



Service Manual

Side by Side Refrigerator

MODEL : FRS-2031

✓ **Caution :**

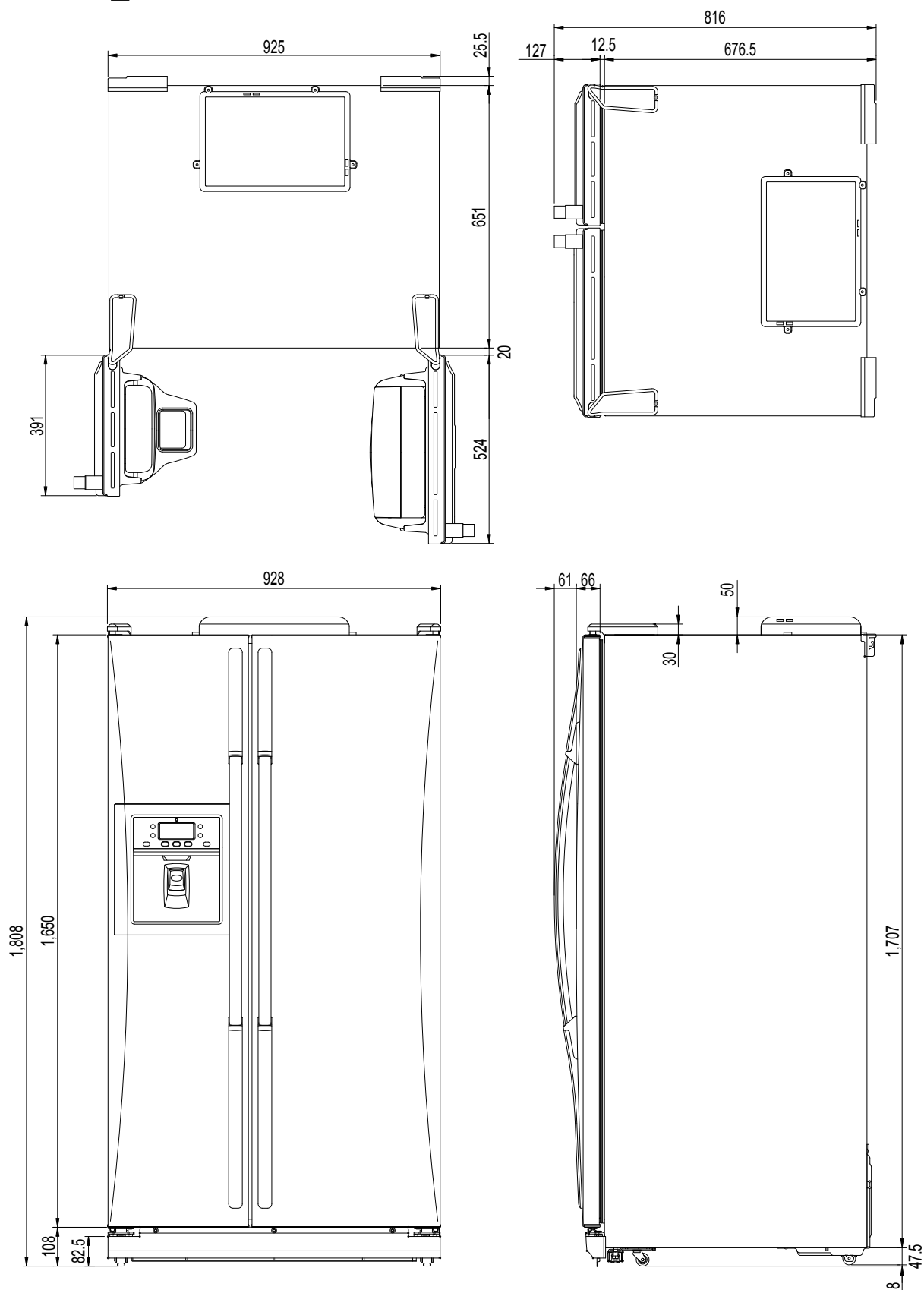
In this Manual, some parts can be changed for improving, their performance without notice in the parts list. So, if you need the latest parts information, please refer to PPL(Parts Price List) in Service Information Center (<http://svc.dwe.co.kr>).

DAEWOO ELECTRONICS Corp.

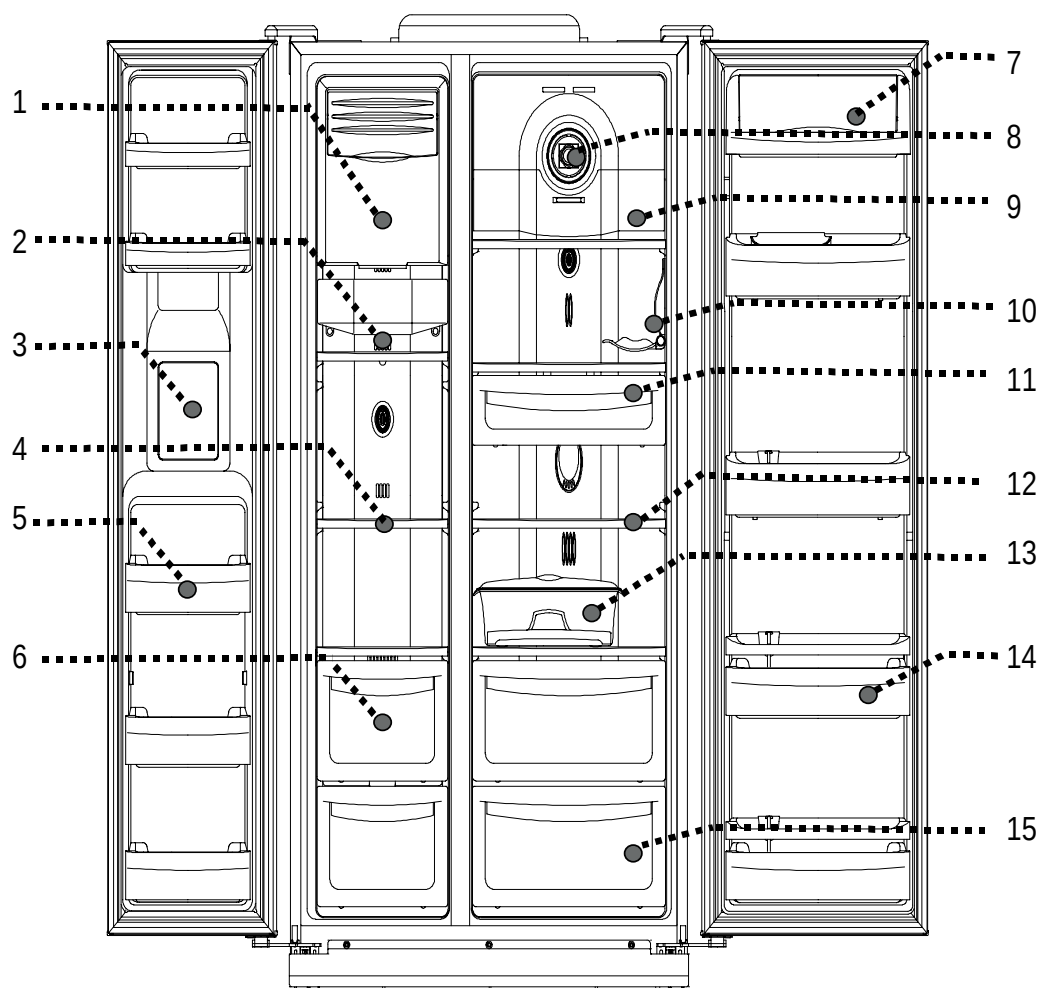
[http : //svc.dwe.co.kr](http://svc.dwe.co.kr)

Apr. 2004

■ FRS-2031



■ FRS-2031



Freezer

1. Ice cubes storage case
2. Freezer light
3. Water/Ice Dispenser
4. Freezer shelf
5. Freezer pocket
6. Freezer case

Refrigerator Compartment

7. Dairy pocket
8. Deodorizer
9. Refrigerator light(A)
10. Wine holder
11. Chilled case
12. Refrigerator shelf
13. Movable Egg case
14. Refrigerator pocket
15. Refrigerator case

2. SPECIFICATIONS

2-1. OUTLINE

DIVISION		CONTENTS	
MODEL NAME		FRS-2031	
USABLE CAPACITY (L)	FREEZER	190	
	REFRIGERATOR	365	
	TOTAL	555	
EXTERNAL DIMENSION (mm)	WIDTH	925	
	DEPTH	816	
	HEIGHT	1808	
REFRIGENT	R134a	190	
COOLING & CONTROL SYSTEM	COOLING SYSTEM	Fan Cooling System	
	DEFROST SYSTEM	Fin Evaporator Forced	
	DEFORST CONTROL	Automatic Start & Stop	
NET WEIGHT (kg)		119	

2-2 ELECTRIC PARTS

1) COMPRESSOR

REFRIGERANT	R134a						
VOLTAGE (V/Hz)	100 /50,60	110 / 60	115,120/60	127/60	220 / 60	220 ~240/50	
COMP MODEL	X	HBL27YG-3	X	HCL27YG-2	HPL27YG-4A	HPL30YG-5	
PART CODE	X	3952127R30	X	3957127R20	3956127R40	395S130R50	
STARTING TYPE	X	CSR	X	CSIR	RSCR	RSCR	

2) RELAY

REFRIGERANT	R134a						
VOLTAGE (V/Hz)	100 /50,60	110 / 60	115,120/60	127/60	220 / 60	220~240 / 50	
ASSY	TYPE NAME	X	783SHB	X	801SFB	419RHB	308NHB
	PART CODE	X	3018119370	X	3018118180	3018118131	3018119980
PTC	RESISTANCE	X	6.8 Ω	X	6.8 Ω	33 Ω	33 Ω
OVER LOAD	PART CODE	X	783SHB	X	801SFB	419RHB	308NHB

3) STARTING CAPACITOR

REFRIGERANT	R134a						
VOLTAGE (V/Hz)	100 /50,60	110 / 60	115,120/60	127/60	220 / 60	220~240 / 50	230 / 50
PART CODE	X	3016400100	X	3016400100	X	X	X
RATED VOLTAGE	X	200V	X	200V	X	X	X
RATED CAPACITANCE	X	100 μF	X	100 μF	X	X	X

4) RUNNING CAPACITOR

REFRIGERANT	R134a						
VOLTAGE (V/Hz)	100 /50,60	110 / 60	115,120/60	127/60	220 / 60	220~240 / 50	230 / 50
PART CODE	X	400EL15130	X	X	3016401170	3016401920	3016401170
RATED VOLTAGE	X	230V	X	X	350V	400V	350V
RATED CAPACITANCE	X	10 S	X	X	5 S	5 S	5 S

5) F-FAN MOTOR

REFRIGERANT	R134a						
VOLTAGE (V/Hz)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
TYPE NAME	BL-2213DWFA-1						
PART CODE	3015911300						
REVOLUTION	DC 12V 2200RPM						

6) R-FAN MOTOR

REFRIGERANT	R134a						
VOLTAGE (V/Hz)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
TYPE NAME	BL-2213DWRA-1						
PART CODE	3015911400						
REVOLUTION	DC 12V 2200RPM						

EXTERNAL VIEWS

7) C- FAN MOTOR

REFRIGERANT	R134a						
VOLTAGE (V/HZ)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
TYPE NAME	BL-2213DWCA-2						
PART CODE	3015911500						
REVOLUTION	DC 12V 2200RPM						

8) DEFROST HEATER

REFRIGERANT	R134a						
VOLTAGE (V/HZ)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
SPEC (W)	X	140W	←	←	←	←	←
PART CODE	X	3012811200	←	←	←	←	←

9) DRAIN HEATER

REFRIGERANT	R134a						
VOLTAGE (V/HZ)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
SPEC (W)	X	110V 10W	←	←	220V 10W	←	←
PART CODE	X	3012811110	←	←	3012811100	←	←

10) LAMP ASSEMBLY

REFRIGERANT	R134a						
VOLTAGE (V/HZ)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
SPEC (W)	X	120V 15W	←	←	240V 15W	←	←
PART CODE	X	3013600070	←	←	3013600060	←	←
SPEC (W)	X	120V 25W	←	←	230~240V 25W	←	←
PART CODE	X	3013602020	←	←	3013602010	←	←

11) MAIN PCB ASSEMBLY

REFRIGERANT	R134a						
VOLTAGE (V/HZ)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
TYPE NAME	X	SBS PREMIUM	←	←	←	←	←
PART CODE	X	30143C4010	←	←	←	←	30143C4020

12) FUSE (PCB)

REFRIGERANT	R134a						
VOLTAGE (V/HZ)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
RATED CURRENT	X	250V/3.15A	←	←	←	←	←
PART CODE	X	5F3GB3282R	←	←	←	←	←

13) THERMOSTAT FUSE

REFRIGERANT	R134a						
VOLTAGE (V/HZ)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
OPERATING TEMPERATURE	x	77 °C	←	←	←	←	←
PART CODE	x	30127201400	←	←	←	←	←

14) MOTOR GEARED AS

REFRIGERANT	R134a						
VOLTAGE (V/HZ)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
SPEC	x	120V/60Hz	←	←	220V/60Hz	230V/50Hz	←
PART CODE	x	3015914000	←	←	3015912800	3015913900	←

15) VALVE SOLENOID DISPENSER

REFRIGERANT	R134a						
VOLTAGE (V/HZ)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
SPEC	x	110~115V/60Hz	←	←	220V/60Hz	230V/50Hz	←
PART CODE	x	3015403200	←	←	3015402100	3015403000	←

16) VALVE SOLENOID CRUSHER

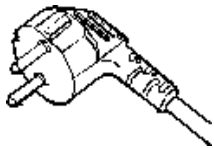
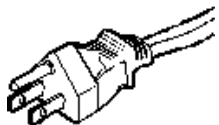
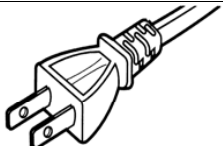
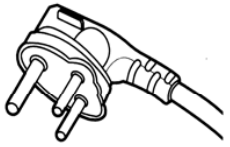
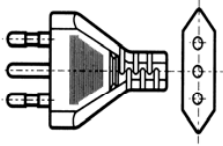
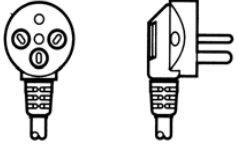
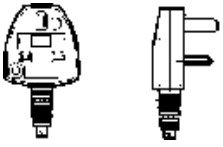
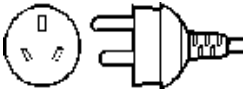
REFRIGERANT	R134a						
VOLTAGE (V/HZ)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
SPEC	x	110~127V 60Hz	←	←	220~240V 50,60Hz	←	←
PART CODE	x	3015402900	←	←	3015402000	←	←

17) VALVE WATER

REFRIGERANT	R134a						
VOLTAGE (V/HZ)	100 /50,60	110 / 60	115,120/60	127/60	220/60	220~240 / 50	230 / 50
SPEC	x	110~127V 60Hz	←	←	220~240V 50,60Hz	←	←
PART CODE	x	3015402800	←	←	3015402200	←	←

EXTERNAL VIEWS

2- 3. POWER CORD

NO	SHAPE OF POWER CORD	PART CODE	DESCRIPTION	REMARK
1		3011315000	CP-2PIN	For european country
2		401RA17200	CP-2PIN	For other country
3		4006D17101	KP-30	For America & El Salvador
4		401PD17101	KP-211	For Japan & Taiwan
5		3011300801	BP-3PIN	
6		3011303010	# 267	For Chile
7		3011315310		For Israel
8		3011303050	BS-1363A	For U.K, Middle Asia Singapore & Malaysia
9		3011301200	KP-551/550	For China & Australia

Upper power cord's part code is only lead wire, without any kinds of terminal or housng

DOOR COLOR CODE. ASSEMBLY URETHAN FREEZER DOOR. FRS-2031 (220V~240V/50Hz)

Blowing Agent	Cyclo Pentane				
COLOR TYPE	Bright White PCM	White Emboss	Beige Emboss	Inox Looking Ellio 1	Inox Looking Ellio 2
COLOR CODE	RWB3C	GWG1B	FBG3B	DSG1E	ISG3E
PART CODE	3000028430	3000028440	3000028030	3000028450	3000028020

2) ASSEMBLY URETHAN REFRIGERATOR DOOR

FRS-2031

Blowing Agent	Cyclo Pentane				
COLOR TYPE	Bright White PCM	White Emboss	Beige Emboss	Inox Looking Ellio 1	Inox Looking Ellio 2
COLOR CODE	RWB3C	GWG1B	FBG3B	DSG1E	ISG3E
PART CODE	3000018830	3000018820	3000018810	3000018840	3000018800

