



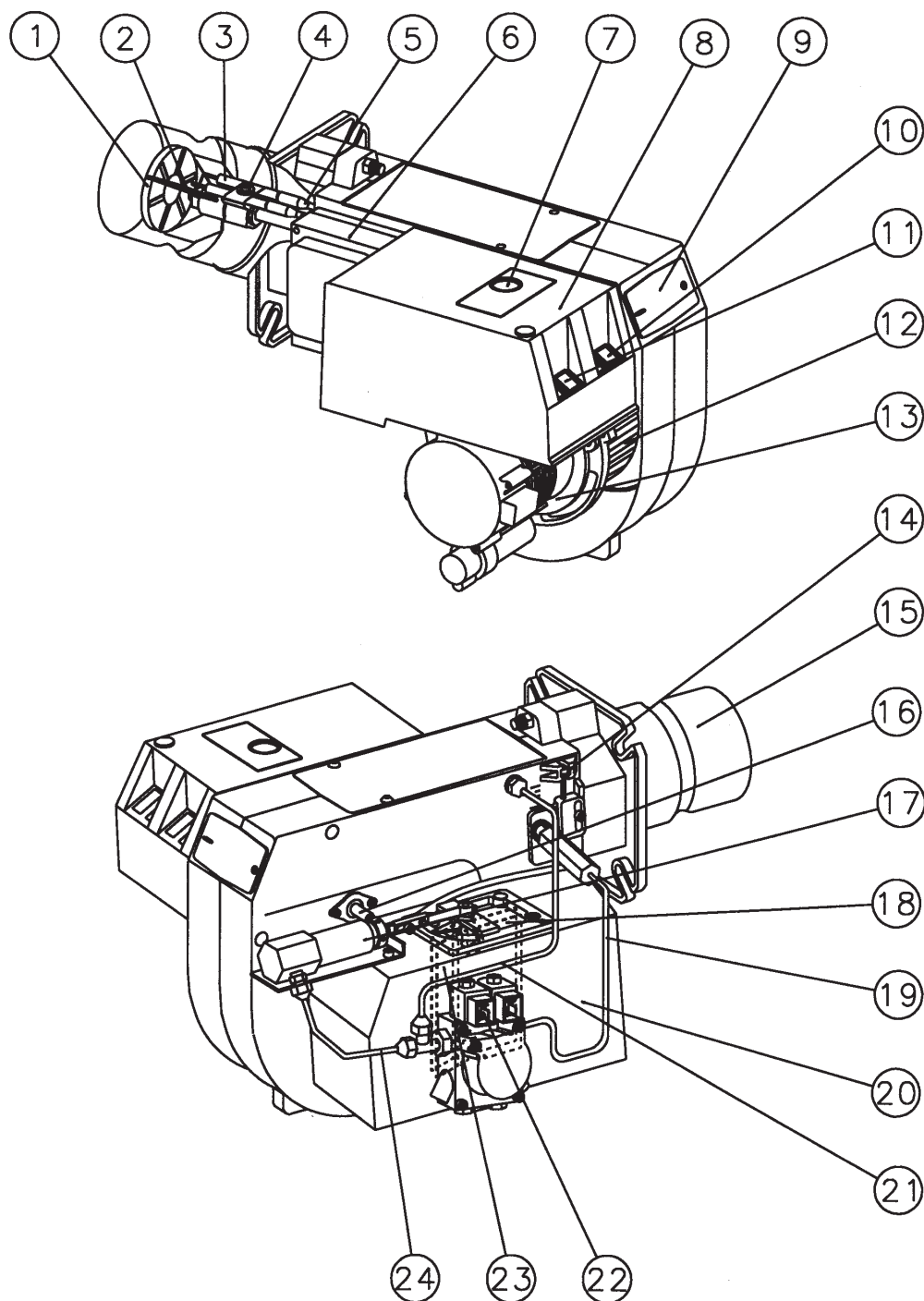
Providing sustainable energy solutions worldwide

Installation- and maintenance instruction

B30A2.2H
B30A2.2HL

DESCRIPTION

Components



- 1. Brake plate
- 2. Nozzle
- 3. Ignition electrodes
- 4. Nozzle assembly
- 5. Ignition cable
- 6. Ignition transformer
- 7. Reset button
- 8. Electric panel
- 9. Cover, inspection glass

