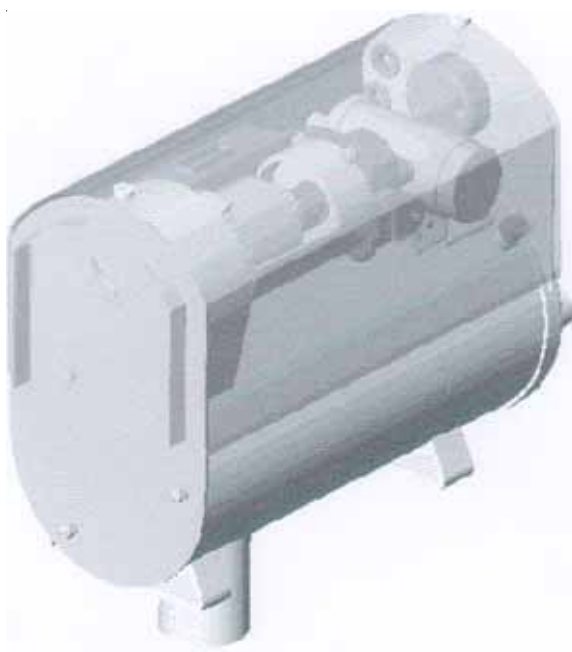


# **SERVICE INSTRUCTIONS**

## **for oil burner type**



# **STROCO 15.00 M**

Stroco ApS, Norgesvej 2, DK-8450 Hammel, tlf. 86961066, fax 86969647

Type approval no.: SP 555 AD 06

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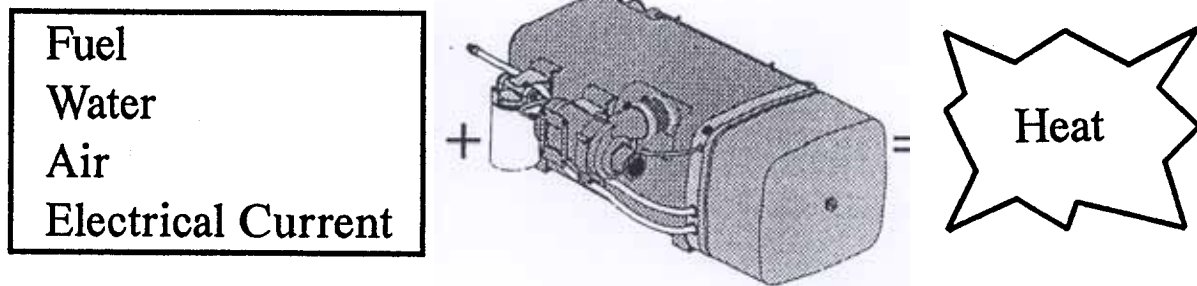
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## DESCRIPTION

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The presence of the above elements in the right quantities and the right mixtures is the condition of the heat production of the STROCO oil burner.

In case of a malfunction or unsatisfactory operation, it is therefore important to check these basic elements first.

The STROCO oil burner works independently of the motor running, and vice versa. This means that operational failures in one system will not influence the other one. Failing power or diesel fuel supply will, however, influence both systems if both motor and oil burner are connected to a common battery and oil/fuel tank.

The task of the oil burner is to heat the water in the heating system by burning diesel fuel at high temperatures in the combustion chamber of the oil burner. This heat is then transferred to the water in the boiler from where the hot water is pumped to heat emitters.

This process is continuous, and the water serves as the connecting medium between the heat producer (oil burner) and heat emitters.

The core of the oil burner is the burner unit. Oil is pumped to the burner under pressure and atomised in a nozzle. The oil mist is ignited, and the flame established (combustion). Correct combustion of the oil mist depends on various factors, including an adjusted supply of air.

The combustion process and other functions of the oil burner are controlled by the brain of the system, an electronically controlled automatic monitoring system.

The automatic system ensures that the process proceeds according to established routines. If the process deviates from the routines or if combustion fails or inadequate as a result of a poor supply of basic elements (oil, water, power and air), the automatic system will interrupt the process.

In principle, the presence of the basic elements will be able to ensure a combustion process, but since the process requirements are a high rate of efficiency and reliability, it must proceed in a controlled manner. These instructions are to help ensure that the burner always functions satisfactorily. If the burner does not work or does not work perfectly - what then ?

*The alarm function* of the service instructions will help locate the error source and analyse the symptoms.

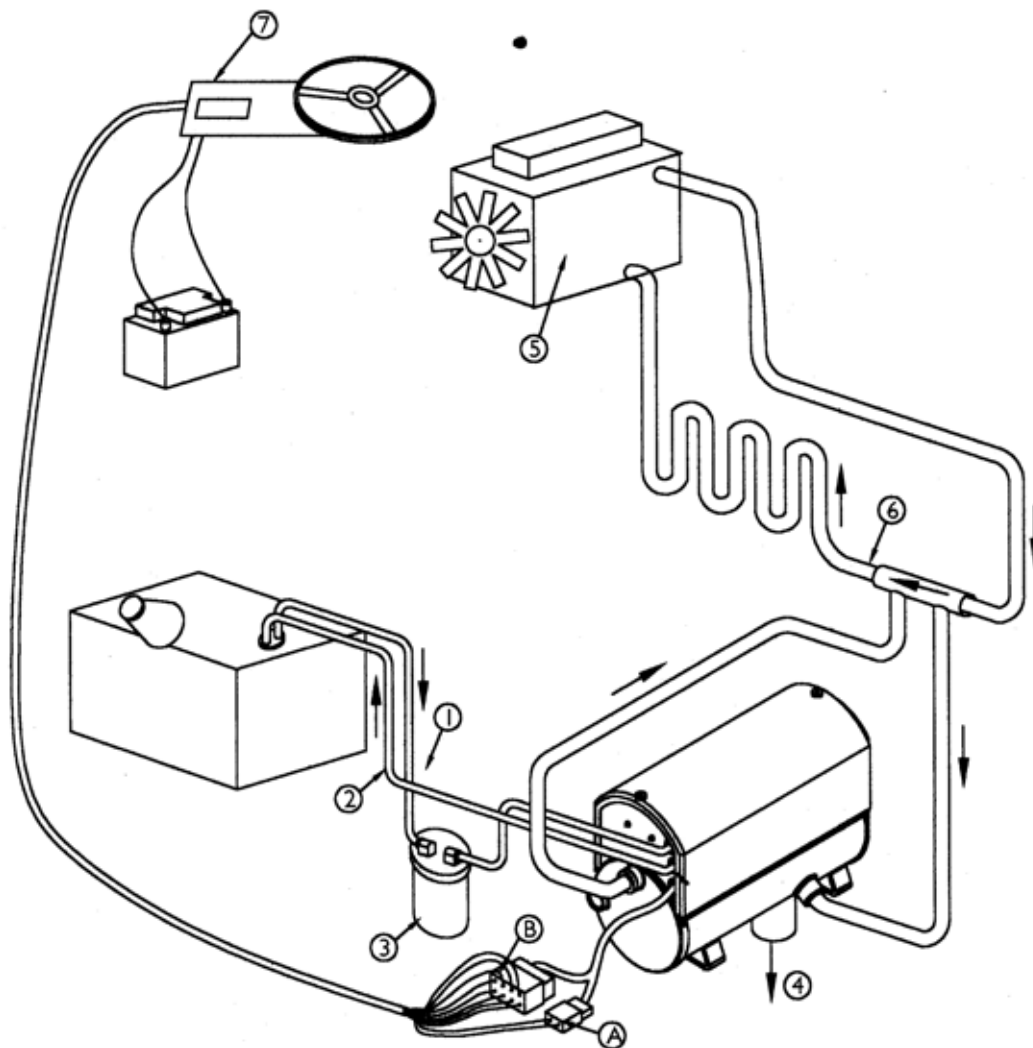
*The remedial action* of the service instructions will tell and illustrate how to remedy the error.

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Since it is always better to prevent than to cure, experience has pinpointed various *maintenance procedures* that should be carried out regularly to ensure that the oil burner is always functional. See the section on maintenance.

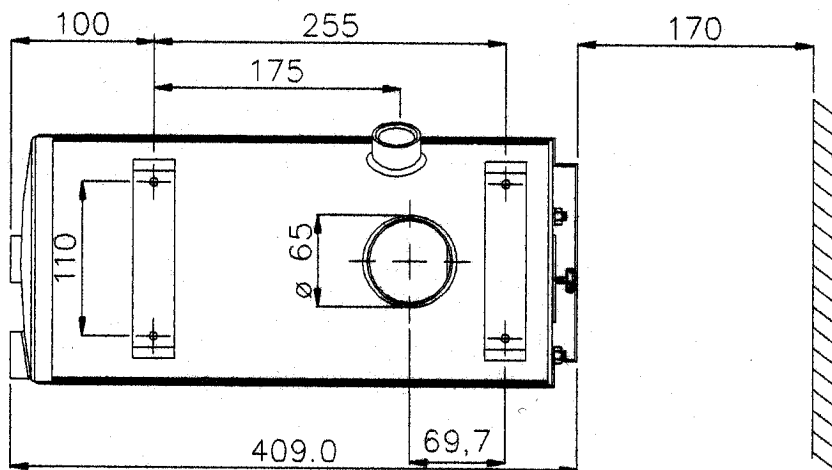
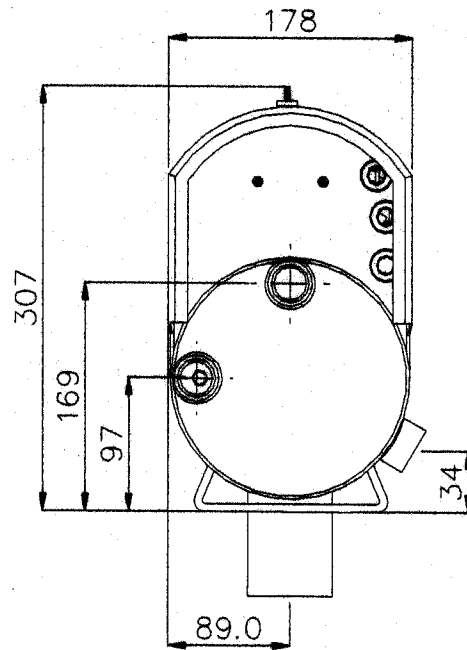
Section 1 in the instructions describes the installation of the oil burner, i.e. describes the actual assembly. The other sections concern only service and maintenance.

