as the list of future programs is updated. If a collision is discovered, the S1405 Schedule Collision alarm is activated. Once the collision is rectified, the alarm is disabled again. In the event of a collision, the device only executes the program that is further up in the table. If an
additional program is planned during an active program, the program is not executed and not shifted.

<table>
<thead>
<tr>
<th>Schedules for Automatic Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
</tr>
<tr>
<td>----</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

52 Example of detailed scheduling of sequences

Fixed date and time for program to start
1. Open the configuration tool.
2. Select the Programs tab.
3. Under Schedules for Automatic Mode, in the Program column, select the desired program from the drop-down menu.
4. Schedule the program by selecting the days and enter a time in the "Start" column. The program is now assigned a day and time and is executed automatically in the automatic operating mode.
5. Save the configuration tool.
6. Export to CSV if no additional configurations are made in the tool.

Setting a periodic schedule for a program
1. Select the program.
2. Set the days.
3. In the "Start" column, specify the first starting time of the day at which the cyclic program runs for the first time on that day.
4. Enter 00:00 as the starting time for the cyclic execution of programs over the entire day.
5. In the "End" column, specify the last starting time of the day at which the cyclic program runs for the last time on that day. The end time must be a multiple of the interval and is the last time the program starts on this particular day. The end time + interval may not be after 00:00 (midnight).
6. Enter the interval in minutes in the "Periodic[min]" column. The end time must be a multiple of "Periodic"!

Example in the graphic: The program with the ID 805 starts every 30 minutes each day for the entire day: first start at 00:00, last start at 23:30.

Importing or exporting csv files from the configuration tool
User role: Maintenance
Operating mode: Setup
The following files can be imported or exported:

<table>
<thead>
<tr>
<th>Programs</th>
<th>csv files generated with the configuration tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>System configuration</td>
<td>Data for system configuration, e.g. serial number. System configuration is specific for every device.</td>
</tr>
<tr>
<td>Device configuration</td>
<td>Settings, e.g. warning limits, for the devices</td>
</tr>
<tr>
<td>Operating data</td>
<td>All data that are measured and determined</td>
</tr>
<tr>
<td>Logbook</td>
<td>Data from the event logbook and calibration logbook</td>
</tr>
</tbody>
</table>
Exporting the program configuration
1. Open the configuration tool.
2. Select the Export CSV tab.
3. Click Export to CSV.
   ➡️ The configuration tool creates a cfg folder in the background. This folder contains all the CSV files for each individual tab.
4. Save the ‘cfg’ folder on a storage medium (USB) in the following folder structure: /public

Importing the program configuration
1. Open the display cover of the control unit. ➡️ 32
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 Import and click Next
7. Select the programs and click Next
   ➡️ The programs are imported automatically.
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.
An "Out of Spec" message is displayed if invalid steps or sequences have been imported. The invalid programs are grayed out and cannot be started.

Programs with invalid content cannot be started, e.g. calibration programs/steps in a device with cleaning only. The message disappears automatically as soon as programs are imported again and do not contain any invalid steps/sequences.

10.2.6 Running the programs

Running the program manually
User role: Maintenance or Operator
Programs can be started in the Operation mode Manual if no errors are pending.
1. Navigate to: User Guidance/Configuration/Program.
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 Finish to quit the wizard.
   ➡️ The program is not stopped.
**Explanation of buttons**

<table>
<thead>
<tr>
<th>Button Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play button magenta</td>
<td>The program can be started</td>
</tr>
<tr>
<td>Play button blue</td>
<td>The program is running</td>
</tr>
<tr>
<td>Stop button magenta</td>
<td>The program can be stopped</td>
</tr>
<tr>
<td>Stop button gray</td>
<td>Cannot currently be selected</td>
</tr>
</tbody>
</table>

**10.2.7 Configuring sequences and programs in the HMI**

**Programming sequences**
User role: Maintenance  
Operating mode: Setup  
1. Go to the User Guidance/Configuration/Sequences menu.  
2. Select the sequence to be edited.  
3. Click Next.  
4. Delete the step with "-".  
5. Create a new step at the same position with "+".  
6. Select the desired step from the list.  
7. Specify the duration of the step for the measuring points.  
8. Click Next.  
9. Click Next.  
10. Press Complete to confirm.

**Compiling programs**
User role: Maintenance  
Operating mode: Setup  
1. Go to the User Guidance/Configuration/Program menu.  
2. Select the program to be edited.  
3. Click Next.  
4. Delete the program with "-".  
5. Create a new program at the same position with "+".  
6. Select the desired sequence from the list.  
7. Select the channel on which the sequence should be executed.  
8. Assign a program name.  
9. Click Next.  
10. Click Next.  
11. Press Complete to confirm.

