BlueHeat MARINE

Webasto
Feel the drive

Marine Air Heater Systems

Air Top 2000 S
Air Top 3500
Air Top 5000

Do-It-Yourself Kit

For Diesel Powered Marine Vessels

WARNING!- CONCERNING INSTALLATIONS IN GASOLINE POWERED VESSELS!

Installation of a diesel fuel fired auxiliary heater in gasoline powered marine vessels requires professional knowledge and strict adherence to safety information, special installation instructions and restrictions.

For these reasons, installation of a diesel fuel fired auxiliary heater in gasoline powered marine vessels must be performed by an authorized Webasto marine installation center. Installations must comply with all applicable American Boat & Yacht Council recommendations and U.S. Coast Guard regulations. Also, all relevant state and provincial licensing regulations if any, governing the installation and use of auxiliary heating devices in watercraft must be observed.

To find an authorized Webasto marine installation center near you, please call (800) 860-7866 toll free or visit our web site at: www.webasto.us

- Improper installation of Webasto heating and cooling systems can cause fire or the leakage of deadly carbon monoxide leading to serious injury or death.
- Diagnoisis and repair of mafunctioning, non-functioning or damaged Webasto heating and cooling systems requires special factory training, technical information, special tools and special equipment.
- ALWAYS carefully follow Webasto installation instructions and heed all WARNINGS.
- Improper installation voids all warranties on this product.
- All fuel fired heating appliances are capable of producing poisonous carbon monoxide gases. Webasto fuel fired heaters are engineered with state-of-the-art components and safety features to precisely control combustion and minimize the production of deadly carbon monoxide gas. Nevertheless, due to the confined spaces within marine vessels, an increased risk of carbon monoxide poisoning causing death or serious injury to personnel is possible if equipment is improperly installed. Therefore, it is extremely important that you fully read and understand all installation documentation supplied with your heater BEFORE attempting installation.

Contents Page

WEBASTO AT2000, AT3500, AT5000 BlueHeat Marine®

LIMITED WARRANTY

Webasto Product North America, Inc. (herein after referred to as Webasto) warrants BlueHeat Marine® heaters and heater kits against defects in material and workmanship for two (2) years or 3000 hours of operation, which ever comes first, effective at the time of purchase by the end user.

Replacement parts are covered for six (6) months or the remainder of the original warranty period, which ever is longer. Replacement heaters are considered a "Replacement Part".

The intent of the Webasto warranty is to remedy defects in material and workmanship in the manner provided herein. During the warranty period the exclusive remedy will be for Webasto, at its discretion, to repair or replace those parts which are demonstrated to be defective in material or workmanship.

While warranty is provided to the "end user", it is to be administered and serviced through a Webasto Authorized Dealer in accordance with the Webasto warranty policy.
To locate the nearest "Webasto Authorized Dealer" phone Webasto Product North America at 1-800-860-7866.

While this warranty covers parts and labor, if the heater was self installed by the end user or someone other than a Webasto Authorized Dealer, the diagnosis and repair must be completed by a Webasto Authorized Dealer in order to receive compensation under the terms of this warranty.

Limitations and Exclusions:

Webasto specifically excludes and limits from warranty the following:

- Normal wear: (fuel filters and fuses are not covered.)
- Damage to product in transit: all claims must be filed with carrier.
- Improper installation, which is not in accordance with valid, supplied installation instructions.
- Deterioration due to normal wear, corrosion, abuse, neglect, damage, accident, improper storage or operation.
- Modification of product by alteration, use of not-genuine parts or repair by unauthorized personnel.
- Economic loss for expenses related to travel, vessel disability, personal injury or other incidental or consequential damages arising from any breach of this expressed warranty.

Owners Responsibilities:

1) Perform Webasto recommended maintenance procedures per Webasto Owners Manual.
2) A Warranty Registration Card is included with each BlueHeat Marine® heater kit. It is the end users responsibility to complete this card and return it to Webasto for registration. Proof of purchase is required for all heaters that are not registered.

This warranty gives you specific rights and you may also have other rights which vary by State or Province.

THE WARRANTY DESCRIBED IN THIS POLICY SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Foreword

General

The air heaters covered in this manual can be used to heat and ventilate marine vessel cabins and cockpits (Air Top 2000 S does not feature a ventilation mode). Only Diesel or fuel oil operated auxiliary heaters are approved for installation on marine vessels.

Installation accessories can be found in our accessories list for boats/ships. The recommended accessories for the heaters are designed to facilitate the selection of suitable components, but are not all required (or complete) for all installation variants.

Scope and Purpose

These installation instructions are intended to support customers in the installation of Air Top 2000 S / Air Top 3500 / Air Top 5000 air heaters in marine vessels.

Acknowledged engineering conventions must be observed for the installation work.

Safety and Important Information Symbols and their Meaning

Warning
This symbol is used to highlight that non-compliance with instructions or procedures can result in serious injuries or death to personnel.

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

Attention
This symbol is used to highlight and draw specific attention to important information.

Flammable or Combustible
This symbol is used to highlight and draw specific attention to flammable or combustible materials or risks.

Reference
This symbol is used to draw attention to important information provided in Webasto or Manufacturer Manuals.

IMPORTANT SAFETY INFORMATION – Read Before Proceeding with Installation!

WARNING!

All fuel fired heating appliances are capable of producing poisonous carbon monoxide gases. Webasto fuel fired heaters are engineered with state-of-the-art components and safety features to precisely control combustion and minimize the production of deadly carbon monoxide gas. Nevertheless, due to the confined spaces within marine vessels, an increased risk of carbon monoxide poisoning causing death or serious injury to personnel is possible if equipment is improperly installed. Therefore, it is extremely important that you fully read and understand all installation documentation supplied with your heater BEFORE attempting installation.

If you have any doubts, safety concerns or question concerning the installation documentation or the procedures within, do not hesitate to seek professional advice from your authorized Webasto marine dealer or Webasto Product N.A., Inc., directly at 1-800-555-4518.

- **DO NOT** install fuel fired heaters in unventilated passenger compartments or confined cargo holds unless authorized in writing by a Webasto installation specialist or Webasto Product N.A., Inc. directly.
- **DO NOT** install fuel fired heaters in engine compartments or areas where equipment must be U.S. Coast Guard rated "Ignition Proof."
- **DO NOT** install Gasoline fired heaters on marine vessels.
- **DO NOT** install diesel fuel fired heaters in the engine compartment of Gasoline powered marine vessels.
- **DO NOT** draw combustion air from the engine compartment of Gasoline powered marine vessels.
- **ALWAYS** switch fuel fired heaters off during refueling or when in a refueling area.

WARNING! - CONCERNING INSTALLATIONS IN GASOLINE POWERED VESSELS!

Installation of a diesel fuel fired auxiliary heater in gasoline powered vessels requires professional knowledge and strict adherence to safety information, special installation instructions and restrictions. For these reasons, installation of a diesel fuel fired auxiliary heater in gasoline powered vessels must be performed by an authorized Webasto marine installation center. Installations must comply with all applicable American Boat & Yacht Council recommendations and U.S. Coast Guard regulations.

CAUTION!

Location of heater, fuel system and components, wiring and control devices and installation of warm air ducting are important for proper operation. Failure to comply with the installation instructions provided may result in poor operation or damage to heater and vessel components.

CAUTION!

The installation instructions within this manual are intended to be used as general installation guidelines only.

For information concerning special marine applications or marine applications you are not sure of, contact an authorized Webasto marine dealer or Webasto Product N. A., Inc. directly at:

1-800-555-4518 (USA) or 1-800-667-8900 (Canada).

ATTENTION

It is the installer's responsibility that the installation complies with all applicable American Boat & Yacht Council and U.S. Coast Guard regulations. Also, all relevant state and provincial licensing regulations if any, governing the installation and use of auxiliary heating devices in watercraft must be observed.

Symbol Identification

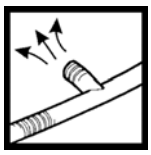
Symbols that define sections in this manual

Mechanical Preparation

Fuel

Electrical

Exhaust



Warm Air Ducting

Combustion Air Intake

Initial Start-up

Maintenance/Troubleshooting

General Information

Unless tolerances are shown within the technical data table, a tolerance of ± 10% applies at an ambient temperature of +20 °C (+68 °F) and at the rated voltage and conditions.

Fuel Requirements (Diesel/):

Diesel fuel, heating oil and kerosene are suitable fuels for the heater. Any negative effect caused by additives is not known. Any addition of waste oil is not permitted.

When changing to cold-resistant fuels, the heater must be operated for approximately 15 minutes to ensure that the fuel metering pump is filled with the new fuel.

Electrical Components:

Control unit, motor, fuel metering pump, light bulb in the digital timer and pencil-type glow pin are designed either for 12-volt or 24-volt operation.

The digital timer, temperature limiter and flame detector are voltage-independent components.

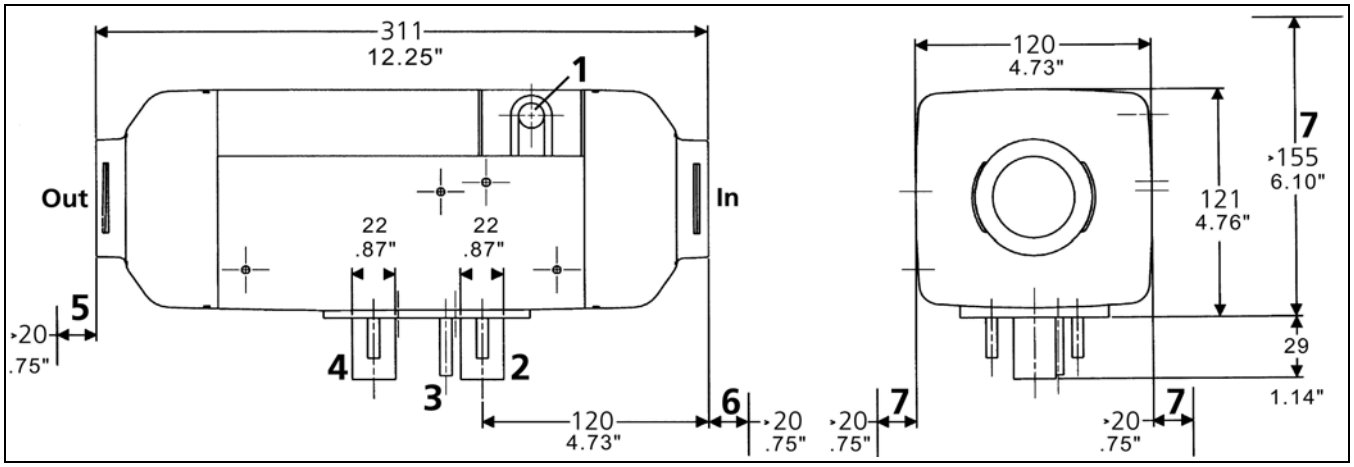
Heater	Operation	AT 2000 S	AT 3500	AT 5000
Type		Air heater with vaporizing type burner (Ferro-Tec)		
Heat Output	Control Range Boost (30 min.)	0.9 - 2.0 kW	1.5 - 3.5 kW	1.5 - 5.0 kW 5.5 kW
Fuel		Diesel		
Fuel Consumption	Control Range Boost (30 min.)	0.12 - 0.24 l/h	0.17 - 0.42 l/h	0.17 - 0.60 l/h 0.66 l/h
Rated Voltage		12/24 Volts	12/24 Volts	12/24 Volts
Operating Voltage Range	12 Volt 24 Volt	10 - 15 Volts 20 - 30 Volts	10.5 - 15 Volts 21 - 30 Volts	10.5 - 15 Volts 21 - 30 Volts
Rated Electric Power Consumption	Control Range	9-22 Watts	15-36 Watts	15-90 Watts
Permissible Ambient Temperature Heater: - operation - storage Metering Pump: - operation - storage Control Element: - operation - storage		-40 °C ... +40 °C (-40 °F ... +104 °F) -40 °C ... +85 °C (-40 °F ... +185 °F) -40 °C ... +20 °C (-40 °F ... +68 °F) -40 °C ... +85 °C (-40 °F ... +185 °F) -40 °C ... +75 °C (-40 °F ... +167 °F) -40 °C ... +85 °C (-40 °F ... +185 °F)		
Combustion Air Intake Temperature	Maximum	+40 °C (+104 °F)		
Setting Range for Interior Temperature		+10 °C ... +45 °C (+50 °F ... +113 °F)		
Flow Rate of Heating Air Against 0.5 mbar	Maximum	70 m^3/h	139 m^3/h	218 m^3/h
CO_2 Content in Exhaust Gas (operating range maximum)		9.5 ... 10.5 Vol.-%	9.5 ... 12.0 Vol.-%	
Dimensions of Heater (mm and in)		Length 311mm (12.25”) Width 120mm (4.72”) Height 121mm (4.75”)	Length 425mm (16.75”) Width 148mm (5.82”) Height 148mm (5.82”)	
Weight of Heater		2.6 kg (5.73 lb)	5.9 kg (13.0 lb)	

Table 1: Technical Data

Dimensions

The mounting dimensions as well as the space required for the performance of servicing work are shown in the following figures.

