

LKF-Automotive HD

Coalescence filter

Translation of operating manual



Legal notice

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1 Information about this document

This instruction includes information related to the life cycle of the product. It is directed toward specialist personnel who handle, install and maintain the product.

The original Operating Manual is written in German language. A specimen of the original manual is enclosed with every translation of this instruction. Should uncertainties or discrepancies be determined in the translation, before the utilization of the supplied product the instruction in the original language must be referred to for clarification and the manufacturer informed.

It is possible that illustrations in this instruction are used as an example and therefore do not agree exactly with the product supplied.

1.1 Storage

This instruction is a component part of the product. It should be stored near the product and protected against environmental impacts.

1.2 Replacement

If this instruction should become illegible or be lost, a replacement document can be acquired from the manufacturer. For this purpose, the reference number of the instruction must be known, which can be found in the footer on the inside margin of every page.

1.3 Copyright

Willibrord Lösing Filterproduktion GmbH has copyright to all documents with the Willibrord Lösing Filterproduktion GmbH company signature. Without approval of the Willibrord Lösing Filterproduktion GmbH, such documents may not be either made accessible to third parties or used in any other manner or improperly.

It is admissible, within a documentation management system, to make it available as an electronic document or a hardcopy for in-house use.

1.4 Handling instructions

Work and procedures are described by handling instructions:

- ▶ This is a prerequisite which must be met.
 - ▶ A further prerequisite which must be met.
 1. This handling step is implemented first.
 - That is the result of the handling step.
 2. That is a further handling step.
- = That is the result of the handling instruction.


1.5 Notes

Notes draw attention to situations which can lead to object damage or injuries to persons if certain rules of conduct are not adhered to.

1.5.1 Notes of safety

Notes on safety draw attention to dangers to health. The general safety symbol in the following examples can be replaced in concrete notes on safety by a hazard-specific symbol.

! DANGER




Type and source of risk

Failure to observe the rule of conduct may result in most serious injuries or death!

Rule of conduct.

! WARNING




Type and source of risk

Failure to observe the rule of conduct may result in most serious injuries or death!

Rule of conduct.

! CAUTION



Type and source of risk


Failure to observe the rule of conduct may result in most serious injuries or death!

Rule of conduct.

1.5.2 Notes

Notes draw attention to the correct handling of the product in order to avoid material damage.

! NOTICE



Type and source of risk

Failure to observe the rule of conduct may result in most serious injuries or death!

Rule of conduct.

1.5.3 Eingebettete Hinweise

If dangerous situations can occur during work or if inappropriate behaviour is possible, attention is drawn to this by embedded notes in handling instructions:

1. Handling step

! DANGER Type and source of risk! Rule of conduct.

2. Handling step

! WARNING Type and source of risk! Rule of conduct.

3. Handling step

! CAUTION Type and source of risk! Rule of conduct.

4. Handling step

! NOTICE Type and source of risk! Rule of conduct.

2 Safety information

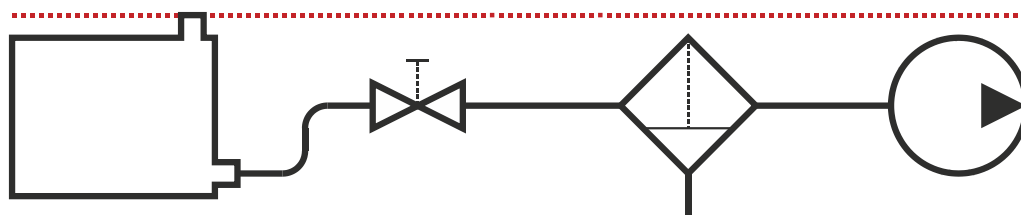
The safety information is to be considered in performing all work.

2.1 Intended use

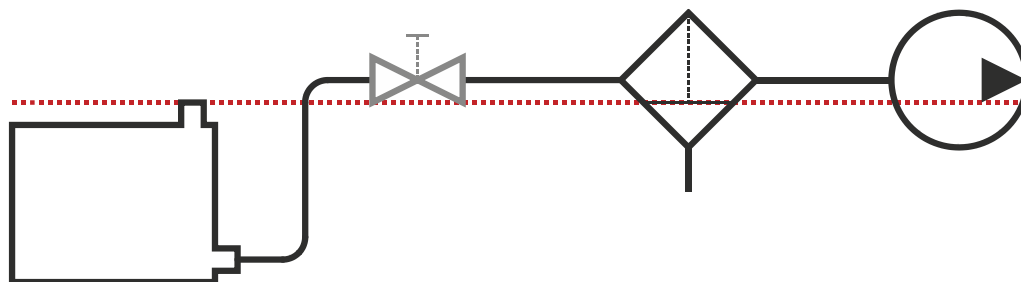
The filter is suitable for the cleaning and water-removal of light diesel oils, in accordance with DIN EN 590. It is installed in the supply flow pipe of the fuel circuit.

2.1.1 Installed situation

If the supply flow of the filter is below the maximum filling level in the tank, a blocking valve must be installed between tank and filter.



If the supply flow of the filter is above the maximum filling level in the tank, a blocking valve between tank and filter is not required as mandatory.



Basically we recommend to install a blocking valve.

2.1.2 Fuel specification and temperature range

DIN EN 590..... -40 °C to 85 °C

Our SEPAR products are compatible with various diesel fuels. Compatibility with additional fuels is tested on a regular basis, and the list is continuously expanded. The possibility of using fuels not specified here, or operation in other temperature ranges, can be requested if required.

The compatibility list can be found in the current version of document D10143: "Permitted fuels for SEPAR products."

2.1.3 Predictable misuse

The maximum flow rate of the filter must be greater than or equal to the maximum pump capacity of the fuel pump.

For the supply pipe to the filter, the following component parts may be used exclusively:

- Straight pipe pieces.
- Pipe bends with a radius which corresponds to at least three times the outer diameter of the pipe.
- Connectors and blocking elements which do not restrict the free cross-section of the pipe.

