



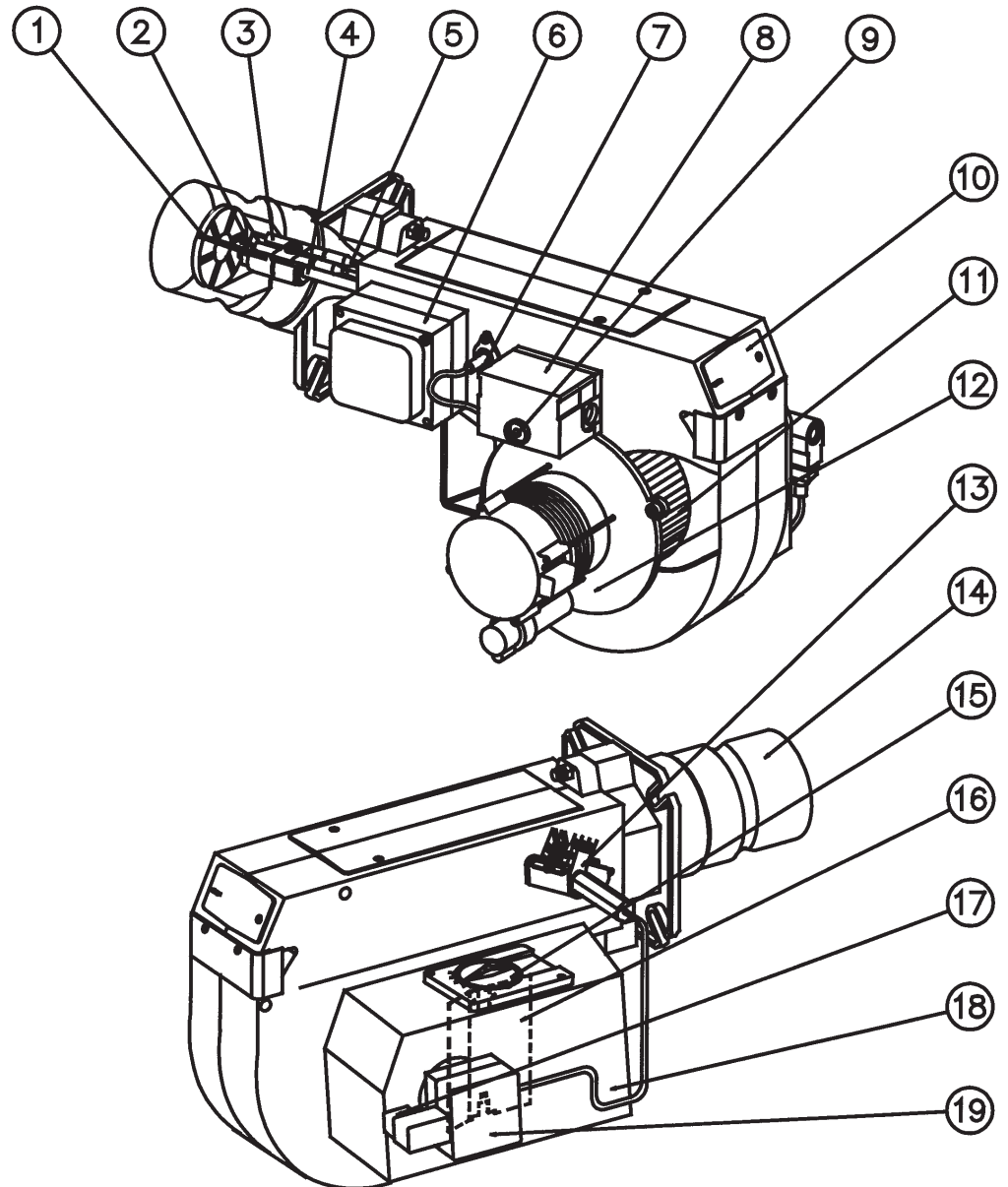
Providing sustainable energy solutions worldwide

Installation- and maintenance instruction

B 40 A2.2

DESCRIPTION

Components



1. Shrouded disc
2. Nozzle
3. Ignition electrodes
4. Nozzle assembly
5. Ignition cable
6. Ignition transformer
7. Photo cell
8. Reset button

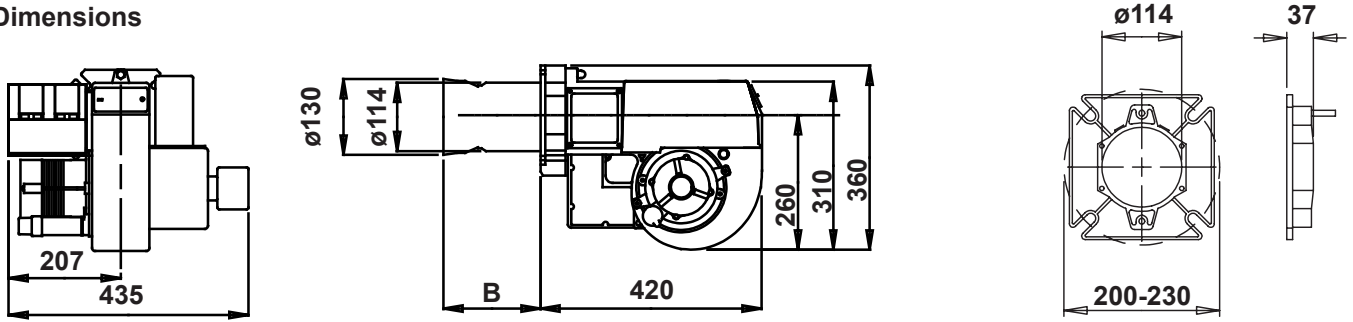
9. Electric panel
10. Cover, inspection glass
11. Indicating lamp
12. Change-over switch
13. Fan wheel
14. Motor
15. Nozzle assembly adjustment
16. Blast tube

