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# Installation Instructions
# **Liquiline System CA80SI/82HA analyzer**

Process engineering

Endress+Hauser
People for Process Automation

## Table of contents

# 1 Overview

## 1.1 Spare parts kits

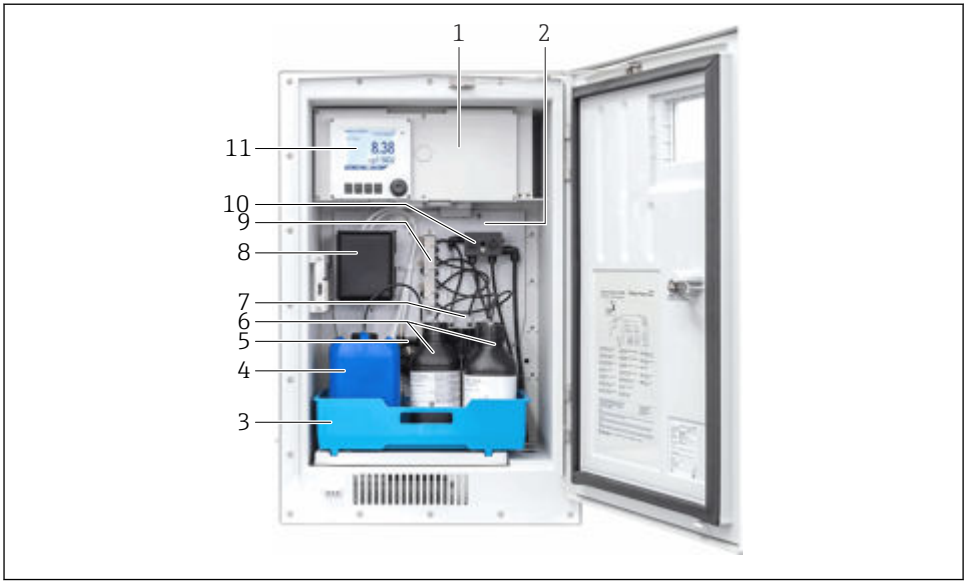
These Installation Instructions apply to the following spare parts kits:

| Order code | Designation | Page |
|---|---|---|
| 71411242 | CA80SI/82HA flow sensor | → 11 |
| 71411247 | CA80SI/82HA reagent valve | → 11 |
| 71411249 | CA80SI/82HA hose pump, complete | → 12 |
| 71411248 | CA80SI/82HA filter, complete | → 12 |
| 71503211 | CA80SI/82HA control module version 2 | → 12 |
| 71699155 | CA80SI/82HA sample switch valve, 2-channel | → 14 |

## 1.2 Overview of CA80SI/82HA

The figures below (→ 1, 4 and → 2, 5) show an overview of the CA80SI/82HA for photometric silicate measurement or to measure water hardness in the low validity range. A 2-channel device is shown.

For 2-channel devices, the sample switch is integrated into the device. Filters and pressure limiters are mounted externally.

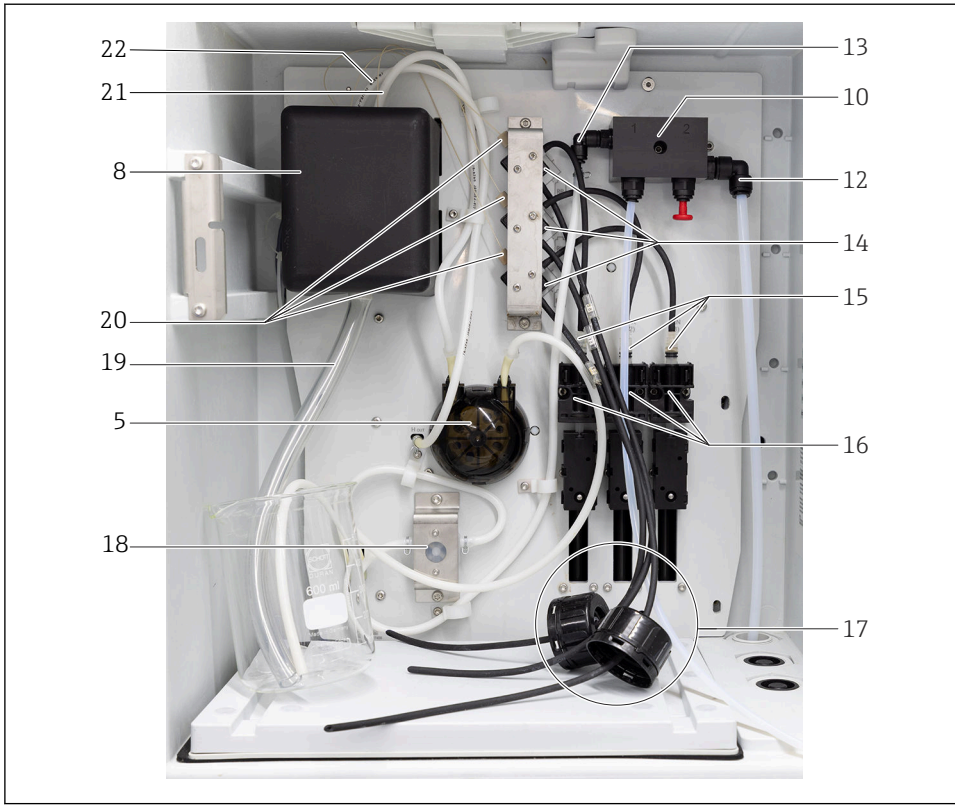



*1 CA80SI/82HA assembly overview*

*1 Electronics compartment cover*
*2 Carrier plate*
*3 Bottle tray*
*4 Bottle for standard solution*
*5 Peristaltic pump for standard solution*
*6 Reagent bottles*
*7 Dosing dispensers for reagents*
*8 Cover with cuvette, photometer and stirrer behind*
*9 Valve block for reagent dosing*
*10 Sample switch (only 1-channel/2-channel devices)*
*11 Measuring and control device*

The figure below shows the carrier plate from the front.

