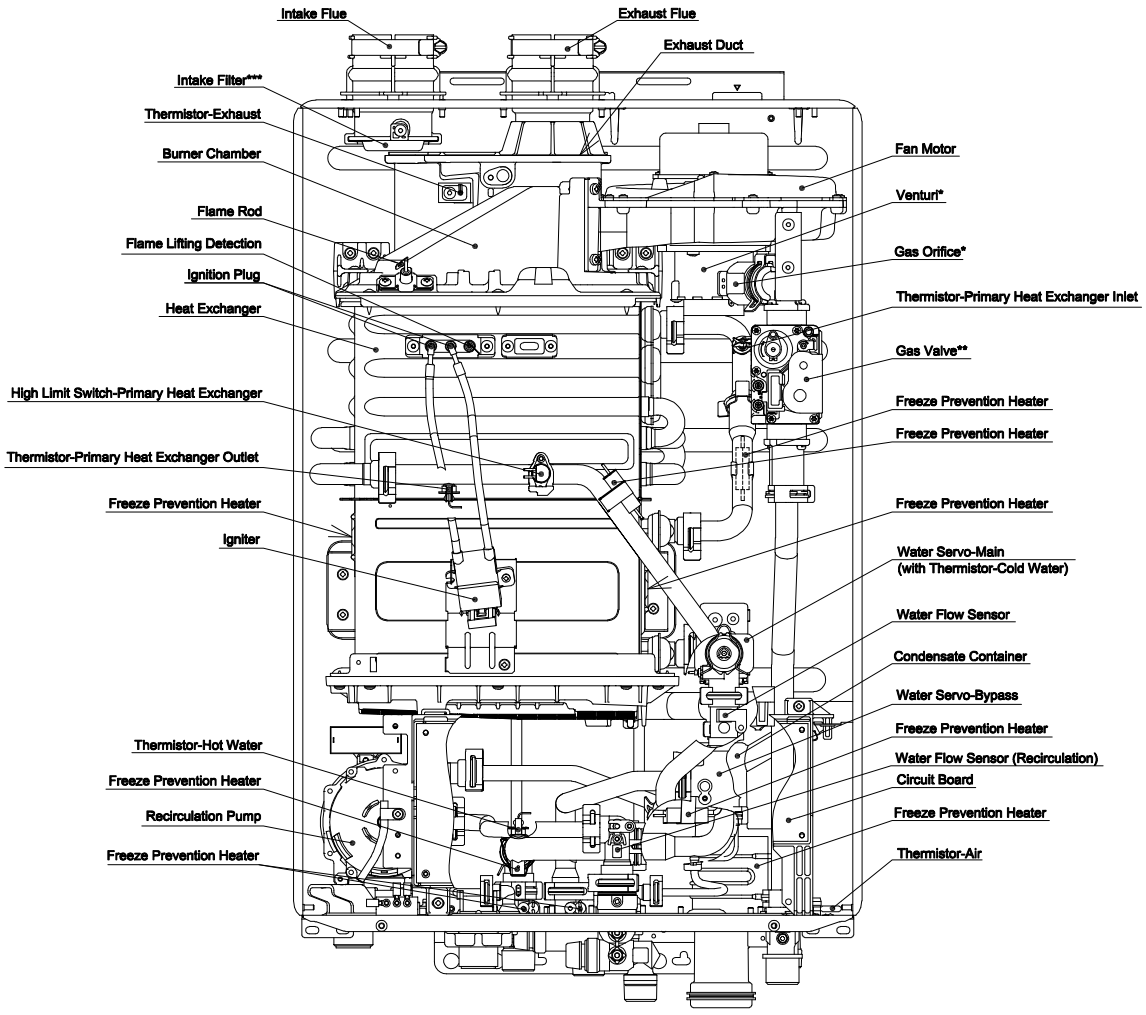
Technical Sheet

Models	
	NRCR111DV(GQ-C3260WXQ-FF US)
	NRCR92DV(GQ-C2660WXQ-FF US)
	PR199DV(GQ-C3260WXQ-FF PB US)

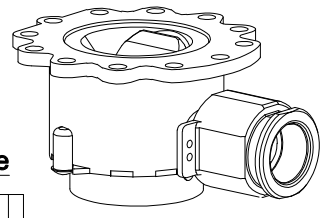
WARNING When performing maintenance, disconnect the power supply from the unit for your safety. Never attach measuring equipment or change components with the power supply connected to the unit.