17. Damper motor
18. Connecting pipe Stage 2
(Burner with two nozzles)
19. Air damper
20. Air intake
21. Connecting pipe Stage 1
22. Solenoid valve
23. Pump

TECHNICAL DATA

Type designation B40A2

Dimensions



Burner tube	Length of burner tube	Measure B
A	204	174
A	304	274
A	402	372

Output range and nozzles recommended

Burner tube	Oil capacity			Recommended Nozzle		Recommended Pump pressure
	kg/h	kW	Mcal/h	Angle	Type	Bar
A	8,0-29,5	95-350	82-301	45° - 60°	S, B, R, PLP	14

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

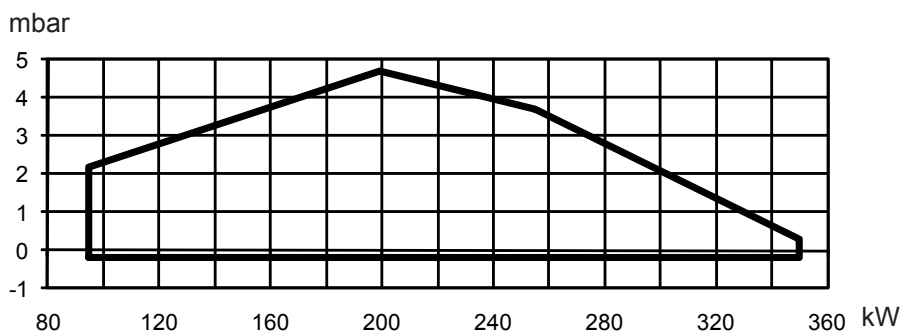
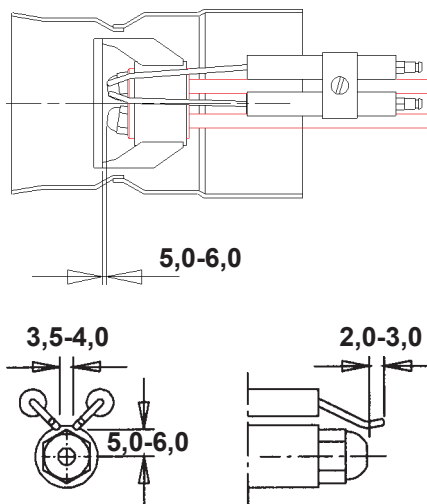
Recommended nozzle

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 boiler manufacturers 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

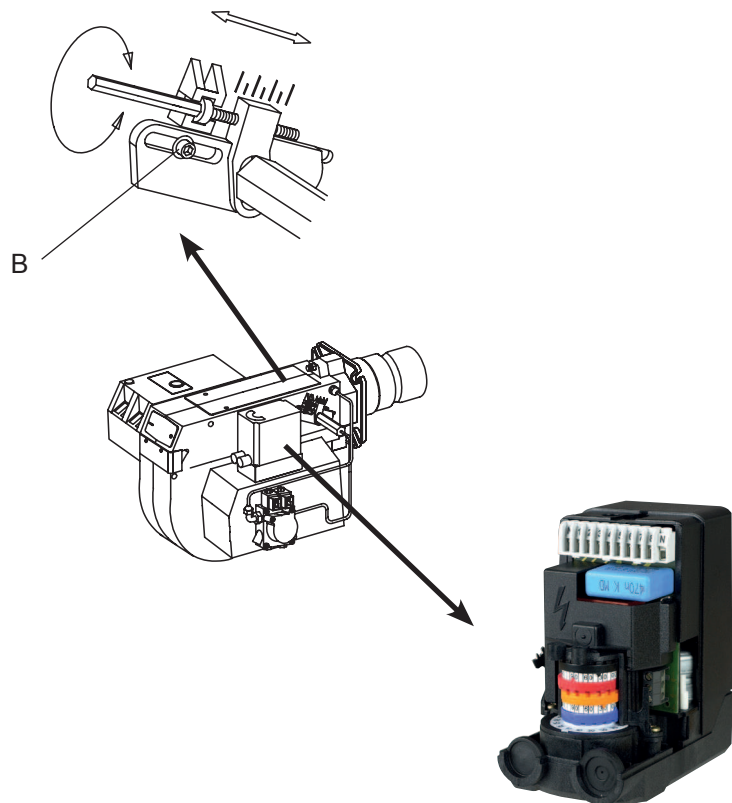
The oil line should be dimensioned in accordance with the pump manufacturer's instruction. In the suction line to the burner a filter should be mounted to prevent any particles in the oil from reaching the burner. If the installation consists of several burners each one should have its own suction line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

Adjustment of nozzle assembly

Loosen the locking screw B and adjust the nozzle assembly to the desired position. Lock the screw B again.



