



Installations- och skötselanvisning

B 70-3R

BP230UVFR-S3

RSA 125

**Bruksanvisning i original.
Behåll för framtida bruk.
Läs noggrant innan användning.**

178 060 63-6 CR00734 2024-01-29



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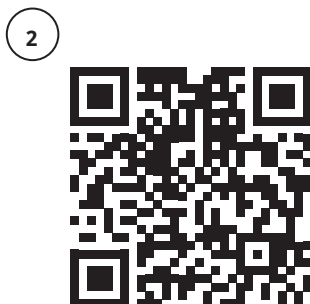
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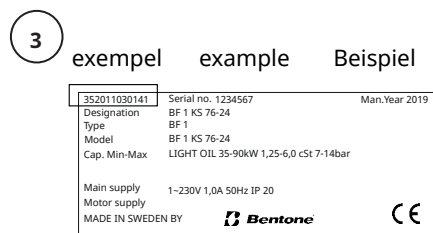
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exempel example Beispiel

| | | |
|-------------------|--|---------------|
| 352011030141 | Serial no. 1234567 | Man.Year 2019 |
| Designation | BF 1 KS 76-24 | |
| Type | BF 1 | |
| Model | BF 1 KS 76-24 | |
| Cap. Min-Max | LIGHT OIL 35-90kW 1,25-6,0 cSt 7-14bar | |
| Main supply | 1-230V 1,0A 50Hz IP 20 | |
| Motor supply | | |
| MADE IN SWEDEN BY | | |

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1. General Information

The burner may only be used for its intended purpose in accordance with the product's technical data.

We reserve the right to make design changes and cannot be held liable for any misprints or typographical errors.

Modifying the design or using accessories or components that have not been approved by CTC in writing is strictly prohibited.

This Installation and Maintenance manual:

- is to be regarded as part of the burner and must always be kept near the installation site.
- must be read prior to installation.
- is intended for use by authorised personnel.

1.1 Delivery inspection

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

1.2 Safety

- before installation:

- Installation and work on the burner and associated system components may only be carried out by persons who have undergone relevant training.
- The product is packaged to prevent damage from occurring when handled – Handle the product with care! Lifting equipment must be used to lift larger packages.
- The products must be transported/stored on a level surface in a dry environment, max. 80% relative humidity, no condensation. Temperature -20 to +60 °C.



- installation:

- The burner must be installed in accordance with local regulations for fire safety, electrical safety, and fuel distribution.
- The premises must comply with local regulations pertaining to use of the burner, and must have adequate air supply.
- The installation site must be free of chemicals.
- Fire extinguisher with Class BE recommended.
- Make sure when installing the burner that there is enough space to service the burner.
- The electrical installation must be professionally carried out in accordance with current mains electricity regulations and in a professional manner.
- Make sure that the burner is suitable for the application (see Technical Data).
- All components must be installed without being bent, twisted or subjected to mechanical or thermal forces that affect components.

- Care must be taken by the installer to ensure that no electrical cables or fuel lines are pinched or otherwise damaged during installation or service.
- Flame tubes, fan wheels and air dampers, for example, may contain sharp edges.

- before first start:

- The burner must not be put into operation without proper safety and protection devices.
- Permitted ambient temperature during operation -10 to +60 °C. Max. 80% relative humidity, no condensation.
- The surface temperature of the burner's components may exceed 60 °C.
- Handle with caution – the burner has moving parts, and there is risk of crushing injuries.
- Seal inspections must be performed during installation and servicing to prevent leakage.
- fitting and installation work has been completed and approved.
- electrical installation has been correctly performed.
- flue gas ducts and combustion air ducts are not blocked.
- all actuators and control and safety devices are in working order and correctly set.
- If the boiler is equipped with an access hatch, this must be equipped with a hatch opening switch connected to the burner's safety system.
- When in operation, the burner's noise level can exceed 85 dBA – use hearing protection!

- Operation:

- Carry out all stipulated settings, service and inspection work within the set time.
- If the oil burner control has a solid red light, contact your installer.



2. Technical data

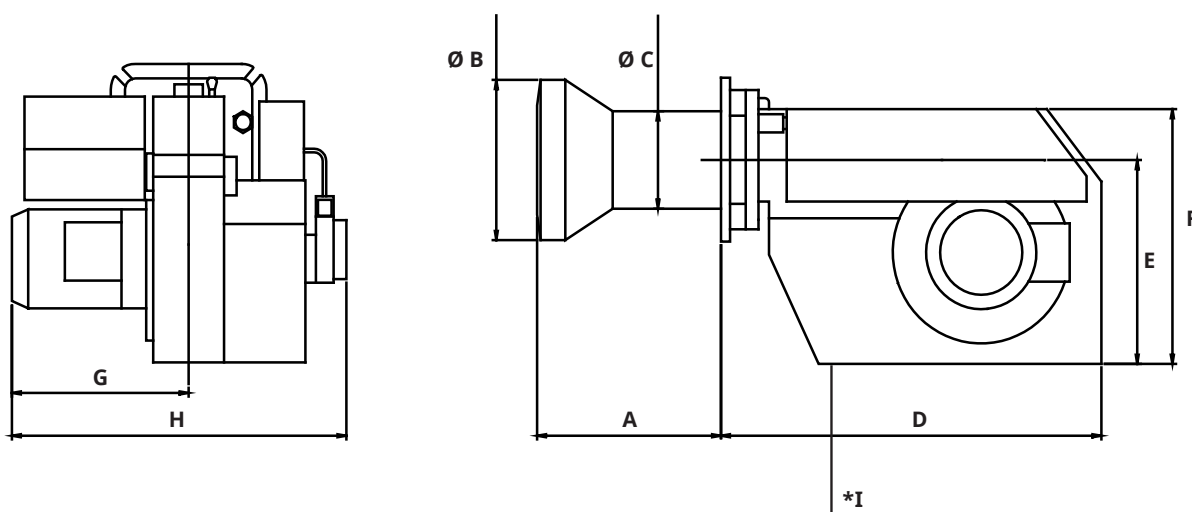
The burner is intended for:

- Operation in installations according to EN 303 and EN 267.

Fuels:

- HVO/XTL according to EN 15940.
- Fuel oil according to DIN 51603-1.
- Fuel oil A Bio 10 according to DIN 51603-6.

2.1 Dimensions B 70-3R



| A | Ø B | Ø C | D | E | F | G | H | *I |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|
| 324/624 | 220 | 205 | 730 | 408 | 504 | 420 | 830 | 200 |

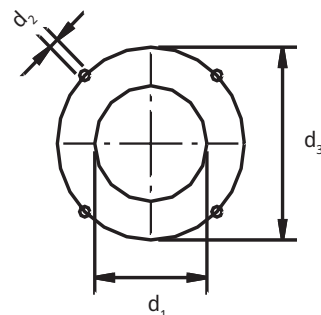
* Min. recommended distance to floor.

2.2 Burner installation

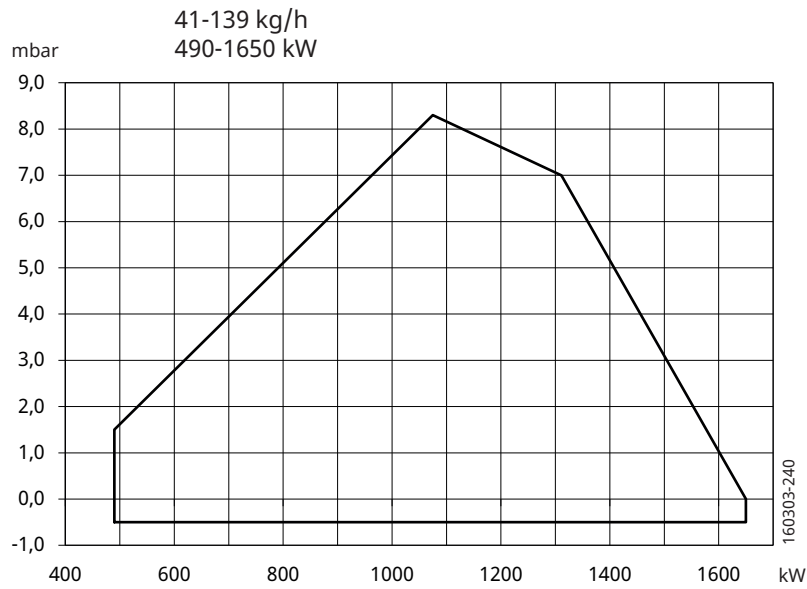
2.2.1 Hole patten

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

| d_1 | d_2 | d_3 |
|-------------|-------|-----------------|
| Ø (205) 225 | 14 | Ø (310) 324-390 |



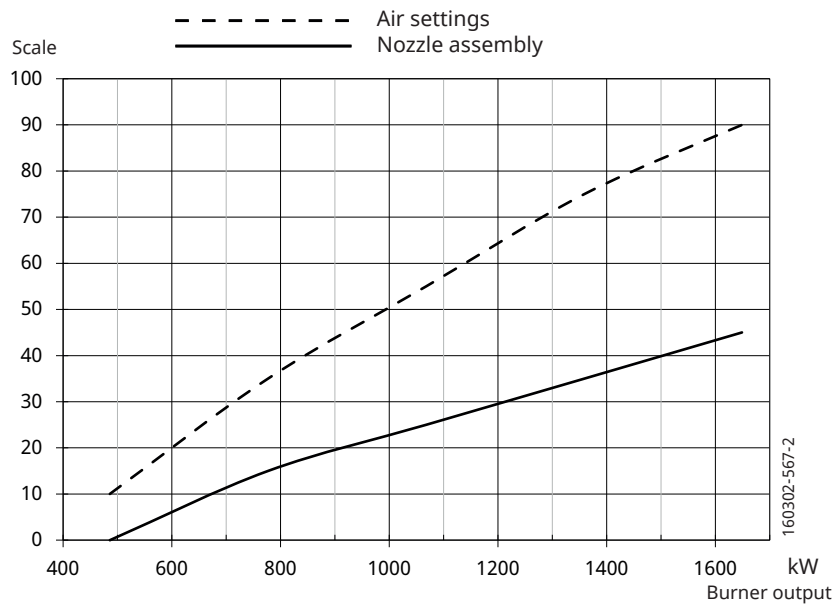
2.3 Working field



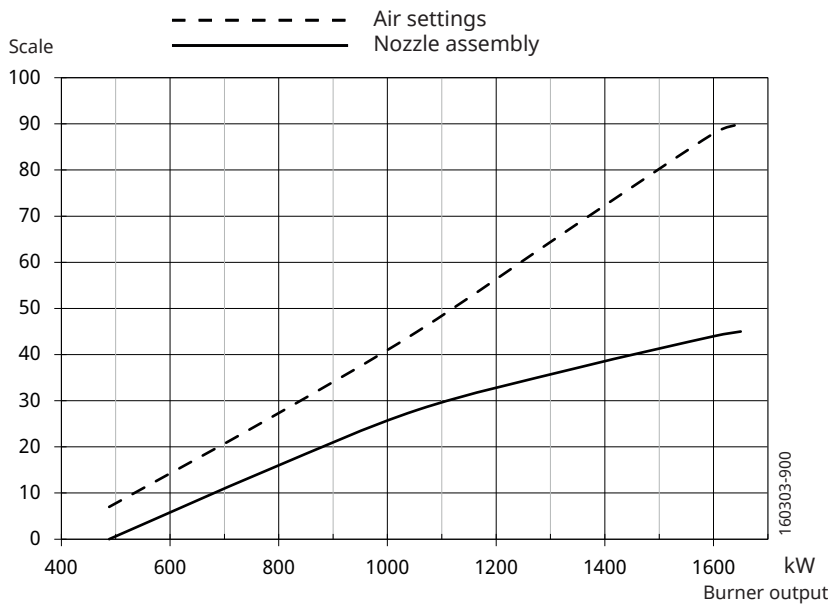
! Do not exceed working field.

