

Service Manual

Continuous Type Ice Machines

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1. General Information

1.1. Safety Precautions

 WARNING	
<ul style="list-style-type: none">- This product must be installed in compliance with laws and regulations of the country, state and area of installation.- Read the manual thoroughly before starting installation, maintenance and repair of the product.- Failing to follow the instructions provided in the manual may cause property damage or injury.- The installation, maintenance and repair of the product must be conducted by a certified technician.- The product must be connected to an independent power line and must be earth-wired.- The product must be installed on an even surface, and items with independent head and bin must have aligning openings.- Water supply must provide drinkable water.- The product is filled with high-pressure gas. Make sure to prevent any damage to the refrigerant circuit during installation, maintenance and repair.- Before starting installation, maintenance or repair of the product, make sure to remove all potential risk factors, such as water on the floor.- Make sure to cut off power before starting installation, maintenance or repair of the product.- If cleaning agent or chemical is used during maintenance, make sure to wear protective equipment before conducting work.- Do not remove ice using a sharp object or tool.	

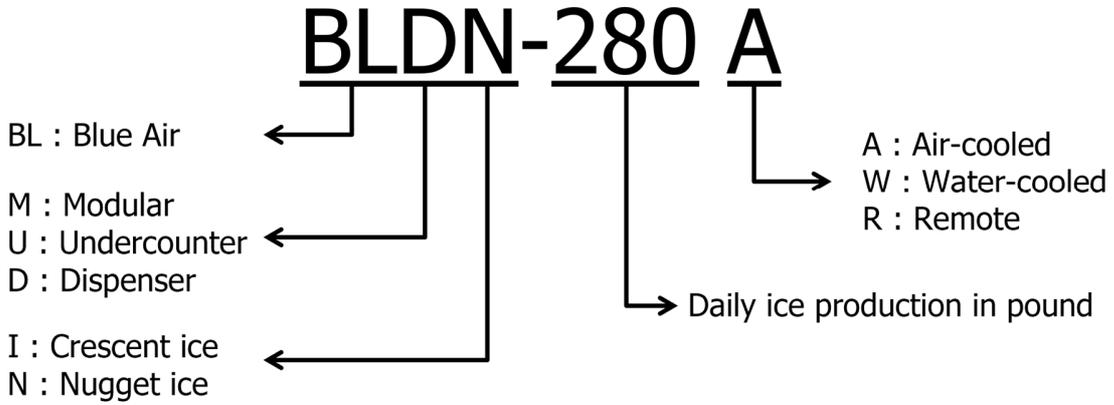
1.2. Warranty information

 WARNING	
- Product or parts damage occurring due to inappropriate use and storage or use of incompatible parts is not subject to warranty coverage.	

Classification		Warranty period
Product		3 years
Parts	Compressor	5 years
	Evaporator	5 years
	Other parts	3 years

1.3. Model Name and Serial Number

1.3.1. Model Name



1.3.2. Serial Number



- a. (4 digits): CIS code for specific model
- b. (1 digit): Product group
- c. (2 digits): Manufacturing site (Supplier code)

a b c d e f

d. (1 digit): Manufacturing year
e. (1 digit): Manufacturing month

Year	2020	2021	2022	2023	2024	2025
Mark	N	R	T	W	X	Y
Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.
Mark	1	2	3	4	5	6
Month	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Mark	7	8	9	A	B	C

- f. (5 digit): Serial number (00001 ~ 99999)

1.4. Installation and Usage Environment

1.4.1. Installation Location

The product must be installed in an area that meets the following conditions:

- Well-ventilated indoor space
- Space with no heat source in the vicinity and no direct sunlight
- Space with sufficient amenities for water supply and drainage, and easy wiring
- Space with no obstacles disturbing the air circulation (heat exchange) around the ice machine
- Clean space with no contamination near the ice machine
- Space with flooring capable of withstanding the weight of the ice machine when it is filled with ice.

1.4.2. Installation Conditions

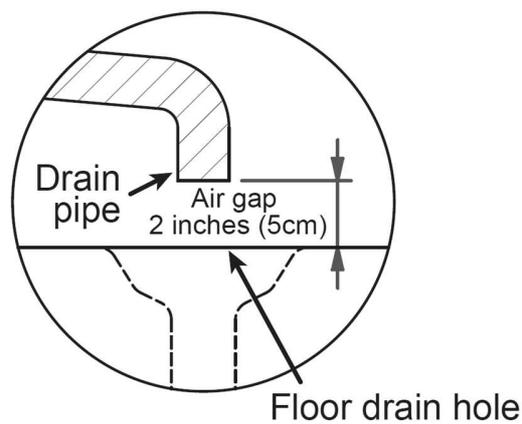
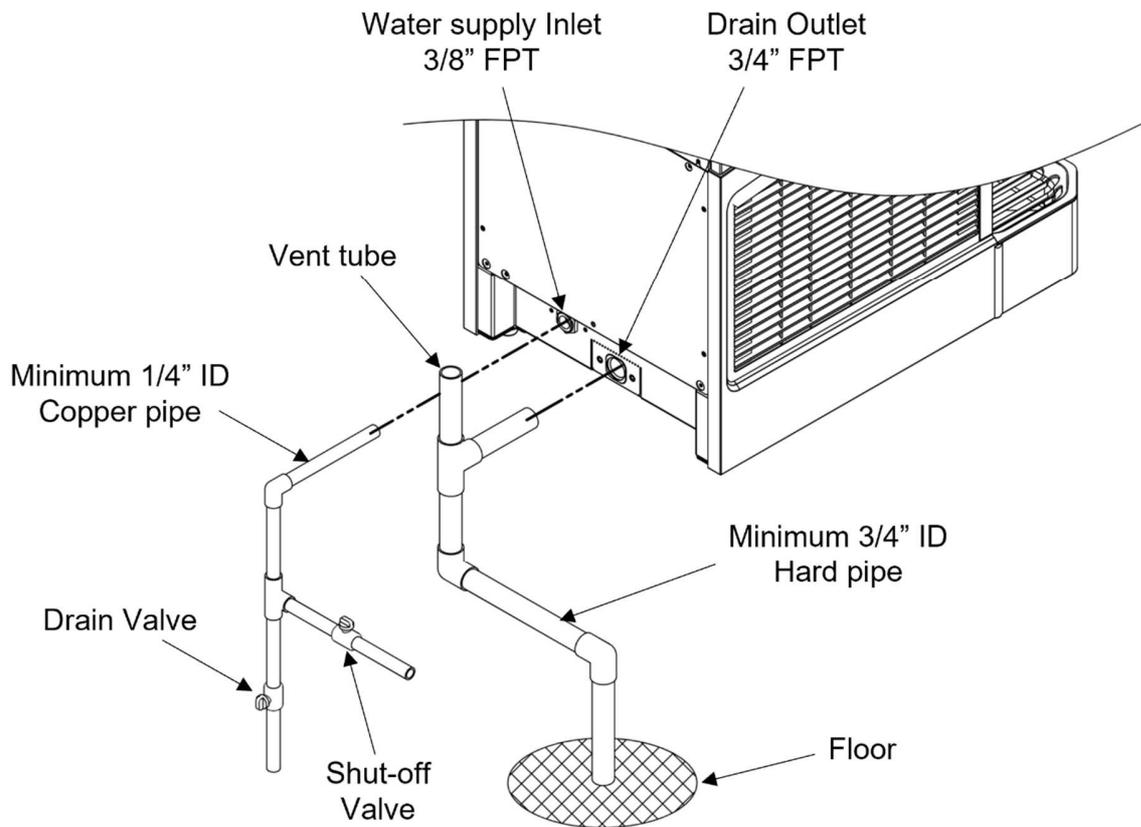
- The ice machine must be on an even level during installation.
- The drain end of the ice machine must have an air gap (5cm).
- The ice machine must be cleaned after installation.
- It should be possible to easily remove the drain line from the ice machine.
- To ensure sufficient air circulation and ease of maintenance, spaces of 12" (30cm) on the top, 6" (15cm) on the side, and 6" (15cm) on the rear must be secured.

1.4.3. Usage Environment

Item	Model	Range	Unit
Ambient temperature	All	7~38	°C
		45~100	°F
Water temperature	All	7~32	°C
		45~90	°F
Water pressure	All	10~100	psig
		0.7~7.0	Kg/cm ²
Voltage	115V product	104~127	V
	208-230V product	198~242	
	220-240V product	207~253	

