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Installation Instructions
Liquiline System CA80SI/82HA analyzer

CAZ800 upgrade kits

Endress+Hauser
People for Process Automation

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1 Overview

1.1 Spare parts kits

These installation instructions apply to the following spare parts kits:

Designation	Page
CAZ800-(AH/R1)K2 2 channels	→ 🖹 9
CAZ800-(AH/R1)K4 4 channels	→ 🖹 10
CAZ800-(AH/R1)K6 6 channels	→ 🖹 11

1.2 Product structure

	Measuring parameters, device type		
	AH	SiO_2, CA80SI, heteropoly blue method	
	R1	$CaCO_3$, CA82HA, 0 to 2.5 mg/l	
		Upgrade	
		K2	2 channels
		K4	4 channels on mounting plate
		K6	6 channels on mounting plate
CAZ800-	**AH**		Complete order code
	R1		Complete order code

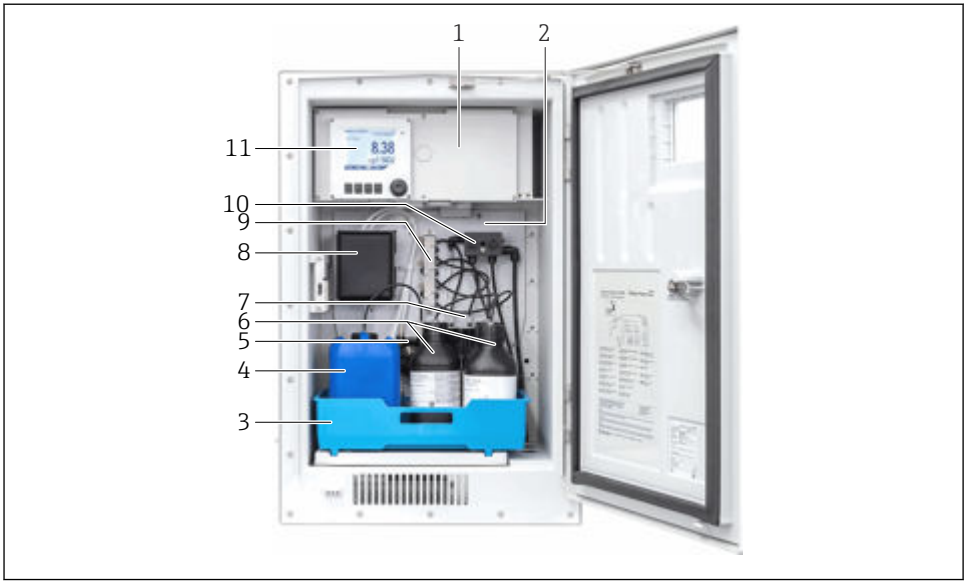
1.3 Overview of CA80SI/82HA

1.3.1 Structure of CA80SI/82HA

The figure below → 🖼 1, 🖹 4 shows an overview of the CA80SI/82HA; a 2-channel device is shown.

For 1-channel and 2-channel devices, the sample switch is integrated in the device. Filters and pressure-reducing valves must be mounted externally.

For 4-channel and 6-channel devices, filters, pressure-reducing valves and sample switch are mounted on external mounting plates, see the “4-channel and 6-channel device hose system” section → 🖹 5.



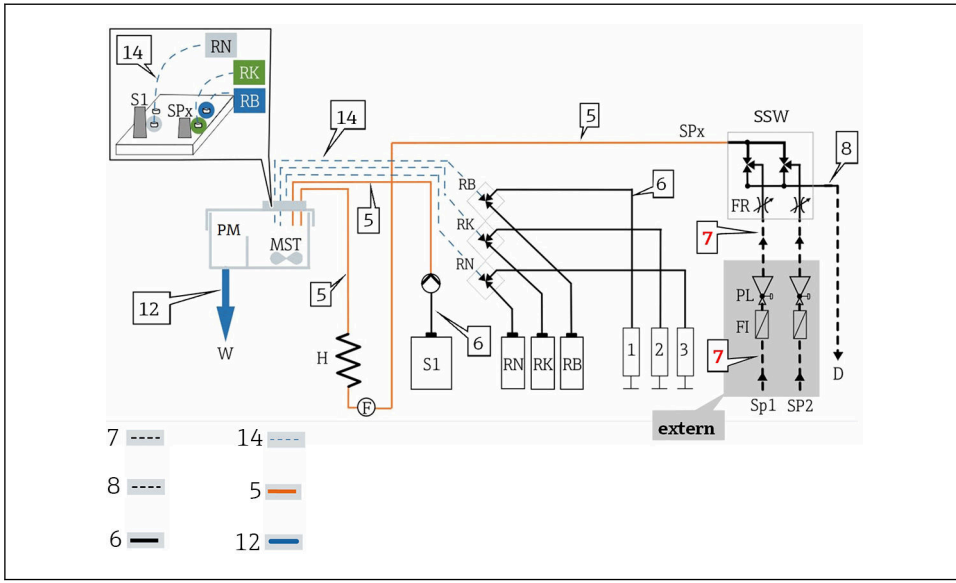
1 CA80SI/82HA assembly overview

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*

1.3.2 1-channel and 2-channel device hose system

The figure below → 2, 5 shows the hose system of 1-channel and 2-channel devices.

The sample switch is installed in the device; filters and pressure-reducing valves must be installed externally.



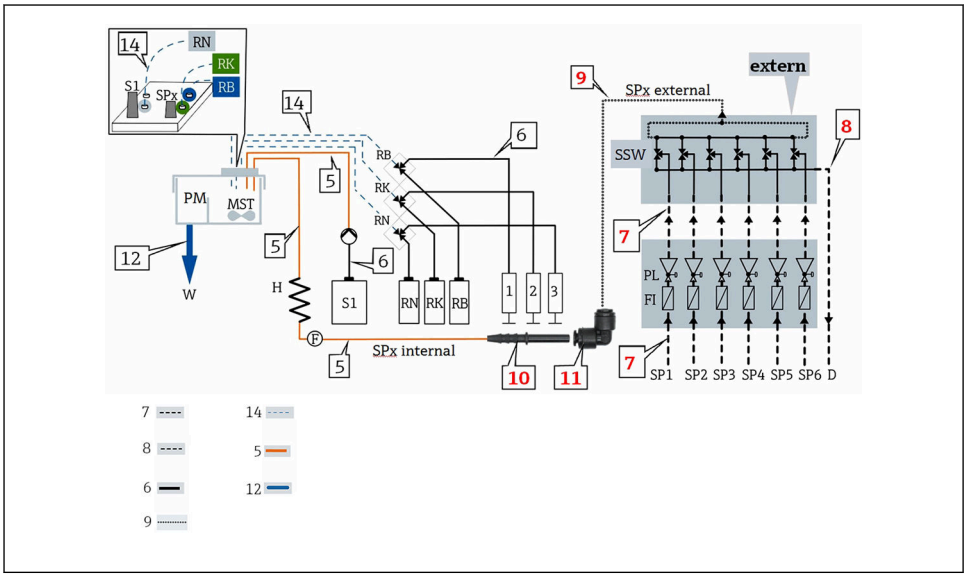
2 *Hose system of 1-channel/2-channel devices*

