

Installation- and maintenance instruction

B55, B65

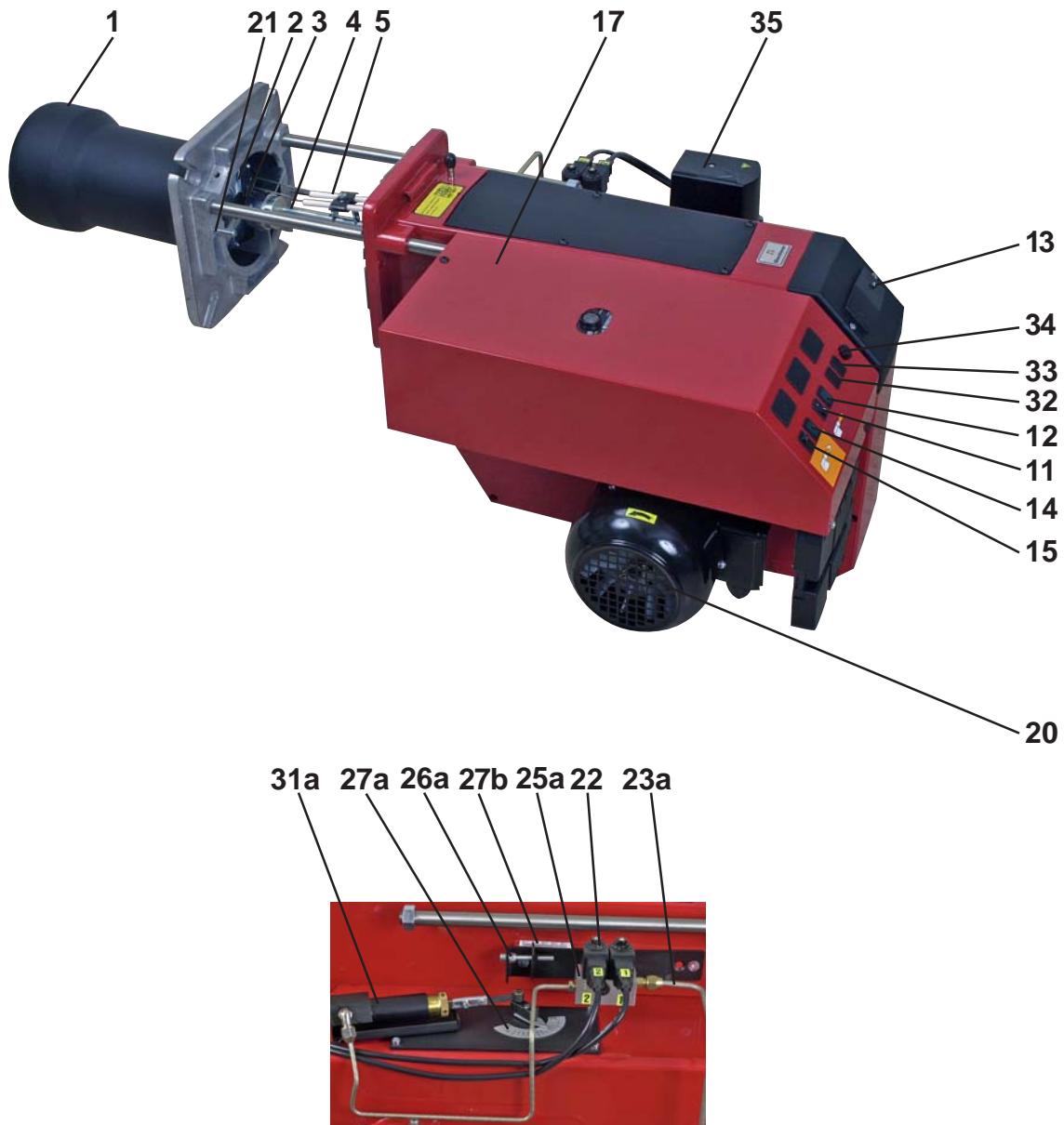
Model 2H, 2R, 3R

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01. GENERAL

Description B55/B65

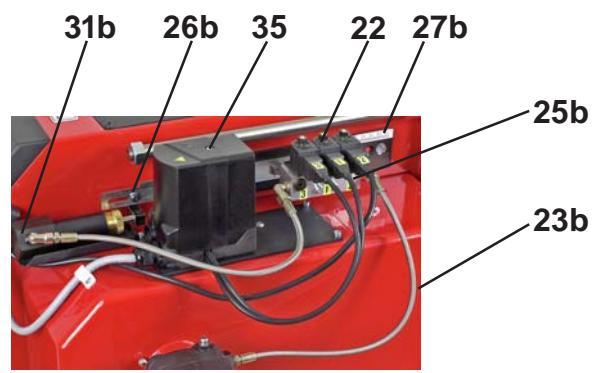
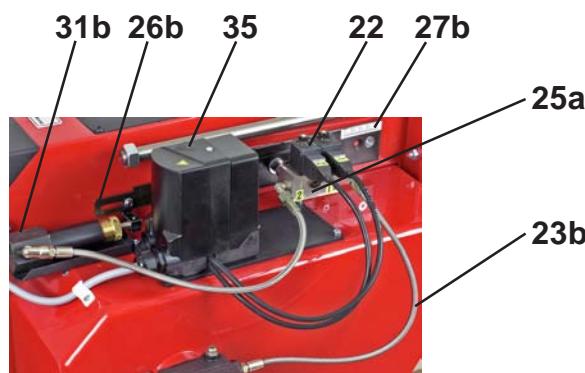
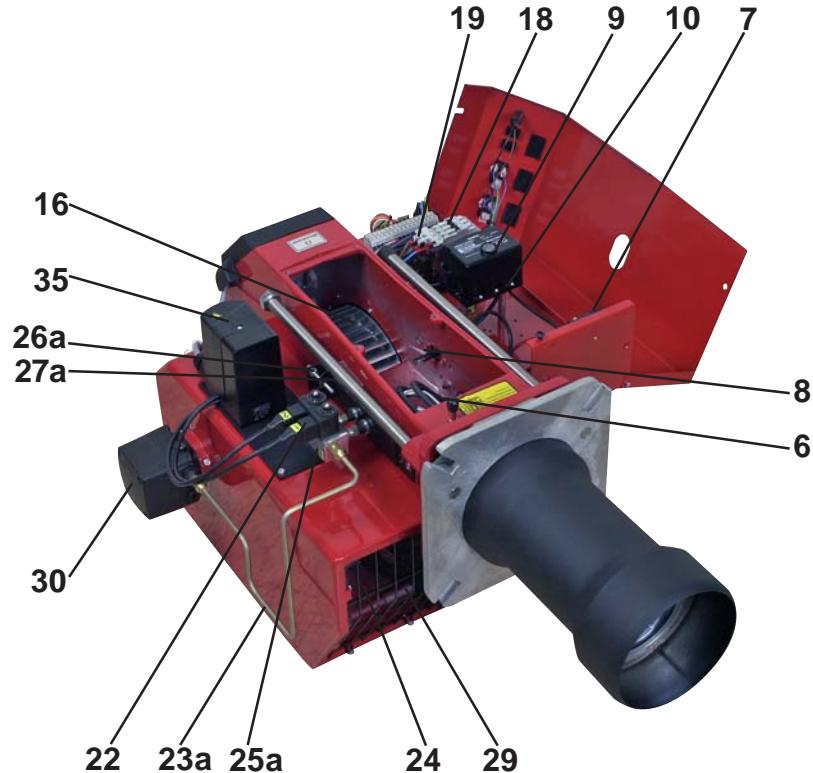


Components

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

01. GENERAL

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

Declaration of conformity

Manufacturer: Enertech AB, Bentone Division
Street address: Näsvägen
Address: SE-341 34 Ljungby
P.O. Box 309
SE-341 26 Ljungby
Sweden
Product: Oil burner

Type: B 1, B 2, B 9, B 10, B 11, B 20, B 30, B 40, B 45, B 50,
B 55, B 60, B 65, B 70, B 80, ST 97, ST 108, ST 120,
ST133, ST 146

Certifikat TÜV Süddeutschland
Certifikat Nr Burner
