



COMMERCIAL REFRIGERATOR/FREEZER

HRE-SC-S series
HFE-SC-S series
HRFE-SC-S series

SERVICE MANUAL

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I. GENERAL INFORMATION

1. SAFETY INSTRUCTIONS

The following instructions contain important safety precautions and should be strictly observed. The terms used here are defined as follows:

WARNING: There is a possibility of death or serious injury to the service person and a third party or the user due to improper service operations or defects in serviced products.

CAUTION: There is a possibility of injury to the service person and a third party or the user or damage to their property* due to improper service operations or defects in serviced products.

* The term "damage to their property" here refers to extensive damage to household effects, houses and pets.

WARNING

1. Always ask the user to keep children away from the work area. They may be injured by tools or disassembled products.
2. When there is no need to energize the unit during disassembly or cleaning, be sure to unplug the unit or disconnect the main power supply before servicing the unit to prevent electric shocks.
3. If the unit must be energized for inspection of the electric circuit, use rubber gloves to avoid contact with any live parts resulting in electric shocks.
4. Keep the following in mind when servicing the refrigeration circuit:
 - (1) Be sure to recover the refrigerant. Do not discharge it into the atmosphere. It will affect the environment.
 - (2) Check for any flames in the vicinity, and ensure good ventilation.
 - (3) If the refrigerant should leak in servicing, immediately stop operation, keep the site ventilated and put out any fire used in the vicinity.
 - (4) When unbrazing the refrigeration circuit connections, check that the circuit is completely evacuated and that there is no flammable refrigerant in the welding area. The refrigerant may explode gas when coming in contact with an open flame.
 - (5) Do not work in an enclosed room to prevent carbon monoxide poisoning.

- (6) In case of a refrigerant leak, locate and repair the leaking part completely before recharging the refrigerant and checking for other leaks. Be sure to check again for further leaks after recharging the refrigerant.
Leaking refrigerant may catch fire or explode if exposed to open flames.
- (7) Before servicing, check the surface temperature of the refrigeration circuit to prevent a burn.
- (8) When repairing the product, anti-static measures should be taken to prevent static sparks.
- (9) If you bring a refrigerant container for door-to-door service, the refrigerant filled in the refrigerant container should not exceed the specified value.
The container should be stored in the vehicle or at the maintenance site, fixed and placed vertically, and away from heat sources, fire sources, radiation sources, and electrical equipment.

5. Keep the following mind when making electrical connections:

- (1) Check for proper earth connections, and repair if necessary to prevent electric shocks.
- (2) Always use service parts intended for the applicable model for replacement of defective parts. Use proper tools to secure the wiring. Otherwise abnormal operation or trouble may occur and cause electric leaks or fires.
- (3) Check for proper part installations, wiring conditions and soldered or solderless terminal connections to avoid fire, heat or electric shocks.
- (4) Be sure to replace damaged or deteriorated power cords and lead wires to prevent fire, heat or electric shocks.
- (5) Cut-off lead wires must be bound using closed end connectors or the like, with their closed ends up to avoid entrance of moisture that could lead to electric leaks or fire.
- (6) After servicing, always use a megohmmeter (500V DC) to check for the insulation resistance of at least 1 megohm between the live part (attachment plug) and the dead metal part (earth terminal).
- (7) Do not service the electrical parts with wet hands to prevent electric shocks.
- (8) The capacitors used for the compressor and other components may be under high voltage and should be discharged properly before servicing.

CAUTION

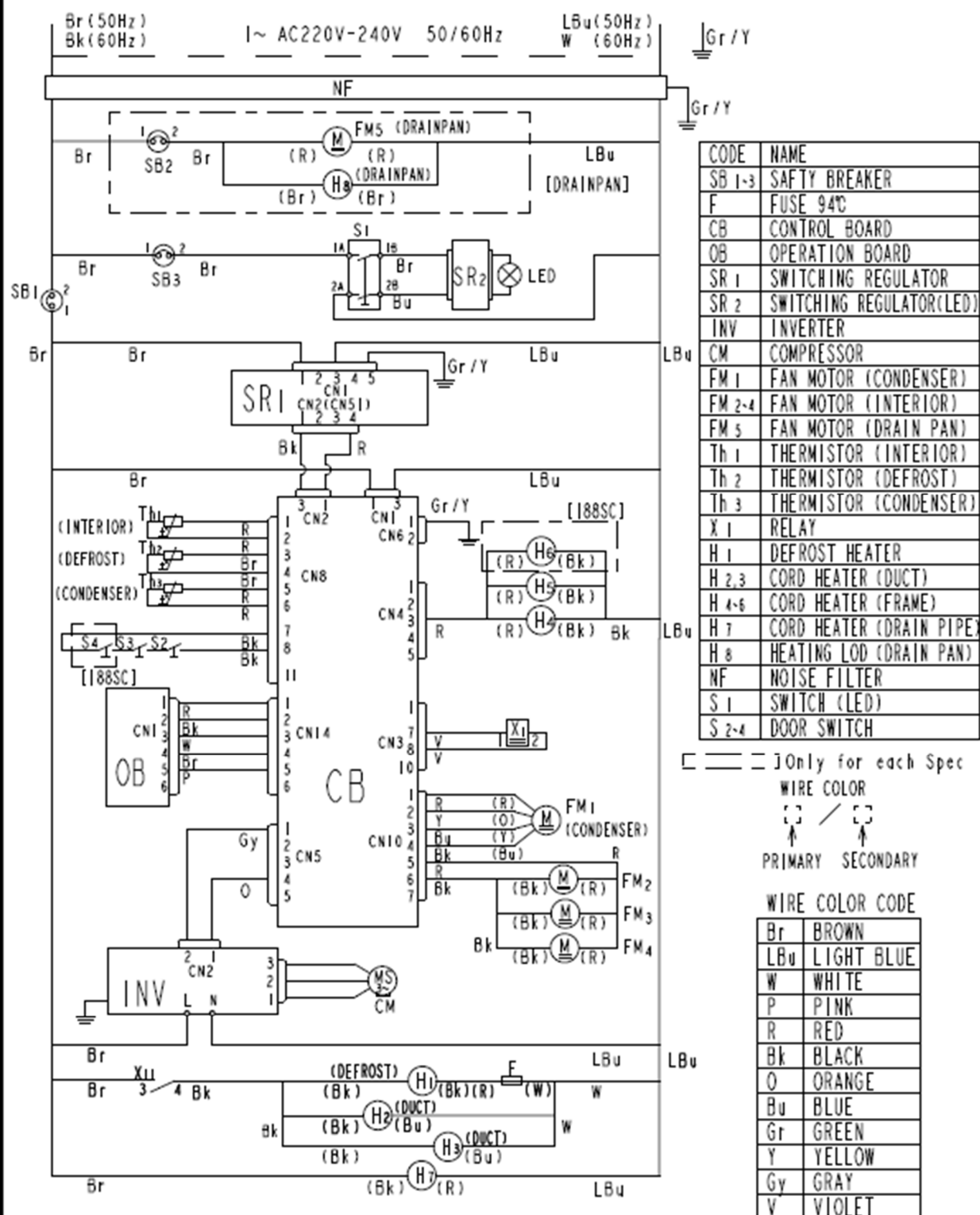
1. After servicing, follow the instructions below:

- (1) Always check the unit for proper operation before finishing services.
- (2) Be sure to reassemble the parts completely. Loose assembly of such parts as control box cover may cause entrance of vermin resulting in a short circuit between terminals and possible ignition.

2. PACKING SPECIFICATIONS

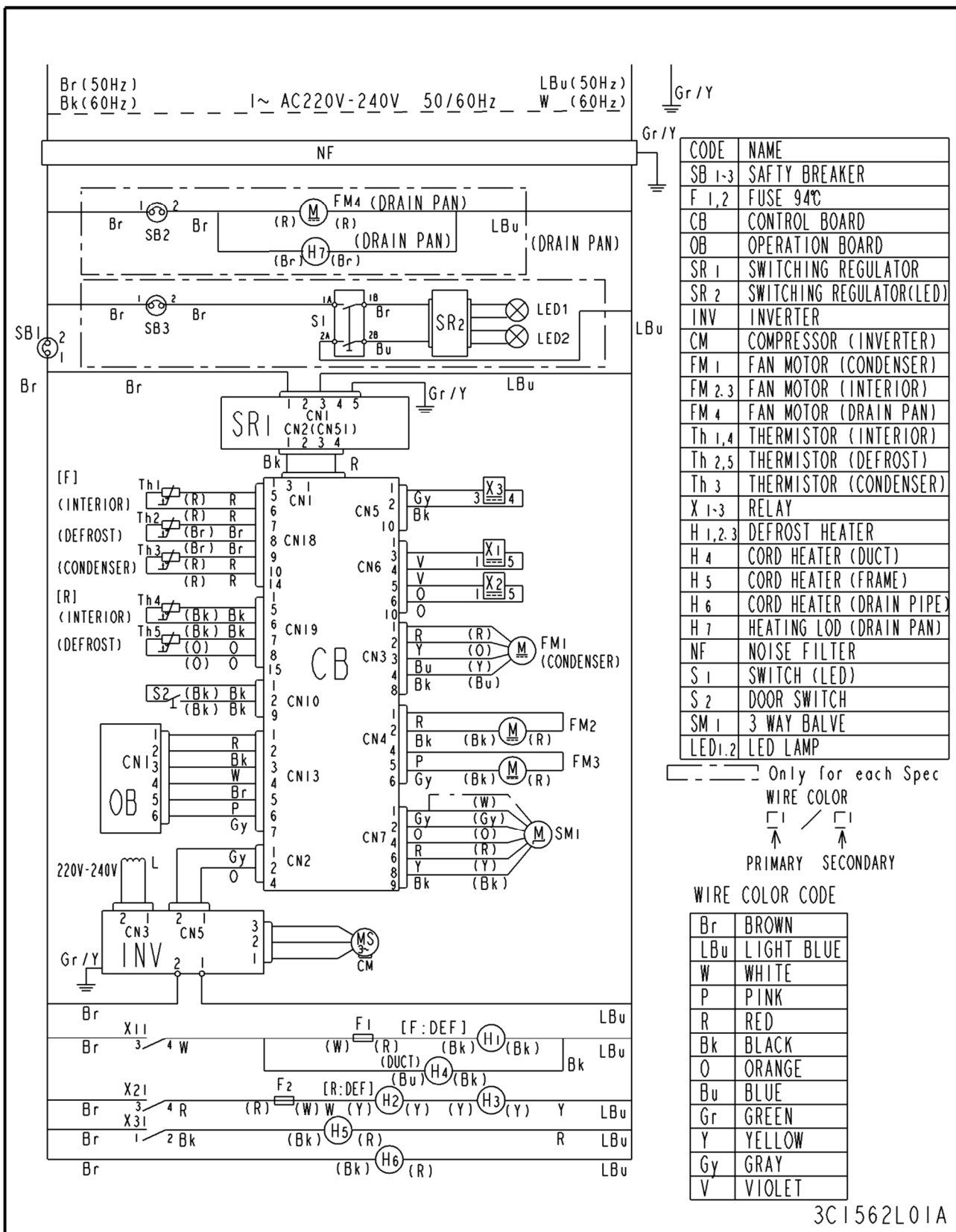
MODEL	WEIGHT		WIDTH [mm]	DEPTH [mm]	HEIGHT [mm]
	Net [kg]	Gross [kg]			
HRE-78SC-S	102	124	760	920	2075
HRE-128SC-S	145	171	1260	920	2075
HRE-148SC-S	156	186	1460	920	2075
HRE-188SC-S	189	224	1860	920	2075
HFE-78SC-S	104	126	760	920	2075
HFE-128SC-S	147	173	1260	920	2075
HFE-148SC-S	158	188	1460	920	2075
HFE-188SC-S	191	226	1860	920	2075
HRFE-78SC-S	—	—	760	920	2075
HRFE-128SC-S	—	—	1260	920	2075

[b] HFE-128 - 188SC-S

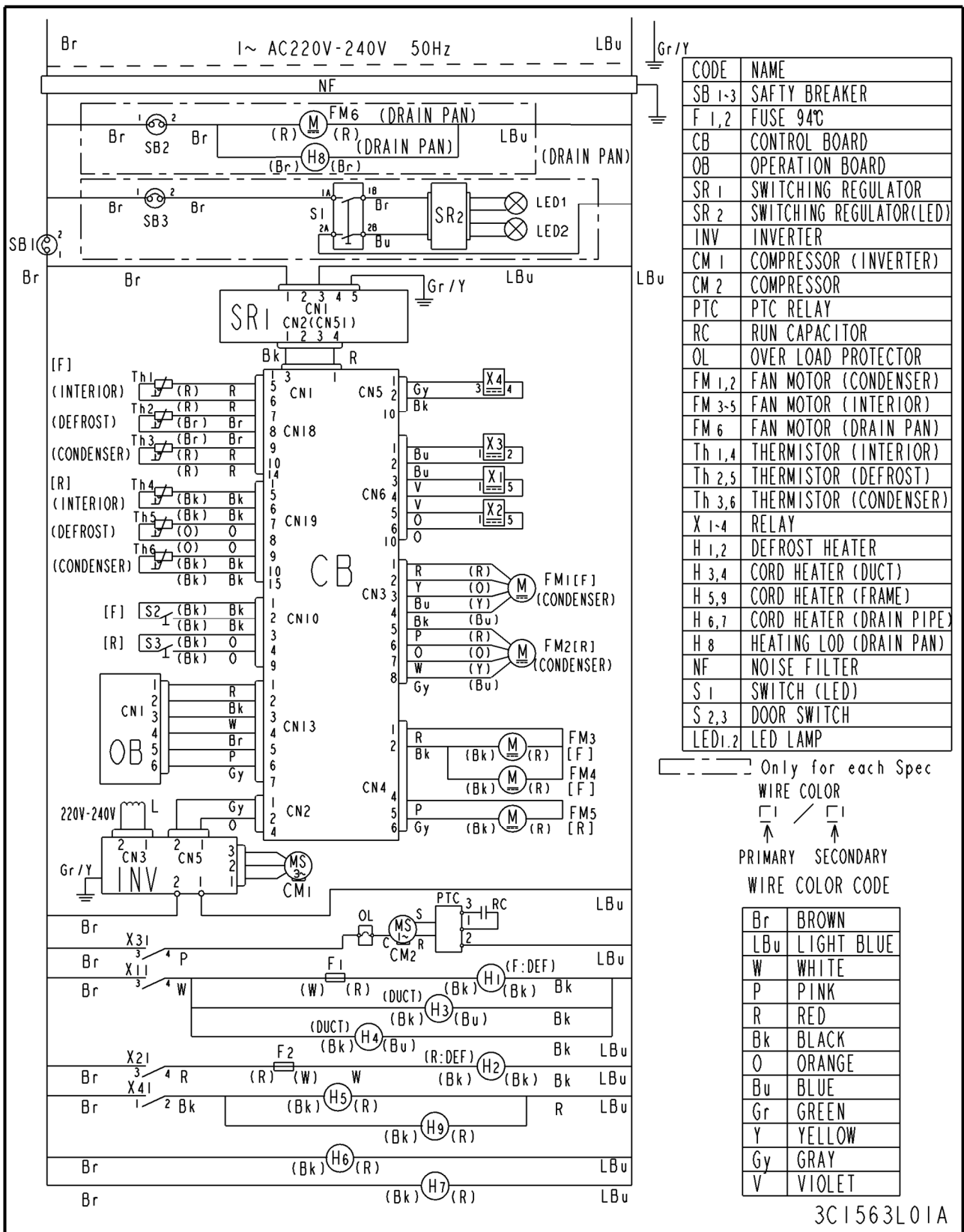


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[c] HRFE-78SC-S

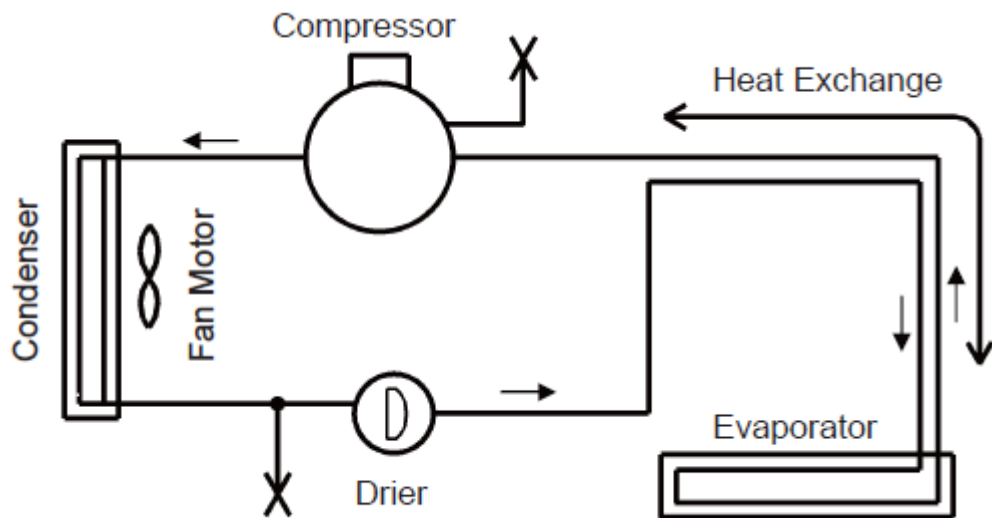


[d] HRFE-128SC-S

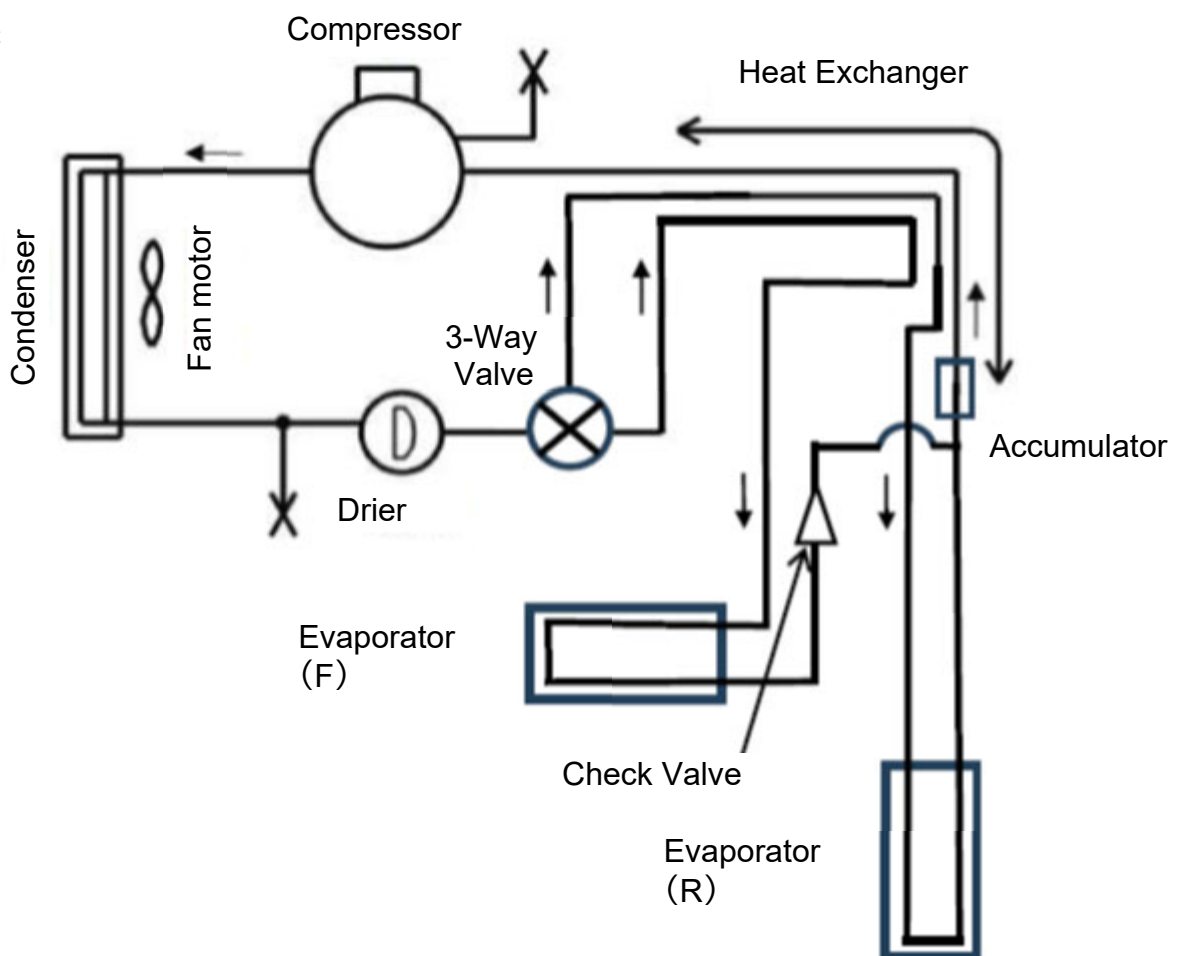


2. REFRIGERATION CIRCUIT

HRE/HFE

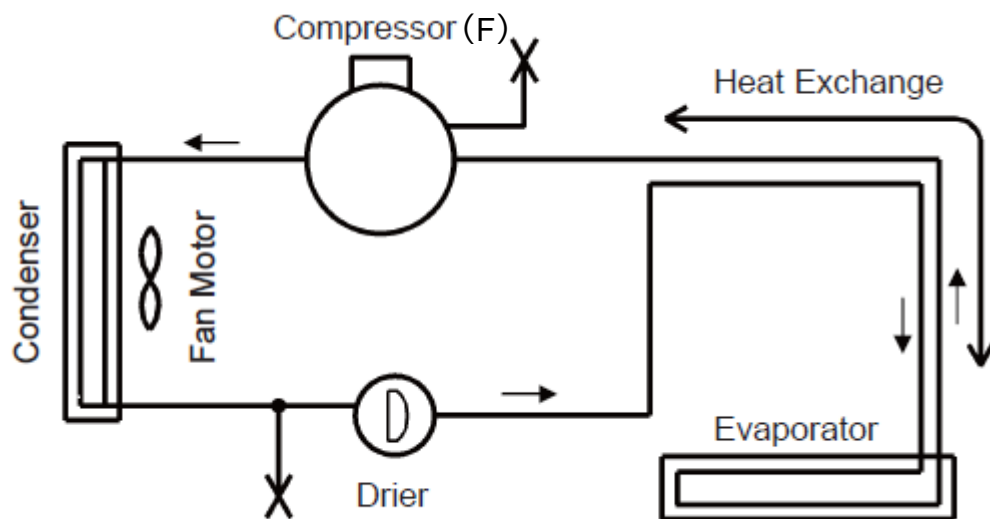
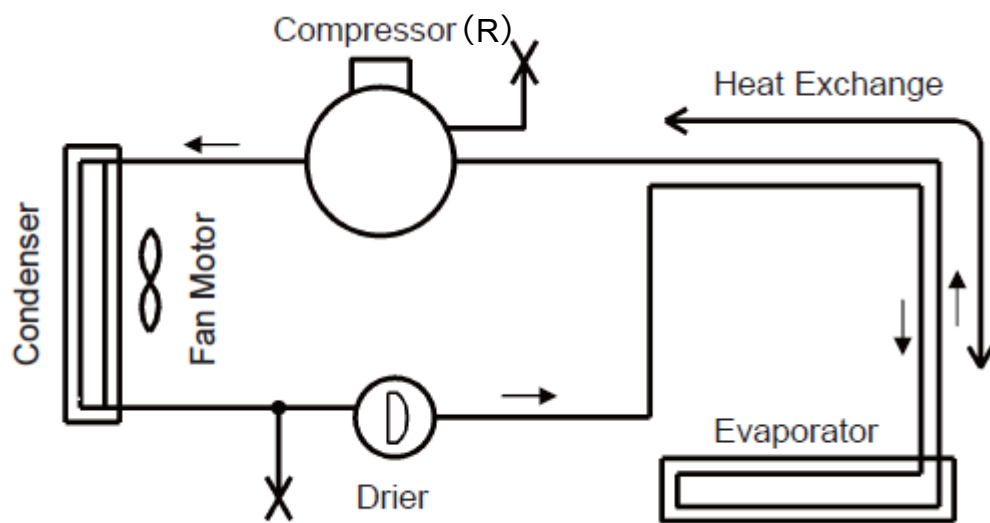


HRFE-78SC



Refrigerant: HC-R290

HRFE-128SC



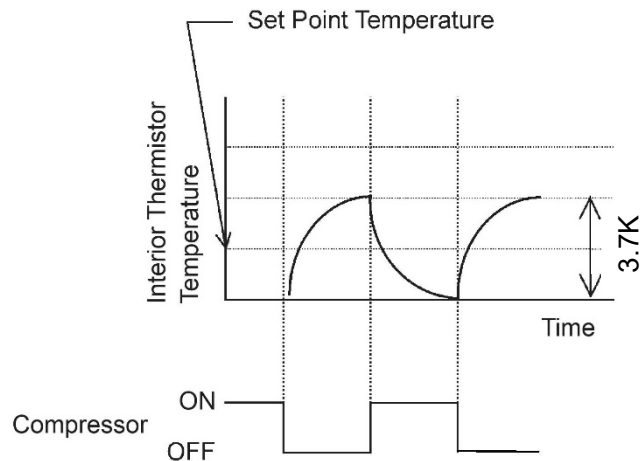
Refrigerant: HC-R290

3. ELECTRONIC CONTROLS

[a] SET POINT TEMPERATURE

(Mean temperature between compressor ON and OFF temperatures)

Refrigerator: -6 to +12°C
Freezer : -25 to -7°C



[b] CABINET TEMPERATURE DIFFERENTIAL

3.7K OFF temperature = Set point temp - 2.0 K
ON temperature = Set point temp + 1.7 K

Note: On the Controller Board only. Actual differential may be larger.

