Willibrord Lösing Filterproduktion GmbH
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LKH

Fuel heater

Translation of the original operating manual

Table of contents

1 General information

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

A specimen in the original language is enclosed with every translation of this manual. Should uncertainties or discrepancies be determined in the translation, before the utilisation 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 manual are used as an example and therefore do not agree exactly with the product supplied

1.1 Storage

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

1.2 Copyright

1.3 Notes

Safety symbol in the following examples can be replaced by a hazard-specific symbol in specific safety instructions.

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

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 serious physical injuries!

Rule of conduct.

CAUTION

Type and source of risk

Failure to observe the rule of conduct may result in physical injuries!

Rule of conduct.

NOTICE

Type and source of risk

Failure to observe the rule of conduct may result in property damage!

Rule of conduct.

DANGER	**Type and source of risk! Rule of conduct.**
WARNING	**Type and source of risk! Rule of conduct.**
CAUTION	**Type and source of risk! Rule of conduct.**
NOTICE	**Type and source of risk! Rule of conduct.**

2 Safety information

2.1 Intended use

The LKH fuel heater (further referred to "heater") is suitable exclusively for heating light diesel fuels (see chap. 3.8). It is installed in the supply line of the fuel circuit.

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.

⚠ NOTICE

Heater damage!

Operating the heater without fuel can destroy the heater!

Make sure the heater is filled with fuel before starting operation!

3 Product description

The manufacturer reserves the right to change the technical characteristics through product improvements without special notice.

3.1 Design and function

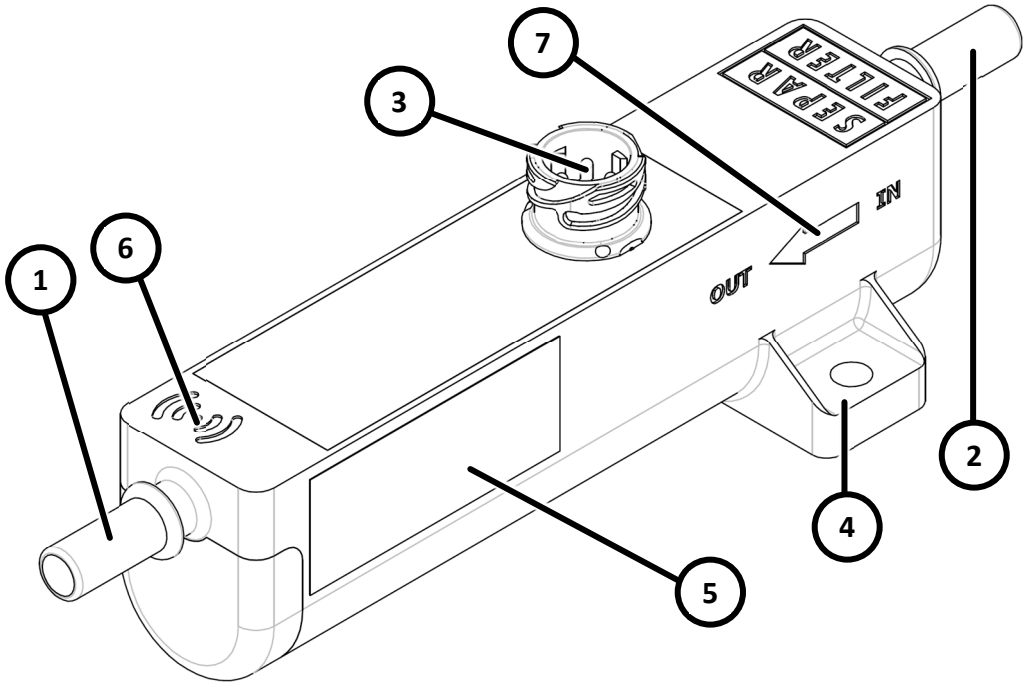


Figure 1: Functions of the LKH

1	Fuel outlet	**5**	Type plate
2	Fuel inlet	**6**	RFID product marking
3	Electrical connector	**7**	Flow direction
4	Mounting bracket (There is a second one on the other side)		

The built-in temperature controller automatically switches the heating current on and off again via an externally wired relay, depending on the preset temperature thresholds.