0111110535004 B1
0207110535005 B2
02119815001 ST97, ST108, ST120, ST133, ST146
02119815002 B9, B10, B11
02119815003 B20, B30, B40, B45
02119815004 B50, B60, B70, B80
040588622001 B55
040588622002 B65

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

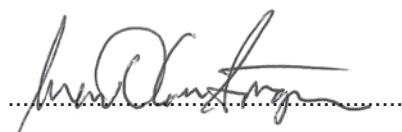
and follows the provisions of applicable parts in the following EU Directives:
89/336/EEC Electromagnetic compatibility
73/23/EEC Low-voltage directive
89/392/EEC Machinery directive
92/42/EEC Efficiency directive

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

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

Ljungby, Sweden 050906

Sven-Olov Lövgren



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.

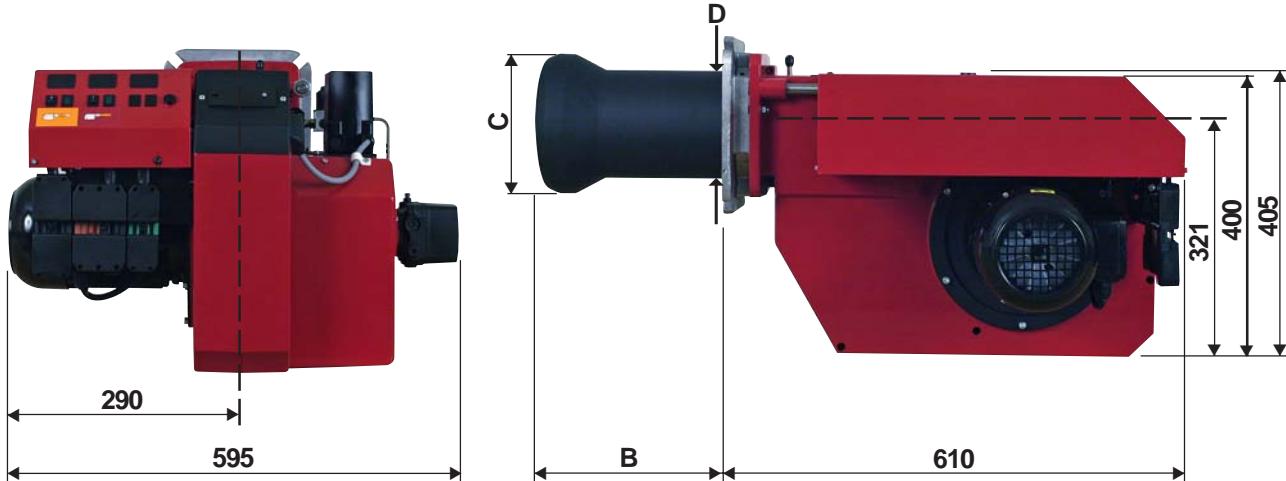
Setting the burner

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.