1.5. Water Connections

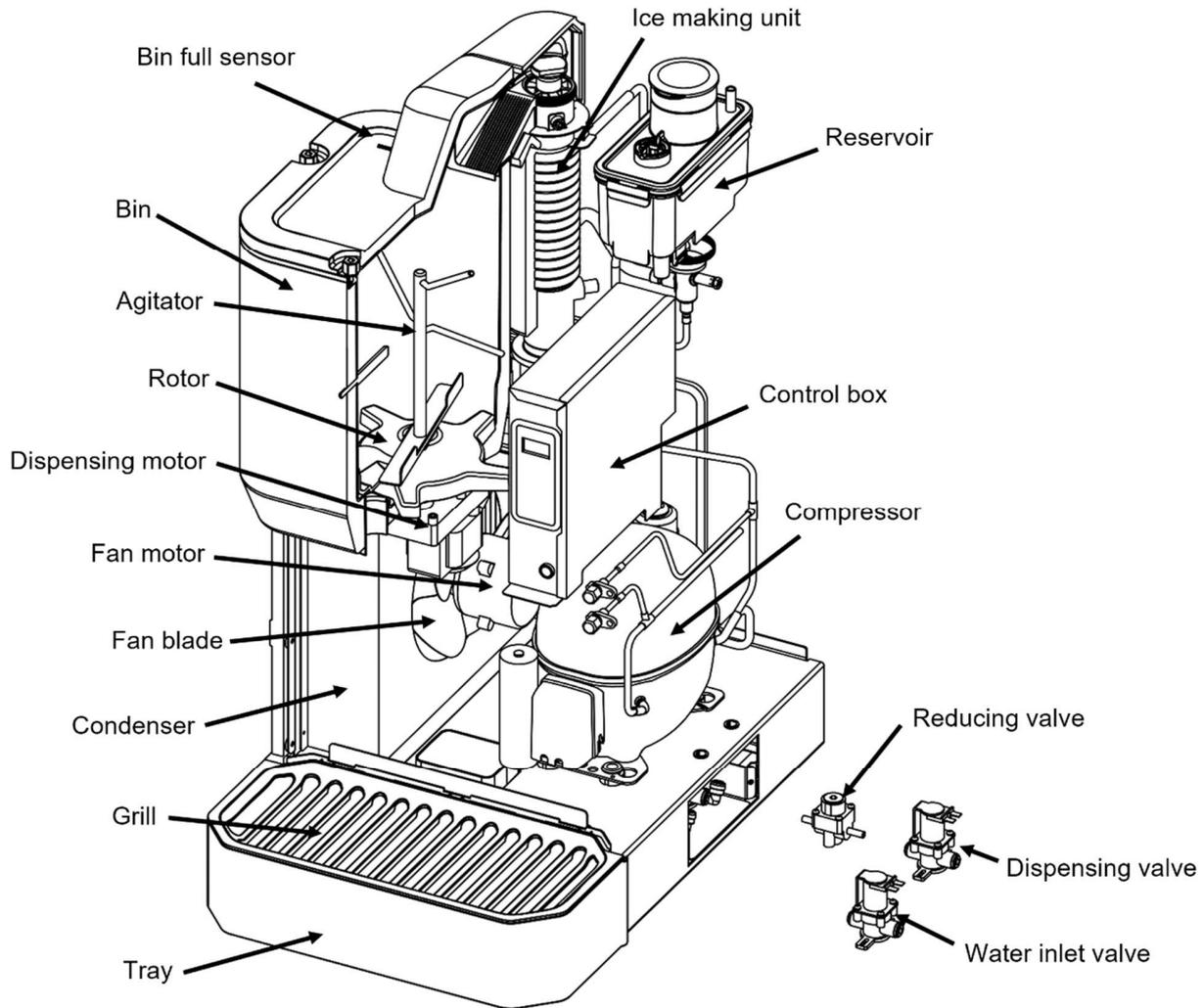
1.5.1. BLDN-280A



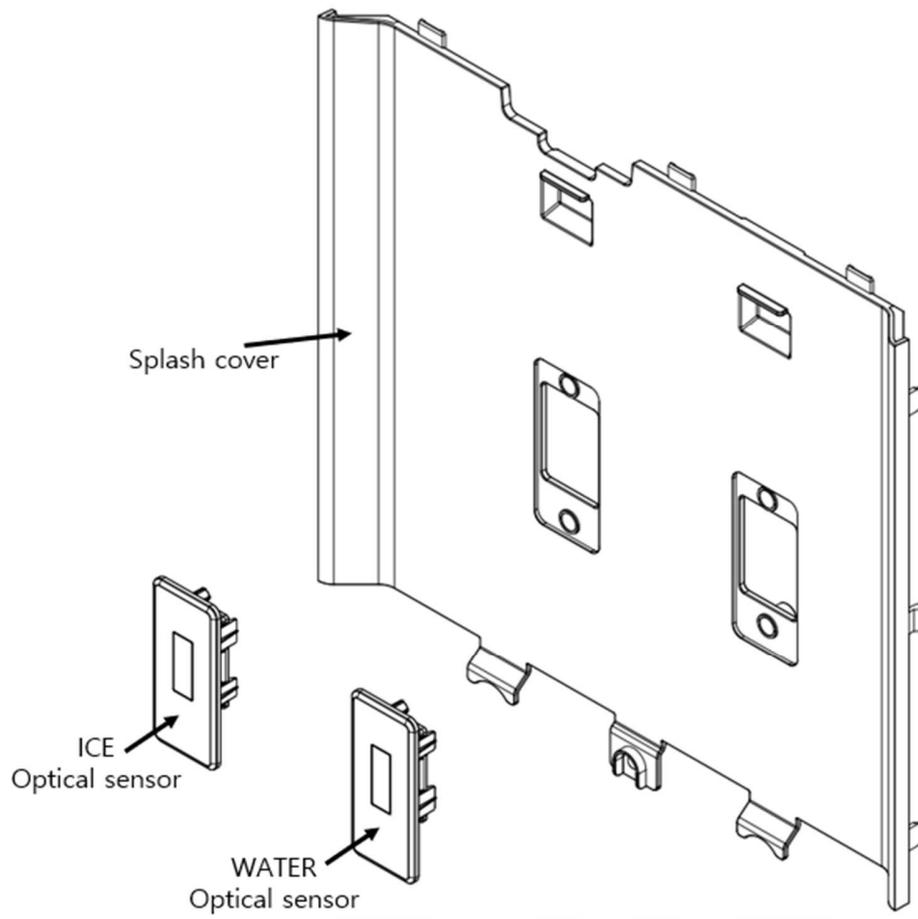
*** At least 5cm (2") of vertical space must be provided between the drain pipe end and the floor drain.**

1.6.Names of Parts

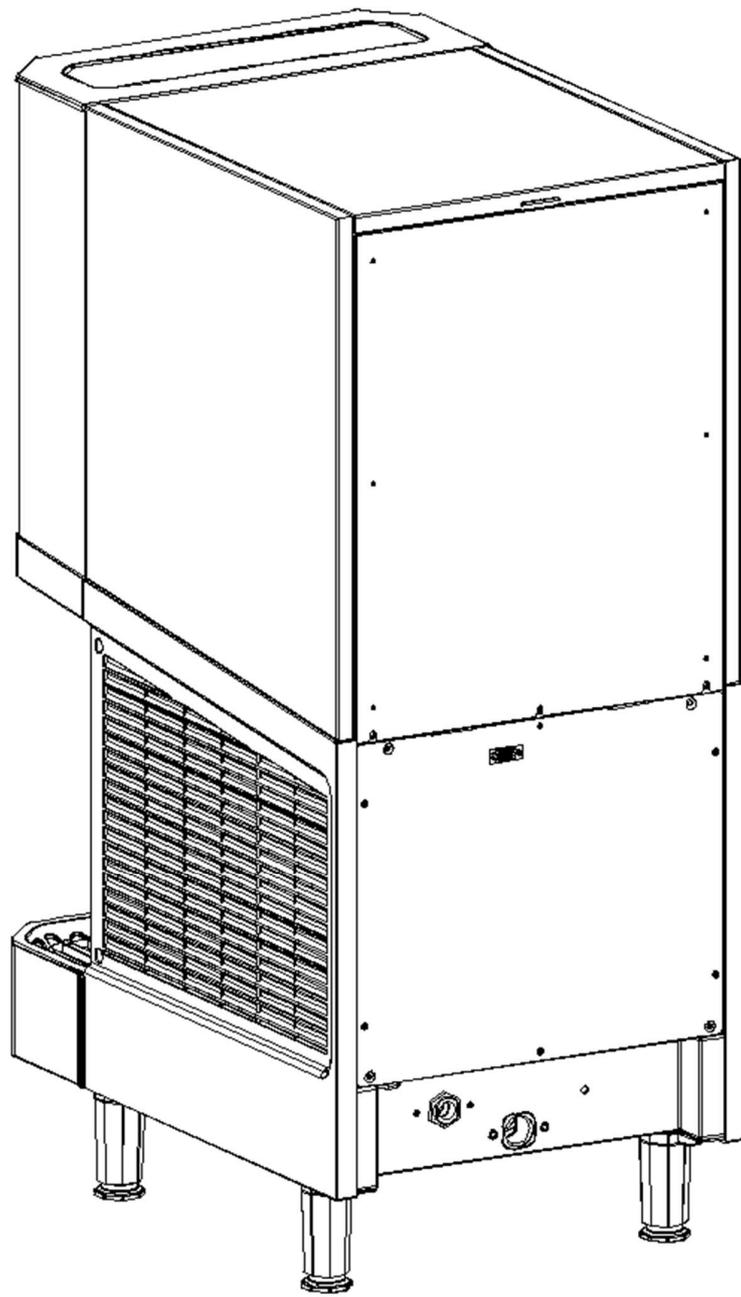
1.6.1. BLDN-280A (domestic version: LIM-120CN)



