Installation- and maintenance instruction

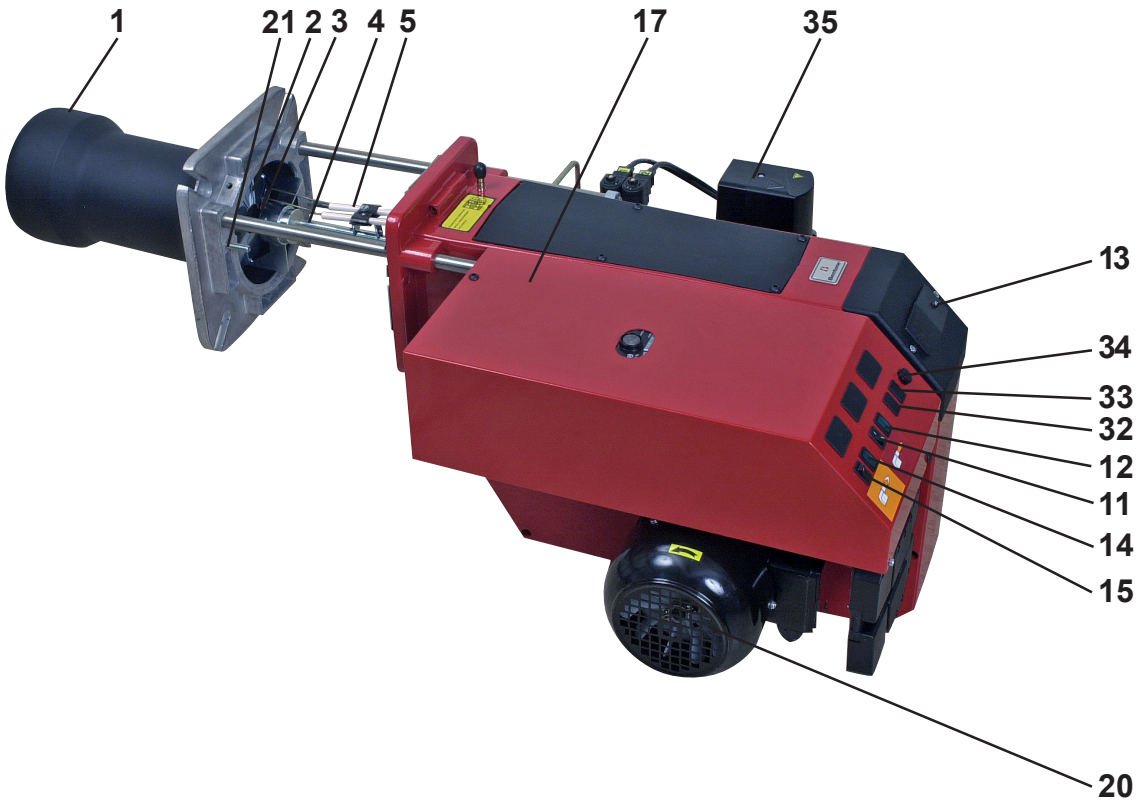
B55, B65

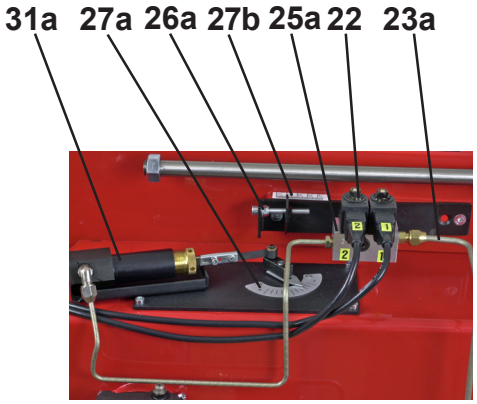
Model 2H, 2, 2R, 3R

Bentone®
Enertech Group

Contents

Description B55/B65

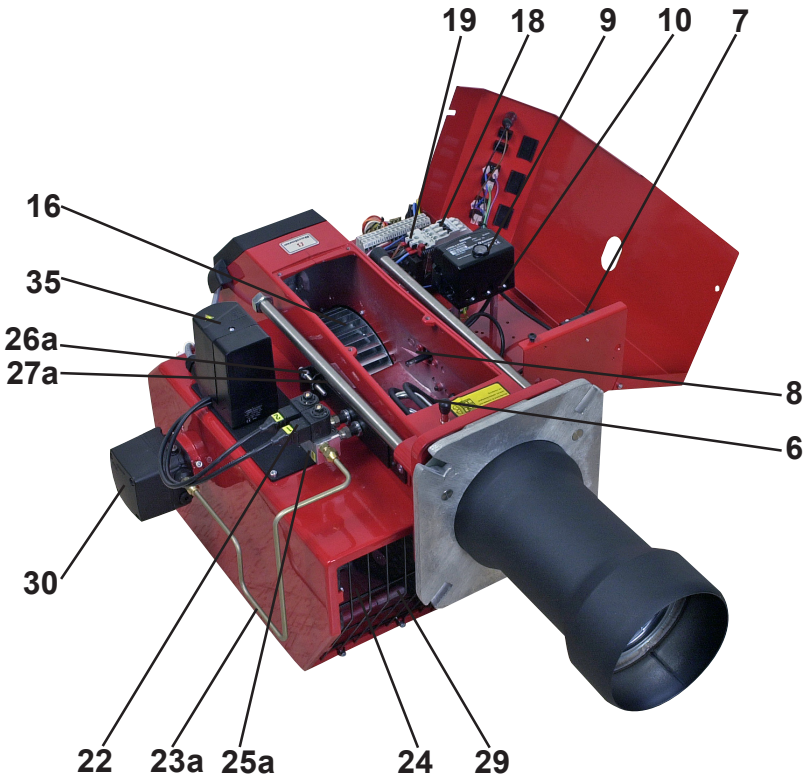


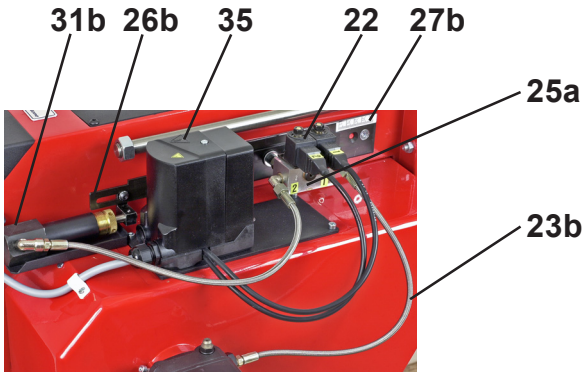


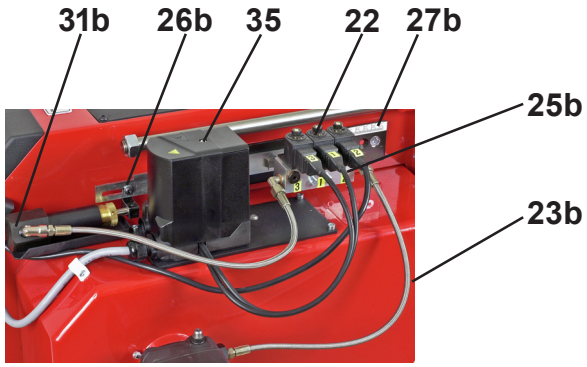
Components

1. Flame cone
2. Brake plate
3. Nozzle
4. Nozzle assembly
5. Ignition electrodes
11. Switch I-II
12. Indicating lamp Stage 2
13. Cover, inspection glass
14. Indicating lamp Stage 1
15. Switch 0-I
17. Electric panel
20. Motor
21. Locking device, flange
22. Solenoid valves
23a. Connecting pipe
25a. Solenoid valve bloc Stage 2
26a. Nozzle assembly adjustment fixed
27a. Scale, air regulation
27b. Scale, nozzle assembly
31a. Adjustment device, air damper
32. Switch II-III
33. Indicating lamp Stage 3
34. Fuse
35. Damper motor

Description B55/B65







Components

6. Ignition cables
7. Ignition transformer
8. Photocell
9. Control box
10. Front plate, relay base
16. Fan wheel
18. Contactor
19. Thermal overload protection
22. Solenoid valve
23a. Connecting pipe
23b. Hydraulic hose
24. Air intake
25a. Solenoid valve bloc Stage 2
25b. Solenoid valve bloc Stage 3
26a. Nozzle assembly adjustment fixed
26b. Nozzle assembly adjustment hydrauli
27a. Scale, air regulation
27b. Scale, Nozzle assembly
29. Air damper
30. Pump
31b. Adjustment device, Nozzle assembly
35. Damper motor

01. GENERAL

Manual

- The contents of this manual are to be observed by all who work for any reason on the unit and its appertaining system parts.
- This manual is intended especially for authorised personnel.
- This manual is to be regarded as part of the burner and shall always be available near the place of installation.