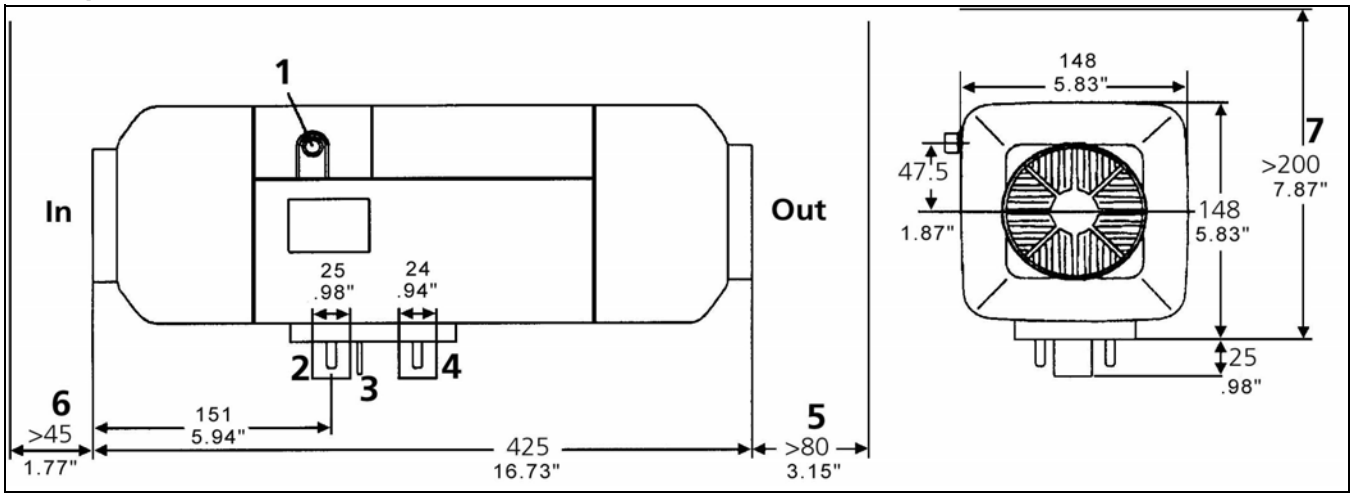
Air Top 2000 S



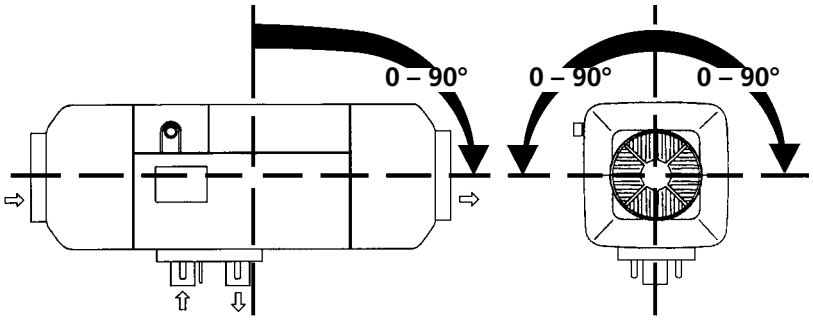
Legend for Air Top 2000 S (above) and Air Top 3500 & 5000 (below):

1 Electrical Cable Access (Right or Left)
2 Combustion Air Inlet
3 Fuel Inlet Tube
4 Exhaust Gas Outlet
5 Minimum Space Requirement for Warm Air Outlet
6 Minimum Space Requirement for Cool Air Inlet
7 Minimum Space Requirement for Heater Removal

Air Top 3500 & 5000



Permissible installation positions for Air Top 2000 S, Air Top 3500 and Air Top 5000 air heaters.



Checklist of Minimum Requirements for the Installation of Heaters on Marine Vessels

Installation Location of Heater

- Install heater in a location that will prevent it from being submerged in the bilge water when the vessel is heeling
- As a rule, to be installed in the foredeck box or locker (to keep exhaust lines short)

Fuel Connection

- Mount the pump as closely to the fuel tank as possible (see Fig. 9, page 19) (maximum 1.2 meter long suction line, maximum 9 meter pressure line)
- Install pump with an anti vibration, sound deadening mount
- Always use a fuel filter (see Fig. 7, page 18 and Webasto accessories)
- Do not mount pump on frames (noise transmission)
- Provide for dedicated fuel extraction, i.e. use separate tank extraction device (standpipe), do not extract fuel from engine's supply line. Do not "Tee" into engine fuel delivery or return lines.

Exhaust Gas System

- Exhaust gas outlet: on sailing vessels to be located at the upper stern (due to heeling) on motor boats on the sides (owing to submerging of the upper stern)
- Install exhaust gas outlet at least 500 millimeters (20 inches) above the water line
- Always route lines with a goose-neck bend (see Fig. 4, page 15) preventing water from entering the system when the vessel is heeling
- Always use a **sealed** exhaust muffler (if applicable to your installation)
- Maximum overall length of the exhaust tube is 5 meters (16.5 feet) without muffler or 2 meters (6.5 feet) with a muffler installed.
- The total radius of bends should not exceed 270 degrees (large radii to be selected)
- Always insulate the exhaust tubes
- A condensation water drain is necessary with exhaust line lengths greater than 3 meters (10 feet) and optional on shorter lengths (see Fig. 4, page 15) (drain to be filled with water after installation)

Combustion Air System

- Air to be drawn from ventilated foredeck box or ventilated locker or *engine room (*Diesel engines only)
- Check that intake openings are unobstructed

Heating Air Intake

- Air to be drawn from ventilated foredeck box or ventilated locker, **not** from the engine room (ensure that intake openings are kept unobstructed)
- Optionally, fresh air or recirculated air may be drawn in using a distributing piece with control flap (Webasto accessory)

Hot Air Circulation

- In the saloon, large, non-closable air outlet nozzles are to be used
- In backrooms, use small air outlet nozzles; they may be closable
- At least one air outlet nozzle with an outlet diameter appropriate for the heater must always be open
- Keep length of the air duct lines as short as possible to achieve good heat circulation without excessive flow restriction on the heating system overall

Electrical System

- Be sure to install an external temperature sensor if air heaters are operated in the fresh-air mode

Installation Example - Air Heater

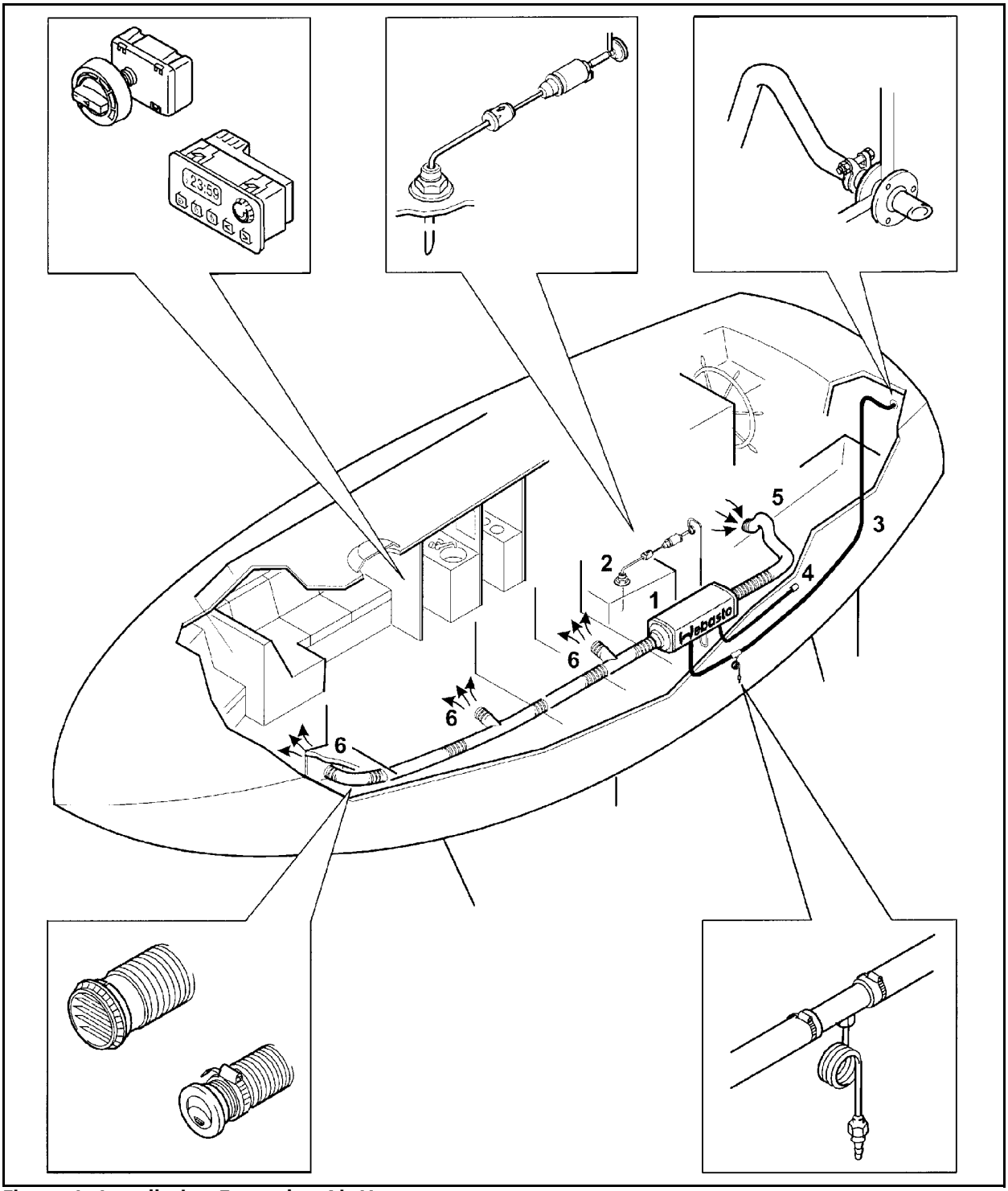


Figure 1. Installation Example - Air Heater

Legend for Figure 1:

1 Air heater
2 Fuel Connection
3 Exhaust gas tube
4 Combustion air intake tube
5 Cool air inlet (return)
6 Heated air outlets

Installation

In the following we would like to provide some useful advice and tips which, when followed, will ensure that the heating system fully meets your specific needs.

The installation instruction manual supplied with the heater must always be observed.

General Installation Notes

When installing the heater, the maximum inclination of the marine vessel must be taken into account. The heater must not be submerged, for example, in the bilge water when the vessel is in an inclined position. The heater must be installed horizontally and parallel with the longitudinal axis of the vessel. The positional changes that are normal during heeling are acceptable.

The installation location should not be situated next to the berths or adjacent to the salon, if possible. The heating air (cool air return) must not be extracted from the engine room.

DO NOT store flammable material in the vicinity of the heater and its exhaust gas line. This also applies to flammable liquids, dusts, vapors and gases.

Resilient mounting of the heater is recommended in order to absorb vibrations. In most cases, this results in a significant noise reduction.

Positioning of the Heater

When selecting a mounting location for the heater, keep in mind storage and the movement of gear, i.e. sail stowage, fender stowage, conduits and service access points, steering gear linkages etc.

In selecting the best mounting location, first consider all installation aspects and the constraints they will place on the mounting location, i.e. electrical harness routing, fuel pick-up point, fuel line routing, fresh air and heated air ducting, and most importantly, the exhaust line maximum length and outlet position.

A cockpit locker or storage compartment is a favored installation area where access to the transom for the exhaust line routing, fuel tank and fuel line, and cockpit fresh air inlet (cool air return) routing are close at hand. Refer to Figure 1 on previous page.

As an alternative, the heater can be installed within the engine room of Diesel powered boats, however, in this location it can be difficult to route the exhaust and other components of the heater.

Keep in mind, components such as the fresh air inlet ducting (cool air return) will have to be inspected for damage on a regular basis to avoid engine room fumes being drawn into the warm air distribution system.

Special Restrictions Concerning Gasoline Powered Vessels!

WARNING!

When installing a Webasto diesel fuel fired air heater in a gasoline powered boat, the heater MUST NOT be installed in the engine compartment. The Webasto heater must be installed above the top level of the engine compartment.

The combustion air supply for the heater MUST NOT be drawn from the engine compartment. The inlet end of the combustion air intake tube must be positioned above the top level of the engine compartment to prevent the possibility of drawing flammable vapors and gases into the heater.

Universal Heater Mounting Bracket

WARNING!

Drowning risk! Be absolutely sure where you are drilling or punching holes! Inadvertently drilling large holes through the hull of a vessel below the waterline can result in massive water intake in very short order. Always be aware of your surroundings should you have to make an escape in an emergency.

For heater mounting, use the pre-drilled stainless steel mounting bracket, which is provided with the kit.

Make certain that the bracket is mounted securely to enable the heater to withstand "sea shock." In some cases it may be necessary to fiberglass a wooden pad in place at the mounting location to avoid drilling into or through the hull of the vessel.

It is also preferable to position the bracket so that the heater exhaust outlet is vertical-down. This will provide optimum heater operation and allow for vessel's heel.