1.6.2. BLDN-280A(-OS)



1.6.3. LIM-150CNC



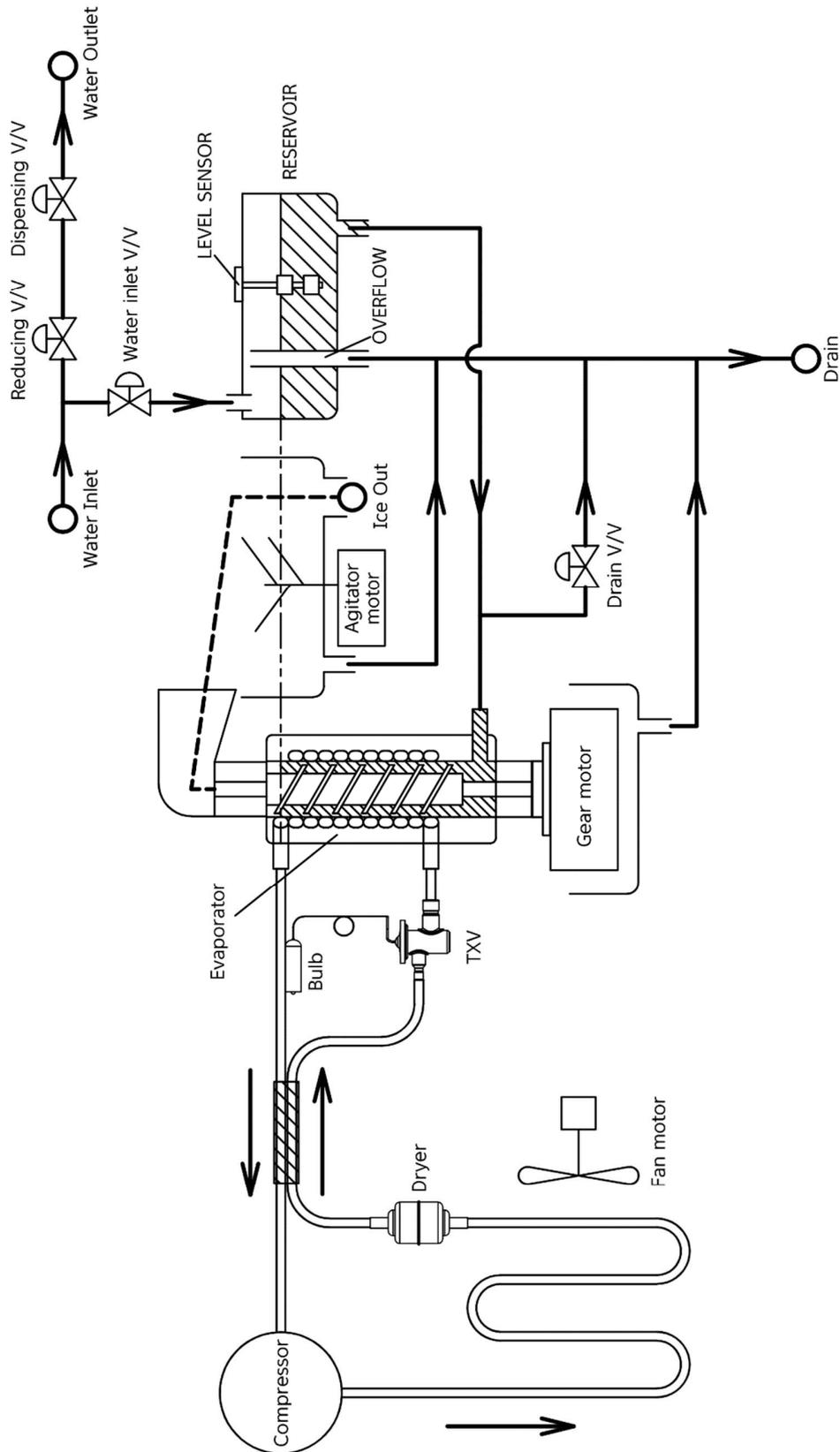
1.7. Product Specifications

Content	BLDN-280A	LDN-280A	LIM-120CN	REMARKS
AC Supply Voltage	115V / 60Hz / 1Ph	230V / 50Hz / 1Ph	220V / 60Hz / 1Ph	
Amperage / Power Consumption	7A	6A	6A	
Maximum Fuse Circuit Breaker	15A	15A	15A	
Product Size (W*D*H)	405 x 605 x 980 [mm] 16" x 24" x 39" [inch]			
Weight	125lbs (57kg)			
Maximum Daily Ice Production	282.8 lbs (128.3 kg)	262.9 lbs (119.2 kg)	289.7 lbs (131.4 kg)	AT90°F/WT70°F AT32°C/WT21°C
Ice Hardness Factor	92%	-	89%	AT90°F/WT70°F AT32°C/WT21°C
Refrigerant	R-290 145g	R-404A 300g	R-404A 300g	

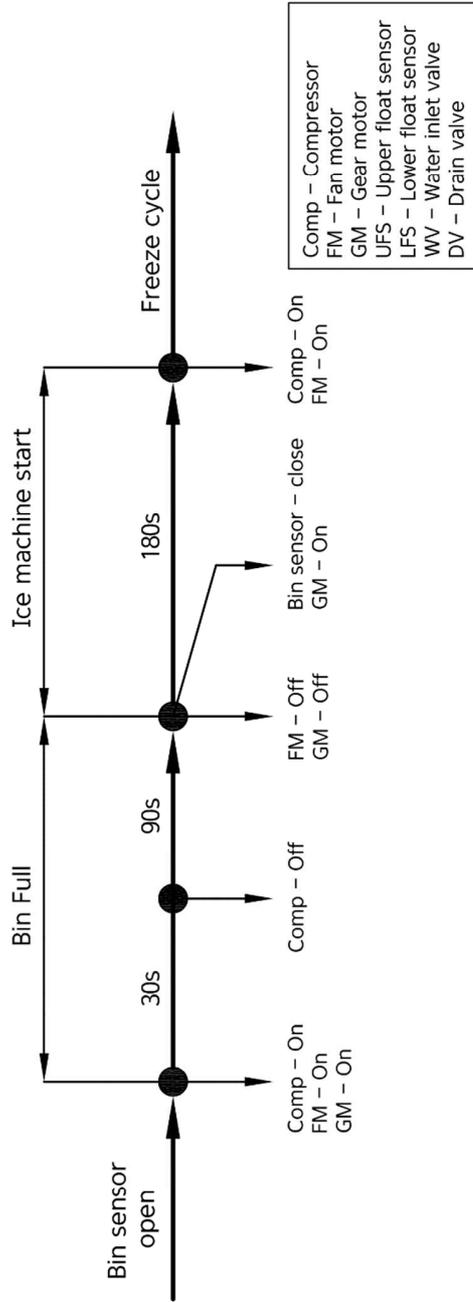
2. Technical Information

2.1. Refrigerant and Water Circuit Diagram

2.1.1. Counter Top



2.2.2. Flowchart for Ice Full Status



2.2.3. Description of Ice Machine Stages

- **Power Standby**

- Once the main power is connected, the On/Off LED turns red, indicating 'Standby' state.

- **Water Supply**

- 'Water Supply' stage is the stage where the water required to make ice is supplied after pressing the power button to operate the ice machine.
- During the 'Water Supply' stage, the water inlet valve starts operating.
- Once water fills up to the full level of the water tank, the 'Water Supply' stage ends.
- The On/Off LED turns green.
- "Ice" is indicated on the display.

- **Ice Making**

- 'Ice Making' stage is the stage where ice is made.
- During the 'Ice Making' stage, the compressor, fan motor and gear motor operate.
- The On/Off LED turns green.
- "Ice" is indicated on the display.

- **Drain**

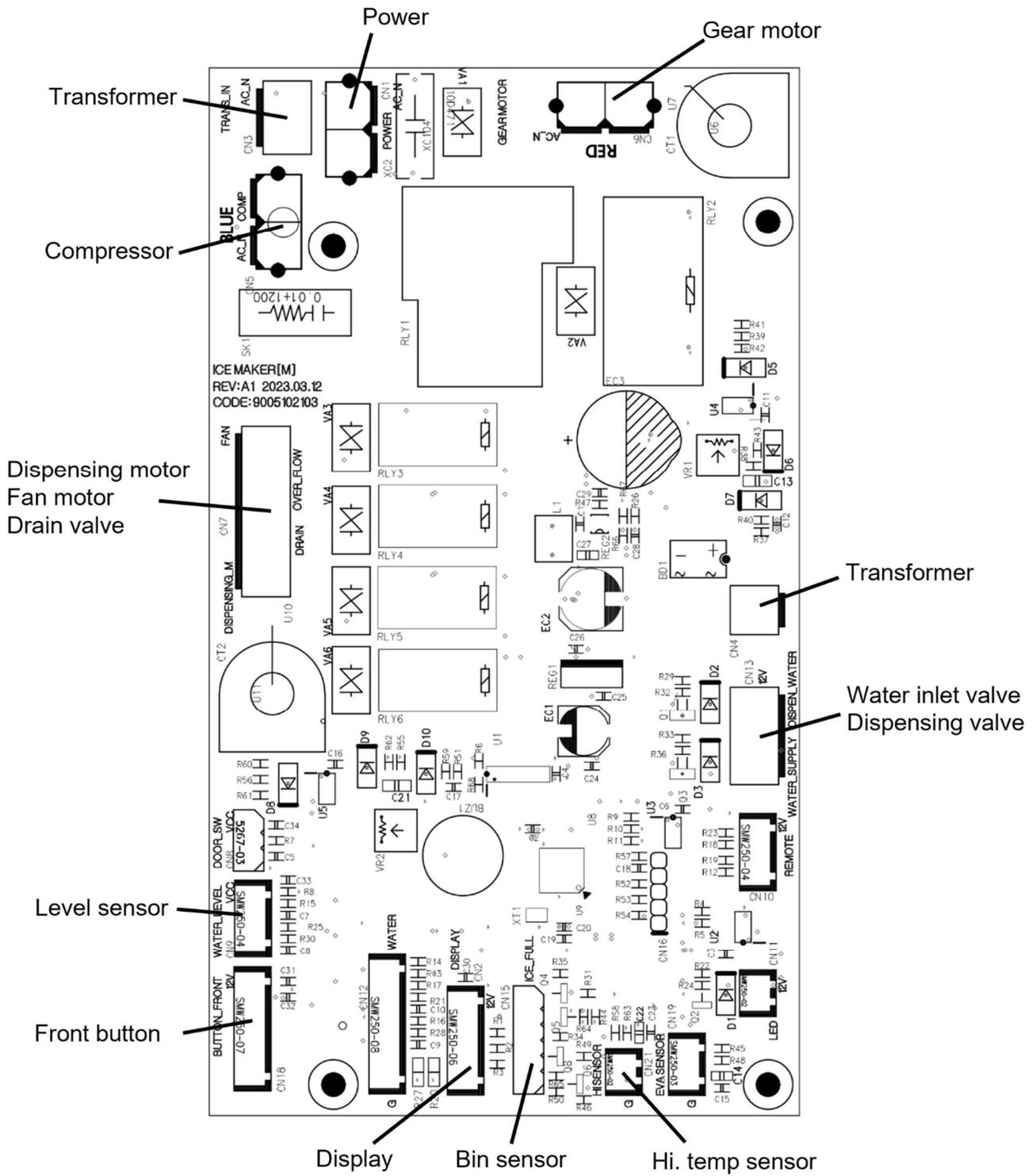
- 'Drain' stage is the stage where the water in the water tank and EVA are drained.
- During the 'Drain' stage, the drain valve starts operating.
- The drain operates periodically according to the user setting.
(Default: 15-minute draining every 10 hours)

- **Ice Full**

- 'Ice Full' is the stage set when the ice bin cannot hold more ice.
- Once the 'Ice Full' sensor operates, all parts stop operation in stages.
- Once the 'Ice Full' sensor stops, the 'Ice Making' stage resumes.

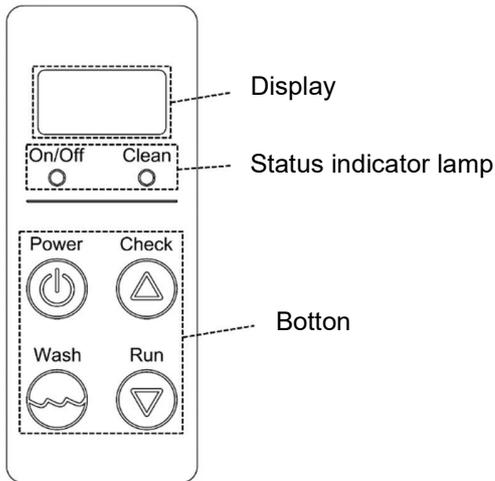
2.3. Ice Machine Control Board and Operation

2.3.1. Main Control Board



2.3.2. Display Control Board

1) Name of Each Part



7-segment display

Status indicator

Buttons

2) Major functions

- 7-segment display

Display	Status
	'Ice Making' stage
	Drain in operation
	Cleaning in operation
	'Ice Full'
	Indication when it is necessary to add cleaning agent and disinfectant during 'Cleaning Mode'
	'Cleaning Mode' complete

● **Error Codes**

- When the ice machine is not operating properly, the following error codes are displayed along with a signal (beep).

