COMMERCIAL REFRIGERATOR/FREEZER

HR-MA series
HF-MA series
HRF-MA series

SERVICE MANUAL

R590-1053 (022125)

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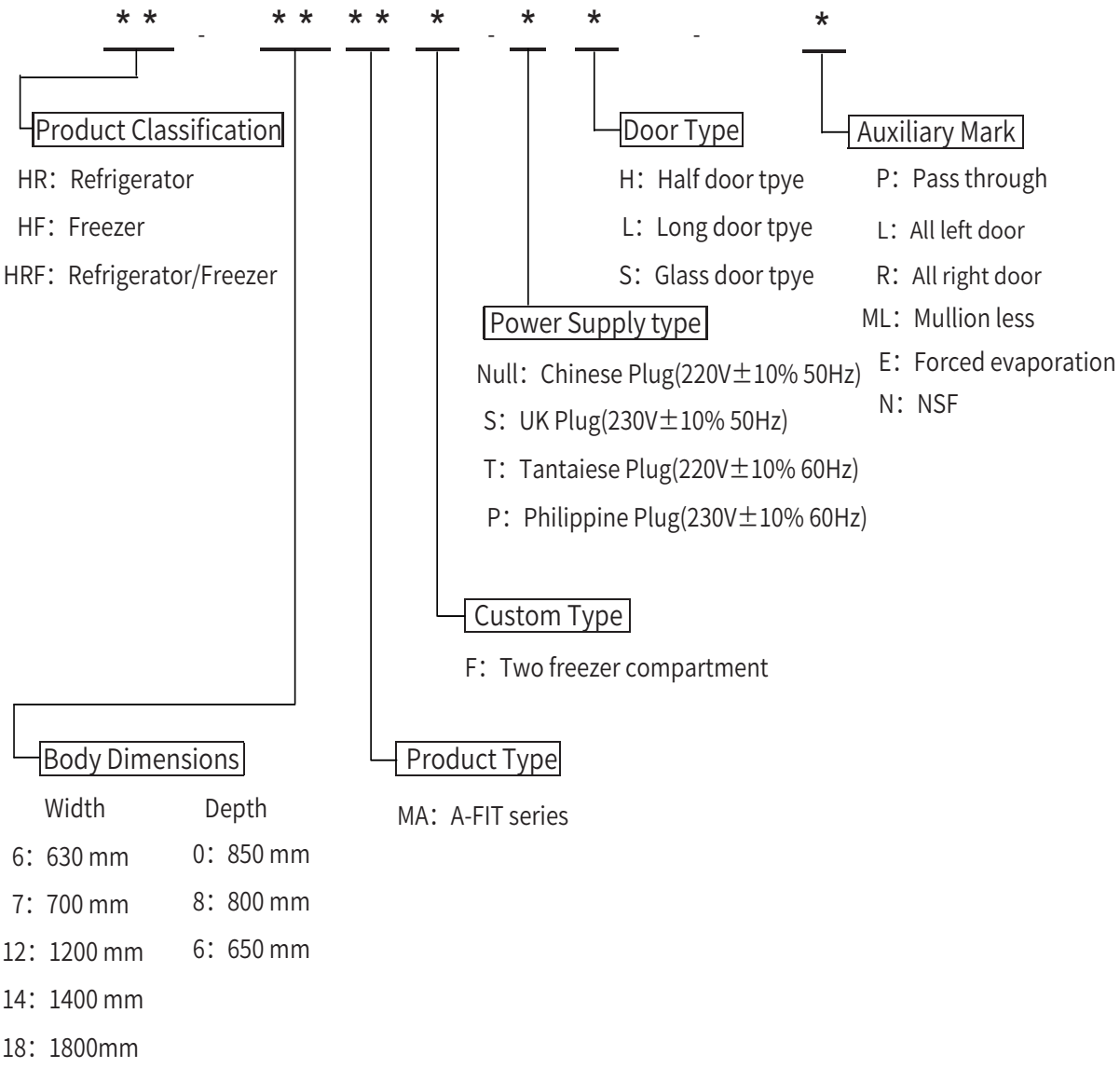
Explanation for Model Name



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 put out any fire used in the vicinity.

   (4) When unbrazing the refrigeration circuit connections, check that the circuit is completely evacuated. The refrigerant may produce a poisonous gas when coming in contact with an open flame.

   (5) Do not braze 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 further leaks. If the leaking part

cannot be located, be sure to check again for further leaks after recharging the refrigerant. Leaked refrigerant may produce a poisonous gas when coming in contact with an open flame of a gas cooking stove or a fan heater.

(7) Before servicing, check the surface temperature of the refrigeration circuit to prevent a burn.

5. 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 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 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).

(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 vermins resulting in a short circuit between terminals and possible ignition.

2. DIMENSIONS/SPECIFICATIONS *Representative (standard) models only

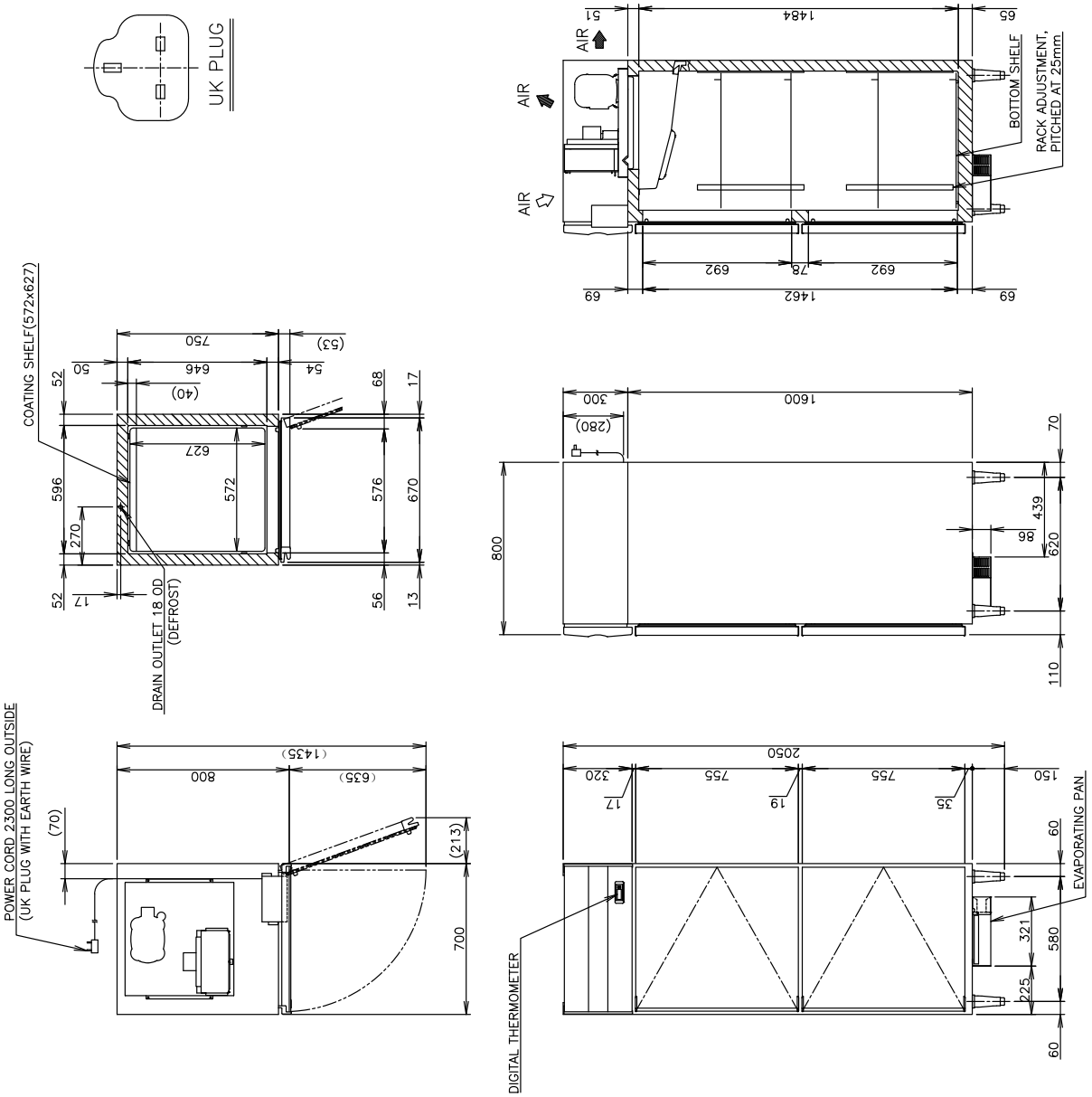
[a] HR-78MA(Model Code: R590)

HOSHIZAKI

ITEM	Hoshizaki Reach-in Refrigerator
MODEL	HR-78MA-S
POWER SUPPLY	1 Phase 220 - 240V 50Hz Capacity: 0.74kVA (3.36A)
AMPERAGE	Rated: 2.6A Starting: 11.3A
ELECTRIC CONSUMPTION	238W Heater: 386W Defrost: 386W
HEAT REJECTION	*W
POWER CORD	2.3m (UK Plug with Earth Wire)
EFFECTIVE CAPACITY	569L
OUTSIDE DIMENSIONS	700mm(W)×800mm(D)×2050(-2080)mm(H)
INSIDE DIMENSIONS	596mm(W)×646mm(D)×1484mm(H)
EXTERIOR	Stainless Steel, Galvanized Steel(Top, Rear, Bottom)
INTERIOR	Stainless Steel, ABS Plastic(Door)
INSULATION	Polyurethane Foam
INSULATION FOAM BLOWING AGENT	Cyclopentane
REFRIGERATION SYSTEM	Forced Air Circulation
DEFROST SYSTEM	Heater
COMPRESSOR	Hermetic
CONDENSER	Fin and Tube type, Air-cooled
EVAPORATOR	Fin and Tube type
REFRIGERANT	R134a
TEMPERATURE CONTROL	Microprocessor (Digital Temp. Indication) Adjustable from -6 to 12°C
DEFROST CONTROL	Microprocessor
ELECTRIC CIRCUIT PROTECTION	Earth Wire, Circuit Breaker
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto-reset)
LEG	Plastic Adjustable from 150 to 180mm
SHELF	4 pcs.
WEIGHT	102kg (Gross 124kg)
PACKAGE	Carton (Wooden Pallet) 760mm(W)×900mm(D)×2075mm(H)
ACCESSORIES	Drain Hose x 1, Drain Pan x 1
OPERATING CONDITIONS	Ambient Temperature: 5 ~ 43°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 35°C.
3. Product Code: R590-C100 (HS)



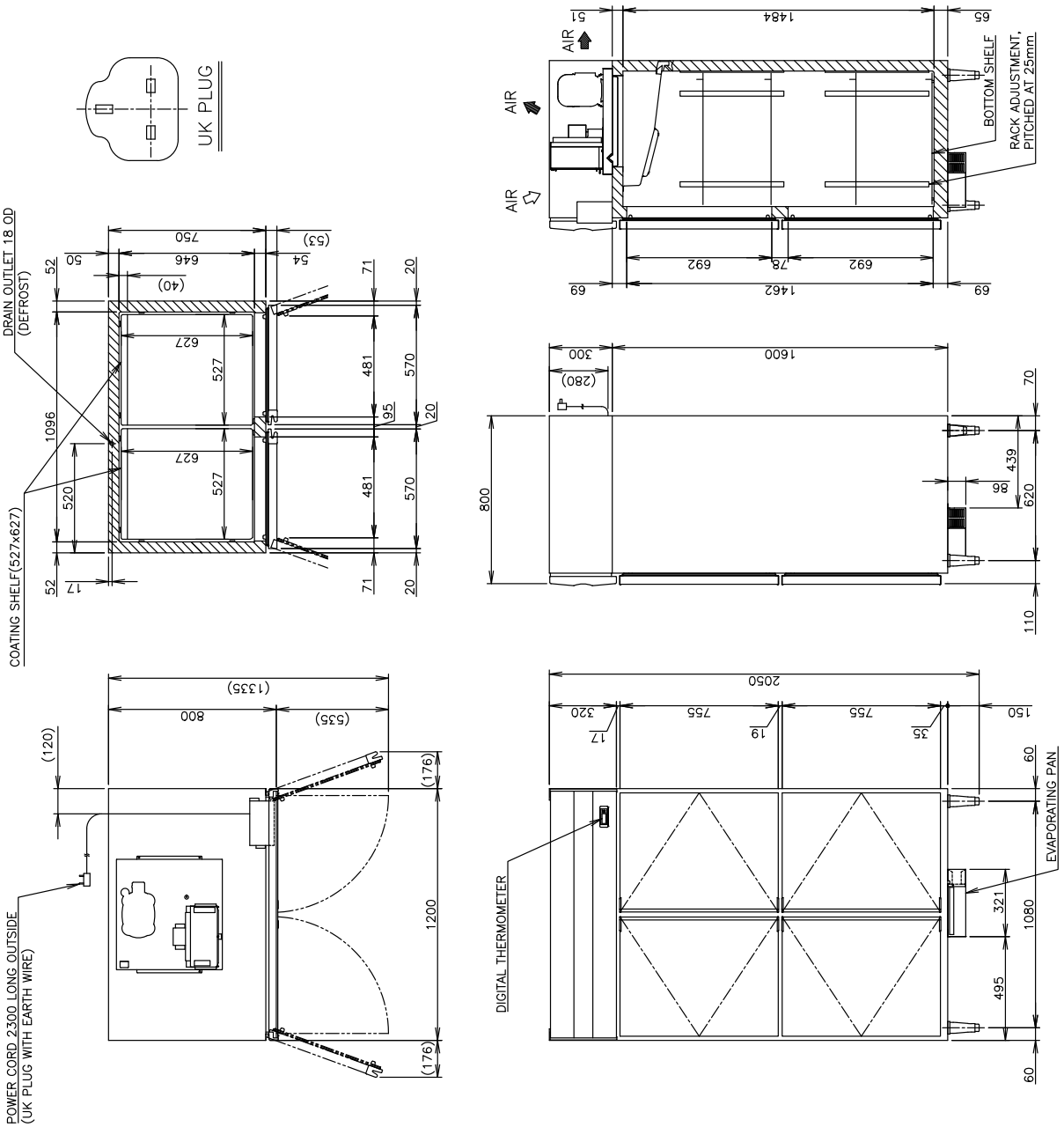
[b] HR-128MA(Model Code: R591)

