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INSTRUCTION MANUAL

OilGuard 2 Ex

Fluorescence Measuring Instrument

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Contents

1 General user information

1.1 Terms used in this document (glossary)

Please refer to our website for specialist terms: www.photometer.com/en/glossary/

1.2 Purpose of the Instruction Manual

This Instruction Manual provides the user with helpful information about the entire life cycle of the OilGuard 2 Ex and its peripheral devices. Before commissioning the instrument, you should be completely familiar with the Instruction Manual.

1.3 Target group of the documentation

The Instruction Manual is intended for all persons who are responsible for the operation and maintenance of the instrument.

1.4 Additional documentation

DOC. NO.	TITLE	CONTENT
13005E	Brief Instructions	The most important functions and the servicing schedule.
13004E	Reference Manual	More sophisticated menu functions and worksteps for advanced users.
13118E	Data Sheet	Descriptions and technical data about the instrument.
13006E	Service Manual	Repair and conversion instructions for service engineers.
13166DEF	Declaration of Conformity	Compliance with the underlying directives and standards.
13167E	Service & Operating Manual VERSA-MATIC	Instruction Manual for pumps, only available in English.
12919DEF	Manual BVS 12 ATEX E 143	Description of the pressurized enclosure.

1.5 Copyright provisions

1.6 Document storage location

This document is part of the product. It should be stored in a safe place and always be close at hand for the user.

1.7 Order document

The most recent version of this document can be downloaded at www.photometer.com (first time registration required).
It can also be ordered from a SIGRIST representative in your country (→ Instruction Manual "Customer service information").

1.8 Proper use

The OilGuard Ex and its peripherals are designed for measuring mineral oil traces or other fluorescent materials in aqueous solutions.

1.9 User requirements

The instrument may be operated only by trained technical personnel who have read and understood the content of the Instruction Manual.

1.10 Declaration of conformity

Current technological principles were followed in designing and manufacturing the instrument. They comply with the applicable guidelines concerning safety and duty to take due care.

CE

EU: The measuring instrument meets all applicable requirements within the European Union (EU) for carrying the CE mark.

Please refer to the separate declaration of conformity for details. Section 1.4

1.11 Dangers when not used properly

DANGER!

Operation when not used properly.

Improper use of the instrument can cause injuries to persons, process-related consequential damage and damage to the instrument and its peripherals.

In the following cases the manufacturer cannot guarantee the protection of persons and the instrument and therefore assumes no legal responsibility:

- The instrument is used in a way not included in the described area of application.
- The instrument is not properly mounted, set up or transported.
- The instrument is not installed and operated in accordance with the Instruction Manual.
- The instrument has been operated with accessory parts which SIGRIST-PHOTOMETER AG has not expressly recommended.
- Improper changes to the instrument have been performed.
- The instrument has not been operated within the specifications, in particular concerning pressure and temperature.
- The instrument is exposed to vibrations, shocks or other mechanical forces.

1.12 Meaning of the safety symbols

All **danger symbols** used in this document are explained below:

DANGER!

Danger due to electrical shock that may result in serious bodily injury or death.

Non-observance of this notice may lead to electrical shocks and death.

EXPLOSION HAZARD!

Danger due to explosion that may result in serious bodily injury or death.

Non-observance of this notice may cause explosions resulting in serious property damage and death.

WARNING!

Warning about bodily injury or hazards to health with long-term effects.

Non-observance of this warning may lead to injuries with possible long-term effects.

CAUTION!

Notice about possible material damage.

Non-observance of this notice may cause material damage to the instrument and its peripherals.

1.13 Meaning of the pictograms

All **pictograms** used in this document are explained below:

	Additional information about the current topic.
	Practical procedures when working with the OilGuard 2 Ex.
	Manipulations on the touchscreen.
	The screenshot is an example and may differ from current device.

2 Instrument overview

2.1 Overview of OilGuard 2 Ex

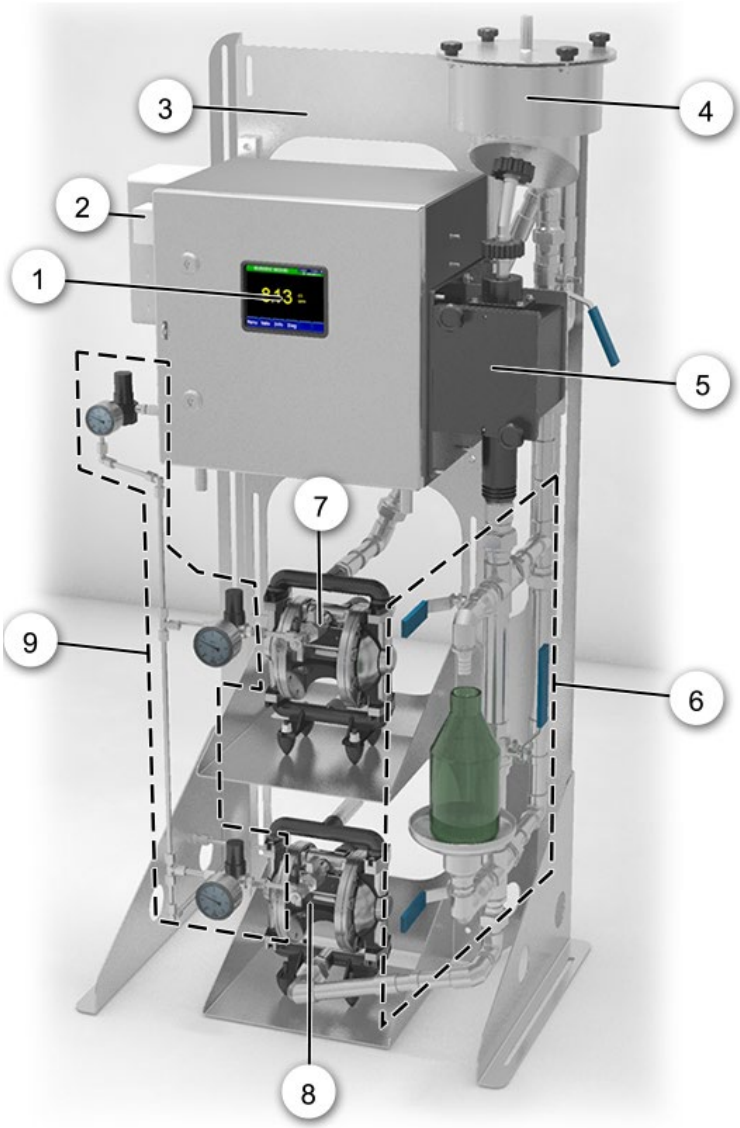


Figure 1: Instrument overview of OilGuard 2 Ex

①	OilGuard 2 Ex photometer with display (touchscreen)	②	Ex control unit
③	Large stand with adjustable pump brackets	④	Sample preparation system
⑤	Measuring cell housing	⑥	Sampling equipment
⑦	Sample feed pump	⑧	Sample return pump
⑨	Piping, compressed air for pump		

2.2 Designation of the OilGuard 2 Ex

The photometer is fitted with the following rating plate:

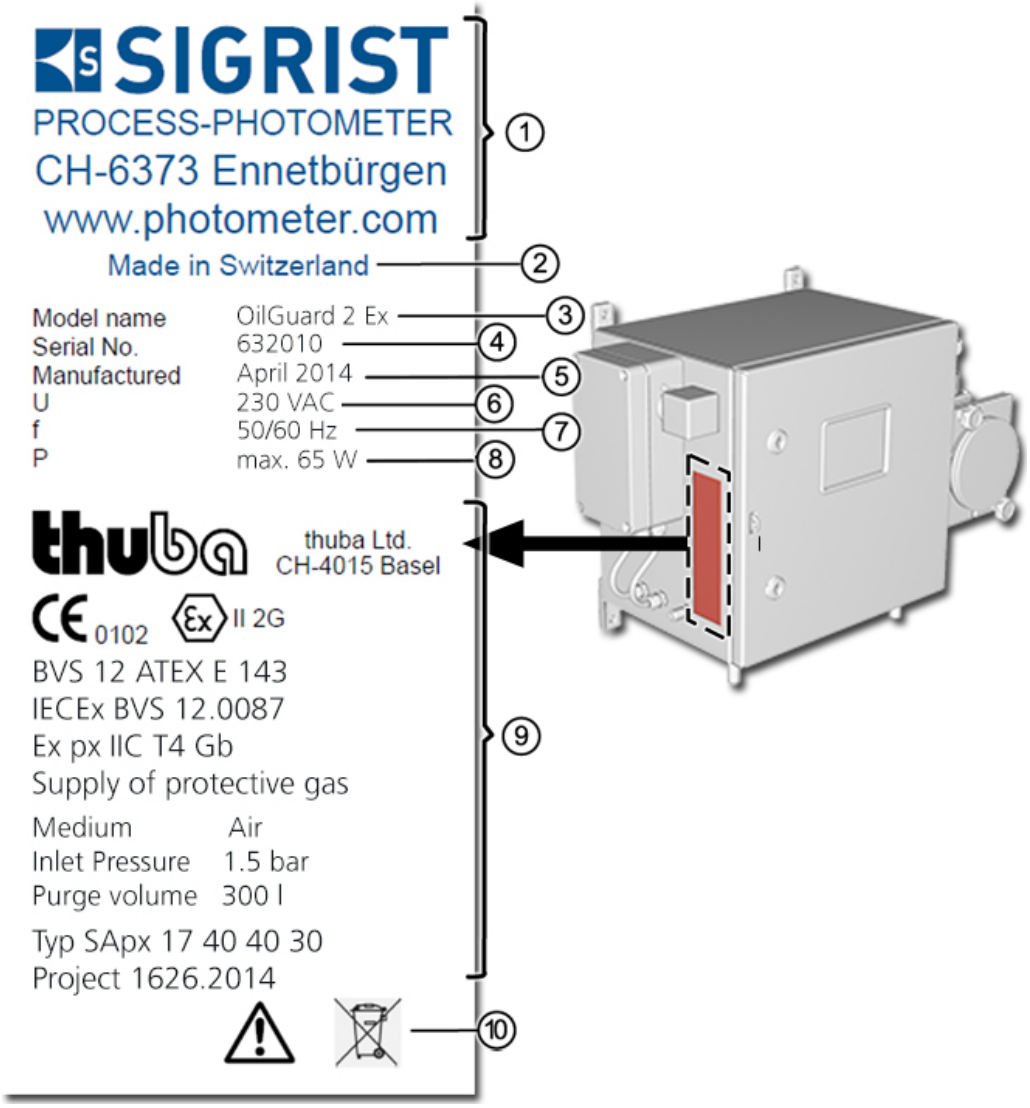


Figure 2: Rating plate on OilGuard 2 Ex

①	Manufacturer	②	Country of origin
③	Product name	④	Serial number
⑤	Date of manufacture	⑥	Service voltage
⑦	Frequency range	⑧	Power
⑨	For information on explosion protection from thuba, see the Manual 12919DEF (BVS 12 ATEX E143)	⑩	Pay attention to the Instruction Manual and disposal information

2.3 Scope of supply and accessories

Standard scope of supply for the OilGuard 2 Ex:

PCS.	Art. no.	Name	View	Variant
1	119552	Ex housing with photometer and integrated operating unit		230 VAC
1	119553			115 VAC
1	[1] 114427 [2] 114429 [3] 115801	Measuring cell [1] Closed measuring cell KPFL30 **or** [2] Free-fall measuring cell KPFLJ VA **or** [3] Free-fall measuring cell KPFLJC PVDF		
1	119075	Checking unit		

PCS.	Art. no.	Name	View	Variant
1	13003	Instruction Manual		German French English
1	13004	Reference Manual		German English
1	13005	Brief Instructions		German French English

Optional accessory parts:

PCS.	Art. no.	Name	View	Variant
1	119745	Sample preparation system for PVDF measuring cell		
1	119810	Sample preparation system for VA measuring cell (incl. piping for sample preparation, connecting pipe to free-fall measuring cell and short inlet pipe with thread)		
1	119815	Sampling kit		
1	119808	Sample feed pump (incl. pressure gauge, inlet pipe and valve)		
1	119809	Sample return pump (incl. pressure gauge, outlet pipe and valve)		
1	119922	Sample return pump (incl. piping if no sampling equipment is available)		

PCS.	Art. no.	Name	View	Variant
1	119816	Piping for compressed air on pump		
1	119805	Large stand		
1/2	119813	Pump bracket		Can only be used together with the stand.
1	119804	Wall bracket (incl. screws)		
1	114432	Cooling system		
1	118442	Interfaces pcb		Profibus DP
1	118445			Modbus RTU
1	119796			HART

2.4 Technical data

DATA	VALUES
Measuring principle	Fluorescence measurement
Measuring scope	0 .. 0.1 FLU / 0 .. 100 FLU
Measuring ranges	8 ranges (freely configurable for different types of oil)
Sample medium	Aqueous solutions with traces of mineral oil or other fluorescent materials
Resolution	± 0.5% (based on the quinine sulfate in the water)
Dimensions	For a detailed dimension sheet, see the Section 16
Reproducibility	± 2 % (based on the quinine sulfate in the water)
Warm-up time	At least 2 hours
Sensitivity	0.5 .. 5 ppm for mineral oils (depending on the oil)
Reaction time	< 2 secs (step response → limit switch)

OilGuard 2 Ex photometer:

DATA	VALUES
Service voltage	230 V; 50/60 Hz (100, 115, 130 V only with impedance matching transformer)
Power consumption	P = 65 W / S = 160 VA
Outputs	▪ 1 x 0/4 .. 20 mA, galvanically isolated up to max. 50 V relative to ground and max. 500 Ω burden ▪ 3 x digital outputs up to max. 30 VDC ▪ 2 x relay contacts with max. 250 VAC / max. 6 A
Inputs	4 x digital inputs up to max. 30 VDC
Interfaces	▪ Ethernet for operation/configuration via web browser ▪ Modbus TCP, SD card for logging, SW update, diagnostics ▪ Optional: Modules for Profibus DP, Modbus RTU, HART
Weight	About 43 kg
Protection class	IP 66
Explosion protection	Zone 1, Ex px ib IIC T4 Gb
Operation/display	¼ VGA with touch screen Resolution: 320 x 240 pixels with 5.7“ diagonals
Maximum operating altitude	2,000 m above sea level
Ambient temperature	-20 .. +40 °C (with optional cooling system up to +50 °C)
Ambient humidity	0 .. 100 % rel. humidity

DATA	VALUES
Sample pressure	See measuring cell
Housing material	Stainless steel 1.4404 / 316L
Quality of compressed air	Instrument air, ISO 8573-1:2010 [1:3:1]
Compressed air consumption	At least 1.5 bar, minimum flow rate during purging 54 l/min, consumption during operation 5.5 l/min

Closed flow cell KPFL30:

DATA	VALUES
Material	Stainless steel 1.4435 (316L)
Window material	Quartz and Borosilicate
Seals	Neoprene
Medium pressure	Max. 1 MPa (= 10 bar)
Medium temperature	Max. 100 °C
Sample flow	0.5 .. 2 l/min
Connections	∅ 12mm

Free fall flow cell KPFLJ VA:

DATA	VALUES
Material	Stainless steel 1.4435 (316L)
Window material	–
Seals	–
Medium pressure	Pressureless
Medium temperature	Max. 40 °C
Sample flow	5 .. 7 l/min (8 .. 25 l/min with sample preparation)
Connections	Inlet: ∅ 12mm / outlet: ∅ 35mm

Free fall flow cell KPFLJC PVDF:

DATA	VALUES
Material	PVDF
Window material	–
Seals	–
Medium pressure	Pressureless
Medium temperature	Max. 95 °C
Sample flow	5 .. 7 l/min
Connections	Inlet: ∅ 16mm / outlet: ∅ 50mm

3 General safety points

3.1 Dangers during normal use

DANGER!

Opening the photometer in potentially explosive areas.

Opening the photometer in potentially explosive areas can lead to an explosion.

- The instrument may be opened only after the service voltage has been interrupted and a period of at least ten minutes has elapsed.

DANGER!

Damage to the instrument or cabling.

A short circuit due to damaged cabling can lead to an explosion.

- The system may be operated only when the cables are undamaged.
- The system may be put into operation only if it has been properly installed or repaired.
- Carry out servicing according to the servicing schedule.

DANGER!

Operation with a defective Ex control unit.

A non-functional Ex control unit can lead to an explosion.

- The system may be operated only when the Ex control unit is working perfectly.
- Carry out servicing according to the servicing schedule.

DANGER!