D Sample drain
F Flow sensor
FI Filter
PL Pressure-reducing valve
SSW Sample switch
H Heater
MST Magnetic stirrer
RB Reagent RB
RK Reagent RK
RN Reagent RN
S1 Standard S1
SP Pump for standard solution
SPx Sample inlet
W Drain
1–3 Dispensers
PM Photometer
5 C-Flex OD 6.4 mm (0.25 in) ID 3.2 mm (0.12 in)
6 Norpren A OD 4.8 mm (0.19 in) ID 1.6 mm (0.06 in)
7 PUN-H OD 6 mm (0.24 in) ID 4 mm (0.16 in)
8 PUN-H OD 8 mm (0.31 in) ID 5.5 mm (0.22 in)
12 PVC OD 17 mm (0.67 in) ID 13 mm (0.51 in)
14 PEEK OD 0.8 mm (0.03 in) ID 0.015 mm (0.0006 in)

1.3.3 4-channel and 6-channel device hose system

The figure below → 3, 6 shows the hose system of 4-channel and 6-channel devices.

Sample switch, pressure-reducing valves and filters are mounted on external mounting plates.



3 *Hose system of 4-channel/6-channel devices*

D Sample drain
F Flow sensor
FI Filter
PL Pressure-reducing valve
SSW Sample switch
H Sample heating
MST Magnetic stirrer
RB Reagent RB
RK Reagent RK
RN Reagent RN
S1 Standard S1
SP Pump for standard solution
SPx Sample inlet
W Drain
1–3 Dispensers
PM Photometer
5 C-Flex OD 6.4 mm (0.25 in) ID 3.2 mm (0.12 in)
6 Norpren A OD 4.8 mm (0.19 in) ID 1.6 mm (0.06 in)
7 PUN-H OD 6 mm (0.24 in) ID 4 mm (0.16 in)
8 PUN-H OD 8 mm (0.31 in) ID 5.5 mm (0.22 in)
9 PTFE OD 4 mm (0.16 in) ID 2 mm (0.08)
12 PVC OD 17 mm (0.67 in) ID 13 mm (0.51 in)
14 PEEK OD 0.8 mm (0.03 in) ID 0.015 mm (0.0006 in)

2 Designated use

- The parts of the CAZ800-AH/R1 upgrade kits must only be used to upgrade the CA80SI/82HA analyzer. Any other use is not permitted!
- Only use 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 chapters 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.
- ▶ 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. Discuss service work 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.

5 Scope of delivery

5.1 CAZ800-(AH/R1)K2 2 channels

The kit contains the following parts → 🖼 4, 🗎 9:

1	1 x	Dirt trap (filter) G ¼" 1.4408
2	2 x	Screw-in conn. straight, G ¼", OD 6 mm
3	1 x	Retaining plate for filter
4	1 x	Triple sealing insert M32, 3x6, 2–8 mm
5	2 x	Screw-in conn. straight, G 1/8", OD 6 mm
6	1 x	Pressure-reducing valve 0.1–2.0 bar, G ⅛"
7	2 m	Hose PUN-H OD 6 mm WT 1.0 mm bk
8	1 x	Retaining plate for pressure-reducing valve
	1 x	Upgrade code
	1 x	Kit instructions

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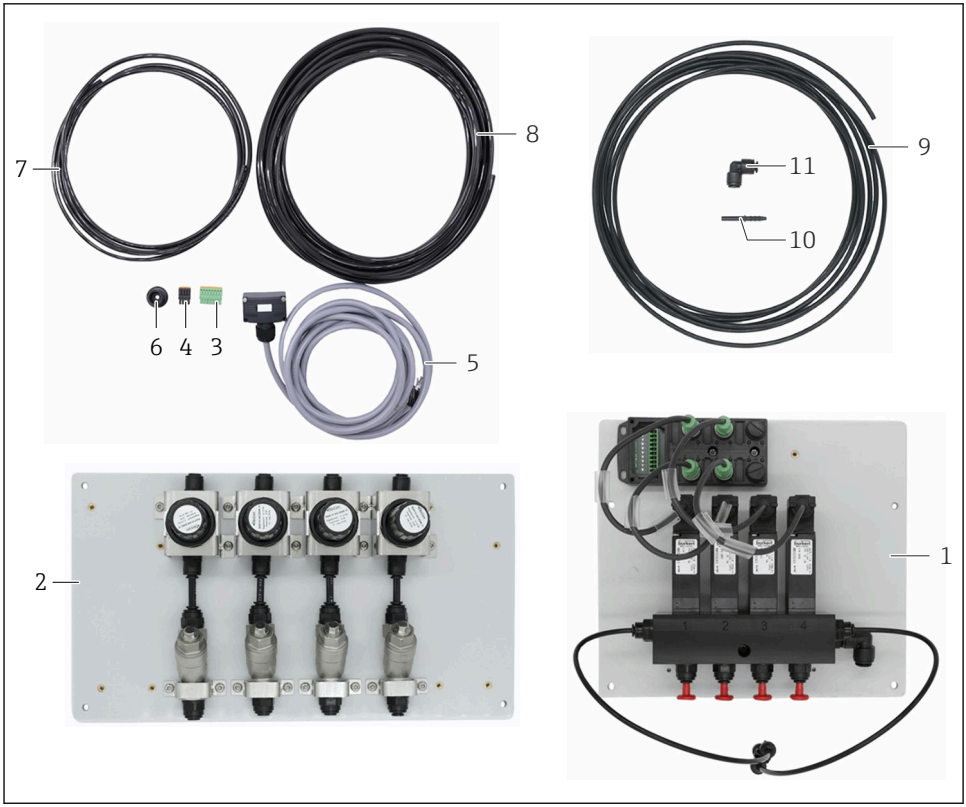
🖼 4 *CAZ800-(AH/R1)K2 2 channels*

5.2 CAZ800-(AH/R1)K4 4 channels

The kit contains the following parts → 🖼 5, 🖹 10:

1	1 x	Sample switch, CA80SI/82HA 4-channel	**8**	5 m	Hose PUN-H OD 8 mm WT 1.25 mm bk
2	1 x	Sample preparation CA80SI/82HA 4-channel	**9**	4 m	Hose PTFE OD 4 mm WT 1 mm bk
3	1 x	Socket connector 1x8 RM3.5 180° FM	**10**	1 x	Hose adapter 4x 3.2 mm
4	1 x	Socket connector 1x4 RM3.5	**11**	1 x	Angled plug connector 4 mm POM-C
5	1 x	Valve block cable with terminal head		1 x	Upgrade code
6	1 x	Single sealing insert M32x1.5, 1x4.9 mm		1 x	Kit instructions
7	4 m	Hose PUN-H OD 6 mm WT 1.0 mm bk			



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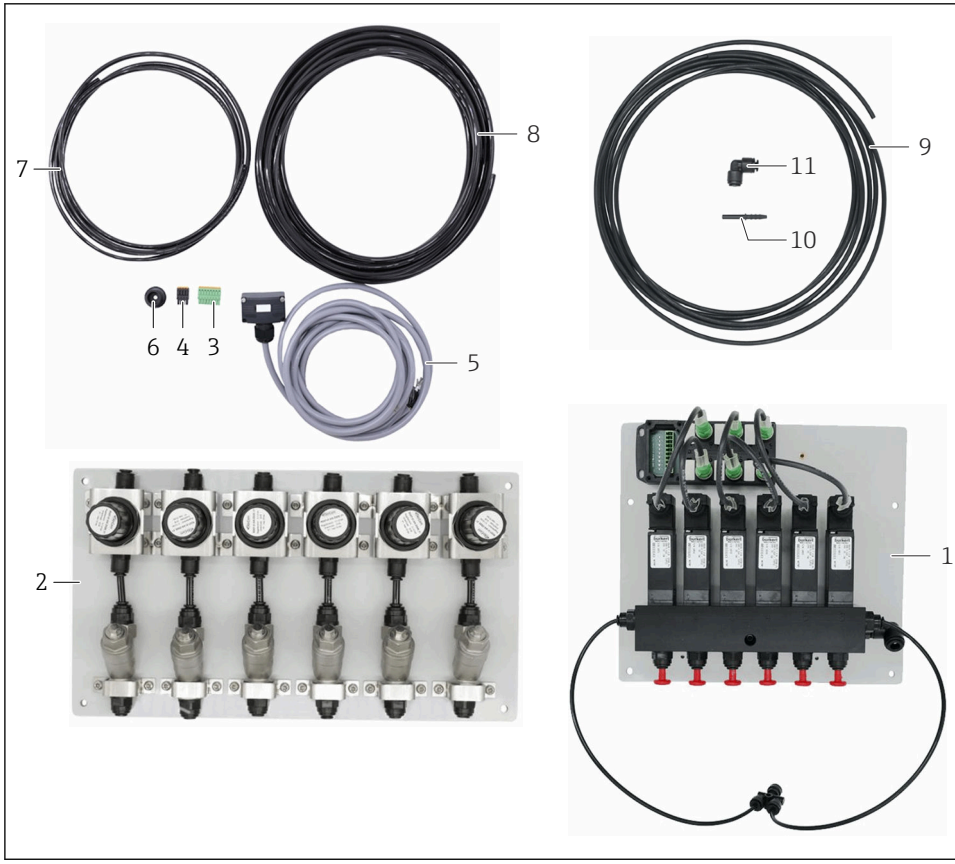
🖼 *5 CAZ800-(AH/R1)K4 4 channels*

5.3 CAZ800-(AH/R1)K6 6 channels

The kit contains the following parts → 6, 11:

1	1 x	Sample switch, CA80SI/82HA 6-channel	**8**	5 m	Hose PUN-H OD 8 mm WT 1.25 mm bk
2	1 x	Sample preparation CA80SI/82HA 6-channel	**9**	4 m	Hose PTFE OD 4 mm WT 1 mm bk
3	1 x	Socket connector 1x8 RM3.5 180° FM	**10**	1 x	Hose push-fit nozzle 4x 3.2 mm
4	1 x	Socket connector 1x4 RM3.5	**11**	1 x	Angled plug connector 4 mm POM-C
5	1 x	Valve block cable with terminal head		1 x	Upgrade code
6	1 x	Single sealing insert M32x1.5, 1x4.9 mm		1 x	Kit instructions
7	6 m	Hose PUN-H OD 6 mm WT 1.0 mm bk			



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6 CAZ800-(AH/R1)K6 6 channels

6 Replacing components

6.1 Preparation

For upgrading from 1 channel to 2 channels, perform → **steps 1 to 6**.

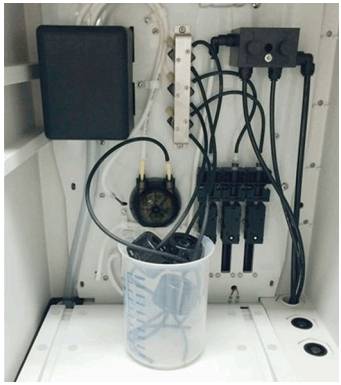
For upgrading from 1 or 2 channels to 4 or 6 channels, perform → **steps 1 to 14**.

For upgrading from 4 channels to 6 channels, perform → **steps 1 to 4**.

1. Open the door of the analyzer.
2. Press the **MODE** softkey and select **Manual mode**.
   ↳ **Current mode – Manual** appears on the display.
3. Wait until all operations have stopped. Ongoing operations can be stopped under **Menu → Operation → Manual operation**.
   ↳ All valves are now closed.
4. Stop the sample feed(s) provided by the customer.
5. **⚠ WARNING**

   Escaping liquids!
   - ▶ Wear protective gloves and protective clothing.
   - ▶ Use paper towels to soak.