**Editing the scheduling**
User role: Maintenance  
Operating mode: Setup  
1. Go to the User Guidance/Configuration/Schedules menu.  
2. Delete the schedule with "-".  
3. Create a new schedule at the same position with "+".
4. Select the program ID from the list.
5. Specify the schedule for the measuring points.
6. Specify the start time, end time and the period.
7. Click Next.
8. Press Complete to confirm.

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

User role: Maintenance
Operating mode: Setup

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

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

10.2.9 Selecting communication

Selecting communication for local operation

User role: Maintenance
Operating mode: Setup

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 DCS 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

10.2.10 Monitoring inputs and outputs

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
Digital outputs
- Status of the assemblies
- Program active
- Alarm active
- DO 1 to DO 10: user configurable DO
- DO 11 and DO 12 for operating 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 (0 = no program active, 1 = program active)
- DO 16: alarm status (0 = alarm, 1 = no alarm)

Analog outputs
DCS output current value

Pilot valves
- V 1: Compressed air control for assembly measuring position, 1st measuring point
- V 2: Compressed air control for assembly service position, 1st measuring point
- V 3: Compressed air control for process valve, water
- V 4: Compressed air control for process valve, air
- V 5: Pump 1 / liquid canister 1 (left)
- V 6: Pump 2 / liquid canister 2 (center)
- V 7: Pump 3 / liquid canister 3 (right)
- V 8: User-configurable valve
- V 9: Compressed air control for changeover valve, top, 1st measuring point
- V 10: Compressed air control for changeover valve, bottom, 2nd measuring point
- V 11: Compressed air control for assembly measure position, 2nd measuring point
- V 12: Compressed air control for assembly service position, 2nd measuring point
- V 13 to 16: User-configurable valves

10.2.11 Current outputs

Current outputs to transmit measured values on an additional analog card can only be configured with an external display or via the web server of an external transmitter.

Please contact your Endress+Hauser sales organization for the configuration of the current outputs.
11 Diagnostics and troubleshooting

11.1 General troubleshooting

11.1.1 Simulating the inputs and outputs
The pilot valves and outputs can be simulated for test purposes, e.g.:  
- Opening or closing of the pilot valves for the assembly position or the pumps  
- Program and alarm status  
- Switching of the compressed air on and off

Configuring the simulation
User role: Maintenance or Operator
Operating mode: Manual

1. Navigate to: Diagnosis/Simulation.

2. Set or disable the following values:

Pilot valves
- Compressed air of assemblies
- Positions of assemblies
- Water
- Pressure
- Pump 1 to 3
- Changeover valves
- Configurable valves

Move assembly to measuring position:
1. Switch on the pilot valve Assembly 1 measuring position (NC).
2. Shortly after this, switch on the pilot valve for position assembly Assembly 1 service position (NO).

Move assembly to 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
- Status of the assemblies
- Program active
- Alarm active
- Configurable DO 1 to DO 10

