EA01677C/07/EN/01.25-00
71712541
2025-05-31



# Installation Instructions
# **Liquiline System analyzer CA80COD/TP**

Carrier plate components

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 |
|---|---|---|
| 71324170 | CA80COD/TP leakage sensor | → 14 |
| 71700602 | CA8x leakage sensor | → 14 |
| 71324175 | CA80COD/TP safety cover | → 15 |
| 71324153 | CA80COD/TP PharMed hose 4.8 mm | → 16 |
| 71431075 | CA80COD/TP waste/dilution hose 6.4 mm | → 16 |
| 71431077 | CA80COD/TP waste valve | → 18 |
| 71431079 | CA80TP waste valve | → 17 |
| 71431081 | CA80COD/TP dilution valve | → 17 |
| 71601539 | CA80COD/TP hose pinch valve V2 | → 18 |
| 71324193 | CA80COD/TP reactor vent valve | → 18 |
| 71324194 | CA80COD heated cuvette, 15 mm | → 19 |
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| 71324197 | CA80COD/TP control module | → 21 |
| 71503213 | CA80COD/TP control module version 2 | → 21 |
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| 71324202 | CA80TP photometer transmitter module | → 22 |
| 71324211 | CA80COD/TP photometer receiver module | → 22 |
| 71389529 | CA80 photometer electronics | → 22 |
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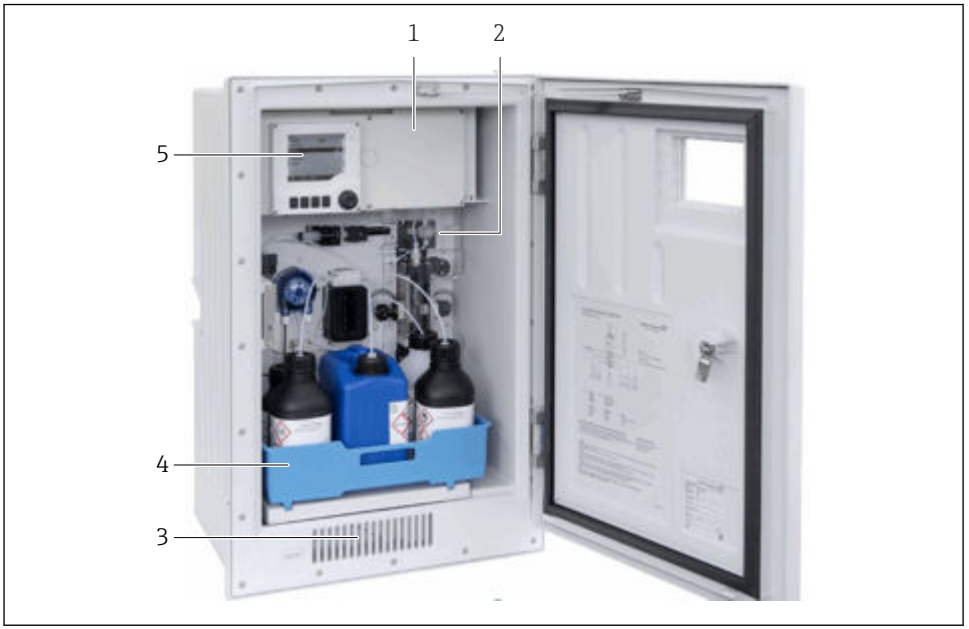
| 71479010 | CA80COD/TP linear drive light barrier | → 23 |

## 1.2 Overview of the CA80COD/TP

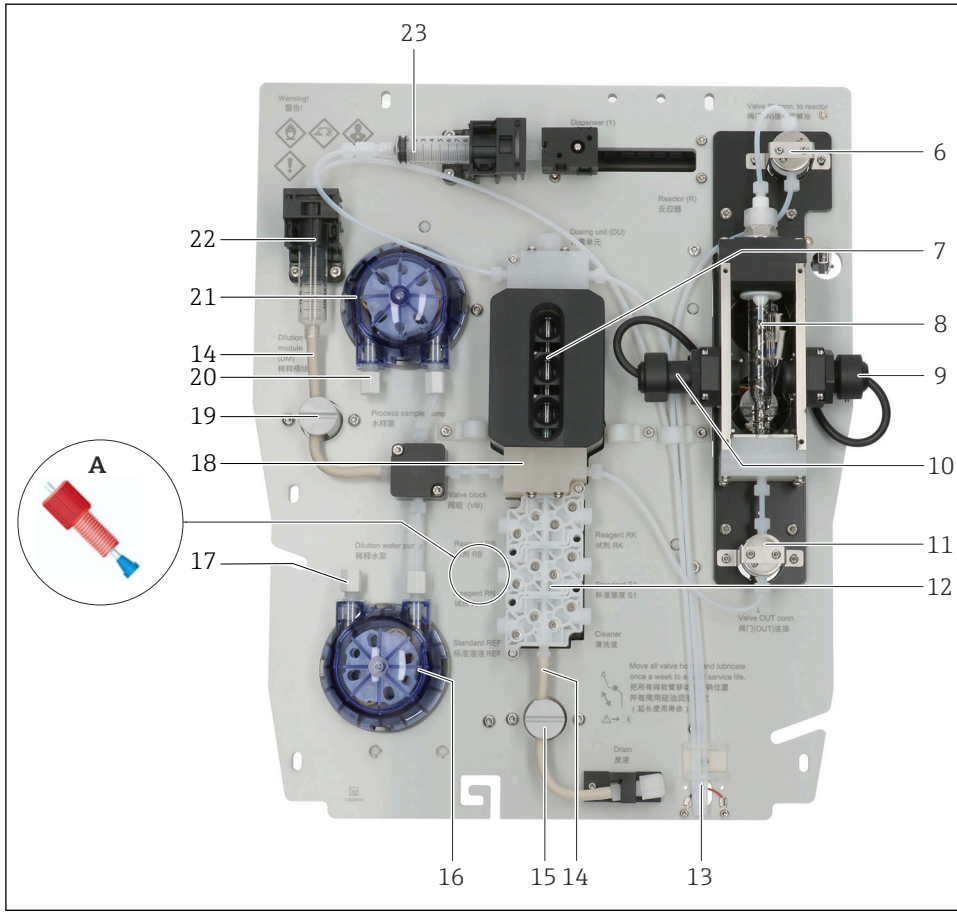
The figure below shows an overview of the CA80 for colorimetric sum parameter measurement.




A0057629

*1 Assembly overview of CA80COD/TP sum parameters*

*1 Electronics compartment*
*2 Carrier plate → 2, 5*
*3 Cooling (option for CA80TP)*
*4 Bottle tray for reagents and standard*
*5 Measuring and control unit (controller)*

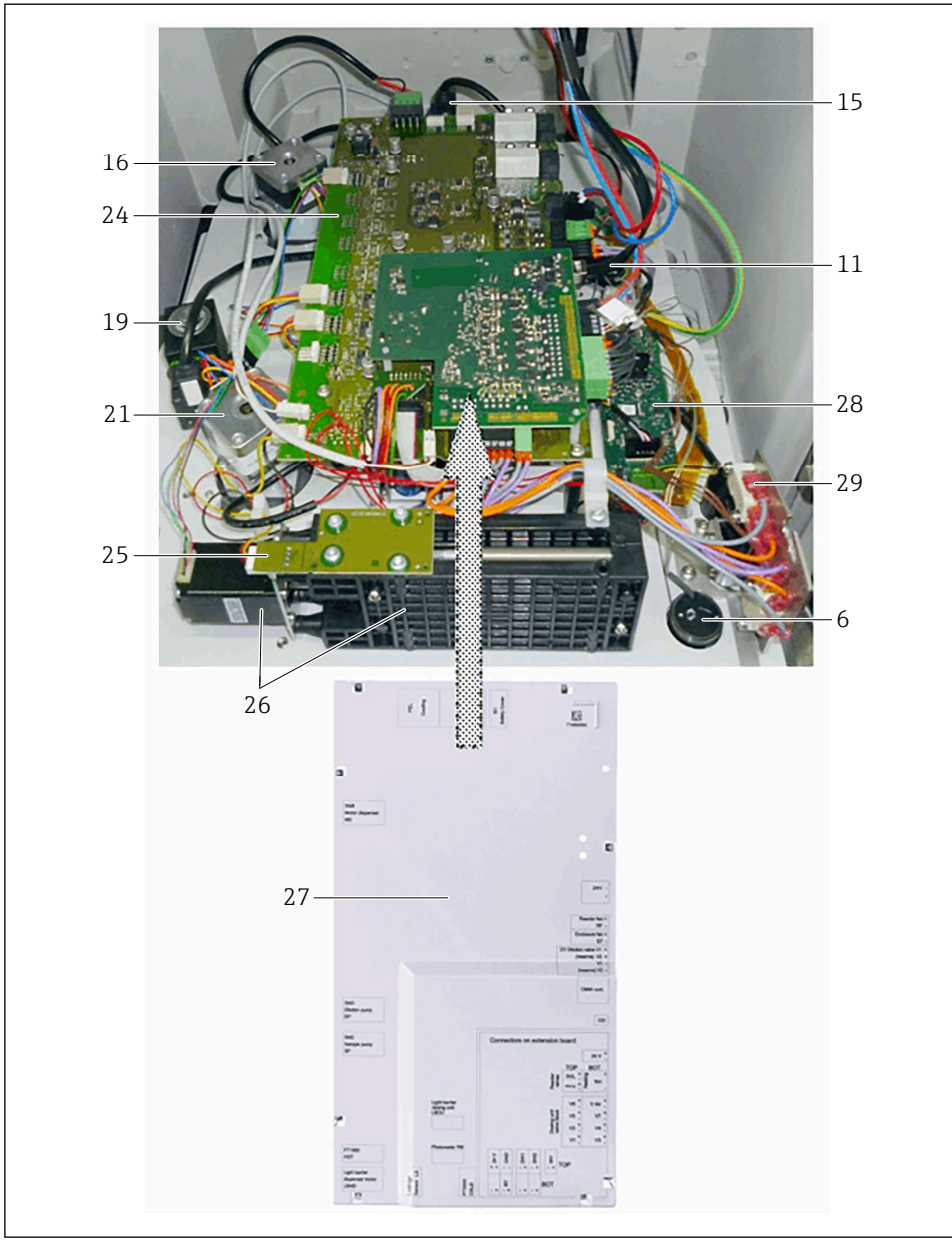



A0058781

2 *Carrier plate CA80 sum parameters from the front (remove safety cover!)*

*A Handling of the hose connections with ferrule: Note the installation direction of the ferrule!*
*6 Upper reactor valve ventilation (RVU)*
*7 Dosing unit with dosing tubes*
*8 Reactor with reactor cuvette*
*9 Photometer (receiver module)*
*10 Photometer (transmitter module)*
*11 Lower reactor valve (RVL)*
*12 Valve block*
*13 Leakage sensor*
*14 Pharmed® hose for pinch valve*
*15 Waste valve*
*16 Dilution pump (only with high measuring range)*
*17 Dilution water intake*
*18 Valve block with dosing unit*
*19 Dilution water valve*

*20 Sample inlet*
*21 Sample pump*
*22 Dilution module (only with high measuring range)*
*23 Dosing dispenser*

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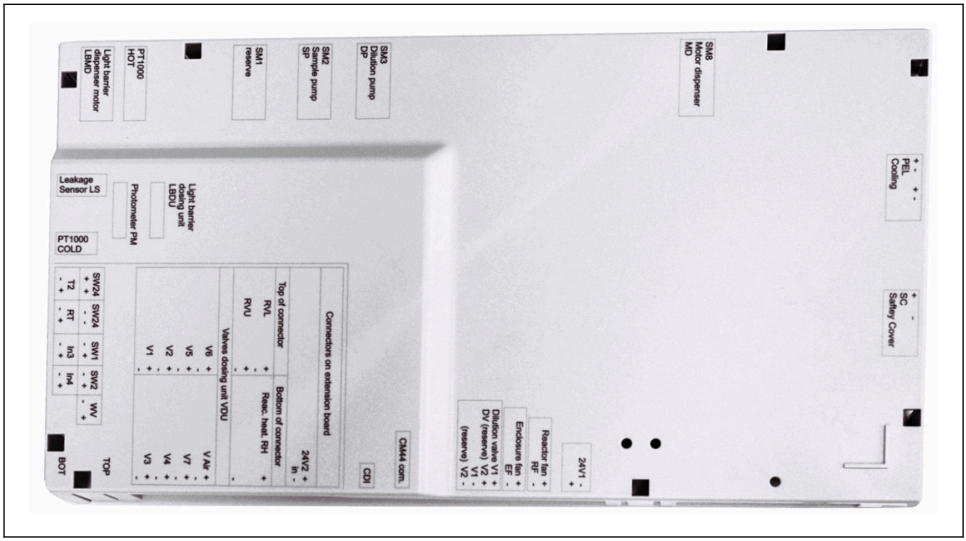
3 *Rear of CA80COD/TP, carrier plate folded out*

