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[www.heatwagon.com](http://www.heatwagon.com)

## Installation and Maintenance Manual

Please retain this manual for future reference.

# ***HVF110, 210, 310, 410HD***

## ***Construction Heaters***



*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**

**READ INSTRUCTIONS CAREFULLY. READ AND FOLLOW ALL INSTRUCTIONS. PLACE INSTRUCTIONS IN A SAFE PLACE FOR FUTURE REFERENCE. DO NOT ALLOW ANYONE WHO HAS NOT READ THESE INSTRUCTIONS TO ASSEMBLE, LIGHT, ADJUST OR OPERATE THE HEATER.**

**IF THE INFORMATION IN THIS MANUAL IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.**

**SERVICE MUST BE PERFORMED BY A QUALIFIED SERVICE TECHNICIAN.**

**UNVENTED PORTABLE HEATERS USE AIR (OXYGEN) FROM THE AREA IN WHICH IT IS USED. ADEQUATE COMBUSTION AND VENTILATION AIR MUST BE PROVIDED. REFER TO INSTRUCTIONS.**

## **WARNING**

**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.**

## **WARNING**

**COMBUSTION BY-PRODUCTS PRODUCED WHEN USING THIS PRODUCT CONTAIN CARBON MONOXIDE, A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS (OR OTHER REPRODUCTIVE HARM).**

## **WARNING**

**NOT FOR HOME OR RECREATIONAL VEHICLE USE**

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 HVF110, 210, 310, 410HD 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**

Warranty 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.



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TECHNICAL SPECIFICATIONS			HVF110	HVF210	HVF310	HVF410HD
Heat input	[kBTU/h]		112	205	300	412/272
Air flow	[cfm]		1020	1.530	2.500	3250
Efficiency	[%]		85,0	89.5	88.0	
Heat output	[kBTU/h]		94.8	183.5	264.0	354/231
Fuel consumption	[gal/h]		0,81	1.48	2.17	2.89/1.86
	[lb/h]		5.73	10.47	15.37	
Power supply	Phase		1	1	1	1
	Voltage	[V]	120	120	120	120
	Frequency	[Hz]	60	60	60	60
Electric consumption		[W]	440	785	1.240	1,820
		[A]	4.05	7.65	11.40	20
Nozzle	[USgal/h]		0.55-80° W	1,10-80° W	1,50-80° W	2.0-80° W
Pump pressure	[psi]		196	174	174	240/120
Static pressure	[in WC]		0.5	0,5	0,5	0.6
Adjustment of combustion air flap	[in]		0.118	A=3.5, .196	0,14	1.5
Flue diameter	[in]		5.9	5.9	5.9	5.90
Compulsory flue draft	[in WC]		0.05	0.05	0.05	0.05
Tank capacity <sup>2</sup>	[gal]		17.2	27.7	35.7	57
Dimensions <sup>2</sup> , L x W x H	[in]		49.3x20x33.3	56.5x21.9x38	56.5x21.9x38	83x33x48
Net Weight <sup>2</sup>	[lb]		142	220	297	456

Fuel Blend Guide	
Temperature Range	Fuel Blend
15° to 30°F	80% #2 : 20% #1
0° to 15°F	70% #2 : 30% #1
-15° to 0°F	50% #2 : 50% #1
below -15°F	30% #2 : 70% #1

***Runs on #1 & #2 diesel, kerosene, JP-8 or Jet A***

## 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 5 ft.);
- 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; -below 20°F
- 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 fan;
- 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 breaker switch.**

**Unit plug must be linked to a socket with a mains disconnect switch  
Do not touch exhaust gas outlet danger of burns.**

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).

Hand filling the filter cup with fuel may help to prime the pump.

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.

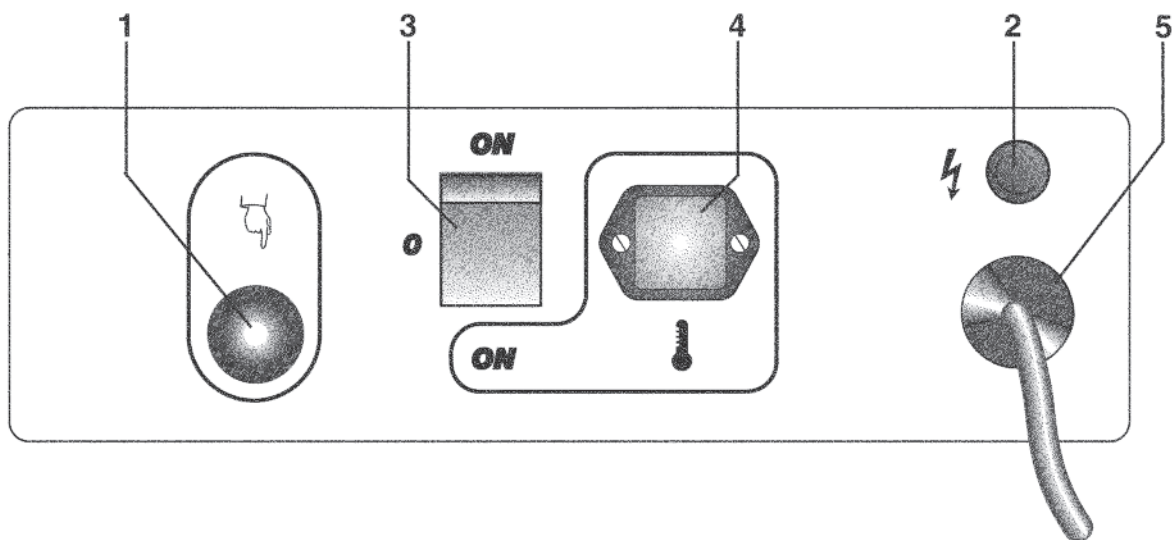
#### Warning



**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 fan 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 "REGULATION OF ELECTRODES".

## CONTROL BOARD



1 Reset Button

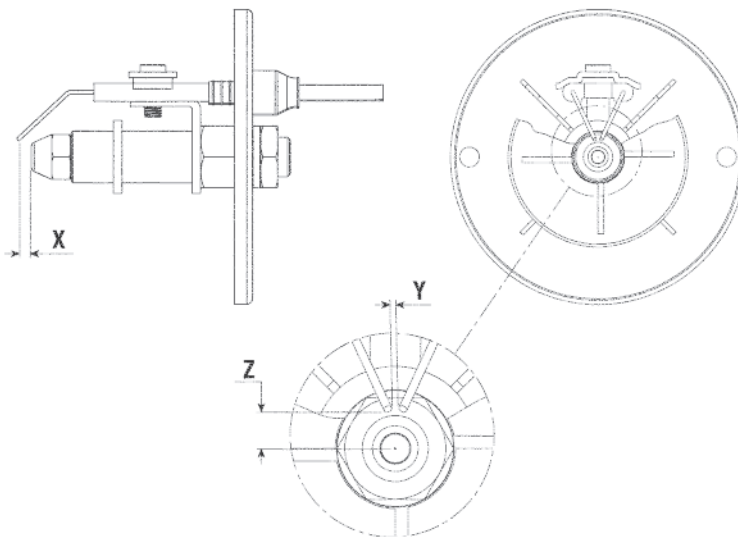
4 Room Thermostat Plug

2 Control Lamp

5 Power Cord

3 Main Switch

### Regulation of Electrodes



Models	X	Y	Z
HVF110	2 mm	3 mm	6,5 mm
HVF210	4 mm	2,5 mm	4 mm
HVF310	4 mm	2,5 mm	4 mm
HVF410HD	2 mm	3 mm	6,5 mm

Note: 1/16" = 1.6 mm

## 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
	• Electrical motor bearings defective	• Replace electrical motor
	• Burned out capacitor	• Replace capacitor
• 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") pg. 6
		• 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
	• Solenoid defective	• Clean or replace oil nozzle
		• Check electrical connection • Check thermostat LI • Clean or replace solenoid
• Air switch fault	• Remove ducting restrictions/check voltage at control board	
• 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

For additional details see advanced troubleshooting (page 8).

## ADVANCED TROUBLESHOOTING

### Motor and transformer do not operate.

#### **Causes:**

1. Incorrect or low voltage supplied to the heater.
2. Fuse in heater is blown.
3. Thermostat defective, or not turned up to call for heat.
4. Control board is defective.
5. Reset button has not been reset.

#### **Solutions:**

1. Incorrect or low voltage supplied to the heater. Most indirect oil heaters require a minimum of 108 volts to operate properly. A multi-meter set to measure volts can be used to check the amount of voltage at the end of the extension cord(s). If the measured voltage is too low, the length of the extension cord (s) must be shortened or a thicker gauge extension cord must be used.
2. Fuse in heater is blown. Locate and remove the in-line fuse of the heater. Set a multi-meter to measure ohms of resistance. Place a multi-meter probe on each end of the fuse. The multi-meter should read zero ohms (continuity) or the fuse is blown. If a new fuse blows immediately, check for possible causes. Check for incorrect voltage to the heater. Make sure the total amperage draw of all equipment running on the circuit is not too great. If the supplied voltage and total amperage draw are correct, check the wiring in the heater for correctness and possible shorts.
3. Thermostat is defective or not turned up to call for heat. Turn the thermostat up to the highest possible setting and try to start the heater. Next set a multi-meter to measure voltage coming out of the thermostat. If approximately 120 volts is not measured, the thermostat is defective.
4. Control board is defective. Using a multi-meter set for volts, check the hot and neutral wires which bring voltage into the control board. If proper voltage is reaching the board then the control board is defective.
5. Reset button has not been reset. Push the reset button and try to start the heater.

### Motor does not start, but ignition spark is present

#### **Causes:**

1. Control board is defective.
2. Motor is defective.
3. Motor start capacitor is defective.
4. Fuel pump seized

#### **Solutions:**

1. Control board is defective. Locate the terminals of the control board that connect to the motor wires. Use a multi-meter set to read voltage and check for approximately 120 volts to the motor when the heater is turned on. If no voltage is observed the control board is defective.
2. Motor is defective. If the control board and the motor start capacitor check ok and the fuel pump is not seized, the motor is defective.
3. Motor start capacitor is defective. The capacitor may be tested using a multi-meter set to the lowest possible ohm range. First "short" the capacitor by momentarily placing a screwdriver across the two capacitor terminals. Then place the multi-meter probes on the two capacitor terminals. The multi-meter should read close to zero ohms (continuity) first, then slowly move to infinity on the multi-meter. If not then the capacitor is defective.
4. Fuel pump seized. With the heater unplugged, stand behind the heater and attempt to turn the fan blade clockwise by hand. If the fan blade is difficult to turn, undo the connection between the motor shaft and the pump shaft. Attempt turning the fan blade again. If the motor now turns freely, the pump has seized up. If the fan blade is still difficult to turn, the motor is defective.

## **Motor runs, spark is present, but there is no fuel spray**

### **Causes:**

1. Spray nozzle clogged.
2. Fuel pump is defective/or broken pump coupling
3. Air entering the fuel pump thru the inlet line.
4. Solenoid valve is defective.
5. Control board is defective.
6. Fuel filter is dirty.
7. Safety thermostat defective or tripped or improper ducting.
8. Air proving switch defective.

### **Solutions:**

1. Spray nozzle clogged. Remove and inspect the spray nozzle. Clean or replace as needed. Do not clean the nozzle orifice with anything metal as this may enlarge the orifice.
2. Fuel pump is defective. The output pressure of the fuel pump can be checked by placing a high pressure fuel gauge into the gauge port of the fuel pump. Use a gauge with enough capacity to measure the high pressure your particular heater can produce. Use the adjustment on the pump to set the pump pressure to the manufacturer's specification. If you do not have a fuel gauge, you may slightly loosen the pump's output line connection and place a rag there. Run the heater briefly and see if fuel reaches the rag. If no fuel is pumped, check the connection between the motor and the fuel pump to make sure the motor can turn the pump. Also check the external and internal fuel filters for blockage, and clean or replace if necessary. The fuel pump's internal filter is usually located where the fuel inlet line enters the pump. Check to make sure motor is rotating pump.
3. Air entering the fuel pump thru the fuel inlet line. If air enters the pump it will lose its prime and will not maintain adequate pump pressure. First make sure all fittings, including the fuel filter on the inlet line are tight. If you still suspect air is entering the pump, start eliminating portions of the inlet line until the air leak is found. Start this process at the fuel tank end of the inlet line. It may be necessary to draw fuel from a small container rather than the fuel tank.
4. Solenoid valve is defective. Use a multi-meter set to measure volts. Check for approximately 120 volts at the ends of the two wires that carry voltage to the solenoid valve. If proper voltage is read, try cleaning the valve if it is dirty. If the valve will not open fully to allow fuel spray, the solenoid valve is defective. If proper voltage is not read, check for voltage on the control board terminals that the solenoid valve wires connect to. If proper voltage is read, the solenoid valve wires are defective. If voltage is not read on the board terminals, the control board is defective.
5. Control board is defective. Use a multi-meter set to measure voltage. Check for proper voltage on the two board terminals that the solenoid valve wires connect to. If proper voltage is read, the control board is ok. If proper voltage is not read, the control board is defective.
6. Fuel filter dirty. Check the external and internal fuel filters and clean or replace as necessary. Most fuel pumps contain an internal fuel filter located where the inlet line enters the fuel pump.
7. Safety thermostat defective or tripped. Also called overheat switch. Some indirect oil heaters have a safety thermostat wired between the control board and the solenoid valve. If the heater becomes too hot this normally closed switch will open and interrupt power to the solenoid valve. Use a multi-meter set to measure ohms. Place the multi-meter probes on the two male terminals of the safety thermostat. If the multi-meter shows infinity (no continuity) the safety thermostat is defective. If the switch opens up before the heater becomes hot, the safety thermostat is defective.
8. Air proving switch is defective. Try to start the heater without ducting. Indirect oil heaters have an air proving switch wired between the control board and the solenoid valve. The air proving switch is normally open and requires air from the turning fan blade to close the switch and send power to the solenoid valve. Set a multi-meter to measure voltage. With the fan blade turning, check for voltage coming out of the air proving switch to the solenoid valve. If no voltage is read, next check for voltage at the control board terminals out to the air proving switch. If voltage at the control board is read, the air proving switch is defective. If no voltage is read at the board, the control board is defective.

## **Motor runs, fuel sprays, but no spark is observed**

### **Causes:**

1. Electrodes damaged or gapped incorrectly.
2. Transformer defective.
3. Control board defective.

### **Solutions:**

1. Electrodes damaged or gapped incorrectly. Inspect the electrode tips for melting. Make sure there are no cracks in the porcelain insulation. Check the electrodes with the manufacturer's specifications for gapping and spacing. Adjust or replace the electrodes as needed.
2. Transformer defective. Transformers require a ground connection to function properly. Check the transformer's ground wire or mounting tabs for a good ground connection. Use a multi-meter set to measure voltage. Check the voltage in to the transformer from the control board for approximately 120 volts. Do not attempt to measure the transformer's output voltage with an ordinary multi-meter. The transformer may also be bench tested for proper output arc.
3. Control board defective. Use a multi-meter set to measure voltage. Take a voltage reading on the control board terminals that send input power to the transformer. If proper voltage is not present, the control board is defective.

## **Motor runs, fuel sprays, spark is present, but heater will not ignite**

### **Causes:**

1. Pump pressure incorrect.
2. Electrodes damaged or gapped incorrectly.
3. Nozzle dirty or worn.
4. Air damper setting is incorrect.
5. Transformer output is weak.
6. Ducting is improper.
7. Venting is improper.
8. Fuel contains water or contaminants.

### **Solutions:**

1. Pump pressure incorrect. Using a high pressure fuel gauge, check the output pressure of the fuel pump. If necessary, use the pump's adjustment to set the pump pressure to the manufacturer's specifications.
2. Electrodes damaged or gapped incorrectly. Inspect the electrode tips for melting. Make sure there are no cracks in the porcelain insulation. Check the electrodes with the manufacturers specifications for gapping and spacing. Adjust or replace the electrodes as needed.
3. Nozzle dirty or worn. Clean the nozzle using compressed air. Never use anything metal to clean the nozzle as this may enlarge the orifice. With enough use, fuel traveling under high pressure thru the nozzle orifice can enlarge the orifice. This is especially true when diesel fuel is used. Clean or replace the nozzle as needed.
4. Air damper setting is incorrect. Use the manufacturers specifications for the air damper setting and adjust as needed.
5. Transformer output is weak. Remove the transformer and perform a bench test.
6. Ducting is improper. Follow the manufacturer's recommendations concerning maximum duct length and diameter.
7. Venting is improper. Follow the manufacturer's guidelines for venting.
8. Fuel contains water or contaminants. Visually inspect the fuel in the tank for water bubbles or contaminants. Drain, flush, and re-fill tank as needed.

