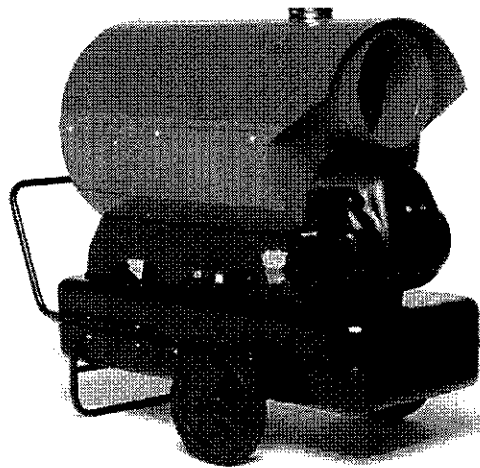


# OPERATING & MAINTENANCE MANUAL

## INDUSTRIAL INDIRECT FIRED DIESEL HEATERS



### PRO 60PSB



**NOT FOR DOMESTIC USE – SPACE HEATING ONLY**

**Importer:** Cial AS – PB 295 Sentrum - 3721 SKIEN  
Telefon + 4000 3482 Telefaks + 47 3559 0998  
internett: [www.cial.no](http://www.cial.no)

**WARNING:** **FAILURE TO FOLLOW OPERATING, SAFETY AND MAINTENANCE INSTRUCTIONS LISTED IN THIS MANUAL RELEASES THE MANUFACTURER FROM ANY RESPONSIBILITY FOR ACCIDENTS OR DAMAGES TO BOTH HUMANS AND OBJECTS AND MAY RENDER ANY WARRANTY VOID**

## CE DECLARATION OF CONFORMITY

**Models diesel heaters PRO 14C, PRO 20C, PRO 28C, PRO 40 P, PRO 45 PIH, PRO 80 PIH , PRO 90, PRO 22 CIH, PRO 60PSB**

We declare under our own responsibility that the products to which this declaration refers are in accordance with the following European directives:

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## CE DEKLARASJON

**For Diesel varmer modeller: PRO 14C,PRO 20C, PRO 28C, PRO 40 P, PRO 45 PIH, PRO 80 PIH , PRO 90, PRO 22 CIH, PRO 60PSB**

Vi bekrefter med dette at de listede varmer modellene er produsert og levert i henhold til følgende Europeiske direktiv:

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Varmerne tilfredstiller norsk standard **NS 5095** med unntak av temperatur grense for varmluft utslipp. Varmerne er beregnet for bruk utendørs. Varmerne er behørig merket med denne bruks begrensningen.

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## TECHNICAL DATA

<b>PRO 60PSB</b>	<b>DIESEL</b>
HEAT INPUT APPROX	62KW
HEAT OUTPUT APPROX	51KW
NOZZLE SIZE	1.35USGPH 90° A
FUEL PRESSURE	10BAR
CONSUMPTION DIESEL	5.2kg/h
APPROX HEATED AIR	0.742m <sup>3</sup> /s
SMOKE NO	0-2 (ACTUAL 0.5-1)
CO	12PPM
CO2	13%
AIR DAMPER NO	6.1
HEAD POSITION NO	4
MAX DUCTING LENGTH	1 x 12M of 300mm dia. OR 2 x 12M of 300mm dia. using Y piece OR 4 x 6M of 150mm dia. using 4-way adapter
ELECTRICAL SUPPLY	230V 50HZ 1PH
ELECTRIC MOTOR	580W 3.2A
THERMOSTAT SETTING FAN	BETWEEN 30-35 C <sup>0</sup> (AMBIENT -5C <sup>0</sup> )
LIMIT THERMOSTAT SETTING	95C <sup>0</sup>
TANK CAPACITY	139L
WEIGHT DRY	138KG
L x W x H	1240 x 755 x 1210 mm.

The manufacturer reserves the right to modify design features and technical data without notice.

