



25AG AIR HEATER



Technical Description

Installation Instructions

Operating Instructions

Troubleshooting

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Introduction

Thank you for purchasing our 25AG heater.

The 25AG heater is designed to provide cabin heating for trucks, off-highway equipment and RVs by using on-board gasoline fuel and battery systems. Operation is simple and the heater provides a safe and reliable alternative to engine idling or need for electrical plugins.

Please take a moment to familiarize yourself with this manual, safety warnings and heater requirements before installing or operating your heater.



Heater Warnings

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.

■ Warning - Installation Hazards

- The installation of this kit requires trained decision making concerning locating and integrating components, tying components together, rerouting, or relocating OEM components, etc. It is impossible to describe all of the safety and operational considerations in the installation instructions, therefore, the technician must exercise professional judgment to achieve a safe and quality installation.
- 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 Hazards

- Heater must be turned off while re-fueling.
- Do not install heater in enclosed areas where combustible fumes may be present.

■ Warning - Fire Hazards

- Exhaust pipe must maintain a minimum a distance of 50mm (2") from any flammable or heat sensitive material.
- Ensure there are no leaks in the fuel system.

■ Warning - Asphyxiation Hazards

- Ensure that exhaust fumes cannot enter passenger compartments.
- The heat exchanger should not be used for more than 5 years. After expiration, it must be replaced with genuine parts and replaced by the heater manufacturer.

■ Warning - Burn Hazards

- Exhaust pipe will become very hot during heater operation.
- Avoid touching exhaust pipe during operation.
- Route exhaust pipe in a manner to shield it from anyone making contact with it.

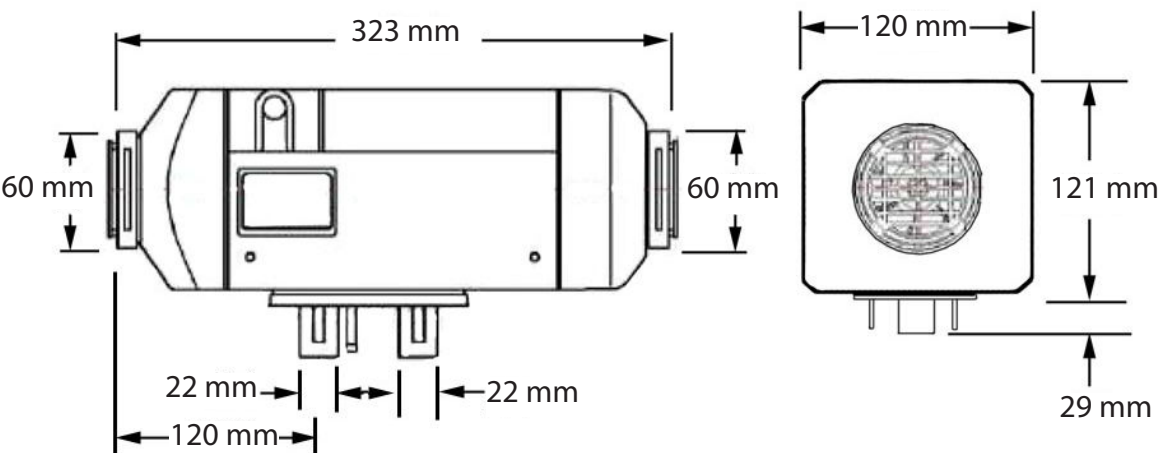
Caution - Operational Considerations

High Altitudes

This heater is designed to operate continuously at altitudes from 0 to 5,000 m (16,404') above sea level. Operating in altitudes above this may plug the heater with soot and result in combustion failure.

Specifications

Principal Dimensions




Performance Specifications		
Heating Mode	High Range	Low Range
Heating Capacity kW/hr (BTUs/hr)	2.0 (6,824)	1.0 (3,412)
Fuel Consumption L/hr (US Gal/hr)	0.27 (0.07)	0.14 (0.04)
Air Flow M ³ /min (CFM)	1.19 (42)	0.47 (16)
Power Consumption - watts	29	14
Power Consumption at Start - watts	≤ 100	
Fuel Type	Gasoline	
Operating Altitude	0 to 5,000 m (16,404')	
Nominal Voltage	12 Volt	
Lower Voltage Limit	10 Volts over 20 seconds	
Upper Voltage Limit	15.0 Volt over 20 seconds	
Overheat Protection	115° C (239° F)	
Allowed Ambient Temperature	-40° C to 50° C (-40° F to 122° F)	
Weight	2.6 kg (5.7 lbs)	
Overall Dimensions	Length: 323 mm (12.7") Width: 120 mm (4.7") Height: 121 mm (4.7")	


Above Specifications (± 10%)

Heater Kit List

	QTY 1	Description 2 kW Air Heater	Part Number P25A-T888
	QTY 1	Description Operating Switch	Part Number P65A-X388
	QTY 1	Description Heater Mounting Plate & Seal	Part Number U65A-X702
	QTY 1	Description Wiring Harness 4.5M (15') Power Harness, 20A Fuse 6M (20') Switch Harness 4.5M (15') Fuel Pump Harness	Part Number P65A-X304 P65D-X303
 	QTY 1 1	Description 22mm Flexible Stainless Steel Exhaust, with End Cap 22mm Combustion Air Intake Tube, 1M with End Cap	Part Number U65D-X519 U65D-X522
    	QTY 1 1 4 1	Description 60mm Hot Air Ducting 1M (3') Length 60mm Air Outlet with Adjustable Vent 60mm Air Inlet 60mm Hose Clamps	Part Number U20A-X603 U20A-X602 U20A-X601 U20A-X604

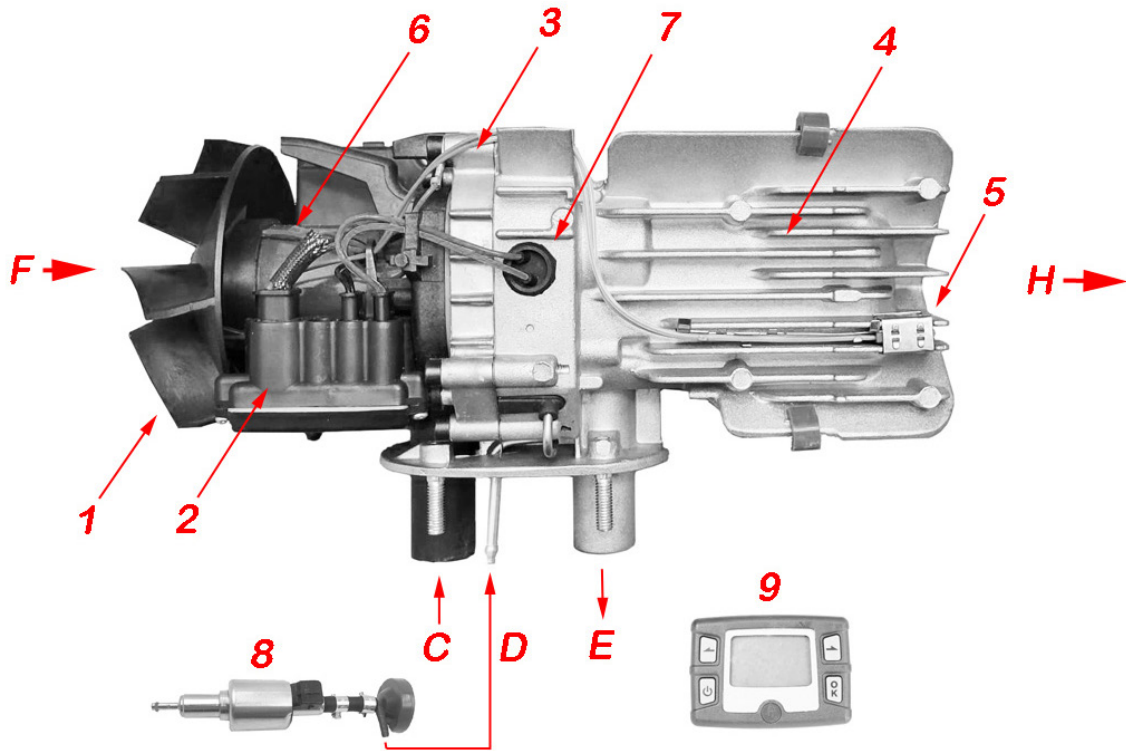
Heater Kit List

	QTY	Description	Part Number
	1	Fuel Metering Pump	P25A-T410
	1	Fuel Pump Holder	U65D-X407
	1	Black Rubber Fuel Line, 4.5mm ID x 0.5M	U65D-X414
	6	4.5mm ID x 50mm Fuel Line Connectors	U65D-X409
	1	Clear Nylon Fuel Line, 8M (26'), 1.5 - 2.0 mm ID	U65D-X403
	12	Small Fuel Line Clamps, 9-11 mm x 9mm wide	U65D-X401
	1	Fuel Filter	U65D-X402
	10	Cable Ties, Medium Grade, Black, 20cm	U65D-X705
	1	Plastic Tee	NPN
	2	Large Fuel Line Clamps, 12-14 mm x 9mm	NPN
	1	One Way Check Valve	NPN

