

Hydronic 4/5 (Coolant Heaters)

Installation • Troubleshooting • Parts Manual



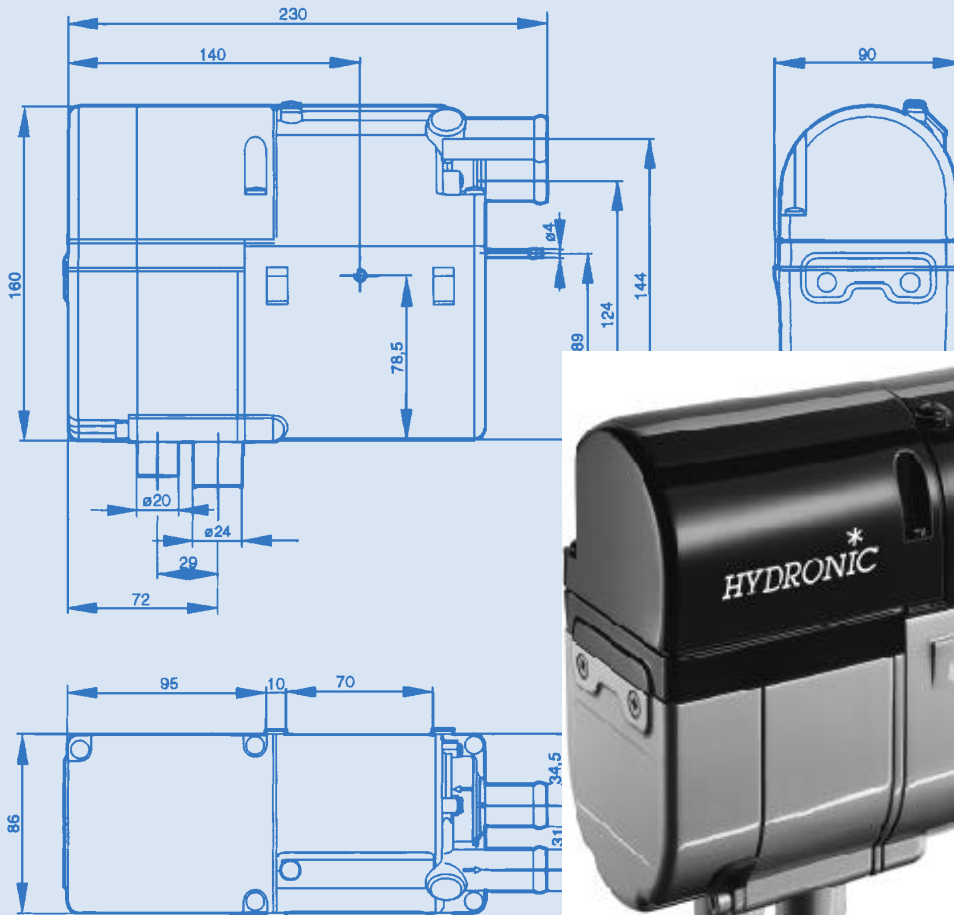
Heater Model 12 V

| | |
|----------------|------------|
| Hydronic D4 SC | 25 1917 01 |
| | 25 2096 05 |
| Hydronic B4 SC | 20 1789 05 |
| Hydronic D5 SC | 25 1920 05 |
| | 25 2098 05 |
| Hydronic D5 S | 25 2031 05 |
| | 25 2100 05 |
| Hydronic B5 SC | 20 1791 05 |
| Hydronic B5 S | 20 1793 05 |

Heater Model 24 V

| | |
|----------------|------------|
| Hydronic D5 SC | 25 2147 05 |
| Hydronic D5 S | 25 2009 05 |

www.espar.com
inquiries@espar.com



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Special Notes

Note: Highlight areas requiring special attention or clarification.

Caution: Indicates that personal injury or damage to equipment may occur unless specific guidelines are followed.

Warning: Indicates that serious or fatal injury may result if specific guidelines are not followed.



Heater Warnings

⚠ Warning To Installer

- Correct installation of this heater is necessary to ensure safe and proper operation. Read and understand this manual before attempting to install the heater. Failure to follow all these instructions could cause serious or fatal injury

⚠ Warning - Explosion Hazard

- Heater must be turned off while re-fueling.
- Do not install heater in enclosed areas where combustible fumes may be present.
- Do not install heaters in engine compartments of gasoline powered boats.

⚠ Warning - Fire Hazard

- Install the exhaust system so it will maintain a minimum distance of 50mm (2") from any flammable or heat sensitive material.
- Ensure that the fuel system is intact and there are no leaks.

⚠ Warning - Asphyxiation Hazard

- Route the heater exhaust so that exhaust fumes cannot enter any passenger compartments.
- If running exhaust components through an enclosed compartment, ensure that it is vented to the outside.

⚠ Warning - Safety Hazard on Coolant Heaters Used With Improper Antifreeze Mixtures

- The use of Espar coolant heaters requires that the coolant in the system to be heated contain a proper mixture of water and antifreeze to prevent coolant from freezing or slushing.
- If the coolant becomes slushy or frozen, the heater's coolant pump cannot move the coolant causing a blockage of the circulating system. Once this occurs, pressure will build up rapidly in the heater and the coolant hose will either burst or blow off at the connection point to the heater.
- This situation could cause engine damage and/or personal injury. Extreme care should be taken to ensure a proper mixture of water and antifreeze is used in the coolant system.
- Refer to the engine manufacturer's or coolant manufacturer's recommendations for your specific requirements.

Caution: During electrical welding work on the vehicle disconnect the power to the heater in order to protect the control unit.

Note: All measurements contained in this manual contain metric and approximate SAE equivalents in brackets eg 25mm (1")

Direct questions to Espar Heater Systems

USA **1-800-387-4800**
CANADA **1-800-668-5676**

This publication was correct at the time of print. However, Espar has a policy of continuous improvement and reserves the right to amend any specifications without prior notice.

Introduction

Espar's Hydronic D4/D5 Heater

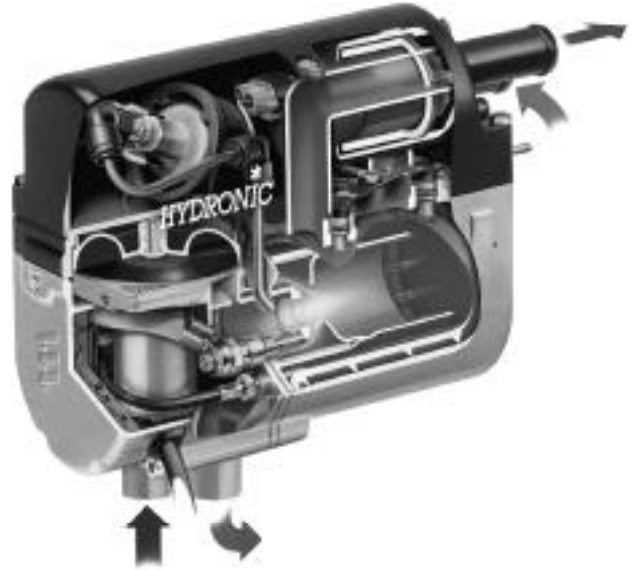
Quality engineered to provide a dependable means of heating, the Espar Hydronic 4/5 is a diesel fired coolant heater capable of between

Hydronic 4 - 1.6 kW to 4 kW/hr (5,500 to 13,700 BTU/hr).
Hydronic 5 - 2.4 kW to 5 kW/hr (8,200 to 17,100 BTU/hr).

This compact coolant heater offers an affordable heating solution to many applications. The Hydronic 4/5 is ideal for pre-heating the engines of trucks, cars, off-road equipment, small trucks and boats. It features automatic heat regulation while being fuel and power efficient. Since the heater runs on fuel and 12 or 24 volt power, it is able to perform this completely independently of the vehicle engine. The unit regulates the coolant temperature between a low of 65°C (149°F) and a high of 80°C (176°F) by automatically cycling the heater.

The Hydronic 4/5 can be operated from the vehicle cab by an on/off switch, a preselect timer or a combination of both.

A Flame sensor, temperature regulating sensor and overheat sensor are among the safety features which makes the Hydronic D4/D5 a safe and dependable heating system.

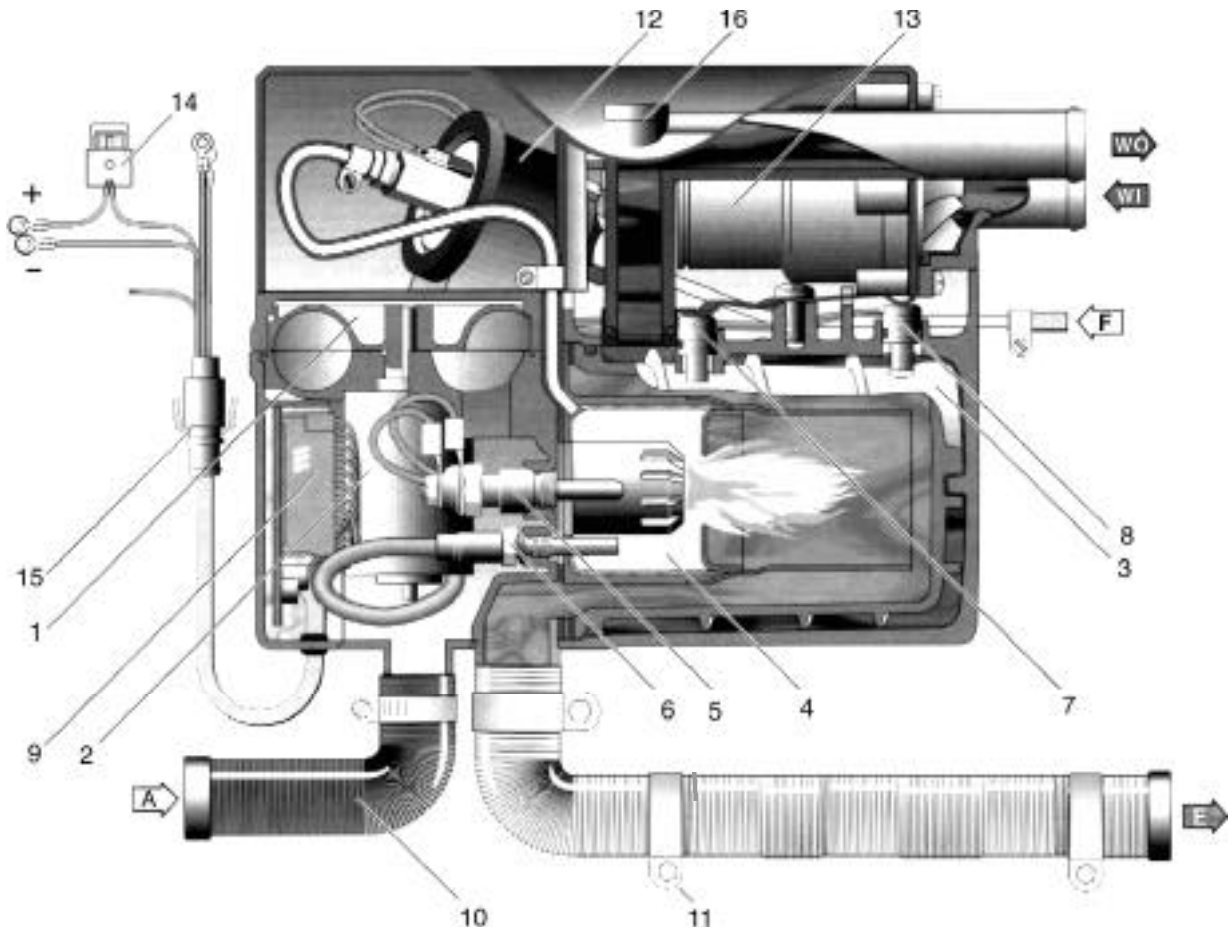


| Specifications | Hydronic 4 | Hydronic 5 | | | | |
|--|---|---|---------|---------|---------------------------------|---------------------------------|
| Heat output (±10%) | 4 kW (13,700 BTU/hr) - Boost 3.3 kW (11,300 BTU/hr) - High 1.6 kW (5,500 BTU/hr) - Low | 5 kW (17,000 BTU/hr) - High 2.4 kW (8,200 BTU/hr) - Low | | | | |
| Current draw (±10%) | 4.3 amps Boost 3.0 amps High 2.0 amps Low | <table border="1"> <thead> <tr> <th>12 volt</th> <th>24 volt</th> </tr> </thead> <tbody> <tr> <td>4.16 amps High 1.91 amps Low</td> <td>2.08 amps High 0.95 amps Low</td> </tr> </tbody> </table> | 12 volt | 24 volt | 4.16 amps High 1.91 amps Low | 2.08 amps High 0.95 amps Low |
| 12 volt | 24 volt | | | | | |
| 4.16 amps High 1.91 amps Low | 2.08 amps High 0.95 amps Low | | | | | |
| Fuel consumption (±10%) | 0.51 l/hr (0.13 US gal/hr) Boost 0.40 l/hr (0.11 US gal/hr) High 0.20 l/hr (0.05 US gal/hr) Low | 0.62 l/hr (0.16 US gal/hr) High 0.27 l/hr (0.08 US gal/hr) Low | | | | |
| Operating Voltage Range | | | | | | |
| Minimum Voltage | 10 V | 10 V 20.4 V | | | | |
| Maximum Voltage | 16 V | 16 V 32.0 V | | | | |
| Working pressure | 2.5 bar (36 psi) | 2.5 bar (36 psi) | | | | |
| Ambient operating temperature | -40°C to +80°C (-40°F to 176°F) | -40°C to +80°C (-40°F to 176°F) | | | | |
| Overheat temperature shutdown (±5%) | 105°C (221°F) | 105°C (221°F) | | | | |
| Weight | 2.5 kg. (5.5 lbs.) | 2.9kg. (6.4lbs) | | | | |
| Controls available | On/Off switch or 7-day timer | On/Off switch or 7-day timer | | | | |

Note: The heater is equipped with a high-voltage cutout as well as a low-voltage cutout.

Heater Components - Hydronic 4 & 5 SC versions - 12 Volt - Diesel

25 1917 01
 25 2096 05
 25 1920 05
 25 2098 05



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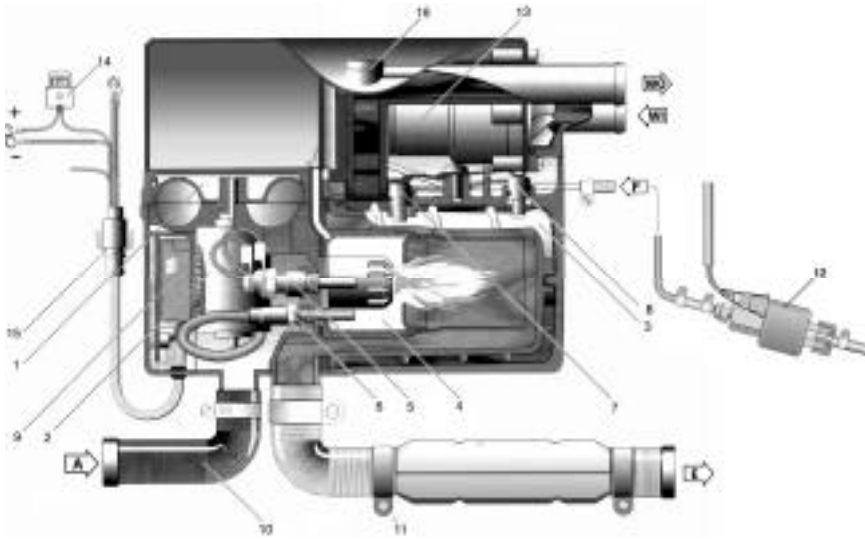
A = **Combustion air**
E = **Exhaust**
F = **Fuel supply line**
WO = **Water Outlet**
WI = **Water Inlet**

- 1 Combustion air blower wheel
- 2 Electric motor
- 3 Heat exchanger
- 4 Combustion chamber
- 5 Glow pin
- 6 Flame sensor
- 7 Temperature sensor
- 8 Overheat temperature sensor
- 9 Control unit

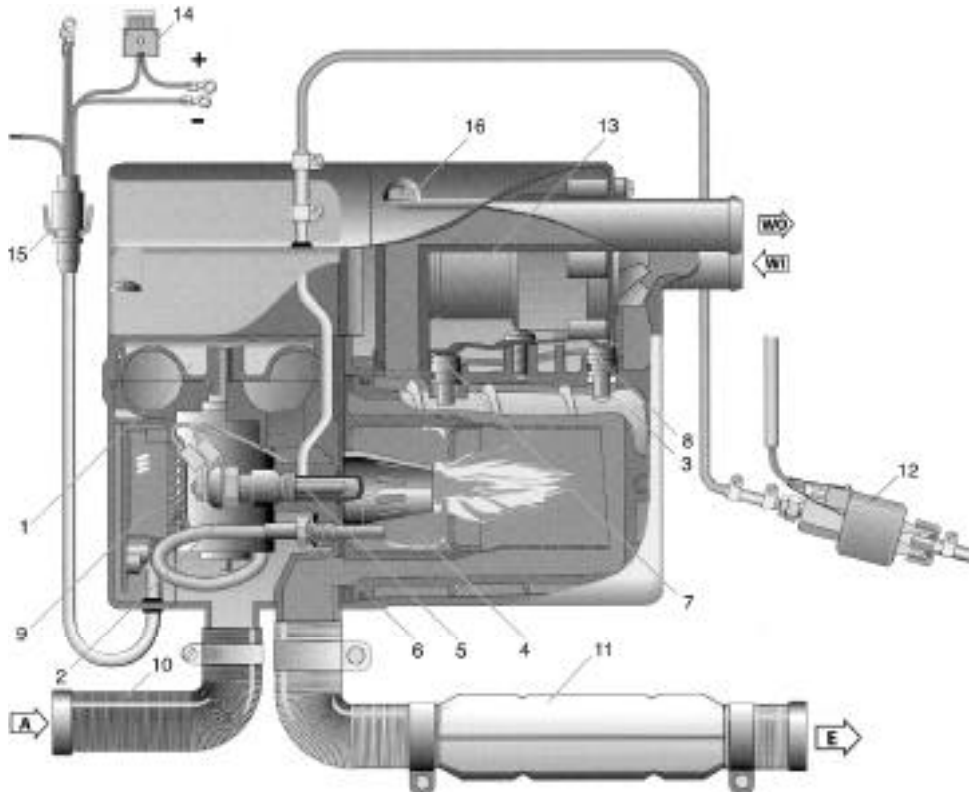
- 10 Combustion air tube
- 11 Exhaust tube
- 12 Fuel-metering pump
- 13 Coolant pump
- 14 Main fuse
- 15 Interface/8-pin connector
- 16 Bleed screw
- 17 Push/Pull switch
- 18 7-day timer

