Technical Sheet

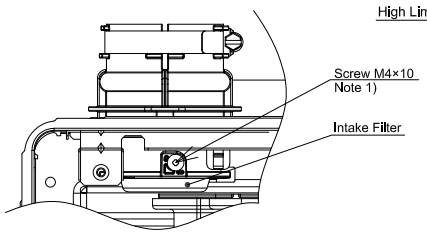
Models	
	NRCB199DV(GHQ-C3201WX-FF US)
	NRCB180DV(GHQ-C2801WX-FF US)
	PV199DV(GHQ-C3201WX-FF PB US)

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.

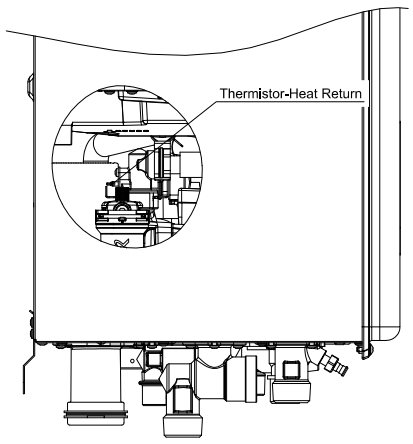
■ Components

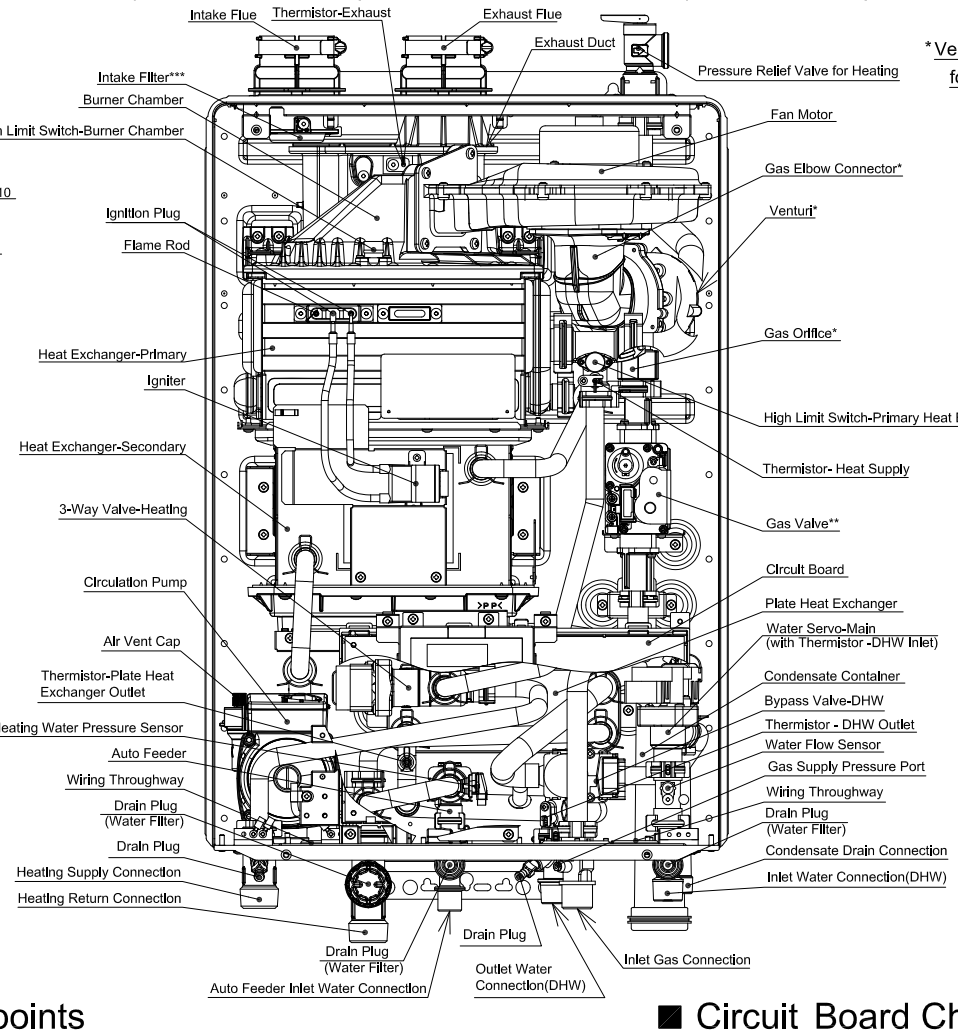
NRCB199DV(GHQ-C3201WX-FF US)、NRCB180DV(GHQ-C2801WX-FF US)、PV199DV(GHQ-C3201WX-FF PB US)

