



342 N. Co. Rd. 400 East  
Valparaiso, IN 46383  
219-464-8818 • Fax 219-462-7985  
[www.heatwagon.com](http://www.heatwagon.com)

## Installation and Maintenance Manual

Please retain this manual for future reference.

# DF400/DF600

*Construction  
Heater*



NRTL  
ANSI Z83.7  
CONST. HTR

*For your safety: Do not use this heater in a space where gasoline or other liquids having flammable vapors are stored.*

## **CONSTRUCTION HEATER GENERAL HAZARD WARNING:**

Failure to comply with the precautions and instructions provided with this heater, can result in death, serious bodily injury and property loss or damage from hazards of fire, explosion, burn, asphyxiation, carbon monoxide poisoning, and/or electrical shock.

Only persons who can understand and follow the instructions should use or service this heater.

If you need assistance or heater information such as an instruction manual, labels, etc., contact your local Heat Wagon dealer or the manufacturer.

## **W A R N I N G**

Fire, burn, inhalation, and explosion hazard. Keep solid combustibles, such as building materials, paper or cardboard, a safe distance away from the heater as recommended by the instructions. Never use the heater in spaces which do or may contain volatile or airborne combustibles, or products such as gasoline, solvents, paint thinner, dust particles or unknown chemicals.

**Not for home or recreational vehicle use!**

## **IMPORTANT INFORMATION! READ FIRST**

The heater is designed for use as a construction heater under ANSI Z83.7a-1993. The primary purpose of construction heaters is to provide temporary heating of buildings under construction, alteration, or repair and to provide emergency heat. Properly used, the heater provides safe, economical heating. Products of combustion are vented into the area being heated.

The heater **IS NOT** designed as an Unvented Gas Fired Room Heater under ANSI-Z21.11.2 and **SHOULD NOT** be used in the home.

ANSI A119.2(NFPA 501C)-1987 Recreational Vehicle Standard prohibits the installation or storage of LP-gas containers even temporarily inside any recreational vehicle. The standard also prohibits the use of Unvented Heaters in such vehicles.

### **NFPA-58 1989 STANDARD FOR THE STORAGE AND HANDLING OF LIQUEFIED PETROLEUM GASES AND THE NATURAL GAS AND PROPANE INSTALLATION CODE, CSA B149.1**

Use of the heater must be in accordance with this Standard and in compliance with all governing state and local codes. Storage and handling of propane gas and propane cylinders must be in accordance with standard for the storage and handling of liquified petroleum gases, ANSI/NFPA 58 and CSA B149.1, natural gas and propane installation code and all local governing codes.

We cannot anticipate every use which may be made for our heaters. **CHECK WITH YOUR LOCAL FIRE SAFETY AUTHORITY IF YOU HAVE QUESTIONS ABOUT LOCAL REGULATIONS.**

Other standards govern the use of fuel gases and heat producing products in specific applications. Your local authority can advise you about these.

## **FOR YOUR SAFETY**

**DO NOT USE THIS HEATER IN A SPACE WHERE GASOLINE OR OTHER LIQUIDS HAVING FLAMMABLE VAPORS ARE STORED OR USED.**

# Installation and Maintenance Manual Model DF400 - DF600 Construction Heater

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## WARRANTY

All new Heat Wagon and Sure Flame heaters and fans are guaranteed against defective materials and workmanship for one (1) year from invoice date.

Warranty repairs may be made only by an authorized, trained and certified Heat Wagon dealer. Warranty repairs by other entities will not be considered. Warranty claims must include model number and serial number.

## LIMITATIONS

Warrant claims for service parts (wear parts) such as spark plugs, igniters, flame rods will not be allowed. Diagnostic parts such as voltage meters and pressure gauges are not warrantable.

Evidence of improper fuel usage, fuel pressures outside of manufacturer's specification, poor fuel quality, and improper electric power, misapplication or evidence of abuse may be cause for rejection of warranty claims.