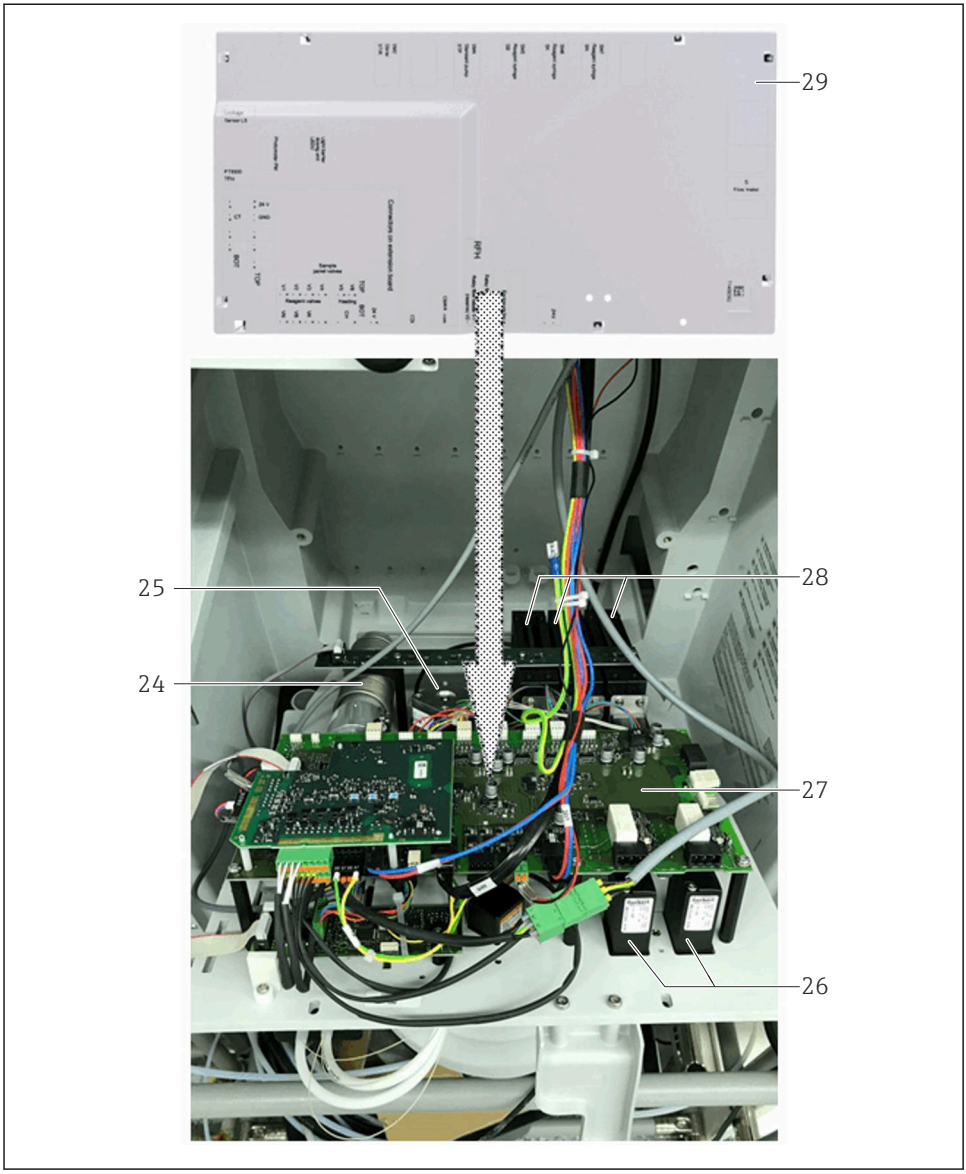
For 4-channel/6-channel devices, the sample switch is outside the analyzer.




2 *Carrier plate CA80SI/82HA with photometer*

*12 Drain hose sample switch OD 8 mm*
*13 Sample hose to flow sensor*
*14 Valves for reagents*
*15 Dosing dispensers*
*16 Dispenser holders*
*17 Cover of reagent container with hoses*
*18 Flowmeter*
*19 Drain hose, cuvette ID 13 mm*
*20 Capillaries for reagents*
*21 Hose standard solution*
*22 Sample hose (from heater of CA80SI)*

The figure below shows the carrier plate folded out and from the rear with a view of the control module.




*3 Rear of CA80SI/82HA carrier plate, folded out*

*24 Sample heating*
*25 Motor for pump standard solution*
*26 Sample switch valve(s) (for 1-channel and 2-channel version, external from 4-channel version)*

*27 Control module (cover (29) removed)*
*28 Dispenser drives*
*29 Cover for the control module: On the cover, you can find information about the connections of the control module (see also figure 5).*

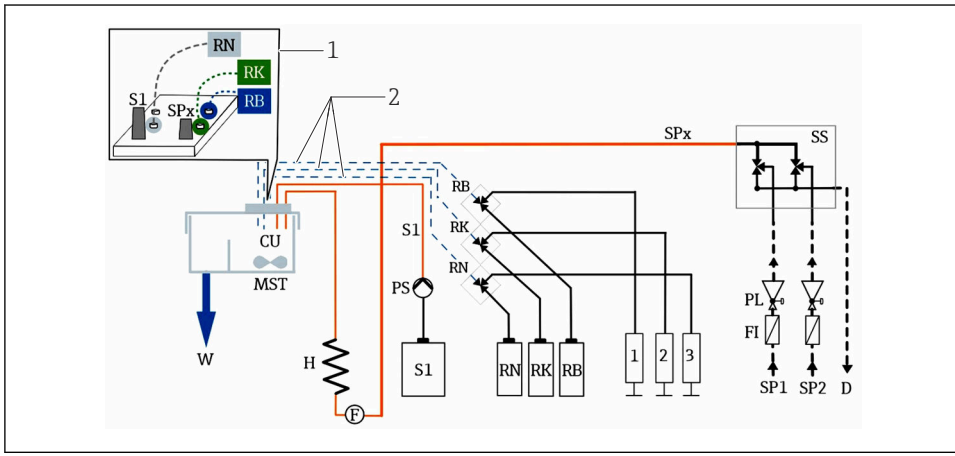
## 1.3 Hose connection diagram

The figure below shows the hose connection diagram of the CA80SI/82HA, for example for a 2-channel device.

For 2-channel devices, the sample switch (see figure 4/SS) is installed in the analyzer.

Sample filter (FI) and pressure-reducing valve (PL) are always installed outside the device.

For 4-channel/6-channel devices, the sample switch is also installed outside the analyzer.