■ Components

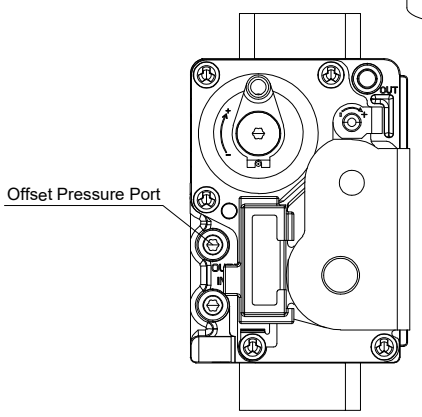
NRCR111DV(GQ-C3260WXQ-FF US), NRCR92DV(GQ-C2660WXQ-FF US)
PR199DV(GQ-C3260WXQ-FF PB US)



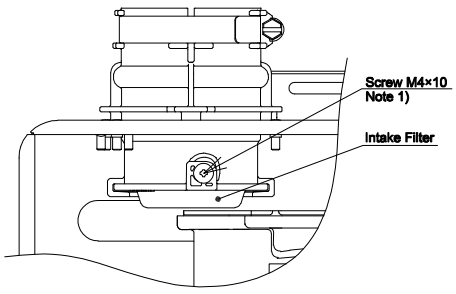
* Venturi and Gas Orifice



**Gas Valve

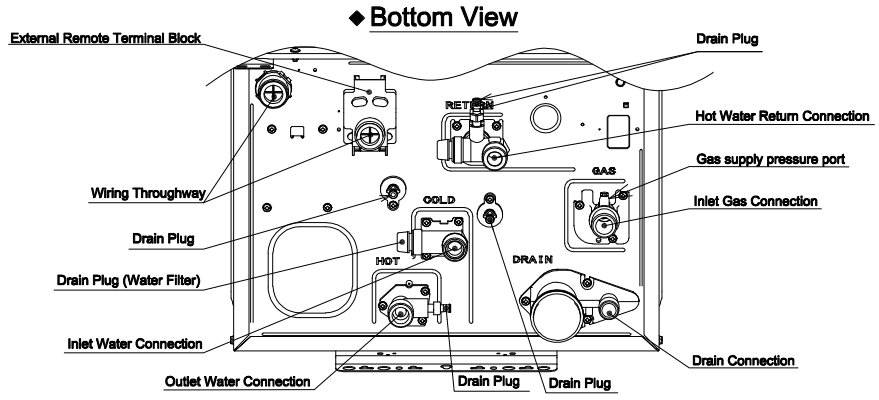


***Intake Filter



Note 1) When securing the Intake Filter with the Screw(M4×10), only tighten by a hand screwdriver.(No Drills)