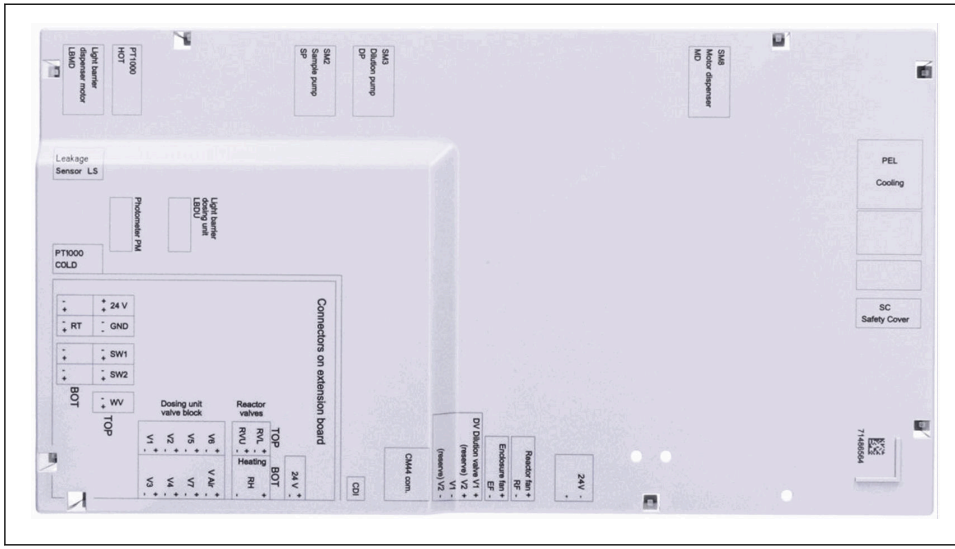
*6 Upper reactor valve ventilation (RVU)*
*11 Lower reactor valve (RVL)*
*15 Waste valve*
*16 Dilution pump (only with high measuring range)*
*19 Dilution water valve*
*21 Sample pump*
*24 Control module*
*25 Linear unit: light barrier*
*26 Linear unit: drive for dosing dispenser*
*27 Cover plate for the control module.*
*28 Photometer electronics*
*29 Reactor cover safety lock*

The cover plate contains information on the connections of the control module (see figures below).




A0058830

*4 Cover plate of control module version 1 with labeling for the electrical connections*

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*5 Cover plate of control module version 2 with labeling for the electrical connections*

## 1.3 Valve types and history

### 1.3.1 Valve types

**Waste valve CA80COD:**

Since February 2019 = SNR **P2**....., the CA80**COD** analyzers have featured a new waste valve (type **2**) and a thick-walled hose.

**Waste valve CA80TP:**

Since January 2022 = SNR **T1**....., the CA80**TP** analyzers have also featured a new waste valve (type **2**) and a thick-walled hose.

**Dilution valve CA80COD and TP:**

Type **2** with a thick-walled hose was also introduced for the dilution valve on the CA80**COD** and **TP** analyzers from mid-2024.

| Valve | Note | |
|---|---|---|
| **Type 1** (for thin and thin-walled hose = kit 71324153) | ▪ Waste valve for **COD** until January 2019 = SNR P1.....<br>▪ Waste valve for **TP** until December 2021 = SNR SC.....<br>▪ Dilution valve **COD** + **TP** gradual phase-out from mid-2024 |  <br>A0058739 |
| **Type 1a** (for thin and thin-walled hose = kit 71324153) | Waste valve for **COD**, only used temporarily, must be replaced by a valve type **2**! |  <br>A0058740 |
| **Type 2** (for thick and thick-walled hose = kit 71431075) | ▪ Waste valve for **COD** since February 2019 = SNR P2.....<br>▪ Waste valve for **TP** since January 2022 = SNR T1.....<br>▪ Dilution valve **COD** + **TP** introduced from mid-2024 |  <br>A0058741 |

### 1.3.2 Use of the hose and valve kits

For utilization times and serial numbers, see also section "Valve types" → 9.

| | | |
|---|---|---|
| **71324153 kit CA80COD/TP: PharMed hose** | PharMed® hose, thin-walled, ID 3.2 W 0.8 OD 4.8 (see → 16) | Hose for valve types **1** and **1a** |
| **71431075 kit CA80COD/TP: waste/ dilution hose** | PharMed® hose, thick-walled, ID 3.2 W 1.6 OD 6.4 (see → 16) | Hose for valve type **2** |
| **71601539 kit CA80COD/TP: hose pinch valve V2** (see → 18, → 12, 18) | | ▪ Waste valve for COD since February 2019<br>▪ Waste valve for TP since January 2022<br>▪ Dilution valve for COD and TP, the change from type 1 to type 2 took place in mid-2024<br>▪ Replacement waste and dilution valve in already modified CA80 COD and TP. |
| **71431077 kit CA80COD/TP: waste valve** (type **2**, see → 18, → 12, 18) | | Discontinued, as identical to kit 71601539 |
| **71431079 kit CA80TP: waste valve** (type **1**, see → 17, → 11, 17) | | Waste valve TP until Dec. 2021 / discontinued |
| **71431081 kit CA80COD/TP: dilution valve** (type **1**, see → 17, → 11, 17) | | Dilution valve, phase-out mid-2024 |

**Conversion of the waste valve**

For CA80**COD** analyzers up to year of manufacture January 2019 / SNR P1..., the waste valve **must** be converted to type **2**.

For CA80**TP** analyzers up to year of manufacture Dec. 2021 / SNR SC..., a conversion of the waste valve to type **2** is **recommended**.

**Prescribed kit:**

71431078 kit CA80COD/TP waste valve conversion kit

This kit contains a valve type **2** and the necessary "Extension module V3.xx". This kit has its own instructions (available in the SFT, for example).

When performing service work, note that an older CA80COD or TP can already be modified!

**Conversion of the dilution valve**

When replacing a dilution valve type **1** with a type **2**, a new extension module is **not** required. Kit **71601539 kit CA80 COD/TP: hose pinch valve V2** is therefore sufficient.

When performing service work, note that an older CA80COD or TP can already be modified!

# 2 Designated use

- The parts of the kits must only be used as spare parts for CA80COD/TP 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 electric 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 CA80COD/TP analyzer does not have a switch for the power supply.
- ▶ All work must be carried out according to applicable safety standards.

**⚠ 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 medium.

**⚠ 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

Note the instructions in the Operating Instructions for the analyzer.

## 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).

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

**In these instructions, this only affects the control module.**

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 |

# 5 Scope of delivery

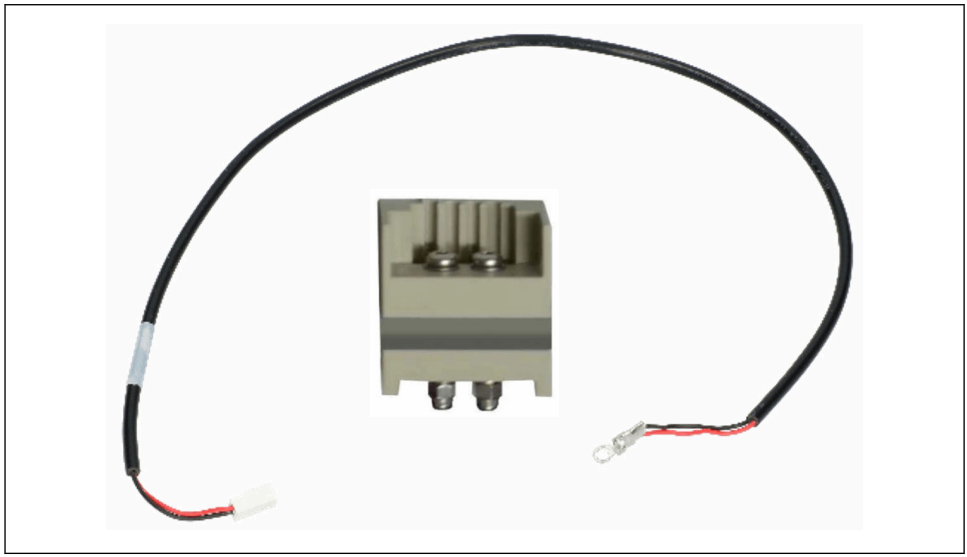
## 5.1 71324170 kit CA80COD/TP leak sensor

This kit applies to all CA80 single parameters and CA80COD/TP or newer, approx. May 2024, serial number < W5.

For serial numbers that are close to the change date, please visually check whether a leak sensor with hose holder is used.

The kit contains the following parts → 🖼 6, 🖹 14:

| | | | |
|---|---|---|---|
| 1 x | Leakage sensor CA80COD/TP, complete | 1 x | Kit instructions |
| 1 x | Cable for leakage sensor (incl. screws for mounting) | | |



A0058736

🖼 6 *CA80COD/TP leakage sensor*

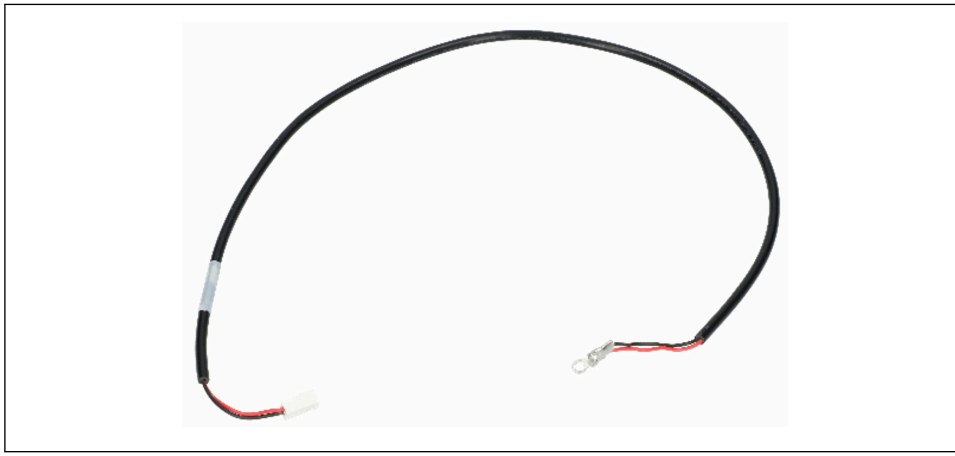
## 5.2 71700602 kit CA8x leakage sensor

This kit applies to all CA80 single parameters and CA80COD/TP or newer, approx. May 2024, serial number > W5.

For serial numbers that are close to the change date, please visually check whether a leak sensor with hose holder is used.

