Add-Heater *HYDRONIC* D 5 W Z

Technical description
Installation instructions
Operating instructions

Eberspächer®

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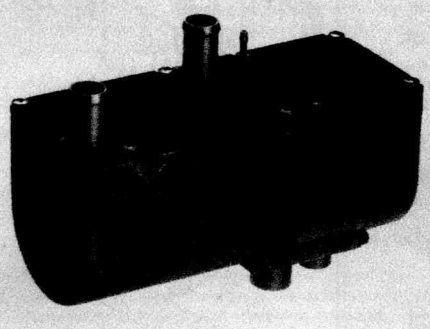
Add-Heater 12 V
for diesel fuel

Order-No.
25 1988 00 00 00



Specification ± 10 %

Heating medium Water, coolant

Regulation of heating capacity		High	Low
Heating capacity (W)		5000	2400
Fuel consumption (l/h)		0.62	0.3
Electric power consumption (W), without heater blower	in operation	43	13
	on start-up	<90	
Fuel Diesel	(commercial grade) see also Fuel at low temperatures (p. 8)		
Rated voltage	12 V		

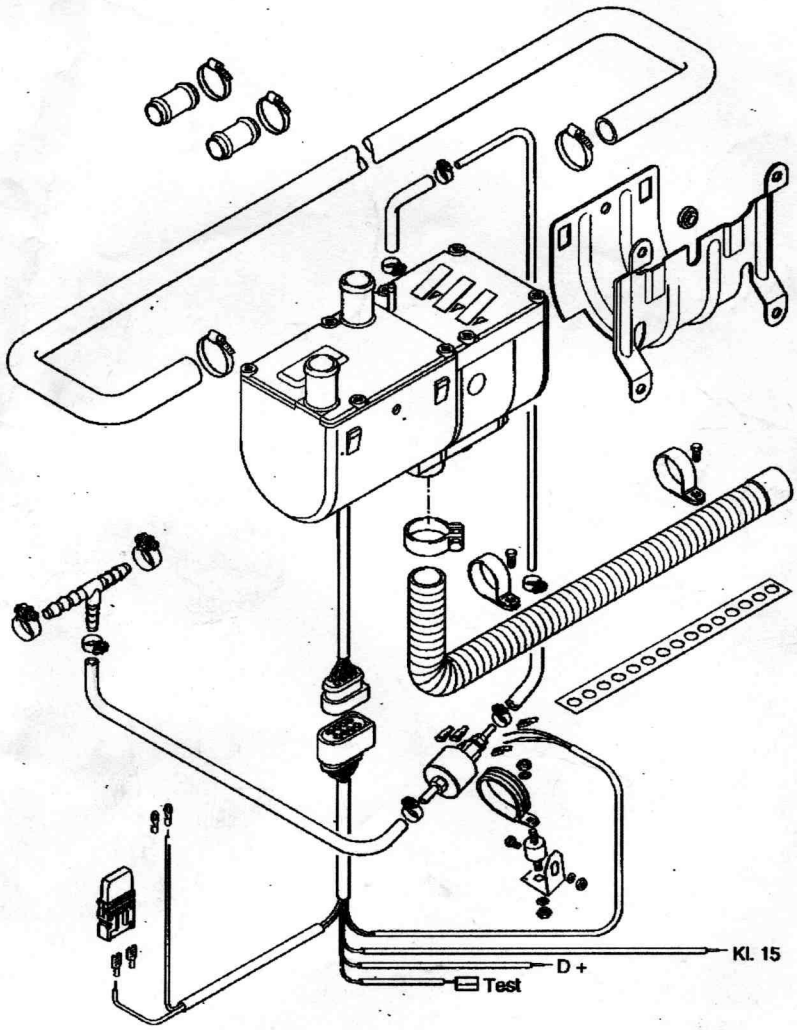
Operating range	
Min. Voltage [1]	10 V
Max. Voltage [2]	15 V
Max. allowable working pressure	2.5 bar
Min. water flow rate of heater	450 l/h
Radio interference suppression level	3 for VHF 4 for SW 5 for MW/LW
Max. available ambient temperature:	
Operation:	–40 °C to +80 °C
Storage:	–40 °C to +125 °C
Weight approx.	2.3 kg

[1] An undervoltage protection device incorporated in the control unit cuts out at approx. 10 volts.

[2] An overvoltage protection device incorporated in the control unit cuts out at approx. 15 volts.

P.P. 4, 6 MISSING.

Scope of delivery



Installation instructions:

Hydronic heaters are used in combination with the in-vehicle heating system to preheat the engine, to heat the cabin and to defrost the windows.

They are connected to the vehicle's cooling water system, electrical system and fuel system.

Hydronic heaters can be wired to operate as add-heaters, thereby raising the heating capacity of the vehicle's own heater to a comfortable level - especially in vehicles whose engines have been optimized in terms of combustion.

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 MotorVehicle Office and receive an official test symbol (WV S 274) indicated on the name plate. The year of first operation is a requirement of German approval not representing a model number

- The heater must be retrofitted according to these installation instructions. The installation is to be checked in accordance with §19 StVZO (Federal Motor Vehicle Safety Standards) by an officially certified expert or tester of motor vehicles, a motor vehicle expert or employee in accordance with Section 7.4a of Enclosure VII to the StVZO following submis sion of the "Final approval certificate" and this certified on the final approval certificate with details of the vehicle manufacturer, vehicle type and vehicle identification number.

  The form "Final approval certificate" and a copy of the "General design certification" are available from the heater manufacturer or through their contractual workshop.
  The "Final approval certificate" and the copy of the "General design certification" are to be kept in the vehicle. The validity of the design certification depends on this.

  An entry in the vehicle's registration papers - which had been obligatory up to December 1993 - is then no longer necessary.

  Alternatively, the installation of the heater can be entered in the vehicle's registration papers - which was common prac tice up to December 1993. (§ 19 section 4).

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 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 saw dust stores, grain silos etc.).

6. Differences from the installation instructions, particularly with regard to the water supply connection, 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. Since water heaters are incorporated into the cooling system of the vehicle engine, they form an integral part of the cooling system.

   The following points must therefore be borne in mind:
   6.1 The heater must always be mounted below the cooling water level of the radiator or vehicle heat exchanger in such a way that it operates in the flow direction of the engine circuit.
   6.2 The entire cooling system including the heater must be bled to free it of bubbles following installation and in accordance with the engine manufacturer's specifications. All water connections (clips) must be tightened sufficiently to prevent all leaks and then retightened after 2 hours of operation or 100 km driving.
   6.3 All water ducts must be protected against chafing and excessive temperatures (radiated heat from exhaust pipes).
   6.4 Following any work on the cooling water system (repairs, cooling water change), the system must be bled as set forth in 6.2.
   6.5 The coolant should contain at least 10%o antifreeze all year round as corrosion protection.
   In cold weather the coolant must contain antifreeze in sufficient quantity. Operating the heater with frozen coolant is not permitted.