◆ Bottom View



■ Error Codes and Checkpoints

Display*	Description	Diagnosis Point (Trouble Point)	Remarks
(F) 06	Low recirculation flow (Only Warning Indication) NOTE) Even though the unit is detecting recirculation flow, but the flow is not enough for proper recirculation operation.	Check return line filter. <Dedicated mode only> Purge the air in the domestic hot water line and return line. <Crossover mode only> Check the crossover valve's filter	
(F) 10	Combustion abnormality (Only memorized in error code history)	Check air supply vent for blockage or obstruction. Check exhaust vent for blockage or obstruction. Have a professional check the gas supply pressure. Check if the condensate drain line (clogged, frozen or slope down). Check the DIP switch settings on the circuit board.	
(F) 11	Ignition failure (Initial flame fault detection)	Check the gas supply piping and pressure. Check for Igniter spark (12). Check Gas Valve (13). Check Flame Rod (10). Check ground, paying special attention to the ground connection to the Circuit Board.	
(F) 12	Flame Rod does not detect flame (Flame fault detection)	Check for accidental extinction of the flame. Check for abnormal combustion. Check Gas Valve (13). Check Flame Rod (10). Check ground, especially on Circuit Board. Check for any exhaust gas leaking in the appliance or leaking from the vent pipe.	
(F) 13	External CO alarm triggered	Check for abnormal combustion. Check all vent components are secure and fully connected. Check for any exhaust leaking from vent pipes. Check if CO alarm wire cut off.	
(F) 15	Abnormally high input temperature	Measure the resistance through the Thermistor -Primary Heat Exchanger Inlet (6). Check gas type.	
(F) 16	Abnormally high output temperature	Measure the resistance through the Thermistor-Hot Water (5). Check for the offset pressure of the gas valve and gas type.	
(F) 20	High Limit Switch -Primary Heat Exchanger triggered	Check if High Limit Switch-Primary Heat Exchanger is triggered (14). Check for improper connection of High Limit Switch-Primary Heat Exchanger. Check if the Scale Build-up in the Heat Exchanger.(This error code may be caused by Scale Build-up in the Heat Exchanger)	To reset this error code, the power needs to be disconnected and then reconnected.
(F) 30	Thermistor-Air abnormality	Measure the resistance through the Thermistor-Air (15). Check for an open or short circuit. Check for improper connection of Thermistor-Air.	
(F) 31	Thermistor-Cold Water abnormality	Measure the resistance through the Thermistor-Cold Water (4). Check for an open or short circuit. Check for improper connection of Thermistor-Cold Water.	
(F) 32	Thermistor-Hot Water abnormality	Measure the resistance through the Thermistor-Hot Water (5). Check for an open or short circuit. Check for improper connection of Thermistor-Hot Water.	
(F) 33	Thermistor-Primary Heat Exchanger Outlet abnormality	Measure the resistance through the Thermistor-Heat Exchanger Outlet (7). Check for an open or short circuit. Check for improper connection of Thermistor-Heat Exchanger Outlet.	
(F) 35	Thermistor-Exhaust abnormality	Measure the resistance through the Thermistor-Exhaust (8). Check for an open or short circuit. Check for improper connection of Thermistor-Exhaust.	
(F) 36	Thermistor-Primary Heat Exchanger Inlet abnormality	Measure the resistance through the Thermistor-Heat Exchanger Inlet (6).Check for an open or short circuit. Check for improper connection of Thermistor-Heat Exchanger Inlet.	
(F) 42	Water Flow Sensor (Recirculation) abnormality	Check voltage from Circuit Board (17).	
(F) 61	Fan Motor abnormality	Check that the fan is rotating and check the pulse frequency from the fan rotational frequency sensor (11). Check for improper connection of the fan. Check voltage from Circuit Board.	
(F) 63	Recirculation Abnormality (No recirculation flow) NOTE) The unit is not detecting recirculation flow.	Check return line filter. <Dedicated mode only> Purge the air in the domestic hot water line and return line. <Crossover mode only> Check the connector marked “Crossover” is closed. Check the crossover valve's filter	
(F) 65	Water Servo-Main abnormality	Check that the Water Servo-Main is functioning (1). Check for improper connection of the valve.	To reset this error code, the power needs to be disconnected and then reconnected.
(F) 66	Water Servo-Bypass abnormality	Check that the Water Servo-Bypass is functioning (2). Check for improper connection of the valve.	To reset this error code, the power needs to be disconnected and then reconnected.
(F) 70	Circuit Board abnormality	Circuit Board failure.	To reset this error code, the power needs to be disconnected and then reconnected.
(F) 71	Gas Valve drive circuit abnormality	Check for damage to the Gas Valve drive circuit on the Circuit Board.	To reset this error code, the power needs to be disconnected and then reconnected. If the display continues, contact nearest agent.
(F) 72	Flame Rod circuit abnormality (Detection of flame when no flame is present)	Measure the current from the Flame Rod when there is no flame (9). Check for a ground fault.	
(F) 73	Circuit Board setting abnormality (Improper Maintenance Writers Settings, DIP Switch Settings, etc.)	Check for proper setting of maintenance writers on Circuit Board. Check the Circuit Board (microcomputer) for damage. Check the dip switch settings. e.g.) Exhaust type, vent length, etc.	This error is displayed when switching the dip switch with the power on. To reset this error code, the power needs to be disconnected and then reconnected.
F76	Multi-system communication error	Check for proper connection of Quick Connect Cord.	
760	Remote Controller transmission abnormality	Check connection from Remote Controller to Circuit Board. Check Remote Controller and Circuit Board for damage.	
(F) 90	Combustion abnormality (Unit shuts off)	Check air supply vent for blockage or obstruction. Check exhaust vent for blockage or obstruction. Have a professional check the gas supply pressure. Check if the condensate drain line is clogged or frozen. Check that the condensate drain pipe slopes down. Check the dip switch settings on the circuit board.	To reset this error code, the power needs to be disconnected and then reconnected. If the display continues, contact nearest agent.
(F) 94	Exhaust temperature is too high	Check for abnormal combustion (8).	To reset this error code, the power needs to be disconnected and then reconnected.
(F) C1# # = 1-9	Service Reminder (Warning Indication)	This unit is equipped with a service reminder. Excessive scale build-up may cause premature failure of the heat exchanger. Excessive dust or lint build-up in the fan and air intake may affect efficiency and combustion performance . Contact the phone number of instruction manual for additional information about recommended maintenance.	

