

Installation and Maintenance instruction  
**B40 MF, B45-2 MF**





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# Manual

- This manual should be considered by all those who, for whatever reason, work with the equipment and associated system components.
- This manual is aimed specifically at authorised personnel.
- This manual is to be regarded as part of the burner and must always be kept near the installation site.

## Safety Instruction

The electrical installation shall be carried out in accordance with applicable heavy current regulations and in a professional manner, avoiding the risk of oil leaks, fire or personal injury

Care should be taken by the installer to ensure that no electrical cables or oil/gas pipelines are crushed or damaged during installation or servicing.



Use caution when operating the burner, surfaces may be hot.

### Condensation in flue

A modern burner operates using less excess air and often also with smaller nozzles than older models. This makes the boiler more efficient, but increases the risk of condensation in the flue. The risk increases if the area of the flue duct is too large. Flue gas temperature should be above the condensation point of the specific oil measured 0.5 m down in the flue.

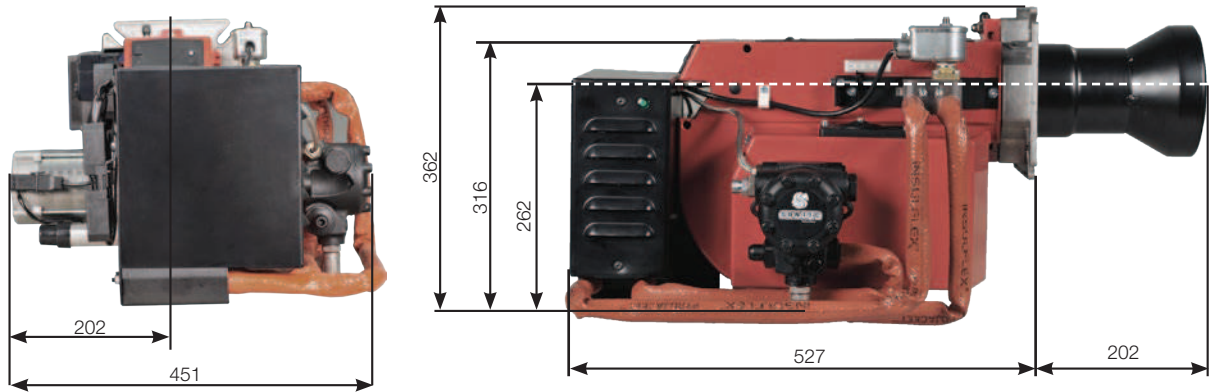
### Setting the burner

In order to obtain the correct setting, a flue gas analysis, soot quantity measurement and temperature measurement must be carried out.

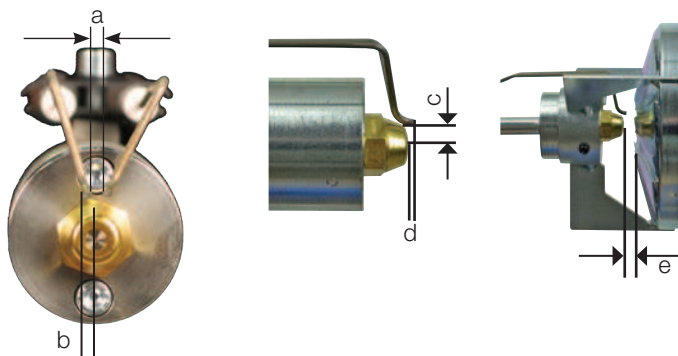
Otherwise, there is a risk of soot build up, poor efficiency or condensation precipitation in the flue.

# 1. TECHNICAL DATA

## 1.1 Dimensions B40



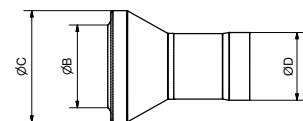
## 1.2 Setting of ignition electrodes and brake plate



**!** \*NB It is important that the spark does not strike against the brake plate or nozzle

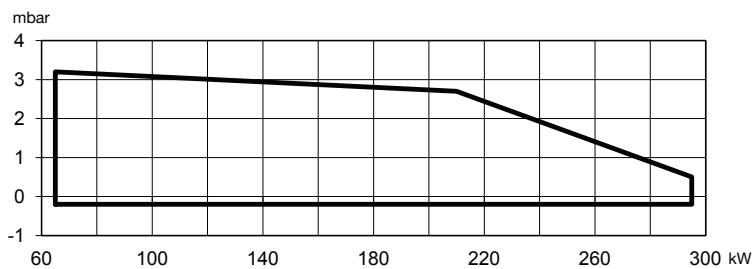
	a	b	c	d	e
B40 MF	2,5-3,0	2,0	6,5-7,0	2,0	5,0

B40 MF	Insertion length, burner tube	Burner tube, Dimension B	Burner tube, Dimension C	Burner tube, Dimension D
Standard 1	202	115	160	114



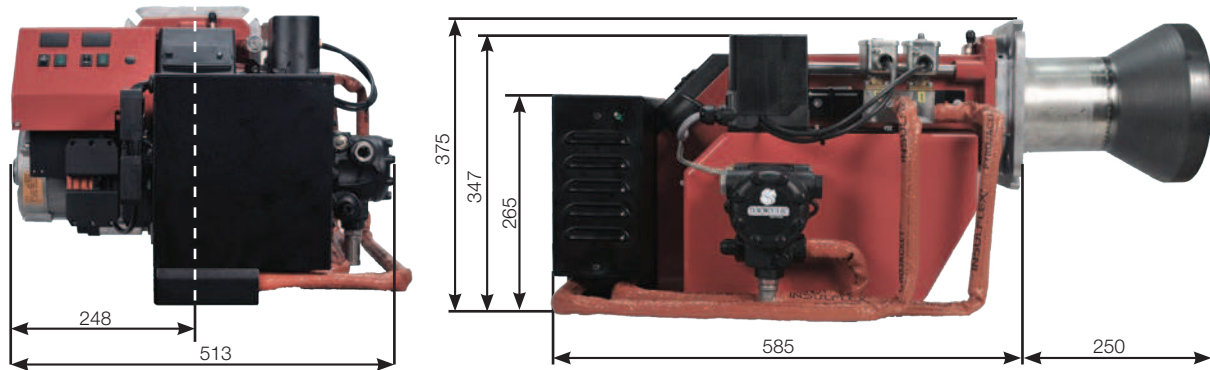
### 1.1.1 Burner output

6.5 - 29.5 kg/h  
65 - 295 kW

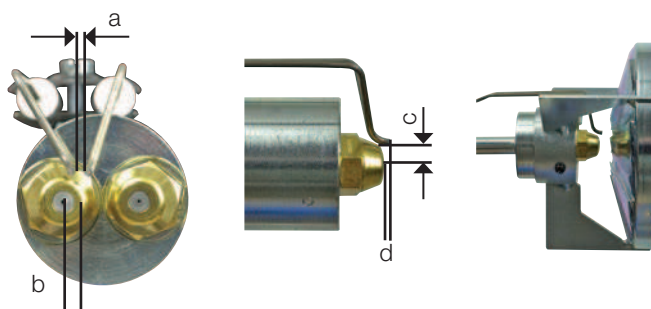


\* Used lower calorific value of 10.00 kWh/kg for rapeseed oil in accordance with DIN 51605:2010-10

### 1.3 Dimensions B45-2



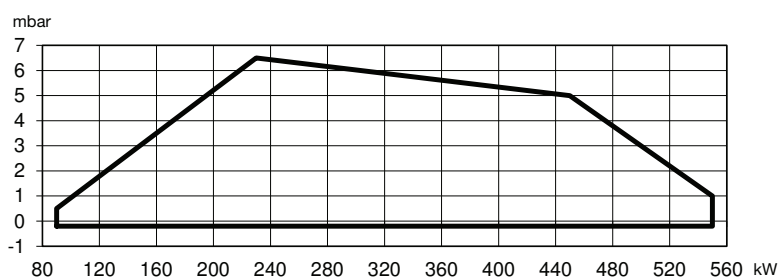
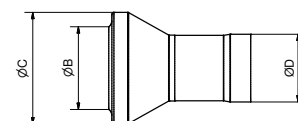
### 1.4 Setting of ignition electrodes and brake plate



**!** \*NB It is important that the spark does not strike against the brake plate or nozzle

	a	b	c	d	e
B45-2 MF	2,5-3,0	2,0	6,5-7,0	2,0	6,0

B45-2 MF	Insertion length, burner tube	Burner tube, Dimension B	Burner tube, Dimension C	Burner tube, Dimension D
Standard 1	250	160	220	134

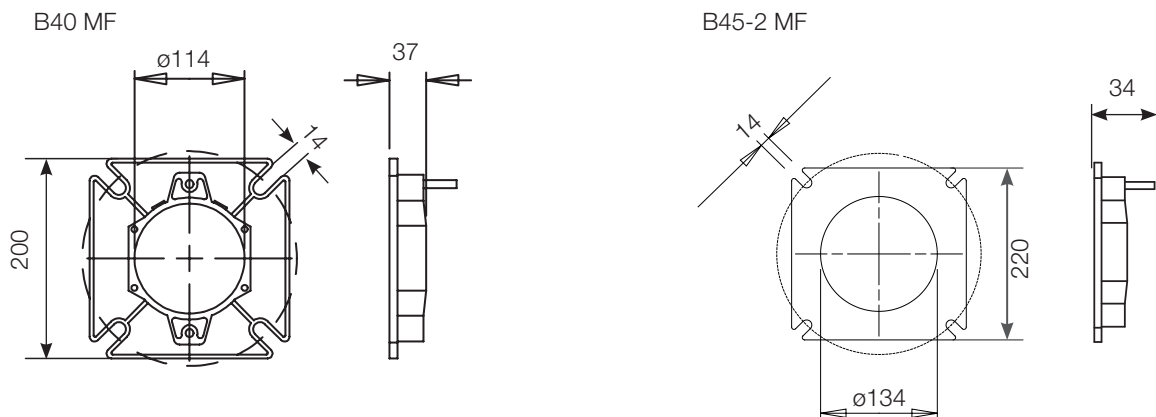


#### 1.2.1 Burner output

9.0 - 55.0 kg/h  
90 - 550 kW

\* Used lower calorific value of 10.00 kWh/kg for rapeseed oil in accordance with DIN 51605:2010-10

## 1.5 Dimensions, flange



## 1.6 Recommended nozzle and pressure

Because of the various boiler types with varying furnace geometries and furnace loads, it is impossible to commit to a certain scattering angle or a specific distribution pattern.

It should be noted that the scattering angle and distribution pattern changes with pump pressure.

Nozzle:	45° Solid/semi-solid
	60° Solid/semi-solid
Pump pressure	28 bar (24-28 bar) <sup>1)</sup>
	24 bar (24-26 bar) <sup>2)</sup>

<sup>1)</sup> high viscosity oils

<sup>2)</sup> low viscosity oils



The burner pump is factory set at 24 bar and test operated using FAME (RME)

## 1.7 Oil grades

The burner is tested and approved for pure rapeseed oil, which is compliant with standard DIN 51605:2010-10.

The burner is designed to be able to burn oils with a higher viscosity, both of biological and fossil origin.

The maximum viscosity at which the burner has been tested is 120 mm<sup>2</sup>/s at 20 °C. 120 mm<sup>2</sup> / s at 20 °C corresponds to a fossil oil type EO3 50 mm<sup>2</sup> / s at 40 °C, which is standard conditions for the oil. This may vary depending on the oil grade. Another way to define the type of oil the burner can handle is that it shall be of such a nature that it can be pumped by the burner pump at the temperature that oil has at the pump connection point.

The burner is designed to withstand the more corrosive environment that is often created by oils of biological origin. A maximum limit for oil aggressiveness has been defined - burners are built to withstand fuel with an acid value of up to 80 mg KOH/g oil.

The burner pump has a service life of about 3-5 years if the oil is of a grade that is compliant with standard DIN 51605:2010-10. If oil of different grade is used, and especially if it contains contaminants such as grit, Pomace, metal shavings, etc. or is chemically aggressive, the pump may be expected to have a significantly shorter service life.





## 1.8 Nozzle for bio oils, 20-28 bar

Pump pressure bar

Gph	20		22		24		26		28	
	kg/h	kW	kg/h	kW	kg/h	kW	kg/h	kW	kg/h	kW
1,00	4,9	49	5,2	51	5,4	53	5,6	56	5,8	58
1,50	7,4	73	7,7	77	8,1	80	8,4	84	8,7	87
2,00	9,8	98	10,3	103	10,8	107	11,2	112	11,6	116
2,50	12,3	122	12,9	128	13,5	134	14,0	140	14,5	145
3,00	14,8	147	15,5	154	16,2	161	16,8	168	17,5	174
3,50	17,2	172	18,0	180	18,9	188	19,6	196	20,4	203
4,00	19,7	196	20,6	206	21,5	215	22,4	224	23,3	232
4,50	22,1	221	23,2	232	24,2	242	25,2	252	26,2	261
5,00	24,6	245	25,8	257	26,9	269	28,0	280	29,1	290
5,50	27,0	270	28,4	283	29,6	296	30,8	308	32,0	320
6,00	29,5	295	30,9	309	32,3	323	33,6	336	34,9	349
6,50	32,0	319	33,5	335	35,0	350	36,4	364	37,8	378
7,00	34,4	344	36,1	361	37,7	377	39,2	392	40,7	407
7,50	36,9	368	38,7	386	40,4	404	42,0	420	43,6	436
8,00	39,3	393	41,3	412	43,1	430	44,9	448	46,5	465
8,50	41,8	418	43,8	438	45,8	457	47,7	476	49,5	494
9,00	44,3	442	46,4	464	48,5	484	50,5	504	52,4	523
9,50	46,7	467	49,0	489	51,2	511	53,3	532	55,3	552
10,00	49,2	491	51,6	515	53,9	538	56,1	560	58,2	581
10,50	51,6	516	54,1	541	56,6	565	58,9	588	61,1	610
11,00	54,1	540	56,7	567	59,3	592	61,7	616	64,0	640
11,50	56,5	565	59,3	593	61,9	619	64,5	644	66,9	669
12,00	59,0	590	61,9	618	64,6	646	67,3	672	69,8	698

Rapeseed oil compliant with DIN 51605:2010-10 Viscosity: 36.0 mm<sup>2</sup>/ s, at 40 °C preheater 160 °C

