CAMPER VAN FUEL INSTALLATION



Fuel Installation Practices and Fault Codes For Camper Van Installations

For Additional Product Information Please Refer to the Product Catalogue or visit our Partner Portal at https://partner.eberspaecher.com

Introduction

The purpose of this document is to outline the best practices for the installation of the fuel system for a Camper Van Heater Application. This document will also outline the more common fault codes as well as some troubleshooting steps. These practices apply for Airtronic Heaters as well as Hydronic Heaters.

Caution!

Do not use the auxiliary fuel connection located on the vehicle body or fuel sending unit as the main fuel connection unless otherwise stated. This connection can cause excessive fuel cavitation and heater no starts at higher elevation. The Eberspaecher fuel line may be inserted into the auxiliary fuel port or the proper fuel pickup pipe can be installed directly into the fuel sending unit. (See Page 3).

Fuel Connection

Setup

There are three main methods for fuel system installation. The method used depends on the preference of the installer and make of the vehicle. Most methods would require slight modification to the fuel sending unit. Below is a list of Eberspaecher components that would cover the methods.

Part Number	Description	Quantity	Used By Method
20.2900.20.0050	Plastic Fuel Line 2 mm (0.08 in) ID x 2M (6.5 ft)	1	1, 2
22.1000.20.3000	Fuel Line Adaptor 7.5 mm (0.3 in) to 5mm (0.2 in)	1	1, 2
10.2068.01.1098	Clamp 11 mm (0.4 in)	2	1, 2
22.1000.20.1600	Fuel Pickup Pipe	1	3
22.1000.20.4500	Easy Fix Tank Connection	1	3

Method 1 – Quick Connect Fitting – Mercedes Sprinter Only

This method is for the Mercedes Sprinter only. A quick connect fitting can be installed on to the fuel sending unit. The recommended fitting is provided by Dorman, part number is 800-188. An image of the fitting is below. Please note, if no fuel line is connected to the auxiliary fuel port inside the sending unit, Method 2 would have to be used.



Dorman Quick Connect Fitting

Preparation

- Gather the Dorman quick connect fitting, fuel line adaptor, 11 mm (0.4 in) clamps, and Eberspaecher fuel line

Steps for Installation

- Access the fuel sending unit on the vehicle.
- Locate the auxiliary fuel connection and remove the fitting/cover.
- Attach quick connect fitting (4) to port.
- Insert fuel line adaptor (3) onto quick connect fitting (4), secure with a clamp (2).
- Insert fuel line (1) into other side of fuel line adaptor (3), secure with a clamp (2).
- The assembly would appear similar to the below image

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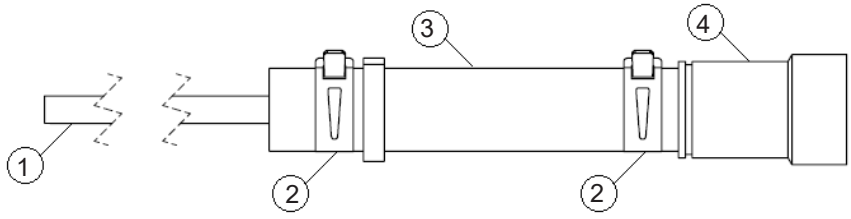


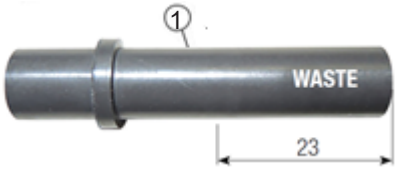
1 Eberspaecher Fuel Line 2 Clamps 3 Fuel Line Adaptor 22.1000.20.3000 4 Quick Connect Fitting

Method 2 – Fuel Line Insertion – Most Camper Van Models

For other camper van models, to access the fuel tank a fuel line can be inserted into the auxiliary fuel port on the fuel sending unit. Please see picture below

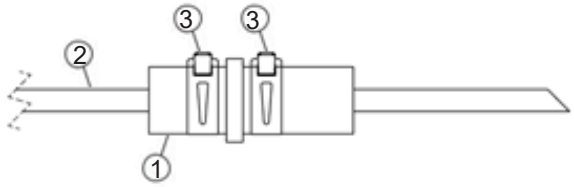
Preparation

- Cut 23 mm (0.9 in) off from the 7.5mm (0.3 in) side of the fuel line adaptor (1).