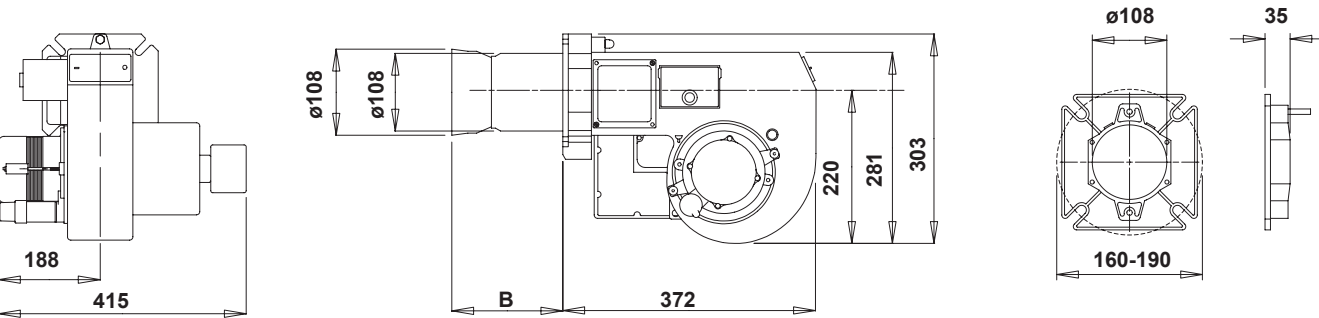
- 10. Switch I-II
- 11. Switch I-0
- 12. Fan wheel
- 13. Motor
- 14. Nozzle assembly adjustment
- 15. Blast tube
- 16. Photo cell
- 17. Adjustment device
- 18. Indication, air damper

- 19. Connecting pipe Stage 1
- 20. Air intake
- 21. Connecting pipe Stage 2
- 22. Solenoid valve
- 23. Air damper
- 24. Connecting pipe, pump-adjustment device

TECHNICAL DATA

Type designation B30A2

Dimensions



Burner tube	Length of burner tube	Measure B
A	137	102
A Standard	209	174
A Long design	350	315

Output range and nozzles recommended

Burner tube	Oil capacity kg/h	Output kW	Output Mcal/h	Recommended nozzle Angle Danfoss Monarch	Recommended pump pressure Bar
A	4,5-15,0	53-178	46-153	45° - 60° S, B R, PLP	14

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

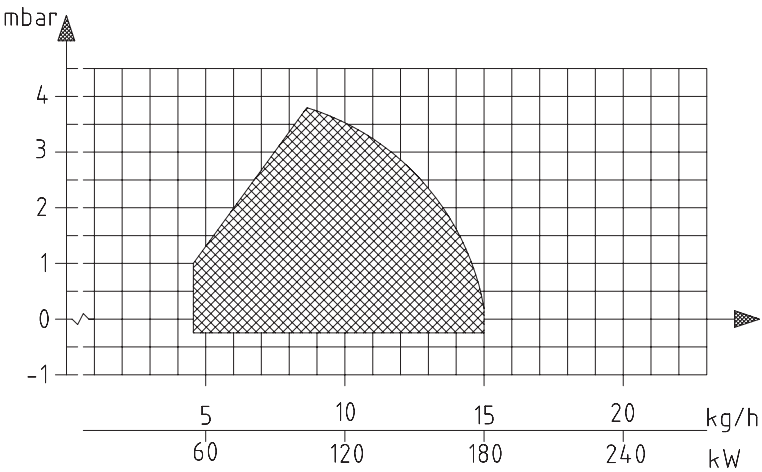
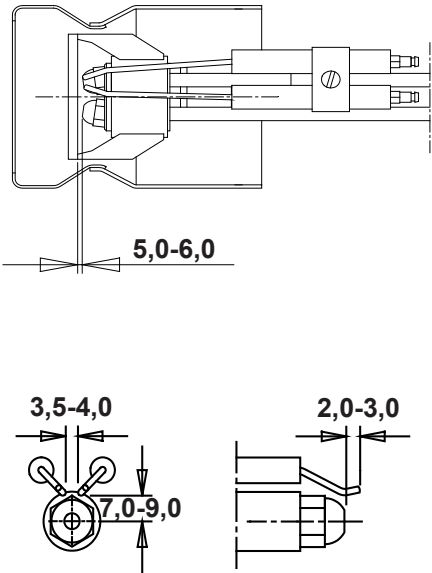
Recommended nozzle

