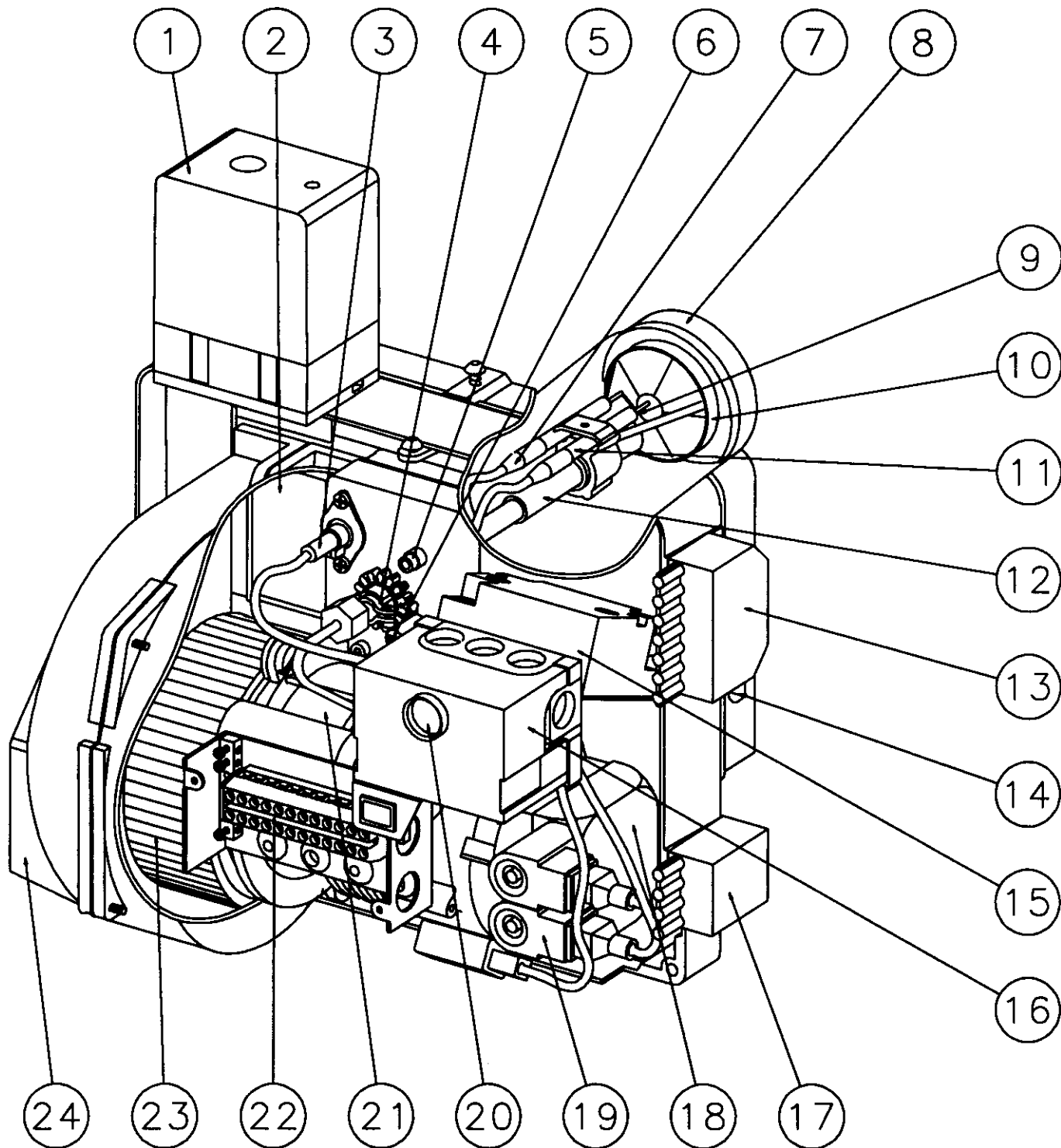


Installation- and maintenance instruction  
**B20KA-2**

## DESCRIPTION

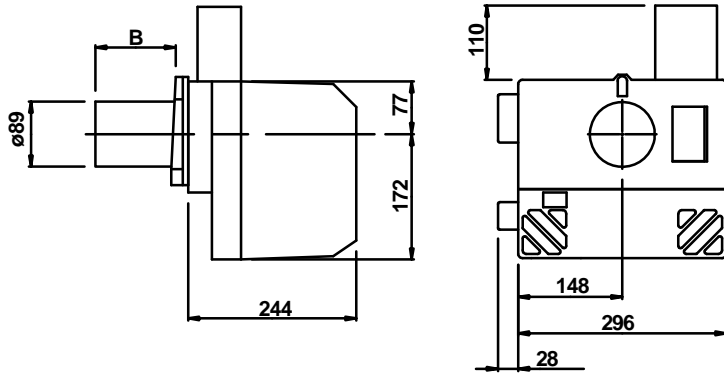


## COMPONENTS

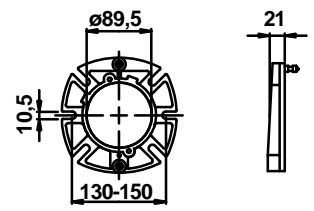
- |                               |                                |                                |
|-------------------------------|--------------------------------|--------------------------------|
| 1. Damper motor               | 9. Nozzle                      | 17. Electric connection 4-pole |
| 2. Air damper                 | 10. Shrouded disc              | 18. Pump                       |
| 3. Photocell                  | 11. Ignition electrodes        | 19. Solenoid valve             |
| 4. Scale, nozzle assembly     | 12. Nozzle assembly            | 20. Reset button               |
| 5. Test nipple                | 13. Electric connection 7-pole | 21. Motor                      |
| 6. Nozzle assembly adjustment | 14. Suspension hole            | 22. Terminal board             |
| 7. Ignition cables            | 15. Ignition transformer       | 23. Fan wheel                  |
| 8. Blast tube                 | 16. Control box                | 24. Air intake                 |

# TECHNICAL DATA

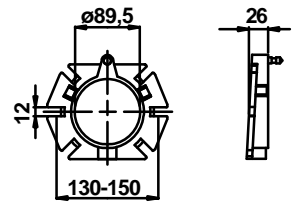
## DIMENSIONS



Flange A



Flange B



Burner tube	Length of burner tube	Flange A Measure B	Flange B Measure B
KA-2	94	69	64
KA-2	147	122	117
KA-2	224	199	194

## OUTPUT RANGE AND NOZZLES RECOMMENDED

Burner tube	Oil capacity kg/h	Output kW	Output Mcal/h	Recommended Nozzle			Pump pressure Bar	
				Angle	Size	Type	Stage 1	Stage 2
KA-2	2,0-6,0	24-71	20-61	60°	0,55-1,65	S or R	8-12	12-25

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

### RECOMMENDED NOZZLE

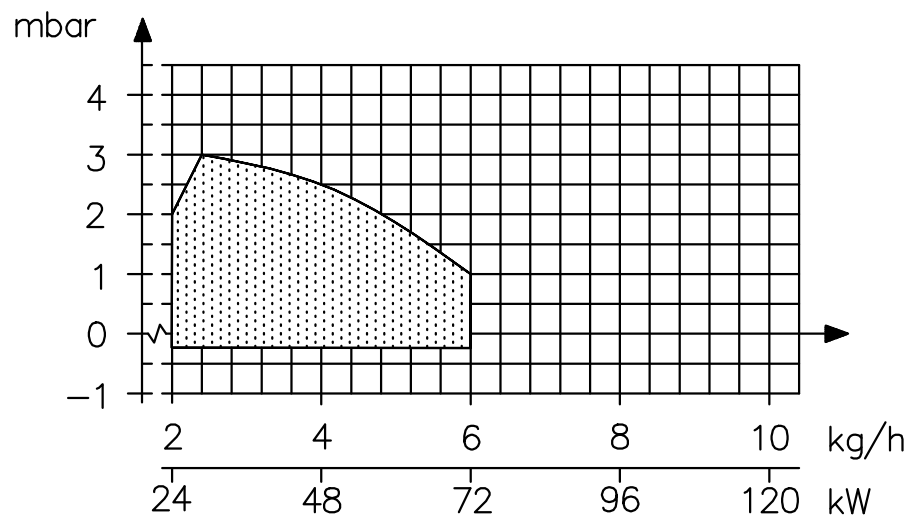
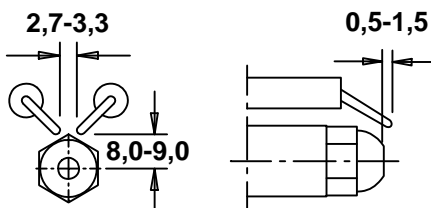
Because of different boiler types existing on the market, with varying combustion chamber designs, it is not possible to state a definite spray angle or spray pattern.

