Rinnai

PERFORMANCE DATA

To View Performance Data:

1. Press and hold the ▼ (Down) button for two seconds (Fig 1).
2. While holding the ▼ (Down) button, press and hold the "Domestic Hot Water" (DHW) button (hold both buttons at the same time) (Fig 1).
3. Use the ▲ (Up) and ▼(Down) buttons (Fig 2) to scroll to the desired information described in Table 1. Performance Data.
4. The data for the performance number automatically appears in the display (Fig 3).
5. To exit performance data, repeat step 2 above.

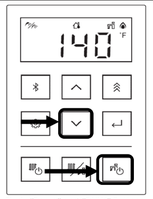


Fig 1. "Down" and "DHW" Buttons

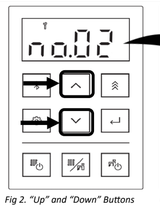


Fig 2. "Up" and "Down" Buttons

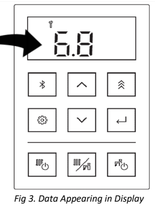


Fig 3. Data Appearing in Display

Table 1. Performance Data

#	Data	Unit
01	Water Pressure	PSI/bar[1]
02	Water Flow Rate	x0.1 GPM/LPM[1]
03	Supply Temperature	°F/°C[1]
04	Return Temperature	°F/°C[1]
05	Freeze Protection Temperature	°F/°C[1]
06	Exhaust Temperature	°F/°C[1]
07	Outgoing Temperature	°F/°C[1]
08	Inlet Temperature	°F/°C[1]
09	Heat Exchanger Outlet Temperature	°F/°C[1]
11	Fan Frequency	Hz
13	Water Flow Control Position	0=Mid, 1=Open, 2=Closed
14	Bypass Flow Control Position	Degrees of Opening
15	3-Way Valve Control Position	0=Mid, 1=DHW, 2=CH
16	3-Way Valve Control Cycles	x100
21	Venturi Position	0=Closed, 1=Open

#	Data	Unit
18	Venturi Cycles	x100
20	Pump Cycles	x100
21	Pump Hours	x10
22	Pump for Boiler	0=OFF, 1=ON
23	Pump for System (Pumps 1-3) See Table 1(B) for more information.	0=OFF, 1=ON
24	Pump for System (Pump 4)	0=OFF, 1=ON
31	Outdoor Temperature	°F/°C[1]
32	Additional Controllers Connected	See Table 3
40	Energization Hours	x100
41	Combustion Hours	x10
42	Combustion Cycles	x100
43	Combustion Hours (DHW)	x10
44	Combustion Cycles (DHW)	x100
45	Commissioning Cycles	x1

[1] See "Units of Measurement" section below.

Units of Measurement

1. Press the "Settings" button.
2. Press the ▲ (Up) or ▼ (Down) arrows to select a unit of measurement (refer to Table 2).

Table 2. Units of Measurement

Units of Measurement	Temp.	Water Flow	Pressure
1: English	°F	gal/min	psi
2: Metric	°C	L/min	bar

Table 1(B). Pump for System (1-3)

Pump for System (1-3)		
System Pump	ON	OFF
Pump 1	_ _ _ 1	_ _ _0
Pump 2	_ _ 1_	_ _ 0_
Pump 3	_ 1_ _	_ 0_ _

Table 3. Connecting Additional Controllers

Controllers Connected		
Controller Model	Connected	Not Connected
Controller Panel	1_ _ _	—
Additional Controller (BC)	_ 1_ _	_ 0_ _
Additional Controller (BSC)	_ _ 1_	_ _ 0_
Additional Controller (BSC2)	_ _ _ 1	_ _ _ 0

Note: BC, BSC and MC are PCB recognition position.

ELECTRICAL DIAGNOSTICS

Table 4. Diagnostic Points

COMPONENT	WIRE COLOR	VOLTAGE	RESISTANCE	PCB CONNECTOR	PCB PIN
Power Supply	Black-White	AC108～132V	N/A	CN200	1-3
Flame Rod	Yellow-Body	more than 0.5VAC	N/A	CN8	20
	Black-Body	more than 0.5VAC	N/A	CN7	1
Spark Electrode	White-Black	11～14VDC*	N/A	CN8	2-3
Combustion Fan	Red-Black	7~48VDC*	N/A	CN7	18-19
	White-Black	2~14VDC*	N/A	CN7	16-18
	Yellow-Black	11~14VDC*	N/A	CN7	17-18
Water Flow Control Device	Red-Pink	N/A	40～60Ω	CN12	9-10
	White-Blue			CN12	7-8
	Grey-Orange	11～14VDC	N/A	CN12	5-15
	Brown-Grey	Servo Valve Fully Open or Closed: Less than 1VDC Servo Valve in a Mid Position: 4～6VDC	N/A	CN12	15-17
Venturi Control Device	Blue-Black	N/A	350~550Ω	CN11	1-9, 2-9, 3-9, & 4-9
	Red-Black			CN11	8-11, 8-12, 8-13, & 8-14
	Black-Black	4~6VDC*	N/A	CN11	8-16 & 6-7
By-Pass Flow Control Device	Red-Pink	N/A	40～60Ω	CN12	13-14
	White-Blue			CN12	11-12
3-way Valve	Brown-Grey	Servo Valve Fully Open or Closed: Less than 1VDC Servo Valve in a Mid Position: 4～6VDC	N/A	CN12	16-18
	Orange-Grey	11～14VDC		CN12	6-16
	Pink-Red	N/A	40～60Ω	CN12	3-4
	White-Blue			CN12	1-2
Gas Solenoid Valve	Yellow-Black	11～14VDC	15～25Ω	CN8	11-12
Outgoing Thermistor	White-White	N/A	59°F : 11.4-14kΩ 86°F : 6.4-7.8kΩ 113°F : 3.6-4.5kΩ 140°F : 2.2-2.7kΩ 221°F : 0.6-0.8kΩ Disconnect the connector and measure at thermistor side.	CN7	4-6
Inlet Thermistor	White-White			CN7	12-14
Exhaust Thermistor	White-White			CN7	9-10
Heat Exchanger Thermistor	White-White			CN7	3-6
Supply Thermistor	White-White			CN7	11-14
Return Thermistor	White-White			CN7	5-6
Freeze Protection Thermistor	Black-Black		32°F: 38k-43k 50°F: 22k-26k 68°F: 14k-17k Disconnect the connector and measure at thermistor side.	CN7	8-10

