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

## Installation and Maintenance Manual

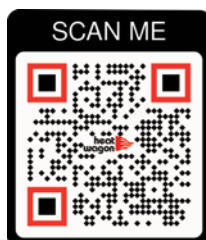
Please retain this manual for future reference.

# HRF115

***Infrared  
Construction  
Heater***



***SN 96004001 and beyond***



*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.**

**Never Use The Heater In Spaces Which Are Not Sufficiently Sized Or Ventilated For The Heater Being Utilized.**

**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. Heater is not intended for use in pest remediation. 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**

# Installation and Maintenance Manual

## Model HRFI 15

### 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.

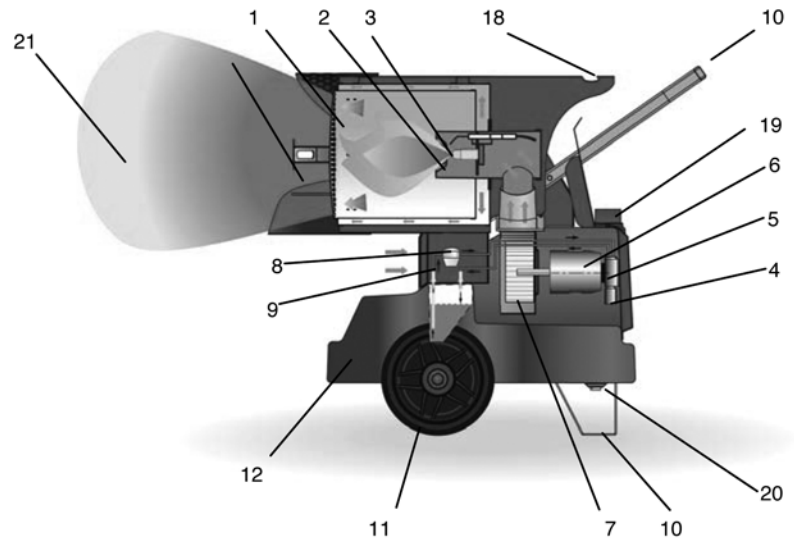
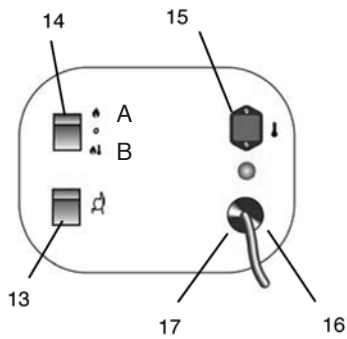
Travel time, mileage and shipping charges will not be allowed. Minor adjustments of heaters are dealers' responsibility. Defective parts must be tagged and held for possible return to the factory for 60 days from date of repair. The factory will provide a return goods authorization, (RGA) for defective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

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



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## OPERATING DIAGRAM



1 COMBUSTION CHAMBER

2 BURNER

3 NOZZLE

4 SOLENOID VALVE

5 DIESEL PUMP

6 MOTOR

7 FAN

8 FUEL FILTER

9 FUEL CIRCUIT

10 SUPPORT/HANDLE

11 WHEEL

12 FUEL TANK

13 RESET BUTTON WITH CONTROL LAMP

14 MAIN SWITCH  
A - without thermostat  
B - with thermostat

15 ROOM THERMOSTAT PLUG

16 CONTROL LAMP

17 POWER CORD

18 HANDLE

19 FUEL CAP

20 DRAIN PLUG

21 HEAT FLOW

TECHNICAL SPECIFICATIONS			HRF115
Max heating output	[BTU/h]	115.159	
Fuel consumption	[gal/h]	0.849	
Power supply	Phase		1
	Voltage	[V]	120
	Frequency	[Hz]	60
Power consumption	[W]	175	
Nozzle	[USgal/h]	0.60 x 80 S	
Pump pressure	psi	166 Factory Set 180 Maximum Do not exceed this pressure	
Adjustment of combustion air flap	[in]	0.125	
Tank capacity	[USgal]	11.35	
Noise level at 1 m	[dBA]	69	
Dimensions, L x W x H	[in]	35.24 x 20.94 x 31.81	
Weight	[lb]	92.5	