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

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

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

Burner head



GENERAL INSTRUCTIONS

General rules

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

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

Installation instructions

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

Adjustment of burner

The burner is from the factory pre-set to an average value that must then be adjusted to the boiler in question. All burner adjustments must be made in accordance with the boiler manufacturer's instructions. These must include the checking of flue gas temperatures, average water temperature and CO₂ or O₂ concentration. To adjust the combustion device, start by increasing the air volume and the nozzle assembly somewhat. When the burner starts it is burning with excess air and smoke number 0. Reduce the nozzle assembly adjustment until soot occurs, and then increase the adjustment to make the soot disappear again. Then the volume of air is reduced until soot occurs and increased again to reach a combustion free of soot.

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

A whistling sound may be heard which can be eliminated or reduced as follows: Increase the nozzle assembly adjustment somewhat. The CO₂-content and consequently the air volume will then be reduced.

Condensation in chimney

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

Measures to raise the temperature:

Insulate the chimney in cold attics

Install a tube in the chimney

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

Increase the oil quantity

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

Pump adjustment

See separate description.

Maintenance

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

Oil supply

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

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

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

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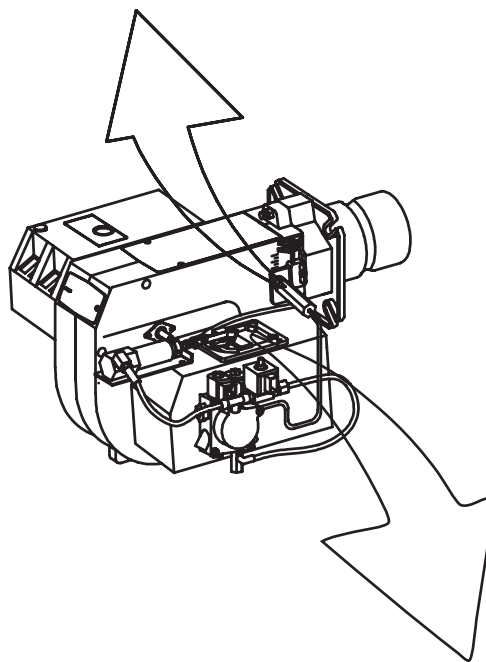
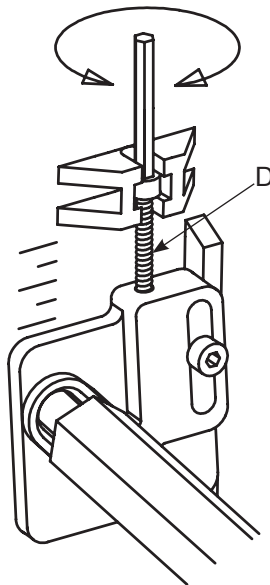
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GENERAL INSTRUCTIONS

Adjustment of nozzle assembly

Adjust the nozzle assembly with the adjustment screw D to the desired position.



Air adjustment

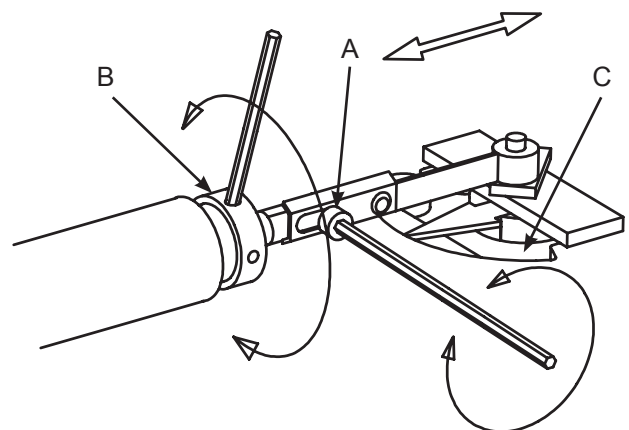
First stage:

Set the operating switch (S2) on low capacity (I). Loosen the screw (A) and turn the damper to the position wanted. Tighten the screw (A) again.