### INTRODUCTION

The SPACEHEATERS® range of heaters has been designed to give safe, efficient and reliable service when the correct operating sequences are followed and proper attention is given to cleaning and maintenance procedures. This manual is to provide up to date information necessary to the user/serviceperson for operating, cleaning and servicing the heaters, together with fault finding techniques and general specifications details and diagrams. Please note that the information given herein after may be subject to revision in compliance with the policy of continual improvements.

The SPACEHEATERS® range of heaters should only be used in the manner and purpose for which they were intended and in accordance with the recommendations and safety precautions detailed in the following Manual and in the Operating Instructions stickers on the unit itself.

All SPACEHEATERS® heaters undergo rigorous safety and operational tests before being despatched into the marketplace however it is imperative that, prior to use, all operators have read and understood all information and instructions provided and are aware of possible hazards.

### IMPORTANT SAFETY INSTRUCTIONS & PRECAUTIONS

This booklet contains important information for the use and safe operation of this heater. Please read and understand all warnings before you start using the unit.

**WARNING: When using this heater:**

1. Read all instructions before using this heater.
2. Know how to start and stop the unit. Be quite familiar with the controls.
3. Follow the maintenance procedures and fault finding techniques outlined in the manuals provided.
4. Do not restrict under any circumstances either the inlet or outlet end of the heater.
5. Do not operate this heater in basements or below ground.
6. Permanent ventilation to the outside atmosphere must be provided. Allow 6.5cm<sup>2</sup> for every 293W input divided equally between floor and high levels.
7. Not for domestic use space heating only.
8. The heater must not be used in close proximity to combustible material. A guard must be placed 900mm away from the heater outlet to prevent the approach of combustible materials.
9. Read carefully the instructions concerning earthing.
10. Use only clean filtered diesel as fuel. Do not refill the fuel tank while the heater is running.
11. Do not operate the heater with the top cover removed.
12. Do not exceed the recommended ducting length listed in the technical specifications.
13. Do not pull on the electrical cord in order to unplug the unit.
14. Do not effect temporary repairs on worn or damaged electrical cords and plugs. Have worn, cut or damaged cords and plugs replaced by an authorised service person/electrician.
15. To prevent injury always disconnect the power plug before disassembling any part of the heater, effecting any servicing or when the unit is not in use.
16. Local regulations should be followed as to the installation of industrial heaters.

### ELECTRICITY SUPPLY

The SPACEHEATERS® range of heaters is designed to run off 230V Single Phase 50Hz electrical supply. The unit should be plugged into a 10A outlet.

**WARNING: This appliance must be earthed.**

Note: If the Plug needs to be replaced to suit local requirements a qualified electrician should carry out the replacement taking care to earth the unit and maintain the correct phase connection as per the wiring diagram.

### FUEL SUPPLY

Please only use the following fuel types in the heater:

- Class D Diesel

**WARNING:** Under no circumstances should any other fuel type be used. Do not fill the fuel tank while the heater is running.

## INSTALLATION AND OPERATING INSTRUCTIONS

### INSTALLATION

1. Identify your unit from the model description on the serial number label affixed to the heater and the exploded views contained in this manual. (ALL NUMBERED REFERENCES APPLY TO EXPLODED VIEW OF UNIT)
2. Fill the Fuel Tank (1) using clean filtered fuel.
3. Connect a rigid stainless steel exhaust Flue (length 1M 5" diameter) to the draught diverter (9) terminated with a rain cowl protection. Make sure that the flue is insulated from inflammable surfaces (Longer flues and other materials can be used please contact your authorised agent for details.)
4. Connect ducting as necessary making sure that the maximum lengths as listed in the technical specifications are not exceeded. To maintain maximum heater efficiency ducting should be kept as short and straight as possible.
5. Connect Power Plug to Mains Power Outlet and check that the power light (40) is on.

### OPERATING INSTRUCTIONS

#### TO START & USE

1. Set fan thermostat (10) temperature following outlines in the technical specifications and allowing for changes in ambient temperature.
2. WHERE FITTED. This unit can be fitted with a thermostat. If required please contact your service agent for further information. Set operating temperature to the desired position on the thermostat.
3. Turn power switch (37) to the Flame (II) position. This will start the ignition cycle for the burner and the fan will start after a preheat period.