2.2 Basic notes on safety

CAUTION



Skin and eye irritation!

In case of contact with diesel oil, skin and eyes can become irritated!

When working with fuels, the following must always be observed:

1. When indicated, wear protection gloves that protect against diesel oil.
2. When indicated, wear eye protection.
3. In case of skin contact, wash off the affected areas of the skin thoroughly and apply skin protection ointment.
4. In case of eye contact, flush the eye immediately with flowing water and then consult a doctor.

CAUTION



Environmental damage!

Fuel discharging into the environment can cause damage!

When working with fuels, the following must always be observed:

1. Protect the work area so that any leaking fuel is safely collected.
2. Prior to commencement of work, exclude any leakage of fuel by suitable measures.
3. Collect any residue of leaked fuel completely with suitable materials on completion of the work.
4. Implement non-polluting waste disposal of any collected fuel, as well as materials impregnated with fuel.

3 Technical data

The manufacturer reserves the right to change the technical characteristics as a result of product improvements without special announcement.

3.1 Scope of delivery

Filter, optionally with

- 2 M14×1,5 sealing plugs and 1 PG7 sealing plug
- 2 M14×1,5 sealing plugs and water sensor

3.2 Mechanical data

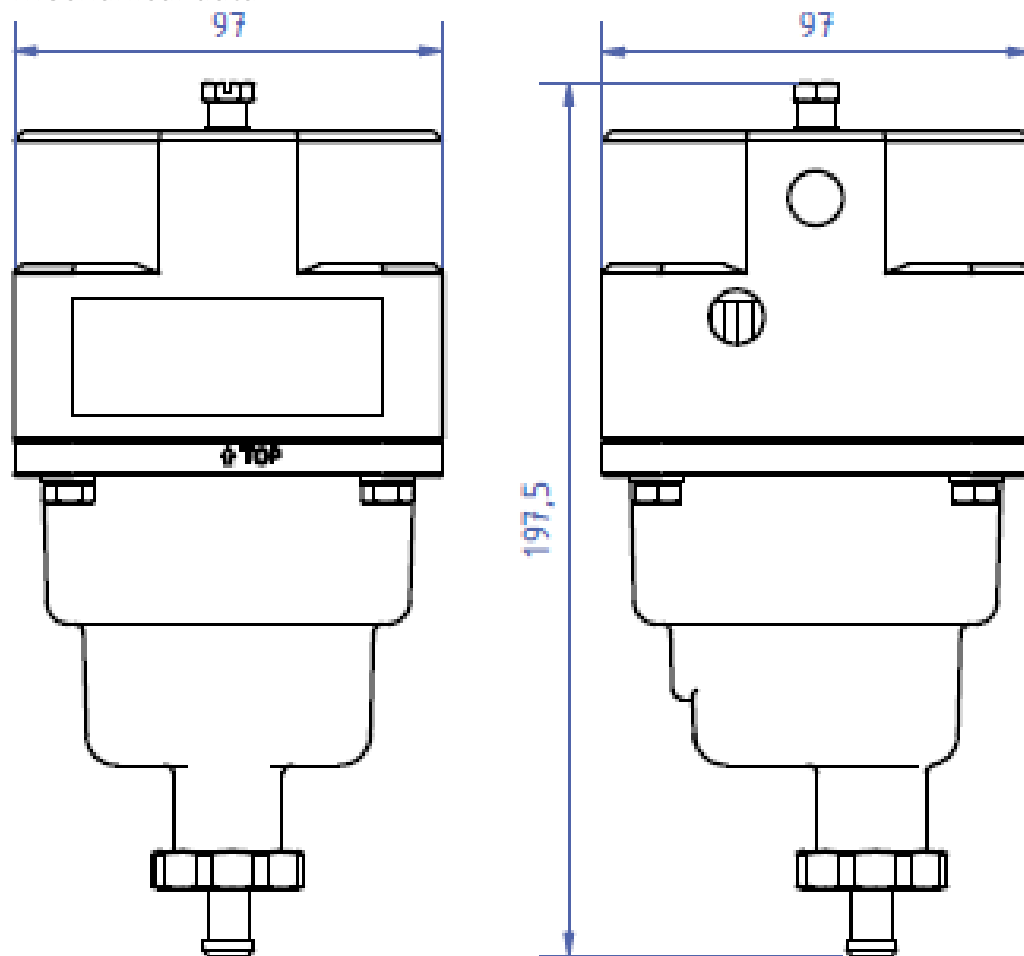


Figure 1: Dimensions



Mass.....	< 1,3 kg
Ambient temperature range	-40 °C to 85 °C
Fixing Points	
Screw tap	4
Screw-in-capable length of thread	10 mm
Tightening torque.....	17 Nm ± 3 Nm
Media connectors	4
Screw tap	M14×1,5
Seal according	ISO 9974-1
Screw-in-capable length of thread	≤15 mm
Tightening torque.....	25 Nm ± 5 Nm
Water sensor connector	
Internal thread	PG7
Tightening torque.....	screw in manually until the limit stop is reached
Bleed screw	
Tightening torque.....	8 Nm ± 2 Nm
Locking Ring Mounting	
Screw	Hexagon bolt M6 x 16
Tightening torque.....	8 Nm ± 2 Nm



3.1 Performance data

Performance data items are limit values. By the integration of the filter into an existing infrastructure, the indicated performance data can be limited under certain circumstances.

