



MANUAL

SMART-LINE 7kW

CAMINUS 10 - 40kW

BLUE-LINE  15 - 40kW

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FOREWORD

Dear Customer,

This manual applies to the oil-fired CH and combi boilers listed below.

- ◆ Smart-Line 7 kW
- ◆ Caminus type 10 – 40 kW
- ◆ Blue-line 15-40 kW

The primary aim of this manual is to provide the installer and/or user with information about the installation and use of the CH boiler.

The installer and the user must study and understand this manual. This manual has been compiled with care and in accordance with the applicable standards. Post Marine Heating B.V. accepts no liability arising from incorrect use or incorrect interpretation of this manual. If in doubt, please contact Post Marine Heating B.V.

For correct installation and use of this unit, this manual must be kept with the relevant unit.

SAFETY REGULATIONS

Chapter 2 outlines the safety regulations.



Danger: if these instructions are not complied with, hazardous situations can arise and therefore a risk of injuries which could potentially be life-threatening!

Post Marine Heating B.V. continuously works to improve its products and, for that reason, changes may be made to technical data. Post Marine Heating B.V. is always open to improvements and any remarks or suggestions are therefore always welcome.

Post Marine Heating B.V. hopes you enjoy using its equipment.

Post Marine Heating B.V.

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1. INTRODUCTION

1.1 General

The central heating boilers have been manufactured in accordance with the latest European directives and standards. The CH boiler is made from sheet steel and the heat exchangers are produced from tubing. The boilers are designed and manufactured at our factory in Gorinchem.



Smart-Line CH



Caminus CH



Blue-Line CH

1.2 Use

The central heating boilers are used to heat water for a central heating system, with or without hot water supply, with a maximum operating temperature of 95°C and a maximum operating pressure of 2 Bar. The boiler's output is less than 3% of the capacity.

The capacity of the CH boiler depends on the required radiator capacity (size and numbers of radiators) as well as underfloor heating (if any) and/or other heat radiation sources. The CH system calculation can be downloaded from our website www.postmarineheating.com

1.3 Description

An oil burner in the central heating boiler heats the CH water. This oil burner is modified for the different types of CH boilers (*see tabel 1*).



Please note: Never change the oil burner settings of your own accord!

You will find a description of the oil burner in **appendices I, II and III**. The oil burner is only suitable for burning diesel oil or gas oil. The use of alternative fuels is only possible after modification of the system. For information about this, please contact Post Marine Heating B.V.

1.4 Technical information

You will find the most important information concerning:

- name of manufacturer,
 - type of boiler,
 - capacity of the boiler
 - tap litres/ min,
 - year of construction of the boiler,
 - serial number of the boiler,
 - elektrical data,
 - operating pressure and maximum water temperature of the boiler
- on the nameplate which is attached to the boiler.

You will find detailed data in **chapter 12 Technical data**.

1.5 Warranty

For the warranty conditions, please see **chapter 16**.

HEATER TYPE	BURNER TYPE
Smart-Line 7kW	Ecoflam MAX 1
Caminus 10-20kW	Ecoflam MAX 1
Caminus 30-40kW	Ecoflam MAX 4
Blue-Line 15kW	Elco burner VB 1.20
Blue-Line 20kW	Elco burner VB 1.24
Blue-Line 30kW	Elco burner VB 1.30
Blue-Line 40kW	Elco burner VB 2.45

tabel 1

 Boezem 20a 4206 CB Gorinchem Tel: +31 (0)183 610 211 postmarineheating.com Made in Holland	Type Caminus: ???
	Capaciteit input kW: ????
	Capaciteit output kW: ??
	Tap liter/min: ??
	Bouwjaar: ????
	Serie nr.: ?????
	220-240V~50-60Hz
	Max druk: 3bar
	Max temp.: 110 c°

nameplate

2. SAFETY

In this chapter you will find a summary of safe installation, electrical work, safe transport, safe use and a safe installation area.

2.1 The following instructions must be complied with

These operating instructions contain basic information which must be adhered to during installation, operation and maintenance. You must read and understand this chapter concerning safety. Also pay attention to the instructions and safety instructions in the other chapters. Failure to follow these installation and operating instructions will result in risks for persons, the environment and the product. It follows that any claim for damages will lapse. Non-compliance can, for example, entail the following dangers:

- Danger to persons from electrical, mechanical and bacteriological influences
- Danger to the environment due to leakage of hazardous materials
- Property damage
- Failure of required maintenance and repair procedures
- Failure of important product/unit functions

Commissioning and maintenance of the central heating boilers may only be carried out by authorized professionals, in accordance with the valid guidelines and regulations. This appliance must not be used by persons (including children) with reduced physical, sensory or mental capabilities or persons without experience or knowledge, unless they are supervised by someone responsible for their safety or supervision, or who have received prior instructions on the use of the appliance. Use of the appliance has given. Supervise children and make sure that they do not play with the appliance.

Indication of instructions in the manual

Indication of safety regulations in this manual, safety-instructions to prevent material damage and injury are used and shown differently:





- Safety instructions for the prevention of injury begin with a signal word and are preceded by a corresponding **symbol**.
- Safety instructions for the prevention of material damage begin with a signal word and are displayed **without a symbol**.

Signal words

- **DANGER!** - Acutely dangerous situation. Non-observance results in death or the most serious of injuries.
- **WARNING!** - The user can suffer (serious) injuries. 'Warning' implies that (serious) injury to persons is probable if this information is disregarded
- **CAUTION!** - The user can suffer (serious) injuries. 'Warning' implies that (serious) injury to persons is probable if this information is disregarded.
- **PLEASE NOTE!/ NOTE** - Useful information on handling the product. It draws attention to possible problems.

Symbols

The following symbols are used in these installation and operating instructions:

Symbol	Description
	Danger from electrical voltage
	General danger symbol
	Warning of hot surfaces/liquids
	Please note/ note

2.2 Safe installation

Installation, commissioning, inspection, maintenance and any repair work may only be carried out by (us) authorized installers, in accordance with the installation instructions.

Electrical work:

- Only use the supplied power cord.
- The product must be earthed
- Switch the power off and remove the plug from the wall socket
- Always wear protective clothing and safety shoes.
- When carrying out electrical work, always use insulated tools.



WARNING!

Safe transportation

This chapter describes how the CH boiler can be transported safely without being damaged.

CAUTION 1A:

Damage to the CH boiler can be caused by incorrect transportation. To transport the CH boiler, always use an appropriate vehicle. During transportation and when in the vehicle, the CH boiler must always stand upright.

CAUTION 1B:

Damage to the CH boiler can be caused by rough transit. Some parts of the CH boiler components that are sensitive to jolting movements. Therefore, during transport, safeguard all components against jolting impact.

Lifting the CH boiler

Damage to the CH boiler can be damaged by lifting and moving the boiler incorrect.

- The CH boiler must be lifted by 2 people, holding the boiler underneath and at the rear.
- Do not lift the CH boiler by holding the control panel/dashboard, but by holding the boiler underneath and at the rear.

Safe installation

- Never change the burner settings of your own accord.
- Arrange for the CH boiler and the burner to be checked annually by an (by us) approved installer.
- Allow the boiler (and the heating system) to cool down before starting inspection, maintenance and any repair work related to combustion on hot surfaces and / or liquids.

2.3 Installation room

The CH boiler takes the air required for the combustion process from the room in which the boiler is installed. The room in which the CH boiler is installed must be equipped with air intake openings of at least three times the diameter of the flue gas openings. Do not place any objects in front of these openings!



PLEASE NOTE! These must be kept clear at all times
(see illustration 1A).

This aeration is only calculated with regard to the CH boiler. You must take aeration into account of other machines that are located in the same room (due to the development of, for example, underpressure in the installation room).

The flue gas temperature is between 150°C and 250°C. Make sure that the chimney does not come into contact with combustible parts; it is therefore advisable to insulate these with heat-insulating material.

Flammable materials or liquids may not be stored or used in the vicinity of the CH boiler.

NOTE! Make sure that the room in which the CH boiler is installed is frost-free!

2.4 Maintenance frequency

For optimal, durable and safe operation of the CH boiler, the appliance must be maintained at least once a year by an approved service company or installer. This is to ensure that claims can be made under the manufacturer's warranty.

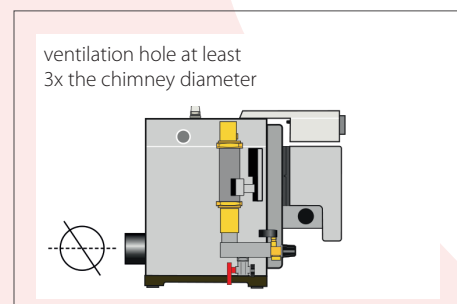


illustration 1A

3. INSTALLATION AND COMMISSIONING

This chapter explains how you install the CH boiler in a professional manner. During installation, make sure that you comply with the safety instructions in chapter 2.



WARNING!

No flammable or gaseous substances may be stored in the room in which the boiler is installed!

3.1 Installation of the CH boiler

Install the CH boiler in a non-humid room with plenty of options for ventilation. The minimum ventilation required is three times the chimney diameter (*see illustration 1B*).

Install the CH boiler on a firm, non-combustible, foundation and attach the CH boiler using the floor-mounting strip located beneath the CH boiler which is provided specifically for that purpose. A bolted joint will attach the boiler to the foundation (*see illustration 2*).

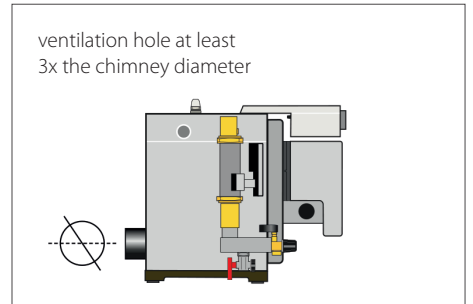


illustration 1B



illustration 2

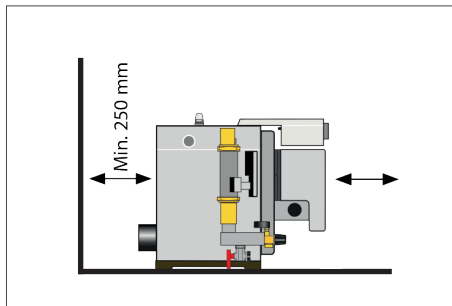


illustration 3

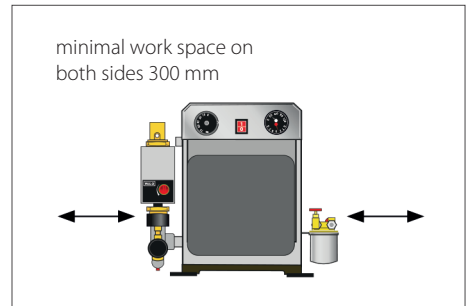


illustration 4

A space of at least 250mm must be kept free to the rear of the boiler (*see illustration 3*). The front of the boiler must always be freely accessible to enable service and maintenance to be performed (*see illustration 3*). A space of at least 300mm must be kept free to the side of the boiler (*see illustration 4*).

3.2 Electricity 230 volts

Install a 230-volt earthed wall socket within a range of 1 metre from the boiler.

This has to be fused at max. 4 A.

PLEASE NOTE! Always use multiple electrical cables for the electrical connection!

3.3 Connection of a CH system with hot water supply (combi) (*see illustration 5*).

- | | |
|-------------------|--------------------------|
| A) Flow CH. | E) Pressure relief valve |
| B) Return CH | G) Filling/ Drain cock |
| C) Cold water in | H) Bleeding |
| D) Warm water out | |

The CH System must always include an expansion vessel. The size of the expansion vessel depends on the water content of the system. Consult your installer about this.

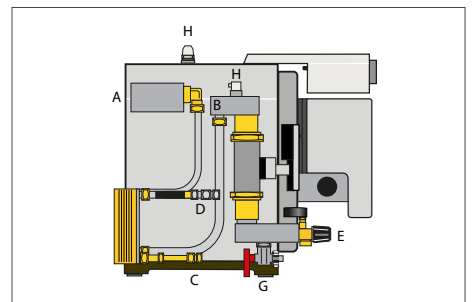


illustration 5

3.4 Connection of the CH system (see illustration 6).

- A) Flow CH
- B) Return CH
- C) Pressure relief valve
- D) Filling/ Drain cock *
- E) Bleeding

* In the Smart-Line CH, the filling cock (D) is located to the rear of the boiler as opposed to underneath.

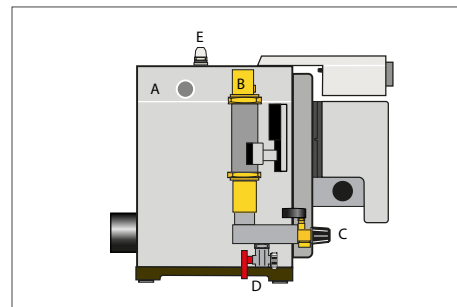


illustration 6



PLEASE NOTE! In the CH system an expansion vessel must always be connected to the return side. The size of the expansion vessel depends on the water content of the system. Consult your installer about this.

4. FLUE GAS DISCHARGE

In this chapter we will look at installing the flue gas discharge pipe. The flue duct is an important part of your CH system and must always be made from non-corrosive materials.

The flue gas temperature is often between 150°C and 250°C, therefore always insulate the flue duct and use the correct hose clamps because of leaks of exhaust gases. For the duct diameter of the flue duct, see the technical data (chapter 12).



WARNING!
Burn hazard

4.1 Horizontal flue gas discharge

The flue gases can be discharged through the side wall. If a horizontal chimney is used, the length may not exceed 5 metres. However, you must pay attention to the following:

- Always use thin-wall stainless steel discharge materials. These materials can be single-wall or double-wall.
- Always use the supplied exhaust clamps to attach the outlet materials
- The diameter depends on the CH boiler model; see the technical data concerning this (chapter 12).
- Position the lead-through in the side wall as high as possible above the waterline.
- Fit this with a swan neck connector to prevent incoming water splash (see illustration 7).

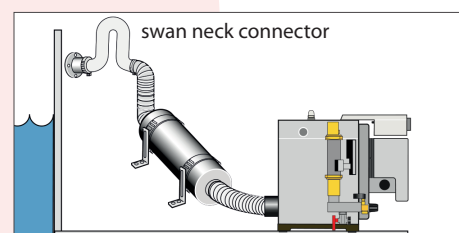


illustration 7

We recommend that you use a standard chimney set for side exhausts, which is available from Post Marine Heating B.V. This set comprises:

- 1 x lead-through fitting, made from polished stainless steel
- 1 x muffler, made from stainless steel
- 2-metre flexible stainless steel exhaust hose
- 4 x exhaust clamps (also available in stainless steel)
- 2-metre thermal insulation sleeve

4.2 Vertical flue gas discharge (see illustration 8).

If the flue gases have to be discharged vertically, the following should be taken into account:

Always use thin-wall stainless steel discharge materials in order to reduce the amount of condensation that is generated. The materials can be single-wall or double-wall. If a vertical chimney is used, the length may not exceed 7 metres. The exhaust must be fitted with a gas flue blank hood, which is available from Post Marine Heating B.V.

The diameter of the flue depends on the boiler capacity, see the technical data concerning this (chapter 12).

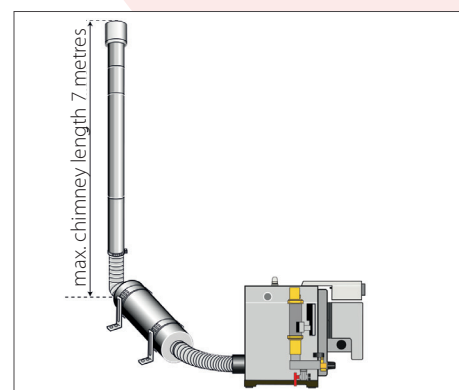


illustration 8

5. ROOM THERMOSTAT

5.1 Connection of the room thermostat to the CH outlet

PLEASE NOTE! The room thermostat for a CH outlet is a 230-V outlet. This must be connected with a 2-core cable of 0.75 mm²!

Connection of the room thermostat to the switch panel:

- Remove the cover of the control panel/dashboard to gain access to the switch panel (*see illustration 9*).
- Remove the bridging wire from connector A (*see illustration 10*).
- Connect the thermostat wire cable to A.
- To connect the room thermostat, see the installation instructions for this room thermostat.

To set the thermostat, we refer you to the manual for the RDH100 (*see illustration 11A*) (*appendix III*).

5.2 Connection of the room thermostat to Tap Water/Boiler Outlet

PLEASE NOTE! The room thermostat for a tap water or boiler outlet is activated by a potential-free contact. It is important that a 230V power supply is therefore not connected to this! This must be connected with a 4-core cable of 0.75 mm²!

Connection of the room thermostat to the switch panel:

- Remove the cover of the control panel/dashboard to gain access to the switch panel (*see illustration 9*).
- Remove the bridging wire from connector A (*see illustration 12*). This is for turning hot water on and off. If the bridging wire is not removed, the hot water will always be on stand-by.
- Remove the bridging wire from connector B (*see illustration 12*). This switches the room thermostat.
- Connect the 4-core cable to A and B.
- To connect the room thermostat, see the installation instructions for this room thermostat.

To set the thermostat, we refer you to the manual for the RDD100 1DHW (*see illustration 11B*) (*appendix IV*).

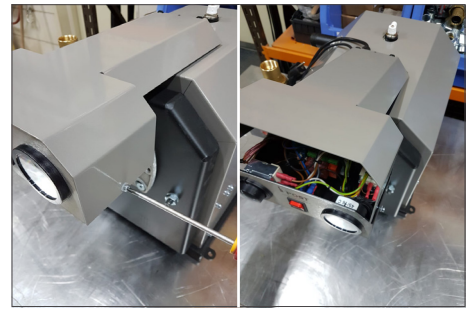


illustration 9

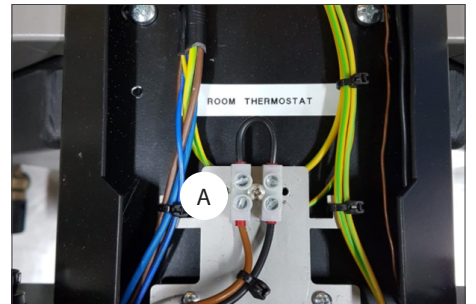


illustration 10



illustration 11A



illustration 11B

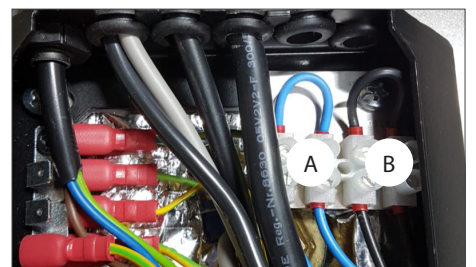


illustration 12

6. CH SYSTEM



WARNING! Switch the power off and remove the plug from the wall socket. Leave the boiler (and heating system) first cool before starting cleaning, inspection and/or maintenance due to burning on hot surfaces and/or liquids

6.1 Filling the CH system

The CH boiler is protected with a pressure relief valve, which activates above 3 bar.

To fill or to drain the CH system, use the filling cock (*see D, illustration 6 chapter 3*). Other fluids can also be used, provided they are suitable for CH systems. Consult your installer about this beforehand. The water pressure in the system must be at least 1 bar and no more than 2 bar.

Follow the steps below:

- Connect the water hose to the boiler.
- Slowly fill the system until the pressure reaches a maximum of 2 bar.
- Bleed the entire system (radiators, etc.).
- Then bleed the CH boiler (*see D on illustration 13*)
Some CH boilers have automatic bleeding valves.
- If the pressure has dropped, refill the system.
- Turn on the CH pump and allow this to run for approx. 5 minutes.
- Bleed the entire system again.
- Fill the system until the operating pressure reaches a maximum of 2 bar.
- From time to time check the pressure in the system.

Comment: if the pressure in the system falls, you must repeat the procedure; bleed the system again and check for leaks.

6.2 Bleeding the system using the CH pump

To bleed the system using the CH pump, we refer you to the relevant manual (*illustration 14 Wilo-Para*) (*appendix VI*).

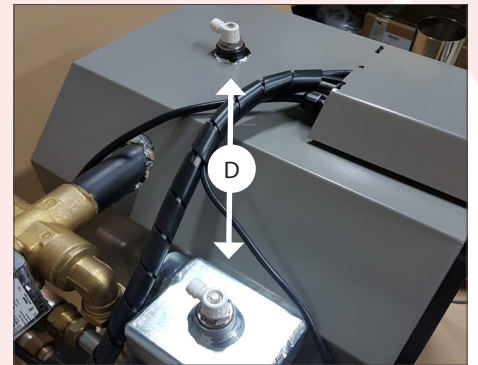


illustration 13



illustration 14

7. OIL BURNER

7.1 Fitting the oil burner

Type Smart-Line / Caminus

In the factory, the burner flange is mounted on the burner door.

- Slide the burner into the flange to enable the fixing nut to be fastened **(see illustration 15)**.
- Now tighten the fixing nut (M8) so that the burner is clamped in the flange **(see illustration 16)**. Don't forget the O ring.
- Plug the 7-pole burner plug of the switch panel into the burner **(see appendix I and II)**.

Type Blue-line

In the factory, the burner flange is mounted on the burner door.

The pipe support is mounted on the burner tube.



PLEASE NOTE! This distance is important!
(see appendix I, II and III).

- Insert the exhaust pipe onto the burner tube and rotate this to the right until the bayonet fitting is properly engaged (this is possible with burners VB1.20 & VB1.24).
- Slide the burner into the flange so that the pipe support connects to the door flange (this is possible with burners VB1.20 & VB1.24).
- Now tighten the internal wrenching nut with a torque of max. 6 Nm.
- If you have burner VB1.30, VB2.45, you have to disassemble the boiler door. This is in order to be able to attach the exhaust pipe.
- Insert the exhaust pipe onto the burner tube and rotate this to the right until the bayonet fitting is properly engaged.
- Reinstall the door with burner in the boiler.
- Fit the oil hoses to the oil filter.
- Plug the 7-pole burner plug of the switch panel into the burner



WARNING! Make sure all fasteners and / or connections are tight to prevent gas oil leakage.

7.2 Fitting and connecting the oil filter

- Fit the oil filter that is supplied to the boiler.
- Fit the pipe, with its own connection to the tank, to the oil filter. The pipe from the oil tank to the oil filter may not exceed 8mm, with a maximum length of 4 metres and made from one piece.
- Fit the oil supply and oil return hose from the burner to the oil filter **(see illustration 17)**.



PLEASE NOTE! Arrows are shown on the filter and the oil pump which indicate the direction in which the fuel flows; it is important that these are complied with!



illustration 15

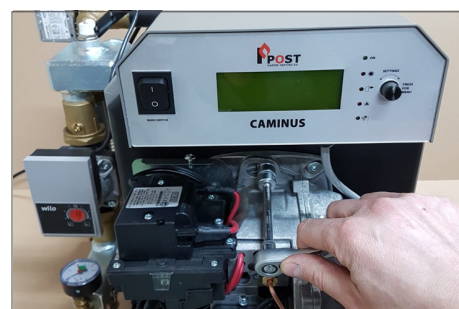


illustration 16

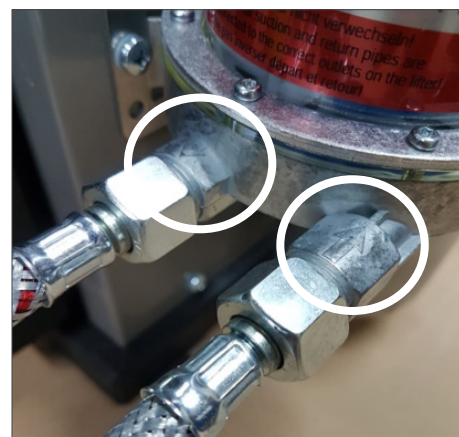


illustration 17

8. COMMISSIONING

8.1 Commissioning of the CH system

The oil filter is bled during commissioning.

- Insert the plug into the wall socket (230V).
- Turn on the On/Off switch on the control panel (**see illustration 18**) (when the light in the switch is illuminated, voltage is present).
- Adjust the room thermostat to the required temperature.
- Adjust the boiler water temperature with the boiler thermostat on the control panel, to at least 60°C (**see illustration 18**).
- Open the cut-off valve on the fuel tank (if there is a cut-off valve).
- Open the cut-off valve on the fuel filter (**see illustration 19**).
- Place the bleed tube on the bleed nipple of the filter, place the other end of the bleed tube in an oil collection bin (**see illustration 20**) (this does not apply to an automatic bleed filter set-up).
- Open the bleed nipple on the oil filter (**see illustration 20**).
- After approximately 3 minutes, the burner will start.
- As soon as only oil comes out of the hose, with no foam, close the bleed nipple on the oil filter.
- If the burner does not start, the warning light on the burner will be illuminated. Press the reset button of the burner to restart the burner.
- Repeat the start-up procedure.



illustration 18

8.2 Commissioning of the combi system

The oil filter is bled during commissioning.

- Insert the plug into the wall socket (230 V).
- Turn on the On/Off switch on the control panel (**see illustration 21**) (when the 'ON' light is illuminated, voltage is present).
- Adjust the room thermostat to the required temperature.
- Open the cut-off valve on the fuel tank.
- Open the cut-off valve on the fuel filter (**see illustration 19**).
- Place the bleed tube on the bleed nipple of the filter, place the other end of the bleed tube in an oil collection bin (**see illustration 20**) (this does not apply to an automatic bleed filter) (**see page 7 - illustration 2**, for an example of an automatic bleed valve).
- Open the bleed nipple on the oil filter (**see illustration 20**).
- After approximately 3 minutes, the burner will start.
- As soon as only oil comes out of the hose, with no foam, close the bleed nipple on the oil filter.
- If the burner does not start, the warning light on the burner will be illuminated. Press the reset button of the burner to restart the burner.
- Repeat the start-up procedure.

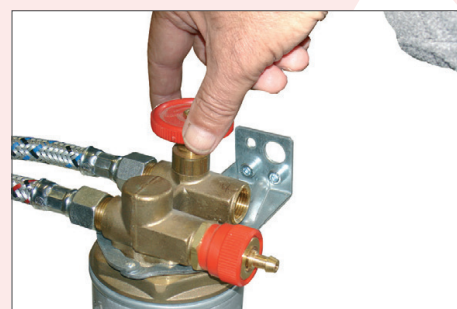


illustration 19



illustration 20

Remark:

The manufacturer sets the oil burner at a basic setting. Never change these standard settings. For the commissioning and adjustment of the boiler, you can make an appointment with Post Marine Heating B.V. (or an approved installer). Once the boiler has been commissioned in accordance with the foregoing procedure, further operation is simple (**also see chapter 2.2.**)



illustration 21

9. OPERATION

9.1 Control panels

Adjust the temperature of the boiler water with the boiler thermostat (see illustration 22). This can vary from 0°C to 90°C.



Remark: do not adjust the boiler thermostat any lower than 60°C, because of condensation.

The heat demand is regulated with the room thermostat. See the operating instructions for this room thermostat type RDH100 (see appendix III) or RDD100 1DHW (see appendix IV).

Control panel CH (see illustration 22).

- 1 On/off switch (red button on the dashboard).
- 2 Boiler thermostat for adjusting the boiler water temperature (dial on the left).
- 3 Temperature meter (clock on the right).
- 4 Safety/maximum thermostat, resetting in the event of overheating (looking from the front, right rear display) (see illustration 23).
- 5 Fuse (looking top down, left rear display) (see illustration 23).

Control panel CH + Hot water supply (see illustration 24)

- 1 On/off switch (black button on the left).
- 2 Screen.
- 3 Knob for operating the menu.
- 4 Safety/maximum thermostat, resetting in the event of overheating (looking from the front, right rear display) (see illustration 23).
- 5 Fuse (looking from the front, left rear display) (see illustration 23).
- 6 Warning lights.



PLEASE NOTE!
When the safety/maximum thermostat activates due to overheating, always first of all check the cause and rectify this if possible, prior to resetting this (see Chapter 13 - Faults list).



WARNING!
Always switch off the power before carrying out any work on the boiler and remove the plug from the wall socket.

9.2 Dashboard settings Combi

Symbols digital dashboard (see illustration 25)

- 1 Dashboard on (green LED)
- 2 Room thermostat requesting (red LED)
- 3 Burner switched on (cold start warm-up phase 3 min.) (red LED)
- 4 Circulation pump (red LED)
- 5 Hot water requested (red LED flashing)

Menu operation has to be operated with the knob on the right of the dashboard. The correct menu line and change of values can be chosen by rotating the knob (see illustration 25, number 3). Confirm or activate by pushing the knob.



WARNING! The dashboard is set in the factory to the correct factory settings. If these settings are changed, this can lead to injuries to individuals and/or damage to the unit.



illustration 22

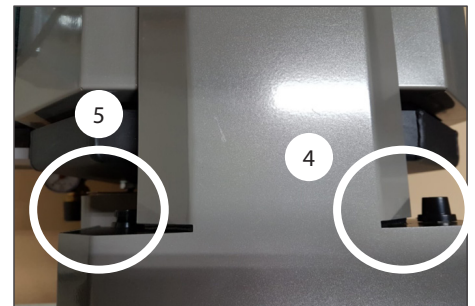


illustration 23

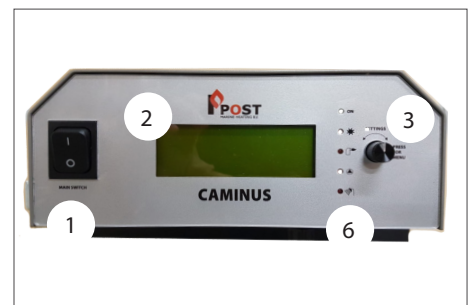


illustration 24

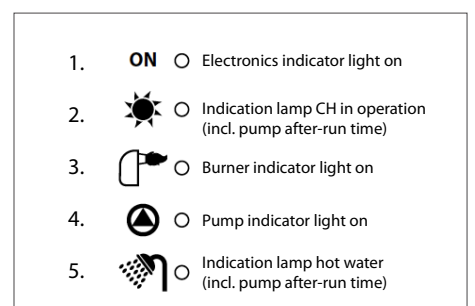


illustration 25

ACTIVATE THE MENU

Comment: If you wish to change the dashboard settings during commissioning of the system, the cycle is automatically interrupted.

POST MARINE HEATING
HEATER TEMP. °C
D.H.W. TEMP. °C
SYSTEM STAND BY

Turn the dashboard on with the on/off switch.

Main menu screen. Menu lighting can be turned on by turning the knob once to the left or right. The lighting will switch on for 2 minutes and will then dim automatically.

POST MARINE HEATING
EXIT MENU

Press the knob on the right of the dashboard. The following text will appear.

When you wish to leave the menu, press the knob again and leave the menu.

POST MARINE HEATING
C.H. SETTINGS

Turn once to the right. Using the knob, the following settings can be chosen from the menu.

Settings menu:

- CH SETTINGS (central heating in degrees)
- D.H.W. SETTINGS (hot water)
- PUMP SETTINGS (circulation pump)
- BURNER (burner)

CH SETTINGS - central heating setting

POST MARINE HEATING
C.H. SETTINGS
← SELECT →

Choose central heating Press the knob once (CH SETTINGS) and the following text will appear.

By pressing the knob again, the temperature setting can be set higher or lower.



PLEASE NOTE! The minimum value can never be higher than the maximum value

POST MARINE HEATING
C.H. SETTINGS
C.H. MAX. TEMP. °C

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the **maximum** temperature with the knob. When you have reached the correct setting, press the knob and the asterisk will disappear.

Turn the knob to the right again and you can change the minimum temperature.

POST MARINE HEATING
C.H. SETTINGS
C.H. MIN. TEMP. °C

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the **minimum** temperature. When you have reached the correct setting, press the knob and the asterisk will disappear.

D.H.W. SETTINGS (DOMESTIC HOT WATER) - hot water settings

POST MARINE HEATING
D.H.W. SETTINGS
← SELECT →

Choose DHW SETTINGS
Press the knob once and the following text will appear:

Turn the knob once to the right.

POST MARINE HEATING
D.H.W. SETTINGS
D.H.W. MAX. TEMP. °C

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the **maximum** temperature with the knob. When you have reached the correct setting, press the knob and the asterisk will disappear. Turn the knob to the right again and you can change the minimum temperature.

POST MARINE HEATING
D.H.W. SETTINGS
D.H.W. MIN. TEMP. °C

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the **minimum** temperature. When you have reached the correct setting, press the knob and the asterisk will disappear. Turn the knob to the right again and you can change the HEATER MAX. temperature.



WARNING! Changing the temperature settings can lead to damage to the product and/or injuries to individuals. Consult the manufacturer for changes.

PUMP SETTINGS - circulation pump settings

POST MARINE HEATING
PUMP SETTINGS
← SELECT →

In this menu, the start-up of the circulation pump can be set in degrees. Turn the knob once to the right to change the setting.

POST MARINE HEATING
PUMP SETTINGS
PUMP ON TEMP. °C

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the start-up temperature of the pump. When you have reached the correct setting, press the knob and the asterisk will disappear.

Turn the knob to the right again and you can change the overrun time of the circulation pump. When the boiler is only being used to heat the hot water, after being set, the circulation pump will continue to run for a number of minutes. This ensures that the boiler is properly fully heated and, at the time at which it is used, hot water is available.

POST MARINE HEATING
PUMP SETTINGS
AFTERRUN D.H.W. MIN

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the number of minutes for which the pump will continue to run. When you have reached the correct setting, press the knob and the asterisk will disappear. Turn the knob to the right again and you can change the setting of the pump to 24 hours.

POST MARINE HEATING
PUMP SETTINGS
24HR RUNTIME 2 MIN

The circulation pump will switch on once every 24 hours, to ensure that it doesn't stick. The running time can be set in minutes from 1 to 60 minutes. By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the number of minutes for which the pump will run. When you have reached the correct setting, press the knob and the asterisk will disappear.

BURNER SETTINGS - burner settings

POST MARINE HEATING
BURNER SETTINGS
← SELECT →

BURNER OFF. This will ensure that, after a certain burn time, the burner does not immediately turn back on. This prevents faults during the start-up process of the burner.

POST MARINE HEATING
BURNER SETTINGS
BURNER OFF 5 SEC

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the time at which the burner will turn on into seconds. When you have reached the correct setting, press the knob and the asterisk will disappear.

POST MARINE HEATING
BURNER SETTINGS
AFTER RUN 30 SEC

AFTER RUN. This is the running time that the burner continues to ventilate in order to blow the flue gases out of the boiler. This time is set at 30 seconds. The after run is set in the factory and can therefore not be adjusted.

Factory settings dashboard combi

C.H. SETTINGS:		T.W. SETTINGS:		PUMP SETTINGS:		BURNER SETTINGS:	
C.H. MAX. TEMP.	80°C	T.W. MAX. TEMP.	80°C	PUMP ON TIME.	50°C	BURNER OFF.	5 SEC
C.H. MIN. TEMP.	70°C	T.W. MIN. TEMP.	75°C	AFTER RUN	5 MIN.	AFTER RUN.	30 SEC

9.3 Dashboard settings boiler

Symbols digital dashboard (see illustration 25)

- 1 Dashboard on (green LED).
- 2 Room thermostat requesting (red LED).
- 3 Burner switched on. (cold start warm-up phase 3 min.) (red LED).
- 4 Circulation pump (red LED).
- 5 Hot water requested (red LED) (flashing).

Menu operation has to be operated with the knob on the right of the dashboard. The knob is used to choose the correct menu line and to change values. Confirm or activate by pushing the push knob.

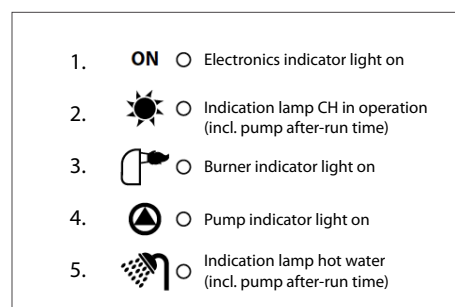


illustration 25



WARNING! The dashboard is set in the factory to the correct factory settings. If these settings are changed, this can lead to injuries to individuals and/or damage to the unit.

ACTIVATE THE MENU

Comment: if you wish to change the dashboard settings during commissioning of the system, the cycle is automatically interrupted.

POST MARINE HEATING
HEATER TEMP. °C
D.H.W. TEMP. °C
SYSTEM STAND BY

Turn the dashboard on with the on/off switch.

Main menu screen. Menu lighting can be turned on by turning the knob once to the left or right. The lighting will switch on for 2 minutes and will then dim automatically.

POST MARINE HEATING
EXIT MENU

Press the knob on the right of the dashboard. The following text will appear on the display.

When you wish to leave the menu, press the knob again and leave the menu.

POST MARINE HEATING
C.H. SETTINGS

Turn the knob once to the right.

Using the knob, the following settings can be chosen from the menu.

CH SETTINGS - central heating setting

POST MARINE HEATING
C.H. SETTINGS
← SELECT →

Choose central heating Press the push button (CH SETTINGS) once and the following text will appear.

By pressing the push button again, the temperature setting can be set higher or lower.



PLEASE NOTE! The minimum value can never be higher than the maximum value

CH SETTINGS - central heating setting

POST MARINE HEATING
C.H. SETTINGS
C.H. MAX. TEMP. °C

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the **maximum** temperature with the knob. When you have reached the correct setting, press the knob and the asterisk will disappear.

Turn the knob to the right again and you can change the minimum temperature.

POST MARINE HEATING
C.H. SETTINGS
C.H. MIN. TEMP. °C

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the **minimum** temperature. When you have reached the correct setting, press the knob and the asterisk will disappear.

D.H.W. SETTINGS - hot water for domestic use boiler

POST MARINE HEATING
D.H.W. SETTINGS
← SELECT →

Choose DHW.
Press the knob once and the following text will appear.

Turn the knob once to the right.

POST MARINE HEATING
D.H.W. SETTINGS
D.H.W. MAX. TEMP. °C

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the **maximum** temperature with the knob. When you have reached the correct setting, press the knob and the asterisk will disappear.

Turn the knob to the right again and you can change the minimum temperature.