1 Fuel Line Adaptor
22.1000.20.3000

- Cut a 45° angle at the end of the Eberspaecher fuel line (2).
- Insert cut end into fuel line adaptor (1) and place the clamps (3) on either side of the adaptor. See the image below.



1 Fuel Line Adaptor
22.1000.20.3000

2 Eberspaecher Fuel Line

3 Clamps

Steps for Installation

- Access the fuel sending unit on the vehicle.
- If applicable, drop the fuel tank and remove the fuel sending unit as per manufacturer's documentation.
- Locate the auxiliary fuel connection port and remove the fitting/cover.
- Feed fuel line (2) through port and secure.
  - If opening is too small, use an 11/64 in drill bit to open up the port.
- Feed fuel line into port until it reaches the bottom of the fuel sending unit. Secure the fuel line to the fuel sending unit with a nylon zip tie.





Note: Eberspaecher Europe offers a fitting that can be used instead of the Fuel Line Adaptor. The fuel line is still to be fed through connector.

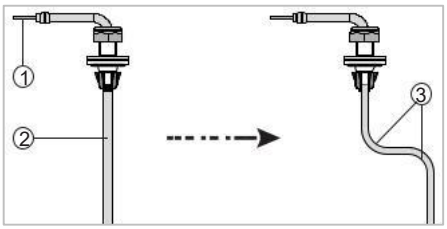
Method 3 – Fuel Pickup Pipe or Easy Fix Connection – Most Camper Van Models

A fuel pickup pipe (PN 22.1000.20.1600) or the Eberspaecher Easy Fix Connection (PN 22.1000.20.4500) can also be installed into the fuel sending unit to draw fuel from the tank. Using this method requires drilling a hole into the fuel sending unit housing.

Note The Easy Fix Connection is only compatible with plastic 2.8 mm to 3.5 mm (0.11 in to 0.14 in) thick.

Preparation

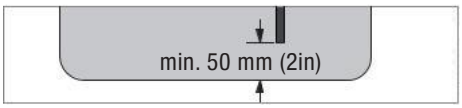
- Determine the depth of the tank and cut the pickup pipe or Easy Fix Connection to length. The recommended minimum distance is 50 mm (2 in) from the bottom of tank. The pickup pipe can be bent to fit the application, bend carefully with the plastic core: max. 2 bends, each with min. 10 mm (0.4 in) bending radius are allowed.



1 Plastic core
2 Riser
3 Bends: max. 2, min. radius 10 mm (0.4 in)

Note

Minimum distance from the end of the riser to the bottom of the tank: approx. 50 mm (2 in)

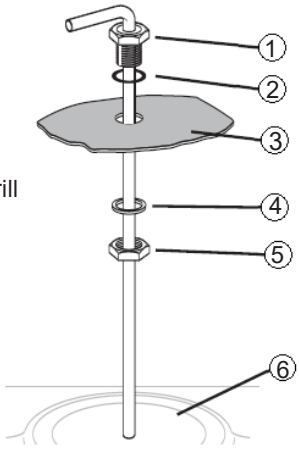


Steps for Installation

- Locate the fuel sending unit on vehicle.
- If applicable, drop the fuel tank and remove fuel sending unit as per manufacturer's documentation.
- On the underside of the fuel sending area, locate an open area.
- Drill 8 mm (0.3 in) hole into housing. If using the Easy Fix Connection, Use the enclosed drill bit to drill a 9.5 mm (0.37 in) hole into the housing.
- Insert pickup pipe into hole and secure with nut.
- Pull the plastic core out of the fuel pickup pipe or Easy Fix Connection. If the plastic core cannot be removed investigate fuel pickup pipe or Easy Fix Connection for bends, kinks or damage.

