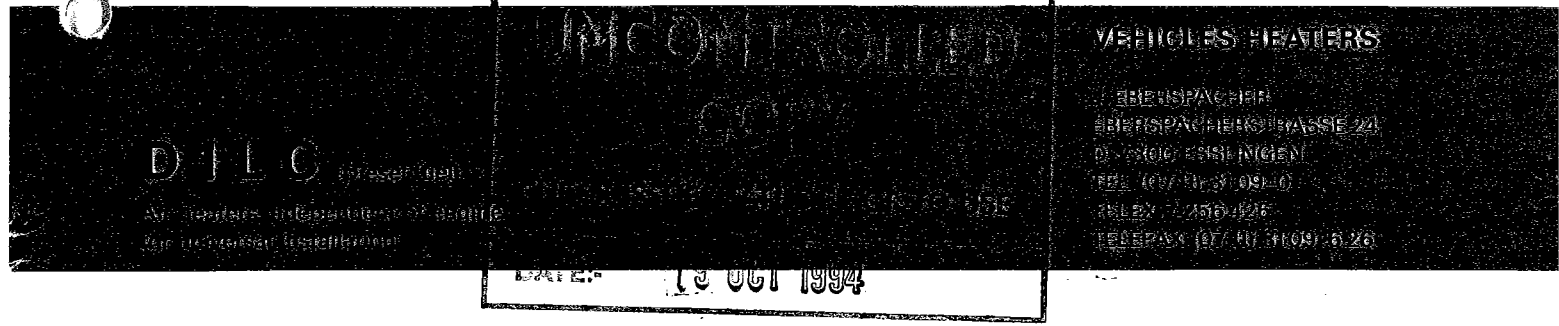
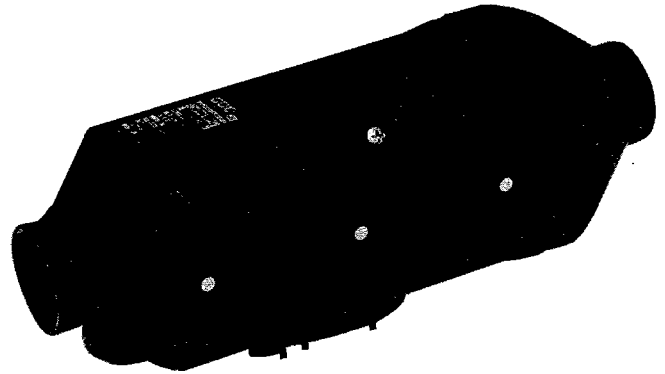


Technical Description and Installation Instructions Operating Instructions



	Cat. No.
Basic heater	12 V 25 1688 05 00 00
with standard equipment	24 V 25 1689 05 00 00
Universal installation kit	25 1688 80 00 00



Timers must be ordered separately as additional equipment, see page 2.
See Additional Equipment Catalog for further accessories.

Specifications

Heating medium	Air
Hot air throughput without counter-pressure ¹⁾	High / Medium / Low 110 70 70 kg/h \pm 10%
Heating capacity ¹⁾	High / Medium / Low 1800 1200 850 W \pm 10%
Fuel	Diesel fuel (commercially available)
Fuel consumption ¹⁾	High / Medium / Low 0.21 0.14 0.10 l/h \pm 10%
Rated voltage	12 V or 24 V respectively
Operating range	10 V or 20 V respectively
Minimum voltage ²⁾	14 V or 28 V respectively
Maximum voltage ³⁾	
Electric power consumption ¹⁾	at start 12 V = 250 W \pm 10% after about 50 seconds: 24 V = 490 W \pm 10% In High / Medium / Low operation 30 20 20 W \pm 10%

Ventilation operation	possible with suitable circuits
Radio interference suppression	remote, additional suppression measures possible
Weight	approx. 3.5 kg

- 1) at rated voltage
- 2) an undervoltage safety device built into the control unit switches off the heater at around 10.5 V or 21 V respectively.
- 3) an overvoltage safety device built into the control unit switches off the heater at around 15 V or 30 V respectively.

**TECHNICAL
DEPARTMENT**

Contents

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Scope of delivery

Item	Qty.	Designation/Cat. No.
1-6	1	Basic heater with standard equipment 12 V 25 1688 05 00 00 24 V 25 1689 05 00 00

The standard equipment comprises:

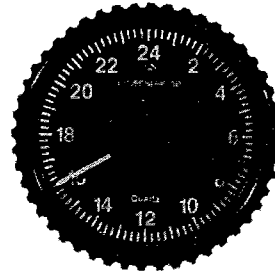
1	1	Basic heater 25 1688 01 (12 V), 25 1689 01 (24 V) (not available alone)
2	1	Control unit
3	1	Holder for control unit
4	1	Metering pump with built-in fuel filter
5	1	Relay
6	1	Operating unit

To be ordered in addition:

-	1	Universal installation kit 25 1688 80 00 00
---	---	---

Optional timers

7.



Heater timer with fasteners

Cat. Nos.

12 V 25 1482 89 09 00
24 V 25 1482 89 10 00

8.



Heater timer with fasteners

Cat. Nos.

12 V 25 1482 89 19 00
24 V 25 1483 89 02 00

9.



Heater timer

Cat. Nos.

