DEEP FREEZER

HDF-140A-SEA
HDF-300A-SEA
HDF-400A-SEA

SERVICE MANUAL

V112-1181 (083024)

CONTENTS

PAGE

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. Only trained service engineer can service the unit using a flammable refrigerant.

2. Always ask the user to keep children away from the work area. They may be injured by tools or dissembled products.

3. 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.

4. 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.

5. To prevent frostbite, do not touch the interior with bare hands.

6. To prevent burn or injury, do not touch the condenser with bare hands.

7. Ensure adequate clearance between the top of the unit and the ceiling. In case of refrigerant leak, the leaked refrigerant accumulates and may cause fire.

8. Keep the following in 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 models for replacement of defective parts. Use proper tools to secure the wiring. Otherwise abnormal operation or trouble may occur and cause electric leaks or fire.
   (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). Otherwise electric leaks or shocks may occur.
   (7) To prevent electric shocks, do not service the electrical parts with wet hands.
   (8) The capacitors used for the compressor and other components may be under high voltage and should be discharged properly before servicing to prevent electric shocks.

CAUTION

After servicing, follow the instructions below:
(1) Check for water leaks from water supply/drain lines to prevent water damage to the surroundings.
(2) Always check the unit for proper operation before finishing servicing.
(3) Be sure to reassemble the parts completely. Loose assembly of such parts as control box cover may cause entrance of vermins resulting in a short circuit between terminals and possible ignition.

2. DIMENSIONS/SPECIFICATIONS

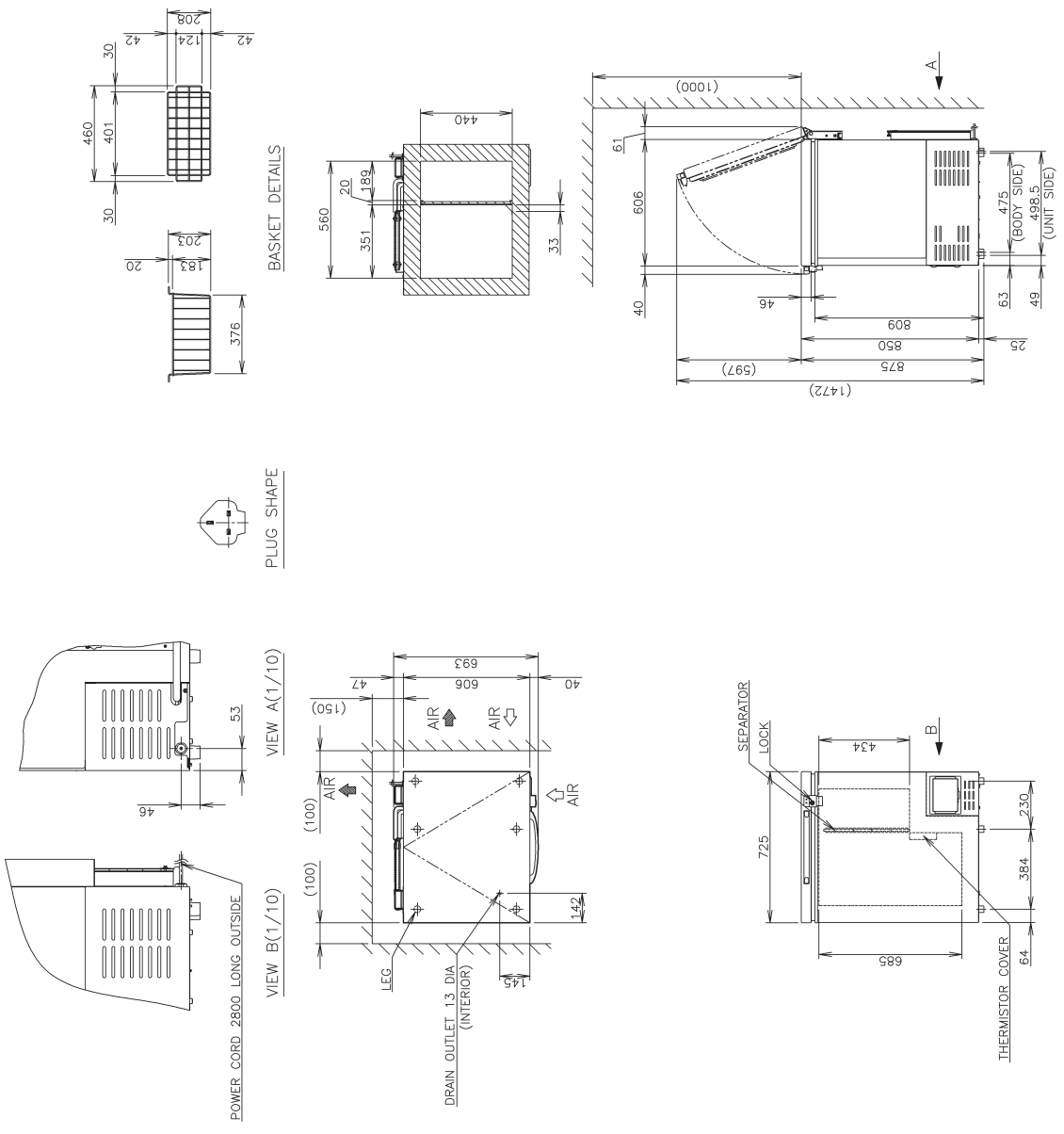
[a] HDF-140A-SEA

HOSHIZAKI

ITEM	Hoshizaki Deep Freezer
MODEL	HDF-140A-SEA
POWER SUPPLY	1 Phase 220-240V 50Hz Capacity: 0.91kVA (3.8A)
AMPERAGE	Running: 1.8A Rated Motor: 1.8A Starting: 14A
ELECTRIC CONSUMPTION	230W (Power Factor: 53%)
HEAT REJECTION	430W
POWER CORD	2.8m (with Earth Wire, UK Plug)
EFFECTIVE CAPACITY	140L
OUTSIDE DIMENSIONS	725mm(W) x 693mm(D) x 875mm(H)
INSIDE DIMENSIONS	560mm(W) x 440mm(D) x 685mm(H)
EXTERIOR	Painted Steel (Off-White)
INTERIOR	Painted Steel (Off-White)
DOOR	Horizontally Hinged Single Door + Stainless Steel
INSULATION	Polyurethane Foam
REFRIGERATION SYSTEM	Convection Cooling
COMPRESSOR	Hermetic 368W
CONDENSER	Tube on Sheet Built in Exterior Cabinet + Wire on Tube
EVAPORATOR	Tube on Sheet Built in Interior Cabinet
REFRIGERANT	R600 · R1150
TEMPERATURE CONTROL	Microprocessor (Digital Temp Indication) Adjustable from -60 to -50°C
ELECTRIC CIRCUIT PROTECTION	10A Fuse, Earth Wire
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto-reset)
LEG	Plastic
LOCK	Rotating Lock (Key x 2)
WEIGHT	59kg (Gross Approx. 65kg)
PACKAGE	Carton 785mm(W) x 775mm(D) x 964mm(H)
ACCESSORIES	Basket, Separator, Scraper
OPERATING CONDITIONS	Ambient Temperature: 5 – 32°C Voltage Range: Rated Voltage ±6%

*We reserve the right to make changes in specifications and design without prior notice.

1. Install the product properly in accordance with the instructions on location, water supply/drain connections and electrical connections stated in the instruction and installation manuals provided. Allow 10mm extra space at the installation site to meet any installation requirements (additional spacing is also required for proper air flow and pipe connections).
2. The heat rejection is based on the reached pulldown temperature at ambient temperature of 30°C.
3. Allow at least 100mm extra space at both sides, 150mm at the rear, and 1000mm at the top of the unit for proper exhaust.
   The hatched area shows the wall and ceiling.
4. The main breaker capacity is 15A.
   Be sure to use an exclusive circuit (with overload & short circuit protection).
5. Product code: V112-D001



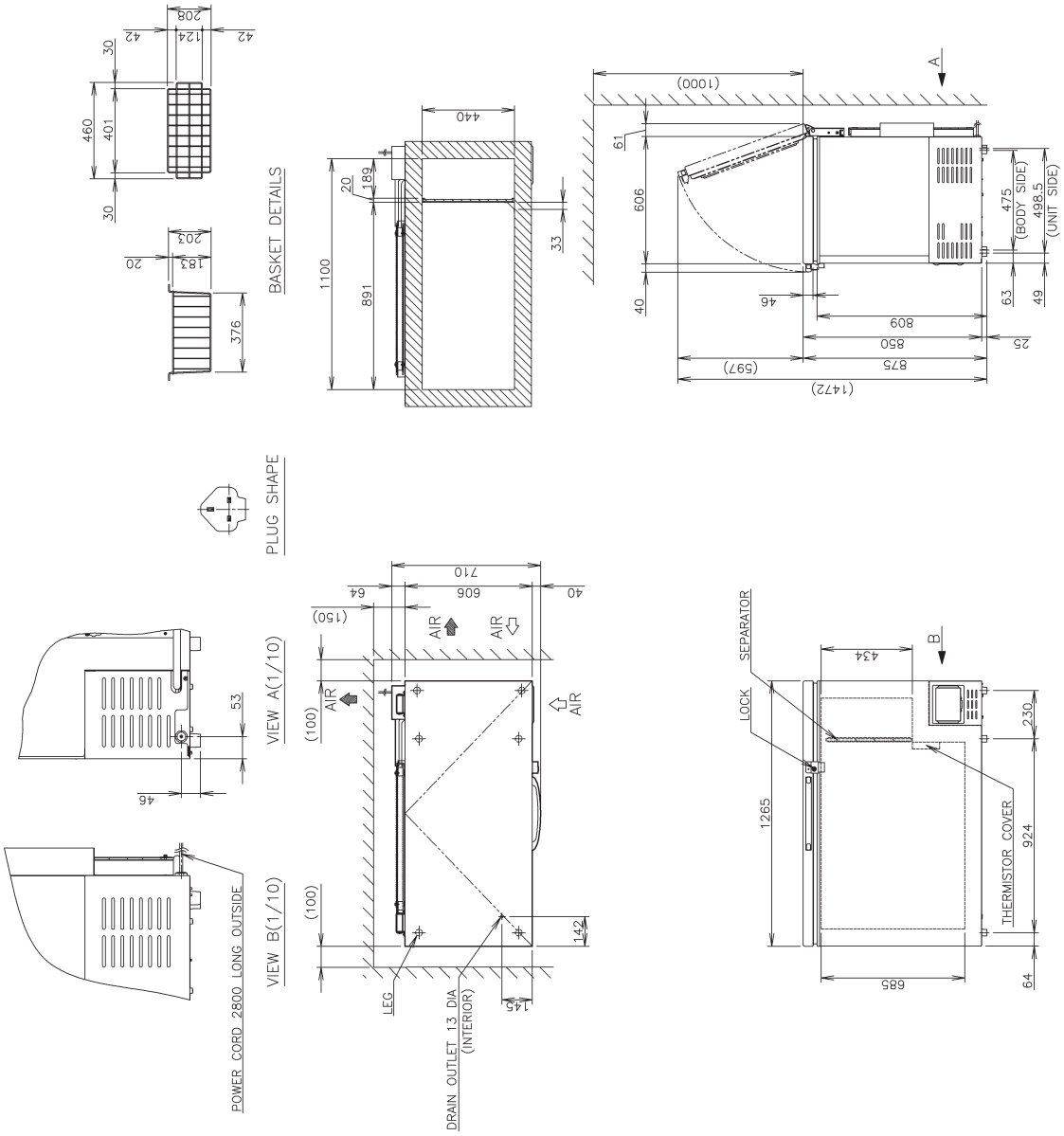
[b] HDF-300A-SEA

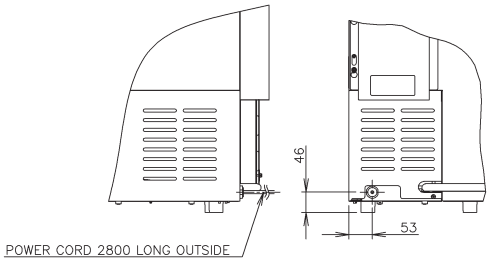
HOSHIZAKI

ITEM	Hoshizaki Deep Freezer
MODEL	HDF-300A-SEA
POWER SUPPLY	1 Phase 220-240V 50Hz Capacity: 1.14kVA (4.8A)
AMPERAGE	Running: 2.2A Rated Motor: 2.2A Starting: 18A
ELECTRIC CONSUMPTION	320W (Power Factor: 60%)
HEAT REJECTION	560W
POWER CORD	2.8m (with Earth Wire, UK Plug)
EFFECTIVE CAPACITY	298L
OUTSIDE DIMENSIONS	1265mm(W) x 710mm(D) x 875mm(H)
INSIDE DIMENSIONS	1100mm(W) x 440mm(D) x 685mm(H)
EXTERIOR	Painted Steel (Off-White)
INTERIOR	Painted Steel (Off-White)
DOOR	Horizontally Hinged Single Door + Stainless Steel
INSULATION	Polyurethane Foam
REFRIGERATION SYSTEM	Convection Cooling
COMPRESSOR	Hermetic 551W
CONDENSER	Tube on Sheet Built in Exterior Cabinet + Wire on Tube
EVAPORATOR	Tube on Sheet Built in Interior Cabinet
REFRIGERANT	R600-R1150
TEMPERATURE CONTROL	Microprocessor (Digital Temp Indication) Adjustable from -60 to -50°C
ELECTRIC CIRCUIT PROTECTION	10A Fuse, Earth Wire
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto-reset)
LEG	Plastic
LOCK	Rotating Lock (Key x 2)
WEIGHT	84kg (Gross Approx. 93kg)
PACKAGE	Carton 1325mm(W) x 775mm(D) x 964mm(H)
ACCESSORIES	Basket x 3, Separator, Scraper
OPERATING CONDITIONS	Ambient Temperature: 5 ~ 32°C Voltage Range: Rated Voltage ±6%

*We reserve the right to make changes in specifications and design without prior notice.