*In a Quick Connect Multi-System, "F##"(except F76) indicates an error code from the secondary unit (unit without a remote controller).

■ Circuit Board Checkpoints

Ref. No.	Part	Circuit board Check points (Check the wiring diagram behind the front cover)					Normal value	Remarks
		CN & Pin	No.	Wire Color	CN & Pin	No.		
1	Water Servo-Main	CN59	12	W - O	CN59	7	DC 1 - 16 V	
			12	W - G		8	DC 1 - 16 V	
			12	W - V		9	DC 1 - 16 V	
			12	W - BK		10	DC 1 - 16 V	
			11	Y - BL		28	DC 1V or less	When valve is fully open
2	Water Servo-Bypass	CN59	1	W - O	CN59	3	DC 1 - 16 V	
			1	W - G		4	DC 1 - 16 V	
			1	W - V		5	DC 1 - 16 V	
			1	W - BK		6	DC 1 - 16 V	
			2	Y - BL		28	DC 1V or less	When valve is fully open
3	Water Flow Sensor	CN59	30	R - BL	CN59	28	DC 14 - 16 V	
			29	Y - BL		28	DC 0.5 - 15 V	
4	Thermistor-Cold Water	CN63	7	W - W	CN63	2	Note 1)	Note 1)
5	Thermistor-Hot Water	CN63	1	W - W	CN63	2	Note 1)	Note 1)
6	Thermistor-Primary Heat Exchanger Inlet	CN63	5	W - W	CN63	2	Note 1)	Note 1)
7	Thermistor-Primary Heat Exchanger Outlet	CN63	8	W - W	CN63	2	Note 1)	Note 1)
8	Thermistor-Exhaust	CN63	3	W - W	CN63	2	Note 2)	Note 2)
9	Flame Rod	CN78	3	BL - Heat exchanger	-	GND	10 kHz - 100 kHz	
			3	BL - Electrode		Flame Rod	DC 0.45μA or less	When no flame is detected
10	Flame Rod	CN78	3	BL - Heat exchanger	-	GND	10 kHz - 100 kHz	
			3	BL - Electrode		Flame Rod	DC 1μA or more	At flame detection
11	Fan Motor	CN27	6	W - BL	CN27	4	DC 140 - 187 V	
			3	R - BL		4	DC 13 - 16 V	
			1	O - BL		4	DC 1.69 - 8.25 V	When fan is rotating
			2	Y - BL		4	208Hz - 1300 Hz	12 pulse/revolution
12	Igniter	CN42	6	W - BK	CN1	2	AC 108 - 132 V	When igniter is sparking
13	Gas Valve	CN10	1	R - BL	CN10	2	DC 90 - 120 V	When valve is open
							1.22 kΩ - 1.50 kΩ	Coil resistance Note 4)
14	High Limit Switch -Primary Heat Exchanger	CN42	1	BK - W	CN1	1	1Ω or less	Contact resistance Note 4)
15	Thermistor - Air	CN63	6	BK - W	CN63	2	Note 3)	Note 3)
16	Recirculation Pump	CN42	3	W - BK	CN1	2	AC 108 - 132 V	When Pump is working
17	Water Flow Sensor (Recirculation)	CN59	30	R - BL	CN59	28	DC 14 - 16 V	
			27	Y - BL		28	DC 0.5 - 15 V	
-	Power Supply (Power Circuit Board)	CN92	3	W - BL	CN92	4	AC 108 - 132 V	
-	Power Supply (Power Circuit Board)	CN92	1	W - BK	CN92	2	AC 108 - 132 V	
-	Remote Controller	CN89	1	BL - BL	CN89	3	DC 14 - 16 V	