   If the above instructions are not complied with, the manufacturer's warranty for the entire heater system is null and void, and possibly the general operating permit for the vehicle.

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) harbors 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 nongenuine spare parts are dangerous, and therefore not permitted. When carried out in cars, they invalidate the general design approval of the heater and conse quently the general permit of the vehicle.

   Safety Instructions
   A trial run of the heater should be performed before the heating period commences. The heater must be switched off if dense smoke is persistently formed and closed down by removing the safety device. The heater should only be operated again after it has been inspected by trained Eberspächer servicing personnel. Observance of these operating instructions is a precondition for liability claims. Non-observance of the technical description, mounting and operating instructions, as well as unprofessional repairs or the use of non-original spare parts, exclude any liability on the part of Eberspächer.

9. The warranty conditions are set forth in the heater book let given to you by the after-sales service workshop when the heater is installed. Only our warranty conditions shall apply.

Running the combustion air piping and exhaust piping

Running the combustion air piping

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

The heater is installed in the engine compartment as shown in these installation instructions. If the intake is located in a place where the temperature of the combustion air cannot exceed 25°C, then the combustion air line is already suitable for suction.
If this is not the case, connect flexible tubing with an inner diameter of 20 mm and up to 1.5 m in length for extracting the combustion air from an area which meets this prerequisite. In this case, do not install the inlet of the combustion air line facing the vehicle's airstream. In addition, lay it in such a manner that it cannot be clogged by dirt and snow and that any water that does enter can flow out. Attach an end sleeve. This prevents insertion of a 16 mm dia. ball (as specified in „Technical Requirements for Heaters").

Running the exhaust piping

The scope of delivery includes flexible exhaust tubing with an inner diameter of 24 mm and 1 m in length.

The exhaust pipe can be shortened or extended up to max. 2 m as required.
Exhaust pipes must not project beyond the sides of the vehicle. The exhaust pipe must be laid with a slight downward slope or have approx. 5 mm drain holes for condensate at the lowest points.

Arrange the exhaust pipe outlet and combustion air inlet so that exhaust gas cannot be directly drawn in again.

The outlet of the exhaust pipe must extend to the outside. Exhaust pipes must be laid in such a manner that exhaust gases cannot be expected to enter the vehicle or sucked in through the vehicle blower and that the functioning of parts of the vehicle important for its operation cannot be impaired (maintain adequate clearance). Lay the outlet of the exhaust pipe in such a manner that it cannot be clogged by dirt and snow and that any water that does enter can flow out. Do not install it facing the vehicle's airstream.

This requirement can be considered fulfilled if the mouth of the exhaust pipe is facing upwards, to the side or, if the exhaust piping is laid below the floorpan of the vehicle, extends to near the side or rear of the driver's cabin or vehicle.

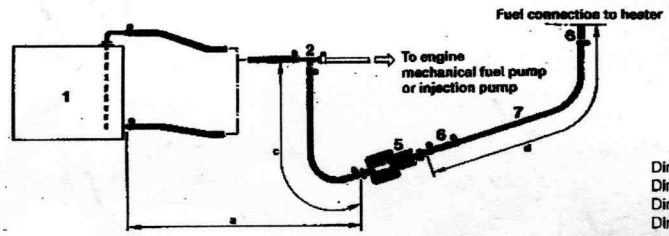
Fuel supply

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

1. For cars with diesel engines.

Fuel tapped from the fuel supply line to the engine.

Precondition: The fuel line from the fuel tank to the engine must be leak-free, so that there is no break in the fuel column when the engine is not running.

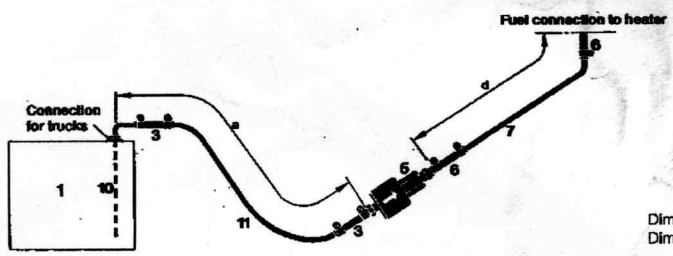


Dimension a = max. 2 m with diesel
Dimension b = 50 mm
Dimension c = max. 300 mm
Dimension d= max~ 6 m with diesel

2. For trucks with diesel engines.

The following possibilities are available:

2.1 Tapping fuel – where possible – using a separate riser pipe, fitted directly into the fuel tank in the case of trucks.

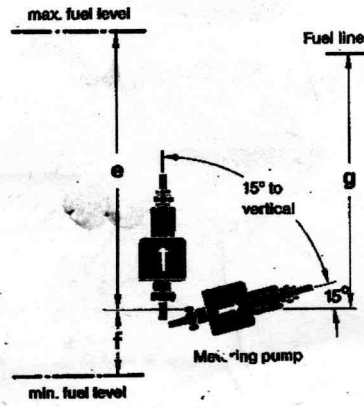


Dimension a = max. 2 m with diesel
Dimension d = max. 6 m with diesel

2.2 If it is not possible to fit a separate riser pipe in the case of trucks with diesel engines, the fuel supply line can be tapped (as shown under 1.).

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. 251226 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. 1.5 mm
Cat. No. 090 31118
or internal dia. 2 mm
Cat No. 090 31 117
10 Riser pipe, internal dia. 2 mm, Cat. No. 251226 89 50 00
external dia. 6 mm
11 Fuel pipe, internal dia. 2 mm
Cat. No. 090 31125

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



Supply pressure from tank to meterint pump:
e = max. 3000 mm suction head:
tank at zero pressure
f = max. 1000 mm with diesel oil

Check wheather 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.

4. Important

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

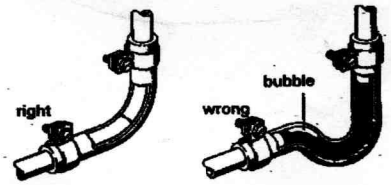
When installing the fuel line, fuel filter and fuel metering pump near the rear axle, be sure to takte the spring deflection of the rear axle into consideration.

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.



