

Marine Air Heaters

Installation Instructions

Air Top 2000 ST

Air Top Evo 40

Air Top Evo 55

Trade names :

Air Top 2000 ST D (Diesel)

Air Top Evo 40 D (Diesel)

Air Top Evo 55 D (Diesel)





Caution: When heater is in use, the surface of the hot air outlet may become hot to the touch. Contact with skin may cause burns.

Product produces temperatures high enough to ignite surrounding combustible materials such as inflammable liquids, gases, vapor, and other combustible matter. The heater must be switched off when loading or unloading inflammable materials to prevent the risk of explosion.



ALWAYS carefully follow Webasto installation and repair instructions and heed all WARNINGS.

Only genuine Webasto parts may be used. See also Webasto air and water heaters accessories catalogue.

Webasto rejects any liability for problems and damage caused by the system being installed by untrained personnel.

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 the authorized installer fully read and understand all installation documentation supplied with the heater BEFORE attempting installation. Improper installation or repair of Webasto heating and cooling systems can cause fire or the leakage of deadly carbon monoxide leading to serious injury or death.

Webasto heating and cooling systems require qualified and/or professional installation and repair technicians. Warranty shall be void if not installed by a certified or trained installer/repair technician who has successfully completed the factory training course for installation and repair of Webasto heating and cooling systems, and has been provided with the technical information, tools and equipment required to properly complete the necessary installation/repairs.

GB Table of Contents

1	Safety and General Information	4
2	Regulations Governing installation	7
3	Heater	9
4	Cold and hot air	17
5	Fuel supply	22
6	Combustion air supply	28
7	Exhaust system	30
8	Electrical Connections	34
9	Wiring diagrams	43
10	Initial operation	50
11	Troubleshooting	54
12	Technical data	56

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55



1 Safety and General Information

1.1 General Information

Webasto Thermo & Comfort North America, Inc. is pleased to provide this installation manual with the Air Top 2000ST / Evo 40 / Evo 55 air heaters. When installed according to the guidelines stated in this manual, you can expect your customer to enjoy many years of trouble-free heater operation.

This manual represents our latest effort to produce the best technical documentation possible. In our efforts towards continuous, ongoing product improvement, we encourage our customers to write to us with their comments or criticisms concerning this manual and the Air Top 2000 ST/Evo 40/Evo 55 heating systems.

Please write to us at:

Webasto Thermo & Comfort North America, Inc.
Technical Documentation Group
15083 North Road
Fenton, MI 48430

You are also invited to fill out our online questionnaire concerning our technical documentation and web site at: www.techwebasto.com. If you have any immediate questions concerning this manual, the installation procedures within or the product itself, please call us at: (800) 860-7866 or send a fax to: (810) 593-6001.

1.2 Use of the heating system

Solely for use on marine vessels:

- for the pre-heating and heating of ship cabins, cargo holds, personnel and crew transportation areas
- on inland waters and at sea
- for sailing and motor boats

Not suitable for:

- continuous heating of living areas, houseboats, etc.
- for heating and /or drying living beings

The heaters operate independently of the boat's engine. They are connected to the boat's fuel tank and electrical system.



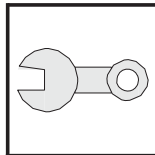
Technical Information

Marine Air Heaters *Air Top 2000 ST / Evo 40 / Evo 55*

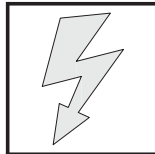
1.3 About this Document

To enable quick reference to the individual procedures you will find a descriptive symbol on the top outer edge of each page and safety symbols and signal words which are intended to convey the level of importance of the safety messages. The symbols are described below. Remember that safety messages by themselves do not eliminate danger and are not a substitute for proper accident prevention measures.

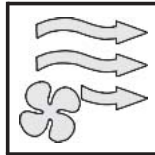
Mechanical system



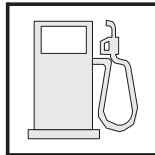
Electrical system



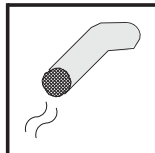
Heated air



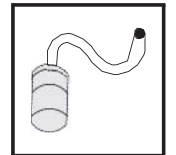
Fuel



Exhaust



Combustion air



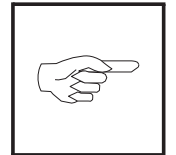
Technical Information



Attention



Note



**Flammable or
Combustible**



Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

Technical Information



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 Thermo & Comfort 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 Thermo & Comfort 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.

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, contact an authorized Webasto marine dealer or Webasto Thermo & Comfort N. A., Inc. directly at: 1-800-860-7866 (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.



Technical Information

Marine Air Heaters *Air Top 2000 ST /Evo 40 /Evo 55*

2 Regulations governing installation

Read this installation manual in its entirety before installing this equipment.

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.

2.1 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.

2.2 Legal Provisions

The installation and service of Webasto heaters requires special expertise and training. Installations and servicing of Webasto products by untrained, unauthorized personnel and end-users voids all warranties and releases Webasto Thermo & Comfort North America, Inc. and Webasto authorized distributors, dealers and their personnel from responsibility for damage to Webasto products, any resulting collateral property damage and personal injury.

2.2.2 Any use, operation, installation, modification or application of the product not described in Webasto manuals, or subjecting the product to extreme or unusual conditions beyond the limits of specified performance characteristics is misuse of the product. Failure to comply with all installation instructions is a misuse of Webasto products. The same applies for repairs without using genuine Webasto service parts. This will void the heaters "official Marks of Conformity."

IMPORTANT!

All relevant state and provincial licensing regulations if any, governing the installation and use of auxiliary heating devices must be observed!

Requirements relating to the basic unit:

When switched off, it is permissible for combustion heaters to continue running for max. 40 seconds. Only combustion heaters are to be used with heat exchangers that are not damaged during their standard operating period by the reduced afterrunning time of 40 seconds.

2.3. Additional documentation to be used



These installation instructions contain all the information and instructions necessary to install Air Top 2000 ST /Evo 40 /Evo 55 heaters.

The operating instructions must also be observed.



CAUTION!

When heater is in use, the surface of the hot air outlet may become hot to the touch. Contact with skin may cause burns.



Fire risk! The heating system can overheat.

- Pay attention to maintaining a sufficient distance and sufficient ventilation for all parts.
- Use only fire resistant materials.
- If necessary, fit a heat shield.
- Do not install in the vicinity of flammable or temperature-sensitive objects such as sails, fenders, bulkheads, paper, gas lines, fuel containers, etc.
- When installing in a locker or control cabinet;
 - Only with good ventilation
 - Prevent contact with hot parts
 - If necessary, create a contact barrier around the heating system



3 Heater

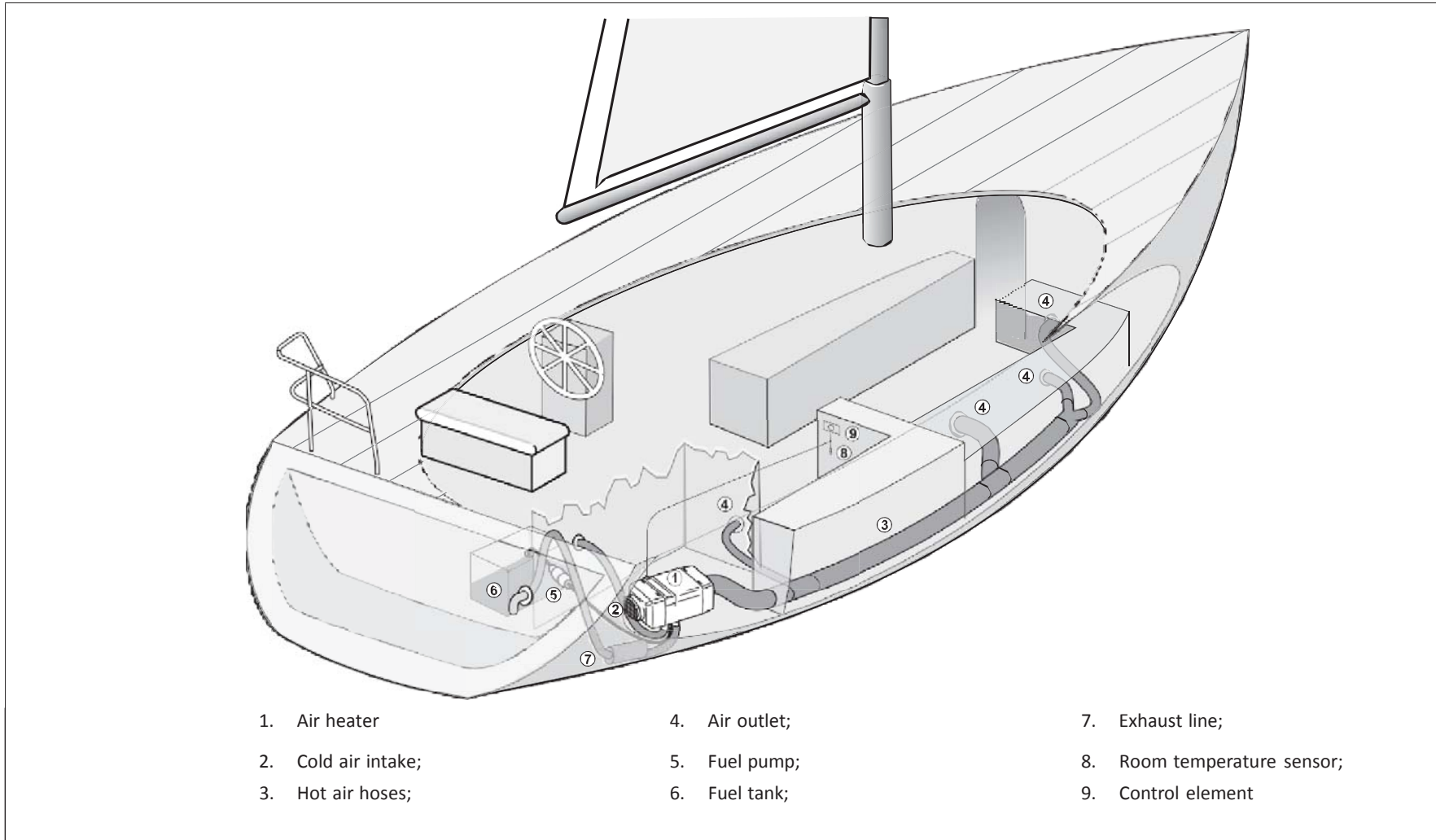


Fig. 1 Installation example

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

Technical Information



3.1. Choosing installation location



ATTENTION:

Danger of suffocation!

Do not install heater and exhaust system in accommodation areas.

- ▶ Install the heater in a dry location, protected from the ingress of sea water, excessive vibration, heat, engine exhaust gases and soiling by fuel or oil.
- ▶ Arrange the installation to suit the requirements and type of boat! Take the following into account: all peripheral components, such as permissible length of the exhaust system, position of the through-hull fitting, combustion air intake, routing of electrical wiring and cable lengths, distance from the fuel tank, routing of hot air hoses, fresh air intake, etc.
- ▶ Take the following into account: the maximum inclination of the boat must not result in the ingress of sea water through the exhaust gas outlet.
- ▶ The inclination must not cause the heater to come in contact with bilge water.
- ▶ No obstruction of moving parts (e.g. rudder assembly).

- ▶ Every reasonable precaution should be taken when positioning the heater to minimize the risk of injury and damage to personal property



ATTENTION:

Danger of fire!

- ▶ Do not install in the vicinity of flammable or temperature-sensitive objects such as sails, fenders, bulkheads, paper, gas lines, fuel containers, etc.
- ▶ When installing in locker or rudder box:
 - Only with good ventilation
 - Prevent contact with hot parts
 - Install a contact barrier around the heating system if necessary



Technical Information

Marine Air Heaters *Air Top 2000 ST /Evo 40 /Evo 55*

- ▶ Recommended installation locations (see Fig. 2):
 - A) In locker or rudder box if it is well ventilated.
Install a contact barrier around the heating system so that sails, fenders, bulkheads, etc. do not come in contact with hot parts!
 - B) In the engine compartment of inboard diesel engines. Condition: cold air intake from outside, combustion air intake from outside.

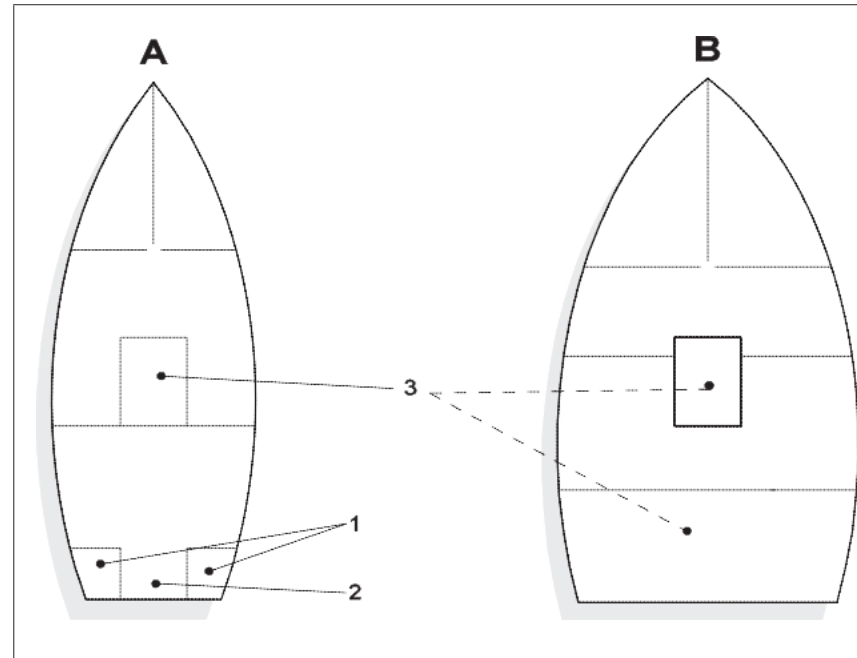
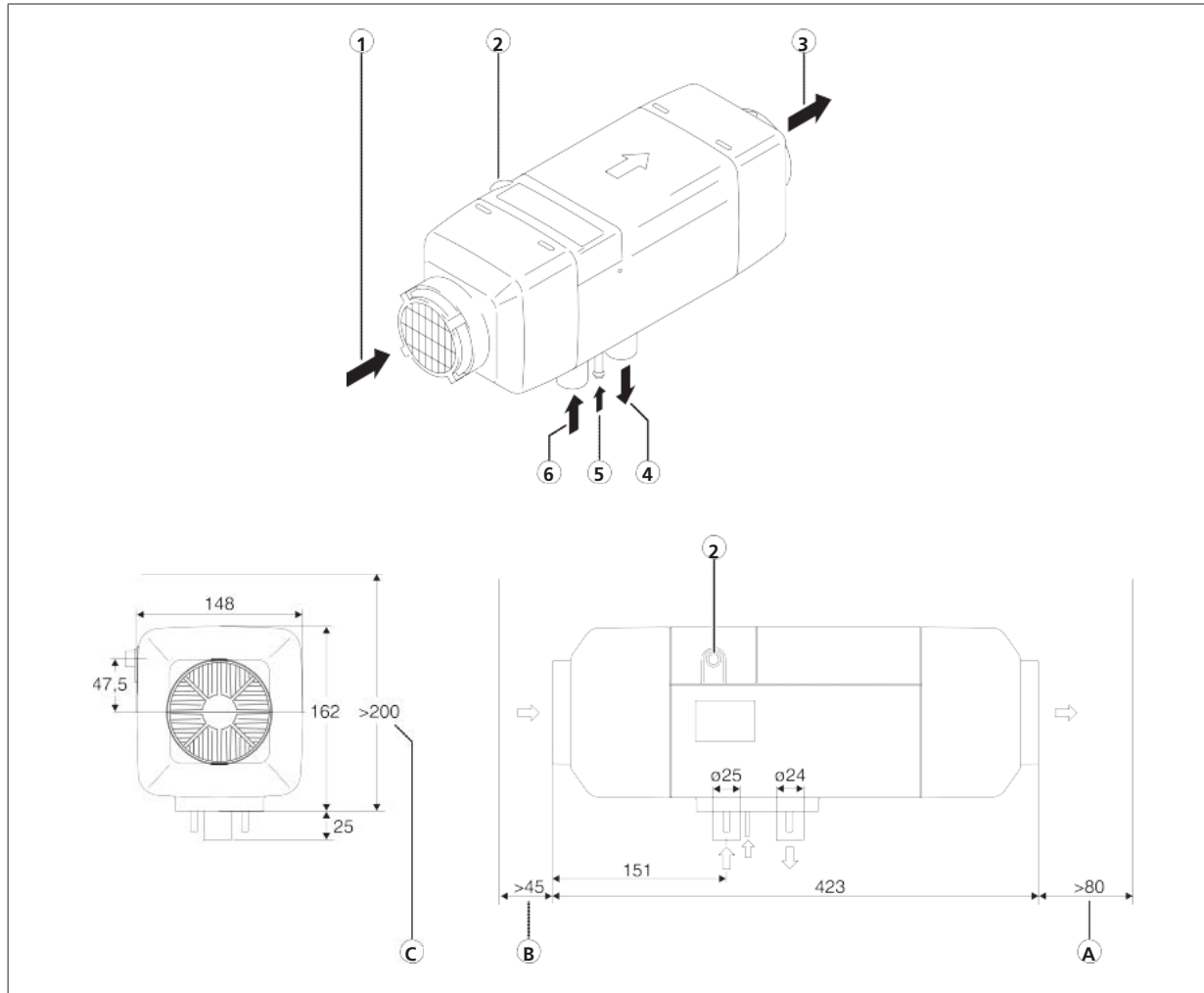