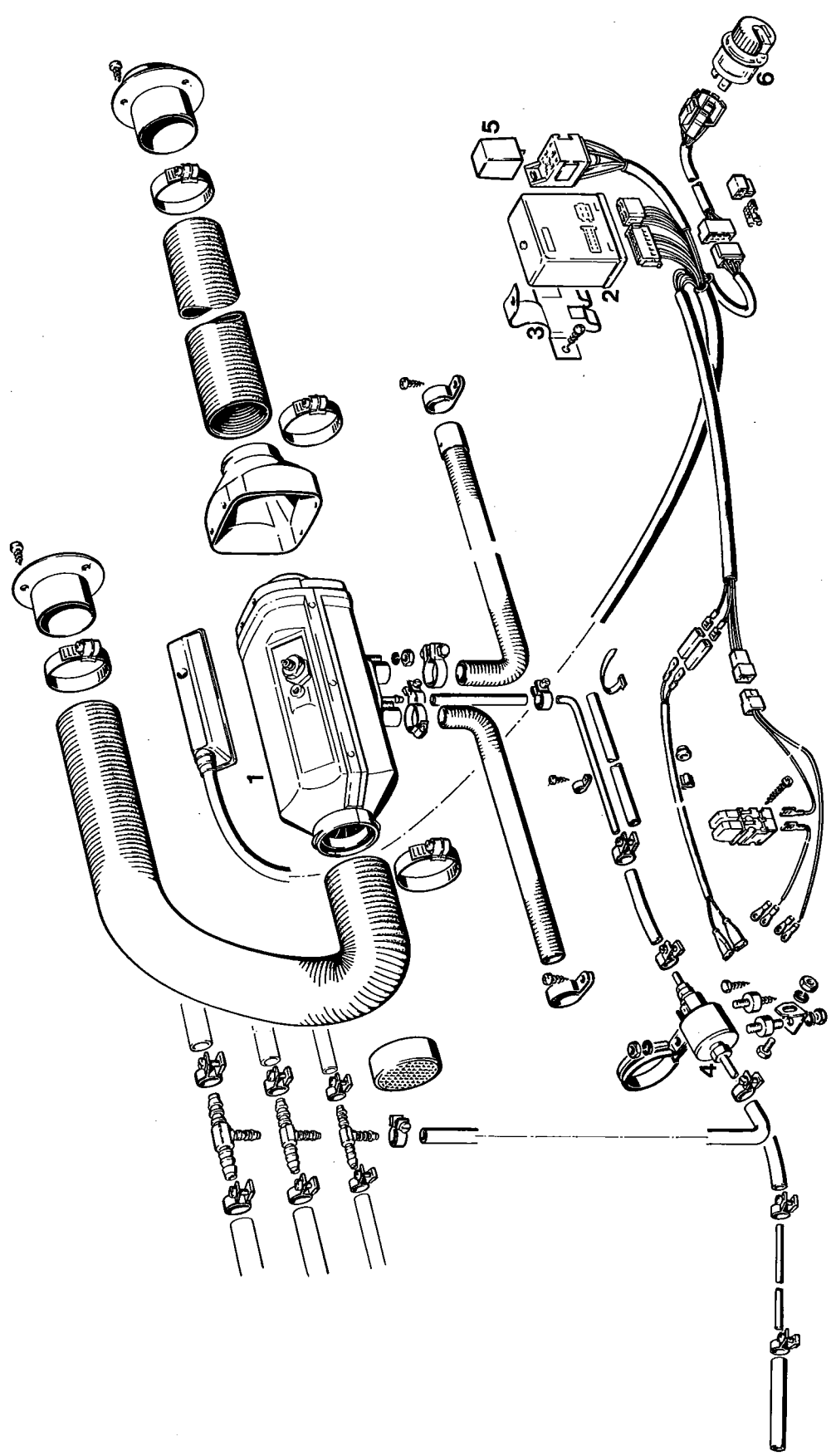
12 V 25 1482 89 35 00
24 V 25 1483 89 07 00

(fasteners only required
for installation with
screen)

Cat. No.

25 1482 70 01 00

Scope of delivery



parts without item number
= universal installation kit

Approval, official regulations, general

1. For vehicles registered in West Germany (subject to the road traffic regulations StVZO), the heaters are approved by the Federal Motor Vehicle Office and receive an official test symbol indicated on the name plate).

The year of first operation is a requirement of German approval not representing a model number.

2. If the heater is installed in special-purpose vehicles (e. g. vehicles transporting dangerous cargoes), the regulations applicable to such vehicles must be observed.
3. The heater must not be operated in closed rooms, e. g. garages.

The heater must always be switched off when the petrol tank is to be filled.

4. The heaters must be installed by a workshop approved by the manufacturer and in compliance with the installation instructions.
5. The heaters may only be used for the purpose specified by the manufacturer and in compliance with the operating instructions supplied with every heater.

Operating the heater is not permitted where inflammable vapours or dust can build up (e. g. near fuel, coal or sawdust stores, grain silos etc.).

