MANN+HUMMEL
Diesel Heater DH12 and DH24 for PreLine® Fuel Prefilter

Installation and Maintenance Manual

Contact information

This installation and maintenance manual is a component part of the scope of delivery. It must be kept close to hand and remain with the equipment in the event of resale.

We reserve the right to make technical modifications to the product described in this installation and maintenance manual without notification.

This installation and maintenance manual is not subject to any updating service.

You can obtain the updated version by contacting:

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Contents

1 Foreword

This installation and maintenance manual should serve to explain the Diesel Heaters DH12 and DH24 for the PreLine® fuel prefilter and its intended use.

The installation and maintenance manual contains important information on operating the machine safely, properly and economically. Observation of the manual helps avoid risks and repair costs, reduce downtimes, improve machine reliability and increase its service life.

The manual must be available to every person charged with working on the diesel heater.

The respective existing national environmental protection regulations (especially on the disposal of removed parts), the general accident prevention regulations and the other generally recognised safety-related and industrial safety and health rules must be complied with.

We reserve the right to make technical modifications to the filter and to these diesel heaters and/or to amend the content of this installation and maintenance manual.

Information for the operator:

The operator is responsible for the provision of working equipment complying with basic health and safety requirements in accordance with the Ordinance on Industrial Health and Safety. This also includes deploying the work equipment such that it is only used within the scope of its intended use. The operator can define individual inspection plans and intervals in addition to those stipulated in the installation and maintenance manual.

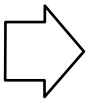
2 Safety

2.1 Warning notes and symbols

This symbol appears in all the sections of the manual in which your safety could be at risk. Failure to observe the information leads to the potential risk of personal injury.

!

This symbol indicates sections which must be strictly observed to prevent the risk of damage or destruction of system parts.



This symbol appears in all the sections of the manual in which the information provided must be carefully observed to ensure trouble-free, economic operation.

2.2 General information

Read the EU Material Safety Data Sheet on Diesel Fuel and observe the information contained in it regarding handling diesel fuel.

- Diesel fuel and fuel fumes are damaging to health. Ensure fumes are not inhaled, do not get in the eyes or come into contact with bare skin.
- Only complete assembly work when the engine has stopped.
- Depressurize pressure lines before starting work.
- In the case of escaping fuel, place a collecting vessel in the appropriate position to prevent environmental pollution.
- Only complete work for which you have been trained and received the necessary instruction.
- Do not overpaint the diesel heater.

2.3 Intended use

The diesel heater is exclusively designed to heat diesel fuel compliant with DIN 590 in combination with the PreLine®. Any other use above or beyond this is considered unintended use.

The manufacturer/supplier is not considered liable for damage resulting from unintended use.

The use and addition of benzene and/or other media is prohibited in all cases!

Intended use also includes observing the information in the installation and maintenance manual and maintaining the inspection and maintenance conditions.

All labels and identifications on the diesel heater must be kept in a legible condition

The diesel heater may only be serviced and maintained by trained, authorized personnel.

Area of application
Filter head of the fuel filter system
PreLine® 250
PreLine® 270, 420, 600
PreLine® 271, 421, 601

3 Scope of Delivery

Order number	Scope of delivery
DH24	Diesel heater, 24 Volt version (part number 29 017 00 230)
DH12	Diesel heater, 12 Volt version (part number 29 017 00 240)

4 Technical Data

4.1 Diesel heater DH24 / 24 Volt

Order Number DH24	**DH24 = 29 017 00 230** **29 017 00 231**
Nominal voltage	24 V DC
Operating voltage	16 - 36 V DC
Storage temperature	-40℃ to +120℃ *(-40℉ to 248℉)*
Operating temperature	-30℃ to 95℃ *(-22℉ to 203℉)*
Permissible operating pressure	6 bar
Heat output	350 W +12% / - 35%
Continuous current	Max. 14.5 A at Up = 27.6 V
Switch-on current	17.2 A at Up = 27.6 V DC
Temperature switching point	ON -2℃ ± 3K *(28.4℉ ± 5.4℉)* OFF +9℃ ± 3K *(48.2℉ ± 5.4℉)*
Surface temperature, heating element	Max. 162℃ *(323.6℉)*
Protection class complying with DIN 40050 Part 9	IP6K9K