Leaking Ex housing.

A leaking Ex housing can lead to an explosion.

- The system may be operated only when the pressure display shows overpressure according to Section 2.4.
- Carry out servicing according to the servicing schedule.

DANGER!

Damage to the instrument due to incorrect power supply.

The instrument may be damaged if it is connected to an incorrect voltage source.

- The instrument may be connected only to voltage sources as specified on the rating plate.

DANGER!

Instruction Manual missing when the instrument changes hands.

If the instrument is operated without knowledge of the Instruction Manual, then this can lead to personal injuries and damage to the instrument.

- If the instrument changes hands, always include the Instruction Manual.
- If the Instruction Manual is lost, you can request a replacement.
  Registered users can download the latest version at www.photometer.com.

CAUTION!

Escaping water from leaks on the instrument or water connections.

Escaping water can lead to flooding of the room and material damage to the building and fittings.

- Check that the inlet and outlet are not leaking.

CAUTION!

Moisture and condensation on electronic components during servicing duties.

The photometer may be damaged if moisture enters the inside of the instrument.

- Work inside the instrument may only be carried out in dry conditions. In doing so, the instrument should be at operating temperature or room temperature (avoid condensation on optical and electrical surfaces).

CAUTION!

Use of aggressive chemicals when cleaning.

The use of aggressive cleaning agents can lead to damage to the instrument components.

- Do not use aggressive chemicals or solvents when cleaning.
- If the instrument should come into contact with aggressive chemicals, then clean it immediately with neutral cleaning agents.

3.2 Residual risk

WARNING!

According to the risk assessment of the applied safety directive DIN EN 61010-1, there remains the risk of the displayed measuring values being incorrect. This risk can be reduced with the following measures:

- Use an access code to prevent unauthorized persons from changing parameters.
- Perform the specified servicing duties.

3.3 Warning and danger symbols on the instrument

WARNING!

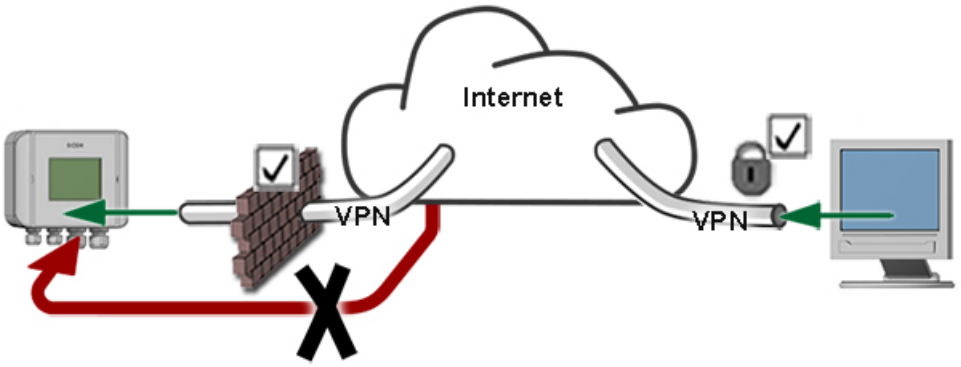
There are no warning or danger symbols on the instrument.

Users must ensure that they observe the safety measures as specified in the Instruction Manual at all times when working with the instrument and its peripheral equipment, even if no warning or danger symbols are attached to the instrument.

The following sections must be internalized:

- Section 1.8
- Section 1.11
- Section 1.12
- Section 3.1
- Section 3.2
- Observe safety pointers when performing the described procedures.
- Observe local safety pointers.

3.4 Preventing undesirable online access attempts



WARNING!

SIGRIST instruments are equipped with an integrated web user interface and Modbus TCP interface, thus offering state-of-the-art administration and control possibilities. However, if these are connected directly to the Internet, then any Internet user can in principle access your instrument and change the configuration.

Please note the following points to prevent this:

- Never connect the instrument directly to the Internet.
- Operate it behind a firewall and block access to the instrument.
- Only connect to branch offices via VPN.
- Change the standard password on commissioning.
- Always keep up to date with the latest changes regarding Internet security so that you can react promptly in the event of alterations.
- Install the latest updates immediately (also for the router and firewall).

4 Mounting

4.1 Location selection

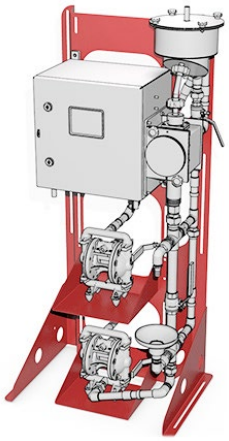
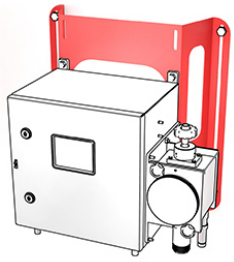
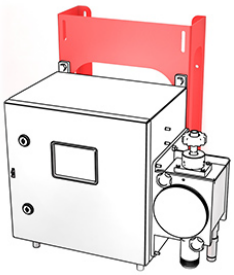
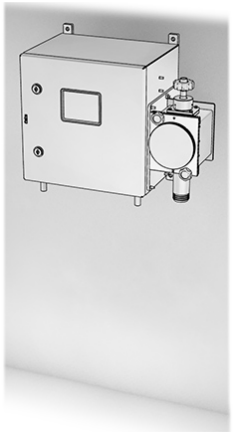
Note the following points for the operating location:

- The electrical supply must be ensured.
- The purging air/compressed air connection must be ensured.
- The sample feed must be ensured as described in the technical data.
- The drainage of water must be possible without obstructions.
- The system should not be exposed to direct sunlight during measurement as the measurement can be skewed by excessive external light.

4.2 Mounting variations

When fastening the mounting devices and mounting the photometer, refer to the corresponding **OILGUARD 2/IECEx/...-MB** dimension drawing.

SIGRIST-PHOTOMETER AG supports the following four mounting types:

Stand mounting	**Mounting with wall mount**	**Mounting with retrofit mounting kit**	**Direct wall mounting**
			
See dimension drawing: OILGUARD 2/IECEx/2-MB	See dimension drawing: OILGUARD 2/IECEx/4-MB	See dimension drawing: OILGUARD 2/IECEx/6-MB	See dimension drawing: OILGUARD 2/IECEx/1-MB
Suitable for systems with the following optional accessories: ▪ Sample preparation system ▪ Sampling equipment ▪ Sample feed pump ▪ Sample return pump ▪ Pump bracket	Suitable for systems with the following optional accessories: ▪ Sample preparation system ▪ Sampling equipment	For retrofitting with a sample preparation system. Suitable for systems with the following optional accessories: ▪ Sample preparation system ▪ Sampling equipment Holes for direct wall mounting can be used.	System without optional accessories.

4.3 Mounting the system

EXPLOSION HAZARD!

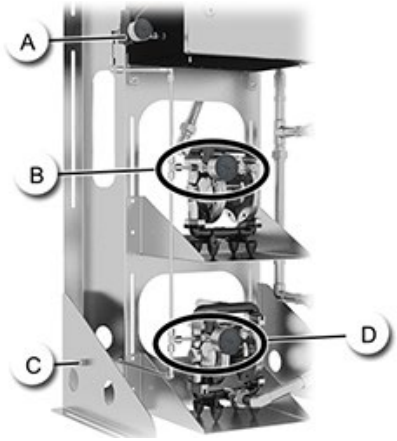
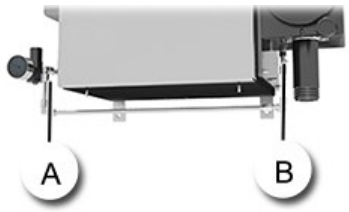
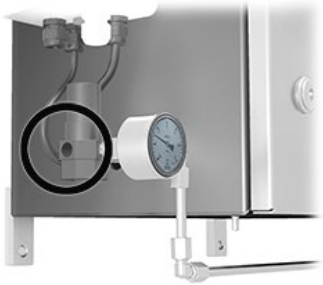
Explosion hazard due to static discharge of the pumps.

Static discharges can occur when the pumps are in operation. This can lead to explosions.

- The pumps must be connected to earth.

Ensure that a seal is always inserted in all screw connections on lines used for carrying samples.

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Open the packaging and check that the contents are complete.	Section 2.3
2.	Position the available mounting device and photometer horizontally and fasten them in place according to the dimension sheet, as detailed under Section 4.2.	If a cooling system is present, then fasten this onto the photometer first as detailed under Section 4.9.
3.	Install the supplied inlet pipe according to the separate chapter. This step does not apply to versions with the closed measuring cell KPFL 30.	▪ Free-fall measuring cell KPFLJ VA according to Section 4.8 ▪ Free-fall measuring cell KPFLJC PVDF according to Section 4.7
4.	Mount the optional sample feed pump according to the **OILGUARD 2/IECEx/2-MB** dimension sheet and Section 4.5.	
5.	Mount the optional sample preparation system to the available mounting device according to the **OILGUARD 2/IECEx/6-MB** dimension sheet and Section 4.4.	
6.	Mount the sample inlet on the inlet pipe of the measuring cell. If a sample preparation system and a free-fall measuring cell are present, then mount the connecting pipe (see figure) between the sample preparation system and the measuring cell inlet.	
7.	Mount the optional sampling equipment according to the **OILGUARD 2/IECEx/2-MB** dimension sheet.	The sampling equipment can be used with or without the sample preparation system.
8.	Mount the optional sample return pump according to the **OILGUARD 2/IECEx/2-MB** dimension sheet and Section 4.6.	

	WORKSTEP	ADDITIONAL INFO / IMAGES
9.	Connect the measuring cell to the outlet. If a sample return pump is present, then use the connecting pipe (see figure below). Section 2.3 	The connection of the sample return is dependent on the installed components. The following options are available: ▪ Direct connection to the discharge system ▪ Direct connection to the optional sample return pump ▪ Through the optional sampling equipment
10.	a) Connect the compressed air line on systems with optional pumps. The compressed air line is adjusted at the factory according to the components present and installed. The purging air for the Ex housing and compressed air for the pump are fed from the same source. ⚠ The compressed air is also used as purging air and should thus be clean, dry and oil-free (instrument air, ISO 8573-1:2010 [1:3:1]). A: Reducing valve for purging air on the Ex housing B: Compressed air connection for sample feed pump C: Main purging air/compressed air connection D: Compressed air connection for sample return pump	
	b) Connect the compressed air line on instruments without pumps.	
	Only carry out steps 1 and 2 if a free-fall measuring cell KPFLJC PVDF is present. 1. Connect the purging air line to the measuring cell KPFLJC PVDF (pos. B). 2. Connect the purging air line on the pressure regulator side (pos. A). 3. Connect the compressed air/purging air to the fittings (circle).	 

4.4 Mounting the sample preparation system (optional)

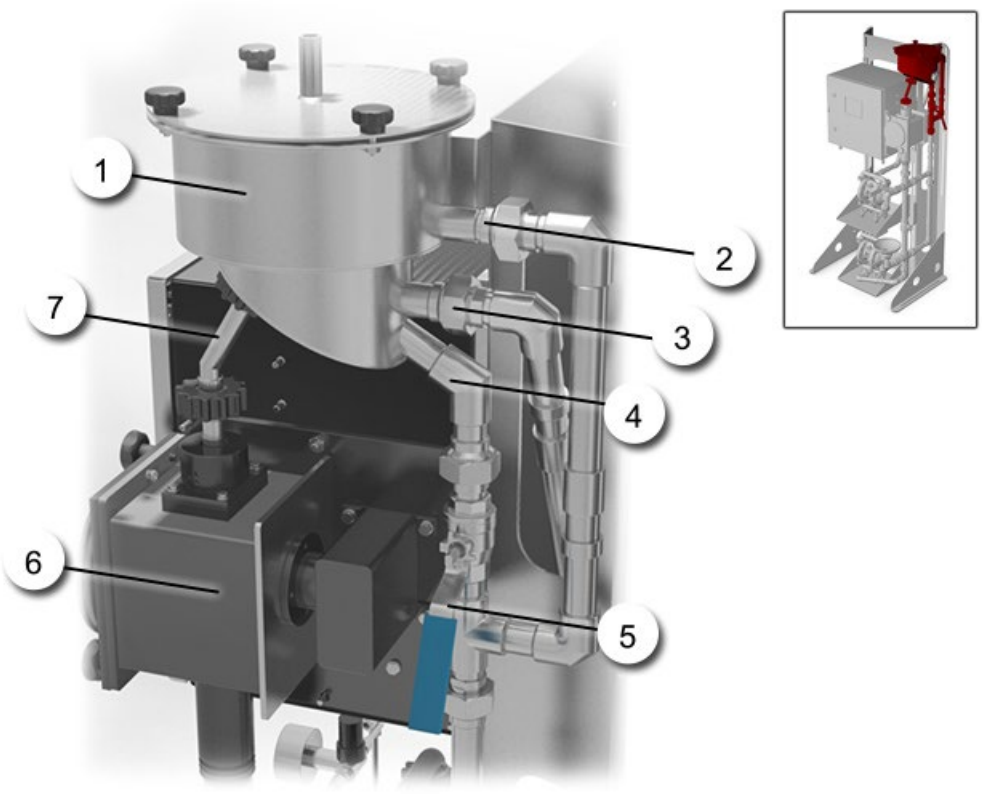
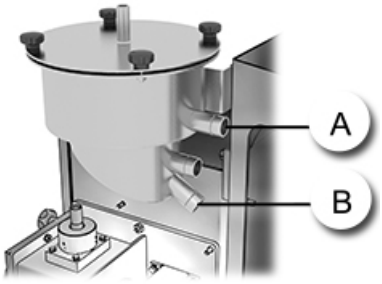


Figure 3: Overview of sample preparation system on OilGuard 2

①	Vessel for sample preparation	②	Overflow
③	Sample feed	④	Drain (sludge removal)
⑤	Drainage valve (sludge removal)	⑥	Measuring cell
⑦	Connecting pipe between sample preparation system and measuring cell		

For the montage of the sample preparation system according to the following process:

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Fasten the vessel for sample preparation (Figure 3, pos. 1) to the mounting device using the two screws (circle).	
2.	Connect the overflow (A) and sludge removal (B) to the sample preparation system. These connections may look different depending on the optional additional components used. Figure 3 shows the connection when using optional sampling equipment.	
3.	Connect the sample feed (Figure 3, pos. 3).	
4.	Mount the connecting pipe between the measuring cell and sample preparation system (Figure 3, pos. 7).	

4.5 Mounting the sample feed pump (optional)

EXPLOSION HAZARD!

Explosion hazard due to static discharge of the pumps.

Static discharges can occur when the pumps are in operation. This can lead to explosions.

- In potentially explosive areas, the pumps must be connected to earth.