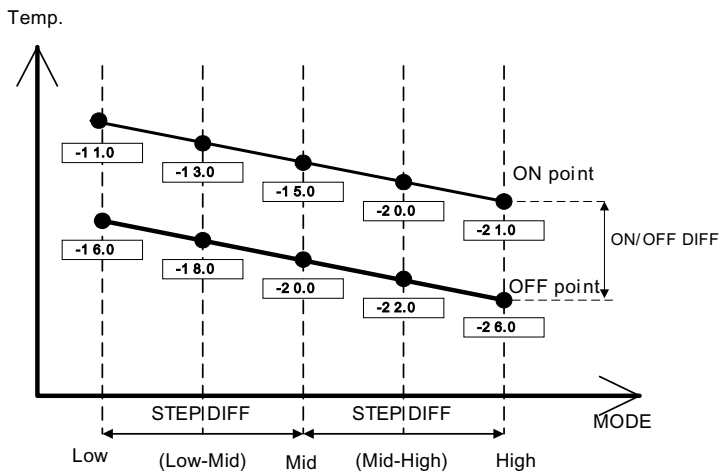
OPERATION AND FUCTIONS

1. DISPLAY

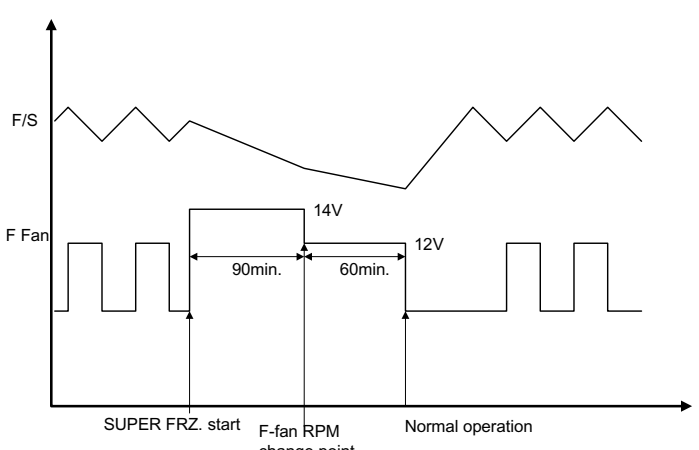
INPUT		Control Object			
Front PCB buttons FREEZER SET. button REFRIGERATOR SET. button SUPER FREEZER. button SUPER REFRIGERATOR. button WATER / ICE button LOCK Button / SLEEP button		LCD			
CONTENTS					REMARKS
1. Normal Operation 1) Temperature control of Freezer / Refrigerator (Initial mode : Freezer & Refrigerator Middle) 2) Lock mode / Sleep mode / Ice maker Lock : OFF 3) SPEED icon : inactive 4) FUZZY & DEODORIZER letters and icons : always ON 5) Water / Cube Ice / Crushed Ice (Initial mode : Water) 6) Other display modes					
CUSTOM LCD	Normal Operation		Silent Mode		Sleep Mode
	Normal Mode	Load Mode		Silence Mode	
Freezer / Refrigerator BAR	DIAL	DIAL	DIAL	DIAL	DIAL
Temp. SEG.	DIAL	DIAL	DIAL	DIAL	DIAL
1) Letters of [FRZ., REF., LOW, HIGH, SETTEMP, FUZZY, DEODO., SILENT, SLEEP, Water] 2) Icons of [FUZZY, DEODO., SLEEP, Water] 3) Temp. bars and lines	ON	ON	ON	ON	ON
SILENT icon	OFF	OFF	ON	ON	OFF
SPEED letters	OFF	ON	ON	OFF	OFF
SPEED bars	OFF	ON (progressive)	ON (progressive)	OFF	OFF
LOCK ON/OFF, SLEEP ON/OFF	DIAL	DIAL	DIAL	DIAL	DIAL
Water / Cube Ice / Crushed Ice	DIAL	DIAL	DIAL	DIAL	DIAL

CONTENTS	REMARK
2. "FREEZER SET." button ① Temperature control of Freezer compartment ② 5 steps of sequential temperature mode Initial mode by power input : "MID" (Temperature and bars are shown.) * Letters are not indicated at Soft-Mid and Mid-Strong modes. (Just Setting temperatures and bars are shown.) Temperature progress : Low →(Low-Mid) →Mid →(Mid-High) →Hlgh Temp. indication : -15°C -17°C -19°C -21°C -25°C Number of bars : 5EA 3EA 5EA 3EA 5EA 3. "SUPER FREEZER." button When this mode is chosen, "QUICK" icon and letters of freezer flicker 3 times and ON. (The set temperature and bars are still the previous value.) 4. "REFREGERATOR SET." button ① Temperature control of Refrigerator compartment ② 5 steps of sequential temperature mode Initial mode by power input : "MID" (Temperature and bars are shown.) Letters are not indicated at Soft-Mid and Mid-Strong modes. (Just temperatures and bars are shown.) Temperature progress : Low →(Low-Mid) →Mid (Mid-High) →Hlgh Temp. indication : 4°C 3°C 2°C 1°C 0°C Number of bars : 5EA 3EA 5EA 3EA 5EA 5. "SUPER REFRIGERATOR." button When this mode is chosen, "QUICK" icon and letters of refrigerator flicker 3 times and ON. (The set temperature and bars are still the previous value.) 6. "SLEEP" button ① Start by pushing the button ("ON" lights.) ② Stop by pushing button again ("OFF" lights.) ③ Automaticcally terminated after maximum 12 hours ("OFF" lights.) 7. Water/Ice button ① Select Water mode or Ice mode. ② A rectangle Line around the icon lights up to indicate your selection is on. Initial mode by power input: "Water"mode. Progress: Water →Cube Ice →Crushed Ice →Water 8. "LOCK" button ① Start by pushing the button ("LOCK" letters and icon light.) * No other buttons and modes, buzzer sound are controllable. ② Stop by pushing button again for a second ("OFF" and icon light.) * Except "Lock"button, other buttonare inactive during "Sleep"mode.	

CONTENTS	REMARK
9. "Lock Ice Maker" button ① Start by pushing "Lock Ice Maker" button ▶ "Lock Icer Maker" is "ON", ▶ The Icon & Box of "Cube Ice"/"Crushed Ice" disappear ▶ "Water" Icon & Box is always "ON" ② Stop by pushing "Lock Ice Maker" button again. ▶ "Lock Icer Maker" Icon is "OFF", ▶ The Icon & Box of "Cube Ice"/"Crushed Ice" is "OFF", ▶ "Water" Icon & Box is "ON". 10. Filter information ① The normal (Green LED) is on for 6 month after first power input. ② After six month, Red LED is on. ③ How to reset Filter information. ▶ Push "LOCK" button and push the "Lock Ice Maker" button for 3 seconds.	

INPUT	Control Object
1. FREEZER SET. button 2. SUPER FREEZER. button 3. F-sensor	1. COMP 2. F-FAN
CONTENTS	REMARKS
1. Temperature modes change by pushing the button. Low → Low-Mid → Mid → Mid-High → High 2. Comp. and F-fan are controlled by ON / OFF point of each mode. 3. FC [ON / OFF] DIFF : 2 °C (Freezer middle OFF point : -20.0 °C) (If RT↑ 13°C, F-S OFF point is 2 °C UP. Freezer Middle OFF point : -18 °C) 4. FC [Low → (Low-Mid) → Mid → (Mid-High)] DIFF : 2 degrees respectively * ([(Mid-High) → High] DIFF : 4 degrees) 5. Control point of each mode 	

OPERATION AND FUCTIONS

CONTENTS	REMARKS
6. SUPER FREEZER. (Quick Freezing) 1) Comp. and F-fan are ON (about 150 minutes) regardless of F-sensor. 2) F-fan runs at 14V for the first 90 min., then at 12V for the rest time.  The graph illustrates the F/S (Freezer Sensor) and F Fan (Freezer Fan) status over time. The F/S line is a jagged line representing temperature fluctuations. The F Fan line shows the fan's operation: it is ON during 'SUPER FRZ. start', then switches to 14V for 90 minutes, then to 12V for 60 minutes, and finally to 'Normal operation'.	* <u>ON/OFF DIFF. :</u> fixed by MICOM * <u>STEP DIFF. :</u> fixed by MICOM * <u>Comp. and C-fan :</u> linked

Temperature Control of Refrigerator Compartment (RC)

INPUT	Control Object
1. REFRIGERATOR SET. button 2. R-sensor	1. COMP 2. R-FAN
CONTENTS	REMARKS
1. Temperature modes change by pushing the button. Low → Low-Mid → Mid → Mid-High → High 2. R-fan are controlled by ON / OFF point of each mode. 3. RC [ON / OFF] DIFF : 0.5°C (RC middle OFF point : 0.7°C) (If $RT \leq 13^{\circ}\text{C}$, R-S OFF point is 2°C UP. Refrigerator Middle OFF point : 2.7°C) 4. RC [Low→(Low-Mid)→Mid →(Mid-High)] DIFF : 1 degree respectively 5. Prevention of weak/poor-refrigeration 1) When weak refrigeration is sensed, comp. is ON regardless of F-sensor. 2) When R-sensor reaches R-fan OFF point, comp. is controlled by F-sensor and R-fan turns OFF. 3) Sensing point of weak refrigeration : R-sensor OFF point of each mode + 7°C 4) Termination point : Same as R-sensor OFF point of each mode	* <u>ON/OFF Diff. :</u> fixed by MICOM * <u>STEP DIFF. :</u> fixed by MICOM

CONTENTS	REMARKS
6. Control point of each mode Temp 9.3°C 8.3°C 7.3°C 6.3°C 5.3°C Weak refrigeration point (Off point+7 °) 2.65°C 1.65°C 0.65°C -0.35°C -1.35°C ON point 2.3°C 1.3°C 0.3°C -0.7°C -1.7°C OFF point ON/OFF DIFF (0.35 deg) STEPI DIFF STEPI DIFF Low (Low-Mid) Mid (Mid-High) High MODE 7. Super refrigeration proceeds for 40 minutes. * Example of temperature change (Refrigerator ; Low (normal) -> Super refrigeration) Temp. ON OFF Low Operation ON OFF High Operation Over Refrigeration OFF point Super (40min.) Time 1) R-fan and comp. are ON until R-sensor reaches to over-refrigeration OFF point (-7°C). 2) After reaching to the point, it goes on with HIGH mode until the end of Super refrigeration. It returns to normal after Quick refrigeration of 40 minutes.	

INPUT	Control Object	
1. SLEEP button	1. COMP 2. R-FAN 3. F-FAN 4. CUSTOM-LCD	
CONTENTS		REMARKS
1. This mode starts with a push of SLEEP button. 2. Conditions to start Sleep mode ① F-sensor $\leq -13^{\circ}\text{C}$ ② Unless it is a restart within 40 minutes after the end of previous Sleep mode ③ F-sensor error ④ Door switch error ⑤ Defrosting (Heater defrosting, pause, Fan delay) ⑥ If the above conditions of ① ~ ⑤ are all satisfied, the sleep mode starts. 3. Control of electrical parts 1) Mode 1 Once Sleep mode starts, all the electrical parts (COMP, F-FAN, R-FAN) turn OFF. ("ON" letters of SLEEP on LCD is display.) 2) Mode 2 It operates with Silent mode and ON letters of SLEEP on LCD is displayed on.) 4. Termination of Sleep mode 1) MODE 1 ① F-sensor $\geq -9^{\circ}\text{C}$ ② In case of F-sensor error ③ When other button is pushed during this mode ④ Total F/R door open time exceeds 30 seconds during the mode ⑤ If Sleep mode is terminated by ①, ② and ③, F/R-fan delay for 5 minutes and restart of this mode is prevented for 40minutes. ⑥ If it exceeds time limit of 130 minute, Mode1 is terminated and Mode2 starts. 2) MODE 2 Sleep mode is terminated 12 hours after the first start. (Speed mode and defrosting operate in normal way.) 5. After Sleep mode stops all the electrical parts return to normal operation and Sleep icon changes from "ON" to "OFF". 6. If Sleep mode starts during PRECOOL, it goes on again after the Sleep mode is terminated. 7. If Sleep mode starts during Super FRZ., Super REF., it returns to previous set modeafter the Sleep mode is terminated.		

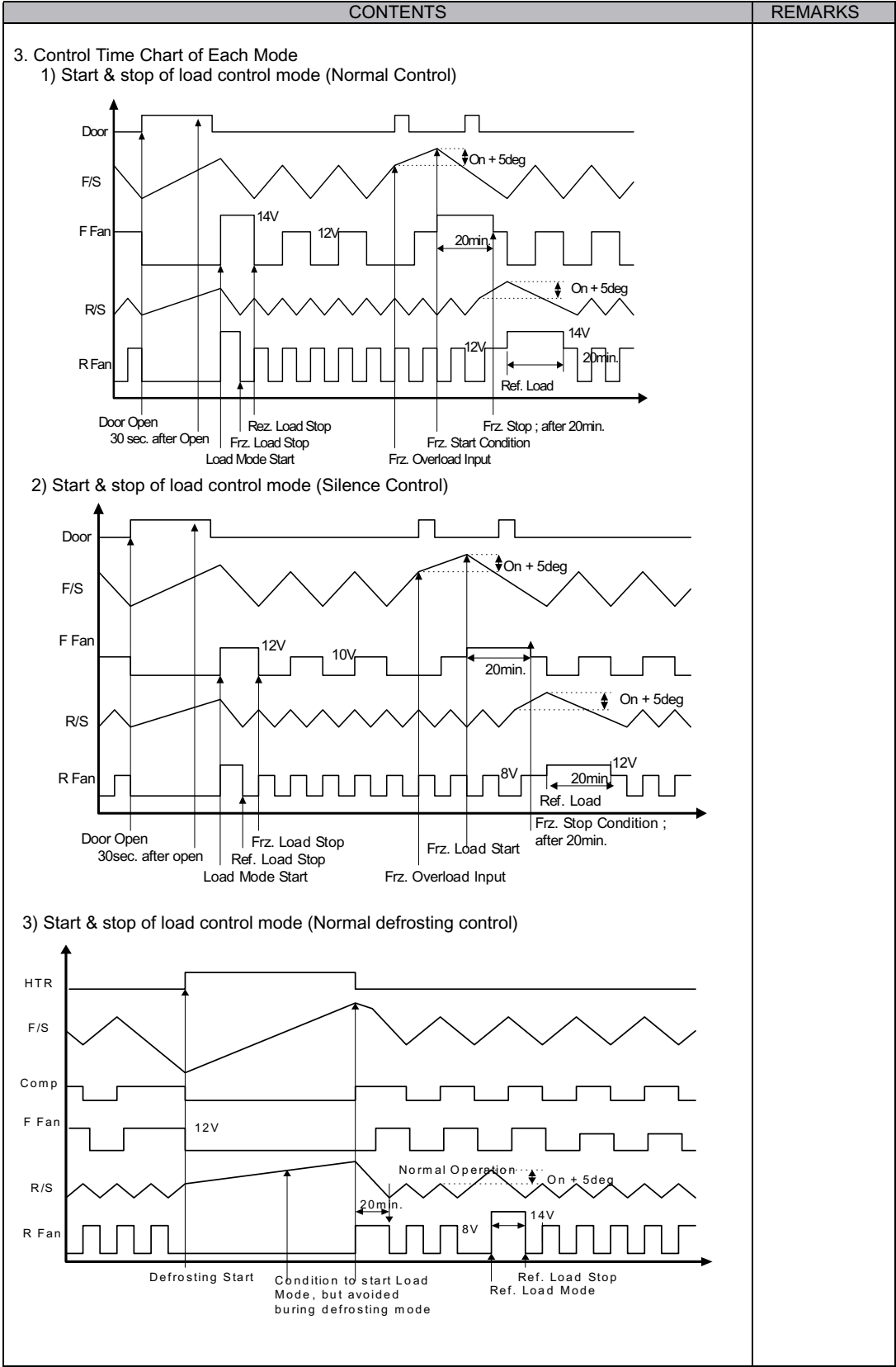
SILENT (Silence Mode)