HOSHIZAKI

ITEM	Hoshizaki Reach-in Refrigerator
MODEL	HR-128MA-S
POWER SUPPLY	1 Phase 220 - 240V 50Hz Capacity: 0.86kVA (3.90A
AMPERAGE	Rated: 3.6A Starting: 13.1A
ELECTRIC CONSUMPTION	333W Heater: 408W Defrost: 408W
HEAT REJECTION	*W
POWER CORD	2.3m (UK Plug with Earth Wire)
EFFECTIVE CAPACITY	1053L
OUTSIDE DIMENSIONS	1200mm(W) x 800mm(D) x 2050(-2080)mm(H)
INSIDE DIMENSIONS	1096mm(W) x 646mm(D) x 1484mm(H)
EXTERIOR	Stainless Steel, Galvanized Steel(Top, Rear, Bottom)
INTERIOR	Stainless Steel, ABS Plastic(Door)
INSULATION	Polyurethane Foam
INSULATION FOAM BLOWING AGENT	Cyclopentane
REFRIGERATION SYSTEM	Forced Air Circulation
DEFROST SYSTEM	Heater
COMPRESSOR	Hermetic
CONDENSER	Fin and Tube type, Air-cooled
EVAPORATOR	Fin and Tube type
REFRIGERANT	R134a
TEMPERATURE CONTROL	Microprocessor (Digital Temp. Indication) Adjustable from -6 to 12° C
DEFROST CONTROL	Microprocessor
ELECTRIC CIRCUIT PROTECTION	Earth Wire, Circuit Breaker
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto-reset)
LEG	Plastic Adjustable from 150 to 180mm
SHELF	8 pcs.
WEIGHT	144kg (Gross 176kg)
PACKAGE	Carton (Wooden Pallet) 1260mm(W) x 900mm(D) x 2075mm(H)
ACCESSORIES	Drain Hose x 1, Drain Pan x 1
OPERATING CONDITIONS	Ambient Temperature: 5 - 43° 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 35° C.
3. Product Code: R591-C100 (HS)



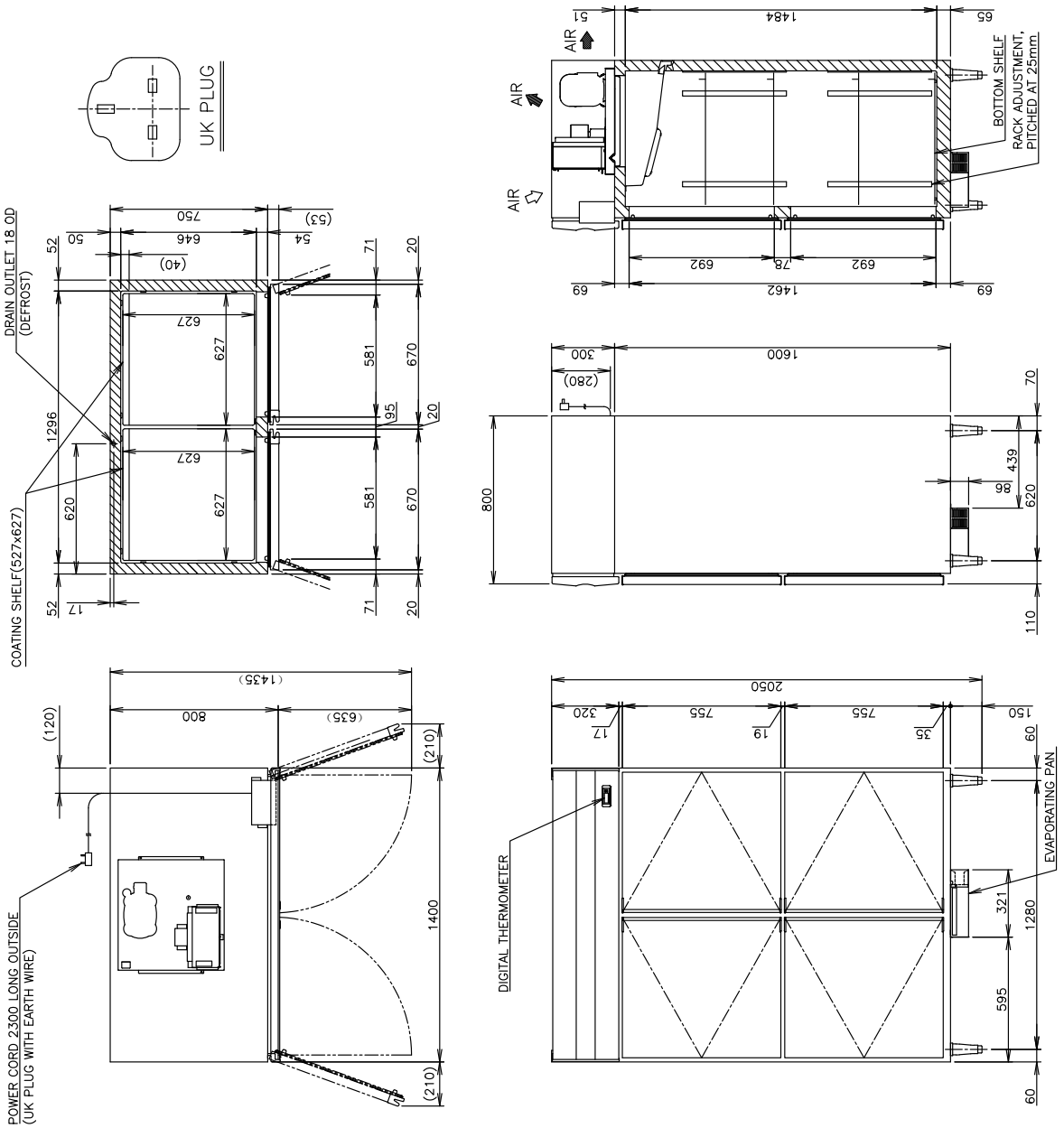
[c] HR-148MA(Model Code: R592)

HOSHIZAKI

ITEM	Hoshizaki Reach-in Refrigerator
MODEL	HR-148MA-S
POWER SUPPLY	1 Phase 220 - 240V 50Hz Capacity: 0.86kVA (3.9A)
AMPERAGE	Rated: 3.6A Starting: 13.1A
ELECTRIC CONSUMPTION	367W Heater: 412W Defrost: 412W
HEAT REJECTION	*W
POWER CORD	2.3m (UK Plug with Earth Wire)
EFFECTIVE CAPACITY	1243L
OUTSIDE DIMENSIONS	1400mm(W)×800mm(D)×2050(-2080)mm(H)
INSIDE DIMENSIONS	1296mm(W)×646mm(D)×1484mm(H)
EXTERIOR	Stainless Steel, Galvanized Steel(Top, Rear, Bottom)
INTERIOR	Stainless Steel, ABS Plastic(Door)
INSULATION	Polyurethane Foam
INSULATION FOAM BLOWING AGENT	Cyclopentane
REFRIGERATION SYSTEM	Forced Air Circulation
DEFROST SYSTEM	Heater
COMPRESSOR	Hermetic
CONDENSER	Fin and Tube type, Air-cooled
EVAPORATOR	Fin and Tube type
REFRIGERANT	R134a
TEMPERATURE CONTROL	Microprocessor (Digital Temp. Indication) Adjustable from -6 to 12° C
DEFROST CONTROL	Microprocessor
ELECTRIC CIRCUIT PROTECTION	Earth Wire, Circuit Breaker
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto-reset)
LEG	Plastic Adjustable from 150 to 180mm
SHELF	8 pcs.
WEIGHT	155kg (Gross 190kg)
PACKAGE	Carton (Wooden Pallet) 1460mm(W)×900mm(D)×2075mm(H)
ACCESSORIES	Drain Hose x 1, Drain Pan x 1
OPERATING CONDITIONS	Ambient Temperature: 5 ~ 43°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 35c.
3. Product Code: R592-C100 (HS)



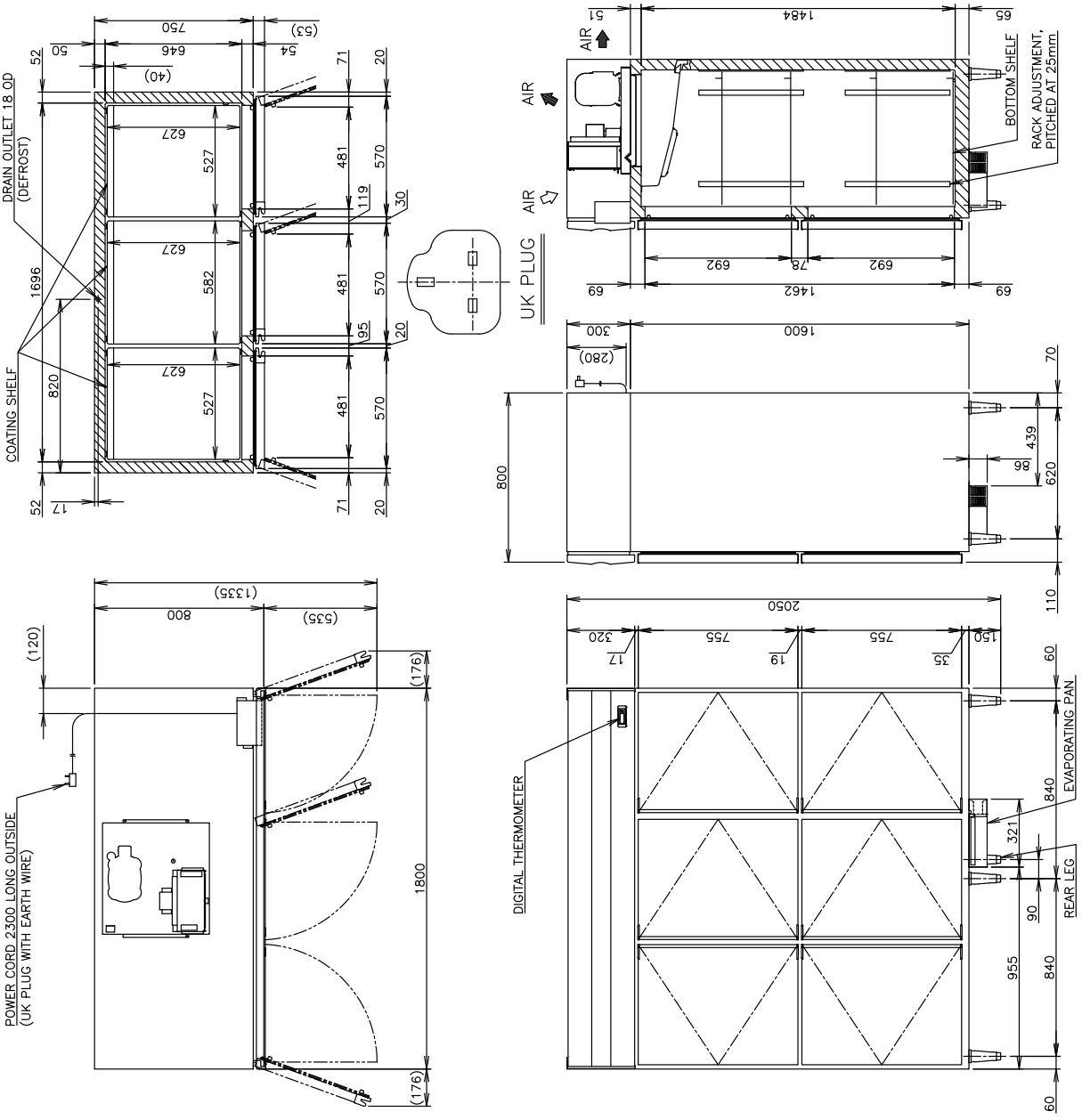
[d] HR-188MA(Model Code: R593)

HOSHIZAKI

ITEM	Hoshizaki Reach-in Refrigerator
MODEL	HR-188MA-S
POWER SUPPLY	1 Phase 220 - 240V 50Hz Capacity: 0.86kVA (3.90A)
AMPERAGE	Rated: 3.6A Starting: 13.1A
ELECTRIC CONSUMPTION	413W Heater: 433W Defrost: 433W
HEAT REJECTION	*W
POWER CORD	2.3m (UK Plug with Earth Wire)
EFFECTIVE CAPACITY	1632L
OUTSIDE DIMENSIONS	1800mm(W) x 800mm(D) x 2050(-2080)mm(H)
INSIDE DIMENSIONS	1696mm(W) x 646mm(D) x 1484mm(H)
EXTERIOR	Stainless Steel, Galvanized Steel(Top, Rear, Bottom)
INTERIOR	Stainless Steel, ABS Plastic(Door)
INSULATION	Polyurethane Foam
INSULATION FOAM BLOWING AGENT	Cyclopentane
REFRIGERATION SYSTEM	Forced Air Circulation
DEFROST SYSTEM	Heater
COMPRESSOR	Hermetic
CONDENSER	Fin and Tube type, Air-cooled
EVAPORATOR	Fin and Tube type
REFRIGERANT	R134a
TEMPERATURE CONTROL	Microprocessor (Digital Temp. Indication) Adjustable from -6 to 12℃
DEFROST CONTROL	Microprocessor
ELECTRIC CIRCUIT PROTECTION	Earth Wire, Circuit Breaker
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto-reset)
LEG	Plastic Adjustable from 150 to 180mm
SHELF	12 pcs.
WEIGHT	184kg (Gross 226kg)
PACKAGE	Carton (Wooden Pallet) 1860mm(W) x 900mm(D) x 2075mm(H)
ACCESSORIES	Drain Hose x 1, Drain Pan x 1
OPERATING CONDITIONS	Ambient Temperature: 5 ~ 43℃ 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 35°C.
3. Product Code: R593-C100 (HS)



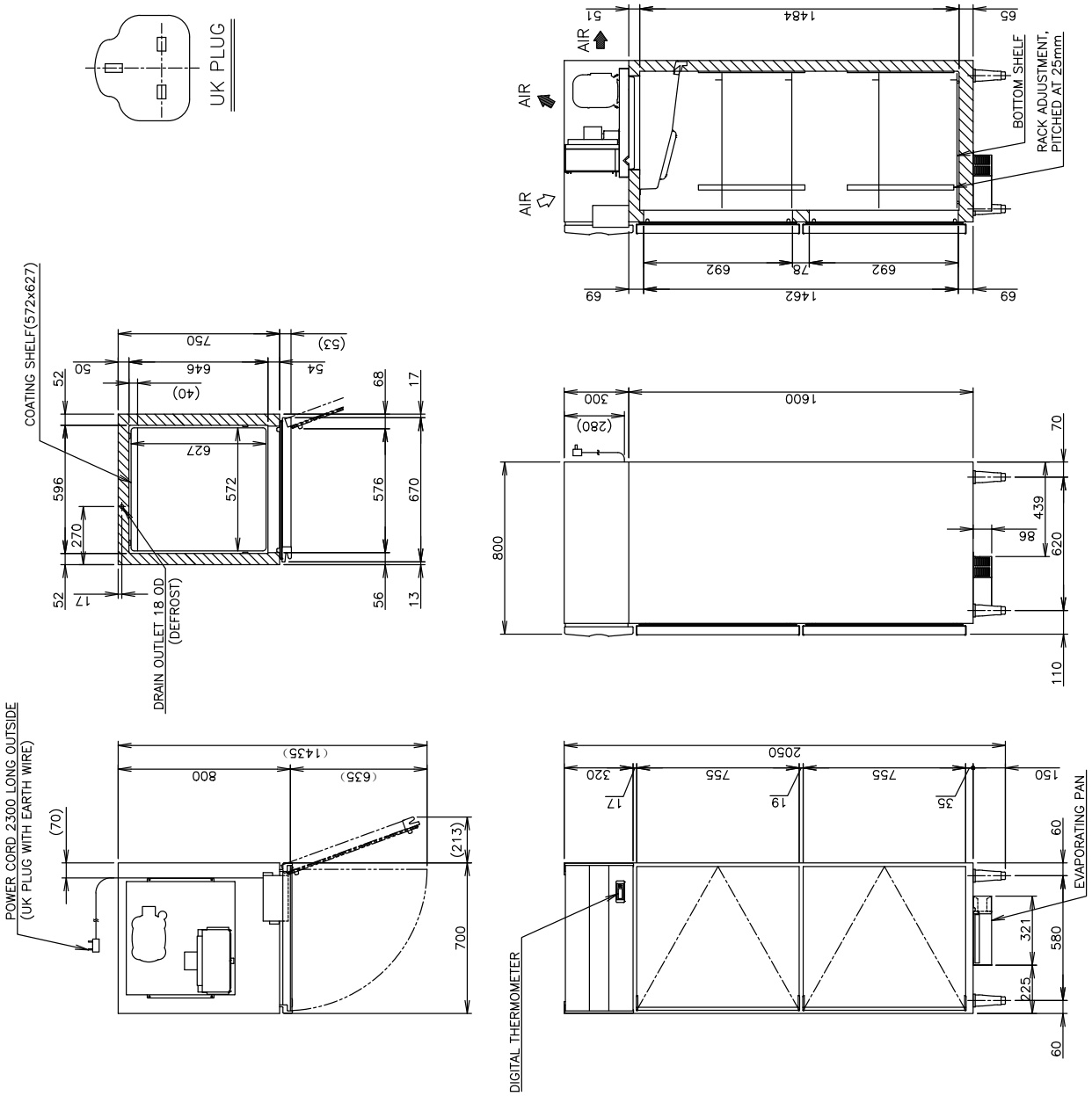
[e] HF-78MA (Model Code: R594)