Fig. 2 *Installing heater in locker (1), rudder box (2) or engine compartment (3)*



3.2 Heater data

1. Dimensions Air Top Evo 40 / Air Top Evo 55



- 1) Cold air inlet
- 2) Cable outlet (optionally on right or left)
- 3) Hot air outlet
- 4) Exhaust gas outlet
- 5) Fuel inlet
- 6) Combustion air inlet
- A) Space requirements for hot air outlet
- B) Space requirements for cold air inlet
- C) Space requirements for removing heater

Fig. 3 Dimensions and space requirements [mm] Air Top Evo 40 / Air Top Evo 55



3.2.2. Dimensions Air Top 2000 ST

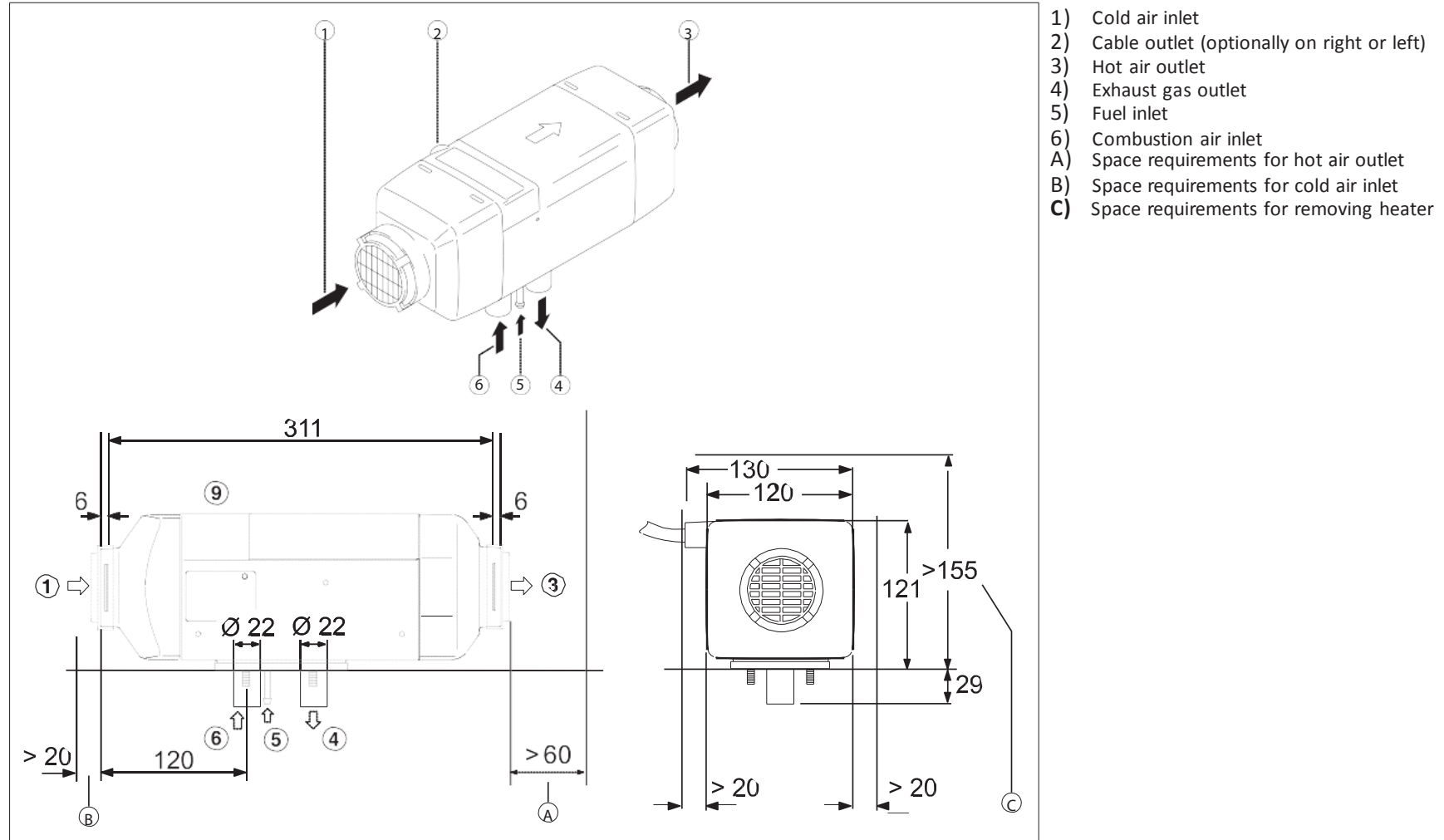


Fig. 4 Dimensions and space requirements [mm] Air Top 2000 ST

**ATTENTION:****Danger of drowning!**

There is a danger of drowning when drilling into the boat's outer skin! Drilling below the water line can cause the boat to sink!

If the boat is in the water: check the drilling location! Have leak sealing equipment available beforehand and familiarise yourself with possible escape routes!

**ATTENTION:****A blockage in the heating air fan can cause the heater to overheat!**

Damage to heater

- ▶ Make sure that the casing of the heater is clear, i.e. does not make contact with any other parts, in installed position (see Fig. 7).

**NOTE:**

- ▶ Installation positions: observe possible inclination of boat!
- ▶ Recommended installation position: exhaust gas outlet routed downward, heater parallel to longitudinal axis of boat.
- ▶ Do not install transversely in sailing boats!
- ▶ Exception: if heater is primarily operated when boat is moored or in motor boats then installation transverse to longitudinal axis is permissible.

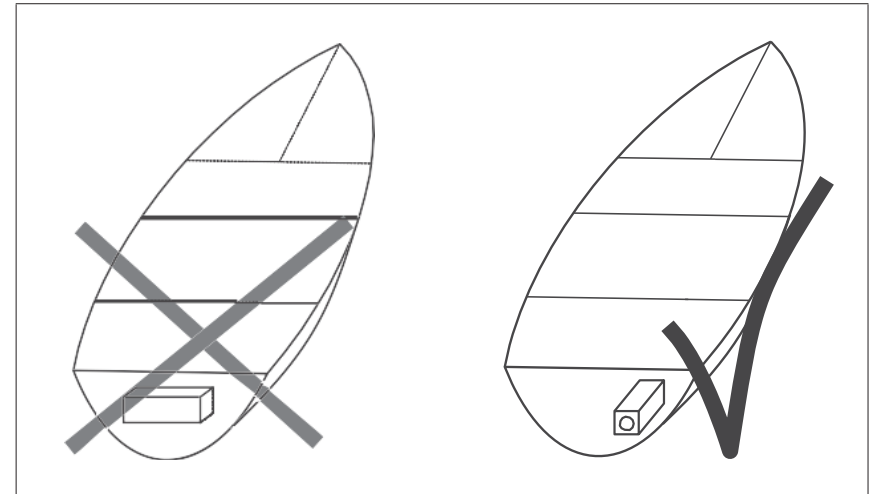


Fig. 5 *Install heater in longitudinal direction in sailing boats!*

3.3. Heater mounting

- Securely mount the heater (vibration, swell)! Use the supplied bracket and rubber seal under the base.
- This rubber seal must be replaced each time the heater is reinstalled.
- The M6 nuts must be tightened to 6 Nm (-0 Nm, +1 Nm) to mount the base.



Technical Information

Marine Air Heaters Air Top 2000 ST /Evo 40 /Evo 55

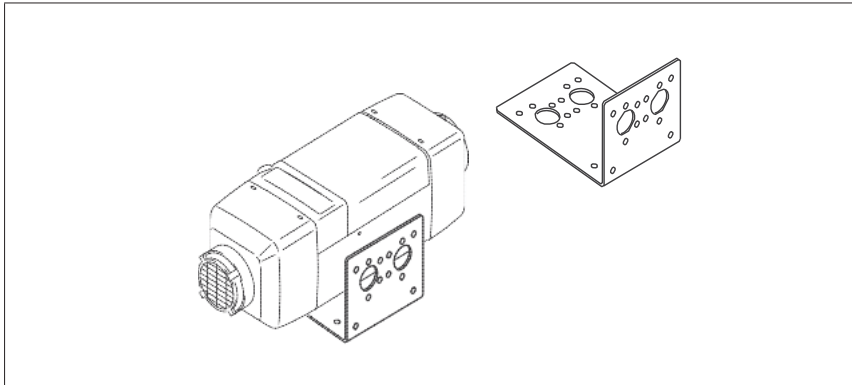


Fig. 6 Mounting Air Top with bracket



NOTE:

After installation check that the casing is not in contact with any part of the boat's body. Failure to do this may result in the heating air fan blocking.

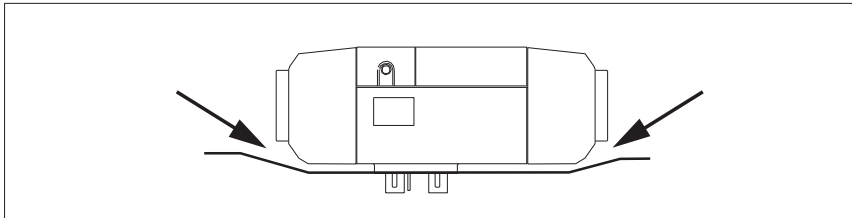


Fig. 7 Ensure ease of movement of all moving parts!

- Recommendation: flexible mounting (vibration decoupling, noise reduction)!
- Secure the heater onto the bracket with bolts.
- Recommendation when mounting on outer skin on FRP boats: laminate wooden panel onto the fastening location from the inside to prevent drilling through the outer skin.



ATTENTION:

There is a danger of drowning when drilling into the boat's outer skin!

Drilling below the water line can cause the boat to sink!

- ▶ If the boat is in the water: check the drilling location! Have leak sealing equipment available beforehand and familiarise yourself with possible escape routes!

- Determine space requirements and installation position
 - Air Top 2000 ST: see Fig. 4
 - Air Top Evo 40 / Air Top Evo 55: see Fig. 3
- Do not exceed inclination angle (see Fig. 8).

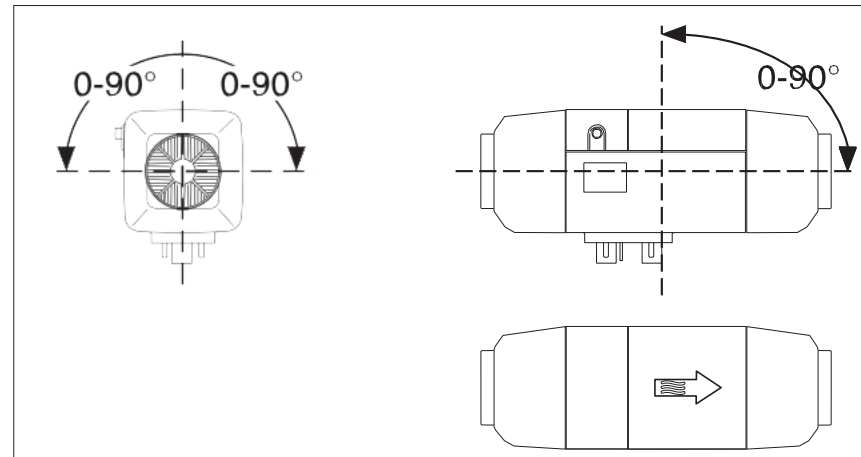


Fig. 8 Permissible installation positions of diesel-operated air heaters



ATTENTION:

The base seal must be replaced when removing and reinstalling a heater.

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

Technical Information



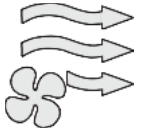
- On the heater label leave the year of installation and remove the remainder year tabs.
- Secure heater. Tighten the M6 nuts to 6 Nm (–0 Nm, +1 Nm).



NOTE:

After installing the heater, the type label should be clearly visible in a well-protected position.

- If the type label is not visible after installing the heater: use the type label duplicate.



Cold and hot air

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

4 Cold and hot air

4.1. General



ATTENTION:

Danger of suffocation!

The air intake must be from a clean area with no exhaust gases.

Never pull air intake from the engine compartment!

It must not be possible for stowed articles to block the intake opening .



NOTE:

The direct intake of hot air must be avoided (see Fig. 9). It is not permitted to short-circuit the air flow.

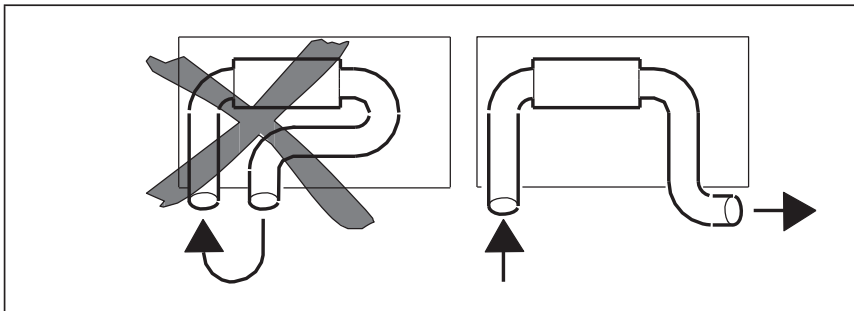


Fig. 9 Cold air inlet and hot air outlet

4.2. Fresh air mode

Cold air is drawn in from the outside, heated and blown into the boat's interior. This renews the cabin air and reduces humidity. Ensure there are enough ventilation openings in the cabins! A room temperature sensor must be installed for temperature control, preferably in the salon. In summer, ventilation is also possible (when comfort control element is used).

- ▶ Draw in cold air directly from lockers or rudder boxes if they are dry, clean and free of odors and exhaust gases.
For proper ventilation, ensure the intake diameter = 1.5 x hose diameter of the heater.
- ▶ Otherwise, use an intake hose for intake from the outside.
- ▶ Prevent water from entering through the intake opening.

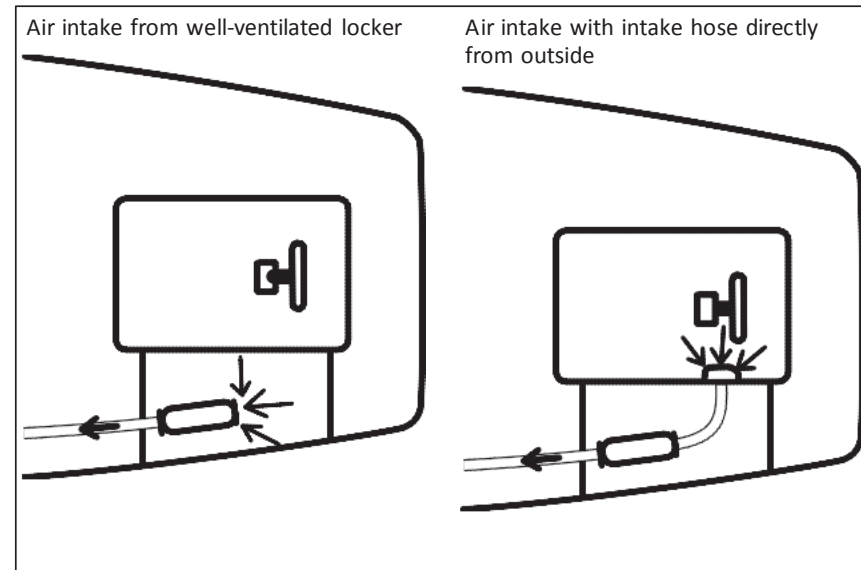
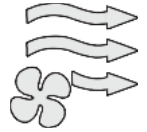


Fig. 10 Air intake

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

Cold and hot air



NOTE:

For fresh air mode, a room temperature sensor must be installed in the cabins to be heated.

4.3. Recirculated air mode

In recirculated air mode, the air to be heated is taken from the interior area. The advantage of this is that heating takes place faster due to more effective heat utilisation. However, the humidity is not reduced or the room air not renewed in this mode.

No room temperature sensor needs to be installed. The heater uses the sensor integrated in the control unit.

4.4. Position of hot air openings



WARNING:

Risk of injury!

Do not blow hot air directly onto living creatures or temperature-sensitive objects.

All areas in the boat can be evenly heated with an appropriate air distribution system. For this purpose, branch off several side branches from the main line to reach all cabins. The air, and therefore the heat flow, can be influenced by suitable selection of the branches and hose diameters.

See the accessories catalogue for branches, connecting elements, Y-junctions, air outlets, etc. made from temperature-resistant material.

- ▶ A free flow of air into the cabins provides the most effective cabin heating and air circulation!
- ▶ Only use one or two air outlets per cabin!

4.5. Properties of cold and hot air ducts

Recommended inside diameter of main hot air duct:

- 60 mm for Air Top 2000 ST
- 90 mm for Air Top Evo 40
- 90 mm for Air Top Evo 55



NOTE:

Only materials with a thermal resistance of 130 °C are to be used for the hot air duct.