4 *Hose connection diagram (example: 2-channel device)*

*1 Capillary holder*
*2 Capillaries*
*SP1 Sample inlet*
*SP2 Sample inlet*
*D Sample outlet*
*FI Sample filter*
*PL Pressure-reducing valve*
*SS Sample switch*
*SPx Sample to flow sensor*
*1–3 Dosing dispensers*
*RB Bottle and capillary, reagent RB*
*RK Bottle and capillary, reagent RK*

# 2 Designated use

- The parts of the kits must only be used as spare parts for CA80SI/82HA analyzers. Any other use is not permitted!
- Use only original parts from Endress+Hauser.
- In the Device Viewer, check if the spare part is suitable for the device in question.

# 3 Personnel authorized to carry out conversion

- 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 perform the stated tasks.
- The electrical connection may only be established by an electrical technician.
- The technical personnel must have read and understood these Installation Instructions and must follow the instructions they contain.
- Measuring point faults may be repaired only by authorized and specially trained personnel.
- In the case of Ex-certified devices, the technical staff must also be trained in explosion protection.

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

# 4 Safety Instructions

**⚠ WARNING**

**Danger of death from electrical shock!**

- ▶ Perform work on the device with the utmost caution, especially when the device remains fully or partially powered on during maintenance tasks.
- ▶ Follow the instructions in the relevant sections of this manual, as the procedure for electrical safety depends on the service kits used. The CA8x analyzer does not have a power switch for the power supply.
- ▶ Work must be carried out according to applicable safety standards.
- ▶ Note the instructions in the Operating Instructions for the analyzer.

**⚠ CAUTION**

**Risk to health due to contact with the process medium!**

- ▶ Wear protective gloves, protective goggles and protective clothing, particularly when working with reagents, chemicals or process solutions.

**⚠ CAUTION**

**Risk to health due to contact with chemicals!**

- When handling chemicals, note the warnings on the safety data sheets. Wear acid-proof protective gloves, a protective jacket and protective goggles!
- Note the nationally applicable workplace safety regulations for the work area when handling toxic or corrosive chemicals. If necessary, consult a physician and show the safety data sheet or the information on the chemical container.

**⚠ CAUTION**

**Electronic assemblies are sensitive to electrostatic discharges (ESD)!**

- Before removing an assembly from the antistatic packaging, it must be discharged, e.g. at a protective ground. Continuous grounding, e.g. with an ESD wristband, is recommended.

**Potential impact on the process**

Before decommissioning an active device, the potential impact on the overall process must be taken into account! This applies in particular when using the switching contacts, the analog signal outputs or the communication interface of the associated measuring instrument to control process variables. Coordinate service tasks with the operator!

Contact Endress+Hauser Service if you have questions: www.addresses.endress.com

## 4.1 Compatibility of the electrical assemblies

If one of the modules specified in the table below needs to be replaced, care must be taken to use a module of the same version. A device's generation of modules can be determined in the Asset Central Viewer (ACV).

Electronics modules of version 1 are not compatible with version 2 electronics modules. This means that only modules of version 1 or modules of version 2 may be installed in one device. The table shows the compatibility of modules.

Version 2 of the electronics modules is only supported by firmware 01.08.00 and later!

| | Backplane V1 | BASE-E | Interface module V1 | Control module V1 | Backplane V2 | BASE2-E | Interface module V2 | Control module V2 |
|---|---|---|---|---|---|---|---|---|
| Backplane V1 | N/A | ☑ | ☑ | ☑ | N/A | - | - | - |
| BASE-E | ☑ | N/A | ☑ | ☑ | - | N/A | - | - |
| Interface module V1 | ☑ | ☑ | N/A | ☑ | - | - | N/A | - |
| Control module V1 | ☑ | ☑ | ☑ | N/A | - | - | - | N/A |
| Backplane V2 | N/A | - | - | - | N/A | ☑ | ☑ | ☑ |
| BASE2-E | - | N/A | - | - | ☑ | N/A | ☑ | ☑ |
| Interface module V2 | - | - | N/A | - | ☑ | ☑ | N/A | ☑ |
| Control module V2 | - | - | - | N/A | ☑ | ☑ | ☑ | N/A |

| CA80 | Name @ ACV | Module name | Spare parts kit |
|---|---|---|---|
| All | FIDC1 + FXHC1 | BASE-E module | **71239305** CA8x BASE-E base module |
| | FIDC1 + FXHC**2** | BASE**2**-E module | **71431302** BASE**2**-E base module |
| | FIDS1 | Interface mod. V1 | **71218507** CA8x interface module (version 1) |
| | FIDS**2** | Interface mod. V**2** | **71465480** CA8x interface module (version 2) |
| | FC4W2 | Backplane V1 | **71239304** CA8x backplane CM44 (version 1) |
| | FC4W**3** | Backplane V**2** | **71401272** kit CA8x backplane CM44 (version 2) |
| | | | |
| CA80SI/82HA | FMAB1 (FXAB1 with AXIO1) | Control module V1 | N/A |
| | FMAB2 (FXAB**2** with AXIO1) | Control module V**2** | **71503211** kit CA80SI/82HA control module version **2** |

# 5 Scope of delivery

## 5.1 71411242 kit CA80SI/82HA flow sensor

The kit contains the following parts → 5, 11:

| | | | |
|---|---|---|---|
| 1 x | Flow sensor | 1 x | Kit instructions |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5 *CA80SI/82HA flow sensor*

## 5.2 71411247 kit CA80SI/82HA reagent valve

The kit contains the following parts → 6, 11:

| | | | |
|---|---|---|---|
| 1 x | Valve | 1 x | Kit instructions |
| 2 x | Screw-in connector ¼-28 UNF, for hose ID 2.4 to 3.2 mm | | |