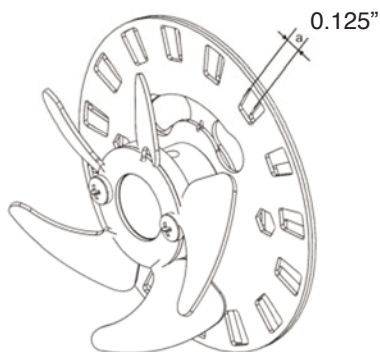


Fig 1

## 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 heater described in this manual is a portable oil-fuelled infrared heat generator running on heating oil.

Its easy handling and large fuel tank allow it to be used locally and temporarily with complete stand-alone operation. The area to be heated is therefore hit by an even and uniform flow of heat, as can be seen by the shape of the irradiation cone (18), without air movement.

The unit is a direct combustion hot generator that works by sending both hot air and combustion products in the room you wish to heat: all the necessary precautions must therefore be taken to guarantee a sufficient exchange of air.

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 10 feet);
- 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 three square foot at heater level, for direct-fired heaters;
- The heater is installed and connected to an electrical switchboard;
- Ensure that the machine resting surface or ground is not made of flammable material;
- Minimum clearances from combustible material must be:
  - 30" from side and rear (air inlet) of heater
  - 80" from ceiling
  - 40" on air outlet of heater.
- Never block air inlet (rear) or air outlet (front);
- In case of very low temperatures add kerosene to the heating oil;
- Before starting the heater always check free rotation of ventilator;
- Make sure heater is always under surveillance and keep children and animals away from it;
- 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;
- Heater is not ductable.
- Unplug heater when not in use.

### 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 (13) will light up.

#### Warning



The reset push-button emits a different light, depending on the state of the machine:

- off, when the machine is running regularly;
- red, when the machine is in safety lock-out mode: to restart it, the reset button (13) must be pressed.

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 (13) on control box before being able to restart the heater.

### OPERATION

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

#### Warning

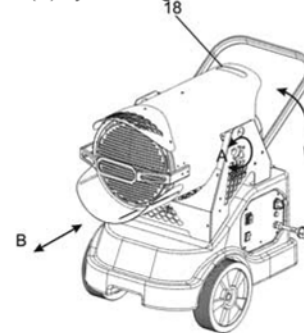
Mains must be fitted with a breaker switch.



Unit plug must be linked to a socket with a mains switch.

The hot generator must be placed on a flat, stable and level surface to avoid machine tipping and/or gas oil leakage from the tank fuel cap.

The flow of heat can be directed upward with an approximately 5° angle: loosen the two locking knobs (A) and tilt the combustion unit by pressing on the handle (18) until the desired angle is reached, then lock the knobs (A) by screwing them.



#### Warning




Before start-up, always ensure the guard (B) has been completely pulled out, so as to guarantee maximum protection of the machine resting surface.

You can run the generator in manual by setting switch (14) to ON. The heater can only work automatically when a control device, such as for example a thermostat 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 (13).

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 (14) 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.

### TRANSPORT

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.



**Warning**

During handling and transport fuel may leak: the tank fuel cap cannot guarantee sealing to allow the introduction of air and tank emptying during machine operation.

For handling in short to medium distances, it is enough to grab the generator by the handle and roll it on its wheels. In case of need, the generator can be lifted using ropes or chains secured to the hook (20, 21) provided on the machine. In this case it is always best to ensure that the ropes and/or chains are securely hooked and that they are intact and stably in place before handling.

**MAINTENANCE**

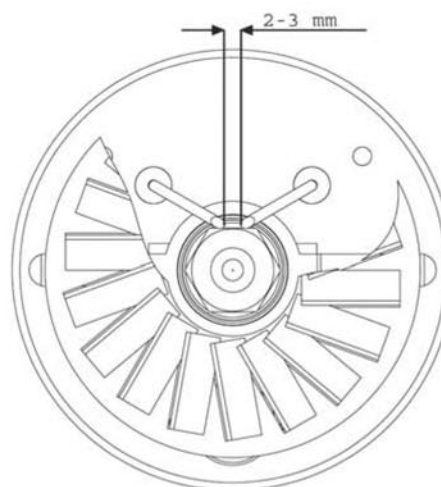
Preventive and regular maintenance will ensure a long trouble free life to your heater.