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

### RECOMMENDED PUMP PRESSURE

The factory setting of the pump pressure is 10 bar for stage 1 and 20 bar for stage 2. To accommodate the range of the burner the pressure can be reduced and/or increased within the limits for the pressure range of the pump.

## ELECTRODE ADJUSTMENT



# 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 and the nozzle assembly somewhat. When the burner starts it is burning with excess air and smoke number 0. Reduce the nozzle assembly adjustment until soot occurs, and then increase the adjustment to make the soot disappear again. Then the volume of air is reduced until soot occurs and increased again to reach a combustion free of soot.

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

A whistling sound may be heard which can be eliminated or reduced as follows: Increase the nozzle assembly adjustment somewhat. The CO<sub>2</sub>-content and consequently the air volume will then be reduced.

## 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.

## AIR ADJUSTMENT

On all burners the air adjustment shall be made with the burner cover fitted.

## MAINTENANCE

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

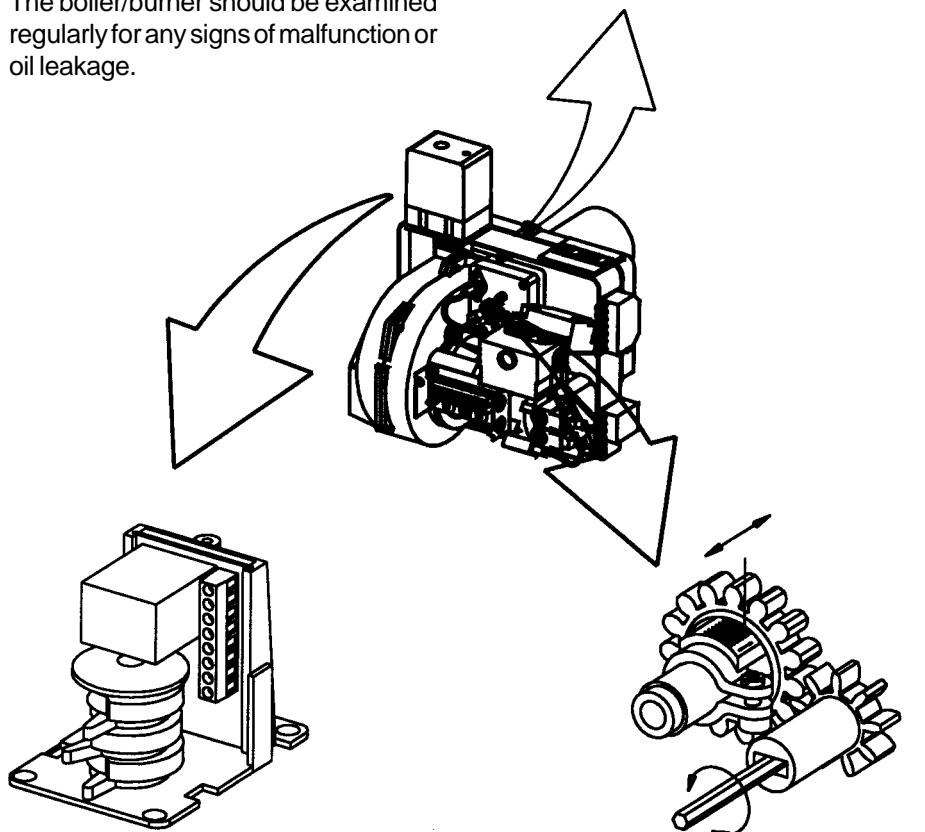
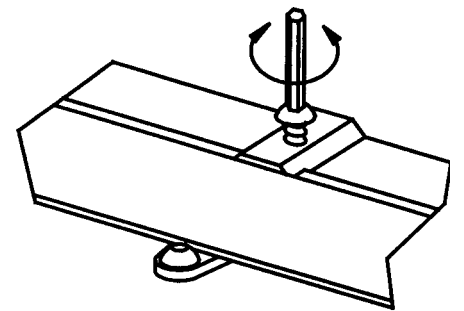
## OIL SUPPLY

The oil line should be dimensioned in accordance with the pump manufacturer's instruction. In the suction line to the burner a filter should be mounted to prevent any particles in the oil from reaching the burner. If the installation consists of several burners each one should have its own suction line from the tank or a circulation system should be used.

The temperature in the oil line should be kept as constant as possible. Avoid exposing the line to excessive cold which may cause blockages of paraffin deposits.

The oil pipe and electric cable should be fitted so that the burner can be placed on the floor for inspection of the combustion device.

## FASTENING OF THE BURNER TO THE BOILER (FLANGE)



## AIR ADJUSTMENT

See page "Function two stage design."

## ADJUSTMENT OF NOZZLE ASSEMBLY

# FUNCTION - TWO STAGE DESIGN

## FUNCTION

### Start

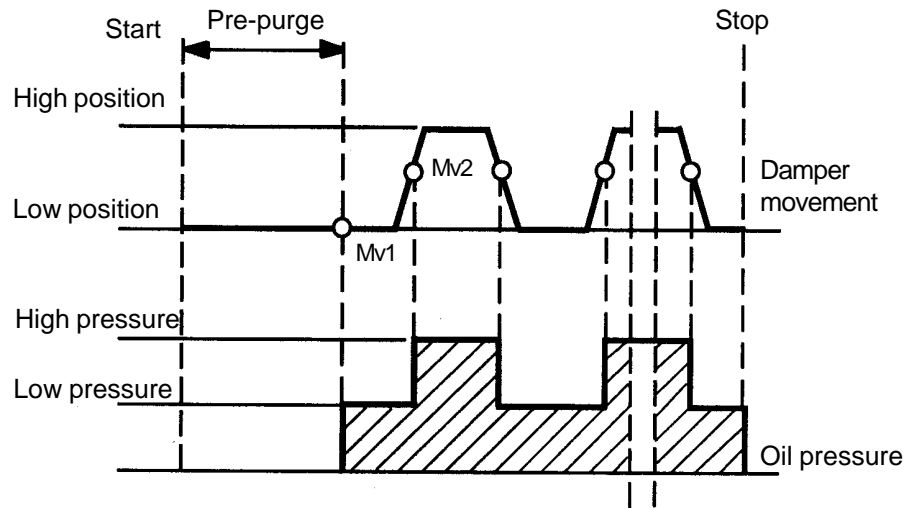
The fan motor starts and the damper opens. During the pre-purge period of the burner the solenoid valve 1 (Mv1) is closed.

### Low capacity

After the end of the pre-purge period Mv 1 is energized and opens, the oil passes to the nozzle where it is atomized and ignited. The pump is now working with a reduced pressure.

