

GAS HEATERS

Model Nos: Little Devil • Devil 850 • Devil 1250 • Devil 1850 • Devil 3150

OPERATING & MAINTENANCE INSTRUCTIONS



Should you experience difficulty in setting up or operating this equipment, please contact your Clarke dealer, or Clarke International helpline on:

020 8588 7400

For Spare Parts and Service, please contact your nearest dealer, or CLARKE International, on one of the following numbers.

PARTS & SERVICE TEL: 020 8988 7400 PARTS & SERVICE FAX: 020 8558 3622 or e-mail as follows: PARTS: Parts@clarkeinternational.com

Thank you for purchasing this CLARKE Gas Space Heater.

This range of portable, direct fired gas heaters is designed to BS 4096 for industrial applications to give safe, efficient and reliable operation, and are for use with **Propane Gas only.** Propane gas bottles are not supplied with the unit, but are readily available from Builders Merchants or gas suppliers.

As with all mechanical equipments, optimum performance will only be achieved if the correct application and servicing procedures are followed.

Please read this leaflet thoroughly and follow the instructions carefully before attempting to use the heater. In doing so you will ensure the safety of yourself and that of others around you, and you can look forward to it giving you long and reliable service.

GUARANTEE

This CLARKE product is guaranteed against faulty manufacture for a period of 12 months from the date of purchase. Please keep your receipt as proof of purchase.

This guarantee is invalid if the product is found to have been abused or tampered with in any way, or not used for the purpose for which it was intended.

Faulty goods should be returned to their place of purchase, no product can be returned to us without prior permission.

This guarantee does not effect your statutory rights.

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SAFETY PRECAUTIONS

WARNING!

Lack of ventilation can cause Carbon Monoxide poisoning. Carbon Monoxide poisoning can kill.

Signs of Carbon Monoxide poisoning are, headaches, dizziness and/or nausea. Should anyone show these signs, they must GET FRESH AIR IMMEDIATELY. Turn off the heater and have it serviced before using again.

Pregnant women, persons with a heart or lung condition, anaemia or under the influence of alcohol, or those at high altitudes, are more likely to be effected by Carbon Monoxide than others.

Read, and make sure you fully understand the following precautions and the hazards associated with this type of equipment.

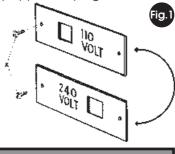
- Use ONLY Propane gas
- Ensure the Propane gas bottle, gas hose and electric cable, are positioned behind the unit, well away from the heat
- Ensure all gas hose and regulator connections are GAS TIGHT, and the hose is not kinked.
- NEVER use the heater where Gasoline, Paint thinner or other highly flammable vapour or high dust content is present.
- Use ONLY with the electrical voltage specified, and ensure the appliance is properly earthed.
- Use ONLY in well ventilated areas. Provide ventilation of at least 100 square inches of fresh air for every 100,000 BTU/ hr of rating.
- The minimum clearance from any combustible materials is 8 feet (250cm) from hot air outlet and 4 feet (125cm) from the top and sides.
- Stand the heater on a stable, level surface whilst hot or operating. If the heater should overturn, a fire could occur.
- Keep children and animals away from heater at all times.
- Use heater in accordance with all fire regulations.
- NEVER use heater in living or sleeping areas.
- NEVER leave a heater plugged in without adult supervision if children or animals are likely to be present.
- NEVER move, handle, replenish gas supply or service the heater, when it is hot, operating or plugged in.
- NEVER attach duct work, or impede air flow into or out of heater.
- Disconnect the heater from the power supply when not in use.
- Use ONLY the regulator supplied with the machine.
- DO NOT exceed the limit of 240Btu/hr, per square metre of room area.
- If the machine works for long periods at maximum capacity, be aware that it is possible for ice to form on the cylinder, due to excessive evaporation.
- NEVER direct hot air towards the cylinder in order to de-ice.