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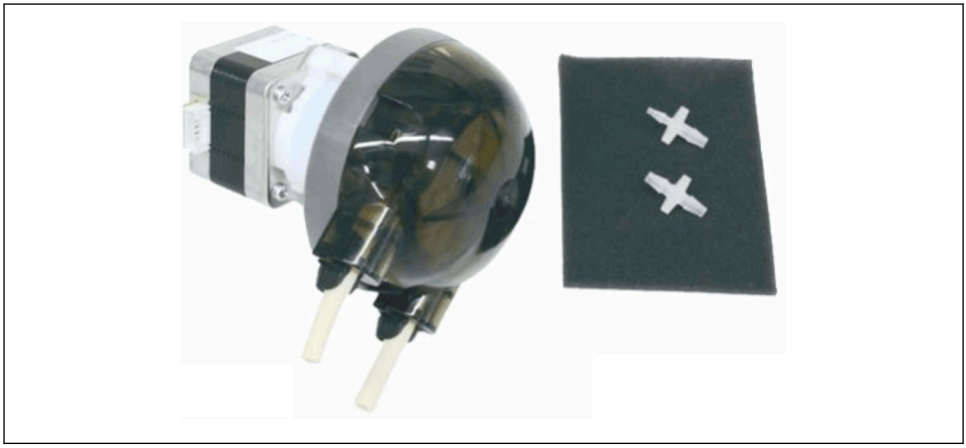
6 *CA80SI/82HA reagent valve*

## 5.3 71411249 kit CA80SI/82HA hose pump, complete

The kit contains the following parts → 7, 12:

| | | | |
|---|---|---|---|
| 1 x | Peristaltic pump, complete | 1 x | Reduction connector 3.2x1.6 mm |
| 1 x | Hose connector 3.2x3.2 mm | 1 x | Kit instructions |



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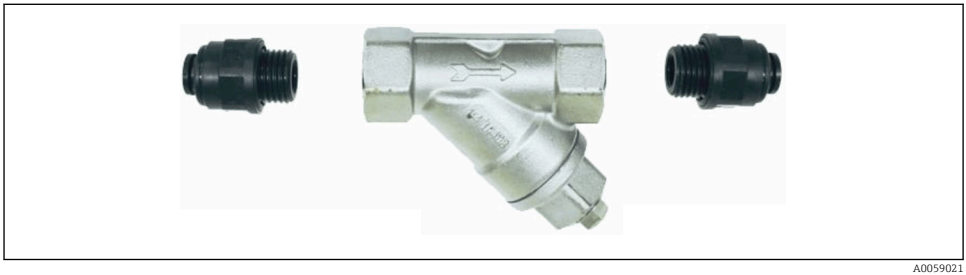
7 *CA80SI/82HA hose pump, complete*

## 5.4 71411248 kit CA80SI/82HA filter, complete

The kit contains the following parts → 8, 12:

| | | | |
|---|---|---|---|
| 1 x | Sample filter G¼", 1.4408 | 1 x | Kit instructions |
| 2 x | Screw-in connector G¼" OD 6 mm | | |



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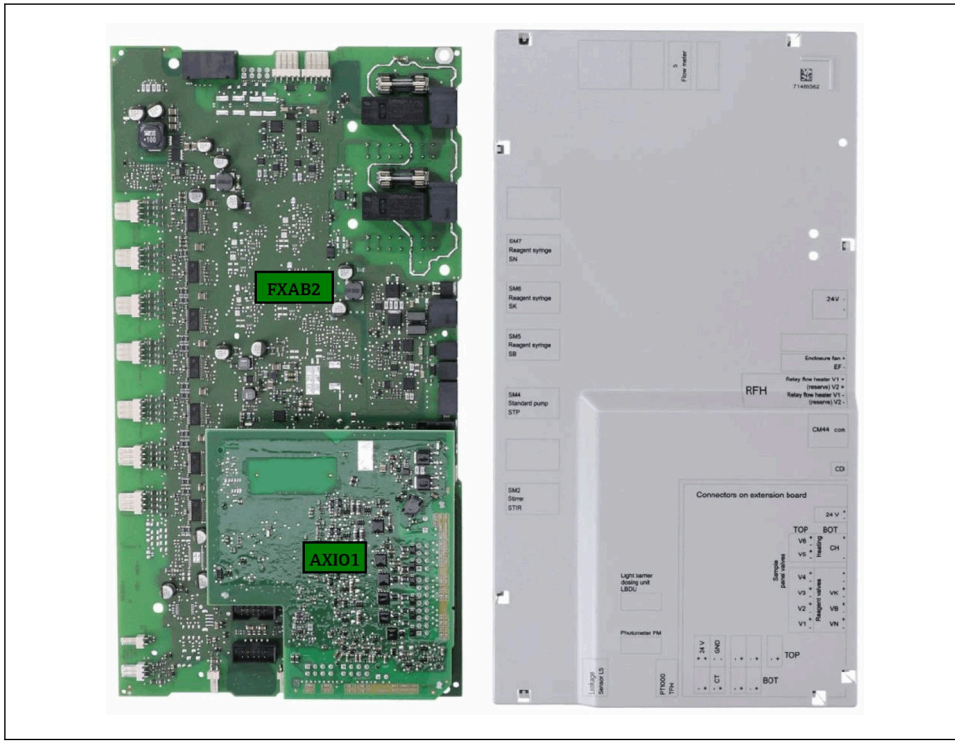
8 *CA80SI/82HA filter, complete*

## 5.5 71503211 kit CA80SI/82HA control module version 2

The kit contains the following parts → 9, 13:

| | | | |
|---|---|---|---|
| 1 x | Control module version 2, complete, modules FXAB2 and AXIO1 | 1 x | Kit instructions |
| 1 x | Cover, labeled | | |

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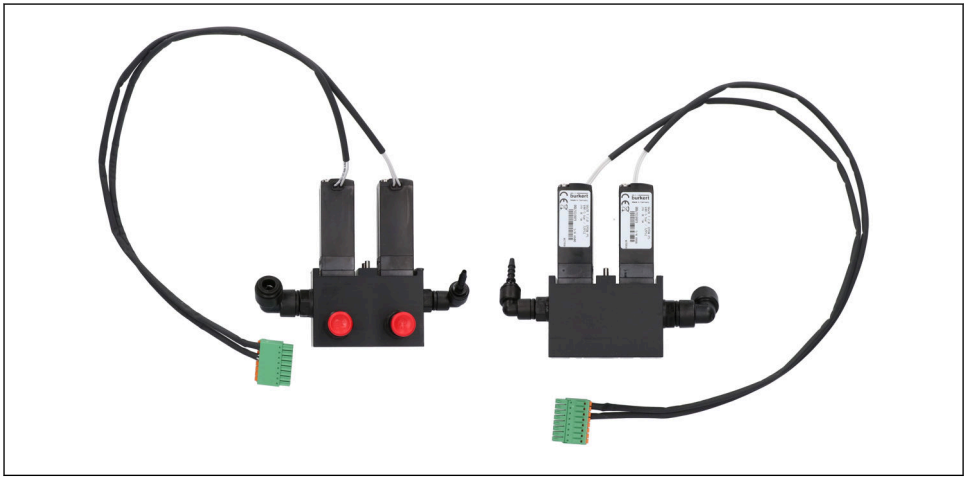
9 *CA80SI/82HA control module version 2*