## **Heater ignites, runs less than one minute and shuts down**

### **Causes:**

1. Photocell is dirty, misaligned or defective.
2. Control board is defective.
3. Fuel pump defective.
4. Fuel filter dirty.

### **Solutions:**

1. Photocell is dirty, misaligned or defective. Check that the photocell is aimed correctly and is free of dirt. If necessary, clean the photocell "eye" with a soft, dry cloth. Unfortunately no test exists for the photocell. Attempting to "jumper out" the photocell will not test the function. You must either replace the photocell or borrow a known functioning photocell from an identical heater.
2. Control board is defective. If the heater's spray and spark are correct, the photocell and control board must work together to recognize the combustion flame has become established. Therefore if a new photocell does not correct this symptom, the control board is defective.
3. Fuel pump is defective. If the fuel pump will not achieve or maintain proper output pressure, the fuel pump is defective. Check the pump's output pressure with a gauge.
4. Fuel filter dirty. Inspect the internal and external fuel filters and clean or replace as needed.

## **Heater ignites, runs several minutes, then shuts down.**

### **Causes:**

1. Fuel pump is defective.
2. Solenoid valve is defective.
3. Overheat thermostat is defective.
4. Ducting is improper.
5. Venting is improper.
6. Nozzle is dirty.
7. Fuel filter is dirty.
8. Control board is defective.
9. Fuel contains water or contaminants.

### **Solutions:**

1. Fuel pump is defective. If the fuel pump will not achieve or maintain proper output pressure, the pump is defective. Check the fuel pump output pressure with a gauge.
2. Solenoid valve is defective. Use a multi-meter set to measure voltage. Check for proper voltage at the solenoid valve. If proper voltage is read and the solenoid valve will not stay open and allow fuel spray, the solenoid valve is defective.
3. Overheat thermostat is defective. Also called a safety thermostat or limit switch. Some heaters are equipped with this. Set a multi-meter to measure ohms of resistance. Perform this test immediately after the heater shuts down and the overheat thermostat is still hot. Place the multi-meter probes on the two male terminals of the safety thermostat. If the multi-meter reads infinity (no continuity) the safety thermostat is defective. Remember that if the heater is over firing due to high pump pressure, worn nozzle, or is improperly ducted or vented, the safety thermostat will heat enough to shut the heater off.
4. Ducting is improper. Always follow the manufacturer's recommendations regarding maximum duct length and diameter. Failure to do so can result in heat building up in the heater until the safety thermostat contacts open and shut the heater off.

5. Venting is improper. Follow the manufacturer's recommendations concerning proper venting. Failure to do so can result in heat building up in the heater until the safety thermostat contacts open and shut the heater off.
6. Nozzle is dirty. If dirt reaches the nozzle, the spray can be adversely affected and cause a shut down. If possible observe the spray pattern and clean the nozzle as needed.
7. Fuel filter dirty. Check the internal and external fuel filters. Clean or replace as needed.
8. Control board is defective. For the heater to function, the control board must send proper voltage to three components: motor, transformer and solenoid valve. Using a multi-meter set to measure voltage, check the appropriate control board terminals for proper voltage out to these three components. If proper voltage to any of these three components is not observed, the control board is defective.
9. Fuel contains water or contaminants. Visually inspect the fuel in the tank for water bubbles or contaminants. Drain, flush, and re-fill as needed.

### **Heater ignites, but combustion is poor or uneven**

#### **Causes:**

1. Fuel pump pressure is incorrect.
2. Nozzle dirty or worn.
3. Electrodes damaged or gapped incorrectly.
4. Fuel filter is dirty.
5. Air damper setting incorrect.
6. Whirl disk dirty or mis-aligned.
7. Ducting is improper.
8. Venting is improper.
9. Fuel contains water or contaminants.

#### **Solutions:**

1. Fuel pump pressure is incorrect. The output pressure of the fuel pump can be checked by placing a high pressure fuel gauge into the gauge port of the fuel pump. Use a gauge with enough capacity to measure the high pressure your particular heater can produce. Use the adjustment on the pump to set the pump pressure to the manufacturer's specifications.
2. Nozzle dirty or worn. Clean the nozzle using compressed air. Never use anything metal to clean the nozzle as this may enlarge the orifice. With enough use, fuel traveling under high pressure thru the nozzle orifice can enlarge the orifice. This is especially true when diesel fuel is used. Clean or replace the nozzle as needed.
3. Electrodes damaged or gapped incorrectly. Inspect the electrode tips for melting. Make sure there are no cracks in the porcelain insulation. Check the electrodes with the manufacturer's specifications for gapping and spacing. Adjust or replace the electrodes as needed (page 5/17).
4. Fuel filter is dirty. Inspect the internal and external fuel filters and clean or replace as needed.
5. Air damper setting incorrect. Use the manufacturer's specifications for the air damper setting and adjust as needed. (see Diagram B, page 17)
6. Whirl disk dirty or mis-aligned. Inspect the whirl disk and clean if necessary. If the disk is warped or mis-aligned, replace or adjust as needed.
7. Ducting is improper. Follow the manufacturer's recommendations concerning maximum duct length and diameter.
8. Venting is improper. Follow the manufacturer's guidelines for venting.
9. Fuel contains water or contaminants. Visually inspect the fuel in the tank for water or contaminants. Drain, flush, and re-fill tank as needed.

## Heater ignites but flame is excessive

### Causes:

1. Fuel pump pressure is too high.
2. Nozzle is worn.
3. Incorrect fuel.

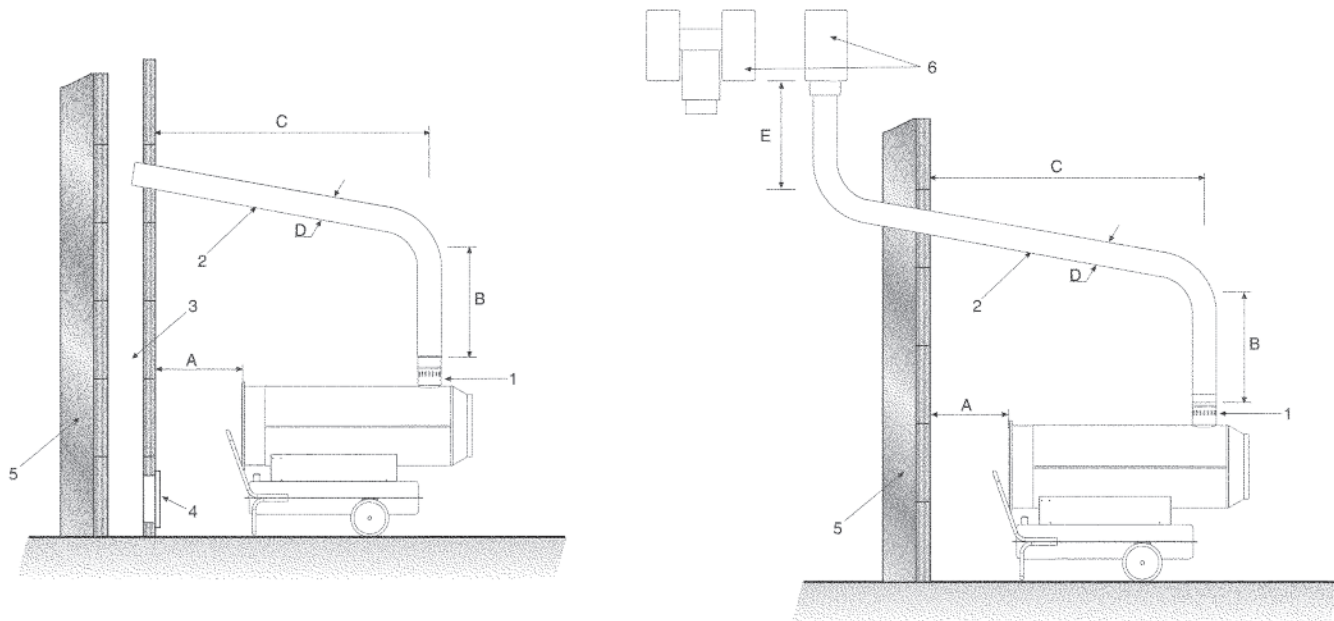
### Solutions:

1. Fuel pump pressure is too high. Attach a high pressure fuel gauge to the fuel pump and check the pump pressure. Adjust the pressure to the manufacturer's specifications with the adjustment on the fuel pump.
2. Nozzle is worn. With enough use, the impurities in the fuel traveling under high pressure thru the nozzle orifice can enlarge the orifice. This is especially true when diesel fuel is used. A worn nozzle can cause the heater to run "rich" and possibly over fire the heater enough to activate the safety thermostat and cause a shutdown. Replace after 400 hours of operation.
3. Incorrect fuel. Only use the manufacturer's recommended fuels. Never use gasoline, paint thinner, solvents, or other flammable liquids. If you suspect the fuel is incorrect, drain, flush and re-fill the tank with proper fuel.

## FUEL PUMP ADJUSTMENT

Model Heat Wagon	Nozzle			Pump pressure [bar] / [psi]
	Type	[GPH]	[°]	
HVF 110	Danfoss	0,55	80° W	13,5 / 196
HVF 210	Delavan	1.10	80° W	12 / 174
HVF 310	Delavan	1.50	80° W	2 Stage P1: 10/145 P2: 20 / 290 1 Stage 12 / 174
HVF 410	Delavan	2,00	80° W	P1: 8,5 / 123,3 P2: 12 / 174

## CHIMNEY LAY-OUT SUGGESTED RECOMMENDATIONS



### DESCRIPTION ENGLISH

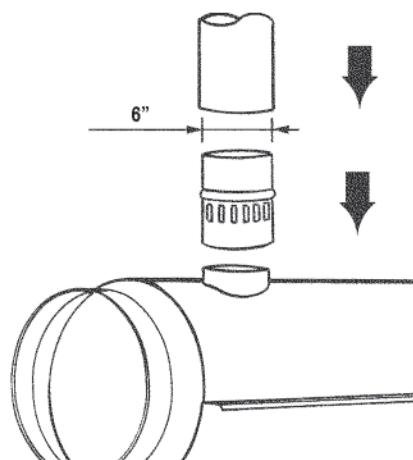
- A) Minimal 3 ft
- B) Minimal 3 ft
- C) The shortest
- D) The same or bigger than the outlet collar diameter of heater
- E) Minimal 3 ft
- 1) Anti-wind device provided with the heater
- 2) Horizontal crossing with minimal upside angle pitch of 5°
- 3) Chimney 8" x 8" minimal
- 4) Chimney anti-explosion flap door
- 5) External seating wall
- 6) Chimney ending H shape

**Have your installation checked by local authority.**

### MINIMUM CLEARANCES TO COMBUSTIBLES

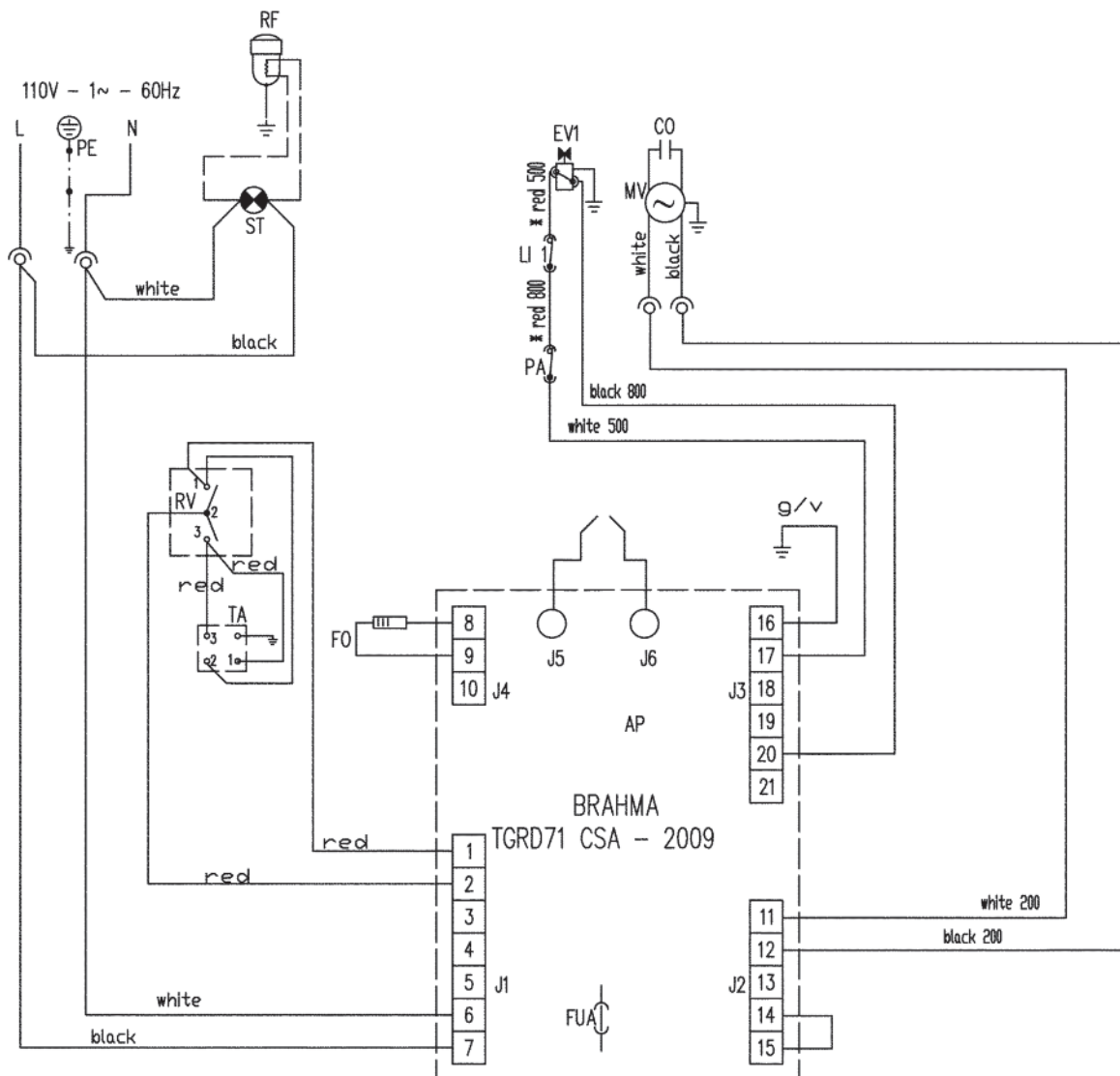
Heater; outlet 10 ft, front 3 ft, rear 3 ft, side 1 ft, ceiling 6 ft, flue 1 ft