ELECTRICAL CONNECTIONS

Connect the mains lead to a standard, 230 Volt (50Hz) electrical supply through an approved 13 amp BS 1363 plug, or a suitably fused isolator switch.

With the exception of the Little Devil and Devil 650, the appliance may also be connected to a 110 Volt supply, through a suitably approved plug.

The conversion to 110V, is by means of a switch, mounted on the rear panel of the unit, which is held in place by a lock plate. To change the voltage, remove the two self tapping screws securing the plate, and remove the plate. Move the switch to the appropriate position, and replace the plate having turned it through 180° as shown opposite.



N WARNING! THIS APPLIANCE MUST BE EARTHED

IMPORTANT: The wires in the mains lead are coloured in accordance with the following code:

Green & Yellow	-	Earth
Blue	-	Neutral
Brown	-	Live

As the colours of the flexible cord of this appliance may not correspond with the coloured markings identifying terminals in your plug proceed as follows:

- Connect GREEN & YELLOW cord to terminal marked with a letter "E" or Earth symbol ` + ' or coloured GREEN or GREEN & YELLOW.
- Connect BROWN cord to terminal marked with a letter "L" or coloured RED
- Connect BLUE cord to terminal marked with a letter "N" or coloured BLACK

If this appliance is fitted with a plug which is moulded onto the electric cable (i.e. non-rewirable) please note:

- 1. The plug must be thrown away if it is cut from the electric cable. There is a danger of electric shock if it is subsequently inserted into a socket outlet.
- 2. Never use the plug without the fuse cover fitted.
- 3. Should you wish to replace a detachable fuse carrier, ensure that the correct replacement is used (as indicated by marking or colour code).
- 4. Replacement fuse covers can be obtained from your local dealer or most electrical stockists.
- 5. The fuse in the plug must be replaced with one of the same rating (**13 amps**) and this replacement must be ASTA approved to BS1362.

We strongly recommend that this machine is connected to the mains supply through a Residual Current Device (RCD).

If in doubt, consult a qualified electrician. Do not attempt any electrical repairs yourself.

UNPACKING

On unpacking, check the heater for possible shipping damage. Should any damage be apparent, please notify your Clarke dealer immediately.

Your heater is fully assembled, only the electrical and gas supply's need connecting.

PROPANE GAS SUPPLY

These heaters are designed for use with PROPANE gas ONLY. Gas bottles are not

WARNING

Propane Gas cylinders must be used and stored in accordance with the

Highly Flammable Liquids and Liquefied Petroleum Gases Regulations 1972

supplied, but are readily available from Builders Merchants or gas suppliers etc

GAS CONNECTION

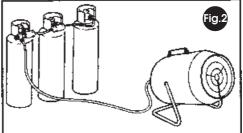
Connect the free end of the gas hose to the gas inlet connection on the machine, and tighten to ensure there are no gas leaks. Before attaching the regulator to the gas cylinder, ensure the mating parts are free from grease and dirt, and are undamaged.

Fit the regulator to the cylinder, tightening the thread as tight as possible with a propane spanner, noting that the threads are LEFT HANDED. To check for leaks, use soapy water, or liquid soap

IMPORTANT: The gas hose and cylinder must ALWAYS be located behind the machine.

In order to reduce the risk of icing up when operating at long periods at maximum capacity, you should use a larger capacity gas bottle, or two/three bottles in parallel, as shown in Fig. 2.

The 'Tee' piece and 'pigtails' are readily available from your Builders Merchants or gas supplier



CHANGING GAS BOTTLES

- 1. Turn off the heater, and disconnect from the electrical supply.
- 2. Close the gas valve on the bottle, and unscrew the regulator, (left hand thread).
- 3. Ensure the replacement bottle screw threads and gas orifice is perfectly clean before screwing in the regulator valve, tightly.
- 4. Check to ensure there are no leaks using soapy water, and when satisfied, plug in to the electrical supply, and restart the machine.

OPERATION

Understanding the basic operation of the heater, will reinforce the need to maintain the unit in top condition at all times, whilst **always** observing the safety precautions.