POST MARINE HEATING
D.H.W. SETTINGS
D.H.W. MIN. TEMP. °C

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the **minimum** temperature. When you have reached the correct setting, press the knob and the asterisk will disappear. Turn the knob to the right again and you can change the HEATER MAX. temperature.



WARNING! Changing the temperature settings can lead to damage to the product and/or injuries to individuals. Consult the manufacturer for changes.

POST MARINE HEATING
D.H.W. SETTINGS
HEATER MAX. °C

This is the maximum temperature at which the burner will turn off. This temperature must always be higher than the maximum set temperature for the D.H.W. (drinking water). The temperature cannot be set higher than 99°C. By pressing the knob an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the **maximum** temperature with the knob. When you have reached the correct setting, press the knob and the asterisk will disappear.

CONTINUED - D.H.W. BOILER SETTINGS - hot water for domestic use boiler

POST MARINE HEATING
D.H.W. SETTINGS
HEATER MIN. °C

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the **minimum** temperature. When you have reached the correct setting, press the knob and the asterisk will disappear.



WARNING! Changing the temperature settings can lead to damage to the product and/or injuries to individuals. Consult the manufacturer for changes.

POST MARINE HEATING
D.H.W. SETTINGS
HEAT STOP DIF. °C

Heat stop will ensure that the D.H.W. does not become too hot after the burner has been turned off, once the set final value minus this value is reached. By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the temperature. When you have reached the correct setting, press the knob and the asterisk will disappear.



PLEASE NOTE! The set value will be deducted from the D.H.W. MAX value if the central heating is not requested. With this setting, you can align the boiler and the external boiler.

POST MARINE HEATING
D.H.W. SETTINGS
CH. AT. D.H.W. - MIN + °C

CH AT D.H.W.-MIN+ This is the difference in temperature (in degrees), higher than the minimum temperature of the D.H.W., that is set. By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the temperature. When you have reached the correct setting, press the knob and the asterisk will disappear.

PUMP SETTINGS - circulation pump settings

POST MARINE HEATING
PUMP SETTINGS
← SELECT →

In this menu you can set the start-up of the circulation pump in degrees. Turn the knob once to the right to change the setting.

POST MARINE HEATING
PUMP SETTINGS
PUMP ON TEMP. °C

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the start-up temperature of the pump. When you have reached the correct setting, press the knob and the asterisk will disappear.

POST MARINE HEATING
C.H. SETTINGS

The circulation pump will turn on once every 24 hours to ensure that it doesn't stick. The running time can be set in minutes, from 1 to 60 minutes. By pressing the knob an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the number of minutes for which the pump will run. When you have reached the correct setting, press the knob and the asterisk will disappear.

BURNER SETTINGS - burner settings

POST MARINE HEATING
BURNER SETTINGS
← SELECT →

BURNER OFF. This will ensure that, after a certain burn time, the burner does not immediately turn back on. This prevents faults during the start-up process of the burner.

POST MARINE HEATING
BURNER SETTINGS
BURNER OFF 5 SEC

By pressing the knob, an asterisk (*) will appear at the bottom left of the screen. It is now possible to change the time at which the burner will turn on into seconds. When you have reached the correct setting, press the knob and the asterisk will disappear.

POST MARINE HEATING
BURNER SETTINGS
AFTER RUN 30 SEC

AFTER RUN. This is the running time that the burner continues to ventilate in order to blow the flue gases out of the boiler. This time is set at 30 seconds. The after run is set in the factory and can therefore not be adjusted.

Factory settings dashboard boiler

C.H. SETTINGS:

C.H. MAX. TEMP. 80°C
C.H. MIN. TEMP. 70°C

T.W. SETTINGS:

T.W. MAX. TEMP. 75°C
T.W. MIN. TEMP. 65°C
HEATER MAX. 80°C
HEATER MIN. 75°C
HEAT STOP DIF. 8°C
C.H. AT TW-MIN+ 5°C

PUMP SETTINGS:

PUMP ON TIME. 50°C
24 HR RUNTIME. 2 MIN.

BURNER SETTINGS:

BURNER OFF. 5 SEC
AFTER RUN. 30 SEC

10. PERIODIC CLEANING, INSPECTION AND MAINTENANCE

Installation, commissioning, inspection, maintenance and any repair work may only be carried out by (us) authorized installers, in accordance with the installation instructions.



WARNING! Switch the power off and remove the plug from the wall socket. Leave the boiler (and heating system) first cool before starting cleaning, inspection and/or maintenance due to burning on hot surfaces and/or liquids



WARNING! Never use aggressive cleaning products. Always wear protective clothing such as a facemask, safety goggles and gloves. Make sure that the room is properly ventilated when carrying out the work listed below

10.1 Cleaning the CH boiler

- Remove the cover of the burner (*see illustration 26*).
- Remove the burner plug which is connected to the burner.
- Remove the burner (*see illustration 27*).
- Remove the burner door (*see illustration 28*).
- Remove the gasket of the boiler, which will reveal the internal parts of the boiler (*see illustration 28*).
- Clean the piping with a pipe cleaner (*see illustration 29*).
- Use a vacuum cleaner to remove dirt.
- Clean the flue duct.

Cleaning the oil burner and changing the oil filter

To clean the oil burner (consult the manual for the specific oil burner in order to clean this properly).

- To change the oil filter element the oil supply should first be switched off (*see illustration 30*).
- Then change the filter element.



illustration 26



illustration 27



illustration 28

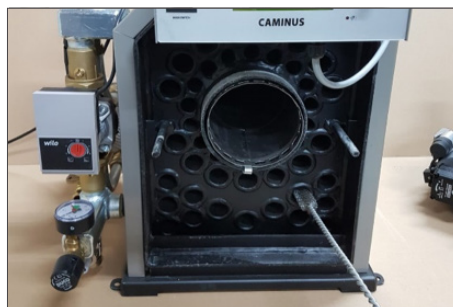


illustration 29

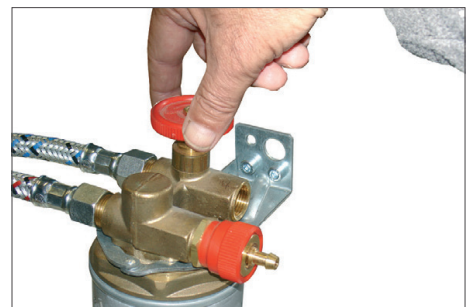


illustration 30

11. DISPOSAL OF A USED CH SYSTEM

11.1 Disposal of a used CH system

The boiler, burner and the majority of parts are made from recyclable materials. Dispose of the boiler separately; any residual oil, the oil filter and oil hoses should be disposed of as chemical waste.



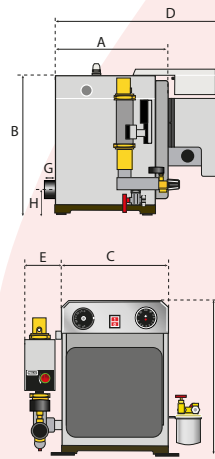
12 TECHNICAL DATA CH SYSTEM

12.1 Smart-Line

DIMENSIONS IN MM	A	B	C	D	E	F	G	H
Smart-Line CH	270	305	315	425	100	345	45	50
Smart-Line Combi / Boiler	270	305	315	425	100	345	45	50

Note: These are the dimensions of the boiler including heating pump and oil burner and not a footprint

TECHNICAL SPECIFICATIONS SMART-LINE		
Load (input)	kW	7,7
Capacity (output)	kW	7
Diameter exhaust	mm	50
Weight (CH / Boiler / Combi)	Kg	42 / 44 / 47
Liquid content boiler (water / glycol)	L	4,5
CH connection	mm	1" / 22mm
Drinking water connection	mm	15
Capacity hot water 40/80°C (Combi)	L / Min	7 / 3
Temperature Exhaust	°C	170 - 190
Efficiency	%	>91
Operating pressure	Bar	1.5 - 2.0
Maximum pressure (operation overflow valve)	Bar	3
Max. length chimney (horizontal)	Mtr	5
Max. length chimney (vertical)	Mtr	7
Fuel	Dieseloil GTL	

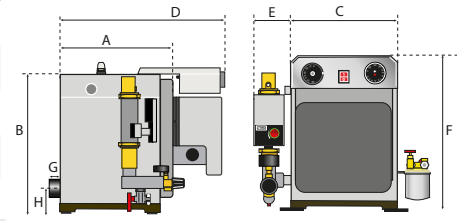


TECHNICAL SPECIFICATIONS LOW NOX OIL BURNER		
Pumping pressure	Bar	8 - 10
Diameter oil spray 60/80°S	°S	0.15 - 0.25
Start capability	W	295
Voltage	V	230
Power consumption based on 30% switch-on percentage (12 / 24V)	A	0,9 - 1,3
Operating power	W	175

All boilers are supplied with **LOW NOx** oil burner, pump, TOK80 oil filter, room thermostat, and clear instructions for installation and operation. We offer a 10-year warranty on the body of the boiler. The overall warranty is 2 years. This does not include any parts that may experience wear and tear, including the oil filter.

12.2 Caminus

DIMENSIONS IN MM *	A	B	C	D	E	F	G	H
Caminus 10kW	300	390	315	453	100	430	50	120
Caminus 15kW	370	390	315	523	100	430	50	120
Caminus 20kW	410	480	335	563	100	520	50	120
Caminus 30kW	450	605	410	654	100	645	50	150
Caminus 40kW	540	605	410	744	100	645	50	150



Note: These are the dimensions of the boiler including heating pump and oil burner and not a footprint.

TECHNICAL SPECIFICATIONS CAMINUS*

* Specifications upwards of 40kW on request

IN KILOWATTS (KW)		CAMINUS 10	CAMINUS 15	CAMINUS 20	CAMINUS 30	CAMINUS 40
Load (input)	kW	11	16,5	22	33	44
Capacity (output)	kW	10	15	20	30	40
Diameter exhaust	mm	60	80	80	110	130
Weight (CH / Boiler / Combi)	Kg	51	58	75	118	142
CH connection	mm	1" / 22mm	1" / 22mm	1" / 22mm	1" / 22mm	1" / 22mm
Drinking water connection	mm	15	15	15	15	15
Capacity hot water 40/80°C (Combi)	L/Min	7 / 3	12- /	16,5 / 7	21 / 9	24 / 11
Temperature Exhaust	°C	190 - 210	190 - 210	190 - 210	190 - 210	190 - 210
Efficiency	%	>92	>92	>92	>92	>92
Operating pressure	Bar	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0	1.5 - 2.0
Maximum pressure (operation overflow valve)	Bar	3	3	3	3	3
Max. length chimney (horizontal)	Mtr	5	5	5	5	5
Max. length chimney (vertical)	Mtr	7	7	7	7	7
Fuel		Diesel / GTL				

TECHNICAL SPECIFICATIONS LOW NOX OIL BURNER

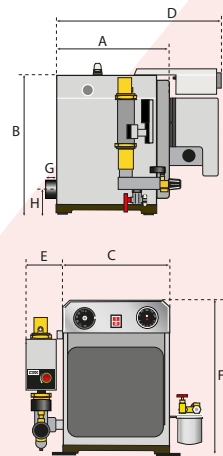
MODEL		LOW NOX 1	LOW NOX 2	LOW NOX 3	LOW NOX 4	LOW NOX 5
Pumping pressure	Bar	8 - 10	8 - 10	8 - 10	8 - 10	8 - 10
Diameter oil spray 60/80°S	°S	0.30	0.40	0.50	0.75	1.00
Start capability	W	300	300	300	300	300
Voltage	V	230	230	230	230	230
Power consumption based on 30% switch-on percentage (12 / 24V)	A	0.9 - 1.3	0.9 - 1.3	0.9 - 1.3	0.9 - 1.3	0.9 - 1.3
Operating power	W	175	175	175	175	175

All boilers are supplied with **LOW NOx** oil burner, pump, TOK80 oil filter, room thermostat, and clear instructions for installation and operation. We offer a 10-year warranty on the body of the boiler. The overall warranty is 2 years. This does not include any parts that may experience wear and tear, including the oil filter.

12.3 Blue-Line

DIMENSIONS IN MM *	A	B	C	D	E	F	G	H
Blue-Line CH 15kW	370	390	315	670	100	430	50	120
Blue-Line CH 20kW	410	480	335	710	100	520	50	120
Blue-Line CH 30kW	450	605	410	750	100	645	50	150
Blue-Line CH 40kW	540	605	410	840	100	645	50	150
Blue-Line Combi 15kW	370	390	315	670	140	430	50	120
Blue-Line Combi 20kW	410	480	335	710	140	520	50	120
Blue-Line Combi 30kW	450	605	410	750	140	645	50	150
Blue-Line Combi 40kW	540	605	410	840	140	645	50	150

Note: These are the dimensions of the boiler including heating pump and oil burner and not a footprint



TECHNICAL SPECIFICATIONS BLUE-LINE*

* Specifications upwards of 40kW on request

IN KILOWATTS (KW)		BLUE-LINE 15	BLUE-LINE 20	BLUE-LINE 30	BLUE-LINE 40
Load (input)	kW	16,5	22	33	44
Capacity (output)	kW	15	20	30	40
Diameter exhaust	mm	80	80	110	130
Weight (CH / Boiler / Combi)	Kg	58 / 63	75 / 80	118 / 123	142 / 147
Liquid content boiler (water / glycol)	L	7	12	16	19
CH connection	mm	1" / 22mm	1" / 22mm	1" / 22mm	1" / 22mm
Drinking water connection	mm	15	15	15	15
Capacity hot water 40/80°C (Combi)	L/Min	12 / 5	16,5 / 7	21 / 9	24 / 11
Temperature Exhaust	°C	150 - 190	150 - 190	150 - 190	150 - 190
Efficiency	%	>95	>95	>95	>95
Operating pressure	Bar	2,0	2,0	2,0	2,0
Maximum pressure (operation overflow valve)	Bar	3	3	3	3
Max. length chimney (horizontal)	Mtr	5	5	5	5
Max. length chimney (vertical)	Mtr	7	7	7	7
Fuel		Diesel/ GTL			

TECHNICAL SPECIFICATIONS BLUE-FLAME LOW NOX OIL BURNER

MODEL		VB.120	VB.1.20	VB1.24	VB.1.35	VD2.44
Pumping pressure	Bar	10 - 13	10 - 13	10 - 13	10 - 13	10 - 13
Diameter oil spray 60/80°S	°S	0.20 - 0.30	0.40	0.45	0.60	0.75
Start capability	W	207	207	207	207	192
Voltage	V	230	230	230	230	230
Power consumption based on 30% switch-on percentage (12 / 24V)	A	0.7 - 1.0	0.7 - 1.0	0.7 - 1.0	0.7 - 1.0	0.7 - 1.0
Operating power	W	135	135	135	135	125

All boilers are supplied with **BLUE-FLAME LOW NOX** oil burner, pump, TOK80 oil filter, room thermostat, and clear instructions for installation and operation. We offer a 10-year warranty on the boiler body. The overall warranty is 2 years. With the exception of all parts that may experience wear and tear, including the oil filter.

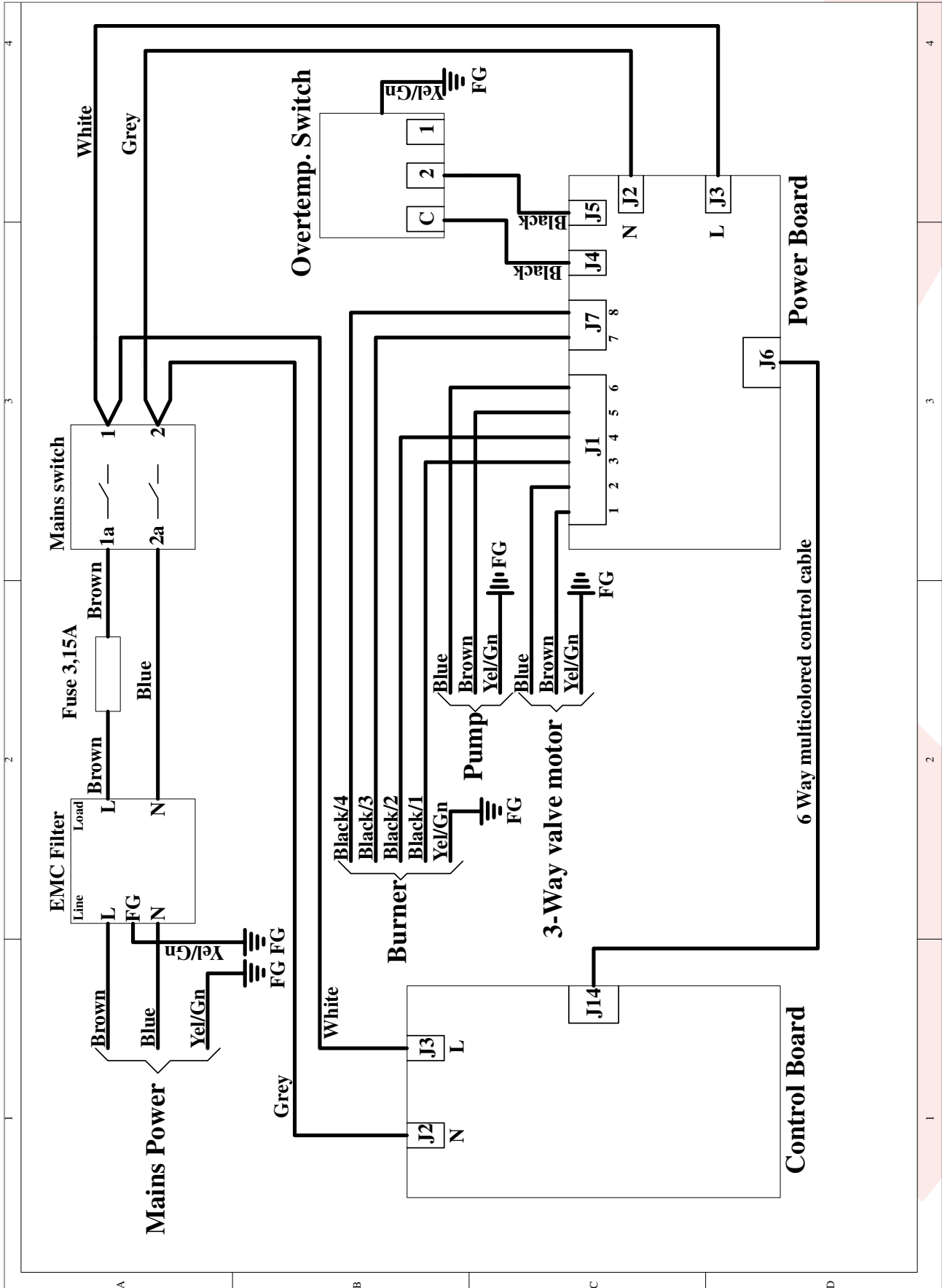
13. FAULTS LIST

Below is a list of possible faults and solutions. If you experience any problems that are not mentioned, please contact Post Marine Heating B.V.

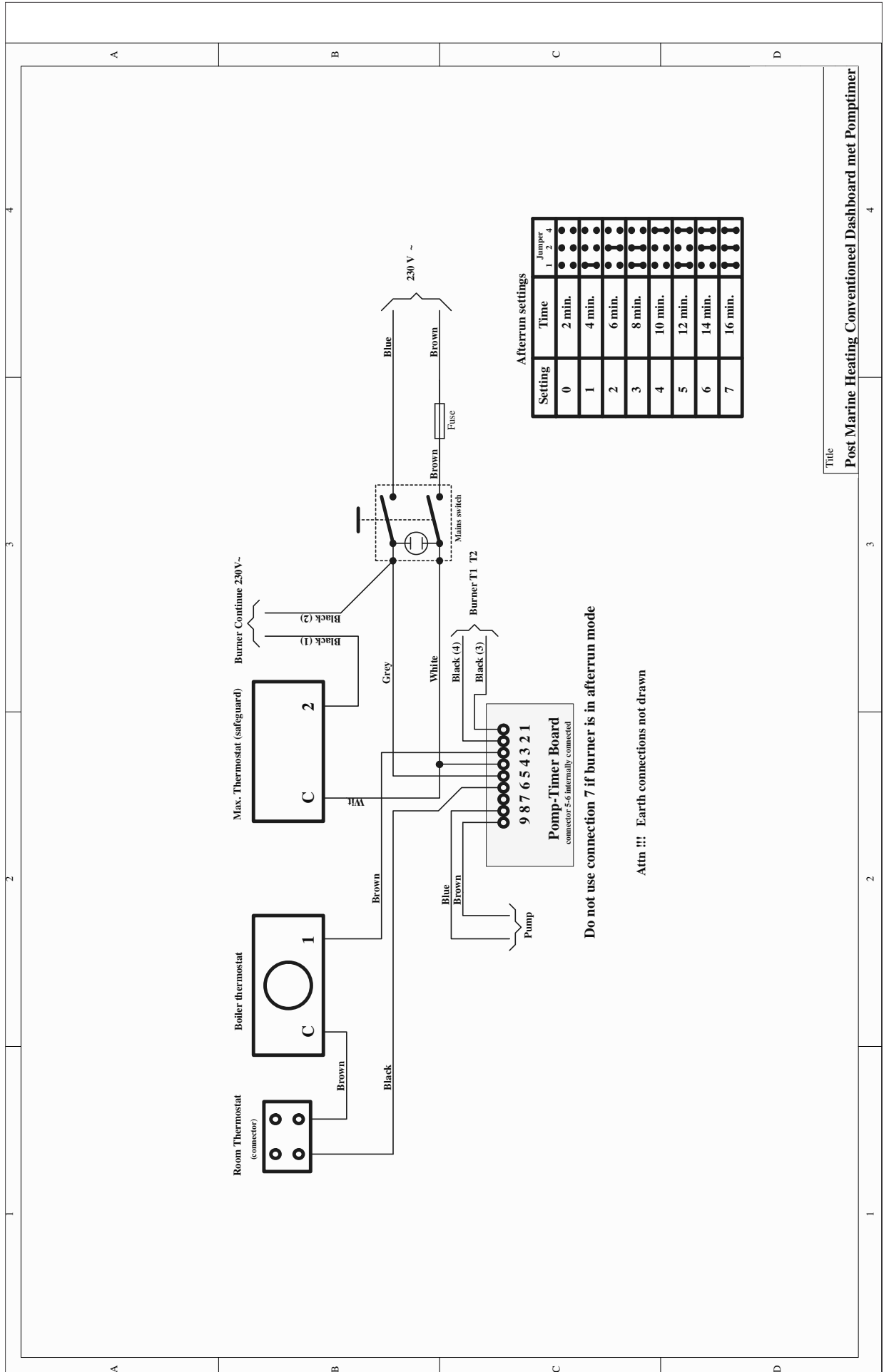
FAULT	POSSIBLE CAUSE	POSSIBLE SOLUTION
No voltage 230 volts	No plug in wall socket	Insert the plug in the wall socket
	Fuse defect	Replace the fuse
	Incorrect voltage (Herz)	Check the converter
The burner starts but then a fault is displayed	Fuel level too low	Top up the fuel
	Burner supply closed	Open the valve
	Air in oil pipe	Bleed the oil filter
	Photocell broken	Replace the photocell Reset the burner
The burner starts but resonates	Injector is blocked	Replace injector
	Air adjustment incorrect	Adjust air supply
	Flue duct blocked	Cleaning the flue duct.
Burner malfunctions	Operating voltage too low	Check voltage
		Reset burner
Voltage present, but burner is not working	Safety/maximum thermostat is switched on	Check the system pressure
		Refill the system
		Bleed the system
		Reset safety/maximum thermostat
	Possible air in the boiler	Bleed the boiler
	Valve of pump coupling(s) closed	Open lockable pump coupling(s)
Circulation pump broken	Replace pump	
Room thermostat is not responding	Bridging wire in switch panel hasn't been removed	Remove the bridging wire and switch the room thermostat on
	Batteries	Replace batteries
No circulation in the system	Possible air in the boiler	Bleed the boiler
	Water pressure too low	Fill the system to the correct pressure
	Lockable pump coupling(s) closed	Open lockable pump connection(s)
	Circulation pump broken	Replace circulation pump

14. ELECTRICAL DIAGRAMS

14.1 Electrical diagram combi



14.2 Electrical diagram CH



Title
Post Marine Heating Conventioneel Dashboard met Pomptimer

14.3 System index

This chart can be found on the inside of the dashboard cover.

SYSTEM INDEX BOILER

230 Volt High Voltage Print:

<u>Switch Port:</u>		<u>Wire Selection:</u>
1-2	3 Way-Valve	Brown-Blue
3-4	Burner L1-N	Black 1 & Black 2
5-6	Pump	Brown-Blue
7-8	Burner T1-T2	Black 3 & Black 4

5 Volt Circuit Board-Print:

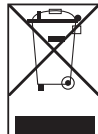
<u>Switch Port:</u>		<u>Wire Selection:</u>
9-10	Roomthermostat	Black-Black
11-12	Hotwater-Switch	Blue-Blue
13-14		
15-16	3 Way-Valve	Grey-Orange
17-18		
19-20	Heater-Sensor	White-Red
21-22	Domestic Hot Water-Sensor	White-Red

POST MARINE HEATING B.V. FACTORY SETTINGS

- Rated voltage 220-240 Vac
- Frequency range 50-60 HZ
- Central Heating Settings (C.H.) Max. 80°C - min. 70°C
- Domestic Hot Water Settings (D.H.W.) Max. 75°C - min. 65°C
- Pump Settings Pump on 50°C
- Burner Settings After run D.H.W. 2 minutes
Burner off 5 seconds
Burner running after 30 seconds



Post Marine Heating B.V.
Boezem 20A
4206 CB GORINCHEM (THE NETHERLANDS)
Phone Number: 0031-(0)183-610211
E-mail address: info@postmarineheating.com



SYSTEM INDEX COMBI

230 Volt High Voltage Print:

<u>Switch Port:</u>		<u>Wire Selection:</u>
1-2	3 Way-Valve	Brown-Blue
3-4	Burner L1-N	Black 1 & Black 2
5-6	Pump	Brown-Blue
7-8	Burner T1-T2	Black 3 & Black 4

5 Volt Circuit Board-Print:

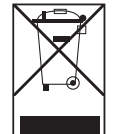
<u>Switch Port:</u>		<u>Wire Selection:</u>
9-10	Roomthermostat	Black-Black
11-12	Hotwater-Switch	Blue-Blue
13-14	Flow-Switch	Grey-Brown
15-16	3 Way-Valve	Grey-Orange
17-18		
19-20	Heater-Sensor	White-Red
21-22	Domestic Hot Water-Sensor	White-Red

POST MARINE HEATING B.V. FACTORY SETTINGS

- Rated voltage 220-240 Vac
- Frequency range 50-60 HZ
- Central Heating Settings (C.H.) Max. 80°C - min. 70°C
- Domestic Hot Water Settings (D.H.W.) Max. 80°C - min. 75°C
- Pump Settings Pump on 50°C
- Burner Settings After run D.H.W. 5 minutes
Burner off 5 seconds
Burner running after 30 seconds



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www.postmarineheating.com

DECLARATION OF CONFORMITY - CONCEPT

Manufacturer

Post Marine Heating B.V.
Boezem 20a
4206 CB Gorinchem
The Netherlands

Subject of the statement:

Brand:
Caminus
Blue-Line
Smart-Line

Type:
CV/Combi/Boiler 10/15/20/30/40 kW
CV/Combi/Boiler 15/20/30/40 kW
CV/Combi/Boiler 7kW

to which this declaration relates, meets the essential requirements of the following directives based on mentioned harmonized standards:

Directive		Harmonized Standard	
2014/35/EU	Low Voltage Directive	EN 61010 EN 60335-1 EN 60335-2-102	2012 2012 2016
2014/30/EU	EMC Directive	EN 60945 EN 61000-6-3+A1+AC EN 61000-3-2 EN 61000-3-3 EN 61000-6-1	2003 2007,2011,2012 2014 2013 2007
2011/65/EU	RoHs Directive	EN 50581	2012
813/2013	Efficiency Directive	ISO 303-3	2006

Additional information:

Follow the instructions in the enclosed manual.

Place and date of issue

Gorinchem, 15/05/2020

A.J.H. Post
Post Marine Heating BV

Signature

KvK Tilburg 59627018 | BTW nl 853577043B01 | BIC ABNANL2A | IBAN NL86 ABNA 0401 1222 39

Op al onze offertes, op alle opdrachten aan ons en op alle met ons gesloten overeenkomsten zijn toepasselijk de METAALUNIEVOORWAARDEN, gedeponeerd ter Griffie van de rechtbank te Rotterdam, zoals deze luiden volgens de laatstelijk aldaar neergelegde tekst.

16. WARRANTY CONDITIONS

Article 1 Duration

1.1 For a period of 24 months after delivery or completion, Post Marine Heating B.V.(PMH) guarantees the proper execution of the agreed performance, which is the delivery, assembly and commissioning of the installation of the Caminus, Blue-Line, Smart-Line CH/Combi/Boiler Control systems. Furthermore, for a period of 120 months, PMH provides a warranty for defective materials and workmanship of the boiler casing. The warranty term only applies provided that the original purchase invoice can be produced. The overall warranty does not apply to all parts subject to wear and tear, including the oil filter and the oil nozzle.

1.2 The obligation of PMH defined in this declaration of warranty is only an obligation vis-a-vis the Client; third parties cannot derive any rights from this declaration, but should contact the holder of the original purchase invoice. This invoice cannot in any way be transferred to third parties and will only be issued once. The rights and obligations ensuing from the purchase invoice can equally not be transferred, do not qualify for offsetting and cannot be delegated to third parties or otherwise be exercised by third parties. However, in the event of insolvency of the Client whose name is on the purchase invoice, PMH is entitled to disregard this article and to fulfil its obligation in respect of an interested third party.

Article 2 Warranty – Notification

The Client shall inform PMH in writing of a possible defect within a reasonable period of time, but within 5 working days at the latest of having found the defect or should reasonably have found this defect. In the absence of which any claim towards PMH in respect of that defect, shall lapse.

Article 3 Warranty

For the period stated in article 1, PMH guarantees the soundness of the supplied system and the materials used, provided that PMH was free to choose such system and materials.

If it becomes apparent that the supplied system and/or the materials used are not sound, PMH can choose whether it shall repair or replace these parts or whether it shall credit a proportional part of the invoice. The parts that shall be repaired at PMH or replaced by PMH have to be sent carriage paid to PMH. PMH becomes the owner of those parts of the product that are released as a result of the repair, as well as the product that is replaced by another product. Disassembly and assembly of these parts and any travel and accommodation costs that are incurred shall be borne by the Client.

Article 4 Warranty – Processing of Supplied Materials

If it transpires that improper processing has been carried out, PMH shall choose whether:

- to carry out the processing again. In that case, the Client will supply new materials at its own expense;
- to repair the defect. In that case, the Client must return the materials carriage paid to PMH;
- He will credit the Client for a proportional part of the invoice.

Article 5 Installation/Assembly of the Supplied Product

5.1 If the agreed performance (also) includes the installation and/or assembly of a product that is supplied, then for the period stated in article 1, PMH guarantees the soundness of the system and/or assembly.

5.2 If it transpires that improper installation and/or assembly has been carried out, PMH will remedy this. Any travel and accommodation costs that are incurred shall be borne by the Client.

5.3 If it transpires that, based on the Client's description, the engineers of PMH or an approved installer appointed by PMH are unable to find the fault or are unable to find this fault following a further inspection, the call-out costs and wages will be charged, according to the rates applicable at that time.

5.4 Differences in quality, tolerance and other differences in, to or on the product considered to be normal and usual, are not defects. The quality standards that are applied are the standards that apply at the time of manufacture of the product, as laid down by approved inspection bodies. Any changes to these standards made at a later date are excluded.

Article 6 Opportunity to repair

In all cases, the Client will give PMH the opportunity to fulfil its obligation to repair and/or replace the product. The Client will provide PMH with (in the opinion of PMH) the necessary cooperation which includes, but is not limited to, the provision of personnel and energy, without being entitled to remuneration to this end. PMH will decide on the method and time of execution.

Article 7 Warranty conditions

7.1 The client can only make a claim under the warranty after it has fulfilled all of its obligations, including payment obligations, in respect of PMH.

7.2 PMH is only obliged to fulfil its obligations to remedy a defect in the event and insofar as the product has identifying marks, such as the distinctive nameplate. If no identifying marks are agreed, the buyer must demonstrate in another manner that the product has been purchased from PMH and that the warranty period has not yet expired.

7.3 The warranty only relates to defects identified during the warranty period, insofar as these relate to the points under article 1 paragraph 1.

7.4 The warranty period of the installation/the system will not be extended if the unit/part is repaired or replaced. The general statutory warranty period of 24 months applies to the unit/part that is replaced.

Article 8 Manufacturer warranty

By way of derogation from the warranty given based on this warranty declaration, there is only a manufacturer warranty if the parties have agreed this in writing and the manufacturer's warranty certificate is appended to this warranty declaration.

Article 9 Warranty coverage exclusions

9.1 PMH is not obliged to remedy the defect and to provide a warranty in the event that the defect was visible at the time at which the product

- structural changes made by the Client to the CH boiler;
- the original parts no longer being available;
- fitting, assembly, alterations or repairs by the Client or by third parties;
- no, insufficient or incorrect maintenance taking place in accordance with the manual;
- improper use of the CH boiler by the Client;
- the CH boiler no longer being in the possession of the first owner;
- the defects having arisen as a result of normal wear and tear;
- the use of any government regulation concerning the nature or quality of the materials that are used;
- parts purchased by PMH from third parties in the event and insofar as those third parties have no or a less far-reaching obligation in respect of PMH than PMH has in respect of the Client;
- causes unrelated to the product, or of external influences of chemical, physical, mechanical, moisture and electrochemical ingress of water or of other nature;
- minor defects that are of no importance to the functionality of the product.
- faults in or unsuitability of products that originate from or that are recommended by the Client;
- faults in or unsuitability of the materials or tools used by the Client

9.2 PMH is not obliged to remedy the defect if the Client has not fulfilled one or more of its obligations in respect of PMH

9.3 No warranty is given on goods supplied that were not new at the time of delivery or on goods that are recommended by the Client or supplied by or on the Client's behalf.

9.4 No warranty is given on inspecting and/or repairing the Client's goods.

9.5 No warranty is given if the unit is not commissioned by a dealer or installer approved by PMH.

Article 10 Liability

10.1 Exclusion clause PMH does not accept any liability pursuant to operations that it has carried out, requested or omitted in respect of the Client. In addition, PMH explicitly limits its liability to a maximum amount equal to the invoice value excluding VAT.

10.2 The liability of PMH on account of attributable shortcoming in the performance of the agreement shall only arise if the Client declares PMH to be in default duly, without delay and in writing, stating a reasonable period in which to remedy the failure, and PMH continues to fail in the fulfilment of its obligations even after such period.

10.3 PMH is not liable for damage that is caused by the client failing to provide the correct information on time which PMH believes is required for the correct execution of the agreement.

10.4 The client shall indemnify PMH against any liability as a result of claims made by third parties, as well as for damage caused by any acts or omissions of the third parties involved in the execution of the agreement.

10.5 Apart from the liability referred to in article 11.1, PMH bears no liability whatsoever for compensation in respect of the Client and/or third parties, regardless of the ground on which an action for compensation may be based.

10.6 PMH can never be held liable for indirect damage, including consequential loss, lost profit and damage due to business interruption.

10.7 PMH cannot be held liable if the client has the ability to make a claim in respect of the damage that has occurred directly from its insurance company or a third party's insurance company.

10.8 PMH does not accept any liability vis-a-vis the client for any damage apart from in the event that its liability insurance covers the damage and insofar as, where appropriate, the insurer pays out.

Article 11 Applicable law

11.1 This declaration is governed solely by Dutch law, to the exclusion of those agreements that result in the applicability of non-Dutch law.

11.2 A dispute regarding whether or not there is a shortcoming, shall be determined in a way that is binding for the parties, by an expert appointed by the parties by common accord and, if the parties fail to reach an agreement about that, by one or more experts at the request of the party raising the issue, by the District Court of Dordrecht. The other disputes shall be exclusively resolved by the competent court in the District of Rotterdam without prejudice to the parties' right of appeal and appeal to the Supreme Court. A dispute between parties regarding whether or not there is a dispute that has to be decided by one or more experts or by the competent court in the District of Rotterdam, shall be decided by the competent court in the District of Rotterdam, without prejudice to the parties' right of appeal and appeal to the Supreme Court.

