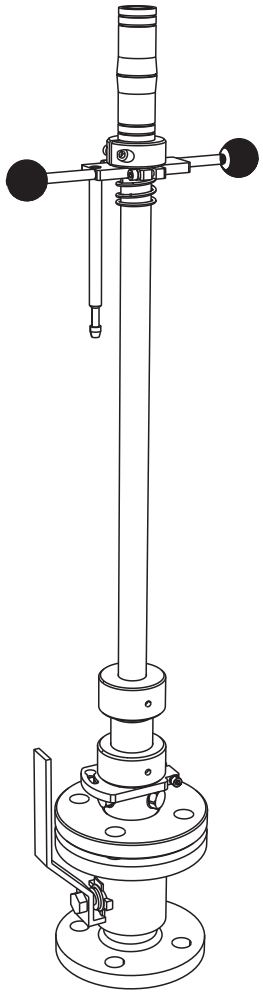
Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Operating Instructions

Cleanfit W CPA450

Retractable Assembly for 12 mm Sensors for DO/pH/ORP Measurement



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1 Safety instructions

1.1 Designated use

The manually operated retractable assembly Cleanfit W CPA450 is designed for installing pH / ORP and oxygen sensors in tanks and pipelines.
Thanks to its design, the assembly can be used in pressurized systems (see Technical data).

Any other use than the one described here compromises the safety of persons and the entire measuring system and is not permitted.
The manufacturer is not liable for damage caused by improper or non-designated use.

1.2 Installation, commissioning and operation

Please note the following items:
- Installation, commissioning, operation and maintenance of the measuring system must only be carried out by trained technical personnel.
  Trained personnel must be authorized for the specified activities by the system operator.
- Electrical connection must only be carried out by a certified electrician.
- Technical personnel must have read and understood these Operating Instructions and must adhere to them.
- Before commissioning the entire measuring point, check all the connections. Ensure that electrical cables and hose connections are not damaged.
- Do not operate damaged products and secure them against unintentional commissioning. Mark the damaged product as being defective.
- Measuring point faults may only be rectified by authorized and specially trained personnel.
- If faults can not be rectified, the products must be taken out of service and secured against unintentional commissioning.
- Repairs not described in these Operating Instructions may only be carried out at the manufacturer's or by the service organization.

1.3 Operational safety

The assembly has been designed and tested in accordance with the latest industry standards and left the factory in perfect functioning order.
Relevant regulations and standards have been met.

As the user, you are responsible for complying with the following safety conditions:
- Installation instructions
- Local prevailing standards and regulations.

1.4 Return

If the assembly needs repair, please contact your local representative and follow the instructions.
Before return assembly has to be cleaned.
Please use the original packaging, if possible.

Please enclose the completed "Declaration of de-contamination" (copy the second to last page of these Operating Instructions) with the packaging and the transportation documents.
No repair without completed "Declaration of de-contamination"!

1.5 Notes on safety conventions and icons

Warning!
This symbol alerts you to hazards that can cause serious damage to the instrument or to persons if ignored.

Caution!
This symbol alerts you to possible faults which could arise from incorrect operation. They could cause damage to the instrument if ignored.

Note!
This symbol indicates important items of information.

2 Identification

2.1 Nameplate

You can identify the assembly version by the order code on the nameplate. Please compare this code with your order.

On the nameplate you will find the following information:
- Order code
- Serial number
- Permissible pressure
- Permissible temperature

You can find possible assembly versions and the resulting order codes in the product structure.

2.2 Product structure

	Immersion depth; material					
	A	100 mm (3.93"); titanium with safety locking device				
	B	250 mm (9.84"); titanium with safety locking device				
	C	700 mm (27.56"); titanium with safety locking device				
	H	100 mm (3.93"); Alloy C4 with safety locking device				
	I	250 mm (9.84"); Alloy C4 with safety locking device				
	K	700 mm (27.56"); Alloy C4 with safety locking device				
	0	100 mm (3.93"); 316L				
	1	250 mm (9.84"); 316L				
	2	700 mm (27.56"); 316L				
	3	250 mm (9.84"); 316L with safety locking device				
	4	700 mm (27.56"); 316L with safety locking device				
		Process connection and stop cock				
		A	Thread G 1¼ external, 316L; without adapter			
		B	Thread G 1¼ external, 316L			
		C	Thread NPT 1¼" external, 316L			
		D	Flange DN 32 PN 16; 316L			
		E	Flange ANSI 1¼", 150 lbs, 316L			
		F	Ball valve 316; thread G 1¼ internal			
		G	Ball valve 316L; thread G 1¼ internal			
		H	Ball valve 316; thread NPT 1¼" internal			
		I	Ball valve 316; flange DN 32 PN 16			
		K	Ball valve 316; Fflange ANSI 1¼"			
		M	Thread M-NPT 1½", titanium, without ball valve			
		N	Flange ANSI 2", titanium, without ball valve			
		Q	Thread M-NPT 1½", Alloy C4, without ball valve			
		R	Flange ANSI 2", Alloy C4, without ball valve			
			Material: Seals			
			1	EPDM		
			2	FPM, Viton®		
			3	FFKM, Kalrez® / PTFE		
				Equipment, cable protection		
				10	With cable protection	
				16	Certificate EN 10204 3.1 for assembly without ball valve; with cable protection	
				20	Desiliconized, with cable protection	
				30	Certificate EN 10204 3.1 for assembly with ball valve (only for CPA450-*G***)	
				40	With safety pressure test, 20 bar at T = 20 °C	
CPA450-						complete order code

Note!
The certificate EN 10204 3.1 is not available for the material titanium.

2.3 Scope of delivery

The scope of delivery comprises:
- Cleanfit W CPA450 assembly (ordered version)
- PMC (potential matching) mounting kit
- Hook wrench
- Operating Instructions (English)

If you have any question, please contact your supplier or your local sales representatives.

2.4 Design changes

Starting 02/11 the assembly will be delivered with following improvements:
- Immersion tube with dead stop
- Double O-ring sealing for the immersion tube
- Screwable hand grip
- Modified cable protection

Both versions are easy to distinguish:
- Old version up to 01/11 is equipped with a **black** hand grip
- New version starting 02/11 is equipped with a **blue** hand grip

3 Installation

3.1 Incoming acceptance, transport, storage

- Make sure the packaging is undamaged!
  Inform the supplier about any damage to the packaging.
  Keep the damaged packaging until the matter has been settled.
- Make sure the contents are undamaged!
  Inform the supplier about damage to the contents. Keep the damaged products until the matter has been settled.
- Check that the order is complete and agrees with your shipping documents.
- The packaging material used to store or to transport the product must provide shock protection and humidity protection. The original packaging offers the best protection. Also, keep to the approved ambient conditions (see "Technical data").
- If you have any questions, please contact your supplier or your local sales center.

3.2 Installation conditions

3.2.1 Dimensions and process connections

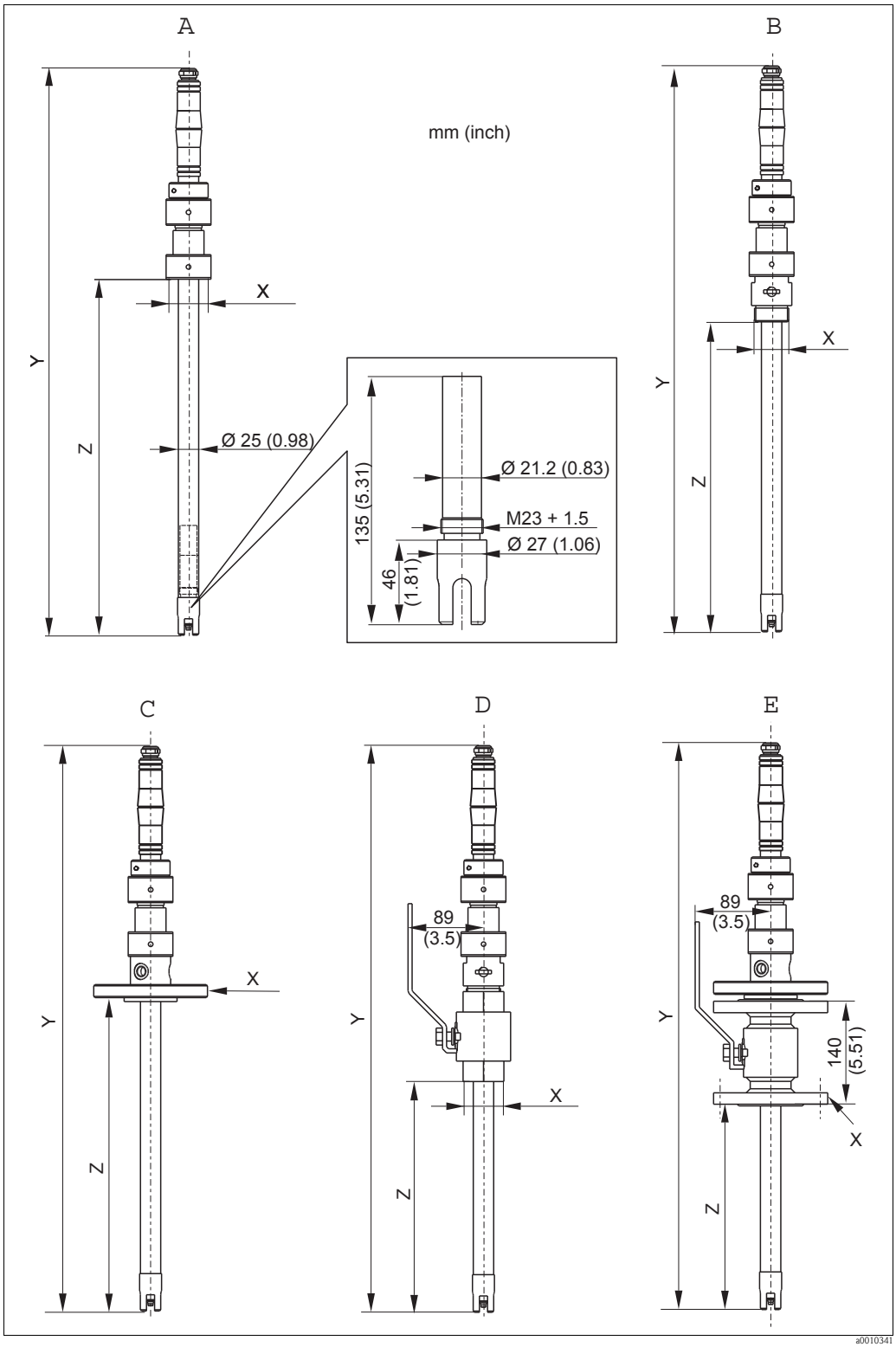

Fig. 1: Dimensions (see the following table)