Table 4. Diagnostic Points (Continued)

COMPONENT	WIRE COLOR	VOLTAGE	RESISTANCE	PCB CONNECTOR	PCB PIN
Transformer	White-Grey	AC108～132V	N/A	CN202	1-2
	Red-Red	AC20～30V (Possible to measure at Output terminal as substitute position)		CN202	3-4
Overheat Switch	Black-Black	less than 1VDC	less than 2Ω	CN8	4-15
Water Flow Sensor	Black-Red	11～14VDC	N/A	CN8	6-7
	Yellow-Black	4～7VDC Comment: More than 6Hz (0.26GPmin)		CN8	7-8
Water Pressure Sensor	Red-Black	11～14VDC	N/A	CN8	5-9
	Yellow-Black	0 kPa: 655-745 mV; 200 kPa: 2,155-2,245 mV; 400 kPa: 3,655-3,745 mV		CN8	1-9
Water Level Electrode	White-White	11～14VDC	N/A	CN8	13-14
Integrated Pump	White-Black	AC108～132V	N/A	CN101	1-2
Control Panel	Black-Black	11～14VDC	N/A	CN6	1-2
Additional Controller(s)	White-White	11～14VDC	N/A	CN4	1-3

[2] When the unit is operating.

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 boiler. 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).

Electrical Diagram

Refer to the Wiring Diagram attached to the back of the boiler front cover.

Flame Rod

Place one lead of your meter to the flame rod and the other to the ground. When the unit is attempting to ignite, you should read more than 2 VAC.

Amp Fuses

This unit has six (10) amp glass fuses located on the PC Board. 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.

PC BOARD BUTTONS

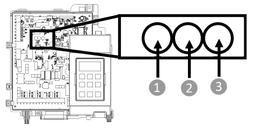


Fig 4. PC Board Buttons

Table 5. PC Board Buttons

Item #	PC Board Switch #	Primary Function	Notes
1	Button 1	Parameter Setting Mode	Refer to section "12.4 Parameter Settings" in Boiler Installation and Operation Manual.
2	Button 2	Deaeration Mode	Refer to section "10. Commissioning" in Boiler Installation and Operation Manual.
3	Button 3	Data Transfer Mode/ Test Combustion Mode/Flushing Mode	This is for transferring PCB data when replacing the PCB. Refer to the instructions included in the replacement parts. Also, this is used for setting the boiler into forced combustion mode and flushing mode.

PARAMETER SETTINGS

1. To access the parameter settings, press and hold the SW 1 Button on the PC Board for five seconds (Fig 5). 00-A appears on the display (Fig 6).

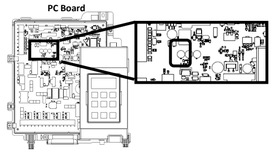


Fig 5. SW 1 Button on PC Board

2. Press the ▲ (Up) or ▼ (Down) arrows to select a parameter setting. Then, press the "Select" button (Fig 7).

Fig 6. "00-A" shown in display

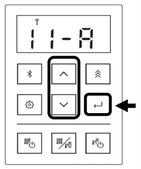


Fig 7. "Up," "Down" and "Select" Buttons

3. Press the ▲ (Up) or ▼ (Down) arrows to change the selection for the setting number (such as 11-A or 11-b). Then, press the "Select" button (Fig 8).

Fig 8. "Up," "Down" and "Select" Buttons

4. To exit parameter settings and enter normal operation mode, press the SW1 Button on the PC Board.

For more information on parameter settings, refer to the "I-Series Plus Condensing Boiler Installation and Operation Manual."