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II Manual Vectron Blue	52
III Manual Vectron Blue 2.45 VD	66
IV Operating Instructions RDH-100	94
V Operating Instructions RDD-100.1DHW	95
VI User Manual Wilo-Para	97

MAX 1 R
MAX 4 R
Low Nox

EN
IT
FR
ES
RU



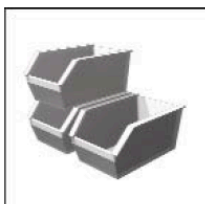
Technical data
Dati tecnici
Données techniques
Datos técnicos
Технические характеристики



Operating instructions
Istruzioni per l'uso
Notice d'emploi
Manual de uso
Руководство по эксплуатации



Electric diagrams
Schemi elettrico
Schémas électrique
Esquemas eléctrico
Электрические схемы



Spare parts list
Pièces de rechange
Parti ricambi
Piezas de recambio
Запчасти



420010474601

MAX 1 R Low NOx TC 230-50-60 TW B10 3142713
MAX 4 R Low NOx TC 230-50-60 TW B10 3142722

EN Overview - Index of contents / **Panoramica** - Indice dei contenuti / **Vue d'ensemble** - Table des matières
FR Descripción - Sumario / **Обзор** - Содержание

ES

RU

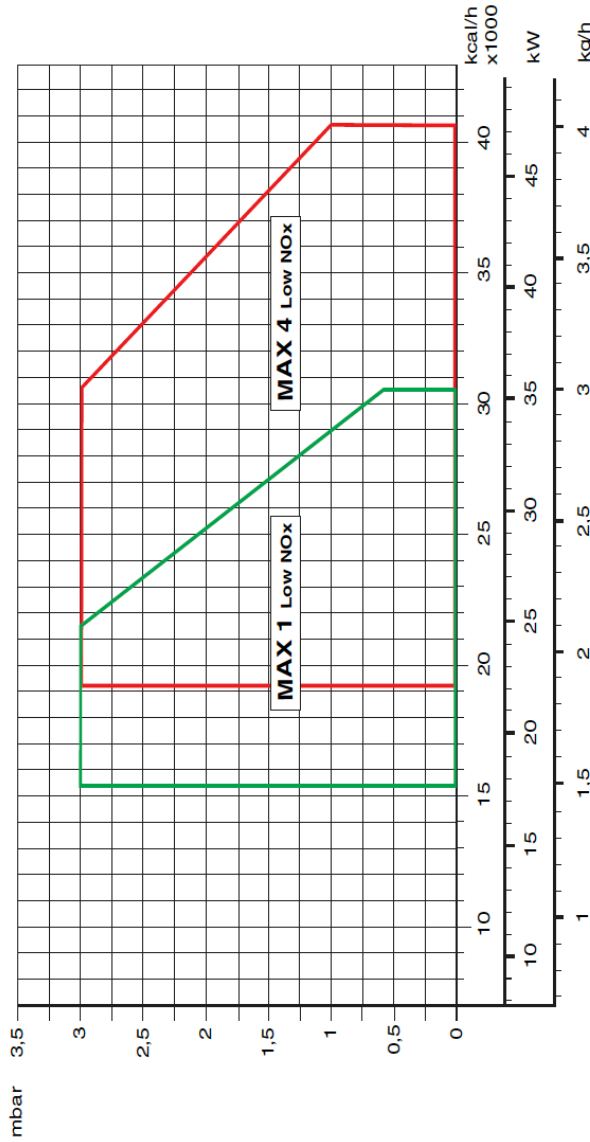
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Working fields Campi di lavoro Domaine de fonctionnement Ámbito de funcionamiento Рабочий диапазон	EN IT FR ES RU	4
Dimensions Dimensioni Dimensions Dimensiones Размеры	EN IT FR ES RU	5
Operating instructions for authorised specialists	EN	6 - 17
Istruzione per l'uso per il personale qualificato	IT	18 - 29
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Overview / Panoramica / Vue d'ensemble / Descripción / Обзор

Technical data	Dati tecnici - Données techniques - Datos técnicos - Технические характеристики			MAX 1R LOW NOx	MAX 4R LOW NOx
	Potenza bruciatore max/min kW - kcal/h	Puissance du brûleur max/min kW - kcal/h	Potencia del quemador máx/min kW - kcal/h		
Burner output max/min kW - kcal/h	35.5	17.6	47.4	35.5	22.5
Oil throughput max/min kg/h	30600	15300	40800	30600	19350
Hydraulic system 1 stage	3	1,5	4	3	1,9
Regulating ratio	1	1	1	1	1
Fuel oil	1:1	1:1	1:1	1:1	1:1
Emission class	Light oil (L.C.V. 10.200 kcal/kg max. visc 1,5°E at 20°C) (EL) Hu = 11,86 kWh/kg				
Control box	Standard Class 3 - yellow flame (NOx < 120 mg/kWh)				
Air regulation Air flap	THERMOWATT E-BCU OIL				
Flame monitor	photoresistor				
Ignition transformer	danfoss / cofi				
Fuel-oil pump	danfoss / suntec				
Electric motor rpm - watt	2800 (3400) rpm				
Voltage	75 W				
Power consumption (operation)	230 V / 50 (60) Hz				
Weight	300 W				
Protection level	7 kg				
Sound pressure level dB(A)	9 kg				
Ambient temp. for storage	IP40				
Temperature for use	60				
	-20°...+70° C				
	-10°...+60° C				

Overview - Working fields / Panorámica - Curve / Vue d'ensemble - Domaine de fonctionnement / Descripción - Ámbito de funcionamiento /

Обзор - Рабочий диапазон



Working field

The working field shows burner output as a function of combustion chamber pressure. It corresponds to the maximum values specified by EN 267 measured at the test fire tube. **The efficiency rating of the boiler should be taken into account when selecting a burner.**

Calculation of burner output:

$$QF = \frac{Q_N}{\eta_K}$$

QF = Burner output (kW)
Q_N = Rated boiler output (kW)
η_K = Boiler efficiency (%)

Curva

Il campo di attività indica la potenza del bruciatore in funzione della pressione della camera di combustione. Corrisponde ai valori massimi previsti dalla norma EN 267 misurati sul tubo della fiamma di controllo. **In occasione della scelta del bruciatore si deve tenere conto del rendimento energetico della caldaia.**

Calcolo della potenza del bruciatore:

$$QF = \frac{Q_N}{\eta_K}$$

QF= potenza bruciata (kW)
Q_N= potenza nominale della caldaia (kW)
η_K = rendimento energetico della caldaia (%)

Domaine de fonctionnement

Le domaine de fonctionnement correspond aux valeurs mesurées lors de l'homologation. Elle correspond aux valeurs max mesurées sur tunnel d'essai d'après l'EN 267. **Pour le choix du brûleur, tenir compte du rendement de la chaudière.**

Calcul de la puissance calorifique:

$$QF = \frac{Q_N}{\eta_K}$$

QF= Puissance calorifique (kW)
Q_N= Puissance nominale chaudière (kW)
η_K = Rendement chaudière (%)

Ámbito de funcionamiento

El ámbito de funcionamiento corresponde a los valores registrados en el momento de la homologación. Corresponde a los valores máx medidos en el túnel de ensayo según la EN 267. **Para la elección del quemador, se ha de tener en cuenta el rendimiento de la caldera.**

Cálculo de la potencia calorífica:

$$QF = \frac{Q_N}{\eta_K}$$

QF = Potencia calorífica (kW)
Q_N = Potencia nominal de la caldera (kW)
η_K = Rendimiento de la caldera (%)

Рабочий диапазон

Рабочий диапазон соответствует значениям, измеренным при сертификации. Он соответствует максимальным значениям, измеренным в соответствии со стандартом EN 267 в стандартном канале. **При выборе горелки необходимо учитывать КПД котла.**

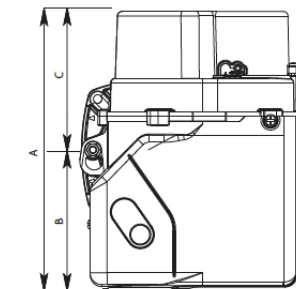
Расчет тепловой мощности:

$$QF = \frac{Q_N}{\eta_K}$$

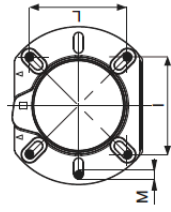
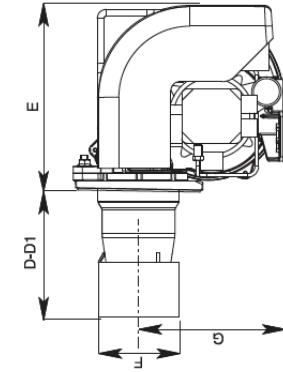
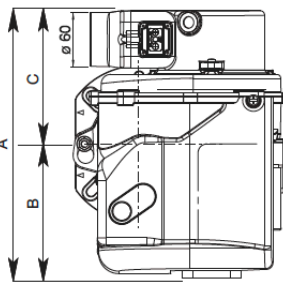
QF = Тепловая мощность, кВт
Q_N= Номинальная мощность котла, кВт
η_K = КПД котла, %

Overview - Dimensions / Panoramica - Dimensioni / Vue d'ensemble - Dimensions / Descripción - Dimensiones / Обзор - Размеры

MAX 1



MAX 4

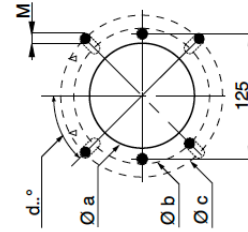


Model	A	B	C	D	D1	E	F	G	I	L	M
MAX 1	288	143	145	153	-	153	89	160	92/107	92/107	M8
MAX 4	297	149	148	167	-	204	89	160	90/107	90/107	M8

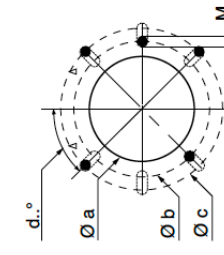
Boiler plate drilling

Model	Ø a	Ø b	Ø c	d°..
MAX 1	100	130	150	45°
MAX 4	110	126,5	151,5	45°

MAX 1

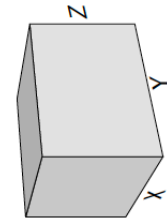


MAX 4



Packaging

Model	X	Y	Z	Kg
MAX 1	385	415	275	7
MAX 4	385	415	275	9



Contents - Index - General warnings - Conformity declaration

Overview	Technical data	3
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	Dimensions	5
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	Conformity declaration	6
	Burner description	7
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	E-BCU OIL control and safety unit	9
	Oil burner pump	10
Installation	Burner assembly	11
	Electrical connection	12
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	Adjusting burner output	15
	Oil pressure regulation	15
Service	Maintenance	16
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Overview	Electrical diagrams	66
	Spare parts list	67-69

Important notes

The MAX burners are designed for the combustion of domestic fuel oil EL in accordance with EN267 standards.

Assembly, commissioning and maintenance must be carried out only by authorised specialists and all applicable guidelines and regulations must be observed.

Burner description

The MAX burner is a single-stage, fully-automatic monoblock-type burner. It is suitable for use, within its range of performance, with boilers complying with EN 303 or hot-air generators in line with DIN 4794, DIN 30697 or EN 621. Use for any other application requires the approval of Ecoflam.

The following standards should be observed in order to ensure safe, environmentally sound and energy-efficient operation:

EN 226

Connection of vaporising oil and forced draught gas burners to the heat generator.

EN 60335-2

Safety of electrical equipment for domestic use.

Installation location

The burner must not be operated in rooms containing aggressive vapours (e.g. spray, perchloroethylene, hydrocarbon tetrachloride, solvent, etc.) or tending to heavy dust formation or high air humidity. Adequate ventilation must be provided at the place of installation of the furnace system to ensure a reliable supply with combustion air. Variations may arise as a result of local regulations.

Declaration of conformity for oil burners

We,

Ecoflam Bruciatori S.p.A.

declare under our sole responsibility that the light oil burners named

MAX

conform to the following standards:

EN 267: 2010
EN 60335-1: 2008
EN 60335-2-30: 2006
EN 60335-2-102: 2007
EN 55014-1: 2008 + A1: 2009
EN 55014-2: 1998 + A1: 2001 + A2: 2008

These products bear the CE mark in accordance with the stipulations of the following directives:

2006/95/EEC Low Voltage Directive
2004/108/EEC EMC Directive
2006/42/EC Machinery directive

Resana, 28th June 2011
M. PANIZZON

We can accept no warranty liability whatsoever for loss, damage or injury caused by any of the following:

- Inappropriate use.
- Incorrect assembly or repair by the customer or any third party, including the fitting of non-original parts.

Provision of the system and the operating instructions

The firing system manufacturer must supply the operator of the system with operating and maintenance instructions on or before final delivery. These instructions should be displayed in a prominent location at the point of installation of the heat generator, and should include the address and telephone number of the nearest customer service centre.

Notes for the operator

The system should be inspected by a specialist at least once a year. It is advisable to take out a maintenance contract to guarantee regular servicing.

Ecoflam burners have been designed and built in compliance with all current regulations and directives.

All burners comply to the safety and energy saving operation regulations within the standard of their respective performance range. The quality is guaranteed by a quality and management system certified in accordance with ISO 9001:2008.



Contents - Burner description

MAX 4 LN TW TC - 230V/50-60Hz

RANGE NAME BY FUEL TYPE

MAX Light oil

MODEL SIZE (Gas: kW; Oil: kg/h)

MAX 4 4 kg/h

EMISSION COMBUSTION TYPE

MAX Low NOx Low NOx Class 3 yellow flame (<120 mg/kWh)
 MAX Standard Class 2-OIL EN267 (<185 mg/kWh)

OPERATION TYPE

- 1 stage
 R 1 stage with preheater
 TW Thermowatt E-BCU

HEAD TYPE

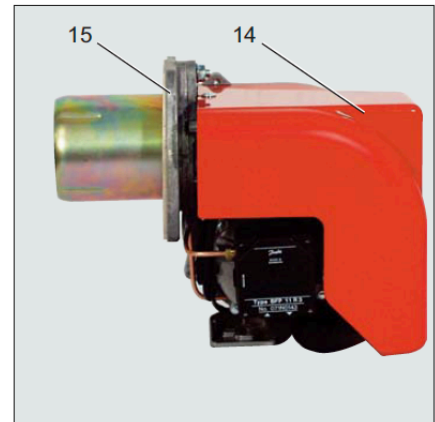
TC Short head
 TL Long head

FUEL

- Light oil
 KER Kerosene
 BIODIESEL Biodiesel
 D Heavy oil: max visc. 50° E at 50°C

ELECTRICAL SUPPLY TO THE SYSTEM

230V/50-60Hz 230 Volt, 50-60 Hz

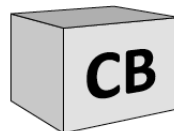


- A1 E-BCU OIL control box
- M1 Electric motor for pump and blower wheel
- T1 Ignition transformer
- Y Graduated rod
- Y1 Solenoid valve
- 3 Air regulation in the burner head
- 5 Fastening screws for equipment plate
- 9 Wieland socket
- 15 Burner flange
- 16 Release knob
- 102 Fuel-oil pump
- 103B Air regulation
- 113 Air intake

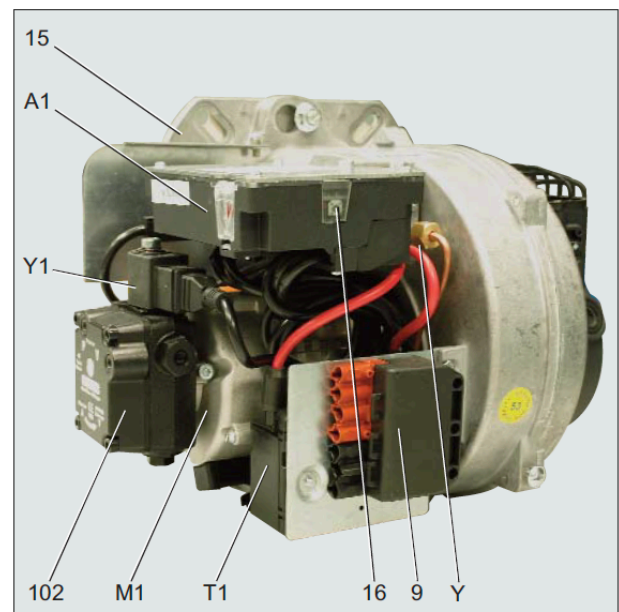
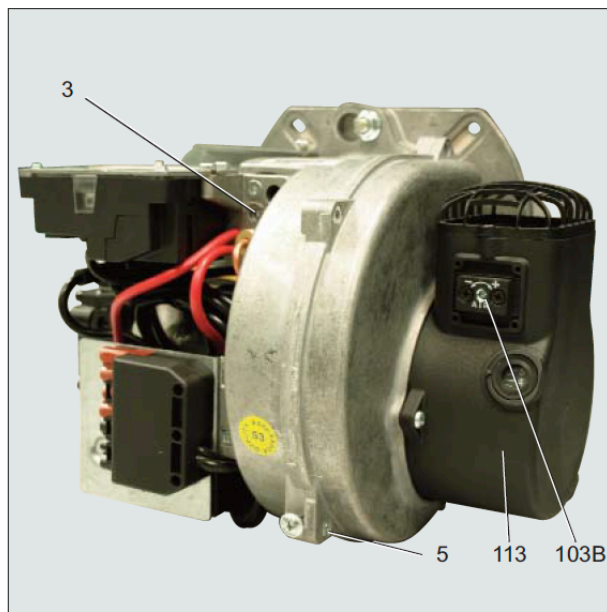
Scope of delivery

CB: COMPLETE BURNER

- 1 bag including :
 - multilanguage technical manual.
 - filter and hoses.
 - wieland plug.
 - nozzle and spanner.
 - screws, nuts and washer.



KIT & ACS delivered separately



Function - General safety functions

Light oil pre-heating (version R)

If the system demands heat, the pre-heater is switched on first.

When the oil preheating temperature is reached, a thermostat in the pre-heater activates the program sequence.

The heating time with cold start is approximately 1 minutes.

Operating function

- If heat is requested by the boiler regulator, the automatic oil combustion control unit starts the program sequence.
- The motor starts, the igniter is switched on and the preventionation period of 15 seconds commences.
- During the preventionation period, the furnace is monitored for flame signals.
- At the end of the preventionation period, the fuel-oil solenoid valve opens and the burner starts.
- The igniter remains switched off while the burner is in operation.

Controlled shutdown

- Boiler thermostat interrupts heat request.
- The fuel-oil solenoid valve closes and the flame is extinguished.
- Burner motor switches off.
- Burner enters standby.

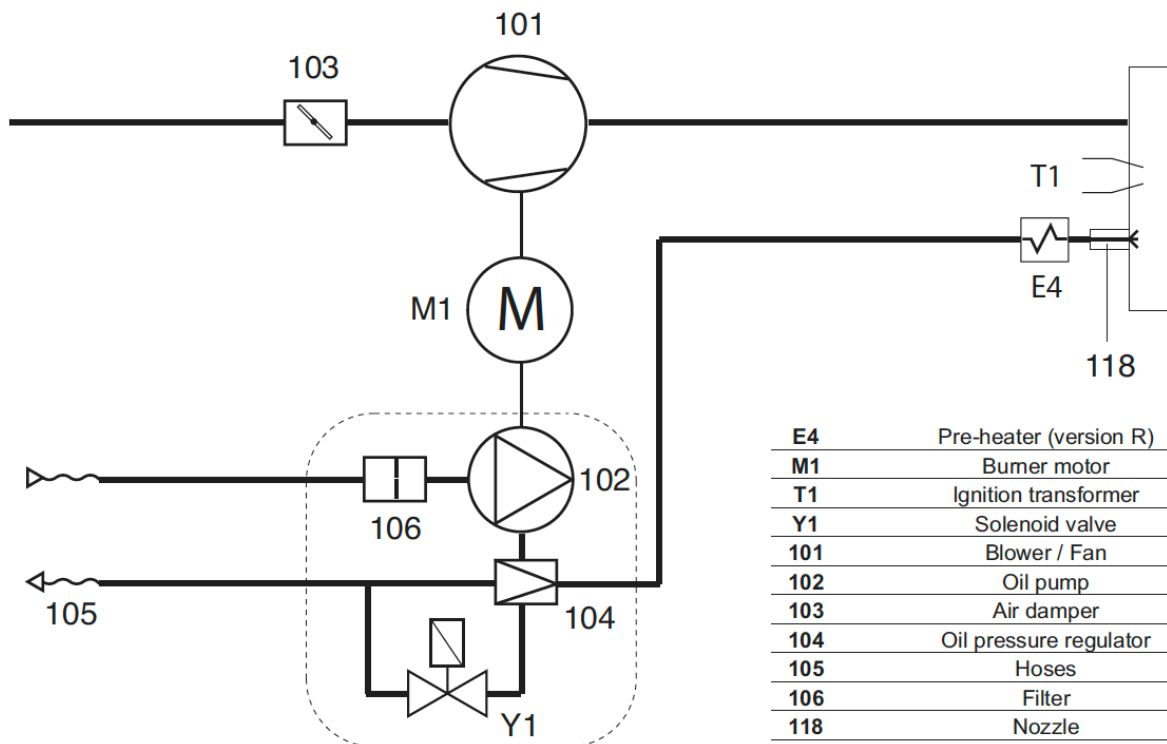
Safety function

A safety shutdown occurs:

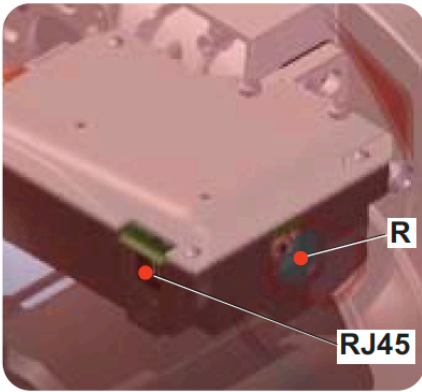
- if a flame signal is present during preventionation (parasitic flame monitoring).
- if no flame is produced within 5 seconds (safety time) of start-up (fuel authorisation).
- if no flame is produced after an unsuccessful restart attempt in the event of flame failure during operation.

A safety shutdown is indicated by the malfunction lamp lighting up and it is then only possible to reenale the burner by pressing the reset button after the cause of the malfunction has been rectified.

For further information, see the automatic combustion control unit description.



Function - E-BCU OIL control and safety unit



The E-BCU OIL fuel oil control and safety unit controls and monitors the forced draught burner. The microprocessor-controlled program sequence ensures maximum stability of time periods, regardless of fluctuations in the power supply or ambient temperature. The design of the automatic combustion control unit protects it from the effects of brownouts. Whenever the supply voltage drops below its rated minimum level (170 V), the control unit shuts down - even in the absence of a malfunction signal. The control unit switches itself back on again once the voltage has exceeded the 178 V.

Locking and unlocking the system

The control unit can be locked (switched to malfunction) and unlocked (malfunction cleared) by pressing the R reset button, provided the system is connected to the mains power supply.

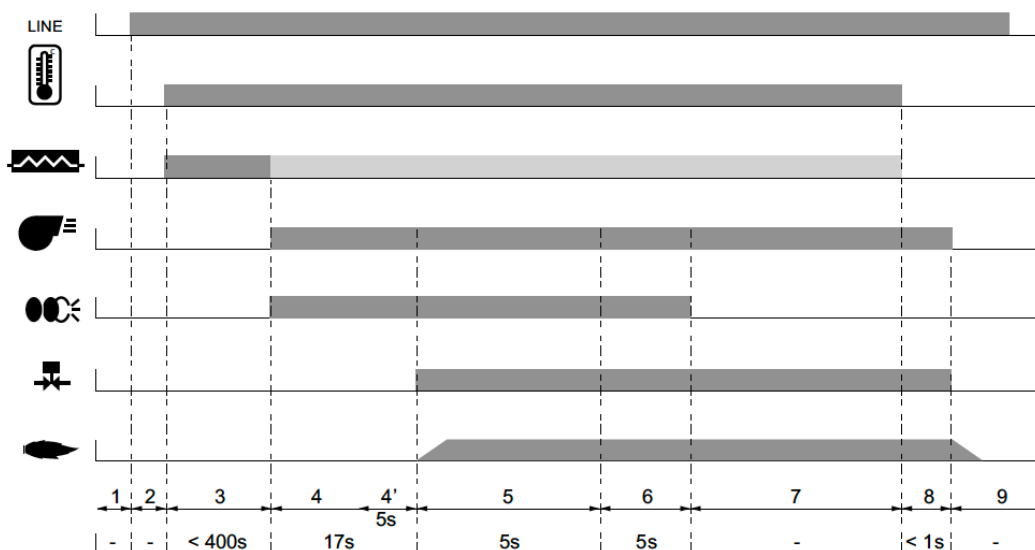
- R** - Reset button + lock-out led.
- RJ45** - Connector for PC interface (diagnostic, separate item).

! Always disconnect the power supply before installing or removing the control unit. Do not attempt to open or carry out repairs on the control unit.

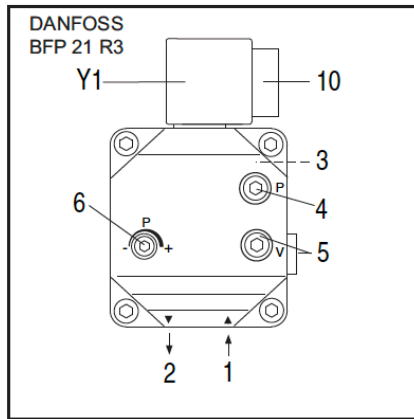
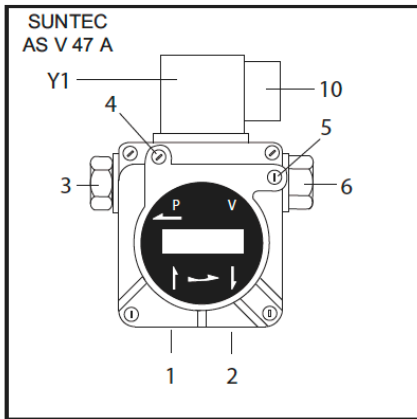


KIT E-BCU
DIAGNOSTIC TOOL
(not supplied)

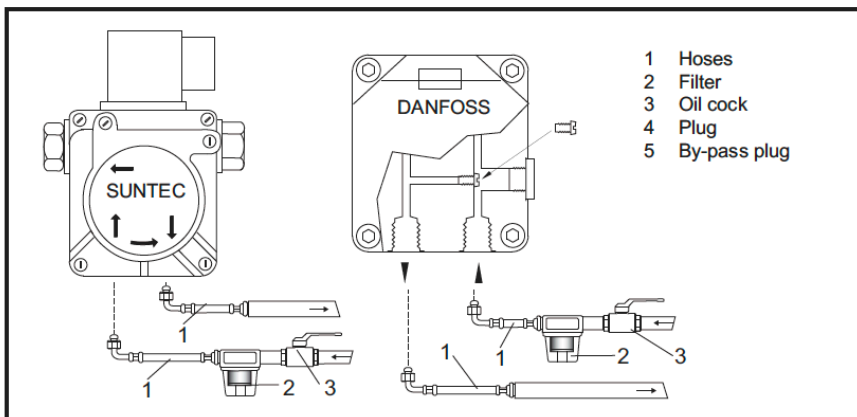
Symbol	Designation
	Waiting for heat request
	Waits for pre-heater (for burner with pre-heater)
	Burner motor on
	Start of ignition
	Flame present



Function - Oil burner pump

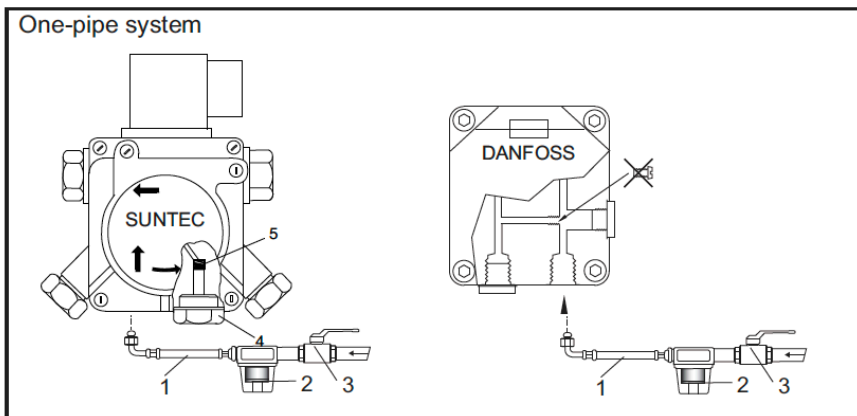


- 1 suction intake connection.
- 2 return connection.
- 3 pressure connection.
- 4 oil pressure gauge connection.
- 5 negative pressure gauge connection.
- 6 oil pressure regulator.
- 10 Solenoid valve electrical connection.
- Y1 fuel-oil solenoid valve.



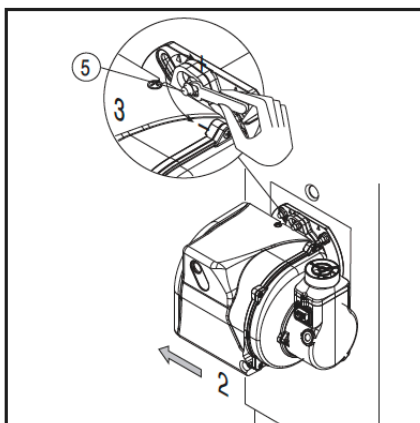
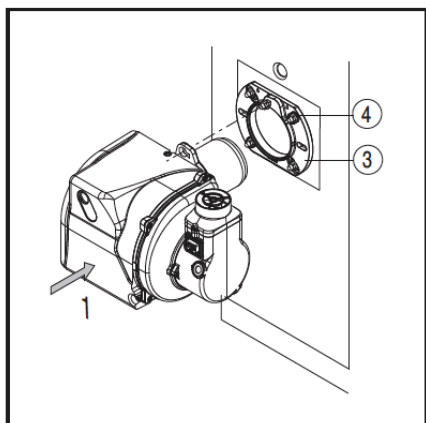
The oil burner pump used is a self-priming gear pump, which must be connected as two-line pump via a bleed filter. There is an intake filter and an oil pressure regulator integrated in the pump. Pressure gauges for pressure measurements and negative pressure measurements must be connected before the equipment is commissioned.

NB: before starting the burner, check that the return pipe is open. An eventual obstruction could damage the pump sealing device.



ONE PIPE SYSTEM: If the oil supply circuit is one-pipe system, the pump needs to be modified following instructions in the picture.

Installation - Burner assembly



Burner assembly

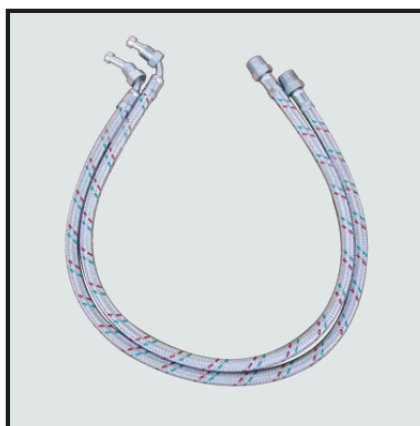
The burner is fixed by means of connecting flange and therefore to the boiler.

Installation:

- To fix the flange 3 to the boiler with the screws 4.
- Turn the burner slightly, guide it into the flange and secure using screw 5.

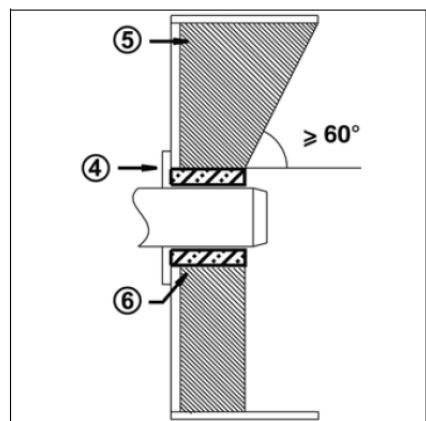
Removal:

- Loosen screw 5.
- Turn the burner out and pull it out of the flange.



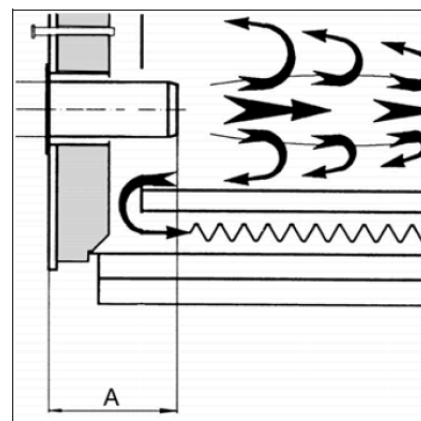
Oil connection

The filter must be located in such a way that the correct hose routing cannot be impaired. The hoses must not kink.



Burner pipe insertion depth and brickwork

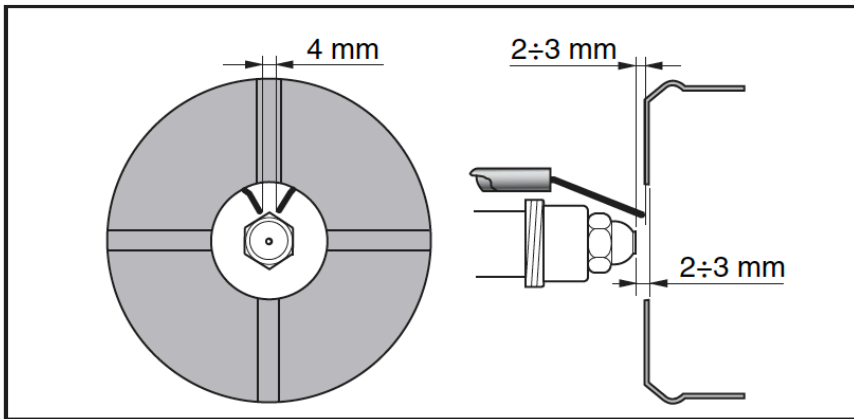
Unless otherwise specified by the boiler manufacturer, heat generators without a cooled front wall require brickwork or insulation 5 as shown in the illustration. The brickwork must not protrude beyond the leading edge of the flame tube, and should have a maximum conical angle of 60°. Gap 6 must be filled with an elastic, non-combustible insulation material. For boilers with reverse firing, the minimum burner tube insertion depth A as specified in the boiler manufacturer's instructions must be observed.



Exhaust system

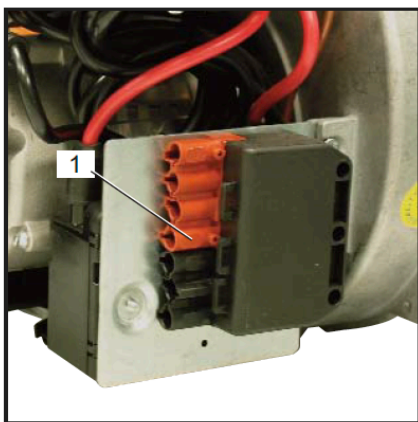
To avoid unfavourable noise emissions, right-angled connectors should not be used on the flue gas side of the boiler.

Installation - Electrical connection - Checks before commissioning



Position of electrodes

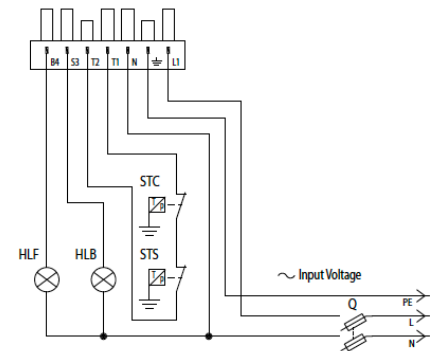
Note: Always check the position of electrodes after having replaced the nozzle (see illustration). A wrong position could cause ignition troubles.



Electrical connection

The electrical installation and connection work must only be carried out by an authorised electrical specialist. All applicable rules and regulations must be observed. The electrical installation should include a type A circuit breaker. **The applicable guidelines and directives must be observed, as well as the electrical circuit diagram supplied with the burner!**

- Check to ensure that the power supply voltage is as specified in the electric diagram and in data plate.
- Burner fuse: 5 A.



Electrical connection (plug-in)

It must be possible to disconnect the burner from the mains using an omnipolar shutdown device complying with the standards in force. The burner and heat generator (boiler) are connected by a 7-pin connector (fig.1).

Checks before commissioning

The following must be checked before initial commissioning:

- That the burner is assembled in accordance with the instructions given here.
- That the burner is pre-set in accordance with the values in the adjustment table.
- Setting the combustion components.
- The heat generator must be ready for operation, and the operating regulations for the heat generator must be observed.
- All electrical connections must be correct.
- The heat generator and heating system

must be filled with water and the circulating pumps must be in operation.

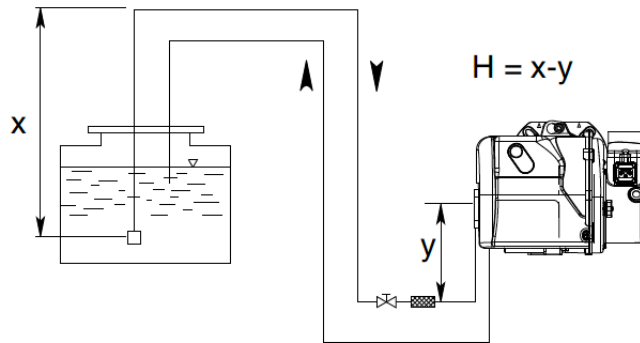
- The thermostats, pressure regulator, low water detectors and any other safety or limiting devices that might be fitted must be connected and operational.
- The exhaust gas duct must be unobstructed and the secondary air system, if available, must be operational.
- An adequate supply of fresh air must be guaranteed.
- The heat request must be available.
- Fuel tanks must be full.
- The fuel supply lines must be

assembled correctly, checked for leaks and bled.

- A standard-compliant measuring point must be available, the exhaust gas duct up to the measuring point must be free of leaks to prevent anomalies in the measurement results.