11.2 Overview of diagnostic information

11.2.1 Diagnostics 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

<table>
<thead>
<tr>
<th>Namur status</th>
<th>Error number</th>
<th>Error message</th>
<th>Troubleshooting</th>
</tr>
</thead>
</table>
| 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 distributed control system (for Modbus TCP) or the gateway (for 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 for delivery volume of 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.  
<p>|              |              | ▶ Check pressure supply unit. |</p>
<table>
<thead>
<tr>
<th>Namur status</th>
<th>Error number</th>
<th>Error message</th>
<th>Troubleshooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>M Maintenance</td>
<td>1301</td>
<td>Number of switching operations of the purge air valve is exceeded.</td>
<td></td>
</tr>
<tr>
<td>M Maintenance</td>
<td>1302</td>
<td>Number of switching operations of the water valve is exceeded.</td>
<td></td>
</tr>
<tr>
<td>M Maintenance</td>
<td>1303</td>
<td>Number of switching operations of the changeover valve is exceeded.</td>
<td></td>
</tr>
<tr>
<td>M Maintenance</td>
<td>1304</td>
<td>Number of switching operations of the customer valve is exceeded.</td>
<td></td>
</tr>
<tr>
<td>S Out of Spec</td>
<td>1400</td>
<td>Program file is incorrect. Invalid program loaded. For example, program for channel 2 even though this is a 1-channel device; calibration program in a cleaning device. In the case of 1-channel devices, this message is always active during initial commissioning as programs for the 2nd channel are also loaded at the factory. The message disappears automatically when the customer programs have been uploaded.</td>
<td>1. Check the file path. 2. Check the file.</td>
</tr>
<tr>
<td>S Out of Spec</td>
<td>1401</td>
<td>Invalid step in program.</td>
<td></td>
</tr>
<tr>
<td>S Out of Spec</td>
<td>1402</td>
<td>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.</td>
<td>1. Check the channel number. 2. Check the program ID.</td>
</tr>
<tr>
<td>F Failure</td>
<td>1403</td>
<td>Error in calibration.</td>
<td></td>
</tr>
<tr>
<td>F Failure</td>
<td>1404</td>
<td>Step precondition breached.</td>
<td></td>
</tr>
<tr>
<td>S Out of Spec</td>
<td>1405</td>
<td>Collision of multiple program starts.</td>
<td></td>
</tr>
<tr>
<td>S Out of Spec</td>
<td>1406</td>
<td>Limit values for verification exceeded or undershot.</td>
<td></td>
</tr>
<tr>
<td>Namur status</td>
<td>Error number</td>
<td>Error message</td>
<td>Troubleshooting</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>M Maintenance</td>
<td>1500</td>
<td>Warning limit for</td>
<td>Warning limit for movements exceeded. The assembly must be serviced.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>movements exceeded.</td>
<td>assembly must be serviced.</td>
</tr>
<tr>
<td>F Failure</td>
<td>1501</td>
<td>Assembly position not</td>
<td>Assembly position not defined.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>defined.</td>
<td>1. Check the configuration of the assembly type in the system settings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Check whether the assembly can insert/retract freely.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Check pneumatic connections.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Check limit position switches.</td>
</tr>
<tr>
<td>C Function check</td>
<td>216</td>
<td>Hold active</td>
<td>Output values and status of the channel are on hold.</td>
</tr>
<tr>
<td>F Failure</td>
<td>374</td>
<td>Sensor check</td>
<td>No measurement signal from sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Check sensor connection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Check sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Replace sensor if necessary.</td>
</tr>
<tr>
<td>C Function check</td>
<td>951</td>
<td>Hold active CH1</td>
<td>Output values and status of the channels are on hold.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Wait until the hold is deactivated again.</td>
</tr>
<tr>
<td>C Function check</td>
<td>952</td>
<td>Hold active CH2</td>
<td></td>
</tr>
<tr>
<td>F Failure</td>
<td>992</td>
<td>pH calc. range</td>
<td>pH calculation outside the measuring range.</td>
</tr>
<tr>
<td>F Failure</td>
<td>993</td>
<td>rH calc. range</td>
<td>rH calculation outside the measuring range.</td>
</tr>
<tr>
<td>F Failure</td>
<td>002</td>
<td>Sensor unknown</td>
<td>Replace the sensor.</td>
</tr>
<tr>
<td>F Failure</td>
<td>004</td>
<td>Sensor defective</td>
<td>Replace the sensor.</td>
</tr>
<tr>
<td>F Failure</td>
<td>005</td>
<td>Sensor data invalid</td>
<td>1. Check firmware compatibility of sensor and transmitter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Set the sensor to the factory settings, disconnect the sensor and reconnect it.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Update transmitter data.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Replace the sensor.</td>
</tr>
<tr>
<td>F Failure</td>
<td>010</td>
<td>Sensor scanning</td>
<td>Wait for initialization to be finished.</td>
</tr>
<tr>
<td>F Failure</td>
<td>013</td>
<td>Sensor type wrong</td>
<td>Sensor does not suit the device configuration or device configuration must be changed to new type of sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Change to a sensor of the type that is configured.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Adapt the device configuration to the connected sensor.</td>
</tr>
<tr>
<td>F Failure</td>
<td>018</td>
<td>Sensor not ready</td>
<td>Sensor communication blocked</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Internal software error. Contact the Service Department.</td>
</tr>
<tr>
<td>F Failure</td>
<td>022</td>
<td>Temperature sensor</td>
<td>Temperature sensor defective</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Replace the sensor.</td>
</tr>
<tr>
<td>F Failure</td>
<td>061</td>
<td>Sensor electronic</td>
<td>Sensor electronics defective</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Replace the sensor.</td>
</tr>
<tr>
<td>Namur status</td>
<td>Error number</td>
<td>Error message</td>
<td>Troubleshooting</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------</td>
<td>----------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| F Failure           | 062          | Sensor connection                      | 1. Check sensor connection.  
2. Contact the Service Department.                                               |
| F Failure           | 100          | Sensor communication                   | 1. Check sensor connection.  
2. Check sensor connector.  
3. Contact the Service Department.                                               |
| F Failure           | 101          | Sensor incompatible                    | 1. Update sensor firmware  
2. Replace the sensor.  
3. Contact the Service Department.                                               |
| C Function check    | 107          | Calibration active                     | ► Wait for calibration to be finished.                                           |
| F Failure           | 120          | Sensor reference                       | Reference warning, impedance of reference too low  
Measuring can continue until the alarm (120) occurs.                           |
2. Clean reference/junction.  
3. Replace the sensor.                                                           |
| F Failure           | 122          | Sensor glass                           | Impedance limit values exceeded/undershot  
Measuring can continue until the alarm (122, 124) occurs.                      |
| M Maintenance       | 123          | Sensor glass                           | 1. Inspect sensor for hair-line cracks and breakage.  
2. Check or change limit values.  
3. Replace the sensor.                                                           |
|                     | 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  
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  
1. Check sensor connection.  
2. Replace the sensor.                                                            |
| M Maintenance       | 179          | Operating time                         | Operating hours > 300 mV, measurement can still take place  
1. Replace the sensor.  
2. Change monitoring limit.  
3. Disable monitoring.                                                            |
<table>
<thead>
<tr>
<th>Namur status</th>
<th>Error number</th>
<th>Error message</th>
<th>Troubleshooting</th>
</tr>
</thead>
</table>
| M Maintenance | 180 | Operating time | Operating hours < -300 mV, measurement can still take place  
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  
1. Replace the sensor.  
2. Change monitoring limit.  
3. Disable monitoring. |
| M Maintenance | 194 | Operating time | Operating hours > 100 °C (212°F), measurement can still take place  
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, main measured value varies  
Reasons: sensor too old, sensor occasionally dry, calibration value not constant  
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  
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  
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  
1. Check or replace sensor.  
2. Check or replace calibration solution.  
3. Repeat calibration. |
<table>
<thead>
<tr>
<th>Namur status</th>
<th>Error number</th>
<th>Error message</th>
<th>Troubleshooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>M Maintenance</td>
<td>509</td>
<td>Sensor calibration</td>
<td>Min. slope warning, measurement can still take place</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Check or replace sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Check or replace calibration solution.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Repeat calibration.</td>
</tr>
<tr>
<td>M Maintenance</td>
<td>511</td>
<td>Sensor calibration</td>
<td>Max. slope warning, measurement can still take place</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Check or replace sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Check or replace calibration solution.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Repeat calibration.</td>
</tr>
<tr>
<td>M Maintenance</td>
<td>515</td>
<td>Sensor calibration</td>
<td>Max. operating point warning, measurement can still take place</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Check or replace sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Check or replace calibration solution.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Repeat calibration.</td>
</tr>
<tr>
<td>M Maintenance</td>
<td>517</td>
<td>Sensor calibration</td>
<td>Min. operating point warning, measurement can still take place</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Check or replace sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Check or replace calibration solution.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Repeat calibration.</td>
</tr>
<tr>
<td>M Maintenance</td>
<td>518</td>
<td>Sensor calibration</td>
<td>Delta slope warning, measurement can still take place</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Check or replace sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Check or replace calibration solution.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Repeat calibration.</td>
</tr>
</tbody>
</table>
### Diagnostics and troubleshooting