2.4 Basic settings - Fuel oil

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



2.5 Basic settings - HVO/XTL



2.6 Technical specification

| B 70-3R | |
|--------------------------------------|----------------------------|
| Main supply, Operating ¹⁾ | 230V, 1~, 2.7A, 50Hz, IP20 |
| Main supply, Motor | 230/400V, 10.4/6.0A |
| Max fuse rating, Operating | 6.3A |
| Max fuse rating, Motor | 10A |
| EI _{min} | 0.4/4.9A |
| EI _{max} | 0.66/5.4A |
| P _{SB} | 0.03A |
| NO _x -class | 2 |
| Sound power (dBA) L _{WA} | 95dBA |

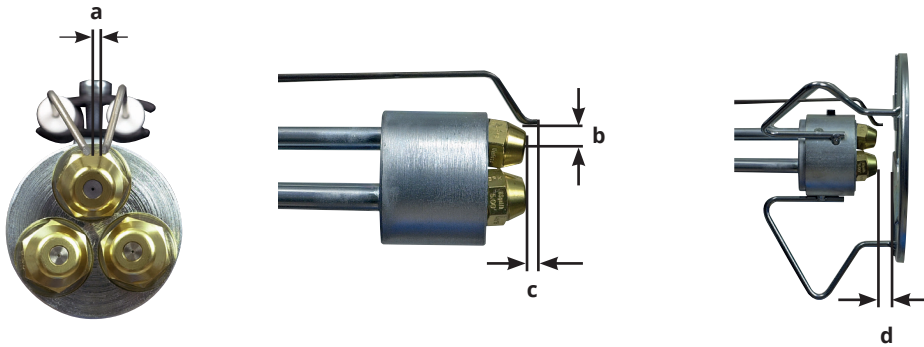
¹⁾ Motor excluded.

Measurements according to EN 15036-1:2006

Alt.1 The noise level of the burner can be reduced by equipping the burner with silencer. Installation must be done so it does not prevent air supply to the burner.

Alt.2 The burner's noise level can be reduced by connecting the burner's air intake to the air duct that opens into an appropriate location. Installation must be done so it does not prevent air supply to the burner.

2.7 Setting of ignition electrodes and brake plate



| a | b | c | d |
|---------|----------|---------|-----------|
| 3.5-4.0 | 8.0-10.0 | 2.0-3.0 | 10.0-13.0 |

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

2.8 Nozzle and pump pressure

Due to different furnace geometries and capacities, it is not possible to recommend a nozzle model.

| | |
|-----------------------|---------------------|
| Nozzle: | 45° Solid/semisolid |
| | 60° Solid/semisolid |
| | 80° Solid/semisolid |
| Pump pressure: | min. 14 bar |

2.9 Nozzle table

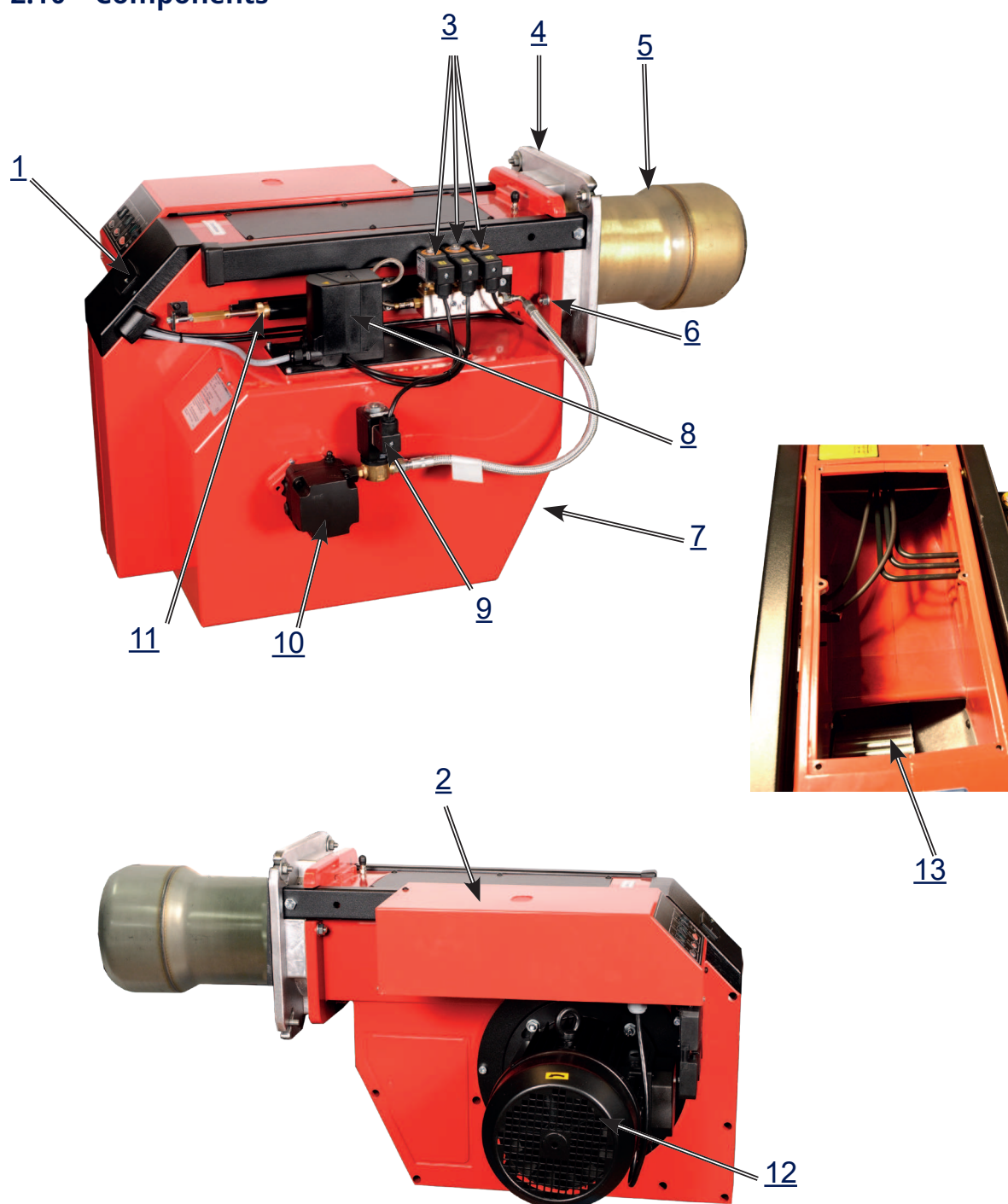
| Pump pressure bar | 10 | | | 11 | | | 12 | | | 13 | | |
|-------------------|-------|------|-----|--------|------|------|--------|------|------|--------|------|------|
| | Gph | kg/h | kW | Mcal/h | kg/h | kW | Mcal/h | kg/h | kW | Mcal/h | kg/h | kW |
| 1,00 | 3,72 | 44 | 38 | 3,90 | 46 | 40 | 4,08 | 48 | 42 | 4,24 | 50 | 43 |
| 1,10 | 4,09 | 48 | 42 | 4,29 | 51 | 44 | 4,48 | 53 | 46 | 4,67 | 55 | 48 |
| 1,20 | 4,47 | 53 | 46 | 4,68 | 55 | 48 | 4,89 | 58 | 50 | 5,09 | 60 | 52 |
| 1,25 | 4,65 | 55 | 47 | 4,88 | 58 | 50 | 5,10 | 60 | 52 | 5,30 | 63 | 54 |
| 1,35 | 5,02 | 59 | 51 | 5,27 | 62 | 54 | 5,50 | 65 | 56 | 5,73 | 68 | 58 |
| 1,50 | 5,58 | 66 | 57 | 5,85 | 69 | 60 | 6,11 | 72 | 62 | 6,36 | 75 | 65 |
| 1,65 | 6,14 | 73 | 63 | 6,44 | 76 | 66 | 6,73 | 80 | 69 | 7,00 | 83 | 71 |
| 1,75 | 6,51 | 77 | 66 | 6,83 | 81 | 70 | 7,14 | 85 | 73 | 7,42 | 88 | 76 |
| 2,00 | 7,45 | 88 | 76 | 7,81 | 93 | 80 | 8,16 | 97 | 83 | 8,49 | 101 | 87 |
| 2,25 | 8,38 | 99 | 85 | 8,78 | 104 | 90 | 9,18 | 109 | 94 | 9,55 | 113 | 97 |
| 2,50 | 9,31 | 110 | 95 | 9,76 | 116 | 100 | 10,19 | 121 | 104 | 10,61 | 126 | 108 |
| 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 | 24,46 | 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 | 459 | 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 |
| 22,00 | 81,91 | 971 | 835 | 85,89 | 1019 | 876 | 89,73 | 1064 | 915 | 93,36 | 1107 | 952 |
| 24,00 | 89,36 | 1060 | 911 | 93,70 | 1111 | 956 | 97,88 | 1161 | 998 | 101,85 | 1208 | 1039 |
| 26,00 | 96,81 | 1148 | 987 | 101,50 | 1204 | 1035 | 106,04 | 1258 | 1081 | 110,33 | 1308 | 1168 |

The table applies to oil with a viscosity of 4.4 mm²/s (cSt) at a density of 830 kg/m³.

| Pump pressure bar 14 | | | | 15 | | | 16 | | | 17 | | |
|----------------------|-------|------|--------|-------|------|--------|-------|------|--------|-------|------|--------|
| Gph | kg/h | kW | Mcal/h | kg/h | kW | Mcal/h | kg/h | kW | Mcal/h | kg/h | kW | Mcal/h |
| 1,00 | 4,40 | 52 | 45 | 4,56 | 54 | 46 | 4,71 | 56 | 48 | 4,85 | 57 | 49 |
| 1,10 | 4,84 | 57 | 49 | 5,01 | 59 | 51 | 5,18 | 61 | 53 | 5,34 | 63 | 54 |
| 1,20 | 5,29 | 63 | 54 | 5,47 | 65 | 56 | 5,65 | 67 | 58 | 5,82 | 69 | 59 |
| 1,25 | 5,51 | 65 | 56 | 5,70 | 68 | 58 | 5,89 | 70 | 60 | 6,07 | 72 | 62 |
| 1,35 | 5,95 | 70 | 61 | 6,15 | 73 | 63 | 6,36 | 75 | 65 | 6,55 | 78 | 67 |
| 1,50 | 6,60 | 78 | 67 | 6,83 | 81 | 70 | 7,06 | 84 | 72 | 7,27 | 86 | 74 |
| 1,65 | 7,27 | 86 | 74 | 7,52 | 89 | 77 | 7,77 | 92 | 79 | 8,01 | 95 | 82 |
| 1,75 | 7,71 | 91 | 79 | 7,97 | 95 | 81 | 8,24 | 98 | 84 | 8,49 | 101 | 87 |
| 2,00 | 8,81 | 104 | 90 | 9,12 | 108 | 93 | 9,42 | 112 | 96 | 9,71 | 115 | 99 |
| 2,25 | 9,91 | 118 | 101 | 10,26 | 122 | 105 | 10,60 | 126 | 108 | 10,92 | 130 | 111 |
| 2,50 | 11,01 | 131 | 112 | 11,39 | 135 | 116 | 11,77 | 140 | 120 | 12,13 | 144 | 124 |
| 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 | 374 |
| 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 |
| 22,00 | 96,92 | 1149 | 988 | 100 | 1189 | 1023 | 104 | 1229 | 1057 | 107 | 1267 | 1089 |
| 24,00 | 106 | 1254 | 1078 | 109 | 1297 | 1116 | 113 | 1341 | 1153 | 116 | 1382 | 1188 |
| 26,00 | 115 | 1359 | 1168 | 119 | 1406 | 1209 | 122 | 1453 | 1249 | 126 | 1497 | 1287 |

The table applies to oil with a viscosity of 4.4 mm²/s (cSt) at a density of 830 kg/m³.