HOSHIZAKI

ITEM	Hoshizaki Reach-in Freezer
MODEL	HF-78MA-S
POWER SUPPLY	1 Phase 220 – 240V 50Hz Capacity: 0.56kVA (2.53A)
AMPERAGE	Rated: 4.1A Starting: 8.5A
ELECTRIC CONSUMPTION	469W Heater: 426W Defrost: 426W
HEAT REJECTION	*W
POWER CORD	2.3m (UK Plug with Earth Wire)
EFFECTIVE CAPACITY	569L
OUTSIDE DIMENSIONS	700mm(W)×800mm(D)×2050(–2080)mm(H)
INSIDE DIMENSIONS	596mm(W)×646mm(D)×1484mm(H)
EXTERIOR	Stainless Steel, Galvanized Steel(Top, Rear, Bottom)
INTERIOR	Stainless Steel, ABS Plastic(Door)
INSULATION	Polyurethane Foam
INSULATION FOAM BLOWING AGENT	Cyclopentane
REFRIGERATION SYSTEM	Forced Air Circulation
DEFROST SYSTEM	Heater
COMPRESSOR	Hermetic
CONDENSER	Fin and Tube type, Air-cooled
EVAPORATOR	Fin and Tube type
REFRIGERANT	R404A
TEMPERATURE CONTROL	Microprocessor (Digital Temp. Indication) Adjustable from -23 to -7℃
DEFROST CONTROL	Microprocessor
ELECTRIC CIRCUIT PROTECTION	Earth Wire, Circuit Breaker
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto-reset)
LEG	Plastic Adjustable from 150 to 180mm
SHELF	6 pcs.
WEIGHT	102kg (Gross 124kg)
PACKAGE	Carton (Wooden Pallet) 760mm(W)×900mm(D)×2075mm(H)
ACCESSORIES	Drain Hose x 1, Drain Pan x 1
OPERATING CONDITIONS	Ambient Temperature: 5 – 43℃ 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 35℃.
3. Product Code: R594-C100 (HS)



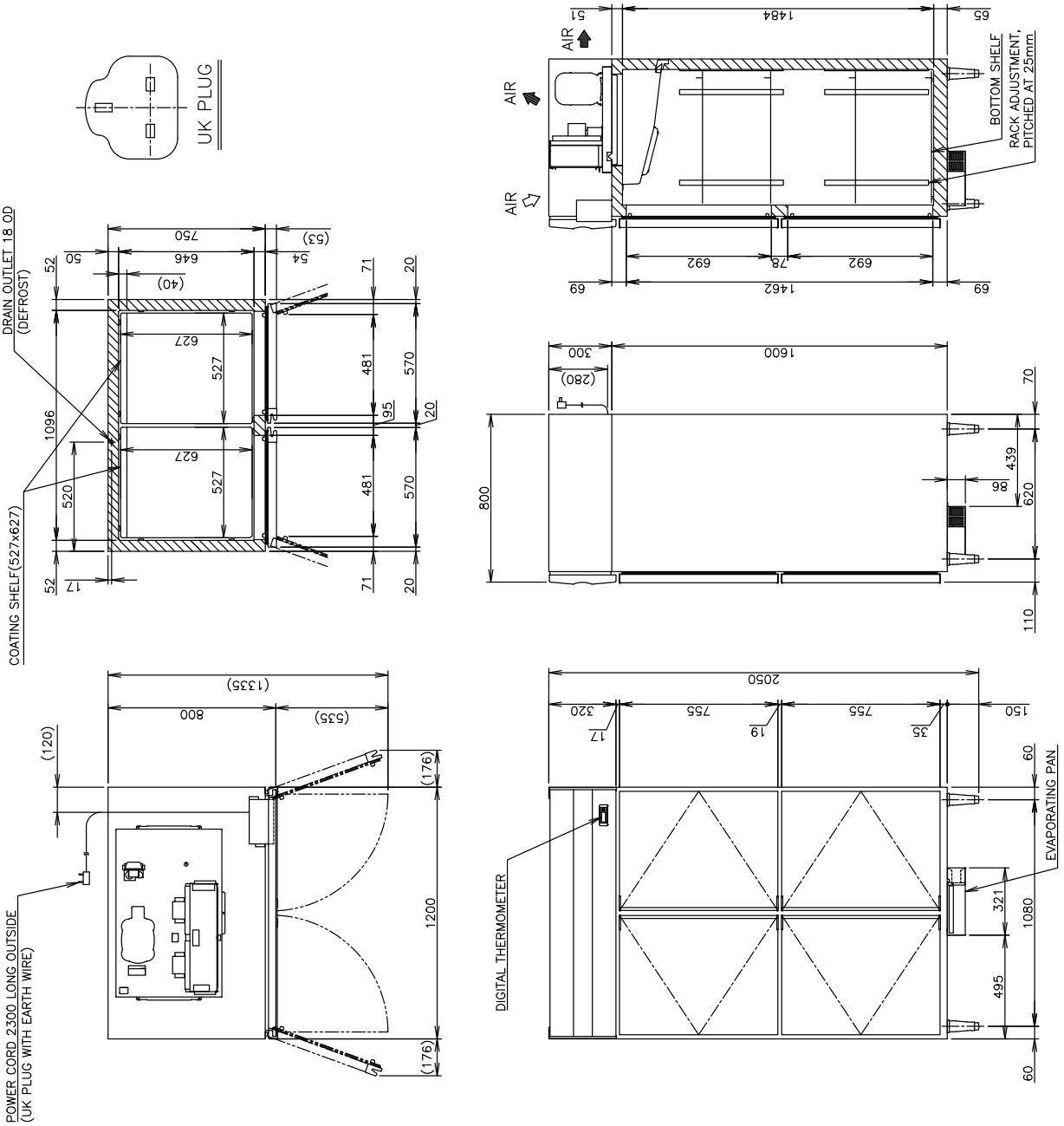
[f] HF-128MA (Model Code: R595)

HOSHIZAKI

ITEM	Hoshizaki Reach-in Freezer
MODEL	HF-128MA-S
POWER SUPPLY	1 Phase 220 - 240V 50Hz Capacity: 1.02kVA (4.64A)
AMPERAGE	Rated: 4.9A Starting: 15.6A
ELECTRIC CONSUMPTION	700W Heater: 474W Defrost: 474W
HEAT REJECTION	*W
POWER CORD	2.3m (UK Plug with Earth Wire)
EFFECTIVE CAPACITY	1047L
OUTSIDE DIMENSIONS	1200mm(W) x 800mm(D) x 2050(-2080)mm(H)
INSIDE DIMENSIONS	1096mm(W) x 646mm(D) x 1484mm(H)
EXTERIOR	Stainless Steel, Galvanized Steel(Top, Rear, Bottom)
INTERIOR	Stainless Steel, ABS Plastic(Door)
INSULATION	Polyurethane Foam
INSULATION FOAM BLOWING AGENT	Cyclopentane
REFRIGERATION SYSTEM	Forced Air Circulation
DEFROST SYSTEM	Heater
COMPRESSOR	Hermetic
CONDENSER	Fin and Tube type, Air-cooled
EVAPORATOR	Fin and Tube type
REFRIGERANT	R404A
TEMPERATURE CONTROL	Microprocessor (Digital Temp. Indication) Adjustable from -23 to -7℃
DEFROST CONTROL	Microprocessor
ELECTRIC CIRCUIT PROTECTION	Earth Wire, Circuit Breaker
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto-reset)
LEG	Plastic Adjustable from 150 to 180mm
SHELF	8 pcs.
WEIGHT	149kg (Gross 180kg)
PACKAGE	Carton (Wooden Pallet) 1260mm(W) x 900mm(D) x 2075mm(H)
ACCESSORIES	Drain Hose x 1, Drain Pan x 1
OPERATING CONDITIONS	Ambient Temperature: 5 ~ 43℃ 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 35°C.
3. Product Code: R595-C100 (HS)



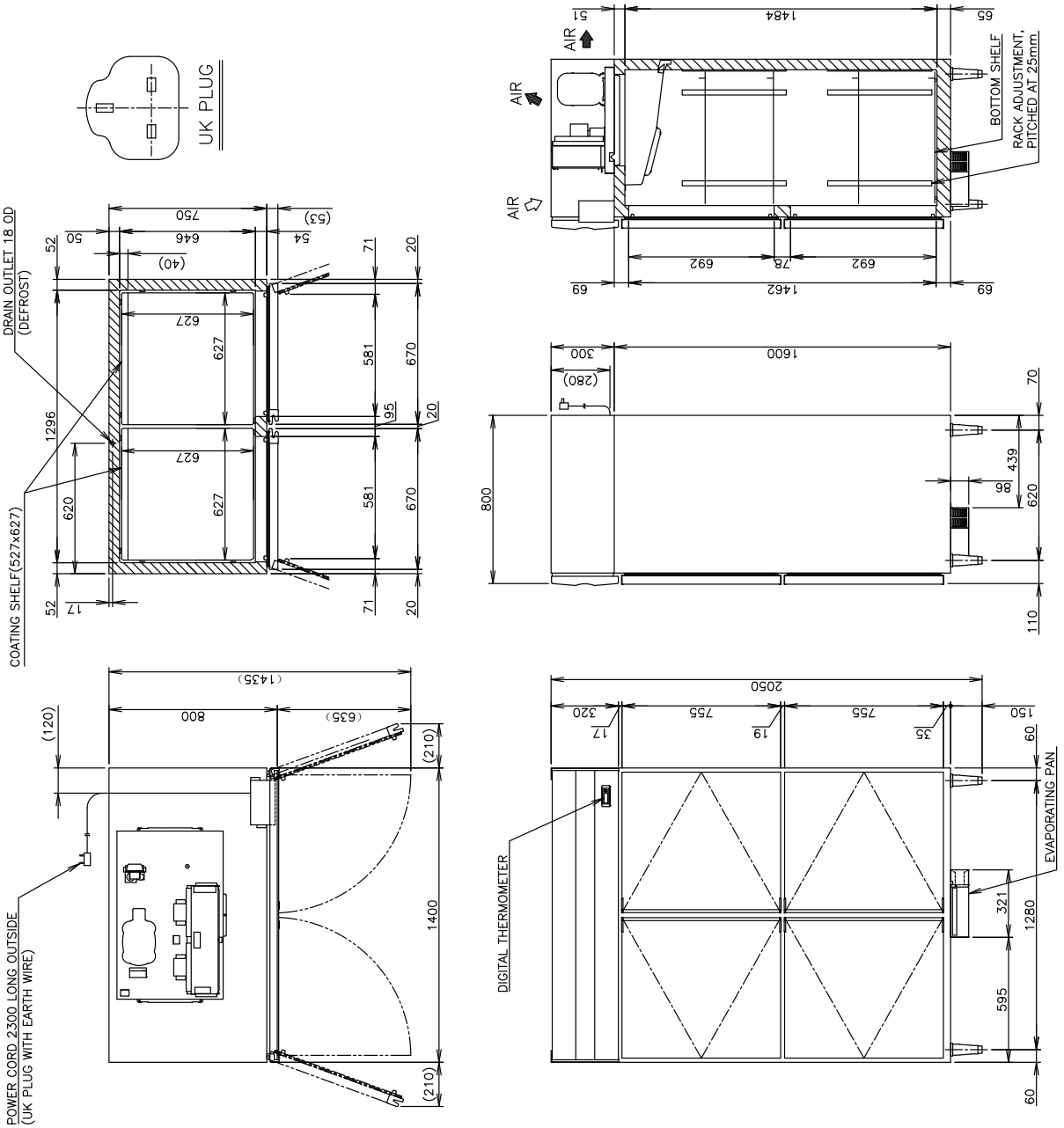
[g] HF-148MA (Model Code: R596)

HOSHIZAKI

ITEM	Hoshizaki Reach-in Freezer
MODEL	HF-148MA-S
POWER SUPPLY	1 Phase 220 - 240V 50Hz Capacity: 1.02kVA (4.64A)
AMPERAGE	Rated: 4.9A Starting: 15.6A
ELECTRIC CONSUMPTION	740W
HEAT REJECTION	Heater: 481W Defrost: 481W *W
POWER CORD	2.3m (UK Plug with Earth Wire)
EFFECTIVE CAPACITY	1233L
OUTSIDE DIMENSIONS	1400mm(W)x 800mm(D)x 2050(-2080)mm(H)
INSIDE DIMENSIONS	1296mm(W)x 646mm(D)x 1484mm(H)
EXTERIOR	Stainless Steel, Galvanized Steel(Top, Rear, Bottom)
INTERIOR	Stainless Steel, ABS Plastic(Door)
INSULATION	Polyurethane Foam
INSULATION FOAM BLOWING AGENT	Cyclopentane
REFRIGERATION SYSTEM	Forced Air Circulation
DEFROST SYSTEM	Heater
COMPRESSOR	Hermetic
CONDENSER	Fin and Tube type, Air-cooled
EVAPORATOR	Fin and Tube type
REFRIGERANT	R404A
TEMPERATURE CONTROL	Microprocessor (Digital Temp. Indication) Adjustable from -23 to -7℃
DEFROST CONTROL	Microprocessor
ELECTRIC CIRCUIT PROTECTION	Earth Wire, Circuit Breaker
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto-reset)
LEG	Plastic Adjustable from 150 to 180mm
SHELF	8 pcs.
WEIGHT	160kg (Gross 194kg)
PACKAGE	Carton (Wooden Pallet) 1460mm(W)x 900mm(D)x 2075mm(H)
ACCESSORIES	Drain Hose x 1, Drain Pan x 1
OPERATING CONDITIONS	Ambient Temperature: 5 ~ 43℃ 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 35℃.
3. Product Code: R596-C100 (HS)