- Volume flow≤3 l/min
- Operating pressure (with reference to ambient pressure)
- Continuous pressure
- Inflow-outflow differential pressure at maximum flow
 - New filter element≤ 40 mbar
 - Contaminated filter element.....≤ 500 mbar
- Separation methodCoalescence + hydrophobic barrier
 - Water separation efficiency> 95 % according ISO 16332
 - Available filtration ratings 10 µm, 6 µm, 3 µm
 - Filter areaapprox. 10 dm²
- Water collection capacity.....approx. 70 ml
 - Alarm volume (optional)approx. 60 ml



3.2 Identification



Figure 2: Nameplate

1	Type designation	4	QR code for the downloading of the instruction
2	Address of the manufacturer	5	Performance data
3	Serial number		

Table 1: Explanation of the symbols on the nameplate

Symbole	Bedeutung
	Special waste, dispose of environmentally correctly
	Suitable only for diesel oil

3.3 Structure

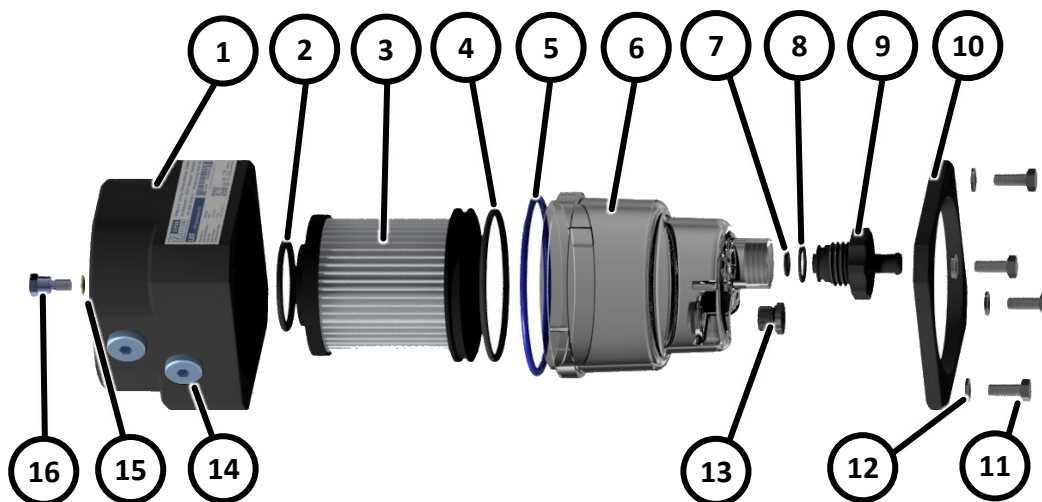


Figure 3: Individual parts of the filter

1	Filter body with media connectors	9	Drain valve
2	O-Ring seal filter element/filter body	10	Locking ring
3	Filter element	11	Hexagon bolt M6 x 16
4	O-Ring seal container/filter element	12	Washer 6,4
5	O-Ring seal container/filter body	13	Sealing plug PG7
6	Container	14	Sealing plug M14x1,5 with profiled gasket
7	O-Ring seal for drain valve seating	15	USIT sealing ring
8	O-Ring seal drain valve/container	16	Bleed screw M6

3.4 Mechanical connectors

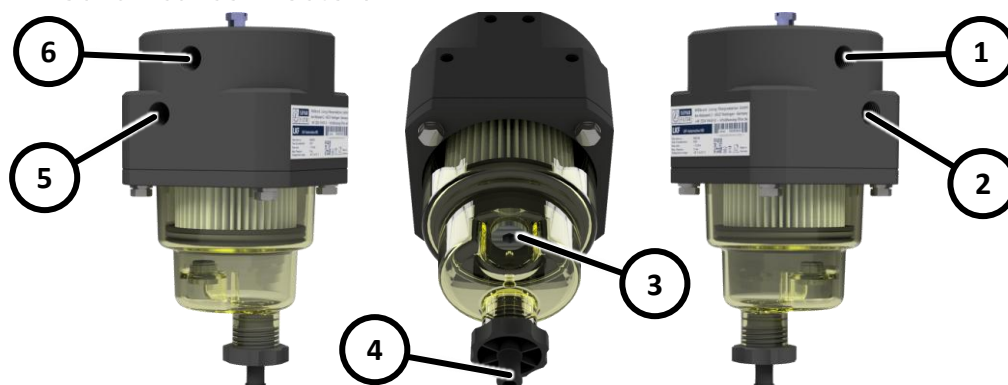


Figure 4: Mechanical connectors

1	Medium flow, right	4	Nozzle for drain hose
2	Medium supply flow, right	5	Medium supply flow, left
3	Screw-in thread for water sensor	6	Medium flow, left



4 Function

The medium suctioned by the fuel pump flows into the filter. A patented, multi-stage process first mechanically retains particles and suspended matter. Subsequently, water contained in the medium is separated, which collects at the bottom of the container. After that the cleaned medium leaves the filter.

5 Storage

The filter can be stored in its original packing or alternatively wrapped dust-protected in air-cushion film.

Storage temperature range..... -40 °C to 85 °C

Air humidity level..... ≤80%, non-condensing

6 Transport

The filter can be transported in its original packaging or, alternatively, wrapped in bubble wrap to protect it from dust.

During transport, the filter must not be dropped, subjected to impacts, or exposed to any mechanical load. Contact with sharp or pointed objects must also be avoided.

7 Installation

NOTICE



Transport damages!

A damaged filter can lead to consequential damage due to leaking medium!

Before installation

1. check the filter for visible damage.
2. check the package content for completeness.
3. when indicated, replace damaged parts and extend lost parts or use a new filter.

