

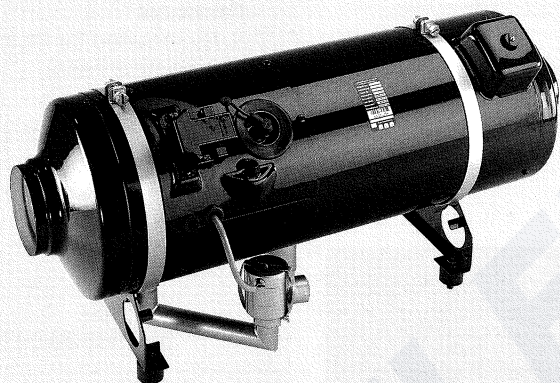


# Air heaters D 7 L

Technical Description  
Installation Instructions

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**Hot air heater independent of engine  
for universal installation**



Cat. No.

|                                       |         |                  |
|---------------------------------------|---------|------------------|
| Basic unit with<br>standard equipment | 12 Volt | 25 1480 00 00 00 |
|                                       | 24 Volt | 25 1481 00 00 00 |

## Specification:

|   |  |  |   |
|---|--|--|---|
| Heating medium:   | Air  | Operating range:                             |   |
| Heating-air flow at<br>rated voltage without<br>counterpressure | 350 kg/h $\pm$ 10 %  | Min. voltage:                                | An undervoltage protection<br>device incorporated in the<br>control unit cuts out at<br>approx. 10 or 20 volts. |
| Heating capacity*:<br>at full setting                           | approx. 8.000 Watts $\pm$ 10 %   | Max. voltage:                                | 14 or 28 volts.   |
| at half setting   | approx. 4.000 Watts $\pm$ 10 %   | Electric power<br>consumption*:<br>at start: | 230 W $\pm$ 10 % with 12 V<br>345 W $\pm$ 10 % with 24 V  |
| Regulation of heating<br>capacity:                              | Full - Half on on-off switch,<br>Full - Half also possible with<br>room thermostat | in operation:                                | 115 W $\pm$ 10 %  |
| Fuel:   | Diesel or fuel oil<br>(commercial grade)   | Ventilation:                                 | Possible  |
| Fuel consumption*:<br>at full setting                           | approx. 1.05 l/hr $\pm$ 5 %  | Degree of radio<br>interference:             | Remote, additional inter-<br>ference suppression<br>measures possible   |
| at half setting   | approx. 0.5 l/hr $\pm$ 5 %   | Weight:                                      | approx. 20 kg   |
| Rated voltage:  | 12 or 24 V   |  |   |

\* at rated voltage

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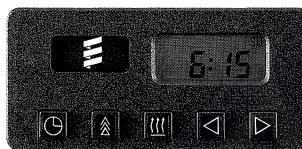
Operating instructions are supplied with control elements.

### Optional control elements



Heating timer with fasteners

Cat. No.  
12 V 25 1482 89 19 00  
24 V 25 1483 89 02 00

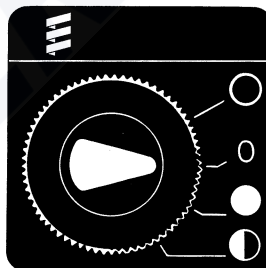


Timer

Cat. No.  
12 V 25 1482 89 25 00  
24 V 25 1483 89 10 00

Fasteners  
(only required for installation with screen)