*** Intake Filter



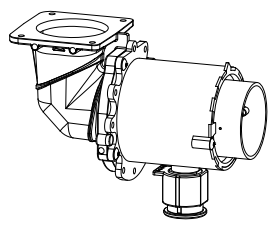
Note 1) When securing the Intake Filter with the Screw(M4×10), only tighten by a hand screwdriver.(No Drills)



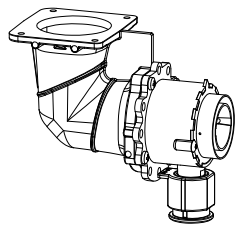


*Venturi, Gas Orifice and Gas Elbow Connector

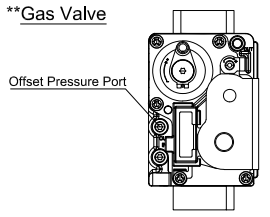
for NRCB199DV(GHQ-C3201WX-FF US) PV199DV(GHQ-C3201WX-FF PB US)



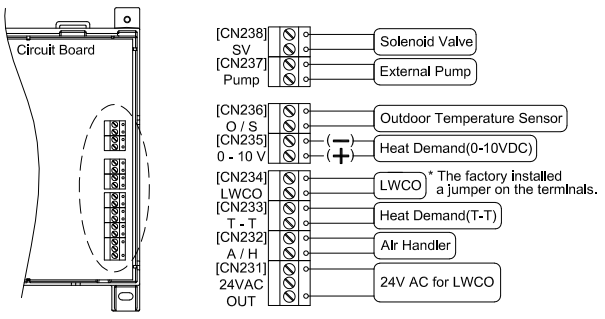
for NRCB180DV(GHQ-C2801WX-FF US)



