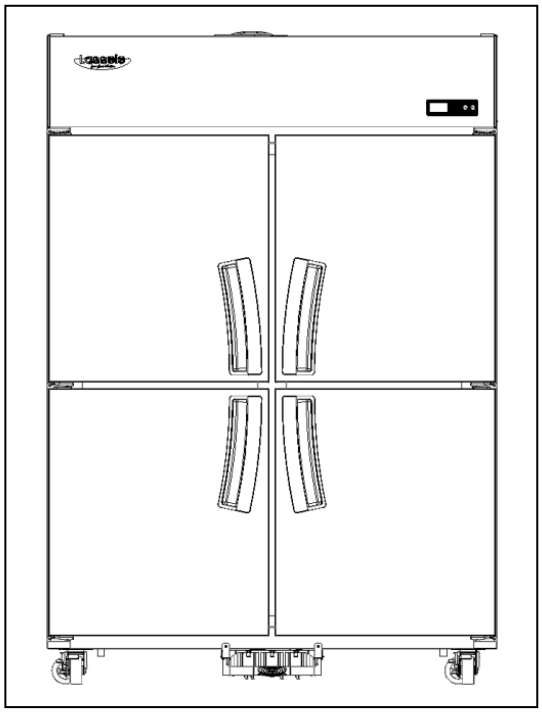
Fan Cooling
Commercial Refrigerator

- Refrigerator/Freezer Model :
  LRF-1382PC/1984PC
- Refrigerator Model :
  LR-681PC/1381PC/1981PC
- Freezer Model:
  LF-681PC/1381PC/1981PC

SERVICE Manual

Commercial Refrigerator



Contents

1. Safety Cautions in Service

Safety Cautions in Service

· **Before replacing or repairing electrical parts, pull out a power plug.**

· **Before replacing electrical parts, reply on the proper parts.**

- Be sure to check the indications including model name, rated voltage, rated currents, and operating temperature.

· **When repairing failures, remove any dusts or foreign materials from the housing unit, connection unit and contacting point completely.**

- This is to prevent any danger of fire in tracking and short.

· **Examine traces of any moisture in electrical parts.**

- In case of any such traces, replace the part or take a proper action to prevent tracking.

· **Examine the status of the parts assembly after the repair is finished.**

- Retain the status as it was before the repair.

· **Examine the operating environment of the product and change the position for use if the installation position is unstable.**

- Consider factors that you should avoid such as moisture, wet area, and inflammables if it is a heating product.

· **Ground the product if you think ground connection is necessary.**

- If there is any likelihood of electrical leakage due to moisture or water, ground connection is a must.

· **If the product consumes much power like a heater, avoid plugging numerous products into a single outlet.**

2. Electrical Parts Specifications(220V/50Hz)

Category		Indirect Cooling Freezer/Refrigerator	
Item		Specifications	
Model		LRF-1382PC	LRF-1984PC
Compressor	Type	SK1A1Q-L2U, 2EA	
	Starting Type	RSCR PTC TYPE(ST/RN One-body Type), 268Kcal/hr	
	Running Capacitor	350VAC 8 ㎌	
Cooler		FIN & TUBE TYPE	
Capacitor		WIRE(Fe) & TUBE(Fe) TYPE(FORCED CONVECTION)	
Dryer		XH-9, 18gr	
Capillary	Freezer	∅3.0*∅1.1*4500 BK	∅3.0*∅1.1*4500 BK
	Refrigerator	∅3.0*∅1.6*3500 BL	∅3.0*∅1.6*3500 BL
Refrigerant		R-134a	
Enclosed Refrigerant Q'ty	Freezer	150 g	150 g
	Refrigerator	110 g	120 g
Front Body Dew Prevention	Exterior Body	HOT PIPE TYPE	
	Cross Bar	HOT PIPE TYPE	
Starting Relay Operation		350V, 22Ω, 2EA	
Overload Relay	Type	4TM308PHBYY-53, 2EA	
	ON Temperature	69±9℃	
	OFF Temperature	125±5℃	
Evaporator Fan Motor		BLDC 2.43W*2890RPM*3EA	BLDC 2.43W*2890*4EA
Heater Defrost (Freezer)		AC220V/280W, 173Ω, 1EA	
Bimetal (Freezer)		G4A00, AC220V, 80℃±5℃, 1EA	
Drain Hose Heater(Freezer)		AC220V 25W, 9.4W, 1407Ω, 1EA	
Starting PCB		SMPS TYPE AC220V/2.5A	
Temperature Display		Digital DISPLAY	
Temperature Sensor		10.75 kΩ±1%,-25~25(B3145+3%)	
Condenser Fan Motor		BLDC TYPE DC12V, 2.67W, 1600RPM, 2EA	
Fan Blade		ABS ∅150, CW(시계방향), 2EA	
Fuse		AC250V/12A	
Power Cord		AC250V/16A, KKP-e, 1.5 ㎟	
Ground Screw		BSBN PI M4*10	
Vaporizer	Fan Motor	DC12V, 250mA, 3W,3000RPM * 2EA	
	Heater	220V, 70W, 691Ω * 1EA	

Category		Indirect Refrigerator		
Item		Specifications		
Model		LR-681PC	LR-1381PC	LR-1981PC
Compressor	Type	SK1A1Q-L2U, 1EA		SK1A1Q-L2U, 2EA
	Starting Type	RSCR PTC TYPE(ST/RN One-body Type), 268Kcal/hr		
	Running Capacitor	350VAC 8 ㎌		
Cooler		POS TYPE(Natural Convection Type)		
Capacitor		WIRE-CONDENSER TYPE (ST/RN One-body Type)		
Dryer		MOLE CULAR SIEVES 18gr		
Capillary	Freezer	-		
	Refrigerator	¢3.0*¢1.6*3500 BL	¢3.0*¢1.6*3500 BL	¢3.0*¢1.6*3500 BL
Refrigerant		R-134a		
Enclosed Refrigerant Q'ty	Freezer	-		
	Refrigerator	110 g	130 g	120 g * 2
Front Body Dew Prevention	Exterior Body	HOT PIPE TYPE		
	Cross Bar	220V 7W	HOT PIPE TYPE	
Starting Relay Operation		350V, 22Ω, 2EA		
Overload Relay	Type	4TM308PHBYY-53, 1EA	4TM308PHBYY-53, 1EA	4TM308PHBYY-53, 2EA
	ON Temperature	69±9℃		
	OFF Temperature	125±5℃		
Evaporator Fan Motor		BLDC 2.43W*2890*1EA	BLDC 2.43W*2890*2EA	BLDC 2.43W*2890*4EA
Heater Defrost (Freezer)		-		
Bimetal (Freezer)		-		
Drain Hose Heater(Freezer)		-		
Starting PCB		SMPS TYPE AC220V/1.3A		SMPS TYPE AC220V/2.5A
Temperature Display		Digital DISPLAY		
Temperature Sensor		10.75 kΩ±1%,-25~25(B3145+3%)		
Condenser Fan Motor		BLDC TYPE DC12V, 2.67W, 1600RPM, 1EA		BLDC TYPE DC12V, 2.67W, 1600RPM, 2EA
Fan Blade		ABS ¢150, CW(시계방향), 1EA		ABS ¢150, CW(시계방향), 2EA
Fuse		AC250V/12A		
Power Cord		AC250V/16A, KKP-e, 1.5 ㎟		
Ground Screw		BSBN PI M4*10		
Vaporizer	Fan Motor	DC12V, 250mA, 3W,3000RPM * 1EA		← * 2EA
	Heater	220V, 70W, 691Ω * 1EA		← * 2EA

Category		Indirect Freezer		
Item		Specifications		
Model		LF-681PC	LF-1381PC	LF-1981PC
Compressor	Type	SK1A1Q-L2U, 1EA	SK1A1Q-L2U, 2EA	SK1A1Q-L2U, 3EA
	Starting Type	RSCR PTC TYPE(ST/RN One-body Type), 268Kcal/hr		
	Running Capacitor	350VAC 8 ㎌		
Cooler		POS TYPE(Natural Convection Type)		
Capacitor		WIRE-CONDENSER TYPE (ST/RN One-body Type)		
Dryer		MOLE CULAR SIEVES 18gr		
Capillary	Freezer	∮3.0*∮1.6*3500 BL	∮3.0*∮1.6*3500 BL	∮3.0*∮1.6*3500 BL
	Refrigerator	-		
Refrigerant		R-134a		
Enclosed Refrigerant Q'ty	Freezer	-		
	Refrigerator	160g	160g x 2	130g x 3
Front Body Dew Prevention	Exterior Body	HOT PIPE TYPE		
	Cross Bar	220V 7W	HOT PIPE TYPE	
Evaporator Fan Motor		BLDC 2.43W*2890*1EA	BLDC 2.43W*2890*4EA	BLDC 2.43W*2890*6EA
Overload Relay	Type	4TM308PHBYY-53*1EA	4TM308PHBYY-53*2EA	4TM308PHBYY-53*3EA
	ON Temperature	69±9℃		
	OFF Temperature	125±5℃		
Heater Defrost (Freezer)		AC220V/280W,173Ω,1EA	AC220V/280W,173Ω,2EA	AC220V/280W,173Ω,3EA
Bimetal (Freezer)		G4A00, AC220V, 80℃±5℃	G4A00, AC220V, 80℃±5℃, 2EA	G4A00, AC220V, 80℃±5℃, 3EA
Drain Hose Heater(Freezer)		AC220V/25W, 9.4W 1407,1EA	AC220V/25W, 9.4W 1407,2EA	AC220V/25W, 9.4W 1407,3EA
Starting PCB		SMPS TYPE AC220V/1.3A	SMPS TYPE AC220V/2.5A	SMPS TYPE AC220V/2.5A
Temperature Display		Digital DISPLAY		
Temperature Sensor		10.75 ㏀±1%,-25~25(B3145+3%)		
Condenser Fan Motor		BLDC TYPE DC12V, 2.67W, 1600RPM, 1EA	BLDC TYPE DC12V, 2.67W, 1600RPM, 2EA	BLDC TYPE DC12V, 2.67W, 1600RPM, 3EA
Fan Blade		ABS ∮150, 3-blades, CW(시계방향), 1EA	ABS ∮150, 3-blades, CW(시계방향), 2EA	ABS ∮150, 3-blades, CW(시계방향), 3EA
Fuse		AC250V/12A		
Power Cord		AC250V/16A, KKP-e, 1.5 ㎟		
Ground Screw		BSBN PI M4*10		
Vaporizer	Fan Motor	DC12V, 250mA, 3W,3000RPM * 1EA	← * 2EA	← * 3EA
	Heater	N/A		

2-1. Electrical Parts Specifications(220V/60Hz)

Category		Indirect Cooling Freezer/Refrigerator	
Item		Specifications	
Model		LRF-1382PC	LRF-1984PC
Compressor	Type	SK1A1B-L1W, 2EA	
	Starting Type	385VAC. 30μF, 2EA	
	Running Capacitor	500VAC. 3.5μF, 2EA	
Cooler		FIN(AL) & TUBE(AL) TYPE	
Capacito		WIRE(Fe) & TUBE(Fe) TYPE(FORCED CONVECTION)	
Dryer		XH-9, 18g	
Capillary	Freezer	ϕ3.0×ϕ1.1×4500 BK	ϕ3.0×ϕ1.1×4500 BK
	Refrigerator	ϕ3.0×ϕ1.6×3500 BL	ϕ3.0×ϕ1.6×3500 BL
Refrigerant		R-134a	
Enclosed Refrigerant Q'ty	Freezer	120g	120g
	Refrigerator	90g	100g
Front Body Dew Prevention	Exterior Body	HOT PIPE TYPE	
	Cross Bar	HOT PIPE TYPE	
Starting Relay Operation		AC 385V, 33Ω, 2EA	
Overload Relay	Type	PTM412PFBYY-53, 2EA	
	OFF Temperature	61±9℃	
	OFF Temperature	125±5℃	
Evaporator Fan Motor		BLDC 2.43W*2890, 3EA	BLDC 2.43W*2890, 4EA
Heater Defrost (Freezer)		AC220V/280W, 173Ω, 1EA	
Bimetal (Freezer)		G4A00, AC220V, 80℃±5℃, 1EA	
Drain Hose Heater(Freezer)		AC220V, 25W&9.4W, 1EA	
Starting PCB		SMPS TYPE AC220V/2.5A	
Temperature Display		DIGITAL DISPLAY	
Temperature Sensor		10.75㏀±1%,-25~25(B3145+3%)	
Condenser Fan Motor		BLDC TYPE DC12V, 2.67W, 1600RPM, 2EA	
FAN BLADE		ABS ϕ150, 3-blades, CW(시계방향), 2EA	
Fuse		AC250V/12A	
Power Cord		AC250V/16A, VCTF 3C x 1.5㎟	
Ground Screw		BSBN PI M4×13	
Vaporizer	Fan Motor	DC12V, 250mA, 3W,3000RPM * 2EA	
	Heater	220V, 70W, 691Ω * 1EA	

Category		Indirect Refrigerator		
Item		Specifications		
Model		LR-681PC	LR-1381PC	LR-1981PC
Compressor	Type	SK1A1B-L2W, 1EA		SK1A1B-L2W, 2EA
	Starting Type	385VAC. 30μF, 1EA		385VAC. 30μF, 2EA
	Running Capacitor	500VAC. 3.5μF, 1EA		500VAC. 3.5μF, 2EA
Cooler		FIN(AL) & TUBE(AL) TYPE (FORCED CONVECTION)		
Capacitor		WIRE ON TUBE TYPE((ST/RN One-body Type)		
Dryer		XH-9, 18g		
Capillary	Freezer	-		
	Refrigerator	ϕ3.0×ϕ1.6×3500 BL	ϕ3.0×ϕ1.6×3500 BL	ϕ3.0×ϕ1.6×3500 BL
Refrigerant		R-134a		
Enclosed Refrigerant Q'ty	Freezer	-		
	Refrigerator	90g	100g	100g X 2
Front Body Dew Prevention	Exterior Body	HOT PIPE TYPE		
	Cross Bar	220V 7W	HOT PIPE TYPE	
Starting Relay Operation		AC 385V, 33Ω, 2EA		
Overload Relay	Type	PTM412PFBYY-53		
	ON Temperature	61±9℃		
	OFF Temperature	125±5℃		
Evaporator Fan Motor		BLDC 2.43W*2890*1EA	BLDC 2.43W*2890*2EA	BLDC 2.43W*2890*4EA
Heater Defrost (Freezer)		-		
Bimetal (Freezer)		-		
Drain Hose Heater(Freezer)		-		
Starting PCB		SMPS TYPE AC220V/1.3A		SMPS TYPE AC220V/2.5A
Temperature Display		Digital DISPLAY		
Temperature Sensor		10.75㏀±1%,-25~25(B3145+3%)		
Condenser Fan Motor		BLDC TYPE DC12V, 2.67W, 1600RPM, 1EA		BLDC TYPE DC12V, 2.67W, 1600RPM, 2EA
Fan Blade		ABS ϕ150, 3-blades, CW(시계방향), 1EA		ABS ϕ150, 3-blades, CW(시계방향), 2EA
Fuse		AC250V/12A		
Power Cord		AC250V/16A, VCTF 3C x 1.5㎟		
Ground Screw		BSBN PI M4×13		
Vaporizer	Fan Motor	DC12V, 250mA, 3W,3000RPM * 1EA		← * 2EA
	Heater	220V, 70W, 691Ω * 1EA		← * 2EA

Category		Indirect Freezer		
Item		Specifications		
Model		LF-681PC	LF-1381PC	LF-1981PC
Compressor	Type	SK1A1B-L2W, 1EA	SK1A1B-L2W, 2EA	SK1A1B-L2W, 3EA
	Starting Type	385VAC. 30μF, 1EA	385VAC. 30μF, 2EA	385VAC. 30μF, 3EA
	Running Capacitor	500VAC. 3.5μF, 1EA	500VAC. 3.5μF, 2EA	500VAC. 3.5μF, 3EA
Cooler		FIN(AL) & TUBE(AL) TYPE (FORCED CONVECTION)		
Capacitor		WIRE ON TUBE TYPE((ST/RN One-body Type)		
Dryer		XH-9, 18g		
Capillary	Freezer	ϕ3.0×ϕ1.1×4500 BL	ϕ3.0×ϕ1.1×4500 BK	ϕ3.0×ϕ1.1×4500 BK
	Refrigerator	-		
Refrigerant		R-134a		
Enclosed Refrigerant Q'ty	Freezer	130g	130g X 2	110g X 3
	Refrigerator	-		
Front Body Dew Prevention	Exterior Body	HOT PIPE TYPE		
	Cross Bar	220V 7W	HOT PIPE TYPE	
Evaporator Fan Motor		BLDC 2.43W*2890*1EA	BLDC 2.43W*2890*4EA	BLDC 2.43W*2890*6EA
Overload Relay	Type	PTM412PFBYY-53		
	ON Temperature	61±9℃		
	OFF Temperature	125±5℃		
Heater Defrost (Freezer)		AC220V/280W, 173Ω, 1EA	AC220V/280W, 173Ω, 2EA	AC220V/280W, 173Ω, 3EA
Bimetal (Freezer)		G4A00, AC220V, 80℃±5℃, 1EA	G4A00, AC220V, 80℃±5℃,2EA	G4A00, AC220V, 80℃±5℃,3EA
Drain Hose Heater(Freezer)		AC220V, 25W&9.4W, 1EA	AC220V, 25W&9.4W, 2EA	AC220V, 25W&9.4W, 3EA
Starting PCB		SMPS TYPE AC220V/1.3A	SMPS TYPE AC220V/2.5A	SMPS TYPE AC220V/2.5A
Temperature Display		Digital DISPLAY		
Temperature Sensor		10.75㏀±1%,-25~25(B3145+3%)		
Condenser Fan Motor		BLDC TYPE DC12V, 2.67W, 1600RPM, 1EA	BLDC TYPE DC12V, 2.67W, 1600RPM, 2EA	BLDC TYPE DC12V, 2.67W, 1600RPM, 3EA
Fan Blade		ABS ϕ150, 3-blades, CW(시계방향), 1EA	ABS ϕ150, 3-blades, CW(시계방향), 2EA	ABS ϕ150, 3-blades, CW(시계방향), 3EA
Fuse		AC250V/12A		AC250V/15A
Power Cord		AC250V/16A, VCTF 3C x 1.5㎟		
Ground Screw		BSBN PI M4×13		
Vaporizer	Fan Motor	DC12V, 250mA, 3W,3000RPM * 1EA	← * 2EA	← * 3EA
	Heater	N/A		

3. Basic Specifications of Product(220V/50Hz)

Type		Indirect Cooling Freezer/Refrigerator		
Model		LR-1381PC	LF-1381PC	LRF-1382PC
Effective Internal Capacity	Total Internal Capacity	1081ℓ	1053ℓ	1014ℓ
	Freezer	-	1053ℓ	504ℓ
	Refrigerator	1081ℓ	-	510ℓ
Exterior Dimension (WidthxDepthxHeight in mm)		1260*800*1830		
Indoor/Outdoor		Indoor		
Insulation Grade		Grade E		
Voltage		220V 50Hz		
Monthly Consumption (kWh/month)		46.65	-	105.11
Performance	Refrigerator	0℃ ~ 7℃		
	Freezer	-24℃ ~ -3℃		
Climate Grade		Warm Temperature (N) Grade		
Product Weight		142kg	155kg	162kg

Type		Indirect Cooling Freezer/Refrigerator				
Model		LR-681PC	LF-681PC	LR-1981PC	LF-1981PC	LRF-1981PC
Effective Internal Capacity	Total Internal Capacity	505ℓ	500ℓ	1667ℓ	1633ℓ	1608ℓ
	Freezer	-	500ℓ	-	1633ℓ	506ℓ
	Refrigerator	505ℓ	-	1667ℓ	-	1102ℓ
Exterior Dimension (WidthxDepthxHeight in mm)		640*800*1830		1900*800*1830		
Indoor/Outdoor		Indoor				
Insulation Grade		Grade E				
Voltage		220V 50Hz				
Monthly Consumption (kWh/month)		36.59	-	60.48	-	114.51
Performance	Refrigerator	0℃ ~ 7℃				
	Freezer	-24℃ ~ -3℃				
Climate Grade		Warm Temperature (N) Grade				
Product Weight		97kg	97kg	194kg	204kg	204kg

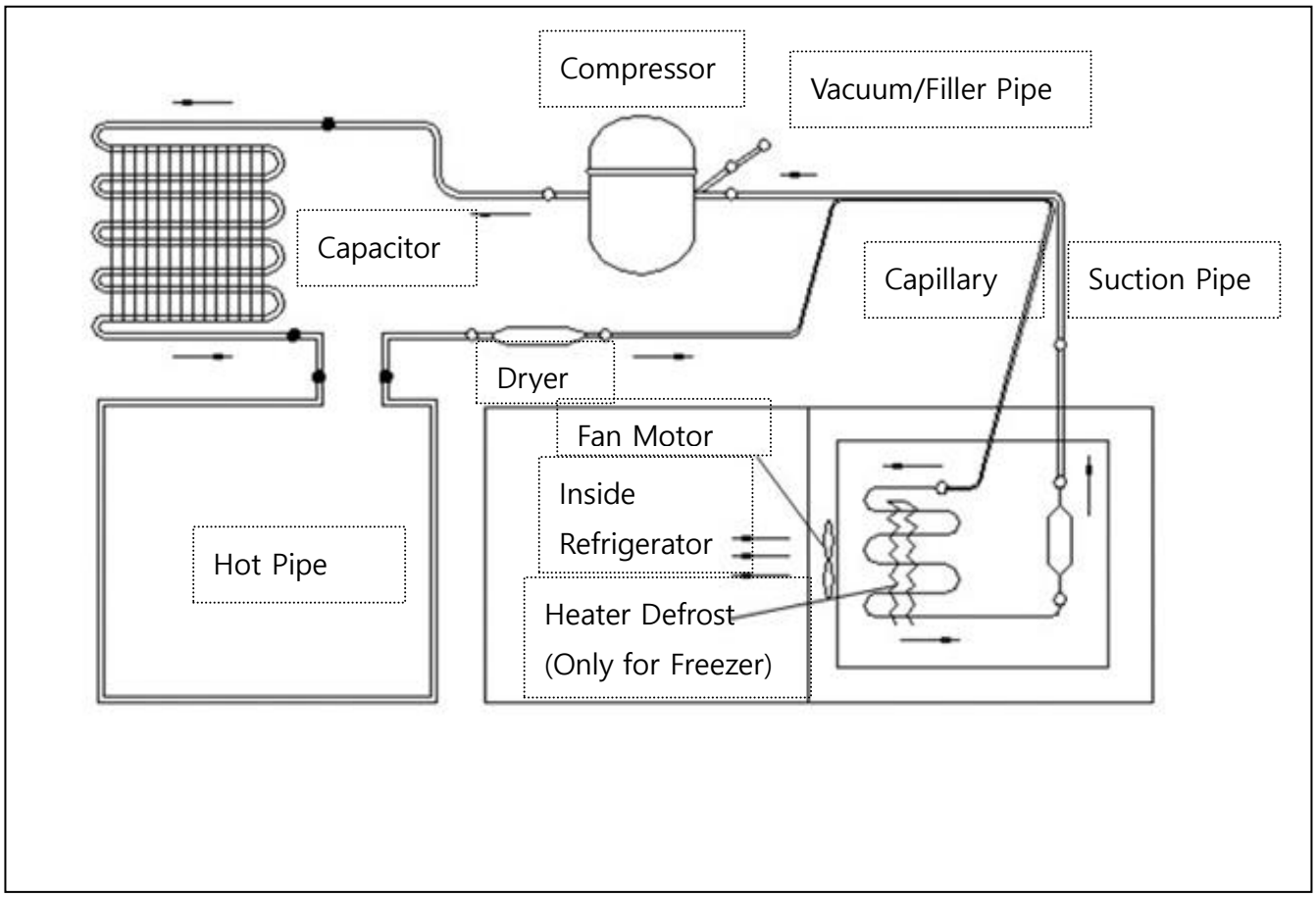
3-1. Basic Specifications of Product(220V/60Hz)

Type		Indirect Cooling Freezer/Refrigerator		
Model		LR-1381PC	LF-1381PC	LRF-1382PC
Effective Internal Capacity	Total Internal Capacity	1081ℓ	1053ℓ	1014ℓ
	Freezer	-	1053ℓ	504ℓ
	Refrigerator	1081ℓ	-	510ℓ
Exterior Dimension (WidthxDepthxHeight in mm)		1260*800*1830		
Indoor/Outdoor		Indoor		
Insulation Grade		Grade E		
Voltage		220V 60Hz		
Monthly Consumption (kWh/month)		46.65	-	105.11
Performance	Refrigerator	0℃~7℃		
	Freezer	-24℃~-3℃		
Climate Grade		Warm Temperature (N) Grade		
Product Weight		142kg	155kg	162kg

Type		Indirect Cooling Freezer/Refrigerator				
Model		LR-681PC	LF-681PC	LR-1981PC	LF-1981PC	LRF-1981PC
Effective Internal Capacity	Total Internal Capacity	505ℓ	500ℓ	1667ℓ	1633ℓ	1608ℓ
	Freezer	-	500ℓ	-	1633ℓ	506ℓ
	Refrigerator	505ℓ	-	1667ℓ	-	1102ℓ
Exterior Dimension (WidthxDepthxHeight in mm)		640*800*1830		1900*800*1830		
Indoor/Outdoor		Indoor				
Insulation Grade		Grade E				
Voltage		220V 60Hz				
Monthly Consumption (kWh/month)		36.59	-	60.48	-	114.51
Performance	Refrigerator	-3℃~7℃				
	Freezer	-24℃~-3℃				
Climate Grade		Warm Temperature (N) Grade				
Product Weight		97kg	97kg	194kg	204kg	204kg

4. Refrigerant Gas Circulation Diagram

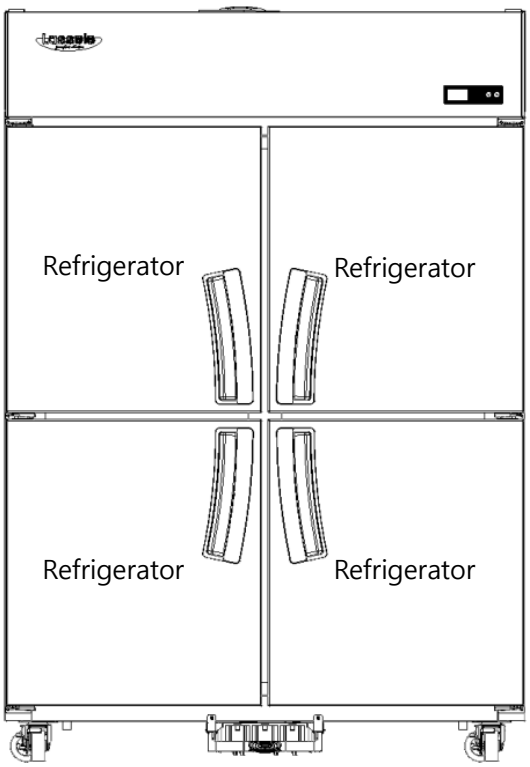
■ **Indirect Cooling Method**



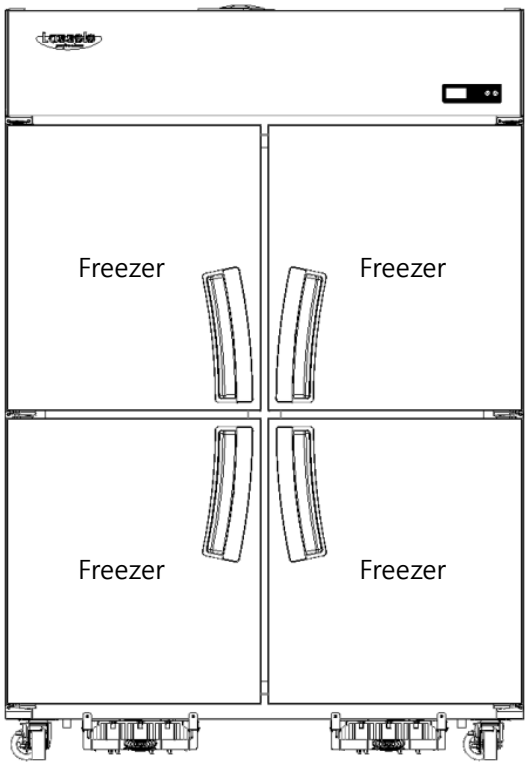
● : 30% is lead soldering
○ : 5% is lead soldering

