MANN+HUMMEL
DH11 Diesel Heater for PreLine Fuel Prefilters

Installation and Maintenance Manual

Contact information

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

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

This operating and maintenance manual is not subject to an 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 Heater DH11 for the PreLine fuel prefilters 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 potential risks, reduce repair costs and downtimes as well as improve machine reliability and increase its service life.

The manual must be made 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), general accident prevention regulations and 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:

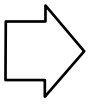
The operator is responsible for the provision of working equipment complying with basic health and safety requirements in accordance with the Ordinance on Industrial Safety and Health. This also includes deploying the work equipment such that it is only used within the scope of its intended use. The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

2 Safety

2.1 Warning labels 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 provided could put persons at risk.

This symbol appears in all the sections of the manual in which the information provided must be strictly observed to prevent damage to 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. Do not inhale them, let them get in your eyes or come into direct 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 meeting all 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
29 017 00 239	Diesel heater, unpacked
29 017 00 260	Diesel heater packed with installation and maintenance manual

4 Technical Data

4.1 Diesel heater DH11 / 24 Volt

Order number DH11	**DH11 = 29 017 00 239**
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
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

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℃ *(7.2-9.0℉)* 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.

Volume flow [l/h]	**Temperature increase** in℃ *(℉)*
50	6.5 *(11.7)*
100	4.5 *(8.1)*
200	3 *(5.4)*
300	2.1 *(3.8)*
400	1.9 *(3.4)*
500	1.5 *(2.7)*
600	1.2 *(2.1)*

5.3. Function of the diesel heater when installed 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 that the scope of delivery is complete and that there are no signs of damage.

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

6.2 Installation space for the diesel heater

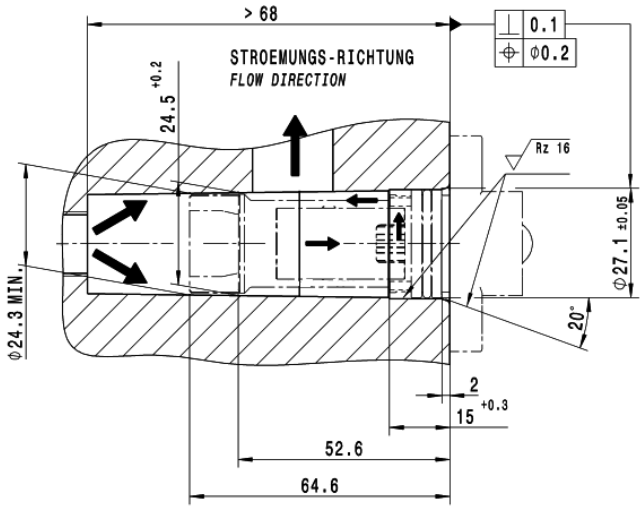


Fig. 1 Installation space

Requirements of the installation location:

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

6.3 Installing the diesel heater

6.3.1. 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.

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

Please make sure that the installation space described in 6.2 exists for 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 carefully and properly.

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

6.4 Retrofitting the diesel heater

Incoming goods check:

Make a visual inspection for any external damage.

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 are to 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.)

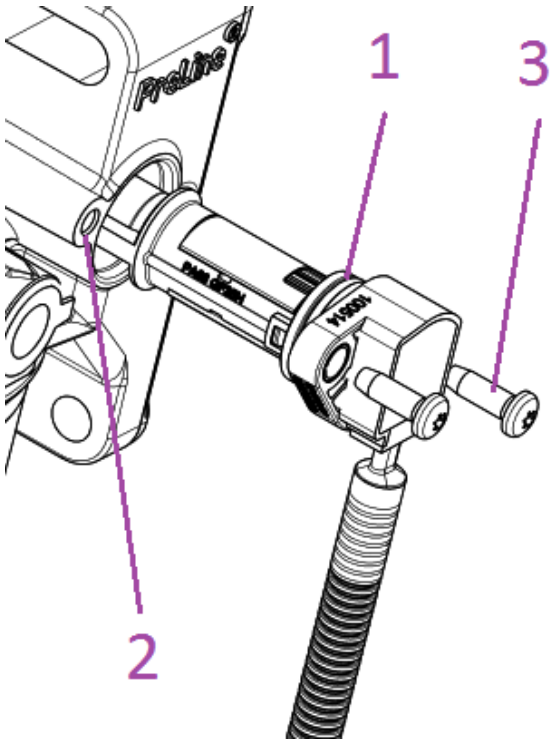


Fig. 2 Complete an incoming goods check

- Switch off the vehicle engine.
- Close the water drainage screw (4). (The water drain plug is opened by turning clockwise.)
- Drain off approx. 0.5 litres diesel fuel into a collecting vessel.