**Gas Valve



●Wiring Diagram for External Options on Circuit Board



■ Error Codes and Checkpoints

Display*	Description	Diagnosis Point (Trouble Point)	Remarks
(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 is clogged or frozen. Check that the condensate drain pipe slopes 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 (15). Check Gas valve (16). Check Flame Rod (12). 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 (16). Check Flame Rod (12). Check ground, especially on Circuit Board.	
(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) 16	Abnormally high output temperature	Measure the resistance through the Thermistor-DHW Outlet (10). Check for the offset pressure of the gas valve. Check gas type.	
17	Low Heating Water Pressure (Small amount of water leakage)	Water pressure becomes lower than [Setting Pressure - 4] psi 8 times in 4 hours. Check the Auto Feeder (17). Check the water leakage.	
(F) 20	High Limit Switch-Primary Heat Exchanger triggered	Check if High Limit Switch-Primary Heat Exchanger is triggered (20). Check for improper connection of High Limit Switch-Primary Heat Exchanger. Clean the water filter in the Drain Cock. Check the Circulation Pump speed setting as speed III. 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) 21	High Limit Switch-Burner Chamber triggered	Check if High Limit Switch-Burner Chamber is triggered (19). Check for improper connection of High Limit Switch-Burner Chamber. Clean the water filter in the Drain Cock. Check the Circulation Pump speed setting as speed III. Check if the Scale Build-up in the Heat Exchanger. Check if the Burner Chamber is clogged or damaged.	To reset this error code, Contact the nearest agent.
24	Heat Demand(0-10VDC) reverse connection	Check the Heat Demand(0-10VDC) wires connect the correct terminals on the Circuit Board (26). This terminals has electrical polarity.	
26	Low Water Cutoff abnormality	In case using LWCO : Measure 24VAC from terminal on Circuit Board (30), and check if LWCO operates normally (27). In case not using LWCO : Measure 24VAC from terminal on Circuit Board (30), and check that a short circuit connector is connected. Ensure that the LWCO in piping system is properly installed. Make-up water to the system if necessary. Check the Auto Feeder (17).	
(F) 30	Outdoor Temperature Sensor Open or Short Circuit	Check Outdoor Temperature Sensor. Ensure connections are secure (25). Check sensor resistance. If resistance is zero, replace the sensor.	
(F) 31	Thermistor-DHW Inlet abnormality	Measure the resistance through the Thermistor-DHW Inlet (9). Check for an open or short circuit. Check for improper connection of Thermistor-DHW Inlet.	
(F) 32	Thermistor-DHW Outlet abnormality	Measure the resistance through the Thermistor-DHW Outlet (10). Check for an open or short circuit. Check for improper connection of Thermistor-DHW Outlet.	
(F) 33	Thermistor-Plate Heat Exchanger Outlet abnormality	Measure the resistance through the Thermistor-Plate Heat Exchanger Outlet (8). Check for an open or short circuit. Check for improper connection of Thermistor-Plate Heat Exchanger Outlet.	
(F) 35	Thermistor-Exhaust abnormality	Measure the resistance through the Thermistor-Exhaust (5).Check for an open or short circuit. Check for improper connection of Thermistor-Exhaust.	
(F) 36	Thermistor- Heat Supply abnormality	Measure the resistance through the Thermistor- Heat Supply (7). Check for an open or short circuit. Check for improper connection of Thermistor- Heat Supply. Clean the water filter in the Drain Cock. Check the Circulation Pump speed setting as speed III. Check if the Scale Build-up in the Heat Exchanger.	
37	Thermistor-Heat Return abnormality	Measure the resistance through the Thermistor-Heat Return (6). Check for an open or short circuit. Check for improper connection of Thermistor-Heat Return.	
43	Heating Water Pressure Sensor abnormality	Check the Heating Water Pressure Sensor (21). Check for an open or short circuit.	
44	High Heating Water Pressure	Water pressure higher than 42 psi over 10 seconds. Check the Heating Water Pressure Sensor wiring connection. Check the output voltage of the Heating Water Pressure Sensor (21). Check the Pressure Relief Valve for Heating.	
54	Low Heating Water Pressure	Water pressure is lower than [Setting Pressure - 8] psi. Check the Auto Feeder (17). Check the Auto Feeder inlet pressure. Check the Heating Water Pressure Sensor (21). Check the water leakage.	
56	External Solenoid Valve abnormality	Check the Solenoid Valve terminal on the Circuit Board (23). Check the Solenoid Valve for Quick Connect Multi System. Check for improper connection of the valve.	
57	Stopped Water Supply	Auto Feeder valve opens over 600 seconds. Check the Heating Water Pressure Sensor wiring connection. Check the Auto Feeder inlet pressure. Check the voltage from Auto Feeder (17). Check the output voltage of the Heating Water Pressure Sensor (21). Check the water leakage.	
(F) 61	Fan Motor abnormality	Check that the Fan Motor is rotating and check the pulse frequency from the fan rotational frequency sensor (13, 14). Check for improper connection of the fan. Check voltage from the Circuit Board.	
(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	Bypass Valve-DHW abnormality	Check that the Bypass Valve-DHW is functioning (2). Check for improper connection of the valve.	
67	3-Way Valve-Heating abnormality	Check that the 3-Way Valve-Heating is functioning (3). Check for improper connection of the valve.	
(F) 70	Circuit Board abnormality	The Circuit Board failure.	
(F) 71	Gas Valve drive circuit abnormality	Check for damage to the Gas Valve drive circuit on the Circuit Board. Measure the resistance through High Limit Switch-Primary Heat Exchanger and High Limit Switch-Burner Chamber (19, 20).	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 (11). 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 the 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 (22).	
760	Operation Panel transmission abnormality	Check connection from the Operation Panel to the Circuit Board. Check the Operation Panel and the Circuit Board for damage.	
88	Service Reminder (Warning indication)	The Combi Boiler is equipped with a Service Reminder to announce for maintenance.	To reset this error code, press the power button on the Operation Panel 5 times in 5 seconds. Contact the nearest agent.
(F) 90	Combustion abnormality (Unit shuts off)	Check the air supply vent for blockage or obstruction. Check the 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 (5).	To reset this error code, the power needs to be disconnected and then reconnected.
FC1	Water Heater's Service Reminder. Refer to Water Heater's Technical Sheet.		

* In a Quick Connect Multi-System, "F##"(except F76) indicates an error code from the Water Heater. Refer to the Water Heater's Technical Sheet.