5. Function Distribution Diagram by Models

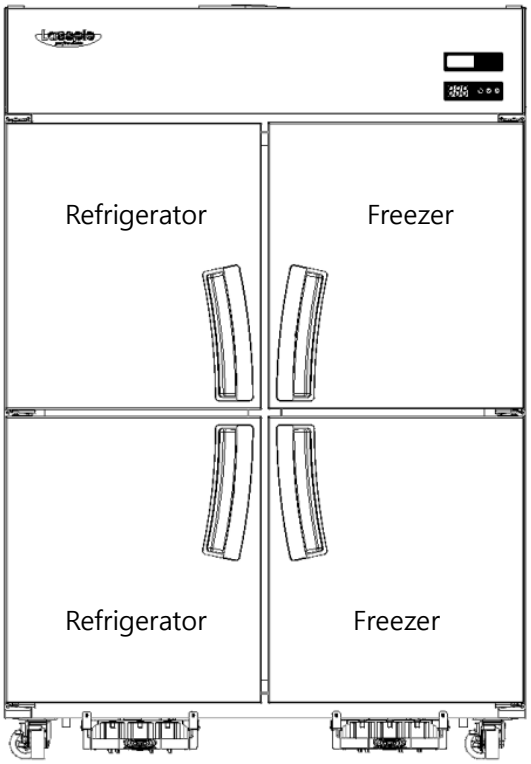
- LR-1381PC



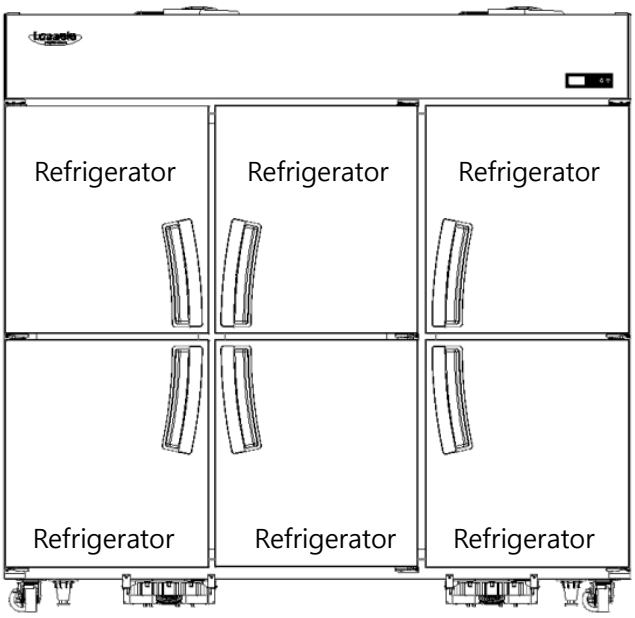
- LF-1381PC



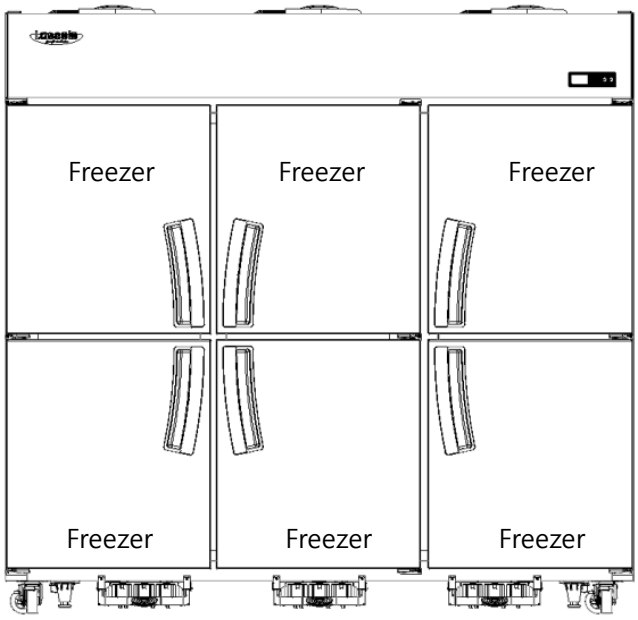
- LRF-1382PC



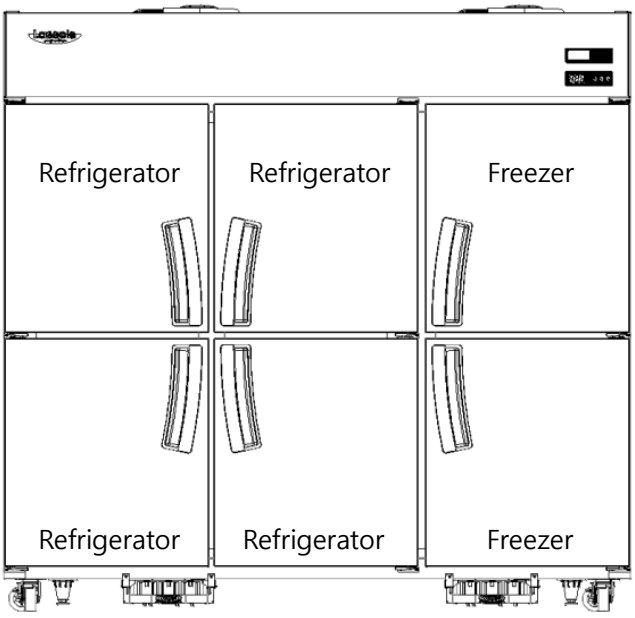
- LR-1981PC



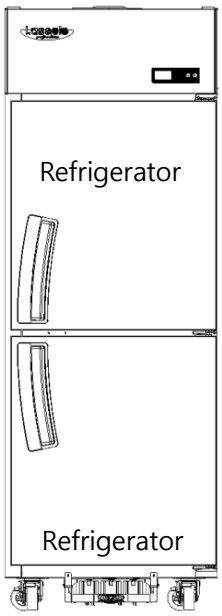
- LF-1981PC



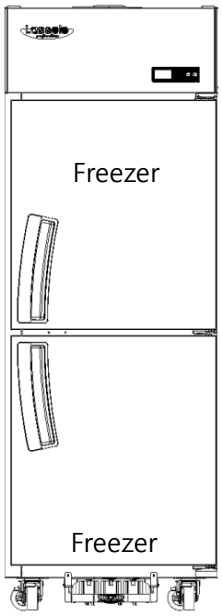
- LRF-1981PC



- LR-681PC

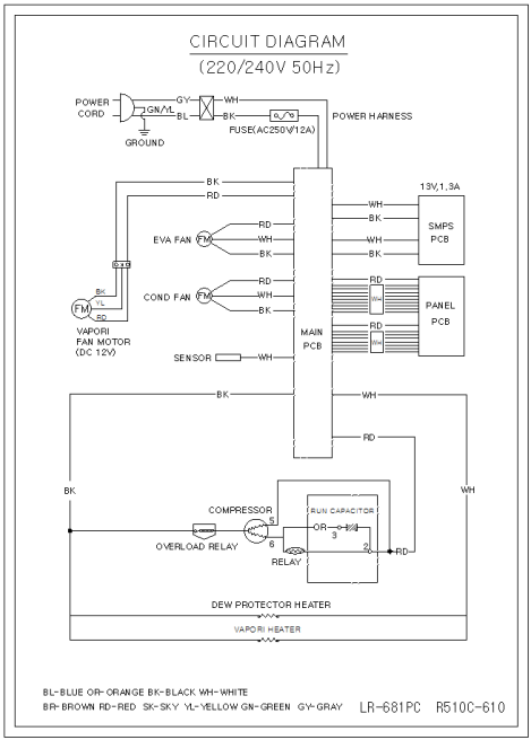


- LF-681PC

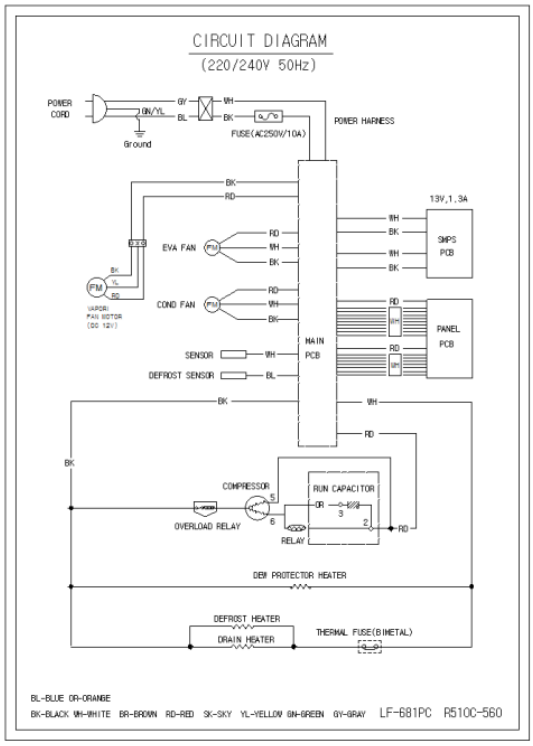


6. Electrical Warning Diagram(220V/50Hz)

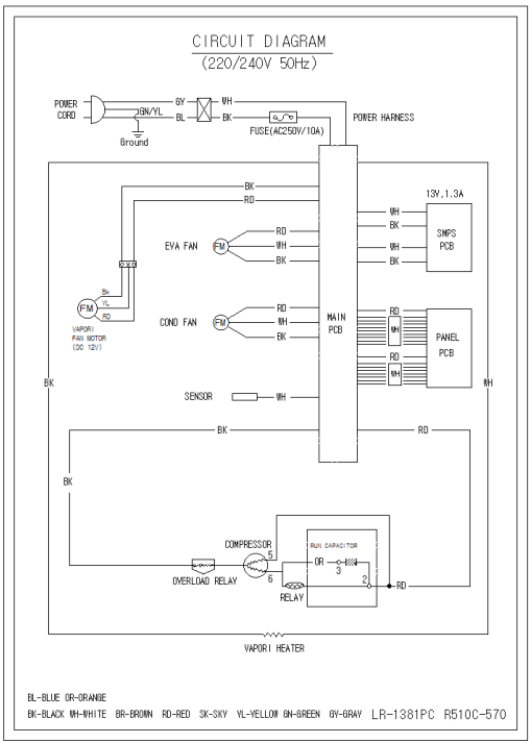
- LR-681PC



- LF-681PC



- LR-1381PC



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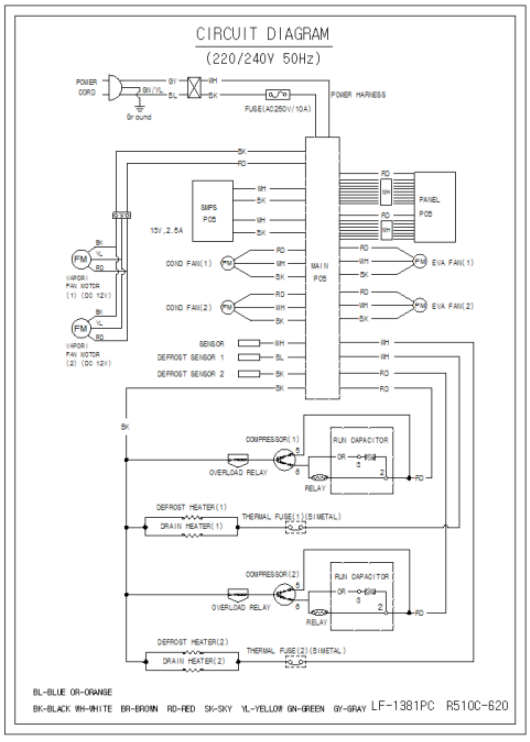
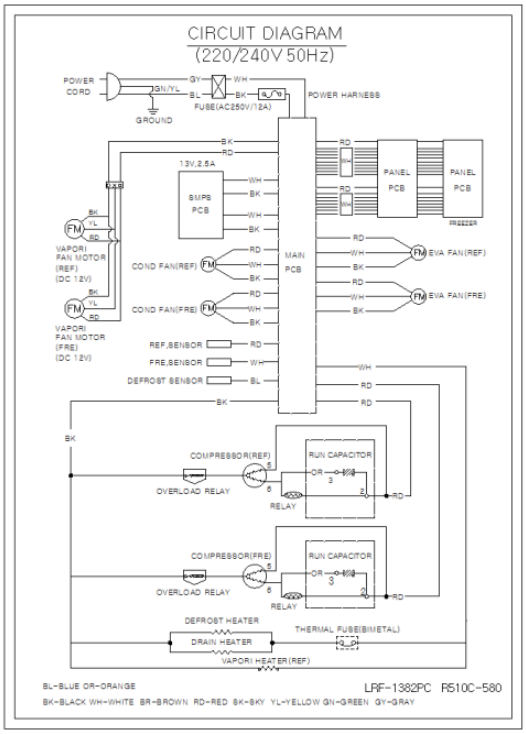
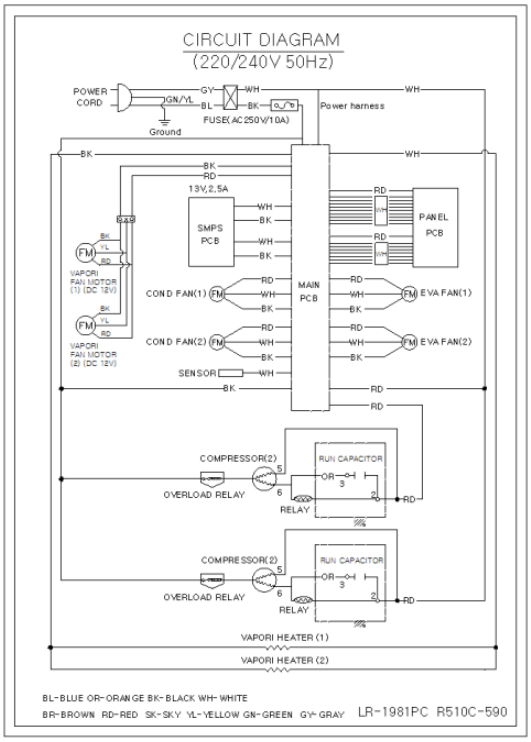


- LRF-1382PC / LRF-1984PC



- LR-1981PC



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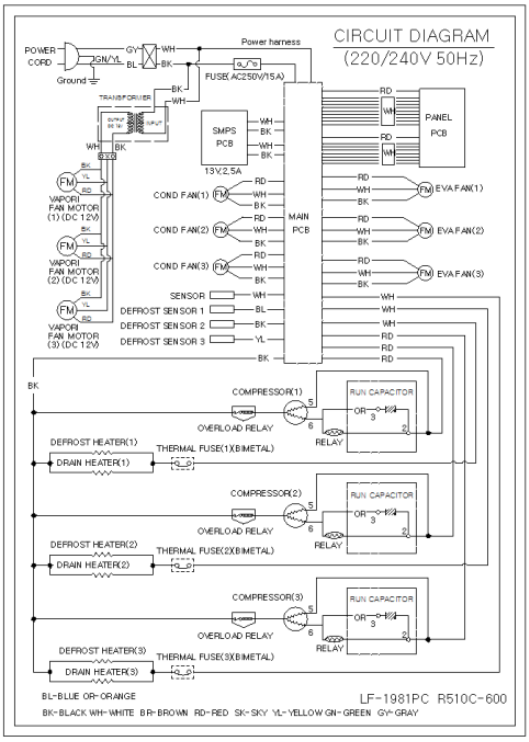
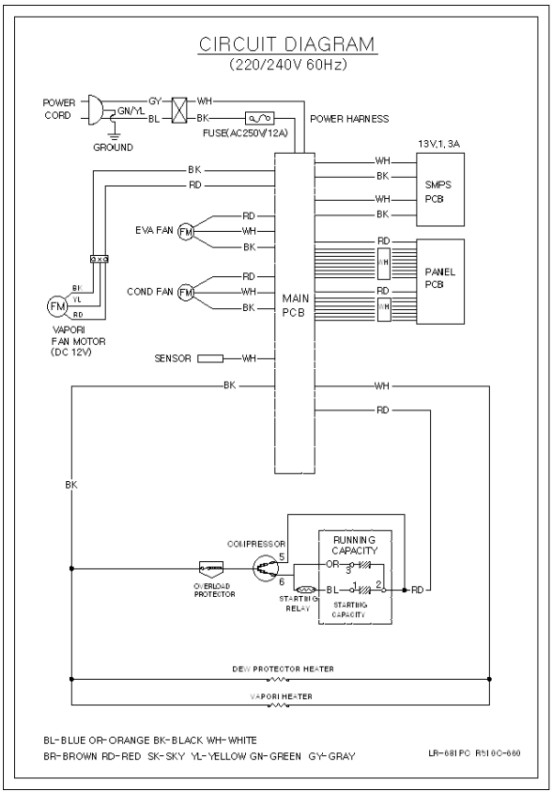
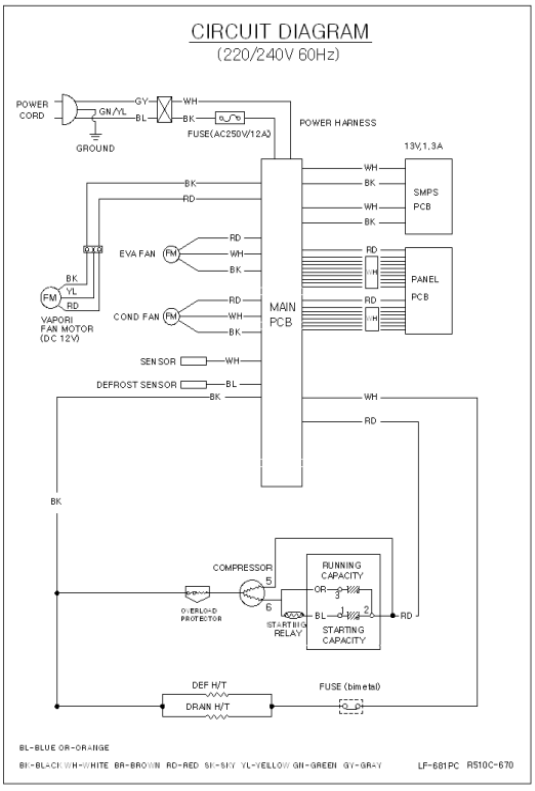


6-1. Electrical Warning Diagram(220V/60Hz)

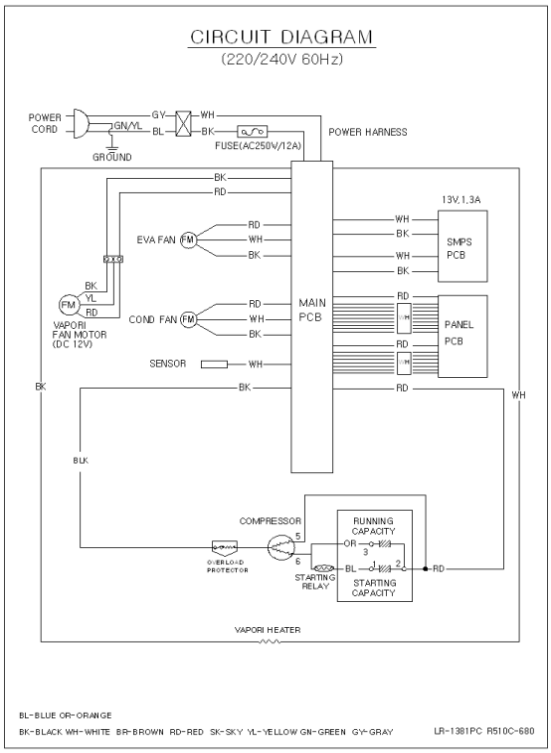
- LR-681PC



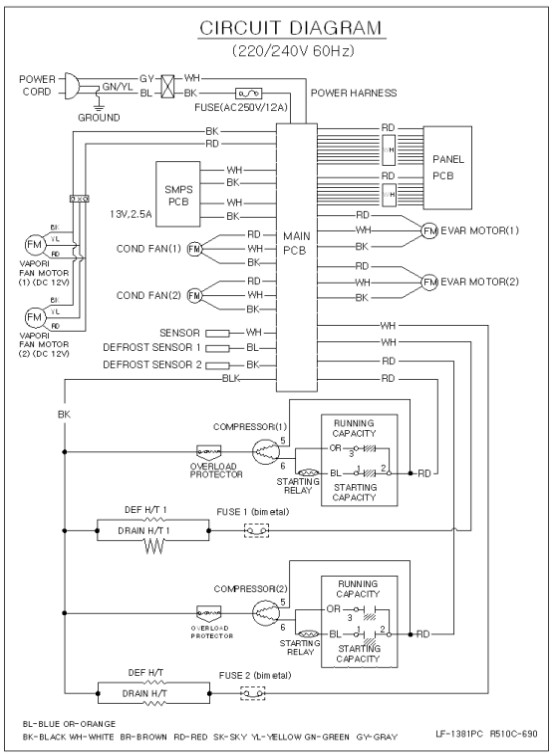
- LF-681PC



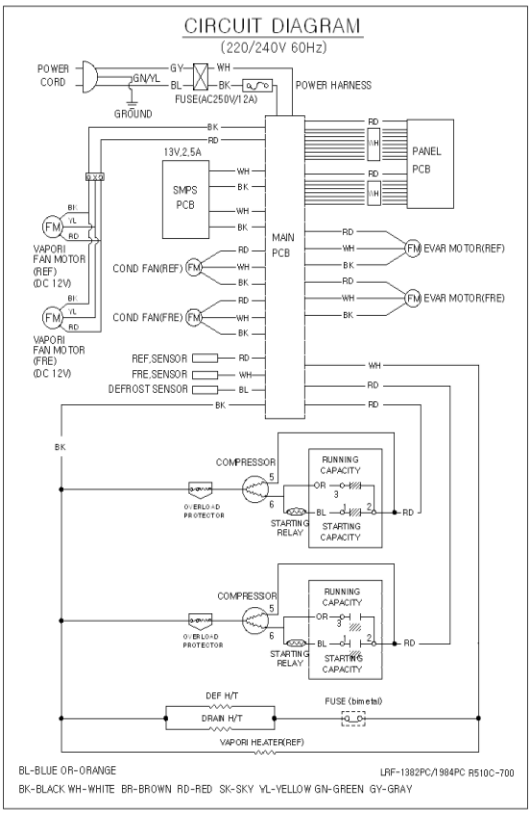
- LR-1381PC



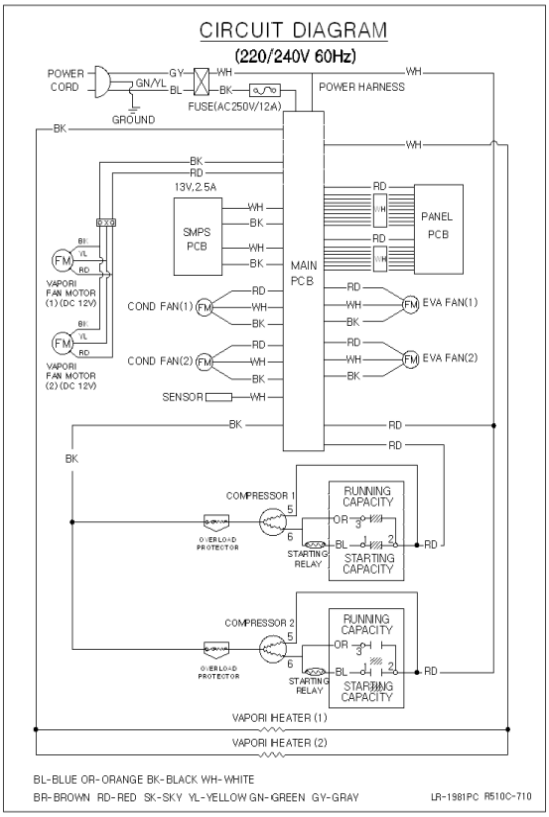
- LF-1381PC



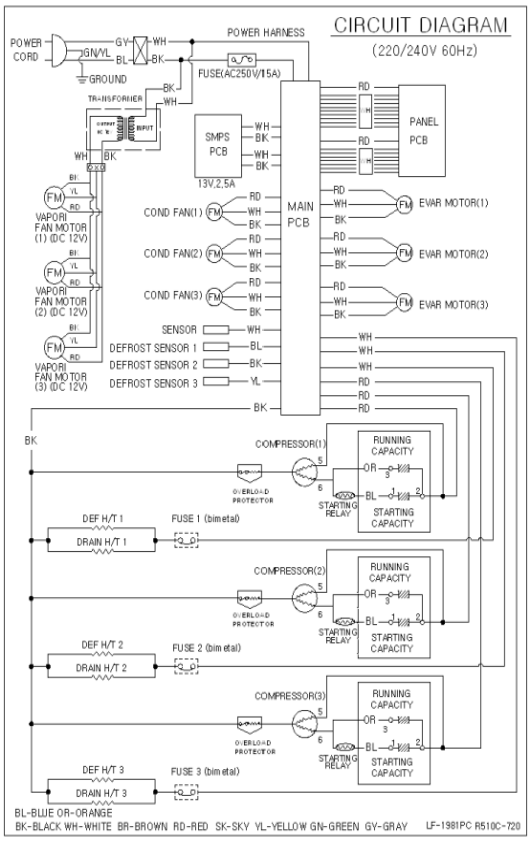
- LRF-1382PC/ LRF-1984PC



- LR-1981PC

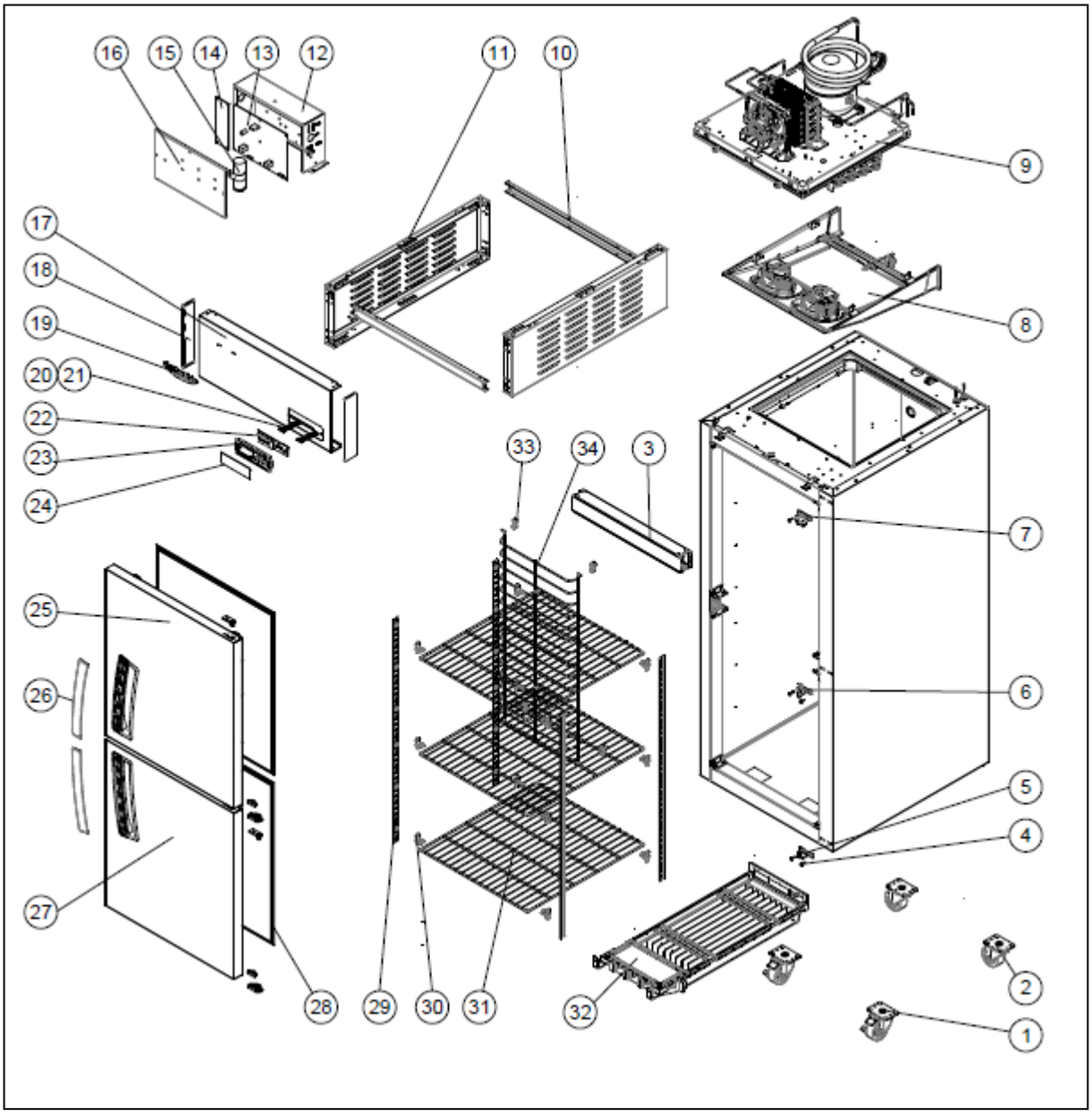


- LF-1981PC



7. Major Parts by Models

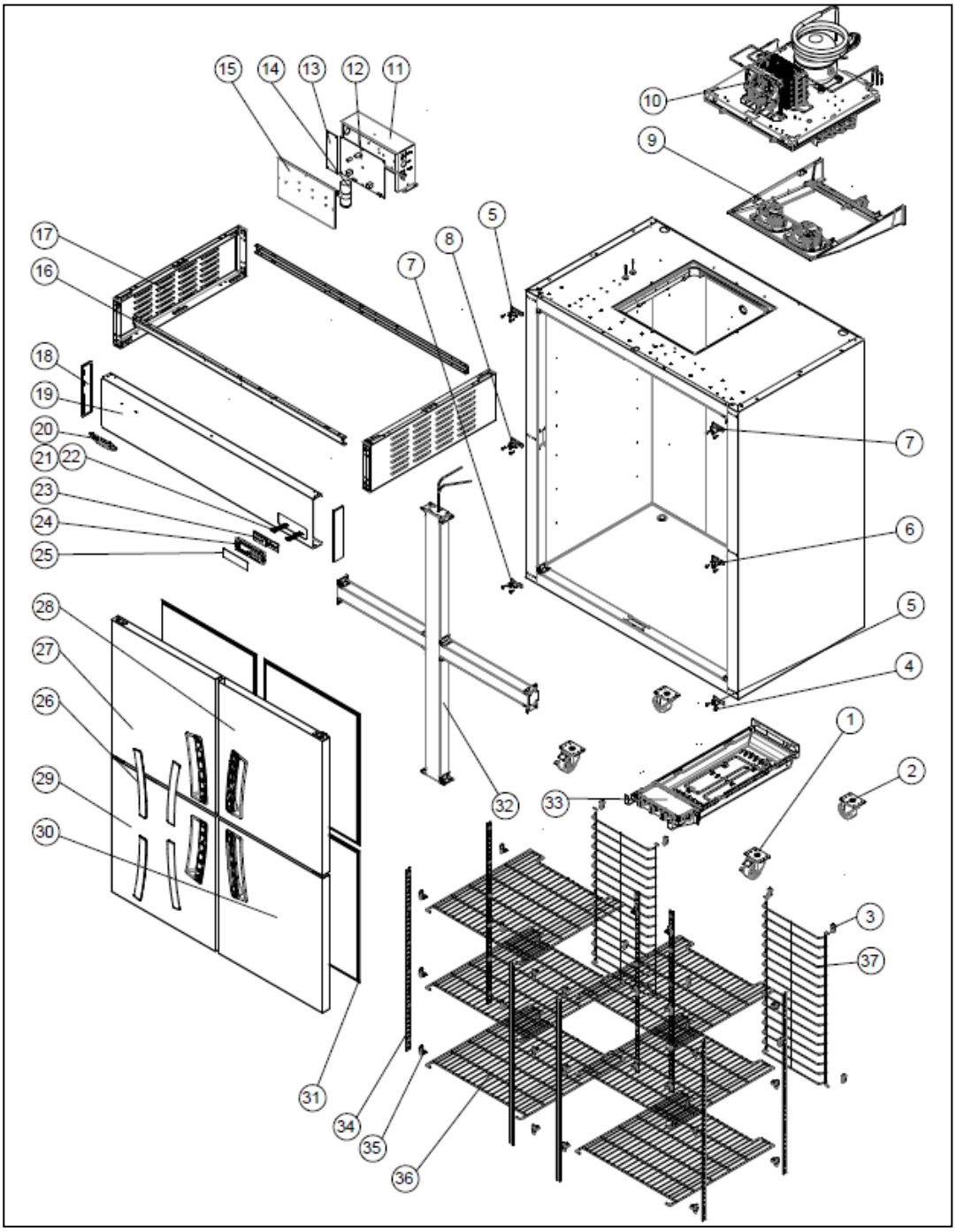
1) LR-681PC / LF-681PC



1) LR-681PC / LF-681PC

NO	CODE	Title	Subject	Q'TY	Models	
					LR-681PC	LF-681PC
1	D3323-010	CASTER (3 INCH) MOVING_STOPPING	3 INCH MOVING_STOPPING	2	○	○
2	R3323-210	CASTER 3" MOVE	3" MOVE H=103MM	2	○	○
3	R816A-870	ASSY CROSS BAR	LS-523R	1	○	○
4	Z394A-180	SCREW MACHINE	PH M5*10 SWCH-ZN	6	○	○
5	R3393-261	HINGE DOOR LF-UPP(RH-LOW)	STS-304. T3.0 64*44	1	○	○
6	R3393-241	HINGE DOOR RH-MID	STS-304. T3.0 64*44	1	○	○
7	R3393-251	HINGE DOOR LF-LOW(RH-UPP)	STS-304. T3.0 64*44	1	○	○
8	R8139-570	EVA COVER 1P-R AS	LS-520R2	1	○	–
	R8139-580	EVA COVER 2P-F AS	LS-520F2	1	–	○
9	R8579-980	UNIT BASE R AS	LS-1040R2	1	○	–
	R8579-970	UNIT BASE F AS	LS-1040F2	1	–	○
10	R3213-123	SUPT UNIT FRAME (600L)	GI T1.0*64*1253	2	○	○
11	R8249-392	ASSY U-COVER SIDE	240*750, STS430-#4	2	○	○
12	R7119-877	BOX MAIN PCB	GI. T0.5*559*331.1	1	○	○
13	R725A-174	PCB MAIN LR-681/1381PC_VAPORI	DIGITAL℃용 CEM1 T1.6*260*190	1	○	–
	R725A-184	PCB MAIN LF-681PC_VAPORI	DIGITAL℃용 CEM1 T1.6*260*190	1	–	○
14	R7119-925	PCB SMPS	CEM-1. 1.3A. T1.6*60*190	1	○	○
15	R7549-140	RUNNING-CAPACITOR	350V AC 8 μF, 2P	1	○	○
16	R7119-883	COVER MAIN PCB BOX	GI, T0.5*357.07*218.97	1	○	○
17	R303A-330	U-COVER FRONT(LR-681PC)	STS430 #4 / T0.5*369.7*635	1	○	○
18	R4222-011	DECO FRONT (GLAY)	ABS.GRAY. T2.5*55*260	2	○	○
19	R5133-160	MASCOT	AL. LASSELE 157.7*40	1	○	○
20	R7613-300	HARNESS F-PCB 8P B	AWG24. 8P. L380	1	○	○
21	R7613-320	HARNESS F-PCB 10P B	AWG24. 10P. L380	1	○	○
22	R725C-220	PCB PANEL	144*39 WHITE	1	○	○
23	R321A-920	CASE CONTROL PANEL	ABS, 166.5*60.5	1	○	○
24	R511A-540	INLAY CONTROL	2 BUTTON 141.8*43.5	1	○	○
25	R817A-680	ASSY DOOR RH-UP (FRE)	F-DOOR	1	○	○
26	R342A-042	HANDLE COVER	ABS+SPRAY	2	○	○
27	R817A-730	ASSY DOOR RH-LOW (FRE)	F-DOOR	1	○	○
28	R3903-760	GASKET DOOR	PVC-S, 12.5MM	2	○	○
29	R3373-630	SHELF STANDARD L	T1.2*930 ㎜	4	○	○
30	R8429-060	ASSY SHELF CLIP	16 SET	1	○	○
31	R836A-190	ASSY SHELF SH-K	SH-K 4EA->1 BOX	1	○	○
32	R872A-010	ASSY VAPORI LF-1381	LF-1381PC_ML225	1	-	○
32	R872A-020	ASSY VAPORI LR-1381	LR-1381PC_ML225	1	○	-
33	R371A-851	SHELF REAR CLIP	POM 11*24.1*H30	4	○	○
34	R371A-060	SHELF REAR B	SWRM+PE/C 350*790	1	○	○

