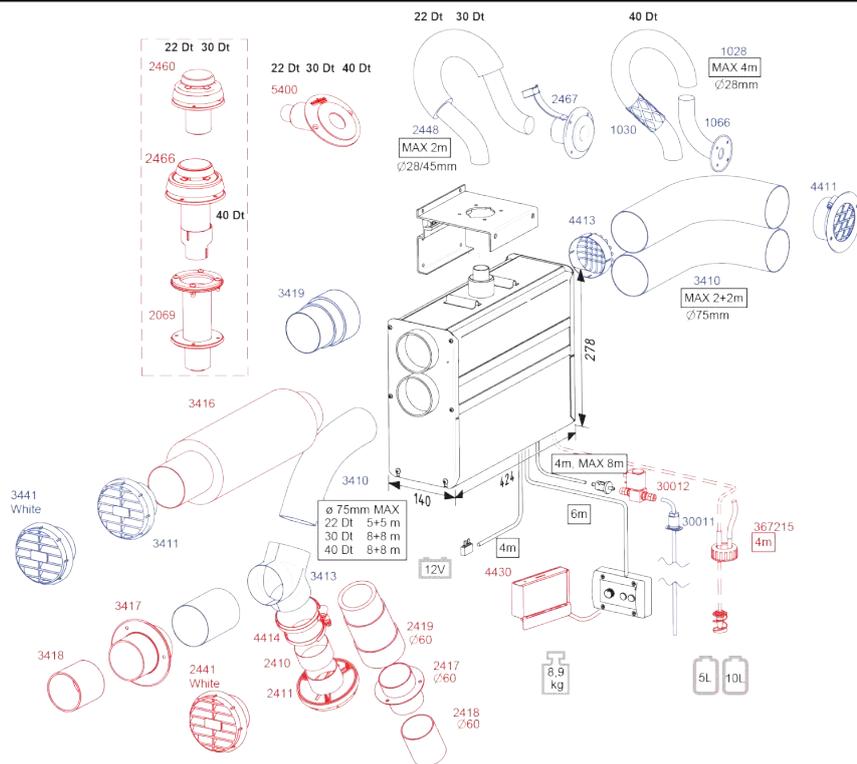


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- Standard delivery
■
- Installation accessory
●
- Special installation
○
- Accessory
✱



Supplies and accessories

		22 Dt	30 Dt	40 Dt
2467	Hull lead-through	●	●	
1066	Hull lead-through			●
5400	Stern lead-through, 28 / 45 mm	●	●	●
2448	Exhaust tube ø 28/45 mm inox	●	●	
1028	Exhaust tube, stainless 28 mm			●
1030	Heat insulation, 30 mm, Fiber glass			●
4411	Inlet grill ø 75 mm	●	●	●
4413	Intake grill d 75	●	●	●
3410	Warm air duct ø 75 mm	●	●	●
3419	Insulated warm air duct d 75 mm	●	●	●
2460	Sealable deck lead-through	○	○	
2466	Sealable deck lead-through			○
2069	Exhaust extension kit	○	○	○
3416	Silencer		○	○
30012	Magnetic valve 12V/0,5 A	○	○	○
30011	Tank fitting / diesel	●	●	●
367215	Tank feed through, diesel	○	○	○
3413	Warm air 3-way divider	●	●	●
3411	Warm air ventilation ø 75 mm	●	●	●
3441	Warm air ventilation ø 75 mm, white	●	●	●
3417	Bulkhead lead through 75 mm	○	○	○
4414	Duct adapter ø 60/75 mm	○	○	○
2419	Insulated warm air duct d 60 mm	○	○	○
2410	Warm air duct, 60 mm	○	○	○
4430	GSM/GPRS Remote control system	○	○	○
2441	Warm air ventilation ø 60 mm, white	○	○	○
2411	Warm air ventilation ø 60 mm	○	○	○
2417	Bulkhead lead through 60 mm	○	○	○

Package contents

22 Dt / 30 Dt / 40 Dt	
1 pcs	Diesel heater
1 pcs	Fuel hose (4m)
1 pcs	Power cable with connector and integrated fuse 15 A (4m)
1 pcs	Mounting plate
1 pcs	Accessory bag 17724A
2 pcs	Mounting bolt M8 x 140 mm
2 pcs	Washer M8
2 pcs	Corrugated base plate M8
6 pcs	Fastening screw 4,8 x 16 mm
1 pcs	Hose clamp 20 - 32 mm
1 pcs	Hose clamp 32 - 50 mm
4 pcs	Hose clamp 60 - 80 mm
1 pcs	Pipe clip D6 x 12 mm
1 pcs	Fastening screw 4,2 x 13 mm
1 pcs	Control panel package 361062
1 pcs	Control panel
1 pcs	Extension collar
1 pcs	Control panel cable, 6 m
4 pcs	Control panel fastening screws 3,5 x 20 mm (black) TX 10
4 pcs	Control panel fastening screws 3,5 x 40 mm (black) TX 10
1 pcs	Fuel filter package 603721
1 pcs	Fuel filter
4 pcs	Hose clamp 8 mm
2 pcs	Hose clamp 10 mm
2 pcs	Rubber hose ø 5 mm
1 pcs	Rubber hose ø 6 mm
1 pcs	Installation, operation and maintenance instructions

Technical information

	22 Dt	30 Dt	40 Dt
Fuel	Diesel oil, light furnace oil		
Operating voltage	12 V DC		
Fuel consumption	0,1 - 0,2 l/h 0,026 - 0,053 US gph	0,1 - 0,3 l/h 0,026 - 0,078 US gph	0,2 - 0,4 l/h 0,053 - 0,11 US gph
Heating power	1 - 2,2 kW 3,500 - 7,500 btu	1 - 3 kW 3,500 - 10,500 btu	1,5 - 4 kW 5,000 - 14,000 btu
Heating air volume, min *)	54 m ³ /h 32 cfm	60 m ³ /h 35 cfm	86 m ³ /h 51 cfm
Heating air volume, max *)	72 m ³ /h 42 cfm	96 m ³ /h 56 cfm	147 m ³ /h 86 cfm
Power consumption	0,6 - 0,9 A (during ignition ca. 5 - 10 min. 8 A)	0,8 - 1,8 A (during ignition ca. 5 - 10 min. 8 A)	1,0 - 3,9 A (during ignition ca. 5 - 10 min. 8 A)
Dimensions (L x H x W)	424 x 278 x 140 mm 16 11/16" x 10 15/16" x 5 1/2"		
Weight	Appr. 10 kg Appr. 17 lbs		
Maximum permitted length of exhaust pipe	2 m (ø 28/45 mm) 6,5' (ø 28/45 mm)		4 m (ø 28 mm) 13' (ø 28 mm)
Maximum permitted length of fuel hose	8 m 26'		
Maximum permitted length of outlet air duct	5 + 5 m 16,5' + 16,5'	8 + 8 m 26' + 26'	
Maximum permitted length of inlet air duct	2 + 2 m 6,5' + 6,5'		
Minimum area of the replacement air opening	100 cm ² 16 square inches		
Warm air connection	2 x ø 75 mm (2 15/16")		
Fresh air connection	2 x ø 75 mm (2 15/16")		
Connections	Solenoid valve Remote control Timer		
Suitable Exhaust gas lead-throughs	2467 and 2460		1066 and 2466 + 2069

Due to physical laws of thermodynamics, Wallas-Marin announces measured values with 10 % tolerance.

*) the values are defined in Wallas -reference measurement point with maximum ducting lengths. Both tubes included four 90° bends.

Operation description

The **22 Dt**, **30 Dt** and **40 Dt** heaters are forced air diesel heaters without an exposed flame.

The **22 Dt** and **30 Dt** models take combustion air from outside the boat through the outer coaxial exhaust gas pipe and blow their exhaust out through the inner coaxial pipe. The coaxial pipe connects to a common through hull fitting that allows both inlet air and exhaust to pass separately. This process improves efficiency, wind resistance and lowers the minimum power level. The model **40 Dt** takes combustion air from its place of installation and blows the exhaust gas out through a single pipe.

For all these models, fresh makeup air is taken from desired areas with air intake ducting, e.g. from outside of the boat or inside the cabin. This enables good air circulation and cabin air replacement. Diesel engine compartment installations are supported by the separate makeup air intake ducts, quarantining the makeup air away from any smells or noxious engine fumes.

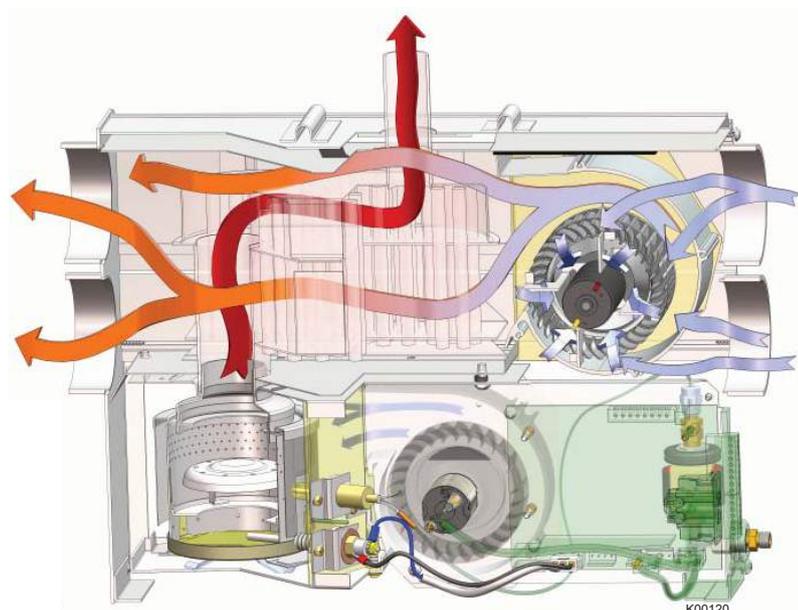
The heat generated by forced air fuel combustion, is transferred to the circulation air by a heat exchanger. The heating power can be adjusted freely between high and low output settings by manual rheostat control or by thermostat. The heated air is circulated through the cabin through the warm air ducting.

In hot and/or humid conditions, these heating units can be used for simple fresh air ventilation and circulation.

When starting the device, the glow plug ignites the pumped fuel in the burner bowl. The glow/start and shut down sequences are factory programmed, so - starts and stops are automatically controlled.

The fuel pump inside the heater case regulates the fuel feed and the system electronics control both the fuel and air mixture to maintain the ideal clean burning process. The temperature sensor inside the burner feels the ignition and lights up the red signal light (1) to indicate a successful start. When stopping the device, an automatic after cooling process takes place. This process cleans the burner, purging any unburned fuel.

The heaters are completely made out of corrosion resistant materials.



Heater's operation principles

Heater installation

Country specific regulations shall be followed in any installation.

The warranty of boat products is valid only in boat installations. The warranty is not valid in installations to vehicles or other spaces.

The device is meant for marine pleasure craft use. The device is not designed for continuous use for example in live aboard boats or commercial settings. In such use the device will require more frequent servicing not covered by warranty.

Things to note when selecting the installation location

The device shall be installed into a dry space in a protected location. The device must be mounted to a solid, stable bulkhead or wall. Deck or floor mounting is not possible with these models. When installing, please note that the device needs to be removable for servicing. Connections and location should be made so that the device can be easily disconnected for removal. For maintenance, it is useful to leave 200 mm (7 ⁷/₈") empty space below the heater for the removal of the bottom cover of the heater.

The heater should be installed vertically level when the boat is on an even keel. The static inclination must not exceed 5°. While the device will tolerate being temporarily tilted to a steep angle (even for some hours), the burner will not yield optimal performance if it is constantly inclined.

Select the place of installation to allow a minimum amount of bending in the warm air ducting. Avoid installing the heater and control panel in the immediate vicinity of any potential water intrusion. If possible, install the control panel on a vertical surface. We recommend that the device be installed by an authorized Wallas service shop or installer.

Things to note when installing pipes, hoses and cables

Power cables, warm-air ducting and fuel hoses must be protected in locations where they are susceptible to mechanical damage due to sharp edges or heat. All cables and hoses should have a fluid precluding "drip loop" to prevent water or other fluids from following wires or hoses to the heater.

Installation space

The device can be installed within the heated space or outside of it. If located outside the heated area, heating performance can be improved by installing the an intake air tube to the heated space (warm return air). If located inside the heated area, air refreshing performance can be improved by installing the an intake air tube to the outside air (cold, dry fresh air to be heated).



The heater cannot be installed into a space which may include gasoline fumes (danger of explosion).

The necessary installation tools



ø 2 mm
ø 5 / ø 6 mm

PZ 2
PH 2
TX 10

8 mm
12 mm
13 mm

ø 35 / ø 50 mm
ø 76 mm
ø 83 mm



In a metal-hulled boat, you must ensure that the device, the exhaust gas lead-through, the fuel connection, the control panel, and all other parts are insulated from the boat's hull. This must be done to

- prevent electrochemical corrosion
- prevent voltage from being transmitted from the hull to the device or vice versa during electrical faults.



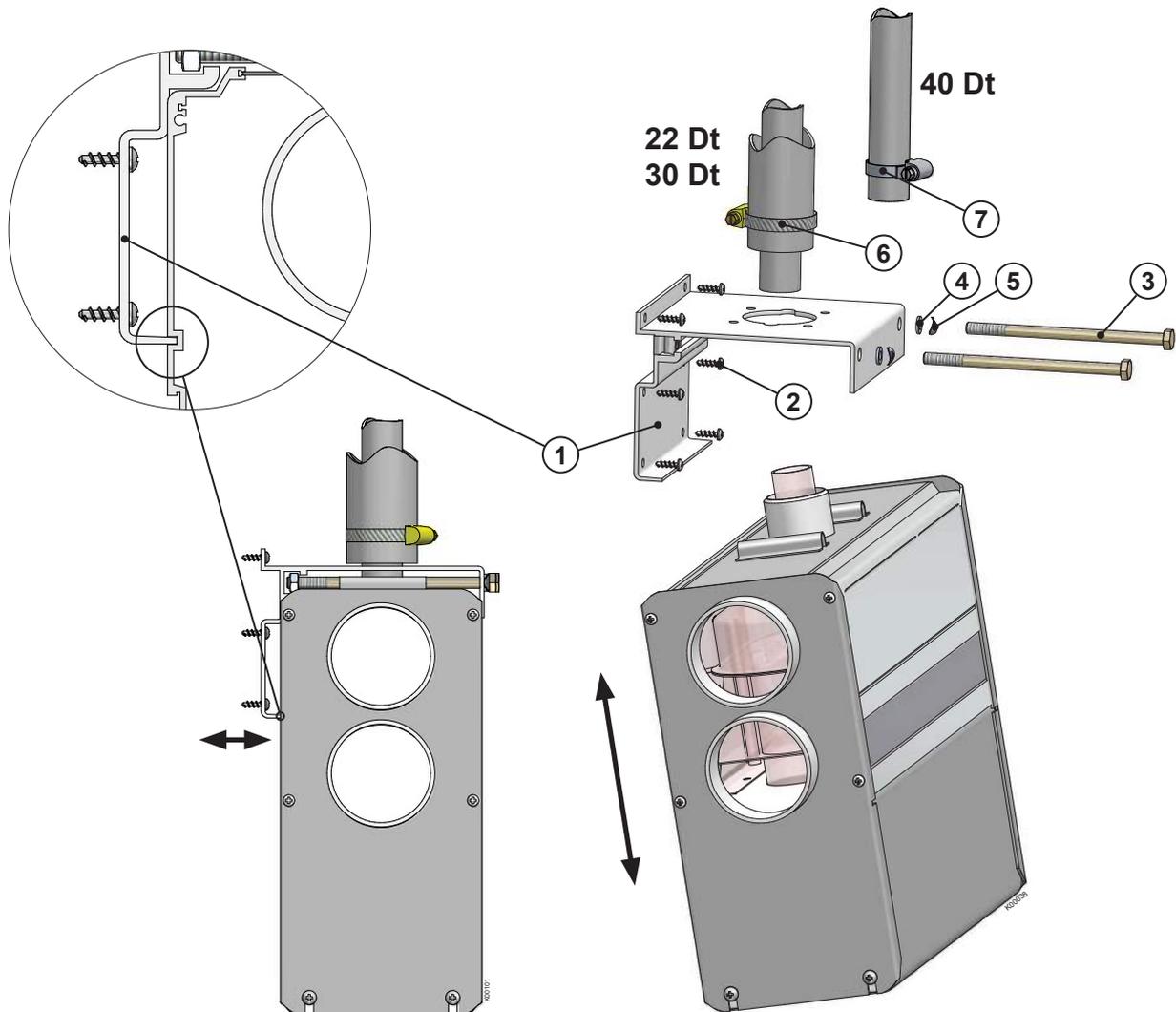
Always use original Wallas accessories and parts with Wallas equipment.

