

Coolant Heater

DBW 2010.73

DBW 2010.74

Operating Instructions
Installation Instructions

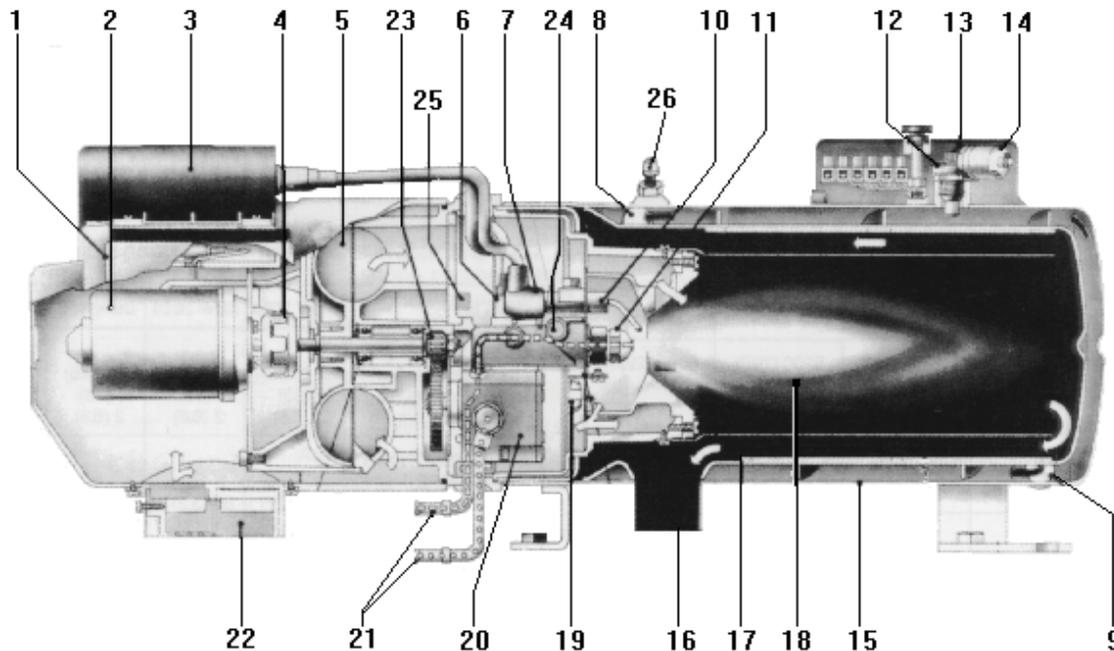
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1. Introduction

1.1 General Description



Webasto DBW 2010

1 Electronic control unit	11 Fuel nozzle	21 Fuel pipes
2 Motor	12 Overheat fuse	22 Combustion air intake
3 Electronic ignition coil	13 Control thermostat	23 Reduction gear
4 Clutch	14 Overheat limiter	24 Nozzle preheat cartridge
5 Combustion air fan	15 Heat exchanger	25 Preheat thermostat
6 Solenoid valve	16 Exhaust pipe	26 Bleed screw
7 Electrode holder	17 Combustion air swirler	
8 Outlet water pipe	18 Combustion tube	
9 Inlet water pipe	19 Flame detection photocell	
10 Ignition electrodes	20 Fuel pump	

The Webasto DBW 2010 is designed to be used on any diesel vehicle including: trucks, buses, construction, off-road and military equipment, generators and independent heating systems.

Webasto coolant heaters for the following applications:

- Engine block preheating** of liquid cooled engines to ensure reliable starting in cold weather and to reduce cold start wear and emissions (white smoke).
- Sleeper and engine block** heating with the engine off. The heater will increase the drivers comfort in cold weather, cut down on unnecessary idling and reduce engine and transmission wear, as well as, air and noise pollution.
- Boost heating** with the engine running. The heater will boost the heating system in cold weather when an engine is running at light loads, even at high speeds or idling. The heat rejection of modern diesel engines to the coolant, especially in buses, is often no longer adequate to heat the vehicle's interior.

- 4. **Cargo heating** - The heater can be used in independent heating systems to protect valuable cargo (produce, beverages, paint) from freezing.
- 5 **Marine** - Boat installation should only be performed by a Webasto authorized marine dealer. It is the dealers responsibility that the installation complies with all applicable Coast Guard regulations.

1.2 Legal provisions

Heater installation must be performed in accordance with the manufacturer's installation instructions.

Any deviations from this instructions are only permitted with the written approval from Webasto Thermosystems Inc.

It is the dealers responsibility to approve installations not performed by Webasto trained personnel.

Installation not complying with the installation instructions release Webasto Thermosystems Inc. from any product liability.

OEM installations must be approved by Webasto Thermosystems Inc.

1.3 Meaning of Warning, Caution and Note

WARNING

This heading is used to highlight that non-compliance with instructions or procedures may cause injuries or lethal accidents to personnel.

CAUTION

This heading is used to highlight that non-compliance with instructions or procedures may cause damage to equipment.

NOTE

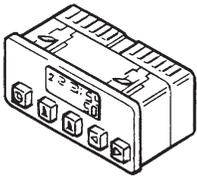
This heading is used to highlight and draw specific attention to information.

2. Operating your Webasto DBW 2010

Before switching the Webasto on, set vehicle heating system to the “heat” position and open any shut off valves. Depending on the type of control installed in the dashboard of the vehicle, the Webasto can be operated by the following methods.

2.1 Switching On

Using a timer:

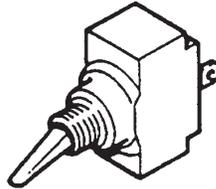


Timer

Upon actuation of the “instant heat” button the “operation indicator” on the timer lights up.

Or

Using a switch:



Switch

When the switch is used for switching “ON” the Webasto, the operation indicator integrated in the switch is illuminated.

The heater motor and coolant circulating pump begin to run. After approximately 10-25 seconds the solenoid valve opens and fuel is sprayed into the combustion chamber. At the same time, the electronic ignition coil produces high voltage (8000 V) and the mixture of fuel and air in the combustion chamber is ignited by a spark produced at the tip of the ignition electrodes. The flame is detected by the photo resistor, then the electronic ignition coil stops producing high voltage and combustion continues by itself (spark on electrodes is only required to ignite the flame). At this point the heater is working and produces heat.

The Webasto will cycle on and off until:

1. The Webasto is switched off.
2. Time has elapsed on the timer.
3. The vehicle battery voltage drops below 10.5V (20.0V).
4. The Webasto runs out of fuel.
5. A fault lock out occurs, indicated by the operating indicator light being off during the cool down cycle (i.e. overheat).

WARNING

Due to the danger of poisoning and asphyxiation the heater must not be operated in enclosed spaces such as garages or workshops without adequate exhaust extraction.

WARNING

The heater must be switched “OFF” while refueling and at fueling stations.

WARNING

Do not operate any Webasto heater in an area where toxic or explosive materials or fumes may be present.

NOTE

If heater is being switched on while the engine is warm only the circulating pump will run, coolant temperature must fall below 140 °F. (60 °C.) before heater starts.

2.2 Switching Off

When heating is no longer required, switch the Webasto heater off. The solenoid valve interrupts the fuel supply, combustion stops and the indicator light turns off. The Combustion air fan and the water pump remain on for another 2-3 minutes (after run cycle) purging the combustion chamber of any fumes.

NOTE
Restarting the Webasto during the after-run period is allowed.

2.3 Engine Preheating

1. Set the timer 30 min. to 1 hr. before you want to start engine. The heater will start up at set time. (See timer operating instructions.) Or switch the toggle switch or “instant on” switch on your timer in the vehicle dash to “ON”. The heater will start up.
2. When time is elapsed on your timer or engine preheat is no longer required, switch the Webasto heater “OFF”. The DBW 2010 will go through the after-run cycle.

2.4 Engine and Sleeper Heating

1. Switch the toggle switch (or the “instant on” button of the timer) in the vehicle dash to “ON”. The heater will start up if coolant temperature is below 140 °F. (60 °C.). Above this temperature only the water pump will run.
2. Turn ignition key to accessory position to power up your sleeper or switch on Webasto thermostat.
3. Set the thermostat in the sleeper to desired temperature. Switch sleeper fan to low position. The fan will cycle “ON” and “OFF” and maintain selected temperature.
For sleepers with continuous fan operation a Webasto Thermostat and auxiliary bunk heat exchanger is recommended.
Bunk heat exchanger kit 12V part # 905.670
4. When engine and sleeper heating is no longer required, switch the Webasto “OFF”. The DBW 2010 will go through the after-run cycle.

NOTE
Turn off unnecessary equipment, i.e. radio, position lights, etc.

NOTE
Only sleepers where the blower is cycled On and Off by the thermostat.

NOTE
Continuous fan operation will run down the vehicle batteries with most factory installed units.

3. Technical Data

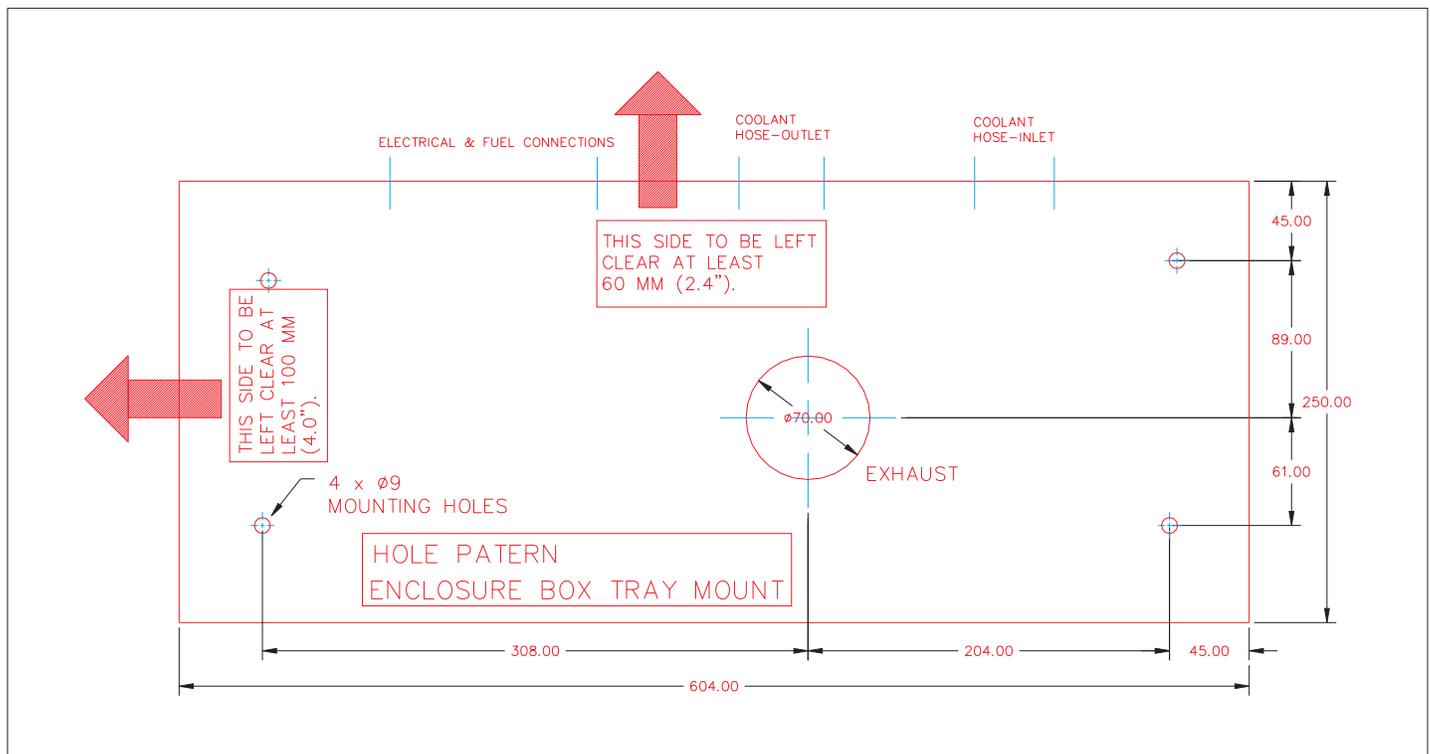
3.1 Technical Data

The following data is subject to the normal tolerance for heaters, if no tolerance is specified. This is approximately +/-10% in an ambient of 20 °C at nominal voltage.