Second stage:

Set the operating switch (S2) on high capacity (II). Screw the knurled ring (B) in (reduce) or out (increase). The position of the damper can be read on the damper scale (C).

Check the air adjustment by making a flue gas analysis.

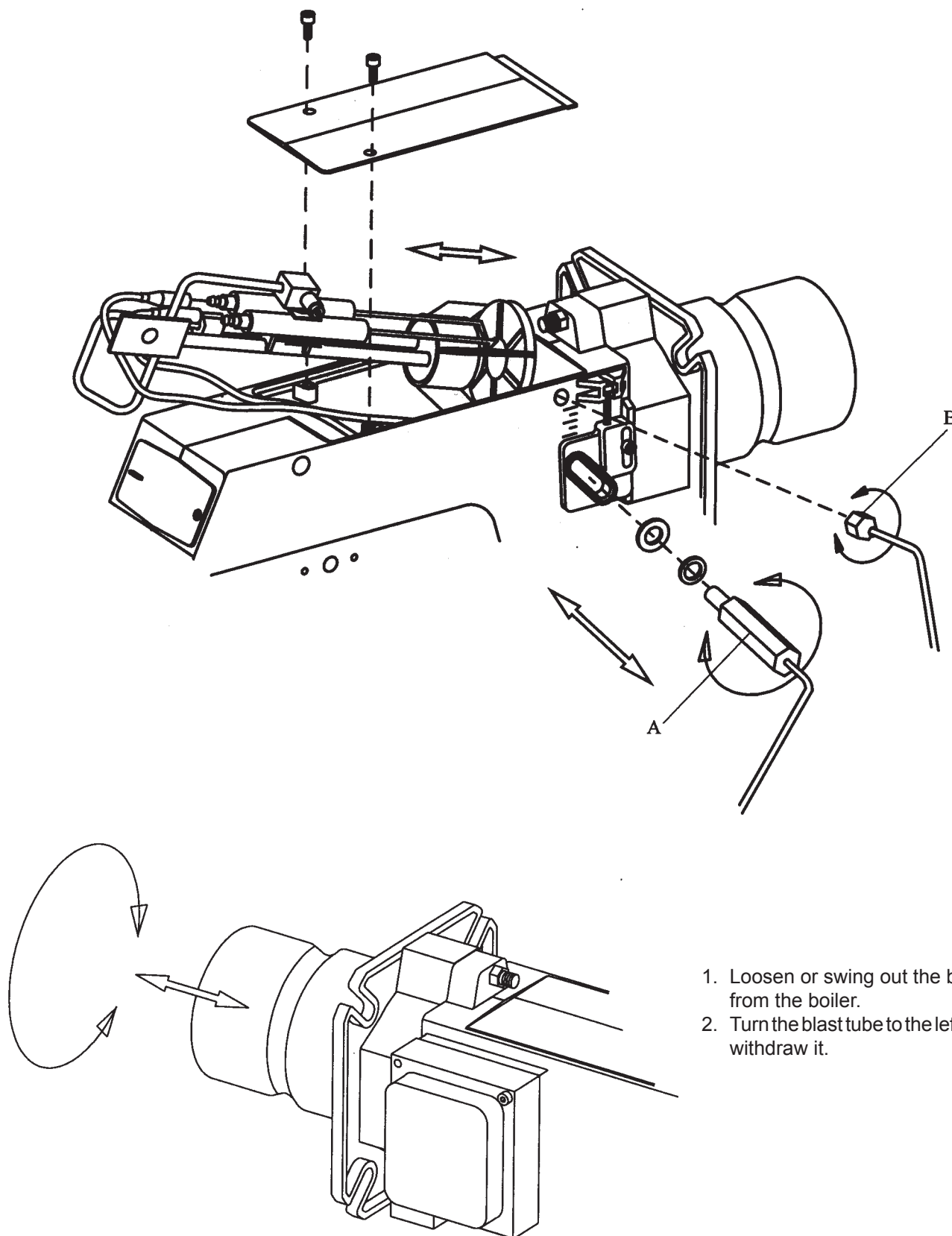


MAINTENANCE

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

Service of burner head

Open the cover and disconnect the connecting pipes by loosening screw A and nut B.