Type	Assembly	Immersion depth mm (inch)	X Adapter	Y mm (inch)	Z mm (inch)
A	CPA450-*A***	100 (3.94) 250 (9.84) 700 (27.5)	G1½ internal	536 (21.1) 686 (27.0) 1136 (44.7)	276 (10.9) 425 (16.7) 875 (34.5)
B	CPA450-*B***	100 (3.94) 250 (9.84) 700 (27.5)	G1¼ external	536 (21.1) 686 (27.0) 1136 (44.7)	220 (9.06) 370 (14.9) 820 (32.6)
B	CPA450-*C***	100 (3.94) 250 (9.84) 700 (27.5)	NPT 1¼" external	536 (21.1) 686 (27.0) 1136 (44.7)	220 (9.06) 370 (14.9) 820 (32.6)
C	CPA450-*D***	100 (3.94) 250 (9.84) 700 (27.5)	Flange DN32	536 (21.1) 686 (27.0) 1136 (44.7)	220 (9.06) 370 (14.9) 820 (32.6)
C	CPA450-*E***	100 (3.94) 250 (9.84) 700 (27.5)	Flange ANSI 1¼"	536 (21.1) 686 (27.0) 1136 (44.7)	220 (9.06) 370 (14.9) 820 (32.6)
D	CPA450-*F*** and CPA450-*G***	100 (3.94) 250 (9.84) 700 (27.5)	G1¼ internal	536 (21.1) 686 (27.0) 1136 (44.7)	130 (5.12) 280 (11.0) 730 (28.7)
D	CPA450-*H***	100 (3.94) 250 (9.84) 700 (27.5)	NPT 1¼" internal	536 (21.1) 686 (27.0) 1136 (44.7)	130 (5.12) 280 (11.0) 730 (28.7)
E	CPA450-*I***	100 (3.94) 250 (9.84) 700 (27.5)	Flange DN32	536 (21.1) 686 (27.0) 1136 (44.7)	100 (3.94) 250 (9.84) 700 (27.5)
E	CPA450-*K***	100 (3.94) 250 (9.84) 700 (27.5)	Flange ANSI 1¼"	536 (21.1) 686 (27.0) 1136 (44.7)	100 (3.94) 250 (9.84) 700 (27.5)
B	CPA450-*M*** and CPA450-*Q***	700 (27.5)	M-NPT 1½ external	1143 (45.0)	830 (32.6)
C	CPA450-*N*** and CPA450-*R***	700 (27.5)	Flange ANSI 2"	1143 (45.0)	830 (32.6)

3.2.2 Installation notes

Suitable sensors

The following sensors are suitable for installation in the CPA450:

- Digital sensors with Memosens technology, length 120 mm / 4.72"
- pH/ORP glass electrodes, length 120 mm / 4.72"
- ISFET sensors: only sensors listed in "Accessories" chapter
- DO sensors, length 120 mm / 4.72"
- For the conductivity sensor CLS15 a modification is available

Installation positions

The permissible installation angle of the assembly depends on the sensor:

- Glass electrodes and digital sensors with Memosens technology:
  Install the assembly at an angle of at least 15° from the horizontal (see Fig. 2).
- ISFET sensors:
  When using an ISFET sensor, there are, in principle, no restrictions to the installation. An installation angle between 0° and 180° is, however, recommended.

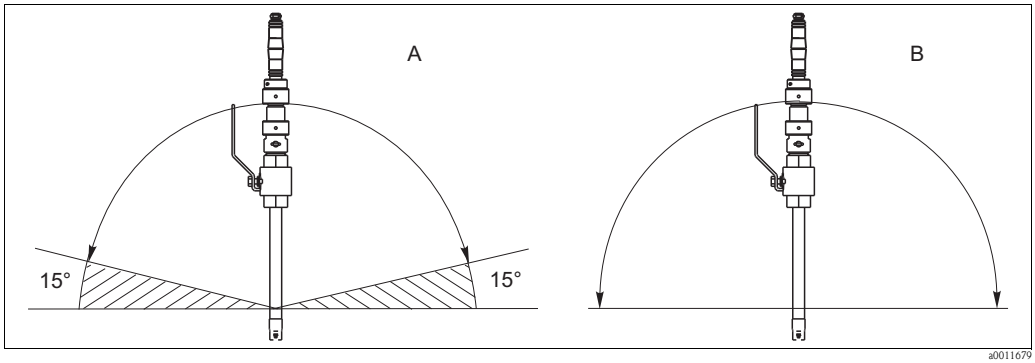

Fig. 2: Installation angle of the assembly

A Glass sensors: 15° to horizontal
B ISFET sensors 0 to 180° recommended

Install the assembly so that the sensor is kept wet at all times.

Installation with ball valve

When replacing the sensor without switching off the process a ball valve is needed. The ball valve is part of the assembly (according to product structure) or has to be installed by the customer.

Note!
When used without ball valve switch off the process before removing the immersion tube or replacing the sensor. Danger of spraying liquid.

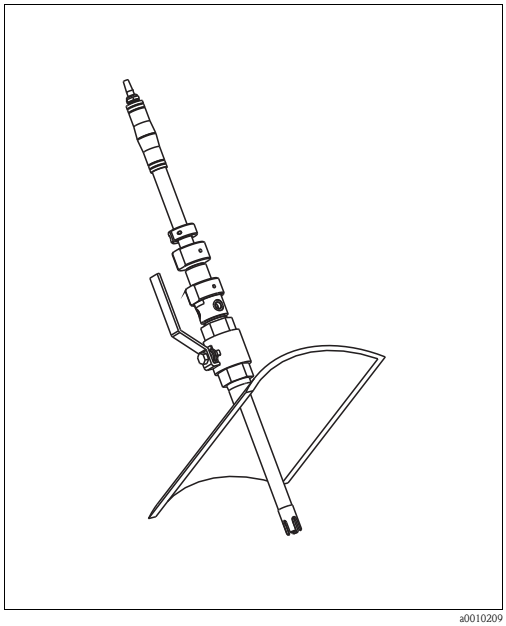

Fig. 3: Assembly in inserted position = measuring mode (ball valve open)

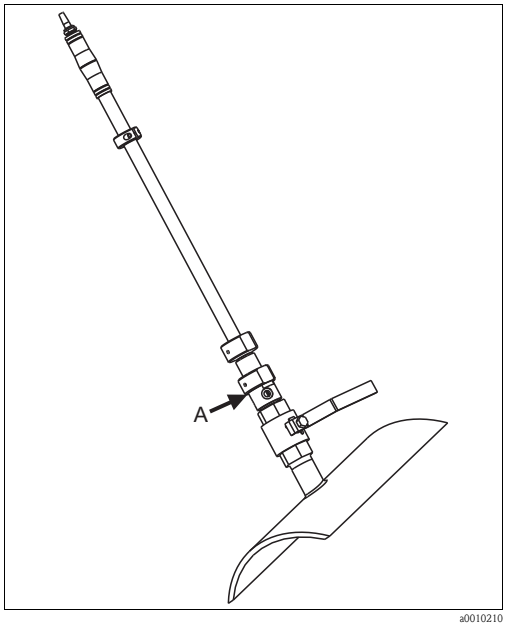

Fig. 4: Assembly in retracted position for electrode replacement, calibration, rinsing (ball valve closed)

A Top of adapter

Note!
Please note that a mounting clearance of min. 700 or 1150 mm (27.6" or 45.3") from the top of the adapter is required depending on assembly version.

3.2.3 Process pressure

Pay attention to the specification of the process pressure!