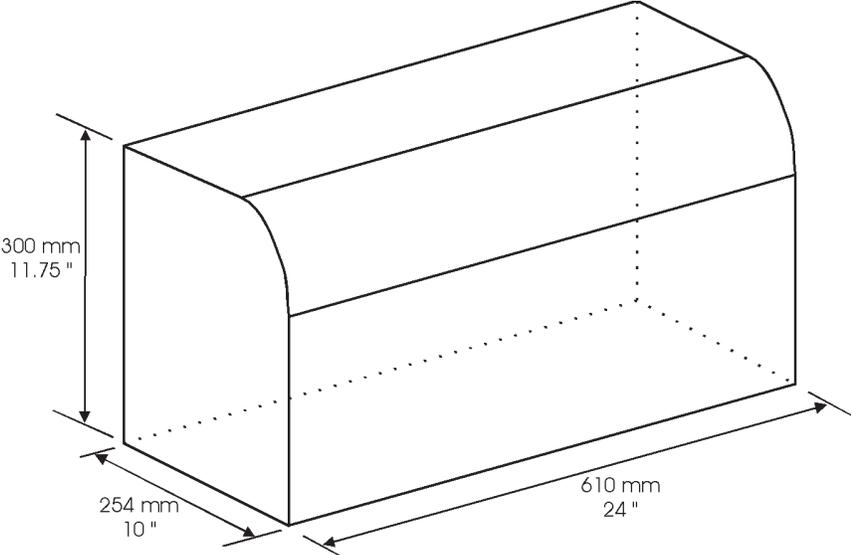
Heater	DBW 2010
Design	Coolant heater with high pressure nozzle
Heat Output BTU/hr (kW)	45,000 (13.1)
Fuel	Diesel #1, Diesel #2 and Arctic
Fuel Consumption l/hr (gal/hr)	1.5 (0.4)
Rated Voltage (V)	12 or 24
Operating Voltage (V)	10 - 14 or 20 - 28
Power Consumption w/o Water pump (W)	60
Permissible Ambient Temperature during Operation °C (°F)	-40 ... +60 (-40 ... +140)
Storage Temperature °C (°F)	+85 max. (185 max.)
Min. Capacity of Cooling System l (gal)	10 (2.6)
Permissible Operating Pressure of Coolant bar (psi)	0,4 - 2 (06 - 29)
CO in Exhaust Gas ppm	32
CO ₂ in Exhaust Gas % by Vol.	10 +/-0.5
NO _x in Exhaust Gas ppm	70
HC in Exhaust Gas ppm	<5
Emission Bacharach	1
Dimension of L Heater W mm (inch) H	584 (23) 205 (8.1) 228 (9)
Dimension of L Enclosure Box and Tray Mount W mm (inch) H	610 (24) 254 (10) 300 (11.75)
Weight with Enclosure Box kg (lb)	29,5 (65)
Weight on Tray kg (lb)	21,3 (47)
Weight of Heater incl. Control Unit kg (lb)	15 (33)

Water pump	U4846 (Magnetic Drive)
Flow Rate l/hr (gal/min)	1650 (7) against 0,15 bar
Rated Voltage (V)	12 or 24
Power Consumption (W)	28
Dimensions	
L	128 (7.16)
mm (inch)	94 (3.70)
W	82 (3.23)
H	
Weight kg (lb)	0.85 (1.88)
Hose connection mm (inch)	20 (0.78)

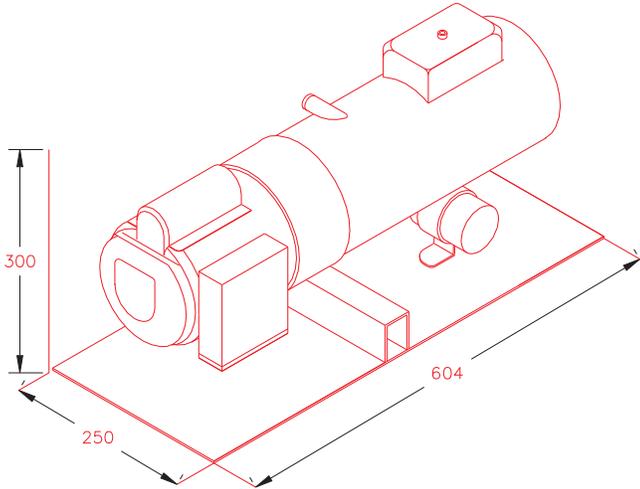
3.2 Enclosure Dimensions



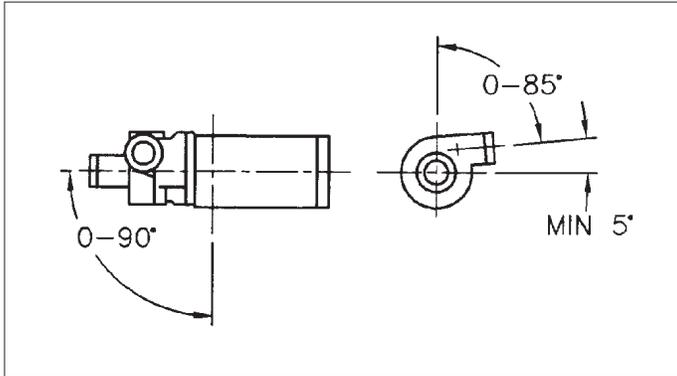
Foot print – Enclosure box and tray mount kit



Enclosure box dimensions



Tray mount dimensions



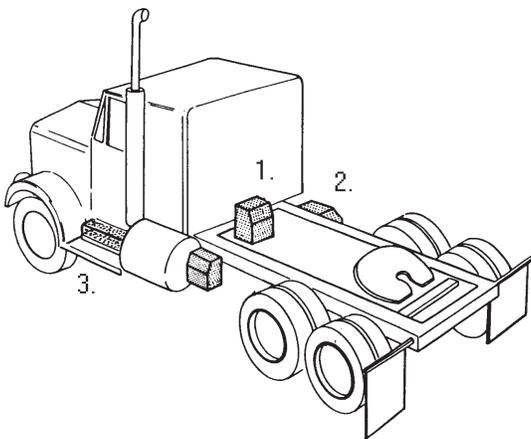
Water pump mounting position

4. Installation

4.1 General Information

Webasto will take you step by step through the installation process to ensure successful operation for years to come. The installation must be performed in accordance with the installation instructions provided in this manual.

4.2 Installation Location



NOTE:

This manual does not cover all possible installations. For special applications use this manual as a general guideline only. Contact an authorized Webasto dealer or Webasto Thermosystems directly at 1-800-555-4518.

NOTE

The circulating pump is not self priming.

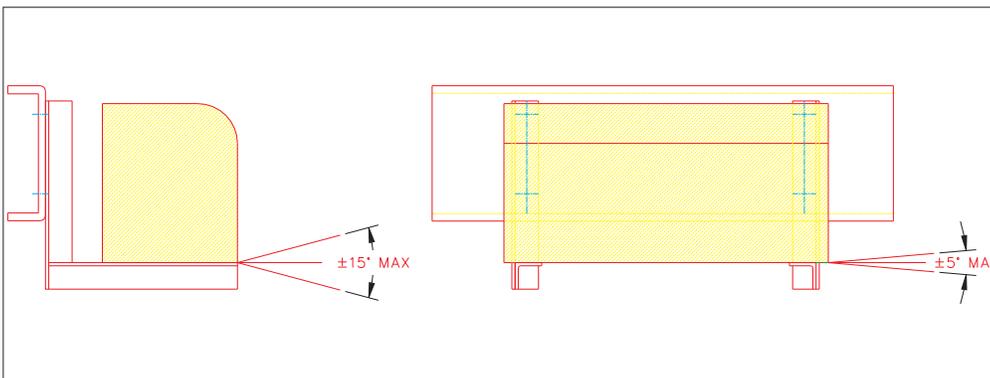
WARNING

Do not install heater inside the passenger compartment.

Installation Locations

1. Behind cab or sleeper.
2. On left/right side of the frame.
3. In an existing enclosure (tool box) on the vehicle.

The Webasto should be installed as low as possible in the cooling system to assure static bleeding of the heater and the circulating pump.



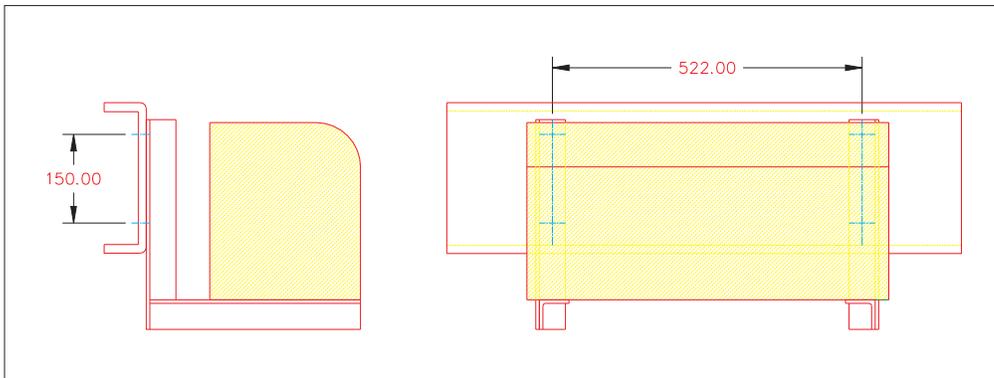
Enclosure Box Mounting angle

If the heater is installed in an existing enclosure box other than the Webasto enclosure the installation template (enclosed) must be used and adequate ventilation [4 in² (20 cm²)] must be provided.

4.3 Mounting the Heater

A. Enclosure box frame rail mounting

1. Remove the enclosure cover.
2. Mark frame rail (522 mm, 20,55") and drill 2 holes (Ø 1/2") on each side.
3. Bolt angle brackets to frame rail (Webasto part # 600.050)
4. Bolt enclosure box to angle brackets.



Enclosure box mounting

B. Tray Kit mounting in existing enclosure on vehicle, i.e. toolbox, battery box.

1. Ensure that the enclosure is big enough to accommodate the heater. Use supplied installation template.
2. The installation housing must be provided with adequate ventilation [4 in² (20 cm²)].
3. Lay supplied installation template in enclosure box. Mark the mounting hole location and exhaust location.
4. Drill 4 mounting holes (9 mm) and Exhaust hole 70 mm (2,75").
5. Bolt tray in enclosure box.

WARNING

The heater must not be installed in either the driver's compartment or in the passenger area of vehicles.

NOTE

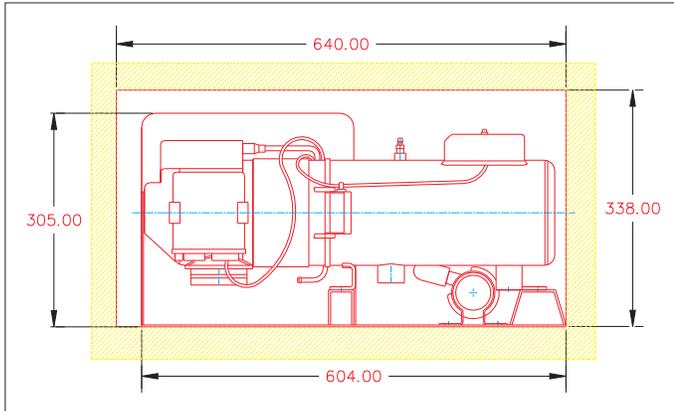
Do not weld angle brackets to the frame.

WARNING

Exhaust pipes must be so routed that the possibility of exhaust fumes entering the vehicle is unlikely.

NOTE

Additional flexible exhaust tubing # 353.221.



Tray mount enclosure

4.4 Exhaust Pipe Connection

1. Insert supplied exhaust pipe to heater and fasten exhaust clamp
2. The discharge opening of the exhaust pipe must not point in the direction of travel, and so located that any clogging caused by snow or mud is not to be expected.

The exhaust pipe I.D. 1 1/2" (38 mm) can have a length up to 16' (5 m) and may have several bends (totaling 270°).

Rigid exhaust pipe may be used, bends must be formed (smallest bending radius 3 3/8" (85 mm)). Do not weld pipe and make 90° corners. Any condensation water in the exhaust pipe must be discharged. If necessary, drill a drain hole at the lowest point.

4.5 Combustion Air Supply

A combustion air intake tube I.D. 3,2" (80 mm) may be installed on the heater if there is risk of contamination (dirt, moisture, etc.).

Combustion air intake tubing should be kept as short as possible and should not exceed 16'. Bends in the combustion air tubing should not exceed 270° total.

Combustion air should always be taken from a clean area, and should be routed in a gradual downward slope, so that moisture can drain.

4.6 Plumbing the System

4.6.1 General Information

The coolant circulating pump (bottom of Enclosure box or Tray) must be mounted at least 6" (15 cm) below the lowest permissible coolant level of the vehicles cooling system. Minimum amount of coolant in the cooling system should be at least 2.6 gal. (10 l). Independent heating

NOTE

Route the exhaust pipe in such a way so it does not touch or be directed toward any parts of the vehicle that may be damaged by heat (i.e., brake lines, electrical wiring, hoses).

WARNING

Never draw combustion air from inside the vehicle, or from areas where fumes or gases can accumulate

CAUTION

When working on the coolant system, allow the engine to cool down and open the radiator cap carefully.

systems require a minimum of 5 gal. (20 l). A minimum of 10% of a good quality antifreeze should be maintained in the cooling system at all times. Heater and water pump fit 3/4" (19 mm) I.D. heater hose meeting SAE 20 R3 specifications. Silicone hose requires special hose clamps.

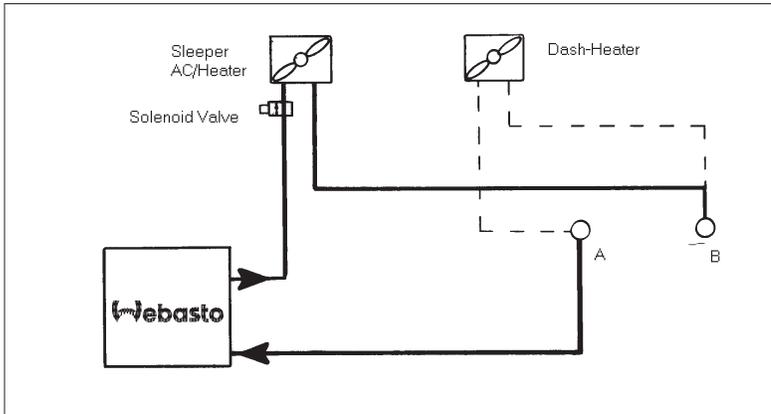
4.6.2 Select your Plumbing

Instructions for options A - B - C

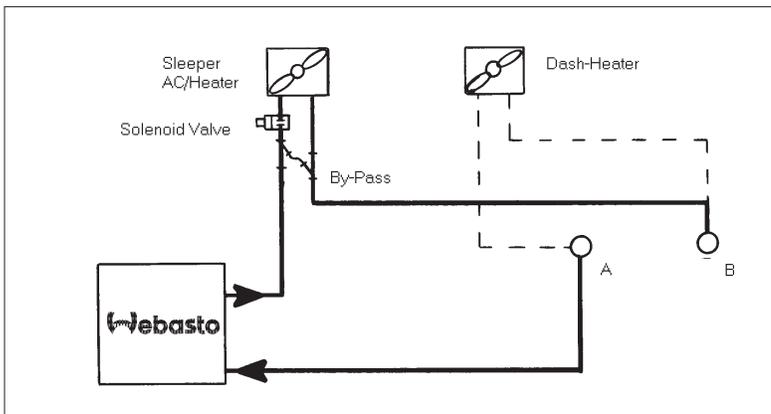
1. Remove radiator cap and release system pressure.
2. Close shut off valves for heating system, if so equipped, or pinch off supply and return line with long nose vise-grip pliers.
3. Plumb the system depending on the trucks set up shown in A, B or C.
4. Remove long nose vise-grip pliers and open shut off valves.
5. Top off engine coolant as per engine manufacturer's recommendations and re-install the radiator cap.

