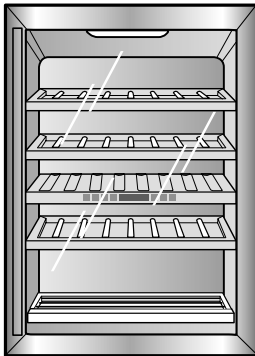




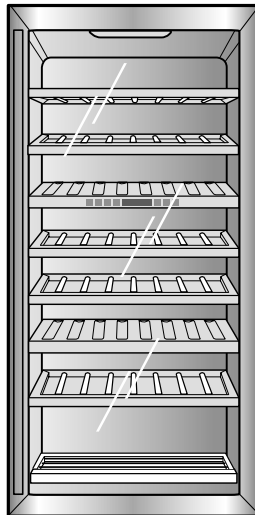
WINE CELLAR

SERVICE MANUAL

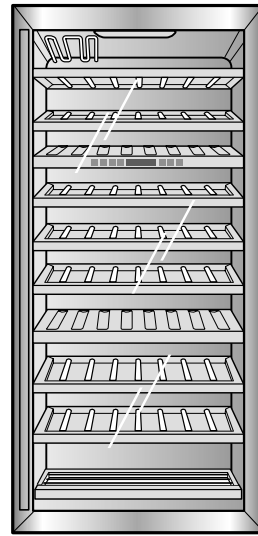
CAUTION
BEFORE SERVICING THE UNIT, READ THE "SAFETY
PRECAUTIONS" IN THIS MANUAL.



LRV410TT



LRV650TT




LRV810TT

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1. Product Specification.....	3
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SAFETY INSTRUCTIONS

1. Unplug the power before you handle any electrical component.
2. If you must test the product with the power on, please wear a rubber globe in order to prevent an electric shock.
3. Check the rated current, voltage, and capacity if you are using a gauge.
4. Take caution not to let any water near the electrical component around the compressor.
5. Please use a designated part for  marked parts or the circuit diagram.
6. Please remove any object from the top prior to tilting the product.
7. In order to prevent a cut from a fin, put on a glove before you repair the refrigerator or get near the heat resistor area.

PRODUCT SPECIFICATION

1. Product Specification

1-1. Rated, product specifications

Model Name		LRV410TT	LRV650TT	LRV810TT
Regular Contents		4.7cu.ft	7.5cu.ft	9.9cu.ft
Exterior measurements (Width X Depth X Height)		595 X 580 X 820	595 X 580 X 1185	595 X 580 X 1475
Rated Voltage/Frequency		115V / 60Hz		
Power Consumption		72W	80W	85W
Weight		47kg	64kg	71kg
Cooling Method		Cool Air Automatic Circulation Type		
Temperature Control Device		MICOM		
Outer Case Material		Vinyl Coated Metal		
Inner Case Material		A.B.S Resin		
OUT DOOR		Indium Thin Oxide Triple Layers Glasses/Aluminium Deco		
Insulation Material		Poly Urethane Foam (Insulation Foam Gas: Cyclopentane)		
Package Details	Package Exterior Measurement (Width X Depth X Height)	693 X 717 X 946	693 X 717 X 1296	693 X 717 X 1586
	Package Weight	51kg	74kg	81kg

1-2. Component Details

Model Name	LRV410TT	LRV650TT	LRV810TT
Compressor	NR45LADG	MA53LCDG	
Overload Protect	4TM232NFB		
P.T.C	P220MC	P330MC	
Heater	UPPER: 8W (1EA) UPPER: 4W (2EA)	UPPER: 8W (2EA) UPPER: 5W (2EA)	
Interior Light	12V / 3W / 0.25A		
Power Cord (Length)	1.9m		
Temperature Sensor	Heat Reducing Load Resistance Device		

- Interior Heater: Heat up the interior when surrounding temperature is lower than the set temperature.

COMPONENT NAMES AND MOTIONS

2. Component Names and Motions

2-1. Interior

- Interior Light (Interior Ceiling, CASE DISPLAY & BARRIER installed in the lower column) Interior light operates by the control panel regardless of door opening or closing.
- Interior light uses DC voltage. Please see 1-2, component details.
- 2 or 3 interior lights are installed according to model sizes and light turns on and off by control panel operation button.

2-2. Wine Rack

- Wine rack detail may vary according to the model types.
- Each rack can hold 8 wine bottles and top rack holds 9 bottles.

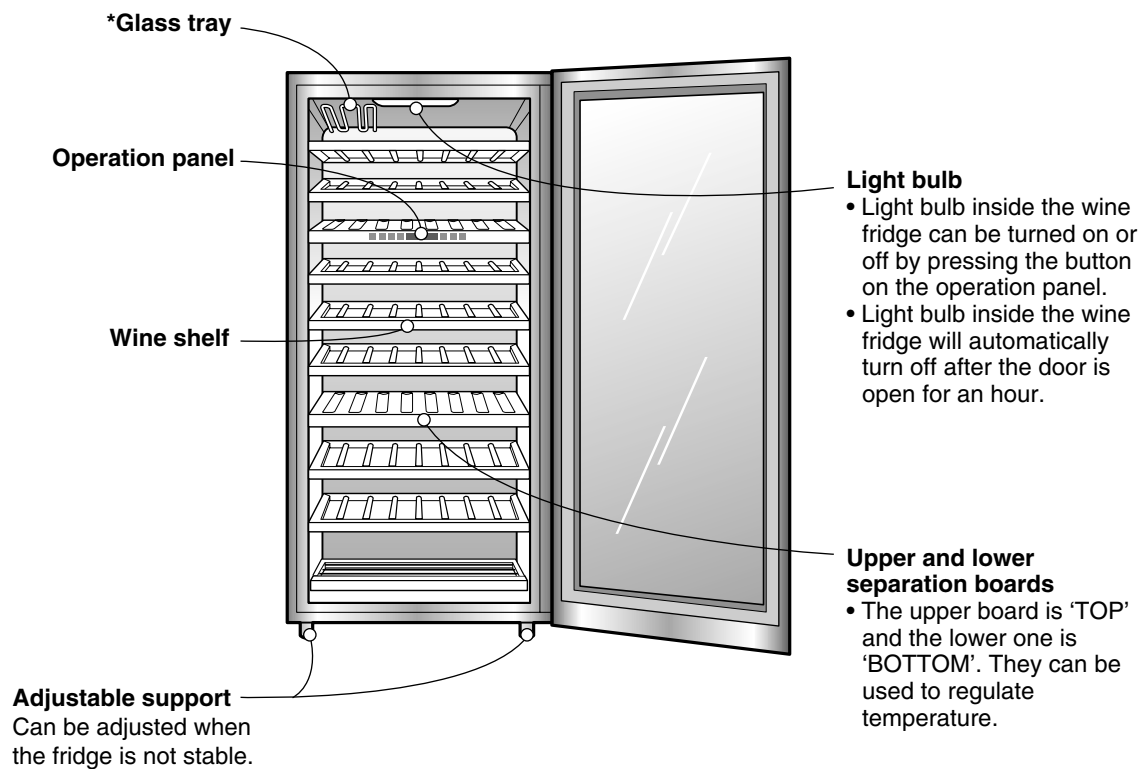
Model Name	LRV410TT	LRV650TT	LRV810TT
Standard Capacity	41bottles	65bottles	81bottles

2-3 Others

- Glass Holder
 - Hangs wine glasses. (LRV810TT)
- Wine Rack
 - Stores leftover wine (tilted). (LRV810TT, LRV650TT)
- Locking Device
 - Key is enclosed in the inside of the refrigerator.
- Leg Adjustor (Front & Back, Left & Right, one each)
 - Please level the product using the leg adjustor.

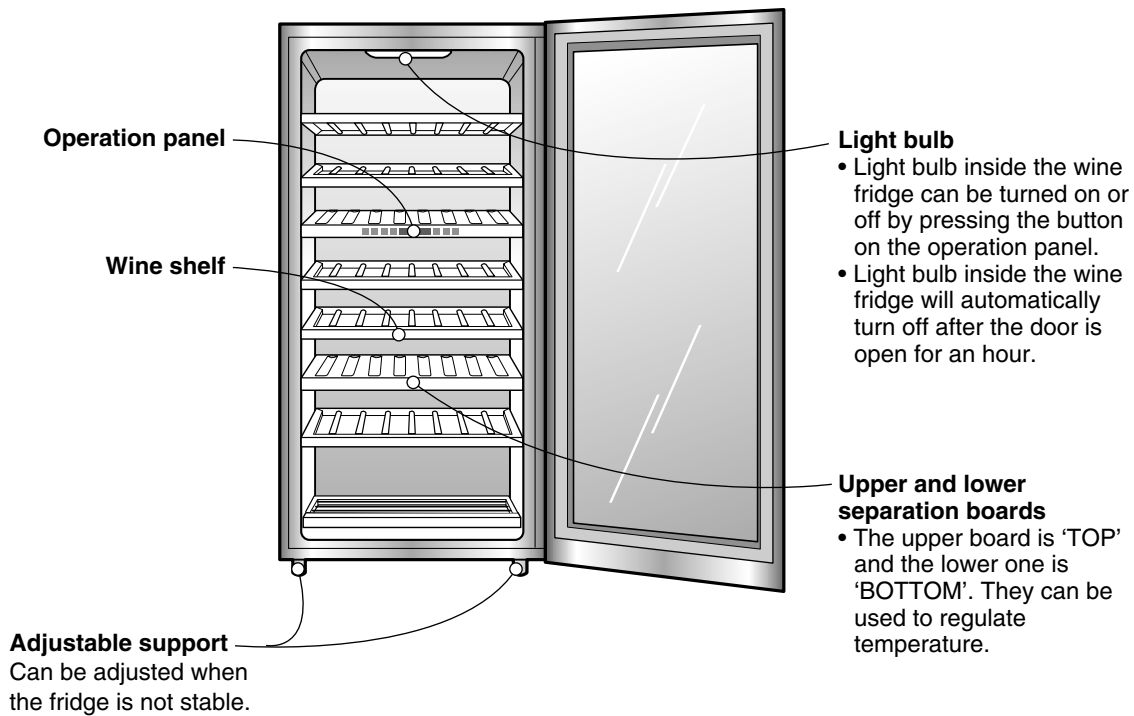
COMPONENT NAMES AND MOTIONS

LRV810TT

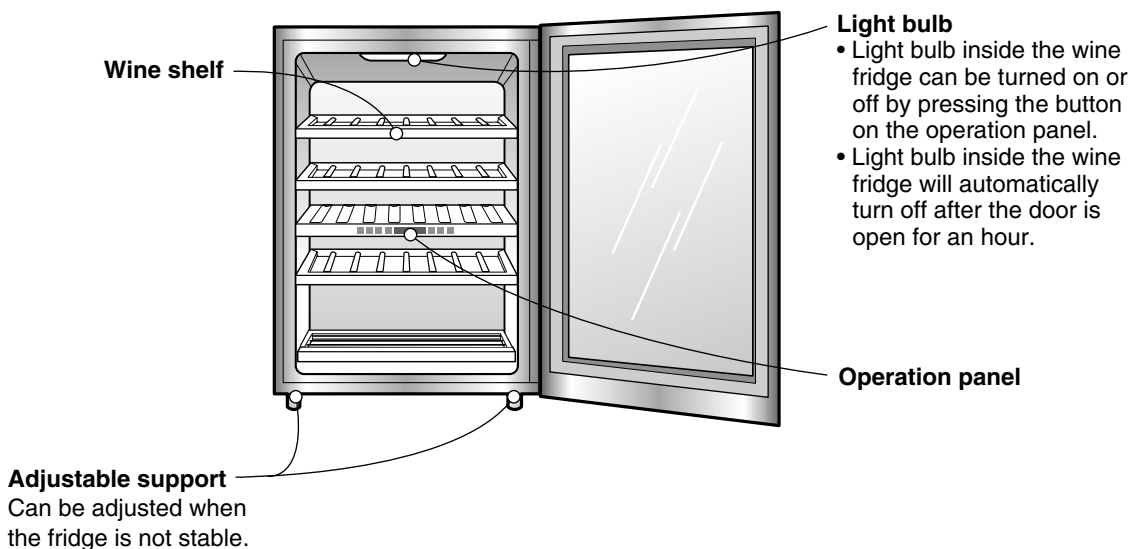


COMPONENT NAMES AND MOTIONS

LRV650TT



LRV410TT

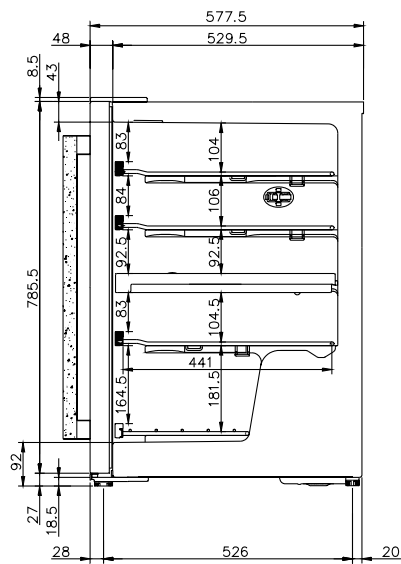
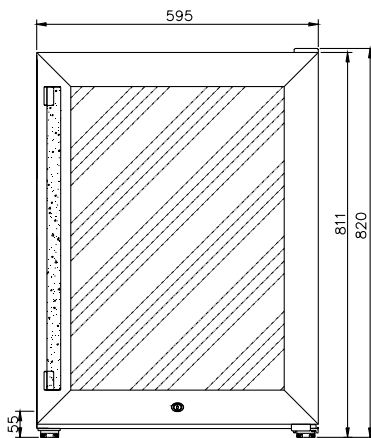
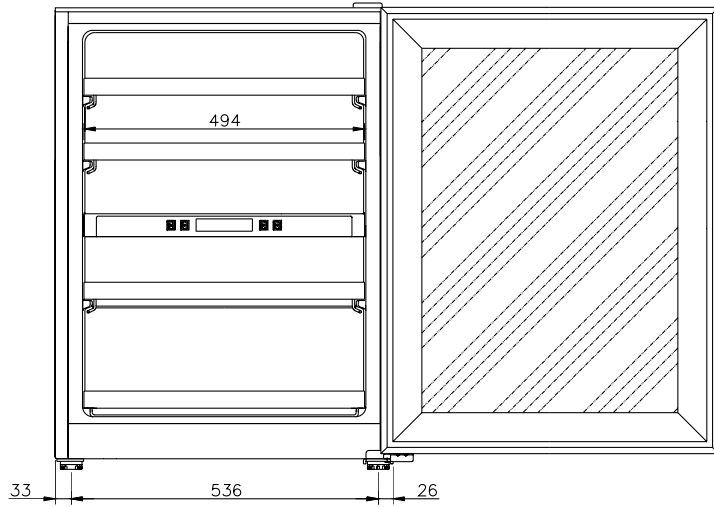
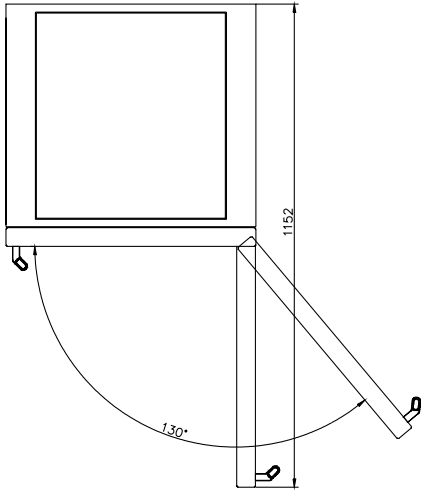