Heater Components - Hydronic 5 SC - 24 volt version - Diesel

25 2147 05

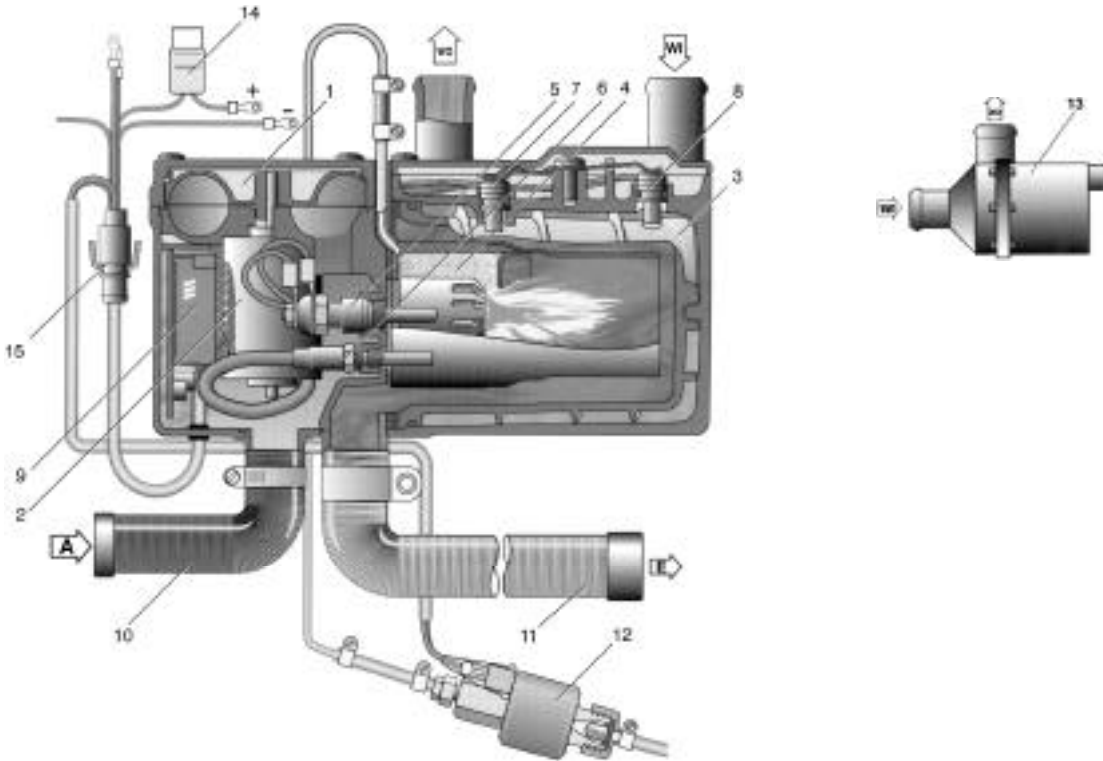


Heater Components - Hydronic 4 & 5 SC - 12 volt version - Gasoline

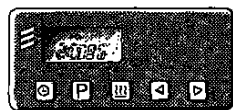
20 1789 05
20 1791 05

Heater Components - Hydronic 5 S - 12 & 24 volt versions - Diesel & Gasoline versions

25 2031 05
25 2100 05
20 1793 05
25 2009 05



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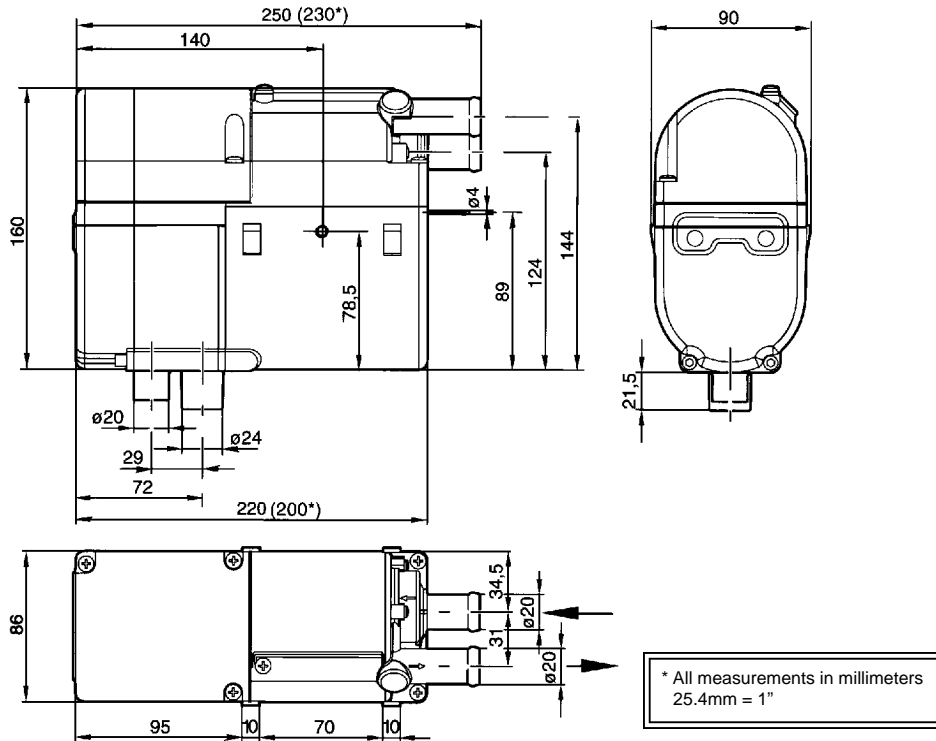
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A = Combustion air
E = Exhaust
F = Fuel supply line
WO = Water Outlet
WI = Water Inlet

1 Combustion air blower wheel
2 Electric motor
3 Heat exchanger
4 Combustion chamber
5 Glow pin
6 Flame sensor
7 Temperature sensor
8 Overheat temperature sensor
9 Control unit

10 Combustion air tube
11 Exhaust tube
12 Fuel-metering pump
13 Coolant pump
14 Main fuse
15 Interface/8-pin connector
16 Bleed screw
17 Push/Pull switch
18 7-day timer

Principal Dimensions - Hydronic D4/D5 SC (values in brackets* = D4SC)



Heater Location

Mount the heater in a protected area if you're in extreme conditions where heavy salting is experienced.

Eg: storage compartment, engine compartments, step box or battery box.

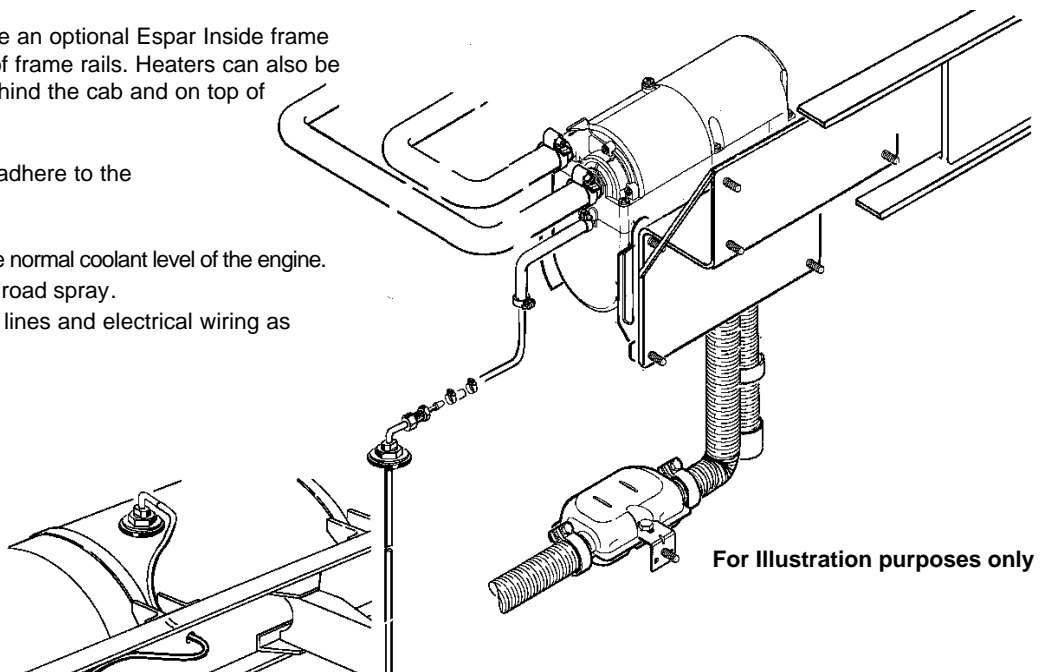
Espar recommends you use the boxed unit. Boxed heaters can be mounted by utilizing one of the existing brackets. See following page.

If mounting on frame rail use an optional Espar Inside frame bracket to mount to inside of frame rails. Heaters can also be mounted on a cross tray behind the cab and on top of the frame rails.

When mounting the heater adhere to the following conditions.

- Situate the heater below the normal coolant level of the engine.
- Guard against excessive road spray.
- Keep coolant hoses, fuel lines and electrical wiring as short as possible

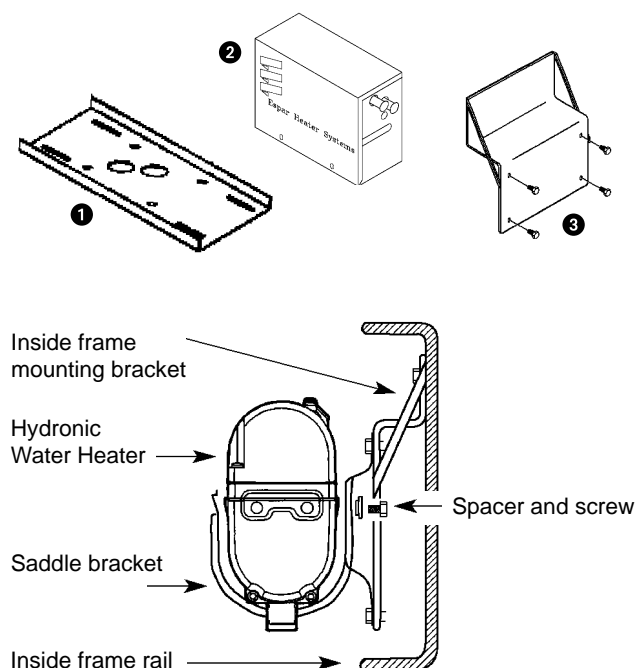
Caution: Guard the heater against excessive road spray to avoid internal corrosion



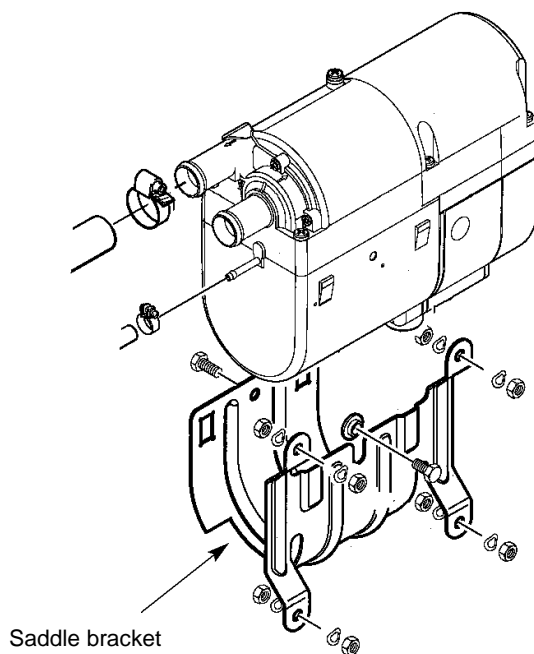
Heater Mounting

Mount heater in saddle bracket and secure with hardware provided. If heater is not a boxed unit, mount bracket onto inside frame rail bracket. Boxed unit can also be secured to the inside frame bracket or mounted to the Cross frame Mounting Tray

- 1 Cross Frame Mounting Tray
- 2 Hydronic 4/5 box
- 3 Inside frame mounting bracket



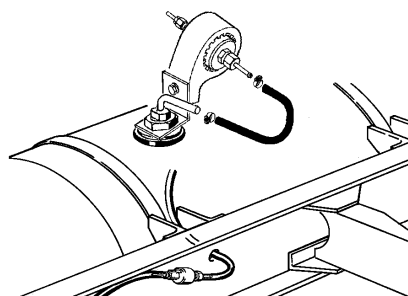
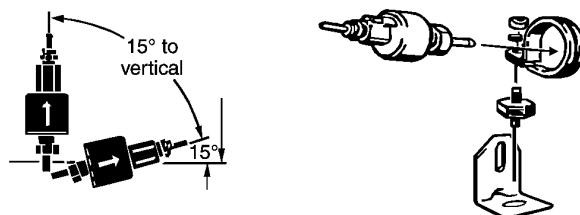
Hydronic D4 SC boxed unit P/N CA 2096 55
Hydronic D5 SC boxed unit P/N CA 2098 55



For "S" and gasoline version heaters which have external fuel metering pumps

- Choose a protected mounting location close to the fuel pick-up pipe and heater.
- Using the bracket and rubber mount provided, install fuel pump as shown

Note: Proper mounting angle of the fuel pump is necessary to allow any air or vapor in the fuel lines to pass through the pump rather than cause a blockage.



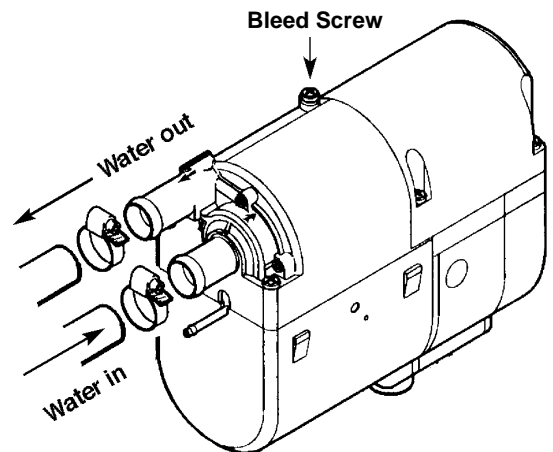
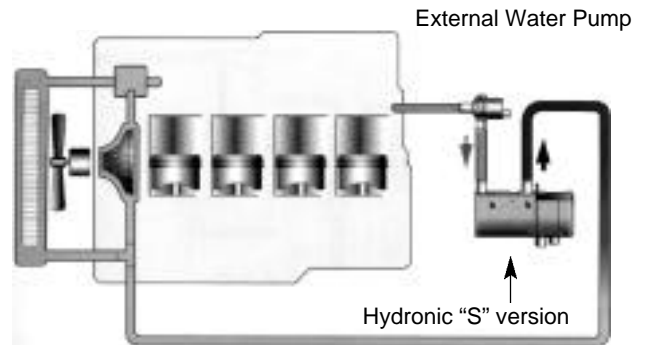
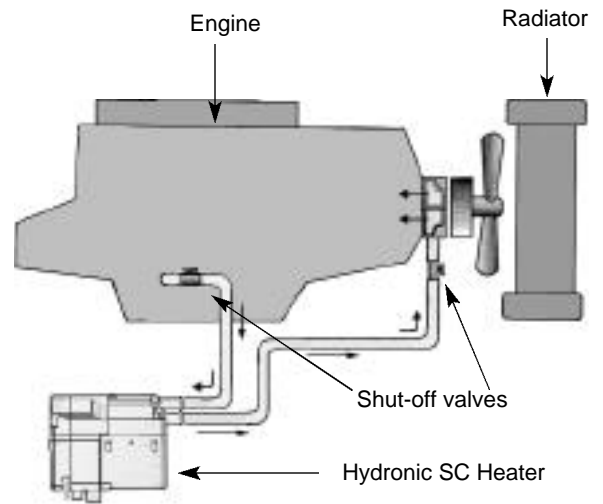
Heater Plumbing

The heater is incorporated into the engine's cooling system for engine preheating.

Engine Plumbing

Follow these guidelines and refer to engine plumbing diagram shown below.

