

# Rinnai

## SELF-DIAGNOSTIC ERROR CODED MESSAGES

All Rinnai Energy Savers with LED have self-diagnostic codes to assist the technician in troubleshooting the product. Information about the previous faults is stored in the PCB and can be recalled during servicing by pressing the **ECONOMY** button and the temperature control **UP & DOWN** buttons at the **SAME** time for 2.5 seconds with the unit in the **OFF** position. Release the buttons and then the error codes will be displayed in sequence. The previous faults will be displayed as follows:

THE MOST RECENT FAULT IS DISPLAYED FIRST FOLLOWED BY UP TO 10 FAULTS IF THEY HAVE OCCURRED. IF YOU MISS THE CODES AS THEY ARE DISPLAYED, WAIT UNTIL THE LED TURNS OFF AND REPEAT THE PROCEDURE FOR RECALLING THE FAULTS AGAIN. THE CODES WILL BE DISPLAYED ON THE UNITS DEPENDING ON THE MODEL NUMBER THAT YOU ARE SERVICING AS FOLLOWS:

### **ALL HEATERS having analog displays with temperature indicator lights**

LO 60 64 68 72 76 80 HI

EXAMPLE= 60 64 68 = ABNORMAL COMBUSTION FAN MOTOR RPMS

### **ALL HEATERS having digital LED temperature displays**

EXAMPLES

SET	ROOM
1	53
2	14

01 = FIRST CODE MOST RECENT AND 53= ABNORMAL SPARK SENSED

02 = SECOND CODE 2<sup>ND</sup> MOST RECENT AND 14=OVERHEAT SAFETY

### **On RHFE 263 SERIES and RHFE 1004FA SERIES**

TEMPERATURE DISPLAY SHOWS EITHER TEMP OR CODED ERROR

01	71
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EXAMPLE =01 MOST RECENT THEN 71 = FAULTY SOLENOIDS

**01 THEN CODE, 02 THEN CODE, 03 THEN CODE SEQUENTIALLY**

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## ERROR CODED MESSAGES

Analog Indicator Light	Digital LED Display	PROBABLE CAUSE	COMMENTS
LO-HI	PF --:--	POWER FAILURE	CHECK POWER SUPPLY
60	11	Miss Ignition	Flame current does not reach 1.0 microamp within the given time after solenoid opens.
LO	12	Flame failure	Flame rod current remains below 1.0 microamp for 3 seconds during initial combustion
68	14	Overheat safety device	High-limit temperature thermistor or thermal fuse has activated
HI	16	Over temperature cut off	Room temperature is sensed as being above 104°F for longer than 10 minutes
72*76	31	Room temperature thermistor disconnection	Room temperature thermistor open circuit
76*80	32	Room temperature thermistor short circuit	Room temperature thermistor wire trapped, touching bare metal
64*68*72	33	High-limit thermistor disconnection	High limit thermistor open circuit
68*72*76	34	High-limit thermistor short circuit	High limit thermistor wire trapped touching bare metal
LO*60*64	53	Abnormal spark sensed	Sparker not OFF within 20 seconds at time of ignition 1st spark sense not within 2 seconds 2nd spark sense spark not continuous for 1 second after solenoid valve opens

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## ERROR CODED MESSAGES

Analog Indicator Light	Digital LED Display	PROBABLE CAUSE	COMMENTS
60*64*68	61	Abnormal combustion fan motor rpm	Speed is not achieved within time or goes over speed level
64*68	70	ON/OFF switch failure	ON/OFF switch connects continuously for more than 15 seconds
LO*60	71	Solenoid valve check	Solenoid valve(s) (SV1 & SV2) signal and response signal are different
80	72	Flame Rod failure	Flame rod output does not cease within 20 seconds
72*76* 80-HI	73	Communication failure	Data transfer between CPU and E2PROM fails
NA	49	Pressure sensor disconnect or breakdown	Check sensor connections to PCB & hoses to blower motor housing in rear
NA	99	Flue block or venting disconnected. Vent must be connected	Check intake and exhaust inside and outside for blockage or freezing.