EXTERIOR

3. Exterior

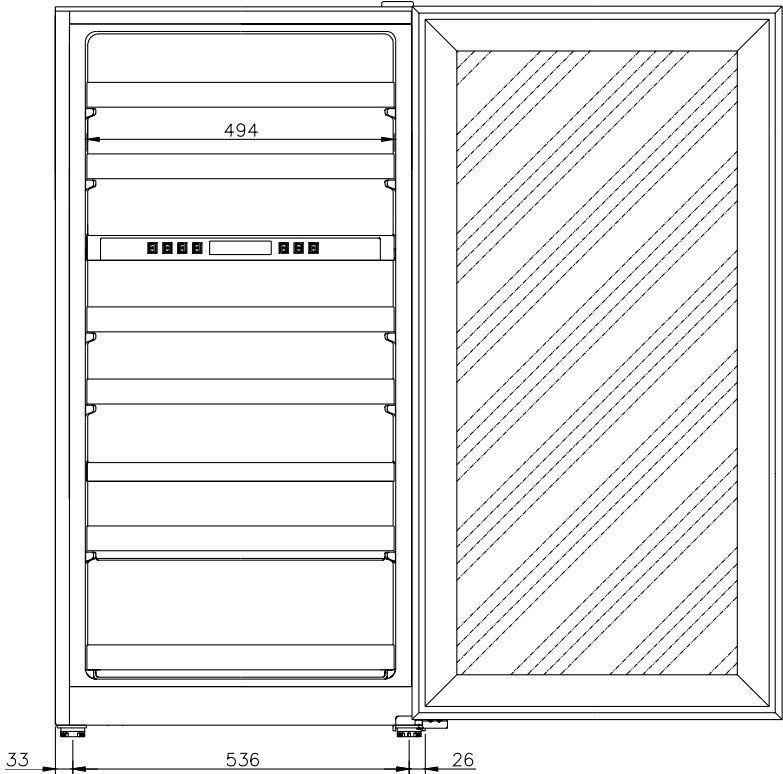
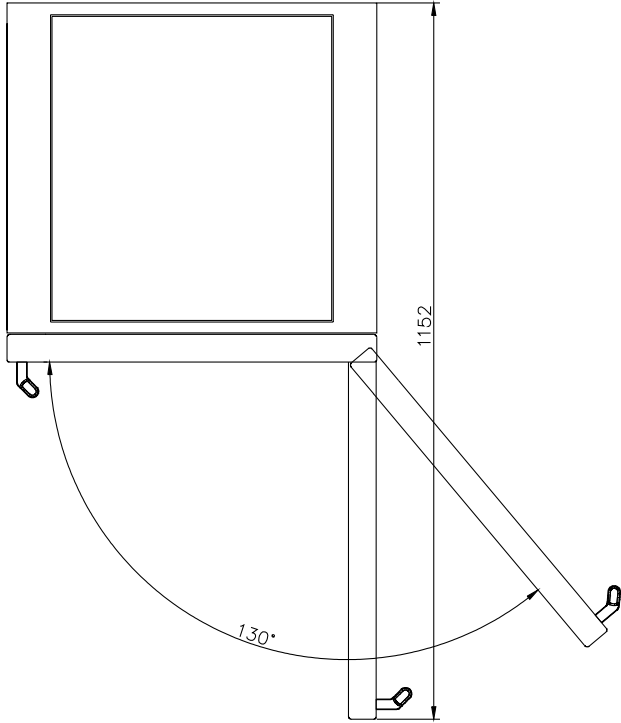
3-1. Exterior

LRV410TT

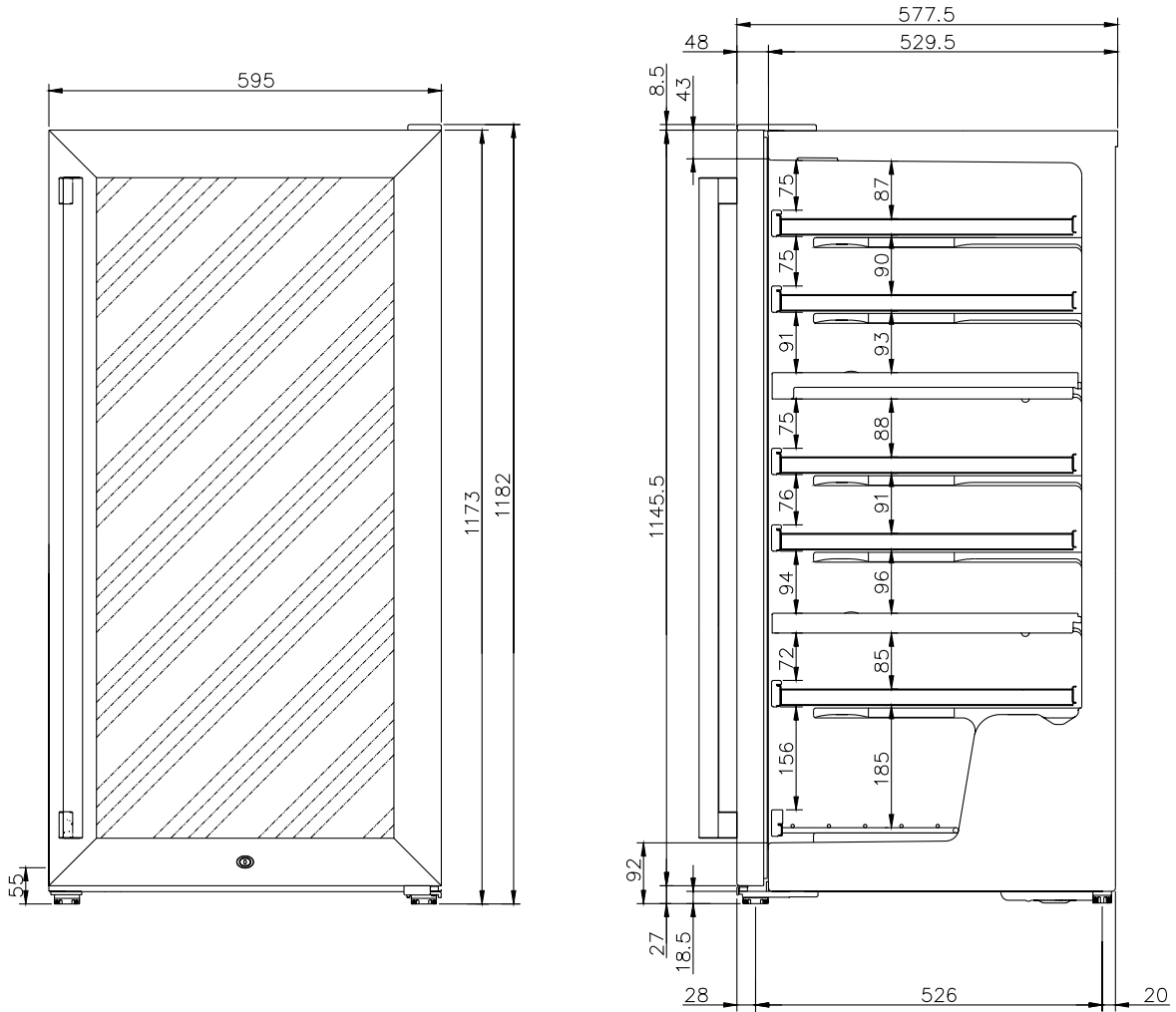


EXTERIOR

LRV650TT

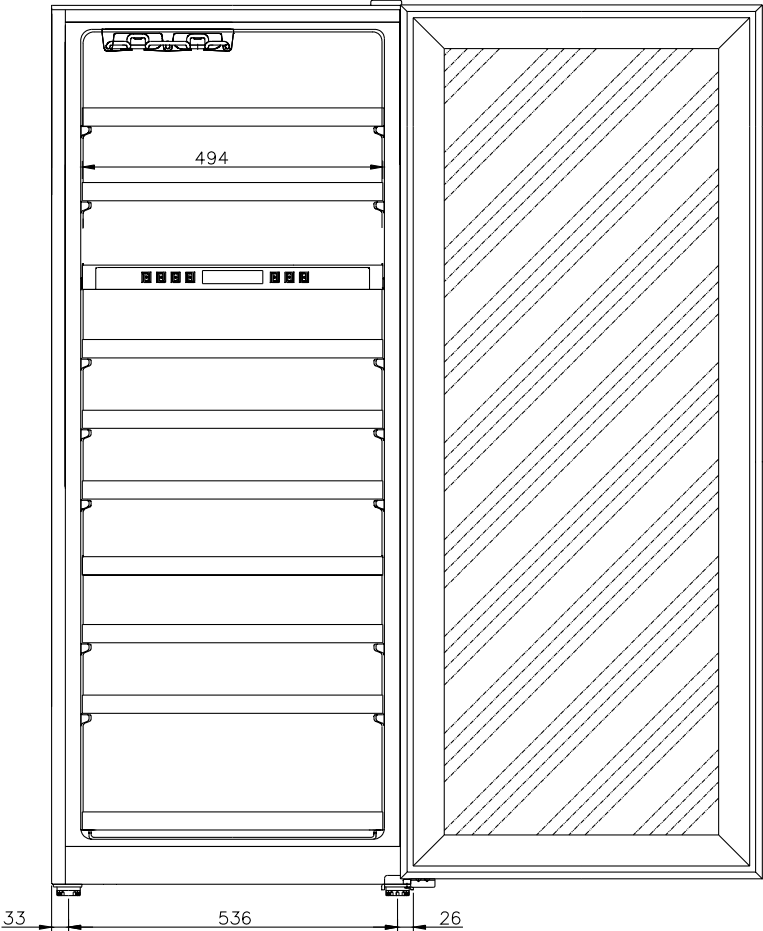
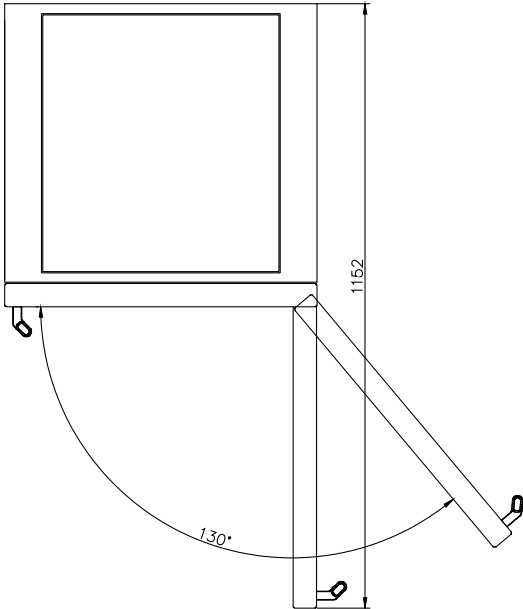


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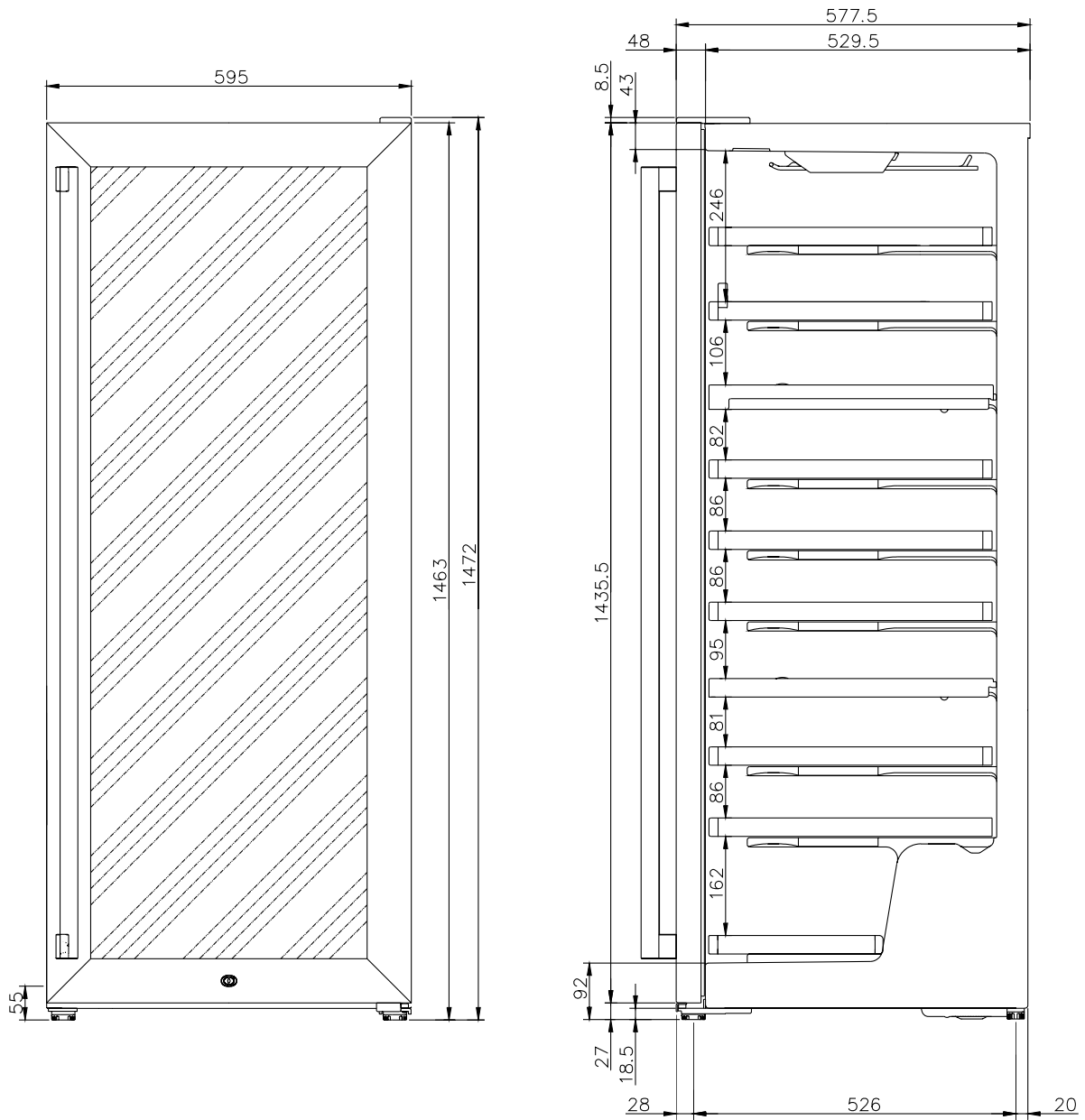