The correct wiring can be found in chapter 6.5.4.

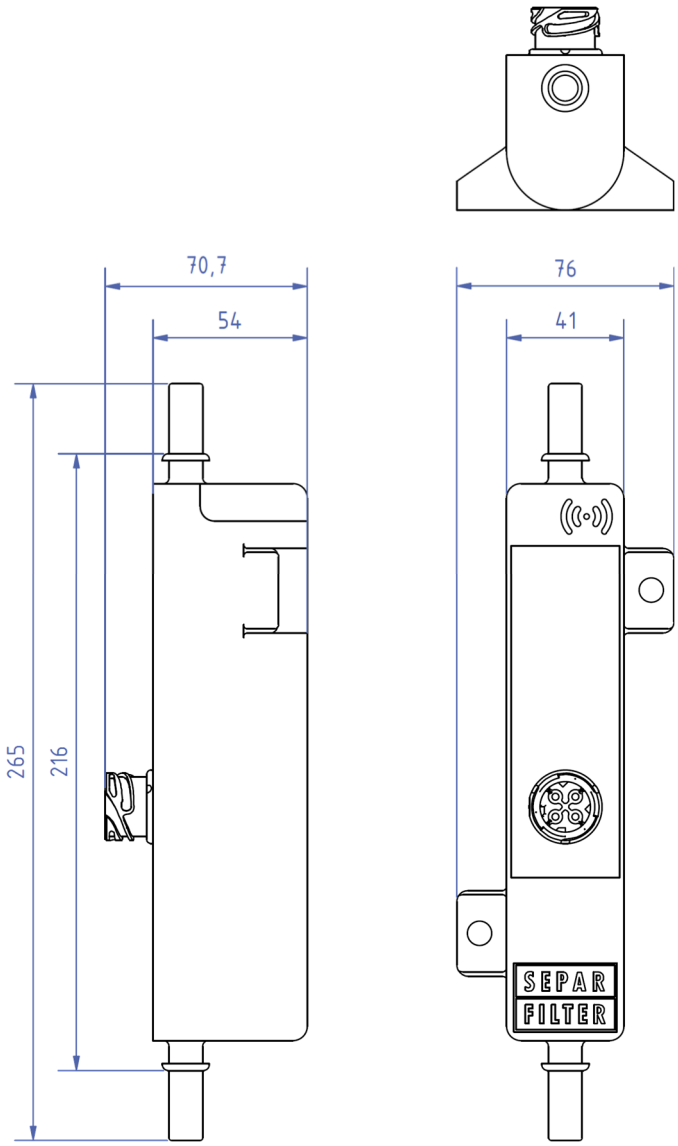


Figure 2: Dimensions of LKH

3.2 Identification

3.2.1 Type plate

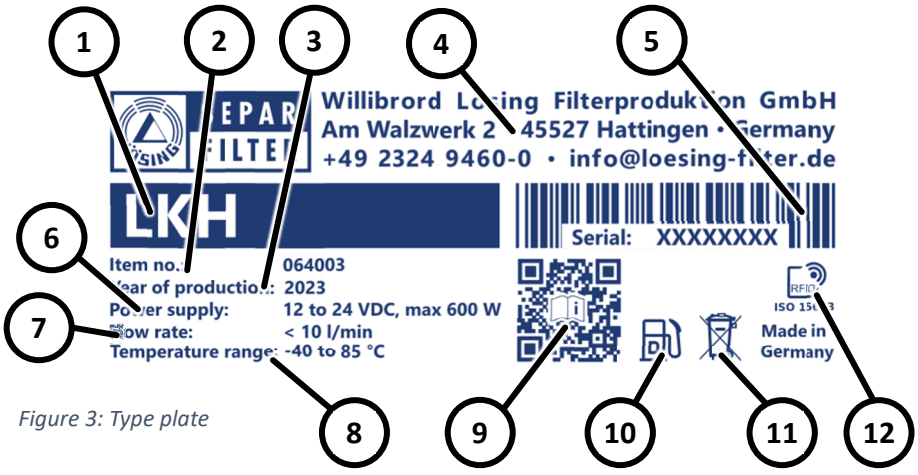


Figure 3: Type plate

1	Type designation	**7**	Volume flow
2	Article number / order number	**8**	Ambient temperature range
3	Date of manufacture	**9**	QR code for downloading the manual
4	Address of the manufacturer	**10**	Only suitable for diesel fuels
5	Serial number	**11**	Special waste, dispose of environmentally correctly
6	Supply voltage and maximum possible power	**12**	The device is equipped with a transponder which is activated with radio frequency

3.2.2 RFID chip

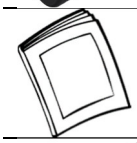
The product is equipped with an RFID transponder according to ISO 15693, which can be determined with a suitable reader. The reading position of the transponder can be found in chapter 3.1 under point 6.

The transponder and the serial number can both be used to uniquely identify the device and include it in the traceability chain.

3.3 Installed situation

The fuel heater is installed at a suitable location in the fuel supply line. Ideally, it is placed directly upstream of a SEPAR filter to protect the powertrain from the consequences of a clogged filter. Alternatively, the heater can also be used independently of a filter.

3.4 Scope of delivery

Illustration	Description	REF
	LKH fuel heater	
	Quick guide with link to operating manual	
	Cable socket with straight and angled grommet	

3.5 Mechanical data

Characteristic	Unit	Value	Comment
Height	mm	ca. 265	Without quick connector
Width	mm	ca. 76	
Depth	mm	ca. 71	Without cable socket
Mass	kg	< 0,8	Without extra parts and without fuel