## FLUE CONNECTIONS DIAGRAM



# HVF110 Electrical Schematic

For SN 21100801 and Beyond



FUA FUSE 6,3 A

LI1 OVERHEAT THERMOSTAT

EV1 SOLENOID VALVE 1°

FO PHOTOCELL

CO CONDENSER

MV FAN MOTOR

ST ELECTRIC PILOT LAMP

RV CONTROL

TA ROOM THERMOSTAT PLUG

AP CONTROL BOX

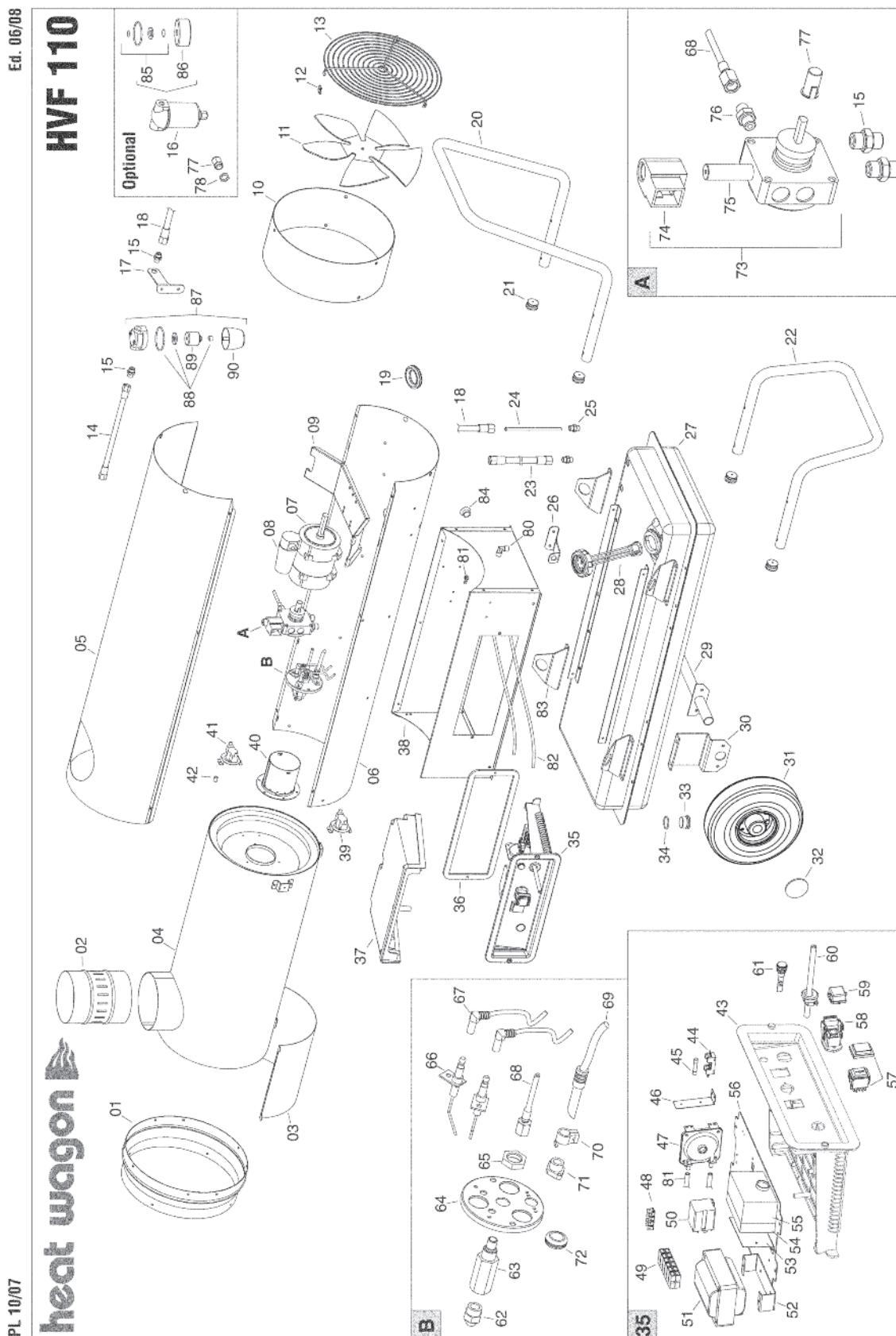
PA AIR PRESSURE CONTROL

RF HEATED FILTER

Optional

# HVF110 Breakdown

Prior to SN 21100801



# HVF110 Parts List

Prior to SN 21100801

Pos.	Cod.	PART LIST
01	G06075-9010	Outlet cone
02	G06077	Chimney Ø 150
03	G06079	Combustion chamber support
04	G06081	Combustion chamber
05	G06083-9010	Upper body
06	G06085-9010	Lower body
07	E10677-110	Motor 200W with condenser
08	E11208	Condenser 20 µF
09	G06067	Motor flange
10	G06070-9010	Fan protection ring
11	T10207	Fan Ø300 18"
12	M20402	Elastic Plate U42-032
13	P30165	Inlet grille
14	I40330	Tube BP 1/4" FF L.420mm
15	I20104	Nipplo FE 1/4" MM
16	T20239	Filter with cartidge
17	G06104-9005	Filter support
18	I40329	Tube BP 1/4" FF L.260mm
19	C30307	Protection cable Ø 35
20	P20174-9005	Handle
21	C30319	Plug Ø25
22	P20175-9005	Foot
23	I40331	Tube BP 1/4" F L.580mm
24	I30695	Pascante L.150mm
25	I30737	Nipplo OT 1/4" M - M12x1,75 M
26	G06068-9005	Power lead hook
27	G06110-9005	Fuel tank
28	C30363	Plug with level control
29	G06105-9005	Wheel axle
30	G06106-9005	Wheels axle support
31	C10546	Wheel Ø 260 - Ø 25
32	M20202	Spring washer Ø20
33	I25019	Drain plug
34	C30350	OR Ø30 x 2.62
35	G00212	El. componets drawer
36	C30425	Seal
37	P50127	Control box cover
38	G06108-9010	Base
39	E50101	Fan Thermostat
40	G06087	Blast tube
41	E50102	Limit Thermostat
42	G06072	Sleeve Ø8 x Ø6 x 9,5
43	G06153	Electr. componets drawer
44	E20508	Fuse holder
45	E10308	Fuse (6x30)10A
46	G06102	Switch support
47	E50437	Pressure switchesHONEYWELL
48	E20319	Terminal board
49	E20305	Terminal board
50	E11125	Relay Finder 65.31 AC
51	E10917-2	Transformer H.T. 818C 110V
52	G06109	Transformer H.T. flange

Pos.	Cod.	PART LIST
53	G06103	Support
54	E40107	LANDIS LOA 21-24 base
55	E40113	Control box LANDIS LOA 21-24
56	G06073	Plate for electrical components
57	E10102-P	Switch 0 - 1
58	E20640	Thermostat plug 3P+T
59	E20665	Drain plug
60	E30443	El. wire with plug and cable fastener
61	E11030	Lamp 230V
62	T20339	Nozzle 0.60 GPH 80° S
63	I33001	Nozzle support
64	P20526	Burner flange Ø 80mm
65	I31034	Nut M14
66	E10248	Electrode
67	G02076	H.T. Cable connect. 90°
68	I40192	Micropipe
69	E50306	Ld ph. Unit L&G QRB1A
70	E50307	Fixing clamp
71	E50308	Photoresistance flange
72	C30352	Cable protection Ø15
73	T20429-1	Pump Danfoss BFP01
74	T20118	Solenoid spool BFP11-21 Danfoss
75	T20117	Solenoid valve Danfoss
76	I20115	Nipplo FE 1/8" MM
77	E10513	Coupling K1
78	E20953	Cable holder PG11
79	E20954	Ring nut PG11
80	I20325	Connection 1/8"
81	I31130	Conn. Straight Ø6 1/8"
82	I40332	Silicone pipe Ø5x9
83	G06111-9005	Lifting bracket
84	C30319	Rubber tap
85	T20241	OR KiToil filter
86	T20242	Filter cartridge
87	T20201	Oil filter 1/4"
88	T20234	OR KiToil filter
89	T20206	Filter cartridge
90	T20212	Filter housing

# HVF110 Breakdown

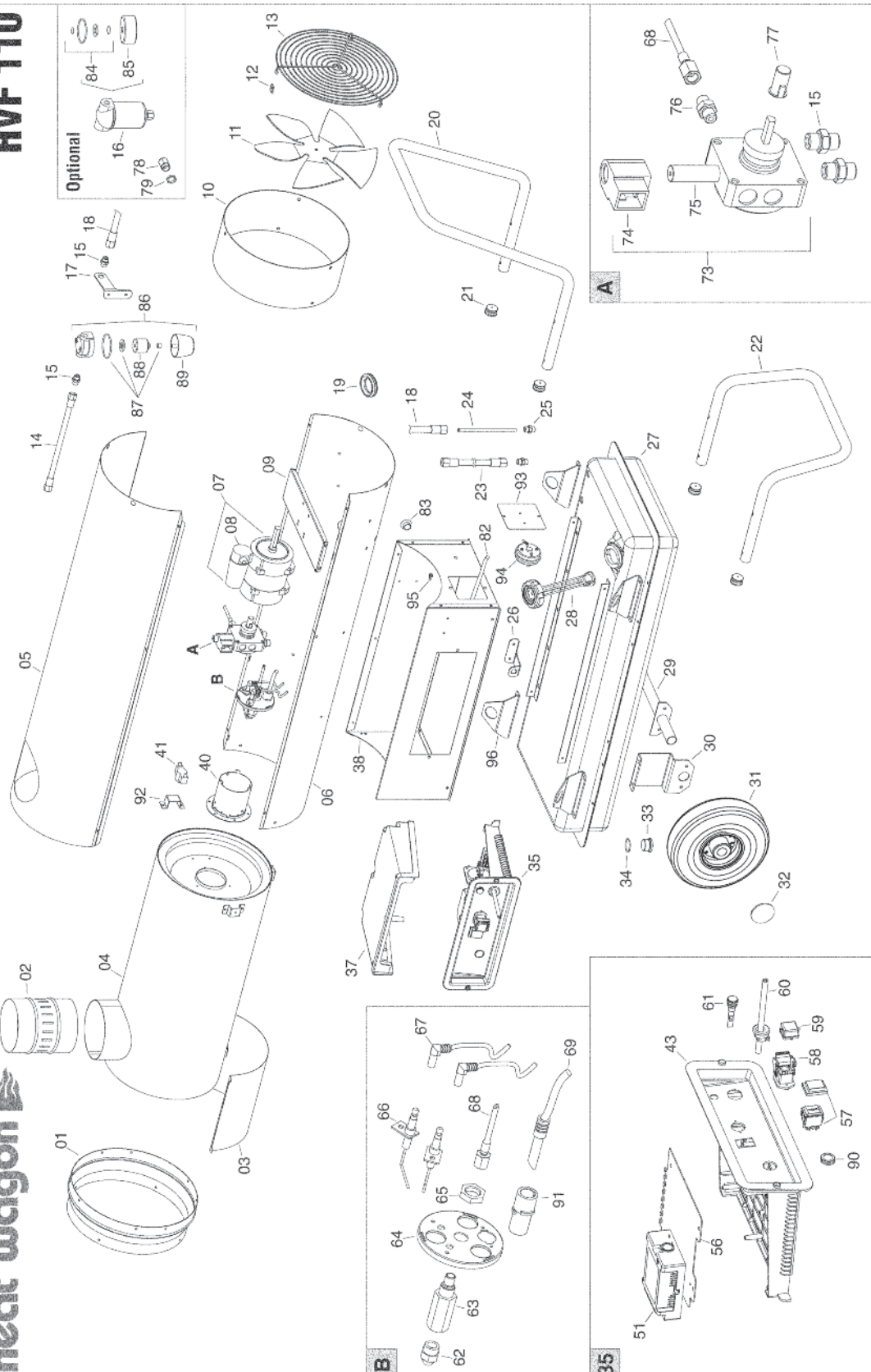
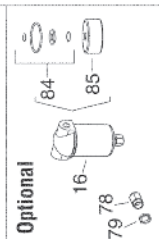
SN 21100801 to SN 21101000

Ed. 05/09

PL 10/07

**heat wagon**

**HVF 110**



# HVF110 Parts List

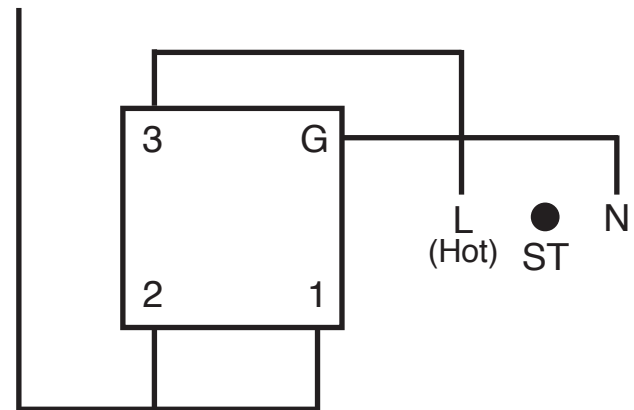
SN 21100801 to SN 21101000

Pos.	Cod.	PART LIST
01	G06075-9010	Outlet cone
02	G06077	Chimney Ø 150
03	G06079	Combustion chamber support
04	G06081	Combustion chamber
05	G06083-9010	Upper body
06	G06216-9010	Lower body
07	E10677-110	Motor 200W with condenser
08	E11233	Condenser 20 µF
09	G06217	Motor flange
10	G06070-9010	Fan protection ring
11	T10207	Fan Ø300 18°
12	M20402	Elastic Plate U42-032
13	P30165	Inlet grille
14	I40330	Tube BP 1/4" FF L.420mm
15	I20104	Nipplo FE 1/4" MM
16	02AC513	Filter with cartridge
17	G06104-9005	Filter support
18	I40329	Tube BP 1/4" FF L.260mm
19	C30372	Cable protection Ø35 mm
20	P20174-9005	Handle
21	C30319	Plug Ø25
22	P20175-9005	Foot
23	I40331	Tube BP 1/4" F L.580mm
24	I30696	Pascante L.220mm
25	I30737	Nipplo OT 1/4" M - M12x1,75 M
26	G06068-9005	Power lead hook
27	G06110-9005	Fuel tank
28	C30363	Plug with level control
29	G06105-9005	Wheel axle
30	G06106-9005	Wheels axle support
31	C10546	Wheel Ø 260 - Ø 25
32	M20202	Spring washer Ø25
33	I25019	Drain plug
34	C30350	OR Ø30 x 2,62
35	G00249	El. componets drawer
37	P50127	Control box cover
38	G06218-9010	Base
40	G06219	Blast tube
41	E50108	Limit Thermostat
43	G06153	Electr. componets drawer
51	E40125	Control box BRAHMA TGRD 71
56	G06184	Plate for electrical components
57	E10102-P	Switch 0 - 1
58	E20640	Thermostat plug 3P+T
59	E20665	Drain plug
60	E30443	El. wire with plug and cable fastener
61	E11030	Lamp 230V
62	T20358	Nozzle 0,55 GPH 80° B
63	I33001	Nozzle support
64	G06220	Burner flange Ø 80mm
65	I31034	Nut M14

Pos.	Cod.	PART LIST
66	E10248	Electrode
67	G02075	H.T. Cable connect. 90°
68	I40192	Micropipe
69	E50328	Ld ph. Unit FC13
73	T20429-1	Pump Danfoss BFP01
74	T20118	Solenoid spool BFP11-21 Danfoss
75	T20117	Solenoid valve Danfoss
76	I20115	Nipplo FE 1/8" MM
77	E10513	Coupling K1
78	E20953	Cable holder PG11
79	E20954	Ring nut PG11
82	I40332	Silicone pipe Ø4x9
83	C30319	Rubber tap
84	T20241	OR KIToil filter
85	T20242	Filter cartridge
86	T20201	Oil filter 1/4"
87	T20234	OR KIToil filter
88	T20206	Filter cartridge
89	T20212	Filter housing
90	E20418	Stop button protection
91	E50327	Photoresistence protection
92	G06221	Box fixing bracket
93	G06222-9010	Switch support
94	E50440	100 Pa switch
95	I31131	Conn. Straight Ø4
96	G06111-9005	Lifting bracket

RV3 (110)  
RV1 (210,310)  
RV (410)

## Wiring Schematic For Digital Thermostat



RV1 (110)  
RV3 (210,310)  
Term #2 on Brahma (410)