Safety directions

The electrical installation shall be made according to valid regulations for heavy current and in a professional way, so that the risk of leaking oil, fire or personal injury is avoided.

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.

Condensation in chimney

A modern burner works with less air surplus and often with a smaller nozzle than older models. This improves the efficiency but increases also the risk of condensation in the chimney. The risk is greater if the cross sectional area of the chimney flue is too big. Temperature of the flue gases should be higher than 60°C measured 0.5 m from the top of the chimney.

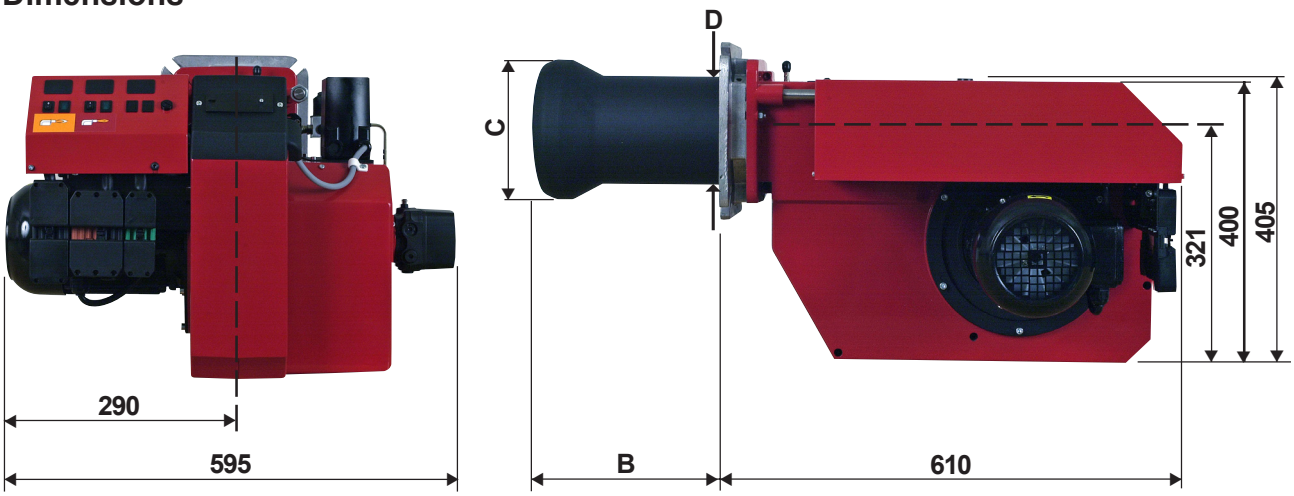
Setting the burner

A flue-gas analysis and measuring of the temperature should be done to facilitate a correct setting. There is otherwise a risk of soot, poor efficiency or condensation in the chimney.

02. TECHNICAL DATA

Type designation B55-2H/B55-2/B55-2R/B55-3R/B65-2H/B65-2/B65-2R/B65-3R

Dimensions



	Length of burner tube B55	Flange Measure B B55	Burner tube Measure C B55	Burner tube Measure D B55	Length of burner tube B65	Flange Measure B B65	Burner tube Measure C B65	Burner tube Measure D B65
Standard 1	303	273	160	155	288	258	200	155
Standard 2	403	373	160	155	388	358	200	155
Standard 3	503	473	160	155	488	458	200	155

Output range and nozzles recommended

	Oil capacity kg/h	Output kW	Output Mcal/h	Recommended nozzle Angle	Recommended nozzle Danfoss	Recommended Pump pressure
B55-2H, B55-2, B55-2R	14-67	166-795	143-685	45°-60°	S, B	14 bar
B55-3R	14-64	166-759	143-654	45°-60°	S, B	14 bar
B65-2H, B65-2, B65-2R	24-99	285-1174	246-1012	45°-60°	S, B	14 bar
B65-3R	24-99	285-1174	246-1012	45°-60°	S, B	14 bar

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

Recommended nozzle and pressure

Because of the different boiler types, combustion chamber geometries and combustion chamber loads that exist, it is not possible to specify a given spray angle or spray pattern.It should be noted that the spray angle and spray pattern will vary depending on the pump pressure.

Nozzle

45°S Danfoss
45°B Danfoss
60°S Danfoss
60°B Danfoss

Pump pressure

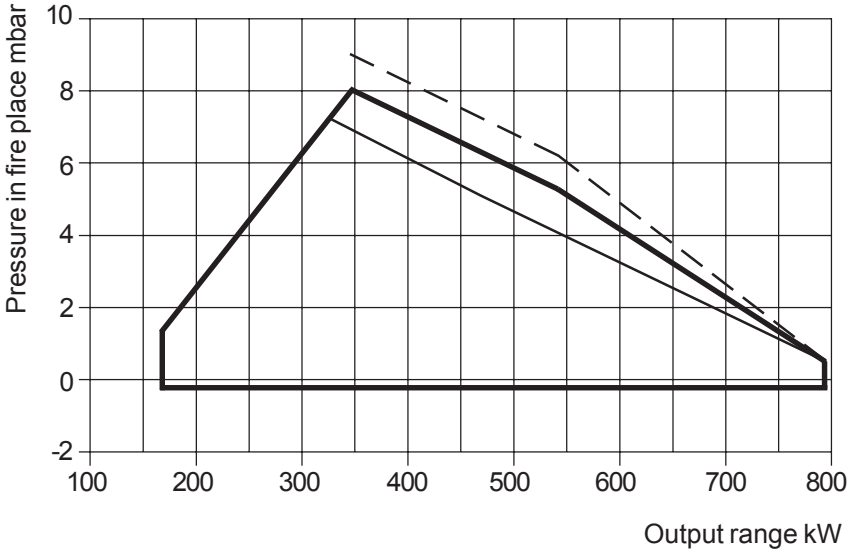
14 bar (12 - 16 bar)
On burners equipped with hydraulic air control or optimization the oil pressure should not be less than 14 bar.

02. TECHNICAL DATA

Working field

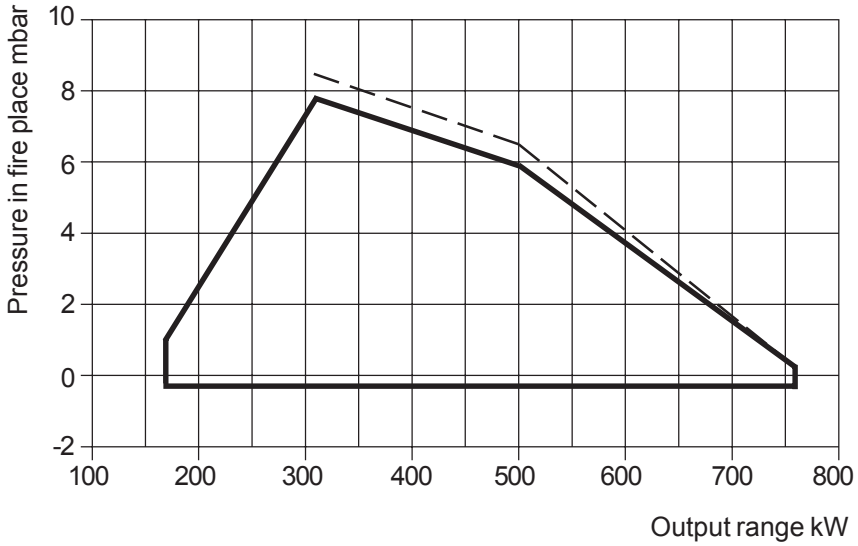
B55-2
14-67 kg/h
166-795 kW

B55-2R
B55-2H/B55-2
Measured (test)



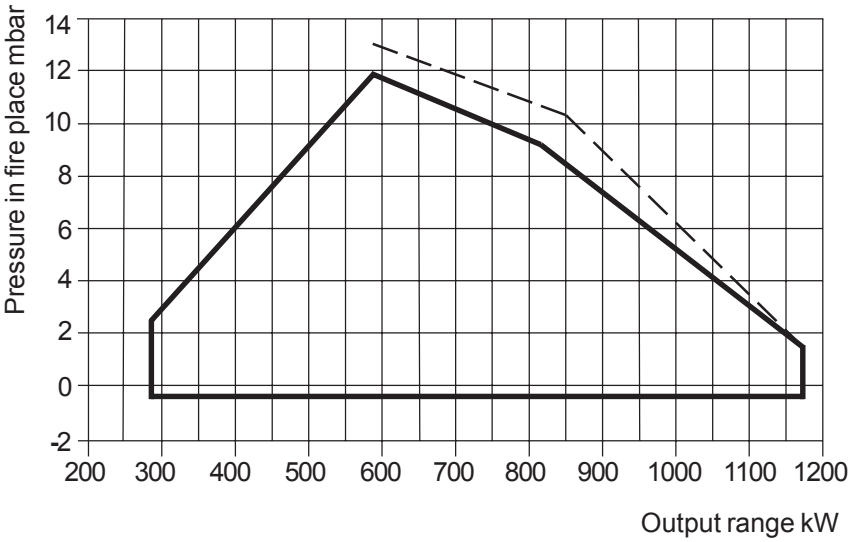
B55-3R
14-64 kg/h
166-759 kW

B55-3R
Measured (test)



B65
24-99 kg/h
285-1174 kW

B65
Measured (test)



Unbroken line is the approved working field as per EN267.