Fixing points		2x M8	Screw length > 10 mm (depends on surface thickness)
Fuel connector			2x quick connector 12 mm according SAE J2044

3.6 Electrical data

Characteristic	Unit	Value	Comment
Power supply	VDC	12 … 24 Max. 30	
Power (at 12 VDC)	W	50, 100 or 150	External fuse: 22 A for 150 W operation
Power (at 24 VDC)	W	200, 400 or 600	External fuse: 45 A for 600 W operation
Connector			Lear Series VKS Plus Type 3, 4 pin flange plug

3.7 Performance data

Characteristic	Unit	Value
Flow rate	l/min	10
Operating pressure (Continuously)	bar	-0,8 … 5
Operating pressure (Short-term, max. 15 Sec.)	bar	< 6
Lower switching point	°C	> 5
Upper switching point	°C	< 10
Ambient temperature range (Operating)	°C	-40 … 80
Ambient temperature range (Storage)	°C	-40 ... 60

3.8 Fuel specification

Our SEPAR products are compatible with various diesel fuels. The compatibility to further fuels is tested regularly and the list is extended. If the desired fuel is not listed here, it must be requested from the manufacturer.

3.8.1 Civil fuels

	DIN EN 590		**DIN EN 16709:2019 (B20 and B30)**
	DIN V 51603-6		**ASTM D975-16a grade 1/2-D S15**

3.8.2 Military fuels

	F34		**F54**
	F35		**F75** With a sulphur content not exceeding 1,0 %
	F44		**F76** With a sulphur content not exceeding 1,0 %

3.8.3 Marine Distillates

	ISO-F DMX		**ISO-F DMB** With a sulphur content not exceeding 2,0 %
	ISO-F DMA With a sulphur content not exceeding 1,0 %		

3.8.4 Jet fuels Europe

☐	**JET A1**	☐	

3.8.5 Jet fuels US

☐	**JP-8**	☐	**JP-5**

3.8.6 Alternative fuels

☐	**EN 15940**	☐	**EN 16734**
☐	**EN 16709**	☐	**ASTM D7467**

4 Storage

The heater can be stored in its original packing. If using alternatively packing it must wrapped dust-protected and impact-protected.