If the engine is more than 3 meters from the filter, drain off a further 0.1 litre 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, a bleed plug which is nearer the engine. (Required tool: wrench with wrench size 12)

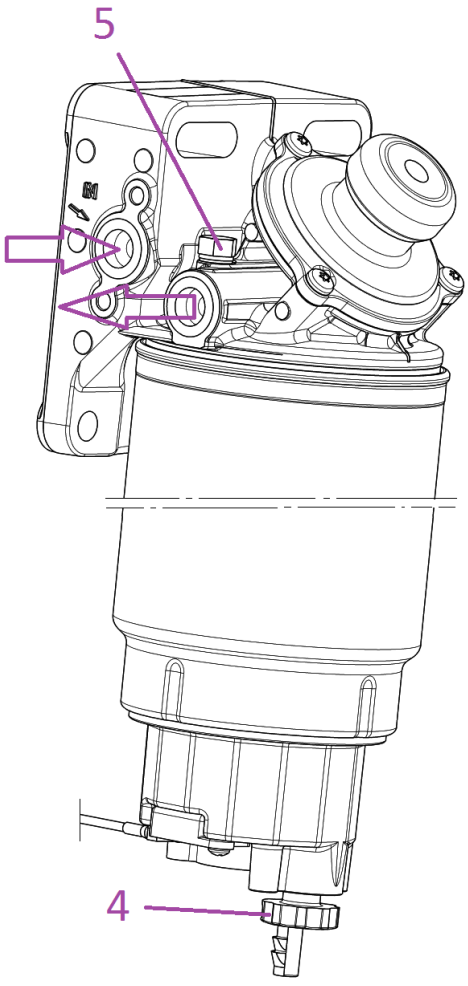


Fig. 3 Bleeding the fuel prefilter

- 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 is not permitted!)
- Fix the electrical box to the vehicle frame using hexagon head screws M6x50 and washers ISO 7090-6 and secure against loosening with Loctite. (Tightening torque 5 ±1 Nm.) Alternatively, fix with cable ties near the electrical box or mating plug.

The outside temperature can be up to 25 ℃ *(45℉)* higher than the ambient temperature due to heat generation of the power electronics.

- Draw up fuel using the filter hand pump (8). (Approx. 40 strokes + approx. 7 strokes per meter fuel line in excess of 3 meters.)
- Close the bleed plug (5) when fuel escapes from 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)