	QTY	Description	Part Number
	1	Exhaust Clamp, 24 - 26 mm	U65D-X505
	2	25mm "P" Routing Clamp	U65D-X712
	1	"Z" Mounting Bracket (See Specs and Drawing)	U65D-X707
	2	"L" Brackets (See Specs and Drawing)	U65D-X706
	1	Combustion Air Tube Clamp	U65D-X702
	7	TEKS Mounting Screws 1/4" - 14 x 1 1/2"	NPN
	6	M6-1 x 25 Hex Head Screw, Grade 8 Zinc Plated	NPN
	10	M6-1 Hex Nuts - Grade 8, Zinc Plated	NPN
	10	6mm Wave Washers	NPN
	8	#8 x 20mm, Self Drilling, Phillips Head Cap	NPN

Main Components and Operating Concept

Main Components



1) Process Air Blower	6) Blower Motor	C. Combustion Air
2) Control Unit	7) Glow Pin	E. Exhaust Gas
3) Combustion Air Blower	8) Fuel Metering Pump	F. Fresh Air Intake
4) Combustion Chamber & Heat Exchanger	9) Operating Switch	H. Hot Air Outlet
5) Overheat Sensor		D. Fuel Intake

Operating Concept

- The fuel pump delivers fuel to the combustion chamber.
- The combustion air blower delivers air to the combustion chamber.
- A glow pin is used to ignite the fuel-air mixture.
- The heat from the flame is transferred through the heat exchanger while the exhaust gases are expelled to the exterior of the vehicle.
- The process air blower transfers air from the cabin, over the outside of the heat exchanger and blows hot air into the cabin.
- The heater automatically maintains the desired set temperature in the cabin by regulating through multiple heat output modes.

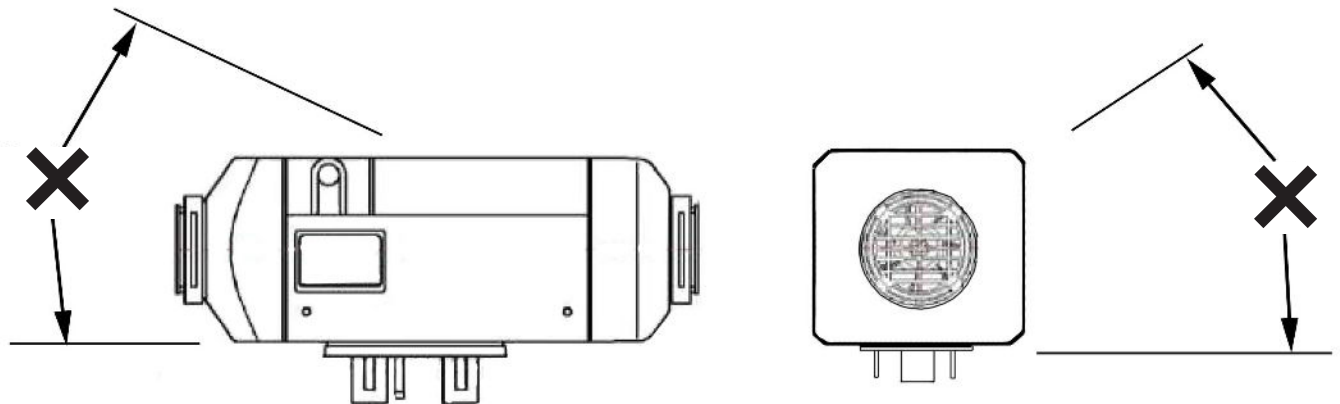
Heater Mounting

Heater Location

Typically, air heaters are mounted inside a tool compartment with the OEM HVAC System. However, the heater may be mounted anywhere inside the cabin provided you adhere to the following conditions:

- Combustion air intake, exhaust and fuel inlet connections must be on outside of the vehicle.
- Heater must be mounted on flat surface and provide an air tight seal between heater and vehicle.
- Heater must be mounted on a flat horizontal surface with exhaust port pointed straight down. (Figure M1)

Figure M1

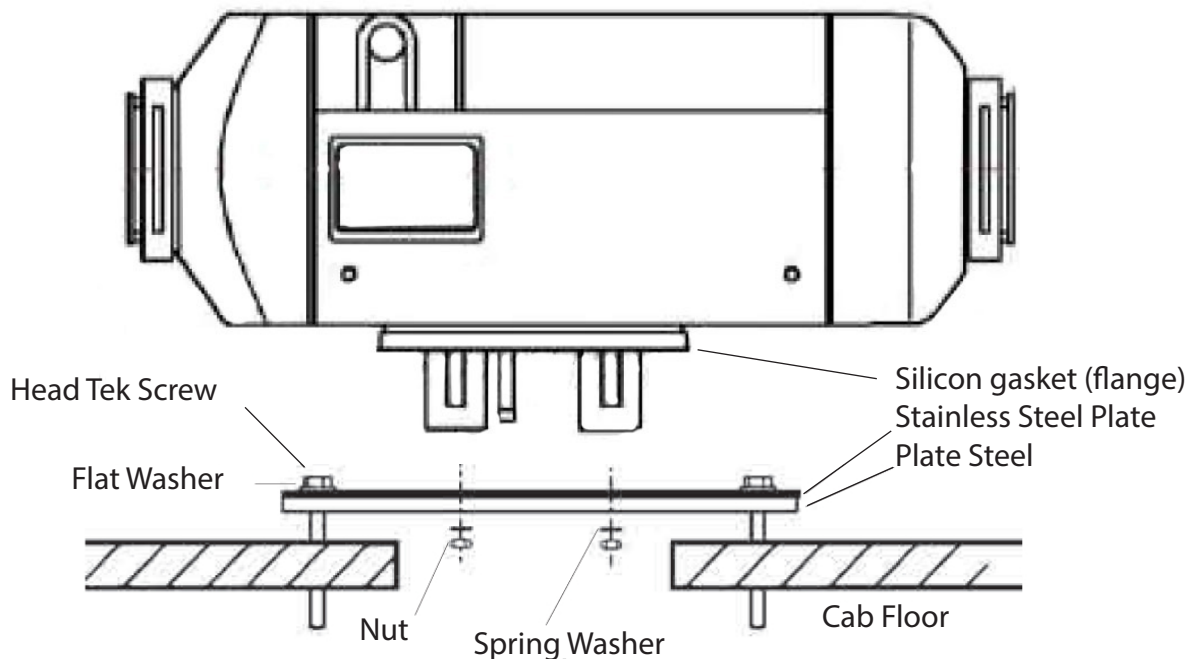


Heater Mounting

Mounting

- A mounting plate and hardware are provided with the truck heater kit.
- Refer to Figures M2 & M3 for assembly orientation. Note: If the mounting plate will not be used, the heater flange can be used as a template to mark where the individual components openings should be made.
- For ease of installation fasten the mounting plate to the heater and make exhaust, combustion air intake and fuel connections at the base of the heater before mounting the assembly to the vehicle.
- Cut a two 3" holes or a 4"x 5" rectangular opening on the cabin floor to accommodate mounting plate and seal. Refer to Figure M4.
- Secure mounting plate to vehicle with self tapping "Tek" screws provided.

Figure M2



Heater Mounting

Figure M3

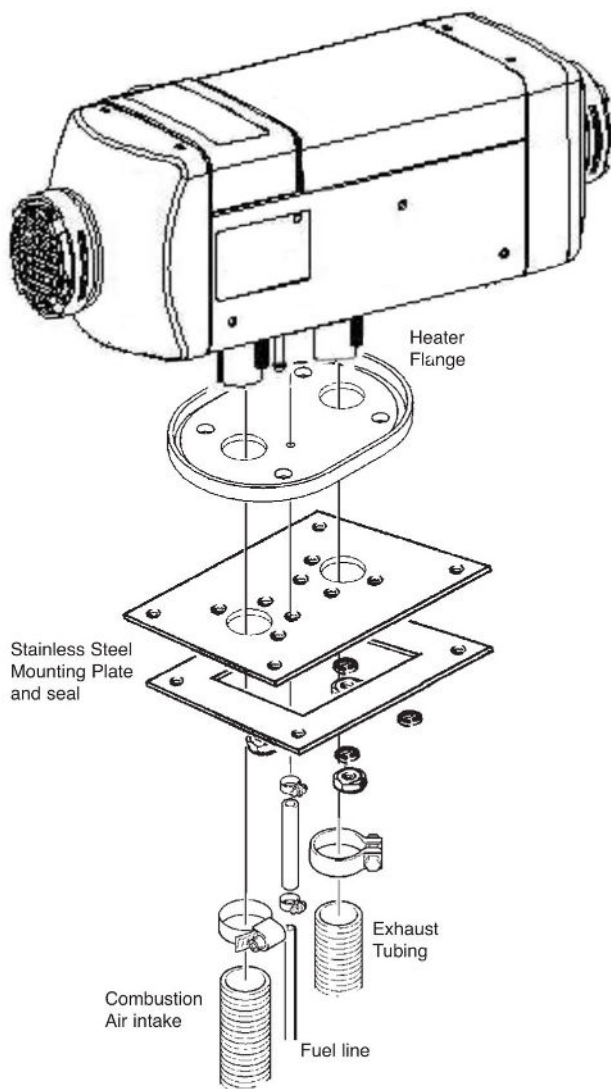
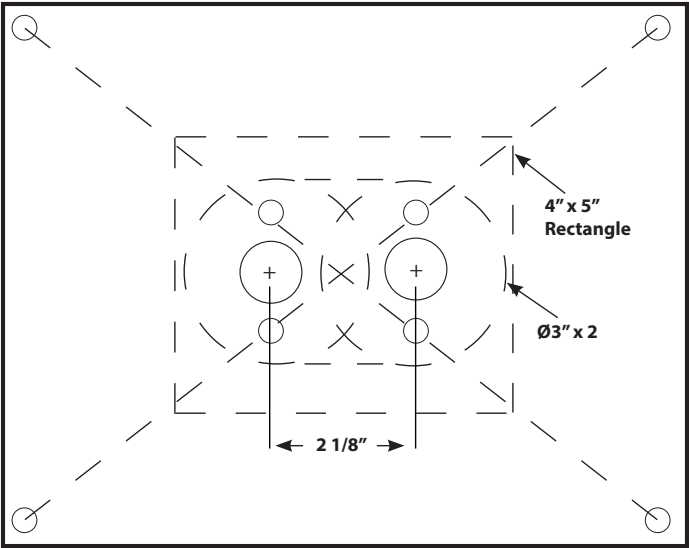