## 5.6 71699155 kit CA80SI/82HA sample switch valve, 2-channel

The kit contains the following parts → 10, 14:

| | | | |
|---|---|---|---|
| 1 x | Sample switch valve, 2-channel | 1 x | Kit instructions |



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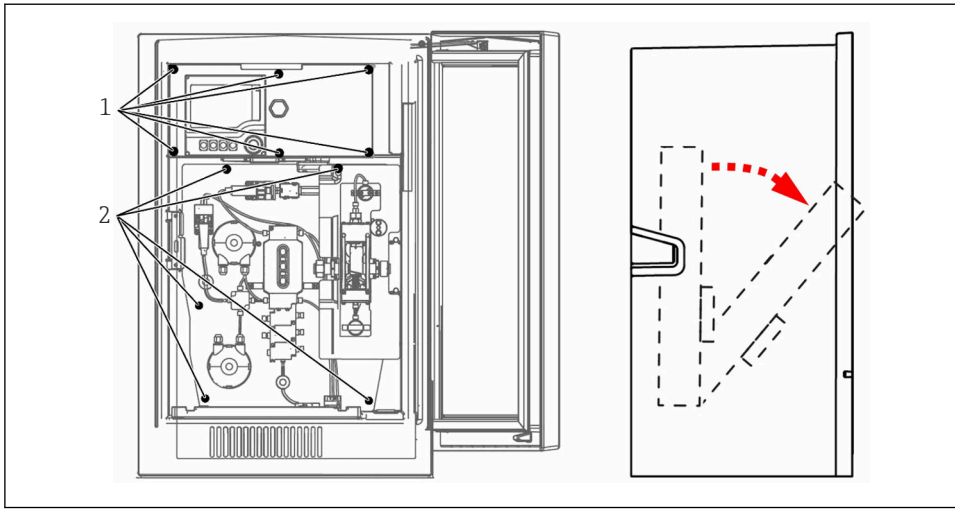
*10 CA80SI/82HA sample switch valve, 2-channel*

# 6 Replacing components

## 6.1 Access for service work

The figure below shows the opening of the connection compartment cover and the folding forward of the carrier plate.




*11 Access for service work on the rear of the carrier plates*

*1 Screws for connection compartment cover*
*2 Screws for securing the carrier plates*

## 6.2 Preparation

The spare part installation differs depending on the spare part and parameters. Therefore, refer to and differentiate between Sections 6.2.1 and 6.2.2.

### 6.2.1 Work without removing the chemical containers = replacing modules/ components in the electronics compartment

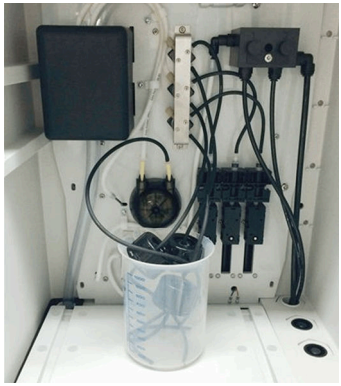
The following steps must only be carried out upon replacing the sample filter → 22.

1. Select **Mode → Manual mode** and confirm by pressing the navigator button.
2. Wait until the analyzer has finished the measurement and **Manual** is displayed as the **Current mode**.
3. **Disconnect the analyzer from the power supply and secure the circuit breaker against unintentional recommissioning.**

### 6.2.2 Work with the removal of chemical containers = replacing components on or behind the carrier plate

1. Select **Mode → Manual mode** and confirm by pressing the navigator button.
2. Wait until the analyzer has finished the measurement and **Manual** is displayed as the **Current mode**.
3. Stop the sample feed.

4. Remove the covers of the reagent bottles and the hoses and place them in a plastic vessel.



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12 *Beaker for covers with hoses*

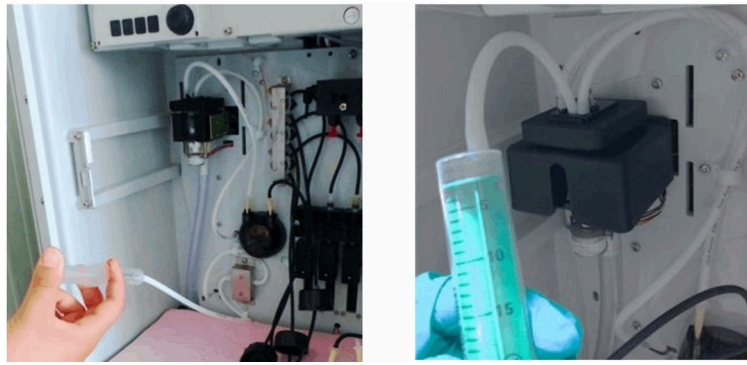
5. Remove the bottle tray together with the bottles from the analyzer
6. Place the hoses in an empty beaker and select **Menu → Operation → Maintenance → Decommissioning → Empty hoses**.

The software evaluates this as the bottles being removed. Therefore, they need to be reinserted at a later time.

7. Place the hoses in a beaker with distilled or treated water and select **Menu → Operation → Maintenance → Decommissioning → Flush with water**. Wait until rinsing is finished.
8. Place the hoses back in an empty beaker and select **Menu → Operation → Maintenance → Empty hoses**.

All the hoses are now flushed, clean and filled with air. It is now possible to work on the analyzer without danger.

9. The analyzer cannot drain the SPx sample hose and the photometer cuvette independently. If required for draining, remove the hose from the flowmeter and drain it with a dispenser.