**NOTE:** If a fault code occurs it will be necessary to cut the unit off and back on to clear the code. It will go into memory for future reference for the technician. If the unit operates and heats without the error code occurring again a service call may not be necessary.

### UNDERSTANDING SELF-DIAGNOSTIC CODES

Fault codes are used to assist the technician in identifying probable causes to shorten diagnostic time. Flame failure can be from situations that are not a fault with the unit. Consider flame failure in an orderly sequence beginning with the following sequence:

- Is the proper fuel with the proper pressure as specified available for the unit? Check that the unit is installed correctly with proper electrical grounding? Check for gas in the air supply or tank regulator freezing? Confirm that no gas escapes. **UNITS MUST BE GROUNDED TO PROOF FLAME**
- Maintain all clearances and cleaning, as per installation specifications.

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## Memory Function for Maintenance Data

The 9 most recent error messages and the total combustion time, total combustion frequency, and total power failure frequency are stored in memory.

<How to recall data>

While the unit is off, press the "Economy", "▲", and "▼" buttons simultaneously for at least 2.5 seconds to bring up the error history on the display. The error history will display the following in 1.9 second intervals: the 9 most recent error messages (the most recent is No. 1; No. 9 the oldest), total combustion time, total combustion frequency, and total power failure frequency.

Example.

Item	Digital Display	Comments
Normal OFF state	Time displayed when appliance OFF ◦ 11:32 ◦	Press "Economy", "▲", and "▼" buttons simultaneously to display error history
Error History	◦ 1:12 ◦	No. 1 (Latest Error) Flame Failure
	◦ 2:11 ◦	No. 2 Mis-ignition
	◦ 3:11 ◦	No. 3 Mis-ignition
	◦ 8:11 ◦	No. 8 Mis-ignition
	◦ 9:-- ◦	No. 9 No Error
Total Combustion Time	◦ 50:82 ◦	5082 hours of Combustion
Total Combustion Frequency	◦ 18:42 ◦	18420 times Combustion
Total Power Failure Frequency	◦ 1:25 ◦	125 times Power Failure
When the maximum no. of hours has been surpassed, the following is displayed:  Total Combustion Time  Total Combustion Frequency  Total Power Failure: Frequency	◦ H:50 ◦	15082 hours of Combustion (after surpassing 9999 hours) 150820 times Combustion (after surpassing 99990 times) 15082 times Power Failure (after surpassing 9999 times)

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## E<sup>2</sup> PROM Data

E<sup>2</sup> PROM data will not be erased during a power failure. However, this data is divided into 2 groups where one of the groups of data can be reset at the external control pads.

[Permanent Data]	[Deletable Data]	(Initial Setting)
• Total Combustion Time	• Present Time	(0:00 AM)
• Total Combustion Frequency	• Error History	(None)
• Total Power Failure Frequency	• Timer 1 Time	(6:00 AM)
	• Timer 2 Time	(6:00 PM)
	• Set Room Temperature	(22°C)
		(0 Hours)

### <Resetting>

Refer to “How to Reset” under “Memory Function for Maintenance Data”.

### <Test Mode>

To select test mode, press the test switch at the top of the PCB while the appliance is operating. Each time the test switch is pressed, the display will change to the following modes:

1. Enter test mode.
2. Low Pressure test mode
3. High Pressure test mode.
4. Convection Fan Low Adjustment Mode-...Displays “LF.” Use “Up” and “Down” buttons to change rpm. Press the “Economy” button to store in memory.
5. Convection Fan High Adjustment Mode ....Displays “HF.” Use “Up” and “Down” buttons to change rpm. Press the “Economy” button to store in memory.

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## Fault Finding

### 1. The main faults and their remedies

Note: The numbers on the right hand side of this table refer to "Causes of faults and suggested remedies" on the next page.