Air adjustment

See page "Air adjustment with damper motor".

AIR ADJUSTMENT WITH DAMPER MOTOR

The damper motor turns the damper between 3 preset positions: fully closed, low capacity and high capacity. These positions are controlled in the motor by cams which are set by means of the coloured disks. In addition there is a black disk controlling the connection of solenoid valve 2.

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

Low capacity:

Adjust the operating switch to high capacity (II).

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

Adjust the operating switch back to low capacity and check.

Full capacity:

Adjust the operating switch to low capacity (I).

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

If the red cam is moved, change the black cam as much. Adjust the operating switch back to high capacity and ensure that the correct air volume has been obtained.

Note!

The blue cam is the limit position for fully closed damper and it is normally not necessary to change it.

Releasing button

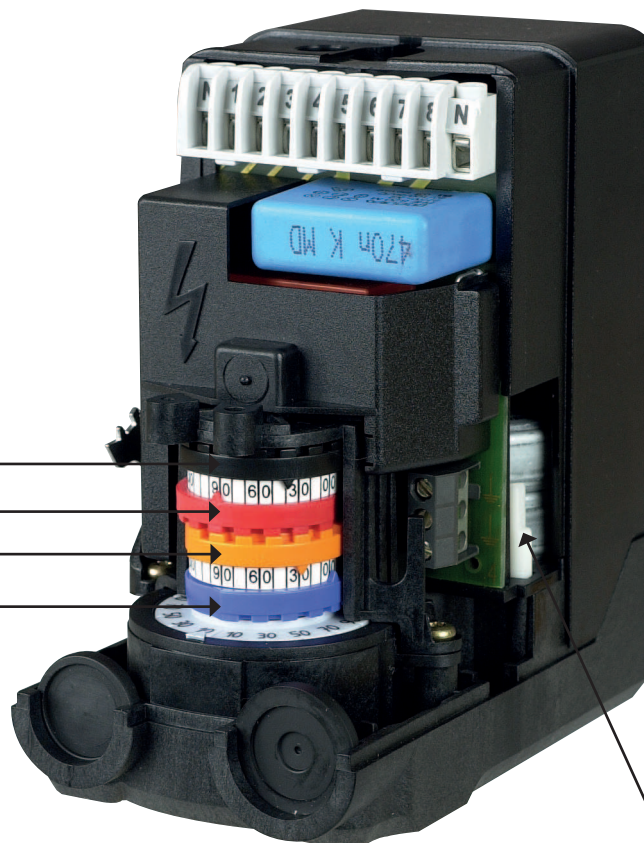
By pressing the button and snapping it down, the motor will be released and the damper can easily be turned. This function facilitates an exchange of damper motor.

Solenoid valve High capacity (black)

High capacity (red)

Low capacity (orange)

Closed damper (blue)