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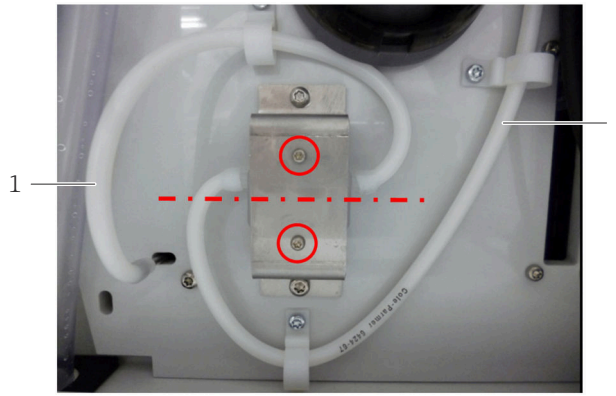
13 *Draining the SPx sample hose and photometer*

10. **Disconnect the analyzer from the power supply and secure the circuit breaker against unintentional recommissioning.**

## 6.3 Replacing the flow sensor

1. Carry out preparatory work as per Section 6.2.2 → 15.
2. Remove the C-Flex hoses from the flow sensor → 14, 17.

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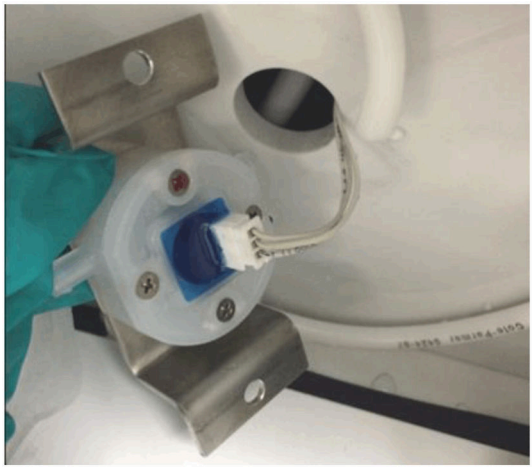
14 *Sensor installation position*

*1 Sample to heater (CA80SI) or to flow sensor (CA82HA)*
*2 Sample inlet SPx*

3. Unscrew the mounting bracket → 15, 18.
4. Release the connector on the back of the sensor.
5. Release the two mounting screws for the flow sensor (at the top of the mounting bracket, → 15, 18) and remove the sensor.
6. Install the new sensor. **Note installation position:** The sensor is asymmetrical. It must be mounted in such a way that the hose connections are above the center → 15, 18!



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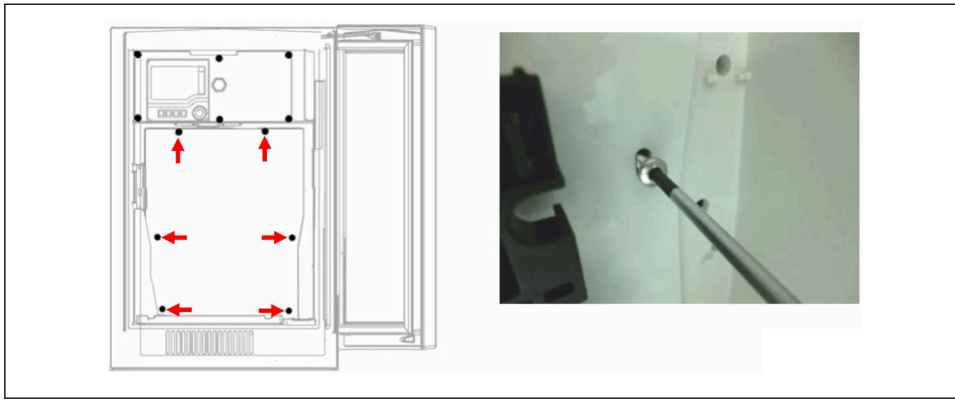
*15 Removal and plug connectors*

7. Reconnect the hoses. Retain the hose arrangement → 15, 18.
8. Put the analyzer back into operation → 26.

## 6.4 Replacing a reagent valve

1. Carry out preparatory work as per Section 6.2.2 → 15.
2. Release the carrier plate (six screws → 16, 19, left).



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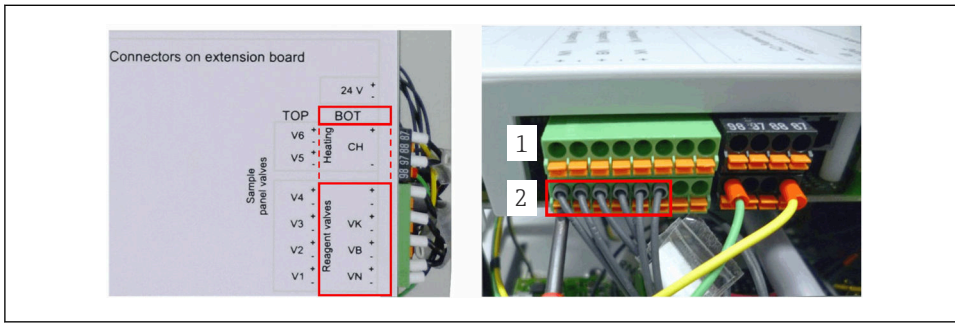
16 *Releasing the carrier plate*

3. Fold out the carrier plate forward. Make sure that the capillaries are not damaged!
4. Remove the lines of the relevant valve from the control module (→ 17, 19, reagent valves VN, VB, VK).

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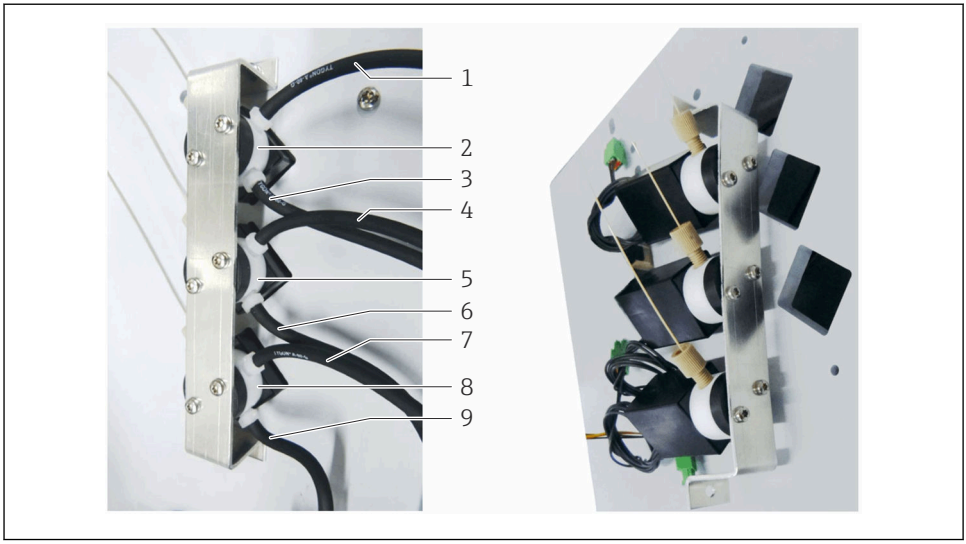
17 *Electrical connections of the valves*

*1 Top*
*2 Bottom*

5. Fold back the carrier plate.
6. Release the neoprene hoses and the capillary of the relevant valve.
7. Release the holder of the valve block → 18, 20.
8. Release the relevant valve from the holder and remove it.