Cat. No.  
25 1482 70 01 00

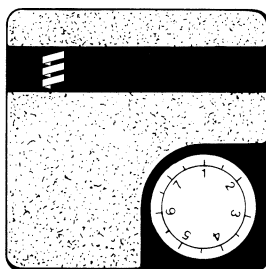


Universal switch

Cat. No.  
25 1380 89 04 00

Bulb

12 V 207 00 005  
24 V 207 00 006

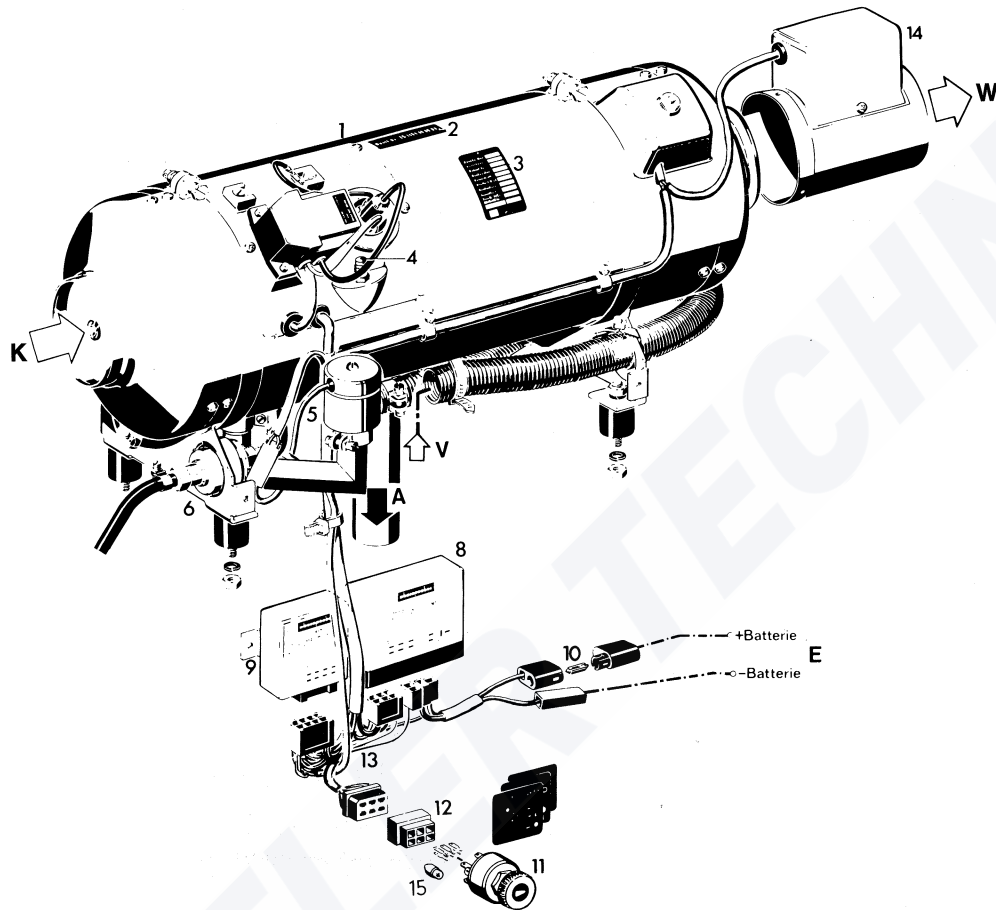


Room thermostat

Cat. No.  
black 25 1557 80 01 00  
brown 25 1557 80 07 00



**Scope of supply**



| Item | Qty. | Designation  |
|------|------|--|
| 1    | 1    | Basic heater<br>12 V 25 1480 01 not available<br>24 V 25 1481 01 alone |
| 2    | 1    | Identification plate with cat. no.                                     |
| 3    | 1    | Name plate   |
| 4    | 1    | Thermal cutout automatic fuse  |
| 5    | 1    | Solenoid valve for combustion air                                      |
| 6    | 1    | Fuel metering pump   |
| 8    | 1    | Control unit   |
| 9    | 1    | Impulse transmitter  |
| 10   | 1    | Main fuse 16 A   |
| 11   | 1    | Universal switch   |
| 12   | 1    | Socket connection casing,<br>6 poles                                   |
| 13   | 1    | Cable harness  |
| 14   | 1    | Temperature limiting device<br>(accessory)                             |
| 15   | 1    | Bulb for universal switch  |

- K = Cold air
- W = Warm air
- V = Combustion air
- A = Exhaust
- B = Fuel supply

## Installation Instructions


The Eberspächer D 7 L heaters are diesel or fuel oil operated fresh-air heating and ventilating units for universal installation. They can be operated independently of the vehicle's engine.

Area of application: large vehicles (freight space of trucks, passenger areas of buses).

See page 6 for installation in passenger areas of vehicles registered in West-Germany.

The suggestions put forward in these installation instructions are only examples. Possibilities other than those illustrated (e.g. with regard to the choice of installation location, 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.

## 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 (D 7 L  S 124) 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.

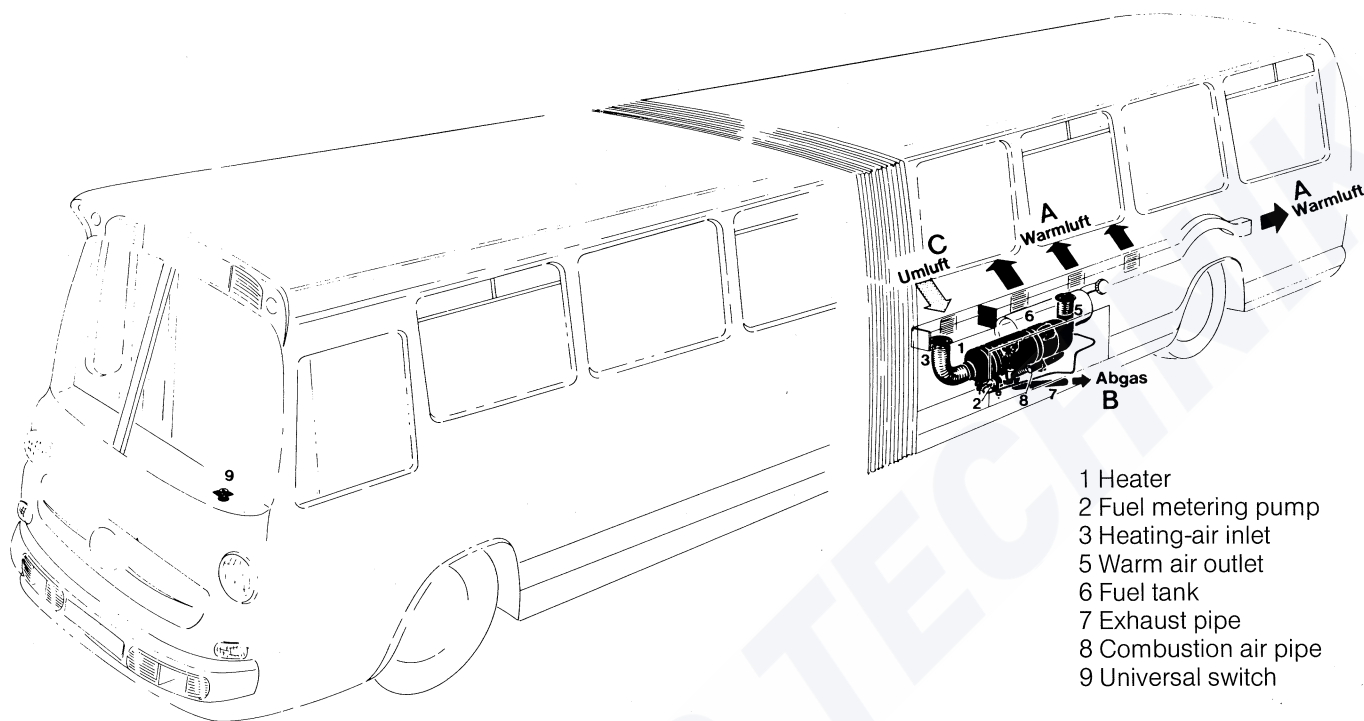
9. The warranty conditions are set forth in the heater booklet given to you by the after-sales service workshop when the heater is installed.

Only our warranty conditions shall apply.