[c] DEFROST CYCLE

Every 6 hours

Note: During a defrost cycle, the Temperature Display Window indicates "dF".
See "7. TIMING CHART" for further details.

If the Defrost Cancellation Control* is activated, the defrost cycle may be up to 18 hours.

*See "S. Defrost Cancellation Control".

[d] DEFROST COMPLETION TEMPERATURE

HRE-78SC: +5°C (Off-cycle defrost), +25°C (Heater defrost) * See note below
HRE-128 - 148SC: +5°C (Off-cycle defrost), +20°C (Heater defrost) * See note below
HRE-188SC: +20°C
HFE-78SC: +10°C
HFE-128 - 188SC: +20°C
HRFE-78SC: +20°C (Refrigerator), +13°C (Freezer)
HRFE-128SC: +10°C (Refrigerator), +5°C (Freezer)

Note: The defrost method for HRE-78/128/148SC is factory-set to off-cycle defrost (without using the defrost heater). It is automatically switched between off-cycle defrost and heater defrost depending on the set point temperature below.

-6 to 0°C: Heater defrost
1 to 12°C: Off-cycle defrost

[e] CLOGGED CONDENSER DETECTION TEMPERATURE

Refrigerator: 55°C for 2 minutes
Freezer : 58°C for 2 minutes

[f] HIGH PRESSURE ABNORMALITY DETECTION

If a high pressure abnormality is detected under the following conditions, the compressor will be forcibly stopped for 6 minutes.

- 1) The clogging thermistor temperature exceeds the high pressure detection temperature.

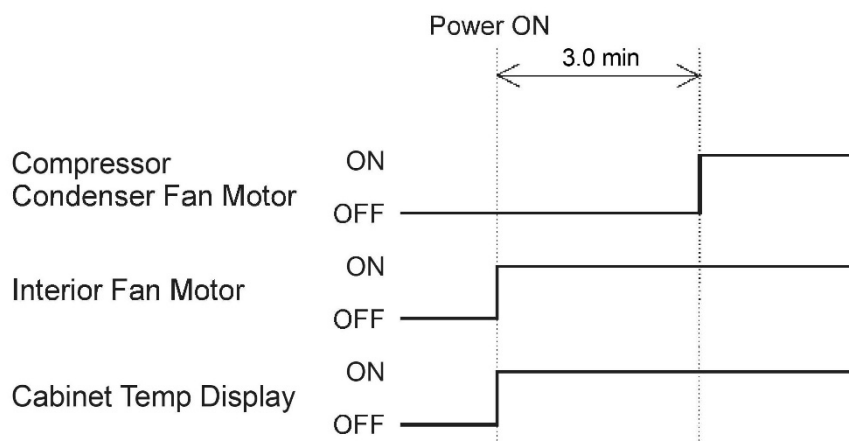
High pressure detection temperature: Refrigerant R290 / 70°C

[g] TEMPERATURE DISPLAY CYCLE

The Temperature Display Window renews its cabinet temperature display every 30 seconds. The display remains the same for 30 seconds even if the actual temperature changes in the meantime. During a defrost cycle, the temperature Display Window indicates “dF”.

[h] COMPRESSOR SOFT START

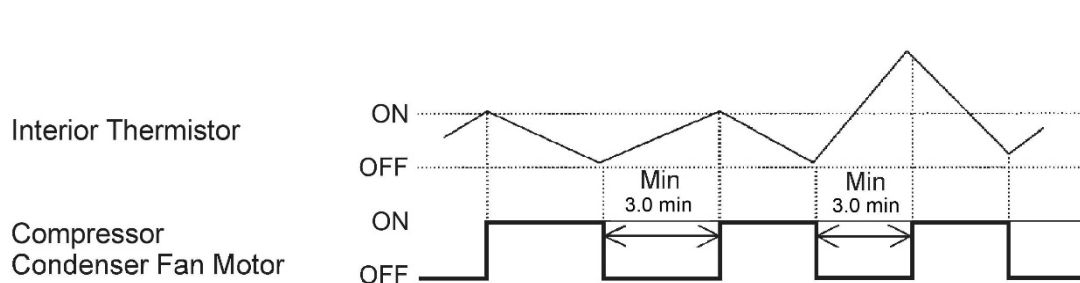
- 1) Startup



When the power supply is turned on, the Interior Fan Motor starts up and the Temperature Display Window shows the cabinet temperature, but the Compressor and Condenser Fan Motor start up with a 3.0 minute delay.

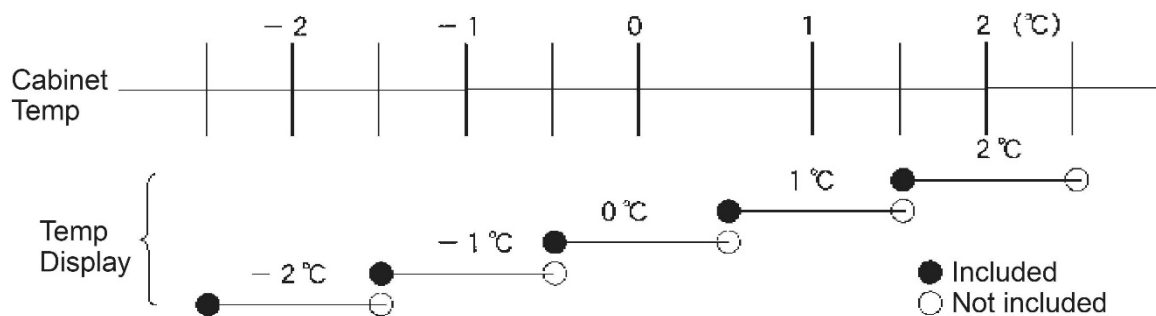
This delay is intended to minimize the difference between the high-side and low-side pressures and to reduce the load on the Compressor so that it can start easily in case of a short (especially instantaneous) power failure.

2) Normal Control



When the Compressor turns off during normal control, it has a mandatory 3.0 minute delay before startup. For example, if the Compressor turns off by its Thermistor and the Door is opened immediately after (causing the cabinet temperature to immediately exceed the restart temperature), the Compressor will still not start until 3.0 minutes have passed since its shutdown.

[i] CABINET TEMPERATURE AND TEMPERATURE DISPLAY



[j] RESOLUTION

0.5 K (1 K for temperature setting and display)

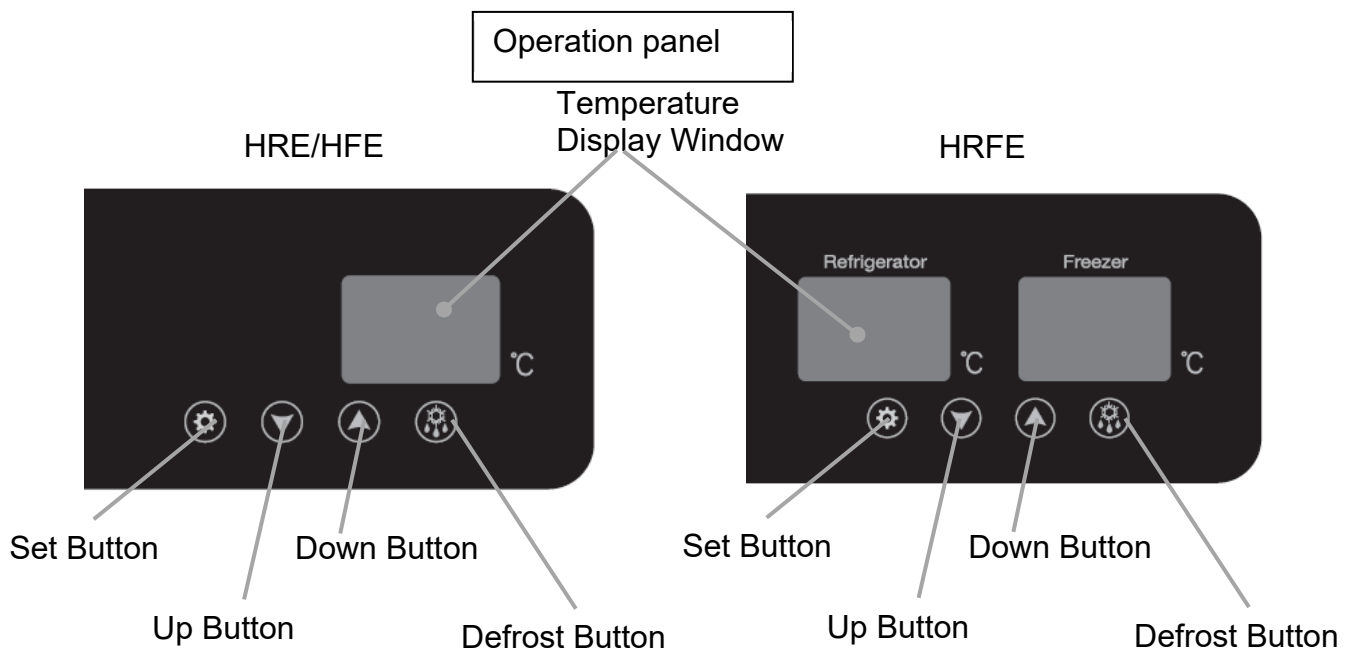
[k] CHECKING AND ADJUSTING SET POINT TEMPERATURE

Press the Set Button to display will flash the set point temperature on the Temperature Display Window.

Note: To restore the internal temperature display, wait 10 seconds or press the Set Button.

While the set point temperature flashes on the Temperature Display Window, press the Up Button (▲) or Down Button (▼) to set the desired temperature. And press the Set Button.

Note: If the Set Button is not pressed after 10 seconds, the setting will not change and the display will return to the internal temperature.



[l] MANUAL DEFROST

To start the manual defrost process, press and hold the Defrost Button for 3 seconds. During defrosting, the Temperature Display Window will display "dF".

Note: The refrigerator/freezer will not start a manual defrost cycle if the Defrost Thermistor senses a temperature of 7°C or more (Refrigerator) or 5°C or more (Freezer).

[m] CANCELLING SOFT START

To cancel the "Soft Start" (3.0 minutes delay), turn on the power supply while pressing the Set Button. The Compressor and Condenser Fan Motor will start at the same time after 10 second. At this time, the Temperature Display Window shows the data code for 5 second and return to the internal temperature.

Data code: HRE-78SC:	01
HRE-128 - 188SC:	02
HFE-78SC:	03
HFE-128 - 188SC:	04
HRFE-78SC:	07
HRFE-128SC:	08
HRE-78/128/148SC-S (energy-saving):	09
HRE-188SC-S (energy-saving):	10

Note: If you turn off the power while the compressor is running and then immediately turn it on with the soft start disabled, the high and low pressures cannot be equalized, which can lead to poor compressor start-up. Do not disable the soft start immediately after turning off the power. Wait at least 5 minutes.

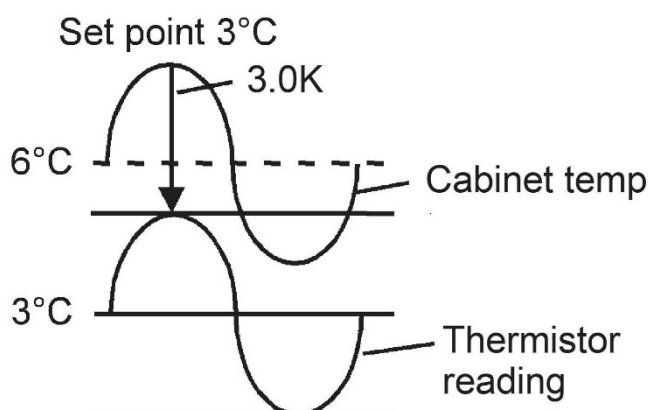
[n] CABINET TEMPERATURE CORRECTION

Any difference between the actual cabinet center temperature and the displayed temperature (Thermistor reading) can be corrected within -5.0 to 5.0 K in 0.5 K steps.

* Note: Some models do not require configuration. In addition, the set values may differ for custom-made specifications.

- 1) Turn on the power while holding down the Up and Down and Set Buttons at the same time from the power-off state. → Display “C0”.
- 2) Press the Up or Down button to switch the display and display “C2”.
* Note: Other than that, please do not change it.
- 3) Press the Set Button to display the correction value.
(e.g. “10” stands for 1.0 K).
- 4) Press the Up or Down button to change the setting.
- 5) Press the Set Button again to display “C2”.
- 6) Turn off the power supply and turn it back on. The cooling cycle begins with the corrected offset.

For example, as shown on the below, if the average cabinet temperature is 3 K higher than the Thermistor reading, set the offset to 3.0 K. The cabinet temperature will be controlled at 3°C.



[o] CONDENSER FAN MOTOR CONTROL

The rotation speed of the Condenser Fan Motor can be changed in 5 steps depending on the condenser temperature (clogging thermistor temperature). The higher the condensation temperature, the faster it rotates.

1. Temperature conditions

Refrigerator

Clogging thermistor temperature is 42°C or higher: 1 step up

Clogging thermistor temperature is 39°C or lower: 1 step down

Freezer

Clogging thermistor temperature is 40°C or higher: 1 step up

Clogging thermistor temperature is 39°C or lower: 1 step down

However, the rotation speed will be maintained for 10 seconds immediately after the change.

2. Clogging temperature conditions

When the high pressure abnormality is detected, the unit will operate in 5(max)-speed.

Note: If the high pressure abnormality occurs, the compressor and Condenser Fan Motor will stop immediately, so the actual operation at 5(max)-speed will be after a 6-minute protective stop after the high pressure abnormality is reported.

3. Condenser fan speed

Model	Speed	Number of Revolutions [r/min]	Pulse/sec [pulse/sec]
Shinano Kenshi DR-738-602 4 pulse / 1 roll (P07098-01)	Stop	0	0
	1	382	113
	2	566	120
	3	750	127
	4	1000	136
	5 (Max)	1250	145

[p] INTERIOR FAN MOTOR CONTROL

Only the Refrigerator operates intermittently when the compressor is OFF.
The Freezer operates constantly ON even when the compressor is OFF.

Model	Temperature setting	ON Time	OFF Time
Refrigerator	0 to +12°C	15 sec.	150 sec.
	-6 to -1°C	15 sec.	90 sec.

[q] ANTI-CONDENSATION HEATER SETTING

The energizing rate is determined by the difference between the ambient temperature and the internal temperature, and the heater to prevent condensation is powered intermittently. The energizing rate is updated every minute.

When shipped, the duty ratio level is set to [0].

If condensation occurs due to the installation environment, you can change the duty ratio level in user setting mode.

[HRE-SC series, Current carrying rate list of frame heater]

* Heater ON/OFF 1 cycle = 3 minutes

Level	Applicable Model	Ambient Temp. – Internal Temp. [K]	ON Time [seconds]	OFF Time [seconds]	Energizing Rate [%]
[0] Factory Setting	HRE-78SC-S [S186-V9**] HRE-128SC-S [S187-V9**] HRE-148SC-S [S188-V9**] (Cabinet temp. set to 1°C or higher)			Always OFF	
[0] Factory Setting	HRE-78SC-S [S186-V9**] HRE-128SC-S [S187-V9**] HRE-148SC-S [S188-V9**] (Cabinet temp. set to 0°C or lower) and all other models	$\Delta T \geq 45$	Always ON	-	100
		$40 \leq \Delta T < 45$	153	27	85
		$35 \leq \Delta T < 40$	126	54	70
		$30 \leq \Delta T < 35$	99	81	55
		$25 \leq \Delta T < 30$	72	108	40
		$20 \leq \Delta T < 25$	45	135	25
		$\Delta T < 20$	18	162	10
[1]	All models	$\Delta T \geq 40$	Always ON	-	100
		$35 \leq \Delta T < 40$	153	27	85
		$30 \leq \Delta T < 35$	126	54	70
		$25 \leq \Delta T < 30$	99	81	55
		$20 \leq \Delta T < 25$	72	108	40
		$15 \leq \Delta T < 20$	45	135	25
		$\Delta T < 15$	18	162	10
[2]	All models	$\Delta T \geq 35$	Always ON	-	100
		$30 \leq \Delta T < 35$	153	27	85
		$25 \leq \Delta T < 30$	126	54	70
		$20 \leq \Delta T < 25$	99	81	55
		$15 \leq \Delta T < 20$	72	108	40
		$10 \leq \Delta T < 15$	45	135	25
		$\Delta T < 10$	18	162	10
[3]	All models		Always ON	-	100

[r] MAIN BOARD MODEL SETTING

When you turn on the power while pressing the Up Button and Down Button, the model setting number of the main board will be displayed in the temperature display.

Data code:	HRE-78SC:	01
	HRE-128 - 188SC:	02
	HFE-78SC:	03
	HFE-128 - 188SC:	04
	HRFE-78SC:	07
	HRFE-128SC:	08
	HRE-78/128/148SC-S (energy-saving):	09
	HRE-188SC-S (energy-saving):	10

Note: After replacing the main board, you must set the correct model. For instructions, see "5. [g] HOW TO SET MODEL AND INTERNAL TEMPERATURE CORRECTION VALUE WHEN REPLACING BOARD".

[s] DEFROST CANCELLATION CONTROL (Only FREEZER)

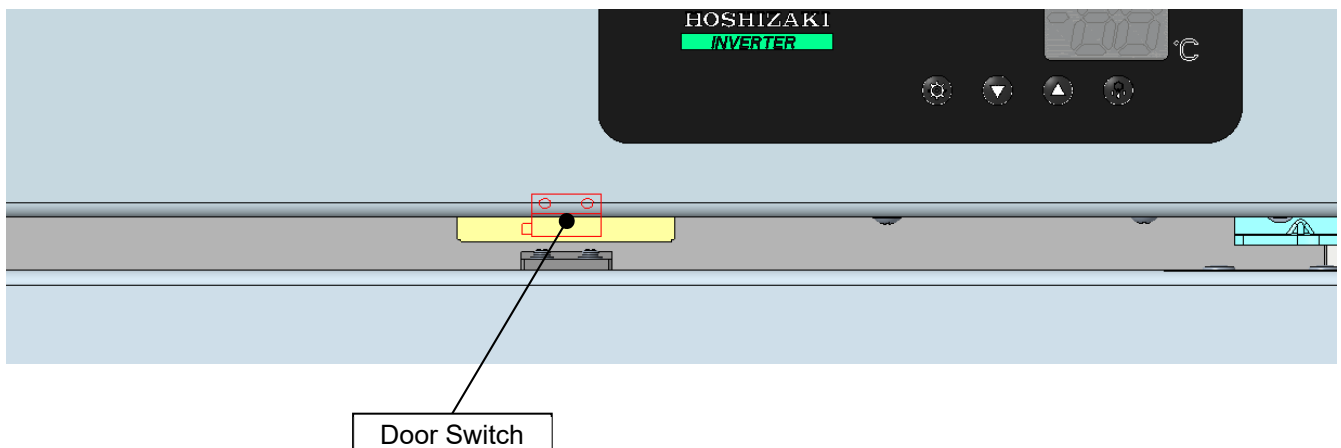
If all of the following conditions are met, the automatic defrost that occurs every 6 hours will be canceled. It will be canceled up to two times in a row, so the defrost cycle may be up to 18 hours.

1. Ambient temperature 25°C or higher.
2. Cabinet temperature setting: -25°C or higher.
3. The cabinet temperature has never exceeded the balance temperature +1K.
4. The last two defrosts have not been cancelled consecutively.

[t] DOOR SWITCH

Some models are equipped with a Door Switch.

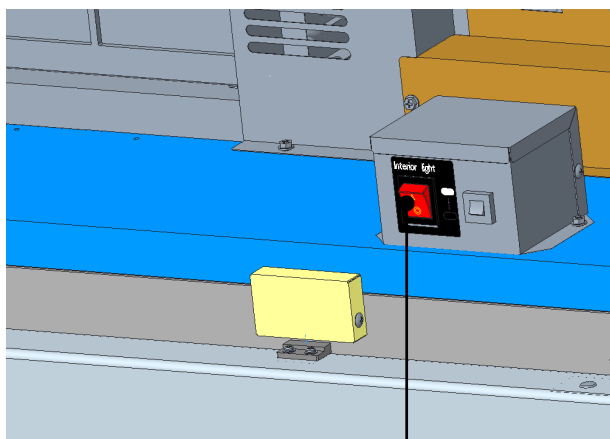
If the appliance has a Door Switch, the Interior Fan Motor will stop when the door is opened. When the Door is closed, the Interior Fan Motor will start again 10 seconds later.