Fastening the device

Fix the mounting plate (1) with screws (2) to a suitable place and check that the bottom of the heater is in horizontal position.

Lift the heater into the installation plate and lock the device with the mounting bolts (3). There has to be a washer (4) and a corrugated base plate (5) under the head of the screw. Be sure that the edge of the mounting plate will lock to the slot in the side profile of the heater.

Connect the exhaust gas pipe with a hose clamp (6) **22 Dt** and **30 Dt** or (7) **40 Dt**.

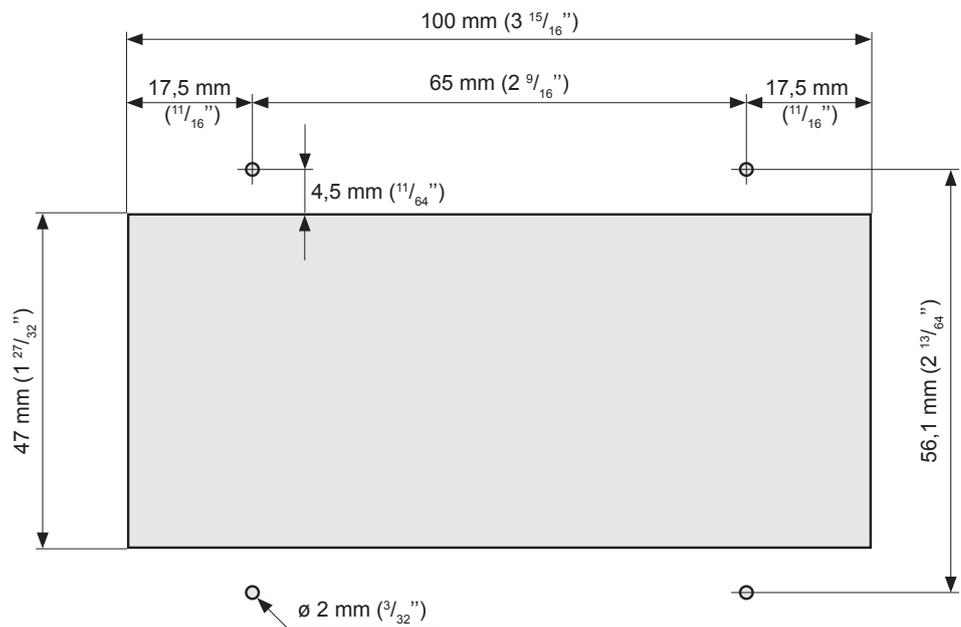


Control panel installation

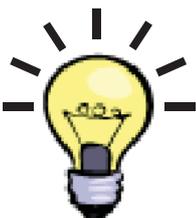
Cut a suitable installation hole for the control panel in the selected location. Try to install the panel in a vertical surface in a location that will remain dry.



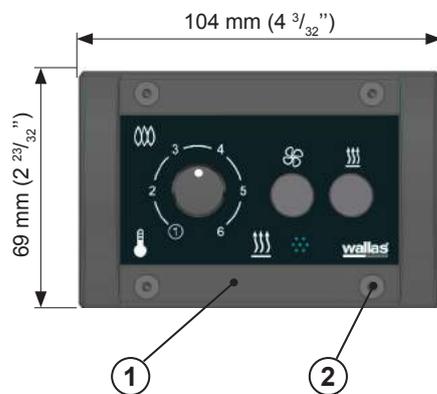
The thermostat sensor is in the panel face, so select the location with thermostatic operation/regulation in mind. Do not install close to heat source or close to a window or door. Avoid locations that might be contacted by direct sunlight. The length of the control panel cable is 6 m. A 10 meter cable 363058 is available as an accessory.



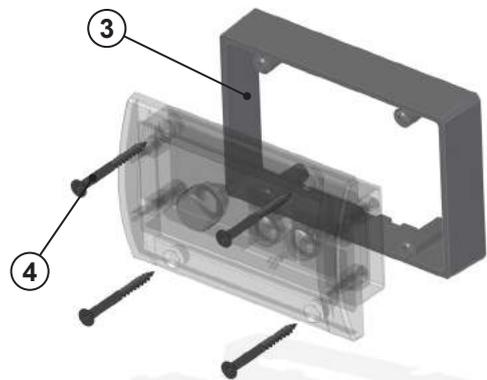
Measurements of the control panel installation cut-out. If necessary, predrill holes for the \varnothing 2 mm (3/32") screws.



You can utilize the sample of the box when drawing the lines of the installation hole.



Connect the control panel cable from the device to the control panel (1). Use the fastening screws to install the control panel to the installation cut-out (2).

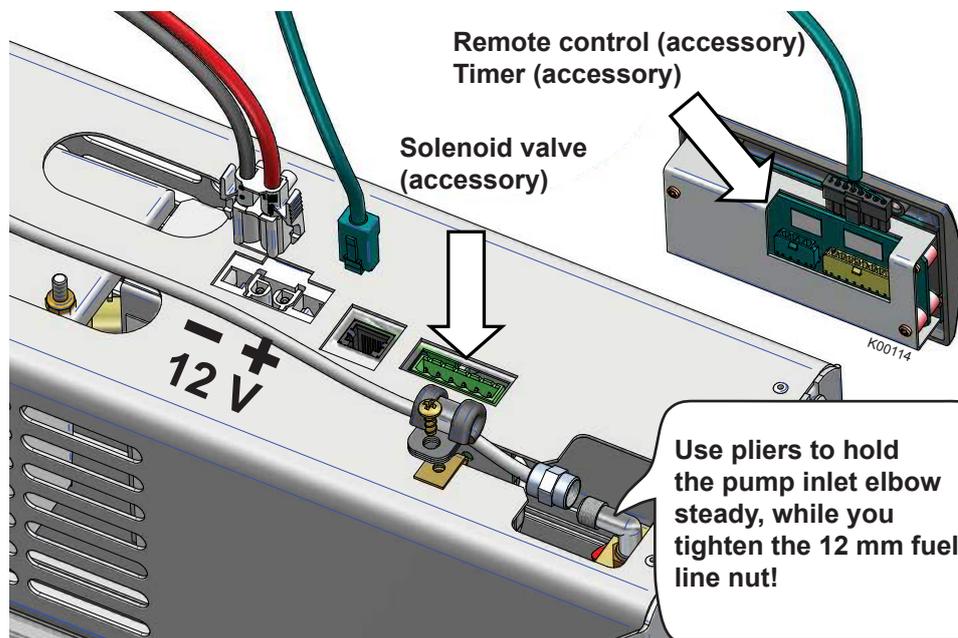
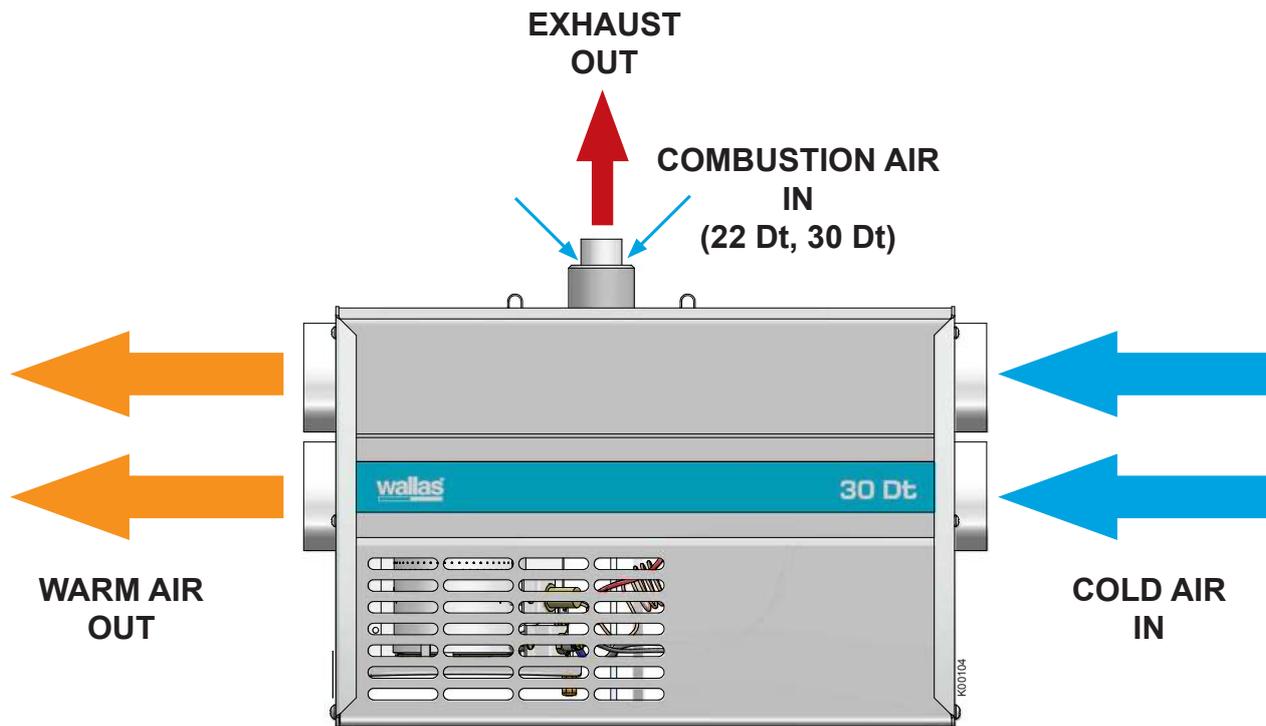


An extension collar (3) is used when control panel is surface mounted. The box of the panel includes 4 pcs screws 3,5 x 40mm (black) TX10 (4).

Connections of the device

Things to note about the connections

In installation, to make the mounting and demounting for service easier, it is recommended to leave some extra length of loose cables and fuel line by creating a coil. If the installation location is cramped, it is recommended to connect the cables and the fuel line to the device before mounting the unit to bracket. This will help the installation of device.



Accessories are connected to the control panel, the image shows the place. Take care of the strain relief.

Electrical connections

Things to note about the connections

The device uses 12 V (nominal) direct current voltage. To minimize current losses, make the power cable as short as possible and avoid joining. The cross-sectional area of the cable is dependent on the length of the power cord. The cross-sectional area of the cable must be consistent all the way from the stove to the battery. The maximum length of the power cord is 10 m, based on 6 AWG cable.

The cross-sectional area of the cable

Total length of the power cord (m)	Cross-sectional area of the cable in square mm (US Gauge)
0 - 4	4 (11 or 10 AWG)
4 - 6	6 (9 or 8 AWG)
6 - 10	10 (7 or 6 AWG)

If a thicker cable is required, make a separate joint in the power cord. See picture on the next page.

Main switch

A main switch must be installed on the device's "positive (Red)" cord. Always cut the power at the main switch (after cooling has completed), if the device is going to be left unused for a long period of time.

Recommended main switch should be 20 V DC / 20 A DC minimum.



Never use the main switch to cut the power before the cooling phase is completed.

Electrical connections of the device

12 V direct current system

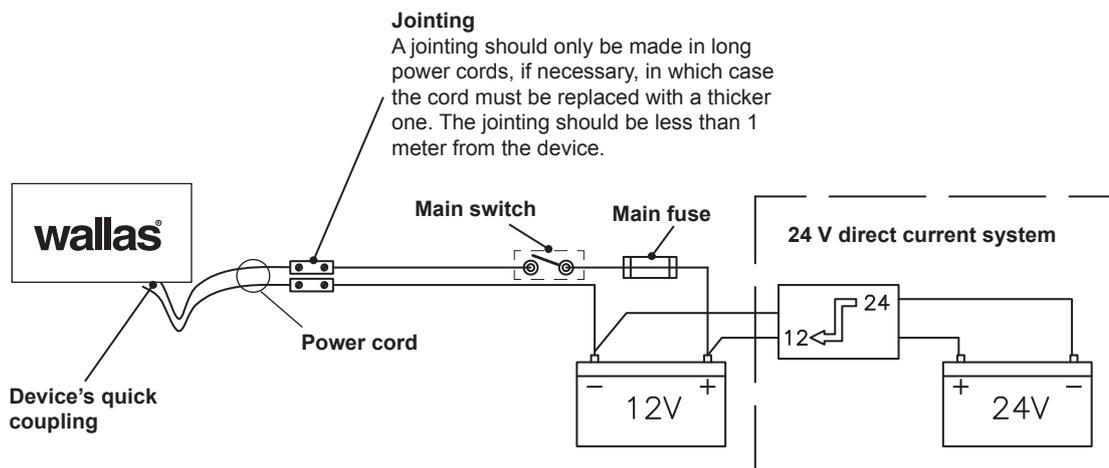
Connect the red wire of the power cord to the plus terminal of the battery and the black or blue wire to the minus terminal. A 15 A main fuse must be installed near the battery on the red plus wire of the power cord. See picture.

24 V direct current system

If the device is to receive power from a 24 V system, always connect a charging voltage reducer and a 12 V battery before connecting the device. Without the battery the voltage reducer will not be enough on its own as it cannot generate the large amount of current the glow plug requires. After the 12 V battery, the connection is the same as in a 12 V system.



The unit should be connected to a battery used for purposes other than starting the engine, if possible.



Checking the connection

The device consumes most power when it is started up (glowing). At this point voltage losses are also at their highest. During the glowing phase, the voltage must be at least 11,5 V measured at the quick coupling. See picture. If the voltage is lower than this, the device may not start.

Fuel connections

Things to note about the connections

The standard length of the fuel hose is 4 m (max 8 m). Cut the fuel hose to a length suitable for installation.

The lift height of the pump should be less than 2 m; preferably 0.5 – 1 m.

The fuel pipe must always have a Wallas filter. The fuel filter can be installed either near the device, near the tank, or in another location where it can be easily checked and replaced, when necessary.

Diesel engine fuel filters and/or separators are not approved for use. All soft connections should be made with rubber or silicone hose which is resistant to diesel.

Country-specific requirements

The standard fuel hose is plastic. Please observe country-specific requirements with regard to the material of the fuel hose/pipe and the fuel filter. The inner diameter of a new replacement hose should be equal to the inner diameter of the plastic hose. Copper pipe **300692** and metal filters **30016** are available as accessories.

Fuel feed

If the lift height exceeds 2 m, the fuel feed must be checked and, if necessary, adjusted. The fuel feed must also always be checked, if parts of the fuel system, such as the pump or the electronics card, have been replaced.