Table 6. Parameter Settings

Parameter #	Setting Description	Selection A (Default)	Selection b	C	d	E	F	H
00	**Outdoor Temperature Sensor:** Enables or disables the outdoor temperature sensor.	In Use	Not In Use					
01	**Outdoor Reset Curve:** (*) This parameter shows up only when selecting Outdoor Temperature Sensor "In Use" as selecting parameter number 00. For selecting outdoor reset curve as below: Curve 1, Curve 2, Curve 3, Curve 4, Curve 5, Curve 6, and Curve 7 (Custom). Refer to Boiler Installation and Operation Manual for complete curve details.	1	2	3	4	5	6	7
02	**Boost:** Available when parameter 00 is selected as "A." Boost Mode increases the CH set temperature above the outdoor reset curve target when the boiler has been running on an unusually long call for heat.	30 Minutes	60 Minutes					
03	**Maximum Outdoor Temperature:** Available when parameter 00 is set to as "A." Sets maximum outdoor temperature the boiler will fire in CH mode and can prevent boiler from firing in warm outdoor temperatures.	No Maximum	77°F (25°C)					
04	**Service Soon:** 55 is a time-based service indicator set during installation.	Disabled	0.5 Year	1 Year	2 Years			
05	**Pressure Indication on Controller Panel:** The current pressure will cycle on the controller display. If an external pressure gauge is present, it is permissible to change the setting to "No."	Yes	No					
06	**De-Rate:** This parameter is to limit maximum input when it is necessary.	No	Setting 1	Setting 2				
08	**Simultaneous Central Heating and Domestic Hot Water:** Enables simultaneous operation between Central Heating and Domestic Hot Water.	Domestic Hot Water Priority	Simultaneous CH and DHW Permitted					
09	**DHW Recirculation:** Enables the DHW Recirculation function for Pump 4 connection.	Pump 4 Connection Enabled for CH Zone Pump	DHW recirculation ON (Pump 4 connection for DHW Recirculation Pump)					
10	**Maximum DHW Setting Temperature:** This selects the maximum DHW set point temperature. When 140°F, it is recommended to have a mixing valve to prevent scalding.	120°F (49°C)	140°F (60°C)					
11	**Length of Time 3 Way Valve in DHW Position:** This selects the length of time the 3 Way Valve will stay in the DHW position after using DHW even if a CH demand is present. While the 3 Way Valve is in the DHW position, this enables quicker delivery of hot water.	3 Minutes	10 Seconds					
12	**DHW Recirculation Piping Setup:** This parameter is available when parameter number 09 is selected as "b." This sets the DHW recirculation piping mode, which controls the circulation logic. Ensure this corresponds to the DHW recirculation piping.	Cross Over Valve	Dedicated Return					
13	**DHW Recirculation with Timer Relay Input:** This parameter is available when parameter number 09 is selected as "b." This enables an external timer to also control the timing for DWH recirculation to more directly correspond to the customers needs. When selecting "No," the boiler operates with pump ON continuously for controlling external timer pump.	Yes	No					
14	**CH Temperature Limitation During Simultaneous Operation:** This parameter is available when parameter number 09 is selected as "b" or parameter number 08 is selected as "b." This enables the CH temperature setting to be limited during simultaneous DHW and CH operation. This can prevent unintentionally supplying high temperature water to low temperature CH applications. During simultaneous operation, the CH supply temperature may be up to 180°F. When selecting "NO" limitation, ensure that the CH system and heating application is designed for high temperature.	Yes	No					
15	**3 Way Valve Position During Simultaneous Operation:** This parameter is available when parameter number 09 is selected as "b" or parameter number 08 is selected as "b." This adjusts the 3 Way Valve position to open the CH side more for when the flow of the CH side is reduced due to DHW demand. This may restrict the DHW capacity.	Normal	Additional CH					
16	**Lime Condition (LC) Check:** This setting enables the boiler to check for lime scale conditions in the DHW side of the plate heat exchanger. When detecting lime scale, an LC error code will appear on the display. Once lime scale is removed by flushing the plate heat exchanger, the LC code will disappear.	Available	No Detection					
17	**Adjust DHW Temperature Setting:** This setting enables the DHW output temperature to be adjusted without adjusting the set point temperature to make up for system temperature losses.	0°F (0°C)	1.8°F (1°C)	3.6°F (2°C)	5.4°F (3°C)			
18	**DHW Continuous Operation Time:** This setting adjusts the maximum continuous operating time of DHW, whether in DHW priority or simultaneous modes.	120 Minutes	60 Minutes	180 Min.	Unlimited			
19	**First Day Pump Operation:** To make the first day pump running 24h or waiting for learning the DHW usage patter for smart-circ.	Off	On					
20	**Smart-Circ:** To enable circ-logic together for DHW recirculation on each mode.	Off	On					
40	**Linked Operation Among Each CH Pumps:** This parameter enables linked operation among each CH pumps. For example, when parameter b is selected and T/T 1 is active, both pump 1 and 2 are ON. The T/T wire must be connected to the T/T1 connection. This setting is primarily for an application that requires two pumps or more for one zone, such as in use with an injection loop or similar system.	No	Linked Together CH pump 1 and pump 2	Linked Together CH pump 1, pump 2 and pump 3	Linked Together CH pump 1, pump 2, pump 3 & pump 4			
41	**Linked Operation Between Main Boiler Pump and CH Pump 1:** This enables the linked operation between the main boiler pump and CH pump 1. Example: when the main pump is on, pump 1 is also on.	No	Yes (Linked together)					
42	**Main Pump Runs When the Target Temperature is Reached:** This selects the mode of the main pump running when the target setpoint is achieved. This setting is for whether running on intervals to reduce pump operation or continuously running to reduce wait time to re-fire. Intervals are 10 minutes ON and 30 minutes OFF.	Continuously	Intervals					
43	**External Pump Runs When the Temperature is Reached:** For selecting the mode of external pump running when the temperature is reached to setting. This is setting for whether stopping external pump running to reduce pump operation timing or operating as same as main pump operation to enable to deliver remained heat in heat exchanger	Same as Main Pump	Does Not Run					
44	**External Pump Running at Freeze Protection Operation:** Selects the mode of external pump running when freeze protection operation. This is setting for whether stopping external pump running to reduce pump operation timing or operating as same as main pump operation to enable to deliver remained heat to the system for keeping system piping from freezing. But it could reduce the temperature inside heat exchanger.	Does Not Run	Same as Main Pump					
45	**Freeze Protection Level:** This selects the freeze protection level. Selecting "b" will prevent the boiler from operating in freeze protection mode more than believed necessary.	Normal	For Warm Room Temp					
46	**The Differential Temperature From Extinguishing Fire to Fire Again:** How much temperature drop is permitted by the supply water thermistor before the boiler will fire again. When selecting "Quick", the boiler will fire more frequently and achieve more temperature control	Normal	Quick					
	CH Setting Temperature	Temperature Drop	Temperature Drop					
	168°F -182°F (75-82°C)	27°F (15°C)	15°F (8°C)					
	104°F -166°F (40-74°C)	15°F (8°C)	9°F (5°C)					
47	**The Time Which Not Allow to Fire Again for CH:** For selecting time which not allow to fire again for CH after shutdown burner. This is setting for whether preventing from frequently operating unit or allowing frequent operation for quick heating up again.	Normal (3 Minutes)	Quick (10 Seconds)					
50	**Air Handler Connection:** The setting changes to enable to AH output with linking pump 3.	No	Yes					
51	**Air Handler Post Pump Extension Setting:** Extending the post Pump timing of pump 3.	15 Seconds	40 Seconds					
60	**N/A:** Manufacture Use Only	Manufacture Use Only	Manufacture Use Only					
61	**Thermostat Usage:** Changes the mode between Thermostat Usage and Central Heating Button	Thermostat Used	CH ON button used. Boiler fires based on room temperature.					
70	Not Used	N/A	N/A					
71	**Cascade:** Setting Primary or Secondary. This parameter is only used for Cascade compatible models.	Secondary	Primary					
72	**Cascade Units in Standby:** Adjust the parameter setting of the primary unit to set the number of unit as in standby. This parameter is only used for Cascade compatible models.	1	2	3	4	5	6	
80	**Recirculation Setting for DHW Cascade:** Applies only when Cascade with water heaters is set up with recirculation mode. This parameter is to set the recirculation mode on water heater connected as secondary.	No Recirculation	Recirculation (Dedicated)	Recirculation (Crossover)				
81	**Recirculation Mode for DHW Cascade:** Applies only when Cascade with water heaters is set up with recirculation mode. This parameter is to setting the recirculation mode on water heater connected as secondary.	Economy	Comfort	Commercial				
82	Not Used	N/A	N/A					
83	**Pump Speed for DHW Cascade:** This parameter is only when cascade with water heaters is set up with recirculation mode. This parameter is to setting the pump speed of recirculation mode on water heater connected as secondary.	Max	High	Medium	Low			
R0	**Gas Type:** For selecting gas type when conducting gas conversion.	Natural Gas	Liquid Propane					
R1	**Model:** Manufacture Use Only	Manufacture use only	Manufacture use only					
R2	**Vent Material Used:** This selects the venting material used. The boiler is set from the factory to be installed in a PVC venting system. If CPVC, PP, or other approved venting is used, this may be adjusted. See the section on PVC Safety Switch for more information.	PVC	Material other than PVC: CPVC, PP, or Other.					
R3	**Altitude Setting:** Sets the elevation of the boiler installation.	Level 0: 0-2,000 ft (0-610m)	Level 1: 2,001-5,400 (610-1646m)	Level 2: 5,401-7,700 ft (1,646-2,347m)	Level 3: 7,701-10,200 ft (2,347-3,109m)			