Releasing button

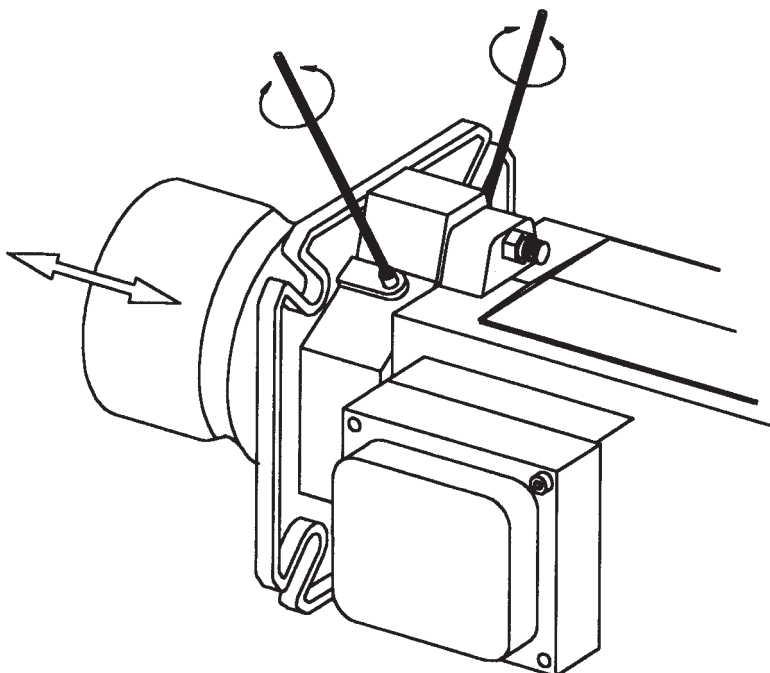
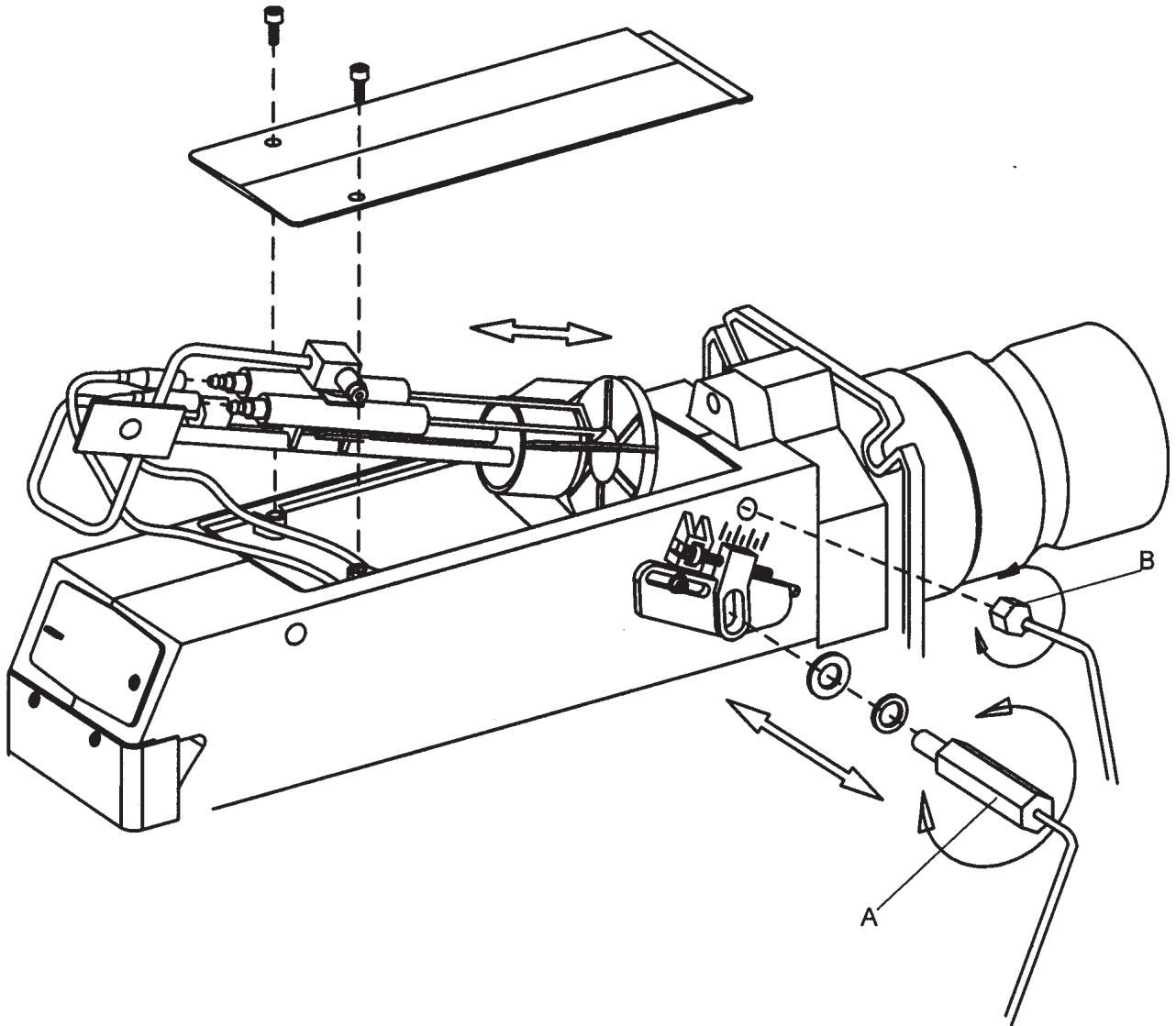
N.B. The upper position is the standard position