Fuel system adjustments are device specific. These adjustments should only be carried out by an authorized service shop.

Connection to a fixed tank

The device must have a dedicated connection with a fuel filter outside the tank.

Connection to a separate tank

Cap run-throughs and sintered filters are used on plastic tanks.

The fuel tank should be mounted securely.

Wallas fuel tanks

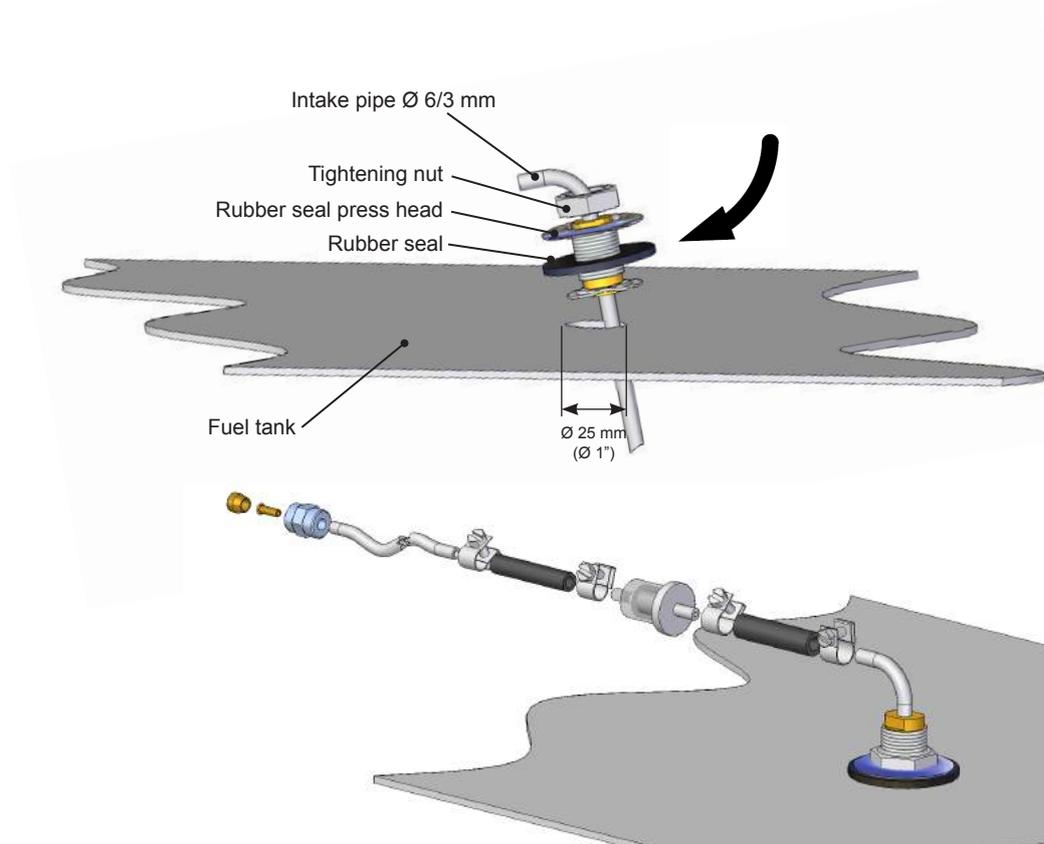
Volume	length x height x width	Order code	
5 l	200 x 300 x 130 mm	2024	(accessory)
10 l	380 x 195 x 210 mm	2027	(accessory)
30 l	590 x 200 x 300 mm	4030	(accessory)
130 l	800 x 400 x 600 mm	4130	(accessory)



The fuel connections must be tightened firmly so that the air cannot leak into the hose. Always check the cleanliness of the connection surfaces before tightening. Air leaks in the fuel system will cause the device to malfunction.

Installation instructions for Tank connection 30018

- You will need to make a \varnothing 25 mm (1") hole in the upper surface of the fuel tank. Choose the location of the hole so that when the fuel tank tilts the end of the intake pipe will stay in the fuel even if the tank is not full. If the end of the intake pipe does not reach the fuel, the device will quickly choke on the air in the fuel system.
- Cut the fuel intake pipe (\varnothing 3.17/0.8 mm) to the appropriate length. The end of the pipe must not touch the bottom of the tank in order to keep water and sediment from the system. It is recommended to cut the pipe short enough to leave the engine intake pipe at a lower level. This way the device cannot empty the tank.
- Install the pipe straight end first and angle the two "ears" below the threaded barrel inside the hole and then align the threaded barrel vertically so the ears are hooked on the underside of the tank top. Carefully slip the rubber washer over the bent pipe end and over the threaded barrel, followed by the metal washer and the nut. Thread the nut to the threaded barrel and tighten, sealing the fitting to the top surface of the tank.

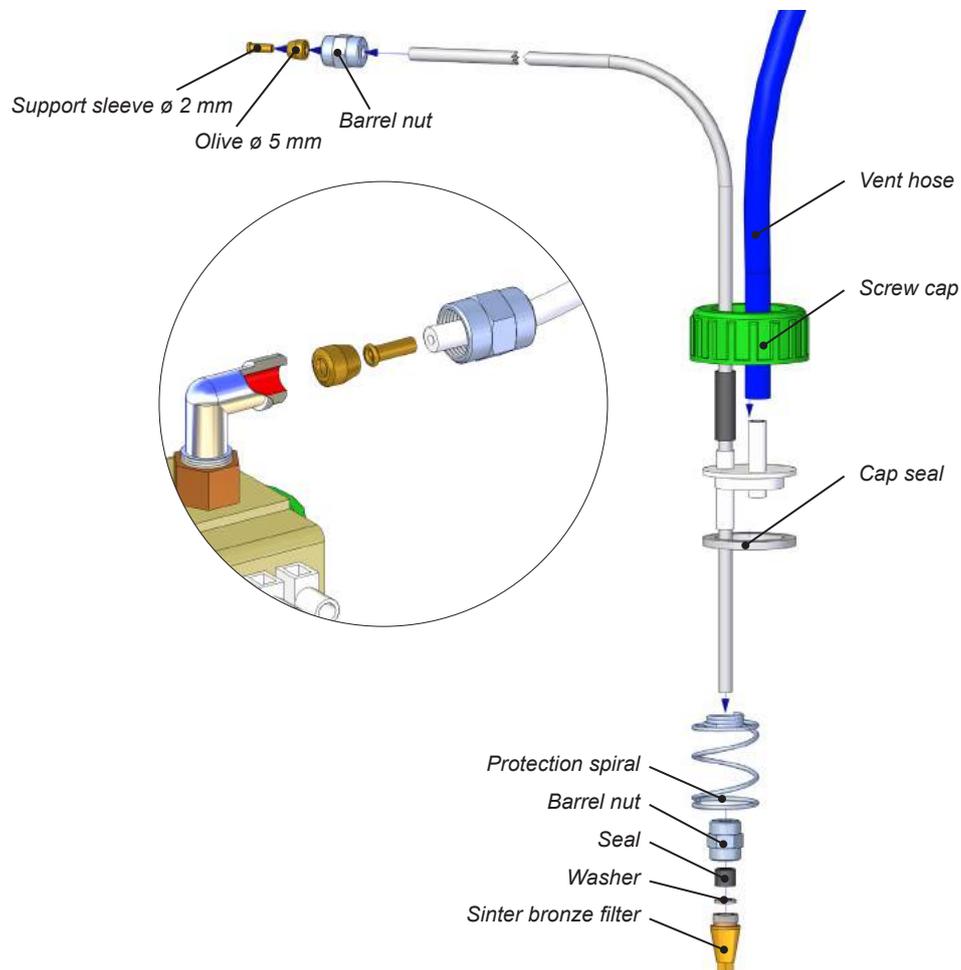


If the device uses the main tank, note that the device cannot take the fuel from the same fuel output line as the engine.

Installation instructions for Tank connection

If the fuel will be taken from a separate tank, you must install a tank connection **367215** (4 m) / **367216** (6 m).

- Tighten the barrel nut tightly to the fuel pump connector. Keep the parts and the hose clean and ensure that the connection is tight, because an air leak in the connector will stop the device from functioning.
- Install the tank connection in the tank.

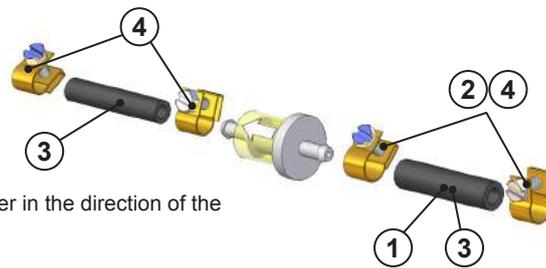
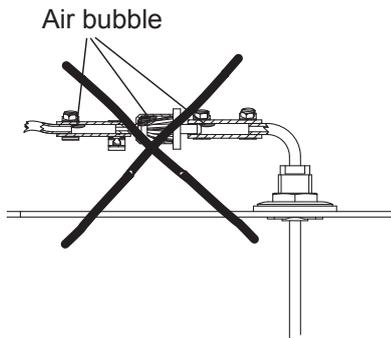


Tank-external filters

Filters can be installed in a $\varnothing 5$ or $\varnothing 6$ mm plastic or $\frac{1}{8}$ " metal pipe. Ensure that the fuel pipes are clean before installing the filter. There must be no debris or impurities between the pump and the filter as they will clog the pump. The filter type must be selected according to the operating conditions and country-specific requirements.

Fuel filter 30015

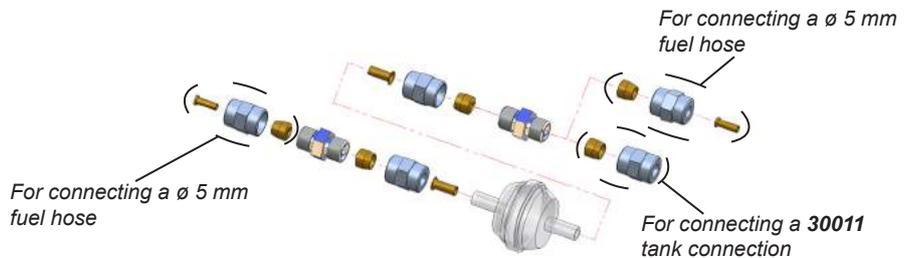
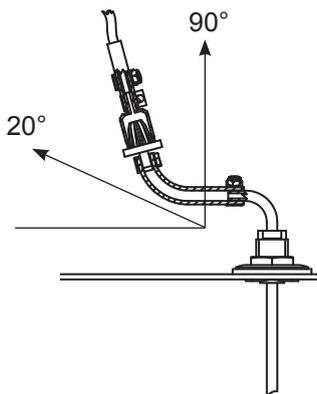
The filter can be installed directly in the **30011** tank connection by using a $\varnothing 6$ mm rubber hose (1) and 10 mm hose binders (2). Alternatively, the filter can be installed between two $\varnothing 5$ mm fuel hoses with $\varnothing 5$ mm rubber hose (3) and $\varnothing 8$ mm hose binders (4).



Install the filter in the direction of the arrow on it.

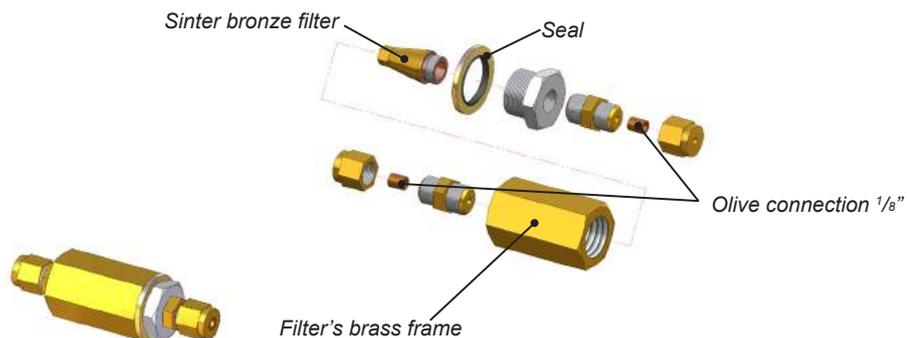
Fuel filter 30014

This filter is intended for cold conditions. The filter can be installed directly in the **30011** tank connection by using a $\varnothing 6$ mm barrel nut and 6 mm olive. Alternatively, the filter can be installed between two $\varnothing 5$ mm fuel hoses with $\varnothing 5$ mm barrel nut, $\varnothing 5$ mm olive and $\varnothing 2$ mm support sleeve.



Fuel filter 30016

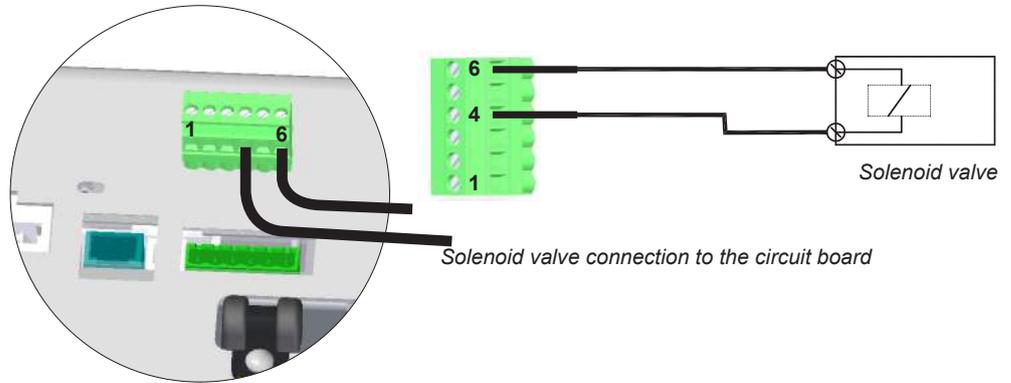
Used in countries where a metallic fuel transfer system is required. A $\frac{1}{8}$ " metal pipe is used for the installation.



Installation instructions for Solenoid valve 30012 (accessory)

The solenoid valve **30012** prevents the tank from emptying in case the fuel line breaks.

The fuel filter should be installed before the solenoid valve.

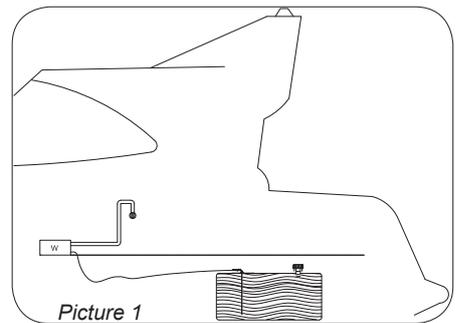


Our recommendations in the following installation scenarios:

1. Fuel level is below the heater/stove.

Picture 1.

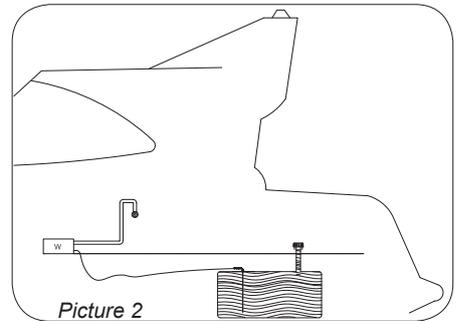
- Recommended installation scenario
- No special accessories required



2. Fuel level may temporarily rise above the heater/stove (e.g. in the fuel tank filler pipe or when the boat tilts).

Picture 2.

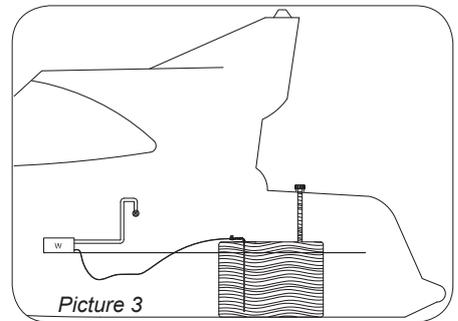
- No special accessories required



3. Fuel level is above the heater/stove.

Picture 3.