A sample preparation system must always be in place when a sample feed pump is used. This is because the sample preparation system is used as a pulsation damper. Section 2.3

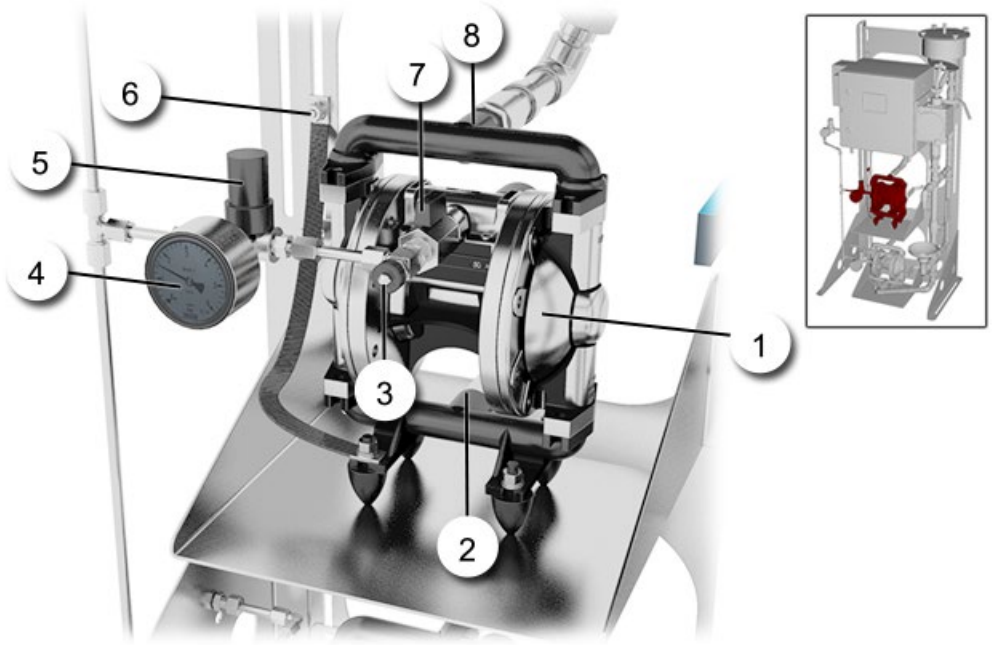
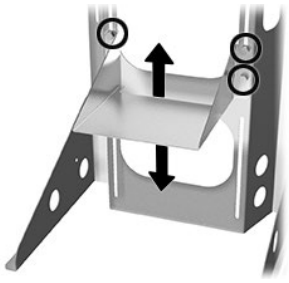
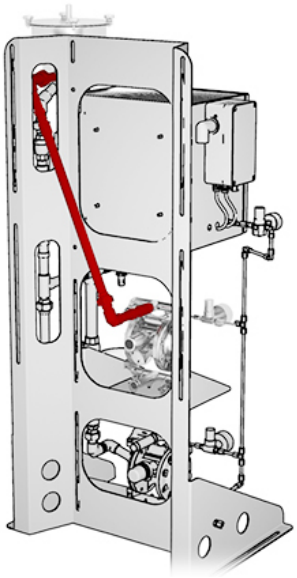
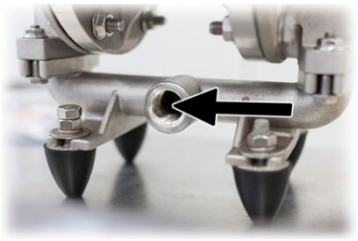
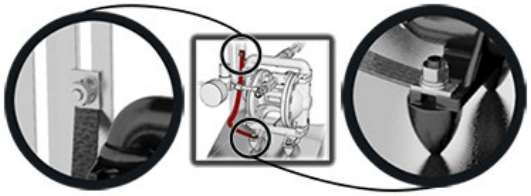


Figure 4: Sample feed pump

①	Sample feed pump	②	Pump inlet
③	Needle valve for fine adjustment of the pump cadence	④	Pressure display
⑤	Pressure reducing valve	⑥	Earth
⑦	Ball valve	⑧	Pump outlet

For the montage of the sample feed pump according to the following process:

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Preassemble the pump bracket on the stand using the four screws.	
2.	Position the pump on the top pump bracket.	
3.	Adjust the position of the pump by moving the pump bracket. Fix the pump bracket in place by tightening the screws (circles).	
4.	Mount the pump inlet pipe between the pump outlet (Figure 4, pos. 8) and the inlet on the sample preparation system.	
5.	Connect the sample feed to the pump inlet (Figure 4. pos. 2) (provided by the customer). The pump inlet nozzle is provided with an internal thread 1/2 "NPT (arrow).	
6.	Attach the earth (Figure 4, pos. 6) to the pump. The earth is fixed to the stand on one side and on the foot of the pump on the other. 	

4.6 Mounting the sample return pump (optional)

EXPLOSION HAZARD!

Explosion hazard due to static discharge of the pumps.

Static discharges can occur when the pumps are in operation. This can lead to explosions.

- The pumps must be connected to earth.

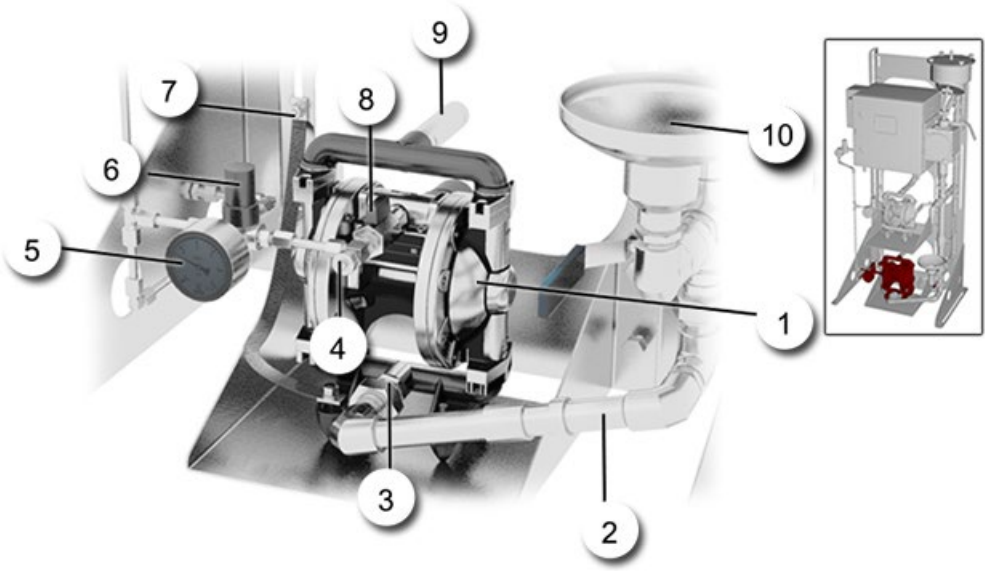
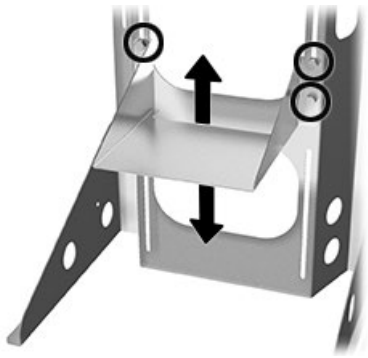
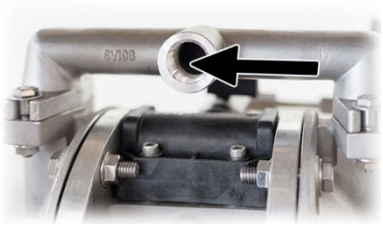
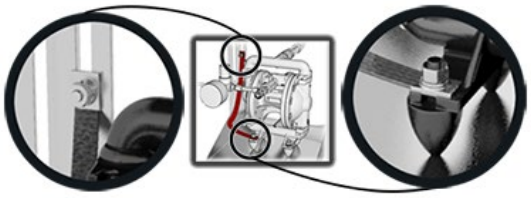


Figure 5: Sample return pump

①	Sample return pump	②	Tube to pump inlet
③	Pump inlet	④	Needle valve for fine adjustment of the pump cadence
⑤	Pressure display	⑥	Pressure reducing valve
⑦	Earth	⑧	Ball valve
⑨	Pump outlet	⑩	Sampling equipment

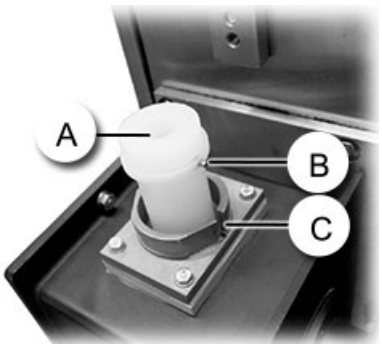
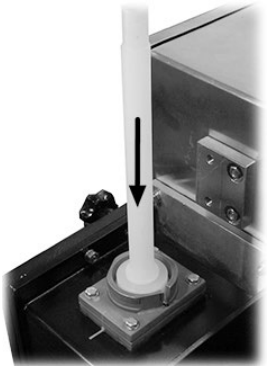
For the montage of the sample return pump according to the following process:

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Preassemble the pump bracket on the stand using the four screws.	
2.	Position the pump on the bottom pump bracket.	
3.	Adjust the position of the pump by moving the pump bracket. Fix the pump bracket in place by tightening the screws (circles).	
4.	Connect the separately delivered tubing (, pos. 2) to the pump inlet (Figure 5, pos. 3).	
5.	⚠ The sample retake has to be accomplished by the customer. For this action the pump output (Figure 5, pos. 9) must be used. The outlet connection is internally threaded with 1/2" NPT (arrow).	
6.	Attach the earth (Figure 5, pos. 7) to the pump. The earth is fixed to the stand on one side and on the foot of the pump on the other. 	

4.7 Mounting the inlet pipe on the free-fall measuring cell PVDF

Longer inlet pipes are used on measuring systems with no sample preparation system. Section 2.3

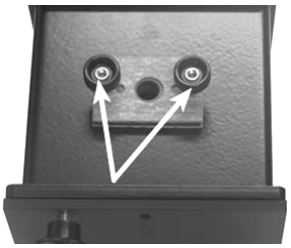
The following procedure describes the installation of the supplied inlet pipe. In the example provided, a long inlet pipe is used. The procedure is the same if a short inlet pipe is used.

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Insert the protective pipe (A) from above into the measuring cell housing. The pin on the protective pipe (B) must be inserted in the slot on the measuring cell housing (C).	
2.	Insert the inlet pipe (arrow) into the protective pipe.	
3.	Guide the lock nut over the inlet pipe and fix it into place with a small turn clockwise (bayonetlock).	

4.8 Mounting the inlet pipe on the free-fall measuring cell VA

Longer inlet pipes are used on measuring systems with no sample preparation system. Section 2.3

The following procedure describes the installation of the supplied inlet pipe. In the example provided, a long inlet pipe is used. The procedure is the same if a short inlet pipe is used.

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Remove the two locking screws (arrows).	
2	Insert the shorter end of the inlet pipe (A) from above into the measuring cell housing.	
3.	Fix the inlet pipe in place by tightening the two locking screws (arrows of step 1).	

4.9 Mounting the cooling system (optional)

The following procedure describes the mounting process for the optional cooling system. This must be made before mounting the photometer at the measurement position.

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Position the cooling system on the bolts on the rear of the photometer and fasten in place with the four nuts. Ensure that the cooling water connections are positioned at the top and bottom. A = Cooling water feed at bottom B = Cooling water return at top	
2.	Mount the photometer onto the mounting device with the four supplied spacer bolts according to Section 4.2.	
3.	Connect the cooling water to the feed and return connections. ∅ Internal pipe diameter = 10 mm The water flow must be at least 1 liter/min. Max. pressure = 500 kPa (5 bar).	
4.	The cooling water feed can now be opened.	
5.	Proceed with assemble according Section 4.3, step 3.	

5 Electrical installation

EXPLOSION HAZARD!

Operation of devices without explosion protection in potentially explosive areas.

The operation of components without the appropriate explosion protection in potentially explosive areas can lead to explosions.

5.1 Safety pointers for the electrical connection

DANGER!

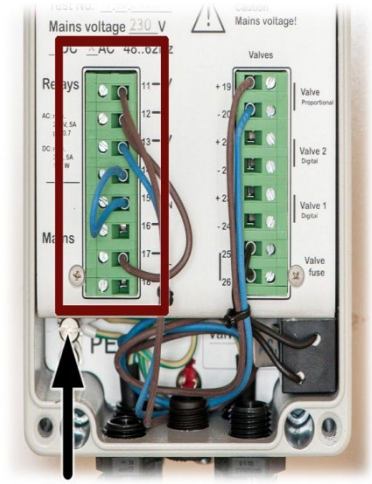
Connecting the service voltage.

Improper connection of the service voltage can be potentially fatal. The instrument may also be damaged. Local regulations for electrical connection must be observed at all times.

Further, the following basic principles must be observed:

- Consult the documentation for the Ex-P system before carrying out the electrical installation.
- Because the instrument has no main switch, a suitable disconnection device (switch, plug) should be installed near the service voltage. It must be designated and easily accessible.
- It is imperative that the protective conductor is connected.
- The instrument must not be charged with voltage until the installation is completed and the door is closed.
- A back-up fuse with a max. tripping current of 16 A must be present. The cables must be able to withstand this load.
- If faults cannot be remedied, the unit must be put out of operation and protected against inadvertent operation.

5.2 Connecting the mains voltage to the Ex control unit

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Loosen the four screws (circles) and remove the cover on the Ex control unit.	
2.	Loosen the left cable gland (circle) and feed the mains cable into the Ex control unit.	
3.	Connect the power supply to the terminals according to the following table. **Terminals** / **Function** 18 (L) / Phase 16 (N) / Neutral PE / Protective earth (arrow)	
4.	Tighten the cable gland.	
5.	Close the Ex control unit.	

5.3 Opening and closing the door on the OilGuard 2 Ex

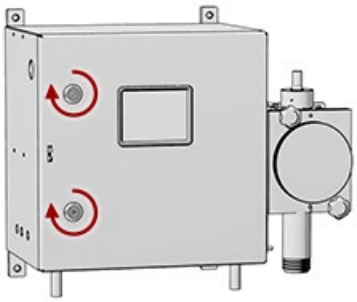
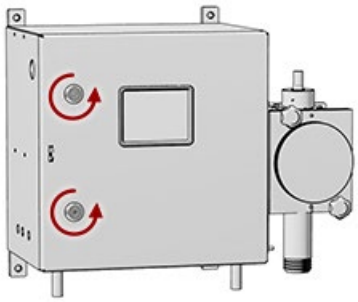
DANGER!

Opening the photometer in potentially explosive areas.

Opening the photometer in potentially explosive areas can lead to an explosion.

- The instrument may be opened only after the service voltage has been interrupted and a period of at least ten minutes has elapsed.

The OilGuard 2 Ex has two locks on the door. A special key is required for opening and closing the door.

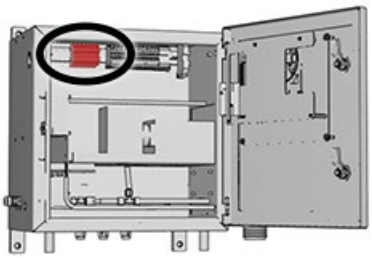
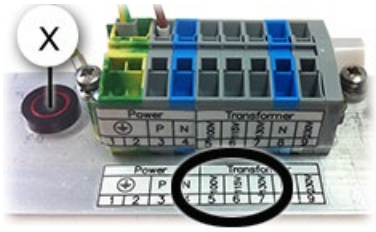
Opening the OilGuard 2 Ex	Closing the OilGuard 2 Ex
Insert the special key in the locks and turn **clockwise**. 	Insert the special key in the locks and turn **counter-clockwise**. 

5.4 Adjusting the mains voltage on 115 VAC instruments

An impedance matching transformer is integrated in instruments that are rated to 115 VAC. Using this transformer, the input voltage can be adjusted to the actual mains voltage of 100, 115 or 130 V.

The terminal is only integrated, if the OilGuard 2 was ordered for 115 Volts.

Proceed as follows to adjust the mains voltage:

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Open the door of the photometer according to Section 5.3.	
2.	Insert the wire coming from the fine-wire fuse (X) into the corresponding terminal (100 V, 115 V or 130 V).  Terminal position (circle).	 110, 115 or 130 V can be set on the terminal block for fine tuning. The wire is inserted in the 115 V terminal as standard.

5.5 Connecting the lines for data transmission

The use of operating signals is described in the Reference Manual.

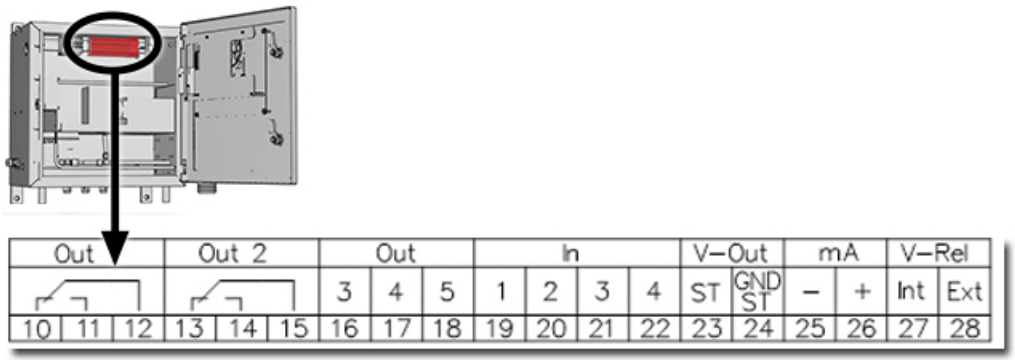
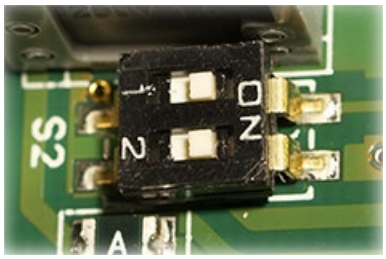


Figure 6: Terminal block

Establish the electrical connections in the following sequence:

	Terminal	Meaning	Reference
1.	10 .. 12	Relay output 1	The relay outputs can be freely configured according to the Reference Manual.
	13 .. 15	Relay output 2	
	16 .. 18	Digital outputs	→ Reference Manual
	19 .. 22	Digital inputs	→ Reference Manual
	23 - 24	Internal power supply for operating signals	The DIL switch (arrow) must be **ON**.  The DIL switch is found on the NG_Bedi-Print in the door. → Reference Manual
	25 - 26	Current output	0/4 .. 20 mA, max. burden 500 Ω If not used, then these terminals must be short-circuited with a jumper.
2.	27 - 28	Relay power supply	→ Reference Manual

6 Commissioning

The initial start-up of the web user interface via the Ethernet interface is described in the Reference Manual. If malfunctions occur, consult the Section 10.