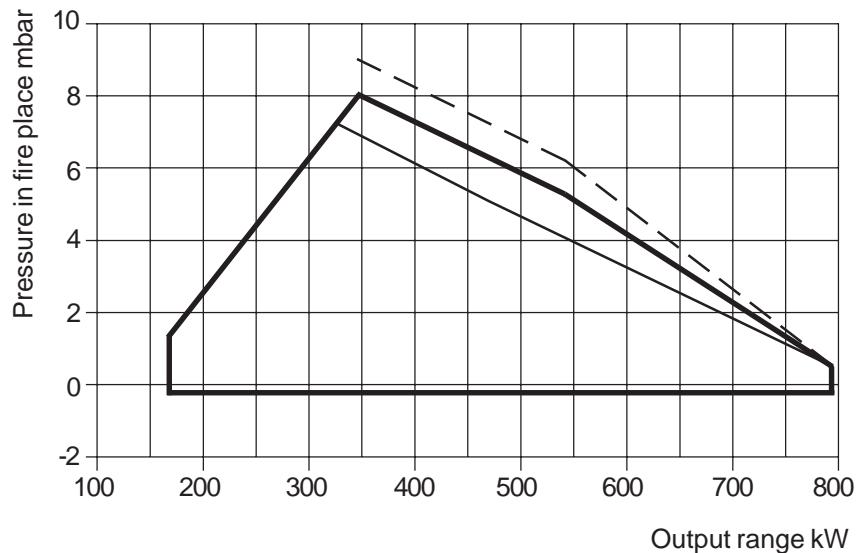
02. TECHNICAL DATA

Working field

B55-2

14-67 kg/h
166-795 kW

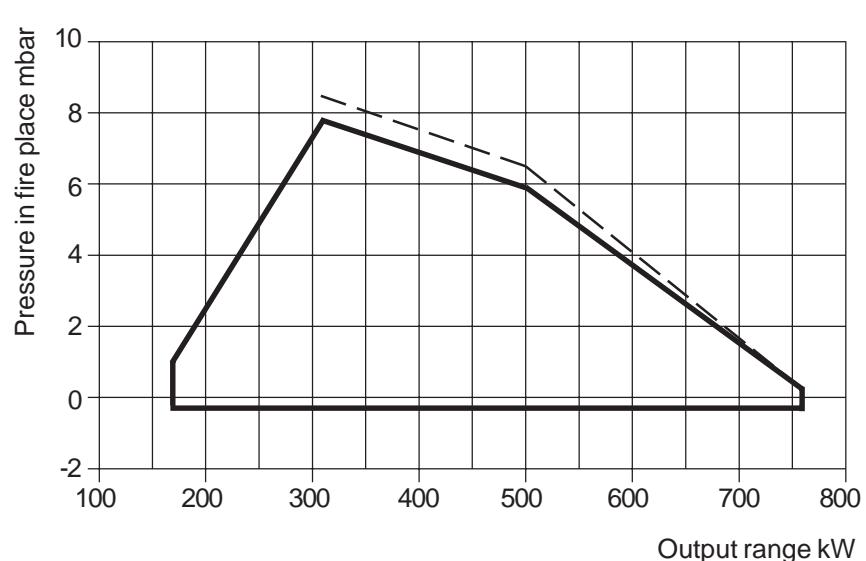
— B55-2R
— B55-2H/B55-2
- - - - Measured (test)



B55-3R

14-64 kg/h
166-759 kW

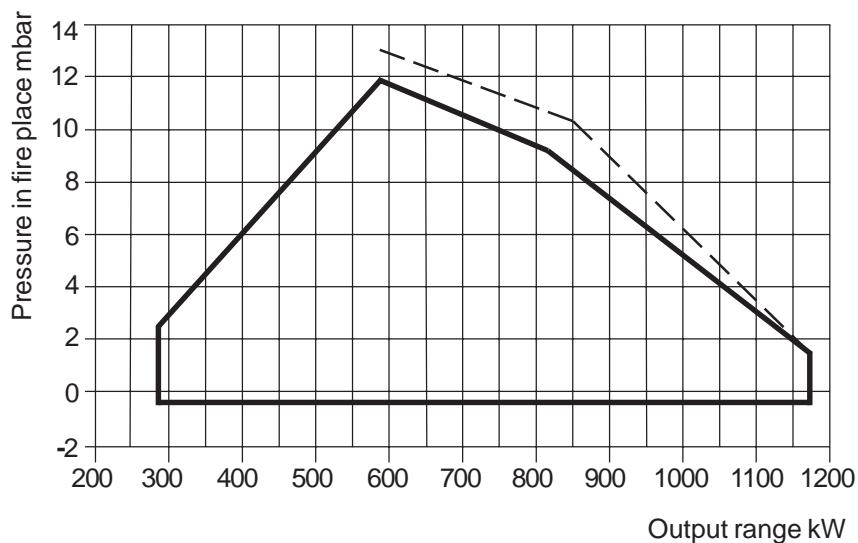
— B55-3R
- - - - Measured (test)



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

Gph	10			11			12			13			Pump pressure bar		
	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h	kg/h	kW	Mcal/h
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	36,71	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			Pump pressure bar		
	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 mm²/s (cSt) with density 830 kg/m³.

3(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.

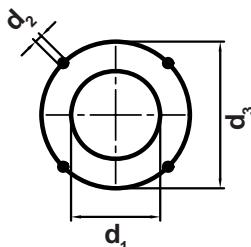
Setting of the brake plate and air flow

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.