MAINTENANCE

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

Service of burner head

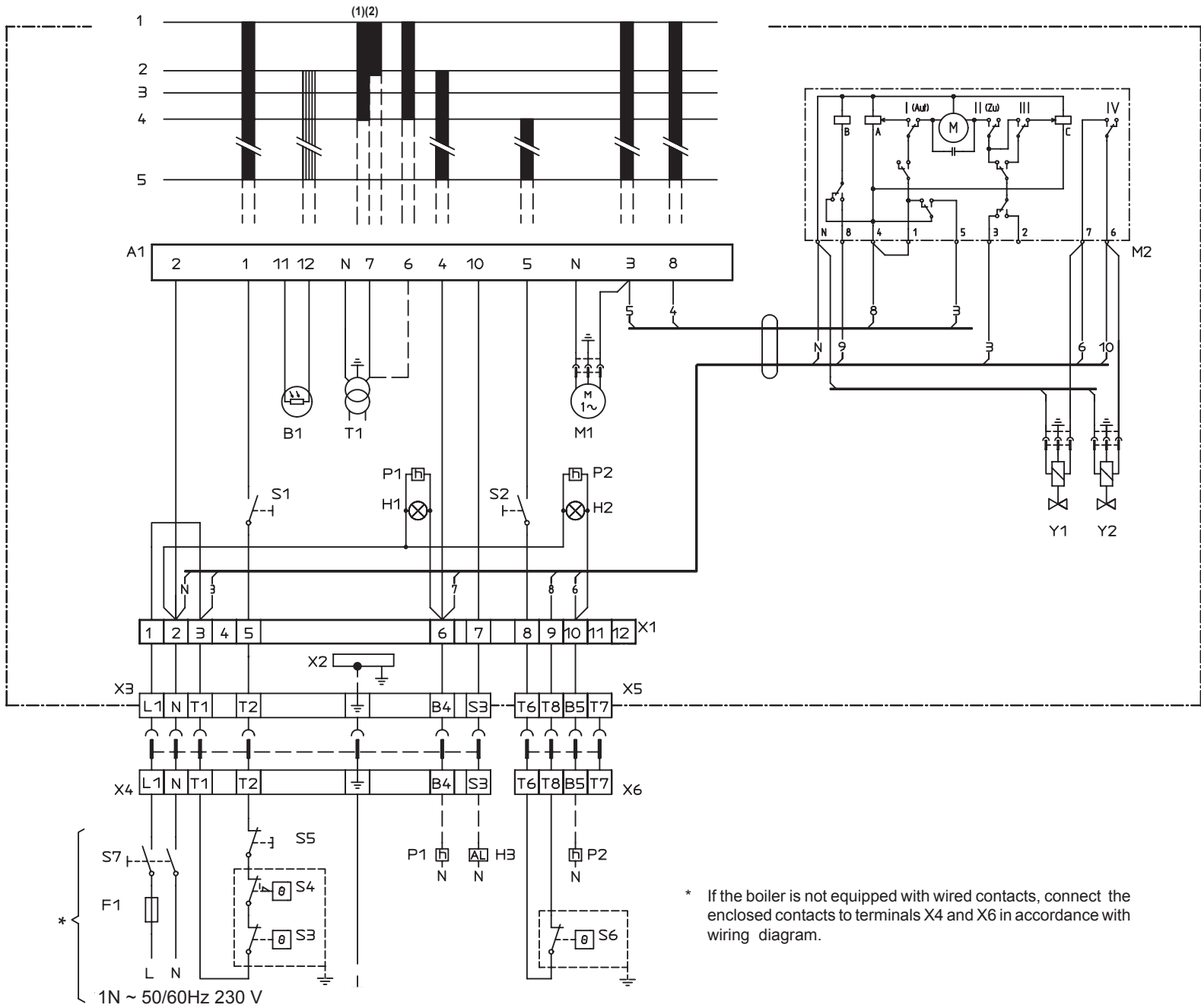
Open the cover and disconnect the connecting pipes by loosening screw A and nut B.



1. Loosen or swing out the burner from the boiler.
2. Loosen 2 fixing screws and with draw the blast tube.

ELECTRIC EQUIPMENT

Oil burner control: LOA21... / LOA24...
Wiring diagram



* If the boiler is not equipped with wired contacts, connect the enclosed contacts to terminals X4 and X6 in accordance with wiring diagram.

ELECTRIC EQUIPMENT

List of components

- A1 Oil burner control
- B1 Photoresistor
- F1 Fuse
- H1 Lamp, low capacity
- H2 Lamp, high capacity
- H3 Lamp, lock-out signal 220 V
- M1 Burner motor
- M2 Damper motor SQN75.244A21B
- P1 Time meter, low capacity (optional)
- P2 Time meter, high capacity (optional)
- S1 Operating switch
- S2 Operating switch, high/low capacity
- S3 Control thermostat
- S4 Temperature limiter
- S5 Micro switch for hinged door
- S6 Control thermostat, high/low
- S7 Main switch
- T1 Ignition transformer
- X1 Connection terminal board
- X2 Earth terminal
- X3 Plug-in-contact, burner
- X4 Plug-in-contact, boiler
- X5 Plug-in-contact high/low capacity , burner
- X6 Plug-in-contact high/low capacity, boiler
- Y1 Solenoid valve 1
- Y2 Solenoid valve 2

If S6 is missing connection between T6 and T8.

Mains connection and fuses in accordance with local regulations.

ELECTRIC EQUIPMENT

Function

1. Switch on operating switch and twin thermostat

A spark is formed. The air damper motor opens the damper to low load position. The burner motor starts, 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.

- (1) The ignition spark goes out 15 s. after flame indication (**LOA24.171...**).
- (2) The ignition spark goes out 2 s. after flame indication when the ignition transformer is connected to terminal 7 (**LOA24.173...**).

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. High/Low thermostat ON

The burner is in operating position and can now change between full load and low load.

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

- (2) If a post-ignition of 15 s. is wanted, move the ignition transformer from terminal 7 to terminal 6 (**LOA24.173...**).