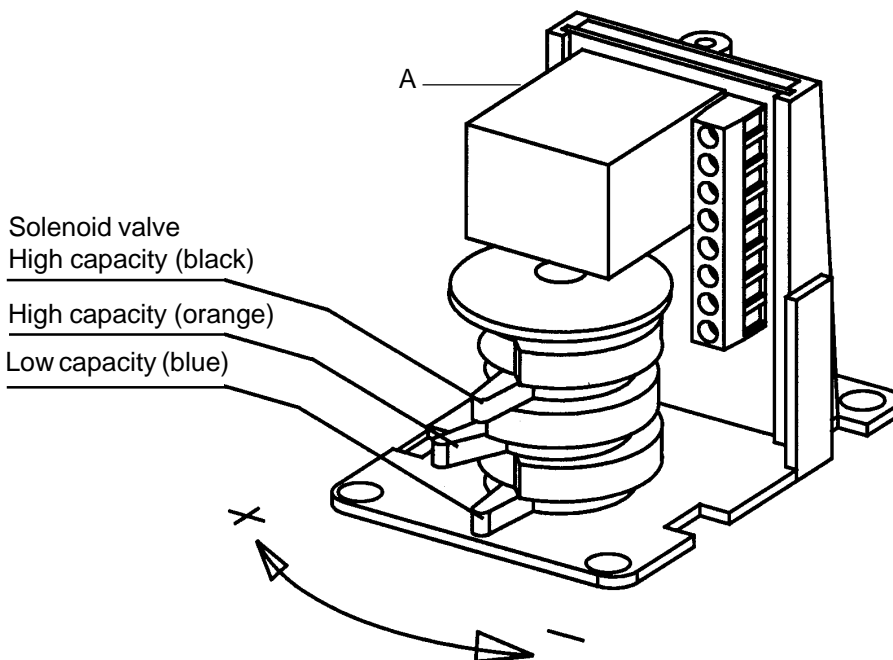
### High capacity

If the operating switch and the thermostat for high/low capacity are closed, the damper opens more, solenoid valve 2 (Mv2) is energized and the pump goes up to full pressure.



## AIR ADJUSTMENT

If the air volume needs changing: Remove the cover from the damper motor and change the position of the cams by turning them by hand. See fig.



### Low capacity:

Adjust the operating switch to high capacity (II).

- \* Reduce the air volume:  
Turn blue cam towards minus.
- \* Increase the volume:  
Turn blue cam towards plus.

Adjust the operating switch back to low capacity and check.

### Full capacity:

Adjust the operating switch to low capacity: (I).

- \* Reduce the air volume:  
Turn orange cam towards minus.
- \* Increase the air volume:  
Turn orange cam towards plus.

If the orange cam is moved, change the black cam as much.

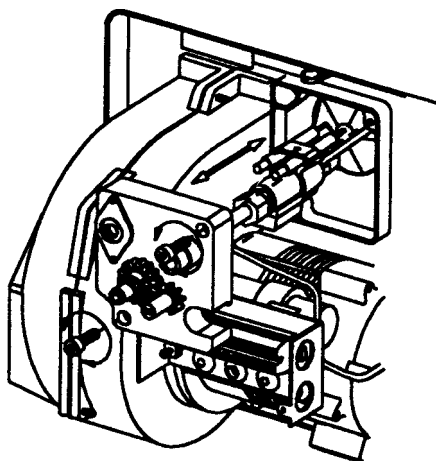
Adjust the operating switch back to high capacity and check that the correct air volume has been obtained.

### NOTE!

If the air for volume for low load during down-time has been increased press the yellow button on the side of the relay. The motor then adjust to the correct position. (See A in the picture).

## MAINTENANCE OF OIL BURNER

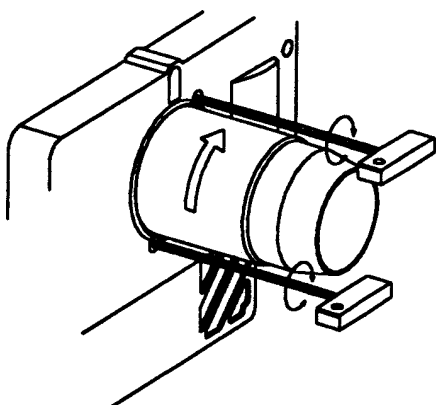
**Warning:** Before doing any service switch off power at the main switch and cut off the oil supply.



### SERVICE OF BURNER HEAD

(alt. A)

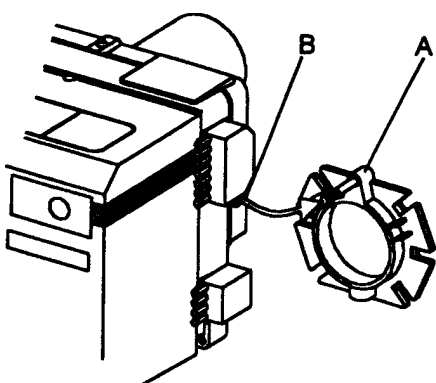
1. Remove the cover.
2. Withdraw the photo resistor.
3. Loosen the connecting pipe.
4. Loosen two fixing screws of the nozzle assembly cover.
5. Retract the nozzle assembly so far that the ignition cables can be removed from the ignition electrodes (if applicable, loosen also the preheater cable).
6. Remove the nozzle assembly.



### SERVICE OF BURNER HEAD

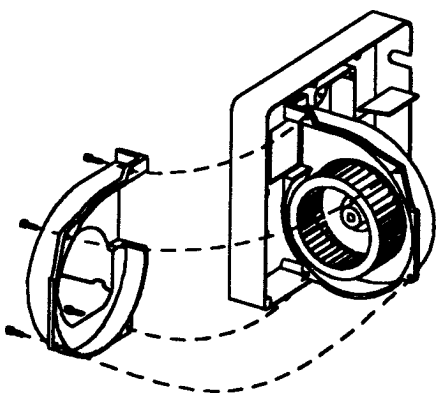
(alt. B)

1. Slacken retaining screws.
2. Remove the burner.
3. Loosen the two blast tube retaining screws.
4. Turn the tube to the right and remove.



### SUSPENSION OF BURNER

- A. Pin for suspension of burner.  
B. Hole for suspension (also available on the right side).