7-segment	Button flash	Details	Remarks
E01	Ice and Water buttons flash simultaneously at a 1-second interval	Ice making error: No water was consumed for 30 minutes	
E02	Ice button flashes at a 1-second interval	Compressor overheat: High temperature sensor for temperatures > 115°C	
E03	Water button flashes at a 1-second interval	Gear motor error: Overcurrent or undercurrent of gear motor	
E04	Ice and Water buttons flash twice simultaneously at a 1-second interval	EVA icing error: Excessive freezing of EVA	
E05	Ice and Water buttons flash in sequence at a 1-second interval	Water supply error: Full level not detected	
E06	Ice button flashes twice at a 1-second interval	High temperature sensor not connected	
E07	-	Error of main control board function program	
E08	Ice and Water buttons flash simultaneously at a 2-second interval	Low temperature sensor not connected	
E11	Water button flashes twice at a 1-second interval	'Ice full' sensor error	

E01: Error is displayed when low water level is not detected for 30 minutes after detecting full water level during the 'Ice Making' stage.

- E02: Error is displayed when the compressor high temperature sensor detects temperatures higher than 115°C.
- E03: Error is displayed when the gear motor current is too high or too low (2.5A or higher/0.2A or lower).

- E04: Error is displayed only if the EVA outlet temperature is 7°C lower than the temperature 50 seconds before, and then the gear motor and fan operate for 90 seconds, product stops and restarts operation 10 minutes later.
If the product stops operation for three consecutive times, the button flashes to indicate the error, and the product shuts down completely.

- E05:
 - 1) Water supply stage: If the water level does not reach full after 90 seconds of water supply, water supply is executed again for 90 seconds. Error code E05 is displayed if the water level does not reach full after another water supply.
 - 2) 'Ice Making' stage: Water supply is executed if low water level is detected. Error is displayed if low water level is detected 10 seconds later.
 - 3) 'Ice Making' stage: 90-second water supply is executed if full water level is not reached 90 seconds after the low water level is lifted. Error is displayed if full water level is not reached after supplying water.

- E06: Error is displayed if the high temperature sensor is not connected or is short circuited.

- E07: Error is displayed if an error occurs in the main control board program.

- E08: Error is displayed if the low temperature sensor is not connected or is short circuited.

- E11: Error is displayed if the 'Ice Full' sensor is not connected or is short circuited.

● **Status Indicator**

- Indicates the state of the ice machine.

LED	Color	Details
On/Off	Green	Ice making in progress
	Red	Product on standby
	Red (Flashing)	Product error
Clean	Green	Cleaning in progress

● **Buttons**

- Power: Press and hold for 2 seconds to turn on/off the ice machine.
- Check:
 - 1) Press once to check the internal operation data for the ice machine.
 - 2) Press and hold for 5 seconds to enter the 'Program Change' mode.
- Wash:
 - 1) Press once to enter 'Cleaning/Disinfection' mode.
 - 2) Press and hold for 5 seconds to enter 'Parts Test' mode.
- Run:
 - 1) Press and hold to discharge ice.
 - 2) Press twice and hold to discharge water.

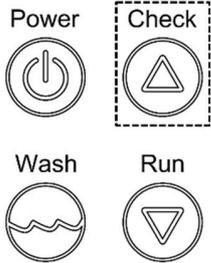
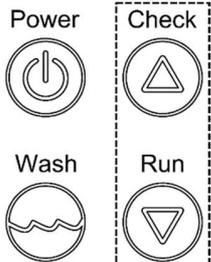
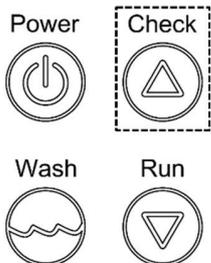
● **Real-time Data**

Each time the 'Check' button is pressed during operation, data is displayed on the display. If no additional action is made for 20 seconds, the product returns to its operation state.

Order	Item	Unit	Remarks
1 - T	Gear motor operation time	Hour	
2 - H	High temperature sensor temperature	°C (°F)	
3 - L	Low temperature sensor temperature	°C (°F)	
4 - A	기어모터 전류 Gear motor current	A	

2.3.3. Changing Ice Machine Control Board Parameters

1) How to Change

Order	Display Control Board	Operation
1		<p>Press and hold the 'Check' button for 5 seconds to enter the parameter change mode.</p>
2		<p>The display shows P-1.</p>
3		<p>Press the 'Check' button to increase the value. Press the 'Run' button to decrease the value.</p>
4		<p>Press the 'Wash' button to move to the next parameter.</p>
5	-	<p>For information about the definition and order of parameters, refer to the Parameter Table.</p>
6		<p>Press and hold the 'Check' button for 5 seconds to close the parameter change mode.</p>

2) Parameter Order

Order	Display	Details	Min.	Max.	Default (US)	Unit	Remarks
1	P-1	Drain interval	1	10	10	-	Hour(1,2,5,10)
2	P-2	Drain time	5	10	5	5	sec
3	P-3	Ice discharge time	5	30	30	1	sec
4	P-4	Water discharge time	5	20	20	1	sec
5	P-5	Comp delay at off	5	180	30	5	sec
6	P-6	Gear motor delay at off	60	180	90	10	sec
7	P-7	Water supply valve on time	60	150	90	5	sec
8	P-8	Dispensing type	BT	SN	BT	-	BUTTON SENSOR
9	P-9	Cleaning time	30	60	30	10	min
10	P-10	Cleaning count	1	5	3	1	회
11	P-11	Temperature unit setting	°C	°F	°F	-	°C / °F
12	P-12	Model name setting	TOP	UND	TOP	-	TOP / UND

P-1: Drain interval: Stops the ice machine and drains water at the operation interval set by the user.

Can be set as 1, 2, 5, 10 hours (Default: 10 hours)

P-2: Drain time: Draining is executed during operation of the ice machine for the set amount of time (default: 5 seconds)

- P-3: Sets the maximum ice discharge time when the ice discharge button is pressed (Default: 30 seconds)
- P-4: Sets the maximum water discharge time when the water discharge button is pressed (Default: 20 seconds)
- P-5: Sets the delay time until the compressor shuts down after the ice machine stops.

(Default 30 seconds)

- P-6: Sets the time the gear motor operates to empty the ice inside the evaporator when the ice machine stops (Default: 90 seconds)
- P-7: Sets the time for which the water supply valve operates after detecting low water level in the Ice Making stage (Default: 90 seconds)
- P-8: Sets ice/water discharge operation as button type or sensor type (Default: BT)
- P-9: Sets the cleaning operation time in cleaning mode (Default: 30 minutes)
- P-10: Sets the number of rinsing motions in cleaning mode (Default: 3)
- P-11: Sets the temperature unit the temperature sensor reads (Default: °F)
- P-12: Sets the ice machine model (Default: TOP)

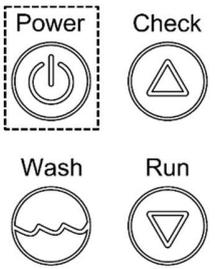
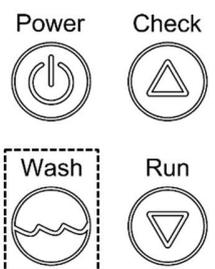
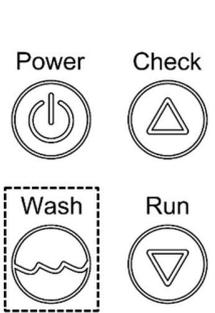
3. Service Information

3.1.Parts Operation Check

3.1.1. Test Mode

1) How to Enter Test Mode

- Operation of major ice machine parts can be checked using Test Mode.

Order	Display Control Board	Operation
1		<p>If the product is operating, press and hold the 'Power' button for 5 seconds to stop the ice machine.</p>
2		<p>Press and hold the 'Wash' button for 5 seconds to enter test mode.</p>
3		<p>'oFF' is displayed on the display.</p>
4		<p>Press the 'Wash' button again to display C on the display, and the compressor begins operation.</p>
5	-	<p>Pressing the 'Wash' button again will display other parts, and the corresponding part will begin operation. For information about the order of parts operation, refer to the Test Mode Order Table.</p>
6		<p>With 'oFF' displayed on the display, press and hold the 'Wash' button for 5 seconds to close test mode. The mode also closes if no action is made for 3 minutes.</p>

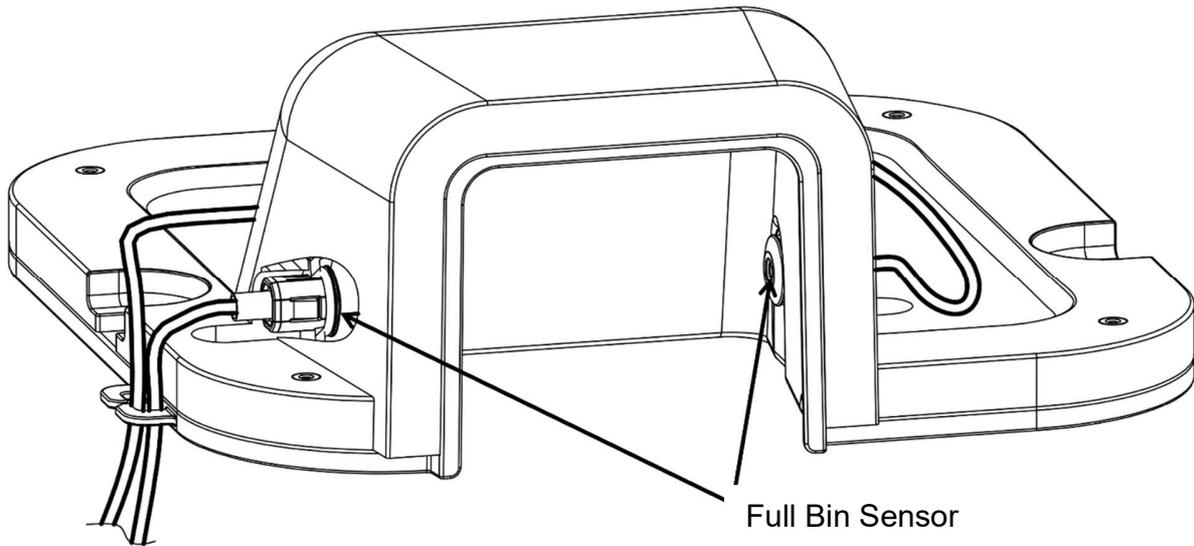
2) Test Mode Order

Order	Operation	Display	Details	Remarks
1	Wash 버튼 순차적으로 누름 Each press of the 'Wash' button moves the menu to the next item	oFF	테스트 대기상태 Test standby	
2		C	Compressor On	
			Fan Motor On	
			Gear Motor On	
3		≡	Water Inlet Valve On	
4		dSP	Dispensing Valve On	
5		F	Fan Motor On	
6		AG	Agitator Motor On	
7	D	Drain Valve On		
8	Gea	Gear Motor On		

* Parts that are not included in the machine will not be displayed.