2) LR-1381PC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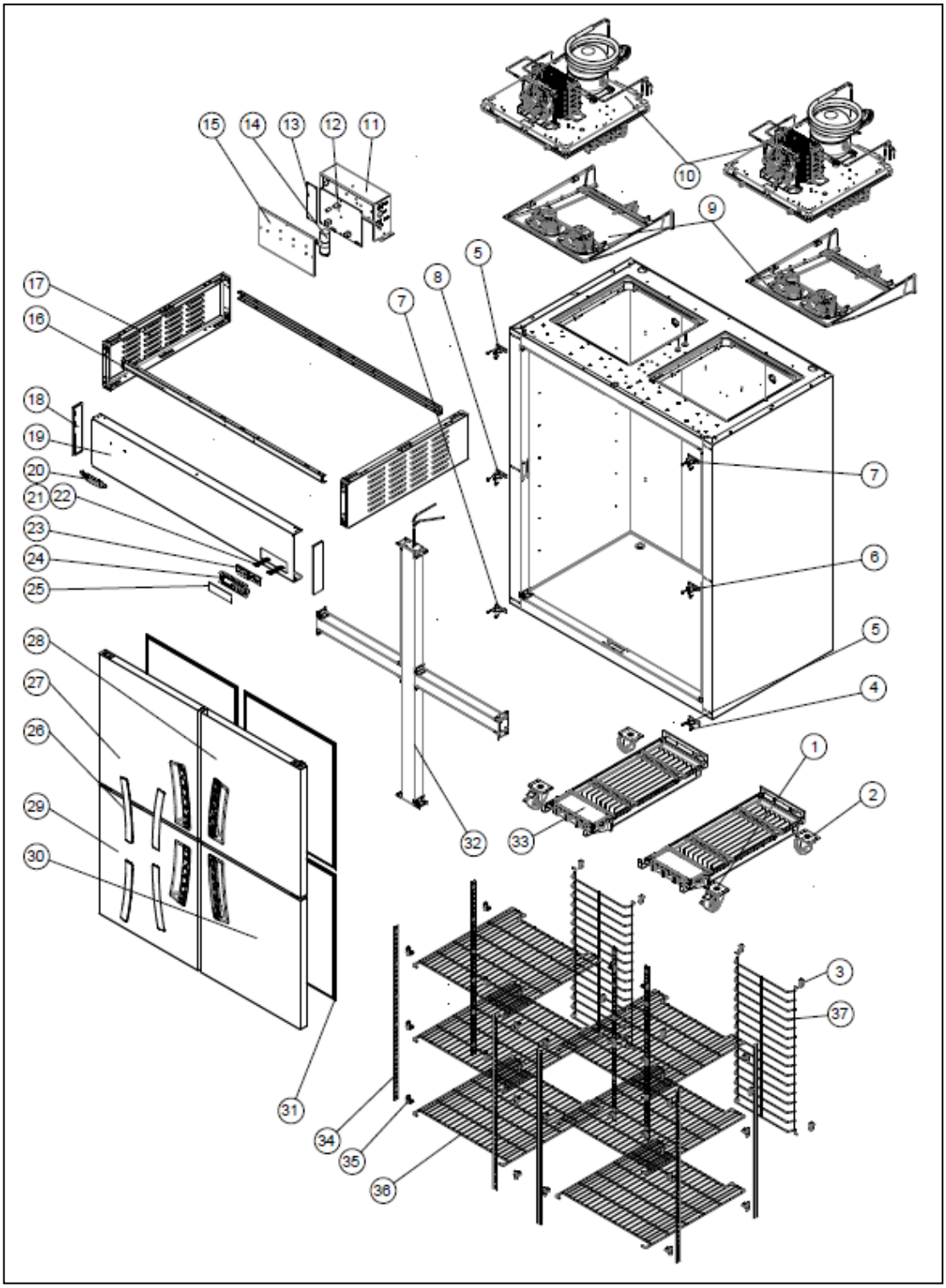
2) LR-1381PC

NO	CODE	Title	Subject	Q'TY
1	D3323-010	CASTER (3 INCH) MOVING_STOPPING	3 INCH MOVING_STOPPING	2
2	R3323-210	CASTER 3" MOVE	3" MOVE H=103MM	2
3	R371A-851	SHELF REAR CLIP	POM 11*24.1*H30	4
4	Z394A-180	SCREW MACHINE	PH M5*10 SWCH-ZN	12
5	R3393-261	HINGE DOOR LF-UPP(RH-LOW)	STS-304. T3.0 64*44	2
6	R3393-241	HINGE DOOR RH-MID	STS-304. T3.0 64*44	1
7	R3393-251	HINGE DOOR LF-LOW(RH-UPP)	STS-304. T3.0 64*44	2
8	R3393-231	HINGE DOOR LF-MID	STS-304. T3.0 64*44	1
9	R8139-590	EVA COVER 2P-R AS	LS-1040R2	1
10	R8579-980	UNIT BASE R AS	LS-1040R2	1
11	R7119-877	BOX MAIN PCB	GI. T0.5*559*331.1	1
12	R725A-174	PCB MAIN LR-681/1381PC_VAPORI	DIGITAL℃용 CEM1 T1.6*260*190	1
13	R7119-925	PCB SMPS	CEM-1. 1.3A. T1.6*60*190	1
14	R7549-140	RUNNING-CAPACITOR	350V AC 8 μF, 2P	1
15	R7119-883	COVER MAIN PCB BOX	GI, T0.5*357.07*218.97	1
16	R3213-114	SUPT UNIT FRAME (1100L)	GI T1.0*64*1253	2
17	R8249-392	ASSY U-COVER SIDE	240*750, STS430-#4	2
18	R4222-011	DECO FRONT	ABS.GRAY. T2.5*55*260	2
19	R303A-340	U-COVER FRONT(LR-1381PC)	STS430 #4 / T0.5*369.7*1255	1
20	R5133-160	MASCOT	AL. LASSELE 157.7*40	1
21	R7613-300	HARNESS F-PCB 8P B	AWG24. 8P. L380	1
22	R7613-320	HARNESS F-PCB 10P B	AWG24. 10P. L380	1
23	R725C-220	PCB PANEL	144*39 WHITE	1
24	R321A-920	CASE CONTROL PANEL	ABS, 166.5*60.5	1
25	R511A-540	INLAY CONTROL	2 BUTTON 141.8*43.5	1
26	R342A-042	HANDLE COVER	ABS+SPRAY	4
27	R817A-690	ASSY DOOR LF-UP (FRE)	F-DOOR	1
28	R817A-680	ASSY DOOR RH-UP (FRE)	F-DOOR	1
29	R817A-720	ASSY DOOR LF-LOW (FRE)	F-DOOR	1
30	R817A-730	ASSY DOOR RH-LOW (FRE)	F-DOOR	1
31	R3903-760	GASKET DOOR	PVC-S, 12.5MM	1
32	R816A-630	ASSY CROSS BAR	KR R/F, +Type	1
33	R872A-020	ASSY VAPORI LR-1381	LR-1381PC_ML225	1
34	R3373-630	SHELF STANDARD L	T1.2*930 ㎜	6
35	R8429-080	ASSY SHELF CLIP	32EA	1
36	R836A-200	ASSY SHELF SH-Q_1	SH-Q_1 4EA->1BOX	2
37	R371A-060	SHELF REAR B	SWRM+PE/C 350*790	1

3) LF-1381PC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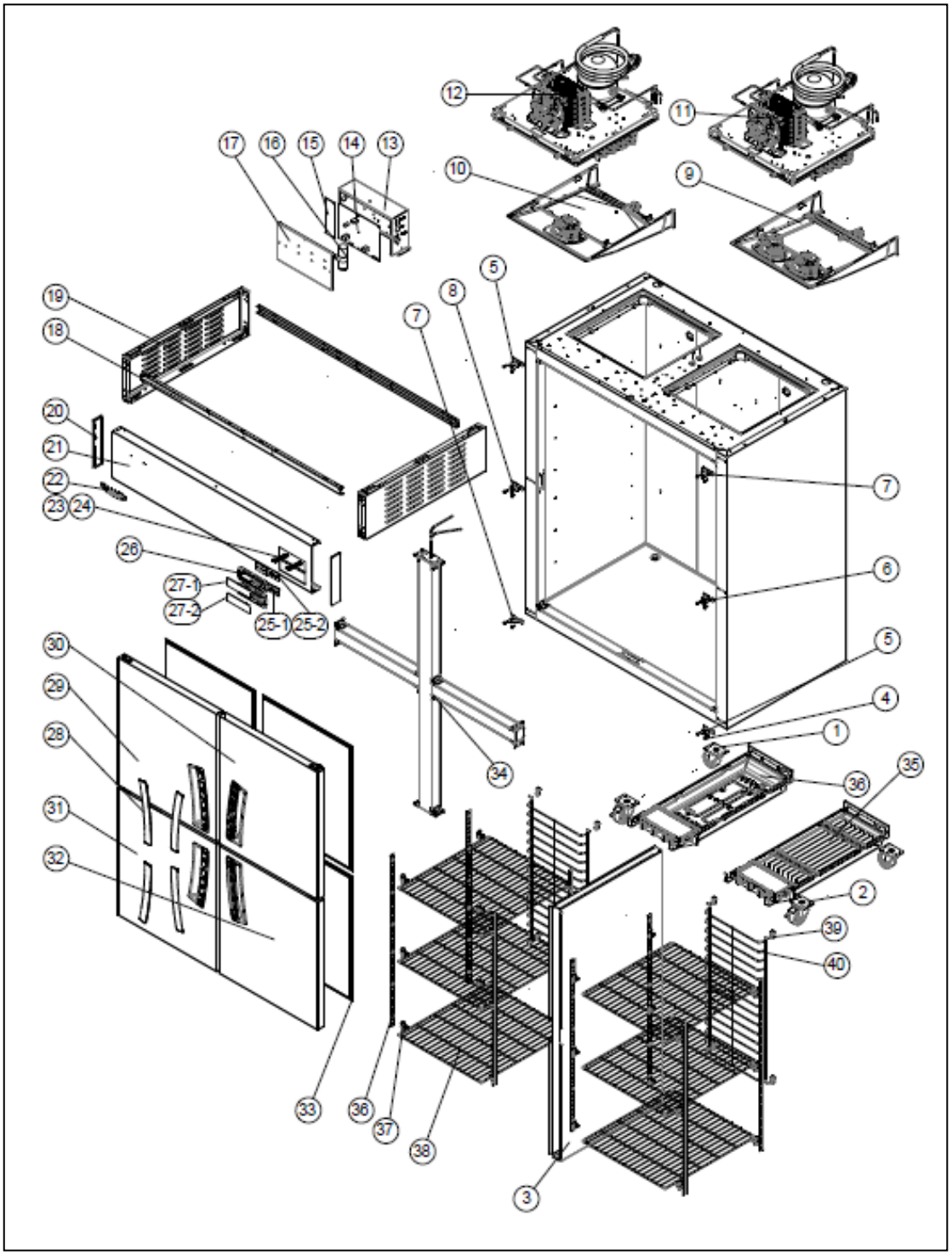
3) LF-1381PC

NO	CODE	Title	Subject	Q'TY
1	D3323-010	CASTER (3 INCH) MOVING_STOPPING	3 INCH MOVING_STOPPING	2
2	R3323-210	CASTER 3" MOVE	3" MOVE H=103MM	2
3	R371A-851	SHELF REAR CLIP	POM 11*24.1*H30	8
4	Z394A-180	SCREW MACHINE	PH M5*10 SWCH-ZN	12
5	R3393-261	HINGE DOOR LF-UPP(RH-LOW)	STS-304. T3.0 64*44	2
6	R3393-241	HINGE DOOR RH-MID	STS-304. T3.0 64*44	1
7	R3393-251	HINGE DOOR LF-LOW(RH-UPP)	STS-304. T3.0 64*44	2
8	R3393-231	HINGE DOOR LF-MID	STS-304. T3.0 64*44	1
9	R8139-580	EVA COVER 2P-F AS	LS-520F2	2
10	R8579-970	UNIT BASE F AS	LS-1040F2	2
11	R7119-877	BOX MAIN PCB	GI. T0.5*559*331.1	1
12	R725A-194	PCB MAIN LF-1381PC_VAPORI	DIGITAL℃용 CEM1 T1.6*260*190	1
13	R7119-931	PCB SMPS	CEM-1. 2.5A. T1.6*60*190	1
14	R7549-140	RUNNING-CAPACITOR	350V AC 8 μF, 2P	1
15	R7119-883	COVER MAIN PCB BOX	GI, T0.5*357.07*218.97	1
16	R3213-114	SUPT UNIT FRAME (1100L)	GI T1.0*64*1253	2
17	R8249-392	ASSY U-COVER SIDE	240*750, STS430-#4	2
18	R4222-011	DECO FRONT	ABS.GRAY. T2.5*55*260	2
19	R303A-340	U-COVER FRONT(LR-1381PC)	STS430 #4 / T0.5*369.7*1255	1
20	R5133-160	MASCOT	AL. LASSELE, 157.7*40	1
21	R7613-300	HARNESS F-PCB 8P B	AWG24. 8P. L380	1
22	R7613-320	HARNESS F-PCB 10P B	AWG24. 10P, L380	1
23	R725C-220	PCB PANEL	144*39 WHITE	1
24	R321A-920	CASE CONTROL PANEL	ABS, 166.5*60.5	1
25	R511A-540	INLAY CONTROL	2 BUTTON 141.8*43.5	1
26	R342A-042	HANDLE COVER	ABS+SPRAY	4
27	R817A-690	ASSY DOOR LF-UP (FRE)	F-DOOR	1
28	R817A-680	ASSY DOOR RH-UP (FRE)	F-DOOR	1
29	R817A-720	ASSY DOOR LF-LOW (FRE)	F-DOOR	1
30	R817A-730	ASSY DOOR RH-LOW (FRE)	F-DOOR	1
31	R3903-760	GASKET DOOR	PVC-S, 12.5MM	1
32	R816A-630	ASSY CROSS BAR	KR, R/F ,+Type	1
33	R872A-010	ASSY VAPORI LF-1381	LF-1381PC_ML225	2
34	R3373-630	SHELF STANDARD L	T1.2*930 ㎜	6
35	R8429-080	ASSY SHELF CLIP	32SET	1
36	R836A-200	ASSY SHELF SH-Q_1	SH-Q_1 4EA->1BOX	2
37	R371A-060	SHELF REAR B	SWRM+PE/C 350*790	2

4) LRF-1382PC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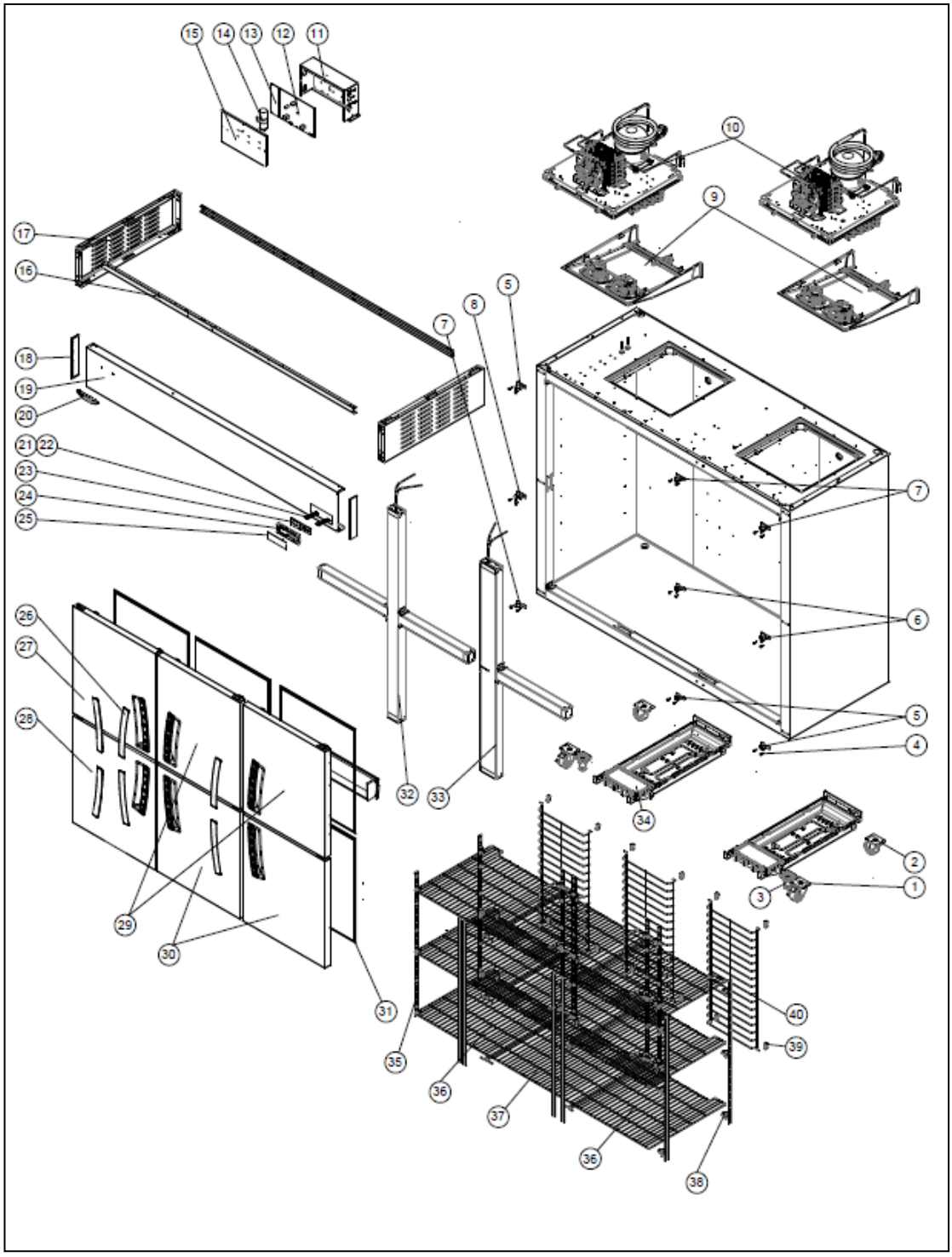
4) LRF-1382PC

NO	CODE	Title	Subject	Q'TY
1	R3323-210	CASTER 3" MOVE	3" MOVE H=103MM	2
2	D3323-010	CASTER (3 INCH) MOVING_STOPPING	3 INCH MOVING_STOPPING	2
3	R8523-970	PARTITION AS (1040RF)	LS-1040RF2	1
4	Z394A-180	SCREW MACHINE	PH M5*10 SWCH-ZN	12
5	R3393-261	HINGE DOOR LF-UPP(RH-LOW)	STS-304. T3.0 64*44	2
6	R3393-241	HINGE DOOR RH-MID	STS-304. T3.0 64*44	1
7	R3393-251	HINGE DOOR LF-LOW(RH-UPP)	STS-304. T3.0 64*44	2
8	R3393-231	HINGE DOOR LF-MID	STS-304. T3.0 64*44	1
9	R8139-580	ASSY EVA COVER 1P-F	LS-520F2	1
10	R8139-570	EVA COVER 1P-R AS	LS-520R2	1
11	R8579-970	UNIT BASE F AS	LS-1040F2	1
12	R8579-980	UNIT BASE R AS	LS-1040R2	1
13	R7119-877	BOX MAIN PCB	GI. T0.5*558.34*330.71	1
14	R725A-204	PCB MAIN LRF-1382/1984PC_VAPORI	DIGITAL℃용 CEM1 T1.6*260*190	1
15	R7119-931	PCB SMPS	CEM-1. 2.5A. T1.6*60*190	1
16	R7549-140	RUNNING-CAPACITOR	350V AC 8 μF, 2P	2
17	R7119-883	COVER MAIN PCB BOX	GI, T0.5*357.07*218.97	1
18	R3213-114	SUPT UNIT FRAME (1100L)	GI T1.0*64*1253	2
19	R8249-392	ASSY U-COVER SIDE	240*750, STS430-#4	2
20	R4222-011	DECO FRONT	ABS.GRAY. T2.5*55*260	2
21	R303A-300	U-COVER FRONT	LRF-1382PC STS430 #4 T0.5*369.7*1255	1
22	R5133-160	MASCOT	AL. LASSELE 157.7*40	1
23	R719D-020	HARNESS F-PCB 8P A	AWG26,L500/250	1
24	R719D-040	HARNESS F-PCB 10P A	AWG26,L500/250	1
25-1	R725C-230	PCB PANEL	144*39 RED	1
25-2	R725C-240	PCB PANEL	144*39 BLUE	1
26	R321A-920	CASE CONTROL PANEL	ABS, 166.5*60.5	2
27-1	R511A-550	INLAY CONTROL	3 BUTTON 141.8*43.5	1
27-2	R511A-570	INLAY CONTROL	FREEZER 141.8*43.5	1
28	R342A-042	HANDLE COVER	ABS+SPRAY	4
29	R817A-690	ASSY DOOR LF-UP (FRE)	F-DOOR	1
30	R817A-680	ASSY DOOR RH-UP (FRE)	F-DOOR	1
31	R817A-720	ASSY DOOR LF-LOW (FRE)	F-DOOR	1
32	R817A-730	ASSY DOOR RH-LOW (FRE)	F-DOOR	1
33	R3903-760	GASKET DOOR	PVC-S, 12.5MM	4
34	R816A-660	ASSY CROSS BAR	HRF, + Type	1
35	R872A-010	ASSY VAPORI LF-1381	LF-1381PC_ML225	1
36	R872A-020	ASSY VAPORI LR-1381	LR-1381PC_ML225	1
37	R8429-080	ASSY SHELF CLIP	32EA	1
38	R836A-190	ASSY SHELF SH-K_1	SH-K_1 4EA->1BOX	2
39	R371A-851	SHELF REAR CLIP	POM 11*24.1*H30	8
40	R371A-060	SHELF REAR B	SWRM+PE/C 350*790	2
41	R3373-630	SHELF STANDARD L	T1.2*930 ㎜	4

5) LR-1981PC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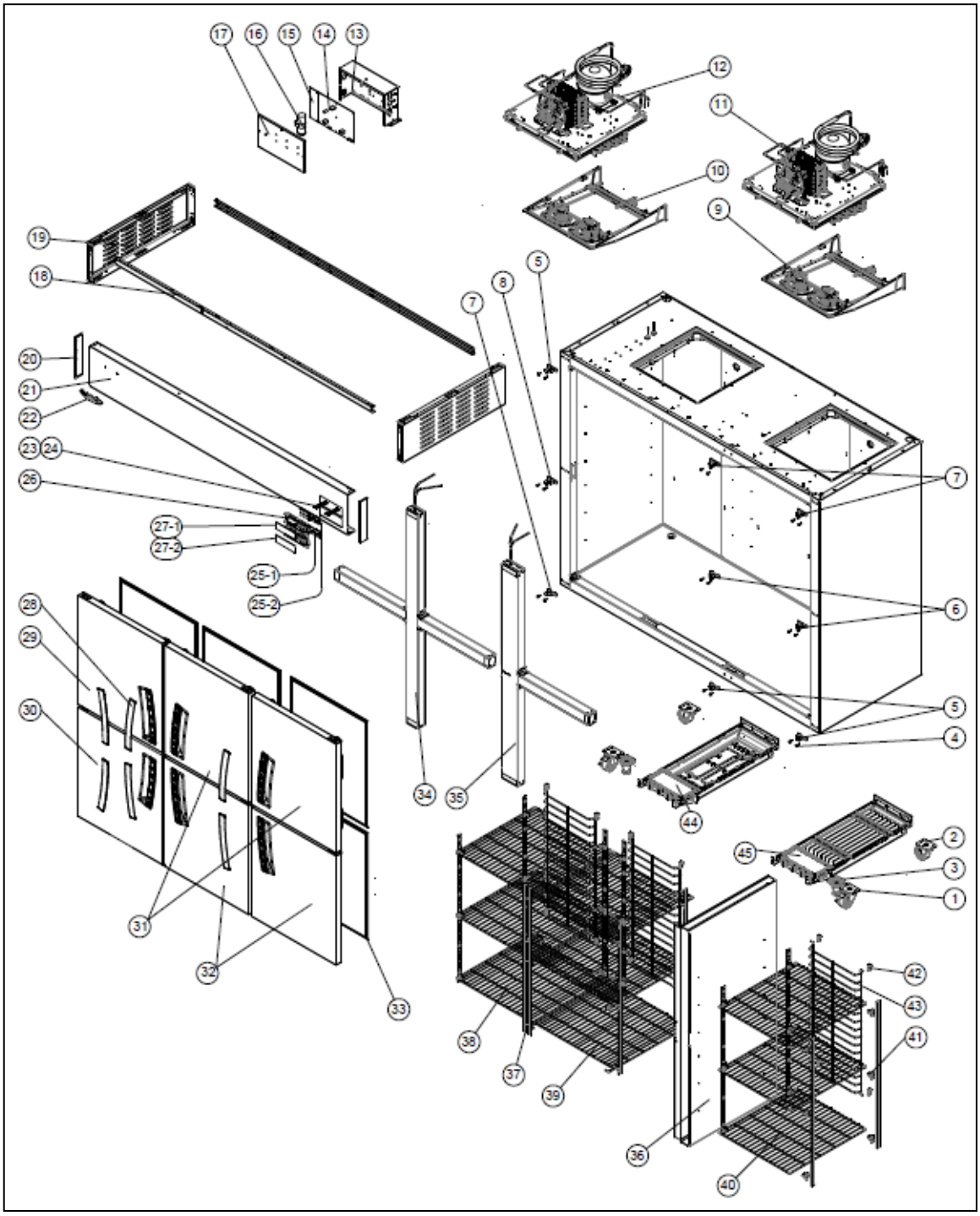
5) LR-1981PC

NO	CODE	Title	Subject	Q'TY
1	D3323-010	CASTER (3 INCH) MOVING_STOPPING	3 INCH MOVING_STOPPING	2
2	R3323-210	CASTER 3" MOVE	3" MOVE H=103MM	2
3	R825A-010	ASSY LEG BASE	K-REF	2
4	Z394A-180	SCREW MACHINE	PH M5*10 SWCH-ZN	18
5	R3393-261	HINGE DOOR LF-UPP(RH-LOW)	STS-304. T3.0 64*44	3
6	R3393-241	HINGE DOOR RH-MID	STS-304. T3.0 64*44	2
7	R3393-251	HINGE DOOR LF-LOW(RH-UPP)	STS-304. T3.0 64*44	3
8	R3393-231	HINGE DOOR LF-MID	STS-304. T3.0 64*44	1
9	R8139-590	EVA COVER 2P-R AS	LS-1040R2	2
10	R8579-980	UNIT BASE R AS	LS-1040R2	2
11	R7119-877	BOX MAIN PCB	GI. T0.5*559*331.1	1
12	R725A-214	PCB MAIN LR-1981PC_VAPORI	DIGITAL℃용 CEM1 T1.6*260*190	1
13	R7119-931	PCB SMPS	CEM-1. 2.5A. T1.6*60*190	1
14	R7549-140	RUNNING-CAPACITOR	350V AC 8 μF, 2P	3
15	R7119-883	COVER MAIN PCB BOX	GI, T0.5*357.07*218.97	1
16	R3213-073	SUPT UNIT FRAME (1700L)	T1*64*1893	2
17	R8249-392	ASSY U-COVER SIDE	240*750, STS430-#4	2
18	R4222-011	DECO FRONT	ABS.GRAY. T2.5*55*260	2
19	R303A-350	U-COVER FRONT(LR-1981PC)	STS430 #4 / T0.5*369.7*1895	1
20	R5133-160	MASCOT	AL. LASSELE. 157.7*40	1
21	R7613-290	HARNESS F-PCB 8P A	AWG24. 8P. L130	1
22	R7613-310	HARNESS F-PCB 10P A	AWG24. 10P. L150	1
23	R725C-220	PCB PANEL	144*39 WHITE	1
24	R321A-920	CASE CONTROL PANEL	ABS, 166.5*60.5	1
25	R511A-540	INLAY CONTROL	2 BUTTON 141.8*43.5	1
26	R342A-042	HANDLE COVER	ABS+SPRAY	6
27	R817A-690	ASSY DOOR LF-UP (FRE)	F-DOOR	1
28	R817A-720	ASSY DOOR LF-LOW (FRE)	F-DOOR	1
29	R817A-680	ASSY DOOR RH-UP (FRE)	F-DOOR	2
30	R817A-730	ASSY DOOR RH-LOW (FRE)	F-DOOR	2
31	R3903-760	GASKET DOOR (내수)	PVC-S, 12.5MM	1
32	R816A-630	ASSY CROSS BAR	R/F, + Type	1
33	R816A-640	ASSY CROSS BAR	1660R, ㅏ Type	1
34	R872A-020	ASSY VAPORI LR-1381	LR-1381PC_ML225	2
35	R3373-630	SHELF STANDARD L	T1.2*930 ㎜	8
36	R836A-230	ASSY SHELF SH-T	SH-T 4EA 1BOX	1
37	R836A-220	ASSY SHELF SH-P	SH-P 4EA 1BOX	1
38	R836A-190	ASSY SHELF SH-K	SH-K 4EA 1BOX	1
39	R835A-090	ASSY SHELF CLIP	48EA	1
40	R371A-851	SHELF REAR CLIP	POM 11*24.1*H30	12
41	R371A-060	SHELF REAR B	SWRM+PE/C 350*790	3