EXTERIOR

LRV810TT



EXTERIOR



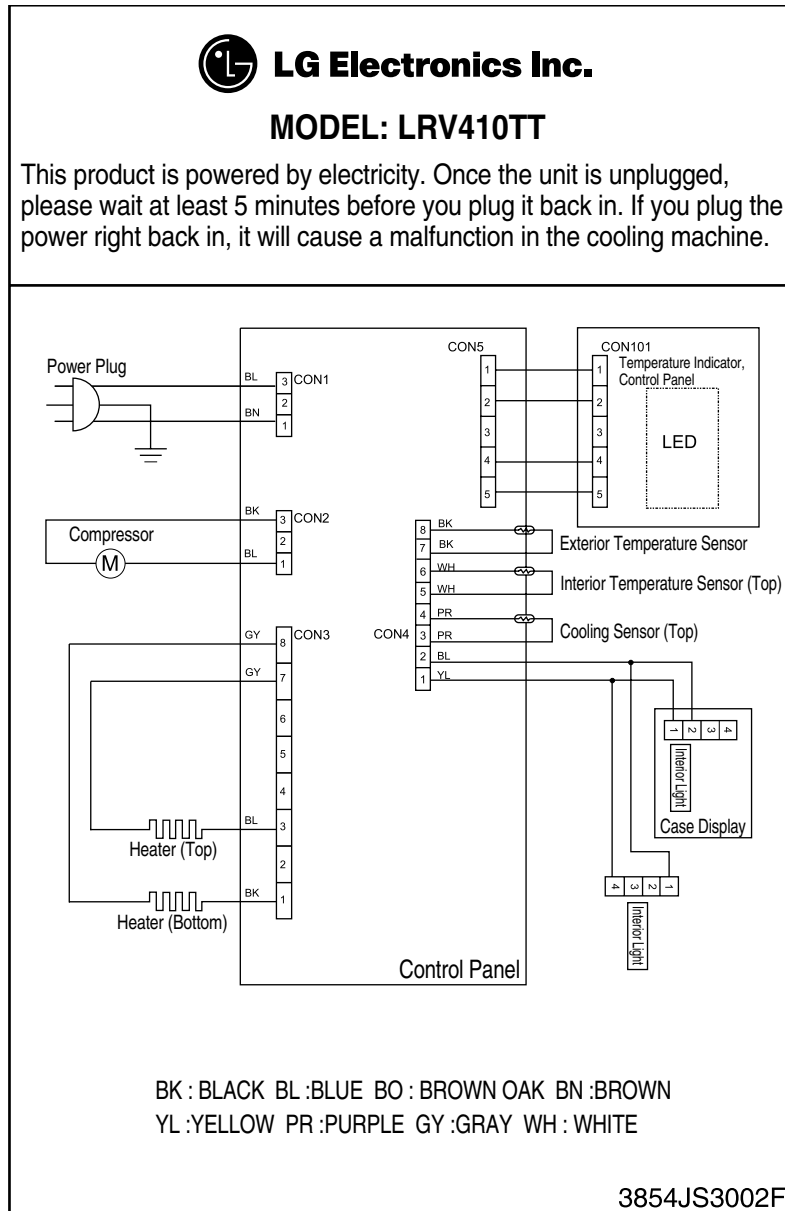
CIRCUIT DIAGRAM

4. Circuit Diagram

4-1. Circuit Diagram

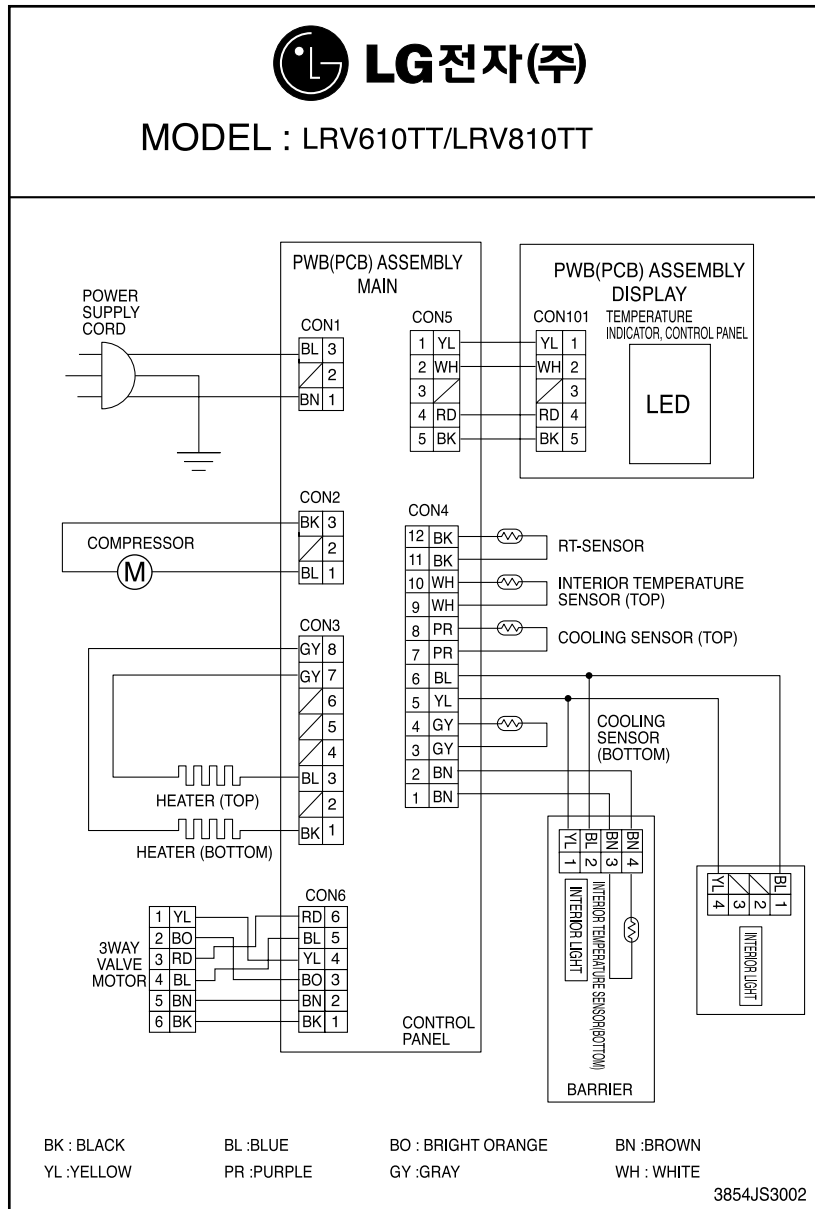
⚠ : Indicated component is a safety part. (In case of a replacement, please use a designated part for its function and your safety.)

LRV410TT



CIRCUIT DIAGRAM

LRV650TT/LRV810TT

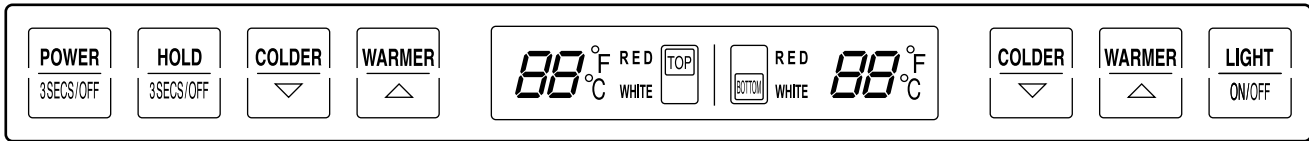


MICOM FUNCTION AND CIRCUIT DIAGRAM

5. MICOM Function and Circuit diagram

5-1. Functions

5-1-1. Displays



1. At the first power-up, the machine is unlocked. And, the initial setting is 57°F/RED for top, 46°F/WHITE for bottom.

5-1-2. Lock/Unlock Function

1. By pressing the 'Lock/Unlock' button for 3 seconds, it will unlock the machine. If the control panel is idle for 10 second, it will automatically lock itself.
2. 1 minute after the lock, the luminescence of the display will decrease.
3. You have to cancel the lock in order to operate the machine.

5-1-3. Setting the top/bottom parts' storage temperature

(1) Top temperature setting

1. With the lock off, set the top storage temperature using ' ', ' ' button on the left side of the display.
2. By pressing ' '

It will display in the order of 43°F → ○ ○ ○ ○ ○ ○ → 52°F → 54°F → ○ ○ ○ ○ ○ ○ → 64°F
 |← WHITE LED ON →| |← RED LED ON →|

3. By pressing ' '

It will display in the order of 64°F → ○ ○ ○ ○ ○ ○ → 54°F → 52°F → ○ ○ ○ ○ ○ ○ → 43°F
 |← RED LED ON →| |← WHITE LED ON →|

4. NOTE: Top temperature cannot be lower than the bottom

(2) Bottom temperature setting

1. With the lock off, set the top storage temperature using ' ', ' ' button on the right side of the display.
2. By pressing ' '

It will display in the order of 43°F → ○ ○ ○ ○ ○ ○ → 52°F → 54°F → ○ ○ ○ ○ ○ ○ → 64°F
 |← WHITE LED ON →| |← RED LED ON →|

3. By pressing ' '

It will display in the order of 64°F → ○ ○ ○ ○ ○ ○ → 54°F → 52°F → ○ ○ ○ ○ ○ ○ → 43°F
 |← RED LED ON →| |← WHITE LED ON →|

4. NOTE: Bottom temperature cannot be higher than the top.

MICOM FUNCTION AND CIRCUIT DIAGRAM

5-1-4. DISPLAY OFF Function

1. With the lock off, by pressing the 'Power' button for 3 seconds, every LED turns OFF and the machine switches to suspension mode.
2. In the suspension mode, by pressing 'Power' button for 3 seconds, the suspension mode is cancelled and the Top/Bottom part displays its prior values.

NOTE: The lock is off. You can change the Top/Bottom temperature.

5-1-5. Lamp ON/OFF Function

1. Each press of the LAMP button turns on/off the LAMP.
2. If the LAMP remains turned on for over an hour, the LAMP automatically turns itself off.

5-1-6. Temperature Control

(1) Top Temperature

1. Top temperature is controlled by controlling the coolant intake valve according to the set temperature.
2. If the exterior temperature is lower than the top setting, the control increases the temperature by turning on/off the top heater.

(2) Bottom Temperature

1. Bottom temperature is controlled by controlling the coolant intake valve according to the set temperature.
2. If the exterior temperature is lower than the bottom setting, the control increases the temperature by turning on/off the bottom heater.

(3) 3-WAY Valve Operation Condition

1. Appropriate valve opens/closes according to each sensor temperature.
2. If both top and bottom temperature is insufficient, the part that is already in cooling process finishes its cooling, then the other part's valve becomes opens. (No simultaneous cooling)
3. If the cooling is not finished in given time (45min for top/30min for bottom), the parts valve in cooling process will be closed and the other part's valve will be opened.

Top Part	Bottom Part	Valve Operation
Satisfied	Satisfied	1)*
Satisfied	Unsatisfied	Top CLOSE / Bottom OPEN
Unsatisfied	Satisfied	Top CLOSE / Bottom OPEN
Unsatisfied	Unsatisfied	Top 45min / Bottom 30min

*1): The opposite valve of the last satisfied part will be opened.

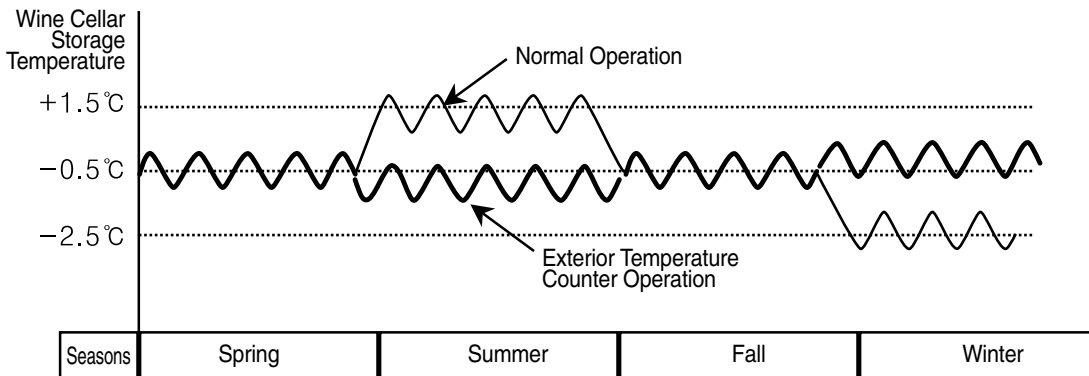
(4) COMP Operation Condition

1. COMP will be turned on if either the top or bottom part temperature is unsatisfied.
NOTE: If EVA sensor reading is below the set temperature, COMP will not operate.
2. If both top and bottom are satisfied, COMP switches to OFF.
3. If bottom is satisfied and top is unsatisfied after a heating, COMP will not be turned on until 30 minutes after the heating termination.
4. If top is satisfied and bottom is unsatisfied after a heating, COMP will not be turned on until 30 minutes after the heating termination.

MICOM FUNCTION AND CIRCUIT DIAGRAM

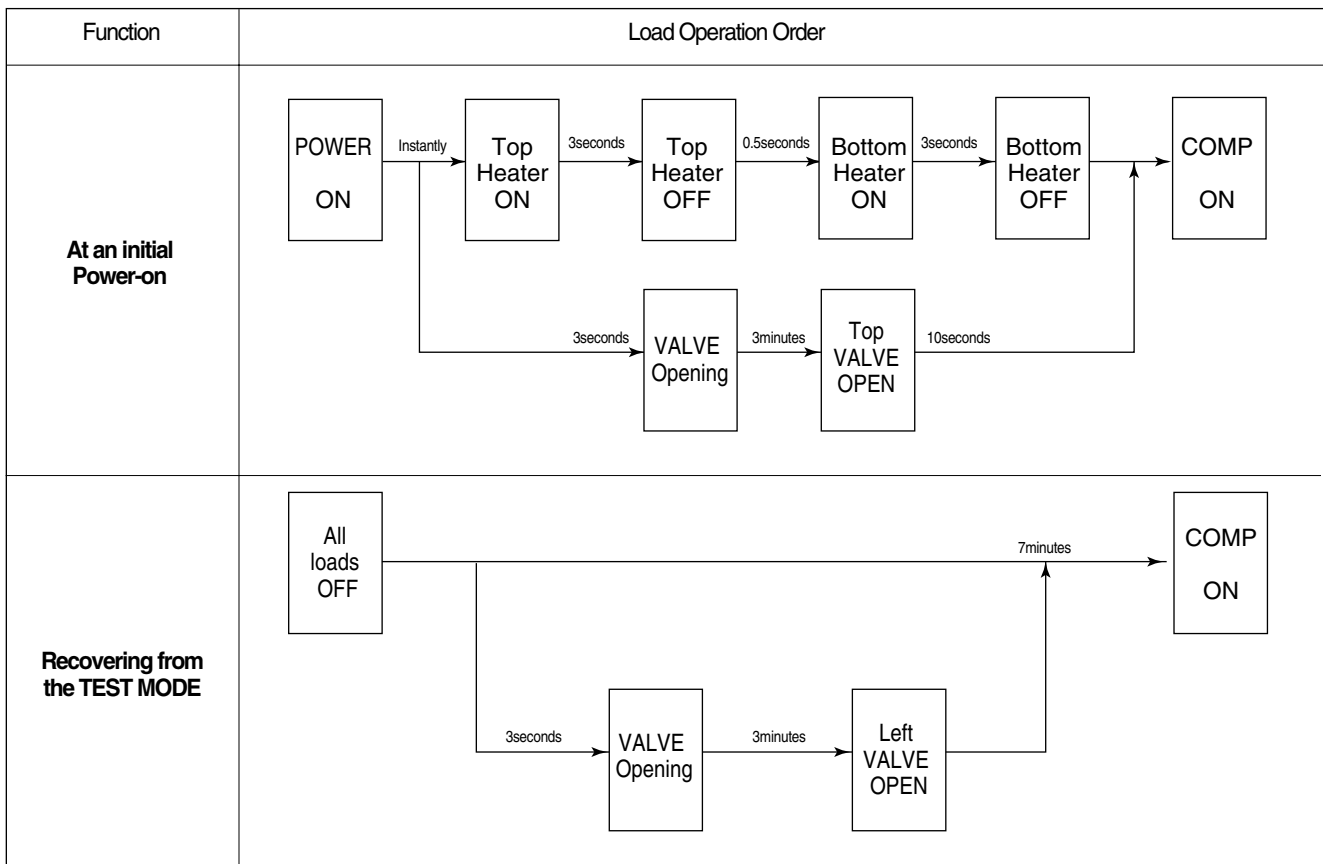
5-1-7. Exterior Temperature Counter Operation

1. A sensor senses exterior temperature and keeps interior temperature constant



5-1-8. Electronic Parts Consecutive Operation

Electronic parts, such as COMP, top/bottom, will operate in consecutive order to prevent a noise and parts damages from multiple parts operating at an initial power-on and a series of test runs. (Includes temporary power outage)



MICOM FUNCTION AND CIRCUIT DIAGRAM

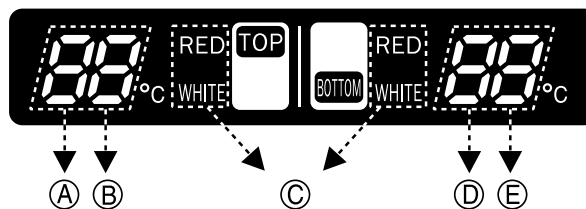
5-1-9. Malfunction Diagnosis Function

1. This function is to facilitate SVC at a time of a problem during an operation.
2. Even when a problem occurs, display buttons and LED will operate in normal condition. You can identify the problem by pressing both ' ' and ' ' button. The display will indicate the problem for 5 seconds.