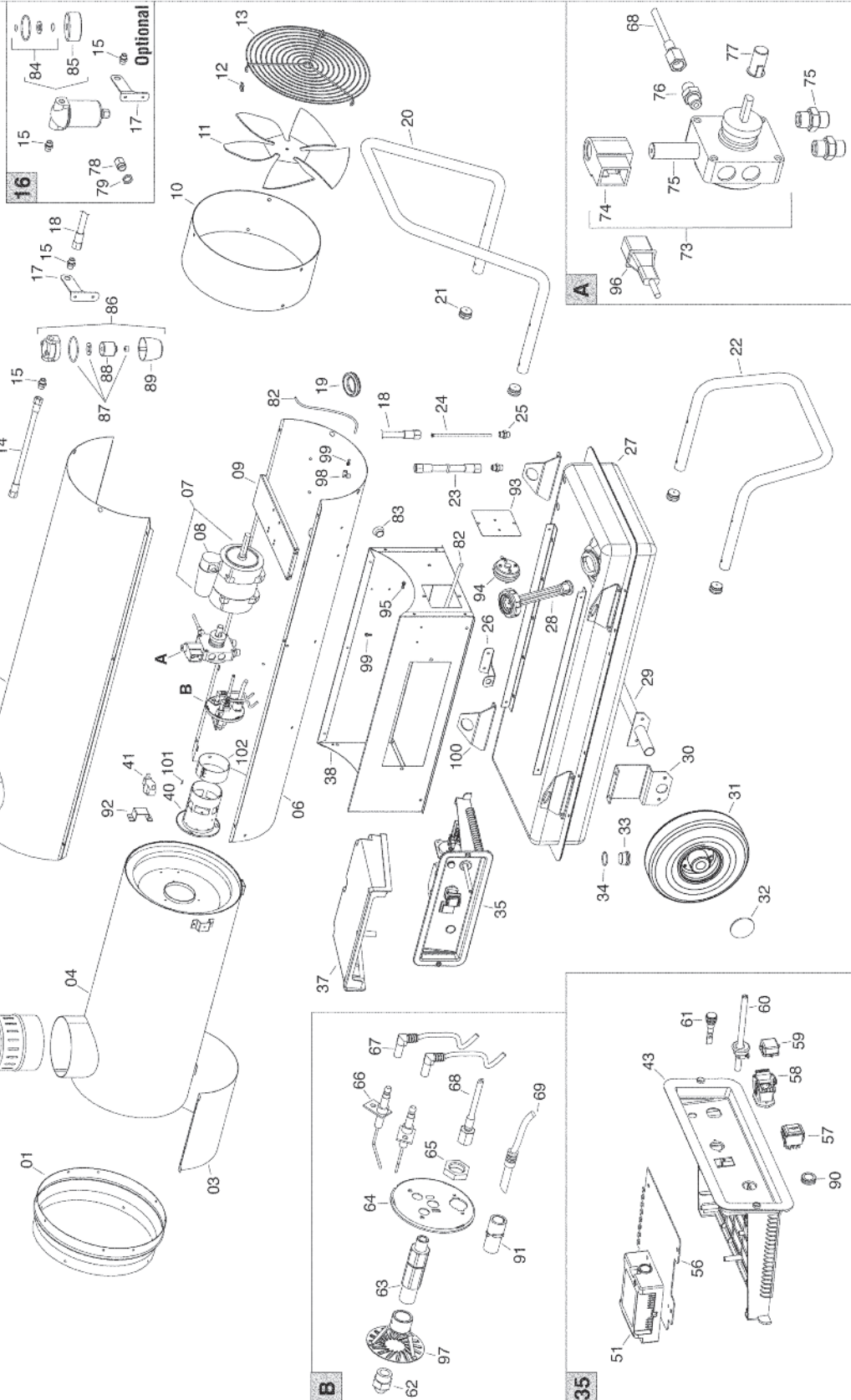
# HVF110 Breakdown

For SN 21101001 and Beyond

PL 10/07

**heat wagon**

**HVF 110**



# HVF110 Parts List

For SN 21101001 and Beyond

Pos.	Cod.	PART LIST
01	G06075-9010	Outlet cone
02	G06077	Chimney Ø 150
03	G06079	Combustion chamber support
04	G06301	Combustion chamber
05	G06083-9010	Upper body
06	G06216-9010	Lower body
07	E10677-110	Motor 200W with condenser
08	E11233	Condenser 20 µF
09	G06217	Motor flange
10	G06070-9010	Fan protection ring
11	T10207	Fan Ø300 18°
12	M20412	Elastic Plate U42-032
13	P30165	Inlet grille
14	I40330	Tube BP 1/4" FF L.420mm
15	I20104	Nipplo FE 1/4" MM
16	02AC513	Filter with cartidge
17	G06104-9005	Filter support
18	I40329	Tube BP 1/4" FF L.260mm
19	C30372	Cable protection Ø35 mm
20	P20174-9005	Handle
21	C30355	Plug Ø25
22	P20175-9005	Foot
23	I40331	Tube BP 1/4" F L.580mm
24	I30696	Pascante L.150mm
25	I30737	Nipplo OT 1/4" M - M12x1,75 M
26	G06068-9005	Power lead hook
27	G06110-9005	Fuel tank
28	02AC508	Plug with level control
29	G06105-9005	Wheel axle
30	G06106-9005	Wheels axle support
31	C10546	Wheel Ø 260 - Ø 25
32	M20202	Spring washer Ø25
33	I25020	Drain plug
34	C30375	OR Ø16 x 2,62
35	G00249	El. componets drawer
37	P50127	Control box cover
38	G06218-9010	Base *
40	G06361	Blast tube
41	E50109	Limit Thermostat
43	G06153	Electr. componets drawer
51	E40125	Control box BRAHMA TGRD 71
56	G06184	Plate for electrical components
57	E10102-P	Switch 0 - 1
58	E20640	Thermostat plug 3P+T
59	E20665	Drain plug
60	E30443	El. wire with plug and cable fastener
61	E11030	Lamp 230V
62	T20361	Nozzle 0,55 GPH 80° W
63	I33007	Nozzle support
64	G06228	Burner flange Ø 80mm
65	I31034	Nut M14

Pos.	Cod.	PART LIST
66	E10248	Electrode
67	G02078	H.T. Cable connect. 90°
68	I40192	Micropipe
69	E50328	Ld ph. Unit FC13
73	T20429-1	Pump Danfoss BFA01 R3
74	T20118	Solenoid spool BFP11-21 Danfoss
75	T20117	Solenoid valve Danfoss
76	I20115	Nipplo FE 1/8" MM
77	E10513	Coupling K1
78	E20953	Cable holder PG11
79	E20954	Ring nut PG11
82	I40335	Silicone pipe Ø4x9
83	C30319	Rubber tap
84	T20241	OR KIToil filter
85	T20242	Filter cartridge
86	T20201	Oil filter 1/4"
87	T20234	OR KIToil filter
88	T20206	Filter cartridge
89	T20212	Filter housing
90	E20418	Stop button protection
91	E50327	Photoresistance protection
92	G06221	Box fixing bracket
93	G06222-9010	Switch support*
94	E50440	100 Pa switch
95	I31131	Conn. Straight Ø4
96	T20442	Solenoid valve cable
97	G01077	Turbo disc
98	I20325-2	Connection 1/8"
99	I31130	Conn. Straight Ø6 1/8"
100	02AC511	Lifting bracket
101	E20671	Terminal board
102	G06183	Air regulatoin flap

\* Note

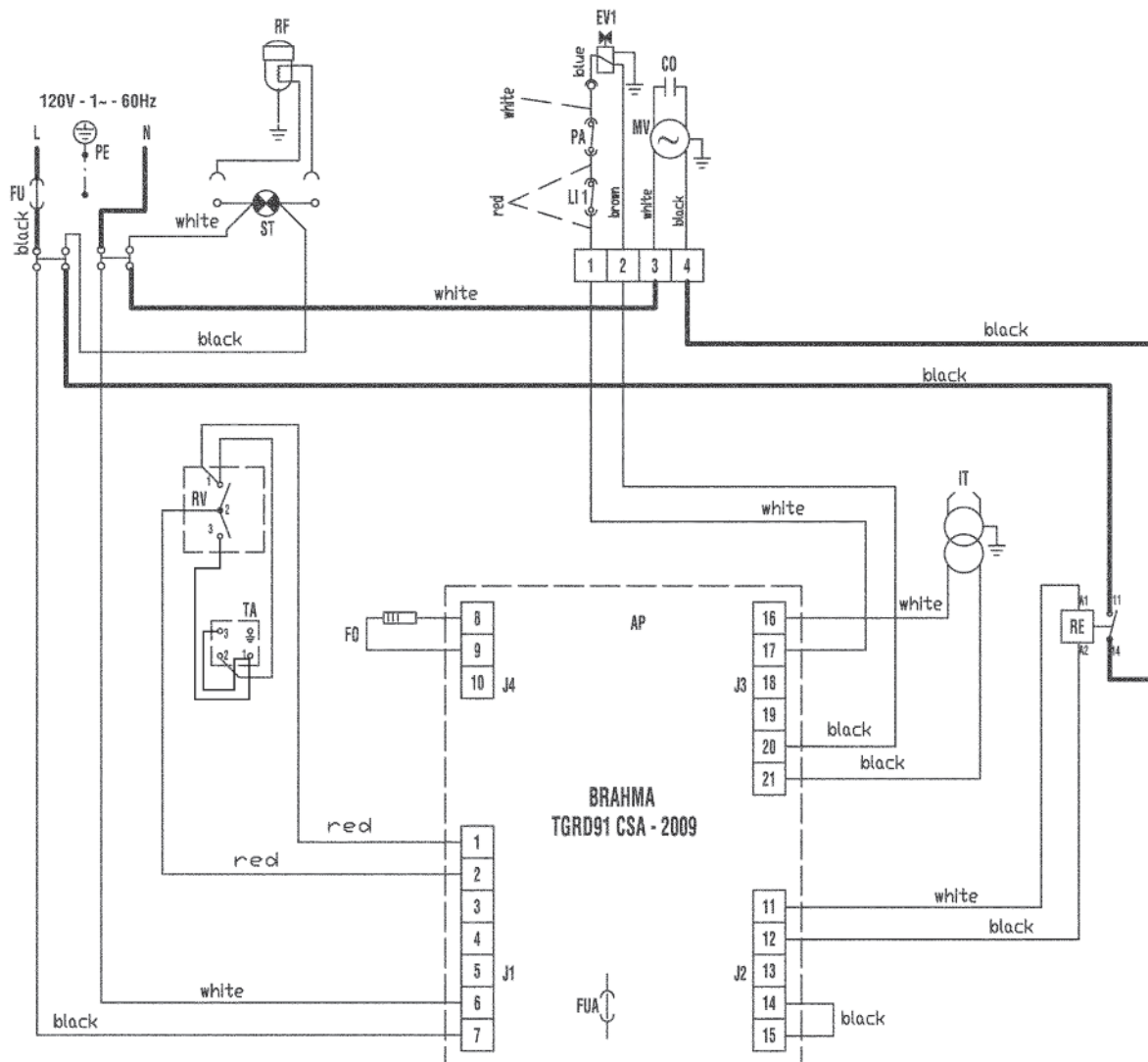
For SN 21101501 and Beyond

Pos 38 - Base, PN G06405 - 9010

Pos 93 - Switch support, PN G06406-9010

# HVF210 Electrical Schematic

For SN 21200801 to SN 21201201



**FU** FUSE 20A

**RV** CONTROL

**IT** TRANSFORMER H.V.

**TA** ROOM THERMOSTAT PLUG

**LI1** OVERHEAT THERMOSTAT

**RE** RELAY

**EV1** SOLENOID VALVE 1°

**AP** CONTROL BOX

**FO** PHOTOCELL

**FUA** FUSE 6,3A

**CO** CONDENSER

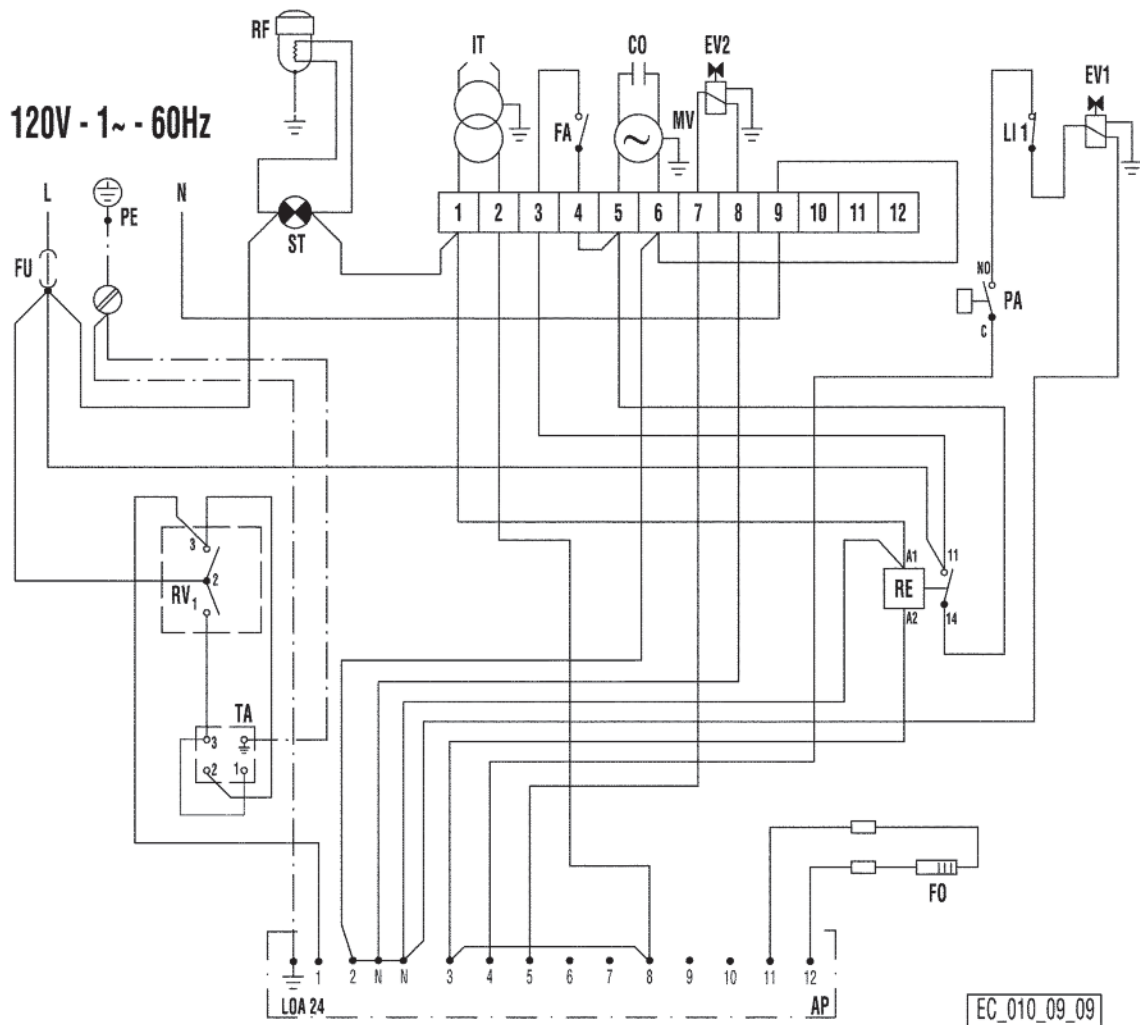
**RF** HEATED FILTER Optional

**MV** FAN MOTOR

**PA** AIR PRESSURE SWITCH

**ST** ELECTRIC PILOT LAMP

**HVF310 Electrical Schematic Prior to SN 2131201**  
**HVF210 Electrical Schematic Prior to SN 21200801**  
**HVF110 Electrical Schematic Prior to SN 21100801**



FU FUSE 20A

IT TRANSFORMER H.V.