Installation - Oil feeding and suction line

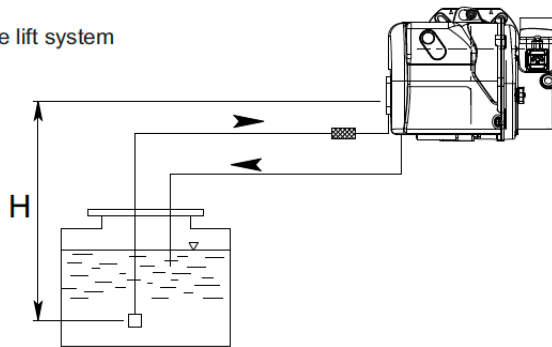
Two-pipe siphon feed system



FEEDING LINE WITH SUNTEC AS V 47 A

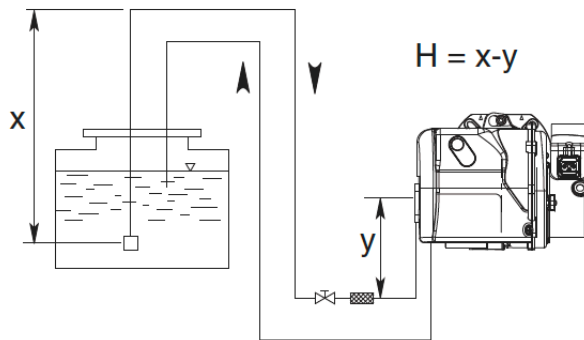
H (m)	Length pipe (m)	
	ø 8 mm	ø 10 mm
0,5	30	65
1	35	70
1,5	40	75
2	45	80
2,5	50	85
3	55	90
3,5	60	95

Two-pipe lift system



H (m)	Length pipe (m)	
	ø 8 mm	ø 10 mm
0,5	23	55
1	21	50
1,5	19	45
2	17	40
2,5	14	34
3	9	28
3,5	4	22

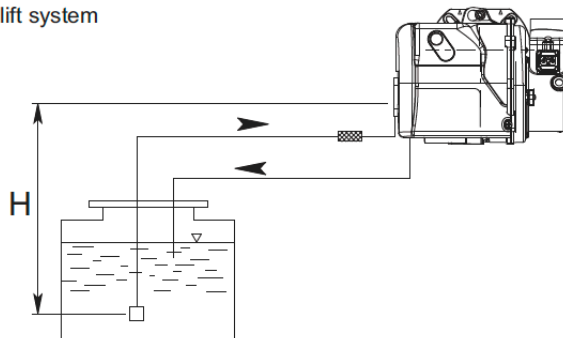
Two-pipe siphon feed system



FEEDING LINE WITH DANFOSS BFP21 R3

H (m)	Length pipe (m)		
	ø 6 mm	ø 8 mm	ø 10 mm
0,5	19	60	100
1	21	66	100
1,5	23	72	100
2	25	79	100
2,5	27	85	100
3	29	91	100
3,5	31	98	100

Two-pipe lift system



H (m)	Length pipe (m)		
	ø 6 mm	ø 8 mm	ø 10 mm
0,5	15	47	100
1	13	41	99
1,5	11	34	84
2	9	28	68
2,5	7	22	53
3	5	15	37
3,5	-	9	22

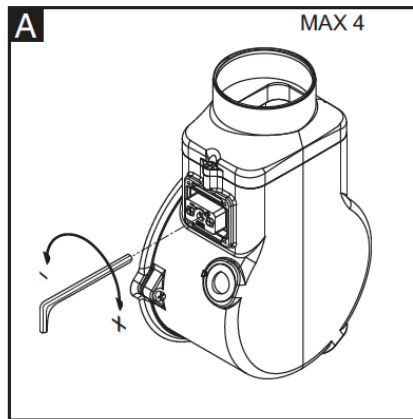
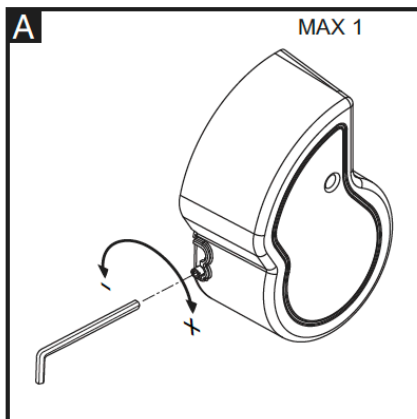
Start up - Setting data table - Air regulation

	NOZZLE		PUMP	OUTPUT	FIRING HEAD SETTING	AIR DAMPER SETTING
	gph	spry	bar	kg/h	Pos.	Pos.
MAX 1R LN	0.50	60°S	12	1,75		
	0.55	60°S	12	1,84		
	0.60	60°S	12	1,92		
	0.65	80°S	12	2,4	2	4
	0.75	60°S	12	2,8		
MAX 4R LN	0.50	60°S	12	1,75		
	0.55	60°S	12	1,84		
	0.60	60°S	12	1,92		
	0.65	60°S	12	2,4		
	0.75	60°S	12	2,8	2	4
	1.00	60°S	12	3,8		

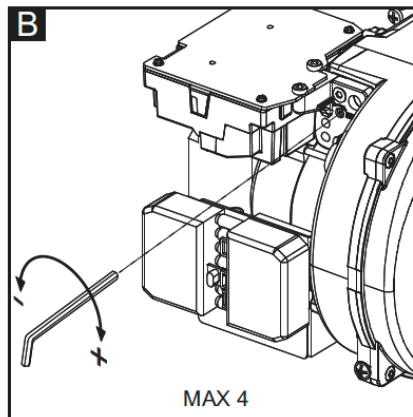
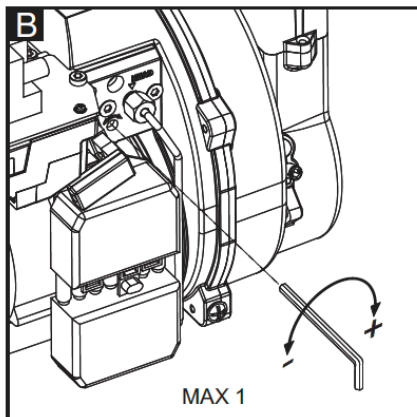
The settings above are **basic settings**. These adjustment values are normally suitable for commissioning the burner. These values have been determined in our test labs and are useful for the first

switch-on as final setting must be done using a combustion analyzer. Favourable combustion values can be achieved using the following nozzles:

- DANFOSS H+S 80°±60°
- DELAVAN W 60°
- STEINEN S 60°



Air damper setting (A).
To act on the screw in figure:
 • to increase output, turn screwdriver clockwise
 • to reduce output, turn screwdriver counterclockwise



Firing head setting (B).
To act on the screw in figure:
 • turn Allen key till you reach the requested value (index 0-4,5).

Start up - Adjusting burner output - Oil pressure regulation



Risk of air blast!
Continuously check CO, CO₂ and soot emissions when adjusting the output of the burner. Optimise combustion values in the event of CO formation. CO must not exceed 50 ppm.

Burner start

Before starting the burner, draw oil in until the filter is completely filled.
Then start the burner by switching on the boiler regulator. Open the bleed screw on the oil filter to allow the oil line to bleed fully during the prevention phase. The negative pressure must not fall below 0.4 bar. Close the bleed screw when the filter is completely filled with oil and oil is flowing out without bubbles.

Burner output adjustment

Use the pressure regulator to adjust the oil pressure in accordance with the burner output desired. Monitor the combustion values continuously as you do so (CO, CO₂, soot test). Adjust the airflow gradually if necessary.

Optimising combustion values

If the combustion values are not satisfactory modify the position of the combustion head. By doing this the burner ignition conditions and the combustion values change. Compensate for the change in airflow if necessary by adjusting the air flap position.

Note: observe the minimum required flue gas temperature specified by the boiler manufacturer and the requirements demanded of flue gas ducts for avoiding condensation.

Oil pressure regulation

The oil pressure, and therefore burner output, is adjusted using oil pressure regulator 6 in the pump.

Turn to

- right: to increase pressure
- left: to reduce pressure

Connect a pressure gauge at point 4 (with R1/8" thread).

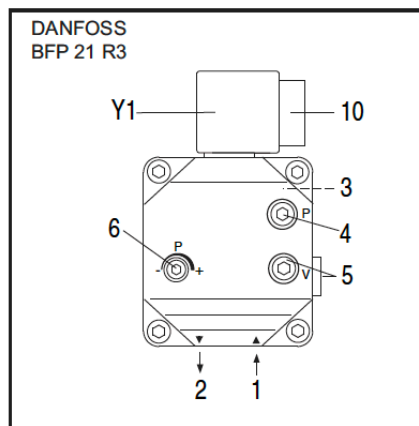
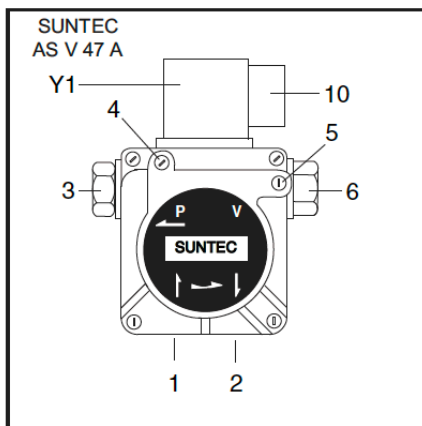
Checking negative pressure

The vacuum meter for checking negative pressure must be connected to point 5, R1/8". Maximum permissible negative pressure is 0.4 bar. At higher negative pressures, the fuel oil gasifies, which causes scraping noises in the pump and ultimately leads to pump damage.

Cleaning the pump filter

The filter is located under the pump cover (SUNTEC) or in appropriate cartridge (DANFOSS). To be able to clean the filter, it is necessary to loosen the screws and remove the cover first (SUNTEC) or to unscrew the screw (DANFOSS).

- Check the pump cover seal and replace the gasket if necessary.



- 1 suction intake connection.
- 2 return connection.
- 3 pressure connection.
- 4 oil pressure gauge connection.
- 5 negative pressure gauge connection.
- 6 oil pressure regulator.
- 10 Solenoid valve electrical connection.
- Y1 fuel-oil solenoid valve.

Operating check

Flame monitoring must be checked for safety as part of initial commissioning and also after servicing or if the system has been out of operation for any significant period of time.

- Starting attempt with flame monitor unlit: the automatic combustion control unit must switch to malfunction at the end of the safety time

- Start with flame monitor lit: the automatic combustion control unit must switch to malfunction after 10 seconds of prevention
- Normal start-up: flame monitor goes out when burner in operation; the automatic combustion control unit must switch to malfunction after the restart and end of the safety time

Service - Maintenance

Burner and boiler servicing must only be carried out by qualified personell. The system operator is advised to take out a service contract to guarantee regular servicing.

Attention

- Disconnect the electrical supply before carrying out any maintenance or cleaning work.
- The blast tube and firing head may be hot.

Checking the exhaust gas temperature

- Check the flue gas temperature at regular intervals.
- Clean the boiler if the flue gas temperature is more than 30°C above the value measured at the time of commissioning.
- To simplify the check, use a flue gas temperature indicator.

for maintenance.

Position 1

Maintenance line air (cleaning/substitution fan)

Position 2

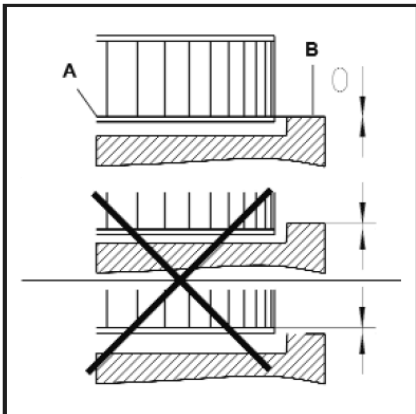
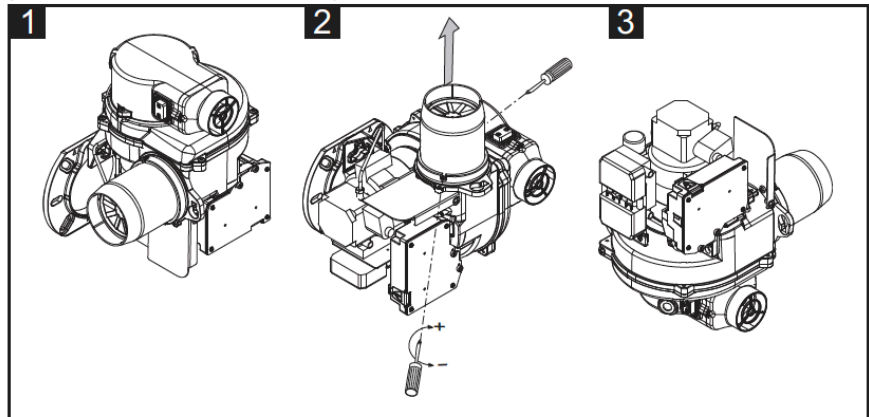
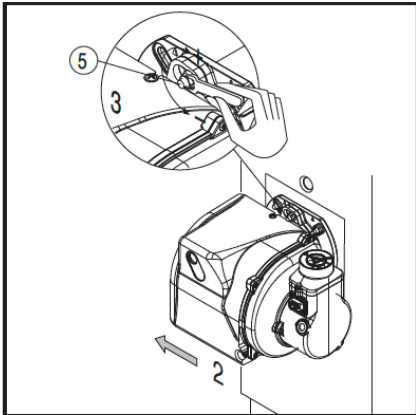
Burner head maintenance.

Position 3

Maintenance components (filter and light oil pump).

Burner maintenance positions

- After removing the screws 5 turn the burner and pull it out of the flange. It is possible to fix the burner in three positions



Fan assembly

Observe the positioning diagram below when replacing the motor and blower wheel. The inside flange **A** of the blower wheel must be fitted at the same level as the equipment plate **B**. Insert a straight edge between the wing of the blower wheel and set **A** and **B** to the same height, tighten the set screw on the blower wheel (maintenance position 1).

Nozzle and cleaning replacement

Use only the suitable box wrench provided for this operation to remove the nozzle, taking care to not damage the electrodes. Fit the new nozzle by the same care. Note: Always check the position of electrodes after having replaced the nozzle (see illustration). A wrong position could cause ignition troubles.



Maintenance on the burner

Maintenance position 1

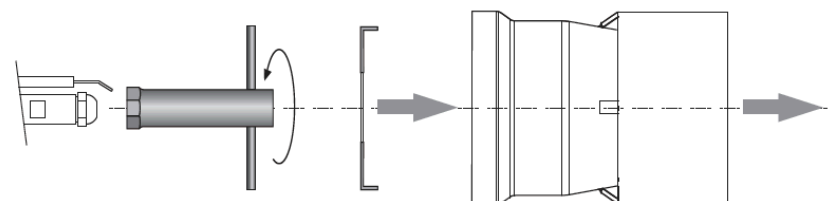
- Clean fan and housing and check for damage.

Maintenance position 2

- Check and clean the combustion head.
- Replace oil nozzle.
- Check ignition electrodes, readjust or replace as necessary.
- Fit combustion head. Observe adjustment dimensions.
- Fit burner.
- Start burner, check flue gas data, correct burner settings if necessary.

Maintenance position 3

- Check oil supply components (tubes, pumps, oil feed tube) and their connections for leaks or signs of wear, replace if necessary.
- Check electrical connections and connection cables for damage, replace if necessary.
- Check pump filter and clean if necessary.



Service - Troubleshooting

Fault diagnosis and repair

In the event of a malfunction, first check that the prerequisites for correct operation are fulfilled:

1. is the system connected to the power supply?
2. is there oil in the tank?
3. are all shut-off valves open?
4. are all control and safety devices, such as the boiler thermostat, low-water detector, limit switch, etc. adjusted correctly?

If the malfunction persists, use the following table.

It is not permitted to repair any components relevant to safety.

These components must be replaced by parts with the same order number.




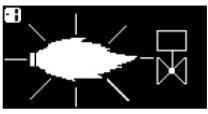
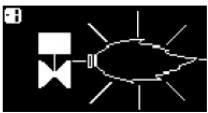

Only use original spare parts.

NB: after each operation:

- under normal operating conditions (doors closed, hood fitted, etc.), check combustion and check the individual lines for leaks.
- Record the results in the relevant documents.

E-BCU display interface must be used to read the faults by service personnel.



Fault	Symbol fault	Cause	Remedy
	No heat request	Thermostats defective or incorrectly adjusted	Adjust the thermostats, replace if necessary.
	Bumer does not start after thermostat shutdown. No malfunction indicated on the automatic combustion control unit.	Drop in supply voltage or power failure. Control unit malfunction	Check the cause of the fall in voltage or the power failure. Replace the control unit.
	Bumer starts at switch-on for very short period and then shuts down and the red LED lights up	The control unit has been intentionally locked	Reset control unit.
	Bumer starts and then shuts down after pre-ventilation	Flaring during pre-ventilation or pre-ignition	Check ignition sparks/adjust or replace electrode Check/replace fuel-oil solenoid valve
	Bumer starts and then shuts down after the solenoid valves have opened	No flame signal at end of safety time	Check the oil level in the tank. Top tank up as required. Open the valves. Check the oil pressure and the operation of the pump, coupling, filter, solenoid valve. Check ignition circuit, electrode adjustment. Clean/replace electrodes.
	Flame extinguishing during operation	Flame goes out during operating phase	Clean/replace flame monitor. Replace the following items as required: Ignition electrodes/ignition cables/ignition transformer/nozzle/pump/solenoid valve/automatic combustion control unit.

VECTRON BLUE 1.20
VECTRON BLUE 1.24
VECTRON BLUE 1.28
VECTRON BLUE 1.30
VECTRON BLUE 1.35

elco



Bedieningshandleiding

Voor de gespecialiseerde vakman

Aangeblazen oliebrander Low NOx 2-14

nl

Operating manual

For the authorised specialist

Low NOx forced-draught fuel-oil burner... 15-27

en



de, fr, it..... 4200 1015 6600



..... 4200 1016 4200

Overview

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Important notes

VECTRON BLUE blue-flame burners 1.20/24/28/30/35 are designed for low-pollutant combustion of extra light fuel oil in accordance with country standards:
AT: ÖNORM C1109: standard or low sulphur
BE: NBN T52.716: standard or NBN EN590: low sulphur
CH: SN 181160-2: domestic fuel oil and low-sulphur eco fuel oil
DE : DIN 51603-1: standard and low sulphur.

The design and function of the burners meet standard EN267. They are suitable for use with all heat generators complying with EN 303 or for use by hot air generators complying with DIN 4794 or DIN 30697 within their respective performance range. Use for any other application requires the approval of ELCO. Assembly and commissioning must be carried out only by authorised specialists and all applicable guidelines and directives must be observed.

Burner description

VECTRON BLUE blue-flame burners 1.20/24/28/30/35 are single-stage, fully-automatic monoblock-type burners. The special design of the burner head with internal fume recirculation provides low-polluting combustion with high efficiency. In line with testing as defined by EN267, the values comply with emissions class 3 - the most stringent standard - and also fulfils the requirements of national environmental legislation:

AT: KFA 1995, FAV 1997

CH: LRV 2005

DE: 1.BImSchV

Emissions values may differ, depending on combustion chamber dimensions, combustion chamber load and the firing system (three-pass boilers, U-fired boilers). For specifying warranty values, the conditions for the measuring equipment, tolerances, humidity and the nitrogen content of the fuel oil must be observed.

Scope of delivery

The burner packaging also contains:

- 1 connection clamping flange with insulation
- 1 bag containing installation fittings
- 1 bag containing Technical Documentation
- 1 Blast tube
- 1 setting template

The following standards should be observed in order to ensure safe, environmentally sound and energy-efficient operation:

DIN 4755

Oil firing in heating systems

EN 226

Connection of vaporising oil and forced draught gas burners to the heat generator

EN 60335-2

Safety of electrical equipment for domestic use

Place of installation

The burner must not be used in rooms exposed to aggressive vapours (e.g. hairspray, tetrachloroethylene or carbon tetrachloride), large amounts of dust, or high levels of air humidity (e.g. in laundry rooms).

If no connection to an air exhaust system is provided for the air supply, there must be a supply air inlet measuring:

DE: up to 50 kW: 150 cm²

per additional kW: + 2.0 cm²

CH: QF [kW] x 6 = ...cm²; but at least 200 cm².

Variations may arise as a result of local regulations.

Declaration of conformity for forced-draught oil burner

We, the works tested by no. AQF030 F-74106 ANNEMASSE Cedex declare under our sole responsibility that the products
VECTRON BLUE 1.20
VECTRON BLUE 1.24
VECTRON BLUE 1.28
VECTRON BLUE 1.30
VECTRON BLUE 1.35

comply with the following standards:

EN 50165

EN 55014

EN 60335

EN 60555-2

EN 60555-3

EN 267

Belgian royal decree dated 08/01/2004

In accordance with the stipulations of the following European Directives 89/392/EECMachinery Directive 89/336/EECEMC directive 2006/95/ECLow Voltage Directive 92/42/EECEfficiency directive

these products bear the CE marking

Annemasse, 1st November 2008
Mr SPONZA

We can accept no warranty liability whatsoever for loss, damage or injury caused by any of the following:

- Inappropriate use.
- Incorrect assembly or repair by the customer or any third party, including the fitting of non-original parts.

Provision of the system and the operating instructions

The firing system manufacturer must supply the operator of the system with operating and maintenance instructions on or before final delivery. These instructions should be displayed in a prominent location at the point of installation of the heat generator, and should include the address and telephone number of the nearest customer service centre.

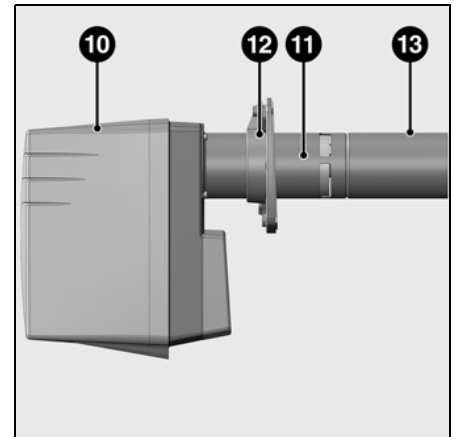
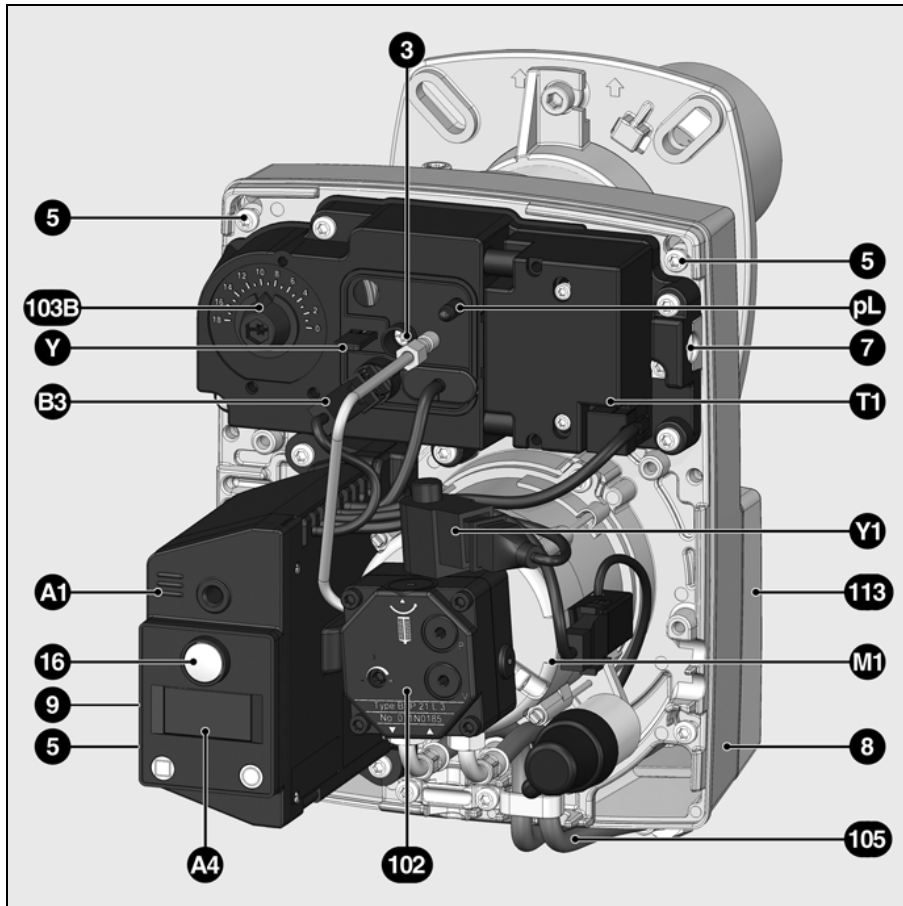
Notes for the operator

The system should be inspected by a specialist at least once a year. It is advisable to take out a maintenance contract to guarantee regular servicing.

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Overview

Burner description



- A1 Oil combustion system
- A4 Display
- B3 IRD flame monitor
- M1 Electric motor for pump and blower wheel
- pL Air pressure nipple
- T1 Ignition transformer
- Y Graduated scale for recirculation opening
- 3 Setting screw for recirculation opening
- 5 Fastening screws for equipment plate
- 7 Mounting bracket
- 8 Housing
- 9 7-pin connecting socket (covered)
- 10 Cover
- 11 Burner tube
- 12 Pipe bracket with connecting flange and insulation
- 13 Blast tube (accessories kit)
- 16 Release knob
- 102 Fuel-oil pump
- 103B Airflow adjustment
- 105 Hoses
- 113 Air intake box

Function

Heating function Operating function Safety function

Heating function

If the system demands heat, the pre-heater is switched on first. When the oil preheating temperature is reached, a thermostat in the pre-heater activates the program sequence. The heating time with cold start is approximately 2 minutes.

Operating function

- If heat is requested by the boiler regulator, the automatic oil combustion control unit starts the program sequence.
- The motor starts, the igniter is switched on and the prevention period of 15 seconds commences.
- During the prevention period, the furnace is monitored for flame signals.
- After prevention, the fuel-oil solenoid valve **11** and diaphragm valve **4** open and the burner starts.
- The igniter remains switched off while the burner is in operation.

Controlled shutdown

- Boiler regulator interrupts heat request.
- Fuel-oil solenoid valve **11** and diaphragm valve **4** close and the flame is extinguished.
- Burner motor switches off.
- Burner enters standby.

Safety function

A safety shutdown occurs:

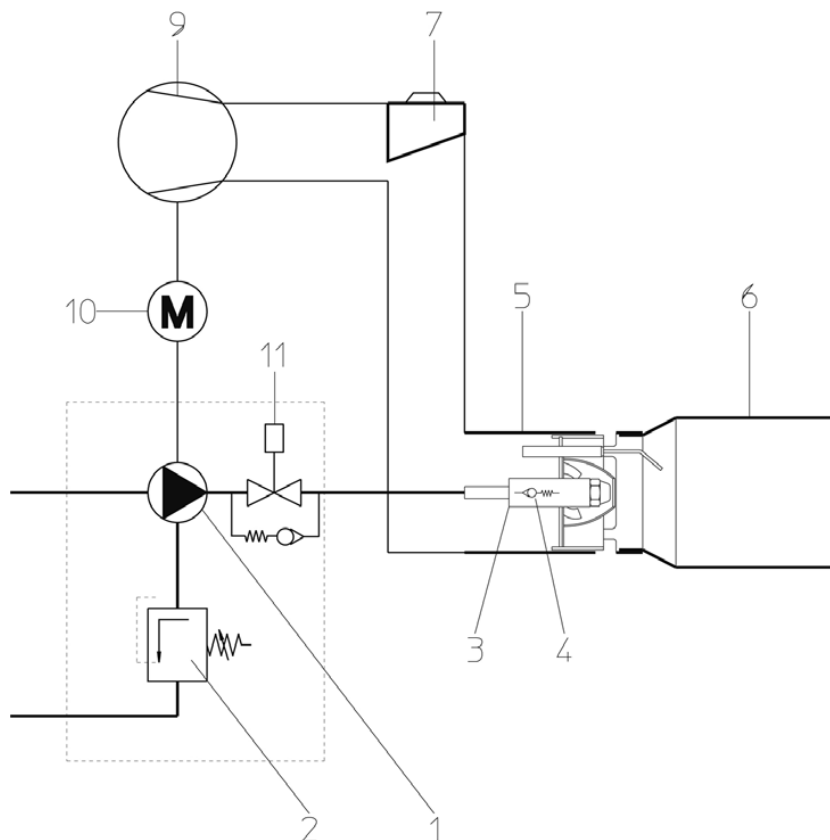
- if a flame signal is present during prevention (parasitic flame monitoring)
- if no flame is produced within 9 seconds (safety time) of start-up (fuel authorisation)
- if no flame is produced after an unsuccessful restart attempt in the event of flame failure during operation.

A safety shutdown is indicated by the malfunction lamp lighting up and it is then only possible to reenable the burner by pressing the reset button after the cause of the malfunction has been rectified.

For further information, see the automatic combustion control unit description.

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Function diagram BLUE 1. ...

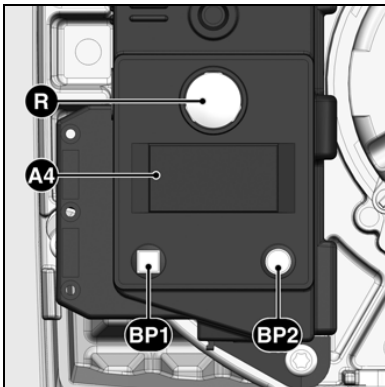


Principle diagram

- | | | | | | |
|---|------------------------|---|--|----|--|
| 1 | Oil burner pump | 4 | Diaphragm valve for closing off the nozzle | 9 | Blower |
| 2 | Oil pressure regulator | 5 | Burner tube | 10 | Burner motor |
| 3 | Oil preheating | 6 | Identification plate | 11 | Solenoid valve with bypass for nozzle closing system |
| | | 7 | Linearised air metering drum | | |

Function

Automatic combustion control unit TCH 1xx



Pressing and holding the R button for leads to ...
... 1 second...	Unlocking of the control unit
... 2 seconds....	Locking of the control unit
... 9 seconds....	Clearance of control unit statistics

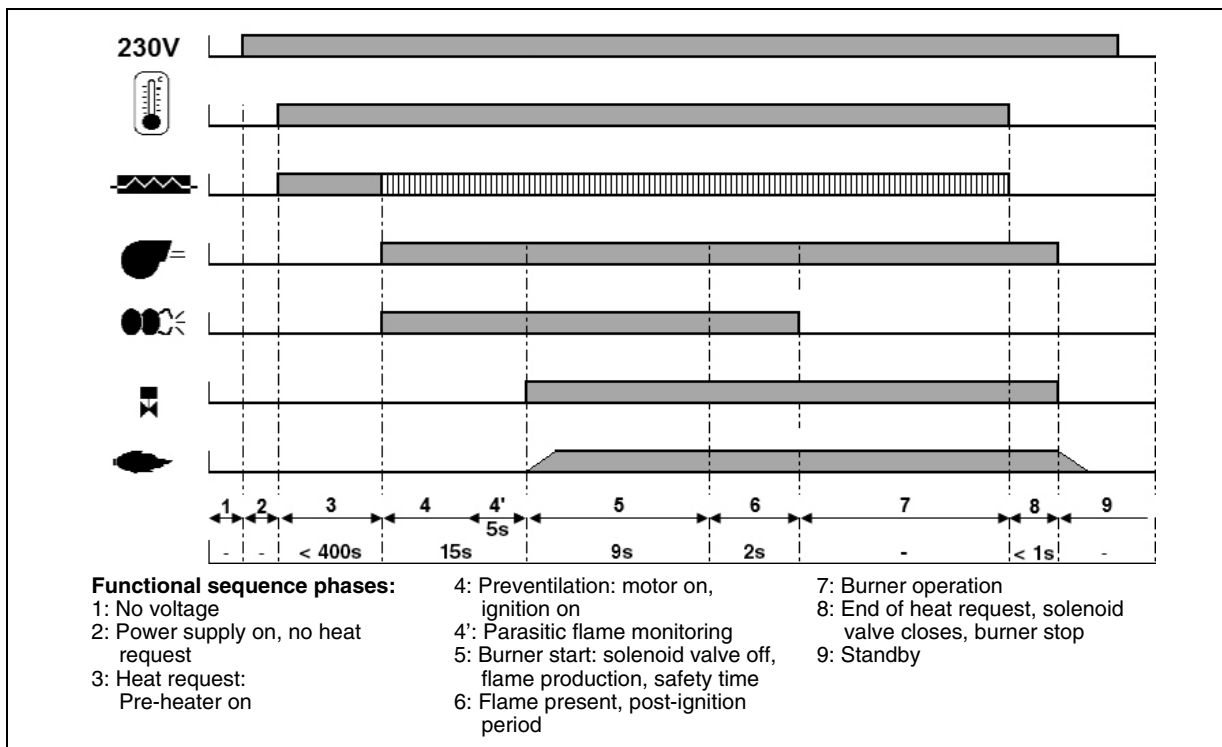
- A4** Display
- BP1** Push-button 1
Request: fault code
- BP2** Push-button 2
Request: values

The TCH 1xx fuel oil control and safety unit controls and monitors the forced draught burner. The microprocessor-controlled program sequence ensures maximum stability of time periods, regardless of fluctuations in the power supply or ambient temperature. The design of the automatic combustion control unit protects it from the effects of brownouts. Whenever the supply voltage drops below its rated minimum level, the control unit shuts down - even in the absence of a malfunction signal. The control unit switches itself back on again once the voltage has returned to normal levels.

Locking and unlocking the system
The control unit can be locked (switched to malfunction) and unlocked (malfunction cleared) by pressing the **R** reset button, provided the system is connected to the mains power supply.

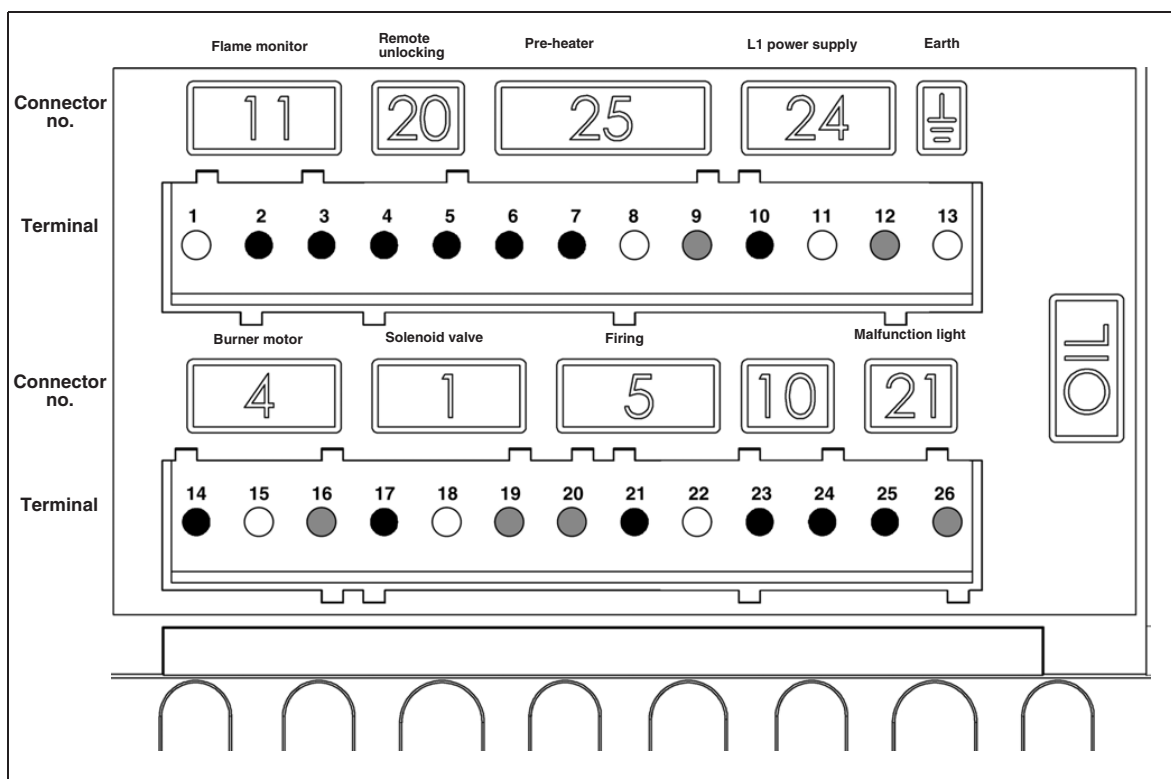
⚠ Always disconnect the power supply before installing or removing the control unit. Do not attempt to open or carry out repairs on the control unit.

Symbols	Description
	Waiting for heat request
	Waits for pre-heater (for burner with pre-heater)
	Burner motor on
	Start of ignition
	Flame present



Function

Allocation chart Connection socket

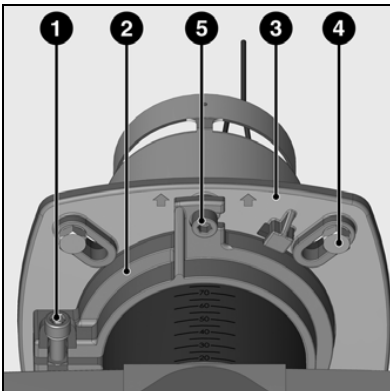


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Terminal	Designation	Connector no.	Terminal	Designation	Connector no.
1	Earth	11	14	Burner motor phase	4
2	Flame monitor signal		15	Earth	
3	Live		16	Neutral	
4	Remote release signal	20	17	L1 solenoid valve network-side	1
5	Live		18	Earth	
6	Live	25	19	Neutral	5
7	Pre-heater/release contact		20	Neutral	
8	Earth		21	Ignition transformer phase	
9	Neutral	24	22	Earth	10
10	Live		23		
11	Earth		24		
12	Neutral		25	Fault display phase	
13	Earth	26	Neutral		

Assembly

Burner assembly Burner installation position



Burner assembly

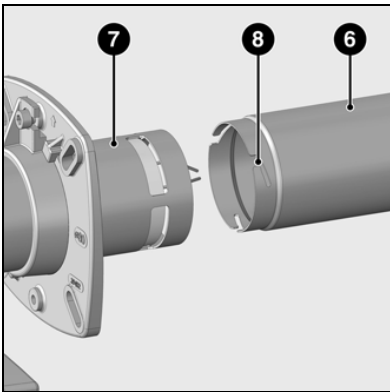
The burner flange 3 is equipped with elongated holes and can be used with a hole circle diameter of 150 - 170 mm. These dimensions comply with EN 226. Sliding the pipe bracket 2 on the burner pipe makes it possible to adjust the installed depth of the combustion head to the geometry of the furnace concerned. The installed depth remains the same during fitting and removal. Pipe bracket 2 secures the burner to the connecting flange and therefore to the boiler. This completely seals off the combustion chamber.

Installation:

- Secure connecting flange 3 to the boiler using screws 4
- Fit pipe bracket 2 to the burner pipe and secure using screw 1. Tighten screw 1 to a maximum torque of 6 Nm.
- Turn the burner slightly, guide it into the flange and secure using screw 5.

Removal:

- Loosen screw 5.
- Turn the burner out and pull it out of the flange.



Flame tube installation

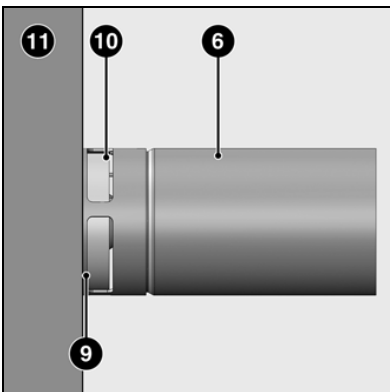
- Following installation of the burner, open the boiler door.
- Fit flame tube 6 onto burner pipe 7 and turn it clockwise until bayonet socket 8 is firmly engaged.

Burner installed depth

Adjust the burner installed depth in such a way that the rear edge 9 of the recirculation opening 10 closes flush with the boiler door insulation 11. Close the boiler door carefully. **Make sure that there is a free swivel radius for flame tube 6.** If necessary, pull the burner back further and cut out the boiler door insulation accordingly.