NOTE: In case of a communication error, the problem will automatically be displayed on the bottom temperature setting LED.

3. For every sensor malfunction (top, top EVA, bottom, bottom EV, Exterior sensor), all of the appropriate malfunction indications will be displayed even when more than 2 sensors are malfunctioning.
4. In case of a communication error, the communication error has the priority. Sensor malfunction indication will not be displayed during a communication error display.
5. Sensor malfunctions and communication error indications

NO	Malfunctions	Indications					Conditions
		A part	B part	C part	D part	E part	
1	Top sensor malfunction	8	E	ON	8	8	Cut wire or short circuit in top sensor
2	Top EVA sensor malfunction	E	8	ON	8	8	Cut wire or short circuit in top EVA sensor
3	Bottom sensor malfunction	8	8	ON	8	E	Cut wire or short circuit in a bottom sensor
4	Bottom EVA sensor malfunction	8	8	ON	E	8	Cut wire or short circuit in a bottom EVA sensor
5	Exterior sensor malfunction	8	8	OFF	8	8	Cut wire or short circuit in an exterior sensor
6	Communication malfunction	OFF	OFF	OFF	C	O	No communication in 30 consecutive seconds (connector unplugged, defected TR in communication part)



5-1-10. TEST Function

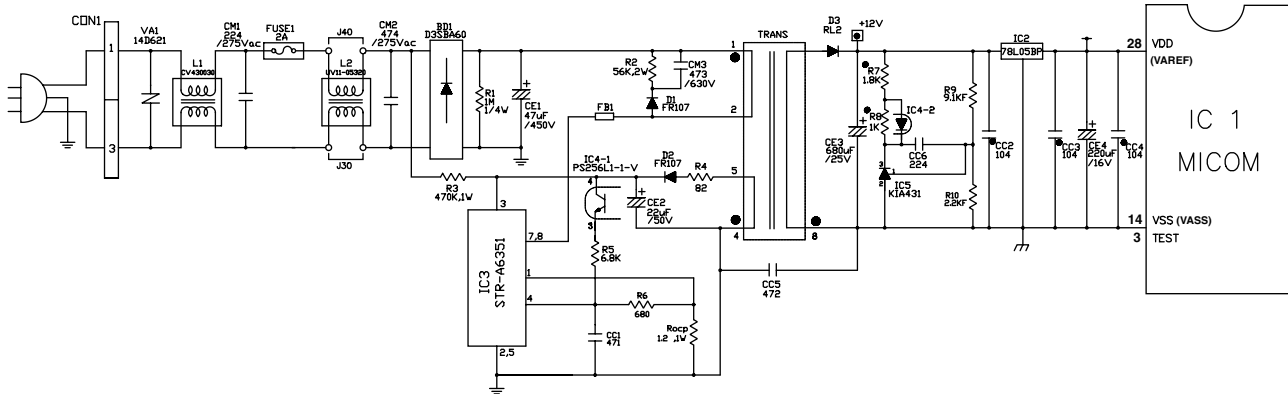
1. Test function allows PCB and product function check, and malfunctioning part identification.
2. TEST S/W is on the MAIN PCB. Test mode resumes normal operation after 2 hours.
3. After you terminate the test mode, you have to cycle the power in order to resume the normal mode.

MODE	Operation	COMP	VALVE	DISPLAY LED	
TEST1	Press TEST S/W once	ON	Top valve OPEN	P1	Checking for top part's cooling system
TEST2	Press TEST S/W once from TEST1	ON	Bottom valve OPEN	P2	Checking for bottom part's cooling system
TEST3	Press TEST S/W once from TEST2	ON	TOP 45min / Bottom 15min switchover	P3	Checking for top/bottom part's cooling system
Resume Normal Operation	Each test mode resumes the initial state after two hours When resuming from the test mode, operation will activate after 5 minutes COMP delay				

MICOM FUNCTION AND CIRCUIT DIAGRAM

5-2. Circuit Diagram

5-2-1. Power Supply Diagram

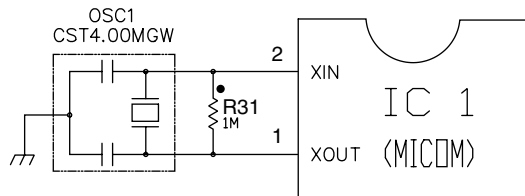


Power supply diagram consists of a noise reduction part and a SIMPS(Switching Mode Power Supply), a rectifying part (BD1, CE1) (from AC to DC), a switching part (IC3) for switching the DC voltage, TRANS for delivering the energy from Switch #1 to #2, Switch #2 for supplying power to MICOM and IC, and a FEED BACK(IC4) for sending a feedback to TRANS in order to maintain a consistent voltage at #2.

Caution There may be high voltage electricity (DC310V) on the power supply. Please wait more than 3 minutes after you unplug the power in order to prevent an electric shock.

5-2-2. Oscillation Circuit

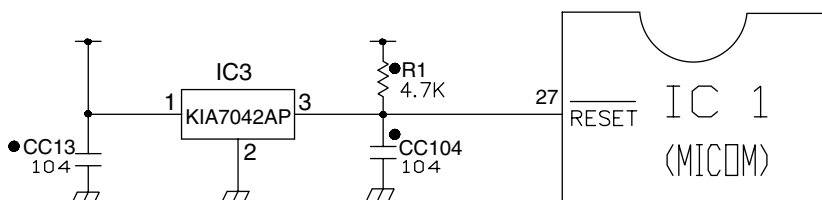
Synchronizing CLOCK generation for transmitting and receiving information of IC1 (MICOM) inner logic devices, and time generation for time calculation. If specifications of OSC1 are modified, it may alter its calculation time or may cause a malfunction. Please use regular parts.



5-2-3. RESET Circuit

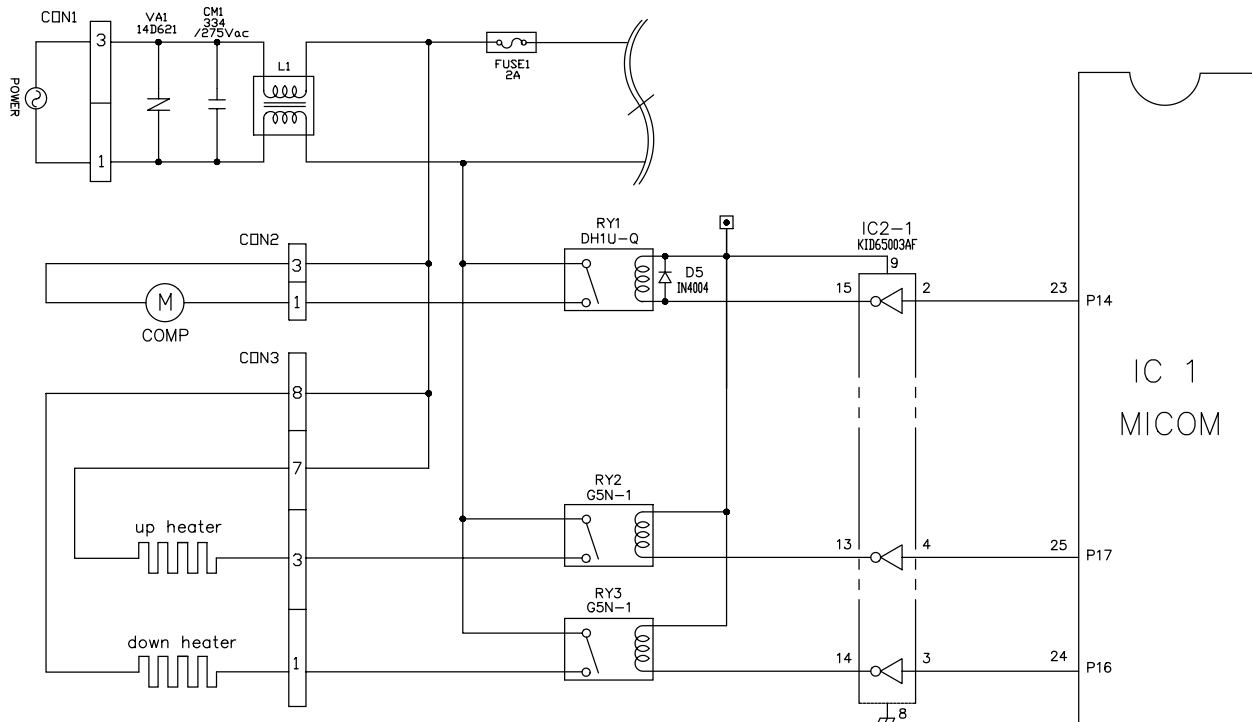
When MICOM is powering up from an initial power-on or from a power outage recovery, the reset circuit initialize several parts inside of the MICOM (C1), including the RAM. In the early stage of the power-up process, the MICOM RESET terminal is supplied with a 'LOW' voltage for a certain period of time (10mins). (normal voltage for RESET terminal is 5.3V)

(MICOM does not operate with a defective RESET IC)



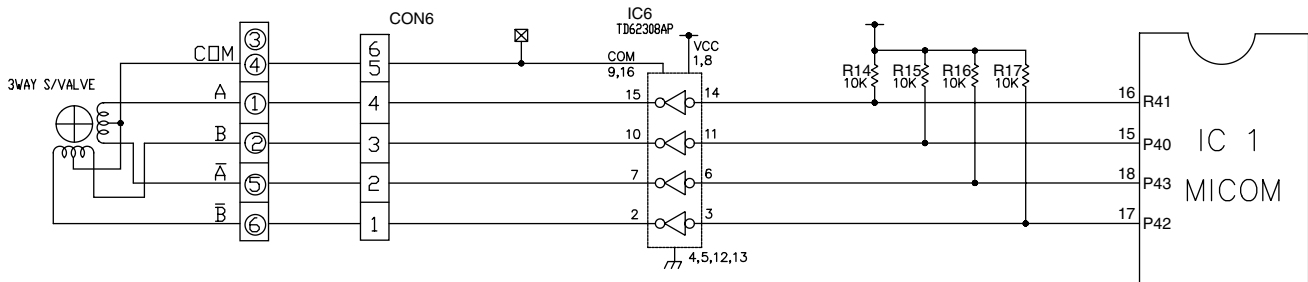
MICOM FUNCTION AND CIRCUIT DIAGRAM

5-2-4. Load Drive Circuit



Load Type	COMP	Top Maturing Heater	Bottom Maturing Heater
Measuring Parts (IC2)	#15	#13	#14
Condition	ON	Below 1V	
	OFF	12V	

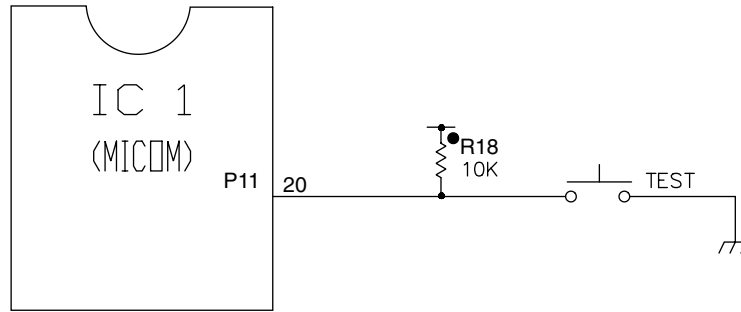
5-2-5. STEPPING MOTOR Operation Circuit (3-WAY VALVE)



According to a specified STEP numbers, send 'HIGH' and 'LOW' signals through MICOM PIN #16, 15, 18, and 17. Revolving magnetism forms on the motor coil. Motor starts running.

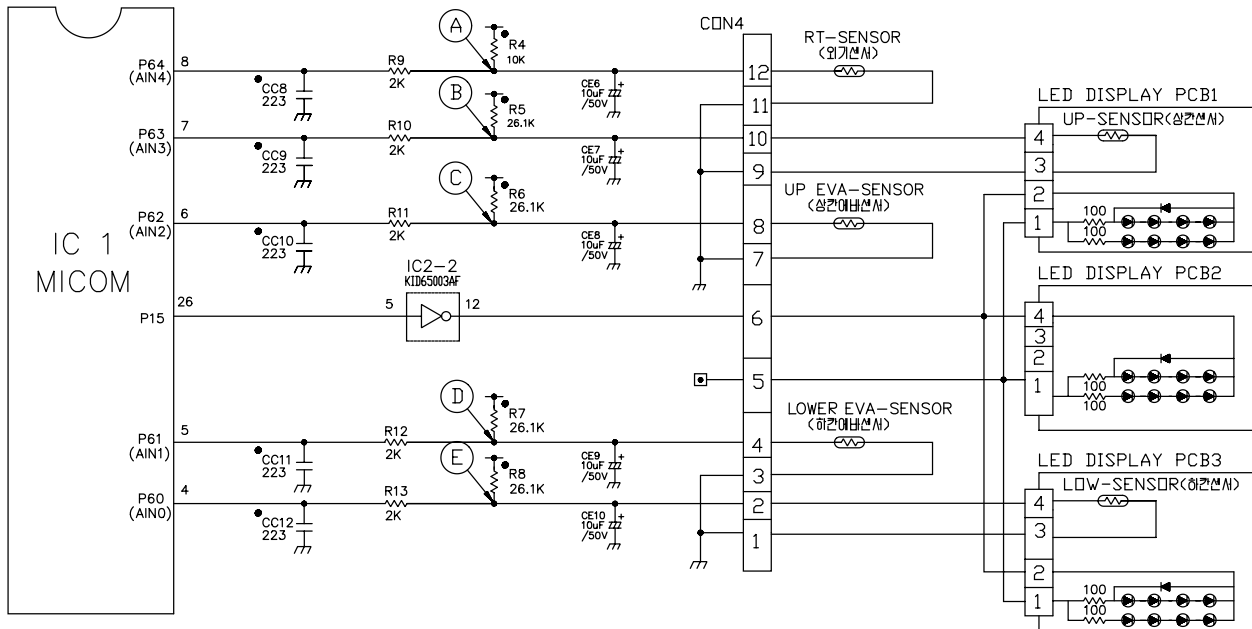
MICOM FUNCTION AND CIRCUIT DIAGRAM

5-2-6. Switch Input Circuit



Input Circuit is to sense a TEST-S/W signal for refrigerator inspection.