- Use existing holes in the engine block (ie. remove blanking plugs when possible). Install fittings into the block for pick-up and returns.
- If possible, use shut off valves to ensure the system can be isolated from the engine when not in use.
- Provide 20mm (3/4") hose barbs for hose connections.
- Use 20mm (3/4") hoses to ensure adequate coolant flow.
- Keep the pick up and return points as far apart as possible to ensure good heat distribution.
- Take the coolant from a low point on the engine to reduce aeration in the system.
- Ensure proper direction of coolant flow by taking coolant from a high pressure point in the engine and returning it to a low pressure point. (ie. pickup from back of block and return to the suction side of the engine's water pump).
- Ensure adequate flow rate through the heater by comparing the incoming and outgoing coolant temperatures while the heater is running. If the rise in temperature exceeds 10°C (18°F), coolant flow must be increased by modifying the plumbing.
- Ensure the heater and water pump are installed as low as possible to allow the purging of air. Bleed system via radiator or bleed screw located on heater.



Caution: The coolant must contain a minimum of 10% antifreeze at all times as a protection against corrosion. Fresh water will corrode internal heater parts.





Fuel System

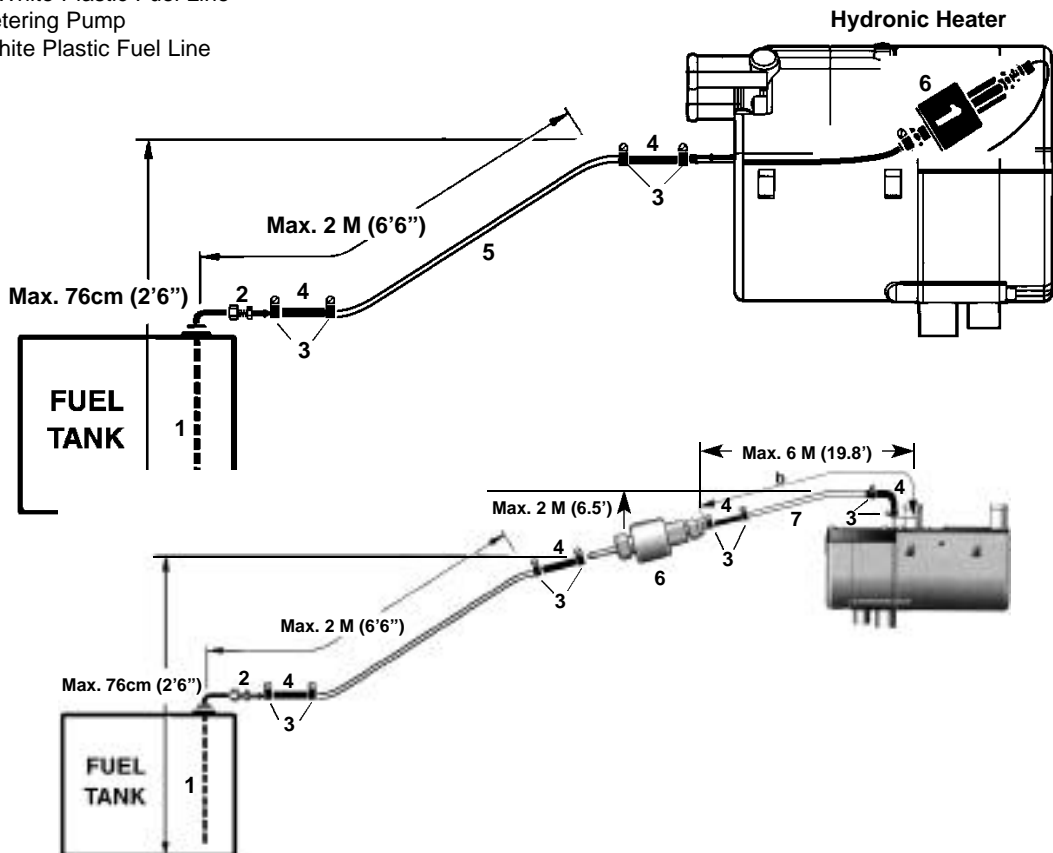
The Hydronic water heaters typically have the fuel metering pump mounted inside the unit. This is to reduce installation time and to protect the pump from corrosion. Some versions have an external fuel metering pump. Refer to graphics for connections and specifications.

All parts necessary to do the installation are included in the kit as shown.

Note: Fuel line limits must not be exceeded. Ensure that the following conditions are met. Hydronic heater must be within a height of 76cm (2'6") from the bottom of the fuel pick-up pipe. Fuel-metering pump must be within a total distance of 200 cm (6'6") from the fuel pick-up pipe. If the above conditions cannot be met, a heater with external fuel metering pump must be used.

Fuel System Tolerances

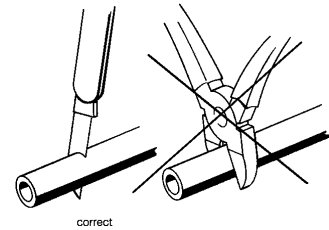
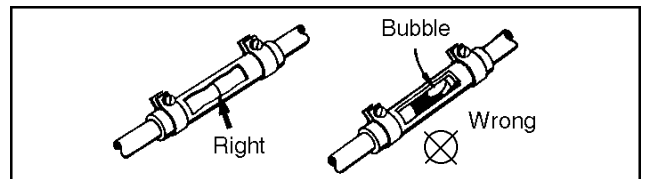
1. Fuel Pick-Up Pipe
2. Fuel Pipe Reducer
3. 9mm Clamp
4. 3.5mm Rubber Connector
5. 2.0mm White Plastic Fuel Line
6. Fuel Metering Pump
7. 1.5m White Plastic Fuel Line



Fuel Line

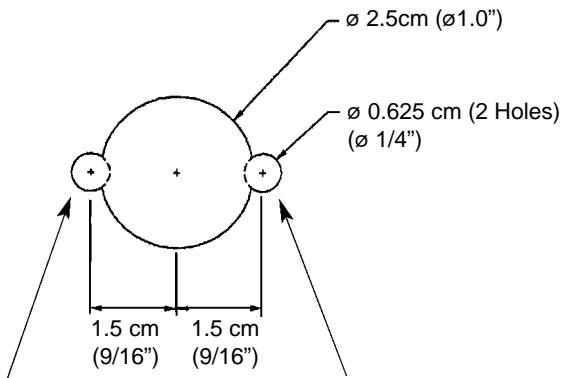
- Route fuel lines from the fuel pick-up pipe to the heater.
- Use fuel lines provided.
- Other sizes or types of fuel lines may inhibit proper fuel flow.
- Make proper butt joints using clamps and connector pieces as shown
- Use a sharp utility knife to cut plastic fuel lines to avoid burrs.

Note: Butt joints and clamps on all connections.

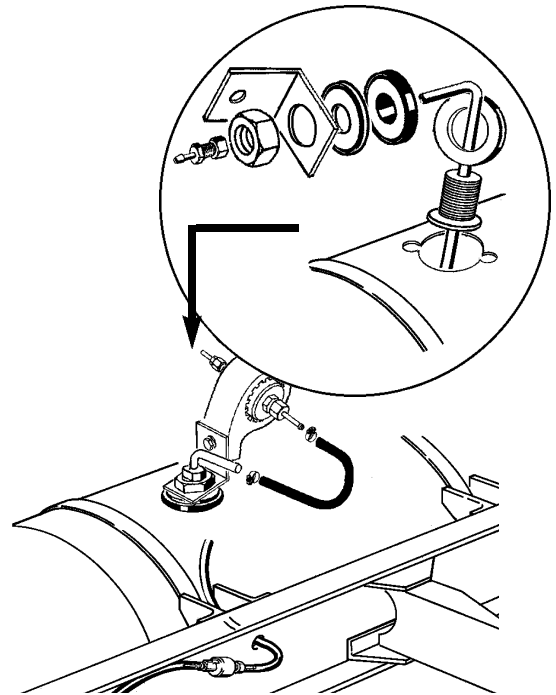
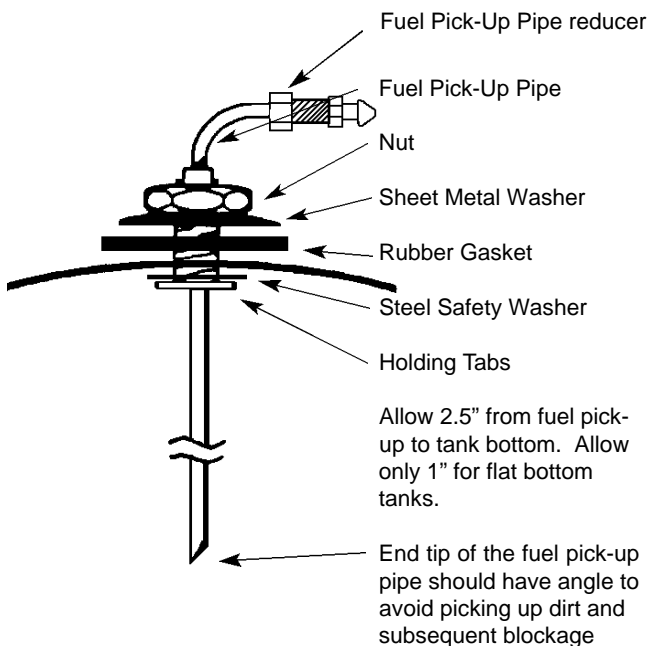


Fuel Pick-Up Pipe Installation (Standard Pick-Up)

- Choose a protected mounting location close to the pump and heater. A spare fuel sender gauge plate provides an ideal mounting location. If one is not available.....
- Drill mounting holes in tank to accommodate pick-up pipe as shown.
- Cut the fuel pick-up pipe to length. Allow 2-2.5" from bottom of tank.
- Mount the fuel pick-up pipe as shown
- Lower the fuel pick-up pipe (with reinforcing washer) into the tank using the slot created by the two 0.6cm (1/4") holes.
- Lift the assembly into position through the 2.5cm (1") hole.
- Assemble the rubber washer, metal cup washer and nut.

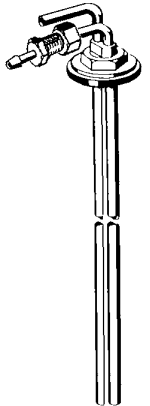


Note: Drill the two (1/4") holes first.



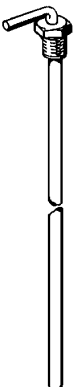
Double pick ups (used with combo kits)

- Double NPT pipe.
P/N: CA0 12 107



(Optional Pick-Up Pipe with NPT fitting)

- Remove an existing plug from the top of the fuel tank.
- Cut the fuel pick-up pipe to length.
- Secure the fuel pick-up pipe into position using the combined NPT compression fitting as shown



Note: NPT fittings are available in various sizes (Refer to parts section).

Electrical Connections

All parts needed are included with the kit. (*) indicates external mounted fuel and or water pump versions of Hydronics.

A. Main Heater Harness.....

- Connects switch and power harness to the heater harness. (* in some cases power to fuel metering pump)

B. Power Harness.....

- 2 core harness (red, brown).
- Connect red wire to fuse link and terminal.
- Attach ring terminal to vehicle battery (+).
- Connect brown wire to vehicle battery (-) using ring terminal provided.
- Insert 25 amp fuse

C. Switch Harness.....

- 4 core harness (red/yellow, brown, yellow, blue/white)
- Run to location of switch. Make terminal connections at switch. Espar has 2 available switches see switch instructions on following pages.

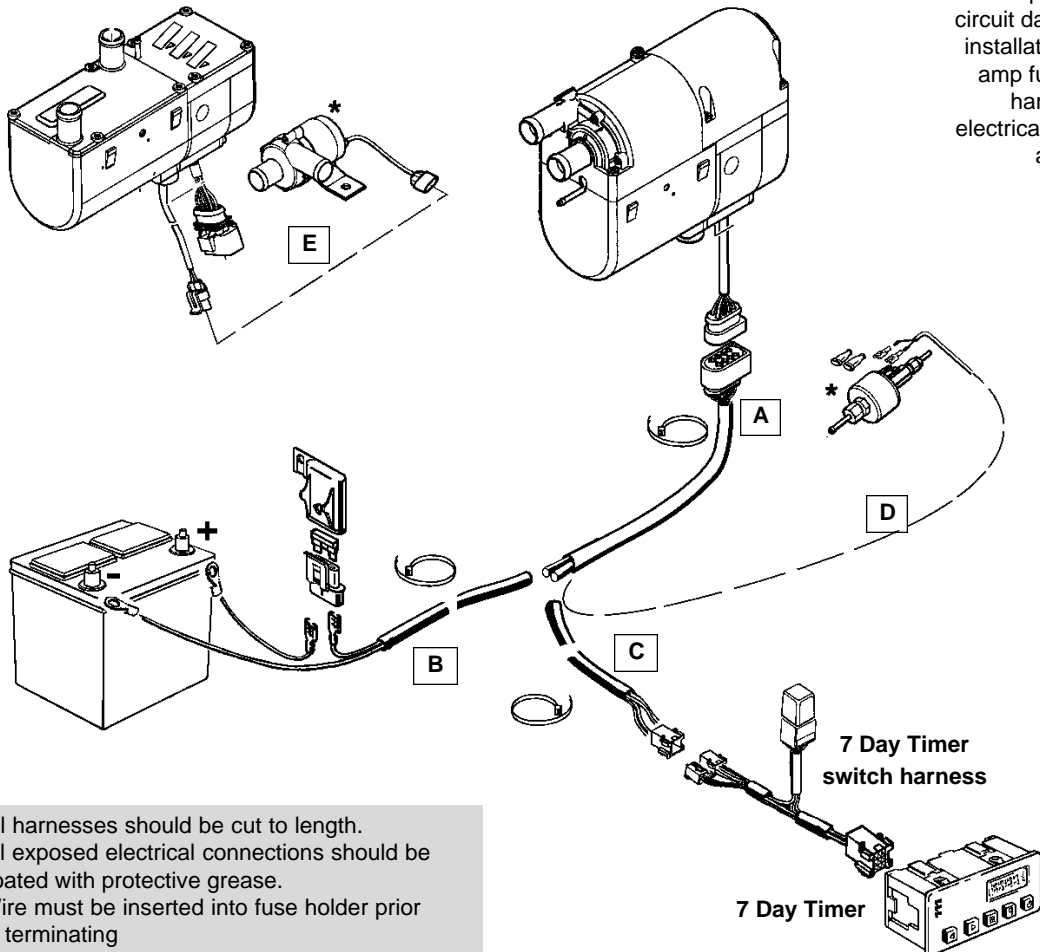
D. * Fuel Metering Pump Harness.....

- 2 core harness (green, green)
- Connect to fuel metering pump using single terminals and rubber protective boots (no polarity required).

E. * Water Pump Harness.....

- 2 core harness (black, brown)
- Connect to main harness at heater.

Hydronic Heaters



Caution:

To avoid potential short circuit damage during installation, insert 25 amp fuse on power harness after all electrical connections are complete.

Note: All harnesses should be cut to length. All exposed electrical connections should be coated with protective grease.

Note: Wire must be inserted into fuse holder prior to terminating

Exhaust Connection

A 24mm flexible tube exhaust pipe with a length no more than 2 m. long is required for the exhaust. A 27-30mm exhaust clamp is needed to secure the exhaust to the the heater. Connect the exhaust as follows:

- Connect the exhaust pipe to the exhaust port on the heater and attach with clamp provided.
- Run exhaust to an open area to the rear or side of the vehicle so that fumes can not build up and enter the passenger compartment or the heater combustion air intake.
- Install exhaust pipe with a slight slope or drill a small hole in the lowest point to allow water to run off. Any restriction in exhaust will cause operational problems.
- Route the exhaust pipe from the heater using holders provided

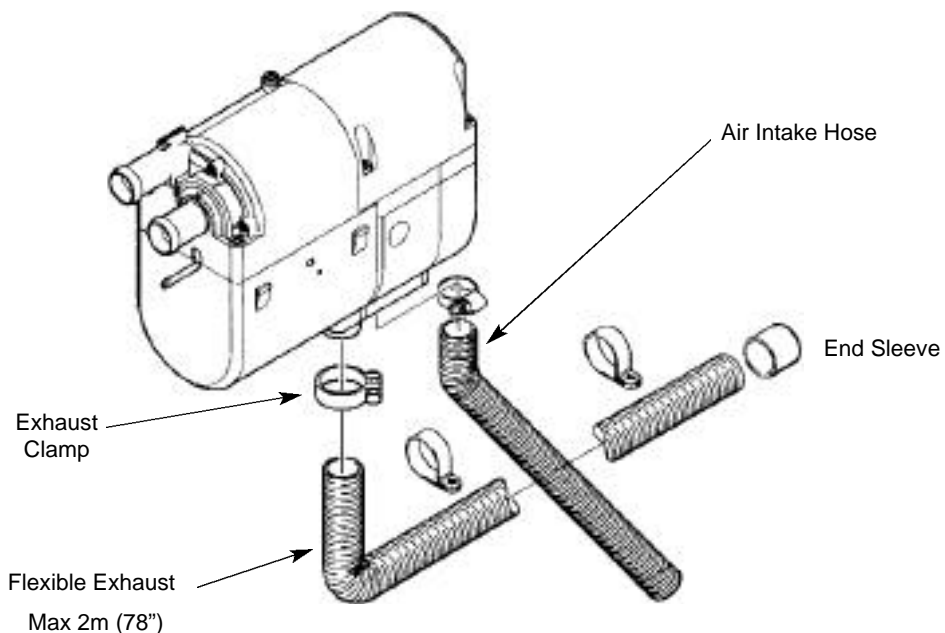
Caution: Run exhaust so that it cannot be plugged by dirt, water or snow. Ensure the outlet does not face into the vehicle slip stream.

Intake Connection

Combustion air must be drawn in from the outside. The combustion air opening must be kept free at all times.