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



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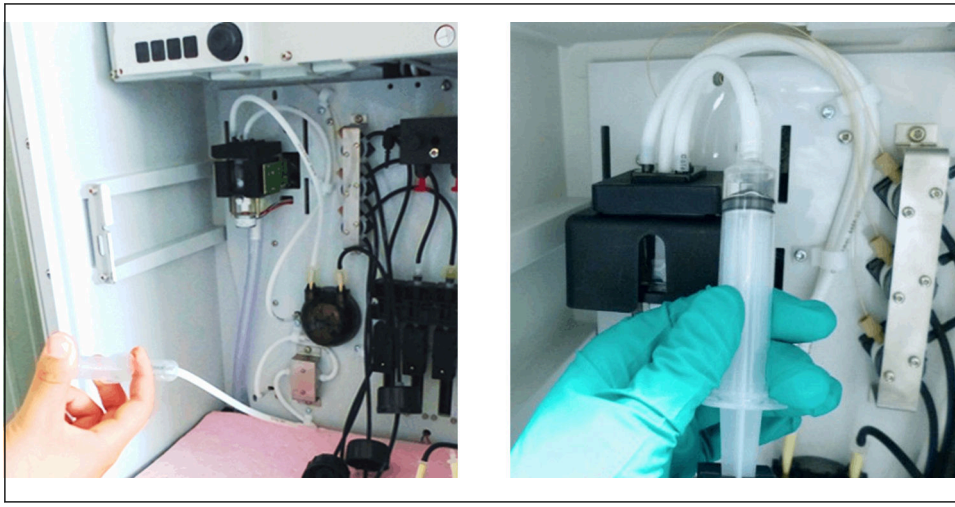
7 *Beaker for covers with hoses*

6. Remove the bottle tray together with the bottles from the analyzer.
7. Drain the hoses of chemicals, **Menu → Operation → Maintenance → Decommissioning → Empty hoses**.

8. Place the hoses in air or in an empty plastic vessel and flush with air via **Menu → Operation → Maintenance → Decommissioning → Rinse with water**.
9. Place the hoses into a plastic vessel with approx. 500 ml of distilled or ultra-pure water. Flush the hoses with water via **Menu → Operation → Maintenance → Decommissioning → Rinse with water**.
10. Finally, repeat step 8.
11. Stop the power supply. The analyzer does not have a mains switch; you should therefore disconnect the mains plug.
12. The analyzer cannot drain the internal SPx sample hose (see also figures → 🖼 2, 🖹 5 and → 🖼 3, 🖹 6) independently. Therefore, disconnect the hose (on a 2-channel device, at the sample switch output) and drain it with a dispenser (→ 🖼 8, 🖹 13, left). The dispenser is included in the scope of delivery of the CA8x
13. Drain the cuvette completely using a dispenser (→ 🖼 8, 🖹 13, right). The capillary holder has a suitable opening. Dispenser+hose, see the scope of delivery of the CA8x.



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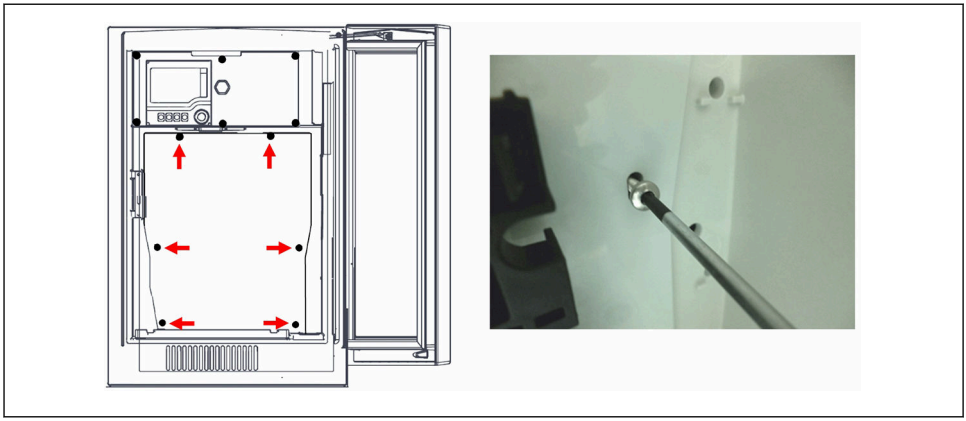
🖼 8 *Draining the sample hose and cuvette*

14. To connect the valve block cable to the control module, the carrier plate must be released and swiveled forward (6 Torx T25 screws, → 🖼 9, 🖹 14).



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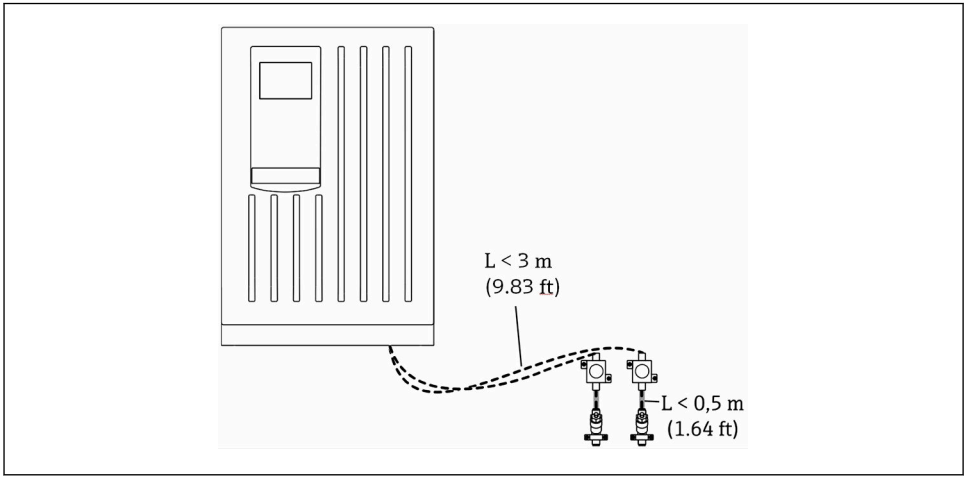
9 Releasing the carrier plate

6.2 Upgrade from 1 to 2 channels

6.2.1 Installation area

The figure below → 10, 14 shows the maximum hose lengths between the analyzer and pressure-reducing valve and between the pressure-reducing valve and filter.



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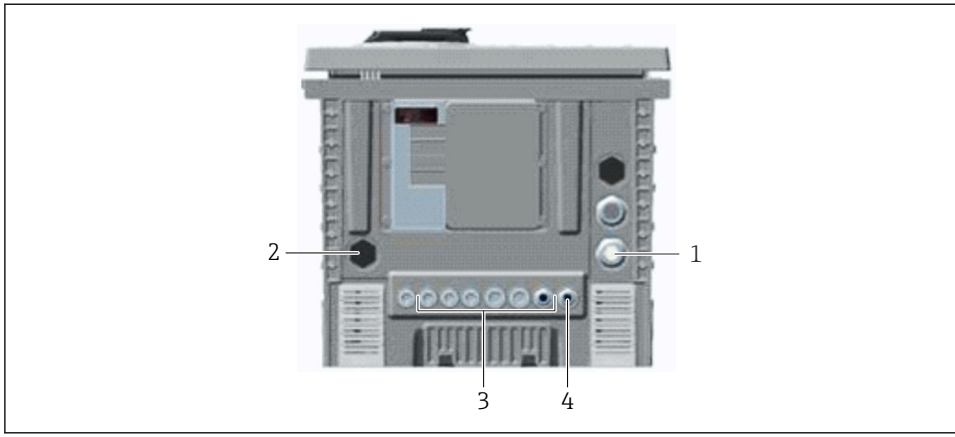
10 Installation area for pressure-reducing valve and filter at 2-channel analyzer

6.2.2 Sample hose routing

The figure below → 11, 15 shows the glands in the housing floor. As a general rule, take care to ensure that the hoses do not become bent or crushed.