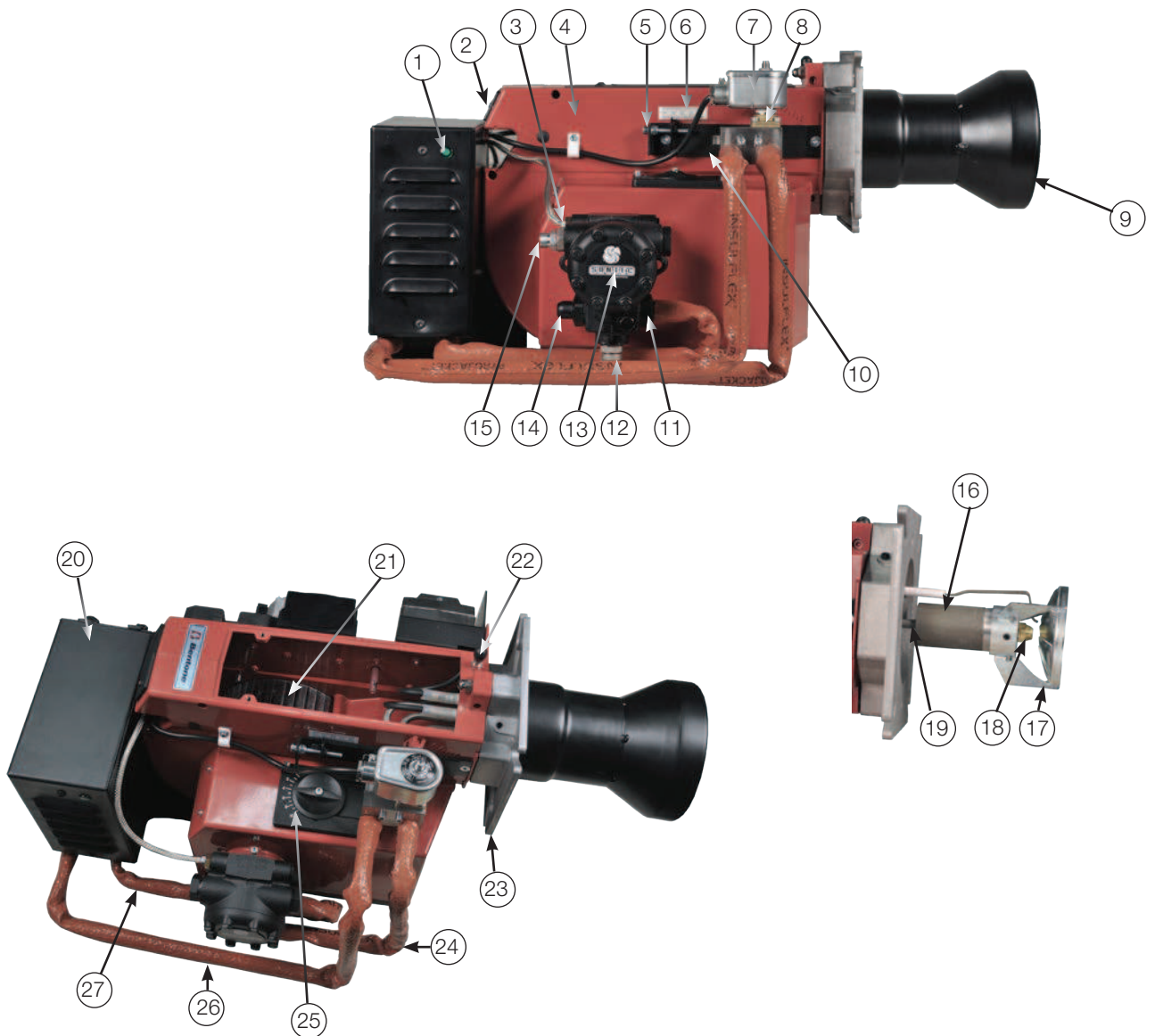
## 1.9 Nozzle for fossil oils, 22-28 bar

Pump pressure bar

Gph	22		24		26		28	
	kg/h	kW	kg/h	kW	kg/h	kW	kg/h	kW
1,00	5,52	65,44	5,76	68,35	6	71,14	6,22	73,83
1,50	8,66	102,73	9,05	107,3	9,42	111,68	9,77	115,9
2,00	11,01	130,53	11,5	136,33	11,96	141,9	12,42	147,25
2,50	13,78	163,42	14,39	170,69	14,98	117,66	15,55	184,37
3,00	17,21	204,06	17,97	213,13	18,7	221,83	19,41	230,21
3,50	19,13	226,93	19,89	237,02	20,8	246,7	21,59	256,01
4,00	21,06	249,8	22	260,9	22,9	271,56	23,76	281,81
4,50	23,88	283,22	24,94	295,81	25,96	307,89	26,94	319,51
5,00	27,44	325,44	28,66	339,91	29,83	353,79	30,96	367,14
5,50	31	367,66	32,38	384	33,7	399,68	34,97	414,77
6,00	34,71	411,63	36,25	429,94	37,73	447,49	39,16	464,39
6,50	38,71	459,13	40,43	479,55	42,08	499,13	43,67	517,97
7,00	41,38	490,8	43,22	512,62	44,99	533,55	46,69	553,69
7,50	44,2	524,22	46,17	547,53	48,05	569,89	49,86	591,4
8,00	46,72	554,12	48,8	578,76	50,79	602,4	52,71	625,14
8,50	49,1	582,27	51,28	608,16	53,37	632,99	55,39	656,89
9,00	52,51	622,73	54,84	650,42	57,08	676,98	59,24	702,53
10,00	55,92	663,19	58,4	692,68	60,79	720,96	63,08	748,18
11,00	63,04	747,63	65,84	780,87	68,53	812,76	71,12	843,44
12,00	70,75	839,1	73,9	876,41	76,91	912,2	79,82	946,63

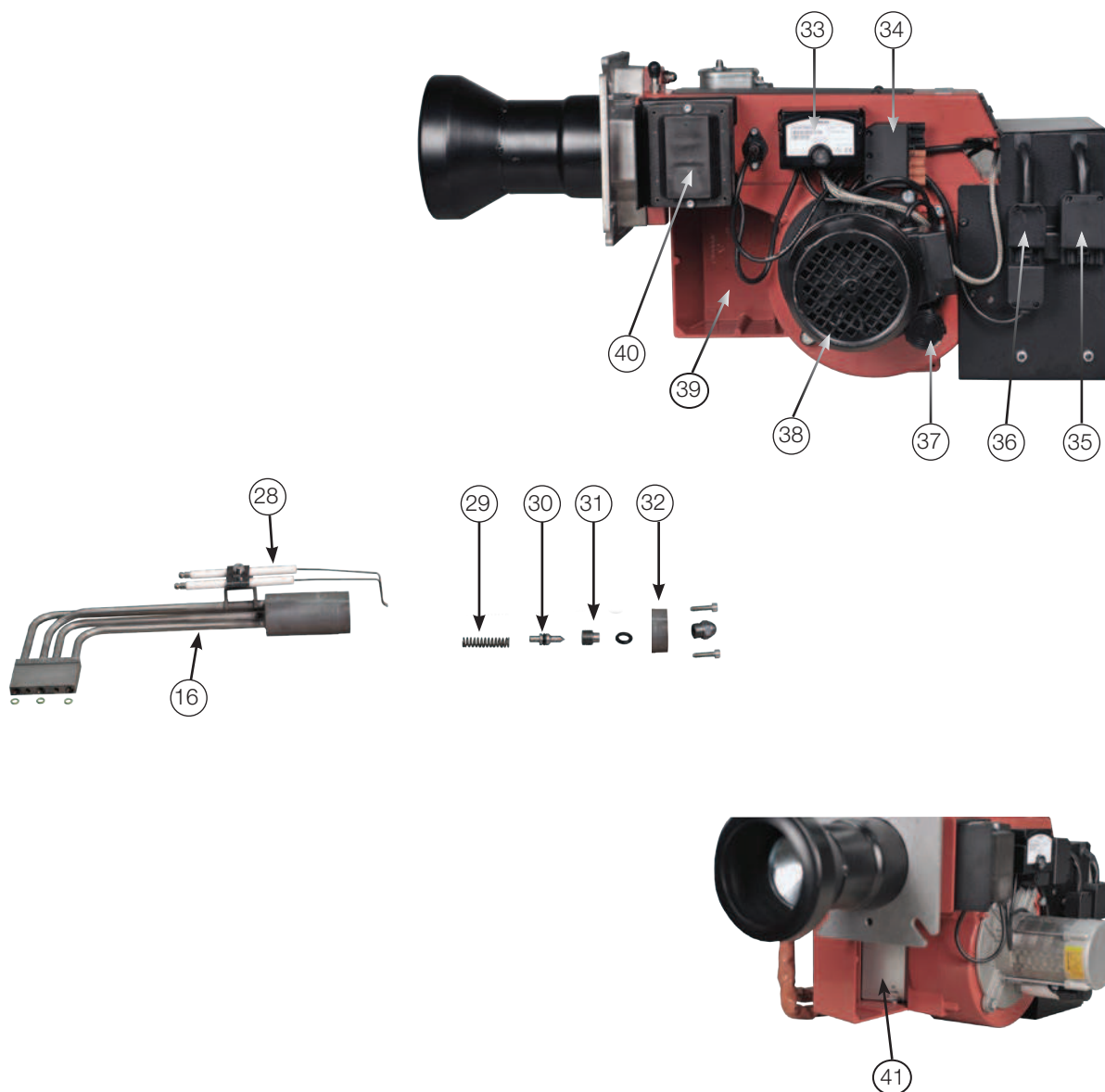
The table applies to oil with a viscosity of 4.4 mm<sup>2</sup>/s at a density of 830 kg/m<sup>3</sup>.

## 1.10 Description B40 MF



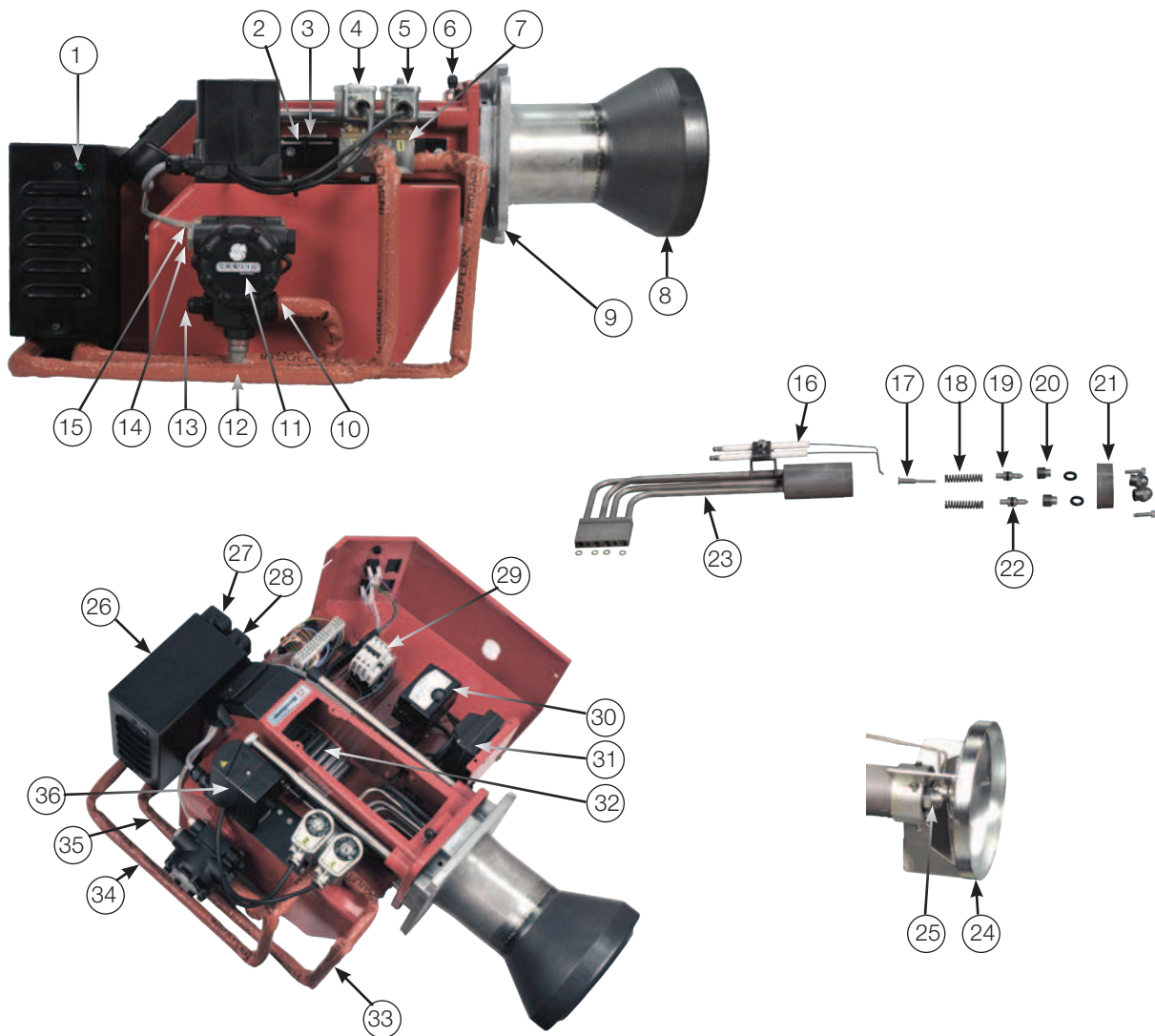
### 1.10.1 Components B40 MF

- |   |   |
|---|---|
| 1. Indicator lamp, preheater ON         | 11. Pressure outlet pump                  |
| 2. Inspection glass                     | 12. Return pump                           |
| 3. Immersion heater, pump               | 13. Pump                                  |
| 4. Fan housing                          | 14. Pressure control pump                 |
| 5. Nozzle assembly control              | 15. Inlet pump                            |
| 6. Scale, nozzle assembly control       | 16. Nozzle assembly                       |
| 7. Solenoid valve NO                    | 17. Brake plate                           |
| 8. Valve block                          | 18. Nozzle                                |
| 9. Burner tube                          | 19. Cavity immersion heater nozzle holder |
| 10. Cavity immersion heater valve block | 20. Preheater                             |



