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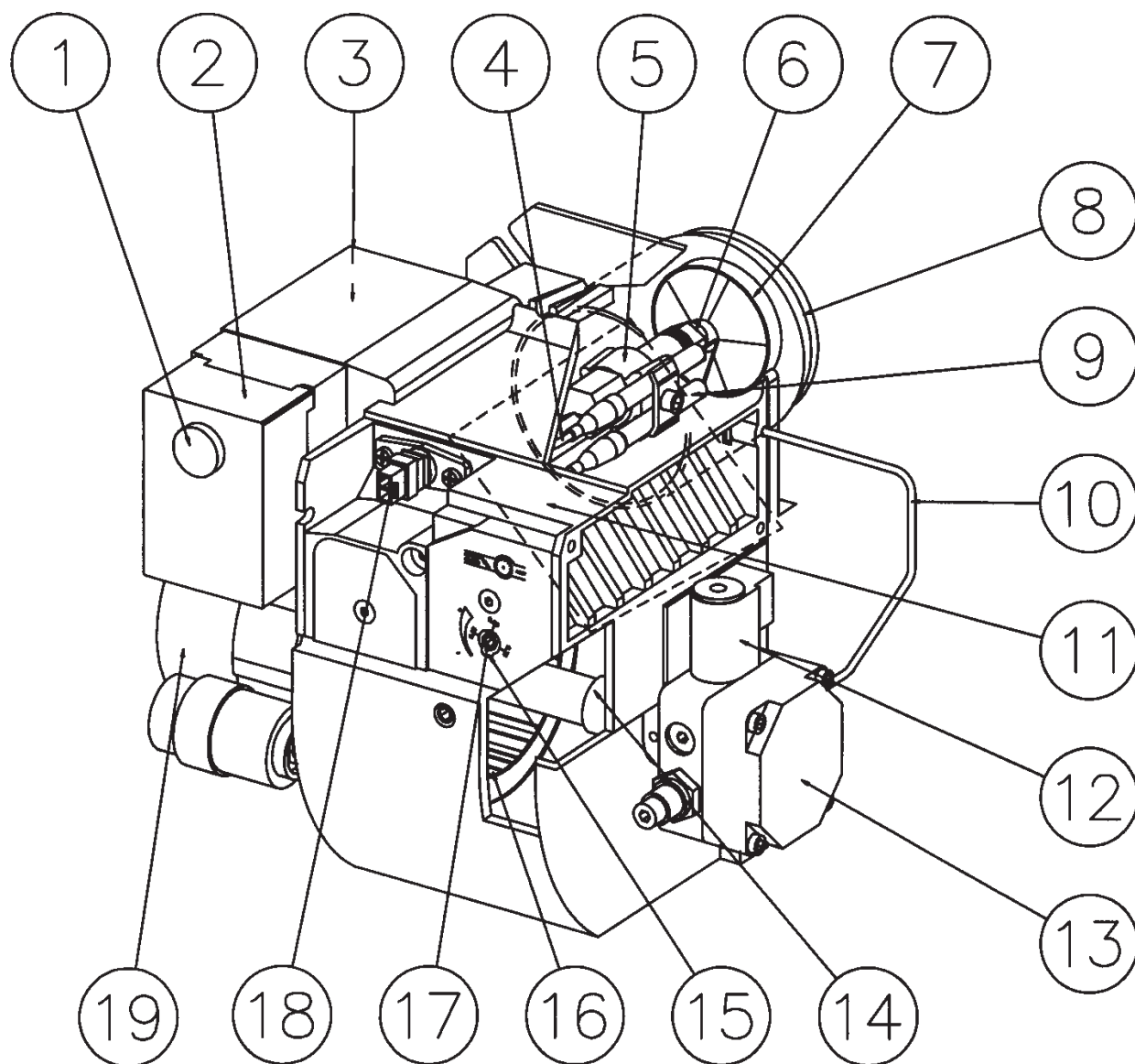
Installation- and maintenance instruction

## **BENTOFLEX ST120KA**



## DESCRIPTION

### Components



1. Reset button
2. Control box
3. Ignition transformer
4. Ignition cables
5. Nozzle assembly
6. Nozzle
7. Brake plate

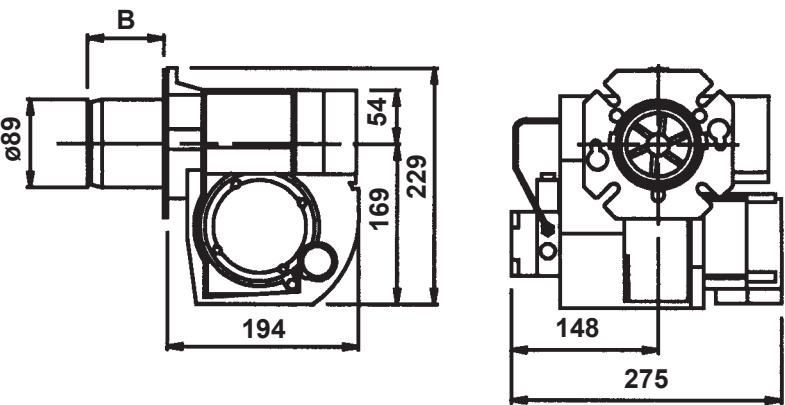
8. Blast tube
9. Ignition electrodes
10. Connecting pipe
11. Air damper
12. Solenoid valve
13. Pump
14. Drive coupling

15. Indication, air damper
16. Fan wheel
17. Adjustment, air damper
18. Photoresistor
19. Motor

# TECHNICAL DATA

## ST 120 KA

### Dimensions



| Burner tube | Length of burner tube | Incl. flange A<br>Measure B | Incl. flange B<br>Measure B | Incl. flange C<br>Measure B | Incl. flange D<br>Measure B |
|-------------|-----------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| KA          | 94                    | 56                          | 69                          | 77                          | 76                          |
| KA          | 147                   | 109                         | 122                         | 130                         | 129                         |
| KA          | 197                   | 159                         | 172                         | 180                         | 179                         |
| KA          | 224                   | 186                         | 199                         | 207                         | 206                         |

### Output range and nozzles recommended

| Burner tube | Oil capacity |       | Output |  | Recommended Nozzle |      | Recommended Pump pressure |
|-------------|--------------|-------|--------|--|--------------------|------|---------------------------|
|             | kg/h         | kW    | Mcal/h |  | Angle              | Type |                           |
| KA          | 2,0-5,6      | 24-66 | 20-57  |  | 60°, 80°           | H, S | 10                        |

The net calorific value of 11,86 kWh/kg for light oil has been used.