<table>
<thead>
<tr>
<th>Namur status</th>
<th>Error number</th>
<th>Error message</th>
<th>Troubleshooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>M Maintenance</td>
<td>520</td>
<td>Sensor calibration</td>
<td>Delta zero point warning, measurement can still take place</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Check or replace sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Check or replace calibration solution.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Repeat calibration.</td>
</tr>
<tr>
<td>M Maintenance</td>
<td>522</td>
<td>Sensor calibration</td>
<td>Delta operating point warning, measurement can still take place</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Possible reasons: sensor old or defective, reference blocked, calibration solution too old or contaminated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Check or replace sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Check or replace calibration solution.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Repeat calibration.</td>
</tr>
<tr>
<td>F Failure</td>
<td>722</td>
<td>Impedance of reference membrane too low.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. Check or replace sensor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2. Check/correct reference limit value.</td>
</tr>
</tbody>
</table>

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.

Logbooks as SQLite database

The logbooks can be exported as an SQLite database.

User role: Maintenance

Operating mode: Setup

> Select the User Guidance/Import / Export/ menu.

View the calibration results

The following values are displayed:

- Measuring point
- Parameter
- Sensor serial number
- Sensor-specific calibration data
- Number of measuring points
- Results

> 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
• Name
• Time stamp
• Measuring point
• Status of the message

11.4 Resetting the measuring device
► Contact the Endress+Hauser Service Department to reset the device.

11.5 Firmware history

11.5.1 Update
► Contact the Endress+Hauser Service Department.
12 Maintenance

**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 operating 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 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.

### 12.1.1 Pneumatic control unit

<table>
<thead>
<tr>
<th>Weekly</th>
<th>Annually</th>
</tr>
</thead>
</table>
| 1. Verify the leak-tight condition of compressed air connections on: 
  - 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. | 1. Check if interior is clean, dry and free from corrosion. 
  - 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. |

### 12.1.2 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 before you remove sensors from the assembly.
- If you need to test 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. Remove the sensor that requires maintenance.

2. Install the new sensor.
   - The sensor data are automatically accepted by the transmitter. A release code is not required.
   - Measurement is resumed.

3. 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.

12.1.3 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.