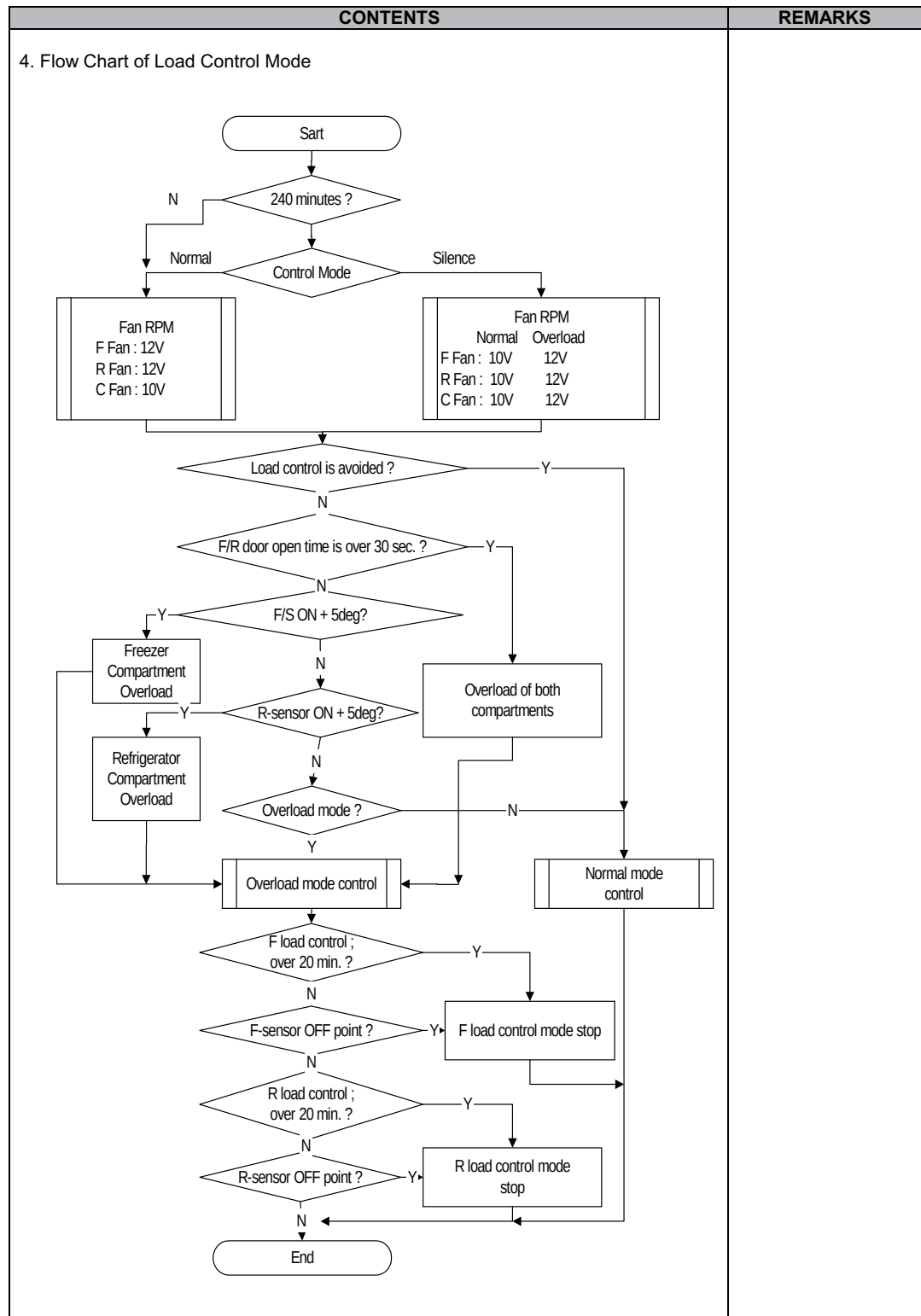
INPUT		Control Object													
1. CDS SENSOR		5. COMP 6. R-FAN 7. F-FAN 8. CUSTOM-LCD													
CONTENTS		REMARKS													
1. Purpose of Silence mode To reduce refrigerator noise at night by decreasing fan RPM to a minimum degree															
2. Condition to start 1) The optical or light sensor in top middle of control panel senses surround light and Silence mode starts if the amount of light sensed is below the standard value for more than 1 minute. (The mode does not start for initial 240 minutes to prevent down of cooling performance.) ① Standard value to decide "night" : below 5~7 Lux (optical sensor surface) ② Standard value to decide "daytime" : above 4~16 Lux (optical sensor surface)															
3. Control Method															
<table><tr><td colspan="2">Control Mode</td><td>F-FAN</td><td>R-FAN</td><td>C-FAN</td></tr><tr><td rowspan="2">Silence</td><td>Normal</td><td>10V</td><td>10V</td><td>10V</td></tr><tr><td>Load Control</td><td>12V</td><td>12V</td><td>10V</td></tr></table>					Control Mode		F-FAN	R-FAN	C-FAN	Silence	Normal	10V	10V	10V	Load Control
Control Mode		F-FAN	R-FAN	C-FAN											
Silence	Normal	10V	10V	10V											
	Load Control	12V	12V	10V											
4. Termination Condition The mode stops if lux value is above the standard for more than 1 minute.															

Control of Each Mode

INPUT		Control Object	
1. CDS SENSOR 2. R SENSOR 3. F SENSOR		1. F-FAN (14V, 12V, 10V)	
CONTENTS			REMARKS
Control of Silence mode : operation mode when the optical sensor feels that it is night Normal control : daytime operation mode (Refrigerator noise is relatively low at daytime.) Load control : operation mode when inside temperature goes up due to an increase of load (foods) or frequent door openings			

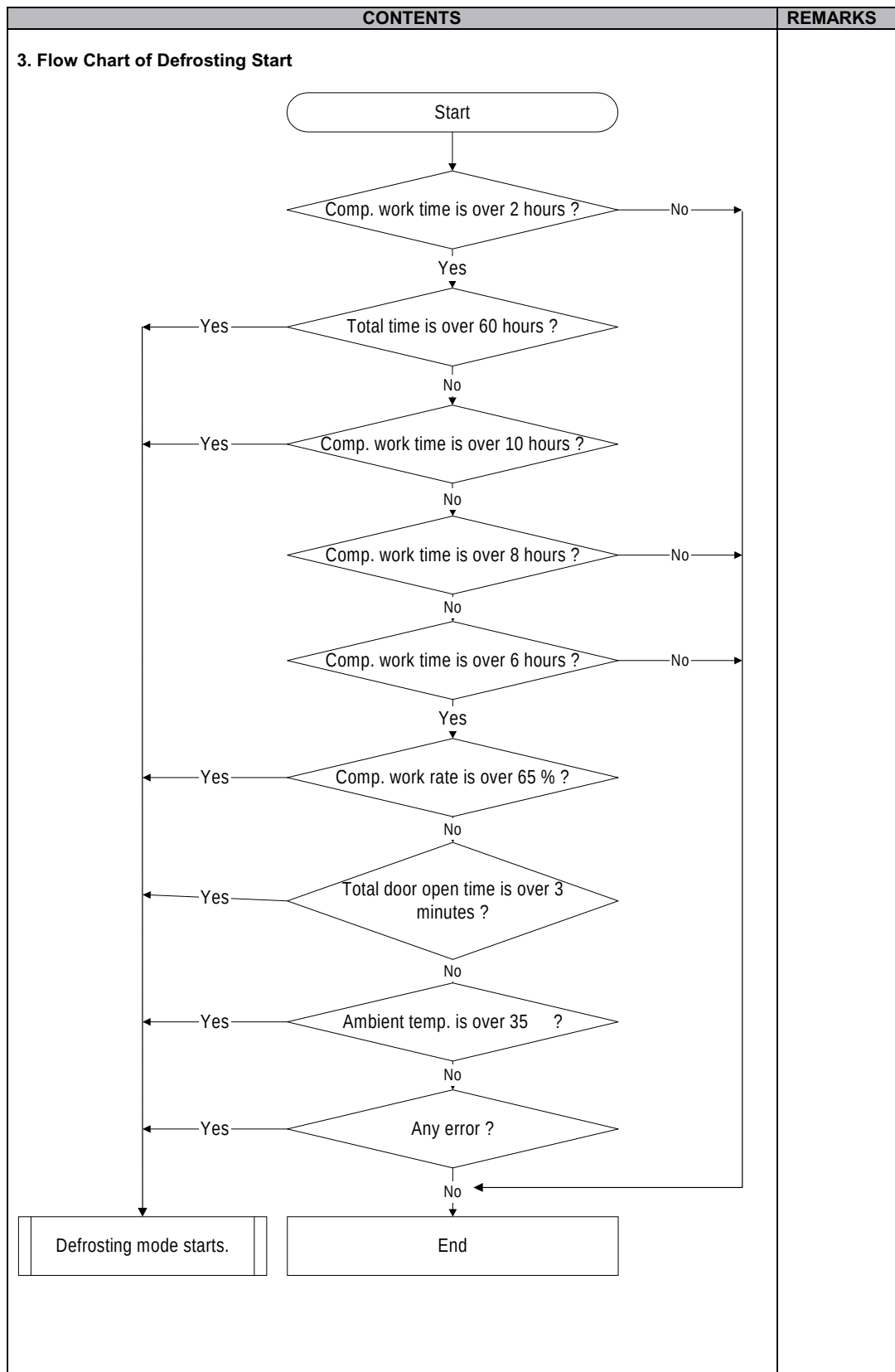
CONTENTS				REMARKS
1. Fan voltage of each control mode				
Control Mode		F-FAN	R-FAN	
Normal		12V	12V	
Load Control	Normal	14V	14V	
	Silence	12V	12V	
Silence	Normal	10V	10V	
Sleep Mode2	Normal	10V	10V	
	Load control	12V	12V	
2. Control against (under) load (Load Control)				
1) Purpose : To restore F/R-temperature which has risen by load (much foods in or frequent door openings) as soon as possible				
2) Display : "SPEED" lights until the mode and speed icons flicker.				
3) Conditions to start (from both Normal and Silence)				
① F or R door open time exceeds 30 seconds at a time Freezer and Refrigerator load control starts respectively.				
② Over [F-sensor On Point + 5 degree] →F load control				
③ Over [R-sensor On Point + 5 degree] →R load control				
4) Conditions to avoid load control				
① Initial operation (right after pow				
② Just after Pre-cool, Heater defrosting, Pause, Defrosting cycle				
(After door opening, the load control enters if the condition complies with.)				
(During Sleep Mode1, load control isn t active.)				
5) Control Method				
5-1) Control mode by F/R-door open time (over 30 seconds)				
F/R-fan works by 14V respectively.				
5-2) Control mode by [F-sensor On Point + 5 degree]				
F-fan works by 14V.				
5-3) Control mode by [R-sensor On Point + 5 degree]				
R-fan works by 14V.				
C-fan works by 10V as normal.				
6) Conditions to stop				
① The mode works for 20 minutes.				
(If another condition happens at the end of the mode, it starts again.)				
② When it reaches to [F-sensor Off point], F-fan load control mode stops.				
③ When it reaches to [R-sensor Off point], R-fan load control mode stops.				





Defrosting Cycle

INPUT	Control Object	
1. Total comp. work time 2. Comp. work rate 3. RT temperature 4. Total door open time	1. Defrosting Mode	
CONTENTS		REMARKS
1. Conditions to start defrosting cycle 1) Total comp. work time : 6, 8, 10 hours 2) Comp. work rate (by the 2 hours) : over 65% 3) Total door open time : 3 minutes (Any door - F or R - open time is over 3 minutes.) 4) Total time of [comp. ON + comp. OFF] : 60 hours 5) Ambient temperature over 35°C 6) Any error mode : R1, F1, D1, F3, RT/S, Door-switch 2. Conditions to start defrosting mode 1) The mode starts in the following conditions ; ① Any error happens when total comp. work time is 6 or 8 or 10 hours. ② Comp. work rate by the 2 hours is over 65%. ③ Total door open time is over 3 minutes. (Any door - F or R - open time is over 3 minutes.) Ambient temperature is over 35°C. 2) Defrosting mode starts unconditionally as long as total comp. work time is 10 hours, even if the above conditions(①~④) are not satisfied. 3) Defrosting mode starts immediately as long as total time of [comp. ON + comp. OFF] is over 60 hours, even if the above 1) and 2) conditions are not satisfied.		



Defrosting Mode

INPUT		Control Object																															
1. Defrosting Cycle		1. COMP 2. F-FAN 3. R-FAN 4. HEATER																															
CONTENTS		REMARKS																															
1. Defrosting Mode Pre-Cool ↓ Heater Defrosting ↓ Pause ↓ Fan Delay 1) Time ; 50 minutes 2) Comp. / F-fan : ON R-fan : Control Heater : OFF 3) If F-sensor≤ - 27°C, PRE-COOL becomes OFF. 1) If D-sensor ≥ 10°C, Heater becomes OFF. 2) In case of Heater return by time limit of 40 or 80 min (F3-Error) 3) Heater is ON for 30 minutes (time limit) in case of D-sensor error. 4) Time limit ① 30 seconds : Heater is ON regardless of D-sensor temperature right after defrosting start. ② 30 minutes : in case of D1-Error ③ 80 minutes : in normal control state 1) Time : 7 minutes Comp., F-fan, R-fan, Heater : OFF 1) Time : 5 minutes Comp. : ON F/R-fan, Heater : OFF Output control and time limit of each defrosting mode <table><tr><th></th><th>PRE-COOL</th><th>Heater Defrosting</th><th>Pause</th><th>Fan Delay</th></tr><tr><td>COMP</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td></tr><tr><td>F-FAN</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td></tr><tr><td>R-FAN</td><td>Co ntrol</td><td>OFF</td><td>OFF</td><td>OFF</td></tr><tr><td>HEATER</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td></tr><tr><td>Time Limit</td><td>50 min.</td><td>① 80 min. ② 30 min. (in case of D1-Error)</td><td>7 min.</td><td>5 min.</td></tr></table>			PRE-COOL	Heater Defrosting	Pause	Fan Delay	COMP	ON	OFF	OFF	ON	F-FAN	ON	OFF	OFF	OFF	R-FAN	Co ntrol	OFF	OFF	OFF	HEATER	OFF	ON	OFF	OFF	Time Limit	50 min.	① 80 min. ② 30 min. (in case of D1-Error)	7 min.	5 min.	C-fan and comp. are linked.	
	PRE-COOL	Heater Defrosting	Pause	Fan Delay																													
COMP	ON	OFF	OFF	ON																													
F-FAN	ON	OFF	OFF	OFF																													
R-FAN	Co ntrol	OFF	OFF	OFF																													
HEATER	OFF	ON	OFF	OFF																													
Time Limit	50 min.	① 80 min. ② 30 min. (in case of D1-Error)	7 min.	5 min.																													