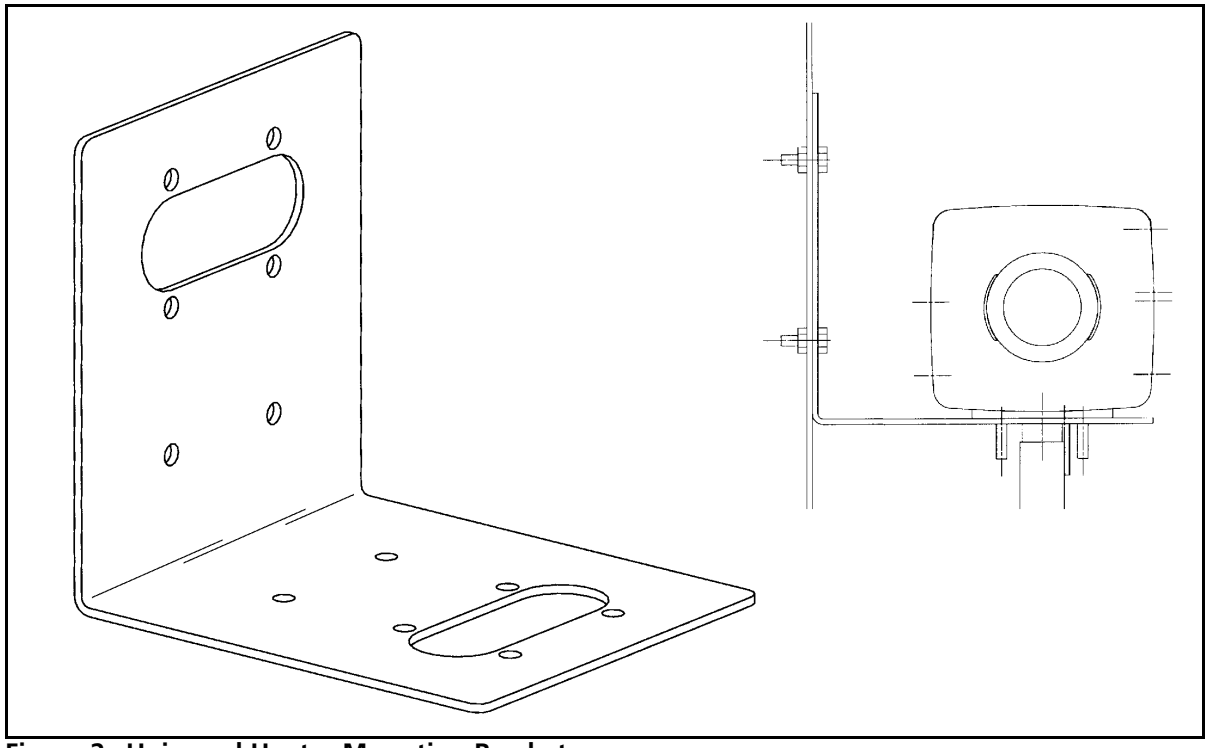


Figure 2. Universal Heater Mounting Bracket

Place the heater on the mounting bracket. Ensure the rubber gasket on the base of the heater is in place.

Secure the heater using the provided hardware.

Exhaust System

General Information

Follow the diagrams below for correct installation guidelines and ensure the exhaust tube is routed with a minimum of bends, not to exceed 270 degrees in total and with a minimum bend radius of 50mm (2 in.).

Through-hull Fitting

The exhaust gas through-hull fitting is preferably, to be mounted at the upper stern, if possible at least 500mm (20 in.) above the water line, and must not be immersed under water even when the boat is heeling.

The hull side is acceptable for motorboats, but bear in mind the bow wave line and beam sea risk. In all cases, the through-hull fitting must not point in the direction of travel, or be susceptible to high wind pressure which may blow out the heater's flame.

A suitable hole should be drilled at a 30 degree angle in the hull for the through-hull fitting. A 6mm bar is included in the kit to be used as an extended drilling guide for the hole saw.

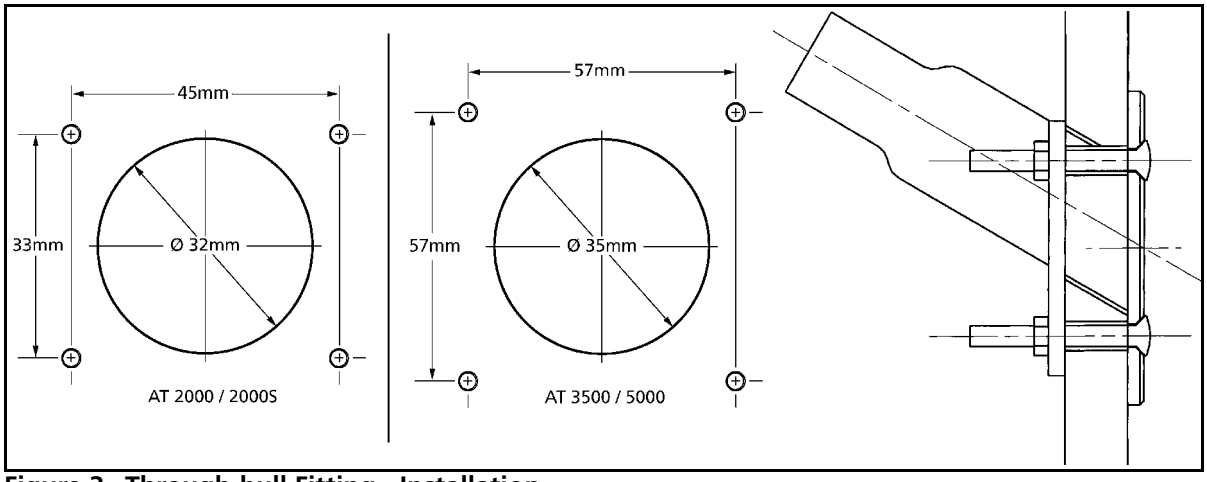


Figure 3. Through-hull Fitting - Installation

Exhaust Tube Installation

Route the flexible exhaust in such a way that the heat cannot affect adjacent heat sensitive materials, plastic piping, electric cables and sails etc. The stainless steel flexible exhaust tube supplied in the kit is wrapped in a glass / silicon protective insulating sleeve (see Fig. 4, item 2).

If additional protection is required, we recommend over-sleeving with an additional layer of insulation (available from your local Webasto marine dealer).

CAUTION!

DO NOT connect the heater exhaust into the engine or generator exhaust. Doing so will result in unacceptable back-pressure levels and may damage the heater or cause operational failure.
DO NOT install a flapper valve (clamshell) over the exhaust outlet as this will cause excessive back pressure within the exhaust system and heater.
DO NOT cover or block the exhaust outlet while the heater is in operation.

The end of the exhaust gas line must be routed with a goose-neck bend and be pitched downward toward the outlet (see Fig. 4, item 1). Any splash water that may have penetrated can thus drain back out again and not into the heater.

The exhaust gas line is to be kept as short as possible. The maximum length of 5 meters (16.5 feet) without muffler or 2 meters (6.5 feet) with muffler must on no account be exceeded. The total radius of bends should not exceed 270 degrees with a minimum bend radius of 50mm (2 in.).

The exhaust tube and exhaust components must be securely fastened using approved exhaust tube clamps and P-clips as supplied with the heater kit.
Under no circumstances should coolant hose style clamps be used to secure exhaust tubing to the heater or other exhaust components.

If exhaust gas lines are routed through rooms occupied by persons, these pipes must be replaced with genuine Webasto replacement parts after at least 10 years of service.

At the lowermost point of the exhaust gas line, a condensation water drain (see Fig. 4, item 3) can be installed via which the condensation water collecting in the exhaust gas line can be drained off at regular intervals. A condensation drain is provided in your heater kit to drain off any collected condensation or sea water that may enter the exhaust. Fill condensation drain with water to provide a seal against exhaust gas leakage once drain has been installed.

WARNING!

Avoid asphyxiation! If the exhaust gas tube is routed through the inside of the vessel, exhaust gas tube must be as leakproof as possible:

- use only Webasto approved exhaust clamps and firmly tighten clamps.
- an approved exhaust sealant can be used on the inside of the exhaust tube at all connection points
- use condensation water drain
- if desired, use an optional gas tight exhaust muffler to reduce interior noise (see accessories)

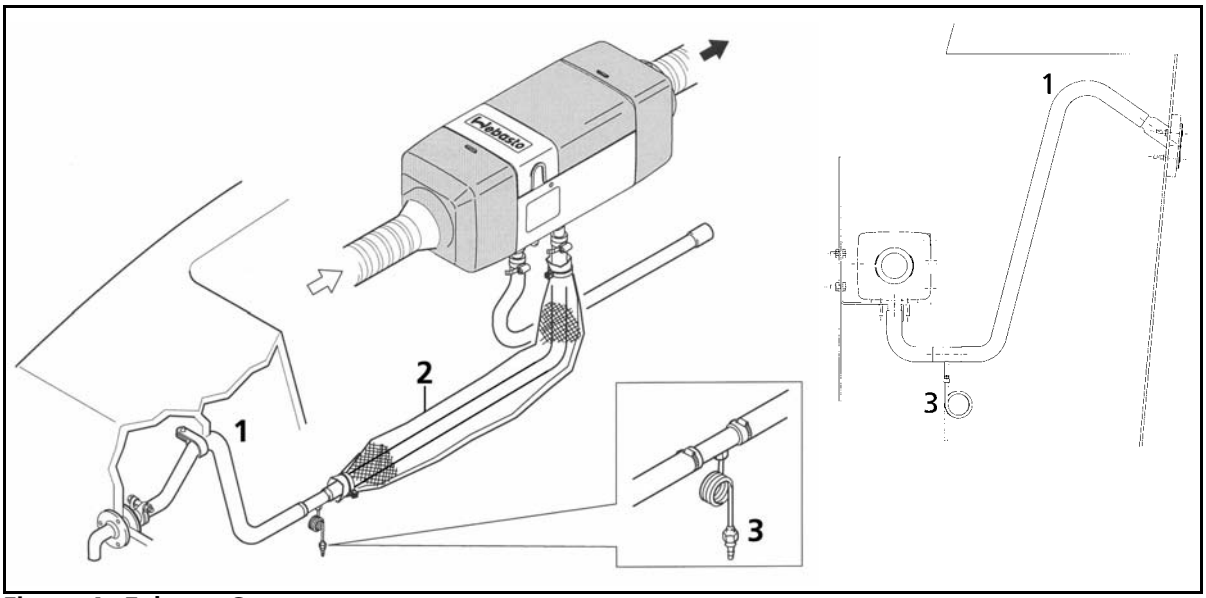


Figure 4. Exhaust System

Legend for Figure 4:

1 Goose-neck (prevents water intrusion)
2 Heat insulating sleeve
3 Condensation drain-off

Combustion Air Intake Tube Installation

WARNING!

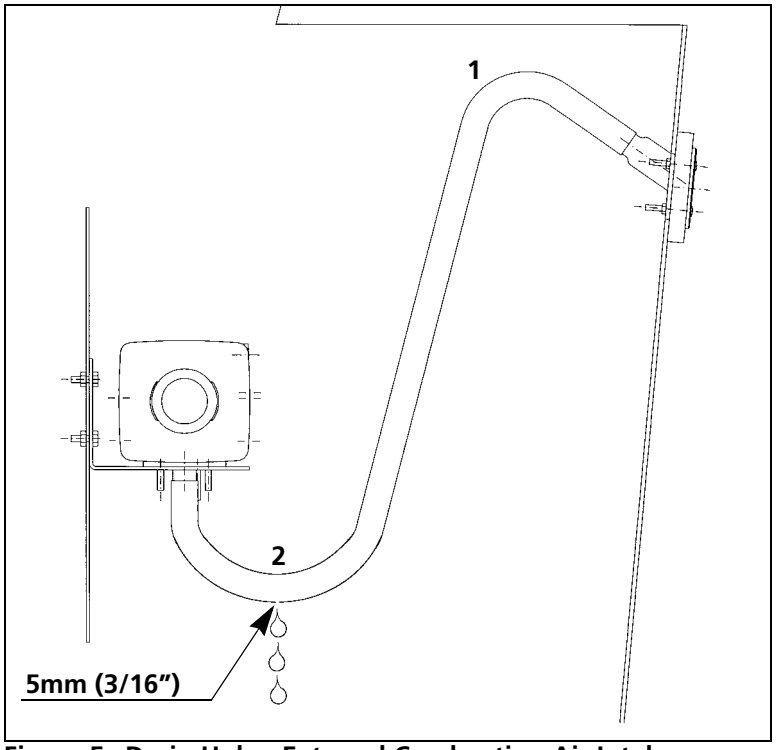
Asphyxiation risk! The combustion air required for the heater may only be drawn in from the outside or from spaces that are not occupied by persons e.g. ventilated foredeck box or ventilated *engine compartment (Diesel only).

Explosion risk! Do not draw combustion air from engine compartment of gasoline powered vessels.

The maximum length of the combustion air intake tube is 5 meters (16.5 feet) without a silencer or 2 meters (6.5 feet) with a silencer. On no account are these lengths to be exceeded. The total radius of bends should not exceed 270 degrees with a minimum bend radius of 50mm (2 in.).