## Basic plan of oil burner plant



1:Supply, diesel fuel, 2:Return diesel fuel, 3:Filter, 4:Exhaust, 5:Motor, 6:Heating system, 7:Control panel

# INSTALLATION DIMENSIONS



# MOUNTING INSTRUCTIONS/MOUNTING PLAN

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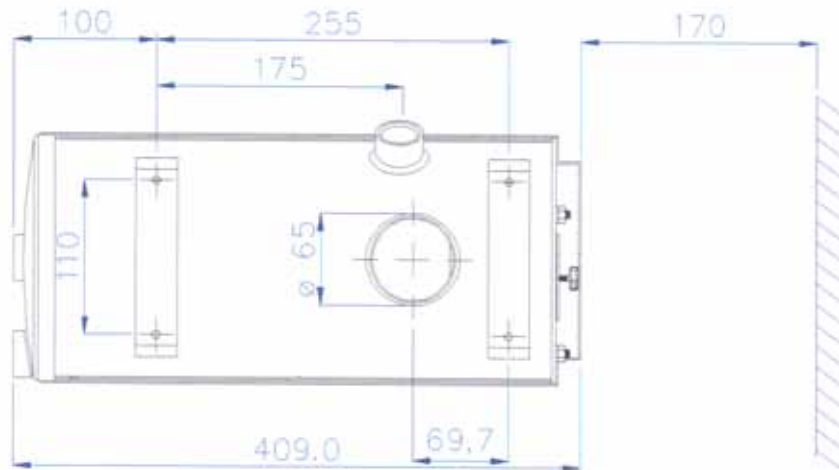
These instructions apply to STROCO oil burner, type 15.00 M.

- \* **Material and design of fuel hoses/pipes: TA max. -40°C/+120°C. Oil hoses may be used as extensions with copper pipes or similar approved material only.**
- \* **Non-insulated exhaust pipes/hoses must have at least 7.5 cm to flammable material.**
- \* **Fuel hoses placed on the outside of the vehicle must be screened to prevent any damage. Electric cables may not be placed next to fuel hoses.**
- \* **Mount the oil burner in a location where it is protected against water and splashes from the wheels of the vehicle and from shocks and other destructive impacts.**
- \* **Mount the oil burner so that maintenance on the oil burner and vehicle components will not be impeded. Place the oil burner in a separate assembly box, if necessary.**
- \* **Carry out the mounting to prevent heat impact from the engine and exhaust system of the vehicle from damaging the oil burner. All vehicle components must also be protected from damage resulting from the oil burner exhaust.**
- \* **Electrical installations for the oil burner must comply with SEN 3607111 „Electric installations for motor vehicles“ or similar.**
- \* **The water system to which the oil burner is connected must be equipped with a relief valve.**
- \* **Mount the oil burner in as a low position as possible in relation to the cooling/heating system.**
- \* **If the oil burner is mounted in a box, the box must have a fresh air inlet of at least 75 cm<sup>2</sup>. The box must be made from a non-combustible material.**
- \* **Intake air for the oil burner must not be taken from rooms in which people stay. It must be located in a position where the exhaust gases of the vehicle do not get into contact with intake air.**
- \* **The air inlet for the oil burner must be located in a position where it cannot be blocked by snow and dirt. Place the air inlet so that the system pressure ratio will not be affected by airflows from the vehicle.**
- \* **Place the orifice of the exhaust pipe so that the combustion is not materially affected by airflows around the vehicle to prevent heating damage on adjacent vehicle components, and to prevent ignition of grass, etc.**
- \* **The design of the exhaust pipe must allow connection of local exhaust ventilation.**
- \* **Ensure the vehicle to prevent exhaust gases from reaching rooms in which people stay.**
- \* **The max. length of the exhaust pipe is 4000mm, and its max. diameter is 65mm.**
- \* **If the oil burner is mounted in driver, passenger or storage room, this part of the fuel line must be made from solid-drawn pipe steel. Connection to the fuel supply of the vehicle must be established outside these rooms.**

# MOUNTING INSTRUCTIONS/MOUNTING PLAN

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- \* If the oil burner is mounted in driver or passenger rooms, the air inlet must be led to fresh air.
- \* The exhaust pipe must be made from material capable of withstanding heat and of no corrosive (AISI 304 SS 2333) alloy steel sustaining a maximum temperature of 800°C at a wall thickness of at least 0.75 mm.
- \* Connections to the exhaust system must be tight and secured by clamps.
- \* When the oil burner is mounted in driver, passenger or storage rooms, the exhaust must be made as one complete pipe.
- \* EXHAUST GASES MUST BE LED OUTSIDE THE VEHICLE IN A HOSE OR PIPE.

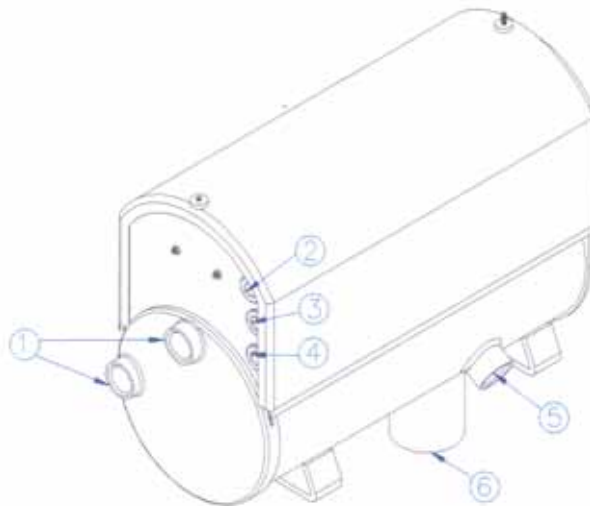


At the burner end of the oil burner, adequate room must be provided to remove the burner unit and burner pipe of the oil burner. Minimum distances appear from the sketch. Mounting the oil burner on vibration dampers is recommended. If so, all hose connectors to the oil burner must be flexible hoses.

# LIST OF CONNECTIONS

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## Water/oil connection



**Pos 1: Exit for supply water:**  
3/4" thread

**Pos 2: Inlet for oil supply (to the oil pump of the oil burner from the fuel tank):**  
Connection of oil hose with 1/4 x 1/4 mm nipple.

**Pos 3: Exit for return oil (to fuel tank):**  
Oil hose with 1/4 x 1/4 nipple.

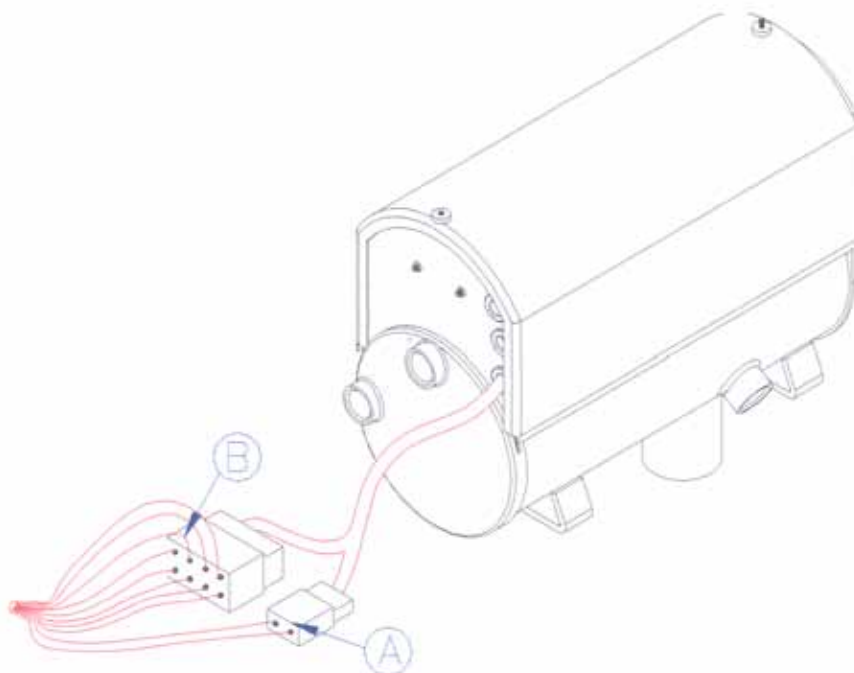
**Pos 4: Electric connection, 8- and 2-pin connectors.**

**Pos 5: Inlet for return water:**  
3/4" thread.

**Pos 6: Exhaust:**  
External dimensions Ø65mm.

## ELECTRICAL CONNECTIONS

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The oil burner is available in two versions that can be used only for either 24V DC or 12V DC. The external connections are gathered in 8-pin connectors A and B. The internal connectors of the oil burner appears on a separate diagram, see page 28. Connect connectors as follows:

**Connector A:** Connected to the water pump.

**Pin B1:** Connected to the diagnostic lamp. The other end of the diagnostic lamp is connected to + (positive) contact. The diagnostic lamp must be a LED.