DIAGNOSTIC CODES

To Display Diagnostic Codes:

1. Press and hold the "DHW" button for two seconds and then the ▲ (Up) button simultaneously (Fig 9).
2. The last nine maintance codes display and flash one after the other.
3. To exit diagnostic codes and return the boiler to normal operation, press and hold the "DHW" button for two seconds, and then the ▲ (Up) button

Fig 9. "Up" and "DHW" Buttons

Table 8. Diagnostic Codes

021 Too Long DHW Continuous Operation
- Using DHW beyond maximum continuous operating time by parameter 18 setting.
- Ensure the parameter setting is correct.
- Check the water leakage of DHW.

100 Air Supply or Exhaust Blockage/Condensate Trap is Full
- Fan current initial check error.
- Ensure condensate line and trap is not blocked.
- Ensure internal air filter is clean with no obstructions.
- Ensure high altitude setting is set properly (See High Altitude Setting).
- Ensure combustion air and exhaust vents are not blocked and the approved venting materials are being used.
- Ensure either the exhaust ring or intake cap is removed properly.
- Ensure vent length is within limits.
- Check fan for debris and ensure wheel turns freely.
- Verify fan check valve is not stuck between fan casing and burner body.

110 No Ignition (Unit Not Turning On)
- Ignition Error. Check that the gas is turned on at the boiler, gas meter, and/or propane cylinder.
- If the unit is installed in a propane system, ensure that gas is in the tank.
- Bleed all air from the gas lines.
- Check the ground wire for the PC Board.
- Ensure the flame rod wire is connected.
- Ensure the igniter is operational.*
- Ensure the venting is installed in accordance to this manual.
- Check that the surface of the electrode and flame rod are clean.
- Check gas solenoid valves for open or short circuits.*
- Verify gas orifice installed is correct for the gas system the unit is installed in.
- Check flame rod voltage to ground during ignition.

120 Flame Failure
- Boiler has flame failure. Check that the gas is turned on at the boiler, gas meter, and/or propane cylinder.
- If the unit is installed in a propane system, ensure that gas is in the tank.
- Ensure the venting is installed in accordance to this manual.
- Ensure the flame rod wire is connected.
- Ensure the gas type and inlet gas pressure are correct.
- Bleed all air from the gas lines.
- Check the ground wire to the PC Board.
- Check flame rod voltage to ground during ignition.

140 Heat Exchanger Overheat
- Overheat switch is tripped.
- Measure the resistance of the Overheat Switch.*
- Check the heat exchanger surface for hot spots which may indicate blockage due to scale buildup.
- Ensure the boiler pump is not locked up.
- Ensure that all of the valves in the CH circuit are open.
- Ensure the boiler and CH circuit does not have a freezing condition.
- Surface of heat exchanger may turn to a black color as stainless steel is tempered even in normal conditions. This does not indicate an abnormal condition.
- Check for damage on the exhaust, seal, and venting.

150 Venturi Control
- Venturi operation error.
- Ensure the venturi motor is operating correctly.*
- Replace the gas valve assembly.

160 High Outgoing Temperature
- Safety shutdown because DHW outgoing temperature is too hot.
- Check sensor wiring for damage of outgoing thermistor.
- Measure resistance of outgoing thermistor.*
- Ensure the gas valve has no damage and the orifice is installed correctly.
- Replace the gas valve assembly.

170 Venturi Blockage
- Check the venturi and silencer for blockage.
- Before resetting this error, check if the condensate drain is block and if the venting is connected properly.

180 Gas Valve Adjustment Limit
- Ensure gas type is correct.
- Ensure the ground from PCB is correct.
- Ensure gas type parameter is correct.
- Please call Rinnai Technical Support.

190 Electrical Grounding
- Secondary circuit ground fault.
- Check all electrical components for electrical short.

210 Data Transfer Error
- If the PCB has been replaced, ensure the data transfer process is complete.

220 Gas Valve Adjustment
- Ensure a Reed switch is located properly.
- Ensure the gas valve adjustment is operating correctly.*

250 Condensate Pump (Accessory)
- Boiler will operate for 60 seconds.
- Confirm wire connections and harnesses are good.
- Ensure the condensate reservoir is empty and condensate pump is operational.

310 Freeze Protection Thermistor
- Check sensor wiring for damage.
- Measure the resistance of the sensor.
- Replace if necessary.

321 Outgoing Thermistor (Combi Only)
- Check sensor wiring for damage.
- Clean sensor of any scale buildup present.
- Measure the resistance of the sensor.
- Replace if necessary.

331 Heat Exchanger Thermistor (Combi Only)
- Check sensor wiring for damage.
- Measure the resistance of the sensor.
- Replace if necessary.

341 Inlet Thermistor (Combi Only)
- Check sensor wiring for damage.
- Measure the resistance of the sensor.
- Replace if necessary.

353 Supply Thermistor
- Check sensor wiring for damage.
- Clean the surface of the sensor.
- Measure the resistance of the sensor.
- Check the return thermistor.
- Replace if necessary.

363 Return Thermistor
- Check sensor wiring for damage.
- Measure the resistance of the sensor.
- Replace if necessary.

380 Exhaust Thermistor
- Check sensor wiring for damage.
- Clean the surface of the sensor.
- Measure the resistance of the sensor.
- Check the return thermistor.
- Replace if necessary.

393 Outdoor Thermistor
- Ensure that parameter number 00 is set to the appropriate position.
- Check sensor wiring for damage.
- Measure the resistance of the sensor.
- Replace if necessary.

400 Pressure Sensor
- Check sensor wiring for damage. Measure the voltage of the sensor.
- Replace if necessary.

430 High/Low Water Pressure
- If water pressure is too low, add water into system until at least 13 PSI is observed.
- Ensure there are no leaking components in the CH system.
- If the pressure is too high, adjust the pressure to a maximum of 30 PSI.
- Ensure the pressure relief valve and water fill are working correctly.