Where combustion air is drawn from an internal source, the combustion air tube should be routed away from the heater with a downward pitch to prevent condensation or moisture from collecting in the tube.

Where combustion air is drawn from an external source, the end of the combustion air intake tube must be routed with a goose-neck bend (see Fig. 5, item 1) with a downward pitch toward the outlet so that any water that may penetrate can drain out and not into the heater. A 5mm (3/16 in.) condensation weep hole must be provided at the lowest point between the goose-neck and the heater to allow drainage of any trapped condensation or splash water (see Fig. 5, item 2).



Keep combustion air intake tube opening clear of obstructions!

Figure 5. Drain Hole - External Combustion Air Intake

To avoid pressure differences between exhaust gas outlet and combustion air inlet, the openings of the through-hull fittings should be located in an area where equal pressure prevails.
Do not point the inlet of the combustion air tube in the direction of travel when intake air is drawn from an external source.

Secure intake tube to heater with hose clamp provided. Ensure the fuel pump connector harness is in place in the slot provided in the air intake port before tightening clamp. Secure the tube to adjacent structures with P-clips or nylon wire ties.

Fuel System

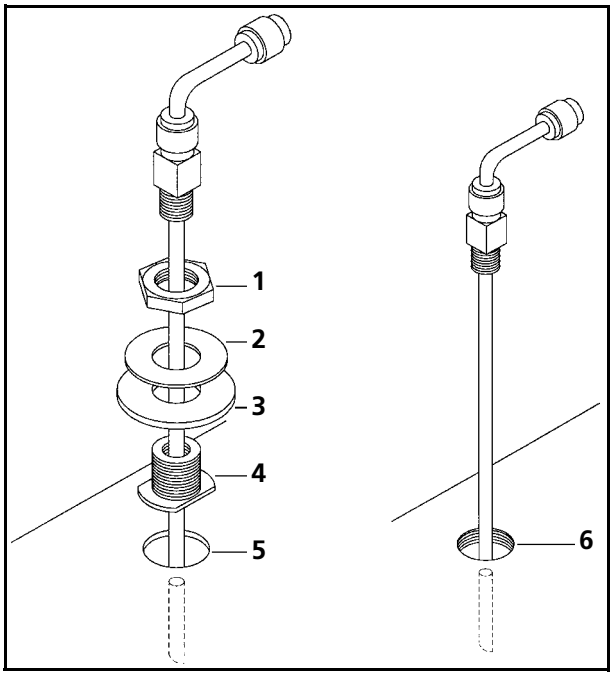
General Information

This heater installation must follow the American Boat & Yacht Council, Inc. (ABYC) guidelines.
The Fuel system conforms to Inland Waterways specifications.
Several specific regulations may apply including the use of flame resistant fuel pipe such as copper pipe, and fire resistant fixings.
The fuel must be extracted from the fuel tank of the vessel by means of a separate fuel pick-up (standpipe). Do not "Tee" into engine fuel delivery or return lines.
Suitable fuel extraction devices or tank pick-up devices are contained in the accessory lists for the heaters, or are included in the heater kit.
If an additional fuel tank needs to be installed for the fuel supply of the heater, we recommend this be carried out by a marine installation center familiar with applicable marine industry directives, codes and standards. Any safety hazards can thus be avoided.

Fuel Standpipe Installation

The fuel standpipe should be kept 25mm (1 in.) off the bottom of the fuel tank to prevent drawing sediment and water into the heater's fuel system.

Figure 6. Fuel Standpipe



Legend for Figure 6:

1 Nut
2 Washer
3 Rubber gasket
4 Bushing (tank-boss)
5 Tank with 25mm (1 in.) hole
6 Tank with available N.P.T. threaded port

1. Cut fuel standpipe to length, approx. 25 mm (1 in.) off bottom of fuel tank. Angle the cut to prevent clogging.
2. Remove burrs from cut end. Apply thread sealant to threaded fittings to prevent fuel leaks.
3. Install fuel standpipe using one of the following methods:
   - use 1/4 or 1/2 spare port on top of fuel tank (if available) and install standpipe
   OR
   - drill or punch a 25 mm (1 in.) hole in a clear area on top of the fuel tank or fuel sender plate. (Before drilling hole, apply grease to drill bit to catch metal chips)
   - assemble tank-boss and fuel standpipe to form single unit.
   - install standpipe by angling unit in so that one ear of the bushing hooks under the edge of the hole.
   - repeat with the other ear in the same fashion.
4. Center in hole and clamp in place by tightening nut down until gasket begins to squeeze out slightly.

Auxiliary Fuel Tank

In the case of gasoline powered marine vessels, a separate fuel tank must be provided to supply Diesel fuel to the Webasto air heater.

Gasoline fuel fired Webasto auxiliary heaters are not recommended nor certified for marine use and must never be installed in marine vessels.

Fuel Pump and Enclosure Installation

Appropriate mounting suggestions are contained in the following installation diagrams.

The maximum permissible fuel suction height and fuel supply height for the metering pump are referenced in Figure 9 on the next page.

CAUTION!

The fuel pump must not be mounted lower than 500 mm (20 in.) below the top of the fuel tank.

The fuel pump assembly should be mounted as close to the fuel source as possible.

The total length of fuel line run including the fuel pick-up tube to the inlet of the fuel pump must not exceed 2 meters (78 in.) and a suction height no greater than 1 meter (39 in.).

On the outlet side of the pump, the fuel line must not exceed 6 meters (234 in.) and a delivery height no greater than 3 meters (117 in.).

Ensure the fuel metering pump is mounted in a cool area. Ensure the correct direction of flow is observed.

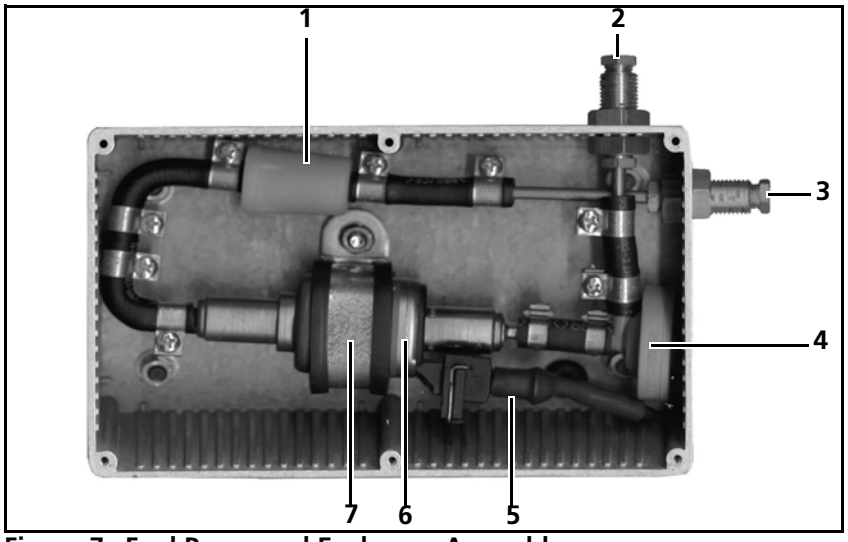


Figure 7. Fuel Pump and Enclosure Assembly

Legend for Figure 7:

1 Fuel filter P/N 5048717A
2 Fuel outlet connection
3 Fuel inlet connection
4 Pulse damper
5 Electrical cable
6 Fuel metering pump
7 P-clip

Observe Figure 8 on the next page closely.

The fuel pump outlet must be as shown (check-marked images) when installing the enclosure. This will ensure the fuel metering pump is in the correct horizontal plane for proper operation and fuel metering.

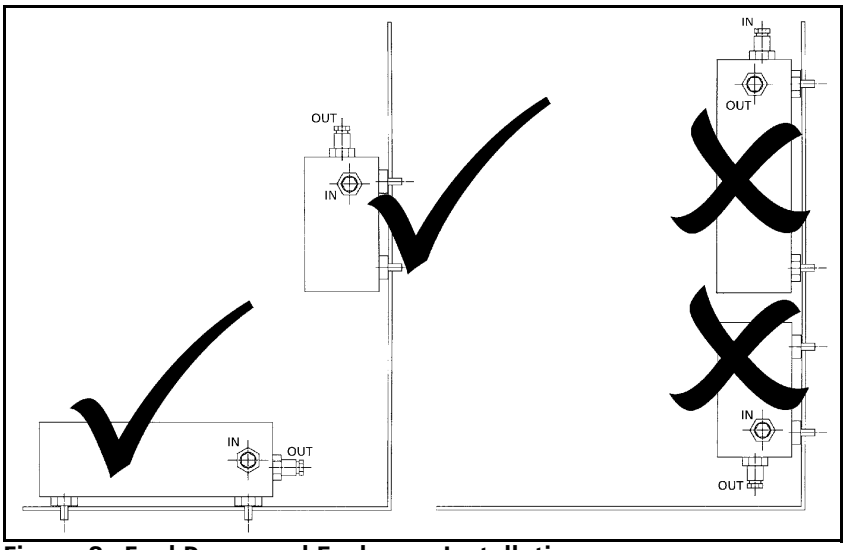


Figure 8. Fuel Pump and Enclosure Installation

Fuel System Parameters

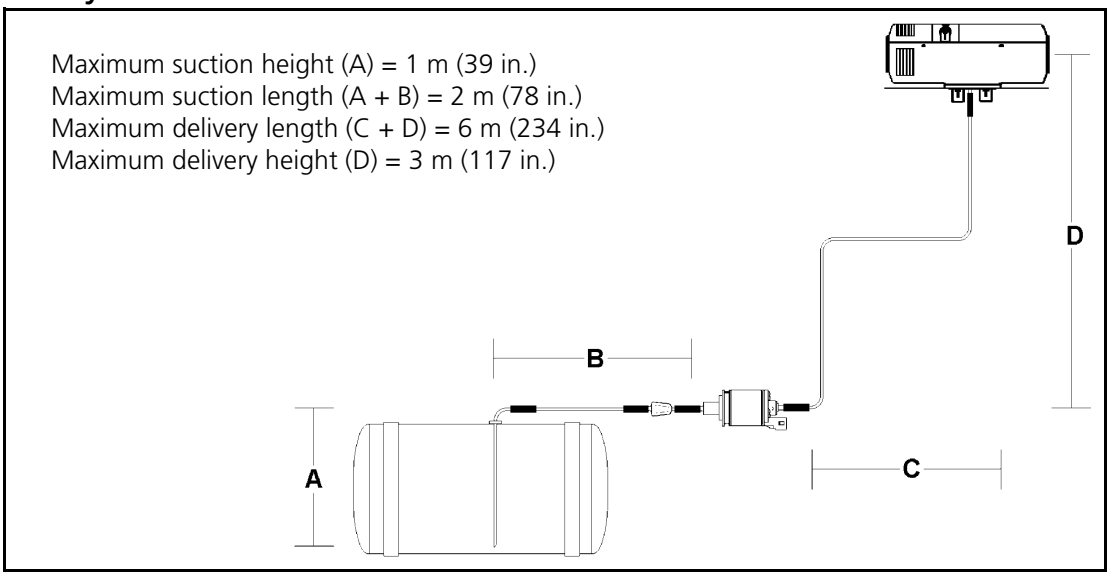


Figure 9. Fuel System Limitations

Fuel Lines

Link the fuel supply from the standpipe to the fuel pump and from the fuel pump to the heater using the metal fuel tubing and compression fittings supplied with the kit. Be sure to remove any burrs from the fuel tubing using a small file after cutting. Place the nut and olive over the end of the tubing and re-assemble onto the matting component.

The compression fittings should be tightened with moderate force only, as over-tightening will lead to a distorted olive and leaking connections.

Route the fuel tubing as straight as possible, preferably running upwards towards the heater and securely clip at frequent intervals, away from any heat source.

Heating Air Circuit

General Information

WARNING!

Drowning risk! Be absolutely sure where you are drilling or punching holes for ducting! Inadvertently drilling large holes through the hull of a vessel below the waterline can result in massive water intake in very short order.

There are two types of heating air circuits of which both have certain advantages and disadvantages over each other. The two common types are the fresh-air mode (extracting the heating air from the outside) and the recirculating mode (extracting the heating air from the heated room).

In the case of the fresh-air mode, exhaust air discharge openings (fans, hatches) leading to the outside are required in every room that is heated to prevent pressurization resulting in reduced flow through the heater. The advantage of this operating mode is that fresh air is constantly introduced with a reduction in humidity, as compared to the recirculating mode.

The recirculating mode of operation requires return air openings leading to the heating air intake ducting socket of the heater so that the heating air can flow back to the heater to facilitate proper air circulation. The advantage of this operating mode lies in the faster heating action through better heat utilization.

The total free cross-sectional area of the return air openings (or exhaust air openings of the rooms heated) must be at least 1.5 times the size of the cross-sectional area of the heating air intake opening on the heater.

Irrespective of the position of the heating air inlet it must be ensured that no water can penetrate and that the intake openings are not and cannot be obstructed by any objects stowed away.

Webasto air heaters feature powerful blowers that are capable of conveying the heating air through long ducting runs for distribution throughout the vessel. Nevertheless, keep ducting runs and turns to a minimum. Plan your heating circuit carefully to avoid high flow resistance. If flow resistance is too high, the overheat protection will likely respond by switching the unit off.