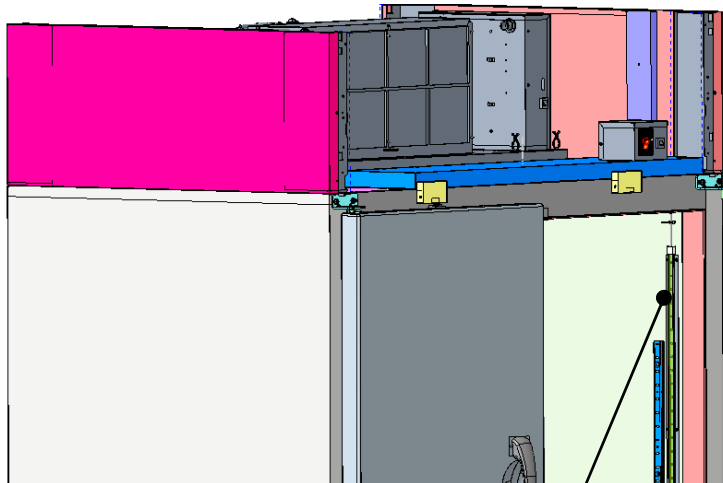
[u] LED LIGHT AND SWITCH

Some models are equipped with an LED Light on the inside the cabinet and an ON/OFF switch inside the Front Panel. Use the LED Light when necessary.

Note: Be careful not to hit the LED light with stored items to prevent damage or malfunction.



ON/OFF Switch
for LED Light



LED Light

4. INVERTER

Item	Part No.	Name	Specification	Used Model
Compressor	P06828-02	FMFT406U-513805028 (Embraco)	For Inverter R290, 230V 46-150Hz	HRE-SC HFE-78SC HRFE-SC
	P06761-01	FMFD413UE 5138050XX (Embraco)	For Inverter R290, 230V 53-167Hz	HFE-128 - 188SC
Inverter Board (Inverter Box with Inductors)	P06831A01 (P06831-01 + P06832-01)	Inverter: 519308522 (VCC3 2456 T8 A 0Q) Inductors: 193504021 (3A/8.0mHV) (Embraco)	For FMFT406U 220-240V 48-62Hz 3.3A 320W	HRE-SC HFE-78SC HRFE-SC
	P07397-01	Inverter : 519302231 (CF10C01 M0.1 23A01)	For FMFD413UE 220-240V 50-60Hz 5.0A 1000W	HFE-128 - 188SC
Controller Board (Mainboard)	P05426-04	HK036-04 (Katata Electric Co., Ltd.)	-	HRE/HFE/
Controller Board (Mainboard)	P04611-14	HK031-14 (Katata Electric Co., Ltd.)	-	HRFE-SC
Operation Board	P06503-01	HK045-01 (Katata Electric Co., Ltd.)	-	HRE/HFE/ HRFE-SC
Switching Regulator	C05928-01	CUS30-12 (TDK-Lambda)	-	HRE/HFE/ HRFE-SC
Protector (Circuit Breaker)	440972-01	W28XQ1A-10 (ASAHIKIKEN KOGYO)	AC250V, 10A	HRE/HFE/ HRFE-SC

[a] INVERTER CONTROL

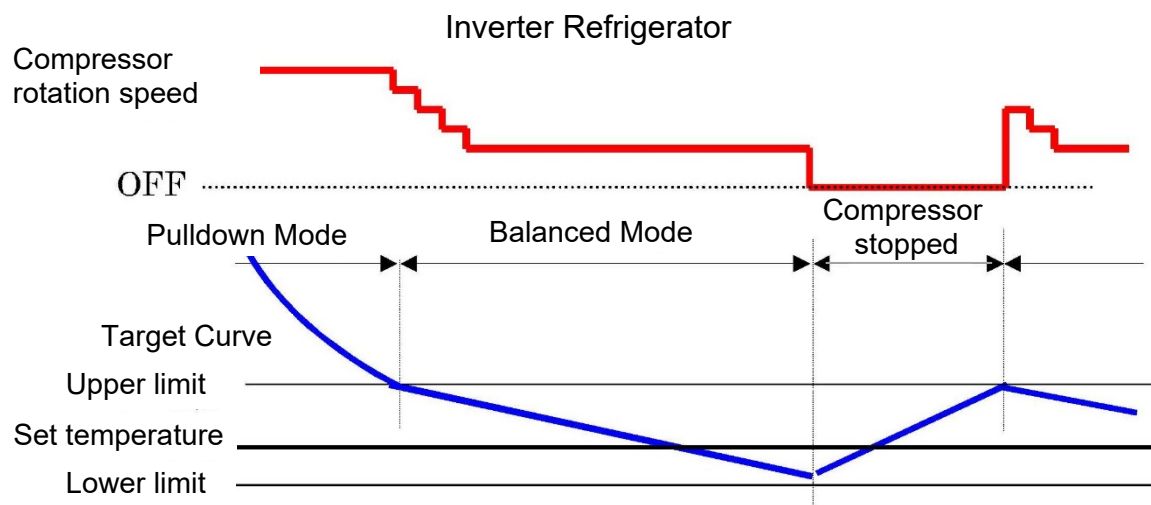
The rotation speed of the inverter compressor is 6 speeds.

The higher the speed, the greater the cooling capacity, but the higher the power consumption. On the other hand, the lower the rpm, the smaller the cooling capacity, but the lower the power consumption.

The rotation speed of the inverter compressor is determined on the main board along the cooling target curve according to the temperature inside the chamber.

In addition, the rotation speed is controlled according to the temperature inside the cabinet and the condensation temperature.

Target Curve



In order for the thermistor temperature inside the chamber to follow the target curve (pull-down curve), the compressor speed is adjusted for cooling.

The compressor is operated ON/OFF depending on the temperature of the thermistor in the chamber. Within the upper limit of the set temperature, the rotation speed is reduced and the operation is performed.

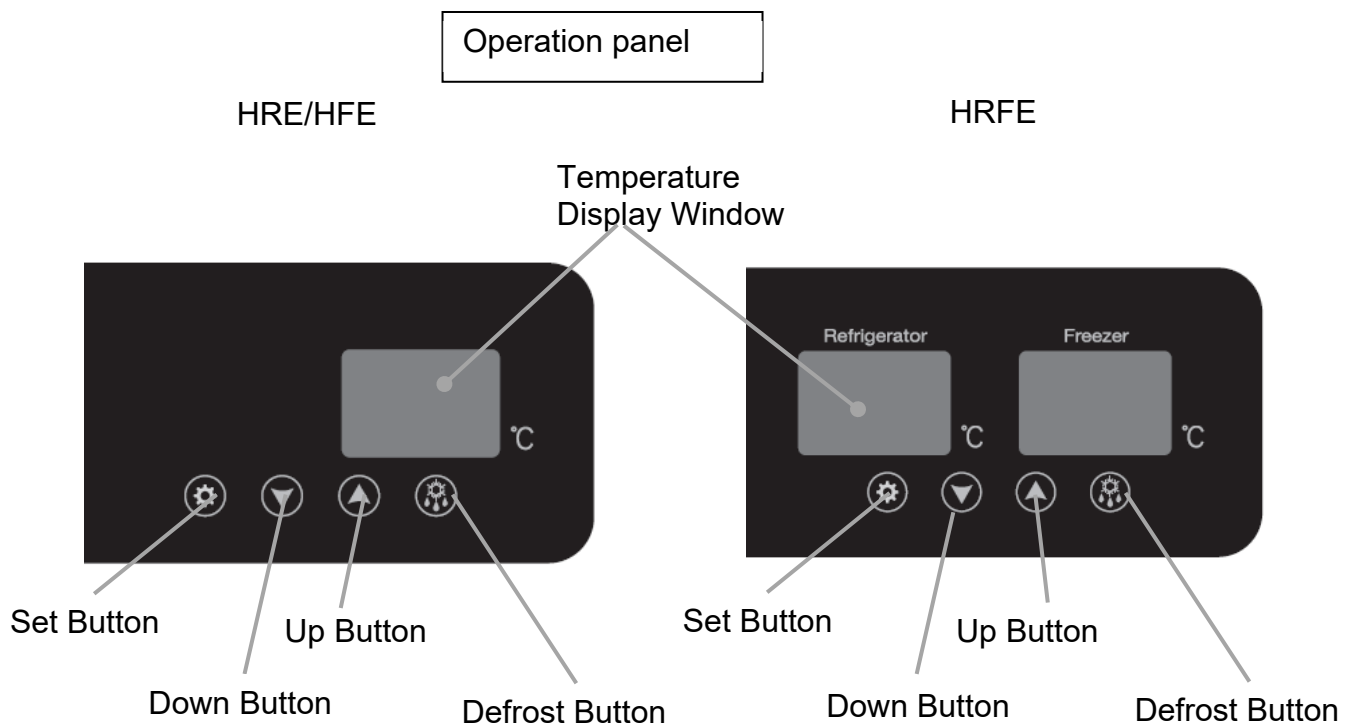
[b] NOISE GENERATED BY INVERTER MACHINES

Due to the nature of inverter machines, when the inverter board converts DC voltage to pseudo-AC voltage, the contacts are turned on and off at high speed, resulting in radiated noise (noise). The inverter control of this unit is designed to comply with the Electrical Appliance and Material Safety Act, but depending on the usage conditions, there may be disturbances in the reception of nearby TVs and radios. In that case, please take the following measures to see how it goes.

1. Make sure that the machine is grounded.
2. Television and radio should be kept as far away from the unit as possible.
3. Indoor antennas, telephones, cable broadcasting signal lines, etc. should be installed as far away from the unit as possible.
(If possible, do not use an indoor antenna)
4. Do not take electricity from the same outlet as the refrigerator.

5. MAINTENANCE MODE

[a] DISPLAY PANEL



[b] LIST OF BASIC BUTTON OPERATIONS

Situation	Button	How to press	Behavior
Always	Set Button	Short	Flashing display of the temperature setting inside the cabinet
Always	Press the Setting Button, press the Up or Down Button, and then press the Set Button again	Short	Changing the temperature setting inside the cabinet
Always	Defrost Button	Long (3 seconds)	Manual Defrost
When the error is on	Up Button	Long (3 seconds)	Clearing the error display (There is an unbreakable error)

[c] HOW TO CHECK ERROR HISTORY

1) HOW TO CHECK THE ERROR HISTORY

1. Press and hold the two buttons, the Up Button and the Set Button, at the same time for 5 seconds. (Press the Up Button first) → display is "F0"
2. Use the UP and DOWN Buttons to display "F6".
3. Press the Set Button. → error history flashes in the order in which they occurred. When there is no error, it is displayed, "—".
The error history flashes on the temperature display.
4. Press the Set Button. → Return to "F6" display.
5. Do the same as in 1. → Return to the temperature display in the cabinet.
(Even if you do nothing for 1 minute, the temperature display inside the cabinet will return.)

2) HOW TO CLEAR THE ERROR HISTORY

1. Perform operations up to 1 - 3. of 1).
2. Press and hold the Up button for 5 seconds. → "—" flashes.
3. Perform operations up to 4 - 5. of 1).

3) NOTES ON CHECKING THE ERROR HISTORY

There are several types of displays from F0 to FF before the display is set to F6, but do not accidentally press other buttons at this time. The basic settings may change and malfunction. If you accidentally perform other operations, leave it for 1 minute and it will return to the temperature display inside the cabinet. The error history remembers only the type of error that occurred. When the same error occurs consecutively, there is only one history.

[d] HOW TO CHANGE OPERATION SETTING

Settings that can be changed

1. Cabinet temperature setting
2. Conductivity distribution setting for the front frame
3. Soft-start release
4. Automatic defrost interval ---[F0]
5. Time of alert of "E1" error (high-temperature) ---[F3]
6. Time of alert of "E2" error (low-temperature) ---[F4]
7. Whether the interior Fan Motor operates intermittently during defrosting ---[F5]
8. Error history check (Clear History) ---[F6]
9. Fixed inverter speed ---[F7]
10. Setting the Defrost Cancel ---[FA]
11. Buzzer output (external output) ---[Fb]
12. Setting the Defrost Backup Timer ---[FC]
13. Choosing Condenser Fan Control ---[FF]
14. Low Noise Mode

Except for 1. and 2., the default settings are set to meet the specifications.
Don't change it unless you have to.

1. Changing the temperature setting inside the cabinet

When the Set Button is pressed, the digital temperature display switches from the cabinet temperature to the cabinet set temperature, and the current set temperature flashes. From the flashing display state, use the UP Button or DOWN Button to adjust the temperature you want to set, and then press the Set Button again.

Note: After adjusting the temperature to be set, the temperature setting inside the cabinet will not be changed unless the Set Button is pressed.

2. Changing the conductivity distribution setting of the front frame heater

Press and hold the Set Button for 3 seconds to enter the user setting mode, and use the Up and Down Buttons to show "U1" on the display.

When you press the Set Button again, you will enter edit mode, and the current setting value will be flashed on the Temperature Display Window.

You can change the energization level within the range of (0~3) with the Up and Down Buttons.

Press the Set Button again to confirm the setting and return to "U1" on the display.

After returning to "U1" on the display, press the Up and Down Buttons to show "UE" on the display. Press the Set Button again to save the user settings, exit this mode, and return to the temperature display inside the cabinet.

Factory Setting: level [0]

3. Soft-start release (when you want the compressor to start immediately)

Turn on the power while holding down the Set Button. → After 10 seconds, the compressor starts.

When the power is turned on, it is activated only once.

Note: If the power is turned off during compressor operation and immediately started up with the above operation, the compressor is likely to fail to start because the high and low pressures cannot be equalized.

Do not release the soft start immediately after turning off the power.

Please leave it for at least 5 minutes.

4. Low Noise Mode (HFE-128/148/188SC)

Press and hold the Set Button for 3 seconds to enter the user setting mode, and use the Up and Down Buttons to show "U2" on the display.

When you press the Set Button again, you will enter edit mode, and the current setting value will be flashed on the Temperature Display Window.

You can change the value from 0 to 1 with the Up and Down Buttons.

Press the Set Button again to confirm the setting and return to "U2" on the display.

After returning to "U2" on the display, press the Up and Down Buttons to show "UE" on the display. Press the Set Button again to save the user settings, exit this mode, and return to the temperature display inside the cabinet.

Setting	Mode
0: factory setting	Standard
1	Low noise

[e] OPERATION SETTING CHANGE MODE

Steps 4 - 13 (as described on the previous page) are performed in the operation setting change mode shown below.

Checking and clearing the error history is also part of this operation.

1. Press and hold the two buttons, the Up Button and the Set Button, at the same time for 5 seconds. (Press the up button first) → display is F0
2. Use the UP or DOWN buttons to match the number you want to set from F0 to FF in the list below.
3. Press the Set Button. → The current setting flashes.
Note) F6: Separate operation for error history only.
4. Press the UP or DOWN Button to match the value you want to set.
If you do not know the settings, please match the initial settings of each item.
5. End editing: Press the Set Button.
6. Do the same as in 1. → Return to the temperature display in the cabinet and complete the setting.

[f] LIST OF OPERATION SETTING CHANGE MODE (Service Mode)

Number indication	Substance	Flashing indication when the Set Button is pressed
F0	Automatic defrost interval	--: No automatic defrost 3: 3 hours 6: 6 hours (default setting) 8: 8 hours 12: 12 hours 24: 24 hours * If the defrost time is long, there will be more frosting, which may cause poor cooling.
F3	"E1" error (High temperature abnormality) Time to Alert	0: Immediate notification (Not recorded in history) → For checking remote alarms. After checking, it will return to the original settings. 1: 1 hour 2: 2 hours (default setting) 3: 3 hours
F4	"E2" error (Low temperature abnormality) Time to Alert	0: Immediate notification (Not recorded in history) → For checking remote alarms. After checking, it will return to the original settings. 1: 1 hour (default setting)
F5	Whether the interior Fan Motor operates intermittently during defrosting	oF: Do not on: Do
F6	Error history check (Clear History)	(1) Press the Set Button. Display errors from E1 to Ed. (Displayed every 0.5 seconds for 1 second. Up to 8 pieces per room.) (2) Press and hold the Up Button. (5 seconds or more) The error history is cleared. (3) Press the Set Button. Return to number display "F6".
F7	Fixed inverter speed	--: 0 - 6 speed variable operation (default setting) 0 - 6: Fixed rotation speed * If it is fixed, sufficient cooling capacity may not be obtained, such as during busy times.
FA	Defrost Cancel establishment	on: Defrost cancel (default setting for Freezer) oF: Defrost do not cancel (Default setting for Refrigerator)
Fb	Buzzer output (External output)	AL: Buzzer occurs on all errors (default setting) 12: Buzzer occurs only for E1, E2 errors

FC	Defrost Backup Timer (Time until the defrost heater is forcibly turned off when the energization becomes long)	--: No time limit (No E3 errors) 4: 24 minutes (4×6 minutes) 7: 40 minutes (7×6 minutes) 10: 60 minutes (10×6 minutes) 13: 80 minutes (13×6 minutes) 17: 100 minutes (17×6 minutes) 20: 120 minutes (20×6 minutes) * If the backup time is long (no backup), there is a risk that the heater fuse will blow when the defrost heater is energized for a long time.
FF	Condenser Fan Control	AU: Speed switching possible (default setting) FL: High-speed driving

[g] HOW TO SET MODEL AND INTERNAL TEMPERATURE CORRECTION VALUE WHEN REPLACING BOARD

When replacing the main board, it is necessary to change the model setting and the temperature compensation value inside the cabinet.

- Since the model of the main board for supplying parts is not set, if it is used as it is, it will malfunction and correct cooling will not be possible. Be sure to set the model.

< How to set up model >

1. Turn off the power.
2. Turn on the power while holding down the UP and DOWN Buttons at the same time. → initial display is "--"
Note: The display is "--", but it is not the model setting that is remembered.
3. Use the UP and DOWN Buttons to match the number of the model you want to set. → display is the model setting number.
4. Press and hold the Set Button for at least 3 seconds. → indication flashes "rc"
5. Press and hold the Set Button again for at least 3 seconds. → indication flashes "oF"
6. Turn off the power. → End of setting

< How to check settings >

1. Turn on the power while holding down the Set Button.
2. After the display part is fully lit, the model display number is displayed.
(This operation will start after 10 seconds for the compressor.)

List of model setting numbers

Model		Model setting number
HRE-78SC	Refrigerator Inverter	01
HRE-128 - 188SC	Refrigerator Inverter	02
HFE-78SC	Freezer Inverter	03
HFE-128 - 188SC	Freezer Inverter	04
HRFE-78SC	Refrigerator - Freezer Inverter	07
HRFE-128SC	Refrigerator - Freezer Inverter	08
HRE-78/128/148SC-S (energy-saving)	Refrigerator Inverter	09
HRE-188SC-S (energy-saving)	Refrigerator Inverter	10

< How to set the internal temperature correction value >

* Note: Some models do not require configuration. In addition, the set values may differ for custom-made specifications.

1. Turn on the power while holding down the Up and Down and Set Button at the same time from the power-off state. → Display "C0".
2. Press the Up or Down Button to switch the display and display "C2". Other than that, please do not change it.
3. Press the Set Button to display the correction value.
4. Press the Up or Down Button to change the setting.
5. Press the Set Button again to display "C2".
6. Turn off the power. → Setup Completed.

[h] HOW TO OPERATE MAINTENANCE MODE

It is used to check the operating status of the refrigerator and is useful for fault diagnosis.

There is no operation to change the setting value, and it will be "display only"

< How to check the driving status >

1. Press and hold the Down Button and the Set Button at the same time for at least 5 seconds. (Press the Down Button first.)
→ Display is "tr" (Temperature detected by thermistor inside the cabinet.)
2. Use the Up or Down Buttons to match the number you want to set from "tr" - "ad" in the list below.
3. Press the Set Button. → Current driving status is displayed.
4. Perform the operation in 1. → Return to the temperature display in the cabinet.

< Maintenance mode display contents >

Index	Item	Display Content
tr	Interior thermistor	Interior thermistor temperature
td	Defrost thermistor	Defrost thermistor temperature
tc	Clog thermistor	Clog thermistor temperature
tA	Ambient temperature thermistor	Ambient temperature thermistor
cn	Driving Situation	"0" : S_WAIT
		"1" : FATAL_ERROR
		"2" : INTO_CONTROL
		"3" : S_START
		"4" : ZONE_JUDGE_INIT
		"5" : ZONE_JUDGE
		"6" : R__INIT
		"7" : OUT_OF_CONTROL__
		"8" : S_PULL_DOWN
		"9" : S_FORCE_DOWN
		"10" : S_STOP
		"11" : S_BALANCE
		"12" : R__
		"13" : S_ZONE
		"14" : S_PULL_DOWN_
		"15" : DOOR_CTRL_INIT
		"16" : DOOR_CTRL
		"17" : R__INIT
		"18" : OUT_OF_CONTROL__
		"19" : DOOR_CLOSE
		"20" : DOOR_OPEN
		"21" : R__
		"22" : DOOR_OPEN_CLOSE
		"23" : COMP_TM_CTRL_INIT

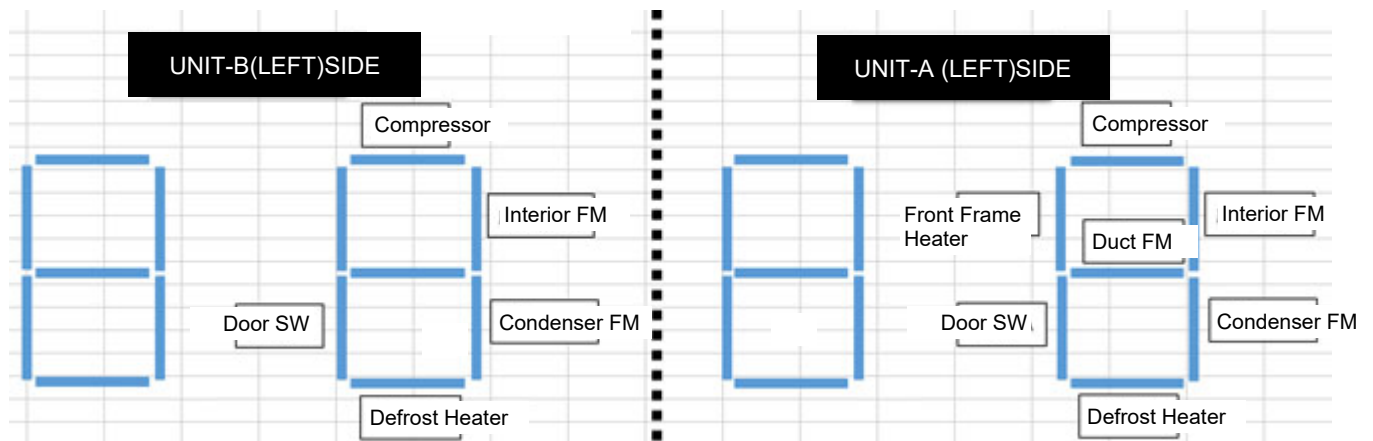
		"24" : COMP_TM_CTRL
		"25" : R__INIT
		"26" : OUT_OF_CONTROL_
		"27" : OFF_TIME_NG
		"28" : OFF_TIME_OK
		"29" : ON_TIME_NG
		"30" : ON_TIME_OK
		"31" : R_
		"32" : COMP_OFF
		"33" : COMP_ON
		"34" : COOLING_DEF_INIT
		"35" : COOLING_DEF
		"36" : R_INIT
		"37" : OUT_OF_CONTROL
		"38" : COOLING_NG
		"39" : COOLING_EXPECTED
		"40" : COOLING_UDON_STOP
		"41" : ROOM_FAN_ON
		"42" : INTERVAL_OFF
		"43" : INTERVAL_ON
		"44" : COMP_SPEED_CONTROL
		"45" : DEF_DELAY
		"46" : DEF_HEATER
		"47" : DEF_DRAIN
		"48" : FAN_DELAY_WAIT
		"49" : FAN_DELAY_HIGH_PRESSURE_RELEASE
		"50" : FAN_DELAY_HIGH_PRESSURE
		"51" : FAN_DELAY_NORMAL
		"52" : DEF_FINISH
		"53" : R
		"54" : COOLING_CONTROL
		"55" : COOLING_OK
		"56" : COOLING_ROOM_SENSOR_ERROR
		"57" : COOLING_NORMAL
		"58" : COOLING_COMP_OFF
		"59" : COOLING_COMP_ON
		"60" : DEFROST_CONTROL
		"61" : ROOM_FAN_INTERVAL
		"62" : DEF_FAN_DELAY
oP	Port Output	Left a bit:
		Left b bit:
		Left c bit:
		Left d bit:
		Left e bit:
		Left f bit:
		Left g bit:
		Right a bit: Compressor A