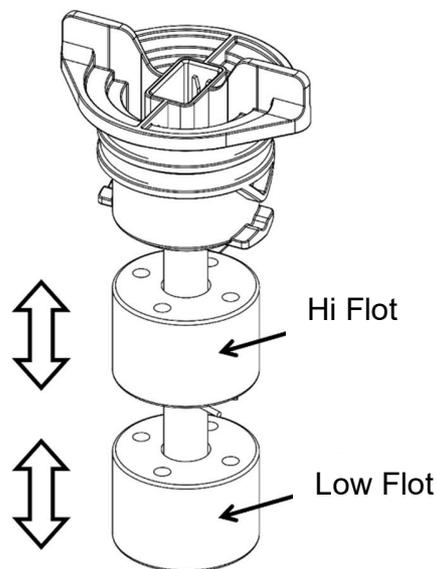
3.1.2. Sensor Operation Check

1) 'Ice Full' Sensor



- Operation check is possible when the ice machine is operating (Water supply stage, ice making stage)
- Block one of the two 'Ice Full' sensors LEDs using a finger.
- If the sensor is operating properly, the display shows 'Ful' in 5 seconds (Ice full state).
- Remove the finger and the 'Ice Full' state is removed in 5 seconds.

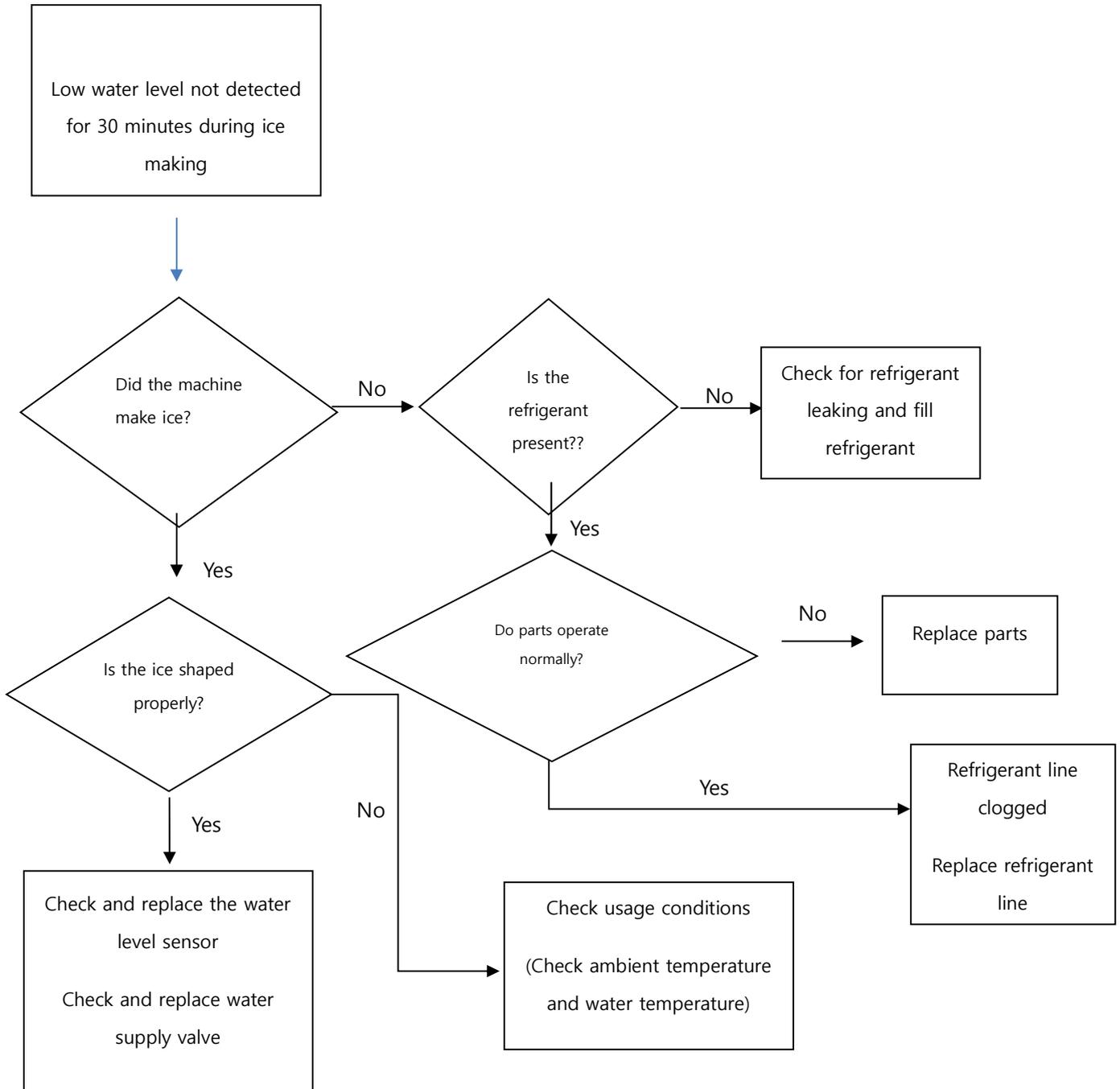
2) Water Level Sensor



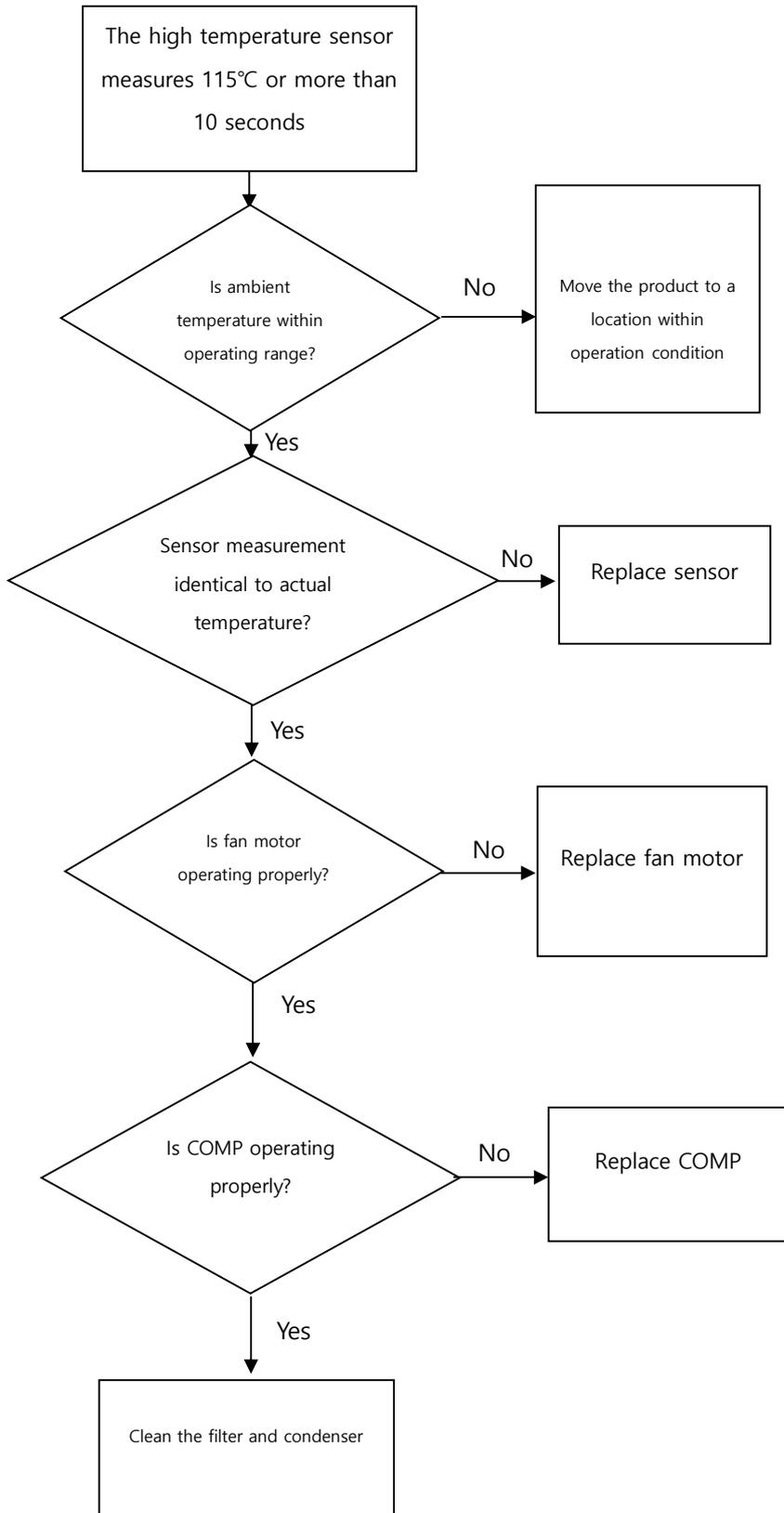
- Low water level float
 - Full water level float
- Operation check is possible when the ice machine is operating (Water supply stage, ice making stage)
 - Pulling down the low water level float will initiate water supply to the water tank.
 - Pulling up the full water level float will stop water supply to the water tank.