■ 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	7	W - O	CN59	9	1 - 16 V DC	
			7	W - G		10	1 - 16 V DC	
			7	W - V		11	1 - 16 V DC	
			7	W - BK		12	1 - 16 V DC	
			8	Y - BL		28	1V DC or less	When valve is fully open
			13	R - BL		28	14 - 16 V DC	
2	Bypass Valve-DHW	CN59	1	W - O	CN59	3	1 - 16 V DC	
			1	W - G		4	1 - 16 V DC	
			1	W - V		5	1 - 16 V DC	
			1	W - BK		6	1 - 16 V DC	
			2	Y - BL		28	4 - 6 V DC	
			13	R - BL		28	14 - 16 V DC	
3	3-Way Valve-Heating	CN59	14	W - O	CN59	16	1 - 16 V DC	
			14	W - G		17	1 - 16 V DC	
			14	W - V		18	1 - 16 V DC	
			14	W - BK		19	1 - 16 V DC	
			15	Y - BL		28	1V DC or less	When valve is on the DHW side
			13	R - BL		28	14 - 16 V DC	
4	Water Flow Sensor	CN59	30	R - BL	CN59	28	14 - 16 V DC	
			29	Y - BL		28	DC 0.5 - 15 V	
5	Thermistor-Exhaust	CN63	10	W - W	CN63	2	Note 2)	Note 2)
6	Thermistor-Heat Return	CN63	6	W - W	CN63	2	Note 3)	Note 3)
7	Thermistor-Heat Supply	CN63	13	W - W	CN63	2	Note 3)	Note 3)
8	Thermistor-Plate Heat Exchanger Outlet	CN63	9	W - W	CN63	2	Note 3)	Note 3)
9	Thermistor-DHW Inlet	CN63	3	W - W	CN63	2	Note 3)	Note 3)
10	Thermistor-DHW Outlet	CN63	1	W - W	CN63	2	Note 3)	Note 3)
11	Flame Rod	CN78	1	BL -Heat Exchanger	-	GND	10 kHz - 100 kHz	
			1	BL -Electrode		Flame Rod	DC 0.45μA or less	When no flame is detected
12	Flame Rod	CN78	1	BL -Heat Exchanger	-	GND	10 kHz - 100 kHz	
			1	BL -Electrode		Flame Rod	DC 1μA or more	At flame detection
13	Fan Motor	CN27	6	W - BL	CN27	4	140 - 187 V DC	
14	Fan Motor	CN27	3	R - BL	CN27	4	13 - 16 V DC	
			1	O - BL		4	1.69 - 8.25 V DC	When fan is rotating
			2	Y - BL		4	194 Hz - 1302 Hz	12 pulse/revolution
15	Igniter	CN42	1	W - BK	CN1	2	108 - 132 V AC	When igniter is sparking
16	Gas Valve	CN10	1	R - BL	CN10	2	90 - 120 V DC	When valve is open
							1.22 kΩ - 1.50 kΩ	Coil resistance Note 4)
17	Auto Feeder	CN23	3	W - R	CN23	4	13.5 - 16.5 V DC	When valve is open
18	Circulation Pump	CN42	4	W - W	CN42	5	108 - 132 V AC	When pump is rotating
19	High Limit Switch -Burner Chamber	CN1	1	W - W	CN1	3	1Ω or less	Contact resistance Note 4)
20	High Limit Switch -Primary Heat Exchanger	CN1	1	W - BK	CN42	2	1Ω or less	Contact resistance Note 4)
21	Heating Water Pressure sensor	CN73	1	R - BL	CN73	3	4.5 - 5.5 V DC	
22	Quick connect cord	CN59	20	BL - BL	CN59	28	DC 14 - 16 V	
			21	BL - BL		28	DC 14 - 16 V	
23	Solenoid Valve	CN238	-	-	CN238	-	120 V AC	External Option
24	External Pump	CN237	-	-	CN237	-	120 V AC	External Option
25	Outdoor Temperature Sensor	CN236	-	-	CN236	-	-	External Option Note 5)
26	Heat Demand(0-10VDC)	CN235	-	-	CN235	-	-	External Option
27	LWCO	CN234	-	-	CN234	-	-	External Option
28	Heat Demand(T-T)	CN233	-	-	CN233	-	-	External Option
29	Air Handler	CN232	-	-	CN232	-	-	External Option
30	24VACOUT	CN231	-	-	CN231	-	22.8 - 25.2 V AC	External Option
-	Power Supply (Main Circuit Board)	CN230	1	O - O	CN230	3	22.8 - 25.2 V AC	
-	Power Supply (Power Circuit Board)	CN94	1	BK - BK	CN94	2	108 - 132 V AC	
-	Power Supply (Power Circuit Board)	CN92	5	W - BK	CN92	7	108 - 132 V AC	
-	Operation Panel	CN89	1	BL - BL	CN89	3	14 - 16 V DC	

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 - Heat Return / Heat Supply / Plate Heat Exchanger Outlet / DHW Outlet / DHW Inlet 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 4) When measuring the resistance, disconnect the connector from the Circuit Board and check the connector side.