1. Install the product properly in accordance with the instructions on location, water supply/drain connections and electrical connections stated in the instruction and installation manuals provided. Allow 10mm extra space at the installation site to meet any installation requirements (additional spacing is also required for proper air flow and pipe connections).
2. The heat rejection is based on the reached pulldown temperature at ambient temperature of 30°C.
3. Allow at least 100mm extra space at both sides, 150mm at the rear, and 1000mm at the top of the unit for proper exhaust.
   The hatched area shows the wall and ceiling.
4. The main breaker capacity is 15A.
   Be sure to use an exclusive circuit (with overload & short circuit protection).
5. Product code: V114-D001

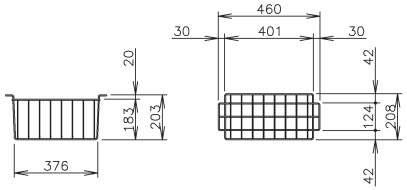




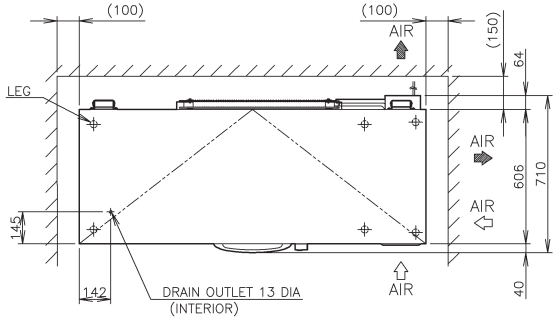
VIEW B(1/10)

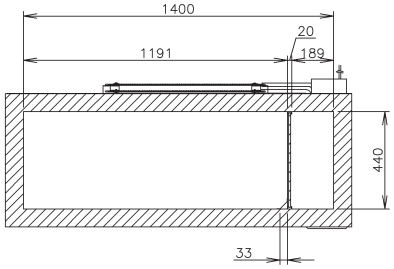
VIEW A(1/10)

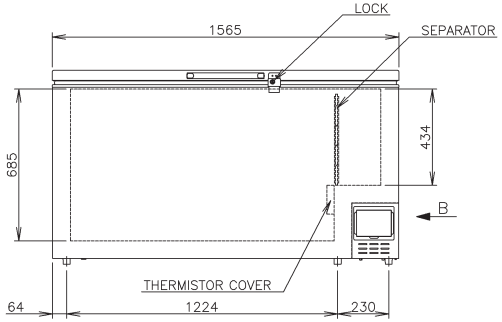
PLUG SHAPE

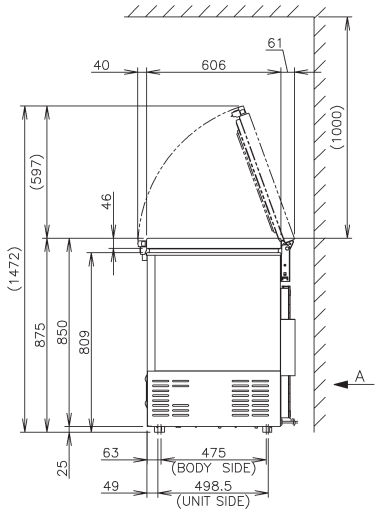


BASKET DETAILS









HOSHIZAKI

ITEM	Hoshizaki Deep Freezer
MODEL	HDF−400A−SEA
POWER SUPPLY	1 Phase 220−240V 50Hz Capacity: 1.14kVA (4.8A)
AMPERAGE	Running: 2.2A Rated Motor: 2.2A Starting: 18A
ELECTRIC CONSUMPTION	330W (Power Factor: 62%)
HEAT REJECTION	560W
POWER CORD	2.8m (with Earth Wire, UK Plug)
EFFECTIVE CAPACITY	385L
OUTSIDE DIMENSIONS	1565mm(W) x 710mm(D) x 875mm(H)
INSIDE DIMENSIONS	1400mm(W) x 440mm(D) x 685mm(H)
EXTERIOR	Painted Steel (Off−White)
INTERIOR	Painted Steel (Off−White)
DOOR	Horizontally Hinged Single Door + Stainless Steel
INSULATION	Polyurethane Foam
REFRIGERATION SYSTEM	Convection Cooling
COMPRESSOR	Hermetic 551W
CONDENSER	Tube on Sheet Built in Exterior Cabinet + Wire on Tube
EVAPORATOR	Tube on Sheet Built in Interior Cabinet
REFRIGERANT	R600・R1150
TEMPERATURE CONTROL	Microprocessor (Digital Temp Indication) Adjustable from −60 to −50°C
ELECTRIC CIRCUIT PROTECTION	10A Fuse, Earth Wire
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto−reset)
LEG	Plastic
LOCK	Rotating Lock (Key x 2)
WEIGHT	94kg (Gross Approx. 104kg)
PACKAGE	Carton 1625mm(W) x 775mm(D) x 964mm(H)
ACCESSORIES	Basket x 3, Separator, Scraper
OPERATING CONDITIONS	Ambient Temperature: 5 − 32°C Voltage Range: Rated Voltage ±6%

*We reserve the right to make changes in specifications and design without prior notice.

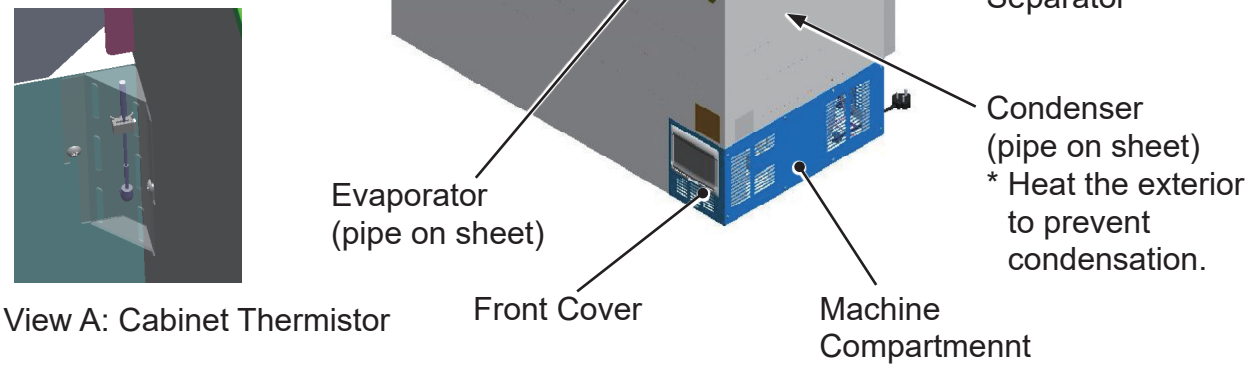
1. Install the product properly in accordance with the instructions on location, water supply/drain connections and electrical connections stated in the instruction and installation manuals provided. Allow 10mm extra space at the installation site to meet any installation requirements (additional spacing is also required for proper air flow and pipe connections).
2. The heat rejection is based on the reached pulldown temperature at ambient temperature of 30°C.
3. Allow at least 100mm extra space at both sides, 150mm at the rear, and 1000mm at the top of the unit for proper exhaust.
   The hatched area shows the wall and ceiling.
4. The main breaker capacity is 15A.
   Be sure to use an exclusive circuit (with overload & short circuit protection).
5. Product code : V115−D001

3. PACKAGING SPECIFICATIONS

Model name	Weight (kg)	Gross weight (kg)	Stacks	Width (mm)	Depth (mm)	Height (mm)
HDF-140A-SEA	59	65	Max. 3 stacks	785	775	964
HDF-300A-SEA	84	93		1325	775	964
HDF-400A-SEA	94	104		1625	772	964

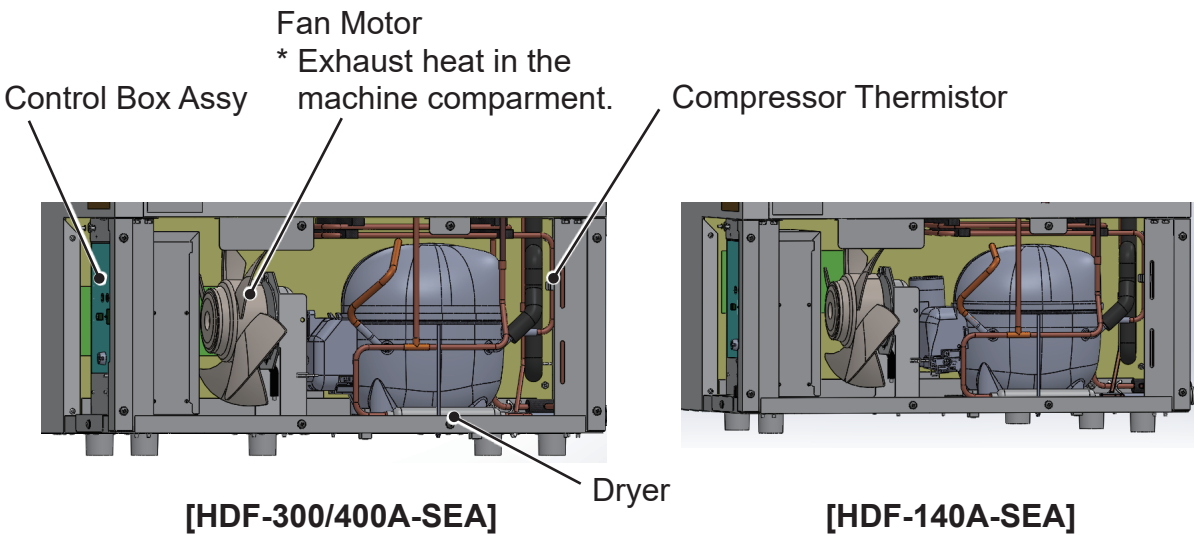
4. CONSTRUCTION

4-1. Construction



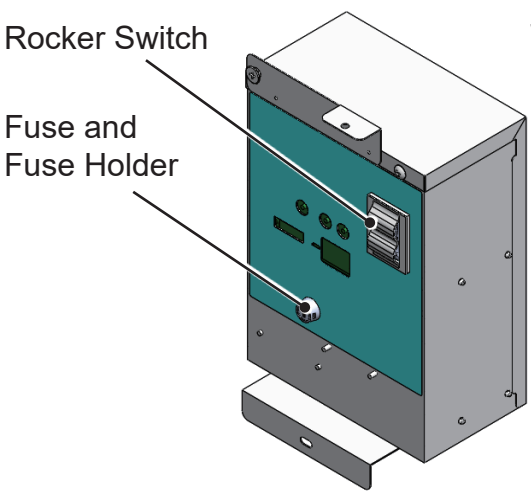
View A: Cabinet Thermistor

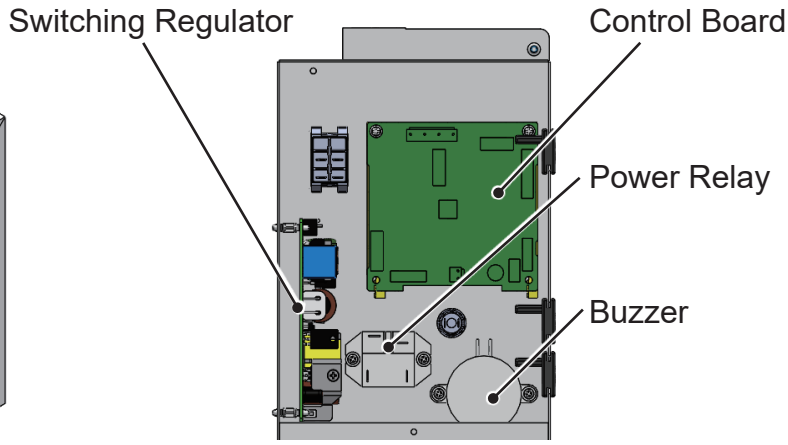
[HDF-300A-SEA]