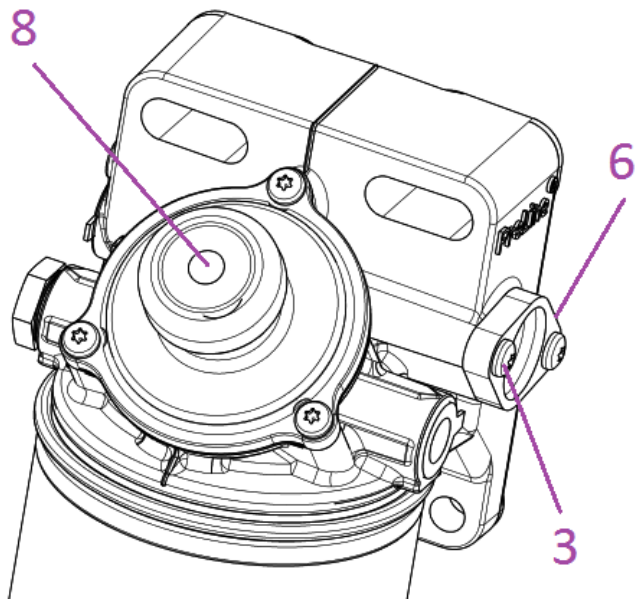


Fig. 4 Disassembling the cover cap

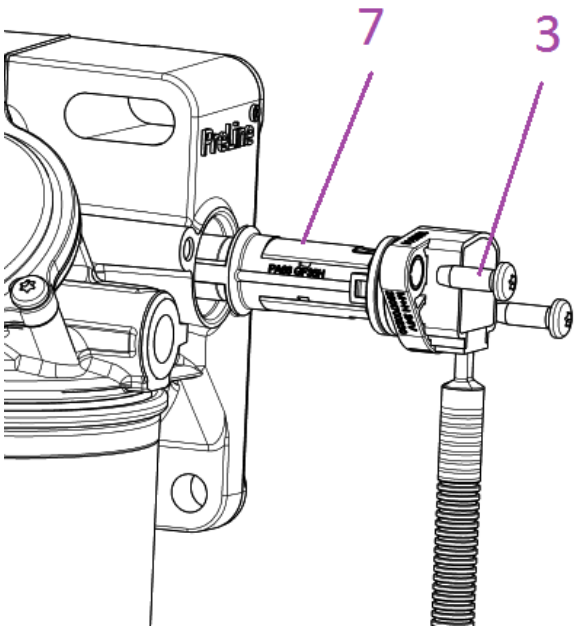


Fig. 5 Assembling the diesel heater

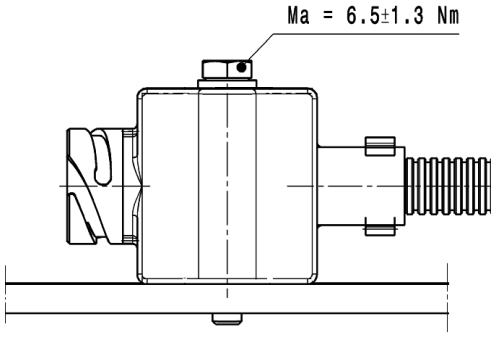


Fig. 6 Securing the power electronics

Wiring, clamp assignment

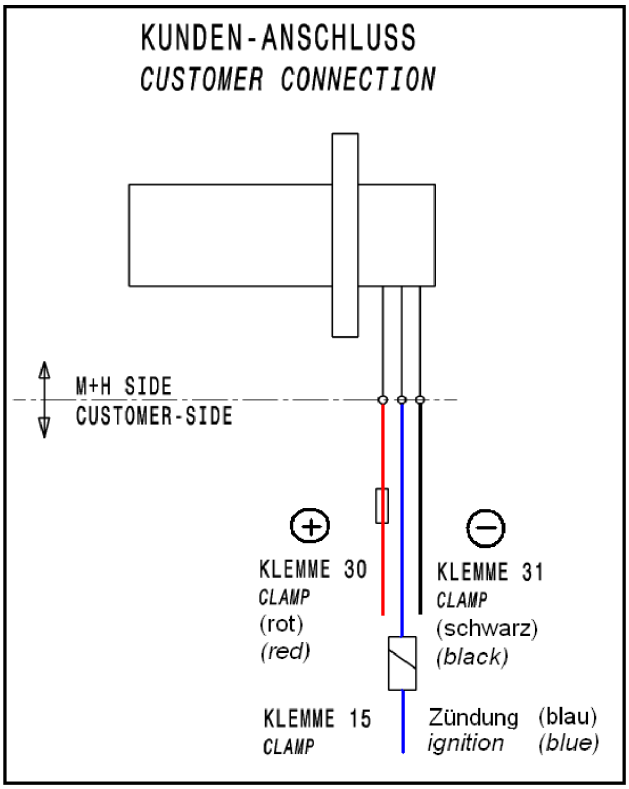


Fig. 7 Wiring

Disconnect the battery before starting work on the electric system!

The positive pole must be connected to the power supply via a 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	
DH11	24 V , 20 amps (colour code yellow)
Nominal voltage	
DH11	24 V DC
Max. cable length	5 m
Connecting cable	3-wire non-metallic sheathed cable, e.g. Radox 155S FLR; Temperature class 150 ℃; For load circuit (clamp 30/31): minimum 2.5 mm^2 cross-section complying with DIN 72551 and ISO 6722, Class B

A function test (mechanical and electrical) must be completed following installation to ensure the correct installation and proper functioning.