- Non-recommended installation scenario
- Solenoid valve **30012** must be installed in the fuel hose near the tank.



If the fuel level in the tank is above the device, a solenoid valve 30012 must be installed in the fuel line immediately after the tank lead-through.

Selecting the fuel

When selecting the fuel type, take note of the temperature limits of each particular fuel. The limit values provided here are to be treated as guidelines. Confirm the actual temperature limits from the fuel supplier.

- light furnace oil (diesel heating oil) / diesel, summer grade, temperature must not fall below $-5\text{ }^{\circ}\text{C}$.
- light furnace oil (diesel heating oil) / diesel, winter grade, temperature must not fall below $-24\text{ }^{\circ}\text{C}$.
- light furnace oil (diesel heating oil) / diesel, arctic winter grade, temperature must not fall below $-40\text{ }^{\circ}\text{C}$.

If the temperature drops lower than the minimum level, paraffin may form in the fuel. This may result in the fuel filter and pump being clogged. The clog will dissolve only if the fuel temperature rises clearly over $0\text{ }^{\circ}\text{C}$.

The less aromatic substances the fuel contains, the less deposits will be formed. Normal furnace oils contain 35–40 % of aromatic substances. In city diesels and green furnace oils (green diesel heating oil) the concentration is 20 %.



The light furnace oil/ diesel qualities and definitions vary by country. Always check the right fuel from your importer / dealer



Confirm the actual temperature limits for the fuel you are using from the fuel supplier.

Exhaust gas connections

Exhaust gas lead-throughs

Exhaust gas lead-throughs **2467** and the closable model **2460** are suitable for device **22 Dt** and **30 Dt**. The \varnothing 28/45 mm lead-throughs fit the exhaust gas pipe **2448**.

Exhaust gas lead-throughs **1066** and the closable model **2466 + 2069** are suitable for device **40 Dt**. The \varnothing 28 mm lead-throughs fit the exhaust gas pipe **1028**.

All exhaust gas lead-throughs are stainless steel.

General instructions for exhaust gas connections

LOCATION

Air must always flow freely past the lead-through. Install the lead-through on a flat surface. Avoid corners or recessions where wind pressure can disturb the functioning of the device.

The minimum distance of the lead-through from the fuel tank's filler hole is 400 mm (16").

The minimum distance of the side lead-through from the surface of the water is 500 mm (20"). Especially in sail boats it should be noted that the lead-through must never be submerged.

It is recommended to place the lead-through in the side as far back as possible or directly in the transom.

INSTALLATION

When preparing the installation cut-out for the lead-through, it is a good idea to use the lead-through as a model for the cut-out; especially if the lead-through is circular. If necessary, seal the installation cut-out with silicone in addition to the lead-through seal. Note! Do not use silicone on a wooden boat.

The side lead-through must always be equipped with a so-called goose neck section.

The goose neck will effectively prevent splash water from getting to the device.

The highest point of the goose neck must always be above the surface of the water.

The device will go out, if the exhaust gas lead through is submerged.

OTHER THINGS TO NOTE

Exhaust gas is hot. Always ensure that there is nothing that is susceptible to heat damage within 200 mm (8") of the effective area of the exhaust gases (e.g. ropes, fenders or the side of another boat).

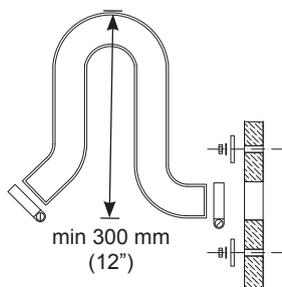
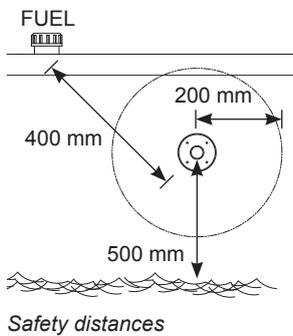
All lead-throughs raise the temperature of their surroundings. A wooden deck, in particular, may dry due to the heat. Remember that the surface of the lead-through is hot during use.

A exhaust gas tube with a length of more than 2 meters (7') has to be equipped with a drainage lock **602293** (condense water) located to the lowest point of the tube.

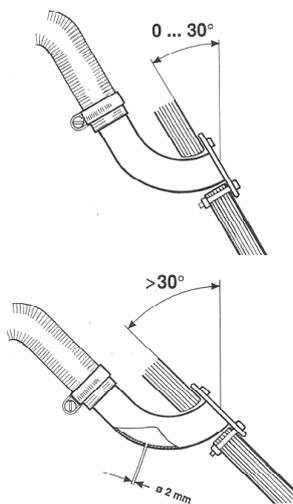
The Exhaust gas pipe must be made of stainless steel.

If necessary, seal the connections between the exhaust gas pipe and the lead-through with heat-resistant silicone.

When installing the lead-through to the stern side or to otherwise leaning position, be sure that the water do not stuck the exhaust. Drill app. 2 mm ($\frac{3}{32}$ ") hole to the lead-through or to the exhaust pipe.



Goose neck



Installation to the stern side

Insulation kits

Insulation kit for a metal-hulled boat

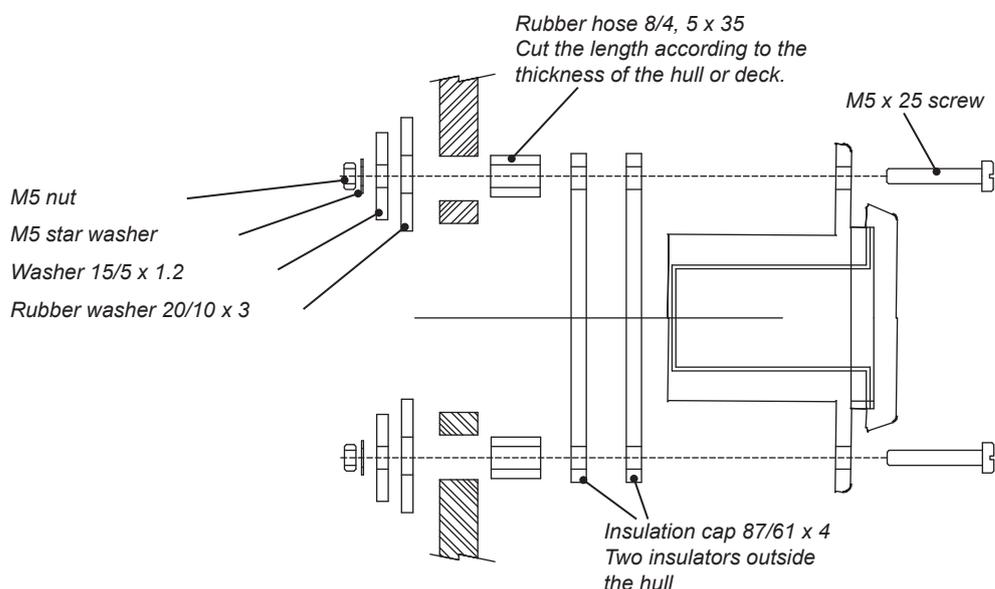
An insulation kit must be used to insulate the lead-through from the boat's metal hull.

The insulation kit insulates the exhaust gas lead-through and the device from each other.

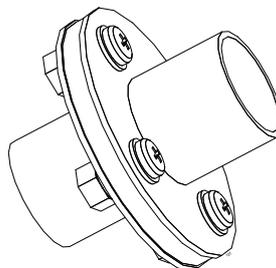
In fault situations the electric circuit runs between the metal hull and the device.

This can result in the oxidation or malfunctioning of the device's circuit board, the circuit board may be damaged.

Insulation kit 2461 for circular coaxial lead-throughs (2467 and 2460)



Insulation kit 602308 for a side lead-through (1066)



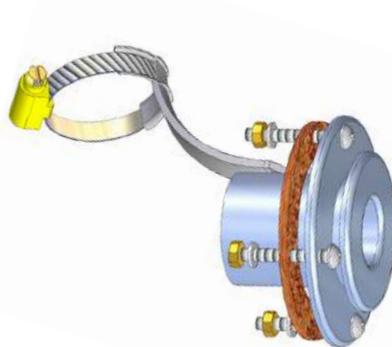
The exhaust pipe will be cut and the insulation kit will be fixed with hose clamp to the ends of the tube.

Specific instructions for individual lead-throughs

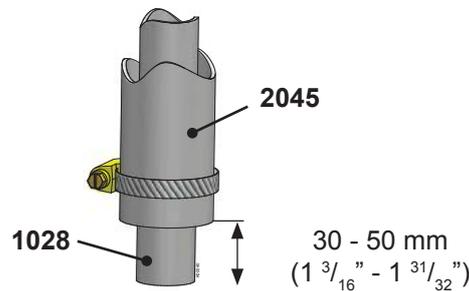
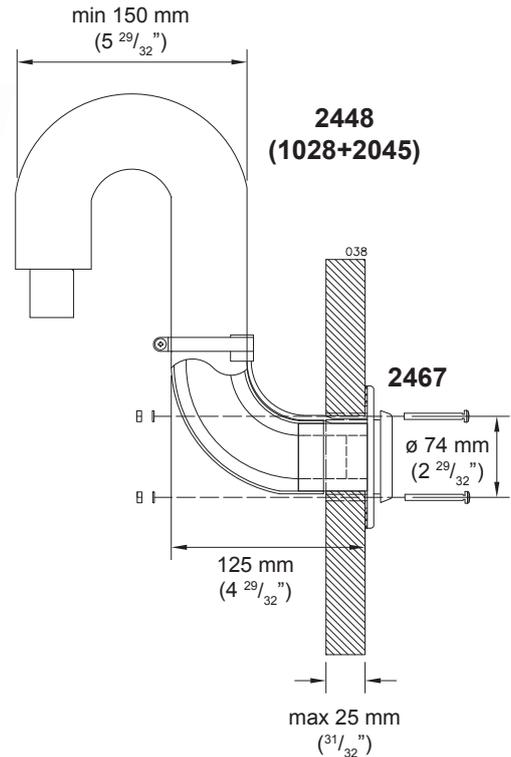
Side lead-through 2467

A side lead-through is installed in the side of the boat or in the transom. In sail boats it is recommended to install it in the transom. The installation always requires a so-called goose neck piece.

Make the necessary installation cut-outs and spread a suitable sealing agent on both sides of the seal and on the screw holes. This will ensure that the connection is waterproof.



2467 Side lead-through



Length difference of the pipes

Side lead-through 2467 installed.
The installation cut-out is \varnothing 50 mm (1 31/32") and the screw holes are 4 x \varnothing 6 mm.



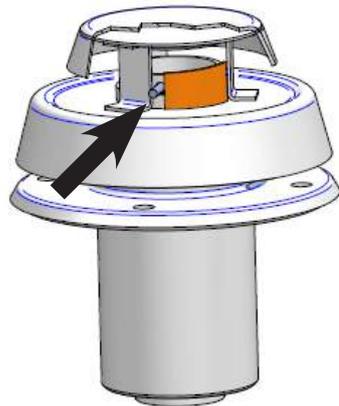
The 1028 exhaust gas pipe must be 30–50 mm (1 3/16" - 1 31/32") longer than the 2045 inlet pipe. This way the exhaust gas pipe will stay in place in the lead-through more firmly. The measurement depends on the overall length of the piping.

Package contents

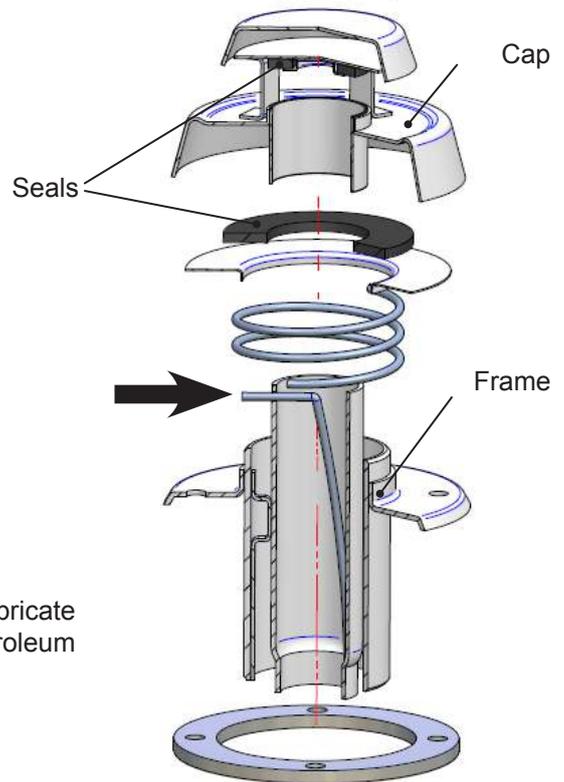
2467	
1 pcs	Side lead-through
1 pcs	Accessory bag 17679
4 pcs	Fastening screw M5 x 40 mm
4 pcs	Nut M5
4 pcs	Washer 5,3 x 10 mm
1 pcs	Hose clamp 32 - 50 mm
1 pcs	Gasket

Closable lead-through 2460

The cap of the closable lead-through must be detached for installation and seal maintenance by pressing the spring indicated by the arrow in with, for instance, a screwdriver. Take care not to let the screwdriver slip as the spring is very stiff. Hold the cap with your other hand when pressing in the spring. When the spring is down, pull the cap gently out of the frame. When assembling the lead-through, ensure that the order of the parts is correct. Also make sure that the spring goes in the correct hole in the cap. Otherwise, the lead-through cannot be closed.



2460
Closable lead-through.



Maintenance

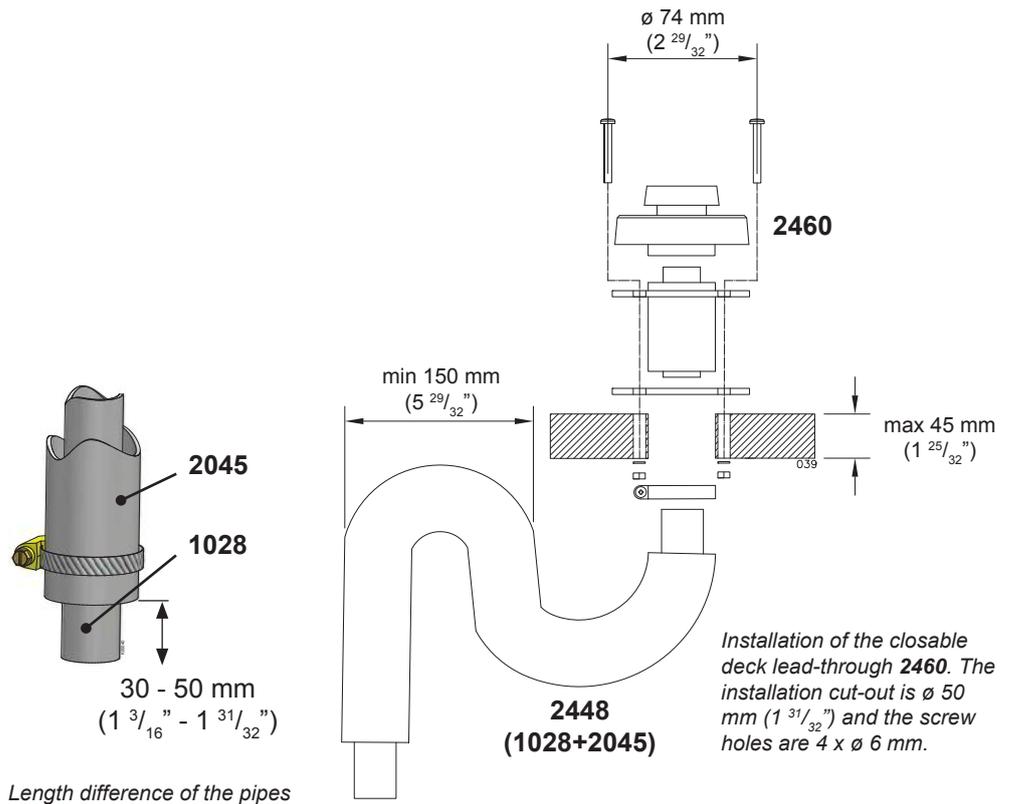
To keep the seals from hardening, lubricate them yearly with a heat-resistant petroleum jelly.