2.10 Components



- | | |
|----------------------------|--------------------------------|
| 1. Cover, inspection glass | 8. Damper motor |
| 2. Connection box | 9. Safety valve |
| 3. Solenoid valve block | 10. Pump |
| 4. Fixing flange | 11. Nozzle assembly adjustment |
| 5. Flame tube | 12. Motor |
| 6. Locking, flange | 13. Fan wheel |
| 7. Air intake | |

3. Electric equipment

3.1 Safety system

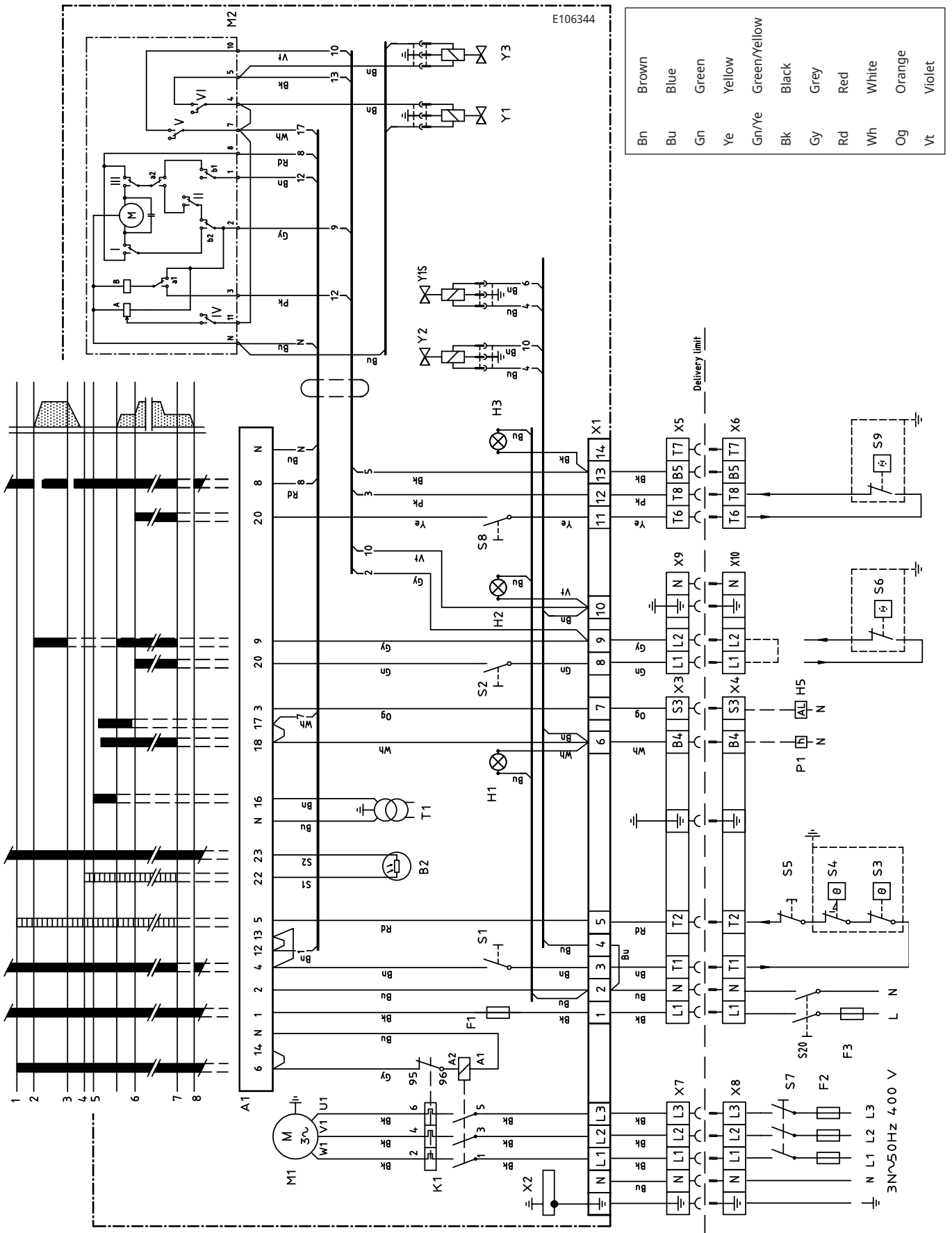
The safety system (safety switch for hatches, doors, water level, pressure, temperature and other safety devices) must be installed in the safety circuit in accordance with current regulations for the system.

The cables of the safety system must be separated so that the outgoing signal is not placed in the same cable as the incoming signal.

3.2 Components

| | | | | | |
|----|---|-----|---------------------------------|-----|----------------------------------|
| A1 | Burner control | S1 | Operating switch | X3 | Plug-in contact, burner |
| B2 | Flame detector | S2 | Operating switch, Step 2 | X4 | Plug-in contact, boiler |
| F1 | Fuse | S3 | Regulating/Operating thermostat | X5 | Plug-in contact, Step 2, burner |
| F2 | Fuse | S4 | Temperature/Pressure limiter | X6 | Plug-in contact, Step 2, boiler |
| F3 | Fuse | S5 | Safety switch for hinged door | X7 | Plug-in contact, 3 phase, burner |
| H1 | Indicator lamp, Step 1/ Operating lamp | S6 | Regulating thermostat, Step 2 | X8 | Plug-in contact, 3 phase, boiler |
| H2 | Indicator lamp, Step 2 | S7 | Main switch 3-phase | X9 | Plug-in contact, burner |
| H3 | Alarm signal 230V | S8 | Air pressure switch | X10 | Plug-in contact, boiler |
| H5 | Alarm signal 230V | S9 | Pressure switch, min. | Y1 | Solenoid valve 1 |
| K1 | Contactor + Motor protection | S20 | Main switch, Operation | Y2 | Solenoid valve 2 |
| M1 | Motor | T1 | Ignition transformer | Y3 | Solenoid valve 3 |
| M2 | Damper motor | X1 | Connection block | Y1S | Safety solenoid valve |
| P1 | Timer/Operation | X2 | Earth terminal | | |

3.3 Wiring diagram



4. Control








4.1 Technical data

| | BP230UVFR-S2 | BP230UVFR-S3 |
|---------------------------------|---------------|---------------|
| Pre-purge time (t1) | 30.7 s | 37.2 s |
| Pre-ignition time (t3) | 6 s | 2.5 s |
| Safety time (TSA) | 3 s | 5 s |
| Post-purge time (t6) | 16.8 s | 14.9 s |
| Reaction time for low interrupt | 1 s | 1 s |
| Ambient temperature BP | -40 to +60 °C | -40 to +60 °C |
| Ambient temperature UV5 | -20 to +60 °C | -20 to +60 °C |
| Max. current, terminals 6-7 | 2 A | 2 A |
| Max. current, other terminals | 1 A | 1 A |
| Ionisation current | 3-10 µA | - |

4.2 LED indicator lamps

BurnerPRO's burner control has seven LEDs which indicate the operating status of the control unit and the cause of the lockouts.

Each LED has an icon describing its function.

| | | |
|---|-------------------|---|
|  | FAN | Lights up when voltage is supplied to the fan motor (terminal 6) |
|  | OPEN DAMPER 6 | Flashes when the damper motor runs to maximum position. When the switch for the maximum damper motor position closes, this LED will light continuously. |
|  | CLOSE DAMPER 5 | Flashes when the damper motor runs to minimum position. When the switch for the minimum damper motor position closes, this LED will light continuously. |
|  | AUTO 4 | Lights up when the Burner control is in normal operating mode. |
|  | IGNITION 3 | Indicates ignition |
|  | FLAME 2 | Lights up when a flame is detected by the flame detector. |
|  | ALARM/STATUS | In lockout mode, the Alarm lamp lights up and the other LEDs light up to indicate lockout. Refer to "Fault codes". |

The LEDs can show the flame strength in Control mode by pressing the reset button for 3 seconds when the Flame LED flashes during start-up. In Control mode, the Status LED shines yellow, the Fan LED flashes, and LEDs 2-6 show the flame signal strength. Each LED corresponds to 20% of the total flame signal. 5 lit LEDs correspond to 100% and 2 LEDs correspond to 40%.

4.3 Explanation of the different sequence modes

1. **Operation**
This is the control unit voltage supply.
2. **System test**
In this status mode, the control unit undergoes an internal test to verify correct functionality of the hardware and software.
3. **Preconditions for burner start-up**
When the burner is equipped with a pressure switch, the control unit verifies the function and position of the switch.
4. **Heating requirement**
The operating thermostat closes and voltage is supplied to connection 5 so that the control unit can start the burner.
5. **Pre-purge begins**
The control unit starts the fan. Connections 6 and 7.
6. **Damper motor opens**
Control unit connection 9 sends a command to the damper motor to run at Max. mode. The control unit detects that the damper motor's end position switch indicates successful transition to the Max. load mode by supplying voltage to the connection 8 input. The control unit also performs a test to ensure that the air sensor detects airflow by monitoring connection 14.
7. **Pre-purge**
The combustion chamber is ventilated.
8. **Damper motor closes**
Following pre-purge, the control unit closes connection 10. The control unit detects that the damper motor is in the Low Load mode by supplying voltage to connection 8 on the control unit.
9. **Ignition on**
The control unit supplies voltage to the ignition transformer by activating connection 16.
10. **Fuel on**
The control unit activates the fuel valve by supplying voltage to connections 17 and 18 as well as to direct ignition systems.
11. **Flame indication**
Ignition transformer turns off. The flame signal is tested during this stage. If no flame is detected, the burner enters Lockout mode.
12. **Operating mode**
Once a flame is stable, the control unit transitions to Operating mode. There must be a flame signal. Voltage is supplied to connection 20.
13. **Shutdown**
Shutdown occurs when the heating requirement is met and power is cut off to the operating thermostat connection 5. The control unit closes the fuel valves by cutting off power to outputs 18 and 20. The fan post-purges the combustion chamber.
14. **Lockout**
The control unit enters lockout mode when an internal or external fault is detected. The reset button and the remote-reset connection can be used to disable Lock mode. However, the control unit will revert to lockout mode if the fault is not rectified.








BURNER LOCKOUT

When lockout occurs, the LEDs indicate the cause. The control unit status is saved in the memory, even in the event of a power outage. By pressing the manual reset button on the control unit or remote reset.



Note! At remote reset: maximum 5 reset attempts within a 15 min period, after which qualified personnel must examine the burner before further reset attempts are made.