<table>
<thead>
<tr>
<th>Interval</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly</td>
<td>1. Check the top section of the assembly for compressed air leaks and mechanical damage.</td>
</tr>
<tr>
<td></td>
<td>2. Check that the process connection is leak-tight in relation to the process and check for mechanical damage.</td>
</tr>
<tr>
<td></td>
<td>3. Check compressed air pipes and connections for leaks and mechanical damage.</td>
</tr>
<tr>
<td>Monthly</td>
<td>1. Check the retraction of the assembly to the measuring and service position.</td>
</tr>
<tr>
<td></td>
<td>2. Clean and lubricate the retraction pipe of the assembly regularly.</td>
</tr>
<tr>
<td>Annually and as required</td>
<td>1. Clean the assembly on the outside if necessary. To replace the seal, the assembly must be clean, dry and decontaminated.</td>
</tr>
<tr>
<td></td>
<td>2. In the event of an inductive feedback signal, check the switching distance and adjust if necessary.</td>
</tr>
<tr>
<td></td>
<td>1. If necessary, set the switching distance</td>
</tr>
<tr>
<td></td>
<td>2. Replace the seals that are not in contact with the medium (recommended: if necessary, at least 1x annually).</td>
</tr>
<tr>
<td></td>
<td>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).</td>
</tr>
<tr>
<td></td>
<td>4. Once maintenance work has been completed, perform the following final inspection:</td>
</tr>
<tr>
<td></td>
<td>o Assembly moves to measure and service position?</td>
</tr>
<tr>
<td></td>
<td>o Service and measure feedback signals present?</td>
</tr>
<tr>
<td></td>
<td>o Process connection and compressed air connections leak-tight?</td>
</tr>
<tr>
<td></td>
<td>o Does measurement indicate plausible values?</td>
</tr>
</tbody>
</table>

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.

12.1.4 Pump canister unit

Proceed as follows if the canister is empty or the pump unit is to be replaced.
1. Unscrew the float switch.
2. Remove it together with the cover and the pump.
3. Fill the empty canister or replace it with a full canister. Use a funnel when filling the canister.
4. Fit the cover with the pump and loose float switch onto the canister.
5. Screw the float switch into the canister.

### 12.1.5 Cables, connections and power supply lines

<table>
<thead>
<tr>
<th>Weekly</th>
<th>Monthly</th>
<th>Biannually</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check the leak-tight condition of:</td>
<td>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.</td>
<td>Check if the interior and circuit boards are clean, dry and free from corrosion. If not:</td>
</tr>
<tr>
<td>- Compressed air hoses and connections,</td>
<td>- 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.</td>
<td>- Clean and dry the interior and the circuit boards.</td>
</tr>
<tr>
<td>- Pressurized water hoses and connections</td>
<td>- Verify that cable connections are tight (no leaks).</td>
<td>- In the event of corrosion, replace the affected circuit boards.</td>
</tr>
<tr>
<td>- Hoses and connections of buffer and cleaner vessels</td>
<td>- 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.</td>
<td>- Verify that seals and couplings are leak-tight and undamaged.</td>
</tr>
</tbody>
</table>
| - Multihose connections at control unit and assembly | | 2. Tighten the terminals.
| | | 3. |

### 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.
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: www.endress.com/device-viewer

- 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:
- Refer to the website www.endress.com/support/return-material for information on the procedure and conditions for returning devices.

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.

- 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]
Orbisint CPS11D
- pH sensor for process technology
- With dirt-repellent PTFE diaphragm
- Product Configurator on the product page: www.endress.com/cps11d
  Technical Information TI00028C

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 CPS31D
- pH electrode with gel-filled reference system with ceramic diaphragm
- Product Configurator on the product page: www.endress.com/cps31d
  Technical Information TI00030C

Ceraliquid CPS41D
- pH electrode with ceramic junction and KCl liquid electrolyte
- Product Configurator on the product page: www.endress.com/cps41d
  Technical Information TI00079C

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

Ceragel CPS71D
- pH electrode with reference system including ion trap
- Product Configurator on the product page: www.endress.com/cps71d
  Technical Information TI00245C

Memosens CPS171D
- pH electrode for bio-fermenters with digital Memosens technology
- Product Configurator on the product page: www.endress.com/cps171d
  Technical Information TI01254C

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

Orbipore CPS91D
- pH electrode with open aperture for media with high dirt load
- Product Configurator on the product page: www.endress.com/cps91d
  Technical Information TI00375C
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

Orbisint CPS12D
- ORP sensor for process technology
- Product Configurator on the product page: www.endress.com/cps12d

Technical Information TI00367C

Ceraliquid CPS42D
- ORP electrode with ceramic junction and KCl liquid electrolyte
- Product Configurator on the product page: www.endress.com/cps42d