The heater comprises four basic systems:

- 1. The gas system.
- 2. The air system.
- 3. The ignition system.
- 4. The safety control system.

1. Air System

An axial fan, which is energised when switching ON, provides the main air flow.

2. Gas System

The gas supply to the machine is by means of a high pressure hose, connected to a LPG cylinder, via a pressure regulator.

When the mains supply is switched on, the Safety Shut-off Valve Solenoid is energised, allowing the gas to flow to the Flame Failure Valve, and when the Failure Valve Override knob is depressed, gas flows to the Burner Head.

3. Ignition System

A Piezoelectric Igniter is positioned at the burner head. When the Igniter button is depressed, a high intensity spark is generated, which ignites the gas. Heat from the flame is sensed by a Thermocouple, which is connected to the Flame Failure Valve. As the Thermocouple heats up, a low voltage is fed to the Flame Failure Valve, causing the valve to open, so that after 5-10 seconds, the Override knob may be released, and the main flame is established.

4. The Safety Control System.

Should the flame extinguish for any reason, the Thermocouple will quickly cool, causing the Flame Failure Valve to close, shutting off the gas supply.

Similarly, should there be a power failure, causing the fan motor to stop, the Safety Shut-Off Valve Solenoid will become de-energised, and therefore shut off the gas supply.

Additionally, the machine is fitted with Thermal Overload Protection, which will intervene should the unit overheat, shutting off the electrical supply.

STARTING PROCEDURE

WARNING!

Before starting the heater, you MUST ensure that the minimum ventilation requirements are observed, to avoid the risk of carbon monoxide poisoning.

- 1. Ensuring there is sufficient gas, and that it is correctly connected, open the valve on the gas cylinder, and open the regulator valve which is adjacent to the gas inlet pipe. (Not applicable on the Little Devil).
- 2. Plug the heater in to a suitably earthed supply, and observing all precautions previously stated, push the fan switch to the ON (I) position, (1, Fig.3), and ensure the fan operates.

3. Fully depress the gas valve button (2, Fig.3), which is adjacent to the gas inlet pipe, and push the ignition button (3, Fig.3), repeatedly, until the burner ignites. Keep the gas valve button (4, Fig.3), depressed for a further 10 seconds approx., until the main flame is established.

Should the flame extinguish when the gas valve button is released, wait for 1 minute, before repeating the operation, this time, holding down the gas valve button for a longer period.



NOTES:

The Little Devil and Devil 650 heaters have a fixed, regulated gas flow, whereas all other models have a variable gas flow regulator so that you can regulate the heat output by adjusting the regulator pressure.

Turning the knob clockwise will increase the pressure, and therefore the output, anticlockwise to decrease.

If ignition is difficult or irregular, ensure the fan is operating, and that the air inlet and outlet are completely free. Ensure also that the electrode gap is correct, and that the electrode is clean (see Maintenance).

IMPORTANT:

Should the thermal overload protection feature operate, shut off the gas supply, and allow the unit to cool for at least 10 minutes, with the fan running, before attempting to relight the burner.

Should the other safety features (previously mentioned) operate, the heater may be restarted once the cause of the problem has been found and rectified.

STOPPING PROCEDURE

- 1. Turn OFF gas at source. (Turn off cylinder valve).
- 2. Disconnect gas supply.
- 3. Allow fan to run for 2 3 minutes with burner off, in order to allow casing to cool down.
- 4. Switch OFF fan, and disconnect electrical supply.

Minimum fresh air opening requirements						
Heater Model	Output Btu/hr	Minimum Ventilation ft ²	Minimum Ventilation mtrs ²			
Little Devil	34,000	0.25	0.023			
Devil 650	60,000	0.36	0.035			
Devil 850	78,500	0.75	0.07			
Devil 1250	121,000	1.03	0.10			
Devil 1850	170,000	1.40	0.13			
Devil 3150	300,000	2.40	0.22			

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eg. For the Devil 1250 at max. output, a 3ft window must be open by 13" minimum As a general rule of thumb, an opening of $1in^2$ per 1000 Btu/hr is a minimum requirement.