Note 1) •Cold Water / Hot water / Primary Heat Exchanger Inlet / Primary Heat Exchanger Outlet Thermistor Temperature Characteristics

Temperature (° F)	32	50	68	86	104	122	140	158	176
Temperature (° C)	0	10	20	30	40	50	60	70	80
Resistance (k Ω)	23.7	15.5	10.3	7.0	4.9	3.5	2.5	1.9	1.4
Voltage (V)	4.5	4.3	4.0	3.6	3.2	2.8	2.4	2.0	1.7

Note 2) •Thermistor - Exhaust Temperature Characteristics

Temperature (° F)	-4	14	32	50	68	86
Temperature (° C)	-20	-10	0	10	20	30
Resistance (k Ω)	487	276	162	98.3	61.4	39.5
Voltage (V)	4.6	4.3	3.9	3.4	2.8	2.3

Note 3) •Thermistor - Air Temperature Characteristics

Temperature (° F)	-4	14	32	50	68	86
Temperature (° C)	-20	-10	0	10	20	30
Resistance (k Ω)	101.7	57.7	33.8	20.4	12.6	8.0
Voltage (V)	4.4	4.0	3.5	2.9	2.3	1.7

Note 4) When measuring the resistance, disconnect the connector from circuit board and check the connector side.

Refer to appliance's installation manual or reach out to our customer care, if more information is needed.
Contact details are available on the rating plate of the appliance.

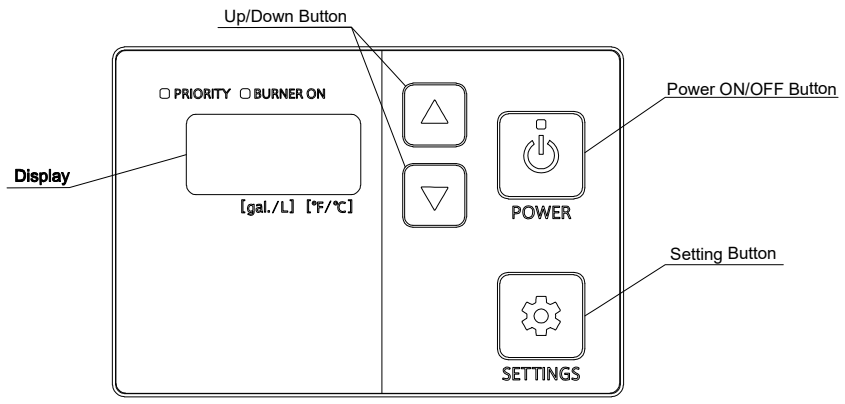
■ Displaying Maintenance Monitors

<Display Procedure>
1. Press and hold both the Up [▲] and Down [▼] Buttons simultaneously for more than 2 seconds.
   This can be done regardless of whether the power has been turned on or the unit is operating.

<Indications>
1. The maintenance monitor data No. will appear on the display for two seconds, and then the data will appear.
2. In order to switch to other maintenance monitor data, press either the up or down button once. The data No. will then reappear, then different data No. can be selected using the Up [▲] and Down [▼] Buttons. When the maintenance monitor data No. is changed, the data No. will be displayed for two seconds, after which the data will appear.
3. With the Remote Controller in maintenance mode, the hot water set temperature and Settings cannot be adjusted.

<Returning to Normal Mode>
1. To return to normal mode, press and hold both the Up [▲] and Down [▼] Button simultaneously more than two seconds, or leave it alone for more than 10 minutes.