4.2 Diesel heater DH12 / 12 Volt

Order number	**DH12 = 29 017 00 240**
Nominal voltage	12 V DC
Operating voltage	8 - 16 V DC
Storage temperature	-40℃ to +120℃ *(-40℉ to 248℉)*
Operating temperature	-30℃ to 95℃ *(-22℉ to 203℉)*
Permissible operating pressure	6 bar
Heat output	250 W ± 30%
Continuous current	Max. 18.5 A at Up = 13.5 V
Switch-on current	25 A at Up = 13.5 V
Temperature switching point	ON -2℃ ± 3K *(28.4℉ ± 5.4℉)* OFF +9℃ ± 3K *(48.2℉ ± 5.4℉)*
Surface temperature, heating element	Max. 162℃ *(323.6℉)*
Protection class complying with DIN 40050 Part 9	IP6K9K

4.3 Diesel heater 24 Volt

Order number	**29 017 00 250**
Nominal voltage	24 V DC
Operating voltage	16 - 36 V DC
Storage temperature	-40℃ to +120℃ *(-40℉ to 248℉)*
Operating temperature	-30℃ to 95℃ *(-22℉ to 203℉)*
Permissible operating pressure	6 bar
Heat output	350 W +12% / -35%
Continuous current	Max. 14.5 A at Up = 27.6 V
Switch-on current	17.2 A at Up = 27.6 V DC
Temperature switching point	ON +7℃ ± 3K *(44.6℉ ± 5.4℉)* OFF +24℃ ± 3K *(75.2 ± 5.4℉)*
Surface temperature, heating element	Max. 162℃ *(323.6℉)*
Protection class complying with DIN 40050 Part 9	IP6K9K

5 Performance and power of the diesel heater

5.1 On starting the engine

Due to use of the diesel heater, the temperature at which the vehicle can be used without coagulation of the fuel may be around 4-5°C *(7.2-9.0°F)* less.

5.2. During operation of the engine

The diesel heater increases the temperature of the fuel flowing through it as stipulated in the details in the table.

Version	24 V DC	12 V DC
flow rate in l/h	temperature increase in °C *(°F)*	temperature increase in °C *(°F)*
50	6.5 *(11.7)*	4.6 *(8.3)*
100	4.5 *(8.1)*	3.2 *(5.7)*
200	3 *(5.4)*	2.1 *(3.8)*
300	2.1 *(3.8)*	1.5 *(2.7)*
400	1.9 *(3.4)*	1.4 *(2.5)*
500	1.5 *(2.7)*	1.1 *(2.0)*
600	1.2 *(2.1)*	0.9 *(1.6)*

5.3. Function of the diesel heater during installation in the water collection space

When installing the diesel heater in water collection space, coagulation of the fuel in the filter is not prevented. Here, the diesel heater prevents the separated and accumulated water from freezing during operation.
This allows the water to be drained off at any time.

6 Assembly

6.1 General information

Check the products delivery are complete and for any signs of damage.

If parts supplied are damaged, please inform MANN+HUMMEL immediately.

6.2 Assembling the diesel heater

6.2.1 The heater has already been installed in the filter housing at the factory.

For additional procedures, refer to Chap. 6.5 Wiring and clamp assignment.

6.2.2 The heater has not been installed in the filter housing at the factory.

Please make sure that the installation space described in 6.3 exists at your filter by measuring the filter head or based on your order drawing.

For additional procedures, refer to Chap. 6.4 Retrofitting the diesel heater.

Qualification of personnel

Assembly of the heater and installation of the lines, particularly in respect of the electrical connections, may only be carried out by skilled personnel in vehicle workshops who have received the necessary instruction or suitably trained personnel deployed in vehicle fleets which have their own workshops and personnel.