4.6. Layout of cold and hot air ducts



ATTENTION:

Use without cold air intake hose Risk of injury by rotating heating air fan

- ▶ If used without the air intake hose, install the supplied mesh guard over the intake

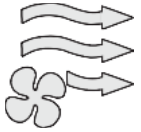
Maximum differential pressure between intake and pressure side of heater:

- Air Top 2000 ST: 2.0 hPa
- Air Top Evo 40: 2.0 hPa
- Air Top Evo 55: 3.0 hPa



ATTENTION:

The heating output will be reduced if this pressure differential is exceeded.



Cold and hot air

Marine Air Heaters *Air Top 2000 ST / Evo 40 / Evo 55*

4.7. Installing cold and hot air ducts

- ▶ Do not route the ducts through the bilge.
- ▶ Hot air ducts in damp areas: use temperature-resistant, flexible, metal spiral-reinforced plastic hoses.
- ▶ Secure cold and hot air ducts at all connections.
- ▶ In stowage areas:
Use a perforated metal cover, for example, to protect the ducts from damage by cargo.
- ▶ Recommended:
Routing through bulkheads:
Use wall lead-through as shown in Fig. 11.
See the Webasto accessories catalogue.
- ▶ Secure ducts:
 - With hose clips at all connecting elements.
 - Prevent from chafing, see Fig. 12.
- ▶ Recommendation
for routing hoses through area not to be heated: insulate the hose sections to prevent heat loss.

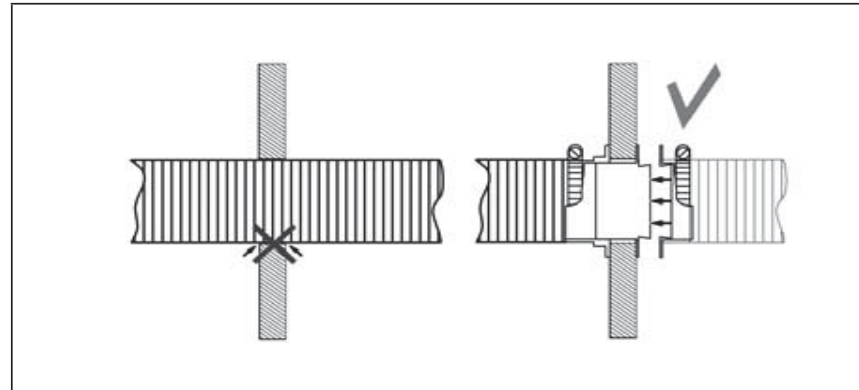


Fig. 11 Recommended duct lead-through in bulkheads

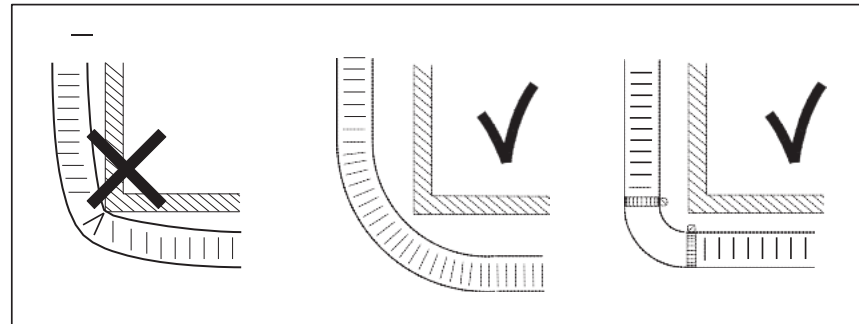
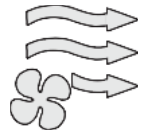


Fig. 12 Recommended routing around corners

Marine Air Heaters

Air Top 2000 ST / Evo 40 / Evo 55

Cold and hot air



4.8. Air routing examples

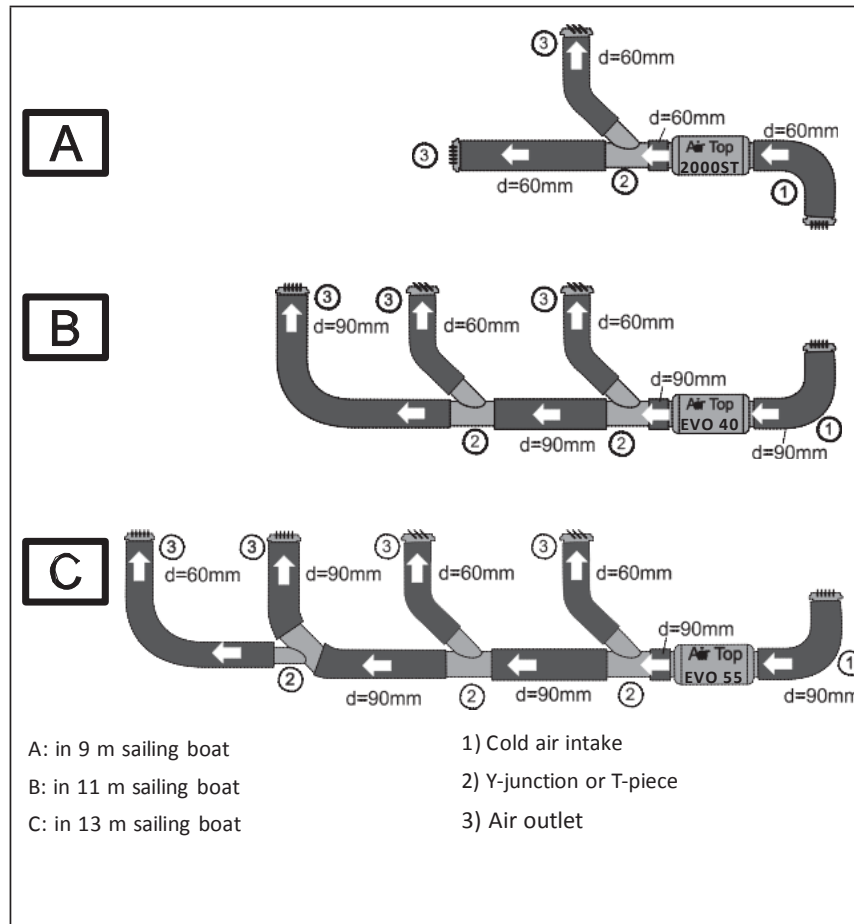
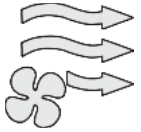


Fig. 14 Heating air routing examples

The main duct must not be reduced from 90 to 80 mm for Air Top Evo 55!
 If 90 mm is not possible throughout, it is better to use Y-junction 90/80/80 and thus create two 80 mm main ducts.



4.9. Installation examples:

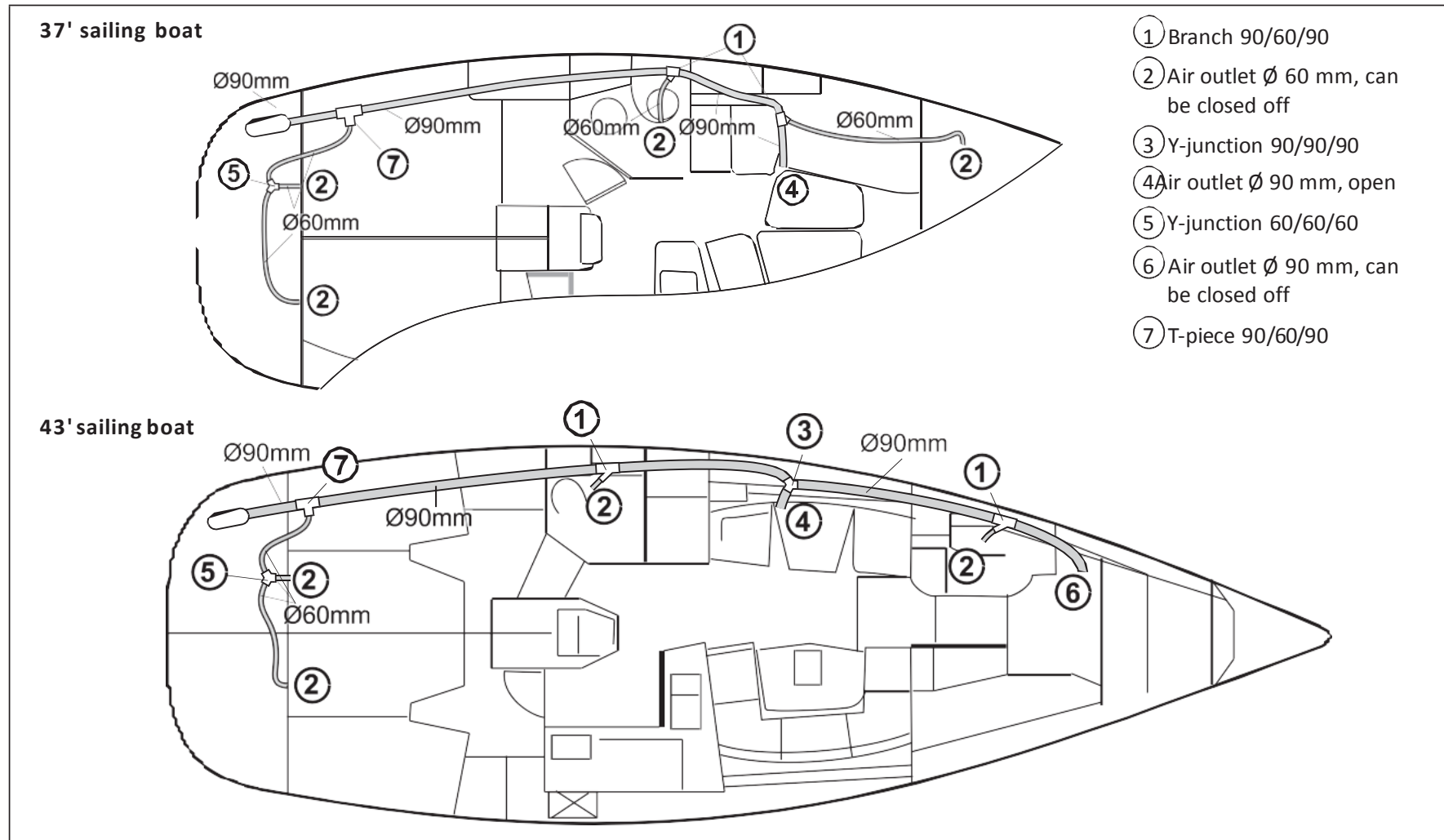
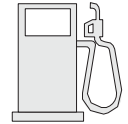


Fig. 15 Installation examples:



5 Fuel supply

5.1. General



ATTENTION:
Danger of fire!

If the heater takes the fuel from a separate additional tank, the fuel type and the filler neck must be clearly marked. .

- ▶ The fuel filler neck must not be located in the interior of the boat and must be fitted with a well-sealing cap to prevent fuel from escaping .
- ▶ Protect the boat hull/components in the vicinity of the heater from heat/contamination by fuel/oil!



NOTE:

- Fuel take-off must take place with virtually no pressure.
- If taking fuel from the return line make sure that the line is not blocked by non-return valves.

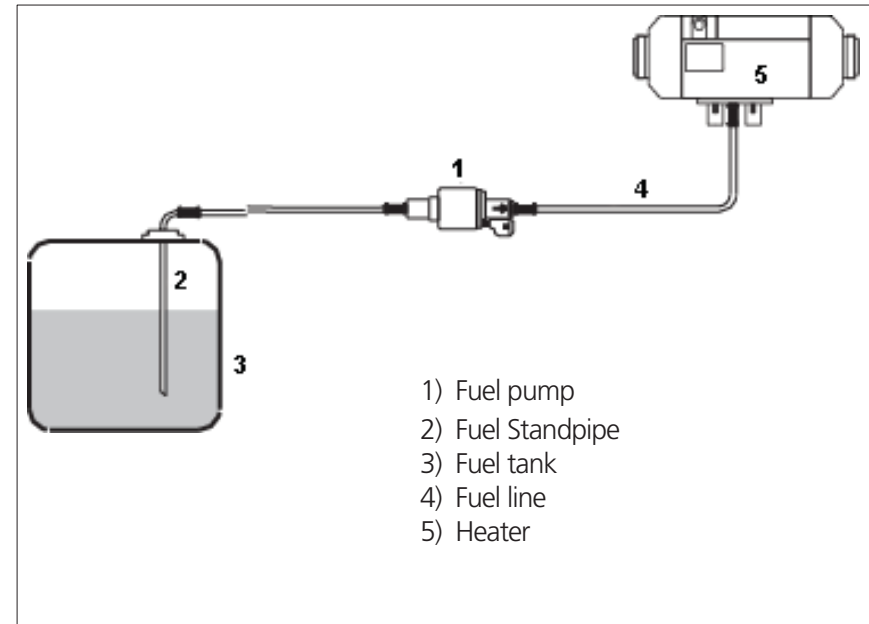
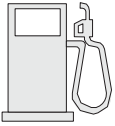


Fig. 16 Example of fuel supply Air Top heaters

5.2 Fuel extraction

3) Tank extracting device

- Fuel take-off directly from the boat's fuel tank.
- Plastic fuel tanks: install the tank extracting device in the tank fitting. Do not drill into a plastic fuel tank.
- For suitable tank extracting device for metal tanks see the accessories catalogue or scope of delivery.



Fuel

Marine Air Heaters *Air Top 2000 ST /Evo 40 /Evo 55*

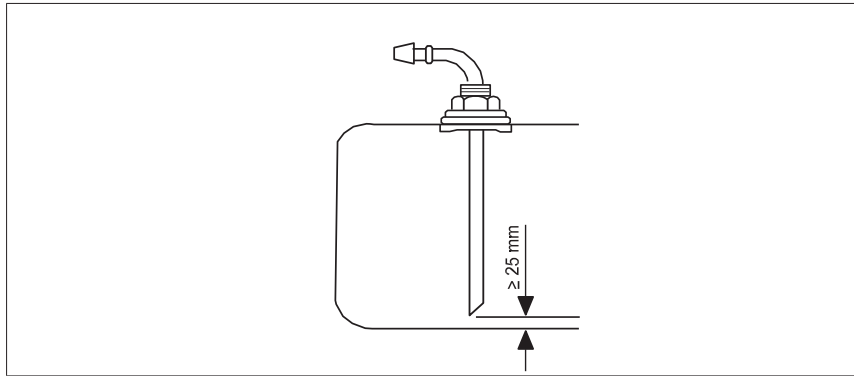


Fig. 17 Installing a tank extracting device in metal tank

Install the tank extracting device as shown in Fig. 17:

- 1) Shorten the immersion tube: the end should be approx. 25 mm above the bottom of the tank or high enough that fuel for the boat engine always remains in the tank. Cut the tube diagonally. Deburr the cut edges.
- 2) Drill a hole in the tank or tank fitting from above. Use suitable drilling attachment. Grease the drill bit and drilling surface beforehand (to catch small drilling chips).
- 3) Fit the tank fitting into the hole and screw tight (the seal is slightly compressed).

5.2.2. Fuel take-off coupling

If there is an unused fuel take-off coupling already fitted in the boat's fuel tank then use it.

Do not take fuel from the drain plug at the bottom of the tank as dirt or water can be drawn in from the drain.

5.3. Pipe lengths and delivery head

When installing the fuel line make sure that it is kept as short as possible. See Fig. 19.

The pipe must be installed such as to protect it from being damaged. The fuel line must be installed in cool areas to avoid bubbles being formed by the effect of heat. High fuel temperatures can cause the heater to malfunction.

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

Fuel

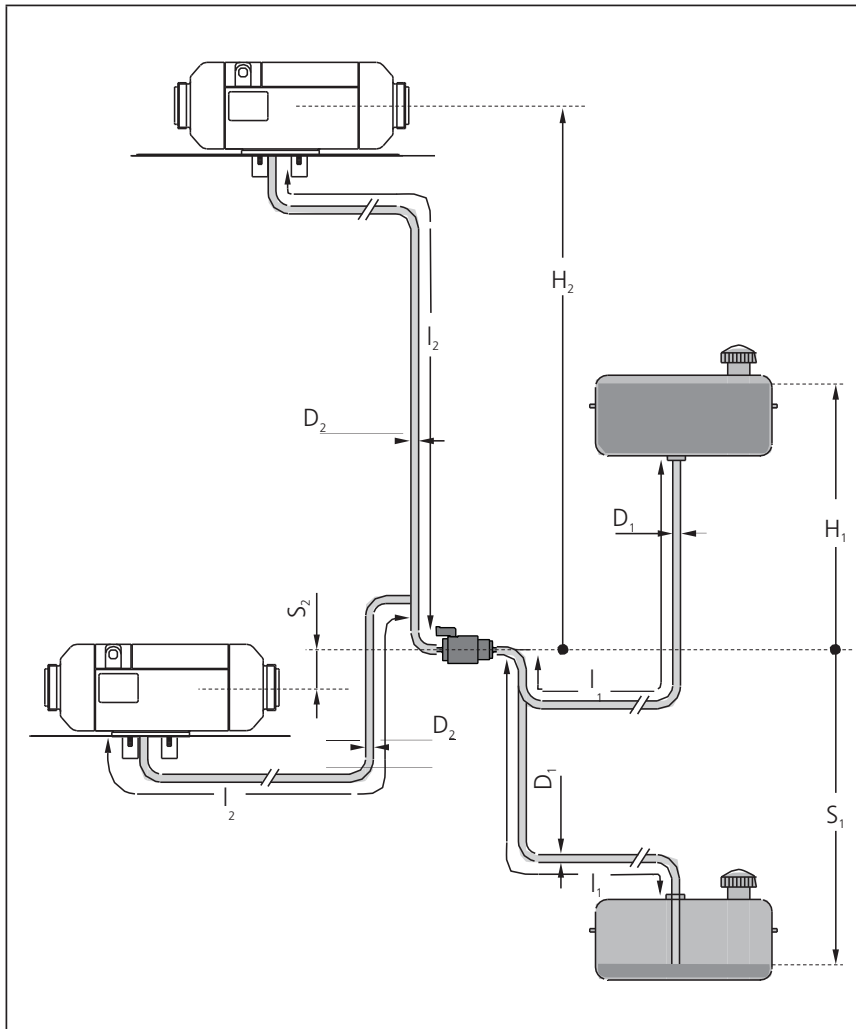
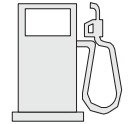


Fig. 19 Fuel supply

The fuel lines must be secured using state-of-the-art fastening elements. Do not damage the fuel line.