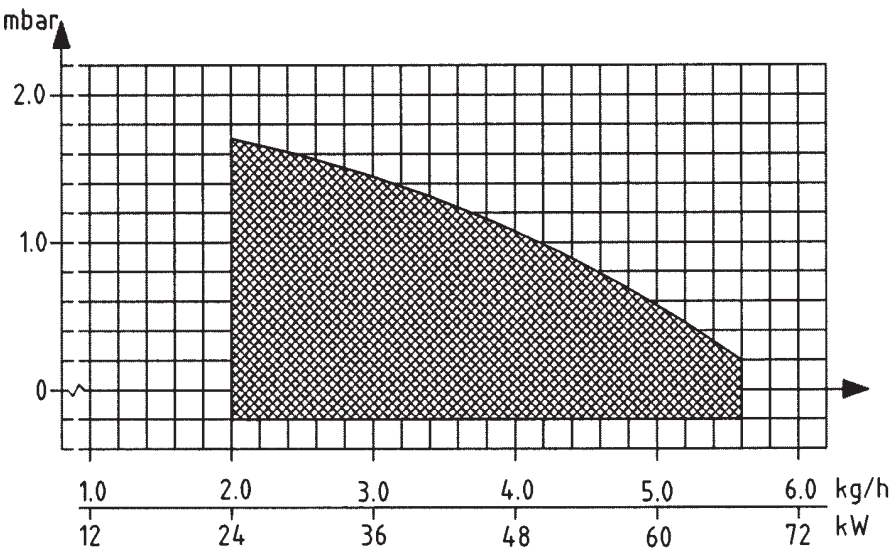
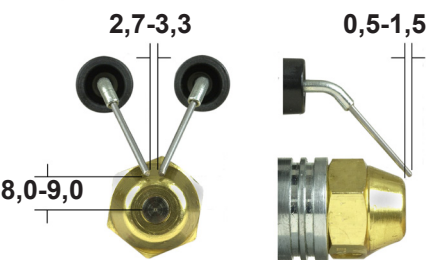
### Recommended nozzle

Because of different boiler types existing on the market, with varying combustion chamber designs, it is

not possible to state a definite spray angle or spray pattern.

Note that the spray angle and the spray pattern change with the pump pressure.

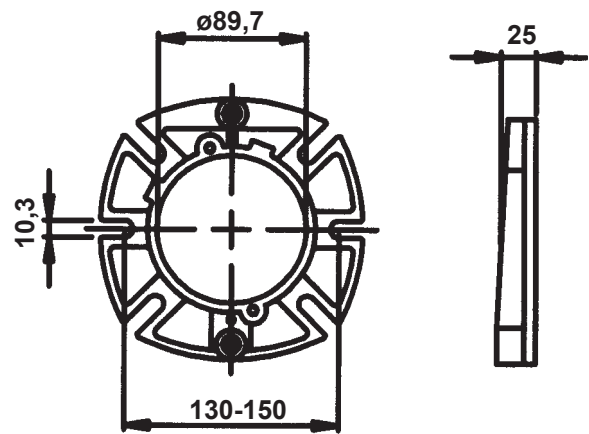
### Electrode adjustment



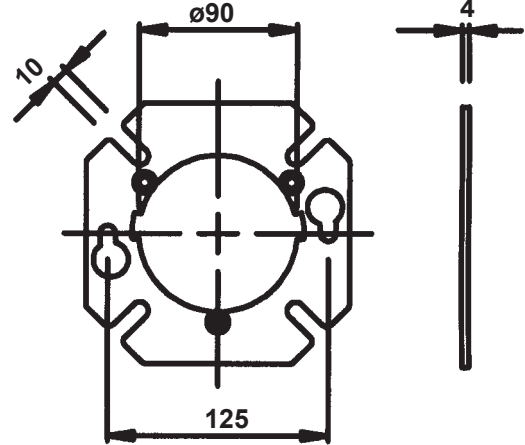
# TECHNICAL DATA

## Dimensions

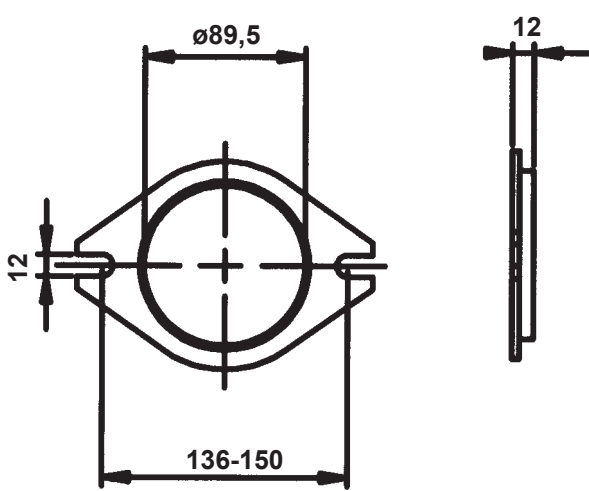
Flange A



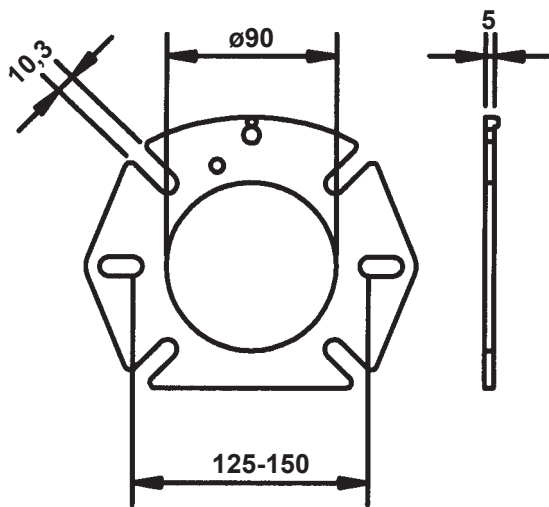
Flange C



Flange B



Flange D



# GENERAL INSTRUCTIONS

## General rules

The installation of an oil burner should be carried out in accordance with local regulations. The installer of the burner must therefore be aware of all regulations relating to oil and combustion. Only oil suitable for the burner should be used and then in combination with a suitable oil filter before the oil pump of the burner.

If the burner is replacing an existing burner make sure that the oil filter is replaced or cleaned. The installation must only be undertaken by experienced personnel. Care should be taken by the installer to ensure that no electrical cables or fuel/gas pipes are trapped or damaged during installation or service/maintenance.

## Installation instructions

General installation instructions accompany the burner and should be left in a prominent place adjacent to the burner.

## Adjustment of burner

The burner is from the factory pre-set to an average value that must then be adjusted to the boiler in question.

All burner adjustments must be made in accordance with boiler manufacturers instructions. These must include the checking of flue gas temperatures, average water temperature and CO<sub>2</sub> or O<sub>2</sub> concentration.

To adjust the combustion device, start by increasing the air volume somewhat.

When the burner starts it is burning with excess air and smoke number 0. Reduce the air volume until soot occurs and increase again to reach a combustion free of soot.

By this procedure an optimum adjustment is obtained. If larger nozzles are used the preadjustment of the air volume must be increased.

## Condensation in chimney

A modern burner works with less excess air and often also with smaller nozzles than older models. This increases the efficiency but also the risk of condensation in the chimney. The risk increases if the area of the chimney flue is too large. The temperature of the flue gases should exceed 60°C measured 0,5 metres from the chimney top.

Measures to raise the temperature:

Insulate the chimney in cold attics

Install a tube in the chimney

Install a draught regulator (dilutes the flue gases during operation and dries them up during standstill)

Increase the oil quantity

Raise the flue gas temperature by removing turbulators, if any, in the boiler.

## Instructions for use

The end user of the burner should be instructed about the operation and safety features of the burner.

He should also be made aware of the importance of the area around the boiler/burner being kept free of combustible material.