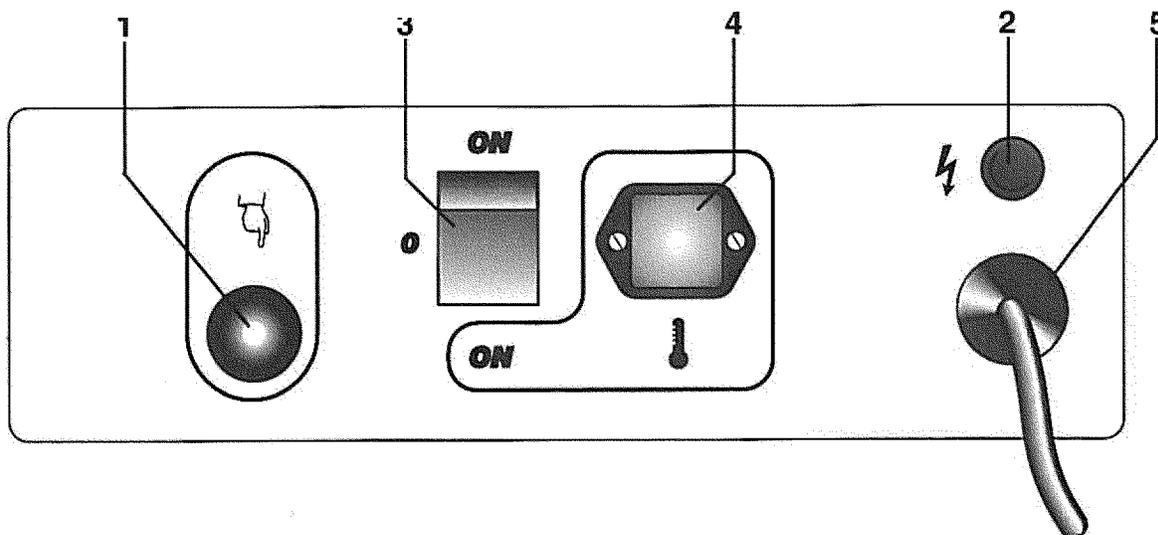
Travel time, mileage and shipping charges will not be allowed. Minor adjustments of heaters are dealers' responsibility. Defective parts must be tagged and held for possible return to the factory for 60 days from date of repair. The factory will provide a return goods authorization, (RGA) for defective parts to be returned.

No warranty will be allowed for parts not purchased from Heat Wagon.



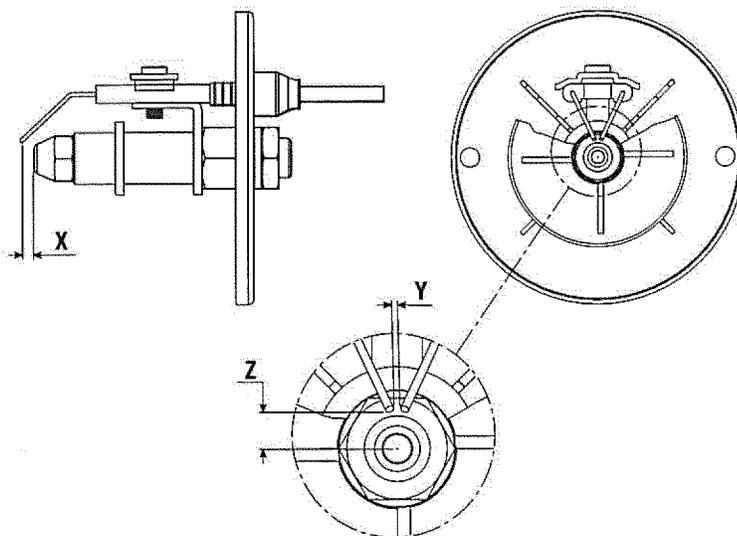
342 N. Co. Rd. 400 East • Valparaiso, IN 46383  
219-464-8818 • 888-432-8924 • Fax 800-255-7985  
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# Control Board