		Right b bit: Fan A in the cabinet
		Right c bit: condenser fan A
		Right d bit: Defrost heater A
		Right e bit: Door SW A
		Right f bit: Frame heater
		Right g bit: Duct Fan
		Left a bit:
		Left b bit:
		Left c bit:
		Left d bit:
		Left e bit:
		Left f bit:
		Left g bit:
		Right a bit: Compressor B
		Right b bit: Fan B inside the cabinet
		Right c bit: condenser fan B
		Right d bit: Defrost heater B
		Right e bit : door SW B
		Right f bit:
		Right g bit:
iP	Port Input	Left a bit:
		Left b bit:
		Left c bit:
		Left d bit:
		Left e bit:
		Left f bit:
		Left g bit:
		Right a bit: SW up
		Right b bit: SW down
		Right c bit: Set SW
		Right d bit: Manual defrost SW
		Right e bit: Door SW A
		Right f bit: Door SW B
		Right g bit:
cc	High pressure condition (clogging sensor state)	"0" : S_WAIT
		"1" : S_START
		"2" : COND_SENSOR_CTRL_INIT
		"3" : COND_SENSOR_CTRL
		"4" : R_INIT
		"5" : OUT_OF_CONTROL
		"6" : OPEN
		"7" : SHORT_DELAY
		"8" : SHORT_CONFIRM
		"9" : HIGH_PRESSURE
		"10" : COND_CLOG_DELAY
		"11" : COND_CLOG_CONFIRM
		"12" : NORMAL

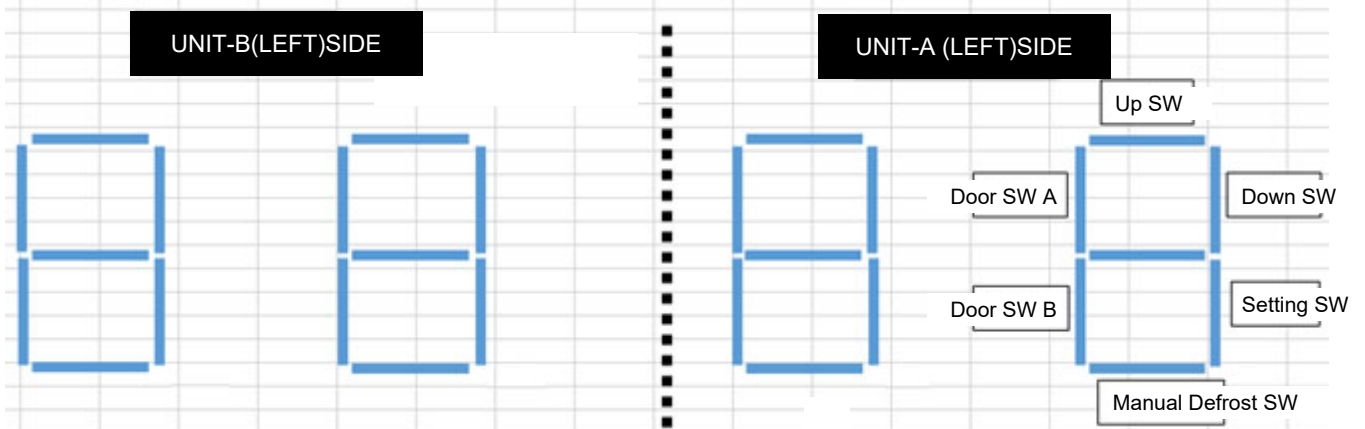
		"13" : R
		"14" : INTO_CONTROL
		"15" : COND_SENSOR_NG
		"16" : SHORT
		"17" : COND_SENSOR_OK
		"18" : COND_CLOG
		"19" : HIGH_PRESSURE_STOP_CTRL_INIT
		"20" : HIGH_PRESSURE_STOP_CTRL
		"21" : R_INIT
		"22" : NOT_HIGH_PRESSURE_STOP
		"23" : HIGH_PRESSURE_STOPPING
		"24" : R_
		Off: Not a high-pressure shutdown
		Lighting: High pressure stop
		Clogging sensor control status (*Same as 7seg on A side)
		Off: Not a high-pressure shutdown
		Lighting: High pressure stop
Fq	Current Inverter Frequency	Current Inverter Frequency
		Current Inverter Frequency
cF	Condenser Fan Status	Current rotation speed rpm/100
		Current rotation speed rpm/100
id	Model settings	Top 2 digits of the version (lit for 2 seconds)
		↓ (Off for 0.5 seconds)
		Lower 2 digits of the version (lit up for 2 seconds)
		↓ (Off for 0.5 seconds)
		Top 2 digits of checksum (lit for 2 seconds)
		↓ (Off for 0.5 seconds)
		Lower 2 digits of checksum (lit for 2 seconds)
		↓ (Off for 0.5 seconds)
		End of display
ad	Defrost Cancellation Conditions	Left a bit:
		Left b bit:
		Left c bit:
		Left d bit:
		Left e bit:
		Left f bit:
		Left g bit:
		Right a bit: Automatic defrosting?
		Right b bit: Ambient temperature above 25°C?
		Right c bit: Is the ambient temperature sensor open/short-circuited?
		Right d bit: Is the cabinet temperature setting: -25°C or higher?
		Right e bit: Once the balance area is in, isn't it missing?
		Right f bit: Haven't you canceled two in a row in the last minute?
		Right g bit: Compressor operation rate less than 45%? (Refrigerated only)
		Left a bit:
		Left b bit:
		Left c bit:

		Left d bit:
		Left e bit:
		Left f bit:
		Left g bit:
		Right a bit: Automatic defrosting?
		Right b bit: Ambient temperature above 25°C?
		Right c bit: Is the ambient temperature sensor open/short-circuited?
		Right d bit: Is the cabinet temperature setting: -25°C or higher.?
		Right e bit: Once the balance area is in, isn't it missing?
		Right f bit: Haven't you canceled two in a row in the last minute?
		Right g bit: Compressor operation rate less than 45%? (Refrigerated only)

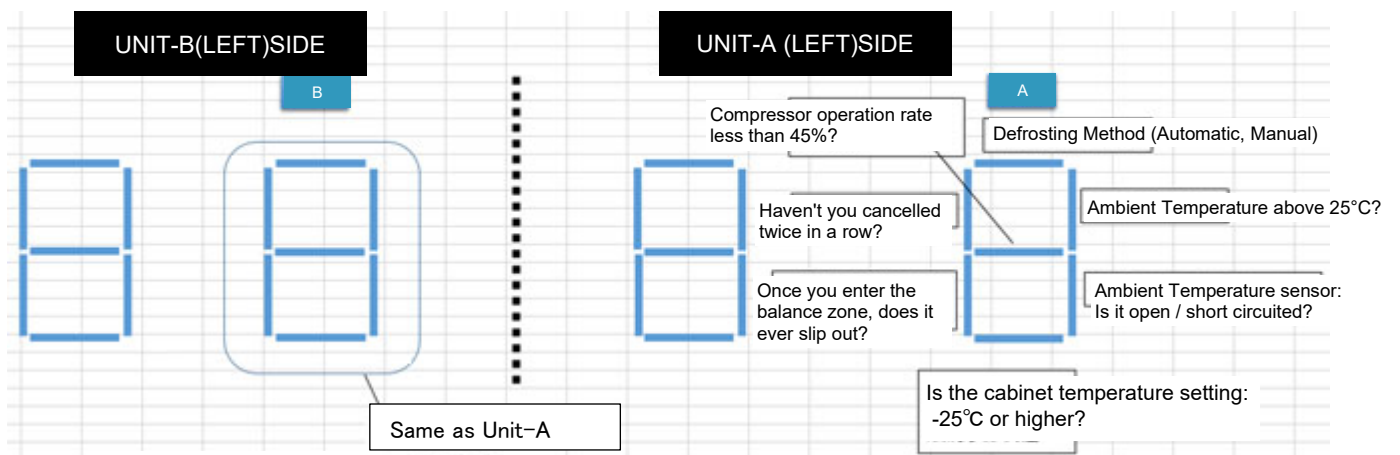
7-segment display of port output "oP"



7-segment display of port output "IP"



7-segment display of the defrost cancellation condition "ad"



6. ERROR CODES

In case of trouble, the Temperature Display Window will alternately flash every second between one of the following error codes and the cabinet temperature or “dF” during a defrost cycle. The error codes are displayed in the following order of priority:

Priority	Code	Error
1	EA	EEPROM Write Error
2	Ed	EEPROM Verify Error
3	Eb	Operation Board Verify Error
4	EC	Operation Board Communication Error
5	E5	Interior Thermistor Defective
6	E8	Defrost Thermistor Defective
7	E9	Clog Thermistor Defective
8	E6	Condenser Fan Motor Defective
9	E4	Abnormal Pressure
10	E7	Condenser Clogged
11	E3	Defrost Cycle Too Long
12	E1	Cabinet Temperature Too High
13	E2	Cabinet Temperature Too Low

[a] EEPROM WRITE ERROR (EA)

When the values written on EEPROM (IC3) differ from those retrieved for verification, “EA” will be displayed.

The “EA” display will not reset until the power supply is turned off.

The EEPROM (IC3) may be defective. Replace the Controller Board.

[b] OPERATION BOARD VERIFY ERROR (Eb)

“Eb” is displayed if the ROM checksum of the Operation Board is abnormal.

The Operation Board may be defective. Replace the Operation Board.

*Notes: In this case, "Eb" will be displayed on the 7-segment display, but "EC" will be stored in the error history on the controller side.

[c] OPERATION BOARD COMMUNICATION ERROR (EC)

"EC" is displayed when communication between the operation board and controller board is interrupted for a certain period of time.

The device will periodically attempt to restore communication and will automatically be released when communication is restored.

[d] EEPROM VERIFY ERROR (Ed)

When every value retrieved from EEPROM (IC3) for verification differs from the memory setting of the Controller Board, "Ed" will be displayed. The "Ed" display will automatically reset when retrieved values have been verified. The EEPROM (IC3) may be defective. Replace the Controller Board.

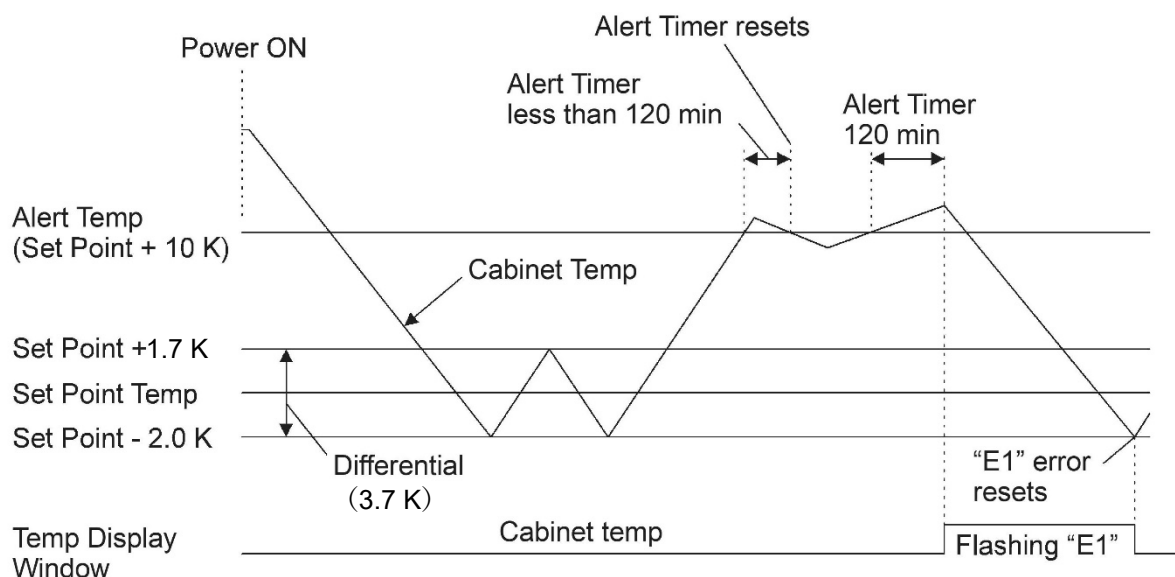
[e] CABINET TEMPERATURE TOO HIGH (E1)

When the cabinet temperature rises to the alert temperature (10K above the set point), the High Temperature Alert Timer will start counting down from 120 minutes. When the Timer counts down to zero, "E1" will be displayed. If the cabinet temperature drops below the alert temperature before the Timer counts down to zero, the Timer will reset and "E1" will not be displayed. When the power supply is turned on, this function will not work until the cabinet temperature drops below the Compressor OFF temperature. This function is available even during a defrost cycle.

The "E1" display will automatically reset when the cabinet temperature drops below the Compressor OFF temperature.

The cause may be:

- 1) The Doors are opened too frequently or left open.
- 2) The Interior Thermistor is defective.
- 3) The Compressor is defective or gas is leaking.



[f] CABINET TEMPERATURE TOO LOW (E2)

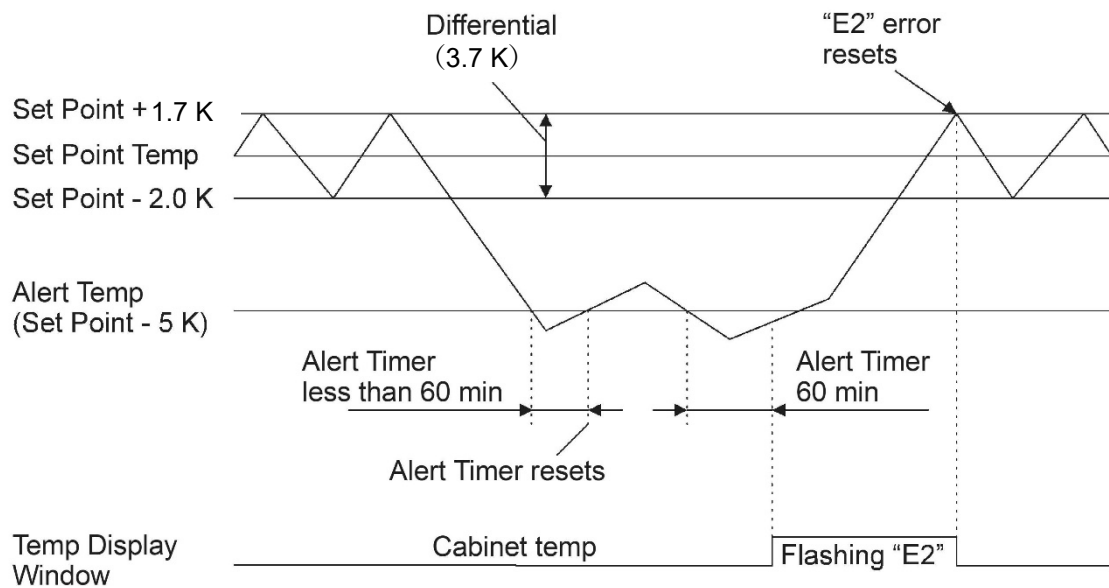
When the cabinet temperature drops to the alert temperature (5K below the set point), the Low Temperature Alert Timer will start counting down from 60 minutes. When the Timer counts down to zero, "E2" will be displayed. If the cabinet temperature rises above the alert temperature before the Timer counts down to zero, the Timer will reset and "E2" will not be displayed.

When the power supply is turned on, the Timer will start counting if the cabinet temperature is below the alert temperature (5 K below the set point). This function is available even during a defrost cycle.

The "E2" display will automatically reset when the cabinet temperature rises above the Compressor ON temperature.

The cause may be:

- 1) The ambient temperature is too low, or a large amount of frozen food is stored inside.
- 2) The Interior Thermistor (black) is defective.



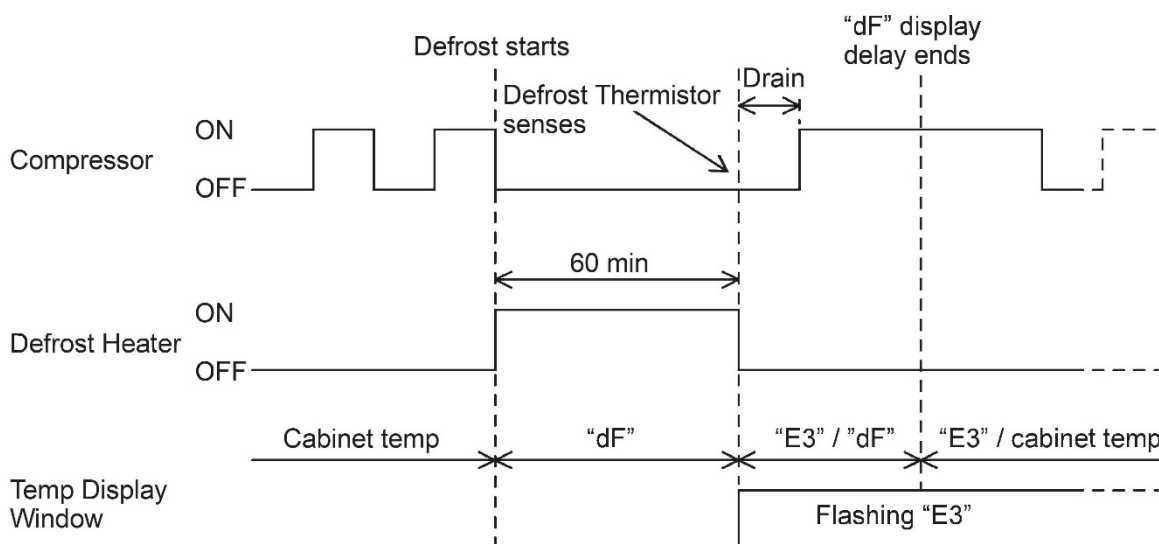
[g] DEFROST CYCLE TOO LONG (E3)

When the Defrost Thermistor does not turn off after 60 minutes have passed since the defrost cycle starts, "E3" will be displayed. In this case, the refrigerator/freezer will proceed to the next process: (1) Defrost cycle terminated, (2) Drain, (3) Fan Motor delay, (4) "dF" display delay, (5) Cooling cycle.

Press and hold the top button for 3 seconds to perform error reset.

The cause may be:

- 1) The Defrost Heater is defective.
- 2) The Thermal Fuse is blown.
- 3) The Defrost Thermistor is defective.
- 4) A large amount of moist food is stored inside.



[h] ABNORMAL PRESSURE (E4)

When the Clog Thermistor senses a temperature above 70°C, the refrigerator/freezer will detect an abnormal pressure to stop the Compressor for 6 minutes. At the first detection, the Pressure Alert Timer will start counting down from 60 minutes.

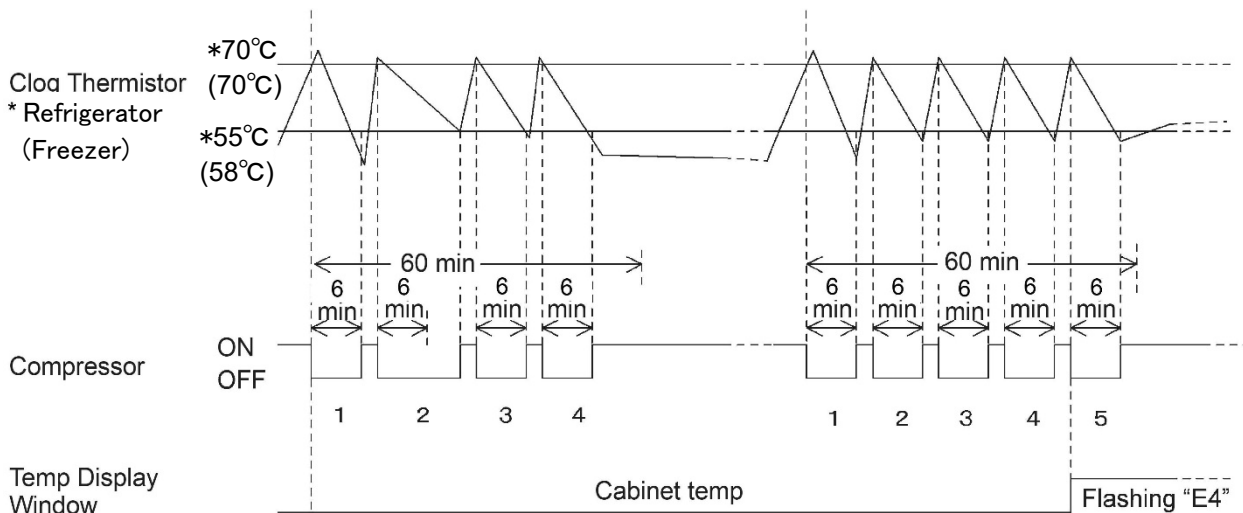
The Compressor will restart after the 6 minute interruption, if the Clog Thermistor senses a temperature below 55°C (Refrigerator) or 58°C (Freezer). The Compressor will not restart until the above conditions are satisfied. If an abnormal pressure is still detected, the Compressor will stop again.

If an abnormal pressure is detected five times before the Timer counts down to zero, "E4" will be displayed. If the Timer has already counted down by then, "E4" will not be displayed. This function is available even during a defrost cycle.

Press and hold the top button for 3 seconds to perform error reset.

The cause may be:

- 1) The Condenser Fan Motor is locked or defective.
- 2) The Condenser Filter is clogged with dirt or dust.



[i] INTERIOR THERMISTOR DEFECTIVE (E5)

When the Interior Thermistor senses a temperature below -60°C (open circuit) or above 70°C for 10 minutes (short circuit), "E5" will be displayed. The Interior Thermistor may be defective. Replace the Interior Thermistor. Also, press and hold the top button for 3 seconds to perform error reset.

[j] CONDENSER FAN MOTOR DEFECTIVE (E6)

"E6" is displayed when the Condenser Fan Motor is rotating but the number of rotations is 0 for 30 seconds. The Condenser Fan Motor may be defective. Replace the Condenser Fan Motor.