Optional ducting system silencers are available to reduce any associated noise to a minimum.

The heating air circuit must be so designed that the heating air ducting can neither be crushed nor pinched.

Where heating air ducts need to be routed through bulkheads the use of pipe sockets is recommended so that the ducts can be attached on both sides. Ducting hoses that are merely passed through the openings without any protection will wear through with time.

When installing heating air ducting in a wet environment we recommend the use of spiral wire reinforced ducting.

The use of closable air outlet nozzles is only allowed on branch lines (side rooms).

In air heating systems, manifolds with control flaps and cable control are frequently used. The air flow can thus be distributed and adjusted by infinitely variable control.

Our accessories list contains all air circulation elements available (branches, elbows, etc.).

Heating Air Ducting Installation

Figure 10 illustrates the installation of an air heater in a sailboat with heating air intake from the cockpit. Figure 11 illustrates the installation of an air heater with recirculating mode of operation in a sailboat.

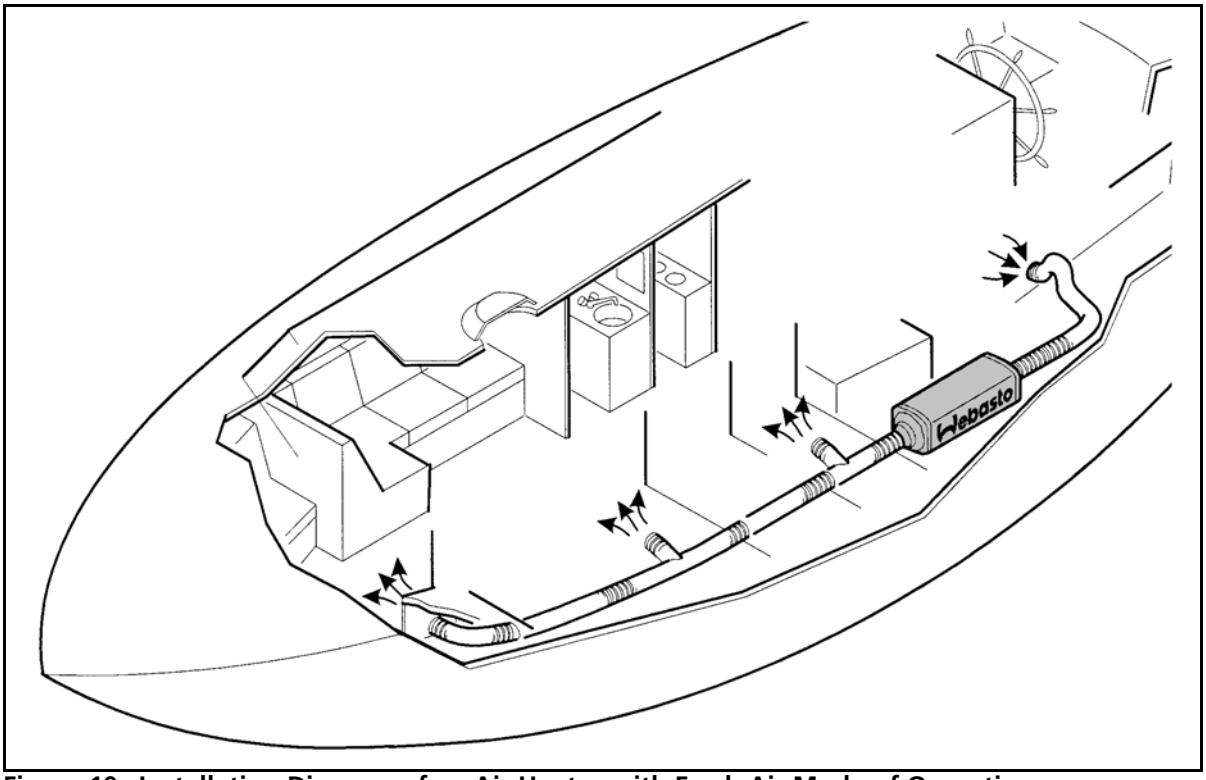


Figure 10. Installation Diagram of an Air Heater with Fresh Air Mode of Operation

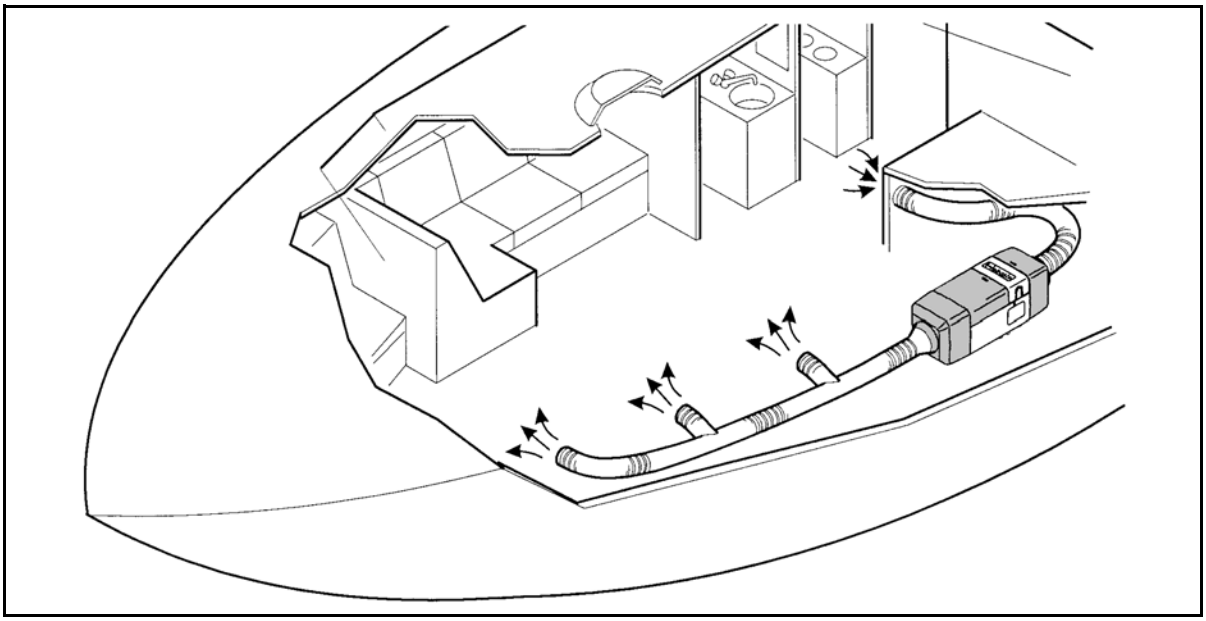


Figure 11. Installation Diagram of an Air Heater with Recirculating Mode of Operation

Heating Air Intake Options

Option 1, Recirculation Mode:
The return air for heating is drawn in from the cabin (and any side-rooms) either via flexible ducting or return openings. Use a Webasto fixed open grille to terminate the flexible duct. If the heater is mounted in a locker, use the grille supplied in the kit to ventilate the locker.
Locate the air intake grille close to the heater intake, so that outside air is drawn in, in preference to the locker air. It is not necessary to connect the grille to the heater with flexible ducting, unless there is a risk of contaminated air reaching the heater.
If the heater is fitted in the engine room, use flexible ducting to draw in fresh cabin air, thus, avoiding engine room air and associated fumes from being drawn into the heating air system.

Option 2, Fresh Air Intake Mode:
The air for heating is drawn into the heater from an external source either via flexible ducting or a grille located on an external locker wall or wall opening. It is important that the rooms being heated are adequately ventilated, otherwise air flow through the heater will be reduced, in which case the heater's overheat protection is likely to respond.

WARNING!
Asphyxiation risk! The fresh air intake must be located where exhaust fumes from the heater or the engine cannot be drawn in to the heater intake and heating system.

To control the room temperature in the case of fresh air intake, an optional external temperature sensor must be installed in a location with average room temperature and be connected to the control unit.

ATTENTION
IT IS IMPORTANT THAT A SUPPLY OF CLEAN, UNOBSTRUCTED AIR REACHES THE HEATER THROUGHOUT ITS OPERATION.

Hot Air Outlets

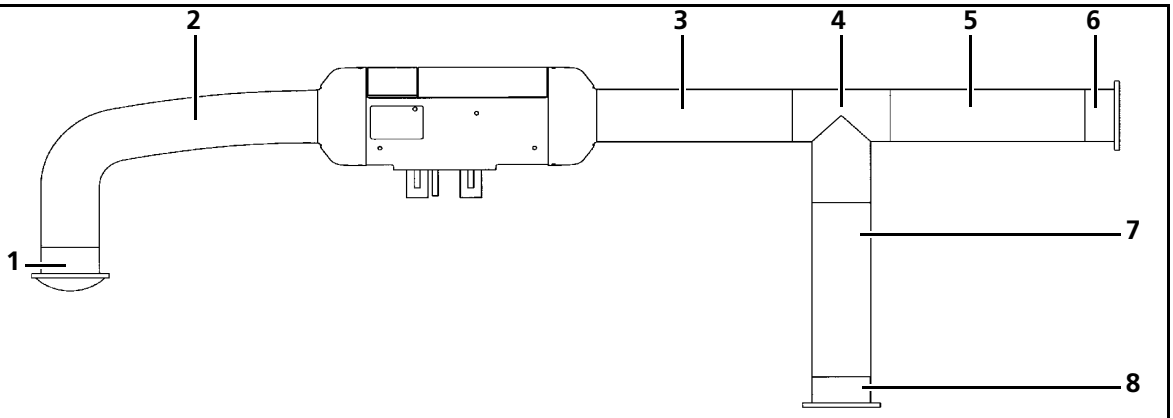
Hot air outlets should be located low in the rooms being heated. Be aware that the heated air discharged can reach temperatures upwards to 90 °C (200 °F). Outlets should be located where contact with passengers is unlikely. The hot air discharge should not be directed towards heat sensitive components or surfaces in the immediate vicinity of the outlet.

Avoid long runs of ducting; they are inefficient and could lead to over heating.
A heater is more efficient when venting the hot air into free cabin space rather than being confined to a "rabbit warren" of ducting.

It is not always necessary to place outlets at every point where heat is desired. The pressure of the fan, (particularly with minimal ducting), is effective at reaching most parts of the vessel.
Keep the duct runs as straight as possible and avoid running ducts where they could become crushed or broken.

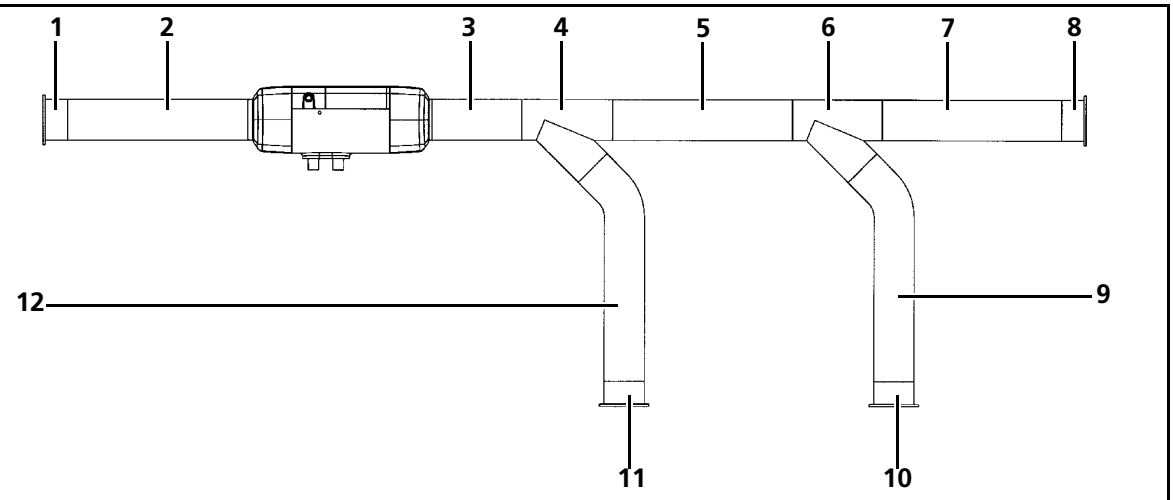
The following diagrams illustrate typical ducting systems created with "Y" or "T" branches and outlets. Use the clips provided to secure duct joints.