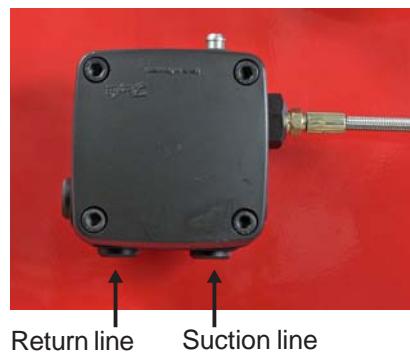
Installing the burner



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 filter (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 : $770 \times 0,6 = 460$ kW $460 / 11,86 = 38,8$ kg/h
Nozzle Stage 2 : $770 \times 0,4 = 310$ 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

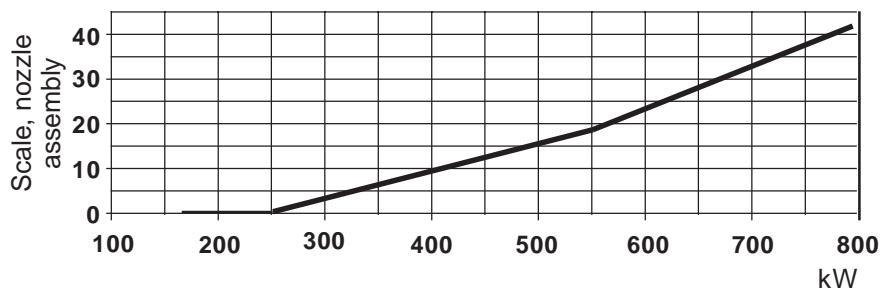
Basic settings
B65-3R

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

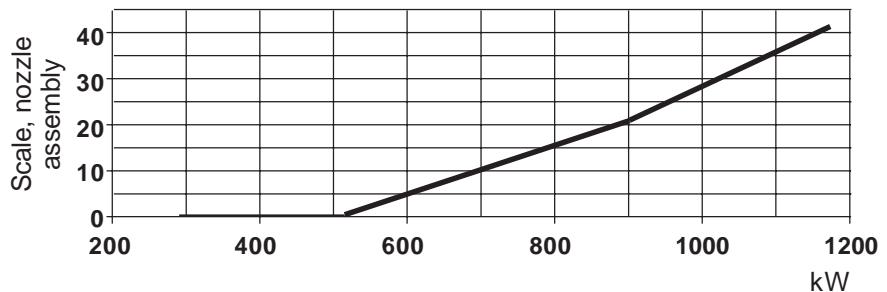
The cams for Stage 2 (MV 2) and Stage 3 (MV 3) must be placed between the cams for Stage 1 and Stage 2, and between Stage 2 and Stage 3, respectively. The positions of MV 2 and MV 3 are determined by the boiler characteristics when switching between stages, but for a basic setting the cams (MV2 and MV3)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

04. BASIC SETTINGS

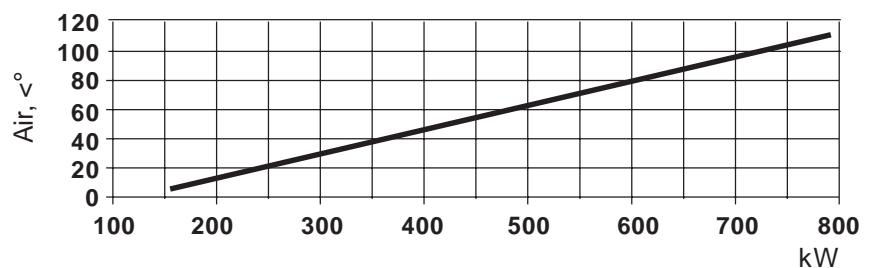
Set values for nozzle assembly B55



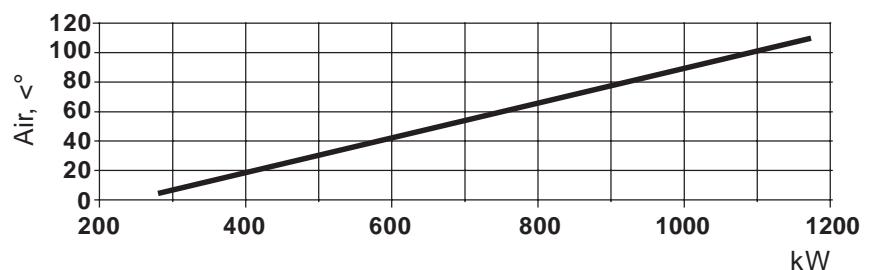
Set values for nozzle assembly B65



Set values for air damper B55

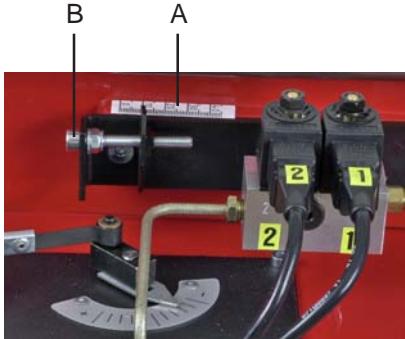


Set values for air damper B65



04. BASIC SETTINGS

Nozzle assembly regulation – fixed brake plate



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

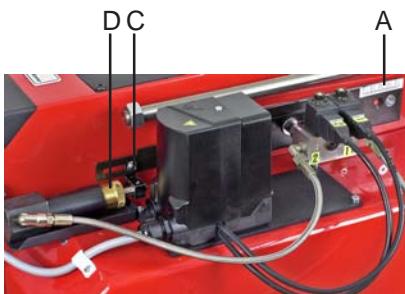
Nozzle assembly regulation should be adjusted for Stage 2 output.

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.