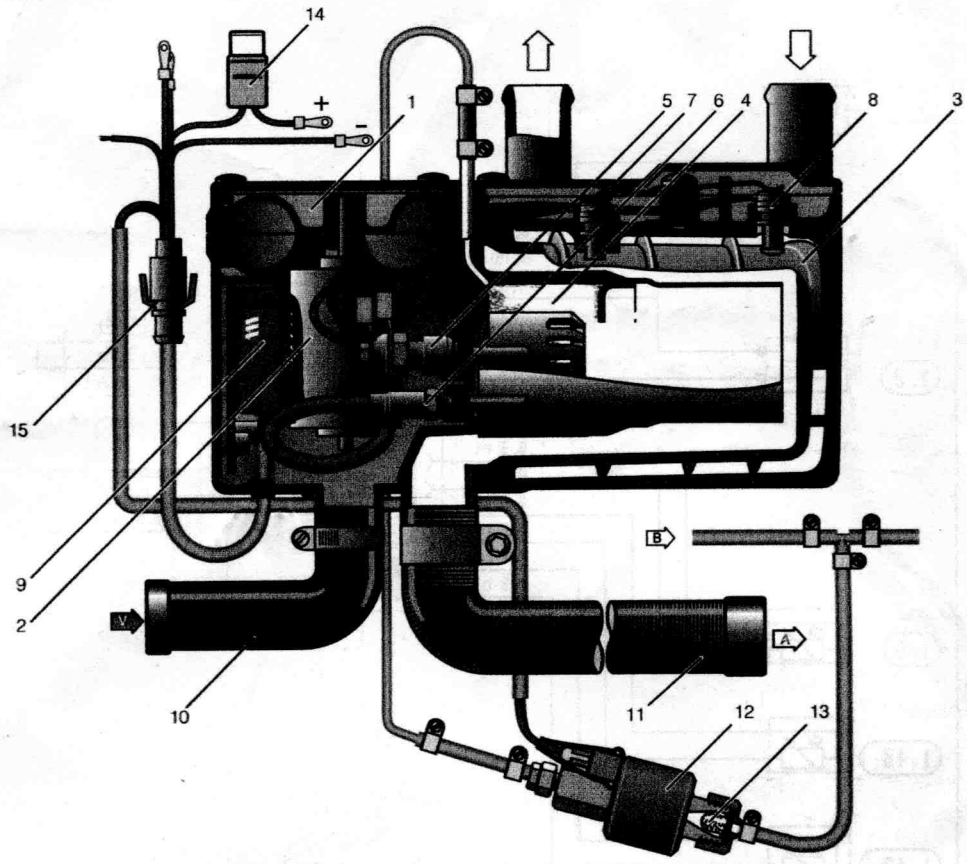
Fuel grades/Fuel at low temperatures

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).

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

Sectional view



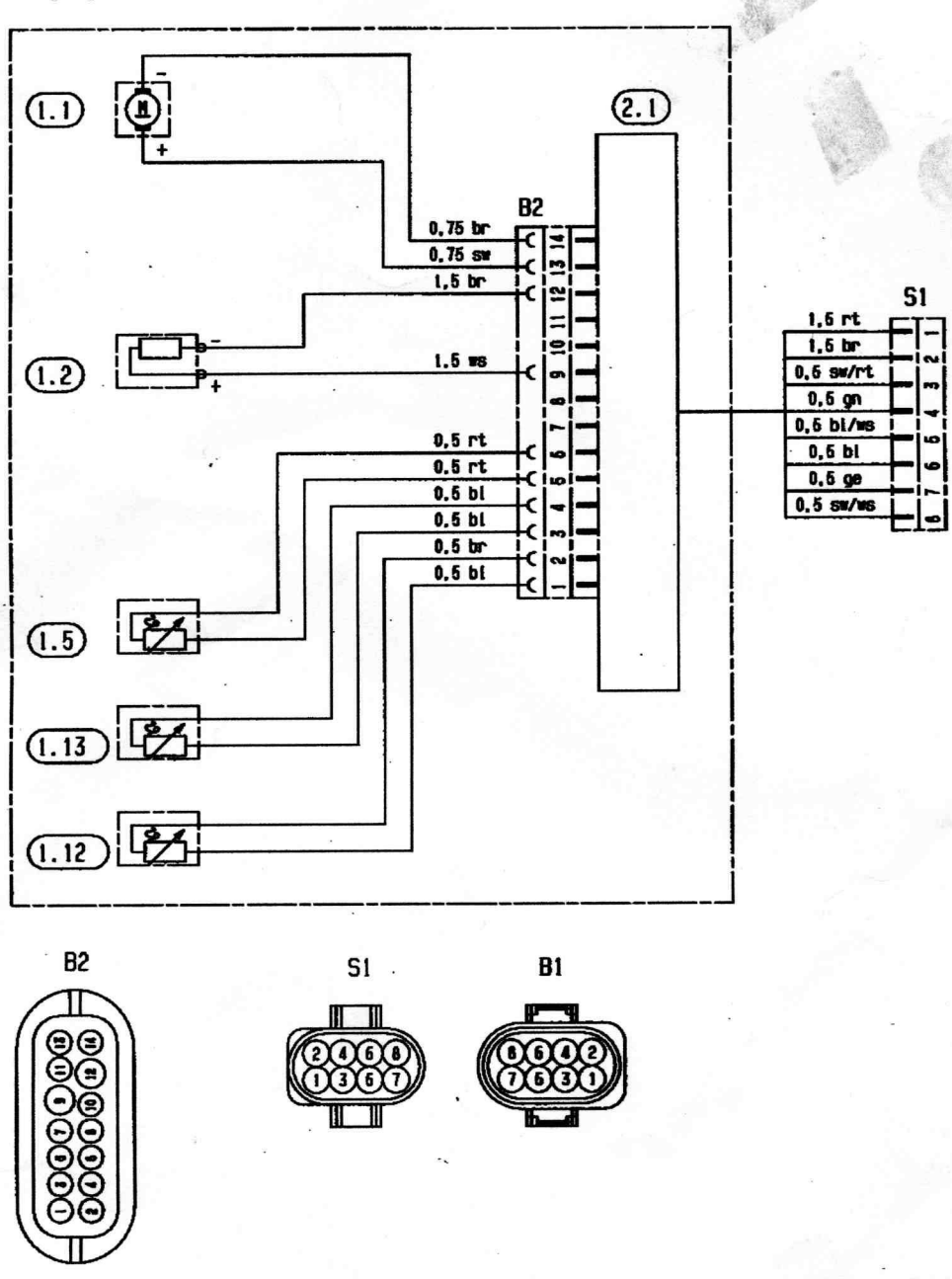
1 Combustion air blower
2 Electric motor
3 Heat exchanger
4 Combustion chamber
5 Glow plug
6 Flame sensor
7 Temperature sensor
8 Overtemperature sensor
9 Control unit
10 Combustion air hose
11 Exhaust pipe
12 Metering pump
13 Barrel-type sieve installed in metering pump
14 Main fuse
15 Interface / 8-pin connector