4.4 BurnerPro LED fault/lock code table

| NO. | FAULT | LED 1 | LED 2 | LED 3 | LED 4 | LED 5 | LED 6 | LED 7 | POSSIBLE SOLUTION |
|-----|----------------------------------|---|---|---|---|---|---|---|---|
| | | Fan | Open damper | Closed damper | Auto | Ignition | Flame | Status | |
| | OPERATION LED ● = ON | | | | | | | | |
| | ICON |  |  |  |  |  |  |  | |
| 1 | DIAGNOSTIC ERROR, MAIN MCU INLET | ● | | | | | | RED | Initial diagnostic error. Ensure correct status of inputs and outputs when the unit is turned on. |
| 2 | LOCAL RESET | | ● | | | | | RED | User-initiated manual reset/lockout or defective reset switch. |
| 3 | AIR SENSOR | ● | ● | | | | | RED | Air sensor signal [connection 14] could not be detected by the end of the safety time, or loss of the air sensor signal during burner operation |
| 4 | DIAGNOSTIC ERROR | | | | | ● | | RED | "The system detected voltage at terminal 16, 17, 18, or 19 at the incorrect time, or no voltage detected when necessary. Check cabling and makes sure the system is running on a single line phase (50/60Hz)" |
| 5 | IONISATION FLAME LOSS | ● | | ● | | | | RED | Flame loss. Inspect the system, check the gas pressure, flame detector, cabling, etc. |
| 6 | IONISATION CIRCUIT FAULT | | ● | ● | | | | RED | Replace the control unit. Contact reseller/distributor. |
| 7 | INTERNAL COMMUNICATION ERROR | ● | ● | ● | | | | RED | Reset the system to continue normal operation. Contact reseller/distributor if the fault persists. |
| 8 | REMOTE RESET | | | | | | | RED | The user has pressed Remote Reset or the remote controller has short-circuited. |
| 9 | IONISATION FAULT | ● | | | ● | | | RED | Replace the control unit. Contact reseller/distributor. |
| 10 | MAIN PROGRAM SEQUENCE ERROR | | ● | | ● | | | RED | Replace the control unit. Contact reseller/distributor. |
| 11 | RAM TEST | ● | ● | | ● | | | RED | Replace the control unit. Contact reseller/distributor. |
| 12 | PROGRAM SEQUENCE ERROR | | | ● | ● | | | RED | Replace the control unit. Contact reseller/distributor. |
| 13 | READING ERROR INPUT | ● | | ● | ● | | | RED | Check cabling and makes sure the system is running on a single phase (50/60Hz) |
| 14 | TIMER2 ERROR | | ● | ● | ● | | | RED | Replace the control unit. Contact reseller/distributor. |
| 15 | CPU TEST FAILED | ● | ● | ● | ● | | | RED | Replace the control unit. Contact reseller/distributor. |
| 16 | FLAME LOSS | ● | | | | ● | | RED | Visually inspect the flame detector and confirm that the pilot light was lit during start-up. Check the fuel supply system. |

| NO. | FAULT | LED 1 | LED 2 | LED 3 | LED 4 | LED 5 | LED 6 | LED 7 | POSSIBLE SOLUTION |
|-----|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|--|
| 17 | CABLE FAULT | | ● | | | ● | | RED | The system detected voltage at terminal 16, 17, 18, or 19 at the incorrect time, or no voltage detected when necessary. Check cabling and makes sure the system is running on a single phase (50/60Hz) |
| 18 | SAFETY RELAY FAULT | ● | ● | | | ● | | RED | Replace the control unit. Contact reseller/distributor |
| 19 | FUEL VALVE OPEN | | ● | ● | | ● | | RED | Check fuel valve cabling. The valves may not be fully closed. |
| 20 | FLAME LOSS | ● | | ● | | ● | | RED | Visually inspect the flame detector and confirm that the main flame was lit during start-up. Check the fuel supply system. |
| 21 | WELDED SAFETY RELAY | | ● | ● | | ● | | RED | Replace the control unit. Contact reseller/distributor. |
| 22 | SELF TEST | ● | ● | ● | | ● | | RED | Replace the control unit. Contact reseller/distributor. |
| 23 | ROM ERROR | | | | ● | ● | | RED | Replace the control unit. Contact reseller/distributor. |
| 24 | FLAME LOSS DURING OPERATION | ● | | | ● | ● | | RED | Check the cabling. Check the flame detector. Check the fuel supply system. |
| 25 | RAM ERROR | | ● | | ● | ● | | RED | Replace the control unit. Contact reseller/distributor. |
| 26 | INTERNAL FAULT | ● | ● | | ● | ● | | RED | Replace the control unit. Contact reseller/distributor. |
| 27 | NOT USED | | | | | | | | |
| 28 | NOT USED | | | | | | | | |
| 29 | AMBIENT TEMPERATURE | | ● | ● | ● | ● | | RED | Ambient temperature below -40 °C or above 70 °C |
| 30 | ROM ERROR | ● | ● | ● | ● | ● | | RED | Replace the control unit. Contact reseller/distributor. |
| 31 | IONISATION SHORT-CIRCUIT | | | | | | ● | RED | Possible external short-circuit between terminals 23 and 24. Contact reseller/distributor if the fault persists. |
| 32 | TIME LIMIT EXCEEDED FOR CONTROL MODE | ● | | | | | ● | RED | 30-minute activation time passed. |
| 33 | STANDBY FALSE FLAME | | ● | | | | | RED | False flame detected in Standby mode. |
| 34 | NOT USED | | | | | | | RED | |
| 35 | INTERNAL RESET | | | ● | | | ● | RED | Internal software reset of control unit. Contact reseller/distributor if the fault persists. |
| 36 | SOFTWARE RESET | ● | | ● | | | ● | RED | Internal software reset of control unit. Contact reseller/distributor if the fault persists. |
| 37 | WAITING TIME INPUTS | | ● | ● | | | ● | RED | The system was unable to perform airflow sensor test and/or valve closure test. Check the cabling. Check the air sensor and/or fuel valve switch. |

| NO. | FAULT | LED 1 | LED 2 | LED 3 | LED 4 | LED 5 | LED 6 | LED 7 | POSSIBLE SOLUTION |
|-----|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|--|
| 38 | INTERNAL RESET | ● | ● | ● | | | ● | RED | Internal software reset of control unit. Contact reseller/distributor if the fault persists. |
| 39 | SOFTWARE RESET | | | | ● | | ● | RED | Internal software reset of control unit. Contact reseller/distributor if the fault persists. |
| 40 | HARDWARE RESET | ● | | | ● | | ● | RED | Replace the control unit. Contact reseller/distributor if the fault persists. |
| 41 | HARDWARE RESET | | ● | | ● | | ● | RED | Replace the control unit. Contact reseller/distributor if the fault persists. |
| 42 | CONTROL PROGRAM FROZEN | ● | ● | | ● | | ● | RED | Replace the control unit. Contact the distributor/factory. |
| 43 | CONTROL PROGRAM FROZEN | | | ● | ● | | ● | RED | Replace the control unit. Contact reseller/distributor. |
| 44 | TIMER2 ERROR | ● | | ● | ● | | ● | RED | Replace the control unit. Contact reseller/distributor. |
| 45 | LOW VOLTAGE ERROR | | ● | ● | ● | | ● | RED | Check mains power. Contact reseller/distributor if the fault persists. |
| 46 | LOW VOLTAGE ERROR | ● | ● | ● | ● | | ● | RED | Check mains power. Contact reseller/distributor if the fault persists. |
| 47 | UV DETECTION FAULTY | | | | | ● | ● | RED | Replace the control unit. Contact reseller/distributor. |
| 48 | INTERNAL FAULT | ● | | | | ● | ● | RED | Replace the control unit. Contact reseller/distributor. |
| 49 | INTERNAL FAULT | | ● | | | ● | ● | RED | Replace the control unit. Contact reseller/distributor. |
| 50 | IGNITION FEEDBACK | ● | ● | | | ● | ● | RED | The system detected voltage at terminal 16 at the incorrect time, or no voltage. Check cabling and ensure sufficient earthing. |
| 51 | PILOT FEEDBACK | | | ● | | ● | ● | RED | The system detected voltage at terminal 17 at the incorrect time, or no voltage. Check cabling and ensure sufficient earthing. |
| 52 | MAINP FEEDBACK | ● | | ● | | ● | ● | RED | The system detected voltage at terminal 19 at the incorrect time, or no voltage. Check cabling and ensure sufficient earthing. |
| 53 | WAITING TIME FEEDBACK LIMIT EXCEEDED | | ● | ● | | ● | ● | RED | Loss of feedback from the damper motor for more than 10 minutes. Check the cabling. Check the damper motor. |
| 54 | MAIND FEEDBACK | ● | ● | ● | | ● | ● | RED | The system detected voltage at terminal 18 at the incorrect time, or no voltage. Check cabling and ensure sufficient earthing. |
| 55 | DIAGNOSTICS INTERRUPTED | | | | ● | ● | ● | RED | Replace the control unit. Contact reseller/distributor. |
| 56 | UV FALSE FLAME | | | ● | ● | ● | ● | RED | False flame detected prior to ignition. Check the cabling. Check the flame detector. Ensure sufficient earthing. |
| 57 | IONISATION FALSE FLAME | | | ● | ● | ● | ● | RED | False flame detected prior to ignition. Check the cabling. Check the flame detector. Ensure sufficient earthing. |

| NO. | FAULT | LED 1 | LED 2 | LED 3 | LED 4 | LED 5 | LED 6 | LED 7 | POSSIBLE SOLUTION |
|-----|-----------------------------|-------|-------|-------|-------|-------|-------|-------|---|
| 58 | OPEN FEEDBACK READING | | ● | ● | ● | ● | ● | RED | The system detected voltage at terminal 8 at the incorrect time, or no voltage. Check cabling and ensure sufficient earthing. |
| 59 | ADJACENT POLE SHORT-CIRCUIT | ● | | | ● | | ● | RED | Replace the control unit. Contact reseller/distributor. |
| 60 | LOCAL RESET | ● | ● | ● | ● | ● | ● | RED | The local reset button has been pressed in for more than 10 seconds, or the reset button is stuck. |
| 61 | FUEL VALVE OPEN | | ● | | ● | ● | ● | RED | Fuel valve open at incorrect time. |
| 62 | STRONG UV FLAME | ● | ● | | ● | ● | ● | RED | Flame detector too close to the flame. Increase the distance between the flame detector and the flame. |
| 63 | INTERNAL FAULT | | | | | ● | | RED | Replace the control unit. Contact reseller/distributor. |

5. Installation

5.1 General instructions

Oil burners must be installed in accordance with local regulations. The installer must therefore be knowledgeable of the regulations pertaining to oil and combustion.

Only oil suitable for the burner must be used and then in combination with a suitable oil filter installed before the burner's oil pump.

If the burner is replacing an existing burner, ensure that the oil filter is replaced or cleaned. Installation may only be performed by qualified personnel.

Care should be taken by the installer to ensure that electrical cables and oil lines are not pinched or otherwise damaged during installation or servicing.

5.2 Inspection and maintenance

The system must be maintained at the interval specified in the service schedule. If the burner is in a dirty environment, service should be done at more frequent intervals.

5.3 Start-up

In order to obtain the correct setting, a flue gas analysis and temperature measurement must be carried out. Otherwise, there is a risk of soot build up, poor efficiency or condensation in the chimney. The system must be fine-tuned at start-up. The temperature in the chimney at a depth of 0.5 m must be at least 60 °C to prevent condensation.

5.4 Preparing for installation

Check that the burner's dimensions and capacity range are suitable for the relevant boiler. The power data on the rating plate refers to the burner's minimum and maximum power.

5.5 Oil distribution

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

Take the following into account:

- Selection of pipe diameter, pipe length and height difference; see Pump instruction.
- Pipelines are to be laid with the fewest possible number of glands.
- The pipes are to be laid so that the oil supply hoses are not subjected to tensile stresses or become excessively bent when the burner is swung out or removed for servicing.
- The oil filter should be installed so that the filter cartridge can easily be replaced or cleaned.
- Parts in contact with oil must be selected in materials that are capable of withstanding the medium's physical properties.
- When installing oil hoses, check that the inlet and return hoses are fitted to the appropriate connection on the oil pump. The hoses must be located so that they do not bend or become subject to tensile load.
- Bleed the oil system. The oil pump/oil preheater may be damaged if run dry. The vacuum in the suction line should not fall below 0.3 bar during start-up.