Exhaust system

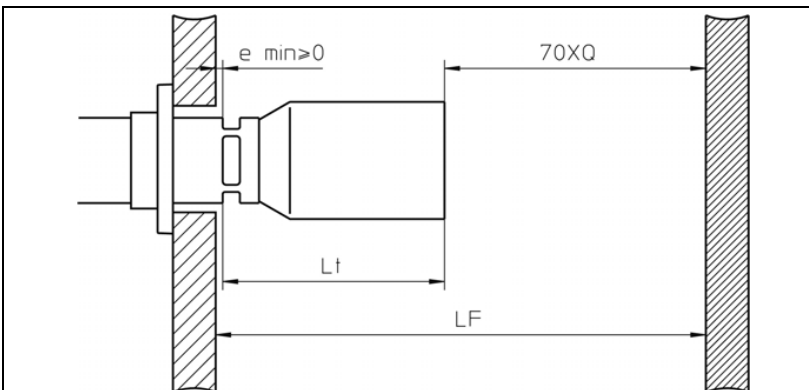
To avoid unfavourable noise emissions, right-angled connectors should not be used on the flue gas side of the boiler.



Positioning

- 1 Corrugated-head screw on pipe bracket
- 2 Pipe bracket
- 3 Connecting flange
- 4 Screws on flange
- 5 Corrugated-head screw on flange
- 6 Identification plate
- 7 Burner tube
- 8 Twist and lock
- 9 Rear edge of recirculation opening
- 10 Recirculation opening
- 11 Boiler door insulation

The recirculation opening must be completely free and easily accessible in the combustion chamber to allow exhaust gas to return unimpeded. It must not be covered by insulation.

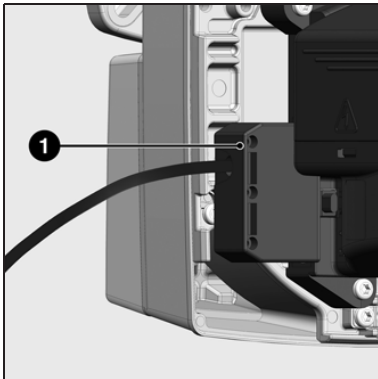


The necessary minimum distance between the front edge of the blast tube and the rear wall of the combustion chamber can be calculated using the formula $70 \times Q$ ($Q = \text{kg oil/h}$). The minimum length of the combustion chamber L_F is therefore calculated as:
 $L_F = e + L_t + 70 \times Q$

- $L_t (1.20) = 156 \text{ mm}$
- $L_t (1.24) = 156 \text{ mm}$
- $L_t (1.28) = 166 \text{ mm}$
- $L_t (1.30) = \text{xxx mm}$
- $L_t (1.35) = 206 \text{ mm}$

Assembly

Electrical connection Oil connection, oil burner pump Checks before commissioning



Electrical connection

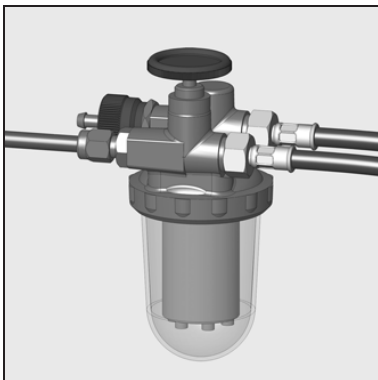
The electrical installation and connection work must only be carried out by an authorised electrical specialist. All applicable rules and regulations must be observed.

This burner contains electronic components; it is advisable to connect a type A FI multipole switch upstream of the system to detect error currents with a direct current component.

- Check to ensure that the power supply voltage is as specified (230 V, 50 Hz)
- Burner fuse: 10 A.

The burner and heat generator are connected by a 7-pin connector 1.

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Oil connection

The oil hoses supplied are already connected to the oil burner pump. The supply hose is individually marked to reduce the risk of swapping the hoses. The oil is connected by a single pipe system with bleed filter. The filter must be located in such a way that the correct hose routing cannot be impaired. The hoses must not kink.

Cu pipe DN 4 (4x6) should be used as a fuel-oil tube.

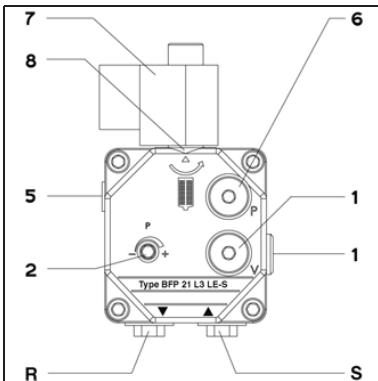
CH: Polyamide fuel-oil tube DN4, DIN 16773, item no. 501183.

For threshold values for suction line lengths and suction heights, see the guideline for planning and dimensioning plants with suction installations. This guideline is an integral part of the ELCO planning criteria. The Procal guideline applies for CH.

The suction conduit is passed up to 5 cm above the tank floor in cubic tanks, and up to 10 cm above the tank floor in cylindrical tanks.

Electrical connection for water protection valve (CH)

- The water protection valve (installation site) is located on connector C.



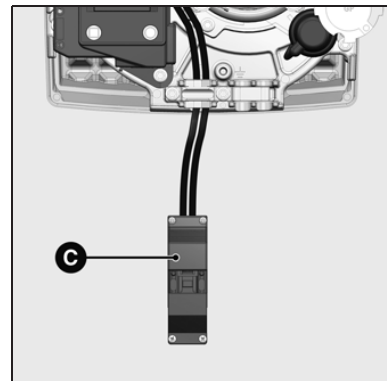
Oil burner pump

The oil burner pump used is a self-priming gear pump, which must be connected as two-line pump via a bleed filter.

There is an intake filter and an oil pressure regulator integrated in the pump.

Cleaning the pump filter

The filter is located underneath screw 8.



Positioning

- 1 Vacuum gauge connection
- 2 Oil pressure regulating screw
- 5 Pressure connection to the nozzle
- 6 Pressure gauge connection
- 7 Solenoid valve
- 8 Filter
- S Supply connection
- R Return connection

Checks before commissioning

Check the following points on the system:

- Water pressure in heating circuit
- Circulation pumps in operation
- Additional air device in flue operable (if present)
- Power supply (230 V) to the boiler control panel is ensured
- Oil level in tank
- Oil hose connections (feed/return, tightness)
- Open fuel-oil valves
- Burner combustion head settings

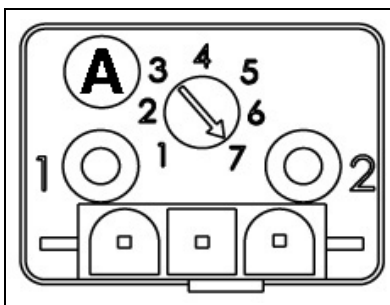
- Ignition electrode settings
- Thermostat settings

Before start-up, draw up oil with a hand pump. Switch on the burner for start-up. Open the bleed screw at the oil filter to allow the oil line to bleed fully. Negative pressure should not drop below 0.4 bar. Close the bleed screw once the filter is completely full of oil and the oil comes out free of bubbles.

Start up

Adjustment data Checking the combustion head

Burner	Burner output kW	Air nozzle Ø mm	Danfoss GpH nozzle	Nozzle type	Pump pressure bar	Air volume scale	Recirculation opening scale	Oil-air nozzle distance mm	Air intake adjuster scale
VB1.20	11	19	0,30	60° S	7,5	2	2	2,5	1
	15	19	0,30		14	5	2	2,5	1
	20	19	0,30		24	9	2	2,5	1
	15	19	0,40		11	5	2	2,5	1
	17	19	0,40		14	6	2	2,5	1
VB1.24	20	19	0,40	60° S	19	9	2	2,5	1
	18	22	0,45		10	6	3	2,5	1
	21	22	0,45		14	8	3	2,5	1
VB1.28	24	22	0,45	80° S	17	10	3	2,5	1
	20	22	0,50		11	7	4	2,5	1
VB1.30	23	22	0,50	80° S	20	18	4	2,5	1
	25	24	0,55		11	9	4	2,5	1
VB1.35	28	24	0,55	80° S	14	12	4	2,5	1
	30	24	0,55		15	18	4	2,5	1
	28	26	0,60		11	9	3	2,5	1
	31	26	0,60		14	12	3	2,5	1
	35	26	0,60		18	18	3	2,5	1



IRD probe setting

Burner in operation.

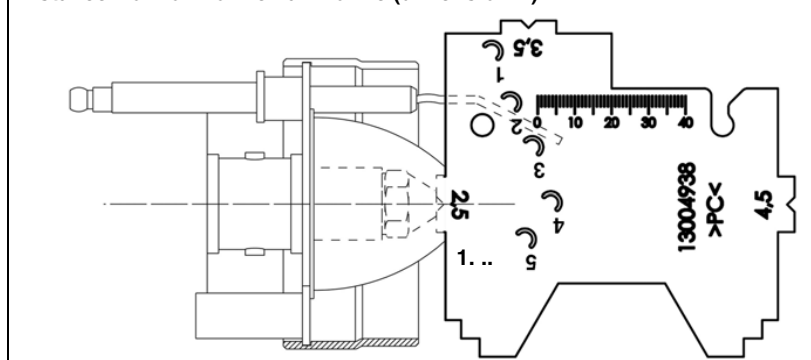
- Turn potentiometer **A** back to the probe until the 1st LED goes out.
- Turn the potentiometer up 2 scale values.

The setting data above corresponds to **basic settings**. The factory-set adjustment values are outlined in bold. These adjustment values are normally suitable for commissioning the burner. Always check the adjustment values on a case by case basis. System-specific corrections may be necessary. The following nozzle types are recommended to achieve favourable combustion values:

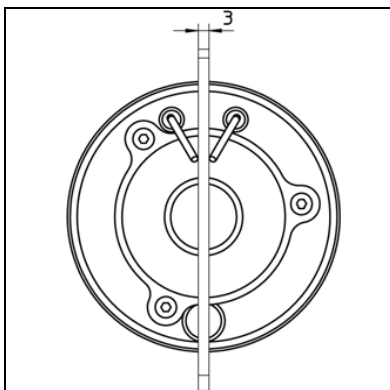
Danfoss 80°S
Danfoss 60°S
Delavan 80° B.

The setting template included with the burner can be used for the following functions.

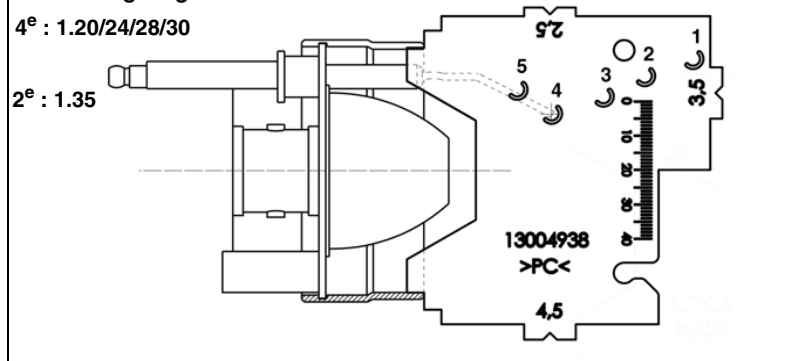
Distance from oil nozzle - air nozzle (dimension Y)



Ignition electrode settings

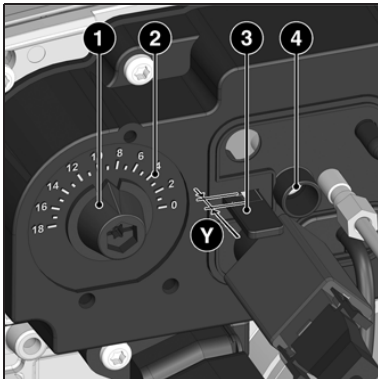


Positioning of ignition electrodes



Start up

Air regulation Oil pressure regulation Operating check



Positioning

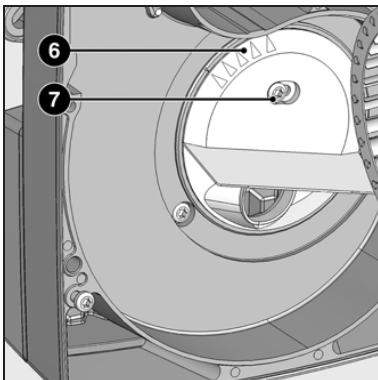
- 1 Air volume regulating knob
- 2 Air volume graduated scale
- 3 Recirculation opening graduated scale
- 4 Recirculation opening adjusting screw (varnished in the factory)
- 6 Air intake adjuster
- 7 Adjustment screw for air intake adjuster

The **airflow** is adjusted by turning regulating knob **1**.

- Turn the regulating knob
- clockwise to reduce airflow and increase CO₂
 - anti-clockwise to increase airflow and reduce CO₂

The adjustment value defined in the adjustment table can be read from control scale **2**. Fine adjustment requires the use of a suitable gauge. A CO₂ value of 12.5% - 13.5% must be set.

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Air intake adjuster 6 is set at the factory.

Position 1 = max. blower pressure
Position 5 = min. blower pressure
In cases where a higher blower pressure proves a disadvantage, e.g. large negative pressure in the combustion chamber, the pressure can be reduced by adjusting the air intake adjuster:

- Loosen adjustment screw **7**
- Set air intake adjuster to the new value
- Tighten the screw again.

Setting recirculation

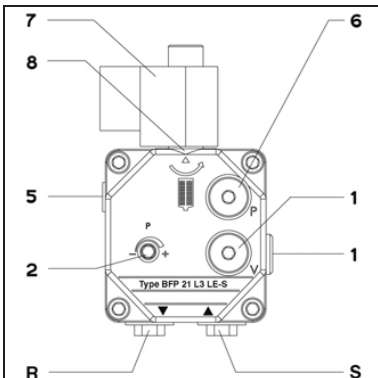
The recirculation opening is preset at the factory (adjustment screw varnished).

It does not normally need to be adjusted. In the event of output changes, see the setting table on page 23.

An NO and CO meter must be connected in order to set the recirculation quantity correctly. The width of the recirculation opening is set by shifting the combustion head in the burner pipe longitudinally.

Positioning takes place at adjusting screw **3** in accordance with the value specified in the setting data table. This value can be read at scale **4**. Once recirculation has been adjusted, a new start attempt should be made after pausing operation for approximately 5 minutes. If the burner does not start or does not start on time, the recirculation must be adjusted to smaller scale values until safe start can be ensured (cold start).

Do not operate the burner with the recirculation opening closed, or open too little. This would cause the temperature of the combustion head to rise significantly and could cause damage to the combustion head.



Oil pressure regulation

The oil pressure, and therefore burner output, is adjusted using oil pressure regulator **2** in the pump.

Turn:

- right: higher pressure,
- left: lower pressure.

Connect a pressure gauge at point **6** (with R1/8" thread).

Checking negative pressure

The vacuum meter for checking negative pressure must be connected to point **1**, R1/8". Maximum permissible negative pressure is 0.4 bar. At higher negative pressures, the fuel oil gasifies, which causes scraping noises in the pump.

Operating check

Flame monitoring must be checked for safety as part of initial commissioning and also after servicing or if the system has been out of operation for any significant period of time.

- Starting attempt with flame monitor unlit: The automatic combustion control unit must switch to malfunction at the end of the safety time
- Start with flame monitor lit: The automatic combustion control unit must switch to malfunction after 10 seconds of prevention
- Normal start; flame monitor goes out when burner in operation: The automatic combustion control unit must switch to malfunction after the restart and end of the safety time

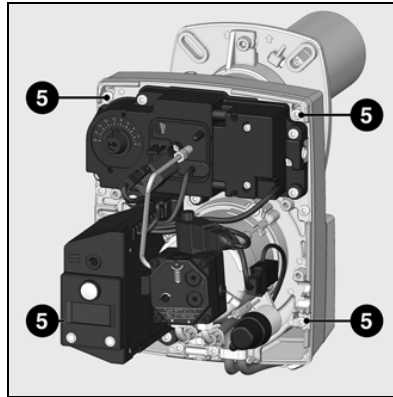
Service

Maintenance

Burner and boiler servicing must only be carried out by a professionally qualified heating engineer. The system operator is advised to take out a service contract to guarantee regular servicing.

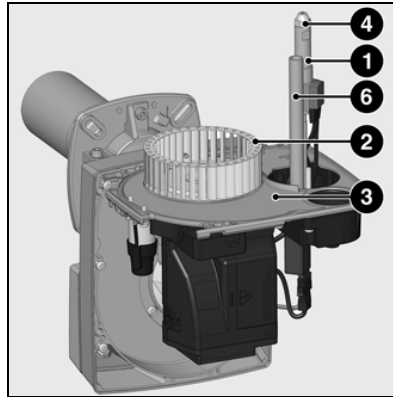
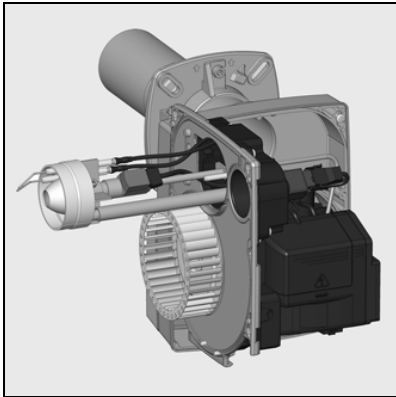
Checking the exhaust gas temperature

- Check the exhaust gas temperature.
- Clean the boiler if the flue gas temperature is more than 30K above the value measured at the time of commissioning.



Positioning

- 1 Nozzle rod
- 2 Air fan
- 3 Housing plate
- 4 Nozzle
- 5 Fastening screws for housing plate
- 6 Flame monitor
- 11 Blast tube
- 12 Clamping screw for connecting flange



Burner maintenance positions

After removing the screws 5, the equipment plate can be hung in two maintenance positions.

Position 1

For example, for maintenance work on the pump

Position 2

For example, for maintenance work on the combustion head

Maintenance on the burner

Maintenance position 1

- Check oil supply components (tubes, pumps, oil feed tube) and their connections for leaks or signs of wear, replace if necessary.
- Check electrical connections and connection cables for damage, replace if necessary.
- Check pump filter and clean if necessary.

Maintenance position 2

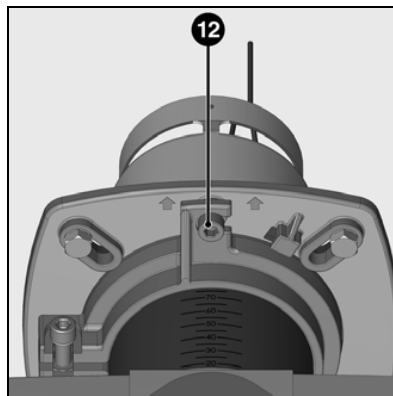
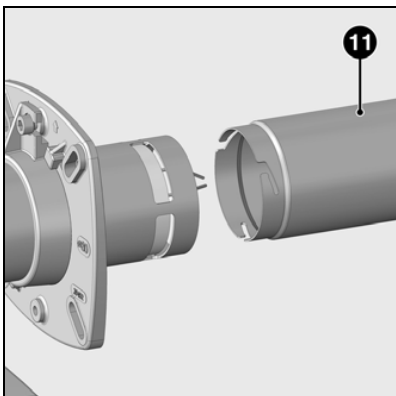
- Clean blower wheel and housing and check for damage.
- Check and clean the combustion head.
- Remove baffle plate.
- Replace oil nozzle.
- Check ignition electrodes, readjust or replace as necessary.
- Fit combustion head. Observe the adjustment dimensions (see page 23) when using the setting template.
- Fit burner.
- Start burner, check flue gas values, correct burner settings if necessary.
- Perform flame monitor function check (see page 24).

Removing the burner from the connecting flange

- Switch off the power
- With the boiler door open, turn flame tube 11 and pull it off (bayonet socket)

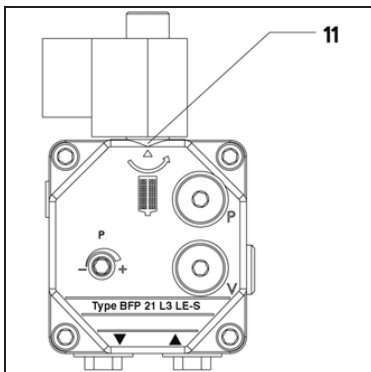
⚠The fire tube may be hot

- Undo clamping screw 12 on the connecting flange
- Turn the burner out of the bayonet socket, lift it slightly and pull it out of the connecting flange



Service

Maintenance



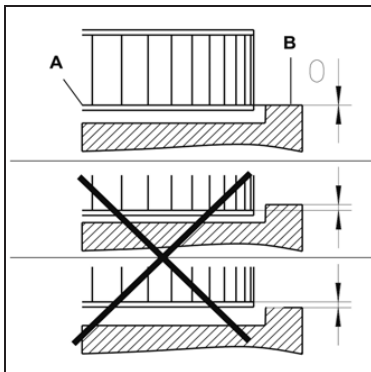
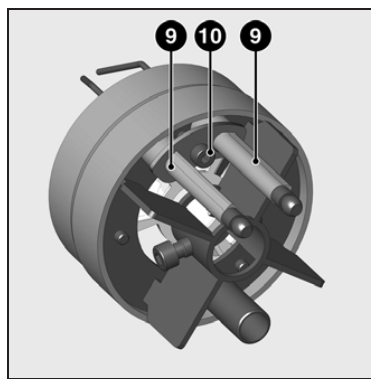
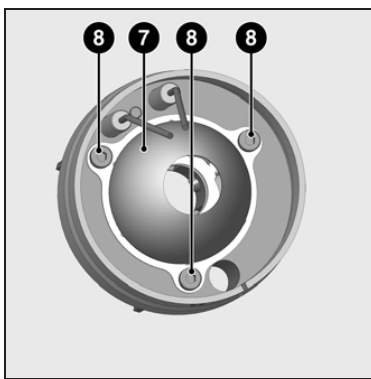
Cleaning the pump filter

- Unscrew locking screw 11.
- Carefully clean/replace filter.
- Reinsert filter.
- Check/replace O-ring seal.

Cleaning the oil line filter

- Close the shut-off valve on the filter
- Clean/replace the filter element
- When you open the shut-off valve, check the filter system for tightness.

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Installing the air fan

Observe the positioning diagram below when replacing the motor and air fan. Inside flange **A** of the air fan must be fitted at the same level as housing plate **B**. Insert a straight edge between the wing of the air fan and bring **A** and **B** to the same height; tighten the set screw on the air fan.

Positionings

- 7 Air nozzle
- 8 Air nozzle fastening screws
- 9 Ignition electrode
- 10 Ignition electrode fastening screw
- 11 Filter
- A Air fan inner flange
- B Housing plate (inner surface)

Troubleshooting

Fault diagnosis and repair

In the event of a malfunction, first check that the prerequisites for correct operation are fulfilled:

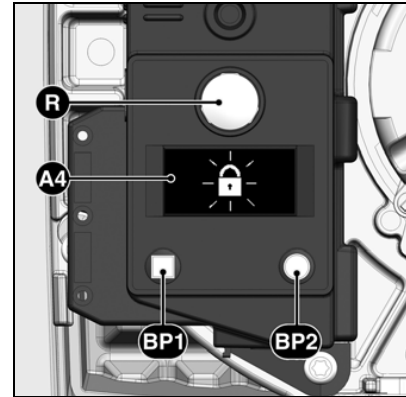
1. Is the system connected to the power supply?
2. Is there oil in the tank?
3. Are all shut-off valves open?
4. Are all control and safety devices, such as the boiler thermostat, low-water detector, limit switch, etc. adjusted correctly?

If the cause of the malfunction cannot be ruled out by the checks described above, check the functions associated with individual burner parts.

Safety components must not be repaired. They must always be replaced with parts with the same order number.

⚠ Only use original spare parts. Disconnect the electrical supply before carrying out any maintenance or cleaning work.

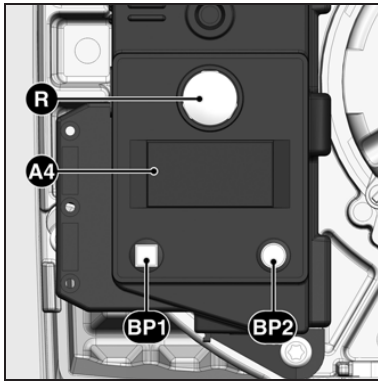
After any work in the system, check combustion under normal operating conditions (doors closed, cover fitted, etc.). Enter the measurement values in the boiler room documentation.



- A4** Display
- BP1** Push-button 1
Request: fault code
- BP2** Push-button 2
Request: values

Symbol	Symbol Fault	Cause	Remedy
	No heat request	Thermostats defective or incorrectly adjusted	Adjust the thermostats, replace if necessary.
	Burner does not start.	Drop in supply voltage or power failure.	Check the cause of the fall in voltage or the power failure.
	No malfunction indicated on the automatic combustion control unit.	Control unit malfunction.	Replace the control unit.
	Burner starts at switch-on for very short period and then shuts down	The control unit has been manually locked.	Reset control unit.
	Burner starts and then shuts down after preventilation	Parasitic flame during preventilation/ pre-ignition phase	Check ignition sparks/adjust or replace electrode Check/replace fuel-oil solenoid valve
	Burner starts and then shuts down after the solenoid valves have opened	No flame signal at end of safety time	Check the oil level in the tank. Top tank up as required. Open the valves. Check the oil pressure and the operation of the pump, coupling, filter, solenoid valve.
	Flame extinguishing during operation	Flame goes out during operating phase	Check ignition circuit, electrode adjustment. Clean/replace electrodes. Clean/replace flame monitor. Replace the following items as required: Ignition electrodes / ignition cables / ignition transformer / nozzle / pump / solenoid valve / automatic combustion control unit.

Maintenance frequency indicator Fuel oil stock indicator



- A4** display
- BP1** push-button 1
Request: fault code
- BP2** push-button 2
Request: values

After a certain period of operation, the following information may be displayed:



This means that **maintenance** must be carried out by a specialist.



If the fitter has registered his **telephone number**, then this appears,



as well as the **number of the completed service contract** (accessible via the fault menu)

To change the telephone number:

- Call up the fault menu by pressing **BP1**, then keep pressing the button to scroll through **BP1** until the desired pictogram is displayed.
- Press **BP2** to enter a change in the pictogram: the first figure flashes.
- Select the value (from 0 to 9) by repeatedly pressing **BP1**.
- Confirm by pressing **BP2**.
- Repeat the operation until you reach the last figure.

After confirming the last figure, the complete pictogram is displayed for 5 seconds, then the control unit returns to the operating screen.

To change the contract number

- Call up the fault menu by pressing **BP1**, then keep pressing the button to scroll through until the desired pictogram «contract number» is displayed.
- Press **BP2** to enter a change in the pictogram: the first figure flashes.
- Select the value (from 0 to 9) by repeatedly pressing **BP1**.
- Confirm by pressing **BP2**.
- Repeat the operation until you reach the last figure.

After confirming the last figure, the complete pictogram is displayed for 5 seconds, then the control unit returns to the operating screen.

The fuel oil stock indicator can be accessed:



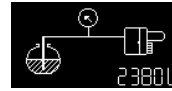
Nozzle size (value can be changed) (0.5 - 1.5)



Pump pressure (value can be changed) (8.0 - 17.0)



Quantity of fuel oil in the tank (value can be changed)



Estimating the quantity of fuel oil in the tank (value calculated)

To do this while the burner is operating:

- Press and hold button **BP1** for at least 5 seconds: The nozzle size pictogram is displayed.

To change the nozzle size:

- Press **BP2** to enter a change in the pictogram: the figure flashes.
- Select the value (nozzle size, in increments of 0.05 US GAL/h) by repeatedly pressing button **BP1**.
- Confirm by pressing **BP2**.

The screen then displays the pump pressure.

To change the pump pressure value:

- Press **BP2** to enter a change in the pictogram: the figure flashes.
- Increase the value (in increments of 0.5 bar) by repeatedly pressing button **BP1**.
- Confirm by pressing **BP2**.

The quantity of fuel oil in the tank is then shown in the display (fuel oil reserve).

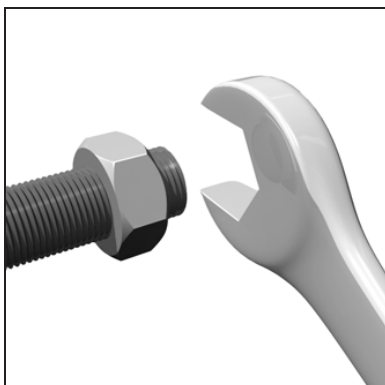
To enter the fuel oil reserve:

- Press **BP2** to enter a change in the pictogram: the figure flashes.
- Enter the value (4 figures from 0 to 9) by repeatedly pressing **BP1**.
- Confirm by pressing **BP2**.

The screen then displays an estimate of the quantity of fuel oil in the tank. The value changes over time, depending on the values entered above and the burner runtime.

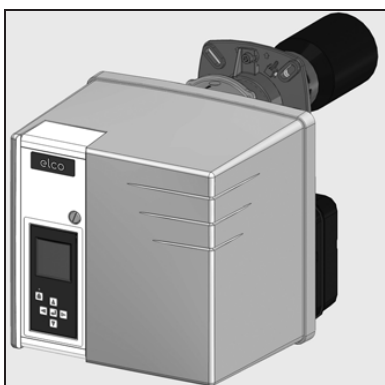
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VB 2.. VD



Operating instructions For specialist installation engineers Fuel oil burners

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de, fr.....	4200 1046 8002
it, nl.....	4200 1046 8102
en.....	4200 1046 8202



de, fr, it, nl, en.....	4200 1046 7903
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.....	420 110 084 400
-------	-----------------



.....	4200 1068 3900
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Overview

Contents

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Important information

VB2.. VD blue-flame burners are designed for the low-pollution combustion of extra light fuel oil in accordance with the following standards:

AT: ÖNORM C1109: standard and low sulphur

BE: NBN T52.716: standard and NBN EN 590: low sulphur

CH: SN 181160-2: standard and low sulphur

DE: DIN 51603-1 : standard and low sulphur
DINV 51603-6 ELA BIO 10

The design and function of the burners meet standard EN 267.

Assembly, start-up and maintenance must only be carried out by authorised specialists and all applicable guidelines and regulations complied with. This device is not designed for use by individuals (including children) whose physical, sensory, or mental abilities are reduced, or by persons lacking in experience and/or knowledge, unless supervised by a person responsible for their safety or if they are following the latter's recommendations concerning the use of the device.

Children must be supervised to ensure they do not play with the device.

Burner description

VB2.. VD blue-flame burners are 2-stage monoblock type devices. The special design of the burner head with internal recirculation of the combustion gases provides highly efficient, low-polluting combustion. According to tests as defined by EN267, the values produced comply with emissions class 3, the most stringent standard, and with the requirements of following national legislation relating to the environment:

AT: KFA 1995, FAV 1997

CH: OPAir 2005

DE: 1.BImSchV

They are suitable for use with all heat generators complying with standard EN 303 or for use by hot air generators complying with DIN 4794 or DIN 30697 within their respective performance range. Any other type of application requires the approval of ELCO.

Packaging

The following are included in the burner packaging:

- 1 connecting flange with insulating gasket
- 1 bag containing fittings
- 1 bag containing technical documentation
- 1 blast tube
- 1 setting template

The following standards should be observed in order to ensure safe, environmentally sound and energy-efficient operation:

EN 226

Connection of fuel oil and gas burners with blast air to the heat generator

EN 60335-1, -2-102

Safety of electrical equipment for domestic use

Place of installation

The burner must not be operated in rooms with aggressive vapours (e.g. hair spray, tetrachloroethylene, carbon tetrachloride), high levels of dust or high air humidity (e.g. laundry rooms).

If no connection to an air exhaust system is provided for the air supply, a supply air inlet with the specifications set out below must be installed:

- DE: up to 50 kW: 150 cm²
for every further kW: + 2.0cm²
- CH: Calorific power [kW] x 6 = ... cm²;
but at least 200 cm²

Variations may arise as a result of local regulations.

We cannot be held liable for any damage caused by the following situations:

- unauthorised use
- incorrect installation and/or repair on the part of the buyer or any third party, including the fitting of non-original parts.

Final delivery and instructions for use

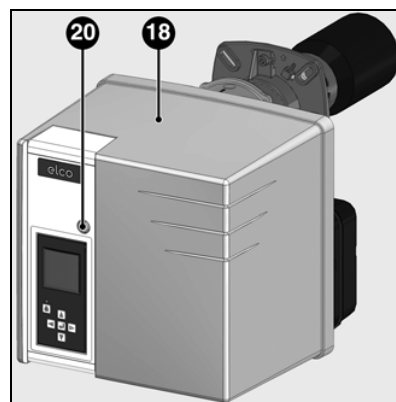
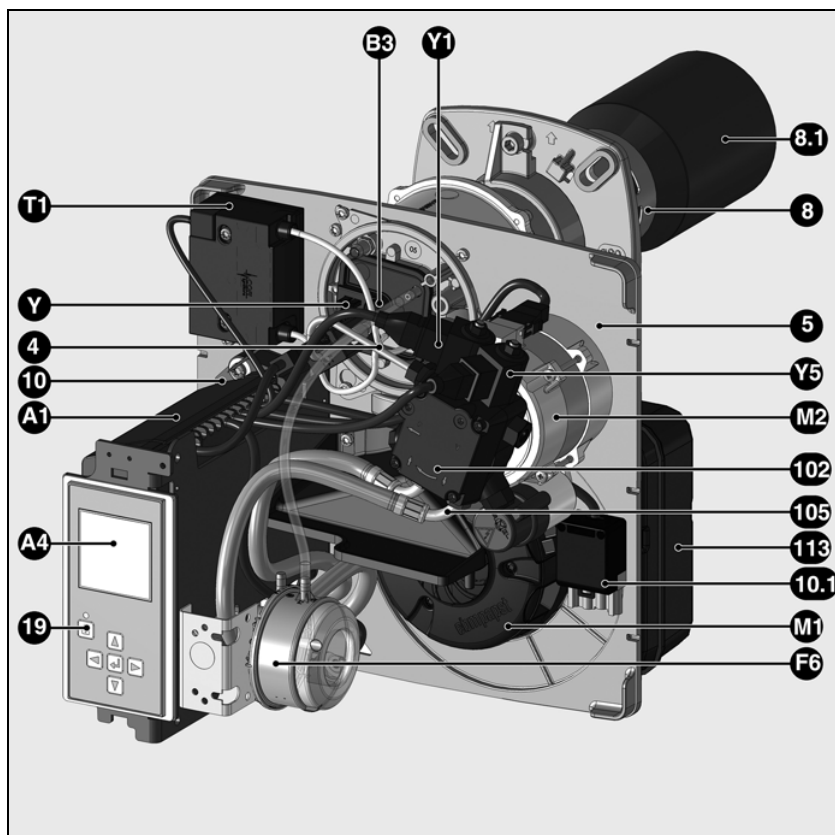
The firing system fitter must supply the operator of the system with operating and maintenance instructions on or before final delivery. These instructions should be displayed in a prominent location at the point of installation of the heat generator. They should include the address and telephone number of the nearest customer service centre.

Advice to the user

The system should be inspected by a specialist at least once a year. Depending on the type of installation, shorter maintenance intervals may be necessary! The system operator is advised to take out a maintenance contract to guarantee regular servicing.

Overview

Burner description



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- A1 Control and safety unit
- A4 Display
- B3 Flame detector
- M1 Fan motor
- M2 Pump motor
- T1 Igniter
- Y Adjusting screw dimension Y (recirculation)
- 4 Nozzle line tube
- 5 Base plate
- 8 Burner pipe
- 8.1 Flame tube (supplied disassembled)
- 10 7-pin connector (hidden)
- 10.1 4 pin connector
- 18 Cover
- 19 Release knob
- 20 Hood securing screw
- 102 Fuel oil pump
- 105 Fuel oil hoses
- 113 Silencer
- Y1, Y5 Solenoid valves

Operation

Operation Safety function

Heating function

If the system demands heat, the pre-heater is switched on first. When the oil preheating temperature is reached, a thermostat in the pre-heater activates the program sequence. The heating time with cold start is approximately 2 minutes.

Starting the burner

- If heat is requested by the boiler regulator, the automatic oil combustion control unit starts the program sequence.
- The fan motor starts, air pressure is checked.
- Pre-ventilation
- The pump motor and ignition are on.
- Solenoid valve **6** opens, the pressure is regulated via the pressure controller **5**.
- Flame formation.
- The ignition is switched off.

Burner mode, control between partial and full load

The burner is equipped with a nozzle and operates at two different fuel oil pressures (partial load and full load). These pressures are controlled independently by two regulators fitted in the pump. If an increase in load is requested by the boiler regulator, the burner switches from partial load mode to full load mode after a delay of approximately 13 seconds.

- The fan motor **10** reaches the speed for full load mode.
- If the fan speed (quantity of air) is adjustable, the solenoid valve **3** closes, the partial load pressure controller **5** is deactivated and the full load pressure controller **2** regulates the pressure.
- The fan motor continues to run at the

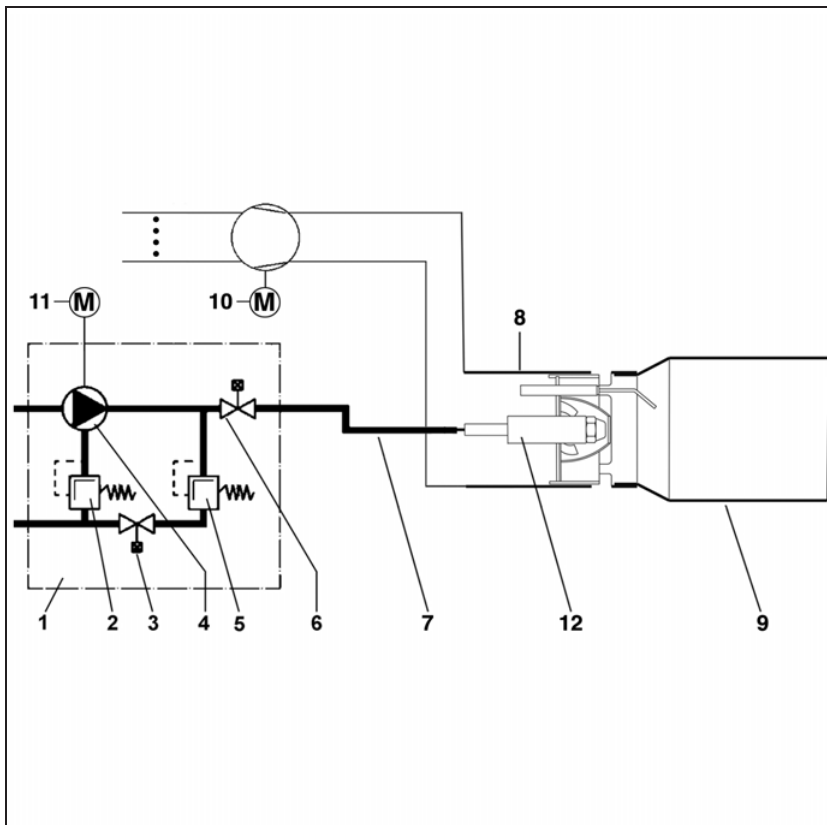
maximum load speed, and maximum load mode is active.