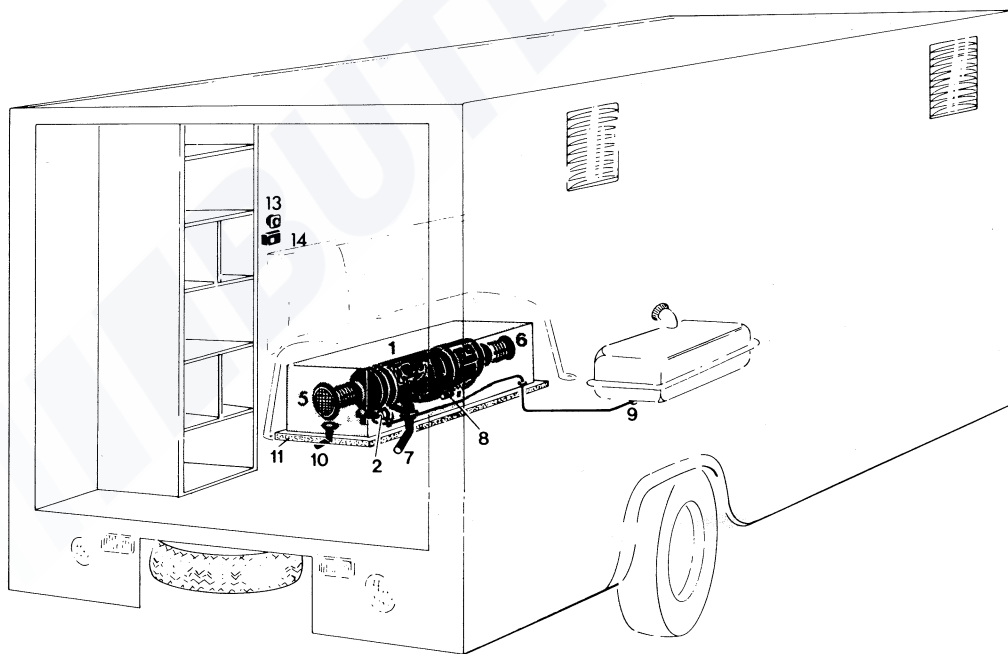


**Typical installation / Recirculation heating – BUS –**



- 1 Heater
- 2 Fuel metering pump
- 3 Heating-air inlet
- 5 Warm air outlet
- 6 Fuel tank
- 7 Exhaust pipe
- 8 Combustion air pipe
- 9 Universal switch

**Typical installation in a room with box  
(site officetraiter)**



- 1 Heater
- 2 Fuel metering pump
- 5 Heating air inlet
- 6 Warm air outlet
- 7 Exhaust pipe
- 8 Combustion air pipe
- 9 Fuel connection
- 10 Box ventilation
- 11 Box seal
- 13 Universal switch
- 14 Room thermostat

## Installing the heater

### Permissible installation positions:

Installation should as a rule be in the normal position as illustrated. If different arrangements are necessary, please consult the manufacturer.

A heater installed in the normal position can be tilted by both axes out of this position by up to  $\pm 15^\circ$ , as a result of non-level positions of the vehicle while it is being driven, and still operate. Furthermore, continuous operation after starting is possible at deviations from the normal position of up to  $\pm 30^\circ$ , provided these positions are not long-term. Heating is impossible at more than  $30^\circ$  deviation.

### Installation in passenger areas:

For installation in passenger areas of vehicles registered in West Germany, the following applies:

Since fuel, exhaust and combustion air lines in passenger areas may not have any loose connections, the heater must be installed in a box sealed off from the passenger area and with ventilation from the outside. Openings to the outside must be proof against splash water.

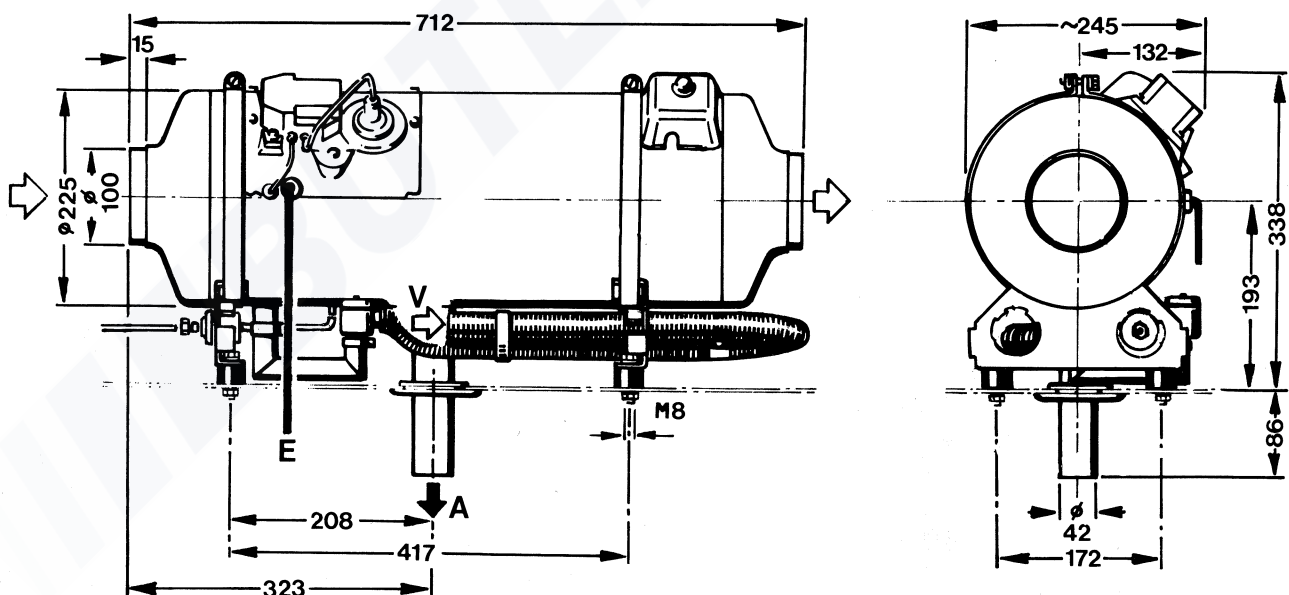
Heaters must not be installed in the driver and passenger areas of buses (vehicles with seats for more than 8 passengers).

If the bus has nowhere but the interior to install a heater, then the bodywork must be modified so that the heater is located on the outside and not the inside. This is also feasible using a box integral to the bodywork, ventilated from the outside and airtight to the inside, in which the heater is then placed.

The factory plate must be clearly visible with the heater in place. If necessary, a second plate (duplicate) can be affixed, with the same information as the original, to a place on the heater which is clearly visible after installation, or to a cover placed in front of the heater. A second plate is unnecessary if the original is visible after removal of a cover without the aid of tools.