Technical data

Pre-ignition time:	13 s
Pre-purge time:	13 s
(1) Post-ignition time:	15 s
(2) Post-ignition time:	2 s
Safety lock-out time:	10 s
Reset time after lockout:	≈ 50 s
Reaction time on flame failure:	max. 1 s
Ambient temperature:	from - 20 to + 60°C
Min. current with flame established:	65 μ A
Max. photo current at start:	5 μ A
Enclosure:	IP 40
(Under voltage proof only LOA24...)	

Control of photo current

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

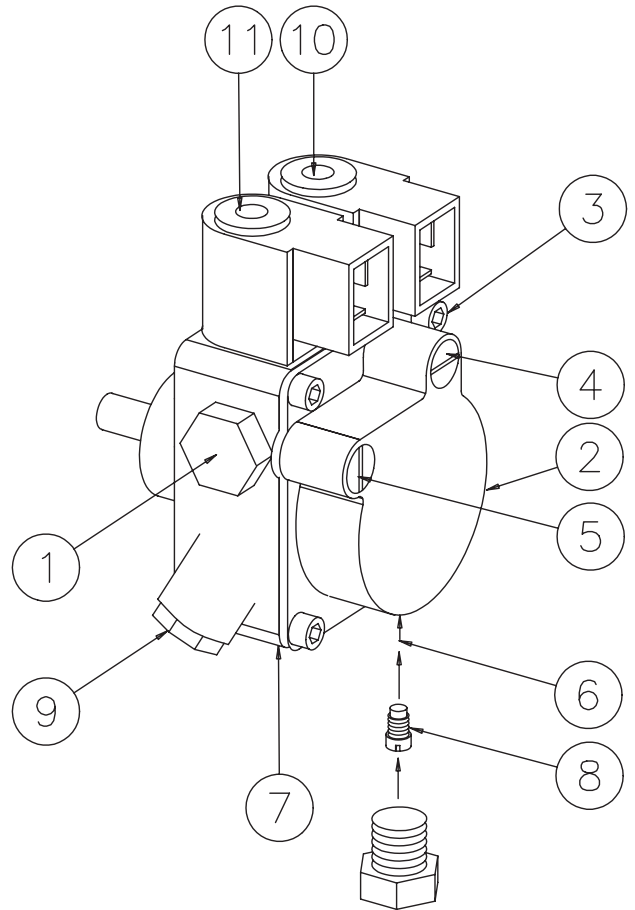
INSTRUCTIONS PUMP TYPE SUNTEC A2L 65C - 75C

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 commis- sioning 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.

<p>1-pipe system</p>				
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	
<p>Two-pipe system</p>				
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
<p>1-pipe system</p>				
Height	Pipe diameter			
H	ø6 mm			
m	m			
<p>With an underlying tank a 1-pipe-system is not recommended</p>				
<p>Two-pipe system</p>				
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.

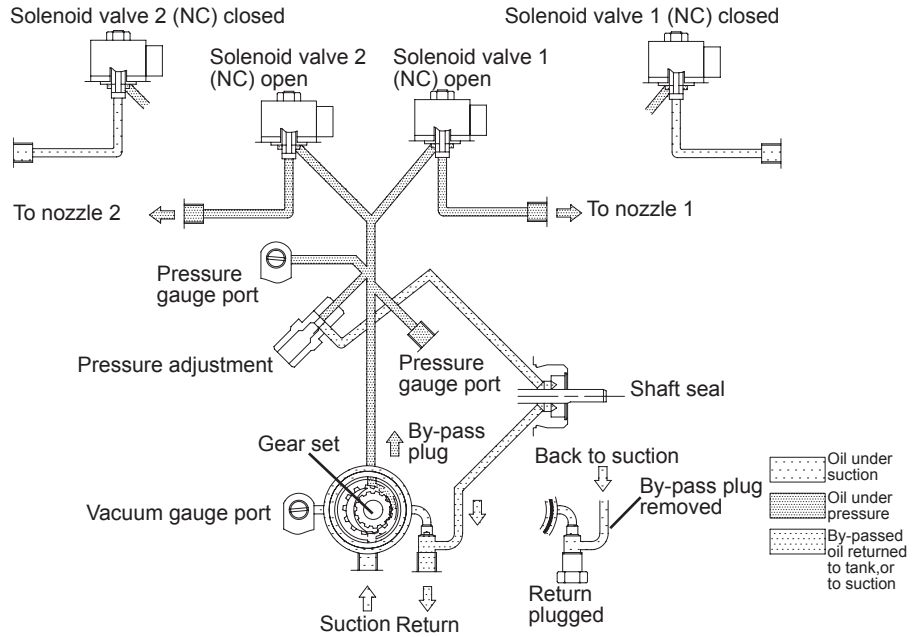
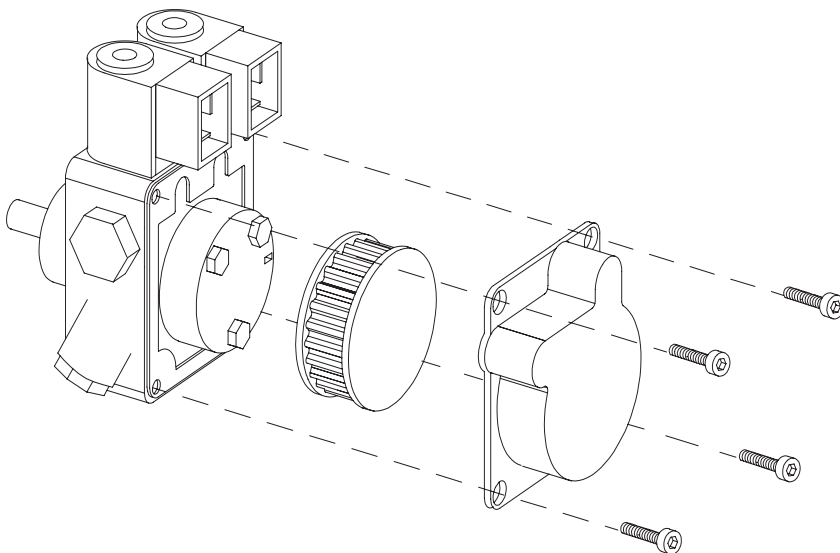
Bleed