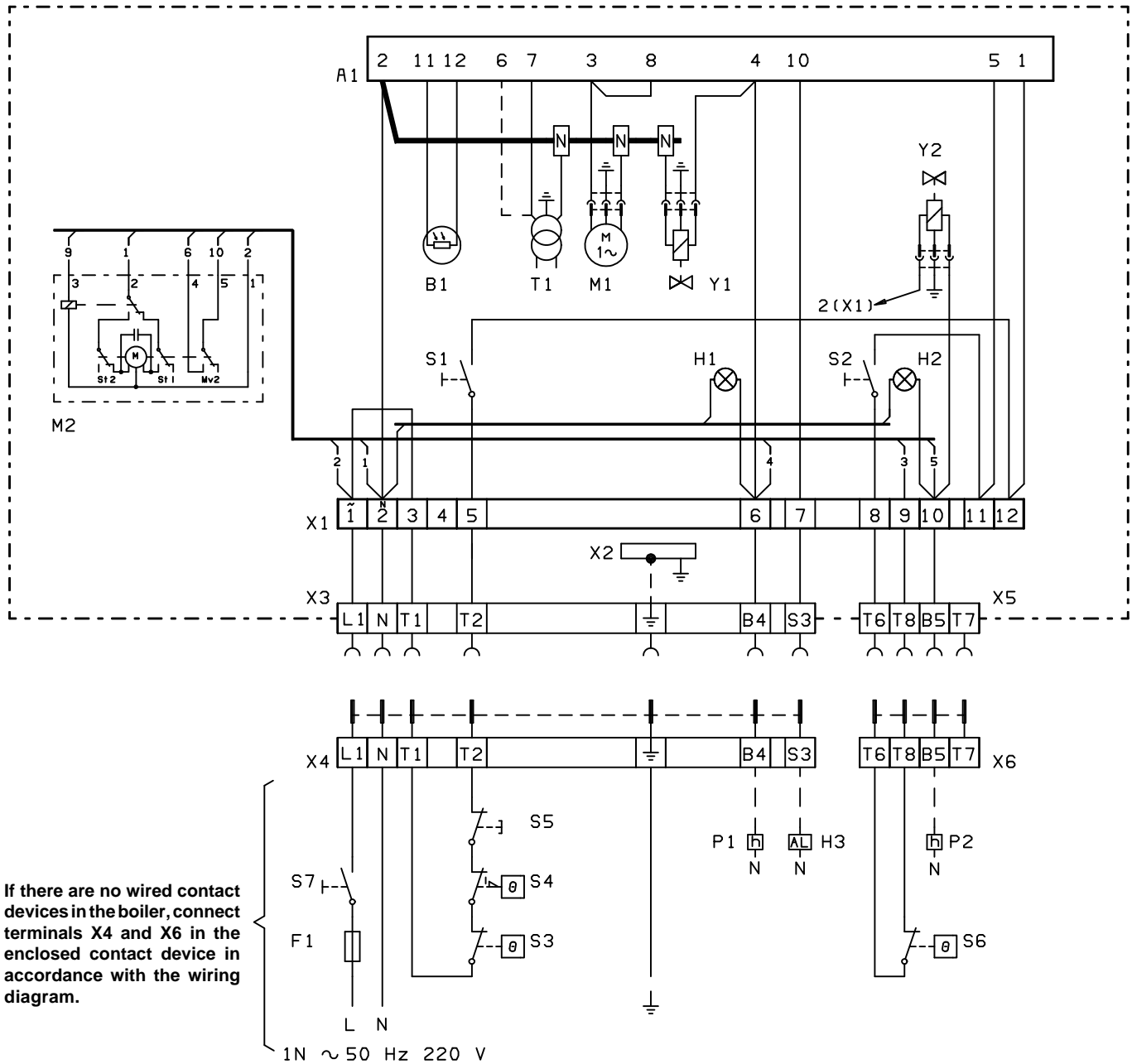


### CLEANING OF FAN WHEEL

- Loosen four fixing screws.  
Remove the fan housing half.

# WIRING DIAGRAM

## OIL BURNER CONTROL: LOA21... / LOA24... / LOA44...



### LISTE OF COMPONENTS

- |                                                   |                                              |                                             |
|---------------------------------------------------|----------------------------------------------|---------------------------------------------|
| A1 Oil burner control                             | P2 Time meter, high capacity time (optional) | T1 Ignition transformer                     |
| B1 Photoresistor                                  | S1 Operating switch                          | X1 Connection terminal board                |
| F1 Fuse                                           | S2 Operating switch high/low capacity        | X2 Earth terminal                           |
| H1 Lamp, low capacity                             | S3 Control thermostat                        | X3 Plug-in contact "Euro", burner           |
| H2 Lamp, high capacity                            | S4 Temperature limiter                       | X4 Plug-in contact "Euro", boiler           |
| H3 Alarm indication 220V                          | S5 Micro switch for hinged door              | X5 Plug-in contact "Euro", high/low, burner |
| M1 Burner motor                                   | S6 Control thermostat, high/low capacity     | X6 Plug-in contact "Euro", high/low, boiler |
| M2 Damper motor<br>Conectron LKS 120 05 (B5-5 S1) | S7 Main switch                               | Y1 Solenoid valve 1                         |
| P1 Time meter, total operating time (optional)    |                                              | Y2 Solenoid valve 2                         |

(Under voltage proof only LOA24...)

Mains connection and fuses in accordance with local regulations.

If a post-ignition of 15 s. is wanted, move the ignition transformer from terminal 7 to terminal 6.

If S6 is missing, connect T6 and T8.

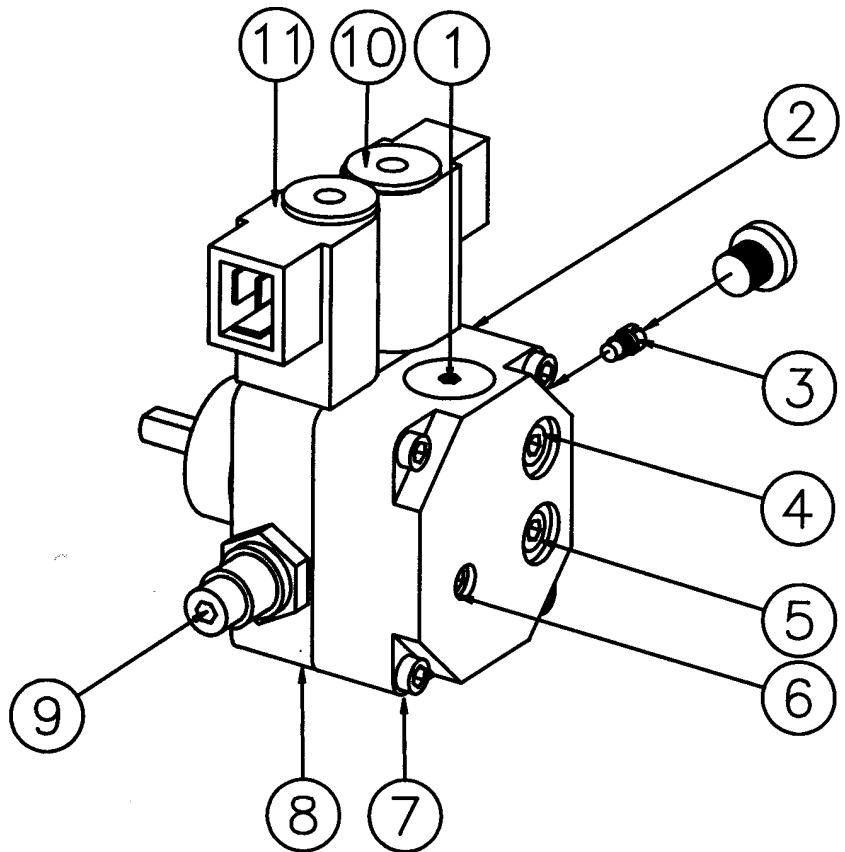
# INSTRUCTIONS PUMP TYPE DANFOSS BFP 52E

## TECHNICAL DATA

Viscosity range:	1,8-12,0 mm <sup>2</sup> /s
Pressure range:	7-25 bar
Rated voltage of coil:	220/240V
	50/60 Hz
Oil temperature:	-10 to +70°C

## COMPONENTS

1. Cartridge filter
2. Nozzle outlet G 1/8"
3. Return plug
4. Pressure gauge port G 1/8"
5. Vacuum gauge port G 1/8"
6. Pressure adjustment Stage 1
7. Suction line G 1/4"
8. Return line G 1/4"
9. Pressure adjustment Stage 2
10. Solenoid valve 1
11. Solenoid valve 2



## 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 5,0 kg/h and 2,15 mm<sup>2</sup>/s (cSt). 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																																																																																										
<table border="1"> <thead> <tr> <th rowspan="2">Height H</th> <th colspan="3">Pipe diameter</th> </tr> <tr> <th>ø4 mm</th> <th>ø5 mm</th> <th>ø6 mm</th> </tr> </thead> <tbody> <tr><td>m</td><td>m</td><td>m</td><td>m</td></tr> <tr><td>4,0</td><td>66</td><td>100</td><td>100</td></tr> <tr><td>3,5</td><td>57</td><td>100</td><td>100</td></tr> <tr><td>3,0</td><td>49</td><td>100</td><td>100</td></tr> <tr><td>2,5</td><td>41</td><td>100</td><td>100</td></tr> <tr><td>2,0</td><td>33</td><td>80</td><td>100</td></tr> <tr><td>1,5</td><td>25</td><td>60</td><td>100</td></tr> <tr><td>1,0</td><td>16</td><td>40</td><td>83</td></tr> <tr><td>0,5</td><td>8</td><td>20</td><td>41</td></tr> </tbody> </table>	Height H	Pipe diameter			ø4 mm	ø5 mm	ø6 mm	m	m	m	m	4,0	66	100	100	3,5	57	100	100	3,0	49	100	100	2,5	41	100	100	2,0	33	80	100	1,5	25	60	100	1,0	16	40	83	0,5	8	20	41	<p>With an underlying tank a 1-pipe-system is not recommended</p> <table border="1"> <thead> <tr> <th rowspan="2">Height H</th> <th colspan="3">Pipe diameter</th> </tr> <tr> <th>ø6 mm</th> <th>ø8 mm</th> <th>ø10 mm</th> </tr> </thead> <tbody> <tr><td>m</td><td>m</td><td>m</td><td>m</td></tr> <tr><td>4,0</td><td>66</td><td>100</td><td>100</td></tr> <tr><td>3,5</td><td>62</td><td>100</td><td>100</td></tr> <tr><td>3,0</td><td>58</td><td>100</td><td>100</td></tr> <tr><td>2,5</td><td>54</td><td>100</td><td>100</td></tr> <tr><td>2,0</td><td>51</td><td>100</td><td>100</td></tr> <tr><td>1,5</td><td>47</td><td>100</td><td>100</td></tr> <tr><td>1,0</td><td>43</td><td>100</td><td>100</td></tr> <tr><td>0,5</td><td>39</td><td>100</td><td>100</td></tr> </tbody> </table>	Height H	Pipe diameter			ø6 mm	ø8 mm	ø10 mm	m	m	m	m	4,0	66	100	100	3,5	62	100	100	3,0	58	100	100	2,5	54	100	100	2,0	51	100	100	1,5	47	100	100	1,0	43	100	100	0,5	39	100	100				
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## FUNCTION DANFOSS BFP 52E