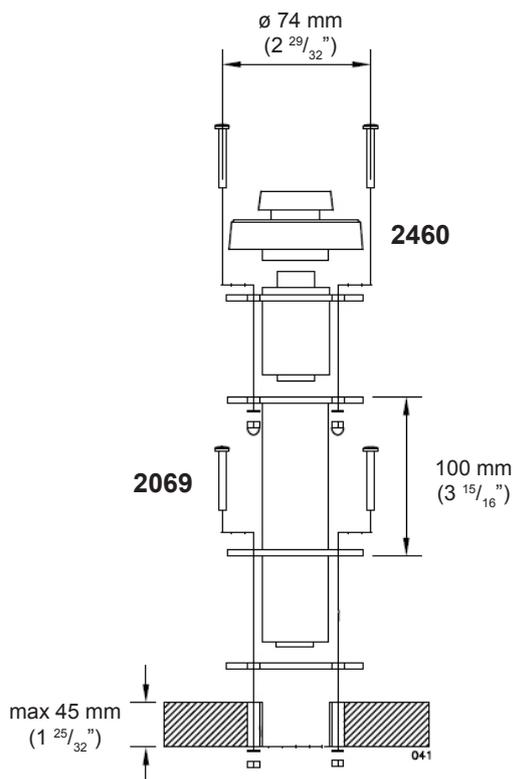
Check that closeable fitting is open before starting the device.

Package contents

2460	
1 pcs	Closable lead-through
1 pcs	Spacing tube
1 pcs	Accessory bag 17676
4 pcs	Fastening screw M5 x 85 mm
8 pcs	Nut M5
4 pcs	Washer 5,3 x 15 mm
4 pcs	Washer 5,3 x 10 mm
1 pcs	Hose binder 32 - 50 mm
1 pcs	Gasket



The 1028 exhaust gas pipe must be 30–50 mm ($1 \frac{3}{16} \text{''} - 1 \frac{31}{32} \text{''}$) longer than the 2045 inlet pipe. This way the exhaust gas pipe will stay in place in the lead-through more firmly. The measurement depends on the overall length of the piping.

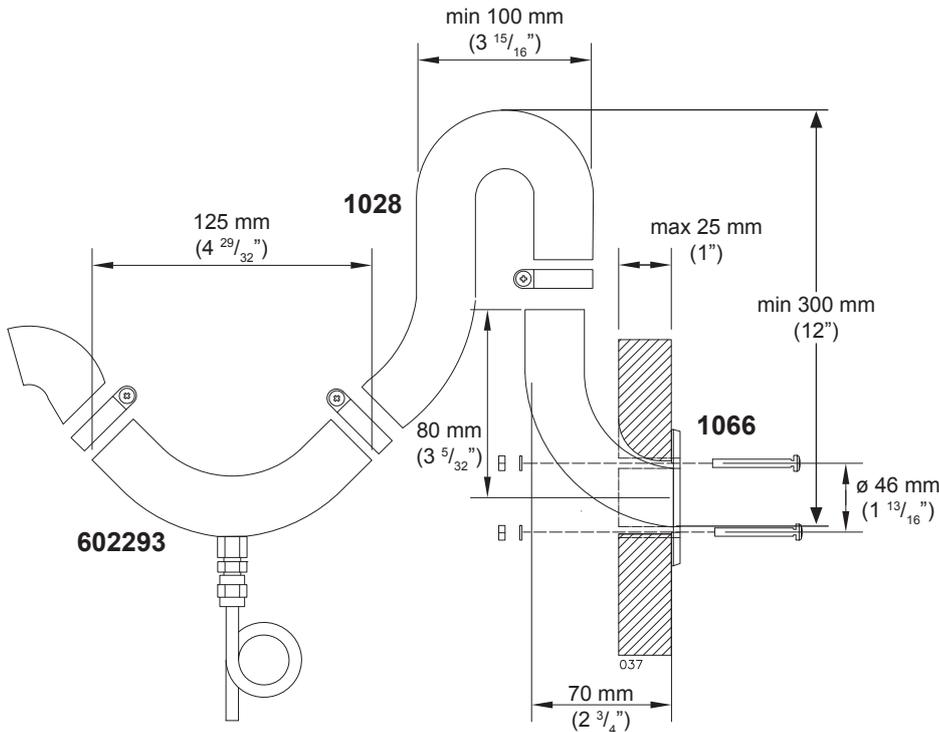


Closable deck lead-through 2460 and lead-through elevation 2069 for particularly demanding conditions.

Installation of the exhaust gas connctions of the model 40 Dt

The heater **40 Dt** uses only single exhaust gas tube \varnothing 28 mm (**1028**). The coaxial tube is not needed.

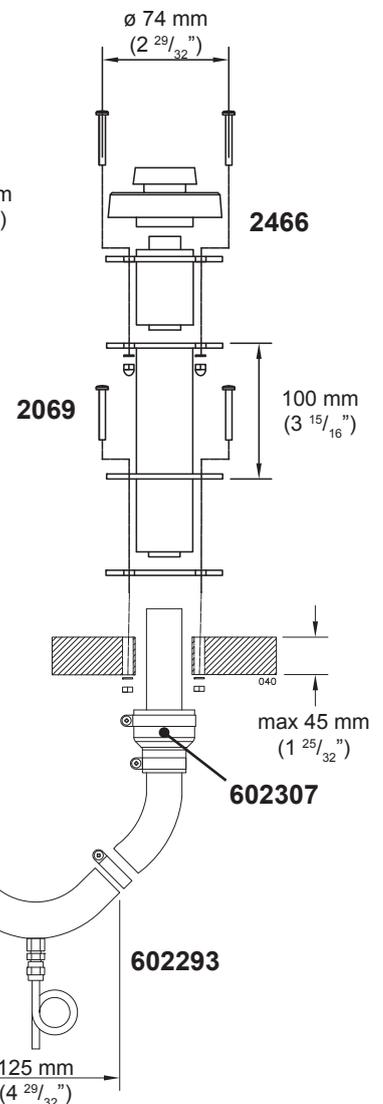
1. Side installation (**1066**).
2. Deck installation (**2466**).



Installation of exhaust lead-through **1066** in hull. The installation opening is \varnothing 35 mm ($1 \frac{3}{8}$ ") and the screw holes are 4 x \varnothing 5 mm.



1066 Side lead-through



Installation of the sealable deck lead-through **2466**. The installation hole is \varnothing 50 mm (2") and the holes of the screws 4 x 6 mm. The extension **2069** needs to be used. The The reduction piece will be fixed to the under part of the extension.

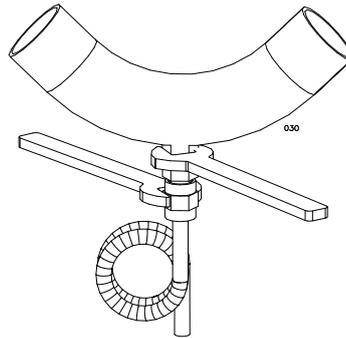


The exhaust gas tube reaches a high temperature! Be sure that the tube does not touch flammable materials and double check the connections. Insulation sock 1030 is available as an accessory.

Drainage lock 602293 (40 Dt)

It is recommended to use drainage lock in deck lead-throughs and in over 2 meter (7') long exhaust gas tubes (ø 28 mm). This is to remove splash water and condense water.

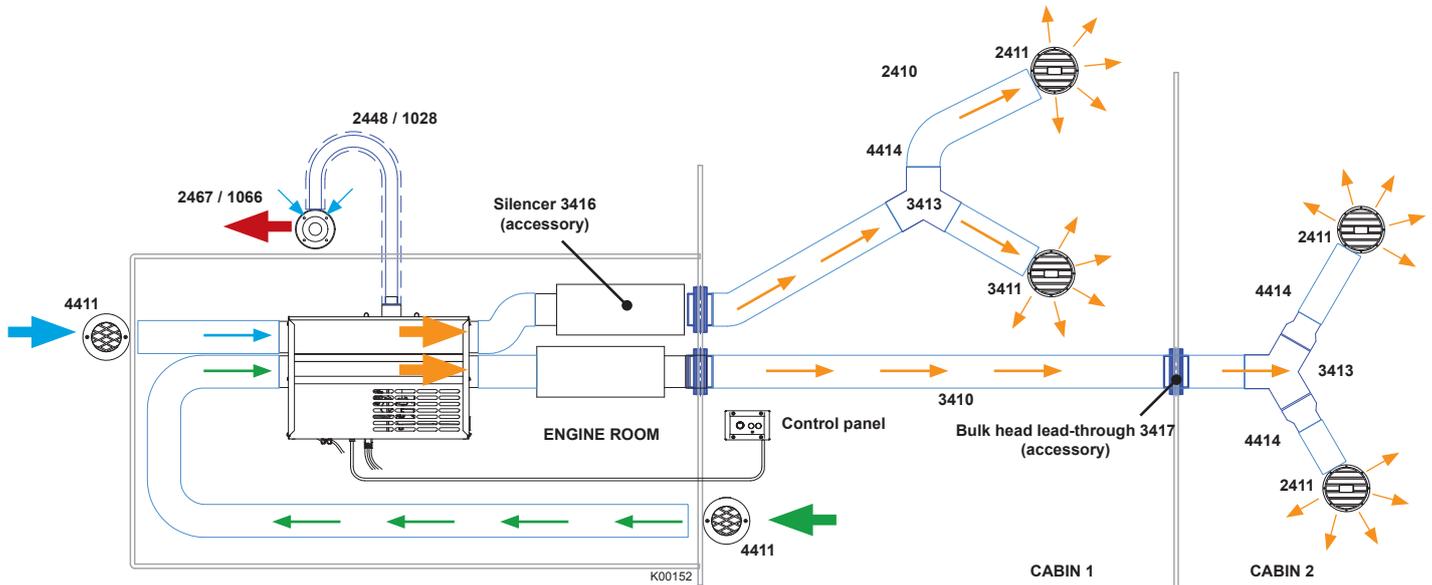
If desired, it is possible to install a drainage lock to the exhaust pipe (ø 28 mm) of a hull lead-through, but then the drainage lock must come after the goose neck.



When washing the boat with a pressure washer, never aim the water jet at the lead-through as the device may get wet.

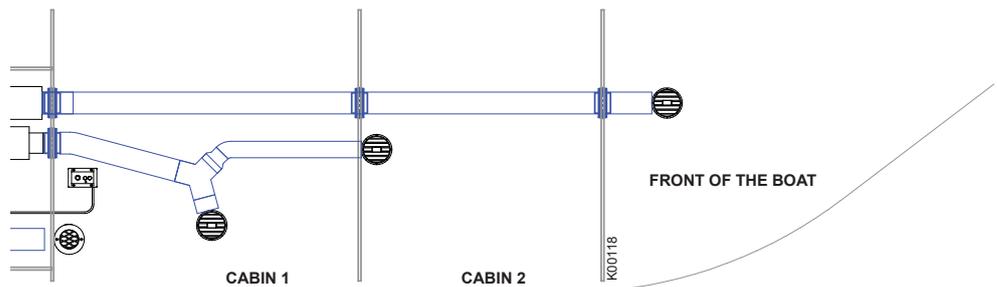
Air ductings

Description of installation into engine compartment



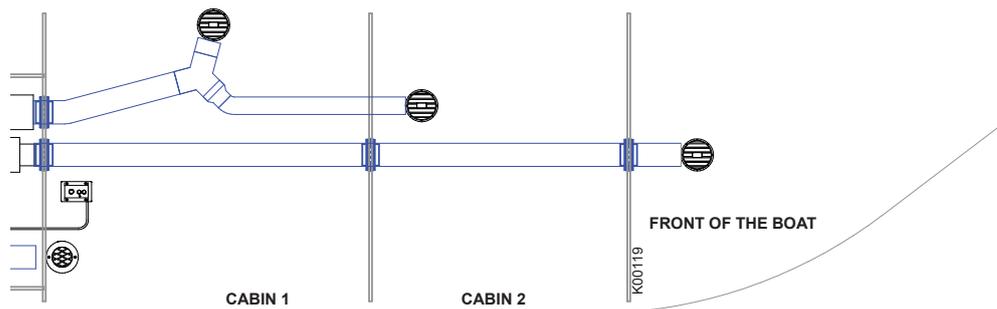
To ensure a proper air flow in a long duct into a far front of the boat, it is useful to lead the hotter duct all the way to the front. The other duct can then be distributed according the need.

22 Dt
30 Dt



22 Dt and 30 Dt the upper duct is hotter.

40 Dt



40 Dt the lower duct is hotter.

Warm air ducting of the heater

It is important to plan the proper routing of the duct and the locations of the air registers. It is good to locate the heater as near as possible to the area being heated. Avoid the use of sharp bends in the ducting and keep overall bends to a minimum.

Outlet ducting

Heated air is distributed through the boat with **3410** ø 75mm duct. Multiple outlets can be installed by adding **3413** ø 75mm “Y” fittings leading to various locations. All duct to “Y” and duct to register connections should be clamped.

The **3411** air registers are adjustable for direction and flow and located at each duct termination point. It is important that sufficient flow is allowed by the installed registers to maintain (limit) the heater temperature. To ensure this for some applications, the adjustment flap of the register in the bigger heated space, will be removed. Too much resistance in the ductwork (too many flaps closed) and the heater may overheat and shut down.

If the heater will be used mainly with thermostat control, the control panel should be located in the largest heated area. To minimize the loss of heat energy, any long runs and/or runs in areas that do not require heating can be insulated using **3412** insulation. Insulation nearer the heater will be more effective than insulation at the far ends of duct runs.

Inlet ducting and makeup air

The heater can take air for heating (makeup air) from either the heated area (return air) or from outside the boat (fresh air). In most cases, a mixture of both is the best choice. The upper of the 2 x ø 75 mm intake air ducts should be installed to take fresh air from outside and the lower return air from inside of the boat. Intake air grills **4411** should be installed into the head of the inlet ducts to preclude foreign objects from entering the heater. Protect the outside grill from splash water, spray etc. If the makeup air will be taken from the same space where the heater is installed, there is no need for the inlet air ducts, but protective grills should be present. There has to be minimum 100 cm² (16 square inches) ventilation hole in the space where the heater is installed.



Heater installations in diesel engine spaces must be fitted with inlet ducting bringing fresh air from outside the boat, return air from inside the heated cabin or both. The heater should NEVER take inlet makeup air from the engine spaces.

Ducting runs

To enable low power consumption, the blower power is limited. It is important that diameters in ducting and air supply holes are as large as possible.

Long air ducting will weaken the total effect, as the flow will be reduced due to friction losses and loss of temperature through the walls of the ducts. Temperature loss can be reduced with the insulation sock **3412**.



There has to be minimum 100 cm² (16 square inches) ventilation hole in the space where the heater is installed.