The oil filter must be installed before the burner's oil pump.



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

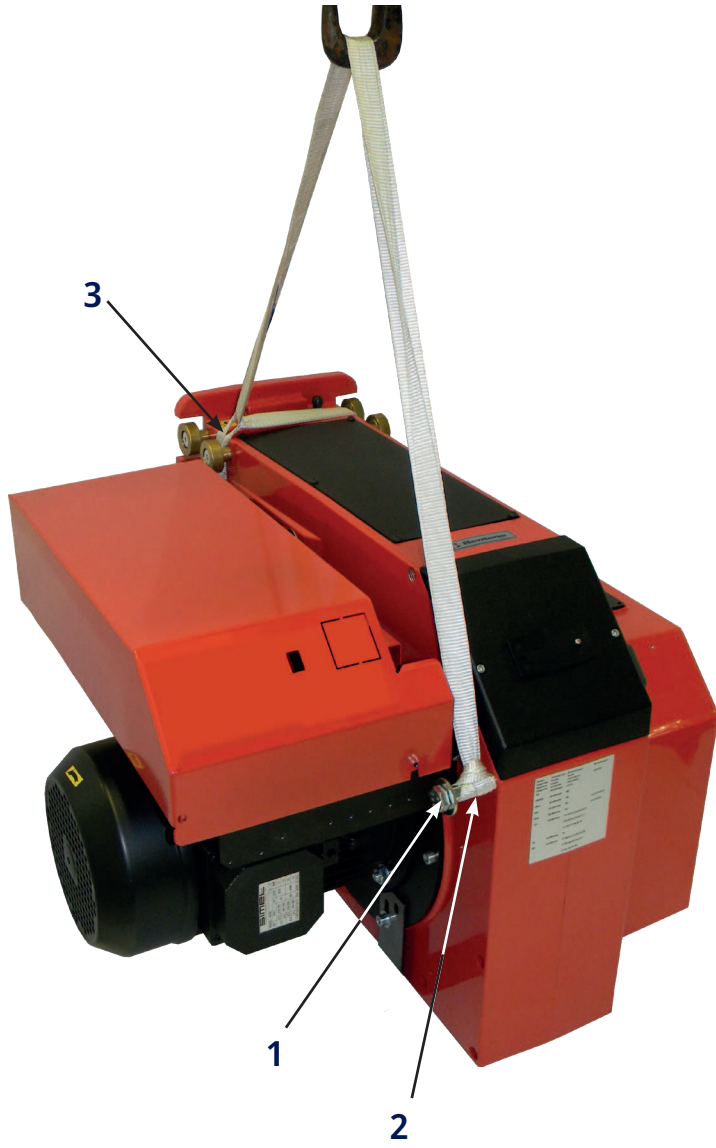
5.6 Electrical connection

- Before work on the electrical connection, the current must be disconnected so that the installation is isolated.
- Electrical connection must be done in accordance with the applicable regulations.
- Burners must be connected to an all-pole switch.
- Connection must conform to the wiring diagram.
- Use appropriately sized fuses.



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

5.7 Handling and lifting instruction



1



2



3



The lifting aid are available as accessories.



6. Mounting

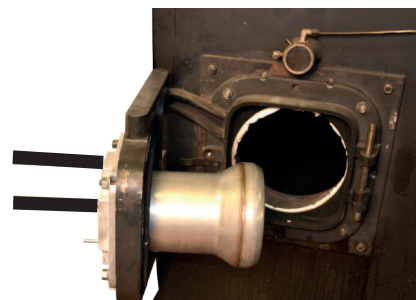
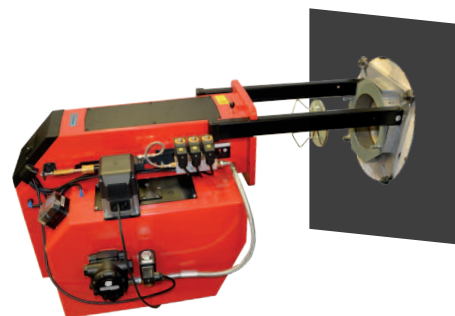
1. Remove fan housing from fixing flange.
2. Pull out the burner on the guides.
3. Remove the brake plate from the oil line.
4. Install the selected nozzles, (see Technical data).
5. Install the brake plate on the oil line.
6. Remove flame tube from fixing flange.
7. Install fixing flange with gasket on boiler.
8. Install the flame tube on the fixing flange. Make sure that the holes in the front edge of the flame tube are pointing down (not on all flame tubes), allows any drops of oil to run out.

! If the burner tube must be installed from the inside of the boiler, this means that the boiler must be opened or have a spectacle flange that is designed so that it can be reconnected with the burner tube mounted.

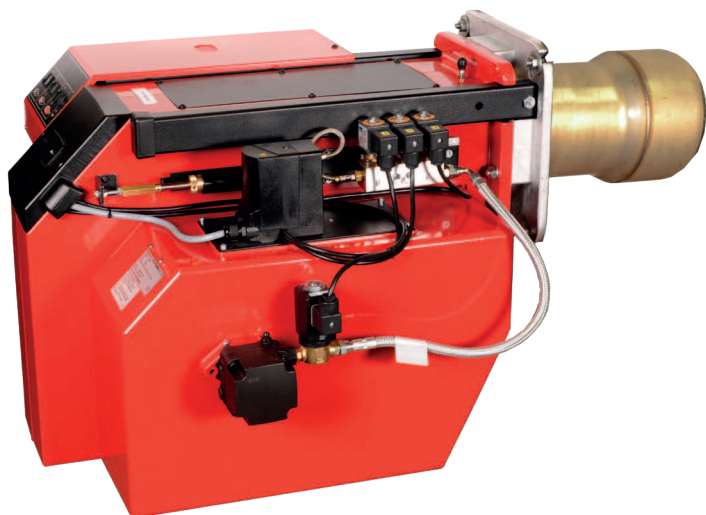
9. Insulate between burner and boiler door to reduce radiated heat.
10. Install fan housing on fixing flange and lock with nuts.
11. Connect oil lines to the pump.
12. Connect the burner electrically.

6.1 Check oil line seals

When the burner has been installed and put into operation, the tightness of the various coupling elements should be checked, in case of leakage - tighten the coupling elements.



! Use Loctite 5188 on threaded oil lines.



6.2 Nozzle assembly adjustment – adjustable brake plate

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

3 nozzles

The nozzle assembly adjustment changes the position of the brake plate between Stage 2 and Stage 3 by means of a hydraulic piston. There are two adjustments to be made to the insert, one for Low load and one for High load.

Low load

The low load adjustment is done by changing the guide rail's mounting to the hydraulic piston, using the locking screw (C). For basic setting, the total value of steps 1 and 2 is used, see chapter "Example of Basic settings" and the diagrams in chapter "Technical data". During operation, the insert is adjusted so that the best function is achieved.

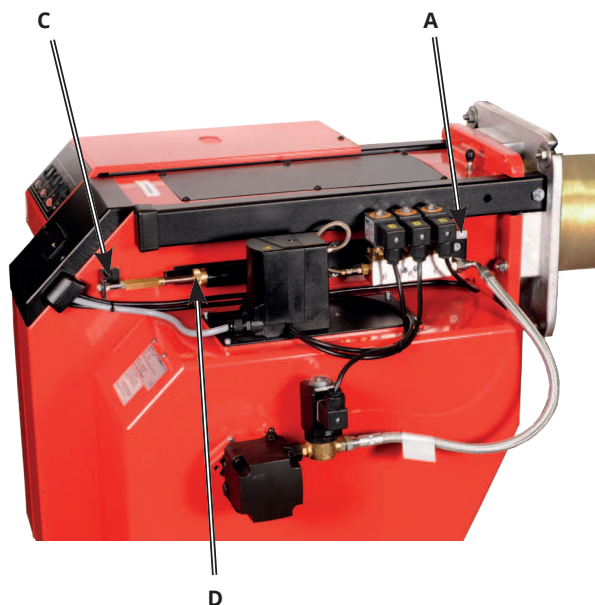
- Undo the locking screw (C).
- Set the desired position on the scale (A) by pushing the disc in the desired position.
- Tighten the screw.

High load

The high load adjustment is done by adjusting the stroke of the hydraulic piston by means of the locking screw (D). To increase the stroke, the locking screw is screwed out and to decrease the stroke, it is screwed in.

Set the desired position on the scale (A) by means of the adjusting screw (D), the left-hand turn reduces the pressure drop and the brake disc is moved outwards.

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



6.3 Example of Basic settings

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

B 70-3R

| | |
|--------------------------|---------------------------------------|
| Burner output: | 1307 kW |
| Estimated nozzle output: | $1307 / 11.86^* = 110.2 \text{ kg/h}$ |

(* Caloric value Fuel oil = 11.86 kWh/kg)

This provides the following nozzle according to the nozzle table, (see Technical data).

| | | |
|-------------------------------------|-----------|--------|
| 1307 kW distributed over 3 nozzles: | | |
| Nozzle, Stage 1: | 10.00 Gph | 523 kW |
| Nozzle, Stage 2: | 7.50 Gph | 392 kW |
| Nozzle, Stage 3: | 7.50 Gph | 392 kW |
| Pump pressure: | 14.0 bar | |

Setting values for 1307 kW according to basic setting diagram, (see Technical data).

| | | | |
|---------------|------------------|---|----|
| Insert | Stage 1+2 | = | 21 |
| Insert | Stage 3 | = | 33 |
| Air | Stage 1 | = | 12 |
| Fuel, Stage 2 | Solenoid valve 2 | = | 30 |
| Air | Stage 2 | = | 45 |
| Fuel, Stage 3 | Solenoid valve 3 | = | 60 |
| Air | Stage 3 | = | 72 |

Selection of output and connection between the different power stages must be selected and adjusted so that the system achieves good functionality.

6.4 Setting Damper motor 3-stage

Air adjustment

The damper motor rotates the air damper between three preset positions: low load, medium load and high load. These positions are controlled in the motor by colored cam discs, the black and green cam discs control the switching on/off of the solenoid valves. Adjust the amount of air by changing the position of the cam discs.

Low load

- Set control switch for load position to position II (high load).
- Turn blue cam disc to 0° to reduce airflow and to 90° to increase airflow.
- Return the control switch to position I (low load) and check the combustion values.

Medium load

- Set control switch for load position to position I (low load).
- Turn orange cam disc to 0° to reduce airflow and to 90° to increase airflow.
- Place black cam disc in a position between blue and orange cam discs and adjust to obtain a good load change.
- Return the control switch to position II (high load) and check the combustion values.

