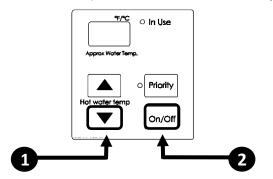
PERFORMANCE DATA

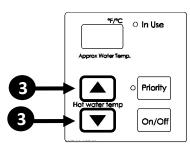
To obtain Performance Data:

Rinnai

- Press and hold the ▼ (Down) button.
- 2. While holding the ▼ (Down) button for 2 seconds, press and hold the "On/Off" button (hold both buttons simultaneously).



3. Use the \triangle (Up) and ∇ (Down) buttons to scroll to the desired performance information described below



Performance Data Table

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Combustion Cycles				
Pump Cycle	es			
DISPLAY	CYCLE COUNT			
000 to 999	x100 (0 to 99,900)			
I□− to 99- x10,000 (100,000 to 990,000)				
I to B	x1,000,000 (1,000,000 to 6,000,000)			

Controllers Connected					
CONTROLLER MODEL	CONNECTED	NOT CONNECTED			
MC	1	0			
ВС	_1_	_0_			
BSC & BSC2	I, Z (QTY2)	0			

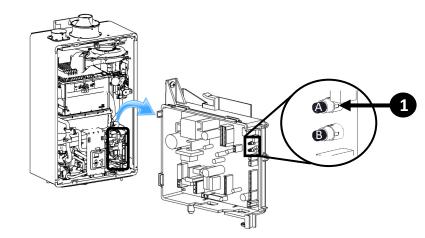
Default display is IDD.

depends on connection status of another controller.

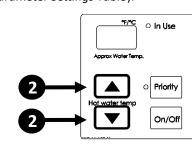
PARAMETER SETTINGS

To adjust the parameters:

1. Press the "A" button for 1 second.

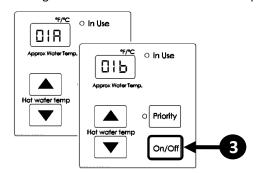


2. Use the ▲ (Up) and ▼ (Down) button on the controller to select a setting number (See Parameter Settings Table).



3. Once the desired setting number is selected, use the "On/Off" button on the controller to change the selection for the setting number.

Example: Display will change from 01A to 01b for Maximum Temperature setting (as shown below).



4. To exit the parameters, press the "A" button on the PC board for 1 second.

Parameter Settings Table

Default is A for all settings below nt II II II and II which are factory set

Default is	A for all setting	gs below excep	t 10, 12, 13, and	ዘ which are fac	tory set.	
SETTING	ETTING SETTING SELECTION		CTION			
# DESCRIPTION		A	Ь	Ε	А	
01	Maximum Set Temperature	Residential: 120°F	Residential: 140°F			
02	High Altitude (Installation Location)	0 - 2,000 ft (0 - 610 m)	2,001 - 5,400 ft (610 - 1,646 m)	5,401 - 7,700 ft (1,646 - 2,347 m)	7,701 - 10,200 ft (2,347 - 3,109 m)	
03	Service Soon ¹	Disabled	0.5 Year	1 Year	2 Years	
		No Recirculation	Recirculation			
04	Recirculation Settings		Dedicated	Crossover Mode		
	Settings		Mode	Long Loop	Short Loop	
05	Recirculation Mode ²	Economy	Comfort			
06	Control Switch	BMS ³	Air Handler (AH)			
07	Units in Standby	2	1			
(EZ Connect)						
10	Gas Type (Factory Set)	NG	LPG			
11	Maximum Flow Rate ⁴	Standard	High			
12	Water Heater Model	Without Pump	With Pump			
13	(Factory set	199 (3237)		160 (2530)		
14	values and not adjustable)	Internal (Indoor)	External (Outdoor)			

See section "Service Soon, 55" in the Installation and Operation Manual for more

² Setting 🛮 5 is available only if setting 🗘 ነታር, or 🗘 ነና selected.

Economy mode cycles the pump less often, using less energy to maintain the circulation loop temperature. **Comfort mode** cycles the pump more frequently, ensuring the loop

temperature remains higher (but also uses more energy).

BMS = Building Management System

⁴ Selecting "High" will increase the water flow rate to the maximum capacity.

ELECTRICAL DIAGNOSTICS

NOTE: Wiring diagram is available in manual and on the inside front cover.

Important Safety Notes

There are a number of (live) tests required when performing electrical diagnostics on this product. Proceed with caution at all times to avoid contact with energized components inside the water heater. Only trained and qualified service technicians should attempt to repair this product. Before checking for resistance readings, disconnect the power source to the unit and isolate the item from the circuit (unplug it).

Freeze Protection

This unit has freeze protection heaters mounted at different points to protect the water heater from freezing. All of them should display a positive resistance reading.