**Pin B2:** Connect to - for a low temperature.

**Pin B3:** Connect through a 10A (at 24V) and 8A (at 12V) fuse to + (positive).

**Pin B5:** Connect to the room fan relay.

**Pin B7:** Connect to the main switch or timer. Connect the other end of the switch through an 8A fuse to + (positive).

**Pin B8:** Connect to frame (negative).

**NOTE:** The oil burner can be set to adjust the temperature within two ranges (see page 8-9: high/low temperature). Select the low range by connecting wire B2 to frame point M. Select the *NORMAL* range by *NOT* connecting B2.

# TECHNICAL SPECIFICATIONS

---

## Technical data:

<b>Stroco oil burner, type 15.00 M:</b>	<b>Oil burner unit with built-in automatic controls and alarm functions.</b>
<b>Dimensions LxWxH:</b>	<b>409 x 178 x 307 mm</b>
<b>Weight:</b>	<b>17.5 kg</b>
<b>Connections:</b>	<b>The oil burner is connected to the electrical installation, fuel tank and water/heating system of the vehicle.</b>
<b>Supply voltage:</b>	<b>24 or 12V DC</b>
<b>Fuel:</b>	<b>Diesel fuel</b>
<b>Fuel consumption:</b>	<b>approx. 1.25 kg/h</b>
<b>Fuel filter:</b>	<b>Filter area: 1937 cm<sup>2</sup> Filter degree: 0.02 mm Connection: 1/4"RG</b>
<b>Heating effect:</b>	<b>Output approx. 13 kW</b>
<b>Power consumption:</b>	<b>approx. 5A at 24V DC (incl. water pump) 9A at 12V DC (incl. water pump)</b>
<b>Combustion data:</b>	<b>CO<sup>2</sup>: approx. 10%, Soot figure: 0-1 Bacharach</b>
<b>Circulation pump:</b>	<b>approx. 22.5 l/min.</b>
<b>Oil pump:</b>	<b>Suntec type AL35 Operating pressure: 8 bar (kg/cm<sup>2</sup>)</b>
<b>Nozzle:</b>	<b>1.46 kg/h (0.40 Us gal/h 60°S)</b>
<b>Photo unit:</b>	<b>Type LDR JP Maskinfabrik</b>
<b>Over boiling protection:</b>	<b>Type „Therm-o-dise“ Breaking temperature 110°C</b>
<b>Control thermostat:</b>	<b>NTC 10 K sensor. Boiler temperature: High: making/breaking approx. 73/80°C Low: making/breaking approx. 55/60°C Cab ventilation: Start approx. 50°C/Stop approx. 45°C.</b>
<b>MAX. AMBIENT TEMPERATURE:</b>	<b>80°C</b>

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<b>Pre-ventilation period:</b>	<b>At first start approx. 60 sec. At restart approx. 10 sec.</b>
<b>Post-ventilation period:</b>	<b>approx. 60 sec.</b>
<b>Under voltage:</b>	<b>At 24V system: Connection or disconnection approx. 20.5/22 VDC At 12V system: Connection or disconnection approx. 10.5/11,5 VDC</b>
<b>Over voltage:</b>	<b>At 24V system: Connection or disconnection approx. 29.5/29 VDC At 12V system: Connection or disconnection approx. 15/14.5 VDC</b>
<b>Safety time:</b>	<b>Max. 15 sec.</b>
<b>Contact load:</b>	<b>Max. 10 Amp</b>
<b>Electrical connection:</b>	<b>15 pin AMP connector (A in wiring diagram)</b>

## **Definitions**

### **Low supply temperature on boiler water**

At low supply temperature, the operating thermostat makes at approx. 60°C and breaks again at approx. 55°C. In the text, this is referred to as the low range.

*Note: If a low supply temperature is wanted, wire B2 must be connected.*

### **High supply temperature on boiler water**

At high supply temperature, the operating thermostat makes at approx. 80°C and breaks again at approx. 73°C. In the text, this is referred to as the high range, and it is the temperature range normally used.

*Note: If a high supply temperature is wanted, wire B2 must not be connected.*

### **Over boiling protection (max. temperature)**

Over boiling of the water is prevented by means of a switch in the overheating thermostat activated at approx. 110°C. If the switch is activated, breaking the electrical circuit, it can only be re-connected manually by pressing the black button on the thermostat. An automatic start is therefore not possible, not even when the water has cooled off.

### **Safety period at flame failure**

At flame failure, the safety relay connects the ignition in an attempt to start again. If a flame is not established within the safety period of the relay of 15 seconds, the relay cuts out, and a post-ventilation period is started. If the safety relay cuts out, the error lamp lights up.

### **Pre-ventilation**

When the oil burner is started, there is a pre-ventilation period of 60 seconds in which the oil is pre-heated before being released. The pre-ventilation period is reduced to 10 seconds when the oil burner is in normal operation where starting/stopping is controlled by the thermostat.

# MAINTENANCE

---

To ensure the reliability of the oil burner at all time, the maintenance inspections below must be carried out after the heating season or well in advance of a new one:

\* Change of oil filter.

\* Check brushes.

\* Check pipe and hose connections for leakage. It is particularly important that the fuel suction line of the oil burner is completely tight.

\* Inspection of boiler and burner pipes.

If the boiler is sooty, it is best cleaned by means of high-pressure water or steam. Protect connectors and motors during cleaning.

If the burner pipe is corroded, replace it.

\* Inspection of burner unit.

Electrode clamp with nozzle and turbulator must be clean and intact.

Check the electrode position (see page 20).

If the boiler is very sooty, it may indicate incorrect combustion. One possible action is to replace the nozzle.

The nozzle service life is limited. Do not attempt to clean or repair the nozzle, but replace it with a new one.

Check the air inlet and air position when a nozzle has been replaced.

Check the photocell and clean it for dirt and soot.

\* Outside the heating season you should operate the oil burner for a minimum of 15 minutes a week.

---

## Check the pump suction side

- \* Is there any oil in the tank ?
- \* Does the pump work (i.e. suction) ?
- \* Is there any air in a transparent test tube mounted on the pump suction side ?
- \* Is the oil filter or suction line clogged ? The pump makes a screeching sound if the suction side is clogged.
- \* Is the nozzle clogged ?
- \* Is the oil very cold and viscous ?

## Check the pump delivery side


Check the oil pressure:

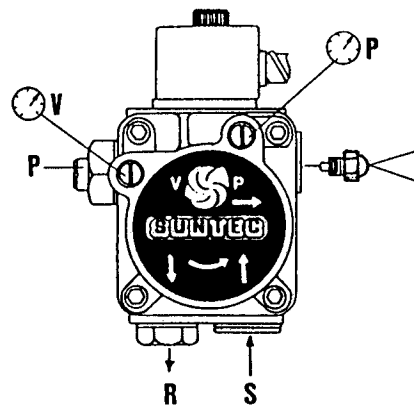
Screw a manometer into the pump manometer exit.

Set the pressure at the screw P at 8 bar (kg/cm<sup>2</sup>).

Unsteady manometer reading indicates air in the suction line.

See page 18 in case of nozzle failure.

- P: Pressure setting
- S: Suction pipe 1/4" RG
- R: Return pipe 1/4" RG
- : To nozzle
- OV: Vacuum meter connection
- OP: Manometer connection



## Oil filter

The filter is located on the oil suction line between the oil pump and the fuel tank.

It must be mounted to ensure that the arrows on the filter point in the direction of flow.

When the filter is replaced, check the filter and connection for leakage.

---

## **Circulation pump**

**The circulation pump transports water in the heating system.**

**The pump is running continuously while the main switch/start clock is connected and the oil burner system is running.**

**The pump is connected to connector A.**

# FUNCTIONAL DESCRIPTION OF OPERATIONS

---

Start the oil burner from the main switch on the instrument panel. The main switch may also be a start clock.

During start-up the control current from the installation is connected (battery 12 or 24V).

The main power supply is directly connected with the automatic control of the oil burner, controlling the power supply to the oil burner.

During start-up the pump relay is immediately activated, starting the circulation pump. The pump runs continually when the main switch is activated.

The control thermostat emits a signal to start the burner when the boiler temperature is below the set value.

During *the ventilation period* the electrodes are live (spark), the fan motor runs and power is supplied to the nozzle preheater.

Some 60 seconds after start-up, the solenoid valve of the oil pump is connected, releasing oil for atomisation in the nozzle. *The safety timer* is connected at the same time.

When the flame has been established, the nozzle preheater and ignition are disconnected. The start program has been completed, and the burner runs until the control thermostat disconnects, and the *post-ventilation period* is started.

When the control thermostat reconnects the circuit, the start procedure will be repeated with a *pre-ventilation time* of 10 seconds.

*The automatic controls* are primarily monitored in connection with the combustion process.

The oil is *not* ignited during start-up, the safety relay remains engaged. After some 15 seconds the safety relay disconnects, and a post-ventilation period is started.