6) LRF-1984PC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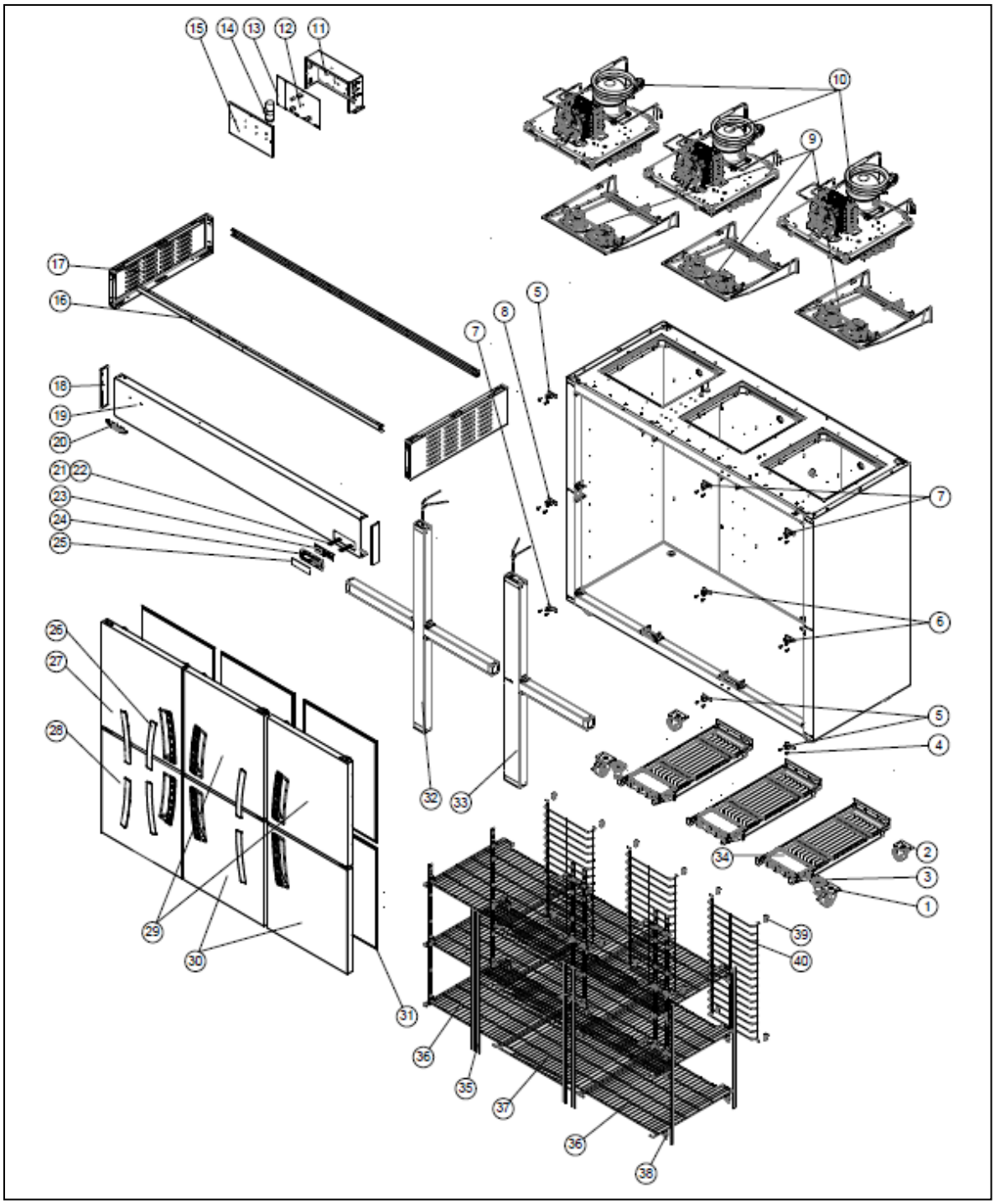
6) LRF-1984PC

NO	CODE	Title	Subject	Q'TY
1	D3323-010	CASTER (3 INCH) MOVING_STOPPING	3 INCH MOVING_STOPPING	2
2	R3323-210	CASTER 3" MOVE	3" MOVE H=103MM	2
3	R825A-010	ASSY LEG BASE	K-REF	2
4	Z394A-180	SCREW MACHINE	PH M5*10 SWCH-ZN	18
5	R3393-261	HINGE DOOR LF-UPP(RH-LOW)	STS-304. T3.0 64*44	3
6	R3393-241	HINGE DOOR RH-MID	STS-304. T3.0 64*44	2
7	R3393-251	HINGE DOOR LF-LOW(RH-UPP)	STS-304. T3.0 64*44	3
8	R3393-231	HINGE DOOR LF-MID	STS-304. T3.0 64*44	1
9	R8139-580	EVA COVER 2P-F AS	LS-520F2	1
10	R8139-590	EVA COVER 2P-R AS	LS-1040R2	1
11	R8579-970	UNIT BASE F AS	LS-1040F2	1
12	R8579-980	UNIT BASE R AS	LS-1040R2	1
13	R7119-877	BOX MAIN PCB	GI. T0.5*558.34*330.71	1
14	R725A-204	PCB MAIN LRF-1382/1984PC_VAPORI	DIGITAL℃용 CEM1 T1.6*260*190	1
15	R7119-931	PCB SMPS	CEM-1. 2.5A. T1.6*60*190	1
16	R7549-140	RUNNING-CAPACITOR	350V AC 8 μF, 2P	3
17	R7119-883	COVER MAIN PCB BOX	GI, T0.5*357.07*218.97	1
18	R3213-073	SUPT UNIT FRAME (1700L)	T1*64*1893	2
19	R8249-392	ASSY U-COVER SIDE	240*750, STS430-#4	2
20	R4222-011	DECO FRONT	ABS.GRAY. T2.5*55*260	2
21	R303A-310	U-COVER FRONT	LRF-1984PC STS430 #4 T0.5*	1
22	R5133-160	MASCOT	AL. LASSELE, 157.7*40	1
23	R719D-020	HARNESS F-PCB 8P A	AWG26,L500/250	1
24	R719D-040	HARNESS F-PCB 10P A	AWG26,L500/250	1
25-1	R725C-230	PCB PANEL	144*39 RED	1
25-2	R725C-240	PCB PANEL	144*39 BLUE	1
26	R321A-920	CASE CONTROL PANEL	ABS, 166.5*60.5	1
27-1	R511A-550	INLAY CONTROL	3 BUTTON 141.8*43.5	1
27-2	R511A-570	INLAY CONTROL	FREEZER 141.8*43.5	1
28	R342A-042	HANDLE COVER	ABS+SPRAY	4
29	R817A-690	ASSY DOOR LF-UP (FRE)	F-DOOR	1
30	R817A-720	ASSY DOOR LF-LOW (FRE)	F-DOOR	1
31	R817A-680	ASSY DOOR RH-UP (FRE)	F-DOOR	2
32	R817A-730	ASSY DOOR RH-LOW (FRE)	F-DOOR	2

NO	CODE	Title	Subject	Q'TY
33	R3903-760	GASKET DOOR	PVC-S, 12.5MM	1
34	R816A-630	ASSY CROSS BAR	R/F , + Type	1
35	R816A-680	ASSY CROSS BAR	1660RF, ㅏ Type	1
36	R8523-990	PARTITION AS (1660RF)	LS-1660RF2	1
37	R3373-630	SHELF STANDARD L	T1.2*930 ㎜	6
38	R836A-230	ASSY SHELF SH-T	SH-T 4EA->1 BOX	1
39	R836A-220	ASSY SHELF SH-P	SH-P 4EA->1 BOX	1
40	R836A-190	ASSY SHELF SH-K	SH-K 4EA->1 BOX	1
41	R835A-090	ASSY SHELF CLIP	48EA	1
42	R371A-851	SHELF REAR CLIP	POM 11*24.1*H30	8
43	R371A-060	SHELF REAR B	SWRM+PE/C 350*790	2
44	R872A-020	ASSY VAPORI LR-1381	LR-1381PC_ML225	1
45	R872A-010	ASSY VAPORI LF-1381	LF-1381PC_ML225	1

7) LF-1981PC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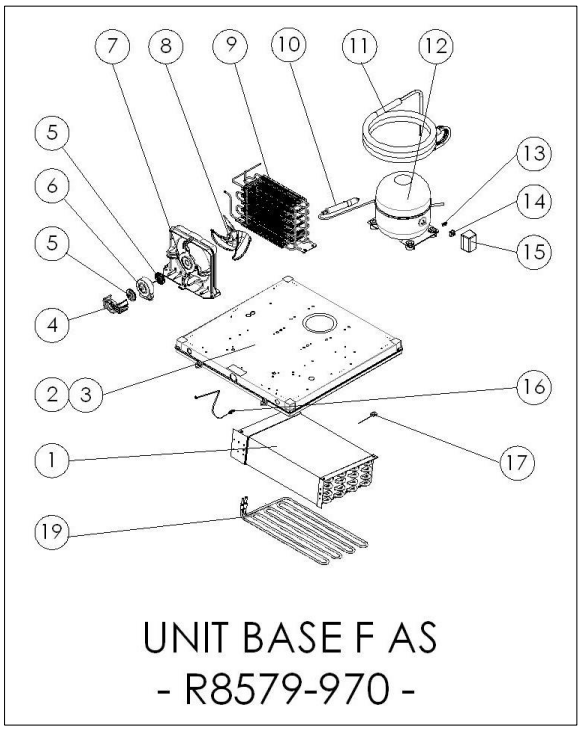
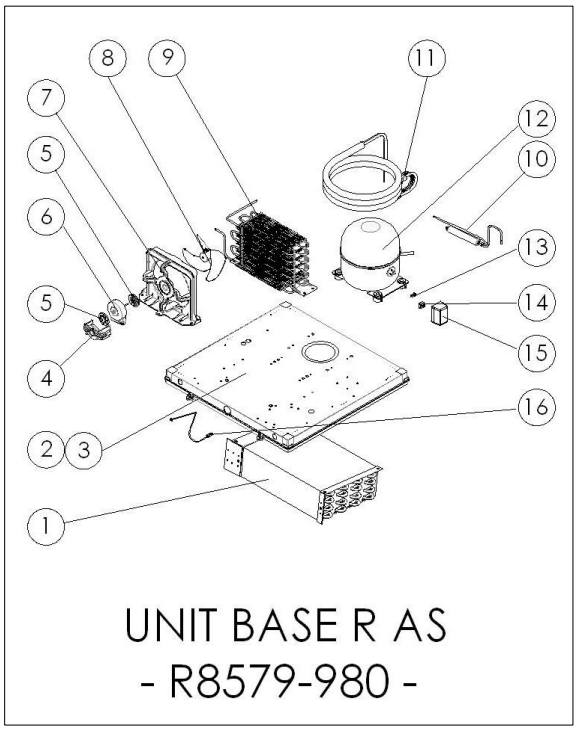
7) LF-1981PC

NO	CODE	Title	Subject	Q'TY
1	D3323-010	CASTER (3 INCH) MOVING_STOPPING	3 INCH MOVING_STOPPING	2
2	R3323-210	CASTER 3" MOVE	3" MOVE H=103MM	2
3	R825A-010	ASSY LEG BASE	K-REF	2
4	Z394A-180	SCREW MACHINE	PH M5*10 SWCH-ZN	18
5	R3393-261	HINGE DOOR LF-UPP(RH-LOW)	STS-304. T3.0 64*44	3
6	R3393-241	HINGE DOOR RH-MID	STS-304. T3.0 64*44	2
7	R3393-251	HINGE DOOR LF-LOW(RH-UPP)	STS-304. T3.0 64*44	3
8	R3393-231	HINGE DOOR LF-MID	STS-304. T3.0 64*44	1
9	R8139-580	EVA COVER 2P-F AS	LS-520F2	3
10	R8579-970	UNIT BASE F AS	LS-1040F2	3
11	R7119-877	BOX MAIN PCB	GI. T0.5*558.34*330.71	1
12	R725A-223	PCB MAIN 1663F	DIGITAL℃용 CEM1 T1.6*260*190	1
13	R7119-931	PCB SMPS	CEM-1. 2.5A. T1.6*60*190	1
14	R7549-140	RUNNING-CAPACITOR	350V AC 8 μF, 2P	3
15	R7119-882	COVER MAIN PCB BOX	GI, T0.5*357.07*218.97	1
16	R3213-073	SUPT UNIT FRAME (1700L)	T1*64*1893	2
17	R8249-392	ASSY U-COVER SIDE	240*750, STS430-#4	2
18	R4222-011	DECO FRONT	ABS.GRAY. T2.5*55*260	2
19	R303A-350	U-COVER FRONT(LR-1981PC)	STS430 #4 / T0.5*369.7*1895	1
20	R5133-160	MASCOT	AL. LASSELE 157.7*40	1
21	R7613-290	HARNESS F-PCB 8P A	AWG24. 8P. L130	1
22	R7613-310	HARNESS F-PCB 10P A	AWG24. 10P. L150	1
23	R725C-220	PCB PANEL	144*39 WHITE	1
24	R321A-920	CASE CONTROL PANEL	ABS, 166.5*60.5	1
25	R511A-540	INLAY CONTROL	2 BUTTON 141.8*43.5	1
26	R342A-042	HANDLE COVER	ABS+SPRAY	4
27	R817A-690	ASSY DOOR LF-UP (FRE)	F-DOOR	1
28	R817A-720	ASSY DOOR LF-LOW (FRE)	F-DOOR	1
29	R817A-680	ASSY DOOR RH-UP (FRE)	F-DOOR	2
30	R817A-730	ASSY DOOR RH-LOW (FRE)	F-DOOR	2
31	R3903-760	GASKET DOOR (KR)	PVC-S, 12.5MM	6
32	R816A-630	ASSY CROSS BAR	R/F, + Type	1
33	R816A-640	ASSY CROSS BAR	1600R , ㅏ Type	1
34	R872A-010	ASSY VAPORI LF-1381	LF-1381PC_ML225	3
35	R3373-630	SHELF STANDARD L	T1.2*930 ㎜	8
36	R836A-200	ASSY SHELF SH-Q_1	SH-Q_1 4EA->1BOX	2
37	R836A-240	ASSY SHELF SH-R_1	SH-R_1 4EA->1BOX	1
38	R835A-090	ASSY SHELF CLIP	48EA	1
39	R371A-851	SHELF REAR CLIP	POM 11*24.1*H30	12
40	R371A-060	SHELF REAR B	SWRM+PE/C 350*790	3

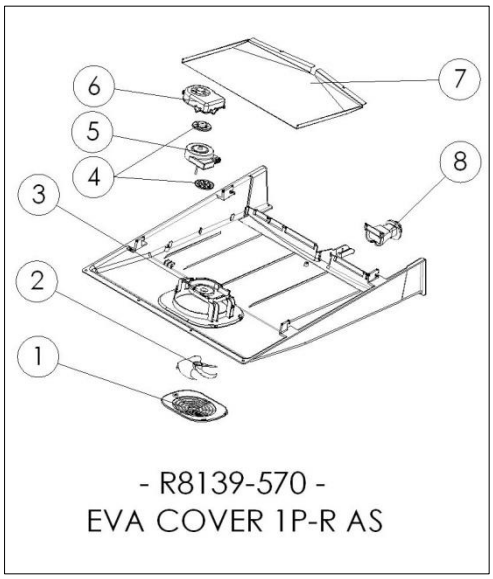
8) UNIT BASE ASSY



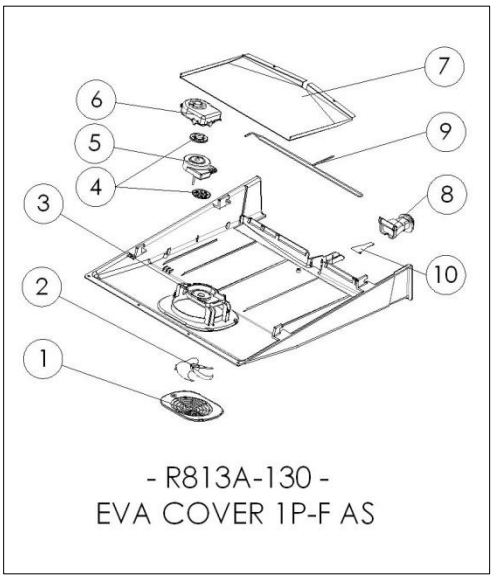


NO	CODE	Title	Subject	Q'TY	CODE NO	
					R8579-970	R8579-980
1	R8619-553	EVAPORATOR FRE	AL. 330*107. D-HEATER	1	○	–
	R8619-543	EVAPORATOR REF	AL. 330*107	1	–	○
2	R3201-023	UNIT BASE UPP	T0.5*593*584	1	○	○
3	R3201-011	UNIT BASE LOW	PP.J150.NATURAL	1	○	○
4	R3852-732	COVER C FAN MOTOR	ABS. WHITE	1	○	○
5	R3603-050	BUSHING MOTOR	NBR.BLACK.OD42	1	○	○
6	R7423-410	MOTOR COND	BLDC.CCW.2.67W. .223A.1600RPM	1	○	○
7	R3761-011	FIXTURE C FAN MOTOR	ABS. BLACK	1	○	○
8	R3723-230	FAN BLADE	ABS+G/F 10%. ¢150 3WINGS	1	○	○
9	R2203-191	WIRE CONDENSER	SWST. OD4.76*T0.7*L6781	1	○	○
10	R2183-160	DRYER (R-134A)	XH-9.18GR. ¢3.4. 간냉식용	1	○	○
11	R2113-653	PIPE FRE SUCTION	ASSY. CT1220. ID 1.1*4500	1	○	–
	R2113-644	PIPE REF SUCTION	ASSY. CT1220. ID 1.6*3500 WH TUBE	1	–	○
12	R7439-170	COMPRESSOR	SK1A1Q-L2U, 220V 50HZ, R-134a	1	○	○
13	R7519-120	OVERLOAD PROTECTOR	4TM308PHBYY-53	1	○	○
14	R7539-110	PTC RELAY	220M	1	○	○
15	R3813-900	COVER RELAY	HOOK TYPE, S	1	○	○
16	R7213-412	SENSOR ROOM	AT25℃.10.75 kΩ±1%.-25~25	1	○	○
17	R7253-101	BIMETAL(THERMAL FUSE)	N80 Z200 109℃퓨즈일체형	1	○	–
18	R7703-273	HEATER DEFROST	SUS316L, .220V.280W.173Ω	1	○	–

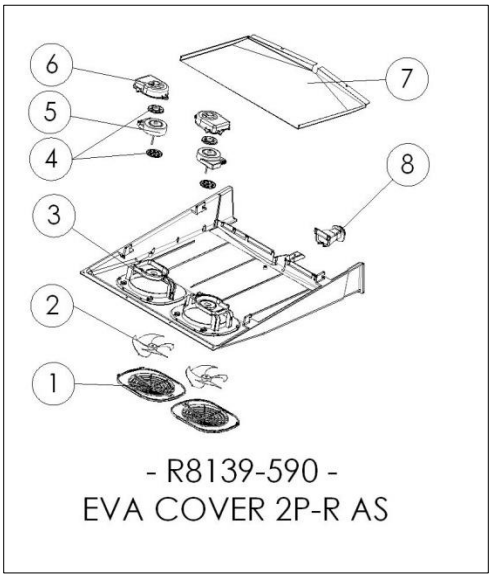
9) EVA COVER ASSY



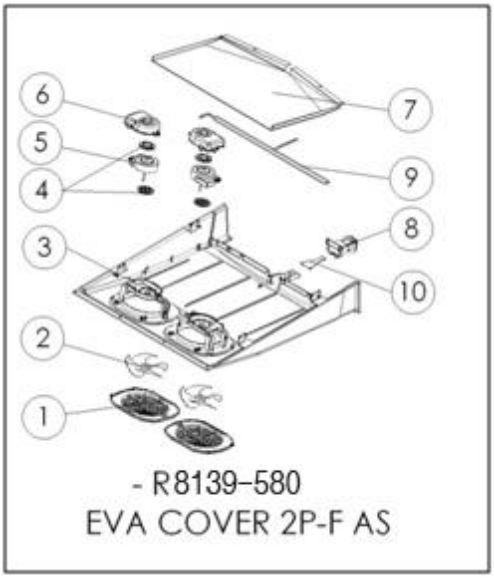
- R8139-570 -
EVA COVER 1P-R AS



- R813A-130 -
EVA COVER 1P-F AS



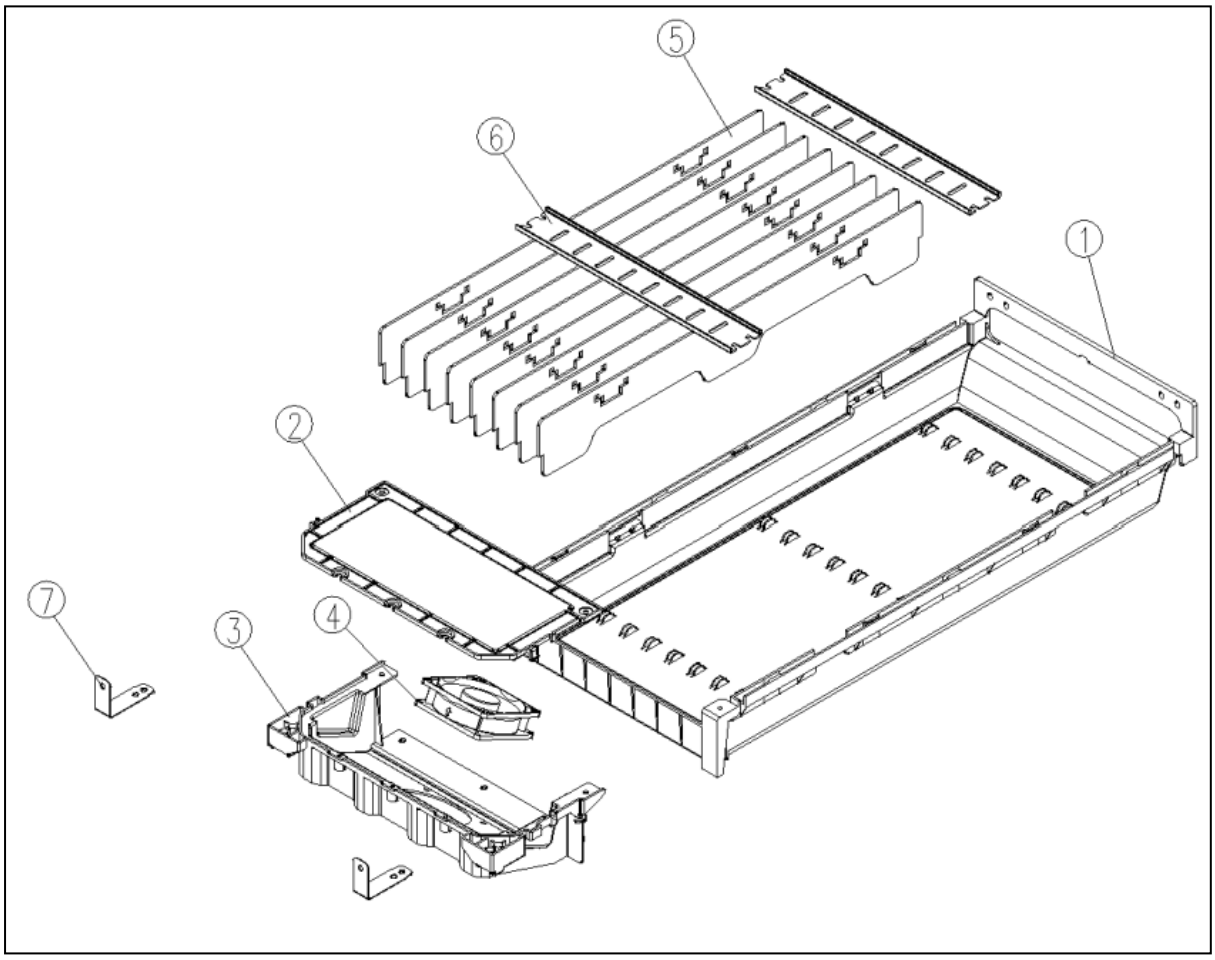
- R8139-590 -
EVA COVER 2P-R AS



- R8139-580
EVA COVER 2P-F AS

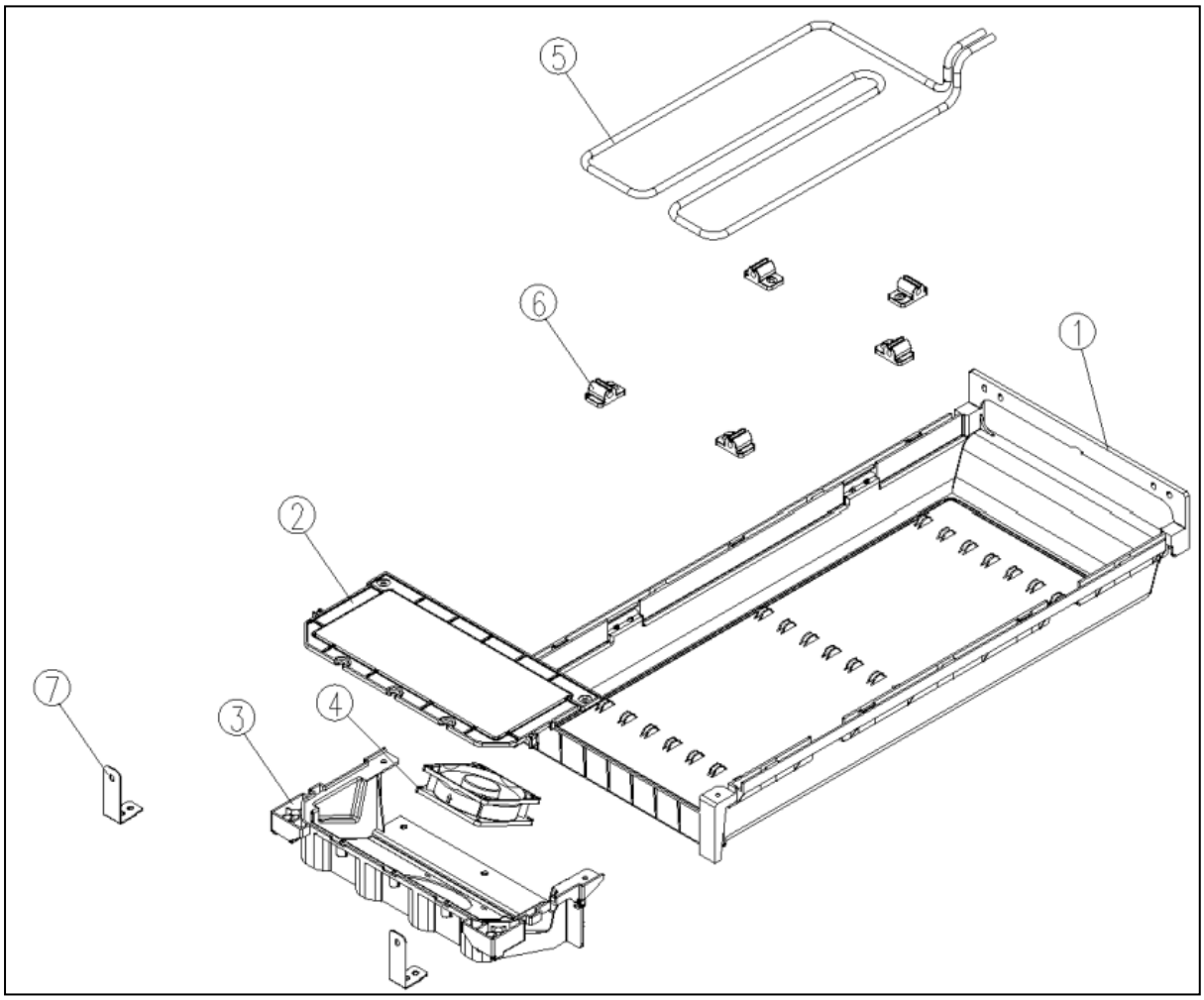
NO	CODE	Title	Subject	Q'TY	CODE NO			
					R8139-570	R813A-130	R8139-590	R8139-580
1	R3132-551	GRILLE EVA COVER	ABS. GRAY	1	○	○	○	○
2	R3723-081	FAN BLADE	¢110, 4WINGS, CRF-114BD	1	○	○	○	○
3	R3851-742	COVER EVA 2P	ABS. GRAY	1	–	–	○	○
	R3851-752	COVER EVA 1P	ABS. GRAY	1	○	○	–	–
4	R3603-050	BUSHING MOTOR	NBR.BLACK.OD42	2	○	○	○	○
5	R7423-420	MOTOR EVA	BLDC.CW. 2.43W. 0.20A. 2890RPM	1	○	○	○	○
6	R3853-760	COVER E FAN MOTOR	PP. J150.NATURAL	1	○	○	○	○
7	R3742-331	PLATE DRAIN	AL T1.0*460*330	1	○	○	○	○
8	R3743-370	CAP DRAIN	SILICON. WHITE 경도 50	1	○	○	○	○
9	R7313-934	HEATER PLATE DRAIN	220V 25W. 9.4W 1407Ω	1	–	○	–	○
10	R3743-382	TUBE HEAT TRANSFER	AL6061 T1.0 17.8*14.4*93	1	–	○	–	○

10) ASSY VAPORI FELT TYPE



NO	CODE	Title	Subject	Q'TY
1	R3422-012	CASE VAPORI T49	ABS. 602.5*275*106.5	1
2	R3422-050	COVER DC MOTOR T49	ABS. 280.5*131*11.5	1
3	R3422-030	CASE DC MOTOR T49	ABS. 283*143.5*69.5	1
4	R831A-030	ASSY MOTOR DC VAPORI	DC 12V / 3000RPM DA08025B12MF	1
5	R1154-090	WICKING DRAIN WATER	2.5T*480*63.5	8
6	R3853-780	GUIDE WICKING	PP(WHITE). 1.5T*269*40	2
7	R315A-410	BRACKET CASE VAPORI FRONT	STS304 T0.8 114.4*31.9	2

11) ASSY VAPORI HEATER TYPE



NO	CODE	Title	Subject	Q'TY
1	R3422-012	CASE VAPORI T49	ABS. 602.5*275*106.5	1
2	R3422-050	COVER DC MOTOR T49	ABS. 280.5*131*11.5	1
3	R3422-030	CASE DC MOTOR T49	ABS. 283*143.5*69.5	1
4	R831A-030	ASSY MOTOR DC VAPORI	DC 12V / 3000RPM DA08025B12MF	1
5	R720A-510	HEATER VAPORIZER	220V 70W 691Ω SHEATH HEATER	1
6	R3743-400	HOLDER VAPORI HEATER	33*20*13.5	5
7	R315A-410	BRACKET CASE VAPORI FRONT	STS304 T0.8 114.4*31.9	2

12) 220V/50Hz, 220V/60Hz Dedicated parts

	HARNESS MAIN AC		COMP		CIRCUIT DIAGRAM		LABEL SPEC	
MODEL	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
LR-681PC	R7613-550	R7273-100	R7439-170	R7439-440	R510C-610	R510C-660	R513Q-120	R513Q-200
LF-681PC	R7613-560	R7273-112	R7439-170	R7439-440	R510C-560	R510C-670	R513Q-130	R513Q-210
LR-1381PC	R7613-571	R7273-123	R7439-170	R7439-440	R510C-570	R510C-680	R513Q-140	R513Q-220
LF-1381PC	R7613-580	R7273-131	R7439-170	R7439-440	R510C-620	R510C-690	R513Q-150	R513Q-230
LR-1981PC	R7613-600	R7273-150	R7439-170	R7439-440	R510C-590	R510C-710	R513Q-160	R513Q-250
LF-1981PC	R7613-610	R7273-161	R7439-170	R7439-440	R510C-600	R510C-720	R513Q-170	R513Q-260
LRF-1382PC	R7613-590	R7273-142	R7439-170	R7439-440	R510C-580	R510C-700	R513Q-180	R513Q-240
LRF-1984PC	R7613-640	R7273-142	R7439-170	R7439-440	R510C-580	R510C-700	R513Q-190	R513Q-270

8. Operations

1. Button names and functions of Control part

1) R / F models

(1) How to set

- Down button : The button is to set temperature level lower.
- Up button : The button is to set temperature level higher.
  *The setting range of temperature is (-3~ -24) in freezer compartment and (7 ~ 0) in refrigerator compartment.
- Power off : Top the up button until the temperature reaches the limit and then press the up button to turn off the power.
- Power on : Press the down button to turn on the power. Once "OFF" is shown, press down button one more time to control temperature.