A = Exhaust gas
B = Fuel
V = Combustion air
WA = Water outlet
WE = Water inlet

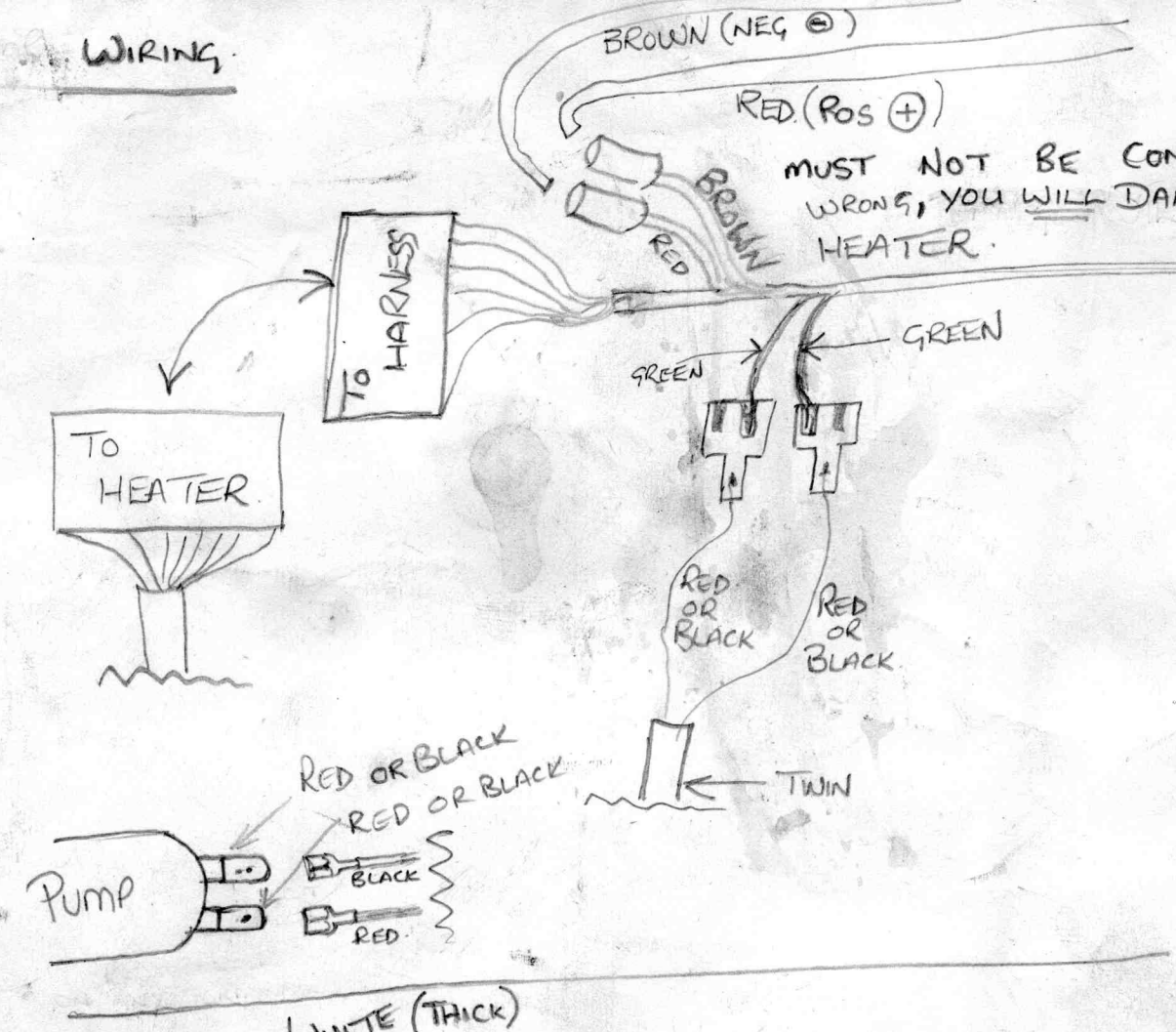
Functional description

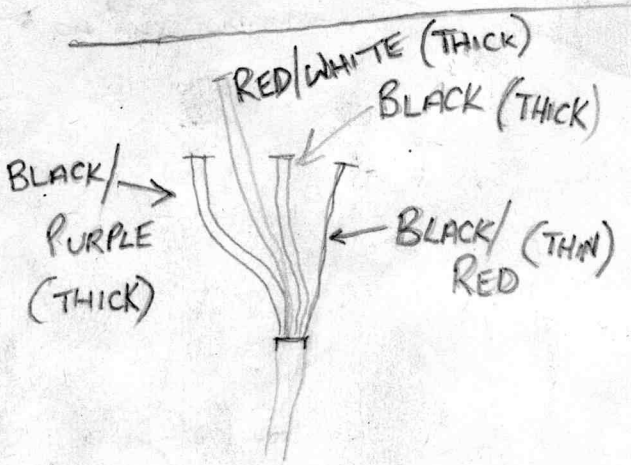
If the vehicle engine does not supply enough heat (in the warm-up phase, inner-city traffic, traffic jams, etc.), the add-heater cuts in automatically and backs up the in-vehicle heater. The add-heater has 2 settings: High and Low, with heating capacities of 5000 W and 2400 W respectively.
All starting and control functions as well as the after-run function for cooling after shutdown run automatically.
Safety devices monitor the functions of the add-heater. The flame sensor, overtemperature sensor, undervoltage and overvoltage protection devices and blower motor speed control, together with the electronic control unit, offer an extremely high standard of safety. The electric power supply is protected by a 25 A main fuse.

Wiring diagram



WIRING.





BLACK - TO SWITCH SIDE

BLACK/PURPLE - TO MOTOR SIDE

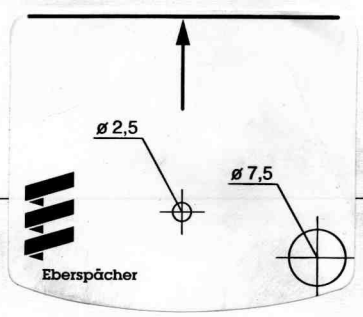
BLACK/RED - NOT USED

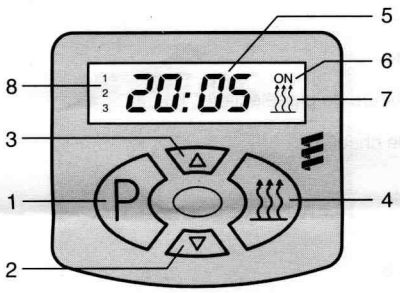
} SEE DIAGRAM PAGE 6 AND 7 (GERMAN BOOK)

RED/WHITE - MAIN FEED (NOT TO HEATER FEED) MUST BE FUSED FOR FAN WIRING.

Mini-Clock

Operating / Installation Instructions





1	Key to activate the setting capabilities
2 / 3	Time setting keys forwards / backwards
4	ON / OFF key to activate / deactivate the preset time
5	Current time, preset time and heating time
6	Symbol for activated preset time
7	Symbol for heater operation
8	Symbol for preset time 1, 2 or 3

General remarks

Setting and operating the Mini-Clock

- If a key is not depressed within 15 seconds, the display will return to its initial state – Current time.
- When setting the time with the keys 2 or 3, the setting speed is accelerated when the key is kept depressed.
- Up to three preset times can be set and activated on this Mini-Clock. Each preset time is deactivated after the heating period, and it must be newly activated for each new heating period – see activate / deactivate the preset time.