#### TO STOP (NORMAL OPERATION)

1. Turn power switch (37) to the Off (0) position. The fan will continue to run until the cooling cycle is complete, DO NOT REMOVE THE PLUG FROM THE ELECTRICAL SUPPLY UNTIL THE FAN HAS STOPPED RUNNING AS THIS WILL CAUSE DAMAGE TO THE UNIT.
2. After the fan has stopped running remove the plug from the electrical outlet.

#### OPERATING INSTRUCTIONS – SUMMER VENTILATION

1. Set fan thermostat (10) temperature to below ambient.
2. Turn power switch (37) to the Fan (I) position. After use turn to Off (0) position and remove plug from electrical outlet.

**Note:** If the heater is to be laid up for a long period of time make sure it is stored away from the elements and that water cannot get into the chimney.

### BURNER INSTRUCTIONS - MAINTENANCE

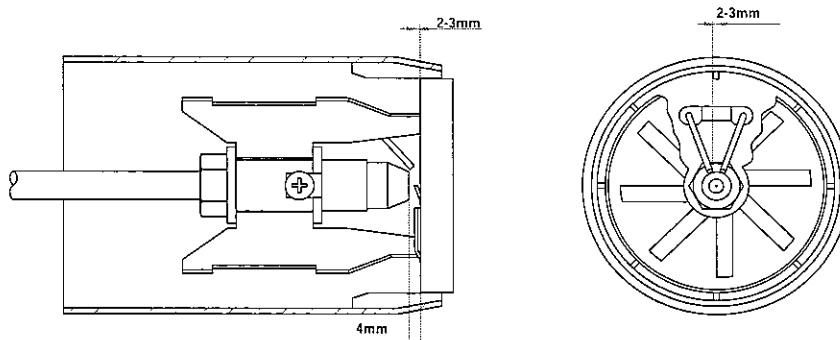
After every heating season, or sooner if used in a dirty environment, carry out the following maintenance procedures on your heater.

#### GENERAL

Disconnect the heater from the electricity main power socket. Remove the screws retaining the cover and remove the cover. Check the combustion chamber conditions and clean any carbon deposits as necessary.

#### BURNER SERVICE

Remove the high tension leads and check. Disconnect the fuel line and remove the burner head. Check and clean burner head, photocell, burner nozzle, electrodes from carbon deposit and replace any faulty/cracked parts. Reassemble all parts following a reverse order making sure that the electrode position is as per diagram attached and that the fuel line connections are airtight.



## TRANSFORMER

The transformer produces a high voltage discharge to the electrodes (see burner scheme for their adjustments).

## FUEL SUPPLY

Drain and clean fuel tank by removing the plug fitted on the bottom of the tank. Reassemble making sure that the plug is tight. Clean and drain fuel filters and replace them if necessary. Check fuel lines for leaks.

## DIESEL PUMP

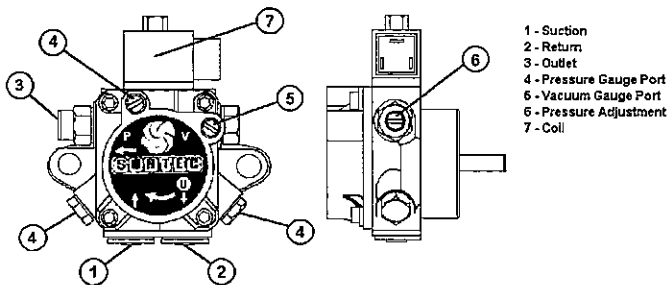
The diesel pump has a built in solenoid valve which controls the regulator cut-off valve giving fast cut-on cut-off function, independent of the rotational speed. The gear-set draws diesel from the tank through the built in filter and transfers it to the valve and regulates the diesel pressure to the nozzle line. All diesel which does not go through the nozzle line will be dumped through the valve back to the return line, or if it is a one pipe installation back to the suction port in the gear set.