6. The proposed installations in the installation instructions are only examples. Other installation locations are also permissible, provided they comply with the general installation requirements: the manufacturer should be consulted if necessary. In all other respects, differences from the installation instructions, particularly with regard to wiring (wiring diagrams), fuel supply, combustion air and exhaust ducts, and use of operating and control elements not supplied by the manufacturer, are only permissible with the written approval of the manufacturer. Failing that, the manufacturer's warranty is null and void for the entire heater system, as is the general operating permit.
7. Every combustion process generates exhaust gas, which has toxic constituents. Because of this and the high temperatures generated, the exhaust duct must comply without fail with the installation instructions. Failure to comply with the instructions or operation of the heater in closed rooms (garages) harbours the risk of poisoning.
8. When the heater or the heating system is damaged, an authorized workshop must be called in to repair the damage in an expert manner and using genuine spare parts. Makeshift repairs (on one's own initiative) or the use of non-genuine spare parts are dangerous, and therefore not permitted. When carried out in cars, they invalidate the general design approval of the heater and consequently the general permit of the vehicle.
9. The warranty conditions are set forth in the heater booklet given to you by the after-sales service workshop when the heater is installed. Only our warranty conditions shall apply.
10. Further information on installation (e. g. in boats and ships) is available on request from the manufacturer.

Factory plate

The factory plate is fastened to the basic heater.

J. EBERSPÄCHER ESSLINGEN MADE IN W. GERMANY		
Heizgerät Typ	<input type="text"/>	
Ausführung	<input type="text"/>	
Fabrik Nr.	<input type="text"/>	
Prüfzeichen	WMS	
Brennstoff	<input type="text"/>	
Elektr. Werte	<input type="text"/>	
Wärmestrom	<input type="text"/>	
Betriebsüberdruck	<input type="text"/>	
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Erste Inbetriebnahme		
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88	89	90

Year commissioned

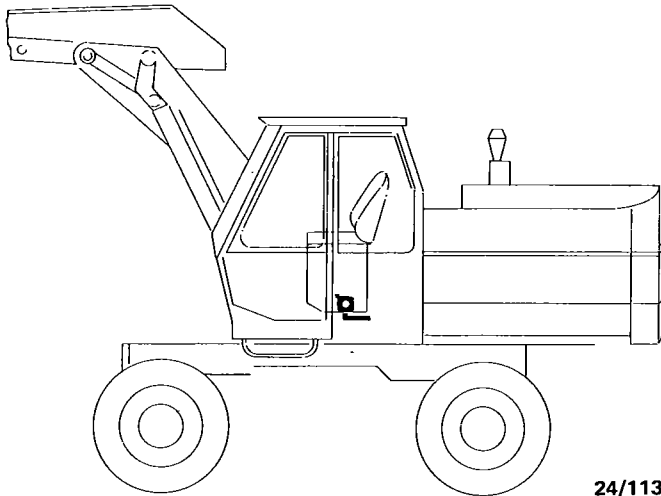
Type approval has been applied for at the Federal Motor Vehicle Office for vehicles registered in West Germany.

Installation Instructions

The suggestions put forward in these installation instructions are only examples. Possibilities other than those illustrated (e. g. in the selection of the installation position or means of running air) are also permissible provided they meet the requirements of the West German road traffic regulations (StVZO), and if necessary after consultation with the manufacturer.

Typical installations/installation position

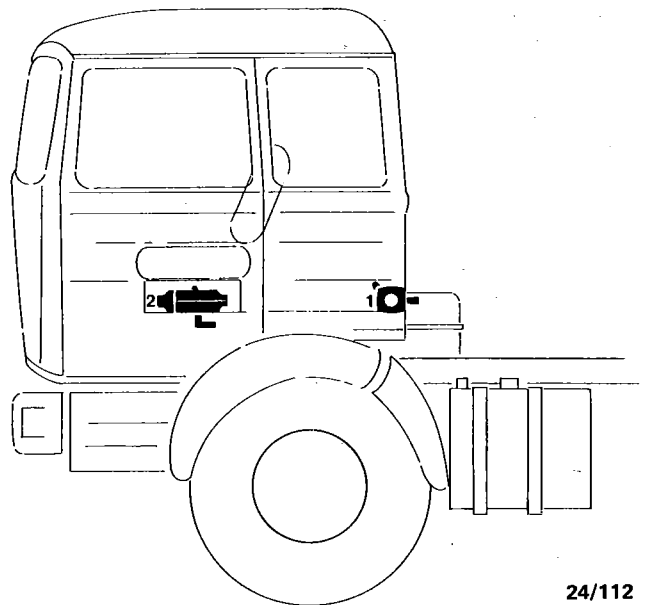
in the cab of the excavator



24/113

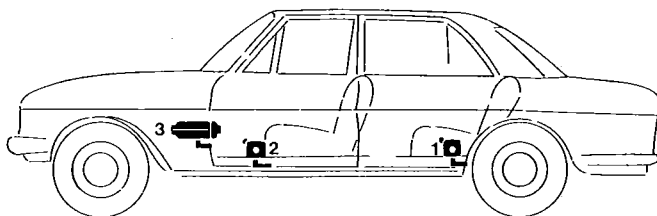
in the truck cab

1. on the rear panel of the cab
2. under the driver's seat

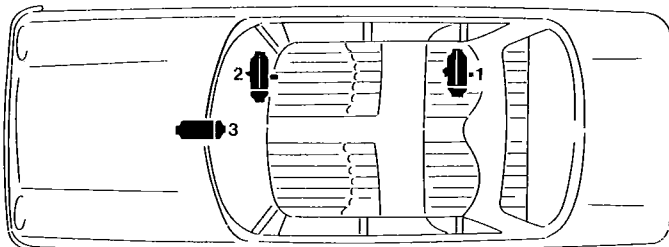


24/112

inside a passenger car



1. under the back seat, inside or underfloor
2. in front of the passenger seat
3. on the center console



24/111a

Installing the heater

The D1LC heaters are suitable and approved for installation in vehicle areas used by persons. Installation in the driver or passenger areas of motor buses* is not permitted.