●Remote Controller



■ When setting the maximum temperature to 125-140°F (55-60°C)

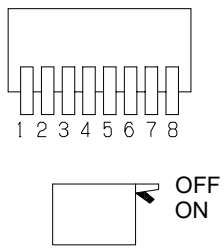
1. Turn the unit off by pressing the Power ON/OFF Button on the Remote Controller.
2. Press and hold the Setting Button until a sound is heard (2 sec.) and 120 °F (50 °C) appears on the display.
3. Set the upper limit of the hot-water supply temperature to 125°F, 130 °F, 135 °F or 140 °F (55 °C or 60 °C) using the Up [▲] and Down [▼] Buttons.
4. To put the unit back into operation, press the power ON/OFF Button on the Remote Controller. To keep the unit off, let the unit sit for 30 sec. to return to the original display.

■ DIP Switch Settings

Disconnect the electrical power to the water heater before adjusting the DIP Switches.

The following settings can be adjusted using the DIP Switches:
1. To set up with the common vent system, SW 1 needs to be turned on.*
2. By using SW 2 and 3, it can adapt to the setting of the exhaust type.**
3. By using SW 5 and 6, adjustments can be made for use at high elevation.
4. By using SW 7 and 8, adjustments can be made for extended vent lengths. Refer to the "Setting list for DIP Switches" table for details.

［DIP Switches ］



Setting list for DIP Switches

SW1	SW2	SW3		SW5	SW6		SW7	SW8	
Common vent system*	Exhaust type**			Elevations above 2000ft			Vent Length Adjustment and Vent Size		
SW1	SW2	SW3		SW5	SW6	High Elevation Adjustment	SW7	SW8	
OFF	OFF	OFF	DV	OFF	OFF	0~2000ft (0~610m)	OFF	OFF	2" Short Length
ON	ON	OFF	OD	ON	OFF	2001~4000ft (611~1219m)	ON	OFF	2" Long Length
	OFF	ON	SV	OFF	ON	4001~7000ft (1220~2134m)	OFF	ON	3" Short Length
	ON	ON	EZTR	ON	ON	7001~10000ft (2135~3048m)	ON	ON	3" Long Length

* Refer to the Installation Manual of common vent system for detail information.
** DV : Direct Vent, OD : Outdoor (using VC-6), SV : Single Vent (using SV Conversion Kit), EZTR : 2" PP Flexible Pipe (using EZ2-CK)

All Recirculation Mode Settings

Recirculation Mode／ Recirculation Timer	Unit Itself Settings					Required Additional Item
	Crossover Connector	Maintenance Writer #				
		22	23	24	3B	
①External / Auto (Default)	OFF	OFF	OFF	OFF	OFF	Nothing
②External / On Demand (TT24)	OFF	ON	ON	OFF	ON	On Demand Switch
③External / Manual	OFF	ON	OFF	ON	OFF	RC-9018M
④External / Always (24hrs)	OFF	OFF	ON	OFF	OFF	Nothing
⑤Crossover / Auto	ON	OFF	OFF	OFF	OFF	Cross Over Valve
⑥Crossover / On Demand (TT24)*	ON	ON	ON	OFF	ON	Cross Over Valve, On Demand Switch
⑦Crossover / Manual	ON	ON	OFF	ON	OFF	Cross Over Valve, RC-9018M
⑧Crossover / Always (24hrs)**	ON	OFF	ON	OFF	OFF	Cross Over Valve, RC-9018M
⑨No Recirculation*** (Pump Always OFF)	OFF	ON	ON	OFF	OFF	Nothing

* Possible to set ⑥, but the unit behaves as ⑤.
** Not recommended Recirculation Mode because of the unit can't detect Reirculation failure.
*** If a customer uses RC-7651M (residential remote), can stop recirculation without Maintenance Writer changing. See the Owner's Guide for detail information.