If the flame disappears during operation, the safety relay connects the ignition in an attempt to start again. If the oil is not ignited, the safety relay will disconnect, the oil release cease and an alarm be given. But if the oil is ignited during the attempted restart, combustion will continue until the control thermostat disconnects.

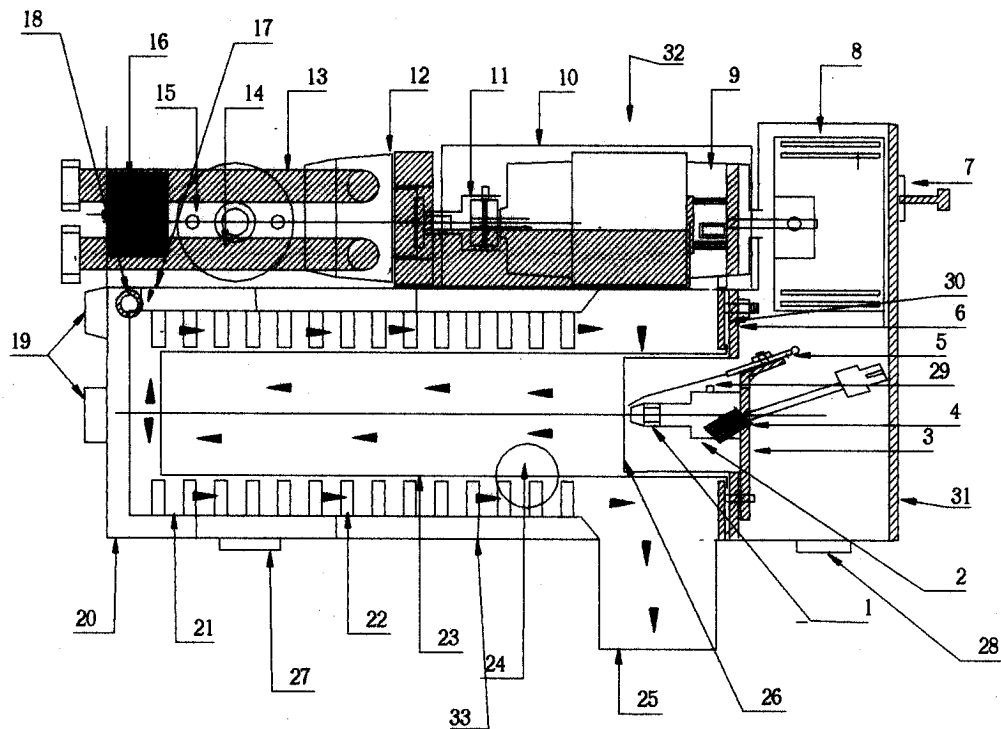
The electrical circuit is self-controlling, and the oil release will be stopped if a component failure occurs in the photo or motor circuits.

During abnormal operation conditions, such as flame failure during operation or a false light during pre-ventilation, the automatic safety system will stop the oil burner and connect *the alarm functions*.

The automatic controls have a built-in fan motor regulator maintaining a constant voltage of approx. 21V/11.8V.

The *pre- and post-ventilation and low voltage logic* of the oil burner is also controlled by the automatic controls.

# FUNCTIONAL DESCRIPTION



- |    |                       |    |                         |
|----|-----------------------|----|-------------------------|
| 1  | Nozzle                | 17 | Over boiling protection |
| 2  | Nozzle retainer       | 18 | Operation thermostat    |
| 3  | Nozzle retainer plate | 19 | Exit water 3/4"RG       |
| 4  | Photo                 | 20 | Outer boiler            |
| 5  | Igniters              | 21 | Inner boiler            |
| 6  | Flange                | 22 | Copper pins             |
| 7  | Air shutter           | 23 | Burner pipes            |
| 8  | Fan wheel             | 24 | Entry water 3/4"RG      |
| 9  | Fan motor             | 25 | Chimney                 |
| 10 | Automatic controls    | 26 | Burner                  |
| 11 | Coupling              | 27 | Foot                    |
| 12 | Oil pump              | 28 | Foot                    |
| 13 | Oil hose              | 29 | Oil pipes               |
| 14 | Oil hose              | 30 | Gasket                  |
| 15 | Ignition coil         | 31 | End cover               |
| 16 | Ignition oscillator   | 32 | Plastic cover ABS       |
|    |                       | 33 | Spiral                  |

## TROUBLESHOOTING - HOW TO ?

---

If the oil burner does not work, and troubleshooting is initiated, it is important to get information about the condition of the system before and after the occurrence of the failure, to locate the error source, if possible, before using any tools.

- \* Has the main switch or start clock stopped ?
- \* Does the power lamp/diagnostics lamp light ?
- \* Does the error lamp/diagnostics lamp indicate an error at alarm functions?
- \* Have irregularities been observed prior to the condition of the oil burner ? Smells, sounds or visible changes?
- \* Is there any fuel in the tank ?
- \* Is there any water in the system ?
- \* Is the power supply to the oil burner working properly ? 24V connector B pins 3, 4 and 7 (see page 28).
- \* Are the airways to the oil burner free ?
- \* Are the main fuses intact ?
- \* Did the over boiling protection cut out ?
- \* Is the desired temperature range selected correctly with wire A13 (see page 28) ?

Before additional troubleshooting is initiated, please note the automatic controls controlling the oil burner in various sequences. Certain functions such as pre-ventilation and ignition run only in limited periods.

If the automatic controls disconnect the oil burner as a result of a failure, post-ventilation will continue for some 60 seconds, and the diagnostics lamp of the automatic controls will indicate an error (see page 17).

Only professionals are allowed to carry out repairs.

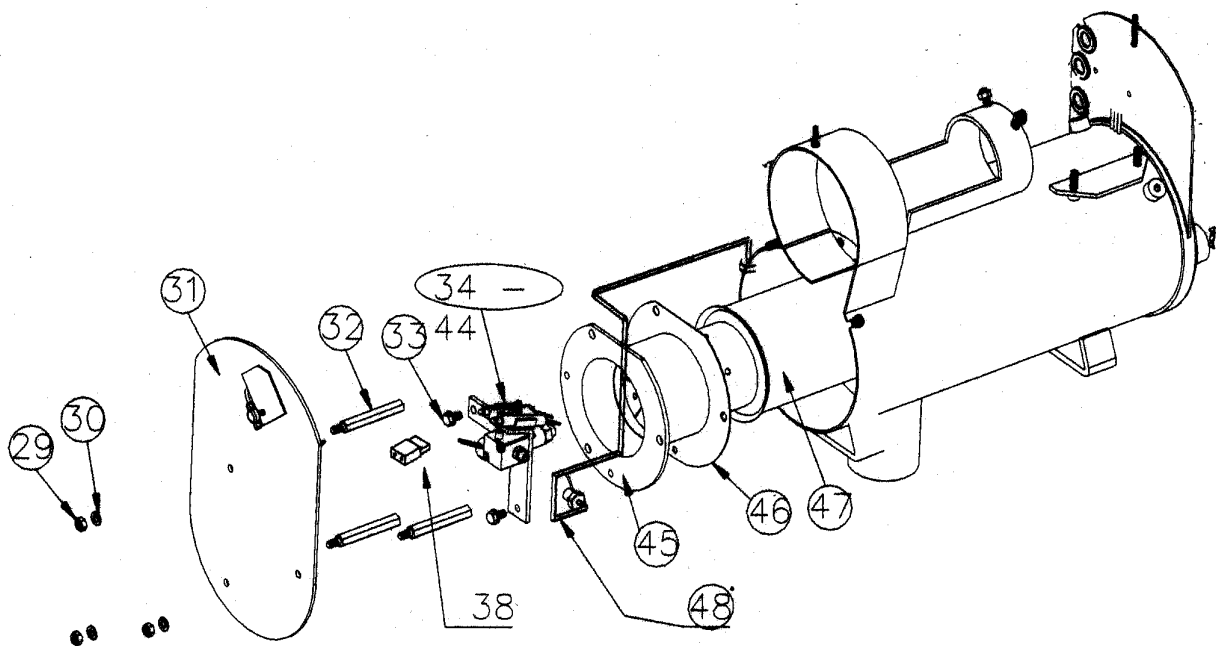
## DISMOUNTING BURNER AND CUMBUSTION CHAMBER