## COMBUSTION

Satisfactory thermal performance of the combustion chamber may be obtained only through good combustion. Dirty fuel containing water always produces faulty combustion with soot deposits on the pipe. If, depending on the local atmospheric pressure and the length of the chimney, the combustion is not satisfactory, regulate the combustion by minimally adjusting the position of the burner head through the regulation screw and the air adjustment ring.

## PUMP SERVICE

Disconnect the fuel lines from the pump and remove the socket head screws. Remove the pump body by tapping, making sure not to damage the seals. Remove and clean the fuel filter inside the pump. Reassemble the pump following a reverse order and reconnect the fuel lines making sure there are no leaks.



## ELECTRICAL

Check that the motor fixing bolts are tight and make sure that the fan fixing screw at the fan boss is tight. Check the limit thermostat junction for continuity. Open all electrical enclosures and check that all electrical connections are tight and in good condition.

## GENERAL

Reassemble the heater making sure all screws and fittings are tight. Reconnect and start the heater following the installation and operating instructions. Test the heater for correct operation making sure that all safety mechanisms (where fitted photocell, fan thermostat, limit thermostat) are operating correctly.

## MAINTENANCE AND FAULT FINDING PROCEDURES

**WARNING: ALWAYS ISOLATE UNIT FROM THE ELECTRICAL SUPPLY BEFORE ATTEMPTING ANY REPAIRS OR MAINTENANCE.**

### TROUBLESHOOTING GUIDE

FAULT	CAUSE
<b>A</b> The Power Light is not on	1
<b>B</b> The fan motor never starts	1-2-3-4-5
<b>C</b> The burner does not start	1-5-6
<b>D</b> The burner starts but goes into lockout	7-8-9-10-11-12-13-14-15
<b>E</b> Heater runs but excessive smoke is emitted from flue	10-16-17