4.6.3 Sleeper and Engine Block Heating

A: Normally open solenoid valve plumbing circuit



B: Normally closed solenoid valve bypass circuit



NOTE
Silicone hose requires special hose clamps.

NOTE
Heater hose must meet SAE 20 R3 specifications.

NOTE
Hose clamps must be tightened to 45 in/lb. (5 Nm) torque.

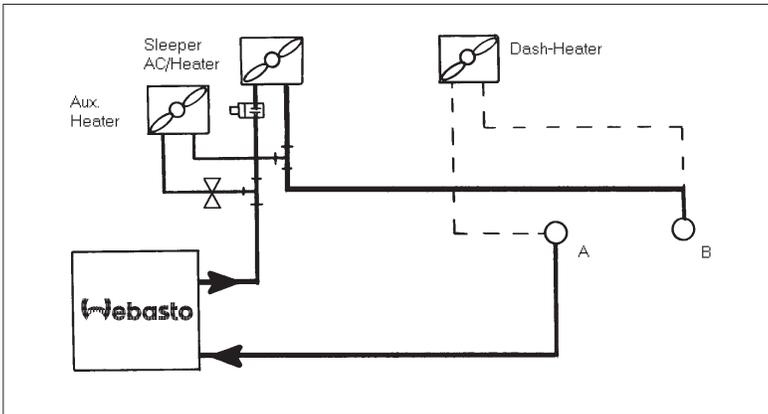
CAUTION
When working on the coolant system, allow the engine to cool down and open the radiator cap carefully.

NOTE
A: Engine pressure side
B: Engine water pump suction side

NOTE
Vehicles with a normally closed solenoid shut-off valve, require a bypass circuit for engine block preheating.

Vehicles equipped with heater/air conditioner units and normally closed solenoid shut-off valves need a bypass circuit for engine block preheating with vehicle ignition in the "OFF" position. Use Webasto #605.005 "H"-piece to make your by-pass or use "Y"-fittings as shown in diagram. Make sure the solenoid is open with vehicle ignition in the "ACC" position for sleeper heating or have your truck dealership install a separate switch to open the solenoid.

C: Modulating valve or high amp blower parallel circuit

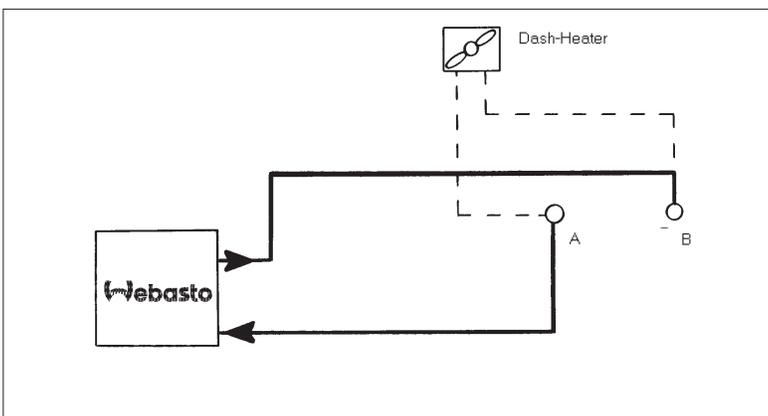


NOTE

Recommended plumbing Kenworth-Studio Sleeper with modulating valve and International with high amp blower motor.

Vehicles with continuous fan operation or high amperage heat exchanger fans, Webasto recommends the use of an auxiliary heat exchanger with low power consumption and Webasto room thermostat.

D: Engine Block Preheating and/or Boost Heating



1. Remove radiator cap and release system pressure.
2. Drain coolant from engine.
3. Plumb the Webasto system as shown above.
4. Refill engine coolant as per engine manufacturer's recommendations and re-install the radiator cap.

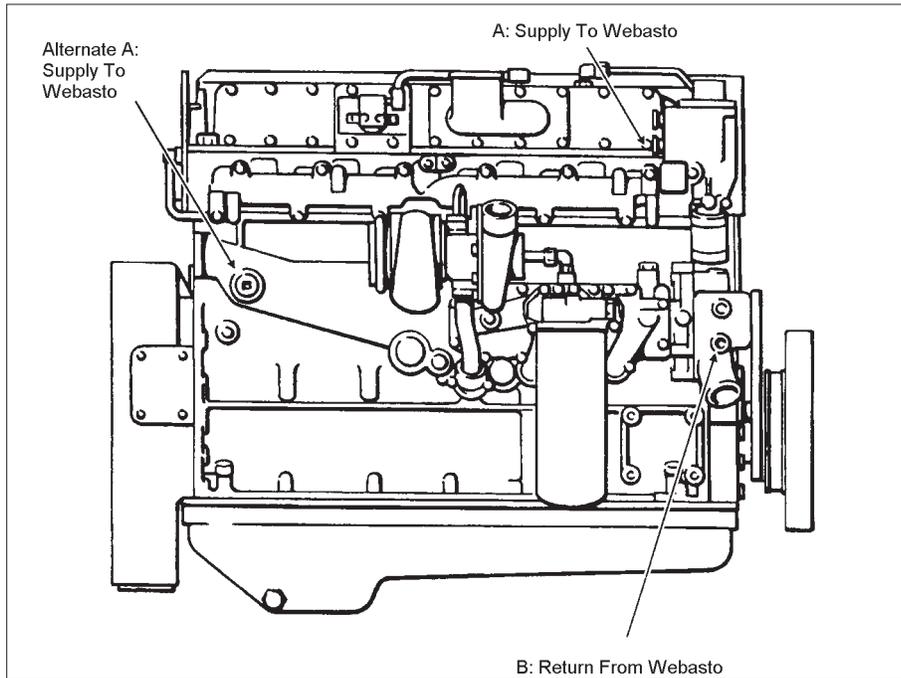
CAUTION

When working on the coolant system, allow the engine to cool down and open the radiator cap carefully.

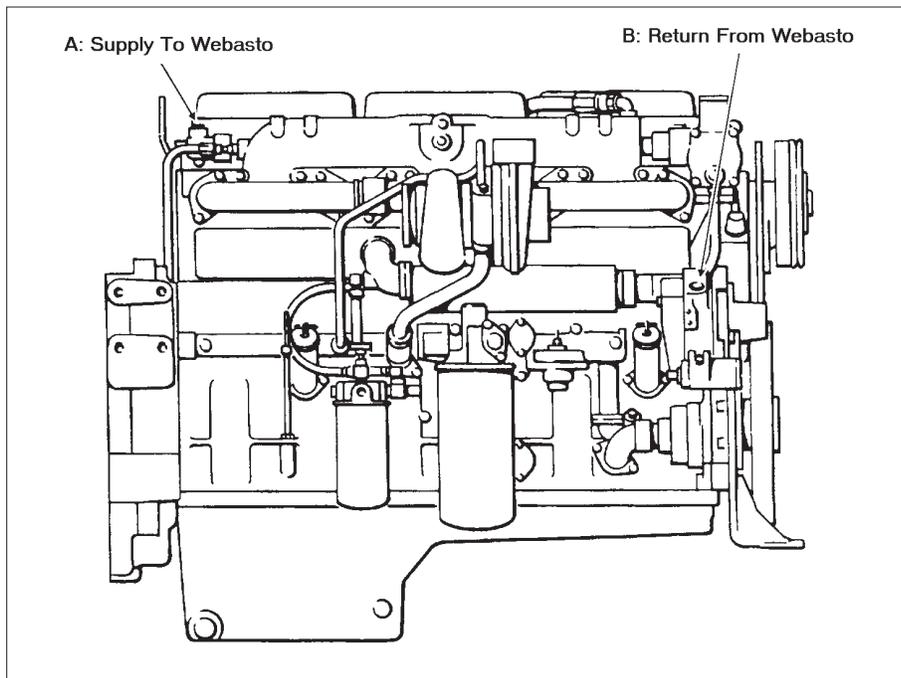
4.6.4 Contents – Engine Connections

Caterpillar	
3116	409
3176	409
3306	410
3406	410
3408	411
C-10/C-12	411
Cummins	
B Series	412
C Series	413
KTA1150	413
L10	414
M11	414
NT, BIG CAM II	415
NT, BIG CAM IV, N14	415
Detroit Diesel	
Series 50	416
Series 55	416
Series 60	417
6V92, 8V92	417
Mack	
E6	418