Functional faults and material damage through improper assembly

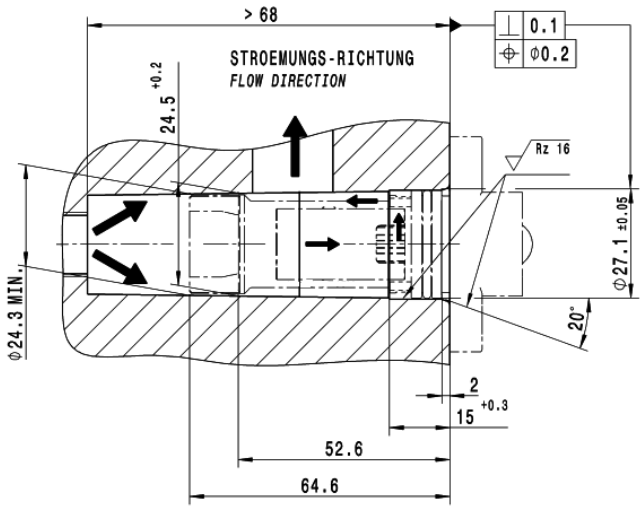
It is essential to observe the information on correct assembly when completing assembly and installation work.

Connection conditions, wire cross-sections and fusing etc., of the vehicle manufacturer and of the manufacturer of the heater must be observed.

Complete fixations and electrical connections properly.

The connection plug of the heater must always be connected to its mating connector.

6.3 Installation space for the diesel heater



Requirements of the installation location:

The necessary location hole must already be provided on the PreLine® filter system.

6.4 Retrofitting the diesel heater

Incoming goods check:

Make a visual inspection for any external damages.

Check whether the seal (1) is on the heater flange.

The filter housing (2) will be damaged if screws with a metric thread are used!

Only use screws (3) from the dismounted cover cap of the assembled diesel heater, or new "self-tapping" M6x18 screws.

(part number 01 163 06 018)

If screws with a metric thread must be used, the thread in the filter head must be retapped. The head diameter of the selected screw or washer must be > 11 mm. (risk of the spacer sleeve being pressed out)

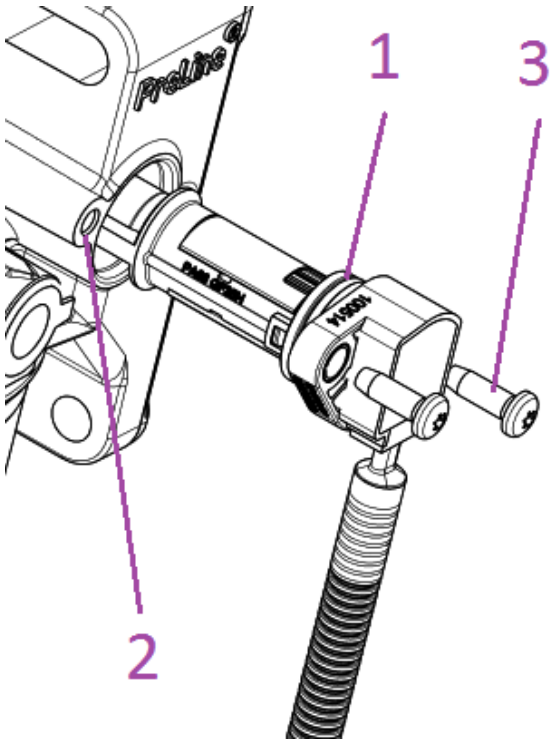


Fig. 1 Make a check of incoming goods

- Switch off the vehicle engine.
- Open the water drain plug (4).
  (The water drain plug must be turned counterclockwise.)
- Drain off approx. 0.5 litres of diesel fuel into a collecting vessel.

If the drive engine is more than 3 meters from the filter, drain off 0.1 litres more fuel for each meter of fuel line.