**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 the following scheme.



## Troubleshooting

OBSERVED FAULT	CAUSE	REMEDY
• Motor does not start, no ignition	• No electrical current	• Check mains
		• Check proper positioning and functioning of switch
		• Check fuse (control board)
	• Wrong setting of room thermostat or other control (thermostat)	• 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
• 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 Fig. 2)
		• Check electrodes for cleanliness
		• Replace H.T. transformer
	• Flame control box defective	• Replace control box
	• Photocell defective	• Clean or replace photocell • Confirm that air flap(37), diffuser ring(38) and air adjustment disc(39) are clean and adjusted to provide an open line of sight for flame sensor
	• 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 • 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 (Fig1, pg. 5)
		• Clean burner disc
	• Too much combustion air	• Check setting of combustion air flap (Fig1, pg. 5)
	• Fuel contaminated or contains water	• Drain fuel in tank with clean fuel
		• Clean or replace oil filter
	• Air leaks in fuel circuit	• Check fuel line and filter for possible leaks
	• 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 is still not working properly, please call Heat Wagon Tech Service.

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



## 1. DIAGNOSTICS

If the control unit is in lockout status, by keeping the reset push-button pressed for about 5 seconds, the diagnostics routine will be activated and the cause leading to the lockout condition will be displayed. Pressing the reset push-button again enables to reset the device and to terminate the diagnostics routine. The following table shows a description of the diagnostics messages provided by the red LED blinking:

No. blinks of red LED	Description
2	Flame failure at the end of TS
4	Extraneous light / Flame simulation at start-up
7	Flame failure in running status
8-14	Internal failure

### FOR 2 RED BLINKS CAUSE MAY BE:

- No flame at 1st start up (review page 12 and 13)
- Other causes may be defective over heat limit switch (check for continuity)

### FOR 4 RED BLINKS CAUSE MAY BE:

- Photocell senses light before start- up (make sure cover is on and photocell installed properly)

### FOR 7 RED BLINKS CAUSE MAY BE:

- Out of fuel
- Filter or nozzle blocked
- Broken fuel line (intake sucking air)
- Bad photocell
- Overheat limit switch tripped

## 2. SIGNALLING DURING OPERATION

In the various operating conditions, the device can signal its operating status by means of a multicolour LED located on the on-board lockout signal. The meaning of the colours is the following:







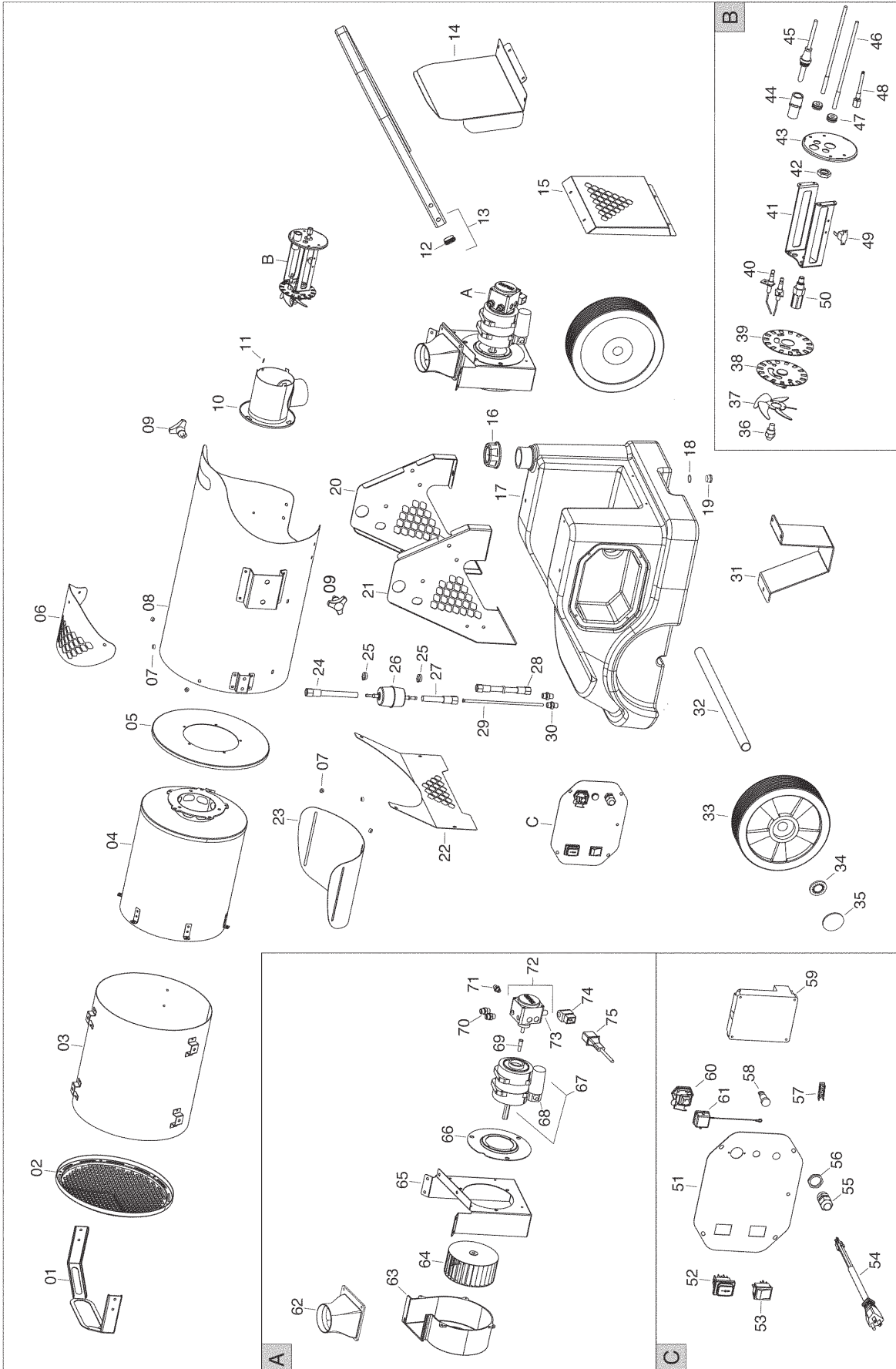
	<b>Green:</b> Prepurge time (TP) – Ignition (TS) - Operating (RP)
	<b>Orange:</b> Cooling of the transformer
	<b>Red:</b> Lockout position (LO)
	<b>Flashing Green:</b> Stand-by position (SY)
	<b>Flashing Orange:</b> Stand-by position (SY) with presence of spurious flame
	<b>Green + Flashing Orange:</b> Prepurge time (TP) with presence of spurious flame

Fig. 6 – Meaning of LED signals

## 3. RESETTING THE CONTROL UNIT

When the control unit goes to non-volatile lockout, to reset the system press the reset push-button till the lockout signal turns off (< 5 seconds).

- Non-volatile lockout (manual reset), in order to reset the system, the reset button must be pressed (less than 5 seconds).
- Volatile lockout, turn selector switch to OFF position, hold reset button for a least one minute, red light should go out, let control board “reboot” for at least another minute before attempting to start again.