The kit contains the following parts → 7, 15:

| | | | |
|---|---|---|---|
| 1 x | Cable for leakage sensor (incl. screws for mounting). | 1 x | Kit instructions |



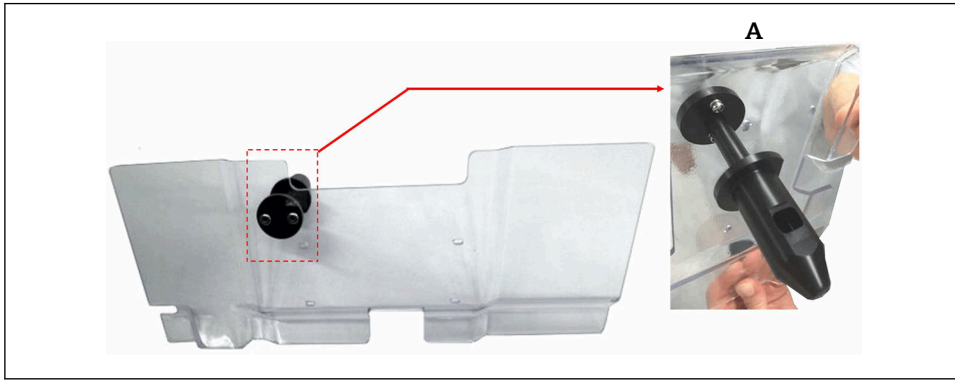
A0058737

7 *CA8x leakage sensor*

## 5.3 71324175 kit CA80COD/TP safety cover

The kit contains the following parts → 8, 15:

| | | | |
|---|---|---|---|
| 1 x | Safety cover with safety lock | 1 x | Kit instructions |




A0058738

8 *CA80COD/TP safety cover*

*A Detail of "safety lock"*

## 5.4 71324153 kit CA80COD/TP PharMed® hose (2 m)

The kit contains the following parts → 9, 16:

| | | | |
|---|---|---|---|
| 2 m | PharMed® hose (thin-walled) ID 3.2 W 0.8 OD 4.8 | 1 x | Kit instructions |

A0058742

*9 CA80COD/TP PharMed® hose (2 m) (valve type 1 and 1a)*

## 5.5 71431075 kit CA80COD/TP waste/dilution hose

The kit contains the following parts → 10, 17:

| | | | |
|---|---|---|---|
| 2 m | PharMed® hose (thick-walled) ID 3.2 W 1.6 OD 6.4 | 1 x | Kit instructions |

A0058743

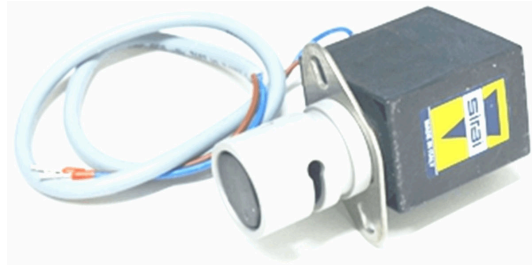
*10 CA80COD/TP waste/dilution hose (valve type 2)*

## 5.6 71431079 kit CA80TP waste valve

This kit has been discontinued! Successor waste valve: see section "Valve types and history" → 9.

## 5.7 71431081 kit CA80COD/TP dilution valve

This kit has been discontinued! Successor waste valve: see section "Valve types and history" → 9.



A0058744

*11 CA80COD/TP dilution valve*

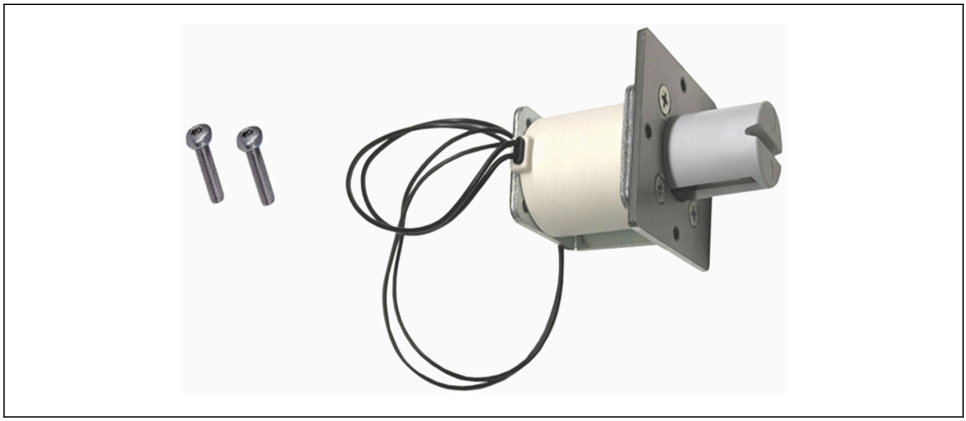
## 5.8 71431077 kit CA80COD/TP waste valve

This kit has been discontinued! Use kit 71601539 instead!

## 5.9 71601539 kit CA80COD/TP hose pinch valve V2

The kit contains the following parts → 12, 18:

| | | | |
|---|---|---|---|
| 1 x | Hose pinch valve type 2 | 1 x | Kit instructions |
| 2 x | Torx screw M4x16 | | |



A0058745

*12 CA80COD/TP hose pinch valve V2*

## 5.10 71324193 kit CA80COD/TP reactor vent valve

The kit contains the following parts → 13, 18:

| | | | |
|---|---|---|---|
| 1 x | Valve, PTFE | 1 x | Kit instructions |


A0058746

*13 CA80COD/TP reactor vent valve*

## 5.11 71324194 kit CA80COD heated cuvette, 15 mm

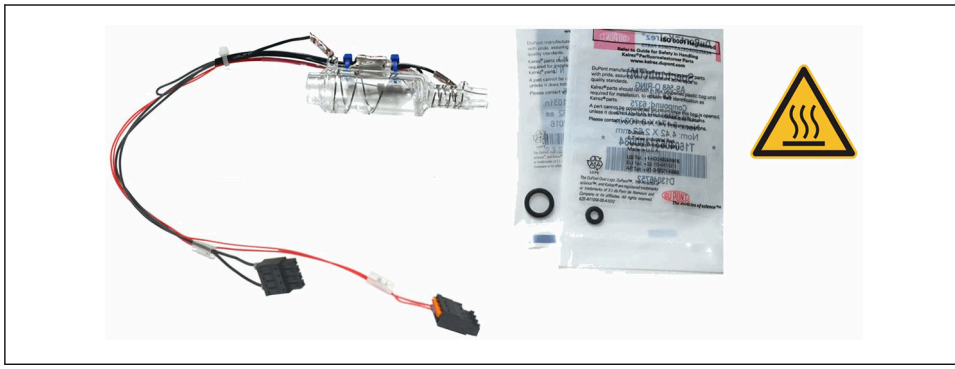
The kit contains the following parts → 14, 19:

| | | | |
|---|---|---|---|
| 1 x | Reactor cuvette 15 mm for COD with heating wire and temperature sensor | 1 x | "Hot surface" warning sign |
| 1 x | O-ring ID 4.42 W 2.62 FFKM | 1 x | Kit instructions |
| 1 x | O-ring ID 16.01 W 2.62 FFKM | | |

## 5.12 71324196 kit CA80TP heated cuvette, 10 mm

The kit contains the following parts → 14, 19:

| | | | |
|---|---|---|---|
| 1 x | Reactor cuvette 10 mm for TP with heating wire and temperature sensor | 1 x | O-ring ID 16.01 W 2.62 FFKM |
| 1 x | O-ring ID 4.42 W 2.62 FFKM | 1 x | Kit instructions |



A0058747

*14 CA80TP heated cuvette, 10 mm*

## 5.13 71324526 kit CA80COD reactor housing with cuvette

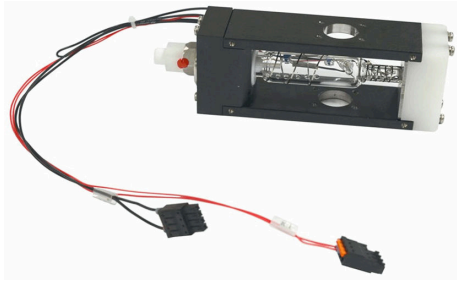
The kit contains the following parts → 15, 20:

| | | | |
|---|---|---|---|
| 1 x | Pressure reactor CA80COD, complete | 1 x | Kit instructions |

## 5.14 71339179 kit CA80TP reactor housing with cuvette

The kit contains the following parts → 15, 20:

| | | | |
|---|---|---|---|
| 1 x | Pressure reactor CA80TP, complete | 1 x | Kit instructions |



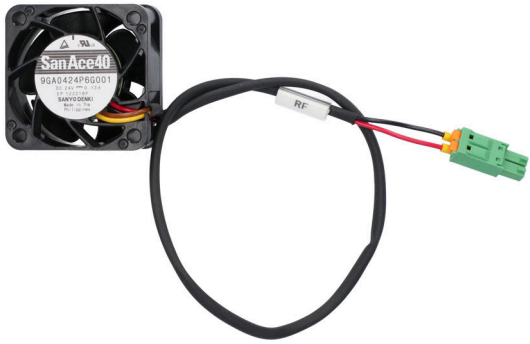
A0058748

15 *CA80TP reactor housing with cuvette*

## 5.15 71701344 CA80COD/TP reactor fan

The kit contains the following parts → 16, 20:

| | | | |
|---|---|---|---|
| 2 x | Axial fan 40x40x20 mm 24 V, high air flow | 2 x | Wire end ferrule, insulated |
| 0.4 m | Heat shrink tube | 1 x | Socket connector |
| 1 x | Labelling sleeve | 1 x | Kit instructions |
| 1 x | Wire marker | | |




A0059106

16 *CA80COD/TP reactor fan*

## 5.16 71324197 kit CA80COD/TP control module

Only for devices with backplane version **1**, interface module vers. **1** and module BASE-E

For the corresponding cover, see → 4, 8.

The kit contains the following parts → 17, 21:

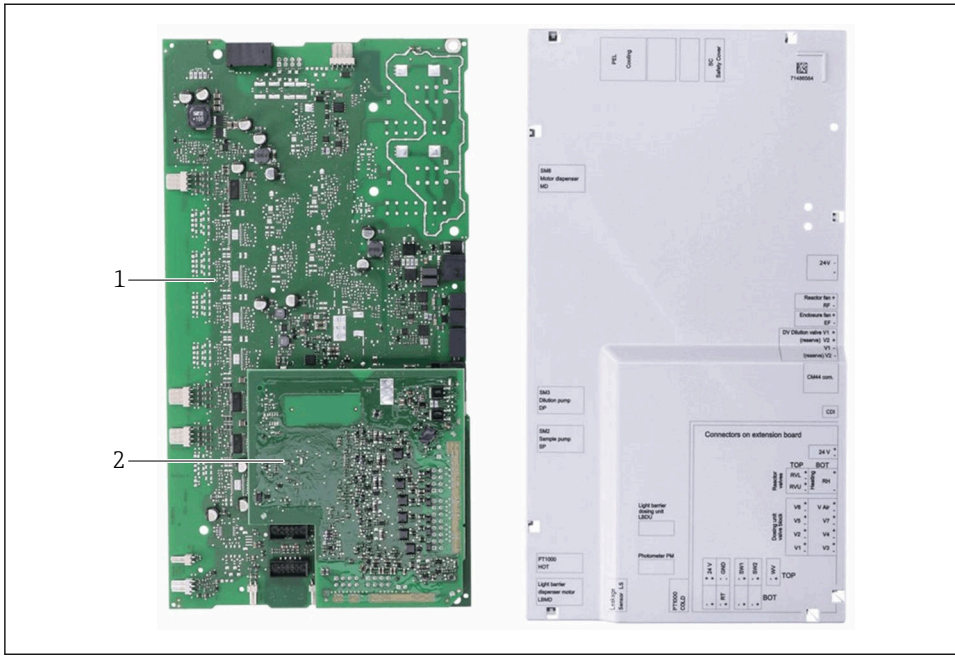
| | | | |
|---|---|---|---|
| 1 x | Control module (FXAB**1** + AXIO1) | 1 x | Kit instructions |

## 5.17 71503213 kit CA80COD/TP control module version 2

Only for devices with backplane version **2**, interface module vers. **2** and module BASE 2-E

The kit contains the following parts → 17, 21:

| | | | |
|---|---|---|---|
| 1 x | Control module vers. **2** (FXAB2 + AXIO1) | 1 x | Kit instructions |
| 1 x | Cover FMAB**2**, labeled | | |




A0058749

17 *CA80COD/TP control module version 2*

1 *Control module V2 (FXAB2)*
2 *Extension module V3.xx (AXIO1)*

## 5.18 71324199 kit CA80COD photometer transmitter module

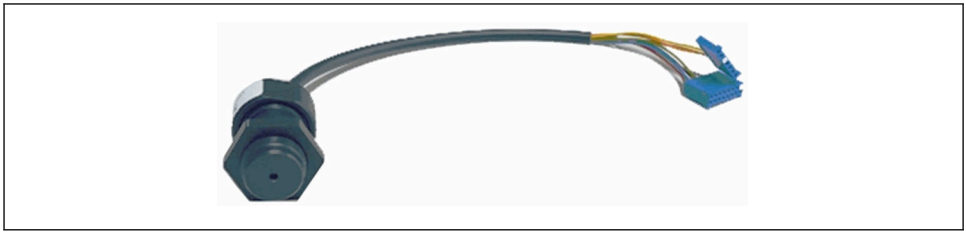
The kit contains the following parts → 18, 22:

| | | | |
|---|---|---|---|
| 1 x | Transmitter module for COD photometer as ordered | 1 x | Kit instructions |