3416 silencer (accessory)

For the war air tubing is available an silencer 3416 as an accessory, which effectively reduces air flow noise. The silencer can be installed in the inlet-, or to the blower side.

Ventilation

An equivalent amount of air which is blown out through grills must leave the cabin, either outdoors or as return air to inlet tubing.

Installation of the air registers

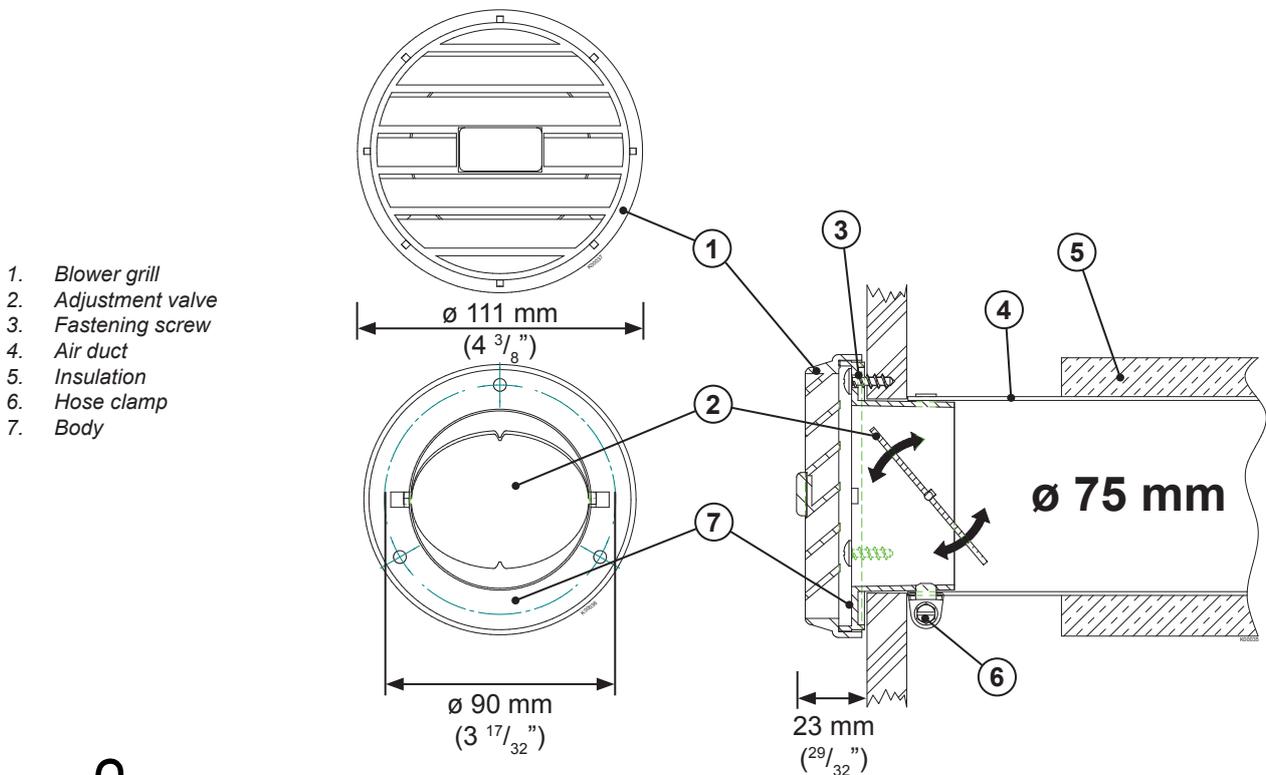
When installing the warm air register 3411 or 2411, remove the grill part (1) of the body (7) by pulling. The grill part can be turned 360° to be able to adjust the air flow direction.

3411

For installation, cut the bulkhead with $\varnothing 76 \text{ mm}$ (3") hole for the grill frame. Use screws to attach the grill frame (7) to bulkhead with three screws. In order to install warm air tubing drill a hole $\varnothing 83 \text{ mm}$ ($3 \frac{1}{4}$ ") to bulkhead.

2411

Cut a $\varnothing 67 \text{ mm}$ ($2 \frac{5}{8}$ ") hole in the bulkhead or wall. Screw the body of the register (7) to the bulkhead with 3 screws. Connect the warm air duct to the register and reinstall the grill cover.



- 1. Blower grill
- 2. Adjustment valve
- 3. Fastening screw
- 4. Air duct
- 5. Insulation
- 6. Hose clamp
- 7. Body



At least one of the two air outlets of the heater must be open at all times.

Installation and initial start-up

Installation

- Ensure sufficient air ventilation for heater, minimum aperture of 100 cm² (16 sq. in.) into installation area.
- Ensure that the boat is sufficiently ventilated.
- The exhaust pipe outlet must be at least 400 mm (16") away from the opening for filling fuel or tank breather.
- We recommend installing the operating switch on a vertical surface where liquids are not able to leak into the switch and it is out of reach of children (cable length 6 m).

Fuel system

- Fuel for the device comes through a separate tank fitting, not via a manifold or connection shared by the engine or other device.
- Install the filter to the fuel hose before you install the device, in an accessible location for filter changes.
- Fasten the fuel hose couplings tightly.** Always use a sleeve joint on the hose (olive ring).
- Make sure that the surfaces of the couplings are clean before fastening them.
- The hoses must be kept clean during installation.
- Use only Wallas fuel hoses.
- If the surface of the fuel tank is above the device, a magnetic valve must be installed into the fuel hose close to the tank.
- Cut the fuel hoses to the appropriate length when installing them.

Electrical installation

- The nominal voltage of the device is 12 VDC.
- Current for the device is taken directly from the battery terminals using cables that are as short as possible.
- Put the main fuse of c. 15 A on the + cable close to the battery.

Exhaust fumes

- When choosing the outlet location, note that exhaust fumes are hot.
- Use a goose-neck to prevent splash water entering the boat from splashing into the outlet.
- If your boat has a metal hull, the device and outlet must be insulated from the hull to prevent electrochemical corrosion.
- The exhaust pipe must not come into contact with combustible materials. Insulate the exhaust hose, if necessary.

Warm air outlet

- ø 75 mm air hose is not allowed to reduce to 60 mm hose. The only permitted is to divide one ø 75 mm outlet to two ø 60 mm outlets.
- It is recommend to insulate the warm air hoses.
- Note! Warm air registers are allowed not to be closed at the same time.

Initial start-up

The device usually does not start the first time after it has been installed. It may take several starts (c. 4-6) for the fuel hoses to fill up enough for the fuel to reach the burner.

Watch the hoses as they fill up as you start the device.

After two unsuccessful start-ups, the device will lock. (The yellow and red LED lamps will blink simultaneously indicating a lock-up.)

Follow the instruction for unlocking the device and try again.

Watch the hoses fill up with fuel while you start the device.

When the device starts, look for possible leaks in the exhaust and fuel connections.

Run the device for c. ½ hour to allow possible installation and manufacturing greases to burn off. Make sure there is enough ventilation.



Remember to carefully read the instructions for installing, operating and servicing each device before installation.

To be filled in by the installer

- Test-run performed

Serial number	
Company	
Installer	
Installation date	
Signed	

Installer must check (x) the sections, then sign her/his signature.

Device use

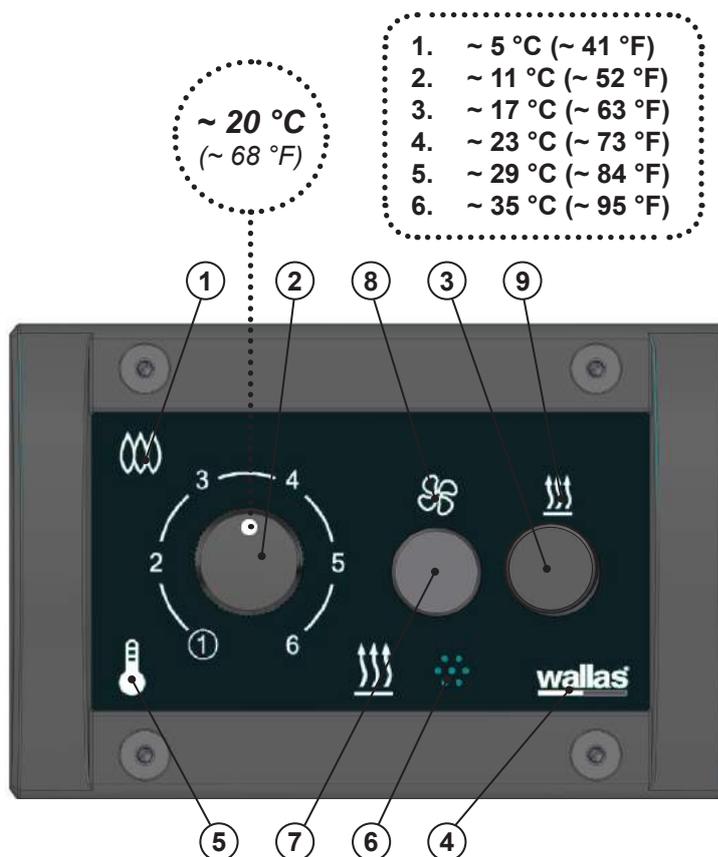
Ignition

The start-up process and heating is automatic.

The heater will ignite when the heating switch (3) is pressed continuously for more than 2 seconds. A yellow heating indicator will light, indicating that the heating is on.

A red combustion indicator light (1) will be lit when the burner flame has been ignited and the combustion has stabilised after about five minutes after the ignition.

The whole process takes about 11 minutes.



- 1. Combustion indicator
- 2. Temperature adjustment / Power control
- 3. Heating switch
- 4. Power indicator
- 5. Thermostat indicator

- 6. Thermostat sensor
- 7. Ventilation switch
- 8. Ventilation indicator
- 9. Heating indicator

First start-up

After installation or maintenance, if the fuel line is empty, the heater may not start at the the first attempt. Start-up phase with empty fuel line is longer than normally and might take about 15 minutes. If the heater doesn't ignite the red combustion indicator light will start to blink after start-up.

Turn off the heater. The device cannot be restarted until the cooling phase is completed.

When the cooling phase is finished, switch the heater on again.

If the device does not start after two attempts, it cannot be started again: the heater will lock itself (lights blink to indicate this). Find out the reason why the unit didn't start.

If the heater ignites during two attempts the red combustion indicator (1) will go on.

After locating the fault, release the locking (instructions in the maintenance section) and start-up the unit.

Depending on the length of the fuel hose, the heater may have to be started up several times during priming. Keep an eye on how the fuel travels in the fuel hose while starting up the heater.

Adjusting the heat

Adjustment of temperature can be done by using thermostat (recommended use) or manually.

The desired mode is chosen by turning the regulation knob (2) min - max - min – max, by doing this the unit is switched to either to thermostat- or to manual mode. When thermostat mode is chosen the thermostat light (5) is on. In manual mode the thermostat light (5) is off. Note ! the heater will remember it's last mode ie. if it is shut down in thermostat mode next time when ignited it it will start in the same mode ie. thermostat mode.

Thermostat mode

Temperature is controlled by the thermostat (recommended use)

The device starts when the heating switch (3) is pressed in continuously for at least 2 seconds, after which the yellow power indicator light (9) lights to indicate that the power is on.

The red combustion indicator light (1) will be lit, when the burner flame has been ignited and combustion has stabilised, about 2.5 - 4 min after starting the heating cycle. The starting phase will complete after about 11 minutes. After this phase, the heater will run according to set power, adjustable by turning the knob.

After the heater has passed the ignition phase, you can adjust the thermostat setting using the temperature control knob (2). Turn the knob to set the temperature to your desired setting.



The total time of the starting procedure is app. 11 minutes, when after the device can be adjusted or will set itself to the selected effect.

Sun-switch

The sun-switch shuts down the device automatically, if the temperature rises above the requested temperature, for example, due to sunlight. The temperature must rise by +3 °C above the set value for a half an hour. If the device has been shut down by the sun-switch, an indicator light (5) blinks on the thermostat. The sun-switch can be turned off temporarily, by turning the temperature control (2). A heater that has been shut down can be restarted manually, if necessary.

Conservation temperature: the temperature control (2) is set to minimum, and the cabin is maintained at a temperature of +2 – +8 °C. The sun-switch is not enabled in this mode.

Temperature of cabin can be determined by turning the knob (2) until the brightness of the thermostat light (5) changes. The position of knob (2) when the light changes will indicate cabin temperature.

Manual use

The power can be adjusted manually.

To enable this function, turn the power adjuster (2) to positions min - max - min – max.

The device signals that manual function has been activated when the thermostat light (5) shuts off.

After the heater has been started up, the power can be adjusted smoothly with the power adjustment knob (2).

From manual mode to thermostat mode you can go by turning the knob (2) min - max - min – max. As a confirmation of mode change the thermostat light (5) will go on.

Air boost

The air boost is meant to be used when you need higher air volume, for example to remove moisture. When the heater is running, the air boost can be activated by pressing the ventilation switch (7) one time briefly (less than 2 seconds). The heating continues according the set effect, but the air volume increases app. 50% of the value between set and maximum effect. The air boost is indicated by the green ventilation light (8). When you press the switch second time shortly, the air volume goes to maximum. Third press restores the air volume to normal and the green indication light (8) shuts off.



When adjusting the effect from the regulation knob, the effect adjusts smoothly.

Ventilation

Fresh air ventilation activates by pressing the ventilation switch (7) continuously at least 2 seconds. Ventilation is indicated with the green ventilation light (8). Ventilation is deactivated by pressing the ventilation switch (7) continuously at least 2 seconds. The green ventilation light (8) will shut off.

When pressing the ventilation switch (7) continuously at least 2 seconds, while heating is on, the heater will shut off and after the aftercooling mode, the heater goes to ventilation mode.

The ventilation can be adjusted smoothly. The thermostat control deactivates after switching to ventilation mode. When pressing the heating switch (3) at least 2 seconds while the ventilation is on, the heater will start and go to heating mode.

Note ! when adjusting the ventilation effect the change of rotation speed of the ventilation motor will take place slowly after the knob is turned.

Shutdown

You can shut down the heater by pressing the heating switch (3) continuously for at least 2 seconds. The yellow heating indicator light (9) will go out immediately. The red combustion indicator light (1) will continue to blink for about five minutes, while the device is cooling down. You cannot restart the device until the combustion light has stopped blinking.

Remote control

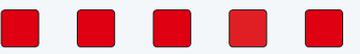
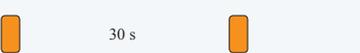
The heater can be controlled manually with an accessory, which can be purchased separately.

If the device is started using the remote control, the orange indicator light (5) on the control panel will blink at 10-second intervals.

The sun-switch is not enabled in this mode.

The ventilation cannot be used with the remote controller.

Signal lights

Colour		Blink interval	Function
Yellow			Heating on
Green			Ventilation on
Yellow Green			Air boost
Red			Combustion indicator when the combustion has begun normally
Red			Aftercooling
Orange			Thermostat control, the set temperature exceeds the set value > power is increasing
Orange			Thermostat control, the set temperature is lower than the set value > power is decreasing
Orange			Device in remote control mode
Orange			Sun switch has shut down the device

Fault signals and releasing the lock

Colour	Blink interval	Fault description
Yellow	  2 s  2 s 	Glow failure
Yellow	   2 s  	Combustion air blower fault
Yellow	    2 s   	Main blower fault
Yellow	     	Undervoltage
Yellow Red Green	                          	Locking; the device locks itself after 2 unsuccessful starts *)
Red	      	Indicating flameout
Yellow Red	              	Overheat
Red	  30 s 	5 minutes after fault indication

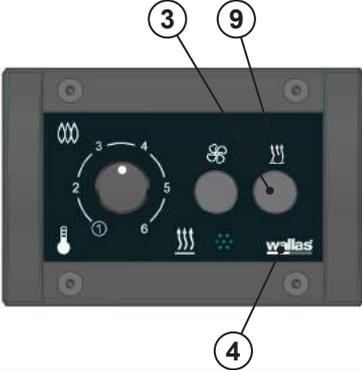


If the heater has locked itself, you must determine the cause for the locking before releasing it.