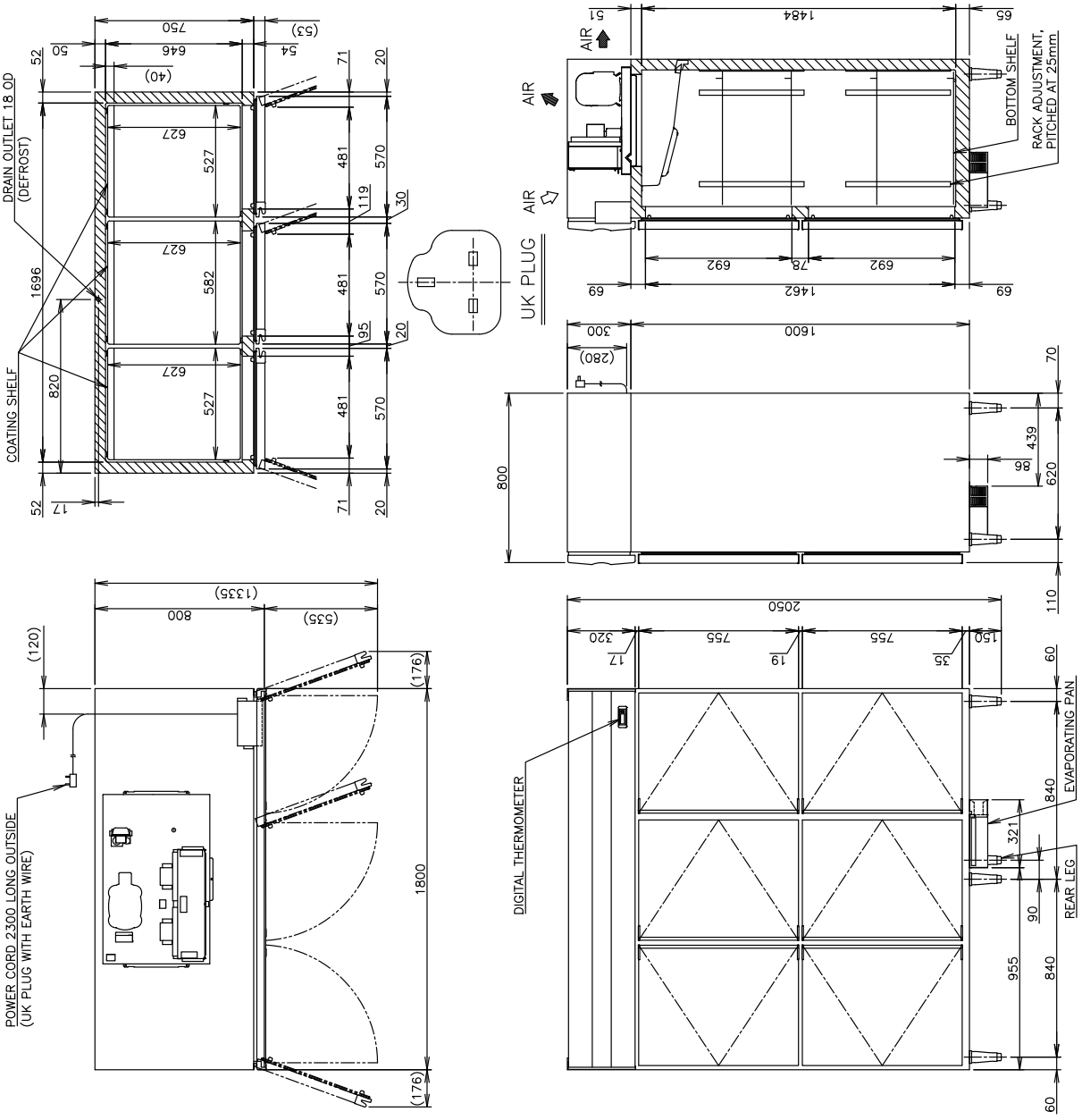
[h] HF-188MA (Model Code: R597)

HOSHIZAKI

ITEM	Hoshizaki Reach-in Freezer
MODEL	HF-188MA-S
POWER SUPPLY	1 Phase 220 - 240V 50Hz Capacity: 1.53kVA (6.96A)
AMPERAGE	Rated: 5.55A Starting: 23.4A
ELECTRIC CONSUMPTION	917W Heater: 523W Defrost: 523W
HEAT REJECTION	*W
POWER CORD	2.3m (UK Plug with Earth Wire)
EFFECTIVE CAPACITY	1622L
OUTSIDE DIMENSIONS	1800mm(W) x 800mm(D) x 2050(-2080)mm(H)
INSIDE DIMENSIONS	1696mm(W) x 646mm(D) x 1484mm(H)
EXTERIOR	Stainless Steel, Galvanized Steel(Top, Rear, Bottom)
INTERIOR	Stainless Steel, ABS Plastic(Door)
INSULATION	Polyurethane Foam
INSULATION FOAM BLOWING AGENT	Cyclopentane
REFRIGERATION SYSTEM	Forced Air Circulation
DEFROST SYSTEM	Heater
COMPRESSOR	Hermetic
CONDENSER	Fin and Tube type, Air-cooled
EVAPORATOR	Fin and Tube type
REFRIGERANT	R404A
TEMPERATURE CONTROL	Microprocessor (Digital Temp. Indication) Adjustable from -23 to -7C
DEFROST CONTROL	Microprocessor
ELECTRIC CIRCUIT PROTECTION	Earth Wire, Circuit Breaker
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto-reset)
LEG	Plastic Adjustable from 150 to 180mm
SHELF	12 pcs.
WEIGHT	197kg (Gross 239kg)
PACKAGE	Carton (Wooden Pallet) 1860mm(W) x 900mm(D) x 2075mm(H)
ACCESSORIES	Drain Hose x 1, Drain Pan x 1
OPERATING CONDITIONS	Ambient Temperature: 5 - 43°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 35°C.
3. Product Code: R597-C100 (HS)



[i] HRF-78MA (Model Code: R*)**

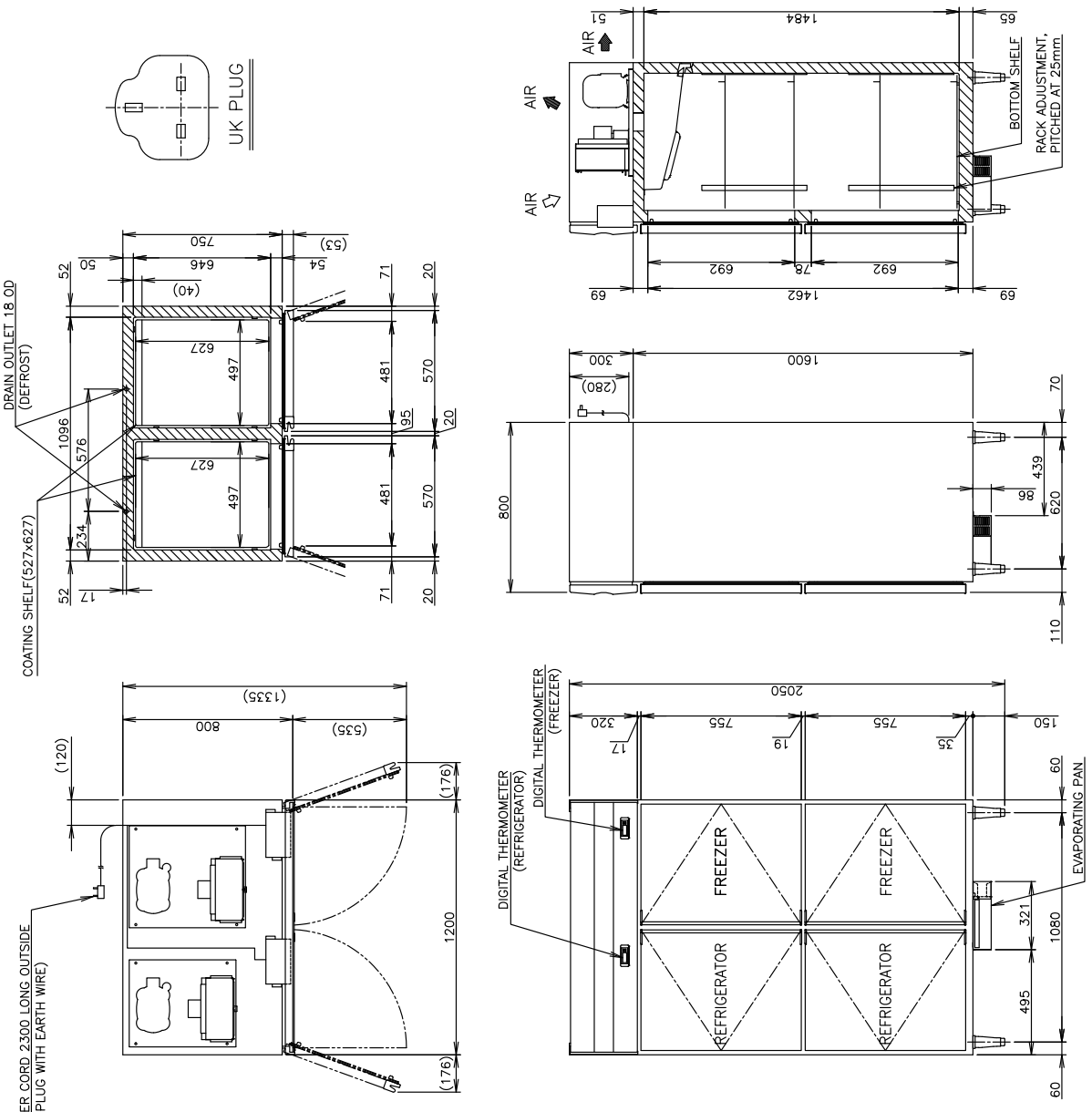
[j] HRF-128MAF(Model Code: R599)

HOSHIZAKI

ITEM	Hoshizaki Reach-in Freezer/Refrigerator	
MODEL	HRF-128MA-S	
POWER SUPPLY	1 Phase 230V 50Hz Capacity: 0.74kVA (3.36A)	
AMPERAGE	Rated: 7.7A Starting: 11.3A	
ELECTRIC CONSUMPTION	704W	
HEAT REJECTION	Heater: 727W Defrost: 727W	
POWER CORD	*W	
EFFECTIVE CAPACITY	2.3m (UK Plug with Earth Wire)	
OUTSIDE DIMENSIONS	Total 908L (Refrigerator: 454L, Freezer: 454L)	
INSIDE DIMENSIONS	1200mm(W)×800mm(D)×1990(-2020)mm(H)	
	Refrigerator 521mm(W)×646mm(D)×1484mm(H)	
	Freezer 521mm(W)×646mm(D)×1484mm(H)	
EXTERIOR	Stainless Steel, Galvanized Steel(Top, Rear, Bottom)	
INTERIOR	Stainless Steel, ABS Plastic(Door)	
INSULATION	Polyurethane Foam	
INSULATION FOAM BLOWING AGENT	Cyclopentane	
REFRIGERATION SYSTEM	Forced Air Circulation	
DEFROST SYSTEM	Refrigerator Off Cycle	
	Freezer Heater	
COMPRESSOR	Refrigerator Hermetic	
	Freezer Hermetic	
CONDENSER	Refrigerator Wire and Tube Type, Air-cooled	
	Freezer Wire and Tube Type, Air-cooled	
EVAPORATOR	Refrigerator Fin and Tube type	
	Freezer Fin and Tube type	
REFRIGERANT	Refrigerator R134a	
	Freezer R404A	
TEMPERATURE CONTROL	Refrigerator Microprocessor Controlled (Digital Temperature Indication) Adjustable from -4 to 17℃	
	Freezer Microprocessor Controlled (Digital Temperature Indication) Adjustable from -23 to -7℃	
DEFROST CONTROL	Microprocessor	
ELECTRIC CIRCUIT PROTECTION	Earth Wire, Circuit Breaker	
REFRIGERANT CIRCUIT PROTECTION	Motor Protector (Auto-reset)	
LEG	Plastic Adjustable from 150 to 180mm	
SHELF	8 pcs.	
WEIGHT	171kg (Gross 202kg)	
PACKAGE	Carton (Wooden Pallet) 1260mm(W)×900mm(D)×2075mm(H)	
ACCESSORIES	Drain Hose×2	
OPERATING CONDITIONS	Ambient Temperature: 5 – 43° 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 35°C.
3. Product Code: R599-C100 (HS)



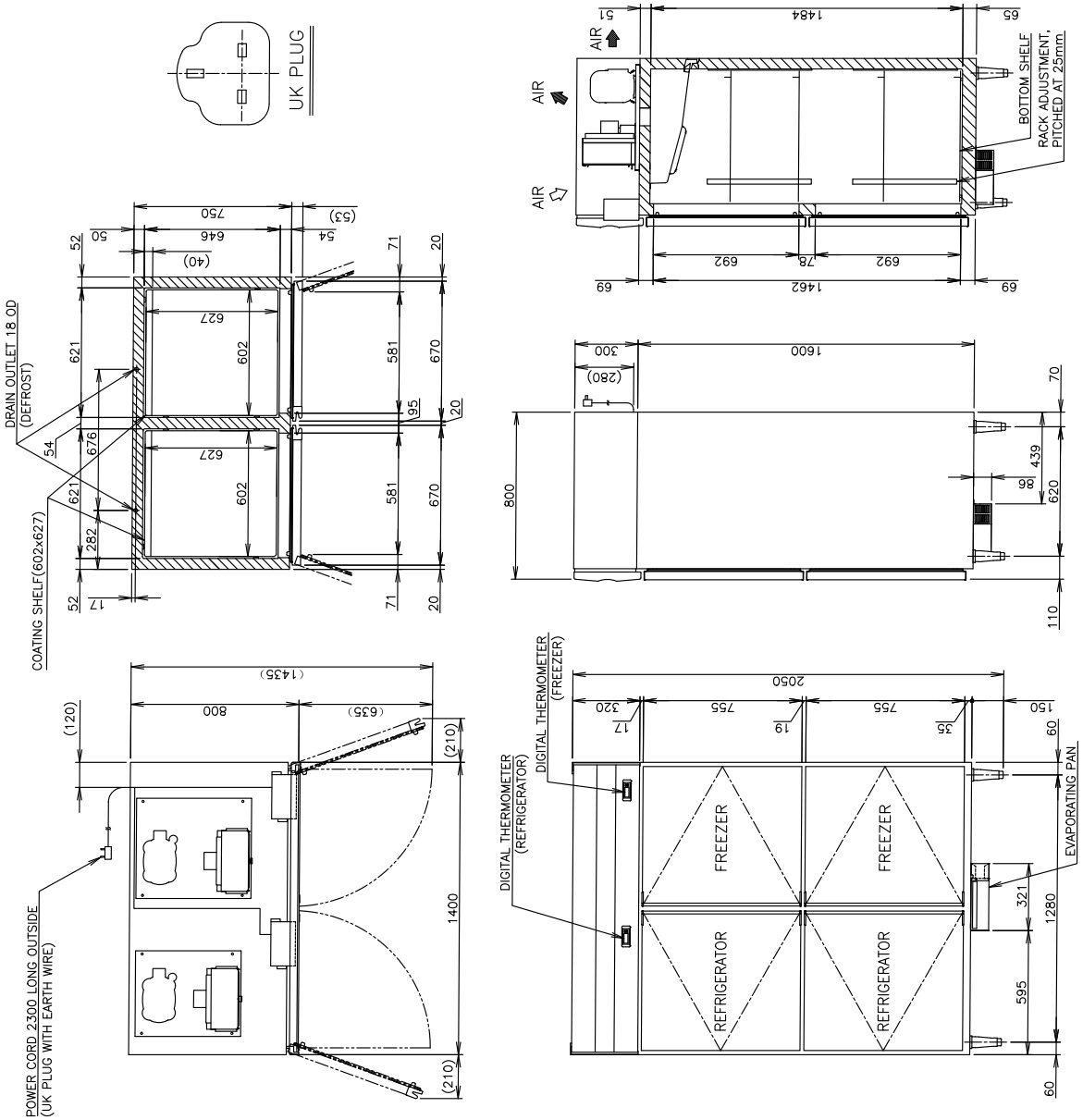
[k] HRF-148MAF (Model Code: R600)