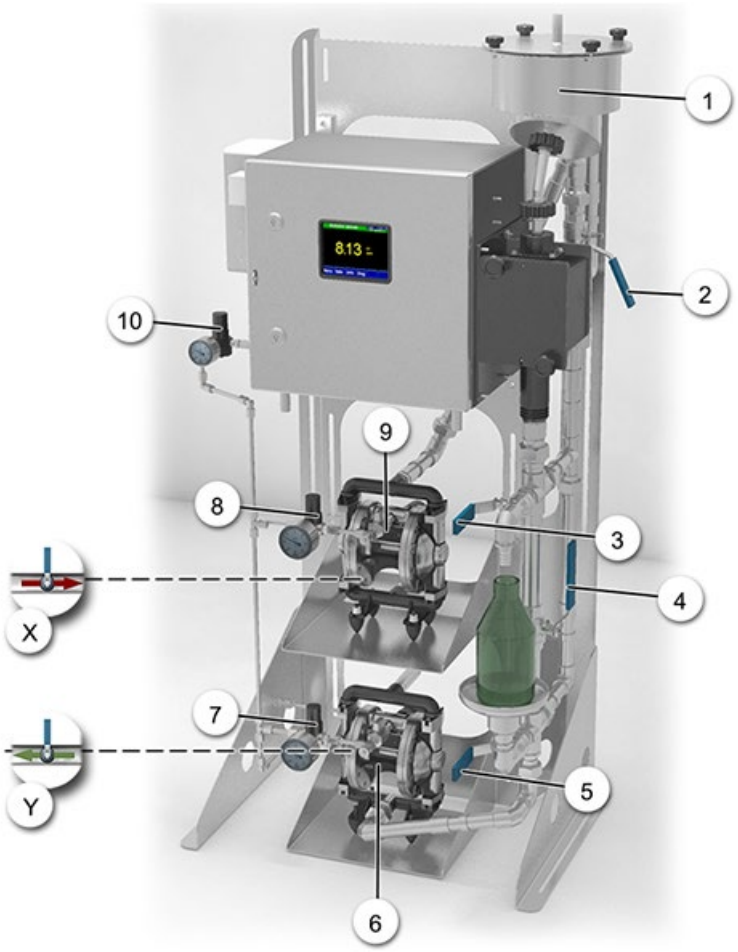
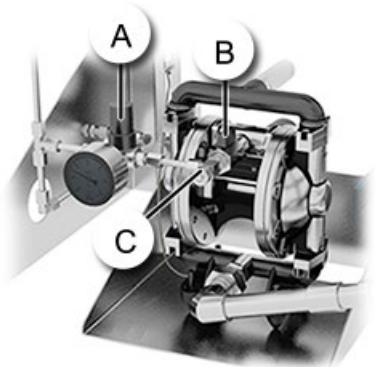
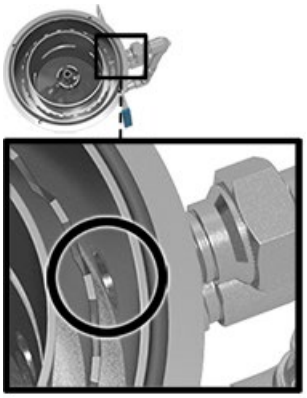
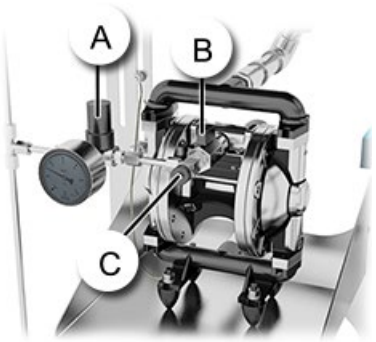


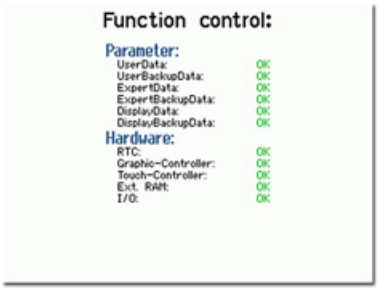
Figure 7: Overview of OilGuard 2 Ex for commissioning

①	Optional sample preparation system	②	Valve for draining the sample preparation system
③	Valve for optional sampling equipment	④	Valve for sample retention/valve for outlet
⑤	Valve for outlet	⑥	Optional sample return pump
⑦	Pressure reducing valve for compressed air on sample return pump	⑧	Pressure reducing valve for compressed air on sample feed pump
⑨	Optional sample feed pump	⑩	Pressure reducing valve for purging air
X	Inlet valve at customer Section 4.5	**Y**	Outlet valve at customer Section 4.6

Proceed with the initial start-up in accordance with the following table:

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Check whether all components are correctly mounted and connected.	Section 4
2.	If pumps are present, then check that they are connected to earth.	
3.	Remove the cover on the measuring cell and check that the optics are clean.	Section 9.4, Section 9.6 and Section 9.7
4.	**Ensure that the sample return is in place.**	
	4.1: Open the outlet valve at the customer (Figure 7, pos. Y).	
	4.2: Fully open the needle valve (C) on the pump.	
	4.3: Fully open the ball cock (B) on the pump.	
	4.4: Open the pressure reducing valve (A) slowly until the pump starts to operate minimally.	
	4.5: Increase the pressure on the pressure reducing valve (A) by 0.5 bar.	
	4.6: Carry out fine tuning of the pump output on the needle valve (C) in order to optimize the air consumption of the pump.	
5.	If optional sampling equipment is present, then open the outlet valve here (Figure 7, pos. 5).	
6.	**6 a) Setting up the sample feed without a pump.**	
	6.1 a: If an optional sample preparation system is present (Figure 7, pos. 1), then remove the cover here.	
	6.2 a: Ensure that the drainage valve is closed (Figure 7, pos. 2).	

	WORKSTEP	ADDITIONAL INFO / IMAGES
	6.3 a: Open the inlet valve at the customer (Figure 7, pos. X) for the sample feed. 6 to 7 liters / minute.	
	6.4 a: If an optional sample preparation system is present (Figure 7, pos. 1), then increase the feed until it overflows.	
	6 b) Setting up the sample feed with a pump.	
	6.1 b: Remove the cover on the sample preparation system (Figure 7, pos. 1).	A sample preparation system (Figure 7, pos. 1) must be in place when a sample feed pump is used.
	6.2 b: Ensure that the drainage valve is closed (Figure 7, pos. 2).	
	6.3 b: Open the main valve for the sample feed at the customer.	
	6.4 b: Fully open the needle valve (C) on the pump.	
	6.5 b: Fully open the ball cock (B) on the pump.	
	6.6 b: Open the pressure reducing valve (A) slowly until the sample preparation system overflows.	
	6.7 b: Increase the pressure on the pressure reducing valve (A) by around 0.2 bar.	
	6.8 b: Carry out fine tuning of the overflow in the sample preparation system on the needle valve (C) of the pump.	
7.	Reattach the cover on the measuring cell.	
8.	Reattach the cover on the sample preparation system.	
9.	If optional sampling equipment is present, then close the outlet valve here (Figure 7, pos. 5).	

	WORKSTEP	ADDITIONAL INFO / IMAGES
10.	Establish the service voltage to the system.	
11.	11.1: Set the purging air to 1.5 bar on the pressure reducing valve (Figure 7, pos. 10). The purging process begins. After the purging process is completed, the instrument is switched on as follows:	
	11.2: The welcome screen appears. The factory setting language is English. Accordingly, the displayed language during the initial start-up is English.	
	11.3: The instrument carries out an internal functional check.	
	11.3: The instrument is ready for measurement.	
12.	Set the operating language.	Section 8.1
13.	Set the current outputs.	Section 8.2
14.	Set the limits.	Section 8.3
15.	Set the inputs.	Section 8.5
16.	Set the outputs.	Section 8.4
17.	Set the date and time.	Section 8.6
18.	Enter the access code.	Section 8.7
19.	Copy the configured data to the microSD card.	Section 8.8

7 Operation

7.1 Operation basics

In this document we describe the practical examples only for the first steps of the menu configuration. All other setting options are described in the Reference Handbook. Operation using the web user interface is described in detail in the Reference Manual.

The instrument has a touchscreen. It is operated by touching with your finger. The navigation elements change color when touched.

CAUTION!

Sensitive touchscreen.

The touch screen can be damaged through improper handling. Damage can be avoided with the following measures:

- Touch the touchscreen only with your fingers and not with sharp objects.
- Use only slight pressure to perform manipulations on the touchscreen.
- Do not use chemicals or solvents to clean the touchscreen.

7.2 Control elements in measuring operation

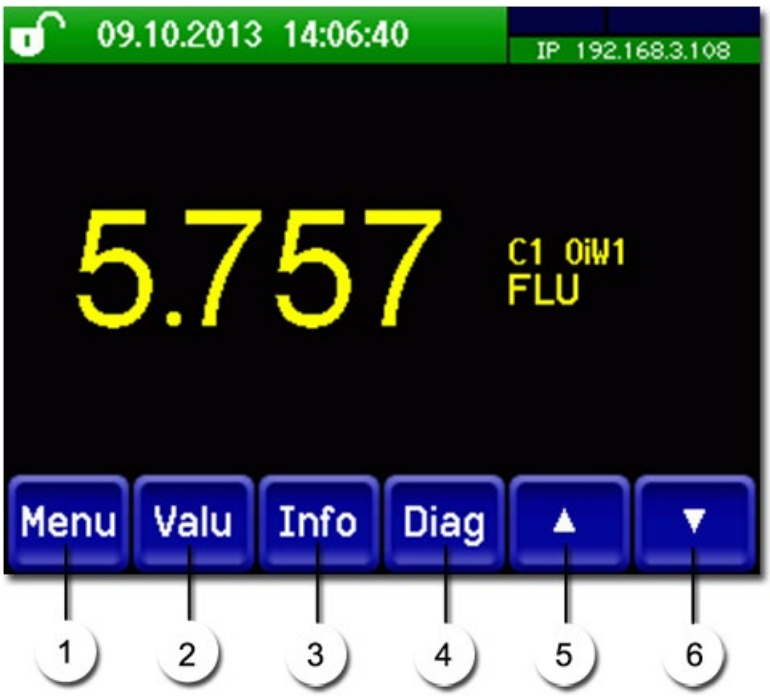


Figure 8: Control elements in measuring operation

①	**Menu** button Calls up the menu structure. Section 7.3	②	**Valu** button Numerical representation of the measuring values. Section 7.4
③	**Info** button Displays the information screen. Section 7.5	④	**Diag** button Graphical representation of the measuring values. Section 7.6
⑤	**Up arrow** Goes to the previous page.	⑥	**Down arrow** Goes to the next page.

7.3 Menu button

Pressing the **Menu** button and entering the access code takes you to the menu structure. Now the instrument is in service operation. Operator prompting in service operation is described in Section 7.10.

7.4 Valu button

Pressing the **Valu** button displays the measuring values in numerical form. This is described in detail in Section 7.8.

7.5 Info button

When you press the **Info** button, a general overview of the instrument settings appears. These are described below:

7.5.1 Page 1, Info button

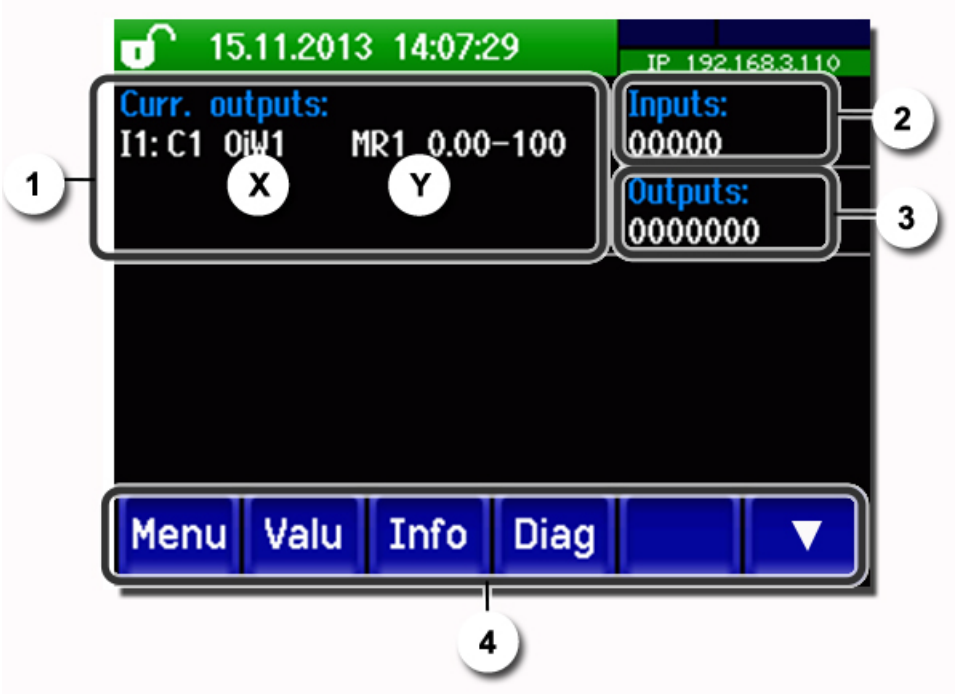


Figure 9: Info display

①	Information about the current outputs Standard I1 .. I4 (with additional print I1 .. I8) X: Source of the current output Y: Measuring range of the current output	②	Status of the inputs → Reference Manual
③	Status of the outputs → Reference Manual	④	Main menu buttons

7.5.2 Page 2, Info button

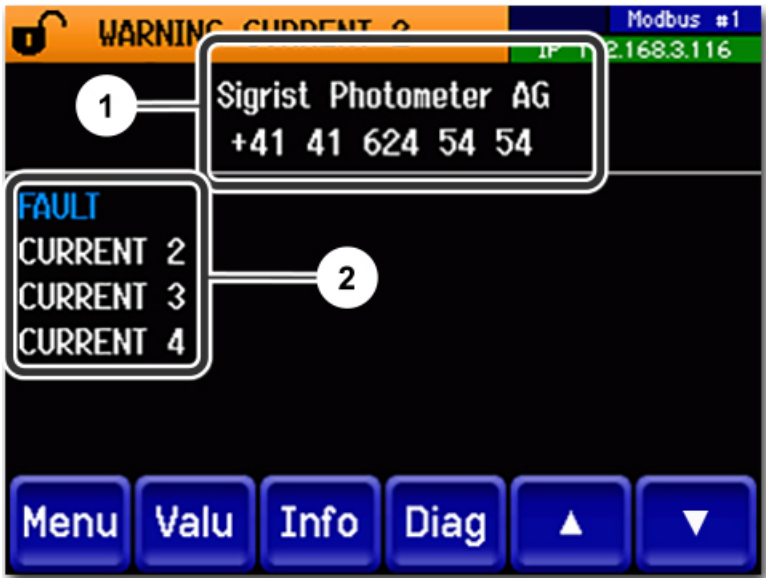


Figure 10: Info screen, page 2

①	Contact information	②	Display of up to 5 pending fault messages

7.6 Diag button

When you press the **Diag** button, a diagram appears which graphically shows the measuring values over a certain period of time.