02. TECHNICAL DATA

Nozzle table

Pump pressure bar

Gph	10			11			12			13		
	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h
2,75	10,24	121	104	10,73	127	109	11,21	133	114	11,67	138	119
3,00	11,16	132	114	11,71	139	119	12,23	145	125	12,73	151	130
3,50	13,03	154	133	13,66	162	139	14,27	169	146	14,85	176	151
4,00	14,89	176	152	15,62	185	159	16,31	193	166	16,97	201	173
4,50	16,75	199	171	17,57	208	179	18,35	218	187	19,10	226	195
5,00	18,62	220	190	19,52	231	199	20,39	242	208	21,22	252	216
5,50	20,48	243	209	21,47	255	219	22,43	266	229	23,34	277	238
6,00	22,34	265	228	23,42	278	239	24,47	290	250	25,46	302	260
6,50	24,20	287	247	25,37	301	259	26,51	314	270	27,58	327	281
7,00	26,06	309	266	27,33	324	279	28,55	339	291	29,70	352	303
7,50	27,92	331	285	29,28	347	299	30,59	363	312	31,83	377	325
8,00	29,79	353	304	31,23	370	318	32,63	387	333	33,95	403	346
8,50	31,65	375	323	33,18	393	338	34,66	411	353	36,07	428	368
9,00	33,59	398	343	35,14	417	358	63,71	435	374	38,19	453	389
9,50	35,37	419	361	37,09	440	378	38,74	549	395	40,31	478	411
10,00	37,23	441	380	39,04	463	398	40,78	484	416	42,44	503	433
11,00	40,96	486	418	42,94	509	438	44,86	532	457	46,68	554	476
12,00	44,68	530	456	46,85	556	478	48,94	580	499	50,92	604	519
14,00	52,12	618	531	54,65	648	557	57,10	677	582	59,41	705	606
16,00	59,57	706	607	62,46	741	637	65,26	774	666	67,90	805	692
18,00	67,02	795	683	70,27	833	717	73,41	871	749	76,39	906	779
20,00	74,47	883	759	78,08	926	796	81,57	967	832	84,87	1007	865

Pump pressure bar

Gph	14			15			16			17		
	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h
2,75	12,11	144	123	12,53	149	128	12,95	154	132	13,35	158	136
3,00	13,21	157	135	13,67	162	139	14,13	168	144	14,56	173	148
3,50	15,42	183	157	15,95	189	163	16,49	196	168	16,99	201	173
4,00	17,62	209	180	18,23	216	186	18,84	223	192	19,42	230	198
4,50	19,82	235	202	20,51	243	209	21,20	251	216	21,84	259	223
5,00	22,03	261	225	22,79	270	232	23,55	279	240	24,27	288	247
5,50	24,23	287	247	25,07	297	256	25,91	307	264	26,70	317	272
6,00	26,43	313	270	27,49	326	280	28,27	335	288	29,13	345	297
6,50	28,63	340	292	29,63	351	302	30,62	363	312	31,55	374	322
7,00	30,84	366	314	31,91	378	325	32,98	391	336	33,98	403	347
7,50	33,04	392	337	34,19	405	349	35,33	419	360	36,41	432	371
8,00	35,25	418	359	36,47	433	372	37,69	447	384	38,80	460	396
8,50	37,45	444	382	38,74	459	395	40,04	475	408	41,26	489	421
9,00	39,65	470	404	41,02	486	418	42,40	503	432	43,69	518	446
9,50	41,85	496	427	43,30	514	442	44,75	531	456	46,11	547	470
10,00	44,06	523	449	45,58	541	465	47,11	559	480	47,11	559	480
11,00	48,46	575	494	50,14	595	511	51,82	615	528	53,40	633	545
12,00	52,87	627	539	54,70	648	558	56,53	670	576	58,25	691	594
14,00	62,68	732	629	63,81	757	651	65,95	778	669	67,96	806	693
16,00	70,49	836	719	72,93	865	744	75,38	894	769	77,67	921	792
18,00	79,30	940	809	82,05	973	837	84,80	1006	865	87,38	1036	891
20,00	88,11	1045	899	91,17	1081	930	94,22	1117	961	97,09	1151	990

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

03. INSTALLATION

Acceptance inspection

Ensure that everything is delivered and that there is no transport damage. If there is anything wrong with the delivery, please report it to the supplier. Any transport damage should be reported to the forwarding company.

Preparations for installation

Ensure that the size and capacity range of the burner are suitable for the boiler. Power data on the data plate refer to the minimum and maximum power of the burner.

Distribution of oil

To ensure satisfactory operation it is essential that the oil distribution system is correct.
Observe the following:

- See Pump instructions for choice of tube diameter, tube length and height difference.
- Fix the tubing with a minimum number of screw fittings.
- Fix the tubes so that the oil hoses are not subjected to tensile stress or sharp bending when swinging out the burner or removing it for service.
- Fit the oil filter 1½" so that the filter cartridge can easily be replaced.

Electrical connections

The main power switch must be turned off before beginning electrical installation. If the boiler has a 7-pin and a 4-pin Eurostecker connector these will often connect straight to the burner. If not, use the connectors supplied. A 5-pin connector supplies the burner motor with a separate 3-phase supply. See connection under the Electrical equipment heading.

If another electrical connection is used than the one recommended by Bentone, there might be a risk of material damage or personal injury.

Choice of nozzle

See under Technical Data: Recommended nozzle and table of nozzles.

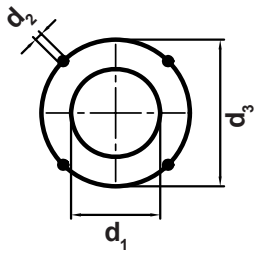
Setting of the brake plate and air flow

Basic burner settings can be made before commissioning as shown in the diagram. See Basic settings. Note that these are just basic settings and must be correctly adjusted when the burner has been started. Flue gas analysis and soot measurement should be carried out at this time.

03. INSTALLATION

Burner installation

Hole pattern

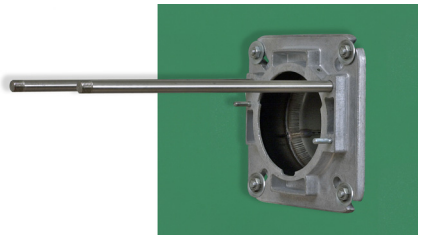


Check that the hole pattern on the boiler matches the pattern on the burner flange.

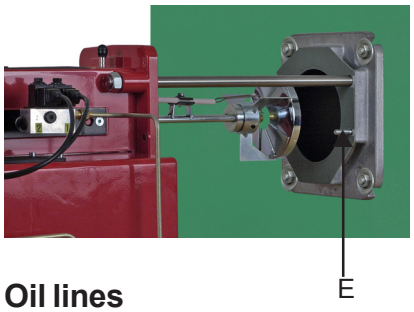
Flame head	d_1	d_2	d_3
B55	(160)* 165	M12	(226)* 254-295
B65	(160)* 210	M12	(226)* 254-295

* The hole pattern can be reduced if the burner pipe is fitted from the front and the heels in the flange are ground off.

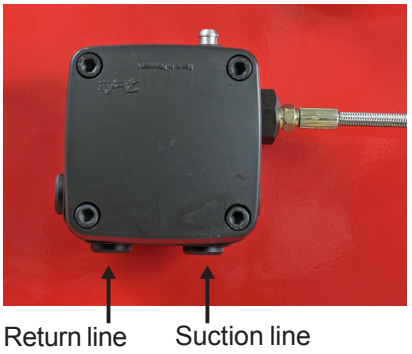
Installing the burner



1. Separate the burner body and the flange.
2. Fit the flange and gasket on the boiler.
3. Insulate between the burner pipe and boiler door to reduce heat radiation.
4. Slide the burner body on to the guides.
5. Pull the brake plate off the oil pipe.
6. Fit the chosen nozzles (see Technical data).
7. Fit the brake plate and check the ignition electrodes (see Servicing the burner).
8. Slide the burner together and secure it with the nuts (E).