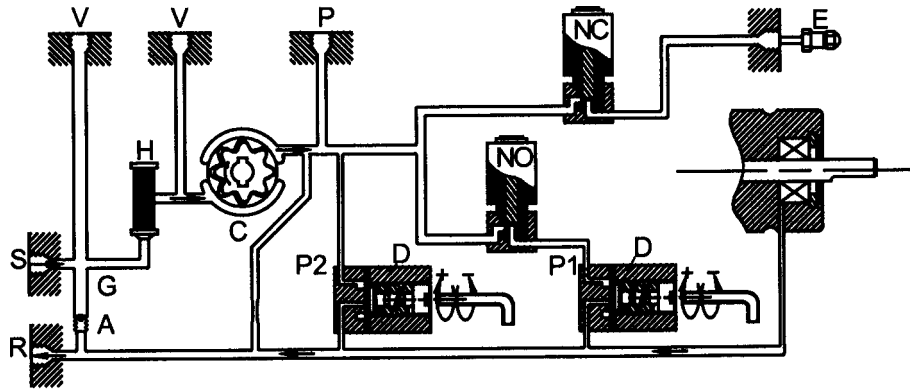
When the oil pump is started, oil is drawn from the suction connection (S) through the filter (H) to the gear wheel (C).

From here the gear wheel pumps the oil over to the pressure side in connection with the pressure regulation (P1) and (P2).

When the oil reaches the cut-off valve (NC), the pressure rises until regulating valve (P1) opens and holds the pressure constant at the set level.

When voltage is applied to the cut-off valve (NC) it opens and releases oil to the nozzle (E). Surplus oil is led through the return channel to the return connection (R).

The pump will now run at the pressure set for stage 1, since stage 1 is adjusted to a lower pressure than stage 2. If voltage is applied to the solenoid valve (NO), it closes and sets the regulating valve (P1) out of action. The pressure will now rise to the setting on regulating valve (P2).



The valve (P2) opens and holds the pressure constant at the set value for stage 2. Surplus oil is led back through the return channel to the return connection (R). On a 2-pipe unit the oil is led back to the oil tank. On a 1-pipe unit the oil is recirculated across the changeover valve (A) through the return channel (G). The return connection (R) is blanked off with a plug.

When the burner stops, the voltage to the solenoid valves is cut off so that the NC valve closes and the NO valve opens. The oil flow to the nozzle is cut off by the NC valve.

## BURNER WITH PREHEATING

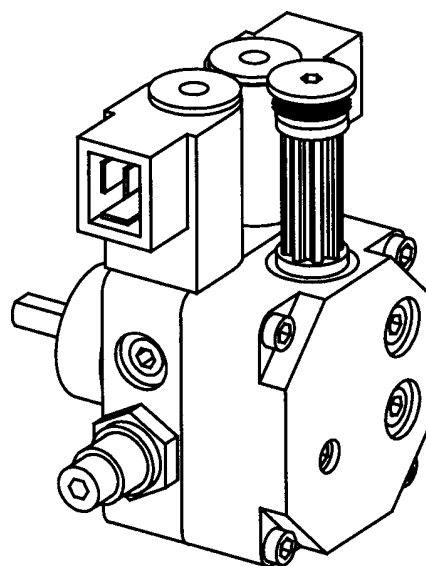
Consider that the oil quantity is reduced at preheating by 5-20% depending on.

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

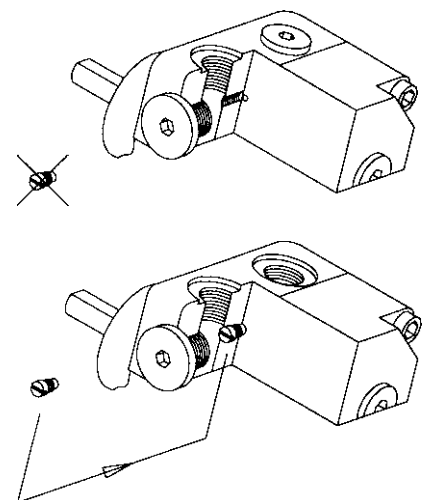
## HOW TO REMOVE CARTRIDGE FILTER FROM PLUG

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.