## 5.19 71324202 kit CA80TP photometer transmitter module

The kit contains the following parts → 18, 22:

| | | | |
|---|---|---|---|
| 1 x | Transmitter module for TP photometer as ordered | 1 x | Kit instructions |



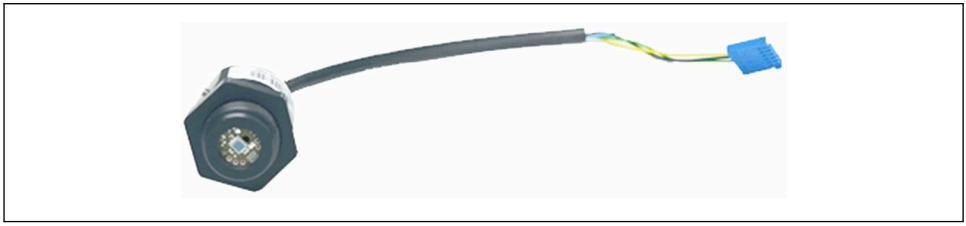
A0058750

18 *CA80TP photometer transmitter module*

## 5.20 71324211 Kit CA80COD/TP photometer receiver module

The kit contains the following parts → 19, 22:

| | | | |
|---|---|---|---|
| 1 x | Photometer receiver module COD+TP | 1 x | Kit instructions |



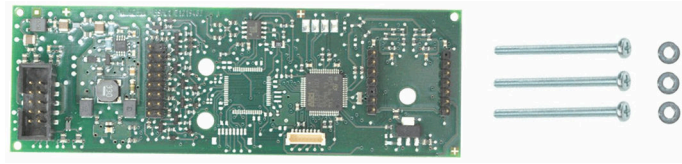
A0058751

19 *CA80COD/TP photometer receiver module*

## 5.21 71389529 kit CA80 photometer electronics

The kit contains the following parts → 20, 23:

| | | | |
|---|---|---|---|
| 1 x | Photometer electronics FSFC1 | 3 x | Washer PA |
| 3 x | Torx screw M3x35, stainless steel | 1 x | Kit instructions |



A0058752

*20 CA80 photometer electronics*

## 5.22 71414702 kit CA80COD/TP photometer electronics holder

The kit contains the following parts → 21, 23:

| | | | |
|---|---|---|---|
| 1 x | Electronics holder for photometer | 1 x | Kit instructions |

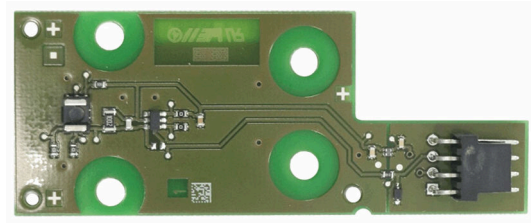
A0058753

*21 CA80COD/TP photometer electronics holder*

## 5.23 71479010 kit CA80COD/TP linear drive light barrier

The kit contains the following parts → 22, 23:

| | | | |
|---|---|---|---|
| 1 x | Light barrier for linear drive | 1 x | Kit instructions |



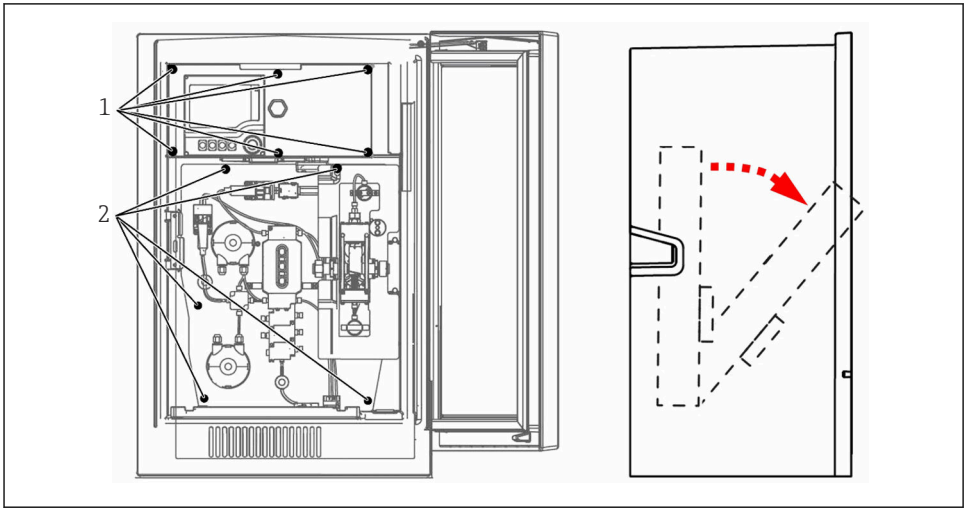
A0058754

*22 CA80COD/TP linear drive light barrier*

# 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.




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

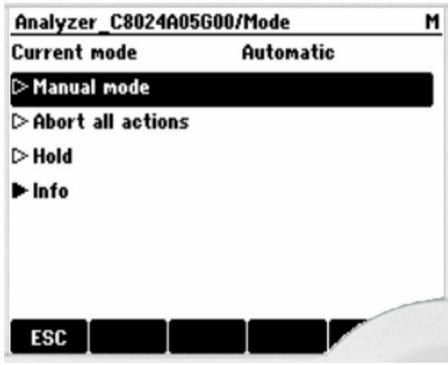
*1 Screws for access to the electronic compartment*
*2 Screws for securing the carrier plate*

## 6.2 Preparation

**⚠ WARNING**

► In order to prevent reagents from escaping, the system must be cleaned before replacing spare parts on the carrier plate.

1. Select **Mode → Manual mode** and wait until the analyzer has completed all actions (display shows **Current action: none**).

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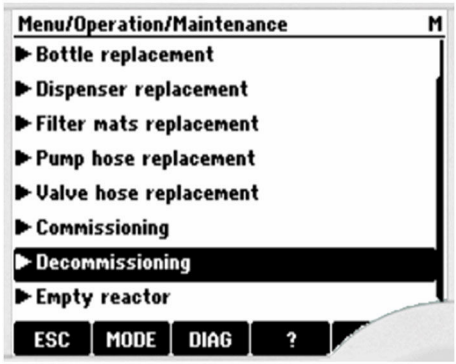
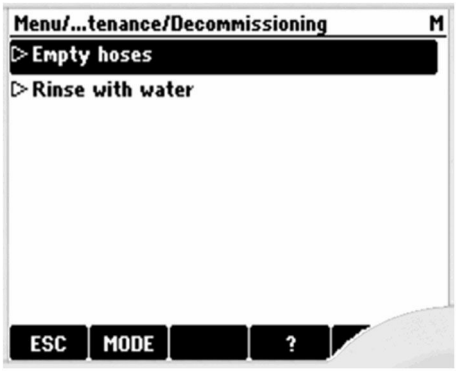
2. Select **Menu → Operation → Maintenance → Decommissioning**. Confirm the respective menu item by pressing the navigator button.




A0058758

3. Remove the hoses from the reagent bottles and wipe them with a paper towel.
4. Remove the sample hose from the sample.
5. If present: Remove the dilution water hose from the water. Place all hoses in an empty beaker.
6. Select the **Empty hoses** entry.

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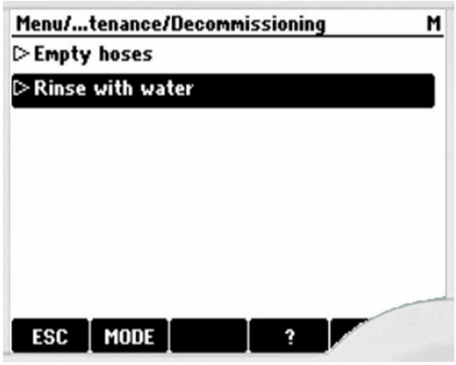
7. Place all hoses in a beaker containing distilled or demineralized water.
8. Select the **Rinse with water** entry.




A0058760

9. Wait until the action has been successfully completed.
10. Place all hoses back in an empty beaker.
11. Repeat the step **Menu → Operation → Maintenance → Decommissioning → Empty hoses**.
    ↳ At the end of this step, the system is clean and dry. The necessary repairs and maintenance can be performed.
12. Remove the bottle tray together with the bottles.
13. **Disconnect the analyzer from the power supply and secure the circuit breaker against unintentional recommissioning.**

## 6.3 Replacing the leakage sensor

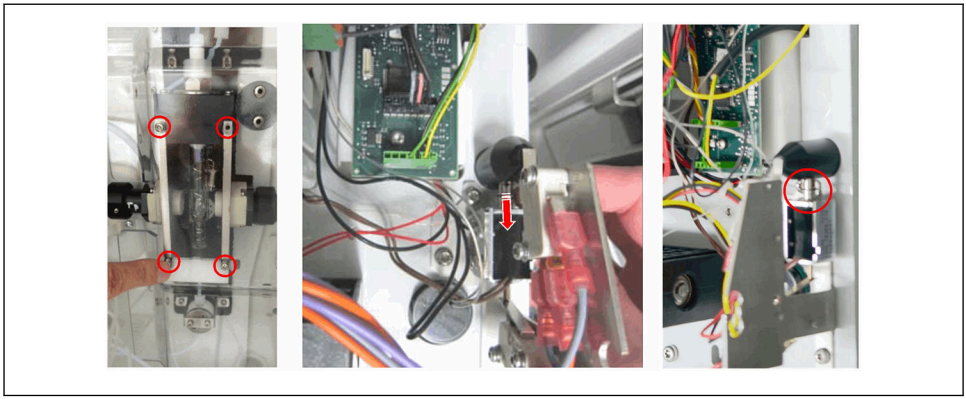
**Affected components: See → 14, → 14 and → 2, 5, item 13.**

1. Carry out preparatory work as per section 6.2 → 24.
2. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
3. Remove the cover plate of the control module.
4. Remove the connector of the leakage sensor ("LS") from the control module.
5. Swing the carrier plate back up and temporarily secure it with a screw.
6. Remove all hoses from the slots of the hose holder.
7. **For devices older than May 2024 (serial number < W5...) → 6, 14:** Fit the new leakage sensor on the carrier plate and re-secure the hoses in the slots.
8. **For devices newer than May 2024 (serial number > W5...) → 7, 15:** Secure the cable on the lower edge of the carrier plate.
9. Swing the carrier plate out and insert the connector of the new leakage sensor into the control module.
10. Reinstall the cover plate of the module.
11. Swing the carrier plate back and secure it again (6x T25).
12. Put the analyzer back into operation → 50.

## 6.4 Replacing the safety cover

**Affected components: See → 15.**

1. Carry out preparatory work as per section 6.2 → 24.
2. Loosen the screws in the safety cover (4x T10, see → 24, 28, left). Keep the screws for reuse. The cover is still held by the magnetic closure.
3. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
4. Release the lifting magnet by hand by pressing back the pin with your finger (see → 24, 28, center and right) and remove the safety cover.



A0058784

*24 Magnetic closure for safety cover*

5. Swing the carrier plate back and secure it again (6x T25).
6. Mount and secure the new safety cover. Ensure that the pin of the lifting magnet engages in the slot of the locking mechanism (see → 8, 15).
7. Put the analyzer back into operation → 50.

## 6.5 Replacing the solenoid valves (hose pinch valves)

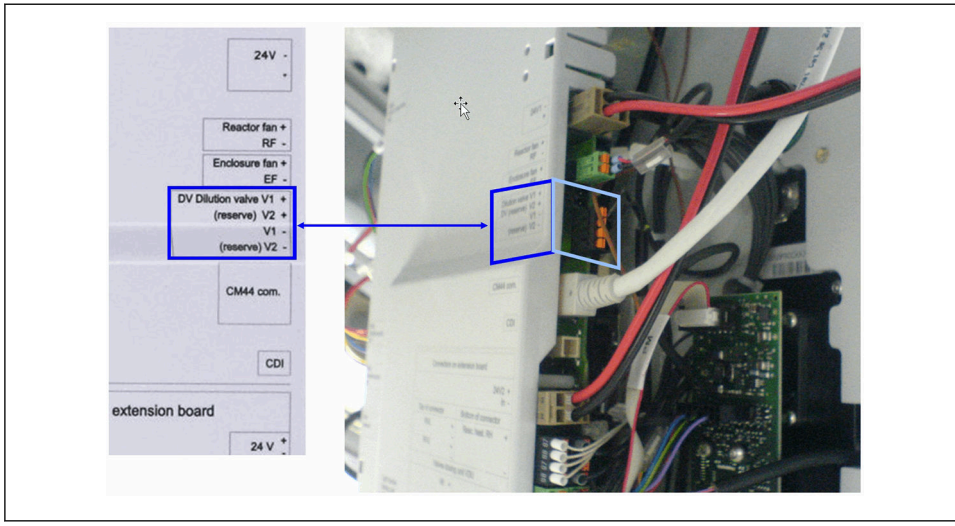
Observe the notes on the types and use of valves and PharMed® hoses in section "Valve types and history"→ 9.