- Connect the air intake pipe to the intake port on the heater and secure with clamp provided.

Caution: Do not install the intake opening facing the vehicle slipstream. Ensure that the opening cannot become clogged with dirt or snow and that any water entering the intake can drain away.



Warning:

Fire Hazard

The exhaust is hot, keep a minimum of 5cm (2") clearance from any heat sensitive material. Route exhaust so that the exhaust fumes cannot enter the passenger compartment.

Warning:

Asphyxiation Hazard

Route exhaust beyond the skirt of the cab and outside of the frame area. Failure to comply with this warning could result in Asphyxiation.

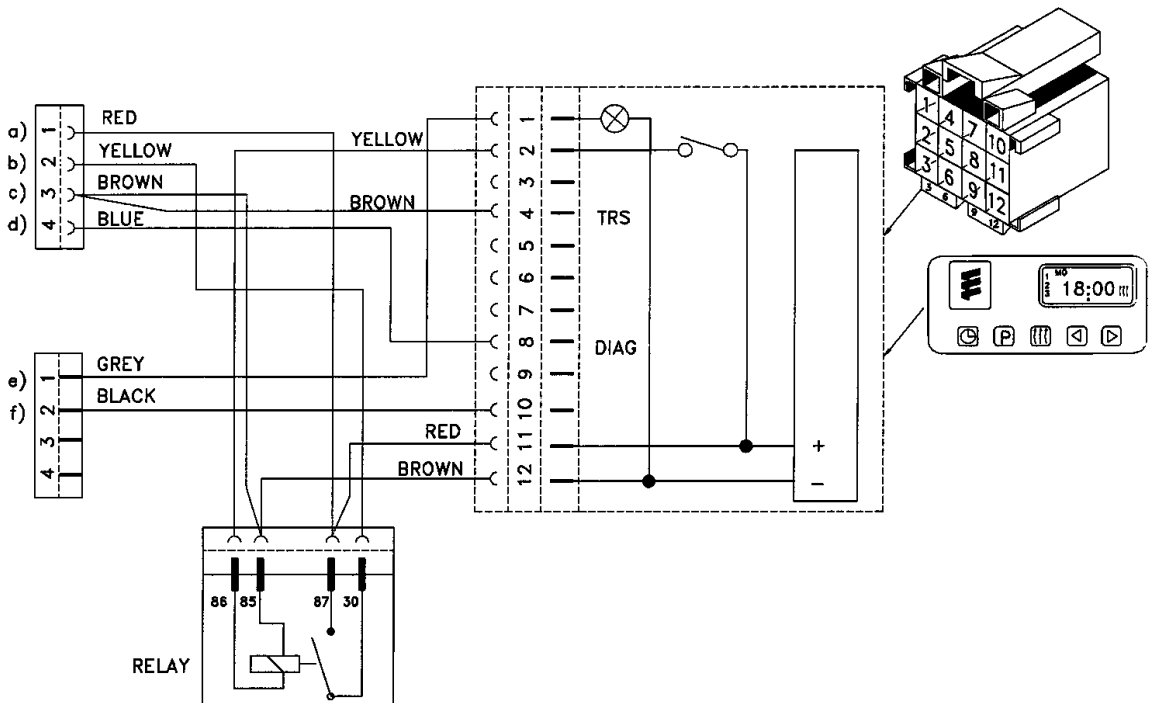
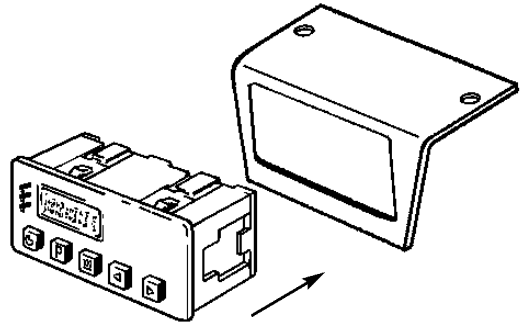
Operating Switches

A Push/Pull switch or a 7 Day Timer are available.

7 Day Timer

The 7 day timer is capable of setting 1 start time with in 7 days. It also has other functions such as a current time display and a heater numeric fault code. Refer to instructions provided with timer for setting options.

- Mount timer and bracket in a suitable location.
- Connect the switch harness to the connector at the heater and run the harness to the switch location.
- Cut harness to length at the switch and install terminals.
- Connect switch harness to timer as shown below
- Refer to timer instructions for other wiring options.



- Power from battery "+"
- Switch control to the heater
- Power from battery "-"
- Diagnostic from heater
- To the vehicle dimmer switch for light display
- To vehicle ignition accessories for continuous operation of heater

Note: The timer display is automatically illuminated while the heater is operating. Connecting the grey wire to the vehicle dimmer switch will allow the timer display to illuminate with the vehicles dash lights.

Note: Connecting the black wire to the vehicle ignition accessories "On" circuit may also be considered for some applications where extended run times are desired. Powering the black wire will enable the heater to run continuously when the heater is switched on manually.

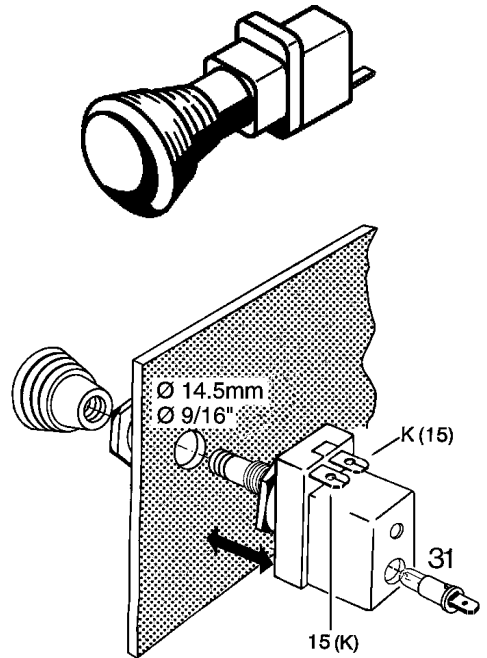
Push/Pull Switch

- Mount switch in a location where it is easily accessible
- Mount using hardware supplied
- Connect the switch harness to the connector at the heater and run the harness to the switch location
- Cut harness to length at the switch and install terminals
- Connect wiring as shown

Note: Wired as above the switch light glows when pulled out and is off when pushed in.

Control Wiring Push/Pull Switch

| | |
|--------------|--|
| Brown- 31 | Power from battery “-” |
| Red- K(15) | Power from battery “+” |
| Yellow-15(K) | Switch control to the heater |
| Blue/White | Diagnostic from heater (disregard- tape end and tie off to the side) |



Heater Operation

Pre-Start Procedures

Upon completion of installation prepare the heater as follows:

- Check all fuel, electrical and plumbing connections
- Refill the engine coolant
- Bleed air from the coolant system by loosening the bleed screw on top of the heater to allow air to escape.
- Loosen Rad cap and run engine to allow air to be purged.
- Top up engine coolant.

Start Up

Once switched on the following sequence occurs:

- Control unit does a systems check (flame sensor, temperature sensor, safety thermal sensor and various other control unit checks).
- Water pump starts circulating coolant fluid.
- Combustion air blower comes on.
- Glow pin begins to preheat 20-50 secs.
- Metering pump starts and combustion air blower speeds up gradually
- Once ignition takes place the flame sensor alerts the control unit and the control unit shuts off the glow pin (ignition time: 1.5 - 2 minutes)

Note: If the heater fails to start the first time it will automatically attempt a second start. If unsuccessful, the heater will shut down completely.

Note: On initial start up the heater may require several start attempts to self prime the fuel system.

Running

Once ignition is successful the following operations take place:

- Heater runs in high heat mode and the temperature is monitored at the heat exchanger.
- Once coolant reaches 80°C (185°F) the heater automatically switches to low heat mode and continues to run.
- If coolant temperature drops to 75°C (167°F) the heater will automatically switch back to high heat mode
- If the coolant temperature continues to rise, the heater will automatically switch off once temperature reaches 86°C (187°F)
- The water pump will continue to circulate coolant to allow the heater to monitor engine temperature
- The heater will automatically re-start once coolant temperature reaches 75°C (167°F)
- The heater continues to run as described above until it is switched off, either manually, automatically by a timer or heater malfunction shutdown.



Note: If the heater should shut down due to flame out while in running mode, it will automatically attempt one restart. If successful, it will continue to run. If not, it will shut down completely with a cool-down cycle.

Note: During operation the heater continually senses the input voltage from the batteries. If the input voltage drops to approximately 10 volts or rises above 16 volts the heater will automatically shut down with a cool-down cycle.

Switching Off

- When the heater is switched off, manually or automatically, it starts a controlled cool down cycle
- The fuel metering pump stops delivering fuel and the flame is extinguished
- The combustion air blower and water pump continue to run for 130 seconds to cool down
- The heater shuts off.

Safety Equipment

The control unit, temperature sensor, overheat sensor and flame sensor continually monitor heater functions and will shut down the heater in case of a malfunction.

- The control unit ensures electrical circuits (fuel pump, combustion air blower etc.) are complete prior to starting the heater.
- If the heater fails to ignite within 90 seconds of the fuel pump being started, the starting procedure will be repeated. If the heater again fails to ignite after 90 seconds of fuel being pumped, a “no start safety shutdown” follows
- If the heater flames out during operation, the heater automatically attempts to restart. If the heater fails to ignite within 10 seconds of fuel delivery, or ignites but flames out again within 3 minutes, “flame out” shutdown follows. After troubleshooting the problem the heater can be started again by switching the heater off and then back on again
- Overheating due to lack of water, a restriction or a poorly bled coolant system results in the overheat shutdown. Fuel delivery will cease and an “overheat shut down” follows. If heater overheats 3 consecutive times, a lockout on the control unit will occur. To unlock the control unit you will need to use the Fault Code Retrieval Device. See following pages for self diagnostics.
- If at any time the voltage drops below 10.2V, or rises above 15.9V, a “high/low voltage” shutdown follows (after a 20 second delay).








Warning:

The heater must be switched off while any fuel tank on the vehicle is being filled. The heater must not be operated in garages or enclosed areas



Operational Flow Chart

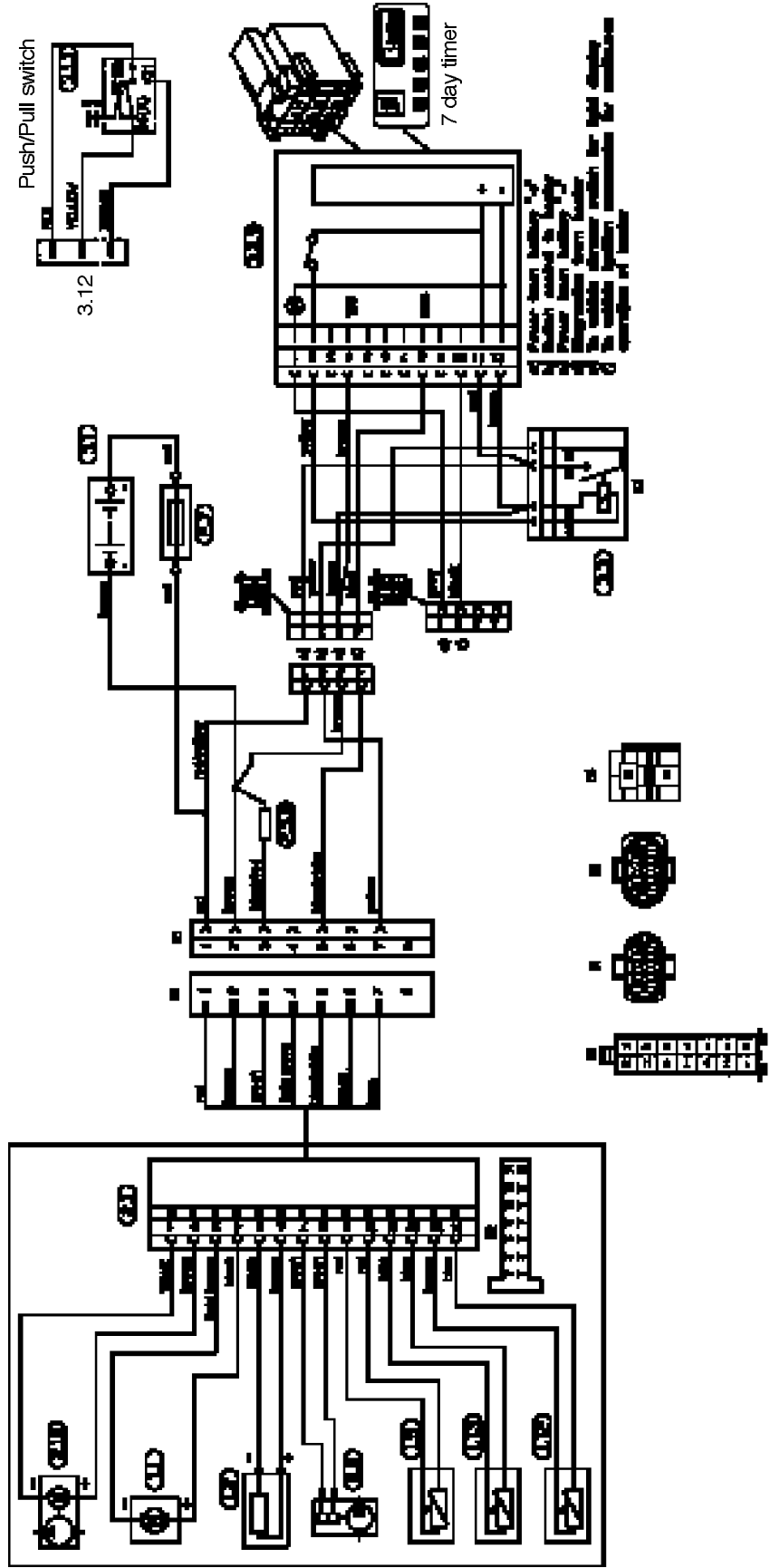
| Operating Mode | STARTING PHASE | | | | | RUNNING PHASE | SHUT DOWN PHASE | | |
|--|-------------------|----------|------------------|------------------------|-------------------------------|--|-----------------|-----------|------------------------------|
| | System Check | Pre-heat | Ignition Attempt | Pre-heat 2nd. attempt | Ignition Attempt 2nd. attempt | | After Glow | Cool Down | Off or Stand by |
|  Water Pump | Off | On | On | On | On | On | On | On | Off On: if in stand by |
|  Blower | On Momentarily | On | On | Off | On | On | On | On | Off |
|  Glow Pin | Off | On | On | On | On | Off | On | Off | Off |
|  Fuel Pump | Off | Off | On | Off | On | On | Off | Off | Off |
|  Time | 1-3 sec. | 80 sec. | Up to 90 sec. | 80 sec. If Required | Up to 90 sec. | High/Low Operation until switched off manually or automatically | 20 sec. | 2.5 min. | |

Note: During the controlled heating cycle, if the coolant temperature exceeds 86°C(187°F) the heater will cycle off.
Heater will automatically restart in high mode once coolant temperature reaches 75°C(167°F)



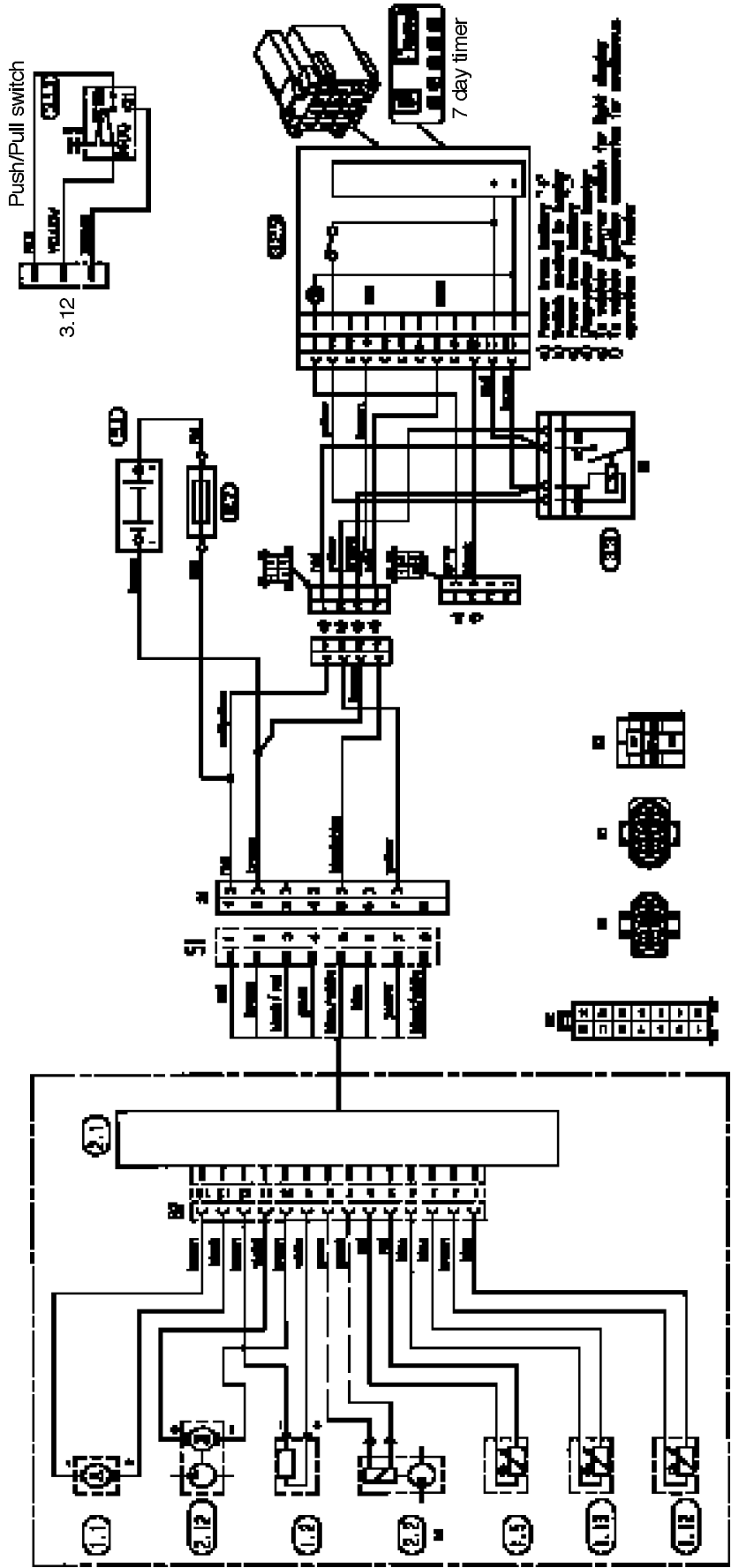
**Hydronic D4 SC 12 Volt
Model 25 1917 01
Wiring Harness P/N: CA1 60 401**