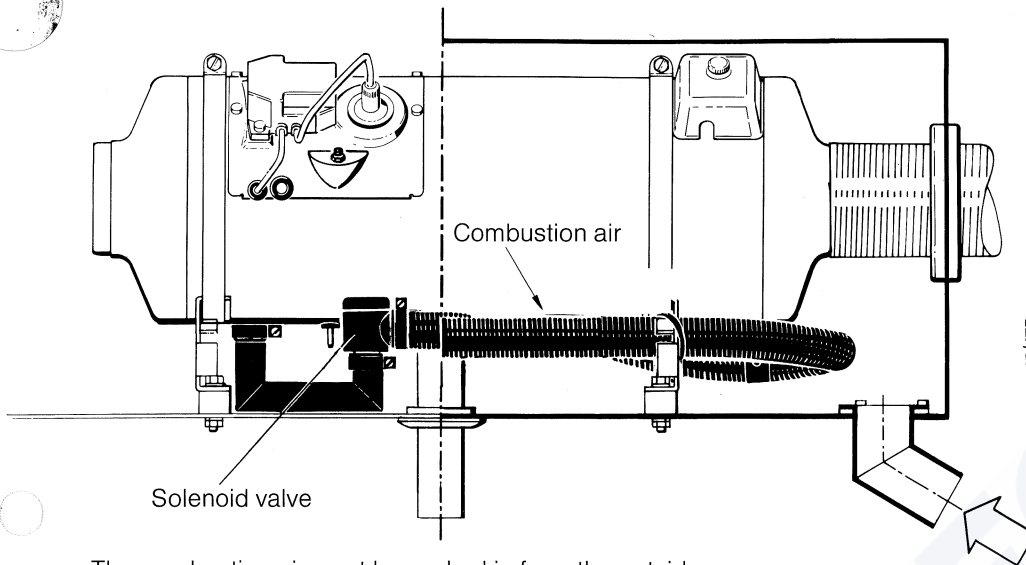
Electrical wiring, switches and controls must be arranged in the vehicle in such a manner that their proper operation is not affected (sufficient clearance from hot vehicle and heater components, protection against spray water); all plugs should face downward.

## Principal dimensions





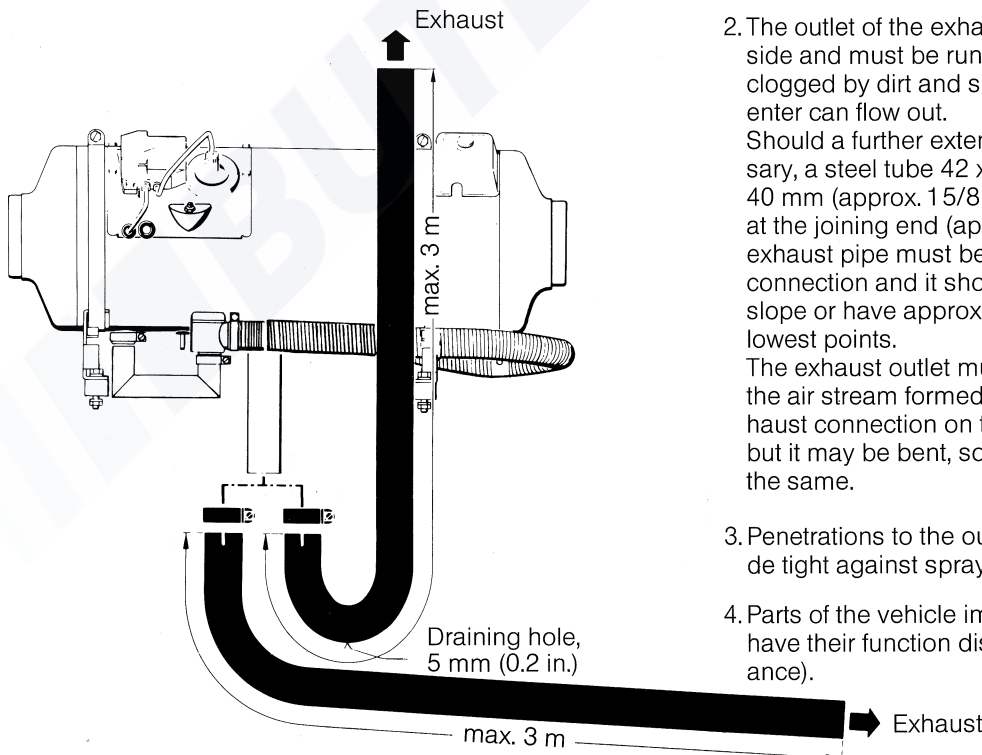
### Running the combustion air Piping



The combustion air must be sucked in from the outside (not from the passenger compartment or trunk) using the flexible tubing mounted to the heater without shortening or extending this tubing but leaving it unchanged.

When the heater is installed in a box, the latter must be adequately ventilated to the outside. The opening (approx. 25 cm<sup>2</sup>) to the outside must be located in such a way that it is protected against spraywater and dirt or it must be provided with an elbow tube.

### Running the exhaust Piping



In running the exhaust lines, care should be taken that:

1. Exhaust gases cannot be expected to enter the vehicle or be sucked in through the vehicle or heater blower.
2. The outlet of the exhaust pipe must extend to the outside and must be run in such a manner that it cannot be clogged by dirt and snow and that any water that does enter can flow out.  
Should a further extension of the exhaust line be necessary, a steel tube 42 x 1 mm with an internal diameter of 40 mm (approx. 1 5/8 in.) which is opened out to 42 mm at the joining end (approx. 1 3/4 in.) should be used. The exhaust pipe must be securely attached to the exhaust connection and it should be laid with a slight downward slope or have approx. 5 mm (0.2 in.) drain holes at the lowest points.  
The exhaust outlet must be to the outside but not facing the air stream formed by the vehicle's travel. The exhaust connection on the heater may not be shortened, but it may be bent, so long as the total length remains the same.
3. Penetrations to the outside of the vehicle should be made tight against spray-water with a grommet.
4. Parts of the vehicle important for its operation must not have their function disturbed (maintain adequate clearance).

## Running the heating air

Locate the inlet for the heating air in such a manner that the exhaust gases from the vehicle's engine and from the heater itself cannot contaminate the heating air.

In fresh air heating (drawing the heating air from outside), the fresh air should be drawn in from as high a position as possible and not in the vicinity of the exhaust pipe or in an area subjected to wind pressure or vacuum. When operating as a recirculating heater, locate the inlet for the heating air in such a way that the out-flowing hot air cannot be sucked directly in again.

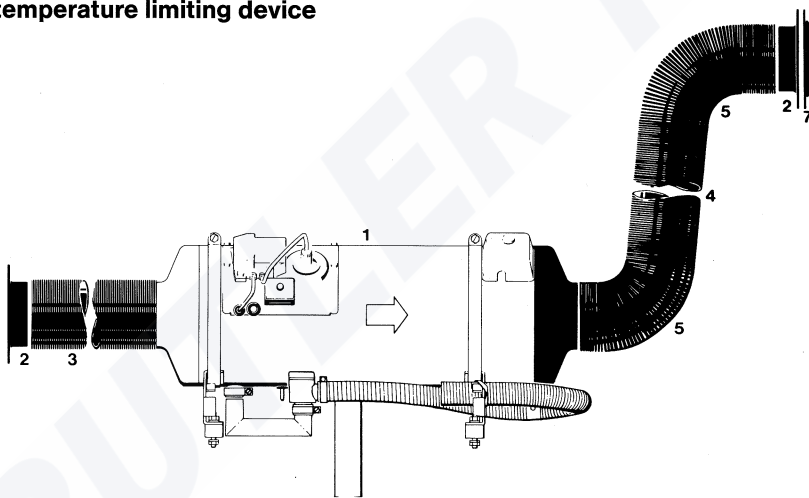
A heater provides the greatest heating air flow when it blows freely. Components which carry heating air reduce the flow of heating air.