Place one lead of your meter to the flame rod and the other to ground. With the unit running you should read between 5 - 150 VAC. Set your meter to the micro (μ) amp scale and arrange meter leads in line with the flame rod. You should read 1 μ amp or greater for proper flame circuit. In the event of low flame circuit, remove the flame rod and check for carbon or damage.

This unit has two glass fuses located on the PC Board, one inline (10) amp and one (4) amp glass fuse. Remove the fuses and check continuity through it. If you have continuity through each fuse then it is functioning. Otherwise the fuse is blown and must be replaced.

Thermistors

Check all thermistors by inserting meter leads into each end of the thermistor plug. Set your meter to the 20 K scale and read resistance. Applying heat to the thermistor bulb should decrease the resistance. Applying ice to the thermistor bulb should increase the resistance.

Below are examples of typical temperatures and resistance readings.

Temperature	Resistance Readings
59°F	11.4 - 14ΚΩ
86°F	6.4 - 7.8ΚΩ
113°F	3.6 - 4.5ΚΩ
140°F	2.2 - 2.7ΚΩ
221°F	0.6 - 0.8ΚΩ

COMPONENT

Electrical Circuit Table

CONTROLIENT	WIDE COLOR	VOLTACE	DECICEANCE	COMPONENT	PCB		
COMPONENT	WIRE COLOR	VOLTAGÉ	RESISTANCE	CONNECTOR	CONNECTOR	PIN	
Spark Electrode	Red-Black	11~13VDC*	34 K ~ 40 K ohms	D2	D	12-2	
	Red-Black	7~48VDC*	N/A	D3	D	4-6	
Combustion Fan	White-Black	10~12VDC*	N/A	D3	D	10-6	
run	Yellow-Black	11~13VDC*	N/A	D3	D	8-6	
	Red-Pink		44~52 ohms	D4	D	18-2	
Water Flow	White-Blue	N/A		D4	D	16-1	
Control Device	Grey-Orange	12~14VDC	N/A	D4	D	30-1	
	Blue-White	NI/A	25×41 - h	D5	D	5-7	
	Yellow-Red	N/A	35~41 ohms	D5	D	11-9	
Venturi	Black-Red	12~14 VDC		D5	D	30-1	
Control Device	Black-Brown	less than 1VDC*	N/A	D5	D	30-2	
	Black-Grey	less than 1VDC*		D5	D	30-2	
By-Pass Flow	Red-Pink		440/52 - 1	D6	D	15-1	
Control Device	White-Blue	N/A	44~52 ohms	D6	D	17-1	
Gas Solenoid Valve	Yellow-Black	11~13VDC*	18~22 ohms	D7	D	29-2	
Outgoing	White-White			H1	Н	3-2	
Thermistor	Blue-Blue					8-11	
Inlet Thermistor	White-White					Н2	Н
Exhaust Thermistor	White-White	N/A	See Example	Н3	Н	2-5	
Heat Exchanger Thermistor	White-White			H4	Н	2-6	
Freeze Protection Thermistor	Yellow-Black			Н5	Н	2-7	
Overheat Switch	Black-Black	11~13 VDC	less than 1 ohm	Н6	Н	28-1	
Water Flow Sensor	Black-Red	11~13 VDC	N/A	H7	Н	30-1	
	Yellow-Black	4~7 VDC*		H7	Н	12-3	
Additional Controller(s)	White-White	10~13 VDC	N/A	К	-	-	

DIAGNOSTIC CODES

To display diagnostic codes:

- 1. Turn off the water heater by pressing the "On/Off" button.
- 2. Press and hold the "On/Off" for 2 seconds and then the ▲ (Up) button simultaneously.
- 3. The last 9 maintenance codes display and flash one after the other.
- 4. To exit diagnostic codes and return the water heater to normal operation, press and hold the "On/Off" button for 2 seconds and then the \triangle (Up) button simultaneously.
- 5. Turn on the water heater by pressing the "On/Off" button.

Inlet Thermistor Power interruption during bath fill

• Turn off all hot water taps. Press ON/OFF twice.

(Water will not flow when power returns)

- Measure resistance values of the by-pass flow control (See Electrical Diagnostics)

By-Pass Flow Control

- Replace By-Pass flow control device.

Air Supply or Exhaust Blockage/Condensate Trap is Full

- Ensure condensate line is not blocked.
- Ensure internal air filter is clean with no obstructions. (Indoor Only)
- Ensure High Altitude setting. (See Parameter Settings)
- Ensure Combustion air and Exhaust vents are not blocked and approved venting
- materials are being used. (Indoor Only)
- Ensure vent length is within limits. (Indoor Only) • Check fan for debris and ensure wheel turns freely.
- Verify check valve is not stuck between fan casing and burner body.