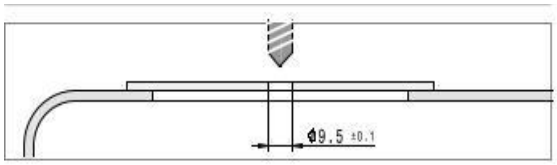
Note

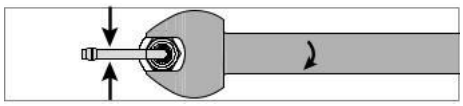
- Max. drill speed: 500 revolutions/min.
- Do not interrupt the drilling process and do not switch off the drill until after the drill bit has been pulled out of the drill hole, this prevents chips from falling into the fuel tank.
- Redrilling or deburring the edges is not allowed.
- Directly after drilling, insert the tank connection carefully into the hole and press in. The flange (1) and washer (2) must be positioned at the top on the threaded bushing (3). Make sure that the O-ring (4) is positioned correctly.
- Ensure the fuel pickup pipe or Easy Fix Connection is in the desired orientation before securing.
- Once the fuel pickup pipe or Easy Fix Connection is in the desired orientation tighten the nut M8 using an open-ended wrench until it stops. Tightening torque: 2.5 ±0.2 Nm (22 ±1.77 in-lbs).

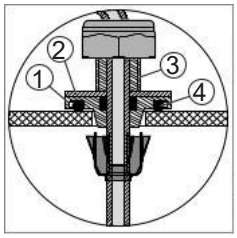


1 Fuel Pickup Pipe
2 Rubber Seal
3 Fuel Sending Unit
4 Washer Seals
5 Lock Nut
6 Fuel Tank

Fuel Pickup Pipe: PN 22.1000.20.1600







1 Flange
2 Plain washer
3 Threaded bushing
4 O-ring

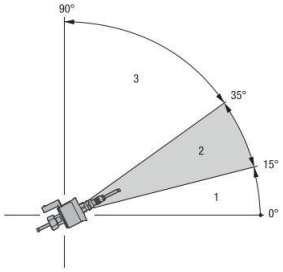
Note

When tightening the nut the fuel pickup pipe is moved upwards. Due to the pressure, the O-rings form a fuel-tight seal on the top of the tank fitting. The end position is reached when minimum of two threads are exposed above the nut and the flange (1) rests against the tank fitting (6) without a gap.

Easy Fix Connection: PN 22.1000.20.4500

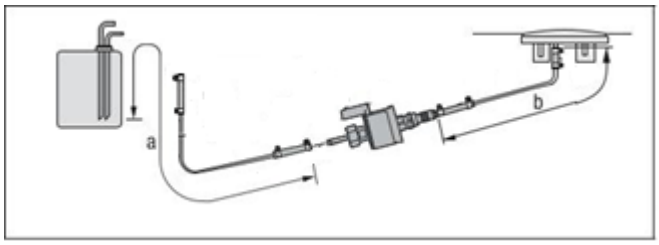
Fuel Line Installation

When installing the fuel line there are a few system requirements to consider.



Fuel Pump Orientation
Always install the fuel metering pump (FMP) with the pressure side angled upwards.
The FMP must be mounted between 15° and 35°.

Fuel Line Specifications
The following image depicts an example of a complete fuel line assembly.



Recommended Fuel line lengths

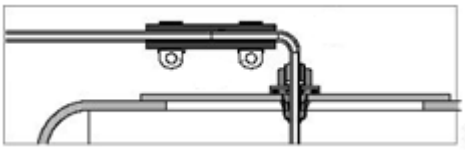
Intake Side	
Airtronic D2/D2L/B2L	a = max 2 m (6.6 ft)
Airtronic B4/D4/B4L/D4L	a = max 2 m (6.6 ft)
Pressure side	
Airtronic D2/D2L/B2L	b = max. 6 m (19.7 ft)
Airtronic B4/D4/B4L/D4L	b = max. 6 m (19.7 ft)