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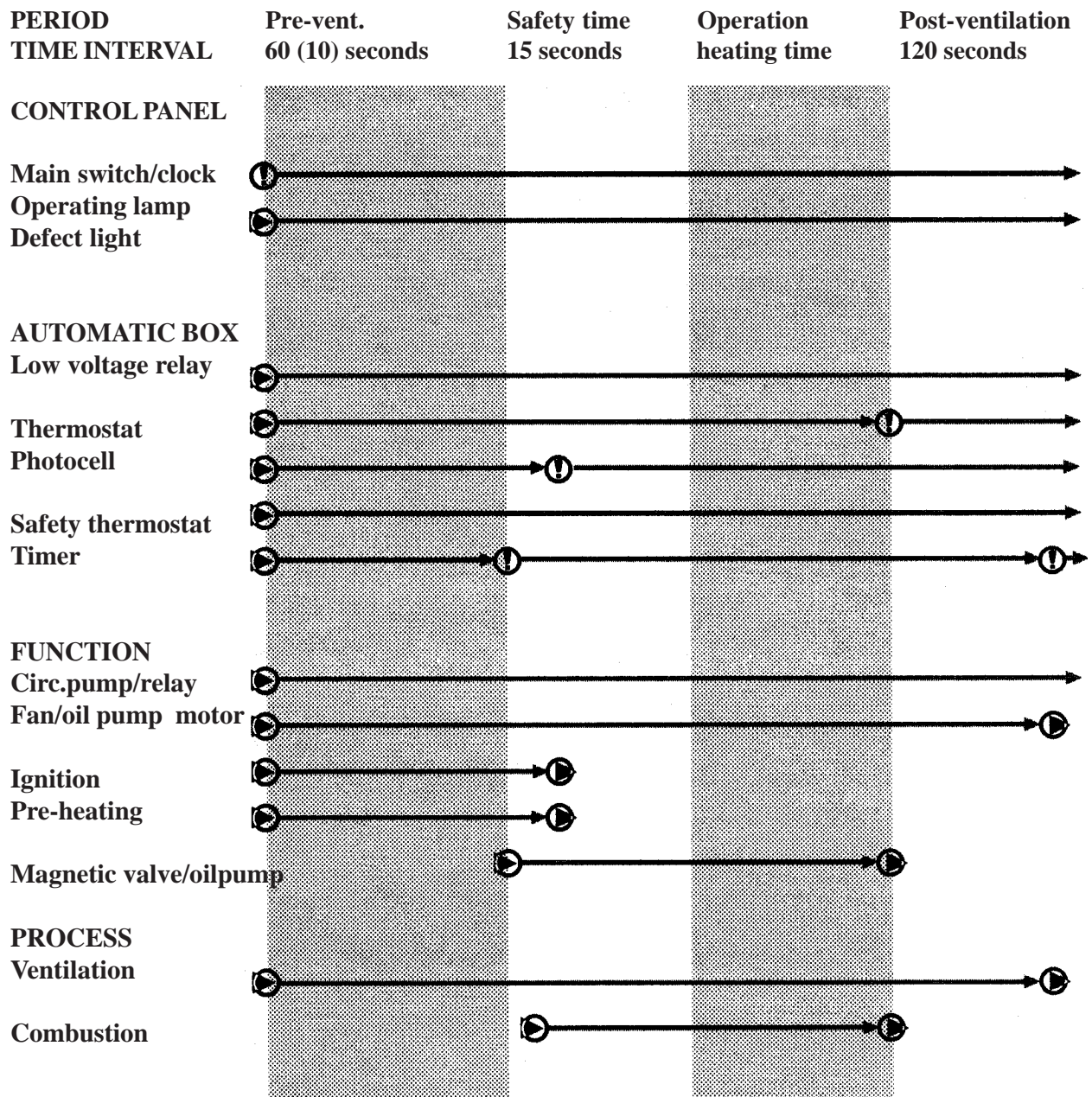
Access to the oil burner and combustion chamber is obtained by dismantling the end cover (pos. 31) at the three 6 mm nuts (pos. 29) and the three 6 mm stay bolts (pos. 32).

Dismount the oil pipe (pos. 48) and the connectors (pos. 38).

Remove the burner (pos. 34), and the combustion chamber (pos. 47) is free.



# PROCESS CONTROL CHART



*Note: When starting first time the pre-ventilation time is 60 seconds  
When starting during the operating period the pre-ventilation time is 10 seconds*

**Symbols:**

- ⊙ :Signal for either connection or disconnection
- : Connection
- ⊙ :Disconnection

*Note: THE OIL-FIRED BOILER MUST NOT BE USED IN GARAGES, PETROL STATIONS, OR WHEREVER THE USE OF OPEN FLAMES IS PROHIBITED!*

# ALARM FUNCTIONS

Type of defect	With LED indicator (seconds)	display indicator	Remedy
0 Normal operation		0	
1 Safety time exceeded		7	page 19
2 Ignition electrode defective		2	page 20
3 Photodetector defective		3	page 21
4 Undervoltage		4	page 22
5 Overvoltage		5	page 22
6 Fan defective		6	page 23
7 Magnetic valve defective		7	page 24
8 Sensor defective		8	page 25
9 Too many start attempts		9	(reset at operation and light)
10(A) Overboiling alarm		A	page 25

**NB !**

**Boilers with LED indicators;**

**Black field means red light.**

**White field means no light.**

**Dotted field means flashing.**

The burner unit is the centre of the combustion process. Air and oil mist is mixed in the burner and ignited by the ignition spark from the ignition coil.

The flame is registered by the photocell.

A correct setting of the burner unit is important to an efficient combustion process:

- \* Locations of the igniters in relation to the nozzle.
- \* The spacing between the two electrodes.
- \* Locations of the electrodes in relation to the turbolator.

## Why is there no flame ?

Possible causes:

- No oil in the tank.
- Leaky suction line.
- Air build-up in the suction line.
- The oil pump cannot perform any suction.
- The oil pump does not rotate since the coupling is defective.
- Too low oil pump pressure.
- Solenoid valve of the pump does not release oil for the nozzle.
- Dirt is sucked from the oil tank, obstructing the nozzle.
- The oil is very cold and therefore very viscous.
- The suction and return oil lines have been switched.
- No spark owing to defective ignition coil oscillator or ignition cables.
- No spark owing to shorted electrodes, coking or sooting on the ceramic insulator.

## Manual re-connection

If the automatic controls have been cut out by the safety relay, they are re-connected by disconnecting the main switch on the instrument panel for approx. 5 seconds and then switching it on again. The oil burner will then start normally.

# VOLTAGE CONTROL OF ELECTRODES

---

Carried out when checking the ignition coil and ignition oscillator.

During ignition control, the solenoid coil connector must be disconnected.

Access to the burner unit is obtained by removing the end flange of the burner, unscrewing the three 6 mm nuts, and removing the oil burner.

Remove and cover the photocell to prevent it from being exposed to light.

Start the oil burner. Voltage discharges at the electrodes can now be observed. The automatic controls provide power to the ignition oscillator and ignition coil of the ignition system via connector A, pin 2 (see page 28).

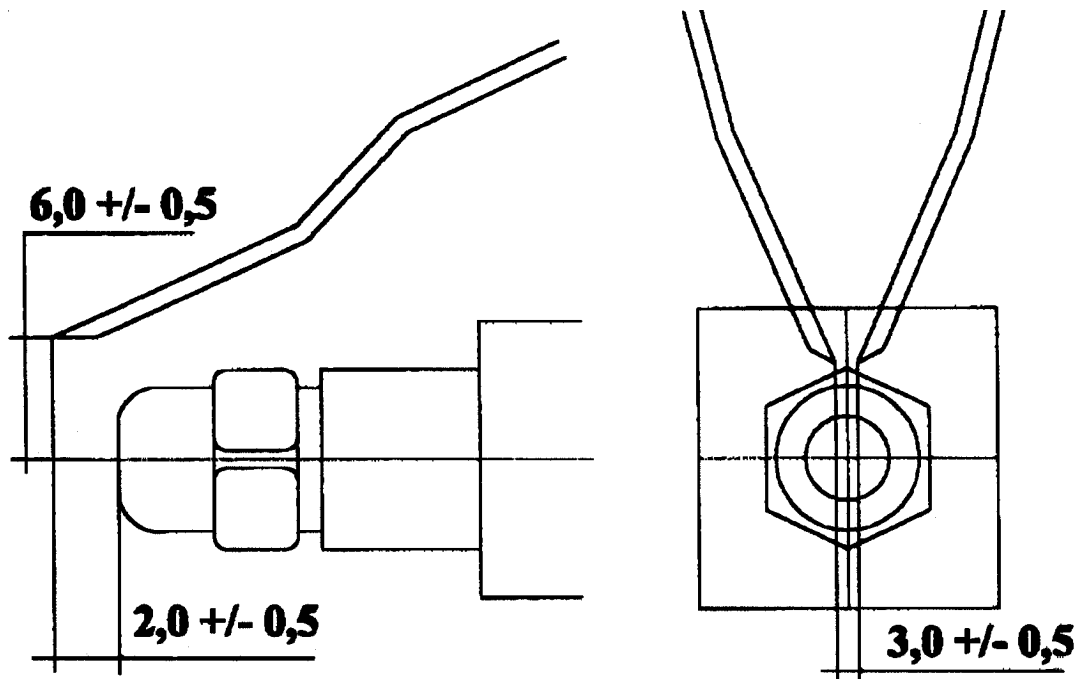
The ignition coil and oscillator are mutually connected and do not work separately.

The ignition oscillator picks the minus of the operating current apart, and these pulses are then transformed by the ignition coil to high voltage, discharged as a spark between the igniters.

If no charge occurs, the causes may be:

1. Defective ignition cable.
2. Electrode setting.
3. Dirt on the electrodes.
4. Defective ceramics on the electrode unit.
5. Ignition coil, oscillator, automatic controls.

The electrodes are set according to the dimensioned sketch below.