Caterpillar

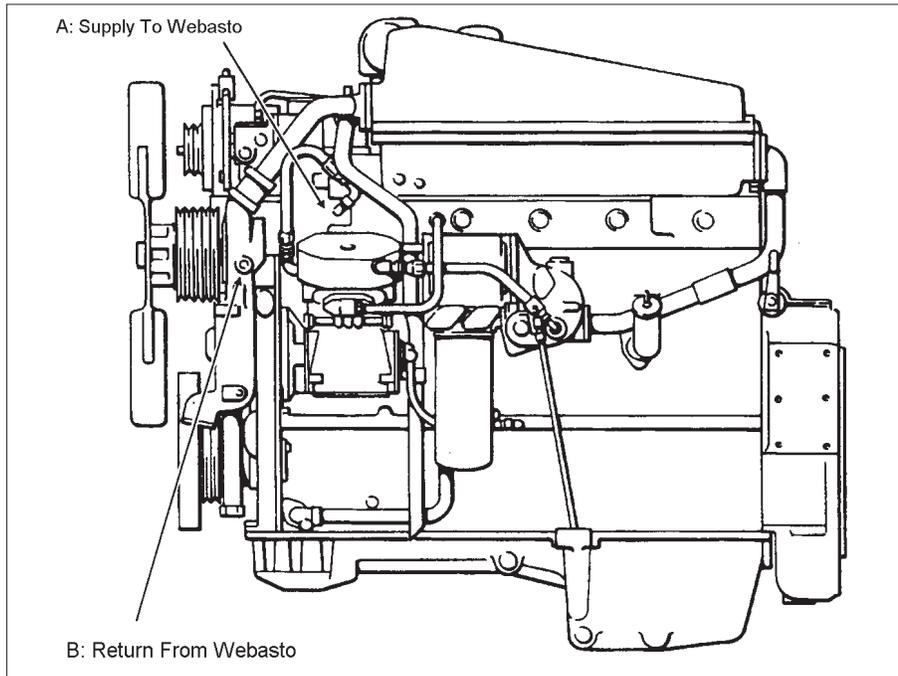


Caterpillar 3116

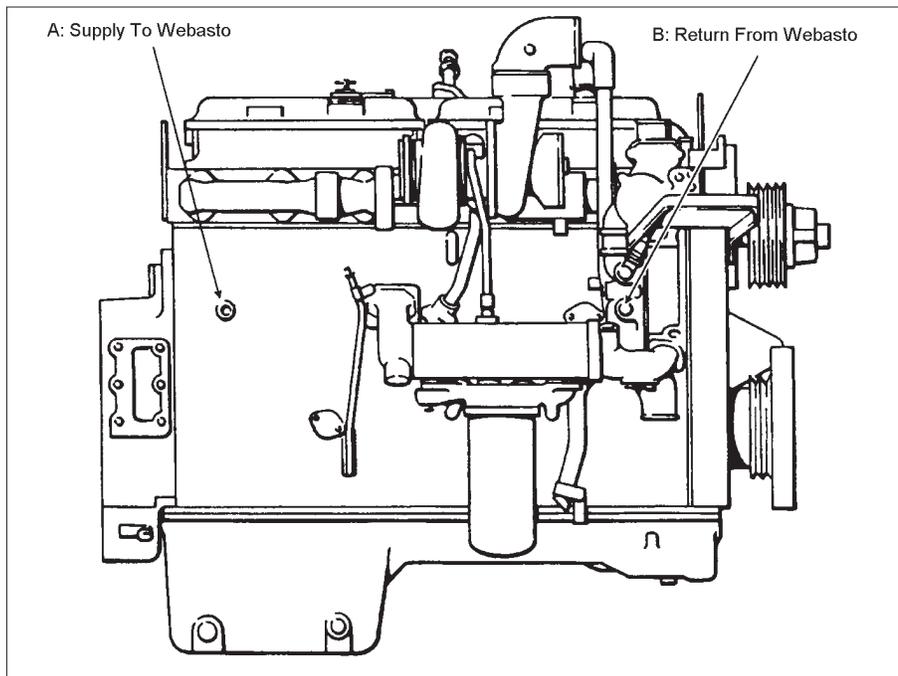


Caterpillar 3176

Caterpillar

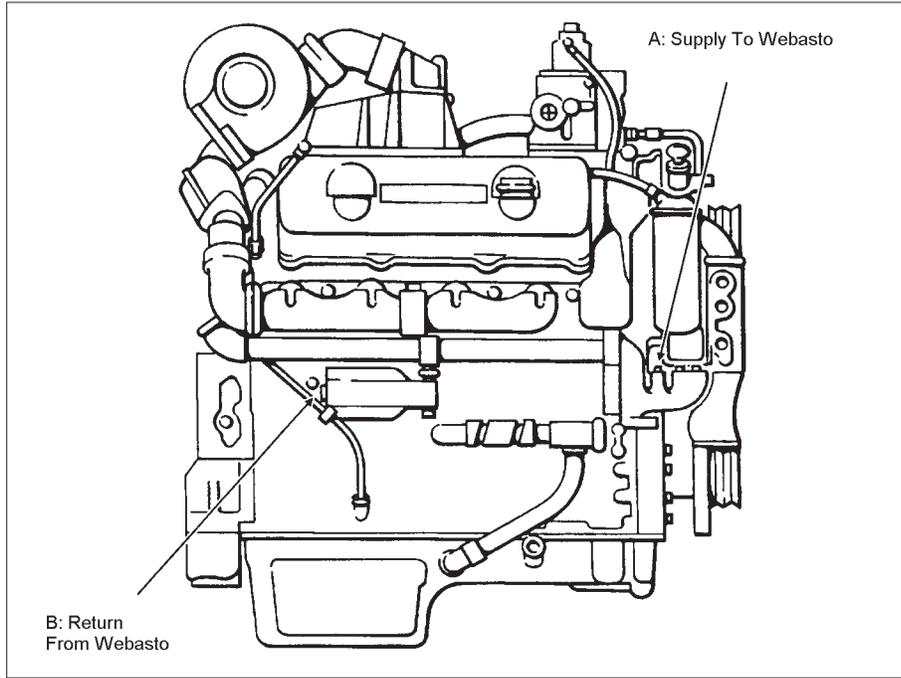


Caterpillar 3306

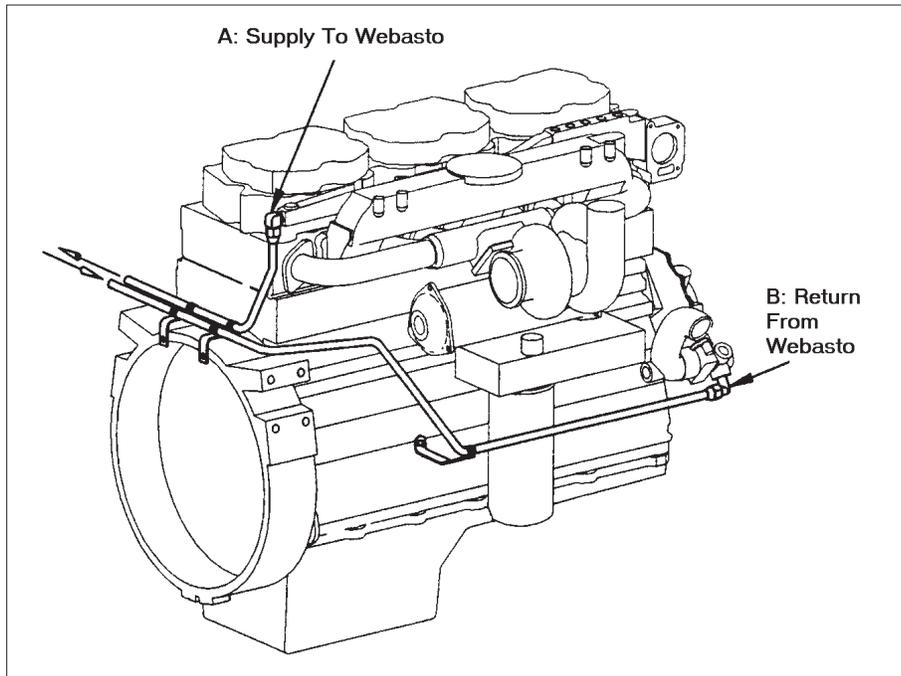


Caterpillar 3406

Caterpillar

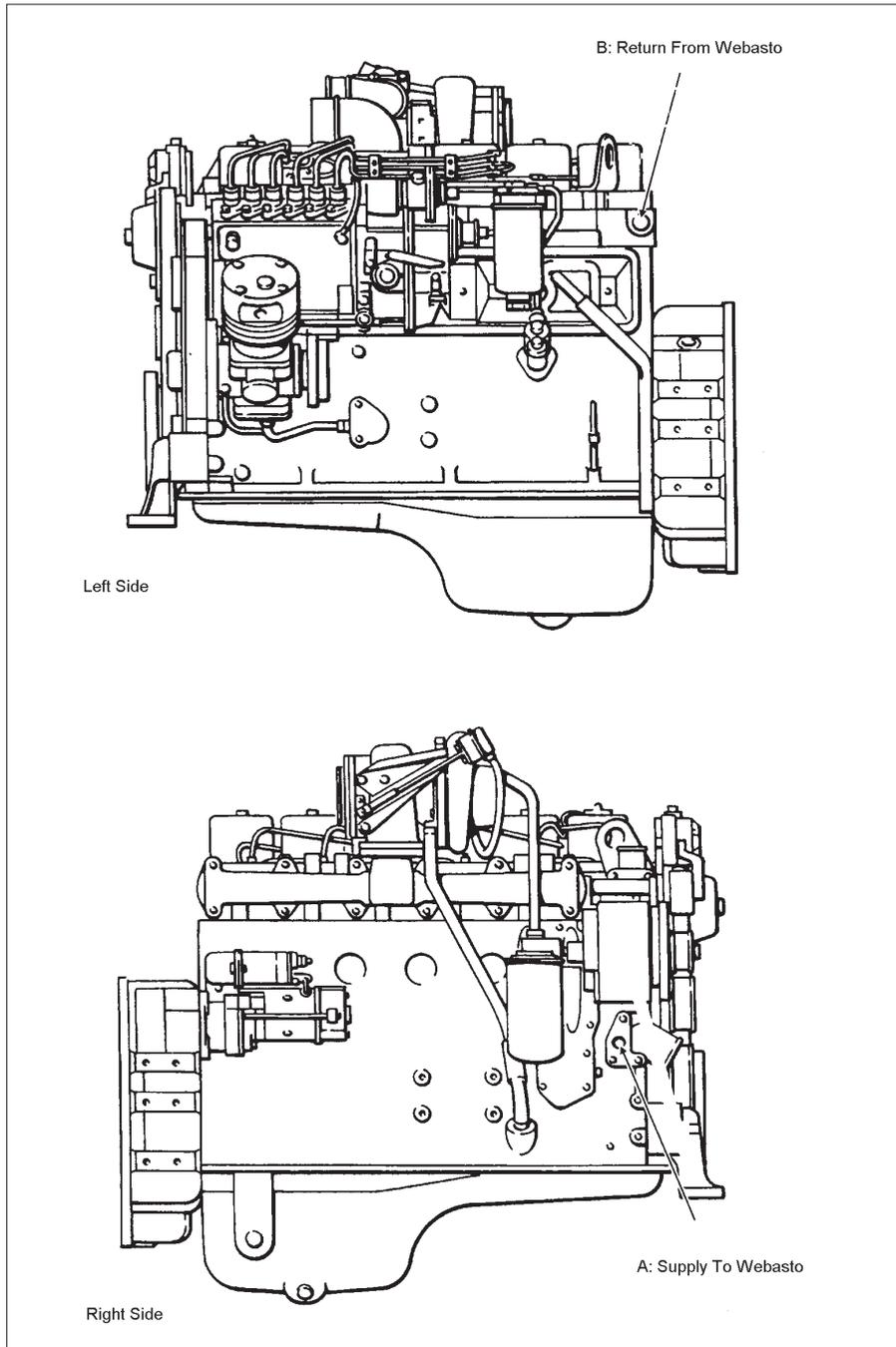


Caterpillar 3408

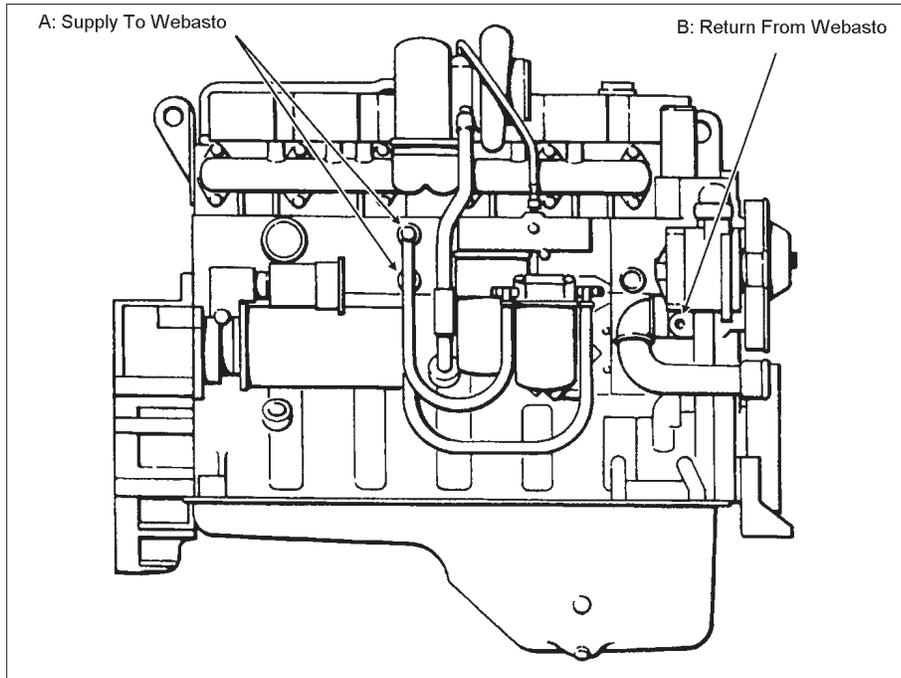


Caterpillar C-10, C-12

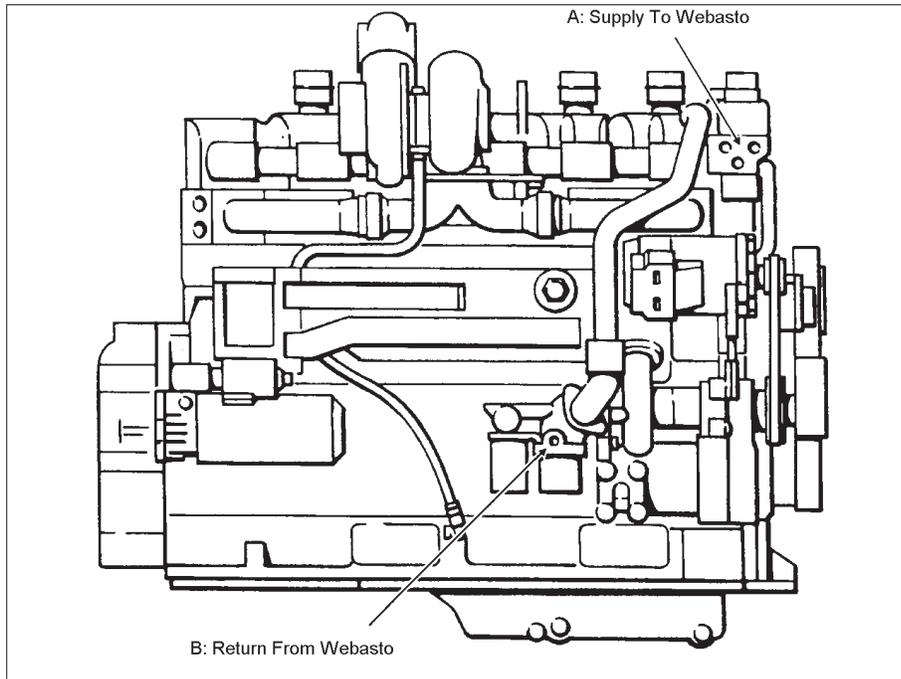
Cummins



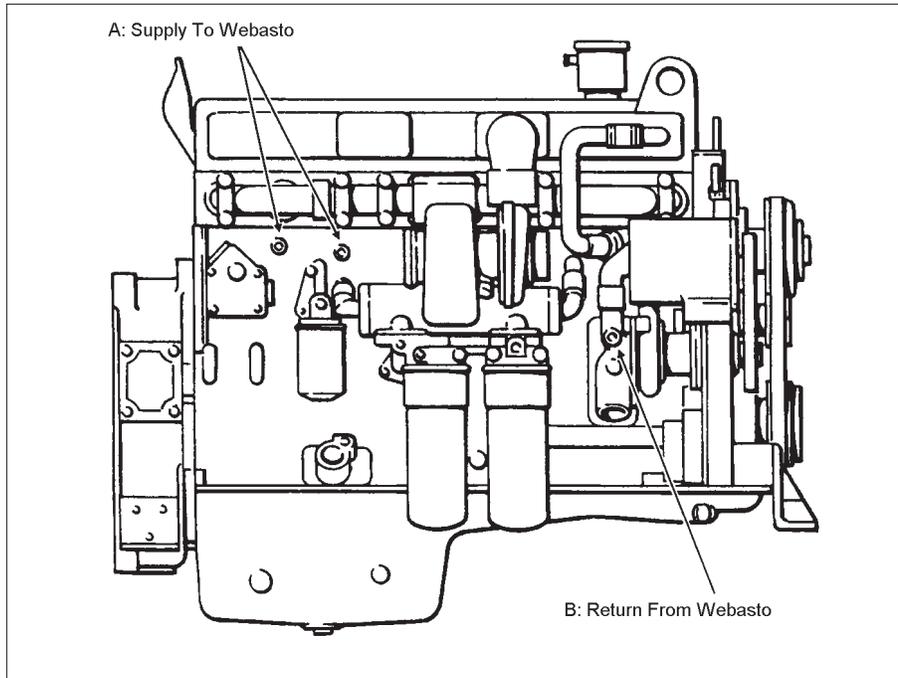
Cummins B Series



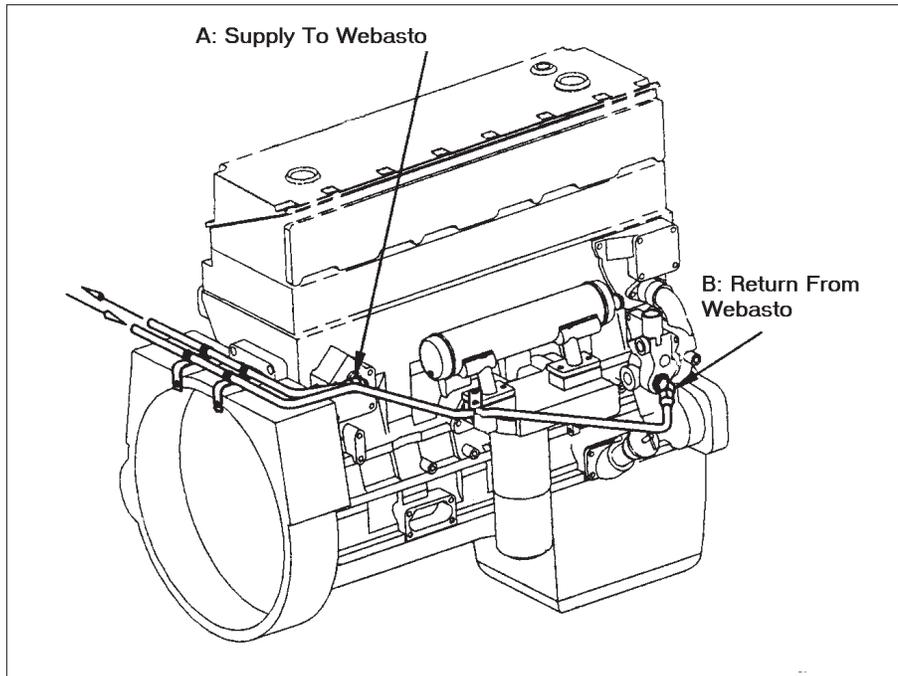
Cummins C Series



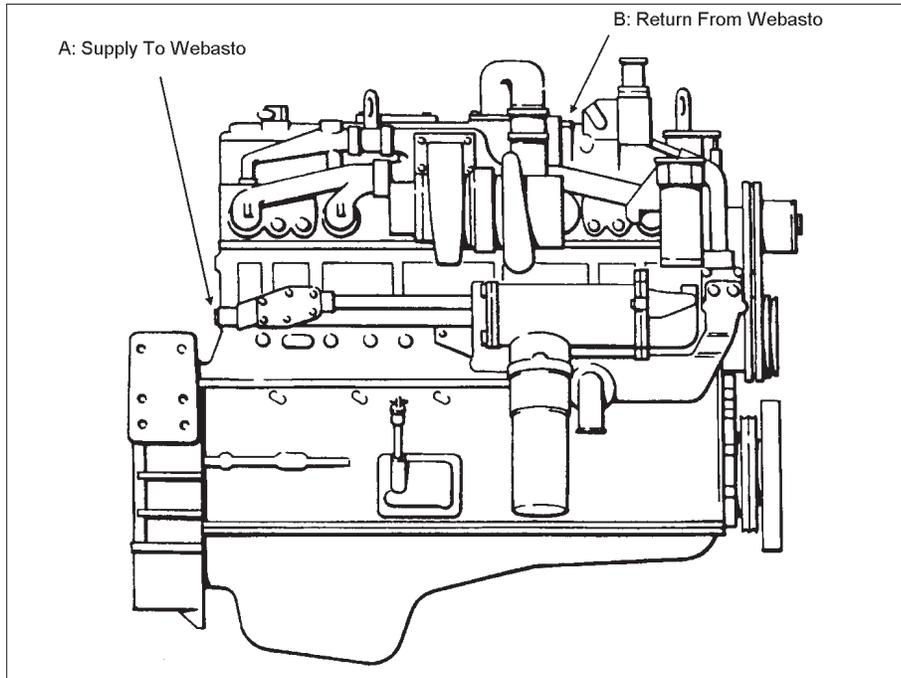
Cummins KTA1150



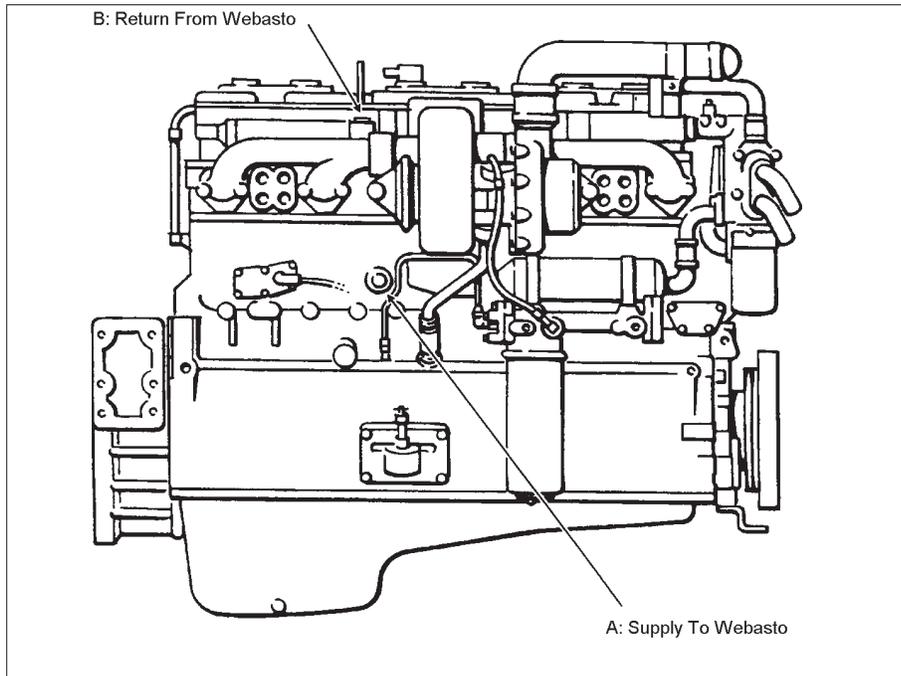
Cummins L10



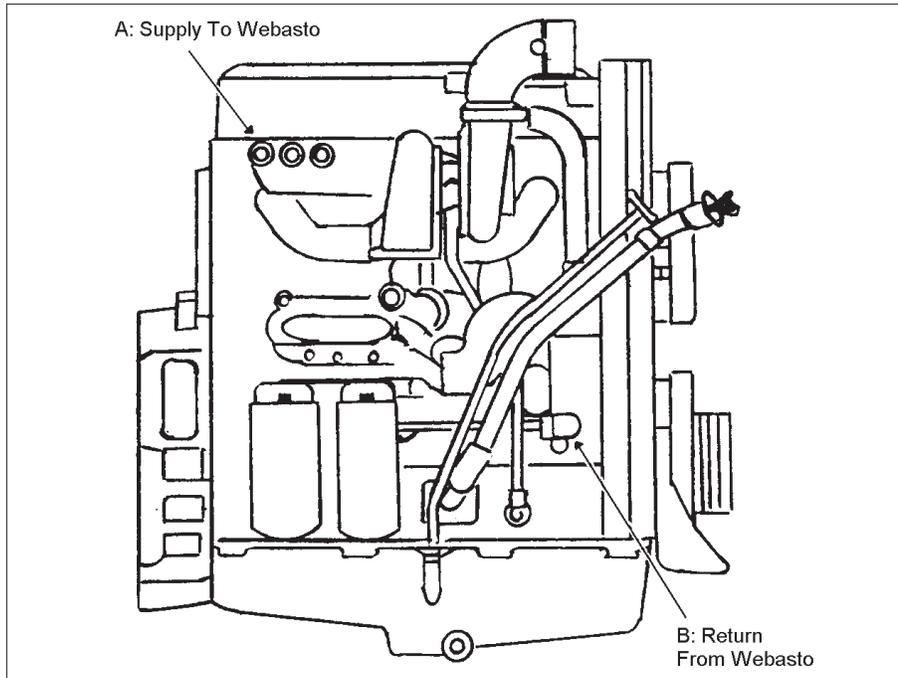
Cummins M11



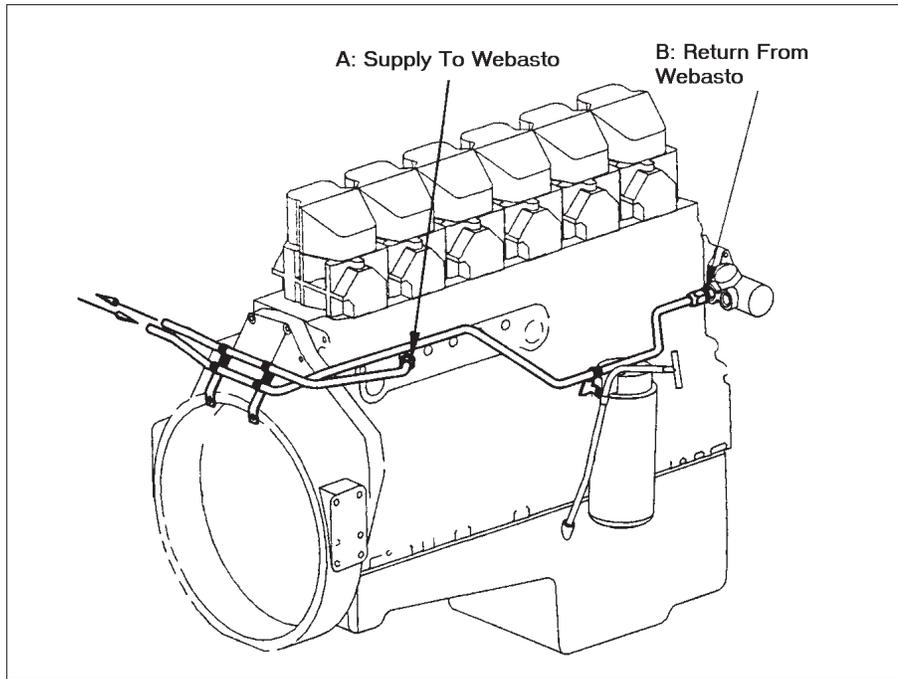
Cummins NT, BIG CAM II



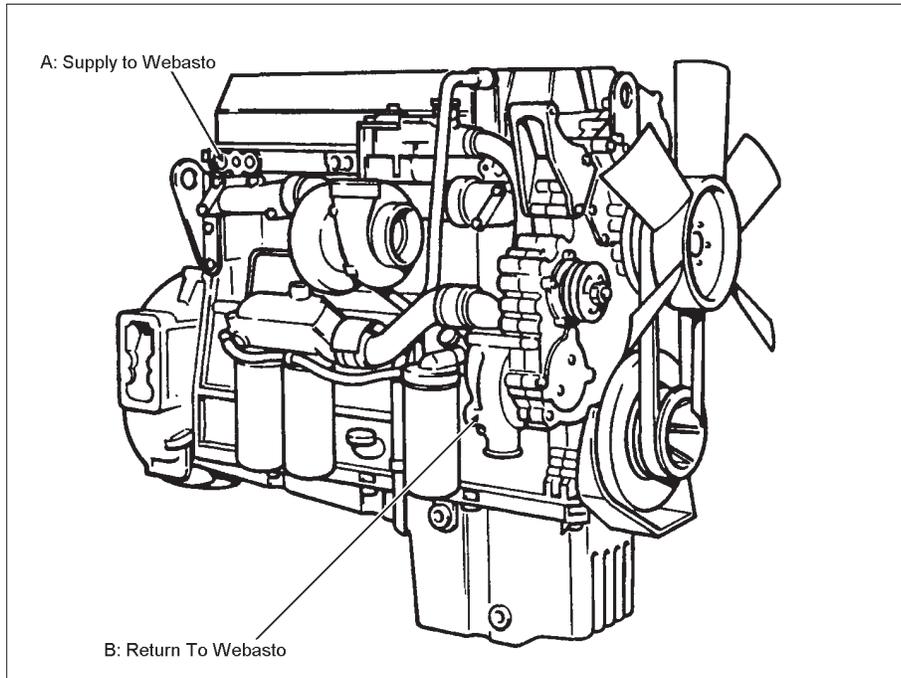
Cummins NT, Big Cam IV, N14



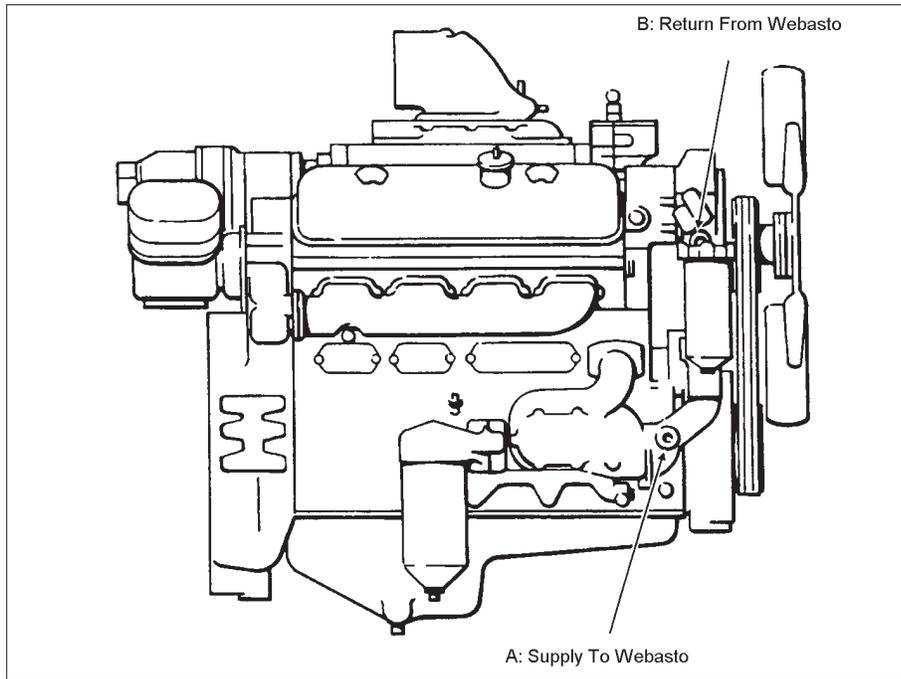
Detroit Diesel Series 50



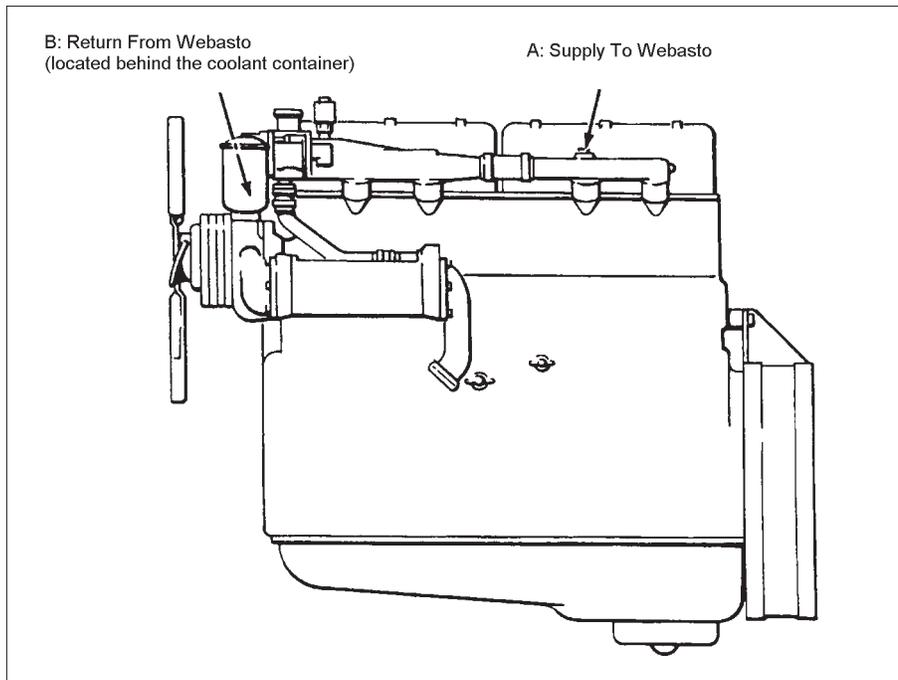
Detroit Diesel Series 55



Detroit Diesel Series 60



Detroit Diesel 6V92, 8V92



Mack E6

4. Installation

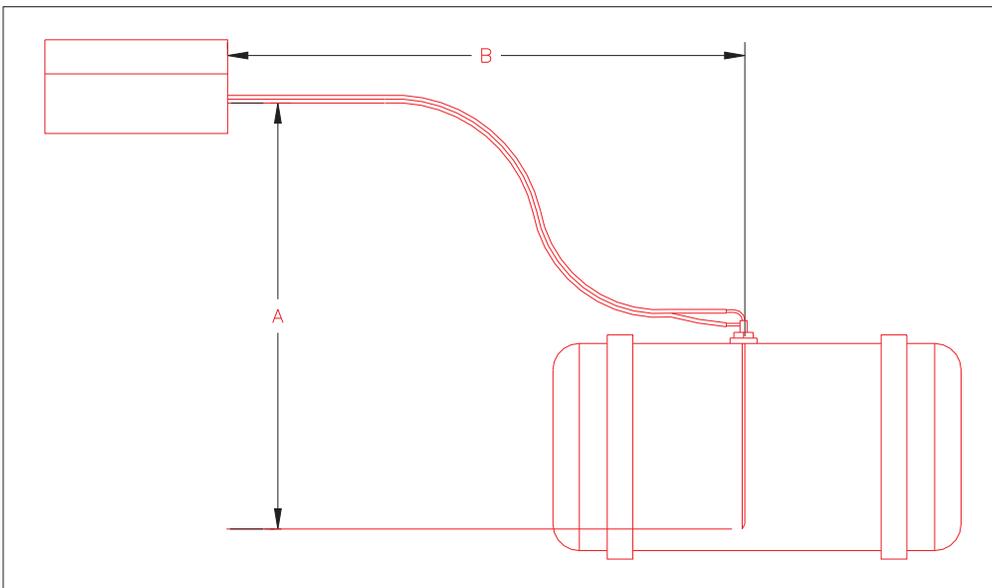
4.7 Fuel System

4.7.1 General Description

The fuel is drawn and returned from the vehicles fuel tank through a fuel standpipe. This stand pipe can be utilized on vehicles with a spare threaded port, or if no threaded port is available, a 1" hole can be drilled into the tank and the universal tank boss installed as shown on pg. 420. Keep the fuel standpipe 2" from the bottom of fuel tank.