- 1.1 Blower motor
- 1.2 Glow pin
- 1.5 Overheat sensor
- 1.12 Flame sensor
- 1.13 Temperature sensor
- 2.1 Control unit
- 2.12 Water Pump
- 2.2 Fuel metering pump
- 2.5.8 Blower lock out resistor
- 2.7 25 amp main fuse
- 3.12 Push/Pull switch
- 3.2.9 7 day timer
- 3.3 Timer load relay
- 5.1 Battery



Hydronic D4 SC 12 Volt
 Model 25 2096 05
 Wiring Harness P/N: CA1 60 503

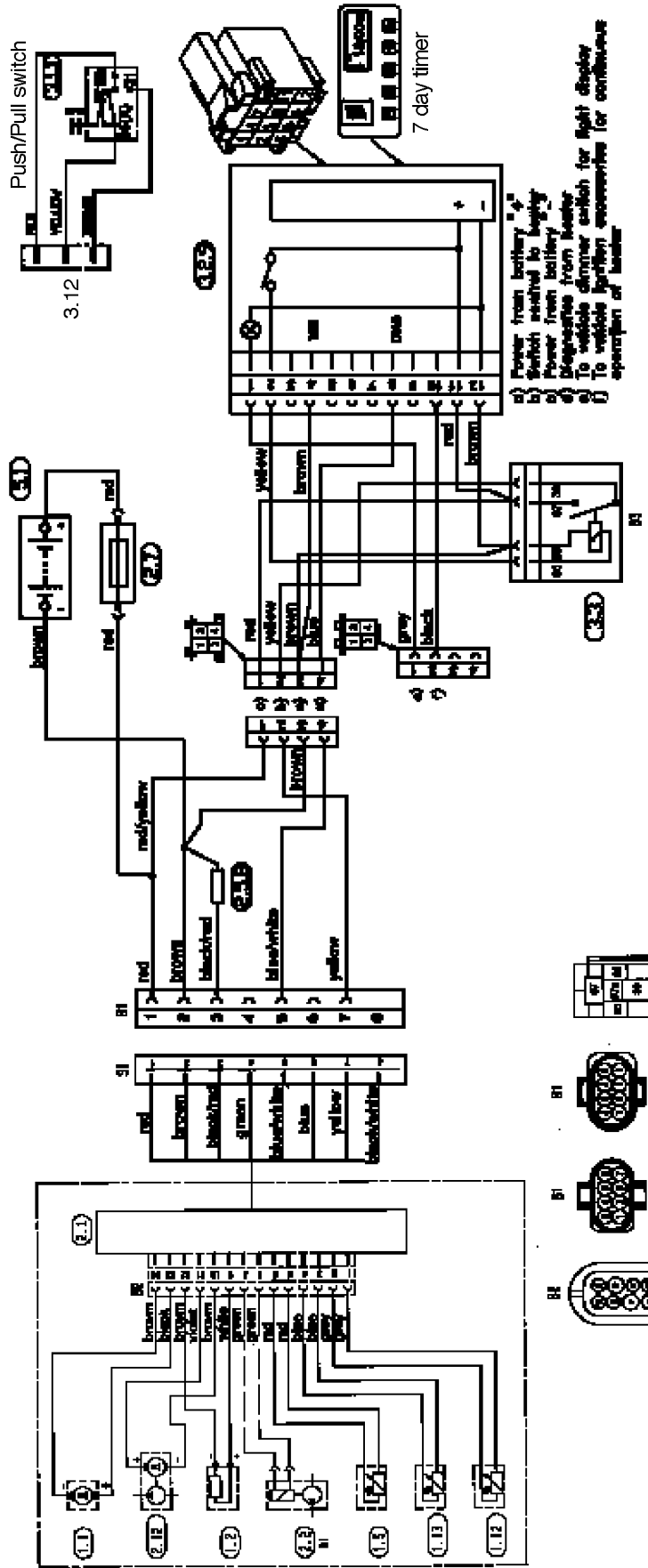
- 1.1 Blower motor
- 1.2 Glow pin
- 1.5 Overheat sensor
- 1.12 Flame sensor
- 1.13 Temperature sensor
- 2.1 Control unit
- 2.12 Water Pump
- 2.2 Fuel metering pump
- 2.7 25 amp main fuse
- 3.12 Push/Pull switch
- 3.2.9 7 day timer
- 3.3 Timer load relay
- 5.1 Battery





Hydronic D5 SC 12 Volt
 Model 25 1920 05
 Wiring Harness P/N: CA1 60 401

- 1.1 Blower motor
- 1.2 Glow pin
- 1.5 Overheat sensor
- 1.12 Flame sensor
- 1.13 Temperature sensor
- 2.1 Control unit
- 2.12 Water Pump
- 2.2 Fuel metering pump
- 2.5.8 Blower lock out resistor
- 2.7 Blower lock out resistor
- 3.12 25 amp main fuse
- 3.2.9 Push/Pull switch
- 3.3 7 day timer
- 5.1 Timer load relay
- 5.1 Battery



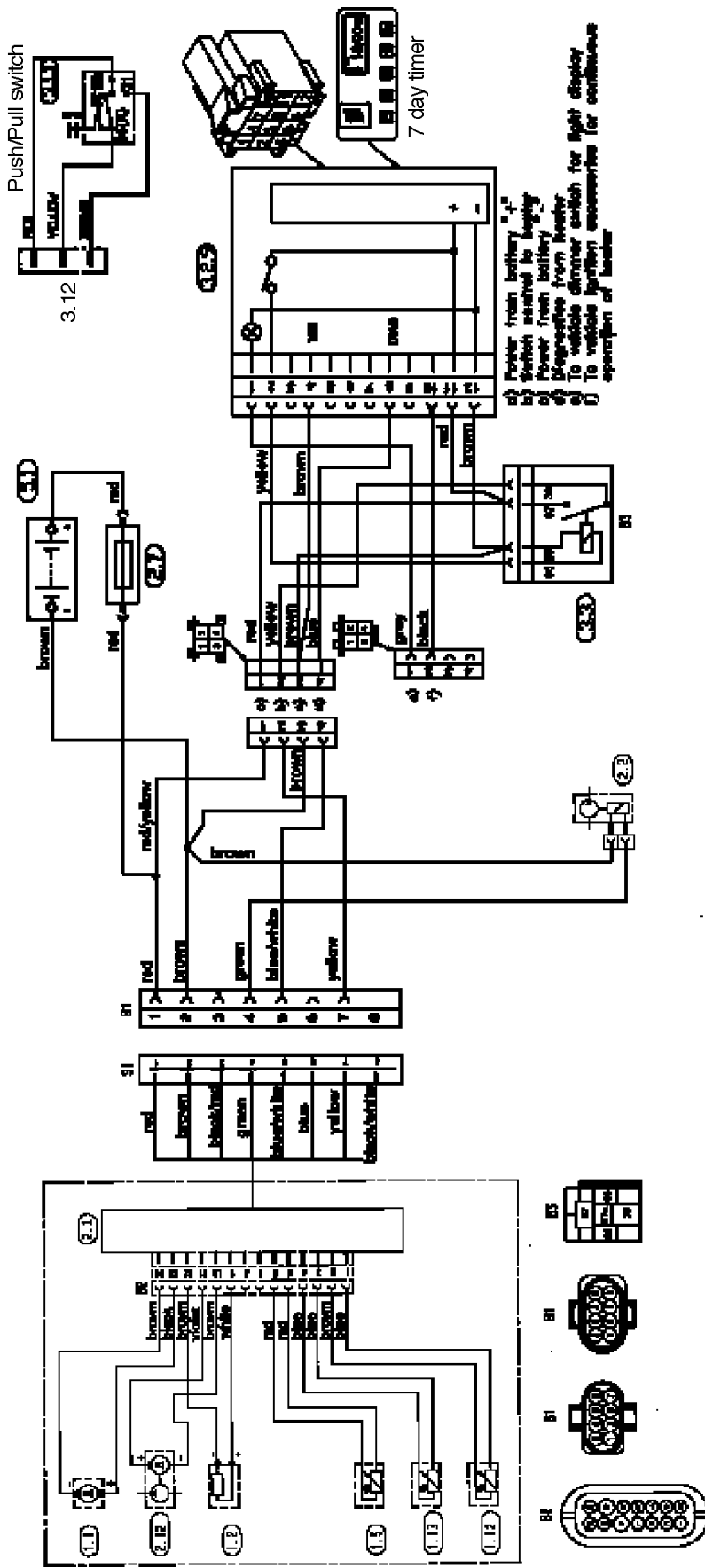
a) Power from battery
 b) Switch related to lighting
 c) Power from battery
 d) Signal from heater
 e) To vehicle driver switch for light display
 f) To vehicle driver accessories for continuous operation of heater



Hydronic D5 SC 24 Volt
 Model 25 2147 05
 Wiring Harness P/N: CA1 60 502-001

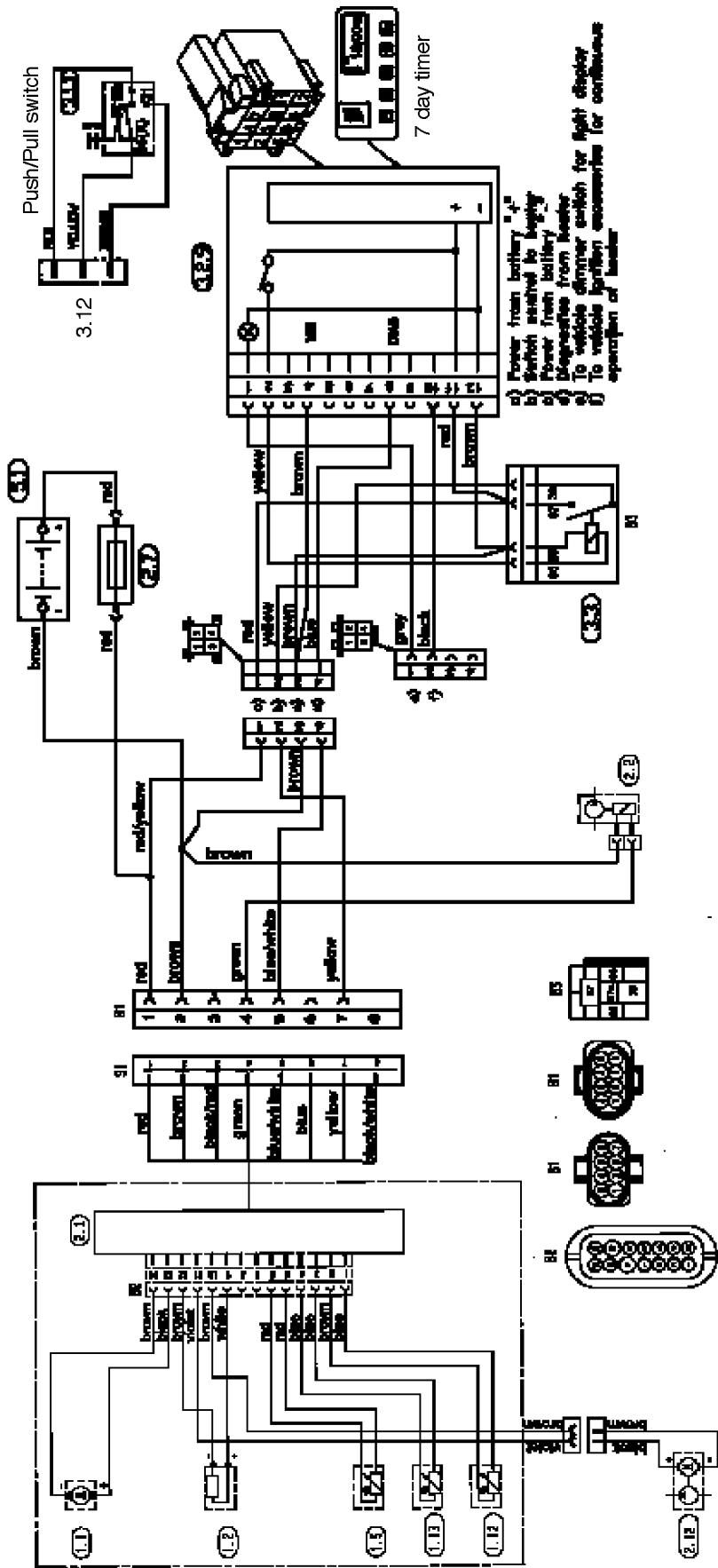
Also applicable to
 Hydronic 4 & 5 SC 12 volt
 Gasoline versions
 Model 20 1789 05
 Model 20 1791 05

- 1.1 Blower motor
- 1.2 Glow pin
- 1.5 Overheat sensor
- 1.12 Flame sensor
- 1.13 Temperature sensor
- 2.1 Control unit
- 2.12 Water Pump
- 2.2 Fuel metering pump
- 2.7 25 amp main fuse
- 3.12 Push/Pull switch
- 3.2.9 7 day timer
- 3.3 Timer load relay
- 5.1 Battery



Hydronic 5 S - 12 & 24 volt versions
 Diesel & Gasoline versions
 Model 25 2031 05
 Model 25 2100 05
 Model 20 1793 05
 Model 25 2009 05

- 1.1 Blower motor
- 1.2 Glow pin
- 1.5 Overheat sensor
- 1.12 Flame sensor
- 1.13 Temperature sensor
- 2.1 Control unit
- 2.12 Water Pump
- 2.2 Fuel metering pump
- 2.7 25 amp main fuse
- 3.12 Push/Pull switch
- 3.2.9 7 day timer
- 3.3 Timer load relay
- 5.1 Battery



Maintenance Troubleshooting & Repairs

Periodic Maintenance

- Check coolant hoses, clamps, and make sure all valves are open. Maintain the engine manufacturers recommended coolant level and ensure that the heater is properly bled after service on or involving the coolant system.
- Visual check of all fuel lines for leaks. Check and if necessary replace fuel filter inserts.
- Visual check of electrical lines and connections for corrosion.
- Run your heater at least once a month during the year (for a minimum of 15 minutes).
- Maintain your batteries and all electrical connections in good condition. With insufficient power the heater will not start. Low and high voltage cutouts will shut the heater down automatically.
- Use fuel suitable for the climate (see engine manufacturers recommendations). Blending used engine oil with diesel fuel is not permitted.
- Check the glow pin and replace if necessary

Troubleshooting

Basic Troubleshooting

In the event of failure there are several items which should be checked first before any major troubleshooting is done. **Check:**

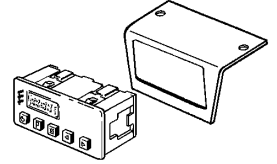
- Circuit breakers and fuses.
- Electrical lines and connections
- For interference in Combustion air and Exhaust pipes.
- That there is fuel in the tank.
- Battery voltage

Self Diagnostics

The heater is equipped with self diagnostic capability. You can retrieve information on the heaters last 5 faults using the Espar 7-day timer or Espar's Fault Code Retrieval Device.

7-Day Timer

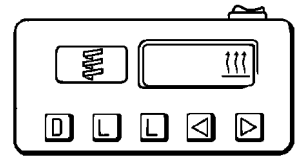
Espar's 7-day timer has a fault code retrieval device built into the unit. This function automatically activates if the heater is experiencing problems.



- Fault codes appear on the LCD display screen
- Codes can then be translated from the charts on the following pages.

Fault Code Retrieval Device

Equipment Face and Controls



Symbols seen on the display face are as follows:

AF Actual fault.

F1-F5 Up to five stored faults can be accessed. The AF and F1 are the same number.