- |  |  |
|--|--|
| <p>1 BOUTON REARMEMENT AVEC LAMPE TEMOIN<br/>RESET BUTTON WITH CONTROL LAMP</p> <p>2 LAMPE TEMOIN D'ALIMENTATION<br/>CONTROL LAMP</p> <p>3 INTERRUPTEUR MARCHE-ARRET<br/>MAIN SWITCH</p> | <p>4 PRISE THERMOSTAT D'AMBIANCE<br/>ROOM THERMOSTAT PLUG</p> <p>5 CABLE ELECTRIQUE<br/>POWER CORD</p> |
|--|--|

## REGLAGE DES ELECTRODES REGULATION OF ELECTRODES



Models Modèle	X	Y	Z
DF400	2 mm	3 mm	6,5 mm
DF600	2 mm	3 mm	6,5 mm

## IMPORTANT

Before using the heater, read and understand all instructions and follow them carefully. The manufacturer is not responsible for damages to goods or persons due to improper use of units.

### GENERAL RECOMMENDATIONS

The hot air heaters run on heating oil. Those with direct combustion send hot air and the combustion products into the room, while those with indirect combustion are fitted with a flue to take the products of combustion away through the chimney.

Always follow local ordinances and codes when using this heater:

- Read and follow this owner's manual before using the heater;
- THE INSTALLATION OF THE UNIT SHALL BE IN ACCORDANCE WITH THE REGULATIONS OF THE AUTHORITIES HAVING JURISDICTION. Also, as a recommended installation practice reference should be made to the current issue of CSA B139, Installation Code for Oil Burning Equipment in Canada and NFPA 31 Standard for the Installation of Oil-Burning Equipment in the USA.
- Use only in places free of flammable vapours or high dust content;
- Never use heater in immediate proximity of flammable materials (the minimum distance must be 2 m);
- Make sure fire fighting equipment is readily available;
- Make sure sufficient fresh outside air is provided according to the heater requirements. Direct combustion heaters should only be used in well vented areas in order to avoid carbon monoxide poisoning;
- A rough estimate of opening required for each gallon (US) of capacity is one square foot for indirect-fired heater and three square foot at heater level, for direct-fired heaters;
- the heater is installed near a chimney to vent products of combustion (see the paragraph "CHIMNEY LAY-OUT RECOMMENDATION") and connected to an electrical switchboard;
- When the heater is connected to a flue pipe, the flue pipe shall terminate in a vertical section at least two feet long and sufficient draft shall be created to assure safe and proper operation of the heater;
- Never block air inlet (rear) or air outlet (front);
- In case of very low temperatures add kerosene to the heating oil;
- Connect the power cord to the mains and wait 15 min at least before starting heater, to allow pre-heated filter warming heating oil inside the filter;
- Make sure heater is always under surveillance and keep children and animals away from it;
- Before starting the heater always check free rotation of ventilator;
- Indirect fired units only can be connected to air ducts to distribute warm air, with respect to the max. static pressure declared (see "TECHNICAL SPECIFICATION" sheet);
- Unplug heater when not in use.

### OPERATION

Before any attempt of starting the heater is made, check that your electrical supply conforms to the data on the model plate.

#### Warning



**Mains must be fitted with a thermo-magnetic differential switch.  
Unit plug must be linked to a socket with a mains switch.**

The heater can only work automatically when a control device, such as for example a thermostat or a timer, is connected to the generator. Connection to the heater is made by removing the socket cover (4) and inserting the thermostat plug.

To start the machine you must:

- if connected to the thermostat, turn the switch to (ON + );
- if not connected to the thermostat, turn the switch to (ON).

When unit is started for the first time or is started after the oil tank has been totally emptied, the flow of oil to the burner may be impaired by air in the circuit. In this case the control box will cut out the heater and it might be necessary to renew the starting procedure once or twice by depressing the reset button (1).