443 Low Water Cut-Off (LWCO)
- Ensure the LWCO device is working correctly.
- Ensure the LWCO jumper is connected properly when LWCO is not in use.
- Ensure the output is 24 V AC. If it is not, a transformer is needed.

520 Solenoid Valve Circuit
- Check the flame rod and wire for damage.
- Close the gas shut off valve installed near the boiler.
- Ensure the flame rod and wire are not wet.
- Check the output from the PC Board to the solenoid gas valve.
- If the output from the PC Board is abnormal, replace the PC Board.
- If the output from the PC Board is normal, replace the gas control.

[3] See "Electrical Diagnostics" section of this document.

Table 7. Error Reset

Power Reset	Venturi Control (150), Gas Valve Adjustment Limit (180), Gas Valve Adjustment (220), High Exhaust Temperature (540), and Freeze Issue (890) can be reset by shutting down power to the boiler.
Interlock Reset	Venturi (170) and Solenoid Valve (520) allow only interlock rest. Please call Rinnai Technical Support.
Combustion Error During DHW	Error can be reset by closing faucet.
Other Reset	Other error can be reset by Domestic "On/Off" button or "Central Heating" (CH) button.

540 High Exhaust Temperature
- Make sure boiler pump activates during operation.
- Check the exhaust thermistor wiring for damage.
- Clean the surface of the thermistor.
- Measure the resistance of the exhaust thermistor.*
- If the sensor has been replaced and the error still appears, check the return thermistor.
- If boiler is used in a hard water area, flush the DHW plate heat exchanger.
- Check the exhaust duct, seal, and venting for damage.

610 Combustion Fan
- Check the motor wire harness for loose or damaged connections.
- Measure resistance and voltage of motor wire harness.*
- Ensure the combustion fan spins freely.

631 DHW Recirculation Pump (Combi Only)
- Ensure the DHW recirculation matches the Parameter 12 setting.
- Ensure the dedicated return line is properly installed.
- Ensure the inlet water filter and bypass filter are clean and free of debris.
- Ensure the DHW recirculation pump is connected to the DHW Pump Terminal.
- Ensure the capacity of the recirculation pump is sized appropriately for the piping (DHW recirculation pump should be higher than 1.3 GPM).
- Ensure air is removed from the recirculation line.

661 Water Flow Control (Combi Only)
- Measure the resistance values and voltage of the water flow control.*
- Ensure the harness and connector are not wet.
- If the voltage from the PC Board is abnormal, replace the PC Board; otherwise, replace the water flow servo valve.

661 By-Pass (Combi Only)
- Measure the resistance values and voltage of the bypass servo valve.*
- Ensure the harness and connector are not wet.
- If the voltage from the PC Board is abnormal, replace the PC Board; otherwise, replace the bypass servo valve.

670 3-Way Valves (Combi Only)
- Check the CH system water quality.
- Measure the resistance values and voltage of the 3-way valve control.*
- Replace the 3-way valve control device.

681 Hot Water Supply Temperature Abnormality (Combi Only)
- If the DHW water temperature is higher than the set point temperature because the boiler bypass servo fails to close.
- Measure resistance values and voltage of the bypass flow control.*
- Replace the bypass flow control device if needed; otherwise, check the inlet thermistor and heat exchanger thermistor wiring for damage.
- Measure the resistance of the sensor. Replace if needed.
- Clean the sensor of any scale buildup present.

700 PC Board
- PC Board circuit error. Replace PC Board.

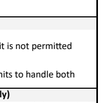
710 Solenoid Valve Circuit
- Ensure Dip switch 5 on the PC Board is in the OFF position (default).
- Ensure the gas control wire is not loose or damaged.
- Ensure the heater circuit is not grounded.
- Ensure outgoing thermistor works without error by using DHW (Combi only).
- Replace the PC Board.

720 Flame Rod
- Check the flame rod and wire for damage.
- Ensure the flame rod and wire are not wet.
- If there is no issue with the flame rod or wiring, replace the PC Board.

890 Freeze Issue
- The boiler checks the heat exchanger temperature at the time of operation. If the temperature is too low, an error will occur.
- Check if there is freezing in the boiler or CH system.

LC Scale Buildup in Heat Exchanger (Combi Only)
- Flush the DHW plate heat exchanger.
- The LC code will reset automatically when scaling is removed.
- If LC code remains, check the DHW thermistor, flow sensor or boiler pump.

FFF Maintenance Indicator
- This code is a placeholder in diagnostic code history indicating a service provider performed maintenance or service.
- Enter this code after performing service by pressing the following buttons at the same time: UP, DOWN, and DHW. FFF appears on the monitor (right image).



55 Service Soon (55)
- Service Soon (55) is a time-based service indicator set during installation. See parameter 04 in the "Parameter Settings" section for more information.
- To reset 55 code, press Central Heating button 5 times until 55 disappears.

NO CODE Nothing Happens When DHW Water Flow is Activated (Combi Only)
- Verify the minimum flow rate required to fire the boiler is seen.
- Measure the resistance of the flow control sensor.*
- Clean the inlet water supply filter.
- On new installations, ensure the hot and cold water lines are not reversed.
- Confirm the inlet water temperature is not too high.
- Ensure the integrated boiler pump operates properly.
- Ensure the DHW operation switch is on.

NO CODE Decreasing or Fluctuating DHW Water Flow Volume (Combi Only)
- Ensure the gas pressure is proper.
- Ensure the water pressure is proper.
- Ensure the inlet water filter for DHW is clean.
- Ensure there is not lime scale buildup present.
- Ensure the vent and vent settings are properly set up.
- If a DHW recirculation system is used, DHW flow volume may vary slightly.
- Ensure all air has been purged from the system.

NO CODE Fluctuating DHW Outgoing Temperature (Combi Only)
- Ensure the gas pressure is proper.
- Ensure the water pressure is proper.
- Ensure the DHW thermistor, flow servo, and bypass servo are in good condition.
- Ensure the inlet filter for DHW is clean.
- If a DHW recirculation system is used, the DHW temperature may vary slightly.
- Ensure all air is removed from the system.

NO CODE Boiler Does Not Start Heating With a Heating Demand Present
- Supply temperature or return temperature inside the boiler may be too hot.
- Ensure the pump operates properly.
- If there is a demand immediately after using DHW, wait at least three minutes for operation.