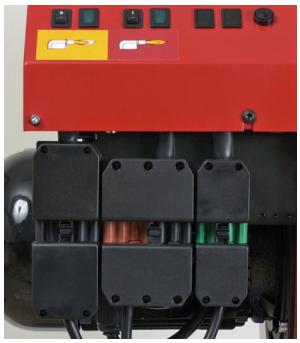


Oil lines



1. Check the size of the oil line (see Pump instructions).
2. An oil filer (1/2") must be fitted to the oil line. If an air trap is fitted then the oil filter should be fitted to the oil line before the air trap.
3. With a single pipe system the return plug must be removed (see Pump instructions).
4. When fitting oil hoses, check that the supply and return hoses are connected to the right couplings on the oil pump. The hoses must be positioned so that they are not subjected to tensile stress or sharp bending.
5. Bleed the oil system. The oil pump will be damaged if it is run dry.
6. The vacuum in the suction line should not exceed 0.3 bar during commissioning.

Electrical connections



1. Turn off the main power switch.
2. Connect the Eurostecker connectors (see Electrical equipment).
3. Check that the burner control switch (S1) is off.
4. Fit the Eurostecker connectors on the burner.
5. Turn on the main power switch.
6. Check the direction of rotation of the burner motor.

04. BASIC SETTINGS

Typical basic settings for B65-2H/B65-2/B65-2R/B65-3R

Choice of nozzle
B65-2H/B65-2/B65-2R

Burner output= 770 kW
Nozzle Stage 1 : 770 x 0,6 = 460 kW 460 / 11,86 = 38,8 kg/h
Nozzle Stage 2 : 770 x 0,4 = 310 kW 310 / 11,86 = 26,1 kg/h

According to the table of nozzles this gives the following nozzles:
Stage 1 : 8,50 Gph
Stage 2 : 6,00 Gph
Pump pressure : 14 bar

Basic settings
B65-2H

Nozzle assembly	Stage 2 =	15
Air adjustment	Stage 1 =	25°
	Stage 2 =	65°

Each graduation on the scale corresponds to 10°.

Basic settings
B65-2

Power outputs and nozzle choice from example.

Nozzle assembly	Stage 2	=	15
Damper motor	Closed	= 0°	Blue cam
	Stage 1	= 25°	Orange cam
	MV 2	= 50°	Black cam
	Stage 2	= 65°	Red cam

The black cam for Stage 2 (MV 2) must be placed between the cams for Stage 1 and Stage 2. The positions of MV 2 are determined by the boiler characteristics when switching between stages, but for a basic setting the black cam should be placed in the middle.

Basic settings
B65-2R

Power outputs and nozzle choice from example.

Nozzle assembly	Stage 1	=	0
	Stage 2	= 15	
Damper motor	Closed	= 0°	Blue cam
	Stage 1	= 25°	Orange cam
	MV 2	= 50°	Black cam
	Stage 2	= 65°	Red cam

The black cam for Stage 2 (MV 2) must be placed between the cams for Stage 1 and Stage 2. The positions of MV 2 are determined by the boiler characteristics when switching between stages, but for a basic setting the black cam should be placed in the middle.

Choice of nozzle
B65-3R

Burner output = 880 kW
Nozzle 880 / 3 = 293 kW 293 / 11,86 = 24,7 kg/h
According to the table of nozzles this gives the following nozzles:
Stage 1 : 5,50 Gph
Stage 2 : 5,50 Gph
Stage 3 : 5,50 Gph
Pump pressure : 14 bar

Basic settings
B65-3R

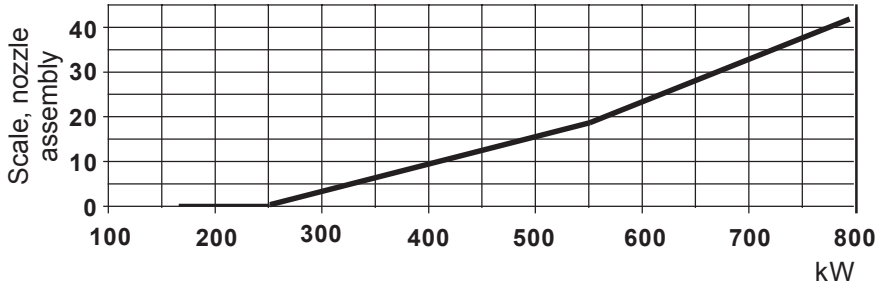
Power outputs and nozzle choice from example.

Nozzle assembly	Stage 1/2 =	5	
	Stage 3 =	20	
Damper motor	Stage 1	= 10°	Blue cam
	MV 2	= 30°	Black cam
	Stage 2	= 44°	Orange cam
	MV 3	= 60°	Green cam
	Stage 3	= 80°	Red cam

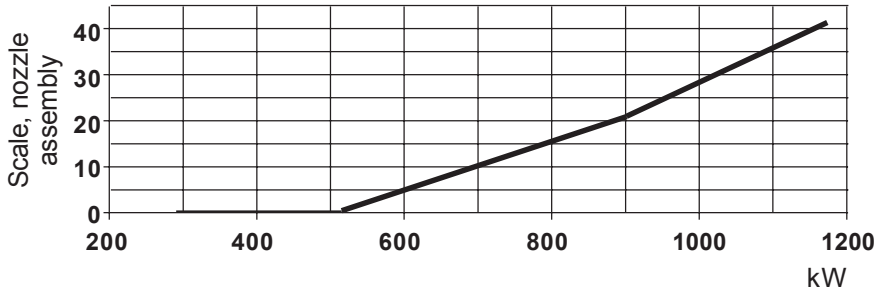
The cams for Stage 2 (MV 2) and Stage 3 (MV 3) must be placed between the cams for Stage 1 and Stage 2, and between Stage 2 and Stage 3, respectively. The positions of MV 2 and MV 3 are determined by the boiler characteristics when switching between stages, but for a basic setting the cams (MV2 and MV3) should be placed in the middle.

04. BASIC SETTINGS

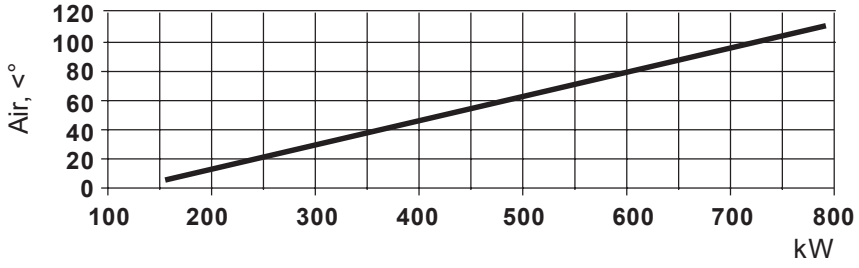
Set values for nozzle assembly B55



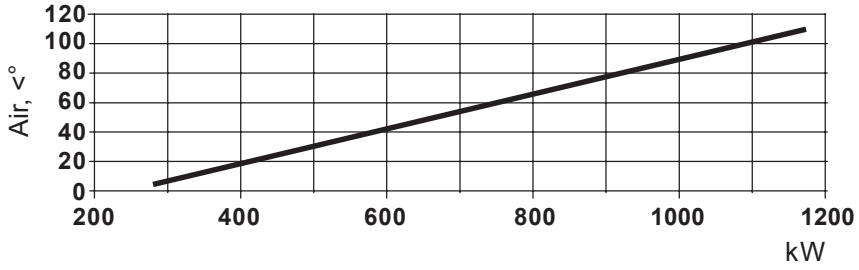
Set values for nozzle assembly B65



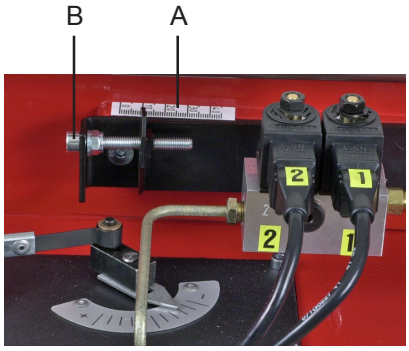
Set values for air damper B55



Set values for air damper B65



Nozzle assembly regulation – fixed brake plate

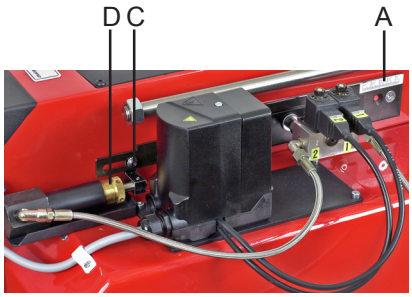


Nozzle assembly regulation is used to achieve the most favourable pressure drop possible across the brake plate.
Nozzle assembly regulation should be adjusted for Stage 2 output.

Adjustment
Adjust to the desired position on the scale (A) using the set screw (B) (turning anti-clockwise reduces the pressure drop and moves the brake plate outwards).