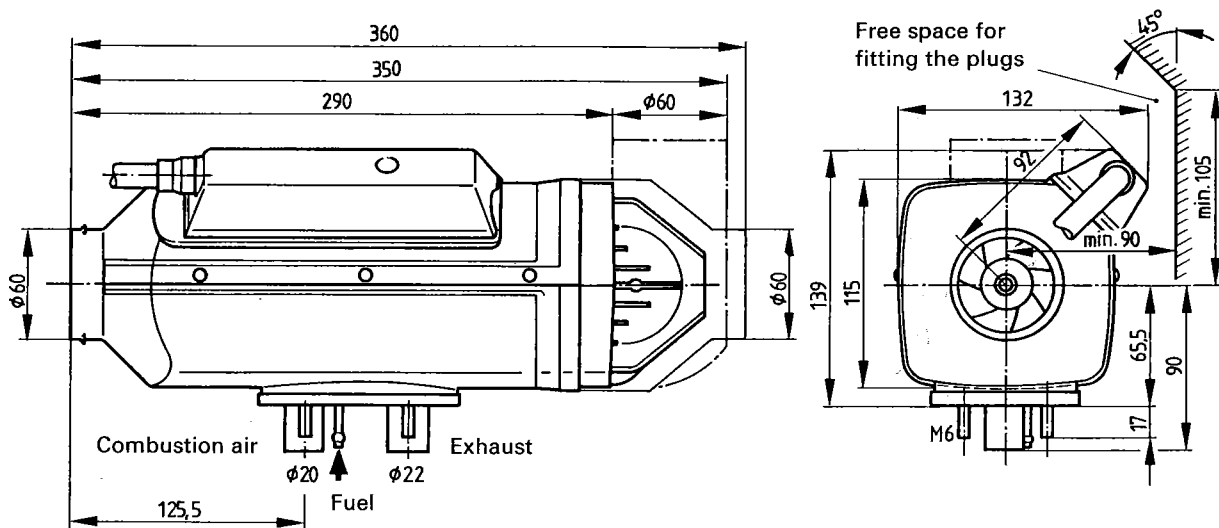
In the case of installation in areas used by persons, the exhaust, combustion air and fuel lines must not have detachable connections inside these areas, and must be laid splash water proof at the penetrations to the outside.

For this reason the heater must be fitted by its base on an outside panel of the vehicle or on the vehicle floor, using the seal seated on the base.

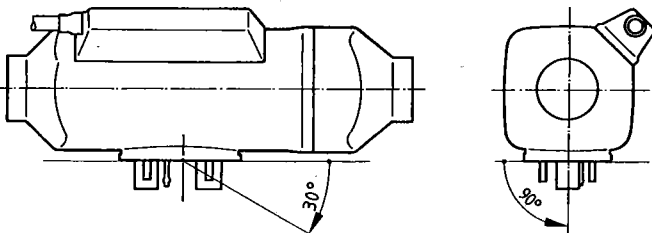
The factory plate must be clearly visible when the heater is installed. If necessary a second plate (duplicate) with the same information as the original can be affixed to a point on the heater clearly visible after installation or to a cover located in front of the heater. A second plate is not necessary if the original is visible after removal of a cover without the aid of tools.

* Vehicles with more than 9 seats.

Principal Dimensions



Permissible installation positions



The heater should be installed in the standard position as shown. See sketch for maximum permissible deviations.

Please consult the manufacturer if further differences are required.

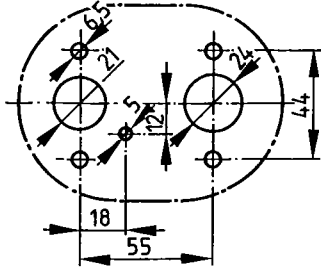
During starting and thermostatic operation a heater installed in the standard position may deviate, due to the inclination of the vehicle during motion, up to $\pm 15^\circ$ in both axes from the standard position.

Continuous heating operation after starting is possible at a deviation of up to $\pm 30^\circ$ from the standard position. With deviations exceeding $\pm 30^\circ$ reliable heating operation is no longer possible. However, this does not lead to damage of the heater if the changes in the operating position are only for brief periods.

Important: the plug connection must always point upwards.

Fastening to the vehicle wall/floor

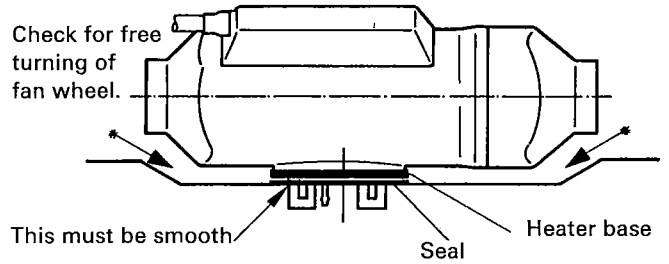
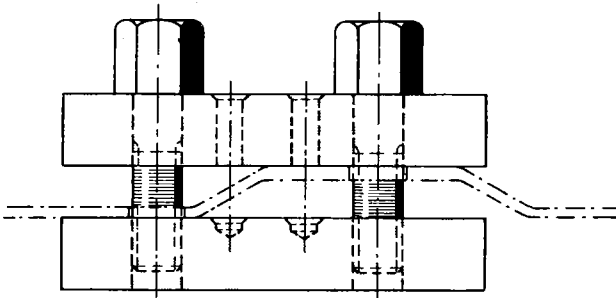
Make penetrations in accordance with the template pattern.