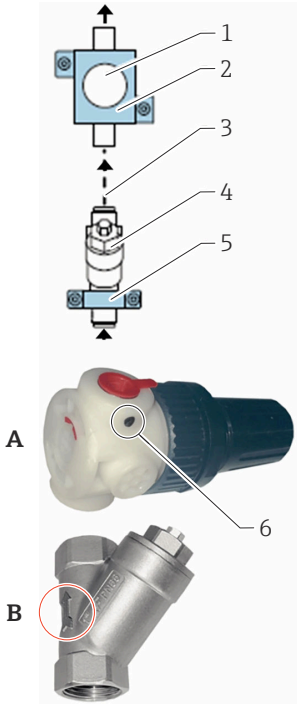


11 Hose and cable glands for 1-channel and 2-channel devices

1 Gland for sample inlet hoses SP1+SP2 and sample drain hose "D"
2 Gland for drain hose "W"
3 Glands for sensor and signal cables
4 Gland for power cable

6.2.3 Installation

1. Carry out preparatory work as per the "Preparatory work" section → 12. See figures → 10, 14 and → 12, 16.
2. Screw the hose connectors onto the pressure-reducing valves and filters.
3. Install the pressure-reducing valve in the mounting bracket: First unscrew the union nut on the pressure-reducing valve.
4. Guide the pressure-reducing valve through the round recess and screw the union nut back on.
5. Mount the pressure-reducing valve on a flat surface, e.g. on a mounting plate (in normal cases, next to the pressure-reducing valve on Channel 1). Note the flow direction (→ 12, 16, A).
6. Mount the filter with the mounting bracket on a flat surface, e.g. on a mounting plate (in normal cases, next to the filter on Channel 1). Note the flow direction (→ 12, 16, B).
7. Cut the hose piece (polyurethane (PU) hose OD 6 mm) to the required length (< 0.5 m) and then connect filters and pressure-reducing valves (→ 12, 16, position 3).



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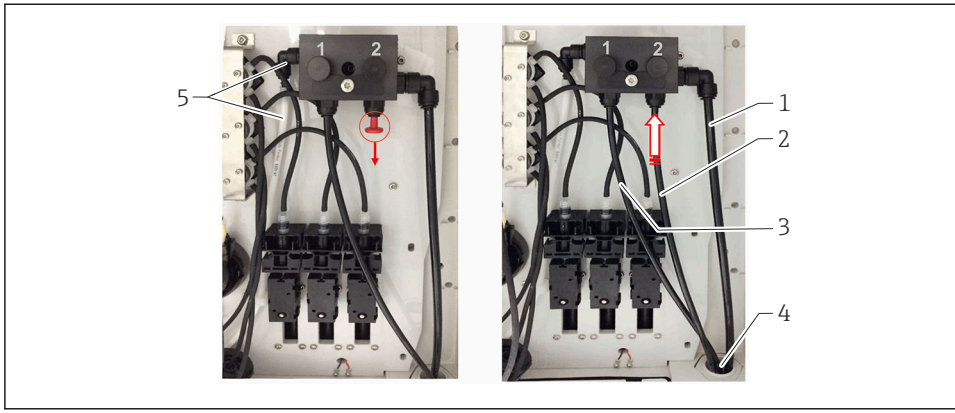
12 *Mounting instructions*

A Pressure direction of pressure-reducing valve (black dot, output side to CA80SI/82HA)
B Flow direction of filter (arrow)
1 Pressure-reducing valve (adjustable)
2 Angle bracket for pressure-reducing valve
3 PU hose, OD 6 mm
4 Filter/dirt trap
5 Angle bracket for filter

8. Mount the supplied triple sealing insert (→ 4, 9, position 4) in the housing gland (→ 11, 15, position 1). For this purpose, the sample hose of channel 1 and drain hose “D” must be temporarily separated from the sample switch.
9. Guide a hose (PU hose OD 6 mm, maximum length 3 m) from the output of the new pressure-reducing valve into the analyzer (→ 11, 15). Remove the red blind plug and connect the hose to input 2 of the sample switch (→ 13, 17).
10. Reconnect sample hose 1 and drain hose “D” to the sample switch.



13 Connecting channel 2 to the sample switch

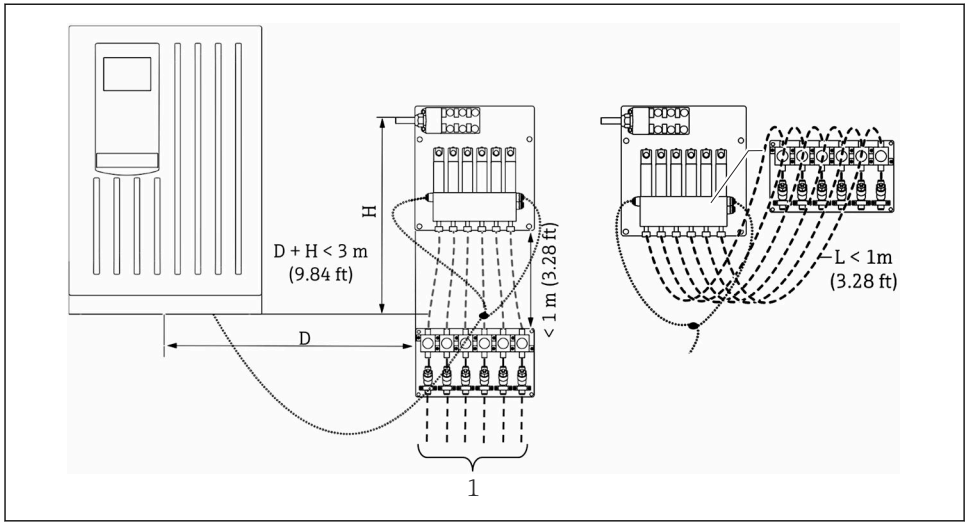
1 *Drain “D”*
2 *K2 sample*
3 *K1 sample*
4 *Triple sealing insert*
5 *Sample output (to flowmeter)*

11. Sample inlet for channel 2: Connect the additional sample hose provided by the user to the new filter.
12. Put the device back into operation, see the “Recommissioning” section → 24.