4.7.2 Fuel Supply and Return

The fuel line must be installed according to these instructions to insure proper heater operation.



Fuel line parameters

A = Suction height 6'6" (2,0 m)

A+B = Suction length 33' (10 m)

1. Cut or extend fuel stand pipe to length, approx. 2" off fuel tank bottom
 - mount stand pipe in fuel tank
2. Install the universal fuel stand pipe
 - use 1/4" or 1/2" spare port on fuel tank (if available) and install fuel standpipe
 - or
 - drill 1" hole on top of tank (assemble tank-boss and fuel standpipe) and install assembled universal fuel standpipe

NOTE

After fuel stand pipe has been cut to length, remove any burr.

NOTE

The heater is equipped with an internal self priming fuel pump.

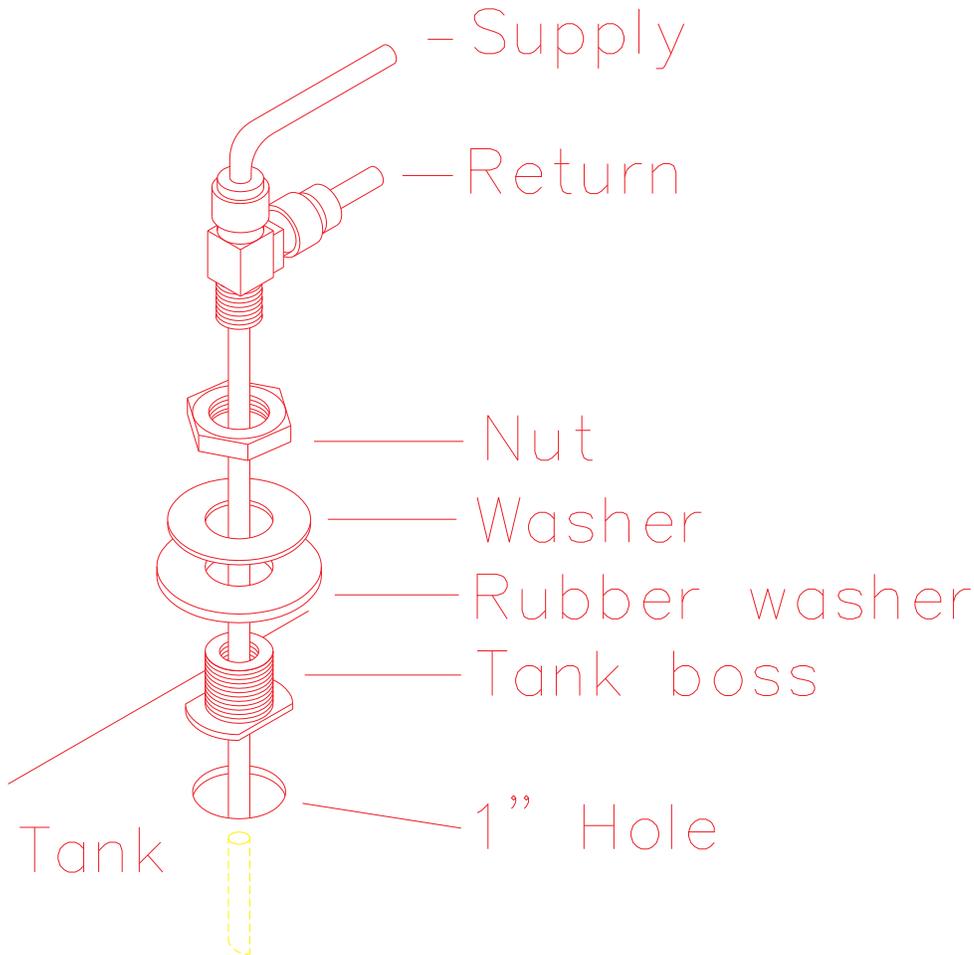
CAUTION

If the fuel tank is higher than the fuel pump, the top of the tank may not be more than 20" above the pump.

- 3. Route and secure fuel line from heater to fuel tank.
- 4. Connect fuel line to fuel stand pipe suction and return using rubber fuel hose(1/4" [6 mm]) meeting SAE 30RI specifications.

NOTE
Use supplied hose clamps to secure connections.

CAUTION
Fuel lines must be secured every 12" and kept away from hot exhaust and moving parts (drive shaft, wheels, etc.).