Ducting Layouts - Typical



1 Air Inlet Nozzle - 60mm (2.36") P/N 398551
2 Ducting - 60mm (2.36") . . . . P/N 398497
3 Ducting - 60mm (2.36"). . . . . P/N 398497
4 T-Junction - 60x60x60mm . . . P/N 86643A
2.36" x 2.36" x 2.36"
5 Ducting - 60mm (2.36") . . . . . P/N 398497
6 Air Outlet Nozzle - 60mm (2.36")P/N 398551
7 Ducting - 60mm (2.36") . . . . . P/N 398497
8 Air Outlet Nozzle - 60mm (2.36")P/N 398551

Figure 12. Air Top 2000 / 2000 S - Typical 2 Outlet Ducting Layout

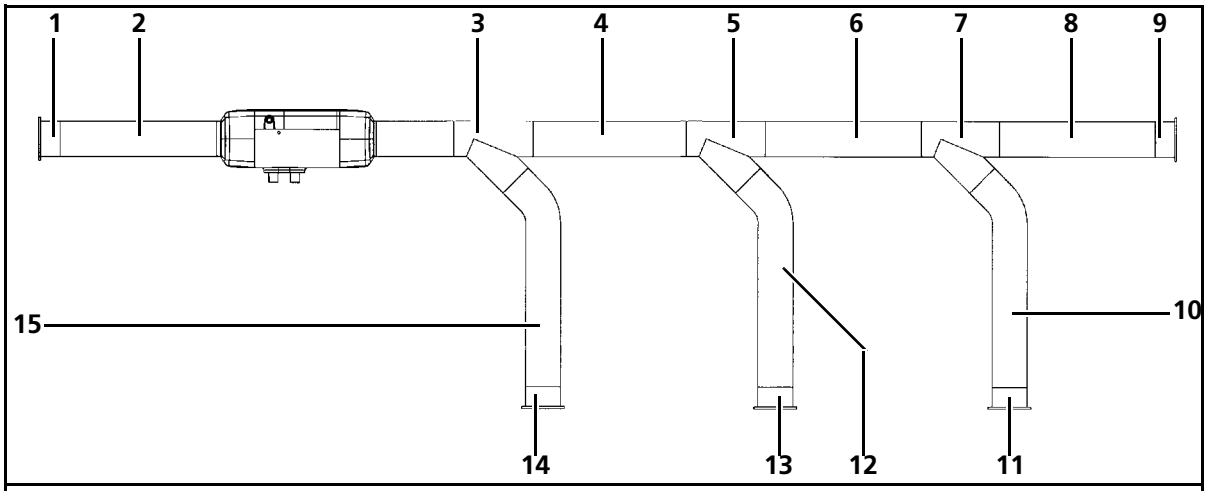


1 Open Air Inlet Nozzle . . . . . P/N 91569A
90mm (3.54")
2 Ducting . . . . . P/N 5000266A
90mm x 1.5m (3.54" x 4.92')
3 Ducting . . . . . P/N 5000266A
90mm x 1.5m (3.54" x 4.92'")
4 Y-Junction. . . . . P/N 90999A
90x60x90mm (3.54" x 2.36" x 3.54")
5 Ducting . . . . . P/N 5000753A
90mm x 5m (3.54" x 16.4')
6 Y-Junction . . . . . P/N 90999A
90x60x90mm (3.54" x 2.36" x 3.54")
7 Ducting. . . . . P/N 5000753A
90mm x 5m (3.54" x 16.4')
8 Open Outlet Nozzle. . . . . P/N 91569A
90mm (3.54")
9 Ducting. . . . . P/N 5000316A
60mm x 2m (2.36" x 6.56')
10 Air Outlet Nozzle. . . . . P/N 398551
60mm (2.36")
11 Air Outlet Nozzle - . . . . . P/N 398551
60mm (2.36")
12 Ducting - . . . . . P/N 5000316A
60mm x 2m (2.36" x 6.56')

Figure 13. Air Top 3500 - Typical 3 Outlet Ducting Layout

See "Accessories" section of this manual for a listing of additional ducting accessories.

Ducting Layouts - Continued



1 Air Inlet Nozzle . . . . . P/N 91569A
90mm (3.54″)
2 Ducting . . . . . P/N 5000266A
90mm x 1.5m (3.54″ x 4.92′)
3 Y-Junction . . . . . P/N 90999A
90x60x90mm (3.54″ x 2.36″ x 3.54″)
4 Ducting . . . . . P/N 5000266A
90mm x 1.5m (3.54″ x 4.92′)
5 Y-Junction . . . . . P/N 90999A
90x60x90mm (3.54″ x 2.36″ x 3.54″)
6 Ducting . . . . . P/N 5000753A
90mm x 5m (3.54″ x 16.40′)
7 Y-Junction . . . . . P/N 90999A
90x60x90mm (3.54″ x 2.36″ x 3.54″)
8 Ducting . . . . . P/N 5000753A
90mm x 5m (3.54″ x 16.40′)
9 Air Outlet Nozzle . . . . . P/N 91569A
90mm (3.54″)
10 Ducting. . . . . P/N 5000316A
60mm x 2m (2.36″ x 6.56′)
11 Air Outlet Nozzle . . . . . P/N 398551
60mm (2.36″)
12 Ducting. . . . . P/N 5000316A
60mm x 2m (2.36″ x 6.56′)
13 Air Outlet Nozzle . . . . . P/N 398551
60mm (2.36″)
14 Air Outlet Nozzle . . . . . P/N 398551
60mm (2.36″)
15 Ducting. . . . . P/N 5000316A
60mm x 2m (2.36″ x 6.56′)

Figure 14. Air Top 5000 - Typical 4 Outlet Ducting Layout

See "Accessories" section of this manual for a listing of additional ducting accessories.

Electrical System

General Information

Electrical connections are to be carried out in accordance with the circuit diagrams contained in this installation manual.

Main power leads must have a minimum cross-sectional area of 4.0 mm² (AWG 10 Gauge) and should be routed a short as possible. In the case of lead lengths greater than 7.5 m (24.5 ft.), the existing cables with 4.0 mm² wires must be replaced with 6.0 mm² (AWG 8 Gauge) wires. The main fuse has to be installed at a distance no greater than 1 m (39 in.) from the battery positive pole.

When installing the electrical system make sure that the components are installed in protected, dry areas to prevent corrosion. When leads need to be extended, make sure you use cables with the correct cross-sectional area!

We recommend a second battery to be installed for the operation of the heater which should, if possible, not be used for engine starting purposes. To avoid having to charge the battery too often its capacity should not be too small.

If you have highly sensitive electronic components on board, a special electrical interference suppression may become necessary. In this case, please consult a competent specialist workshop.

When actuating the battery disconnect switch (if equipped), wait until the after-running period of the heater has been completed.

Harness Connection

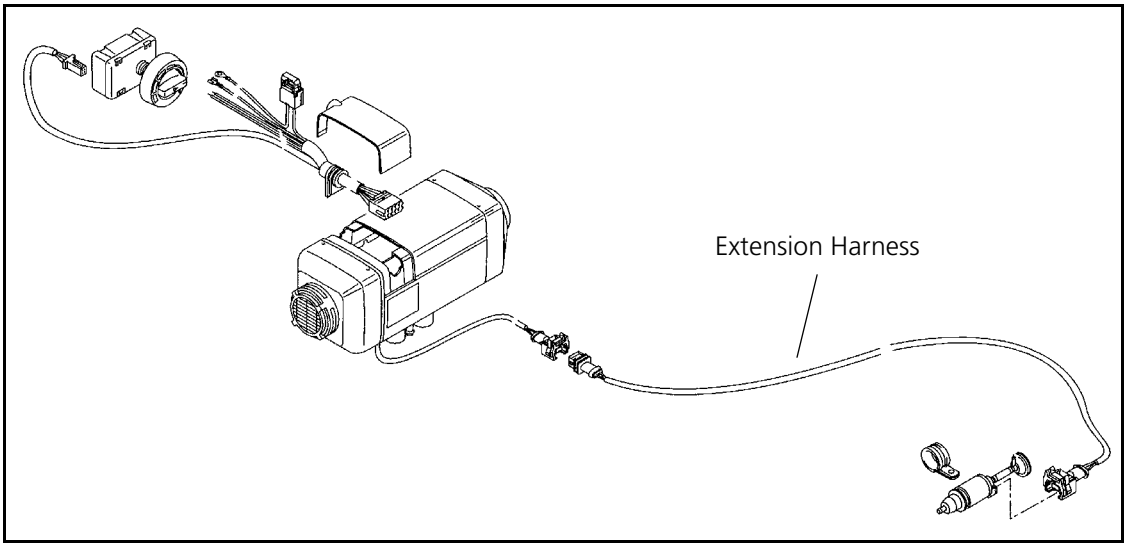


Figure 15. Control and Fuel Pump Electrical Harnesses - Air Top Heaters

For shipping purposes, the fuel pump harness may be tucked in the air intake port on the bottom of the heater. Carefully remove bundled harness from intake port, route it to the desired fuel pump location and install the two terminals into the supplied connector. The fuel pump wires can be installed in either location in the connector. There is not a specific wire location.

A fuel pump extension harness may also be used. Connect extension harness directly between original harness and fuel pump. Refer to Figure 15.

The heater power / control harness can be routed out of the right or left hand side of the heater subject to individual requirements.

ATTENTION

Be sure not to touch the printed circuit board or conductors. Care should be taken to prevent discharge of static electricity that can damage sensitive circuitry.

Remove the control unit cover to access the harness connection sockets. Insert harness connectors into their relative sockets.

NOTE: Lift off control unit cover by applying a blunt edge at its side (see arrows in Figure 16).

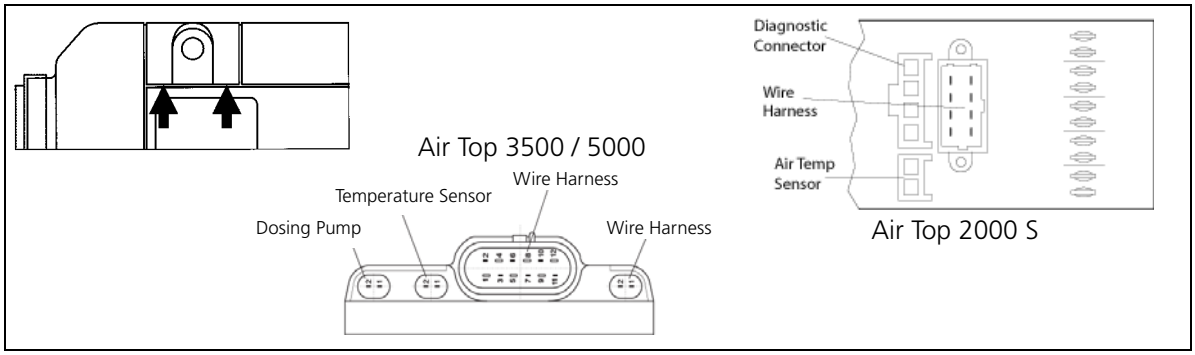


Figure 16. Removal of Control Unit Cover

The Air Top 2000 S will have an eight-way socket whereas the Air Top 3500 & 5000 will have a twelve-way socket. The Air Top 3500 & 5000 will also have an additional two wire connector (green and brown wires) that is used for diagnostic purposes only. The diagnostic connected during the installation process.

Locate a suitable battery supply and ground point. The closer you can connect the main power leads to the battery, the less likelihood of voltage drop problems affecting heater operation. Route and connect the power leads, with ring terminals, as follows:

Red	-	battery positive or power supply point (+)
Brown	-	battery negative or ground point (–)

Fuse Holder Installation

To provide the heater with adequate protection, an additional flat fuse holder is to be installed (supplied with the heater). The fuse holder must be mounted within 1 meter (39 in.) of the positive power source or closer if possible.

The fuse holder may only be installed in an interior space protected from splash water or damage. Mount the fuse holder in an upright position, see Figure 17 for installation position variance. Secure the fuse holder mounting plate to a flat surface and clip the fuse holder into the mounting plate.

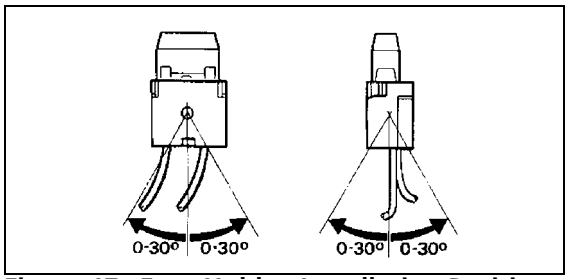


Figure 17. Fuse Holder, Installation Position

Control Element (Rheostat) Installation

ATTENTION

Since the control element is not affected by temperature, it can be mounted virtually anywhere suitable within the vessel as long as it can be easily reached by the user during heater operation.

Install control element in a suitable location allowing enough slack in the harness so that it is not stretched taut. The shaft will require a 12.5 mm (1/2 in.) hole for mounting. Observe the figures below for mounting. Plug harness connector into receptacle on rear of control element.