NOTICE

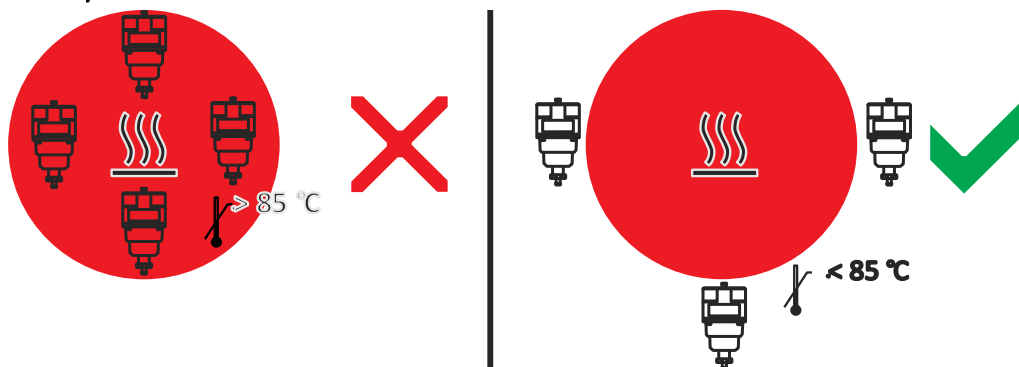


Dust caps!

For the protection of the filter, all mechanical connections are sealed ex works!

The dust caps may only be removed when installing the filter.

7.1 Safety information



CAUTION



Consider ambient temperature!

Too high temperatures can damage the filter and lead to consequential damage due to leaking medium!

Install the filter so that

- the installation surface causes no inadmissible heating.
- the filter is not in the irradiation range of hot system parts.
- when indicated, a heat shield can be mounted for the protection of the filter.

7.2 Mounting material

4 machine screws

Thread size M8

Length of thread > 10 mm

Tightening torque 17 Nm ± 3 Nm

2 spring lock washers DIN 127

The length of the fastening screws must be selected so that the screw thread grips over the full length of the screw tap.

7.3 Tools

- Torque wrench SW13
- Drill machine
- Drill 8,5 mm or 9 mm

7.4 Mounting

The filter is fixed with two machine screws which are screwed into the mounting flange.

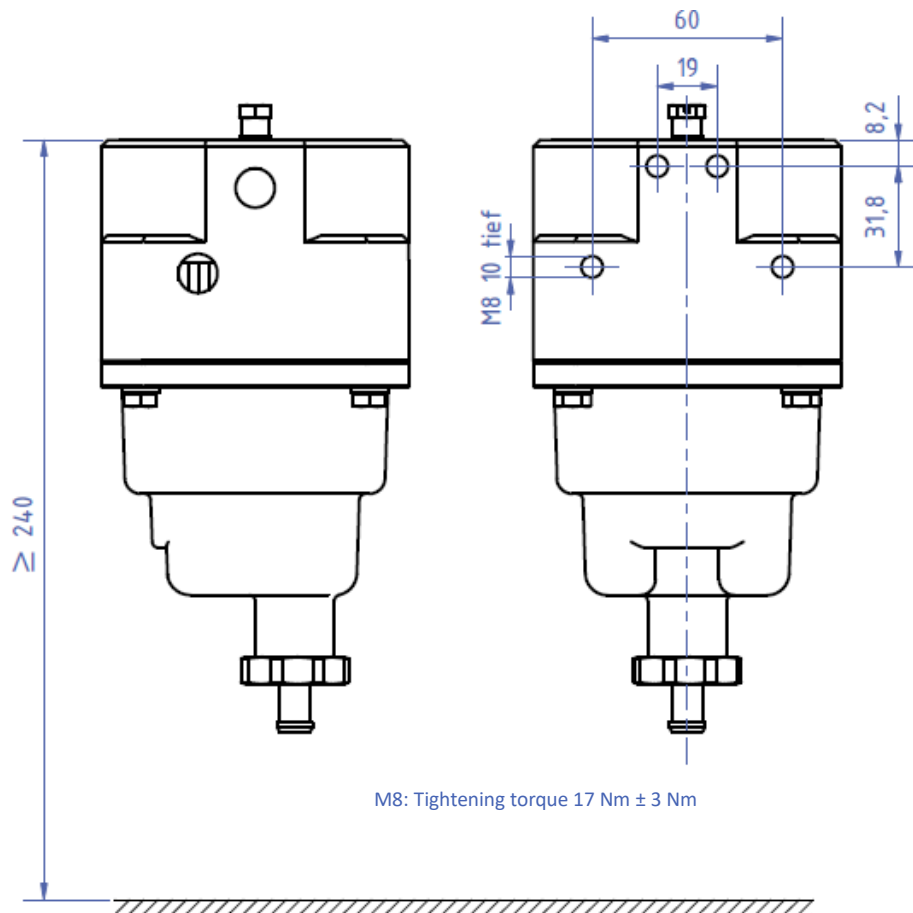


Figure 5: Mounting dimensions

- ▶ The filter is undamaged and the package content is complete.
 - ▶ A clearance height of at least 240 mm is existing at the mounting location.
 - ▶ The filter can be mounted so that sufficient space remains under the drain nozzle for the connection of the drain hose.
 - ▶ The mounting flange does not protrude over the mounting surface.
1. Drill two holes at the correct positions according the figure 5.
 2. Deburr bores.
 3. Insert all four screws through from the rear side of the mounting surface and screw hand-tight into the mounting flange of the filter.
 4. Align filter so that its axis is vertical.
 5. Fix filter and tighten screws with the admissible torque.
- = The filter is mounted.

 **NOTICE**



Damage of the filter!

Failure to observe this can damage the locking hooks (→ p. Fehler! Textmarke nicht definiert.) of the filter head, which can result in reduced pressure resistance of the filter.

During installation, make sure that...

1. The rear hook is supported by the mounting surface.
2. Neither hook is damaged either negligently or intentionally with tools.

7.5 Connections

The media connectors are designed as tapped holes according to ISO 9974-1. Sealing plugs or connectors, which correspond to ISO 9974-2, can be screwed into them.