Fuel stand pipe installation

4.7.3 Fuel Filter

Your heater is equipped with a fuel filter. Fuel filters require changing at least annually and in cases of dirty fuel more often.

NOTE
Change the fuel filter at least annually.

4.8 Wiring Connections

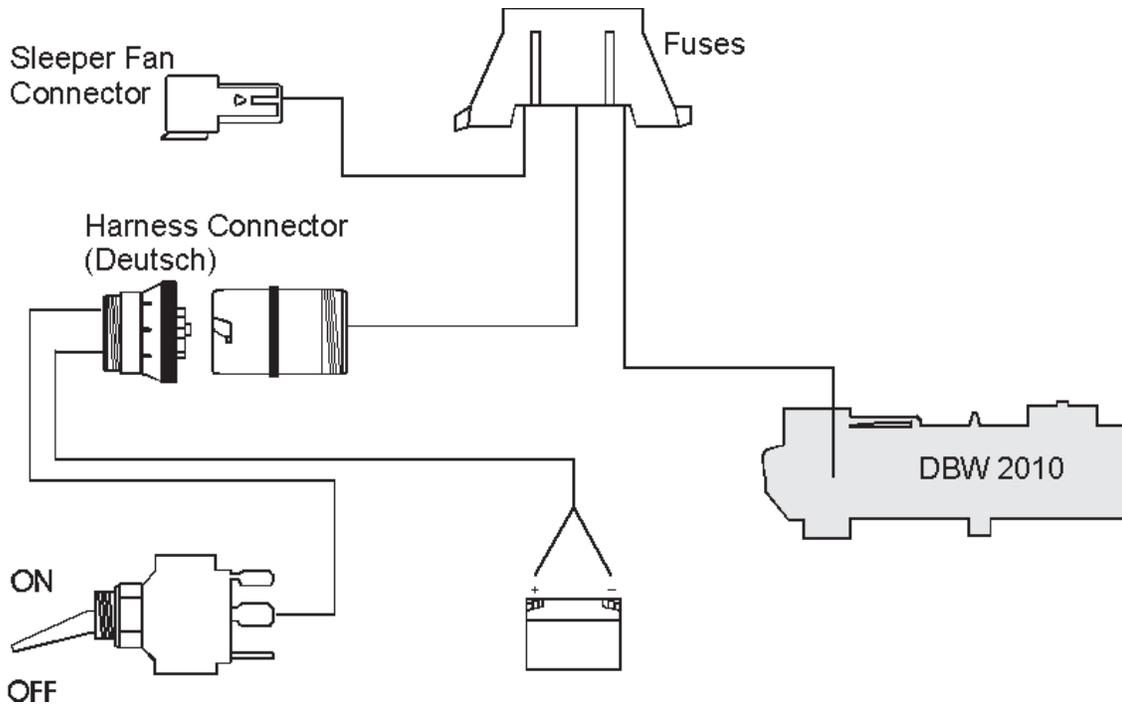
4.8.1 General Information

The control unit is equipped with low voltage protection, therefore it is imperative to keep vehicle batteries in good condition.

For sleeper and engine block heating, Webasto is recommending a four battery system for best results.

NOTE

The Webasto heating system will not perform to your satisfaction with weak batteries.



Harness connection points

Electrical components for the 12V version are labeled red, those for the 24V version with green labeling.

4.8.2 Power Connection to Batteries

1. Route and secure wire harness from Webasto heater to battery box and cut harness to length.
2. Strip wires and crimp supplied ring tongue terminals to the 2 positive (red) and 2 negative (brown) wire leads.
3. Connect the leads to the battery terminals.

CAUTION

If welding is done on the vehicle, the main battery cables must be disconnected from the battery to protect the electronic control unit.

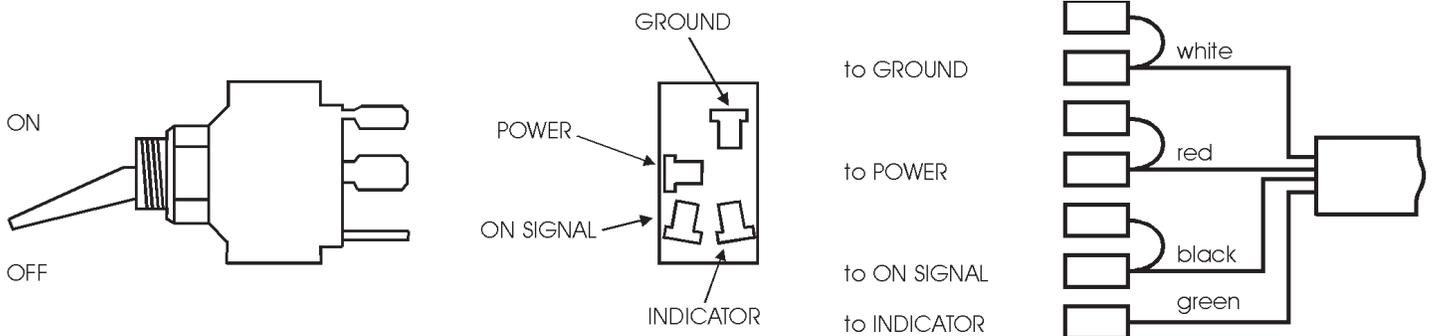
CAUTION

Leave waterproof connector uncoupled until completion of installation.