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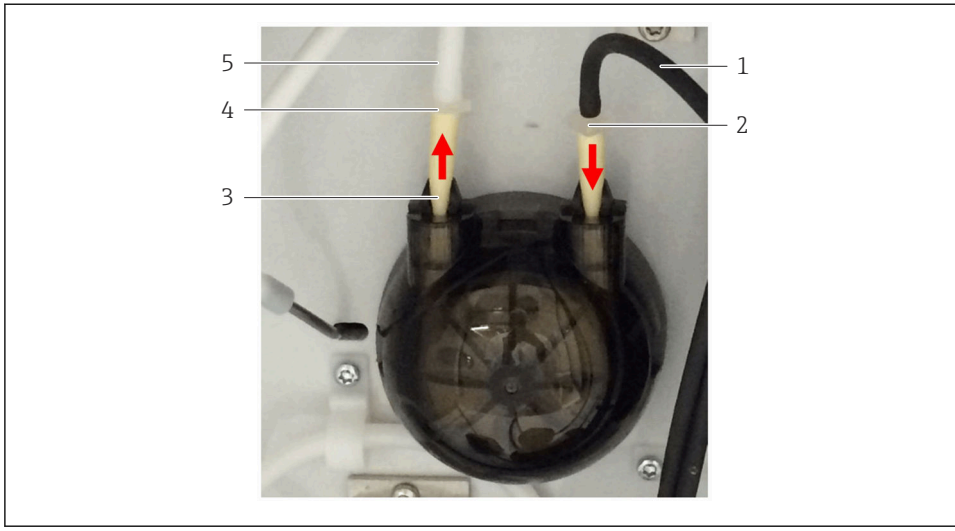
*18 Reagent valves*

*1 Dispenser 1*
*2 Valve VB*
*3 Bottle RB*
*4 Dispenser 2*
*5 Valve VK*
*6 Bottle RK*
*7 Dispenser 3*
*8 Valve VN*
*9 Bottle RN*

9. Install the new valve in reverse order. Only tighten the coupling of the capillary hand-tight!
10. Put the analyzer back into operation → 26.

## 6.5 Replacing the hose pump

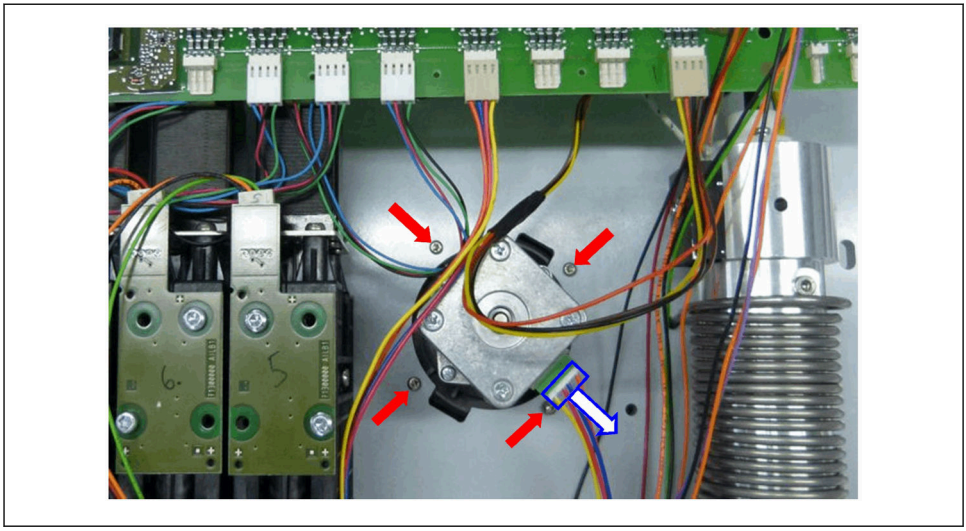
1. Carry out preparatory work as per Section 6.2.2 → 15.
2. Remove the two external hoses from the internal pump hose → 19, 21. Leave the hose connectors on the old pump.




19 *Peristaltic pump*

1 *Hose, Norprene A, ID 1.6 mm*
2 *Reduction connector 3.2x1.6 mm*
3 *Internal pump hose, PharMed BPT, ID 3.2 mm*
4 *Hose connector 3.2x3.2 mm*
5 *Hose, C-Flex, ID 3.2 mm*

3. Remove the pump head. Turn the pump head counterclockwise in order to release the bayonet lock.
4. Fold out the carrier plate forward. Make sure that the capillaries are not damaged!
5. Remove the connector on the pump motor → 20, 22.
6. Loosen the four mounting screws of the pump motor and remove the pump motor → 20, 22.



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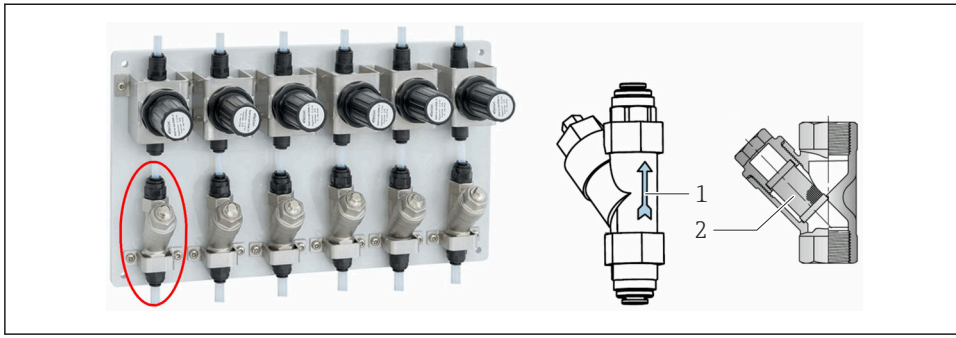
*20 Removing the pump motor*

7. Install the new pump in reverse order. Use the new hose connector supplied to do this.
8. Put the analyzer back into operation → 26.