### 6.5.1 Replacing dilution valves CA80COD and TP

**Affected components: See → 11, 17 (valve type 1) and → 12, 18 (valve type 2).**

Valve type 1 for the dilution valve = kit 71431081 has been discontinued. Use type 2 = kit 71601539 instead.

1. Carry out preparatory work as per section 6.2 → 24.
2. Release both ends of the affected PharMed® hose and remove the hose from the valve.
3. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
4. Remove the cover plate of the control module.
5. Remove the DV connector (V1 and V2, see → 25, 29) of the valve from the control module and release the valve cables from the connector.
6. Loosen the two mounting screws of the affected valve and remove the valve backwards. Keep the mounting parts for reuse.




A0058785

25 *Connector for dilution valve*

7. Fit the new valve.
8. Connect the cables of the valve to the connector (connections V1+ and V1-, the polarity is irrelevant) and reinsert the connector into the control module at DV (V1+ and V2-, see → 25, 29).

We recommend using a new hose. The new hose can be cut cleanly and smoothly using a professional hose cutter.

9. Grease the new PharMed® hose with silicone grease and guide it through the valve.
10. Ensure that the hose remains in position when the valve is switched.

**CAUTION**

**Risk of blockage, breakage, cracks or leaks!**

► Ensure that the hose lies without tension in the valve in order to prevent one-sided loads.

### 6.5.2 Replacing waste valves CA80COD and TP

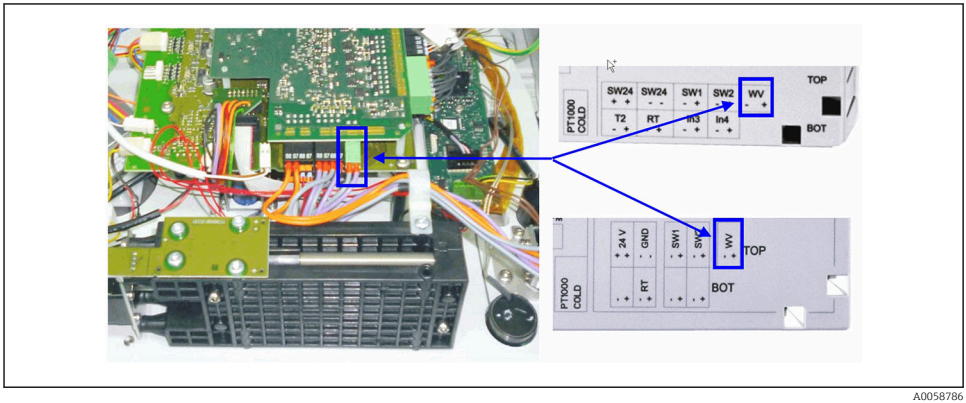
**Affected components: See → 11, 17 (valve type 1), → 9 (valve type 1a) and → 12, 18 (valve type 2).**

**CA80COD:** Valve types **1** and **1a** may no longer be used as waste valves! First convert these analyzers with the following kit: 71431078 kit CA80COD/TP: waste valve conversion kit.

The kit contains detailed instructions.

**CA80TP:** Valve type **1** (kit 71431079) for the waste valve has been discontinued! If a replacement is required, convert to type **2**, also using kit 71431078.

1. Carry out preparatory work as per section 6.2 → 24.
2. Release both ends of the affected PharMed® hose and remove the hose from the waste valve.
3. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
4. Remove the cover plate of the control module.
5. Remove the connector of the valve from the control module (connector WV = waste valve, → 26, 30) and release the valve cables from the connector.
6. Loosen the two mounting screws of the waste valve and remove the valve backwards.
7. Fit the new valve. Use the new screws provided.
8. Connect the cables of the new valve to the connector provided and reinsert the connector at "WV" on the control module. The polarity is irrelevant when using a solenoid valve.
9. Swing the carrier plate back and secure it again (6x T25).




26 *Connector WV for the waste valve*

10. Put the analyzer back into operation → 50.
11. At the start of recommissioning → 50, carry out the following tasks:

We recommend using a new hose. The new hose can be cut cleanly and smoothly using a professional hose cutter.

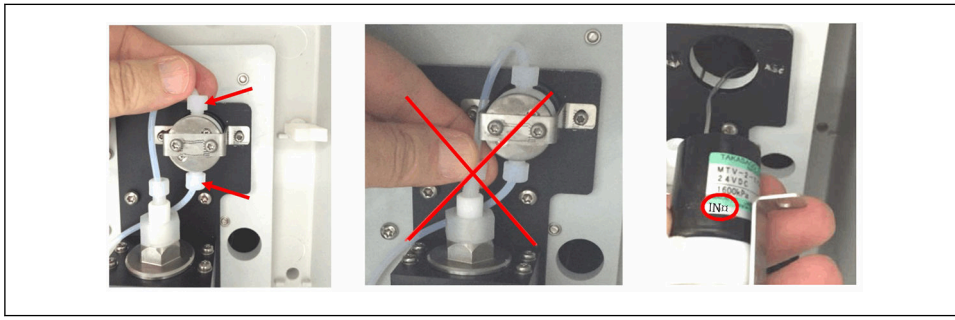
12. Cut off a section of PharMed® hose measuring OD 6.4 to l = 110 mm.
13. Select **Diagnostics → System test → Analyzer → Valves → Valve selection → drain D** to open the waste valve.
14. Grease the new PharMed® hose with silicone grease and guide it through the valve.
15. Connect the hose to the existing hose connector on both sides.

16. Close the waste valve by selecting **Diagnostics → System test → Analyzer → Valves → Valve selection → drain D**.
17. Insert the bottle tray and continue with recommissioning as described in → 📄 50.

## 6.6 Replacing the upper reactor valve ventilation (RVU) and the reactor valve (RVL)

**Affected components: See → 📄 18 and → 🖼 2, 📄 5, item 6 (RVU) and item 11 (RVL).**

1. Carry out preparatory work as per section 6.2 → 📄 24.
2. Loosen the screws in the safety cover (4x T10, see → 🖼 24, 📄 28, left). Keep the screws for reuse. The cover is still held by the magnetic closure.
3. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
4. Release the lifting magnet by hand by pressing back the pin with your finger (see → 🖼 24, 📄 28, center and right) and remove the safety cover.



A0058787

🖼 27 *Removing the upper reactor valve ventilation (RVU)*

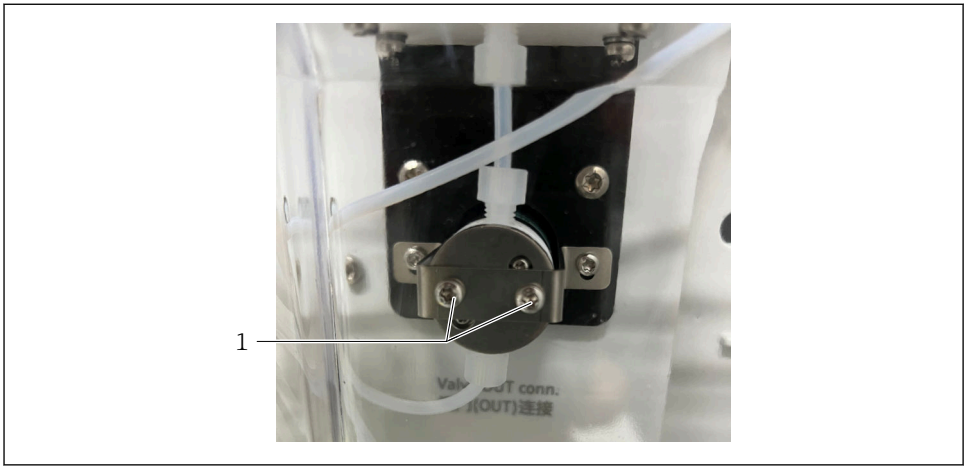
### 6.6.1 Replacing the upper reactor valve ventilation (RVU)

1. Remove the two screw connections on the upper reactor valve (see → 🖼 27, 📄 31, left). Do **not** loosen the hose at the outlet of the reactor (see → 🖼 27, 📄 31, center)!
2. Remove the cover plate of the control module.
3. Remove the connector of the top reactor valve from the control module.
4. Swing the carrier plate back up and temporarily secure it with a screw.
5. Unscrew the top reactor valve (2x T10). Keep the screws for reuse.
6. Remove the retaining bracket from the upper reactor valve. Keep the bracket and screws for reuse.
7. Fit the retaining bracket on the new upper reactor valve.

8. Install the new upper reactor valve. **The 'IN' connection points upwards** (see → 🖼 27, 🖹 31, right).
9. Reconnect the hoses at the top and bottom of the upper reactor valve. When doing so, ensure that the ferrules sit correctly on the hoses (see → 🖼 2, 🖹 5, item A). **Handle the plastic thread of the screw connections with care!**
10. Ensure that the hose for reactor ventilation is secured in the leakage detector.
11. Swing the carrier plate forward and insert the connector of the upper reactor valve into the control module.
12. Refit the cover plate of the control module.
13. Swing the carrier plate back and secure it again (6x T25).
14. Fit and secure the safety cover. Ensure that the pin of the lifting magnet engages in the groove of the locking mechanism (see → 🖼 8, 🖹 15).
15. Put the analyzer back into operation → 🖹 50.
16. Perform a reactor pressure test → 🖹 51.

### 6.6.2 Replacing the lower reactor valve (RVL)

1. Remove the two screw connections on the lower reactor valve (1). Do not loosen the hose at the inlet of the reactor.




A0059108

🖼 *28 Lower reactor valve*

2. Remove the two screw connections on the lower reactor valve (see Figure "Lower reactor valve"). Do not loosen the hose at the inlet of the reactor.
3. Remove the cover plate of the control module.
4. Remove the connector of the bottom reactor valve from the control module.

5. Swing the carrier plate back up and temporarily secure it with a screw.
6. Unscrew the lower reactor valve (2x T 10). Keep the screws for reuse.
7. Remove the retaining bracket from the lower reactor valve. Keep the bracket and screws for reuse.
8. Fit the retaining bracket on the new lower reactor valve.
9. Install the new lower reactor valve. **The 'IN' connection points upwards towards the reactor** (see → 27, 31, right).
10. Reconnect the hoses at the top and bottom of the lower reactor valve. When doing so, ensure that the ferrules sit correctly on the hoses (see → 2, 5, item A). **Handle the plastic thread of the screw connections with care!**
11. Fold the carrier plate forward and insert the connector of the bottom reactor valve into the control module.
12. Refit the cover plate of the control module.
13. Swing the carrier plate back and secure it again (6x T25).
14. Fit and secure the safety cover. Ensure that the pin of the lifting magnet engages in the slot of the locking mechanism (see → 8, 15).
15. Put the analyzer back into operation → 50.
16. Perform a reactor pressure test → 51.

## 6.7 Replacing the heated reactor cuvette

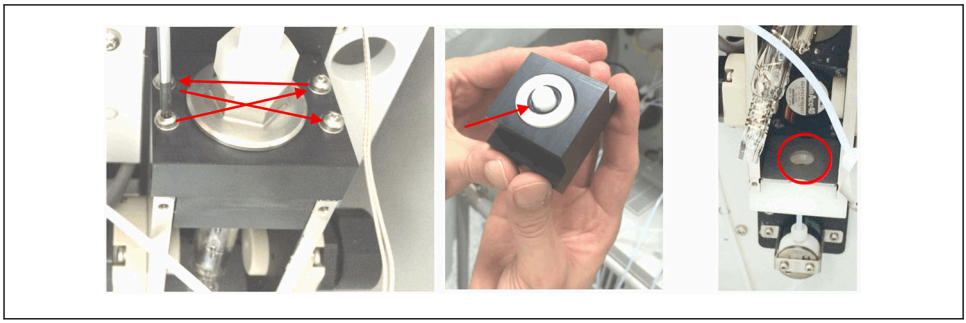
**Affected components: See → 19 and → 19, and → 2, 5, item 8.**

1. Carry out preparatory work as per section 6.2 → 24.
2. Loosen the screws in the safety cover (4x T10, see → 24, 28, left). Keep the screws for reuse. The cover is still held by the magnetic closure.
3. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
4. Release the lifting magnet by hand by pressing back the pin with your finger (see → 24, 28, center and right) and remove the safety cover.
5. Swing the carrier plate back up and temporarily secure it with a screw.
6. Release the hoses from the upper reactor valve (see → 27, 31, left).
7. Release the top valve (2x T10). Suspend the valve from the connection cable (see → 27, 31). Keep the screws for reuse.