(2) How to display

① 888 SEGMENT Display

- Press Temperature Setting button, and 888 SEGMENT which has displayed current temperature will flicker at 5-second intervals displaying setting temperature.
- Press △▽ buttons to set temperature.
- Setting is saved automatically in 5 seconds and current internal temperature is displayed when setting is finished.

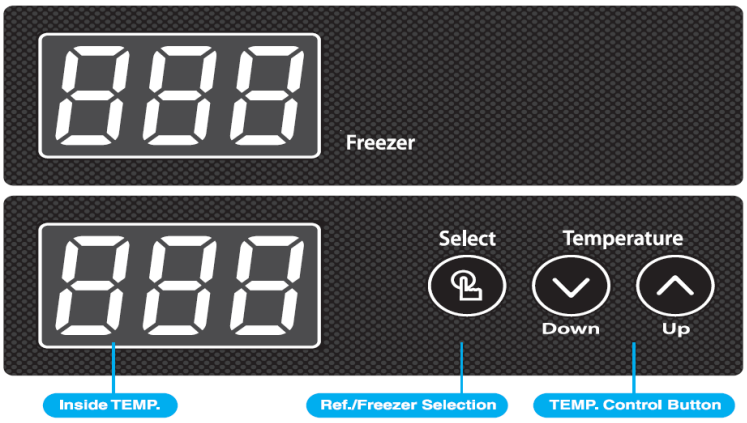
② Temperature Display details

- In normal mode : It displays actual internal temperature.
- In Pre-cool mode : It displays temperature that is in the range of OFF point set.

e.g) If setting temperature is set as -18℃, it could be displayed to -20℃ of COMP OFF temperature, and temperatures below -20℃ would be displayed as -20℃.

- In Defrost : "dF" sign : In Defrost heater ON condition -> Pause(5 min) -> FAN(pause) -> Internal Fan ON(normal mode) and it is displayed for 1 minute.

2) RF / HRF models



(1) How to set

- Down button : The button is to set temperature level lower.
- Up button : The button is to set temperature level higher.

*The setting range of temperature is (OFF,-3~ -24) in freezer compartment and (OFF,7 ~ 0) in refrigerator compartment.

- Temperature Setting button

① Select freezer/refrigerator which you want to set the temperature of.

② Freezer=>Refrigerator=> Setting Completion are repeated in turn.

③ SettingTemperature SEGMENT in freezer/refrigerator compartment which is ready to be set would flicker.

④ If setting temperature is remained the same without pressing for 5 seconds, setting will return to Setting Completion condition.

- Power off : Top the up button until the temperature reaches the limit and then press the up button to turn off the power. (Each side turns on separately)
- Power on : Press the down button to turn on the power. Once "OFF" is shown, press down button one more time to control temperature. (Each side turns on separately)

(2) How to display

① 888 SEGMENT Display

- Press Temperature Setting button and 888 segment which has displayed currrent temperature will flicker at 5-second intervals displaying setting temperature.
- Press △▽ buttons to set temperature.
- Setting is saved automatically in 5 seconds and current internal temperature is displayed when setting is completed.

② Temperature Display details

- In normal mode : It displays actual internal temperature.
- In Pre-cool mode : It displays temperature that is in the range of OFF point set.

e.g) If setting temperature is set as -18℃, it could be displayed to -20℃ of COMP OFF temperature, and temperatures below -20℃ would be displayed as -20℃.

- In Defrost : "dF" sign : In Defrost heater ON condition -> Pause(5 min) -> FAN(pause) ->Internal Fan ON(normal mode) and it is displayed for 1 minute.

2. Function Specification and Program Check List

<table>
<tr><th>Function Specification</th><th>Decision</th></tr>
<tr><td>
2-1. ERROR mode
(1) S2-SENSOR and S1-SENSOR errors
① When Temperature Sensor is Short or above 82℃, SEGMENT flickers with alarm displaying ESH sign.
② When Temperatue Sensor is OPEN or below -50℃, SEGMENT flickers with alarm displaying ESL sign.
③ The alarm which bleeps for 1 second and then is silent for 5 seconds works for 5 minutes, then it stops.
④ Operations in error are as follows.
<table>
<tr><td>Freezer</td><td>In S1-SENSOR error : It operates according to RT temperature.
ⅰ) In RT error 25min/10min of Stepping Motor ON/OFF / COMP ON/OFF
ⅱ) Below -2℃ : 10min/25min
ⅲ) Below 3℃ : 12min/23min
ⅳ) Below 10℃ : 15min/20min
ⅴ) Below 15℃: 18min/17min
ⅵ) Below 20℃ : 22min/13min
ⅶ) Below 26℃ : 25min/10min
ⅷ) Below 31℃ : 28min/7min
ⅸ) Below 38℃ : 30min/5min
ⅹ) Above 38℃ : 31min/4min</td></tr>
<tr><td>Refrigerator</td><td>In S2-SENSOR error : It operates according to RT temperature.
ⅰ) In RT error 30min/30min of Stepping Motor ON/OFF / COMP ON/OFF
ⅱ) Below -2℃ : 12min/48min
ⅲ) Below 3℃ : 13min/47min
ⅳ) Below 10℃ : 15min/45min
ⅴ) Below 15℃ : 20min/40min
ⅵ) Below 20℃ : 25min/35min
ⅶ) Below 26℃: 30min/30min
ⅷ) Below 31℃ : 35min/25min
ⅸ) Below 38℃ : 40min/20min
ⅹ) Above 38℃ : 45min/15min</td></tr>
</table>
※For 1 COMP models, Stepping Motor ON/OFF
※ For 2 COMP models, COMP ON/OFF
⑤ Once the cause of error is settled, it works in normal mode with previous setting.
</td><td>O.K</td></tr>
</table>

Function Specification	Decision
2-2. Self-Check details according to light locations * Self-Check conditions can be checked in Error Check mode.	O.K

NO	Items	Function Specification DISPLAY	Problem	Note
1	S1-SENSOR	S 1	Temperature Sensor is OPEN or below -50℃	ERROR mode operation
		S 1 _	Temperature Sensor is SHORT or above 82℃	
2	S2-SENSOR	S 2	Temperature Sensor is OPEN or below -50℃	ERROR mode operation
		S 2 _	Temperature Sensor is SHORT or above 82℃	
3	Rt-SENSOR (External sensor)	r t	Temperature Sensor is OPEN	Normal operation
		r t _	Temperature Sensor is SHORT	
4	D1-SENSOR	D 1	Temperature Sensor is OPEN or below -50℃	Normal operation
		D 1 _	Temperature Sensor is SHORT or above 82℃	
5	D2-SENSOR	D 2	Temperature Sensor is OPEN or below -50℃	Normal operation
		D 2 _	Temperature Sensor is SHORT or above 82℃	

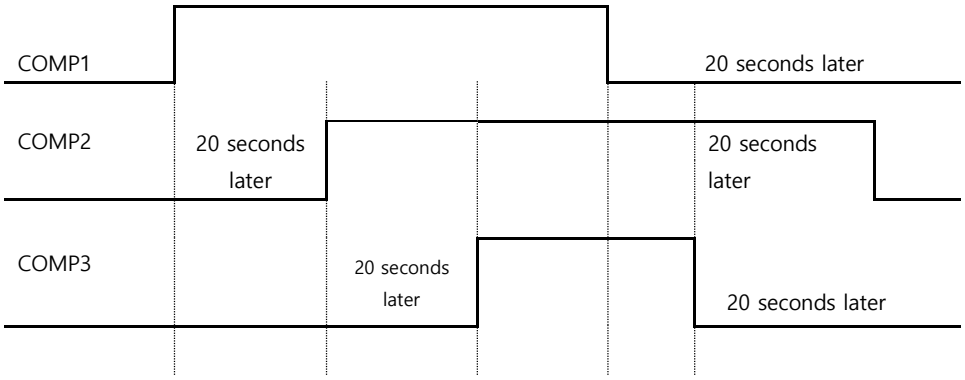
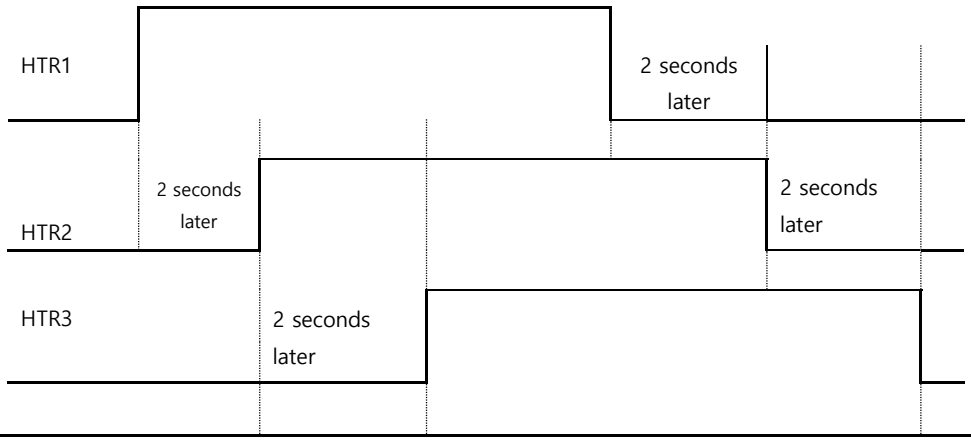
Function Specification					Decision
NO	Items	Function Specification DISPLAY		Problem	Note
6	S1-SENSOR	D 3		Temperature Sensor is OPEN or below -50℃	Normal operation
		D 3 _		Temperature Sensor is SHORT or above 82℃	
7	Bad Defrost 1	d	F 1	When Defrost 1 is stopped automatically because of Defrost limit time(80minutes), not by Sensor	Normal operation
8	Bad Defrost 2	d	F 2	When Defrost 2 is stopped automatically because of Defrost limit time(80minutes), not by Sensor	Normal operation
9	Bad Defrost 3	d	F 3	When Defrost 3 is stopped automatically because of Defrost limit time(80minutes), not by Sensor	Normal operation
10	Bad Cycle 1	C	F 1	When COMP operates for 30 minutes and then the temperature of D1-SENSOR is above 0℃	Normal operation
11	Bad Cycle 2	C	F 2	When COMP operates for 30 minutes and then the temperature of D2-SENSOR is above 0℃	Normal operation
12	Bad Cycle 3	C	F 3	When COMP operates for 30 minutes and then the temperature of D3-SENSOR is above 0℃	Normal operation
13	Abnormal high temperature of freezer compartment	E	H F	When Operation has continued for 3 hours in above 15℃.	Normal operation
14	Abnormal high temperature of refrigerator compartment	E	H L	When Operation has continued for 8 hours in above 10℃	Normal operation

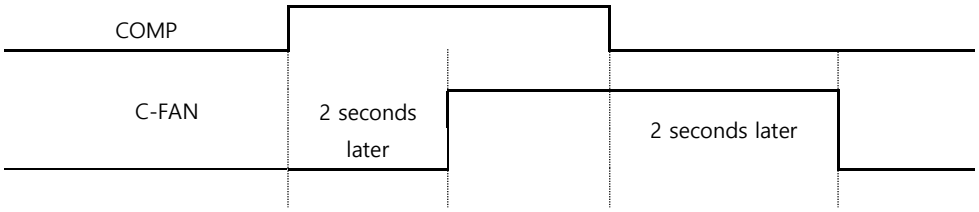
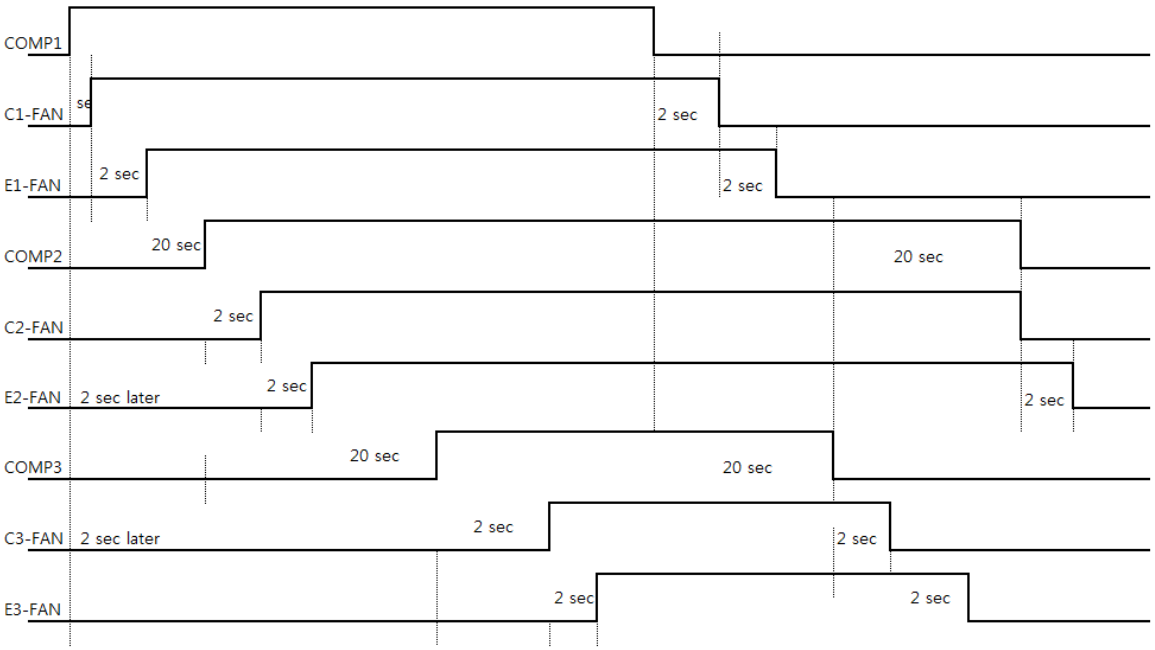
Function Specification					Decision
NO	Items	Function Specification DISPLAY	Problem	Note	
15	Bad E²PROM	E E P	When E2PROM is not available to be read or written	Normal operation	
16	Blockage of freezer valve(Stepping V/V)	L C 1	When temperature is above 5℃ higher than COMP ON Point 60 minutes after operation of COMP	Normal operation	
17	Leakage of freezer valve(Stepping V/V)	L C 2	When temperature is below -10℃ lower than COMP OFF Point 60 minutes after COMP OFF	Normal operation	
18	Leakage of refrigerator valve(Stepping V/V)	r C 2	When temperature is below -10℃ lower than COMP OFF Point 60 minutes after COMP OFF	Normal operation	
19	Leakage of refrigerator valve(Stepping V/V)	r C 2	When temperature is below -10℃ lower than COMP OFF Point 60 minutes after COMP OFF	Normal operation	

Function Specification	Decision
2-3. COMP Operation and a ban on reoperation 1) COMP Operation ① COMP must be stopped for 5 minutes (van on COMP Operation for 5 minutes after COMP OFF). ② It operates according to temperatue value of each Sensor in freezer and Refrigerator compartments. ③ COMP ON point is 2℃ higher than setting temperature, and COMP OFF point is 2℃ lower than setting temperature.	O.K

2-4. Specifications of COMP Operation Control

Models		Terms		RPM	Note
LRF-1383PC 1 COMP		Above 28 degree of Air temperature		3600RPM	* AC COMP operates continuously
		Below 28 degree of Air temperature	Above Setting temperature + 2℃	3600RPM	
			Other cases	2880RPM	
LR-681PC/ LR-1381PC Refrigerator models		Above 28 degree of Air temperature		3600RPM	
		Below 28 degree of Air temperature	Above Setting temperature + 2℃	3600RPM	
			Other cases	1830RPM	
LR-1981PC Refrigerator models		Above 28 degree of Air temperature		3600RPM	
		Below 28 degree of Air temperature	Above Setting temperature + 2℃	3600RPM	
			Other cases	2100RPM	
LRF-1383PC/ 1382PC/ 1984PC	**R room (refrigerator)**	Above 28 degree of Air temperature		3600RPM	
		Below 28 degree of Air temperature	Above Setting temperature + 2℃	3600RPM	
			Other cases	2100RPM	
	F room (freezer)	Above 28 degree of Air temperature		3600RPM	
		Below 28 degree of Air temperature	Above Setting temperature + 2℃	3600RPM	
			Other cases	2100RPM	
LF-681PC/1381PC/ 1981PC Freezer models		Above 28 degree of Air temperature		3600RPM	
		Below 28 degree of Air temperature	Above Setting temperature + 2℃	3600RPM	
			Other cases	2800RPM	

Function Specification	Decision
2-5. Sequential Control of COMP and HTR 1) Sequential Control of COMP ① 2 COMPs can not run together simultaneously, and the next COMP can work 20 seconds after operation of the first COMP. (The first COMP runs and then the next COMP runs after 20 seconds in order.) ② 2 COMPs are not turned off all together, the first COMP is turned off and then the next COMP is turned off after 20 seconds in order. But, COMP3 is turned on 20 seconds after COMP2 ON, and for COMP OFF, COMP2 is turned off 20 seconds after COMP3 OFF.  2) Sequential Control of HTR ① HTR can not run together simultaneously, and the next HTR can work 2 seconds after operation of the first HTR. ② HTR OFF is not turned off all together. The first HTR is turned off and then the next HTR is turned off after 2 seconds in order.  	O.K

Function Specification	Decision
2-6. Details of FAN Operation Control 1) C-FAN Operation Control  - FAN works 2 seconds after COMP ON/OFF.	O.K
2-7. Sequential Control Method of COMP and FAN  	O.K

Function Specification	Decision

Terms	Frequency	Speed	Note
Below -5℃ of Air temperature	0	0	*It works in COMP operation condition. * FAN is turned off in COMP OFF.
-5℃~ 2℃ of Air temperature	45HZ	675RPM	
Above 2℃~12℃ of Air temperature	70HZ	1050RPM	
Above12℃~22℃ of Air temperature	90HZ	1350RPM	
Above 22℃ of Air temperature	110HZ	1650RPM	
Bad Air temperature Sensor	110HZ	1650RPM	

2) E-FAN Operation Control

- EVA FAN is fixed in 210HZ, 3150 RPM.
- EVA FAN is turned off in COMP OFF condition.

(But, If the internal temperature of refrigerator compartment is below 1℃, FAN works without regard to COMP ON/OFF condition.)

2-8. Details of Temperature SPEC for each model

O.K

<LR-681PC/LF-681PC>

NOTCH	Refrigerator Temperature				Freezer Temperature				DIF
	Setting Temperature	COMP	ON/OFF	AD value	Setting Temperature	COMP	ON/OFF	AD value	
	(℃)	ON/OFF	Temperature		(℃)	ON/OFF	Temperature		
0	OFF	OFF	OFF		OFF	OFF	OFF		
		ON	ON			ON	ON		
1	7	OFF	5	238	-3	OFF	-5	1CA	
		ON	9	260		ON	-1	1F2	
2	6	OFF	4	22E	-4	OFF	-6	1BE	
		ON	8	256		ON	-2	1E6	
3	5	OFF	3	223	-5	OFF	-7	1B3	
		ON	7	24B		ON	-3	1DB	
4	4	OFF	2	218	-6	OFF	-8	1A7	
		ON	6	240		ON	-4	1CF	
5	3	OFF	1	20D	-7	OFF	-9	19C	
		ON	5	235		ON	-5	1C4	
6	2	OFF	0	202	-8	OFF	-10	190	
		ON	4	22A		ON	-6	1B8	
7	1	OFF	-1	1FR	-9	OFF	-11	185	
		ON	3	21F		ON	-7	1AD	
8	0	OFF	-2	1EC	-10	OFF	-12	179	
		ON	2	214		ON	-8	1A1	
					-11	OFF	-13	16E	
						ON	-9	196	
					-12	OFF	-14	163	
						ON	-10	18B	DIF±2 ℃
					-13	OFF	-15	158	
						ON	-11	180	
					-14	OFF	-16	14C	
						ON	-12	174	
					-15	OFF	-17	141	
						ON	-13	169	
					-16	OFF	-18	136	
						ON	-14	15E	
					-17	OFF	-19	12C	
						ON	-15	154	
					-18	OFF	-20	121	
						ON	-16	149	
					-19	OFF	-21	117	
						ON	-17	13F	
					-20	OFF	-22	1ϕC	
						ON	-18	134	
					-21	OFF	-23	102	
						ON	-19	12A	
					-22	OFF	-24	F8	
						ON	-20	120	

					-23	OFF	-25	EE	
						ON	-21	116	
					-24	OFF	-26	E4	
						ON	-22	10C	

Function Specification

Decision: O.K

<LRF-1383PC/1382PC/1984PC/LR-1381PC/1981PC/LF-1381PC/1981PC>

NOTCH	Refrigerator Temperature				Freezer Temperature				DIF
	Setting Temperature (℃)	COMP ON/OFF	ON/OFF Temperature	AD value	Setting Temperature (℃)	COMP ON/OFF	ON/OFF Temperature	AD value	
0	OFF	OFF	OFF		OFF	OFF	OFF		
		ON	ON			ON	ON		
1	7	OFF	5	238	-3	OFF	-5	1CA	DIF±2 ℃
		ON	9	260		ON	-1	1F2	
2	6	OFF	4	22E	-4	OFF	-6	1BE	
		ON	8	256		ON	-2	1E6	
3	5	OFF	3	223	-5	OFF	-7	1B3	
		ON	7	24B		ON	-3	1DB	
4	4	OFF	2	218	-6	OFF	-8	1A7	
		ON	6	240		ON	-4	1CF	
5	3	OFF	1	20D	-7	OFF	-9	19C	
		ON	5	235		ON	-5	1C4	
6	2	OFF	0	202	-8	OFF	-10	190	
		ON	4	22A		ON	-6	1B8	
7	1	OFF	-1	1FR	-9	OFF	-11	185	
		ON	3	21F		ON	-7	1AD	
8	0	OFF	-2	1EC	-10	OFF	-12	179	
		ON	2	214		ON	-8	1A1	
					-11	OFF	-13	16E	
						ON	-9	196	
					-12	OFF	-14	163	
						ON	-10	18B	
					-13	OFF	-15	158	
						ON	-11	180	
					-14	OFF	-16	14C	
						ON	-12	174	
					-15	OFF	-17	141	
						ON	-13	169	
					-16	OFF	-18	136	
						ON	-14	15E	
					-17	OFF	-19	12C	
						ON	-15	154	

					-18	OFF	-20	121	
						ON	-16	149	
					-19	OFF	-21	117	
						ON	-17	13F	
					-20	OFF	-22	1ȡC	
						ON	-18	134	
					-21	OFF	-23	102	
						ON	-19	12A	
					-22	OFF	-24	F8	
						ON	-20	120	
					-23	OFF	-25	EE	
						ON	-21	116	
					-24	OFF	-26	E4	
						ON	-22	10C	

Function Specification			Decision
2-9. Function Specification			
1	In the first operation of power supplying	1. Standby status - All power is turned off (standby) for 2 seconds. - LED flickers at 0.5-second intervals after 2 seconds displying the set model with alarm. - After that, all LEDs flicker two times at 0.5-second intervals.	O.K
		2. Check of primary defrost <Over 2 COMPs (RF models) > : 1040RF/1660RF - Operation according to S1/DS1-SENSOR (Defrost sensor of freezer) temperature 1) COMP operates when the temperature is above 3.5℃. 2) Defrost mode runs when all sensors are below 3.5℃. - Operation according to S2-SENSOR (Air sensor of refrigerator) temperature 1) COMP operates when the temperature is above 5.0℃ (COMP ON Terms) 2) Defrost mode runs when the temperature is below 5.0℃.	O.K
		<1 COMP (RF models) > : 520RF/1040RF - Operation according to S1/DS1-SENSOR (Defrost sensor of freezer) temperature 1) COMP operates when the temperature is above 3.5℃. 2) Defrost mode runs when the temperature is below 3.5℃. - Operation according to S2-SENSOR (Air sensor of refrigerator) temperature 1) Stepping motor is OPEN when the temperature is above 5.0℃. 2) Defrost mode runs when the temperature is below 5.0℃.	O.K
		<R models > : 520R/1040R/1660R - Operation according to S1-SENSOR (Air sensor of refrigerator) temperature 1) COMP operates when the temperature is above 5.0℃.(COMP ON condition) 2) Defrost mode runs when the temperature is below 5.0℃.	O.K
		<F models> : 520F/1040F/1660F - 1. 520F model : Operation according to S1/DS1-SENSOR temperature 1) COMP operates when the temperature is above 3.5℃.(COMP ON	O.K

		Term) 2) Defrost mode runs when all sensors are below 3.5℃. - 2.1040F model Operation according to S1,DS1,DS2-SENSOR temperatures 1) COMP operates when the temperature is above 3.5℃.(COMP ON term) 2) Defrost mode runs when all sensors are below 3.5℃. - 3.1660F model : Operation according to S1/ DS1,DS2,DS3-SENSOR temperatures 1) COMP operates when the temperature is above 3.5℃.(COMP ON term) 2) Defrost mode runs when all sensors are below 3.5℃.	
		※ In the beginning of Defrost mode, Pre-cool mode runs after 5 minute pause of COMP.	O.K

Function Specification			Decision
2	In normal operation	- 5 minuts pause of COMP (COMP operation stops for 5 minutes after COMP OFF)	O.K
		- RF model (1COMP) 1)Step modulation of Stepping Motor according to temperature value of S2-SENSOR 2)Step modulation of Stepping Motor according to temperature value of S1-SENSOR 3)Motion reference of Compressor and Stepping Motor 4)Step of Stepping motor is closed and fan is stopped in refrigerator compartment when freezer compartment is in defrosting. 5)Operation of refrigerator compartment returns to normal mode as defrosting of freezer compartment is completed.	O.K
		- Refrigerator/Freezer models for exclusive use : COMP ON/OFF according to the temperature value of S1-SENSOR - RF model (2COMP) 1)COMP1 ON/OFF according to the temperature value of S1-SENSOR (Freezer)	O.K
		2)COMP2 ON/OFF according to the temperature value of S2-SENSOR (Refrigerator)	O.K
3	Room ON/OFF Function	1) If Up buttonis pressed, room would be turned OFF automatically displaying "OFF" on SEGMENT after Step 1. 2) If Temperature Setting button is pressed in room OFF condition, "OFF" sign would be displayed on 888 SEGMENT. 3) If DOWN button is pressed, the lowest step would be displayed and room would be turned ON automatically. -Primary Defrost mode is checked when room is turned ON. (Section 2 is applied in the primary operation of power supplying.)	O.K
4	Defrost cycle of freezer	- Defrost cycle is set as 7 hours (Cumulative hours of COMP). - Defrost of freezer can be started running even earlier than Defrost cycle when excess frosting of EVA is sensed. The article 1) is checked as cumulative operation time of COMP just passes 2 hours (by each an hour). 1) Defrost condition is checked from after the minimum operation hour passed 6 hours (it is changed by setting value). - R-SENSOR error - Defrost SENSOR error - Defrost Limit time error - RT-SENSOR error - When air temperature is above 35℃ - When the rate of COMP operation is over 70% 2) In case the article 1) conditions are not satisfied, if the cumulative hours of COMP operation pass over 8 hours or maximum operation hour becomes 14 hours , defrosting will run.	O.K

Function Specification			Decision
5	Defrost cycle of refrigerator	- Defrost is run every 5 hours.	O.K
6	Defrost system -Defrost system of freezer 1. PRE-COOL	- It is freezing process to lower internal temperature on compensation of internal temperature before defrost heater is turned ON. - Pre-Cool mode runs before defrost heater is turned ON on defrost cycle. If internal temperature falls below -4℃ in 30 minutes, Defrost heater goes to On mode. - Maximum limit time of Pre-cool is different in each model. -F model : 30minutes -Other models : 30minutes	O.K
	2. HEATER ON	- Step of stepping Motor in freezer becomes Freezer OFF condition. - COMP and EVA FAN are turned OFF. - When Pre-cool is completed, Defrost heater is turned ON and frost of EVA is removed.	O.K
		<LRF-1383PC / 1984PC models> - -When DS1/DS2-SENSOR on EVA reach to return temperature of defrost (15℃), Defrost heater is turned OFF.	O.K
		<LF-1981PC model> - When DS1,DS2,DS3-SENSOR on EVA reach return temperature of defrost(15℃), Defrost heater is turned OFF.	O.K
		- Maximum ON time of Defrost heater is 80 minutes. - If heater works for 20 minutes in defrost Sensor error and the temperature value of S1-SENSOR is above -2℃, heater will be turned OFF. - If Defrost SENSOR/S1-SENSOR are bad, heater will run for maximum 40 minutes. - If Defrost-SENSOR cannot reach return temperature of defrost after 80 minutes maximum ON time of defrost heater, ERROR CODE will be memorized internally. ※ Pre-cool function is deleted in Defrost Limit Error.	O.K

Function Specification			Decision
	3. Quiescent time	-When Defrost heater ON mode is completed, 5 minute of quiescent time is given for steady time of freezing cycle. -Step of Stepping Motor in freezer is closed, and Defrost heater fan is turned OFF. -Defrost Heater, FAN, and COMP are all turned off.	O.K
	4. FAN Stop	-When quiescent time is finished, FAN is set to be in Stop mode for maximum 5 minutes lest the heated EVA air gets into the inside directly. -Step of Stepping Motor and COMP operate to cool EVA and surrounding air. -If the temperature of D-SENSOR(even one of DS1,DS2,DS3-SENSOR) falls below -10℃ in less than 5 minutes, FAN Stop mode will be stopped and Normal mode be started. ※For 1 COMP models(520RF/1040RF) - Freezer is closed by force in FAN Stop mode	O.K
7	Defrost system of refrigerator	-Step of Stepping Motor in refrigerator is closed. -Defrost works with only operation of Cooling FAN. -Defrost mode is operated for 30 minutes and returned in Air Sensor error of refrigerator. -Even if the Air Refrigerated limit time 240 minutes. - Setting the temperature-1 ° c below the set temperature + 3 ° c and 0 ° c return more than once to return set temperature is 4 ° c, 3 ° c above the temperature + 5 ° c are set to return.	O.K
8	Code HTR Control (BOX HTR)	-Code HTR is only in LS-520R/520F models. -HTR is turned OFF in room OFF. -When S1-SENSOR is below 3℃, Code HTR is operated.	O.K
9	Prevention system of excess frosting in refrigerator	-EVA FAN is turned OFF in COMP OFF. - When internal temperature is below 1℃ in refrigerator, FAN is operated without regard to COMP ON/OFF to prevent against excess frosting in refrigerator.	O.K
10	E-FAN DRIVE	<Refrigerator> - COMP ON at maximum rpm(3150), E-FAN works - COMP OFF : Chamber and prevents epiphany: (low room temperature 1 ° c) maximum rpm (3150), E-FAN works. If the room temperature is set to low rpm, the E-FAN works. -Defrosting ON at maximum rpm (3150), E-FAN works. < freezer > -COMP ON at maximum rpm (3150), E-FAN works. -COMP OFF : Set rpm, E-FAN works.	