LI1 OVERHEAT THERMOSTAT

EV1 SOLENOID VALVE 1°

EV2 SOLENOID VALVE 2°

FO PHOTOCELL

CO CONDENSER

MV FAN MOTOR

ST ELECTRIC PILOT LAMP

RV CONTROL

TA ROOM THERMOSTAT PLUG

RE RELAY

AP CONTROL BOX

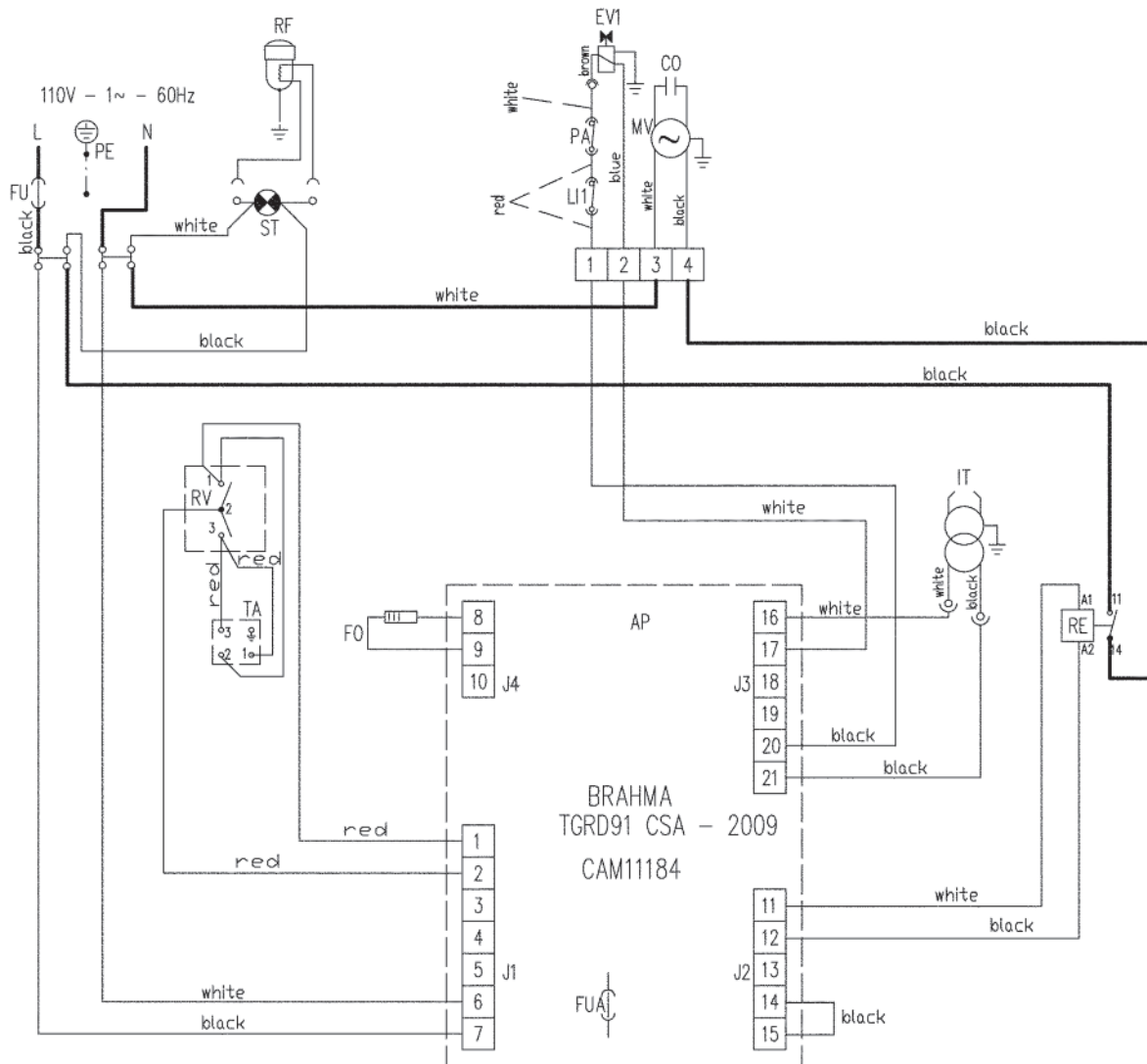
FA FAN THERMOSTAT

RF HEATED FILTER

Optional

PA AIR PRESSURE SWITCH

***HVF310 Electrical Schematic for SN 21301201 and Beyond***  
***HVF210 Electrical Schematic for SN 21201201 and Beyond***

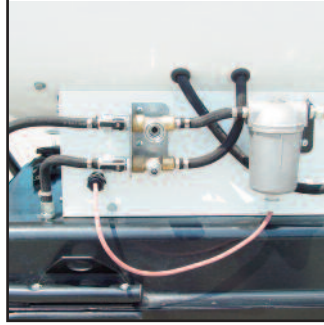


- |            |                     |            |                      |
|------------|---------------------|------------|----------------------|
| <b>FU</b>  | FUSE 20 A           | <b>RV</b>  | CONTROL              |
| <b>IT</b>  | TRANSFORMER H.V.    | <b>TA</b>  | ROOM THERMOSTAT PLUG |
| <b>LI1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

## Accessories



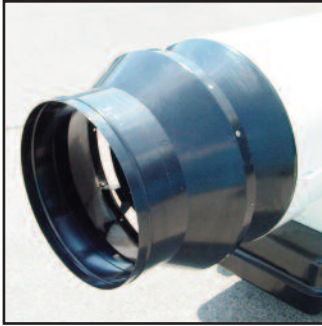
**THERMOSTAT**  
#THIDF



**EXTERNAL FUEL KIT**  
(allows access to  
external fuel source)  
#TK300



**FUEL CADDY (28 GALLONS)**  
#PFC28



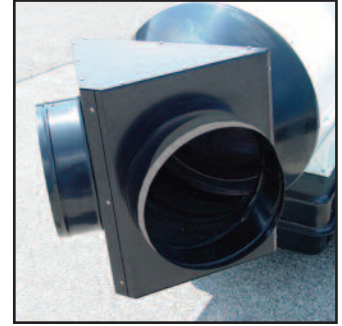
**DUCT ADAPTERS (ONE WAY)**

HVF110 #AR110  
HVF210 #AR210  
HVF310 #AR310  
HVF410HD #AR401



**DUCTING**

HVF110 - #WD1225 (12"X25')  
HVF210 (2 WAY) - #WD1225 (12"X25')  
HVF310 (2 WAY) - #WD1225 (12"X25')  
  
HVF210 (1 WAY) - #WD1425 (14"X25')  
  
HVF310 (1 WAY) - #WD1825 (18"X25')  
HVF402 (2 WAY) - #WD1825 (18"X25')  
  
HVF410HD (1 WAY) - #WD2025 (20"X25')



**DUCT ADAPTERS (TWO WAY)**

HVF210 #AR212  
HVF310 #AR312  
HVF410HD #AR402



**FLUE STACK**  
#EF1



**FUEL PRESSURE GAUGE**  
#BIE99AM003

# HVF210 Breakdown

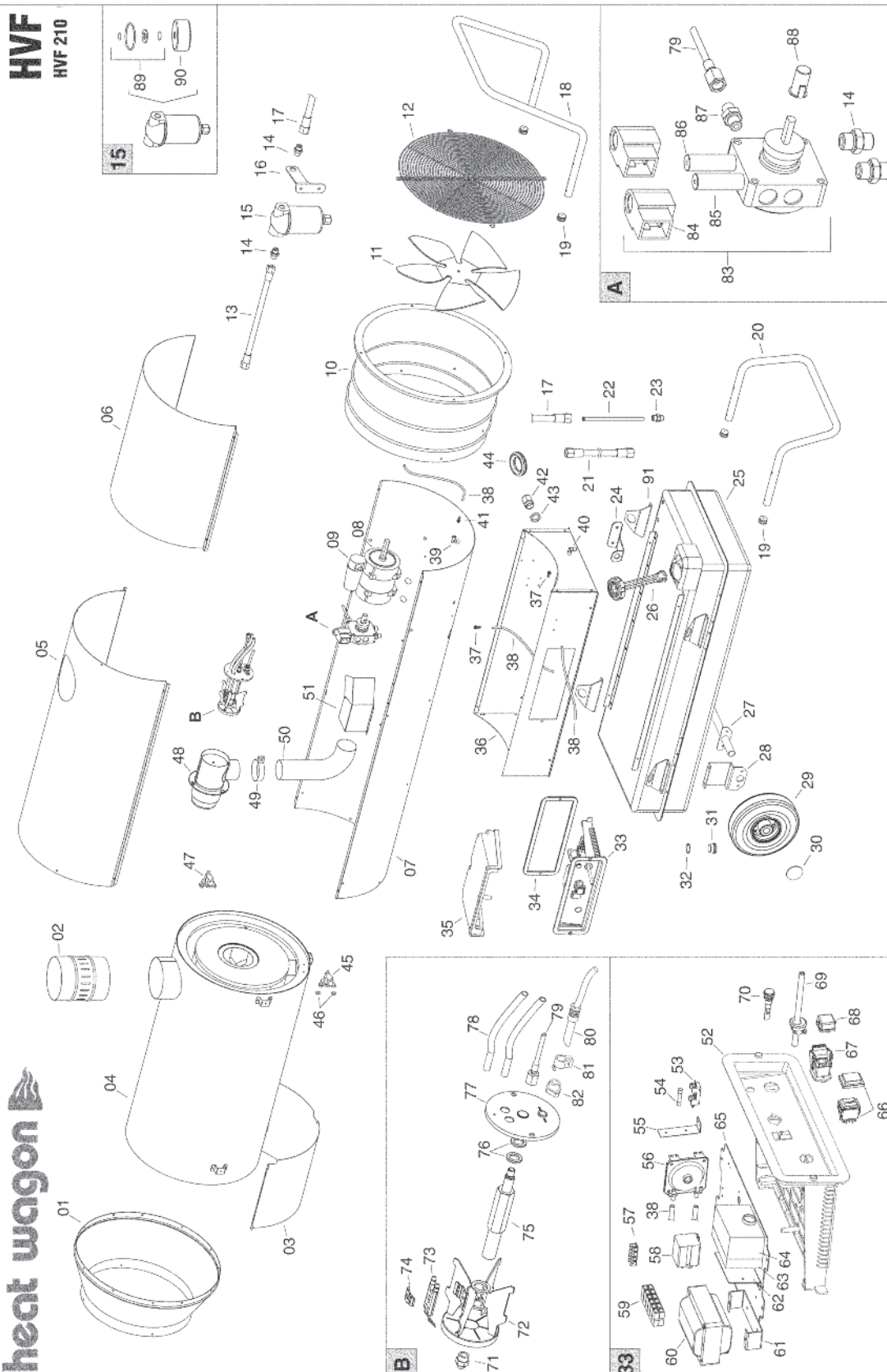
Prior to SN 21200801

Ed. 06/08

**HVF**  
HVF 210

PL 10/07

**heat wagon**



# HVF210 Parts List

Prior to SN 21200801

Pos.	Cod.	PART LIST
01	G06113-9010	Outlet cone
02	G06077	Chimney Ø 150
03	G06115	Combustion chamber support
04	G06117	Combustion chamber
05	G06119-9010	Upper body
06	G06121-9010	Cover inspection
07	G06123-9010	Lower body
08	E10678-110	Motor 450W with condenser
09	E11230	Condenser 40 pF
10	G06125-9010	Motor flange
11	T10260	Fan Ø356 18°
12	P30169	Inlet grille
13	I40330	Tube BP 1/4" FF L.420mm
14	I20104	Nipple FE 1/4" MM
15	T20239	Oil pre-heaters filter 1/4"
16	G06104-9005	Filter support
17	I40329	Tube BP 1/4" FF L.260mm
18	P20174-9005	Handle
19	C30319	Plug Ø25
20	P20175-9005 P20177-9005	Foot
21	I40331	Tube BP 1/4" F.L.580mm
22	I30696	Pascante L.220mm
23	I30737	Nipple OT 1/4" M - M12x1.75 M
24	G06068-9005	Power lead hook
25	G06127-9005	Fuel tank 105 l
26	C30363 C30364	Plug with level control L=215
27	G06129-9005	Wheel axle
28	G06106-9005	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	G00213	El. componets drawer
34	C30425	Seal
35	P50127	Control box cover
36	G06130-9010	Base
37	I31130	Conn. Straight Ø6 1/8"
38	I40332	Silicone pipe Ø5x9
39	I30325-1	Connection 1/8"
40	I20325	Connection 1/8"
41	I31130	Conn. Straight Ø6 1/8"

Pos.	Cod.	PART LIST
42	E20953	Cable holder PG11
43	E20954	Ring nut PG11
44	C30307	Protection cable Ø 35
45	E50102	Limit Thermostat
46	M20107	Washer Ø5 x Ø15 x 1,5
47	E50101	Fan Thermostat
48	G06132	Blast tube
49	G06133	Clip for flexible ducts
50	I40801	Doppelmaterial-Schlauch L=170 mm
51	G06134	Air flap
52	G06153	Electr. componets drawer
53	E20508	Fuse holder
54	E10313	Fuse (6x30) 20A
55	G06102	Switch support
56	E50437	Pressure switchesHONEYWELL
57	E20319	Terminal board
58	E11125	Relay Finder 65.31 AC
59	E20305	Terminal board
60	E10917-2	Transformer H.T. 818C 110V
61	G06109	Transformer H.T. flange
62	G06103	Support
63	E40107	LANDIS LOA 21-24 base
64	E40113	Control box LANDIS LOA 21-24
65	G06073	Plate for electrical components
66	E10102-P	Switch 0 - 1
67	E20640	Thermostat plug 3P+T
68	E20665	Drain plug
69	E30443	El. wire with plug and cable fastener
70	E11030	Lamp 230V
71	T20354	Nozzle 1,00 GPH 45° W
	T20351	Nozzle 1,20 GPH 45° W
72	P10137	Burner's head with electrodes
	P10138	Burner's head with electrodes
73	E10254	Electrodes
74	P10134	Electrodes stirrup
75	I33002	Nozzle support
76	I30685	Washer diam. 14
77	P20529	Burner flange Ø 102mm
78	G02076	H.T. Cable connect. 90°
79	I40192	Micropipe
80	E50306	Ld ph. Unit L&G QRB1A
81	E50307	Fixing clamp
82	E50308	Photoresistance flange
83	T20439-1	Pump Danfoss BFP 52E R3
84	T20118	Solenoid spool BFP 52E Danfoss
85	T20129	Solenoid valve Danfoss (NO)
87	I20115	Nipple FE 1/8" MM
88	E10513	Coupling K1
89	T20241	OR-KIToil filter
90	T20242	Filter cartridge
91	G06111-9005	Lifting bracket

# HVF210 Breakdown

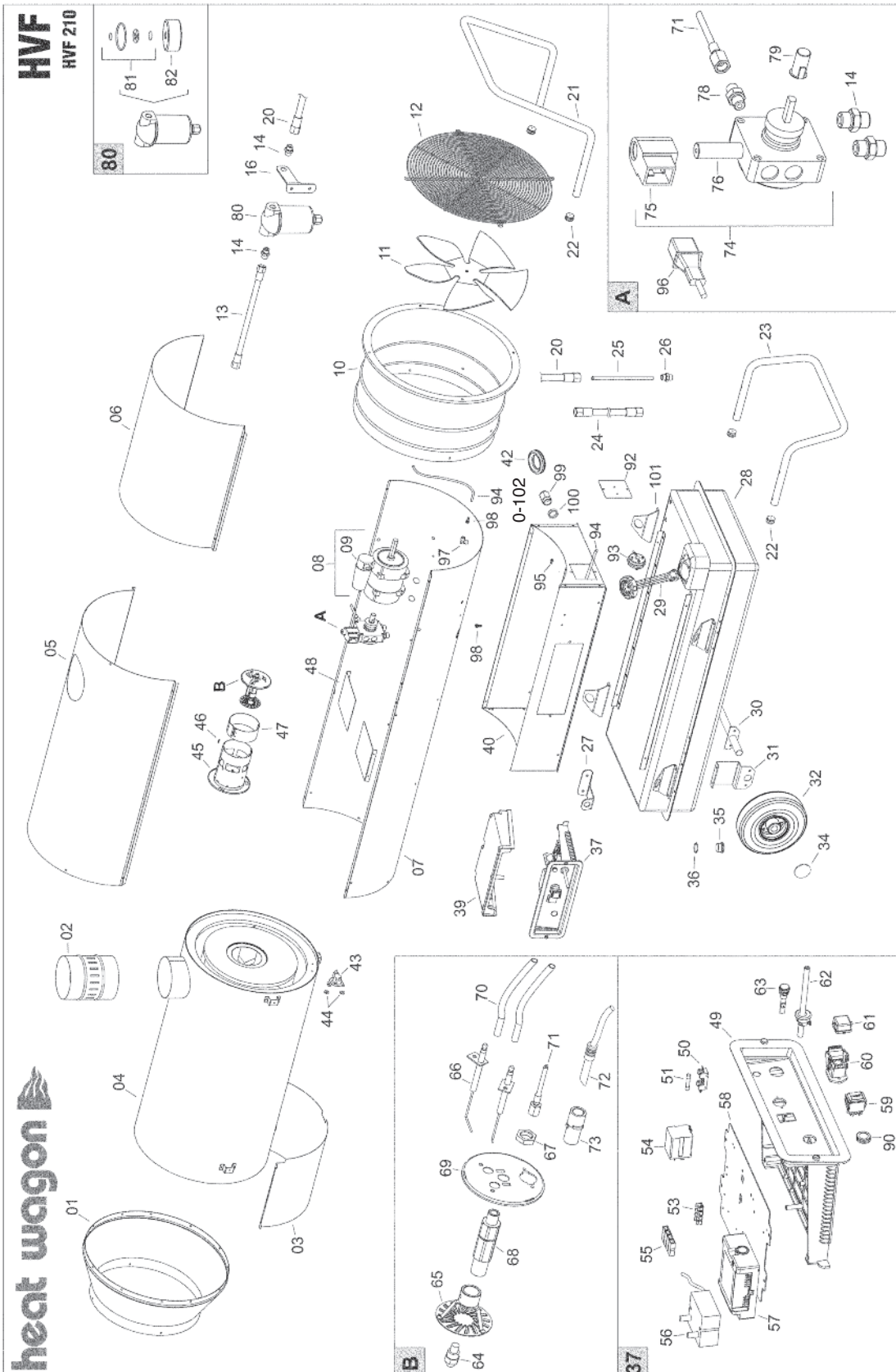
For SN 21200801 and Beyond

Ed. 06/10

PL 10/07

**heat wagon**

**HVF**  
HVF 210



# HVF210 Parts List

For SN 21200801 and Beyond

Pos.	Cod.	PART LIST
01	G06113-9010	Outlet cone
02	G06077	Chimney Ø 150
03	G06174	Combustion chamber support
04	G06176	Combustion chamber
05	G06119-9010	Upper body
06	G06121-9010	Cover inspection
07	G06178-9010	Lower body
08	E10678-110	Motor 450W with condenser
09	E11230	Condenser 40 µF
10	G06125-9010	Motor flange
11	T10260	Fan Ø350 18°
12	P30169	Inlet grille
13	I40330	Tube BP 1/4" FF L.420mm
14	I20104	Nipplo FE 1/4" MM
19	G06104-9005	Filter support
20	I40329	Tube BP 1/4" FF L.260mm
21	P20176-9005	Handle
22	C30319	Plug Ø25
23	P20177-9005	Foot
24	I40331	Tube BP 1/4" F L.580mm
25	I30696	Pascante L.220mm
26	I30737	Nipplo OT 1/4" M - M12x1,75 M
27	G06068-9005	Power lead hook
28	G06127-9005	Fuel tank 105 l
29	C30363	Plug with level control L=215
30	G06105-9005	Wheel axle
31	G06106-9005	Wheels axle support
32	C10546	Wheel Ø 260 - Ø 25
33	M20202	Spring washer Ø25
35	I25020	Drain plug
36	C30375	OR Ø16 x 2,62
37	G00248	El. componets drawer
39	P50127	Control box cover
40	G06242-9010	Base *
42	C30372	Protection cable Ø 35
43	E50102	Limit Thermostat
44	M20107	Washer Ø5 x Ø15 x 1,5
45	G06181	Blast tube
46	E20671	Terminal board
47	G06183	Air regulatoin flap
48	G01061-1	Right air flap
	G01061-2	Left air flap
49	G06153	Electr. componets drawer
50	E20508	Fuse holder
51	E10313	Fuse (6x30) 20A
53	E20319	Terminal board
54	E11125	Relay Finder 65.31 AC
55	E20305	Terminal board
56	E10930	Transformer H.T. BRAHMA
57	E40124	Control box BRAHMA TGRD 91 120V
58	G06073	Plate for electrical components