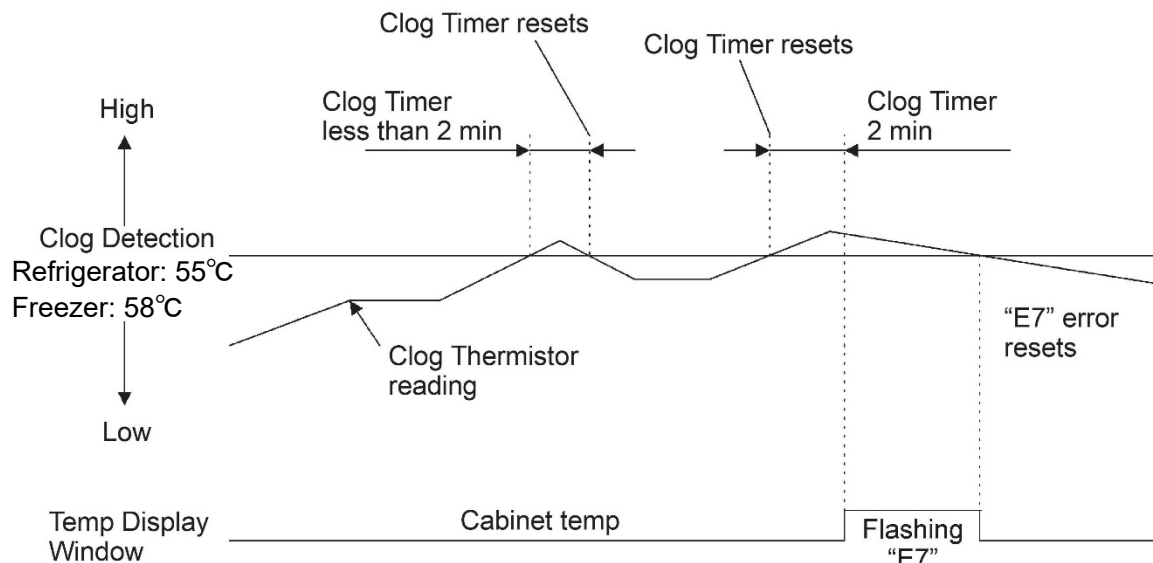
[k] CONDENSER CLOGGED (E7)

When the Clog Thermistor senses a temperature above 55°C (Refrigerator) or 58°C (Freezer) for 2 minutes, "E7" will be displayed.

The "E7" display will automatically reset when the Clog Thermistor senses a temperature below the above point.

The cause may be:

- 1) The Condenser Fan Motor is locked or defective.
- 2) The Condenser Filter is clogged with dirt or dust.



[I] DEFROST THERMISTOR DEFECTIVE (E8)

When the Defrost Thermistor senses a temperature below -60°C (open circuit) or above 70°C (short circuit), "E8" will be displayed.

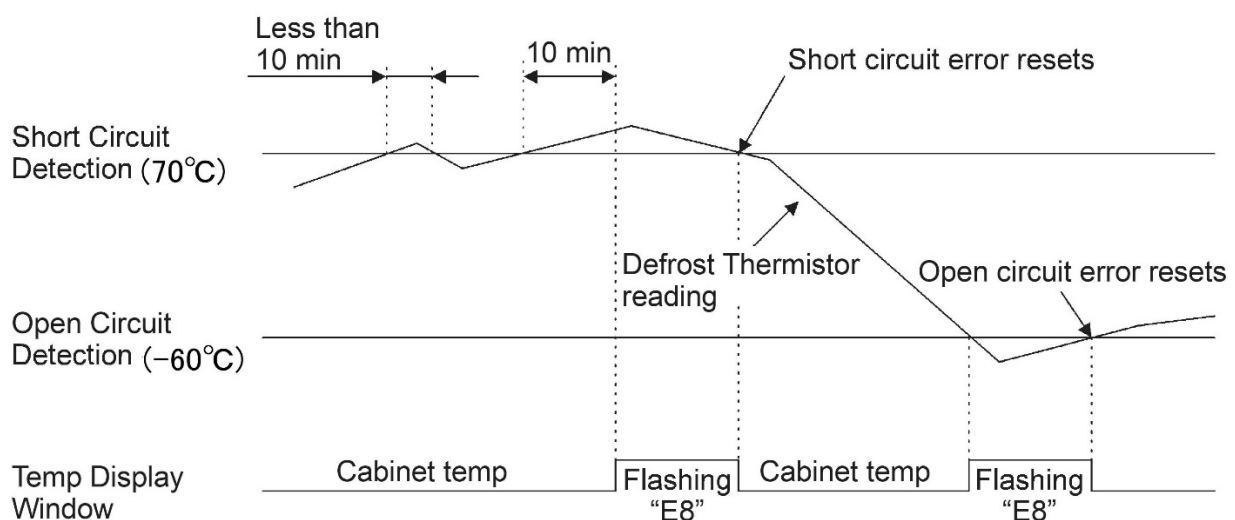
This function is not available during a defrost, drain or Fan Motor delay process.

In case of an open circuit, the "E8" display will automatically reset when the temperature rises above -60°C. In case of a short circuit, the "E8" display will automatically reset when the temperature drops below 70°C.

If it does not reset automatically, turn off the power supply and turn it back on.

The cause may be:

- 1) The Defrost Thermistor is defective.



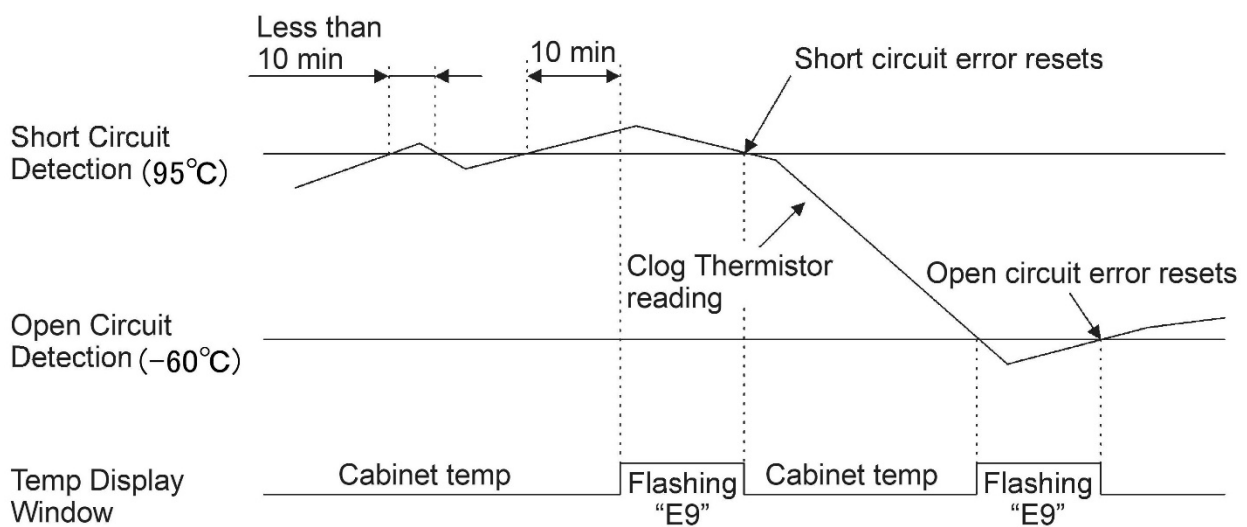
[m] CLOG THERMISTOR DEFECTIVE (E9)

When the Clog Thermistor senses a temperature below -60°C (open circuit) or above 95°C for 10 minutes (short circuit), "E9" will be displayed.

In case of an open circuit, the "E9" display will automatically reset when the temperature rises above -60°C . In case of a short circuit, the "E9" display will automatically reset when the temperature drops below 95°C .
If it does not reset automatically, turn off the power supply and turn it back on.

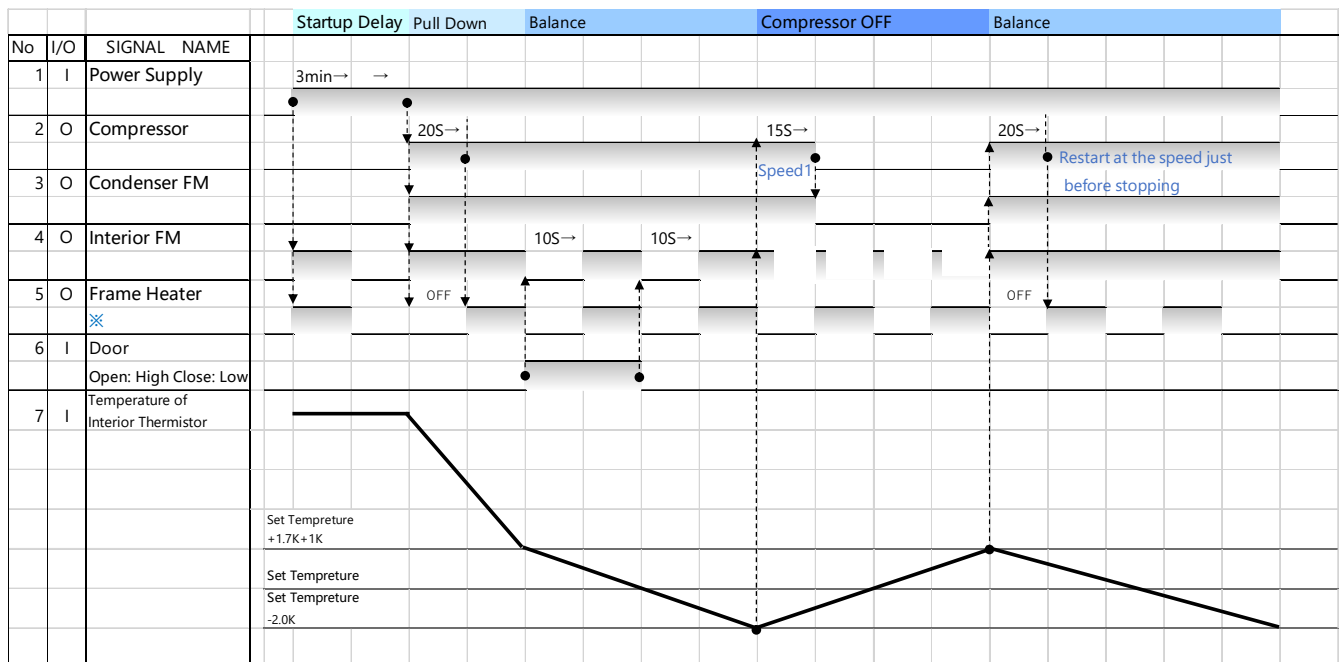
The cause may be:

- 1) The Clog Thermistor is defective.



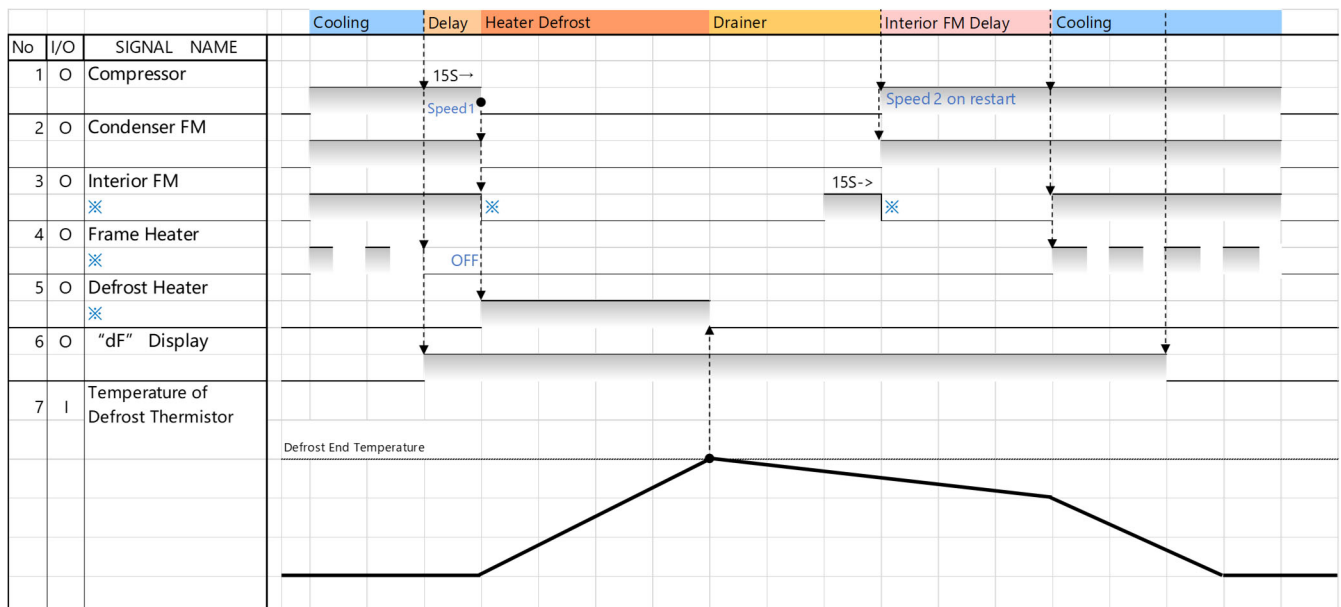
7. TIMING CHART

[a] START TO CONTROL (HRE-SC series, HRFE-128SC (Refrigerator Side))



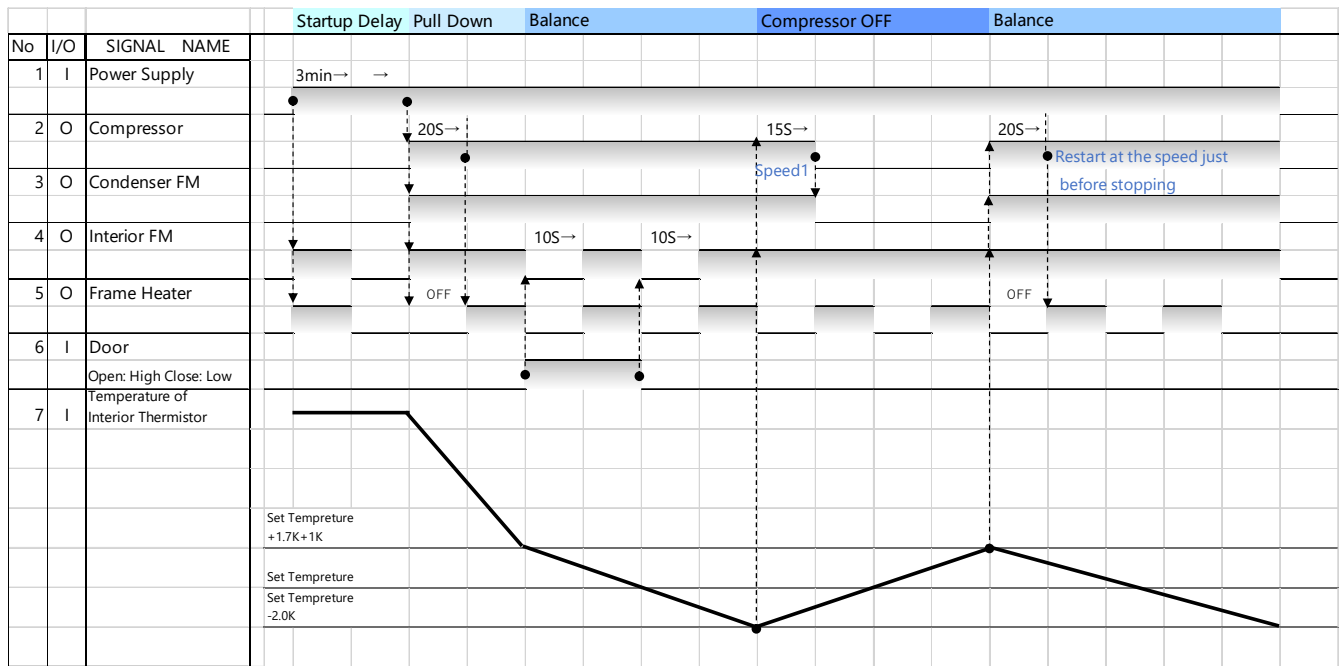
* For HRE-78/128/148SC-S (energy-saving), the frame heater will not start (always OFF) when the cabinet temperature is set to 0°C or higher (including +3°C of factory setting). It works as shown in the chart when the cabinet temperature is set to -1°C or lower.

[b] CONTROL TO DEFROST AND TO CONTROL (HRE-SC series, HRFE-128SC (Refrigerator Side))

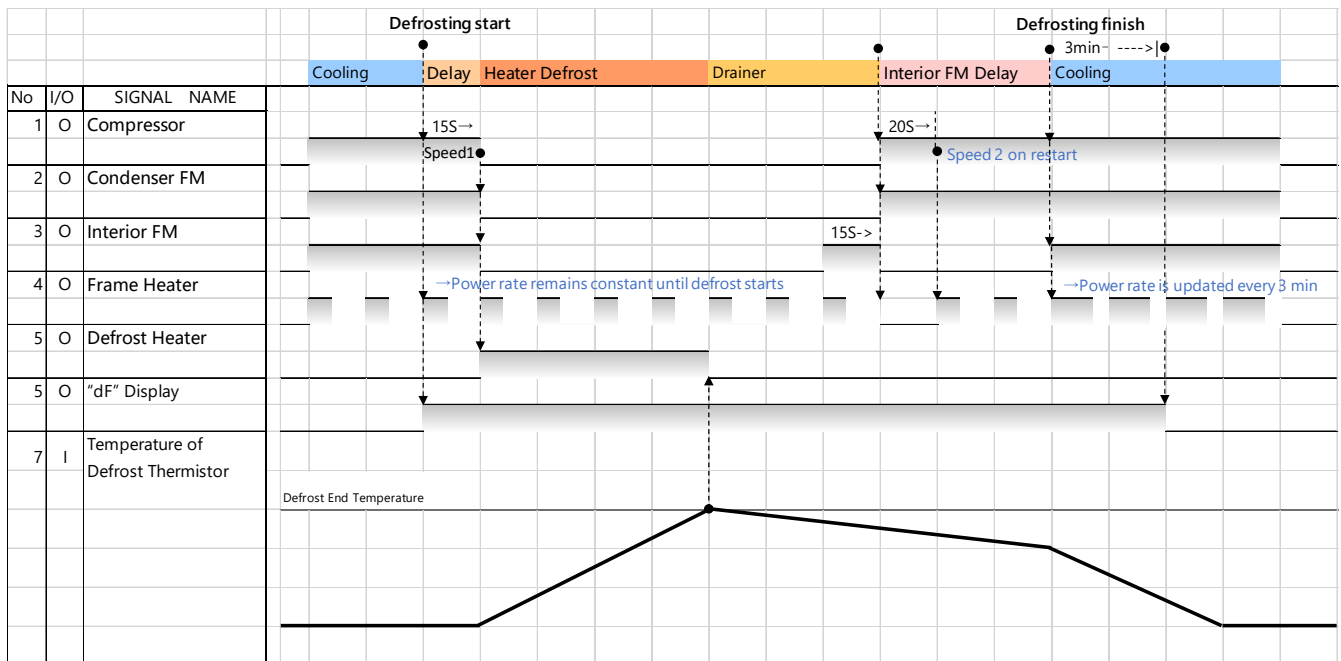


* For HRE-78/128/148SC-S (energy-saving), the frame heater and defrost heater will not start (always OFF) and the interior fan motor will not stop (always ON) when the cabinet temperature is set to 0°C or higher (including +3°C of factory setting). They work as shown in the chart when the cabinet temperature is set to -1°C or lower.

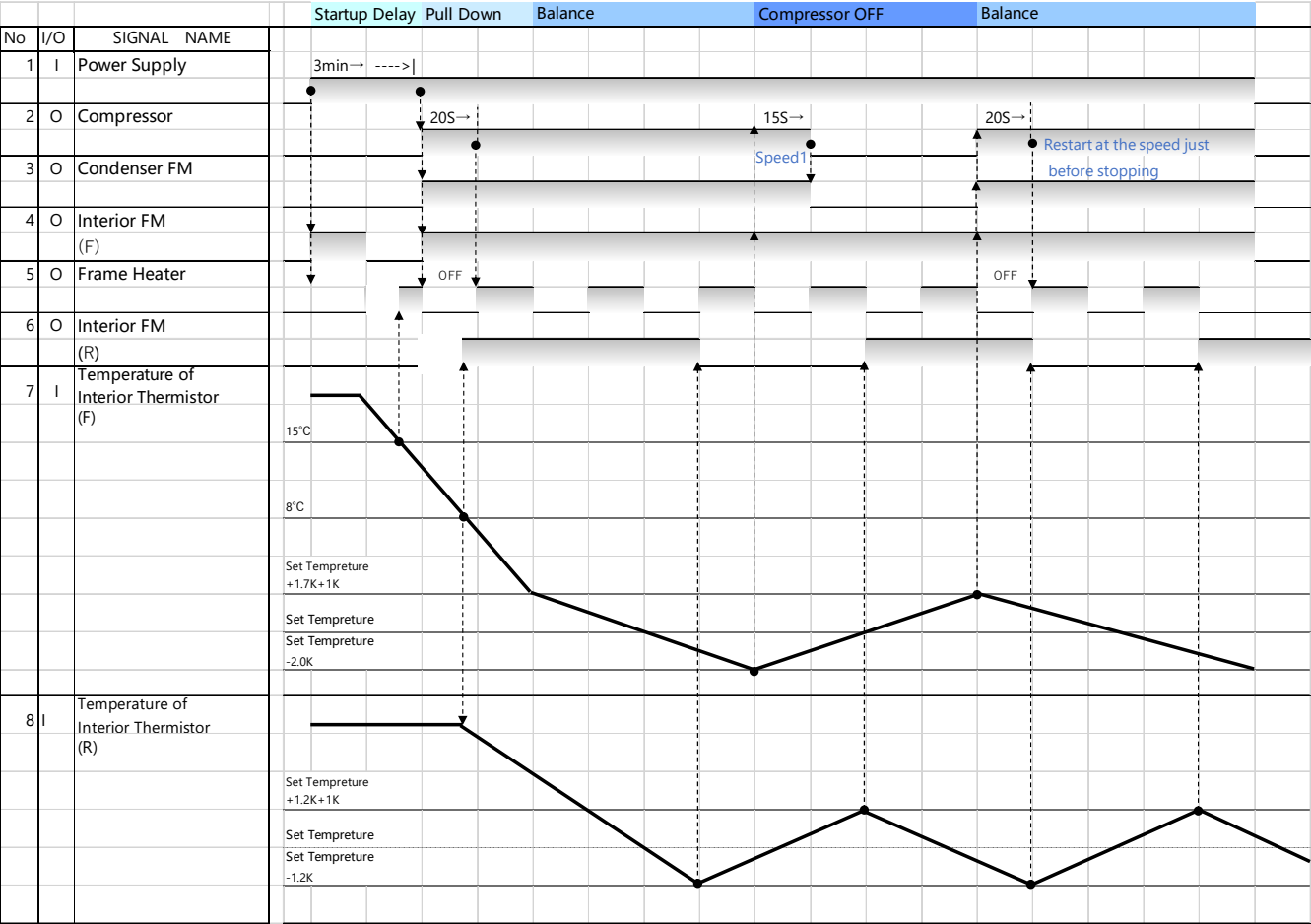
[c] START TO CONTROL (HFE-SC series, HRFE-128SC (Freezer Side))



[d] CONTROL TO DEFROST AND TO CONTROL (HFE-SC series, HRFE-128SC (Freezer Side))