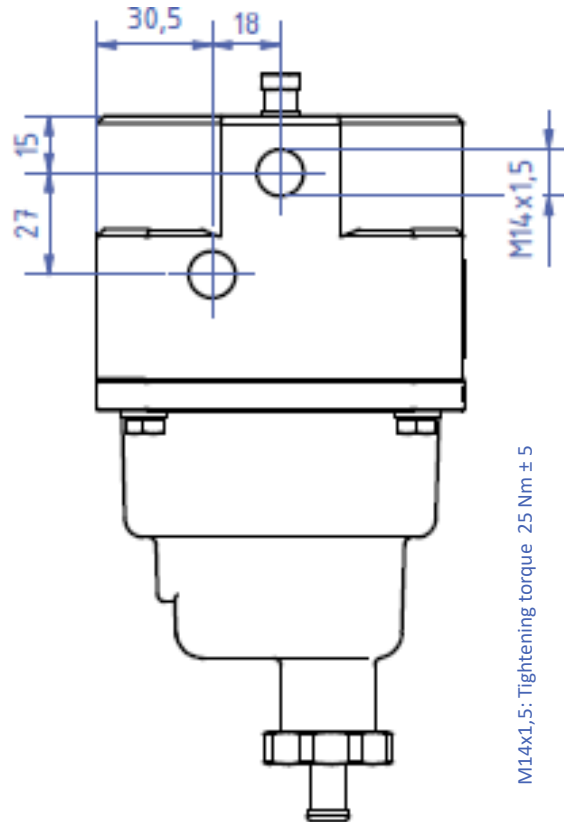


Figure 6: Connection dimensions

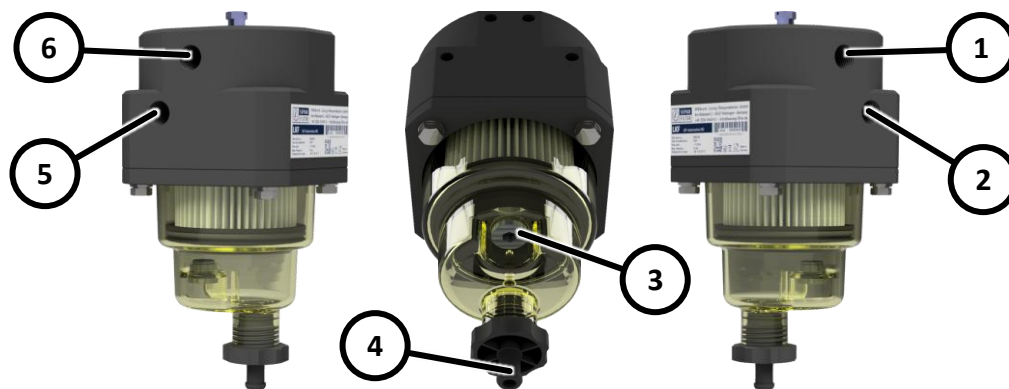


Figure 7: Mechanical connections

1	Medium flow, right	4	Nozzle for drain hose
2	Medium supply flow, right	5	Medium supply flow, left
3	Screw-in thread for water sensor	6	Medium flow, left

Medium supply flow

Connection for the fuel pipe from the deepest point of the tank.

Medium flow

Connection for the fuel pipe to the injection system.

Nozzle for drain hose

For simpler drainage of the filter, a hose which is suitable for the medium can be slid on.

Screw-in thread for water sensor

A water sensor which is available as an accessory can be screwed into this screw tap, where the sensor must be evaluated by additional electronics. This allows a message to be generated when the filter needs to be drained.

7.5.1 Connection example 1: Inlet left side and outlet right side



Figure 8: Connection example: Inlet left side and outlet right side

► The filter is mounted.

1. Connect the line from the tank (IN) to the medium inlet on the left side of the filter.
2. Connect the line from the filter to the injection system (OUT) to the medium outlet on the right side of the filter.
3. Close all still open medium connections with one sealing plug each.

= The filter is connected.

7.5.2 Connection example 2: Inlet right side and outlet left side



Figure 9: Connection example: Inlet right side and outlet left side

► The filter is mounted.

1. Connect the line from the tank (IN) to the medium inlet on the right side of the filter.
2. Connect the line from the filter to the injection system (OUT) to the medium outlet on the left side of the filter.
3. Close all still open medium connections with one sealing plug each.

= The filter is connected.

7.5.3 Connection example 3: Inlet and outlet on one side



Figure 10: Connection example: Inlet and outlet on one side

► The filter is mounted.

1. Connect the line from the tank (IN) to the medium inlet on the left (right) side of the filter.
2. Connect the line from the filter to the injection system (OUT) to the medium outlet on the left (right) side of the filter.
3. Close all still open medium connections with one sealing plug each.

= The filter is connected.

8 Initial commissioning

A water sensor may need to be fitted or the container rotated into a different position before the first start-up.

8.1 Disassemble container



Figure 11: Disassemble container

- ▶ The filter is mounted.
 - ▶ A water sensor should be assembled and/or the container should be rotated.
1. Loosen and remove all four hexagon bolts on the locking ring one after another.
 2. Secure the container against falling and pull the locking ring down over the container. Then remove it and set it aside.
 3. Pull the container downward out of the filter body.

NOTICE

Ensure with pulling off the container that the filter element is pulled out from the filter body as well.

= The container is disassembled.

8.2 Mount water sensor



Figure 12: Tapped hole for the water sensor

1. Remove the sealing plug from the container and keep safe.
2. Check the seal of the water sensor for correct position.
3. Clean the sealing surface on the container with a soft cloth.
4. Carefully screw the water sensor into the thread in the container by hand and tighten by hand until the stop is reached.

= The water sensor is mounted.

8.3 Position container

For optimum access to the drain valve or water sensor, the container can be inserted into the filter housing in four positions.

For this purpose, the container is mounted on the filter body rotated a quarter turn around the longitudinal axis in each case. The positioning is implemented over two pins arranged diametrically on the container, which are guided by two of the four slots in the filter body in each case.