Figure M4

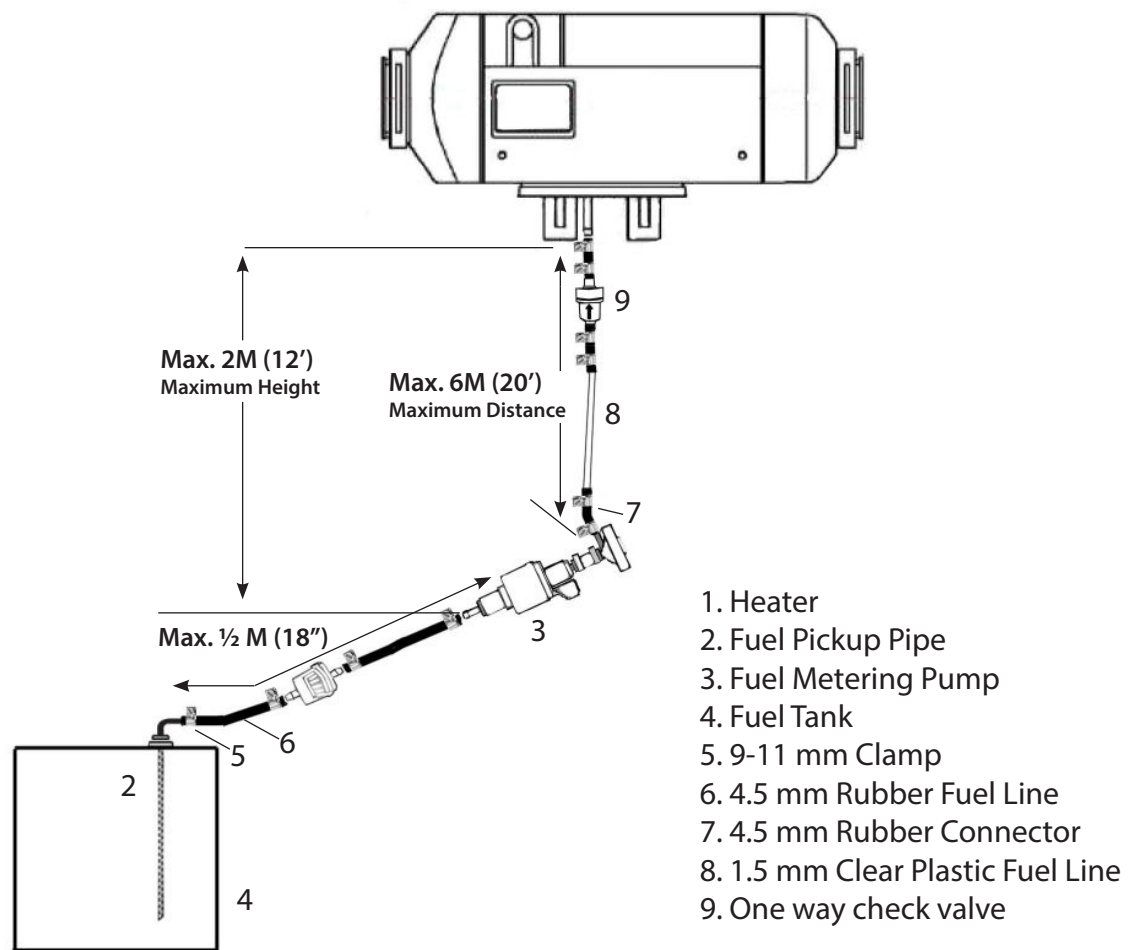


Fuel System

Fuel System Overview

The 25AG fuel pump and fuel system are the heart of the heater. The fuel pump not only delivers fuel to the heater but also controls the amount of fuel delivered. The pump is designed to operate like an electric solenoid and works using electric pulses. Each time it is energized, it provides a measured dose of fuel. It is critical to the heater's operation to stay within parameters outlined in Figure F1 and only use the components provided.

Figure F1



System Layout & Considerations

- Keep the length of the fuel system short as possible.
- Mount the fuel pump as close to the fuel pickup as possible (pump pushes better than it sucks).
- Minimize vertical rise.
- Mount the fuel pump in a protected location away from road spray.
- Choose a mounting location for the fuel pickup pipe that is close to the heater and offer installation access.
- Design your fuel system so that Figure F1 fuel line limits are not exceeded.

Fuel System

Connecting the Fuel System

Caution

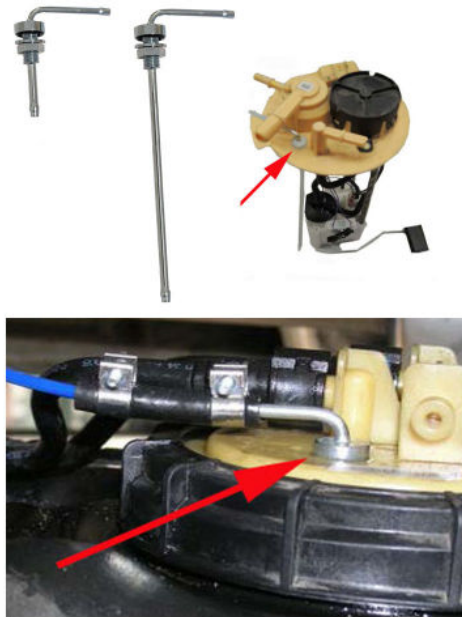
Fuel systems in gasoline vehicles are sealed and electronically monitored to contain fuel vapors. When integrating the heater, you must ensure that you do not disrupt the integrity of the fuel system. Installation should only be completed by a competent technician familiar with the fuel system of the vehicle.

Due to the infinite variations of fuel systems used in Gasoline powered vehicles, it is impossible to provide a standard fuel pickup device or procedure that works for every application. The following section outlines several methods for accessing fuel for your heater. Ensure that your fuel system fits within the specifications outlined in the Fuel System Specification chart Figure 1.

Note:

In some applications, you will be required to drop the tank to be able to access the fuel system.

Mini Fuel Pickup Method:



Parking Heater Products offers two sizes of Mini Pickup Pipes.

These can be adapted to fit inside fuel sender plates of the vehicle and create an air tight seal.

Find a suitable place on the fuel sender plate where the tube can be extended into the tank without interfering with the operation of the fuel sender.

Drill a 5/16" (8 mm) hole and clean off any burrs.

Install either the short or long pickup tube into position and attached the heater fuel line.

Note: Attach a rubber fuel line using a fuel line clamp to the short Mini Pickup to extend into the tank.

U65D-X417 – Short Mini Fuel pickup – 38 mm (1.5")

U65D-X418 – Long Mini Fuel pickup – 480 mm (19")

Fuel System

Auxiliary Fuel Port Method



In some instances, the vehicle may have an auxiliary fuel port. It is possible to use this as fuel tank access. Consult the vehicle dealer for appropriate connections to adapt to our 4.5 mm rubber fuel line.

Tee Into Fuel Line Method (NOT RECOMMENDED)



Parking Heater Products recommends against Teeing into the vehicles fuel line. This is because it can be expected that this will interfere with the integrity of the vehicles EVAP System. This will result in engine error codes and loss of engine performance.

It is possible to Tee into an existing fuel line of other auxiliary equipment such as engine heaters to provide fuel access for your heater. However, this should be done with caution to ensure there is no disturbance to the vehicle's fuel system operation. It is also crucial that the pressure and suction head limitations for the heater are being observed.