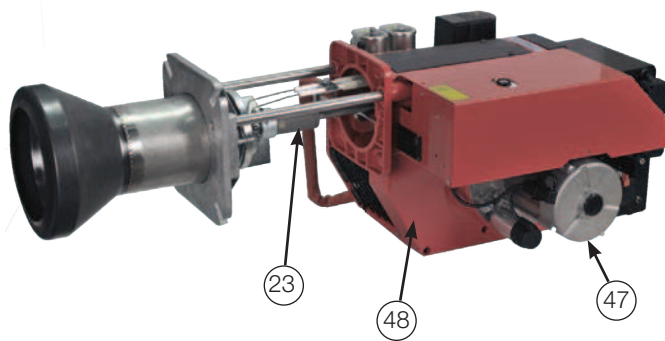
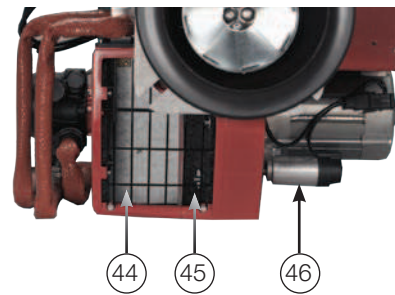
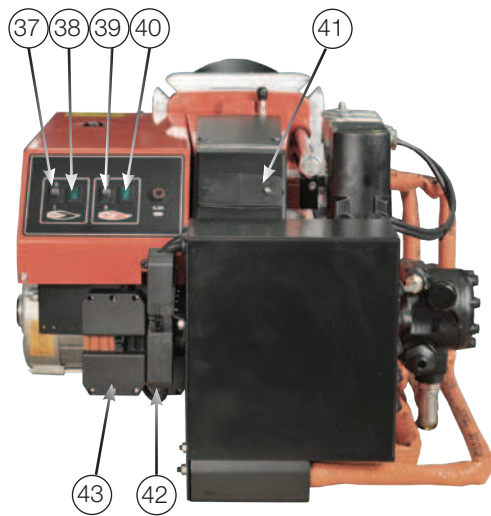
- |  |   |
|--|---|
| 21. Fan wheel                              | 32. Front nozzle holder                         |
| 22. Measuring nipple, fan pressure         | 33. Relay box                                   |
| 23. Burner flange                          | 34. 7-pole Europlug (feed)                      |
| 24. Connecting pipe, valve block return    | 35. 5-pole Euro plug (feed preheater)           |
| 25. Damper motor                           | 36. 4-pole Euro plug (control signal preheater) |
| 26. Connecting pipe, preheater valve block | 37. Capacitor                                   |
| 27. Connecting pipe, pump preheater        | 38. Motor                                       |
| 28. Ignition electrodes                    | 39. Air intake                                  |
| 29. Spring pressure piston                 | 40. Ignition transformer                        |
| 30. Preheater                              | 41. Air damper                                  |
| 31. Valve seat                             |   |

## 1.11 Description B45-2 MF



### 1.11.1 Components B45-2 MF

- |                                   |                               |
|-----------------------------------|-------------------------------|
| 1. Indicator lamp, preheater ON   | 14. Inlet pump                |
| 2. Nozzle assembly control        | 15. Immersion heater, pump    |
| 3. Scale, nozzle assembly control | 16. Ignition electrodes       |
| 4. Solenoid valve NC max. load    | 17. Valve needle              |
| 5. Solenoid valve NO min. load    | 18. Spring pressure piston    |
| 6. Measuring nipple, fan pressure | 19. Pressure piston max. load |
| 7. Valve block                    | 20. Valve seat                |
| 8. Burner tube                    | 21. Front nozzle holder       |
| 9. Burner flange                  | 22. Pressure piston min. load |
| 10. Pressure outlet pump          | 23. Air intake                |
| 11. Pump                          | 24. Brake plate               |
| 12. Return pump                   | 25. Nozzle                    |
| 13. Pressure control pump         | 26. Preheater                 |



- |   |                                       |
|---|---------------------------------------|
| 27. 5-pole Euro plug (feed preheater)           | 40. Indicator lamp, maximum load      |
| 28. 4-pole Euro plug (control signal preheater) | 41. Inspection glass                  |
| 29. Contactor for motor                         | 42. 4-pole Euro plug (max. load)      |
| 30. Relay box                                   | 43. 7-pole Euro plug (min. load feed) |
| 31. Ignition transformer                        | 44. Air damper                        |
| 32. Fan wheel                                   | 45. Air intake                        |
| 33. Connecting pipe, valve block return         | 46. Capacitor                         |
| 34. Connecting pipe, preheater valve block      | 47. Motor                             |
| 35. Connecting pipe, pump preheater             | 48. Fan housing                       |
| 36. Damper motor                                |                                       |
| 37. Switch 0-I                                  |                                       |
| 38. Indicator, min. load                        |                                       |
| 39. Switch I-II                                 |                                       |

## 2. INSTALLATION

### 2.1 Acceptance inspection

Make sure everything is delivered and the goods have not been damaged during transit. If something is wrong with the delivery, report it to the supplier. Transport damage must be reported to the shipping company.

### 2.2 Preparations for installation

Check that the burner's dimensions and capacity range are suitable for the boiler in question. The power data on the type sign refers to the burner's min. and max. power.

### 2.3 Distribution of oil

In order to achieve good reliability, it is important that the oil distribution system is designed correctly.

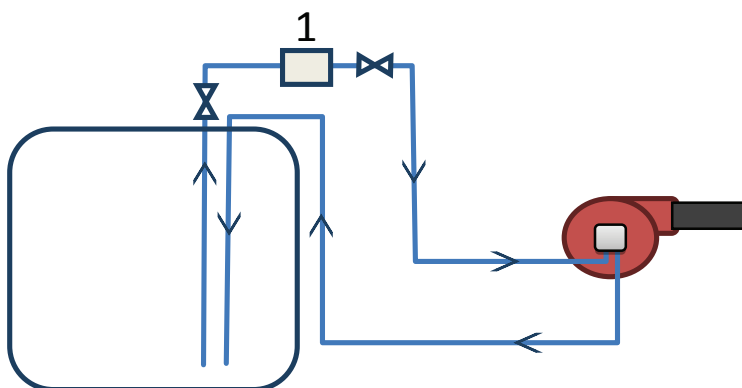
Take the following into account:

- Selection of pipe diameter, pipe length and height difference; see Pump instruction.
- Pipelines are to be laid with a minimal number of glands.
- The pipes are to be laid so that the oil supply hoses are not subjected to tensile stresses or are excessively bent when the burner is swung out or removed for service.
- The ½ " oil filter should be installed so that the filter cartridge can easily be replaced or cleaned. Self-cleaning filters are recommended for oils of a higher viscosity or oils that contain significant impurities.
- Oil-affected parts shall be selected in materials that are capable of withstanding the medium's physical properties.
- When installing oil hoses, check that the inlet and return hoses are fitted to the appropriate connection on the oil pump. The hoses shall be located so that they do not bend or become subject to tensile load.
- Bleed the oil system. The oil pump/oil preheater may be damaged if run dry. The vacuum should not fall below 0 bar in the suction line during start-up.

**!** Be sure to fill the burner oil system before starting it for the first time.

#### 2.3.1 Proposed pipe routing for oil distribution systems without transport pump

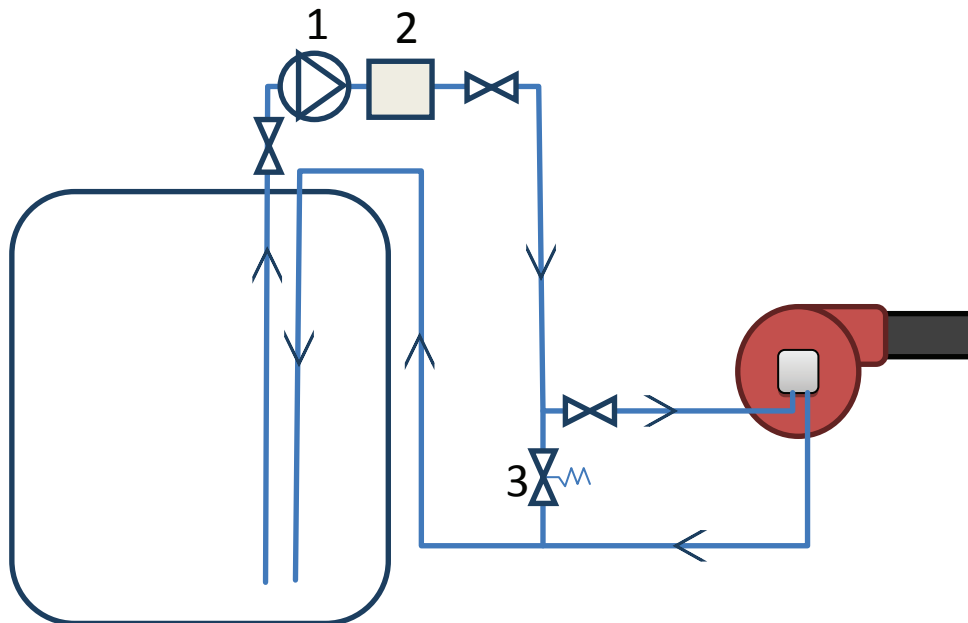
This type of connection should be used only when the oil has a viscosity less than 30 mm<sup>2</sup>/s



1. Self-cleaning filter



### 2.3.2 Proposed pipe routing for oil distribution systems with transport pump



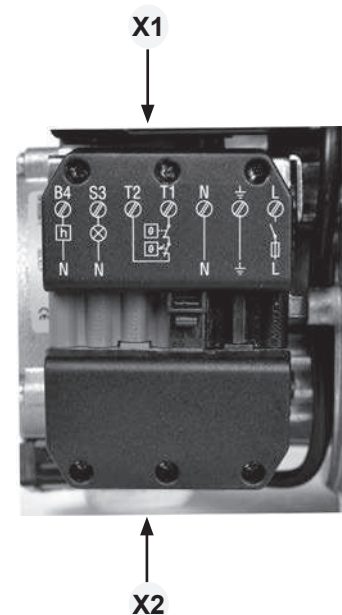
1. Transport oil filter
2. Self-cleaning filter
3. Overflow valve 0.5 – 2.0 bar

## 2.4 Electrical connection

Before electrical installation begins, the main power switch must be turned off.

If the boiler has a 7-pole and a 4-pole Euro plug connector, they will usually connect directly to the burner. Otherwise, use the supplied connectors. The 5-pole connector supplies the burner preheater with a separate 3-phase supply. See connection under Electrical equipment.

1. Switch off the main switch.
2. Connect the Euro plugs. (See Electrical equipment)
3. Make sure the burner operations switch (S1) is off.
4. Turn on the main switch.



If any electrical connection is used other than that recommended by Bentone, there may be a danger of damage to property and personal injury.

## 2.5 Nozzle selection

See under Technical data: Recommended nozzle and Nozzle table.

If, after selecting the nozzle, burner type B45-2 MF has difficulty starting, this may in some cases be due to the selection of nozzle made for the first stage. Selecting a nozzle with a smaller effect in the first stage may solve the problem.

## 2.6 Setting of brake plate and air flow

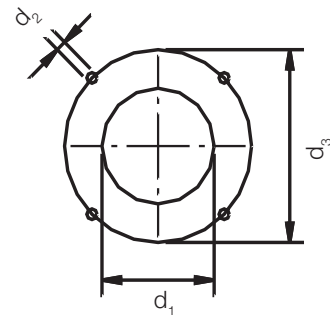
Prior to commissioning, the basic settings of the burner can be set in accordance with the diagram. See under Basic settings. Note that it is simply a matter of a basic setting that should be adjusted retrospectively once the burner has started. You should then conduct a flue gas analysis and soot quantity measurement.

## 2.7 Burner installation

### 2.7.1 Hole pattern

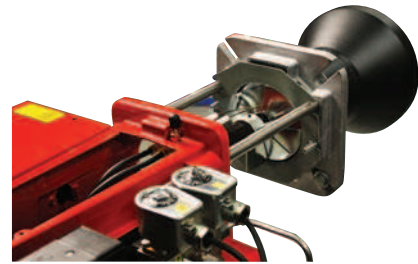
Make sure the hole pattern on the boiler is designed for burner flange.

Combustion device	$d_1$	$d_2$	$d_3$
B40 MF	ø 115-175	M10-M12	ø 195-245
B45-2 MF	ø 135-(175) 200	M10-M12	ø (195) 224-260



## 2.8 Burner installation

1. Separate the burner body and the flange.
2. Remove the brake plate from the oil pipe.
3. Install the selected nozzle. (See Technical data)
4. Install the brake plate on the oil pipe
5. Remove the burner tube from the flange.
6. Install the flange with gasket on the boiler.
7. Install the burner tube on the flange. Make sure that the hole in the front of the burner tube pipe is pointing down. This allows any drops of oil to flow out.
8. Insulate between the burner and boiler door to reduce radiated heat.
9.
  - Fit the burner body on the flange, B40 MF
  - Slide the burner body on the guides, B45-2 MF
10. Lock the burner body using with the nut/nuts.
11. Connect the oil hoses to the pump, see paragraph 2.3
12. Connect burner electrically, see paragraph 2.4



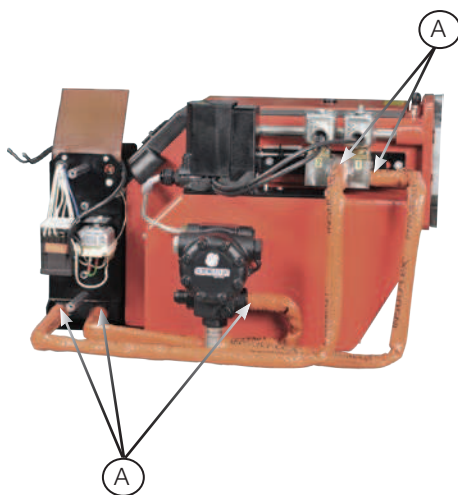
**!** Because the burner tube must be installed from the inside the boiler, it must be possible to open the boiler or have a hinged flange that is designed so that it can be reconnected with the burner tube installed.

## 2.9 Check oil line seals

Once the burner has been installed and commissioned, the seals of the various coupling elements should be checked (A). These may, due to temperature fluctuations or transportation, start to leak.

Temperature fluctuations arise from the process of heating oil used in these burners.

When a leak is detected, it is usually sufficient to tighten the coupling element that is leaking.



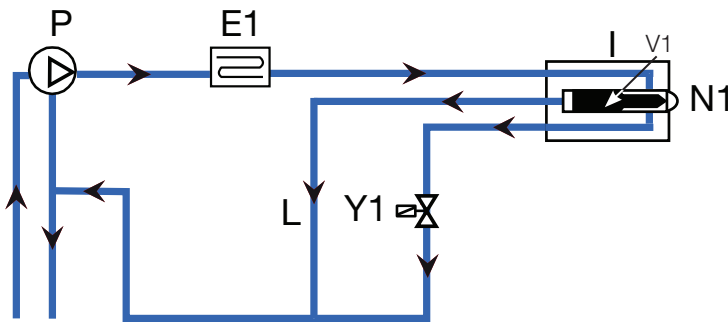
## 3. FUNCTION DESCRIPTION

### 3.1 B40 MF 1-stage burner

When the installation calls for heat, the burner's preheater starts to heat the oil. Once the oil reaches the set temperature, the burner receives the signal to start. Hot oil is flushed throughout the burner's oil system.

After the end of the blow period, the solenoid valve (Y1) receives voltage and closes. The oil pressure builds up in the nozzle holder and the cut valve (V1) opens. The oil is atomised in the nozzle and ignited. A small amount of oil and the nozzle assembly compressed air flow is channelled back to the return side of the pump through the leak oil line (L).

Once the installation has reached the desired temperature, a solenoid valve (Y1) is rendered without power and then opened; cut valve (V1) is then closed. This process extinguishes the burner flame. In the same process, oil heating is also interrupted.