Technical Information TI00373C

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

Ceragel CPS72D
- ORP electrode with reference system including ion trap
- Product Configurator on the product page: www.endress.com/cps72d

Technical Information TI00374C

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

Orbipore CPS92D
- ORP electrode with open aperture for media with high dirt load
- Product Configurator on the product page: www.endress.com/cps92d

Technical Information TI00435C

14.2.3  pH-ISFET sensors

Memosens CPS47D
- Sterilizable and autoclavable ISFET sensor for pH measurement
- Refillable KCl liquid electrolyte
- Product Configurator on the product page: www.endress.com/cps47d

Technical Information TI01412C
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

Memosens CPS77D
- Sterilizable and autoclavable ISFET sensor for pH measurement
- Product Configurator on the product page: www.endress.com/cps77d

Memosens CPS97D
- ISFET sensor for pH measurement with long-term stability in media with high dirt loads
- Product Configurator on the product page: www.endress.com/cps97d

Tophit CPS441D
- Sterilizable ISFET sensor for low-conductivity media
- Liquid KCl electrolyte
- Product Configurator on the product page: www.endress.com/cps441d

Tophit CPS471D
- Sterilizable and autoclavable ISFET sensor for food and pharmaceutics, process engineering
- Water treatment and biotechnology
- Product Configurator on the product page: www.endress.com/cps471d

Tophit CPS491D
- ISFET sensor with open aperture for media with high dirt load
- Product Configurator on the product page: www.endress.com/cps491d

14.2.4 Combined sensors

Memosens CPS16D
- Combined pH/ORP sensor for process technology
- With dirt-repellent PTFE diaphragm
- With Memosens technology
- Product Configurator on the product page: www.endress.com/cps16D

Memosens CPS76D
- Combined pH/ORP sensor for process technology
- Hygienic and sterile applications
- With Memosens technology
- Product Configurator on the product page: www.endress.com/cps76d
**Memosens CPS96D**
- Combined pH/ORP sensor for chemical processes
- With poison-resistant reference with ion trap
- With Memosens technology
- Product Configurator on the product page: [www.endress.com/cps96d](http://www.endress.com/cps96d)

Technical Information TI00507C

### 14.3 Additional functionality

#### 14.3.1 Hardware extension modules

**Kit, extension module DIO**
- 2 x digital input
- 2 x digital output
- Auxiliary voltage supply for digital output
- Order number: 71135638

**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](http://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**
The secondary buffer solutions have been referenced to primary reference material of the PTB (German Federal Physico-technical Institute) or to standard reference material of NIST (National Institute of Standards and Technology) according to DIN 19266 by a laboratory accredited by the DAkkS (German accreditation body) according to DIN 17025. Product Configurator on the product page: [www.endress.com/cpy20](http://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](http://www.endress.com/cpy3)
## 15 Technical data

### 15.1 Input

<table>
<thead>
<tr>
<th>Measured variables</th>
<th>→ Documentation of the connected sensor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring ranges</td>
<td>→ Documentation of the connected sensor</td>
</tr>
</tbody>
</table>

#### Types of input
- 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
Depending on version:
- 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
- **Span**
  - > 0 to 20 mA
- **Signal characteristic**
  - Linear
- **Internal resistance**
  - Non-linear
- **Test voltage**
  - 500 V

#### Digital inputs, passive in the CDC90 control unit
- **Electrical specification**
  - drawing power (passive)
  - Galvanically isolated
- **Span**
  - High: 11 to 30 V DC
  - Low: 0 to 5 V DC
- **Nominal input current**
  - max. 8 mA
- **PFM function**
  - Minimum pulse width: 500 µs (1 kHz)
- **Test voltage**
  - 500 V
### Technical data

**Cable specification**
Max. 2.5 mm² (14 AWG)

<table>
<thead>
<tr>
<th>Digital inputs, passive in the pneumatic control unit</th>
<th><strong>Span</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High:</strong> 11 to 30 V DC</td>
<td></td>
</tr>
<tr>
<td><strong>Low:</strong> 0 to 5 V DC</td>
<td></td>
</tr>
</tbody>
</table>

**Nominal input current**
max. 8 mA

<table>
<thead>
<tr>
<th><strong>Cable specification</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. 2.5 mm² (14 AWG)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analog inputs, passive in CDC90 control unit</th>
<th><strong>Span</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; 0 to 20 mA</td>
</tr>
</tbody>
</table>