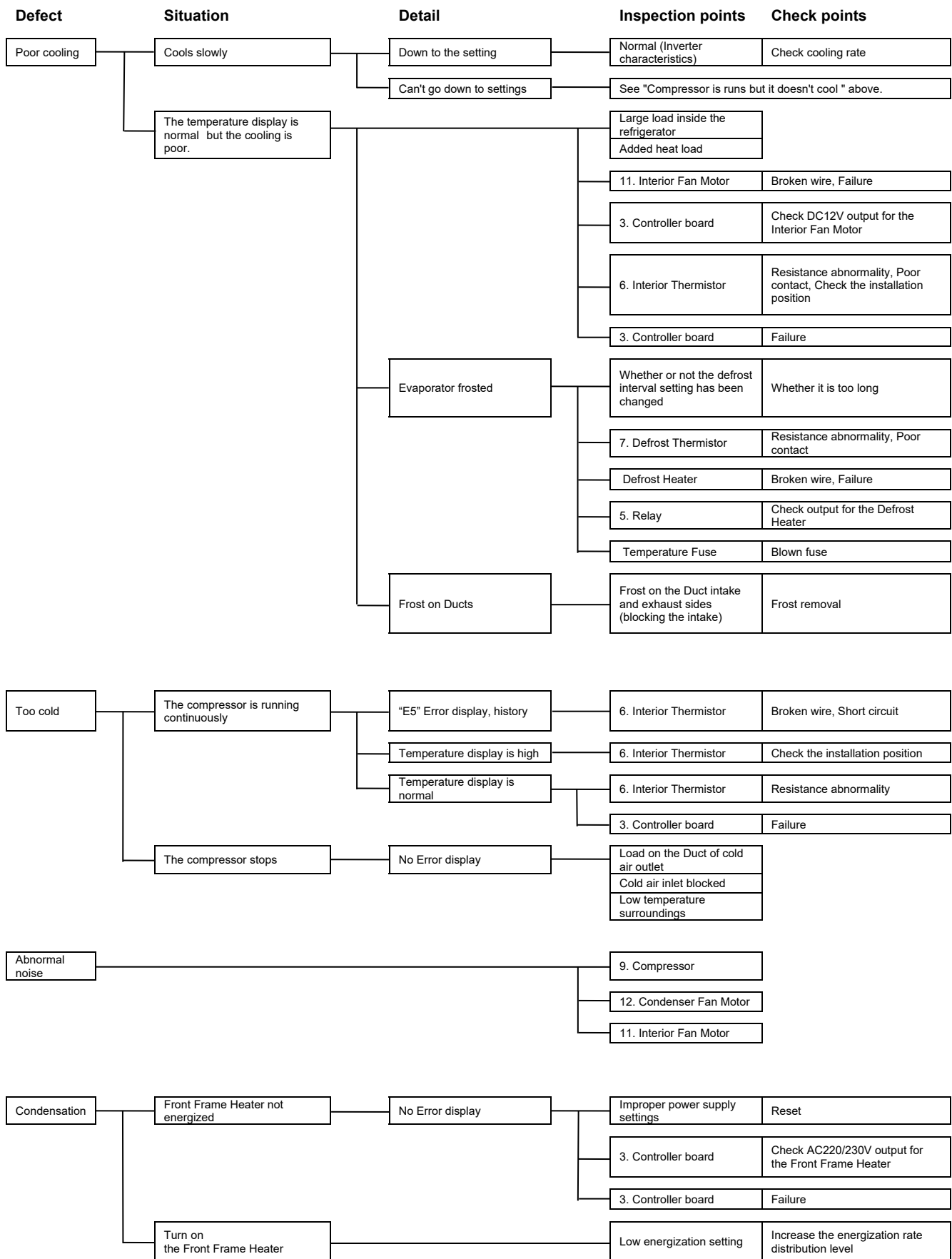
[e] START TO CONTROL (HRFE-78SC)



III. SERVICE DIAGNOSIS

1. FLOWCHART

Defect	Situation	Detail	Inspection points	Check points
Not cold	Compressor does not start	No temperature display	1. Protector	Electric leakage, Blown fuse
			3. Controller board	Check DC12V output for the Operation Board
			4. Operation board	Disconnection, Connector insertion failure
		"EA", "Ed" Error display	3. Controller board	Failure
		"E1" Error display, history or no display	5. Relay	Output check
			6. Interior Thermistor	Resistance abnormality, Poor contact
			8. Clog Thermistor	Resistance abnormality, Poor contact
			9. Compressor	Winding breakage, Electrical component failure
	The compressor starts but stops immediately	"E4" Error display, history (High pressure detection)	High temperature surroundings	
			Insufficient condensation capacity	Surrounding heat sources
			Air Filter	Dirt
			12. Condenser Fan Motor	Lock, Broken wire
		"E1" Error display, history or no display	5. Relay	Check output to Condenser Fan Motor
			8. Clog Thermistor	Resistance abnormality, Poor contact
			Same confirmation as "E4" above	
			Door opens and closes frequently	
			6. Interior Thermistor	Check the installation position
			9. Compressor	Lock etc.
	The compressor runs but it doesn't cool	"E7" Error display, history (Increase in condensing temperature)	High temperature surroundings	
			Insufficient condensation capacity	Surrounding heat sources
			Air Filter	Dirt
			12. Condenser Fan Motor	Lock, Broken wire
		"E8" Error display, history	5. Relay	Check output to Condenser Fan Motor
			7. Defrost Thermistor	Resistance abnormality, Poor contact
		"E3" Error display, history (Frost on the evaporator)	7. Defrost Thermistor	Resistance abnormality
			Defrost Heater	Broken wire, Failure
			5. Relay	Check output to Defrost Heater
		"Eb" Error display, history	Temperature Fuse	Blown fuse
			4. Operation board	Failure
		No Error display	Large load inside the refrigerator	
			Door gap	
			6. Interior Thermistor	Check the installation position
			11. Interior Fan Motor	Broken wire, Failure
			3. Controller board	Check DC12V output for the Interior Fan Motor
			Refrigeration circuit clogged	Capillary Tube, Dryer
			16. Refrigerant Leak	
			9. Compressor	Failure



2. SERVICE DIAGNOSIS

Chart	Item	Possible Cause / Check	Remedy
1	Protector	The protector is activated	Identifying electrical leakage and short circuit locations
		Water on the protector	Allow to dry. or replace.
		The Protector failure	Replace.
2	Switching Regulator	Broken wiring, connector disconnected or pin removal	Repair, replace
		Dust and dirt on the Connector.	Removal
		Electronic component failure or burnout.	Replace
		Check for voltage of 220 – 240V AC (primary) and 12V DC (secondary).	Replace.
3	Controller board	Broken wiring, connector disconnected or pin removal	Repair, replace
		Dust and dirt on the Connector.	Removal
		Electronic component failure or burnout.	Replace
4	Operation board	Broken wiring, connector disconnected or pin removal	Repair, replace
		Dust and dirt on the Connector.	Removal
		Electronic component failure or burnout.	Replace
		The 7-segment display and operation display are missing or disappear.	Replace
5	Relay	Broken wiring, connector disconnected or pin removal	Repair, replace
		Dust and dirt on the Connector.	Removal
		Check the output to each load. Refer to the wiring diagram and timing chart.	Replace
		Abnormal noise	Replace
6	Interior Thermistor	Check the installation position. It's out of place.	Repair
		The temperature display is incorrect.	Check the resistance by placing it in ice water. If abnormal, replace it.
		Short circuit in wiring. Temperature display is over "70°C".	Replace
		Open circuit in wiring. Temperature display is below "-60°C".	Replace
7	Defrost Thermistor	Check the installation position. It's out of place.	Repair
		Resistance Abnormal	Check the resistance by placing it in ice water. If abnormal,

			replace it.
		Short circuit in wiring. Temperature display is over "70°C".	Replace
		Open circuit in wiring. Temperature display is below "-60°C".	Replace
8	Clog Thermistor	Check the installation position. It's out of place.	Repair
		Resistance Abnormal	Check the resistance by placing it in ice water. If abnormal, replace it.
		Short circuit in wiring. Temperature display is over "95°C".	Replace
		Open circuit in wiring. Temperature display is below "-60°C".	Replace
9	Compressor		
10	Inverter Board (Inverter Box with Inductors)	Broken wiring, connector disconnected or pin removal	Repair, replace
		Dust and dirt on the Connector.	Removal
		Electronic component failure or burnout.	Replace
11	Interior Fan Motor	Broken wiring	Repair
		Locked (voltage present but no rotation)	Replace
		Abnormal noise	Replace
12	Condenser Fan Motor	Broken wiring	Repair
		Locked (voltage present but no rotation)	Replace
		Abnormal noise	Replace
13	Air Filter	Clogged.	Clean
14	Air-Cooled Condenser	Dirty fins.	Clean
		No temperature difference between inlet and outlet copper tubes.	Clean or wash
15	Supply Voltage	Check for $\pm 6\%$ of rated voltage.	Increase power supply capacity. Plug into a separate power receptacle.
16	Refrigerant Leak	Compressor discharge pipe will not heat up.	Repair and recharge. Note: Low-side leak requires drying after welding. Replace Drier also.
		Compressor suction pipe will not cool down.	
		Check with leak detector.	
17	Clogged Refrigeration Circuit	In service mode, run the engine at a constant speed (4th gear), • High pressure: High • Low pressure: low Clogged with moisture or dust.	Replace Capillary Tube and Drier.

3. CONTROLLER BOARD

[a] SERVICING CONTROLLER BOARD

1) When receiving a service call, ask the user to turn off the power supply and turn it back on, while watching the unit. This will reset the controller, and in some cases normal operation will resume.

2) Keep the following in mind when servicing the Controller Board:

- * Check that the unit has been earthed properly. If not, the Controller Board will not work properly.
- * To get static free, always touch the cabinet (earth) before servicing. Electrostatic discharge will cause severe damage to the Controller Board. Also, keep it away from vinyl, plastic or other electrostatically charged products.
- * The Controller Board is connected to a commercial power source. Always turn off the power before carrying out repairs.
- * Part of the output is high voltage. Always turn off the power before carrying out repairs. If you have to work with the power on, such as when checking the operating voltage, please wear insulated gloves.
- * This board contains capacitors charged with high voltage. To avoid the risk of electric shock, turn off the power and do not touch the board for at least 30 seconds.
- * Some components may be hot immediately after operation, so handle with care.
- * Depending on the nature of the malfunction, parts may explode. Do not carelessly approach the board when power is applied.
- * Be sure to close the Control Box lid securely to prevent malfunctions caused by contamination of the power supply.
- * Keep the communication line between the Controller Board and the Inverter Board as far away as possible from the power supply and compressor lead wires.
- * The Controller Board and thermistor can be replaced separately.
- * As a rule, handle the board by holding both ends. When doing so, never apply force to the components or wires.
- * Do not touch the reverse side of the Controller Board and tiny electronic devices on it.
- * Do not drop the Controller Board on the floor.
- * Do not short circuit the Relay output terminal coming from the Controller Board.

- * To protect the pattern from damage, place the Controller Board on a flat surface.
 - * The Thermistor leads have a thin coating and are potentially breakable. Do not tension the leads.
 - * The connectors must not be subjected to tension to prevent disconnection or breakage. After servicing the Controller Board, check for disconnected connectors.
 - * The Thermistor is provided with single-wire leads. Do not bend or stretch them (about 400 mm from the end and at lead connections).
 - * Do not pinch or weigh down the Thermistor and Thermistor leads. The coatings may be broken, resulting in a short circuit.
 - * Keep the Thermistor leads at least 30 mm away from high voltage (100V AC or more) wires, especially fluorescent wires.
- 3) The main board supplied as a part is not configured, so if used as is, it may cause malfunctions and breakdowns. Please be sure to configure the model settings. Please see “5. [g] HOW TO SET MODEL AND INTERNAL TEMPERATURE CORRECTION VALUE WHEN REPLACING BOARD” for the setting method.

[b] CHECKING THERMISTOR

- 1) Disconnect the Thermistor connector from the Controller Board.
- 2) Fill a glass with ice water at a temperature of 0°C. Soak the Thermistor Bulb in the water (at the center of the glass) for 5 minutes.
- 3) Measure the resistance of the Thermistor by the ohm scale of a tester.
- 4) Replace the Thermistor if the resistance is not within the following range:
 Interior, Dfrost Thermistor: 5 – 6.5 kΩ (standard: 6 kΩ)
 Clog Thermistor: 150 - 180 kΩ (standard: 162 kΩ)

[c] OPERATION BOARD

- 1) When receiving a service call, ask the user to turn off the power supply and turn it back on, while watching the unit. This will reset the controller, and in some cases normal operation will resume.
- 2) Keep the following in mind when servicing the Operation Board:
 - * Check that the unit has been earthed properly. If not, the Operation Board will not work properly.
 - * To get static free, always touch the cabinet (earth) before servicing. Electrostatic

discharge will cause severe damage to the Operation Board. Also, keep it away from vinyl, plastic or other electrostatically charged products.

- * The Operation Board is connected to a commercial power source. Always turn off the power before carrying out repairs.
- * As a rule, handle the board by holding both ends. When doing so, never apply force to the components or wires.
- * Do not touch the reverse side of the Operation Board and tiny electronic devices on it.
- * Do not drop the Operation Board on the floor.
- * To protect the pattern from damage, place the Operation Board on a flat surface.
- * The connectors must not be subjected to tension to prevent disconnection or breakage. After servicing the Operation Board, check for disconnected connectors.

[d] COMPRESSOR

- 1) Be sure to check the compressor model before repairing.
The terminal cover can be difficult to remove. If using tools, work with caution to avoid injury.
After completing the work, please reattach the butyl tape affixed to the top of the terminal cover in the same way as it was before you peeled it off.
- 2) Keep the following in mind when servicing the Compressor:
 - * This is the compressor for inverter use only, so please connect it to the Inverter Board (Inverter Box) that is compatible with the compressor. Do not use anything that is accidentally connected directly to commercial power.
 - * With an emphasis on energy saving, the refrigerant entering through the suction pipe is more likely to enter the cylinder directly than in conventional compressors. This makes it easier to compress the liquid than conventional products. When repairing, be sure to fill the refrigerant in gas form and be careful not to overfill it.
 - * When charging refrigerant, check the type of refrigerant.
Refrigerator, Freezer: R290

IV. REMOVAL AND REPLACEMENT OF COMPONENTS

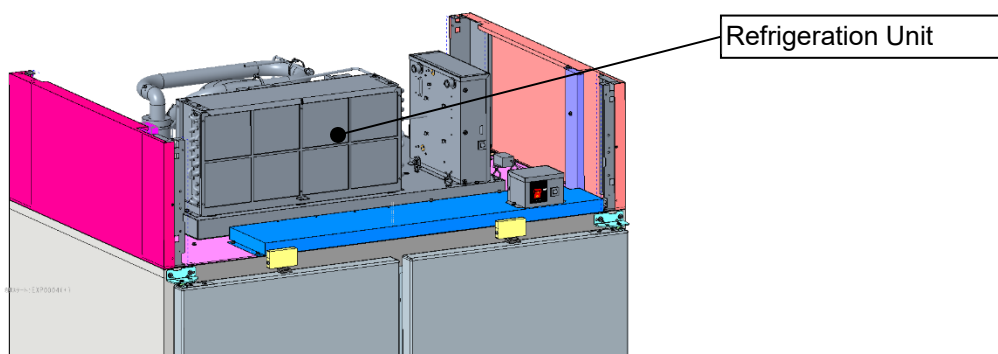
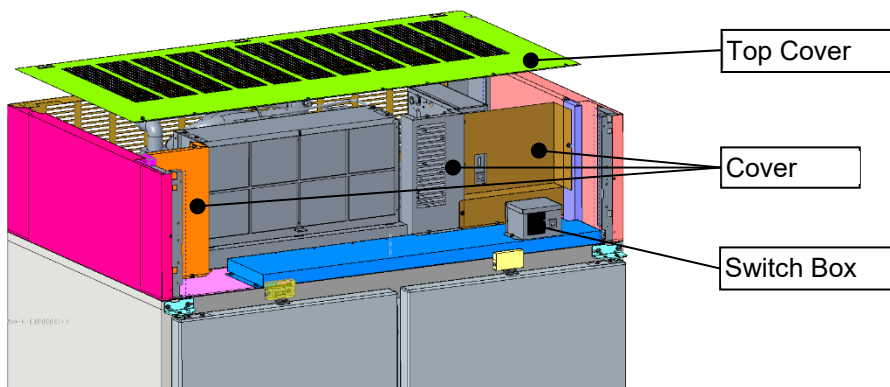
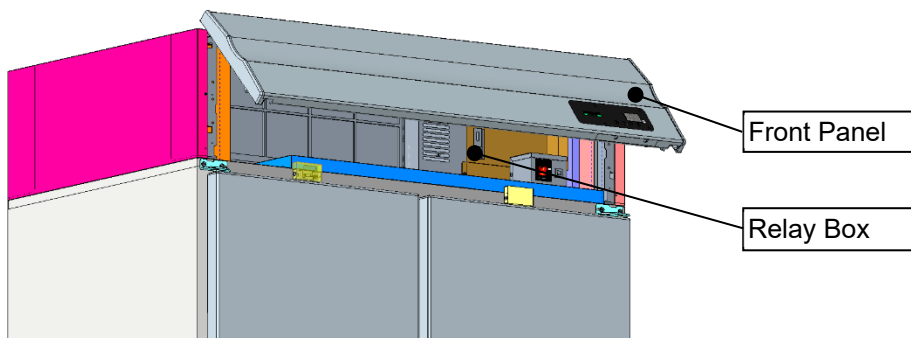
For HRFE-78SC, it is structurally difficult to replace the whole refrigeration circuit. Replace the individual parts.

WARNING

Always unplug the refrigerator/freezer before replacing components.

1. REFRIGERATION UNIT

- 1) Lift the Front Panel.
- 2) Remove the wiring connector from the Relay Box to the Operation Box behind the Front Panel.
- 3) Unscrew the Top Cover fixing screws (M4) and remove the Top Cover.
Remove the fixing screws (M4) around the refrigeration unit and remove the Cover.
- 4) Remove the fixing screws (M5) of the Refrigeration Unit and lift it up with the handle.
Be careful not to damage the Refrigeration Circuit.
- 5) To replace the removed parts, reverse the above removal procedure.



2. REFRIGERATION CIRCUIT

[a] REFRIGERANT

This product uses a flammable refrigerant. There are rules that must be followed when servicing products that use flammable refrigerants, so please make sure you understand the rules before servicing.

(The following related items are excerpted from GL-21)

***If refrigerant is leaking, do not simply recharge it, but find and repair the leak. After that, recharge the specified amount of refrigerant and check that there are no leaks. It is prohibited to use the product by only recharging it. This may cause a large amount of refrigerant to leak indoors, and if the leaked refrigerant comes into contact with an open flame such as a gas stove or fan heater, it may ignite or explode. (Please note that if the amount of refrigerant exceeds 150g, it will not comply with the standards.)**

The Japan Refrigeration and Air Conditioning Industry Association Service Guidelines excerpted from JRA GL-21

5.1 Common points

Contractors involved in transportation, storage, installation, maintenance, equipment removal, and inspection must comply with the following items when transporting, storing, installing, maintaining, removing, and inspecting equipment. To comply with these items, they must participate in training sessions held by manufacturers or related organizations to ensure that each item is followed.

- a) In order to prevent ignition in the event of a refrigerant leak, it is desirable to remove as many ignition sources as possible from near the equipment. It should be noted that ignition sources include sources other than obvious ignition sources such as open flames.
- b) If a refrigerant leaks during work, the work must be stopped immediately and the area must be ventilated. Open a door or window, or if there are no doors or windows, operate the ventilation system to prevent the refrigerant from stagnating.
- c) As general rule, open flames are strictly prohibited, and it is preferable not to use any sources of ignition during work, but if they should be used, first check for refrigerant leaks.
- d) Work must be carried out by knowledgeable personnel who have received the following work training on flammable refrigerants.
 - 1) Education regarding ignition sources
 - 1.1) Risks of smoking
 - 1.2) Education regarding potential sources of ignition
 - 1.3) If refrigerant escapes when using a burner or power tools, the burner must be immediately turned off and any power tools that could be a source of ignition must be stopped.

- 2) When working, it must be confirmed in advance that there is a fire extinguisher in the immediate vicinity of the work area. If there is no fire extinguisher in the immediate vicinity of the work area, a bucket of water or a rag soaked in water must be carried to immediately extinguish the fire in case of a fire.
- 3) It must be confirmed that the earth wiring is installed as specified by the manufacturer for built-in refrigeration and freezing equipment.

5.5 Matters to be observed during maintenance

Contractors involved in maintenance must observe the following in addition to 5.1 when performing maintenance.

- a) When performing maintenance, they must wear gloves that can prevent static electricity, such as work gloves.
- b) When using an electric screwdriver, do not use an electric screwdriver driven by a brush motor.
Note: An electric screwdriver driven by a brush motor can be an ignition source.
- c) When performing maintenance, they must always carry an explosion-proof portable leak detector or a portable leak detector that is approved for use with the flammable refrigerant to be detected, and must keep it in operation before and during work to confirm that the refrigerant is not leaking. Taking into consideration the work time, care must be taken to ensure that the battery of the portable leak detector does not run out during work. If refrigerant leaks during work, they must immediately stop work and do not resume work until the refrigerant concentration has sufficiently decreased.

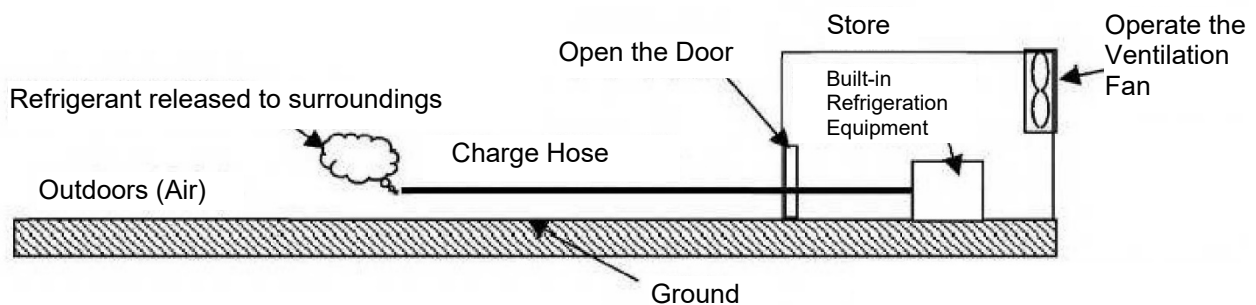
When replacing parts that require the refrigeration circuit to be opened, first remove any flammable refrigerant in the refrigeration circuit and disconnect the piping of the part in question by following the procedure below.

- 1) Open windows and doors, and operate devices that create air currents such as ventilation fans or circulators **to ensure that the work space is well ventilated.**
- 2) Activate an explosion-proof portable leak detector. ***Place it below knee level.**
- 3) When working in a small, enclosed space equivalent to the inside of a 3.3 m² prefabricated refrigerator, turn off the power to all equipment in the room that could be a source of ignition. If the power cannot be turned off, move the product or freezing unit outside and work there.
- 4) Prepare a fire extinguisher, a bucket of water, a wet rag, etc. in case the flammable refrigerant ignites.