High load

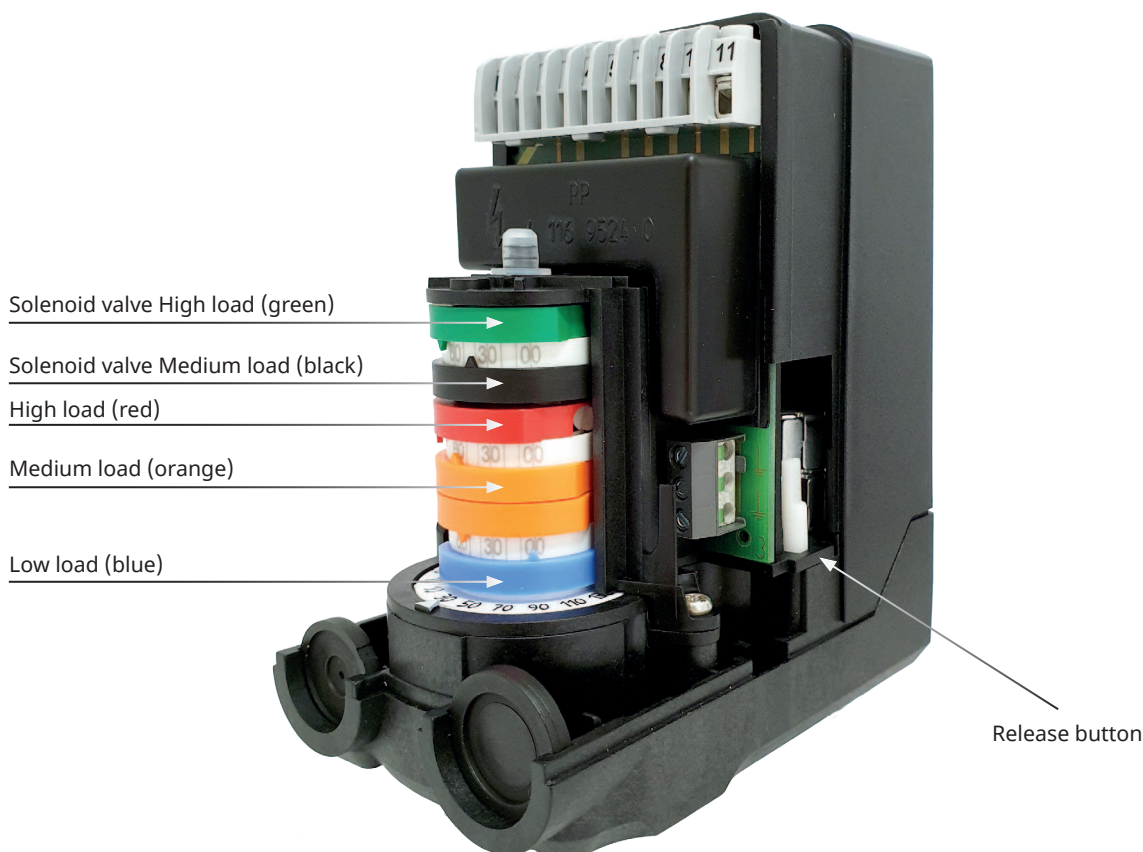
- Set control switch for load position to position II (high load).
- Turn red cam disc to 0° to reduce airflow and to 90° to increase airflow.
- Place green cam disc in a position between red and orange cam discs and adjust to obtain a good load change.
- Return the control switch to position I (low load) and check the combustion values.

Release

By pressing the button, the motor is disengaged and the air damper can be turned. The function is used when servicing air dampers.

Recommended excess air

| Excess air flue gases | | Max % CO ₂ |
|-----------------------|------------------------------|-----------------------|
| % O ₂ | % CO ₂ Lambda 1.2 | |
| 3 - 5 | ≈12.5 | 15.4 |



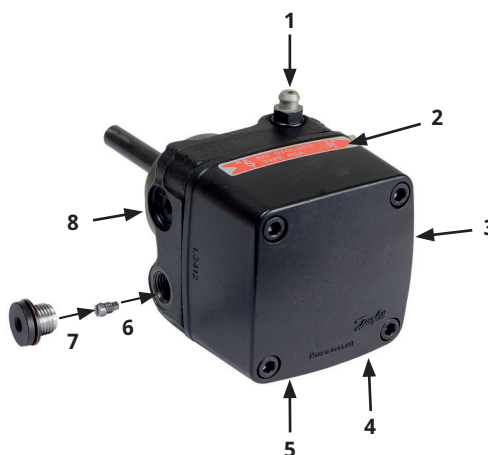
7. Pump RSA 95/125

7.1 Technical data

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

7.2 Components

1. Pressure gauge port G 1/8"
2. Nozzle outlet 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. Return plug
8. Pressure regulation 4 mm Allen key



7.3 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).

7.4 Purging

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

7.5 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.



7.6 Function

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.

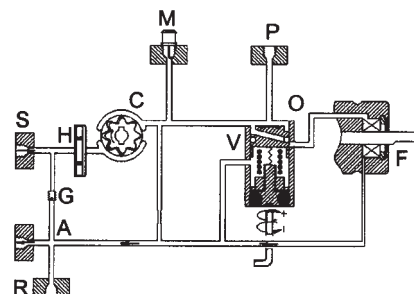
In 2-pipe-systems excess oil is led back to the oil tank. In 1-pipe-systems the by-pass plug "A" must be removed to give free flow back to the suction side via return line "G" with return port "R" closed.

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

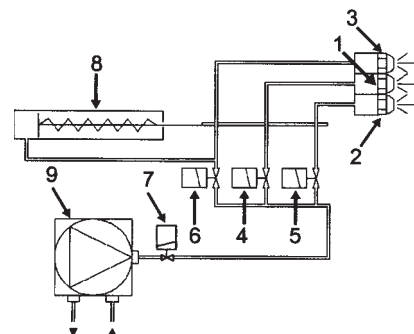
- reducing the pump pressure
- reducing the capacity, i.e. smaller nozzle or greater resistance
- changing to a pump with higher capacity



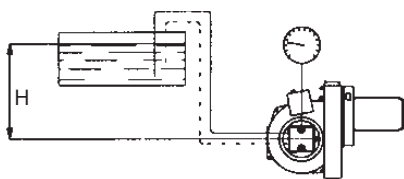
Schematic diagram

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

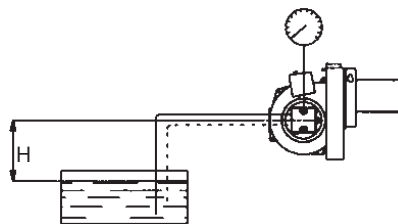
Items 3 and 6 are not fitted to two-stage burners. Item 8 is connected after solenoid valve nozzle 2 (Y2).



7.7 Suction line tables



| 1-pipe system | | Pipe diameter | | |
|---------------|---|---------------|-------|-------|
| Höjd | | ø12mm | ø15mm | ø20mm |
| H | m | m | m | m |



| 1-pipe system | | Pipe diameter | | |
|---------------|---|---------------|-------|-------|
| Height | | ø12mm | ø15mm | ø20mm |
| H | m | m | m | m |

Two-pipe system

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

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

Two-pipe system

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

The suction line tables consist of theoretically calculated values where the pipe dimensions and oil velocity have been matched so that turbulences will not occur. Such turbulences will result in increased pressure losses and in acoustic noise in the pipe system.

In addition to drawn copper piping a pipe system usually comprises 4 elbows, a non-return valve, a cut-off valve and an external oil filter.

The sum of these individual resistances is so insignificant that they can be disregarded.

The tables do not include any lengths exceeding 100 m as experience shows that longer lengths are not needed. The tables apply to a standard fuel oil of normal commercial quality according to current standards. On commissioning with an empty tube system the oil pump should not be run without oil for more than 5 min. (a condition is that the pump is being lubricated during operation).

The tables state the total suction line length in metres at a viscosity of 6,0 mm²/s.

8. Service

Service and maintenance work may only be performed by qualified personnel. Perform operational check of all safety systems and components at each service. Only CTC original parts should be used when replacing components.



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



8.1 Burner Service Schedule, Oil

Servicing must be carried out once a year or after 3,000 hours of operation.

| | | |
|-------------|--|--|
| Burner | 1 year | 3,000 h |
| Filter | 1 year replacement | 3,000 h replacement |
| Oil hose | 1 year inspection/replacement | |
| Nozzle | 1 year replacement | 3,000 h replacement |
| Electrodes | Replacement/cleaning 1 year | Replacement/cleaning 3,000 h |
| Brake disc | Replacement/cleaning 1 year | Replacement/cleaning 3,000 h |
| Motor | 1 year | 3,000 h |
| Drive shaft | Check/replace in the event of damage | Check/replace in the event of damage |
| Fan wheel | "1 year Replace if need for cleaning/imbalance" | "3000 h Replace if need for cleaning/imbalance" |
| Oil filter | Once a year | 3,000 h replacement |
| Oil valve | Tightness check once a year | Replace if leakage detected |

8.2 Component replacement intervals

| Components | Service life - Recommended replacement | Service life - Recommended replacement Operating cycles |
|----------------------------------|--|---|
| Control system | 10 years | 250,000 cycles |
| Pressure switch | 10 years | 250,000 cycles |
| Ignition system with flame guard | 10 years | 250,000 cycles |
| UV flame sensor | 10,000 h | N/A |
| Damper motor | | 500,000 cycles |
| Contactora | 10 years | 500,000 cycles |



The burner and its components must be recycled according to applicable regulations.

8.3 Combustion device

1. Disconnect the main power and shut off the fuel supply.



Before obtaining access to electrical and fuel line components all supply circuits must be disconnected.

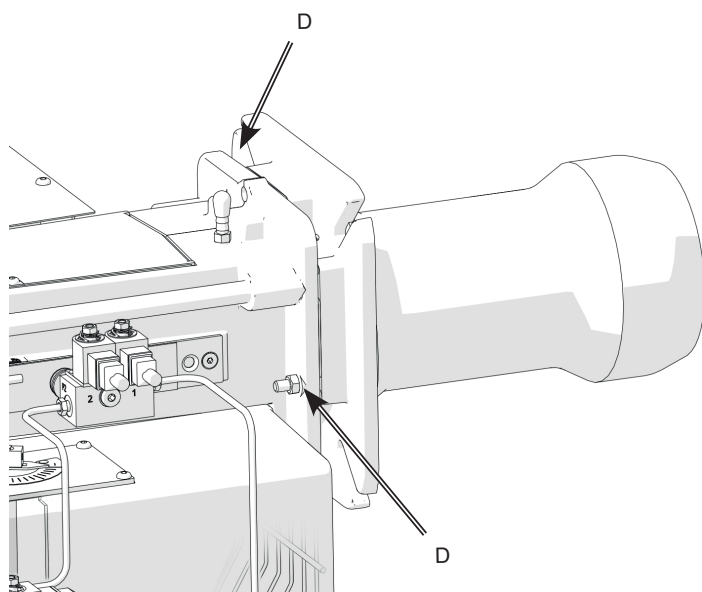
2. Loosen nut (D) and pull out the fan housing from fixing flange.
3. Remove brake plate from the oil pipe.
4. Replace nozzle.
5. Clean or replace brake plate.
6. Fit brake plate (see Technical data for adjustment).
7. Check ignition electrodes, replace if necessary (see Technical data for adjustment).
8. Refit fan housing and fixing flange, lock with nut (D).
9. Open boiler/hinged flange to access the burner tube, remove and clean.
10. Install flame tube, be sure to install the drainage hole downwards (not available on all flame tubes) so that any oil spills can drain out.
11. Close boiler/hinged flange.
12. Switch on the main power and open the fuel supply.
13. Start burner and check/adjust combustion.



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



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



When servicing/replacing components that affect combustion, flue gas analysis and soot test must be carried out following installation.

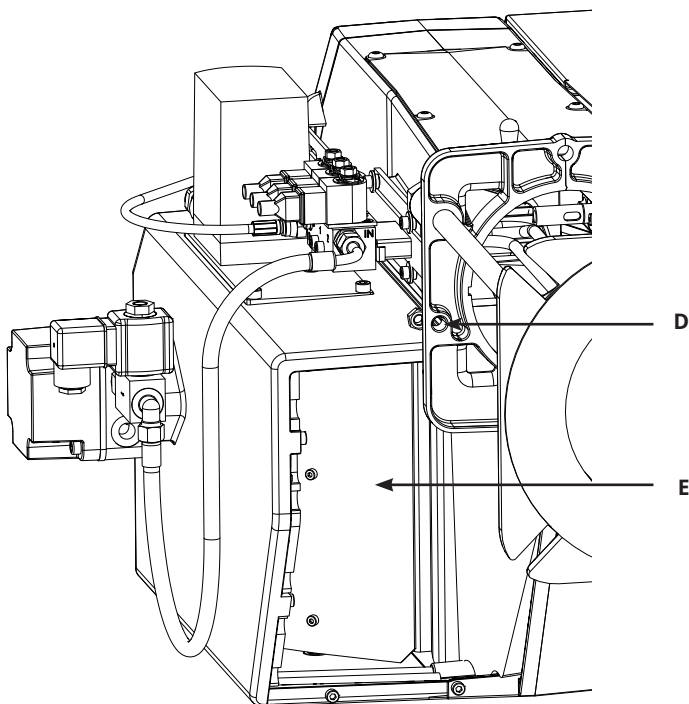
8.4 Air damper

1. Disconnect the main power and shut off the fuel supply.



Before obtaining access to electrical and fuel line components all supply circuits must be disconnected.