Recommended Fuel line Inner Diameter

Diesel heaters	Gasoline heaters
Pressure Side: 2 mm (0.08 in) ID	Pressure Side: 1.5 mm (0.06 in) ID
Suction Side: 2 mm (0.08 in) ID	Suction Side: 2 mm (0.08 in) ID

Connecting the Fuel Line

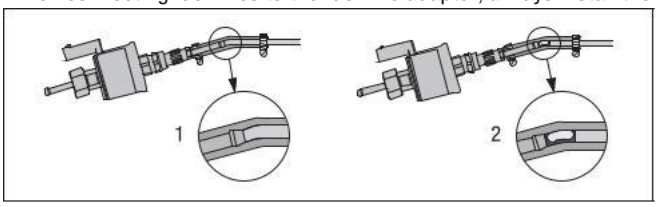
At the open end of the fuel pickup pipe connect the fuel line adaptor and fuel line, use banded hose clamps to secure the adaptor. The additional adaptor and clamps are included in the heater installation kit.



Connect the fuel line to the suction side of the fuel pump.
Repeat for the connections to the pressure side of the fuel pump and the inlet of the heater.

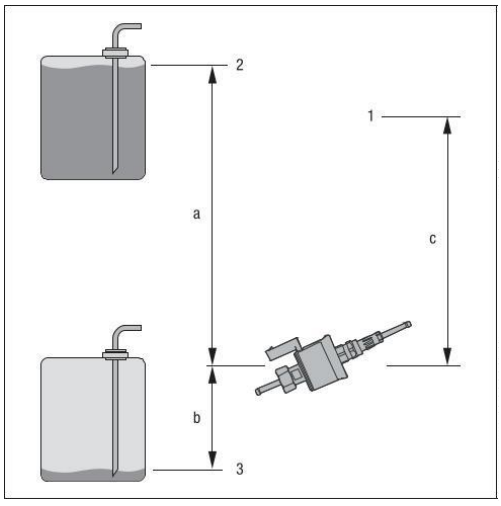
Note

- Never route or fasten the fuel lines directly along the heater or vehicle exhaust system. Damage or vapor lock may occur. Ensure there is enough tolerance (25mm or 1in). If necessary, install heat shielding.
- When connecting fuel lines to the fuel line adaptor, always install the fuel lines with a butt joint to prevent any bubbles from forming.



1 Correct connection
2 Incorrect connection– bubbles form

Allowable suction and pressure head of the metering pump



1 Connection at the heater
2 Max fuel level
3 Min fuel level

Pressure head from vehicle tank to metering pump:
a = max. 3000 mm (118 in)
Suction head in pressure-less vehicle tank:
b = max 1000 mm (39 in) for diesel
b = max 500 mm (19 in) for gasoline

Error Codes

Camper Van Applications can experience more Error codes due to the possible complexity of their electrical system. Please see the below for some common fault codes, descriptions and troubleshooting information.

On the Easy Start Pro controller a service message is displayed when an error code is logged. Most common service message displayed is "**H1: Service**". The detailed Error codes must be read through the workshop menu of the Easy Start Pro.

To open the workshop menu, select the Settings menu and then hold the back button pressed for longer than 2 seconds while the clock symbol under the gear wheel is flashing. The display will change and then say "workshop" on the top of the screen..



Using the controller knob navigate to the "Error Memory" option. Select "H1" and then "Read" to read the detailed heater error codes.



Heater Error Codes

The below list contains common heater error codes, the descriptions that are displayed on the Easy Start Pro Controller and the troubleshooting steps