MAINTENANCE

It is essential that the heater is correctly maintained and kept in top condition at all times.

IMPORTANT

Before carrying out any adjustment or maintenance, ensure the heater is switched OFF, disconnected from the mains and gas supply's, and has been given adequate time to cool down.

All models are similar, in that access to the working parts, is gained by removing the rear panel, which is secured by 4 screws, (3 in the case of the Little Devil), around its' edge. Once removed, the panel complete with all components may be lifted clear.

Monthly (When in constant use)

Ensure the electrode is clean, and the gap is no more than 5mm (see fig 4).

Check the condition of the gas hose, if there are any signs of deterioration, it should be renewed, using only a CLARKE original spare part.

Ensure that all connections are clean and firm.

When necessary, clean the fan and inside of the heater thoroughly.

SFLCIIICAIIONS						
	Little Devil	Devil 650	Devil 850	Devil 1250	Devil 1850	Devil 3150
Min. Output (Btu/hr)	-	-	24,000	60,500	83,350	198,000
Max. Output (Btu/hr)	34,000	60,000	78,500	121,000	170,000	300,000
Gas Pressure Max (bar/psi)	0.3/5	0.7/10	1.5/22	1.5/22	1.5/22	2/30
Air Flow (m ³ /hr)	300	300	650	650	1,500	3300
Gas Consumption (kg/hr)	0.8	1.35	0.6 - 1.8	1.4 - 2.8	2 - 4	4.6 - 8.3
Nozzle Size (mm)	0.7	1.00	1.1	1.25	1.5	2.0
Motor Voltage (Volts)	230 -1ph	230 - 1ph	110/230-1ph	230 - 1ph	230 - 1ph	230 - 1ph
Power rating (Watts)	35	35	85	85	91	140
Input Current 230V (Amps)	0.26	0.3	0.7	0.35	0.42	0.5
110V (Amps)			0.3			
Fuse Rating (Amps)	13	13	13	13	13	13
Dimensions (mm)	350x180x270	490x180x270	550x270x320	635x270x380	725x460x535	1075x420x565
Weight (kg)	5	6	13	15.5	23	30
Part No.	6920160	6920162	6920170	6920340	6920360	6920350

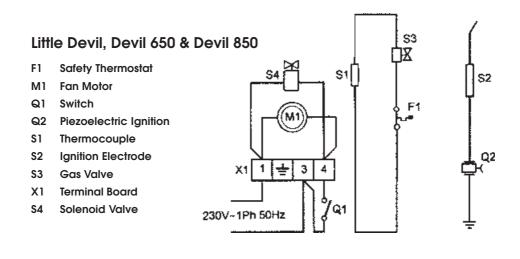
SPECIFICATIONS

TROUBLE SHOOTING

FAULT	CAUSE	REMEDY
Motor does not start	1. No power	1. Check power supply, power cable and fuse, and replace if necessary.
	2. Faulty Motor/ Capacitor	2. Check and if necessary, replace.
	3. Lock out of appliance due to overheating.	3. Detect cause of overheating. Wait for 5 mins, and restart. If condition persists, contact your Clarke dealer for advice.
Piezo does not spark	1. Electrode in wrong position	1. Check position and reset if necessary.
	2. Faulty connection between Piezo and electrode.	2. Check, and connect properly.
No gas flow to the	1. Cylinder gas tap closed.	1. Open the gas tap.
burner	2. Cylinder is empty.	2. Replace cylinder.
	3. The nozzle is obstructed.	3. Remove the nozzle, and clean it.
	4. Gas leaks from the supply hose or from the tap.	4. Use soapy water to find the leak, and repair.
The burner starts, but stops as gas valve is released.	1. The thermocouple is not warm enough.	1. Repeat the starting operation, keeping the gas valve button depressed for a longer time.
The Heater stops during operation.	1. Excessive gas supply.	1. Check the pressure regulator, and replace if necessary.
		2. Check that fan motor works properly.
		3. Check, and use a larger cylinder, or two or more in parallel.
		4. Investigate cause, check to ensure there are no obstructions to air flow. Check adequate ventilation is provided. See also 'Motor does not Start'