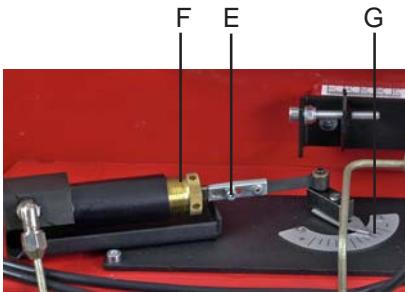
Adjust to the desired position on the scale (A) by sliding the plate to the desired position. Tighten the locking nut (C).

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 (l). Undo the screw (E), turn the damper to the desired position and retighten the screw (E).

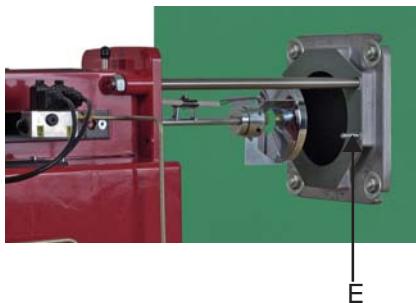
Stage 2

Set the control switch (S2) to high load (l). 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.

05. MAINTENANCE

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

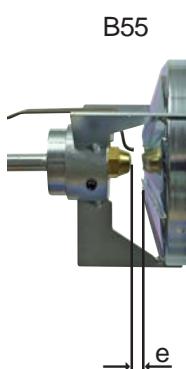
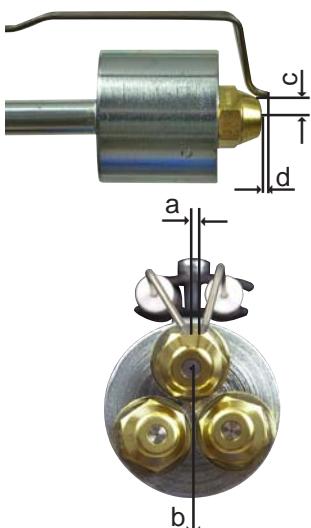
Adjustment dimensions for ignition electrodes.



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!

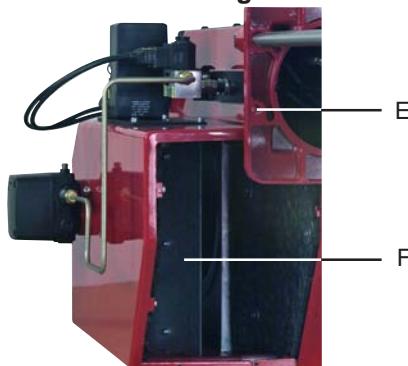
It is important that the spark does not strike the brake plate or nozzle.



05. MAINTENANCE

Servicing the air damper

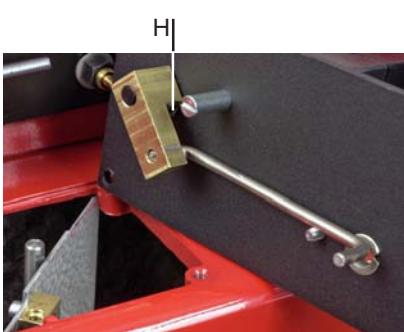
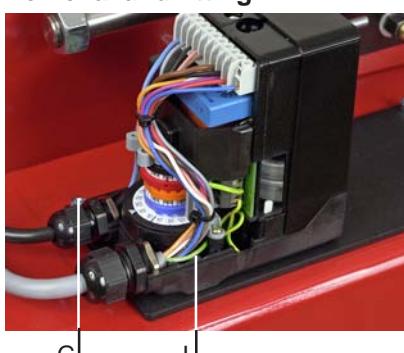
Removal and fitting



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

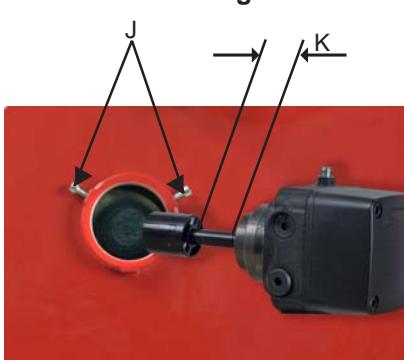
Removal and fitting



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 mm ² /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 filter 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

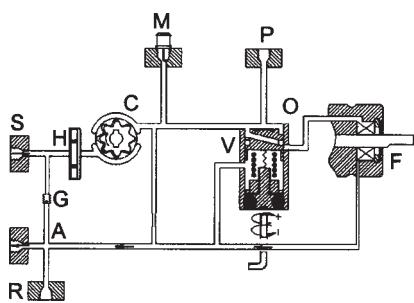
Function Danfoss RSA 95 - 125

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.



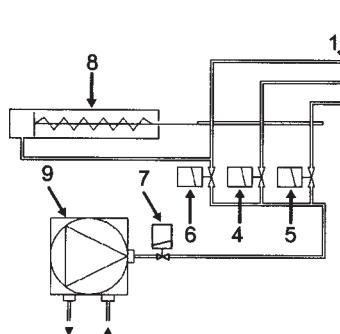
When the pump is stopped, the pump output drops and produces a drop in the oil pressure. The spring in the regulating valve presses the regulating piston forward until it seals in port "P". This cuts off the oil flow to the nozzle and ensures that the nozzle line is effectively shut off.