In order to enable you to determine whether the installation method you intend to employ excessively reduces the flow of heating air – the limit is reached when the heater overheats – we have stipulated a heater rating for every heater model and a component rating for every component through which heating air flows (See Additional Equipment Catalog).

The component rating sum of the components attached to the heater through which heating air flows may not exceed the heater rating.

The outflow temperature in the hot air line must only be measured after completion of installation (300 mm down from the heater) when parts are used that have not been given a component factor. The temperature may not exceed 140 °C.

### 1. Installation without temperature limiting device

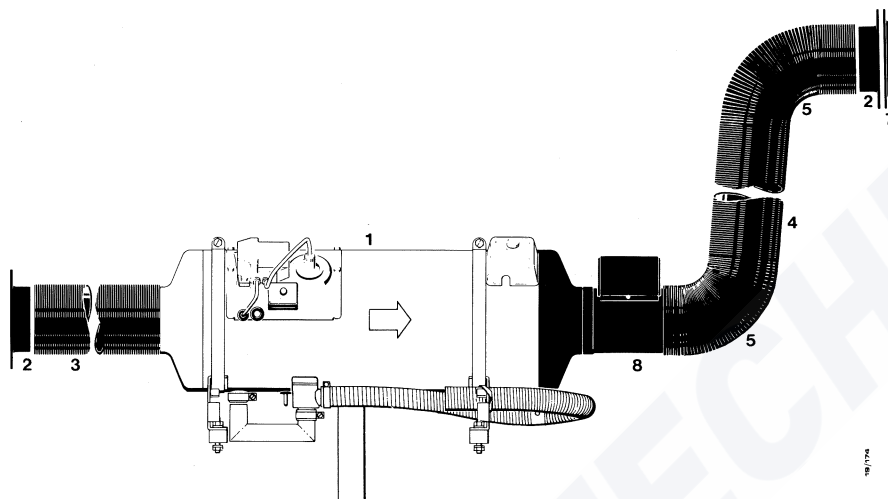


| Item                       | Designation   |                  | Heater factor    |
|----------------------------|---|------------------|------------------|
| 1                          | D 7 L heater  |                  | 8                |
| Item                       | Designation   | Cat. No.         | Component factor |
| 2                          | 2 connections   | 25 1226 89 00 11 | 0,2              |
| 3                          | Flexible tube 100 mm $\phi$ m. run (4 in)             | 10 2114 38 00 00 |                  |
| 4                          | 1 m (40 in)   |                  | 1,0              |
| 5                          | 4 m (160 in)  |                  | 4,0              |
| 5                          | 2 x 90° bends of flexible tubing 100 mm $\phi$ (4 in) |                  | 1,0              |
| 7                          | Outflow grid 100 mm $\phi$ (4 in)                     | 25 1226 89 05 00 | 1,8              |
| Total of component factors |   |                  | 8,0              |





## 2. Installation with temperature limiting device

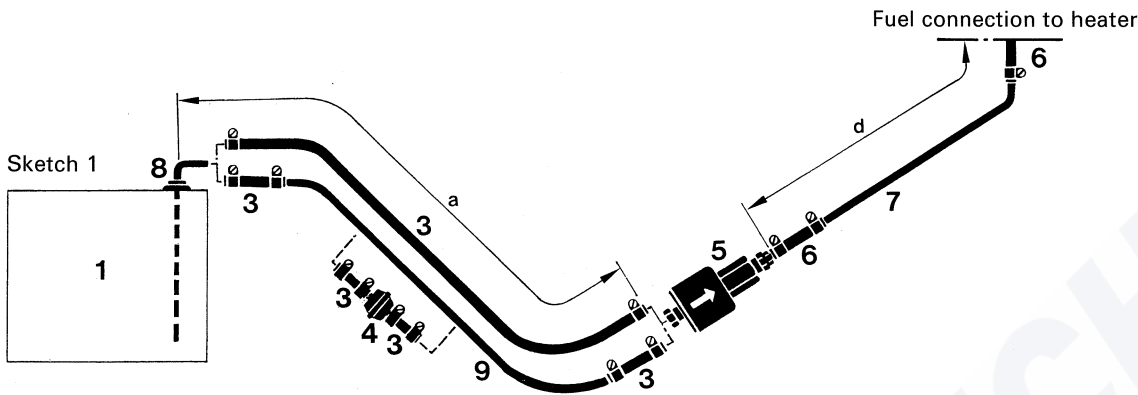


| Item                        | Designation  |                  | Heater factor    |
|-----------------------------|--|------------------|------------------|
| 1                           | D 7 L heater   |                  | 8                |
| Item                        | Designation  | Cat. No.         | Component factor |
| 2                           | 2 Connections  | 25 1226 89 00 11 | 0,2              |
| 3                           | Flexible tube 100 mm $\phi$ m. run (4 in)                          | 10 2114 38 00 00 | 1,0              |
| 4                           | 1 m (40 in)  |                  | 3,0              |
| 5                           | 3 m (120 in)   |                  | 1,0              |
| 7                           | 2 x 90° bends of flexible tubing 100 mm $\phi$ (4 in)              |                  | 1,8              |
| 7                           | Outflow grid 100 mm $\phi$ (4 in)                                  | 25 1226 89 05 00 | 0,7              |
| 8                           | Outflow tube 100 mm $\phi$ (4 in) with temperature limiting device | 25 1431 89 01 00 |                  |
| Total of components factors |  |                  | 7,7              |

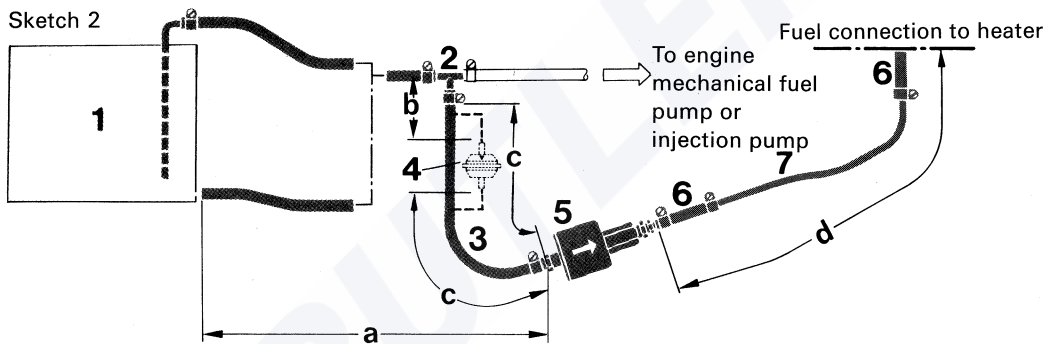
## Fuel supply for heaters of more than 5 kW (as a rule trucks, construction machinery etc.)