HOSHIZAKI

ITEM		Hoshizaki Reach-in Freezer/Refrigerator
MODEL		HRF-148MA-S
POWER SUPPLY		1 Phase 230V 50Hz Capacity: 0.74kVA (3.36A)
AMPERAGE		Rated: 7.7A Starting: 11.3A
ELECTRIC CONSUMPTION		808W Heater: 634W Defrost: 634W
HEAT REJECTION		*W
POWER CORD		2.3m (UK Plug with Earth Wire)
EFFECTIVE CAPACITY		Total1100L (Refrigerator: 550L, Freezer: 550L)
OUTSIDE DIMENSIONS		1400mm(W)×800mm(D)×1990(-2020)mm(H)
INSIDE DIMENSIONS	Refrigerator	621mm(W)×646mm(D)×1484mm(H)
	Freezer	621mm(W)×646mm(D)×1484mm(H)
EXTERIOR		Stainless Steel, Galvanized Steel(Top, Rear, Bottom)
INTERIOR		Stainless Steel, ABS Plastic(Door)
INSULATION		Polyurethane Foam
INSULATION FOAM BLOWING AGENT		Cyclopentane
REFRIGERATION SYSTEM		Forced Air Circulation
DEFROST SYSTEM	Refrigerator	Off Cycle
	Freezer	Heater
COMPRESSOR	Refrigerator	Hermetic
	Freezer	Hermetic
CONDENSER	Refrigerator	Wire and Tube Type, Air-cooled
	Freezer	Wire and Tube Type, Air-cooled
EVAPORATOR	Refrigerator	Fin and Tube type
	Freezer	Fin and Tube type
REFRIGERANT	Refrigerator	R134a
	Freezer	R404A
TEMPERATURE CONTROL	Refrigerator	Microprocessor Controlled (Digital Temperature Indication) Adjustable from -6 to 12°C
	Freezer	Microprocessor Controlled (Digital Temperature Indication) Adjustable from -23 to -7°C
DEFROST CONTROL		Microprocessor
ELECTRIC CIRCUIT PROTECTION		Earth Wire, Circuit Breaker
REFRIGERANT CIRCUIT PROTECTION		Motor Protector (Auto-reset)
LEG		Plastic Adjustable from 150 to 180mm
SHELF		8 pcs.
WEIGHT		187kg (Gross 222kg)
PACKAGE		Carton (Wooden Pallet) 1460mm(W)×900mm(D)×2075mm(H)
ACCESSORIES		Drain Hose×2
OPERATING CONDITIONS		Ambient Temperature: 5 ~ 43°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 35°C.
3. Product Code: R600-C100 (HS)



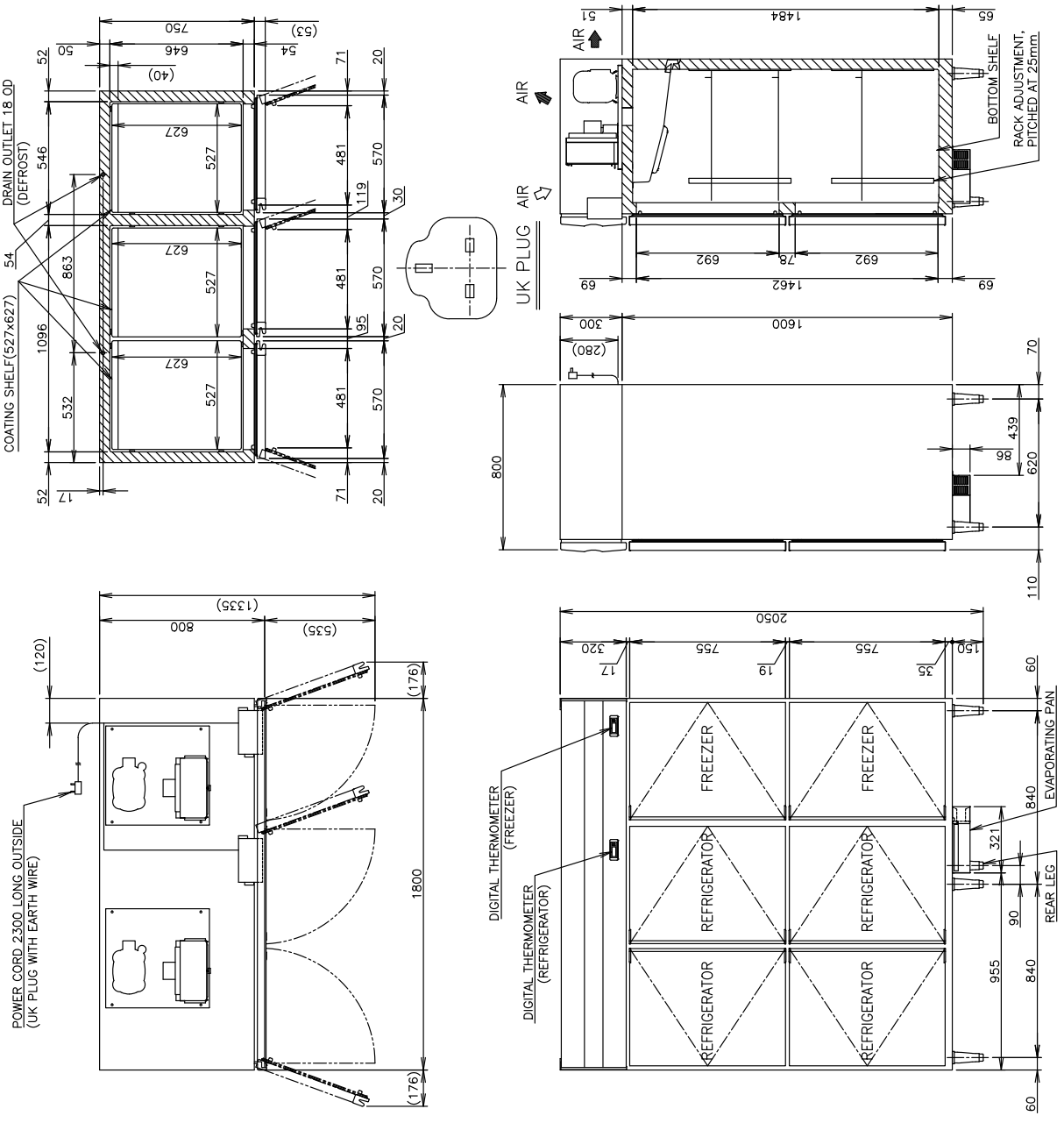
[l] HRF-188MAF (Model Code: R601)

HOSHIZAKI

ITEM		Hoshizaki Reach-in Freezer/Refrigerator
MODEL		HRF-188MA-S
POWER SUPPLY		1 Phase 230V 50Hz Capacity: 0.56KVA (2.53A)
AMPERAGE		Rated: 8.2A Starting: 8.5A
ELECTRIC CONSUMPTION		844W Heater: 752W Defrost: 752W
HEAT REJECTION		*W
POWER CORD		2.3m (UK Plug with Earth Wire)
EFFECTIVE CAPACITY		Total 1523L (Refrigerator: 1025L, Freezer: 498L)
OUTSIDE DIMENSIONS		1800mm(W)×800mm(D)×1990(−2020)mm(H)
INSIDE DIMENSIONS	Refrigerator	1096mm(W)×646mm(D)×1484mm(H)
	Freezer	546mm(W)×646mm(D)×1484mm(H)
EXTERIOR		Stainless Steel, Galvanized Steel(Top, Rear, Bottom)
INTERIOR		Stainless Steel, ABS Plastic(Door)
INSULATION		Polyurethane Foam
INSULATION FOAM BLOWING AGENT		Cyclopentane
REFRIGERATION SYSTEM		Forced Air Circulation
DEFROST SYSTEM	Refrigerator	Off Cycle
	Freezer	Heater
COMPRESSOR	Refrigerator	Hermetic
	Freezer	Hermetic
CONDENSER	Refrigerator	Wire and Tube Type, Air-cooled
	Freezer	Wire and Tube Type, Air-cooled
EVAPORATOR	Refrigerator	Fin and Tube type
	Freezer	Fin and Tube type
REFRIGERANT	Refrigerator	R134a
	Freezer	R404A
TEMPERATURE CONTROL	Refrigerator	Microprocessor Controlled (Digital Temperature Indication) Adjustable from +1 to 10°C
	Freezer	Microprocessor Controlled (Digital Temperature Indication) Adjustable from −23 to −7°C
DEFROST CONTROL		Microprocessor
ELECTRIC CIRCUIT PROTECTION		Earth Wire, Circuit Breaker
REFRIGERANT CIRCUIT PROTECTION		Motor Protector (Auto-reset)
LEG		Plastic Adjustable from 150 to 180mm
SHELF		12 pcs.
WEIGHT		220kg (Gross 262kg)
PACKAGE		Carton (Wooden Pallet) 1860mm(W)×900mm(D)×2075mm(H)
ACCESSORIES		Drain Hose× 2
OPERATING CONDITIONS		Ambient Temperature: 5 – 43°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 35°C.
3. Product Code: R601-C100 (HS)

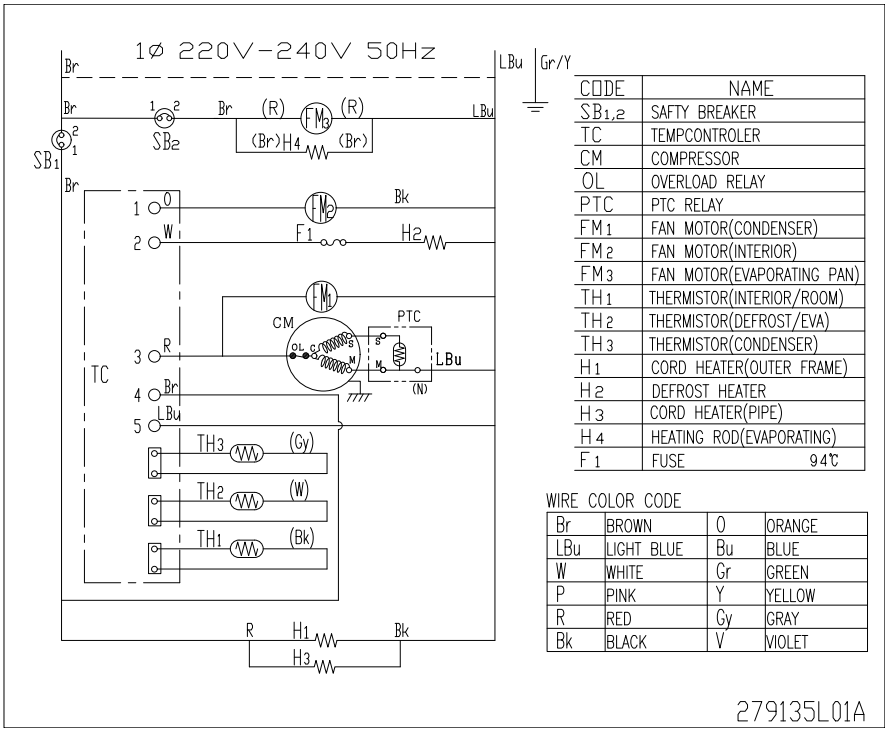


II. TECHNICAL INFORMATION

1. WIRING DIAGRAM

*Standard models: model names and model codes for representative models only

[a] HR-78MA (Model Code: R590)

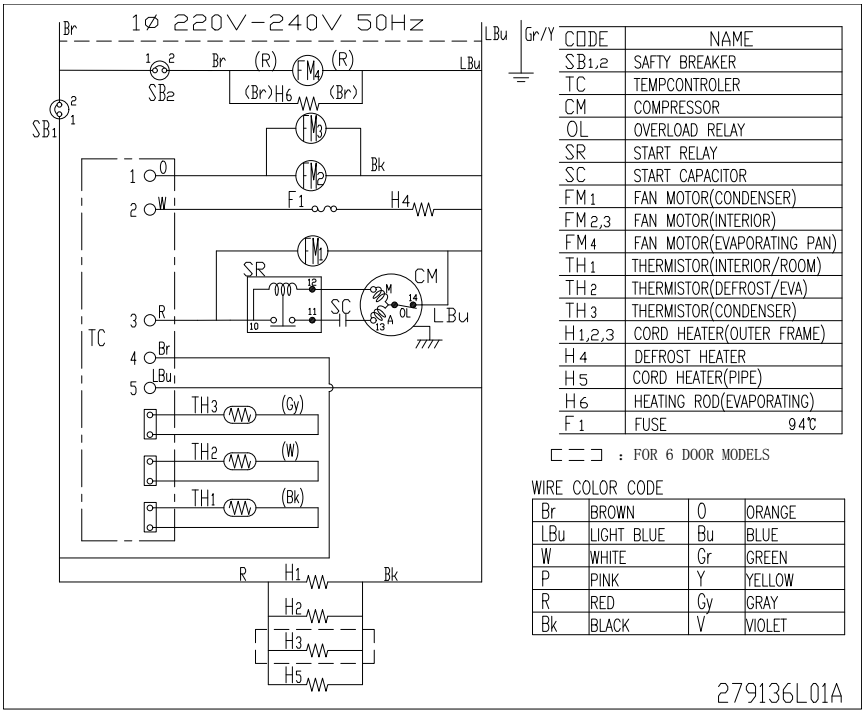


CODE	NAME
SB1,2	SAFTY BREAKER
TC	TEMPCONTROLER
CM	COMPRESSOR
OL	OVERLOAD RELAY
PTC	PTC RELAY
FM1	FAN MOTOR(CONDENSER)
FM2	FAN MOTOR(INTERIOR)
FM3	FAN MOTOR(EVAPORATING PAN)
TH1	THERMISTOR(INTERIOR/ROOM)
TH2	THERMISTOR(DEFROST/EVA)
TH3	THERMISTOR(CONDENSER)
H1	CORD HEATER(OUTER FRAME)
H2	DEFROST HEATER
H3	CORD HEATER(PIPE)
H4	HEATING ROD(EVAPORATING)
F1	FUSE 94℃