If pulsation occurs, the pressure drop across the brake plate can be altered until pulsation stops.

Nozzle assembly regulation – adjustable brake plate



Nozzle assembly regulation is used to achieve the most favourable pressure drop possible across the brake plate for each output stage.

Two nozzles
Nozzle assembly regulation adjusts the position of the brake plate between Stage 1 and Stage 2 by means of a hydraulic piston.

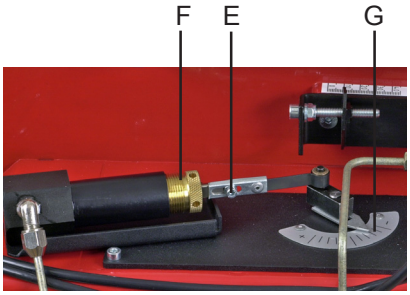
Three nozzles
Nozzle assembly regulation adjusts the position of the brake plate between Stage 2 and Stage 3 by means of a hydraulic piston.

Low load
Undo the locking nut.
Adjust to the desired position on the scale (A) by sliding the plate to the desired position. Tighten the locking nut (C).

High load
Adjust to the desired position on the scale (A) using the set screw (D) (turning anti-clockwise reduces the pressure drop and moves the brake plate outwards).

If pulsation occurs, the pressure drop across the brake plate can be altered until pulsation stops.

Hydraulic air adjustment

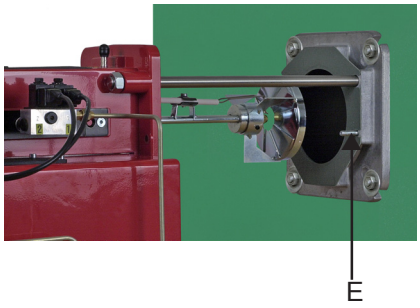


Stage 1
Set the control switch (S2) to low load (I). Undo the screw (E), turn the damper to the desired position and retighten the screw (E).

Stage 2
Set the control switch (S2) to high load (I). Use the adjuster pin to screw the sleeve (F) in (to reduce) or out (to increase). The position of the damper can be read from the damper scale (G). Carry out flue gas analysis to check the air settings.

Servicing the burner device

Removal and fitting



1. Turn off the main power switch and disconnect the Eurostecker connectors from the burner.
2. Undo the nuts (E) and pull out the burner body on its guides.
3. Undo and remove the brake plate from the oil pipe.
4. Unscrew the nozzles.
5. Fit the nozzles.
6. Fit the brake plate (see Adjusting the brake plate).
7. Check the ignition electrodes (see Adjusting ignition electrodes). Replace if necessary.
8. Slide the burner together and secure it with the nuts (E).
9. Connect the Eurostecker connectors and turn on the main power switch.
10. Check combustion*.

Note:

* After servicing/replacing components that affect combustion, a flue gas analysis and soot measurement must be carried out on the installation.

NOTE!

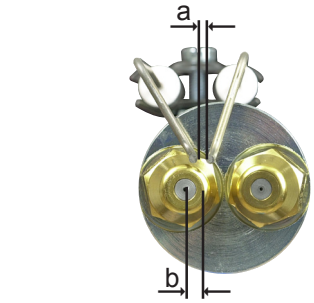
If nozzles are dirty always replace them with new ones. Do not clean them.

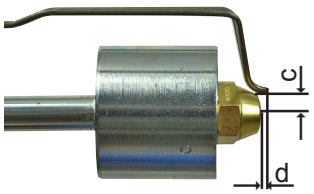
On boilers with a hinged door, the door can be opened and the burner pipe can be removed from the flange and pulled forwards.

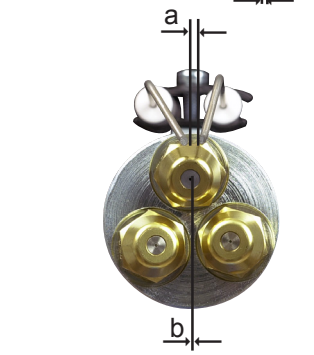
With burners that have an extended burner tube, the burner body must be lifted off the guides, or the oil pipe must be disconnected from the solenoid valves to be removed for servicing.

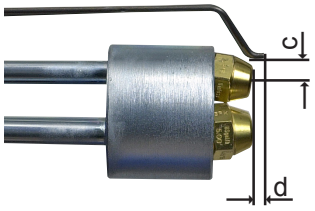
Adjusting the ignition electrodes and brake plate

Adjustment dimensions for ignition electrodes.







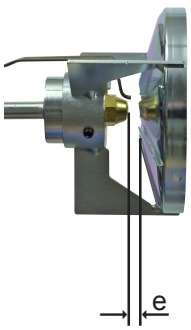


Burner, type	a	b	c	d	e
B55-2	2,5-3,0	2,0	6,5-7,0	2,0	6,0-7,0
B55-3	2,5-3,0	0,0	6,5-7,0	2,0	6,0-7,0
B65-2	2,5-3,0	2,0	6,5-7,0	2,0	10,0-12,0
B65-3	2,5-3,0	0,0	6,5-7,0	2,0	10,0-12,0

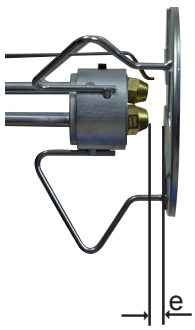
NOTE!

It is important that the spark does not strike the brake plate or nozzle.

B55

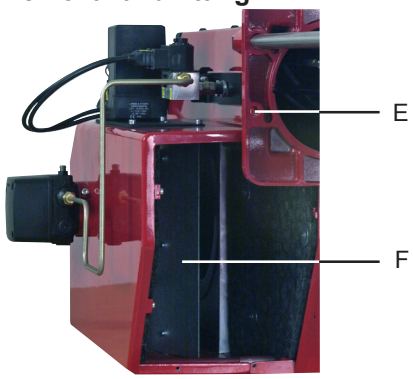


B65



Servicing the air damper

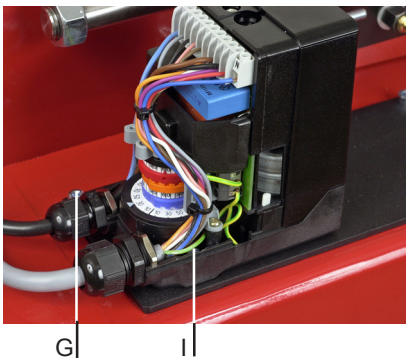
Removal and fitting

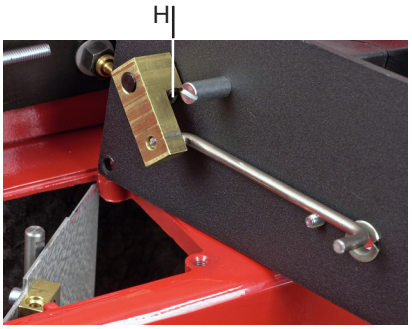


1. Turn off the main power switch and disconnect the Eurostecker connectors from the burner.
2. Undo the nuts (E) and pull out the burner body on its guides.
3. Remove the intake grille from the air intake.
4. Release the damper motor.
5. Clean the air damper (F) and the intake. Lubricate the damper shaft if applicable.
6. Re-engage the damper motor.
7. Fit the intake grille over the air intake.
8. Slide the burner together and secure it with the nuts (E).
9. Connect the Eurostecker connectors and turn on the main power switch.
10. Check combustion*.

Replacing the damper motor

Removal and fitting

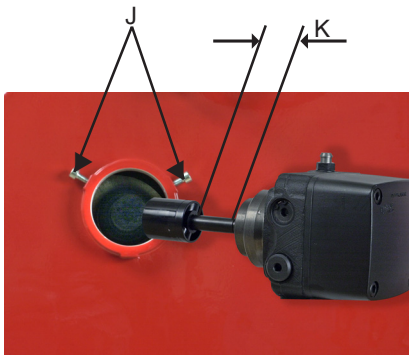




1. Turn off the main power switch and disconnect the Eurostecker connectors from the burner.
2. Note the positions of the cables and then disconnect the cables from the damper motor
3. Release the damper motor and lock it at 30°.
4. Undo the screws (G) that secure the mounting plate for the damper motor.
5. Raise it carefully so that the air damper stays in the air intake.
6. Disconnect the (H) link arm from the motor shaft.
7. Separate the damper motor from the mounting plate (I).
8. Refit the damper motor on the mounting plate.
9. Connect the link arm to the damper motor shaft. It is important that the screw is at right angles to the plane of the shaft.
10. Release the damper motor and lock it at 30°.
11. Fit the mounting plate by guiding the link arm into the attachment point on the air damper and the air damper shaft into the mounting plate (make sure that the bushings are fitted between the mounting plate and damper shaft).
12. Release the damper motor and check that the damper moves freely. Close the damper and zero the graduated scale on the damper motor.
13. Make the electrical connections to the damper motor.
14. Reset the damper motor cams.
15. Connect the Eurostecker connectors and turn on the main power switch.
16. Check combustion.*

Replacing the oil pump B55/B65

Removal and fitting



1. Turn off the main power switch and disconnect the Eurostecker connectors from the burner.
2. Disconnect the oil hoses from the pump.
3. Undo the screws (J) and pull out the oil pump.
4. Measure the distance between the pump mounting and the pump coupling (K).
5. Transfer the pump coupling to the new pump and adjust to give the same spacing between the pump and pump coupling as before (K)
6. Fit the oil pump on the burner and tighten the screws (J). (It is important that splines on the pump shaft align correctly with the pump coupling.)
7. Fit the oil hoses.
8. Connect the Eurostecker connectors and turn on the main power switch.
9. Bleed the pump, start the burner and adjust to the correct oil pressure.
10. Check combustion.*

Note:

* After servicing/replacing components that affect combustion, a flue gas analysis and soot measurement must be carried out on the installation.