Note 5) •Outdoor Temperature Sensor Temperature Characteristics

Temperature (° F)	-40	-22	-4	14	32	50	68	86	104	122
Temperature (° C)	-40	-30	-20	-10	0	10	20	30	40	50
Resistance (k Ω)	1724.5	896.2	487.4	276.1	162.2	98.3	61.5	39.5	26.1	17.6
Voltage (V)	4.6	4.3	3.8	3.2	2.6	2.0	1.4	1.0	0.7	0.5

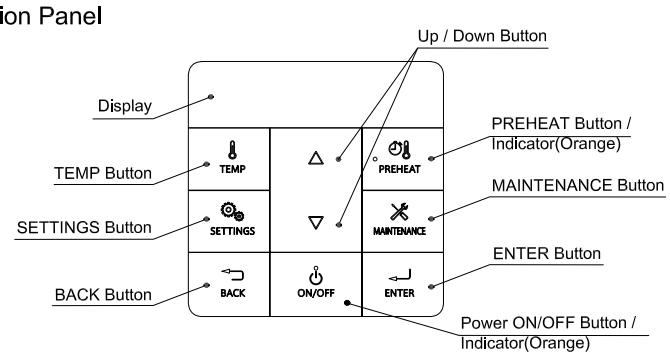
Refer to appliance's installation manual or reach out to our customer care, if more information is needed.
Contact details are available on the rating plate of the appliance.

■ Maintenance Monitors(Technical Data)

●How to enter the Maintenance Monitors(Technical Data)

1. Press "MAINTENANCE" button.
2. Display shows "1:td", then press "ENTER" button to enter "Maintenance Monitors(Technical Data)" Mode.
   This setting can be done regardless of whether the power button is ON/OFF.
3. The maintenance monitor data No. will appear on the display for two seconds, and then the data will appear.
4. Press either the Up [△] or Down [▽] buttons to navigate through "Maintenance Monitors(Technical Data)".
   When the maintenance monitor data No. is changed, the data No. will be displayed for two seconds, after which the data will appear.
5. Press "BACK" button twice or let it sit for approximately 10 minutes to return to the home screen.