Should the heater not start, check that oil tank is full and depress reset button (1).

Should the heater still not work, please refer to chapter "OBSERVED FAULTS, CAUSES AND REMEDIES".

### STOPPING THE HEATER

Set main switch (3) on "0" position or turn thermostat or other control device on lowest setting.

The flame goes out and the fan continues to work for approx. 90 sec. cooling the combustion chamber.

### SAFETY DEVICES

The unit is fitted with an electronic flame control box. In case of malfunction this box will cut in and stop the heater, at the same time the pilot lamp in the control box reset button (1) will light up.

Heaters are also equipped with an overheat thermostat safety cut out which will stop the heater in case of overheating. This thermostat will reset automatically but you will have to depress button (1) on control box before being able to restart the heater.

### TRANSPORT

#### Warning



**Before making any attempt to restart heater find and eliminate reason of overheating.**

Before heater is moved it must be stopped and unplugged. Before moving the heater wait till it has totally cooled off and make sure oil tank cap is securely fixed.

The hot air heater with wheels must be wheeled. The suspended version which has no wheels must be transported with adequate machinery.

### MAINTENANCE

Preventive and regular maintenance will ensure a long trouble free life to your heater.

#### Warning



**Never service heater while it is plugged in, operating or hot. Severe burns or electrical shock can occur.**

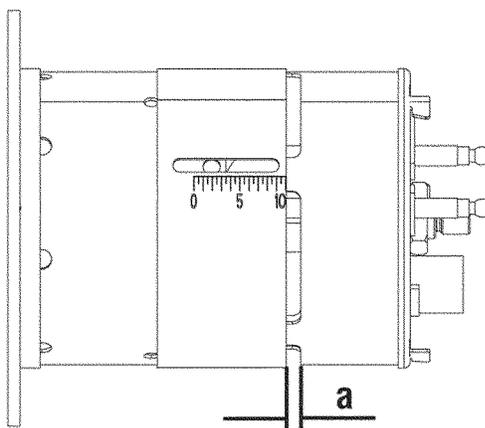
Every 50 hours of operation: disassemble filter and wash with clean oil, remove upper body parts and clean inside and ventilator with compressed air, check correct attachment of H.T. connectors to the electrodes and check H.T. cables, remove burner assembly, clean and check electrode settings, adjust according to scheme "REGULATION OF ELECTRODES".

## OBSERVED FAULTS, CAUSES AND REMEDIES

OBSERVED FAULT	CAUSE	REMEDY
• Motor does not start, no ignition	• No electrical current	• Check mains
		• Check proper positioning and functioning of switch
		• Check fuse
	• Wrong setting of room thermostat or other control	• Check correct setting of heater control. If thermostat, make sure selected temperature is higher than room temperature
	• Thermostat or other control defective	• Replace control device
	• Electrical motor defective	• Replace electrical motor
	• Burned out condenser	• Replace condenser
• Motor starts, no ignition or cuts out	• Electric ignitor defective	• Check connection of H.T. leads to electrodes and transformer
		• Check electrodes setting (see scheme 'REGULATION OF ELECTRODES')
		• Check electrodes for cleanliness
		• Replace H.T. transformer
	• Flame control box defective	• Replace control box
	• Photocell defective	• Clean or replace photocell
	• Not enough or no fuel at all at burner	• Check state of motor-pump plastic coupling
• Check fuel line system including fuel filter for possible leaks		
• Clean or replace oil nozzle		
• Solenoid defective	• Check electrical connection	
	• Check thermostat LI	
	• Clean or replace solenoid	
• Motor starts, heater emits smoke	• Not enough combustion air	• Make sure air inlet and outlet are free
		• Check setting of combustion air flap
		• Clean burner disc
	• Too much combustion air	• Check setting of combustion air flap
	• Fuel contaminated or contains water	• Drain fuel in tank with clean fuel
		• Clean oil filter
	• Air leaks in fuel circuit	• Check the seals on the ducts and the diesel filter
• Not enough fuel at burner	• Check pump pressure	
	• Clean or replace fuel nozzle	
• Too much fuel at burner	• Check pump pressure	
	• Replace nozzle	
• Heater does not stop	• Solenoid defective	• Replace solenoid coil or complete solenoid