**During the pre-ventilation time the photocell should not be exposed to any light, since otherwise the burner will not start.**

**When the pre-ventilation time stops, and the oil is released for combustion, the photocell must see light, or the safety relay will cut out, disconnecting the process.**

**The photocell is connected to the automatic controls via connector D (see page 28).**

## **Adjustment and correction of errors**

**If the light-sensitive LDR sensor of the photocell is shorted or defective, the oil burner will not start since the automatic controls cut out.**

**If the photocell receives too little light when a flame is burning, the automatic controls will cut out. The causes may be dirt on the sensor or an incorrectly positioned photocell in the burner. Troubleshooting the photocell is carried out by means of the replacement principle, i.e. mount a new part and see if it helps.**

**The photocell can be disconnected at connector D (see page 28).**

## **UNDER-/OVERVOLTAGE**

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### **Undervoltage**

If the voltage is below 22/11.5 V (in step 0) and below 20.5/10.5V during pre-ventilation, operation and post-ventilation, the undervoltage alarm will be activated. The alarm can be reset only with the off switch and a voltage exceeding 22/11.5V.

### **Over voltage**

If the voltage exceeds 29.5/15V, the alarm will be activated, and the alarm will be reset below 29/14.5V.

### **Setting the air volume**

The air volume for the combustion is regulated by turning pos. 21 (see page 23) + and -. The air setting influences the complete combustion of the oil, i.e. too little air (soots up, black smoke) or excessive air (blue smoke).

The correct setting is measured from the smoke:

The CO<sub>2</sub> (carbon dioxide) content of the smoke must be 10-11%, og and the soot figure close to 0-1 Bacharach.

### **Oil preheater**

The preheater is mounted in the nozzle retainer, heating this.

The preheater operates when the oil burner is started, but is disconnected during operation.

The preheater is to ensure that a flame is established during cold starts.

The automatic controls control the preheater which is powered through connector F, approx. 3 Amp (see page 28).

### **Oil pump**

The oil pump is mounted on the motor engine bracket with two 6 mm tailstock screws.

The pump is mounted in a two-wire system where ventilation occurs automatically through the return line.

The solenoid valve of the pump is activated by the automatic controls through connector L (see page 28).

The operating pressure of the pump must be 8 bars (kg/cm<sup>2</sup>). The pressure can be set on screw P (see page 11).

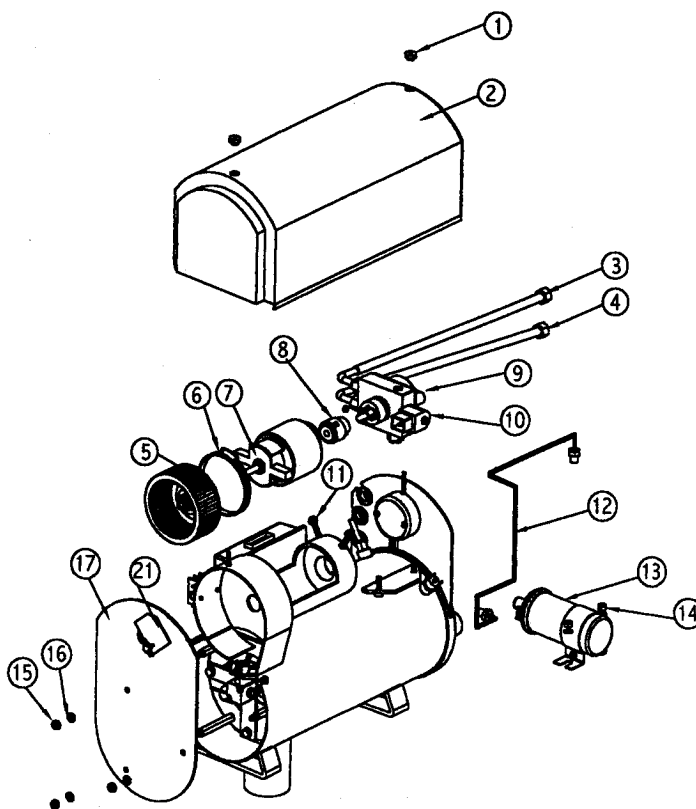
The pump is running when the fan motor is running, but oil is not released for atomisation in the nozzle until the solenoid valve is activated.

It is important that the suction line of the pump is completely tight, and that an oil filter (Stroco type 2000) has been mounted in the suction line.

## REPLACING THE FAN MOTOR

The fan motor is replaced according to the chart below referring to the position numbers on the illustration.

Sequence	Action
1	Turn off the power and check that the oil burner is dead before any replacement work is commenced.
2	Loosen knurled screws pos. 1 and remove casing pos. 2
3	Loosen nut pos. 15
4	Remove nuts and washers pos. 15 and 16
5	Remove end casing pos. 17
6	Remove ignition coil pos. 13 by removing nuts pos. 14
7	Remove pressure pipe pos. 12
8	Removes hoses pos. 3 and 4 and wire for solenoid coil pos. 10 on oil pump pos. 9
9	Loosen screws pos. 11 and remove the oil pump
10	Remove fan wheel pos. 5
11	Loosen tensioning band pos. 6 and remove fan motor pos. 7
12	Mounted in the opposite sequence



## CHECKING THE OIL PUMP SOLENOID VALVE

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Measure the voltage to the coil before checking the solenoid valve. Approx. 24V (12V) must be measured on connector L pin 2 (see page 28).

*Note: Power will only be supplied to the connector after the pre-ventilation period, and power will be disconnected again after approx. 10 seconds if the photoresistor does not register combustion. (see the normal operation chart on page 17).*

If the voltage on L2 (see page 28) is OK, check the traction of the solenoid coil. The core of the coil must become magnetic when voltage is supplied. (A screwdriver can be used).

If the photocell detects light during pre-ventilation, it is considered to be an error in the solenoid valve. This error can be reset only when the switch is set to OFF.

# OPERATING THERMOSTAT SENSOR

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The operating thermostat sensor is connected to the automatic controls via connector C (see page 28).

The sensor is inserted in a clamp on the back of the boiler, registering the boiler temperature. The thermostat can be set to two operating ranges:

**1: Making/Breaking: approx. 55/60°C**

*Note: Select this temperature range by connecting wire B2 to frame.*

**2: Making/Breaking: approx. 73/80°C (the normal range).**

*Note: Select this temperature range by not connecting wire B2 to frame.*

## Adjustment and correction of errors

Errors in the thermostat can be noted when the heating process continues beyond the set temperature range and is finally disconnected by the overboiling protection.

Voltage measurements of an intact thermostat sensor will show:

Descending voltage at increasing temperature. When voltage across the sensor has decreased to approx. 2.5V, the thermostat cuts out (for the normal temperature range).

Inversely, voltage will increase when the temperature decreases. At approx. 3.6V, the thermostat will make (for the normal temperature range).

If the measured voltage is constant and not dependent on the temperature, the sensor is defective, and the thermostat will not be able to adjust.

Change the sensor by dismantling connector C (see page 28), and then unscrewing the sensor from its base.

## Overboiling protection (max. temperature)

This device will ensure that the temperature of the boiler water cannot exceed a maximum temperature of 110°C. The overboiling protection is inserted in a clamp on the boiler side next to the thermostat sensor. If the protection cuts out if the maximum temperature has been exceeded, the error lamp lights up.

The protection cannot be re-connected by an attempted restart with the main switch, but must be re-connected manually by pressing the black button on the overboiling protection. Connection is not possible until the boiler temperature has decreased.

## Adjustment and troubleshooting

It is important to check the cause before and after re-connecting the overboiling protection.

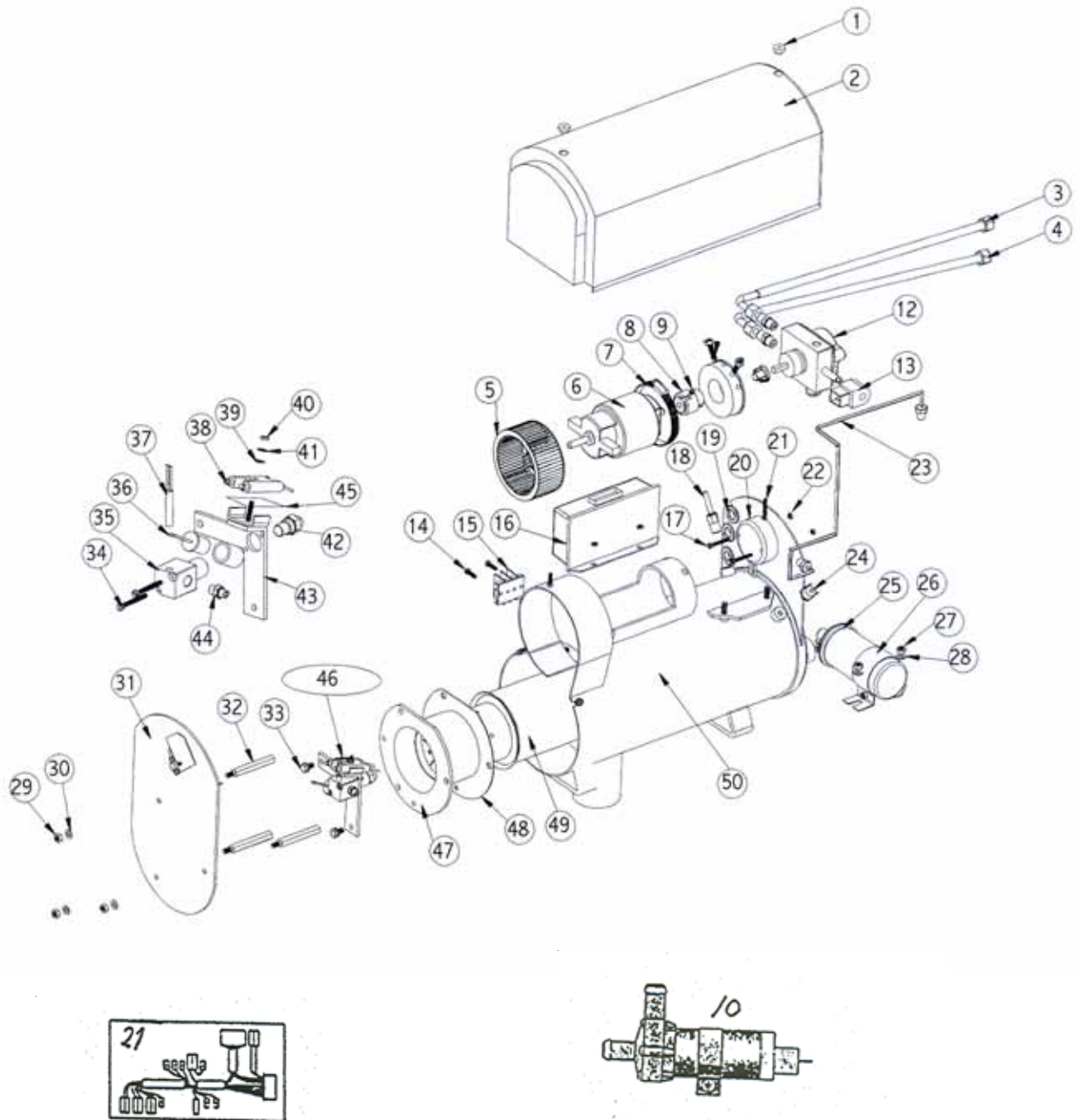
- 1 Is there any water in the system ?
- 2 Has the system been bled correctly ?
- 3 Is the thermostat in order ?