Figure 13: The four positions of the container

8.4 Assemble container

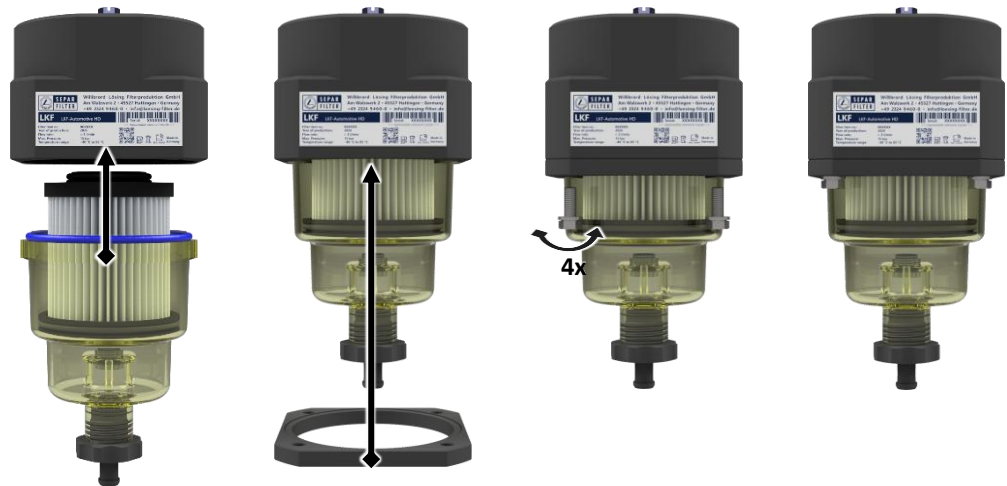


Figure 14: Assemble container

- ▶ The filter element is inserted correctly into the container.
 - ▶ The sealing surfaces on the container and in the filter body are cleaned.
1. Rotate the container around its longitudinal axis to get it into the approximate assembly position.
 2. Slide the container into the filter body from below. Ensure in this case that the filter element slides into the filter body without canting.
 3. Align the pins on the container by rotating so that they grip into the slots in the filter body.
 4. Using light pressure, move the container into the filter body up to the stop and hold fixed.
 5. Slide the locking ring over the container and press it firmly against the filter housing until it is fully seated.
 6. Insert the four hexagon screws into the threaded holes and tighten them in a crosswise pattern using the specified tightening torque.
- = The container is assembled.

8.5 Fill filter

A suitable pump must be connected to the connection for the medium outlet, with which fuel can be sucked from the tank. We recommend integrating the SEPAR HFP hand fuel pump, available as an accessory, into the fuel line after the filter.



Figure 15: Hand fuel pump SEPAR HFP

As soon as the filter is filled completely with fuel and vented, the operation can be started.

9 Maintenance

Regular inspection of the filter ensures its permanent function and protects the engine from damage.

NOTICE



Malfunction!!

Maintenance work on a filter in the active fuel circuit can lead to malfunctions and, consequently, to environmental damage!

In case of maintenance work, the following must always be observed:

1. Before starting work, deactivate the fuel circuit.
2. If there is a pressure difference between the filter and the environment, equalize it before starting work.
3. Ensure correct position of all connections and seals.
4. Check the filter for leaks after recommissioning.

9.1 Safety information

CAUTION



Environmental damage

Replaceable items contaminated with fuel or cleaning agents can cause environmental damage!

In case of maintenance work, the following must always be observed:

1. Prior to commencement of work, prevent any leakage of fuel from the tank by suitable measures.
2. Collect the fuel from the filter completely using a suitable vessel.
3. Place exchanged parts so that any possibly leaking fuel is securely absorbed.
4. Collect any residue of leaked fuel completely with suitable materials on completion of the work.
5. Ensure a non-polluting waste disposal of exchanged parts and the collected fuel, as well as materials used for cleaning.



9.2 Visual inspection

The time interval between visual inspections depends on the operation conditions. The following conditions shorten these intervals, in particular when they occur in combination:

- High ambient temperature
- Severe vibration and/or shaking
- Bad fuel quality

The following points are to be checked with a visual check:

1. Can any lack of sealing be determined?
→ If applicable, locate the leak(s) and replace the seals.
2. Can any damage be determined (cracks, breakouts)?
→ When indicated, replace damaged part.
3. Can dirt precipitation be determined in the container?
→ When indicated, *Clean container* (→ p. 31).
4. Check the water level in the container in case of filter without water sensor.
→ When indicated, *Drain filter* (→ p. 28).
5. In case of filter without differential pressure measurement, check the filter element for cleanliness.
→ When indicated, *Change filter element* (→ p. 29).