## Pump adjustment

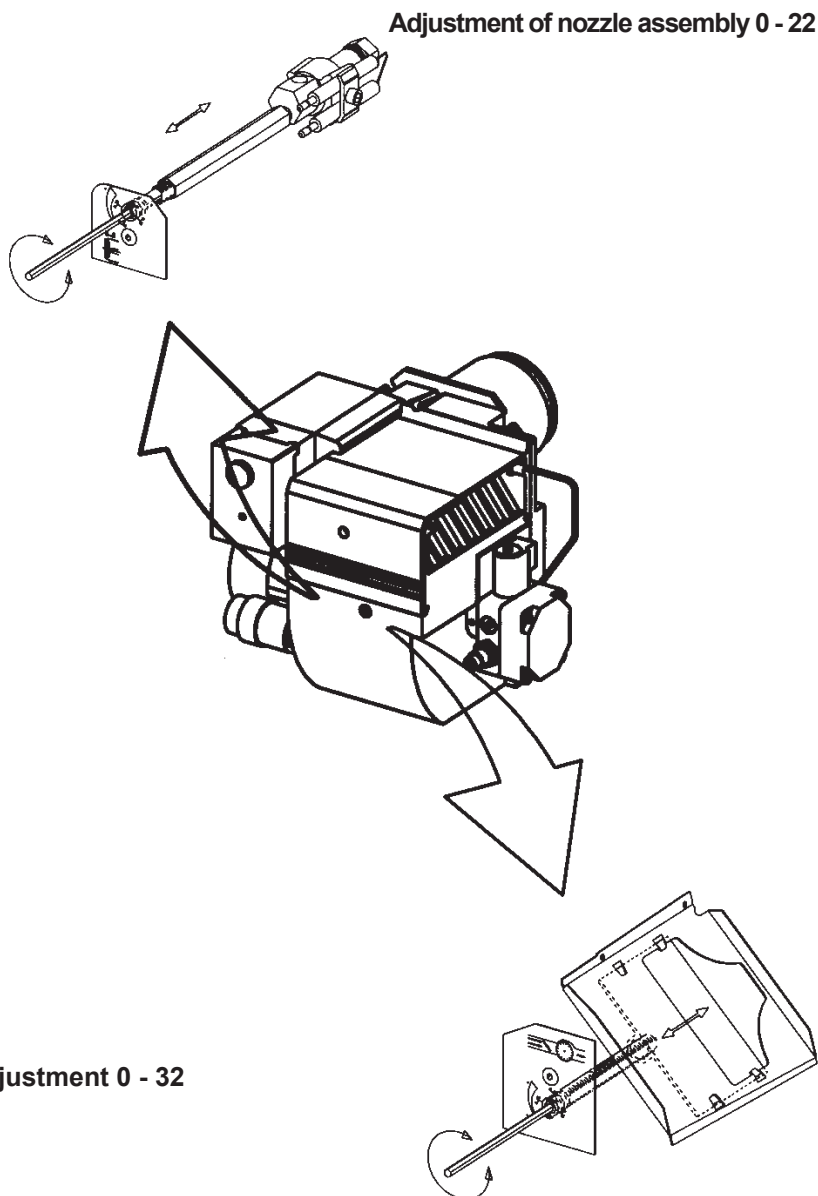
See separate description.

## Adjustment of burner

To obtain a correct adjustment a flue gas analysis and a temperature measurement must be carried out. Otherwise there is a risk that a bad adjustment may cause a formation of soot, bad efficiency or condensate in the chimney.

## Maintenance

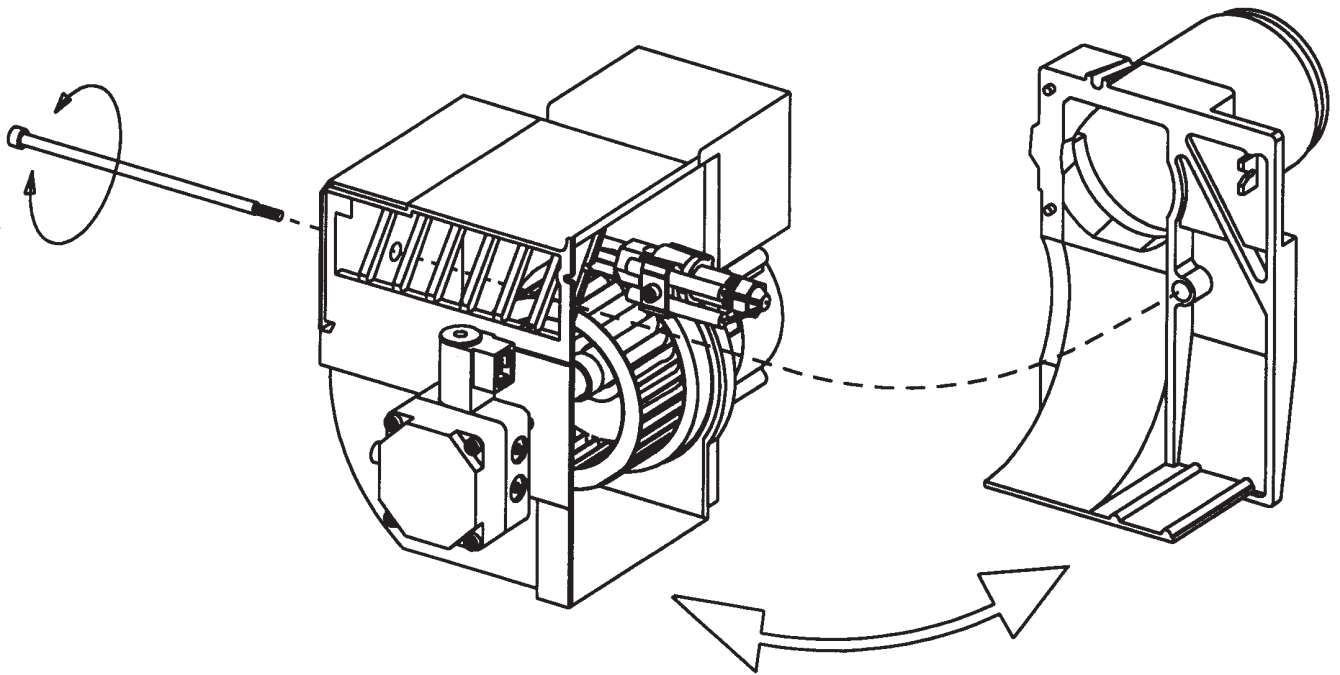
The boiler/burner should be examined regularly for any signs of malfunction or oil leakage.