Error Display (LCD Display of F-PCB)

INPUT	Control Object																						
1. Temperature Control Buttons	CUSTOM LCD																						
CONTENTS																							
1. How to start 1) Set "LOCK ON" first. 2) Push "LOCK" button 3 times while pushing "REF SET." button at the same time. 2. Display Error code is displayed on Freezer temperature display part. 3. How to stop 1) Push "LOCK" button 3 times while pushing "REF SET." button. 2) It stops automatically 4 minutes after the start. 4. All the error Ccodes are reset if they turn to be normal. 5. Error Code <table border="1"> <thead> <tr> <th>ERROR CODE</th><th>CONTENTS</th></tr> </thead> <tbody> <tr> <td>F1</td><td>F-sensor ; disconnection, short(pull-down)</td></tr> <tr> <td>r1</td><td>R-sensor ; disconnection, short(pull-down)</td></tr> <tr> <td>rt</td><td>RT-sensor ; disconnection, short(pull-down)</td></tr> <tr> <td>d1</td><td>D-sensor ; disconnection, short(pull-down)</td></tr> <tr> <td>dr</td><td>R-Door Switch ; defective</td></tr> <tr> <td>dF</td><td>F-Door Switch ; defective</td></tr> <tr> <td>dH</td><td>Homebar (Refreshment Center) Door Switch ; defective</td></tr> <tr> <td>C1</td><td>Cycle ; abnormal or defective.</td></tr> <tr> <td>F3</td><td>Return after defrosting ; abnormal or defective</td></tr> <tr> <td>d2</td><td>Forced defrosting mode for A/S</td></tr> </tbody> </table>		ERROR CODE	CONTENTS	F1	F-sensor ; disconnection, short(pull-down)	r1	R-sensor ; disconnection, short(pull-down)	rt	RT-sensor ; disconnection, short(pull-down)	d1	D-sensor ; disconnection, short(pull-down)	dr	R-Door Switch ; defective	dF	F-Door Switch ; defective	dH	Homebar (Refreshment Center) Door Switch ; defective	C1	Cycle ; abnormal or defective.	F3	Return after defrosting ; abnormal or defective	d2	Forced defrosting mode for A/S
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C1	Cycle ; abnormal or defective.																						
F3	Return after defrosting ; abnormal or defective																						
d2	Forced defrosting mode for A/S																						
REMARKS																							

E1	I sensor; disconnection, short
EF	FLOW sensor; disconnection, short
Et	Level sensor sw error
E9	Water supply Error
EA	Continuously Ice drop 3times at Et.
Eu	Fully Ice sensor sw error

CONTENTS	REMARKS																		
6. Control Way of Errors (if any) 1) "F1" ERROR Cause : F-sensor disconnection / short (pull-down) Control : Comp. / F-fan ON for 25min., OFF for 25min. if F-sensor is normal, the error is terminated automatically. 2) "r1" ERROR Cause : R-sensor disconnection / short (pull-down) Control : Condition of ambient temperature <table><tr><td>RT/S</td><td>In ERROR</td><td>~13℃</td><td>14℃ ~19℃</td><td>20℃ ~29℃</td><td>29℃ ~</td></tr><tr><td>Work rate</td><td>8 / 12</td><td>7 / 13</td><td>8 / 12</td><td>8 / 12</td><td>9 / 11</td></tr><tr><td>ON/OFF</td><td></td><td></td><td></td><td></td><td></td></tr></table> If R-sensor is normal, the error is terminated automatically. 3) "rt" ERROR ① Cause : RT-sensor disconnection / short (pull-down) ② Control : Normal operation, deletion of control condition by RT-sensor ③ If RT-sensor is normal, the error is terminated automatically. 4) "d1" ERROR ① Cause : D-sensor disconnection / short (pull-down) ② Control : Time limit (30min.) of defrosting-return ③ If D-sensor is normal, the error is terminated automatically. 5) Door ERROR("dF","dR","dH" on display) ① Cause : in case it senses that door is open for more than 1 ② Control : Deletion of function related door switch sensing ③ If door switch (open & close) is sensed, the error is terminated automatically. ④ After displaying on LCD the mode is terminated. 6) "C1" ERROR ① Cause : in case comp. works for over 3 hours when D-sensor temp. is over -5℃ ② Control : Normal operation ③ When D-sensor temp. is below -5℃ in comp. OFF, it is terminated. 7) "F3" ERROR ① Cause : in case defrosting-return is done by time limit of 80min. ② Control : Deletion of Pre-cool mode in defrosting mode ③ If defrosting-return is done by D-sensor, it is terminated. 8) "d2" MODE (A/S forced defrosting mode) ① Set "LOCK ON" first, then push "REFRIGERATOR SET." button 5 times while pushing "FREEZER SET." button simultaneously. ② Control : A/S forced defrosting control (Pre-cool is deleted.) ③ If D-sensor temp. is over 10℃, the mode is terminated automatically.	RT/S	In ERROR	~13℃	14℃ ~19℃	20℃ ~29℃	29℃ ~	Work rate	8 / 12	7 / 13	8 / 12	8 / 12	9 / 11	ON/OFF						
RT/S	In ERROR	~13℃	14℃ ~19℃	20℃ ~29℃	29℃ ~														
Work rate	8 / 12	7 / 13	8 / 12	8 / 12	9 / 11														
ON/OFF																			

CONTENTS	REMARKS
9) "EI" ERROR ① Cause : I-SENSOR disconnection / short (pull-down) ② Control : After water supply, Ice drop every 4.8hour. ③ Termination : When I-SENSOR is normal. 10) "Fi" ERROR ① Cause : When Level SW is ERROR ② Control : Time control (Skip water supply mode) ③ Termination : Normal 11) "EF" Error ① Cause : When Flow-sensor is ERROR(There is no Pulse during some time.) When water supply valve is "ON" Pulse input is below 10 during 1s. , ② Control : Time control(By Vector time recorded EEPROM.) (Generally, Water is supplied about 5.5s.) ③ Termination : Exchang Flow-Sensor. 12) "Eg" Error ① Cause : I-Sensor temp(5M after Water supply) dosen t get high. ② Control : Normal control ③ Termination : Normal 13) Dispenser S/W Error Cause : When it senses 1M continuously. Control : Stop Dispenser & Crusher function. Display : Relative ICON BOX is "OFF". Termination : Normal 14) Malfunction of Ice Drop Motor ① Cause : Malfunction of Ice Drop Motor. [Check the Motor by pushing Test S/W.] ② Termination : Exchange Motor 15) "Eu" Error ① Cause : Fully TM position is Error ② Control : When dropping the Ice, the motor just rotates 90 degree. ③ Termination : Fully sensor is normal. 16) "EA" Error ① Cause : When sensing Ice dropping 3 times with level sensor SW Error. ② Control : Pause Ice Maker. ③ Termination : With level sensor SW is normal, Reset the Power or Push TEST S/W. * When all ERROR CODE is normal, the Refrigerator reset.	

Forced Defrosting

INPUT	Control Object
1. "FREEZER SET." Button 2. "REFRIGERATOR SET." button 3. "LOCK" button	Defrosting Mode
CONTENTS	REMARKS
1. How to start Set "LOCK ON" first, then push "REFRIGERAOTR SET." button 5 times while pushing "FREEZER SET." button simultaneously. 2. How to proceed 1) Delete Pre-cool mode. (Others are same as normal defrosting.) 2) Heater is ON regardless of D-sensor temp. at first 30 seconds. (Check of defrosting current)	

6-11. Initial Defrosting

INPUT	Control Object
D-sensor Initial or first power input (power plugin)	Defrosting Mode
CONTENTS	REMARKS
If D-sensor temp. $\leq 3.5^{\circ}\text{C}$, defrosting mode starts from Pre-cool at first power input.	Comp. is delayed for 6 min. at the initial defrosting.

6-12. Buzzer or Alarm

INPUT	Control Object
F-PCB buttons Door Switch Initial Power Input	BUZZER
CONTENTS	REMARKS
1. Buzzer sounds if any button of F-PCB is pushed. 2. Buzzer sounds 3 times 3 minutes after initial power input. 3. Buzzer sounds for 1 second in case of A/S forced defrosting, short (pull-down) operation, explanation mode. 4. If door is open, buzzer sounds continually 3 times for 5 seconds. (Door open alarm)	

LCD Background Light

INPUT	Control Object
F-PCB buttons Door Switch Initial Power Input	LCD BACK LIGHT

OPERATION AND FUCTIONS

CONTENTS	REMARKS
1. Conditions to turn on LCD Light 1) Power input (plugin) 2) When any button on the panel is pushed, first the back light turns on, then button control is done. 3) When F/R door is open, the light turns on. 2. Conditions to turn off the light 1) The back light turns off 10 seconds after F/R door is closed 2) 1 minute after button control	

Explanation After Delivery

INPUT	Control Object
"FREEZER SET." button "REFRIGERATOR SET." button Power Cord	Electrical components and LCD
CONTENTS	REMARKS
1. Start Push "REFRIGERATOR SET." button for 3 seconds within 10 seconds just after power input. 2. Control 1) Electrical components are OFF for 3 hours. 2) Display operates in normal way.	

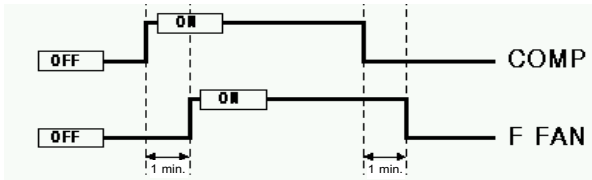
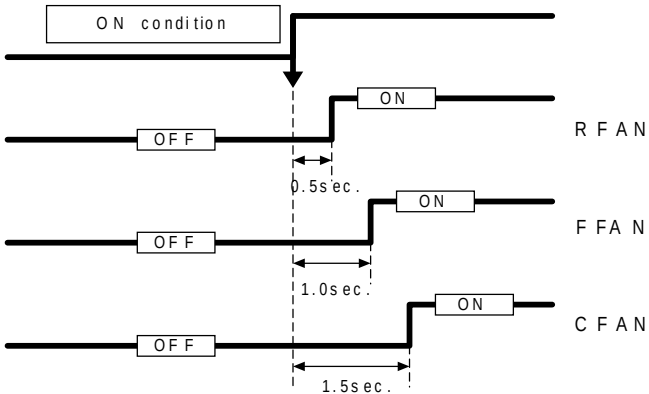
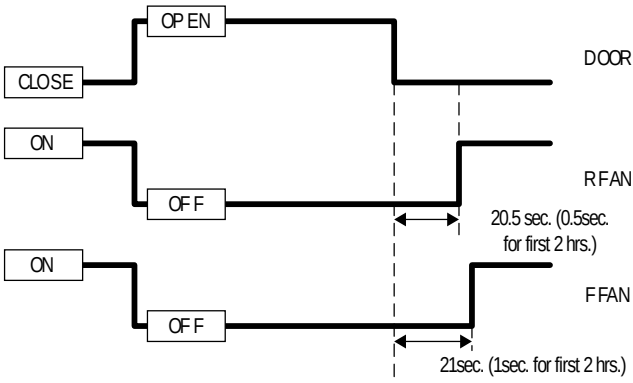
Prevention of Compressor Restart

INPUT	Control Object
None Comp.	
CONTENTS	REMARKS
Comp. does not start again for 6 minutes though F-sensor is ON.	6min. delay

Back Up Function

INPUT	Control Object
None	
CONTENTS	REMARKS
1. Filter Exchange Information : Record as a realtime from the point of Power Input. 2.P FACTOR (Information about Ice Maker) 3.Ice Maker Lock	

Delay Function of Electric Components

INPUT	Control Object
COMP ON/OFF	COMP F-FAN
CONTENTS	
1) F-fan delay by comp. ON/OFF F-fan is ON/OFF 1 minute after comp. is ON/OFF.  2) F an Delay and Priority  3) F /R-fan delay by door open/close for easy door opening. Inspection : checkup door opening 2 hours after initial start. First R is ON, 1 second later F is ON to protect DC fan against over current at initial start. 	
REMARKS	

Home Bar (Refreshment Center) Heater

INPUT	Control Object
None COMP	
CONTENTS	REMARKS
It is linked with comp.	

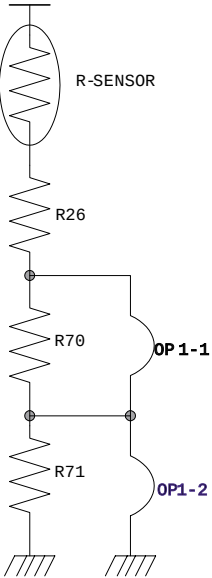
Control of Interior Lights

INPUT	Control Object
Refrigerator Door Freezer Door Home-Bar Door (Refreshment Center)	COMP
CONTENTS	REMARKS
1) Control of Refrigerator Compartment Lights R lights turn ON/OFF by R-door switch (ON/OFF). 10 minutes after sensing door open, the lights turn off automatically though door close is not sensed. 2) Control of Freezer Compartment Lights F lights turn ON/OFF by F-door switch (ON/OFF). 10 minutes after sensing door open, the lights turn off automatically though door close is not sensed. 3) R-lights ON/OFF by Home-Bar door opening R-lights turn ON for 1 minute after sensing HOME-BAR switch open. (If the switch is pushed again within 1 minute, the light turns on another 1 minute.) 4) DISPENSER LAMP CONTROL DISPENSER LAMP turns ON/OFF by DISPENSER SW. Dispenser Lamp turns ON for 5 seconds after sensing switch close.	

Demonstration Function

INPUT	Control Object
"LOCK" button "REFRIGERATOR SET." button "SLEEP" button	COMP F-FAN R-FAN
CONTENTS	REMARKS
1. Start 1) Set "LOCK ON" first. 2) Push "SLEEP" button 5 times while pushing "REF SET." button simultaneously. 2. Control 1) All other electrical components are OFF except for F-fan / R-fan. 2) Fan Control DOOR OPEN → FAN ON / DOOR CLOSE → FAN OFF 3) Display : Normal mode (3.8sec.) → SPEED(3sec.) → Silent mode(3sec.) → Sleep mode (3sec.) 3. Stop or Termination 1) During Demo mode push "SLEEP" button 5 times while pushing "REF SET." button simultaneously. 2) Power in again.	

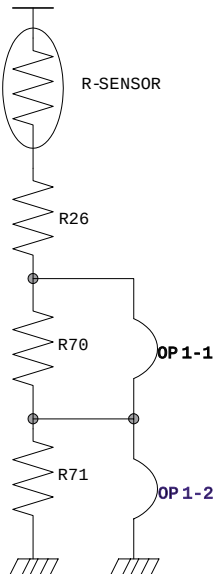
Regulation of R-sensor OFF Point

INPUT	Control Object
J18, 22 on Main PCB	Resistance of R-sensor Mid OFF Point
CONTENTS	REMARKS
Regulation of R-sensor OFF point (1.5degree DOWN) In case refrigeration of refrigerator is weak or insufficient, take the following action.  R26 : R-SENSOR standard resistance in normal mode (31.4K) R70 : In case of weak ref., cut J18 to down the standard resistance by 1.5deg(2K) R71 : In case of weak ref., cut J22 to down the standard resistance by 1.5deg(2K) R26 = Mid OFF point R26 + R70 = Mid OFF point - 1.5 deg R26 + R70 + R71 = Mid OFF point - 3.0 deg	

Summary of Function

CONTENTS	REMARKS								
How to start function modes All the modes are started with "LOCK ON" except for "explanation after delivery & installation". <table border="1"> <tr> <td>A/S forced defrosting</td><td>"FREEZER SET." + "REFRIGERATOR SET." 5 times</td></tr> <tr> <td>Demonstration</td><td>"REFRIGERATOR SET." + "SLEEP" 5 times</td></tr> <tr> <td>Explanation after delivery & installation</td><td>"REFRIGERATOR SET." for 3 sec. Right after first power in</td></tr> <tr> <td>ERROR display</td><td>"REFRIGERATOR SET." + "LOCK" 3 times</td></tr> </table>	A/S forced defrosting	"FREEZER SET." + "REFRIGERATOR SET." 5 times	Demonstration	"REFRIGERATOR SET." + "SLEEP" 5 times	Explanation after delivery & installation	"REFRIGERATOR SET." for 3 sec. Right after first power in	ERROR display	"REFRIGERATOR SET." + "LOCK" 3 times	
A/S forced defrosting	"FREEZER SET." + "REFRIGERATOR SET." 5 times								
Demonstration	"REFRIGERATOR SET." + "SLEEP" 5 times								
Explanation after delivery & installation	"REFRIGERATOR SET." for 3 sec. Right after first power in								
ERROR display	"REFRIGERATOR SET." + "LOCK" 3 times								

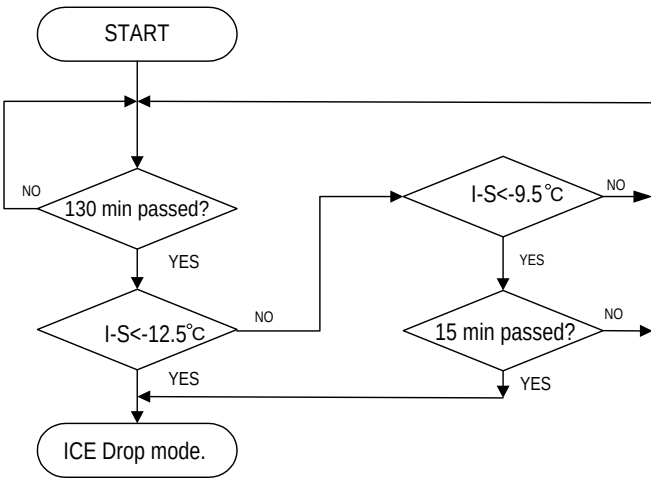
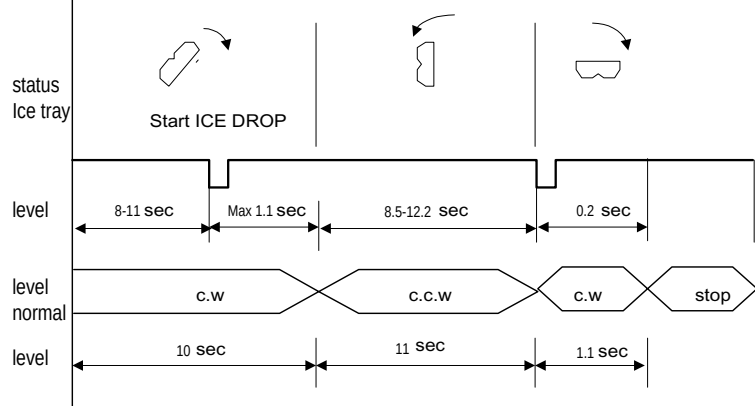
Regulation of R-sensor OFF Point

INPUT	Control Object
J18, 22 on Main PCB	Resistance of R-sensor Mid OFF Point
CONTENTS	REMARKS
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Explanation after delivery & installation	"REFRIGERATOR SET." for 3 sec. Right after first power in								
ERROR display	"REFRIGERATOR SET." + "LOCK" 3 times								