9.3 Assemble disassembled filter

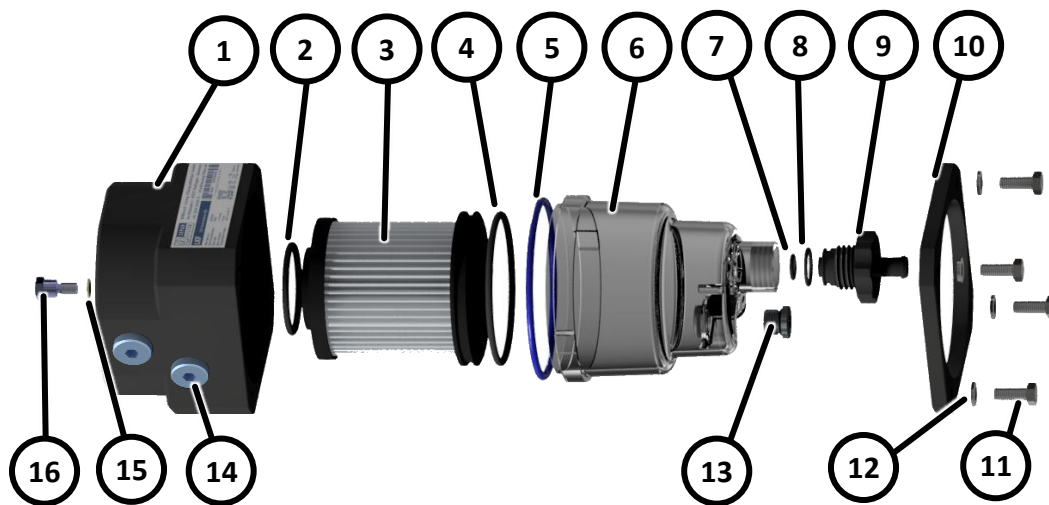


Figure 16: Individual parts of the filter

1	Filter body with media connectors	9	Drain valve
2	O-Ring seal filter element/filter body	10	Locking ring
3	Filter element	11	Hexagon bolt M6 x 16
4	O-Ring seal container/filter element	12	Washer 6,4
5	O-Ring seal container/filter body	13	Sealing plug PG7
6	Container	14	Sealing plug M14x1,5 with profiled gasket
7	O-Ring seal for drain valve seating	15	USIT sealing ring
8	O-Ring seal drain valve/container	16	Bleed screw M6

9.3.1 Complete drain valve



9.3.2 Complete container



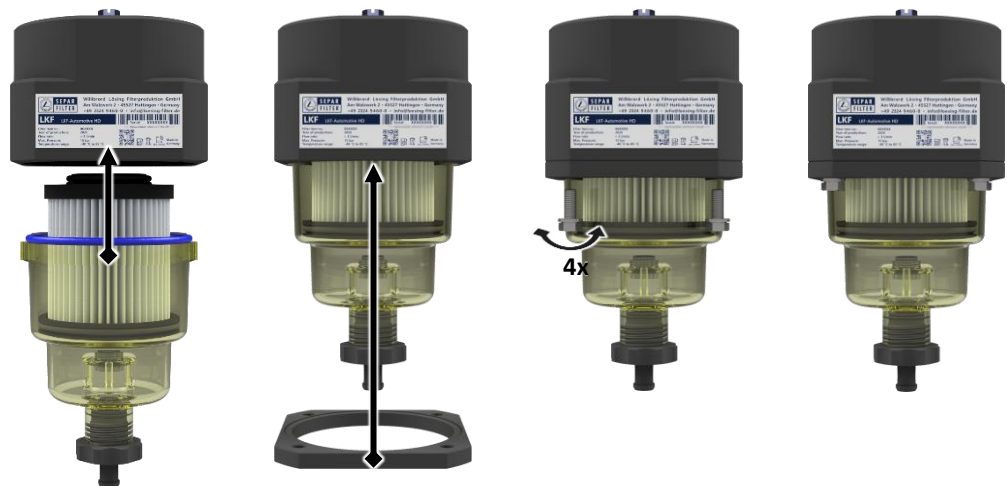
9.3.3 Complete filter element



9.3.4 Insert filter element into the container



9.3.5 Assemble container



9.4 Drain filter

A filter must be drained immediately when

- it is equipped with a water sensor and the maximum water level is signaled.
- with the visual check, a water level which was too high was determined.

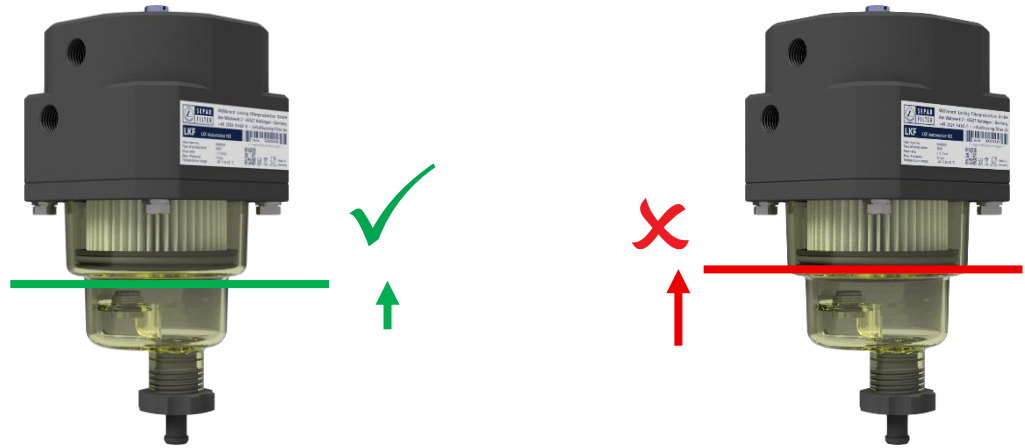
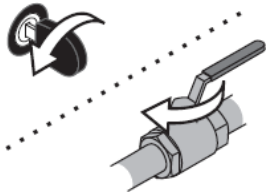




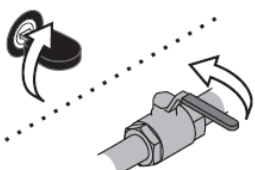
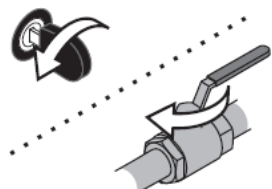



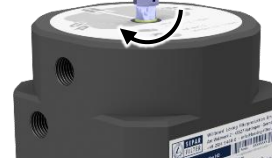


Figure 17: Admissible maximum water level

 <p>1. Stop machine or block supply pipe.</p>	 <p>2. Release the drain valve and open it about half a turn.</p>	 <p>3. Loosen the bleed screw and open it by approximately one turn.</p>
 <p>4. Open the drain valve. Drain off water. Close the drain valve at the latest when diesel oil leaks.</p>	 <p>5. Tighten the loosened vent screw with the specified tightening torque.</p>	 <p>6. Start machine or unblock supply pipe.</p>

9.5 Discharge filter

For work on the filter it must be completely discharged.