Divergences from the instructions set forth here are not permitted, as they can lead to malfunctions.

1. Fuel is preferably tapped from the vehicle fuel tank or from a separate fuel tank with separate riser pipe (tank connection) as shown in Sketch 1.



2. In the event of difficulties in fitting the riser pipe, the supply line can be tapped as shown in Sketch 2 in the case of diesel-engined vehicles and petrol-engined vehicles with a mechanical fuel pump.



Dimension a = max. 750 mm with petrol  
max. 2000 mm with diesel

Dimension b = 50 mm

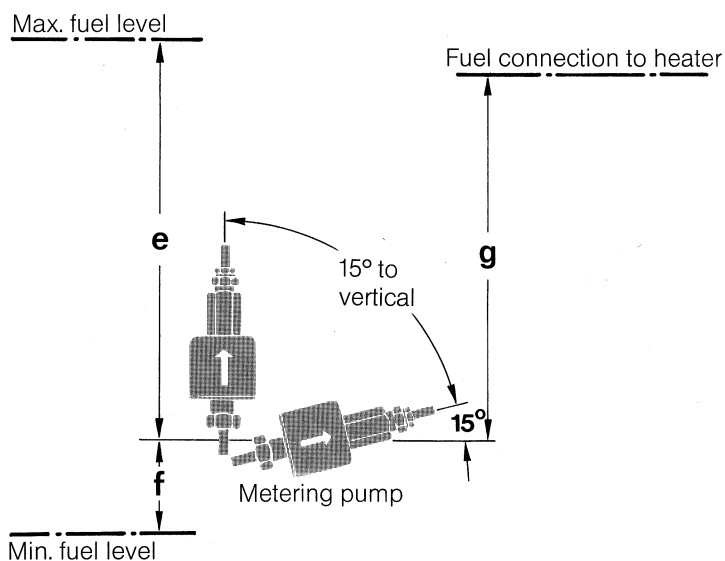
Dimension c = max. 300 mm

Dimension d = max. 4 m with petrol  
max. 6 m with diesel

- 1 Fuel tank (vehicle tank or separate tank)
- 2 Fuel branch
- 3 Fuel hose, internal dia. 5 mm  
Cat. No. 360 75 350
- 4 Fuel pre-filter  
(only necessary when contaminated fuel is used)  
Cat. No. 25 1226 89 00 37
- 5 Fuel metering pump (15° to vertically upwards)
- 6 Fuel hose, internal dia. 3.5 mm  
Cat. No. 360 75 300
- 7 Fuel pipe, plastic, internal dia. 2 mm  
Cat. No. 090 31 117
- 8 Riser pipe (tank connection), internal dia. 4 mm  
Cat. No. 25 1156 30 00 00
- 9 Fuel pipe, internal dia. 4 mm  
Cat. No. 049 10 030 steel  
080 16 001 copper



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



Supply pressure from tank to metering pump:  
e = max. 1000 mm

Suction head:  
with tank at zero pressure:  
f = max. 750 mm with diesel oil

Check whether tank ventilation is working properly  
Intake from tank when underpressure occurs during operation (valve 0.03 bars 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.

4. Important

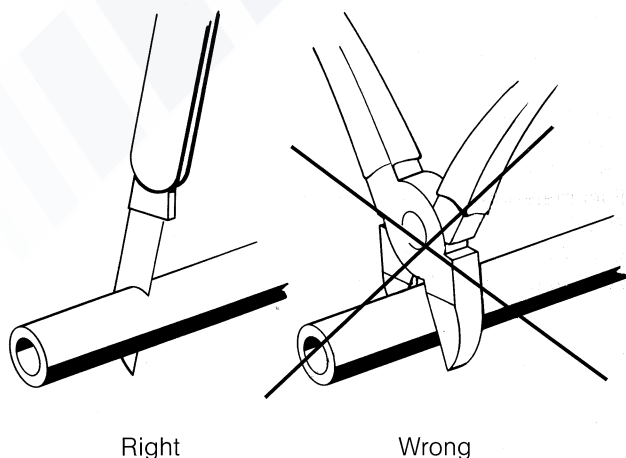
Sections 45 and 46 of the West German road traffic regulations also apply, with due alteration of details, for the fuel lines and additional tanks of heaters.

Protect fuel line, filter and metering pump from overheating; do not install near silencers and exhaust pipes.

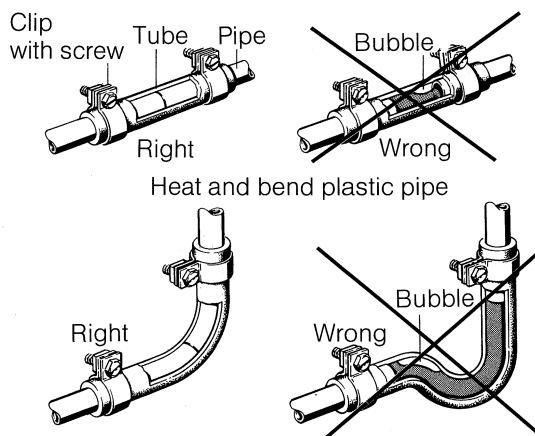
When laying fuel line, fuel filter and fuel metering pump near the rear axle, allow for the spring deflection of the latter.

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

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



Connect up fuel pipes with a fuel tube. Fit the fuel pipe flush.



## Fuel grades

### Fuel of D 7 L at low temperatures

The heater can take without problem the fuel you use in your tank and which is commercially available. 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).

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

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

If there is no special diesel fuel available at low temperatures, mix in petroleum or petrol according to the table.

| Temperature        | Winter diesel fuel | Additive                 |
|--------------------|--------------------|--------------------------|
| 0 °C to – 15 °C**  | 100 %              | –                        |
| – 15 °C to – 25 °C | 50 %               | 50 % Petroleum or petrol |
| – 25 °C to – 40 °C | –                  | 100 % Petroleum*         |

\* or special winter diesel fuels.