06. INSTRUCTIONS PUMP TYPE RSA 95 & 125

Technical data

	RSA 95	RSA 125
Viscosity range:	1,3-18,0 mm²/s	
Pressure range at viscosity 1,3-1,8:	5,5-12,0 bar	
Pressure range at viscosity 1,8-18,0:	2,5-21,0 bar	
Oil temperature:	-10 to+70°C	
Nozzle capacity at viscosity 4,3:	150-190 l/h	215-260 l/h
Gearwheel capacity:	225 l/h	294 l/h
Max pressure on suction- and return side:	4 bar	

Components

1. Pressure gauge port G 1/8"
2. Nozzle port G 1/4"
3. Suction line G 1/4"
4. Suction line G 1/4"
5. Return line G 1/4"
6. Return line G 1/4"
7. By-pass plug
8. Pressure adjustment, 4 mm Allen key

Mounting/dismounting by-pass plug

In a 2-pipe-system excess oil is led back direct to the oil tank. In a 1-pipe-system the by-pass plug must be removed so that there is a free passage back to the suction side through the return line with the return port closed. (Pos.7).

Purging

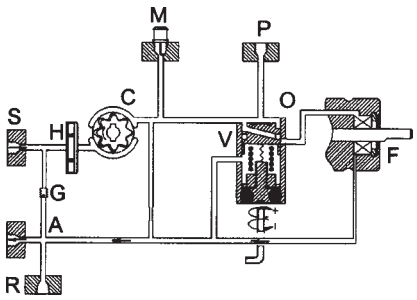
On 1-pipe systems it is necessary to purge the pump. On 2-pipe systems purging is automatic through the return line.

Replacing the filter

Replace the oil fiter on the oil pump as follows.
- Close the oil valves.
- Unscrew the cover (4 x 5 mm Allen screws).
- Replace the oil filter.
- Replace the cover gasket.
- Refit the cover.
- Open the oil valves.

06. INSTRUCTIONS PUMP TYPE RSA 95 & 125

Function Danfoss RSA 95 - 125



When the pump is started oil is drawn through the suction port "S" via filter "H" to the suction side of the gearwheel set "C". From here the gearwheel set pumps the oil to the pressure side and at the same time the oil becomes pressurized. The oil is led to cut-off and regulating valve "V" which opens when the set pressure is reached.

The pressure is controlled and kept constant by regulating valve "V". At the same time the gearwheel set "C" distributes the oil through nozzle port "P" and pump return side "R" via the shaft seal "F".

The quantity of oil supplied to nozzle port "P" is determined by the pressure set on regulating valve "V" and the nozzle/resistance in the nozzle line.

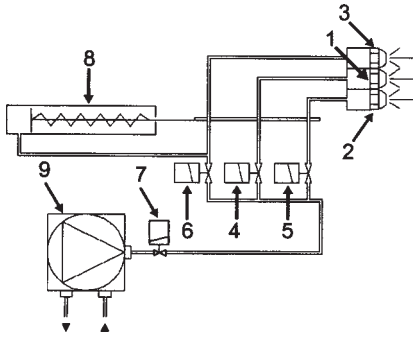
In 2-pipe-systems excess oil is led back to the oil tank. In 1-pipe-systems the by-pass plug "A" must be removed to give free flow back to the suction side via return line "G" with return port "R" closed.

When the pump is stopped, the pump output drops and produces a drop in the oil pressure. The spring in the regulating valve presses the regulating piston forward until it seals in port "P". This cuts off the oil flow to the nozzle and ensures that the nozzle line is effectively shut off.

If the pump is overloaded, i.e. more oil is demanded than the gearwheel is able to pump under the given conditions, the oil pressure falls below the set value because the piston of the regulating valve moves towards its closed position and partially or wholly cuts off the return oil via port "O".

This can be remedied by
- reducing the pump pressure
- reducing the capacity, i.e. smaller nozzle or greater resistance
- changing to a pump with higher capacity

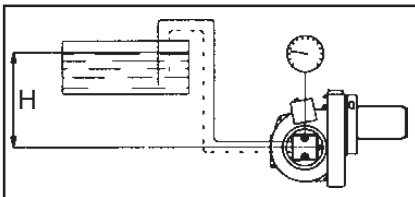
Schematic diagram



1. Nozzle Stage 1
2. Nozzle Stage 2
3. Nozzle Stage 3
4. Solenoid valve Stage 1 (Y1)
5. Solenoid valve Stage 2 (Y2)
6. Solenoid valve Stage 3 (Y3)
7. Safety valve for nozzle (Y1S)
   Only for capacities over 100 kg/h or on special request by customer.
8. Hydraulic control device
   Only on burners with hydraulic air control or nozzle assembly optimisation.
9. Oil pump

Items 3 and 6 are not fitted to two-stage burners. Item 8 is connected after solenoid valve nozzle 2 (Y2).

Suction line tables



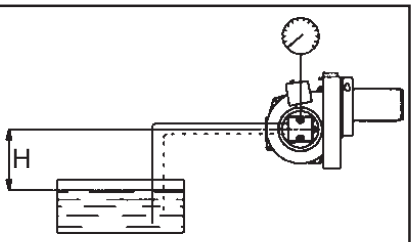
1-pipe system

Height	Pipe diameter		
H	ø12mm	ø15mm	ø20mm
m	m	m	m

With an overlying tank a 1-pipe-system is not recommended.

Two-pipe system

Height	Pipe diameter		
H	ø12mm	ø15mm	ø20mm
m	m	m	m
4,0	81	100	100
3,5	76	100	100
3,0	71	100	100
2,5	66	100	100
2,0	61	100	100
1,5	56	100	100
1,0	51	100	100
0,5	46	100	100



1-pipe system

Height	Pipe diameter		
H	ø12mm	ø15mm	ø20mm
m	m	m	m

With an underlying tank a 1-pipe-system is not recommended

Two-pipe system

Height	Pipe diameter		
H	ø12mm	ø15mm	ø20mm
m	m	m	m
0,0	41	100	100
-0,5	36	89	100
-1,0	31	77	100
-1,5	26	65	100
-2,0	22	53	100
-2,5	17	41	100
-3,0	12	29	91
-3,5	7	17	53
-4,0	2	5	15

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.