Intake side:

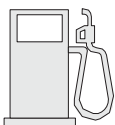
- D₁: Inside diameter of fuel line = 2 mm.
- H₁: Fuel level (tank above fuel pump) [m]
- S₁: Fuel level (tank below fuel pump) [m]
- l₁: Length of fuel line [m]

Pressure side:

- D₂: Inside diameter of fuel line = 2 mm.
- H₂: Height difference between heater and fuel pump (heater above fuel pump) [m]
- S₂: Height difference between heater and fuel pump (heater below fuel pump) [m]
- l₂: Length of fuel line [m]

Fuel level (tank above fuel pump), H ₁ [m]	Maximum permissible fuel pressure at take-off point, p ₁ [bar]
H ₁ = 0	-0.1 < p ₁ < +0.5
0 < H ₁ < 1	-0.1 < p ₁ < +0.4
1 < H ₁ < 2	-0.1 < p ₁ < +0.3

Fuel level (tank below fuel pump), H ₂ [m]	Maximum permissible fuel pressure at take-off point, p ₁ [bar]
0 < H ₂ < 1.3	-0.1 < p ₁ < +0.5



Fuel

Marine Air Heaters *Air Top 2000 ST /Evo 40 /Evo 55*

Parameter	Value
Length of intake pipe l_1 [m]	max. 5
Length of pressure pipe l_2 [m]	max. 10
Length of intake pipe l_1 + length of pressure pipe l_2 [m]	max. 12
Height difference between heater and fuel pump (heater above fuel pump) H_2 [m]	max. 3
Height difference between heater and fuel pump (heater below fuel pump) S_2 [m]	max. 1

Pipe Material: ONLY use copper fuel lines.

Fuel line material: observe regional/national regulations!



ATTENTION:

Danger of fire!

- All fuel lines installed during heater installation must be made of copper and the connecting hoses between the individual components made of fire-resistant material as per ISO 7840.

For installation kits for metal fuel lines see the accessories catalogue.

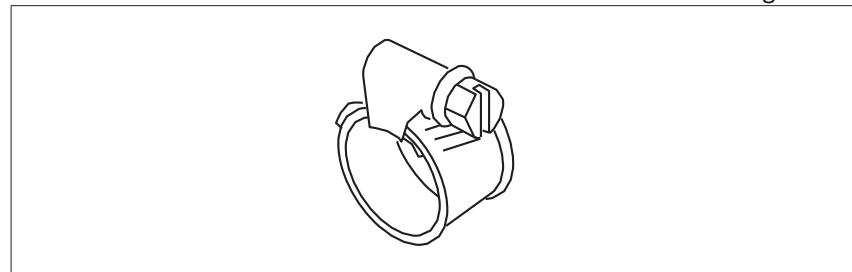


Fig. 20 *Stainless steel hose clamp*



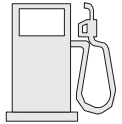
NOTE:

- Only use stainless steel hose clips to secure fuel lines.
- Metal pipes: ensure cleanliness and neatness while carrying out the work! Remove all soiling and burrs from the connection points prior to assembly!
- Do not overtighten union nuts (otherwise leaks may occur).
- Route the fuel lines as straight as possible and at a slight incline so that air bubbles escape towards the heater.
- Secure the line at regular intervals to prevent sagging, avoid kinks.
- Keep away from heat sources. Use heat shield if necessary!
- Inside \varnothing of fuel line = 2 mm, larger diameters will cause problems due to gas bubbles and over fueling.

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

Fuel



5.4. Fuel pump

Air Top 2000 ST heaters must only be operated with the fuel pump DP 30.

Air Top Evo 40 / Air Top Evo 55 heaters must only be operated with the fuel pump DP 42.

The fuel pump is a combined delivery, metering and shut-off system and is subject to certain installation criteria. **For all marine applications a fuel enclosure box must be used to comply with ISO 7840.** The individual fuel pump images (fig. 22 & 23) are for pump installation positions only. The fuel pump should not be removed from the enclosure box.

The fuel pump is controlled with a separate wiring harness and feeds the fuel into the combustion chamber of the heater depending on the required heating capacity. Due to the individual delivery strokes, the separate fuel pumps make a ticking noise during operation.

1. Installation location

The fuel pump enclosure box must not be installed within the radiated heat range of hot components. The fuel pump should be preferably installed close to the fuel tank.

► Install the fuel pump enclosure box in a dry/cool area. Do not install in the bilge.

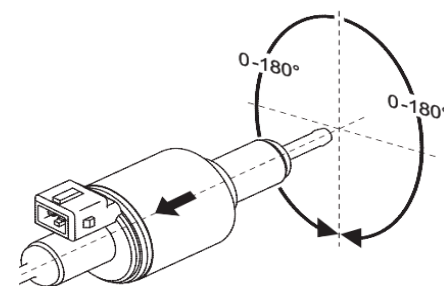
2. Installation and attachment

The installation position is restricted to horizontal installation position of fuel pump enclosure box as illustrated in Fig. 22 (DP 30) or Fig. 23 (DP 42).

The arrow shows the direction of flow.

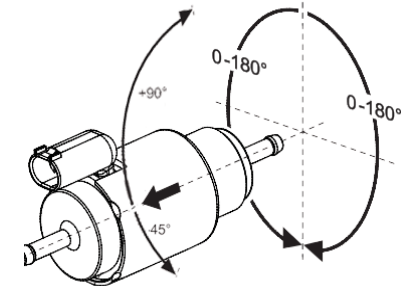


Fig. 20 Fuel Pump Enclosure Box



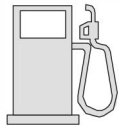
DP30 Installation Position (2000ST)

Fig. 22

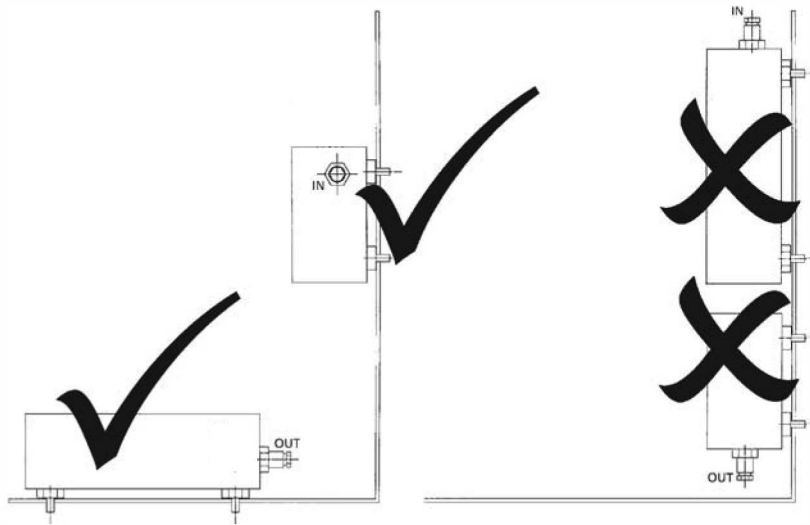


DP42 Installation Position (Evo 40/55)

Fig. 23



The fuel pump enclosure must be mounted as shown in Figure 24 (check-marked images). This will ensure the fuel pump is in the correct horizontal plane for proper operation and fuel metering.



Fuel Pump and Enclosure Installation

Fig. 24

5.5. Auxiliary tank



ATTENTION:

If an auxiliary tank is required for the fuel supply to the heater:

It must only be installed by a specialist company for marine applications (with the necessary knowledge of the required standards, regulations and directives)!

5.6. Special requirements for heaters in boats with petrol engine



ATTENTION:

Petrol-operated heaters are not permitted in recreational boats covered by ISO 9094. Local regulations and special safety requirements must be complied with.

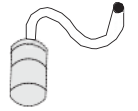
Specific requirements apply to the installation of diesel-operated heaters in petrol engine boats:

- The heater must be supplied with fuel from a separate diesel tank which must comply with the valid regulations for diesel tanks in boats.
- Do not install heaters wherever flammable petrol vapors can form, i.e. especially in engine compartments, fuel tank compartments and rooms directly annexed to them.
- The combustion air intake must come from the outside and not from the engine compartment!
- Do not route exhaust pipes through engine or tank compartments.

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

Combustion air



6 Combustion air supply

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.**

6.1. Combustion air intake line

- ⌚ Combustion air intake line: must be arranged that it cannot be blocked by objects
- ⌚ Keep combustion air intake line as short as possible
- ⌚ Mounting of combustion air intake line: with a hose clip at the intake connection piece of the heater and with pipe clamps or cable ties on fixed built-in components.

6.2. Combustion air intake from a well-ventilated area (locker, stowage compartment or engine compartment)

- ▶ No through-hull fitting required
- ▶ The intake area must be at ambient pressure and sufficiently ventilated to the outside!
- ▶ Intake from engine compartment: the ventilation fan in the engine compartment must not produce an overpressure or negative pressure in the engine compartment.
- ▶ Intake point: no intake of exhaust gases from heater or engine!

6.3. Combustion air intake directly from outside

- ▶ Use a separate through-hull fitting if intake from a ventilated area is not possible.
- ▶ Arrange the end of the combustion air intake line as a gooseneck, as illustrated. Prevent water from entering through the intake opening.
- ▶ Do not position the through-hull fitting in the direction of travel (otherwise backpressure and water ingress may occur in the intake pipe).

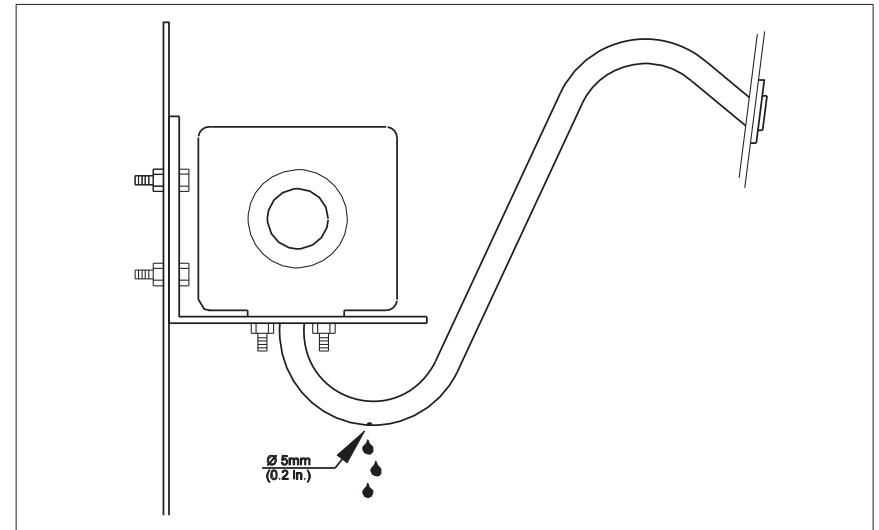


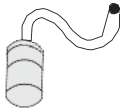
Fig. 27 Combustion air intake line not in direction of travel

- ▶ Drill a drain hole at the lowest point as illustrated in Fig. 27.
- ▶ Route hose free of kinks.



NOTE:

A combustion air intake line is required. A minimum length is not specified. Max length 5m.



Combustion air

Marine Air Heaters *Air Top 2000 ST / Evo 40 / Evo 55*

6.4. Properties of combustion air intake line

**CAUTION:**

The exhaust pipe can be confused with the combustion air intake line!

Damage to fuel pump cable

- ▶ Fit the exhaust pipe only to the exhaust outlet socket coupling
- ▶ Do not use a metal combustion air intake line

6.5. Combustion air intake silencer

**NOTE:**

A combustion air intake silencer must be installed if the length of the combustion air intake line is less than 0.5 m.

Combustion air intake line	Value
Inside diameter	25 mm (Evo 40/55) 22mm (AT2000ST)
Smallest bending radius	50 mm
Max. sum of all bends	270°



7 Exhaust system

7.1. General

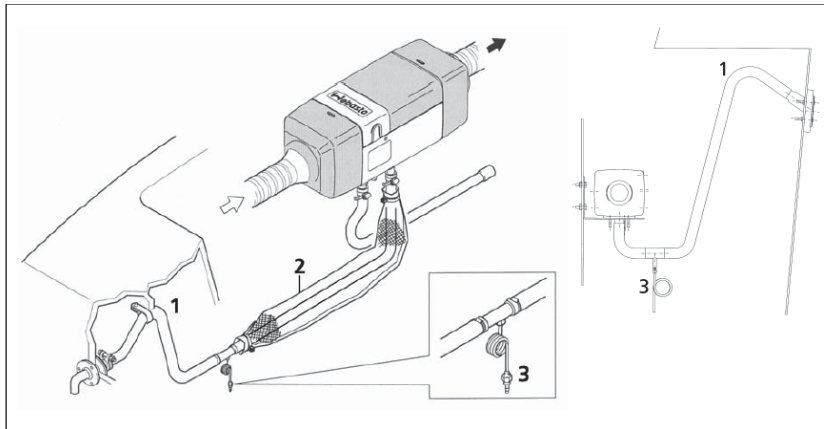


Fig. 28 Exhaust system

Legend for Figure 28 above:

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

At the lowermost point of the exhaust gas line, a condensation water drain (see Fig. 28, 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.

7.2. Exhaust gas outlet



ATTENTION:
Generation of heat by incorrect positioning of exhaust pipe outlet!

Injuries or damage to property caused by fire
► Pay attention to installation position.

Outlet arrangement:

- Position the exhaust gas outlet where no splash water can enter the boat.

Recommendation:

Sailing boats: in stern transom.

Motor boats: in side wall.



ATTENTION:
Danger of suffocation!

Do not position the exhaust gas outlet below or next to ventilation equipment, window openings or the heating air inlet

- At least 60 cm above the water line so that no water can enter when the boat is heeling
- Not in direction of travel of the boat (high wind pressure)
- Do not connect to engine or generator exhaust system (higher pressures; damage to heater!)
- Not where it can be easily covered, e.g. by fender.



Exhaust

Marine Air Heaters *Air Top 2000 ST / Evo 40 / Evo 55*

Through-hull fitting:

- ▶ Choice of design and installation position to minimize rain water ingress!
- ▶ Only use genuine Webasto through-hull fittings! Fit insulation plate exactly for thermal isolation from the side wall (minimization of water ingress)!
If additional sealing is required: use only heat-resistant sealing compound!
- ▶ Through-hull fitting: cannot be closed; not with self-opening flaps!
- ▶ Mount through-hull fitting with pipe socket angled upward.

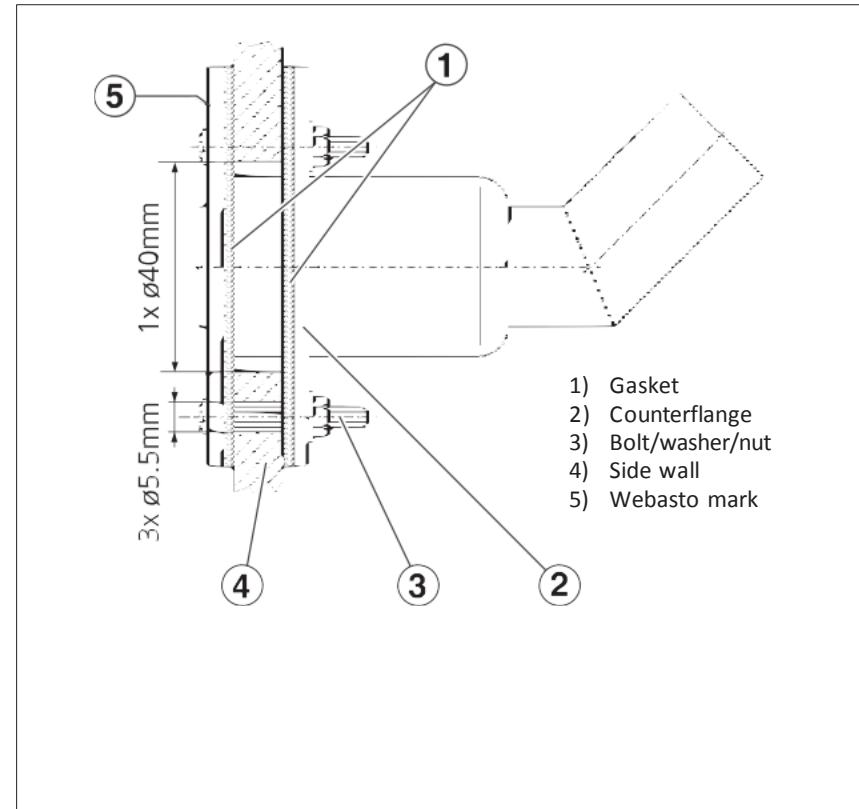


Fig. 29 Through-hull fitting



NOTE:

Avoid drawing in exhaust gas with the combustion air.