P	Oil pump
E1	Preheater
I	Nozzle assembly
L	Leak pipe
N1	Nozzle 1
Y1	Solenoid valve 1 NO
V1	Cut valve

### 3.2 B45-2 MF 2-stage burner

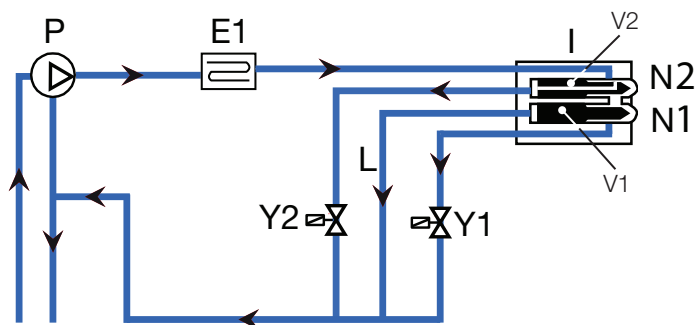
When the installation calls for heat, the burner's preheater starts to heat the oil. Once the oil reaches the set temperature, the burner receives the signal to start. Hot oil is flushed throughout the burner's oil system.

After the end of the blow period, the min. load solenoid valve (Y1) receives voltage and closes. The oil pressure builds up in the nozzle holder and the cut valve (V1) for min. load opens. The oil is atomised in the nozzle (N1) and ignited. A small amount of oil and the nozzle assembly compressed air flow is channelled back to the return side of the pump through the leak oil line (L).

Solenoid valve (Y2) for maximum load opens when the installation calls for maximum load. The pressure difference created over the cut valve (V2) for maximum load makes this valve open. The oil is atomised in the nozzle and ignited.

When the heat in the installation reaches break temperature, solenoid valve (Y2) for maximum load closes to reduce to minimum load. The pressure equalisation which then takes place over the max. load cut valve (V2) gets this to close and the flame is reduced to min. load.

Once the installation has reached the desired temperature, a solenoid valve (Y1) is rendered without power and then opened; cut valve (V1) is then subsequently closed. This process extinguishes the burner flame. In the same process, oil heating is also interrupted.



P	Oil pump
E1	Preheater
I	Nozzle assembly
L	Leak pipe
N1	Nozzle 1
N2	Nozzle 2
Y1	Solenoid valve 1 NO
Y2	Solenoid valve 2 NC
V1	Cut valve 1
V2	Cut valve 2

## 4. BASIC SETTINGS

### 4.1 Examples of basic setting B40 MF

Burner output	200 kW
Estimated nozzle output	200 kW/10 kWh/kg* = 20 kg/h

Nozzle selection in accordance with the table. (See technical data) Nozzle selection is based on the selected pump pressure and the desired effect. According to the nozzle table, this provides the following nozzle.

Selected pump pressure	25 bar
Nozzle	3.50 gph
Power in	20.61 kg/h => 20.61 kg/h x 10 kWh/kg* = 206 kW

\* Taken from the fuel in accordance with standard DIN 51605:2010-10

#### Basic settings

The setting value for 200 kW in accordance with basic setting tables. For the correct procedure when implementing settings, see 4.7 Nozzle assembly control, brake plate B40 MF and 4.8 Air setting B40 MF (See technical data )

Effects and nozzle selection from example	
Nozzle assembly	14
Damper	7

Basic settings should only be seen as setting values to get burner to start and establish a flame. Once the burner has started and established a flame, it will be necessary to adjust the settings so that they are adapted to the installation in question and the fuel used at the time.

## 4.2 Examples of basic setting B45-2 MF

Burner output	Max. 500 kW
	Min. 200 kW
Estimated nozzle output min. load	200 kW/10 kWh/kg* = 20 kg/h
Estimated nozzle output max. load	(500kW-200 kW)/10 kWh/kg* = 30 kg/h

The nozzle effect is calculated for two-stage burners with two nozzles (separately for each nozzle).

Nozzle selection in accordance with the table. (See technical data)

Nozzle selection is based on the selected pump pressure and the desired effect.

According to the nozzle table, this provides the following nozzle.

Selected pump pressure	25 bar
Nozzle min. load	3.50 gph
Nozzle max. load	5.00 gph
Power in min. load	20.61 kg/h => 20.61 kg/h x 10 kWh/kg* = 206 kW
Power in max. load	20.61 kg/h + 29.44 kg/h => 50.05 kg/h x 10 kWh/kg* = 501 kW

\* Taken from the fuel in accordance with standard DIN 51605:2010-10

### Basic settings

The setting value for maximum load 500 kW and minimum load 200 kW according to the basic settings tables. For the correct procedure when implementing settings, see 4.7 Nozzle assembly control, brake plate B45-2 MF and 4.9 Air setting B45-2 MF

Damper motor 2-stage (see technical data ...)

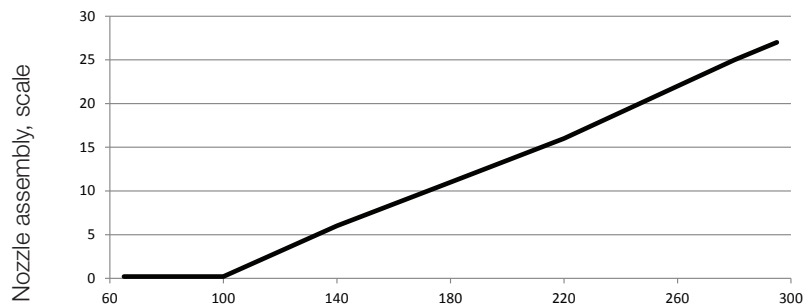
Effects and nozzle selection from example

Nozzle assembly	Stage 2 = 25	
Damper motor	Closed = 0°	Blue cam
	Min. load = 45°	Orange cam
	MV max. load = 60°	Black cam
	Max. load = 90°	Red cam

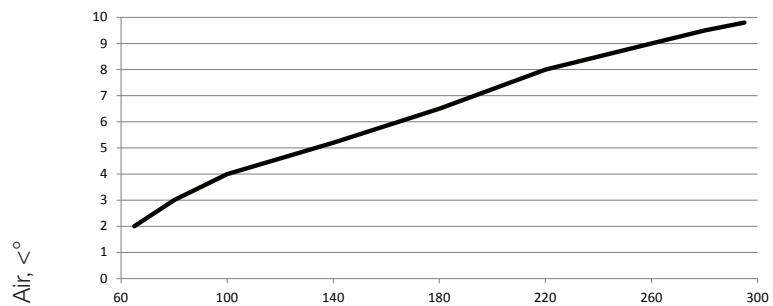
Black cam for MV (solenoid valve) max. load shall be placed between the cams for min. and max. load. The positions of MV max. load are determined by the boiler's characteristics when switching between stages. By default, the black cam is placed between the orange and red cams.

Basic settings should only be seen as setting values to get burner to start and establish a flame. Once the burner has started and established a flame, it will be necessary to adjust the settings so that they are adapted to the installation in question and the fuel used at the time.

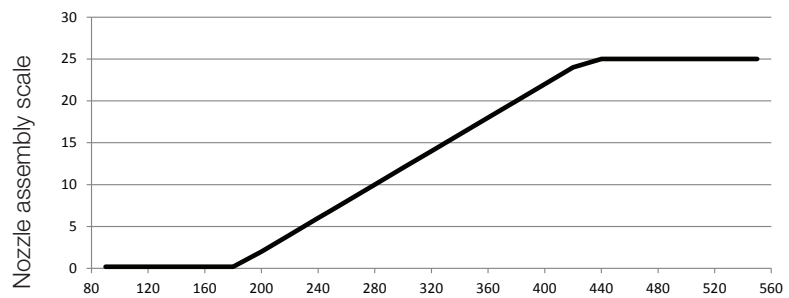
### 4.3 Setting values for nozzle assembly B40 MF



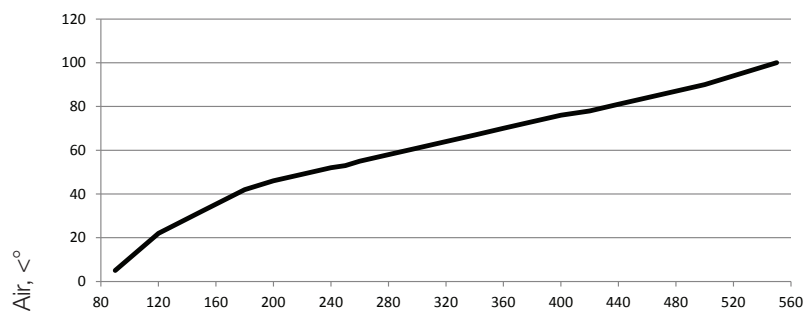
### 4.4 Setting values for air damper B40 MF



### 4.5 Setting values for nozzle assembly B45-2 MF



### 4.6 Setting values for air damper B45-2 MF





## 4.7 Nozzle assembly control, brake plate

The nozzle assembly control is used to achieve the most favourable pressure drop across the brake plate as possible in the various power stages.

### 1 nozzle (B40 MF)

The nozzle assembly control is manually adjusted (B) in order to achieve optimal pressure loss for good combustion.

### 2 nozzles (B45-2 MF)

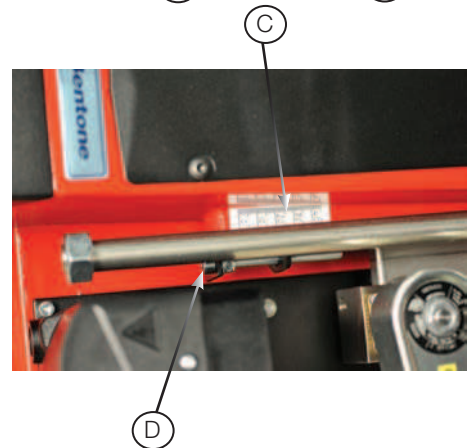
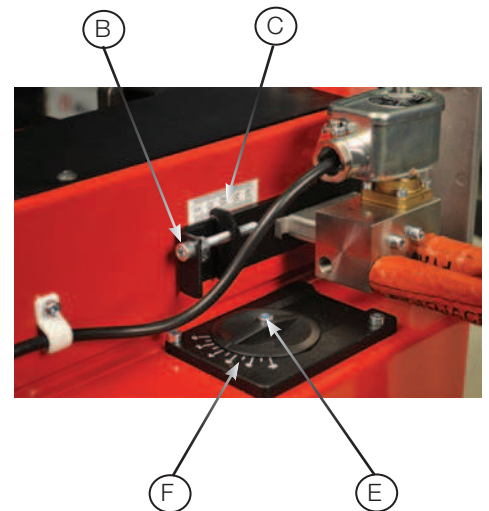
The nozzle assembly control is manually adjusted in order to achieve optimal pressure loss for good combustion. Brake plate position is controlled primarily by the second stage effect.

Set the desired position on the scale (C) using the set screw (D) (left turn reduces pressure loss, the brake plate is moved outward).

If pulsation occurs, the changed pressure drop over the brake plate may result in the pulsation stopping

## 4.8 Air setting B40 MF

Set the operations switch (S1) on the on position (I). Loosen the screw (E) that locks the air adjustment knob. Adjust the position of the air damper using the wheel until the desired air flow is achieved. Clockwise adjustment reduces the amount of air, whilst an anticlockwise adjustment increases the air flow. After adjustment, lock the damper position using the screw (E). Damper position can be read on the damper scale (F). Check the air settings by conducting a flue gas analysis.



## 4.9 Air setting B45-2 MF Damper motor

The damper motor turns the damper between three pre-set positions. These positions are controlled in the motor by a microswitch, whose switching modes is set using the colour-coded cams. There is also a black cam that controls the engagement of solenoid valve 2 second stage oil.

When the amount of air needs to be changed:

Remove the hood from the damper motor and change the position of the cams by turning them using the included tool. In order for the cam to be inoperative while being turned, we recommend that you switch to a different stage than the one that is to be adjusted and, after making the change, returning to pre-check of the outcome.

### Adjustment Stage 1

Set the operations switch to Stage 2 (II).

- \* Reduce the air volume:  
Turn the orange cam towards 0°.
- \* Increase the air volume:  
Turn the orange cam towards 90°.

Once the red or orange cam has been moved, check whether the black cam must be changed. The black cam must be between the orange and red cam.

Return the operations switch to Stage 1 and check combustion.

## Adjustment Stage 2

Set the operations switch to Stage 1 (I).

- \* Reduce the air volume:  
Turn red cam towards 0°.
- \* Increase the air volume:  
Turn red cam towards 90°.

Once the red or orange cam has been moved, check whether the black cam must be changed. The black cam must be between the orange and red cam.

Return the operations switch to Stage 2 and check combustion.

## Closed

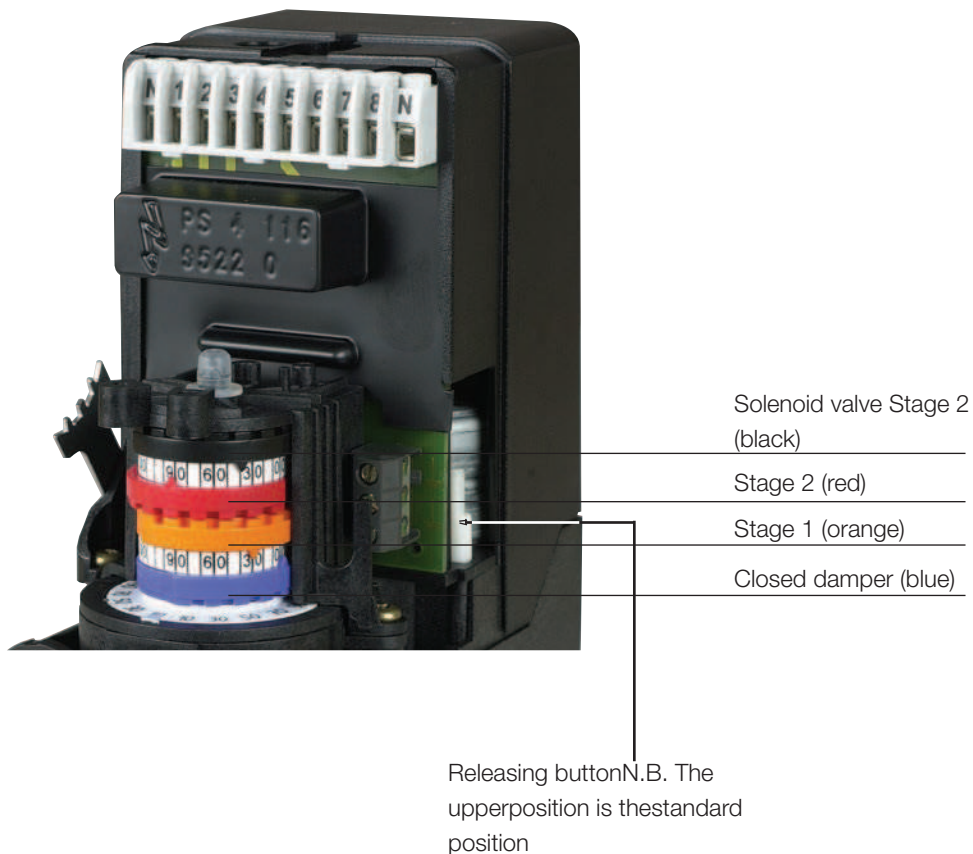
The blue cam is the limit position for fully closed damper and does not normally need to be changed.