**Signal characteristic**
Linear

**Internal resistance**
Non-linear
15.2 Output

Output signal
- 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

<table>
<thead>
<tr>
<th>Analog outputs, active in CDC90 control unit</th>
<th>Signal on alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adjustable, as per NAMUR Recommendation NE 43</td>
</tr>
<tr>
<td>Analog outputs, active in CDC90 control unit</td>
<td>In measuring range 0 to 20 mA:</td>
</tr>
<tr>
<td></td>
<td>failure current from 20 to 23 mA</td>
</tr>
<tr>
<td>Digital outputs, active in the pneumatic control unit</td>
<td>In measuring range 4 to 20 mA:</td>
</tr>
<tr>
<td></td>
<td>failure current from 2.4 to 23 mA</td>
</tr>
<tr>
<td></td>
<td>Factory setting for failure current for both measuring ranges:</td>
</tr>
<tr>
<td></td>
<td>22.5 mA</td>
</tr>
</tbody>
</table>

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 µs (1 kHz)

<table>
<thead>
<tr>
<th>Digital outputs, active in the pneumatic control unit</th>
<th>Electrical specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital outputs, active in the pneumatic control unit</td>
<td>Outputs:16</td>
</tr>
<tr>
<td></td>
<td>Max. current: 0.5 A per output</td>
</tr>
<tr>
<td></td>
<td>Total current: max. 8A</td>
</tr>
</tbody>
</table>

Cable specification
Max. 2.5 mm² (14 AWG)
Technical data

Liquiline Control CDC90

Protocol-specific data

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

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
  - Output (O → T)
  - System Information
  - Measured values and status
  - IO Feedback
  - 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     | 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     | Remote-controlled device configuration, Access to web server via Internet browser |
### 15.3 Power supply

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>100 to 230 V AC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>Max. 50 VA</td>
</tr>
<tr>
<td>Cable specification</td>
<td><strong>Power supply cable (mains)</strong></td>
</tr>
<tr>
<td></td>
<td>Cable cross-section:</td>
</tr>
<tr>
<td></td>
<td>• Minimum cross-section 3 x 0.75 mm² to 10 m length</td>
</tr>
<tr>
<td></td>
<td>• Minimum cross-section 3 x 1.5 mm² to 20 m length</td>
</tr>
<tr>
<td>Overvoltage protection</td>
<td>Integrated overvoltage protection according to EN 61326</td>
</tr>
<tr>
<td></td>
<td>Protection category 1 and 3</td>
</tr>
<tr>
<td>Electrical connection</td>
<td><strong>Electrical safety</strong></td>
</tr>
<tr>
<td></td>
<td>IEC 61010-1, Class I equipment</td>
</tr>
<tr>
<td></td>
<td>Low voltage: overvoltage category II</td>
</tr>
<tr>
<td></td>
<td>Environment &lt; 2000 m (&lt; 6562 ft) above MSL</td>
</tr>
</tbody>
</table>
15.4  Performance characteristics

Response time

**Current outputs**

\[ t_{90} = \text{max. } 500 \text{ ms for an increase from } 0 \text{ to } 20 \text{ mA} \]

**Current inputs**

\[ t_{90} = \text{max. } 330 \text{ ms for an increase from } 0 \text{ to } 20 \text{ mA} \]

**Digital inputs and outputs**

\[ t_{90} = \text{max. } 330 \text{ ms for an increase from low to high} \]

Reference temperature

25 °C (77 °F)

Measured error for sensor inputs

→ Documentation of the connected sensor

Measured error for current inputs and outputs

**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

**Additional measured error depending on the temperature:**

< 1.5 µA/K

Frequency tolerance of digital inputs and outputs

≤ 1%

Resolution of current inputs and outputs

< 5 µA

Repeatability

→ Documentation of the connected sensor

15.5  Environment

This device is for indoor use only.

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 height

**Max. altitude above MSL**

< 2000 m (< 6562 ft) above MSL

Degree of protection

**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 61326-1:2013, Class A for Industry

Pollution degree
The product is suitable for pollution degree 2.

15.6 Mechanical construction

Dimensions
See: → 13

Weight

<table>
<thead>
<tr>
<th>Device</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete device on mounting plate</td>
<td>Approx. 52 kg (114.64 lbs)</td>
</tr>
<tr>
<td>CDC90 control unit</td>
<td>Approx. 2.1 kg (4.63 lbs) depending on the version</td>
</tr>
<tr>
<td>Pneumatic control unit painted</td>
<td>7.5 kg (16.53 lbs) (empty)</td>
</tr>
<tr>
<td>Pump canister unit</td>
<td>Approx. 1.5 kg (3.30 lbs)</td>
</tr>
<tr>
<td>Mounting plate (Trespa)</td>
<td>Approx. 10 kg (22 lbs)</td>
</tr>
<tr>
<td>Canister shelf</td>
<td>Approx. 3.2 kg (7.05 lbs)</td>
</tr>
<tr>
<td>SD card</td>
<td>Max. 5 g (0.17 oz)</td>
</tr>
</tbody>
</table>