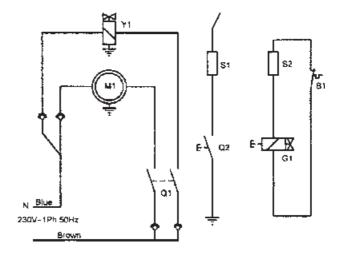
WIRING DIAGRAMS

IMPORTANT: The wiring to these heaters should not be tampered with under any circumstances. Should any wiring problems occur, contact your nearest CLARKE dealer or qualified electrician.



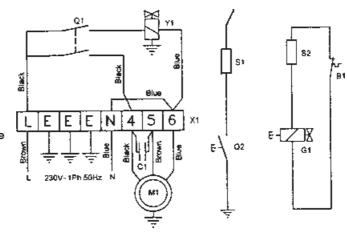
Devil 1250

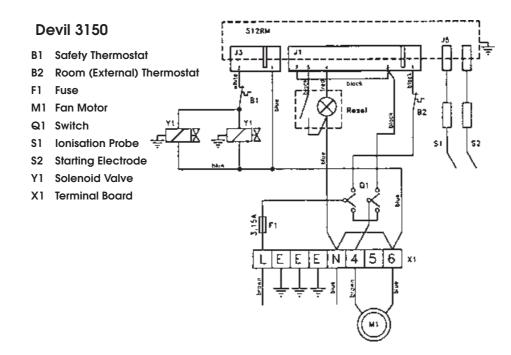
- B1 Safety Thermostat
- G1 Gas Valve
- M1 Fan Motor
- Q1 Switch
- Q2 Piezoelectric device
- **\$1** Ignition Electrode
- S2 Thermocouple
- Y1 Solenoid Valve



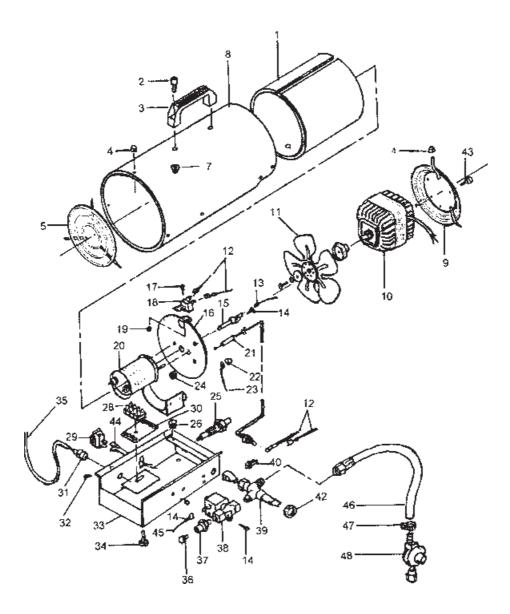
Devil 1850

- **B1** Safety Thermostat
- C1 Capacitor
- G1 Gas Valve
- M1 Fan Motor
- Q1 Switch
- Q2 Piezoelectric device
- S1 Starting Electrode
- S2 Thermocouple
- Y1 Solenoid Valve
- X1 Terminal Board