Marine Air Heaters

Air Top 2000 ST / Evo 40 / Evo 55

Exhaust



7.3. Notes on exhaust pipe

The exhaust pipe must be secured to the heater with a clamp suitable for the exhaust pipe.

Use suitable insulation material to avoid the dew point dropping below the minimum value.

- ▶ Keep exhaust pipe as short as possible.
- ▶ No contact with temperature-sensitive objects such as electrical wiring, water lines, plastic parts, sails or boat hull!

7.4. Length of exhaust pipe and combustion air intake line

For the Air Top 2000 ST / Evo 40 / Evo 55, the following maximum total lengths of the exhaust pipe must be complied with:

Exhaust line	Value
Internal diameter	24 mm
Smallest bending radius	50 mm
Max. sum of all bends	270°
Minimum length	0.5 m
Maximum length	5.0 m

Properties of exhaust pipe



ATTENTION:

The exhaust pipe can be confused with the combustion air intake line!

Damage to fuel pump cable

- ▶ Fit the exhaust pipe only to the exhaust outlet socket coupling

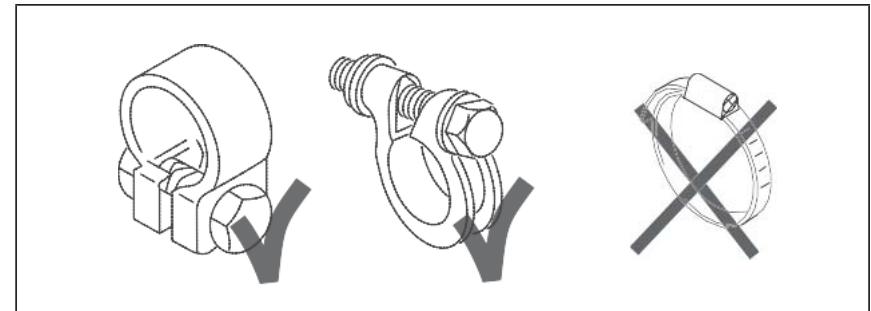


Fig. 30 Approved hose clamps for mounting exhaust pipes



Exhaust

Marine Air Heaters *Air Top 2000 ST / Evo 40 / Evo 55*

7.5. Thermal insulation

Observe the following points when installing the exhaust pipe:

- ▶ Avoid contact between the hot exhaust pipe and temperature-sensitive objects such as electrical wiring, water lines, plastic parts, sails or boat hull!
- ▶ If contact with persons/objects is possible during heating: Insulate the exhaust pipe. Use Webasto provided heat insulating sleeve.
- ▶ Surface temperature ≤ 80 °C!
- ▶ Minimum distance from walls ≥ 50 mm.

7.6. Gooseneck

Last section of exhaust pipe: gooseneck sloping downward to the outlet (due to possible ingress of water)!

Height of gooseneck: ≥ 20 cm.



8 Electrical Connections

The free ends of all lines that are not required must be insulated!

8.1. Electrical system, general

- Observe all information and safety precautions!
- Install a clearly visible operation indicator to show whether the heating is switched on or off . This is already integrated in the Webasto control elements.
- Install all wiring harnesses and electrical components in dry and protected areas! Controllers must not be mounted in direct sunlight.
- The free ends of all lines that are not required must be insulated.
- If there is highly sensitive electronic equipment on board, special electrical interference suppression measures may be necessary. Contact an authorized Webasto partner.
- Do not touch exposed PCBs of the unit (electrostatic discharge).
- For connector designations see the legend and wiring diagrams, Page 47.

8.2. Wiring harnesses

Fig. 33 and Fig. 34 show the wiring harnesses for Air Top 2000 ST and Air Top Evo 40 /Air Top Evo 55

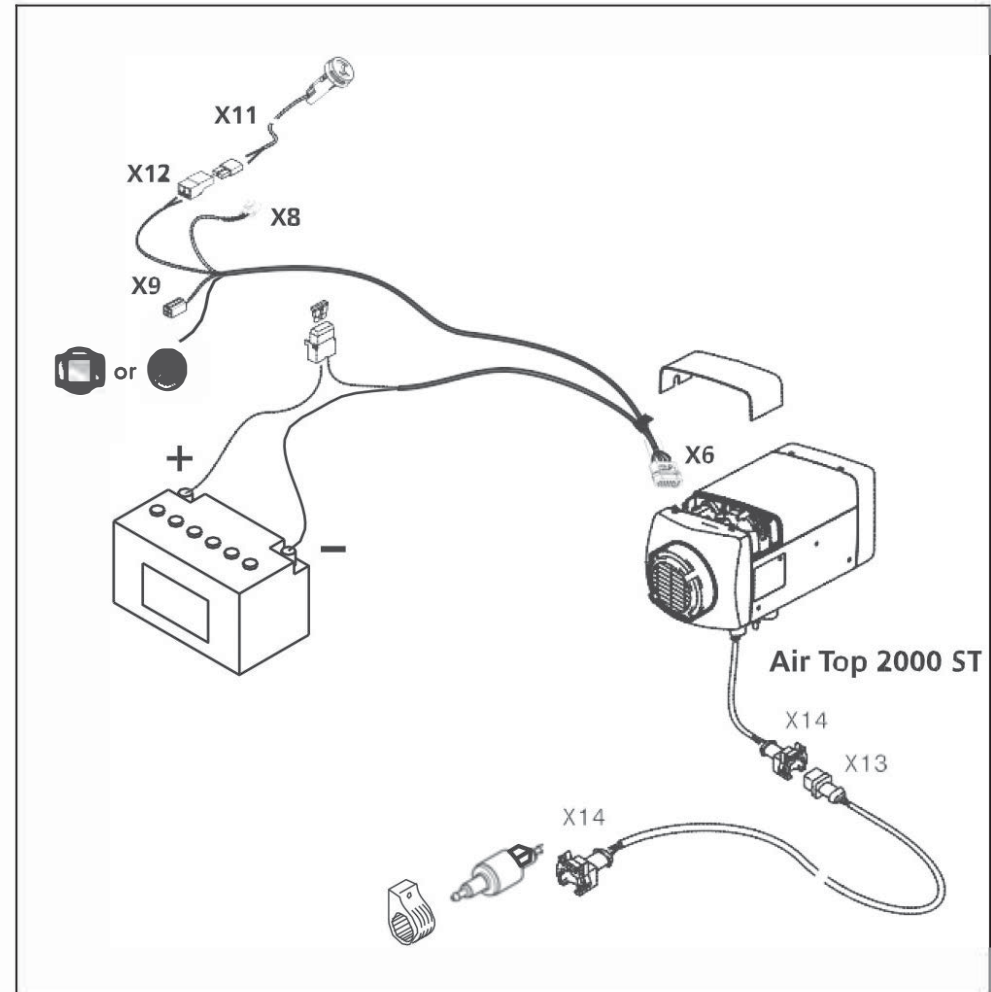


Fig. 33 Wiring harness Air Top 2000 ST



Electrical system

Marine Air Heaters Air Top 2000 ST /Evo 40 /Evo 55

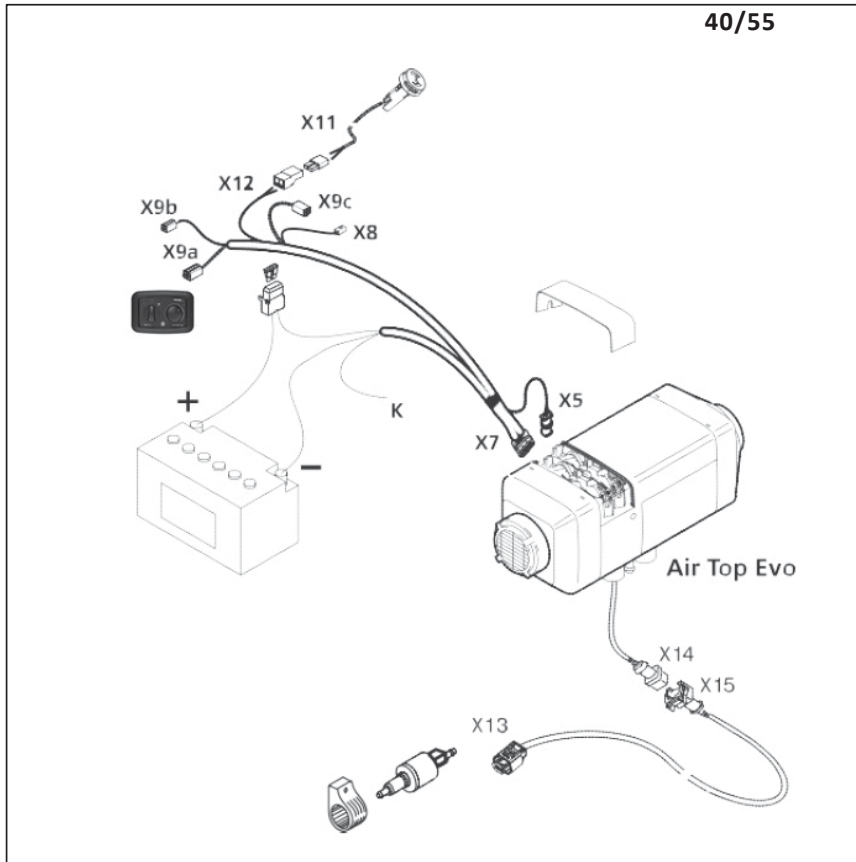


Fig. 34 Wiring harness Air Top Evo 40 /Air Top Evo 55



NOTE:

Use a blunt blade on both sides to remove the control unit cover (Fig. 35 arrows).

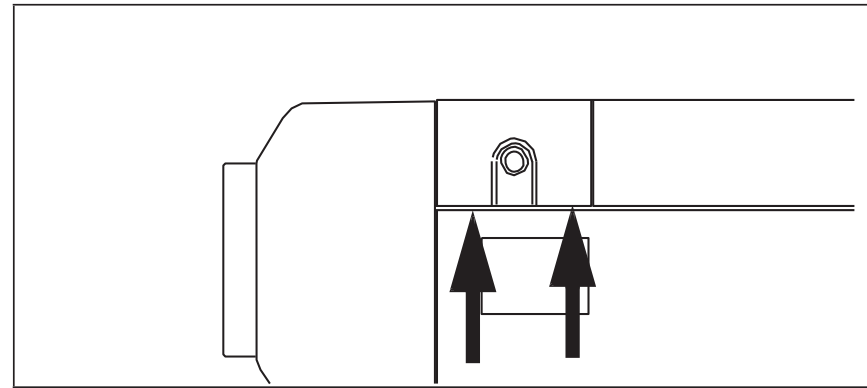


Fig. 35 Removing control unit cover

8.3. Connecting heater

To connect the heater, remove the control unit cover on the heater and plug in the wiring harness connector at the control unit. Connect voltage supply.

To prevent the hot air escaping (heater overheating), reattach the control unit cover prior to initial operation.

The cable lead-through can be either on the left or right. Correspondingly position the cable grommet on the wiring harness to ensure that the cable lead-through is sealed off in the control unit cover.



ATTENTION:

To enable afterrunning, the heater must not be shut down (disconnected from the power supply).

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

Electrical system



Air Top 2000 ST:

The connector for the Air Top 2000 ST must be plugged in as far as point "a".

See Fig. 36.

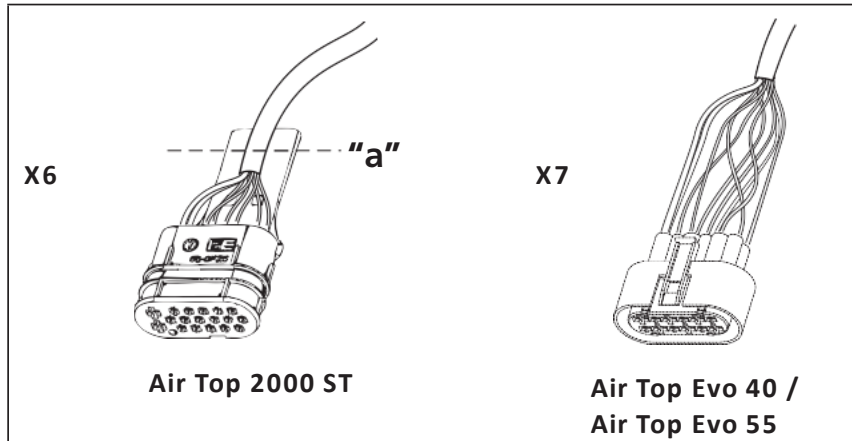


Fig. 36 Connector to heater control unit

Air Top Evo 40 / Air Top Evo 55:

Remove and dispose of the protective cap on the control unit. Plug connector X5 of the wiring harness for the room temperature sensor into this socket.

See Fig. 37.

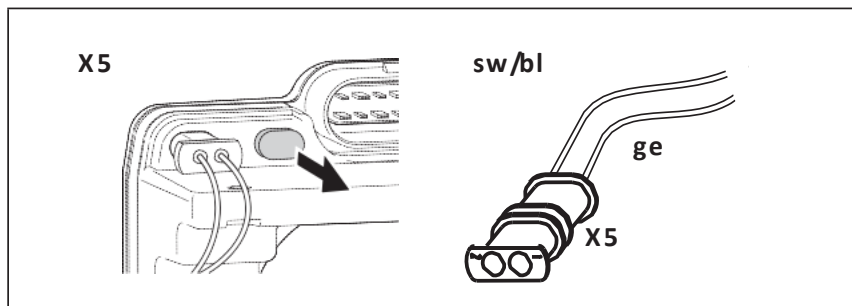


Fig. 37 (*Optional) Plugging in room temperature sensor at control unit

Correspondingly position the cable grommet on the wiring harness to ensure that the cable lead-through is sealed off in the control unit cover.

Route the wiring harness out of the heater and fit the cover (possible in both directions).

The heater must not be operated without the control unit cover (this will cause the heater to overheat).

8.4. Power supply

- Power supply to heater: from the boat's service battery (not the starter battery for the engine due to risk of discharge). Connect the red cable to the "+" terminal of the battery. This connection should always be made before the main switch to enable heater afterrunning. Connect the brown cable to earth directly at the battery.
- The wiring harness for the Air Top Evo 40 / Air Top Evo 55 includes cable K (Fig. 34, colour red/black) for optional control of a battery disconnecter or an additional operation indicator. If not required for this purpose, insulate the end of the cable.
- Keep power supply cables as short as possible. Shorten the cables if necessary.
- Cross section of connection cables: $\geq 4.0 \text{ mm}^2$.
If cable lengths $> 7.5 \text{ m}$: $\geq 6.0 \text{ mm}^2$
- When extending cables, make sure the total cross section is adequate and the insulation matches.
- The heater must be protected with a fuse (F1).
F = 20 A (12 V)
F = 15 A (24 V)
- If the MC04 control element is used with the Air Top Evo 40 / Air Top Evo 55 a 1A fuse (F3) must be inserted in the fuse holder.
- The fuse must be installed splash water-protected in the interior.
- Distance of the main fuse from the "+" battery terminal: $\leq 1 \text{ m}$



Electrical system

Marine Air Heaters *Air Top 2000 ST /Evo 40 /Evo 55*

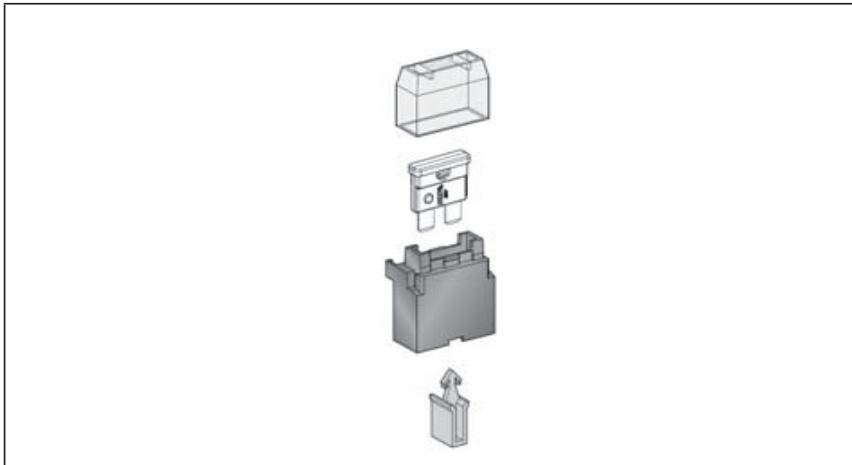


Fig. 38 Fuse holder on wiring harness

8.5. Temperature control (optional)

Install a room temperature sensor in the boat's interior (mandatory for fresh air operation)!

The heater continually compares the set temperature (value set at the control element) and the actual temperature (measured at the room temperature sensor) and automatically adjusts the heating capacity.



ATTENTION:

The Air Top heater is a separate system that operates independently of the engine with integrated temperature control.

An additional automatic control system for the purpose of controlling the temperature is not permitted.

8.5.1. Installing (optional) room temperature sensor

Mount the sensor in a favorable/suitable position in the room to be heated.