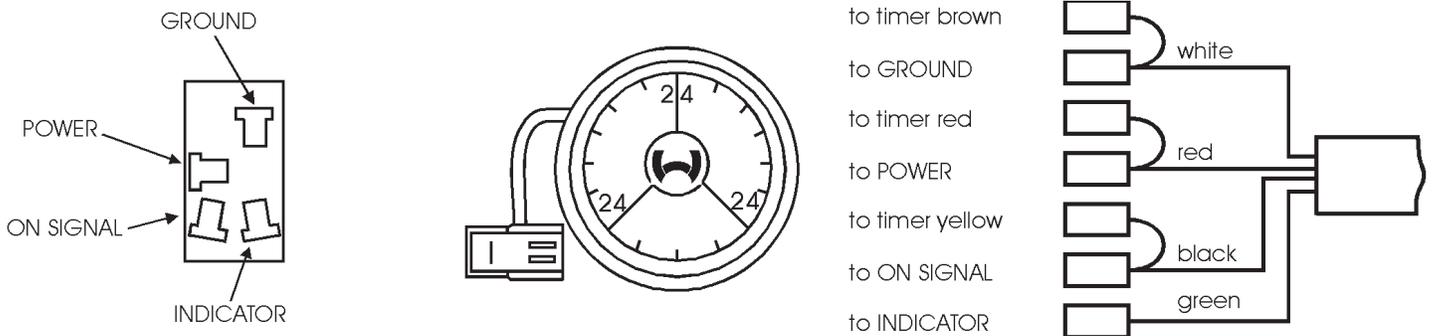
NOTE

Clean battery terminals of corrosion before connecting the Webasto heater.

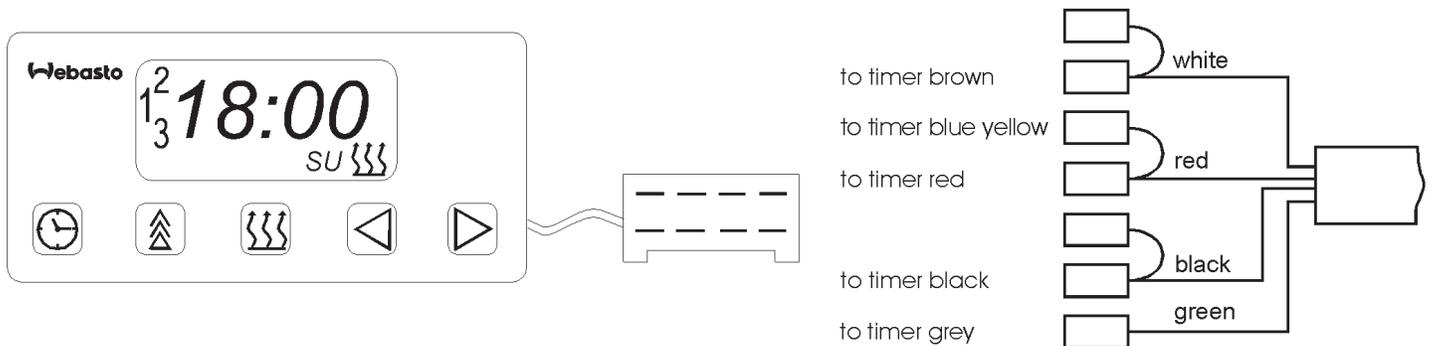
4.8.3 Timer and Switch Connections



On/Off Switch



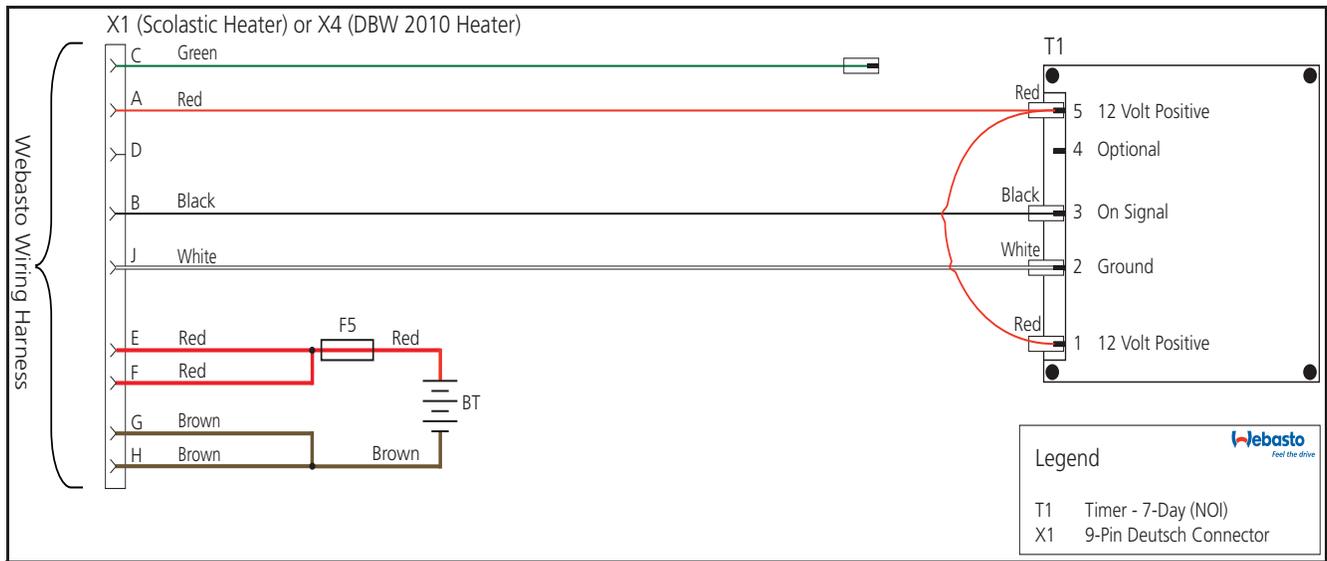
72 Hour Quartz Timer with On/Off Switch



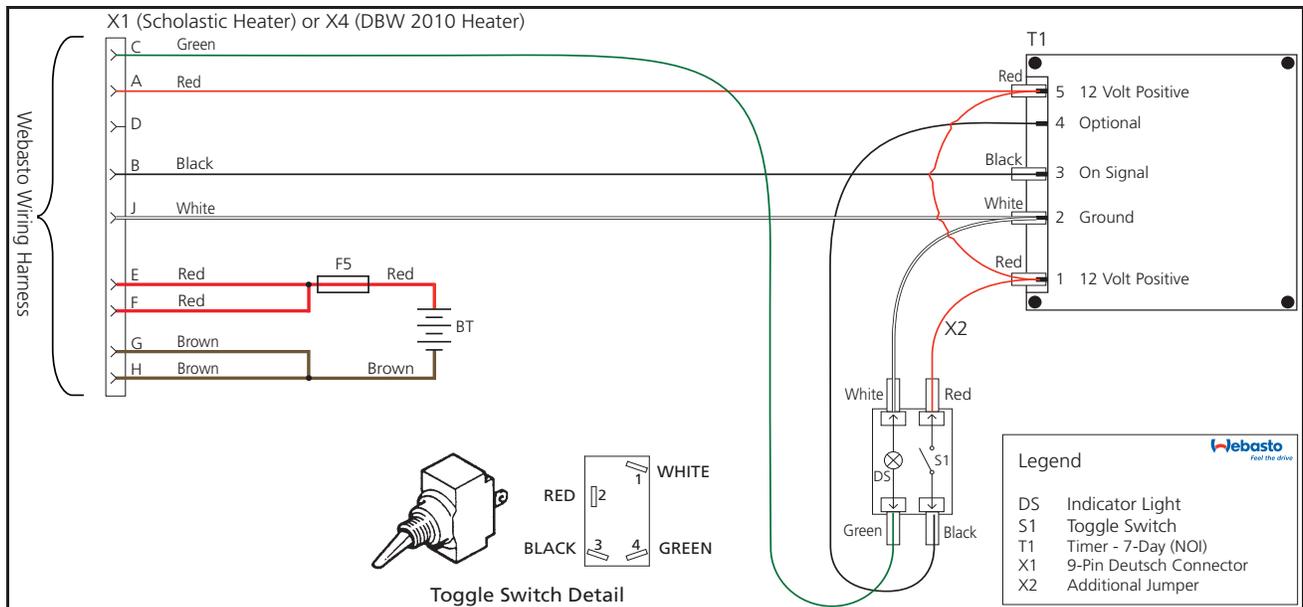
7 Day Digital Timer Model 1529



NOI (No Operator Interface) "White" Timer



NOI (No Operator Interface) "White" Timer



NOI "White" Timer with Toggle Switch

1. Select a suitable location in the vehicle dash for the timer or On/Off switch.
2. Drill a 1/2" hole through the dash for the switch or see timer dimensions.
3. Route and secure switch harness from the heater to the vehicle dashboard. If possible use existing hole in fire wall or drill in suitable location. Protect the harness with a grommet in the fire wall.
4. Connect the terminals to the timer, or switch. See diagrams pg. 422.

NOTE
Make sure there is enough space behind the dash for switch and/or timer and wire connections.

CAUTION
When drilling holes on the vehicle, do not drill into existing wiring or other mechanical components.

4.8.4 Sleeper Fan Wiring

A: Sleeper Fan is Cycled On/Off by Vehicle Thermostat

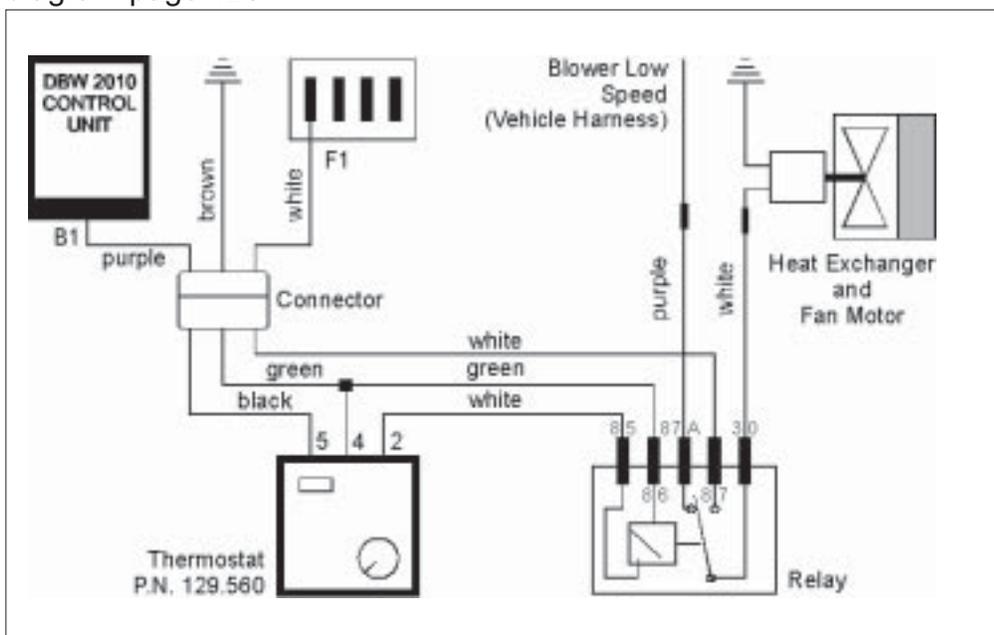
1. Turn ignition key to "ACC" position to power up sleeper.
2. Select desired temperature on thermostat and turn on sleeper fan to low position. Fan will cycle On/Off and maintain temperature.

NOTE
If your heating system doesn't work in the "ACC" position, have your truck dealer install a switch in the dash to power up the sleeper heating system.

B: Sleeper Fan is Cycled On/Off by Webasto Thermostat

1. Installing the Webasto thermostat #129.560 locate the thermostat in an area where the routing of the wiring is possible, about half-way between the ceiling and bed. Do not locate it in the direct air flow from the heat exchanger.
2. Route the blower interface and the thermostat harness from the Webasto heater and the thermostat to the interlock relay at the heat exchanger and secure every 12".
3. Mount interlock relay by the heat exchanger.
4. Make wiring connection shown in schematic below and wiring diagram page 425.

NOTE
Make sure to have air circulation by the heat exchanger.



Sleeper Fan Wiring

C: Auxiliary Bunk Heat Exchanger

Sleepers with continuous fan operation or high amperage heat exchanger fans.

1. Position the auxiliary heat exchanger in a suitable location under the bed, toolbox or other space.
2. Plumb the heat exchanger as shown in C: Modulating valve on high amp blower parallel circuit on page 405.
3. Make air duct connection and route ducting into the sleeper.
4. Follow instructions given on page 423, part B, 1 through 4.