### FAULT CORRECTION

**THE MANUFACTURER RECOMMENDS THAT ALL REPAIRS AND MAINTENANCE WORK BE CARRIED OUT BY A QUALIFIED TECHNICIAN.**

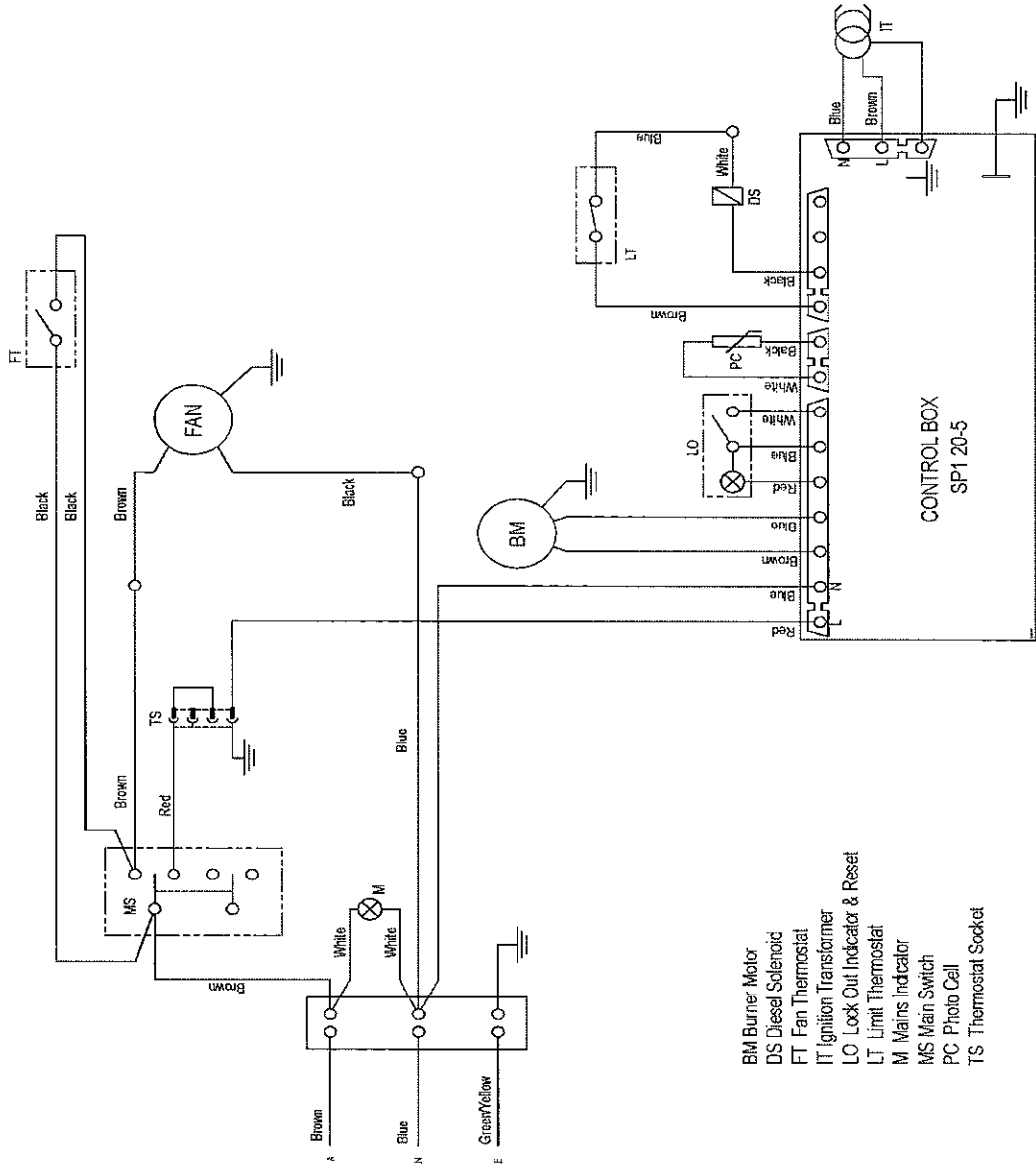
#### CAUSE

1.	Electricity Supply is faulty	<ul style="list-style-type: none"> <li>• Check the power plug is plugged in.</li> <li>• Check that electricity supply is available</li> <li>• Check that all wiring connections are secure and all terminals properly connected</li> </ul>
2.	The motor is blocked/faulty	<ul style="list-style-type: none"> <li>• Check and replace as necessary</li> </ul>
3.	The fan is blocked/damaged	<ul style="list-style-type: none"> <li>• Check and replace as necessary</li> </ul>
4.	The fan thermostat is incorrectly set/faulty	<ul style="list-style-type: none"> <li>• Check and adjust or replace as necessary</li> </ul>
5.	Switch/switch connections is/are faulty/loose	<ul style="list-style-type: none"> <li>• Check and replace as necessary</li> </ul>
6.	If fitted: *The thermostat setting is incorrect *The thermostat plug is not plugged in *The thermostat/thermostat connection is loose/faulty	<ul style="list-style-type: none"> <li>• Adjust thermostat accordingly</li> <li>• Plug the thermostat plug into the appropriate socket</li> <li>• Check and replace as necessary</li> </ul>
7.	Limit thermostat is faulty	<ul style="list-style-type: none"> <li>• Check for continuity in Limit thermostat connection</li> </ul>
8.	Diesel flow absent before solenoid valve	<ul style="list-style-type: none"> <li>• Check that the fuel tank is full. Fill if necessary.</li> <li>• Check that the fuel filters are not blocked or faulty. Clean or replace as necessary.</li> <li>• Check fuel lines for blockages /air leaks. Tighten or replace as necessary.</li> <li>• Check the fuel pump for correct operation and rotation. Adjust and replace as necessary.</li> </ul>