Fuel System

Auxiliary Fuel Tank Method



Auxiliary fuel tanks can be used in some cases as a solution for difficult to access fuel tanks. However, these are not certified for on-road use.

Standard Fuel Pickup Method (Metal tank only)



Standard fuel pickup pipes can be installed in larger metal tanks only. These can be installed using existing NPT ports in the tanks or by drilling an access hole in the tanks. Consult Parking Heater Products for further information about this option.

Fuel Pump Mounting

- Using the bracket and rubber mount provided, install fuel pump as shown in Figure F2.
- Isolating the pump with the rubber holder helps to minimize noise created during operation.
- Ensure that the proper mounting angle is observed to avoid cavitation. (Figure F3)

Figure F2

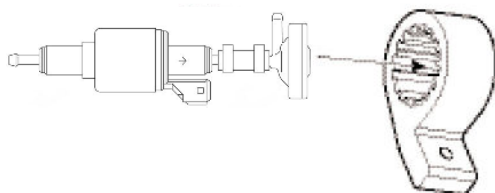
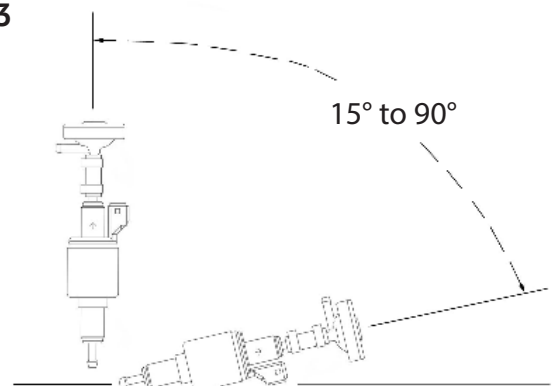


Figure F3

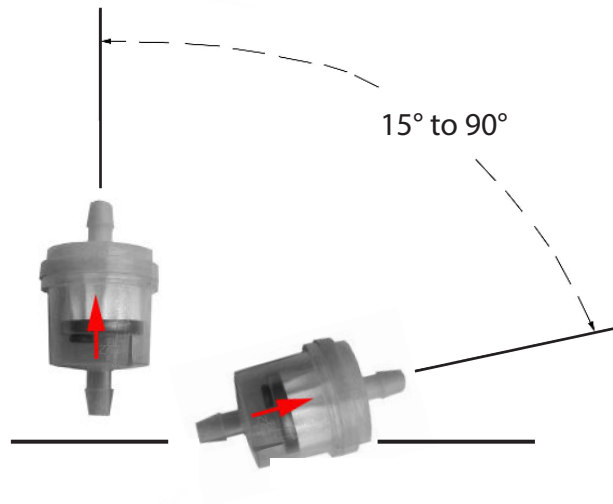


Fuel System

Fuel Filter

- An optional fuel filter is provided with your installation kit.
- If used, it should be replaced every two years.
- Mount between the fuel pump and tank.
- Mount on an incline to allow air to pass through.
- Mount with the arrow on the filter pointed towards the fuel pump.

Figure F4



Fuel Check Valve

- A fuel check valve is provided with the kit.
- This must be installed between the fuel pump and the heater.
- The arrow must be pointed in the direction of fuel flow (towards heater).
- The check valve stops fuel from syphoning back to tank when idle.

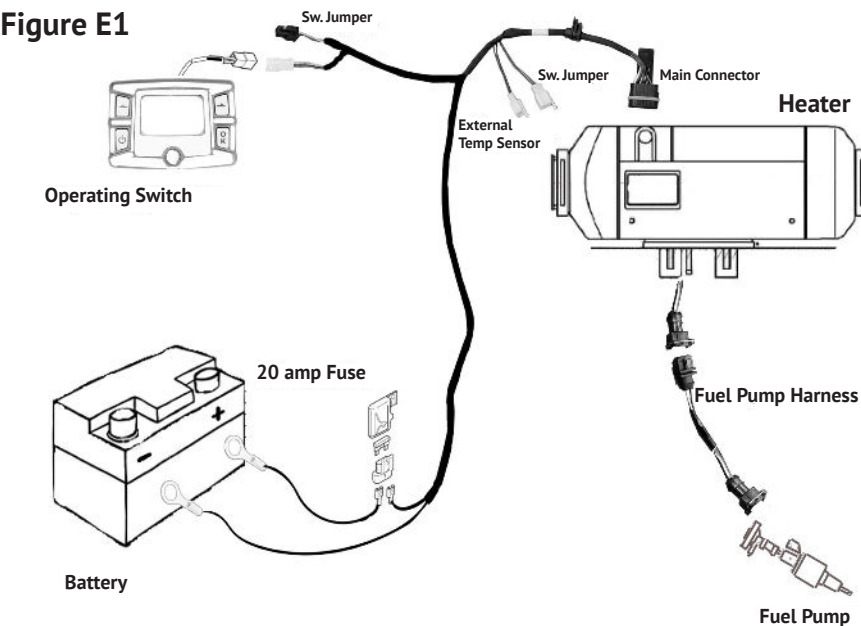
Figure F5



Electrical Connections

Electrical System Installation

The heater harness has all the electrical connections preassembled for easy installation. Route cables using either an existing cable passage or drill holes as required. Seal the hole around the cables and make sure they are protected from chaffing and pinching. Below is a summary of the wiring connections required.

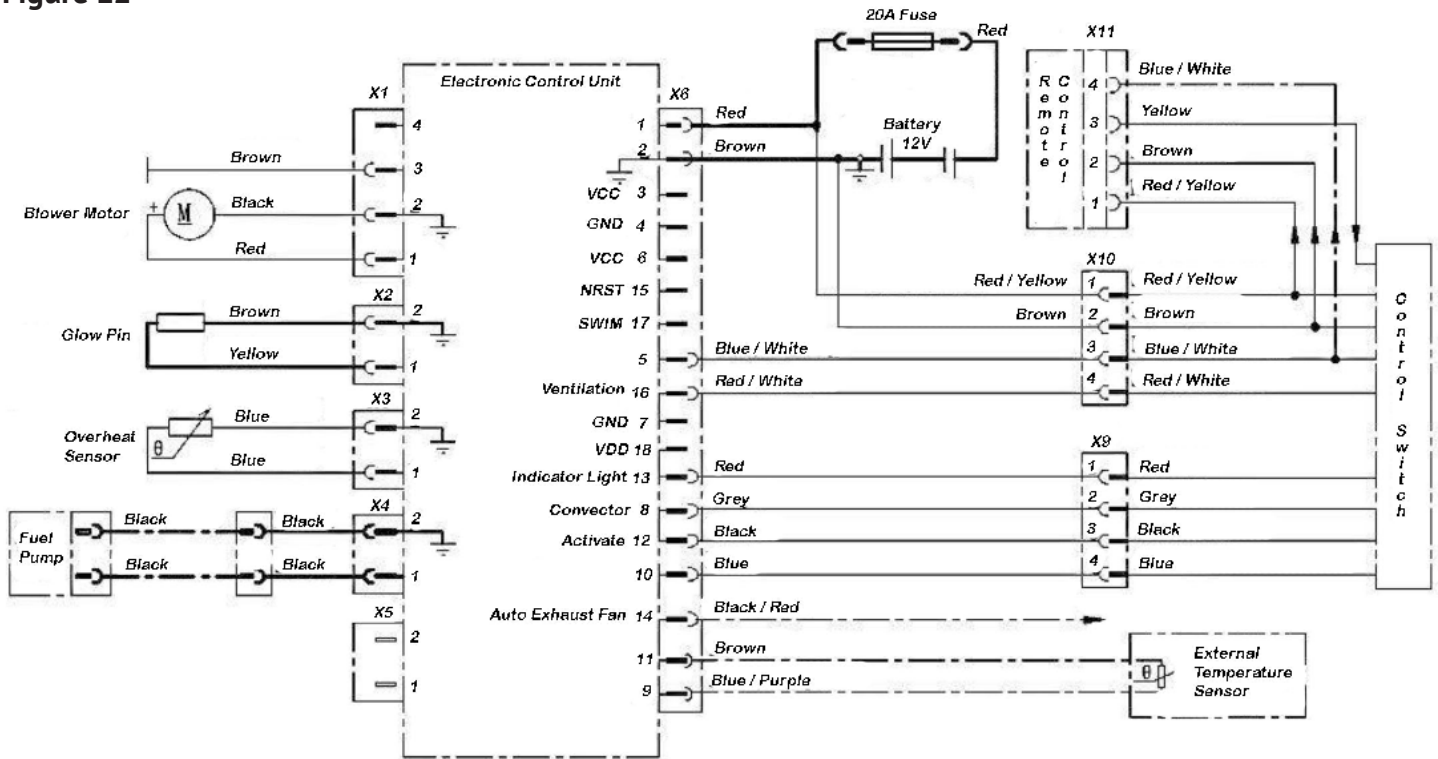


Main Harness		Combines switch and power harness. Connects to the heater's main connector.
Power Harness	2 Core, 4M (13') Long Red (+), Brown (-)	Route power harness section from heater to vehicle batteries. Connect red wire to battery (+) Connect brown wire to battery (-) Install 20 amp main fuse (Last step of installation)
Switch Harness	4 Core, 4M (13') Long Yellow, Brown, Red, Blue/White	Route switch harness section from heater to switch location. Connect to operating switch harness There are also two jumper harness' for remote operation. One located near the heater and one located at the switch.
Fuel Pump Harness	2 Core, 0.5M (20") Long Black, Black	Fuel pump harness exits heater through air intake port. It then connects to the Fuel Pump Extension Harness
Fuel Pump Extension Harness	2 Core, 6.5M (21') Long Brown, Blue	Route fuel pump extension harness from here and connect to fuel pump.
External Temperature Sensor	2 Core Jumper Brown, Blue	For optional external sensor.