Setting functions on the Mini-Clock

Setting-up for the first time:
After connection to the power supply all symbols on the display will start to flash. The heater cannot be turned on in this state. The current time has to be set first.
Press key 1: The clock time flashes. Set the time with key 2 or 3.
Press key 1: The time is displayed; the colon flashes.

Setting the time:
Press key 1 for more than 3 seconds: The time flashes. Set the time with key 2 or 3. Press key 1 within 5 seconds: The time is displayed and the colon flashes.
Note:
If, after the time has been set, key 1 is not pressed within 5 seconds, the Mini-Clock will be transferred to the mode "Setting the Heating Time".

Setting the heating time:
Press key 1 for more than 3 seconds: The time flashes. The Mini-Clock is automatically transferred to the mode "Setting the Heating Time" if no key is pressed for 5 seconds.
The heating symbol is displayed, and the heating time flashes.
Set the heating time (10 to 120 minutes) with key 2 or 3.
Press key 1: The time is displayed once again and the colon flashes.

Setting the preset time:
Press key 1 once, twice or three times to call the preset time 1, 2 or 3. The display will then indicate the preset time, for instance 1 and symbol 1. Set the preset time with key 2 or 3. The preset time is activated or deactivated with key 4. The "ON" symbol is displayed when the preset time has been activated.
Symbol 1, 2 or 3 is displayed when the preset time is activated.

Operating functions of the Mini-Clock

Switching on the heater:
Press key 4. The heating duration is ... minutes.
The display indicates the remaining heating time and symbol 7.

Switching off the heater:
Press key 4. The heating continues for approx. 3 minutes.
The display indicates the current time.

Continuous operation:
Press key 3 and keep it depressed while pressing key 4. The heater will now remain switched on until key 4 (switching off the heater) is pressed again.

Preset time – Activate / deactivate:
Press key 1 to select the preset time 1, 2 or 3. Activate or deactivate the preset time with key 4.
The "ON" symbol is displayed when the preset time is activated.
Symbol 1, 2 or 3 is displayed when the preset time is activated.

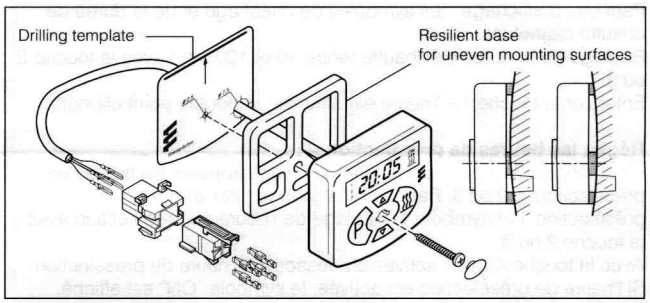
Special functions only in conjunction with the TP41 / TP41i remote control

Programming the receiver to recognize the transmitter:
Press key 2 and keep it depressed while pressing key 4.
The display indicates 2 horizontal lines.
The display returns to its initial state when the receiver has been successfully programmed. The display automatically returns to the initial status after 35 seconds if the transmitter is not recognized. In this case repeat the above procedure once again.

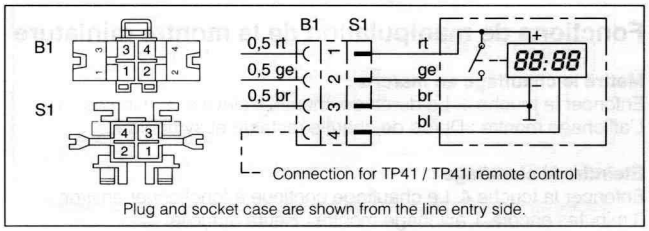
Installing and connecting the Mini-Clock

Follow the drawing to install the Mini-Clock.
The drilling template (can be peeled off and is self-adhesive) is applied on the front.
Follow the diagram to connect the Mini-Clock.
Note:
Do not press the display and control panel when installing the Mini-Clock.

Mounting drawing



Connecting diagram



D S GB F

R. Thursby

HOPE THIS BOOK IS OF SOME HELP.
THIS IS ALL THE INFO WE HAVE
ON THIS INSTALLATION

4 Rutland Street
Sunderland
SR4 6HX

Tel: (0191) 565 8734
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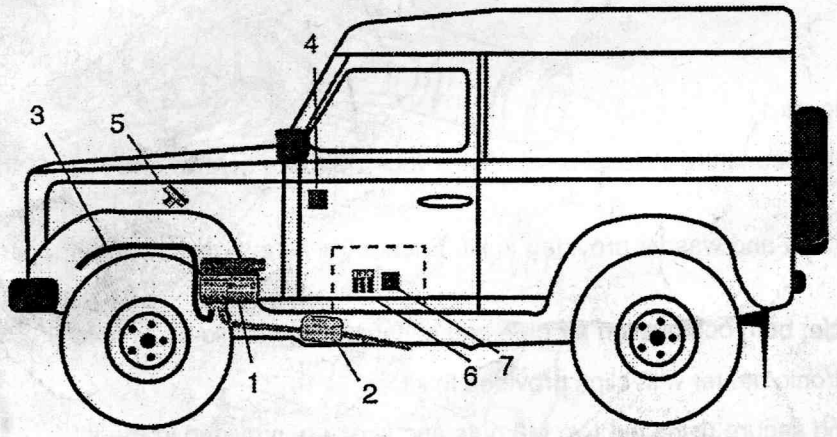
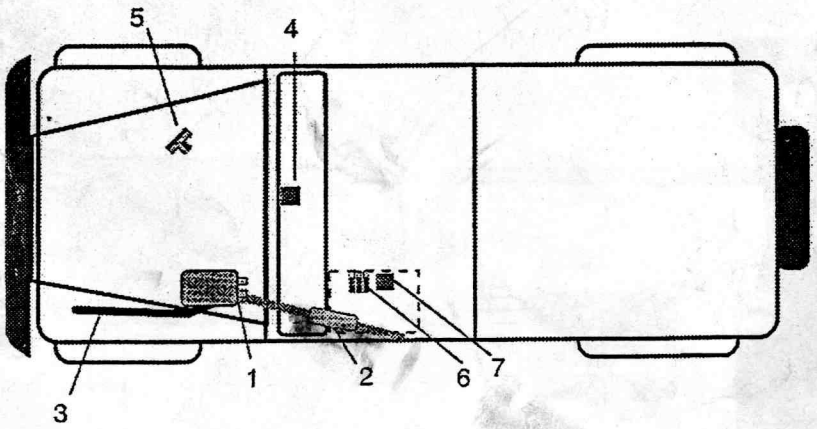
With Compliments

HYDRONIC D 4 W SC in Land Rover Defender

4 Cylinder 2.5 ltr 83 kW. 1995 model year onwards, fitted with Air Conditioning





Location of installation

The *HYDRONIC* D 4 W SC is fitted to the passenger side (RHD) outer front wing above the main chassis rail.

Please note!

This installation suggestion is valid for the vehicle described on the title page to the exclusion of any claims for liability.