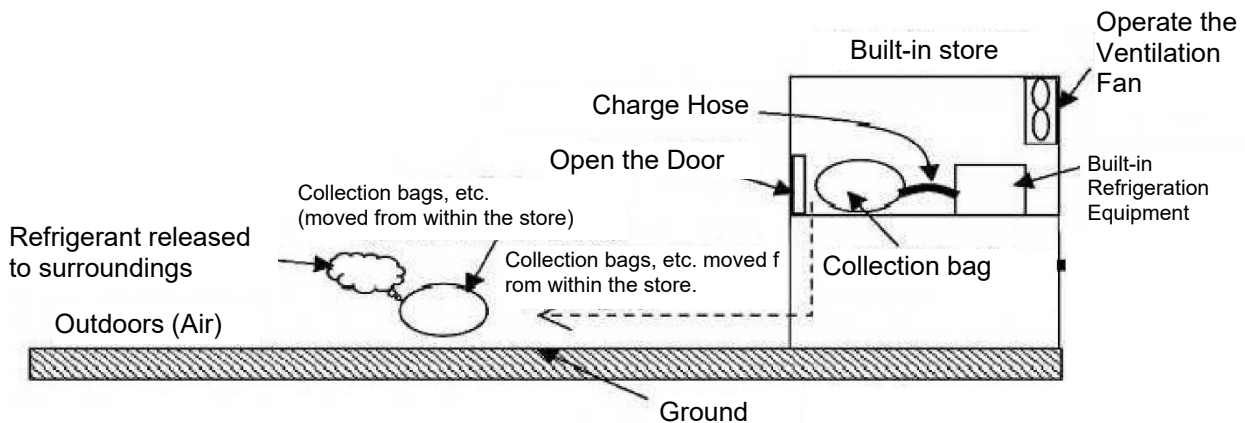
- 5) Unplug the product.
- 6) When releasing into the atmosphere, make sure that there are no ignition sources, **such as those listed below, within a 2 m radius of the center of the installed equipment**, and extinguish any that are found. Or take other measures such as turning off the power.
(Examples of ignition sources: open flames, electric screwdrivers driven by brush motors, relays in refrigerators, etc.)
- 7) Release the refrigerant gas from the low-pressure charge port into the atmosphere using one of the following methods.

- a) Extend the charge hose outdoors and release it into the atmosphere.

***At this time, make sure there are no ignition sources within a 2 m radius.**



- b) Transfer the refrigerant to a refrigerant recovery bag and release the refrigerant in the recovery bag into the atmosphere outdoors.



- 8) Use an explosion-proof vacuum pump designed specifically for HC refrigerants to create a vacuum.
(To eliminate any residual flammable refrigerant in the circuit)
- 9) Fill with nitrogen gas once and then release it.
(To eliminate any residual flammable refrigerant in the circuit)

- 10) Cut the refrigeration piping of the part to be replaced with a pipe cutter.
If unavoidable, use a burner to remove the piping. When using a burner, be careful as there is a possibility that residual flammable refrigerant may ignite when the piping is removed.

[b] COMPRESSOR

- 1) Remove the cover by following steps 1) to 3) of "1. REFRIGERATION UNIT".
- 2) Use a screwdriver to remove the clamp from the Terminal Cover enclosing the Compressor's electrical parts.
- 3) Remove the connection parts to the Terminal Pin.
- 4) Remove refrigerant gas from the Charge Port.
- 5) Remove the high and low pressure pipes using a brazing device or using a tube cutter.
- 6) Remove the bolts securing the Compressor.
- 7) To replace the removed parts, reverse the above removal procedure.

Note:

1. This is the compressor for inverter use only, so please connect it to the Inverter Board (Inverter Box) that is compatible with the compressor. Do not use anything that is accidentally connected directly to commercial power.
2. With an emphasis on energy saving, the refrigerant entering through the suction pipe is more likely to enter the cylinder directly than in conventional compressors. This makes it easier to compress the liquid than conventional products. When repairing, be sure to fill the refrigerant in gas form and be careful not to overfill it.
2. The refrigerant is R290.
3. Evacuation time must be at least 1 hour.
4. After brazing, inspect the brazed area for gas leaks, remove any flux or oxide film adhering to the surface and apply anti-rust treatment.
5. When brazing, protect the burner flame from resin parts such as the wind tunnel (Shroud) and electrical parts with a wet towel or similar to avoid hitting them.
6. The terminal cover may be difficult to remove. If using tools, be careful of your surroundings and work carefully to avoid injury.

[c] CONDENSER AND DRIER

- 1) Unplug the unit.
- 2) Remove the Front Panel.
- 3) Recover the refrigerant from the low side access valve.
- 4) Unscrew the Condenser.
- 5) Disconnect the drier from the wire retainer.
- 6) Disconnect the Condenser from the upper inlet pipe connection using brazing Equipment or using a tube cutter.
- 7) Remove the Condenser and drier from the refrigeration unit base, and disconnect them using brazing equipment.
- 8) To replace the removed parts, reverse the above procedure.

Note: The capillary tube is directly brazed to the drier. To prevent brazing material from clogging, be sure to insert the capillary tube securely into the point of stopper before brazing.

[d] EVAPORATOR

- 1) Unplug the unit.
- 2) Remove the Front Panel.
- 3) Recover the refrigerant from the low side access valve.
- 4) Remove the insulation hoses on the refrigeration unit base. Disconnect the Evaporator using brazing equipment or using a tube cutter.
- 5) Remove the Air Duct.
- 6) Disconnect the Defrost Heater wires. See “[f] DEFROST HEATER AND THERMAL FUSE”.
- 7) Unscrew and remove the Evaporator.
- 8) To replace the removed parts, reverse the above procedure.

[e] CONDENSER FAN MOTOR

- 1) Remove the cover by following steps 1) to 3) of "1. REFRIGERATION UNIT".
- 2) Disconnect the Condenser Fan Motor wire.
- 3) Remove the Condenser Fan Motor and shroud by removing the two self-tapping screws. (M4)
- 4) Remove the Condenser Fan Motor from the shroud.
- 5) To replace the removed parts, perform the above disassembly procedure in reverse.

Note:

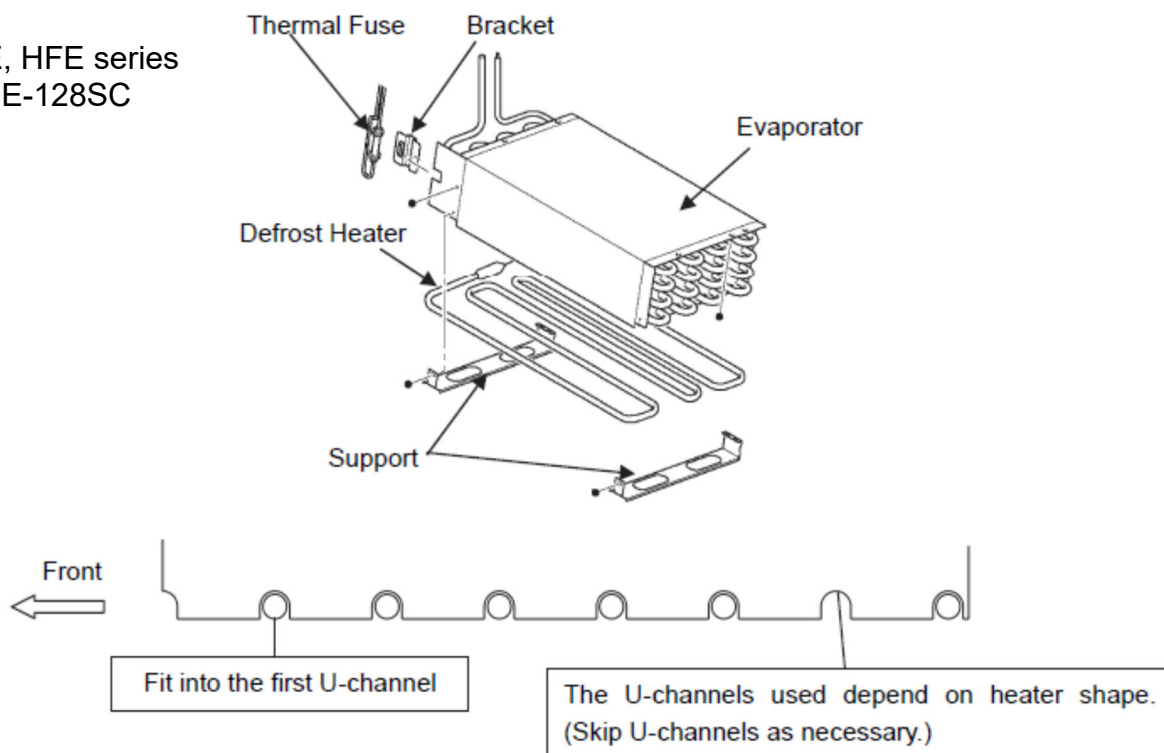
1. The nut securing the Fan Motor must be turned clockwise to loosen and counterclockwise to tighten.

[f] DEFROST HEATER AND THERMAL FUSE

- 1) Unplug the unit.
- 2) Disconnect the Defrost Heater at the back of the refrigeration unit. The Defrost Heater and thermal fuse are connected in series and interchangeable without any operational problems.
- 3) Remove the putty from the wire hole in the refrigeration unit base, and put the connector through the hole.
- 4) Remove the air duct. See "4. [a] AIR DUCT".
- 5) Remove the supports at both ends of the Evaporator bottom by loosening the screws at the front and unhooking the backside.
- 6) Remove the Defrost Heater from the Evaporator by pulling each U-bend from the front to the back.
- 7) Unscrew and remove the thermal fuse from the Evaporator and bracket.
- 8) Pull out the wire through the hole in the refrigeration unit base.
- 9) To replace the removed parts, reverse the above procedure.

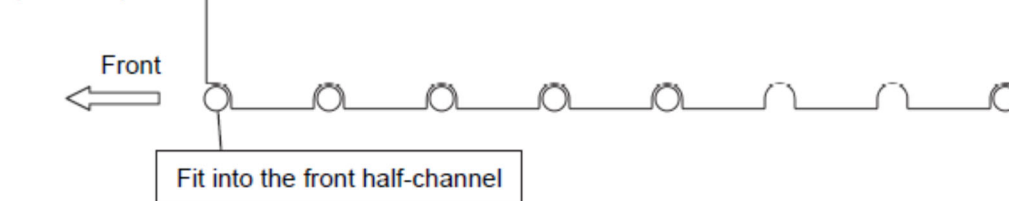
Note: Locate the Defrost Heater in the same position as before. Fit the first front line into the first U-channel, and position the rest according to the U-bend dimensions.

HRE, HFE series
HRFE-128SC

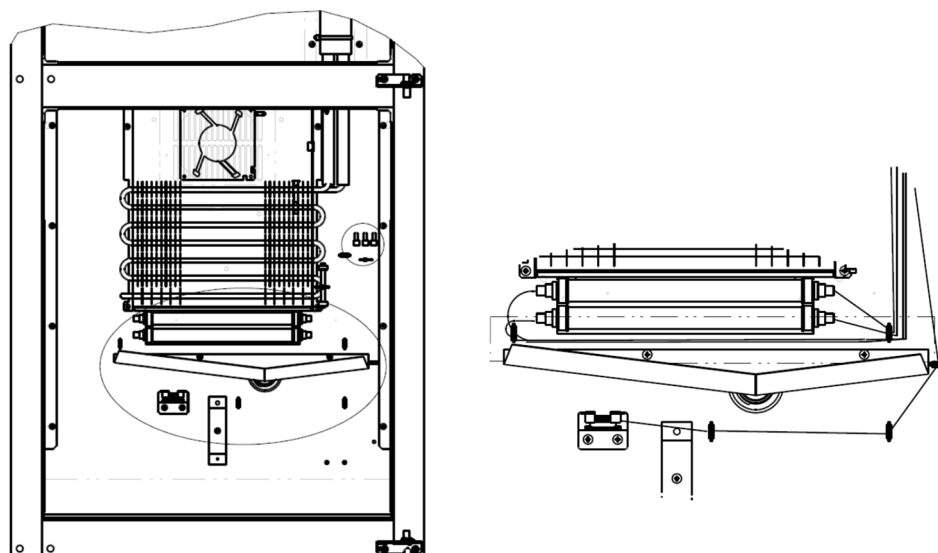


HRFE-78SC

(Freezer)



(Refrigerator)



[g] THREE-WAY VALVE (HRFE-78SC)

When the Three-Way Valve is normal

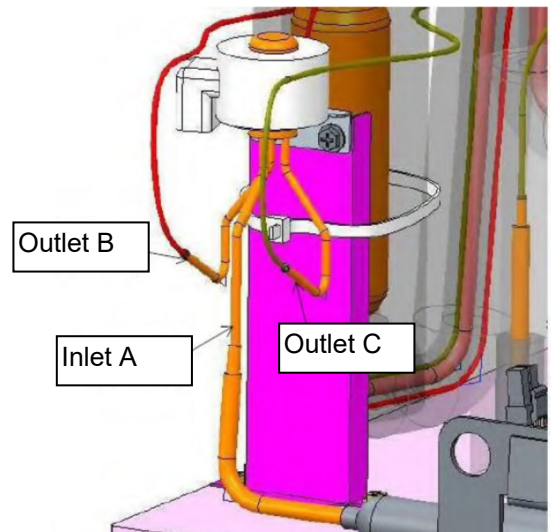
Depending on the position of the Three-Way Valve, the high-pressure side may be blocked, preventing the refrigerant from being released. Before releasing the refrigerant, Be sure to set the Three-Way Valve to its initial position and open both the freezer and refrigerator sides.

When the Three-Way Valve is abnormal

Relieve the refrigerant from both the low-pressure side and the high-pressure side.
(If there is an abnormality in the Three-Way Valve, it may not work properly even if the "Initial position setting" is performed.)

When replacing the Three-Way Valve

- Before connecting the pipe to the new Three-Way Valve, be sure to connect the connector and set the Three-Way Valve to its initial position, so that both the freezer and refrigerator sides are open. If this is not done, the nitrogen may be cut off during welding, or the vacuum may not be complete.
- Pay attention to the pipe connection position.
In the right figure,
 - Inlet A Dryer
 - Outlet B Capillary tube on the freezer side
 - Outlet C Capillary tube on the refrigerator side



Initial position of the Three-Way Valve

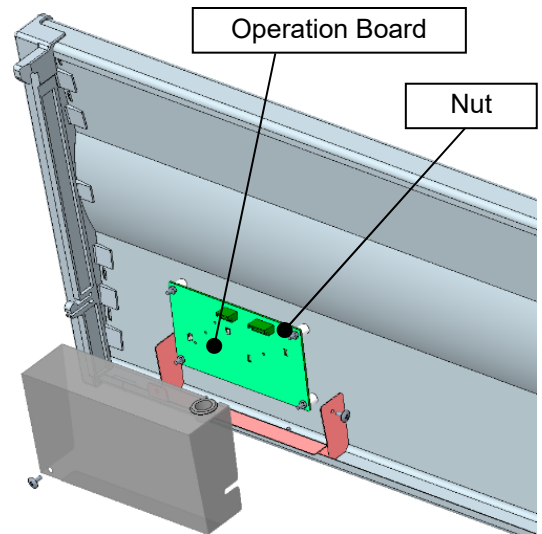
- 1) Turn the power off and back on.
After turning on the power, you will hear the Three-Way Valve working after a few seconds (about 5 seconds). It is easier to check the operation of the Three-Way Valve if you touch the valve body with your hand.
- 2) After confirming that the Three-Way Valve stops working, turn off the power.
This completes the "initial positioning". The valves on both sides of the freezer and refrigerator stop in the open position.
 - * If the device is not used for a long time (more than 2 minutes) after turning it on, the Three-Way Valve will operate again depending on the internal temperature. Therefore, after confirming that the initial operation after turning on the machine has been completed, turn off the power after about 10 seconds.

3. CONTROL BOARD AND THERMISTOR

[a] OPERATION BOARD

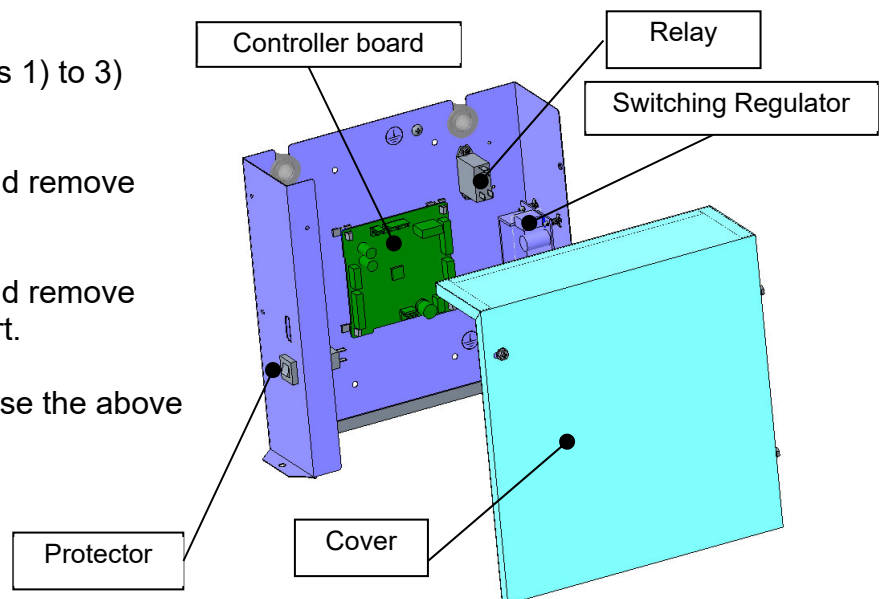
- 1) Lift the Front Panel.
- 2) Wiring from the relay box to the operation box
Remove the wire connector.
- 3) Remove the two screws that secure the cover and remove the cover.
- 4) Remove the connector connected to the operation board.
- 5) Remove the four nuts and remove the operation board.

Reassemble in reverse order.



[b] RELAY BOX

- 1) Remove the cover by following steps 1) to 3) of "1. REFRIGERATION UNIT".
- 2) Remove the 3 fixing screws (M4) and remove the relay box.
- 3) Remove the 3 fixing screws (M4) and remove the cover. Replace the defective part.
- 4) To replace the removed parts, reverse the above removal procedure.



[c] THERMISTOR

- 1) Remove the air duct inside the cabinet. See "4. [a] AIR DUCT".
- 2) Remove the interior thermistor bulb on the ceiling in front of the Evaporator by unhooking the two tabs securing the thermistor holder.
- 3) Remove the defrost thermistor bulb inside the Evaporator fins by pinching off the thermistor holder. (The defrost thermistor is not provided for HRE and HRFE refrigerator.)

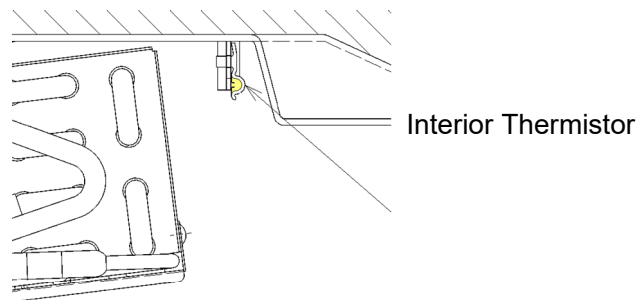
- 4) Pull out the thermistors through the hole in the refrigeration unit base. Be careful not to press hard on the bulbs and leads.
- 5) Remove the clog thermistor bulb by removing the thermistor holder located at the center or outlet of the Condenser.
- 6) Remove the control box, and disconnect the thermistor connectors.

Note: 1. To replace the removed parts, reverse the above procedure.

2. To prevent the Evaporator from freezing, use the bush - thermistor to securely plug the wiring hole in the refrigeration unit base.

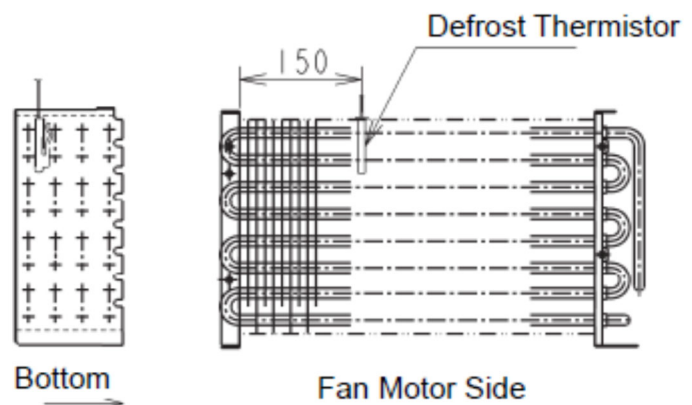
3. To remove the thermistor from HRFE-78SC refrigerator, take off the duct first and then the thermistor bulb.

Interior Thermistor Bulb Location

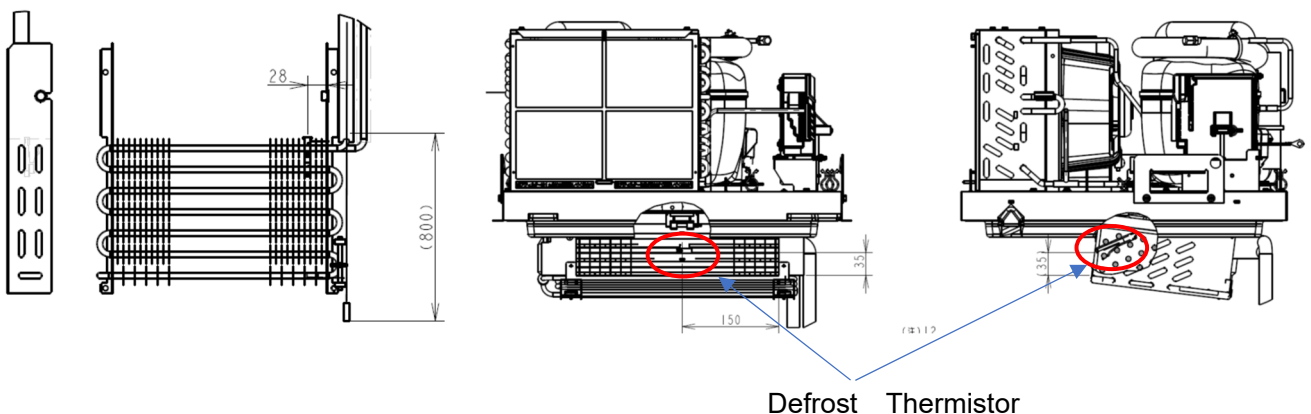


Defrost Thermistor Bulb Location

HRE/HFE series
HRFE-128SC



HRFE-78S



[d] INVERTER BOX

- 1) Remove the cover by following steps 1) to 3) of "1. REFRIGERATION UNIT".
- 2) Disconnect the Inverter Box leads.
- 3) Remove the Inverter Box from the Bracket unscrewing the two tapping screws.
(stainless steel 4x8)
- 4) To replace the removed parts, reverse the above removal procedure.