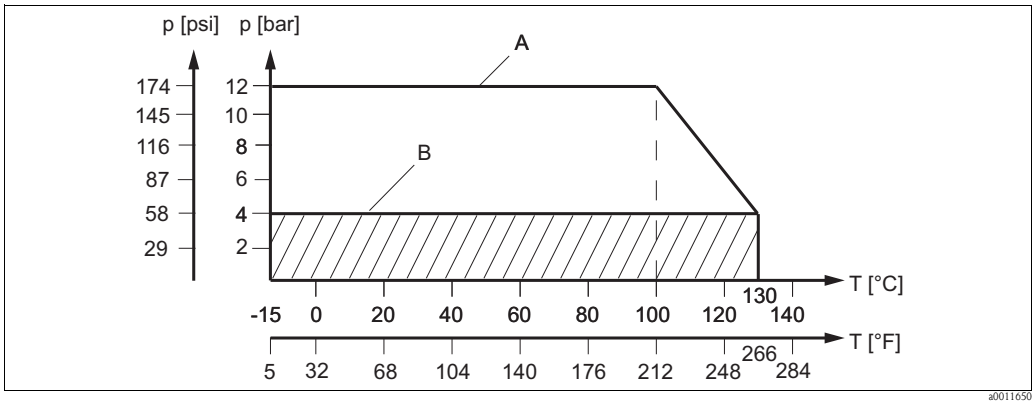

Fig. 5: Pressure-temperature diagram

A Maximum process operating pressure (static), only for completely installed assembly
B Advised upper insertion/retraction pressure (functional)

Warning!
The 4 bar (58 psi) line on the graph represents an advised upper insertion/retraction pressure. At 4 bar (58 psi) you have to apply (press/hold) approximately 20 kg (44 lbs) of force to the probe assembly.

For insertion/retraction of the assembly at any process pressure, consider the following:
- Make sure the service conditions are suitable for insertion/retraction at the process pressure.
- Use locking device safety kit (see chapter "Accessories").

Note!
Press/hold values are calculated based on ideal conditions (new assembly and clean fluid). Actual press/hold values could vary depending on process and/or assembly conditions.

Note!
To calculate the press/hold force use the following equation:
press/hold force = line pressure in bar multiplied by the surface area factor 5
(e.g. 4 bar * 5 = 20 kg force)
or
press/hold force = line pressure in psi multiplied by the surface area factor 0.76
(e.g. 58 psi * 0.76 = 44 lbs force)

3.3 Installation

3.3.1 Measuring system

A complete measuring system consists of:
- Cleanfit W CPA450 assembly
- DO/pH/ORP sensor, length 120 mm (4.72"), e.g. Orbisint CPS11D
- Transmitter, e.g. Liquiline M CM42 or Mycom S CPM153
- Measuring cable, e.g. CYK10 or CPK9

Optional:
- RM junction box for use with extension cable (see chapter "Accessories")
- CYK81 measuring cable for extended cable runs

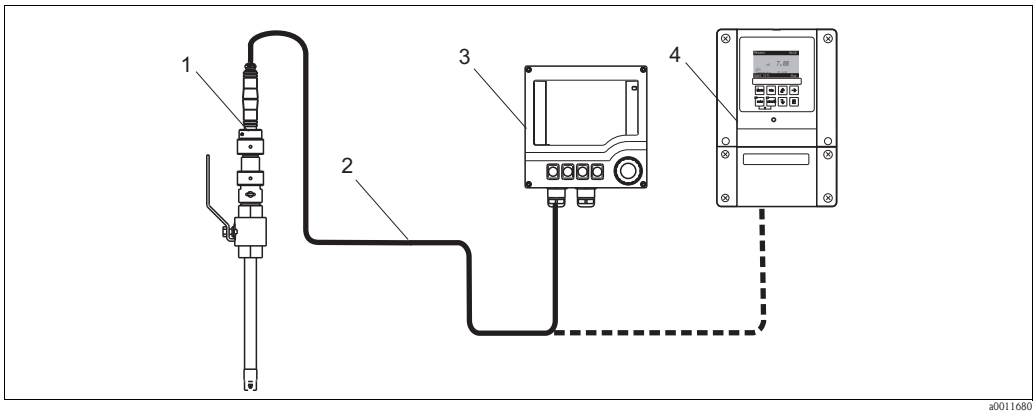

Fig. 6: Measuring system with CPA450

1 Cleanfit assembly with sensor
2 Measuring cable
3 Liquiline M CM42
4 Mycom S CPM153

3.3.2 Required tools

You require the following tools to install the sensor in the assembly and the assembly in the process:

- Allen key M5 (5 mm)
- Hook wrench AF 55 (included)
- Wrench AF 20 (20 mm (0.79")) or adjustable open-end wrench
- Adjustable open-end wrench (up to 45 mm (1.8"))
- Open-end wrench set (flange connection only)

3.3.3 Installing the assembly onto the pipe or tank

Warning!
- Depressurize the system before assembly installation or removal.
- The medium pressure in the tank or pipe must not exceed the maximum permissible assembly and electrode pressures.

Note!
For versions with pre-installed locking device safety kit make sure to install the locking device safety kit in the final position (see chapter "Installation of locking device safety kit").

1. Move the assembly into retracted "Service" position.
2. Secure the assembly to the tank or pipe using your selected process connection.
3. Follow the instructions given in the next chapter to connect rinse water pipes (optional).

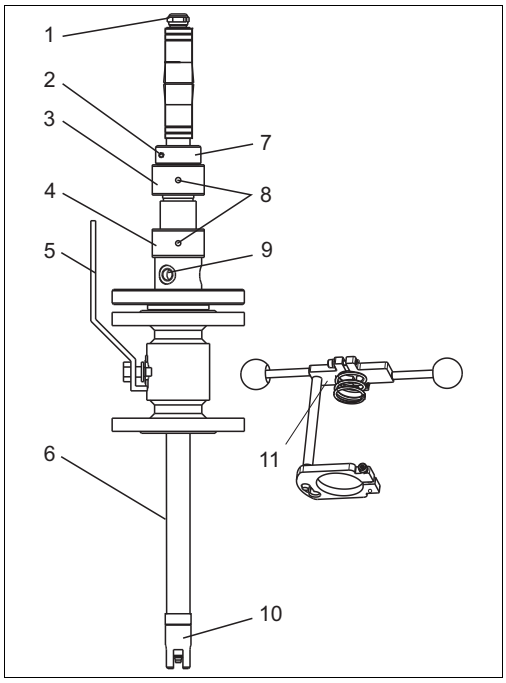

Fig. 7: Assembly in measuring state (ball valve open)

1 Cable protection
2 Allen screw M5
3 Compression fitting (black)
4 Lock ring (metal)
5 Manual lever for ball valve opening and closing
6 Immersion tube
7 Setting collar for adjustment of immersion depth
8 Drill holes for hook wrench
9 Rinse connection G¼ (316L) NPT ¼" (Alloy C4 or titanium)
10 Sensor holder with protecting cage
11 Locking device safety kit

3.3.4 Rinse water connection (optional)

1. Connect the rinse water pipe to the designated rinse nozzle. The three rinse nozzles on the assembly are identical (G¼ for material 316L – NPT ¼" for materials Alloy C4 and titanium).
2. For optimal sensor cleaning operate the rinse water connection of the assembly with a water pressure of 2 to max. 6 bar (29 to 87 psi).

Besides water, other or additional cleaning solutions may be used in the rinse chamber. Make sure cleaning chemicals are compatible with assembly wetted materials of construction. Pay attention to the material resistance of the assembly and comply with the maximum permitted temperatures and pressures.
Additionally you can connect a drain ball-valve or a manometer.

Note!
If it is possible for the water pressure to rise above 6 bar (87 psi, including any transient pressure surges), we propose to install a pressure reducing valve upstream.

3.3.5 Sensor installation

Warning!
For insertion/retraction of the assembly at any process pressure, consider the following:
- Make sure the service conditions are suitable for insertion/retraction at the process pressure. See also chapter "Installation notes – Process pressure"
- Use locking device safety kit (see chapter "Accessories").
- Make sure that the sensor meets the specification of the process pressure!

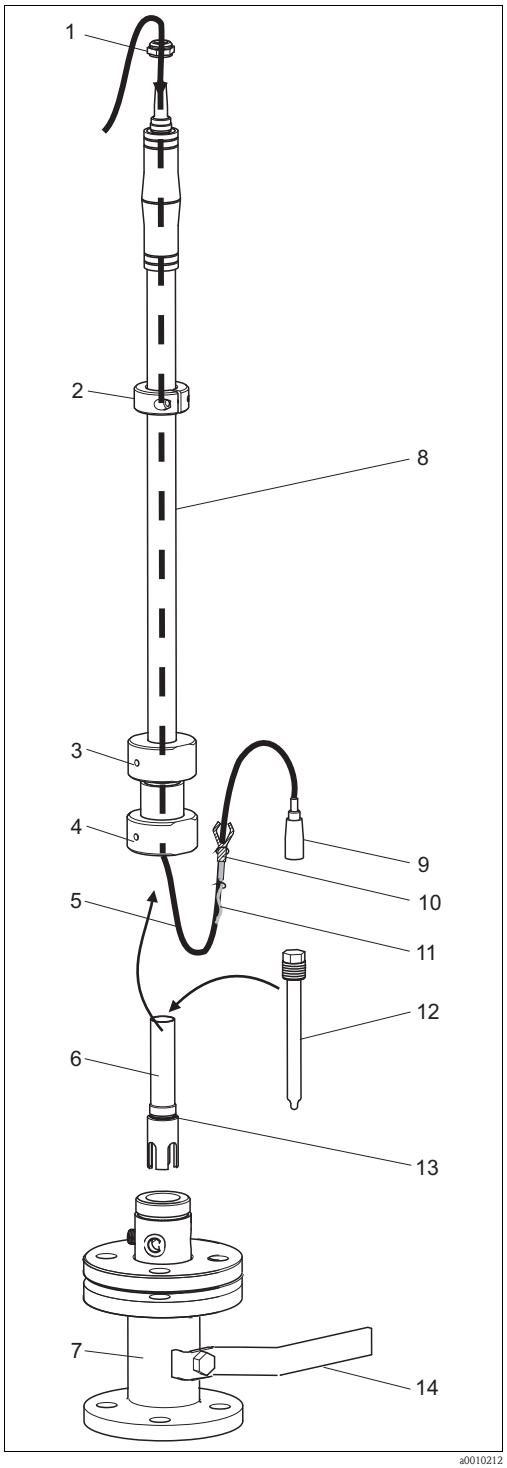

Fig. 8: Cable routing and sensor installation

Prepare the assembly

1. Hold the immersion tube (pos. 8) down with one hand.
2. Carefully loosen the compression fitting (pos. 3) with the hook wrench by ¼ to ½ revolution.
3. Take off the cable protection (pos. 1)
4. Retract the immersion tube (pos. 8) completely.
5. Close the ball valve (pos. 14).