Storage temperature range: -40 °C to 60 °C

Air humidity level: ≤80%, non-condensing

It is recommended to keep the maximum storage temperature as low as possible to reduce the aging of the built-in thermal fuse.

5 Transport

The heater can be transported in its original packing. If using alternatively packing it must be wrapped dust-protected and impact-protected When transporting, the heater may not

- be thrown about.
- be let fall.
- be impacted.
- be loaded with heavy objects.
- Come in contact with sharp and/or pointed objects.

6 Installation

NOTICE

Transport damage!

A damaged heater 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 heater, all mechanical connections are sealed ex works!

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

CAUTION

Consider ambient temperature!

Too high temperatures can damage the heater 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

6.1 Mounting material

- 2 machine screws
  - Thread size M8
  - Screw head hexagon head, socket head, pan head, o.ä.
  - Length of thread > 16 mm
  - Tightening torque 3 Nm +/- 0,5 Nm
- 2 spring lock washers DIN 127
- 2 washers DIN 125
- If necessary 2 hex nuts M8

After mounting at least 6 mm of the thread must be load-bearing. So the thread length depends on the type and thickness of the selected mounting surface.

The nuts are necessary if the mounting surface is a sheet with a thickness smaller than 6 mm..

6.2 Tools

Suitable tools are required for the installation, for

- Drilling two holes (Ø8,5 or Ø9 mm) or two tapped holes M8.
- Tightening the two machine screws.

- Possible work on the piping system in which the heater is inserted.
- Installing the cable socket.

6.3 Mounting

The heater can be positioned flexibly. It operates in both horizontal and vertical orientation.

The distances of the heater from the installation space limits depend largely on the choice of fuel connectors and the cable connector.

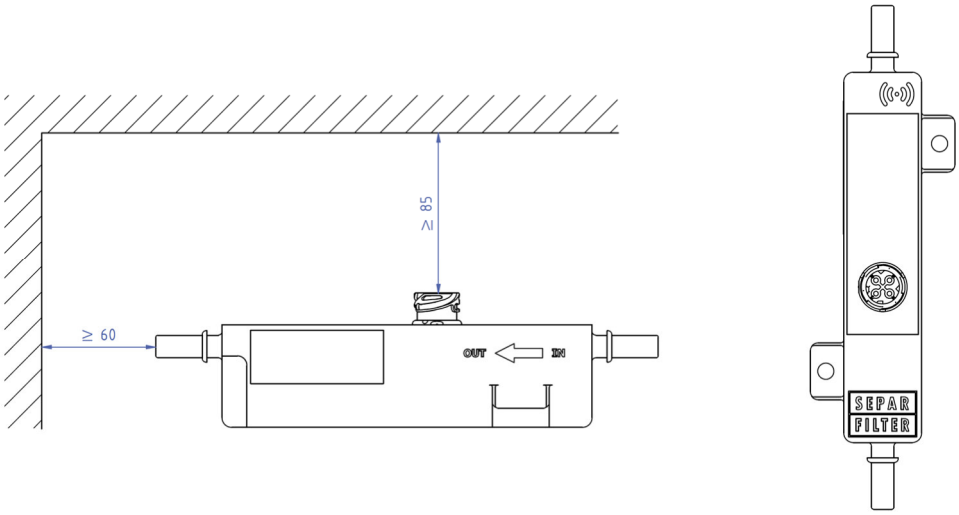
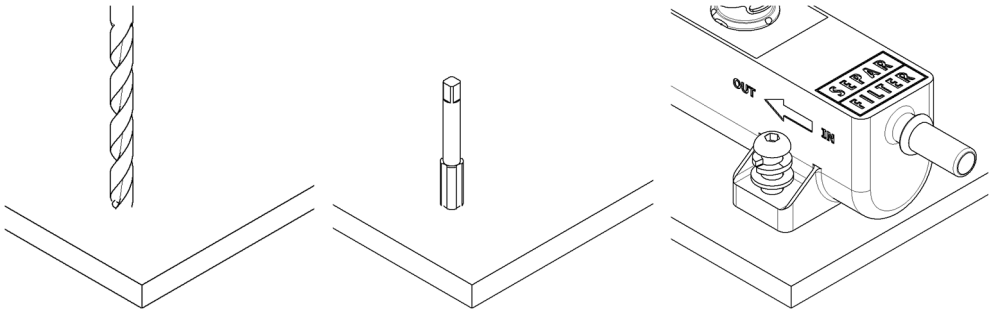