The 10.5 mm dia. hole for the metering pump/control unit cable is not included in the template pattern and must be drilled to suit the installation method.

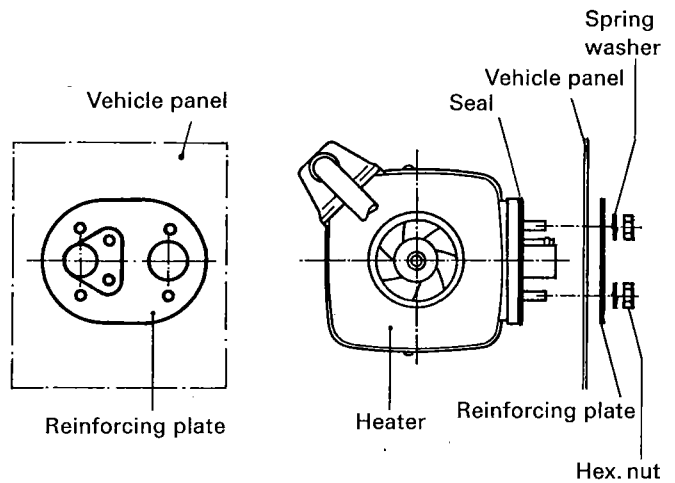
The mating surface for the heater base must be smooth. To drill the penetrations and if necessary to smooth the mating surface a special tool is available from the manufacturer under Cat. No. 99 1201 46 53 29.

Special tool

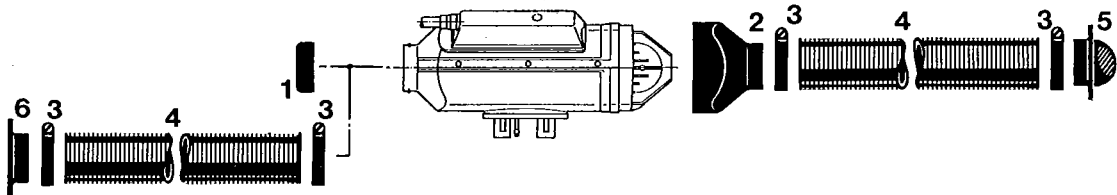


* This must be kept free.

If the mating surface sheet is too thin (criterion: thinner than 1.5 mm), a reinforcing plate, Cat. No. 20 1577 89 00 03 can be installed additionally on the outside.



Running the Heating Air – Parts for running the heating air included in the scope of delivery for the universal installation kit



- 1 Protective grid
- 2 Reducing piece
- 3 Hose clip, dia. 50 mm to dia. 70 mm

- 4 Flexible pipe, dia. 60 mm (1 m + 1 m)
- 5 Air outlet, rotatable
- 6 Connection piece, dia. 60 mm

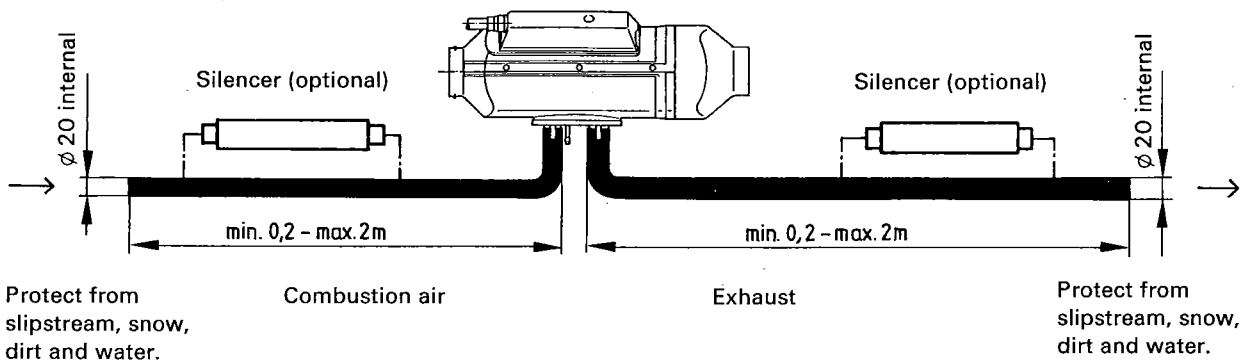
When checking an installation the average output temperature should not significantly exceed 100°C at the output point with an intake temperature of 20°C. This will ensure that the safety thermal cutout switch will not respond under normal operating conditions.

Heating air intake openings shall be arranged in such a manner that exhaust from the vehicle's engine and from the heater cannot be expected to be sucked in under normal operating conditions, and the heating air cannot be contaminated.

When operating as a recirculating heater, locate the inlet for the heating air in such a way that the outflowing hot air cannot be sucked directly in again.