Fault symptom	Analog Indicator Light	Digital LED Display*	Check points/remedy
The Economy indicator will not come ON.			* Confirm that Economy Mode has been selected. * Confirm electrical cord is securely into the power point.
After having pressed the ON - OFF switch the appliance will not operate.	<b>60</b>	<b>11</b>	* Check gas supply .....1 * Confirm no gas escapes .....1 * Check for air in the gas supply .....1 * Reconfirm gas type specified .....1
Insufficient Heating			* Check selected room temperature setting .....2 * Check for blocked air filter .....3 * Check for an obstruction in the warm air flow .....4 * Reconfirm gas pressure at the appliance .....1
Burner goes out during operation.	<b>LO</b> <b>68</b> <b>HI</b>	<b>12</b> <b>14</b> <b>16</b>	* Ensure flue terminal is not blocked .....5 * Ensure air filter is not blocked .....3 * Check for an obstruction in the warm air flow .....4 * Reconfirm gas type specified .....1 * Confirm no gas escapes .....1 * Check for flash back .....6 * Check for high room temperature .....7 * Reconfirm electrical supply at power point .....8
Gas odor			* Confirm no gas escapes .....9 * Check for flash back
Heater stops	<b>ALL</b>	<b>--:--</b>	* Power failure (>0.2 seconds) .....1

\* Error is displayed as room temperature LEDs flashing.

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## 2. Causes of faults and suggested remedies

- ▲.....ALL HEATERS with Digital LED Display
- △.....ALL HEATERS with Analog Indicator Lights

### 1. Gas supply

In case of miss ignition, insufficient heating and gas smell, check that:

- \* The gas supply pressure is correct.
- \* The specified gas type is correct for the unit.
- \* There are no breaks/leaks in the gas supply lines.
- \* There is no air in the gas supply lines.
- Check the gas pressure at both the meter and the appliance.
- Air in the gas line will prevent the appliance from igniting.

### 2. Thermostat setting

When the room does not reach the selected temperature, or the appliance will not remain alight, check that:

- \* The selected temperature is not set lower than the room temperature.
- \* Select the required temperature setting with the UP/DOWN selection buttons.

### 3. Blocked air filter

If insufficient heating or lockout occurs, check that:

- \* The air filter is not blocked with dust.
- If the air filter is blocked, the safety device will operate.
  - ▲ ....14 flashing
  - △ ....68 flashing
- The filter must be cleaned at least once per month.

### 4. Air flow obstruction

If insufficient heating or lockout occurs, check that:

- \* There are no obstacles in front of the appliance or louvers.
  - ▲ ....14 flashing
  - △ ....68 flashing
- There should be no articles within 40 inches of the front of the appliance.

### 5. Flue terminal

If flame failure occurs during normal operation, check that:

- \* The flue terminal on the exterior wall is not obstructed in any way.
  - ▲ ....12 flashing
  - △ ....LO flashing
- Check in particular for shrubs growing over the flue terminal or a thick build-up of spider webs inside intake portion of vent.

### 6. Flash back protection

If flame failure occurs during normal operation, check that:

- \* The flue terminal air intake is not blocked.
- \* For dust or foreign material on the burner.
- \* Combustion specification and gas type.
  - ▲ ....12 flashing
  - △ ....LO flashing

### 7. Room temperature

- \* Is the room temperature unusually high?
- 10 minutes after having sensed 104°F the appliance will automatically go out.

- ▲ ....12 flashing
- △ ....LO flashing

### 8. Power failure

- \* If there has been a power failure for 0.2 seconds or longer. Current time will be displayed on display when “set times” button is pressed once. (Time will be slow by duration of power failure.)

- ▲ ....12 flashing
- △ ....LO flashing

### 9. Smell of products of combustion

If there is a smell of gas or products of combustion, check that:

- \* The flue manifold behind appliance has not come undone.
- The products of combustion are leaving the appliance through the flue terminal.

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Before contacting Rinnai, please check the following points.  
These points are part of the normal operation of the unit.

## *At ignition*

Heater does not operate.



Is the heater plugged in?  
Have the fuses or breaker blown at the breaker box?  
Is there a power failure?  
Is the air filter blocked?  
Is anything blocking the outlet for the hot air?  
Is the flue blocked?  
Are timers set? Clear timers and operate again!  
Is central timer ON? (where fitted)

Warm air does not flow when the burner lights.



The fan is started automatically after a short delay.  
This is to allow the heat exchanger to warm up, helping to avoid cold drafts.