●Operation Panel



●Maintenance Monitor List

Data No.	Item	Data (Display Reading X Multiplier) Multiplier	Unit	Minimum Value for Indication	Remarks
00	Heating Setting	—	—	—	*1
01	Total Heating Combustion Time	X 10	hour	10 hour	Disp. Range [000] - [999]
02	Total Heating Combustion Time	X 10,000	hour	10,000 hour	Disp. Range [000] - [065]
03	Total Plug-in Time	X 100	hour	100 hour	Disp. Range [000] - [1310]
04	Total DHW Combustion Time	X 1	hour	1 hour	Disp. Range [000] - [999]
05	Total DHW Combustion Time	X 1,000	hour	1,000 hour	Disp. Range [000] - [065]
06	Total simultaneous use of DHW & Heating Time	X 1	hour	1 hour	Disp. Range [000] - [1999]
07	Number of DHW Ignition Times	X 100	time	100 times	Disp. Range [000] - [999]
08	Number of DHW Ignition Times	X 100,000	time	100,000 times	Disp. Range [000] - [065]
10	Fan Rotational Frequency	X 10	rpm	10 rpm	
11	Number of Heating Ignition Times	X 100	time	100 times	Disp. Range [000] - [999]
12	Number of Heating Ignition Times	X 100,000	time	100,000 times	Disp. Range [000] - [065]
14	Total Flow Rate	X 0.1	gal/min	0.1 gal/min	*2
		X 0.1	L/min	0.1 L/min	*3
18	Output-DHW (%)	X 1	%	1 %	
20	Calculated Fan Speed	X 10	rpm	10 rpm	
29	Logic for unit not operating correctly	---	---	---	[000] : Normal operation [001] : Water inlet temperature is too high → If possible decrease water inlet temperature [004] : Inlet and Outlet temperature are reversed → Check the pipes and re-install it correctly
30	Thermistor-DHW Inlet Detection Temperature	X 1	°F	1°F	*2
		X 0.1	°C	0.5°C	*3
31	Thermistor-DHW Outlet Detection Temperature	X 1	°F	1°F	*2
		X 0.1	°C	0.5°C	*3
32	Thermistor-Plate Heat Exchanger Outlet Detection Temperature	X 1	°F	1°F	*2
		X 0.1	°C	0.5°C	*3
34	Thermistor-Heat Return Temperature	X 1	°F	1°F	*2
		X 0.1	°C	0.5°C	*3
35	Thermistor- Heat Supply Temperature	X 1	°F	1°F	*2
		X 0.1	°C	0.5°C	*3
36	Thermistor-Exhaust Detection Temperature	X 1	°F	1°F	*2
		X 1	°C	1°C	*3
38	Outdoor Temperature Sensor Detection Temperature	X 1	°F	1°F	Disp. Range [-40] - [122] *2
		X 1	°C	1°C	Disp. Range [-40] - [050] *3
41	Temperature setting_DHW Outlet	X 1	°F	1°F	*2
		X 0.1	°C	0.5°C	*3
45	Temperature setting _ Heat Exchanger Outlet	X 1	°F	1°F	*2
		X 0.1	°C	0.5°C	*3
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-DHW	X 0.1	---	0.1	
54	Service Remainder	X 1	month	1 month	[000](OFF), [006] - [060]
55	Simultaneous use of DHW & Heating	---	---	---	[001] : Available [002] : Unavailable [003] : N/A
56	External Pump setting	---	---	---	[001] : N/A, [002] : Available
57	Air Handler	---	---	---	[001] : N/A, [002] : Available
58	Auto Feeder	---	---	---	[001] : Available, [002] : N/A
59	Boost Time function	X 1	minute	1 minute	[000](OFF), [001] - [120]
60	Position of Water Servo-Main	X 2	Step	---	[000](open) - [1700](closed)
62	Position of Bypass Valve-DHW	X 2	Step	---	[000](Bypass side) - [550](PHE side)
64	Position of 3-Way Valve-Heating	X 2	Step	---	[000](DHW side) - [1935](Heating side)
66	Heat Demand Connection	X 0.1	V	0.1V	Disp. Range [000] - [100]
67	Heating Water Pressure	X 0.1	psi	0.1psi	Disp. Range [000] - [450]
68	Heating Water Pressure Setting	X 0.1	psi	0.1psi	Disp. Range [120] - [260]
74	Number of units(in the Quick Connect System)	[x:yz]		---	[001] : 1, [002] : 2
75	Number of combustion units(in the Quick Connect System)	[x:yz]		---	[000] : 0, [001] : 1, [002] : 2
77	Circulation pump	[x:yz]		---	[000] : OFF, [001] : ON
78	Total Circulation pump Run Time	X 10	hour	10 hour	Disp. Range [000] - [999]
79	Total Circulation pump Run Time	X 10,000	hour	10,000 hour	Disp. Range [000] - [065]
80	Remaining Time of Scale Flushing	X 1	minute	1 minute	Disp. Range [000] - [060]
82	Number of Scale Flushing Times	X 1	time	1 time	Disp. Range [000] - [255]
84	Model type1	---	---	---	[199] : NRCB199DV(GHQ-C3201WX-FF US) PV199DV(GHQ-C3201WX-FF PB US) [180] : NRCB180DV(GHQ-C2801WX-FF US)
85	Model type2(subdivision number)	---	---	---	[001]
87	Circuit Board ID1: Product 1	[1:xy]		---	A=101,B=102,C=103,・・・ ,Z=126
88	Circuit Board ID2: Product 2	[2:xy]		---	A=201,B=202,C=203,・・・ ,Z=226
89	Circuit Board ID3: Version	[3:xy]		---	A=301,B=302,C=303,・・・ ,Z=326
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. The screen display will show below. ● w/ subdivision: 90 ⇄ every 2 sec. ⇄ -01 (The subdivision number will appear. Contact the nearest agent for more information.) ● w/o subdivision: 11 (The Error Code is lit.)
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 [100]: Standard, [201]:Outdoor Reset Control_Ft, [202]:Outdoor Reset Control_AH, [203]:Outdoor Reset Control_CI, [204]:Outdoor Reset Control_Lr, [205]:Outdoor Reset Control_rF, [206]:Outdoor Reset Control_rA, [207]:Outdoor Reset Control_CU, [300]:Heat Demand (0 - 10 V)
*2 When the Operation Panel is in °F/Gallons mode.
*3 When the Operation Panel is in °C/Liters mode.

■ When setting the maximum DHW temperature

* The DHW maximum output temperature can be limited to prevent discharging hot water at too high of a temperature.