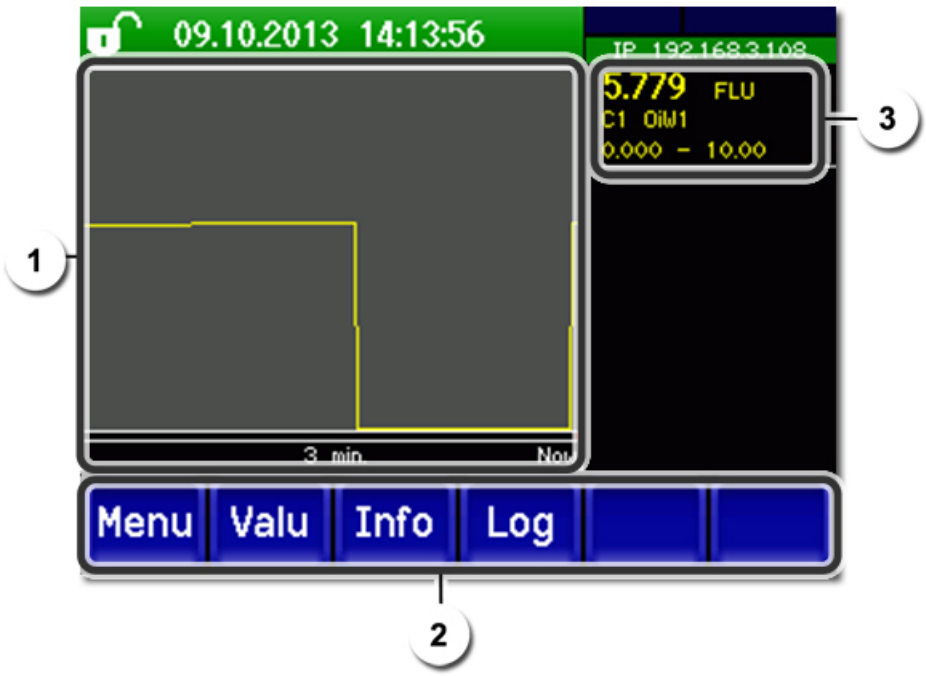


Figure 11: Graphic representation of the measuring values

①	**Graphic representation of the measuring value** The measuring value can be recorded from 3 minutes to 32 days and be graphically represented.	②	**Main menu buttons** The logger functions (Log button) are described in Section 7.7
③	**Measuring channels:** Numerical representation of the set measuring channels. ▪ Current measured value (e.g. 5,808 FLU). ▪ Measuring channel with name (e.g. C1 OiW1). ▪ Scaling of the Y-axis (e.g. 0.000 to 10.00).		

7.7 Functions of the log screen (Log button)

The screen logger works independently of the data logger, which is set in the **Logger** menu and writes to the microSD card.

The screen logger records the data of the last 32 days in one-minute intervals. The data can be called up from the Log menu.
If the instrument is out of operation for more than 32 days, the logger data is restarted. An hourglass is shown for about 1.5 minutes in the graphic display. During this time, no logger data is available.

The **Log** button is found only in the main menu in the graphic screen; in the **Valu** screen, the **Diag** button has to be pressed first. When the **Log** button is pressed, the following screen appears:

Figure 12: Functions of the Log display

①	The cursor shows the time position which is represented at pos. 4. The cursor position can be changed either by briefly touching with your fingertip or by pressing the </> buttons.	②	Represented time period The following time ranges can be set: 3 min./15 min./1 hour/ 3 hours/9 hours/1 day/3 days/10 days/ 32 days
③	The red bar indicates how much of the total time period is currently represented.	④	Measuring value which was measured at the cursor position.
⑤	**</>**: Moves the cursor position. The cursor moves faster when these buttons are held down longer. **<</>>**: Jumps forward or backward by the time period set in point 2. **-/+**: Increases (+) or decreases (-) the screen section around the cursor position.		

In the **Display/General** menu, you can define whether minimum, maximum or mean values are to be displayed. → Reference Manual
Pressing the Diag button takes you to the graphical representation.

7.8 Displays in measuring operation

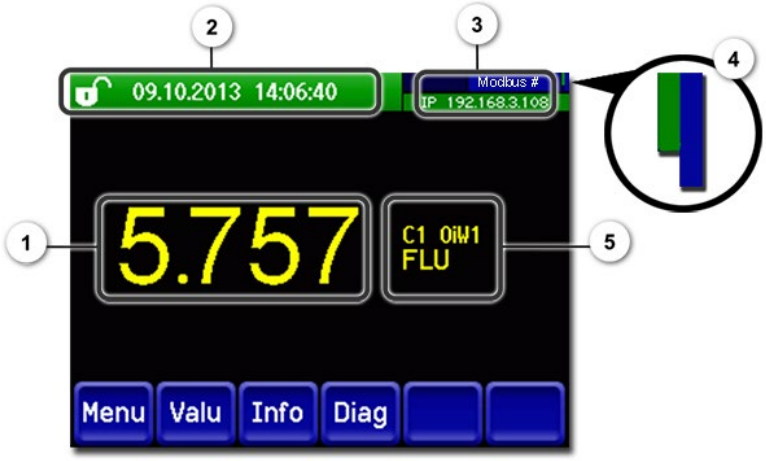
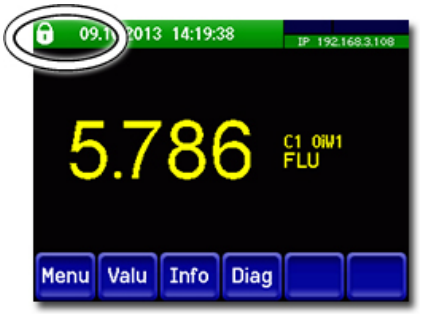
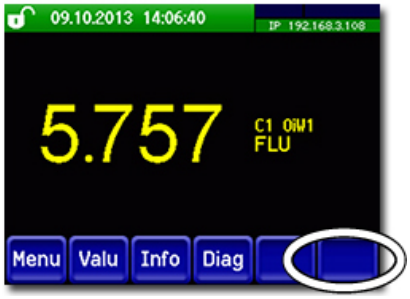


Figure 13: Displays in measuring operation

①	**Measuring value(s)** For values which are greater than the maximum measuring range, no measuring value is displayed; instead, ******** is displayed.	②	**Status line** In measuring operation, the status line is green and shows the date and time. If faults should occur, warning and fault messages are shown and the status line changes to orange or red.
③	**Interface information** ▪ Top left: Logger status ▪ Top right: Modbus, HART or Profibus status ▪ Below: Ethernet IP status The following messages are possible: - IP not connected (cable not connected) - IP DHCP running… - IP 169.254.1.1 (example) Color coding: Black – Not active / not present Blue – Activated, in quiescent mode Green – Active Red – Fault	④	**Touchscreen info** Display for indicating the functionality of the touchscreen ▪ The smaller bar on the left is green when there is a connection to the touchscreen controller (in the event of a fault, this bar is red). ▪ The larger bar on the right changes color from blue to green with each detected press of a button. If this bar continuously changes color, this indicates a pressure spot on the touchscreen. Please contact the service center (Section 11).
⑤	**Channel name with unit** The channel names shown in the figure are examples and can be adjusted individually.		

7.9 Lock / unlock the touch screen

	MANIPULATION	
1.	Press the lock icon top left.	
2.	Within one second press the key bottom at the outside right. Depending on the initial state, the lock icon changes as follows:  Touch screen unlocked  Touch screen locked	

7.10 Switching to service mode

The system is configured in service operation. The measuring procedure is interrupted and the main menus appear on the display. Service operation is accessed as follows:

	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the **Menu** button.	
2.	Set the access code and confirm with **OK**.	Factory setting is **0**.
3.	The main menus appear.	The instrument is now in service operation.

The following applies in service operation:

- * The measuring values remain on the last values on the digital interfaces.
- * Depending on the configuration, the current outputs go to 0/4 mA or remain on the last measuring values.
- The limits are deactivated.
- If an output for service is programmed, it is activated.
- Fault messages are suppressed.

* This does not apply when the **Current outputs\General\For service** parameter is set to **Measure**.

For measuring operation, press the **Meas** button. When switching from service operation to measuring operation, an hourglass appears in the information bar for about 10 seconds. The measuring values are frozen during this time.

7.11 Control components in service mode

7.11.1 Input elements in service mode

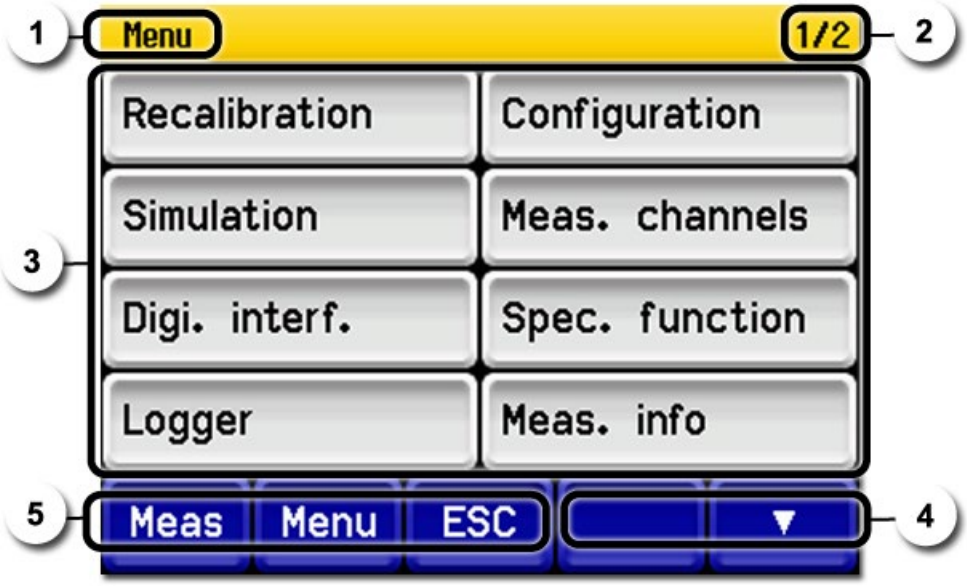


Figure 14: Input elements in service mode

①	Path specification	②	Page number / total number of pages
③	Main menus Instrument-specific menus of the photometer.	④	Next page
⑤	**Meas** button: The instrument changes to measuring operation. **Menu** button: The display goes back to mean menus and remains in service mode. **ESC** button: The display goes back one level in the menu hierarchy until the measuring mode finally is reached.		

7.11.2 Numerical entry

The following screen is for entering numbers and data:

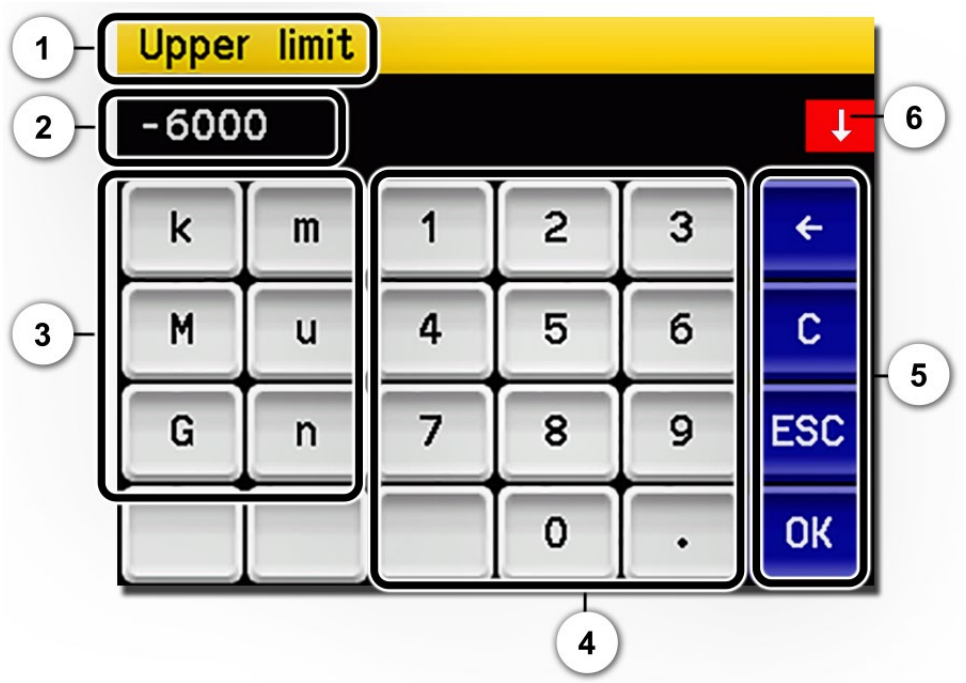


Figure 15: Numerical entry

①	Parameter name	②	Entered values
③	Prefix: For entering very large or very small values. This can be done as follows: 1. Enter value 2. Select SI prefix Function: **n** = 10^{-9}, **u** = 10^{-6}, **m** = 10^{-3}, **k** = 10^{3}, **M** = 10^{6}, **G** = 10^{9}	④	Numerical entry
⑤	**←:** Deletes one digit of the displayed value. **C:** Clears the displayed value. **ESC:** Touching the **ESC** field causes the display to go back one level in the menu hierarchy. The entered value is not saved. **OK:** Confirm entered value.	⑥	If the value entry is too high or too low, a white arrow appears in a red field top right. Arrow points upward: Entry too high Arrow points downward: Entry too low

7.11.3 Single selection of functions

The single selection is identifiable by the **ESC** button below right.

The currently selected function is green. Use the Up/Down arrows to navigate the options in long lists. Use the **ESC** button to cancel the entry.
Pressing a selection item saves the configuration and completes the entry.

Figure 16: Example of single selection

7.11.4 Multiple selection of functions

The multiple selection is identifiable by the **OK** button bottom right:

The currently selected values are green. Use the Up/Down arrows to navigate the options in long lists. Pressing a selection item changes the active status of the corresponding item. Press the **OK** button to save the configuration and complete the entry.

Figure 17: Example of multiple selection

8 Settings

8.1 Setting the operating language

	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the **Menu** button.	
2.	Set the access code and confirm with **OK**.	Factory setting is **0**.
3.	Press the **Configuration** button to access language selection.	If the desired menu does not appear, press the arrow bottom right.
4.	Press language field (circle). The list of all languages appears (factory setting is English).	
5.	Apply the desired language by pressing the corresponding field, or press the **ESC** button to cancel.	
6.	Press the **Meas** button.	The instrument is in measuring operation again.

8.2 Setting the current outputs

	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the **Menu** button.	
2.	Set the access code and confirm with **OK**.	Factory setting is **0**.
3.	Press the **Curr. outputs** button.	If the desired menu does not appear, press the arrow at the bottom right.
4.	Select **Current 1**.	
5.	Select range.	MR1 .. MR8 (see table below) In 1, In 2, Auto 1 → Reference Manual
6.	Press the **Meas** button.	The instrument is in measuring operation again.

Measuring range no.	Measuring range (standard)	Measuring range (customer-specific)
MR1	0 .. 100 FLU	
MR2	0 .. 30 FLU	
MR3	0 .. 10 FLU	
MR4	0 .. 5 FLU	
MR5	0 .. 2 FLU	
MR6	0 .. 1 FLU	
MR7	0 .. 0.3 FLU	
MR8	0 .. 0.1 FLU	

If other measuring ranges are needed, you can re-program the table above as required → Reference Manual.

8.3 Setting the limits

	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the **Menu** button.	
2.	Set the access code and confirm with **OK**.	Factory setting is **0**.
3.	Press the **Limits** button.	If the desired menu does not appear, press the arrow at the bottom right.
4.	Select **Limit 1/2**.	
5.	Define **Mode**.	The following selection is available: ▪ **Inactive** (limit monitor of this channel is deactivated) ▪ **Exceeded** (limit active when the set threshold value is exceeded) ▪ **Undershot.** (limit active when the set threshold value is undershot)
6.	Define the upper limit, lower limit, cut-in delay and cut-out delay with number pad.	Pressing the current number value takes you to the entry mode.
7.	Press the **Meas** button.	The instrument is in measuring operation again.

The limits have to be configured accordingly so that they are not only displayed, but that the outputs are also switched.

8.3.1 Upper and lower threshold value of a limit

A maximum of eight limits with upper and lower threshold values can be programmed.

If the operating mode is set to **Exceeded** (Figure 18), then while the upper threshold value is exceeded the limit is active and remains active until the lower threshold value is again undershot.

If the operating mode is set to **Undershot.**, then while the lower threshold value is undershot the limit is active and remains active until the upper threshold value is again exceeded.

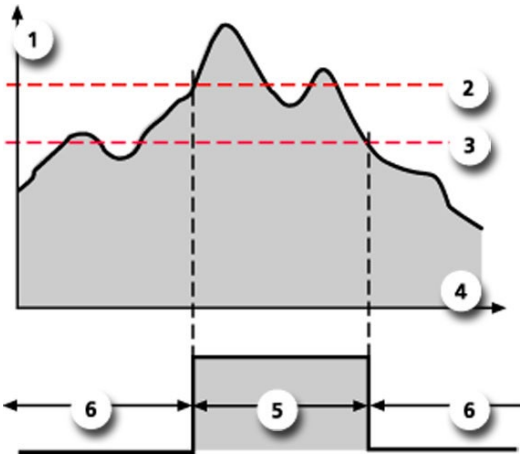


Figure 18: Threshold diagram

①	Measuring value	②	Upper threshold value
③	Lower threshold value	④	Time
⑤	Limit active	⑥	Limit passive

8.3.2 Reading if limit exceeded or undershot

If a limit event occurs during operation, it has the following effects on measuring operation:

- Threshold value display indicates an unusual state.
- If an output for the corresponding limit channel is programmed, it is switched.