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.

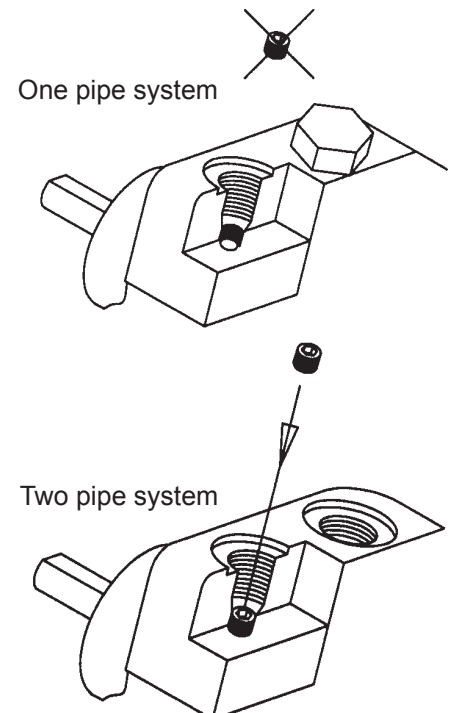
One pipe installation
Shaft rotation and nozzle location seen from shaft end

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.

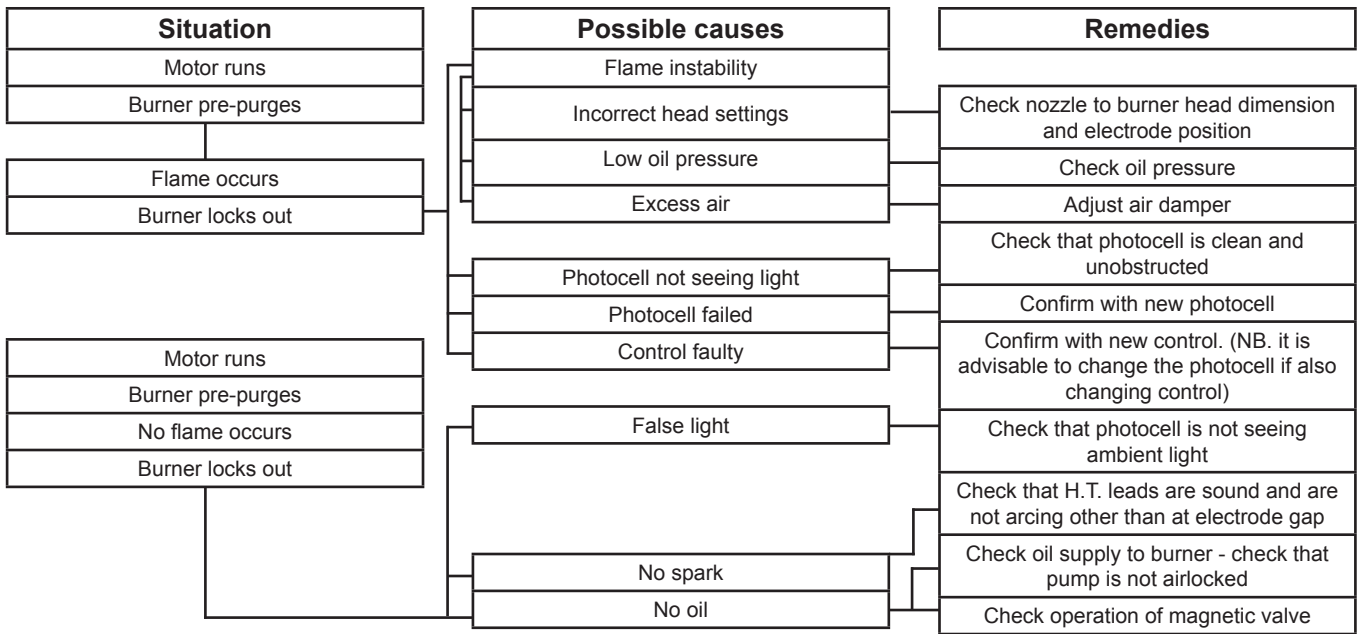
Burner with preheater

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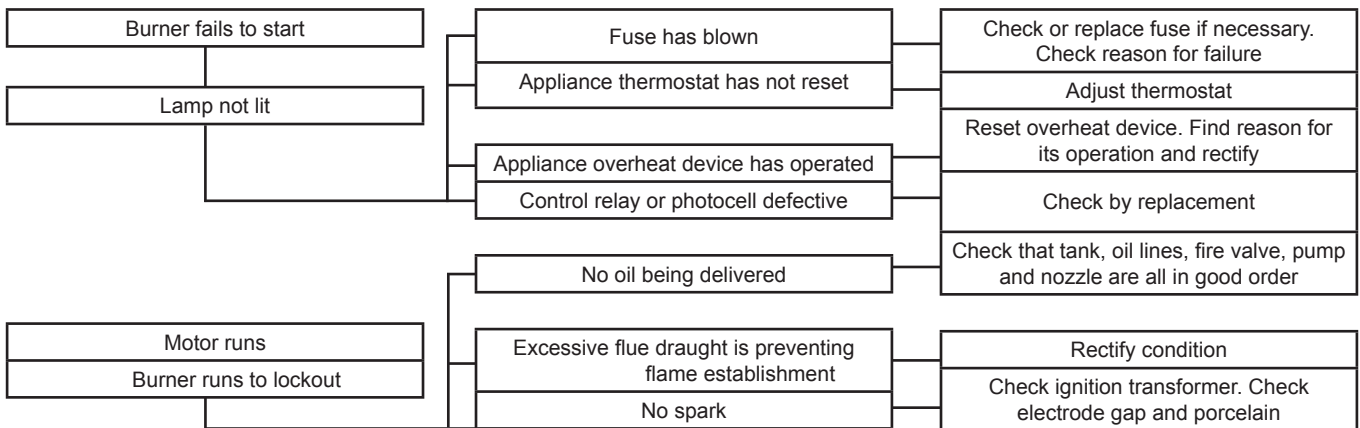
- Rise in temperature at the nozzle
- Design of nozzle
- Capacity (high capacity - small difference)

FAULT LOCATION

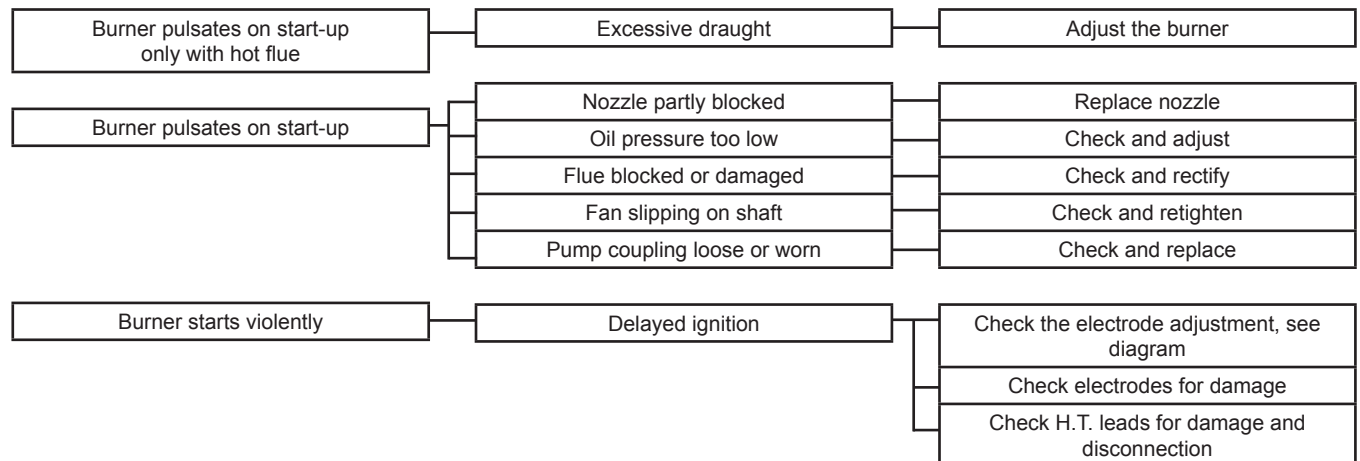
Burner fails to start



Burner fails to start after normal operation



Delayed ignition, burners starts violently



Försäkran om överensstämmelse
Declaration of conformity
Konformitätserklärung
Déclaration de conformité



Brännare, Burner, Ölbrenner, Brûleur

Certifikat TÜV Süddeutschland

Certifikat nr.	Typ, Type:	Certifikat nr.	Typ, Type:
08128915006	BF 1	02119815003	B 20, B 30, B 40, B 45
01111110535004	B 1	02119815004	B 50, B 60, B 70, B 80
0207110535005	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

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

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

Enertech AB erklärt 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
EN 60335

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

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

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

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

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

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

Enertech AB, Bentone Division/
är kvalitetscertifierat enligt/
is quality certified according to/
ist nach dem Qualitätsmanagement /
est certifiée à la norme de qualité
SS-EN ISO 9001:2008

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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.

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.