WIRE COLOR CODE

Br	BROWN	O	ORANGE
LBu	LIGHT BLUE	Bu	BLUE
W	WHITE	Gr	GREEN
P	PINK	Y	YELLOW
R	RED	Gy	GRAY
Bk	BLACK	V	VIOLET

[b] HR-128MA (Model Code: R591)
HR-148MA (Model Code: R592)、HR-188MA (Model Code: R593)



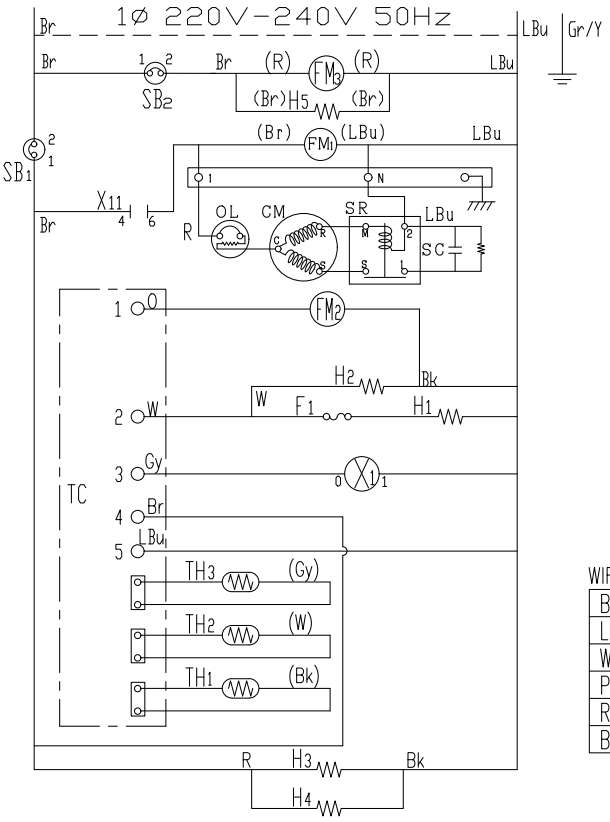
CODE	NAME
SB1,2	SAFTY BREAKER
TC	TEMPCONTROLER
CM	COMPRESSOR
OL	OVERLOAD RELAY
SR	START RELAY
SC	START CAPACITOR
FM1	FAN MOTOR(CONDENSER)
FM2,3	FAN MOTOR(INTERIOR)
FM4	FAN MOTOR(EVAPORATING PAN)
TH1	THERMISTOR(INTERIOR/ROOM)
TH2	THERMISTOR(DEFROST/EVA)
TH3	THERMISTOR(CONDENSER)
H1,2,3	CORD HEATER(OUTER FRAME)
H4	DEFROST HEATER
H5	CORD HEATER(PIPE)
H6	HEATING ROD(EVAPORATING)
F1	FUSE 94℃

⊏二⊐ : FOR 6 DOOR MODELS

WIRE COLOR CODE

Br	BROWN	O	ORANGE
LBu	LIGHT BLUE	Bu	BLUE
W	WHITE	Gr	GREEN
P	PINK	Y	YELLOW
R	RED	Gy	GRAY
Bk	BLACK	V	VIOLET

[c] HF-78MA (Model Code: R594)



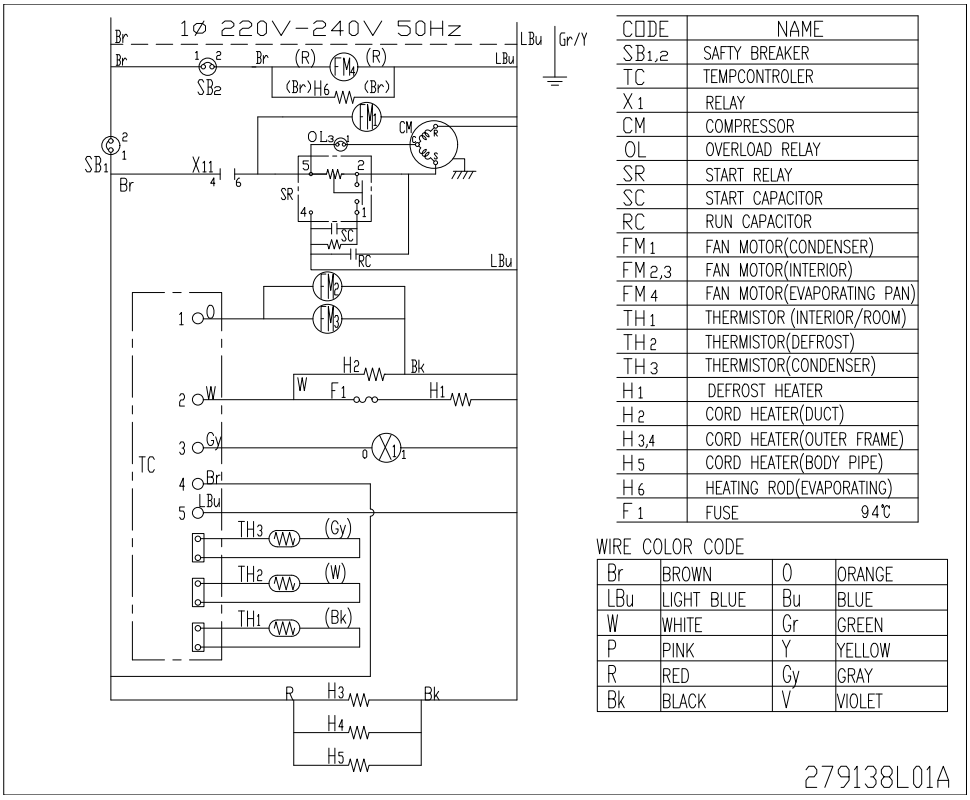
CODE	NAME
$SB_{1,2}$	SAFTY BREAKER
TC	TEMPCONTROLER
X_1	RELAY
CM	COMPRESSOR
OL	OVERLOAD RELAY
SR	START RELAY
SC	START CAPACITOR
FM_1	FAN MOTOR(CONDENSER)
FM_2	FAN MOTOR(INTERIOR)
FM_3	FAN MOTOR(EVAPORATING PAN)
TH_1	THERMISTOR (INTERIOR/ROOM)
TH_2	THERMISTOR(DEFROST)
TH_3	THERMISTOR(CONDENSER)
H_1	DEFROST HEATER
H_2	CORD HEATER(DUCT)
H_3	CORD HEATER(OUTER FRAME)
H_4	CORD HEATER(BODY PIPE)
H_5	HEATING ROD(EVAPORATING)
F_1	FUSE 94℃

WIRE COLOR CODE

Br	BROWN	O	ORANGE
LBu	LIGHT BLUE	Bu	BLUE
W	WHITE	Gr	GREEN
P	PINK	Y	YELLOW
R	RED	Gy	GRAY
Bk	BLACK	V	VIOLET

279137L01A

[d] HF-128MA (Model Code: R595)
HF-148MA (Model Code: R596)

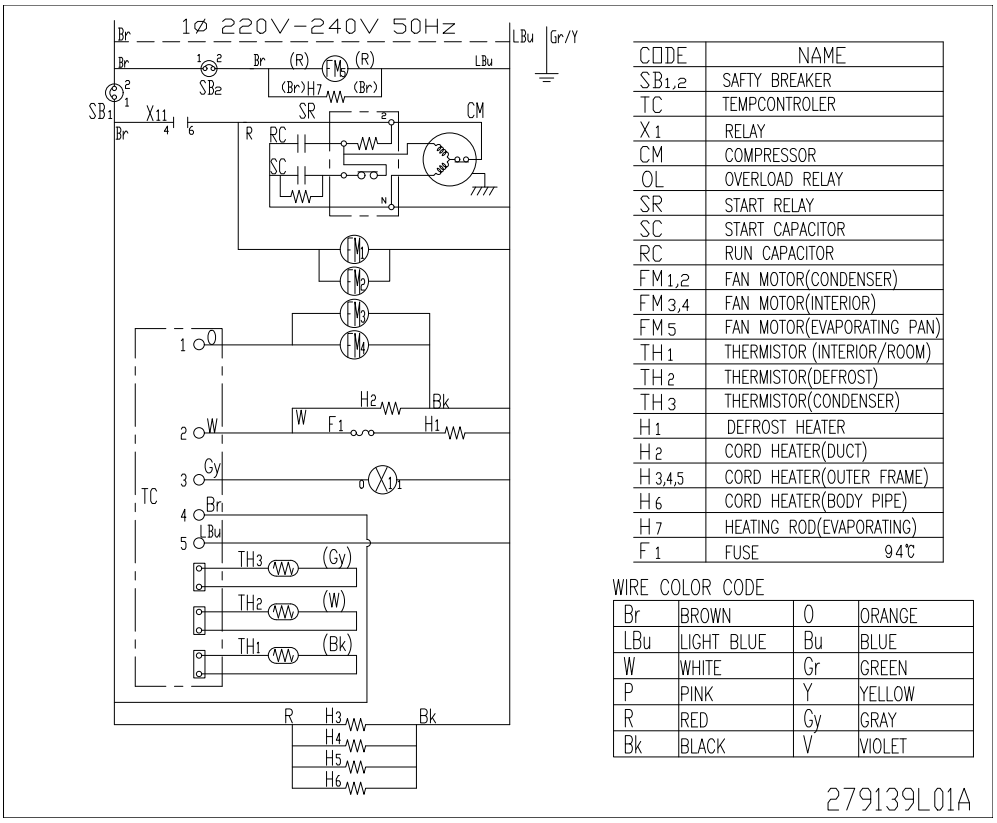


CODE	NAME
SB1,2	SAFTY BREAKER
TC	TEMPCONTROLER
X1	RELAY
CM	COMPRESSOR
OL	OVERLOAD RELAY
SR	START RELAY
SC	START CAPACITOR
RC	RUN CAPACITOR
FM1	FAN MOTOR(CONDENSER)
FM2,3	FAN MOTOR(INTERIOR)
FM4	FAN MOTOR(EVAPORATING PAN)
TH1	THERMISTOR (INTERIOR/ROOM)
TH2	THERMISTOR(DEFROST)
TH3	THERMISTOR(CONDENSER)
H1	DEFROST HEATER
H2	CORD HEATER(DUCT)
H3,4	CORD HEATER(OUTER FRAME)
H5	CORD HEATER(BODY PIPE)
H6	HEATING ROD(EVAPORATING)
F1	FUSE 94℃

WIRE COLOR CODE

Br	BROWN	O	ORANGE
LBu	LIGHT BLUE	Bu	BLUE
W	WHITE	Gr	GREEN
P	PINK	Y	YELLOW
R	RED	Gy	GRAY
Bk	BLACK	V	VIOLET

[e] HF-188MA (Model Code: R597)



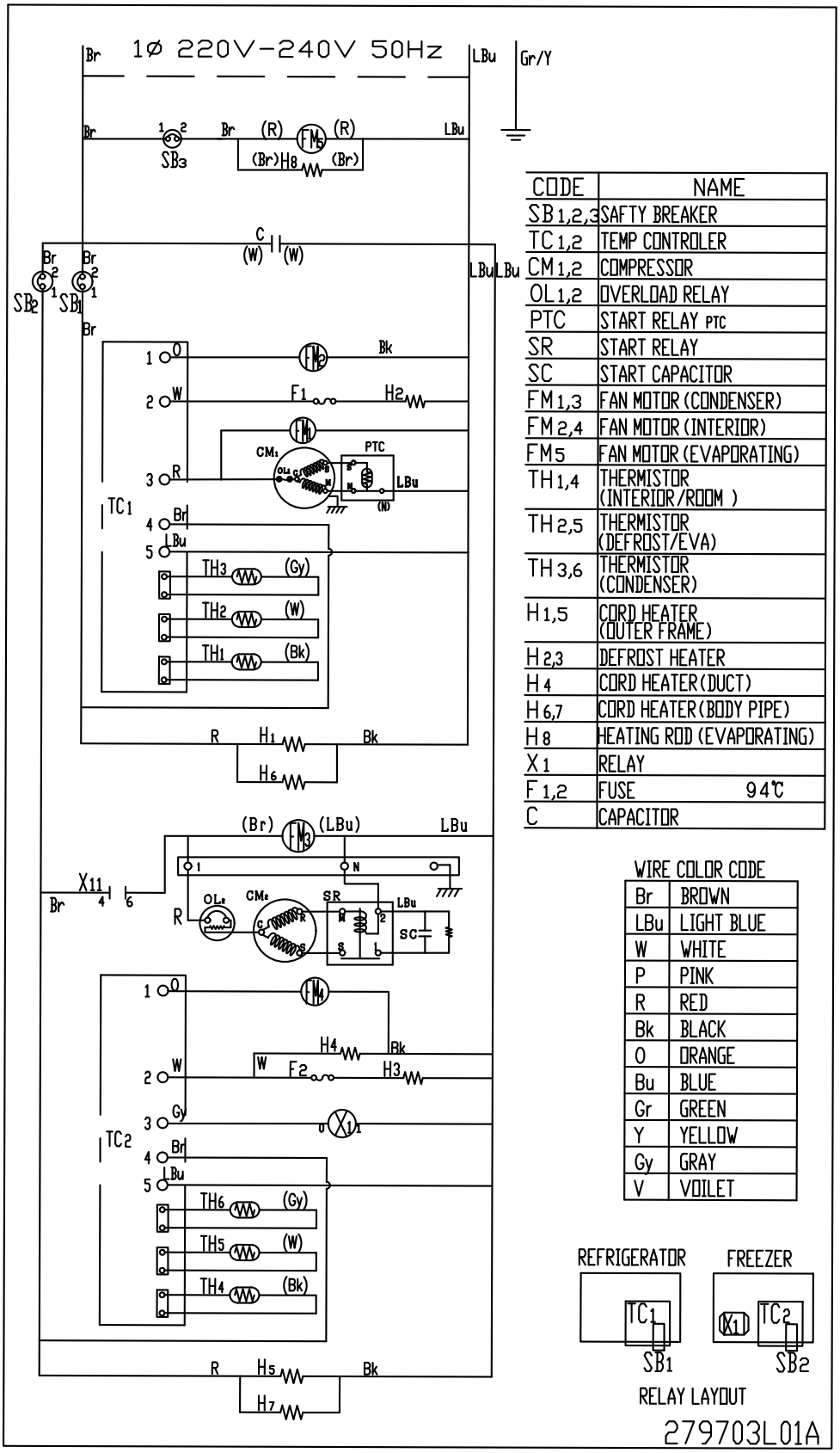
CODE	NAME
SB1,2	SAFTY BREAKER
TC	TEMPCONTROLER
X1	RELAY
CM	COMPRESSOR
OL	OVERLOAD RELAY
SR	START RELAY
SC	START CAPACITOR
RC	RUN CAPACITOR
FM1,2	FAN MOTOR(CONDENSER)
FM3,4	FAN MOTOR(INTERIOR)
FM5	FAN MOTOR(EVAPORATING PAN)
TH1	THERMISTOR (INTERIOR/ROOM)
TH2	THERMISTOR(DEFROST)
TH3	THERMISTOR(CONDENSER)
H1	DEFROST HEATER
H2	CORD HEATER(DUCT)
H3,4,5	CORD HEATER(OUTER FRAME)
H6	CORD HEATER(BODY PIPE)
H7	HEATING ROD(EVAPORATING)
F1	FUSE 94℃