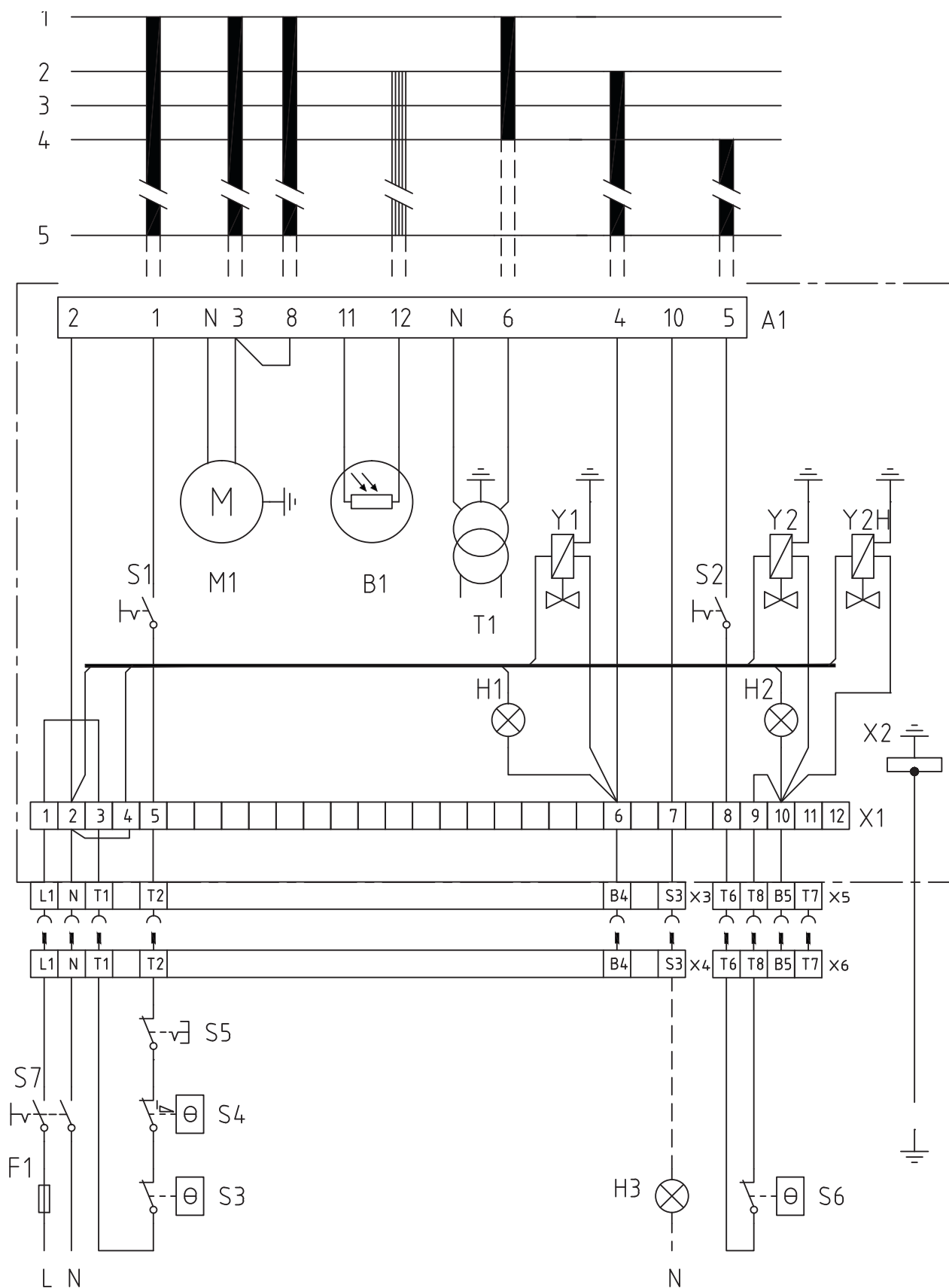


1. Loosen or swing out the burner from the boiler.
2. Turn the blast tube to the left and withdraw it.

ELECTRIC EQUIPMENT

Oil burner control: LMO24...

Wiring diagram



ELECTRIC EQUIPMENT

Oil burner control: LMO24...