■ Adjusting Gas Valve Offset Pressure

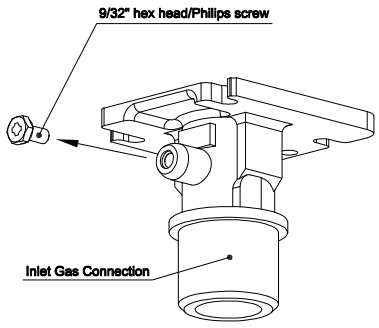
Use the following procedure to adjust the gas valve offset pressure:
1. Shut off the main gas supply valve.
2. When the gas valve offset pressure is adjusted, remove the front cover. Because it is not possible to adjust the gas valve offset pressure with the front cover attached.
3. Remove the 9/32" hex head/Philips screw from the Gas Supply Pressure port on the Inlet Gas Connection and connect the manometer or pressure gauge using a silicon tube.
4. Loosen the screw of Offset Pressure Port on the gas valve and connect the manometer or pressure gauge using a silicon tube. For dual port manometer, use the positive pressure side.
5. Open the gas supply valve and operate the unit.
6. Press and hold both the "Mode" and "Minimum" buttons on the Circuit Board simultaneously for more than 3 seconds. After releasing your fingers, the low fire condition will last 30 minutes.
7. If gas valve offset pressure adjustment needed, remove the cap of gas valve, and then adjust the gas offset pressure by turning the set screw no more than 1/8 turn.
8. After offset pressure adjustment, do not forgot to tighten the 9/32" hex head/Philips screw to the Gas Supply Pressure Port. To return to the normal operation, press and hold the "Mode" button for more than 3 seconds.

Gas Offset Value

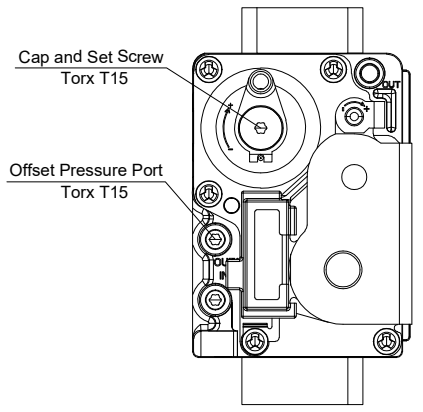
Gas type	Supply Pressure (inch H_2O)	Offset (inch H_2O)
NG	7.9	-0.02
LP	11.0	-0.02

*** Gas offset pressure values are subject to change without prior notice. Check the latest burner specification table.**