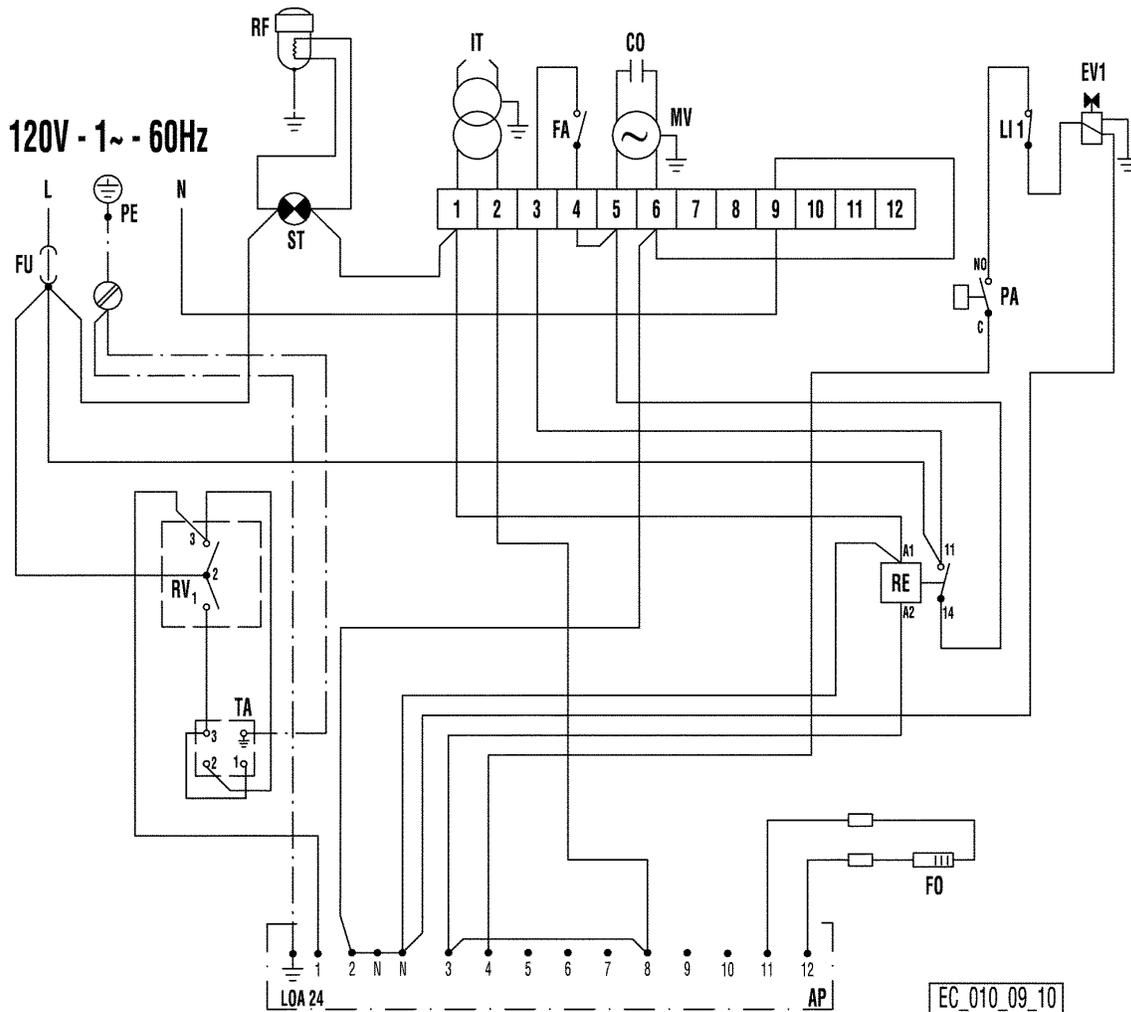
If heater still not working properly, please revert to nearest authorized dealer.