Troubleshooting Error Codes

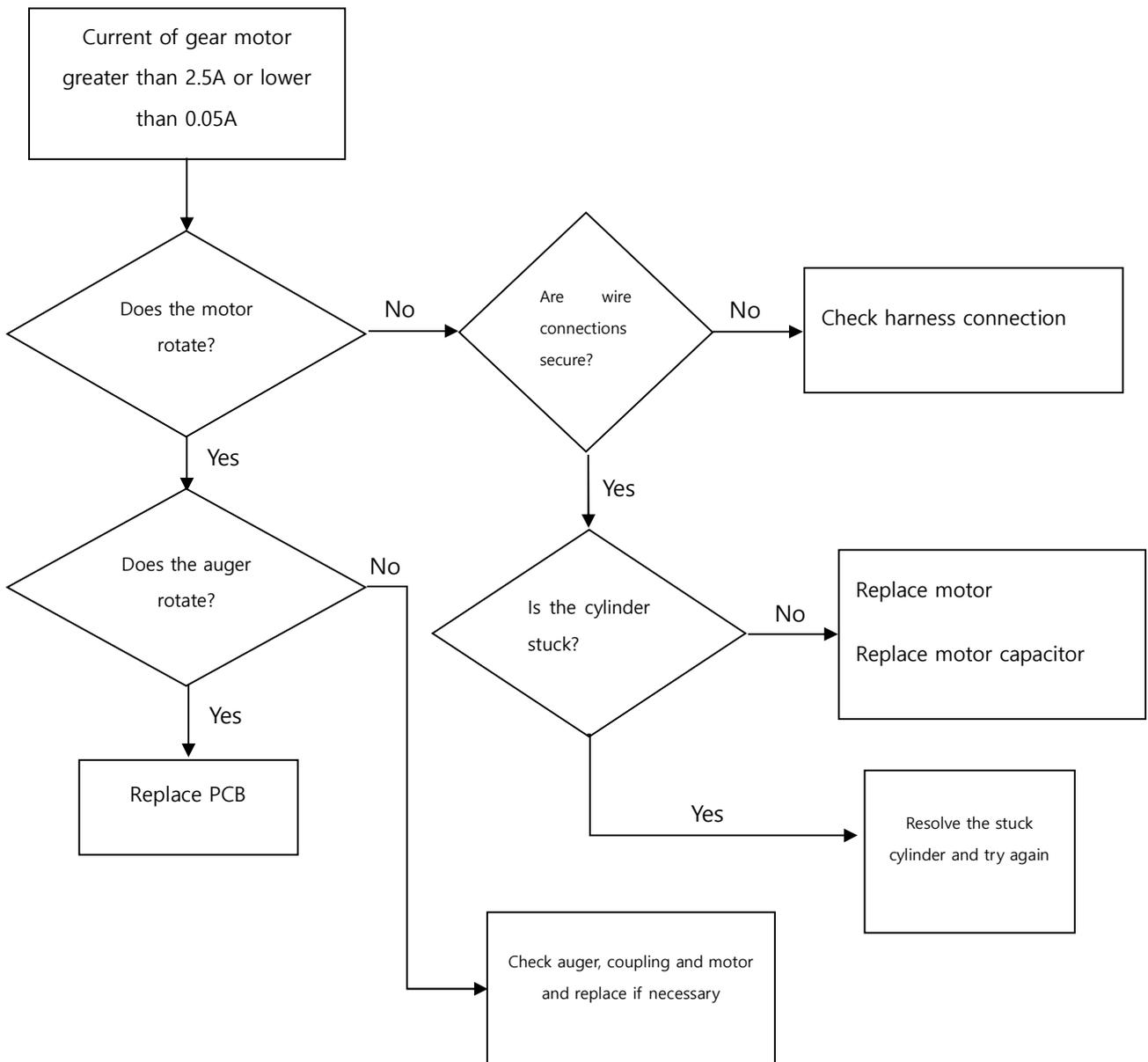
3.1.3. E01 Ice making time exceeded 30 minutes



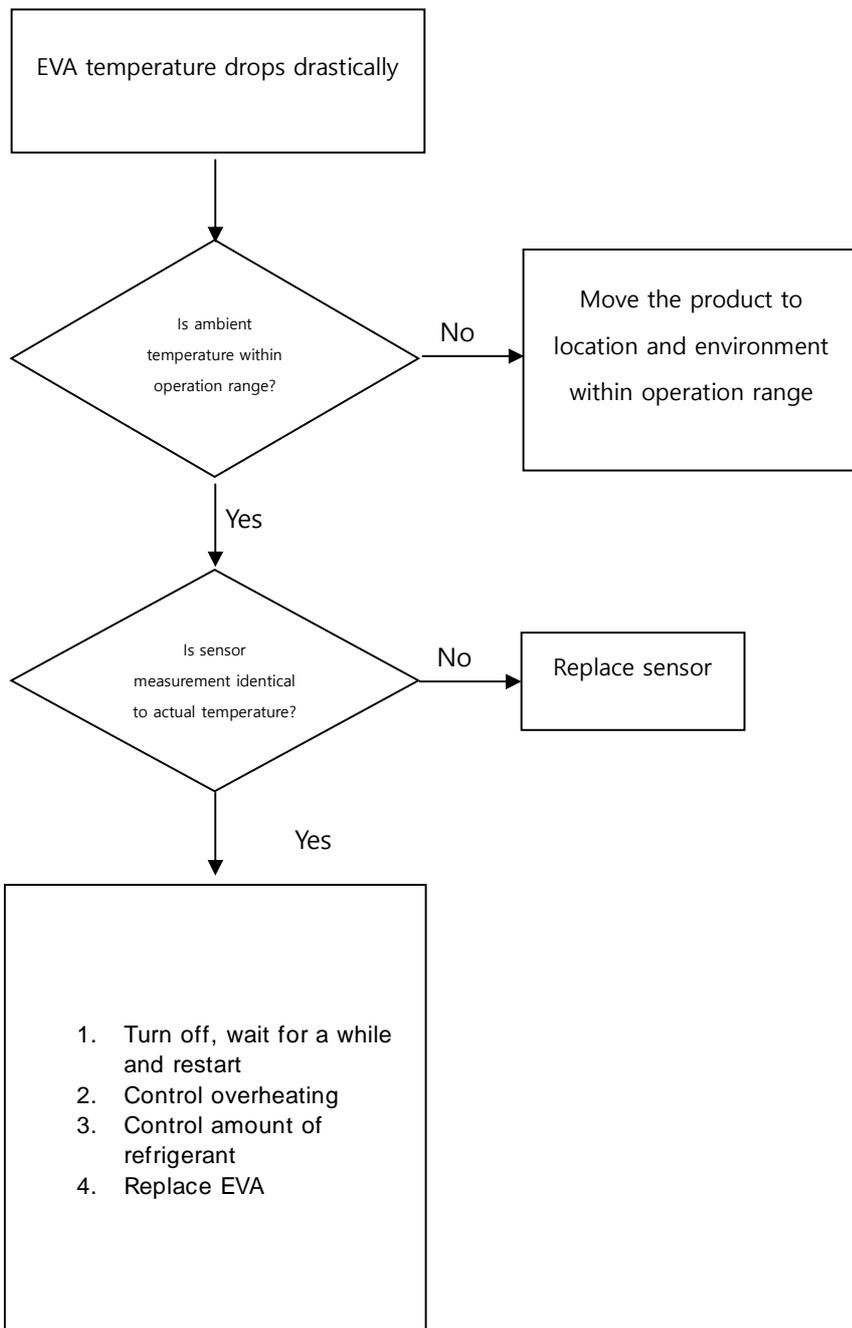
3.1.4. E02 High Temperature Sensor Error