Electrical Connections

25AG Wiring Diagram

Figure E2

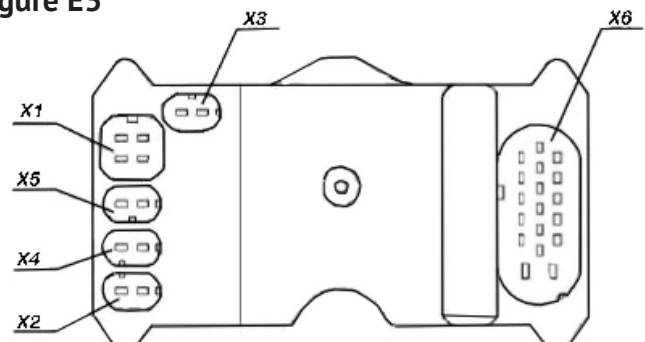


ECU Interfaces

The following represents the wiring connector locations for the ECU. The connectors are constructed to ensure that it is impossible to connect in error.

Socket X1	Fan Motor
Socket X2	Glow Pin
Socket X3	Overheat Sensor
Socket X4	Fuel Pump
Socket X6	Main Connector

Figure E3



Operating Switch Instructions

The 25AG is provided with a multi-functional operating switch. It is capable of manual and timer controlled switching of the heater and conveys heater operational parameters and diagnostics.

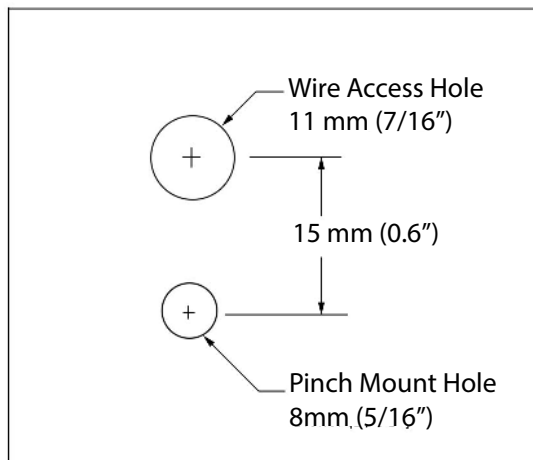
Mount the operating switch in a suitable location using panel mount method shown in Figure S1
Route the switch harness from the heater to the Operating Switch and connect.

Overview

The operating switch allows you to turn the heater on and off, regulate temperature, set operating mode, timed shutdown and timed start-up functions. It also facilitates troubleshooting by providing diagnostic codes.

Figure S1





Drill holes as shown, to panel mount switch








Operating Switch Instructions

Buttons & Display Icons

Buttons:

ON / OFF		On / Off Control
<		Adjust heat settings Toggle through menu
>		Adjust heat settings Toggle through menu
OK		Select Menu settings

Icons:

	Heating Mode
	Fan Mode
	Not Used
	Program Mode
	Clock Settings



Operating Switch Instructions

Set Time of Day / Day of Week:

1. Press **"OK"**

Icons Displayed and heat symbol flashing

2. Press ">" or "<" repeatedly to select **"Clock"** Icon

Clock Icon flashes



3. Press **"OK"**

Days of week are displayed

4. Press ">" or "<" to select current day of week

Current day selected flashes



5. Press **"OK"** to select this day

Hour of day flashes

6. Adjust Hour of day to current hour using "<" or ">"

Note: 24 hour clock

Hour of day flashes

7. Press **"OK"** to confirm hour setting

Minutes of day flashes

8. Adjust Minutes of day using "<" or ">"

Minutes of day flashes



9. Press **"OK"** to confirm minute setting

Reverts back to home screen.

Clock icon flashes

Operating Switch Instructions

On / Off Control

1. Press **"OK"**

Icons Displayed and heat symbol flashing

2. Press ">" or "<" repeatedly to select **"Heat"** Icon

Heat Icon flashes



3. Press **"OK"**

Heater commences start up mode

Current Power Level Setting or Target Temperature Setting of heater is displayed.

4. Press **"ON / OFF"** to switch off heater

Home Screen is displayed



Heat Settings Control

There are two methods for controlling the heater's output levels.

"Power Mode" allows you to set the power output in range of 1-7.

"Automatic Climate Control Mode" allows you to set the desired cabin temperature in range of 5 °C to 35 °C.

Selecting Heat Output Mode

With heater in operation, Press and hold the **"OK"** button.

Display will change from either showing the target temperature or target power mode setting.



Operating Switch Instructions

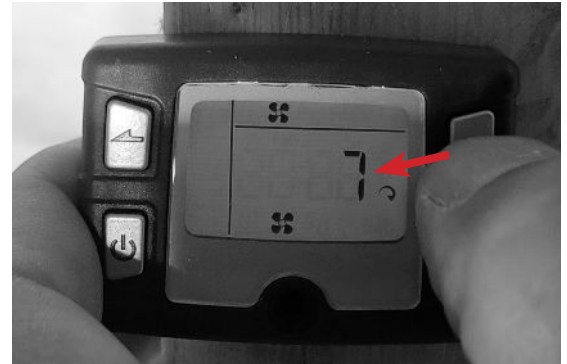
Adjusting Power Mode

With heater operating in "Power Mode",
Press ">" or "<" to adjust setting from 1-7
1 is lowest and 7 is highest

Display will show current target Power Mode setting

Heater will continue to operate in this heat output level.

NOTE: To ensure that the heater maintains clean internal combustion chamber, it is recommended to vary the operating modes (ie. Don't allow the heater to operate in low heat for more than 2-4 hours at a time)



Adjust Target Temperature Setting

With heater operating in "Auto Climate Control Mode"
Press ">" or "<" to adjust setting from 5 °C to 35 °C
Display will show target temperature.



Heat Settings Control

The heater has the ability to operate in a ventilation mode.

NOTE: To prolong the life of the blower motor, we recommend limiting this use.

1. Press "OK"

Icons Displayed and heat symbol flashing

2. Press ">" or "<" to select "Fan" Icon

Fan Icon Flashes



Operating Switch Instructions

3. Press "**OK**"

Fan Speed Setting is displayed

4. Press ">" or "<" to adjust fan speed setting 1-7

Fan Speed Setting is displayed

5. Press the "**On / Off**" Button to switch off the fan

Home Screen displayed



Programmed Startup

The operating switch has the ability to automatically start the heater using programmed start up and shut down. You can establish 3 different preset profiles (you can only activate one at a time).

1. Press "**OK**"

Icons Displayed and heat symbol flashing

2. Press ">" or "<" to select "**P**" Icon

"P" Icon flashes



3. Press "**OK**"

Preset Options 1,2,3 are displayed

"1" Will be flashing

4. Press ">" or "<" to select the desired preset profile (1-3)

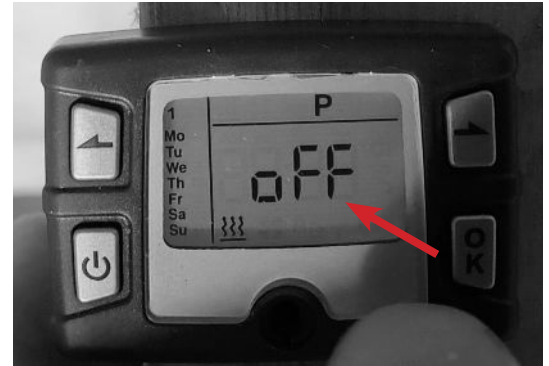
Display will toggle through display profiles



Operating Switch Instructions

5. Press "**OK**" to select desired profile setting
Status "On" or "Off" displayed.

6. Press ">" or "<" to select "**ON**" or "**OFF**"
Status "On" or "Off" displayed.



7. Press "**OK**"
Run Time displayed



8. Press ">" or "<" to adjust run time for this profile.
10 -990 minutes
Run Time displayed

9. Press "**OK**"
Start Time Displayed, Hours flashing

10. Press ">" or "<" to adjust start up time hours
Start Time Displayed, Hours flashing

11. Press "**OK**"
Start Time Displayed, Minutes flashing

12. Press ">" or "<" to adjust start up time minutes
Start Time Displayed, Minutes flashing



2. Hours flashing
4. Minutes flashing

Operating Switch Instructions

13. Press **"OK"**

Days of Week settings are displayed.