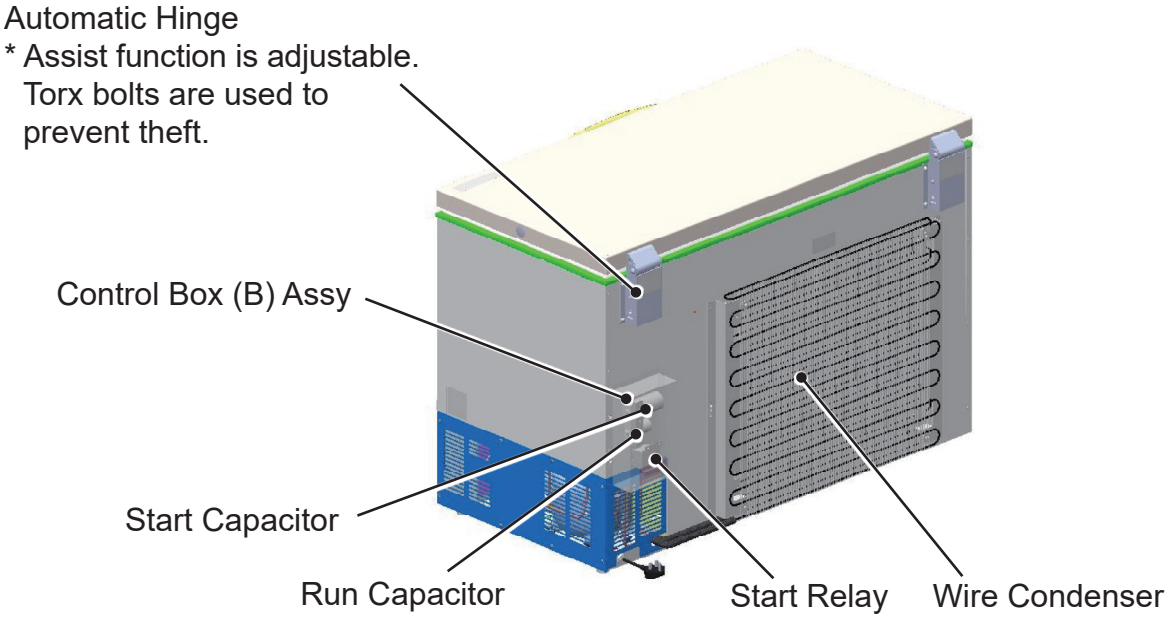


[HDF-300/400A-SEA]

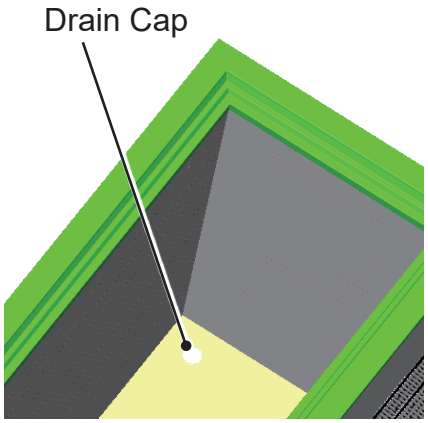
[HDF-140A-SEA]

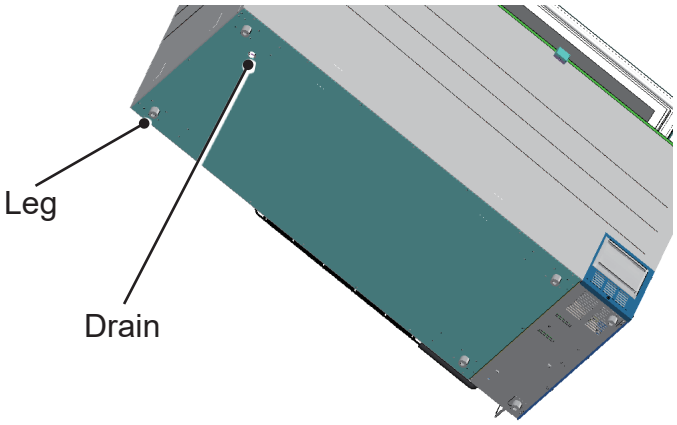




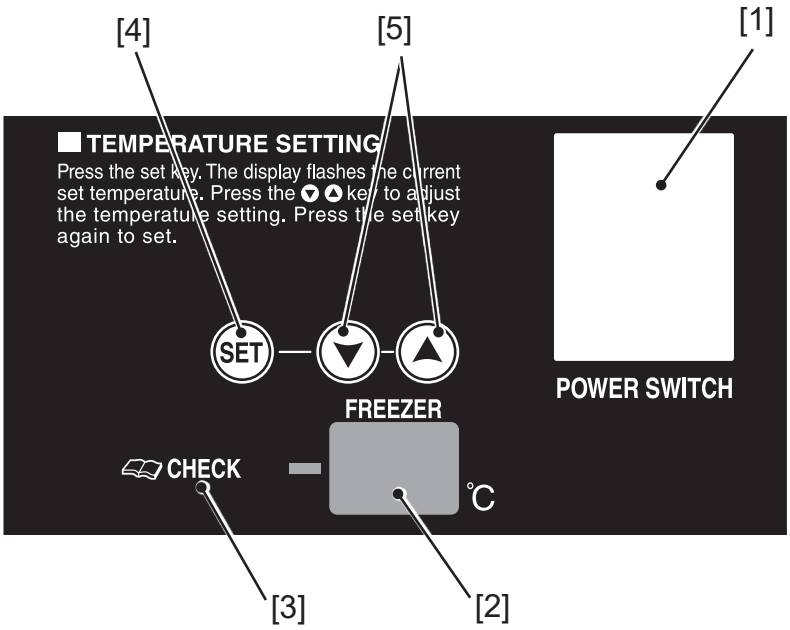


[HDF-300/400A-SEA]





4-2. Operation panel



[1] Power Switch
Turns on/off the unit.
[2] Temperature Display
Indicates the cabinet temperature.
Flashes error code when an error occurs.
[3] Check Lamp
Lights up when an error occurs.
[4] Set Key
Displays/changes the cabinet temperature.
[5] Up/Down Key
Increases/decreases the cabinet temperature.
To reset the check lamp/error code indication/buzzer, use the up key.

1) Press the set key on the operation panel. The display flashes the current set temperature.

* To go back to the current temperature indication, wait for 10 seconds or press the set key again.

2) While the set temperature is flashing, press the up/down key to adjust the temperature setting.

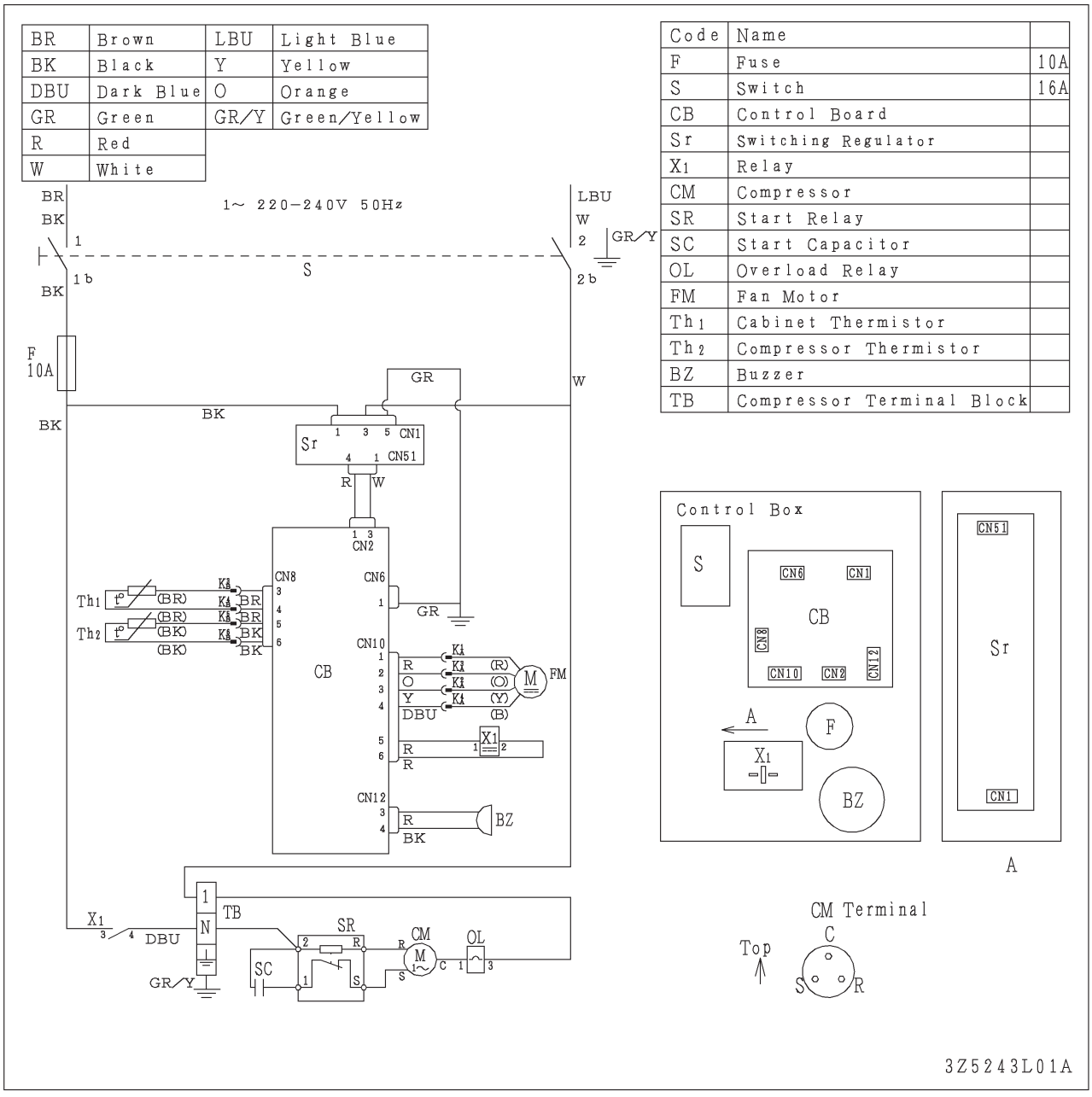
3) Press the set key.

* After 10 seconds without pressing the set key, no settings will be stored, and the display goes back to the current temperature indication.