TECHNICAL SPECIFICATIONS		DF400	DF600	
Heat input	[kBTU/h]	400	600	
Air flow	[cfm]	2.500	2.800	
Efficiency	[%]	100,0	100,0	
Heat output	[kBTU/h]	-	-	
Fuel consumption	[gal/h]	2,83	4,32	
	[lb/h]	20,07	30,65	
Power supply	Phase	1	1	
	Voltage	[V]	120	120
	Frequency	[Hz]	60	60
Electric consumption	[W]	1.170	1.240	
	[A]	7,50	11,10	
Nozzle	[USgal/h]	2,00-80°S	3,00-80° S	
Pump pressure	[psi]	165	190	
Static pressure	[in WC]	-	-	
Adjustment of combustion air flap	[in]	a 0,71	a 1,18	
Flue diameter	[in]	---	---	
Compulsory flue draft	[in WC]	---	---	
Tank capacity <sup>1</sup>	[gal]	35,7	35,7	
Dimensions <sup>1</sup> , L x W x H	[in]	62,4 x 27,6 x 39	67,9x27,6x41,2	
Net Weight <sup>1</sup>	[lb]	222,7	246,7	
Tank capacity <sup>2</sup>	[gal]	35,7	-	
Dimensions <sup>2</sup> , L x W x H	[in]	62,4 x 27,6 x 41,7	-	
Net Weight <sup>2</sup>	[lb]	244,7	-	