***) RELEASING THE LOCK:**

1. When the lights are blinking, switch off the main power at the battery, breaker or in-line switch.
2. Switch the main power back on.
3. Press the power switch (3) for at least 2 seconds.
The yellow heating indicator (9) will light for 1-3 seconds.
4. Press the power switch (3) again for at least 2 seconds.
The heater is turned off. Power indicator light (4) will shut down.
5. Restart the heater normally.



Maintenance recommendations

Basic maintenance of diesel-operated devices

Maintenance procedure	Maintenance interval	Carried out by
First inspection of basic functions	Inspection after first 500 hours of use or the first season of use	Authorised Wallas service shop
Cleaning the burner	The service shop recommends a suitable maintenance interval after performing the inspection of basic functions.	Authorised Wallas service shop

Special recommendations

Occasional (monthly) use of the device will increase reliability by purging old fuel.

If the device uses the same tank as the engine:

Observe the engine manufacturer's recommendation with regard to the fuel type and moisture removal.

If the device has a separate tank:

When selecting the fuel type, take note of the temperature limits of each particular fuel.

Removal of the water from the tank

Isopropanol based anti ice detergent meant for gasoline cars (no ethylene or methyl based) will be added to the fuel during the season. It is useful to make the addition after each couple of tanks and in the beginning and end of the heating season. The anti ice detergent binds the condensed water and prevents the sediment and contamination during the summer. For the dosage, observe the recommendations given by the manufacturer of the agent.

Winter storage

If the device uses the same tank as the engine:

- Change the fuel filter.
- Perform measures recommended by the boat/engine manufacturer to be performed before winter storage.

If the device has a separate tank:

- Drain the fuel tank in the autumn.
- Clean the tank and change the fuel filter.
- Fill the fuel tank with fresh and clean fuel in the spring.

For the device itself, you do not need to do anything.

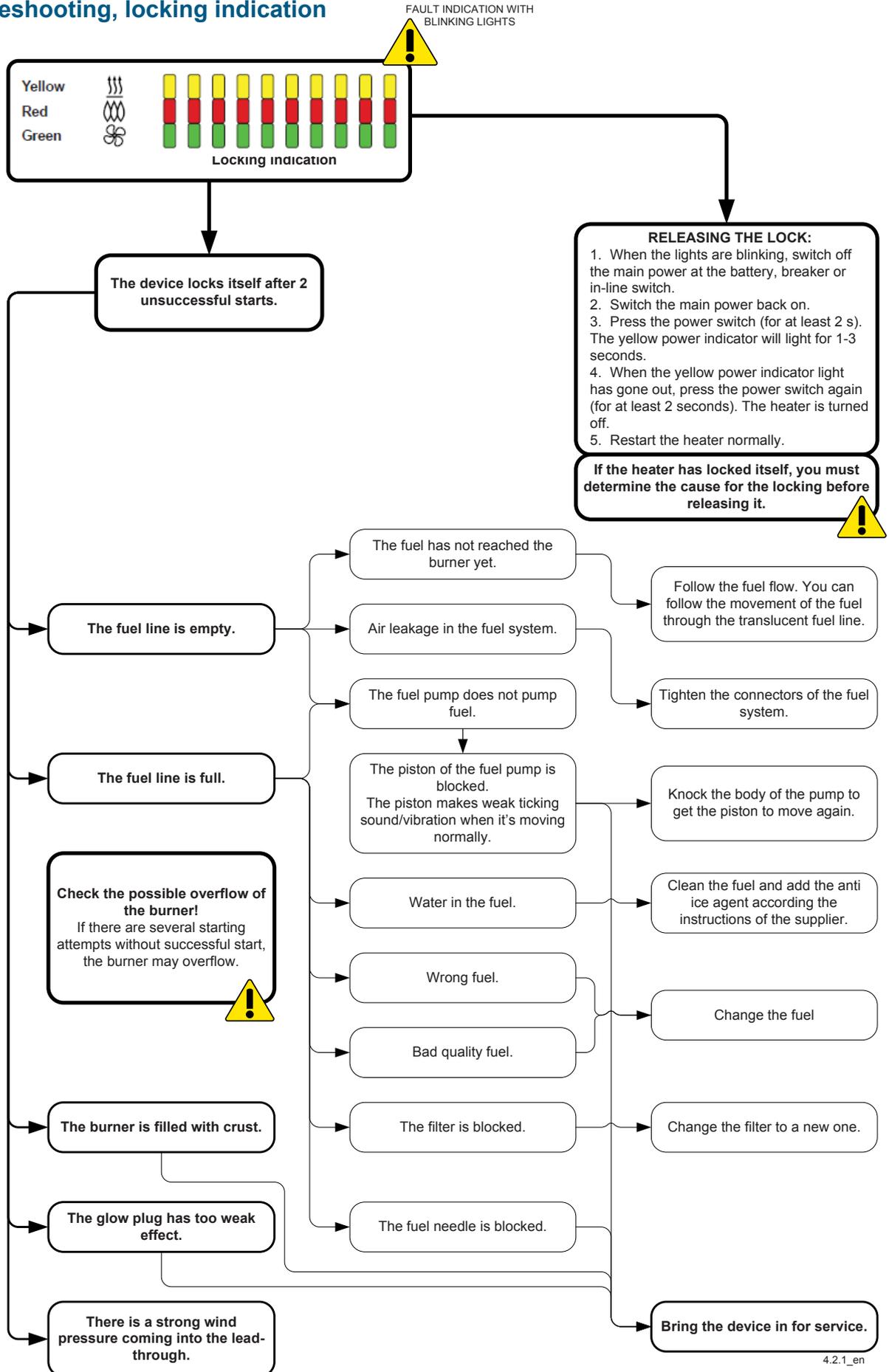
Spare parts

Spare parts list, www.wallas.com

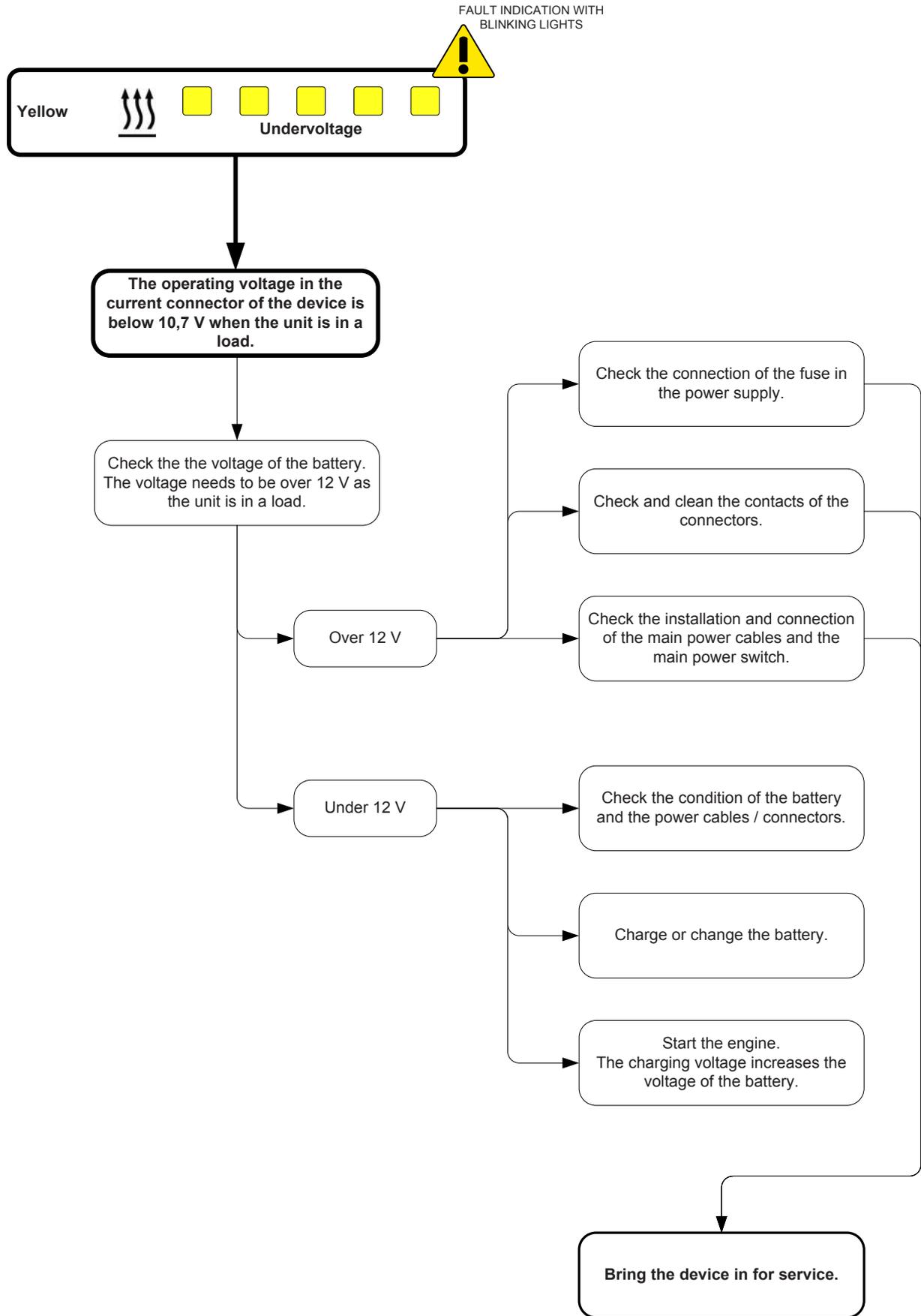


An anti-freezing agent for diesel vehicles may increase the forming of scale at the bottom of the burner and therefore shorten the maintenance interval.