The distance to the control element is ≤ 2.5 m due to the cable length. Use a room temperature sensor with a 5 m long cable for greater distances, see the Webasto accessories catalogue.

The position has a decisive effect on the control characteristics!



NOTE:

- In largest cabin to be heated
- In position at average room temperature
- At half the room height if possible
- On a vertical interior wall if possible, not directly on an outside wall
- Not in the air flow of hot air outlets
- Not within the range of the companionway
- Not in the vicinity of heat sources
- Not behind cushions or curtains
- Not in direct sunlight

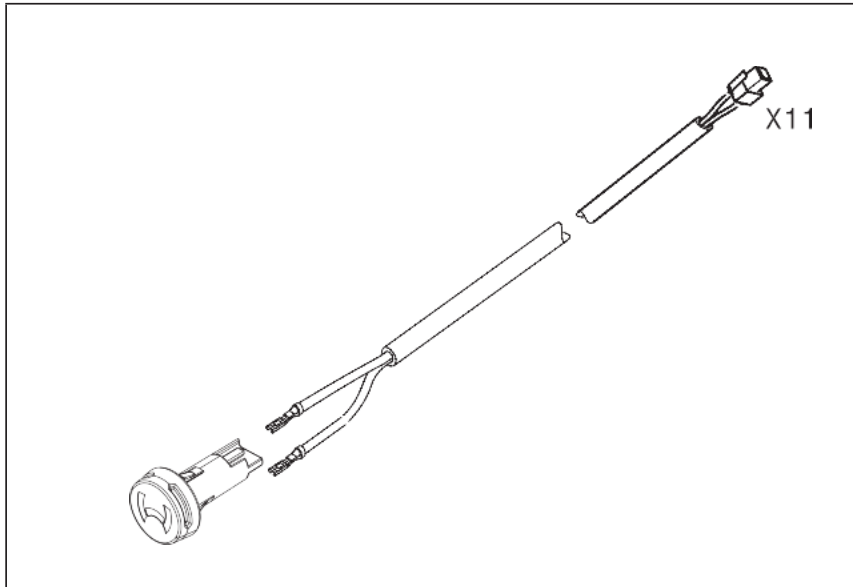
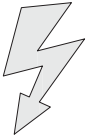


Fig. 39 Room temperature sensor for registering interior temperature

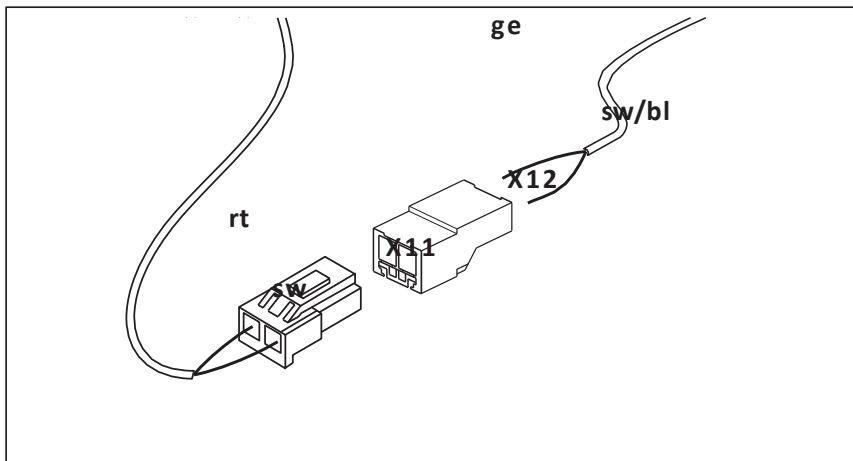


Fig. 40 Wiring of room temperature sensor

8.5.2. Connecting (optional) room temperature sensor

Route the cable of the room temperature sensor up to the installation location of the control element. Here connect the sensor cable to the main wiring harness, see Fig. 40.

Plug cable of room temperature sensor with the white connector housing X11 into the socket on the main wiring harness.

8.6. Control element

This control switches the heater ON/OFF and defines the setpoint for the interior temperature.

Position: mount in the interior such that it is easily accessible, visible and protected from water. The position has no effect on the control characteristics!

Various control elements with different functions are available, see the accessories catalogue.



NOTE:

Only pull on the connector housing to unplug the connector.

The connector housing will lock (self-locking action) by pulling on the wiring harness.



Electrical system

Marine Air Heaters Air Top 2000 ST /Evo 40 /Evo 55

8.6.1. Rotary switch

Connect the control element (ON/OFF and temperature preselection) with rotary potentiometer directly to the wiring harness.

See Fig. 42

Air Top 2000 ST:

Connector X9: pre-installed connector for control element.
Use the pink wire for the ventilation switch (option). When using a ventilation switch install a ground wire leading to the switch. See Fig. 41

Air Top Evo 40 / Air Top Evo 55:

Plug connector X9a (red, blue, white, black wires) with blue marking into the connector at the control element.
Connector X9b with the red marking is not required.
See Fig. 41

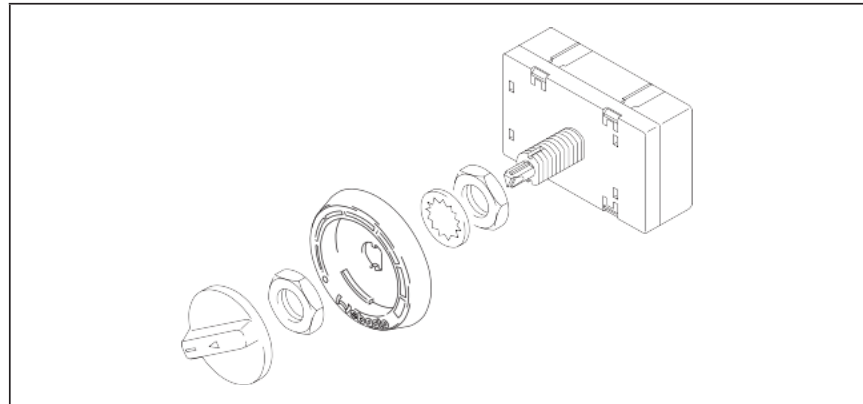


Fig. 42 Control element

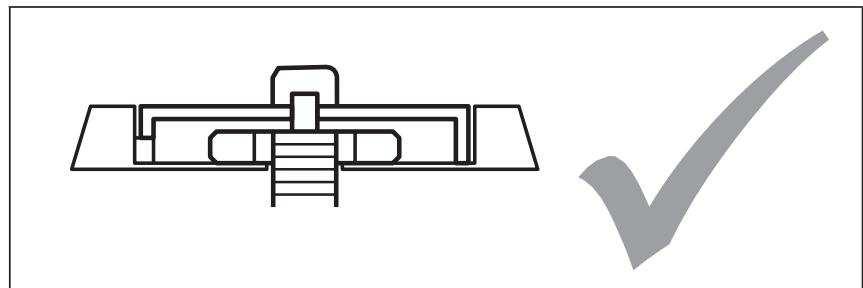


Fig. 43 Installing the control element

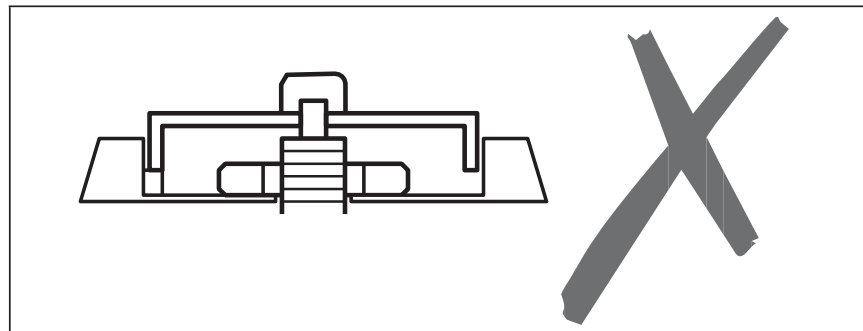


Fig. 44 Installing the control element (wrong)

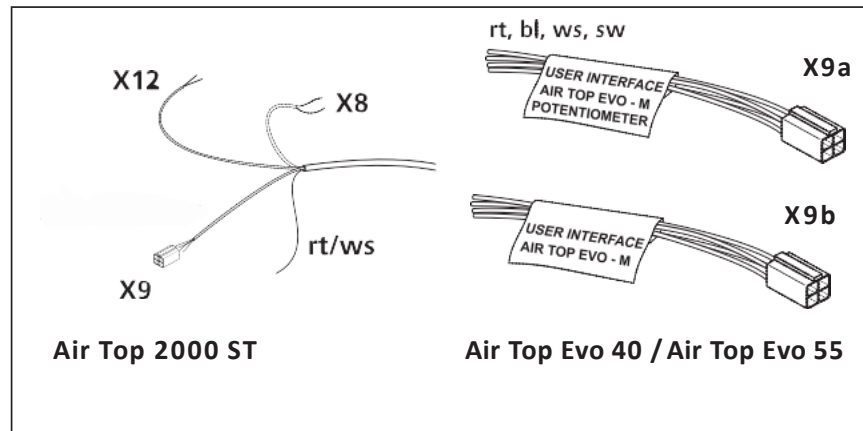


Fig. 41 Control element wiring

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

8.6.2. Air Top Evo control element MC04 Marine

The MC04 heater control element features additional operating modes such as ECO, PLUS and VENTILATION.

The MC04 can only be used in combination with Air Top Evo heaters.

- Make a 98 mm wide x 63 mm high cutout for the MC04.
- Connect the control element to the two connectors on the heater wiring harness, paying attention to the labels on the wiring harness as well as the colour coding on the connectors.
See Fig. 41 (connector X9a and X9b), as well as Fig. 46.
- Provisionally fit the control element in the cutout.
- Lightly press the fastening screws into the holes and screw in. Carefully clip on the trim frame

Electrical system

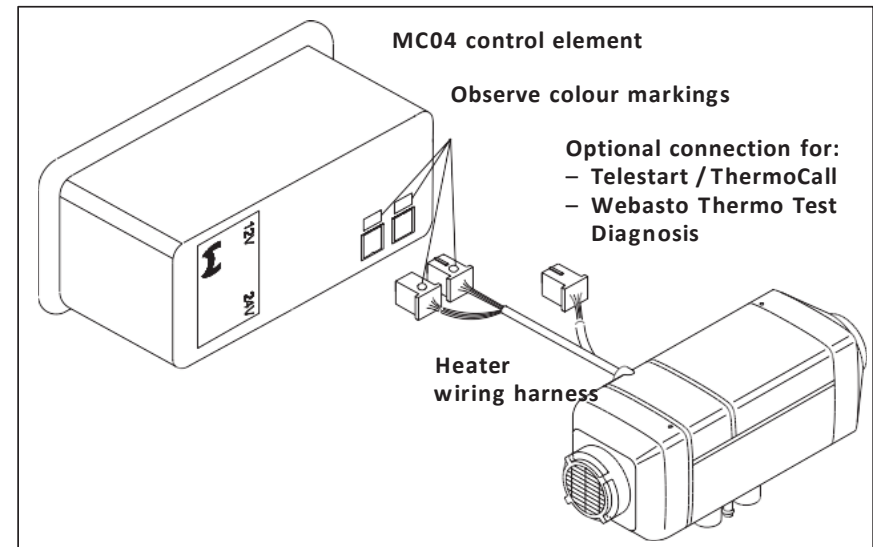
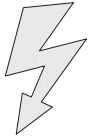


Fig. 45 Connection diagram Air Top Evo 40 / Air Top Evo 55 with MC04 control element

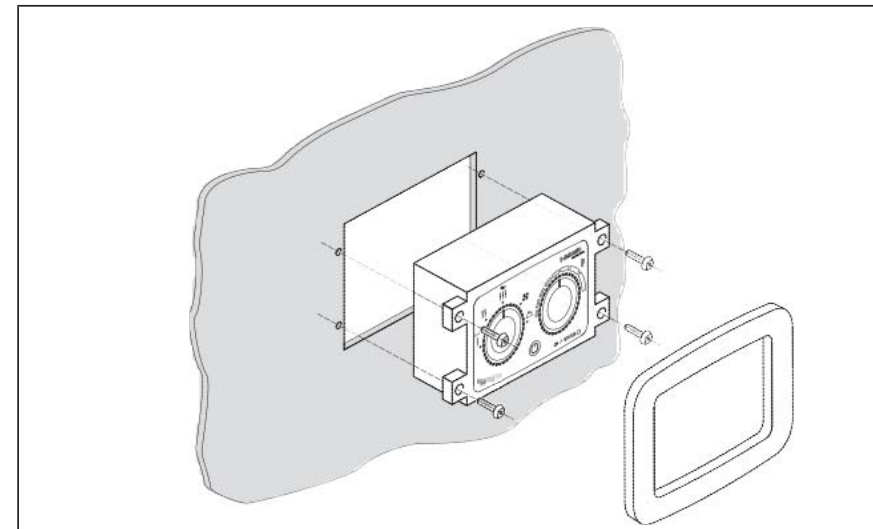


Fig. 46 Installing MC04 control element



Electrical system

Marine Air Heaters Air Top 2000 ST /Evo 40 /Evo 55

- 8.6.3. Control Element (SmarTemp) Connection (2000ST ONLY):** The Control Panel should be installed in a suitable location on a flat surface if possible in a visible area.
- Connect control panel to existing connectors on heater-unit wiring harness (see “Connections Diagrams Section”)
 - Use the drilling dimensions (fig. 47) to lightly mark the two mounting holes.
 - (Optional Step) To route wire harness through the mounting surface, drill a 22mm hole. Make sure to push harness through the hole before installing terminals into connector housing
 - Secure the SmarTemp Control using the two supplied #4 screws.
 - Follow the electrical pin-out fig. 50 to install the supplied harness connector and harness adaptors.
 - Apply the supplied “Heater Off” warning sticker in a highly visible location near the fuel filling cap.
 - Observe the installation / operating manual supplied for proper menu setup.

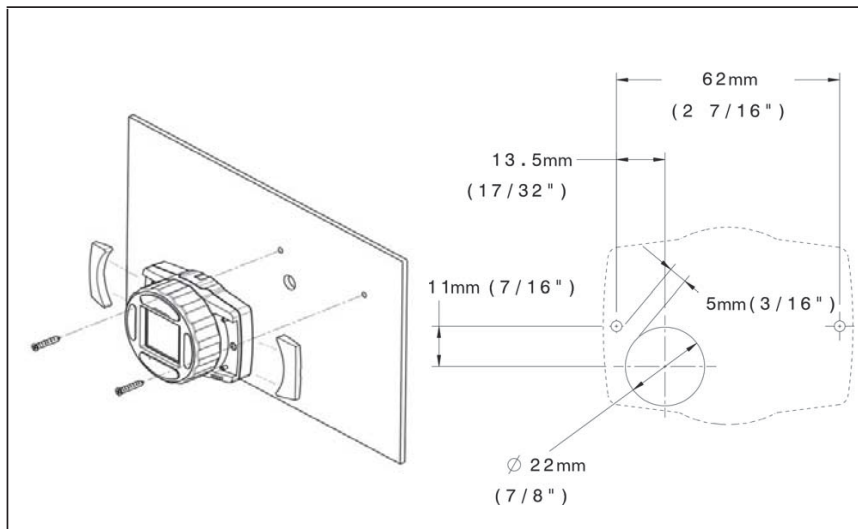


Fig. 47 Control Element (SmarTemp) 2000 ST only and drilling diagram

NOTES:

- Always make sure there are no obstacles behind the mounting location prior to drilling.
- Ensure good readability when selecting installation location.
- Observe information on adhesive labels and colored markings when connecting the control element to vehicles wiring harness.

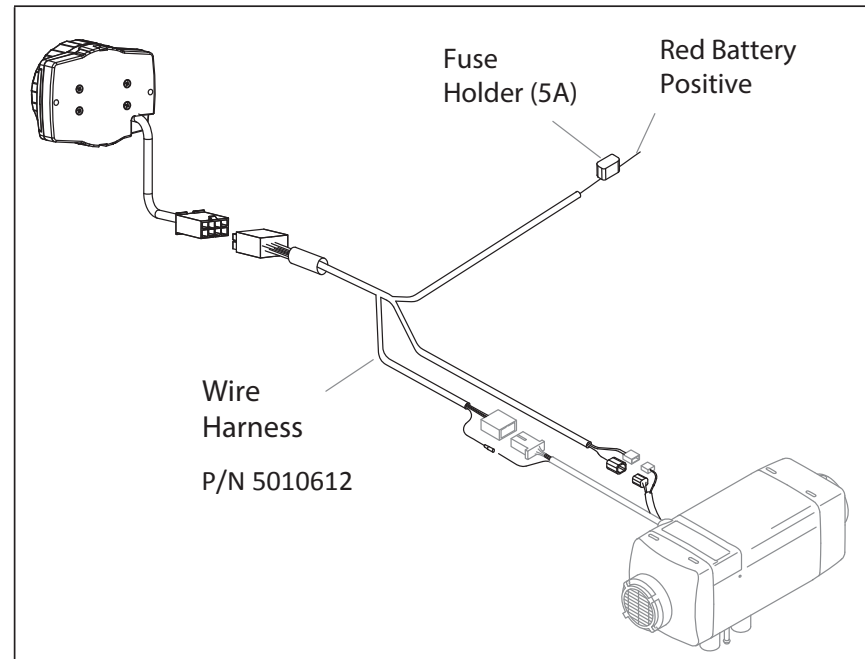


Fig. 48 Control Element (SmarTemp) 2000 ST only - connection diagram

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55



▶ 8.7. PC diagnosis

Air Top 2000 ST:

The wires (gn/ws, br/ws) are used to read out any faults and the operating hours and enable CO₂ calibration with the Webasto Thermo Test PC Diagnosis (only for Webasto service workshops).