1. Press the power button to OFF. The Operation Panel must be off.
2. Press "SETTINGS" button, Select "1:US" using the Up [△] and Down [▽] buttons,and then press "ENTER" button.
   The "User Mode" screen appears.
3. Select "U:03" using the Up [△] and Down [▽] buttons. Display shows "dtL", then press "ENTER" button.
4. Change the setting using the Up [△] and Down [▽] buttons. (Initial setting=120°F / 50°C)
   [For Fahrenheit (°F)] : 90 - 140°F (In 5°F intervals), [For Celsius (°C)] : 32, 35, 37 - 48°C (In 1°C intervals), 50, 55, 60°C
5. To return to the home screen, press "BACK" button three times or let it sit for approximately 30 seconds.
   To change other settings, select option and press "ENTER" button.

■ Heating temperature

This Combi Boiler has three heating control modes, and maximum heating temperature depends on these modes.
When changing the heating temperature setting, refer to the Installation Manual.

1. Standard mode:You can change the Heating Set Temperature by adjusting the numbers on display.
2. Outdoor Reset Control mode:Heating temperature depends on outdoor temperature and types of heating application.
3. Heat Demand (0 - 10 V) mode:Heating temperature depends on a signal from external (i.e. building management system).

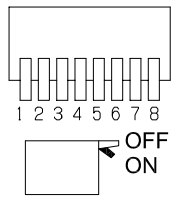
■ Dip Switch Setting

Disconnect the electrical power to the Combi Boiler before adjusting the Dip Switches.

The following settings can be adjusted using the Dip Switches:

1. By using SW 2, it can expand the simultaneous use of DHW & Heating. **
2. SW 3, adjustments can be make for 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* (● :ON ○ :OFF)

SW2		SW3		SW5	SW6		SW7	SW8	
Adjustment for simultaneous use of DHW & Heating**		Exhaust type***		Elevations above 2000ft			Vent Length Adjustment and Vent Size		
SW2		SW3		SW5	SW6	High Elevation Adjustment	SW7	SW8	
○	Normal	○	DV	○	○	0~2000ft (0~610m)	○	○	2" Short Length
●	Expanding	●	SV	●	○	2001~4000ft (611~1220m)	●	○	2" Long Length
				○	●	4001~7000ft (1221~2135m)	○	●	3" Short Length
				●	●	7001~10000ft (2136~3050m)	●	●	3" Long Length

* SW 1 and 4 are blank.
** When the dip switch #2 is ON, Heating temperature setting is increased up to approximately max 30°F during simultaneous operation. Damage caused by increasing Heating temperature is not covered by the Warranty. Check whether for the hydronic heating appliance and plumbing are acceptable it. Refer to Installation Manual for detail information.
*** DV : Direct Vent, SV : Single Vent (using SV Conversion Kit)

■ Adjusting Gas Valve Offset Pressure

Use the following procedure to adjust the gas valve offset pressure:

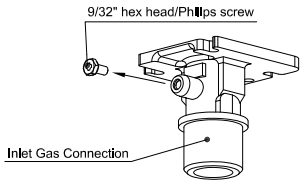
1. Shut off the main gas supply valve.
2. When the gas valve offset pressure is adjusted, remove the front cover.
   Because it is not possible to adjust the gas valve offset pressure with the front cover attached.
3. Remove the 9/32" hex head/Philips screw from the Gas Supply Pressure port on the Inlet 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 the power button on the Operation Panel to ON, and open up fixtures.
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 the 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.
   Tighten the screw of Offset Pressure Port and the Cap on the gas valve.
   To return to the normal operation, press and hold the "Mode" button for more than 3 seconds.

●Gas Offset Value

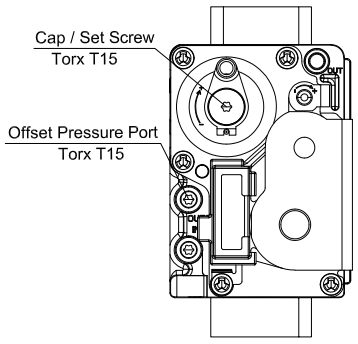
Gas type	Supply Pressure (inch H_2O)	Offset (inch H_2O)
NG	7.0	-0.01
LP	11.0	-0.02