List of components

A1	Oil burner control	S7	Main switch
B1	Photoresistor	T1	Ignition transformer
F1	Fuse	X1	Connection terminal board
H1	Lamp, low capacity	X2	Earth terminal
H2	Lamp, high capacity	X3	Plug-in contact "Euro", burner
H3	Lamp, lock-out signal 230 V	X4	Plug-in contact "Euro", boiler
M1	Burner motor	X5	Plug-in contact "Euro", high/low burner
S1	Operating switch	X6	Plug-in contact "Euro", high/low boiler
S2	Operating switch, high/low capacity	Y1	Solenoid valve 1
S3	Control thermostat	Y2	Solenoid valve 2
S4	Temperature limiter	Y2H	Solenoid valve, Hydraulic piston (Only 2-stage burners with 1 nozzle.)
S5	Micro switch for hinged door		
S6	Control thermostat, high/low capacity		

If S6 is missing connection between T6 and T8.

Mains connection and fuse in accordance with local regulations.

Function

1. Switch on operating switch and twin thermostat

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

2. Solenoid valve 1 opens

Oil mist is formed and ignited. The photocell indicates a flame.

3. The safety time expires

- If no flame is established before this time limit the control cuts out.
- 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 after flame indication (See Technical data oil burner control). 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.

Technical data oil burner control

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

Control of photo current

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

Colour codes LMO14/24

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

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

Fault codes LMO14/24

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

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

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

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

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

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

INSTRUCTIONS PUMP TYPE SUNTEC A2L 65C - 75C

Technical data

One or two-pipe system.

Viscosity range: 2-12 mm²/S

Pressure range: 8-15 bar

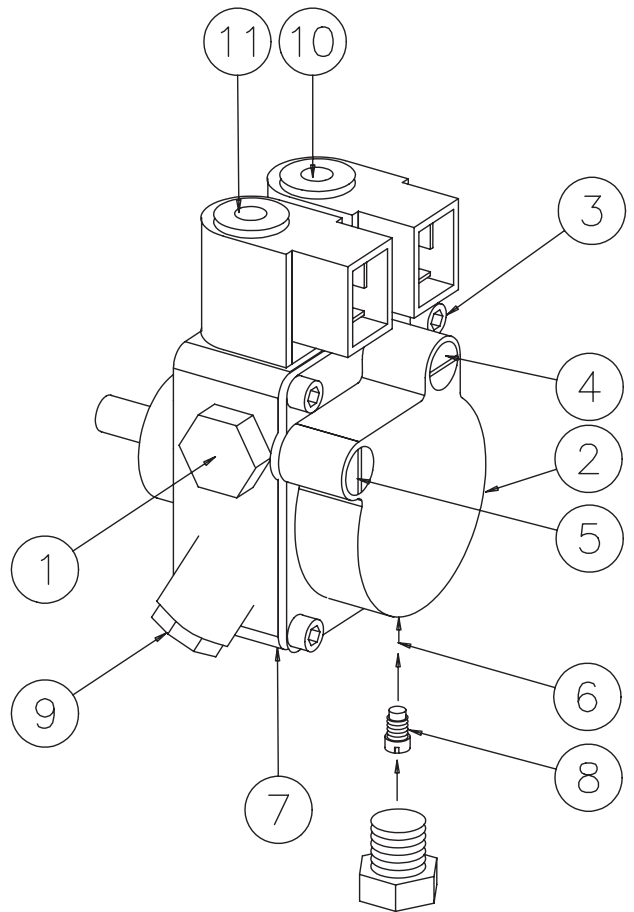
Rated voltage of coil: 220/240V

50/60 Hz

Oil temperature: max 60°C

Components

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



Suction line tables

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

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

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

The tables state the total suction line length in metres at a nozzle capacity of 9,5 Gph. Max. permissible pressure at the suction and pressure side is 2,0 bar.