Note:

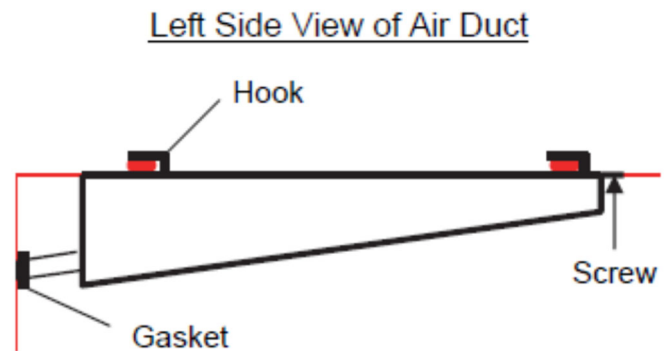
1. When a service call is made, have the user turn off the power, wait 30 seconds, then turn it back on and observe the situation for a while. This is because if the microcontroller is malfunctioning for some reason, turning the power off may return it to normal.
2. Make sure that the refrigerator body is securely earthed. If it is not earthed, the microcontroller may malfunction.
3. Before repairing, touch the refrigerator body (earthed) to discharge static electricity from your body. Static electricity may destroy the IC. Also, do not bring plastic bags, resin products, or other statically charged objects near the circuit board.
4. Do not touch the back of the controller board or the electronic components.
5. It is acceptable to replace the controller board and thermistor separately.
6. As a general rule, handle the board by holding both ends. When doing so, never apply force to the components or wires.
7. Never drop the controller board. Dropping it will break it.
8. Place the controller board on a flat surface and be careful not to scratch or cut the patterns.
9. Do not apply tension to thermistor and other wires as the insulation is thin and the wires may break.
10. Do not apply tension to connectors as this may cause the connector to come loose or the wires to break at the crimped parts. After servicing is completed, check that the connectors have not come loose.
11. The thermistor wire is solid wire, so do not bend or stretch it. (The part about 400 mm from the tip and the connection part of the lead wire)
12. Do not crush the thermistor and the wire part of the thermistor, as the insulation will break and cause a short circuit.
13. Some parts may be hot immediately after operation, so handle with care.

14. The output has high voltage parts. Be sure to turn off the power before carrying out repairs. If you have to work with the power on, such as checking the operating voltage, wear insulated gloves.
15. Be sure to place a sheet (for heat dissipation) between the ICs before fastening them with screws.
16. Depending on the nature of the failure, parts may explode. Do not carelessly approach the controller when it is energized.
17. Electromagnetic waves emitted from the wiring may cause it to malfunction. After repairs, the wiring inside the controller box should be returned to the same state as when it was shipped from the factory.
18. Incorrect settings may cause the compressor to not operate, or in the worst case, may result in breakdown. When replacing the board, always check that the compressor and settings match.
Set the model. See "5-[g] HOW TO SET MODEL AND INTERNAL TEMPERATURE CORRECTION VALUE WHEN REPLACING BOARD".

4. AIR DUCT

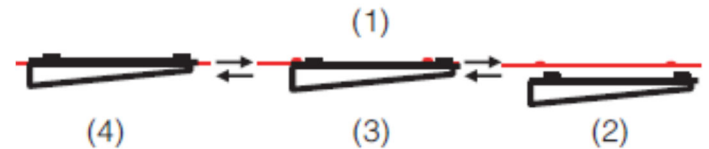
[a] AIR DUCT

- 1) Remove the two or three screws at the front Of the air duct.
- 2) Hold both sides of the air duct, and pull it forward. The air duct in the freezer compartment is provided with a gasket in the drain pipe and must be pulled hard to remove.



- 3) To prevent tension on the wires, place the removed air duct on a shelf.
- 4) To replace the air duct, first insert the drain pipe into the drain outlet at the rear of the unit. For the freezer compartment, move the gasket backward before inserting the drain pipe.

To remove: (1) Pull forward. Air duct will fall off.
To replace: (2) Position to fit hooks. (3) Lift up.
(4) Push backward.

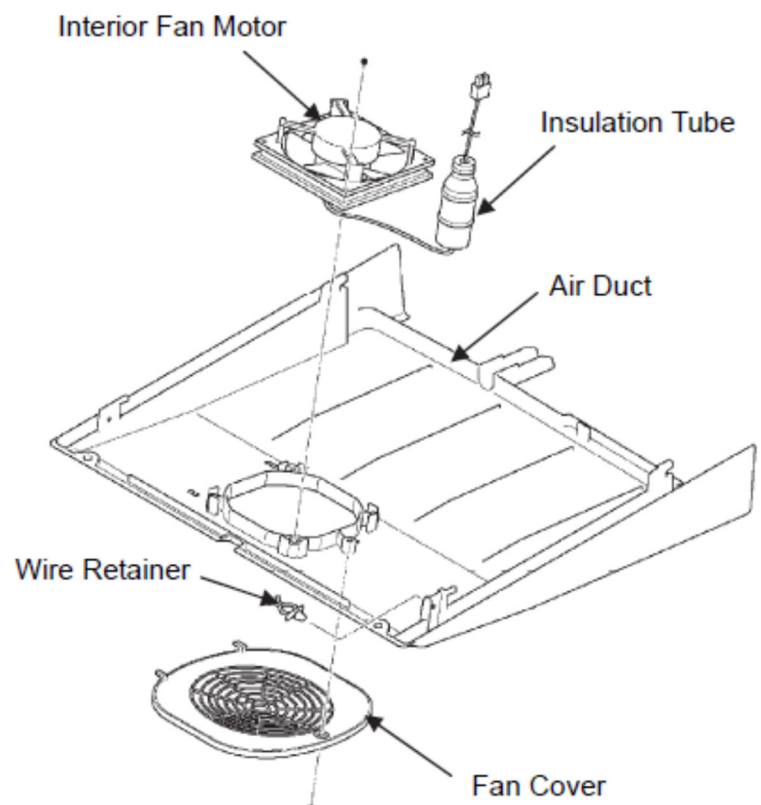


- 5) Position the air duct to fit the six hooks on both sides. Keep the air duct slightly forward for smooth positioning.
- 6) Lift up the air duct, and push it backward to fit in.
- 7) Tighten the screws at the front of the air duct.

Note: Be careful not to catch the interior Fan Motor leads in the air duct.

[b] INTERIOR FAN MOTOR

- 1) Unplug the unit.
- 2) Disconnect the interior Fan Motor connector (blue) beside the refrigeration unit.
- 3) Unscrew the refrigeration unit.
- 4) Slightly lift up the refrigeration unit, and put the interior Fan Motor leads inside the cabinet.
- 5) Remove the air duct.
- 6) Remove the interior Fan Motor from the air duct.

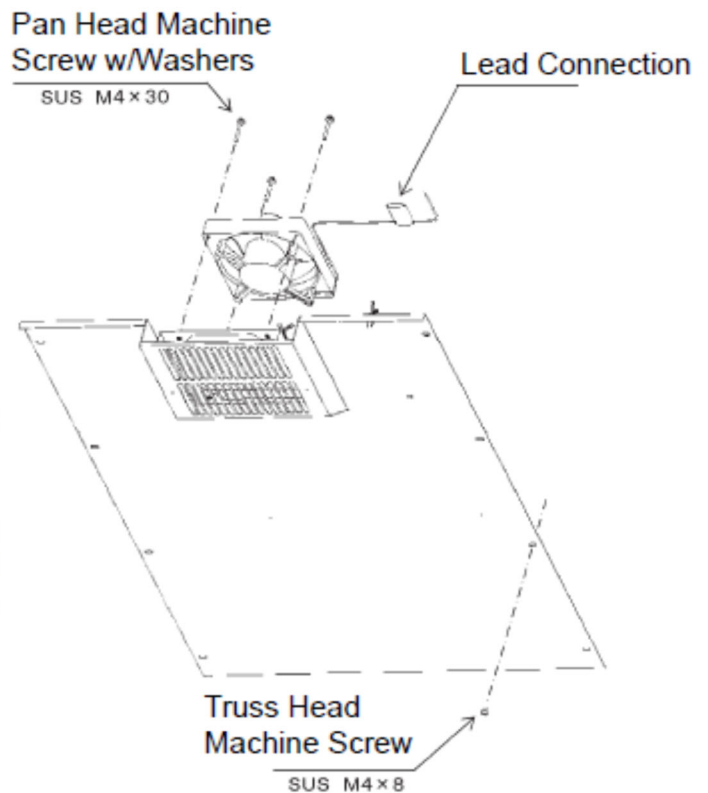


[c] INTERIOR FAN MOTOR (HRFE-78SC)

- 1) Unplug the unit.
- 2) Open the door to the refrigerator. Unscrew and remove the cooling duct.
- 3) Unscrew and remove the Fan Motor.
- 4) Cut the Fan Motor leads at their connection. (Keep the lead re-connectable.)
- 5) To replace the removed parts, reverse the above procedure.

Note: 1. To prevent water from coming in, the lead terminals must be caulked and covered with plastic bag. Be sure to connect the leads outside the unit.

2. Seal the lead hole with putty later.

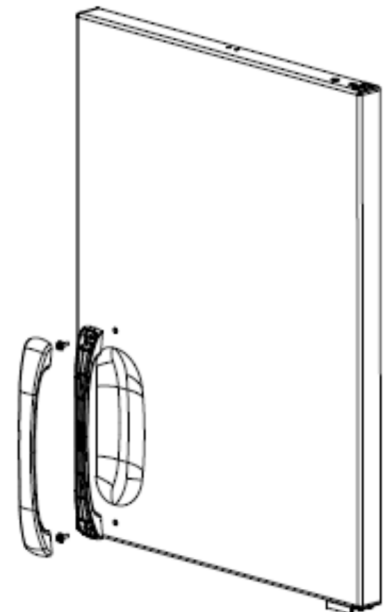


5. DOOR PARTS

[a] DOOR HANDLE

The door handle is replaceable. Order the new steering wheel base and steering wheel cover.

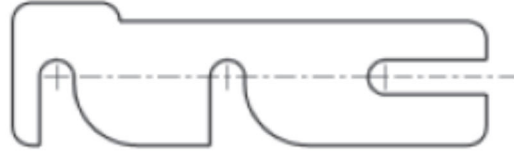
1. Insert a precision screwdriver into the joint to remove the handle cover.
 2. Remove the mounting screws and detach the handle base.
 1. To replace the removed parts, reverse the above procedure.
- Tighten the mounting screws to a torque of 98–127 N·cm (10–13 kgf·cm).



[b] HINGE SPACER

For door closing adjustment, the hinge spacers may be provided between the hinges and cabinet. When removed, the hinge spacers must be reinstalled in the correct position. When the door is replaced or the gasket is often caught in the door, order the following parts and replace the hinge spacers:

Hinge Spacer 473352M01



[c] LIFT HINGE

To ensure smooth door closing, the hinge shaft employs a lift hinge. If the hinge makes an abnormal noise or the worn out lift hinge hinders smooth door closing, apply White Alcom Grease (White grease used for industrial icemakers). If the lift hinge is severely worn out, replace the hinge collar (Lift hinge) on both the door and hinge sides.

* Apply White Alcom Grease also when the door is replaced in the field.

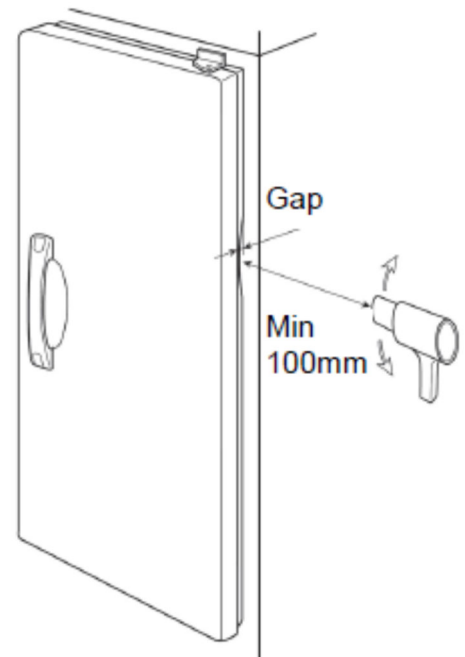
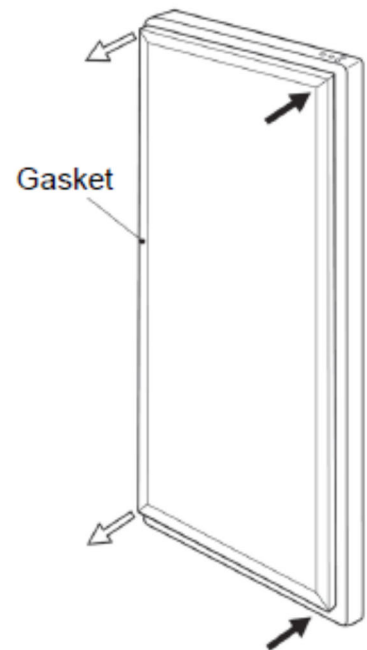
[d] DOOR GASKET

To replace the Door Gasket:

- 1) Pinch and pull out the door gasket from the corners.
- 2) Push the convex of the new Door Gasket into the concave of the door interior. Insert the corners first to facilitate replacement.

Replacement of the door or Door Gasket may cause a gap between the Cabinet and the Gasket. To correct this gap, slightly heat the Gasket with a drier. To avoid melting the Gasket:

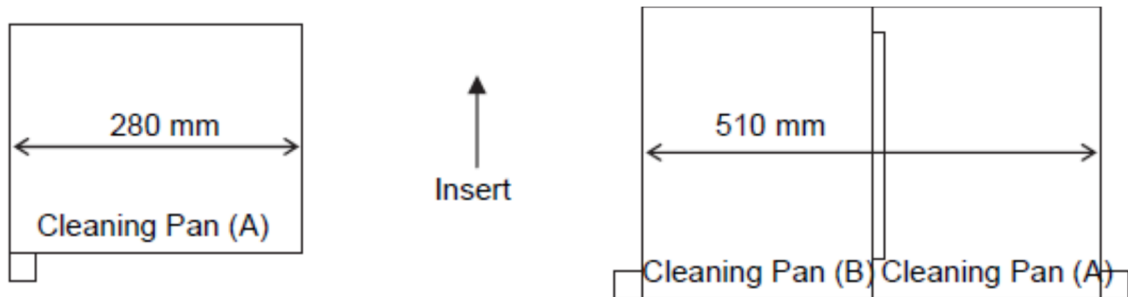
- 1) Keep the drier at least 100 mm away from the Gasket.
- 2) Move the drier up and down to heat the entire gap.



6. CONDENSER CLEANING PAN

The Condenser is designed to allow the cleaning pan at the bottom.

- * Insert the cleaning pan (wastewater pan), and connect the drain hose to the drain outlet. Use the cleaning pan (A) for the 280 mm wide Condenser [HRE-78/128/148/188SC, HFE-78SC, HRFE-78/128SC], and connect the cleaning pan (A) and cleaning pan (B) for the 500 mm wide Condenser [HFE-128/148/188SC].

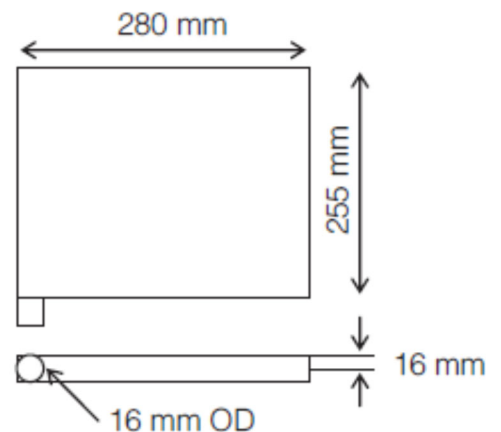


- * Cover the cleaning pan with a waste cloth to prevent wastewater from splashing around (especially the compressor and Condenser Fan Motor).
- * The cleaning pan has a capacity of about 1 L and takes 1 minute to drain. Do not allow a large amount of water into the cleaning pan.

The cleaning pan is not provided in the unit and must be ordered by the following part numbers:

Cleaning Pan (A) 354309G01
 Cleaning Pan (B) 354310G01 for connection only

Dimensions: W280 x D255 x H16 (t 0.8) mm
 Drain Outlet: 16 mm OD x 14 mm ID
 Drain Hose: 16 mm DIA
 Capacity: 1.0 L



7. OPTIONAL PARTS

[a] HINGE KIT

Hinge Kit (R)

Door Hinge (R) – Lo	375316G01	1 pc
Door Hinge (R) - Up	375315G01	1 pc
Door Hinge (R) – CT	375317G01	1 pc
Hinge Collar – Hinge	339948-01	2 pcs

Hinge Kit (L)

Door Hinge (L) – Lo	375319G01	1 pc
Door Hinge (L) – Up	375318G01	1 pc
Door Hinge (L) – CT	375320G01	1 pc
Hinge Collar – Hinge	339948-01	2 pcs

[b] STAINLESS STEEL INTERIOR DOOR

78SC

Door (R) - Up Assy	2C1846A01	1 pc	[With magnet]
Door (R) - Lo Assy	261806A01	1 pc	
Door (L) - Up Assy	2C1848A01	1 pc	[With magnet]

* The Door (R) - Lo Assy does not have a magnet for the door switch. If you want to move the door to the other side, please also order the Door (L) - Up Assy along with the hinge kit.

128SC

Door (R) - Up Assy	2C1416A01	1 pc	[With magnet]
Door (R) - Lo Assy	261799A01	1 pc	
Door (L) - Up Assy	2C1417A01	1 pc	[With magnet]
Door (L) - Lo Assy	261801A01	1 pc	

148SC

Door (R) - Up Assy	2C1846A01	1 pc	[With magnet]
Door (R) - Lo Assy	261806A01	1 pc	
Door (L) - Up Assy	2C1848A01	1 pc	[With magnet]
Door (L) - Lo Assy	261808A01	1 pc	

188SC

Door (R) - Up Assy	2C1416A01	2 pcs	[With magnet]
Door (R) - Lo Assy	261799A01	2 pcs	
Door (L) - Up Assy	2C1417A01	1 pc	[With magnet]
Door (L) - Lo Assy	261801A01	1 pc	

[c] LEG

Width			700/1200/1400mm	1800mm
Leg	H=90	P04879-01	4 pcs	6 pcs
Leg	H=150	P05012-01	4 pcs	6 pcs
Leg	SUS H=90	4Y2043-01	4 pcs	6 pcs
Leg	SUS H=150	4Y2041-01	4 pcs	6 pcs

[d] CASTER

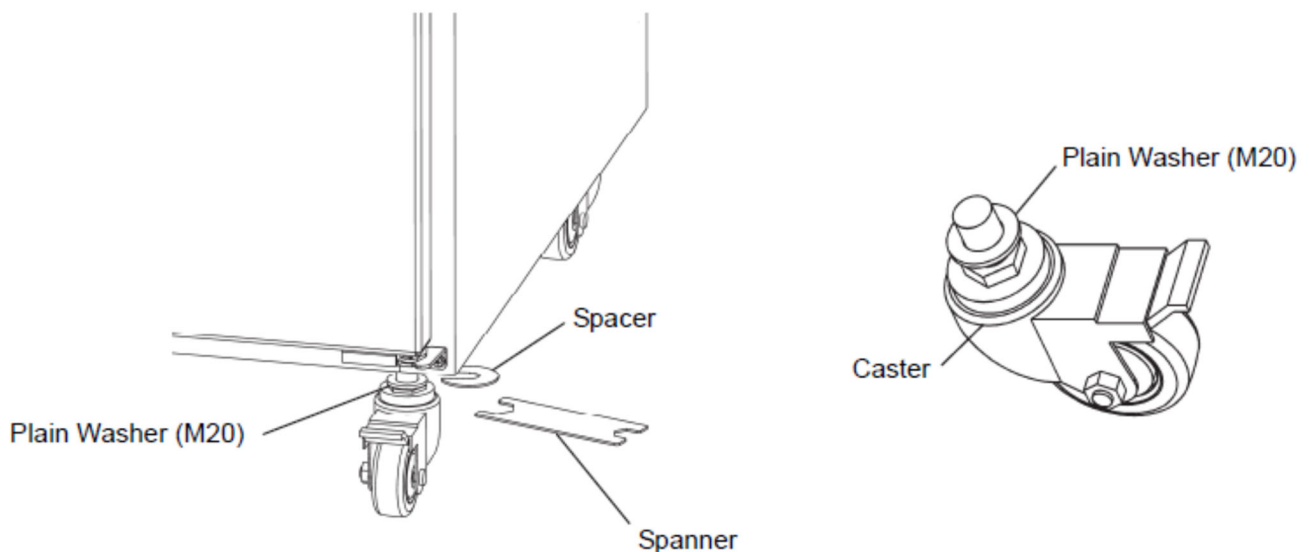
Width			700/1200/1400mm	1800mm
Caster		P00635-01	4 pcs	6 pcs
Plain Washer		FWPL20F0	4 pcs	6 pcs
Spacer – Caster		471512M01	4 pcs	6 pcs
Spanner		471513M01	1 pc	1 pc

To adjust the height of the unit, use the spanner (accessory) to loosen the casters and insert the spacers (accessory). The unit should always be level from side to side and back to front.

All the four casters are provided with stoppers. Always lock the stoppers of the front casters when in use.

Unlock the casters to move the unit for cleaning or other purposes.

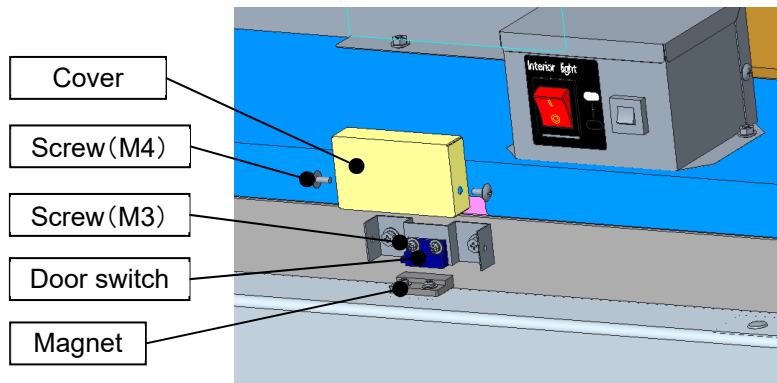
Be sure to attach the plain washers (M20) provided before fixing the casters to the cabinet. The fixing part of caster may deform without the plain washer (M20). The plain washers must be located under the spacers.



8. DOOR SWITCH AND MAGNET (Custom Specification)

[a] DOOR SWITCH

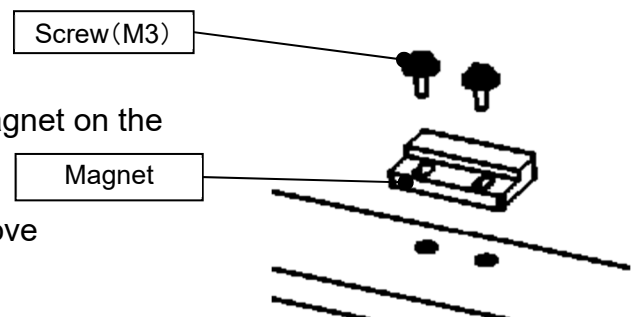
- 1) Lift the Front Panel.
- 2) Remove the 2 screws (M4) and remove the Cover.
- 3) Remove the 2 screws (M3) and remove the Door Switch.



- 4) To replace the removed parts, reverse the above removal procedure.

[b] MAGNET

- 1) Open the Door or Front Panel.
- 2) Remove the 2 screws (M3) that secure the Magnet on the Door top and replace the Magnet.
- 3) To replace the removed parts, reverse the above removal procedure.



9. LED LIGHT (Custom Specification)

- 1) Open the Door.
- 2) Remove the screws that secure the LED light on the ceiling inside the refrigerator and replace the LED light.
- 3) To replace the removed parts, reverse the above removal procedure.