Safety function

A lockout occurs on the device:

- if a flame signal is present during pre-ventilation (stray light monitoring)
- if, when the burner starts up (fuel release), no flame is produced after 5 seconds (safety time)
- if no flame is produced in the event of flame failure during operation after repeated unsuccessful attempts to run the program.

A safety shutdown is indicated by the fault indicator lamp lighting up; the fault can then be acknowledged by pressing the reset button after the cause of the fault has been rectified.



Schematic diagram

- 1 Two-stage pump
- 2 Oil pressure regulator, full load
- 3 Solenoid valve, full load (NO)
- 4 Pump
- 5 Oil pressure regulator, partial load
- 6 Solenoid valve (NC)
- 7 Nozzle line
- 8 Burner pipe
- 9 Flame tube
- 10 Blower motor
- 11 Pump motor
- 12 Oil preheating

Operation

TCH 24x control unit



The TCH 24x fuel oil automatic combustion control and safety unit controls and monitors the forced draught burner. The microprocessor-controlled program sequence ensures maximum stability of time periods, regardless of fluctuations in the power supply or ambient temperature. The control and safety unit is equipped with a device to protect against the effects of brownouts. Whenever the supply voltage drops below its rated minimum level (< 185V), the control unit shuts down - even in the absence of a malfunction signal. The control unit switches itself back on again once the voltage has returned to normal levels (> 195V).

Pressing and holding the unlocking button for...	... causes
... 1 second ...	the control and safety unit to unlock.
... 2 seconds ...	the control and safety unit to lock
... 9 seconds ...	Deleting the control unit statistics

Locking and unlocking

The control unit can be locked using the release knob or unlocked as long as the unit is powered on.

Always switch off the power supply before installing or removing the control unit. Do not attempt to open or carry out repairs on the control unit.

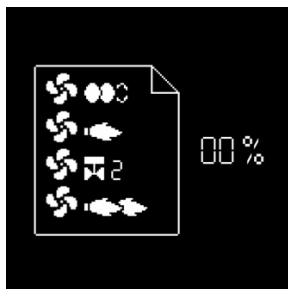
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- Moves the cursor upwards
- Moves the cursor downwards
- Increases the marked value
- Reduces the marked value
- Modifies/confirms the value shown
- Unlocks the control and safety unit
- Red LED (flashes if failure occurs)

Display	Description	Display	Description
	Waiting for boiler heating request		The ventilation speed decreases until it reaches the setting value for the ignition position
	Waits for pre-heater		Oil valve is opened, safety time
	The ventilation speed increases until it reaches the setting value for pre-ventilation		Flame is present, awaiting authorisation of regulation
	Pre-ventilation and pre-ignition		Burner in operation. The lower line shows the strength of the flame signal and the operating time of the burner

Operation

TCH 24x control unit



In parallel with its control and safety functions, the TCH 24x control unit allows the following to be set:

- the ventilation speed during ignition
- the 1st stage ventilation speed
- the ventilation speed by opening the 2nd stage valve (for switching from 1st to 2nd stage)
- the 2nd stage ventilation speed
- the ventilation speed by closing the 2nd stage valve (for switching from 2nd to 1st stage)

The parameters for the control and safety unit are set using the display and 5 keys.

Operating values are shown in real time on the display.

Pressing the keys gives access to 9 menus:



- Ventilation speed setting menu in the setting points



- Ventilation speed display menu in the setting points



- Fault diagnosis menu



- Operating statistics menu



- Setting/modification menu for standard configurations*



- Industrial applications setting menu*



- Manual control menu*



- Configuration mode menu*



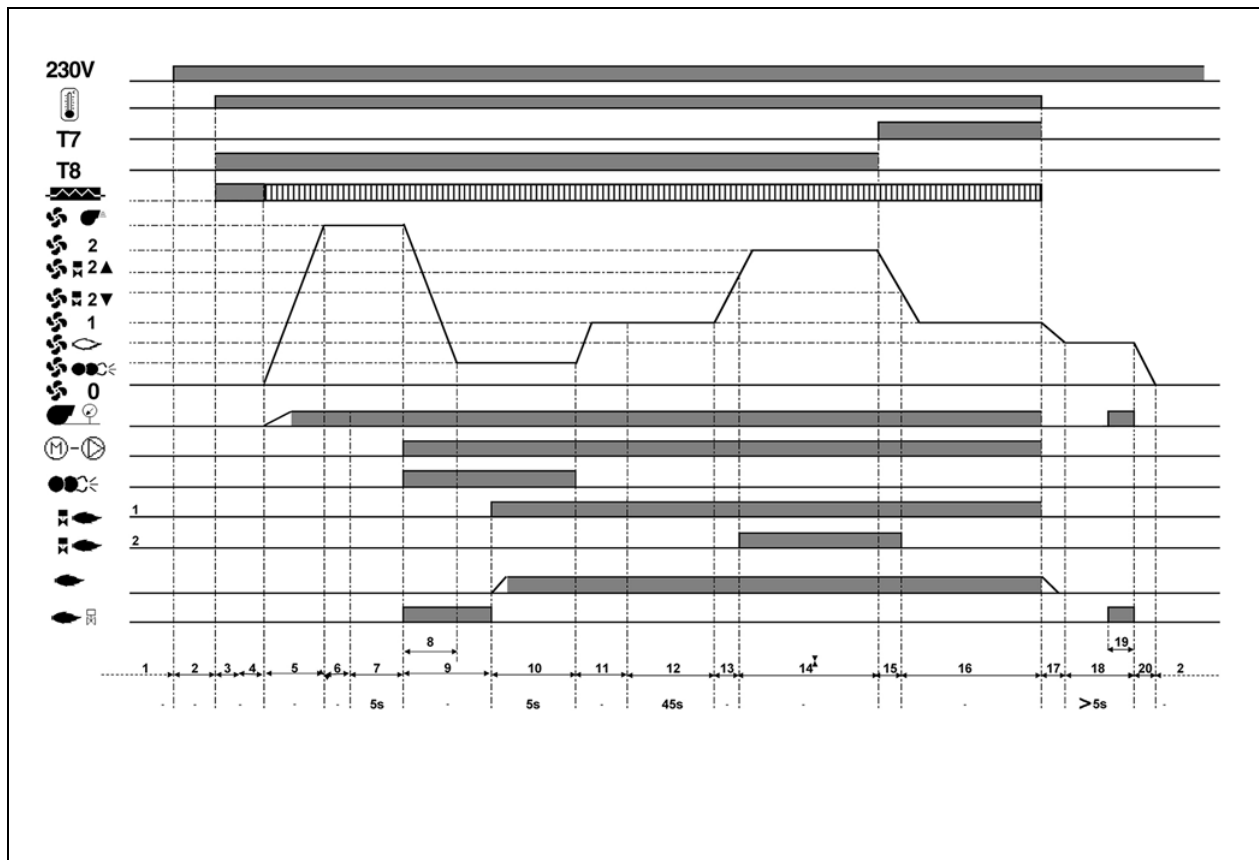
- Screen brightness and contrast setting menu

* In these menus, it is possible to adjust the control unit's standard configurations. These are pre-set in the factory. No modifications may be carried out on-site without prior consultation with ELCO. The access code and the setting setpoints for these menus are available on request.

Operation

TCH 24x control unit

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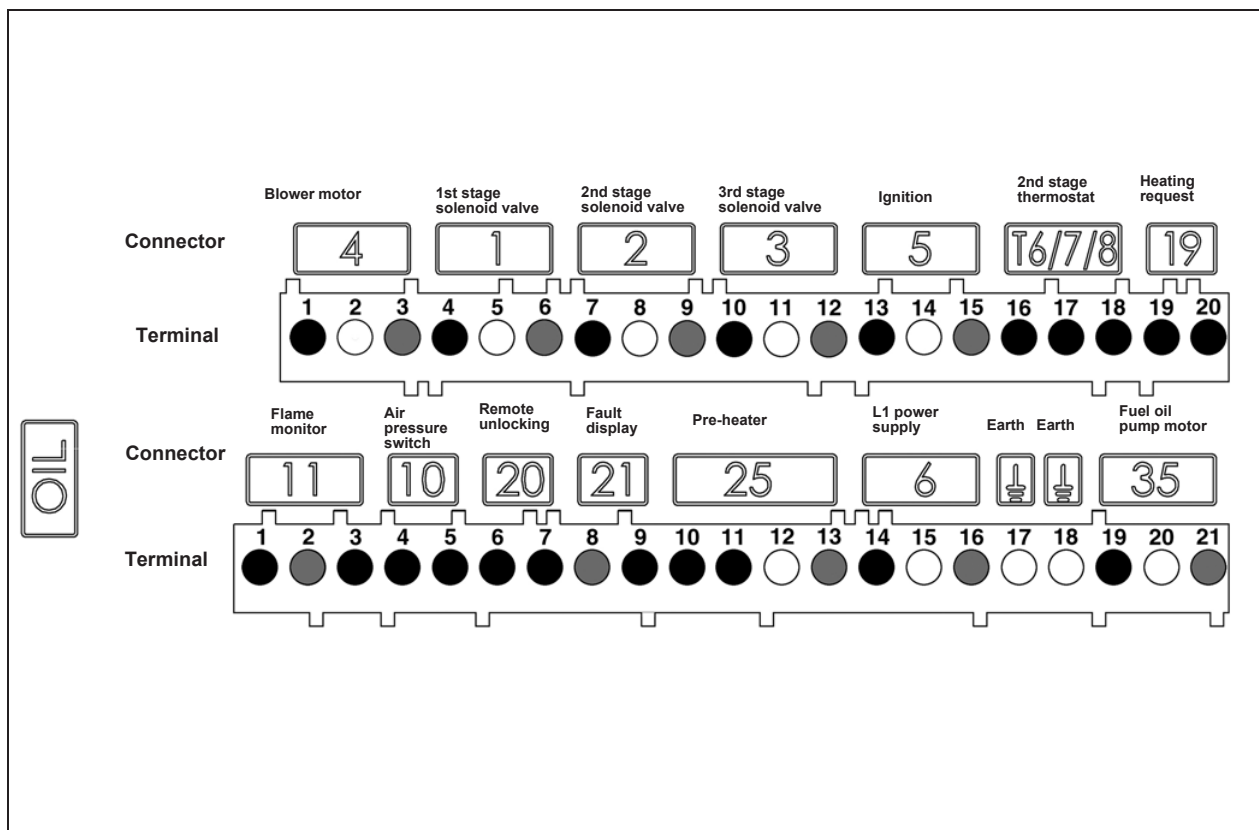


Program sequence phases:

- | | |
|---|---|
| 1: No voltage | 12: Awaiting authorisation for regulation |
| 2: Powering up, no heating request | 13: The fan speed is increased to the 2nd stage valve opening value |
| 3: Heating request, Verification of fan zero speed, pre-heater on | 14: Operation in 2nd stage |
| 4: Checking the rest status of the air pressure switch | 15: The fan speed is decreased to the 2nd stage valve closing value |
| 5: Fan speed is increased to the pre-ventilation position | 16: Operation in 1st stage |
| 6: Checking the air pressure | 17: Regulation cut-out, fan speed is decreased to the post-ventilation position |
| 7: Pre-ventilation | 18: Post-ventilation time |
| 8: The fan speed is decreased to the ignition position, pre-ignition and switching on of the pump motor | 19: Stray light and air pressure monitoring at the end of the post-ventilation time |
| 9: Stray light monitoring | 20: The fan speed is reduced to 0 |
| 10: Burner start-up: opening of the 1st stage solenoid valve, flame formation | - Awaiting a new heating request |
| 11: Stabilisation time, the fan speed is | |

Operation

Terminal allocation chart 230 Volt connection

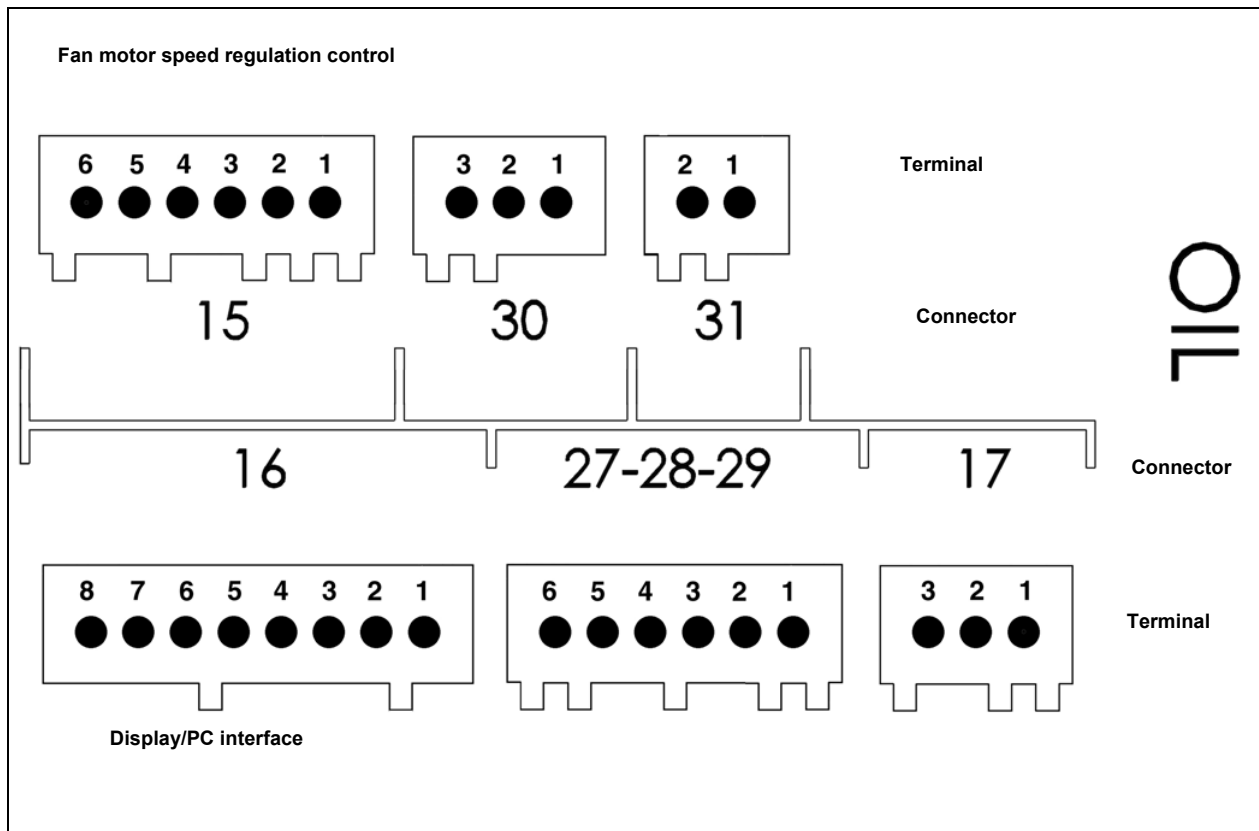


Terminal	Description	Connector	Terminal	Description	Connector
1	Burner motor live	4	1	Flame detector signal	11
2	Earth		2	Neutral conductor	
3	Neutral conductor		3	Live	
4	1st stage solenoid valve live	1	4	Live	10
5	Earth		5	Air pressure switch signal	
6	Neutral conductor		6	Live	
7	2nd stage solenoid valve live	2	7	Remote unlocking signal	20
8	Earth		8	Neutral conductor	
9	Neutral conductor		9	Malfunction signal live	
10	3rd stage solenoid valve live	3	10	Live	25
11	Earth		11	Pre-heater/authorisation contact	
12	Neutral conductor		12	Earth	
13	Ignition transformer live	5	13	Neutral conductor	6
14	Earth		14	Live L1	
15	Neutral conductor		15	Earth	
16	2nd stage thermostat live (T6)	T6/7/8	16	Neutral conductor	
17	Signal T7		17	Earth	
18	Signal T8		18	Earth	
19	1st stage thermostat live (T1)	19	19	Fuel oil pump live	35
20	Heating request signal (option T2)		20	Earth	
			21	Neutral conductor	

Operation

Terminal allocation chart Low voltage connections

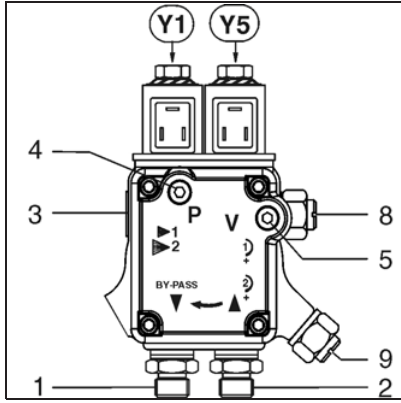
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Terminal	Description	Connector	Terminal	Description	Connector
1	Not used	17	1	Not used	31
2	Not used		2	Not used	
3	Not used		27 28 29	1	Fan motor speed regulation control
1	Not used	2			
2	Not used	3			
3	Not used	1		15	
4	Not used	2			
5	Not used	3			
6	Not used	16	4		
1	Display or PC interface		5		
2			6		
3					
4					
5					
6					
7					
8					

Operation

Pump

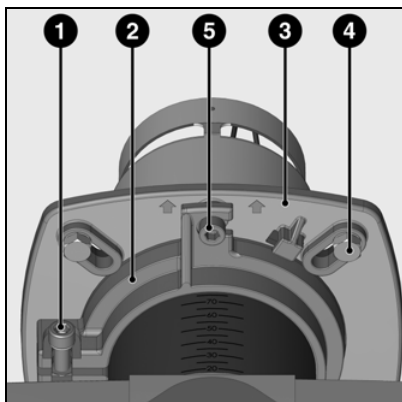


This is a gear pump. It must be connected as a two-line pump via a bleed filter. For the connection of the fuel oil tank and the bleed filter, it is better to use the single line option. An intake filter and two oil pressure regulators are integrated in the pump. Pressure gauges for pressure measurements **4** and negative pressure measurements **5** must be connected before the equipment is commissioned.

- | | | |
|----|-------------------------------|------|
| 1 | Return connection | G1/4 |
| 2 | Vacuum connection | G1/4 |
| 3 | Nozzle supply line connection | G1/8 |
| 4 | Pressure gauge connector | |
| 5 | Vacuum gauge connector | |
| 8 | 1st stage pressure setting | |
| 9 | 2nd stage pressure setting | |
| Y1 | Solenoid valve, 1st stage | |
| Y5 | Solenoid valve, 2nd stage | |

Installation

Burner installation Burner installation location



Burner installation

The burner flange 3 features three elongated slots and can be used for a drilling Ø of 150 to 170 mm (VB2.38/54 VD) and/or of 150 to 184mm (VB2.66/95 VD). These dimensions comply with EN 226.

Sliding pipe bracket 2 on the burner pipe makes it possible to adjust the installed depth of the combustion components to the respective geometry of the combustion chamber. The installed depth remains the same during fitting and removal.

Pipe bracket 2 secures the burner to the connecting flange and therefore to the boiler. This completely seals off the combustion chamber.

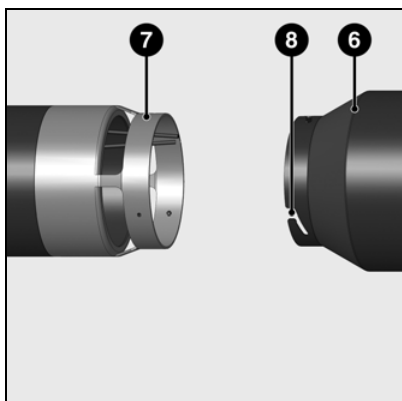
Installation:

- Secure connecting flange 3 to the boiler using screws 4.
- Fit pipe bracket 2 to the burner pipe and secure using screw 1. Tighten screw 1 to a maximum torque of 6 Nm.
- Turn the burner slightly, guide it into the flange and secure using screw 5.

Removal:

- Unscrew screw 5.
- Turn the burner out of the bayonet socket and pull it out of the flange.

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Fitting the flame tube

- After installing the burner, open the boiler door.
- Fit the flame tube 6 on the burner pipe 7 and turn clockwise until the bayonet joint 8 is securely in place.

Installed depth of the burner

The installed depth of the burner must be set so that the rear edge 9 of the recirculation orifice 10 is set at the same level as the boiler door insulation 11.

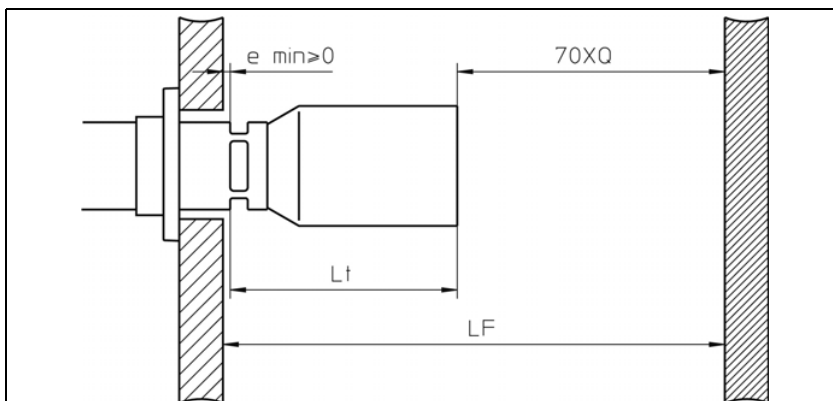
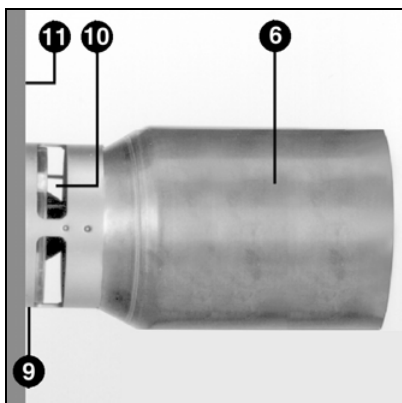
Carefully close the boiler door. **Ensure that the pivoting clearance radius of flame tube 6 is respected.**

If necessary, move the burner back slightly and then cut the insulation as needed.

The recirculation orifice must be positioned in the furnace so that it is completely unobstructed and easy to access, to allow flue gases to return unhindered. This orifice must never be obstructed by insulating material.

Exhaust system

To prevent unpleasant noise emissions, right-angled connectors should not be used on the flue gas side of the boiler.

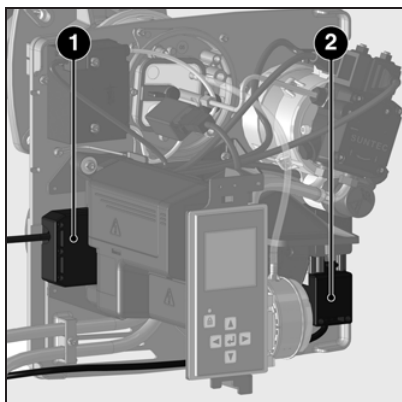


The minimum distance between the front edge of the flame tube and the bottom of the furnace can be calculated using the following formula:

$70 \times Q$ (Q=quantity of fuel oil in kg/h).
For a minimum length of the furnace of L_F , the result is:
 $L_F = e + L_t + 70 \times Q$
 L_t (VB 2.38...45) = 164
 L_t (VB 2.54...95) = 204

Installation

Electrical connection Fuel oil connection



All electrical installation and connection work must only be carried out by a suitably qualified service engineer. All applicable regulations and directives must be observed.

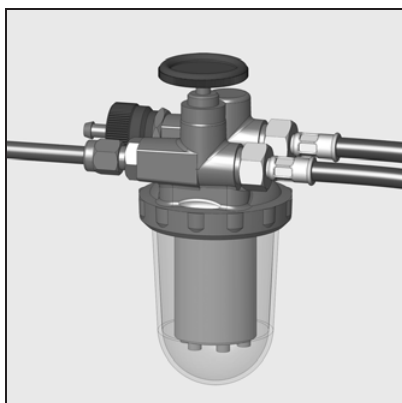
Electrical connection

- Check to ensure that the power supply is as specified (230V, 50 Hz single phase with neutral and earth).
Boiler fuse: > 6.3A

Electrical connection



It must be possible to disconnect the burner from the mains using an omnipolar shutdown device complying with the standards in force. The burner and heat generator (boiler) are connected by a 7-pin Wieland connector **1** and a 4-pin Wieland connector **2** (**not supplied**).



Fuel oil connection

The fuel oil connection must be made via a bleed filter. The filter must be located to ensure that it does not impair the correct hose routing. The hoses must not kink.

The fuel oil pipes used must be in DN6 or DN8 copper pipe.

CH: Polyamide fuel oil line DN6, DIN 16773.

For the maximum values of the suction lengths and heights, see the directive for carrying out and sizing installations with suction. This directive forms an integral part of the elements on which ELCO planning is based.

The suction line is passed up to 5 cm above the tank floor in cubic tanks, and up to 10 cm above the tank floor in cylindrical tanks.

Fuel oil connection

To ensure the operating safety of the system, the fuel oil supply must be installed carefully in compliance with local regulations.

Important:

- Maximum pressure at the pump intake < 1.5 bar
- Maximum vacuum pressure at the pump < 0.4 bar
- Before commissioning, draw oil in using a hand pump and check the oil lines for leaks.

Commissioning

Checks before commissioning Setting data

Checks before commissioning

The following must be checked before initial commissioning:

- That the burner is assembled in accordance with the instructions given here.
- That the burner is pre-set in accordance with the values in the adjustment table.
- Setting the combustion components.
- The heat generator must be ready for operation, and the operating regulations for the heat generator must be observed.
- All electrical connections must be carried out in line with currently accepted

practices.

- The heat generator and heating installation must be filled with water and the circulating pumps must be in operation.
- The temperature regulator, pressure regulator, low water detectors and any other safety or limiting devices that might be fitted must be connected and operational.
- The exhaust gas duct must be unobstructed and the secondary air system, if available, must be operational.
- An adequate supply of fresh air must be guaranteed.

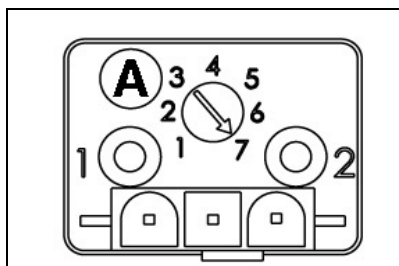
- The heating request must be available.
- Fuel storage tanks must be full.
- The fuel supply lines must be assembled correctly, bled and checked for leaks.
- A standard-compliant measuring point must be available for measuring the exhaust gas, the exhaust gas duct up to the measuring point must be free of leaks to prevent anomalies in the measurement results.

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Burner	Burner output kW		Diameter of the air nozzle (mm)	Fuel oil flow kg/h		Nozzle 80°S Gph (Danfoss)	Pump pressure bar		Air regulation of the nominal motor speed in %				Recirculation adjustment scale Y (mm)	Nozzle - air nozzle dimension (mm)
	1st stage	2nd stage		1st stage	2nd stage		1st stage	2nd stage	Ignition	1st stage	Switching stages	2nd stage		
VB 2.38 VD	21	31	24	1,8	2,6	0,50	10	21	34	39	51	62	4	2,5
	25	35	24	2,1	3,0	0,50	12	23	43	48	65	82	4	2,5
	27	38	24	2,2	3,2	0,60	9	19	47	52	76	100	4	2,5
VB 2.45 VD	23	35	24	2,0	2,9	0,55	9	20	23	28	40	45	4	2,5
	26	37	24	2,2	3,1	0,60	10	20	26	31	40	48	4	2,5
	32	44	24	2,7	3,7	0,60	14	24	35	40	65	100	4	2,5
VB 2.54 VD	30	42	24	2,6	3,6	0,65	10	20	27	32	42	50	4	2,5
	32	45	24	2,7	3,8	0,65	11	22	30	35	45	55	4	2,5
	36	52	24	3,0	4,4	0,75	11	23	35	40	70	90	4	2,5
VB 2.66 VD	40	54	27	3,4	4,6	0,85	11	22	27	32	41	50	4	4,5
	45	64	27	3,8	5,4	1,00	11	22	33	38	51	65	4	4,5
	48	66	27	4,1	5,6	1,10	11	19	36	42	61	80	4	4,5
VB 2.77 VD	45	64	27	3,8	5,4	1,00	11	22	28	32	43	55	4	4,5
	52	72	27	4,4	6,0	1,10	11	22	30	38	49	60	4	4,5
	55	77	27	4,6	6,4	1,25	11	20	38	45	62	80	5	4,5
VB 2.85 VD	52	72	29	4,4	6,0	1,10	11	22	30	36	45	55	5	4,5
	54	79	29	4,6	6,7	1,25	11	22	32	40	52	65	5	4,5
	59	84	29	5,0	7,1	1,35	10	21	28	43	64	86	5	4,5
VB 2.95 VD	52	72	31	4,4	6,1	1,10	11	22	27	32	41	50	5	4,5
	59	84	31	5,0	7,0	1,35	10	21	33	38	49	61	5	4,5
	64	93	31	5,3	7,8	1,35	12	24	35	40	60	80	5	4,5

Highlighted: Delivered from the factory; 1kg of fuel oil at 10°C = 11.86kWh

The adjustment data above are **basic adjustment values**. The factory settings appear on a grey background within a black box. These adjustment values are normally suitable for commissioning the burner. Check the settings values carefully. In most cases, corrections must be made.



Adjusting the IRD cell

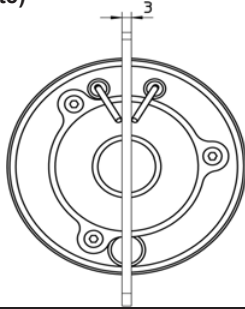
The burner must be running.

- Turn the potentiometer **A** until DEL 1 disappears.
- Increase the potentiometer setting by 2 graduations. (the flame signal shown on the display must remain >13µA).

Commissioning

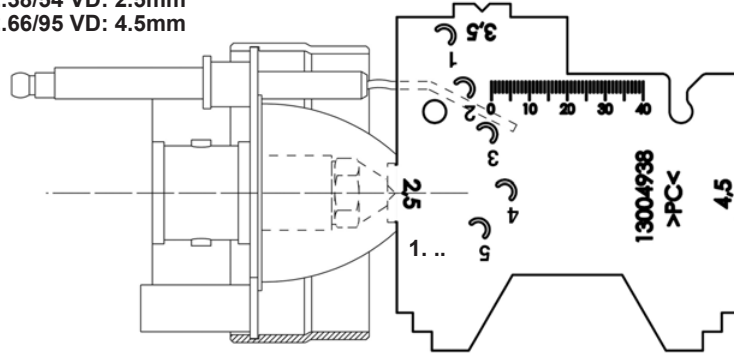
Checking the combustion components Recirculation

Ignition electrode gap
 VB2.38/54 VD: 3mm
 VB2.66/95 VD: 4-5mm (without template)

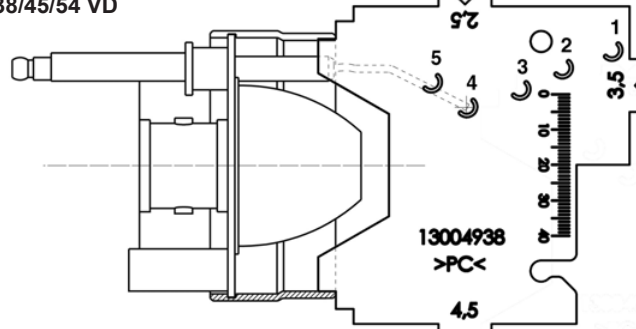


Setting the ignition electrodes
 The setting template supplied with the burner may be used for the following functions.

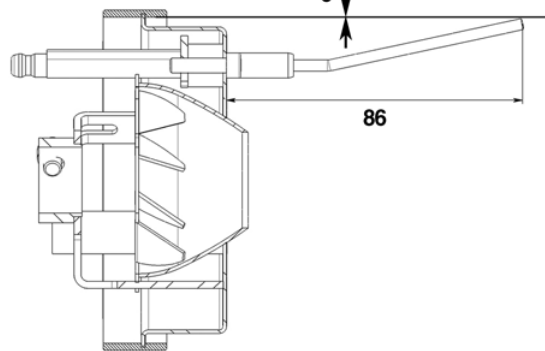
nozzle/air nozzle distance (dimension Y)
 VB2.38/54 VD: 2.5mm
 VB2.66/95 VD: 4.5mm



Position of the ignition electrodes
 4: VB2.38/45/54 VD

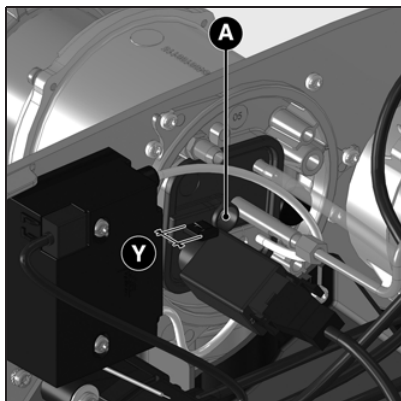


Position of the ignition electrodes
 VB2.66/95 VD



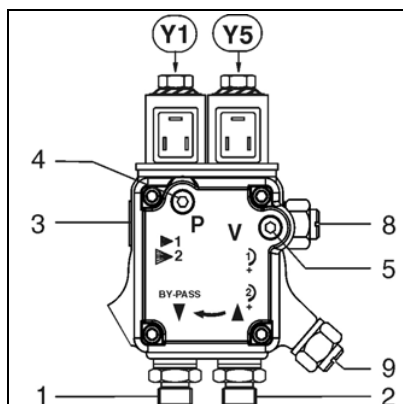
Setting the recirculation
 An NO and CO measuring device may be connected to obtain the correct setting of the recirculation volume. The width of the recirculation orifice can be adjusted by axial movement of the burner head in the burner pipe. The positioning is adjusted with the setting screw **A**, in accordance with the value given in the setting data table. This value can be read on the graduated scale **Y**. Once the recirculation has been set, a new start-up attempt may be made after a rest time of 5 minutes. If the burner does not start, or the start is delayed, recirculation must be set using smaller

values on the scale, until a reliable start-up can be ensured (cold start-up). Alternatively, it is possible to reduce the ventilation speed ignition position. **Do not operate the burner with a recirculation orifice which is too small or obstructed. This will cause a significant increase in temperature within the burner head, and risks causing damage to the system.**



Commissioning

Fuel oil pressure regulation Air regulation



- | | | |
|----|-------------------------------|------|
| 1 | Return connection | G1/4 |
| 2 | Vacuum connection | G1/4 |
| 3 | Nozzle supply line connection | G1/8 |
| 4 | Pressure gauge connector | |
| 5 | Vacuum gauge connector | |
| 8 | 1st stage pressure setting | |
| 9 | 2nd stage pressure setting | |
| Y1 | Solenoid valve, 1st stage | |
| Y5 | Solenoid valve, 2nd stage | |

Setting the fuel oil pressure

The fuel oil pressure is adjusted using fuel oil pressure regulator **8** for the 1st stage and fuel oil pressure regulator **9** for the 2nd stage. To check the pressure, connect a R1/8" pressure gauge to connector **4**.

Turn:

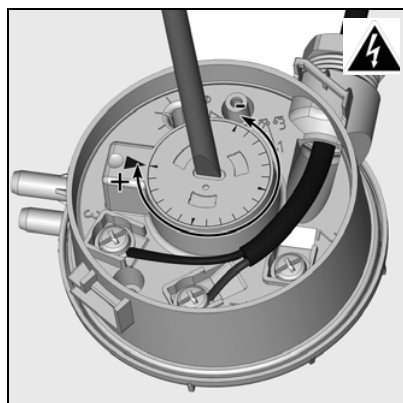
- to the right to increase the pressure
- to the left to reduce the pressure

Checking the vacuum pressure

To check the negative pressure, the vacuum meter must be connected to point **5**, R1/8". Maximum permissible vacuum pressure is 0.4 bar. At higher vacuum pressures, the fuel oil gasifies, which causes scraping noises in the pump and risks damaging it.

Air regulation

The combustion air regulation is carried out on the control unit by setting the ventilation speed.



Air pressure switch adjustment

- Remove the transparent cover.
- Provisionally set to 1 mbar.

en

Commissioning

Pre-setting without flame

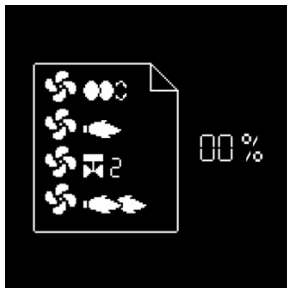
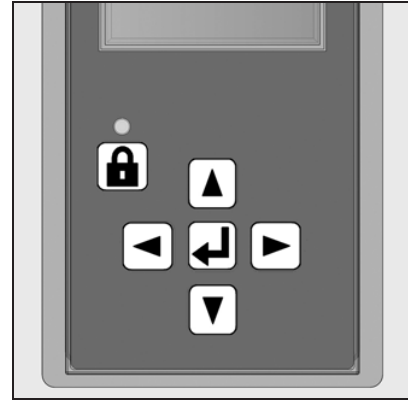
Setting is carried out in two phases:

- Pre-setting without flame
- Setting the flame, to fine tune the settings based on the combustion results

When the burner is switched on, the screen displays the image below.