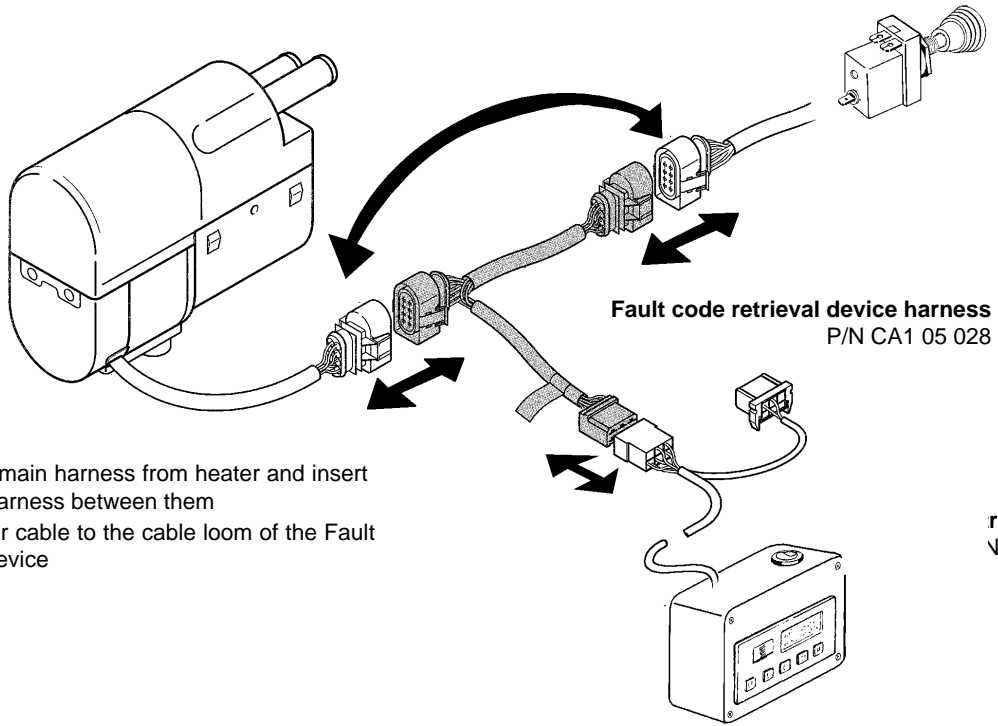
This sign is displayed when the heater is in operation.

DIAG The word (Diagnostic) will come on when the diagnostic number is requested.

000 Three digit diagnostic fault code number.

Instructions:

- Connect as shown on following page
- Switch the fault code retrieval device on and wait 10 seconds.
- Press the "D" button.
- Wait 3-5 seconds for the current fault code to appear (AF).
- To review the previous faults use the arrow buttons (F1= Most Recent, F5= Oldest).
- To erase the faults that are in memory press both "L" keys at the same time.
- See the fault code chart on following pages for code number descriptions.



Hook Up

- Disconnect the main harness from heater and insert adapter cable harness between them
- Connect adapter cable to the cable loom of the Fault code retrieval device

Test Values

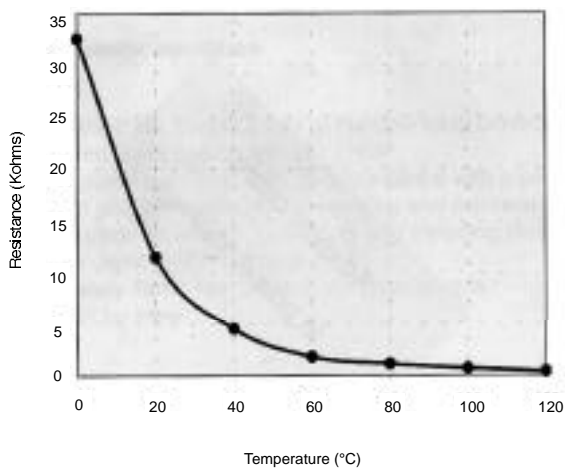
Resistance

| | |
|---------------|-------------|
| Metering pump | approx. 20 |
| Glow Pin | approx. 0.9 |

Checking the sensors

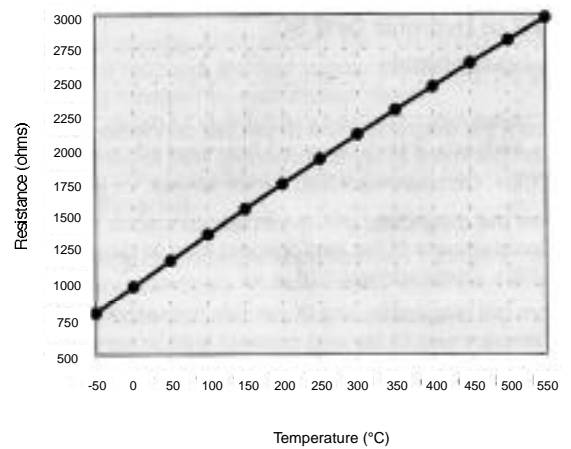
To check the sensors, measure the resistance at current temperature, see following diagrams

Temperature sensor
Overheating sensor



R > 2 = open circuit
R < 50 = short circuit

Flame sensor



R > 3400 = open circuit
R < 50 = short circuit



| Fault Code | Fault Description | Causes / Repair |
|------------|--|--|
| 000 | Normal Operation | |
| 010 | Overvoltage | Check voltage between terminals 1(red) and 2(brown) at connector. (B1). This must be less than 16 volts. Check battery, electrical leads and vehicle charging system. |
| 011 | Under voltage shut down | Check voltage between terminals 1(red) and 2(brown) at connector (B1). This must be greater than 10.2 volts Check battery, electrical leads and vehicle charging system. |
| 012 | Overheating | Check for possible causes of overheat (water circuit), Sensor. Check overheat switch resistance values. Temperature at temperature sensor or overheat sensor is greater than 125°C |
| 014 | Possible overheating detected (difference evaluation) | Difference of measured values at temperature sensor >15°C (min. 70°C water temperature and metering pump in operation); Check temperature sensor and overheating sensor, replace if necessary. Check values from previous page. |
| 015 | Too many overheats | Remove cause of over heat. Reset control unit using 7 day timer or fault code retrieval device to unlock control unit. Permanent overheating counter reading exceeded. Heating enable only possible by means of diagnostics system (press both "LL" keys simultaneously) |
| 017 | Overheating detected | Temperature at temperature or overheating sensor > 130 °C, emergency OFF if Fault Code 012 or 014 not applicable; check water circuit, check temperature sensor and overheating sensor; replace if necessary. See graph on previous page. |
| 020 | Open circuit - glow pin | Check glow pin and electrical leads for continuity, replace if necessary |
| 021 | Short circuit - glow pin | Check glow pin and electrical leads for continuity, replace if necessary |
| 030 | Combustion air blower motor | Blower impeller or electric motor may be jammed (frozen solid, dirty, etc.) Fix jam, replace electric motor if necessary |
| 031 | Combustion air blower motor | Check lead to combustion air motor for continuity, replace motor if necessary |
| 032 | Combustion air blower motor short-circuit | Check combustion air blower motor (electric motor); replace if necessary. Check power supply (chafed, corroded etc.) |
| 038 | Vehicle fan relay control break | Check electric lead to relay, fix break, replace relay if necessary For wiring harness (P/N CA1 60 401) without relay, replace harness |
| 039 | Vehicle fan relay control short circuit | Check electric lead to relay, fix break, replace relay if necessary For wiring harness (P/N CA1 60 401) without relay, replace harness |
| 041 | Water pump break | Check supply lead to water pump for continuity, remedy break, replace water pump if necessary |

| Fault Code | Fault Description | Causes / Repair |
|-------------------|---|--|
| 042 | Water pump short-circuit | Check supply lead to water pump for short circuit, check water pump, replace water pump if necessary |
| 047 | Short circuit - fuel metering pump | Check for wires for short to fuel metering pump. Test fuel metering pump. Replace if necessary |
| 048 | Open circuit - fuel metering pump | Check supply lead to metering pump for continuity, remedy break, replace if necessary |
| 050 | Too many no start attempts | Safety time counter reading exceeded. Reset control unit using 7 day timer or fault code retrieval device to unlock control unit |
| 051 | Faulty flame recognition | At start, if flame sensor is a above 70°C > 240 seconds; check exhaust gas and combustion air supply, check flame sensor, replace if necessary. For flame sensor values see graph on previous page |
| 052 | No start safety time exceeded | No flame detected on start attempt. Check fuel delivery and fuel supply, Check exhaust gas and combustion air ducts |
| 053 | Flame cutout in boost mode | Heater has started successfully the flame has extinguished. Check fuel supply. Check combustion air and exhaust flow. Check flame sensor resistance value. Replace flame sensor if necessary |
| 054 | Flame cutout in high mode | Heater has started successfully the flame has extinguished. Check fuel supply. Check combustion air and exhaust flow. |
| 056 | Flame cutout in low mode | Check flame sensor resistance value. |
| 060 | Open circuit - temperature sensor | Temperature sensor detects a value beyond it's range. Check connections. Check sensor resistance values between 11 and 12 at connector B2 > 2 M (if open circuit) |
| 061 | Short circuit - external temperature sensor | Check connections. Check sensor resistance values between 11 and 12 at connector B2 < 50 (if short circuit) Temperature sensor values on previous pages |
| 064 | Open circuit - flame sensor | Sensor is sensing value outside of range. Check connection leads. Resistance values between 13 and 14 at connector B2 > 3040 (if open circuit) |
| 065 | Short circuit - flame sensor | Check connection leads. Resistance values between 13 and 14 at connector B2 > 780 (if short circuit). Flame sensor values on page 17 |
| 071 | Open circuit - overheat sensor | Check connection leads. Resistance values between 9 and 10 at connector B2 > 2 M (if open circuit) |
| 072 | Short circuit - overheat sensor | Check connection leads. Resistance values between 9 and 10 at connector B2 < 50 M (if short circuit) |
| 090 | Control unit defect (internal fault) | Control unit malfunction due to interference voltage from vehicle electrical system; possible causes low batteries, charges, other sources of interference, eliminate interference voltages. Internal faults detected in microprocessor/ memory detected. Replace control unit |
| 092 | Control unit defective(ROM error) | |
| 093 | Control unit defective(RAM error) | |
| 097 | Control unit defective (power failure) | Internal failure. Replace control unit |

Fuel Quantity Test

The fuel Quantity should be tested if the heater has difficulty starting or maintaining a flame.

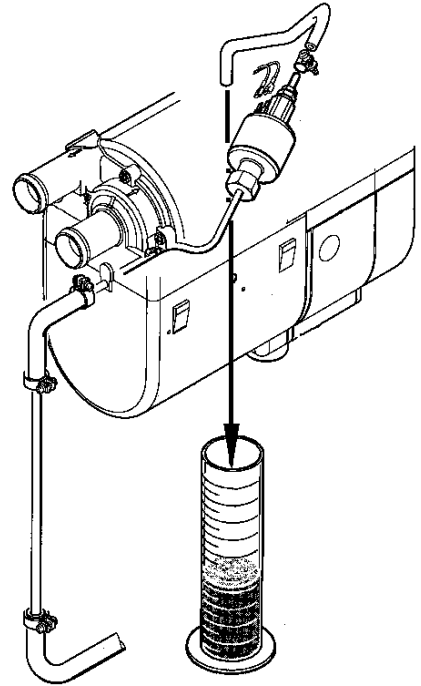
Note: Measure the fuel quantity when the battery is sufficiently charged. At least 11V and at most 13V should be applied at the control unit during measurement.

Preparation

- Remove metering pump cover in the cases of SC versions.
- Pull the fuel line off the combustion chamber and insert into a graduated measuring glass
- Switch the heater on, when fuel delivery is uniform (approximately 40 seconds after switching on), the fuel line is full and bled.
- Switch heater off
- Empty measuring glass and replace

Measurement

- Switch heater on
- Fuel delivery starts automatically approximately 40 seconds after switching on
- Hold the graduated measuring glass at the glow pin height during measurement
- After 90 seconds of fuel delivery, it will shut off automatically
- Switch heater off.
- Read off quantity of fuel delivery in the graduated measuring glass



Evaluation

| Nominal value | ← Diesel | Gasoline → | |
|----------------------------------|----------------------------------|-----------------------------------|--|
| Hydronic D4W SC | Hydronic D5W SC | Hydronic B4W SC | Hydronic B5W SC |
| 7.7 cm ³ / 90 seconds | 8.6 cm ³ / 90 seconds | 10.7 cm ³ / 90 seconds | 12.0 cm ³ / 90 seconds Max |
| 6.7 cm ³ / 90 seconds | 7.5 cm ³ / 90 seconds | 9.3 cm ³ / 90 seconds | 10.5 cm ³ / 90 seconds Min |

If measured quantity of fuel is over or under the nominal value, the metering pump must be replaced or fuel restriction eliminated

Repair Steps covered are for the Hydronic 4 & 5 SC versions - other models are similar

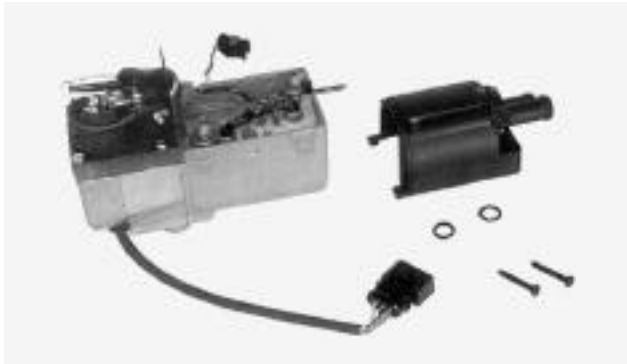
Disassembly / Assembly

- | | |
|--|--|
| <ol style="list-style-type: none"> 1 Cover, metering pump 2 Water pump, assembly 3 Metering pump and bracket 4 Cover, blower 5 Control unit and cover 6 Glow pin | <ol style="list-style-type: none"> 7 Flame sensor 8 Cable harness 9 Electric motor, complete 10 Combustion chamber with flame tube 11 Heat exchanger and jacket |
|--|--|

1 Cover, metering pump



2 Water pump assembly. When mounting, place O-rings on connection on water pump housing



3 Metering pump and bracket



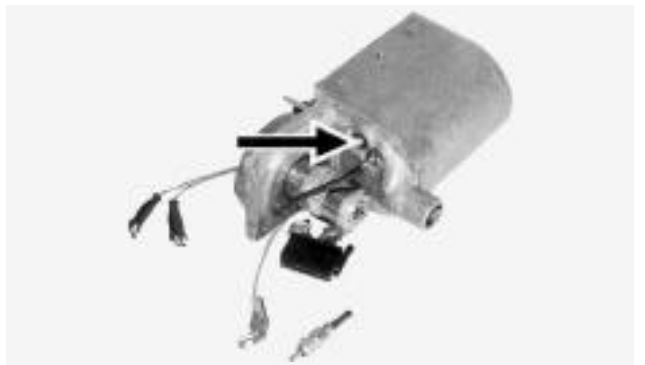
4 Cover, blower



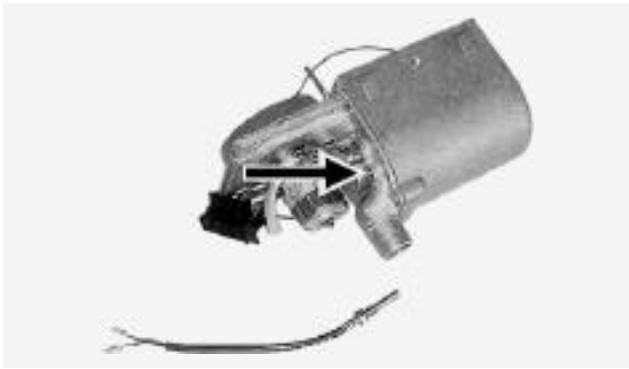
5 Control unit and cover



6 Glow pin



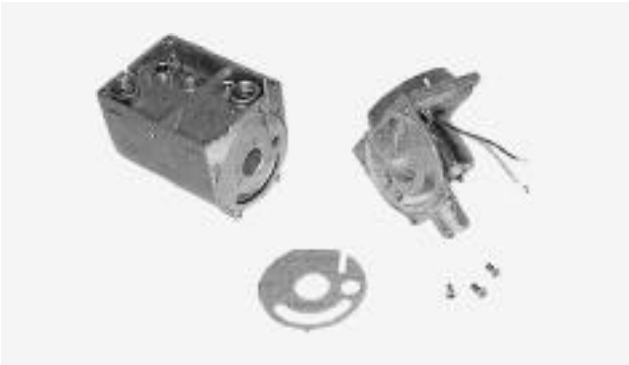
- 7 Flame sensor, For removal of tab receptacles, use AMP extractor tool



- 8 Cable Harness



- 9 Electric motor, complete



- 10 Combustion chamber with flame tube



- 11 Heat exchanger and jacket, Align slot on heat exchanger (arrow) with lug in jacket