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

6.6 Pin assignment of the connection plug

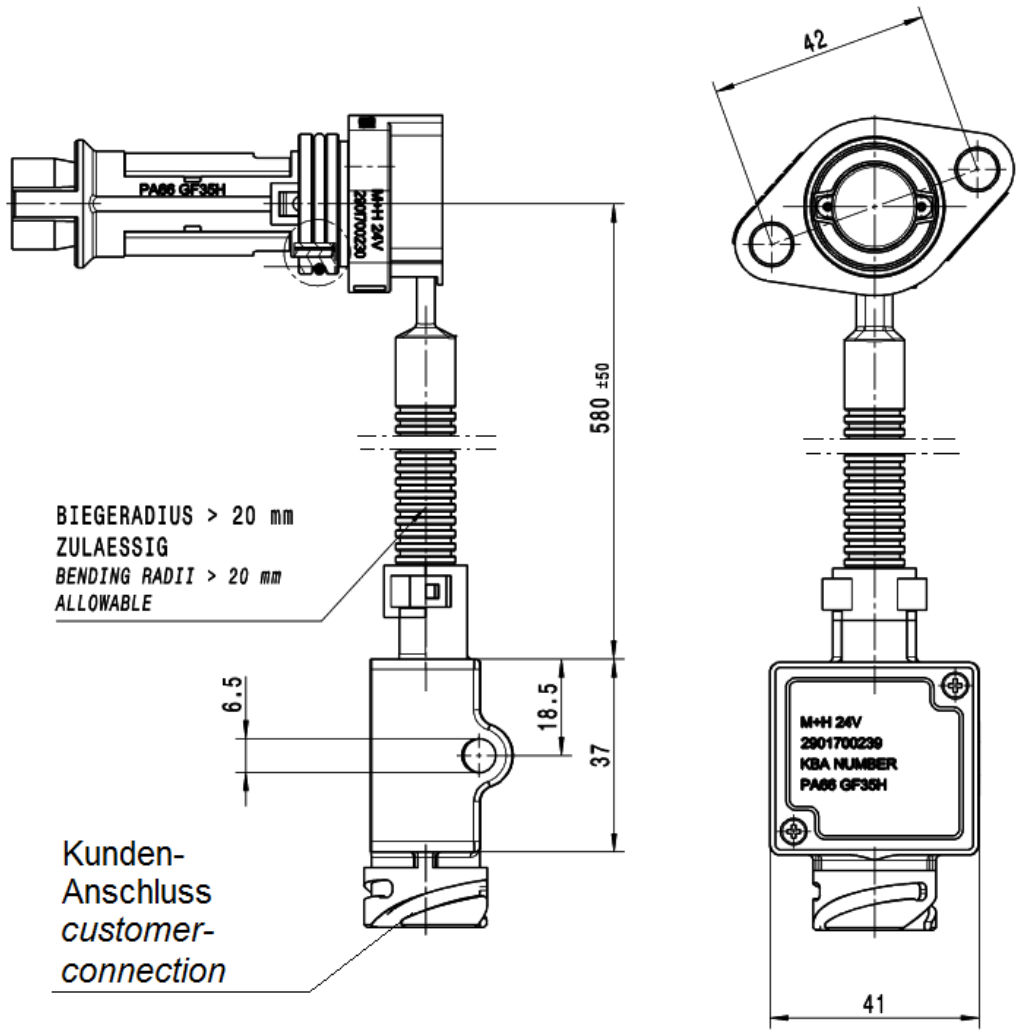


Fig. 8 Diesel heater with electronic regulation

Customer connection

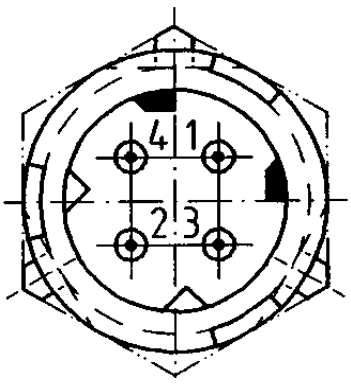


Fig. 9 Pin assignment

Pin 1	Battery's positive pole (red, 2.5 mm²)
Pin 2	Battery's negative pole (black, 2.5 mm²)
Pin 3	Ignition (blue, 0.5 mm²)
Pin 4	Not connected

Connector DIN 72585-B1-4.1-Sn/K2

A = fixed plug connector
2 = arrangement of coding strip
4.1 = Plug assignment (4-pin)
Sn = tin-plated contact compliant with DIN EN 28 092
K2 = stress class (-40℃ up to +140℃)

7 Maintenance

The diesel heater has a service life of 10 years. The diesel heater can then be replaced by the operator as described in Section 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 per week for any visible external signs of damages and defects, as well as to immediately report any changes (including to the operating behaviour) that may impair functional safety, to the manufacturer or the seller.

(See 2 Contact information)

If faults occur on the diesel heater, 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.
- National laws in the country of use that regulate the operation or retrofitting of the diesel heater.