If the message **Limit** appears, the color of the status display changes to **white** and the numbers of the limit channels are listed with their channel numbers in **red** if limits have been exceeded or undershot. Inactive limits are indicated with "_".

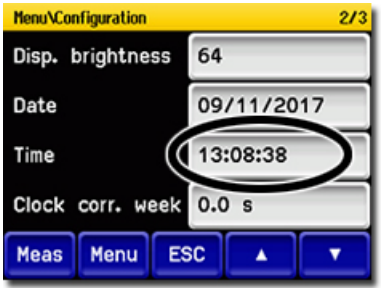
8.4 Setting the outputs

	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the **Menu** button.	
2.	Set the access code and confirm with **OK**.	Factory setting is **0**.
3.	Press the **Inp./outputs** button.	If the desired menu does not appear, press the arrow at the bottom right.
4.	Press the **Outputs** button.	
5.	Select **O1 .. O(n)** .	
6.	Activate the outputs (multiple selection possible).	Activated outputs are highlighted green. ▪ Invert: Inverts the outputs ▪ Prio fault ▪ Fault ▪ Warning ▪ Service ▪ Adjustment ▪ Limit 1/2 The other keys named **MR-Out...** are for automatic measuring range switching → Reference Manual.
7.	Press the **Meas** button.	The instrument is in measuring operation again.

8.5 Setting the inputs

	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the **Menu** button.	
2.	Set the access code and confirm with **OK**.	Factory setting is **0**.
3.	Press the **Inp./outputs** button.	If the desired menu does not appear, press the arrow at the bottom right.
4.	Press the **Inputs** button.	
5.	Select **I1 .. I(n)**	
6.	Activate the inputs (multiple selection possible).	Activated outputs are highlighted green. ▪ Off: Deactivates the input ▪ Invert: Inverts the outputs ▪ Oper./Service ▪ External ▪ MR-In1 Bit 0 .. 2 ▪ MR-In2 Bit 0 .. 2
7.	Press the **Meas** button.	The instrument is in measuring operation again.

8.6 Setting the date and time

	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the **Menu** button.	
2.	Set the access code and confirm with **OK**.	Factory setting is **0**.
3.	Press the **Configuration** button.	If the desired menu does not appear, press the arrow bottom right.
4.	To enter the time, press the currently displayed time at the **Time** menu item and enter the new time with the number pad. Confirm entry with **OK**.	The time must be entered in the format **hh:mm:ss**. 
5.	To enter the date, press the currently displayed date at the **Date** menu item and enter the new date with the number pad. Confirm entry with **OK**.	The date must be entered in the format selected under the **Date format** menu item. 
6.	Press the **Meas** button.	The instrument is in measuring operation again.

8.7 Setting or changing the access code

You can protect the settings of the instrument against unauthorized manipulations by defining your own access code.

	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the **Menu** button.	
2.	Set the access code and confirm with **OK**.	Factory setting is **0**.
3.	Press the **Configuration** button.	If the desired menu does not appear, press the arrow bottom right.
4.	Press the button to the right of the **Access code** description text.	
5.	Enter the access code and confirm with **OK**.	
6.	Press the **Meas** button.	The instrument is in measuring operation again.

A forgotten access code can be cleared only by a SIGRIST service engineer.

Enter your personal access code here:

8.8 Backup configured data

These measures can be of use to the service engineers for service purposes.

	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the **Menu** button.	
2.	Set the access code and confirm with **OK**.	Factory setting is **0**.
3.	Press the **System info.** button.	If the desired menu does not appear, press the arrow bottom right.
4.	In the **User -> SD** and **Expert -> SD** submenus press the **Copy** function.	The user and expert data are copied to the microSD card. After a successfully completed procedure, acknowledge with the **OK** button.
5.	Press the **Meas** button.	The instrument is in measuring operation again.

9 Servicing

DANGER!

Opening the photometer in potentially explosive areas.

Opening the photometer in potentially explosive areas can lead to an explosion.

- The instrument may be opened only after the service voltage has been interrupted and a period of at least ten minutes has elapsed.

CAUTION!

Damage to the instrument due to servicing duties that have not been carried out or have been carried out improperly.

If servicing duties are not carried out according to the servicing schedule or non-original SIGRIST spare parts are used, this can lead to damage to the instrument or measuring errors.

In this case, SIGRIST-PHOTOMETER AG accepts no warranty claims made by the customer and is not responsible for any subsequent costs. To avoid this situation, please adhere to the following steps:

- Carry out servicing duties according to the servicing schedule (Section 9.1).
- When carrying out servicing duties, use original SIGRIST spare parts according to the spare parts list (Section 15). The use of third-party spare parts requires the written approval of SIGRIST-PHOTOMETER AG.
- If the instruments are subjected to heavy use or exposed to severe environmental conditions, servicing duties must be carried out more often as required. Wear parts in particular must be replaced more often depending on the circumstances.

CAUTION!

Servicing duties on third-party components

Servicing the Ex control unit from thuba

Servicing duties on the **PS 850 S** control unit may only be carried out by the manufacturer thuba. Contact details can be found in the enclosed **Manual BVS 12 ATEX E 143**. Section 1.4

Servicing the optional Versa-Matic E5SS5F559C ATEX pumps

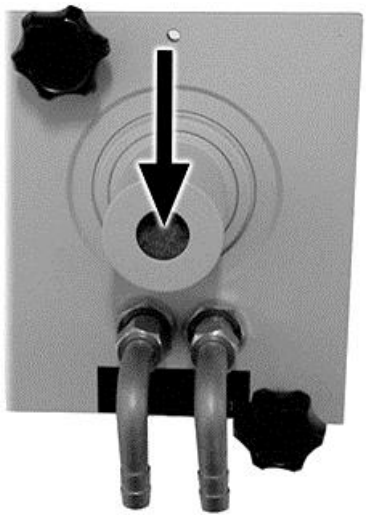
In accordance with the Service & Operating Manual, the pump diaphragms should be replaced twice a year. A Partial and Complete Repair Kit is required for this, which can be ordered from SIGRIST-PHOTOMETER (Section 15).

9.1 Servicing schedule

WHEN	WHO	WHAT	PURPOSE
Every 3 months and at every opportunity	Operator	Leakage check on the measuring cell KPFL 30. Section 9.2	Preventing corrosion and maintaining measuring accuracy.
Every 3 months	Operator	Recalibrate the photometer. Section 9.3	Measure for maintaining measuring accuracy. Interval dependent on medium.
Every 6 months or as needed	Operator	Check and any cleaning of the measuring cell KPFL 30. Section 9.4	Obligatory measure for maintaining measuring accuracy.
Every 2 years or as needed	Service center	Replace the seals on the closed measuring cell. Section 9.5	Obligatory measure for maintaining functional efficiency.
Every 5 years or as needed	Operator / service center	Replace the measuring cell windows on the closed measuring cell KPFL 30. Section 9.5	Measure for maintaining measuring accuracy. Interval dependent on medium and operating conditions.
Every 6 months or as needed	Operator	Replace the pump membrane according to the Service & Operating Manual VERSA-MATIC. Section 1.4	Obligatory measure for maintaining functional efficiency.
Annually or as needed	Operator	Clean the free-fall measuring cell KPFLJC PVDF. Section 9.6	Obligatory measure for maintaining measuring accuracy. Interval dependent on medium.
Every 2 years	Operator	Replace the light source. Section 9.8	Obligatory measure for maintaining measuring accuracy.
Every 5 years	Operator	Replace the fan. Section 9.9	Maintaining the cooling in the housing.
As needed	Operator	Replace the inlet pipes: Inlet pipe KPFLJC PVDF Section 9.10 / Inlet pipe KPFLJ VA Section 9.11 / Short inlet pipe PVDF of sample conditioning system Section 9.12	Obligatory measure for maintaining functional efficiency.
As needed	Operator	Clean the sample preparation system and replace the cover seal. Section 9.13	Obligatory measure for maintaining functional efficiency.
As needed	Operator	Clean the pipes. Section 9.14	Obligatory measure for maintaining functional efficiency.

Table 1: Servicing schedule

9.2 Leakage check on the measuring cell KPFL 30

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Carry out a visual check of the sample lines (connecting pieces, connections etc.).	
2.	Check for discoloration of the desiccant in the inspection glass (arrow). If the desiccant is colored orange, then the desiccant cartridge has to be replaced or regenerated. Ruby red = dry / orange = damp	
3.	Enter the inspection in the servicing log.	Section 16.1

9.3 Recalibrating the photometer

9.3.1 Preparing for recalibration using the checking unit

The instrument must be at operating temperature for recalibration. The warm-up time lasts 2 hours.

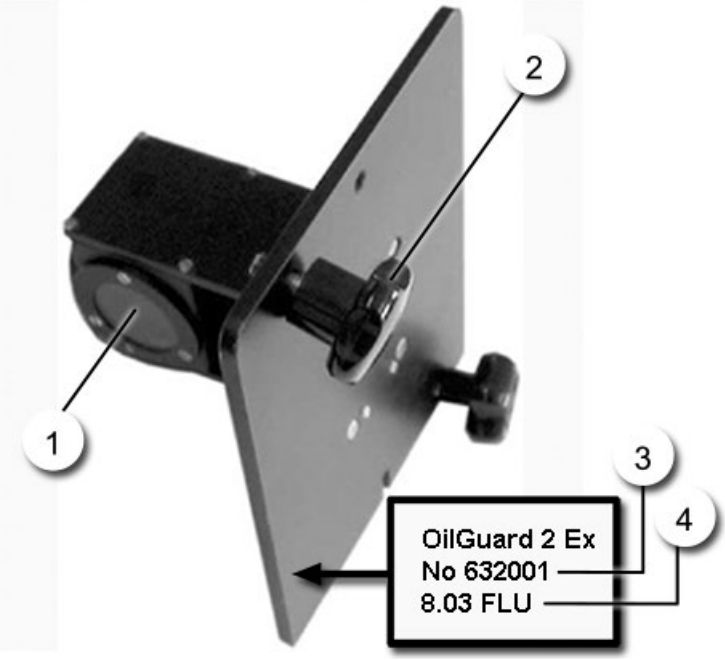
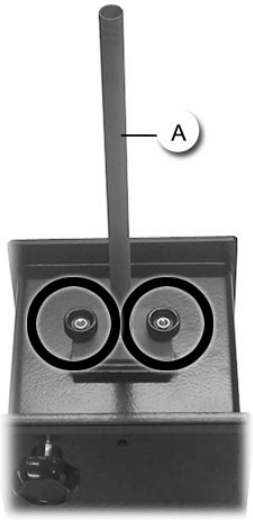


Figure 19: Checking unit on OilGuard 2

①	Fluorescence glass	②	Locking screws
③	Serial number of the photometer	④	Nominal value

The following procedure describes how to prepare the instrument for recalibration using the checking unit.

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Stop the sample feed and remove the inlet.	
2.	Remove the cover of the measuring cell. ▪ On the closed measuring cell KPFL 30, continue with step 5. ▪ On the free-fall measuring cell KPFLJC PVDF, carry out steps 3a and 4. ▪ On the free-fall measuring cell KPFLJ VA, only carry out step 3b.	

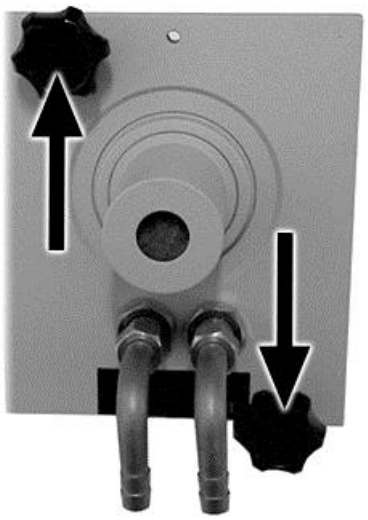
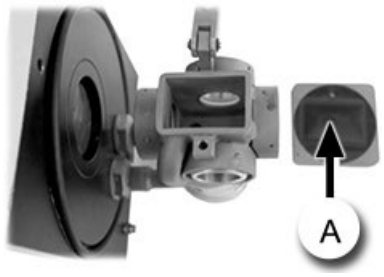
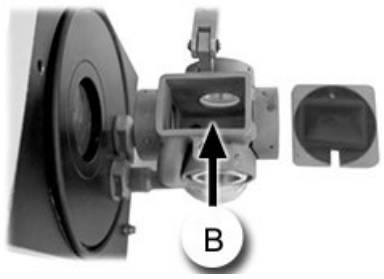
	WORKSTEP	ADDITIONAL INFO / IMAGES
3.	a: Only to be carried out on the free-fall measuring cell **KPFLJC PVDF**. Remove the lock nut by turning counter-clockwise (bayonet lock) and pull out the inlet pipe.	
	b: Only to be carried out on the free-fall measuring cell **KPFLJ VA**. Loosen the locking screws (circle) and pull out the inlet pipe (A).	
4.	Only to be carried out on the free-fall measuring cell **KPFLJC PVDF**. Remove the protective pipe (A).	
5.	Insert the checking unit and fix in place with the two locking screws (Figure 19, pos. 2). Only use instrument-specific checking units. The serial number must match (Figure 19, pos. 3).	
6.	Cover the inlet and outlet of the measuring cell so that no light can enter the cell (interference by external light).	

9.3.2 Carrying out recalibration

The following procedure describes how to carry out recalibration after the necessary preparation has been made:

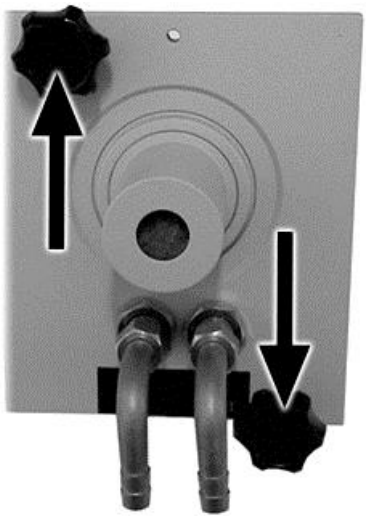
	MANIPULATION	ADDITIONAL INFO / IMAGES
1.	Press the **Menu** button.	
2.	Set the access code and confirm with **OK**.	Factory setting is **0**.
3.	Press the **Recalibr.** button.	If the desired menu does not appear, press the arrow at the bottom right.
4.	Press the **Channel 1** menu.	
5.	Check whether the saved nominal value in the **Nom. val.** menu matches the information on the checking unit (Figure 19, pos. 4).	
6.	Press the **initiate** button and wait. If the adjustment was successful, this is confirmed with **Adjustment OK**. This completes the adjustment. If the adjustment was **not** successful, it is indicated with **Adjust. fault**. In this case, check the points in the following list one after the other and carry out recalibration again: ▪ Cleanliness of the checking unit OK? ▪ Correct checking unit used? ▪ Nominal value does not correspond to the value of the checking unit? ▪ Cleanliness of the measuring cell window OK? ▪ Minimum instrument warm-up time of 2 hours adhered to? ▪ Has the checking unit been stored in a dark place? If the check could not be successfully completed, contact your country representative. Section 11	
7.	Remove the checking unit from the measuring cell and reassemble the instrument in reverse order.	

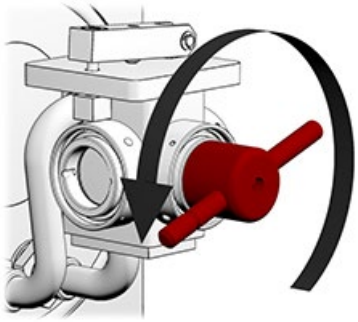
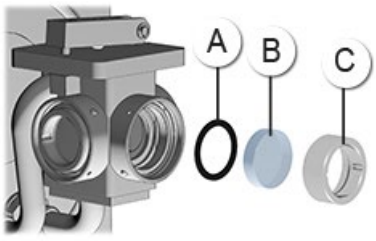
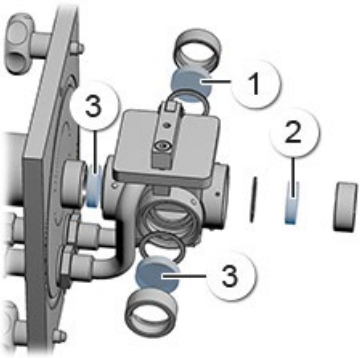
9.4 Contamination check on the measuring cell KPFL 30

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Remove both the sample feed and return from the measuring cell and let the cell run dry.	
2.	Loosen the locking screws (arrows) and remove the measuring cell by tipping it slightly.	
3.	Loosen the Allen bolt (circle) and open the clamp.	
4.	Remove the measuring cell cover (A).	
5.	Clean the interior of the measuring cell (B) and the measuring cell windows with a clean, grease-free cloth. Use soapy water in the event of stubborn soiling.	