Insert the cable and install the sensor

1. Unscrew the lock ring (pos 4.) using the supplied hook wrench.
2. Pull the assembly out of the ball valve.
3. Unscrew the sensor holder (pos. 6).
4. Insert the measuring cable through the immersion tube:
   – Thread the measuring cable from the bottom through the immersion tube to the transmitter.
   – If necessary, connect the solution ground contact spring (pos. 10) to the contact cable (pos. 11). Secure the spring with two cable clips.
5. Screw the sensor (pos. 12) into the sensor holder (pos. 6).
6. Plug the cable coupling (pos. 9) onto the sensor (pos. 12).
7. Make sure that the O-ring (pos. 13) is installed at the end of the thread.
8. Screw the sensor holder (pos. 6) into the immersion tube until it stops and hand tighten it.
9. Install the cable protection.

Reassemble the assembly

1. Insert the assembly in the ball valve (Fig. 8, pos. 7).
2. Tighten the lock ring (pos. 4) using the supplied hook wrench.
3. Make sure that the union nut (pos. 3) is only opened by ½ revolution.
4. Adjust the setting collar (pos. 2) to the desired immersion depth and lock it in that position using an Allen wrench.
5. Open the ball valve (pos. 14).
6. Push the immersion tube into the process until stopped by the setting collar (pos. 2).
7. Tighten the compression fitting hand-tight (pos. 3). Then use the supplied hook wrench to further tighten the compression fitting by 1/8 revolution (45°, corresponds to 10 to 15 Nm (7 to 11 lbf ft)).

3.3.6 Installation of locking device safety kit

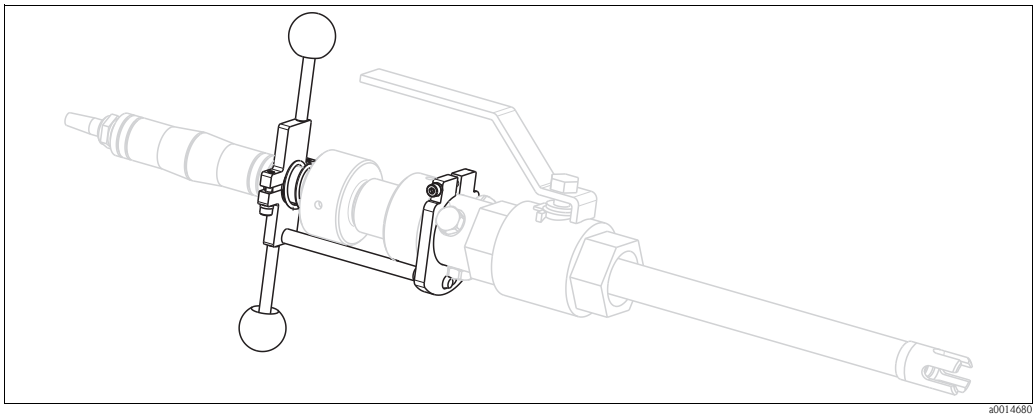

Fig. 9: Assembly with safety kit

Please read and follow product warning and safety instructions. Failure to do so could result in injury or death.

Purpose

- Locking Device Safety Kit is designed to improve product safety and ease of use of the CPA450 Hot Tap Assembly.
- The Locking Device Safety Kit can be ordered with new CPA450 assemblies, or ordered separately as a retrofit kit.
- Do not attempt to install this device unless the CPA450 is removed from the process or is in the fully retracted position with the ball valve completely closed.

Note!
The Locking Device Safety Kit is **not** designed to replace the CPA450 locking compression fitting as the primary means for CPA450 retention.

Personal Safety Warning

- When working with the CPA450, please observe all posted warnings.
- Wear protective clothing, protective gloves, and protective goggles when working with reagents, chemicals, or process liquids.
- Make sure the service conditions are suitable for insertion/retraction of the CPA450.
- Make sure CPA450 immersion tube is clean and dry before attaching Locking Device Safety Kit.
- Make sure all Locking Device Safety Kit retaining screws are properly tightened before attempting to use the Locking Device Safety Kit.

Preparation for installation on existing assembly – retracting the CPA450 to the "service" position:

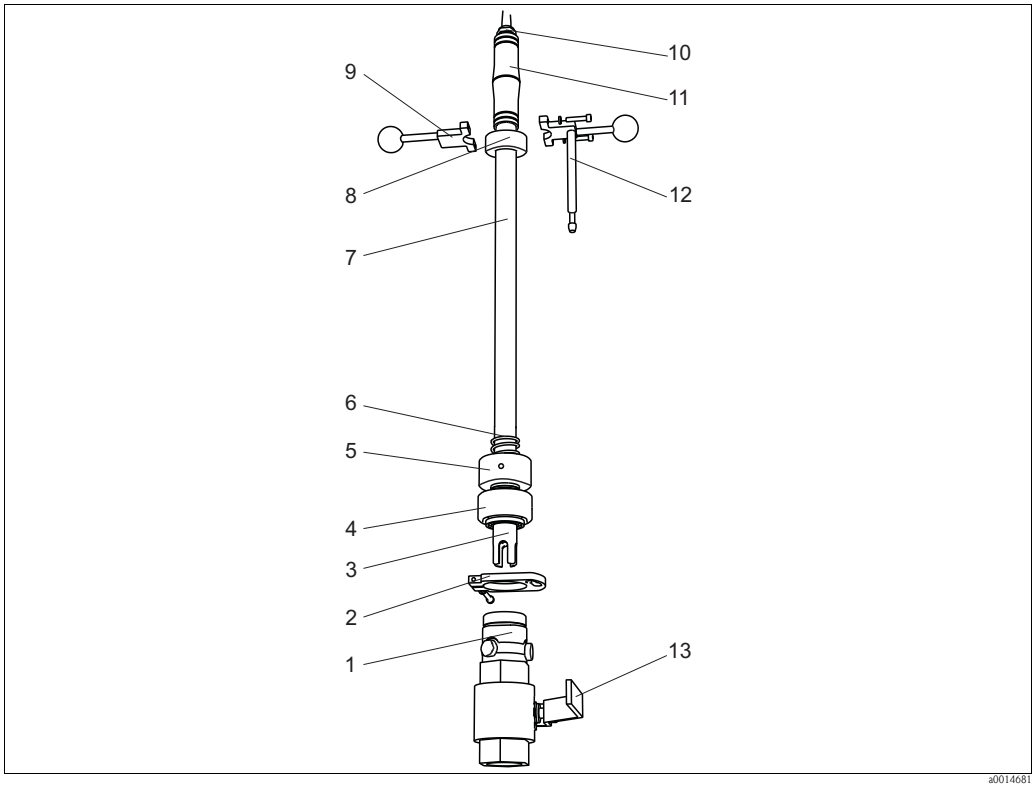

Fig. 10: Installation of the safety kit

1	*Rinse chamber*	*8*	*Setting collar*
2	*Safety kit (bottom part)*	*9*	*Safety kit (top part with handle)*
3	*Sensor holder with protecting cage*	*10*	*Cable protection*
4	*Lock ring (metal)*	*11*	*Immersion tube handle*
5	*Compression fitting (black)*	*12*	*Safety kit (top part with handle and safety rod)*
6	*Safety kit (compression spring)*	*13*	*Ball valve with handle*
7	*Immersion tube*		

1. With the CPA450 in the "insertion" position (desired position in the process), mark the immersion tube approximately 20 mm (0.8 inches) above the compression fitting (Fig. 10, pos. 5). This is the approximate location of the Locking Device Safety Kit top part with handles (Fig. 10, pos. 9).
2. Securely hold the immersion tube. Failure to do so could cause the immersion tube to move suddenly, possibly causing injury.
3. Carefully loosen the compression fitting with the hook wrench by ¼ to ½ revolution.
4. Pull the immersion tube out of the process until it stops (retracted "service" position).
5. Close the ball valve.
6. Unscrew lock ring (Fig. 10, pos. 4), and remove CPA450 assembly from rinse chamber (Fig. 10, pos. 1).