Depending on the version or the level of modification of the vehicle there could be differences from the installation suggestions.

The installer should check this before carrying out the installation and if necessary make allowances for the differences with respect to this installation suggestion.

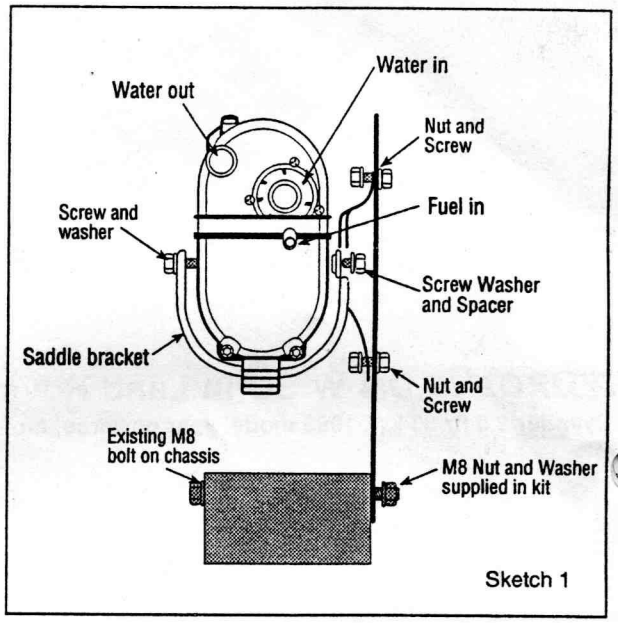
As a complement to this installation suggestion the technical description and installation instructions for the heater must be complied with.

1 *HYDRONIC* D 4 W SC
2 Exhaust pipe with silencer
3 Combustion Air Pipe
4 Mini Timer (suggested mounting)
5 T-Piece (fuel line)
6 Fuses 3 of
7 Relay

Hydronic Heater Part No. E3058 has been specifically designed to be installed in the Land Rover Defender 90 / 110 / 130.

Part No. E3058 contains the following items:-

PART NUMBER	DESCRIPTION	QTY.
25 1917 01 00 00	Heater D4W Hydronic 12v	1.00
25 1917 80 00 00	Kit D4W 12v Hydronic	1.00
501 00 001	Timer Mini 7 Day 12/24v	1.00
18993	Conduit Split Nylon 40mm	1.00
19255	Bracket - Exhaust	2.00
18046	Terminal 8mm Insulated Ring	2.00
360 75 130	Pipe - 5mm Fuel Line	1.00
18000	Terminal Housing Tab 1Way AmpA	2.00
18001	Terminal Housing Rec 1Way AmpA	2.00
18010	Terminal Rec Spade Amp	1.00
18018	AMP Tab Terminal 42241	1.00
18014	AMP Recept Tmnls 180384-1	1.00
18106	Terminal 4.5mm Tab	1.00
18812	Split Tubing For Cable-3/8"	2.00
19942	Brkt-D4W L/Rover 110 Chassis A	1.00
291B083034	Nut M8X1.25 SLK Z+P	2.00
291B082008	Washer M8 Plain Z+P	2.00
20 1568 88 00 02	Bar Punched Hole 500x25mm	1.00
20293	Manual L/Rover Defender D4W	1.00
10 2063 01 20 98	Clip 12mm	2.00



Sketch 1

Before the installation

Disconnect the battery

Drain the engine coolant

Remove the bonnet

Fixing the Heater bracket (see sketch 1 and figure 1)

Using the Hydronic Heater Mounting Bracket provided in the installation kit, fit the four M6 fixing screws and nuts to the Defender mounting bracket.

Secure heater to the cradle bracket using M6 screw and washer provided in kit. Ensure the screw washer and spacer is also fitted to the saddle bracket.

PRIOR to installing Hydronic heater to the vehicle, both combustion air pipe and exhaust pipe should be bent to 90°.*

Secure exhuast and combustion air pipe to Hydronic heater with clips provided in kit.

Locate assembly to the M8 chassis rail studs and secure using the two M8 nuts and washers provided in the kit.

* **WARNING: EXHAUST PIPE IS SHARP AND PROTECTIVE GLOVES SHOULD BE WORN WHEN UNDERTAKING THIS PROCEDURE.**

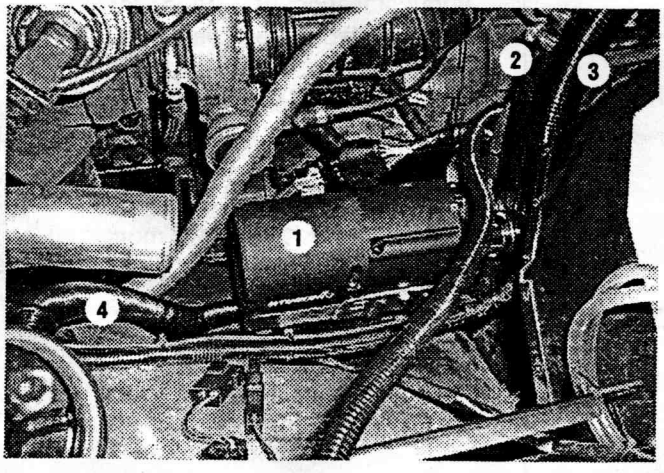


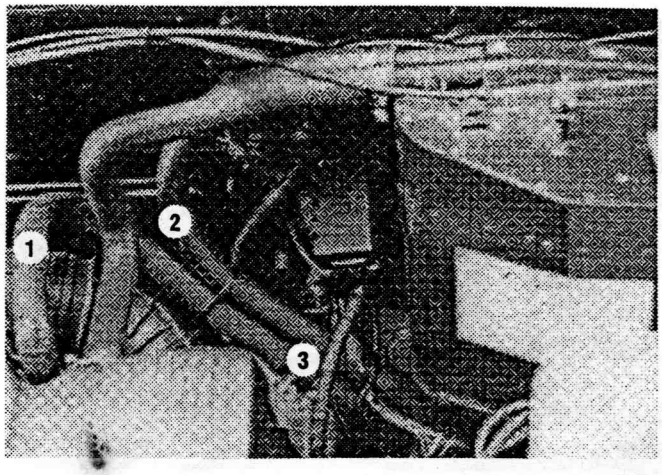
Figure 1

1. Hydronic heater
2. Water pipe inlet
3. Water pipe outlet
4. Combustion air pipe

Water circuit (see figure 2, sketch 2 and 3)

The water feed hose running from the vehicle engine to the Fan Matrix should be taken off at the Fan Matrix and routed to the Hydronic. (see figure 2). Insert 20mm to 18mm in-line water hose connector (3) and route water hose supplied in kit to the Hydronic water inlet connection. Oversleeve water hose with Conduit provided in kit. Secure with water hose clips provided.
Connect remaining water hose to Hydronic water outlet and route water hose to the water feed hose (Fan Matrix end) and connect using hose clip. Oversleeve water hose with Conduit provided in kit. Make sure water pipes are not deformed.