Fit the X8 connector housing (supplied).

Air Top Evo 40 / Air Top Evo 55:

Use connector X8 (brown cable colour) for CO₂ calibration (only for Webasto service workshops).

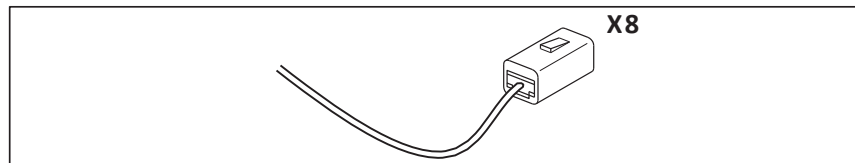


Fig. 49 Connector for CO₂ calibration

8.8. Fuel pump

The wiring harness for the fuel pump is normally routed out of the combustion air intake connection piece. Pull out the stowed cable (do not push back in). Connect it to the fuel pump. The polarity is irrelevant. Use an extension cable if it is not long enough (accessory).



Electrical system

Marine Air Heaters Air Top 2000 ST /Evo 40 /Evo 55

9 Wiring diagrams

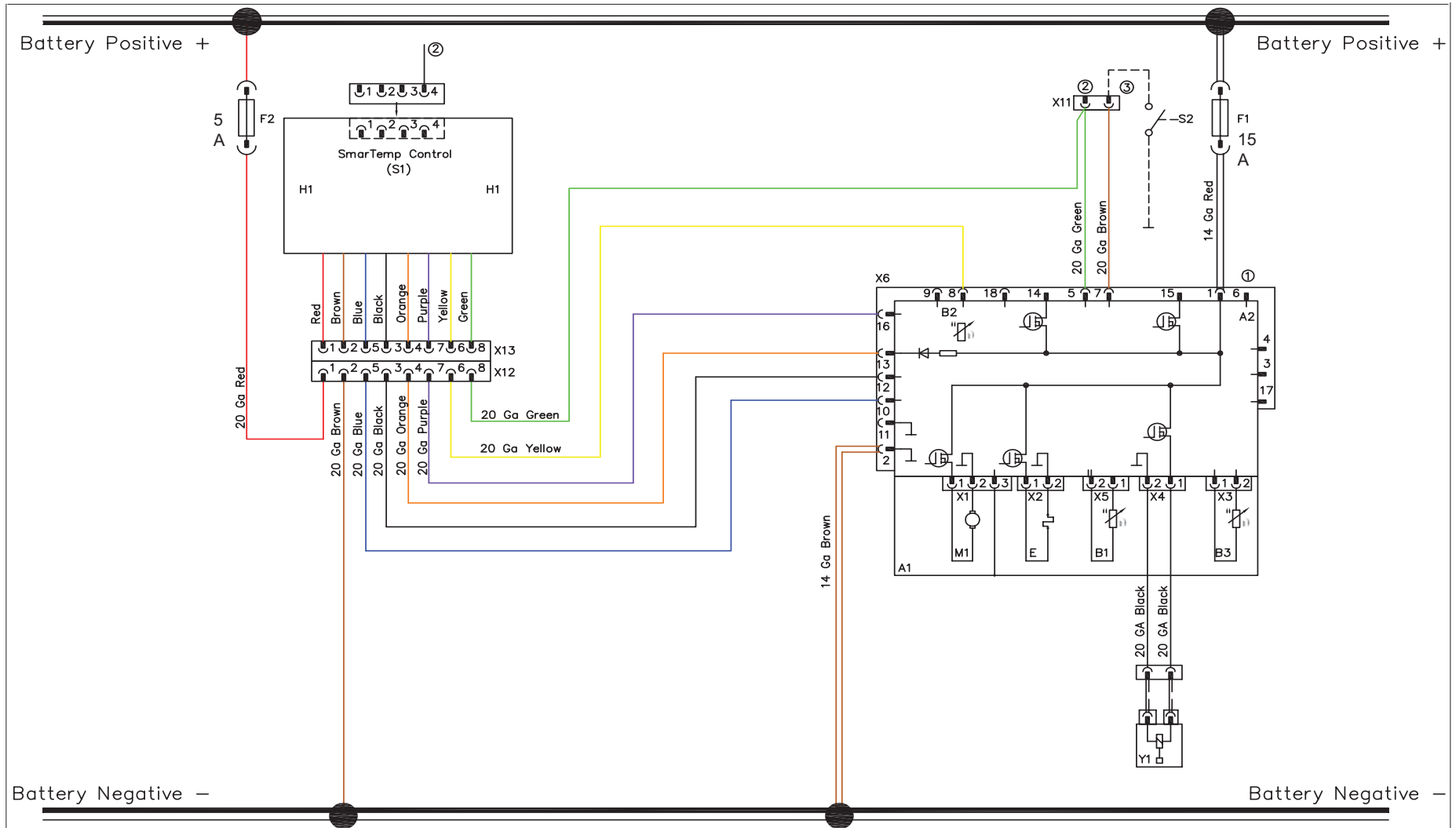


Fig. 50 Wiring diagram Air Top 2000 ST with SmarTemp Control, for legend see Page 44

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

Electrical system



Legend to wiring diagram for Air Top 2000 ST with SmarTemp Control only

- ① Diagnostic K cable
- ② W bus (SmarTemp uses a mini USB Connector)
- ③ CO₂ adjustment (see workshop manual)
- ④ If an external temperature sensor (B4) is used, resistor R1 must be replaced by the temperature sensor (B4).

Cable colors (where applicable)	
bl	blue
br	brown
ge	yellow
gn	green
gr	grey
or	orange
rt	red
sw	black
vi	violet
ws	white

Item	Description	Comment
A1	Heater	Air Top 2000 ST
A2	Control module	
B1	Flame sensor	For petrol heater only
B2	Temperature sensor	Internal
B3	Overheating sensor	Overheating guard
B4	Temperature sensor	External
E	Ceramic glow pin	
F1	15A 12/24V (20A Max.)	Flat fuse SAE J 1284
F2	5A 12/24V	Flat fuse SAE J 1284
H1	LED, green (in item S1)	Indicator
M1	Motor	Combustion and hot air fan
M3	Motor	Vehicle fan
R1	Resistor 620 Ohm	With internal temperature sensor only
R	Resistor 487 Ohm .6 Watt	1% Tol. - Required inline for ventilation mode
S1	Control element	Set point generator switch
S2	Switch	CO ₂ setting
S3	Switch	Ventilation
X1	Plug connector, 2-pin	To item A2 (ST B)
X2	Plug connector, 2-pin	To item A2 (ST V)
X3	Plug connector, 2-pin	To item A2 (ST U)
X4	Plug connector, 2-pin	To item A2 (ST Z)
X5	Plug connector, 2-pin	To item A2 (ST Y)
X6	Plug connector, 2-pin	To item A2 (ST X)
X7	Plug connector, 12-pin	To item A2 (ST1)
X8	Plug connector, 2-pin	
X9	Plug connector, 4-pin	To item S1
X10	Plug connector, 2-pin	To item Y1
X11	Plug connector, 2-pin	PC Diagnostic Link (Mini USB / SmarTemp)
X12	Receptacle Connector, 8-pin	
X13	Plug Connector, 8-pin	
Y1	Dosing pump	



Electrical system

Marine Air Heaters Air Top 2000 ST /Evo 40 /Evo 55

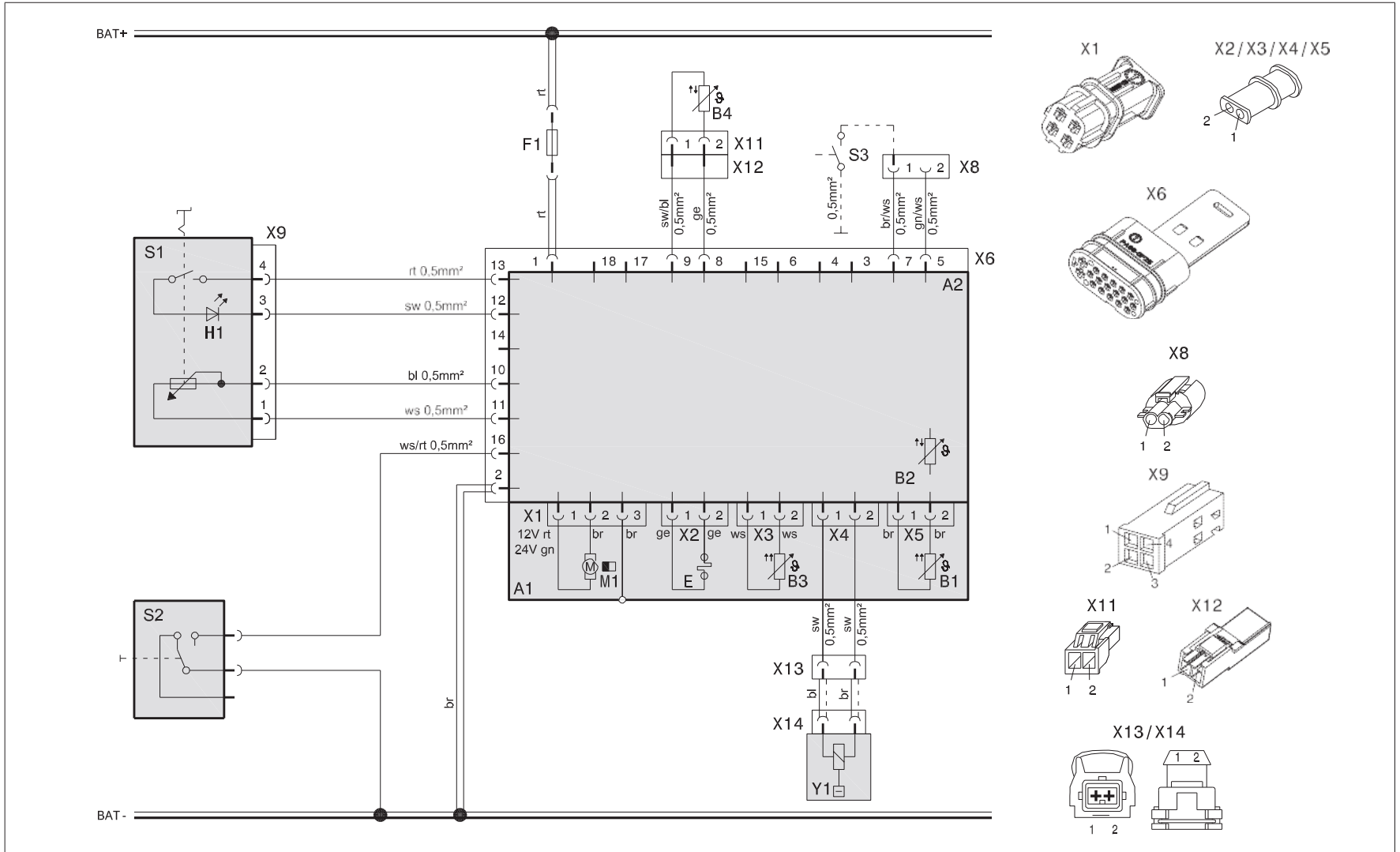


Fig. 51 *Wiring diagram Air Top 2000 ST with rotary switch and ventilation switch (optional)
for legend see Page 48*



Electrical system

Marine Air Heaters Air Top 2000 ST /Evo 40 /Evo 55

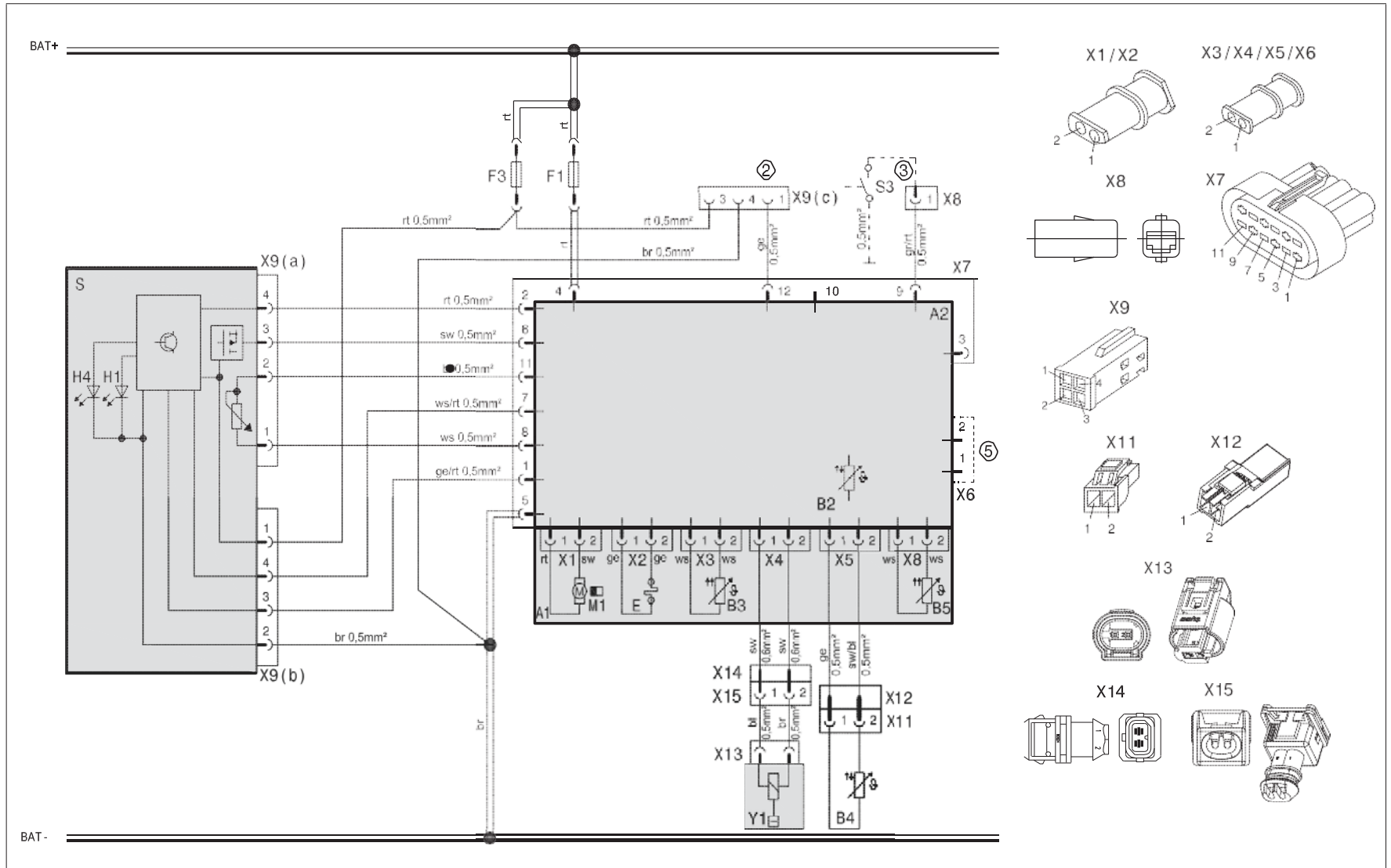


Fig. 53 Wiring diagram Air Top Evo 40 and Air Top Evo 55, with control element Air Top Evo Multi Control (MC04), for legend see Page 48

Marine Air Heaters

Air Top 2000 ST / Evo 40 / Evo 55

Electrical system



9.1. Legend to wiring diagrams

Item	Description	Remarks
A1	Heater	Air Top 2000 ST/ Air Top Evo 40 / Air Top Evo 55
A2	Control unit	Control unit 1574 (for Air Top 2000 ST) control unit 1580 (for Air Top Evo 40 / Air Top Evo 55)
B1	Flame monitor	only for Air Top 2000 ST petrol units
B2	Temperature sensor	Inside
B3	Overheat sensor	Overheating protection
B4	Room temperature sensor	Outside
E	Glow plug / flame monitor	for Air Top Evo 40 / Air Top Evo 55 glow plug only
F1	Fuse 24 V 15A / 12V 20A	Blade type fuse SAE J 1284
F2	Fuse 4A	not included in wiring harness
F3	Fuse 1A	Blade type fuse SAE J 1284
F4	Fuse 4A	not included in wiring harness
H1	LED green (in Item S1)	Operating indicator
H2	LED red (in Item P)	Lighting: Quick Heating button, Ready indicator, ON indicator
H3	Heating symbol on display (in Item P)	Operating indicator
H4	Lamps (in Item P and S)	Display and button lighting
K	Wire for voltage supply	Can be optionally used for additional. oper- ation indicator (<6 W) or battery discon- nector
M1	Motor	Combustion air and heating air blower
P	Combination digital timer 1531	Combination digital timer and setpoint sensor
R	Resistor	In adapter wiring harness
S	Control element Air Top Evo Multi Control (MC04)	ON switch, selector switch for additional functions and temperature selector

Item	Description	Remarks
S1	Rotary switch control element	ON switch and temperature selector
S2	Switch	Ventilation
S3	Switch	CO ₂ setting
S4	Pushbutton	External Quick Heating button
S6	Switch, 1 or 2-pin	Disconnecter
S7	Battery disconnecter	electronically controlled disconnecter max. 500 mA
V1/ V2	Blocking diode	min. 500 mA
X1- X17	Plug connection	-
Y1	Fuel pump	Air Top 2000 ST: DP30 Air Top Evo 40 / Air Top Evo 55: DP 42

9.1.1. Cable cross-sections

Cable	< 7.5 m	7.5 - 15 m
	0.75 mm ²	1.0 mm ²
	1.0 mm ²	1.5 mm ²
	1.5 mm ²	2.5 mm ²
	2.5 mm ²	4.0 mm ²
	4.0 mm ²	6.0 mm ²



NOTE:

Wires/components shown with dashed lines are optional and not included in the scope of delivery / in the wiring harness.