## MAINTENANCE OF OIL BURNER

**Warning:** Before doing any service switch off power at the main switch and cut off the oil supply



Service of burner head and nozzle assembly

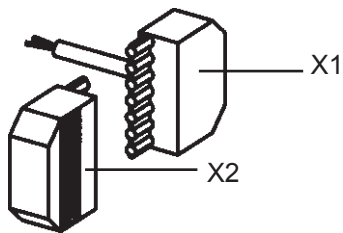
# ELECTRIC EQUIPMENT

## Oil burner control: LMO14.113... / LMO24.255...

### List of components

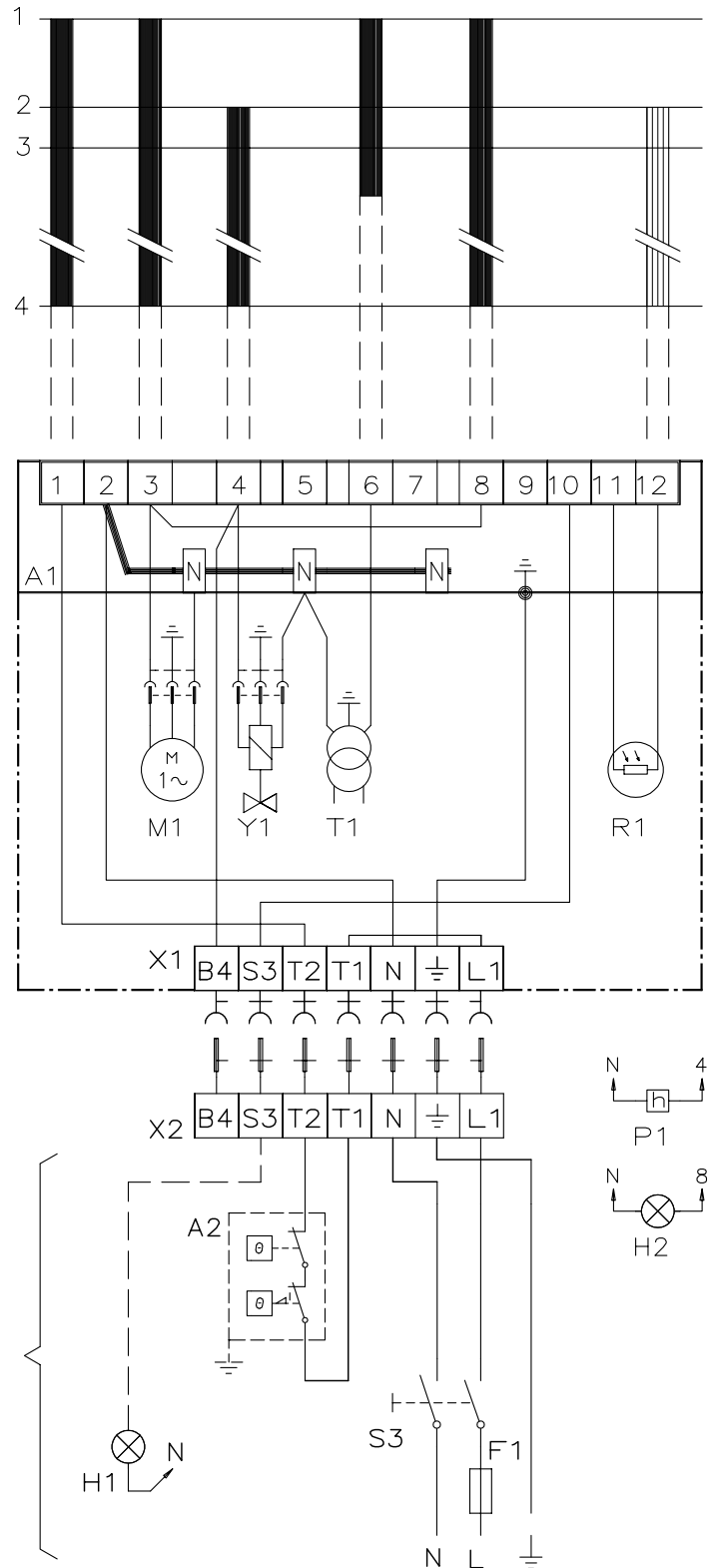
- A1 Oil burner control
- A2 Twin thermostat
- F1 Fuse, max. 10A
- H1 Alarm lamp
- H2 Signal lamp (optional)
- M1 Burner motor
- P1 Time meter (optional)
- R1 Photoresistor
- S3 Main switch
- T1 Ignition transformer
- Y1 Solenoid valve
- X1 Plug-in contact, burner
- X2 Plug-in contact, boiler

### Outer electrical connection



Mains connection and fuses in accordance with local regulations.

### Wiring diagram



\* If there is no plug-in contact (X2) on the boiler, connect to the contact enclosed. In case the twin thermostat is in series on incoming phase L1, a loop between the terminals T1 and T2 is necessary.



# ELECTRIC EQUIPMENT

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## Function

### 1. Switch on operating switch and twin thermostat

The burner motor starts, an ignition spark is formed, the prepurge goes on till the prepurge period expires and the solenoid valve opens.

### 2. Solenoid valve opens

Oil mist is formed and ignited. The photocell indicates a flame. The ignition spark goes out after flame indication (See Technical data oil burner control).

### 3. The safety time expires

- a. If no flame is established before this time limit the control cuts out.
- b. If for some reasons the flame disappears after this time limit, the burner will make an attempt to re-start.

### 3-4. Operating position

If the burner operation is interrupted by means of the main switch or the thermostat, a new start takes place when the conditions in accordance with point 1 are fulfilled.

#### The oil burner control cuts out

A red lamp in the control is lit. Press the reset button and the burner re-starts.

## Technical data oil burner control

|                                      | LMO14.113... | LMO24.255... |
|--------------------------------------|--------------|--------------|
| Pre-ignition time:                   | 15 s         | 25 s         |
| Pre-purge time:                      | 16 s         | 26 s         |
| Post-ignition time:                  | 3 s          | 5 s          |
| Safety lock-out time:                | < 10 s       | < 5 s        |
| Reset time after lockout:            | < 1 s        | < 1 s        |
| Reaction time on flame failure:      | < 1 s        | < 1 s        |
| Ambient temperature:                 | -5 +60°C     | -20 - +60°C  |
| Min. current with flame established: | 45 µA        | 45 µA        |
| Max. photo current at start:         | 5,5 µA       | 5,5 µA       |

## Control of photo current

Current through photo unit is measured with a d.c. ammeter (a moving coil instrument connected in series with the photo unit).

### Colour codes LMO14/24

When the burner starts, three signal lights in the reset switch indicate the normal sequence, as well as provide indication if something abnormal is happening in accordance with the following table:

|                              |                     |
|------------------------------|---------------------|
| Preheater in operation       | Solid yellow        |
| Ignition switched on         | Flashing yellow     |
| Normal operation             | Solid green         |
| Operation, poor flame signal | Flashing green      |
| Undervoltage                 | Flashing yellow-red |
| Fault, alarm                 | Solid red           |
| False light                  | Flashing red-green  |
| Communication mode           | Fluttering red      |

### Fault codes LMO14/24

When the red light for a blocked relay box comes on, you can get information about what has caused the problem by pressing and holding the reset button for 3 seconds.

The number of flashes below is repeated with a pause in between.

|            |                                                                           |
|------------|---------------------------------------------------------------------------|
| 2 flashes  | No flame signal when safety time expires                                  |
| 4 flashes  | False light during start                                                  |
| 7 flashes  | 3 x Losses of flame during operation                                      |
| 8 flashes  | Time-out for preheater *                                                  |
| 10 flashes | Incorrect wiring, internal fault or simultaneous occurrence of two faults |

\* In order for this fault code to occur, the preheater shall not reach its cut-off temperature within 10 mins. from switch on.

To return to normal operation: Press the reset button for 1 second.  
If the reset button is instead kept pressed a second time for at least 3 seconds, you can, via an interface, obtain the corresponding information on a computer or flue gas analyser.