"Mo" flashing

14. Press **">"** or **"<"** to adjust between **"On"** or **"Off"** to activate or deactivate programmed start for that day.

"Off" or **"On"** displayed

15. Press **"OK"** to proceed to next day

Days of Week settings are displayed.

"Tu" flashing

16. Proceed as above to establish **"ON"** / **"Off"** settings for all days of the week (Mo – Su)

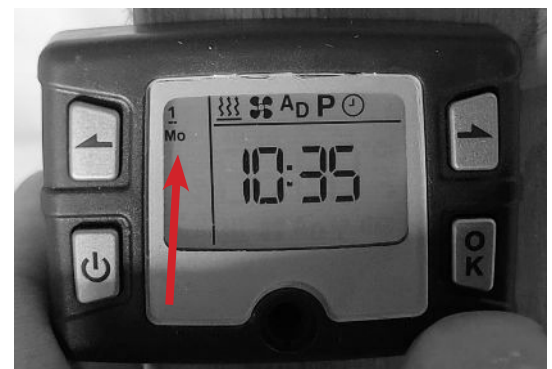
17. Once you confirm settings for Sunday, display reverts to home screen.

Program is activated.

Home screen is displayed

"P" is flashing

Preset 1, 2 or 3 displayed.



Operating Switch Instructions

Fuel System Priming

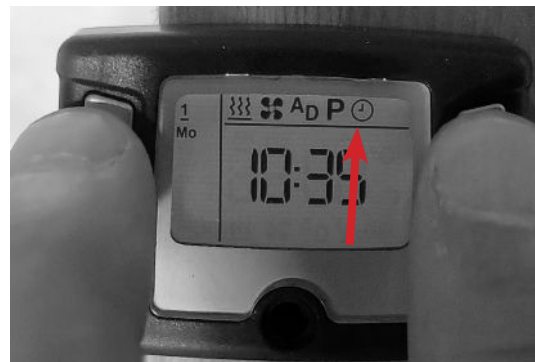
On initial start up after installing the heater, the system has the ability to conduct a fuel system priming function.

1. Press **"OK"**

Icons Displayed and heat symbol flashing

2. Press **">"** or **"<"** repeatedly to select **"Clock"** Icon

Clock Icon flashes



3. Press and hold both **"<"** and **">"** simultaneously for 3 seconds to initiate Program mode

"P1" is displayed

4. Press **">"** to toggle to **"P2"**

"P2" is displayed



5. Press **"OK"**

"F90" displayed

Fuel pump will start pulsing to prime the fuel system for 90 seconds.

6. Press **"ON / Off"** button to switch off fuel pump priming once fuel has reached heater.

(Automatically switches off at 90 seconds)

"F##" displays count down from 90 to 0 seconds.



90 second countdown

Additional Program Settings

While toggling through the settings to activate the "Fuel Priming" function, you will discover that there are other programmable menu settings. There are no other beneficial settings that can be adjusted and so they are not discussed in these instructions.

Exhaust & Combustion Air Intake Connections

Figure A1

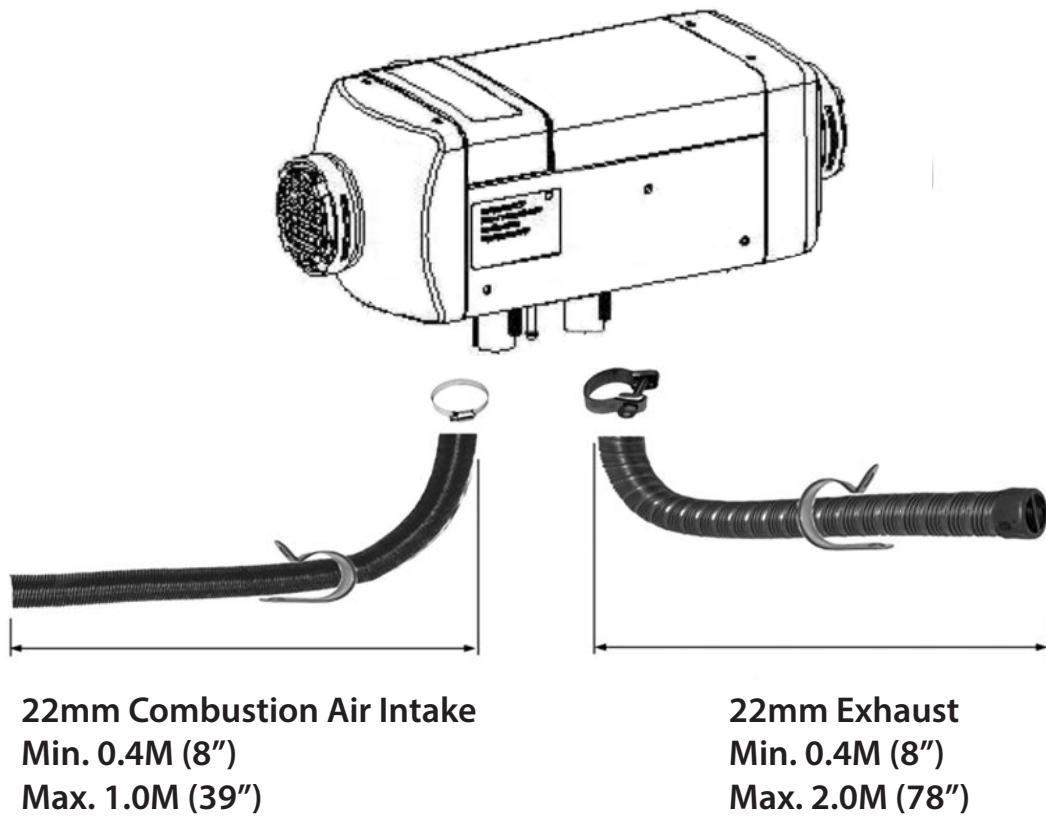
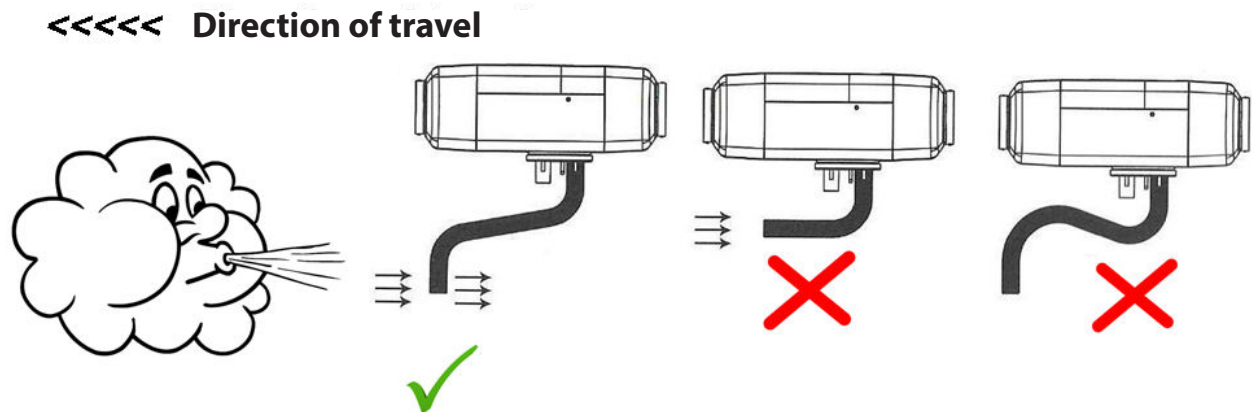


Figure A2



Exhaust & Combustion Air Intake Connections

The combustion air intake tube channels clean air into the heater.

The exhaust tube channels exhaust safely away from the heater and vehicle.

It also assists in providing a required amount of back pressure required to balance the combustion process.

Connect the combustion air intake tube and exhaust as shown in Figure A1

Exhaust Considerations:

- The exhaust is made using a heat resistant, 22mm flexible, stainless steel tube.
- Secure the exhaust tube to the heater using the exhaust clamp provided.
- Discharge exhaust away from passenger compartment.
- Ensure exhaust fumes cannot be sucked into combustion air intake.
- Install exhaust pipe with incline for moisture run off.
- Drill a small drain hole at low point if proper incline cannot be maintained.
- Route the exhaust pipe from the heater using "p" clamps provided.
- Route away from the vehicle slip stream.

Combustion Air Intake Considerations:

- The combustion air intake is made from a 22mm flexible, water resistant, paper / aluminum compound.
- Secure the combustion air intake tube to the heater using the clamp provided.
- Draw air from a clean air source away from water, dust and exhaust.
- The combustion air opening must be kept free at all times.
- Install combustion air intake tube with an incline for moisture run off.
- Route the combustion air intake using "p" clamps provided.
- Route away from the vehicle slip stream.

Warning - Fire Hazards

The exhaust is hot, keep a minimum of 5 cm (2") clearance from any heat sensitive material.

Warning - Asphyxiation Hazards

Route exhaust beyond the skirt of the cab and outside of the frame area.