Fault Code	Description	Controller Description	Troubleshooting
P000301 **P000302** **P000303** **P000304** **P000305** **P000306** **P000307** **P00030A**	- Watchdog reset - Too Many Watchdog Resets - Operating lockout: Too Frequent Output Stage Errors - Too Many Resets (Loose Contact) - Control Box Not Calibrated - Second Cutout Circuit Is Defective - CAN Communication Error In Control Unit - CAN Communication Error	H1: Service	Delete errors and turn on the heater. It is often that the code does not repeat and heater is ready for operation. If code repeats: - Voltage fluctuation may cause these errors. Check which battery is used to power the heater. If a lithium-ion battery is used, try connecting directly to the vehicle battery or an AGM battery - Check for continuity on CAN bus wires, blue/red wire (Pin 1 on main connector) and blue/black wire (Pin 3 on main connector) and measure the resistance. Measurement should read 60 ± 2 Ω - If resistance is 120 ± 4 Ω check for the grey resistor cap installed on the CAN bus harness near the controller. - If the resistor cap is present harness inspect all connections to ensure there is no damage to the connectors
P000310 **P000311**	- Control Box Cutout Due to Overvoltage - Heater Cutout Due to Overvoltage	H1: Overvoltage	- Unplug main connector at the heater. - Measure voltage between red wire (pin 4 on main connector) and brown wire (pin 2 on main connector). - For Airtronic 12 volt, if voltage greater than 16 V, check power supply - For Airtronic 24 volt, if voltage greater than 32 V, check power supply - Check the battery for damage
P000312 **P000313**	- Control Box Cutout Due to Undervoltage - Heater Cutout Due to Undervoltage	H1: Undervoltage	- Unplug main connector at the heater. - Measure voltage between red wire (pin 4 on main connector) and brown wire (pin 2 on main connector). - For Airtronic 12 volt, if voltage is less than 10 V, check power supply - For Airtronic 24 volt, if voltage is less than 21 V, check power supply - Check the battery for damage

Heater Error Codes Continued

Fault Code	Description	Controller Description	Troubleshooting
P000330 **P000331** **P000332** **P000342** **P000390**	- ROM Error - RAM Error - NVMEM Error - Invalid Configuration - ADR Button – Short Circuit	H1: Service	Delete errors and turn on the heater. Most of the time the code does not repeat and heater is ready for operation. If code repeats: - Measure for voltage drops when the heater starts and running - Unplug main connector at the heater. - Measure voltage between red wire (pin 4 on main connector) and brown wire (pin 2 on main connector). - For Airtronic 12 volt, if voltage is less than 10 V, check power supply - For Airtronic 24 volt, if voltage is less than 21 V, check power supply - Check the battery for damage - Measure CAN bus harness resistance ((Pin 1 and 3on main connector, measurement should read 60 ± 2 Ω) - Identify if the CAN bus harness is routed to near anything that would emit frequency interference - Run heater independent of the vehicle to isolate any issues from heater side - For 342 code contact dealer to Reflash ECU and Reflash Easy Start Pro controller. If error occurs again, replace control unit
P000440	- Communication Timeout With Control Unit	None	- Delete errors and disconnect heater from the power supply - Reset controller timer

Controller Error Codes

To read the controller codes one would select "Control Unit" within "Error Memory" of the "Workshop Menu". Below is a list of common controller error codes for air heaters and the troubleshooting steps

Fault Code	Description	Controller Description	Troubleshooting
P001700	Lack of devices on CAN Network (Easy Start Pro is unable to communicate with heater.)	No Heater	- Check for continuity on CAN bus wires, blue/red (Pin 1 on main connector) and blue/black (Pin 3 on main connector) and measure the resistance. Measurement should read 60 ± 2 Ω - If resistance is 120 ± 4 Ω check for the grey resistor cap installed on the CAN bus harness near the controller. - If the resistor cap is present harness inspect all connections to ensure there is no damage to the connectors.
P001701	Change of Devices on CAN Network (Easy Start Pro sees heater as new unit and requires the set up process to be repeated.)	Mismatch	This code can be caused by sudden power loss within the system. On the controller there will be a prompt to regroup which will go through the controller initial set up. Set date, time etc. accordingly.
P001706	Push Button Jammed	Rotary Knob Jammed Pushbutton Jammed	This code can be caused by holding the push button to long. If controller remains operational, clear codes and heater remains operational. If controller can not be operated perform power rest. If the code persists, replace the controller.
P001707	Internal Temperature Sensor Defective	Int. Temp. Sensor Defective	This code can be caused by sudden power loss to the controller. Clear codes and heater may remain operational. If code persists, perform factory rest of controller. This can found within the 'Workshop" menu.