3. Special Functions of Control System

3-1. Model Change

① To set Model change mode : Press and hold Up and Down buttons simultaneously for more than 3 seconds, and the mode will be set and current mode will be displayed.

② Model change mode : Press Down button, and model will be changed.

③ To clear Model mode : If no button is pressed for more than 5 seconds, it will be cleared autumatically.

④ Display of Model mode : Model mode is displayed on right LED.

NO	Models	Number of COMP	DISPLAY spec	Note
1	LRF-1382PC		1 C P Freezer H r F Refrigerator	
2	LR-681PC LR-1381PC		0 0 r	
3	LR-1981PC	2 COMP	1 6 r	
4	LRF-1383PC LRF-1382PC LRF-1984PC		r F 2 Freezer Refrigerator	
5	LF-1381PC		1 0 F	
6	LF-1981PC	3 COMP	1 6 F	
7	LF-681PC	1 COMP	0 5 F	

But) In model change, Be sure to draw power cord and plug it again, and the system will operate in the changed model mode.

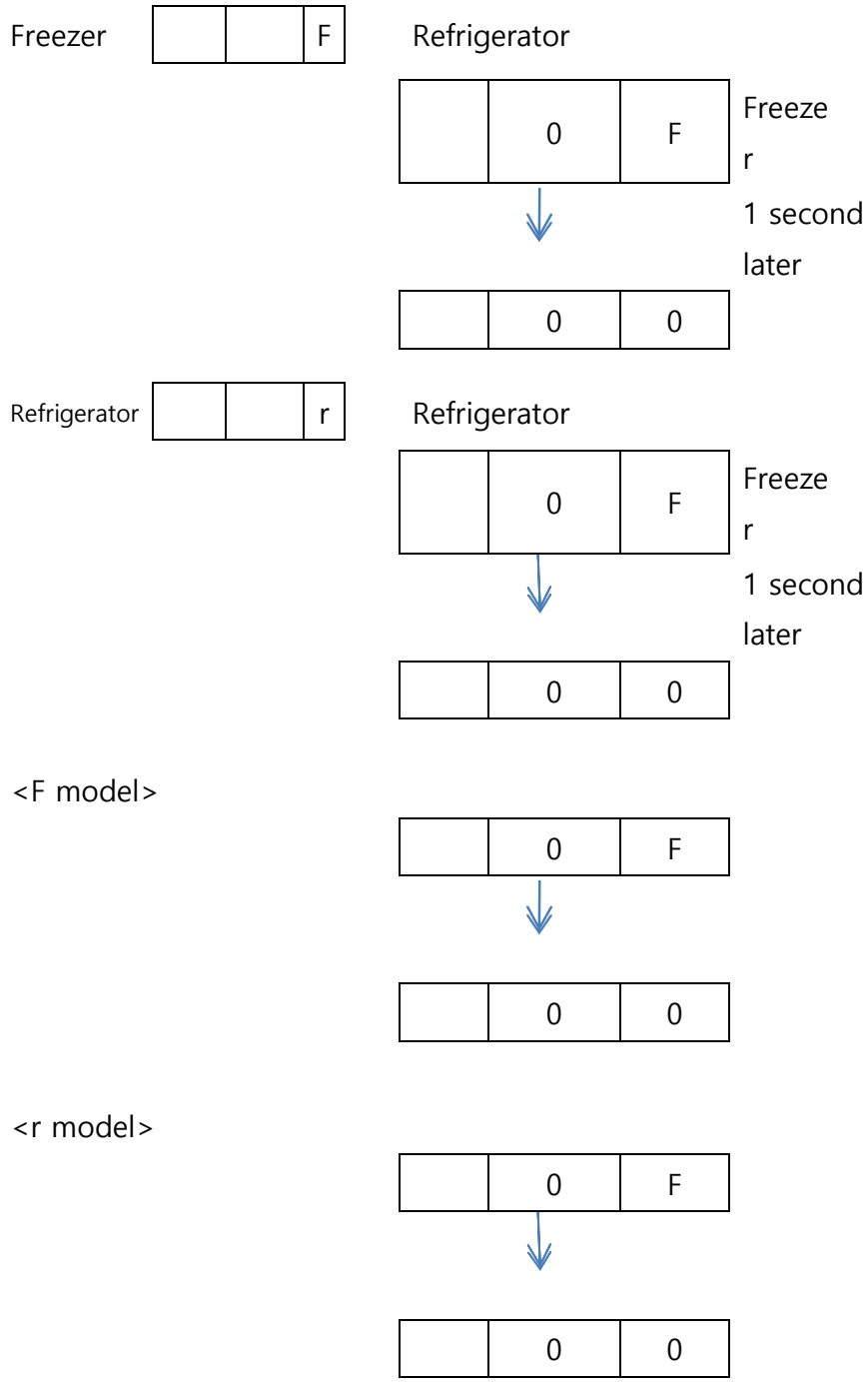
3-2. Change of Setting mode

① To set Setting Mode : Press Down button 5 times pressing and holding Up button in Power ON condition, and Setting Mode will be started.

② Display way : 888 DISPLAY is displayed as follows.

③ To change freezer/refrigerator mode : Select button is used for freezer/refrigerator setting.

<RF model>



<F model>

<r model>

④ How to set

<Freezer>

: Press Up button, then Setting mode is changed to OFF point Change -> DIF Change ->Temperature Compensation (Compensation of Display Temperature)-> Minimum Defrost time ->RPM Change -> OFF point Change in turn.

⑴ 00 a second after 0F : Temperature is rised or fallen by 0.5℃ unit in range of -50~+50 (0.5℃-> displayed as 5 : Decimal point is omitted)

⑵ 20 a second after 0d: ±025 -> ±050 -> ±075 -> ±10 -> ±15 -> ±20 -> ±30 -> ±40 -> ±50) (Decimal point is omitted)

⑶ 0 a second after CA(Temperature Compensation): Temperature is rised or fallen by 1℃ unit in range of -50~+ 50. (Temperature Compensation of Internal Temperature Display : Decimal point is omitted)

⑷ 6 a second after dt (Maximum Defrost Cycle) : (0 -> 5 -> 6 -> 7 -> 8 -> 9 -> 10) It is increased or decreased by an hour (0 : Defrost Delete).

⑸ 315 a second after rP (Fan motor RPM) : It is increased or decreased (90~315) by 15 unit.

<Refrigerator>

: Press Up button, then Setting mode is changed to OFF point Change-> DIF Change ->Temperature Compensation -> Defrost cycle Change -> RPM Change -> OFF point Change in turn.

⑴ 00 a second after 0F : Temperature is rised or fallen by 0.5℃ unit in range of -50~+50 (0.5℃-> displayed as 5 : Decimal point is omitted)

⑵ 20 a second after 0d: ±025 -> ±050 -> ±075 -> ±10 -> ±15 -> ±20 -> ±30-> ±40 -> ±50) (Decimal point is omitted)

⑶ 0 a second after CA(Temperature Compensation): Temperature is rised or fallen by 1℃ unit in range of -50~+ 50. (Temperature Compensation of Internal Temperature Display : Decimal point is omitted)

⑷ 6 a second after dt (Maximum Defrost Cycle) : (0 -> 5 -> 6 -> 7 -> 8 -> 9 -> 10) It is increased or decreased by an hour.

⑸ 315 a second after rP(Fan motor RPM) : it is increased or decreased (90~315) by 15 unit.

- DOWN button is used to increase or decrease.
- Changed value is saved automatically.
- If no KEY is set for 5 seconds, the mode is cleared automatically.

3-3. Error Check mode

① How to start

Press UP button 5 times pressing and holding DOWN button to start Error Check mode.

② Display way

888 DISPLAY is displayed as follows.

⑴ No error exists.

	n	O

⑵ An Error exists

S	1	_

: When S1-SENSOR has SHORT Error

- DOWN button is used to check all the errors that are saved in MICOM.
- Refer to details according to the light locations of Self-Check.

3-4. Electric devices Test Mode

① To set Electric devices Test Mode : Press DOWN and UP buttons for 3 seconds simultaneously in Power OFF condition to set Electric devices Test Mode.

② Steps of Electric devices Test Mode : DOWN button is used to change step 0 to 6, and each applicable operation is operated.

③ To clear Electric devices Test Mode : If no press is given for more than 10 seconds in Step 0(St), the mode is cleared automatically.

<1COMP LRF-1383PC,1382PC>

Step	Subordinate operations	Operation time	DISPLAY
0	All OFF	Auto return 10 seconds later	( ) S t
1	Stepping L ON COMP1 ON E2-FAN ON C1-FAN ON	Continuously	r C P
2	Stepping R ON COMP1 ON E1-FAN ON C1-FAN ON	Continuously	F C P
3	Stepping L/R ON COMP1 ON E1,E2-FAN ON C1-FAN ON	Continuously	C C P
4	HTR 1 ON	Continuously	H t 1

<LF-681PC, LR-681PC, LR-1381PC>

Step	Subordinate operations	Operation time	DISPLAY
0	All OFF	Auto return 10 seconds later	S t
1	COMP1 ON E1-FAN ON C1-FAN ON	Continuously	C P 1
2	HTR 1 ON	Continuously	H t 1
3	HTR 3 ON	Continuously	H t 3

<LF-1381PC,LRF-1383PC/1382PC/1984PC,LR-1981PC>

Step	Subordinate operations	Operation time	DISPLAY
0	All OFF	Auto return 10 seconds later	S t
1	COMP1 ON E1-FAN ON C1-FAN ON	Continuously	C P 1
2	COMP1,2 ON E1,2-FAN ON C1,2-FAN ON	Continuously	C P 2
3	HTR 1 ON	Continuously	H t 1
4	HTR 2 ON	Continuously	H t 2

<LF-1981PC>

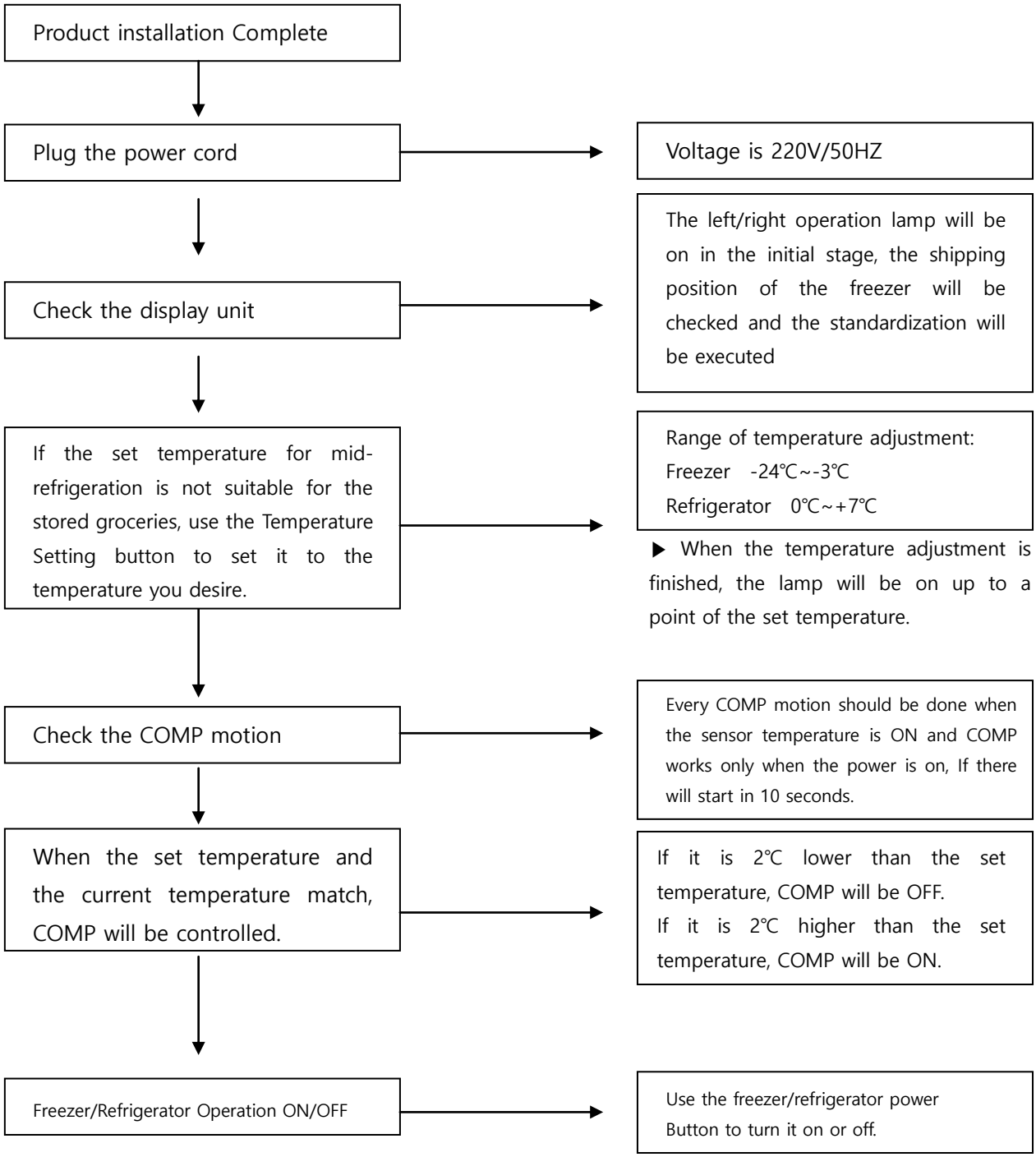
Step	Subordinate operations	Operation time	DISPLAY
0	All OFF	Auto return 10 seconds later	S t
1	COMP1 ON E1-FAN ON C1-FAN ON	Continuously	C P 1
2	COMP1,2 ON E1,2-FAN ON C1,2-FAN ON	Continuously	C P 2
3	COMP1,2,3 ON E1,2,3-FAN ON C1,2,3-FAN ON	Continuously	C P 3
4	HTR 1 ON	Continuously	H t 1
5	HTR 1,2 ON	Continuously	H t 2
6	HTR 1,2,3 ON	Continuously	H t 3

3-5. LED Test and E²PROM Clear

① To set LED mode : Press UP button 5 times pressing and holding POWER button in Power ON condition, then All LEDs will flicker at 0.5 second intervals and the mode will be cleared.

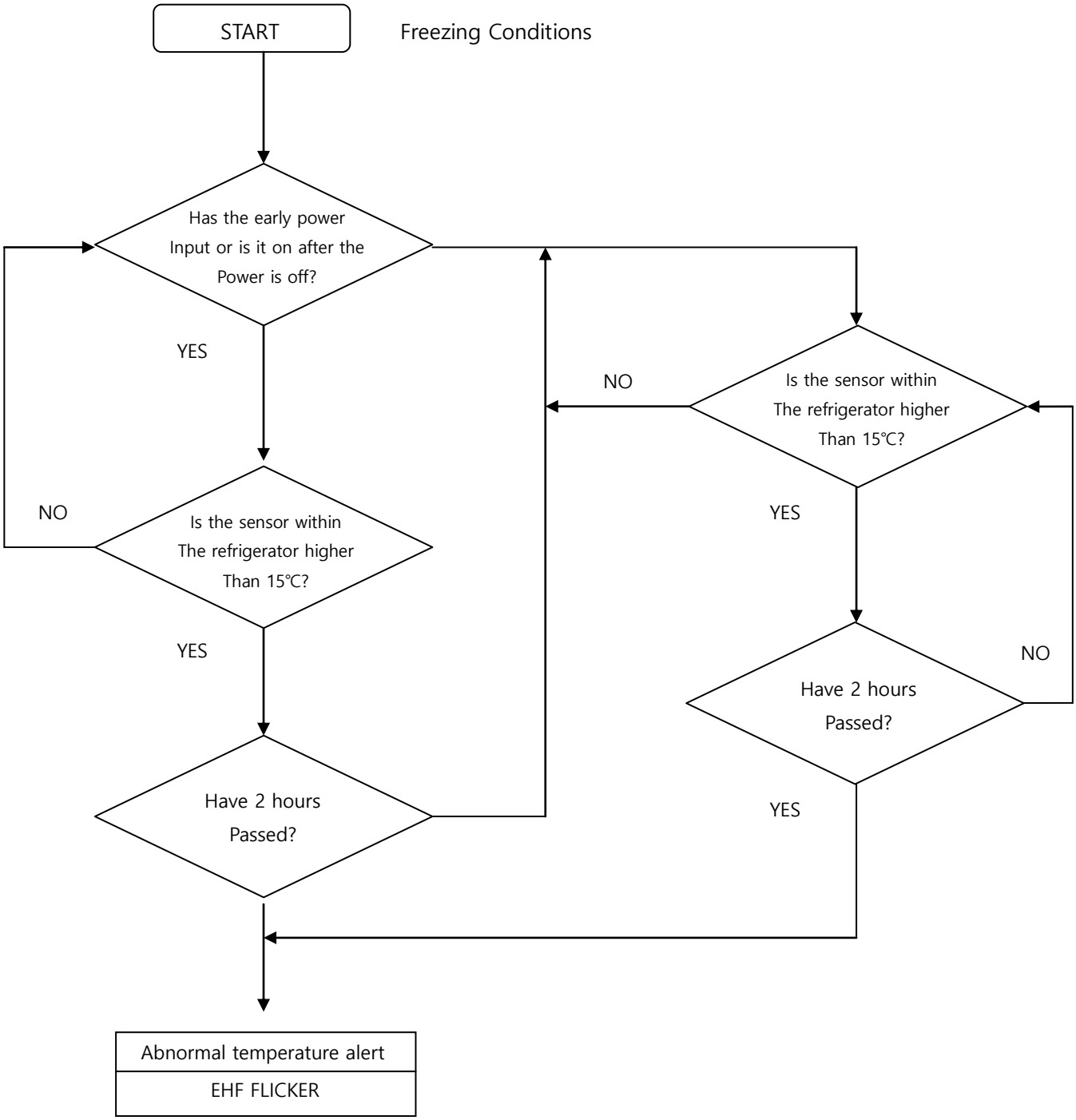
② Contents of E²PROM are cleared and default value is re-memorized.
But model type that is already set is not cleared.

■ Circuit Motion (Operation Flow) : LR-1381PC, LF-1381PC, LRF-1383PC

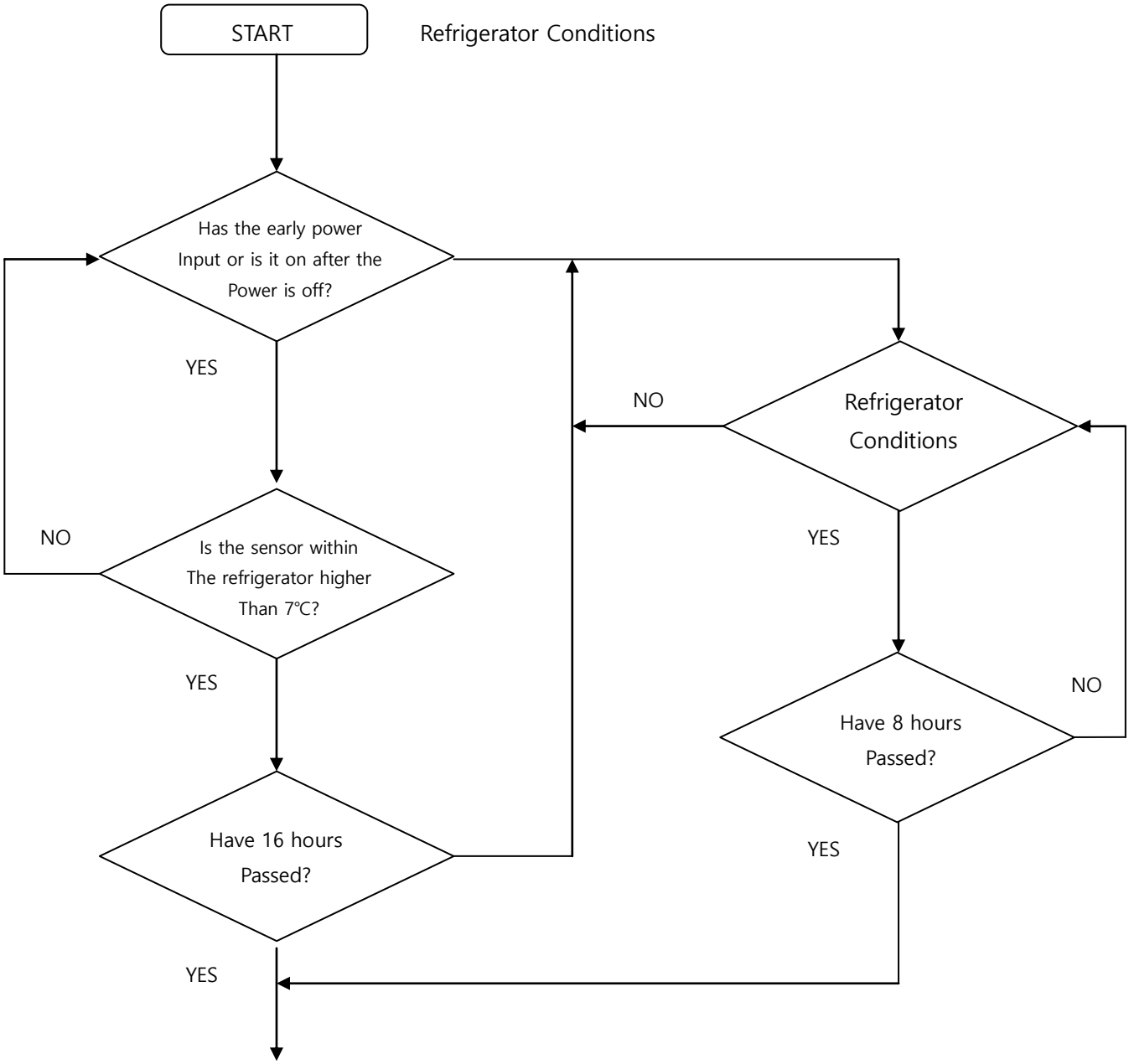


9. Abnormally High Temperature Alert Function

■ Circuit Motion (Operation Flow):

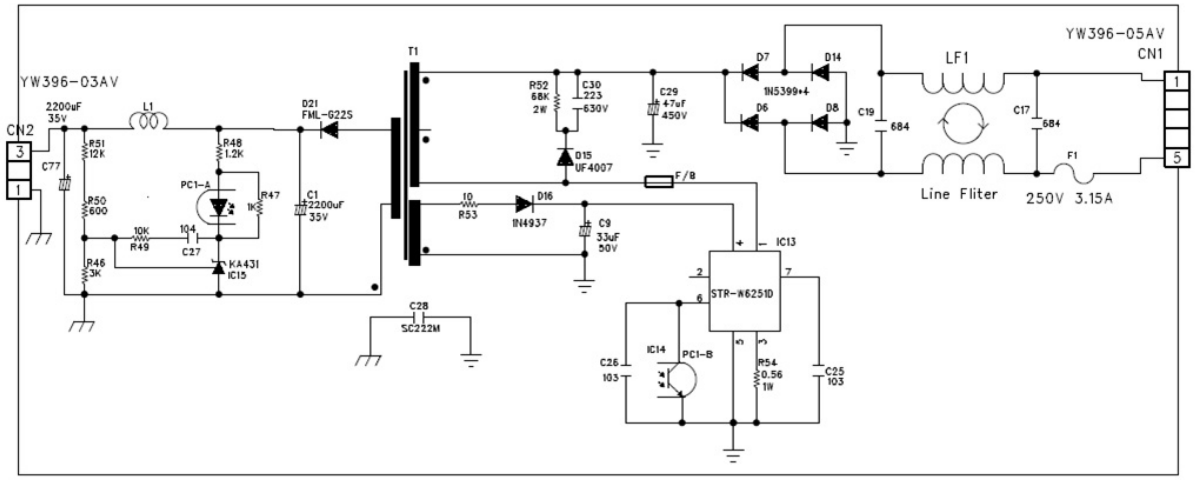


■ Circuit Motion (Operation Flow):

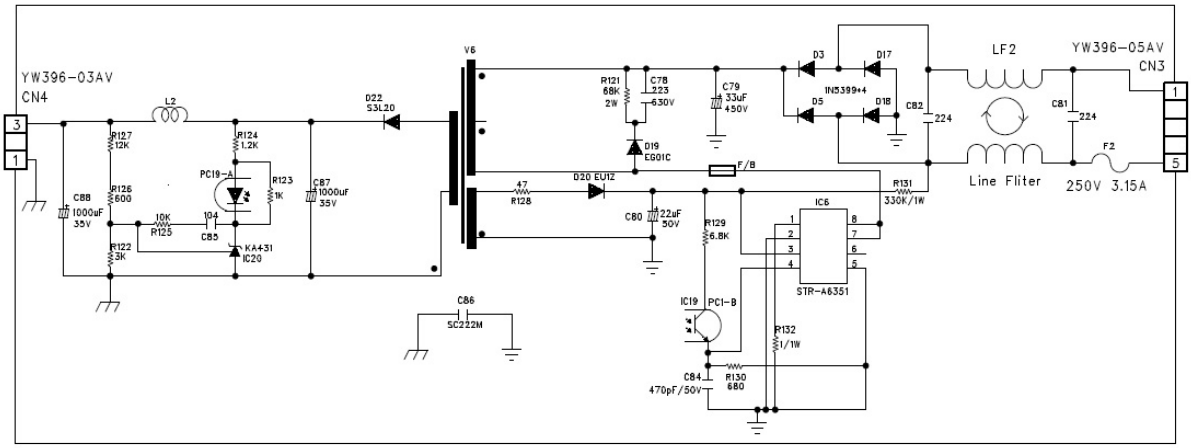


10. Important Units of Circuit Operation

1. V0 = DC13V/2.5A : LF-1381PC / LRF-1383PC/1382PC, LR-1981PC/LF-1981PC/LRF-1984PC



V0 = DC13V/1.3A : LR-681PC, LF-681PC, LR-1381PC



This power units the SMPS(Switch Mode Power Supply), which is a circuit that converts the AC input voltage into the DC of high voltage to improve the power conversion efficiency. Please note that you must always take caution since there are areas in the power unit that generates AC220V and DC 300V. The power input into the AC passes through FUSE(F2) and LF(2), and again, the rectified currents made of 4 diodes (D3, 5, 17, 18) to be rectified. Then, this voltage goes through the Electrolyic Capacitor C79(33㎌/450V) to become the electrolytic DC voltage to be authorized into the SMPS Transmitter.

As such, voltage is authorized into the transmitter and the inifial motion voltage excited by the VCC wires is authorized in the hybrid IC(C6) #3 of the switching regulator via the resistance(R128) and the diode(ID20). The snubber circuit(D19,C78, R121) plays a role here and protects the hybrid IC(IC6) by controlling the voltage surge of the switching waveforms. From this on, the hybrid IC stars the high speed (67KHZ) switching motion. When the IC is switched on, the energy is saved in the transmitter. When it is switched off, the respective wires of the transmitter generate the back EMF(back electromotive force). The rectified voltage through the D22 from the wires in the

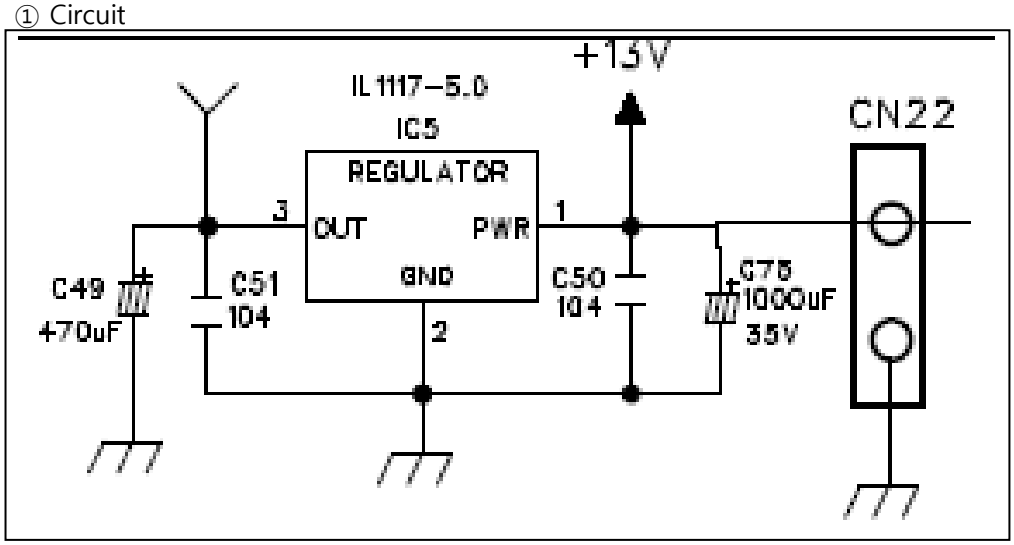
secondary units obtains the DC13V output voltage by having the C87, L2, and C88 devices control the noises and ripples.

At the same time, the IC-powered voltage which is generated continuously by the VCC wires is maintained in a uniform level by the capacitor(C80) and the swiching motion also continues. The output voltage VOUT is kept at a uniform level by resorting to the voltage generated by the resistance R122 and the resistance ratio of (R126+R127). The voltage measured at this point is transmitted to the circuits for providing the output voltage data to the feedback terminal no. 6/4 of the hybrid IC(C16) are used to: i) increase the switch-on hours of the IC if the output voltage is lower than the set voltage(DC13V), or ii) decrease the switch-on hours if it is higher. This way, the output voltage can be maintained at a uniform level of DC13V.

※ The device numbers above are divided pursuant to 2.5A/1.3A, the electric current specifications of DC13V SM PS.