To return to normal operation: Press the reset button for 1 second

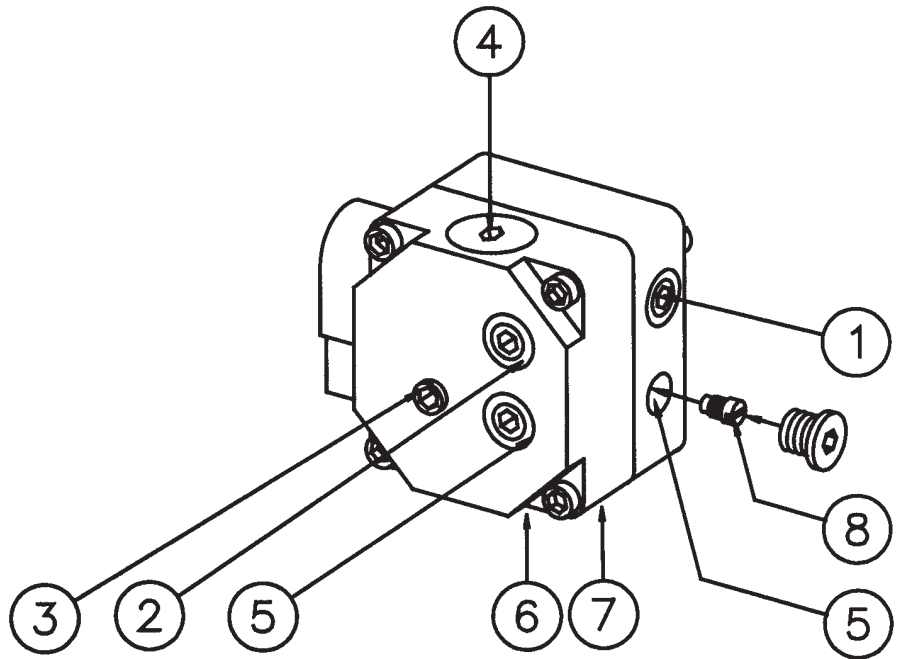
# INSTRUCTIONS PUMP TYPE DANFOSS BFP41

## Technical data

Viscosity range: 1,3-12,0 mm<sup>2</sup>/s  
 Pressure range: 7-15 bar  
 Oil temperature: -10 to +70°C

## Components

1. Nozzle port G1/8"
2. Pressure gauge port
3. Pressure adjustment, 4mm allen key
4. Cartridge filter
5. Vacuum gauge port G1/8"
6. Return line G1/4"
7. Suction line G1/4"
8. Return plug



## Suction line tables

The suction line tables consist of theoretically calculated values where the pipe dimensions and oil velocity have been matched so that turbulences will not occur. Such turbulences will result in increased pressure losses and in acoustic noise in the pipe system. In addition to drawn copper piping a pipe system usually comprises 4 elbows, a non-return valve, a cut-off valve and an external oil filter.

The sum of these individual resistances is so insignificant that they can be disregarded. The tables do not include any lengths exceeding 100 m as experience shows that longer lengths are not needed.

The tables apply to a standard fuel oil of normal commercial quality according to current standards. On commissioning with an empty tube system the oil pump should not be run without oil for more than 5 min. (a condition is that the pump is being lubricated during operation).

The tables state the total suction line length in metres at a nozzle capacity of 2,5 kg/h. Max. permissible pressure at the suction and pressure side is 2,0 bar.

## Purging

On 1-pipe systems it is necessary to purge the pump. On 2-pipe systems purging is automatic through the return line.

|                 |               |       |        |  |                                                            |               |       |        |  |
|-----------------|---------------|-------|--------|--|------------------------------------------------------------|---------------|-------|--------|--|
|                 |               |       |        |  |                                                            |               |       |        |  |
| 1-pipe system   |               |       |        |  | 1-pipe system                                              |               |       |        |  |
| Height          | Pipe diameter |       |        |  | Height                                                     | Pipe diameter |       |        |  |
| H               | ø4 mm         | ø5 mm | ø6 mm  |  | H                                                          | ø4 mm         | ø5 mm | ø6 mm  |  |
| m               | m             | m     | m      |  | m                                                          | m             | m     | m      |  |
| 4,0             | 51            | 100   | 100    |  |                                                            |               |       |        |  |
| 3,5             | 45            | 100   | 100    |  | With an underlying tank a 1-pipe-system is not recommended |               |       |        |  |
| 3,0             | 38            | 94    | 100    |  |                                                            |               |       |        |  |
| 2,5             | 32            | 78    | 100    |  |                                                            |               |       |        |  |
| 2,0             | 26            | 62    | 100    |  |                                                            |               |       |        |  |
| 1,5             | 19            | 47    | 97     |  |                                                            |               |       |        |  |
| 1,0             | 13            | 31    | 65     |  | Two-pipe system                                            |               |       |        |  |
| 0,5             | 6             | 16    | 32     |  | Height                                                     | Pipe diameter |       |        |  |
| Two-pipe system |               |       |        |  | H                                                          | ø6 mm         | ø8 mm | ø10 mm |  |
| Height          | Pipe diameter |       |        |  | m                                                          | m             | m     | m      |  |
| H               | ø6 mm         | ø8 mm | ø10 mm |  | 4,0                                                        | 33            | 100   | 100    |  |
| m               | m             | m     | m      |  | 3,5                                                        | 31            | 98    | 100    |  |
| 4,0             | 33            | 100   | 100    |  | 3,0                                                        | 29            | 91    | 100    |  |
| 3,5             | 31            | 98    | 100    |  | 2,5                                                        | 27            | 85    | 100    |  |
| 3,0             | 29            | 91    | 100    |  | 2,0                                                        | 25            | 79    | 100    |  |
| 2,5             | 27            | 85    | 100    |  | 1,5                                                        | 23            | 72    | 100    |  |
| 2,0             | 25            | 79    | 100    |  | 1,0                                                        | 21            | 66    | 100    |  |
| 1,5             | 23            | 72    | 100    |  | 0,5                                                        | 19            | 60    | 100    |  |
| 1,0             | 21            | 66    | 100    |  |                                                            |               |       |        |  |
| 0,5             | 19            | 60    | 100    |  |                                                            |               |       |        |  |
|                 |               |       |        |  | Two-pipe system                                            |               |       |        |  |
|                 |               |       |        |  | Height                                                     | Pipe diameter |       |        |  |
|                 |               |       |        |  | H                                                          | ø6 mm         | ø8 mm | ø10 mm |  |
|                 |               |       |        |  | m                                                          | m             | m     | m      |  |
|                 |               |       |        |  | 0                                                          | 17            | 53    | 100    |  |
|                 |               |       |        |  | -0,5                                                       | 15            | 47    | 100    |  |
|                 |               |       |        |  | -1,0                                                       | 13            | 41    | 99     |  |
|                 |               |       |        |  | -1,5                                                       | 11            | 34    | 84     |  |
|                 |               |       |        |  | -2,0                                                       | 9             | 28    | 68     |  |
|                 |               |       |        |  | -2,5                                                       | 7             | 22    | 53     |  |
|                 |               |       |        |  | -3,0                                                       | 5             | 15    | 37     |  |
|                 |               |       |        |  | -3,5                                                       | 3             | 9     | 22     |  |
|                 |               |       |        |  | 4,0                                                        | 1             | 3     | 6      |  |

# INSTRUCTIONS PUMP TYPE DANFOSS BFP41

## Function Danfoss BFP41

When the oil pump is started, oil is drawn from the suction connection (S) through the filter (H) to the suction side of the gear wheel (C).

The gear wheel then pumps oil to the pressure side and the oil is put under pressure.

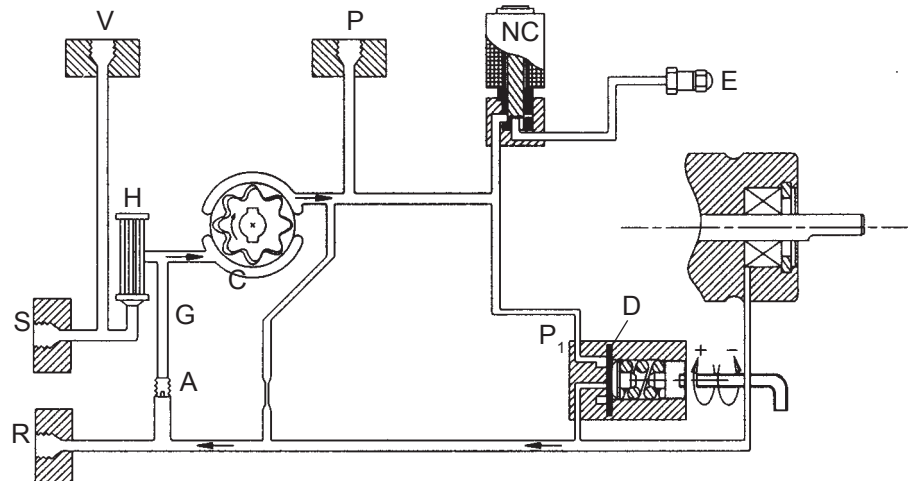
The pressure is controlled and kept constant at the set value by the regulating valve ( $P_1$ ) with the diaphragm (D).