Pos.	Cod.	PART LIST
59	E10102-P	Switch 0 - 1
60	E20640	Thermostat plug 3P+T
61	E20665	Drain plug
62	E30443	El. wire with plug and cable fastener
63	E11030	Lamp 230V
64	T20355	Nozzle 1,10 GPH 80°W
65	G01077	Turbo disc
66	E10215	Electrode
67	I31034	Nut M14
68	I33005	Nozzle support
69	G06228	Burner flange Ø 102mm
70	G02078	H.T. Cable connect. 90°
71	I40192	Micropipe
72	E50328	Ld ph. Unit FC13
73	E50327	Photoresistence protection
74	T20410-1	Pump Danfoss BFP21 R3 Danfoss
75	T20118	Solenoid spool Danfoss
76	T20117	Solenoid valve Danfoss
78	I20115	Nipplo FE 1/8" MM
79	E10513	Coupling K1
80	T20239	Oil pre-heaters filter 1/4"
81	T20241	OR KIToil filter
82	T20242	Filter cartridge
90	E20418	Stop button protection
92	G06222-9010	Switch support*
93	E50440	100 Pa switch
94	I40335	Silicone pipe Ø4x8
95	I31131	Conn. Straight Ø6
96	T20442	Solenoid valve cable
97	I20325-1	Connection 1/8"
98	I31130	Conn. Straight Ø6 1/8"
99	E20953	Cable holder PG11
100	E20954	Ring nut PG11
101	02AC511	Lifting bracket
102	C30323	Cable Protection

*\* Note*

*For SN 21201201 and Beyond*

*Pos 40 - Base, PN G06407 - 9010*

*Pos 92 - Switch support, PN G06406-9010*

# HVF310 Breakdown Prior to SN 21301201

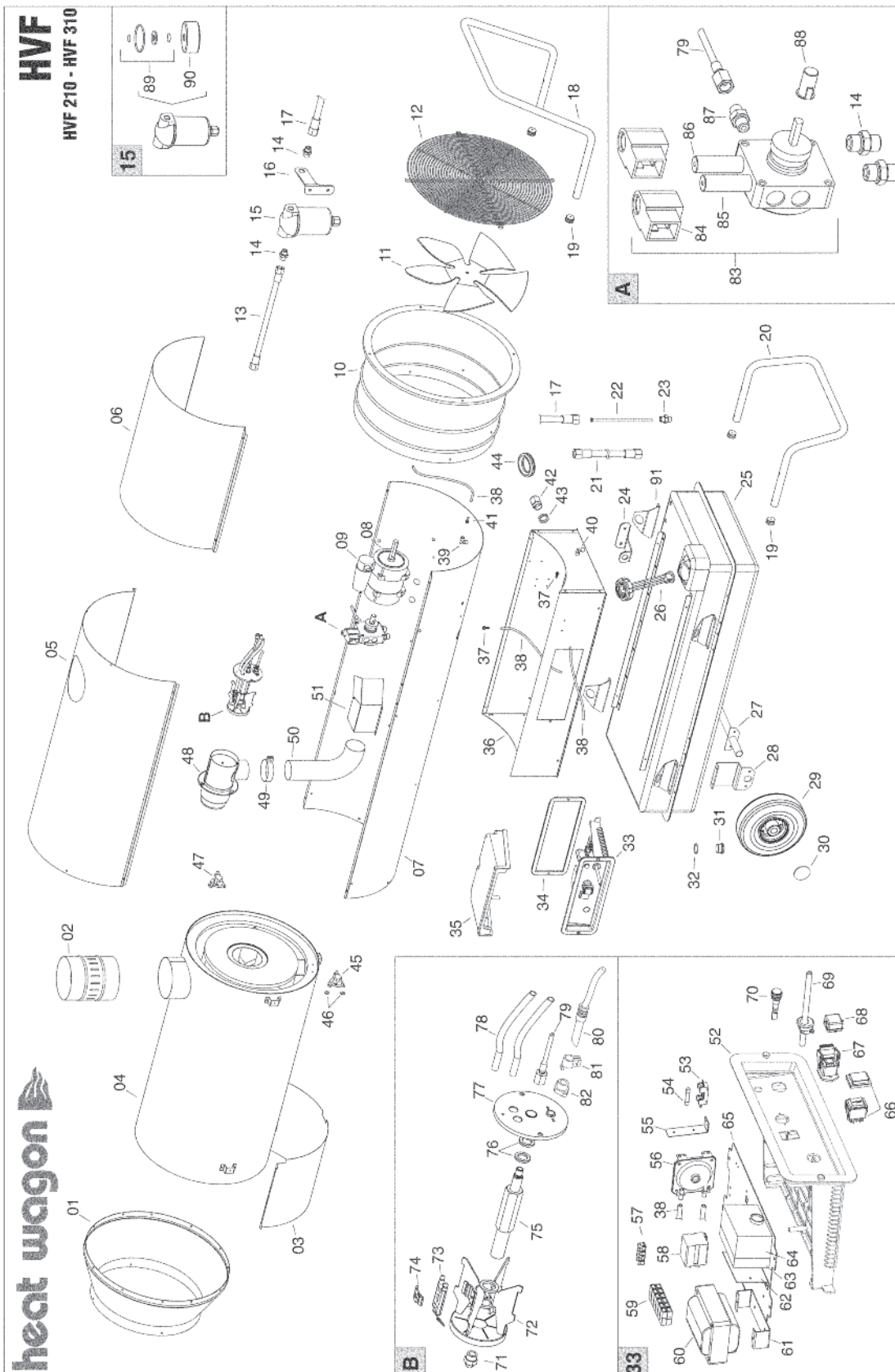
PL 10/07

Ed. 06/08

**heat wagon**

**HVF**

HVF 210 - HVF 310



# HVF310 Parts List Prior to SN 21301201

Pos.	Cod.	PART LIST
01	G06114-9010	Outlet cone
02	G06077	Chimney Ø 150
03	G06116	Combustion chamber support
04	G06118	Combustion chamber
05	G06120-9010	Upper body
06	G06122-9010	Cover inspection
07	G06124-9010	Lower body
08	E10679-110	Motor 750W with condenser
09	E11229	Condenser 80 µF
10	G06126-9010	Motor flange
11	T10261	Fan Ø500 23°
12	P30129	Inlet grille
13	I40330	Tube BP 1/4" FF L 420mm
14	I20104	Nipple FE 1/4" MM
15	T20239	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	C30355	Plug Ø25
20	P20180-9005	Foot
21	I40331	Tube BP 1/4" F L 580mm
22	I30698	Pascante L 220mm
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	I25020	Drain plug
32	C30375	OR Ø30 x 2.62
33	G00213	El. componets drawer
34	C30425	Seal
35	P50127	Control box cover
36	G06131-9010	Base
37	I31130	Conn. Straight Ø6 1/8"
38	I40332	Silicone pipe Ø5x9
39	I30325-1	Connection 1/8"
40	I20325	Connection 1/8"
41	I31130	Conn. Straight Ø6 1/8"

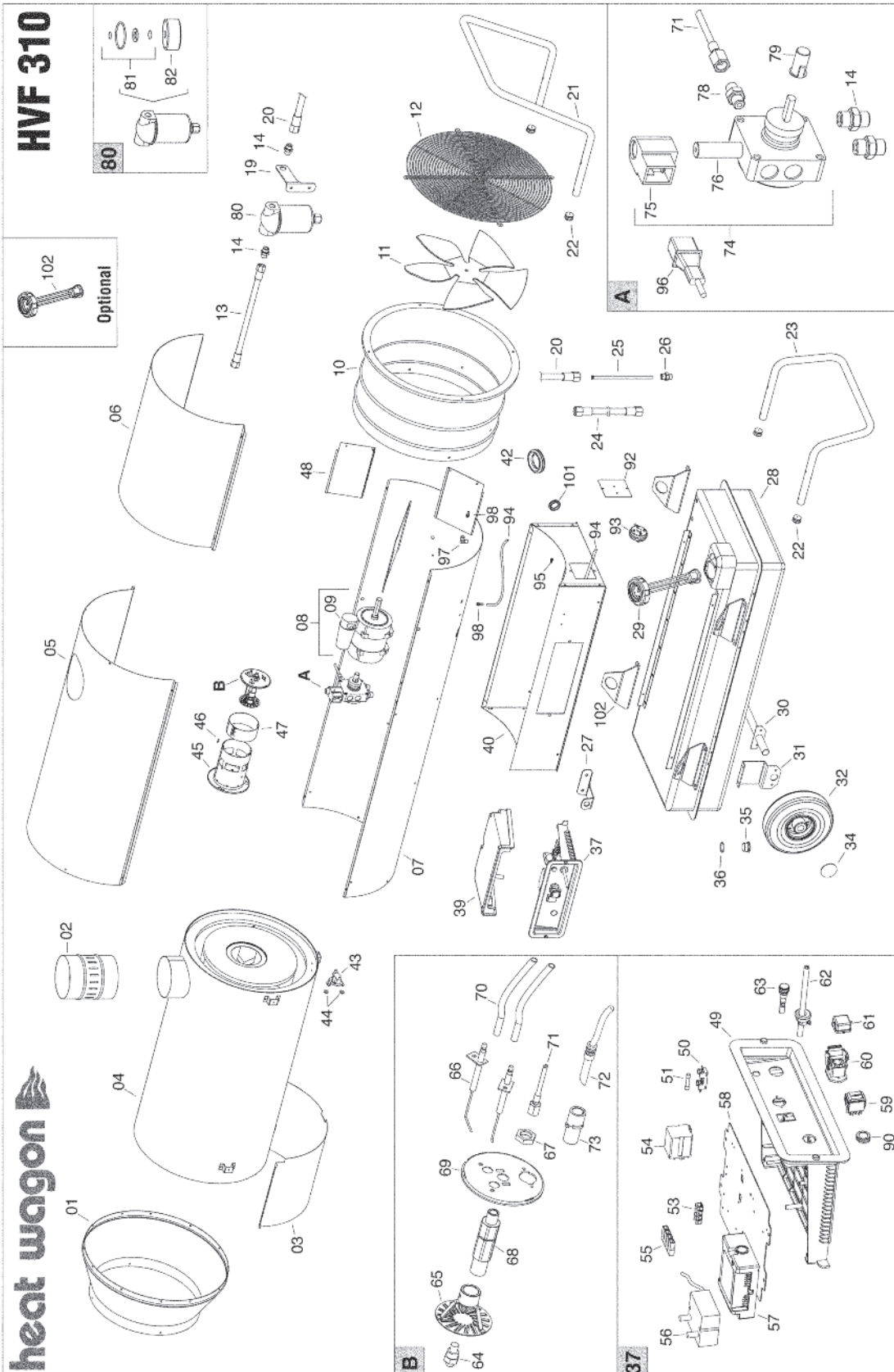
Pos.	Cod.	PART LIST
42	E20953	Cable holder PG11
43	E20954	Ring nut PG11
44	C30307	Protection cable Ø 35
45	E50102	Limit Thermostat
46	M20107	Washer Ø5 x Ø15 x 1,5
47	E50104	Fan Thermostat
48	G06266	Blast tube
49	G06133	Clip for flexible ducts
50	I40802	Doppelmaterial-Schlauch L=170 mm
51	G06134	Air flap
52	G06153	Electr. componets drawer
53	E20508	Fuse holder
54	E10313	Fuse (6x30) 20A
55	G06102	Switch support
56	E50437	Pressure switches HONEYWELL
57	E20319	Terminal board
58	E11125	Relay Finder 65.31 AC
59	E20305	Terminal board
60	E10917-2	Transformer H.T. 818C 110V
61	G06109	Transformer H.T. flange
62	G06103	Support
63	E40107	LANDIS LOA 21-24 base
64	E40113	Control box LANDIS LOA 21-24
65	G06073	Plate for electrical components
66	E10102-P	Switch 0 - 1
67	E20640	Thermostat plug 3P+T
68	E20665	Drain plug
69	E30443	El. wire with plug and cable fastener
70	E11030	Lamp 230V
71	T20351	Nozzle 1.20 GPH 45° W
72	P10138	Burner's head with electrodes
73	E10254	Electrodes
74	P10134	Electrodes stirrup
75	I33002	Nozzle support
76	I30685	Washer diam. 14
77	P20529	Burner flange Ø 102mm
78	G02076	H.T. Cable connect. 90°
79	I40192	Micropipe
80	E50306	Ld ph. Unit L&G QRB1A
81	E50307	Fixing clamp
82	E50308	Photoresistance flange
83	T20440-1	Pump Danfoss BFP 52E R5
84	T20118	Solenoid spool BFP 52E Danfoss
85	T20129	Solenoid valve Danfoss (NO)
86	T20117	Solenoid valve Danfoss (NC)
87	I20115	Nipple FE 1/8" MM
88	E10514	Coupling K2
89	T20241	OR KIToil filter
90	T20242	Filter cartridge
91	G06111-9005	Lifting bracket