WIRE COLOR CODE

Br	BROWN	O	ORANGE
LBu	LIGHT BLUE	Bu	BLUE
W	WHITE	Gr	GREEN
P	PINK	Y	YELLOW
R	RED	Gy	GRAY
Bk	BLACK	V	VIOLET

[f] HRF-78MA (Model Code: R598)

[g] HRF-128MAF (Model Code: R599)
HRF-148MAF (Model Code: R600)

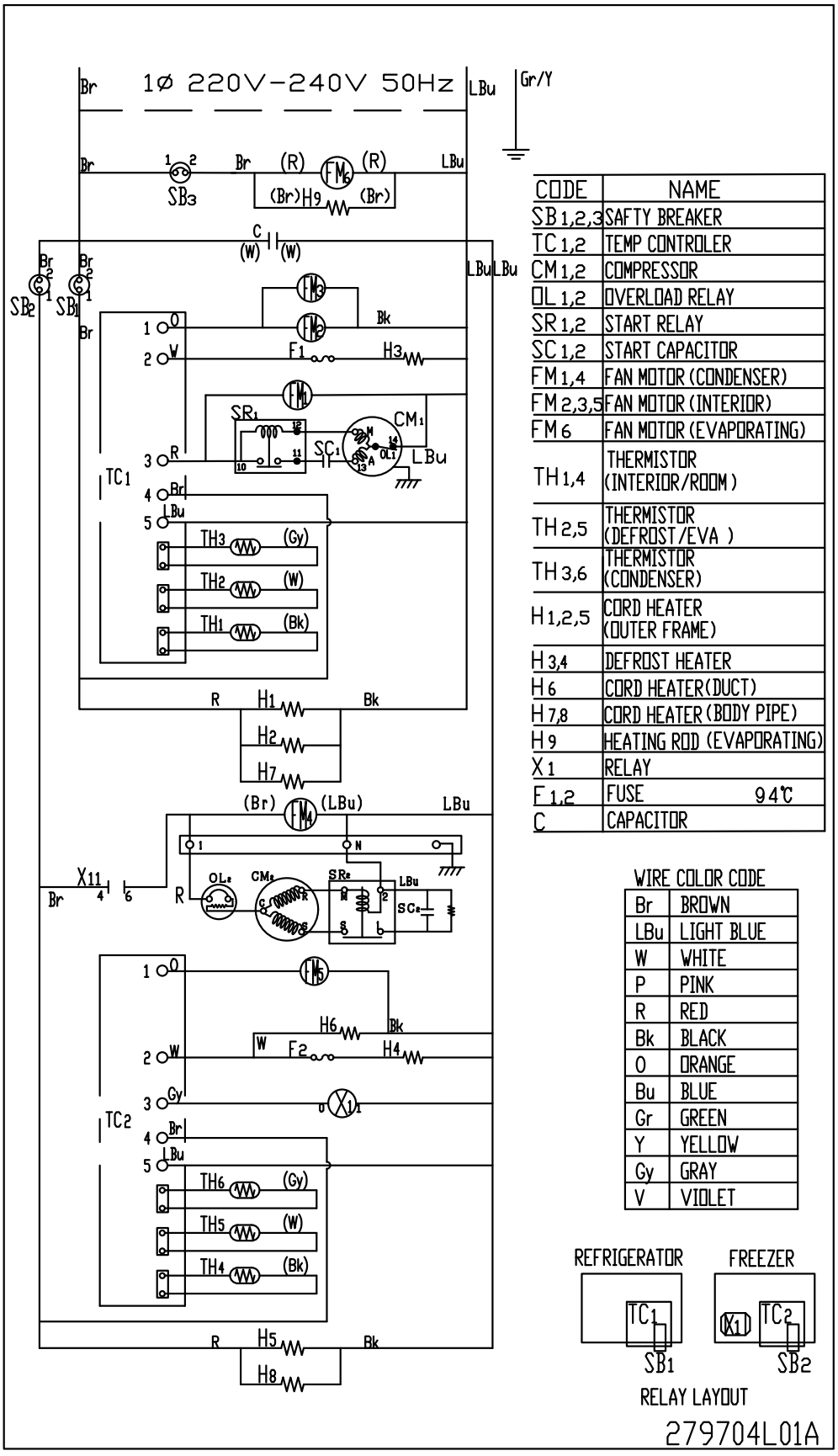


CODE	NAME
SB 1,2,3	SAFTY BREAKER
TC 1,2	TEMP CONTROLER
CM 1,2	COMPRESSOR
OL 1,2	OVERLOAD RELAY
PTC	START RELAY PTC
SR	START RELAY
SC	START CAPACITOR
FM 1,3	FAN MOTOR (CONDENSER)
FM 2,4	FAN MOTOR (INTERIOR)
FM 5	FAN MOTOR (EVAPORATING)
TH 1,4	THERMISTOR (INTERIOR/ROOM)
TH 2,5	THERMISTOR (DEFROST/EVA)
TH 3,6	THERMISTOR (CONDENSER)
H 1,5	CORD HEATER (OUTER FRAME)
H 2,3	DEFROST HEATER
H 4	CORD HEATER (DUCT)
H 6,7	CORD HEATER (BODY PIPE)
H 8	HEATING ROD (EVAPORATING)
X 1	RELAY
F 1,2	FUSE 94℃
C	CAPACITOR

WIRE COLOR CODE

Br	BROWN
LBu	LIGHT BLUE
W	WHITE
P	PINK
R	RED
Bk	BLACK
O	ORANGE
Bu	BLUE
Gr	GREEN
Y	YELLOW
Gy	GRAY
V	VOILET

[h] HRF-188MAF (Model Code: R601)



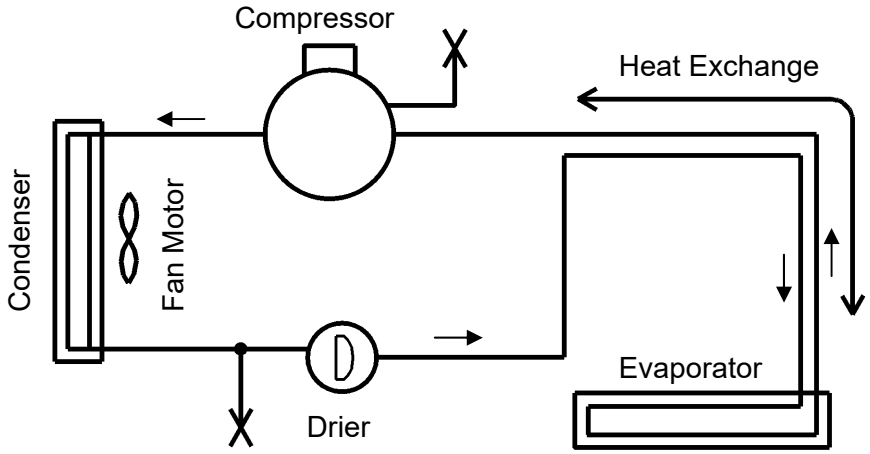
CODE	NAME
SB 1,2,3	SAFTY BREAKER
TC 1,2	TEMP CONTROLER
CM 1,2	COMPRESSOR
OL 1,2	OVERLOAD RELAY
SR 1,2	START RELAY
SC 1,2	START CAPACITOR
FM 1,4	FAN MOTOR (CONDENSER)
FM 2,3,5	FAN MOTOR (INTERIOR)
FM 6	FAN MOTOR (EVAPORATING)
TH 1,4	THERMISTOR (INTERIOR/ROOM)
TH 2,5	THERMISTOR (DEFROST/EVA)
TH 3,6	THERMISTOR (CONDENSER)
H 1,2,5	CORD HEATER (OUTER FRAME)
H 3,4	DEFROST HEATER
H 6	CORD HEATER(DUCT)
H 7,8	CORD HEATER(BODY PIPE)
H 9	HEATING ROD (EVAPORATING)
X 1	RELAY
F 1,2	FUSE 94℃
C	CAPACITOR

WIRE COLOR CODE

Br	BROWN
LBu	LIGHT BLUE
W	WHITE
P	PINK
R	RED
Bk	BLACK
O	ORANGE
Bu	BLUE
Gr	GREEN
Y	YELLOW
Gy	GRAY
V	VIOLET

2. REFRIGERATION CIRCUIT

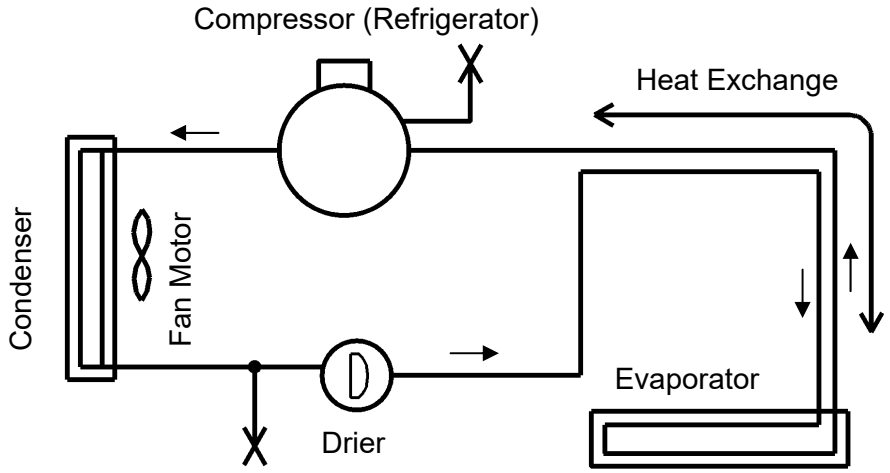
HR/HF

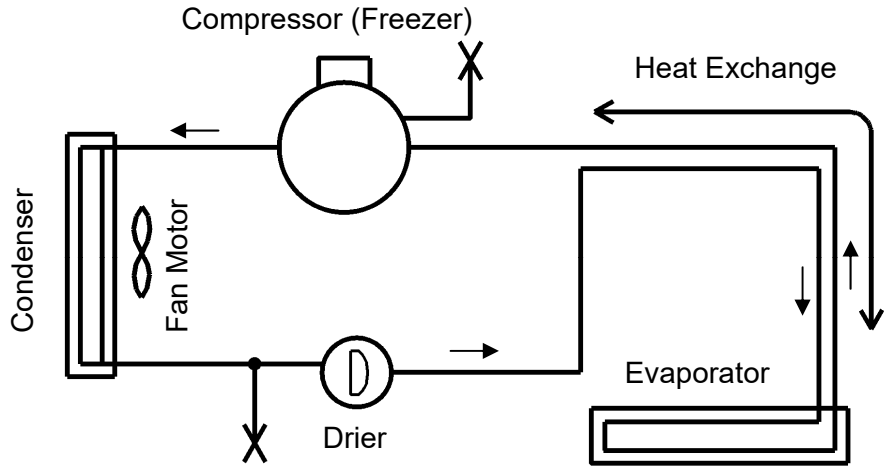


HRF-78MA

Refrigerant:	HFC-134a	(HR series) (HRF refrigerator)
	HFC-404A	(HF series) (HRF freezer)

There may be exceptions for some customized models.

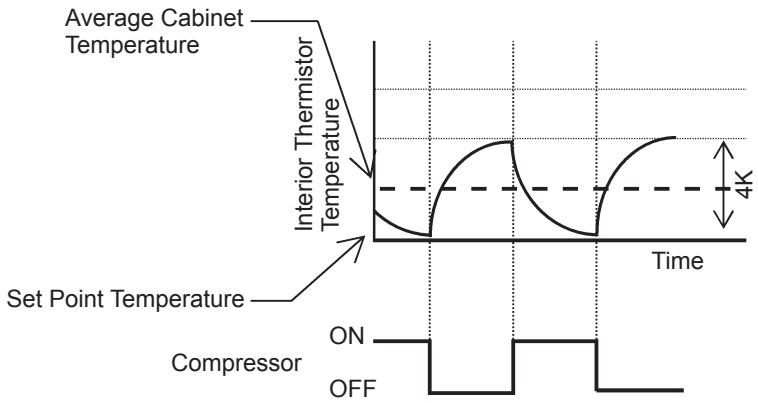

Compressor (Refrigerator)
Heat Exchange
Condenser
Fan Motor
Evaporator
Drier


Compressor (Freezer)
Heat Exchange
Condenser
Fan Motor
Evaporator
Drier

3. ELECTRONIC CONTROLS

[a] SET POINT TEMPERATURE (compressor OFF temperature)

Heater defrost (HR series,): -6 to +12° C
Heater defrost (HF series, HRF series - freezer): -23 to -7° C



[b] CABINET TEMPERATURE DIFFERENTIAL

4 K (from “set point temp” to “set point temp + 4 K”)

The compressor stops when the cabinet temperature reaches down to the set point temperature, and starts when the cabinet temperature rises to the set point temperature + 4° C. Accordingly, the average cabinet temperature will be around the set point temperature + 2° C.

[c] DEFROST CYCLE

The unit automatically defrosts the evaporator 3 hours (HRF series - refrigerator) or 6 hours (HR series,HF series, HRF series - freezer) after the refrigeration starts. The defrost indicator light on the operation panel comes on when the defrost cycle starts.

[d] DEFROST TERMINATION TEMPERATURE

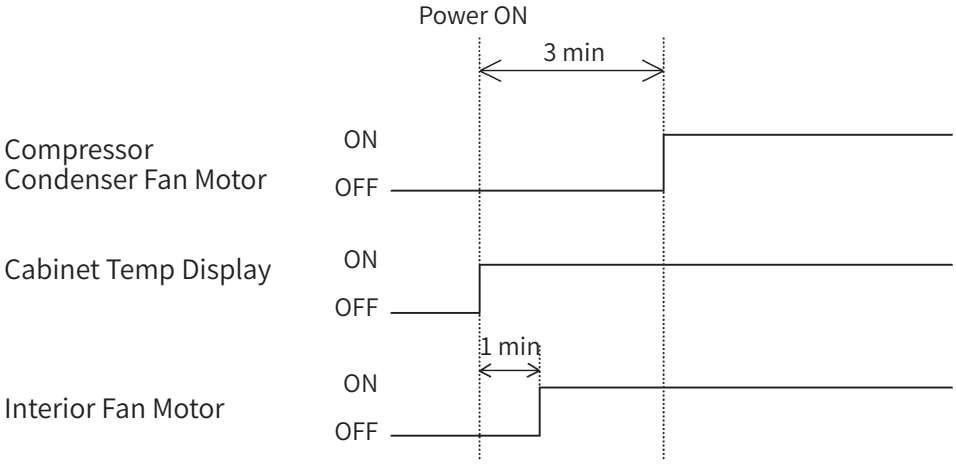
Heater defrost (HF series, HRF series - freezer): +30° C
Heater defrost (HR series, HF-188MA): +20° C

[e] TEMPERATURE DISPLAY

During a defrost cycle, the screen indicates “dEF” .