Figure 4: Position of the LKH within the installation space limits



1. Drilling two holes.
2. Cutting two threads.
3. Fixing the heater.

Figure 5: Mounting example the LKH

6.4 Fuel connectors

6.4.1 Close

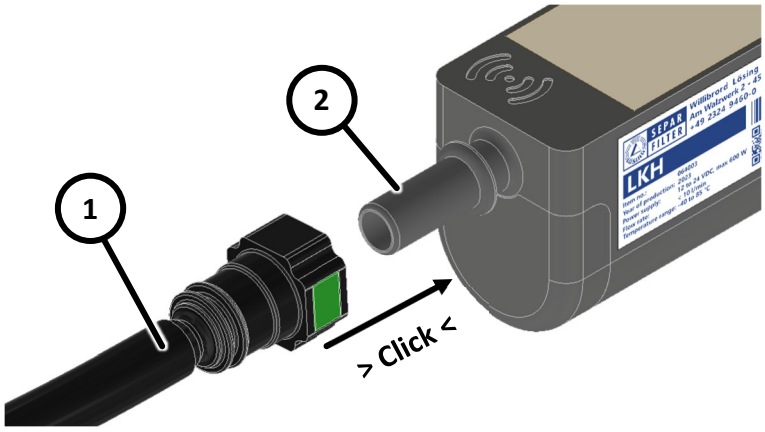


Figure 6: Closing the fuel connector

1. Connect the quick connector according to SAE J2044 to the existing fuel line system.
2. Push the quick connector onto the connection piece until it clicks.
3. Repeat it on the second connection piece.