Input	Control Object
Fully Ice Sensor Ice Maker Lock	Ice sepeation Motor
CONTENTS	REMARKS
1-1. Ice Maker FLOW <pre> graph TD START([START]) --> ICE_MAKER[ICE MAKER Mode] ICE_MAKER -- "STOP the water input mode" --> ICE_DROP[ICE DROP Mode] ICE_DROP --> WATER_INPUT[Water Input Mode] WATER_INPUT --> CHECK[Check Mode] CHECK --> RETURN([RETURN]) </pre> 1) By Pushing of Ice Maker ASS'Y TEST S/W (Over 1 Sec.): TEST Mode Convert (Ice Drop Mode Start with Test Mode Proceed) 2) Initial Power input => Ice Maker is horizontal => Proceed from Ice maker Mode 3) Water-Input hose HTR Control ① Normal operation -: ON ② Ice Marker Operation -: OFF ③ Ice Marker Stop- : OFF ④ Demo Mode -: OFF 4) Water Input Ready State ① Condition : Full Sensing of Ice ② Operation : Processing to Ice Markder Mode during Ice Marker Flow(Ice Drop, Water Input mode Stop) ③ Stop: If Normal operation Proceed => Auto -Stop 5) Crusher Function ① F-DOOR OPEN : Function stop ② F-DOOR CLOSE : Function Normal Start	

CONTENTS	REMARKS
1-2. Ice Maker MODE  <pre> graph TD START([START]) --> D1{130 min passed?} D1 -- NO --> D2{I-S < -9.5°C} D1 -- YES --> D3{I-S < -12.5°C} D3 -- YES --> END1([ICE Drop mode.]) D3 -- NO --> D2 D2 -- YES --> D4{15 min passed?} D2 -- NO --> D1 D4 -- YES --> END1 D4 -- NO --> D1 </pre> 1) I-S is -12.5°C and below after 130 min.=> Ice maker complete 2) Although I-S isn't -12.5°C below for 130 min, I-S maintains -9.5°C below continuously => Ice maker complete 3) I-Sensor Error: Ice Maker Complete after 4.8HR 2. Ice Drop MODE  1) Each Section's Time used in S/W ERROR Confirm 2) Ice Drop MOTOR Rotation is Sensible by Each Sections 3) S/W ERROR: Ice Drop Every Time 4) Ice Drop MOTOR ERROR: Stop to the Status	

CONTENTS	REMARKS														
3. Water-Input MODE <pre>graph TD START([START]) --> InletON[Inlet value ON] InletON --> Count0[Water input pulse Count=0] Count0 --> Sec1{1 Sec passed after inlet value on?} Sec1 -- N --> Count0 Sec1 -- Y --> Pulse10{Water input pulse >10} Pulse10 -- N --> Error[Flow-Sensor Error mode] Pulse10 -- Y --> PulseTarget{Water input pulse >target pulse} PulseTarget -- Y --> Error PulseTarget -- N --> TimeTarget{time > target time} TimeTarget -- Y --> Error TimeTarget -- N --> PulseTarget Error --> InletOff[Inlet value off] InletOff --> STOP([STOP])</pre> 1) Convert of Water-Input Mode After Ice Drop: Water-Input Valve Open. 2) Flow Sensor Error: Water-Input is Controlled by Time 3) Variable Factor Value : Using for A/S Steps ①Flow Sensor Normal Operation : Flow Pulse Value sets "238" (Water input by Time -: Maximum Water Inut Time => 15 sec. ②Flow Sensor error : Water input time => 5.5 sec.															
4. Water-Input Confirm MODE I-S Temp. Rising Value with RT-S Temp. Mode after 5 min. : Estimate of Water Input <table><tr><td>RT-S</td><td>7 °C</td><td>~13°C</td><td>~19°C</td><td>~29°C</td><td>~39°C</td><td>39 °C</td></tr><tr><td>I-S</td><td>-10°C</td><td>-9°C</td><td>-8°C</td><td>-7°C</td><td>-6°C</td><td>-5°C</td></tr></table>	RT-S	7 °C	~13°C	~19°C	~29°C	~39°C	39 °C	I-S	-10°C	-9°C	-8°C	-7°C	-6°C	-5°C	
RT-S	7 °C	~13°C	~19°C	~29°C	~39°C	39 °C									
I-S	-10°C	-9°C	-8°C	-7°C	-6°C	-5°C									

Dispenser Control Function

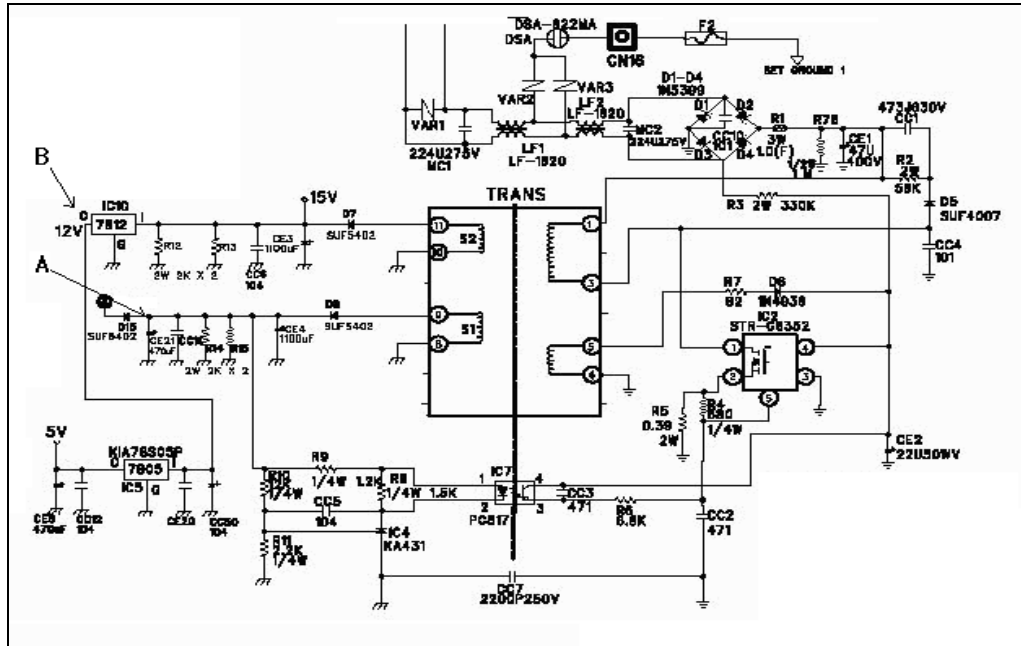
Input	Control Object
Dispenser SW Water/Ice Button Lock Ice Maker Button Freezer Door SW	Dispenser Lamp Crusher Motor Flat Solenoid Crusher Solenoid Dispenser Water Valve
Contents	Remark
1) Water/Ice Selection Button * Initial Mode : Water Progress : Water → Ice Cube → Crushed Ice → Water * Pushing the dispenser value, water/Ice cube/crushed Ice is dispensed as your selection. 2) Lock Ice Maker Button ① Start by pushing "Lock Ice Maker" button " Lock Icer Maker" is "ON", The Icon & Box of "Cube Ice"/"Crushed Ice" disappear, "Water"Icon & Box is always "ON" ② Stop by pushing "Lock Ice Maker" button again. "Lock Icer Maker" Icon is "OFF", The Icon & Box of"Cube Ice"/"Crushed Ice"is "OFF", "Water"Icon & Box is "ON". 3) Display - Initial Mode : Wateer ICON & Letter is "ON". - A rectangle Line around the icon lights up to indicate your selection is on. - The Icon of water, Ice Cube, Crushed Ice is always "ON".(Exception, Dispenser S/W Error) - When pushing ' Lock Ice Maker': - Lock Ice Maker LED is "ON" , The letters of crushed, cube Ice are "OFF" - There is no input during 1 hour, Dispeser transform into Water Mode.	

Contents	Remark
4) Control Flow & Timing Chart 4-1)Crushed Ice 4-2) Ice Cube 4-3) Water Delay Time : A = 500ms, B = 500ms, C = 2.0s D = 5.0s	

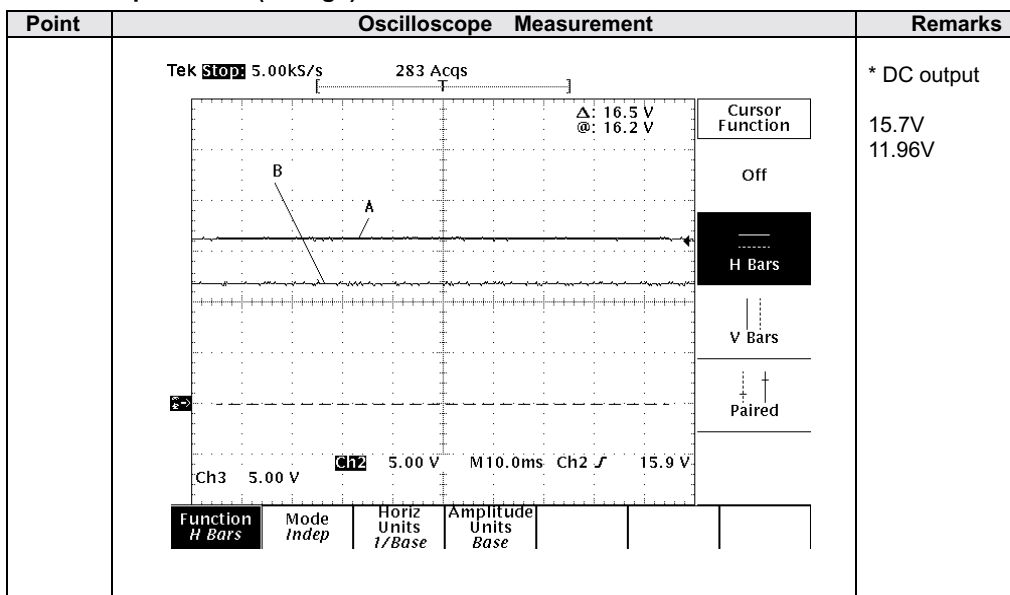
MICOM Circuit

Power

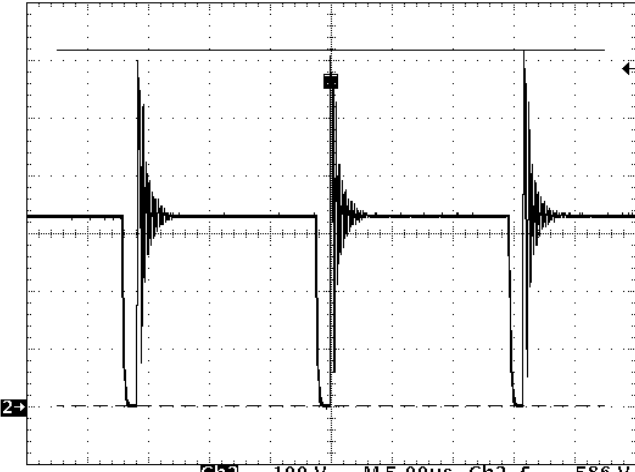
Circuit



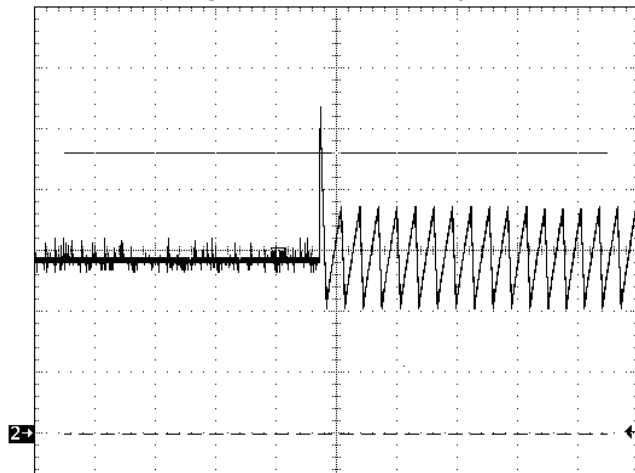
DC Output Power (Voltage)



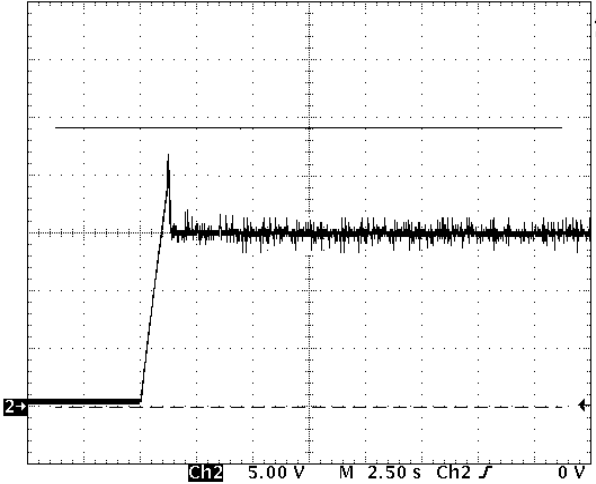
SMPS Movement Wave
Drain to Source Break Voltage

Point	Oscilloscope Measurement	Remarks
SMP SIC PIN 1,2	Tek Run: 50.0MS/s PK Detect 11192  Δ: 618 V @: 618 V 13 Nov 2002 18:00:55	*Voltage between DRAIN and SOURCE : below 650V

OVP(Overvoltage Protection) Wave at power input

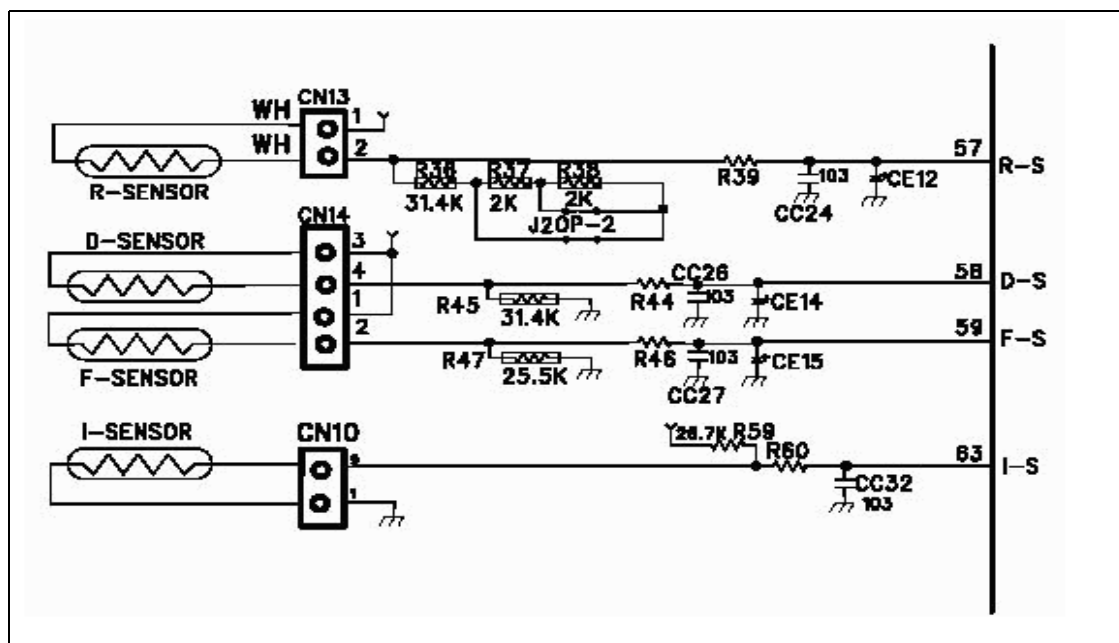
Point	Oscilloscope Measurement	Remarks
SMPS IC PIN 3,4	Tek Stop: 1.00kS/s 1 Acqs  Δ: 23.2 V @: 23.0 V 13 Nov 2002 17:35:32	*Minimum standard voltage at OVP start : 23.2V

Initial Power Wave of Switching Power IC

Point	Oscilloscope Measurement	Remark
SMPS IC PIN 3,4	Tek Stop 1.00kS/s 1 Acqs  Δ: 24.3 V @: 24.1 V ch2 5.00 V M 2.50 s Ch2 J 0 V 13 Nov 2002 17:39:23	

Sensors

Circuit Diagram



Fncion of Each Sensor

[F-sensor]

- 1) It senses the temperature of freezer compartment and controls Comp., F-fan ON / OFF.
- 2) How it works ;

Working Point	Low ON	Mid OFF	High OFF
Working Temp.	-11.0°C	-20.0°C	- 26.0°C
Resistance	14.74k Ω	22.33k Ω	30.92k Ω
Sensing Voltage	$\approx$ 3.50 V	$\approx$ 3.00 V	$\approx$ 2.14 V

[D-sensor]

It senses return point of defrosting heater.