# HVF310 Breakdown SN 21301201 and Beyond

PL 10/07

**heat wagon**

**HVF 310**



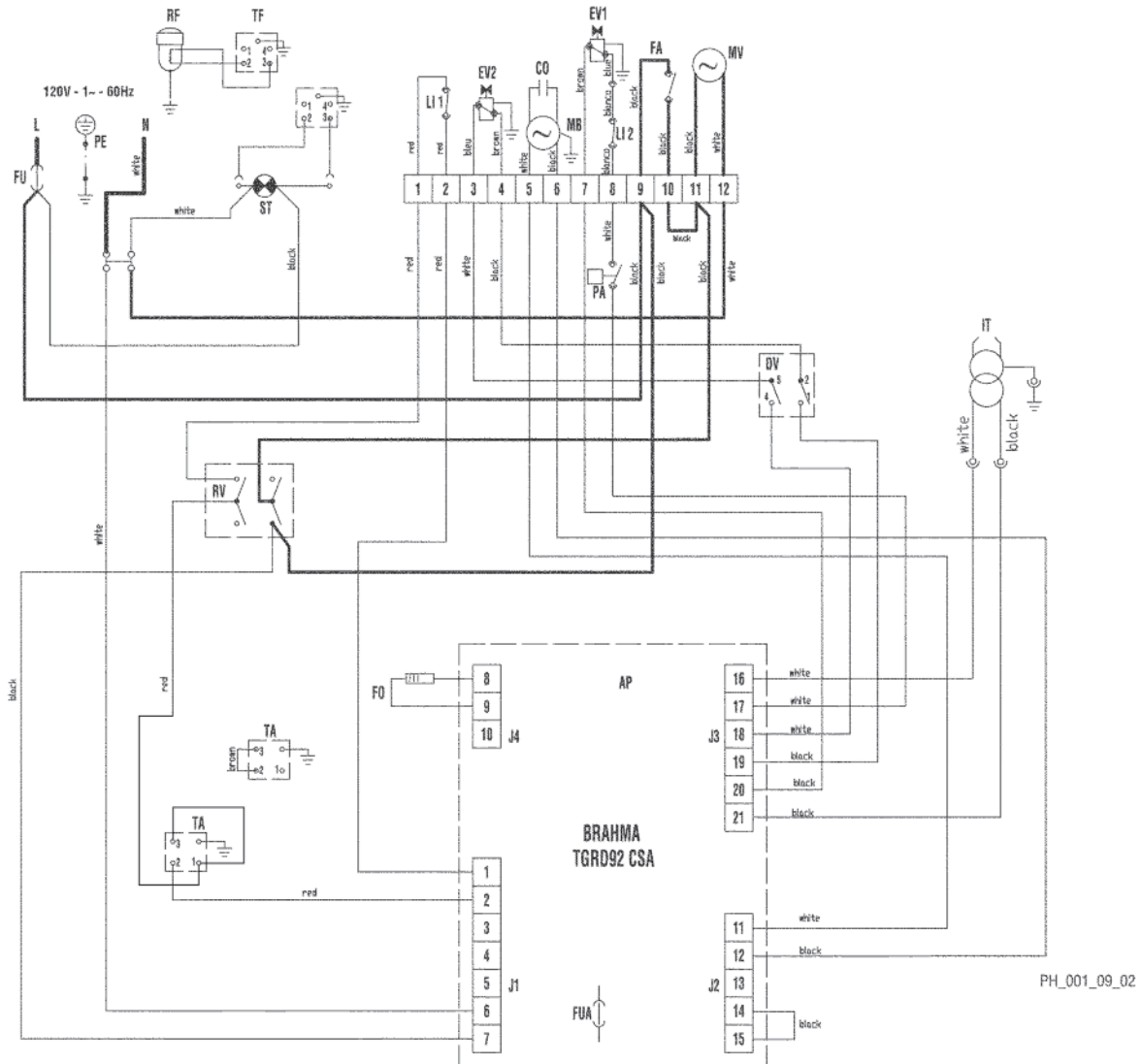
# HVF310 Parts List

Pos.	Cod.	PART LIST
01	G06114-9010	Outlet cone
02	G06077	Chimney Ø 150
03	G06175	Combustion chamber support
04	G06177-09	Combustion chamber
05	G06413-9010	Upper body
06	G06122-9010	Cover inspection
07	G06179-9010	Lower body
08	E10704-110	Motor 750W with condenser
09	E11249	Condenser 80 µF
10	G06126-9010	Motor flange
11	T10261	Fan Ø500 23°
12	P30129	Inlet grille
13	I40330	Tube BP 1/4" FF L.420mm
14	I20104	Nipplo FE 1/4" MM
19	G06104-9005	Filter support
20	I40329	Tube BP 1/4" FF L.260mm
21	P20176-9005	Handle
22	C30355	Plug Ø25
23	P20180-9005	Foot
24	I40331	Tube BP 1/4" F L.580mm
25	I30698	Pascante L.290mm
26	I30737	Nipplo OT 1/4" M - M12x1,75 M
27	G06068-9005	Power lead hook
28	G06146-9005	Fuel tank 135 l
29	02AC10	Plug with level control L=290
30	G06129-9005	Wheel axle
31	G06107-9005	Wheels axle support
32	C10546	Wheel Ø 260 - Ø 25
33	M20202	Spring washer Ø25
35	I25020	Drain plug
36	C30375	OR Ø16 x 2,62
37	G00248	El. componets drawer
39	P50127	Control box cover
40	G06414-9010	Base
42	C30372	Protection cable Ø 35
43	E50102	Limit Thermostat
44	M20107	Washer Ø5 x Ø15 x 1,5
45	G06266	Blast tube
46	E20671	Terminal board
47	G06183	Air regulatoin flap
48	G06394	Air flap
49	G06153	Electr. componets drawer
50	E20508	Fuse holder
51	E10313	Fuse (6x30) 20A
53	E20319	Terminal board
54	E11125	Relay Finder 65.31 AC
55	E20305	Terminal board
56	E10930	Transformer H.T. BRAHMA
57	E40124	Control box BRAHMA TGRD 91 120V
58	G06073	Plate for electrical components

Pos.	Cod.	PART LIST
59	E10102-P	Switch 0 - 1
60	E20640	Thermostat plug 3P+T
61	E20665	Drain plug
62	E30443	El. wire with plug and cable fastener
63	E11030	Lamp 230V
64	T20356	Nozzle 1,50 GPH 80°W
65	G01077	Turbo disc
66	E10215	Electrode
67	I31034	Nut M14
68	I33005	Nozzle support
69	G06228	Burner flange Ø 102mm
70	G02078	H.T. Cable connect. 90°
71	I40192	Micropipe
72	E50328	Ld ph. Unit FC13
73	E50327	Photoresistence Protection
74	T20411-1	Pump BFPC21 R5 Danfoss
75	T20118	Solenoid spool Danfoss
76	T20117	Solenoid valve Danfoss
78	I20115	Nipplo FE 1/8" MM
79	E10514	Coupling K2
80	T20239	Oil pre-heaters filter 1/4"
81	T20241	OR KIToil filter
82	T20242	Filter cartridge
90	E20418	Stop button protection
92	G06406-9010	Switch Support
93	E50440	100 Pa Switch
94	I40335	Silicone pipe Ø4x8
95	I31131	Conn. Straight Ø6
96	T20442	Solenoid valve cable
97	I20325-1	Connection 1/8"
98	I31130	Conn. Straight Ø6 1/8"
101	C30323	Cable protection Ø 20
102	02AC511	Lifting bracket

# HVF410HD Electrical Schematic

Prior to SN 21800800



AP CONTROL BOX

TA ROOM THERMOSTAT PLUG

ST ELECTRIC PILOT LAMP

FU FUSE 20 A

LI1 OVERHEAT THERMOSTAT

EV1 SOLENOID VALVE I° Stage

FO PHOTOCCELL

MB BURNER MOTOR

CO CONDENSER

MV FAN MOTOR

FUA FUSE 6.3 A

EV2 SOLENOID VALVE II° Stage

RV CONTROL

IT TRANSFORMER H.V.

PA AIR PRESSURESWITCHES

LI2 OVERHEAT SAFETY THERMOSTAT, LI2

DV HIGH - LOW THERMAL POWER SWITCH

TF PLUG OF PRE-HEATED FILTER

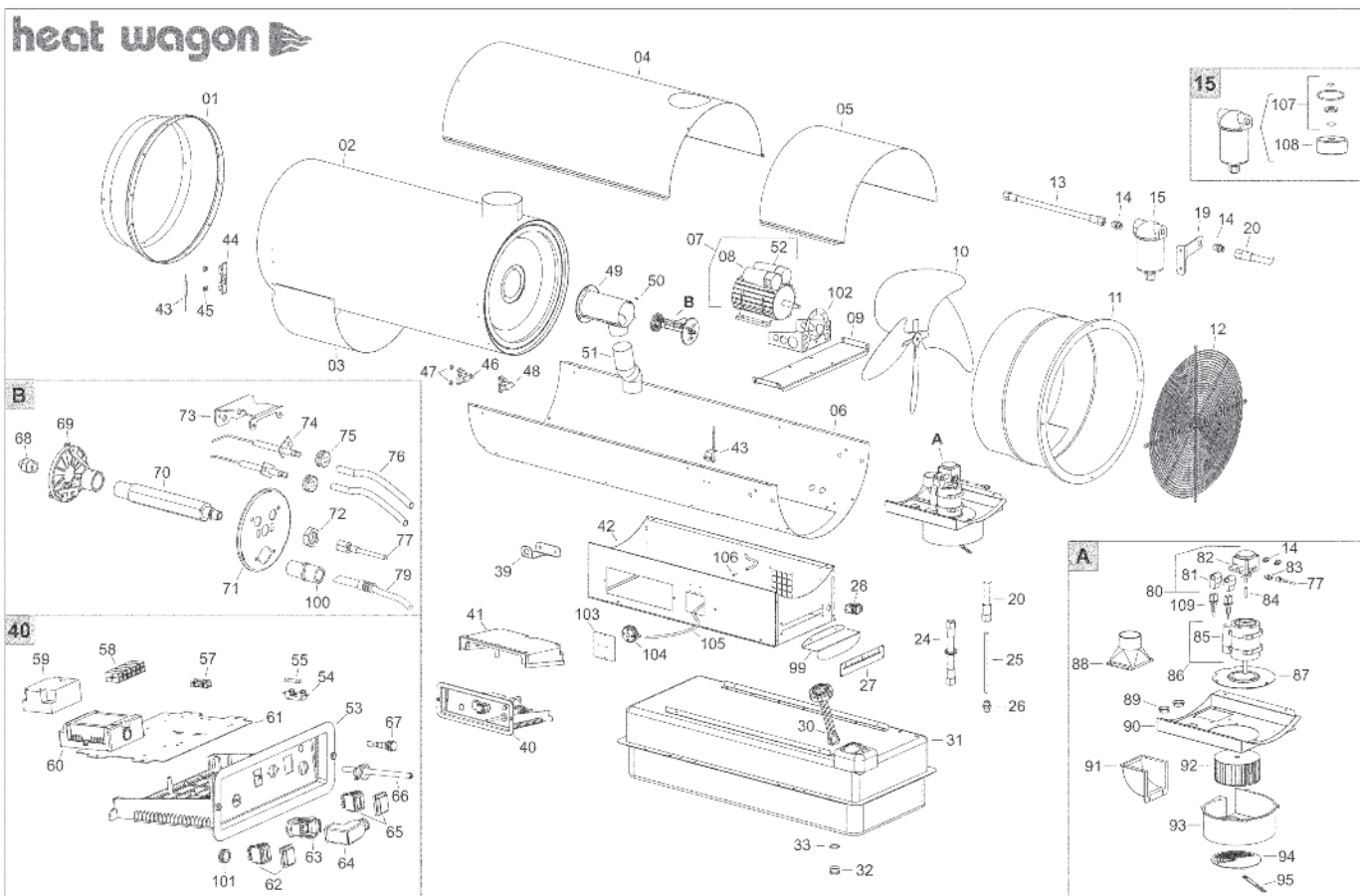
RF HEATED FILTER

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### ***HVF410HD Breakdown Prior to SN 21800800***

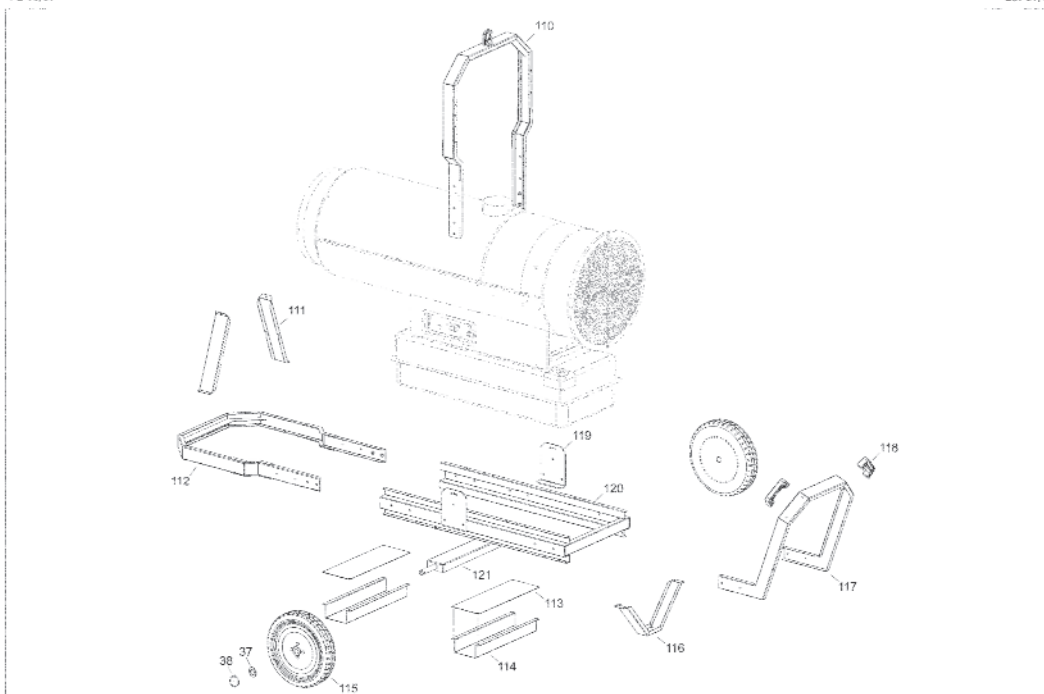
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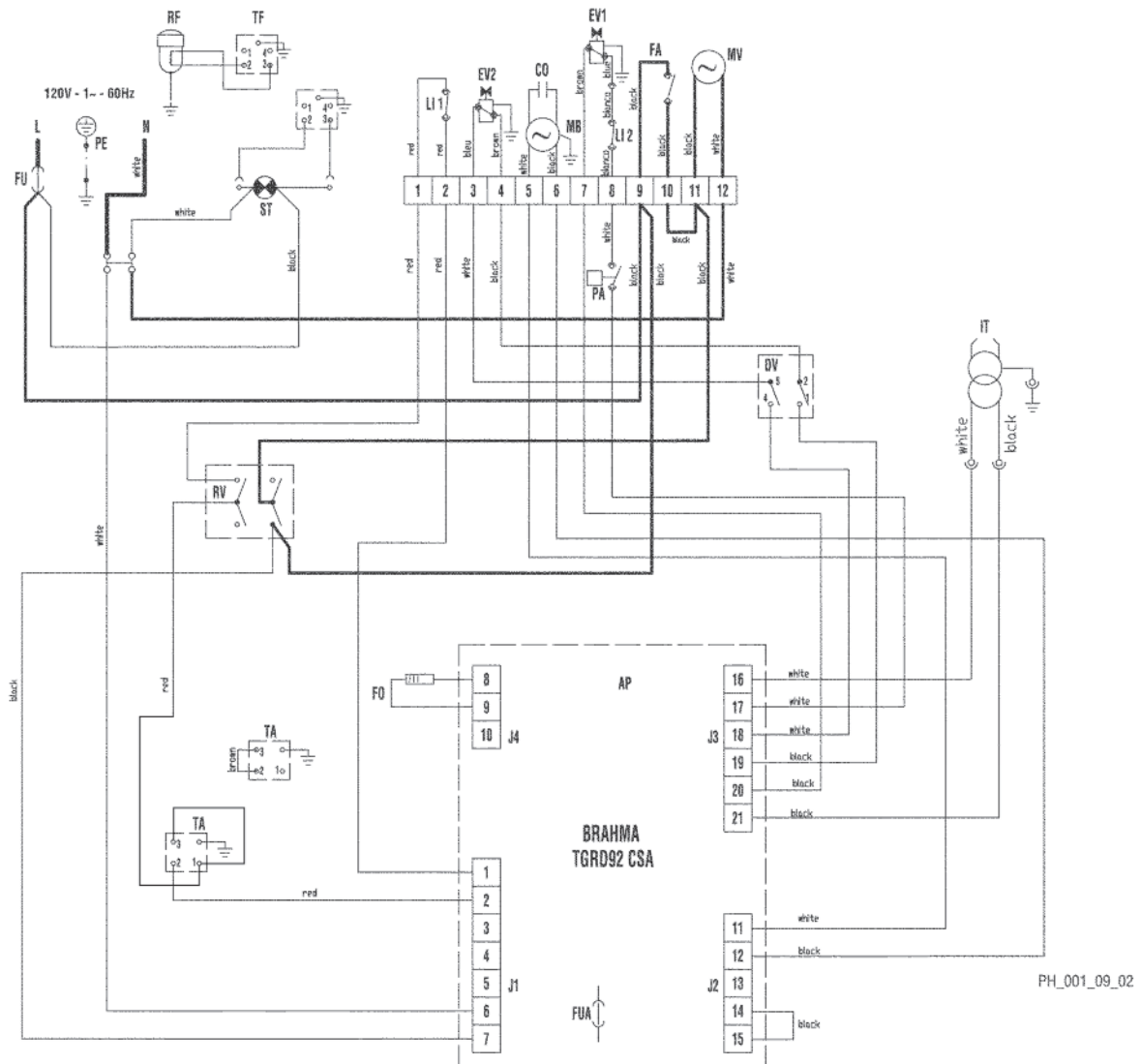
# HVF410HD Parts List Prior to SN 21800800