TECHNICAL INFORMATION

5. WIRING DIAGRAM

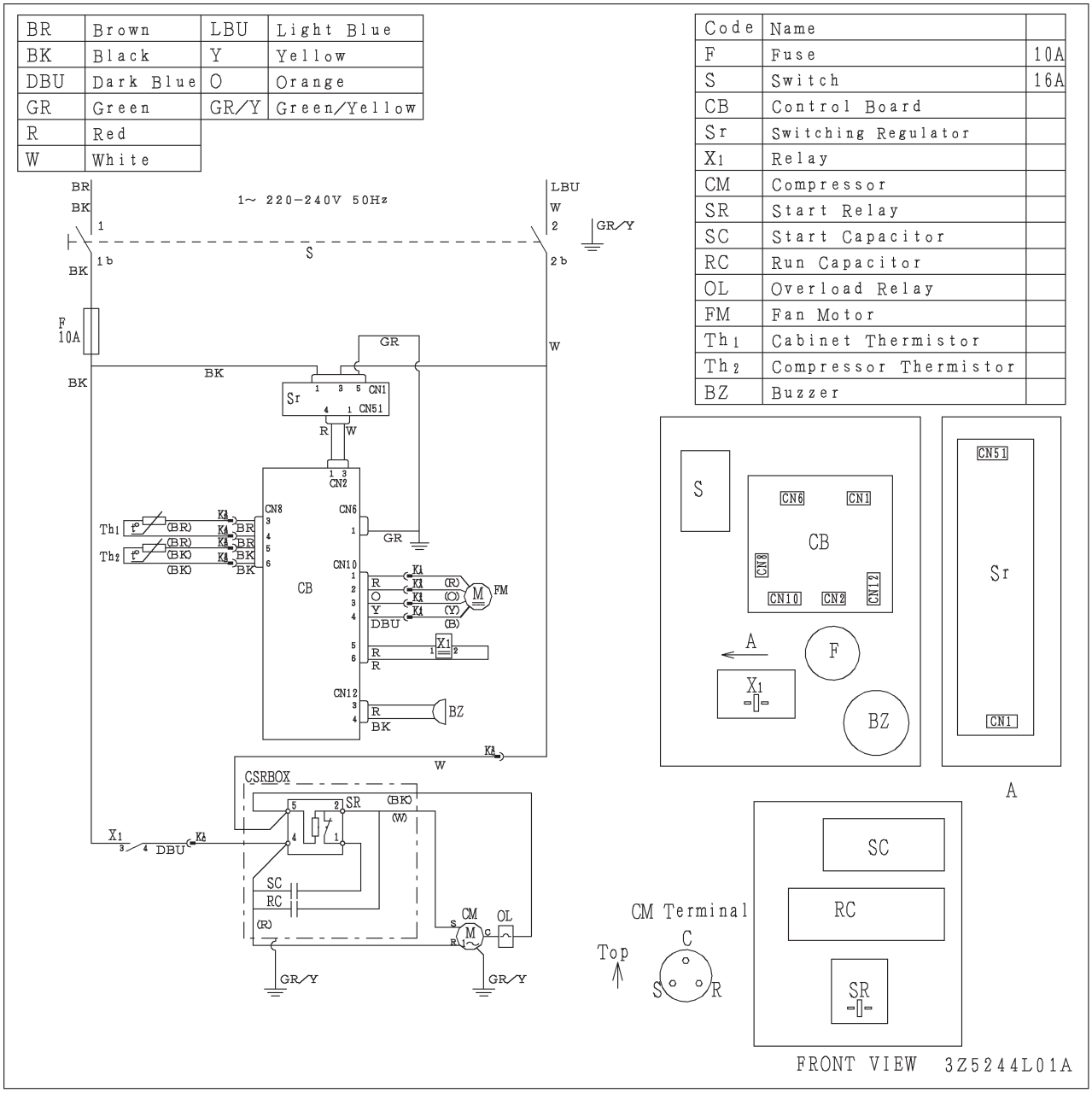
[a] HDF-140A-SEA



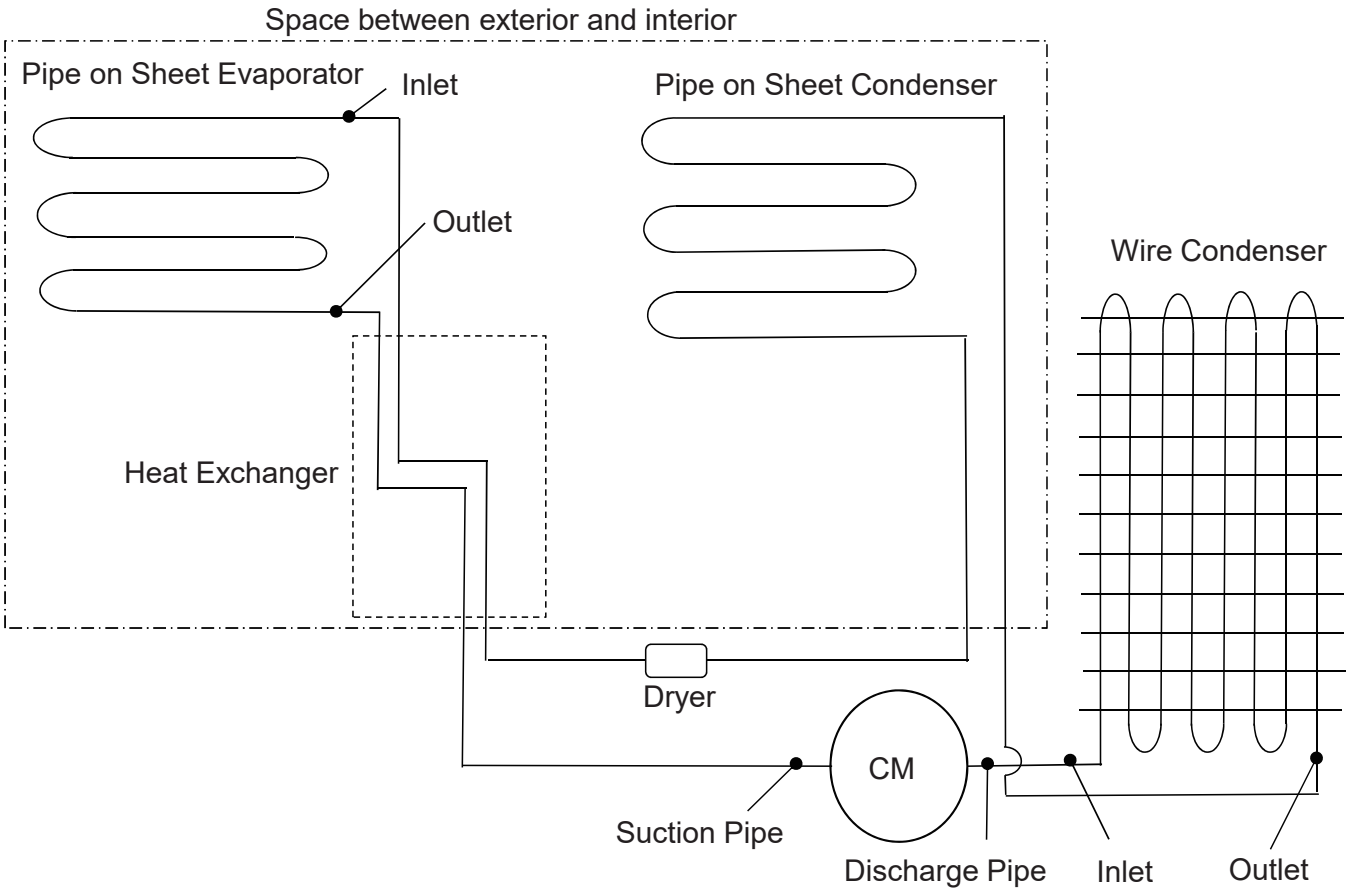
[b] HDF-300/400A-SEA

BR	Brown	LBU	Light Blue
BK	Black	Y	Yellow
DBU	Dark Blue	O	Orange
GR	Green	GR/Y	Green/Yellow
R	Red		
W	White		

Code	Name	
F	Fuse	10A
S	Switch	16A
CB	Control Board	
Sr	Switching Regulator	
X_1	Relay	
CM	Compressor	
SR	Start Relay	
SC	Start Capacitor	
RC	Run Capacitor	
OL	Overload Relay	
FM	Fan Motor	
Th_1	Cabinet Thermistor	
Th_2	Compressor Thermistor	
BZ	Buzzer	



6. REFRIGERATION CIRCUIT



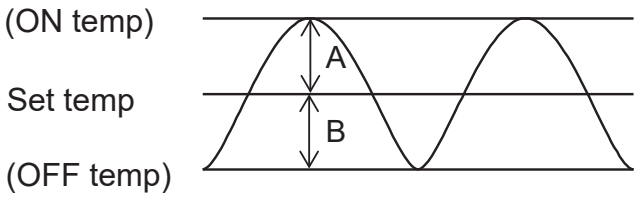
7. OPERATING INSTRUCTIONS

7-1. Control

7-1-1. Set temperature

Temperature setting range: -60 to -50°C (factory-adjusted to -60°C)
Maximum setting: -70 to -40°C (cabinet temperature upper limit: C3, lower limit: C4)
* Setting is adjustable in CF2 mode.

7-1-2. Cabinet temperature differential



The differential range is wider than the above with the control board mounted to the unit. The ranges A and B in the above figure are adjustable in 0.5 K increments within the ranges of 0 to 5 K in the CF2 (function) mode. But both A and B cannot be set to 0 at the same time. The range A shows the upper limit (C5) and B shows the lower limit (C6) of the differential.
- Temperature range: 0 to 5 K
- Increment: 0.5 K
* Default set value is linked to the model code. See the table for CF1 mode.

7-1-3. Temperature display cycle

The digital temperature display renews its cabinet temperature indication every 30 seconds. The display shows the minimum cabinet temperature in the last 30 seconds, and remains the same for 30 seconds even if the actual cabinet temperature changes when the door is opened.

7-1-4. Compressor soft start
[a] Startup

1) Turn on the power supply. The display indicates the cabinet temperature.

2) The compressor and the fan motor start with a 5-minute delay.

3) The timing of the compressor start-up depends on the cabinet temperature 5 minutes after the power supply is turned on.

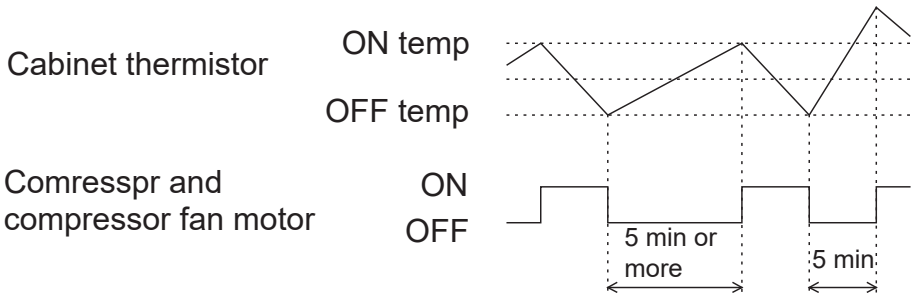
   - When the cabinet temperature is higher than the compressor OFF temperature (cabinet set temperature),
     --> the compressor starts in 5 minutes.

- When the cabinet temperature is the same as or lower than the compressor OFF temperature (cabinet set temperature),
  --> the compressor stays stopped even after 5 minutes have passed. The compressor starts when the cabinet temperature reaches the compressor ON temperature.

* The operation of the fan motor depends on the F4 (fan motor) mode setting.
When the F4 mode is on, the fan motor runs in conjunction with the compressor.
When the F4 mode is off, the fan motor starts and runs continuously right after the power supply is turned on.

* The compressor soft start 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.

[b] Control



1) When the compressor de-starts during the cooling control, the compressor and the fan motor start with a minimum 5-minute delay.

2) When the compressor starts during the cooling control, the compressor and the fan motor continue running for 5 minutes.

e.g. Even if the cabinet temperature rises when the door is opened right after the compressor stops, the compressor does not start for 5 minutes.

* The operation of the fan motor depends on the F4 mode setting. The above figure shows the operation when the F4 mode is on. The fan motor runs in conjunction with the compressor. When the F4 mode is off, the fan motor runs continuously.

7-1-5. Quick start

1) Press and hold the set key and turn on the power supply. All LED lamps light up for 1 second, and the display shows the set model code for 5 seconds. Then the compressor starts up.

2) The operation at the quick start depends on the cabinet temperature when the power supply is turned on.

- When the cabinet temperature is higher than the compressor OFF temperature,
  --> the display shows the model code for 5 seconds, then the compressor starts.

- When the cabinet temperature is the same as or lower than the compressor OFF temperature,
  --> the display shows the model code for 5 seconds. The compressor starts after the cabinet temperature reaches the compressor ON temperature.

* The cabinet temperature is measured in 5 seconds and defined.

3) The buzzer sounds for 1 second when the power supply is turned on.

7-1-6. Checking and setting cabinet temperature

1) Press the set key. The display flashes the set temperature.

2) Use the up/down key to adjust the temperature setting.

3) Press the set key to set. The set temperature is adjustable from -60 to -50°C.

4) After 10 seconds with the display flashing, no settings will be stored, and the display returns to the current temperature indication.