## 6.6 Replacing a sample filter

1. Carry out preparatory work as per Section 6.2.2 → 15.
2. Interrupt the sample supply, e.g. by closing the system-side upstream valves or by shutting down the system-side sample pumps.
3. Release the hose at the inlet-side hose connector of the relevant filter (bottom filter = sample inlet).
4. Release the mounting bracket of the filter.
5. Now open the outlet-side hose connector of the filter (top filter = flow controller direction) and remove the filter from the short hose piece in a downward direction.




*21 Filter arrangement*

*1 Flow direction*
*2 Filter insert*

6. Install the new filter in reverse order. Use the new screw-in plug connectors supplied.
7. Re-establish the sample supply.
8. Re-establish the power supply.
9. Set the analyzer to automatic mode using **Menu → Operation → Mode → Continue automatic mode**.
10. Check the new filter for leaks (seals of screw-in connectors, closure of the filter insert, hoses on inlet side and outlet side).

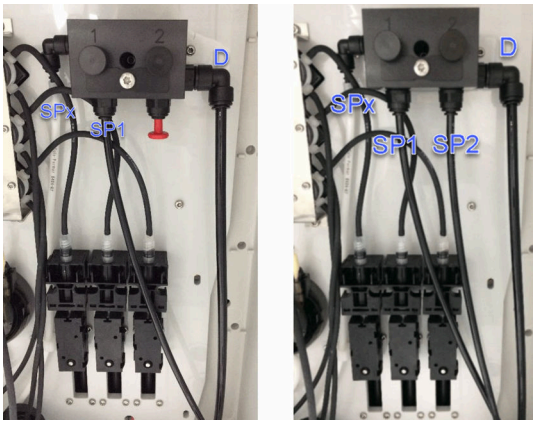
## 6.7 Replacing the control module, version 2

**Components affected: → 3, 6, position 27**

1. Carry out preparatory work as per Section 6.2.2 → 15.
2. Loosen the screws of the carrier plate (5x T25) and fold the carrier plate forward. Store the screws for reuse.
3. Remove the cover of the control module.
4. Loosen the mounting screws of the control module. Store the screws for reuse.
5. The previous control module must be carefully lifted until the new control module can be pushed underneath.
6. Now plug one plug connector after the other from the previous module into the new module. This avoids confusion between identical connectors.
7. Remove the previous control module.
8. Tighten the new control module and fit the cover back on.
9. Fold up the carrier plate and secure it again (5x T25).
10. Put the analyzer back into operation → 26.

## 6.8 Replacing the sample switch valve, 2-channel

1. Remove drain hose D (OD 8 mm; PUN) on the right-hand side of the sample switch valve. Please note that any liquid residue only contains process medium and contains no reagents.
2. Remove sample supply hoses SP1/2 (OD 6 mm; PUN) and the white sample hose to the flow sensor/heater. The positions of the hoses on the sample switch valve are marked in the figure below.

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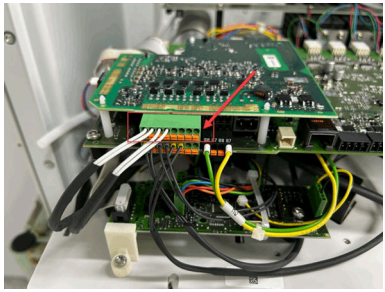
3. Carry out preparatory work as per Section 6.2.2 → 15.
4. Loosen the screws of the carrier plate (5x T25) and fold the carrier plate forward. Store the screws for reuse.
5. Release the green cage clamp from the AXIO1 board → 24.



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6. Pull the cable through the white holder to remove it from the analyzer → 25.

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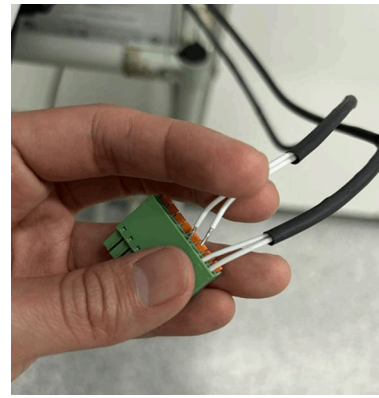
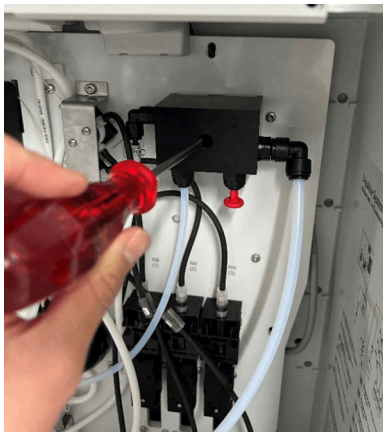
7. Release one of the two cables from the green cage clamp using a slotted head screwdriver. This allows the sample switch valve to be inserted from the other side of the carrier plate → 25.



A0059054

8. Remove the screw in the center of the old sample switch valve → 26.



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9. Remove the sample switch valve from the carrier plate.
10. Insert a new sample switch valve in reverse order. **Important:** For a 1-channel device, leave the second red plug in the sample switch valve.
11. Put the analyzer back into operation → 26.

## 6.9 Recommissioning

1. Insert the bottle tray with reagents, standard and cleaner.
2. Switch the power supply to the analyzer back on.
3. Connect hoses to the reagent containers and fill as described below:
4. Select **Menu → Operation → Maintenance → Bottle replacement → Bottle insertion → Bottle selection**.
5. Highlight all the bottles and confirm by pressing the **OK** softkey.
6. Select the **Bottles inserted confirmation** entry.
7. Activate the sample feed.
8. Select **Mode → Continue automatic mode** to start the normal measuring operation.
9. It is recommended to perform one single-point calibration at the end of the service work. To do so, select **Menu → Calibration → Analyzer → Determine calibration factor**.
10. Check all the new components for leaks.

# 7 Additional documentation

Detailed information on the devices can be found in the Operating Instructions for the analyzer and in the other documentation, available at:

- www.endress.com/device-viewer
- Smartphone/tablet: Endress+Hauser Operations app

# 8 Disposal

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.


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