The regulating valve ( $P_1$ ) distributes the oil quantity supplied by the gear set (C) between the nozzle port (E) and the return side of the pump (R).

The oil quantity utilized is determined by the set pressure on the regulating valve ( $P_1$ ) and the size of the oil nozzle in the nozzle line.

The valve ( $P_1$ ) functions in the following way:

- When the opening pressure has been reached, the passage to the return side opens.
- The diaphragm and the spring keep the pump pressure constant at set value.
- If the pump is overloaded, i.e. if you try to get out more



oil than the gear set can supply under existing circumstances, the oil pressure falls below the set value and the valve closes against the return side (R) by means of the diaphragm (D) and goes into starting position.

This can be remedied by:

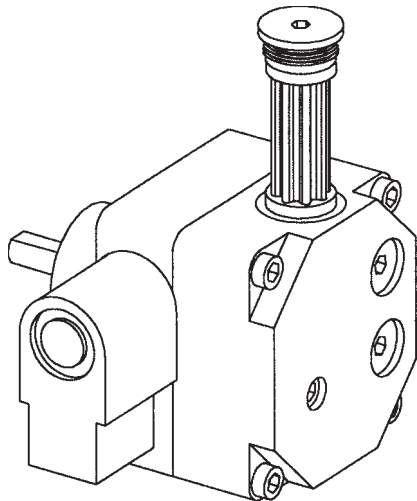
- Reducing the pump pressure.
- Reducing the oil quantity supplied by using a smaller nozzle.
- Using a pump with a larger capacity.

## Burner with preheating

Consider that the oil quantity is reduced at preheating by 5-20% depending on.

- Rise in temperature at the nozzle
- Nozzle design
- Capacity (high capacity - small difference)

## Replacement of cartridge filter

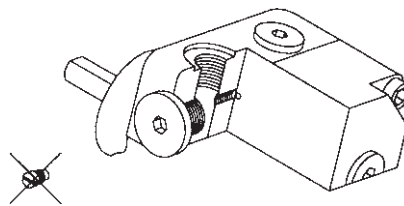


## How to remove cartridge filter from plug

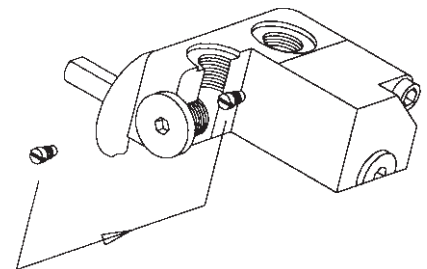
Unscrew the cartridge filter plug in the cover by means of a 4 mm allen key and withdraw the cartridge filter. If necessary, put a screwdriver between the cartridge filter and the plug and turn the cartridge filter carefully until it comes off. Reject the cartridge filter and replace it by a new one. Press it on to the plug. Ensure that the O-ring is not damaged. Then fit the new cartridge filter to the pump.

## Mounting/dismounting return plug

One pipe system



Two pipe system



# NOZZLE TABLE

Pump pressure bar

| Gph  | 8     |     |        | 9     |     |        | 10    |     |        | 11    |     |        |
|------|-------|-----|--------|-------|-----|--------|-------|-----|--------|-------|-----|--------|
|      | kg/h  | kW  | Mcal/h | kg/h  | kW  | Mcal/h | kg/h  | kW  | Mcal/h | kg/h  | kW  | Mcal/h |
| 0,40 | 1,33  | 16  | 13     | 1,41  | 17  | 14     | 1,49  | 18  | 15     | 1,56  | 18  | 16     |
| 0,50 | 1,66  | 20  | 17     | 1,76  | 21  | 18     | 1,86  | 22  | 19     | 1,95  | 23  | 20     |
| 0,60 | 2,00  | 24  | 20     | 2,12  | 25  | 22     | 2,23  | 26  | 23     | 2,34  | 28  | 24     |
| 0,65 | 2,16  | 26  | 22     | 2,29  | 27  | 23     | 2,42  | 29  | 25     | 2,54  | 30  | 26     |
| 0,75 | 2,49  | 29  | 25     | 2,65  | 31  | 27     | 2,79  | 33  | 28     | 2,93  | 35  | 30     |
| 0,85 | 2,83  | 33  | 29     | 3,00  | 36  | 31     | 3,16  | 37  | 32     | 3,32  | 39  | 34     |
| 1,00 | 3,33  | 39  | 34     | 3,53  | 42  | 36     | 3,72  | 44  | 38     | 3,90  | 46  | 40     |
| 1,10 | 3,66  | 43  | 37     | 3,88  | 46  | 39     | 4,09  | 48  | 42     | 4,29  | 51  | 44     |
| 1,20 | 3,99  | 47  | 41     | 4,24  | 50  | 43     | 4,47  | 53  | 46     | 4,68  | 55  | 48     |
| 1,25 | 4,16  | 49  | 42     | 4,40  | 52  | 45     | 4,65  | 55  | 47     | 4,88  | 58  | 50     |
| 1,35 | 4,49  | 53  | 46     | 4,76  | 56  | 48     | 5,02  | 59  | 51     | 5,27  | 62  | 54     |
| 1,50 | 4,98  | 59  | 51     | 5,29  | 63  | 54     | 5,58  | 66  | 57     | 5,85  | 69  | 60     |
| 1,65 | 5,49  | 65  | 56     | 5,82  | 69  | 59     | 6,14  | 73  | 63     | 6,44  | 76  | 66     |
| 1,75 | 5,82  | 69  | 59     | 6,18  | 73  | 63     | 6,51  | 77  | 66     | 6,83  | 81  | 70     |
| 2,00 | 6,65  | 79  | 68     | 7,06  | 84  | 72     | 7,45  | 88  | 76     | 7,81  | 93  | 80     |
| 2,25 | 7,49  | 89  | 76     | 7,94  | 94  | 81     | 8,38  | 99  | 85     | 8,78  | 104 | 89     |
| 2,50 | 8,32  | 99  | 85     | 8,82  | 105 | 90     | 9,31  | 110 | 95     | 9,76  | 116 | 99     |
| 2,75 | 9,15  | 108 | 93     | 9,71  | 115 | 99     | 10,24 | 121 | 104    | 10,73 | 127 | 109    |
| 3,00 | 9,98  | 118 | 102    | 10,59 | 126 | 108    | 11,16 | 132 | 114    | 11,71 | 139 | 119    |
| 3,50 | 11,65 | 138 | 119    | 12,35 | 146 | 126    | 13,03 | 154 | 133    | 13,66 | 162 | 139    |
| 4,00 | 13,31 | 158 | 136    | 14,12 | 167 | 144    | 14,89 | 176 | 152    | 15,62 | 185 | 159    |
| 4,50 | 14,97 | 177 | 153    | 15,88 | 188 | 162    | 16,75 | 198 | 171    | 17,57 | 208 | 179    |
| 5,00 | 16,64 | 197 | 170    | 17,65 | 209 | 180    | 18,62 | 221 | 190    | 19,52 | 231 | 199    |
| 5,50 | 18,30 | 217 | 187    | 19,42 | 230 | 198    | 20,48 | 243 | 209    | 21,47 | 255 | 219    |
| 6,00 | 19,97 | 237 | 204    | 21,18 | 251 | 216    | 22,34 | 265 | 228    | 23,42 | 278 | 239    |
| 6,50 | 21,63 | 256 | 220    | 22,94 | 272 | 234    | 24,20 | 287 | 247    | 25,37 | 301 | 259    |
| 7,00 | 23,29 | 276 | 237    | 24,71 | 293 | 252    | 26,06 | 309 | 266    | 27,33 | 324 | 279    |
| 7,50 | 24,96 | 296 | 254    | 26,47 | 314 | 270    | 27,92 | 331 | 285    | 29,28 | 347 | 298    |
| 8,00 | 26,62 | 316 | 271    | 28,24 | 335 | 288    | 29,79 | 353 | 304    | 31,23 | 370 | 318    |
| 8,50 | 28,28 | 335 | 288    | 30,00 | 356 | 306    | 31,65 | 375 | 323    | 33,18 | 393 | 338    |
| 9,00 | 29,95 | 355 | 305    | 31,77 | 377 | 324    | 33,59 | 398 | 342    | 35,14 | 417 | 358    |