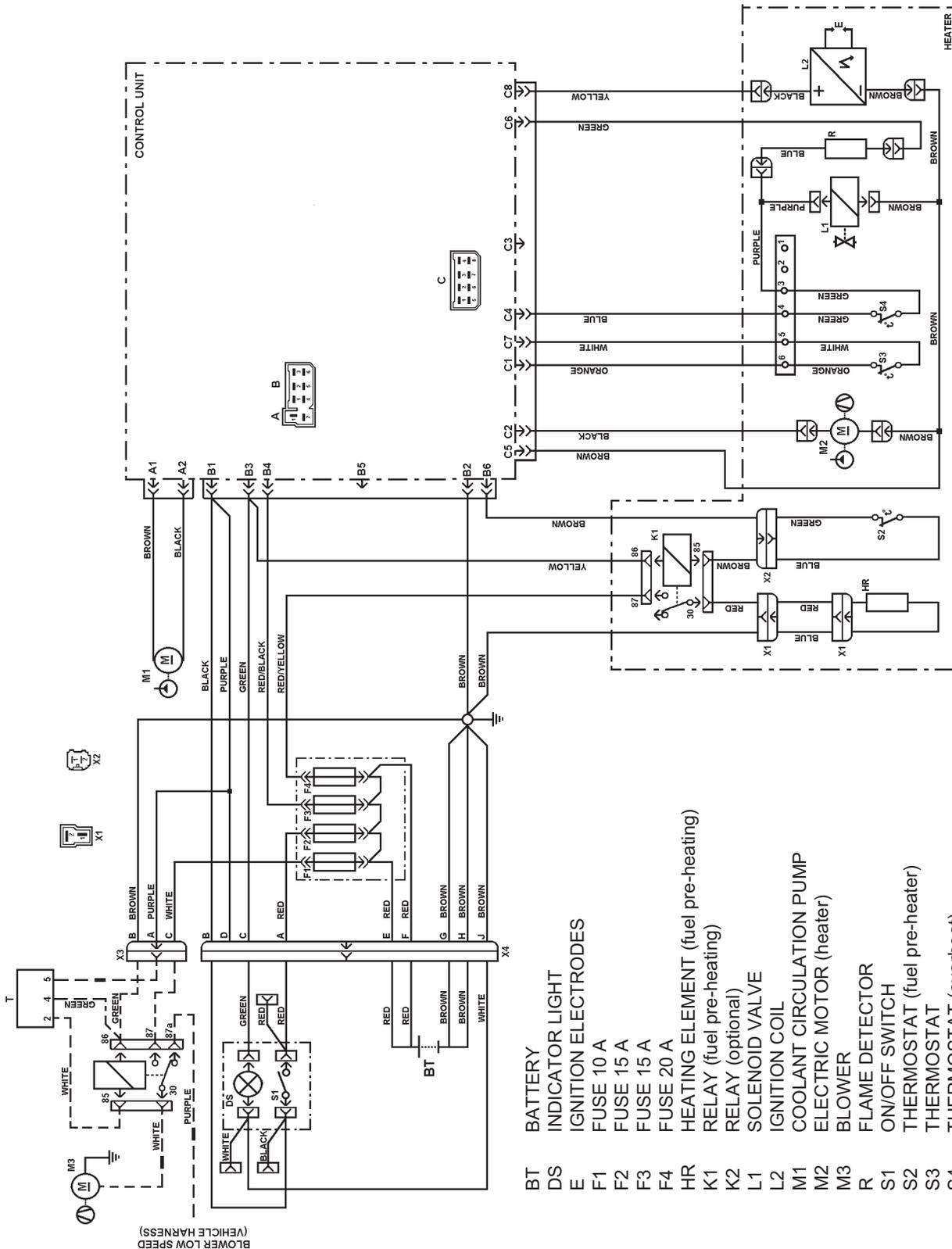
NOTE

Recommended option for Kenworth-Studio Sleeper and International with high amp blower motor.

NOTE

Make sure to have air circulation by the heat exchanger.

4.8.5 Wiring Diagram DBW 2010 12 Volt, 24 Volt



- BT BATTERY
- DS INDICATOR LIGHT
- E IGNITION ELECTRODES
- F1 FUSE 10 A
- F2 FUSE 15 A
- F3 FUSE 15 A
- F4 FUSE 20 A
- HR HEATING ELEMENT (fuel pre-heating)
- K1 RELAY (fuel pre-heating)
- K2 RELAY (optional)
- L1 SOLENOID VALVE
- L2 IGNITION COIL
- M1 COOLANT CIRCULATION PUMP
- M2 ELECTRIC MOTOR (heater)
- M3 BLOWER
- R FLAME DETECTOR
- S1 ON/OFF SWITCH
- S2 THERMOSTAT (fuel pre-heater)
- S3 THERMOSTAT
- S4 THERMOSTAT (overheat)
- T ROOM THERMOSTAT (optional)
- X1 CONNECTOR 2-WAY
- X2 CONNECTOR 2-WAY
- X3 CONNECTOR 3-WAY
- X4 CONNECTOR 9-WAY

4. Installation**4.9 Initial Operation**

1. Check your installation for:
 - loose nuts and bolts.
 - exhaust pipe routing and clamp tightness.
 - loose hose clamps.
 - routing and securing of wiring and heater hoses.
 - kinked or pinched hoses.
 - battery connection and polarity.
 - disconnect control thermostat on Webasto heat exchanger (white and orange wire).
2. Top off or refill cooling system with coolant as per engine manufacturers recommendations.
3. Connect power/switch extension harness to waterproof plug (Deutsch).
4. Open shut-off valves.
5. Set heater valve to max. heat position and turn off Air Conditioning in cab and sleeper.
6. Switch on Webasto heater and check:
 - green indicator light on.
 - circulating pump in operation.
7. Start the vehicle engine and run it at a fast idle for 10 minutes to purge air from the Webasto and the heat exchanger. While the engine is running check:
 - hose connections for leaks.
 - coolant level in the expansion tank and add coolant as needed.
 - Remove upper heater hose clamp and push screwdriver in between pipe and hose to let air escape. Repeat this at least 4 times with engine running or use bleeder if so equipped.
8. Shut off the engine.
9. Re-connect hose clamp and plug in control thermostat, the blower motor starts and the fuel pump primes the fuel lines. 10 to 25 sec. the fuel solenoid opens and the electronic ignition ignites the air fuel mixture.

NOTE

Installation with long fuel lines may need a second start attempt to prime the fuel lines. Cycle ON/OFF switch to reset control unit.

NOTE

Coolant temperature must be below 140⁰ F (60⁰ C) to start up.

NOTE

The engine temperature gauge may read a lower temperature depending on the location of the temperature sensor on the engine.

10. Temperature differential between water inlet and outlet should not exceed 10° C (18° F).
11. Vehicle equipped with sleeper heating option:
 - turn vehicle ignition key to “ACC” position or switch Webasto thermostat “ON”.
 - set thermostat in sleeper to highest heat position.
 - the sleeper heat exchanger fan will blow warm air.
 - turn thermostat down to lowest heat position and fan should cycle off.
12. Switch “OFF” Webasto heater and sleeper blower control.
13. Re-tighten hose clamps to 45 in/lb. (5 Nm) and inspect installation for leaks.
14. Complete the warranty card and send to Webasto Thermosystems.
15. Install the stainless steel enclosure cover.

NOTE

Necessary information to complete warranty card and ensure full warranty coverage can be found on name plate.

5. Maintenance of the Heater

5.1 Annual Maintenance

The Webasto heater requires a minimum of maintenance to operate. To keep your heater in service the following maintenance procedures should be performed annually before each heating season:

Enclosure Box

- clean the heater and enclosure box from any accumulated debris or dust with compressed air
- inspect all components for wear and damage

Electrical System

- check wiring harnesses for damage, fix or replace if required
- check the condition of the batteries and the connections.
- load test the batteries and replace if necessary.

Exhaust System

- check the exhaust system carefully for restrictions or corroded areas. Replace the exhaust pipe or muffler if necessary.

Fuel System

- change fuel filter and inspect fuel line.

Burner System

- swing open burner head, clean flame detection (photo eye), pull out combustion chamber and inspect and clean heat exchanger. Replace nozzle if necessary. Re-install combustion chamber and close up burner head.

Operation Test

- Run your heating system for at least 15 minutes.
- Check water and fuel connections for leakage. Re-tighten hose clamps if necessary.
- Check sleeper blower operation by turning on the thermostat, let the fan cycle on and off.

NOTE

For major repair and spare parts, return to your authorized Webasto Thermosystems Specialist.

NOTE

The heater will not function properly with weak batteries.

NOTE

Operate the heater at least once a month for 20 minutes

6. Basic Trouble Shooting

6.1 General Information

This section describes trouble shooting procedures for the water heater DBW 2010.

Trouble shooting is normally limited to the isolation of defective components.

Before trouble shooting, check for and eliminate these defects:

- fuel supply (plugged fuel filter)
- corrosion on battery terminals
- corrosion on electrical wiring and fuses
- corrosion on connector
- loose contact on connector
- wrong crimping on connector
- shut down initiated by temperature limiter (automatic reset)

CAUTION

Trouble shooting requires profound knowledge about structure and theory of operation of the heater components and may only be performed by skilled personnel.

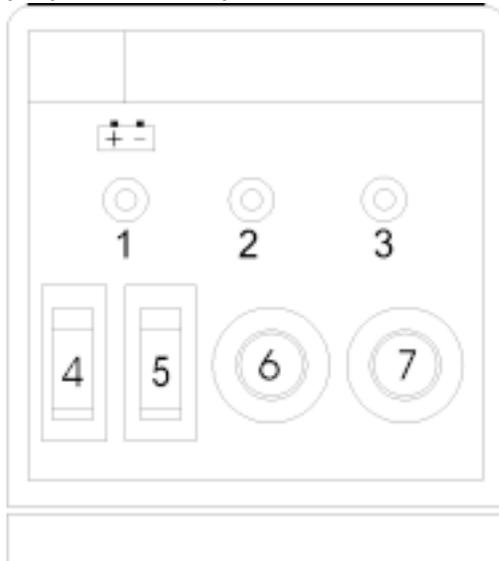
NOTE

After any correction of a defect a functional test has to be performed in the vehicle.

6.2 Heater test unit 440.280

The tester unit has been designed to quickly check the proper operation of the various heater components. By using the tester in place of the heater control unit, you are able to manually control the heater to test components and actually operate the unit in heating mode.

The actual testing is completed in two steps, first you do an individual component test and then a manual start and run test, both designed to pinpoint actual problems in the heater system.



- ① LED - input power to heater
- ② LED - control thermostat
- ③ LED - flame detector
- ④ On/Off switch water pump
- ⑤ On/Off switch motor
- ⑥ push button - ignition spark coil
- ⑦ push button - fuel solenoid valve

NOTE

Make sure Water Pump and Motor switches (④, ⑤) are in "OFF" position before connecting to heater.

6.3 Test Procedures

1. Setup

- Remove connector blocks from heater control unit, inspect for loose wires, corrosion and proper wire connections.
- Plug control unit connector blocks into tester.
- Put heater switch/timer to "ON" and turn vehicle heater valve to "FULL" mode (if equipped).
- Proceed to component test procedures.

WARNING
Do not attempt to test or run heater with burner head open. Ensure burner head is properly closed and secured in place.

NOTE
Make sure Water Pump and Motor switches (④,⑤) are in "OFF" position before connecting to heater.

2. Component Test Procedures

Test Step	Result	If not
Tester connected	BATTERY LED ① unit lights up CONTROL THERMOSTAT LED ② lights up	- test input voltage at control terminals B4(+) and B2(-) - check battery connections - check battery voltage - test switch/timer - test control thermostat on heater Normal operating range - approx. 70 °C or higher open (no heat required) - approx. 60 °C or lower closed (heat required)
Push FUEL SOLENOID VALVE button ⑦ several times	clicking of solenoid should be heard	- test temperature fuse (if equipped) - test overheat limiter - test solenoid valve
Push IGNITION SPARK COIL button ⑥	sparkling should be heard	- check electrode gap - test ignition spark coil
Turn MOTOR switch ⑤ "ON"	motor should run	- test motor
Turn WATER PUMP switch ④ "ON"	pump should run	- test pump

NOTE
Since the heater operates in the 60 °C to 70 °C (On to Off/Off to On) range, if the vehicle engine is hot (e.g.. coolant above 70 °C), the heater will not start until the coolant temperature drops below 60 °C.
THIS IS NORMAL.

3. Manual test run of heater

- Turn WATER PUMP switch ④ “ON”
- Turn MOTOR switch ⑤ “ON”
- Push and hold FUEL SOLENOID VALVE button ⑦ “ON” (start fuel flow to combustion chamber)
- Push and hold IGNITION SPARK COIL button ⑥ “ON” (starts electrodes sparking) until combustion has taken place.

Results:

- LED ③ lights and combustion achieved
 - operation normal
- Combustion achieved but no LED ③ light
 - check flame detector
- Combustion not achieved and no LED ③ light
 - check fuel nozzle
 - check fuel pressure
 - check for blocked fuel lines (dirt or ice)
 - check ignition electrodes for damage and set gap
- Heater should now be in heating mode and will continue to run until you release the fuel solenoid valve button ⑦ which stops fuel flow and extinguishes flame immediately. Allow heater to continue running (for cool down) approximately 30 seconds and then turn WATER PUMP switch ④ and MOTOR switch ⑤ “OFF”.
- If manual test run has been successfully completed, turn heater switch/timer “OFF”, remove the tester and re-connect the control unit. Once done, turn switch/timer “ON”; if heater or a heater component does not respond, control unit is defective; replace control unit and re-test heater.

NOTE

Hold IGNITION SPARK COIL button ⑥ “ON” until FLAME DETECTOR LED ③ lights or combustion is heard, then release; in any case do not hold button on for more than 15 seconds.

NOTE

If flame does not stop when the FUEL SOLENOID VALVE button ⑦ is released, turn MOTOR switch ⑤ “OFF” to stop heater. Check solenoid valve.



Feel the Drive

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