1-pipe system

Height	Pipe diameter		
H	ø6 mm	ø8 mm	ø10 mm
m	m	m	m
4,0	45	144	150
3,0	39	127	150
2,0	34	109	150
1,0	28	92	150
0,5	26	83	150
0,0	23	74	150

1-pipe system

Height	Pipe diameter
H	ø6 mm
m	m

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

Two-pipe system

Height	Pipe diameter			
H	ø8mm	ø10mm	ø12mm	ø14mm
m	m	m	m	m
4,0	42	108	150	150
3,0	36	94	150	150
2,0	31	81	150	150
1,0	26	68	144	150
0,5	23	61	130	150
0,0	20	54	116	150

Two-pipe system

Height	Pipe diameter			
H	ø8mm	ø10mm	ø12mm	ø14mm
m	m	m	m	m
0,0	20	54	116	150
-0,5	17	48	103	150
-1,0	15	41	89	150
-2,0	9	28	61	116
-3,0	4	14	33	65
-4,0	0	0	6	14

INSTRUCTIONS PUMP TYPE SUNTEC A2L 65C - 75C

Pump operating principle for A2L 65C - 75C

The **SUNTEC A2L** oil pump has two nozzle outlets. It incorporates two blocking solenoid valves with in-line-cut-off function, one for each nozzle outlet.

The gear set draws oil from the tank through the built-in filter and transfers it to the nozzle line via the cut-off solenoid valves. A pressure regulating valve is used to dump all oil which is not required at the nozzle.

In one-pipe operation, the oil which does not go through the nozzle lines is returned directly to the gear inlet and the suction line flow is equal to the sum of the 2 nozzle flows. In two-pipe operation, the by-pass plug must be fitted in the return port, which ensures that the oil dumped by the regulating valve is returned to the tank and the suction line flow is equal to the gear set capacity.

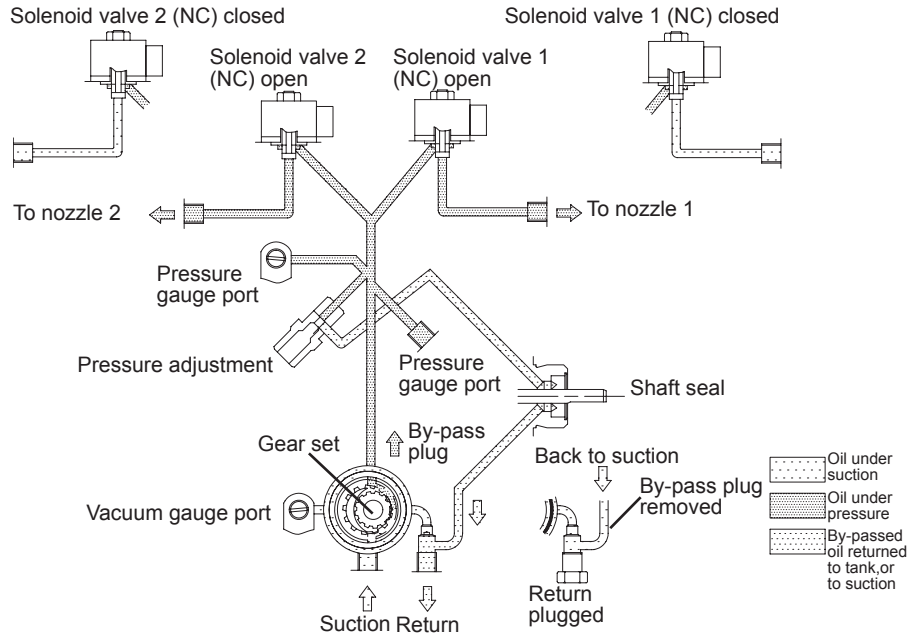
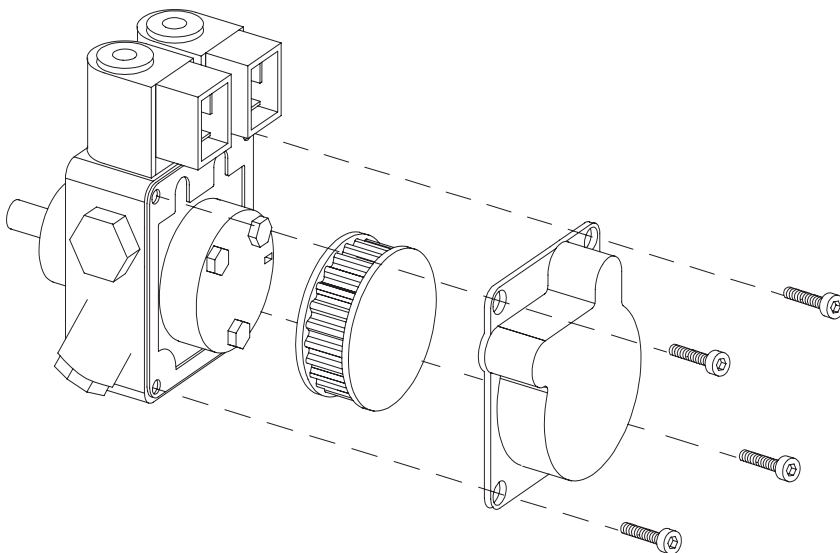
Bleed

Bleeding in two-pipe operation is automatic: it is assured by a bleed flat on the piston. In one-pipe operation, a high pressure connection must be loosened until the air is evacuated from the system.