NO CODE Cannot Turn off ECO Mode
- During DHW recirculation, ECO switch will always be on (Combi only).

NO CODE Cannot Set Up Lock
- Lock is available only when the controller has the priority. (When connecting additional remote controller) (Combi only).

NO CODE DHW Recirculation Does Not Begin (Combi Only)
- Ensure DHW recirculation pump is connected to the DHW_Pump terminal.
- Ensure parameter number 09 is ON.
- Ensure DHW recirculation plumbing type is set properly per Parameter 12.
- Ensure DHW recirculation with timer relay input is set properly per Parameter 13.
- Ensure the wiring to the external timer is correct.
- Ensure the external timer is ON, if in use.
- The recirculation logic has an OFF interval after use.

NO CODE Simultaneous DHW and CH is Not Functional (Combi Only)
- Ensure parameter number 08 is ON.
- If CH set point temperature is lower than 140°F/60°C, it is not permitted (this includes outdoor reset temperature settings).
- Ensure the DHW inlet temperature is not too hot.
- Ensure the heating load for DHW and CH are within limits to handle both simultaneously.

NO CODE Cannot Change the DHW Set Point Temperature (Combi Only)
- When DHW is being produced, the temperature setting can only be adjusted between 98°F (37°C) and 110°F (43°C).

NO CODE Supply Temperature is Different From the Setting Temperature on the Controller
- During outdoor sensor control, the supply temperature will vary dependent on the outdoor temperature.
- During simultaneous operation of DHW and CH, the supply temperature for CH is based on DHW control (Combi Only).

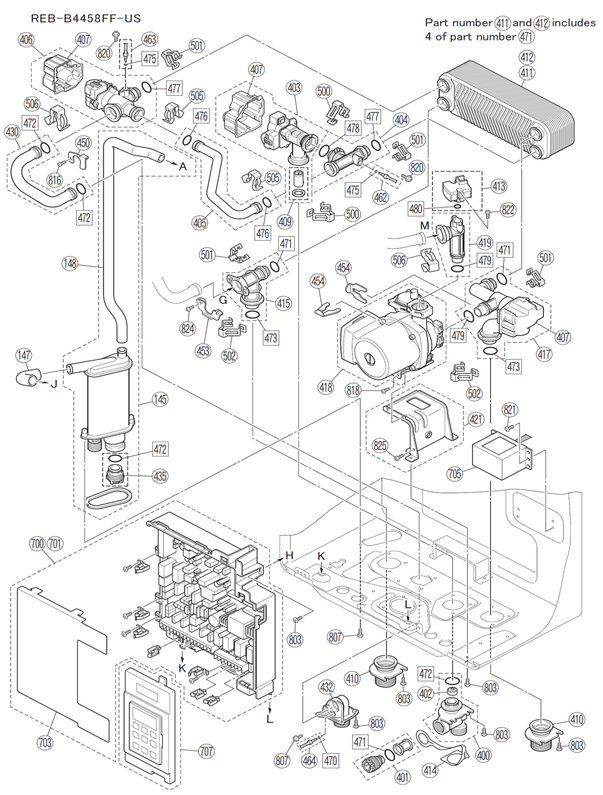
NO CODE CH Capacity is Insufficient
- Ensure the parameters are properly set for the installation.
- During simultaneous operation of DHW and CH, flow volume to heating can be reduced (Combi Only).

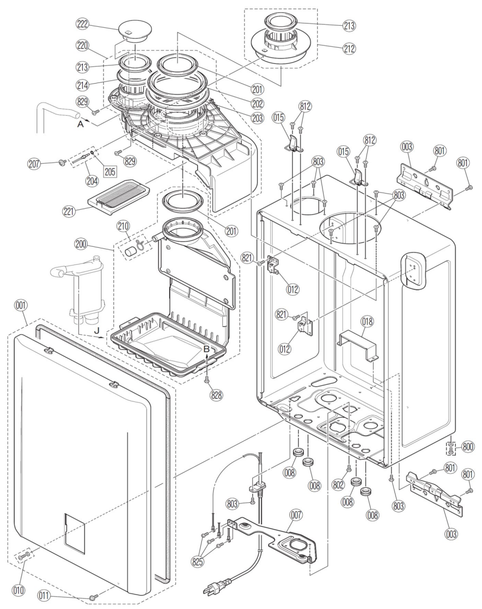
NO CODE Pump or Fan Even With No Demand
- The boiler may start or operate the pump for freeze protection operation.
- The pump may intermittently operate to prevent it from becoming stuck.

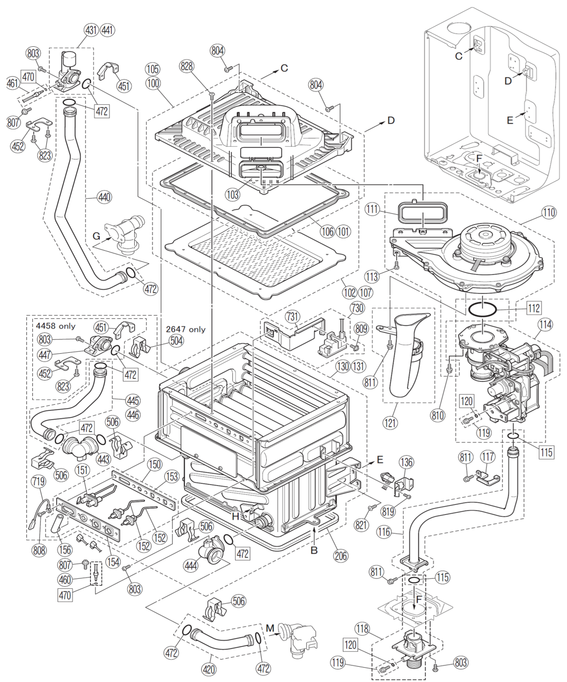
H239-0775-2

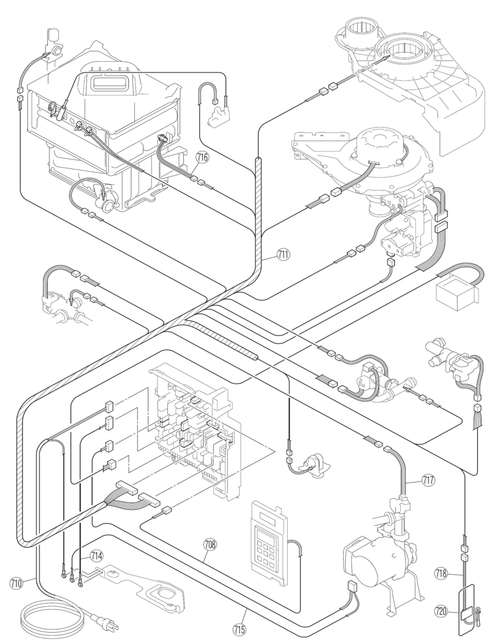
070 00012 66316 6

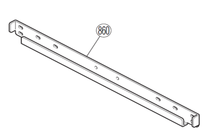
Gas Conversion Kits		
Models	**Gas Type**	**Kit Number**
IP060160C	NG/LPG	804000124
IP090099C		
IP090160C		
IP090199C		
IP120199C		
IP150199C		