Electrical system

Marine Air Heaters *Air Top 2000 ST / Evo 40 / Evo 55*

9.1.2. Cable colours

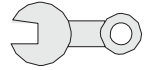
Abbreviation	Colour
bl	blue
br	brown
ge	yellow
gn	green
gr	grey
or	orange
rt	red
sw	black
vi	violet
ws	white

9.1.3. Reference numbers

- ① Positive at connection 10:
Continuous heating mode with quick heating function for as long as ignition is on.
- ② All heater versions: W-bus diagnosis connection.
Heater versions with control element Air Top Evo Multi Control (MC04)
Heater version Master:
Slave heater connection (yellow/blue wire).
Pre-assembled wire included in Slave scope of delivery.
- ③ CO₂ setting (see workshop manual).
- ④ If connected, continuous heating mode is possible with ignition switched off.
Must not be connected to the battery plus terminal in this case!
- ⑤ Tie back.
- ⑥ Room temperature sensor.
- ⑦ Wiring harness adapter is optionally available.

Marine Air Heaters

Air Top 2000 ST / Evo 40 / Evo 55



10 Initial operation



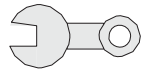
NOTE:

Observe the safety information given in the operating instructions!
Carefully read the operating instructions before operating the heater.

Heater must be switched off when refueling at filling stations and/or while loading or unloading flammable materials for transport, to prevent the risk of explosion. Please review owner's manual for safety and use instructions.

Before starting the heater for the first time, please complete the following checklist:

HEATER MOUNTING		Complete (Yes/No/Comments)
1	Is the heater installation safely secure / rigid? (Ensure that all bracket bolts are tight)	
2	Is there a safe clearance from heat generating Components? (I.e. exhaust, etc...)	
3	Is the heater mounted in an acceptable position according to the limitations noted in the installation manual?	
4	Is the heater installed in a protected location from road debris and splash-water or items stored in the same area?	
ELECTRICAL		Complete (Yes/No/Comments)
1	Has all wiring been safely secured away from moving components and / or heat sources?	
2	Check for proper power and ground connections.	
3	Check for proper fuse tap connection.	
4	Verify the correct fuses are in the specified locations per the installation manual.	
5	Ensure heater and vehicle fuse boxes are closed and secure. Was the Webasto fuse block installed in a location protected from water and / or moisture?	
6	Ensure battery is mounted securely and connections are properly tightened.	
7	Ensure battery is at $\geq 12.2Vdc$.	



Operation Instructions

Marine Air Heaters *Air Top 2000 ST /Evo 40 /Evo 55*

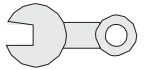
FUEL SYSTEM		Complete (Yes/No/Comments)
1	Is the standpipe properly mounted in the fuel tank? (sealed, structural integrity maintained).	
2	Validate the standpipe does not interfere with function of sending unit by checking fuel gauge for proper operation before completing installation of tank.	
3	Verify that all fuel lines are properly secured and are a safe distance (min. 4 in.) from exhaust systems and / or moving components.	
4	Check all fuel lines for leaks or kinks.	
5	Check fuel line clamps for proper positioning and tightness. Ensure fuel system is free of leaks.	
6	Ensure fuel pump is securely mounted in a cool location	

EXHAUST SYSTEMS		Complete (Yes/No/Comments)
1	Is the muffler and clamps securely tightened?	
2	Has muffler and exhaust tube been routed a safe distance (min. 2 in.) from flammable material?	
3	Ensure drain-holes are drilled in low bend areas of exhaust tube.	
4	Ensure exhaust is venting a safe distance from any vehicle inpenings.	
5	Ensure exhaust is venting in the direction that will not cause back pressure while driving.	

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

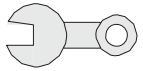
Operation Instructions



COMBUSTION AIR INTAKE		Complete (Yes/No/Comments)
1	Is the combustion air intake drawing fresh air from a non-turbulent location? (i.e. not in direction of travel)	
2	Ensure air intake system is securely fastened.	

HEATER FUNCTION		Complete (Yes/No/Comments)
1	Ensure heater starts and runs for a minimum of 20 minutes.	
2	Ensure control device is functions properly.	

COSMETICS		Complete (Yes/No/Comments)
1	Has the vehicle interior, engine compartment, trunk & glove compartment been inspected for cleanliness after installation.	
2	Has user manual placed in glove box?	
3	Is the vehicle clock time correct after disconnecting the battery?	



Operation Instructions

Marine Air Heaters *Air Top 2000 ST /Evo 40 /Evo 55*

Carefully bleed the fuel supply system after installing the heater.

NOTE:

As a result of the low fuel consumption the heater must be switched on several times to fill the fuel line and prime the system.

Conduct a trial of the heater to check all the connections for leaks and to ensure that they are secure. If the heater suffers a fault during operation, the fault must be located and remedied.

1. Install the heater in accordance with the installation instructions
2. Connect in accordance with the wiring diagram
3. Install the heater control element and room temperature sensor

10.1 Control Element Description

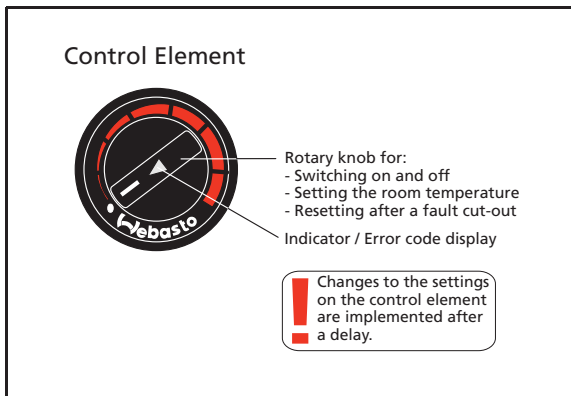


Fig. 54 Control Element (Rheostat)

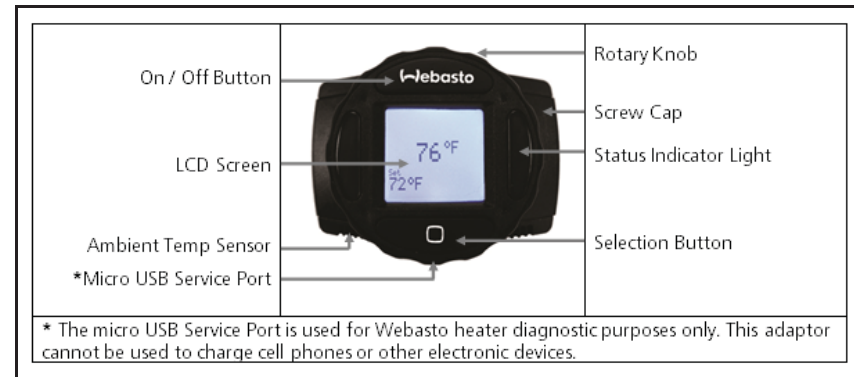


Fig. 55 Control Element (SmarTemp Control) **2000 ST ONLY**

The SmarTemp Control has a ventilation mode built into the software. No special wiring is required. Where desired, a separate switch installed between the 20 ga pink wire (X6, Pin-16) and a ground point allows the user to chose between heating and ventilation mode.

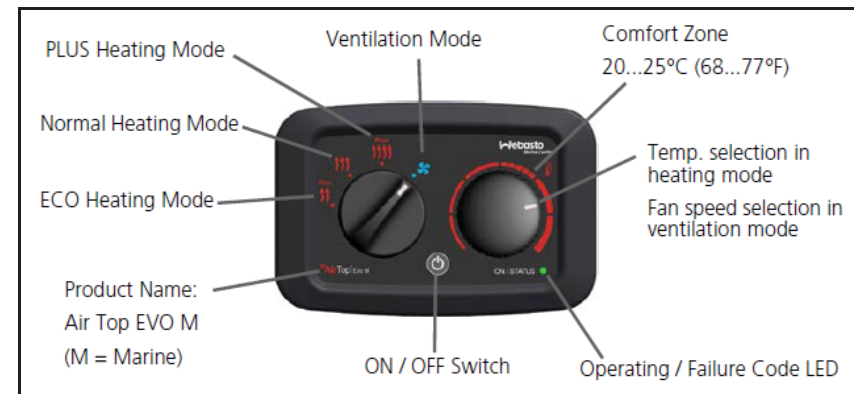


Fig. 56 Control Element (MC-04) **Air Top Evo 40/55 only**

10.2 Product Registration

- Register the product on the internet under: <http://techwebasto.com>
- Hand over the registration document to the next owner or user of the unit.



11 Troubleshooting

11.1 Error Code Output

- If an error occurs, the unit outputs a fault code via the control element.
- You will find further information in the operating instructions and in the heater workshop manual.

NOTE:

An error code is generated on the control element indicator light after an error has occurred. When determining the generated code, there will be a series of 5 fast flashes after which, the error code will be generated by a sequence of long flash pulses, count only the long flash pulses to obtain the code. Error codes are shown in the table below.

AT 2000 ST Fault Codes

Fault code	Fault
F 00	Control unit error
F 01	No start/no flame formation
F 02	Flame failure
F 03	Under-voltage or over-voltage
F 04	Premature flame detection
F 06	Temperature sensor interrupt or short circuit
F 07	Fuel pump defective
F 08	Fan motor interrupt, short circuit, or overload
F 09	Glow plug defective
F 10	Overheating
F 11	Overheating sensor interrupt or short circuit
F 12	Heater lock-out
F 13	Heater lock-out permanent
F 14	Overheat Temperature Sensor defective
F 15	Set-point generator defective

AT 40-55 Fault Codes

Fault code	Fault
F 01	No start/no flame formation
F 02	Flame abort

F 03	Under-voltage or over-voltage
F 04	Premature flame detection
F 05	Not Available
F 06	Not Available
F 07	Fuel pump defective
F 08	Open circuit / short circuit / overloading / blockage in drive motor
F 09	Glow plug defective
F 10	Overheating
F 11	Not Available
F 12	Not Available
F 13	Not Available
F 14	Overheat Temperature Sensor defective
F 15	Not Available
F 16	Exhaust temperature exceeded
F 17	Exhaust gas temperature sensor defective
F 18	Set-point generator defective
F 19	Plausibility of sensors incorrect

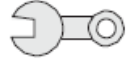
11.2 Fault Lock-Out

The control unit continuously monitors the heater operation. The control unit identifies errors on individual heater components and faults during operation. Should the control unit experience component errors and operational faults, the heater may be shut down.

Causes:

The heater is shut down (fault lock-out) if:

- No or incorrect start
- Temperature sensor defective
- Overheating sensor interrupt or short circuit
- Overheating sensor installed incorrectly
- Ceramic glow pin interrupt or short circuit
- Fan motor overload or blocked or short circuit or interrupt
- Error in the fuel metering pump or circuit
- Under voltage or over voltage for longer than 20 seconds.
- Control unit defective
- Overheating



Effects:

The fuel supply is stopped if the heater overheats.

The heater continues to run in the same way as if it is switched off manually.

After the heater stops the control unit may set in fault lock-out mode.

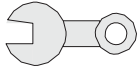
Heater Lock out Reset Procedure:

1. Using switch or standard timer control, turn heater on
2. Remove the main power connection to heater from battery or pull fuse for a minimum of 20 seconds.
3. Using switch or standard timer control, turn the heater off.
4. Reinstall main heater power connection where previously disconnected.

Rectify the cause of the fault.

IMPORTANT: Heater fault codes can be read using PC Diagnostics, however, the heater lockout reset must be manually performed using the procedure stated above.

If you have any questions, contact our technical support team at (800) 860-7866 or via email at: info-us@webasto.com



12 Technical data

If no limit values are specified, the technical data will refer to the usual heater tolerances of $\pm 10\%$ at an ambient temperature of $+20\text{ }^{\circ}\text{C}$ and at the rated voltage.

1. Electrical components

The control unit, lamp in the timer and glow plug are designed for either 12 V or 24 V operation.

The timer (not including lamp), blow-out temperature sensor, room temperature sensor and exhaust gas temperature sensor are designed for both operating voltages.

2. Fuel for Air Top 2000 ST / Evo 40 / Evo 55 (diesel)

Diesel fuel in accordance with DIN EN 590 is to be used.
There are no known adverse effects of using additives.

When changing to low-temperature fuel, the heater must be operated for approx. 15 minutes to fill the fuel system with the new fuel.

The units Air Top 2000 ST D, Air Top Evo 40 D and Air Top Evo 55 D are also approved for use with biodiesel (FAME) conforming to DIN EN 14214.

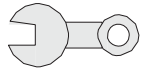
Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55

Technical Data



Heater	Air Top 40 D	Air Top Evo 55 D	Air Top 2000ST
Type approval: EMC	E1 03 5529	E1 03 5529	e1*72/245*95/54*1085*00
Type approval: Heating	E1 00 0385	E1 00 0386	e1*2001/56*0022*00
Design	Air heater with vaporising burner	Air heater with vaporising burner	Air heater with evaporator burner
Heat flow over control range [kW]	1.5 to 3.5 (4.0)	1.5 to 5.0 (5.5)	0.9 - 2.0
Fuel	Diesel / bio-diesel DIN EN 590/ DIN EN 14214	Diesel / bio-diesel DIN EN 590/ DIN EN 14214	Diesel
Fuel consumption over control range	0.15 - 0.36 (0.41) kg/h 0.18 - 0.43 (0.49) l/h	0.15 - 0.51 (0.56) kg/h 0.18 - 0.61 (0.67) l/h	0.1 - 0.21 kg/h (0.12 - 0.24 l/h)
Rated voltage [V]	12 / 24	12 / 24	12 / 24
Operating voltage range [V]	10.5 to 16 / 20.5 to 31	10.5 to 16 / 20.5 to 31	10.5 - 16 / 21 - 32
Rated power consumption over control range [W]	15 to 40 (55)	15 to 95 (130)	14 to 29
Permissible ambient temperature (operation/storage): Heater [°C]	-40 to +40 / -40 to +85	-40 to +40 / -40 to +85	-40 to +40 / -40 to +85
Permissible ambient temperature (operation/storage): Fuel pump [°C]	-40 to +20 / -40 to +85	-40 to +20 / -40 to +85	-40 to +20 / -40 to +85
Permissible combustion air intake temperature [°C]	-40 to +20	-40 to +20	-40 to +20
Set-point temperature range [°C]	+5 to +35	+5 to +35	+5 to +35
Volumetric flow rate with pressure loss in cold/hot air system ≥ 0.5 hPa [m ³ /h]	Max. 132 (140)	Max. 200 (220)	Max. 93
CO ₂ in exhaust gas: Rated heating capacity VL [kW]	3.5	5.0	N/A
CO ₂ in exhaust gas: CO ₂ rated value VL [vol%]	9.2	10.0	N/A
CO ₂ in the exhaust fumes (normal function range) 1kW	N/A	N/A	5.0 ... 8.0
CO ₂ in the exhaust fumes (normal function range) 2kW	N/A	N/A	9.0 ... 12.5
Heater length [mm]	423 ± 2	423 ± 2	311 ± 2
Heater width [mm]	148 ± 1	148 ± 1	120 ± 1



Technical Data

Marine Air Heaters *Air Top 2000 ST / Evo 40 / Evo 55*

Heater	Air Top 40 D	Air Top Evo 55 D	Air Top 2000ST
Heater height [mm]	162 ± 1	162 ± 1	121 ± 1
Heater weight [kg]	5.9	5.9	2.6
IP class: Heater	IP5K4K	IP5K4K	
IP class: Fuel pump	IPX6 / IPX7 / IP6K9K	IPX6 / IPX7 / IP6K9K	
Max. length of combustion air line and exhaust line with exhaust silencer [m]	2	2	
Max. length of combustion air line and exhaust line without exhaust silencer [m]	5	5	
Max. permissible pressure loss in cold and hot air system [hPa]	2.0	3.0	

The technical data apply under the following conditions:

- Ambient temperature: +20 °C
- Geodetic height: 0 m above sea level
- Rated voltage

The standard tolerances of ±10 % for heaters shall apply if no limits are specified.

The values in brackets apply for the extended heating capacity (boost function) that is activated temporarily during each start.

Marine Air Heaters

Air Top 2000 ST / Evo 40 / Evo 55

Notes 



Notes

Marine Air Heaters

Air Top 2000 ST /Evo 40 /Evo 55



Webasto Thermo & Comfort N.A., Inc.
15083 North Road
Fenton, MI 48430

Technical Assistance Hotline
USA: (800) 860-7866
Canada: (800) 667-8900

www.webasto.us
www.techwebasto.com