* No settings will be stored if the power supply is turned off while the set temperature is flashing. Do not turn off the power switch until the display returns to the current temperature indication.

* The temperature setting range is adjustable in CF2 mode.

SERVICE INFORMATION

8. CONTROL BOARD SETTING

8-1. Maintenance mode

1) Press and hold the down key and set key for 5 seconds to enter the maintenance mode. The display indicates the code “tr”.

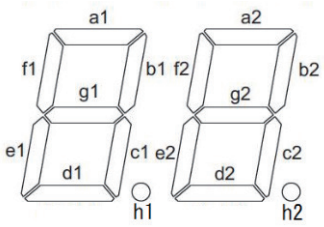
2) Use the up/down key until the display indicates the desired setting code.

3) Press the set key. The current setting flashes in the display.

4) Use the up/down key to adjust the setting. Press the set key to set. The display returns to the setting code indication. If the set key is not pressed in 1 minute, no settings will be stored, and the display returns to the setting code indication.

5) Press and hold the down key and set key for 5 seconds to return to the cabinet temperature indication.

Code	Item	Description
tr	Cabinet thermistor	Thermistor-sensed temperature (instantaneous value)
tc	Compressor thermistor	Thermistor-sensed temperature (instantaneous value) +0°C: “0” +99°C: “99” +100°C: “01” --> “00” +123°C: “01” --> “23”
cn	Operation	PL: Pull down ST: Stop rF: High pressure error SE: Safe mode * When cabinet thermistor has open/short circuit, compressor runs continuously without controlled operation, and display indicates error code “66” or “67”. When cabinet thermistor is repaired, compressor returns to normal operation.
cd	Compressor running rate	Compressor running rate 0 to 99 percent: “0” to “99” 100 percent: “01” and “00” are indicated alternately

Code	Item	Description
io	Port input/output	a1. Fan motor b1. Compressor c1. --- d1. --- e1. Remote alarm (buzzer) f1. g1. --- h1. --- a2. Fan motor frequency generator pulse b2. --- c2. d2. e2. f2. g2. h2. --- 
cc	High pressure state	First digit: Compressor state 0: Waiting for OFF time 2: Stop for high pressure 3: Waiting for cabinet temperature to reach ON temperature 6: Normal Last digit: Pressure state 0: Normal 1: High pressure sensed by thermistor
PS	Power supply	Seven segment display: power supply (deviation from 12.0 V)
cF	Fan motor	Seven segment display: actual rotation speed [100 rpm] e.g. 1200 rpm is displayed as “1.2”. “- (minus) LED”: on/off state of output Light is off: OFF Light is on: ON
br	Reset cause	Seven segment display: cause of reset The cause of the latest system reset is indicated. 00: Normal energization 01: Low voltage 02: Unauthorized memory access 04: RAM parity error 10: WDT activation 50: Reserved reset 80: Unauthorized order execution

Code	Item	Description
id	Model code indication	Model code (ON for 3.5 seconds) (OFF for 0.3 seconds) - - indication (OFF for 0.3 seconds) First 2 digits (ON for 1.7 seconds) (OFF for 0.3 seconds) Last 2 digits (ON for 1.7 seconds) (OFF for 2.0 seconds) End

8-2. Service mode

1) Press and hold the up key and set key for 5 seconds to enter the service mode. The display indicates the code “F1”.

2) Use the up/down key until the display indicates the desired setting code.

3) Press the set key. The current setting flashes in the display.

4) Use the up/down key to adjust the setting. Press the set key to set. The display returns to the setting code indication. If the set key is not pressed in 1 minute, no settings will be stored, and the display returns to the setting code indication.

5) Press and hold the up key and set key for 5 seconds to return to the cabinet temperature indication.

Code	Item	Range	Default
F1	High temperature sensing time	0: Immediately after high temperature is sensed 1: 1-hour delay 2: 2-hour delay 3: 3-hour delay	3
F2	Error history	Error history (8 errors at a maximum) * Resettable	-- (No history)
F3	High pressure error history	Number of errors * Resettable	0 (No history)
F4	Fan motor mode	ON: Operation in conjunction with compressor OFF: Continuous operation	ON
Fb	Buzzer setting	0: Buzzer sounds when any error occurs 1: Buzzer sounds only when high temperature error occurs 2: Buzzer does not sound	0

* To reset an individual error history, press and hold the up and down keys for 5 seconds.

8-3. Model setting mode [CF1]

1) The CF1 mode is for setting the model.

2) Press and hold the up and down keys and turn on the power supply. The display indicates “01”.

3) Use the up/down key to increase/decrease the number.

4) Press and hold the set key for 2 seconds. The code “rc” flashes in the display.

5) Press and hold the set key for 2 seconds while “rc” is flashing. The code “oF” flashes in the display. Then turn off the power supply.

	CF1 Model code	C2	C5	C6
Model	Hexadecimal digit			
HDF-140A-SEA	02	-1.0	0	-2.0
HDF-300A-SEA	04	-1.0	0	-2.0
HDF-400A-SEA	05	-1.0	+1.5	-0.5

8-4. Function mode [CF2]

1) The CF2 mode is for setting the cabinet temperature and other factors.

2) Press and hold the up and down keys and turn on the power supply. The display indicates the code “C2”.

3) Use the up/down key until the display indicates the desired setting code.

4) Press the set key. The setting item flashes in the display.

5) Use the up/down key to adjust the set value.

6) Press the set key to return to the setting code indication.

7) Press and hold the set key for 2 seconds while the setting code or item is indicated. The code “rc” flashes in the display.

8) Press and hold the set key for 2 seconds when the display is flashing the code “rc”. The code “oF” flashes in the display. Then turn off the power supply.

Code	Item	Unit	Range	1: Increment	2: Default
C2	Corrected temperature	K	-5.0 to +5.0	0.5	-1.0
C3	Upper limit of cabinet temperature setting	°C	-50 to -40	1	-50
C4	Lower limit of cabinet temperature setting	°C	-70 to -60	1	-60
C5	Upper limit of differential	K	0 to +5.0	0.5	Depends on model
C6	Lower limit of differential	K	-5.0 to 0.0	0.5	Depends on model

* The set value for both C5 and C6 cannot be “0” at the same time.

9. TROUBLE SHOOTING

9-1. Error codes

- The display indicates the cabinet temperature and error code alternately every second (also during the defrost cycle). The check lamp lights up along with the error code indication.

- The unit does not stop due to the errors requiring manual reset except for the errors “40”, “41”, “44” and “45”.

- If two or more errors occur at the same time, an error of higher priority is indicated.

  High <----------> Low
  40 > 41 > 66 > 67 > 60 > 47 > 91 > 48 > 80

- When an error occurs, the buzzer sounds at the same time.
  * To stop the buzzer, enter the service mode.

- To reset an error, press and hold the up key for 3 seconds. (Only for resettable errors)

Error code	Item	Description	Operation
60	High temperature error	The cabinet temperature is +20K higher than the set temperature for 3 hours. * The error detection starts when the cabinet temperature reaches the set value and the compressor stops after the unit is energized. * Resettable. * All models are applicable.	Continue
91	Compressor high temperature error	The compressor thermistor senses 150°C. (See figure 1)	Stop

Error code	Item	Description	Operation
66	Cabinet thermistor error 1	The cabinet thermistor senses 70°C or more and remains shorted for 10 minutes or more. * Resettable.	Continue
67	Cabinet thermistor error 2	The cabinet thermistor senses -80°C or less and has an open circuit. * Resettable.	Continue
47	Compressor thermistor error 1	The thermistor senses the discharge pipe temperature of 180°C or more. The compressor stops.	Stop Auto-reset
48	Compressor thermistor error 2	The thermistor senses the discharge pipe temperature of less than -15°C. The compressor does not stop. * The error detection starts 10 minutes after the compressor starts running.	Continue
41	EEPROM error	Abnormal value is detected in the EEPROM reading/writing process. (Hard error of the main control board)	Stop
40	Checksum error	There is a contradiction in the setting information. (Soft error of the main control board)	Stop
80	Fan motor error	There is a fan rotation speed error. The fan rotation speed is less than 500 rpm for 30 seconds or more. * If the compressor thermistor senses 150°C or more while the fan motor stops, the display shows the compressor high temperature error code “91”. The fan motor will not restart until the fan motor error resets. (See figure 2) * All models are applicable.	Continue Auto-reset

Compressor thermistor

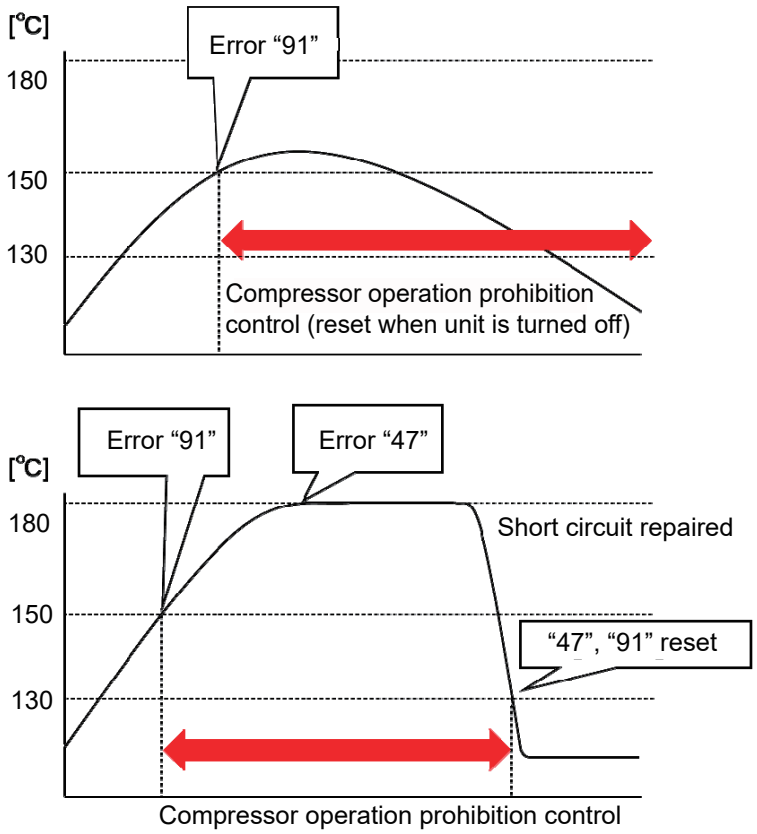


Figure 1

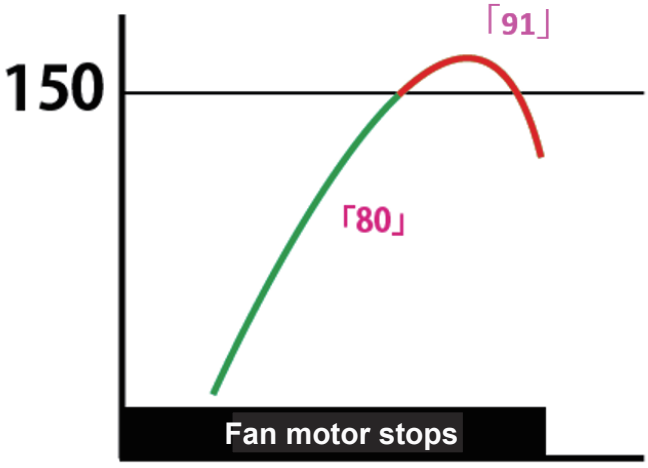


Figure 2

9-2. Possible causes and remedies

Error code	Item	Possible cause	Reset
60	High temperature error	Components - Compressor control error - Compressor error - Control board error - Refrigeration circuit error (e.g. gas leak) State of use - Hot items stored - A lot of items stored at a time - The door opened too long	- Press and hold the up key for 3 seconds. - The error resets automatically when the temperature goes down to the higher limit of the set value. - Turn off the power supply.
91	Compressor high temperature error	Components - Compressor error - Compressor accessory error State of use - Ambient temperature too high - Insufficient clearance around unit	Remove the cause of the error and turn on the power supply.
66	Cabinet thermistor error 1 (short circuit)	- Short circuit - Dust collected on connector - Control board error	- Remove the cause of the error and press and hold the up key for 3 seconds. (The error does not reset automatically.) - Turn off the power supply.
67	Cabinet thermistor error 2 (open circuit)	- Open circuit - Connector not connected securely - Control board error	
47	Short circuit of compressor thermistor	- Short circuit - Dust collected on connector - Control board error	The error resets when the discharge pipe temperature goes down to 130°C. The unit automatically returns to the normal operation.
48	Open circuit of compressor thermistor	- Short circuit - Connector not connected securely	The error resets when the discharge pipe temperature goes up to -15°C. The unit automatically returns to the normal operation.
41	Main control board EEPROM error	- Main control board error - Main control board malfunction	Turn off the power supply and turn it back on after 30 seconds. The error resets if the unit is in a normal condition. (The error does not reset automatically.)