2. DC POWER Unit

① Circuit



② Description

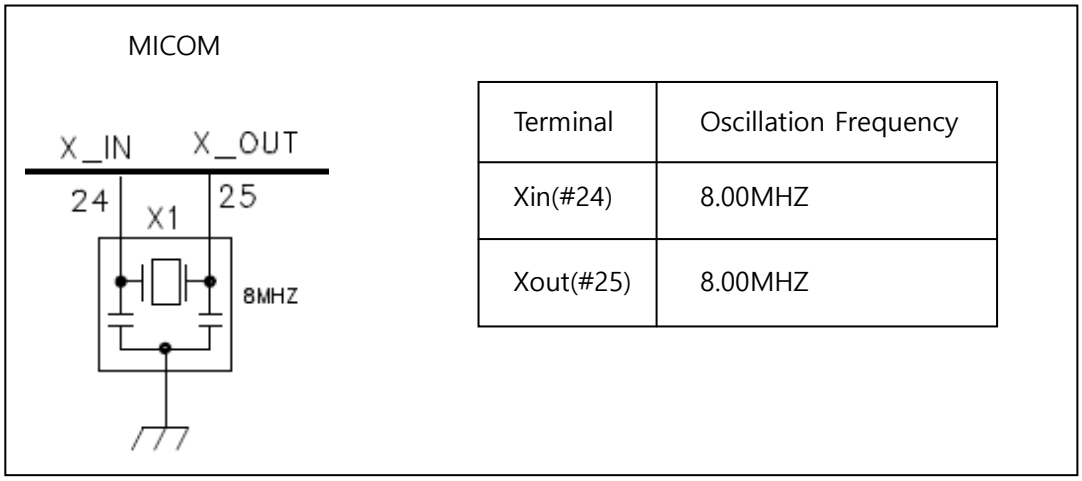
DC+13V generated from the separate SMPS (Specifications : DC13V/2.5A or 1.3A) goes through the connector(CN22) to be authorized into the input voltage PIN#1 of the IC5(IL1117), the voltage regulator for DC+5V.

IC5 receives the input of DC+13V and switches the voltage of DC_5V via the output PIN#3 by resorting to the internal circuit motions.

The makes it possible to supply the stable DC 5V voltage which is used for the power of MICOM.

3. Oscillation Circuit

1) Main MICOM Oscillation Circuit



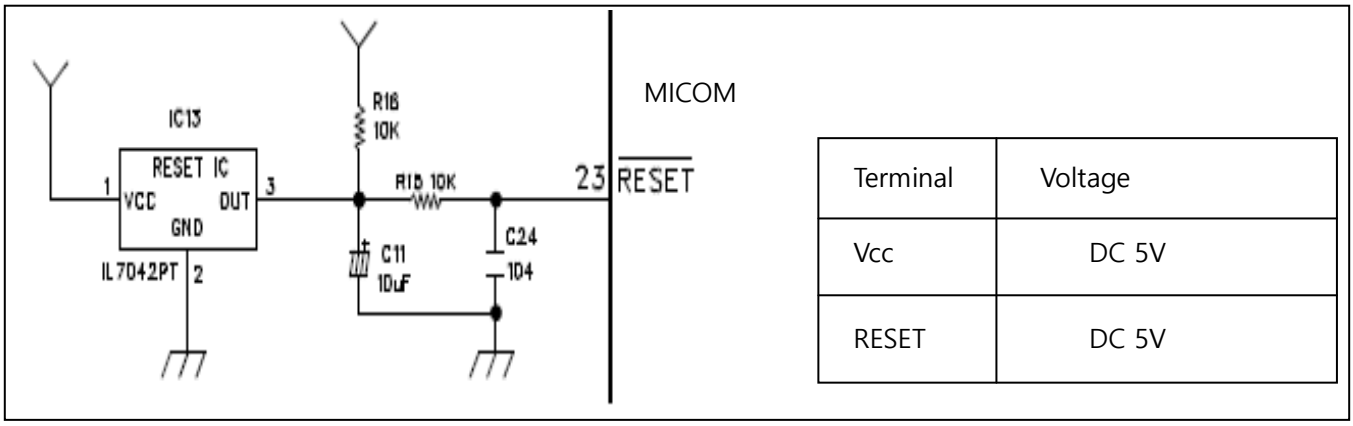
Terminal	Oscillation Frequency
Xin(#24)	8.00MHZ
Xout(#25)	8.00MHZ

It is the oscillation circuit to generate the clock for synchronization regarding the transmission of the devices inside MICOM and calculate time.

It the specification of the resonator is modified, the timing system of MICOM will also be altered, failing to perform the normal functions.

4. Reset Circuit Unit

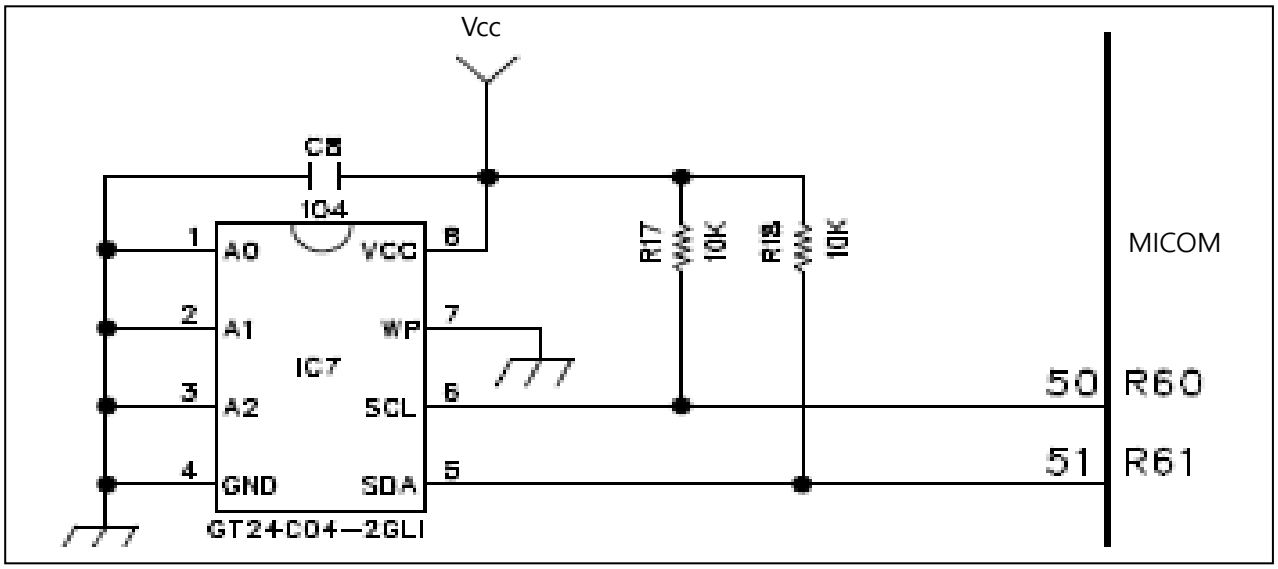
1) MAIN MICOM RESET Unit



Terminal	Voltage
Vcc	DC 5V
RESET	DC 5V

The reset circuit initializes numerous parts including RAM found inside the MICOM in the event the power is authorized to the MICOM while power is supplied or power is off momentarily so that the entire programs can be operated from the scratch (initial status). When the power is authorized, the reset terminal power will be in 'LOW' status compared with the MICOM's Vcc(DC5V) voltage. In a normal operation, it maintains the 'HIGH' (Vcc voltage) status.

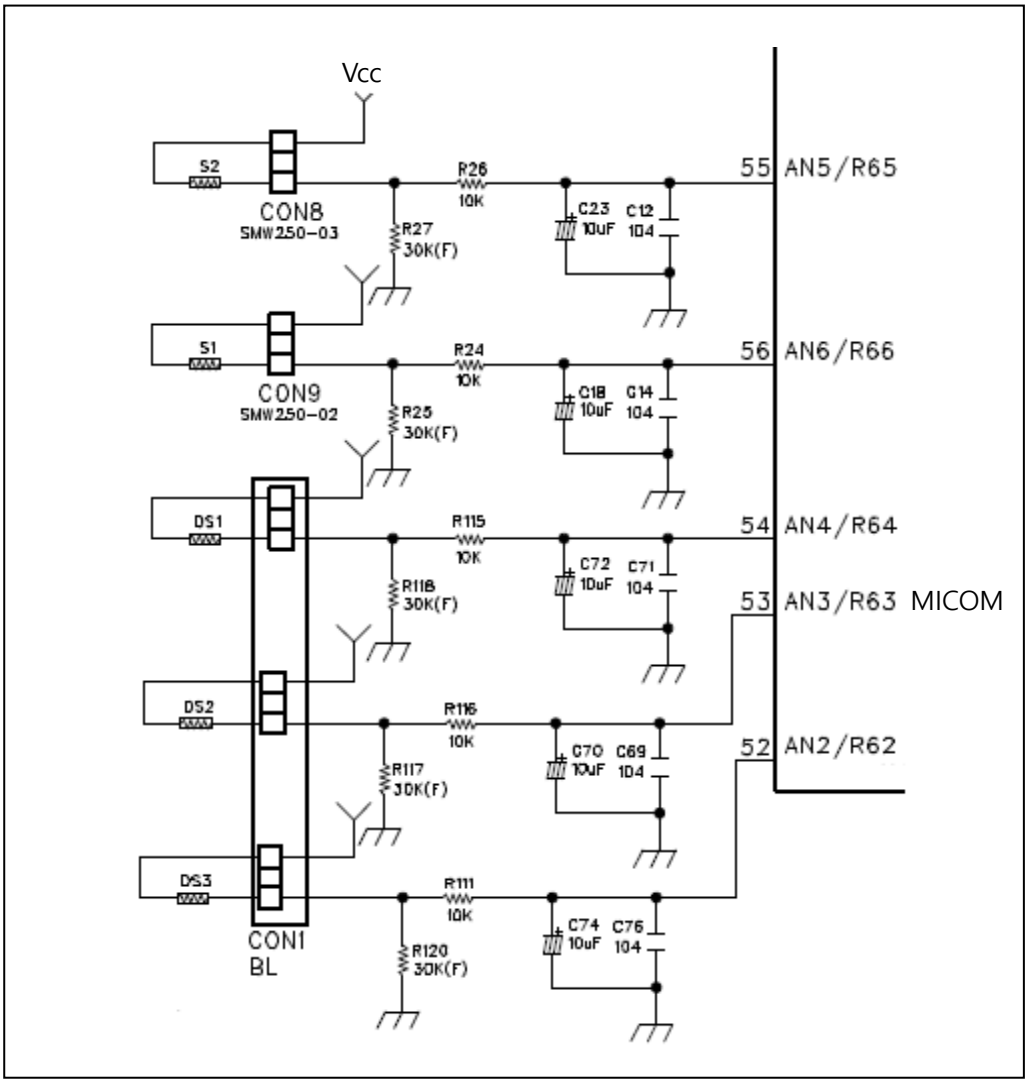
5. EEPROM Circuit Unit



EEPROM is a memory semiconductor that retains data even when the power is shut off.

This model has adopted the EEPROM to record the operation conditions so that users can maintain the set condition even in a place where power supply is unstable or power quality is low that momentary power outage happens. Therefore, even when the power is off and then on again, the conditions set by a user will be maintained.

6. Temperature Detection Circuit Unit



Model	Applicable MICOM Terminal	Voltage
LR-681PC/1381PC/LF-681PC	PIN#54, #56	MICOM input terminal voltage varies from the measured temperature. (Refer to the Temperature/Voltage Conversion Table below)
LF-1381PC/LRF-1383PC/1381PC	PIN#53, #54, #55, #56	

1) The sensor uses the thermistor(temperature sensor) that has the temperature coefficient of the negative resistance. It is based on the property where the higher the temperature, the lower the resistance value becomes and vice versa.
R26,24,115,116,111,C23,18,72,70,74,12,14,71,69, and 76 are parts to prevent noises. They have nothing to do with detecting temperatures.

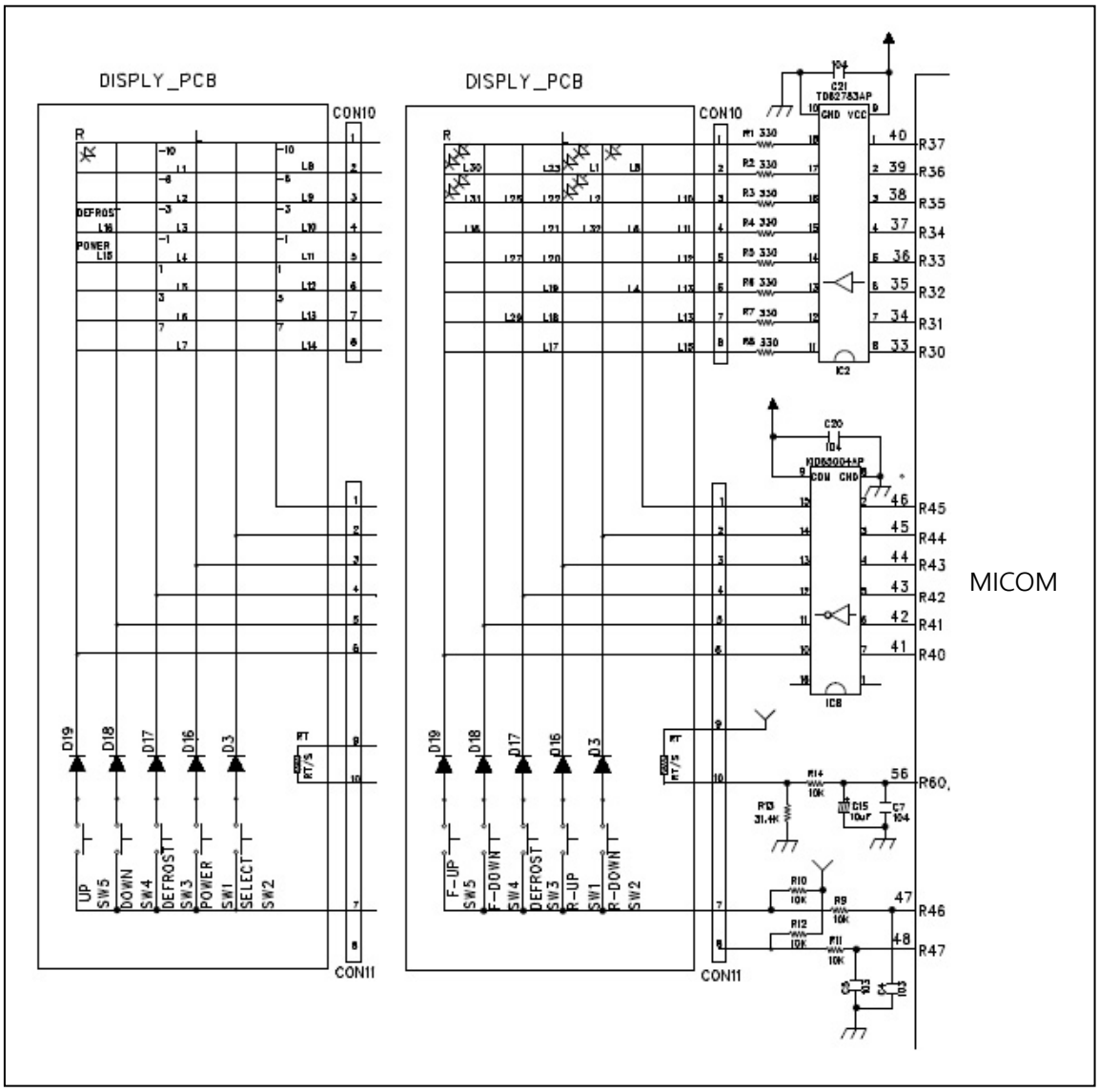
2) As for the S2-Sensor, if you refer the voltage input into the MICOM is Vf, the equation will be Vf=(R27*Vcc)/(R27+Rth). Here, Rth is the resistance value of thermistor that corresponds

with the temperature. For more information, please refer to the [Sensor's Resistance against Temperature and Voltage Calculation Table] shown below this manual and it also includes the MICOM terminal voltage that corresponds with the temperature, so please refer to it for customer service.

■ Sensor's Resistance Value and MICOM PORT Voltage by Temperature

-40.0	223.490	0.592	0.0	29.981	2.501	40.0	6.198	4.144
-39.0	210.990	0.622	1.0	28.691	2.556	41.0	5.985	4.168
-38.0	199.190	0.654	2.0	27.464	2.610	42.0	5.779	4.192
-37.0	188.190	0.687	3.0	26.295	2.665	43.0	5.583	4.215
-36.0	177.890	0.722	4.0	25.183	2.718	44.0	5.393	4.238
-35.0	168.190	0.757	5.0	24.124	2.771	45.0	5.211	4.260
-34.0	158.990	0.794	6.0	23.115	2.824	46.0	5.037	4.281
-33.0	150.490	0.831	7.0	22.154	2.876	47.0	4.869	4.302
-32.0	142.390	0.870	8.0	21.238	2.928	48.0	4.707	4.322
-31.0	134.790	0.910	9.0	20.365	2.978	49.0	4.552	4.341
-30.0	127.690	0.951	10.0	19.533	3.028	50.0	4.402	4.360
-29.0	121.140	0.992	11.0	18.739	3.078	51.0	4.258	4.379
-28.0	114.960	1.035	12.0	17.981	3.126	52.0	4.120	4.396
-27.0	109.142	1.078	13.0	17.259	3.174	53.0	3.987	4.413
-26.0	103.645	1.122	14.0	16.569	3.221	54.0	3.859	4.430
-25.0	98.454	1.168	15.0	15.910	3.267	55.0	3.735	4.446
-24.0	93.553	1.214	16.0	15.282	3.313	56.0	3.616	4.462
-23.0	88.923	1.261	17.0	14.681	3.357	57.0	3.502	4.477
-22.0	84.548	1.309	18.0	14.107	3.401	58.0	3.392	4.492
-21.0	80.413	1.359	19.0	13.559	3.444	59.0	3.285	4.507
-20.0	76.503	1.408	20.0	13.035	3.486	60.0	3.183	4.520
-19.0	72.805	1.459	21.0	12.534	3.527	61.0	3.085	4.534
-18.0	69.306	1.510	22.0	12.055	3.567	62.0	2.990	4.547
-17.0	65.995	1.563	23.0	11.597	3.606	63.0	2.898	4.560
-16.0	62.861	1.615	24.0	11.159	3.644	64.0	2.810	4.572
-15.0	59.893	1.669	25.0	10.740	3.682	65.0	2.724	4.584
-14.0	57.081	1.723	26.0	10.338	3.719	66.0	2.642	4.595
-13.0	54.417	1.777	27.0	9.954	3.754	67.0	2.563	4.607
-12.0	51.892	1.832	28.0	9.586	3.789	68.0	2.486	4.617
-11.0	49.499	1.887	29.0	9.233	3.823	69.0	2.412	4.628
-10.0	47.229	1.942	30.0	8.896	3.856	70.0	2.341	4.638
-9.0	45.076	1.998	31.0	8.572	3.889			
-8.0	43.032	2.054	32.0	8.262	3.920			
-7.0	41.093	2.110	33.0	7.965	3.951			
-6.0	39.352	2.163	34.0	7.680	3.981			
-5.0	37.503	2.222	35.0	7.407	4.010			
-4.0	35.842	2.278	36.0	7.145	4.038			
-3.0	34.264	2.334	37.0	6.893	4.066			
-2.0	32.764	2.390	38.0	6.652	4.093			
-1.0	31.338	2.445	39.0	6.420	4.119			

7. MICOM, DISPLAY PANEL Driver Circuit Unit



Model	Applicable Display	Difference
LR-681PC/1381PC/LF-681PC	DISPLAY_PCB_B	The usage of the applicable button and the content of the display vary in part.
LF-1381PC/LRF-1383PC/1382PC	DISPLAY_PCB_A	

■ It is a Display Driver Circuit that transmits the operation status of the Key on the Display panel unit to the Main PCB, and then the operation status of the Main PCB back to the Display panel unit to display the operation status.

7-1 KEY SCAN

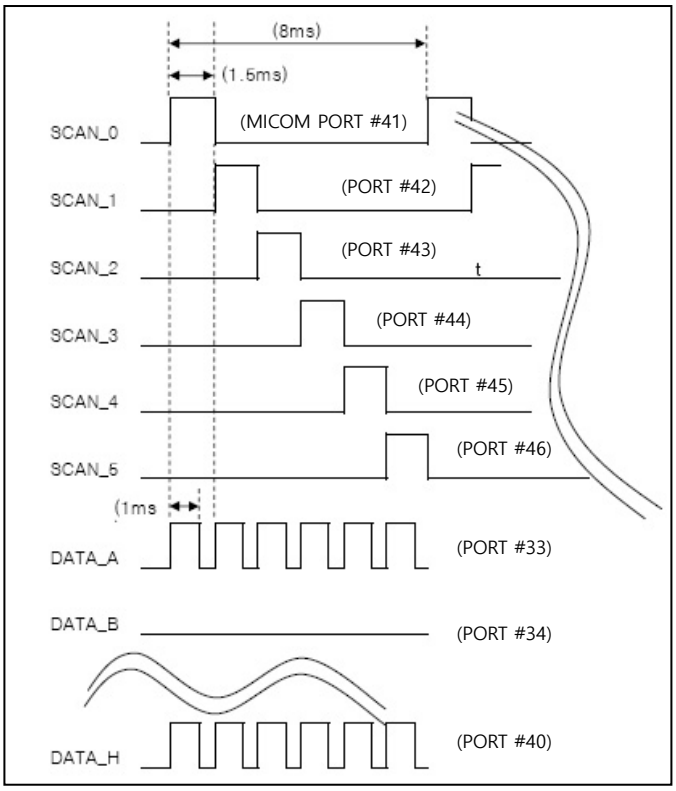
When the 'HIGH' is signaled from the MICOM PORT#41, the CON11 #6 is set at 'LOW'. (SCAN_0 section). At this point, press the F_UP(SW5) switch to make MICOM PORT#47 from 'HIGH' status to 'LOW' . In this case, the MICOM judges a user has pressed the SW5 and performs the function that matches the corresponding key. As such, MICOM will judge other functions in the (SCAN_1~4) section to see if the corresponding keys are in motion and perform it accordingly (Refer to the circuit pictured above).

Given the picture below, it judges if the key has been pressed by performing the key scanning in the section of 0.5ms, which is the remainder after excluding the data output time(1ms) from the respective scanning time(1.5ms).

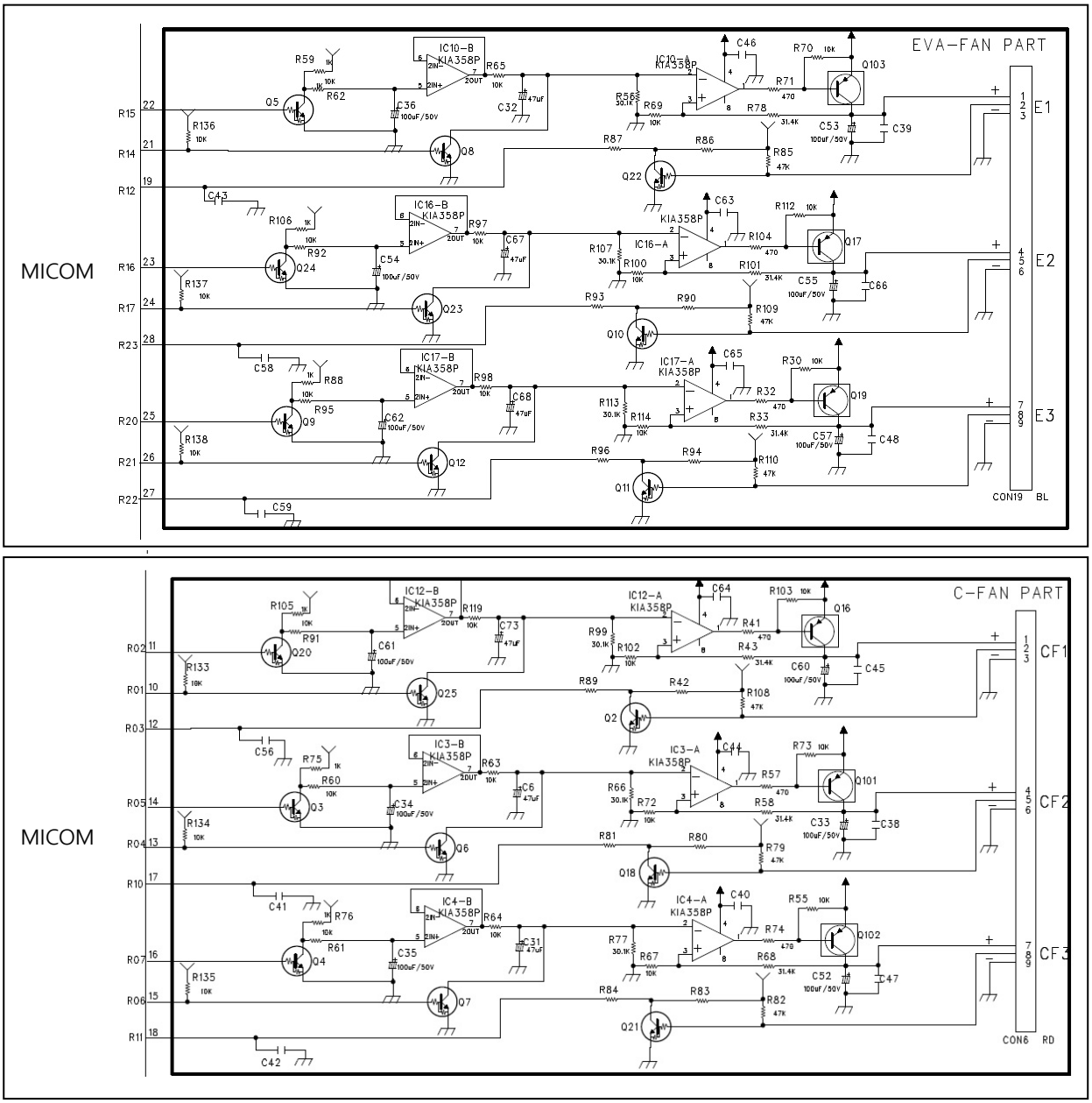
7-2) DISPLAY OPERATING

As shown in the respective unit waveforms below, six terminals of MICOM PORT#41->42->43->44->44->45->46 (SCAN_0~SCAN_5) are used to send out 'HIGH' signal in a sequential order during 1.5mesec in the interval of 8mesec. This signal passes through the input terminal of the IC8 to convert the 'HIGH' signal to 'LOW' to represent it as the OUTPUT terminal (SINK signal). (Conversely, if the 'LOW' signal comes out from the MICOM, it is switched off the 'HIGH'.) When the Scan Port sends out the 'HIGH' signal, its initial 1ms section generates signal to be displayed in the MICOM PORT#33 to as the OUTPUT terminal.

For example, if the DATA_H(PORT#40) is 'HIGH' in the section where the SCAN_4(PORT#45) is 'HIGH', 'L8' LED will be switched on. In this case, the PEAK-TO-PEAK voltage of the waveforms generated via the IC2 comes at about DC 13V. The output square waves take the form as follows.



8. MOTOR Driver Circuit Unit



* Connector Linkage by Model Type *

Model	Connector PIN#
LR-681PC/1381PC/LF-681PC	E1, CF1
LF-1381PC/LRF-1383PC/1382PC	E1,E2,CF1,CF2

This device has adopted the BLDC Motor for the purpose of reduction in electrical consumption and is comprised of a freezer, refrigerator and COMP-FAN BLDC Motor. The method to control the motor speed has been modified from the existing type of fixed voltage control and the MICOM PORT is used to measure the frequency of the FG square waves of the BLDC Motor. And then, the voltage is controlled so that it matches the preset frequency by corresponding with the calculated frequency. Eventually, the RPM will be maintained in a uniform fashion. It has been designed to improve drawbacks where the RPM changes under the low temperature.

8-1 FAN OFF Case (Standby for Initial Operation)

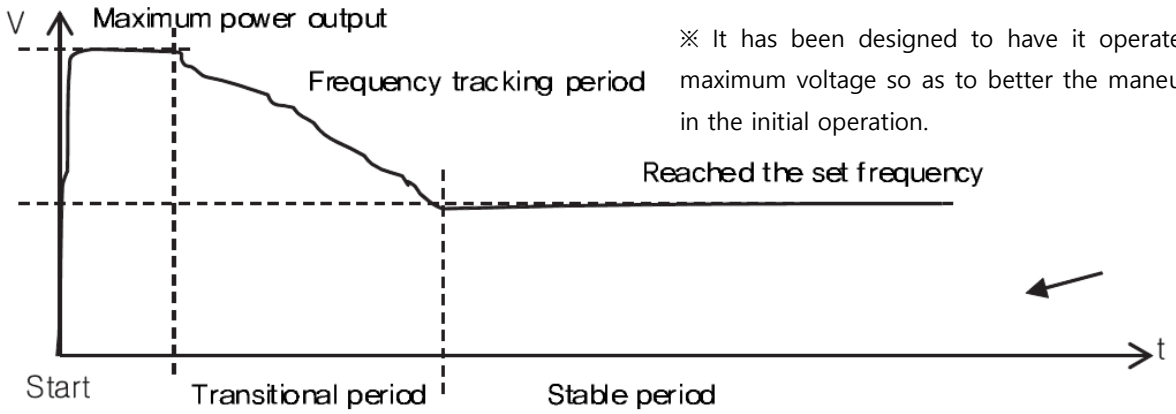
It minimizes the pulse width (DUTY=Min) of the MICOM PORT#22(generating PWM signal) so that the voltage at the point of[(a)] maximizes. In the meanwhile, the output of PORT#21 is set at 'HIGH' to switch on the TR Q8. This puts the voltage of the point of[(b)] at 0V, making the output of the [(c)] point at 'zero', too. Then, the motor stops running.

8-2 FAN ON Case

It sets the output of PORT#21 at 'LOW' to switch off the TR Q8. This maximizes the voltage at the point of [(b)] to 12.5V, marking the output of the [(c)] point at 12.5V. Then, the motor starts running.

One the motor stars running, the frequency of the FG square waves of the BLDC Motor can be measured through the PORT#19 so as to compare it with the preset frequency. In the event the submitted frequency is higher than the preset one, expand the PWM signal pulse width of the PORT#22 to reduce the output voltage. This will lower the frequency. Reversely, if the submitted frequency is lower than the preset one, lessen the PWM signal pulse width to increase the output voltage. This will augment the frequency. This way, it is possible to maintain the set frequency in a uniform manner.

The picture below is an example that has simplified the operation procedure of the set frequency for your information.

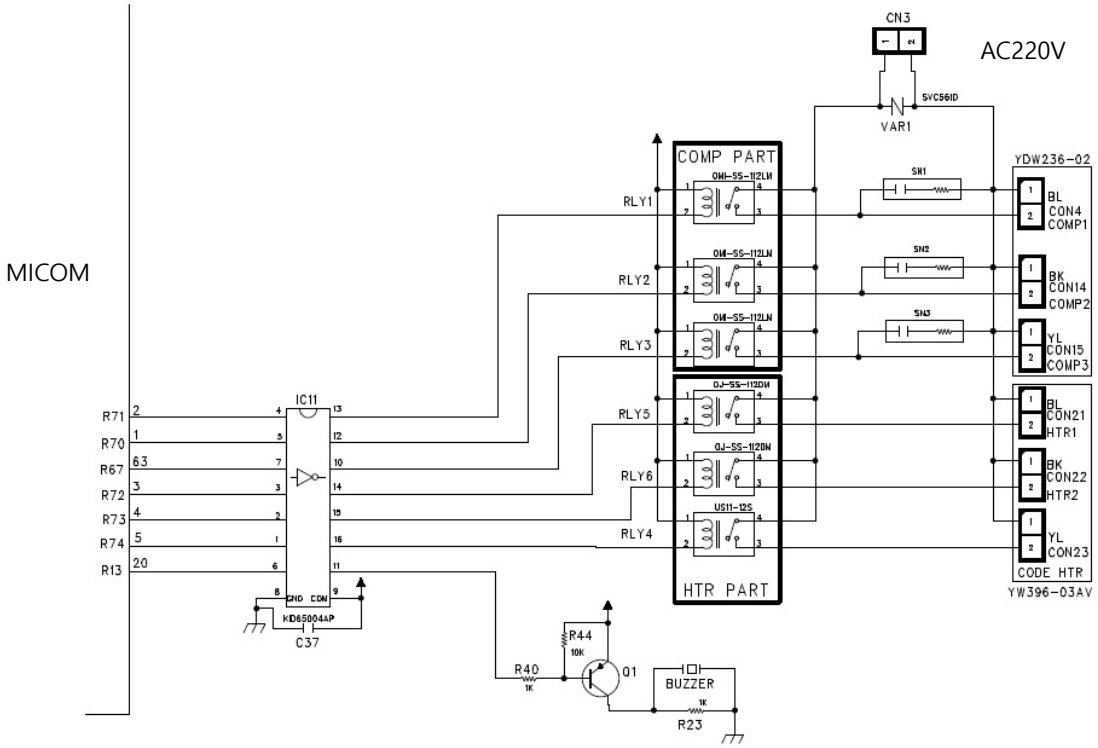


※ It has been designed to have it operated at the maximum voltage so as to better the maneuverability in the initial operation.