## Disconnection

Damper motor can be disengaged using the white disconnection button. This function facilitates the replacement of damper motor.

During disconnection. Press the white disconnection button and move it outwards until it engaged in a milled groove.

During connection. Slide the white release button inwards and release. Changing the position of the motor until the gears engage with each other.



## 5. BURNER SERVICING

### 5.1 Servicing the combustion assembly

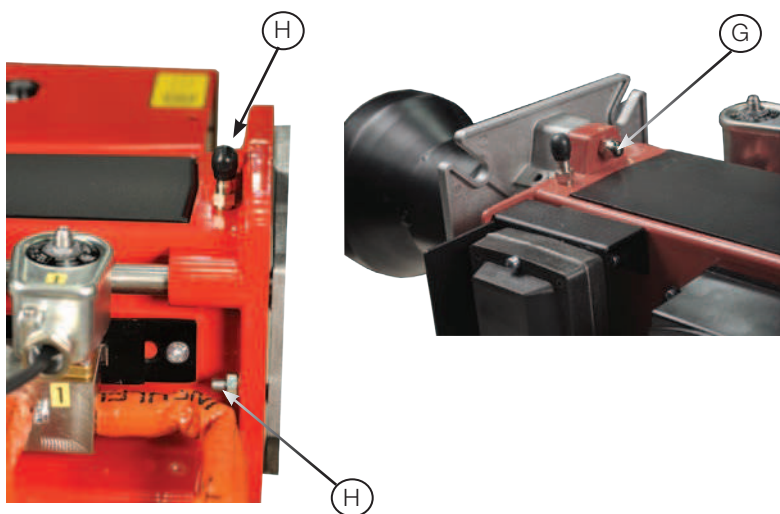
#### Removal and installation

1. Break the main current and disconnect the Euro plugs from the burner.
2.
  - Loosen the nut (G) and remove the burner from the burner flange, B40 MF.
  - Loosen the nuts (H) and pull the burner backwards, B45-2 MF
3. Remove the brake plate from the oil pipe and clean the brake plate.
4. Unscrew the nozzle/nozzles.
5. Install new nozzle/nozzles. If nozzles have filters, these must be removed before the nozzle can be installed.
6. Install the brake plate (See Brake plate setting). (see technical data)
7. Check the ignition electrodes (See Setting the ignition electrodes). (see technical data)
8. If necessary, replace the ignition electrodes.
9.
  - Fit the burner and the burner body and lock using the nut (G) B40 MF.
  - Press the burner together and lock using the nuts (H) B45-2 MF.
10. Open the boiler/hinged flange to access the burner tube..
11. Remove and clean the burner tube.
12. Install the burner; make sure you install the drainage hole in the burner tube so that any spilled oil can drain out.
13. Close the boiler/hinged flange.
14. Fit the Euro plugs and turn on the main current.
15. Check combustion \*.

**!** The burner should be serviced at least 4 times a year

**!** Use caution when operating the burner, surfaces may be hot.

**!** Because the burner tube must be installed from the inside the boiler, it must be possible to open the boiler or have a spectacle flange that is designed so that it can be reconnected with the burner tube installed.



**!** NB: When soiled, always replace nozzles with new nozzles. Do not clean.

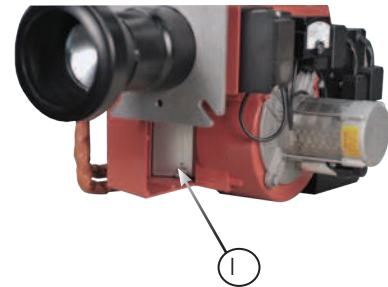
#### Note:

- \* When servicing/replacing components that affect combustion, an analysis and soot test shall be carried out on the installation.

## 5.2 Servicing air dampers

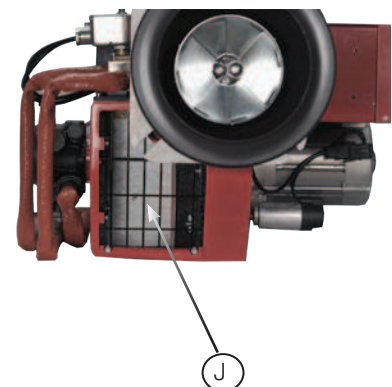
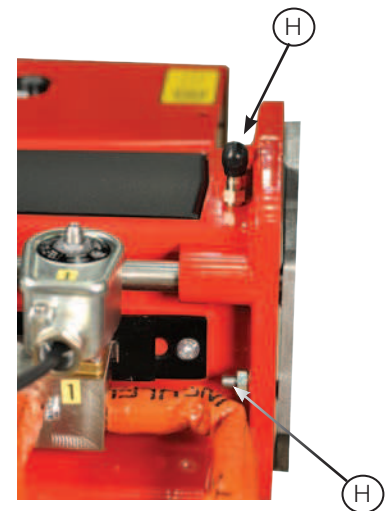
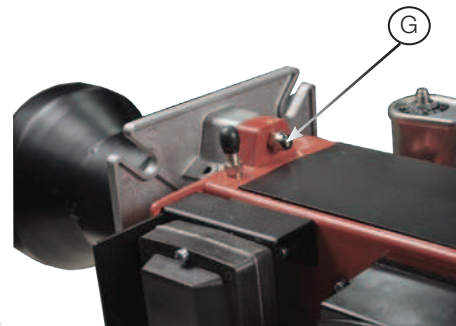
### Removal and installation, B40 MF

1. Break the main current and disconnect the Euro plugs from the burner.
2. Loosen the nut (G) and remove the burner from the burner flange.
3. Note the position of the air damper and loosen the air damper locking screw.
4. Clean the air damper (I) and the intake. Lubricate any damper shaft.
5. Adjust the air damper and its position.
6. Fit the burner and the burner flange together and secure with the nut (G).
7. Fit the Euro plugs and turn on the main current.
8. Check combustion \*.



### Removal and installation, B45-2 MF

1. Break the main current and disconnect the Euro plugs from the burner.
2. Loosen the nuts (H) and pull the burner backwards, B45-2 MF
3. Remove the intake grille at the air intake.
4. Disconnect the damper motor.
5. Clean the air damper (J) and the intake. Lubricate any damper shaft.
6. Reconnect the damper motor.
7. Install the intake grille for the air intake.
8. Press the burner together and lock using the nuts (H).
9. Fit the Euro plugs and turn on the main current.
10. Check combustion \*.



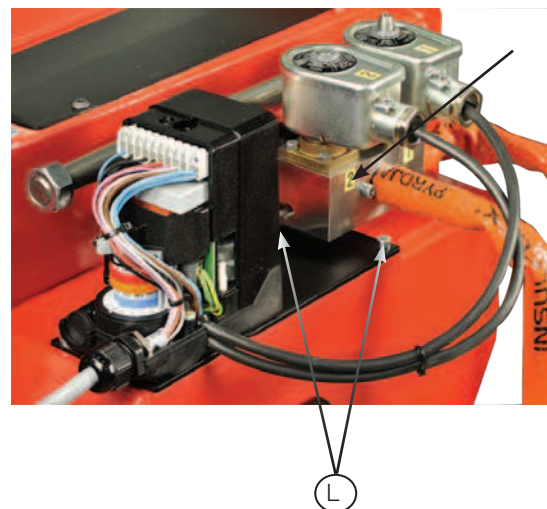
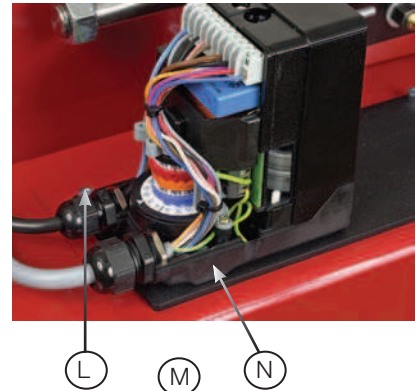
### Note:

- \* When servicing/replacing components that affect combustion, an analysis and soot test shall be carried out on the installation.

## 5.3 Replacement of damper motor B45-2 MF

### Removal and installation

1. Break the main current and disconnect the Euro plugs from the burner.
2. Note the position of the cables and loosen the wires in the damper motor.
3. Disengage the damper motor and lock it at 30°.
4. Loosen the screws (L) to the damper motor mounting plate. Some of the screws may be difficult to access. The valve block (K) may be loosened in order to make this easier. Observe caution when removing and installing valve block and ensure that a seal has been achieved when reinstalling.
5. Lift the damper motor carefully so that the air damper remains in the air intake. Remove (M) the control arm from the motor shaft.
6. Remove the damper motor from the mounting plate (N).
7. Reinstall the damper motor on the mounting plate.
8. Fit the control arm (m) on the damper motor shaft. It is important that the screw is perpendicular to the plane of the shaft.
9. Disengage the damper motor and lock it at 30°.
10. Install the mounting plate by guiding the control arm into the bracket on the air damper and the air damper shaft in the mounting plate (make sure the bushings between the mounting plate and the damper shaft are in place).
11. Disengage the damper motor, feel that the damper moves easily. Close the damper and reset the protractor on the damper motor.
12. Connect the damper motor electrically.
13. Set the damper motor notches as on the motor that has been replaced.
14. Fit the Euro plugs and turn on the main current.
15. Check combustion. \*



### Note:

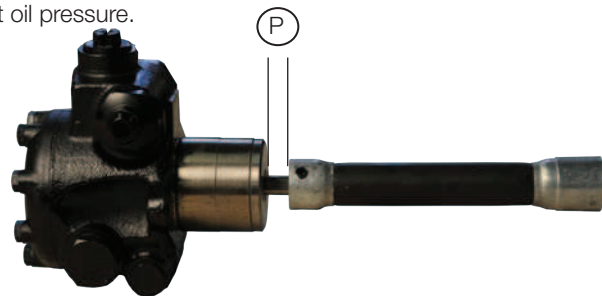
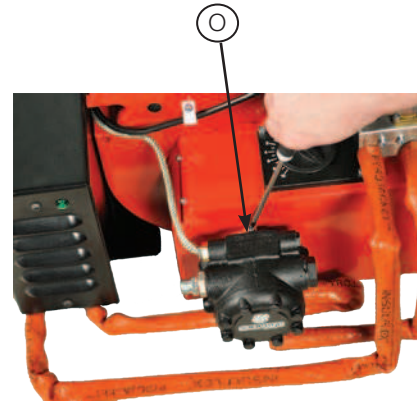
- \* When servicing/replacing components that affect combustion, an analysis and soot test shall be carried out on the installation.



## 5.4 Replacement of oil pump B40 MF / B45-2 MF

### Removal and installation

1. Break the main current and disconnect the Euro plugs from the burner.
2. Undo the oil hoses from the pump.
3. Remove the immersion heater from the pump.
4. Loosen the screws (O) and pull out the oil pump
5. Move the pump coupling to the new pump and set the same distance between (P) the pump and the pump coupling as before in order to avoid pressure on the pump seal.
6. Install the oil pump on the burner and tighten the screws (J). (It is important that the pump shaft splines align correctly in the pump coupling).
7. Fit the immersion heater in the pump.
8. Fit the oil hoses.
9. Fit the Euro plugs and turn on the main current.
10. Bleed the pump, start the burner and set the correct oil pressure.
11. Check combustion. \*



**!** The burner pump has a service life of about 3-5 years if the oil is of a grade that is compliant with standard DIN 51605:2010-10. If oil of different grade is used, and especially if it contains contaminants such as grit, pumice, metal shavings, etc. or is chemically aggressive, the pump may be expected to have a significantly shorter service life.

**!** Use caution when operating the burner, surfaces may be hot.

**!** When servicing oil bearing components, check for oil leakage when the burner is commissioned after servicing.

### Note:

- \* When servicing/replacing components that affect combustion, an analysis and soot test shall be carried out on the installation.

## 5.5 Replacement of preheaters

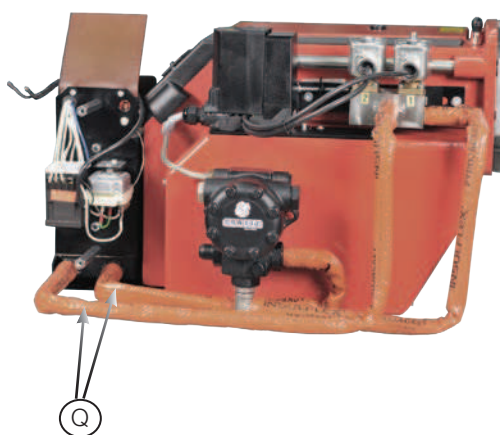
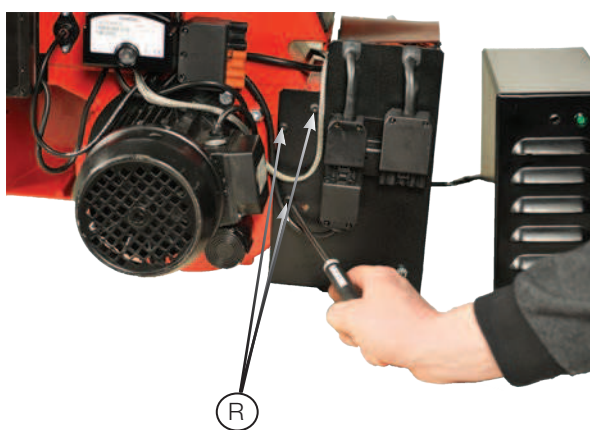
1. Break the main current and disconnect the Euro plugs from the burner.
2. If the preheater is hot, let it cool in order to avoid burning yourself.
3. Remove the connection pipes (Q) from the preheater. The pipes should be released first from its second attachment point in order to make removal easier.
4. Note the thermostat setting.
5. Loosen the screws (R) and remove the preheater from the burner.
6. Install the new preheater on the burner.
7. Attach the connection pipes. Be careful when tightening the connection points to avoid subsequent leakage.
8. Adjust the thermostat to the same temperature as the replaced preheater.
9. Fit the Euro plugs and turn on the main current.
10. Commission the motor only to fill the system with oil. Commissioning the motor can be easily done by using the test equipment, internal test.
11. Start the burner. Check combustion. \*



Use caution when operating the burner, surfaces may be hot.



When servicing oil bearing components, check the oil density when the burner is commissioned after servicing.



### Note:

- \* When servicing/replacing components that affect combustion, an analysis and soot test shall be carried out on the installation.