Error code	Item	Possible cause	Reset
40	Main control board setting error	- Main control board error - Main control board malfunction	Turn off the power supply and turn it back on after 30 seconds. (The error does not reset by using the up key.)
80	Fan motor error	- Fan motor error - Fan in contact with other components	Remove the cause of the error. The error resets automatically.

9-3. Service diagnosis

Problem			Possible cause * Numbers corresponding to "9-4. Component diagnosis".	
No refrigeration	Compressor will not start	No temperature indication	(1) Fuse	Blown out
			(2) Main control board	Defective 12V DC output for operation board, open circuit, connector unplugged
			(9) Switching regulator	Open circuit, connector unplugged
		Error code "40" or "41"	(2) Main control board	Defective
		Error code/ history "60" or no error code indication	(4) Cabinet thermistor	Abnormal resistance, bad contact
			(5) Compressor thermistor	Abnormal resistance, bad contact
			(6) Compressor	Winding open, accessory electrical component defective
	Compressor starts and stops within 3 minutes	Error code/ history "80" or "91" (Compressor high temperature)	Ambient temperature too high	
			Condensing capacity insufficient	Heat source in vicinity, poor ventilation, improper installation site
			Wire condenser	Dirty
			(12) Fan motor	Locked, open circuit
			(2) Main control board	Defective output to fan motor
			(5) Compressor thermistor	Abnormal resistance, bad contact
		Error code/ history "60" or no error indication	Cabinet overloaded	
			(4) Cabinet thermistor	Improper location
			(6) Compressor	Locked
			(11) Refrigerant leak	
		Error code "60" or no error indication	Power supply	Power supply less than 207V
				Extension cord too long
				Unit not connected to separate power supply

Problem			Possible cause * Numbers corresponding to "9-4. Component diagnosis".	
No refrigeration	Compressor runs with no refrigeration	No error indication	Cabinet overloaded	
			Door gap	
			Door gasket damaged	
			Too much frost	
			(4) Cabinet thermistor	Improper location
				Frost built up around thermistor
				Dirt inside thermistor cover
			(13) Clogged refrigeration circuit	Clogged capillary tube or dryer
			(11) Refrigerant leak	
			(6) Compressor	Defective
Poor refrigeration	Slow refrigeration	Set point is reached	Ambient temperature too high	
			(11) Refrigerant leak	Abnormal cooling speed
		Set point is not reached	See "Compressor runs with no refrigeration" above	
	Normal temperature indication with poor refrigeration		Cabinet overloaded	
			Hot items in cabinet	
			Too much frost inside cabinet	
			Ambient temperature too high	
			(4) Cabinet thermistor	Abnormal resistance, bad contact, improper location
			(2) Main control board	Defective
Excessive refrigeration	Compressor runs continuously	Error code/ history "66" or "67"	(4) Cabinet thermistor	Open or short circuit
		High temperature indication	(4) Cabinet thermistor	Improper location
				Frost on thermistor cover
				Dirt inside thermistor cover
		Normal temperature indication	(4) Cabinet thermistor	Abnormal resistance
			(2) Main control board	Defective
			Compressor	Short circuit, defective relay
	Compressor stops	No error code indication	Ambient temperature too low	
Abnormal noise	---		(6) Compressor	
			(12) Fan motor	
			Pipe connections	Refrigerant leak
			Control box	Defective relay
Condensation	---		Ambient temperature and humidity too high	
			Narrow installation space	
			Compressor	
			Wire condenser exposed to cold air	

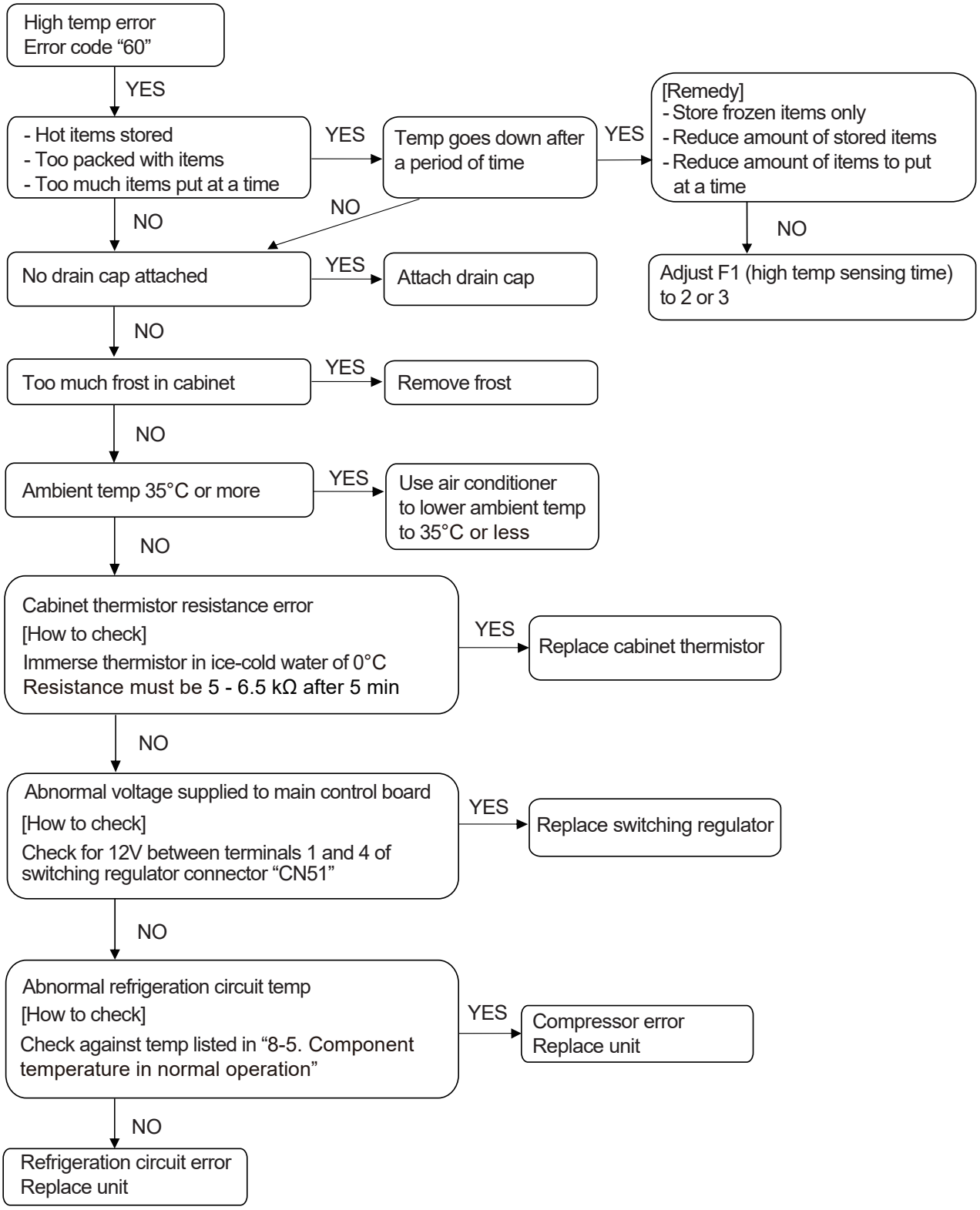
9-4. Component diagnosis

No.	Component	Problem	Remedy
(1)	Fuse	Fuse blown out	Replace
(2)	Main control board	Open circuit, connectors/pins disconnected	Repair or replace
		Input/output (control board, relay, fan motor thermistor or buzzer) failure See wiring label	---
		Cabinet thermistor input failure See wiring label	Replace
		7 segment display partially/totally off	Replace
		Up/down key not available	Replace
		Electronic parts defective/burnt out	Replace
(3)	Relay	Connectors/pins disconnected Contacts 1 and 2: closed Contacts 3 and 4: opened	Repair
			Replace
(4)	Cabinet thermistor	Thermistor disconnected Too much frost attached	Correct
		Incorrect temperature indication	Immerse in ice-cold water to check resistance (5 - 6.5 kΩ) Replace if necessary
		---	Clean inside thermistor cover
		Short circuit Error code “66” shown in display	Remove dust/moisture from connector Replace
		Open circuit. Error code “67” shown in display	Replace
(5)	Compressor thermistor	Abnormal resistance	Immerse in ice-cold water to check resistance (150 - 180 kΩ) Replace if necessary
		Short circuit	Remove dust/moisture from connector Replace
		Open circuit	Replace
		Short circuit Error code “47” shown in display	Remove dust/moisture from connector Replace
		Open circuit Error code “48” shown in display	Replace

No.	Component	Problem	Remedy
(6)	Compressor	Abnormal winding resistance (normally as follows: NEU2140U: 7.79 ± 8% (main), 24.26 ± 8% (sub) at 25°C NEU2155U: 5.97 ± 8% (main), 14.10 ± 8% (sub) at 25°C	Replace unit
		Abnormal insulation resistance (normally 1 MΩ or more at 500V)	Replace unit
		Abnormal noise	Replace unit
		Insufficient compression (discharge pipe temperature too low)	Replace unit
		Electrical parts defective - Run/start capacitor ruptured or deformed - Capacitor defective Check resistance between terminals Gradually reduces: No problem 0 Ω from start: Defective - Overload relay defective Loose terminal, no conductivity, damaged	Replace
(7)	Motor protector Overload relay	Open circuit, connectors/pins disconnected No conductivity Compressor line disconnected	Replace
(8)	Power supply	Voltage outside range (outside rated range of ± 6%)	Move unit to where proper voltage is supplied
(9)	Switching regulator	Input/output failure (normally input: 220 - 240V, output: 12V) Electronic parts defective/burnt out Open circuit, connectors/pins disconnected	Replace
(10)	Buzzer	Open circuit, connectors/pins disconnected	Repair or replace
(11)	Refrigerant leak	Discharge pipe temperature too low, or suction pipe temperature too high	Replace unit
(12)	Fan motor	Open circuit	Repair
		Locked (not rotating with voltage)	Replace
		Abnormal noise	Replace
(13)	Clogged refrigeration circuit	Discharge pressure too high, or suction pressure too low (in vacuum state)	Replace unit
(14)	Rocker switch	Switch ON/OFF failure - Miswiring - Mechanism parts defective - Stuck contact	Repair or replace

9-6. Refrigeration circuit diagnosis

This freezer uses a mixed refrigerant. Repair of the refrigeration circuit at the installation site is not allowed. Follow the instructions below for accurate diagnosis. For the defects requiring the product replacement, contact your local Hoshizaki service agent.



10. PARTS REPAIRING

10-1. Control board

Check by user

If receiving a service call, ask the user to turn off the power to the unit and turn it on again after 30 seconds. When the control board is malfunctioning for some reasons, normal operation may resume once the power is turned off.

Requirements when servicing

- Check that the unit has been earthed properly. If not, the control board will not work properly.

- Check for disconnection or loose connection of the earth wire.

- To get static free, always touch the metal part of the unit (earth) before servicing. Electrostatic discharge will cause damage to the control board. Also, keep things that produce static electricity (e.g. plastic bag or product) away from the control board.

- The control board is connected to a commercial power supply. Before servicing, turn off the power supply.

- Some parts may be hot right after operation. Handle with care.

- Some electric parts may rupture depending on fault conditions. Approach the unit with caution when it is energized.

- To prevent defects caused by contamination on the electric parts, securely close the relay box lid.

- When measuring the input/output voltage, do not disconnect the connector at the output side. The capacitor may remain charged and could spark when the connector is connected.

- A ferrite core (cylindrical component that is used to pass cables through the center hole) may be present in the relay box for noise suppression purposes. Do not remove it. If removed, it must be replaced in its original position. Accumulated noise may cause unexpected defects.

- Do not touch the electronic parts on the control board or the back of the control board.

- The control board and thermistor can be replaced separately.

- Handle the control board by the edges only. Do not touch the electronic parts and wiring.

- Do not drop the control board on the floor. The control board is fragile.