6.3 Upgrading from 1 or 2 channels to 4 or 6 channels

6.3.1 Installation area

The figure below → 14, 18 shows the maximum hose lengths between the analyzer and sample switch and between the sample switch and pressure-reducing valve.

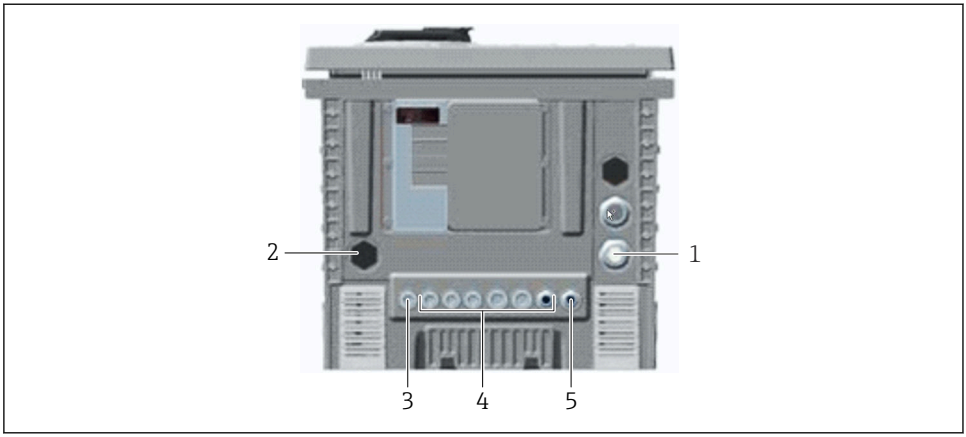


14 Installation area for sample preparation and sample switch on a 4/6-channel analyzer

1 Sample inlets

6.3.2 Internal hose and cable routing

The figure below → 15, 19 shows the glands for cables and hoses in the housing floor.



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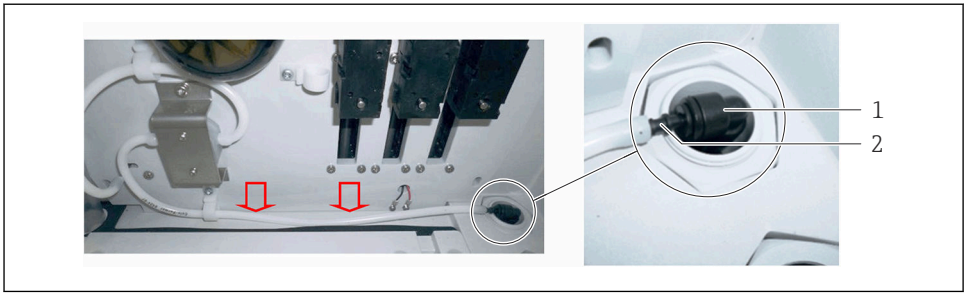
15 Hose and cable glands for 4-channel and 6-channel devices

1 Gland for external SPx sample input hose
2 Gland for drain hose "W"
3 Gland for valve block cable
4 Gland for sensor and signal cables
5 Gland for power cable

Hose connections

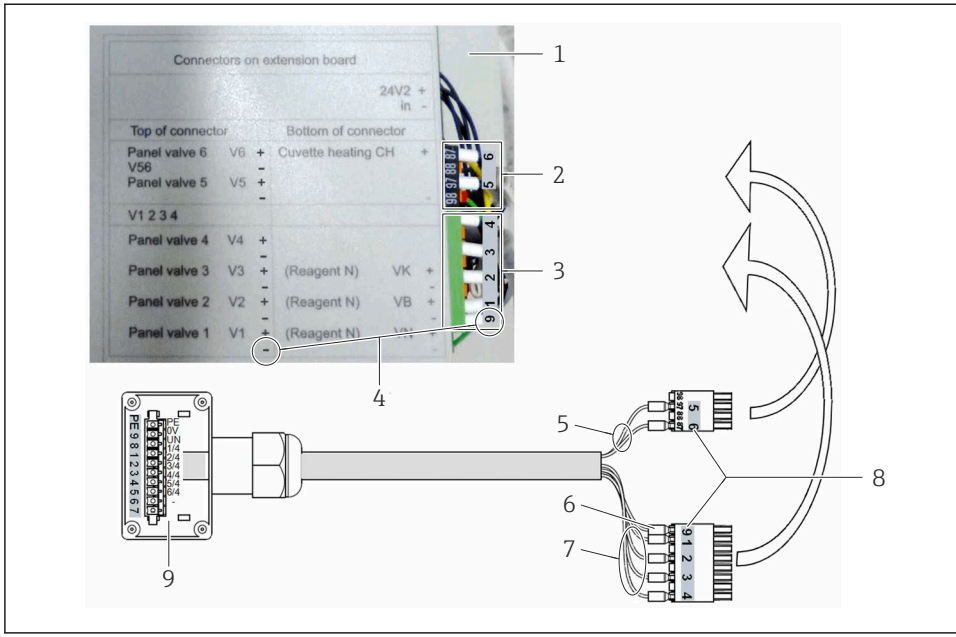
1. Carry out preparatory work as per the "Preparatory work" section → 12.
2. For hoses, use the hose glands in the device floor (→ 15, 19). Take care to ensure that the hoses do not become bent or crushed.
3. Remove the previous external sample hose and the "D" drain hose from the sample switch. This sample hose, drain hose "D" and the internal sample switch are no longer needed.
4. Install the housing gland (→ 15, 19, position 1) and the supplied 1-way sealing insert (→ 5, 10, position 6 and → 6, 11).
5. Slide the new sample hose (external SPx, PTFE OD 4 mm ID 2 mm) into the new seal insert and attach the inner angled connector (→ 5, 10, → 6, 11, and → 16, 20, position 11).
6. Attach the hose adapter 4x3.2 mm (→ 5, 10, → 6, 11, → 7, 12 and → 16, 20, position 10) in the angled bracket and connect to the internal SPx sample hose (CFlex-hose OD 6.4 mm ID 3.2 mm) (→ 3, 6 and → 16, 20).
7. Route the sample hose (internal SPx) on the housing floor (→ 16, 20).