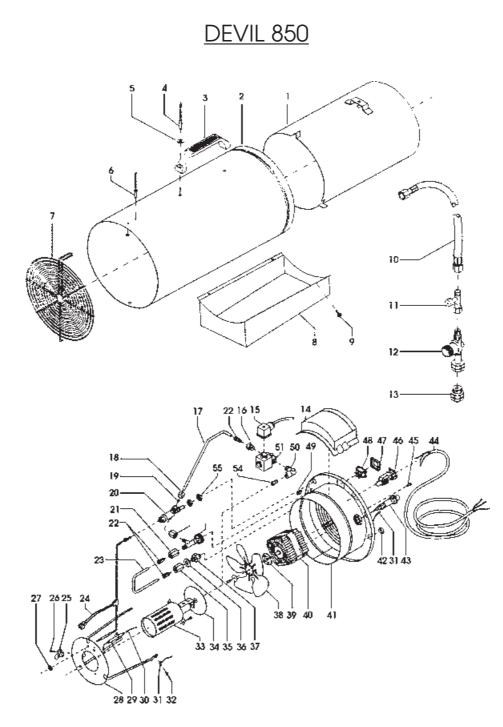


LITTLE DEVIL



LITTLE DEVIL

No.	Description	Part No.	No.	Description	Part No.
1	Chamber	2003104255	28	Terminal Board	1005064500
2	Rivet	1004043000	29	Switch	1005092855
3	Handle	1001015755	30	Label	1004010955
4	Aluminium Rivet	1004014800	31	Grommet	1005091455
5	Cone + Triangle	2003103655	32	Screw	1004012300
7	Washer	1004001100	33	Support	2003059855
8	Body	2003104055	35	Cable	1005091600
9	Grille	1008079955	36	Nozzle	1008063955
10	Motor	1005061300	37	Fitting	1006020555
11	Fan	1008063655	38	Solenoid Valve	1005069200
12	Coupling	1001017855	39	Valve	1006013355
13	Wire	2005054155	40	Fitting	1006017955
14	Screw	1004014000	42	Nut	1006013400
15	Electrode	1005082755	43	Screw	1004011600
16	Disc	2003060155	44	Wire	2005054455
17	Screw	1004000100	45	Blue Wire	2005054555
18	Thermostat	1005062300	45	Brown Wire	2005054655
20	Burner	1008079755	45	Earth Wire	2005054755
21	Thermocouple	1006018355	46	Hose	1009010255
23	Wire	2005054255	47	Valve	1008060755
24	Fastening Ring	1004013100	48	Pressure Regulator	1008072455
25	Piezo Igniter	1005061200	49	Cover Cap	1005092955
26	Rubber Ring	1001005100	50	Fitting	1006014900



<u>DEVIL 850</u>

No.	Description	Part No.	No.	Description	Part No.
1	Chamber	2003103855	29	Electrode	1005063500
2	Body	2003099855	30	Wire	2005048355
3	Handle	1001014700	31	Wire	2005071655
4	Rivet	1004043000	32	Rivet	1004043100
5	Washer	1004001100	33	Burner	1008065655
6	Aluminium Rivet	1004043600	34	Disc	2003104455
7	Grille	1008078455	35	Fitting	1006026455
8	Support	2003091355	36	Washer	1006003500
9	Screw	1004012600	37	Fitting	1006020755
10	Hose	1009010355	38	Fan	1008058700
11	Valve	1008094055	39	Coupling	1001017855
12	Pressure Regulator	1008094355	40	Motor	1005079155
13	Adapter	1006014900	41	Air Conveyor	2003099555
14	Cover	1001038255	42	Black Cap	1005076000
15	Connector	2005076855	43	Piezo Igniter	1005061200
16	Fitting	1006004100	44	Cable	1005102455
17	Hose	2009009555	45	Screw	1004011600
18	Nut	1006018055	46	Fair Lead	1005081755
19	Olive	1006018055	47	Cap Cover	1005092600
20	Valve	1006015355	48	Switch	1005092500
21	Fitting	1006026555	49	Rubber Ring	1001005100
22	Fitting	1006020400	50	Fitting	1006020555
23	Hose	2002019555	51	Solenoid Valve	1005069200
24	Thermocouple	1006018355	52	Nozzle	1008065755
25	Thermostat	1005087800	53	Nut	1006013400
26	Screw	1004000100	54	Тар	1008095455
27	Circlip	1004013100	55	Fitting	1006026655
28	Disc	2003099655			