## 5.6 Replacement of electrical components

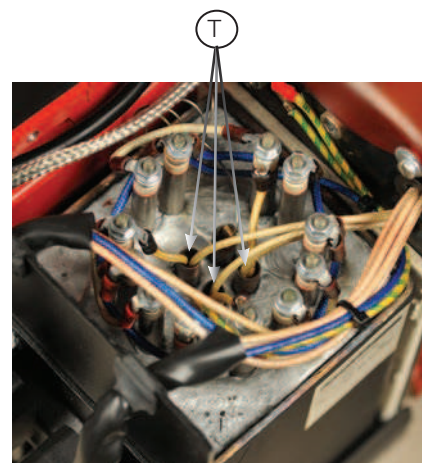
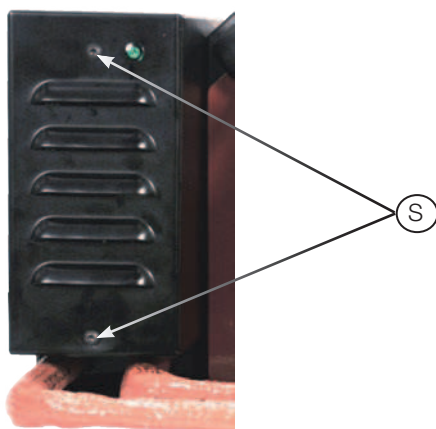
1. Break the main current and disconnect the Euro plugs from the burner.
2. Note the connection of the existing component.
3. Remove the existing component.
4. Install the new component using the same wiring as the existing component or the specified alternative arrangement.
5. Fit the Euro plugs and turn on the main current.
6. Check the function of the new component.
7. Start the burner. Check combustion. \*

## 5.7 Replacement of preheater overheating protector

It is usually apparent that the preheater overheating protector needs replacing when the preheater finds it difficult to maintain a sufficiently high temperature, resulting in problems in retaining stable combustion.

1. Break the main current and disconnect the Euro plugs from the burner.
2. Remove the preheater hood, loosen the screws (K)
3. Measure out which overheating protectors (T) need replacing. (A broken overheating protector has broken conductivity.)
4. Note the overheating protector connection points.
5. Remove the overheating protector.
6. Install and connect the new overheating protector. During installation, the overheating protector shall simply be inserted fully into its sensor tube on the preheater.
7. Fit the preheater hood using the screws (S).
8. Fit the Euro plugs and turn on the main current.
9. Start the burner. Check combustion. \*

**!** Use caution when operating the burner, surfaces may be hot.



### Note:

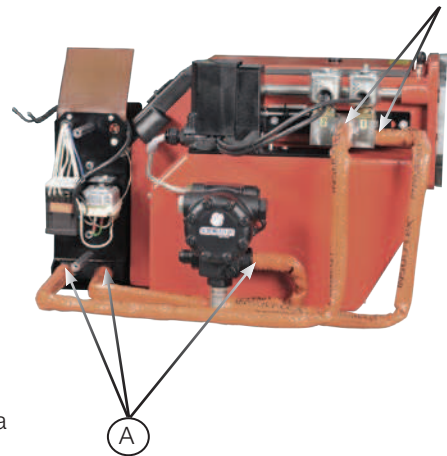
- \* When servicing/replacing components that affect combustion, an analysis and soot test shall be carried out on the installation.

## 5.8 Check oil line seals

Where there are temperature fluctuations in the burner oil system due to the preheater being on the burner, this may result, after a period of operation, in oil leaks occurring in the connection pipe's coupling element.

Therefore, check the tightness of the coupling element (A) after a period of operation after installation of the burner and at each service.

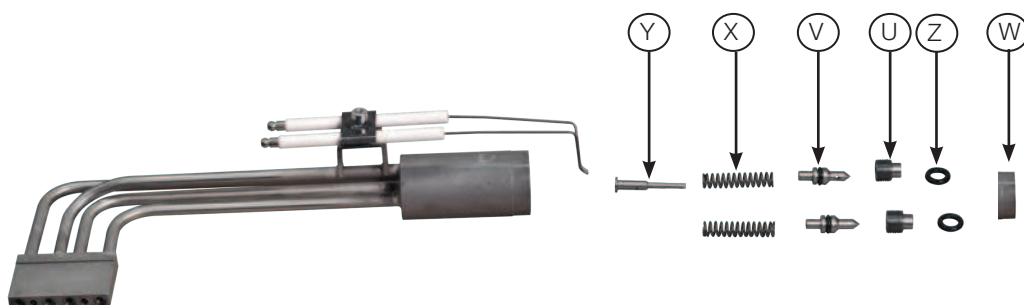
If leakage has occurred, it is usually sufficient to tighten the leaking coupling element.



## 5.9 Check pressure piston nozzle holder seals

As the pressure piston in the nozzle holder (see figure) constitutes a safety component, the seal/function of the pressure piston should be checked on a regular basis.

1. Allow the burner to begin its start-up sequence.
2. Turn off the burner just before it shall release oil through the nozzle.
3. Break the main current and disconnect the Euro plugs from the burner.
4. Open the boiler/burner so that the burner tube/brake plate can be checked.
5. Check whether the burner tube/brake plate is wet with oil.
  - a. If no oil can be seen, there is no leak
  - b. If there is oil, replace the seat (U) and pressure piston (V) and the o-ring (Z). (see 5.10)
6. Restore the burner to operating condition.
7. Fit the Euro plugs and turn on the main current.
8. Start the burner. Check combustion. \*



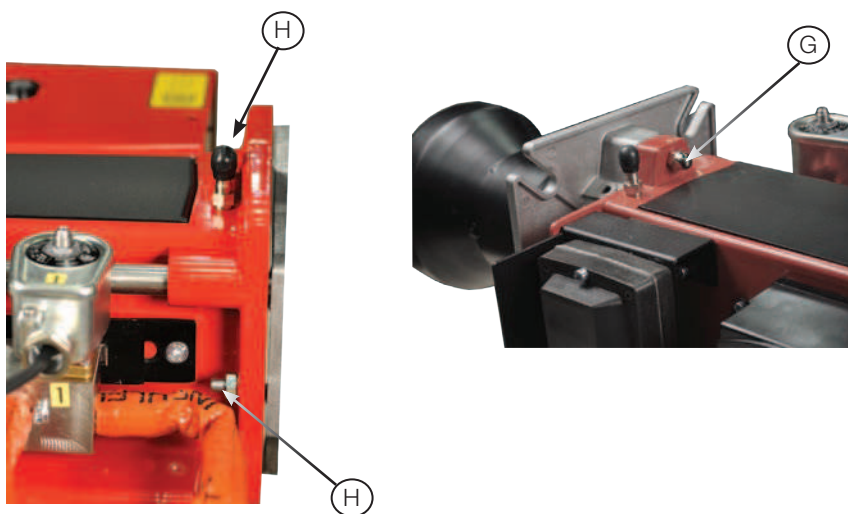
**Note:**

\* When servicing/replacing components that affect combustion, an analysis and soot test shall be carried out on the installation.

## 5.10 Replacement of pressure piston and seat

1. Break the main current and disconnect the Euro plugs from the burner.
2.
  - Loosen the nut (G) and remove the burner from the burner flange, B40 MF.
  - Loosen the nuts (H) and pull the burner body out of the guides, B45- 2 MF.
3. Remove the brake plate from the oil pipe.
4. Remove the front nozzle holder (see figure)
5. Remove the seat(s) (U) and pressure piston(s) (V) (see figure)
6. Install new pressure piston(s) (see figure). Take care to ensure that springs (X) and needles (Y) are correctly fitted. During fitting, make sure that the o-rings are not damaged.
7. Install the seat(s)
8. Install the front nozzle holder (W); exercise caution when installing so that o-ring(s) (Z) is/are not damaged. Ideally, installation should be done using o-rings inserted in the groove on the front nozzle holder in order to minimise the risk of damage to the o-ring.
9. Install the brake plate (See Setting the brake plate). (see technical data)
10. Check the ignition electrodes (See Setting the ignition electrodes). (see technical data)
11.
  - Fit the burner and the burner flange together and secure with the nut (G). Fit the Euro plugs and turn on the main current, B40 MF.
  - Press the burner together and lock using the nuts (H). Fit the Euro plugs and turn on the main current, B45-2 MF.
12. Check combustion \*.

**!** During servicing, all affected o-rings must be replaced.



### Note:

- \* When servicing/replacing components that affect combustion, an analysis and soot test shall be carried out on the installation.

## 5.11 Immersion heaters for extra preheating

If the burner is used with certain types of oils such as high viscosity, or where the oil at a certain temperature changes state from liquid to solid, problems with the operation of the burner may occur. Operational problems can sometimes be overcome by applying extra preheating to the burner's internal oil system on the valve block and nozzle holder.

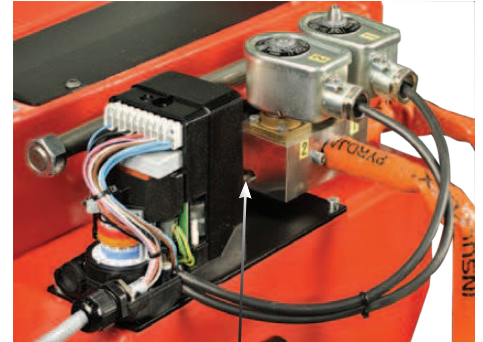
### 5.11.1 Installation of valve block immersion heater

1. Break the main current and disconnect the Euro plugs from the burner.
2. Install the immersion heater in its intended hole (A) on the valve block.
3. Lock the immersion heater in the hole using the supplied nipple
4. Route the cable in the same track as the immersion heater to the pump
5. Plug the immersion heater electrically, see wiring diagram see B40 MF or B45-2 MF
6. Fit the Euro plugs and turn on the main current.
7. Check combustion \*

B40 MF



B45-2 MF

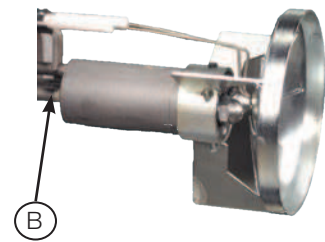


#### Note:

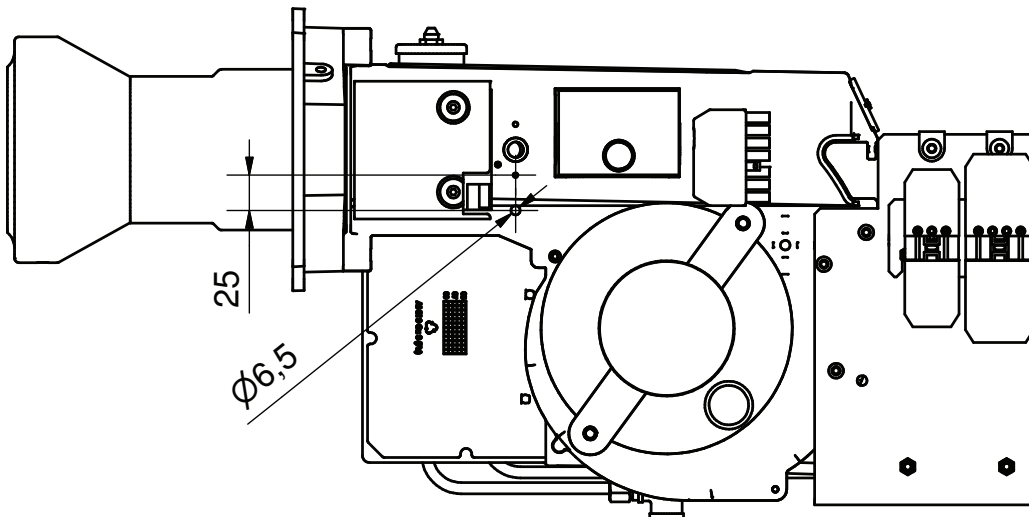
- \* When servicing/replacing components that affect combustion, an analysis and soot test shall be carried out on the installation.

### 5.11.2 Installation of immersion heater, nozzle holder

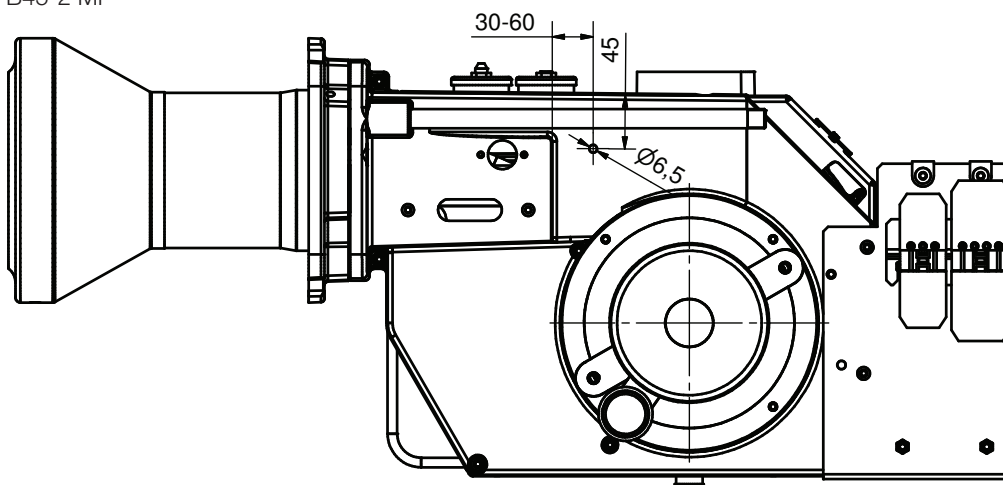
1. Break the main current and disconnect the Euro plugs from the burner.
2. Work the fan housing in accordance with
  - B40 MF, (see figure)
  - B45-2 MF, (see figure)
3. Install the immersion heater in its intended hole (B) on the nozzle holder.
4. Lock the immersion heater in the hole using the supplied nipple
5. Plug the immersion heater electrically, see wiring diagram see B40 MF and B45-2 MF
6. Route the cable through the new hole specifically intended for the purpose and on into the connection point.
7. Fit the Euro plugs and turn on the main current.
8. Check combustion \*



B40 MF

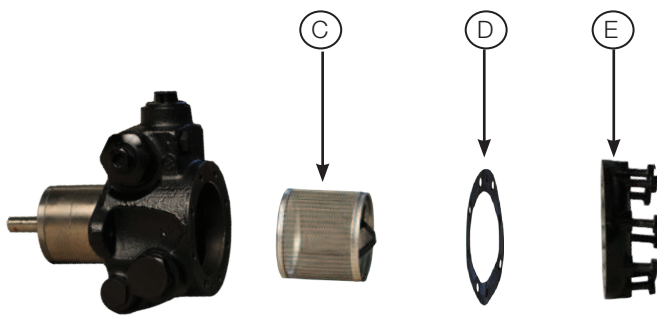


B45-2 MF



### 5.12 Replacement of pump filter

1. Break the main current and disconnect the Euro plugs from the burner.
2. Close the oil valves
3. Unscrew the cover (E) on the pump.
4. Replace the oil filter (C).
5. Replace head gasket (D).
6. Mount the cover on the pump..
7. Open the oil valves.
8. Fit the Euro plugs and turn on the main current.
9. Check combustion \*



### 5.13 Check/service oil pre-filter

In order to ensure that oil-bearing components enjoy satisfactory operation, avoid breakdowns and have a good service life, pre-filters shall be checked/ serviced at service intervals adapted according to the grade of oil used.