6.4.2 Open

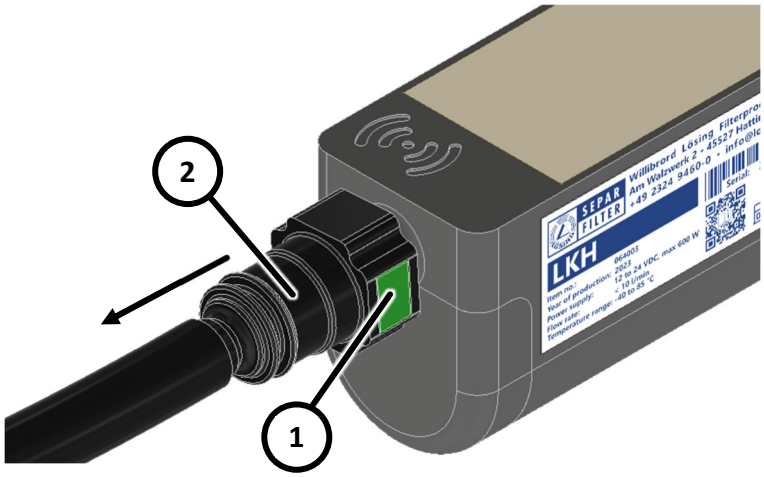


Figure 7: Opening the fuel connector

1. Push and hold the button.
2. Pull off the quick connector.

6.5 Electrical connector

6.5.1 Close

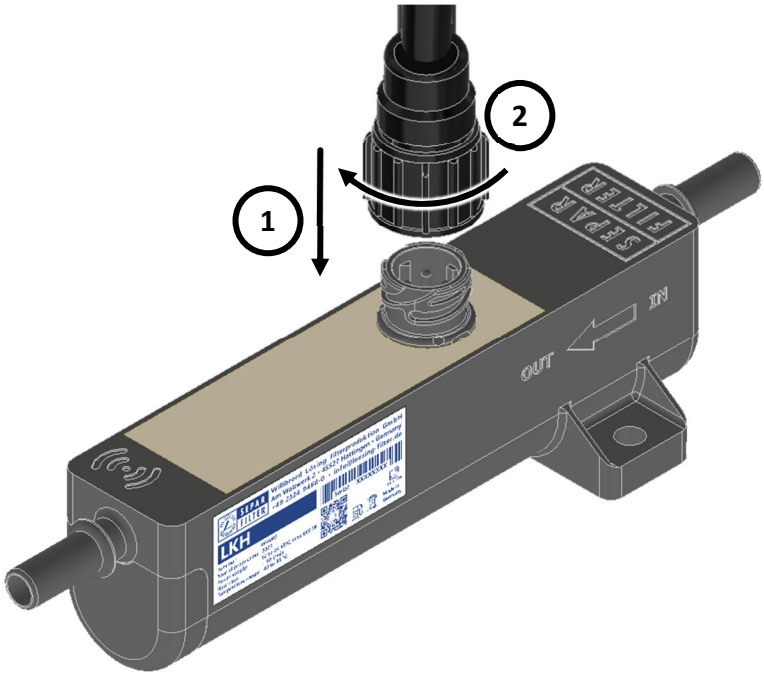


Figure 8: Closing the electrical connector

1. Plug on wired cable socket.
2. Turn the retaining ring clockwise until it clicks into place.

6.5.2 Open

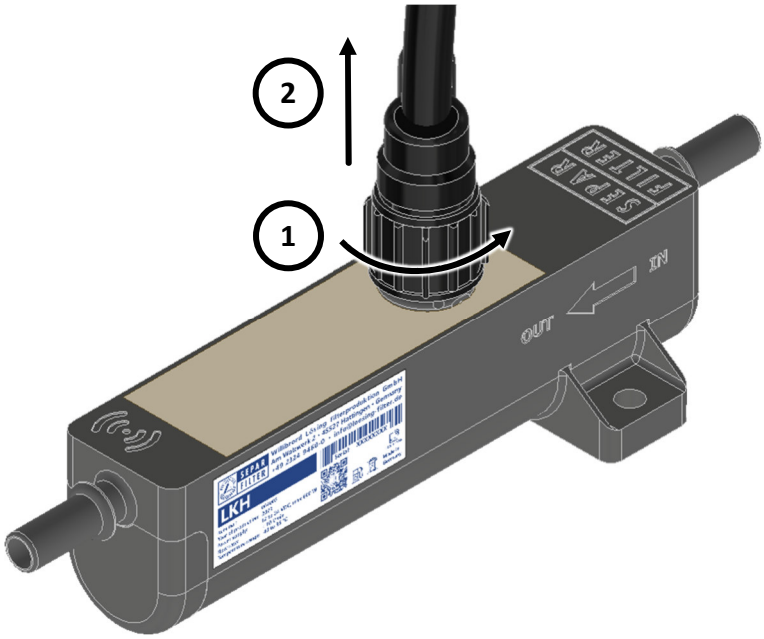


Figure 9: Opening the electrical connector

1. Turn the retaining ring counterclockwise.
2. Pull off the cable socket.

6.5.3 Pin assignment

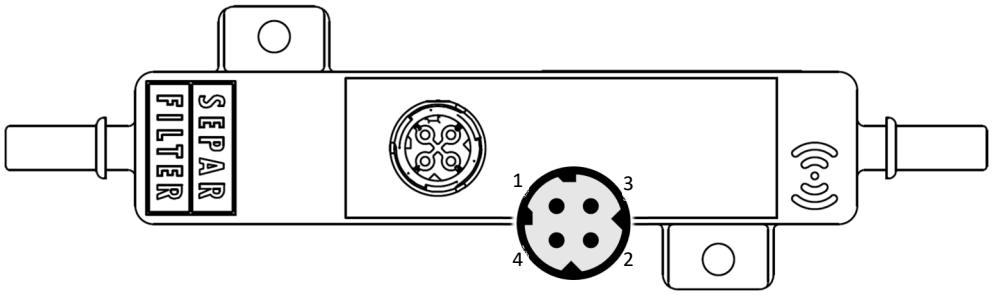


Figure 10: Pin assignment

1	GND heating element	**3**	GND temperature control
2	Supply voltage temperature control	**4**	Supply voltage heating element

6.5.4 External wiring

The components used here are not included in the scope of delivery (see Chap. 3.4)

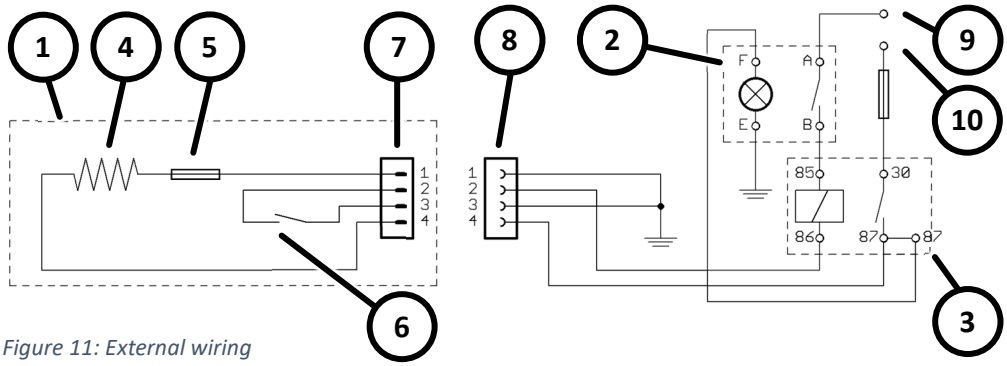


Figure 11: External wiring

1	Heater	**6**	Temperature control
2	Rotary switch with control light	**7**	Flange plug (see Chap. 6.5.3)
3	Relay	**8**	Cable socket
4	Heating element	**9**	Supply voltage temperature control
5	Thermal fuse (83 °C)	**10**	Supply voltage heating element

To 2. A switch with LED can be used alternatively.

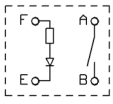


Figure 12: Switch with LED

NOTICE **Observe the polarity of the LED! Otherwise the switch may be damaged.**

To 3. The relay switches the power current. For example, relays with the following characteristics can be used.

a. For 24 V Onboard voltage (45 A contacts)

b. For 12 V Onboard voltage (25 A contacts)

To 6. The temperature controller switches through the control current depending on the defined switching points (see Chap. 3.7).

To 9. 24 V or 12 V switched by the ignition.

To 10. 24 V or 12 V switched by the battery voltage.

DANGER

Fire risk!

Failure to observe the rules of conduct will damage the heater, which may result in failure of turning off the heater voltage.

The heating current must never be switched directly via the thermostat! The thermostat is not designed for this high load. To be able to switch the heating current, controlled by the thermostat, an additional relay is always required, which must be connected according to the above diagram. The cables used must have a sufficient cross-section (2.5 mm² recommended).

7 Initial operation

CAUTION

Environmental damage!

Fuel discharging into the environment can cause damage!

The heater must not be put into operation until the installation has been fully completed

CAUTION

Damage of the heater!

The heating energy cannot be delivered to the medium and damages the heater!