Installing the Locking Device Safety Kit

1. Take off the cable protection (Fig. 10 pos. 10).
2. Unscrew sensor holder (Fig. 10, pos. 3) and remove sensor. Disconnect sensor from sensor cable.
3. Unscrew immersion tube handle (Fig. 10, pos. 11) from immersion tube, and pull cable out of immersion tube.
4. Remove setting collar (Fig. 10, pos. 8).
5. Slide compression spring (Fig. 10, pos. 6) onto immersion tube.
6. Attach both top parts of the Locking Device Safety Kit (Fig. 10, pos. 9 & 12) to immersion tube where previously marked. Tighten locking screws to 3.5 Nm (2.6 lbf ft).
7. Reinstall setting collar.
8. Reinstall immersion tube handle and cable to immersion tube.
9. Reattach sensor cable to sensor and reinstall sensor into sensor holder. Reinstall sensor holder into immersion tube.
10. Attach the bottom part of the Locking Device Safety Kit (Fig. 10, pos. 2) on rinse chamber. Make sure the chamfered edge of the bottom part points to the ball valve. Tighten locking screw to 3.5 Nm (2.6 lbf ft).
11. Reinstall CPA450 into rinse chamber and tighten lock ring.

CPA450 assembly is now ready to be reinserted into process.

Operating the Locking Device Safety Kit:
Locking

1. Carefully open ball valve (Fig. 10, pos. 13). Check for leaks. Make sure compression fitting (Fig. 10, pos. 5) is not yet tightened.
2. Using handles of Locking Device Safety Kit, push the handles towards the ball valve so that safety rod (Fig. 10, pos.12) passes through opening in Locking Device Safety Kit bottom part (Fig. 10, pos. 2). Turn handles counter-clockwise and lock safety rod in grove on Locking Device Safety Kit bottom part.
3. Tighten compression with the hook wrench.

Unlocking

1. Loosen compression fitting with the hook wrench.
2. Using handles of Locking Device Safety Kit, push the handles towards the ball valve and turn the handles clockwise so the safety rod can be removed from Locking Device Safety Kit bottom part. Pull immersion tube back until it stops.
3. Close ball valve.

3.4 Post-installation check

- After installation, check that all connections are firmly in position and leak-tight.
- Ensure that the hoses of the rinse water connections (optionally) are tight. These hoses are in contact with the medium and must be secured accordingly.
- Check all hoses for damage.

4 Operation

4.1 First commissioning

Before the first commissioning, make sure of the following items:
- All seals are correctly seated (on the assembly and process connection).
- The sensor is correctly installed and connected.
- The water supply line is correctly connected to the rinse connections (if fitted).

⚠ Warning!
Danger of spraying liquid.
Before applying the process pressure to the assembly, make sure the connections are correctly fitted. If you use a ball valve for the rinse chamber as a vent valve, ensure the other sides of the rinse chamber are closed by the blind plugs. Otherwise the assembly may **not** be immersed into the process!

4.2 Operating elements

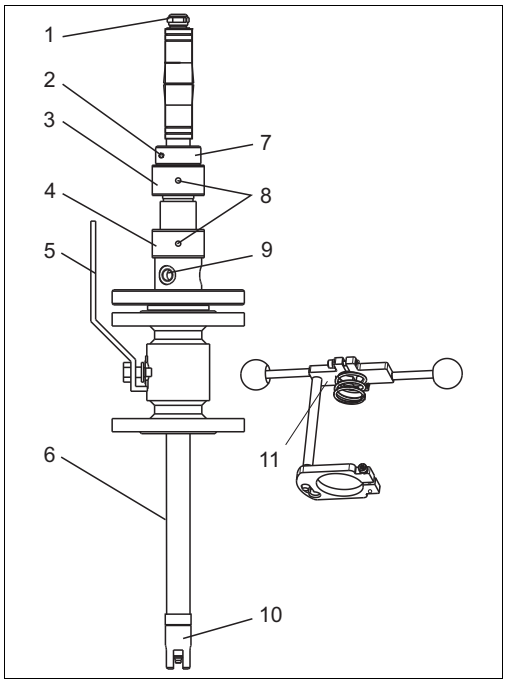

Fig. 11: Operating elements

1 Cable protection
2 Allen screw M5
3 Compression fitting (black)
4 Lock ring (metal)
5 Manual lever for ball valve opening and closing
6 Immersion tube
7 Setting collar for adjustment of immersion depth
8 Drill holes for hook wrench
9 Rinse connection G¼ (316L) NPT ¼" (Alloy C4 or titanium)
10 Sensor holder with protecting cage and stop lip
11 Locking device safety kit

You have the following options for operating the assembly:
- Setting collar (pos. 7)
  Use the setting collar to adjust the desired immersion depth. Alternatively use the locking device safety kit.
- Compression fitting (pos. 3)
  Use the compression fitting to lock the assembly in the desired position.
- Hand lever (pos. 5)
  Use the hand lever to open or close the ball valve.
- Immersion tube (pos. 6)
  Rotate the immersion tube to adjust the sensor orientation.
- Sensor holder/stop lip (pos. 10)
  When moving the assembly to service position pull the immersion tube out of the process until making contact with the stop position of sensor holder.

4.3 Assembly operation

Warning!
For insertion/retraction of the assembly at any process pressure, consider the following:
- Make sure the service conditions are suitable for insertion/retraction at the process pressure. See also chapter "Installation notes – Process pressure"
- Use locking device safety kit (see chapter "Accessories").

Insert from "service" position to "measuring" position

1. Loosen the compression fitting with the hook wrench.
2. Open the ball valve.
3. Push the immersion tube into the process until stopping at the setting collar.
4. Lock the immersion tube by tightening the compression fitting hand-tight. Then use the supplied hook wrench to further tighten the compression fitting by 1/8 revolution (45°, corresponds to 10 to 15 Nm (7 to 11 lbf ft)). This prevents the assembly from retraction.

   ✎ Note!
   When using the locking device safety kit please refer to section "Installation of locking device safety kit". When using the locking device safety kit lock the immersion tube by tightening the compression fitting hand-tight.

Retract from "measuring" position into "service" position

1. Securely hold the immersion tube. Failure to do so could cause the immersion tube to move suddenly, possibly causing injury.
2. Carefully loosen the compression fitting with the hook wrench by ¼ to ½ revolution.
3. Pull the immersion tube out of the process until it stops ("service" position).
4. Close the ball valve (the hand lever is perpendicular to the immersion tube).

   ✎ Note!
   When using the locking device safety kit please refer to section "Installation of locking device safety kit".
5. Perform the necessary service tasks.

5 Maintenance

Warning!
Risk of injury!
Before starting maintenance work on the assembly, make sure that the process line and the tank are depressurized, empty and rinsed.

Move the assembly to the "Service" position and close the ball valve.

5.1 Cleaning the assembly

To ensure a reliable measurement, the assembly and the sensor must be cleaned at regular intervals. The frequency and intensity of the cleaning operation depend on the process medium.

All parts in contact with the medium, e.g. the sensor and the sensor holder, must be cleaned at regular intervals. Remove the sensor[1].

- Remove light dirt using suitable cleaning agents (see chapter "Cleaning agents").
- Remove severe fouling with a soft brush and a suitable cleaning agent.
- Remove persistant fouling by soaking in a liquid cleaner and if neccessary by cleaning with a soft brush.

Note!
A typical cleaning interval for e.g. drinking water is at least half a year.

Note!
Lubricate dry O-rings, especially the O-rings of the sensor holder, to guarantee safe sealing of the assembly.

5.2 Cleaning the sensor

You have to clean the sensor:

- before every calibration
- regularly during operation
- before being returned to the supplier

You can remove and clean the sensor manually or perform an automatic cleaning operation[2] via the rinse connection.

Note!

- Clean ORP electrodes only mechanically and with water, do not use any chemical cleaning agents. These cleaning agents apply a potential to the electrode that takes several hours to decay. This potential causes measuring errors.
- Do not use any abrasive cleaning agents. This can lead to irreparable damage of the sensor.
- After cleaning the sensor, rinse the rinse chamber of the assembly with copious amounts of water (possibly distilled or de-ionized). Otherwise, remaining residues of cleaning agent can corrupt measurement.
- If required, re-calibrate after cleaning.

1) in reverse sequence of operations to the installation procedure
2) with the corresponding assembly equipment only

5.3 Cleaning agents

The selection of the cleaning agent is dependent on the degree and type of contamination. The most common contaminations and the suitable cleaning agents are listed in the following table.

Type of contamination	Cleaning agent
Greases and oils	Hot water or tempered substances containing tensides (alkaline)[1] or water-soluble organic solvents (e.g. ethanol)
Calciferous deposits, metal hydroxide deposits, lyophobic biological deposits	Approx. 3% hydrochloric acid
Sulphide deposits	Mixture of 3% hydrochloric acid and thiocarbamide (commercially available)
Protein deposits	Mixture of 3% hydrochloric acid and pepsin (commercially available)
Fibers, suspended substances	Water under pressure, poss. with surface-active agents
Light biological deposits	Water under pressure

1) do not use for Tophit ISFET sensors! Instead, use commercially available acidic cleaning agents for the food industry (e.g. P3-horolith CIP, P3-horolith FL, P3-oxonia active).

Caution!
Do not use organic solvents containing halogen or acetone. These solvents could destroy plastic components of the assembly or the sensor and are suspected carcinogens.