Working Point	Return point of defrosting heater
Working Temp.	10°C
Resistance	19.53k Ω
Sensing Voltage	$\approx$ 3.1 V

[R-sensor]

- 1) It senses the temperature of refrigerator compartment and controls R-fan ON / OFF.
- 2) How it works ;

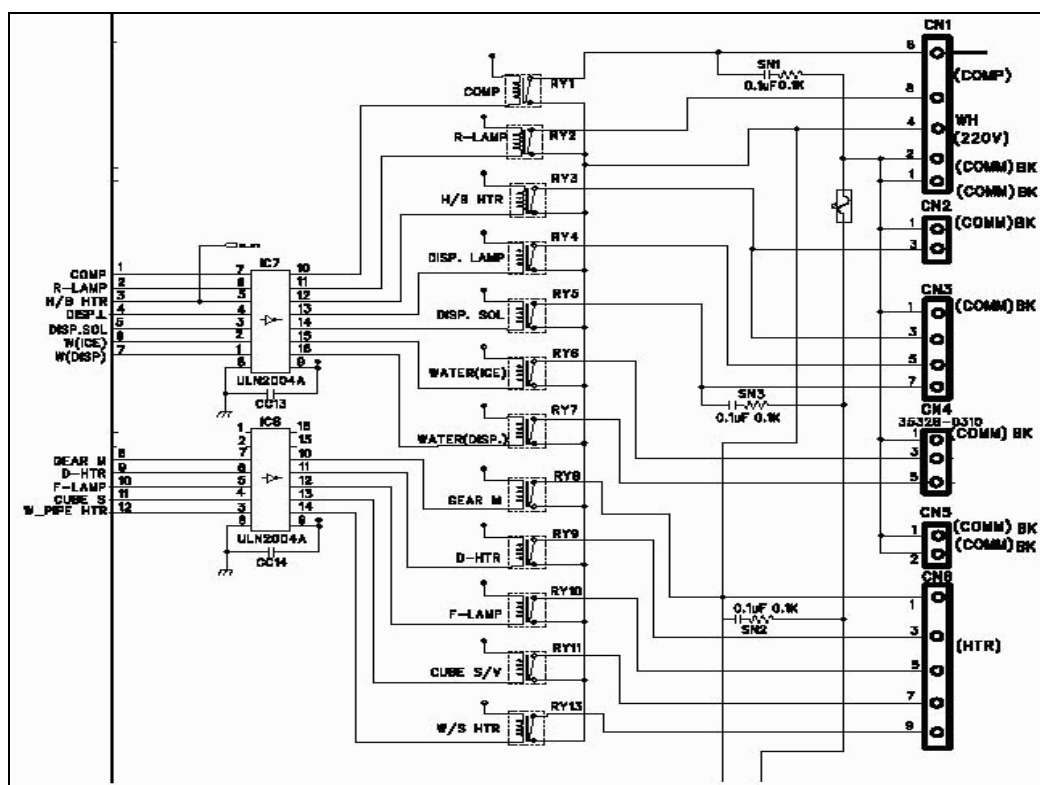
Working Point	Low ON	Mid OFF	High OFF
Working Temp.	2.65°C	0.3°C	-1.7°C
Resistance	26.88k Ω	29.34k Ω	32.00k Ω
Sensing Voltage	$\approx$ 2.90V	$\approx$ 2.81V	$\approx$ 2.74V

* In case refrigeration of refrigerator compartment is poor or insufficient though comp. and R-fan operate in normal way ;

- 1) Cut J18 on M-PCB, then temp. is lowered -2 °C than [Mid OFF point].
- 2) In addition to 1) action, cut J22 on M-PCB, then the temp. is lowered -1°C more.

Relay Function

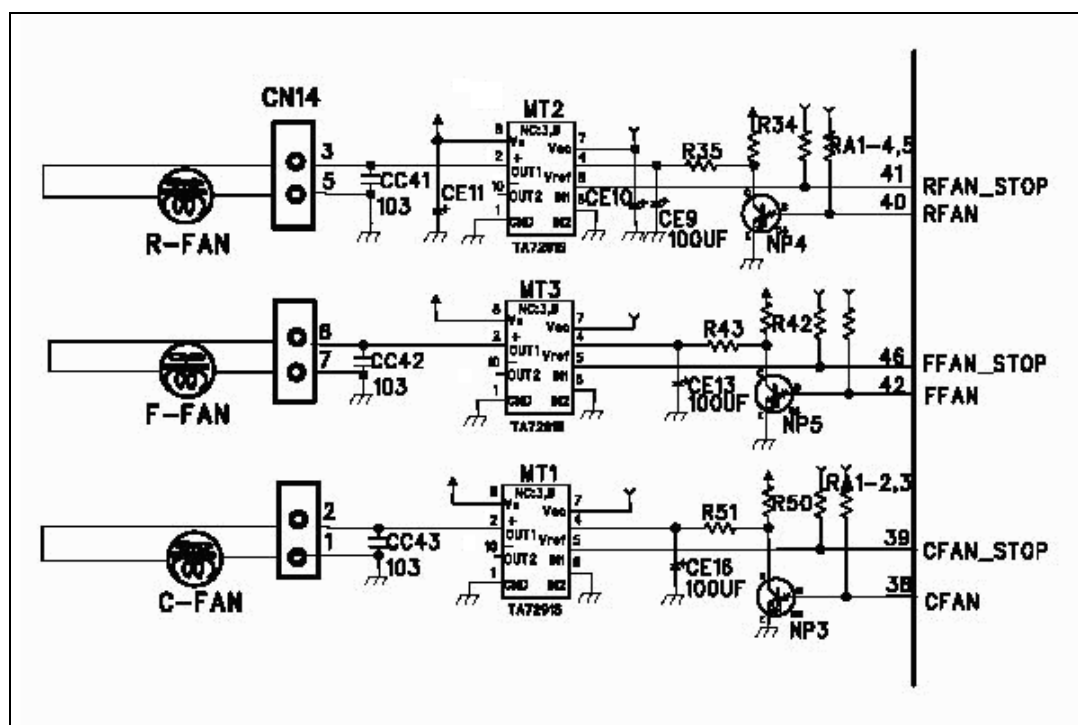
Circuit Diagram



How it works ;

Control	Control Method	ON Condition		OFF Condition	
		MICOM PORT	IC 2 Output PIN	MICOM PORT	IC03 Output PIN
COMP	REPLAY	#1 ≒ 3.7V	#10 ≒ 0.7V	#1 ≒ 0V	#10 ≒ 12V
R-LAMP	REPLAY	#4 ≒ 3.7V	#11 ≒ 0.7V	#4 ≒ 0V	#11 ≒ 12V
DIS-LAMP	REPLAY	#3 ≒ 3.7V	#12 ≒ 0.7V	#3 ≒ 0V	#12 ≒ 12V
DISP-SOL	REPLAY	#5 ≒ 3.7V	#13 ≒ 0.7V	#5 ≒ 0V	#13 ≒ 12V
WATER(ICE)	REPLAY	#1 ≒ 3.7V	#10 ≒ 0.7V	#1 ≒ 0V	#10 ≒ 12V
WATER(DIS)	REPLAY	#4 ≒ 3.7V	#11 ≒ 0.7V	#4 ≒ 0V	#11 ≒ 12V
GEAR-M	REPLAY	#3 ≒ 3.7V	#12 ≒ 0.7V	#3 ≒ 0V	#12 ≒ 12V
D-HTR	REPLAY	#5 ≒ 3.7V	#13 ≒ 0.7V	#5 ≒ 0V	#13 ≒ 12V
F-LAMP	REPLAY	#4 ≒ 3.7V	#11 ≒ 0.7V	#4 ≒ 0V	#11 ≒ 12V
CUBE-SOL	REPLAY	#4 ≒ 3.7V	#11 ≒ 0.7V	#4 ≒ 0V	#11 ≒ 12V
W/S HTR	REPLAY	#2 ≒ 3.7V	#14 ≒ 0.7V	#2 ≒ 0V	#14 ≒ 12V

Fan Function



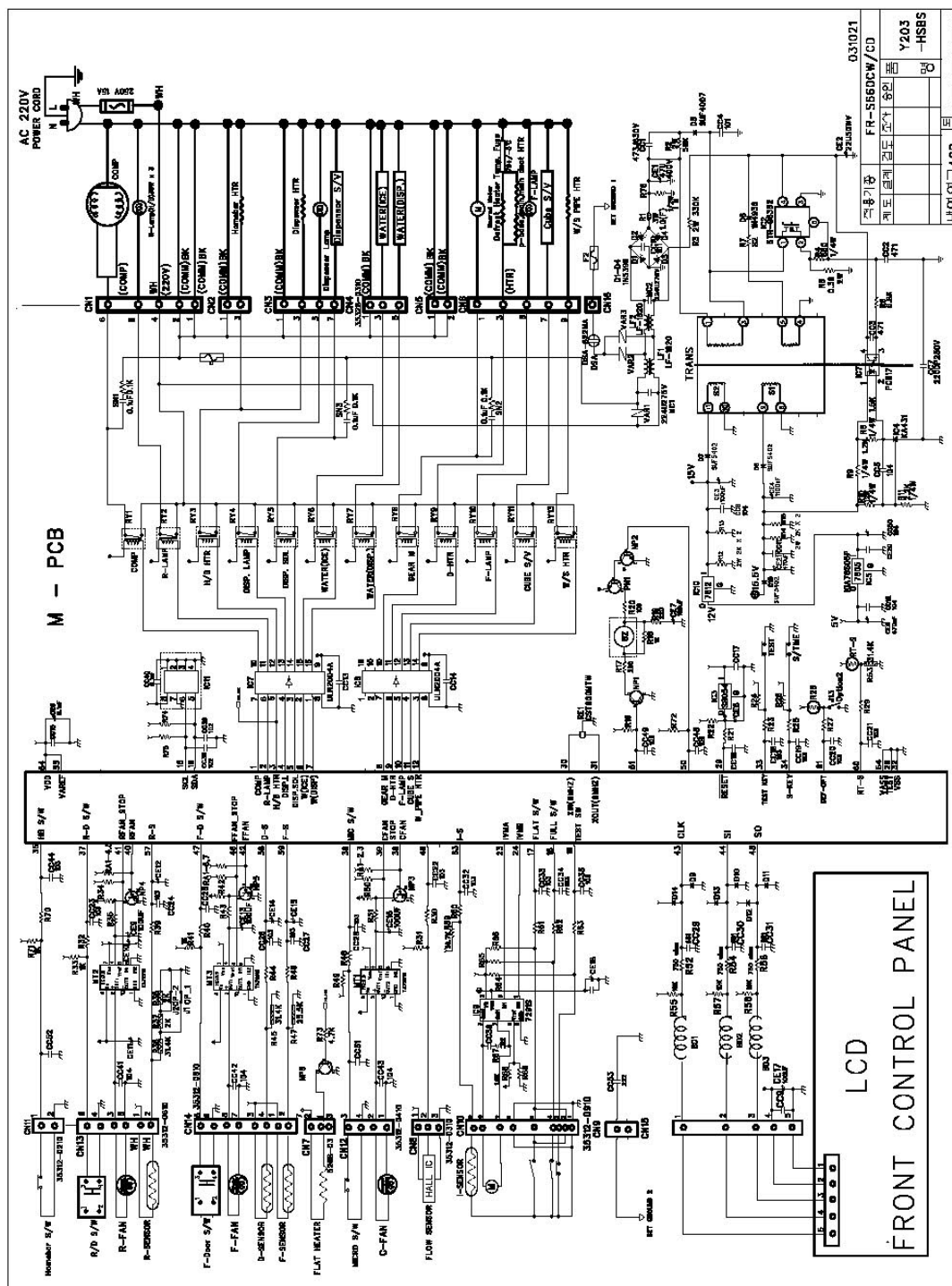
How it works ;

Control Object	Control Method	ON Condition				OFF Condition			
		MICOM Port			IC Collector	MICOM Port			IC Collector
		31	32	33		31	32	33	
F-FAN	Low (10V) operation	5V	0V	0V	10.35V	5V	5V	5V	0V
	Mid (12V) operation	0V	5V	0V	12.19V				0V
	High (14V) operation	0V	0V	0V	14.38V				0V

Control Object	Control Method	ON Condition				OFF Condition			
		MICOM PORT			IC Collector	MICOM PORT			IC Collector
		39	40	41		39	40	41	
R-FAN	Low (10V) operation	0V	5V	5V	10.38V	0V	0V	0V	0V
	Mid (12V) operation	5V	0V	5V	12.24V				0V
	High (14V) operation	5V	5V	5V	14.42V				0V

Control Object	Control Method	ON Condition				OFF Condition			
		MICOM Port		IC Collector		MICOM Port		IC Collector	
		37	38			37	38		
C-FAN	High (14V) operation	0V	0V	14.54V		5V	5V	0V	
	Low (10V) operation	5V	0V	10.45V				0V	