Before switching on the heater electrically, it must be completely filled with the medium to be heated.

Apply the control voltage to the heater to put the heater into operation.

If the wiring is done correctly according to chap. 6.5.4, the heater current will be switched on and off automatically depending on the media temperature and the switching points

8 Maintenance

The heater is generally maintenance-free.

The heater can be cleaned with commercially available, alcohol-free cleaning agents.

NOTICE

Alcohol based cleaners!

Alcohol based cleaners can damage the surfaces!

Cleaning agents containing alcohol should be avoided in order not to damage the materials used in the heater.

9 Troubleshooting

Malfunction	Possible cause	Elimination
The Device does not heat	The electrical wiring has not been done correctly.	The wiring should be checked again with the help of chapter 6.5.4.
The Device does not heat	The built-in thermal fuse has tripped because the device was exposed to a temperature > 83 °C.	The device must be replaced.
The device heats continuously	The electrical wiring has not been done correctly.	The wiring should be checked again with the help of chapter 6.5.4.
Media leaks out of the device	The fuel connections are dirty and the seals do not close properly.	The quick connectors should be disconnected and reconnected after thorough cleaning (see chapter 8) of the fuel connections.
Media leaks out of the device	The heater housing or flange connector is damaged.	The device must be replaced.

10 Decommissioning

It is recommended that the following sequence be followed, when the heater is to be taken out of service.

1. Disconnect the electrical connector (see Chap. 6.5.2)
2. Drain fuel lines
    a. If possible, pump out fuel in advance
    b. Provide a sufficiently large collecting vessel
    c. Disconnect the fuel connectors (see Chap. 6.4.2)
    d. If necessary, take up drip quantities
3. Seal fuel connections with caps
4. Clean the heater before storing, if necessary

11 Disposal

All components of the heater must be disposed of in an environmentally friendly manner in accordance with the legal regulations in the country of use.

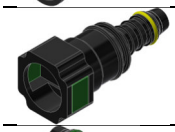
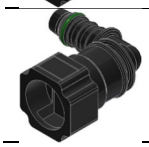
When disposing of the heater, please note that all components are potentially contaminated by the heated medium.

The heater consists of:

- Plastics (Housing, potting compound, Connectors)
- Stainless steel and steel (Heating element, electromechanical components)
- Copper (Circuit board)

12 Spare parts & accessories

The heater cannot be disassembled. Thus no parts can be exchanged.

Abbildung	Beschreibung	REF
	LKH heater 200 W	06 4001
	LKH heater 400 W	06 4002
	LKH heater 600 W	06 4003
	Cable socket with straight or angled grommet	06 1307
	Quick connector (straight) for fuel connection	06 3884
	Quick connector (angled) for fuel connection	06 3883

13 Declaration of conformity

CE

EG-Konformitätserklärung
EU-Declaration of Conformity

Hiermit bestätigen wir, dass das nachfolgend bezeichnete Gerät den angegebenen Richtlinien entspricht.
We herewith confirm that the appliance as detailed below complies with the mentioned directives.

Artikelbezeichnung: Article description:	LKH Heizung
Artikelnummer: Article number:	064001, 064002, 064003
Type:	LKH 200 W, LKH 400 W, LKH 600 W
Firmenanschrift: Company address:	Willibrord Lösing Filterproduktion GmbH Am Walzwerk 2 D-45527 Hattingen
Einschlägige EG-Richtlinien: governing EU-directives:	Elektromagnetische Verträglichkeit Electromagnetic compatibility (EMC) 2014/30/EU
	Niederspannungs-Richtlinie Low voltage directive 2014/35/EU
	Maschinen-Richtlinie Machinery directive 2006/42/EG

Unterschrift: ppa.
Signature:

Stellung im Betrieb: Geschäftsleitung
Position: COO

Ausstellungsdatum: Hattingen, 15.08.2023
Date of issue: Hattingen, 15.08.2023

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SEPAR Embodies Performance And Reliability