Failure to comply with this warning could result in Carbon Monoxide Poisoning.

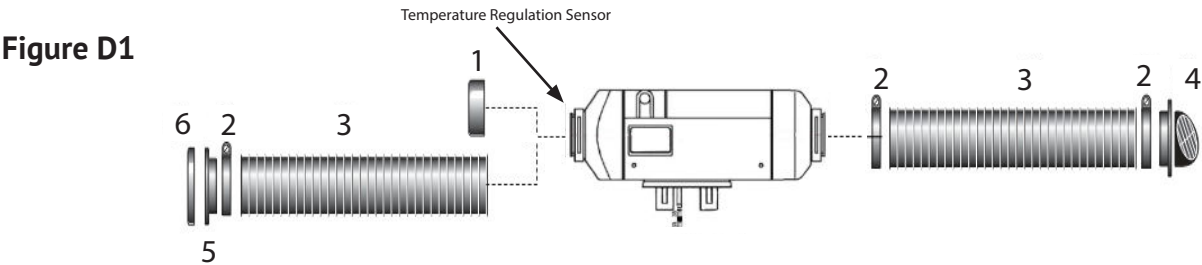
Heater Ducting

Hot Air Ducting

Distribute heat efficiently throughout the cabin by using the high temperature, 60mm flex-ducting and rotatable outlet and return air inlet provided in the installation kit.

IMPORTANT NOTE:
The heater uses a temperature sensor on the inlet side of the heater to regulate the cabin temperature. Use return air ducting for best heating regulation and efficiency.

- Route ducting with smooth bends to avoid crushing.
- Ensure ducting components will not come in contact with combustible materials
- Install protective covers or shields as required.
- Position hot air outlet so that it cannot be blocked or otherwise obstructed it should not point directly towards operator.
- When not using return ducting, use the air intake grille.



Item	Description	Item	Description
1.	Safety Grill	4.	Adjustable Outlet Grill
2.	Hose Clamp	5.	Air Intake Connector
3.	Flexible Duct	6.	Air Intake Grill

Warning - Fire Hazards

Do not use existing vehicle ducting or outlets.
This heater produces temperatures much hotter than a water based heating system.
Ducting components must be capable of withstanding a minimum of 150°C (300°F) operating temperatures.

Warning - Burn Hazards

Position outlet so that it will not blow hot air directly at operator.

Heater Operation

25AG Operation

Note: It is important to understand that this heater does not simply turn on and turn off. Rather, it has a sophisticated operating system similar to a household furnace to provide reliable heating comfort. The operator should familiarize themselves with the normal operation of the heater.

Start up

1. Systems Check Phase

- When switched on, the heater conducts a self check.
- Component integrity (Glow Pin, Blower, Fuel Pump, Flame and Overheat Sensor)
- Voltage (Must be with 10.5-16 volts)
- Upon satisfactory systems check, the heater will continue to the Preheat Phase.

2. Preheat Phase – Glow pin will switch on to preheat for 50 seconds.

3. Ignition Phase – Fuel and combustion air are slowly introduced to the combustion chamber and flame is established typically within 2-3 seconds.

4. Stabilization Phase – To further establish combustion, the glow pin remains on and the fuel / air mixture is slowly increased. The flame sensor monitors the increasing temperature at the heat exchanger (Typically 3-4 minutes).

5. Running Phase – Once the flame is established, the glow pin will switch off. Incoming fuel / air will be ignited by the established flame inside the combustion chamber.

Running Mode

The heater is designed to function in three different operating modes. Refer to the Operating Switch Instructions for details.

“Power Mode” Controls the heat output level.

The operator can adjust heat output level in a range from 1-7.

“Automatic Mode” Establishes target cabin temperature for heater to maintain.

(Primary operating mode for cargo and cabin heating applications)

Target temperatures range is 5° C to 35° C (1° intervals)

Note:

Internal temperature sensor inside heater is used to regulate the cabin temperature.

Temperature displayed on switch, only reflects temperature at operating switch.

We recommend the use of return ducting (ducting on both ends of heater) for best temperature regulation

Heater Operation

“Vent Mode” Runs the blower fan only to provide cabin ventilation.

The operator can adjust the fan speed in a range from 1-7.

Note: Running the fan in vent mode for extended periods will diminish the life expectancy of the motor.

Automatic Start Times

The heater can has the capability of starting and running automatically with pre defined start up and run times. Consult the operating switch instructions for further details.

Shut Down Process

The heater should only be controlled using the operating switches provided. Switching the heater off by interrupting it's power source will bypass the heater's normal cool down process and will cause stress and premature wear of the combustion components.

Switching Off – Heater can be switched off either manually, via timer control or through it's own temperature regulation. Refer to Operating Switch Instructions for details.

Purge Cycle – Once switched off, the heater will switch into high operating mode for a short duration to clear it's combustion chamber (Approximately 100 seconds).

Cool Down Cycle – Upon completion of the Purge Cycle, the fuel pump will switch off, blower will slow down and the flame will quickly extinguish. The blower will switch to high speed and continue to operate to further purge the combustion chamber and cool down the heat exchanger. The cool down cycle will last approximately 4 minutes.

Heater Operation

Safety Systems

The heater is equipped with several control features to protect itself and the operator.

Systems Check:

The heater will not attempt to start if one of the components is detected by the control unit to be defective. If the heater detects a problem during operation it will shut down and depending on the fault it will either restart automatically or it will turn off completely.

No Start Safety Time:

If the heater does not ignite on the first start attempt, it will shut off the fuel pump and the start sequence will repeat. After two unsuccessful starting attempts the controller will turn the heater off in order to prevent fuel flooding the burner chamber. You can restart the process by switching the heater OFF and then ON again.

Flame Out:

If the flame goes out during operation, the heater will shut down and then attempt to restart automatically. If the heater does not ignite, it will shut down. It will need to be turned OFF and ON manually.

Voltage:

If the lower or upper voltage limit is reached, the heater will turn OFF after a 20 second delay.

Fan Speed:

The fan speed is continuously monitored. If the fan motor does not start or if the speed deviates by more than 40%, the heater will turn OFF after 60 seconds.

Emergency Shut Down

In event of an emergency, shut down the heater as follows:

1. Turn the heater OFF with the control switch.
2. Pull the fuse out.
3. Disconnect battery power.

Maintenance

- Switch heater ON at least once monthly for 10 minutes
- Clear combustion air supply and the exhaust system after longer standstill periods.
- Ensure that the vehicle batteries are maintained
- Inspect and clean all electrical connections and apply dielectric grease.
- If the heater has excessive smoking or carbon build up, disassemble and clean the heater.
- Remove the glow pin using the special socket tool. Inspect the glow pin for any damage to wires or wire connections and scratches or buildup on the heating element. Wipe the glow pin clean with a soft cloth only, do not use anything abrasive to clean the glow pin. If the glow pin shows any signs of wear or damage it must be replaced.
- Inspect and clean hot air ducting, inlet and outlet.

Troubleshooting

Troubleshoot heater by first conducting a Basic Inspection, then proceed to the appropriate section below for further direction.

Basic Inspection

Power

- Check that all the electrical connections are intact and not damaged or corroded.
- Check the fuse.
- Ensure voltage going to the heater is 10.5 -16.0 volts while the heater is switched on.

Fuel

- Ensure there is ample clean fuel supply
- Check for restrictions or loose connection in fuel system
- Visual inspection to see fuel in the clear plastic fuel lines (Should see bubbles)

Combustion Air

- Check for restrictions in combustion air intake or exhaust tubes

Ducting

- Visual inspection of hot air ducting to ensure there are no blockages.

Self Diagnostics

The 25AG has an automatic built in error code detection system. When the heater detects a fault, it should display a two-digit error code on the Operating Switch. Refer to the Fault Codes section of this manual for further direction.

No Error Codes Detected

If the heater does not attempt start and there is not an error code on the operating switch, follow these procedures in order shown:

- 1) Ensure that the ambient temperature does not exceed the settings on the operating switch.
- 2) Reconfirm that you have checked the power supply to the heater as noted in Basic Inspection.
- 3) Reboot the ECU by removing the power to the heater for 5 minutes or more. Remove the fuse at the battery and then reinstall the fuse and turn the heater on to test.
- 4) Install and test the heater with a new control switch.
- 5) Install a new electronic control unit into the heater and test.

Combustion Issues

If the heater proceeds through a start up cycle but fails to establish a flame, runs intermittently or exhibits excessive smoking, there is most likely a combustion related problem. In these situations, the operating switch should display either error code E10 or E20. Combustion issues are caused by a deficiency of one or more of these required components; Fuel, Combustion Air, Source of Ignition or Mixing. Review each of these and rectify as required.

Troubleshooting

Fuel

Ensure you are supplying a good quality fuel.

Fuel is not frozen or gelled

Fuel system falls within parameters outlined in installation section.

All connections are secure and there are no air leaks

Try removing the fuel line at the heater during start up to ensure that fuel is being delivered.

Check for fuel filter or fuel metering pump blockage.