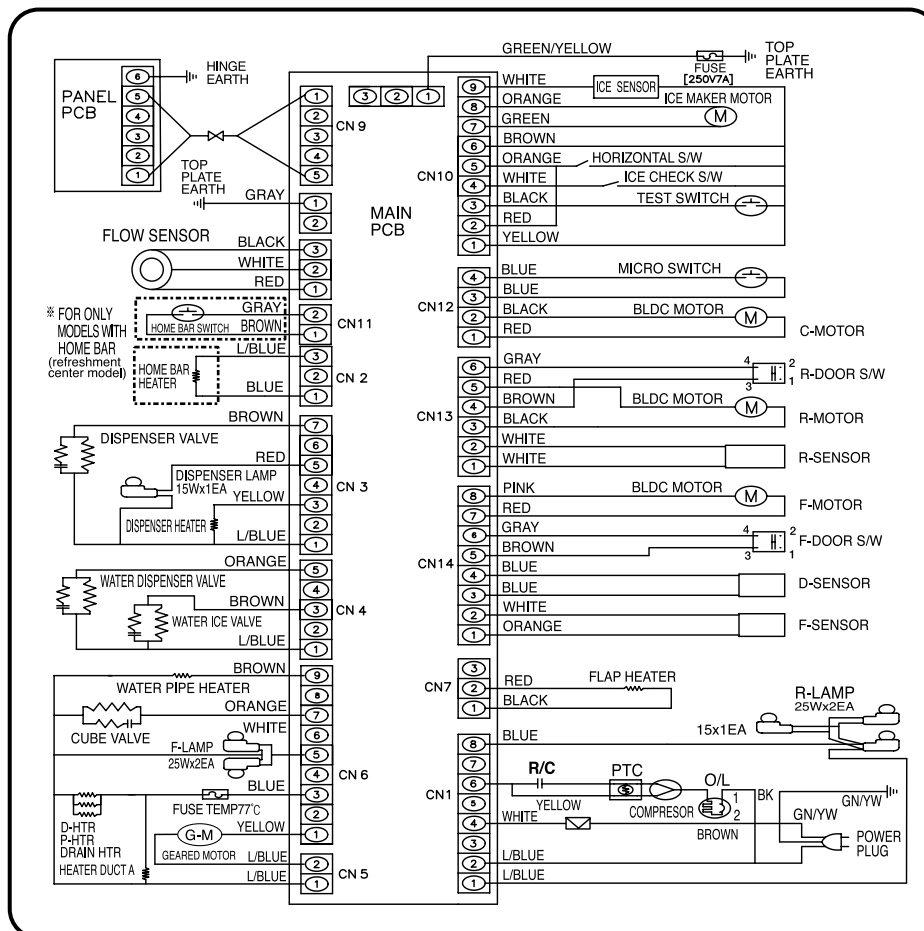
Circuit Diagram of Main PCB



DIAGRAM

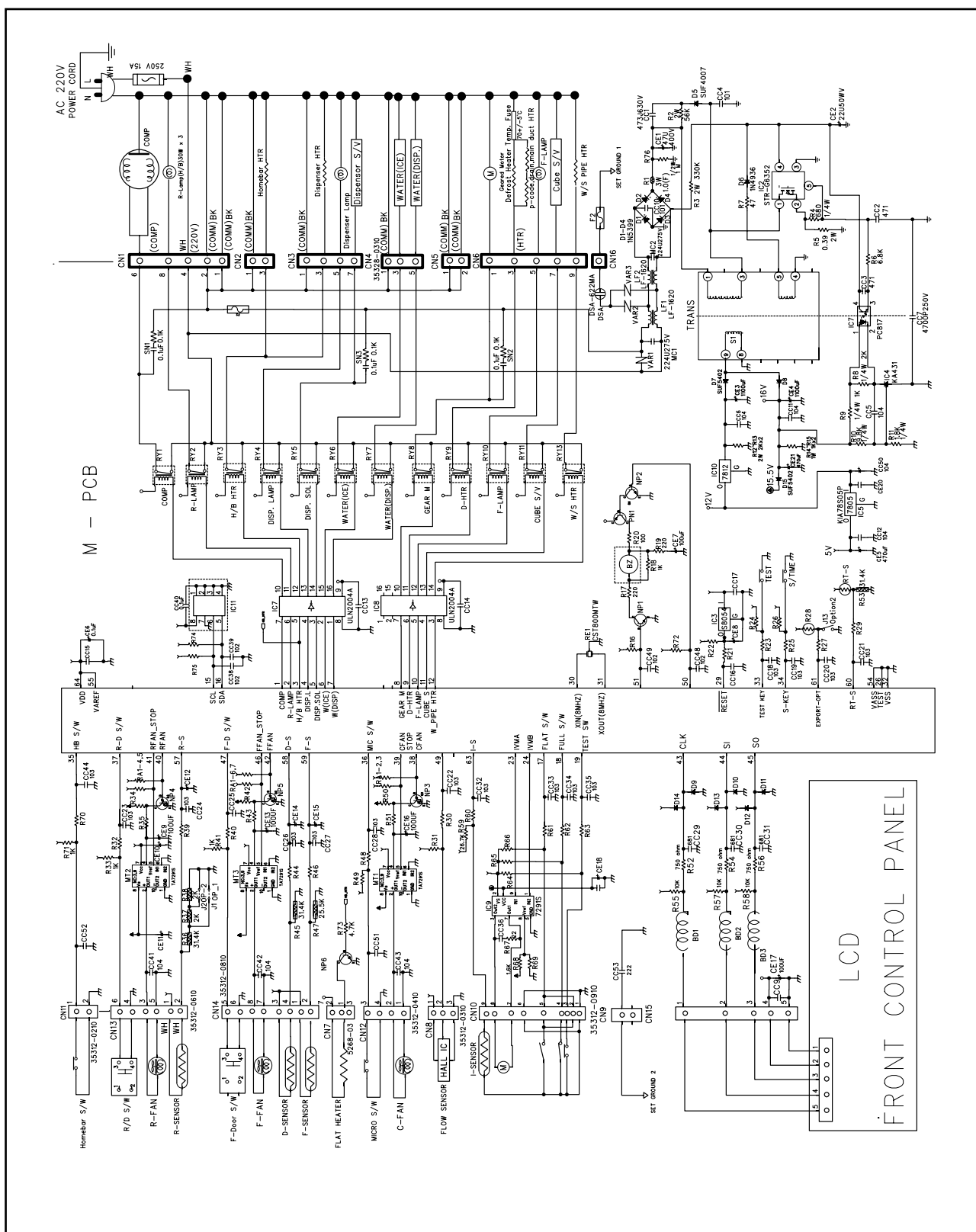
WIRING DIAGRAM

< RSCR TYPE >

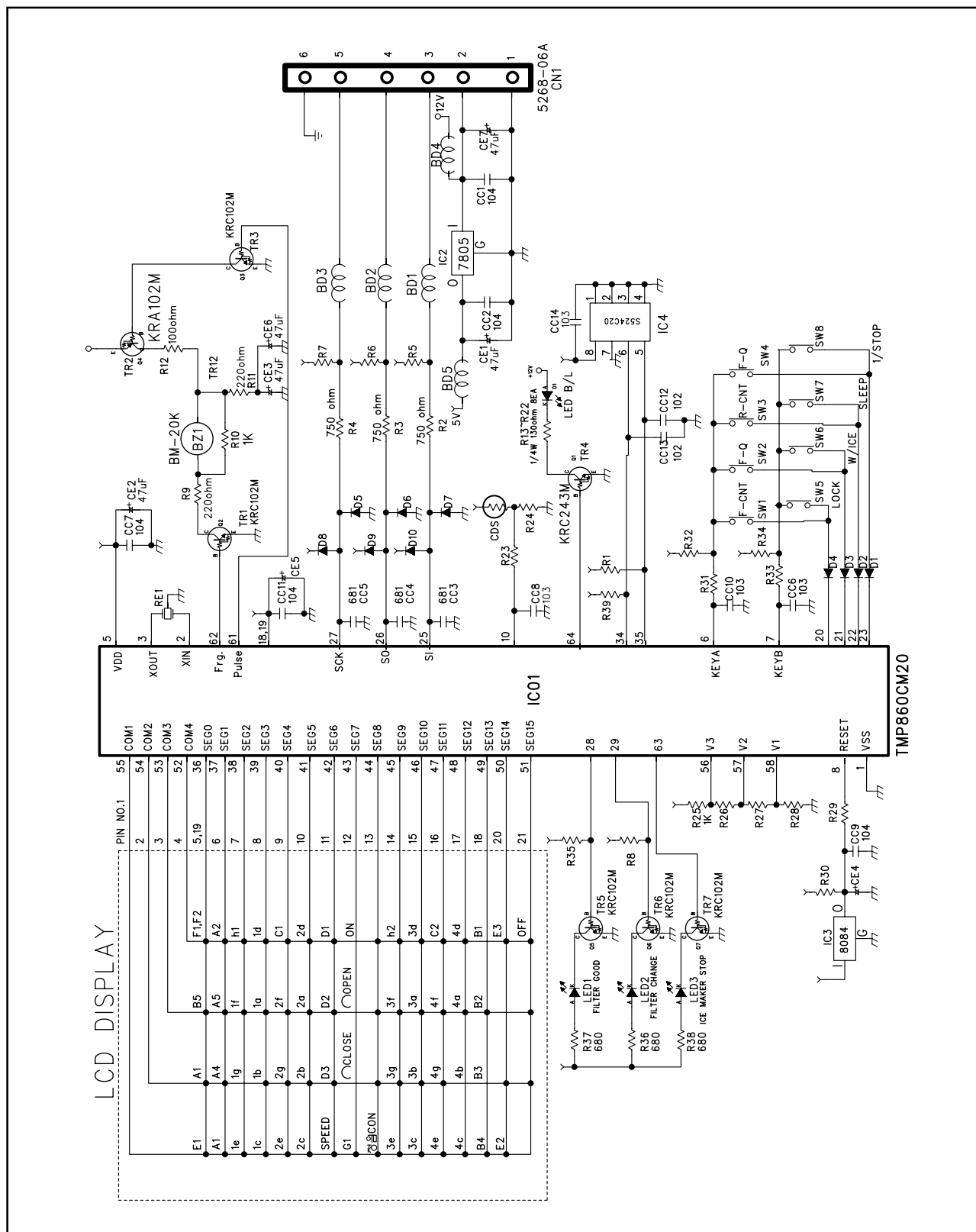


CIRCUIT WIRING DIAGRAM

Main PCB



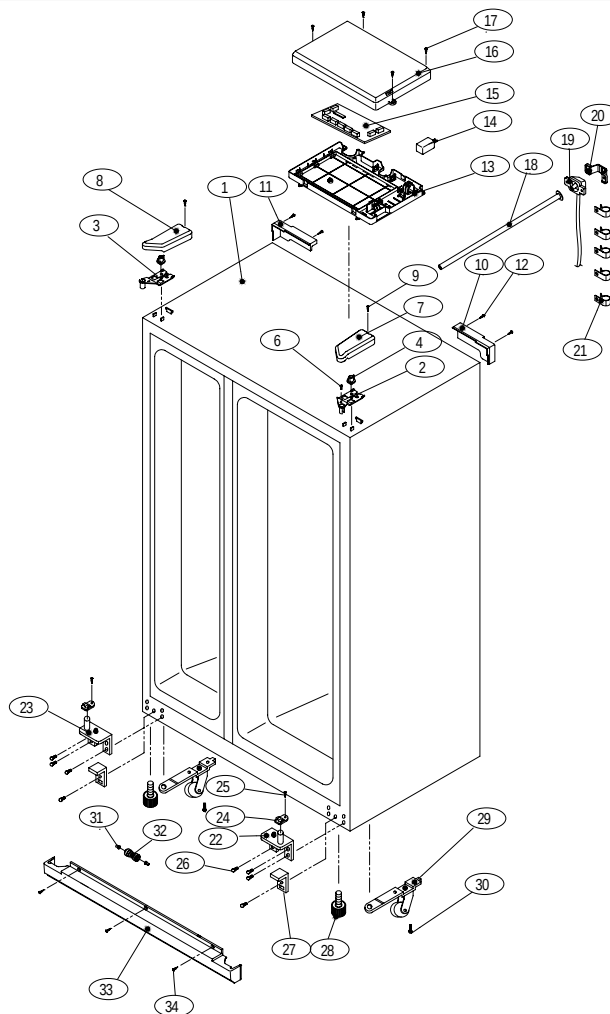
Front PCB



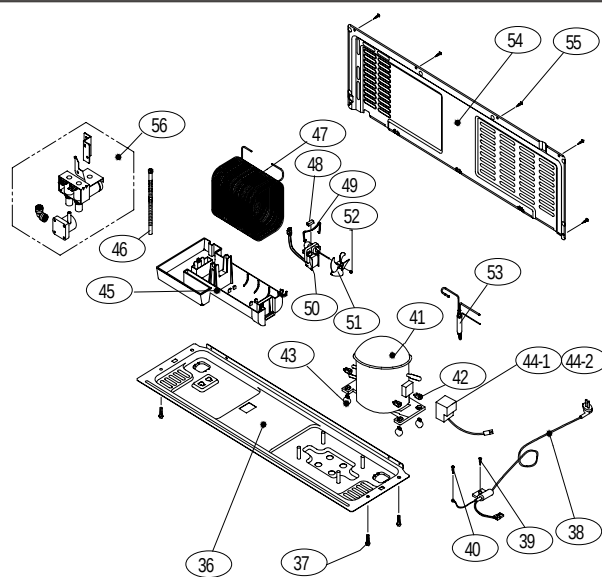
EXPLODED VIEW AND PARTS LIST

■ FRS-2031

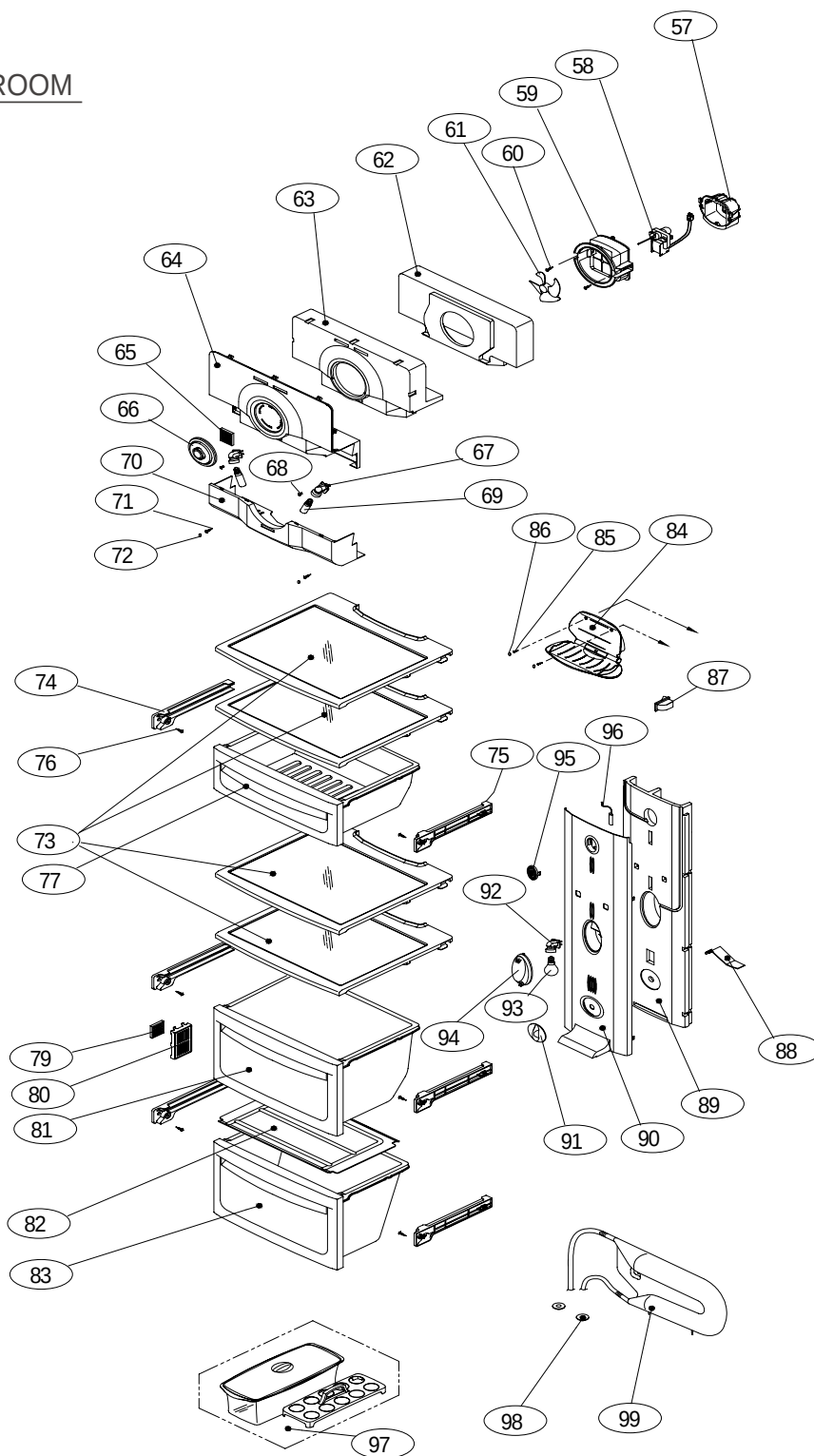
CABINET

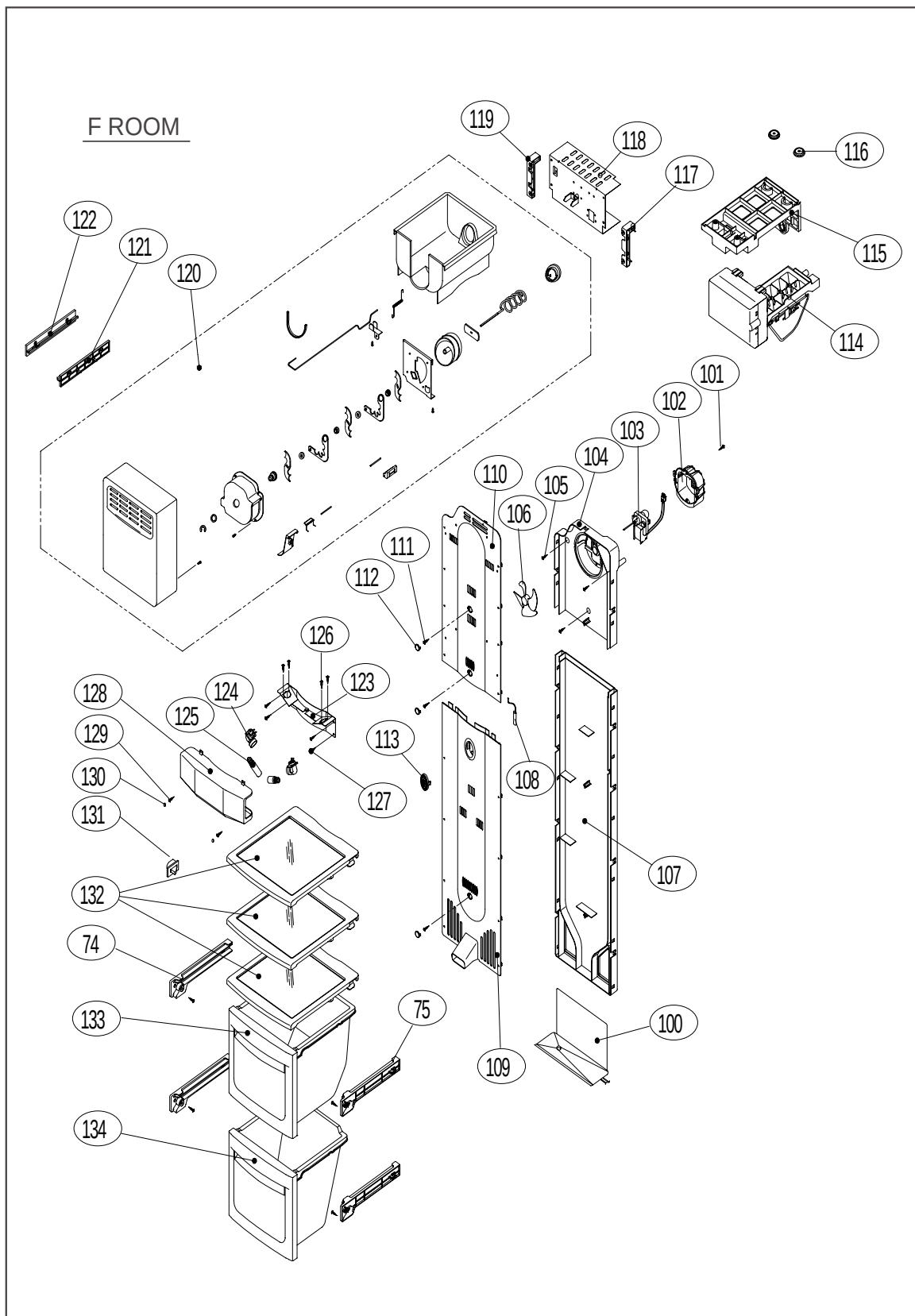


MECH ROOM

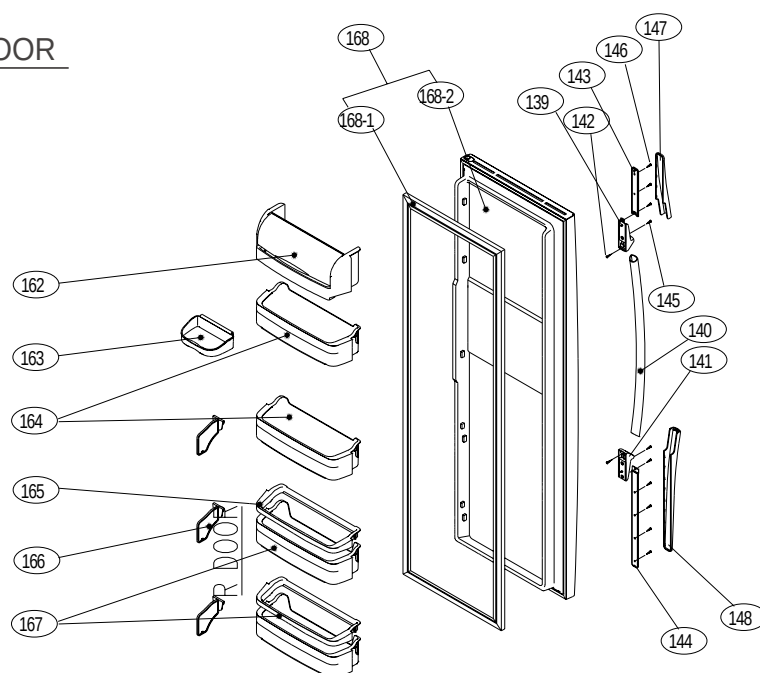
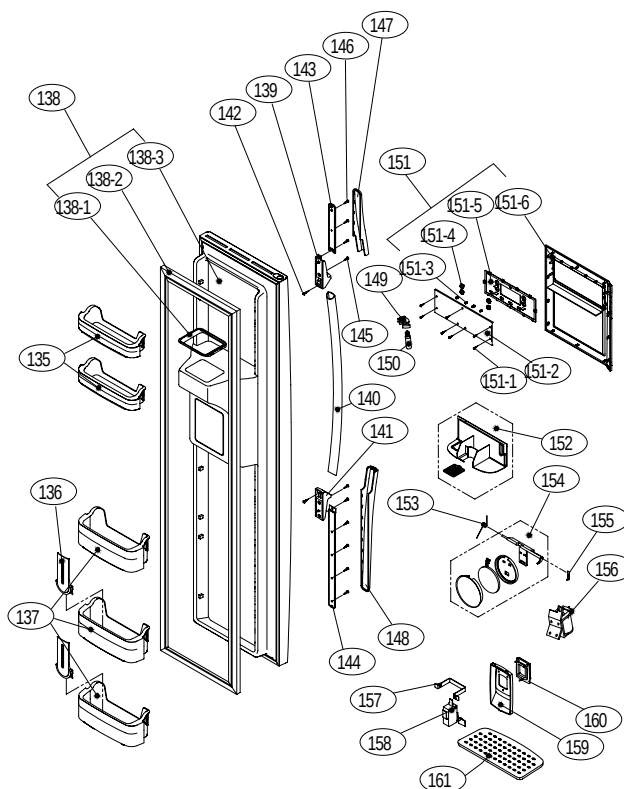


FRS-2031

R ROOM



■ FRS-2031



EXPLODED VIEW AND PARTS LIST

Total Parts List

FRS-2031

CAUTION : In this Service Manual, some parts can be changed for improving their performance without notice in the parts list. So, if you need the latest parts information, please refer to PPL(Parts Price List)in Service information Center(<http://svc.dwe.co.kr>)

NO	PART CODE	PART NAME	Q'TY	REMARK
1	3000003620	ASSY CAB URT	1	
2	3012917600	HINGE *T *R AS	1	PO T3.0
3	3012918500	HINGE *T *L AS	1	PO T3.0
4	3016031400	SCREW SPECIAL	2	
6	7051401065	SCREW MACHINE	1	PAN 4 x 10 SW BSNI
7	3011472400	COVER HI *T *R	1	PP
8	3011472300	COVER HI *T *L	1	PP
9	7112401211	SCREW TAPPING	2	T1 TRS 4 x 12 MFZN
10	3012601301	HANDLE CAB COVR *R	1	PP
11	3012601201	HANDLE CAB COVR *L	1	PP
12	7112401211	SCREW TAPPING	1	T1 TRS 4 x 12 MFZN
13	3010533400	BOX MAIN PCB	1	PP
14		CAPACITOR RUN	1	
15		PCB MAIN AS	1	
16	3011472610	COVER MAIN PCB BOX	1	PP
17	7112401211	SCREW TAPPING	1	T1 TRS 4 x 12 MFZN
18	3013223400	HOSE ICE MAKER TUBE AS	1	
19	3012519200	GUIDE CAB W/TUBE A AS	1	
20	3011485600	COVER GUIDE CAB W/TUBE A	1	HIPS
21	3011202000	CLAMP WATER TUBE A	5	PA -66
22	3012917800	HINGE *U *R AS	1	PO T3.0
23	3012917700	HINGE *U *L AS	1	PO T3.0
24	3012513300	GUIDE *U HINGE *U	2	POM
25	7002501611	SCREW MACHINE	2	TRS M5 x 16 MFZN
26	3016001240	SPECIAL BOLT *T	8	6 x 22 SWCH22A(YL)
27	3015306700	SUPPORTER *U HI AS	2	PO T5.0
28	3012104400	FOOT ADJUST AS	2	
29	3016501200	CASTER TURN AS	2	TURN CASTER
30	3016001240	SPECIAL BOLT *T	2	6 x 22 SWCH22A(YL)
31	3012019500	FIXTURE TUBE FIT B	2	PP
32	3013064200	HOLDER TUBE A	1	ACETAL
33	3011471010	COVER CAB BRKT	1	PP

EXPLODED VIEW AND PARTS LIST

NO	PART CODE	PART NAME	Q'TY	REMARK
34	7142401611	SCREW TAPPING	3	T2 TRS 4 x 16 MFZN
36	3010326700	BASE COMP AS	1	SBHG T1.2
37	3016003300	SPECIAL BOLT	4	T2 M6.5 x 20 4EA
38	3011344200	CORD POWER AS	1	250V 12A
39	7112401211	SCREW TAPPING	1	T1 TRS 4 x 12 MFZN
40	7051401065	SCREW MACHINE	1	PAN 4 x 10 SW BSNI
41		COMP	1	
42	3016002500	SPECIAL WASHER	4	SK -5 T0.8
43	3010101600	RUBBER ABSORBER COMP	4	NBR
44 -1		SWITCH P RELAY AS	1	
44 -2	3811402100	COVER RELAY	1	DS3 -3NORYL S/S
45	3011113500	CASE VAPORI	1	PP + CTALC
46	3013201700	HOSE DRAIN B	1	PE FRB -5350NT
47	3014413730	PIPE WICON AS	1	
48	3010102100	ABSORBER C MOTR	1	NR FRB -5350NT
49	3012004400	FIXTURE C MOTR	1	SUS
50	3015911500	MOTOR C FAN AS	1	DC12V 2.5W
51	3011802200	FAN	1	ABS (O.D.)3.17 x D110
52	3011200500	CLAMP FAN	1	SUS 304
53	3016806900	DRYER AS	1	XH-9 15g
54	3011474700	COVER MACH ROOM AS	1	SBHG T0.4
55	7112401211	SCREW TAPPING	6	T1 TRS 4 x 12 MFZN
56	3015403200	VALVE WATER AS	1	
57	3012007800	FIXTURE MOTOR A	1	PP
58	3015911400	MOTER R FAN AS	1	
59	3012007900	FIXTURE MOTOR B	1	HIPS
60	7122401211	SCREW TAPPING	2	T2S TRS 4 x 12 MFZN
61	3011802200	FAN	1	ABS (O.D.)3.17 x D110
62	3013344200	INSU DAMP B	1	F-PS
63	3013344100	INSU DAMP A	1	F-PS
64	3011471200	COVER DAMP	1	HIPS
65	3018701800	DEO ANTI AS	1	
66	3011471300	COVER DEO	1	ABS

EXPLODED VIEW AND PARTS LIST

NO	PART CODE	PART NAME	Q'TY	REMARK
67	3017905300	SOCKET R LAMP AS	2	
68	7121300811	SCREW TAPPING	1	T2S PAN 3 x 8
69		LAMP R A	2	
70	3015507900	WINDOW R LAMP A	1	MIPS
71	3016002710	SPECIAL SCREW	2	4 x 12
72	3010903200	CAP SCREW	2	PE
73	3017827300	SHELF R AS	4	GLASS + HIPS
74	3012514500	GUIDE CASE A *L AS	5	ABS
75	3012514600	GUIDE CASE A *R AS	5	ABS
76	7142401611	SCREW TAPPING	10	T2 TRS 4 x 16 MFZN
77	3011171200	CASE CHILD AS	1	GPPS + HIPS
79	3018701800	DEO ANTI AS	1	
80	3011472900	COVER RETURN DUCT	1	HIPS