Materials

<table>
<thead>
<tr>
<th>Device</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC90 control unit</td>
<td>PC (polycarbonate)</td>
</tr>
<tr>
<td>Module housing</td>
<td>TPE (thermoplastic elastomers)</td>
</tr>
<tr>
<td>Soft keys</td>
<td>POM</td>
</tr>
<tr>
<td>LED</td>
<td>Plastic capacitive touchscreen</td>
</tr>
<tr>
<td>Cable mounting rail</td>
<td>Stainless steel 1.4301 (AISI 304)</td>
</tr>
<tr>
<td>Display glass</td>
<td>PA (polyamide) V0 as per UL94</td>
</tr>
<tr>
<td>Cable glands</td>
<td>PA (polyamide)</td>
</tr>
<tr>
<td>M12 cable glands</td>
<td>EPDM</td>
</tr>
<tr>
<td>Housing seals</td>
<td>EPDM</td>
</tr>
<tr>
<td>Cable gland O-ring</td>
<td>EPDM</td>
</tr>
<tr>
<td>Pneumatic control unit</td>
<td>Stainless steel 1.4301 (AISI 304), painted steel</td>
</tr>
<tr>
<td>Housing</td>
<td>EPDM (ethylene propylene diene rubber)</td>
</tr>
<tr>
<td>Housing seals</td>
<td>PA (polyamide) V0 as per UL94</td>
</tr>
<tr>
<td>Cable glands</td>
<td>EPDM</td>
</tr>
</tbody>
</table>
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#### Liquiline Control CDC90

<table>
<thead>
<tr>
<th>Device</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pump canister unit</strong></td>
<td></td>
</tr>
<tr>
<td>Pump</td>
<td>PVDF+CF/PP+NBR+PTFE/PTFE/PP</td>
</tr>
<tr>
<td>Canister</td>
<td>PE</td>
</tr>
<tr>
<td>Float switch</td>
<td>PVC/EPDM/PE</td>
</tr>
<tr>
<td>Canister fitting</td>
<td>ABS/PMMA</td>
</tr>
<tr>
<td>Bracket M5 L110*B40 W8</td>
<td>PP</td>
</tr>
<tr>
<td>O-ring</td>
<td>EPDM</td>
</tr>
<tr>
<td>Coupling DMG/8*6 1/4</td>
<td>PVDF</td>
</tr>
<tr>
<td>Canister shelf</td>
<td>PP</td>
</tr>
<tr>
<td><strong>Rinsing block</strong></td>
<td></td>
</tr>
<tr>
<td>Process valve</td>
<td>EPDM/PP/stainless steel:1.4408/PTFE</td>
</tr>
<tr>
<td>Rinsing body</td>
<td>PVDF/1.4401</td>
</tr>
<tr>
<td>Rinse connection</td>
<td>PP</td>
</tr>
<tr>
<td>Check valves</td>
<td>PVDF+FKM/PVDF+FFKM/1.4571+FKM</td>
</tr>
<tr>
<td>Bracket, metal plate</td>
<td>1.4571</td>
</tr>
<tr>
<td>Bracket, clamp</td>
<td>1.4404</td>
</tr>
<tr>
<td>Hose bracket/cable gland</td>
<td>PA</td>
</tr>
<tr>
<td>Sealing plug</td>
<td>Teflon</td>
</tr>
<tr>
<td>Double nipple</td>
<td>PVDF</td>
</tr>
<tr>
<td>O-ring</td>
<td>FKM/FFKM</td>
</tr>
<tr>
<td><strong>Hoses</strong></td>
<td></td>
</tr>
<tr>
<td>Compressed air</td>
<td>PUN-A</td>
</tr>
<tr>
<td>Liquid</td>
<td>PUN-A+/PTFE</td>
</tr>
</tbody>
</table>

#### 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. 8 bar (116 psi) (8 bar corresponds to 8 l/min delivery rate, depending on the control air)

Pipes:
Max. 10 bar (145 psi)

#### Connections

<table>
<thead>
<tr>
<th>Water connection</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water connection, rinsing block</td>
<td>Hose barb D12 PP for hoses with internal diameter 12 mm (0.47 in)</td>
</tr>
<tr>
<td>Assembly inlet and outlet</td>
<td>Hose coupling D6/8 mm (0.24/0.31 in) PVDF</td>
</tr>
</tbody>
</table>
## Technical data

<table>
<thead>
<tr>
<th>Hose diameter</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>ID 6 mm (0.24 in)/ OD 8 mm (0.31 in)</td>
</tr>
<tr>
<td>Compressed air</td>
<td>Compressed air supply, purge air:</td>
</tr>
<tr>
<td></td>
<td>ID 6 mm (0.24 in)/ OD 8 mm (0.31 in)</td>
</tr>
<tr>
<td></td>
<td>Compressed air of assemblies, valves, pumps:</td>
</tr>
<tr>
<td></td>
<td>ID 4 mm (0.16 in)/ OD 6 mm (0.24 in)</td>
</tr>
</tbody>
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