9.	Solenoid valve does not open	<ul style="list-style-type: none"> <li>• Check the solenoid valve and its connection .Adjust or replace as necessary</li> <li>• Check the Limit thermostat</li> </ul>
10.	Diesel nozzle Blocked /faulty	<ul style="list-style-type: none"> <li>• Check and clean/replace as necessary</li> </ul>
11.	Photocell flame detecting device dirty or not working properly	<ul style="list-style-type: none"> <li>• Check, clean and adjust or replace as necessary</li> </ul>
12.	Inlet/outlet grill or inside of heater is dirty or partially blocked	<ul style="list-style-type: none"> <li>• Check and clean as necessary</li> </ul>
13.	Limit thermostat cuts in interrupting the heater	<ul style="list-style-type: none"> <li>• Check if the inlet/outlet grill are dirty or blocked, clean as necessary</li> <li>• Check that airflow in and out of the heater is not impeded</li> </ul>
14.	Diesel is not igniting	<ul style="list-style-type: none"> <li>• Check Transformer and replace if necessary</li> <li>• Check High Tension leads and adjust/replace as necessary</li> <li>• Check electrodes and adjust and replace as necessary</li> </ul>
15.	Burner Control box faulty	<ul style="list-style-type: none"> <li>• Check and replace if necessary</li> </ul>
16.	Air adjustment and/or burner head position is incorrect	<ul style="list-style-type: none"> <li>• Check and adjust as necessary following settings in the technical specifications.</li> </ul>
17.	Pump pressure incorrect	<ul style="list-style-type: none"> <li>• Check and adjust/replace as necessary</li> </ul>