- Put the control board on a flat surface and prevent damage to the electronic parts and devices.

- To prevent damage, do not pull the thermistor wires with thin insulations.

- To prevent disconnection, do not pull the connectors. After servicing, check that the connectors are fixed properly.

- The thermistor is provided with single-wire leads. Do not bend or stretch them. (About 400mm from the wire end and the connection point with the lead wire.)

- Do not pinch or weigh down the thermistor and thermistor leads. The insulations may be damaged, resulting in a short circuit.

- Keep the thermistor's wires at least 30mm away from the high voltage (100V AC) wires.

10-2. Thermistor

1) Disconnect the intermediate connector from the control board.

2) Prepare ice-cold water of 0°C by putting ice and water into a container such as a glass. Immerse the thermistor bulb in ice water for about 5 minutes. The thermistor bulb must be at the center of the container.

3) Measure the resistance between thermistors using the ohm range on the tester.

4) Measured value must be:
   - Cabinet thermistor: 5 to 6.5 kΩ (standard: 6 kΩ)
   - Compressor thermistor: 150 to 180 kΩ (standard: 162 kΩ)
   If the measured value is outside the above range, replace.

10-3 Switching regulator

- The switching regulator (output: 12V DC) is connected to a commercial power supply. Before servicing, turn off the power supply.

- The control board has a charged capacitor. To prevent electric shock, do not touch the control board for at least 30 seconds after turning off the power supply.

- Some parts may be hot right after the power supply is turned off. Handle with care.

10-4 Compressor fan motor

1) Disconnect the connector that is connected to the compressor fan motor.

2) Check if the voltage of 12V DC is applied to the motor drive line. (+ : red, - : dark blue)

3) Check if the voltage of 1.8 to 3.5V DC is applied to the motor control line. (+ : yellow, - : dark blue) But 1.8 to 3.5V DC can be checked only when the compressor fan motor is running.

4) The fan motor is defective if it does not run when 12V DC and 1.8 to 3.5V DC are applied at the same time. The power supply board or control board is defective if the above voltages are not applied to the fan motor.

11. PARTS REPLACEMENT

- Always unplug the unit or turn off the main power supply before replacing parts.

- To reattach the removed parts, reverse the removal procedure.

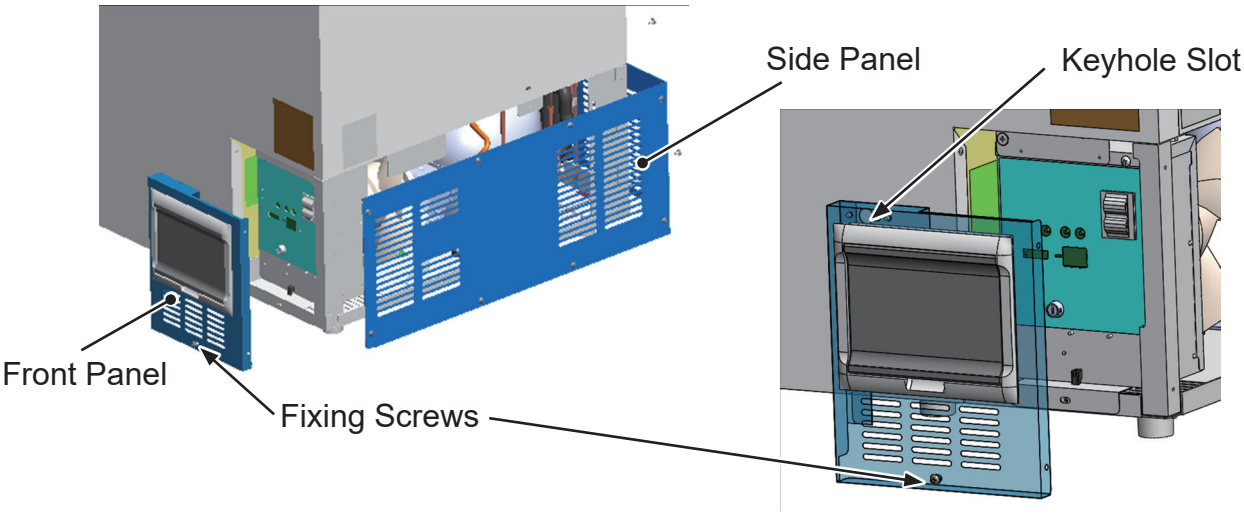
11-1. Exterior panels

11-1-1. Side panel

Loosen the screws on the right and back sides.

11-1-2. Front panel

1) Remove the screw securing the front and side panels together.



2) Remove the screw at the lower front.

3) Slide the front panel to the right using the keyhole sot in the upper left corner
   Remove the front panel.

11-2. Door

CAUTION

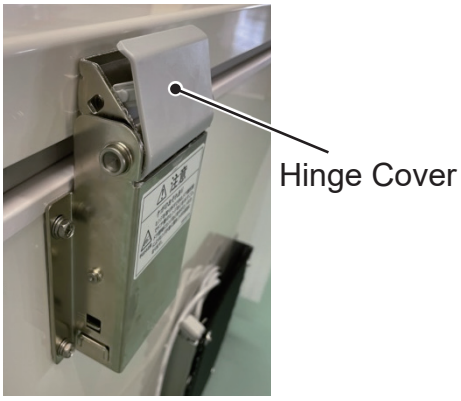
When removing the hinges, remove the hinge screws at the door side with the door open. Removing the hinge screws with the door closed may suddenly open the hinges by spring force, resulting in injury.

11-2-1. Door assy

1) Remove the hinge cover. Use a pointed tool to lever the cover up toward you, and then pull it off. Be careful not to damage the cover.

2) Remove the screws securing the door and hinge with the door open.

   Note: Use a Torx driver with a T30 drive size.



11-2-2. Hinge

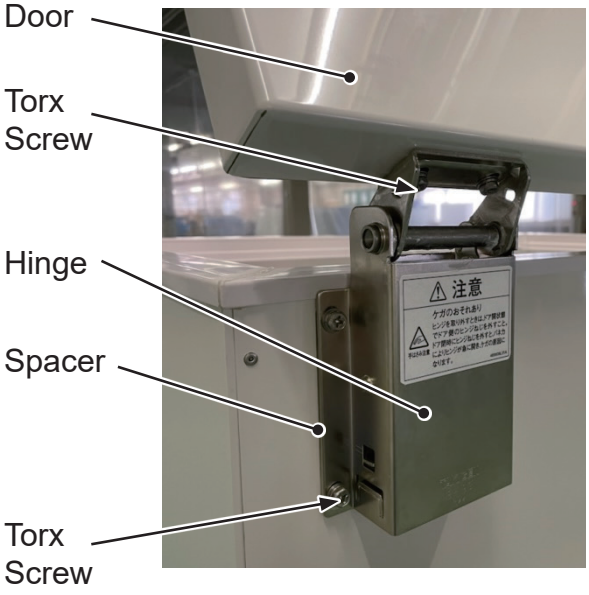
1) After removing the door assy, remove the screws securing the body assy and hinges.

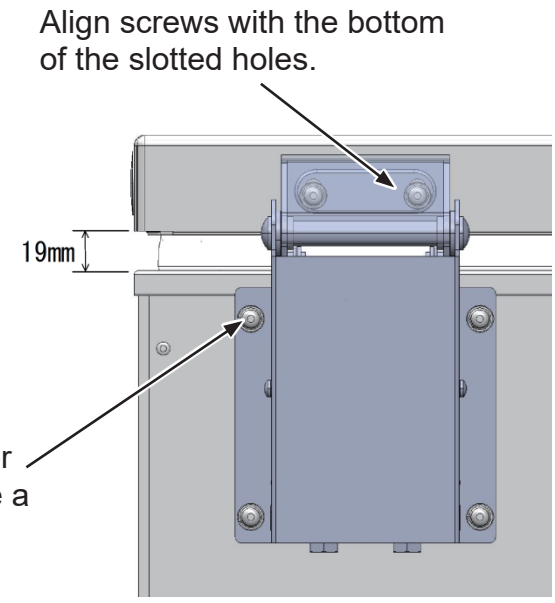
   Note: Use a Torx driver with a T30 drive size.

2) When replacing the hinges, be sure to attach the spacers (two spacers per hinge).

   Note: When attaching the hinge to the door and unit body, adjust the hinge's position to ensure a gap of 19 ± 1.5 mm between the door and breaker strip.

   For the door side, temporarily fix the screws by aligning them with the bottom of the mounting holes (slotted holes). For the body side, temporarily fix the screws by aligning them with the center of the mounting holes (slotted holes). Then adjust the hinge position to ensure the gap and tighten the screws.

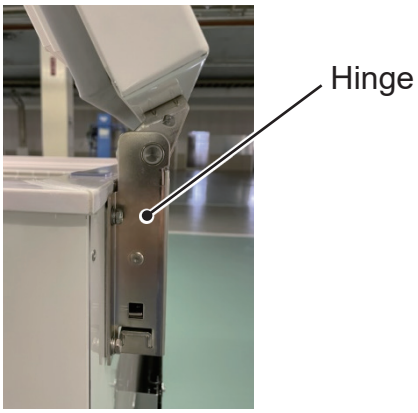


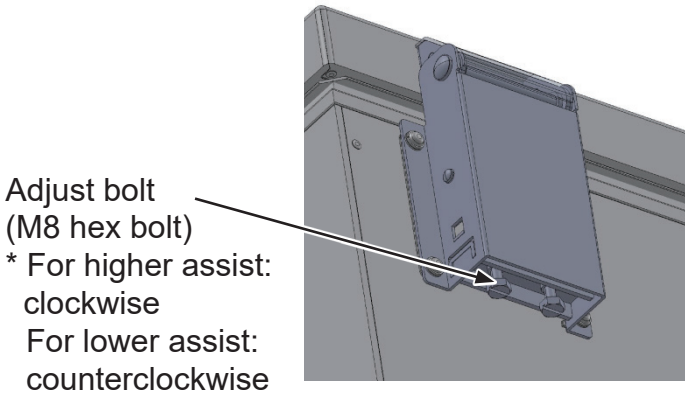


The hinge has a door opening/closing assist function. Adjust torque according to the table below for each model.

* Adjust torque with the door open.

* Use the table below for reference only. Adjust torque to keep the door open.



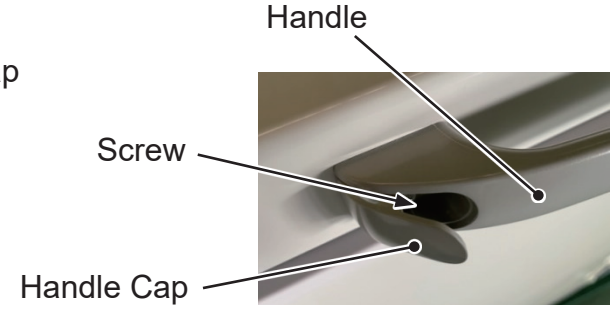


Model	HDF-140/300A-SEA	HDF-400A-SEA
Lever position	Upper surface of the lever at the middle line 	Lower surface of the lever at the middle line 

11-2-3. Handle

1) Use a pointed tool to lever the handle cap up toward you, and then pull it off.

2) Remove the screw securing the handle.



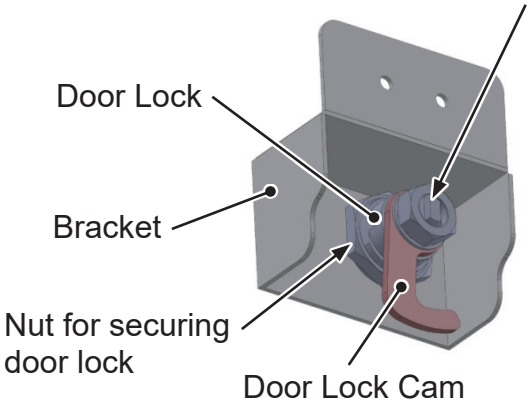
11-2-4. Door lock

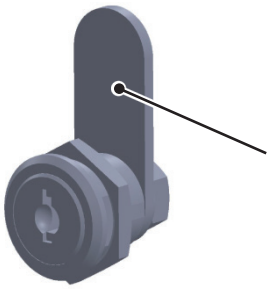
1) Open the door.

2) Remove the nut and washer securing the door lock cam.

3) Loosen the nut securing the lock and remove it from the bracket.

4) The door lock is delivered with the plate. Replace the plate with the door lock cam.