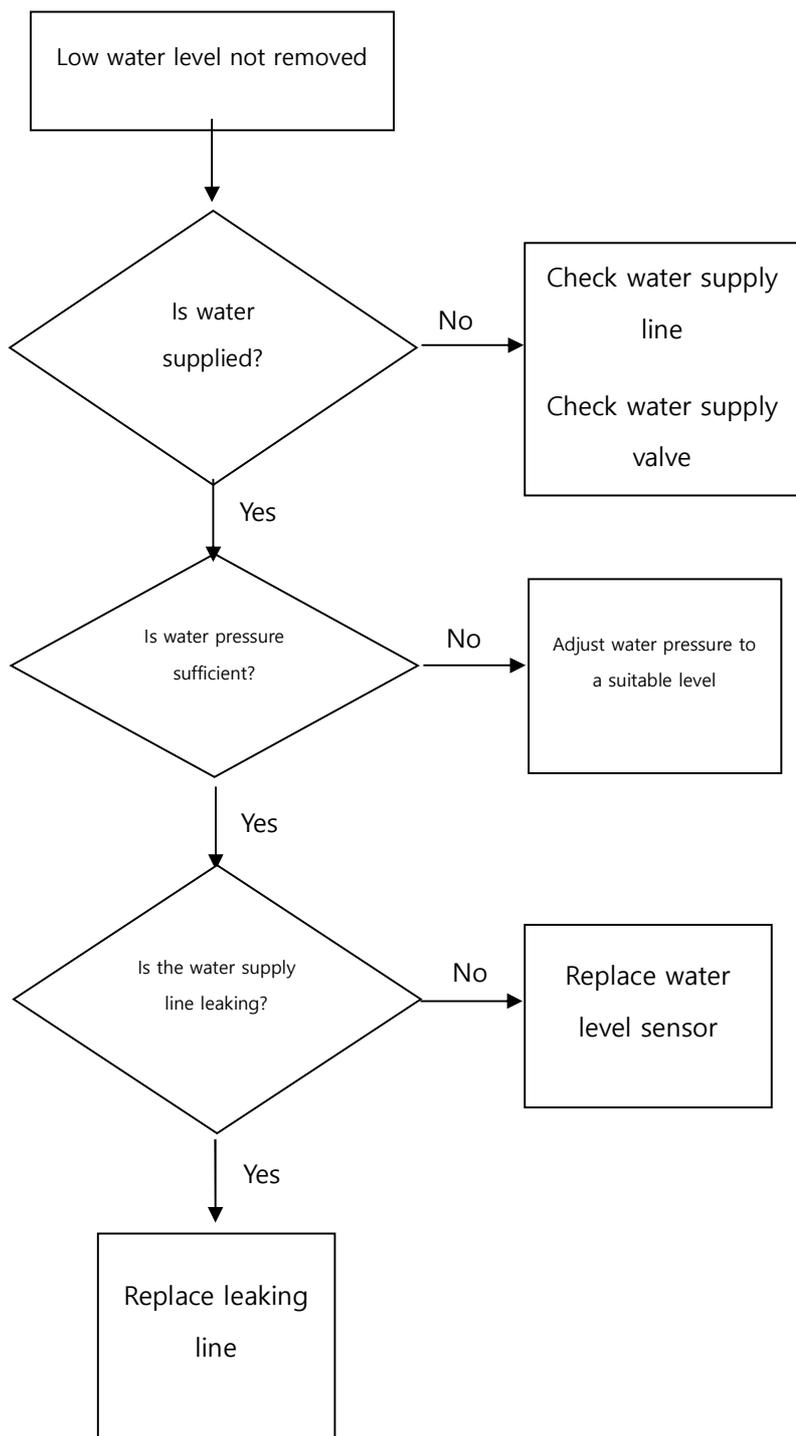
3.1.5. E03 Gear Motor Error



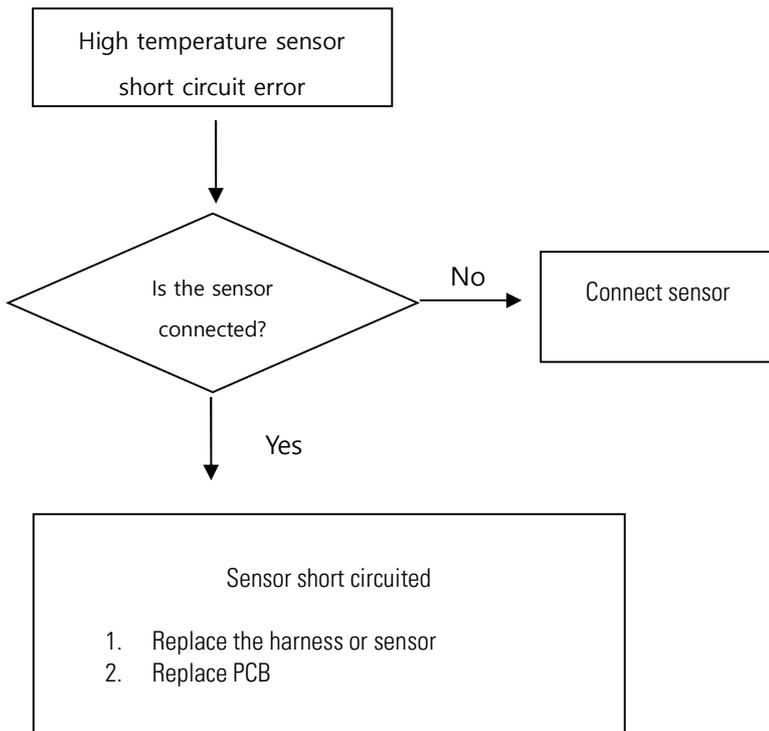
3.1.6. E04 EVA Icing Error



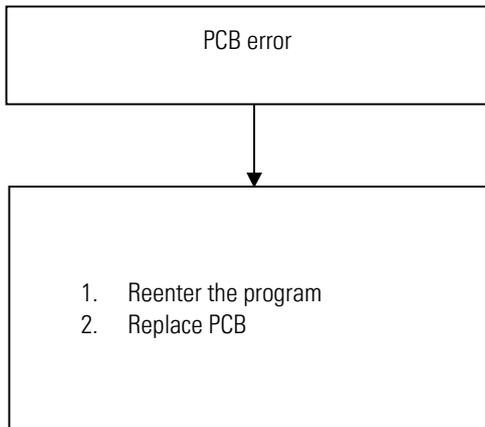
3.1.7. E05 Low Water Level Error



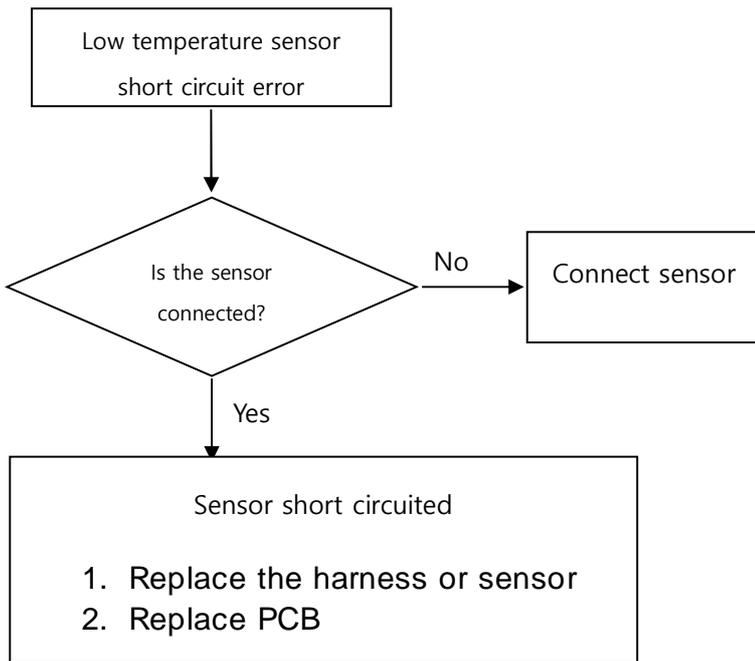
3.1.8. E06 High Temperature Sensor Error (Short Circuit)



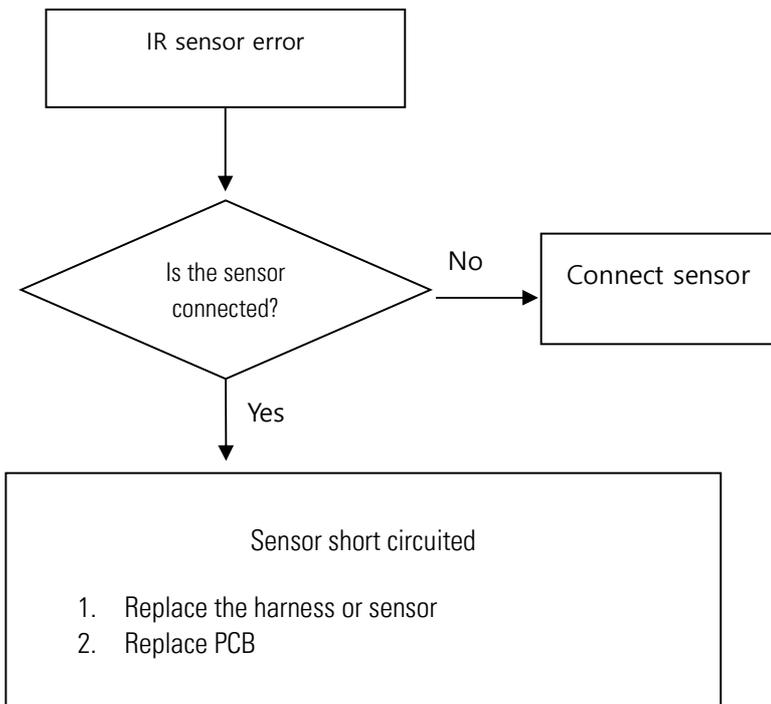
3.1.9. E07 EEPROM Error



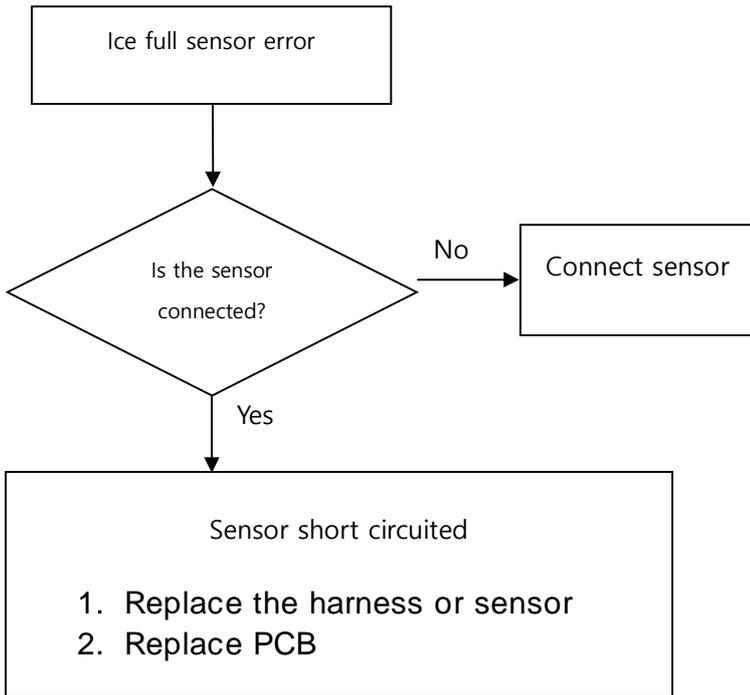
3.1.10. E08 Low Temperature Sensor Error (Short Circuit)