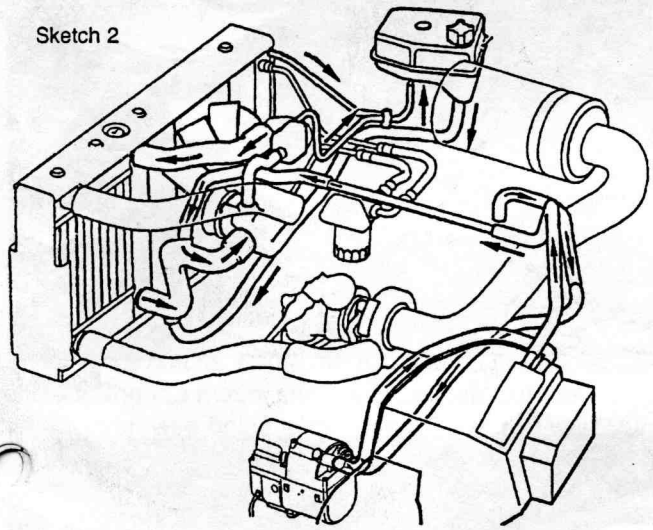
Important:- Ensure water pipes are secured using cable ties provided.



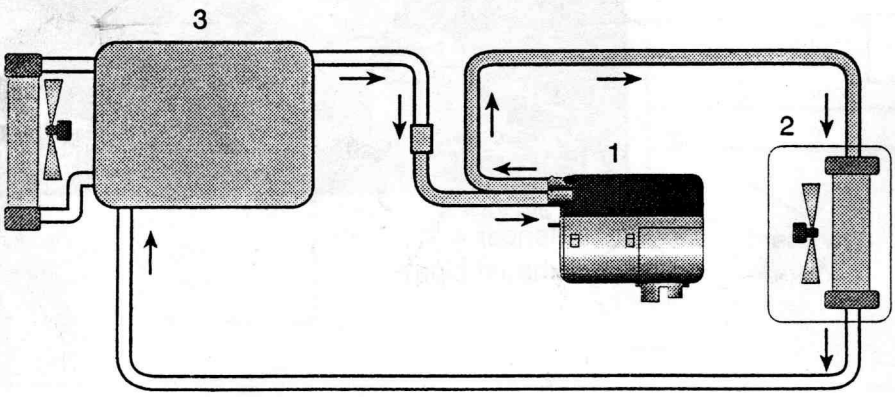
Figures 2

1. Water flow from engine to Hydronic water inlet.
2. Water flow from Hydronic to Fan Matrix.
3. 20mm to 18mm in line water connector.

Sketch 2



Sketch 3



Existing Land Rover Water Hose

Water Hose Supplied in Hydronic installation kit

1. HYDRONIC
2. Fan Matrix
3. Engine

Fuel supply (see figure 4)

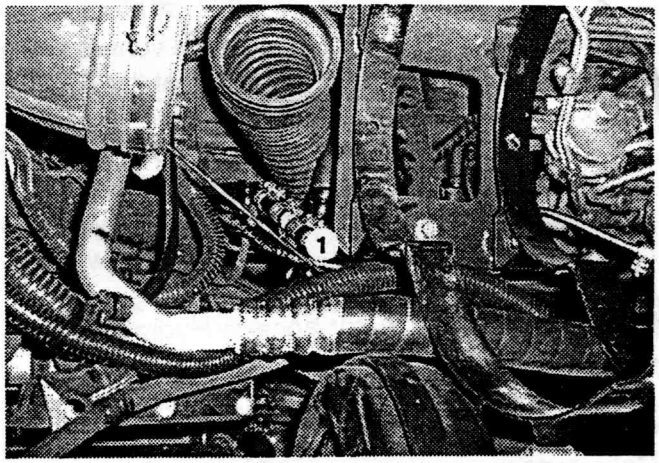
Break 8mm O.D. nylon fuel from fuel tank to lift pump and fit 'T' Piece. Oversleeve white fuel line from 'T' Connection and route to heater and connect using Ø 3.5 x 3mm rubber connection. Secure as required.

Important!
Secure all hose connections with hose clips.
Secure the fuel pipe at suitable points using hose straps.
When running the fuel lines always ensure there is sufficient clearance allowed from hot vehicle components and sharp edges.

Combustion air and Exhaust pipe
(see figures 5,6)

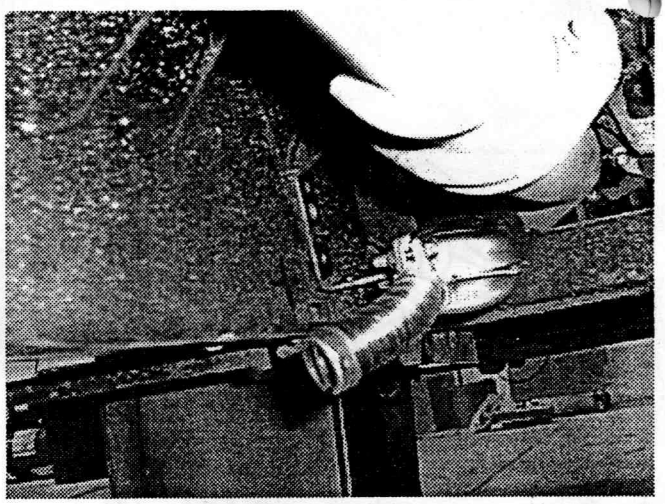
Route exhaust towards the rear, then down chssis rail (see figure 5,6). Fit silencer. Secure as required. Ensure exhaust has a downward slope. Drill 3mm hole at lowest point of exhaust if this is not possible.

Route combustion air pipe to a clean area. It should be routed from heater to upper wing and forward to headlight area. Point combustion air pipe downwards at air entry point to ensure rain / direct airsteam will not enter when driving forwards.

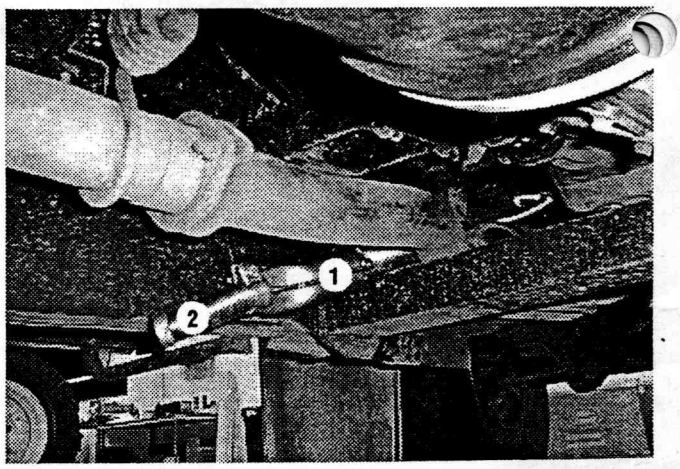


Figures 4

1. T-Piece



Figures 5



1. Silencer
2. Exhaust pipe

Figures 6

Electric's

Fitting the fuse holder (see Figure 7)

Connect the wiring harness to the *HYDRONIC* within box.
Fix the fuse holder (3-way) within the battery box under the passenger seat. Use the two self-tapping screws provided to secure the fuses.
Connect 3 way battery lead from the [illegible] the vehicle battery positive (+).
Connect earth lead to chassis / battery negative (–).