POS	P/N	DESCRIPTION
01	BIE G11089	Bumper
02	BIE G11052	Front disc
03	BIE G11053	Insulating panel
04	BIE G11054	Combustion chamber
05	BIE G11055	Rear disc
06	BIE G11056-N500	Upper protective panel
07	BIE M20820	Spacer
08	BIE G11057-9010	Body
09	BIE C10714	Handwheel
10	BIE G11058	Blast tube
11	BIE E20671	Terminal board
12	BIE C30361	Pipe cap
13	BIE P20304-9005	Handle
14	BIE G11059-9010	Panel
15	BIE G11060-9010	Panel
16	BIE C30383	Tank cap
17	BIE P50150	Fuel tank
18	BIE C30375	O-ring
19	BIE I25020	Drain cap
20	BIE G11061-9010	Panel
21	BIE G11062-9010	Panel
22	BIE G11063-9010	Panel
23	BIE G11064-N500	Lower protective panel
24	BIE I40347	Flex diesel pipe 14"
25	BIE C30729	Clip
26	BIE I30414	Filter
27	BIE I40327	Flex diesel pipe 7"
28	BIE I40348	Flex diesel pipe 11.8"
29	BIE I30696	Suction pipe
30	BIE I30737	Brass fitting
31	BIE G11065-9005	Support
32	BIE G11066-9005	Wheel axle
33	BIE C10504	Wheel
34	BIE M20204	Elastic washer
35	BIE C10513-N	Black wheel cover
36	BIE T20339	.60 x 80° S
37	BIE G11069	Air flap
38	BIE G11068	Diffuser ring
39	BIE G11070	Air adjustment disc
40	BIE E10248	Ignition electrode
41	BIE G11020	Electrodes support stirrup
42	BIE I31034	Brass lock nut
43	BIE G11071	Burner support disc

#### G11089

POS	P/N	DESCRIPTION
44	BIE E50327-40	Photoresistor support
45	BIE E50335	Phototransistor
46	BIE G02089	H.T. Cable connect.
47	BIE C30368	Cable protection
48	BIE I40339	Micropipe 18"
49	BIE E50109	Safety thermostat
50	BIE I33007	Nozzle support
51	BIE G11072-9010	El. control box panel
52	BIE E10102-P	Switch
53	BIE E10140	Reset button
54	BIE E30443-1	Power cord
55	BIE E20964	Cable fastener
56	BIE E20965	Cable fastener nut
57	BIE E20319	Ground terminal board
58	BIE E11033	Lamp
59	BIE E40125	Flame control box
60	BIE E20640	Thermostat plug
61	BIE E20665	Thermostat plug cover
62	BIE C10331	Elbow connection
63	BIE C10323	Scroll
64	BIE T10296	Fan
65	BIE G11073-9010	Fan support bracket
66	BIE G11074-9010	Motor support bracket
67	BIE E10769	Motor
68	BIE E10769-1	Capacitor 14 uF
69	BIE E10698	Motor-pump coupling
70	BIE I20104	Iron fitting
71	BIE I20115	Iron fitting
72	BIE T20448	Diesel pump
73	BIE T20117	Solenoid valve body
74	BIE T20118	Solenoid coil
75	T20442	Solenoid valve cable