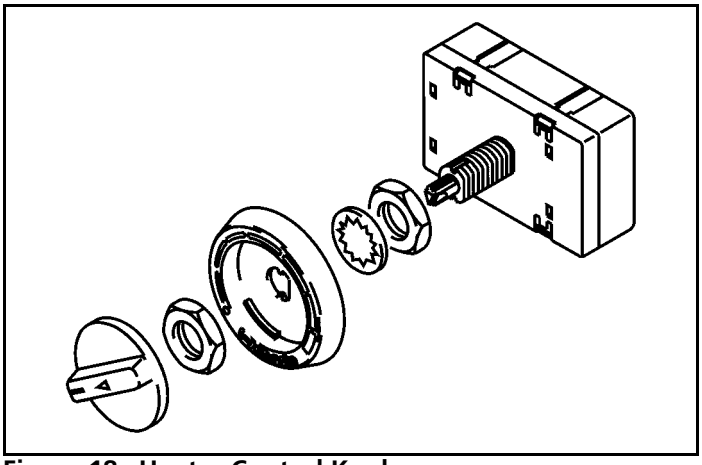


Figure 18. Heater Control Knob

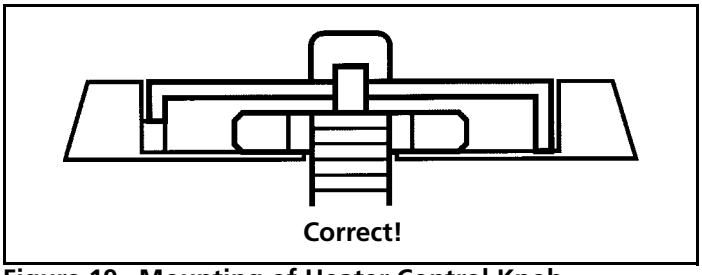


Figure 19. Mounting of Heater Control Knob

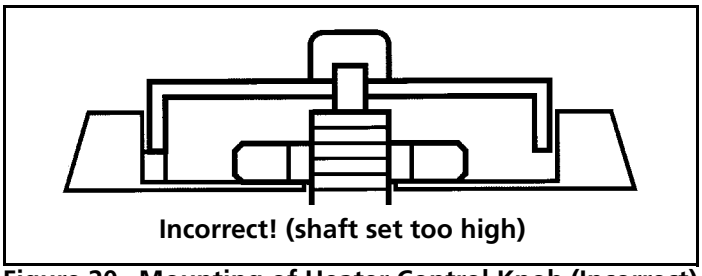


Figure 20. Mounting of Heater Control Knob (Incorrect)

Initial Start-up

Before starting the heater for the first time, check your installation for:

- routing and securing of wiring, fuel line, exhaust/combustion air tubes and hot air outlet/return air ducting.
- battery connections and polarity.
- loose fasteners.

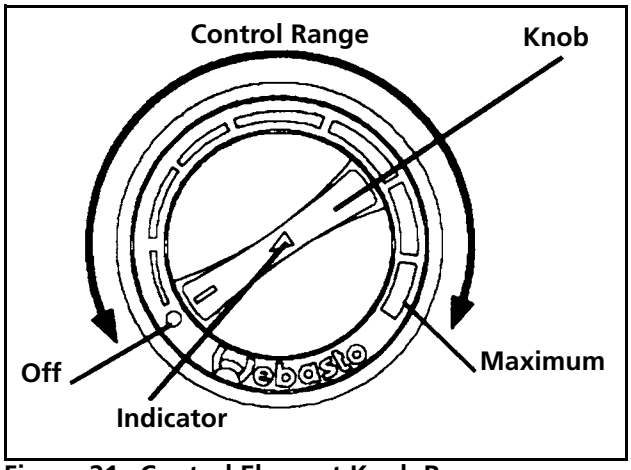


Figure 21. Control Element Knob Range

Once the installation has been inspected, insert the main power fuse and set the control element knob to the maximum heat position (see Figure 21).

The heater may run through a few start-up attempts without actually firing up. Depending on the total length of fuel line, it may take a few start attempts before the fuel reaches the heater. This is normal after switching on for the very first time. Switch the heater off and back on again to clear the lock-out and re-initiate the start-up cycle after each failed attempt.

Once the heater starts, allow it to run until all trapped air bubbles have escaped and heater operation sounds smooth and consistent.

After the heater is in normal operation, all fuel connections must be checked once again for leakage and all lines, tubes and wiring for secure fastening.

Using the information from the heater identification plate, complete the warranty registration card and send to Webasto Product N.A., Inc. for warranty registration.

Maintenance/Troubleshooting

WARNING!

Although simple maintenance procedures can be performed by the owner, any operational problems or major repairs due to damage should be performed by a properly trained Webasto specialist.

CAUTION!

Always use genuine Webasto service and replacement parts to ensure trouble-free operation of the heater.

Heater Maintenance

The Webasto Air Top series air heaters are designed and engineered with minimal maintenance in mind. Under normal circumstances it should be inspected for proper functioning at least once annually, preferably, just prior to the heating season.

To ensure trouble-free operation, the following should be part of an annual and periodical inspection:

- Operate the heater a minimum of 10 minutes every month to keep fresh fuel in the system and the fuel pump lubricated.
- Keep the heating air outlet and ducting clear of obstructions. Inspect outlet ducting for damage and repair as necessary.
- Keep the heater inlet grille clear of obstructions. If the heater is equipped with ducting, inspect for damage and repair as necessary.
- Inspect the combustion air tube and exhaust tube for obstructions and damage. Check to ensure they are securely attached to the heater and vehicle. Repair damaged items where necessary.
- Inspect the fuel system and all connections for leaks. Tighten clamps if loose. Ensure fuel line is well secured to the vehicle. Replace fuel filter if equipped.

Troubleshooting

ATTENTION

Advanced troubleshooting requires comprehensive knowledge about structure and theory of operation of the heater components and should only be performed by authorized Webasto trained specialists.

For the purpose of this manual, only those items as they pertain to installation will be covered under troubleshooting.
For malfunctions beyond the scope of this manual, please call Webasto Product N. A., Inc. directly at 1-800-555-4518 (USA) or 1-800-667-8900 (Canada).

In the event of a heater malfunction, first check the following two items to eliminate them as cause for trouble:

1. Power Supply
   - Fuse blown?
   - Power at fuse?

2. Fuel Supply
   - Fuel in tank?
   - Clean, unrestricted fuel supply?

Heater Shuts Off Automatically

The heater will automatically shut off if a malfunction occurs. To clear a malfunction, turn the control element knob to off, wait 2 seconds and turn on once again to reset the heaters control unit. Should the heater fail to start or continues to malfunction, consult your Webasto specialist.

Heater Emits Black Smoke from Exhaust

Check the combustion air intake tube and exhaust tube for obstructions or damage. Clear obstructions as necessary or replace damaged tubes. Should condition persist, consult your Webasto specialist.

Self-Diagnostic System (Reading Flash Codes)

A flash code will be generated on the indicator light of the control element. These flash codes indicate a malfunction and subsequent operational interruption. There are up to ten codes available depending on the nature of the malfunction and the heater model (see Table 2).

In order to make a correct analysis, it is necessary to understand the flash code event. The flash code pertains to the control element (switch) only. The flash code is only visible during the after-run (cool-down) period of operation (an optional timer will hold the last code in memory until corrected, see "F" codes in parentheses on Table 2).

During the flash code event, you will see five quick flashes followed by a slower sequence of flashes from one flash up to ten flashes. The slower sequence of flashes is the actual malfunction code. The five quick flashes are only an indication that a malfunction has been detected and that the code will be displayed. Count only the slower sequence of flashes to obtain the current malfunction code.

For example (= one flash):
Event code 4X (F 04): ... ...

The fast/slow sequence will be repeated until the heater completes the after-run (cool-down) cycle after which, the code will be stored in the control unit memory.

ATTENTION

Specialized diagnostic equipment is required to read malfunction codes stored in the control unit memory. Consult your Webasto specialist for details.

ATTENTION

After any correction of a malfunction, a functional test has to be performed with the heater installed in the vessel.

ATTENTION

Ambient air temperature must be below the set point on the control element knob before heater will start operation.

Diagnostic Code Table

Symptom	Probable Cause	Check and Correct
No Function	Electrical wiring, fuses Control unit	Fuses, battery connections Power at red wire, ground at brown wire Control unit malfunction
1X Flash (F 01) No start after 2 start attempts No flame-up	Fuel system Combustion air Burner	Fuel level - No fuel - Fuel system not primed Type of fuel being used Plugged fuel filter - replace Fuel line connections and clamps loose Air intake or exhaust - restricted or plugged Clean or replace burner unit
2X Flashes (F 02) Flame-out during operation	Fuel supply (shortage) Burner	Restriction in fuel system Plugged fuel filter - replace Fuel line connections and clamps loose Type of fuel being used Clean or replace burner unit
3X Flashes (F 03) Low or over voltage for more than 20 seconds	Electrical system	Load test batteries Corrosion at connections Loose connections
4X Flashes (F 04) Premature flame detection	Defective flame sensor Defective flame sensor/ glow pin	Replace flame sensor - Air Top 2000 S only Replace flame sensor/glow pin - Air Top 3500/5000 only
5X Flashes (F 05) (Air Top 2000 S Only) Flame sensor	Wiring Defective flame sensor	Damaged or corroded wiring, open or short circuit Replace flame sensor
6X Flashes (F 06) Temperature sensor	Wiring Defective temp. sensor	Damaged or corroded wiring, open or short circuit Replace temperature sensor
7X Flashes (F 07) Fuel metering pump	Wiring Defective fuel pump	Damaged or corroded wiring, open or short circuit Replace fuel pump
8X Flashes (F 08) Combustion air fan	Wiring Wrong RPM Defective fan motor	Damaged or corroded wiring, open or short circuit Replace combustion air fan Replace combustion air fan
9X Flashes (F 09) Glow pin (Ceramic igniter)	Wiring Defective glow pin Defective flame sensor/ glow pin	Damaged or corroded wiring, open or short circuit Replace glow pin - Air Top 2000 S only Replace flame sensor/glow pin - Air Top 3500/5000 only
10X Flashes (F 10) Overheating	Overheating Air flow Wiring Defective temp. limiter	Switch heater off and back on (see air flow) Motor/fan obstruction, heating air flow blocked Damaged or corroded wiring, open or short circuit Replace temperature limiter
11X Flashes (F 11) (Air Top 3500/5000 Only) Temperature limiter	Wiring Defective temp. limiter	Damaged or corroded wiring, open or short circuit Replace temperature limiter
12X Flashes (F 12) (Air Top 3500/5000 Only) Control element	Wiring Defective control element	Damaged or corroded wiring, open or short circuit Replace control element

Table 2: Diagnostic Codes - Air Top Heaters

Wiring Schematic - Air Top 2000 / 2000 S with Control Element (Rheostat)

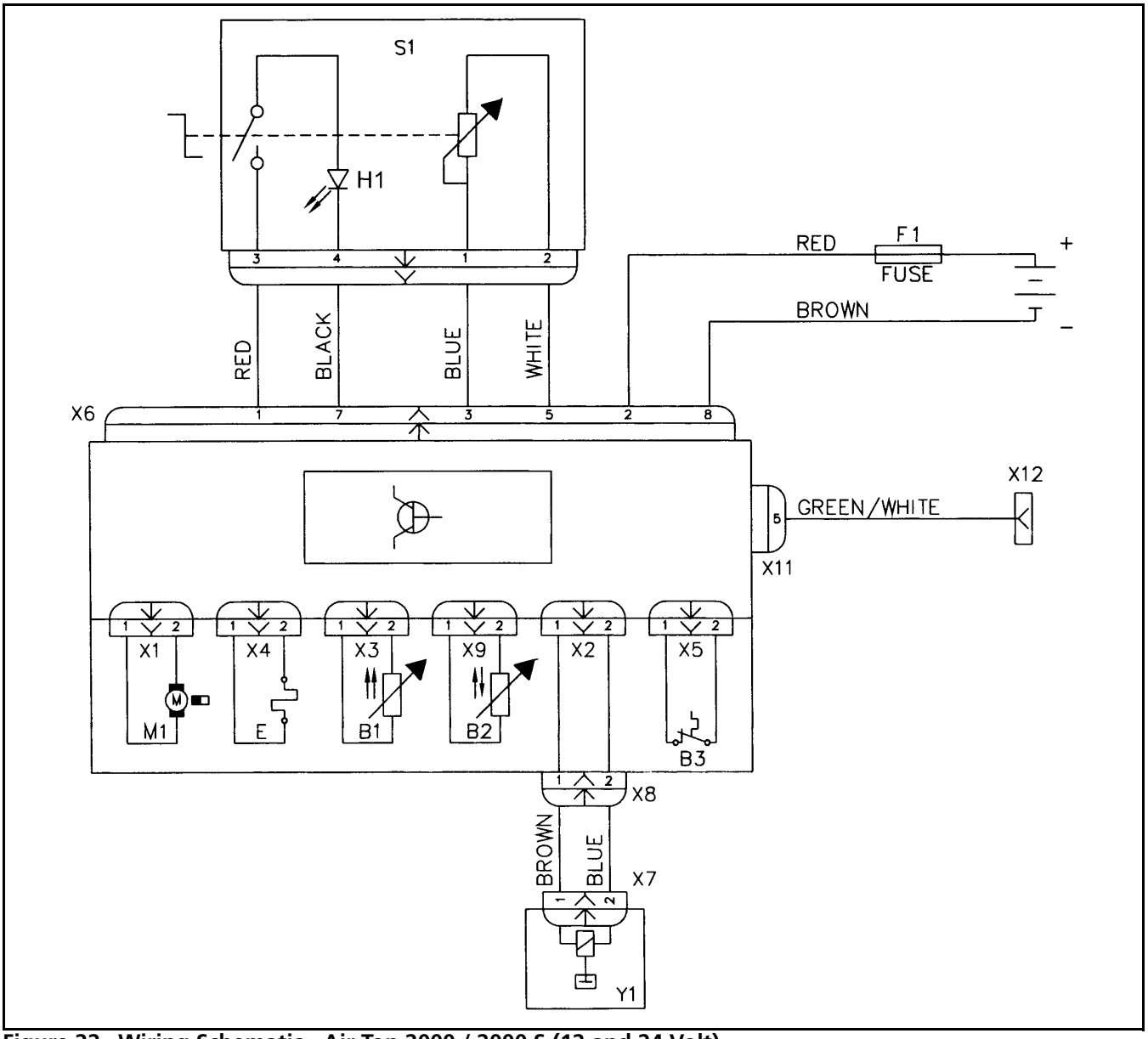


Figure 22. Wiring Schematic - Air Top 2000 / 2000 S (12 and 24 Volt)