\*\* 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.

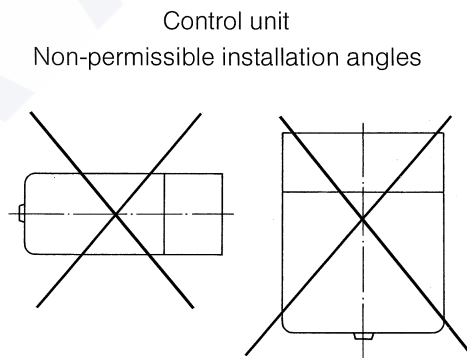
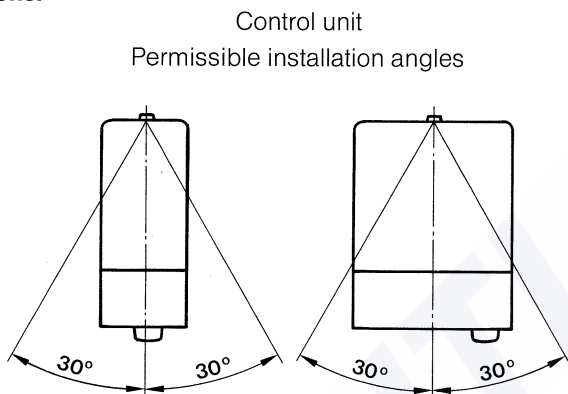
### Fuel for special cases

In special cases, the heaters can also be operated with extralight fuel oil (above 0 °C) or petroleum. If in doubt, please consult the manufacturer.

## Electrics:

**Arrange electric cables, switch 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.



## Electric installation

The required cross-sectional areas of the + lines and – lines must be determined from the following table.

If the dimensions of the line are too small then there is a danger that the heater will be switched off automatically after starting due to undervoltage.

| Total length in meters (+ and – cable lengths added) | DIN cross-section in mm <sup>2</sup> | Cable No. (in general use in America) |
|--|--------------------------------------|---------------------------------------|
| up to 5  | 4                                    | –                                     |
| 5 – 8  | 6                                    | –                                     |
| 8 – 14   | 10                                   | –                                     |
| 14 – 20  | 16                                   | –                                     |
| 20 – 28  | 25                                   | –                                     |
| In general use in America                            |                                      |                                       |
| up to 7  | (5.2)                                | 10                                    |
| 7 – 11   | (8.4)                                | 8                                     |
| 11 – 18  | (13.4)                               | 6                                     |
| 18 – 28  | (21.5)                               | 4                                     |

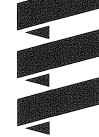
### Example 1:

|                     |                              |                     |
|---------------------|------------------------------|---------------------|
| Line length (plus)  | heater – battery             | = 4 m               |
| Line length (minus) | heater – battery             | = 4 m               |
|                     | overall length               | = 8 m               |
|                     | resulting line cross-section | = 6 mm <sup>2</sup> |

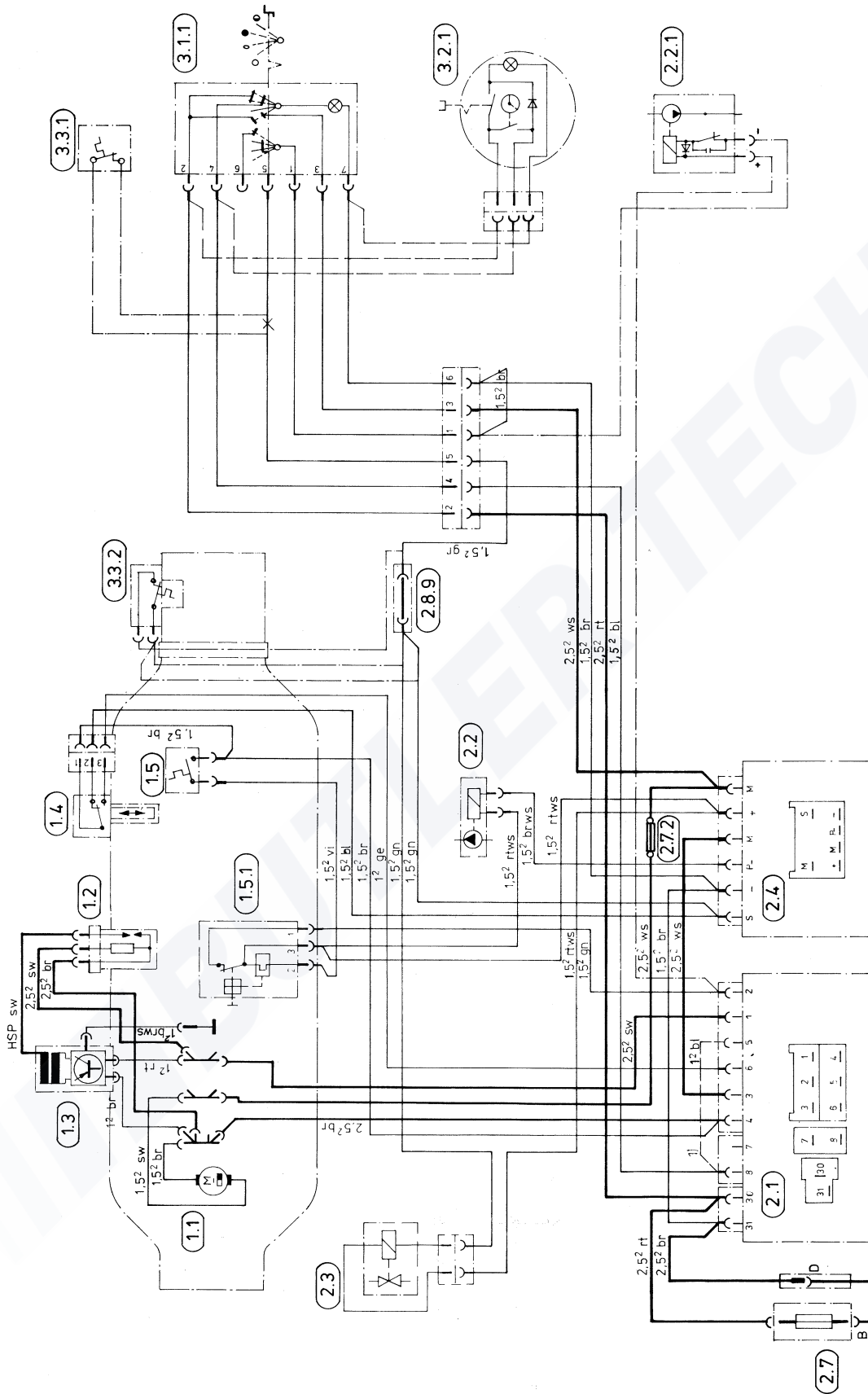
### Example 2:

|                     |                              |                     |
|---------------------|------------------------------|---------------------|
| Line length (plus)  | heater – battery             | = 4 m               |
| Line length (minus) | heater – chassis             | = 1 m               |
|                     | overall length               | = 5 m               |
|                     | resulting line cross-section | = 4 mm <sup>2</sup> |