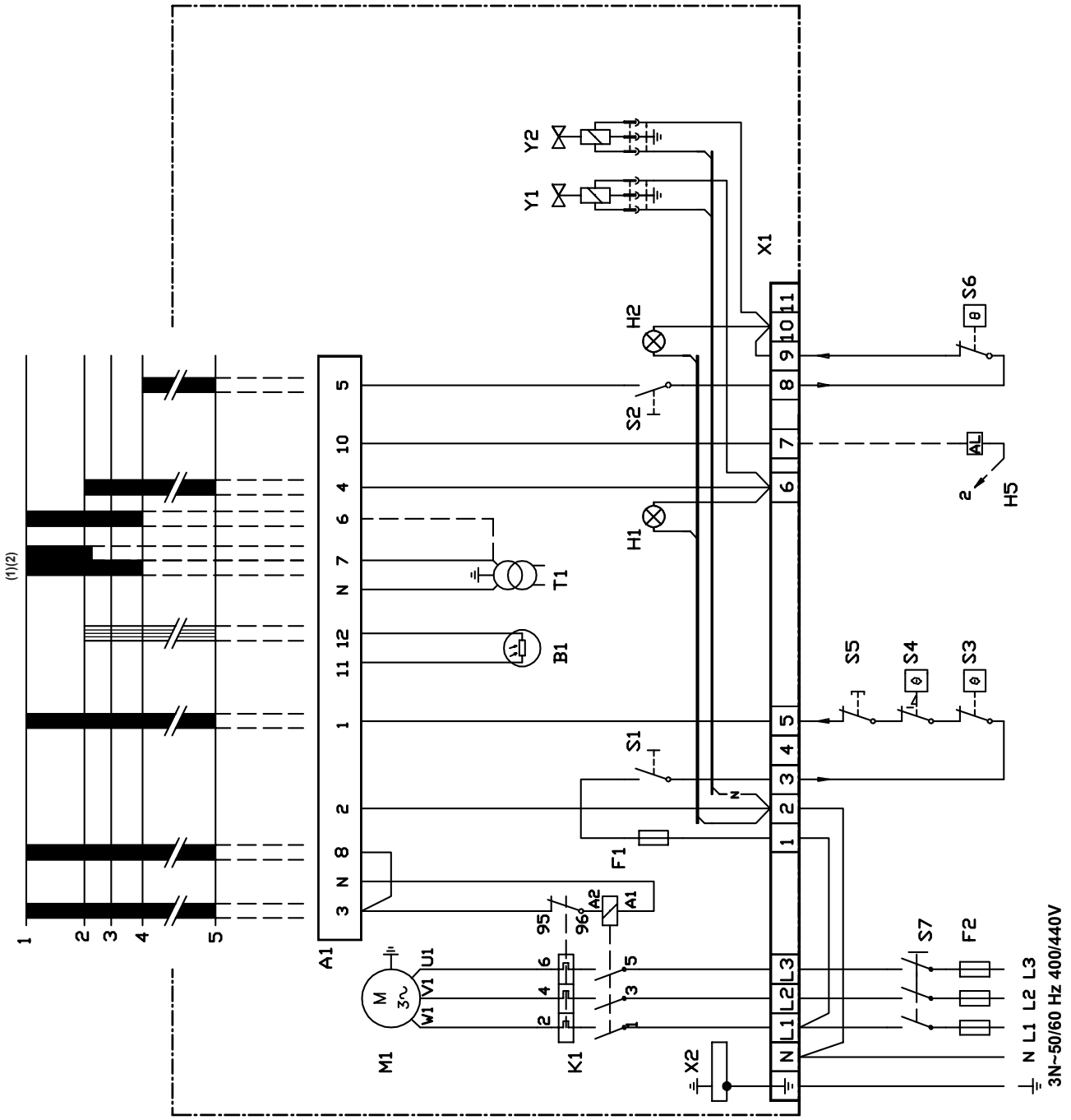
In addition to drawn copper piping a pipe system usually comprises 4 elbows, a non-return valve, a cut-off valve and an external oil filter.
The sum of these individual resistances is so insignificant that they can be disregarded.

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 viscosity of 6,0 mm^2/s.

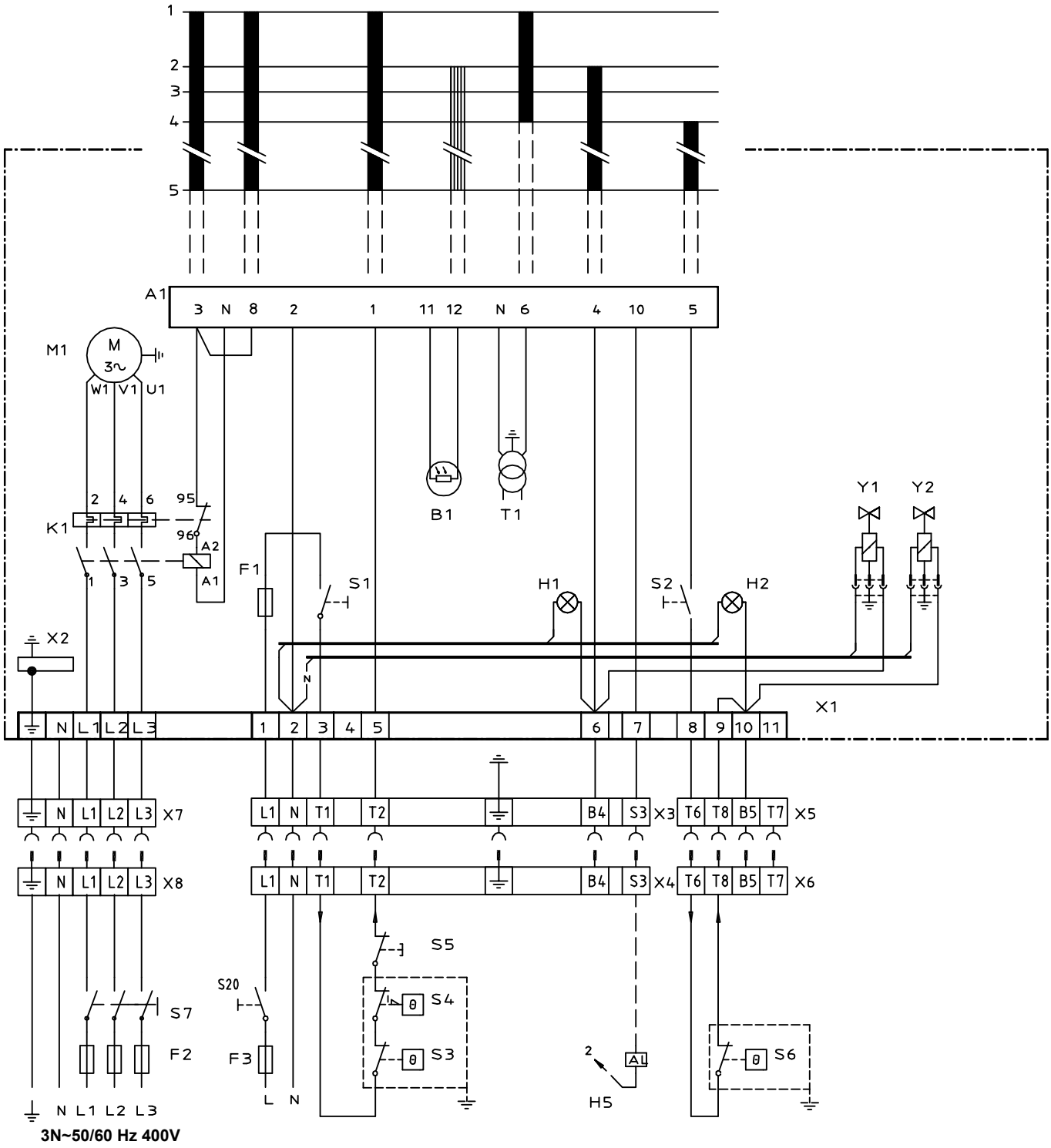
09. ELECTRIC EQUIPMENT

Wiring diagram LOA21.../LOA24... (B55-2H/B65-2H)



09. ELECTRIC EQUIPMENT

Wiring diagram LOA21.../LOA24... (B55-2H/B65-2H)



09. ELECTRIC EQUIPMENT

List of components LOA21.../LOA24... (B55-2H/B65-2H)

max loading K1
Connection A1,A2 / 95, 96 / 97, 98
Max 0,2A/15W

A1	Oil burner control	T1	Ignition transformer
B1	Photoresistor	X1	Connection terminal board
F1	Operating fuse	X2	Earth terminal
F2	Fuse	X3	Plug-in contact ”Euro”, burner
F3	Fuse	X4	Plug-in contact ”Euro”, boiler
H1	Lamp, low capacity	X5	Plug-in contact ”Euro”, high/low burner
H2	Lamp, high capacity	X6	Plug-in contact ”Euro”, high/low boiler
H5	Alarm signal 230V	X7	Plug-in contact ”Euro” 3-phase, burner
K1	Thermal overload protection	X8	Plug-in contact ”Euro”, 3-phase, boiler
M1	Burner motor	Y1	Solenoid valve 1
S1	Operating switch	Y2	Solenoid valve 2
S2	Operating switch, high/low capacity		
S3	Operation thermostat		
S4	Temperature limiter		
S5	Micro switch for hinged door		
S6	Control thermostat, high/low		
S7	Main switch 3-fas		
S20	Main switch 1-fas		

If S6 is missing connection between T6 and T8.
Mains connection and fuse in accordance with local regulations.

Function LOA21.../LOA24...

1. Switch on operating switch and twin thermostat
The burner motor starts, an ignition spark is formed, the prepurge goes on till the prepurge period expires and the solenoid valve 1 opens (2).

2. Solenoid valve 1 opens
Oil mist is formed and ignited. The photocell indicates a flame.

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

4. Full load thermostat ON

The ignition spark goes out 15 s. after flame indication **(LOA...171...)**.

The ignition spark goes out 2 s. after flame indication.when the ignition transformer is connected to terminal 7 **(LOA...173...)**.
The burner is in operating position and can now change between high and low capacity.

4-5. Operating position
If the burner operation is interrupted by means of the main switch or the thermostat, a new start takes place when the conditions in accordance with point 1 are fulfilled.