Running the combustion air/Running the exhaust

Permissible diameters, lengths, bends of combustion air and exhaust lines.



Permissible diversions – exhaust line: max. 180°; combustion air line: max. 180°.

The scope of delivery includes a flexible exhaust pipe, 22 mm internal dia., 1 m long. This can be shortened as required. For longer pipes see the Additional Equipment Catalog.

The scope of delivery includes a flexible combustion air pipe, 20 mm internal dia., 1 m long. This can be shortened as required. For longer pipes see the Additional Equipment Catalog.

Additional noise suppression is possible by installing an exhaust silencer or combustion air silencer (see Additional Equipment Catalog). The permissible overall length, including silencer, remains unchanged.

The combustion air must be sucked in from the outside, not from the passenger compartment or trunk.

Do not install the intake opening facing the slipstream, but run it in such a manner that dirt and snow cannot enter and that any water which does enter can flow out.

Exhaust lines must not project beyond the sides of the vehicle. They must be laid either with a slight slope or with 5 mm dia. holes at the lowest points for draining off condensate.

Arrange the exhaust outlet and the combustion air opening such that the exhaust cannot be sucked back in directly.

The exhaust outlet must be on the outside. Exhaust lines must be laid in such a way that neither the penetration of exhaust into the vehicle interior nor the intake of exhaust through the vehicle or heater blowers need be expected¹⁾, and that the operation of essential vehicle parts is not affected (ensure adequate clearance). Place the outlet opening of the exhaust line in such a way that it cannot be clogged by dirt and snow and that any water which does enter can run off. Do not install facing the slipstream.

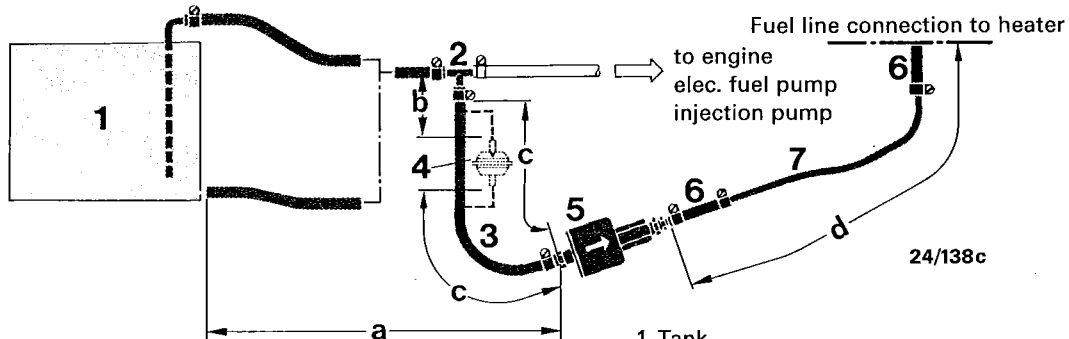
¹⁾ This requirement can be considered met if the outlet opening of the exhaust line is located at the usual places in motor vehicles (see also examples on page 5), e. g. in engine compartment, in wheel case, on the vehicle underside, or on the rear of the cab.

Fuel supply

The instructions given here should not be disregarded as deviations may cause malfunctions.

1. Fuel intake from fuel line to engine (usually in passenger cars):

Precondition: the fuel line from the fuel tank to the engine must be tight, so that the flow of fuel is not interrupted when the engine is not running.



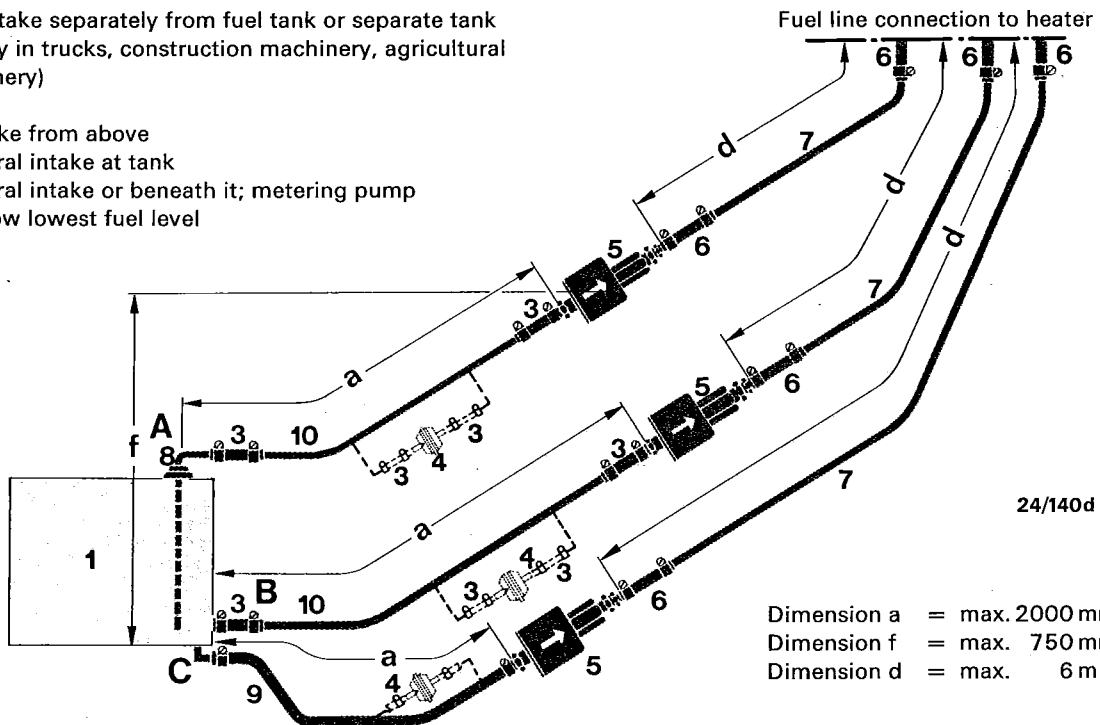
- 1 Tank
- 2 Fuel branch
- 3 Fuel tube, internal dia. 5 mm
- 4 Fuel pre-filter (vertical, up to 30° downward if fuel line is tapped)
Cat. No. 25 1226 89 00 37, only necessary if fuel is contaminated
- 5 Fuel metering pump (15° to vertical, inclined upward)
- 6 Fuel tube, internal dia. 3.5 mm
- 7 Fuel pipe, plastic, internal dia. 1.5 mm
- 8 Tank connection, internal dia. 2 mm
- 9 Tube or plastic pipe (max. internal dia. 5 mm)
- 10 Fuel pipe, plastic, internal dia. 2 mm