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

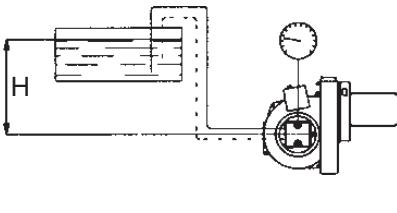
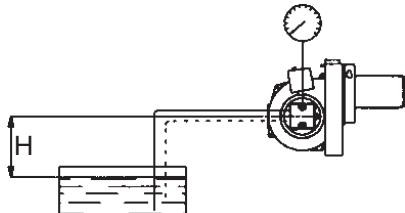


1. Nozzle Stage 1
2. Nozzle Stage 2
3. Nozzle Stage 3
4. Solenoid valve Stage 1 (Y1)
5. Solenoid valve Stage 2 (Y2)
6. Solenoid valve Stage 3 (Y3)
7. Safety valve for nozzle (Y1S)
Only for capacities over 100 kg/h or on special request by customer.
8. Hydraulic control device
Only on burners with hydraulic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

06. INSTRUCTIONS PUMP TYPE RSA 95 & 125

Suction line tables

																																																																																											
<p>1-pipe system</p> <table> <thead> <tr> <th></th> <th>Height</th> <th>Pipe diameter</th> </tr> <tr> <th>H</th> <th>ø12mm</th> <th>ø15mm</th> <th>ø20mm</th> </tr> <tr> <th>m</th> <th>m</th> <th>m</th> <th>m</th> </tr> </thead> </table> <p>With an overlying tank a 1-pipe-system is not recommended.</p>		Height	Pipe diameter	H	ø12mm	ø15mm	ø20mm	m	m	m	m	<p>1-pipe system</p> <table> <thead> <tr> <th></th> <th>Height</th> <th>Pipe diameter</th> </tr> <tr> <th>H</th> <th>ø12mm</th> <th>ø15mm</th> <th>ø20mm</th> </tr> <tr> <th>m</th> <th>m</th> <th>m</th> <th>m</th> </tr> </thead> </table> <p>With an underlying tank a 1-pipe-system is not recommended</p>		Height	Pipe diameter	H	ø12mm	ø15mm	ø20mm	m	m	m	m																																																																				
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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.

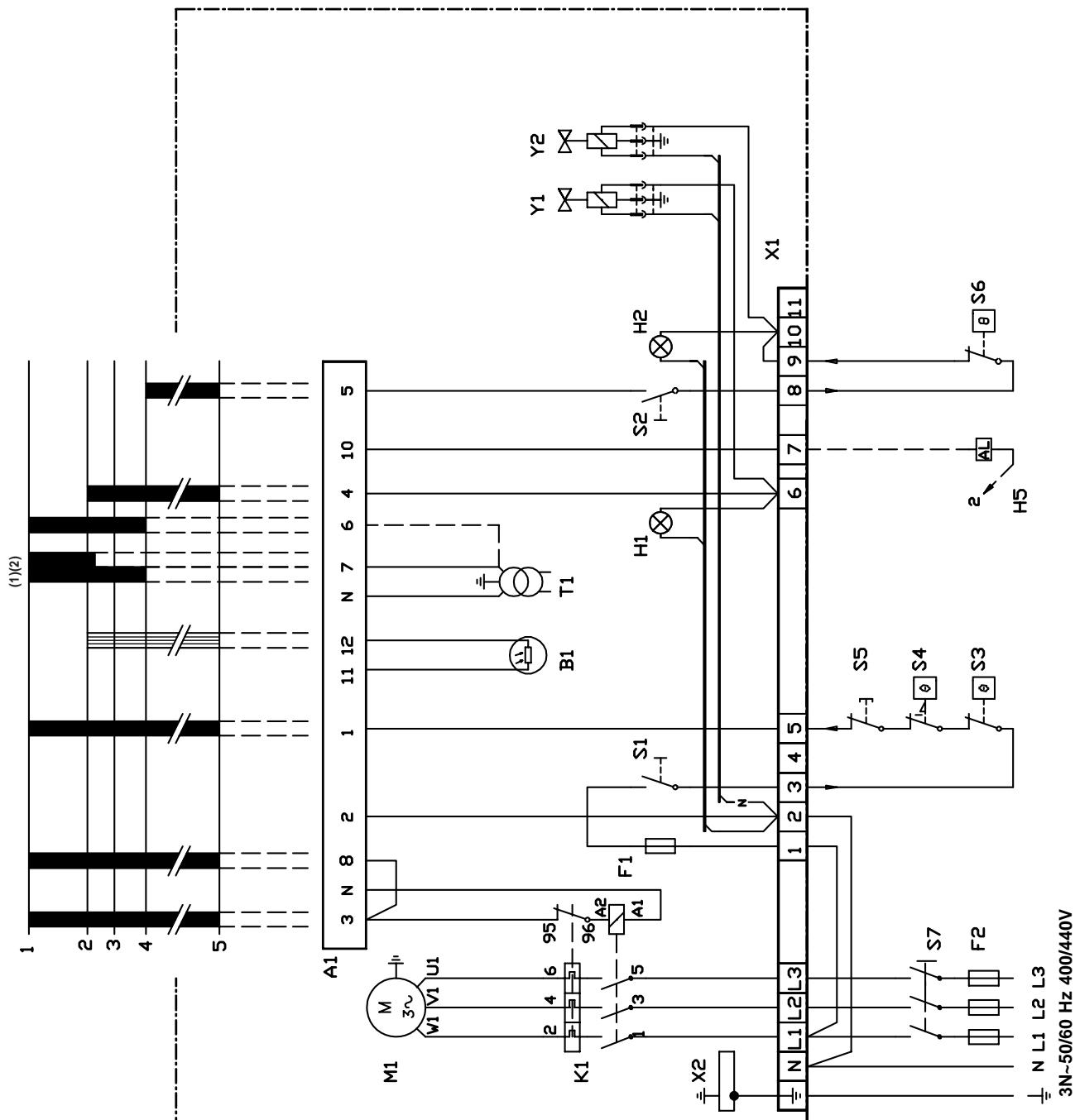
In addition to drawn copper piping a pipe system usually comprises 4 elbows, a non-return valve, a cut-off valve and an external oil filter. The sum of these individual resistances is so insignificant that they can be disregarded.