A1	Air Top 2000
A2	Control Unit
B1	Flame Sensor
B2	Air Temperature Sensor
B3	Temperature Limiter
E	Glow Pin
F1	Fuse - 24V 10A or 12V 15A
H1	Indicator Light (in item S1)
M	Motor
S1	Control Element
X1	Connector 2-Pin (Motor)
X2	Connector 2-Pin (Fuel Pump)
X3	Connector 2-Pin (Flame Sensor)
X4	Connector 2-Pin (Glow Pin)
X5	Connector 2-Pin (Temp. Limiter)
X6	Connector 8-Pin (Main Harness)
X7	Connector 2-Pin (Fuel Pump)
X8	Connector 2-Pin (Fuel Pump)
X9	Connector 2-Pin (Temp. Sensor)
X10	Connector 8-Pin
X11	Connector 4-Pin
X12	Diagnostic Link
Y1	Fuel Metering Pump

Wiring Schematic - Air Top 3500 / 5000 with Control Element (Rheostat)

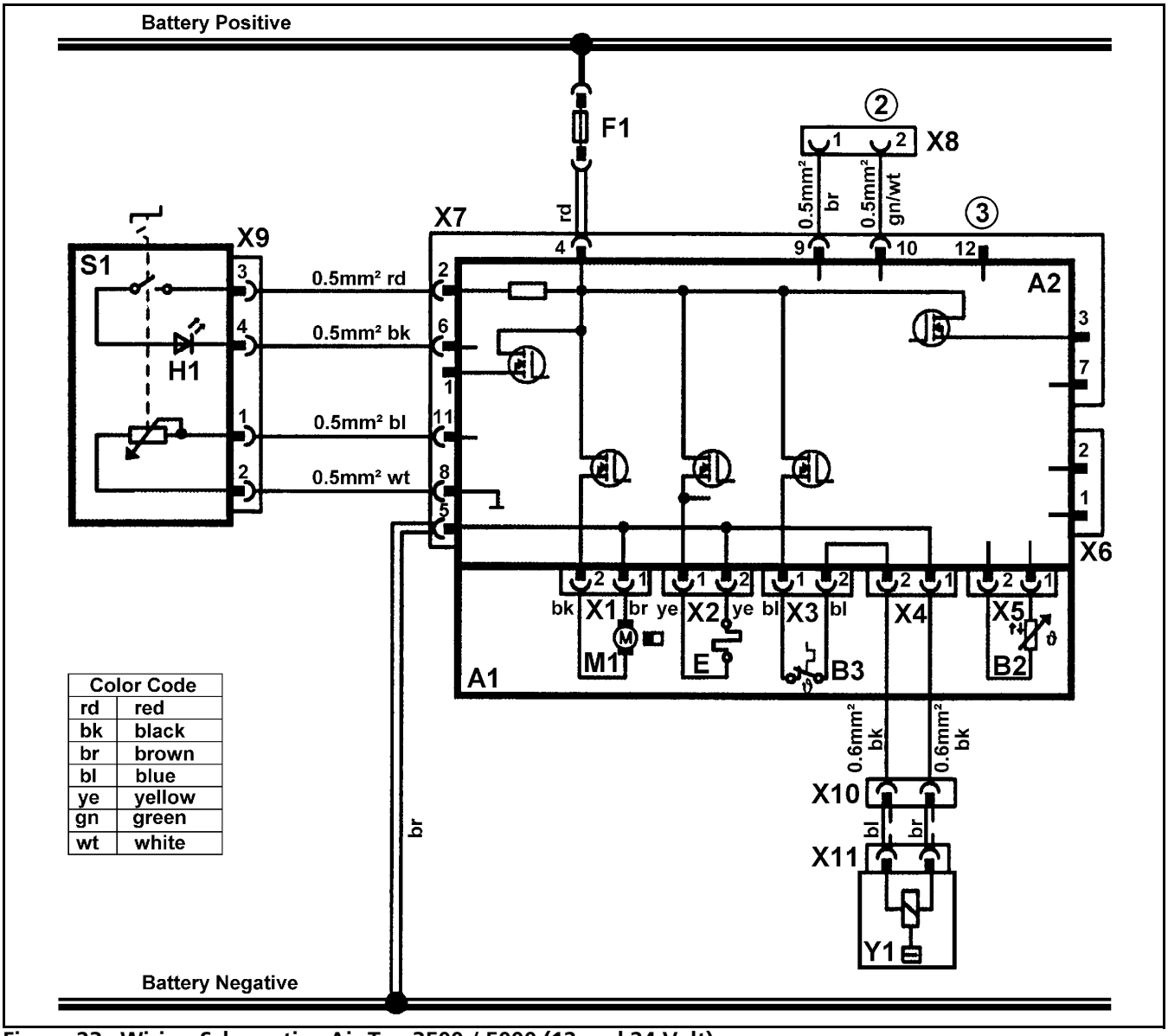
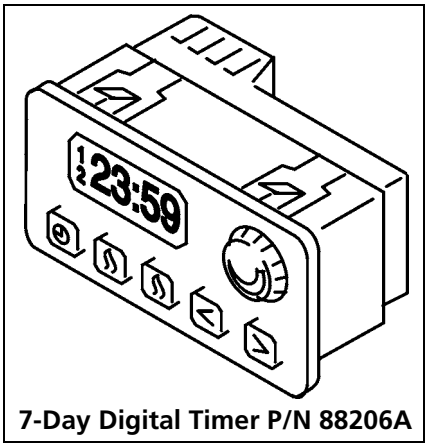


Figure 23. Wiring Schematic - Air Top 3500 / 5000 (12 and 24 Volt)

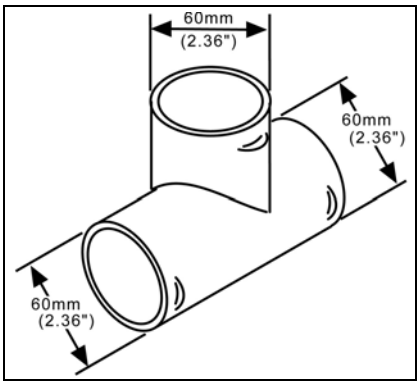
A1 Heater - Air Top 3500 / 5000
A2 Control Unit
B2 Temperature Sensor
B3 Temperature Limiter
E Ceramic Igniter / Flame Detector
F1 Flat Fuse - 15 Amp
H1 Operation Indicator
M1 Fan Motor
S1 Control Element (On - Off Switch and Temperature Controller)
X1 2-pin Connector - Fan Motor
X2 2-pin Connector - Ceramic Igniter / Flame Detector
X3 2-pin Connector - Temperature Limiter
X4 2-pin Connector - Fuel Pump
X5 2-pin Connector - Temperature Sensor
X6 2-pin Connector - Not Used
X7 12-pin Connector - Main Harness Connection
X8 2-pin Connector - Diagnostic Link
X9 4-pin Connector - Control Element
X10 2-pin Connector - Fuel Pump Harness
X11 2-pin Connector - Fuel Pump Harness
Y1 Fuel Dosing Pump

Air Top 2000 S

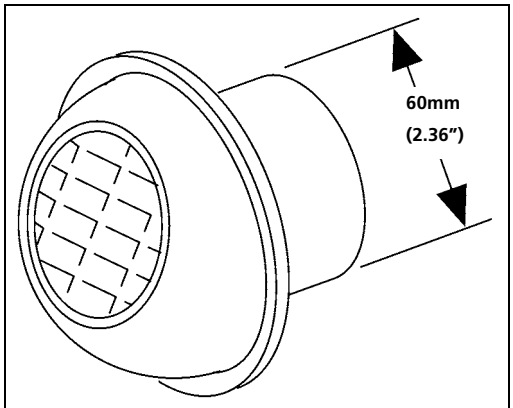
Part Number	Description
88206A	7-Day Digital Timer Model 1531 with 3 Programmable Settings and Temperature Control
398551	Hot Air Outlet Nozzle with 360 Degree Directional Adjust - 60 Millimeter (2.36")
87389A	Return Air Inlet or Hot Air Outlet (Flat Mount - Non Directional) - 60 Millimeter (2.36")
86643A	Tee Junction - 60 x 60 x 60 Millimeter (2.36" x 2.36" x 2.36")
5000258A	Ducting - 60 Millimeter (2.36") Diameter by 0.5 Meter (1.6') Length
900497A	Ducting - 60 Millimeter (2.36") Diameter by 1 Meter (3.3') Length
5000693A	Ducting - 60 Millimeter (2.36") Diameter by 1.5 Meter (4.9') Length
5000316A	Ducting - 60 Millimeter (2.36") Diameter by 2 Meter (6.56') Length
5000692A	Ducting - 60 Millimeter (2.36") Diameter by 3 Meter (9.84') Length
5000318A	Ducting - 60 Millimeter (2.36") Diameter by 10 Meter (32.8') Length



7-Day Digital Timer P/N 88206A



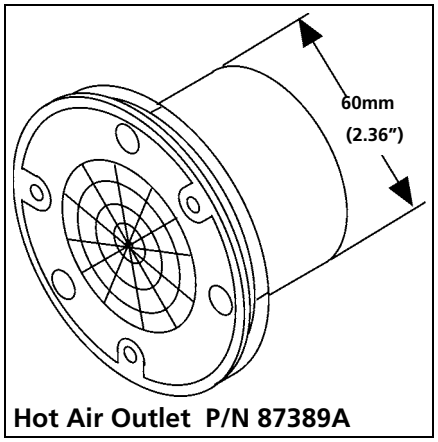
Tee Junction P/N 86643A



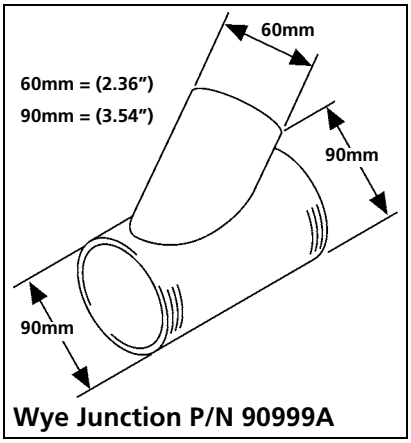
360 Degree Directional Hot Air Outlet P/N 398551

Air Top 3500 / 5000

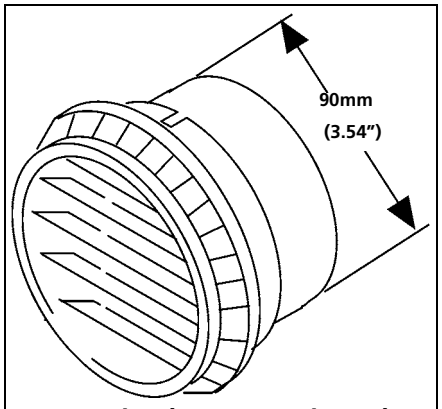
Part Number	Description
88206A	7-Day Digital Timer Model 1531 with 3 Programmable Settings and Temperature Control
91569A	Return Air Inlet or Hot Air Outlet (Flat Mount - Non Directional) - 90 Millimeter
87389A	Hot Air Outlet (Flat Mount - Non Directional) - 60 Millimeter
398551	Hot Air Outlet Nozzle with 360 Degree Directional Adjust - 60 Millimeter
90999A	Wye Junction - 90 x 60 x 90 Millimeter
5000264A	Ducting - 90 Millimeter (3.54″) Diameter by 0.5 Meter (1.6′) Length
5000265A	Ducting - 90 Millimeter (3.54″) Diameter by 1 Meter (3.3′) Length
5000266A	Ducting - 90 Millimeter (3.54″) Diameter by 1.5 Meter (4.9′) Length
5000753A	Ducting - 90 Millimeter (3.54″) Diameter by 5 Meter (16.4′) Length
5090395A	Ducting - 90 Millimeter (3.54″) Diameter by 25 Meter (82′) Length
5000258A	Ducting - 60 Millimeter (2.36″) Diameter by 0.5 Meter (1.6′) Length
900497A	Ducting - 60 Millimeter (2.36″) Diameter by 1 Meter (3.3′) Length
5000693A	Ducting - 60 Millimeter (2.36″) Diameter by 1.5 Meter (4.9′) Length
5000316A	Ducting - 60 Millimeter (2.36″) Diameter by 2 Meter (6.56′) Length
5000692A	Ducting - 60 Millimeter (2.36″) Diameter by 3 Meter (9.84′) Length
5000318A	Ducting - 60 Millimeter (2.36″) Diameter by 10 Meter (32.8′) Length



Hot Air Outlet P/N 87389A



Wye Junction P/N 90999A



Return Air Inlet or Hot Air Outlet P/N 91569A

Webasto
Feel the drive

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