81	3011172000	CASE VEGETB A AS	1	GPPS + HIPS
82	3011485400	COVER VEGETB CASE B	1	GPPS
83	3011172100	CASE VEGETABLE B AS	1	GPPS + HIPS
84	3017827500	SHELF WINE AS	1	ABS
85	3016002710	SPECIAL SCREW	2	4 x 12
86	3010903200	CAP SCREW	2	PE
87	3018124000	SWITCH LAMP	1	SP201R-7DR
88	3017100500	FLAP MULT DUCT	1	PP
89	3013345000	INSU MULT DUCT AS	1	F-PS
90	3011472700	COVER MULT DUCT	1	HIPS
91	3013408100	KNOB MULT DUCT	1	ABS
92	3017905310	SOCKET R LAMP AS	1	250V 1A
93		LAMP R B	1	
94	3015508000	WINDOW R LAMP B	1	MIPS
95	3011473000	COVER SENS	1	ABS
96	3014805400	SENSOR R AS	1	PBN -438
97	3011171300	CASE EGG AS	1	GPPS
98	3014002500	PACKING W/TUBE GUIDE A	2	SILICON
99	3018200800	WATER TANK AS	1	HDPE
100	3012515000	GUIDE DRN AS	1	FR -S580CG

EXPLODED VIEW AND PARTS LIST

NO	PART CODE	PART NAME	Q' TY	REMARK
101	7112401211	SCREW TAPPING	1	T1 TRS 4 x 12 MFZN
102	3012007800	FIXTURE MOTOR A	1	PP
103	3015911310	MOTOR F FAN	1	DL - 2213DWFA -2
104	3018917200	LOUVER F C	1	PP
105	7142401611	SCREW TAPPING	3	T2 TRS 4 x 16 MFZN
106	3011834500	FAN	1	ABS (O.D.)3.17 x D130
107	3018914910	LOUVER F D AS	1	PP
108	3014805300	SENSOR F AS	1	PT -38
109	3018914700	LOUVER F B AS	1	HIPS
110	3018914600	LOUVER F A AS	1	HIPS
111	7142401611	SCREW TAPPING	3	T2 TRS 4 x 16 MFZN
112	3010924600	CAP F LUVR	3	HIPS
113	3011473000	COVER SENSOR	1	ABS
114	3000025900	ASSY ICE MAKER	1	
115 -1	3012205600	FRAME ICE MAKER	1	HIPS
115 -2	3012521300	GUIDE ICING FLOW	1	PP
116	3012013200	FIXTURE C	2	PP
117	3012517900	GUIDE G/MOTR BRACKET *R	1	ABS
118		BRACKET G/MOTR AS	1	
119	3012517800	GUIDE G/MOTR BRACKET *L	1	ABS
120	3011176200	ICE CRUSHER AS	1	
121	3012517700	GUIDE ICE CRUSHER *R	1	ABS
122	3012520500	GUIDE ICE CRUSHER *L	1	ABS
123	3014559510	PLATE LAMP F	1	SBHG T0.8
124	3017905200	SOCKET F LAMP AS	2	
125		LAMP F	2	
126	7121300811	SCREW TAPPING	4	T2S PAN 3X8 MFZN
127	7112401211	SCREW TAPPING	4	T1 TRS 4 x 12 MFZN
128	3015507710	WINDOW F LAMP	1	MIPS
129	3016002710	SPECIAL SCREW	2	4 x 12
130	3010903200	CAP SCREW	2	PE
131	3018124000	SWITCH LAMP	1	SP201R -7DR
132	3017827100	SHELF F AS	3	GLASS + HIPS
133	3011171400	CASE F A AS	1	GPPS + HIPS

EXPLODED VIEW AND PARTS LIST

NO	PART CODE	PART NAME	Q' TY	REMARK
134	30111171500	CASE F B AS	1	GPPS + HIPS
135	3019019000	POCKET F *T	2	HIPS
136	3012516000	GUIDE F POCKET	2	PP
137	3019019100	POCKET F *U	3	HIPS
138	3000028000	ASSY F DR	1	FR -S660CWI
138 -1	3010957100	CAP ICE PATH FRAME	1	HIPS
138-2	3012314200	GASKET F DR AS	1	PVC
138-3	3000003700	ASSY F DR URT	1	
139	3011623800	DECO HNDL *T	1	AB S
140	3012628500	HANDLE	1	AL
141	3011613900	DECO HNDL *U	1	ABS
142	3016031700	SPECIAL SCREW	2	
143	3010326100	BASE DECO COVER *T	1	HIPS
144	3010326200	BASE DECO COVER *U	1	HIPS
145	3016002700	SPECIAL SCREW	4	WASR + TRS 5 X 16 MFZN
146	7112401211	SCREW TAPPING	6	T1 TRS 4 x 12 MFZN
147	3011472100	COVER HNDL DECO *T	1	ABS
148	3011472200	COVER HNDL DECO *U	1	ABS
149	3017905500	SOCKET DISP BOX AS	1	250V 1A
150		LAMP DISP	1	
151	3011485800	COVER DISPNS BOX AS	1	FR -S650CWI
151-1	7173300811	SCREW TA PPTITE	7	T1 PAN 3 x 8 MFZN
151-2	30143C3110	PCB FRONT AS	1	FR -S660CW (SBS03 - HLCD)
151-3	3016302600	BUTTON CONTL B	4	ABS
151-4	3016303100	BUTTON CONTL A	4	ABS
151-5	3015508700	W INDO F PCB	1	ABS
151-6	3011485500	COVER DISPNS BOX	1	ABS
152	3010539100	BOX DISPNS ICE SHUT AS	1	GPPS + ABS
153	3015102200	SPRING ICE D/LEVER	1	Ø0.8 SUS 304
154	3011485900	COVER ICE FLAP AS	1	
155	3012019700	FIXTURE ICE SHUT LVR	1	T1 SUS304
156		VALVE SOL DISP	1	DISP SN6
157	3012020000	FIXTURE MICRO S/W	1	T0.6 SUS304-3/ 4H
158	3018126600	MICRO S/W AS	1	FR -S660CD

EXPLODED VIEW AND PARTS LIST

NO	PART CODE	PART NAME	Q' TY	REMARK
159	3012518200	GUIDE DISPENSER A	1	ABS
160	3012518900	GUIDE DISPENSER B	1	SILICON
161	3012402100	GRILLE DISPENSER	1	ABS
162	3019019400	POCKET DAIRY AS	1	GPPS + HIPS
163	3019019300	POCKET R *S	1	GPPS
164	3019019800	POCKET R *M	2	HIPS
165	3012514100	GUIDE R POKT	2	HIPS
166	3012513400	GUIDE BOTL	2	PP
167	3019019200	POCKET R	2	HIPS
168	3000018800	ASSY R DR	1	FR -S580CG
168 - 1	3012314500	GASKET R DR AS	1	PVC
168 - 2	3000003810	ASSY R DR URT	1	