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 mm²/s.

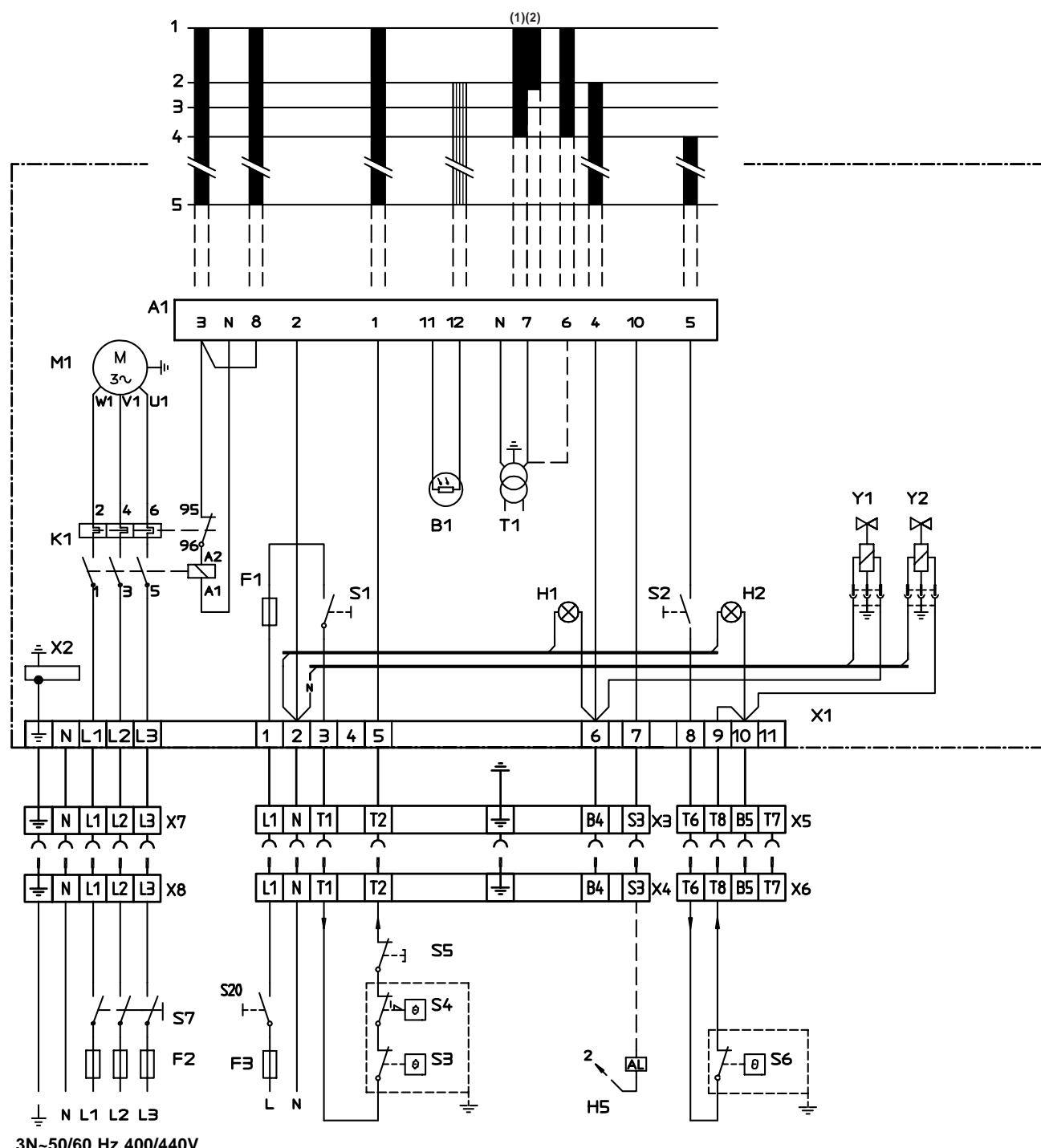
09. ELECTRIC EQUIPMENT

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



09. ELECTRIC EQUIPMENT

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



3N~50/60 Hz 400/440V

09. ELECTRIC EQUIPMENT

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

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

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

- 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 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 µA	65 µA
Max. photo current at start:	5 µA	5 µA
Enclosure:	IP 40	IP 40

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).

10. FAULT LOCATION

Burner fails to start

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

Burner fails to start after normal operation

Burner fails to start	Fuse has blown	Check or replace fuse if necessary. Check reason for failure
Lamp not lit	Appliance thermostat has not reset Appliance overheat device has operated	Adjust thermostat Reset overheat device. Find reason for its operation and rectify
	Control relay or photocell defective	Check by replacement
Motor runs	No oil being delivered	Check that tank, oil lines, fire valve, pump and nozzle are all in good order
Burner runs to lockout	Excessive flue draught is preventing flame establishment No spark	Rectify condition 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 Oil pressure too low Flue blocked or damaged Fan slipping on shaft Pump coupling loose or worn	Replace nozzle Check and adjust Check and rectify Check and retighten 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