# WIRING DIAGRAM

## DF400



**FU** FUSE 20 A  
FUSIBLE

**IT** TRANSFORMER H.V.  
TRANSFORMATEUR H.T.

**LI1** OVERHEAT THERMOSTAT  
THERMOSTAT DE SURCHAUFFE

**EV1** SOLENOID VALVE 1°  
ELECTROVANNE 1°

**FO** PHOTOCCELL  
PHOTORESISTANCE

**CO** CONDENSER  
CONDENSATEUR

**MV** FAN MOTOR  
MOTEUR DU VENTILATOR

**ST** ELECTRIC PILOT LAMP  
LAMPE TEMOIN D'ALIMENTATION

**RV** CONTROL  
COMMUTATEUR

**TA** ROOM THERMOSTAT PLUG  
PRISE THERMOSTAT D'AMBIACE

**RE** RELAY  
RELAIS

**AP** CONTROL BOX  
COFFRET DE SECURITE

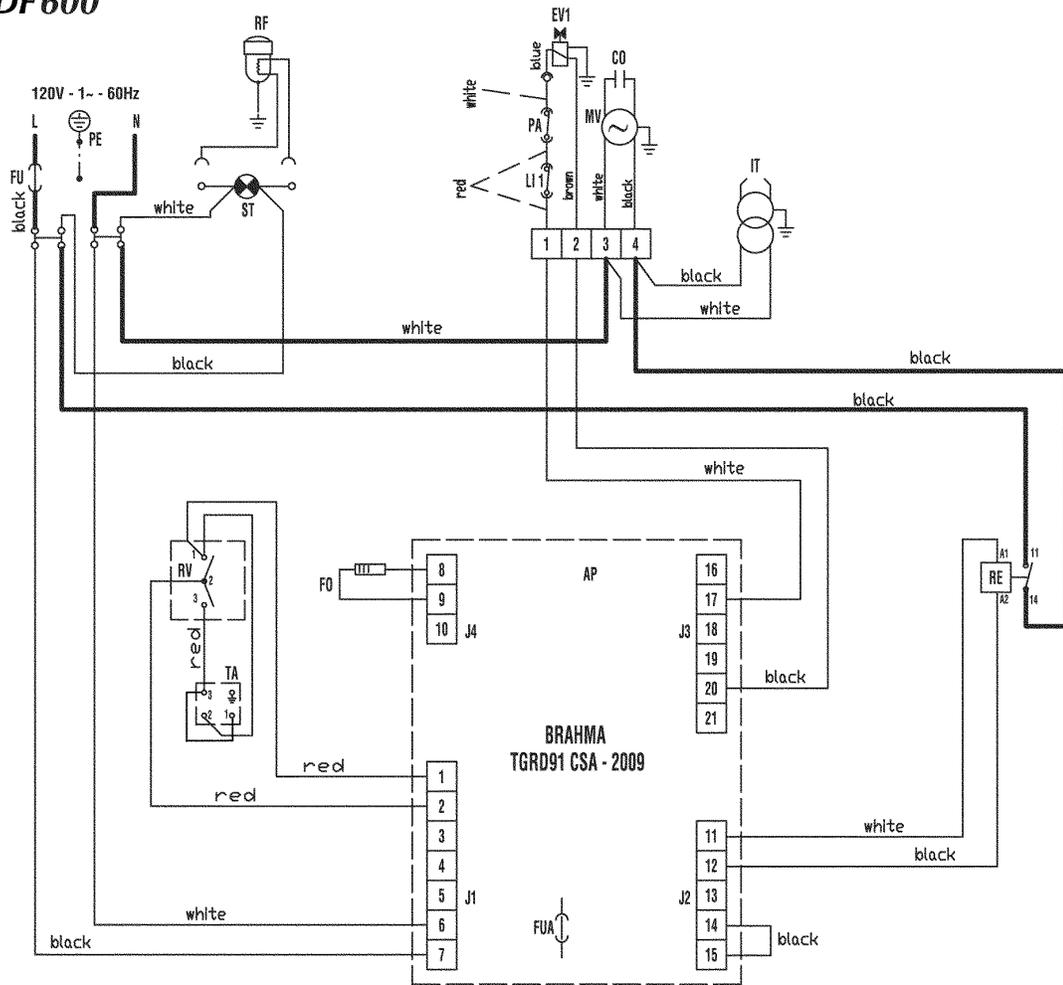
**PA** AIR PRESSURE CONTROL  
PRESSOSTATS AIR

**RF** HEATED FILTER  
FILTRE GASOIL RECHAUFFE Optional

**FA** FAN THERMOSTAT  
THERMOSTAT VENTILATEUR

# WIRING DIAGRAM

## DF600



- |            |                     |            |                               |
|------------|---------------------|------------|-------------------------------|
| <b>FU</b>  | FUSE 20A            | <b>TA</b>  | ROOM THERMOSTAT PLUG          |
| <b>IT</b>  | TRANSFORMER H.V.    | <b>RE</b>  | RELAY                         |
| <b>LI1</b> | OVERHEAT THERMOSTAT | <b>AP</b>  | CONTROL BOX                   |
| <b>EV1</b> | SOLENOID VALVE 1°   | <b>RF</b>  | HEATED FILTER <b>Optional</b> |
| <b>F0</b>  | PHOTOCELL           | <b>PA</b>  | AIR PRESSURE SWITCH           |
| <b>CO</b>  | CONDENSER           | <b>FUA</b> | FUSE 6,3A                     |
| <b>MV</b>  | FAN MOTOR           |            |                               |
| <b>ST</b>  | ELECTRIC PILOT LAMP |            |                               |
| <b>RV</b>  | CONTROL             |            |                               |