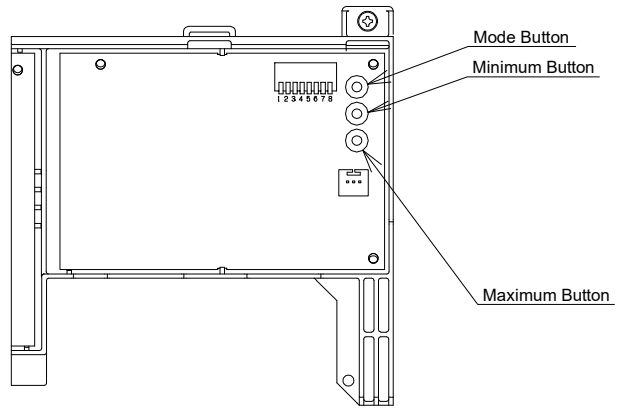
●Gas Supply Pressure Port



●Gas Valve



●Circuit Board



■ Maintenance Monitor List

Data No.	Item	Data (Display Reading X Multiplier) Multiplier	Unit	Minimum Value for Indication	Remarks
03	Total Plug-in Time	X 100	hour	100 hour	Disp. Range [000] - [1310]
04	Total Combustion Time	X 1	hour	1 hour	Disp. Range [000] - [999]
05	Total Combustion Time	X 1000	hour	1000 hour	Disp. Range [000] - [065]
06	Total Pump operating Time	X 100	hour	100 hour	Disp. Range [000] - [1999]
07	Number of Ignition Times	X 10	time	10 times	Disp. Range [000] - [999]
08	Number of Ignition Times	X 10000	time	10000 times	Disp. Range [000] - [065]
10	Fan Rotational Frequency	X 10	rpm	10 rpm	
11	Service Reminder Hours Accumulated(1)	X 1	hour	1 hour	Disp. Range [000] - [999]
12	Service Reminder Hours Accumulated(1)	X 1000	hour	1000 hour	Disp. Range [000] - [065]
14	Total Flow Rate	X 0.1	gal/min	0.1 gal/min	*1
		X 0.1	L/min	0.1L/min	*2
17	Recirculation Flow Rate	X 0.1	gal/min	0.1 gal/min	*1
		X 0.1	L/min	0.1L/min	*2
18	Output (%)	X 1	%	1 %	
20	Calculated Fan Speed	X 10	rpm	10 rpm	
21	Service Reminder Hours Accumulated(2)	X 1	hour	1 hour	Disp. Range [000] - [999]
22	Service Reminder Hours Accumulated(2)	X 1000	hour	1000 hour	Disp. Range [000] - [065]
29	Reason why the unit does not run.	---	---	---	[001] : Water inlet temperature is too high → If possible decrease water inlet temperature [002] : Calculated water outlet temperature is too high → If possible increase flow rate [004] : Inlet and Outlet temperature are reversed → Check the pipes and re-install it correctly
30	Thermistor-Cold Water Detection Temperature	X 1	°F	1°F	*1
		X 0.1	°C	0.5°C	*2
31	Thermistor-Hot Water Detection Temperature	X 1	°F	1°F	*1
		X 0.1	°C	0.5°C	*2
32	Thermistor-Primary Heat Exchanger Outlet Detection Temperature	X 1	°F	1°F	*1
		X 0.1	°C	0.5°C	*2
33	Thermistor-Primary Heat Exchanger Inlet Detection Temperature	X 1	°F	1°F	*1
		X 1	°C	1°C	*2
36	Thermistor-Exhaust Detection Temperature	X 1	°F	1°F	*1
		X 1	°C	1°C	*2
38	Thermistor-Air Detection Temperature	X 1	°F	1°F	Disp. Range [014] - [050] *1
		X 1	°C	1°C	Disp. Range [-10] - [010] *2
50	FF No.-Primary Heat exchanger	X 0.1		0.1	
51	FF+FB No.-Primary Heat exchanger	X 0.1		0.1	
52	Output-Primary Heat exchanger	X 0.1		0.1	
53	Output-Total	X 0.1		0.1	
60	Position of Water Servo-Main	X 2	Step		[000](open) - [1700](closed)
62	Position of Water Servo-Bypass	X 2	Step		[000](open) - [1700](closed)
65	Number of Pump Operation Times	X 1000	time	1000 times	
66	Initial Recirculation Flow	X 0.1	gal/min	0.1 gal/min	Memorized recirculation flow rate as initial recirculation condition. *1
		X 0.1	L/min	0.1L/min	Memorized recirculation flow rate as initial recirculation condition. *2
78	Flame Lifting Detection	---	---	---	OFF [0-0], ON [0-1]
80	Remaining Time of Scale Flushing	X 1	minute	1 minute	[000] - [060]
82	Number of Scale Flushing Times	X 1	time	1 times	[000] - [255]
86	Recirculation Mode	---	---	---	Dedicated Mode / Crossover Mode Auto Recirc (Default) 11 / 21 Manual Timer Recirc 12 / 22 Always Recirc ON 13 / 23 Always Recirc OFF 14 / 24 On-Demand (Title24) Mode 15 / 25
87	Circuit Board ID1: Product 1	[1:xy]			A=101,B=102,C=103,・・・ ,Z=226
88	Circuit Board ID2: Product 2	[2:xy]			A=201,B=202,C=203,・・・ ,Z=326
89	Circuit Board ID3: Version	[3:xy]			A=301,B=302,C=303,・・・
91	Error Code History 1	Most Recent Error Code			If the same error code is repeated, it will appear in the history list twice. If it is repeated more than twice, it will only appear twice.
92	Error Code History 2	Next Most Recent Error Code			
93	Error Code History 3	Next Most Recent Error Code			
94	Error Code History 4	Next Most Recent Error Code			
95	Error Code History 5	Next Most Recent Error Code			
96	Error Code History 6	Next Most Recent Error Code			
97	Error Code History 7	Next Most Recent Error Code			
98	Error Code History 8	Next Most Recent Error Code			

*1 When Remote Controller is in °F/Gallons mode.
*2 When Remote Controller is in °C/Liters mode.