

Rinnai

SERVICEMAN TROUBLESHOOTING INFORMATION

ENERGYSAVER RHFE-431FA, 431FAII, & 431FAIII and RHFE-556FA, 556FTRA, 556FTRAI, & 556FAIII

IMPORTANT SAFETY NOTES:

There are a number of (live) tests that are required to be done in fault finding. Extreme care should be used at all times. You **MUST** be a qualified service person before proceeding with these test instructions.

*** WARNING ***

When setting gas pressures on one of these units, please refer to Owner's Manual for the number unit you are trouble-shooting. You **MUST** ensure you have the complete model number down to Roman numerals. Remember, gas pressures and dip switches can vary from unit to unit. There are presently four different models of the RHFE-431Series. There are five different models of the RHFE-556-Series. Always check the rating plate for complete information and follow directions exactly.

Before checking resistance readings, turn off power source to unit and then isolate each item to be checked from the circuit by unplugging it.

(TR) Transformer
Read Voltage Across

WIRECOLOR	VOLTAGE	RESISTANCE READING	PIN NUMBERS
White - White	98 - 105 VAC	6 - 19 ohms	26 - 30
Red - Red	28 - 50 VAC	1 - 3 ohms	24 - 28
Black - Blue	10 - 15 VAC	0.5 - 2 ohms	25 - 29
Blue - Yellow	130 - 185 VAC	200 - 400 ohms	23 - 29
Grey - Grey	110 - 120 VAC	10 - 14 ohms	19 - 20

(SP) Sparker Board
Read Voltage Across

WIRECOLOR	VOLTAGE	RESISTANCE READING	PIN NUMBERS
Blue - Red	85 - 110 VAC	see below	33 - 36

Set your voltage meter on the 400k scale, unplug the (5) pin connector on the sparker board. When reading across the two lugs the blue and red wire connect to, you should read somewhere between 100k and 120k ohms of resistance. When checking the spark sensing circuit, check across the orange wire (pin #35) and grey wire (pin #32) on your 40 VDC scale. You should read between 4 - 5 VDC. During the spark this voltage will drop to approximately 0 VDC. Once unit ignites the voltage will go back up to 4 - 5 VDC.

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(POV, SV1, AND SV2) Gas Valve Solenoids

Read Voltage Across

WIRE COLOR	VOLTAGE	RESISTANCE READING	PIN NUMBERS
Grey - Grey	4.5 VDC low fire to 11.5 VDC high fire	80 - 100 ohms	43 - 45
Black - Yellow	85 - 90 VDC 85 - 90 VDC	1,300 - 2,000 ohms 1,300 - 2,000 ohms	31 - 34 31 - 34

*Remember, when reading the resistance of a solenoid coil, you should read across the lugs on the coil.

(BL) Combustion Motor

NOTE: If your meter does not have a hertz scale, please refer to voltage and resistance readings listed below. If you have a hertz scale, check the following items first. Hertz reading across black-white wires, pins 41 and 42.

RHFE-431 - LP UNITS	RHFE-556 LP UNITS
Lo fire - 44Hz.	Lo fire - 47 Hz.
Hi fire - 81 Hz.	Hi fire - 106 Hz.

RHFE-431 NG UNITS	RHFE-556 NG UNITS
Lo fire - 44 Hz.	Lo fire - 48 Hz.
Hi fire - 81 Hz.	Hi fire - 106 Hz.

(BL) Voltage and Resistance Check

WIRE COLOR	VOLTAGE	RESISTANCE READING	PIN NUMBERS
Red - Yellow	1 - 2 VDC low fire 7.6 - 18 VDC high fire	1.2 - 1.8 meg. ohms	Pins 39 - 40
Black - White	N/A	9.4 K - 9.9 K	Pins 41 - 42

(FM) Convection Fan Motor

WIRE COLOR	VOLTAGE	RESISTANCE READING	PIN NUMBERS
Red - Grey	80 - 94 VAC low fire 95 - 104 VAC high fire	90 - 180 ohms	Pins 21 - 22

(TH) Thermistor:

Check the thermistor by inserting meter leads into each end of the thermistor plug. Set your meter to the 200k scale and read resistance. You should be able to apply heat to the thermistor bulb and see the resistance decrease. Then apply ice to the thermistor bulb and the resistance should increase.

EXAMPLES: 41degF = 91 k ohms
50degF = 65 k ohms
68degF = 39 k ohms
86degF = 23 k ohms

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(FR) Flame Rod:

Flame rod - yellow wire = pin #27. Low fire current should be 1.3 to 2.0 micro amps. High fire current should be 4 to 8 micro amps, depending on gas type being used.

NOTE: Improperly setup and/or converted units can soot and cause carbon to accumulate on flame rods. This will cause hard lockouts. If carbon is found on the flame rod, remove and clean carbon from rod. Then you will need to confirm manifold gas pressure, proper air dampers and ensure vent is clear. Also, check for proper orifices.

(H₁, H₂ and H₃) Safety Circuit:

Check for continuity across pins 44 and 46 at terminal H on the PC board. If you have no continuity, this means one of these switch/thermal fuses is open. Replace defective component.

(OH - TH) Overheat Thermistor:

Check resistance reading across pins 12 and 13 at terminal A on the PC board. Proper readings should be 0.6 k and 523 k. A reading below 0.6 k ohms indicates a short and a reading above 523k indicates an open circuit.

(MS) On/Off Control:

To check to ensure the on/off button is functioning, unplug terminal I. Place (1) lead of your meter on the red wire for pin #66 and the other lead on the blue wire for pin#68. Now press the on/off button and you should be able to read continuity through this switch each time the button is pressed.

(TB) Terminal Block:

This terminal is located on the right rear upper portion of the unit. On direct vents the jumper should be across terminals 2 and 3. On units with vent extensions over four feet, this jumper should be across terminals 1 and 2.

IMPORTANT INFORMATION CONCERNING HARD LOCKOUTS:

Other items that can cause lockouts are: Improperly converted units, spider webs in burner and air intake of vent system, improperly sized gas lines, low gas pressures or pressure drops due to other appliances on the gas system, improper ground or no ground at receptacle, supply regulators freezing up or defective, voltage drops or bad receptacle, winds in excess of 30 to 40 MPH causing turbulence inside the vent terminal, etc.