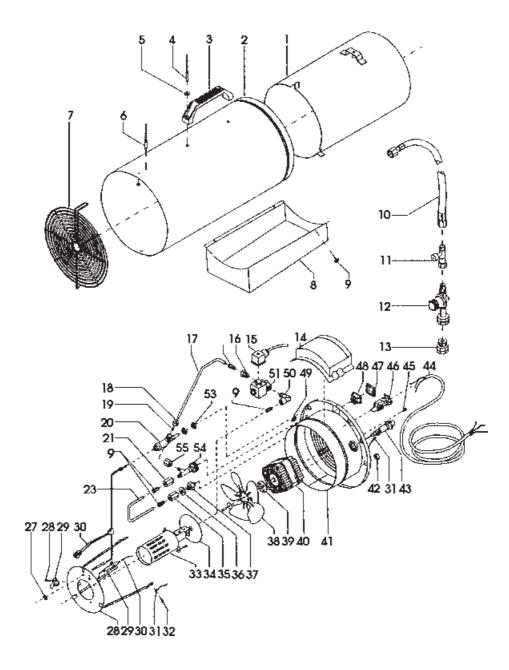
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DEVIL1250

DEVIL1250

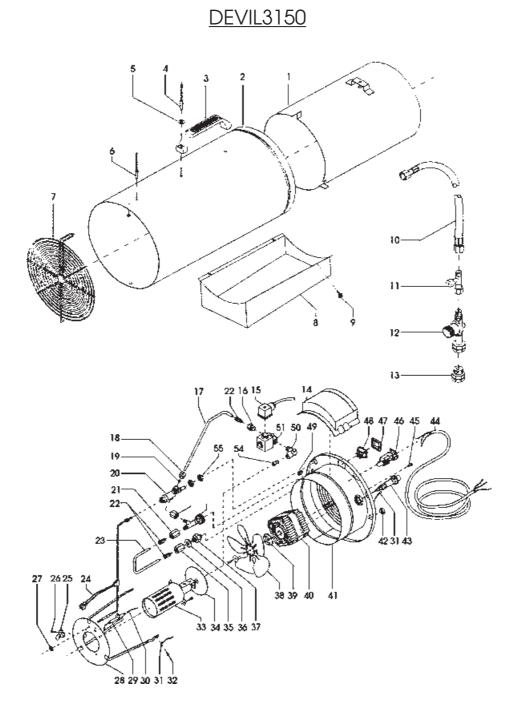
No.	Description	Part No.	No.	Description	Part No.
1	Chamber	2003128455	29	Electrode	1005082836
2	Body	2003128355	30	Wire	2005048355
3	Handle	1001014700	31	Wire	2005071655
4	Rivet	1004043000	32	Rivet	1004043100
5	Washer	1004001100	33	Burner	1008094655
6	Rivet	1004043600	34	Disc	2003104455
7	Grille	1008078455	35	Fitting	1006026455
8	Support	2003091355	36	Washer	1006003500
9	Screw	1004012600	37	Fitting	1006020755
10	Hose	1009016055	38	Fan	1008058700
11	Valve	1008094055	39	Coupling	1001017855
12	Pressure Regulator	1008094355	40	Motor	1005079155
13	Adapter	1006014900	41	Air Conveyor	2003099555
14	Cover	1001038255	42	Black Cap	1005076000
15	Connector	2005076855	43	Piezo Igniter	1005061200
16	Fitting	1006004100	44	Cable	10051402455
17	Hose	2009009555	45	Screw	1004011600
18	Nut	1006014100	46	Fair Lead	1005081755
19	Olive	100601055	47	Cover	1005092600
20	Valve	1006015355	48	Сар	1005092500
21	Fitting	1006026555	49	Rubber Ring	1001005100
22	Fitting	1006020400	50	Fitting	1006020555
23	Hose	2002019555	51	Solenoid Valve	1005069200
24	Thermocouple	1006018355	52	Nozzle	1008094255
25	Thermostat	1005087800	53	Nut	1006013400
26	Screw	1004000100	54	Тар	1008096055
27	Washer	1004013100	55	Fitting	1006026655
28	Disc	2003099655			