1. Break the main current and disconnect the Euro plugs from the burner.
2. Close the oil valves
3. Remove the filter.
4. Clean/replace the filter.
5. Install the filter.
6. Open the oil valves.
7. Fit the Euro plugs and turn on the main current.
8. Check combustion \*

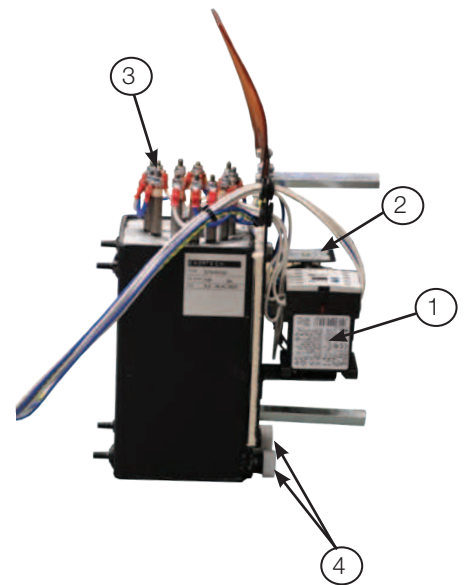
Where a self-cleaning filter is used, there is the option to clean the filter surfaces during operation. Cleaning is done by turning a knob on the filter that scrapes the surface of the filter. Where a self-cleaning filter is installed, the reliability of the burner may be increased without having to perform a complete service of the filter.

## 6. Preheater

### 6.1 Technical data preheater

Connected output	3x2 kW
Voltage	3N ~ 400 V
Current	3x10 A
Resistance	3x22.5 Ω
Oil flow at 80 °C	100 kg/h
Overheating protector	240°C cut-off temperature

1. Contactor
2. Operating thermostat
3. Immersion heaters
4. Connection points oil
5. Overheat protection



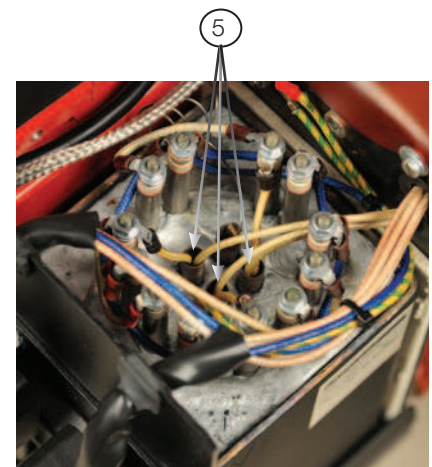
The burner is equipped with a preheater to allow the combustion of oil with a higher viscosity.

The preheater is provided with an operating thermostat that has two cut-off temperatures. The lower of the cut-off temperatures is preset to around 30 °C lower than the second cut-off temperature, which is adjustable.

The adjustable cut-off temperature is the desired temperature of the oil in order to ensure good operation of the burner.

The lower cut-off temperature is used as a condition to enable the burner to start its motor and to start pre-ventilation and oil priming. This feature enables the burner to stop during pre-ventilation/flushing without trying to establish a flame. This sequence occurs because the temperature of the preheater has fallen below the cut-off temperature. When this occurs, the burner stops and waits for the temperature in the preheater to be sufficiently high again.

The lower cut-off temperature also has the function that, if the temperature in the preheater drops below the lower cut-off temperature when the burner is in its operational phase, the burner stops. This is a safety feature to prevent poor combustion when the preheater, for any reason, is unable to keep the oil at a sufficiently high temperature. If the burner stops during operation because the temperature in the preheater is too low, preheater function should be checked. Check, for example, safety thermostats, power to the immersion heater(s), function immersion heater(s), etc.





## 6.2 Adjustment of preheater operating thermostat

The check of which temperature is required to ensure proper ignition and stable operation is done by setting the preheater thermostat to its maximum temperature.

If good start is obtained, the temperature is lowered gradually until an unacceptable start or operation is no longer available. During this procedure, it is of great importance that the boiler itself is not hot. Instead, the setting procedure must be carried out with a boiler that is at a temperature that can be regarded as a cold start temperature.

Once the breakpoint temperature for when good start/operation can no longer be ensured has been found, the preheater's operating thermostat must be set to a temperature with a certain margin against the breakpoint temperature. This is done to avoid the burner having a bad start/operation when environmental factors change over time.

New oil delivery and/or substantial modification of environmental factors may necessitate an adjustment to be made to the preheater thermostat.

### 6.2.1 Basic settings, preheater

Fuel	Temperature °C
RME	60
Bio oils	130-160
Fossil oils with viscosity 120 mm <sup>2</sup> /s	145
Fossil oils with viscosity 90 mm <sup>2</sup> /s	115
Fossil oils with viscosity 60 mm <sup>2</sup> /s	85
Fossil oils with viscosity 20 mm <sup>2</sup> /s	60
Fossil oils with viscosity 6 mm <sup>2</sup> /s	0

For oils not specified in the table, the temperature of the preheater should be set so that a viscosity of about 5-10 mm<sup>2</sup>/s is after preheating. In some instances, a different temperature than that indicated in the above table may be required due to the characteristics of the oil, e.g. ignition propensity.



When using a new oil grade, check combustion and adjust the burner settings in order to achieve good combustion.



## 7. PUMP INSTRUCTION

### PUMP E4NC-1069 7P

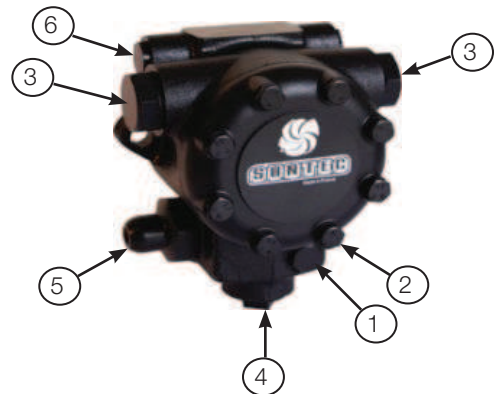
#### 7.1 Technical data

* Viscosity range:	3.0 to 75.0 mm <sup>2</sup> /s
Pressure range:	14-30 bar
Oil temperature:	0 to +130°C
Nozzle capacity at viscosity 20 mm <sup>2</sup> /s	170-185 l/h
Gear capacity:	190 l/h
Max. pressure on the suction and return side:	3.5 bar

- \* Oils of higher viscosity may be used if it is pumped to the burner oil pump or if the oil viscosity is lowered to below 75 mm<sup>2</sup>/s by it being kept hot.

#### 7.2 Components

1. Manometer connection G 1/8"
2. Connection for nozzle G 1/4"
3. Suction line G 1/2"
4. Return line G 1/2"
5. Pressure regulation with screwdriver
6. Holes Immersion heaters
7. Filter
8. Head gasket
9. Cover



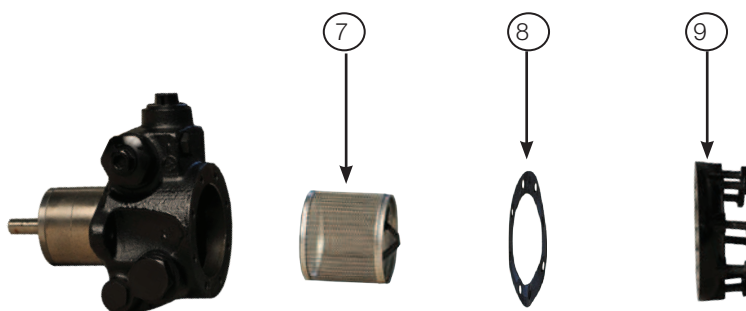
#### 7.3 Oil connection

The pump should be connected using a two-pipe system when it is operated using oils with higher viscosity. A one-pipe system is not recommended.

#### 7.4 Changing the filter

Change the oil pump oil filter in accordance with the following.

- Close the oil valves
- Unscrew the cover on the pump.
- Replace the oil filter.
- Replace head gasket.
- Mount the cover on the pump.
- Open the oil valves.

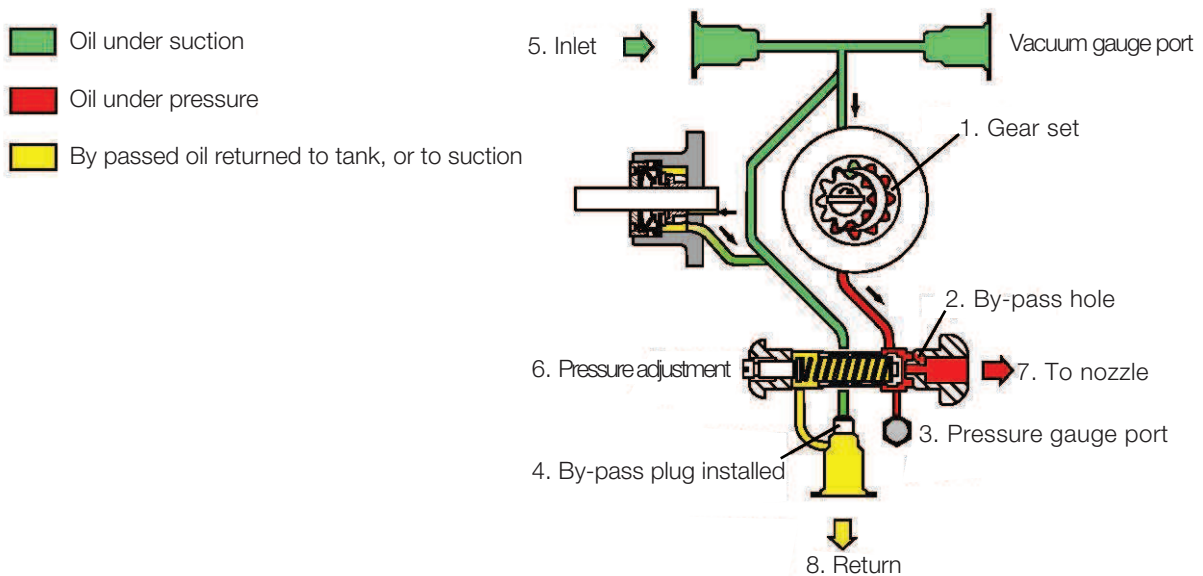


## 7.5 Function

The pump gear (1) draws oil through the pump suction port (5) from the tank through the filter in the pump and transports the oil to the valve (6) which controls the oil pressure to the nozzle. Oil that does not go through the outlet (7) to the nozzle will be bypassed (2) through the valve (6) back to the return port (8) on the pump.

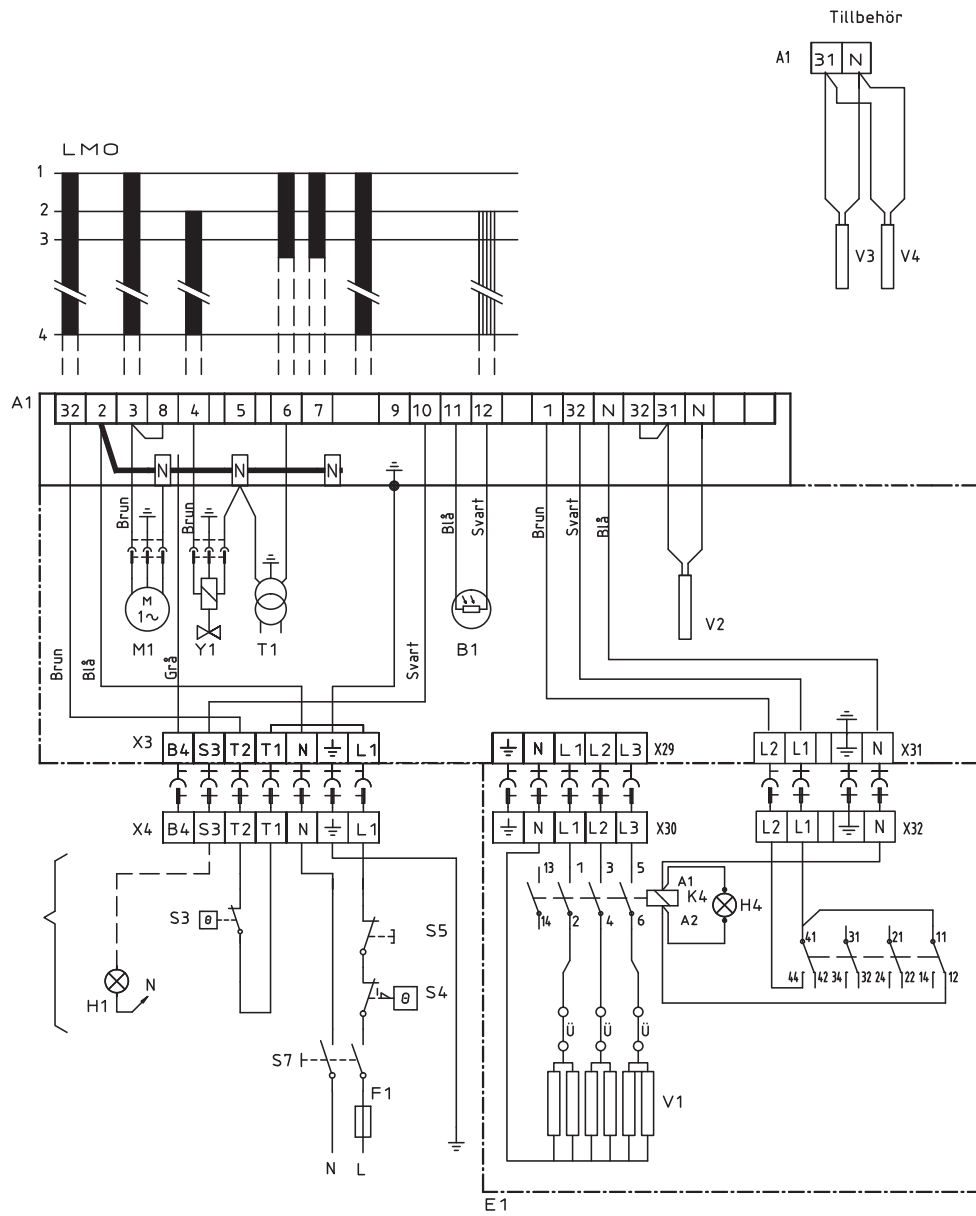
## 7.6 Preheating pump

The pump has the facility to fit an immersion heater to providing preheating. The pump should be equipped with an immersion heater in order to facilitate cold starting and operation where oils of a higher viscosity are used. The burner is of a standard design and equipped with an immersion heater to preheat the pump.