Important

At this point, no setting position has been defined, therefore the burner cannot be started under these conditions.

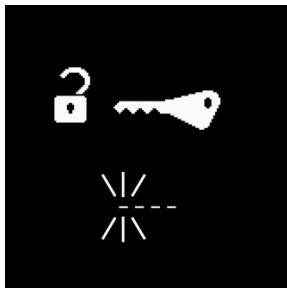


- Press any key to go on to the next step.



The overview of the menus is displayed, and the ventilation speed settings menu is selected.

- Open the setting menu using the key.

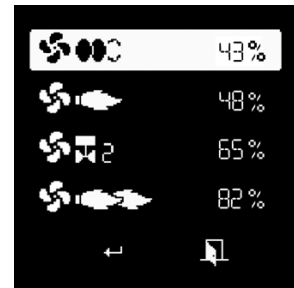


Now enter the access code (see the label on the back of the display)

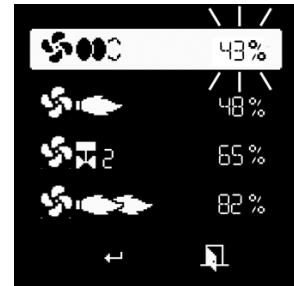
- Increase or decrease the value in increments by pressing or .
- When the first figure has been set, move the cursor to the right by pressing .
- Repeat the process until you reach the last figure.
- Confirm the access code by pressing the .

The control unit then opens the settings mode. The screen displays the factory settings for the different ventilation speeds (here, for example: VB 2.38 VD).

The following positions for the air flap are presented:



- ignition position (when the menu is opened, the cursor goes to this position)
- 1st stage ventilation speed
- ventilation speed by opening the 2nd stage fuel-oil valve
- 2nd stage ventilation speed



Modify the setting value for a ventilation speed:

- To modify the value of a position, move the cursor to the corresponding location with the or key.
- Select the value to be modified using the key, the selected value will flash.
- Increase or decrease the value (in increments of 0.1%) by repeatedly pressing or . For large modifications, press and hold the or key, the value will scroll quickly up or down.
- Confirm the new value using the key. The value stops flashing.

Note:



The values for the different speeds can be set freely. However, for safety reasons, the control unit enforces a minimum difference of 2° between the different speeds (except between the ignition position and the 1st stage).



Commissioning

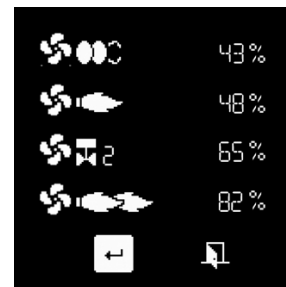
Pre-setting without flame General advice before starting the burner

End of the setting without flame menu

When all the ventilation speed setting positions have been determined according to the required pre-setting, it is then possible to move on to the next section for commissioning - "Setting the flame".

To do this, place the cursor in the lower part of the screen on the  symbol and press the  key.

If it is necessary to quit the menu without saving the pre-settings, position the cursor on the symbol  and confirm with the  key.



en



Preparing the burner start-up

Before starting the burner, draw oil in using a hand pump until the filter is completely filled. Then start the burner by switching on the boiler regulator. Open the bleed screw on the oil filter to allow the oil line to bleed fully during the pre-ventilation phase. In this situation, the vacuum pressure must not exceed 0.4 bar. Close the bleed screw when the filter is completely filled with fuel oil and fuel oil is flowing out without bubbles.

Optimising combustion values

If required, optimise the combustion values by setting the ventilation speed or pump pressure.

For 1st stage and 2nd stage, the CO₂ level obtained must be between 13.0% - and 13.5%. To optimise burner start-up, the ignition speed can be reduced to a value which corresponds to a CO₂ level of between 14% and 14.5% (inclusive).

Warning: To avoid condensation, observe the minimum required flue gas temperature which complies with the boiler manufacturer's instructions and with the requirements for flue gas ducts.



Risk of deflagration

Continuously check CO, CO₂ and soot emissions when adjusting the output of the burner. Improve combustion values in the event of CO emissions. The CO level must not exceed 50 ppm.

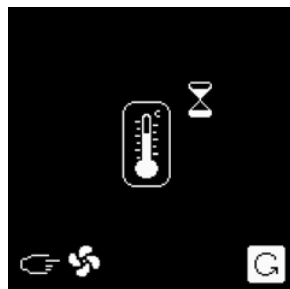
Function check

Flame monitoring must be checked to ensure that it is fully functional as part of initial commissioning and also after servicing or if the system has been out of operation for any significant period of time.

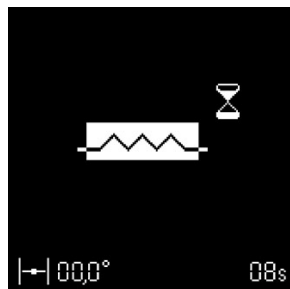
- Starting attempt with flame detection cell obscured:
at the end of the safety time, the control and safety unit must switch to malfunction mode.
- Start-up with the flame detector cell lit:
after pre-ventilation, the control and safety unit must switch to malfunction mode.
- Normal start-up; if the burner is operational, the flame detection cell should be obscured: after restarting and at the end of the safety time, the control and safety unit must switch to malfunction mode.

Commissioning

Setting with flame



- If the boiler heating request is not present, the burner remains on standby. It is still possible to return to the previous setting menu "Pre-setting without flame". To do this, position the cursor on the **G** symbol and confirm with the **↵** key.



Waiting for preheater



- If there is a boiler heating request (T1-T2 contact closed), the burner starts.

The fan speed is increased to the pre-ventilation speed.



Pre-ventilation and pre-ignition

The fan speed is decreased to the ignition speed.



The fuel valve opens.

Awaiting flame signal



If no flame is detected at the end of the safety time, the control and safety unit switches to malfunction mode.



Flame detected

Flame stabilisation
The fan speed is increased to the 1st stage speed.

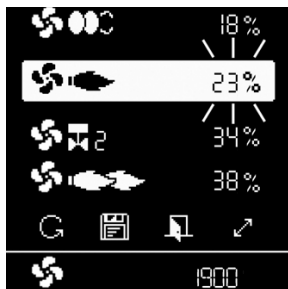


The control unit awaits the regulation authorisation.



Setting with flame

en



1st stage adjustment

If the flame has been detected and stabilised, the control and safety unit switches the burner to the 1st stage.

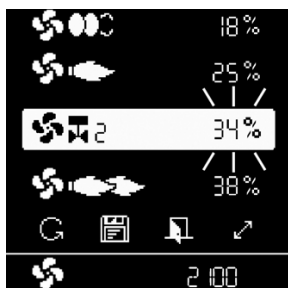
- Depending on the required output, set the fuel oil pressure to 1st stage using regulator **8** on the pump. Monitor the combustion values continuously as you do so (CO, CO₂, soot). If necessary, adjust the dimension **Y** and/or adapt the airflow.
- To do this, modify the 1st stage ventilation speed. Proceed as described on page 16 in the paragraph "**Modifying the value of a servomotor position setting**".
- Warning: when modifying the setting value, the speed changes in real time. Therefore, the combustion values must be constantly checked.



Special function: ignition checking

If the ignition speed has been modified, it is possible to carry out a new burner start-up to check the new ignition speed, without having to exit the settings menu.

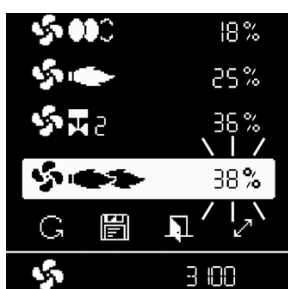
To do this, after modifying the ignition speed, position the cursor on the symbol, and initiate the new start-up using the key.



Setting the opening position of the 2nd stage fuel oil valve

After the 1st stage is set, it is possible to set the opening value for the 2nd stage fuel oil valve. Proceed once more as described in the paragraph "**Modifying the value of a speed setting**".

- Warning: in this case the speed does not change immediately, but first remains in the 1st stage position (the actual speed is always displayed in the lower part of the display). The 2nd stage solenoid valve also remains closed. It is first possible to modify the 2nd stage speed.



Adjustment for stage 2

To set the 2nd stage speed, position the cursor on the corresponding line on the display using the key. If necessary, modify the setting value. Proceed as described in the paragraph "**Modifying the value of a speed setting**".

- To make the burner actually switch to the 2nd stage, press the key again. The speed reaches the set position. At the same time, the 2nd stage fuel oil valve will open, as soon as the set speed for the fan motor is exceeded.
- Depending on the required output, set the fuel oil pressure to stage 2 using regulator **9** on the pump. Monitor the combustion values continuously as you do so (CO, CO₂, soot). If necessary, adjust the dimension **Y** and/or adapt the airflow.
- To do this, modify the 2nd stage speed. Proceed as described on page 16 in the paragraph "**Modifying the value of a speed setting**".
- Warning: when modifying the setting value, the speed changes in real time. Therefore, the combustion values must be constantly checked.



Special function: positioning the opening and closing of the 2nd stage fuel oil valve differently

The control unit makes it possible to set the opening of the 2nd stage valve, when switching from the 1st stage to the 2nd stage, at a different position to that for closing when the 2nd stage drops back to the 1st stage.

- To do this, as described earlier, first set the opening position of the 2nd stage oil valve.
- Lastly, position the cursor on the symbol and confirm with the key. The selected symbol will then appear like this .
- Using the key, position the cursor on the setting value for the 2nd stage fuel oil valve, and set the new closure position, as described in the paragraph "**Modifying the value of a speed setting**".

Commissioning

Setting with flame Operating mode

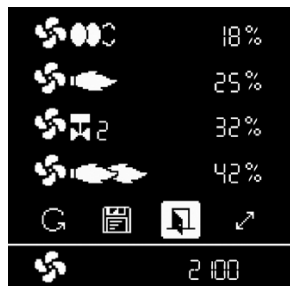
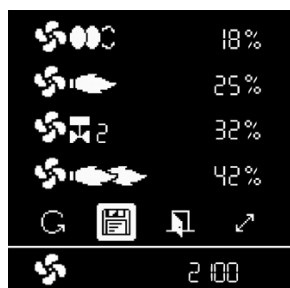


End of the "Setting with flame" menu

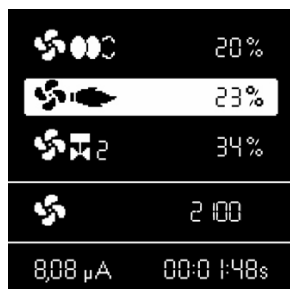
The burner setting is now complete. If necessary, it is possible to again correct each of the settings values. To do this, position the cursor on the value to be modified, using the \uparrow or \downarrow key.

Otherwise, the "Setting the flame" menu can be closed using any of the methods below, at any time:

- Restart the burner setting procedure, passing through the presetting phase (without entering a password). To do this, position the cursor on the G symbol and confirm with the Enter key. All the settings values saved before this time remain available.
- Saving the fixed values and ending the setting procedure. To do this, position the cursor on the Save symbol and confirm with the Enter key. The burner is now ready to operate and can be controlled by the boiler regulation.



- Exiting the settings menu without reaching the end of the setting procedure. To do this, position the cursor on the Exit symbol and confirm with the Enter key. All the speed settings saved at the time will be recovered when the setting menu is next called up.



Operating mode - Display of the operating status, the flame signal and the operating time

After setting of the burner has been completed, it switches to operating mode.

The current operation of the burner (Operation in 1st or 2nd stage) is indicated by the light bar.

The lower left cell shows the intensity of the flame signal. The display range is from 0 μA to 13 μA . A good quality signal is above 3 μA .

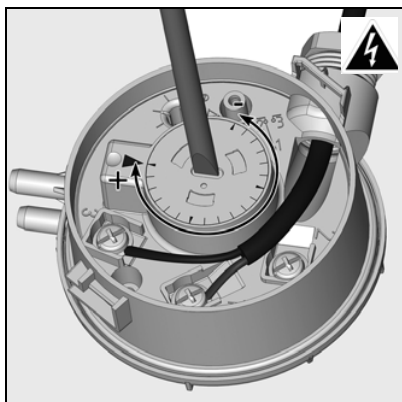
The following limit values are valid:

- During the unauthorised flame test, the signal must be $< 0.7\mu\text{A}$
- During the safety time, the signal must be $> 1.3\mu\text{A}$
- During operation, the signal must be $> 1.1\mu\text{A}$

The cell at the bottom right displays the burner's current operating time.

Start-up

Setting the air pressure switch Menu 5: Configuration for domestic use




Setting the air pressure switch

- Start the burner in the 1st stage.
- Increase the air pressure switch setting value until the burner cuts out.
- Set the switch-off point to approximately 20% below the switch-off pressure read.

en



Menu 5: Configuration for domestic use

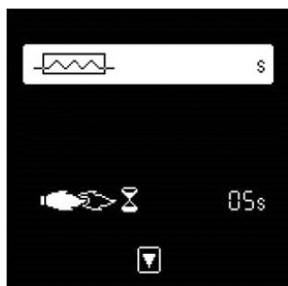
 **To be used by ELCO-qualified technicians only!**

The menu lets you set the following parameters:

- Fuel oil burners: fuel oil heater on / off as well as max heating time.
- Adjustment release waiting time.
- Fan speed when the burner is off.
- Fan speed during the pre-ventilation phase.








- Activate the option “**Configuration for domestic use**” from the menu overview. Enter the access code (only available to an ELCO-qualified technician). Access is possible only when the burner is off.



Fuel oil heater

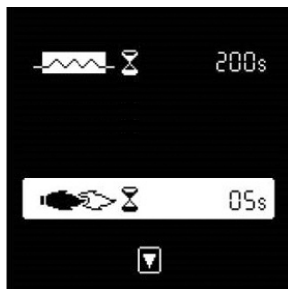
If no time indication is displayed next to the heater symbol, the heater is off.

- Activate the heater setting using the  key. The time starts to flash.
- Heater on/off switch using keys  .
- Changing max heating time with   (1 press = 10 s)

Note: for VB2..VD: 400 s

Commissioning

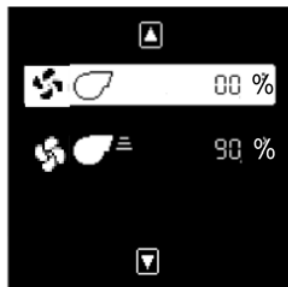
Menu 5: Configuration for domestic use



Adjustment release waiting time

- Activate the setting mode using the key. The time starts to flash.
- Use keys , to decrease or increase the adjustment release waiting time by 1s steps. Adjustment range 0s-255s.
- Confirm the setting by pressing the key.

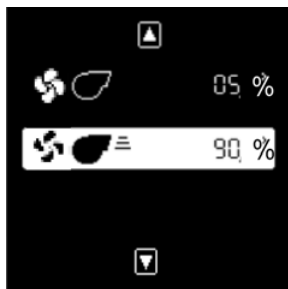
Note: Set the adjustment release to a value of 180s in the boiler STRATON L.



Fan speed when the burner is off (= permanent ventilation**)

- Activate the setting mode using the key. The setting value starts to flash.
- Use keys , to decrease or increase the setting value by 1% steps. Setting value 20%-100%.
- Confirm the setting by pressing the key.

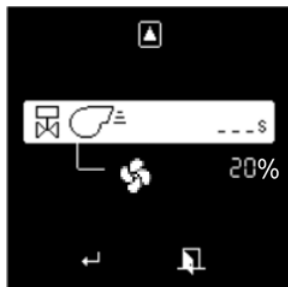
Note: Do not adjust fan speed higher than 2d stage.



Fan speed during the pre-ventilation phase

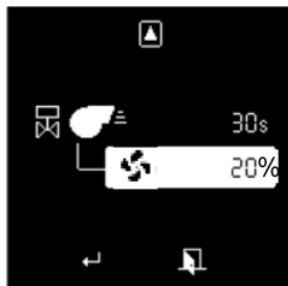
As with the fan speed, the setting is carried out when the burner is off. But the set speed should never be lower than the speed of the 2nd stage.

Note: Same setting as for 2d stage.



Post-ventilation => only accessible if permanent ventilation is deactivated

- Activate the setting mode using the key. The cursor starts to flash.
- Start or stop post-ventilation using the , keys. Time indication at initial start = 5s (= min value).
- Set post-ventilation time using the , keys (max 255s**).
- Confirm the setting by pressing the key.



Fan speed during the post-ventilation phase

During the post-ventilation phase air pressure is monitored. Therefore set post-ventilation speed \geq speed of 1st stage.

A value $<$ 20% causes a lockout, because the fan stops.

- Activate the setting mode using the key.
- Decrease or increase the speed using the , keys.
- Confirm the setting by pressing the key.

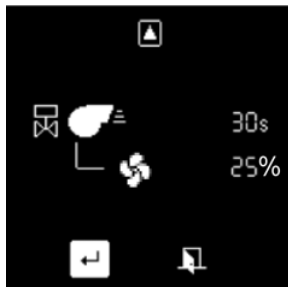
Note: In the boiler STRATON L set post-ventilation to a value of 30s. This setting also applies to the other types of condensation boilers.



**** As the fuel-pump motor is not in operation during the permanent ventilation and post-ventilation phases, there is no need to install an additional fuel-oil solenoid valve.**

Commissioning

Menu 5: Configuration for domestic use



Complete the settings with a test phase

- Confirm the setting with symbol . The burner enters into standby mode and starts a test phase as soon as there is a heating request, or:
- Undo all the changes made with symbol . The burner goes back to its previous state.

en

Test phase

If there is no heating request, the screen displays the image opposite.

During the following heating request, the burner starts with the new setting values.



After starting, the burner stays in the 1st stage and displays the image opposite from the “commissioning” menu. To review the setting values, you can switch manually from 1st to 2nd stage. Position the cursor on the corresponding line and confirm the switch using the key.



Exit the menu:

- via the symbol: repeat the setting phase from the start
- via the symbol: confirm the settings; the burner is ready to operate
- via the symbol: invalidate all the new settings; the burner goes back to its previous state



Start-up


Displaying the setting data from the manual control display





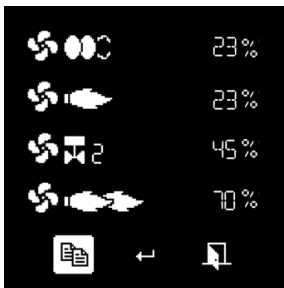
Displaying the setting data from the manual control display

Once the burner setting procedure has been successfully completed in menu 1, the settings for all the operating states are stored in the control unit.

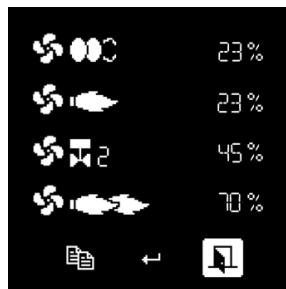
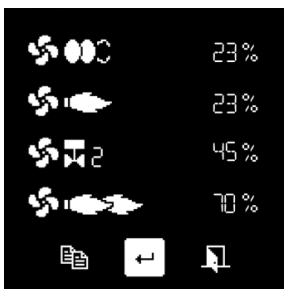
At the same time, a back-up copy of the setting values is saved in the display at the end of menu 1. If the control unit is subsequently changed, the setting data stored in the display can be consulted to enable the new control unit to be set.

To do this, call up the menu overview using the  key.

Using the  key select the menu "Displaying the setting data" and confirm with the  key.



The screen opposite appears. It is not possible to automatically transfer the data to the new control unit. Note down the setting data and enter it manually into the control unit via menu 1.



Exit the menu using the  symbol.



Caution: the values shown in this menu correspond with the values that were last successfully set with the current manual control display using menu 1 (menu 1 must have been completed in its entirety).

Servicing

Maintenance

Burner and boiler servicing must only be carried out by an approved, qualified heating engineer. The system operator is advised to take out a maintenance contract to guarantee regular servicing. Depending on the type of installation, shorter maintenance intervals may be necessary.



- Switch off the power supply before all maintenance and cleaning work.
- Use original spare parts.

Work recommended as part of annual burner maintenance:

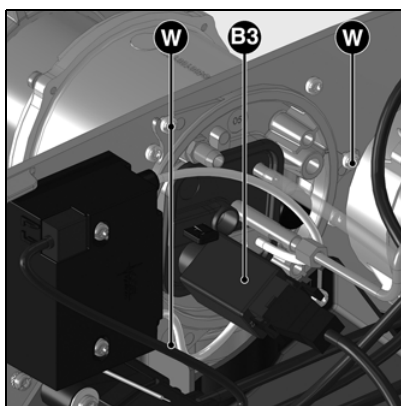
- Burner test run, input measurement in the boiler room
- Clean the combustion components and replace defective parts if necessary
- Clean the fan wheel and blower and check the pump coupling
- Check the fuel oil nozzle, replace if necessary
- Check or replace the fuel oil filters (pump, feed lines)
- Visual inspection of oil hoses, replace if necessary
- Visual inspection of the burner's electrical components; eliminate malfunctions if necessary
- Check burner start characteristics

- Check the oil pressure and vacuum at the burner pump with the burner in operation
- Flame detector and control unit function check
- Correct the adjustment values if necessary
- Creation of a measurement report

General checks

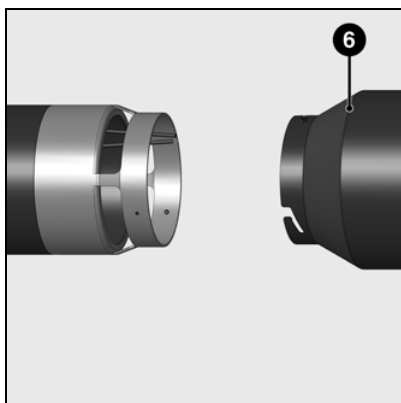
- Emergency stop button function check
- Visual inspection of oil lines in the boiler room

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Checking the combustion components

- Take out the flame detector **B3**.
- Detach the flexible hose from the air pressure switch.
- Remove the three screws **W** from the cover.
- Remove the combustion components.
- Check the nozzle size and replace in accordance with the table on page 13 if necessary.
- Check the ignition electrodes; correct if necessary.
- Check the gap between the fuel oil nozzle and the air nozzle; adjust if necessary.



Checking the flame tube

This operation requires the boiler door to be opened.

- Turn off the power supply.
- When the boiler door is open, turn the flame tube **6** and take it out (bayonet mounting).
- Check the flame tube **6** and replace if necessary.
- Fit and secure the flame tube.



The flame tube may be hot

Servicing

Fault repair

Cause of faults and troubleshooting

In the event of a fault, first check that the prerequisites for correct operation are fulfilled:

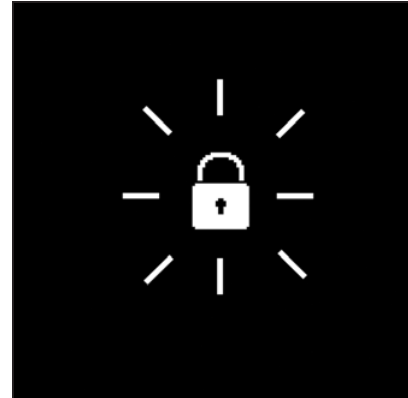
1. Is there any current?
2. Is there fuel oil in the tank?
3. Are all shut-off valves open?
4. Are all control and safety devices, such as the boiler thermostat, low-water detector, limit switch, etc. correctly set?

If the fault cannot be remedied by the checks described above, check the functions of the various burner components.

Components which fulfil an important safety function must not be repaired. These components must be replaced by parts with the same reference number.

⚠ Only use original spare parts. Switch off the power supply before carrying out maintenance or cleaning.

After every operation: check the combustion parameters and real operating condition (doors closed, cover fitted etc.). Record the results in the relevant documents.



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Symbol	Malfunction	Cause	Remedy
	The thermostat no longer starts the burner.	No heat requested by thermostats. Defective control unit.	Check/replace the thermostat. Replace the control unit.
	The burner starts up briefly when the power supply is switched on and then stops.	The control and safety unit has been manually locked.	Unlock the unit.
	The burner starts then stops after pre-ventilation.	Stray light detected during the pre-ventilation/pre-ignition period.	Check for the ignition spark/adjust or replace the electrodes. Check/replace the fuel oil solenoid valve. Check/Replace the flame detector tube.
	The burner starts and stops after the solenoid valves have opened.	No flame at the end of the safety time	Check the fuel oil level in the tank. Top up tank as required. Open the valves. Check the oil pressure and the operation of the pump, coupling, filter, solenoid valve.
	Flame extinguishing during operation.	The flame goes out during operation.	Check the ignition circuit, electrodes and their settings. Clean the electrodes. Clean the flame detector, or replace. Replace the following parts as required: ignition electrodes/ignition cables/ igniter/nozzle/pump/solenoid valve/safety unit.
	Fan motor fault.	Fan blockage. Internal fault with the fan motor.	Replace the fan motor.
	Burner does not start.	Air pressure switch: not in rest position. Incorrect adjustment. Contact welded.	Readjust the pressure switch. Check the wiring. Replace the pressure switch.
	Burner does not start.	Heater defective.	Replace the heater.

Servicing

Fault diagnosis menu Operating statistics menu



Fault diagnosis menu

To access the fault diagnosis menu, press any key when the burner is ready to operate, already operating, or in malfunction mode. It is not possible to access the fault diagnosis menu during the start-up phase.

The general menu screen will appear. Using the , , , or keys, place the cursor on the fault diagnosis menu symbol, and confirm using the key.

The details of the last fault to appear are indicated by the flashing symbol. The flame intensity, network voltage, the fan speed, number of burner start-ups as well as the operating time of the burner at the time it switched to malfunction mode are displayed underneath.

Using the and keys, it is possible to call up the details of the last 5 faults to have appeared (the fault number is displayed in the upper left corner of the display).

After the details of the last 5 faults, the telephone number of the after-sales department as well as the maintenance contract number are shown (no values are entered in the factory).

- Exit the menu using the key.



Entering a telephone number for the maintenance company and the maintenance contract number

When the corresponding symbol appears on the display:

- Keep the key held down until the first figure starts to flash (a short press will exit the menu).
- Using the or keys, change the figure to the value required (underscore = empty field)
- Using the key, move on to the next figure.
- When the number is complete, save using the key.

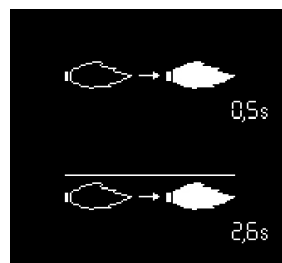


Operating statistics menu

To access the statistics menu, press any key when the burner is ready to operate, already operating, or malfunctioning. It is not possible to access the statistics menu during the start-up phase.

The general menu screen will appear. Using the , , , or keys, place the cursor on the statistics menu symbol, and confirm using the key.

The statistical data menu comprises 7 screens. You can navigate between the different screens using the and keys.



- Flame detection time for last burner start-up

- Average flame detection time for the last 5 burner start-ups



- Total number of burner start-ups

- Total number of faults

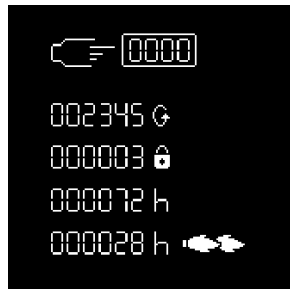
- Total number of operating hours

- Total number of operating hours in 2nd stage

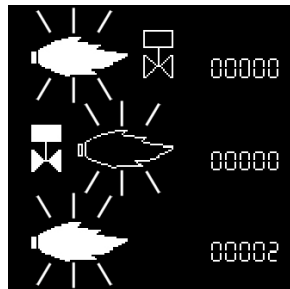
Servicing

Operating statistics menu

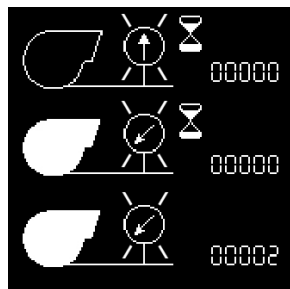
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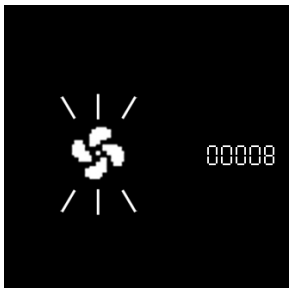
- Total number of burner start-ups since the last meter reset
- Number of faults since the last meter reset
- Total operating time since the last meter reset
- Operating time in 2nd stage since the last meter reset



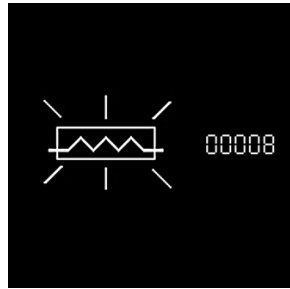
- Number of "Unauthorised flame" faults
- Number of "No flame after safety time" faults
- Number of "Flame extinguishing during operation" faults



- Number of "Air pressure switch stuck" faults
- Number of "Air pressure switch does not close during operation" faults
- Number of "Air pressure switch switching over" faults



- Number of "Fan motor" faults



- Number of "Heater" faults

SIEMENS

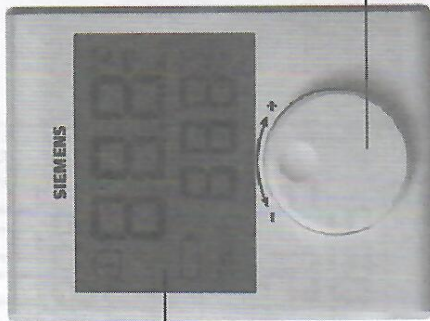
Operating instructions

RDH100

The RDH100 is a room thermostat that allows you to set the desired room temperature (setpoint) for the desired time. The unit features an ergonomic setting knob for easy temperature control.

Display

	Actual room temperature in °C
	The unit controls to the selected comfort temperature
	Indicates when heating is demanded
	Replace batteries



Setting knob

Warmer/colder knob for selecting the temperature setpoint

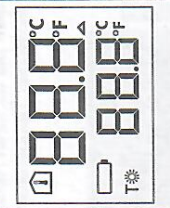
Battery compartment

2 alkaline batteries type AA, 1.5 V



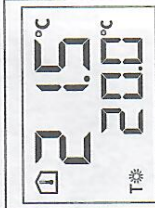
Commissioning

- Remove the black transit tabs from the 2 alkaline batteries. Check to see if the battery compartment is in its correct position
- If no batteries are inserted, fit 2 alkaline batteries type AA in the battery compartment



Initial power-up

Once batteries are inserted, all symbols are displayed as shown for about 2 seconds.



Selecting the required temperature

- Turn the setting knob counter-clockwise to decrease the setpoint, or clockwise to increase the setpoint in increments of 0.5 °C
- The required temperature is displayed next to the comfort temperature symbol T*

Changing the batteries

- Get 2 new alkaline batteries type AA, 1.5 V.
- Within 1 minute: pull out the battery compartment and remove the batteries, insert the new batteries and replace the battery compartment.
- Make certain the old batteries are disposed of properly, in compliance with environmental requirements.

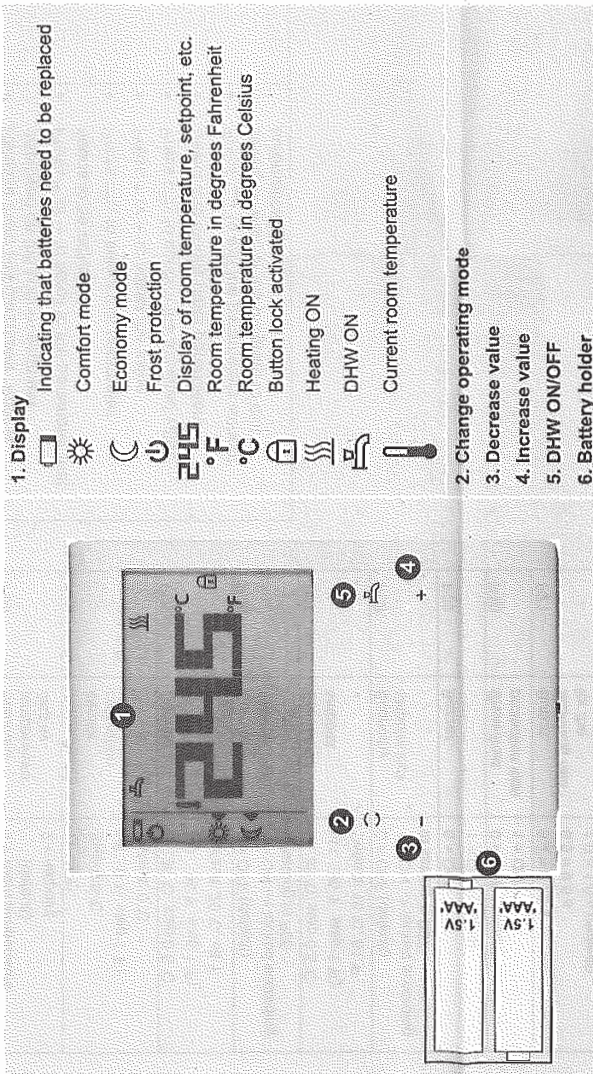
Energy saving tips without sacrificing comfort

- Never allow room temperatures to exceed 21 °C
- Air out rooms for short periods of time only, but properly, with the windows wide open

SIEMENS en Operating Instructions

RDD100.1DHW

RDD100.1DHW is a room thermostat that allows you to set the ideal room temperature at the time you want. In addition, it offers independent control of DHW (Domestic Hot Water).



1. Display

☐ Indicating that batteries need to be replaced

☀ Comfort mode

☾ Economy mode

⚡ Frost protection

24.5 °C Display of room temperature, setpoint, etc.

°C Room temperature in degrees Fahrenheit

🔒 Room temperature in degrees Celsius

🔒 Button lock activated

🔥 Heating ON

DHW ON

🌡 Current room temperature

2. Change operating mode

3. Decrease value

4. Increase value

5. DHW ON/OFF

6. Battery holder

Do you want to change the operating mode?

The thermostat provides Comfort mode ☀, Economy mode ☾. Changeover between the operating modes can be made manually by pressing

Comfort mode is the permanent (24 h) selection of Comfort. Select this mode to maintain Comfort temperature permanently. It is used during occupancy periods, for example.

Economy mode is the permanent (24 h) selection of Economy. Select this mode to maintain the Economy temperature permanently. It is used during non-occupancy periods, for example at night.

! Note:

Frost protection is a function always active in the background. As soon as the room temperature falls below 5 °C, the unit automatically activates the heating



Energy saving tips without sacrificing comfort

- Use Economy mode for long periods of non-occupancy




Do you want to switch on DHW heating?

- Press to switch on DHW heating
 - While DHW heating is switched on, the symbol is displayed
 - Press again; DHW heating is switched off and the symbol disappears
- DHW can also be switched on/off while frost protection is active.


Are your rooms too warm/too cold?

+	<p>Press + or – to increase or decrease the room temperature setpoint in increments of 0.5 °C / 1 °F. Proceed as follows:</p> <ul style="list-style-type: none"> Press + or – to adjust the setpoint temporarily. Press  or  to save the value or wait for the program to exit automatically. To permanently modify the temperature setpoints, use parameters P05 and P07. To lock the setpoints, use parameters P06 and P08.
---	--



Do you want to change parameters?

+	<p>If you want to change control parameters, proceed as follows:</p> <ul style="list-style-type: none"> Press + and – simultaneously for 5 seconds Release them and parameter "P02" is displayed on the bottom segment Press + or – to scroll to the parameter that needs to be adjusted Press  to select this parameter Press + or – to adjust the value Press  to confirm the adjusted value Select and modify other parameters Press  to exit the parameters without saving or wait for the program to exit automatically
---	---

Does symbol appear on the display? (Only with battery-powered version)

- Symbol  is displayed when the batteries are low. Replace them with 2 new alkaline batteries type AAA. Proceed as follows:
- Get 2 new alkaline batteries type AAA
 - Remove the battery holder, then the batteries, insert the new batteries and, within 1.5 minutes, replace the battery holder
 - Ensure the exhausted batteries are disposed of correctly, in compliance with environmental requirements

Do you want to lock the buttons?