3.1.11. E09 IR SENSOR Error (Not Connected)



3.1.12. E11 Ice Full Sensor Not Connected

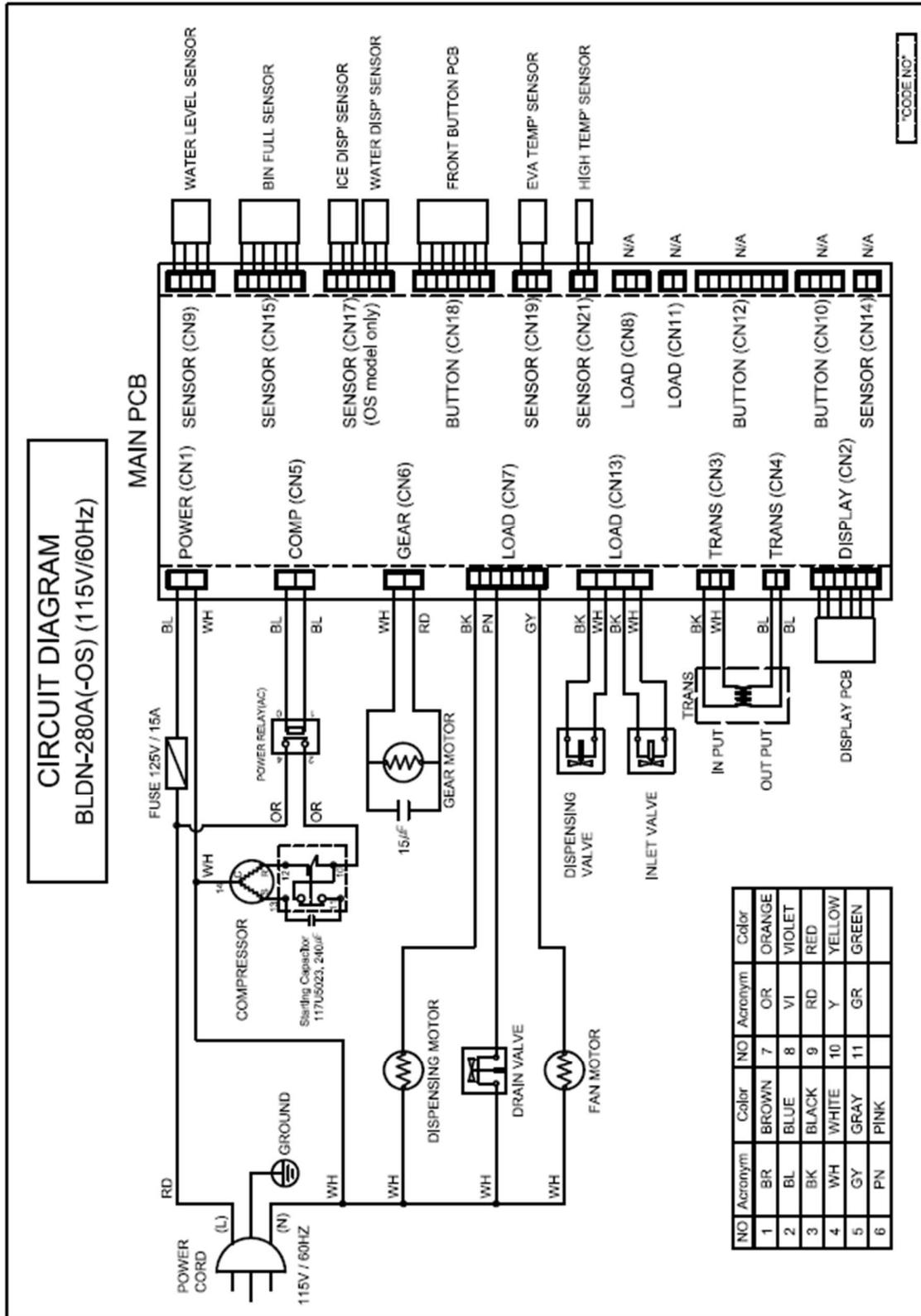


4. Appendix

4.1. Circuit Diagram

4.1.1. BLDN-280A

1) 115V/60Hz



4.2. Performance Data

4.2.1. BLDN-280A

1) 115V/60Hz

Contents	Ambient Temp. (°F/°C)	Water Temp. (°F/°C)					
		50°F/10°C		70°F/21°C		90°F/32°C	
APPROXIMATE ICE PRODUCTION PER 24 HR. lbs./day (kg/day)	70/21	282.8	128.3	259.5	117.7	240.8	109.2
	80/27	266.2	120.8	243.7	110.6	226.4	102.7
	90/32	252.3	114.5	230.6	104.6	215.3	97.7
	100/38	233.9	106.1	215.6	97.8	200.6	91.0
APPROXIMATE ELECTRIC CONSUMPTION watts	70/21	389.5	--	388.1	--	385.7	--
	80/27	402.3	--	401.0	--	400.1	--
	90/32	415.6	--	415.1	--	413.9	--
	100/38	431.6	--	430.7	--	429.8	--
APPROXIMATE WATER CONSUMPTION PER 24 HR. (TOTAL) gal./day (l/day)	70/21	33.9	128.3	31.1	117.7	28.9	109.2
	80/27	31.9	120.8	29.2	110.6	27.1	102.7
	90/32	30.2	114.5	27.6	104.6	25.8	97.7
	100/38	28.0	106.1	25.8	97.8	24.0	91.0
EVAPOPATOR OUTLET TEMP. °F (°C)	70/21	17.8	-7.9	17.9	-7.8	17.9	-7.8
	80/27	18.9	-7.3	18.9	-7.3	19.0	-7.2
	90/32	19.7	-6.8	20.0	-6.6	20.1	-6.6
	100/38	20.9	-6.2	21.0	-6.1	21.0	-6.1
HEAD PRESSURE PSIG (kg/cm2G)	70/21	179.1	12.6	179.2	12.6	179.6	12.6
	80/27	207.4	14.6	207.5	14.6	207.8	14.6
	90/32	232.8	16.4	233.3	16.4	233.5	16.4
	100/38	264.9	18.6	265.2	18.6	265.4	18.7
SUCTION PRESSURE PSIG (kg/cm2G)	70/21	25.3	1.8	25.3	1.8	25.3	1.8
	80/27	26.6	1.9	26.6	1.9	26.5	1.9
	90/32	27.5	1.9	27.3	1.9	27.3	1.9
	100/38	28.7	2.0	28.6	2.0	28.6	2.0

4.3.EVA Sensor Data

T(°C)	Rcent(kΩ)	T(°C)	Rcent(kΩ)	T(°C)	Rcent(kΩ)	T(°C)	Rcent(kΩ)
-40	87.8	0	13.29	40	2.97	80	0.886
-39	83.3	1	12.75	41	2.87	81	0.862
-38	79.0	2	12.23	42	2.78	82	0.839
-37	75.0	3	11.73	43	2.69	83	0.817
-36	71.2	4	11.26	44	2.60	84	0.795
-35	67.6	5	10.81	45	2.52	85	0.774
-34	64.2	6	10.38	46	2.44	86	0.754
-33	61.0	7	9.97	47	2.36	87	0.734
-32	58.0	8	9.58	48	2.28	88	0.715
-31	55.1	9	9.21	49	2.21	89	0.697
-30	52.5	10	8.85	50	2.14	90	0.679
-29	49.9	11	8.51	51	2.08	91	0.661
-28	47.5	12	8.18	52	2.01	92	0.645
-27	45.2	13	7.87	53	1.95	93	0.628
-26	43.1	14	7.57	54	1.89	94	0.612
-25	41.0	15	7.28	55	1.83	95	0.597
-24	39.1	16	7.01	56	1.78	96	0.582
-23	37.2	17	6.75	57	1.72	97	0.568
-22	35.5	18	6.50	58	1.67	98	0.554
-21	33.9	19	6.26	59	1.62	99	0.540
-20	32.3	20	6.03	60	1.57	100	0.527
-19	30.8	21	5.80	61	1.53	101	0.514
-18	29.4	22	5.59	62	1.48	102	0.501
-17	28.1	23	5.39	63	1.44	103	0.489
-16	26.8	24	5.20	64	1.40	104	0.477
-15	25.6	25	5.01	65	1.35	105	0.466
-14	24.5	26	4.83	66	1.32	106	0.455
-13	23.4	27	4.66	67	1.28	107	0.444
-12	22.4	28	4.50	68	1.24	108	0.434
-11	21.4	29	4.34	69	1.21	109	0.423
-10	20.4	30	4.19	70	1.17	110	0.414
-9	19.6	31	4.04	71	1.14	111	0.404
-8	18.7	32	3.90	72	1.11	112	0.395
-7	17.9	33	3.77	73	1.08	113	0.385
-6	17.2	34	3.64	74	1.05	114	0.377
-5	16.4	35	3.52	75	1.02	115	0.368
-4	15.7	36	3.40	76	0.99	116	0.360
-3	15.1	37	3.29	77	0.96	117	0.351
-2	14.5	38	3.18	78	0.94	118	0.343
-1	13.9	39	3.07	79	0.91	119	0.336
0	13.3	40	2.97	80	0.89	120	0.328

4.4. High Temperature Sensor Data

T(°C)	Rcent(kΩ)	T(°C)	Rcent(kΩ)	T(°C)	Rcent(kΩ)	T(°C)	Rcent(kΩ)
-30.0	831.3	0.5	155.35	30.5	38.85	60.5	11.928
-29.5	806.5	1.0	151.51	31.0	38.03	61.0	11.714
-29.0	782.6	1.5	147.77	31.5	37.23	61.5	11.503
-28.5	759.4	2.0	144.14	32.0	36.45	62.0	11.297
-28.0	737.1	2.5	140.61	32.5	35.69	62.5	11.096
-27.5	715.4	3.0	137.17	33.0	34.95	63.0	10.898
-27.0	694.5	3.5	133.83	33.5	34.23	63.5	10.704
-26.5	674.2	4.0	130.57	34.0	33.52	64.0	10.515
-26.0	654.6	4.5	127.41	34.5	32.83	64.5	10.329
-25.5	635.6	5.0	124.33	35.0	32.150	65.0	10.147
-25.0	617.3	5.5	121.33	35.5	31.490	65.5	9.968
-24.5	599.5	6.0	118.41	36.0	30.845	66.0	9.793
-24.0	582.3	6.5	115.57	36.5	30.215	66.5	9.622
-23.5	565.6	7.0	112.81	37.0	29.599	67.0	9.454
-23.0	549.5	7.5	110.12	37.5	28.998	67.5	9.289
-22.5	533.9	8.0	107.50	38.0	28.410	68.0	9.128
-22.0	518.8	8.5	104.95	38.5	27.836	68.5	8.970
-21.5	504.1	9.0	102.47	39.0	27.275	69.0	8.815
-21.0	489.9	9.5	100.05	39.5	26.727	69.5	8.663
-20.5	476.2	10.0	97.70	40.0	26.191	70.0	8.514
-20.0	462.9	10.5	95.41	40.5	25.667	70.5	8.368
-19.5	450.0	11.0	93.17	41.0	25.155	71.0	8.225
-19.0	437.5	11.5	91.00	41.5	24.654	71.5	8.084
-18.5	425.3	12.0	88.88	42.0	24.165	72.0	7.947
-18.0	413.6	12.5	86.82	42.5	23.687	72.5	7.812
-17.5	402.2	13.0	84.81	43.0	23.219	73.0	7.680
-17.0	391.2	13.5	82.85	43.5	22.762	73.5	7.550
-16.5	380.5	14.0	80.95	44.0	22.315	74.0	7.423
-16.0	370.1	14.5	79.09	44.5	21.878	74.5	7.298
-15.5	360.0	15.0	77.28	45.0	21.450	75.0	7.175
-15.0	350.2	15.5	75.51	45.5	21.032	75.5	7.055
-14.5	340.8	16.0	73.79	46.0	20.623	76.0	6.938
-14.0	331.6	16.5	72.12	46.5	20.224	76.5	6.822
-13.5	322.7	17.0	70.48	47.0	19.833	77.0	6.709
-13.0	314.0	17.5	68.89	47.5	19.450	77.5	6.598
-12.5	305.6	18.0	67.34	48.0	19.076	78.0	6.489
-12.0	297.5	18.5	65.83	48.5	18.710	78.5	6.382
-11.5	289.6	19.0	64.35	49.0	18.352	79.0	6.277
-11.0	281.9	19.5	62.91	49.5	18.002	79.5	6.174
-10.5	274.5	20.0	61.51	50.0	17.659	80.0	6.073
-10.0	267.3	20.5	60.14	50.5	17.324	80.5	5.974
-9.5	260.2	21.0	58.81	51.0	16.996	81.0	5.876
-9.0	253.4	21.5	57.51	51.5	16.675	81.5	5.781
-8.5	246.8	22.0	56.24	52.0	16.360	82.0	5.687
-8.0	240.4	22.5	55.01	52.5	16.053	82.5	5.595
-7.5	234.2	23.0	53.80	53.0	15.752	83.0	5.505
-7.0	228.1	23.5	52.62	53.5	15.457	83.5	5.416
-6.5	222.2	24.0	51.47	54.0	15.169	84.0	5.330
-6.0	216.5	24.5	50.35	54.5	14.887	84.5	5.244
-5.5	210.96	25.0	49.26	55.0	14.611	85.0	5.160
-5.0	205.56	25.5	48.19	55.5	14.340	85.5	5.078
-4.5	200.32	26.0	47.15	56.0	14.076	86.0	4.998
-4.0	195.23	26.5	46.14	56.5	13.816	86.5	4.918
-3.5	190.28	27.0	45.15	57.0	13.563	87.0	4.841
-3.0	185.47	27.5	44.18	57.5	13.314	87.5	4.764
-2.5	180.79	28.0	43.24	58.0	13.071	88.0	4.689
-2.0	176.25	28.5	42.32	58.5	12.833	88.5	4.616
-1.5	171.83	29.0	41.42	59.0	12.600	89.0	4.543
-1.0	167.53	29.5	40.54	59.5	12.371	89.5	4.472

-0.5	163.36	30.0	39.68	60.0	12.147	90.0	4.403
0.0	159.30						