The reactor unit does not need to be removed from the carrier plate.

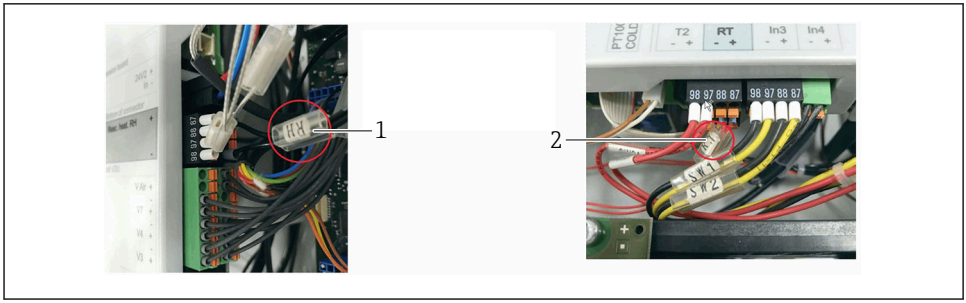
8. Loosen the screws on the reactor cover (4x T10) cross-wise (see → 29, 34, left) and remove the cover. Keep the screws for reuse.

9. Remove the top O-ring from the cover (see → 29, 34, center). The O-ring **cannot** be reused after it has been removed! Fit the new O-ring (FFKM O-ring ID 16.01 / W 2.62).
10. Remove the cover plate of the control module (see → 3, 7, item 27).
11. Remove the connector of the reactor cuvette from the control module (connectors RH and RT, see → 30, 34).
12. Remove the reactor cuvette upwards out of the reactor unit.



A0058788

29 *Removing the reactor and replacing the O-ring*




A0058789

30 *Reactor cuvette connections*

*1 Reactor heating RH*
*2 Temperature sensor for reactor RT*

13. Remove the bottom O-ring (see → 29, 34, right). The sealing ring cannot be reused after it has been removed. Fit a new O-ring (FFKM ID 4.42 / W 2.62).
14. Carefully insert the new reactor cuvette. **Installation position:** The studs that hold the heating wire must be visible from the front. **Never touch the glass with your fingers! Wear clean, dry gloves.**
15. Place the reactor cover on the reactor cuvette. Screw the reactor cover onto the reactor cage cross-wise.

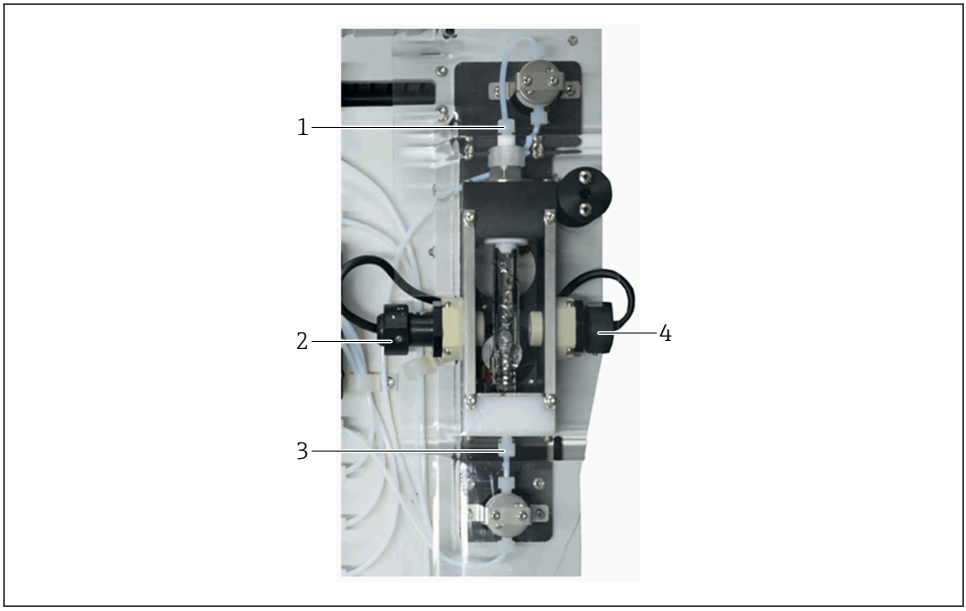
16. Screw the top reactor valve ventilation (RVU) back onto the reactor carrier plate (2x T10). The 'IN' connection points upwards (→ 27, 31, right).
17. Reconnect the hoses at the top and bottom of the top reactor valve. When doing so, ensure that the ferrules sit correctly on the hoses (see → 2, 5, item A). **Handle the plastic thread of the screw connections with care!**
18. Ensure that the hose for reactor ventilation is secured in the leakage detector.
19. Swing the carrier plate forward and insert the two connectors of the reactor cuvette into the corresponding sockets on the control module. Refit the cover of the control module.
20. Swing the carrier plate back and secure it again (6x T25).
21. **CA80COD only:** If it is not already present, glue the warning sign on the black reactor housing.
22. Fit and secure the safety cover. Ensure that the pin of the lifting magnet engages in the groove of the locking mechanism (see → 8, 15).
23. Put the analyzer back into operation → 50.
24. Perform a reactor pressure test → 51.

## 6.8 Replacing the reactor housing with cuvette

**Affected components: See → 19 and → 19, and → 2, 5, item 8 and → 44, → 32, 46.**

1. Carry out preparatory work as per section 6.2 → 24.
2. Loosen the screws in the safety cover (4x T10, see → 24, 28, left). Keep the screws for reuse. The cover is still held by the magnetic closure.
3. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
4. Release the lifting magnet by hand by pressing back the pin with your finger (see → 24, 28, center and right) and remove the safety cover.
5. Remove the two connectors of the reactor (RT, RH) and the connector of the reactor valves (RVU/RVL) from the control module.
6. Remove the connector of the transmitter module and receiver module from module FSFC1.
7. Remove the grounding cable.
8. Swing the carrier plate back up and temporarily secure it with a screw.
9. Open the two hose connectors at the top and bottom on the reactor (see → 31, 36).
10. Remove the screws of the photometer electronics holder. Loosen the four screws of the reactor and release the reactor from the carrier plate.
11. Unscrew the photometer modules (transmitter and receiver) from the reactor. For details on how to do this, see → 44, steps 5...9.
12. Fit the photometer modules (transmitter and receiver) on the new reactor.

13. Fit the new reactor on the reactor carrier plate.
14. Reconnect the hoses at the top and bottom of the vent valve. When doing so, ensure that the ferrules sit correctly on the hoses (see → 2, 5, item A). **Handle the plastic thread of the screw connections with care!**




*31 Replacing the reactor*

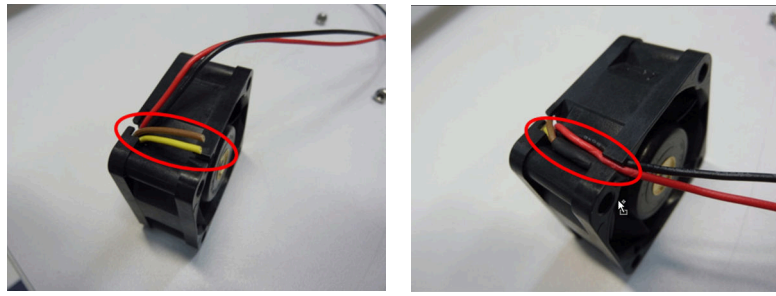
*1 Top reactor connection*
*2 Photometer transmitter module*
*3 Bottom reactor connection*
*4 Photometer receiver module*

15. Swing the carrier plate forward again.
16. Reinsert the connections of the reactor and reactor valves (RVU/RVL) into the control module and the connections of the transmitter and receiver module into module FSFC1.
17. Fit and secure the safety cover. Ensure that the pin of the lifting magnet engages in the groove of the locking mechanism (see → 8, 15).
18. Swing the carrier plate back and secure it again (6x T25).
19. Put the analyzer back into operation → 50.

## 6.9 Replacing the reactor fan

**Affected components: See → 20.**

1. Carry out preparatory work as per section 6.2 → 24.
2. Loosen the screws in the safety cover (4x T10, see → 24, 28, left). Keep the screws for reuse. The cover is still held by the magnetic closure.
3. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
4. Take an axial fan out of the kit packaging, cut down the yellow and brown strands and insulate these with approx. 10 mm heat shrink tube from the kit.



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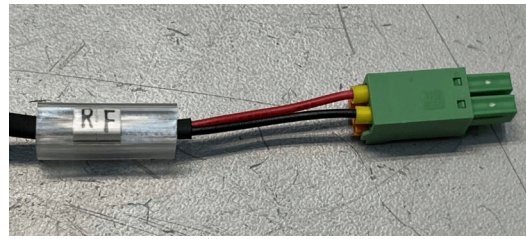
**Carry out the following steps with the two connection strands of the fan (black and red):**

5. Slide a heat shrink tube (CP221-32, 280 mm long) over the two strands.
6. Slide a labeling sleeve (PATG2 15 mm) including the wire marker (UCT-WMT 15x4 mm, labeled with "RF") over the heat shrink tube.
7. Crimp one wire end ferrule onto each end of the strand (insulated 0.25 mm 2 long) and secure the socket connector (1x2 1.5 $mm^2$ RM3.5 180°).

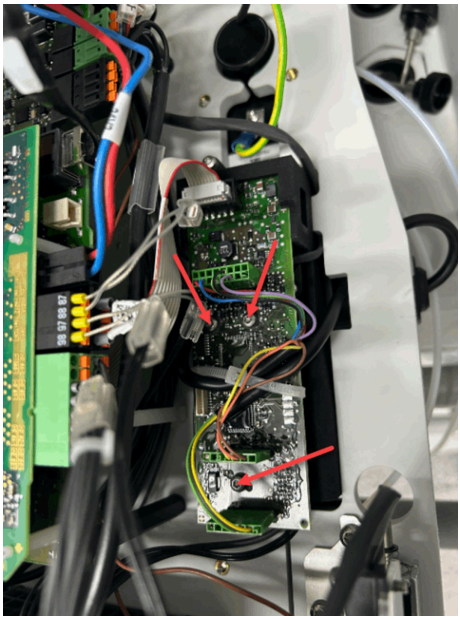
**Caution!**

Observe the correct polarity; please clamp as shown.




A0059116

8. Loosen the screws of the photometer electronics. Keep the screws for reuse.



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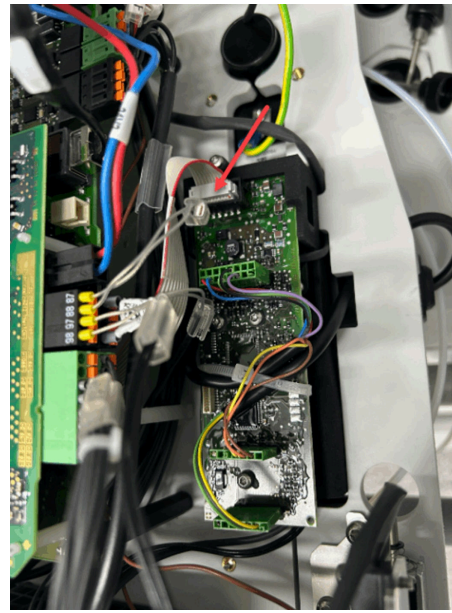
9. Remove the ribbon cable.