16 Angled connector with hose adapter for internal SPx sample hose

Electrical connection:

1. Insert the valve block cable (→ 5, 10, position 5 and → 6, 11) into the analyzer (cable gland, → 15, 19, position 3).
2. Always route cables in the rear panel of the unit in a protected manner.
3. Connect the wires on the back of the mounting plate to the FXAB1 module. See wiring → 17, 21. The necessary connectors are included in the upgrade kit. The – connection is only needed once.



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17 *Connecting the valve block cable to the FXAB1 module*

1 *Cover plate of the FXAB1 module*
2 *Valves 5 and 6*
3 *Valves 1 to 4*
4 *– = 0 V = Wire 9*
5 *Wire numbers 5+6 = Valves V5+V6*
6 *Wire number 9 = – / 0 V / GND*
7 *Wire numbers 1 to 4 = Valves V1 to V4*
8 *Wire numbers*
9 *Terminal head for valve block*

6.3.3 Mounting external components

See figures → 14, 18 and → 18, 23.

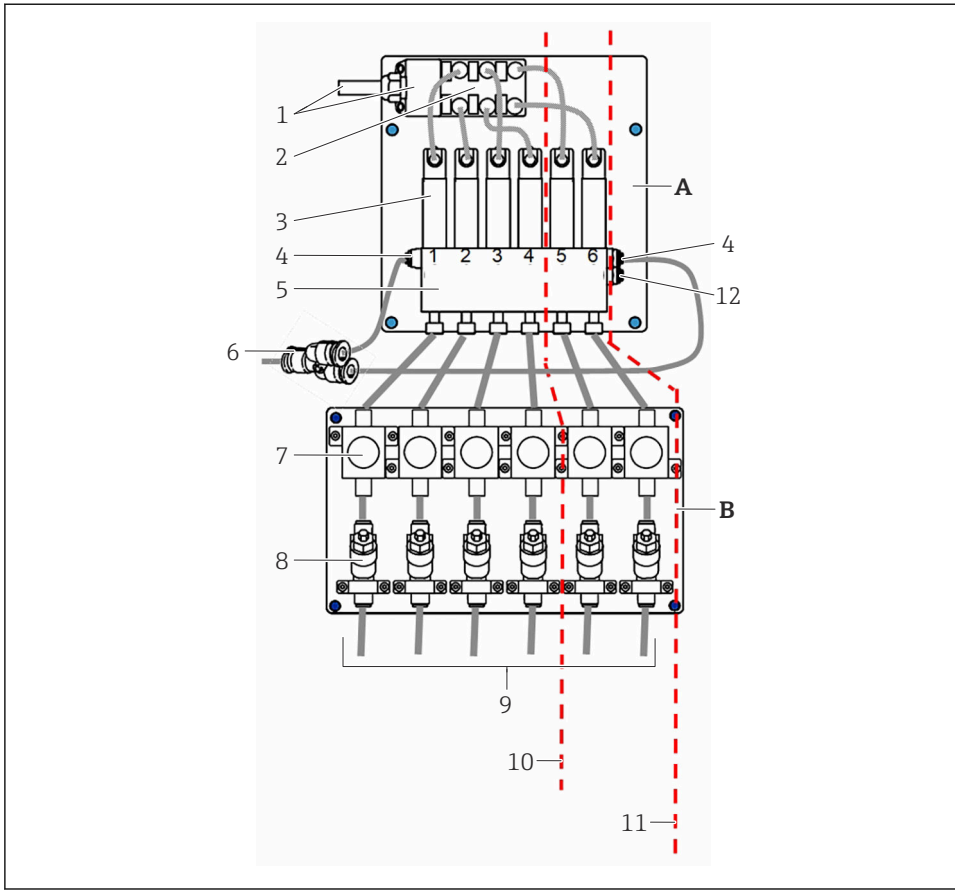
Sample preparation with sample switch consists of two mounting plates:

- Mounting plate with sample switch
- Mounting plate with filters + pressure-reducing valves

The two mounting plates are mounted close to the analyzer (maximum spacing → 14, 18). The mounting plates can be mounted one below the other or side by side.

1. Mount both mounting plates at the designated position.

2. Cut 4 or 6 hose pieces (PU hose, OD 6 mm) to the required length (< 1 m).
3. Connect the pressure-reducing outputs to the valve block inputs of the sample switch.
4. Connect a PUN-H hose with OD 8 mm to the drain connection of the valve block (9/ → 18, 23). Ensure that the outlet is unobstructed.
5. Connect the supplied PTFE hose OD 4 mm to the Y-connector of the valve block sample outputs. Insert the hose into the analyzer (= external hose SPx, see the “Internal hose and cable routing” section → 18 and figures → 3, 6 and → 16, 20).
6. Connect the supply hoses provided by the customer to the filter inputs.



18 *Mounting instructions*

A Mounting plate with sample switch
B Mounting plate with pressure-reducing valve and filter
1 Valve block cable with terminal head
2 Sensor/actuator box
3 Solenoid valves
4 Sample outputs (OD 4 mm (0.16 in), external SPx)
5 Valve block
6 Y-connector, sample
7 Pressure-reducing valve
8 Filter
9 Sample inputs (OD 6 mm (0.24 in))
10 4-channel version
11 6-channel version
12 Outlet (OD 8 mm (0.31 in))

7. Attach the terminal head of the valve block cable to the sensor/actuator box and screw it tight.
8. Put the device back into operation, see the “Recommissioning” section → 24.

6.4 Upgrade from 4 to 6 channels

For upgrading a 4-channel analyzer to 6 channels, the sample preparation and sample switch must be exchanged.

The CAZ800-(AH/R1)K6 kit is required for conversion (see the “CAZ800-(AH/R1) K6 6 channels” section → 11). No intervention in the CA80SI/82HA analyzer is required.

1. Carry out preparatory work as per the “Preparatory work” section → 12.
2. If additional information on the subsequent steps is required, please refer to the “Upgrade from 1 or 2 channels to 4 or 6 channels” section → 17.
3. Remove the “external SPx” sample hose from the Y-connector of the 4-channel sample switch (→ 7, 12 and → 18, 23). Have a paper towel ready to collect any leaking sample.
4. Remove the sample supply hoses provided by the customer from the filter inputs (→ 18, 23).
5. Release the screws and disconnect the terminal head of the sensor/actuator box on the valve block (→ 17, 21 and → 18, 23).
6. Remove the previous 4-channel sample preparation system and the sample switch.
7. Instead, install the 6-channel sample preparation and sample switch from CAZ800-(AH/R1)K6 kit. The dimensions and the fastening holes are identical to the 4-channel version.
8. Connect the “external SPx” sample hose to the Y-connector of the sample switch.
9. Connect the supply hoses provided by the customer to the filter inputs.
10. Attach the terminal head of the valve block cable to the sensor/actuator box of the valve block and screw it tight.
11. Put the device back into operation, see the “Recommissioning” section → 24.
12. If the new channels 5 and 6 are not activated by the CA80SI/82HA: Check whether the plug connector for the cables 5 and 6 is connected and is plugged in to the FXAB1 control module (→ 17, 21).