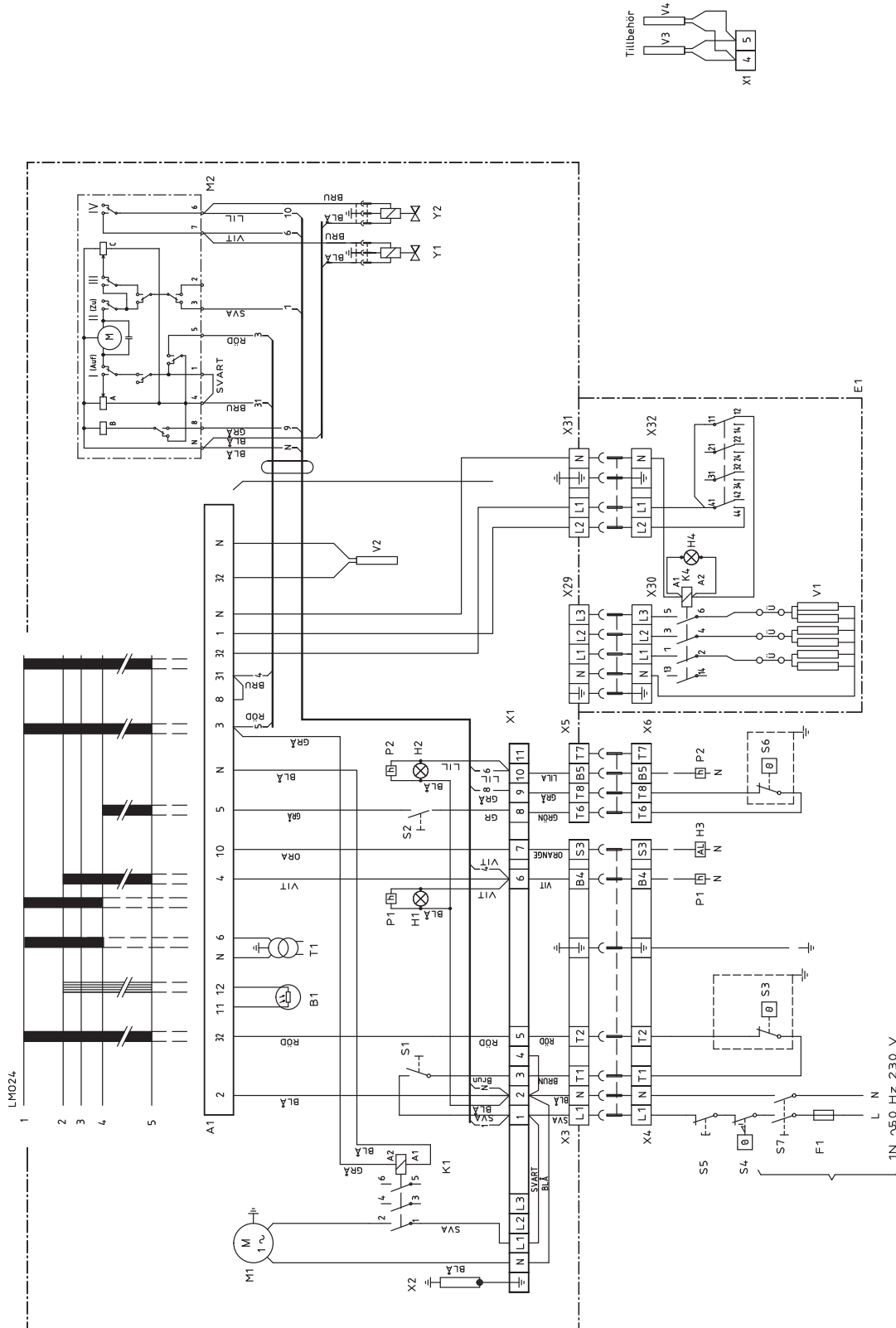


# 8. ELECTRICAL EQUIPMENT

## 8.1 B40 MF wiring diagram LMO24.255 ...



## 8.2 B45-2 MF wiring diagram LMO24.255...



### 8.3 Component list LMO24.255 ...

A1 Burner control	S6 Control thermostat, stage 2
B1 Ionization electrode	S7 Main switch
E1 Preheater	T1 Ignition transformer
F1 Operating fuse	Y1 Gas solenoid valve 1
H1 Lamp, low capacity	Y2 Gas solenoid valve 2
H2 Lamp, high capacity	X1 Connection terminal board
H3 Alarm signal 230 V	X3 Plug-in contact, burner
H4 indication preheater	X4 Plug-in contact, boiler
K1 Motor contactor with thermal overload protector	X5 Plug-in contact, stage 2, burner
K4 Directional relay	X6 Plug-in contact, stage 2, boiler
M1 Burner motor	X29 3-phase supply heater, burner
M2 Damper Motor	X30 3-phase supply preheater, boiler
P1 Time meter, total operating time	X31 Preheater control, burner
P2 Time meter, high capacity, total operating time	X32 Preheater control, boiler
S1 Operating switch	V1 Element 1
S2 Operating switch, stage 2	V2 Element 2
S3 Control thermostat	V3 Element 3
S4 Temperature limiter	V4 Element 4
S5 Micro switch for hinged door	

### 8.4 Function LMO24.255 ...

#### 1 **Operations switch ON, twin thermostat ON**

Burner motor starts, ignition spark is formed and prevention continues until the prevention time is over and solenoid valve 1 operates (2).

#### 2 **Solenoid valve 1 operates**

Oil mist is formed and ignited. Photoresistance indicates flame.

#### 3 **Safety time ends**

- a If the flame goes out before this time limit is passed, the machine switches to blocking mode.
- b If the flame, for whatever reason, disappears after this time limit has passed, the burner will make a new attempt.

#### 4 **High load thermostat ON (B45-2 MF)**

The burner is in operating mode and can switch between high and low load

#### 4-5 **Operational status**

If burner operation is interrupted by the main switch or thermostat, a new start will take place once conditions as specified in paragraph 1 are met.

#### **The machine blocks**

Red light in the machine is on. The burner is restarted by pressing the reset button.

## 8.5 Technical data LMO24.255...

	<b>LMO24</b>
Pre-ignition time:	25 sec
Pre-ventilation time	25 sec
Reconnection after tripping	<1 sec
Ambient temperature	from - 20 to + 60 °C
Min. current at flame:	45 $\mu$ A
Max. output at dark, start:	5.5 $\mu$ A
Enclosure type	IP 40
Safety time	5 sec

### **Check of photo current**

Photo current is measured using a DC ampmeter (torsion coil instrument) connected in series with the photocell.

## 8.6 Colour codes

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

## 8.7 Fault codes

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

## 9. FAULT LOCATION

### 9.1 Burner will not start

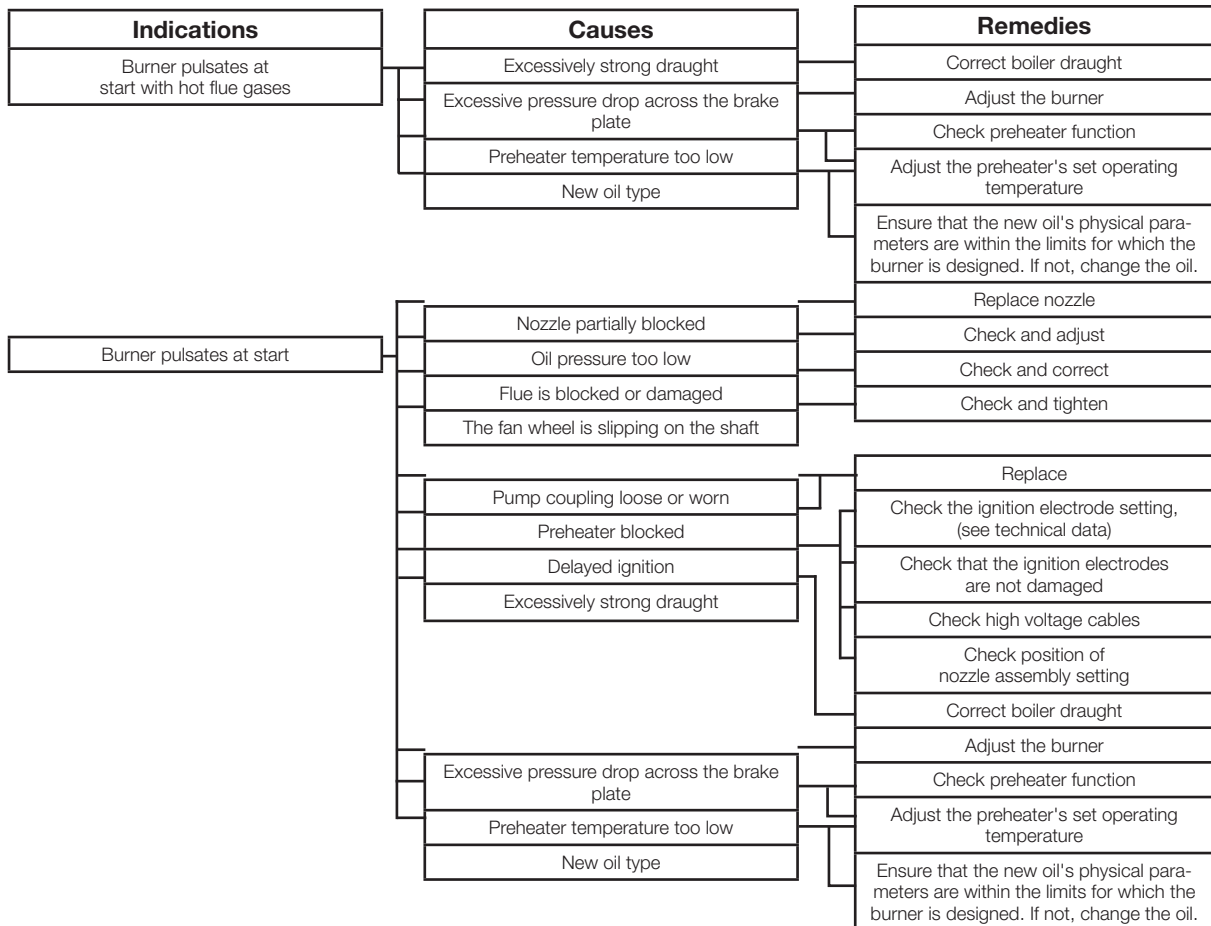
Indications	Causes	Remedies
Motor starts	The flame is unstable	Adjust the air damper
Preventilation	Excess air	
Flame formed	Low oil pressure	Check the oil pressure
	Burner lock-out	Incorrect setting of combustion assembly
Motor starts	Flame monitoring system does not see light	Check that the flame detection system is clean and looks bright
Burner blows	Flame monitoring system error	Check using a new photocell
No flame formation	Faulty relay box	Check using a new relay box (NB It is recommended that the photocell is replaced if the relay box is changed)
Burner trips	No oil	Check oil supply to the burner and that there are no air bubbles in the pump
Motor does not start	False light	Check solenoid valve function
	No spark	Check that flame monitor does not see ambient light
Motor does not start	Preheater does not get up to temperature.	Check the high voltage cables and ignition electrodes
		Check preheater function

### 9.2 The burner does not start after normal operation

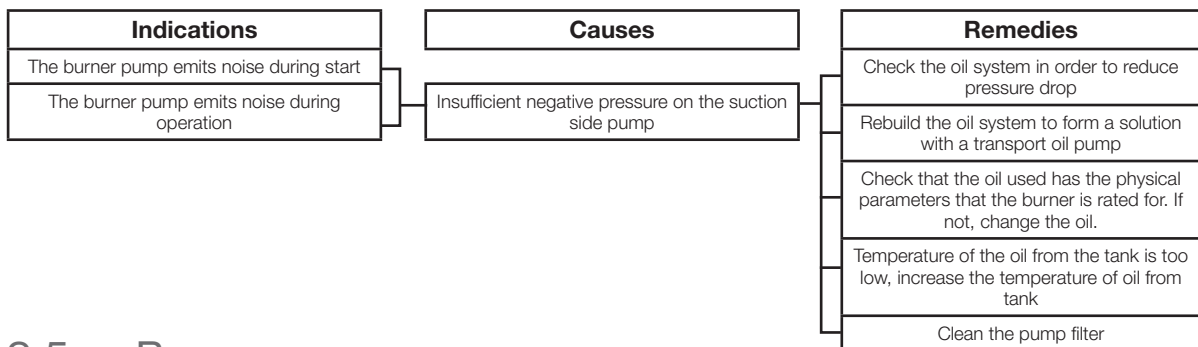
Indications	Causes	Remedies
Burner does not start	Fuse has blown	Check and replace fuse if necessary. Identify reason for the fault
Preventilation	Boiler thermostat has not been reset	Adjust the thermostat
	Preheater does not get up to temperature.	Check preheater function
Preventilation	The overheating protector has engaged	Reset the overheating protector. Identify the reason why it has activated. Correct
	Preheater defective	Check by replacing
Burner lock-out	Relay box or flame monitor defective	Check that the tank, oil lines, solenoid valve, pump and nozzle are in good condition
	No oil supply	Adjust the burner
Burner lock-out	Excessive pressure drop across the brake plate	Correct boiler draught
	Excessive draught prevents the flame from forming	Check ignition transformer. Check ignition electrode settings and ceramic
Burner lock-out	No spark	
	Preheater temperature too low	Check preheater function
Burner lock-out	New oil type	Adjust the preheater's set operating temperature
		Ensure that the new oil's physical parameters are within the limits for which the burner is designed. If not, change the oil.



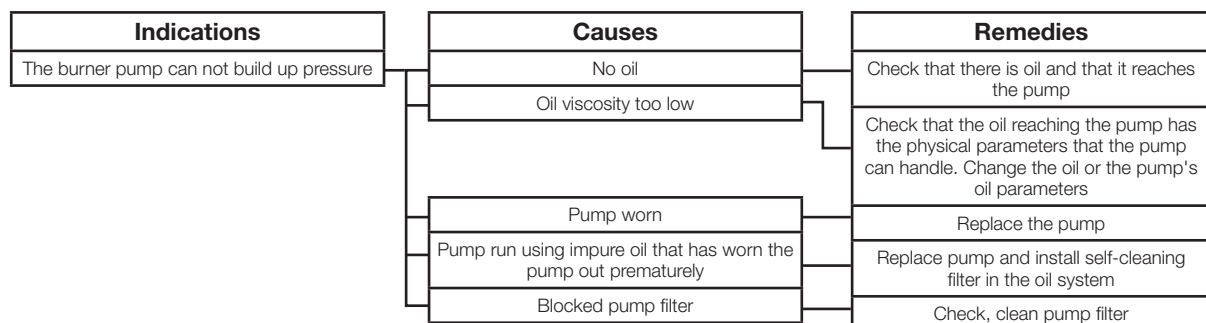
### 9.3 Delayed ignition



### 9.4 Noise in pump



### 9.5 Pump pressure



# 10. DECLARATION OF CONFIRMITY

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
01111110535004	B 1	02119815004	B 50, B 60, B 70, B 80
02071110535005	B 2	040588622001	B 55
02119815001	ST 97, ST 108, ST 120, ST 133, ST 146	040588622002	B 65
02119815002	B 9, B 10, B 11	13129815007	B 45 MF, B 45-2 MF

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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.

Enertech AB erklårt in eigener Verantwortung, dass obenstehende Produkte mit folgenden Normen oder anderen normativen Dokumenten und anwendbare Teile in EU-Direktiven in Übereinstimmung stehen

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

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/  
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SS-EN ISO 9001:2008

Ljungby, Sweden, 120822 (22/08/12)

**ENERTECH AB Bentone Division**

Box 309

SE-341 26 Ljungby Sweden



Håkan Lennartsson



# 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.

## 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.

Installed by:

.....

Tel: .....