	<p>Press and hold  for at least 7 seconds to activate a button lock. Repeat to unlock. The unit operates normally when the buttons are locked, but no changes are possible while the buttons are locked.</p>
---	---

Parameter list

Parameter no.	Description	Setting range (default)
P02	Selection of °C or °F	1 = °C (default) 2 = °F
P03	Standard temperature display	1 = room temperature (default) 2 = setpoint
P04	Temperature sensor calibration	-3...3 °C Step 0.5 °C (-6...6 °F, step 1 °F) Default: 0 °C
P05	Comfort setpoint	5...35 °C, step 0.5 °C (41...95 °F, step 1 °F) Default: 20 °C, 68 °F
P06	Comfort setpoint lock	0 = OFF (default) 1 = ON → locked according to setting in P05
P07	Economy setpoint	5...35 °C, step 0.5 °C (41...95 °F, step 1 °F) Default: 16 °C, 61 °F
P08	Economy setpoint lock	0 = OFF (default) 1 = ON → locked according to setting in P07
P09	Buzzer	0 = OFF 1 = ON (default)
P10	Show frost protection icon	0 = OFF (default) 1 = ON
P21	Button scanning rate for the capacitive buttons Note: a shorter scanning rate means shorter battery life.	0.2 = 0.25 s 0.5 = 0.5 s 1.0 = 1.0 s (default) 1.5 = 1.5 s
P22	Reload factory settings	0 = OFF (default) 1 = reload
P23	Software version information	No adjustment possible

Pioneering for You

wilo

Wilo-Para



de Einbau- und Betriebsanleitung
en Installation and operating instructions
fr Notice de montage et de mise en service

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Fig. 1:

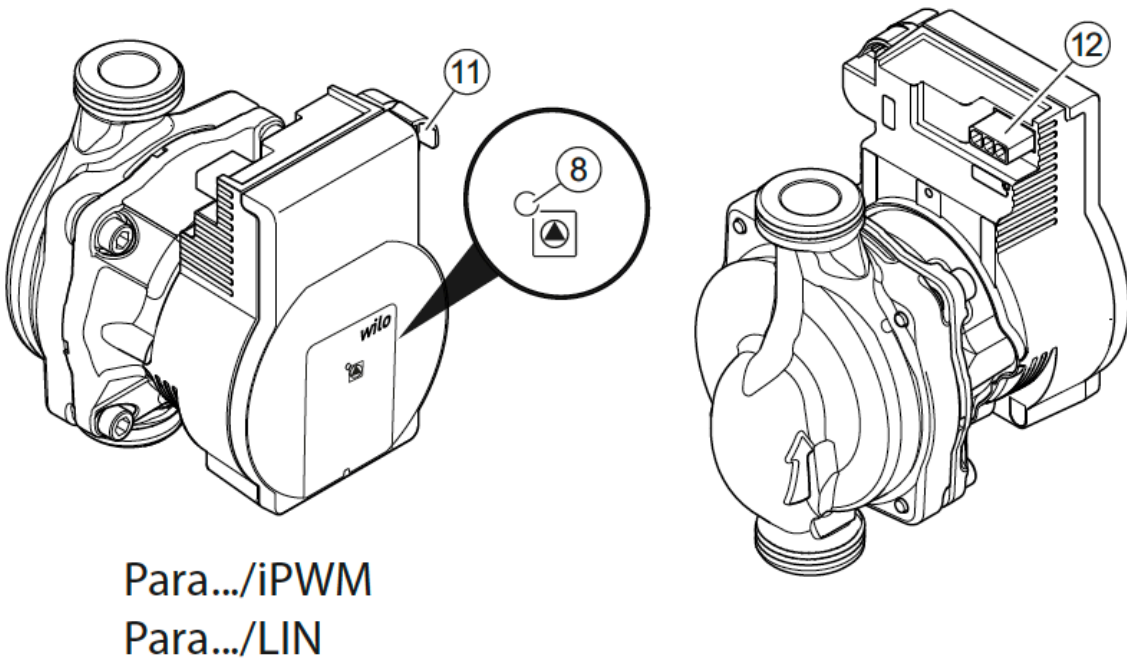
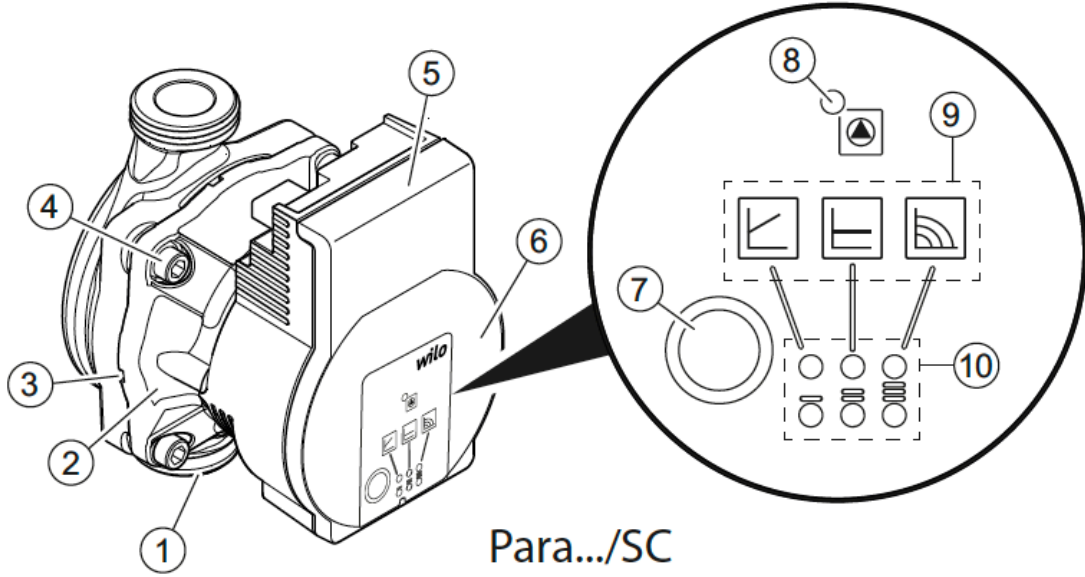


Fig. 2:

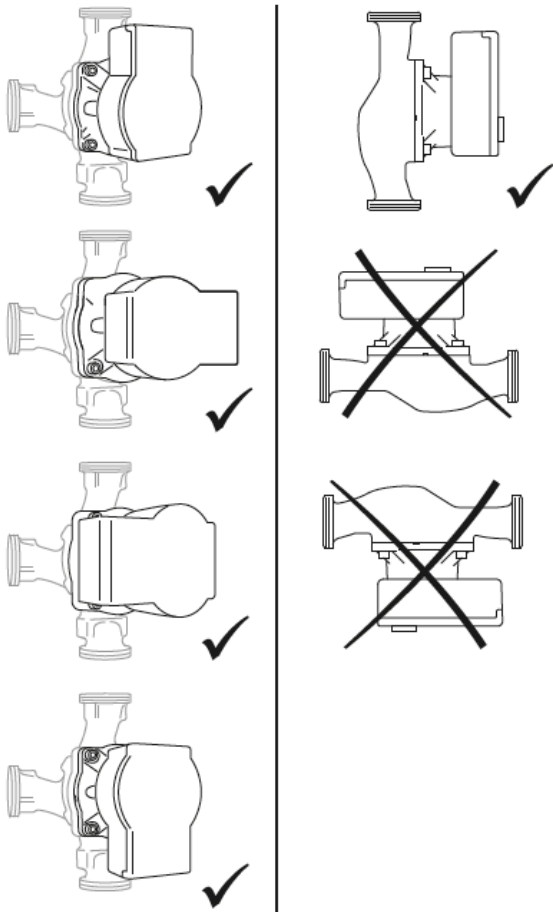


Fig. 4:

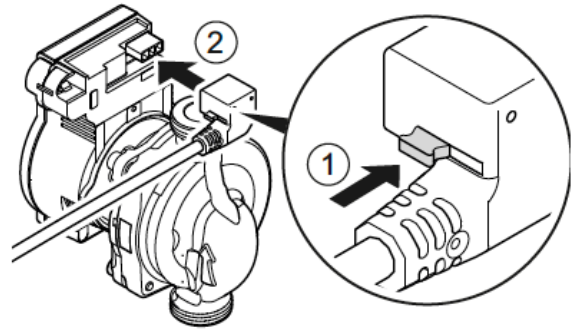


Fig. 5a:

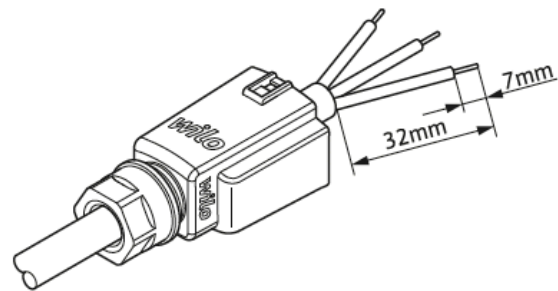


Fig. 3:

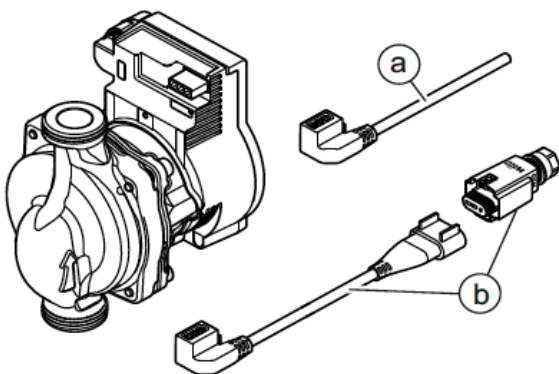


Fig. 5b:

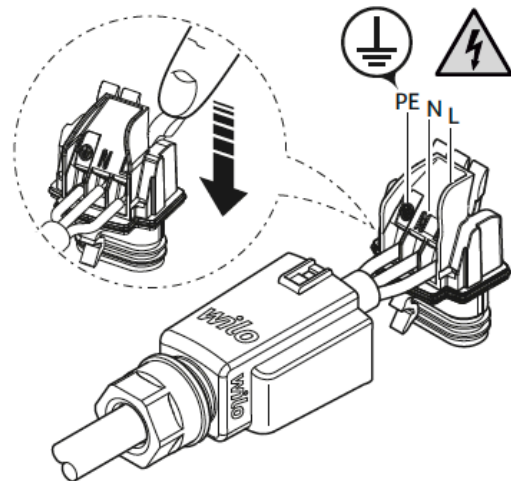


Fig. 5c:

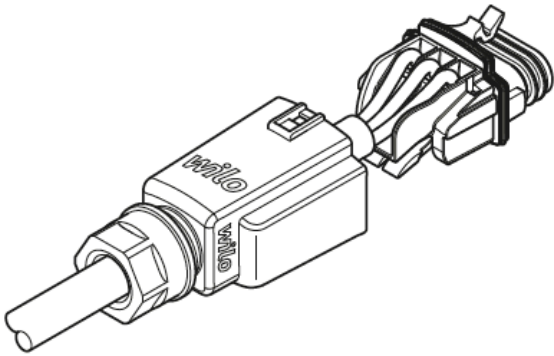


Fig. 5f:

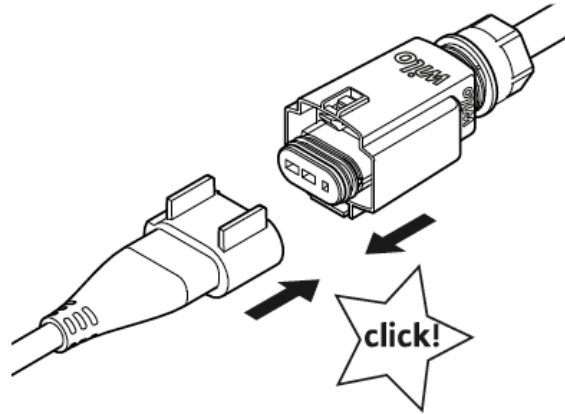


Fig. 5d:

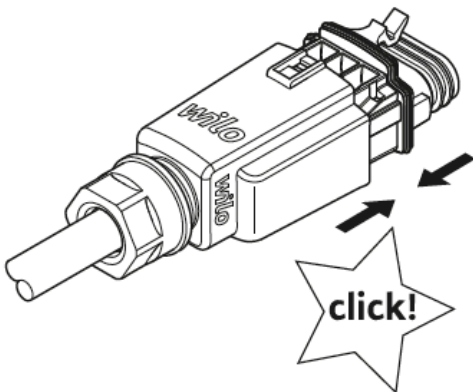


Fig. 6:

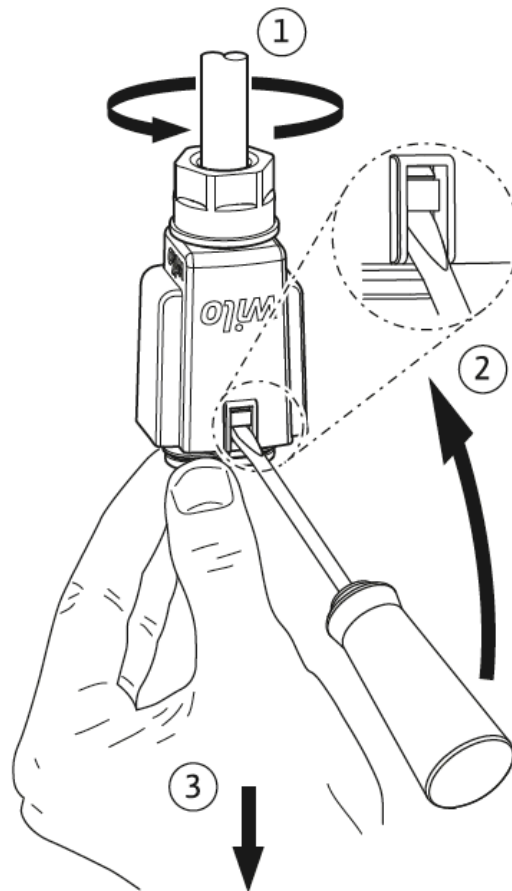
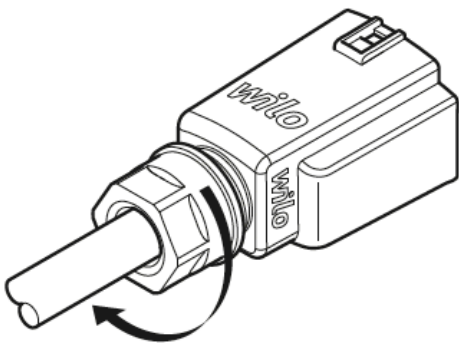


Fig. 5e:



1 General

About these instructions

These installation and operating instructions are an integral part of the product. Read these instructions before commencing work and keep them in an accessible place at all times.

Strict adherence to these instructions is a requirement for intended use and correctly operating the product. All specifications and markings on the product must be observed.

The language of the original operating instructions is German. All other languages of these instructions are translations of the original operating instructions.

2 Safety

This section contains basic information which must be adhered to during installation, operation and maintenance. Additionally, the instructions and safety instructions in the other sections must be followed.

Failure to follow the installation and operating instructions will result in the risk of injury to persons and damage to the environment and the product. This will result in the loss of any claims for damages.

Failure to follow the instructions will, for example, result in the following risks:

- Injury to persons from electrical, mechanical and bacteriological factors as well as electromagnetic fields
- Environmental damage from leakage of hazardous substances
- Property damage
- Failure of important functions of the product

Identification of safety instructions

These installation and operating instructions set out safety instructions for preventing personal injury and damage to property, which are displayed in different ways:

- Safety instructions relating to personal injury start with a signal word and are **preceded by a corresponding symbol**.

- Safety instructions relating to property damage start with a signal word and are displayed **without** a symbol.

Signal words

DANGER!

Failure to observe safety instructions will result in serious injury or death!

WARNING!

Failure to follow instructions can lead to (serious) injury!

CAUTION!

Failure to follow instructions can lead to property damage and possible total loss.

NOTICE

Useful information on handling the product

Symbols

These instructions use the following symbols:



Danger due to electrical voltage



General danger symbol



Warning of hot surfaces/fluids



Warning of magnetic fields



Notices

Personnel qualifications

Personnel must:

- Be instructed about locally applicable regulations governing accident prevention.
- Have read and understood the installation and operating instructions.

Personnel must have the following qualifications.

- Electrical work must be carried out by an authorised electrician (in accordance with EN 50110-1).

- Installation/dismantling must be carried out by a qualified technician who is trained in the use of the necessary tools and fixation materials.
- The product must be operated by persons who are instructed on how the complete system functions.

Definition of “qualified electrician”

A qualified electrician is a person with appropriate technical training, knowledge and experience who can identify and prevent electrical hazards.

Electrical work

- Electrical work must be performed by a qualified electrician.
- Nationally applicable guidelines, standards and regulations as well as specifications issued by the local energy supply companies for connection to the local power supply system must be observed.
- Before commencing work, disconnect the product from the mains and safeguard it from being switched on again.
- The connection must be protected by means of a residual-current device (RCD).
- The product must be earthed.
- Have defective cables replaced immediately by a qualified electrician.
- Never open the control module and never remove operating elements.

Operator responsibilities

- Have all work carried out by qualified personnel only.
- Ensure on-site guard against hot components and electrical hazards.
- Have defective gaskets and connection pipes replaced.

This device can be used by children from 8 years of age as well as by people with reduced physical, sensory or mental capacities or lack of experience and knowledge if they are supervised or instructed in the safe use of the device and they understand the dangers that can occur. Children are not allowed to play with the device. Cleaning and user maintenance must not be carried out by children without supervision.

3 Product description and function

- Overview** Wilo-Para (Fig. 1)
- 1 Pump housing with screwed connections
 - 2 Glandless motor
 - 3 Condensate drain openings (4x around circumference)
 - 4 Housing screws
 - 5 Control module
 - 6 Rating plate
 - 7 Operating button for pump adjustment
 - 8 Run signal/fault signal LED
 - 9 Display of selected control mode
 - 10 Display of selected characteristic curve (I, II, III)
 - 11 PWM or LIN signal cable connection
 - 12 Mains connection: 3-pin plug connection

Function High-efficiency circulator for hot-water heating systems with integrated differential pressure control. Control mode and delivery head (differential pressure) are adjustable. The differential pressure is controlled via the pump speed.

Type key

Example: Wilo-Para 15-130/7-50/SC-12/I

Para	High-efficiency circulator
15	15 = screwed connection DN 15 (Rp ½) DN 25 (Rp 1), DN 30 (Rp 1¼)
130	Port-to-port length: 130 mm or 180 mm
7	7 = maximum delivery head in m at $Q = 0 \text{ m}^3/\text{h}$
50	50 = max. power consumption in watts
SC	SC = Self-Control iPWM1 = external control via iPWM1 signal iPWM2 = external control via iPWM2 signal
12	Position of the control module at 12 o'clock
I	Individual packaging

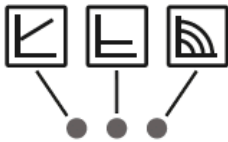
Technical data

Connection voltage	1 ~ 230 V +10 %/-15 %, 50/60 Hz
Protection class	IPX4D
Energy efficiency index EEI	See rating plate (6)
Fluid temperatures at max. ambient temperature +40 °C	-20 °C to +95 °C (Heating/GT) -10 °C to +110 °C (ST)
Ambient temperature +25 °C	0 °C to +70 °C
Max. operating pressure	10 bar (1000 kPa)
Min. inlet pressure at +95 °C/+110 °C	0.5 bar / 1.0 bar (50 kPa / 100 kPa)

Indicator lights (LEDs)



- Signal display
 - LED is lit up in green in normal operation
 - LED lights up/flashes in case of a fault (see chapter 10.1)



- Display of selected control mode
 Δp -v, Δp -c and constant speed

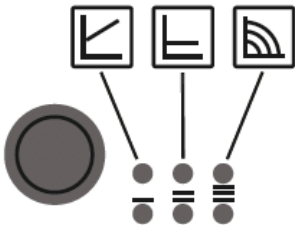


- Display of selected pump curve (I, II, III) within the control mode



- LED indicator combinations during the pump venting function, manual restart and key lock

Operating button



Press

- Select control mode
- Select pump curve (I, II, III) within the control mode

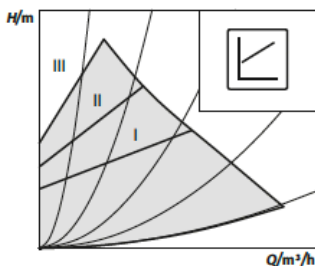
Press and hold

- Activate the pump venting function (press for 3 seconds)
- Activate manual restart (press for 5 seconds)
- Lock/unlock button (press for 8 seconds)

3.1 Control modes and functions

Variable differential pressure $\Delta p-v$ (I, II, III)

Recommended for two-pipe heating systems with radiators to reduce the flow noise at thermostatic valves.



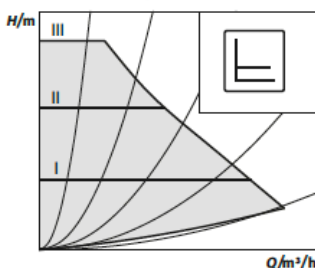
The pump reduces the delivery head to half in the case of decreasing volume flow in the pipe network.

Electrical energy saving by adjusting the delivery head to the volume flow requirement and lower flow rates.

There are three pre-defined pump curves (I, II, III) to choose from.

Constant differential pressure $\Delta p-c$ (I, II, III)

Recommended for underfloor heating for large-sized pipes or all applications without a variable pipe network curve (e.g. storage charge pumps), as well as single-pipe heating systems with radiators.

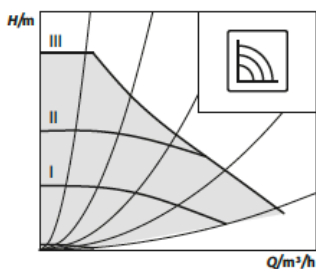


The control keeps the set delivery head constant irrespective of the pumped volume flow.

There are three pre-defined pump curves (I, II, III) to choose from.

Constant speed (I, II, III)

Recommended for systems with fixed system resistance requiring a constant volume flow.



The pump runs in three prescribed fixed speed stages (I, II, III).

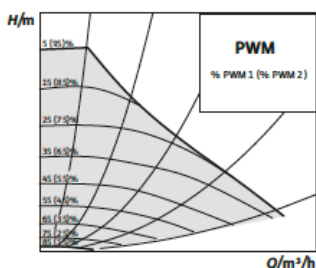


NOTICE

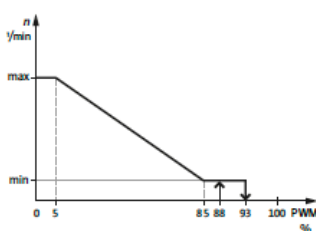
Factory setting:
Constant speed, pump curve III

External control via iPWM signal

The required setpoint/actual value comparison for control is performed by an external controller. A PWM signal (pulse-width modulation) is fed as a correcting variable to the pump.



The PWM signal generator gives the pump a periodic sequence of impulses (the duty cycle) in accordance with DIN IEC 60469-1.



iPWM 1 mode (heating application):

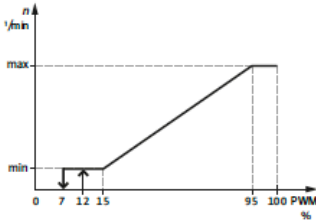
In iPWM 1 mode, the pump speed is controlled according to the PWM input signal.

Behaviour in the event of a cable break:

If the signal cable is disconnected from the pump, e.g. due to a cable break, the pump accelerates to maximum speed.

PWM signal input [%]

- < 5: Pump runs at maximum speed
- 5–85: The speed of the pump decreases linearly from n_{max} to n_{min}
- 85–93: Pump runs at minimum speed (operation)
- 85–88: Pump runs at minimum speed (starting)
- 93–100: Pump stops (standby)



iPWM 2 mode:

In iPWM 2 mode, the pump speed is controlled according to the PWM input signal.

Behaviour in the event of a cable break:

If the signal cable is disconnected from the pump, e.g. due to a cable break, the pump stops.

PWM signal input [%]

- 0-7: Pump stops (standby)
- 7-15: Pump runs at minimum speed (operation)
- 12-15: Pump runs at minimum speed (starting)
- 15-95: The speed of the pump increases linearly from n_{\min} to n_{\max}
- > 95: Pump runs at maximum speed

Venting The **pump venting function** is activated by pressing and holding the operating button (for 3 seconds) and automatically vents the pump. However, this function does not vent the heating system.

Manual restart A **manual restart** is initiated by pressing and holding the operating button (for 5 seconds) and unblocks the pump as required (e.g. after a long idle time in the summer).

Lock/unlock the button The **key lock** is activated by pressing and holding the operating button (for 8 seconds) and locks the pump's current settings. It protects against undesired or unauthorised adjustment of the pump.

Activating factory setting The **factory setting** is activated by pressing and holding the operating button whilst switching off the pump. When the pump is switched on again, the pump runs using the factory settings (delivery condition).

4 Intended use

High-efficiency circulators in the Wilo-Para series are exclusively intended for circulating fluids in hot-water heating systems and similar systems with constantly changing volume flows.

Permitted fluids:

- Heating water according to VDI 2035 (CH: SWKI BT 102-01).
- Water-glycol mixtures* with a maximum of 50% glycol.

* Glycol has a higher viscosity than water. If admixtures of glycol are used, the pumping data of the pump must be corrected to match the mixing ratio.



NOTICE

Only introduce ready-to-use mixtures to the system. The pump must not be used to mix fluid in the system.

Intended use includes observing these instructions and the specifications and markings on the pump.

Misuse Any use beyond the intended use is considered misuse and will void any warranty claims.



WARNING!

Danger of injury or material damage from improper use!

- Never use non-specified fluids.
- Never allow unauthorised persons to carry out work.
- Never operate the pump beyond the specified limits of use.
- Never carry out unauthorised conversions.
- Use authorised accessories only.
- Never operate with phase angle control.

5 Transportation and storage

- Scope of delivery**
- High-efficiency circulator
 - Installation and operating instructions

Accessories Accessories must be ordered separately. For a detailed list and description, consult the catalogue.

The following accessories are available:

- Mains connection cable
- iPWM/LIN signal cable
- Thermal insulation shell
- Cooling shell

Transport inspection Immediately check for transportation damage and completeness upon delivery, and lodge any complaints immediately.

Transport and storage conditions Protect against moisture, frost and mechanical loads. Permissible temperature range: -40 °C to $+85\text{ °C}$ (for max. 3 months)

6 Installation and electrical connection

6.1 Installation

May only be installed by qualified technicians.



WARNING!

Risk of burns from hot surfaces!

Pump housing (1) and glandless motor (2) may become hot and cause burns if touched.

- During operation, only touch the control module (5).
- Allow the pump to cool down before commencing any work.

**WARNING!****Risk of scalding from hot fluids!**

Hot fluids can cause scalding. Before installing or removing the pump, or loosening the housing screws (4), note the following:

- Allow the heating system to cool down completely.
- Close shut-off devices or drain the heating system.

Preparation**Installation within a building:**

- Install the pump in a dry, well-ventilated, frost-free room.

Installation outside a building (outdoor installation):

- Install the pump in a chamber with cover or in a cabinet/housing as weather protection.
- Avoid exposure of the pump to direct sunlight.
- Protect the pump against rain.
- Keep the motor and electronics continually ventilated to avoid overheating.
- The permitted fluid temperatures and ambient temperatures should not be exceeded or undershot.
- Choose an installation point that is as easily accessible as possible.
- Observe the pump's permitted installation position (Fig. 2).

CAUTION!

An incorrect installation position may damage the pump.

- Select the installation point in line with the permissible installation position (Fig. 2).
- The motor must always be installed horizontally.
- The electrical connection must never face upwards.

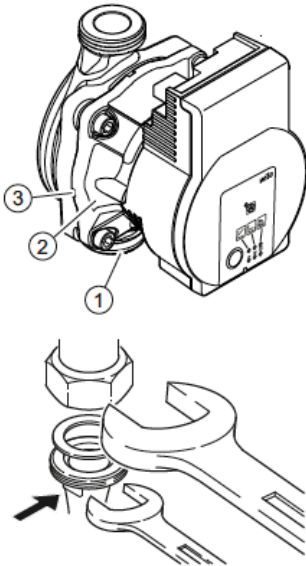
- Install shut-off devices upstream and downstream of the pump to facilitate pump replacement.

CAUTION!

Leaking water may damage the control module.

- Align the upper shut-off device so that leaking water cannot drip onto the control module (5).
- If the control module is sprayed with liquid, the surface must be dried off.

- Align the upper shut-off device laterally.
- When installing in the feed of open systems, the safety supply must branch off upstream of the pump (EN 12828).
- Complete all welding and brazing work.
- Flush the pipe system.
- Do not use the pump to flush the pipe system.

Installing the pump

Observe the following points when installing the pump:

- Note the direction arrow on the pump housing (1).
- Install glandless motor (2) horizontally, without mechanical tension.
- Place gaskets in the screwed connections.
- Screw on threaded pipe unions.
- Use an open-end wrench to secure the pump against twisting and screw tightly to piping.
- Re-mount the thermal insulation shell if required.

CAUTION!

Insufficient heat dissipation and condensation water may damage the control module and the glandless motor.

- Do not thermally insulate the glandless motor (2).
- Ensure all condensate drain openings (3) are kept free.

**WARNING!****Risk of fatal injury from magnetic field!**

Risk of fatal injury for people with medical implants due to permanent magnets installed in the pump.

- The motor must never be removed.

6.2 Electrical connection

The electrical connection may only be carried out by a qualified electrician.

**DANGER!****Risk of fatal injury from electrical voltage!**

Immediate risk of fatal injury if live components are touched.

- Before commencing work, switch off the power supply and secure it from being switched on again.
- Never open the control module (5) and never remove operating elements.

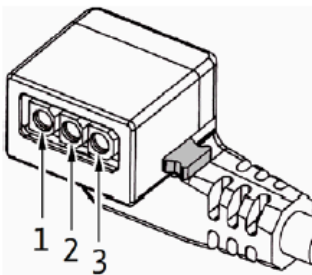
CAUTION!

Pulsed mains voltage can cause damage to electronic components.

- Never operate the pump with phase angle control.
 - For applications where it is not clear whether the pump is operated with pulsed voltage, get the control/system manufacturer to confirm that the pump is operated with sinusoidal AC voltage.
 - Switching the pump on/off via triacs/solid-state relays must be examined on a case-by-case basis.
-

Preparation

- The current type and voltage must correspond to the specifications on the rating plate (6).
- Maximum back-up fuse: 10 A, slow-blow.
- Only operate the pump with sinusoidal AC voltage.
- Note the switching frequency:
 - On/off switching operations via mains voltage $\leq 100/24$ h.
 - $\leq 20/h$ for a switching frequency of 1 min. between switching on/off via mains voltage.
- The electrical connection must be made via a fixed connecting cable equipped with a connector device or an all-pole switch with a contact opening width of at least 3 mm (VDE 0700/Part 1).
- Use a connecting cable with sufficient outer diameter (e.g. H05VV-F3G1.5) to protect against leaking water and to ensure strain relief on the threaded cable connection.
- Use a heat-resistant connecting cable where fluid temperatures exceed 90 °C.
- Ensure that the connecting cable does not make contact with either the pipes or the pump.

Mains cable connection

Installing the mains connection cable (Fig. 3):

1. Standard: 3-core coated cable with brass ferrules
2. Optional: Mains cable with 3-pin connection plug
3. Optional: Wilo-Connector cable (Fig. 3, item b)

- Cable assignment:
 - 1 yellow/green: PE (⊖)
 - 2 blue: N
 - 3 brown: L
- Press down the locking button of the 3-pin pump plug and connect the plug to the plug connection (12) of the control module until it snaps into place (Fig. 4).

Wilco-Connector connection**Installing Wilco-Connector**

- Disconnect the connecting cable from the power supply.
- Observe terminal assignment (⊕ (PE), N, L).
- Connect and install the Wilco-Connector (Fig. 5a to 5e).

Connecting the pump

- Earth the pump.
- Connect the Wilco-Connector to the connection cable until it snaps into place (Fig. 5f).

Removing the Wilco-Connector

- Disconnect the connecting cable from the power supply.
- Remove the Wilco-Connector using a suitable screwdriver (Fig. 6).

Connection to an existing device

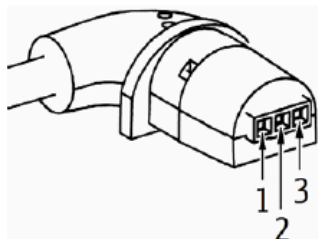
The pump can be directly connected to an existing pump cable with a 3-pin plug (e.g. Molex) when being replaced (Fig. 3, item a).

- Disconnect the connecting cable from the power supply.
- Press down the locking button of the installed plug and remove the plug from the control module.
- Observe the terminal assignment (PE, N, L).
- Connect the existing device plug to the plug connection (12) of the control module.

iPWM/LIN **connection**

Connecting the iPWM/LIN signal cable (accessories)

- Connect the signal cable plug to the iPWM/LIN connection (11) until it snaps into place.



iPWM:

- Cable assignment:
 - 1 brown: PWM input (from controller)
 - 2 blue or grey: Signal earth (GND)
 - 3 black: PWM output (from the pump)
- Signal properties:
 - Signal frequency: 100 Hz – 5000 Hz (1000 Hz nominal)
 - Signal amplitude: Min. 3.6 V at 3 mA to 24 V for 7.5 mA, absorbed by the pump interface.
 - Signal polarity: yes

LIN:

- Cable assignment:
 - 1 brown: 12 V DC to 24 V DC (+/-10 %)
 - 2 blue or grey: Signal earth (GND)
 - 3 black: LIN bus data
- Signal properties:
 - Bus speed: 19200 bit/s

CAUTION!

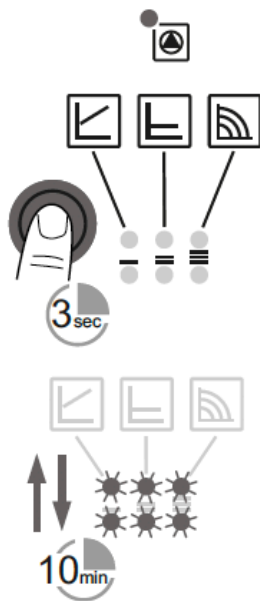
The connection of mains voltage (230 V AC) to the communication pins (iPWM/LIN) will destroy the product.

- At the PWM input, the maximum voltage is 24 V pulsed input voltage.
-

7 Commissioning

Commissioning only by qualified technicians.

7.1 Venting



- Fill and vent the system correctly.

If the pump does not vent automatically:

- Activate the pump venting function via the operating button: press and hold for 3 seconds, then release.
 - ➔ The pump venting function is initiated and lasts 10 minutes.
 - ➔ The top and bottom LED rows flash in turn at 1 second intervals.
- To cancel, press and hold the operating button for 3 seconds.

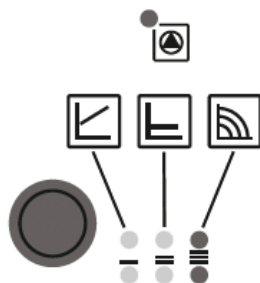


NOTICE

After venting, the LED display shows the previously set values of the pump.

7.2 Setting the control mode










Select control mode



The LED selection of control modes and corresponding pump curves takes place in clockwise succession.

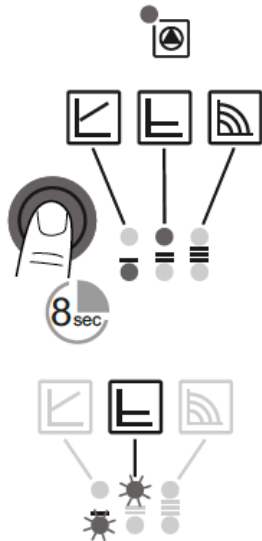
- Press the operating button briefly (approx. 1 second).
 - ➔ LEDs display the set control mode and pump curve.

The following shows the various possible settings (for example: constant speed / characteristic curve III):

	LED display	Control mode	Pump curve
1		Constant speed	II
2		Constant speed	I
3		Variable differential pressure $\Delta p-v$	III
4		Variable differential pressure $\Delta p-v$	II
5		Variable differential pressure $\Delta p-v$	I
6		Constant differential pressure $\Delta p-c$	III
7		Constant differential pressure $\Delta p-c$	II
8		Constant differential pressure $\Delta p-c$	I
9		Constant speed	III

- Pressing the button for the 9th time returns to the basic setting (constant speed / characteristic curve III).

Lock/unlock the button



- To activate the key lock, press and hold the operating button for 8 seconds until the LEDs for the selected setting briefly flash, then release.
 - ➔ LEDs flash constantly at 1-second intervals.
 - ➔ The key lock is activated: pump settings can no longer be changed.
- The key lock is deactivated in the same manner as it is activated.



NOTICE

All settings/displays are retained if the power supply is interrupted.

Activating factory setting

The factory setting is activated by pressing and holding the operating button whilst switching off the pump.

- Press and hold the operating button for at least 4 seconds.
 - ➔ All LEDs flash for 1 second.
 - ➔ The LEDs for the last setting flash for 1 second.
- When the pump is switched on again, the pump runs using the factory settings (delivery condition).

8 Decommissioning

Shutting down the pump

Shut down the pump immediately if the connecting cable or other electrical components are damaged.

- Disconnect the pump from the power supply.
- Contact Wilo customer service or a specialist technician.

9 Maintenance

Cleaning

- Carefully remove dirt from the pump on a regular basis using a dry duster.
- Never use liquids or aggressive cleaning agents.

10 Faults, causes and remedies

The troubleshooting must only be carried out by a qualified specialist, and work on the electrical connection must only be carried out by a qualified electrician.

Faults	Causes	Remedy
Pump is not running although the power supply is switched on	Electrical fuse defective	Check fuses
	No voltage supply at pump	Rectify the power interruption
Noisy pump	Cavitation due to insufficient suction pressure	Increase the system pressure within the permissible range
		Check the delivery head and set it to a lower head if necessary
Building does not warm up	Thermal output of the heating surfaces is too low	Increase setpoint
		Change the control mode from $\Delta p-c$ to $\Delta p-v$

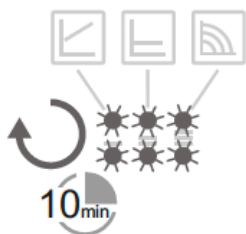
10.1 Fault signals

- The fault signal LED indicates a fault.
- The pump switches off (depending on the fault) and attempts a cyclical restart.

LED	Faults	Causes	Remedy
Lights up red	Blocking	Rotor blocked	Activate manual restart or contact customer service
	Contacting/winding	Winding defective	
Flashes red	Under/overvoltage	Power supply too low/high on mains side	Check mains voltage and operating conditions, and request customer service
	Excessive module temperature	Module interior too warm	
	Short-circuit	Motor current too high	

LED	Faults	Causes	Remedy
Flashes red/ green	Generator operation	Water is flowing through the pump hydraulics, but there is no mains voltage at the pump	Check the mains voltage, water quantity/pressure and the ambient conditions
	Dry run	Air in the pump	
	Overload	Sluggish motor, pump is operated outside of its specifications (e.g. high module temperature). The speed is lower than during normal operation	

Manual restart



- The pump attempts an automatic restart upon detecting a blockage.

If the pump does not restart automatically:

- Activate manual restart via the operating button: press and hold for 5 seconds, then release.
 - ➔ The restart function is initiated, and lasts max. 10 minutes.
 - ➔ The LEDs flash in succession clockwise.
- To cancel, press and hold the operating button for 5 seconds.



NOTICE

After the restart, the LED display shows the previously set values of the pump.

If the fault cannot be remedied, contact a specialist technician or Wilo customer service.

11 Disposal

Information on the collection of used electrical and electronic products

Proper disposal and appropriate recycling of this product prevents damage to the environment and danger to your personal health.



NOTICE

Disposal in domestic waste is forbidden!

In the European Union, this symbol can appear on the product, the packaging or the accompanying documentation. It means that the electrical and electronic products in question must not be disposed of along with domestic waste.

To ensure proper handling, recycling and disposal of the used products in question, please note the following points:

- Only hand over these products at designated, certified collecting points.
- Observe the locally applicable regulations!

Please consult your local municipality, the nearest waste disposal site, or the dealer who sold the product to you for information on proper disposal. Further recycling information at www.wilo-recycling.com



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