5-2-7. Temperature Sensing Circuit



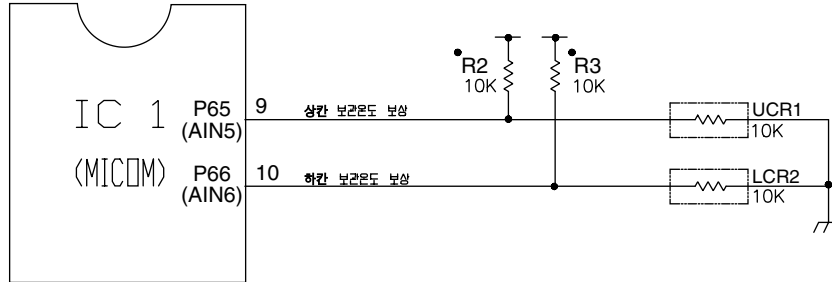
This circuit consists of top/bottom sensor, top EVA/bottom EVA sensor for controlling top/bottom parts' storage/maturing temperature, and an exterior temperature sensor. Each sensor's SHORT and OPEN condition is as followed.

Sensor	Check Point	Normal (-30 ~50)	SHORT	OPEN
Exterior Sensor	POINT (A) Voltage	0.5V~4.5V	0V	5V
Top Sensor	POINT (B) Voltage			
Bottom Sensor	POINT (E) Voltage			
Top EVA Sensor	POINT (C) Voltage			
Bottom EVA Sensor	POINT (D) Voltage			

MICOM FUNCTION AND CIRCUIT DIAGRAM

5-2-8. Temperature compensation and overcooling / insufficient cooling, maturing temperature cut compensation circuit.

(1) Temperature Compensation



A circuit to input a value of compensation temperature to MICOM for controlling top/bottom storage temperature

Top (RCT)	Bottom (RCB)	Value of temperature compensation	Others
180 kΩ		+2.5 °C [+4.5 °F]	Compensation to warm up ↑
56 kΩ		+2.0 °C [+3.6 °F]	
33 kΩ		+1.5 °C [+2.7 °F]	
18 kΩ		+1.0 °C [+1.8 °F]	
12 kΩ		+0.5 °C [+0.9 °F]	
10 kΩ		0 °C [+0 °F]	Standard Temperature
8.2 kΩ		-0.5 °C [-0.9 °F]	↓ Compensation to cool down
5.6 kΩ		-1.0 °C [-1.8 °F]	
3.3 kΩ		-1.5 °C [-2.7 °F]	
2 kΩ		-2.0 °C [-3.6 °F]	
470		-2.5 °C [-4.5 °F]	

4 Temperature compensation chart according to a resistance value change (Value differences by current temperature)

Ex) Top Resistance Compensation (RCT) 10K(Current Resistance) → 18K(Modified Resistance) = Top Temperature +1 °C

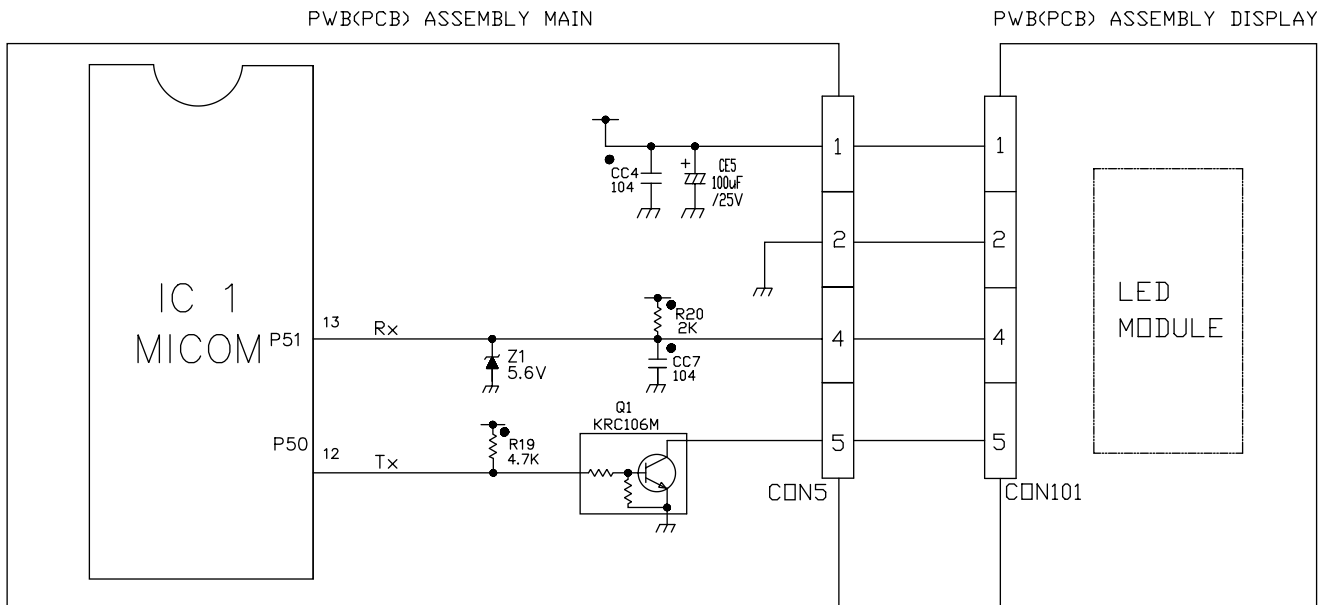
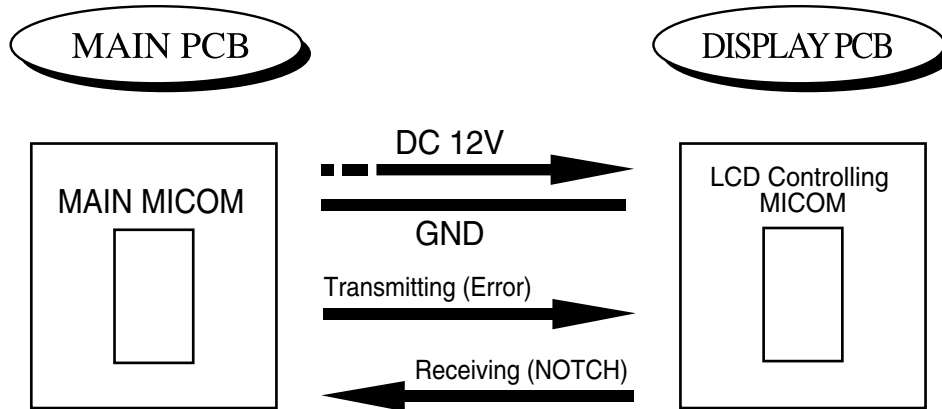
Classification	Modified Resistance / Current Resistance	470	2kΩ	3.3kΩ	5.6kΩ	8.2kΩ	10kΩ	12kΩ	18kΩ	33kΩ	56kΩ	180kΩ
		Top (RCT)	470	No Change	0.5 Increase	1 Increase	1.5 Increase	2 Increase	2.5 Increase	3 Increase	3.5 Increase	4 Increase
2kΩ	0.5 Decrease		No Change	0.5 Increase	1 Increase	1.5 Increase	2 Increase	2.5 Increase	3 Increase	3.5 Increase	4 Increase	4.5 Increase
3.3kΩ	1 Decrease		0.5 Decrease	No Change	0.5 Increase	1 Increase	1.5 Increase	2 Increase	2.5 Increase	3 Increase	3.5 Increase	4 Increase
5.6kΩ	1.5 Decrease		1 Decrease	0.5 Decrease	No Change	0.5 Increase	1 Increase	1.5 Increase	2 Increase	2.5 Increase	3 Increase	3.5 Increase
8.2kΩ	2 Decrease		1.5 Decrease	1 Decrease	0.5 Decrease	No Change	0.5 Increase	1 Increase	1.5 Increase	2 Increase	2.5 Increase	3 Increase
Bottom (RCB)	10kΩ	2.5 Decrease	2 Decrease	1.5 Decrease	1 Decrease	0.5 Decrease	No Change	0.5 Increase	1 Increase	1.5 Increase	2 Increase	2.5 Increase
	12kΩ	3 Decrease	2.5 Decrease	2 Decrease	1.5 Decrease	1 Decrease	0.5 Decrease	No Change	0.5 Increase	1 Increase	1.5 Increase	2 Increase
	18kΩ	3.5 Decrease	3 Decrease	2.5 Decrease	2 Decrease	1.5 Decrease	1 Decrease	0.5 Decrease	No Change	0.5 Increase	1 Increase	1.5 Increase
	33kΩ	4 Decrease	3.5 Decrease	3 Decrease	2.5 Decrease	2 Decrease	1.5 Decrease	1 Decrease	0.5 Decrease	No Change	0.5 Increase	1 Increase
	56kΩ	4.5 Decrease	4 Decrease	3.5 Decrease	3 Decrease	2.5 Decrease	2 Decrease	1.5 Decrease	1 Decrease	0.5 Decrease	No Change	0.5 Increase
180kΩ	5 Decrease	4.5 Decrease	4 Decrease	3.5 Decrease	3 Decrease	2.5 Decrease	2 Decrease	1.5 Decrease	1 Decrease	0.5 Decrease	No Change	

MICOM FUNCTION AND CIRCUIT DIAGRAM

5-2-9. Communication Circuit between MAIN PCB and DISPLAY PCB

Communication circuit for an information exchange between MAIN MICOM and DISPLAY PCB in MAIN PCB

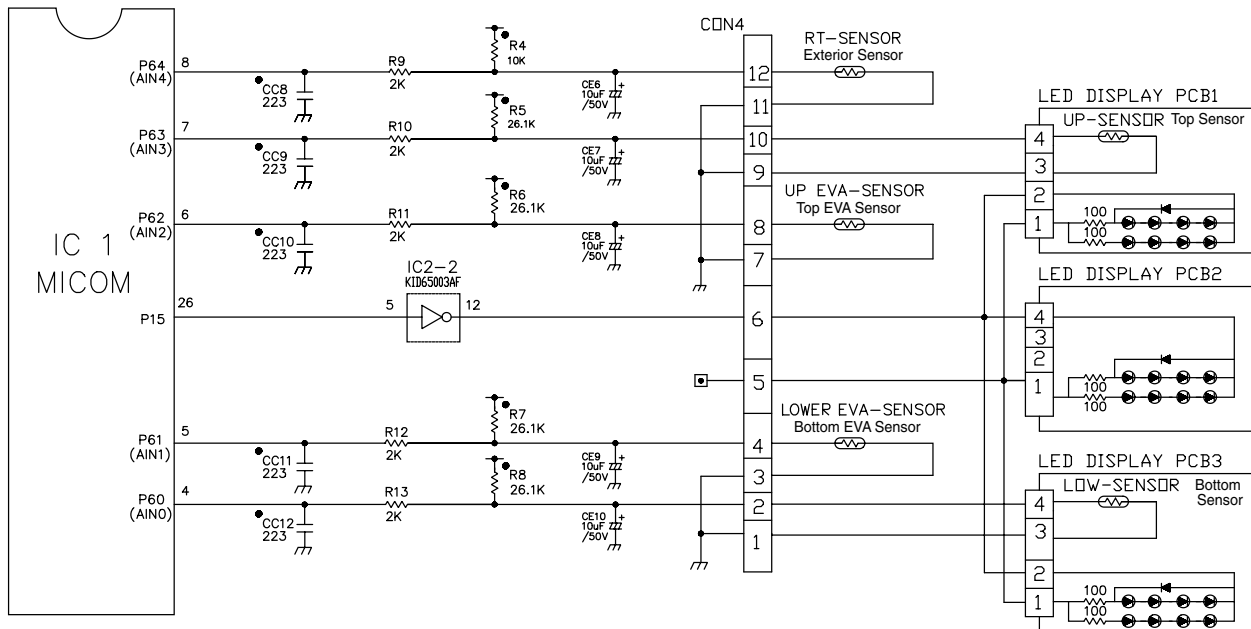
If there is an interruption in information exchange between MAIN MICOM and DISPLAY PCB in MAIN PCB for more than 30 seconds, it causes a communication malfunction.



MICOM FUNCTION AND CIRCUIT DIAGRAM

5-3. Sensor Resistance Specification Chart

Temperature Measurement (°C)	Top · Bottom Sensor, Top · Bottom EVA Sensor, Exterior Sensor
-20 °C [-4 °F]	77 KΩ
-15 °C [+5 °F]	60 KΩ
-10 °C [+14 °F]	47.3 KΩ
-5 °C [+23 °F]	38.4 KΩ
0 °C [+32 °F]	30 KΩ
+5 [+41 °F]	24.1 KΩ
+10 [+50 °F]	19.5 KΩ
+15 [+59 °F]	15.9 KΩ
+20 [+68 °F]	13 KΩ
+25 [+77 °F]	11 KΩ
+30 [+86 °F]	8.9 KΩ
+40 [+104 °F]	6.2 KΩ
+50 [+122 °F]	4.3 KΩ



- 4 Sensor Common Difference is 5%.
- 4 For sensor resistance value measuring, the sensor must stay idle for more than 3 minutes before the measurement. (Because of a sensing rate, a delay is necessary)
- 4 A digital tester is preferred. (an analog tester has greater error range)
- 4 For sensor measurement, separate MAIN Part CON4 HOUSING in PWB (PCB) ASSEMBLY. Referring to a circuit diagram above, measure each sensor's terminal at a separated housing.