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

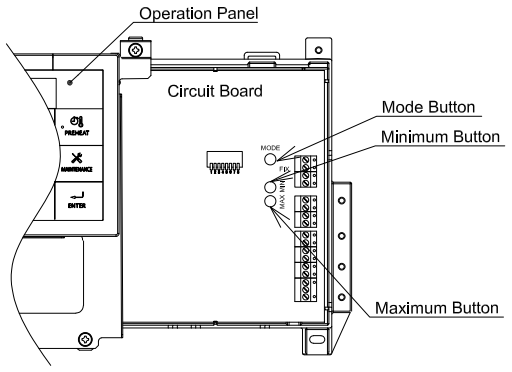
●Gas Supply Pressure Port



●Gas Valve



●Circuit Board



■ Installer Mode

●How to enter the Installer Mode

1. Press the power button to OFF. The Operation Panel must be off.
2. Press "SETTINGS" button. Select "2:In" using the Up [△] and Down [▽] buttons,and then press "ENTER" button.
   The "Installer Mode" screen appears.
3. When entering the "Installer Mode", display will change to "I:01".
   "I:01" displayed for one second, after which "HCt" will appears.
4. Using the Up [△] and Down [▽] buttons to navigate into the desired function in the "Installer Mode".
5. Select the desired function, then press "ENTER" button to enter the function.
6. Using the Up [△] and Down [▽] buttons to change the parameter value.
7. Press "ENTER" button to save the settings and to exit the function.
8. To exit the "Installer Mode" or another function, press "BACK" button.

●Installer Mode List

* Refer to the Installation Manual for detail.

Function	Screen Display	Function Name	Function	Screen Display	Function Name
I:00_FC	FC	Fahrenheit / Celsius * This function will appear within the first 10 minutes of connecting electrical power and before pressing the power button.	I:09_EPP	EPP	External Pump
			I:10_rFt	rFt	Re Fire Time
I:01_HCt	HCt	Heating Control Type	I:11_Pot	Pot	Pump Overrun Time
I:02_tHS	tHS	Type of Heating System	I:12_bFt	bFt	Differential Burner OFF Temperature
I:03_Hot	Hot	Highest Outdoor Temperature	I:13_bot	bot	Differential Burner ON Temperature
I:04_Lot	Lot	Lowest Outdoor Temperature	I:14_HPS	HPS	Heating Water Pressure Setting
I:05_HHt	HHt	Heating High Temp Range	I:15_AFA	AFA	Auto Feeder Activation
I:06_HLt	HLt	Heating Low Temp Range	I:16_dHP	dHP	DHW/Space Heating Priority
I:07_bSt	bSt	Boost Timing	I:17_dHt	dHt	DHW Walt Time
I:08_Air	Air	Air Handler	I:18_CLr	CLr	Setting Clear

■ Diagnostic Mode

●How to enter the Diagnostic Mode

1. Press the power button to OFF. The Operation Panel must be off.
2. Press "MAINTENANCE" button. Select "2:dI" using the Up [△] and Down [▽] buttons,and then press "ENTER" button.
   The "Diagnostic Mode" screen appears.
3. When entering the "Diagnostic Mode", display will change to "d:01".
   "d:01" displayed for one second, after which "ECC" will appears.
4. Using the Up [△] and Down [▽] buttons to navigate into the desired function in the "Diagnostic Mode".
5. Select the desired function, then press "ENTER" button to enter the function.
6. Using the Up [△] and Down [▽] buttons to change the parameter value. Refer to below list for detail.
7. Press "ENTER" button to save the settings and to exit the function.
8. To exit the "Diagnostic Mode" or another function, press "BACK" button.

●Diagnostic Mode List

Function	Screen Display	Function Name & Description
d:01→ECC	ECC	Error Code Clear Press and hold the Up [△] button for approximately 5 seconds. (The Down [▽] button cannot accept.)
d:02→CCH	CCH	Components Check Using the Up [△] and Down [▽] buttons to navigate into the desired sub menu*, and press "ENTER" button. Using the Up [△] and Down [▽] buttons to change the parameter value, and let it sit for approximately 3 seconds. * Sub Menu [1:PP] Pump — [1:oF](Stop Pump)/[2:on](Run Pump) [2:FA] Fan — [1:oF]/[2:Lo](Lowest)/[3:HH](Heating Highest)/[4:dH](DHW Highest) [3:HV] 3-Way Valve-Heating — [1:oF]/[2:dS](DHW Side)/[3:Cr](Center)/[4:HS](Heating Side) [4:AF] Auto Feeder — [1:oF](Close Auto Feeder)/[2:on](Open Auto Feeder) [5:FC] Flow Control Valve — [1:oF]/[2:oP](Open)/[3:Cr](Center)/[4:CL](Close) [6:db] DHW bypass Valve — [1:oF]/[2:PH](Plate Heat Exchanger)/[3:Cr](Center)/[4:by](Bypass)
d:03→SEr	SEr	Service Reminder The Combi Boiler is equipped with a Service Reminder to announce for maintenance. Refer to Installation Manual for detail. Setting Range : OFF(default), 6, 12, 18, 24, 30, 36, 42, 48, 54, 60 months.