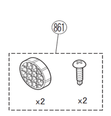


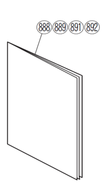


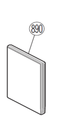


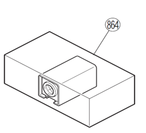


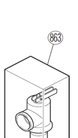


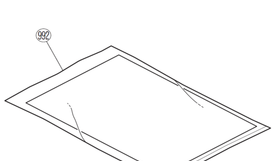












ITEM	DESCRIPTION	PART NUMBER	IP150199C	IP120199C	IP090199C	IP090160C	IP090099C	IP060160C
001	Front Cover Panel Assembly FF	809000306	1	1	1	1	1	1
003	Wall Mount Bracket	109000594	2	2	2	2	2	2
007	Connection Reinforcement Plate	809000307	1	1	1	1	1	1
008	Rubber Bushing	CF79-41020-A	4	4	4	4	4	4
010	Residential Screw and Washer	106000645	1	1	1	1	1	1
011	Ground Screw	109000076	1	1	1	1	1	1
012	Combustion Chamber Support Plate	109000597	2	2	2	2	2	2
015	Latch	109001393	2	2	2	2	2	2
018	Plate HEX Bracket	809000166	1	1	1	1	1	1
100	Burner Assembly-Large	806000082	1	1	1			
101	Burner Gasket-Large	109000609	1	1	1			
102	Burner Plate Assembly-Large	806000050	1	1	1			
103	Combustion Check Valve Assembly	108000135	1	1	1	1	1	1
105	Burner Assembly-Medium	806000083				1	1	1
106	Burner Gasket-Medium	109000610				1	1	1
107	Burner Plate Assembly-Medium	806000052				1	1	1
110	Combustion Fan Assembly	108000130	1	1	1	1	1	1
111	Fan Mounting Packing	109001396	1	1	1	1	1	1
112	O-ring	109000612	1	1	1	1	1	1
113	Hexagon Head Screw	ZQAA0514UK	3	3	3	3	3	3
114	Gas Valve Assembly	806000084	1	1	1	1	1	1
115	O-ring	109000252	2	2	2	2	2	2
116	Gas Connection Pipe	806000085	1	1	1	1	1	1
117	Gas Tube Bracket	109000635	1	1	1	1	1	1
118	Inlet Gas Supply Connection	106000119	1	1	1	1	1	1
119	Inlet Gas Test Port Screw	106000138	2	2	2	2	2	2
120	O-ring	M10B-13-4	2	2	2	2	2	2
121	Noise Filter	106000271	1	1	1	1	1	1
130	Heat Exchanger Assembly-Large	807000234	1	1	1			
131	Heat Exchanger Assembly-Medium	807000235				1	1	1
136	OHS Bracket	109000614	1	1	1	1	1	1
145	Condensate Trap	807000236	1	1	1	1	1	1
147	Condensate Drain tube	807000237	1	1	1	1	1	1
148	Drain Tube at Air Intake	807000238	1	1	1	1	1	1
150	Electrode/Flame Rod Assembly	805000150	1	1	1	1	1	1
151	Electrode	805000151	1	1	1	1	1	1
152	Flame Rod	805000152	1	1	1	1	1	1
153	Electrode Gasket	805000153	1	1	1	1	1	1
154	Electrode Plate	109001401	1	1	1	1	1	1
156	Electrode Sleeve	109000620	1	1	1	1	1	1
200	Exhaust Duct Assy	808000044	1	1	1	1	1	1
201	Exhaust Gasket	109001403	2	2	2	2	2	2
202	Intake Gasket	109001404	1	1	1	1	1	1
203	Air Supply Seal Ring	109001405	1	1	1	1	1	1
204	Exhaust Thermistor	105002024	1	1	1	1	1	1
205	O-ring	107000323	1	1	1	1	1	1
206	Exhaust Duct Gasket	808000051	1	1	1	1	1	1
207	Thermistor Screw	109000622	1	1	1	1	1	1
210	Rubber Cap	109001407	1	1	1	1	1	1
212	Exhaust Adapter Ring	108000132	1	1	1	1	1	1
213	Air Inlet Seal Ring - 2 inch	109001408	1	1	1	1	1	1
214	Air Inlet Gasket	109001409	1	1	1	1	1	1
220	Duct Assembly	108000133	1	1	1	1	1	1
221	Air Inlet Filter	108000086	1	1	1	1	1	1