IMPORTANT:
If battery terminals are dry or corroded, ensure appropriate measures are taken, i.e. Silicone grease.

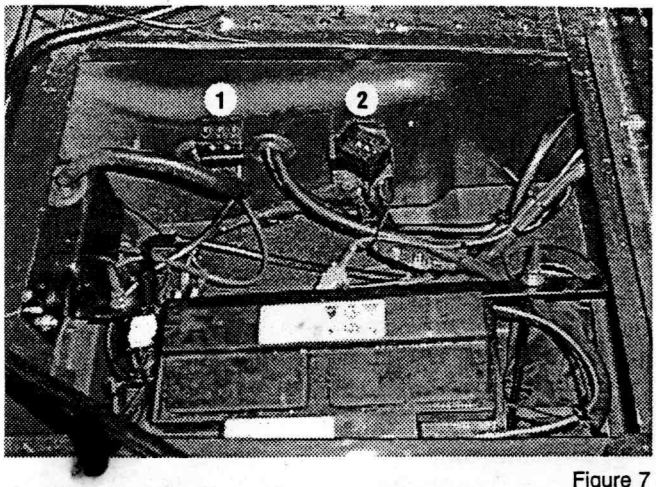
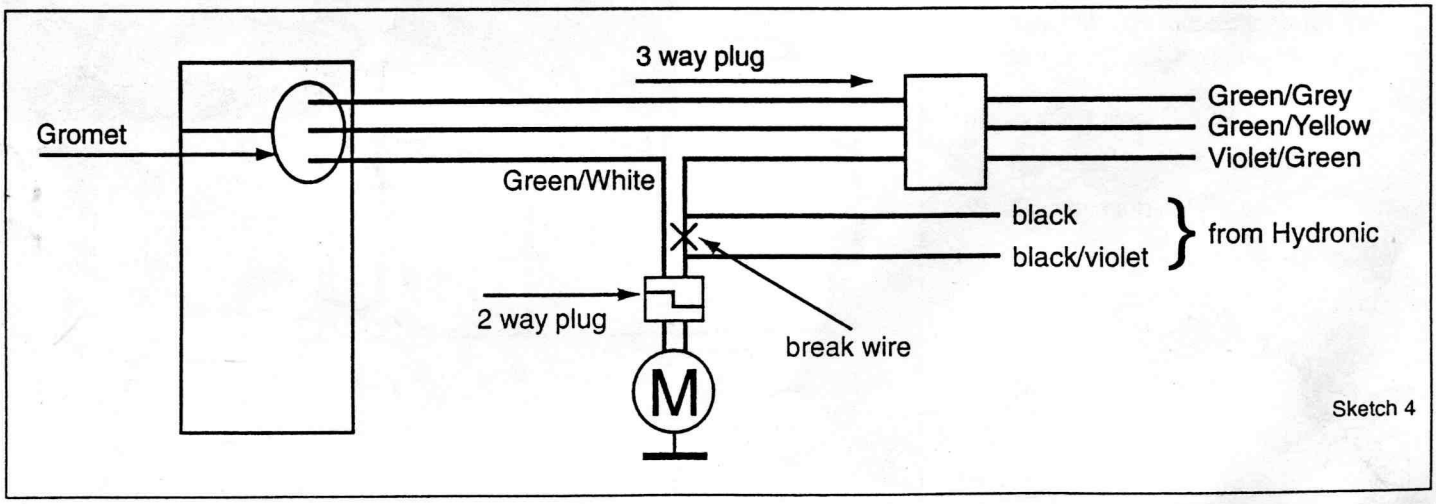


Figure 7

1 Fuse holder (3-way)
red .....20amp .....heater
red/white.....25amp .....blower
red/yellow.....5amp .....timer switch

2 Relay holder

Fit the Hydronic relay base next to the fuses holder within the battery box under the passenger seat.
An alternative position for the relay base and fuses is next to the fan matrix, on the front bulkhead under the bonnet.
Fit relay into base. Route the black and black/violet wires to the fan matrix under the bonnet. Cut the violet/green wire going to the Land Rover two way plug close to the fan motor. Fit terminals and housings to the violet/green wire and connect the black and black/violet wires from Hydronic loom as shown in sketch 4.



Sketch 4

Operating controls

Fitting the mini timer (see Figure 8).
Fix the mini timer onto the centre of the instrument panel below the radio or to the right of the cigarette lighter if additional switches have been fitted.
Run the switch cable harness from the Hydronic to the mini-timer and connect the 4-way male/female plugs (see figure 9).

Wiring Connections (from heater):

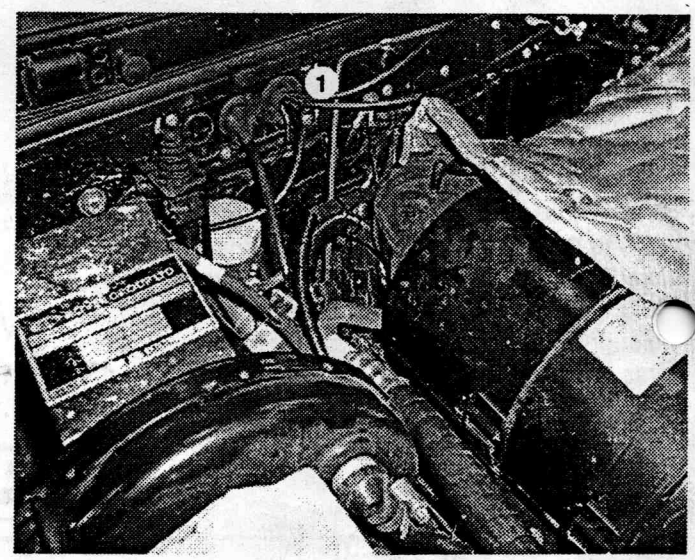
Pin 1 .....Red
Pin 2 .....Yellow
Pin 3 .....Brown
Pin 4 .....Blue/White

1 Mini timer

Figure 8

After heater installation

- Connect vehicle battery.
- Check all water pipe clips are secured.
- Check fuel pipe clips are secured.
- Refill the water coolant to the required level.
- Ensure coolant is of a 50/50 antifreeze/water mix.
- Set timer to present time.
- Select fan speed 1 and set temperature controls to the hot setting.
- Switch heater on.
- After succesful operation of heater, re-check all water pipe connections and fuel connections for tightness.



1 Switch loom / Cable entry

Figure 9