Smoke or strange smells are produced on the first trial light up after installation.



This is caused by greases or oil and dust on the heat exchanger and will stop after a short time.

Sharp clicking noises at ignition, or when the unit cuts down on the thermostat, or goes out.



This is simply expansion noise from the heat exchanger.

## *During Combustion*

Clicking noise when the thermostat operates.



This is the sound of the solenoid gas valves opening and closing.

Unit is not heating room.



Is the air filter blocked?  
Is the set temperature high enough?  
Is the warm air outlet blocked by anything?  
Are the doors and windows of the room closed?

Air filter is blocked or the louvers are blocked or obstructed.



Allow heater to cool, clean air filter, operate again.

Heater will not re-ignite after overheating



Even after the unit has cooled down the heater does not light again. Repair is necessary.  
Contact your local agent or Rinnai for a service call.

## *When the unit is turned off*

Convection fan continues to run after turning OFF.



This is to remove the residual heat from the heat exchanger, the fan will stop when the heater cools down.

## *Other Points*

Steam is discharged from the flue terminal.



High efficiency appliances tend to discharge water vapor on cold days. This is normal.

Unit cuts off without apparent reason.



Check if central timer is switched OFF (where fitted), or whether filters are blocked, (dirty filters will cause the heater to overheat.)

Power failure.



When power is restored, the appliance will begin to heat if it was ON at the time the power failed. Clock will be slow by the length of power failure.

Remote control doesn't operate.



Check battery.  
Try moving closer to heater.



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## Fault Analysis

- ▲ .....ALL HEATERS with Digital LED Display
- △ .....ALL HEATERS with Analog Indicator Lights

*a. After having operated the appliance and:*

- i) The combustion fan doesn't begin to rotate, or it suddenly stops after having run for a short time.
- ii) There is no spark (after 30 seconds).
- iii) The solenoids do not open, preventing gas flow to the burners.
- iv) The convection fan does not begin to rotate, approximately 15 seconds after ignition.



Is there electrical supply → NO → 1. Confirm the connection at the wall socket.  
2. Is the 3 amp fuse blown?



YES



*The appliance does not operate*

- i) Open circuit or loose pin connector on PCB or wiring harness.
- ii) ON/OFF button faulty. ▲ ....70, △ ....64-68 flashing
- iii) Faulty Printed Circuit Board
- iv) Control panel PCB faulty.
- v) OHS is in the 'OPEN' position. (Closed - Normal) ▲ ....14, △ ....68 and filter flashing
- vi) Thermal fuse has melted.
- vii) Solenoid circuit is faulty. ▲ ....71, △ ....LO-60 flashing



*The combustion fan doesn't rotate, or the appliance fails after a short time.*

- i) Combustion fan shaft screw loose.
- ii) An obstruction in the combustion fan is preventing it from rotating.
- iii) Combustion fan does not reach pre-determined speed. ▲ ....61, △ ....60-64-68 flashing
- iv) The flame rod current is greater than 0.1 microamp during pre-purge. ▲ ....72, △ ....80 flashing
- v) The combustion fan rpm does not match the ignition rpm check. ▲ ....61, △ ....60-64-68 flashing
- vi) Faulty spark generator ▲ ....53, △ ....LO-60-64 flashing
- vii) Faulty PCB



*There is no spark.*

- i) High tension cord is disconnected or broken
- ii) Insulation leak from the high tension cord. (Spark sound is not regular.)
- iii) The spark gap is not correct (normal spark gap is 3/16" - 1/4").
- iv) Weak or shorting spark.
- v) Faulty PCB.

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*b. The solenoids do not open, preventing gas flow to the burners.*

- i) Open circuit or loose pin connectors on PCB or wiring harness.
- ii) Faulty solenoid, or coil.
- iii) Faulty sparker, (no spark is sensed).
- iv) Faulty PCB.