2. Undo the nuts (D) and pull out the burner body on its guides.
3. Remove the intake grille at the air intake.
4. Release the damper motor.
5. Clean the air damper (E) and air intake, lubricate the damper shaft if necessary.
6. Refit the damper motor.
7. Refit the intake grille.
8. Slide the burner together and secure it with the nuts (D).
9. Switch on the main power and open the fuel supply.
10. Start burner and check/adjust combustion.



When servicing/replacing components that affect combustion, flue gas analysis and soot test must be carried out following installation.

8.5 Replacement of damper motor, air

1. Disconnect the main power and shut off the fuel supply.

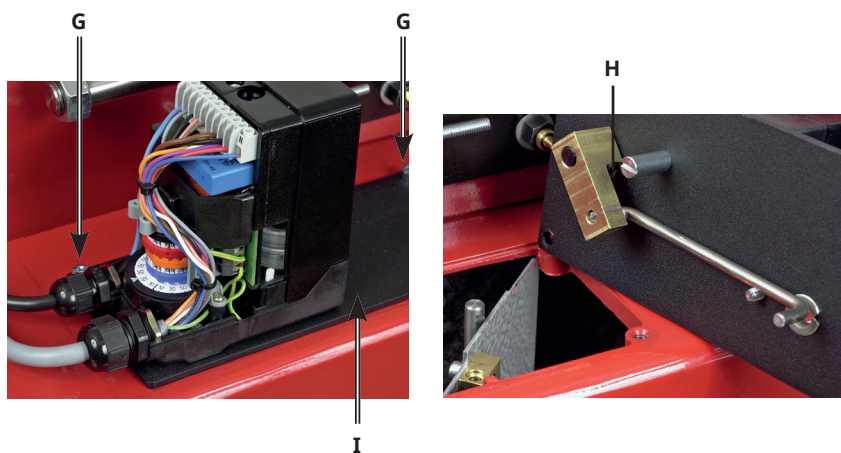


Before obtaining access to electrical and fuel line components all supply circuits must be disconnected.

2. Note the connection position of the cables on the damper motor.
3. Disconnect cables from damper motor.
4. Release the damper motor.
5. Remove the screws (G) securing the damper motor mounting plate.
6. Turn the damper approx. 30°.
7. Lift up the damper motor.
8. Disconnect the link arm (H) from the motor shaft.
9. Remove the damper motor from the mounting plate (I).
10. Install the new damper motor on the mounting plate.
11. 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.
12. Release the damper motor and lock it at 30°.
13. 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).
14. Release the damper motor and check that the damper moves freely. Close the damper and zero the graduated scale on the damper motor.
15. Make the electrical connections to the damper motor.
16. Reset the damper motor cams.
17. Switch on the main power and open the fuel supply.
18. Start burner and check/adjust combustion.



When resetting dampers, ensure that they do not engage in the close damper position. If dampers do engage, the automatic control unit will report an error message.



When servicing/replacing components that affect combustion, flue gas analysis and soot test must be carried out following installation.

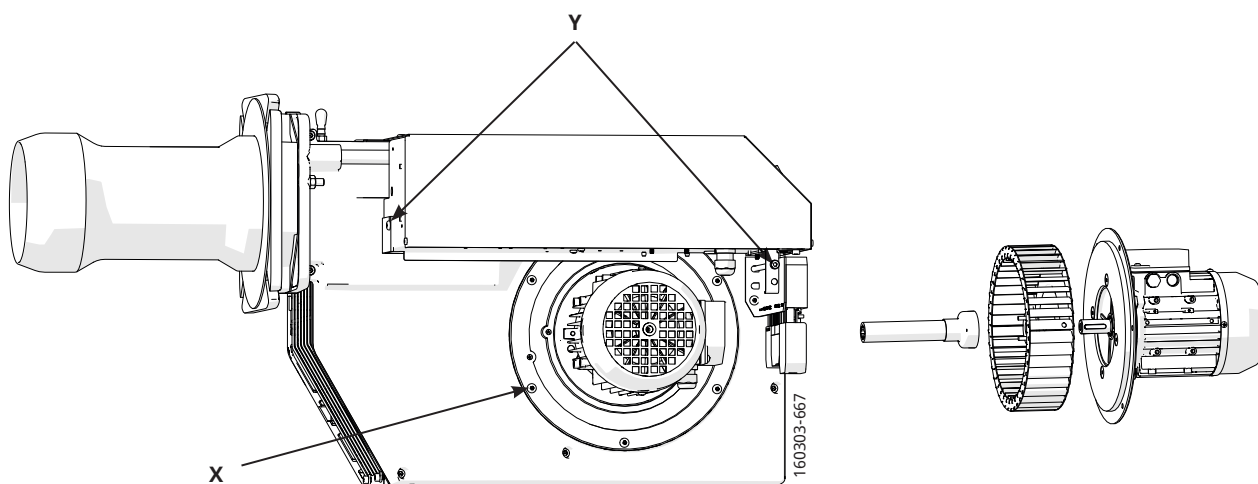
8.6 Fan

1. Disconnect the main power and shut off the fuel supply.



Before obtaining access to electrical and fuel line components all supply circuits must be disconnected.

2. Detach the electrical panel (Y).
3. Loosen the motor electrical connection and screws (X) enough to turn and lift out the motor.
4. Check the fan wheel attachment and any skew, replace if damaged.
5. Clean or replace the fan wheel.
6. Refit the parts, making sure that the drive shaft is correctly connected at both ends.
7. Switch on the main power and open the fuel supply.
8. Start burner and check/adjust combustion.



8.6.1 Replace drive shaft

1. Disconnect the main power and shut off the fuel supply.
2. Detach the electrical panel (Y).
3. Loosen the motor electrical connection and screws (X) enough to turn and lift out the motor.
4. Remove drive shaft and drive coupling from motor.
5. Replace drive shaft coupling on pump.
6. Refit coupling, pump and motor, making sure drive shaft is connected correctly at both ends.
7. Switch on the main power and open the fuel supply.



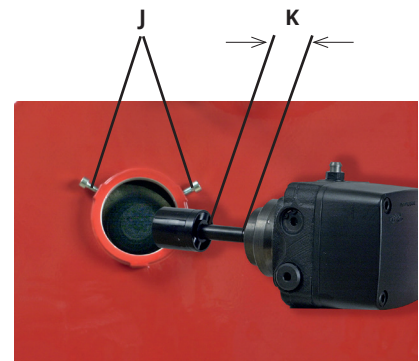
When servicing/replacing components that affect combustion, flue gas analysis and soot test must be carried out following installation.

8.7 Replace oil pump

1. Disconnect the main power and shut off the fuel supply.

! Before obtaining access to electrical and fuel line components all supply circuits must be disconnected.

2. Disconnect oil hoses from the pump.
3. Loosen screws (J) and pull out the oil pump.
4. Move/replace the pump coupling over to the new pump and set the same distance (K) between pump and pump coupling as before to avoid pressure on the pump packing box.
5. Install the oil pump on the burner and tighten the screws (J). It is important that the splines of the pump shaft are correctly inserted in the pump coupling.
6. Fit new oil hoses.
7. Switch on the main power and open the fuel supply.
8. Bleed the pump.
9. Start burner and check/adjust combustion.



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

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

! When servicing/replacing components that affect combustion, flue gas analysis and soot test must be carried out following installation.

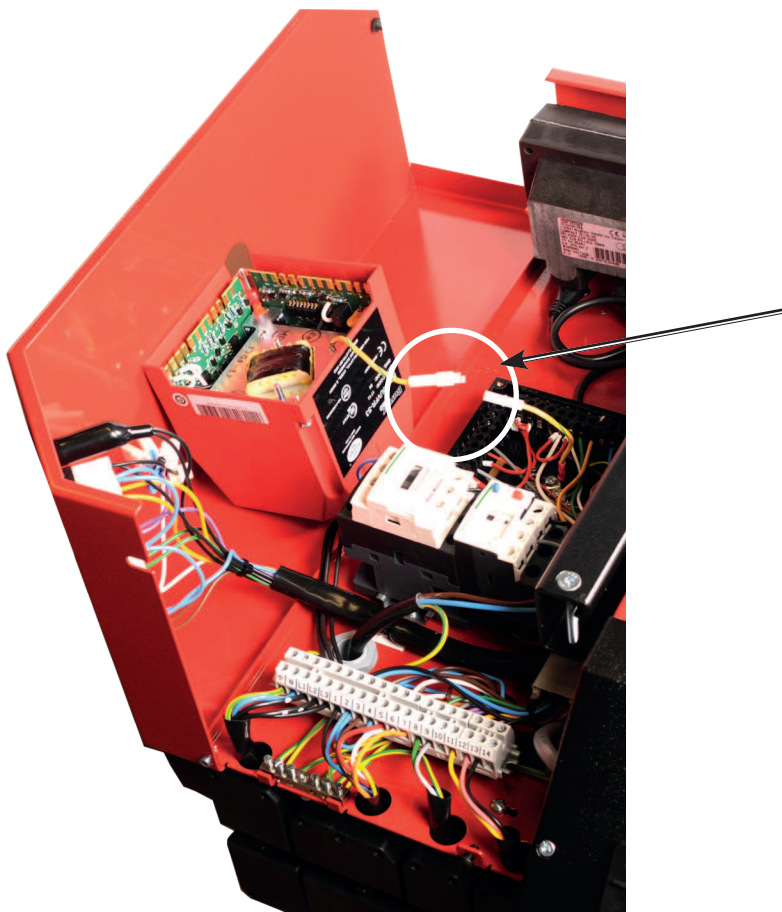
8.8 Replacement of electrical components

1. Disconnect the main power and switch off the fuel supply.

! Before obtaining access to terminals, all supply circuits must be disconnected.

! Lift the relay carefully to avoid stretching the earth cable when dismantling.

2. Note the connection of the existing component and disassemble.
3. Fit new component with same connection or with specified alternative connection.
4. Make sure the relay's earth cable is in place.
5. Switch on the main power and check the operation of the new component.
6. Start burner and check/adjust combustion.



! When servicing/replacing components that affect combustion, flue gas analysis and soot test must be carried out following installation.

8.9 Vibrations

Maximum permitted vibration level is 5.0 mm/s.