Pos.	Cod.	PART LIST
01	G06185-9010	Outlet cone
02	G06186	Combustion chamber
03	G06187	Combustion chamber support
04	G06188-9010	Upper body
05	G06189-9010	Cover inspection
06	G06190-9010	Lower body
07	E10695-110	Motor 750W with condenser
08	E11242	Condenser 50 µF
09	G06191	Motor flange
10	T10267	Fan Ø550 18°
11	G06192-9010	Air flap
12	P30151	Inlet grille
13	I40330	Tube BP 1/4" FF L.420mm
14	I20104	Nipplo FE 1/4" MM
15	02AC575-1	Oil pre-heaters filter 1/4"
19	G06104-9005	Filter support
20	I40329	Tube BP 1/4" FF L.260mm
24	I40331	Tube BP 1/4" FF L.580mm
25	I30696	Pascante L.290mm
26	I30737	Nipplo OT 1/4" M - M12x1,75 M
27	G06193	Air adjustment panel
28	E20676	Thermostat plug 4P+T
30	C30364	Plug with level control L=290
31	G06243-9005	Fuel tank 57 US gal
32	I25019	Drain plug M30x1,5 mm
33	C30350	OR Ø30 x 2,62 mm
39	G06068-9005	Power lead hook
40	G00250	El. componets drawer
41	P50127	Control box cover
42	G06224-9010	Base
43	E50767	Thermostat TY95A 105 °C Campini
44	G06196	Centrifuge air fan
45	M20413	Bulb support
46	E50102	Limit Thermostat
47	M20107	Washer Ø5 x Ø15 x 1,5 mm
48	E50104	Fan Thermostat
49	G06197	Blast tube
50	E20671	Terminal board
51	I40804	Air duct L=220 mm
52	E11229	Condenser 80 µF
53	G06154	Electr. componets drawer
54	E20508	Fuse holder
55	E10313	Fuse (6x30) 20A
57	E20319	Terminal board
58	E20305	Terminal board
59	E10930	Transformer H.T. BRHAMA
60	E40121	Control box BRAHMA TGRD 92 120V
61	G06073	Plate for electrical components
62	E10102-P	Switch 0 - 1
63	E20640	Thermostat plug 3P+T
64	E20675	Plate plug 90° 3P + T
65	E10112-P	Switch 0 - 1

Pos.	Cod.	PART LIST
66	E30443	El. wire with plug and cable fastener
67	E11030	Lamp 230V
68	T20357	Nozzle 2.0 GPH 80° W
69	G06225	Turbo disc
70	I33006	Nozzle support
71	G06226	Burner flange Ø 102mm
72	I31034	Nut M14
73	G06199	Electrodes stirrup
74	E10215	Electrodes
75	C30368	Cable protection Ø12 mm
76	G02076	H.T. Cable connect. L=1000 mm
77	I40192	Micropipe L=250 mm
79	E50328	Ld ph. Unit FC13
80	T20441-1	Pump Suntek AT2 45 BK 2S - 120V
81	T20131	Solenoid spool AT2 45 BK 2S Suntek -120V
82	T20130	Solenoid valve body torque Suntek
83	I20115	Nipplo FE 1/8" MM
84	E10513	Coupling K1
85	E11233	Condenser 20µF
86	E10677-110	Motor 200W with condenser - 120V
87	G06200-9010	Support fan and motor
88	C10328	Connection channel
89	C30372	Cable protection Ø35 mm
90	G06201-9010	Support fan and motor
91	C10329	90° elbow connection
92	T10262	Fan AP 160x55 F12,7
93	C10326	Spiral fan
94	G06202	Shutter for air regulation
95	G06203	Air adjustment level
99	G06204	Air adjustment protection
100	E50327	Photoresistance Protection
101	E20418	Stop button protection
102	G06227	Fitting support
103	G06222-9010	Switch support
104	E50441	100 Pa switch
105	I40332	Silicone pipe Ø4x9
106	I31131	Conn. Straight Ø6
107	T20241	OR KIToil filter
108	T20242	Filter cartridge
109	T20442	Solenoid valve cable
110	G06205-9005	Lifting frame
111	G06206-9005	Body support
112	G06207-9005	Front protection
113	G06208	Reinforcement plate
114	G06209	Fork guides
115	C10545	Wheel Ø 400 - Ø 25,4 mm
116	G08244-9005	Support
117	G06211-9005	Handle
118	C10203	Handle
119	G06212-9005	Bracket
120	G06245-9005	Tank structure
121	G06246-9005	Wheel axle Ø25,4

# HVF410HD Electrical Schematic

SN 21800800 and Beyond



AP CONTROL BOX

TA ROOM THERMOSTAT PLUG

ST ELECTRIC PILOT LAMP

FU FUSE 20 A

LI1 OVERHEAT THERMOSTAT

EV1 SOLENOID VALVE I° Stage

FO PHOTOCCELL

MB BURNER MOTOR

CO CONDENSER

MV FAN MOTOR

FUA FUSE 6.3 A

EV2 SOLENOID VALVE II° Stage

RV CONTROL

IT TRANSFORMER H.V.

PA AIR PRESSURESWITCHES

LI2 OVERHEAT SAFETY THERMOSTAT, LI2

DV HIGH - LOW THERMAL POWER SWITCH

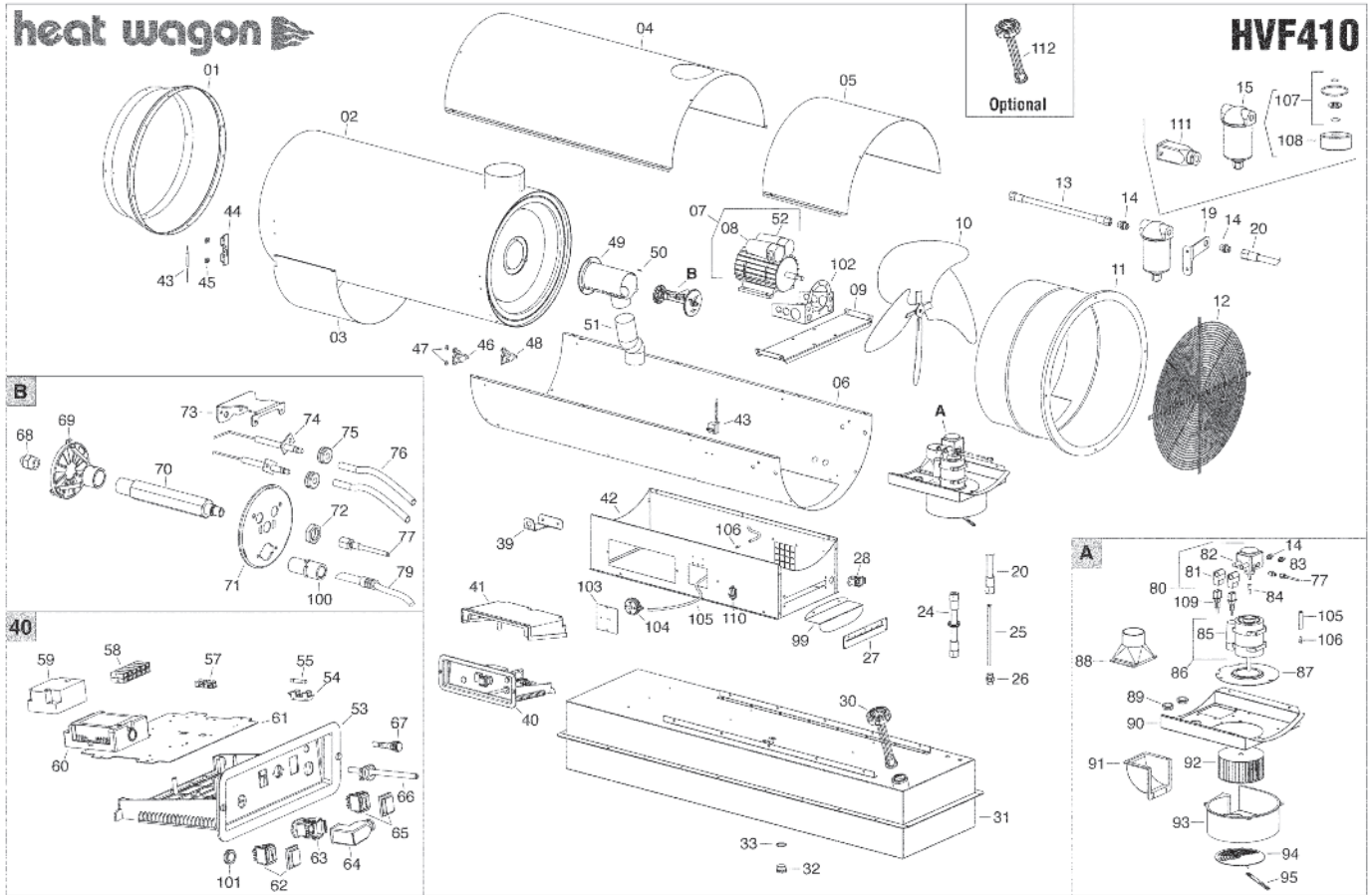
TF PLUG OF PRE-HEATED FILTER

RF HEATED FILTER

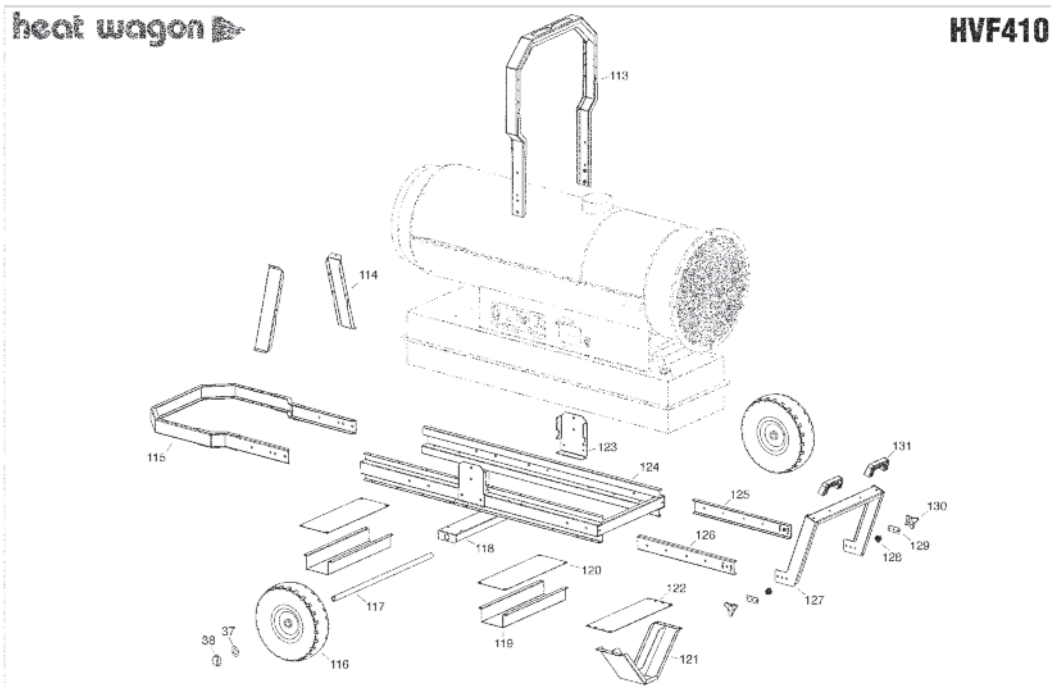
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## HVF410HD Breakdown SN 21800800 and Beyond

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# HVF410HD Parts List SN 21800800 and Beyond

Pos.	Cod.	PART LIST
01	G06185-9010	Outlet cone
02	G06186	Combustion chamber
03	G06187	Combustion chamber support
04	G06188-9010	Upper body
05	G06189-9010	Cover inspection
06	G06429-9010	Lower body
07	E10695-110	Motor 750W with condenser
08	E11242	Condenser 50 $\mu$ F
09	G06191	Motor flange
10	T10267	Fan Ø550 18°
11	G06192-9010	Air flap
12	P30151	Inlet grille
13	I40330	Tube BP 1/4" FF L.420mm
14	I20104	Nipplo FE 1/4" MM
15	T20239	Oil pre-heaters filter 1/4"
19	G06104-9005	Filter support
20	I40329	Tube BP 1/4" FF L.260mm
24	I40331	Tube BP 1/4" FF L.580mm
25	I30698	Pascante L.290mm
26	I30737	Nipplo OT 1/4" M - M12x1,75 M
27	G06193	Air adjustment panel
28	E20639	Thermostat plug 4P+T
30	02AC510	Plug with level control L=290
31	G06427-9005	Fuel tank 50 US gal
32	I25020	Drain plug M16x1,5 mm
33	C30375	OR Ø16 x 2,62 mm
37	M20111	Washer Ø26 x Ø44 x 4 mm
38	M20505	Wheel locking pin
39	G06068-9005	Power lead hook
40	G00250	El. componets drawer
41	P50127	Control box cover
42	G06428-9010	Base
43	E50767	The rmostat TY95A 105 °C Campini
44	G06196	Thermostat bulb metal bracket
45	M20413	Bulb support
46	E50102	Limit Thermostat
47	M20107	Washer Ø5 x Ø15 x 1,5 mm
48	E50104	Fan Thermostat
49	G06197	Blast tube
50	E20671	Terminal board
51	I40804	Air duct L=220 mm
52	E11229	Condenser 80 $\mu$ F
53	G06154	Electr. componets drawer
54	E20508	Fuse holder
55	E10324	Fuse (6x30) 25A
57	E20319	Terminal board
58	E20305	Terminal board
59	E10930	Transformer H.T. BRHAMA
60	E40121	Control box BRAHMA TGRD 92 120V
61	G06073	Plate for electrical components
62	E10102-P	Switch 0 - 1
63	E20640	Thermostat plug 3P+T

Pos.	Cod.	PART LIST
64	E20675	Plate plug 90° 3P + T
65	E10112-P	Switch 0 - 1
66	E30443	El. wire with plug and cable fastener
67	E11030	Lamp 230V
68	T20357	Nozzle 2,0 GPH 80°W
69	G06225	Turbo disc
70	I33006	Nozzle support
71	G06226	Burner flange Ø 102mm
72	I31034	Nut M14
73	G06199	Electrodes stirrup
74	E10215	Electrodes
75	C30368	Cable protection Ø12 mm
76	G02080	H.T. Cable connect. L=1200 mm
77	I40192	Micropipe L=250 mm
79	E50329	Ld ph. Unit FC13
80	T20441-1	Pump Suntek AT2 45 BK 2S - 120V
81	T20131	Solenoid spool AT2 45 BK 2S Suntek -120V
82	T20130	Solenoid valve body torque Suntek
83	I20115	Nipplo FE 1/8" MM
84	E10513	Coupling K1
85	E11233	Condenser 20 $\mu$ F
86	E10677-110	Motor 200W with condenser - 120V
87	G06200-9010	Support fan and motor
88	C10328	Connection channel
89	C30372	Cable protection Ø35 mm
90	G06201-9010	Support fan and motor
91	C10329	90° elbow connection
92	T10262	Fan AP 160x55 F12,7
93	C10326	Spiral fan
94	G06202	Shutter for air regulation
95	G06203	Air adjustment level
99	G06204	Air adjustment protection
100	E50327	Photoresistance protection
101	E20418	Stop button protection
102	G06227	Fitting support
103	G06406-9010	Switch Support
104	E50441	200 Pa switch
105	I40335	Silicone pipe Ø4x8
106	I31131	Conn. Straight Ø6
107	T20241	OR KIToil filter
108	T20242	Filter cartridge
109	T20442	Solenoid valve cable
110	E20406-1	Plastic profile
111	E20627	Plate plug 4P + T
112	02AC510	Plug with level control L=290
113	G06418-9005	Lifting frame
114	G06315-9005	Body support
115	G06316-9005	Front protection
116	C10558	Wheel Ø 409 - Ø 26 mm
117	G06419-9005	Wheel axle Ø25
118	G06420	Axle support
119	G06209	Fork guides
120	G06208	Reinforcement plate
121	G06421-9005	Support
122	G06422	Reinforcement plate
123	G06326-9005	Bracket
124	G06317-9005	Tank structure
125	G06424-9005	Panel DX
126	G06425-9005	Panel SX
127	G06423-9005	Handle
128	M30001	Spring
129	G06426	Plate
130	C10710	Knurled wheel M8x25
131	C10203	Handle



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