## REPLACEMENT OF CARTRIDGE FILTER



## MOUNTING/DISMOUNTING RETURN PLUG



**NOZZLE TABLE**

Pump pressure bar

Gph	8			9			10			11			12			13			14			15		
	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	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	1,63	19	17	1,70	20	17	1,76	21	18	1,82	21	18
0,50	1,66	20	17	1,76	21	18	1,86	22	19	1,95	23	20	2,04	24	21	2,12	25	22	2,20	26	22	2,28	27	23
0,60	2,00	24	20	2,12	25	22	2,23	26	23	2,34	28	24	2,45	29	25	2,55	30	26	2,64	31	27	2,73	32	28
0,65	2,16	26	22	2,29	27	23	2,42	29	25	2,54	30	26	2,65	31	27	2,75	33	28	2,86	34	29	2,96	35	30
0,75	2,49	29	25	2,65	31	27	2,79	33	28	2,93	35	30	3,08	36	31	3,18	38	32	3,30	39	34	3,42	40	35
0,85	2,83	33	29	3,00	36	31	3,16	37	32	3,32	39	34	3,47	41	35	3,61	43	37	3,74	44	38	3,87	46	39
1,00	3,33	39	34	3,53	42	36	3,72	44	38	3,90	46	40	4,08	48	42	4,24	50	43	4,40	52	45	4,56	54	46
1,10	3,66	43	37	3,88	46	39	4,09	48	42	4,29	51	44	4,48	53	46	4,67	55	48	4,84	57	49	5,01	59	51
1,20	3,99	47	41	4,24	50	43	4,47	53	46	4,68	55	48	4,89	58	50	5,09	60	52	5,29	63	54	5,47	65	56
1,25	4,16	49	42	4,40	52	45	4,65	55	47	4,88	58	50	5,10	60	52	5,30	63	54	5,51	65	56	5,70	68	58
1,35	4,49	53	46	4,76	56	48	5,02	59	51	5,27	62	54	5,50	65	56	5,73	68	58	5,95	70	61	6,15	73	63
1,50	4,98	59	51	5,29	63	54	5,58	66	57	5,85	69	60	6,11	72	62	6,36	75	65	6,60	78	67	6,83	81	70
1,65	5,49	65	56	5,82	69	59	6,14	73	63	6,44	76	66	6,73	80	69	7,00	83	71	7,27	86	74	7,52	89	77
1,75	5,82	69	59	6,18	73	63	6,51	77	66	6,83	81	70	7,14	85	73	7,42	88	76	7,71	91	79	7,97	94	81
2,00	6,65	79	68	7,06	84	72	7,45	88	76	7,81	93	80	8,18	97	83	8,49	101	86	8,81	104	90	9,12	108	93
2,25	7,49	89	76	7,94	94	81	8,38	99	85	8,78	104	89	9,18	109	94	9,55	113	97	9,91	117	101	10,26	122	105
2,50	8,32	99	85	8,82	105	90	9,31	110	95	9,76	116	99	10,19	121	104	10,61	126	108	11,01	130	112	11,39	135	116
2,75	9,15	108	93	9,71	115	99	10,24	121	104	10,73	127	109	11,21	133	114	11,67	138	119	12,11	144	123	12,53	148	128
3,00	9,98	118	102	10,59	126	108	11,16	132	114	11,71	139	119	12,23	145	125	12,73	151	130	13,21	157	135	13,67	162	139
3,50	11,65	138	119	12,35	146	126	13,03	154	133	13,66	162	139	14,27	169	145	14,85	176	151	15,42	183	157	15,95	189	163
4,00	13,31	158	136	14,12	167	144	14,89	176	152	15,62	185	159	16,31	193	166	16,97	201	173	17,62	209	180	18,23	216	186
4,50	14,97	177	153	15,88	188	162	16,75	198	171	17,57	208	179	18,35	217	187	19,10	226	195	19,82	235	202	20,51	243	209
5,00	16,64	197	170	17,65	209	180	18,62	221	190	19,52	231	199	20,39	242	208	21,22	251	216	22,03	261	225	22,79	270	232
5,50	18,30	217	187	19,42	230	198	20,48	243	209	21,47	255	219	22,43	266	229	23,34	277	238	24,23	287	247	25,07	297	256
6,00	19,97	237	204	21,18	251	216	22,34	265	228	23,42	278	239	24,47	290	249	25,46	302	260	26,43	313	269	27,49	326	280
6,50	21,63	256	220	22,94	272	234	24,20	287	247	25,37	301	259	26,51	314	270	27,58	327	281	28,63	339	292	29,63	351	302
7,00	23,29	276	237	24,71	293	252	26,06	309	266	27,33	324	279	28,55	338	291	29,70	352	303	30,84	366	314	31,91	378	325
7,50	24,96	296	254	26,47	314	270	27,92	331	285	29,28	347	298	30,59	363	312	31,83	377	324	33,04	392	337	34,19	405	349
8,00	26,62	316	271	28,24	335	288	29,79	353	304	31,23	370	318	32,63	387	333	33,95	403	346	35,25	418	359	36,47	432	372
8,50	28,28	335	288	30,00	356	306	31,65	375	323	33,18	393	338	34,66	411	353	36,07	428	368	37,45	444	382	38,74	459	395
9,00	29,95	355	305	31,77	377	324	33,59	398	342	35,14	417	358	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)

**NOZZLE TABLE**

Pump pressure bar

Gph	10			11			12			13			14			15			16			17		
	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h
1,00	3,72	44	38	3,90	46	40	4,08	48	42	4,24	50	43	4,40	52	45	4,56	54	46	4,71	56	48	4,85	57	49
1,10	4,09	48	42	4,29	51	44	4,48	53	46	4,67	55	48	4,84	57	49	5,01	59	51	5,18	61	53	5,34	63	54
1,20	4,47	53	46	4,68	55	48	4,89	58	50	5,09	60	52	5,29	63	54	5,47	65	56	5,65	67	58	5,82	69	59
1,25	4,65	55	47	4,88	58	50	5,10	60	52	5,30	63	54	5,51	65	56	5,70	68	58	5,89	70	60	6,07	72	62
1,35	5,02	59	51	5,27	62	54	5,50	65	56	5,73	68	58	5,95	70	61	6,15	73	63	6,36	75	65	6,55	78	67
1,50	5,58	66	57	5,85	69	60	6,11	72	62	6,36	75	65	6,60	78	67	6,83	81	70	7,06	84	72	7,27	86	74
1,65	6,14	73	63	6,44	76	66	6,73	80	69	7,00	83	71	7,27	86	74	7,52	89	77	7,77	92	79	8,01	95	82
1,75	6,51	77	66	6,83	81	70	7,14	85	73	7,42	88	76	7,71	91	79	7,97	95	81	8,24	98	84	8,49	101	87
2,00	7,45	88	76	7,81	93	80	8,16	97	83	8,49	101	87	8,81	104	90	9,12	108	93	9,42	112	96	9,71	115	99
2,25	8,38	99	85	8,78	104	90	9,18	109	94	9,55	113	97	9,91	118	101	10,26	122	105	10,60	126	108	10,92	130	111
2,50	9,31	110	95	9,76	116	100	10,19	121	104	10,61	126	108	11,01	131	112	11,39	135	116	11,77	140	120	12,13	144	124
2,75	10,24	121	104	10,73	127	109	11,21	133	114	11,67	138	119	12,11	144	123	12,53	149	128	12,95	154	132	13,35	158	136
3,00	11,16	132	114	11,71	139	119	12,23	145	125	12,73	151	130	13,21	157	135	13,67	162	139	14,13	168	144	14,56	173	148
3,50	13,03	154	133	13,66	162	139	14,27	169	146	14,85	176	151	15,42	183	157	15,95	189	163	16,49	196	168	16,99	201	173
4,00	14,89	176	152	15,62	185	159	16,31	193	166	16,97	201	173	17,62	209	180	18,23	216	186	18,84	223	192	19,42	230	198
4,50	16,75	199	171	17,57	208	179	18,35	218	187	19,10	226	195	19,82	235	202	20,51	243	209	21,20	251	216	21,84	259	223
5,00	18,62	220	190	19,52	231	199	20,39	242	208	21,22	252	216	22,03	261	225	22,79	270	232	23,55	279	240	24,27	288	247
5,50	20,48	243	209	21,47	255	219	22,42	266	229	23,34	277	238	24,23	287	247	25,07	297	256	25,91	307	264	26,70	317	272
6,00	22,34	265	228	23,42	278	239	24,47	290	250	25,46	302	260	26,43	313	270	27,49	326	280	28,27	335	288	29,13	345	297
6,50	24,20	287	247	25,37	301	259	26,51	314	270	27,58	327	281	28,63	340	292	29,63	351	302	30,62	363	312	31,55	374	322
7,00	26,06	309	266	27,33	324	279	28,55	339	291	29,70	352	303	30,84	366	314	31,91	378	325	32,98	391	336	33,98	403	347
7,50	27,92	331	285	29,28	347	299	30,59	363	312	31,83	377	325	3,04	392	337	34,19	405	349	35,33	419	360	36,41	432	371
8,00	29,79	353	304	31,23	370	318	32,63	387	333	33,95	403	346	35,25	418	359	36,47	433	372	37,69	447	384	38,80	460	396
8,50	31,65	375	323	33,18	393	338	34,66	411	353	36,07	428	368	37,45	444	382	38,74	459	395	40,04	475	408	41,26	489	421
9,00	33,59	398	343	35,14	417	358	38,71	435	374	38,19	453	389	39,65	470	404	41,02	486	418	42,40	503	432	43,69	518	446
9,50	35,37	419	361	37,09	440	378	40,74	459	395	40,31	478	411	41,85	496	427	43,30	514	442	44,75	531	456	46,11	547	470
10,00	37,23	441	380	39,04	463	398	44,78	484	416	42,44	503	433	44,06	523	449	45,58	541	465	47,11	559	480	47,11	559	480
11,00	40,96	486	418	42,94	509	438	48,86	532	457	46,68	554	476	48,46	575	494	50,14	595	511	51,82	615	528	53,40	633	545
12,00	44,68	530	456	46,85	556	478	54,65	580	499	50,92	604	519	52,87	627	539	54,70	648	558	56,53	670	576	58,25	691	594
14,00	52,12	618	531	54,65	648	557	62,46	677	582	59,41	705	606	62,68	732	629	63,81	757	651	65,95	778	669	67,96	806	693
16,00	59,57	706	607	62,46	741	637	65,26	774	666	67,90	805	692	70,49	836	719	72,93	865	744	75,38	894	769	77,67	921	792
18,00	67,02	795	683	70,27	833	717	73,41	871	749	76,39	906	779	79,30	940	809	82,05	973	837	84,80	1006	865	87,38	1036	891
20,00	74,47	883	759	78,08	926	796	81,57	967	832	84,87	1007	865	88,11	1045	899	91,17	1081	930	94,22	1117	961	97,09	1151	990
22,00	81,91	971	835	85,89	1019	876	89,73	1064	915	93,36	1107	952	96,92	1149	988	100,28	1189	1023	103,64	1229	1057	106,79	1267	1089
24,00	89,36	1060	911	93,70	1111	956	97,88	1161	998	101,85	1208	1039	105,74	1254	1078	109,40	1297	1116	113,06	1341	1153	116,50	1382	1188
26,00	96,81	1148	987	101,50	1204	1035	106,04	1258	1081	110,33	1308	1125	114,55	1359	1168	118,52	1406	1209	122,49	1453	1249	126,21	1497	1287

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>.