Parts Diagram - Hydronic D4 / D5 SC - 12 & 24 volt - Diesel & Gasoline versions

Model 25 1917 01

Model 25 2098 05

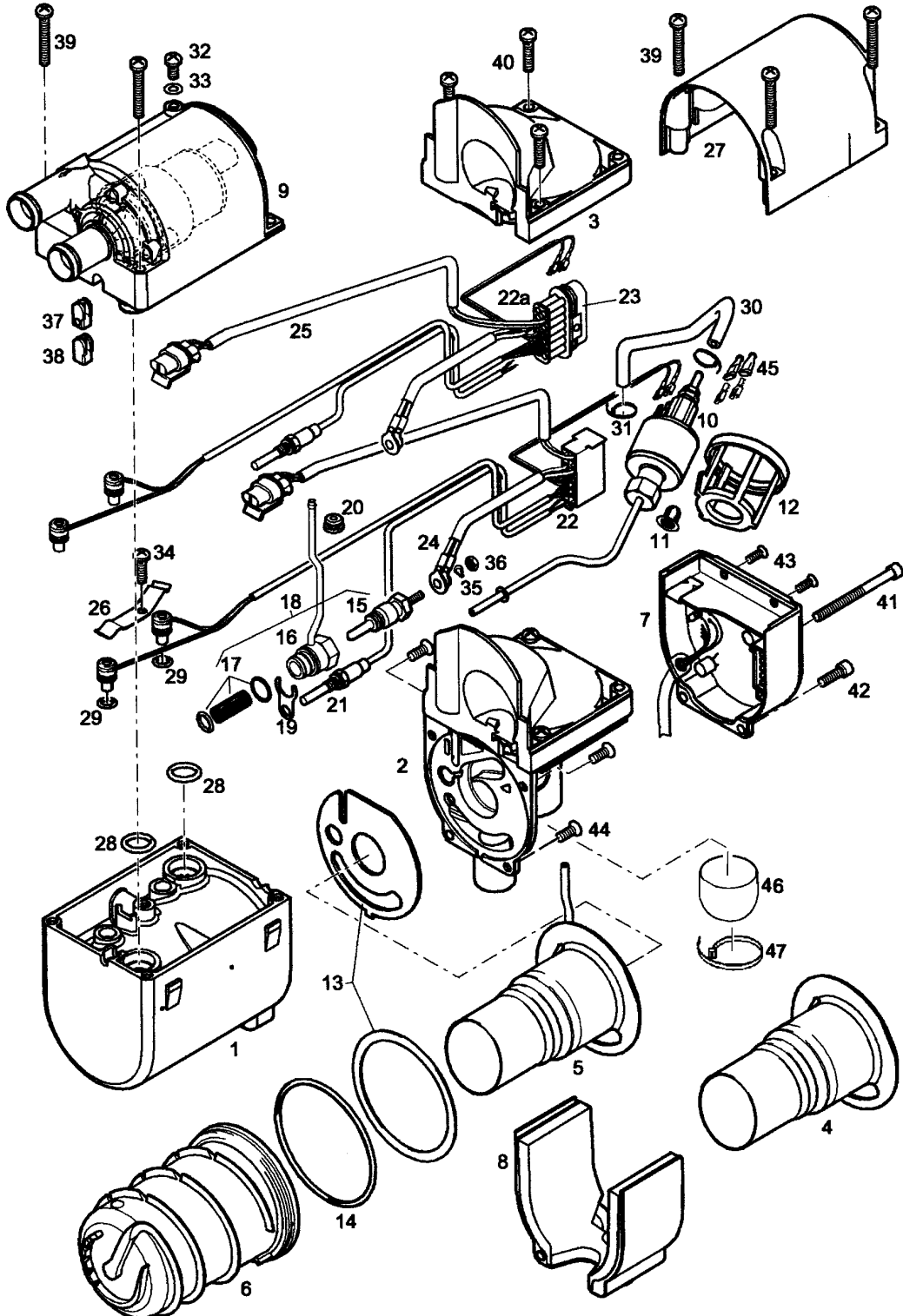
Model 25 2096 05

Model 20 1791 05

Model 25 20 1789 05

Model 22 2147 05

Model 25 1920 05





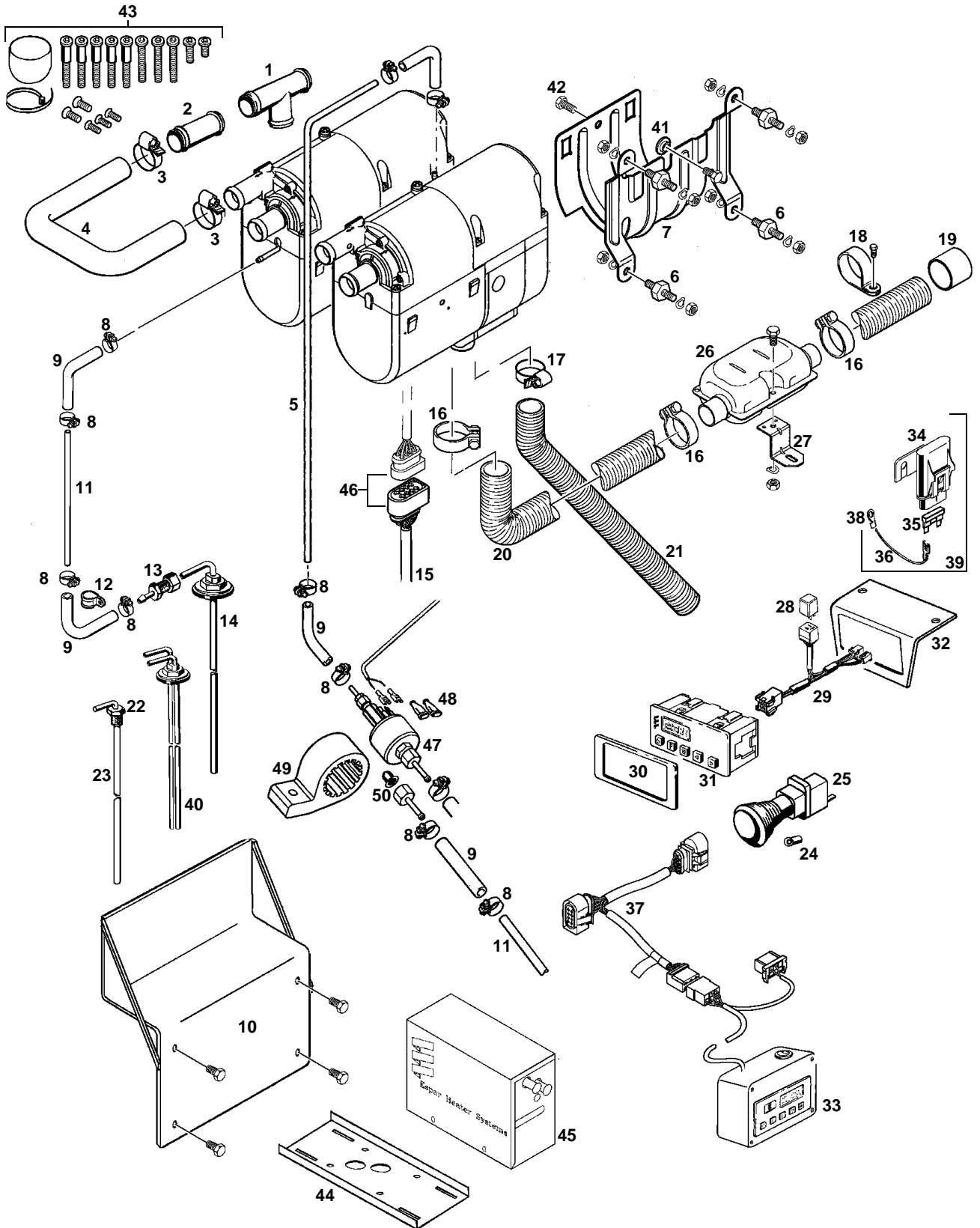
HYDRONIC 4 / 5 SC diesel & gasoline versions
Description & Part #'s

| Ref. No. | Description | Part Number | Model #'s | | | | | | |
|------------------|---------------------------------------|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 20 1789 05 12v | 25 1917 01 12v | 25 2096 05 12v | 20 1791 05 12v | 25 1920 05 12v | 25 2098 05 12v | 25 2147 05 24v |
| 1 | Outer casing | 25 1917 01 01 01 | • | • | • | | | | |
| | | 25 1920 01 01 01 | | | | • | • | • | |
| | | 25 1922 01 01 01 | | | | | | | • |
| 2 | Combustion air blower with cover | 25 1917 99 15 00 | | • | | | | | |
| | | 20 1759 99 15 00 | | | | • | | | |
| | | 25 1922 99 15 00 | | | | | • | • | |
| | | 25 2013 99 15 00 | | | • | | | | |
| | | 20 1774 99 15 00 | | • | | | | | |
| | | 25 2146 99 15 00 | | | | | | | • |
| 3 | Cover | 25 1917 01 00 02 | • | • | • | • | • | • | |
| | | 25 2137 01 00 02 | | | | | | | • |
| 4 | Burner | 20 1752 10 00 00 | • | | | | | | |
| | | 20 1759 10 00 00 | | | | • | | | |
| 5 | Burner | 25 1917 19 00 00 | | • | • | | | | |
| | | 25 1920 10 00 00 | | | | | • | • | |
| | | 25 2146 10 00 00 | | | | | | | • |
| 6 | Heat exchanger | 25 1864 06 00 01 | • | • | • | | | | |
| | | 25 1922 06 00 01 | | | | • | • | • | • |
| 7 | Control unit | 25 1917 51 00 04 | | • | | | | | |
| | | 25 1917 55 00 01 | | | | | • | | |
| | | 22 5201 00 20 01 | • | | | | | | |
| | | 22 5201 00 20 04 | | | | • | | | |
| | | 22 5201 00 10 01 | | | • | | | | |
| | | 22 5201 00 30 01 | | | | | | • | |
| 22 5202 00 10 03 | | | | | | | • | | |
| 8 | Cover (not available as a spare part) | 25 1752 99 01 03 | • | • | • | • | • | • | • |
| 9 | Water pump | 25 1917 99 25 00 | | • | | | | | |
| | | 25 1920 25 00 00 | | | | • | • | • | |
| | | 25 2096 25 00 00 | • | | • | | | | |
| | | 25 2118 25 00 00 | | | | | | | • |
| 10 | Fuel metering pump | 25 1917 45 00 00 | | • | • | | | | |
| | | 25 1920 45 00 00 | | | | | • | • | |
| | | 25 1942 45 00 00 | | | | | | | • |
| 11 | Strainer | 20 1312 00 00 06 | | • | • | | • | • | |
| 12 | Holder for fuel metering pump | 25 1917 01 00 07 | | • | • | | • | • | |
| 13 | Seal & gasket | 25 1864 99 00 21 | | • | • | | • | • | • |
| | | 20 1752 99 01 01 | | • | | • | | | |
| 14 | O-ring | 320 75 104 | • | • | • | • | • | • | • |
| 15 | Glow pin | 25 1864 01 10 00 | • | • | • | • | • | • | |
| | | 25 2107 01 10 00 | | | | | | | • |
| 16 | Glow pin connection | 20 1752 01 10 00 | • | | | • | | | |
| 17 | Lining and 2 O-rings | 20 1752 99 01 02 | • | | | • | | | |
| 18 | Plug connection complete | 25 2147 01 13 00 | | | | | | | • |
| 19 | Holder | 20 1752 01 00 04 | • | | | • | | | • |
| 20 | Sleeve | 20 1752 01 00 02 | • | | | • | | | • |

HYDRONIC 4 / 5 SC diesel & gasoline versions
Description & Part #'s

| Ref. No. | Description | Part Number | Model #'s | | | | | | |
|----------|--|--------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 20 1789 05 12v | 25 1917 01 12v | 25 2096 05 12v | 20 1791 05 12v | 25 1920 05 12v | 25 2098 05 12v | 25 2147 05 24v |
| 21 | Flame sensor | 25 1864 35 00 00 25 1920 35 00 00 | • | • | • | • | • | • | • |
| 22 | Overheat and temperature sensors with cable section including glow plug connector and main connector | 25 1917 01 17 00 25 1920 01 17 00 | | • | • | | • | • | |
| 22a | | 20 1753 01 17 00 25 2147 01 20 00 | • | | | • | | | • |
| 23 | Control unit plug waterproof, complete | 22 1000 30 10 10 | • | | • | • | • | • | • |
| 24 | Cable section for glow plug | 25 1922 01 18 00 25 1920 01 18 00 | • | • | • | • | • | • | • |
| 25 | Cable section water pump | 20 1752 01 18 00 20 1753 01 18 00 | • | • | • | • | • | • | • |
| 26 | Spring leaf | 25 1864 01 00 05 25 1922 01 00 05 | • | • | • | | • | • | • |
| 27 | Cover fuel metering pump | 25 1917 01 00 03 20 1752 01 00 03 | • | • | • | • | • | • | • |
| 28 | O-ring for coolant barbs 14 x 2,6 | 320 75 119 | • | • | • | • | • | • | • |
| 29 | O-ring for sensors 7.5 x 2 | 320 75 111 | • | • | • | • | • | • | • |
| 30 | Fuel hose | 25 1917 01 00 11 | | • | • | | • | • | • |
| 31 | Hose clip | 209 31 071 | | • | • | | • | • | • |
| 32 | Bleed screw | 25 1917 25 00 12 | • | • | • | • | • | • | • |
| 33 | Bleed screw washer | Hardware | • | • | • | • | • | • | • |
| 34 | Tapite screw | 109 10 104 | • | • | • | • | • | • | • |
| 35 | Spring washer | 171 22 112 | • | • | • | • | • | • | • |
| 36 | Hexagon nut | 110 10 024 | • | • | • | • | • | • | • |
| 37 | Sleeve | 25 1917 01 00 05 | | • | • | | • | • | • |
| 38 | Grommet | 20 1752 01 00 05 | • | | | • | | | |
| 39 | Hex bolt M5x35 | 109 10 027 | • | • | • | • | • | • | • |
| 40 | Hex bolt, M5x25 | 109 10 102 | • | • | • | • | • | • | • |
| 41 | Bolt | 100 10 300 | • | • | • | • | • | • | • |
| 42 | Hex bolt, M5x16 | 109 10 101 | • | • | • | • | • | • | • |
| 43 | Tapite screw M4x10 | 109 10 100 | • | • | • | • | • | • | • |
| 44 | Counter sunk screw | 102 10 400 | • | • | • | • | • | • | • |
| 45 | Rubber boots | 320 31 120 | | | • | | • | • | • |
| 46 | Plastic protective dust cover | CA0 00 073 | • | • | • | • | • | • | • |
| 47 | Cable tie | Hardware | | • | | | • | | |

Parts Diagram
HYDRONIC D4 / D5 accessories



| HYDRONIC 4 / 5 SC diesel & gasoline versions Description & Part #'s | | | Model #'s | | | | | | |
|--|---------------------------------|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 20 1789 05 12v | 25 1917 01 12v | 25 2096 05 12v | 20 1791 05 12v | 25 1920 05 12v | 25 2098 05 12v | 25 2147 05 24v |
| Ref. No. | Description | Part Number | | | | | | | |
| 1 | T-piece, 20mm | 20 1673 80 11 00 | • | • | • | • | • | • | |
| 2 | Connecting pipe | 20 1534 88 00 01 | • | • | • | • | • | • | |
| 3 | Clamp 20mm-32mm | 10 2065 02 00 32 | • | • | • | • | • | • | |
| 4 | Hose | 25 1917 80 00 01 | • | • | • | • | • | • | |
| 5 | 1.5m white plastic fuel line | 090 31 118 | • | | • | | | • | |
| 6 | Rubber mount | 20 1185 00 00 01 | • | • | • | • | • | • | |
| 7 | Heater bracket | 25 1864 80 00 01 | • | • | • | • | • | • | |
| 8 | Hose clamp 9mm | 10 2063 00 90 98 | • | • | • | • | • | • | |
| 9 | Fuel hose 3.5mm | 360 75 300 | • | • | • | • | • | • | |
| 10 | Bracket - class 8 truck | CA0 10 085 | • | • | • | • | • | • | |
| 11 | Fuel line 2mm | 090 31 117 | • | • | • | • | • | • | |
| 12 | Pipe clamp 10mm | 152 00 147 | • | • | • | • | • | • | |
| 13 | Fuel pipe reducer | CA0 12 092 | • | • | • | • | • | • | |
| 14 | Fuel pick up pipe 2mm ID | CA0 12 056 | • | • | • | • | • | • | |
| 15 | Main heater harness | CA1 60 401 CA1 60 503 CA1 60 502-001 25 1917 80 10 00 | • | • | • | • | • | • | |
| 16 | Exhaust clamp 27-30mm ID | 152 61 102 | • | • | • | • | • | • | |
| 17 | Intake hose clamp | 10 2064 01 60 25 | • | • | • | • | • | • | |
| 18 | C clamp 28mm | 152 10 051 | • | • | • | • | • | • | |
| 19 | End sleeve for exhaust | 25 1729 80 06 00 | • | • | • | • | • | • | |
| 20 | Exhaust hose | 360 61 299 | • | • | • | • | • | • | |
| 21 | Air intake hose | 360 00 099 | • | • | • | • | • | • | |
| 22 | Compression fitting | 1/4" NPT CA0 12 044 3/8" NPT CA0 00 031 1/2" NPT CA0 12 005 | • | • | • | • | • | • | |
| 23 | Custom straight pick up pipe | 16" length CA0 00 030 24" length CA0 12 053 | • | • | • | • | • | • | |
| 24 | Replacement bulb | 12V 207 00 005 24V 207 00 006 | • | • | • | • | • | • | |
| 25 | Push/pull switch | 12V CA1 00 003 24V CA1 00 004 | • | • | • | • | • | • | |
| 26 | Muffler | 25 1864 81 01 00 | • | • | • | • | • | • | |
| 27 | Muffler clamp | 20 1533 88 00 07 | • | • | • | • | • | • | |
| 28 | Relay | 12V 203 00 093 24V 203 00 092 | • | • | • | • | • | • | |
| 29 | Harness adapter for 7 day timer | CA1 60 008-001 | • | • | • | • | • | • | |
| 30 | 7 day timer bezel | 25 1482 70 01 00 | • | • | • | • | • | • | |