**Note: IF IT IS NECESSARY TO FIND A FAULT OR MAKE ADJUSTMENTS TO THE BURNER (as listed above) FOLLOW ALL INSTRUCTIONS PROVIDED IN THE FAULT FINDING AND MAINTENANCE BURNER BOOKLET PROVIDED.**

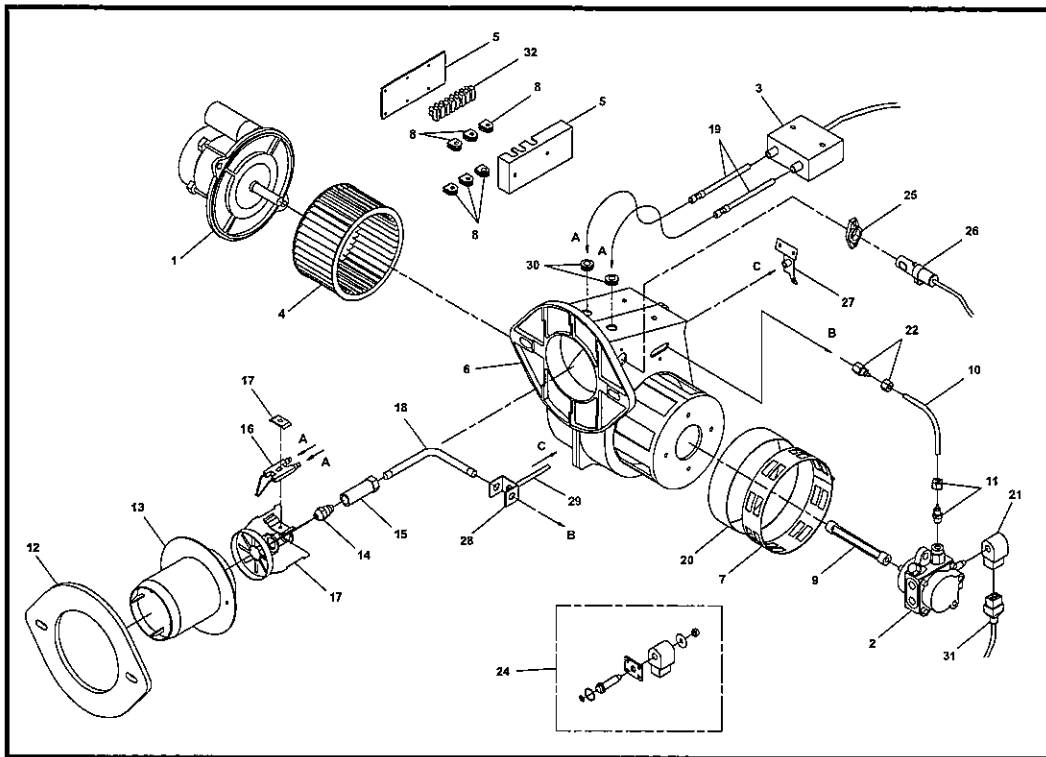
# ELECTRICAL DIAGRAM

PRO60PSB



- BM Burner Motor
- DS Diesel Solenoid
- FT Fan Thermostat
- IT Ignition Transformer
- LO Lock Out Indicator & Reset
- LT Limit Thermostat
- M Mains Indicator
- MS Main Switch
- PC Photo Cell
- TS Thermostat Socket

## 44902/4 - BURNER



No.	Description	Part No.	No.	Description	Part No.
1	Motor	44250	16	Electrode	100225/A
2	Pump with Solenoid Valve	44924	17	Burner Head	100227
3	Transformer	100220	18	Distillate Pipe	44935/A
4	Fan	44656/A	19	High Voltage Cable	44936
5	Terminal Box with Lid	44925	20	Blind Air Adjustment	44913
6	Fan Housing	44051	21	Solenoid Coil	44937
7	Air Adjustment Ring	44926	22	Rilsan Nipple 1/8" Female	48765
8	Grommet – Dia 5.5 Dia 6.5 Dia 7.5	48438	24	Kit for Diesel pump	Sw104
			25	Photocell	48413
			26	Photocell holder	48414
9	Joint	44929	27	Adjustment bracket	44938
10	Distillate Hose	48739	28	Bracket burner tube	44939
11	Rilsan Nipple 1/8" Male	44342	29	Regulation screw	44940
12	Gasket	44101	30	Grommet	48431
13	Electrode Housing	44932/B	31	Lead – Solenoid Valve	48437
14	Nozzle 1.35Gph	44571/D	32	Terminal Block – 8 Way	20020
15	Nozzle Bearer	530017			