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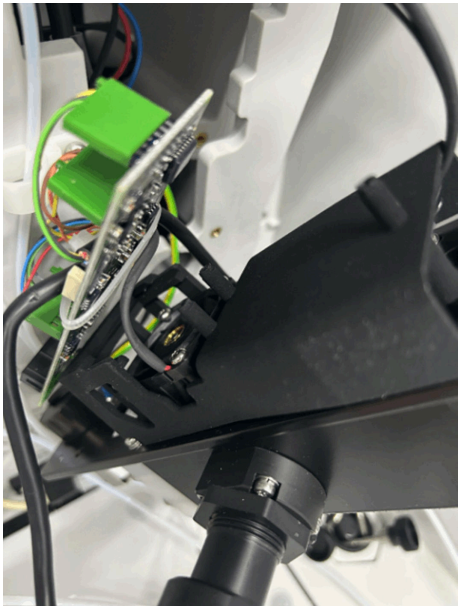
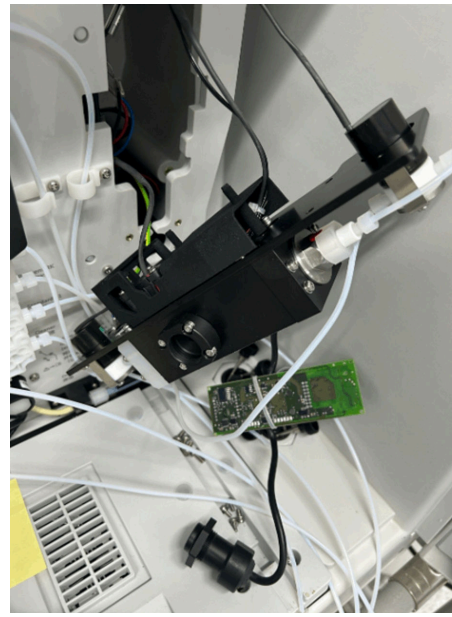
10. Remove the reactor from the front of the carrier plate.
11. Pull the photometer electronics out of the holder and remove.



A0059119

12. Unscrew the photometer transmitter module and disconnect it from the reactor.
13. Then place the disconnected photometer transmitter module and the photometer electronics to one side.



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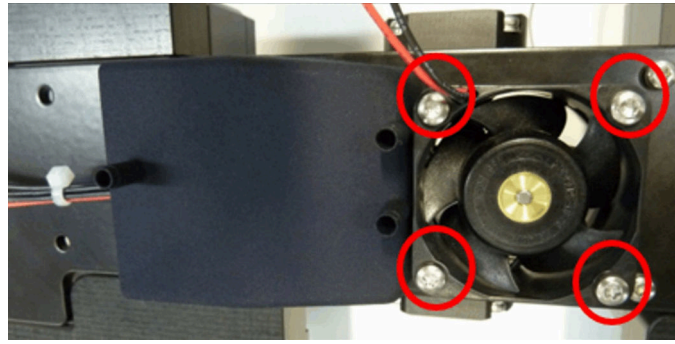
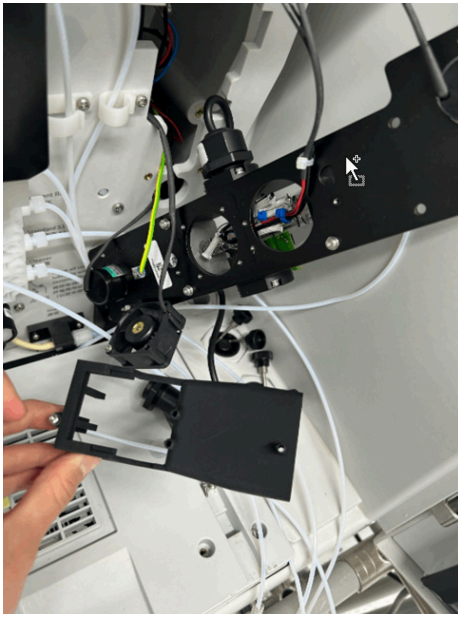
14. Loosen the screws of the reactor fan.



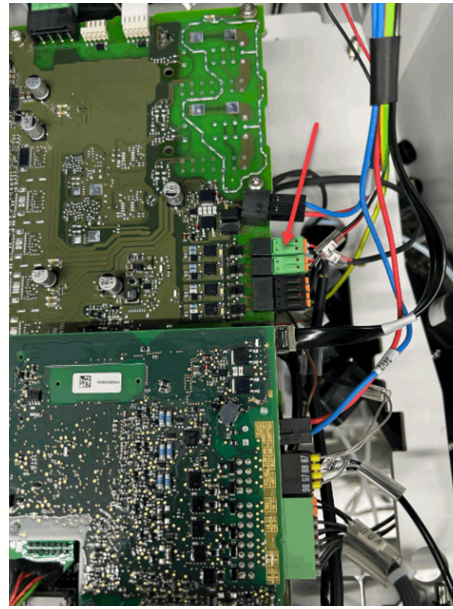
A0059121

15. Remove the reactor fan.



A0059122

16. Fold the carrier plate forward again to gain access to the control module.
17. Disconnect the cable of the reactor fan from the control module.



A0059162

18. Remove the old reactor fan and install the new reactor fan in reverse order.
19. Fit and secure the safety cover. Ensure that the pin of the lifting magnet engages in the groove of the locking mechanism (see → 8, 15).
20. Swing the carrier plate back and secure it again (6x T25).
21. Put the analyzer back into operation → 50.

## 6.10 Replacing the control module (version 1 or version 2)

**Affected components: See → 21 and → 21, and → 3, 7, item 24.**

1. Carry out preparatory work as per section 6.2 → 24.
2. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
3. Remove the cover plate of the control module.
4. Loosen the mounting screws of the control module. Keep the screws for reuse.
5. Carefully lift the old control module (consisting of the base module FXAB1 or FXAB2 and the piggyback module AXIO1) until the new module can be pushed underneath it.
6. Now plug one plug connector after the other from the old module into the new module. This avoids confusion between identical connectors.

7. Tighten the new control module and fit the cover plate back on.
8. Swing the carrier plate back and secure it again (6x T25).
9. Put the analyzer back into operation → 📄 50.

## 6.11 Replacing the photometer transmitter module

**Affected components: See → 📄 22 and → 📄 22, and → 🖼 2, 📄 5, item 10.**

1. Carry out preparatory work as per section 6.2 → 📄 24.
2. Loosen the screws in the safety cover (4x T10, see → 🖼 24, 📄 28, left). Keep the screws for reuse. The cover is still held by the magnetic closure.
3. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
4. Release the lifting magnet by hand by pressing back the pin with your finger (see → 🖼 24, 📄 28, center and right) and remove the safety cover.
5. Remove the two connectors of the transmitter module on the photometer electronics FSFC1 (see → 🖼 32, 📄 46) and pull the cable to the front.
6. Swing the carrier plate back up and temporarily secure it with a screw.
7. Loosen the counter nut on the transmitter module (AF 30). Then unscrew the transmitter module counterclockwise and remove it.
8. Screw in the new transmitter module. When doing so, ensure that the connection cable is not twisted. Re-secure the module with the counter nut.
9. Pull the connection cable backward, fold the carrier plate forward and insert the connectors into the photometer electronics FSFC1. The connectors are coded so that they cannot be mixed up.
10. Swing the carrier plate back and secure it again (6x T25).
11. Fit and secure the safety cover. Ensure that the pin of the lifting magnet engages in the groove of the locking mechanism (see → 🖼 8, 📄 15).
12. Put the analyzer back into operation → 📄 50.

## 6.12 Replacing the photometer receiver module

**Affected components: See → 📄 22 and → 🖼 2, 📄 5, item 9.**

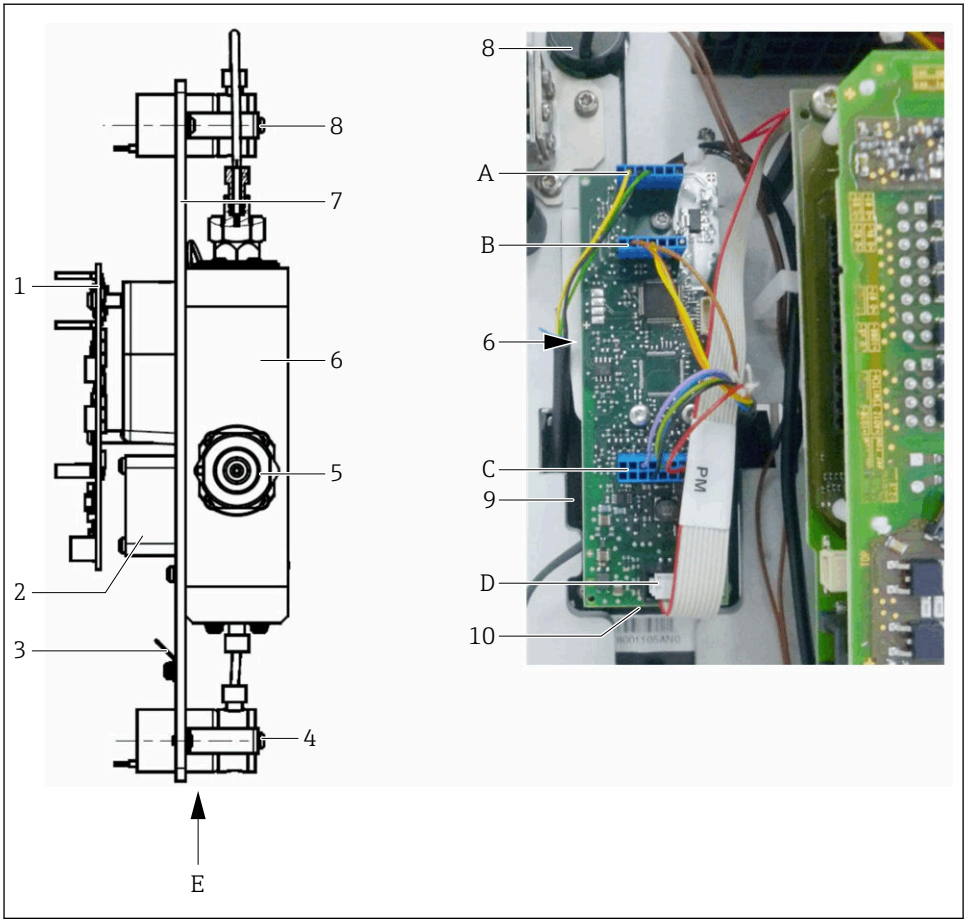
The receiver module is replaced in the same way as the transmitter module → 📄 44.

## 6.13 Replacing the photometer electronics FSFC1

**Affected components: See → 📄 22 and → 🖼 3, 📄 7, item 28.**

1. Carry out preparatory work as per section 6.2 → 📄 24.

2. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
3. Remove all four connectors from the photometer electronics FSFC1 (see → 32, 46).
4. The photometer electronics are screwed onto the reactor from behind with 3 Torx screws M3 (see → 32, 46). Remove these screws together with the washers.
5. Remove the old photometer electronics.
6. Secure the new photometer electronics to the reactor. New screws and washers are included in the scope of delivery of the kit.
7. Reinsert the four connectors. Refer to → 32, 46. All four connectors are coded so that they cannot be mixed up.
8. Swing the carrier plate back and secure it again (6x T25).
9. Put the analyzer back into operation → 50.