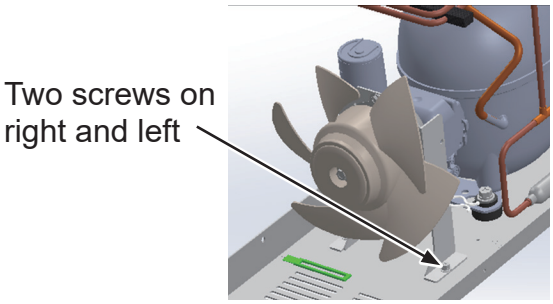


Door lock when delivered

11-3. Refrigeration parts

12-3-1. Fan motor assy

Remove the screws securing the fan motor assy to the refrigeration circuit base.

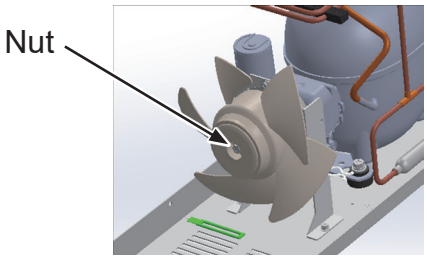


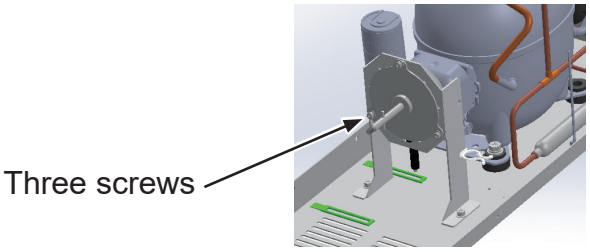
11-3-2. Fan blade and fan motor

1) Remove the nut, spring washer and washer securing the fan blade to the fan motor shaft.

   Note: Tightening torque for securing the fan blade must be 0.78 to 0.98 N·m.

2) Remove the screws securing the bracket and fan motor.





11-3-3. Compressor terminal

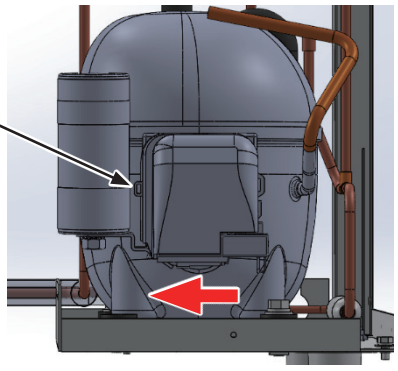
[a] HDF-140A-SEA

1) Remove the side panel. (See 11-1-1. Side panel.)

2) Remove the waterproof tape.

3) Remove the terminal cover from the compressor.

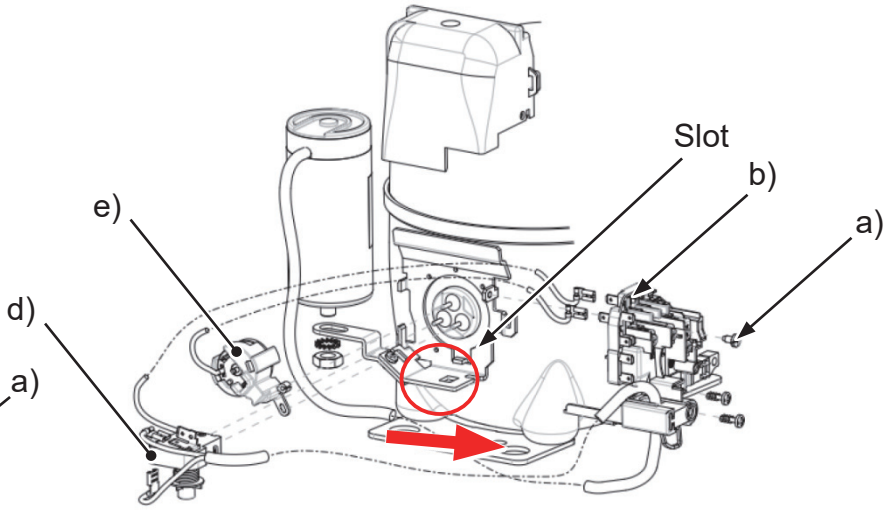
Use a flathead screwdriver on the clip, and move it to the left to remove the terminal cover.
* Slot size: 5 x 2.5

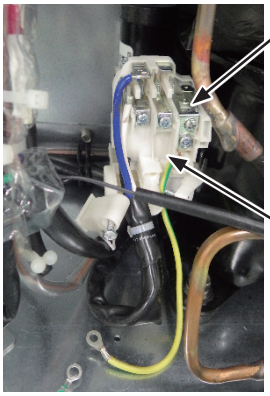


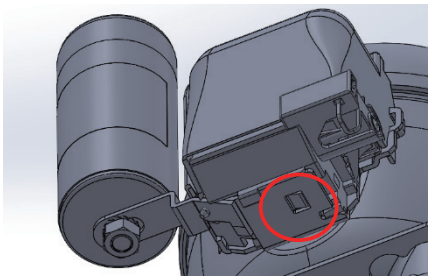
Waterproof tape

4) Remove the terminal board.

a) Remove the screws.
b) Slide the terminal board in the direction of the arrow in the figure.
c) Remove the earth wire.
d) Remove the start relay.
e) Remove the motor protector.





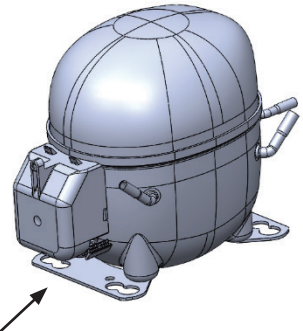


[b] HDF-300/400A-SEA

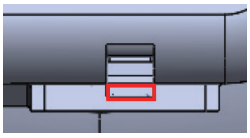
1) Remove the side panel. (See 11-1-1. Side panel.)

2) Remove the waterproof tape.

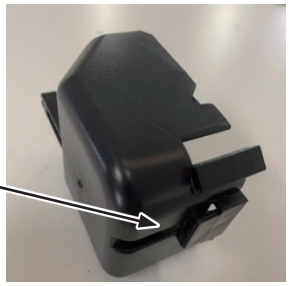
3) Remove the terminal cover from the compressor. The terminal cover is secured by upper and lower clips. Insert a flathead screwdriver into the tool slot on the lower side to release the clips.



Clip



Tool slot
* Slot size: 2 x 7

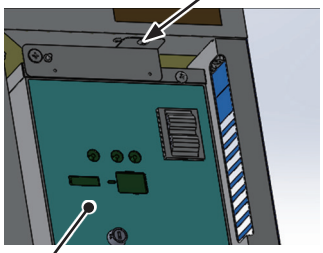


11-4. Control box

11-4-1. Body

1) Remove the front panel. (See 11-1-2. Front panel.)

2) Remove the screw securing the control box to the upper surface of the refrigeration compartment, and pull out the control box toward you.

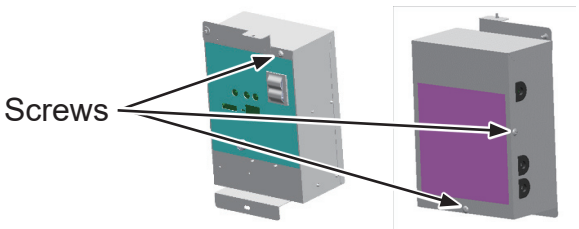


Screw

Control Box

11-4-2. Cover

Remove the three screws securing the cover to the control box body.



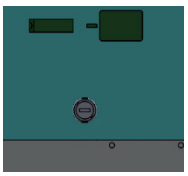
Screws

Front Back

11-4-3. Fuse

1) Remove the front panel. (See 11-1-2. Front panel.)

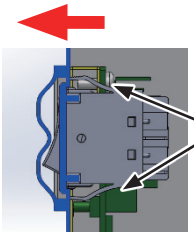
2) Insert a flathead screwdriver into the tool slot and turn it counterclockwise.



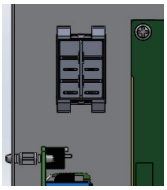
Tool slot
* Slot size: 1.8 x 6

11-4-4. Rocker switch

Hold the clips on the top and bottom, and push the rocker switch in the direction of the arrow.



Front

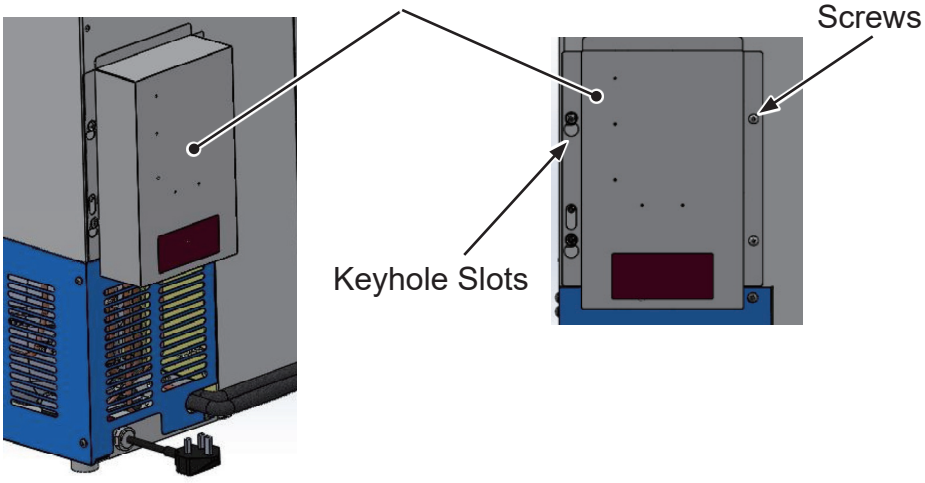


Back

11-5. Control box (B) (HDF-300A/400A-SEA only)

1) Remove the screws securing the control box to the unit rear.

2) Slide off the control box using the keyhole slots.



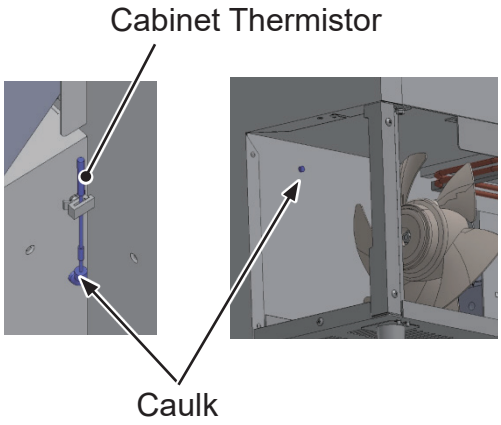
11-6. Thermistor

11-6-1. Cabinet thermistor

1) Remove caulk in the thermistor through-hole from inside and outside the cabinet.

2) Pull the thermistor out of the cabinet.

3) After the replacement, caulk the through-hole from inside and outside the cabinet to prevent any gaps. (Recommendation: Shin-Etsu Silicone 4588N, white)

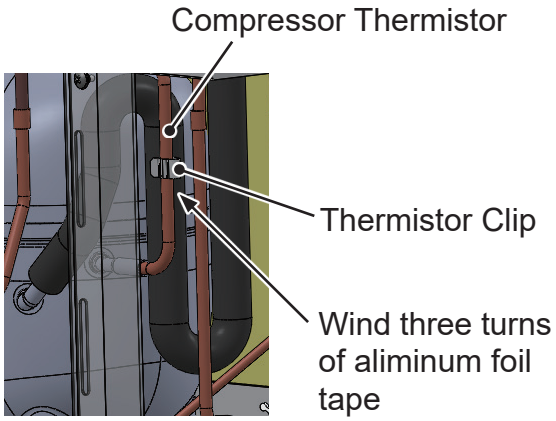


11-6-2. Compressor thermistor

1) Remove the thermistor clip.

2) Remove the aluminum foil tape.

3) Replace the thermistor. Wind three turns of the aluminum foil tape around the copper pipe, and secure it with the clip.



12. WARRANTY FOR REFRIGERATION CIRCUIT

This freezer uses a mixed natural refrigerant. Repair of the refrigeration circuit at the installation site is not allowed. If a defect in the refrigeration circuit is confirmed after a diagnosis, follow the instruction below:

Regardless of distribution channels, the unit should be replaced if a “defect in the refrigeration circuit(*)” occurs within three years of the initial installation (any defects caused by customers’ faults are not included).

* Spontaneous failure including compressor failure, refrigerant leak and poor cooling performance.