**NOZZLE TABLE**

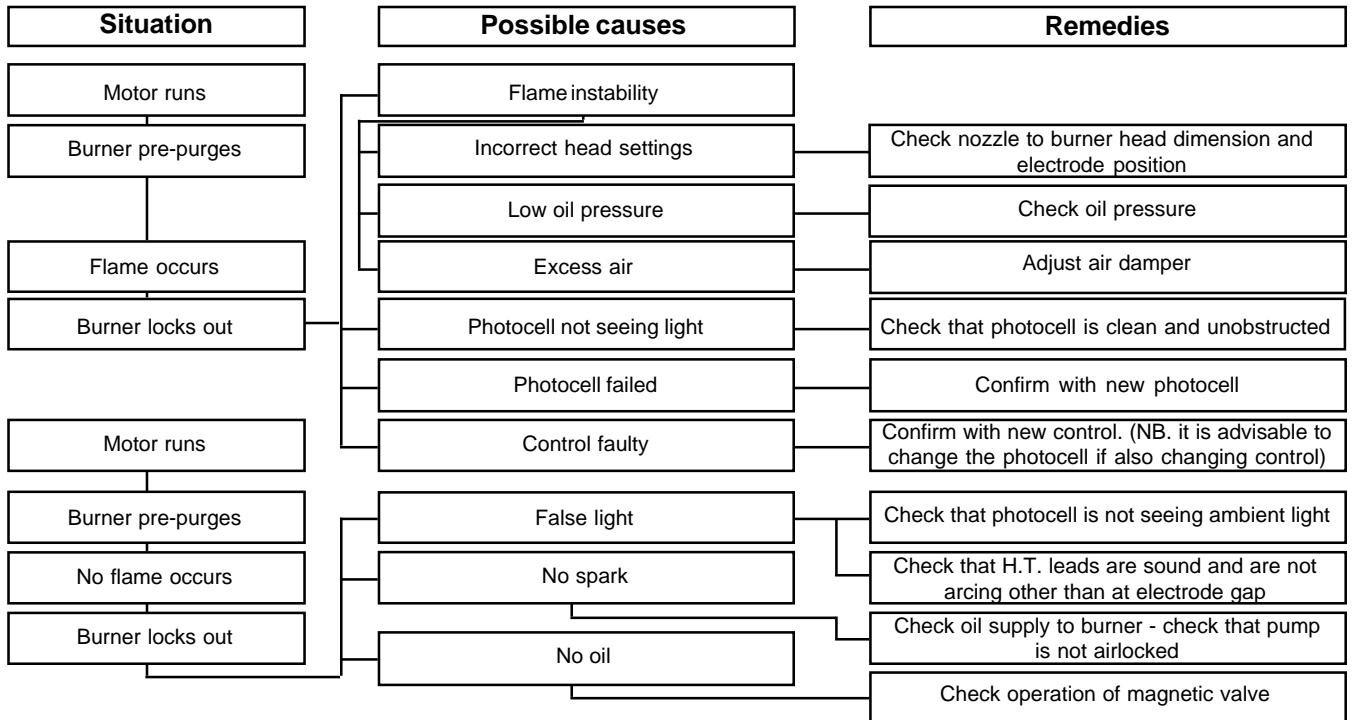
Pump pressure bar

Gph	18			19			20			21			22			23			24			25		
1,00	4,99	59	51	5,13	61	52	5,26	62	54	5,40	64	55	5,53	66	56	5,65	67	58	5,77	68	59	5,89	70	60
1,10	5,49	65	56	5,64	67	57	5,79	69	59	5,93	70	60	6,07	72	62	6,21	74	63	6,34	75	65	6,47	77	66
1,20	5,99	71	61	6,16	73	63	6,32	75	64	6,47	77	66	6,62	78	67	6,77	80	69	6,92	82	71	7,06	84	72
1,25	6,24	74	64	6,41	76	65	6,58	78	67	6,74	80	69	6,90	82	70	7,05	84	72	7,21	85	73	7,35	87	75
1,35	6,74	80	69	6,93	82	71	7,11	84	72	7,28	86	74	7,45	88	76	7,62	90	78	7,78	92	79	7,94	94	81
1,50	7,48	89	76	7,69	91	78	7,89	93	80	8,08	96	82	8,27	98	84	8,46	100	86	8,64	102	88	8,82	105	90
1,65	8,24	98	84	8,47	100	86	8,69	103	89	8,90	105	91	9,11	108	93	9,31	110	95	9,51	113	97	9,71	115	99
1,75	8,78	104	90	8,98	106	92	9,21	109	94	9,44	112	96	9,66	115	98	9,88	117	101	10,09	120	103	10,30	122	105
2,00	9,99	118	102	10,26	122	105	10,53	125	107	10,79	128	110	11,04	131	113	11,29	134	115	11,53	137	118	11,77	140	120
2,25	11,24	133	115	11,55	137	118	11,85	140	121	12,14	144	124	12,43	147	127	12,70	151	129	12,98	154	132	13,25	157	135
2,50	12,48	148	127	12,83	152	131	13,16	156	134	13,49	160	138	13,81	164	141	14,12	167	144	14,42	171	147	14,72	175	150
2,75	13,73	163	140	14,11	167	144	14,48	171	148	14,84	176	151	15,19	180	155	15,53	184	158	15,86	188	162	16,19	192	165
3,00	14,98	178	153	15,39	182	157	15,79	187	161	16,18	192	165	16,18	192	165	16,93	201	173	17,30	205	176	17,65	209	180
3,50	17,48	207	178	17,96	213	183	18,43	218	188	18,89	224	193	19,33	229	197	19,77	234	202	20,19	239	206	20,61	244	210
4,00	19,98	237	204	20,53	243	209	21,06	250	215	21,59	256	220	22,10	262	225	22,59	268	230	23,08	274	235	23,56	279	240
4,50	22,47	266	229	23,09	274	235	23,69	281	242	24,28	288	248	24,85	295	253	25,41	301	259	25,96	308	265	26,49	314	270
5,00	24,97	296	255	25,65	304	262	26,33	312	268	26,98	320	275	27,61	327	282	28,24	335	288	28,84	342	294	29,44	349	300
5,50	27,47	326	280	28,22	335	288	28,96	343	295	29,68	352	303	30,38	360	310	31,06	368	317	31,73	376	324	32,38	384	330
6,00	29,97	355	306	30,79	365	314	31,59	374	322	32,38	384	330	33,14	393	338	33,89	402	346	34,62	411	353	35,33	419	360
6,50	32,46	385	331	33,35	395	340	34,22	406	349	35,07	416	358	35,90	426	366	36,70	435	374	37,49	445	382	38,26	454	390
7,00	34,96	415	356	35,92	426	366	36,86	437	376	37,77	448	385	38,56	457	393	39,53	469	403	40,38	479	412	41,21	489	420
7,50	37,46	444	382	38,49	456	3992	39,49	468	403	40,47	480	413	41,42	491	422	42,35	504	434	43,26	513	441	44,16	524	450
8,00	39,96	474	407	41,05	487	419	42,12	499	429	43,17	512	440	44,19	524	451	45,18	536	461	46,15	547	471	47,10	559	480
8,50	42,45	503	433	43,62	517	445	44,75	531	456	45,87	544	468	46,95	557	479	48,00	569	489	49,03	581	500	50,05	594	510
9,00	44,95	533	458	46,18	548	471	47,39	562	483	48,57	576	495	49,71	589	507	50,83	603	518	51,92	616	529	52,99	628	540
9,50	47,45	563	484	48,75	578	497	50,02	593	510	51,26	608	523	52,47	622	535	53,65	636	547	54,80	650	559	55,93	663	570
10,00	49,94	592	509	51,32	609	523	52,66	624	537	53,96	640	550	55,23	655	563	56,47	670	576	57,69	684	588	58,88	698	600
11,00	54,94	652	560	56,45	669	576	57,92	687	591	59,36	704	605	60,76	721	620	62,12	737	633	63,46	753	647	64,77	768	660
12,00	59,93	711	611	61,58	730	628	63,19	749	644	64,76	768	660	66,28	786	676	67,77	804	691	69,23	821	706	70,66	838	721
14,00	69,92	829	713	71,84	852	733	73,72	874	752	75,55	896	770	77,33	917	789	79,07	938	806	80,77	958	824	82,43	978	841
16,00	79,91	948	815	82,11	974	837	84,25	999	859	86,34	1024	880	88,37	1048	901	90,36	1072	921	92,30	1095	941	94,20	1117	961