ITEM	DESCRIPTION	PART NUMBER	IP150199C	IP120199C	IP090199C	IP090160C	IP090099C	IP060160C
222	Air Inlet Cap	108000134	1	1	1	1	1	1
400	Water Supply Connection	807000177	1	1	1	1	1	1
401	Water Supply Filter Plug Assembly	107000646	1	1	1	1	1	1
402	Rectifier	M8D1-15	1	1	1	1	1	1
403	Water Flow Servo Assy	807000239	1	1	1	1	1	1
404	Water Connection Joint Assy	807000240	1	1	1	1	1	1
405	Bypass Pipe	807000241	1	1	1	1	1	1
406	Bypass Servo Assy	807000242	1	1	1	1	1	1
407	Cover	107000093	3	3	3	3	3	3
409	Flow Turbine Assembly	107000621	1	1	1	1	1	1
410	CH Outlet Connection	807000182	2	2	2	2	2	2
411	Plate HEX-Large	807000183	1	1	1			
412	Plate HEX-Medium	807000184				1	1	1
413	Water Pressure Sensor Assembly	807000185	1	1	1	1	1	1
414	Plug Band	109000018	1	1	1	1	1	1
415	Plate HEX-CH Heating Connection	807000186	1	1	1	1	1	1
417	3-Way Valve Assembly	807000187	1	1	1	1	1	1
418	Circulation Pump Assembly	807000188	1	1	1	1	1	1
419	Pump Connection Assembly	807000221	1	1	1	1	1	1
420	Pump-Plate HEX Connection Tube	807000190	1	1	1	1	1	1
421	Pump Stand	807000191	1	1	1	1	1	1
430	Hot Water Pipe	807000192	1	1	1	1	1	1
431	Heat Exchanger Pipe Connection	807000223	1	1	1			
432	DHW Outlet	807000194	1	1	1	1	1	1
435	Trap Drain Plug Assy	807000195	1	1	1	1	1	1
440	HEX-CH Heating Connection Pipe	807000196	1	1	1	1	1	1
441	Heat Exchanger Pipe Connection Assy-Medium	807000197				1	1	1
443	Secondary Heat Exchanger Outlet Fitting	807000198	1	1	1	1	1	1
444	Secondary Heat Exchanger Inlet Fitting	807000199	1	1	1	1	1	1
445	Primary-Secondary Pipe Assy-Large	807000200	1	1	1			
446	Primary-Secondary Pipe Assy-Medium	807000201				1	1	1
447	Primary-Secondary Connecting Fitting	807000202	1	1	1			
450	Pipe Bracket	U211-322X01	1	1	1	1	1	1
451	Pipe Bracket	809000168	2	2	2	2	2	2
452	Retention Clip	809000169	2	2	2	2	2	2
453	Pipe Bracket	809000170	1	1	1	1	1	1
454	Clip	809000171	2	2	2	2	2	2
460	Thermistor Sensor	805000154	1	1	1	1	1	1
461	Thermistor Sensor	805000155	1	1	1	1	1	1
462	Thermistor Sensor	105002020	1	1	1	1	1	1
463	Thermistor Sensor	105002025	1	1	1	1	1	1
464	TWIN Thermistor	105002026	1	1	1	1	1	1
470	O-ring	807000215	3	3	3	3	3	3
471	O-ring	807000203	3	3	3	3	3	3
472	O-ring	807000204	14	14	14	14	14	14
473	O-ring	807000205	2	2	2	2	2	2
475	O-ring	M10B-2-4	2	2	2	2	2	2
476	O-ring	M10B-2-14	2	2	2	2	2	2
477	O-ring	M10B-2-16	3	3	3	3	3	3
478	O-ring	M10B-2-18	1	1	1	1	1	1
479	O-ring	807000206	2	2	2	2	2	2
480	O-ring	807000207	1	1	1	1	1	1
500	Clip	109000636	2	2	2	2	2	2
501	Clip	809000172	4	4	4	4	4	4

ITEM	DESCRIPTION	PART NUMBER	IP150199C	IP120199C	IP090199C	IP090160C	IP090099C	IP060160C
502	Clip	809000173	2	2	2	2	2	2
504	Clip	809000174				1	1	1
505	Clip	109000639	2	2	2	2	2	2
506	Clip	109000638	6	6	6	6	6	6
700	PC Board - Combi Large	805000156	1	1	1			
701	PC Board - Combi Middle	805000157				1	1	1
703	PCB Cover	809000309	1	1	1	1	1	1
705	Power Transformer	805000158	1	1	1	1	1	1
707	Controller Unit	805000159	1	1	1	1	1	1
708	Controller Unit Harness	105002042	1	1	1	1	1	1
710	Power Cord	805000160	1	1	1	1	1	1
711	Sensor Harness-1	805000161	1	1	1	1	1	1
714	Heater Ground Harness	805000162	1	1	1	1	1	1
715	Pump Harness	805000163	1	1	1	1	1	1
716	Over Heat Switch	805000164	1	1	1	1	1	1
717	Water Pressure Connection Harness	805000090	1	1	1	1	1	1
718	Thermistor Sensor	805000165	1	1	1	1	1	1
719	Igniter Ground Harness	105000243	1	1	1	1	1	1
720	Guide Seal	809000176	1	1	1	1	1	1
730	Igniter Assembly (Module)	805000183	1	1	1	1	1	1
731	Igniter Plate	805000166	1	1	1	1	1	1
800	Screw	109000746	4	4	4	4	4	4
801	Screw	CP-30583	4	4	4	4	4	4
802	Screw	ZBA0408UK	3	3	3	3	3	3
803	Screw	CP-30580	33	33	33	33	33	33
804	Screw	109000648	2	2	2	2	2	2
807	Screw	U217-449	7	7	7	7	7	7
808	Screw	109001417	5	5	5	5	5	5
809	Screw	CP-80452	1	1	1	1	1	1
810	Screw	109000179	3	3	3	3	3	3
811	Screw	109001416	3	3	3	3	3	3
812	Screw	109000649	4	4	4	4	4	4
816	Screw	CP-20883-410UK	1	1	1	1	1	1
818	Screw	209000203	2	2	2	2	2	2
819	Thermistor Screw	ZFAB0406UK	2	2	2	2	2	2
820	Screw	109001300	1	1	1	1	1	1
821	Truss Screw	109000598	14	14	14	14	14	14
822	Screw	809000178	4	4	4	4	4	4
823	Screw	ZAA0408UK	2	2	2	2	2	2
824	Screw	809000179	1	1	1	1	1	1
825	Ground Screw	109000793	4	4	4	4	4	4
828	Screw	809000182	10	10	10	10	10	10
829	Screw	809000310	2	2	2	2	2	2
840	Cable Clip	109001297	1	1	1	1	1	1
841	Cable Clip	809000311	1	1	1	1	1	1
842	Cable Clip	CP-90124-3	2	2	2	2	2	2
860	Wall Bracket	109000628	1	1	1	1	1	1
861	Vent Screen Set	108000104	1	1	1	1	1	1
863	Pressure Relief Valve	807000211	1	1	1	1	1	1
864	Outdoor Thermistor Kit	803000081	1	1	1	1	1	1
888	User Manual - EN	800000192	1	1	1	1	1	1
889	Installation Manual - EN	800000190	1	1	1	1	1	1
890	Tech sheet	800000195	1	1	1	1	1	1
891	User Manual-FR	800000204	1	1	1	1	1	1
892	Installation Manual - FR	800000205	1	1	1	1	1	1
992	Gas Conversion Kit	804000124	1	1	1	1	1	1