Troubleshooting, locking indication

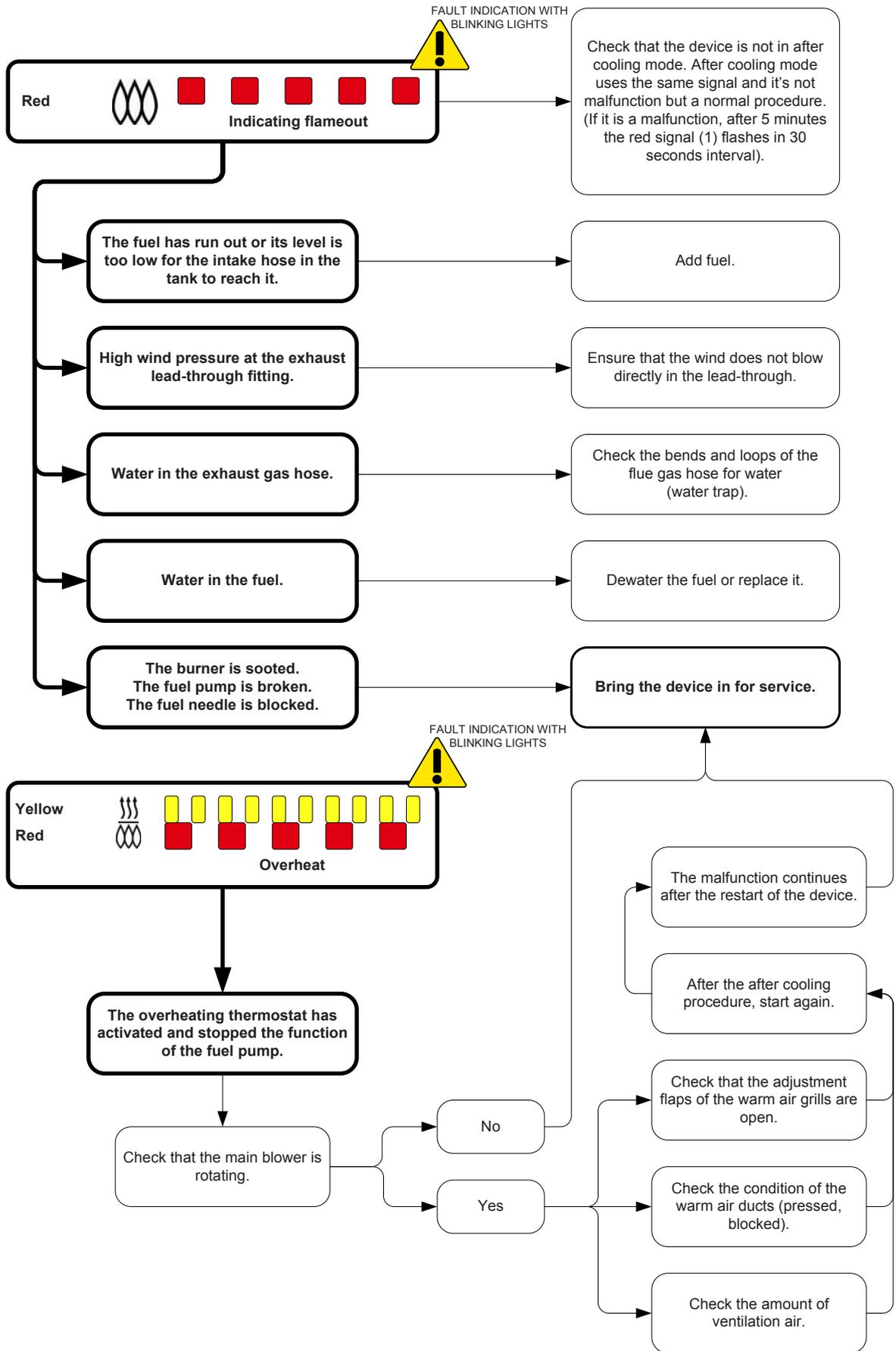


Troubleshooting, undervoltage



4.2.2_en

Troubleshooting, indicating flameout / overheat



4.3.3_en



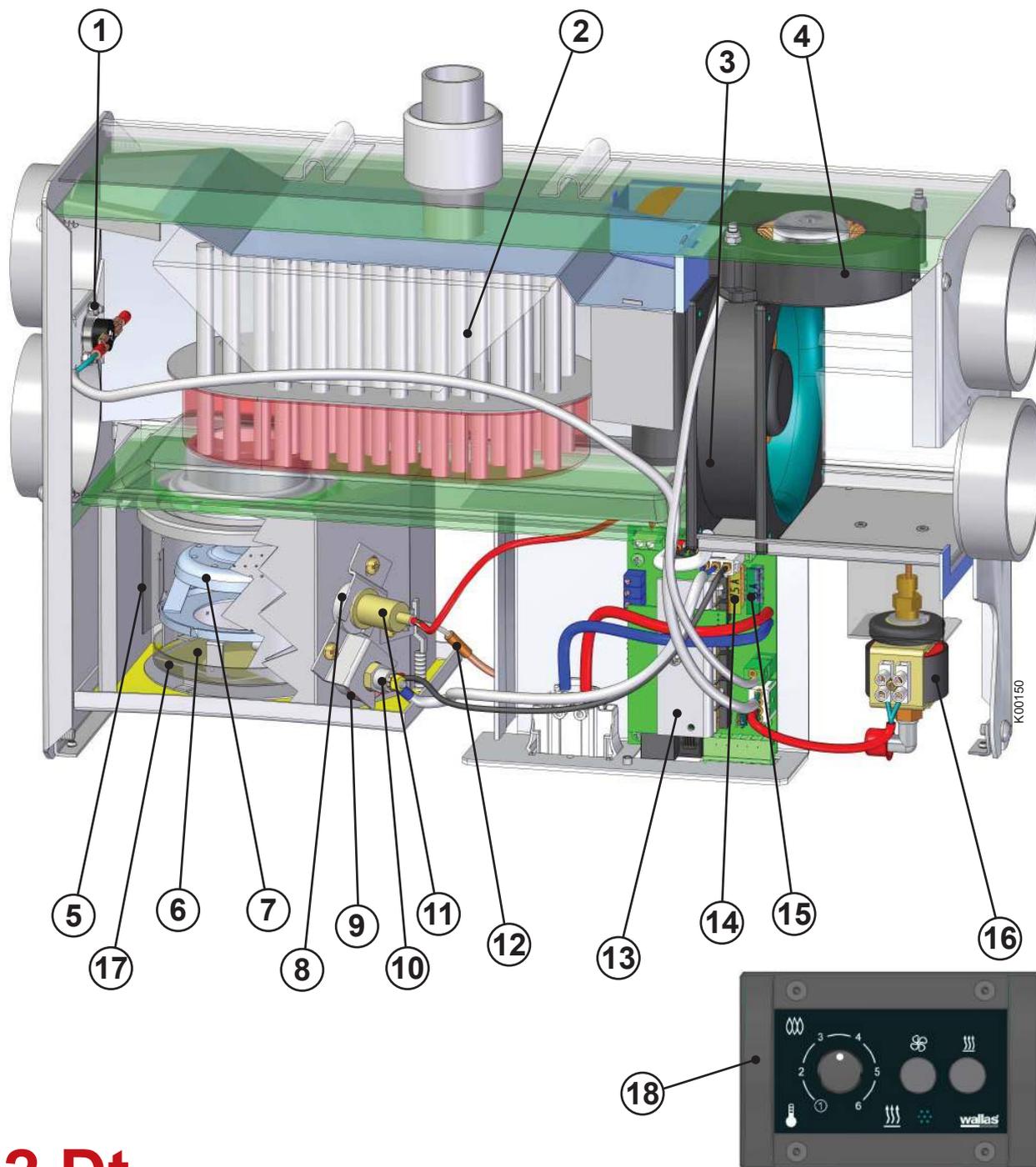
Wallas-Marin Oy (the manufacturer) shall be liable for any defects in the raw material or manufacture of the products and items sold by the importer for 2,000 operating hours or 24 months from the date of sale (whichever comes first) under the conditions noted below. Calendar term of the Warranty can be extended by an additional 12 months by registering the product in the website of Wallas-Marin Oy (www.wallas.fi) within three (3) months of the unit being sold to the end customer.

1. In the event of a defect:
 - a) Look at the check list on the website or installation / usage manual (www.wallas.fi) to make sure the defect in question is not related to use. A simple problem might not be covered by the warranty ie. water in diesel or unit requires a service.
 - b) Notification of the defect must be given in writing immediately, if possible, but no later than two (2) months after the appearance of the defect. After the warranty period ends, a referral back to a notification at the time of the warranty period is not valid unless the notification was made in writing. A valid receipt or another reliable official document of the time of purchase is required for proof of warranty eligibility.
 - c) For repairs under warranty, the customer must take the product to the place of purchase (the seller is responsible for handling units with warranty issues), to an authorized repair shop or to Wallas-Marin Oy factory service. Warranty service must be done by authorized Wallas repair personnel. The warranty does not cover costs for the removal and reinstallation of the device or for any damage in transit of a device that has been sent for repair. Warranty does not include any transport costs. (Wallas is a return to base warranty).
 - d) The customer must provide the following information in writing for warranty service:
 - description of the problem.
 - a description of where and how the device was installed (photographs of the installation may help)
 - product type and serial number, place and date of purchase
2. This warranty is not valid in the following cases when:
 - failure occurs as a result of components, which are not approved by the manufacturer, have been added to the device, and/or, it's structure has been modified without the consent of the manufacturer.
 - the instructions for installation, operation or maintenance have not been followed.
 - storage or transport has been inappropriate.
 - a problem has resulted from an accident or damage, which Wallas has had no control over (force majeure).
 - the product has suffered from improper handling, unsuitable fuel, low voltage, excess voltage, damage due to dirt, water penetrating in to the unit or corrosion
 - the device has been opened without the explicit permission of the factory/importer
 - components, other than original Wallas spare parts or components, have been used in the repair of the device.
 - repair by unauthorized service company
3. Warranty does not cover consumable or wear parts, which include: glow coil/plug, bottom mat or wick, fuel filter, seals.
4. Repairs carried out during the warranty period do not renew or alter the original warranty period.
5. Indirect damages arising from a defective product are not covered by this warranty.
6. This warranty is only valid for boat products that have been installed in boats and for cottage products that have been installed in cottages. The warranty does not cover Wallas products installed in vehicles or other areas.
7. This warranty does not limit rights specified in consumer protection legislation.



When making a warranty claim, the customer must provide proof that the maintenance and safety instructions have been thoroughly followed. This warranty does not apply to defects which have arisen due to carelessness in following installation, operation and maintenance instructions.

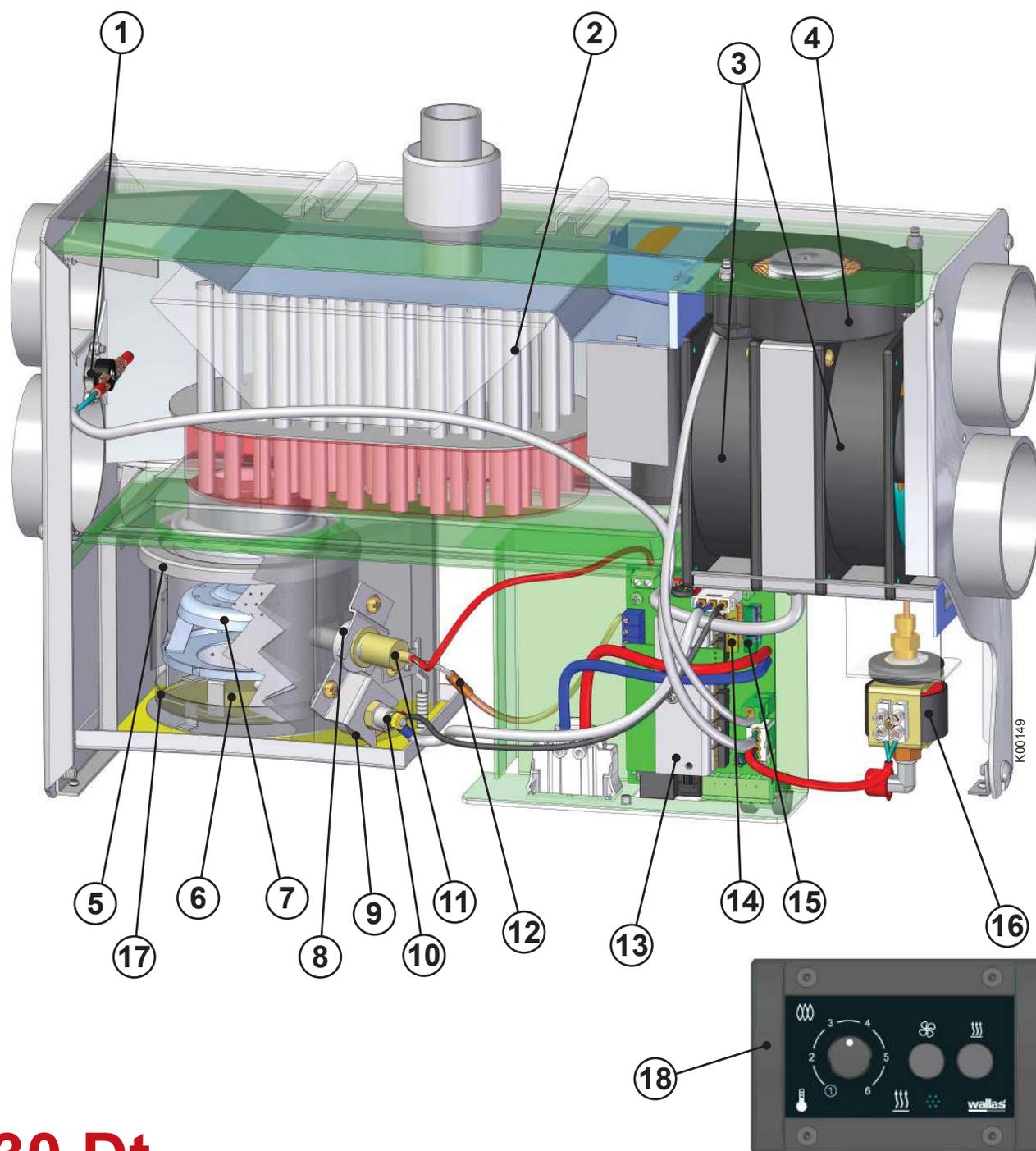




22 Dt

	spare part no
① OVERHEAT THERMOSTAT	362416
③ MAIN BLOWER	365412
⑤ OUTER CYLINDER FOR BURNER	369011
⑦ RADIATION ELEMENT	369007
⑨ GASKET FOR GLOW PLUG	364110
⑪ THERMO ELEMENT	362601
⑬ CONTROL UNIT	361063
⑮ FUSE 15 A	362110
⑰ BURNER CYLINDER, COMPLETE	369024

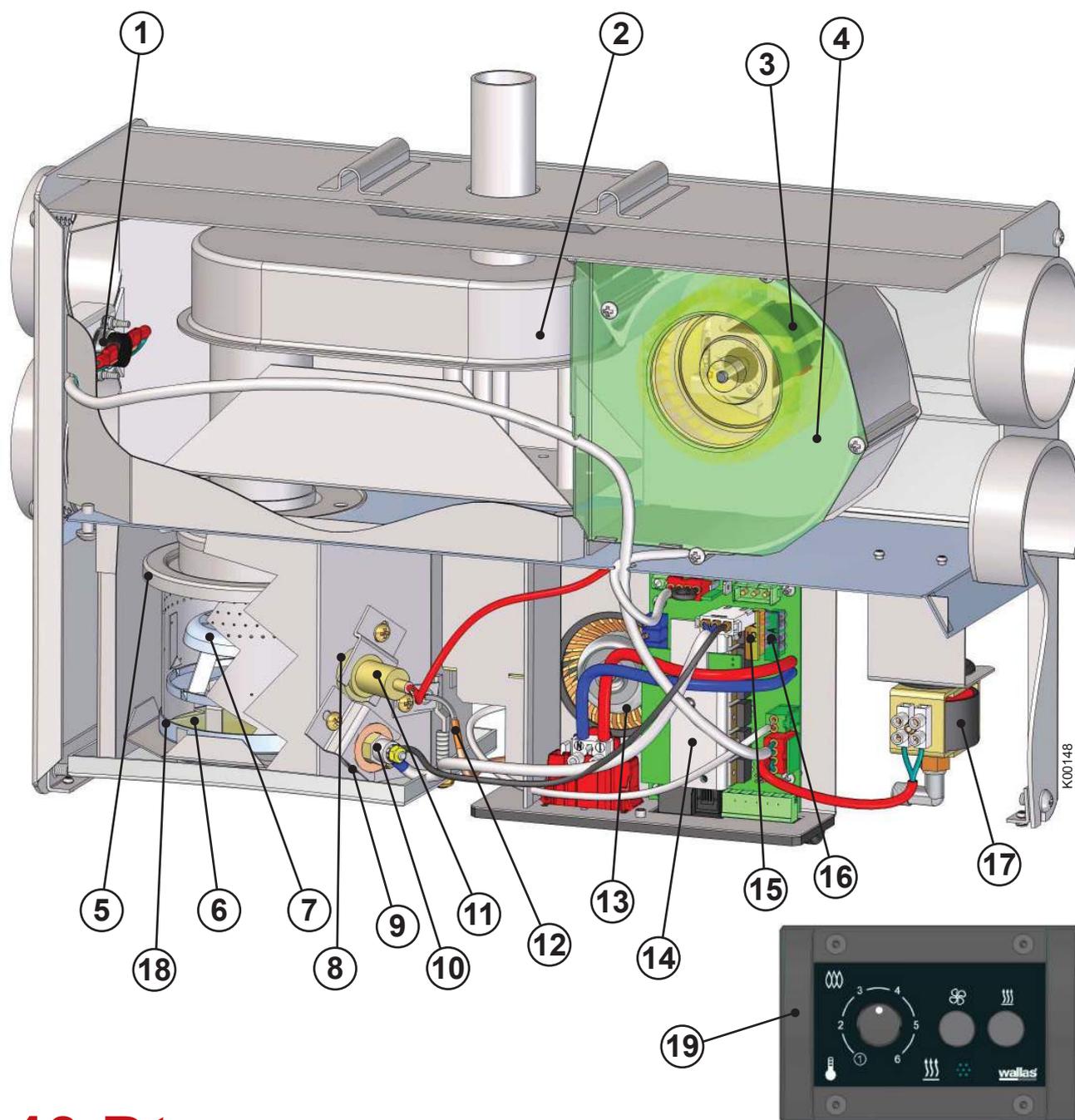
	spare part no
② HEAT EXCHANGER	368608
④ COMBUSTION BLOWER	365316
⑥ BOTTOM MAT, Ø 85 MM	364037
⑧ GASKET FOR T4 THERMO ELEMENT	364015
⑩ GLOW PLUG	362502
⑫ FUEL PIPE	367306
⑭ FUSE 5 A	362108
⑯ FUEL PUMP, FC 7	367506
⑱ CONTROL PANEL WITH CABLE Dt-HEATERS	361062



30 Dt

	spare part no
① OVERHEAT THERMOSTAT	362416
③ MAIN BLOWER, COMPLETE	365410
⑤ OUTER CYLINDER FOR BURNER	369011
⑦ RADIATION ELEMENT	369007
⑨ GASKET FOR GLOW PLUG	364110
⑪ THERMO ELEMENT	362601
⑬ CONTROL UNIT	361068
⑮ FUSE 15 A	362110
⑰ BURNER CYLINDER, COMPLETE	369024

	spare part no
② HEAT EXCHANGER	368608
④ COMBUSTION BLOWER	365315
⑥ BOTTOM MAT, Ø 85 MM	364037
⑧ GASKET FOR T4 THERMO ELEMENT	364015
⑩ GLOW PLUG	362502
⑫ FUEL PIPE	367306
⑭ FUSE 5 A, SLOW	362113
⑯ FUEL PUMP, FC 7	367506
⑱ CONTROL PANEL WITH CABLE Dt-HEATERS	361062



40 Dt

	spare part no
① OVERHEAT THERMOSTAT	362417
③ MAIN BLOWER MOTOR	365111
⑤ OUTER CYLINDER FOR BURNER	369028
⑦ RADIATION ELEMENT	369007
⑨ GASKET FOR GLOW PLUG	364130
⑪ THERMO ELEMENT	362601
⑬ COMBUSTION BLOWER	365315
⑮ FUSE 5 A, SLOW	362113
⑰ FUEL PUMP, FC 7	367506
⑲ CONTROL PANEL WITH CABLE Dt-HEATERS	361062

	spare part no
② HEAT EXCHANGER	368609
④ COMPLETE MAIN BLOWER	365411
⑥ BOTTOM MAT, Ø 85 MM	364037
⑧ GASKET FOR T4 THERMO ELEMENT	364015
⑩ GLOW PLUG	362502
⑫ FUEL PIPE	367306
⑭ CONTROL UNIT	361068
⑯ FUSE 15 A	362110
⑱ BURNER CYLINDER, COMPLETE	369025
○	