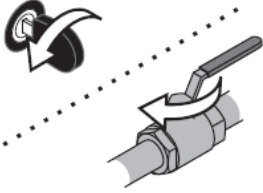












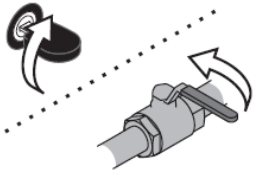
 <p>1. Stop machine or block supply pipe.</p>	 <p>2. Release the drain valve and open it about half a turn.</p>	 <p>3. Loosen the bleed screw and open it by approximately one turn.</p>
 <p>4. Open drain valve. Discharge filter. Close drain valve.</p>	 <p>5. Tighten the loosened vent screw with the specified tightening torque.</p>	

9.6 Change filter element

The filter element must be changed regularly, at the latest, 12 months after operational start-up.

Whether an earlier change is required can be determined unambiguously only with a differential pressure measurement between medium supply flow and medium run-off. If such measuring equipment is not available, the condition of the filter element must be tested regularly by a visual check. We recommend to change the filter element in case of soiling which is obviously identifiable from externally and to also clean the container in this case.

With the change of the filter element, basically new seals must be used and the sealing surfaces in the filter body, as well as in the container, cleaned free of residue. An already used filter element may not be used again.

 <p>1. Stop machine or block supply pipe.</p>	 <p>2. Release the drain valve and open it about half a turn.</p>	 <p>3. Loosen the bleed screw and open it by approximately one turn.</p>
 <p>4. Discharge filter.</p>	 <p>5. Container demontieren.</p>	 <p>6. Remove used filter element from the container and dispose of in an environmentally friendly manner.</p>
 <p>7. Clean container.</p>	 <p>8. Complete container</p>	 <p>9. Unpack new filter element and O-rings.</p>
 <p>10. Complete filter element.</p>	 <p>11. Insert the completed filter element into the container.</p>	 <p>12. Assemble container.</p>
 <p>13. Tighten the loosened vent screw with the specified tightening torque.</p>	 <p>14. Evacuate the air from filter, then start machine or unblock supply pipe.</p>	

9.7 Clean container

The container must always be cleaned each time the filter element is changed.

NOTICE



Do not use any alcohol-content cleaners!

Alcohol changes the material properties of the container and leads to irreversible damage!

The following must always be observed during maintenance work:

1. Use clean diesel oil exclusively for the cleaning.
2. Do not use any hard or sharp-edged objects.

<p>1. Stop machine or block supply pipe.</p>	<p>2. Discharge filter</p>	<p>3. Disassemble container</p>
<p>4. Remove used filter element from the container and dispose of in an environmentally friendly manner.</p>	<p>5. Clean container.</p>	<p>6. Complete container.</p>
<p>7. Unpack new filter element and O-rings</p>	<p>8. Complete filter element</p>	<p>9. Insert new filter element.</p>
<p>10. Assemble container.</p>	<p>11. Start machine or unblock supply pipe.</p>	

10 Waste disposal

All component parts of the filter must be disposed of environmentally correctly, in accordance with local legal and operational regulations.

11 Spare parts

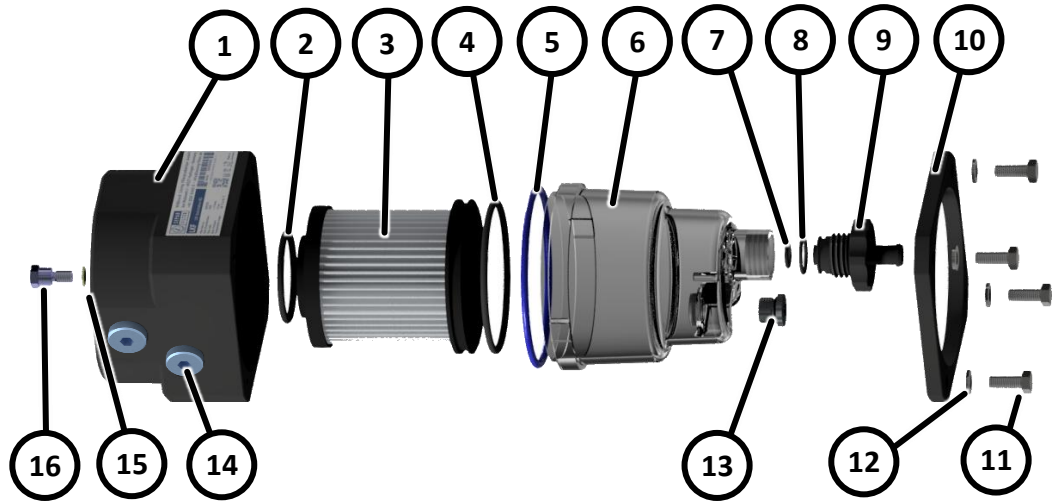


Table 2: Spare parts

Position	Description	REF
1 ... 16	LKF-Automotive HD with filter element 3 µm	06 3941
	LKF-Automotive HD with filter element 6 µm	06 3942
	LKF-Automotive HD with filter element 10 µm	06 3943
2, 3, 4	LKF-Automotive, filter element 3 µm	06 3738
	LKF-Automotive, filter element 6 µm	06 3739
	LKF-Automotive, filter element 10 µm	06 3719
5, 7, 8	LKF-Automotive, seal set, consisting of 2 x O-ring seal for drain valve (material NBR) 2 x O-ring seal for container (material FVMQ)	06 3746
	5, 6, 7, 8, 9	LKF-Automotive, container with drain valve and seal set
13	Sealing plug PG7 with O-ring seal	06 1558
14	Sealing plug M14x1,5 with profiled gasket	06 3681

12 Accessories

Table 3: Accessories

Position	Description	REF
	Connector plug for WSA water sensor	06 1834
	WSA water sensor	06 1381
	Hand fuel pump HFP	06 3880





SEPAR Embodies Performance And Reliability