<u>DEVIL1850</u>



DEVIL1850

No.	Description	Part No.	No	. Description	Part No.
1	Chamber	2003072636	27	Wire	2005048355
2	Handle	1001018636	28	Nut	1006016000
3	Body	2003072436	29	Burner	1008071836
4	Grille	1008071736	30	Fitting	1006026555
5	Foot	2003072536	31	Fitting	1006026455
6	Nut	1004013600	32	Disc	2003105336
7	Сар	1001010900	33	Electrode	1005082836
8	Hose	1009010355	34	Nozzle	1008071936
9	Valve	1008095836	35	Disc	2003104455
10	Pressure Regulator	1008094355	36	Fitting	1006015955
11	Adapter	1006014900	37	Thermostat	1005087800
12	Cover	1001038736	38	Nut	1005001121
13	Terminal Board	1005070155	39	Air Conveyor	2003072736
14	Insulator	1014057936	40	Rubber Ring	1001005100
15	Capacitor	1005076236	41	Сар	1001019900
16	Тар	1008095536	42	Piezo Igniter	1005061200
17	Nut	1006026755	43	Fair Lead	1005001021
18	Fitting	1006026655	44	Cable	1005102536
19	Valve	1006015355	45	Washer	1004004400
20	Connector	2005077636	46	Screw	1004005000
21	Fitting	1006004100	47	Grille	10080781636
22	Fitting	1006020400	48	Motor- Fan	1005076136
23	Hose	2002016736	49	Cover Cap	1005092600
24	Solenoid Valve	1005069200	50	Switch	1005092500
25	Thermocouple	1006018355	51	Fitting	1006020755
26	Hose	2002019555			



<u>DEVIL3150</u>

No.	Description	Part No.	No.	Description	Part No.
1	Chamber	2003119036	27	Wire	2005073336
2	Body	2003118836	28	Wire	2005073436
3	Grille	1008071736	29	Nut	1006026755
4	Сар	1001018800	30	Nozzle	1008087736
5	Washer	1004010900	31	Fitting	1006021055
6	Wheel	1001002000	32	Air Conveyor	2003118936
7	Foot	2002019036	33	Thermostat	1005087800
8	Hose	1009010355	35	Nut	1005001121
9	Valve	1008095836	36	Push Button	1005082055
10	Pressure Regulator	1008095736	37	Cover Cap	1005099855
11	Adapter	1006014900	38	Fair Lead	1005001021
12	Cover	1001038836	39	Cable	1005012536
13	Flame Control	1005081855	40	Rubber Ring	1001005100
14	Rivet	1004005300	41	Cover	1001038736
15	Stirrup	2003128736	42	Motor	1005011732
16	Тар	1008095636	43	Connector	1005061800
17	Fitting	1006027755	44	Screw	1004002900
18	Fitting	1006001600	45	Connector	1005061600
19	Connector	2005077736	46	Cover	1005078600
20	Solenoid Valve	1005069200	47	Handle	2002019436
21	Fitting	1006004100	48	Grille	1008088236
22	Fitting	1006020400	49	Fan	1008088136
23	Hose	2002021336	50	Capacitor	1005076236
24	Burner	1008087636	51	Fuse Carrier	1005099600
25	Disc	2003117436	52	Fuse	1005002700
26	Electrode	1005082836	53	Cover Cap	1005092600
27	Wire	2005073336	54	Switch	1005092700
28	Wire	2005073436	55	Fitting	1006020755
29	Nut	1006026755	56	Washer	1006003500
23	Hose	2002021336	57	Terminal Board	1005070155
24	Burner	1008087636	58	Insulator	1014057336
25	Disc	2003117436	59	Fitting	1006015000
26	Electrode	1005082836			