- Close the water drainage screw (4).
  (Tightening torque 1±0.2 Nm).
- Vent the fuel system / filter using the bleed plug (5) on the PreLine® fuel prefilter or, preferably, using a bleed plug which is near the engine.
  (required tool: wrench with wrench size 12)

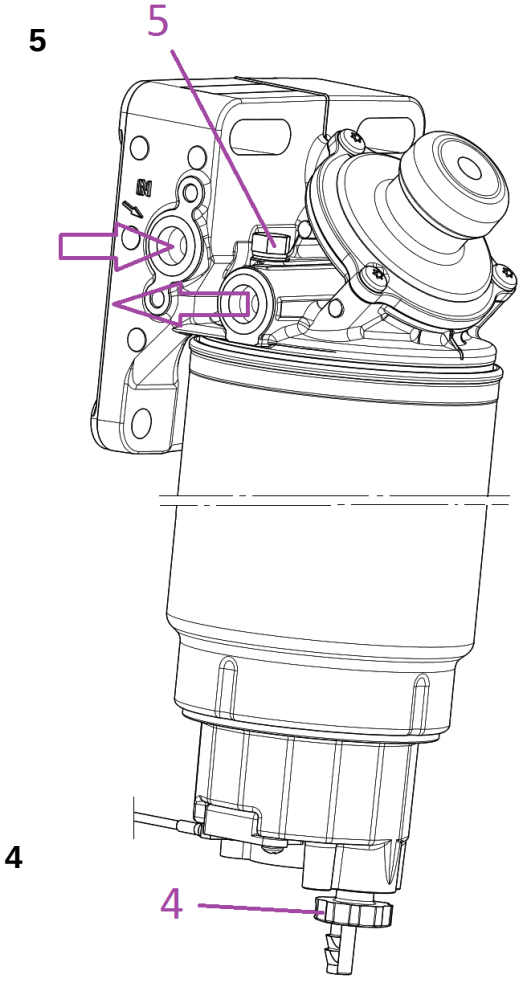


Fig. 2 Venting the fuel prefilter

- Remove the covering cap (6) from the filter system.
- Keep the screws (3) to fix the diesel heater.
- Insert the diesel heater (7) in the location hole in the filter head.
- Fix the diesel heater in place with the screws (3). (Tightening torque 8 ± 1.6 Nm, impact screwdriver not permitted!)
- Draw the fuel using the hand pump (8) on the filter (approx. 40 strokes + approx. 7 strokes for each meter of fuel line in excess of 3 meters).
- Close the bleed plug (5) when fuel escapes at the filter head. (Tightening torque 6.5±1.3 Nm).
- Start the engine and complete a function test / leak test. (The diesel heater only switches on when the ambient temperature is less than 2℃ *(35.6℉).* See chapter 4)
- PreLine® 50 to 250: DH12 or DH24 can be mounted right or left. The adaptor flange has to be mounted accordingly, see manual of PreLine®.
- PreLine® 270 to 420: DH12 or DH24 can only be mounted on the right side of the filter head.