6 Accessories

6.1 Accessory kits

Hose nozzles for rinse connections G¼, DN 12
- SS 1.4404 (AISI 316L), 2 pieces
- Order no.: 51502808

Hose nozzles for rinse connections G¼, DN 12
- PVDF, 2 pieces
- Order no.: 50090491

Manometer
- Installation in rinse connection for checking the process pressure
- 0 to 16 bar (0 to 232 psi); G¼
- Order no.: 71082362

Drain ball-valve for rinse chamber
- To drain residual medium; G¼; stainless steel 1.4408 (AISI CF-8M)
- Order no.: 71083041

Hook wrench DIN 1810 design B
- D 58 - 68 mm
- Order no.: 50090687

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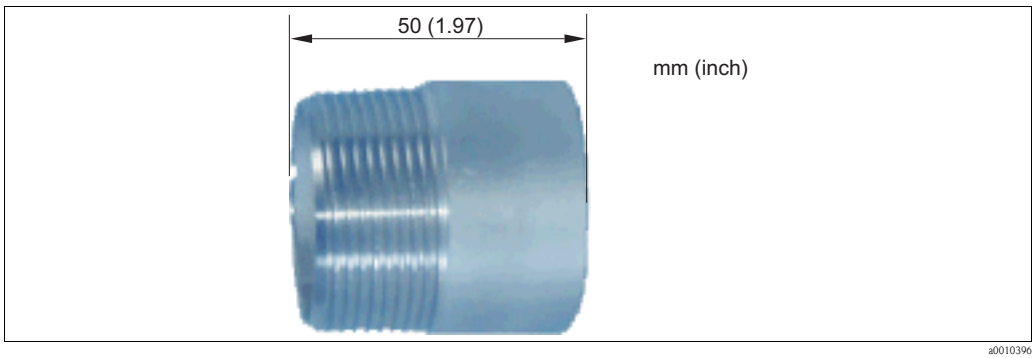
6.2 Welding socket

Welding socket G 1¼ straight
- For process connections F and G
- Material: stainless steel 1.4571 (AISI 316Ti)
- Order no.: 51502284



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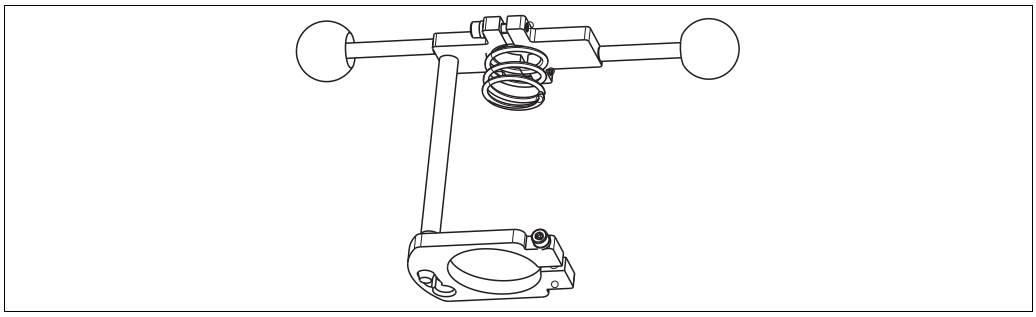
6.3 Locking device safety kit

Locking device safety kit
- Mechanical lock of the measuring position
- For applications in dusty or sooty areas
- For applications with vibrations or pressure surges
- Order no.: 71098681



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6.4 Sensors

6.4.1 Glass electrodes, analog and digital with Memosens technology

Note!
When ordering electrodes, please note that only electrodes with a shaft length of 120 mm (4.72") and diameter of 12 mm (0.47") are suitable for the CPA450 assembly. The most common sensors are listed below.

Orbisint CPS11/CPS11D
- pH electrode for process applications, with PTFE diaphragm
- Memosens functionality as option
- Ordering acc. to product structure, see Technical Information (TI028C/07/en)

Orbisint CPS12/CPS12D
- ORP electrode for process applications, with PTFE diaphragm
- Memosens functionality as option
- Ordering acc. to product structure, see Technical Information (TI367C/07/en)

Ceragel CPS71/CPS71D
- pH electrode with double chamber reference system and integrated bridge electrolyte
- Memosens functionality as option
- Ordering acc. to product structure, see Technical Information (TI245C/07/en)

Ceragel CPS72/CPS72D
- ORP electrode with double chamber reference system and integrated bridge electrolyte
- Memosens functionality as option
- Ordering acc. to product structure, see Technical Information (TI374C/07/en)

Orbipore CPS91/CPS91D
- pH electrode with open aperture for media with high dirt load
- Memosens functionality as option
- Ordering acc. to product structure, see Technical Information (TI375C/07/en)

6.4.2 ISFET sensors for CPA450

Tophit CPS471D
- Sterilisable and autoclavable ISFET sensor with Memosens technology for food and pharmaceutical industries, process technology, water treatment and biotechnology
- Ordering acc. to product structure, see Technical Information (TI283C/07/en)

Tophit CPS491D
- ISFET sensor with Memosens technology, open aperture for media with high dirt load
- Ordering acc. to product structure, see Technical Information (TI377C/07/en)

CPS471-ESA
- pH sensor with ISFET technology, ceramic diaphragm, chip seal: perfluorelastomer
- TOP68 / ESA plug-in head, 120 mm / 4.72"
- Order no.: 51513079

CPS491-ESA
- pH sensor with ISFET technology, open aperture, chip seal: perfluorelastomer
- TOP68 / ESA plug-in head, 120 mm / 4.72"
- Order no.: 51512562

6.4.3 Oxygen sensors

Oxymax H COS21D
- Sterilizable sensor for dissolved oxygen, with Memosens technology
- Ordering acc. to product structure, see Technical Information (TI402C/07/en)

6.5 Measuring cables

CPK1 special measuring cable
- For pH/ORP electrodes with GSA plug-in head
- Ordering acc. to product structure, see Technical Information (TI118C/07/en)

CPK9 special measuring cable
- For sensors with TOP68 plug-in head, for high-temperature and high-pressure applications, IP 68
- Ordering acc. to product structure, see Technical Information (TI118C/07/en)

CPK12 special measuring cable
- For pH/ORP glass electrodes and ISFET sensors with TOP68 plug-in head
- Ordering acc. to product structure, see Technical Information (TI118C/07/en)

CYK10 Memosens data cable
- For digital sensors with Memosens technology
- Ordering according to product structure, see Technical Information (TI376C/07/en)

CYK71 measuring cable
- Non-terminated cable for the connection of pH sensors and COS41 oxygen sensor or the extension of sensor cables
- Sold by the meter, order number:
  – non-Ex version, black: 50085333
  – Ex version, blue: 51506616

CYK81 measuring cable
- Non-terminated measuring cable for extension of sensor cables of e.g. Memosens sensors, CUS31/CUS41
- 2 wires, twisted pair with shield and PVC-sheath (2 x 2 x 0.5 mm^2 + shield)
- Sold by the meter, order no.: 51502543

Junction box VBA
- For cable extension of pH/ORP sensors
- 10 terminals, protection class: IP 65 (≙ NEMA 4X)
- Cable entries: 2 x Pg 13.5, 2 x Pg 16
- Material: polycarbonate
- Order no.: 50005276

Junction box RM
- For cable extension (e.g. for Memosens sensors)
- 5 terminals
- Cable entries: 2 x Pg 13.5
- Material: PC
- Ingress protection: IP 65
- Order no.: 51500832

6.6 Transmitters

Liquiline CM42
- Modular two-wire transmitter, stainless steel or plastic, field or panel instrument
- Various Ex approvals (ATEX, FM, CSA, Nepsi, TIIS)
- HART, PROFIBUS or FOUNDATION Fieldbus available
- Ordering acc. to product structure, see Technical Information (TI381C/07/en)

Liquisys CPM223/253
- Transmitter for pH and ORP, field or panel-mounted housing
- HART or PROFIBUS available
- Ordering acc. to product structure, see Technical Information (TI194C/07/en)

Mycom CPM153
- Transmitter for pH and ORP, one or two channel version, Ex or non-Ex
- HART or PROFIBUS available
- Ordering acc. to product structure, see Technical Information (TI233C/07/en)

7 Troubleshooting

7.1 Replacing damaged parts

Warning!
Damage to the assembly which affects the pressure safety must **only** be repaired by authorized technical personnel.
After every repair and maintenance activity, suitable measures must be taken to test whether the assembly shows any signs of leaking. The assembly must then correspond to the specifications stated in the technical data.

Replace all other damaged components immediately. To order accessories and spare parts, please use the "Accessories" and "Spare parts" chapters or contact your local sales center.

7.2 Replacing seals

- Keep the sealing surfaces of the assembly free of dirt.
- Remove deposits clinging to the assembly from time to time.
- In the event of leakages, contact your local sales center.

Warning!
Risk of leaks!
Seals must **only** be replaced by properly trained personnel.

Seals that can be replaced include:
- 2 O-rings of the sensor holder
- 1 O-ring + 1 thrust collar of the sensor
- 3 O-rings of the flanged sleeve (version starting 02/11)
  2 O-rings of the flanged sleeve (version up to 01/11)
- 1 flat seal of the adapter (flange connection only)

You require grease (e.g. Syntheso Glep 1 or silicone) for the O-rings.
For the required tools see chapter "Installation".