- Dimension a = max. 2000 mm for diesel oil
- Dimension b = 50 mm
- Dimension c = max. 300 mm
- Dimension d = max. 6 m for diesel oil

At all joints, fuel pipe (7) and connection pieces must touch.

2. Fuel intake separately from fuel tank or separate tank (usually in trucks, construction machinery, agricultural machinery)

- A = intake from above
- B = lateral intake at tank
- C = lateral intake or beneath it; metering pump below lowest fuel level

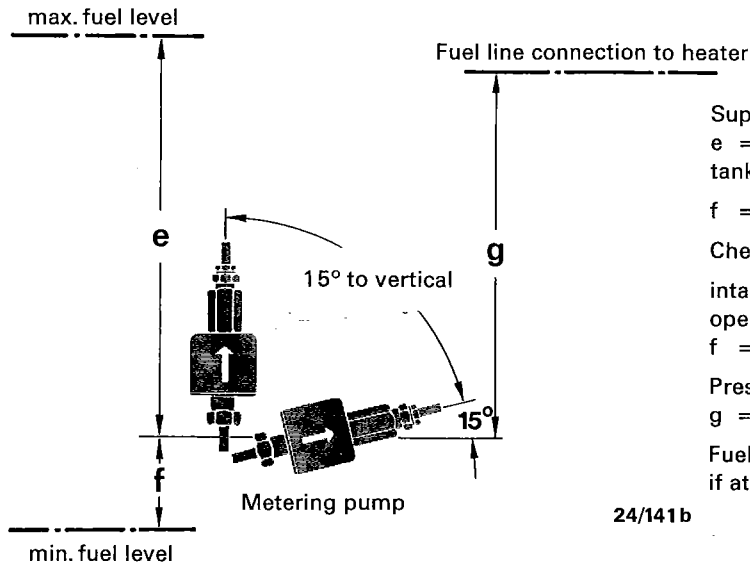


- Dimension a = max. 2000 mm with diesel oil
- Dimension f = max. 750 mm with diesel oil
- Dimension d = max. 6 m with diesel oil

With connection types A and B, the intake line – A includes tank connection (8) – including all connection points must have an internal dia. of 2 mm; for this reason, fuel pipe (10) and connections must touch each other at every joint.

All fuel lines and connecting points must be completely tight.

3. Permissible suction and pressure heads for installation per 1. and 2.; permissible positioning of metering pump



Supply pressure from tank to metering pump:
 e = max. 3000 mm suction head:
 tank at zero pressure

f = max. 750 mm with diesel oil

Check whether tank ventilation works properly
 intake from tank when underpressure occurs during
 operation (valve 0.03 bar in tank cap)

f = max. 400 mm with diesel oil

Pressure head metering pump to heater:
 g = max. 2000 mm

Fuel line metering pump to heater should not have a slope
 if at all possible.

24/141b

2. Important

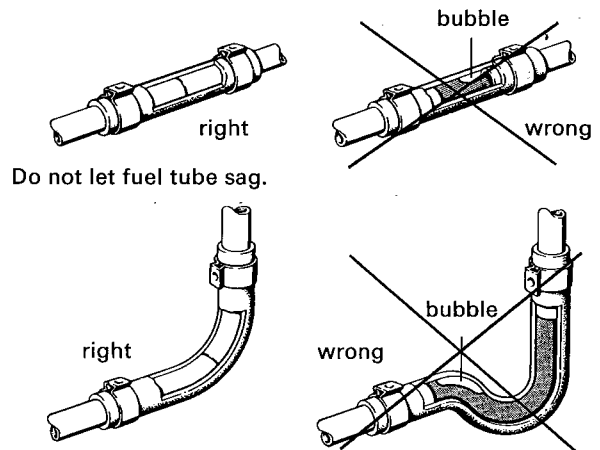
Protect fuel lines, filter and metering pump from overheating; do not install near silencers and exhaust pipes. Temperatures above 30°C lead to gas bubbles and problems with gasoline.

When installing the fuel line, fuel filter and fuel metering pump near the rear axle, be sure to take the spring deflection of the rear axle into consideration.