HYDRONIC 4 / 5 SC diesel & gasoline versions
Description & Part #'s

| Ref. No. | Description | Part Number | Model #'s | | | | | | |
|----------|---|------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | | 20 1789 05 12V | 25 1917 01 12V | 25 2096 05 12V | 20 1791 05 12V | 25 1920 05 12V | 25 2098 05 12V | 25 2147 05 24V |
| 31 | 7 day timer | 22 1000 30 36 00 | • | • | • | • | • | • | • |
| | 7 day timer with kit (harness & relay) | CA1 00 135 | • | • | • | • | • | • | • |
| | 7 day timer with kit (harness & relay) | CA1 00 136 | | | | • | | | • |
| 32 | Bracket for 7 day timer | CA0 10 061 | • | • | • | • | • | • | • |
| 33 | Fault code retrieval device | CA1 05 020 | • | • | • | • | • | • | • |
| 34 | Main fuse holder | CA1 07 001 | | • | • | | • | • | • |
| 35 | Fuse blade | 204 00 089 | | • | • | | • | • | |
| | | CA1 07 005 | | | | | | | • |
| 36 | Wire awg 12 gage red | CA1 61 908 | | • | • | | • | • | • |
| 37 | Retrieval harness for fault code device | CA1 05 028 | • | • | • | • | • | • | • |
| 38 | Ring terminal 3/8" awg 10-12 | CA1 90 014 | • | • | • | • | • | • | • |
| 39 | Fuse link power harness | CA1 65 108 | | • | • | | • | • | |
| 40 | Double pick-up (used with combo kits) | CA0 12 057-001 | • | • | • | • | • | • | • |
| 41 | Spacer | 25 1864 80 00 02 | • | • | • | • | • | • | • |
| 42 | Screw | CA3 00 103 | • | • | • | • | • | • | • |
| 43 | Replacement hardware kit | CA1 00 190 | | • | • | | • | • | |
| 44 | Cross frame mounting bracket | CA0 10 028 | • | • | • | • | • | • | • |
| 45 | Hydronic box Base | CA0 10 101 | • | • | • | • | • | • | • |
| | Hydronic box Lid | CA0 10 102 | • | • | • | • | • | • | • |
| 46 | Plug Cables Complete | 22 1000 30 10 21 | • | • | • | • | • | • | • |
| 47 | Fuel metering pump | 20 1645 45 00 00 | • | | | • | | | |
| | | 25 1942 45 00 00 | | | | | | | • |
| 48 | Boot sleeve | 320 31 120 | • | | | • | | | • |
| 49 | Fuel metering pump holder | 22 1000 50 03 00 | • | | | • | | | • |
| 50 | Fuel filter | 22 4502 00 01 00 | • | • | • | • | • | • | • |

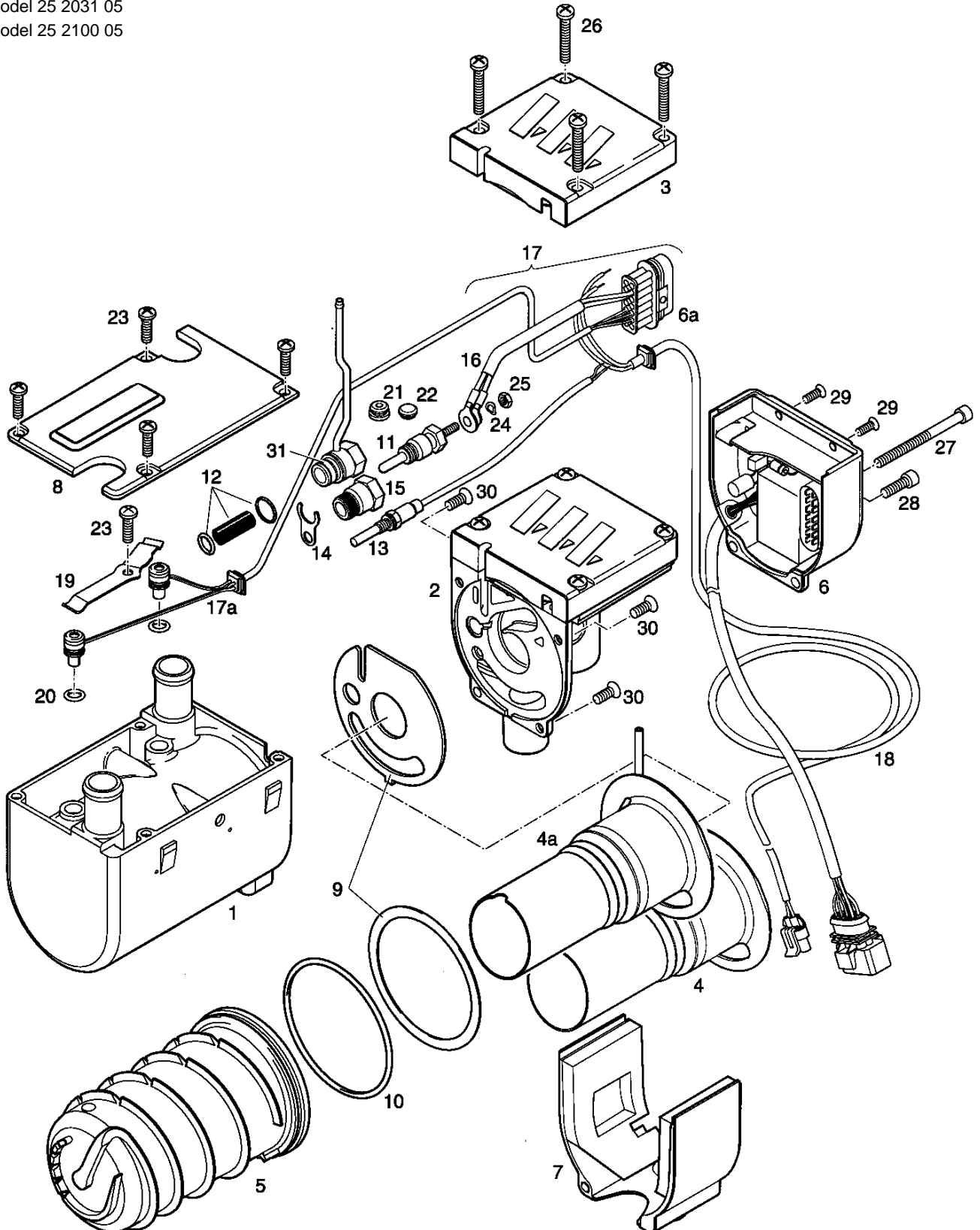
Parts Diagram - Hydronic D4 / D5 S - 12 & 24 volt - Diesel & Gasoline versions

Model 20 1793 05

Model 25 2009 05

Model 25 2031 05

Model 25 2100 05

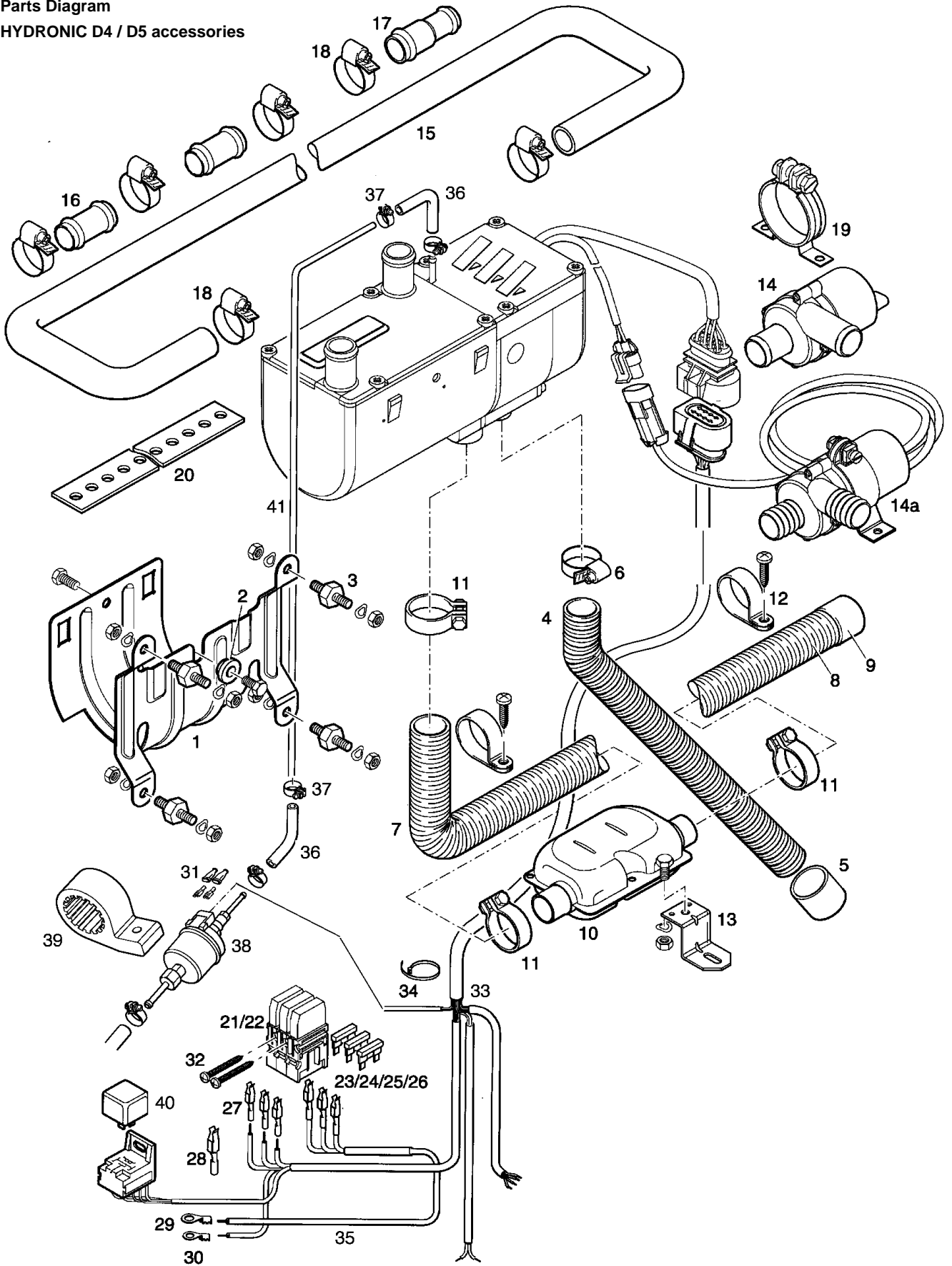




| HYDRONIC 4 / 5 SC diesel & gasoline versions | | Model #'s | 20 1793 05 12v | 25 2009 05 24v | 25 2031 05 12v | 25 2100 05 24v |
|--|----------------------------------|--|----------------|----------------|----------------|----------------|
| Description & Part #'s | | | | | | |
| Ref. No. | Description | Part Number | | | | |
| 1 | Casing | 25 1922 01 01 01 | • | • | • | • |
| 2 | Combustion air blower with cover | 25 1922 99 15 00 25 1922 99 16 00 25 1942 99 15 00 20 1759 99 15 00 | • | • | • | • |
| 3 | Cover | 20 1756 01 00 03 25 1864 01 00 04 | • | • | • | • |
| 4 | Burner | 20 1759 10 00 00 | • | • | • | • |
| 4a | | 25 1922 10 00 00 | • | • | • | • |
| 5 | Heat exchanger | 25 1922 06 00 01 | • | • | • | • |
| 6 | Control unit | 25 1917 55 00 08 25 1942 50 00 02 22 5201 00 30 02 22 5201 00 20 04 | • | • | • | • |
| 6a | Water proof plug | 22 1000 30 10 10 | • | • | • | • |
| 7 | Cover | 20 1756 99 01 02 | • | • | • | • |
| 8 | Heater cover plate | 25 1922 01 00 02 | • | • | • | • |
| 9 | Seal | 20 1752 99 01 01 25 1864 99 00 21 | • | • | • | • |
| 10 | O-ring | 25 1864 99 00 23 | • | • | • | • |
| 11 | Glow plug | 12V 25 1864 01 10 00 24V 25 1816 01 01 00 | • | • | • | • |
| 12 | Lining & 2 o-rings | 20 1752 99 01 02 | • | • | • | • |
| 13 | Flame sensor | 25 1920 35 00 00 | • | • | • | • |
| 14 | Holder | 20 1752 01 00 04 | • | • | • | • |
| 15 | Nipple | 25 1942 01 00 02 | • | • | • | • |
| 16 | Cable section | 25 1922 01 18 00 | • | • | • | • |
| 17 | Cable section | 25 1942 01 20 00 | • | • | • | • |
| 18 | Cable section | 25 2009 01 15 00 | • | • | • | • |
| 19 | Spring | 25 1922 01 00 05 | • | • | • | • |
| 20 | O-ring, 7x2 | 25 1864 99 00 30 | • | • | • | • |
| 21 | Sleeve | 20 1756 01 00 04 | • | • | • | • |
| 22 | Sleeve | N/A | | | | |
| 23 | Tapite Screw | 25 1864 99 00 24 | • | • | • | • |
| 24 | Spring washer | 171 22 112 | • | • | • | • |
| 25 | Hexagon nut | 110 10 024 | • | • | • | • |
| 26 | Tapite screw | 25 1864 99 00 28 | • | • | • | • |
| 27 | Cheese head screw | 25 1864 99 00 26 | • | • | • | • |
| 28 | Tapite screw | 25 1864 99 00 29 | • | • | • | • |
| 29 | Tapite screw | 25 1864 99 00 27 | • | • | • | • |
| 30 | Counter sunk screw | 25 1864 99 00 25 | • | • | • | • |
| 31 | Plug connection | 20 1756 01 10 00 | • | • | • | • |

Parts Diagram

HYDRONIC D4 / D5 accessories





| HYDRONIC 4 / 5 SC diesel & gasoline versions Description & Part #'s | | | Model #'s | | | |
|--|-------------------------------|----------------------|----------------|----------------|----------------|----------------|
| | | | 20 1793 05 12V | 25 2009 05 24V | 25 2031 05 12V | 25 2100 05 24V |
| Ref. No. | Description | Part Number | | | | |
| 1 | Holder | 25 1864 80 00 01 | • | • | • | • |
| 2 | Washer | 25 1864 80 00 02 | • | • | • | • |
| 3 | Metal rubber buffer | 20 1185 00 00 01 | • | • | • | • |
| 4 | Flexible tubing | 360 00 099 | • | • | • | • |
| 5 | End sleeve | 25 1688 80 12 01 | • | • | • | • |
| 6 | Hose clip | 10 2064 01 60 25 | • | • | • | • |
| 7 | Hose | 25 1774 80 02 00 | • | • | • | • |
| 8 | Flexible spiral tubing | 360 61 299 | • | • | • | • |
| 9 | End sleeve | 25 1729 80 06 00 | • | • | • | • |
| 10 | Exhaust muffler | 25 1864 81 01 00 | • | • | • | • |
| 11 | Pipe clip | 152 61 102 | • | • | • | • |
| 12 | Pipe clip | 152 10 051 | • | • | • | • |
| 13 | Clamp | 20 1533 88 00 07 | • | • | • | • |
| 14 | Water pump | 12V 330 00 012 | • | • | • | • |
| 14a | | 24V 25 2009 25 00 00 | • | • | • | • |
| 15 | Coolant hose | 25 1917 80 00 01 | • | • | • | • |
| 16 | Connection piece | 20 1534 88 00 01 | • | • | • | • |
| 17 | Connection piece | 20 1645 89 00 06 | • | • | • | • |
| 18 | Hose clip | 10 2064 02 00 32 | • | • | • | • |
| 19 | Fastening clip | 152 00 101 | • | • | • | • |
| 20 | Bracket with holes | 20 1568 88 00 02 | • | • | • | • |
| 21 | Bottom section of fuse casing | 204 31 004 | • | • | • | • |
| 22 | Cover | 204 31 005 | • | • | • | • |
| 23 | Fuse | 25 amp 204 00 089 | • | • | • | • |
| 24 | Fuse | 20 amp 204 00 087 | • | • | • | • |
| 25 | Fuse | 15 amp 204 00 081 | • | • | • | • |
| 26 | Fuse | 5 amp 204 00 079 | • | • | • | • |
| 27 | Twin leaf-spring contact | 206 73 058 | • | • | • | • |
| 28 | Twin leaf-spring contact | 206 00 199 | • | • | • | • |
| 29 | Eyelet | Hardware | • | • | • | • |
| 30 | Eyelet | Hardware | • | • | • | • |
| 31 | Sleeve | 320 31 120 | • | • | • | • |
| 32 | Screw | 108 10 318 | • | • | • | • |
| 33 | Cable harness | 25 2009 80 10 00 | • | • | • | • |
| | | 25 1917 80 10 00 | • | • | • | • |
| 34 | Cable tie | 25 1801 80 02 00 | • | • | • | • |
| 35 | Cable | 20 1668 80 05 00 | • | • | • | • |
| 36 | Hose | 360 75 300 | • | • | • | • |
| 37 | Hose clip | 10 2063 00 90 98 | • | • | • | • |

| HYDRONIC 4 / 5 SC diesel & gasoline versions | | | Model #'s | | | | |
|--|----------------------|-----|------------------|----------------|----------------|----------------|----------------|
| Description & Part #'s | | | | | | | |
| Ref. No. | Description | | Part Number | 20 1793 05 12v | 25 2009 05 24v | 25 2031 05 12v | 25 2100 05 24v |
| 38 | Fuel metering pump | 12V | 20 1645 45 00 00 | • | | • | • |
| | | 24V | 25 1942 45 00 00 | | • | | |
| 39 | Metering pump holder | | 22 1000 50 03 00 | • | • | • | • |
| 40 | Relay | 12V | 203 00 065 | • | | • | • |
| | | 24v | 203 00 066 | | • | | |
| 41 | Fuel line | | 090 31 118 | • | • | • | • |

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