	WORKSTEP	ADDITIONAL INFO / IMAGES
6.	Check the measuring cell cover seal (A) and replace, if required.	
7.	Reattach the measuring cell cover on the measuring cell, close the clamp and fasten in place with the Allen bolt (circle).	
8.	Clean the measuring cell windows (arrows) from the outside with a clean, grease-free cloth.	
9.	Insert the measuring cell back into the housing and fasten in place with the locking screws. If the desiccant is colored orange, then the desiccant cartridge has to be replaced or regenerated. Ruby red = dry / orange = damp	

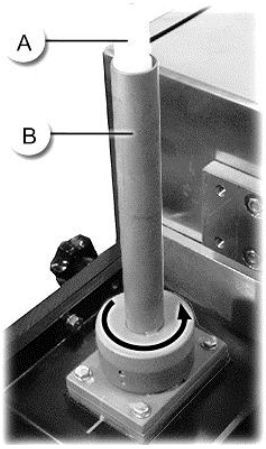
9.5 Replacing the measuring cell windows and seals on the measuring cell KPFL 30

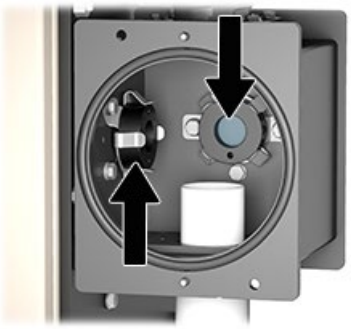
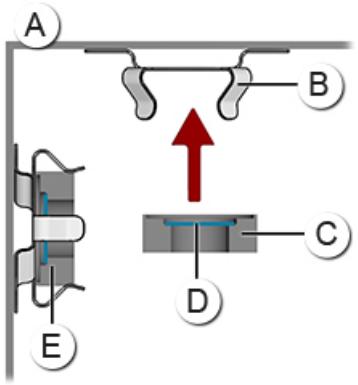
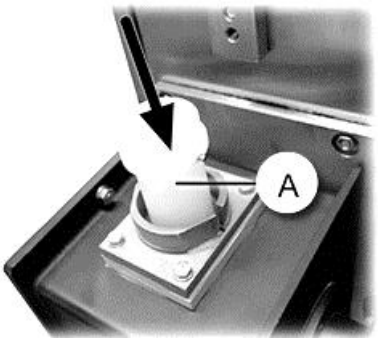
	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Remove both the sample feed and return from the measuring cell and let the cell run dry.	
2.	Loosen the locking screws (arrows) and remove the measuring cell by tipping it slightly.	
3.	Loosen the Allen bolt (circle) and open the clamp.	
4.	Remove the measuring cell cover (A).	

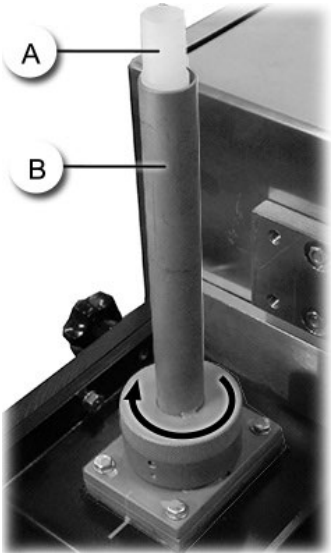
	WORKSTEP	ADDITIONAL INFO / IMAGES
5.	Remove the four measuring cell windows (including seals) as follows: 1. Remove the ring nuts using the face wrench (turn counter-clockwise). 2. Remove the measuring cell windows and seals.	
6.	Clean the sealing surfaces on the window openings.	
7.	Insert the windows in the window openings. Pay attention to the component sequence: A: Neoprene seal (window seal) B: Window C: Ring nut The position of the windows can be seen in the diagram below: 1: Quartz window 2: Tempax window 3: Tempax colored dark window (coating outside)	 
8.	Firmly tighten the ring nuts using the face wrench.	
9.	Clean the interior of the measuring cell and the measuring cell windows with a clean, grease-free cloth.	

	WORKSTEP	ADDITIONAL INFO / IMAGES
10.	Reattach the measuring cell cover on the measuring cell, close the clamp and fasten in place with the Allen bolt (circle).	
11.	Insert the measuring cell back into the housing and fasten in place with the locking screws. If the desiccant is colored orange, then the desiccant cartridge has to be replaced or regenerated. Ruby red = dry / orange = damp	
12.	Carry out recalibration according to Section 9.3.	

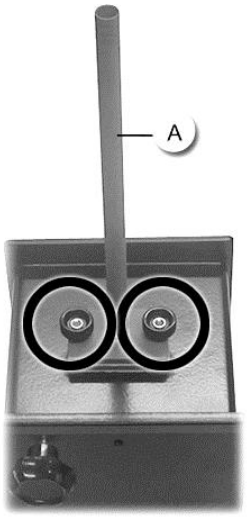
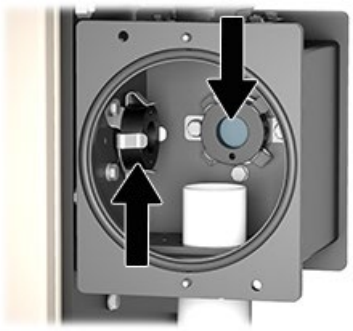
9.6 Contamination check on the free-fall measuring cell KPFLJC PVDF

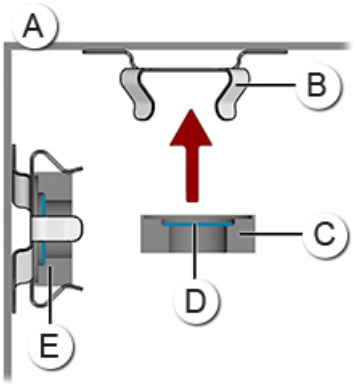
	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Interrupt both the sample feed and return, remove them from the measuring cell and let the cell run dry.	
2.	Loosen the locking screws (arrows) and remove the cover on the measuring cell.	
3.	Remove the lock nut (B) by turning counter-clockwise (bayonet lock) and pull out the inlet pipe (A). This measuring cell is available with a long or short inlet pipe. This example uses a long inlet pipe. There is no difference in handling here.	
4.	Pull out the protective pipe (A).	

	WORKSTEP	ADDITIONAL INFO / IMAGES
5.	Remove the protective glasses (arrows) from the holder and clean them. Use alcohol and a cotton cloth for cleaning.	
6.	Reinsert the protective glasses in the holder (B) after cleaning is completed. Ensure that the protective glasses (D) are mounted as shown in pos. E. A: Measuring cell wall B: Holder for protective glass C: Ring for protective glass D: Protective glass E: Mounted protective glass	
7.	Check the inlet pipe and protective pipe for deposits and clean when necessary. Do not remove the deposits with a knife or similar objects.	
8.	Insert the protective pipe (A) back into the opening on the measuring cell.	

	WORKSTEP	ADDITIONAL INFO / IMAGES
9.	Reinsert the inlet pipe (A) and attach the lock nut (B). Fix the inlet pipe (A) in place by turning the lock nut (B) clockwise.	
10.	Reattach the cover on the measuring cell.	
11.	Reattach the sample feed and return.	

9.7 Contamination check on the free-fall measuring cell KPFLJ VA

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Remove both the sample feed and return from the measuring cell and let the cell run dry.	
2.	Loosen the locking screws (arrows) and remove the cover on the measuring cell.	
3.	Loosen the locking screws (circles) and remove the inlet pipe (A).	
4.	Remove the protective glasses (arrows) from the holder and clean them. Use alcohol and a cotton cloth for cleaning.	

	WORKSTEP	ADDITIONAL INFO / IMAGES
5.	Reinsert the protective glasses in the holder (B) after cleaning is completed. Ensure that the protective glasses (D) are mounted as shown in pos. E. A: Measuring cell wall B: Holder for protective glass C: Ring for protective glass D: Protective glass E: Mounted protective glass	
6.	Check the inlet pipe for deposits and clean when necessary. Do not remove the deposits with a knife or similar objects.	
7.	Reinsert the inlet pipe and fasten in place with the two locking screws.	
8.	Reattach the cover on the measuring cell.	
9.	Reattach the sample feed and return.	

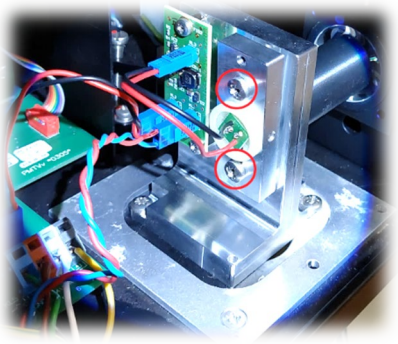
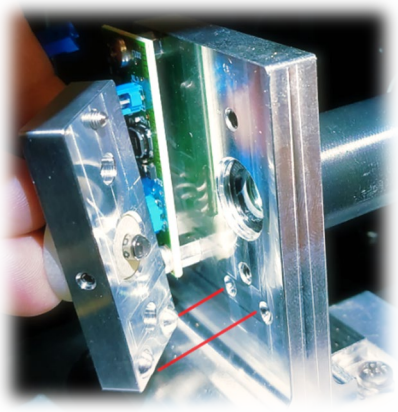
9.8 Replacing the light source

DANGER!

Opening the photometer in potentially explosive areas.

Opening the photometer in potentially explosive areas can lead to an explosion.

- The instrument may be opened only after the service voltage has been interrupted and a period of at least ten minutes has elapsed.

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Interrupt the service voltage to the photometer.	
2.	Open the door according to Section 5.3.	
3.	Remove the two screws (circles) and disconnect the cable.	
4.	The new LED is already adjusted. Mount the new LED with the two screws and take care that the two cams are aligned.	
5.	Reconnect the cable.	
6.	Close the door and put the instrument into operation again.	
7.	Carry out a recalibration according to Section 9.3.	

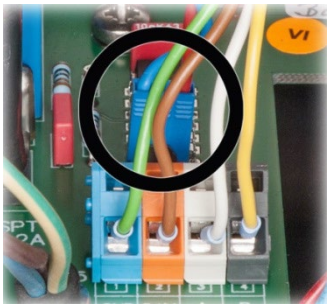
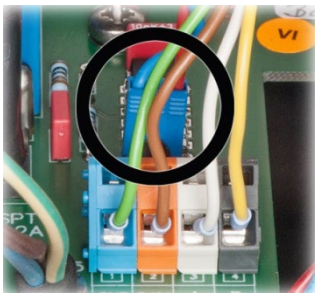
9.9 Replacing the fan

DANGER!

Opening the photometer in potentially explosive areas.

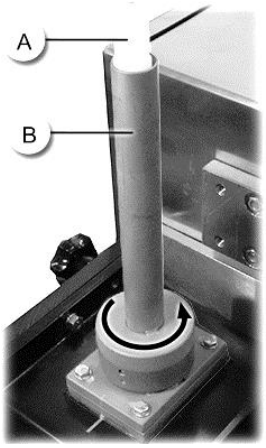
Opening the photometer in potentially explosive areas can lead to an explosion.

- The instrument may be opened only after the service voltage has been interrupted and a period of at least ten minutes has elapsed.

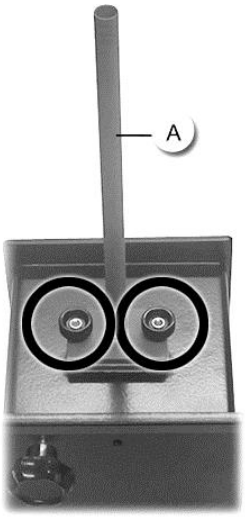
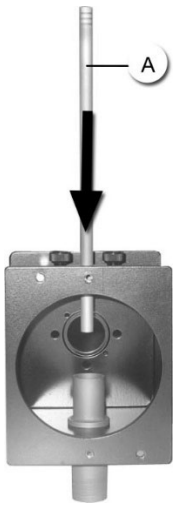
	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Interrupt the service voltage to the photometer.	
2.	Open the door according to Section 5.3.	
3.	Unplug the power supply to the fan on the PMTVV-Print (circle, blue plug).	
4.	Remove the four screws and then remove the fan.	
5.	Insert the new fan and fasten in place with the four screws. Ensure that the fan connections are pointing downwards.	
6.	Plug in the power supply to the fan on the PMTVV-Print (circle, blue plug).	
7.	Close the door according to Section 5.3.	

	WORKSTEP	ADDITIONAL INFO / IMAGES
8.	Re-establish the service voltage.	

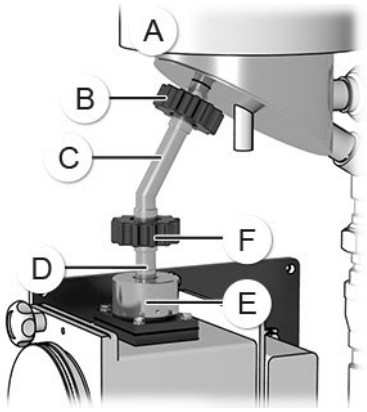
9.10 Replacing the inlet pipe on the KPFLJC PVDF (short or long)

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Stop the sample feed.	
2.	Remove the sample feed from the inlet pipe (A).	
3.	Remove the lock nut (B) by turning counter-clockwise (bayonet lock) and pull out the inlet pipe (A). This measuring cell is available with a long or short inlet pipe. This example uses a long inlet pipe. There is no difference in handling here.	
4.	Insert the new inlet pipe (A) and fix in place with the lock nut.	
5.	Reattach the sample feed.	

9.11 Replacing the inlet pipe on the KPFLJ VA

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Stop the sample feed.	
2.	Loosen the locking screws (circles) and remove the old inlet pipe (A).	
3.	With the short end first, insert the new inlet pipe (A) into the measuring cell in the direction of the arrow, then fasten in place with the locking screws. 	
4.	Reattach the sample feed.	

9.12 Replacing the short inlet pipe PVDF (sample conditioning system)

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Stop the sample feed.	
2.	Remove the connecting piece (C) between the measuring cell and sample conditioning system (A) by loosening the nuts (B and F).	
3.	Remove the lock nut (E) by turning counter-clockwise (bayonet lock) and pull out the short inlet pipe PVDF (D) from the measuring cell.	
4.	Insert the new short inlet pipe PVDF (D) and fix in place with the lock nut (E).	
5.	Insert the connecting piece (C) between the measuring cell and sample conditioning system (A) and fasten in place with the nuts (B and F).	