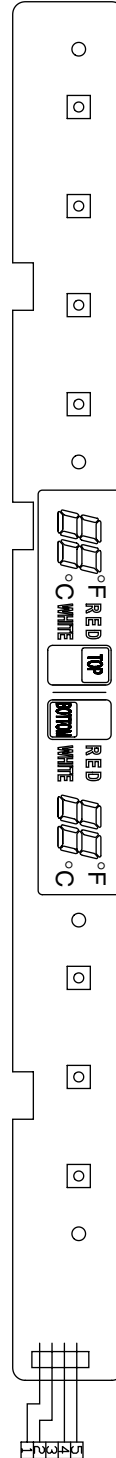
MICOM FUNCTION AND CIRCUIT DIAGRAM

5-4-2 Replacement Parts List

B	A	WORK					
QTY	QTY	No	P/NO	DESCRIPTION	SPEC	MAKER	REMARK
1	1	1	6870JB8205B	PWB(PCB)	WINE CELLAR MAIN PCB NAESU	DOOSAN	FR1,16T
1	1	2	6170JB2010A	TRANSFORMER,SMPS(COIL)	A3-PJT 12.5V 1A	SMC	TRANS
1	1	3	6630VM02803	CONNECTOR (CIRC),W	YW396 YEONHO 3P 3.96MM -3AV (1,3) RED	YEONHO	CON1(RED)
1	1	4	6630VM02803	CONNECTOR (CIRC),W	YW396 YEONHO 3P 3.96MM -3AV (1,3)	YEONHO	CON2
1	1	5	6630VM04208	CONNECTOR (CIRC),W	YW396 YEONHO 8P 3.96MM -8AV (1,3,7,8)	YEONHO	CON3
1	1	6	6630JB8007L	CONNECTOR (CIRC),W	917782-1 AMP 12P 2.5MM STRAIGHT	AMP	CON4
1	1	7	6630JB8007D	CONNECTOR (CIRC),W	917783-1 AMP 5P 2.5MM STRAIGHT	AMP	CON5
1	1	8	6630JB8007E	CONNECTOR (CIRC),W	917782-1 AMP 6P 2.5MM STRAIGHT	AMP	CON6
-	-	9	01ZZJB2057D	IC,DRAWING	TMP87P809N 28P SDIP BK OTP WINE	TOSHIBA	IC1
1	-	10	01ZZJB2057E	IC,DRAWING	TMP87P809N 28P SDIP BK OTP WINE	TOSHIBA	IC1
1	1	11	01KE650030C	IC,KEC	KID65003AF 16SDIP BK 7CH DRIVER	KEC	IC2
1	1	13	01KE704200A	IC,KEC	KIA7042AP 3P BK RESET	KEC	IC3
1	1	14	01PMGNE001A	IC,POWER MANAGEMENT	PS2561-1 NEC 4P,DIP BK = TLP762	NEC	IC4
1	1	15	01STLKE016A	IC,LINEAR	KIA78L05BP	KEC	IC5
1	1	16	01TD623080C	IC,DRAWING	62308AP 16PIN SDIP BK DRIVE IC ST	TOSHIBA	IC6
1	1	17	01PMGSK003A	IC,POWER MANAGEMENT	STR-A6351 SANKEN 8 DIP ST SMPS	SANKEN	IC7
1	1	18	01KE431000A	IC,KEC	KIA431 3 PIN TP --	KEC	IC8
1	1	19	0DD400409AC	DIODE,RECTIFIER	RECT1N4004 TP	DELTA/평창	D5
1	1	20	0DB360000AA	DIODE,RECTIFIERS	D3SBA60 BK SHINDENGEN 600V 4A	SHINDENGEN	BD1
1	1	21	6102JB8001B	VARIABLE	INR14D621 ILJIN 620V 10% WORLD	IL JIN	VA1
1	1	22	0DRSA00070A	DIODE,RECTIFIERS	RL2 SANKEN BK NON 400V 2A 40A 5	SHINDENGEN	D3
2	2	23	0DR107009AA	DIODE,RECTIFIERS	FR107 TP DELTA DD41 1000V 1A 3	DELTA/평창	D1,2
1	1	24	0CF4731Y470	CAPACITOR,POLYESTER	0.047UF D630V 0.05 BLUK	PILKO	CM3
1	1	25	0CE476ZV6E0	CAPACITOR,FIXED ELECT	47UF HE 450V 20% BULK SNAP IN	RUBICON	CE1
1	1	26	0CE226EK638	CAPACITOR,FIXED ELECT	22UF KME TYPE 50V 20% FM5 TP 5	SAMHWA	CE2
1	1	27	0CE687YH6E0	CAPACITOR,FIXED ELECT	680UF RX 25V 20% BULK SNAP IN	SAMYOUNG	CE3
1	1	28	0CE227BF638	CAPACITOR,FIXED ELECT	220UF KME TYPE 16V 20% FM5 TP 5	G-LUXON(MTI)	CE4
1	1	29	0CE1076H638	CAPACITOR,FIXED EL	100UF SMS,SG 25V 20% FM5 TP 5		CE5
5	5	30	0CE1066K638	CAPACITOR,FIXED EL	10UF SMS,SG 50V 20% FM5 TP 5		CE6~10
1	1	31	0CK47202510	CAPACITOR,FIXED CERAM	4700PF D 2KV 10% B(Y5P) R	DOOSAN/SAM HWA	CC5
1	1	32	0CK471DK96A	CAPACITOR,CERAMIC (HI	0.00047UF 2012 50V 80%,-20% R/TP X7R	MURATA	CC1
1	1	33	0CK224DK94A	CAPACITOR,FIXED CERAM	220NF 2012 50V 80%,-20% F(Y5V) R/TP	MURATA	CC15
7	7	34	0CK104DK94A	CAPACITOR,FIXED CE	100NF 2012 50V 80%,-20% R/TP F	MURATA	CC2~4,6,7,13,14
5	5	35	0CK223DK96A	CAPACITOR,FIXED CE	22NF 2012 50V 80%,-20% R/TP X7	MURATA	CC8~12
3	3	36	0RD1002G609	RESISTOR,FIXED MET	10K OHM 1/4 W 5.00% TA52	SMART,CHOYANG	R15~17
1	1	37	0RD4701G609	RESISTOR,FIXED CAR	4.7K OHM 1/4 W 5.00% TA52	SMART,CHOYANG	R18
5	5	38	0RD2001G609	RESISTOR,FIXED CARBON	2K OHM 1/4 W 5.00% TA52	SMART,CHOYANG	R9~13
1	1	39	0RS5602K641	RESISTOR,FIXED METAL	56K OHM 2 W 5.00% F20	SMART,CHOYANG	R21
1	1	40	0RD1004G609	RESISTOR,FIXED CARBON	1M OHM 1/4 W 5.00% TA52	SMART,CHOYANG	R22
1	1	41	0RS4703J609	RESISTOR,FIXED METAL	470K OHM 1 W 5% TA52	SMART,CHOYANG	R23
1	1	42	0RD6800G609	RESISTOR,FIXED CARBON	680 OHM 1/4 W 5.00% TA52	SMART,CHOYANG	R26
4	4	43	0RD2612E472	RESISTOR,FIXED CARBON	26.1K OHM 1/8 W 2012 1.00% TA52	SMART,ROHM	R5~8
4	4	44	0RH1002L622	RESISTOR,METAL GLAZED	10KOHM 1/8 W 2012 5% R/TP	SMART,ROHM	R2~4,14
1	1	45	0RD0822G609	RESISTOR,FIXED CARBON	82 OHM 1/8 W 2012 5.00% TA52	SMART,ROHM	R24
1	1	46	0RD6801G609	RESISTOR,FIXED CARBON	6.8K OHM 1/8 W 2012 5.00% TA52	SMART,ROHM	R25
2	2	47	0RH4701L622	RESISTOR,METAL GLA	4.7K OHM 1 / 8 W 2012 5.00% D	SMART,ROHM	R1,19
1	1	48	0RH2001L622	RESISTOR,METAL GLAZE	2K OHM 1 / 8 W 2012 5% R/TP	SMART,ROHM	R20
1	1	49	0RH1801L622	RESISTOR,FIXED METAL	1.8K OHM 1 / 8 W 2012 5.00% D	SMART,ROHM	R27
1	1	50	0RH1001L622	RESISTOR,FIXED METAL	1K OHM 1 / 8 W 2012 5.00% D	SMART,ROHM	R28
1	1	51	0RN9101G409	RESISTOR,FIXED METAL	9.1K OHM 1/8 W 2012 1.00% TA52	SMART,ROHM	R29
1	1	52	0RN2201G409	RESISTOR,FIXED METAL	2.2K OHM 1/8W 2012 1.00% TA52	SMART,ROHM	R30
1	1	53	0RH1002L622	RESISTOR,FIXED CAR	1M OHM 1/8 W 2012 5% R/TP	SMART,ROHM	R31
1	1	54	0RS0121J609	RESISTOR,FIXED METAL	1.2 OHM 1 W 5% TA52	SMART,CHOYANG	ROCP
1	1	55	0RD1002G609	RESISTOR,FIXED MET	10K OHM 1/4 W 5.00% TA52	SMART,CHOYANG	UCR1
1	1	56	0RD1002G609	RESISTOR,FIXED MET	10K OHM 1/4 W 5.00% TA52	SMART,CHOYANG	UCR2
1	1	57	0DZRM00188A	DIODE,ZENERS	RLZ ROHM R/TP L.LDS(LL-34) 500MW 5.6V	DELTA/ROHM	Z1
1	1	58	6210JB8001A	CORE (CIRC),BEAD	BFS3510A0 SAMHWA 35X10MM AXIAL	SAM HWA	FB1
1	1	59	6600RRT001W	SWITCH,TACT	THVV502GAA POSTECH 12V DC 50MA	POSTEC	TEST
1	1	60	6200JB8003A	FILTER(CIRC),NOISE	3A 3MH 250V CV430030 A345-PJT C	TNC	L1
1	1	61	0FZZJB3001A	FUSE	250V 2A SLOW-BLOW LITTELFUSE,T	SAMJU	FUSE1
1	1	62	0CQ33418670	CAPACITOR,FIXED FILM	0.33UF D 275V M/M/PP NI R	PILKO	CM1
1	1	63	6212W5M002A	RESONATOR,CERAMIC	CST50400 MURATA 4MHZ +/- 0.5%	MURATA	QSC1
1	1	64	0TR106009AF	TRANSISTOR,BIPOLAR	KRC106M KEC	KEC	Q1
1	1	65	6920JB2004D	RELAY	DH12D1-D-Q (DH1U-Q) DEC 250VAC 10A	DIICHI	RY1(LOW NOISE)
2	2	66	6920JB2003A	RELAY	G5N-1A (MRONCJAPAN) 12V 16.7MA	OMRON	RY2,3
4	4	67	6854B50001A	JUMP WIRE	0.6MM 52MM TP TAPING SN	12MM	J5,6,11,13
12	12	68	6854B50001A	JUMP WIRE	0.6MM 52MM TP TAPING SN	8MM	J01~4,7~10,12,14~16
2	2	69	6854B50001A	JUMP WIRE	0.6MM 52MM TP TAPING SN	8MM	J30,40
300	300	70	49111001	SOLDER,SOLDERING	SOLDER(CROSIN WIRE)RSD	HUISUNG,DAEJIN	-
250	250	71	49111004	SOLDER,SOLDERING	H63A	-	-
150	150	72	59333105	FLUX	SGJ0.825-0.830 KOREA F.H-206	KOKI	-

MICOM FUNCTION AND CIRCUIT DIAGRAM

5-4-3 PWB ASS'Y, DISPLAY AND PARTS LIST



D	C	B	A	WORK
NUVD-B(KUL)	NUVD-2,3(KUL)	NUVD-B	NUVD-2,3	APPLICATION
Qty	Qty	Qty	Qty	No
7	7	7	7	1
6	6	6	6	2
9	9	9	9	3
1	1	1	1	4
7	7	7	7	5
-	-	-	-	6
5	5	5	5	7
1	1	1	1	8
2	2	2	2	9
4	4	4	4	10
-	-	-	-	11
-	-	-	-	12
-	-	-	-	13
1	1	1	1	14
-	-	-	-	15
1	1	1	1	16
1	1	1	1	17
1	1	1	1	18
1	1	1	1	19
1	1	1	1	20
4	4	4	4	21
4	4	4	4	22
2	2	2	2	23
5	5	5	5	24
2	2	2	2	25

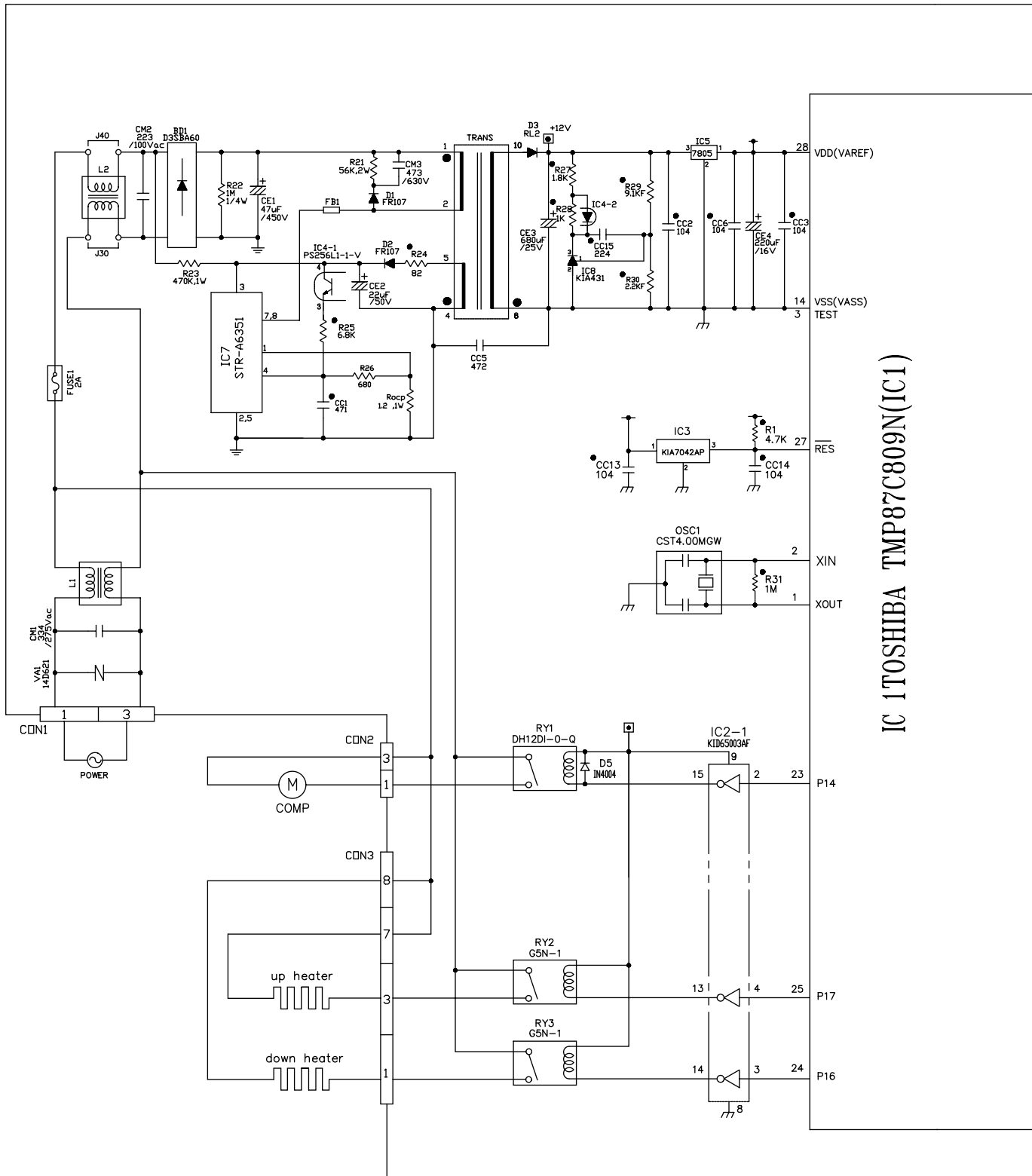
P/NO	DESCRIPTION	SPEC	MAKER	REMARK
	RESISTOR,METAL GLAZE(DCHIP)	360 OHM 1/8 W 5.00% 2012 R/TP		R8~14
		2K OHM 1/8 W 5.00% 2012 R/TP		R6,R16~20
		47K OHM 1/8 W 5.00% 2012 R/TP		R1,R5,R21~27
	SWITCH,TACT	10K OHM 1/8 W 5.00% 2012 R/TP		R2
		JTP1230A 12V DC 50MA (6*6*5)		K1~7
	TRANSISTOR (CHIP)	8550		Q1~5
		KRC106S		Q6
	CAPACITOR,FIXED ELECTROLYTIC	10UF SMS,SG 16V M.FL BULK		E4
		100UF SMS,SG 25V M.FL BULK		E1,E3
	CAPACITOR(CHIP)	0.01UF		C1,C2,C4,C5
	RESONATOR,CRYSTAL	CST50400 4MHZ +/- 0.5% 1SPF TP NONE		X1
	DIODE,ZENERS	RLZ R/TP L10SKLL-34J 0.5V 5.6V 20		Z1
	DIODE,RECTIFIERS(CHIP)	1N4181 TP52 D035 100V 0.5A 0.5A 4		D1
	IC	TMF87C809M 28PIN SDIP BK (MASK1)	TOSHIBA	IC1
	HOUSING	K1A7042P 3P BK RESET	KEC	IC2
	CONTACT	HR2522J-5Y		
	LEAD WIRE	UL1007 22AWG		JP3,4
	JUMP, LINE	LENGTH=10MM		JP5~9
	JUMP, LINE	LENGTH=7.5MM		JP1,2