No Ignition (Heater Not Turning On)

- Check that the gas is turned on at the water heater, meter, or cylinder.
- If the system is propane, make sure that gas is in the tank.
- Ensure gas type and inlet gas pressure are correct.
- Bleed all air from gas lines. • Check the ground wire for the PC Board.
- Ensure flame rod wire is connected.
- Ensure igniter is operational. (See Electrical Diagnostics)
- Check gas solenoid valves for open or short circuits. (See Electrical Diagnostics)
- Verify gas orifice is correct.
- Ensure condensate line is not blocked

No Flame

- Check that the gas is turned on at the water heater, gas meter, or cylinder.
- If the system is propane, make sure that gas is in the tank.
- Ensure flame rod wire is connected.
- Ensure gas type and inlet gas pressure is correct. Bleed all air from gas lines.

Heat Exchanger Overheat

- Measure resistance of Overheat Switch. (See Electrical Diagnostics)
- Check heat exchanger surface for hot spots which indicate blockage due to scale
- Refer to instructions in manual for flushing heat exchanger. Hard water must be treated to prevent scale build up or damage to the heat exchanger.
- Ensure it is not forced Hi setting.

S Venturi Control

- Ensure the Venturi motor is operating correctly. (See Electrical Diagnostics)
- Replace gas valve assembly.
- Clear diagnostic code by resetting the main power supply to the water heater.

High Outgoing Temperature

(safety shutdown because water heater is too hot)

- Confirm fan motor is functioning correctly.
- Replace the gas valve assembly

Venturi Blockage

- Ensure Venturi isn't blocked.
- Please call Rinnai technical department.

• Check all components for electrical short.

Electrical Grounding

Data Transfer Error

• If the PCB has been replaced, ensure the data transfer process has been completed.

Condensate Pump (Accessory)

- Confirm wire connections and harness are good.
- Ensure condensate reservoir is empty and condensate pump is operating.

Outgoing Thermistor

Heat Exchanger Thermistor

- Check sensor wiring for damage.
- Measure resistance of sensor. (See Electrical Diagnostics)
- Clean sensor of scale build-up.
- Replace sensor.

Exhaust Thermistor

- **Freeze Protection Thermistor**
- Check sensor wiring for damage. • Measure resistance of sensor. (See Electrical Diagnostics)
- Replace sensor.

Replace sensor

- Check sensor wiring for damage. • Measure resistance of sensor. (See Electrical Diagnostics)
- Clean sensor of scale build-up.

Gas Valve

- Check flame rod and wire for damage.
- Check gas solenoid valve for open or short circuit. (See Electrical Diagnostics)
- Replace gas valve assembly.
- Please call Rinnai technical department.

54 High Exhaust Gas Temperature

- Ensure condensate line is not blocked
- Ensure Heat Exchanger fins are clean and not blocked.
- Confirm inlet water temperature is not too high. • Clear diagnostic code by resetting the main power supply to the water

5 Combustion Fan

- Check the motor wire harness for loose or damaged connections.
- Measure resistance of motor wire harness. (See Electrical Diagnostics) • Ensure the combustion fan spins freely.

Recirculation Low Flow

- Ensure bypass plug is removed and bypass filter is installed. (COV Mode) • Ensure both the inlet water filter and bypass filter are clean and free of
- Ensure Parameter setting are correctly set for recirculation mode. Ensure Pump supply voltage.
- Ensure air is removed from the recirculation line.

65 Water Flow Control

• Measure resistance values of the water flow control (See Electrical

Contact a licensed professional to service the appliance.

• The water flow control valve has failed to close during the bath fill function. Immediately turn off the water and discontinue the bath fill function.

PC Board

Replace PC Board

Solenoid Valve Circuit

- Ensure dip switch on PC board is in the OFF position.
- Ensure gas control wire is not loose or damaged.
- Ensure heater circuit is not grounded. Replace PC Board.

12 Flame Rod

- Check flame rod and wire for damage.
- Verify HEX is not leaking.

(SS) Service Soon (Flush Heat Exchanger)

- **55** is a time-based service indicator set during installation. See section "3.12 Parameter Settings" for additional details on setting and changing the **55**
- **55** indicates that it is time for service. The heat exchanger should be flushed to prevent damage (refer to section "5.3 Flushing the Heat Exchanger" for more information). Hard water must be treated to prevent scale build-up or damage to the heat exchanger.
- To reset the **55** code, push the **On/Off** button on the temperature controller 5 times in 5 seconds.

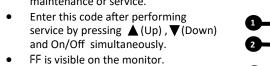
NO CODE - Nothing happens when water flow is activated

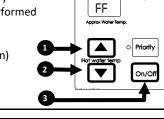
- Verify you have at least the minimum flow rate required to fire unit. • Measure the resistance of the water flow control sensor.
- (See Electrical Diagnostics) Clean inlet water supply filter.
- On new installations ensure hot and cold water lines are not reversed. **SE** Cascade Diagnostic Display (Commercial units only)

• With cascade connections, display will flash between "5E" and the selected set temperature when an error code is displayed on any secondary unit

Maintenance Indicator

 Placeholder in Diagnostic code history indicating that a service provider performed maintenance or service.





*F/*C O In Use