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

Post-ignition
If a post-ignition of 15 s is wanted, move the ignition transformer from terminal 7 to terminal 6 **(LOA...173...)**.

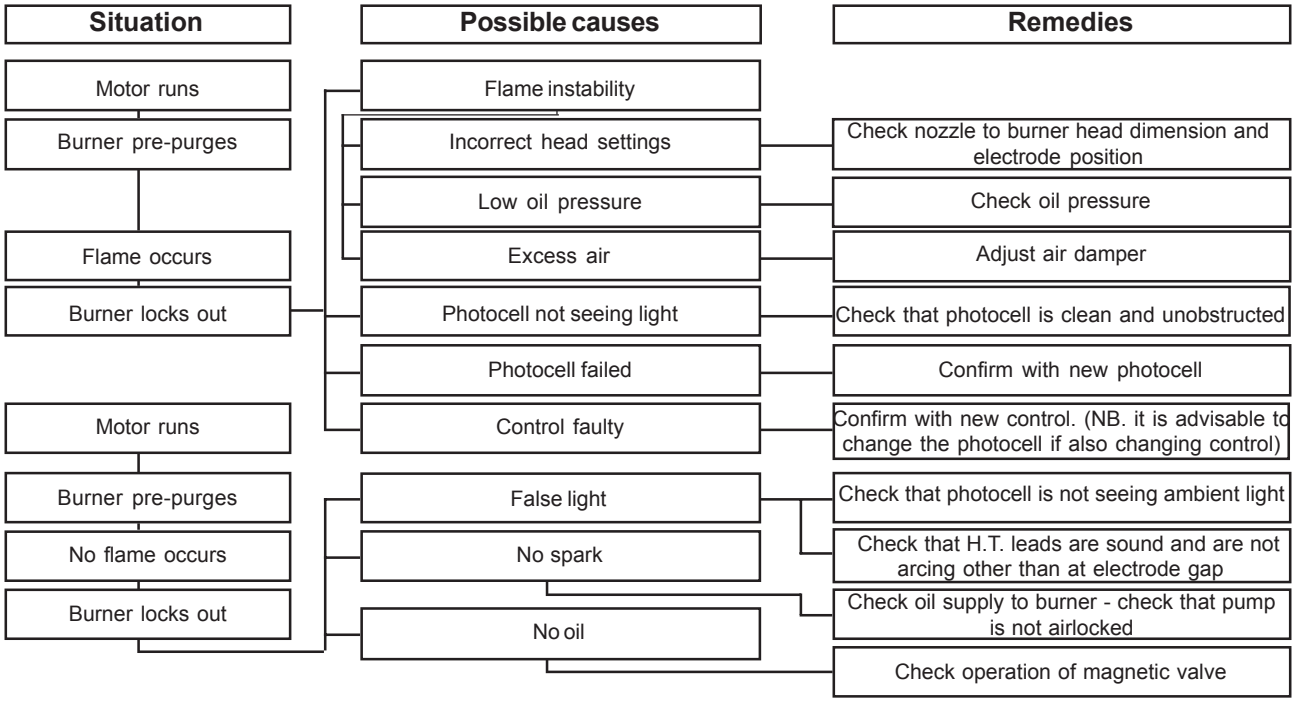
Technical data LOA21.../LOA24...

	LOA...171	**LOA...173**
Pre-ignition time:	13 s	13 s
Pre-purge time	13 s	13 s
Post-ignition time:	15 s	2 s
Safety lock-out time:	< 10 s	< 10 s
Reset time after lockout:	50 s	< 50 s
Reaction time on flame failure:	< 1 s	< 1 s
Ambient temperature:	from - 20 to + 60°C	from - 20 to + 60°C
Min. current with flame established:	65 µ A	65 µ A
Max. photo current at start:	5 µ A	5 µ A
Enclosure:	IP 40	IP 40

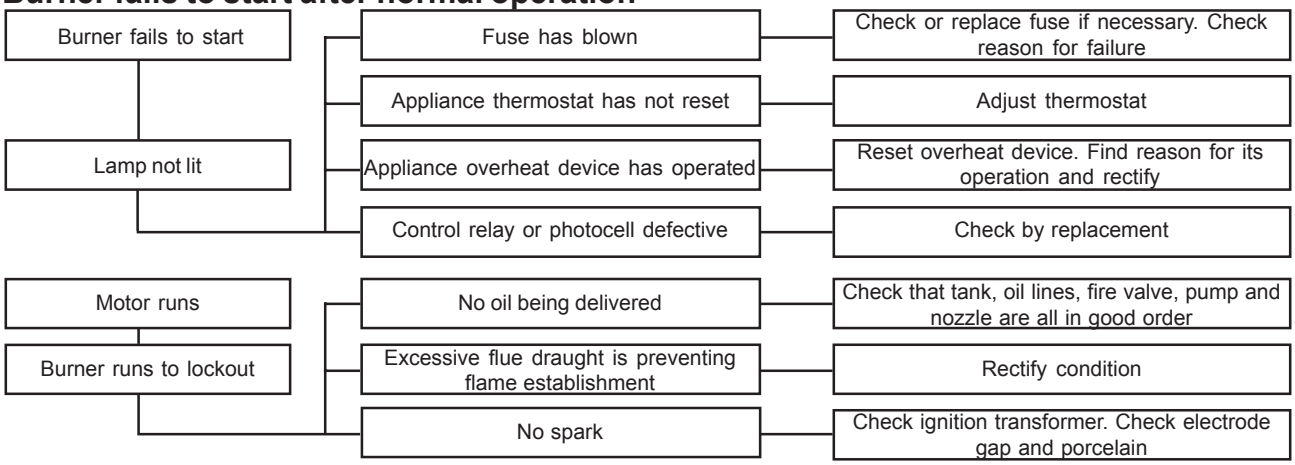
Control of photo current
Current through photo unit is measured with a d.c. ammeter (a movingc oil instrument connected in series with the photo unit).

10. FAULT LOCATION

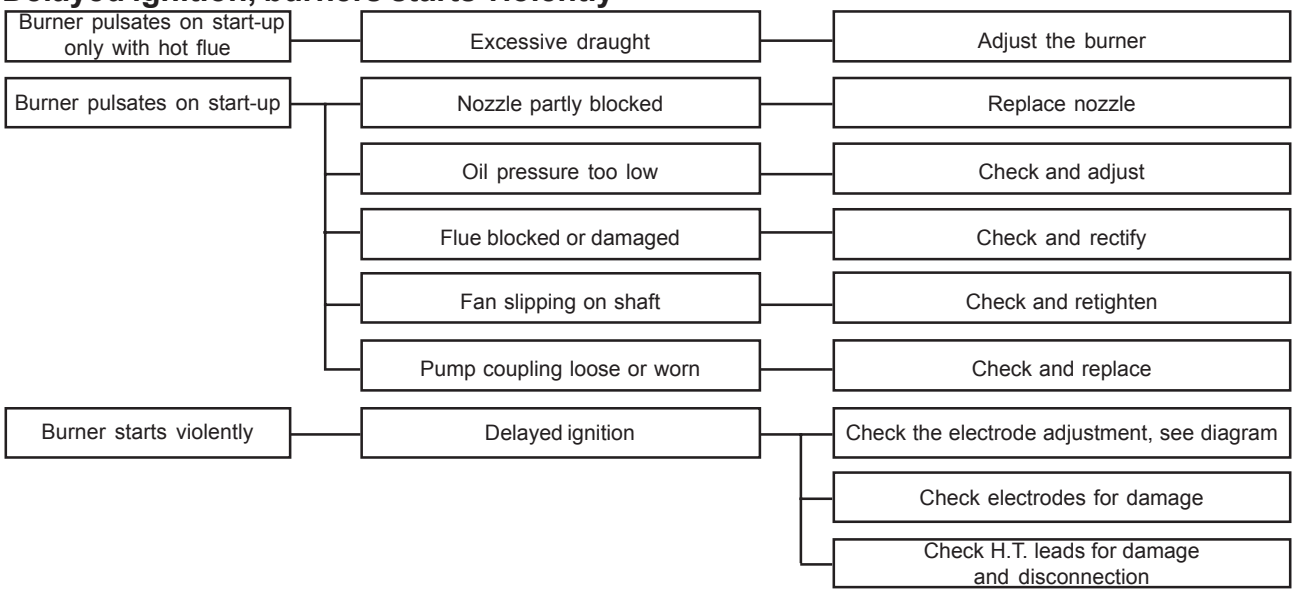
Burner fails to start



Burner fails to start after normal operation



Delayed ignition, burners starts violently



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 theswing 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 tomake 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 areopen.
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 notstart until the oil in the preheater reaches the requiredtemperature.

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 fusesare 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 ashort 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:.....

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Enertech Group