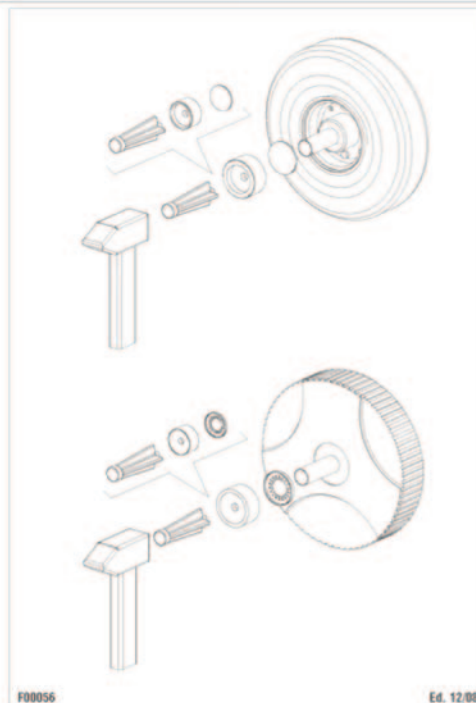
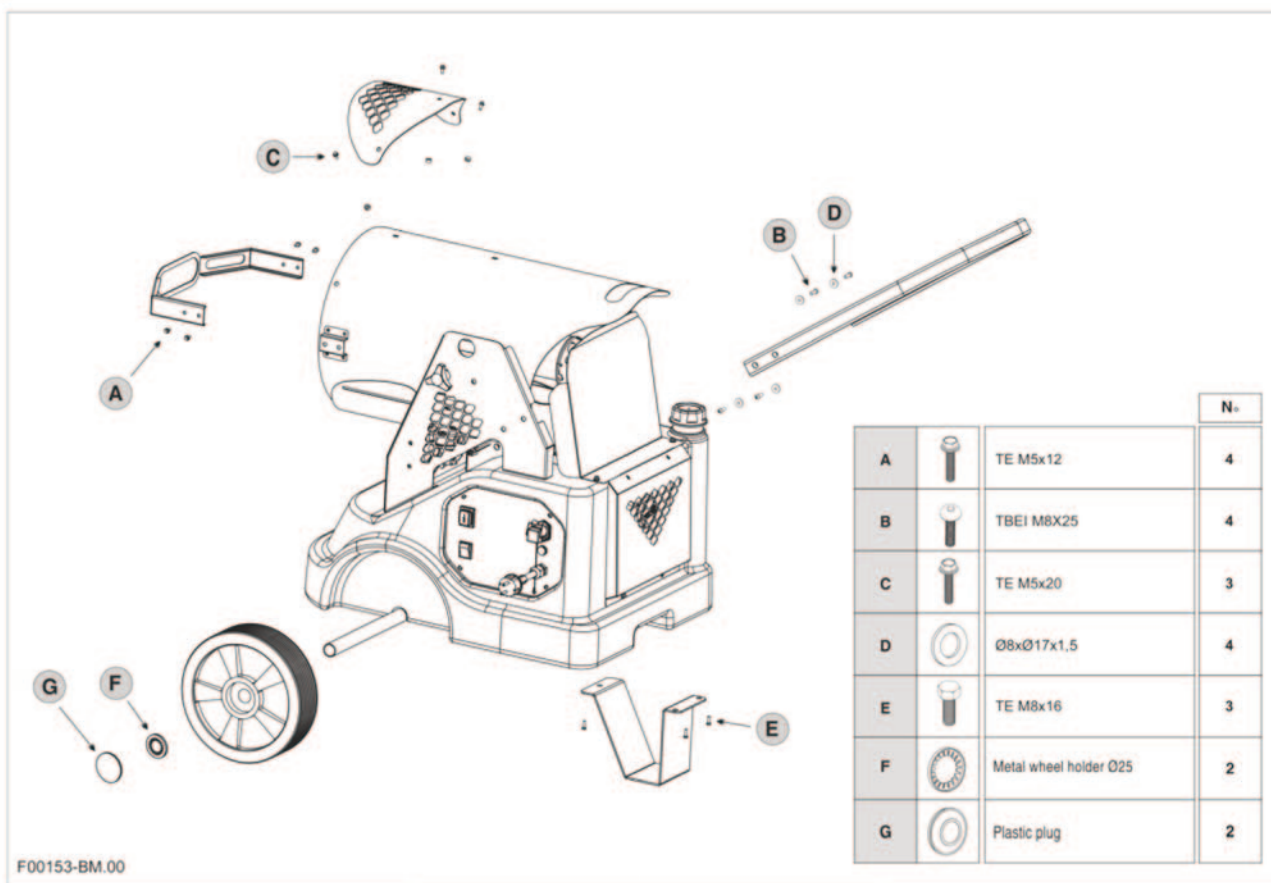
NOTE: Not shown