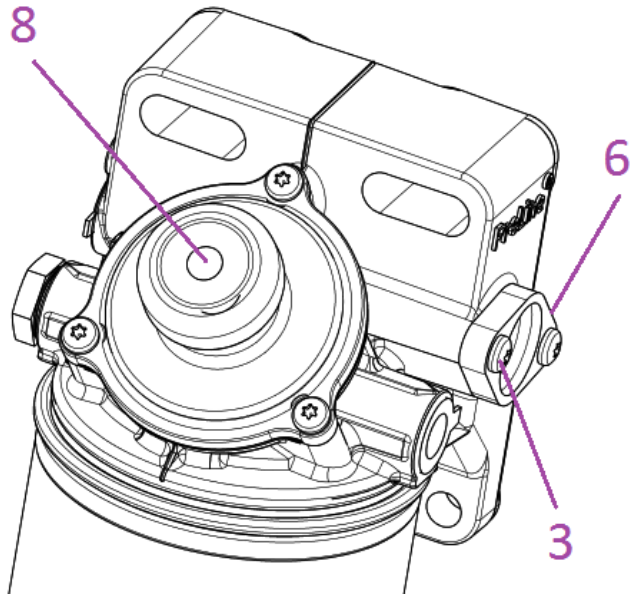


Fig. 3 Disassembling the cover cap

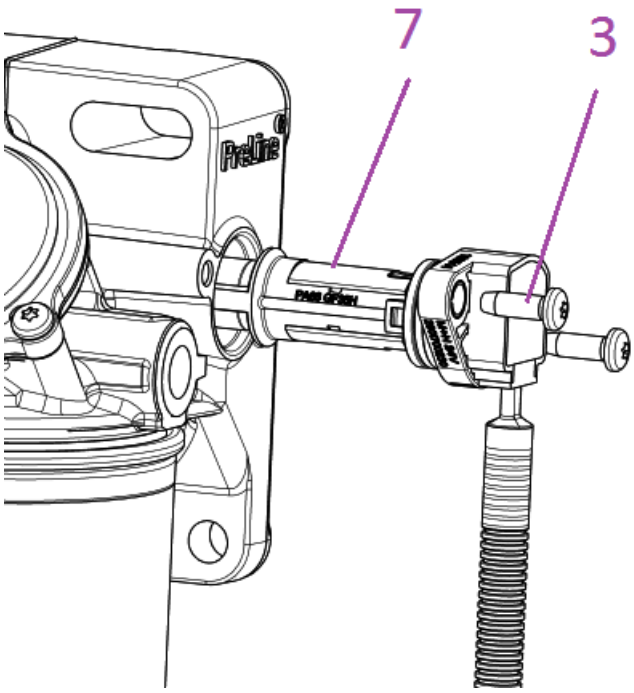


Fig. 4 Assembling the diesel heater

6.5 Wiring, clamp assignment

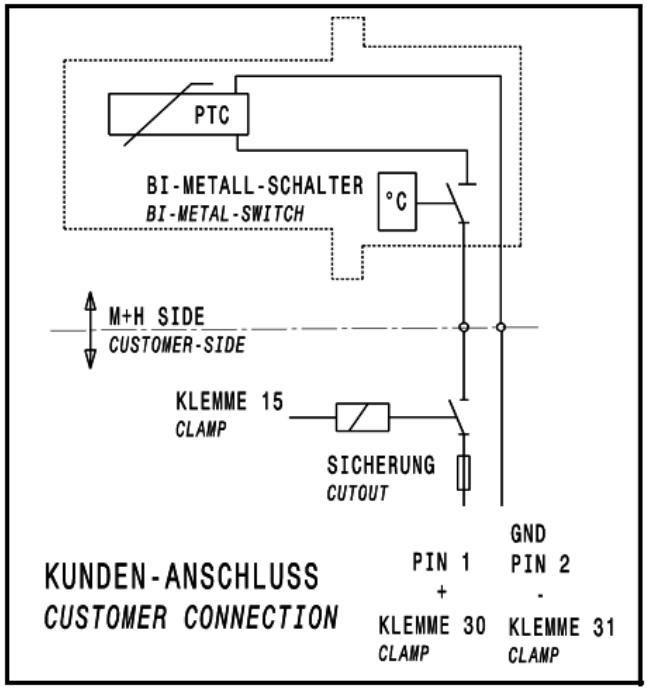


Fig. 5 Wiring

Disconnect the battery before starting work on the electric system!

The positive pole must be connected to the power supply via an electric fuse (in accordance with the company standard of the application manufacturer).

Incorrect connection of the diesel heater can result in damage to the diesel heater, the filter and even your vehicle.

Maximum fuse protection	
DH24	24 V, 20 Amp (colour code yellow)
DH12	12 V, 30 Amp (colour code green)
Nominal voltage	
DH24	24 V DC
DH12	12 V DC
Max. cable length	5 m
Connecting cable	2-wire non-metallic sheathed cable, e.g. Radox 155S FLR, temperature class 150°C *(302°F)* For the load circuit (clamp 30/31): Min. cross-section 2.5 mm^2 complying with DIN 72551 and ISO 6722, Class B

To ensure that the installation has been completed properly and the product functions correctly, a function test (mechanical and electrical) must be performed after assembly.

The function test is a component part of the assembly work.

Coding of the connections and plug

The basic versions of the diesel heaters **DH24 (29 017 00 230)** and **DH12 (29 017 00 240)** are supplied with 2 cable ends without a plug. A plug of your choice can be connected here or the cable can be connected directly to the on-board supply.