7.2.1 To replace the seals

Disassemble the assembly
Separate the assembly from the process. Proceed as follows depending on the specific assembly version:

Assembly versions without ball valve:

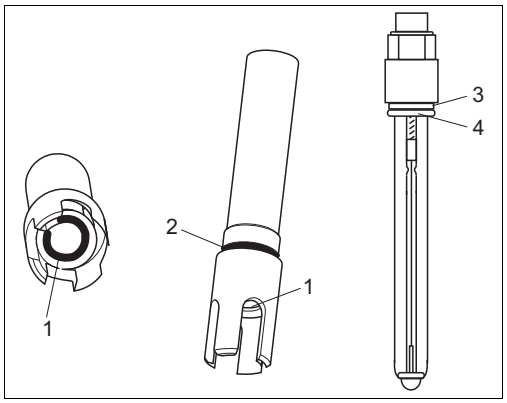
1. Switch off the process.
2. Retract assembly to "Service" position.
3. Empty the piping or the container.
4. Open the lock ring using the hook wrench.
5. Separate the assembly from the process connection (welding socket or flange).

Assembly versions with ball valve:

1. Retract assembly to "Service" position.
2. Close the ball valve.
3. Open the lock ring using the hook wrench.
4. Pull the assembly body out of the ball valve and the adapter.

For order information for O-ring kits see chapter "Spare parts".

Replace the O-rings of sensor and sensor holder



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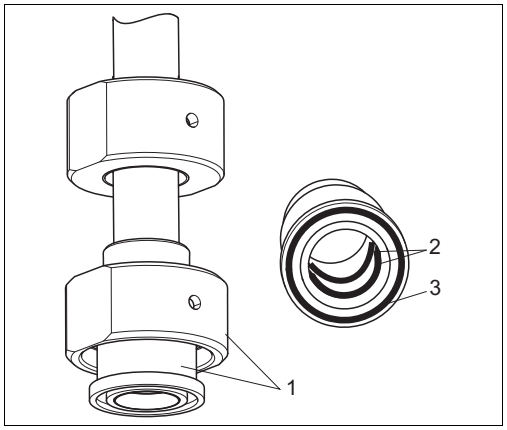
1. Take off the cable protection at the top of the assembly.
2. Remove the sensor holder from the assembly.
3. Remove the sensor from the sensor holder.
4. Lightly lubricate the O-rings.
5. Replace the O-ring (pos. 4, 10.69 x 3.53) and the thrust collar of the sensor.
6. Replace the inner (pos. 1, 10.69 x 3.53) and the outer O-rings (pos. 2, 18.72 x 2.62) of the sensor holder.
7. Screw the sensor back into the holder.

Replace the O-rings of the flanged sleeve



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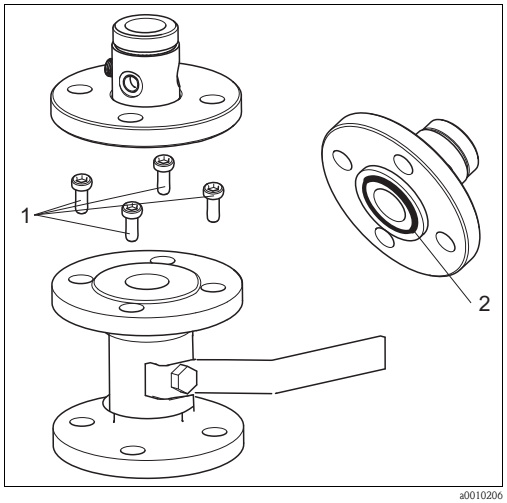
1. Lightly lubricate the O-rings.
2. Push the flanged sleeve together with the lock ring (pos. 1) from the immersion tube.
3. Replace the inner (pos. 2, 24.99 x 3.53) and the outer O-rings (pos. 3, 32.92 x 3.53).
4. Push the flanged sleeve and the lock ring back onto the immersion tube.

Replace the flat seal of the adapter for flanged process connections



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1. Lightly lubricate the seal.
2. Loosen the screws between the flange and the ball valve (pos. 1).
3. Remove the flange together with the adapter from the ball valve and replace the flat seal (Pos. 2, 59 x 50 x 2).
4. Screw the flange and the adapter back onto the ball valve and tighten all screws.

Reassemble the assembly

1. Screw the sensor holder back onto the immersion tube.
2. Install the cable protection.
3. Place the assembly body on the adapter and tighten the lock ring using a hook wrench.
4. Assembly versions without ball valve:
   – Insert the assembly to "Measuring" position.
   – **Check for leaks!**
   Assembly versions with ball valve:
   – Open the ball valve.
   – Insert the assembly to "Measuring" position.
   – **Check for leaks!**

7.3 Spare parts

7.3.1 Exploded view

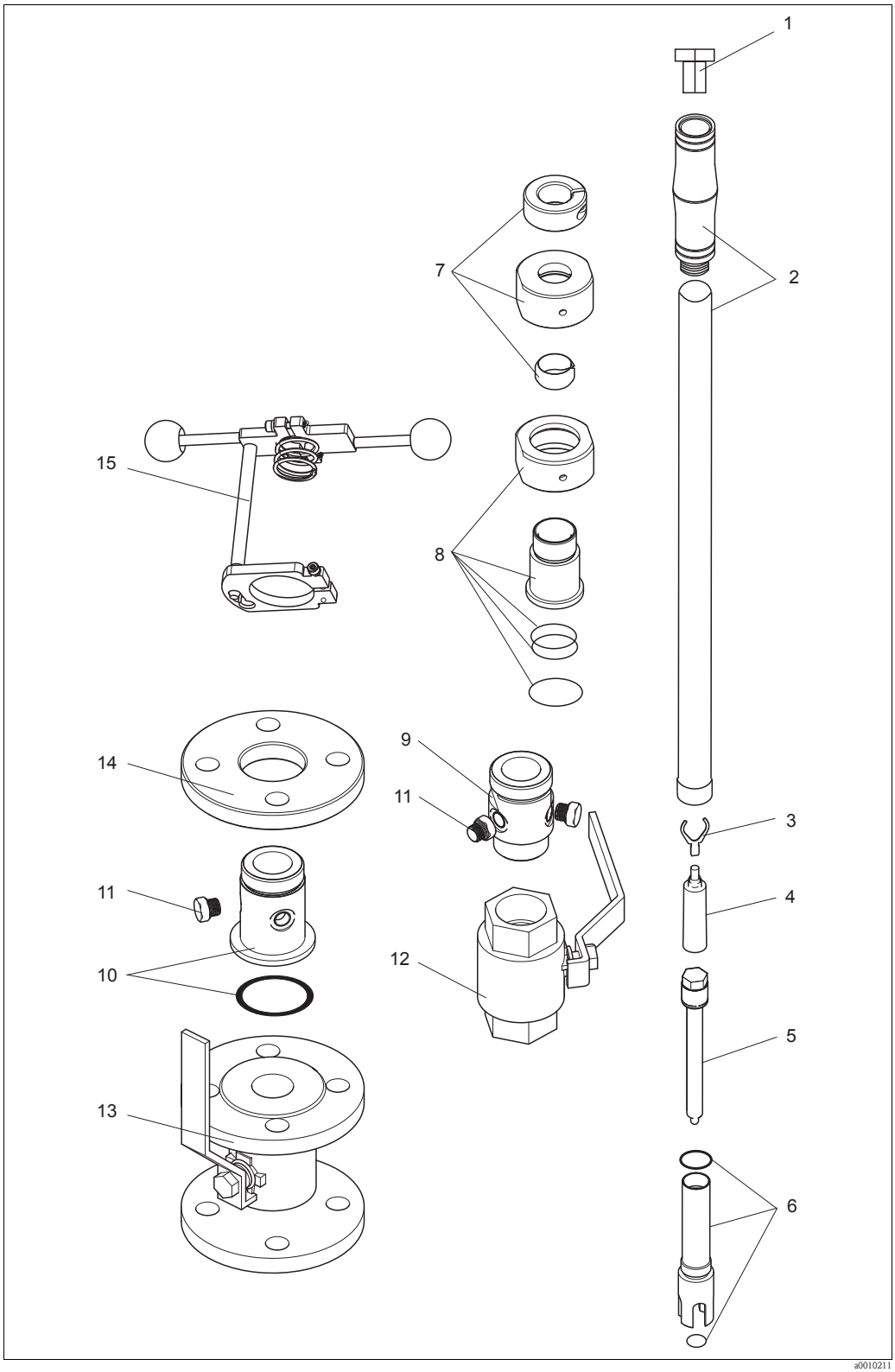

Fig. 12: Exploded view

7.3.2 Spare part kits

Pos. no.	Designation and content	Order number spare part kit
	Sealing set EPDM	50090489
	Sealing set FPM, Viton	50090490
	Sealing set FFKM, Kalrez	71028925
1	Cable gland, sleeve	51501523
2	Immersion tube 100 mm, 316L cable gland; old version up to 01/11	71069820
	Immersion tube 250 mm, 316L cable gland; old version up to 01/11	51501521
	Immersion tube 700 mm, 316L cable gland; old version up to 01/11	51501522
	Immersion tube 100 mm, 316L, stop lip, without hand grip, version starting 02/11	71128830
	Immersion tube 250 mm, 316L, stop lip, without hand grip, version starting 02/11	71128831
	Immersion tube 700 mm, 316L, stop lip, without hand grip, version starting 02/11	71128832
	Immersion tube 100 mm, Alloy C4, stop lip, without hand grip, version starting 02/11	71128833
	Immersion tube 250 mm, Alloy C4, stop lip, without hand grip, version starting 02/11	71128834
	Immersion tube 700 mm, Alloy C4, stop lip, without hand grip, version starting 02/11	71128836
	Immersion tube 100 mm, titanium, stop lip, without hand grip, version starting 02/11	71128837
	Immersion tube 250 mm, titanium, stop lip, without hand grip, version starting 02/11	71128838
	Immersion tube 700 mm, titanium, stop lip, without hand grip, version starting 02/11	71128839
	Hand grip with thread, 316L, with rubber grip (blue), incl. O-ring and cable protection, version starts 02/11	71128840
3	PMC potential matching mounting set	51517802
4	Cable coupling (part of cable)	
5	Sensor (not included)	
6	Sensor holder with EPDM O-rings	51517804
	Sensor holder with Viton O-rings	51517805
	Sensor holder with Kalrez O-rings	71028949
7	Setting collar, clamping ring, union nut	51501535
8	Flanged sleeve, lock ring stainless steel 316L; EPDM O-rings	51501536
	Flanged sleeve, lock ring stainless steel 316L, Viton O-rings	51501537
	Flanged sleeve, lock ring stainless steel 316L, Kalrez O-rings	71028947
	Flanged sleeve, lock ring Alloy C4, Kalrez O-rings	71128841
	Flanged sleeve, lock ring titanium, Kalrez O-rings	71128842
9	Adapter G 1¼ For assembly versions: – CPA450-xBxxx – CPA450-xFxxx – CPA450-xGxxx	51501538
	Adapter NPT 1¼" For assembly versions: – CPA450-xCxxx – CPA450-xHxxx	51501539