MICOM FUNCTION AND CIRCUIT DIAGRAM

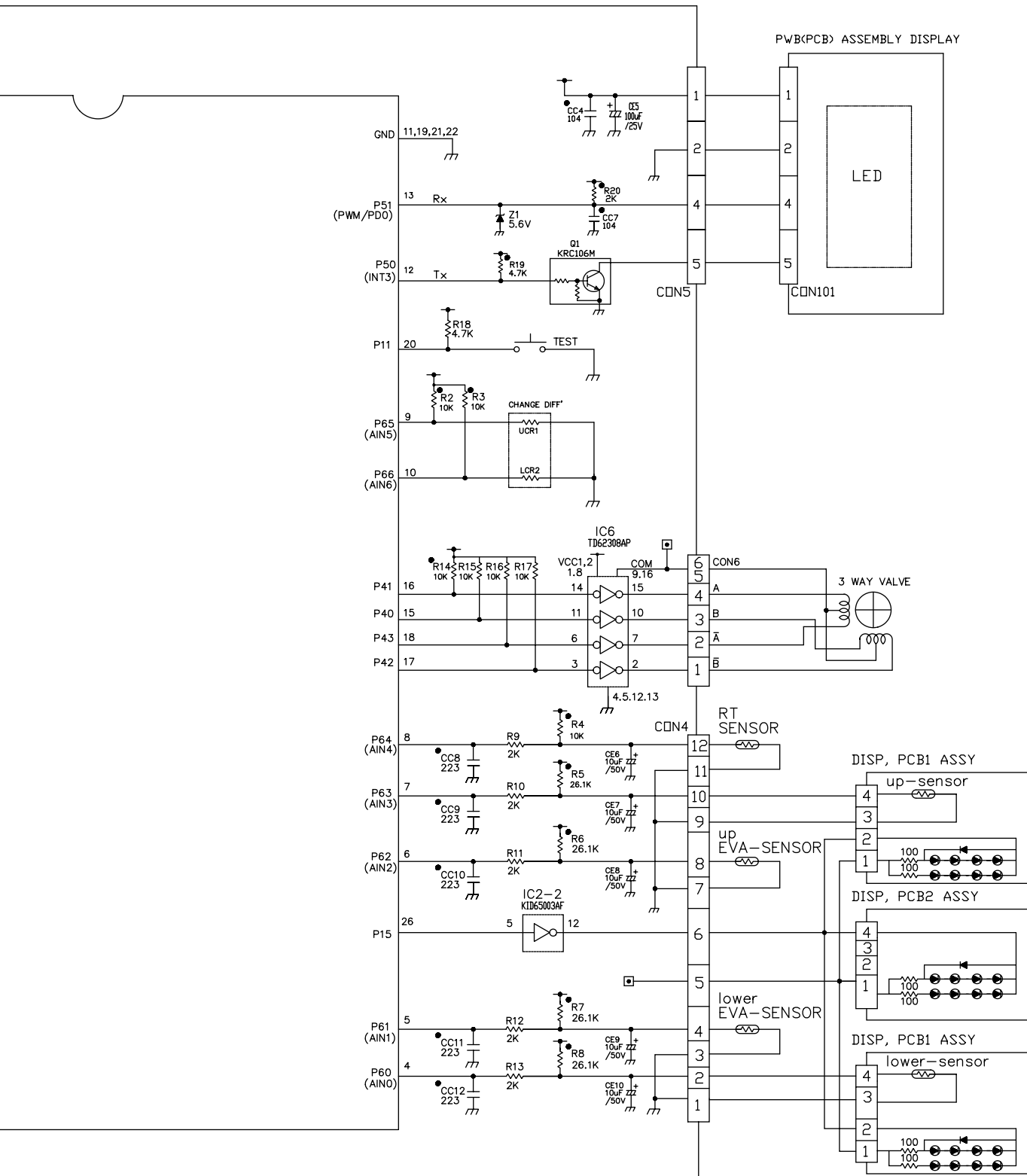
5-5 PWB DIAGRAM

5-5-1 PWB Assembly Main DIAGRAM

(* PWB circuit diagram may vary a little bit depending on actual condition.)



MICOM FUNCTION AND CIRCUIT DIAGRAM



SPECIAL FEATURES

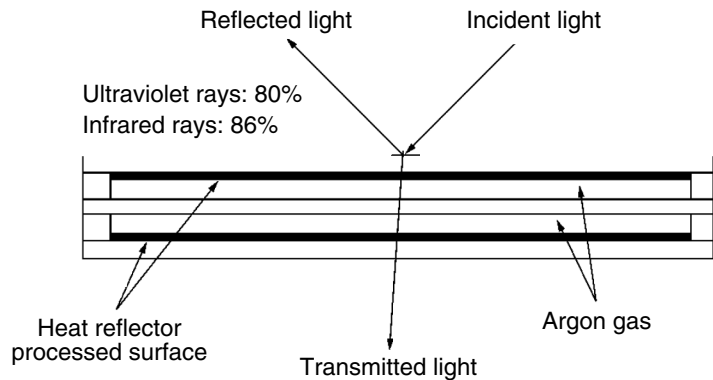
6. Special Features

6-1. Direct cooling system prevents sudden temperature change

An evaporator (laid inside of the back panel) prevents a sudden temperature change. The interior sensor located in the upper/lower part divider controls the temperature, matching the interior and the actual wine temperature. Interior temperature can be adjusted in a range between 6~18 °C. (1 unit = 1 deg).

6-2. ITO triple layer glass blocks ultraviolet and infrared rays. It is a frost free glass.

ITO (Indium Thin Oxide) glass has 86% of infrared rays reflection and 20% of ultraviolet rays transmission. The glass can be reinforced, preventing any injury from an exterior impact. Also, the heat resistant quality of ITO glass prevents any frost forming.



6-3. Low vibration / Anti-vibration structure

Vibration causes convection in precipitations on the bottom of the wine bottle, resulting in a wine heat up by an over-aging. Low vibration/Anti-vibration structure reduces vibrations from the compressor. This supports maintains the wine taste for a longer period of time. Also, the leg adjustor function was added in order to reduce vibration.

STANDARD SELF-DIAGNOSTIC FUNCTION

7. Standard Self-Diagnostic Function

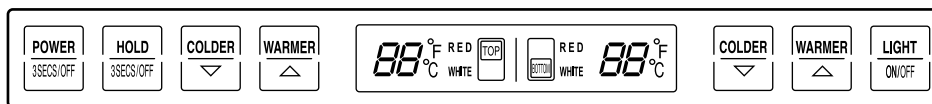
In case if there is any malfunction in the wine cellar, a symbol automatically is indicated on the “set temperature” display. Symbol explanation is on the circuit diagram on the back panel of the product.

7-1. Indications

Symbol	Symptom/Condition	Check point	Cause	Solution
UU/UU	Over-cooling and weak-cooling in upper and lower part at the same time Insufficient cooling in upper and lower part Operation malfunction and OLP activated	VALVE VALVE PIPE welding clogged	Improper coolant valve location Capillary tube welding clogged Improper coolant valve operation	Replace Valve Switch valve terminal location
*EE/88	Insufficient cooling in upper part	Upper part interior sensor Upper part cooling sensor	Sensor line cut Sensor malfunction	Replace Case display
*88/EE	Insufficient cooling in lower part	Lower part interior sensor Lower part cooling sensor	Sensor line cut Sensor malfunction	Replace barrier
CO/--	Improper communication in display	Display PWB lead wire	Cut wire, PWB malfunction	Replace Case display
*8E/88	Insufficient cooling in upper part	Upper part interior sensor	Sensor line cut Sensor malfunction	Replace Case display
*88/8E	Insufficient cooling in lower part	Lower part interior sensor Lower part cooling sensor	Sensor line cut Sensor malfunction	Replace barrier
*E8/88 *88/E8	Insufficient cooling	Upper part cooling sensor Lower part cooling sensor	Sensor line cut Sensor malfunction	--
NOTE)	Weak cooling/overcooling malfunction	MAIN PCB	Cut wire or a short circuit in the exterior sensor	Product Exchange

If ‘ * ’ indication appears, press both of the upper part temperature control switch (‘ ’, ‘ ’) at the same time.

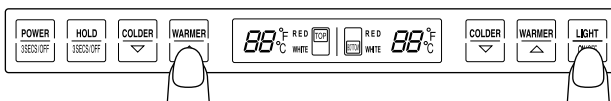
NOTE) Turns off ‘RED’ and ‘WHITE’ LED of TOP and BOTTOM.



7-2. Presentation Mode

This function was added for salesroom display

1. Turn on the power and press both temperature increase key (on the left side) and the ‘lamp’ (on the right side) button at the same time for 5 seconds.



2. ‘SHOP’ or ‘SH’ displays for 3 seconds, then, the normal temperature display comes up



3. The compressor and the heater operation will be interrupted. Temperature control and lamp function will be in normal operation.
 4. If you want to cancel the presentation mode, follow the same instruction from number 1. Normal cooling mode will resume.
- * In case of a power outage, the presentation mode automatically cancels itself. Resetting is required.

MAINTENANCE

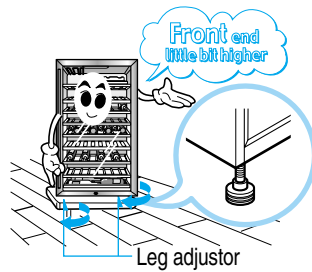
8. Maintenance

8-1. Installation Instruction

(Leveling the product)

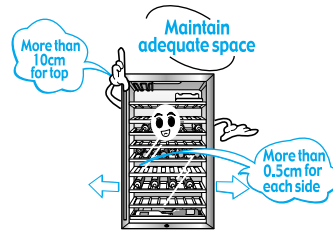
Two people are required in order to perform the leveling.

1. Tilt the product a little bit to the back.
2. Level the product using the leg adjuster. (Front & Back, Left & Right, one each)



(Ensuring heat radiation area)

The heat radiation grill emits heat. Please leave enough space, more than 10cm for top, and 0.5cm for left and right side, for heat radiation area.



(Avoid a heat and direct sunlight when installing the product)

It may decrease the cooling power, resulting in a high electric bill

(Install the product in a dry and well ventilated space)

It may form a mold, resulting in a high electric bill

8-2 Cleaning Instruction

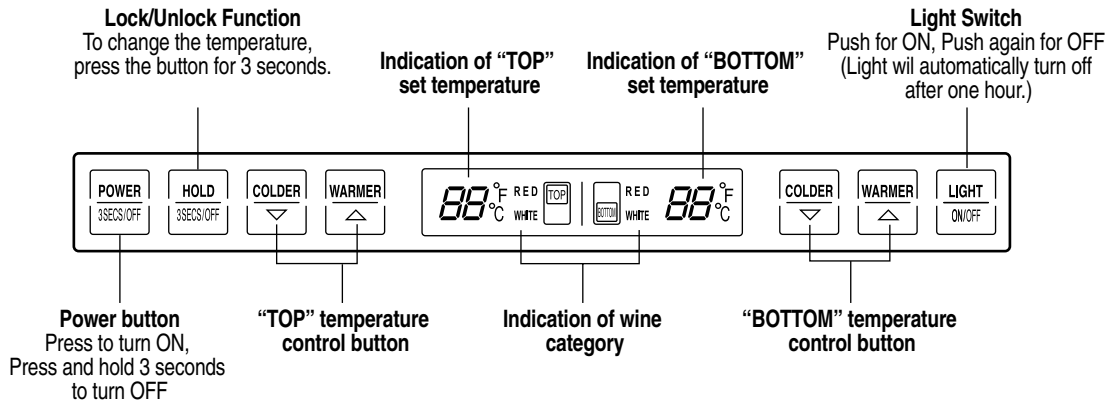
Before cleaning, make sure that the power is unplugged and clean the interior once a year.

1. Unplug the power.
2. Please use a soft cloth dampened with water or a detergent for exterior. If you are using a neutral detergent, wash it off with a clean wet towel.
3. Do not use a polishing agent or a thinner.
4. Do not pour water in the interior or on the exterior.
5. Unclean door packing causes cool air leakage. Please clean it properly.
6. After the cleaning, place the parts in its original place. Plug in the power and set a desired temperature.

MAINTENANCE

8-3. Temperature control

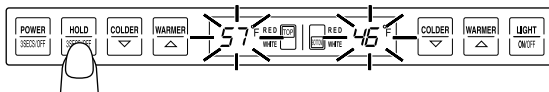
The regulated temperature range is 43°F to 64°F



Change the Temperature

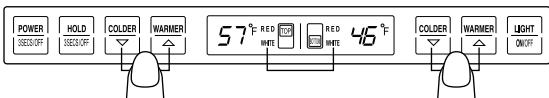
Default (factory) setting is 57°F for the upper section and for model LRV410TT; the lower section is 46°F.

- 1 Press "Hold" button for 3 seconds. In the unlocked state, the temperature indicators blink.

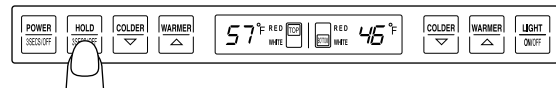


* Children should be restricted from tampering with the "Hold" button to avoid causing unwanted changes.

- 2 Each press of an upper or lower temperature button will raise or lower the temperature by 1°F.



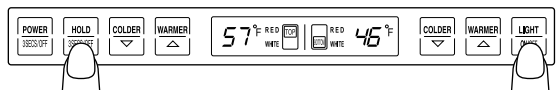
- 3 After the temperature is set, press the "Hold" button again. The indicator will be on, showing the temperature has been set.



- 4 For best results, select a temperature setting in the range specified for each type of wine.

RED 54°F~64°F
WHITE 43°F~52°F

- 5 To change the temperature display from °C to °F or °F to °C, press the "Hold" and "Light" buttons simultaneously for 3 seconds.