Monitor RPM					Remarks
EVA FAN		C-FAN			
RPM	Frequency	Conditions	Frequency	RPM	
3,650rpm	210HZ	Outdoor air under -5℃	0	0	
		Outdoor air under -5~2℃	45HZ	675rpm	
		Outdoor air under 2~12℃	70HZ	1,050rpm	
		Outdoor air under 12~22℃	90HZ	1,350rpm	
		Outdoor air over 22℃	110HZ	1,650rpm	
		Outdoor air sensor failure	110HZ	1,650rpm	

* RPM : The above specification is subject to change without notice for performance reasons.

9. HEATER, COMP, BUZZER Driver Circuit Unit



* Connector Linkage by Type *

Model	Applicable Heater, COMP
LR-681PC/1381PC/LF-681PC	COMP1, HTR1
LF-1381PC/LRF-1383PC/1382PC	COMP1, COMP2, HTR1, HTR2

1) Most of the load control in this device is made by the Main PCB.

2) COMP, heater defrost of the freezer/refrigerator, and other numerous functions are controlled mostly by the Relay or TR.

3) For example, if COMP1 is started, the MICOM PORT#2 sends out 'HIGH' signal. This signal will be input into the IC11 #4 and again be reverted to send out 'LOW' signal via the PIN#13. This means that the coil unit of the RELAY RLY1 connected to the PIN#13 will become 'LOW(0V)'. Therefore, +13V (power output) in the opposite side of the coil will be flown to the GND via the coil and the IC11 #13. While the currents are flown through the coil, the magnet lines will be generated to make the contacting point of the secondary area(sub low) inside the RLY1 switch ON to have AC220V be connected to both sides of COMP1, which makes the COMP start running. Conversely, if the MICOM PORT#2 sends out 'LOW' signal, 'HIGH' signal will be generated via the PIN#13 of the IC11. Then, the RELAY power will be shut down, magnetic fields are disconnected to switch OFF the contacting point of the secondary area. Accordingly, the COMP will be switched off as well.

4) Other types of loads driven by the RELAY are operated according to the same principles. As for the BUZZER, however, it sets off a buzzer sound by switching on or off by the TR, not by the

RELAY. The operating principles are identical with the RELAY;; if the MICOM PORT#20 sends out 'HIGH' signal, the 'LOW' signal will be generated via the PIN#11 of the IC11, Conversely, if the MICOM PORT#20 sends out 'LOW' signal, the 'HIGH' signal will be generated via the PIN#11 of the IC11. Accordingly, the TR Q1 will be switched off to stop the buzzer sound. The buzzer is operated under the frequency range of 2.5KHZ.

11. Control Unit

① Temperature Control Unit

1) Principles of Temperature Control

Temperature control is made by calculating the temperature based on the characteristics of the resistance value that varies in the temperature of the thermistor installed inside the refrigerator and freezer. It connects the circuit whose voltage changes according to those of thermistor value with the MICOM temperature detection port to judge the voltage value that the MICOM reads and compare it with the set temperature to control it. Thermistor is a sensor based on the property that the resistance value varies uniformly in temperatures.

■ Thermistor's Resistance Value, Voltage Value and Temperature Table

Temperature Detection Unit Voltage Value(V)	Resistance Value(kΩ)	Temperature Value(℃)	Remarks
4.78			SHORT
2.876	22.514	7	
2.501	29.981	0	
2.334	34.264	-3	
1.214	93.553	-24	
0.098			OPEN

2) Temperature Adjustment Range

Type	Set Temperature Range
Freezing	-24℃~-3℃
Refrigeration	-0℃~+7℃

3) How to Adjust Temperature

- One-off temperature adjustment : Press the temperature adjustment button and each time the temperature value goes up or down.

② COMP, Heater Control Unit

※ LRF-1383PC/1382PC/1984PC

1) Relay 1 (Freezer COMP) Control

: It instantly starts to work if the power and COMP are all on.

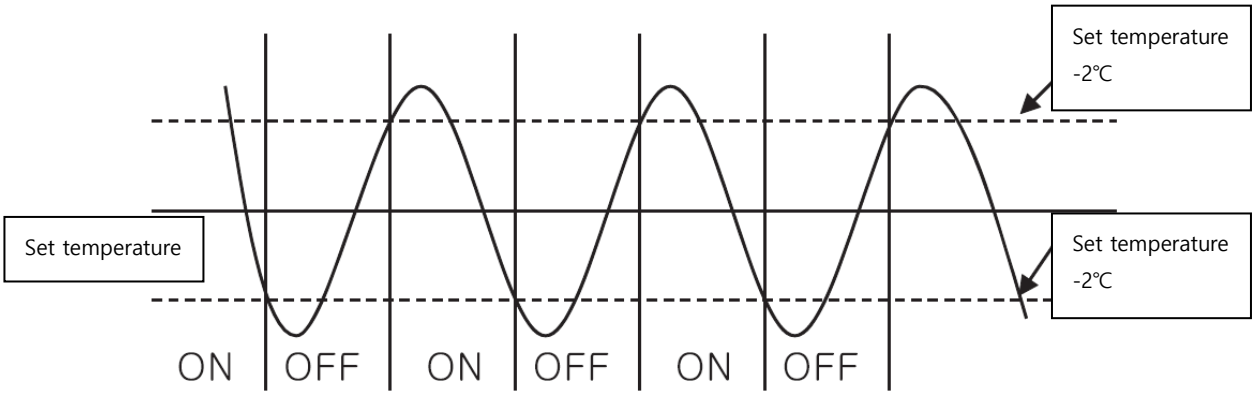
2) Relay 2 (refrigerator COMP) Control

: It instantly start to work if both the power and COMP are on.

If the COMP is switched off during the operation, it restarts in 5 minutes after the point COMP OFF.

※ If it is either 2℃ lower than the set temperature or 2℃ higher than the COMP OFF set temperature, the COMP will be switched on.

▶COMP ON/OFF in graph



3) 2 COMPs will not atart the operation at the same time. The first COMP should run about 10seconds before the other COMP starts the operation.

※ LR-681PC / LF-681PC

1) Relay 1 (Freezer or refrigerator COMP) Control

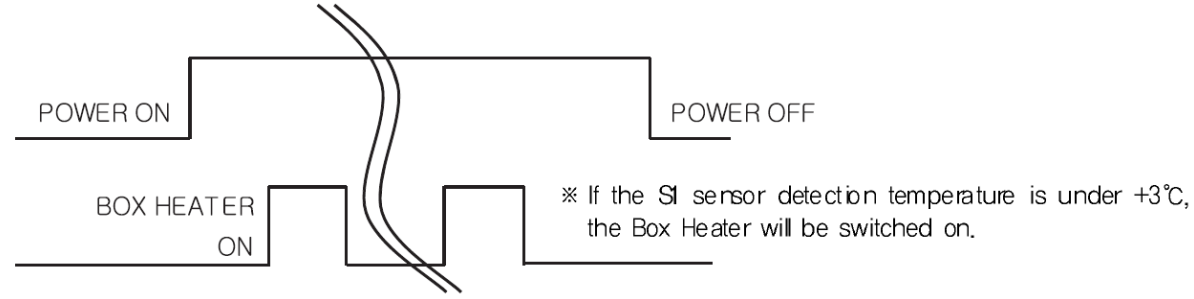
: It instantly starts to work if both the power and COMP are on.

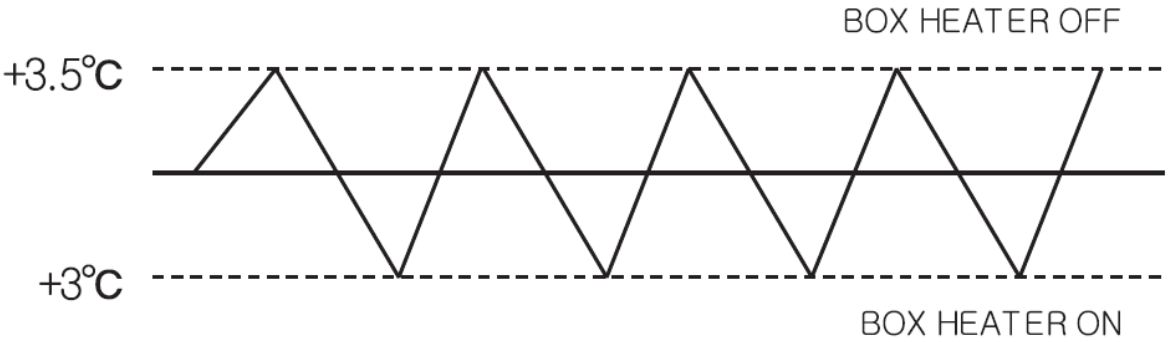
If the COMP is switched off during the operation, it restarts in 3 minutes after the point of COMP OFF.

※ If it is 2℃ lower than the set temperature, the COMP will be OFF and if it is 2℃ higher, the COMP will be ON. (The same applies to freezer/refrigerator)

: COMP ON/OFF

2) Relay 2 (BOX Heater) Control

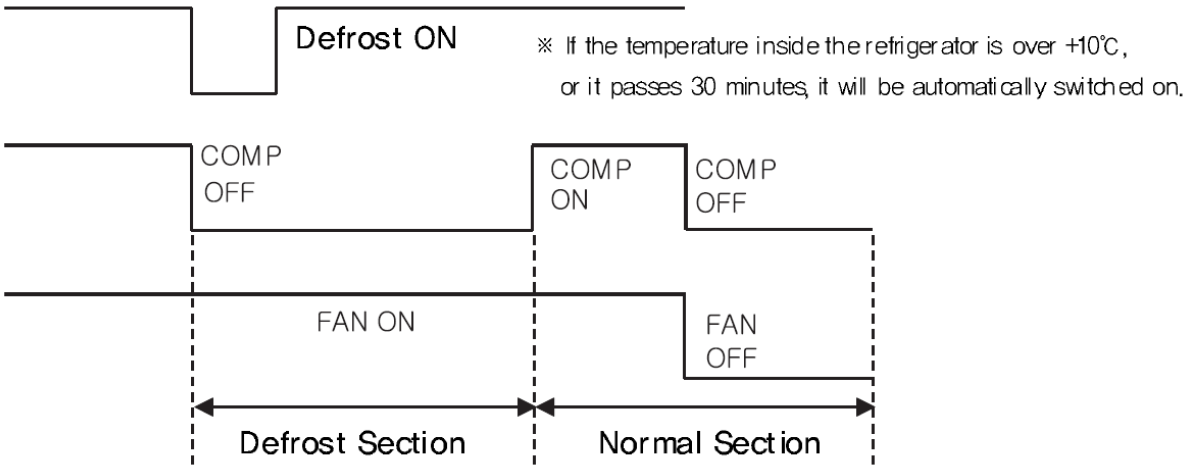




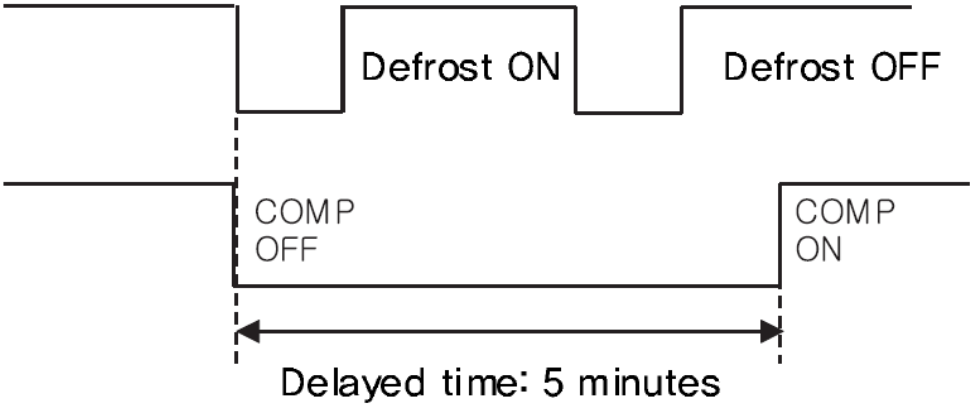
③ Defrost Control Unit / EEPROM Operation

1) Defrost Control Unit (refrigerator)

- Defrost Repeat ON

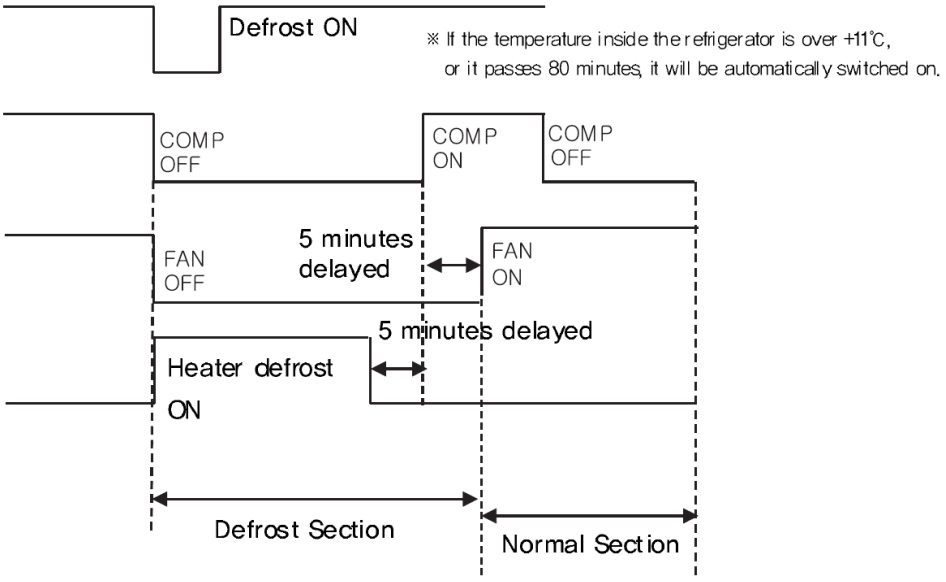


- Forced OFF after Defrost is ON

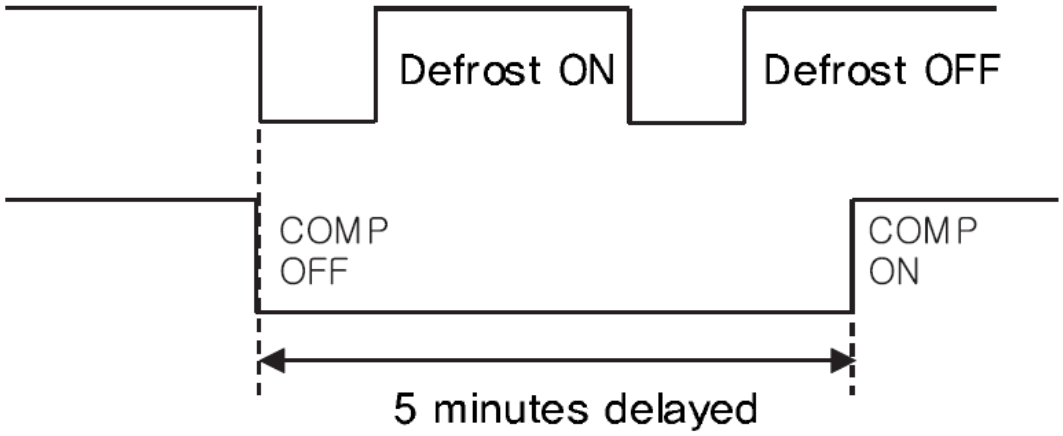


2) Defrost Control Unit (Freezer)

- Defrost Repeat ON



- Forced OFF after Defrost is ON

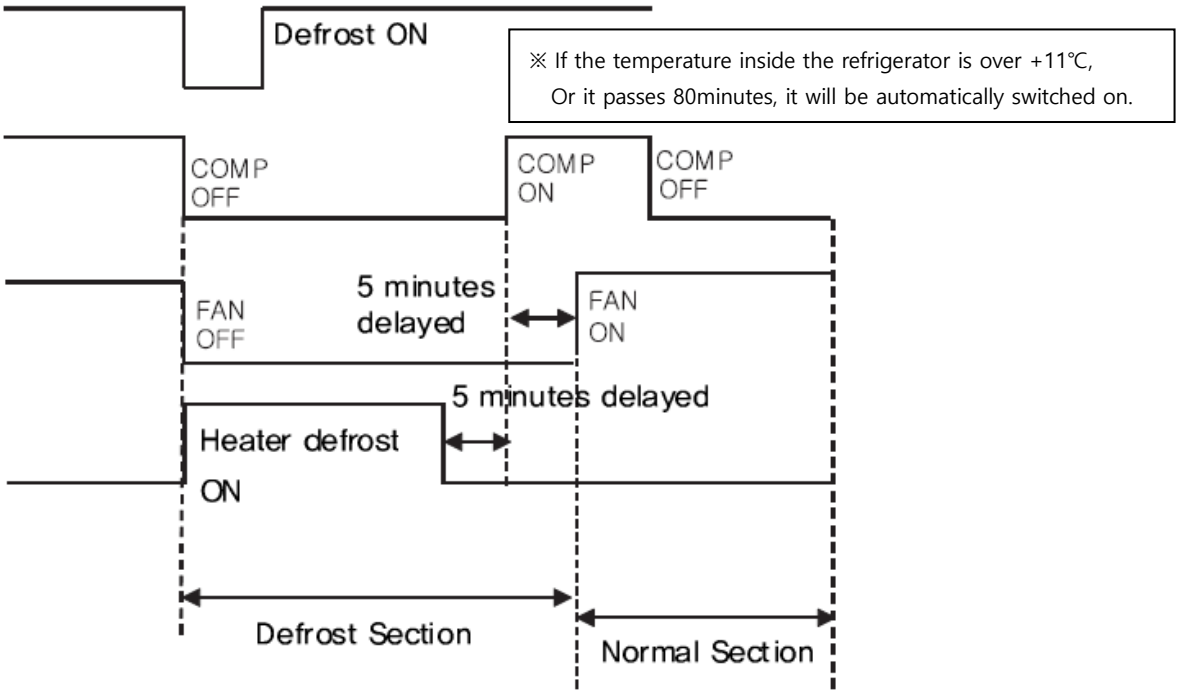


Principles of Defrost Control

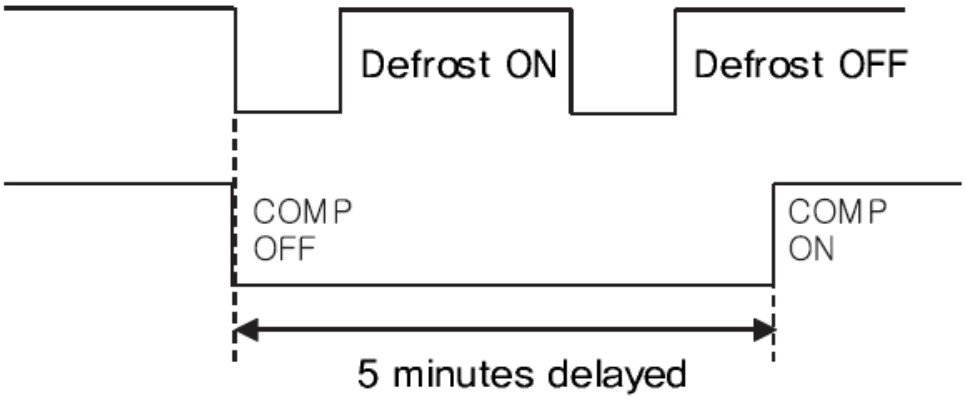
- Before executing the refrigerator defrosting, check if the temperature is under +5℃. Otherwise, defrosting should not be made. After defrosting began, stop the operation with the COMP OFF mode. If either the temperature of the refrigerator is over +10℃ or it passes 30minutes, it reverts to the cooling mode.

2) Defrost Control Unit (Freezer)

- Defrost Repeat ON



- Forced OFF after Defrost is ON



Principles of Defrost Control

- Before executing the refrigerator defrosting, check if the temperature is under +5℃. Otherwise, defrosting should not be made. After defrosting began, stop the operation with the COMP OFF mode. If either the temperature of the refrigerator is over +10℃ or it passes 30minutes, it reverts to the cooling mode.

EEPROM Operation

- Save the motion status of the inside in the EEPROM to compensate the previous motions of the initial POWER ON.
- Type of data saved inside : Temperature set value, CR/CF operation, operation stoppage status, specifications for model selection

※ It saves the status after the temperature is set in the EEPROM.

※ Initial operation after power is on : It loads the value currently save in the EEPROM. It sets reperation statuese by the loaded data.

④ ERROR Detection Unit

1) ERROR Detection Unit and Re-Operation

: In the event error occurs, the operation stops. When the error is restored, it returns to the normal mode according to the set temperature.

2) ERROR Lists

※ LR-1381PC / LF-1381PC / LRF-1382PC / LR-1981PC / LF-1981PC / LRF-1984PC

ERROR Reason	Details	Indication
Refrigerator thermistor SHORT	Refrigerator temperature over +82℃	ESH
Refrigerator thermistor OPEN	Refrigerator temperature under -50℃	ESL
Freezer thermistor SHORT	Freezer temperature over +82℃	ESH
Freezer thermistor OPEN	Freezer temperature under -50℃	ESL

※ LR-681PC / LF-681PC

ERROR Reason	Details	Indication
Refrigerator thermistor SHORT	Refrigerator temperature over +82℃	ESH
Refrigerator thermistor OPEN	Refrigerator temperature under -50℃	ESL
Freezer thermistor SHORT	Freezer temperature over +82℃	ESH
Freezer thermistor OPEN	Freezer temperature under -50℃	ESL

ERROR Reason	Details	Indication
Refrigerator thermistor SHORT	Refrigerator temperature over +82℃	ESH
Refrigerator thermistor SHORT	Refrigerator temperature under -50℃	ESL

※ The defrost thermistor is spplicable only to the freezer.

12. Operation Flow Chart

① Noal operation after initial power supply

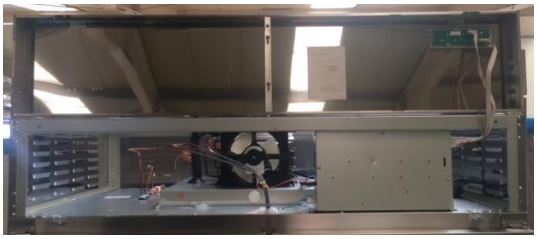
※ When the freezer and refrigerator operate simultaneously,

1. How to Replace Control Unit Parts

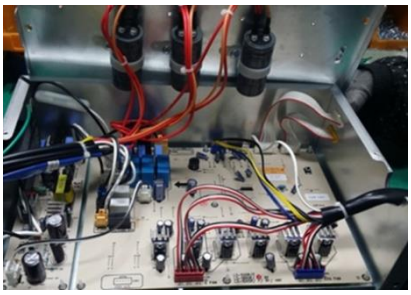
- MAIN PCB, CAPATITOR
- PANEL PCB

※ Caution : Before replacing the electronic parts, be sure to shut down the power first.

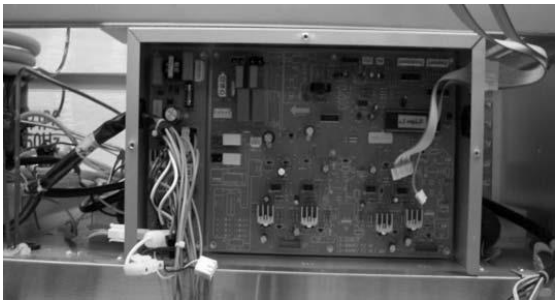
1-1 Lift up the – COVER FORNT. (Disassemble the screws of 2 points in the lower area)



1-2 Unfasten the screws of 3 points of the COVER MAIN PCB BOX.



1-3 Unfasten the rear screws and the housing of wiring of the COVER MAIN PCB.



1-4 Replace the MAIN PCB and the capacitor.

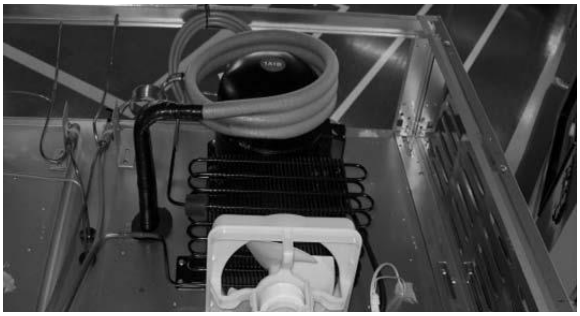
※ Replace the MAIN PCB and the capacitor and re-assemble it in a reverse order.

1-5 Unfasten the screws of 2 points in the FRONT PCB.

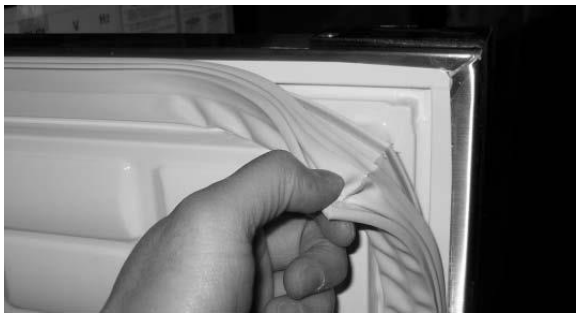
2. How to Replace Parts of Machine Room & Miscellaneous Parts

- COMPRESSOR, CONDENSER FAN MOTOR
- SUCTION PIPE, CONDENSER DRYER
- GASKET

2-1 Unfasten the clamps crews of each part.



2-2 Detach the corner area of the gasket first.

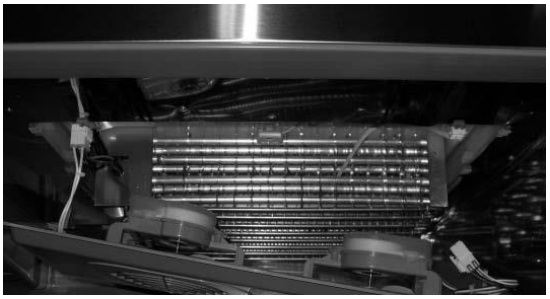


3.How to Replace Freezer Parts

- EVAPORATOR FAN MOTOR
- HEATER DEFROST
- SENSOR ROOM, SENSOR DEFROST

3-1 To Disassemble Cover Evaporator

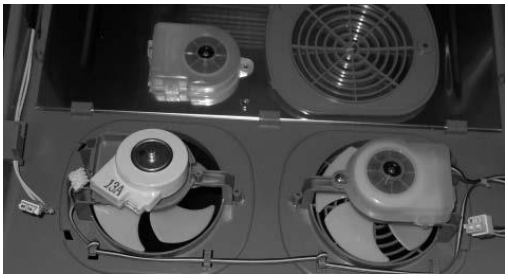
1) Disassemble the screws in 4 points in the upper front area.
2) Disassemble the evaporator and the fan housing inside the cover and detach the cover.

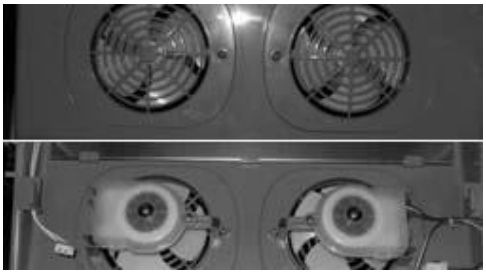


3-2 To Disassemble Cover Evaporator Fan Motor

1) Disassemble the screws of 1 point in the Grill Evaporator Cover.
2) Disassemble the screws of 1 point in the Cover Evaporator Fan Motor.
3) Disassemble the motor housing and the fan.

※ Be careful not t damage the fan while disassembling the motor.





3-3 Replace the Evaporator Fan Motor.

※ Replace the Evaporator Fan Motor and re-assemble it in a reverse or order.

3-4 Complete disassembling the '2-1' section and replace the Heater Defrost.

1) Disassemble the housing of the Heater Defrost.

2) Disassemble the groove that locks the Heater Defrost with pliers.

※ Replace the Heater Defrost and re-assemble it in a reverse order.

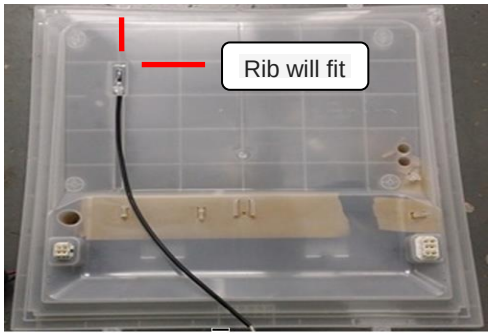
3-5 Replace the Sensor Room, Sensor Defrost

1) Replace the Sensor Room and the Sensor Defrost from the Evaporator Front.

- FREEZER

- REFRIGERATOR

-



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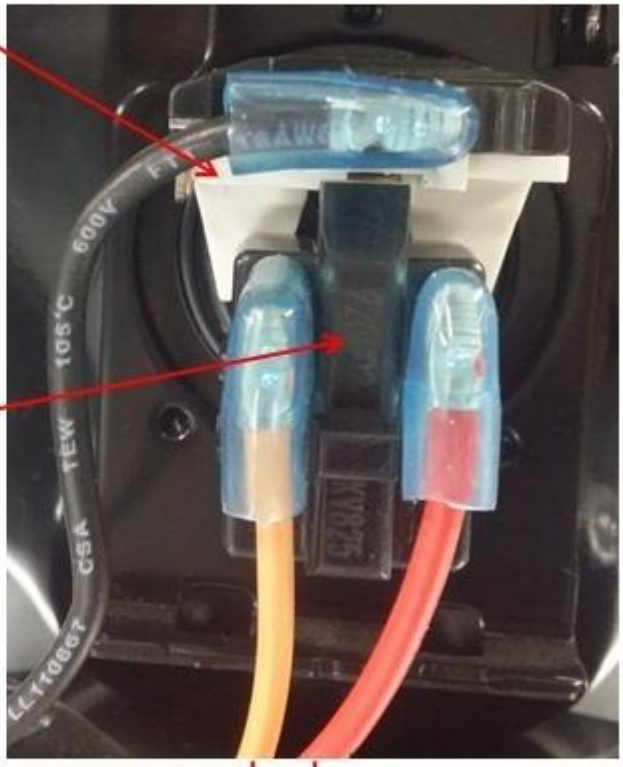
4. Compressor wiring

- Be sure to match the colors will harness

Overload PROTECTOR
4TM308PHBYY-53

PTC RELAY
J531Q34E220M3502

Running Capacitor
350vac-8μF



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-- -- Thanks --