Cut fuel tubes and pipes to length only with a sharp knife. Cuts may not be indented and must be burr-free.

For connection of the fuel branches, always use rubber tubing, never plastic pipe.

Fuel pipes connected by means of a fuel tube. Fuel pipe sections must abut.



Do not let fuel tube sag.

Fuel grades/Fuel at low temperatures

The heater can take without problem the same fuel you use in your tank. In the USA diesel fuel no. 1 and no. 2. Admixture of used oil is not permitted.

The refineries automatically adapt their fuels to normal winter temperatures (Winter Diesel).

Therefore difficulties can only arise at extremely low temperature (as in the engine – see the vehicle's instruction manual).

If the heater is operated from a separate tank, the following rules must be observed: at temperatures above 0°C any type of diesel fuel can be used.

If no special cold-weather diesel fuel is available at low temperatures, mix kerosine or gasoline according to the adjacent table.

Temperature	Winter diesel oil	Additive
From 0°C to -15°C**	100%	–
From -15°C to -25°C	50%	50% kerosine or gasoline
From -25°C to -40°C	–	100% kerosine*

* or special winter diesel oils

** or in accordance with fuel manufacturer's specifications

The fuel line and the fuel pump must be filled with new fuel by operation for 15 minutes.

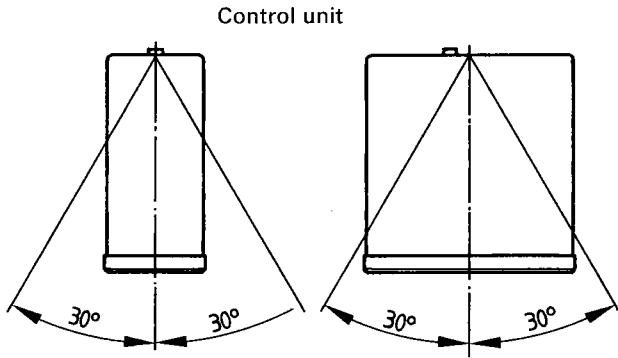
Fuel for special cases

In special cases, the heaters can also be operated on extra light fuel oil (above 0°C) or kerosine. If in doubt consult the manufacturer.

Electrics:

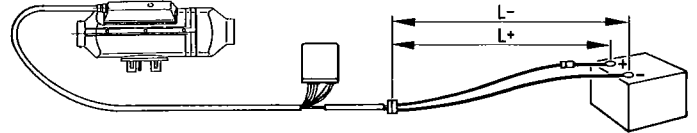
Arrange electric cables, switches and control units in the vehicle in such a way that their correct functioning cannot be impaired under normal operating conditions.

Fit the control unit so that it is protected from splash water (from both its own vehicle and preceding ones). Outside installation is thus not permissible. The unit is best arranged in the vehicle interior, with the plugs pointing downward.



The pilot light (built into the operating unit) should be within the field of vision of the driver, or at least be visible to him without great effort.

The following cable cross-sections must be observed between battery and heater, in order that the maximum permissible voltage losses in the cables (0.5 at 12 V rated voltage and 1 V at 24 V) are not exceeded.



$L^+ + L^- < 5 \text{ m} \rightarrow$ cross-section 4 mm^2
 $L^+ + L^- 5 \text{ to } 8 \text{ m} \rightarrow$ cross-section 6 mm^2

If the positive cable is to be connected to the fuse box (e. g. terminal 30), the vehicle's cable too from the battery to the fuse box must be included in the calculation of the total line length, and if necessary redimensioned in accordance with the above.

Smear plug and earth connections with contact protection grease outside the vehicle interior.

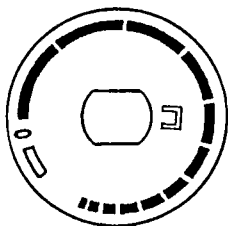
Operating unit and heater timer

The scope of delivery includes the operating unit, which comprises the On-Off switch with control feature for the heating capacity, a red light for illumination, and a green operating pilot light.

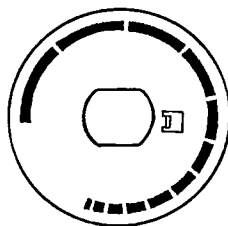
Two scale discs are supplied with the operating unit.

Scale disc 1 is fitted if operation is exclusively with the operating unit. The operating unit then serves as an On switch and temperature controller.

Scale disc 2 is fitted if a timer is used for actuation. Switch-on is then exclusively with the heater timer, and the temperature is selected with the rotary knob. See wiring diagram for connection.



1



2

Temperature control

A temperature sensor is arranged on the intake side inside the heater, and – in conjunction with the controller of the operating unit – switches the heater to "High", "Medium" or "Low" depending on the intake temperature and the controller setting.

This arrangement of the temperature sensor is only suitable in recirculated-air operation (heating air intake from the area being heated).

If the heater is operated with fresh air (heating air intake from the outside), the built-in temperature sensor must be disconnected, and an external temperature sensor (Cat. No. 25 1482 89 45 00) must be fitted in the interior.

The sensor must not be attached to uninsulated outer panels, and must be protected from draughts and direct sunlight. See wiring diagram for connection.

Important:

On/Off-regulation of the heating capacity using an additional thermostat is not permitted, as it puts an unduly heavy strain on the battery.