## GENERAL DRAWING - PARTS LIST

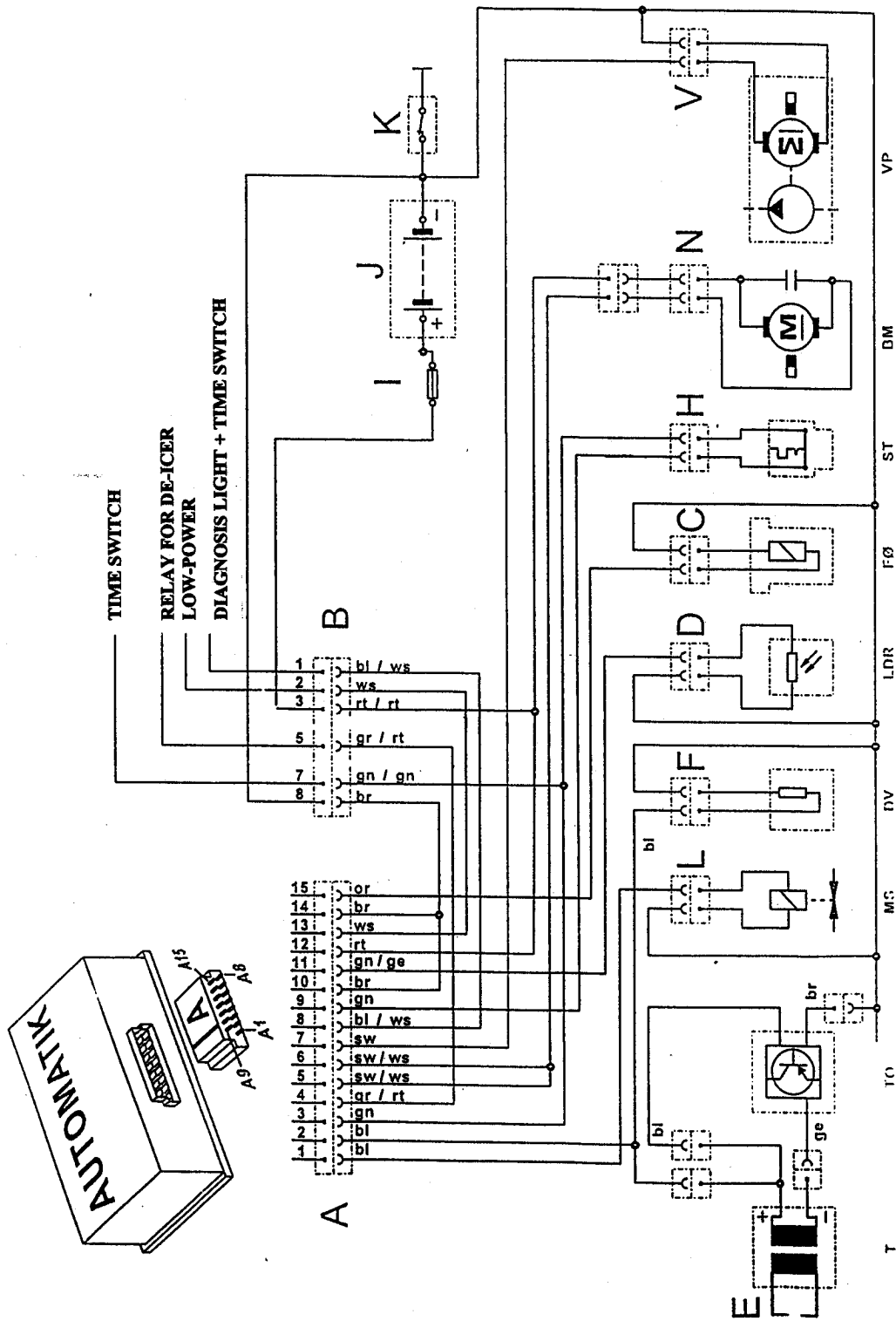
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Pos.	Designation	Order no.
1	Plastic nut 4mm	20.230
2	Plastic cover	15.034
3	Oil hose	15.016
4	Oil hose	15.016
5	Fan wheel	15.270
6	Fan motor 24/12V	15.340/15.342
7	Clip	15.017
8	Coupling, complete	35.360
9	Tailstock screw	15.002
10	Water pump 24/12V	11.700/11.702
12	Oil pump	31.370
13	Solenoid coil 24/12V	31.375/31.377
14	Screw 4x16	15.003
15	Earth connector	31.380
16	Automatic controls 24/12V	35.520/35.522
17	Screw 4x25	15.005
18	Temperature gauge	15.010
19	Rubber grommet	15.006
20	Ignition oscillator	15.510
21	Cable harness	15.570
22	Nut 4 mm	15.007
23	Oil pressure pipe, complete	15.250
24	Overboiling protection	35.030
25	Ignition coil 24V	30.490
26	Clamp ignition coil	15.008
27	Nut 6 mm	15.009
28	Washer 6 mm	15.011
29	Top nut	15.012
30	Washer 6 mm	15.013
31	End cover	15.014
32	Stay bolt	15.015
33	Bolt 6 x 10 mm	15.018
34	Screw 35 x 4 mm	15.120
35	Nozzle retainer	30.130
36	LDR photocell	31.160
37	Preheater element 24/12V	15.142/15.143
38	Electrodes	15.100
39	Rubber washer	30.110
40	Nut 4 mm	15.007
41	Washer 4 mm	30.111
42	Nozzle	15.070
43	Electrode fitting	15.090
44	Nipple	30.210
45	Electrode rubber	30.112
46	Nozzle retainer, complete	15.121
47	Burner unit	15.041
48	Gasket	15.028
49	Burner pipe	15.040
50	Boiler	15.540

# GENERAL DRAWING - PARTS LIST



# WIRING DIAGRAM



<b>Key to abbreviations</b>		<b>Colour codes</b>
<b>A</b>	Connectors for automatic controls	bl blue
	Automatic controls; Electron. control unit	br brown
<b>B</b>	Main connector	ge yellow
<b>BM</b>	Fan motor	gn green
<b>C</b>	Connector for operating thermostat	gr grey
<b>D</b>	Connector for photocell	or orange
<b>E</b>	Igniters	rt red
<b>F</b>	Connector for nozzle preheater	sw black
<b>H</b>	Connector for overboiling protector	ws white
<b>L</b>	Connector for solenoid coil	vl violet
<b>LDR</b>	Photocell	
<b>ST</b>	Overboiling protector	
<b>N</b>	Connector for fan motor	
<b>FØ</b>	Sensor for operating thermostat	
<b>RVP</b>	Relay for circulation pump	
<b>T</b>	Ignition coil	
<b>TO</b>	Ignition oscillator	
<b>V</b>	Connector for circulation pumpe	
<b>VP</b>	Circulation pump	
<b>DV</b>	Nozzle preheater	
<b>MS</b>	Solenoid coil	
<b>I</b>	Fuse 8A	
<b>J</b>	Accumulator	
<b>K</b>	Main switch	

# DIGITAL START CLOCK

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## Mounting

The start clock must be mounted in the compartment in a protected place where it cannot cause any injuries in case of collision.

The clock can be mounted in the instrument panel or in the centre console if there is room. A rectangular hole measuring 85 x 40 mm is required for this mounting option.