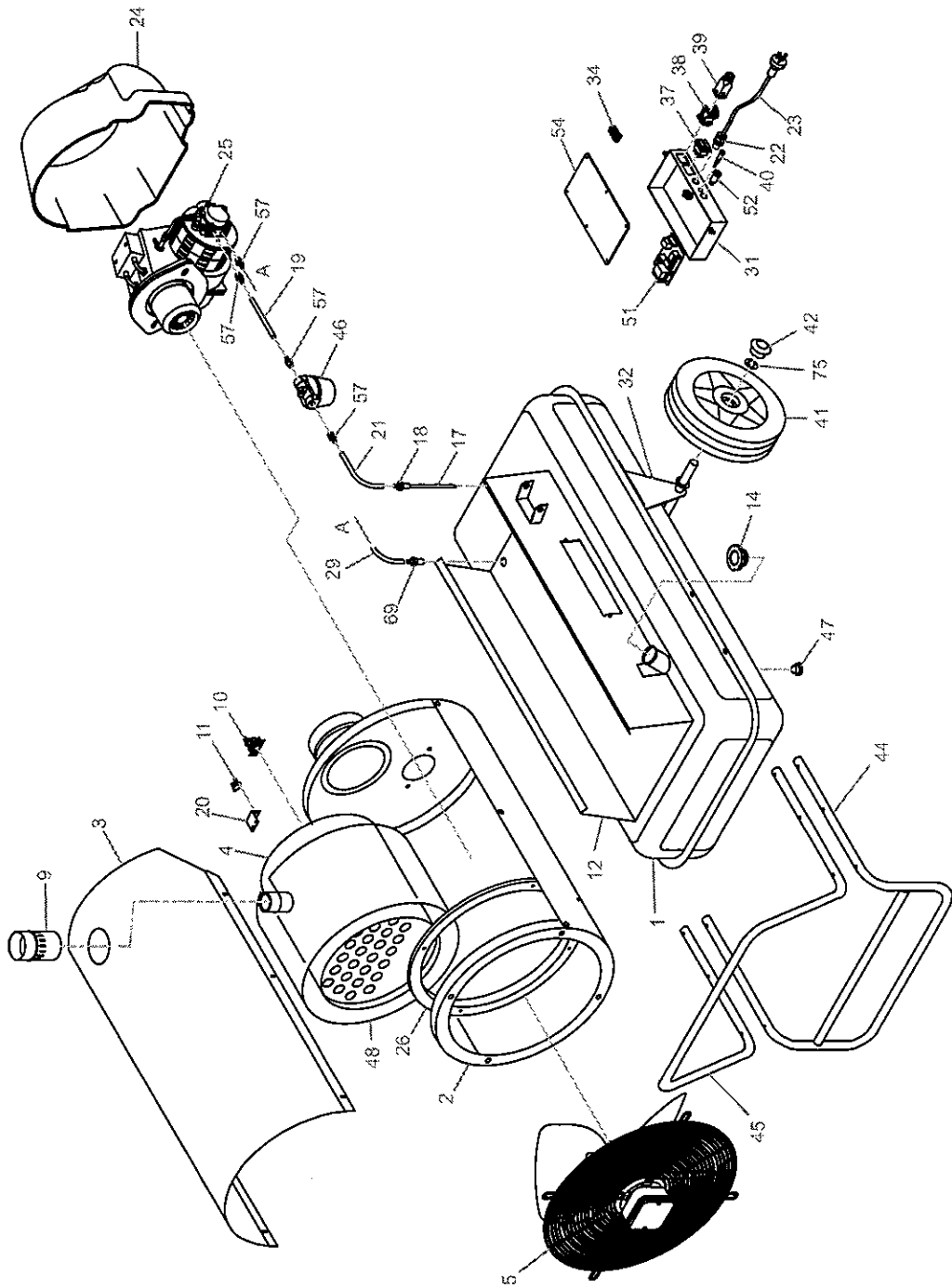


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**SPARE PARTS LISTING**

NO	DESCRIPTION	PRO60PSB	NO	DESCRIPTION	PRO60PSB
1	TANK WELD ASSEMBLY	175001/O	31	PLASTIC BOX	100260
2	BOTTOM CASING	175011	32	AXLE WITH BRACKET	550024
3	TOP COVER	175015	34	TERMINAL BLOCK	33045
4	COMBUSTION CHAMBER	175022	37	SWITCH	33124
5	MOTOR FAN ASSEMBLY	33252	38	THERMOSTAT SOCKET ILME	100261
9	STACK BREAK	260005	39	ILME PLUG	100262
10	LIMIT THERMOSTAT	33041	40	LIGHT	33125
11	FAN THERMOSTAT	550037	41	WHEEL	175030
12	PLINTH	175038	42	HUB CAP COVER	33265/B
14	FILLER CAP	PA29019784	44	TROLLEY	550022
17	PICK UP TUBE	550033/02	45	HANDLE	550023
18	HOSE TAIL M12x1/4	47039/D	46	LINE FILTER	48701
19	HOSE BUR/PUMP-FILTER	175033	47	DRAIN PLUG	100157
21	HOSE TANK/FILTER	175009	48	HEAT SHIELD	175014
20	LIMIT THERMOSTAT BRACKET	20021	51	CONTROL BOX 230VOLT	300133
22	CABLE GLAND	48417/E	52	RESET BUTTON	33205
23	MAIN CABLE	33417/01	54	PLASTIC BOX COVER	100124
24	BURNER COVER	48071	57	HOSE TAIL	47039
25	BURNER	44902/4	69	HOSE TAIL	47039/C
26	AIR RESTRICTION RING	175011/02	75	HUB CAP BLOCK	33265/C
29	HOSE RETURN	175039			

# EXPLODED VIEW



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