The table applies to oil with a viscosity of 4,4 mm<sup>2</sup>/s (cSt) with density 830 kg/m<sup>3</sup>.

## Burner with preheater

Consider that on preheating the oil quantity is reduced by 5-20% depending on.

- Rise in temperature at the nozzle
- Design of nozzle
- Capacity (high capacity - small difference)

# NOZZLE TABLE

Pump pressure bar

| Gph  | 12    |     |        | 13    |     |        | 14    |     |        | 15    |     |        |
|------|-------|-----|--------|-------|-----|--------|-------|-----|--------|-------|-----|--------|
|      | kg/h  | kW  | Mcal/h | kg/h  | kW  | Mcal/h | kg/h  | kW  | Mcal/h | kg/h  | kW  | Mcal/h |
| 0,40 | 1,63  | 19  | 17     | 1,70  | 20  | 17     | 1,76  | 21  | 18     | 1,82  | 21  | 18     |
| 0,50 | 2,04  | 24  | 21     | 2,12  | 25  | 22     | 2,20  | 26  | 22     | 2,28  | 27  | 23     |
| 0,60 | 2,45  | 29  | 25     | 2,55  | 30  | 26     | 2,64  | 31  | 27     | 2,73  | 32  | 28     |
| 0,65 | 2,65  | 31  | 27     | 2,75  | 33  | 28     | 2,86  | 34  | 29     | 2,96  | 35  | 30     |
| 0,75 | 3,08  | 36  | 31     | 3,18  | 38  | 32     | 3,30  | 39  | 34     | 3,42  | 40  | 35     |
| 0,85 | 3,47  | 41  | 35     | 3,61  | 43  | 37     | 3,74  | 44  | 38     | 3,87  | 46  | 39     |
| 1,00 | 4,08  | 48  | 42     | 4,24  | 50  | 43     | 4,40  | 52  | 45     | 4,56  | 54  | 46     |
| 1,10 | 4,48  | 53  | 46     | 4,67  | 55  | 48     | 4,84  | 57  | 49     | 5,01  | 59  | 51     |
| 1,20 | 4,89  | 58  | 50     | 5,09  | 60  | 52     | 5,29  | 63  | 54     | 5,47  | 65  | 56     |
| 1,25 | 5,10  | 60  | 52     | 5,30  | 63  | 54     | 5,51  | 65  | 56     | 5,70  | 68  | 58     |
| 1,35 | 5,50  | 65  | 56     | 5,73  | 68  | 58     | 5,95  | 70  | 61     | 6,15  | 73  | 63     |
| 1,50 | 6,11  | 72  | 62     | 6,36  | 75  | 65     | 6,60  | 78  | 67     | 6,83  | 81  | 70     |
| 1,65 | 6,73  | 80  | 69     | 7,00  | 83  | 71     | 7,27  | 86  | 74     | 7,52  | 89  | 77     |
| 1,75 | 7,14  | 85  | 73     | 7,42  | 88  | 76     | 7,71  | 91  | 79     | 7,97  | 94  | 81     |
| 2,00 | 8,18  | 97  | 83     | 8,49  | 101 | 86     | 8,81  | 104 | 90     | 9,12  | 108 | 93     |
| 2,25 | 9,18  | 109 | 94     | 9,55  | 113 | 97     | 9,91  | 117 | 101    | 10,26 | 122 | 105    |
| 2,50 | 10,19 | 121 | 104    | 10,61 | 126 | 108    | 11,01 | 130 | 112    | 11,39 | 135 | 116    |
| 2,75 | 11,21 | 133 | 114    | 11,67 | 138 | 119    | 12,11 | 144 | 123    | 12,53 | 148 | 128    |
| 3,00 | 12,23 | 145 | 125    | 12,73 | 151 | 130    | 13,21 | 157 | 135    | 13,67 | 162 | 139    |
| 3,50 | 14,27 | 169 | 145    | 14,85 | 176 | 151    | 15,42 | 183 | 157    | 15,95 | 189 | 163    |
| 4,00 | 16,31 | 193 | 166    | 16,97 | 201 | 173    | 17,62 | 209 | 180    | 18,23 | 216 | 186    |
| 4,50 | 18,35 | 217 | 187    | 19,10 | 226 | 195    | 19,82 | 235 | 202    | 20,51 | 243 | 209    |
| 5,00 | 20,39 | 242 | 208    | 21,22 | 251 | 216    | 22,03 | 261 | 225    | 22,79 | 270 | 232    |
| 5,50 | 22,43 | 266 | 229    | 23,34 | 277 | 238    | 24,23 | 287 | 247    | 25,07 | 297 | 256    |
| 6,00 | 24,47 | 290 | 249    | 25,46 | 302 | 260    | 26,43 | 313 | 269    | 27,49 | 326 | 280    |
| 6,50 | 26,51 | 314 | 270    | 27,58 | 327 | 281    | 28,63 | 339 | 292    | 29,63 | 351 | 302    |
| 7,00 | 28,55 | 338 | 291    | 29,70 | 352 | 303    | 30,84 | 366 | 314    | 31,91 | 378 | 325    |
| 7,50 | 30,59 | 363 | 312    | 31,83 | 377 | 324    | 33,04 | 392 | 337    | 34,19 | 405 | 349    |
| 8,00 | 32,63 | 387 | 333    | 33,95 | 403 | 346    | 35,25 | 418 | 359    | 36,47 | 432 | 372    |
| 8,50 | 34,66 | 411 | 353    | 36,07 | 428 | 368    | 37,45 | 444 | 382    | 38,74 | 459 | 395    |
| 9,00 | 36,71 | 435 | 374    | 38,19 | 453 | 389    | 39,65 | 470 | 404    | 41,02 | 486 | 418    |

The table applies to oil with a viscosity of 4,4 mm<sup>2</sup>/s (cSt) with density 830 kg/m<sup>3</sup>.

## Burner with preheater

Consider that on preheating the oil quantity is reduced by 5-20% depending on.