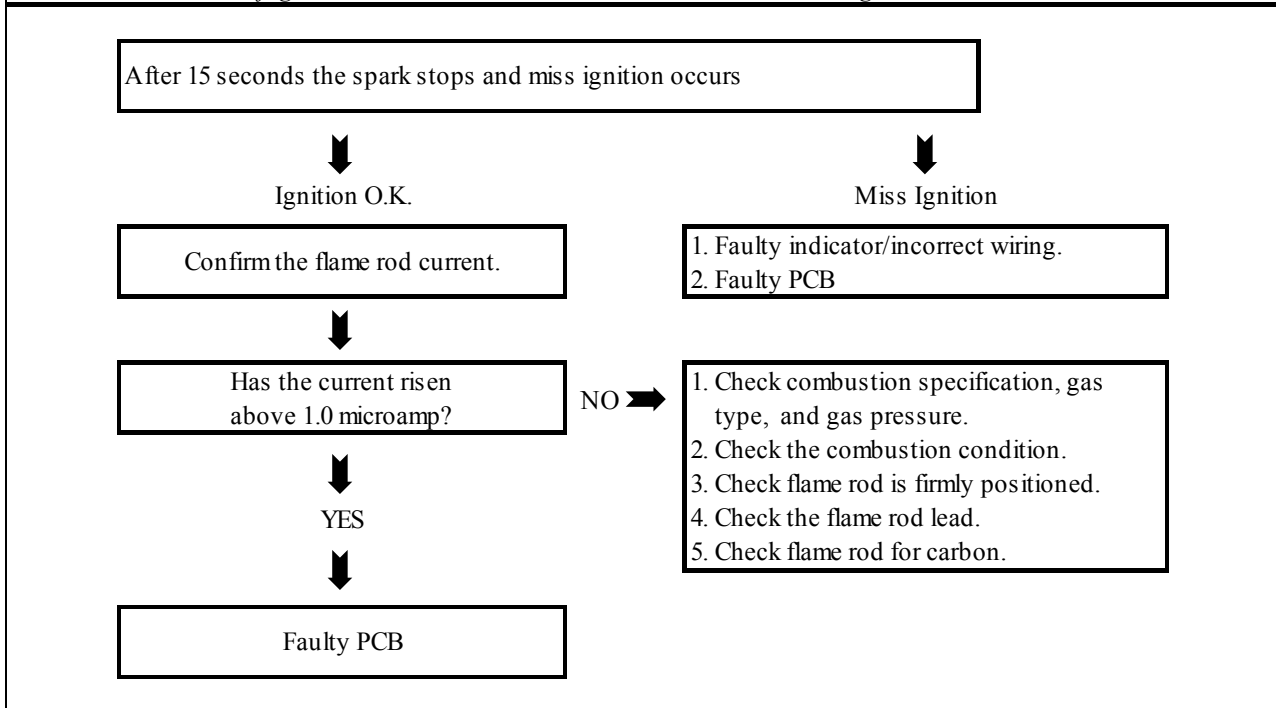


*c. The convection fan doesn't rotate.*

- i) Convection fan shaft allen screw loose.
- ii) An obstruction in the convection fan is preventing it from rotating.
- iii) Flame rod faulty.
- iv) Faulty PCB.



*d. There is the sound of ignition, however the 'combustion' indicator does not glow red..*



*e. After repeated efforts to operate the appliance, it will not ignite.*

▲ ...11, △ ...60 flashing

- i) Air in the gas supply line.
- ii) Incorrect gas pressure.
- iii) Incorrect gas type, or a kink or break in the gas supply line.
- iv) Faulty or weak spark.
- v) Blocked injector. Is the combustion specification correct?

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*f. The flame fails during normal operation.*

1. Power failure for 0.2 seconds or longer.	▲.....--,	△ ...LO - HI flashing
2. Safety devices are activated.		
* Room temperature is sensed at above 104°F for 10 minutes.	▲...16,	△ ...HI flashing
* Air filter is blocked and the OHS is activated.	▲...14,	△ ...68 and filter flashing
* Obstruction in the flue terminal.	▲ ...12,	△ ...LO flashing
* Blockage or insufficient gas supply.	▲ ....12,	△ ...LO flashing
* Gas pressure is abnormally low.		
* The area surrounding the flue terminal may be restricted.		
* Obstruction in front of the heater.	▲ ....14,	△ ...68 and filter flashing