## Technical data

Voltage range:

At 12V: 9.....15 volt

At 24V: 18.....30 volt

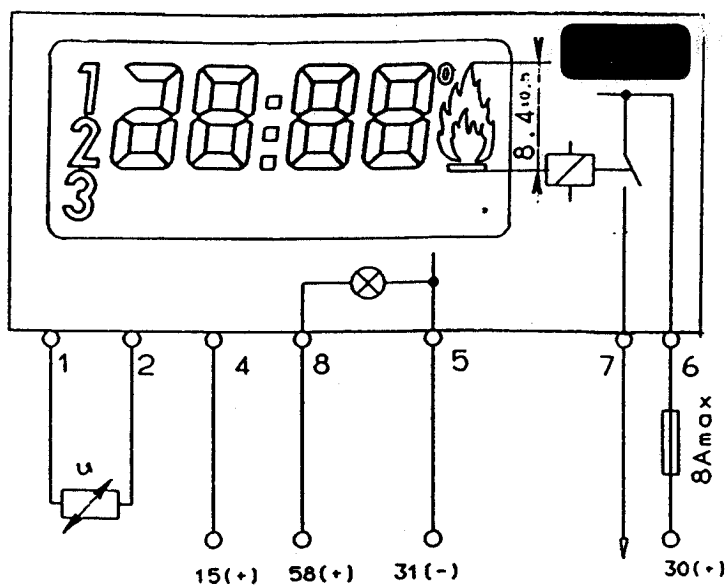
Temperature range during operation:

-40°C.....+75°C

Power consumption with switched off display:

(rest current):  $\leq 1.0\text{mA}$

## Electrical connections



Connectors 1-2 (Remote thermostat)

Connector 4 Ignition +

Connector 5 Minus -

Connectors 6-8 Plus +

Connector 7 Control current +

## **Oil lines, oil filter, melt-fuse valves, etc.**

Oil lines must be made of either steel or copper, be permanently laid up and protected from mechanical loads. Soft soldering is not allowed for any pipe joints.

A fuse-melt valve must be inserted in the oil line as close to the combustion chamber of the device as possible to disconnect the oil flow if the outside temperature exceeds 80°C. If the return line is connected to the tank in a manner that allows the tank to be drained through it, it must also be equipped with a fuse-melt valve. A short, approved (type approved by the directorate) hose may be used in the pipe between the fuse-melt valve and oil burner. If the filter is located in the same room as the oil burner, it must be located between the fuse-melt valve and oil burner. The suction line must be connected to the top of the tank if the tank volume exceeds 10 l.

## **Expansion vessels in general**

Every central heating system must be equipped with one or more expansion vessels, the total value of which is sufficient to take up the thermal expansion of the water during normal operating conditions.

## **Open expansion vessels**

Open expansion vessels must be made from sheet steel. Vessels must be fixed and equipped with terminating pipes with an aperture of at least 25 mm.

## **Expansion vessels with diaphragms**

These are systems intended for a maximum heat output of no more than 50 Mcal/h and a resulting boiler pressure below 2.5 bar and with expansion vessels with a static pressure height below 15m VS.

## **Electrical system**

It must be possible to disconnect the oil burner outside the room in which it is located. This does not, however, apply to hot water circulation pumps.

All cables must be permanently fixed.

The electrical system must be implemented as a two-conductor system, i.e. where + on the oil burner must be returned to the battery -.

For other specifications, see the section on electrical connections and the section Technical Specifications.

## **Air inlet**

If the oil burner is to be used at the same time as the boat engine, the burner must be equipped with a separate air inlet. The requirement applies only, however, if the engine performance exceeds 450 HK. A ventilation hose may be used with a diameter of at least Ø70 mm and a length of maximum 4m.

# INSTALLATION IN BOATS

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The sections below concern conditions to be given special consideration in connection with installation in boats.

## General information

In boats, the oil burner must be located as low as possible, and the exhaust must be led outside. In all types of installation, the supplied circulation pump must be installed in the return line (cold). In the example below, the radiators have been located in a two-wire system, but one-wire systems can, of course, also be used just as both free expansion and pressure expansion may be used.

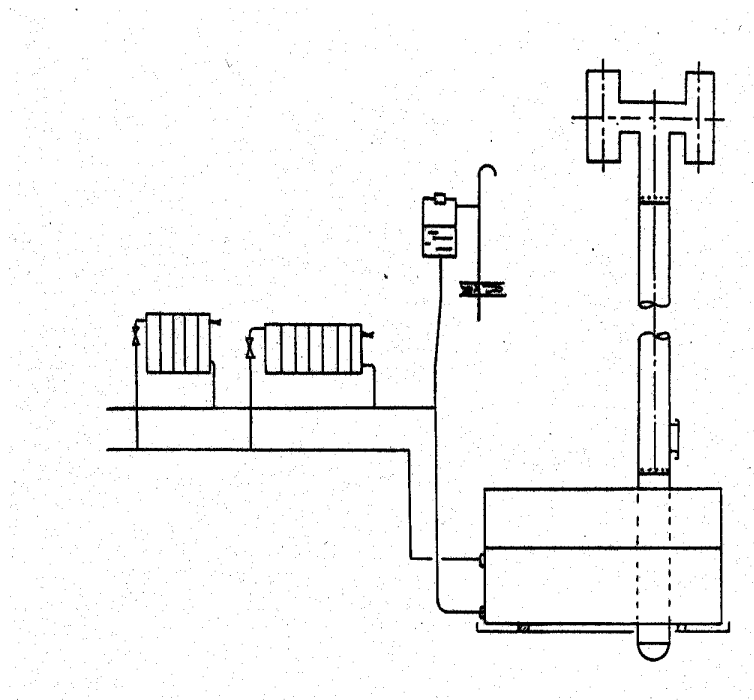


Fig. 1 shows a basic plan for a two-wire system.

## INSTALLATION IN BOATS

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Rooms in which oil burners are installed must be equipped with ventilation in addition to the air required for combustion. All ventilation pipes from the oil burner must be led separately to a free deck, and the outlet must be kept free of superstructures, etc. The upper part of pipe must be able to take up heat expansion. The inner cross section of the pipe must always exceed the connection branch of the unit,  $\text{Ø}65 \text{ mm}$ , and the pipe must be equipped with cleanout doors to enable complete cleaning. The maximum length of the exhaust pipe is 4 meter. Ventilation pipes must be made from stainless steel pipes or stainless steel hoses approved for a minimum temperature of  $600^\circ\text{C}$ . All joints must be ensured by pipe clamps, clips or the like.

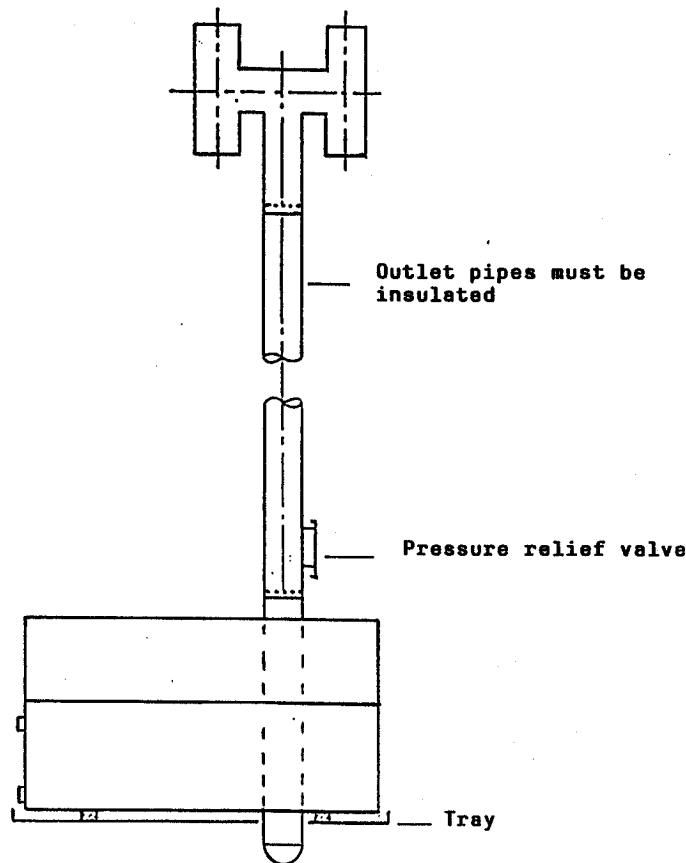


Fig. 2 shows a basic plan for the installation of ventilation pipes.

If there is combustible material within a distance of 7.5 cm from the unit or ventilation pipe, it must be shielded with incombustible material.

In boiler rooms, the unit must be placed in an oil-proof tray with an edge of at least 50mm. The tray must have a discharge pipe with at least the same inner diameter as the delivery pipe, never below 15mm. The pipe must be led to a drain tank (vessel).

Systems with water circulation must have frost protection in periods where temperatures below  $0^\circ\text{C}$  can be expected.

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## **Warranty provisions for STROCO oil burner**

*A warranty of 12 months is given on STROCO oil burners and their parts from the installation date, however, not exceeding two years from our delivery date.*

### **This warranty applies to defects in manufacture and/or material**

The warranty shall lapse if the system is modified, or if the system is not installed in accordance with our instructions.

During the warranty period, *STROCO* undertakes to repair systems or parts thereof that prove to be defective on our examination. Repairs may also be carried out at our service workshops.

*Nozzles are not covered by the warranty.*

### **Labour costs for dismantling and mounting defective parts will not be compensated**

If defects are noted in the system during the warranty period, the defective parts must be sent *carriage to paid* to *STROCO*, stating the defect as well as *delivery date/oil burner number*.

*STROCO's* assessment of whether or not a defect or defect in manufacture exists shall in all cases be final and binding on the purchaser.

### **Consequential damage**

*STROCO* shall assume no liability for any injury, damage to property or loss of profits that may result from any failure in the supplied system, irrespective of cause, including defects in manufacture.



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