9.13 Cleaning the sample preparation system (optional)

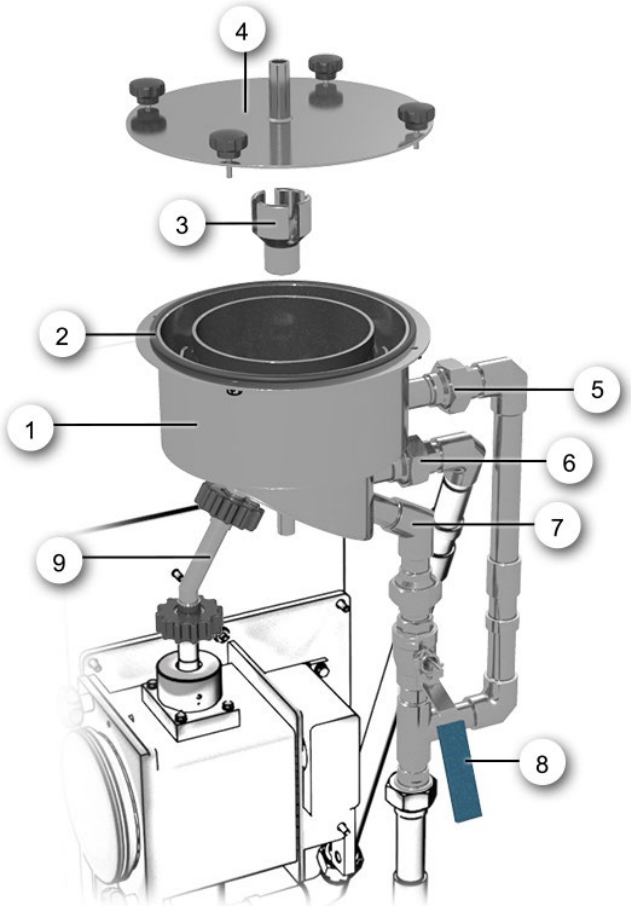


Figure 20: Sample preparation system on OilGuard 2 Ex

①	Vessel for sample preparation	②	Cover seal
③	Skimmer	④	Cover with locking screws
⑤	Overflow	⑥	Sample feed
⑦	Drainage of the sample preparation system (sludge removal)	⑧	Valve for draining the sample preparation system
⑨	Connecting piece between measuring cell and sample preparation system		

The following procedure describes how to cleaning the sample preparation system has been made:

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Stop the sample feed.	
2.	When operating with a sample return pump, ensure that this remains switched on.	
3.	If optional sampling equipment is present, ensure that the sample return valve remains open. This prevents the measuring cell from filling up.	Section 2
4.	Open the drainage valve (Figure 20, pos. 8) slowly and let the sample preparation system run dry.	
5.	Loosen the locking screws and remove the cover (Figure 20, pos. 4) on the sample preparation system.	
6.	Check the seal (Figure 20, pos. 2) and replace, if necessary.	
7.	Remove the skimmer (Figure 20, pos.3) from the vessel (Figure 20, pos.1) and clean it.	
8.	Clean the interior of the sample preparation system and the sample connections.	
9.	Reassemble the sample preparation system in reverse order and put it into operation.	

9.14 Cleaning the pipes

The following procedure describes how to clean the pipes:

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Stop the sample feed.	
2.	Ensure that all of the pipes are empty.	
3.	Remove and clean all of the pipes, including all accessories.	
4.	Reattach the pipes and accessories.	
5.	Put the system back into operation according to Section 6	

9.15 Taking a sample with the optional sampling equipment

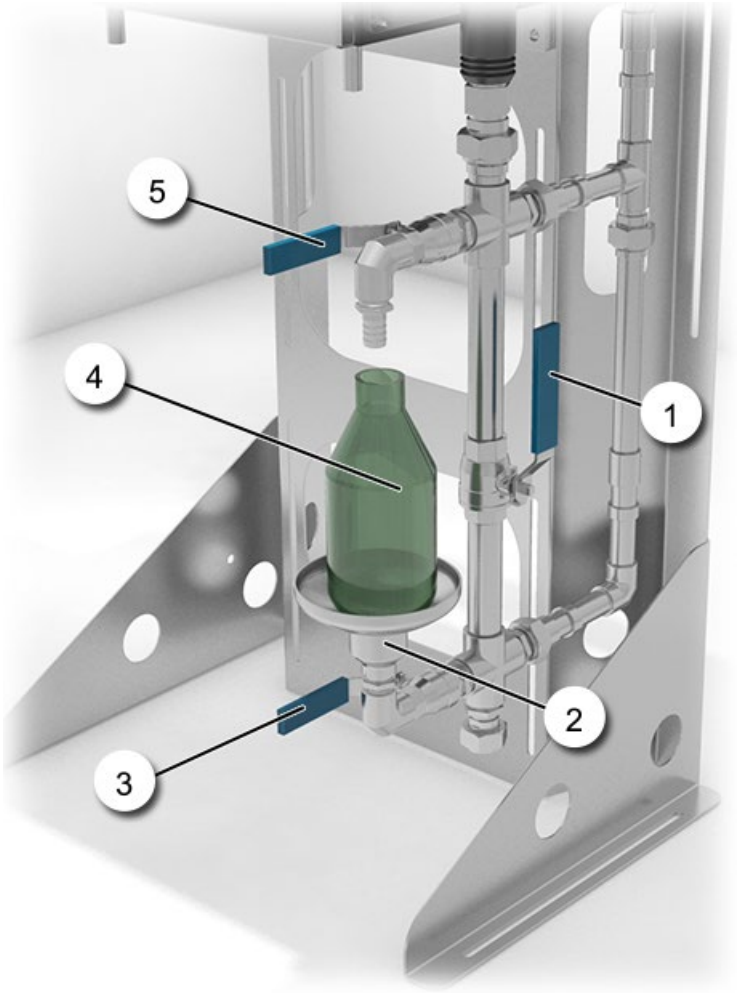


Figure 21: Sampling equipment on the OilGuard 2 Ex

①	Valve for retaining the sample	②	Drainage funnel
③	Drainage valve	④	Sample vessel
⑤	Sampling valve		

A sample can be taken as follows:

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Ensure that the sample return is in place.	
2.	Open the drainage valve (Figure 21, pos. 3).	
3.	Close the valve for retaining the sample (Figure 21, pos. 1).	
4.	Open the sampling valve (Figure 21, pos. 5).	
5.	Fill the vessel (Figure 21, pos. 4) with the sample.	
6.	After a sample has been taken, close the sampling valve (Figure 21, pos. 5).	
7.	Open the valve for retaining the sample (Figure 21, pos. 1) again slowly.	
8.	Close the drainage valve (Figure 21, pos. 3).	

10 Troubleshooting

10.1 Pinpointing malfunctions

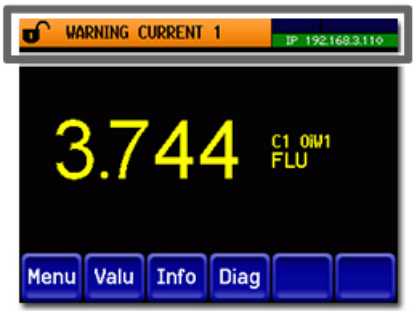
DETECTABLE MALFUNCTION	ACTION
No reading	▪ Check whether the supply voltage is present.
Error message in the display	▪ Analyze the error message. Section 10.1.1 to Section 10.1.3
The reading is wrong	▪ Ensure that the sample to be measured corresponds to the operating conditions. Section 2.4 ▪ Perform adjustment. Section 9 ▪ Check whether the photometer and the associated peripherals are correctly mounted. Section 4 ▪ Ensure that the servicing duties have been performed according to the servicing schedule. Section 9.3

Table 2: Pinpointing malfunctions

If the listed measures do not result in the desired results, please consult with customer service. Section 11

10.1.1 Warning messages and effect on operation

Warnings indicate an unusual state.

WARNINGS	
If a warning occurs during operation, it has the following effects: ▪ The system continues to operate. However, the measuring results must be evaluated with caution. The cause of the warning message should be remedied at the next possible opportunity. ▪ When the cause of the warning has been remedied, it is automatically deleted. ▪ When the **Warning** message occurs, the color of the status display changes to **orange** and the warning text describes the warning in question.	 Example: **WARNING CURRENT 1**

The following warning messages can be displayed:

WARNING	DESCRIPTION	POSSIBLE CAUSES
V IN	The input voltage for the operating electronics is outside the permitted range (18-30 VDC).	▪ The service voltage is faulty.
ADJUST FAULT	The adjustment could not be performed.	▪ The instrument is soiled. ▪ The nominal value for the adjustment does not match the value of the medium.
CURRENT 1	Current output 1 is disturbed.	▪ Terminals are open. ▪ Interruption of the current loop of the measuring value output.
EXTERNAL (Name ext.in.)	An external fault is signaled via a digital input. The user can then configure this as a warning, fault or prio fault.	▪ External fault.
SERVICE	Shows when service work is due.	▪ Service work is due.
VERS.SD CARD	The data on the microSD card does not match the current software.	▪ Update was performed incorrectly.
WATCHDOG	The internal fault monitoring has been actuated. The program has been restarted.	▪ Program crash.

Table 3: Possible warning messages

10.1.2 Fault messages and effect on operation

FAULT	
If a fault occurs during operation, it has the following effects: ▪ The measurement is canceled. ▪ The measuring values go to 0. When the cause of the fault has been remedied, it is automatically deleted. ▪ When the **Fault** message appears, the color of the status display changes to **red** and the text describes the fault in question.	 Example: **FAULT SERIAL 1**

The following fault messages can be displayed:

FAULT MESSAGE	DESCRIPTION	POSSIBLE CAUSES
SERIAL 1	No communication between the operating electronics and measuring electronics.	▪ Cable disconnected. ▪ Defect in the electronic system. → Service technician
MEASUR.FAULT	Measuring value acquisition is faulty.	▪ Bubbles in the water. ▪ External light in the vicinity of the measuring point (e.g. transparent hoses). ▪ Defect in the electronic system. → Service technician
LIGHTSOURCE 1	The detector for monitoring the light source receives no light.	▪ Defective light source. ▪ Obstacle in the optical path. → Service technician
IO PORT	Connection between NG_HAUPT and NG_BASI-Print is disturbed.	▪ Connection has been disconnected. ▪ Defect in the electronic system. → Service technician

Table 4: Possible fault messages

10.1.3 Prioritized fault messages and their effect on operation

When there is a prioritized fault, the cause of the malfunction is serious.

PRIO (PRIORITIZED FAULT)	
If a prioritized fault occurs during operation, it has the following effects: ▪ The measuring values go to 0. ▪ Prioritized faults can be cleared only by a service engineer. ▪ When the **Prio** message occurs, the color of the status display changes to **red** and the text describes the prioritized fault in question.	 Example: **PRIO DEFAULT VALUES**

The following prioritized fault messages can be displayed:

PRIO MESSAGE	DESCRIPTION	POSSIBLE CAUSES
DEFAULT VALUES	The default values were loaded.	▪ If no parameters were initialized or if all parameters were lost, the default values are loaded.
CRC EXPERTS	A fault was determined when the expert data was checked.	▪ Electromagnetic malfunctions. ▪ Defect in the electronic system.
CRC USER	A fault was determined when the user data was checked.	▪ Electromagnetic malfunctions. ▪ Defect in the electronic system.
CRC DISPLAY	A fault was determined when the display data was checked.	▪ Electromagnetic malfunctions. ▪ Defect in the electronic system.
EXT RAM	A fault was determined when the RAM in the graphic controller was checked.	▪ Defect in the electronic system.
SW VERS	An incorrect software version has been loaded for this instrument type.	▪ Handling fault. ▪ → Service technician

Table 5: Possible prioritized fault messages

11 Customer service information

Should you have any questions, please contact the responsible service center in your country or region. If this is not known, SIGRIST-PHOTOMETER AG customer service in Switzerland would be glad to provide you with a contact address.

A current list of all SIGRIST country representatives is available online at www.photometer.com.

Please have the following information ready when you contact a SIGRIST service point or customer service:

- The serial number of the OilGuard 2 Ex.
- A description of instrument behavior and the work steps when the problem occurred.
- A description of what you did when trying to solve the problem yourself.
- The documentation of the third-party products you use in conjunction with the OilGuard 2 Ex.
- Description of operation conditions (place, power supply, measured medium, temperature etc.)
- Application and Instruction Manual.

12 Decommissioning/Storage

DANGER!

Opening the photometer in potentially explosive areas.

Opening the photometer in potentially explosive areas can lead to an explosion.

- The instrument may be opened only after the service voltage has been interrupted and a period of at least ten minutes has elapsed.

12.1 Decommissioning the photometer

The aim of decommissioning is to prepare the individual components of the system properly for storage.

	WORKSTEP	ADDITIONAL INFO / IMAGES
1.	Interrupt the service voltage to the system.	
2.	Stop the main water supply.	
3.	Open the photometer door and remove the electrical connections.	Section 5.3
4.	Close the photometer door again.	
5.	Remove, clean and dry the pipes in the system.	
6.	Clean the measuring cell.	
7.	Remove, clean and dry the sample preparation system on the photometer, if present.	
8.	Remove, clean and dry the sampling equipment on the photometer, if present.	
9.	Remove, clean and dry the sample feed pump on the photometer, if present.	
10.	Remove, clean and dry the sample return pump on the photometer, if present.	
11.	Remove the photometer from the mounting device and close all openings.	
12.	Remove the mounting device from the operating position and pack it.	

12.2 Storing the photometer

There are no special requirements for storing the instruments. However, please note the following information:

- The system contains electronic components. Storage for such components must fulfill the usual conditions. It is important to note that the storage temperature must be between -20 and +50 °C.
- All components that come into contact with the sample during operation have to be dry and clean for a long time before being put into storage.
- The measuring equipment with all of the accessory parts must be protected against weather factors, condensing humidity and aggressive gases during storage.

13 Packaging / Transport / Returning

DANGER!

Injuries to persons due to hazardous media residues in the returned instrument.

Instruments that have come into contact with hazardous media may not be sent without the appropriate information on the corresponding repairs or professional decontamination (see RMA form).

- Precise information on the medium must be received by SIGRIST-PHOTOMETER in advance of the instrument to be repaired so that the necessary precautions can be taken when unpacking it.

The original packaging materials should be used for packaging the OilGuard 2 Ex if possible. If the original packaging is no longer available, note the following information:

- Before packaging, close the openings of the instrument with adhesive tape or plugs so that no packaging materials can enter the instrument.
- The instrument contains optical and electronic components. Make sure that the packaging protects the instrument from being damaged by impacts during transport.
- All peripheral devices and accessory parts must be packaged separately and marked with the serial number of the photometer (Section 2.2). This prevents confusion and mix-ups later while also making it easier to identify parts.
- A RMA form (14711E) must be filled in and enclosed for all returned instruments and spare parts. This can be downloaded at www.photometer.com.

When packaged as described above, the instruments can be transported via all usual shipping methods.

14 Disposal

Disposal of the system and its peripheral devices is to be carried out in compliance with regional statutory regulations.

The system has no environmentally damaging sources of radiation. The materials listed below should be disposed of or recycled as described in the following table:

CATEGORY	MATERIALS	DISPOSAL POSSIBILITIES
Packaging	Cardboard, wood, paper	Reuse as packaging material, local disposal center, incineration plants
	Protective foils, polystyrene shells	Reuse as packaging material, recycling
Electronics	Circuit boards, electromechanical components, photomultiplier, display, touchscreen, transformer and cables	To be disposed of as electronic waste
Measuring cell	PVDF / 316L	Local disposal center
Parts which come into contact with water	PVDF / 316L	Local disposal center
	NBR (seals)	Local disposal center
	Steel	Waste metal disposal center
Optics holder, optical filter, lenses	Glass, waste metal	Recycling via centers for recycling glass and waste metal
Battery	Lithium	Recycling via locally organized collection point
UV lamp	Mercury	Special waste
Vessel for sample preparation	Metal 316L	Waste metal disposal center
Sampling equipment	Metal 316L	Waste metal disposal center
Photometer housing	Metal 316L	Local disposal center

Table 6: Materials and their disposal

15 Spare parts list

The parts mentioned in this documentation and their article numbers are listed in the following table:

ARTICLE NUMBER	ARTICLE NAME	REMARKS
108765	Flow cell cover for KPFLJ, with arrester screws	with star grip
115793	Flow cell cover 1.4571 KPFLJC PVDF	
112900	Drying cartridge 60/40 mm, complete	Only for KPFL30, closed flow cell
104234	Cover seal neoprene	
107154	Tempax glass window	
107552	Quartz glass window	
107629	Dark glass, dyed Tempax	
104203	Windows seal neoprene	
108649	Inlet tube long PVDF	
114339	Inlet tube short PVDF	
114342	Inlet tube long, stainless steel	
114351	Inlet tube short, stainless steel	
119807	Diaphragm pump (incl. gauge and valve)	
119811	Tubing for inlet diaphragm pump	
119812	Tubing for outlet diaphragm pump	
114237	Lightsource adjusted	
119985	Spare parts kit for diaphragm pump	
119986	Valve seats kit for diaphragm pump	
119713	O-Ring NBR 215.26x5.34	
114240	Fan for OilGuard 2(Ex)	
104203	Cover seal Neoprene KPT30/1 57 x 2	
119688	Inlet tube short PVDF with thread OilGuard 2(Ex)	
114329	UG11 filter	
114294	Protective glass round for free-fall flow cells	
120512	Holder proctive glass	

16 Appendix

16.1 Service Record

Service Record				Serial number		
Initial start-up:				Remarks:		
Correction value		Desiccant cartridge (for closed flow cell)		Zero point (optional)	Date	Initials
before	after	o.k.	regenerated			
		☐	☐			
		☐	☐			
		☐	☐			
		☐	☐			
		☐	☐			
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