6.5 Recommissioning

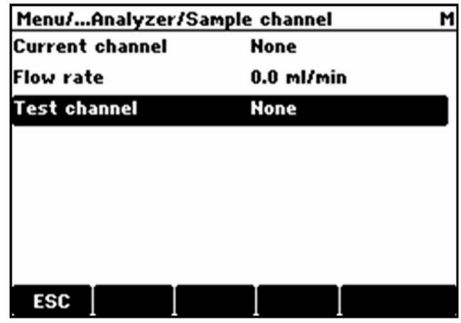
Completing the analyzer:

1. Fold back the carrier plate and secure it (only when upgrading from 1/2-channels to 4/6-channels).
2. Insert the bottle tray with all reagents.
3. Insert the hoses into the reagent bottles.

4. Plug in the power connector (only when upgrading 1/2-channels to 4/6-channels).

Filling the reagent hoses:

1. Select **Menu → Operation → Maintenance → Bottle replacement → Bottle insertion → Bottle selection**.
2. Highlight all the bottles and confirm by pressing the **OK** softkey.
3. Select the **Bottles inserted confirmation** entry.
4. Provide the supplied upgrade code.
5. Select **Menu → Setup → General settings → Extended setup → Data management → Upgrade code → Enter upgrade code**. Enter the upgrade code and confirm by pressing **Accept**.
6. Then select **Device restart**.
7. Create the inflow of the sample. If necessary, open the shut-off valves in the sample supply lines. Samples must be taken at all filters of the sample switch; recommended pressure 1.5 to 3 bar.
8. Set the sample flows to the individual pressure-reducing valves: To do this, open **Menu → Diagnostics → System test → Analyzer → Sample channel**. Under **Test channel**, select the channel (SP1 to SP6) to be adjusted:



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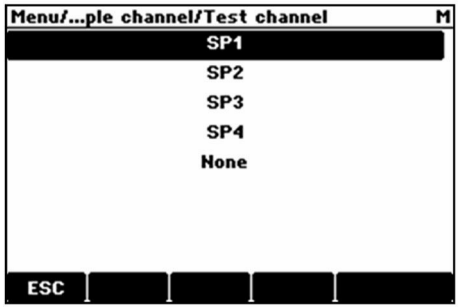
9. Select the individual channels one after the other via **Test channel** and confirm:



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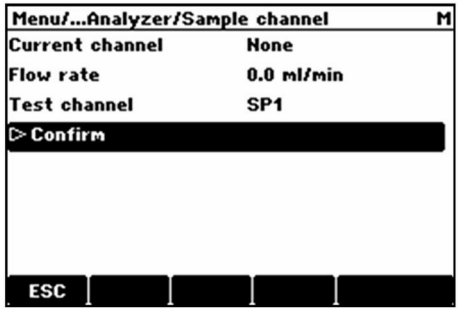
10. Use **Accept** to start the flow measurement.

Information for the 4-channel and 6-channel design: The respective LED on the sensor/actuator box is lit until the test channel is opened to the CA80SI/82HA.



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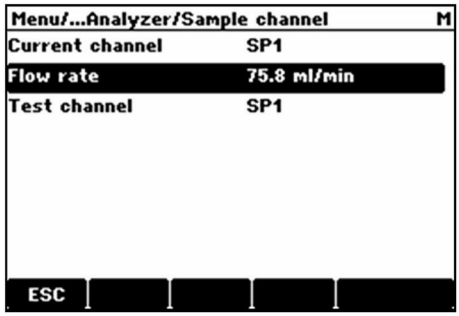

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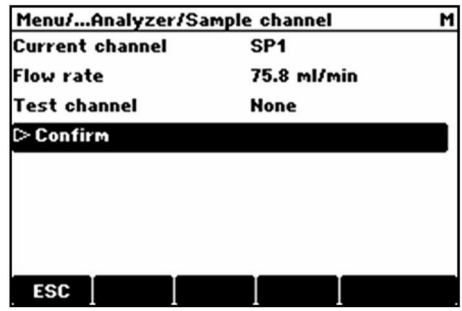
11. Adjust the flow so that the flow rate is in the specified range (60 to 200 ml/min); the recommended value is 70 ml/min. Use the installed pressure-reducing valve or system-side installation (control valves, pressure regulators, etc.) to adjust the flow.
12. The sample pressure must not exceed 5 bar!
13. Repeat the flow setting for each existing measuring channel!
14. Then select the sample channel **None** and confirm to close all the valves of the CA80SI/82HA.



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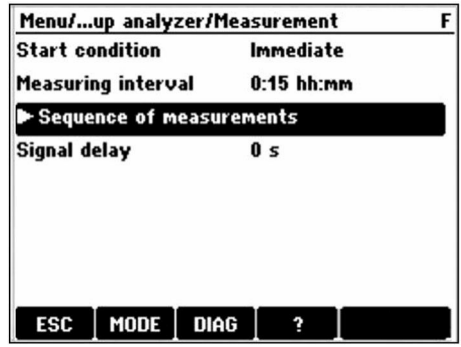
Even if the channel is deactivated, sample continues to flow through each channel and is diverted via sample drain hose "D".

15. Set the channel sequence: Select **Menu → Setup → Analyzer → Measurement → Sequence of measurements**. Select the channel sequence according to customer specifications.



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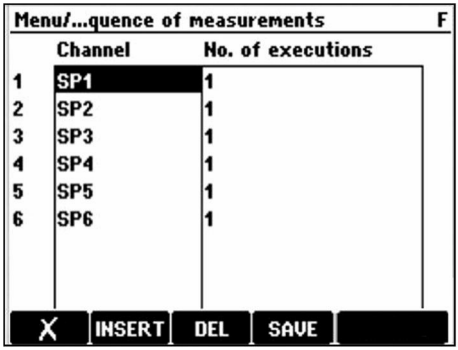

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16. Start the measurement. Select the start condition **Immediately** in **Menu → Setup → Analyzer → Measurement → Start condition**. Once the system changes to the automatic mode, the analyzer will immediately start with the measurement cycle.
17. Check all the new components for leaks.

7 Additional documentation

Detailed information on the devices can be found in the Operating Instructions of the analyzer and the other documentation are 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.

www.addresses.endress.com

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