Combustion Air

Ensure that combustion air intake tube and exhaust tubes are clear from obstructions.

Air intake and exhaust tubes meet parameters outlined in installation section.

Try placing your hand in front of the exhaust while the heater is attempting to start to determine if there is air flow (Should be able to blow out a candle held within 12" of end of exhaust)

Source of Ignition

The heater uses a glow pin as a source of ignition. Normally when this fails, it will create an open or short circuit and yield error code E90, E91 or E92. However, in some cases the glow pin may have a partial failure and will just not get hot enough. Glow pins can be bench tested by applying 12 volts and observing how they heat up. They should exhibit a consistent red throughout the length of the pin. We recommend replacing the glow pin and glow pin screen on a seasonal basis as part of maintenance program.

Mixing

If we have confirmed that we have an appropriate amount of fuel and combustion air and a ignition source, then there is a problem with the heater's ability to mix these components. Start by cleaning the glow pin chamber area and air mixing ports. This is the primary mixing point. If the glow pin chamber appears to be heavily sooted, disassemble the heater and clean the combustion chamber using carburetor cleaner suitable alternative.

Fault Code Chart

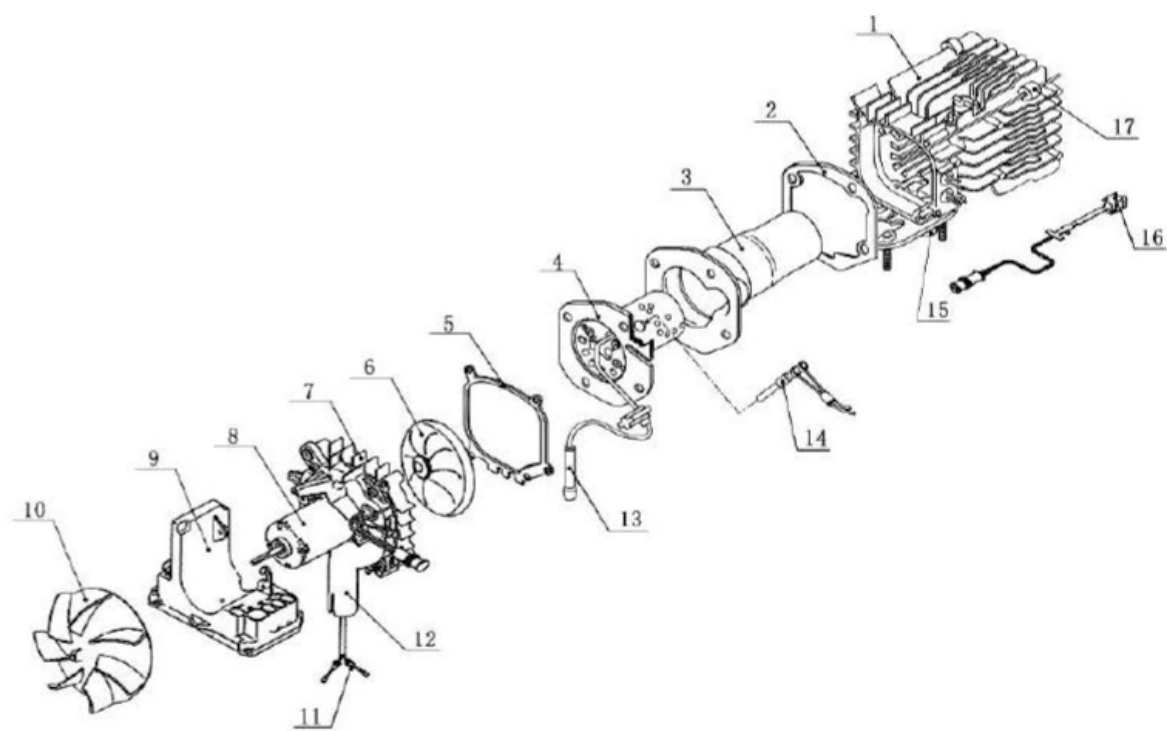
Fault Code	Cause of trouble	Remedy
10	Failure to start on two attempts	Check for combustion issues (see manual section)
20	Failure to start on three attempts	Check for combustion issues (see manual section)
21	Failure to recognize start, flame sensor temperature not high enough. Heater will try to restart.	Check for combustion issues (see manual section)
30	High Voltage Shut Down	Voltage must be less than 16.0v Check charging system.
31	Low Voltage Shut Down	Voltage must be more than 10.5v including startup. Check wiring connections, battery and charging system.
41	Overheat during self-check period	Check and remove obstructions.
50	Flame Sensor Open Circuit	Replace as necessary
51	Flame Sensor Short Circuit	Replace as necessary
52	Temperature Sensor Open Circuit	Internal Sensor Integrated into ECU Replace ECU as necessary
53	Temperature Sensor Short Circuit	Internal Sensor Integrated into ECU Replace ECU as necessary
54	Temperature Sensor Overheat	Check for obstructions or other heat source coming into heater. Internal Sensor Integrated into ECU Replace ECU as necessary
65	Inside Temperature Sensor Open Circuit	
66	Inside Temperature Sensor Short Circuit	
68	Outside Temperature Sensor Open Circuit	
69	Outside Temperature Sensor Short Circuit	
70	Fuel Pump Short Circuit	Should be approximately 10 Ω Replace as necessary
71	Fuel Pump Open Circuit	Should be approximately 10 Ω Replace as necessary

Fault Code Chart

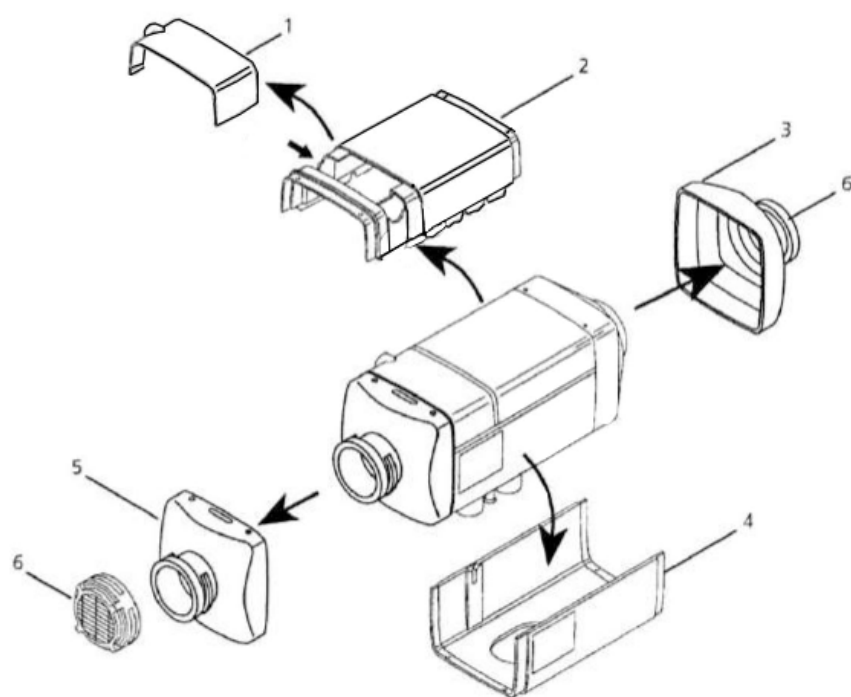
Fault Code	Cause of trouble	Remedy
80	Blower Motor Open Circuit	Replace as necessary
81	Blower Motor Short Circuit	Replace as necessary
82	Blower Speed Too Slow	Replace as necessary
83	Blower Speed Too High	Replace as necessary
84	Blower Speed Measurement Fault	Replace as necessary
90	Glow Pin Short Circuit	Should be approximately 0.7 Ω Inspect and replace as necessary
91	Glow Pin Open Circuit	Should be approximately 0.7 Ω Inspect and replace as necessary
92	Glow Pin – Too High Resistance	Should be approximately 0.7 Ω Inspect and replace as necessary
93	Glow Pin Drive Open Circuit	Replace ECU

Heater Components

25AG Replacement Parts



Heater Casing



Heater Components

25AG Replacement Parts

Item	Description	Part Number
1	Heat Exchanger	NPN
2	Burner Gasket	P25A-X101
3	Burner Tube	P25A-X102
4	Burner Insert	P25A-X103
5	Blower Gasket	P25A-X104
6	Combustion Blower Blades Assembly	NPN
7	Fan Motor Bracket	NPN
8	Blower Motor	P25A-T101
9	ECU - Electronic Control Unit	P25A-T301
10	Blower Fan	NPN
11	Fuel Pump Harness - Internal	NPN
12	Combustion Air Inlet Port	NPN
13	Fuel Inlet Pipe	NPN
14	Glow Pin	P25A-T102
15	Exhaust Port	NPN
16	Overheat Sensor	P65A-X105
17	Insulating Mat	P65A-X106

Heater Casing

Item	Description
1	ECU Cover
2	Top Cover
3	Hot Air Outlet
4	Bottom Cover
5	Air Inlet Hood
6	Air Inlet Screen



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