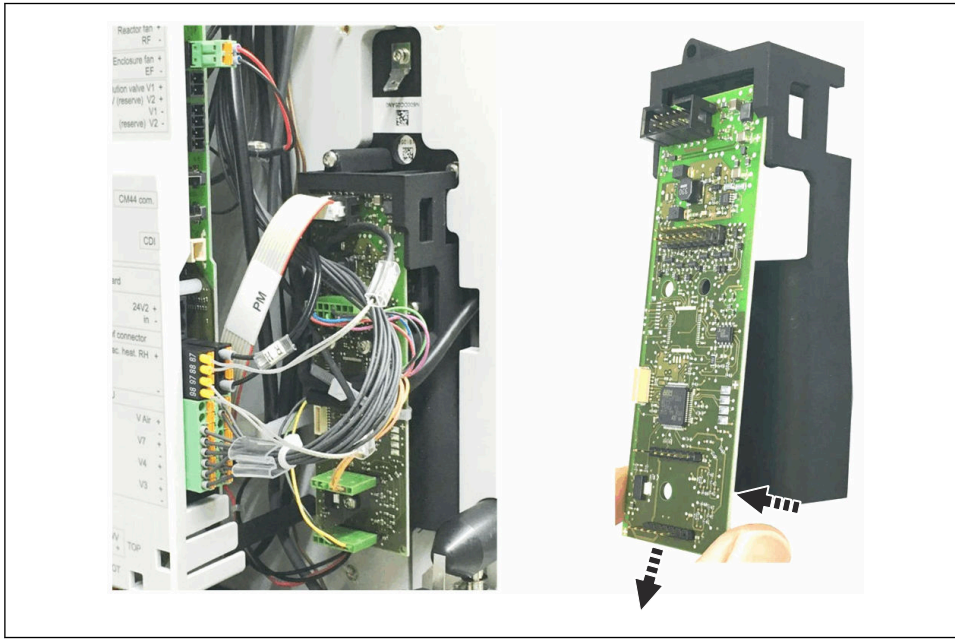

32 *Photometer electronics FSFC1*

*A Connector for receiver module: 7-pin connector, coding = pin 1*
*B Connector for transmitter module: 7-pin connector, coding = pin 5*
*C Connector for transmitter module: 16-pin connector, coding = pin 15*
*D Connection of photometer ↔ control module: 10-pin connector and FBL "PM"*
*E Schematic view of photometer: photometer electronics fitted on reactor (electronics holder not shown)*
*1 FSFC1 module*
*2 Reactor fan*
*3 Grounding*
*4 Lower reactor valve (RVL)*
*5 Transmitter module*
*6 Pressure reactor*
*7 Reactor carrier plate*
*8 Upper reactor valve ventilation (RVU)*
*9 Electronics holder (→ 2, 5 + → 23, 24)*
*10 Photometer electronics FSFC1*

## 6.14 Replacing the photometer electronics holder

**Affected components: See → 23 and → 3, 7, item 28.**

1. Carry out preparatory work as per section 6.2 → 24.
2. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
3. Remove all four connectors from the photometer electronics.
4. The photometer electronics are screwed onto the reactor from behind with 3 Torx screws M3 (see → 33, 47, left). Remove these screws together with the washers.
5. Remove the old photometer electronics (see → 33, 47, right).

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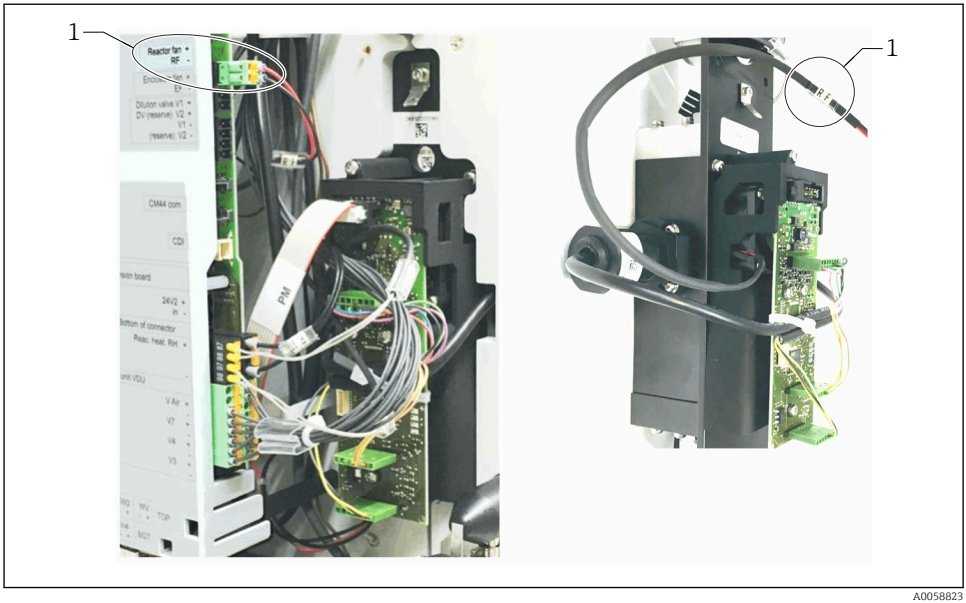
*33 Photometer electronics*

6. Remove the mounting screw of the electronics holder (see → 34, 48, left) and remove the holder.




34 *Securing the electronics holder and the "RF" cable*

7. Remove the connector of the "RF" (Reactor Fan) cable (1) from the control module → 34, 48.
8. Slide the photometer electronics into the new electronics holder.
9. Place the electronics holder including the photometer electronics onto the reactor carrier plate.
10. Thread the "RF" cable through the new electronics holder (see → 34, 48, right) and reinsert the connector into the control module.
11. Secure the new holder with a screw (see → 34, 48, left).
12. Secure the photometer electronics on the new holder using the three screws.
13. Reinsert the four connectors. If necessary, refer to → 32, 46. All four connectors are coded so that they cannot be mixed up.
14. Swing the carrier plate back and secure it again (6x T25).
15. Put the analyzer back into operation → 50.

## 6.15 Replacing the light barrier for the linear drive

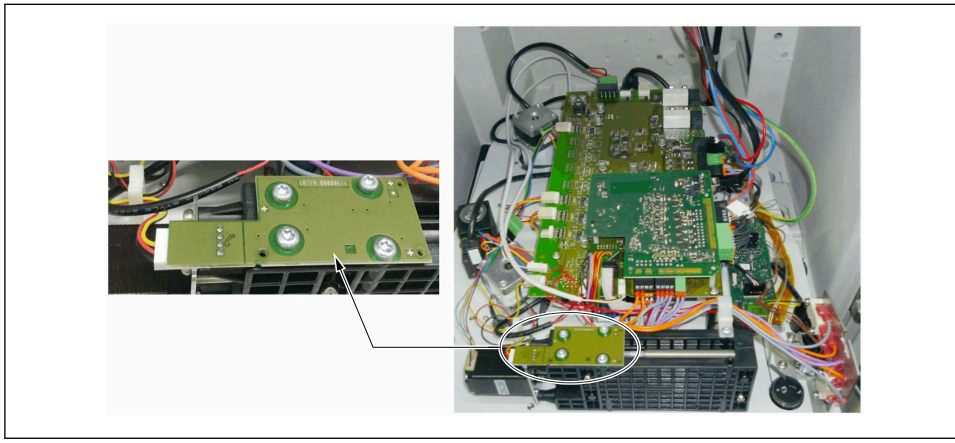
**Affected components: See → 23 and → 3, 7, item 25.**

1. Carry out preparatory work as per section 6.2 → 24.

2. Loosen the screws of the carrier plate (6 x T25) and swing the carrier plate forward. Keep the screws for reuse.
3. Unplug the cables listed below so as to fold out the carrier plate as far as possible (all cables come from the measuring and control unit):

- 2x power supply (2x 24 V, red/blue)
- 1x housing fan ("EF")
- 1x grounding cable to the reactor module
- 1x communication cable ("CM44 com.")

4. Now fold the carrier plate all the way forward.
5. Remove the connector from the light barrier (see → 🖼 35, 🖹 49, left).
6. Loosen the 4 screws of the light barrier (see → 🖼 35, 🖹 49) and remove the light barrier.



A0058824

🖼 35 *Light barrier for linear drive*

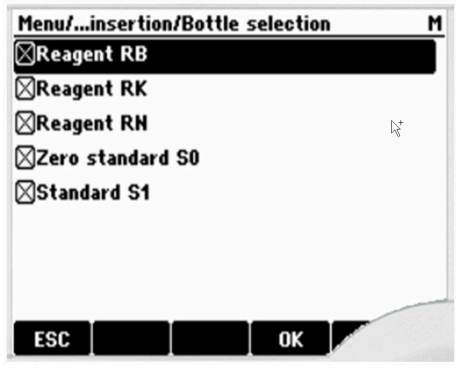
7. Install the new light barrier.
8. Re-insert all of the connectors.
9. Swing the carrier plate back and secure it again (6x T25).
10. Put the device back into operation by applying the mains voltage.
    ↳ The linear drive automatically carries out a reference run. If this is successful, the new light barrier is working correctly.
11. If necessary, a test can be performed via **Menu → Operation → Maintenance → Dispenser replacement**. A reference run is also carried out here with a zero point check. Replacing the light barrier does not require a recalibration.
12. Put the analyzer back into operation → 🖹 50.

## 6.16 Recommissioning

1. Re-establish the power supply to the device.
2. Insert the bottle tray together with all bottles.
3. Screw the cover with the hoses onto the bottles. Ensure that the hoses are not mixed up! If in doubt, refer to the hose connection diagram on the inside of the device door.
4. Select **Menu → Operation → Maintenance → Bottle replacement**.


A0058825

5. Select the **Bottle insertion** entry, then the **Bottle selection** entry.
6. Activate all bottles and confirm by pressing **ok**. Confirm the **Bottle insertion** entry by pressing **ok**.
7. Press the **Bottles inserted confirmation** entry to confirm that all bottles have been inserted.

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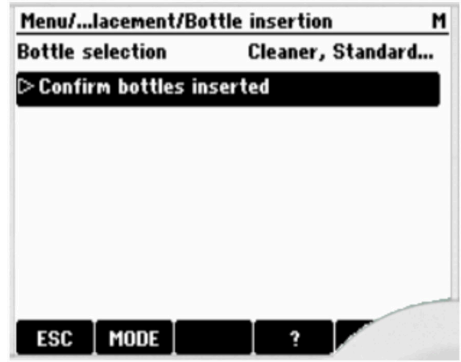


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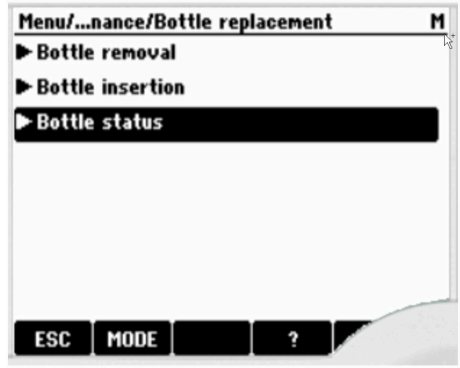
8. Check the status of the bottles in the **Bottle status** menu. The status of all bottles must be "inserted". The analyzer will not start a measurement or calibration if any bottles are marked as "removed".

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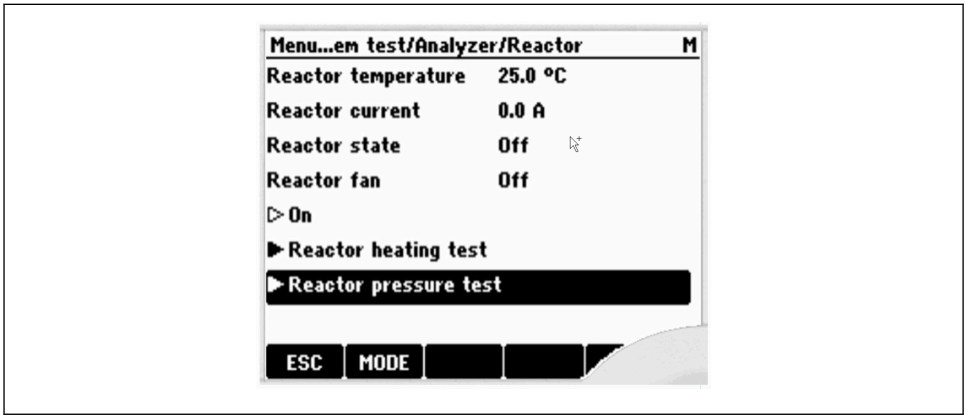
9. Select **Menu → Operation → Maintenance → Commissioning**. Confirm the **Start commissioning** entry.

## 6.17 Pressure test for the reactor

For the CA80**COD**, the pressure test is performed with the zero standard; for the CA80**TP**, the pressure test is performed with the calibration standard.

1. Ensure that each hose is connected to its corresponding bottle. If in doubt, refer to the hose connection diagram in the device door.

2. Select **Menu → Expert** and enter the expert password.
3. Select **Menu → Expert → Diagnostics → System Test → Analyser → Reactor → Reactor pressure test**.

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4. Start the **Reactor pressure test**. The analyzer doses the zero standard (COD) or calibration standard (TP) into the reactor and heats this up until the normal measurement pressure is reached. This test takes several minutes.
5. Once the test is complete, check the reactor and the valves for leaks.
6. If necessary, repair the areas in question (check all connectors, the reactor cover screws and the reactor cuvette O-rings). Repeat the reactor pressure test until the system is hermetically sealed.

# 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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Endress+Hauser

People for Process Automation