- Rise in temperature at the nozzle
- Design of nozzle
- Capacity (high capacity - small difference)

# FAULT LOCATION

## Burner fails to start

| Situation         | Possible causes            | Remedies                                                                                         |
|-------------------|----------------------------|--------------------------------------------------------------------------------------------------|
| Motor runs        | Flame instability          | Check nozzle to burner head dimension and electrode position                                     |
| Burner pre-purges | Incorrect head settings    | Check oil pressure                                                                               |
|                   | Low oil pressure           | Adjust air damper                                                                                |
| Flame occurs      | Excess air                 | Check that photocell is clean and unobstructed                                                   |
| Burner locks out  | Photocell not seeing light | Confirm with new photocell                                                                       |
|                   | Photocell failed           | Confirm with new control. (NB. it is advisable to change the photocell if also changing control) |
|                   | Control faulty             | Check that photocell is not seeing ambient light                                                 |
| Motor runs        | False light                | Check that H.T. leads are sound and are not arcing other than at electrode gap                   |
| Burner pre-purges |                            | Check oil supply to burner - check that pump is not airlocked                                    |
| No flame occurs   |                            | Check operation of magnetic valve                                                                |
| Burner locks out  | No spark                   |                                                                                                  |
|                   | No oil                     |                                                                                                  |

## Burner fails to start after normal operation

|                        |                                                          |                                                                               |
|------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------|
| Burner fails to start  | Fuse has blown                                           | Check or replace fuse if necessary. Check reason for failure                  |
|                        | Appliance thermostat has not reset                       | Adjust thermostat                                                             |
| Lamp not lit           | Appliance overheat device has operated                   | Reset overheat device. Find reason for its operation and rectify              |
|                        | Control relay or photocell defective                     | Check by replacement                                                          |
|                        | No oil being delivered                                   | Check that tank, oil lines, fire valve, pump and nozzle are all in good order |
| Motor runs             | Excessive flue draught is preventing flame establishment | Rectify condition                                                             |
| Burner runs to lockout | No spark                                                 | Check ignition transformer. Check electrode gap and porcelain                 |

## Delayed ignition, burners starts violently

|                                                |                             |                                               |
|------------------------------------------------|-----------------------------|-----------------------------------------------|
| Burner pulsates on start-up only with hot flue | Excessive draught           | Adjust the burner                             |
| Burner pulsates on start-up                    | Nozzle partly blocked       | Replace nozzle                                |
|                                                | Oil pressure too low        | Check and adjust                              |
|                                                | Flue blocked or damaged     | Check and rectify                             |
|                                                | Fan slipping on shaft       | Check and retighten                           |
|                                                | Pump coupling loose or worn | Check and replace                             |
| Burner starts violently                        | Delayed ignition            | Check the electrode adjustment, see diagram   |
|                                                |                             | Check electrodes for damage                   |
|                                                |                             | Check H.T. leads for damage and disconnection |



Försäkran om överensstämmelse  
Declaration of conformity  
Konformitätserklärung  
Déclaration de conformité



Brännare, Burner, Ölbrenner, Brûleur

Certifikat TÜV Süddeutschland

| Certifikat nr. | Typ, Type:                               | Certifikat nr. | Typ, Type:             |
|----------------|------------------------------------------|----------------|------------------------|
| 08128915006    | BF 1                                     | 02119815003    | B 20, B 30, B 40, B 45 |
| 0111110535004  | B 1                                      | 02119815004    | B 50, B 60, B 70, B 80 |
| 0207110535005  | B 2                                      | 040588622001   | B 55                   |
| 02119815001    | ST 97, ST 108, ST 120,<br>ST 133, ST 146 | 040588622002   | B 65                   |
| 02119815002    | B 9, B 10, B 11                          | 13129815007    | B 45 MF, B 45-2 MF     |

Enertech AB försäkrar under eget ansvar att ovannämnda produkter är i överensstämmelse med följande standarder eller andra regelgivande dokument och uppfyller tillämpliga delar i EU direktiv.

Enertech AB declares under sole responsibility that the above mentioned product is in conformity with the following standards or other normative documents and follows the provisions of applicable parts in the following EU Directives.

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Enertech AB déclare sous sa seule responsabilité que les produits désignés ci-dessus sont conformes aux normes et aux documents normatifs suivants et satisfont aux critères applicables des directives CE suivantes:

Dokument: EN 267  
EN 60335

EU direktiv. EU Directives, EU-Direktiven, CE suivantes:

|             |                                                                                                                   |
|-------------|-------------------------------------------------------------------------------------------------------------------|
| 2004/108/EC | Elektromagnetisk kompatibilitet, Electromagnetic compatibility EC-Richtlinie, Compatibilité électromagnétique     |
| 2006/95/EC  | Lågspänningsdirektivet, Low-voltage directive, Niederspannungs-Richtlinie, Directive sur les basses tensions      |
| 2006/42/EC  | Maskindirektivet, Machinery directive, Maschinen-Richtlinie, Directive sur les machines                           |
| 92/42/EEC   | Verkningsgradsdirektivet, Efficiency directive, Wirkungsgrad-Richtlinie, Directive sur les exigences de rendement |

Genom att brännaren uppfyller ovannämnda standarder och direktiv erhåller brännaren CE - märkningen.

In that the burner conforms to the above mentioned standards it is awarded the CE mark.

Indem der Brenner die obengenannten Normen und Richtlinien erfüllt, erhält der Brenner die CE-Kennzeichnung.

Du fait de leur conformité aux directives mentionnées ci-dessus, les brûleurs Bentone bénéficient du marquage CE.

Enertech AB, Bentone Division/  
är kvalitetscertifierat enligt/  
is quality certified according to/  
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SE-341 26 Ljungby Sweden

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# OIL BURNERS MAINTENANCE INSTRUCTIONS

## General information

Keep the boiler room clean. Ensure that the boiler room has permanent fresh air intake. Switch off before dismantling the oil burner.

At hinged mounting, make sure that an automatic safety switch is fitted, so that the burner cannot start when the swing door is open.

Don't use the oil fired boiler to burn paper or rubbish, unless the boiler is especially fitted with a hinged door to make this possible.

Don't fill tank while burner is working.

## Starting precautions

Make sure that the oil tank is not empty

Make sure that the valves on oil and water supply pipes are open.

Make sure that the boiler flue damper is open.

Make sure that the boiler thermostat is set at the correct temperature.

Switch on the current. Most relay systems have a delayed action so that the burner will not start for perhaps 20 seconds.

With heavy oil the delay will be longer as the burner will not start until the oil in the preheater reaches the required temperature.

## If the burner will not start

Press the reset button on the relay. Check that the thermostats are correctly adjusted.

Don't forget the room thermostat, check that any fuses are intact and main switch is on.

## Installed by:

.....

Tel: .....

## If the burner starts but does not ignite

Make an attempt to start the burner.

Never make close repeated start attempts.

Don't restart the burner until the boiler is free from oil gases.

If the burner still does not ignite send for the service engineer.

## When switching off during summer

Always use the main switch to cut out the burner even when adjusting the burner or cutting off the heating for a short time. For longer periods of shut down, close all valves and the oil supply stop-cock.

Clean the filter and nozzle by washing in petrol or paraffin.

Make sure the filter medium is not damaged or defective.

Protect electrical gear from damp.

## Warning

Never stand too near or put your face to the inspection or fire door, when the burner is about to start.

Never use a naked flame to ignite oil if the electrical ignition fails.

Always wait for about 10 minutes for the unburnt gases to disperse before restarting the oil burner if it has failed to ignite previously.