11. SPARE PART LIST



11. SPARE PART LIST

1. Flame cone 304mm	119 728 0105	11. Adjustment bar 55-3, 65-3	118 450 01	30. Solenoid valve bloc compl. 55-3, 65-3	919 947 02
404mm	119 728 0205	55-2, 65-2	118 290 01		
504mm	119 728 0305				
55					
288mm	119 721 0105	12. Adjustment device 55-R, 65-R	918 299 04	31. Connecting pipe pump-solenoid valve bloc compl.	118 237 01
388mm	119 721 0205	13. Gasket set 55-R, 65-R	118 322 02	55-2H, 65-2H	
488mm	119 721 0305	14. Nozzle key	113 461 01	32. Connecting pipe solenoid valve- adjustment device	118 428 01
65		15. O-ring, nozzle assembly 55-3, 65-3	113 168 02	55-2H, 65-2H	
2. Nozzle assembly 380mm	919 746 01	16. Fixing flange compl.	118 490 02	33. Nipple, connection solenoid valve bloc	118 423 01
480mm	919 746 02	Guide bars	118 093 02		
580mm	919 746 03	Fixing flange	118 235 01	34. Angle	118 404 01
55-2		17. Gasket	112 788 03	55-2, 65-2	
380mm	919 749 01	18. Gasket fan housing-flange	118 398 01	35. Copper gasket 10,2x15x1,5	110 212 16
480mm	919 749 02	19. Motor 0,75kW 3-phase	120 316 01	36. Cable solenoid valve Stage1, 3 700mm	115 975 03
580mm	919 749 03	55		Stage2 900mm	115 975 06
65-2		1,5kW 3-phase	120 316 03	37. Hydraulic hose 55-2, 65-2	118 293 01
368mm	919 750 01	65		38. Hydraulic hose 65-2	116 168 01
468mm	919 750 02	20. Cable 700mm	119 449 03		
568mm	919 750 03	21. Fan wheel 224x62x19	118 245 04	39. Filter set RSA 90, 125	117 833 01
55-3		55			
368mm	919 751 01	22. Drive coupling compl.	118 115 03	40. Control box LAL 1.25	914 939 01
468mm	919 751 02	23. Coupling part, pump	04 390 448 66	LOA44252A27	915 595 02
568mm	919 751 03	24. Coupling part, fan wheel	118 065 01	LMO24.255.R2B	920 242 01
65-3		25. Flange,	119 737 0105	55-2, 65-2	
3. Nozzle line 368mm	118 414 01	motor			
468mm	118 414 02	26. Conical shield plate	117 935 01		
568mm	118 414 04	27. Pump RSA95	110 197 23		
55-3, 65-3		55			
380mm	118 104 01	RSA125	110 197 19		
480mm	118 104 02	65			
580mm	118 104 04	28. Solenoid valve compl.	919 946 01		
55-2, 65-2		Coil	115 971 01		
4. Brake plate 55-2, Ø120mm	119 347 01	29. Solenoid valve bloc compl.	919 947 01		
55-3, Ø120mm	119 735 01	55-2, 65-2			
65-2, Ø120mm	112 841 15				
65-3, Ø120mm	112 841 19				
5. Bracket	112 738 01				
6. Bracket	111 552 01				
7. Ignition electrode pair off 55-3, 65-3	919 247 01				
65-2	919 246 01				
55-2	919 245 01				
8. Adjustment plate compl. 55-2H, 65-2H	118 229 01				
9. Adjustment plate compl. 55-R, 65-R	918 288 01				
10. Axle compl. 55-2, 65-2	918 298 02				
55-3, 65-3	918 298 01				

11. SPARE PART LIST

41. Relay base LAL LOA/LMO 55-2, 65-2	114 942 00	58. Cover, inspection glass	118 242 0205
	915 596 00	59. Inspection cover	117 080 01
42. Flange, Photoresistor QRB1	112 405 01	60. Test nipple	118 053 01
43. Photoresistor compl. QRB-A 700mm	912 409 08	61. Slewing bracket compl.	119 470 01
44. Contactor CI 9	113 110 01	62. Covering plate, servo motor adjustment device 55-2H, 65-2H	118 239 01 05
45. Thermal overload protection 2,7-4,2A 65	113 111 03	63. End piece	118 103 01
1,8-2,8A 55	113 111 06	64. Servo motor SQN75.294A21B 2-stage, LAL SQN75.436A21B 3-stage, LAL SQN75.244A21B 2-stage, LOA/LMO	119 423 03
46. Switch I-II 0-I	120 149 01 120 149 02	65. Air damper compl. 55-2H, 65-2H	918 240 02
47. Time meter	117 678 01	66. Adjustment device 55-2H, 65-2H Spring, compl. adjustment device 55-2H, 65-2H	917 565 03
48. Plug-in contact compl. female 7-pole male 7-pole green male 4-pole female 4-pole 55-2, 65-2 stage 2 55-3, 65-3 stage 3 black male 4-pole female 4-pole 55-3, 65-3 stage 2 male 5-pole female 5-pole	115 586 03 115 585 00 119 197 01 119 198 01 119 103 01 119 104 01 119 199 01 119 200 01	67. Transformer EBI Cabel	115 977 01 117 570 04
49. Indicating lamp green	117 211 03	68. Ignition cable 500mm	119 337 06
50. Fuse holder compl. 55-3, 65-3 55-2, 65-2 Fuse 6,3A	118 118 03 118 118 04 113 322 01	69. Flexible pipe 1500mm	113 542 08
51. Plug-in contact compl. 7+4+5+4-pole 55-3, 65-3 4+7+5-pole 55-2, 65-2	119 486 10 119 486 01	70. Oil filter compl. ½" Filter	114 293 04 914 314 03
52. Locking ring	118 018 01		
53. Inspection glass	118 088 01		
54. Gasket	117 953 01		
55. Protective grating	118 319 01		
56. Cover	118 238 0105		
57. Gasket	118 249 01		