Storage Temperature for wine

- Note that the temperature of the upper section cannot be set colder than the lower section. If you want to adjust the upper section below the current temperature of the lower section, it is necessary to first lower the temperature in lower section.
- When it is delivered, the temperature is set to RED (57°F) for upper shelf, and WHITE (46°F) for lower shelf.
- The recommended temperature range for wine is:

WHITE 43°F~52°F

RED 54°F~64°F

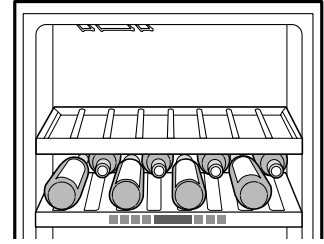
- The time for the interior temperature to reach the set temperature varies with the specific usage of the refrigerator.
- The displayed temperature is the set temperature, which may be different from the actual temperature of the wine stored in the refrigerator.
- After a power outage, temperature resetting is needed. Resetting can be done in accordance with instructions in 'Temperature Setting during Installation'.

MAINTENANCE

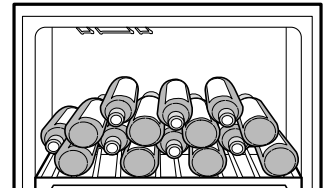
8-4. Correct Usage

8-4-1. How to place the wine bottle?

* When placing in the wine bottle, please place bottles inserting direction crossing each other as shown as in the picture.

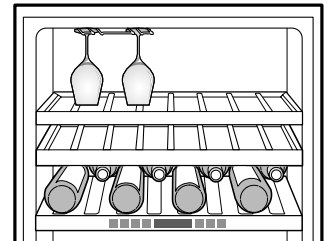


* If you overload one shelf, it may cause inconvenience when you take out the bottle. It may also cause damage to the shelf.



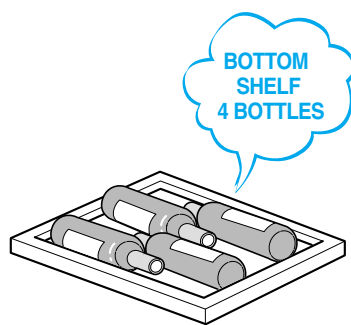
8-4-2. Long term storage (LRV810TT)

* For a leftover wine, store it with its lid tightly shut
* Precipitations may form on the bottom of the wine bottle according to wine variety, storage condition, and storage length. This is only natural.



8-4-3. Bottom shelf storage

* Bottom shelf can hold 4 bottles, maximum 9 bottles.

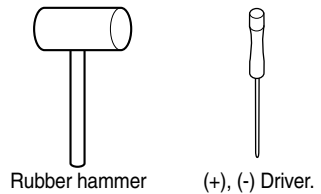


Handle Disassembling, Assembling Instruction

9. Handle Disassembling, Assembling Instruction

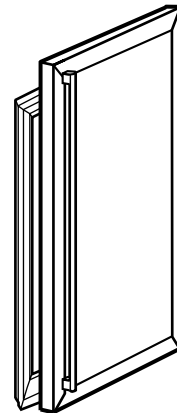
9-1. Before you disassemble the handle.

1. Empty the refrigerator before you disassemble the handle.
2. Following tools are required.
3. Do not tilt the refrigerator.
4. Be careful not to drop the handle when disassembling/assembling.



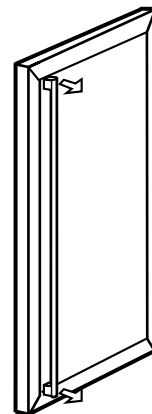
9-2. Take off the gasket.

1. Be careful not to tear the gasket when separating the part.
2. It is much easier if you pull the corner of the gasket.



9-3. Separate the handle and the bar.

1. Take out 3 screws on the bottom of the handle.
2. Take out 3 screws on the top of the handle.



9-4. Separate the supporter and the handle(U/L).


1. Use the rubber handle for supporter and handle (U/L) separation.

9-5. Reverse the order for re-assembling the parts

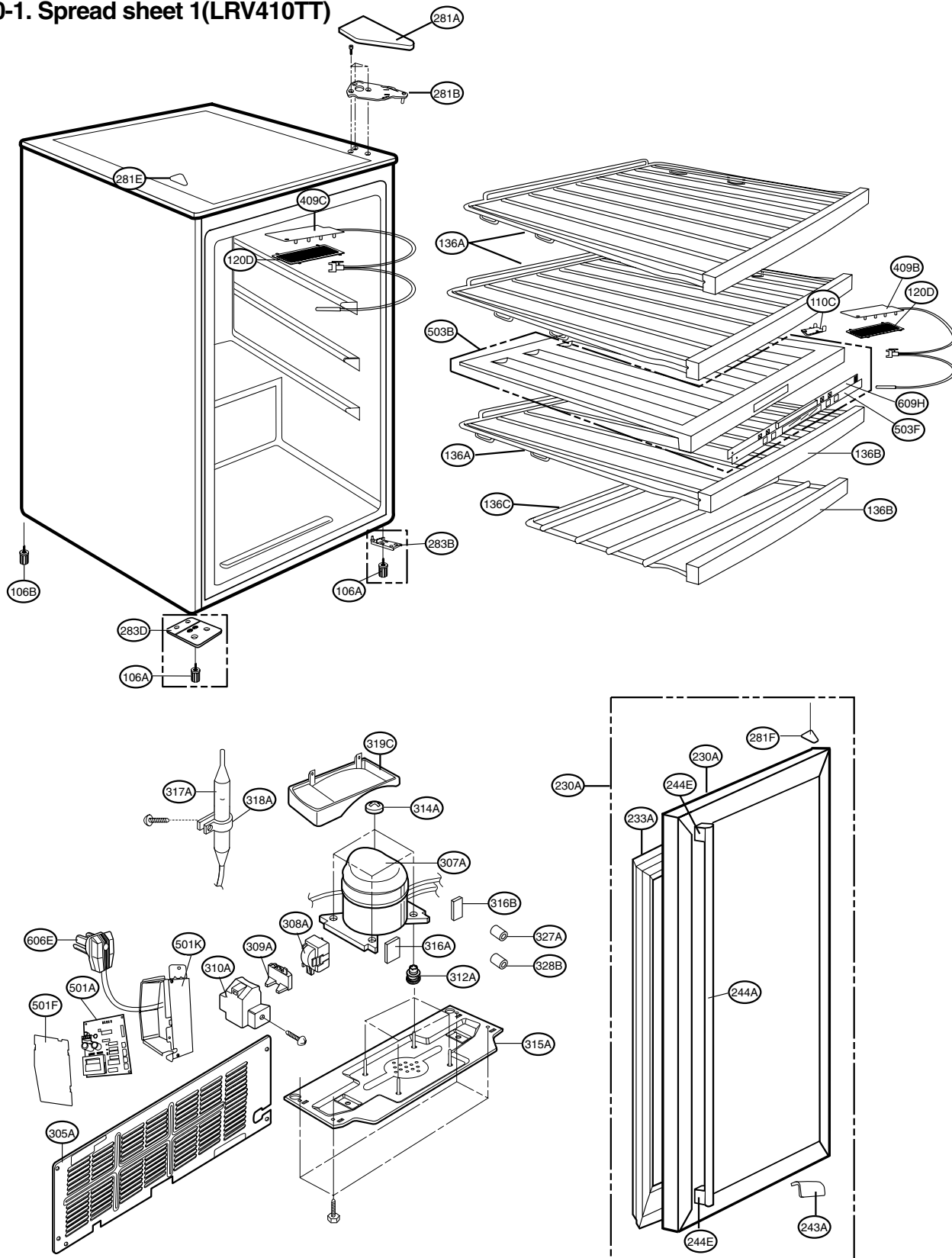


SERVICE PARTS CHART

10. Service Parts Chart

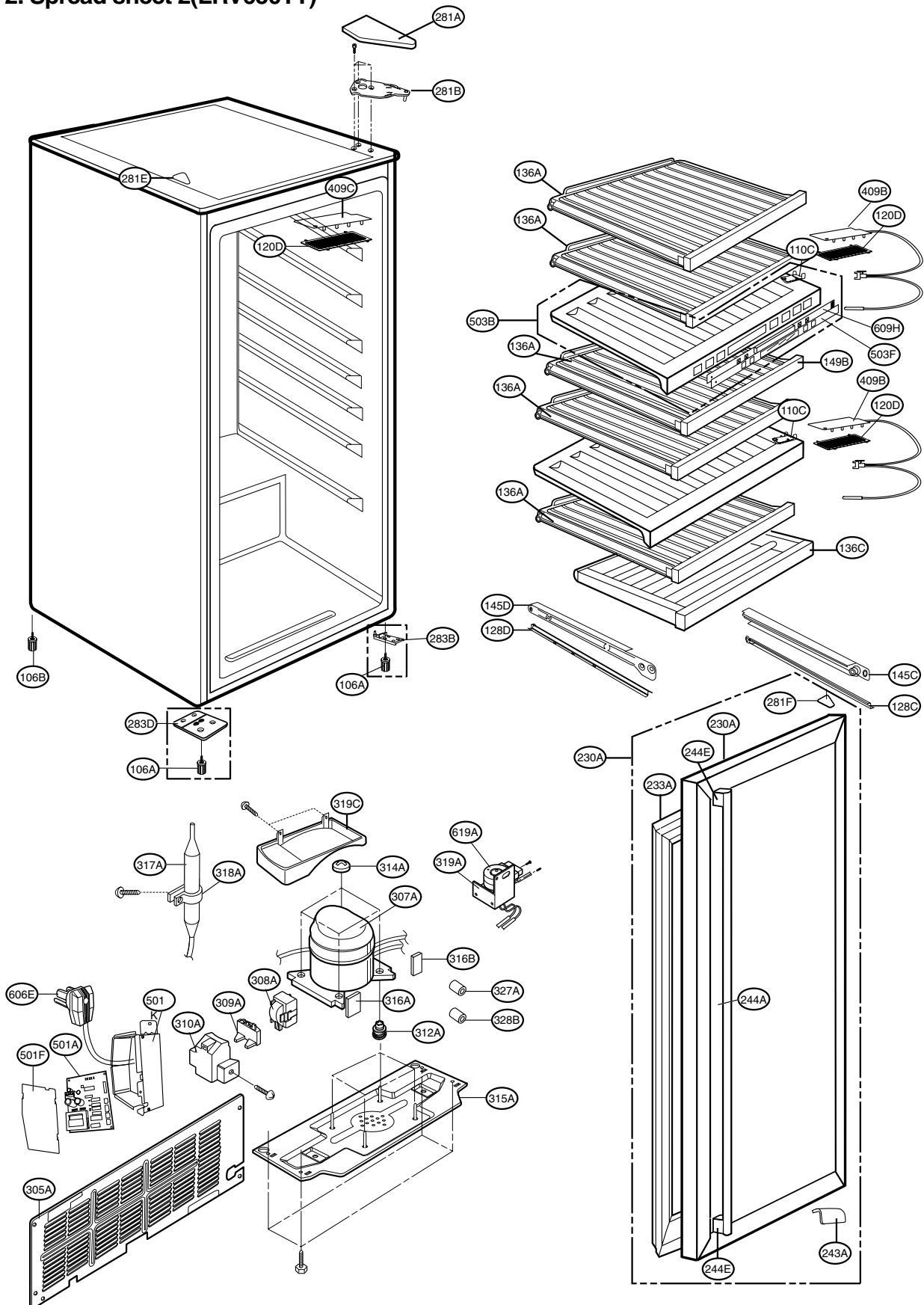
Warning  Indicated is a safety component.
 (When replacing the part, please use a designated part for your safety and its function.)

10-1. Spread sheet 1(LRV410TT)



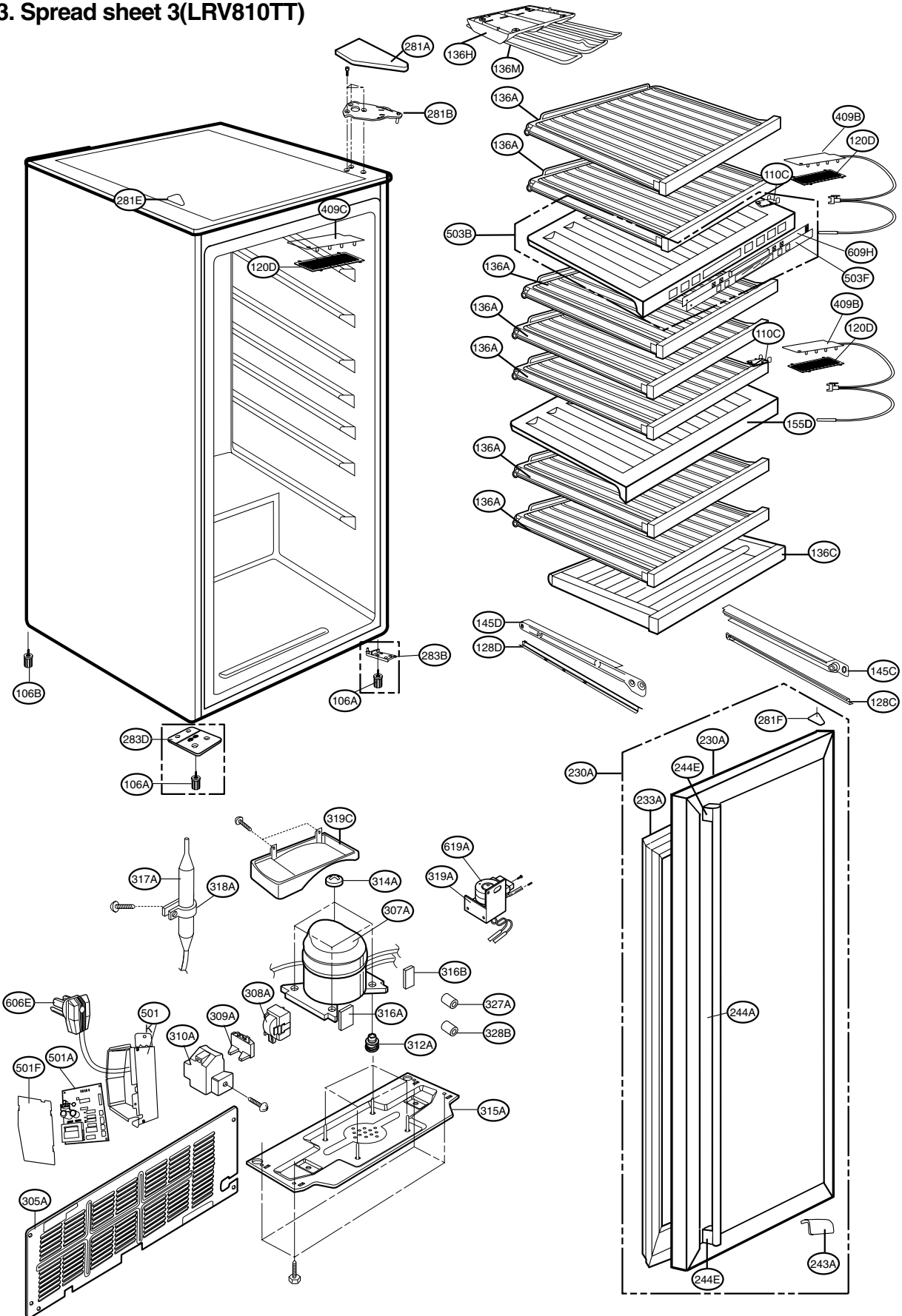
SERVICE PARTS CHART

10-2. Spread sheet 2(LRV650TT)



SERVICE PARTS CHART

10-3. Spread sheet 3(LRV810TT)





P/No. 3828JD8886A

JUL., 2005 Printed in Korea