Circuit diagrams D 7 L - 12 Volt -



25 1480 00 96 03

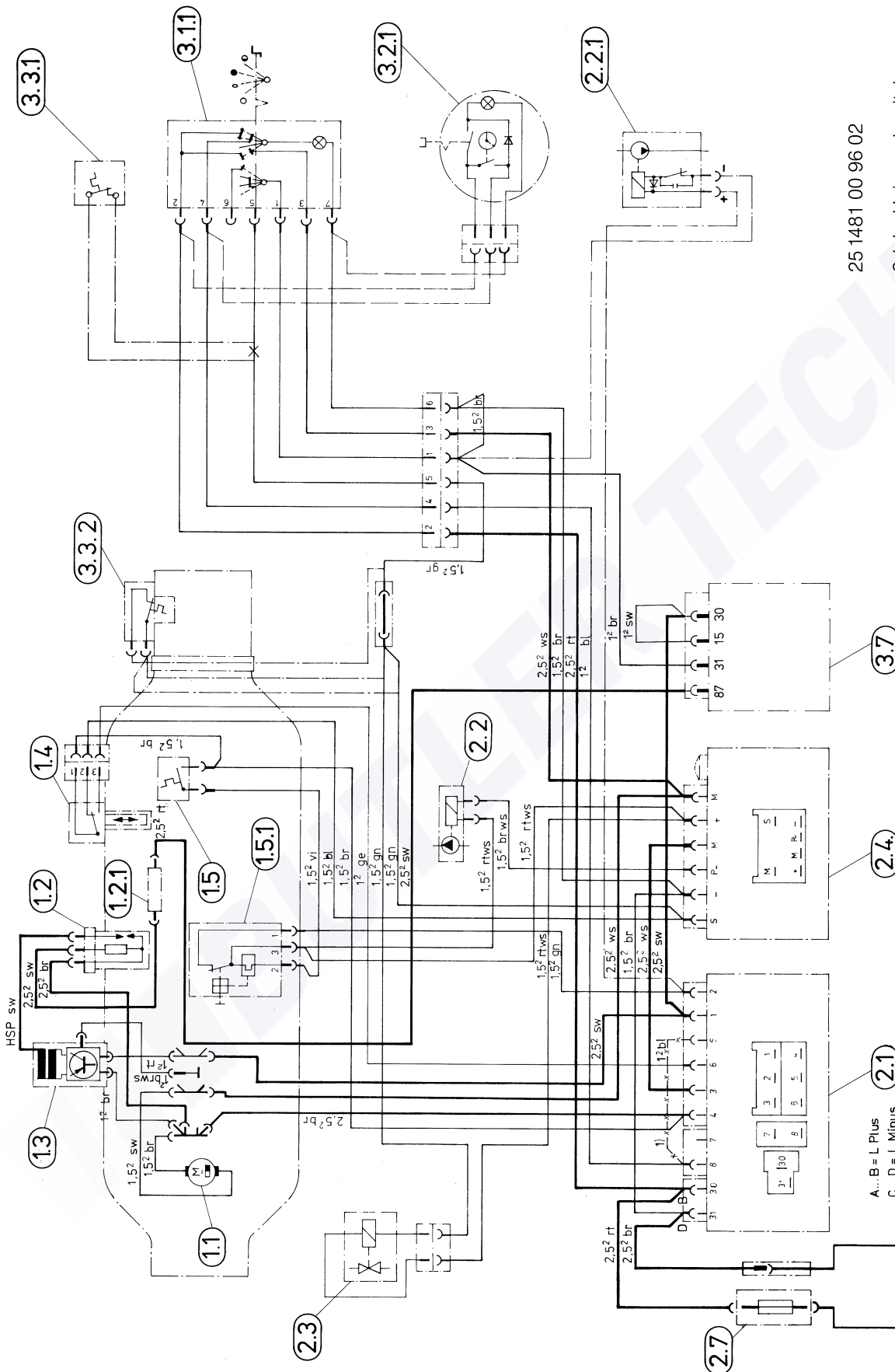
- 2.1 Control unit
- 2.2 Fuel metering pump
- 2.2.1 Fuel circulation pump
- 2.3 Air solenoid valve
- 2.4 Impulse transmitter
- 2.7 Maine fuse 16 A
- 2.7.2 Motor fuse 20 A
- 2.8.9 No. 204 00 87 Connection

- 1.1 Blower motor
- 1.2 Glow-spark plug
- 1.3 Ignition spark generator
- 1.4 Temperature switch
- 1.5 Safety thermal cutout switch
- 1.5.1 Automatic thermal cutout fuse 0.4 A

- 3.1.1 Universal switch
- 3.2.1 Timer
- 3.3.1 Room temperature controller (break cable at A to connect)
- 3.3.2 Temperature limiting device

<sup>1)</sup> for Sweden only

Circuit diagrams D 7 L - 24 Volt -



25 1481 00 96 02

- 3.1.1 Universal switch
- 3.2.1 Timer
- 3.3.1 Room temperature controller (break cable at A to connect)
- 3.3.2 Temperature limiting device
- 3.7 Current control

1) for Sweden only

- 2.1 Control unit
- 2.2 Fuel metering pump
- 2.2.1 Fuel circulation pump
- 2.3 Air solenoid valve
- 2.4 Impulse transmitter
- 2.7 Maine fuse 16 A

- 1.1 Blower motor
- 1.2 Glow-spark plug
- 1.2.1 Series resistor for glow plug
- 1.3 Ignition spark generator
- 1.4 Temperature switch
- 1.5 Safety thermal cutout switch
- 1.5.1 Automatic thermal cutout fuse 0.4 A

- 2.1 A...B = L Plus
- C...D = L Minus
- L Plus + L Minus = L Total



BUTLER TECHNIK

**BUTLER TECHNIK**