Cut-Off

The solenoid valves of the A2L pump are of the "normally closed" type and are situated in the nozzle lines. This

Exchange of filter



Two pipe installation
design ensures extremely fast response and the switching can be selected according to the burner operating sequence and is independent of motor speed.

When the solenoids are non-activated, the valves are closed and all oil pressurised by the gear set passes through the regulator to suction or to the return line, depending upon pipe arrangement.

As soon as the solenoids are activated, oil passes to the nozzle lines at the pressure set by the pressure regulating valve.

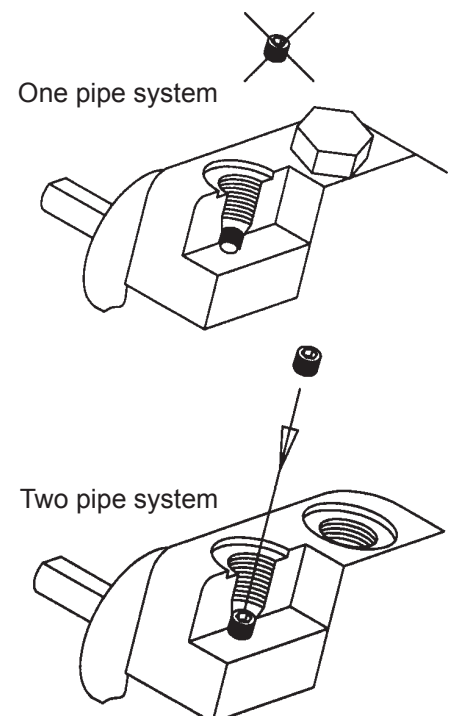
One pipe installation
Shaft rotation and nozzle location seen from shaft end

Gear set capacity

A2L: 2 nozzle outlets

A2LXX C

Mounting/dismounting return plug



NOZZLE TABLE

Pump pressure bar

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

The table applies to oil with a viscosity of 4,4 mm²/s (cSt) with density 830 kg/m³.

Burner with preheater

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

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

NOZZLE TABLE

Pump pressure bar

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

The table applies to oil with a viscosity of 4,4 mm²/s (cSt) with density 830 kg/m³.

Burner with preheater

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

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

FAULT LOCATION

Burner fails to start

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

Burner fails to start after normal operation

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

Delayed ignition, burners starts violently

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

EU Declaration of conformity



Bentone Oilburners

Type

BF 1	ST 133	B 10	B 55
ST 97	ST 146	B 30	B 65
ST 108	B 1	B 40	B 70
ST 120	B 2	B 45	B 80

This declaration of conformity is issued under the sole responsibility of the manufacturer. The object of the declaration described above is in conformity with:

Machinery Directive 2006/42/EC

EMC 2014/30/EU

Restriction of the use of certain hazardous substances (RoHS) Directive 2011/65/EU

References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:

EN 267:2009+A 1 :2011 (excluded Annex J/K) Automatic forced draught burners for liquid fuels

Additional information can be downloaded at:

www.bentone.com

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Ljungby September 26th, 2017

Håkan Lennartsson

Managing Director

Enertech AB

OIL BURNERS MAINTENANCE INSTRUCTIONS

General information

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

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

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

Don't fill tank while burner is working.

Starting precautions

Make sure that the oil tank is not empty

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

Make sure that the boiler flue damper is open.

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

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

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

If the burner will not start

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

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

Installed by:

.....

Tel:

If the burner starts but does not ignite

Make an attempt to start the burner.

Never make close repeated start attempts.

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

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

When switching off during summer

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

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

Make sure the filter medium is not damaged or defective.

Protect electrical gear from damp.

Warning

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

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

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