Pos. no.	Designation and content	Order number spare part kit
10	Adapter for flange EPDM For assembly versions: – CPA450-xDxxx – CPA450-xExxx – CPA450-xIxxx – CPA450-xKxxx	51501546
	Adapter for flange Viton For assembly versions: – CPA450-xDxxx – CPA450-xExxx – CPA450-xIxxx – CPA450-xKxxx	51501547
	Adapter for flange Kalrez For assembly versions: – CPA450-xDxxx – CPA450-xExxx – CPA450-xIxxx – CPA450-xKxxx	71028946
11	Locking screws for adapter (except assembly version CPA450-xAxxx)	51501540
12	Ball valve G 1¼, stainless steel 1.4408 (AISI CF-8M) For assembly version: – CPA450-xFxxx	51501541
	Ball valve G 1¼, stainless steel 1.4404 (AISI 316L) For assembly version: – CPA450-xGxxx	51501542
	Ball valve NPT 1¼", stainless steel 1.4408 (AISI CF-8M) For assembly version: – CPA450-xHxxx	51501543
13	Ball valve DN32 flange For assembly version: – CPA450-xIxxx	51501548
	Ball valve ANSI 1¼" flange For assembly version: – CPA450-xKxxx	51501549
14	Flange DN32 For assembly versions: – CPA450-xDxxx – CPA450-xIxxx	51501544
	Flange ANSI 1¼" For assembly versions: – CPA450-xExxx – CPA450-xKxxx	51501545
15	Locking device safety kit	71098681

7.4 Return

If the assembly needs repair, please contact your local representative and follow the instructions.
Before return assembly has to be cleaned.
Please use the original packaging, if possible.

Please enclose the completed "Declaration of de-contamination" (copy the second to last page of these Operating Instructions) with the packaging and the transportation documents.
No repair without completed "Declaration of de-contamination"!

7.5 Disposal

Dispose of ball valve, sensor holder and other components according to local regulations.

8 Technical data

8.1 Environment

Ambient temperature external to process	0 to 80 °C (32 to 176 °F)

8.2 Process

Process pressure	max. 12 bar at 100 °C (175 psi at 212 °F)) Caution! ■ The maximum advised pressure for assembly movement is 4 bar (58 psi)! ■ Consider the process conditions of the applied sensor!
Process temperature	-15 to 130 °C (5 to 266 °F) Caution! Consider the maximum process temperature of the sensor!
Pressure-temperature load curve	

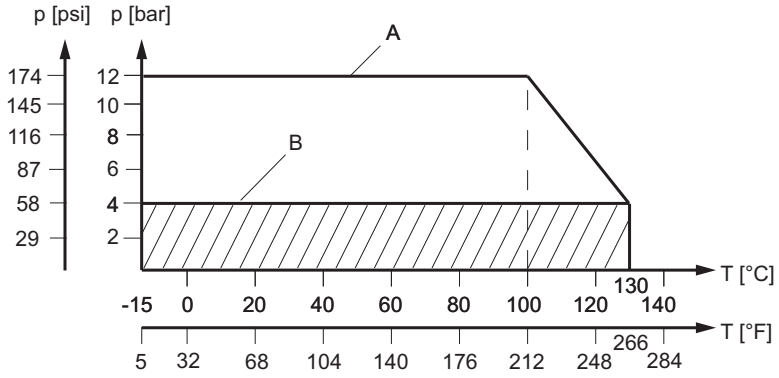

Fig. 13: Pressure-temperature diagram

A Maximum process operating pressure (static), only for completely installed assembly
B Advised upper insertion/retraction pressure (functional)

Note!
See also chapter "Installation notes - Process pressure"

8.3 Mechanical construction

Design, dimensions	see chapter "Installation"	
Weight	Without ball valve: With threaded ball valve: With flanged ball valve:	2 kg (4.4 lb.) 5 kg (11 lb.) 10 kg (22.1 lb.)
Materials (in contact with medium)	Immersion tube: O-rings: Ball valve: Ball valve sealings:	Stainless steel 316L EPDM / Viton / Kalrez Stainless steel 316L or CF-8M PTFE
Materials (not in contact with medium)	Screws: Compression fitting: Clamping ring: Handle: Cable protection:	Stainless steel 316 PA66GF PEEK PVC Thermoplastic elastomer (TPE)
Rinse connection	For material 316L: 3 x G ¼ For material Alloy C4 or titanium: 3 x NPT ¼"	

Index

Endress+Hauser

People for Process Automation

Declaration of Hazardous Material and De-Contamination
Erklärung zur Kontamination und Reinigung

RA No. ☐☐☐☐☐☐☐☐

Please reference the Return Authorization Number (RA#), obtained from Endress+Hauser, on all paperwork and mark the RA# clearly on the outside of the box. If this procedure is not followed, it may result in the refusal of the package at our facility.
Bitte geben Sie die von E+H mitgeteilte Rücklieferungsnummer (RA#) auf allen Lieferpapieren an und vermerken Sie diese auch außen auf der Verpackung. Nichtbeachtung dieser Anweisung führt zur Ablehnung ihrer Lieferung.

Because of legal regulations and for the safety of our employees and operating equipment, we need the "Declaration of Hazardous Material and De-Contamination", with your signature, before your order can be handled. Please make absolutely sure to attach it to the outside of the packaging.
Aufgrund der gesetzlichen Vorschriften und zum Schutz unserer Mitarbeiter und Betriebseinrichtungen, benötigen wir die unterschriebene "Erklärung zur Kontamination und Reinigung", bevor Ihr Auftrag bearbeitet werden kann. Bringen Sie diese unbedingt außen an der Verpackung an.

Type of instrument / sensor
Geräte-/Sensortyp _____

Serial number
Seriennummer _____

☐ Used as SIL device in a Safety Instrumented System / *Einsatz als SIL Gerät in Schutzeinrichtungen*

Process data/ *Prozessdaten*
Temperature / *Temperatur*_____ [°F] _____ [°C]
Conductivity / *Leitfähigkeit* _____ [µS/cm]
Pressure / *Druck* _____ [psi] _____ [Pa]
Viscosity / *Viskosität* _____ [cp] _____ [mm^2/s]

Medium and warnings
Warnhinweise zum Medium

	Medium /concentration *Medium /Konzentration*	Identification CAS No.	 flammable *entzündlich*	 toxic *giftig*	 corrosive *ätzend*	 harmful/ irritant *gesundheits-schädlich/ reizend*	 other * *sonstiges**	 harmless *unbedenklich*
Process medium / *Medium im Prozess*								
Medium for process cleaning / *Medium zur Prozessreinigung*								
Returned part cleaned with / *Medium zur Endreinigung*								

* explosive; oxidising; dangerous for the environment; biological risk; radioactive
* *explosiv; brandfördernd; umweltgefährlich; biogefährlich; radioaktiv*

Please tick should one of the above be applicable, include safety data sheet and, if necessary, special handling instructions.
Zutreffendes ankreuzen; trifft einer der Warnhinweise zu, Sicherheitsdatenblatt und ggf. spezielle Handhabungsvorschriften beilegen.

Description of failure / *Fehlerbeschreibung* _____

_____

_____

Company data / *Angaben zum Absender*

Company / *Firma* _____

_____

Address / *Adresse*

_____

_____

Phone number of contact person / *Telefon-Nr. Ansprechpartner:*

_____

Fax / E-Mail _____

Your order No. / *Ihre Auftragsnr.* _____

"We hereby certify that this declaration is filled out truthfully and completely to the best of our knowledge.We further certify that the returned parts have been carefully cleaned. To the best of our knowledge they are free of any residues in dangerous quantities."
"Wir bestätigen, die vorliegende Erklärung nach unserem besten Wissen wahrheitsgetreu und vollständig ausgefüllt zu haben. Wir bestätigen weiter, dass die zurückgesandten Teile sorgfältig gereinigt wurden und nach unserem besten Wissen frei von Rückständen in gefahrbringender Menge sind."

_____ (place, date / *Ort, Datum*)

_____ Name, dept./*Abt.* (please print / *bitte Druckschrift*)

_____ Signature / *Unterschrift*

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