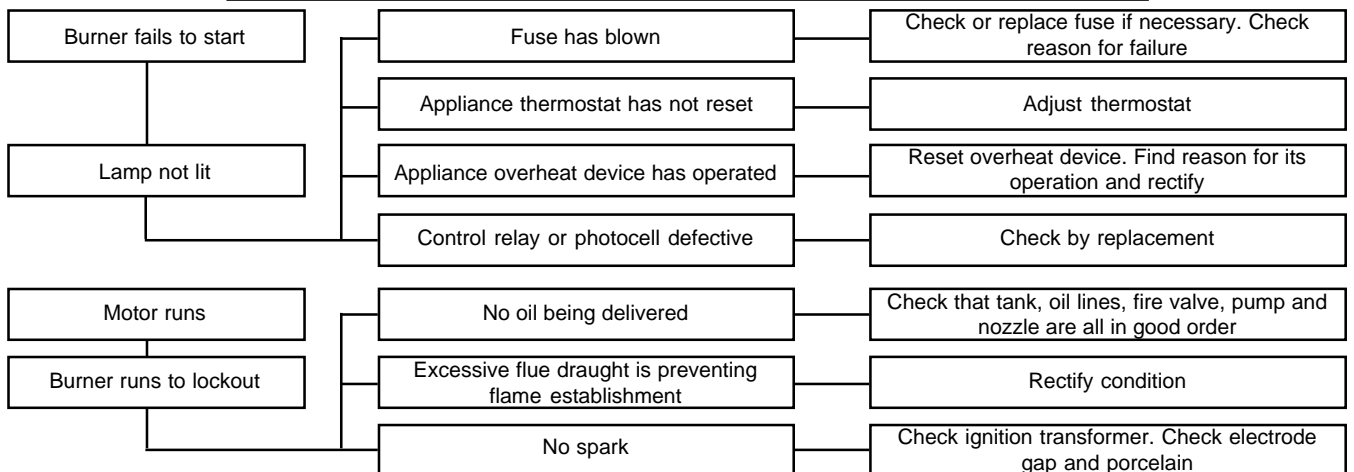
The table applies to oil with a viscosity of 4,4 mm<sup>2</sup>/s (cSt) with density 830 kg/m<sup>3</sup>.

# FAULT LOCATION

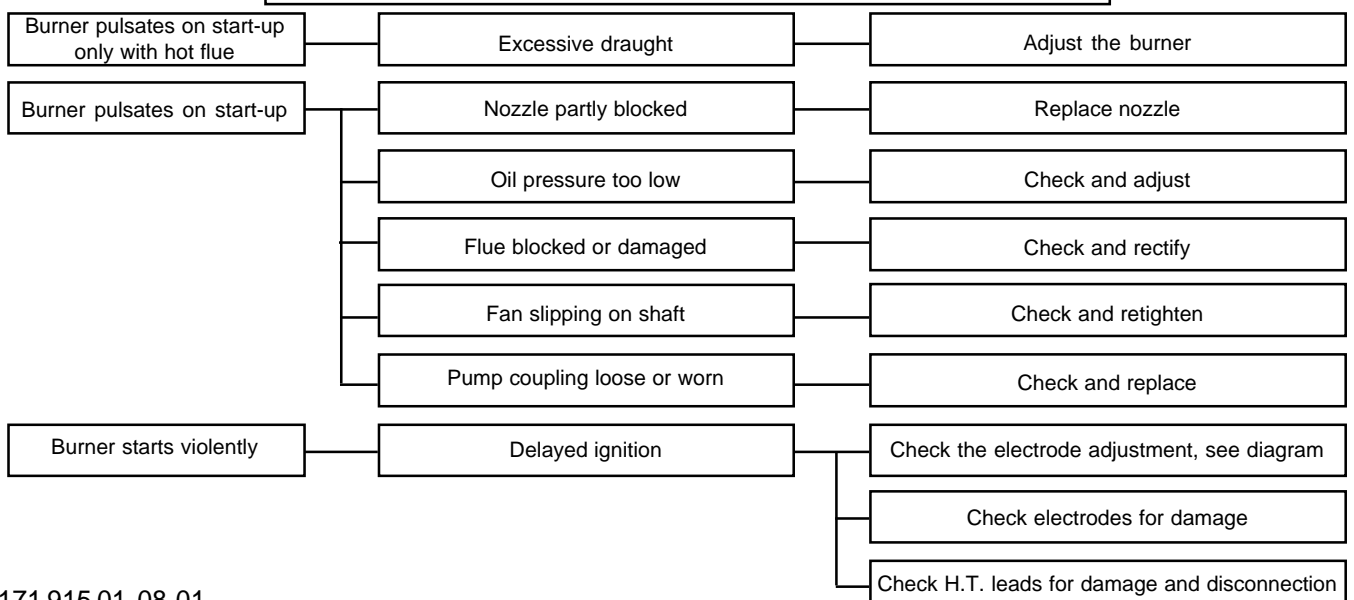
## BURNER FAILS TO START



## BURNER FAILS TO START AFTER NORMAL OPERATION



## DELAYED IGNITION, BURNERS STARTS VIOLENTLY



# DECLARATION OF CONFORMITY

Manufacturer: Enertech AB, Bentone Division  
Street address: Näsvägen  
SE-341 34 Ljungby  
Address: P.O. Box 309  
SE-341 26 Ljungby  
Sweden  
Product: Oil burner  
Type: BF1, B 1, B 2, B 9, B 10, B 11, B 20, B 30, B 40, B 45,  
B 50, B 55, B 60, B 65, B 70, B 80, ST 97, ST 108,  
ST 120, ST133, ST 146

Certifikat TÜV Süddeutschland  
Certifikat Nr Burner  
XXXXXXXXX BF1  
0111110535004 B1  
0207110535005 B2  
021198p15001 ST97, ST108, ST120, ST133, ST146  
02119815002 B9, B10, B11  
02119815003 B20, B30, B40, B45  
02119815004 B50, B60, B70, B80  
040588622001 B55  
040588622002 B65

Enertech AB declares under sole responsibility that the above mentioned product is in conformity with the following standards or other normative documents.

Document: EN 267

and follows the provisions of applicable parts in the following EU Directives:  
89/336/EEC Electromagnetic compatibility  
73/23/EEC Low-voltage directive  
89/392/EEC Machinery directive  
92/42/EEC Efficiency directive

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

Enertech AB, Bentone Division is quality certified according to SS-EN ISO 9001:2000

Ljungby 080115

**ENERTECH AB**  
Sven-Olov Lövgren