# Parts List

Pos.	Cod.	€	DF400	DF600	PART LIST
01	G06139-9010		•	•	Outlet cone
03	G06231 G06232		•	•	Combustion chamber
04	G06143-9010			•	Protection
05	G06234-9010 G06235-9010		•	•	Upper body
06	G06237-9010 G06238-9010		•	•	Lower body
07	G06240		•	•	Air flap
08	E10679-110		•	•	Motor 750W with condenser
09	E11241		•	•	Capacitor 90 µF
10	G06239-9010		•	•	Motor flange
11	T10215-B T10263		•	•	Fan Ø 496 18° Fan Ø500 18°
12	P30129		•	•	Inlet grille
13	I40330		•	•	Tube BP 1/4" FF L.420mm
14	I20104		•	•	Nipple FE 1/4" MM
15	02AC575-1		•	•	Oil pre-heaters filter 1/4"
16	G06104-9005		•	•	Filter support
17	I40329		•	•	Tube BP 1/4" FF L.260mm
18	P20176-9005		•	•	Handle
19	C30319		•	•	Plug Ø25
20	P20180-9005		•	•	Foot
21	I40331		•	•	Tube BP 1/4" F L.580mm
22	I30698		•	•	Pascante L.290mm
23	I30737		•	•	Nipple OT 1/4" M - M12x1,75 M
24	G06068-9005		•	•	Power lead hook
25	G06146-9005		•	•	Fuel tank 135 l
26	C30364		•	•	Plug with level control L=290
27	G06129-9005		•	•	Wheel axle
28	G06107-9005		•	•	Wheels axle support
29	C10546		•	•	Wheel Ø 260 - Ø 25
30	M20202		•	•	Spring washer Ø25
31	I25019		•	•	Drain plug
32	C30350		•	•	OR Ø30 x 2,62
33	G00248 G00251		•	•	El. componets drawer
35	P50127		•	•	Control box cover
36	G06241-9010		•	•	Base
42	C30323		•	•	Cable protection Ø 10
44	C30372		•	•	Protection cable Ø 35
45	E50102		•	•	Limit Thermostat
46	G06072		•	•	Sleeve Ø8 x Ø6 x 9,5
51	G06153		•	•	Electr. componets drawer
52	E20508		•	•	Fuse holder
53	E10313		•	•	Fuse (6x30) 20A
56	E20319		•	•	Terminal board
57	E11125		•	•	Relay Finder 65.31 AC
58	E20305		•	•	Terminal board
59	E10930		•	•	Transformer H.T. BRAHMA
63A	E40124		•	•	Control box BRAHMA TGRD 92 120V
63B	E40113		•	•	Siemens LOA 24 Control box
64	G06073		•	•	Plate for electrical components
65	E10102-P		•	•	Switch 0 - 1
66	E20614		•	•	Thermostat plug 3P+T
67	E20665		•	•	Drain plug
68	E30443		•	•	El. wire with plug and cable fastener
69	E11030		•	•	Lamp 230V
70	T20357 T20327		•	•	Nozzle 2,00 GPH 80° W Nozzle 3,00 GPH 80° S
71	G01077 G07025		•	•	Turbo disc
72	I33005		•	•	Nozzle support
73	G06228 G06229		•	•	Burner flange Ø 102mm Burner flange Ø 102mm
74	I31034		•	•	Nut M14
76	I40192		•	•	Micropipe
77	E10215		•	•	Electrode
78	G02078 G02076		•	•	H.T. Cable connect. 90° BRAHMA H.T. Cable connect. 90° COFI
79	E50328		•	•	Ld ph. Unit FC13
82	T20411-1		•	•	Pump Danfoss BFP11 R5
83	T20118		•	•	Solenoid spool Danfoss
84	T20117		•	•	Solenoid valve Danfoss
85	E10514		•	•	Coupling K2
86	T20241		•	•	OR KIToil filter
87	T20242		•	•	Filter cartridge
90	E20418		•	•	Stop button protection
91	E50327		•	•	Protection de la photorésistance
92	G06222-9010		•	•	Support du pressostat
93	E50441		•	•	Presostat 100 Pa
94	I40332		•	•	Silicone pipe Ø4x9
95	I31131		•	•	Conn. Straight Ø6
96	T20442		•	•	Solenoid valve cable
97	G06111-9005		•	•	Lifting bracket

# Breakdown

PL 10/07

**heat wagon**