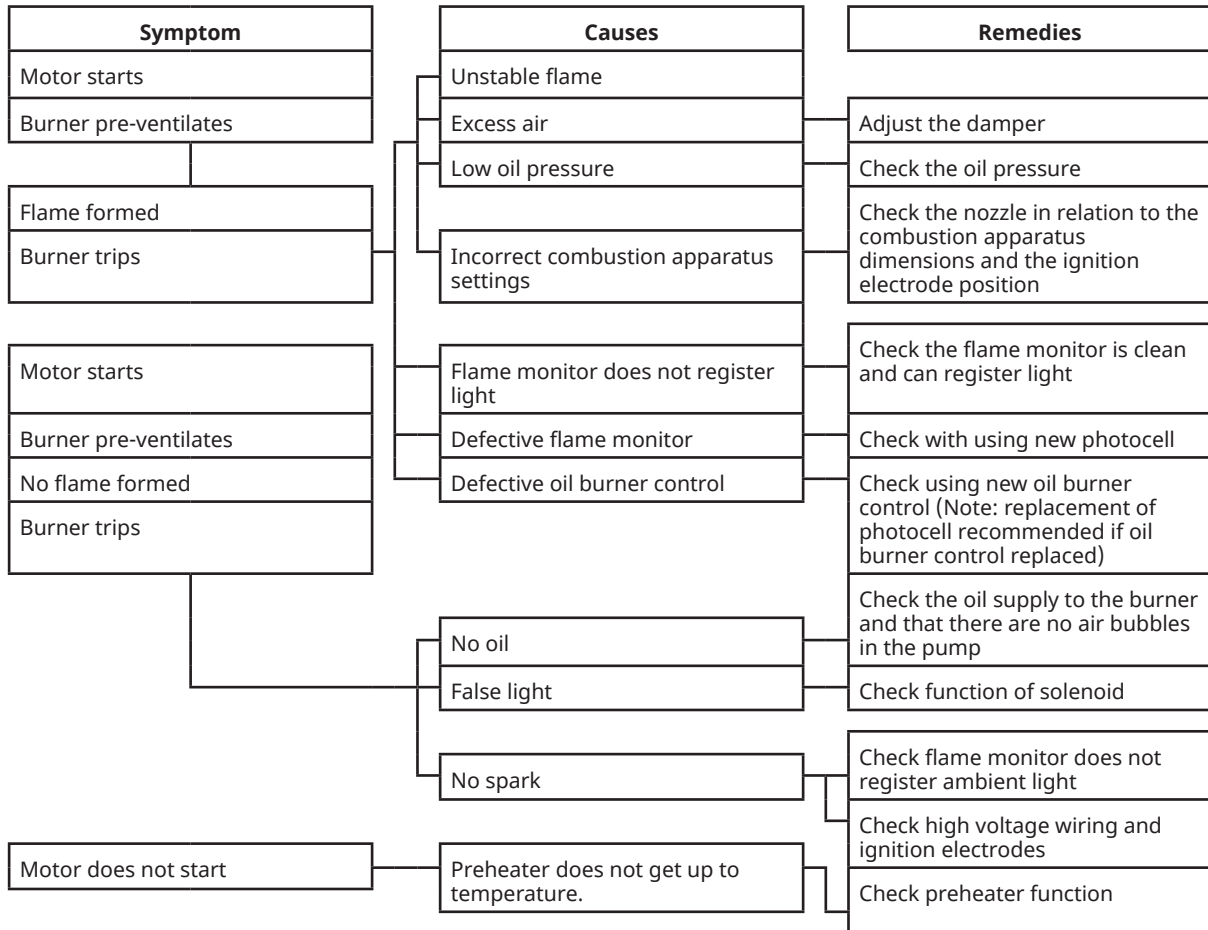
- Check tightness of fasteners.
- Check fan wheel for damage and contamination (replace if necessary).
- Check motor shaft and bearings. If they are worn, replace the motor.



Use the rear screw on the cover to attach the vibration sensor.

9. Fault Location

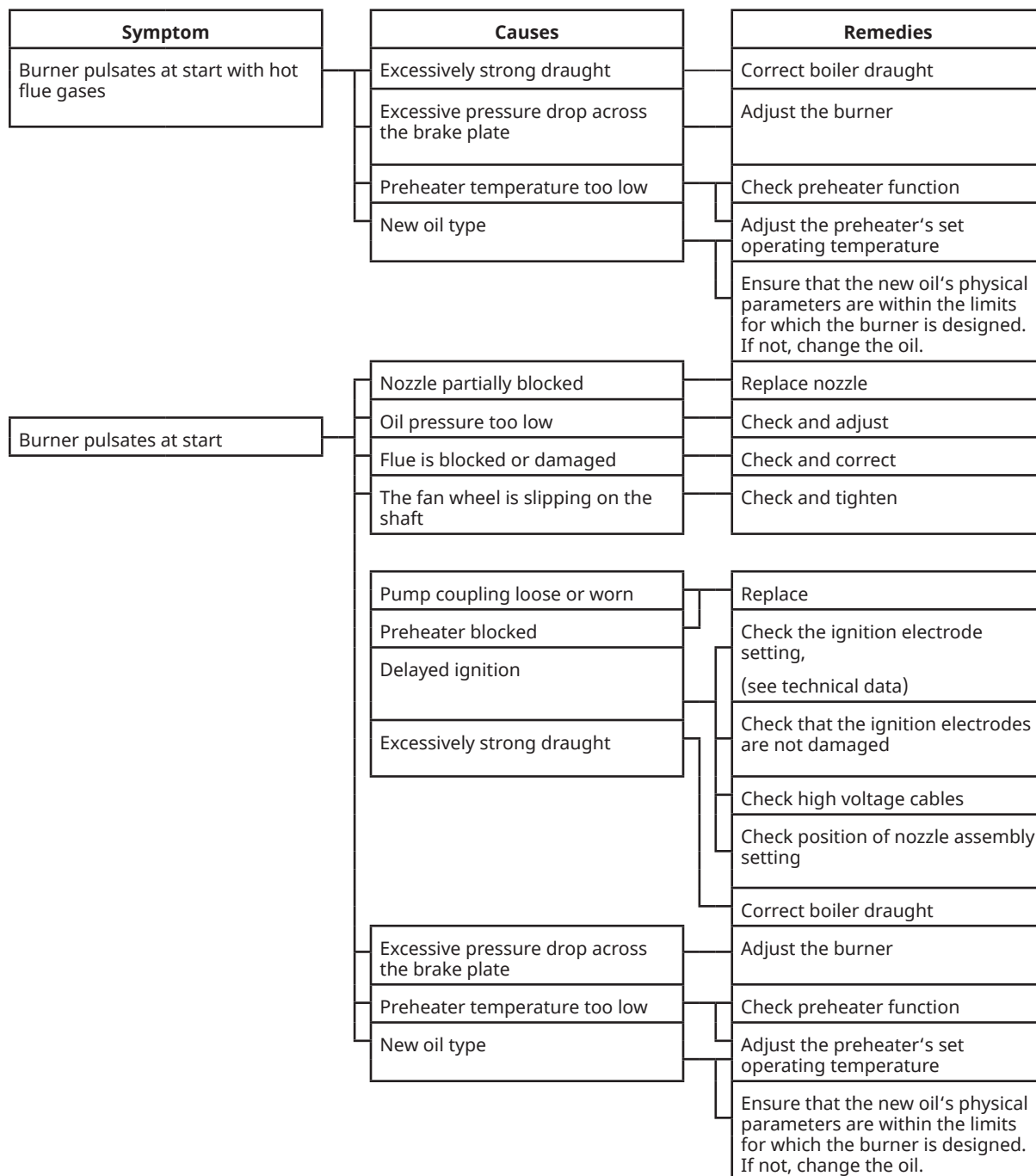
9.1 Burner will not start



9.2 Burner will not start after normal use

| Symptom | Causes | Remedies |
|-----------------------|---|---|
| Burner does not start | Fuse blown | Check and replace fuse as necessary. Investigate cause of fault |
| | Boiler thermostat has not reset | Adjust thermostat |
| | Preheater does not get up to temperature | Check preheater function |
| Burner pre-ventilates | Overheating protection has deployed | Reset the overheating protection. Investigate the cause of its deploying. |
| | Defective preheater | Remedy fault |
| | Defective oil burner control or flame monitor | Check by replacing with new |
| Burner stops | No oil supply | Check that tank, oil lines, solenoid valves, pump and nozzle are in good condition |
| | Too great a pressure drop at brake plate | Adjust the burner |
| | Too strong draught prevents flame forming | Correct the boiler draught |
| | No spark | Check the ignition transformer. Check the ignition electrode settings and ceramics |
| | Preheater temperature too low | Check preheater function |
| | New oil type | Adjust the preheater's set operating temperature |
| | | Check that the oil used has the physical parameters that the burner is rated for. If not, change the oil. |

9.3 Delayed ignition



9.5 Noise in pump

| Symptom | Causes | Remedies |
|--|---|---|
| The burner pump emits noise during start | Insufficient negative pressure on the suction side pump | Check the oil system in order to reduce pressure drop |
| The burner pump emits noise during operation | | Rebuild the oil system to form a solution with a transport oil pump |
| | | Check that the oil used has the physical parameters that the burner is rated for. If not, change the oil. |
| | | Temperature of the oil from the tank is too low, increase the temperature of oil from tank |
| | | Clean the pump filter |

9.4 Pump pressure

| Symptom | Causes | Remedies |
|---|--|--|
| The burner pump can not build up pressure | No oil | Check that there is oil and that it reaches the pump |
| | Oil viscosity too low | Check that the oil reaching the pump has the physical parameters that the pump can handle. Change the oil or the pump's oil parameters |
| | Pump worn | Replace the pump |
| | Pump run using impure oil that has worn the pump out prematurely | Replace pump and install self-cleaning filter in the oil system |
| | Blocked pump filter | Check, clean pump filter |

10. Log of flue gas analysis

| | | |
|--------------|---------|----------|
| Owner | Adresss | Tel. no: |
| | | |
| Installation | | Tel. no: |

Boiler

| | | |
|------|------|----------|
| Type | Make | Power kW |
|------|------|----------|

Burner

| | | | |
|------|-------|------------|------|
| Type | Model | Serial no. | Fuel |
|------|-------|------------|------|

| | Step 1 | Step 2 | Step 3 |
|----------------------|--------|--------|--------|
| Draught in fireplace | | | |
| Fan Press mbar | | | |
| Filter smoke number | | | |
| CO ₂ | | | |
| O ₂ | | | |
| NOx | | | |
| CO | | | |
| Flue gas temp. °C | | | |
| Setting brake disc | | | |
| Setting Air damper | | | |
| Pump pressure bar | | | |
| Nozzle | | | |

| | |
|---------------------|----------------|
| Test performed / 20 | Address |
| Test performed by: | Postal address |
| Company name: | Tel. no: |



EU Declaration of conformity

Bentone Oil Burners

Type:

| | | | |
|---------------|---------------|-------------|-------------|
| BF 1 | ST 133 | B 40 | B 65 |
| ST 108 | ST 146 | B 45 | B 70 |
| ST 120 | B 30 | B 55 | 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**
- **LVD 2014/35/EU**
- **EMC 2014/30/EU**
- **The 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 267:2020 Excluding the requirements of Annex K.
Automatic forced draught burners for liquid fuels.

Additional information can be downloaded at: www.bentone.com

Manufacturer: CTC AB
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Sweden

Ljungby, 2024-01-01

Joachim Hultqvist
Technical Manager
CTC AB

Ola Karlsson
Quality Manager
CTC AB

Bentone Oil Burners

Type:

| | | | |
|---------------|---------------|-------------|-------------|
| BF 1 | ST 133 | B 40 | B 65 |
| ST 108 | ST 146 | B 45 | B 70 |
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The object of the declaration described above is in conformity with:

- **Supply of Machinery (Safety) Regulations 2008**
- **Electrical Equipment (Safety) Regulations 2016**
- **Electromagnetic Compatibility Regulations 2016**
- **The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012**

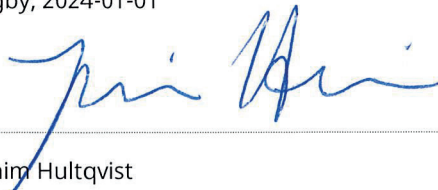
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