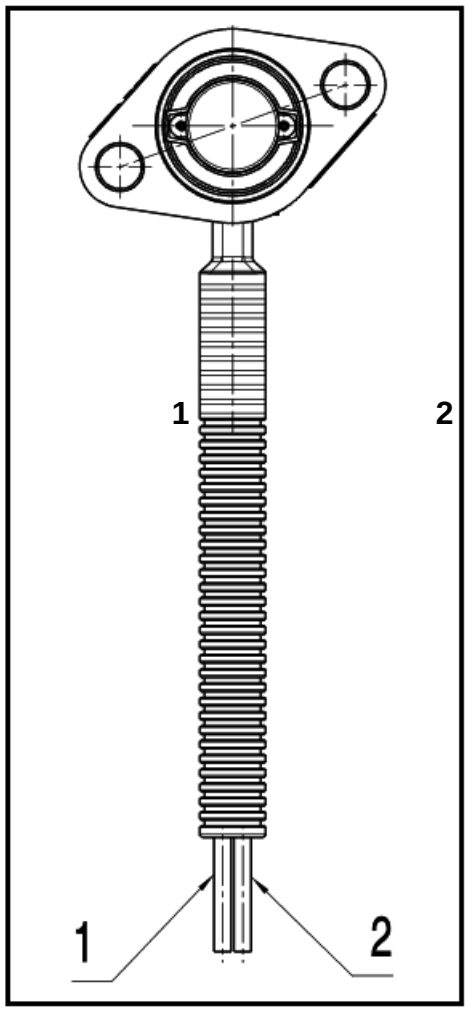


Fig. 6 Diesel heater connection

Pos. 1	Cable (2.5 mm²) to minus pole of battery (colour code: black)
Pos. 2	Cable (2.5 mm²) to plus pole of battery (colour code: red)

6.6 Pin assignment of the connection plug of the diesel heater with bayonet connector

29 017 00 231

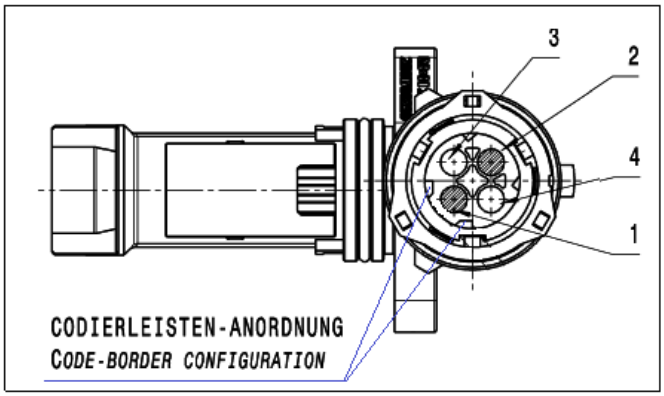


Fig. 7 Heater connection 29 017 00 231 (with bayonet connector)

Pin 1	Battery's positive pole (red, 2.5 mm²)
Pin 2	Battery's negative pole (black, 2.5 mm²)
Pin 3	Not connected
Pin 4	Not connected

Connector DIN 72585-B1-2.1-Sn/K2

B = unoccupied connector

1 = arrangement of coding strip (colour code black (BK))

2.1 = plug assignment (2-pin)

Sn = tin-plated contact compliant with DIN EN 28 092

K2 = stress class (-40℃ up to +140℃) *(-40℉ up to +284℉)*

7 Maintenance

The diesel heater has a service life of 10 years. The diesel heater must then be replaced by the operator as described in Chapter 6.4.

Longer operational use of the diesel heater does not comply with its intended use.

The operator is obliged to check the diesel heater once a week for visible signs of damage or defects as well as for any changes (including operational behaviour) which may impair functional safety, to the manufacturer or the seller.

(See page 2 Contact information)

If faults occur at the diesel heater then it must be disconnected from the power source by interrupting the power line. (pull the fuse or disconnect connecting cable and secure against reconnection/being switched back on)

8 Related Documents

- Order drawing from MANN+HUMMEL
- Operating and maintenance manual from the vehicle manufacturer
- Applicable national laws in country of use
- National laws in the country of use that regulate the operation or retrofitting of the diesel heater.