ACC-THIDF Optional remote thermostat w/50' cord

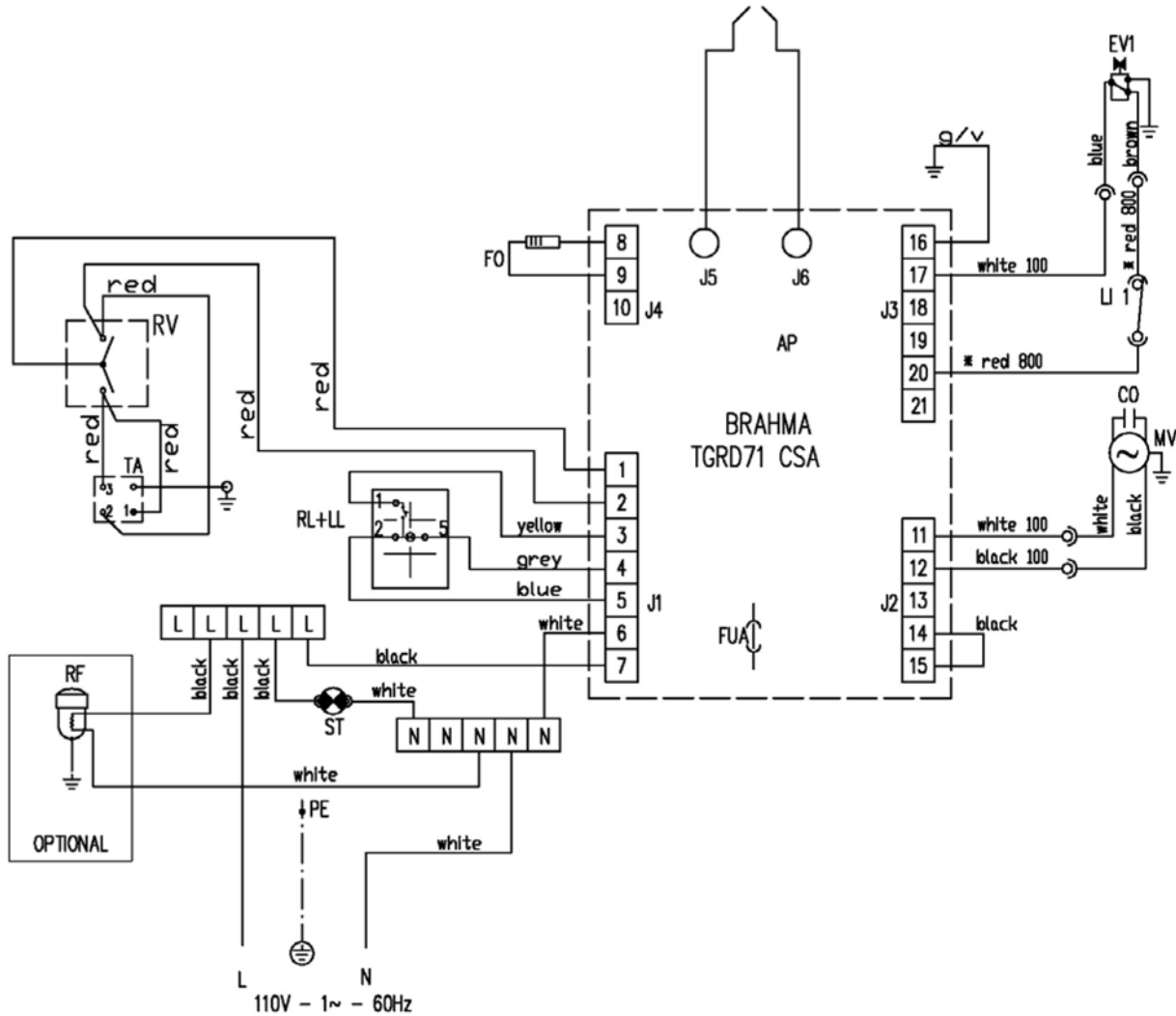
BIE E10325 Slow fuse 6.3A

BIE 99AM003 Fuel Pressure Gauge

## FOOT / HANDLE ASSEMBLY INSTRUCTION



## WIRING DIAGRAM



AP CONTROL BOX

TA ROOM THERMOSTAT PLUG

LI1 OVERHEAT THERMOSTAT

EV1 SOLENOID VALVE

FO PHOTOCCELL

CO CAPACITOR

MV BURNER MOTOR

FUA FUSE BIE E10325

RV SWITCH

ST ELECTRIC PILOT

RF HEATED FILTER

RL RESET BUTTON

LL LOCK OUT INDICATOR LIGHT

RV1 SWITCH

TD TRANSFORMER H.V.

>> OPTIONAL