[f] COMPRESSOR SOFT START

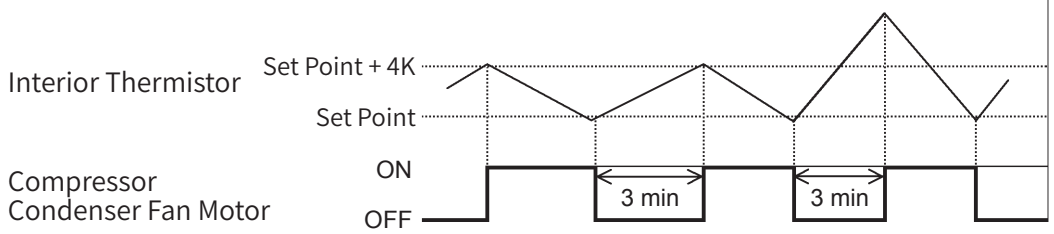
1) Startup



When the power supply is turned on, the screen shows the cabinet temperature and the interior fan motor starts up with a 1 minute delay. The compressor and condenser fan motor start up with a 3 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 minute



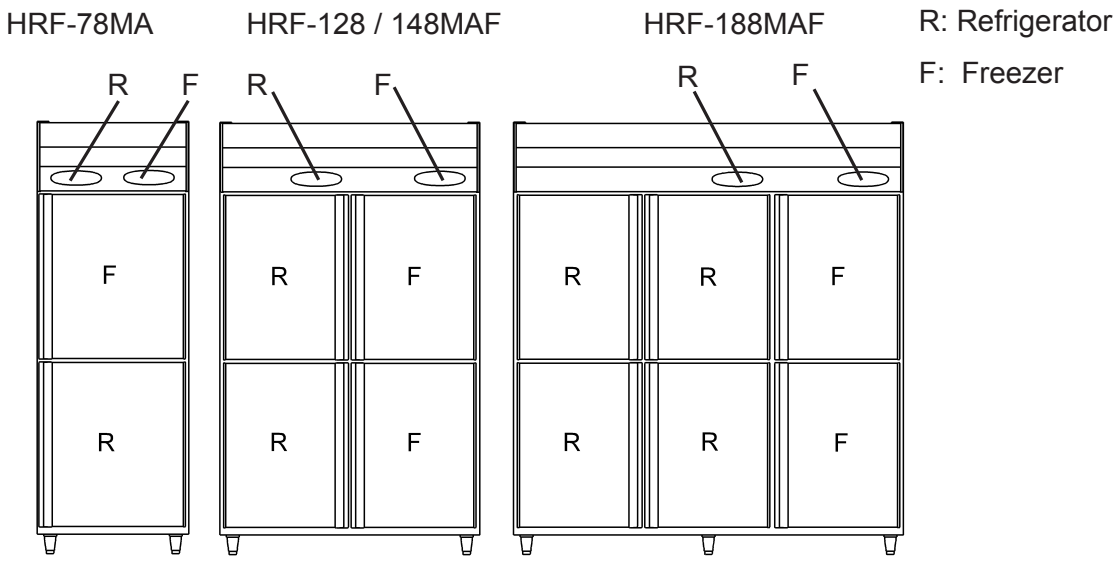
delay before startup. For example, if the compressor turns off by its thermistor and the door is opened immediately after (causing the cabinet temperature to immediately exceed the restart temperature), the compressor will still not start until 3 minutes have passed since its shutdown.

[h] CHECKING SET POINT TEMPERATURE

Note: See “5. CONTROLLER” for the operation panel key locations.

Press and hold the set key on the operation panel for 3 seconds to display “St” on the screen. Press the set key again to display the set point temperature on the screen. After 30 seconds, the screen displays the cabinet temperature again.

- Use the controller on the left side to set the refrigerator compartment temperature. Refer to the standard model instruction manual for temperature setting details.
- Use the controller on the right side to set the freezer compartment temperature. Refer to the standard model instruction manual for temperature setting details.



[i] MANUAL DEFROST

To start the manual defrost cycle, press the defrost/rest key for 3 seconds. The defrost indicator light on the operation panel comes on when the defrost cycle starts.

[j] ERROR CODES

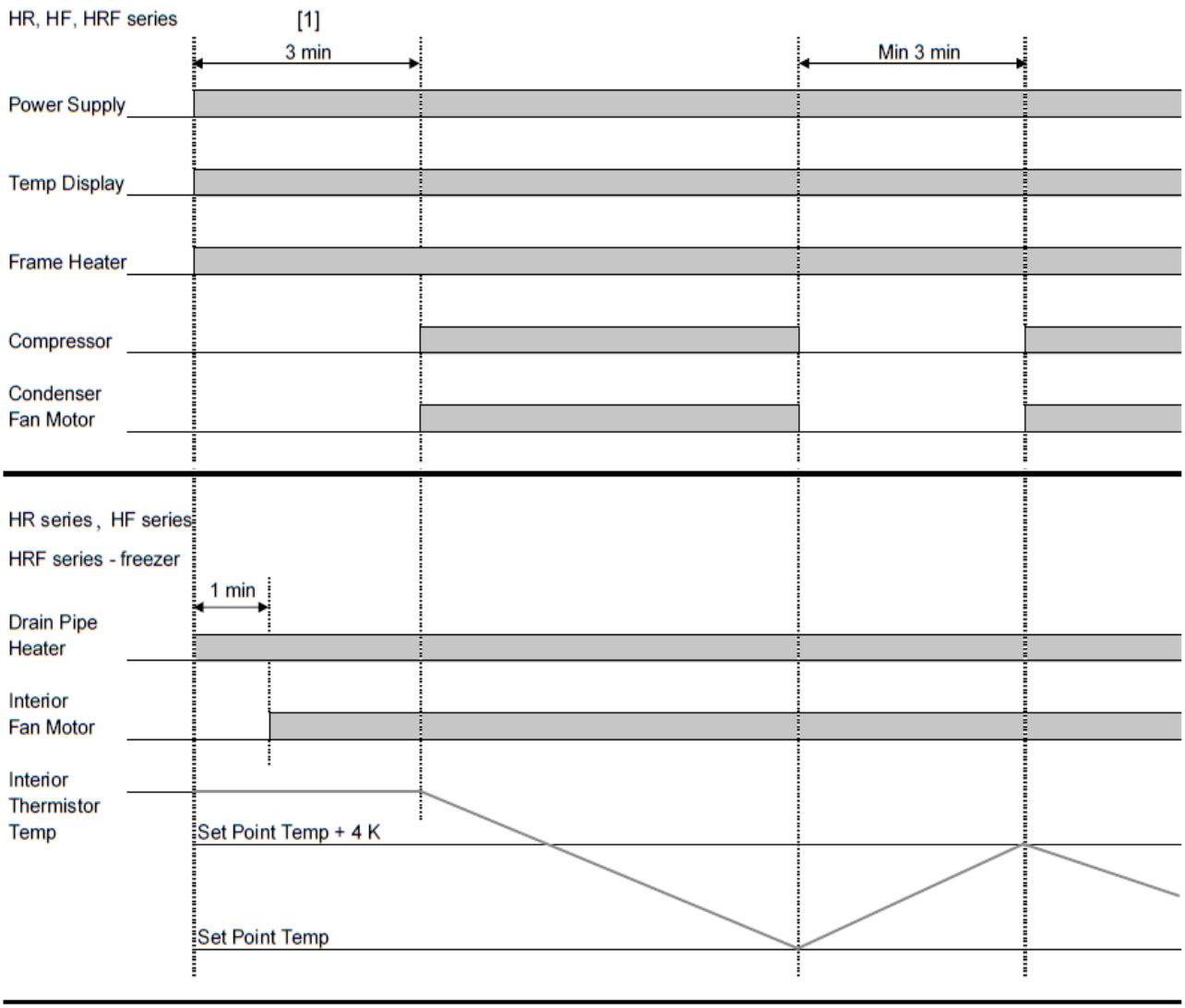
HR series, HF series, HRF series

Code	Possible Cause	Operation and Remedy
E1	Cabinet sensor (interior thermistor) error	Compressor cycles on for 45 minutes and off for 15 minutes. Check cabinet temperature. See “III. 1. ERROR CODES” for further details.
E2	Evaporator (defrost thermistor) error	Defrost termination temperature is invalid. Press any key to stop beep. See “III. 1. ERROR CODES” for further details.
E3	Condenser (defrost thermistor) error	See “III. 1. ERROR CODES” for further details.
cH	Condenser high temperature alarm	When the condenser temperature is too high, the temperature will fall down and the alarm will be released. See “III. 1. ERROR CODES” for further details.

* The code “dEF” is not an error code but indicates the unit is in defrost cycle.
* When the defrost thermistor is defective, error code will not be displayed without [7] down key being pressed. See “5. [b] ” for operation panel detail.

4. TIMING CHART

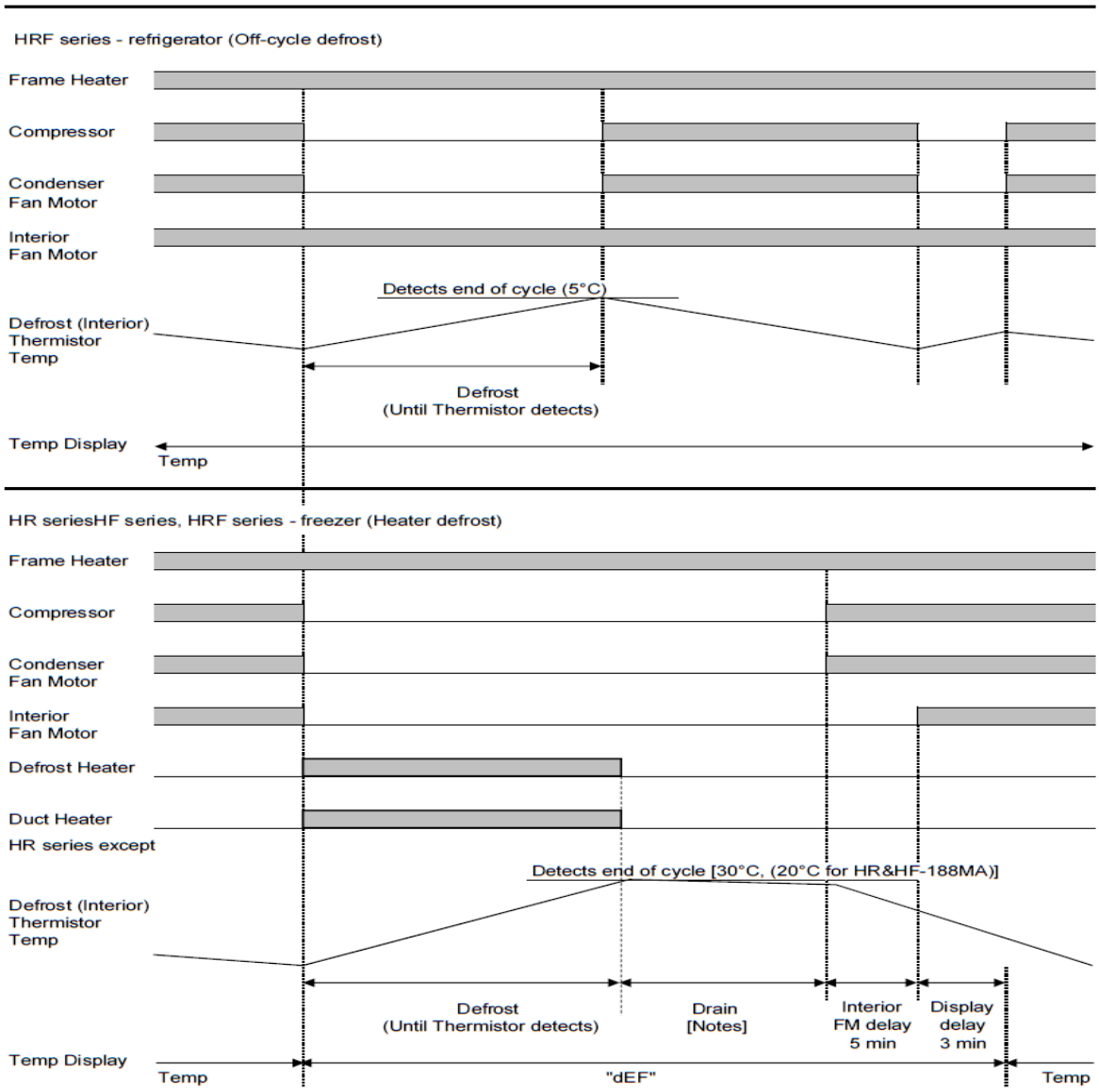
[a] STARTUP - CONTROL



[1] Standby at Startup

Only temperature indication is available for 3 min (not a sign of failure).

[b] DEFROST



Note: HF series, HRF series - freezer drain for 10 minutes, and HR series drain for 5 minutes.

5. CONTROLLER

Operation Panel

[1] Refrigeration Indicator Light
[2] Defrost Indicator Light
[3] Fan Indicator Light
[4] Defrost dripping Indicator Light
[5] Set Indicator Light
[6] Defrost/Reset Key
[7] Down Key
[8] Up Key
[9] Set Key/Menu Key

Indicator Lights

Indicator Light	Symbol	Status	Meaning
Set	SET	On	Parameter setting
		Off	Measuring and controlling status
Refrigeration	❄	On	Refrigerating
		Off	Refrigeration stopped
		Flash	Refrigeration delayed
Defrost	❄	On	Defrosting
		Off	Defrost stopped
Fan		On	Fan running
		Off	Fan stopped
Defrost dripping	drip	On	Defrost dripping running
		Off	Defrost dripping stopped

Key Functions and Setting Modes

Keys	Function	Key action
Set	Enter the status of parameter setting	Press down and hold for 3 seconds
	Switch between menu and parameter	Press down and hold for 3 seconds
	Adjust menu and parameters	Press down and response
	Open/close light(only valid for the model with light control	Press down and response
	Upload parameter to copy card	Press down and hold for 3 seconds
	Adjust menu and parameters	Press down and response
	Download parameter from copy card	Press down and hold for 3 seconds
Rst	View evaporator sensor temperature	Press down and response
	Exit from parameter setting	Press down and response
	Press 3s to forced switch between refrigeration, defrost/defrost delay, defrost dripping	Press down and hold for 3 seconds
Set+	Controller Turn ON/OFF*	Press down and hold for 3 seconds

*When turn off controller, the controller will display "---".

Parameters

Menu	Functions	Setting range		Setting		
			Default	HF	HR	Unit
St	Temperature set value	Upper limit ～ Lower limit	4°C	-20°C	1°C	°C / °F
Po	Administrator menu Password	password is 55 unmodified)	0	55	55	/
C1	Hysteresis value	0.5°C～ 9.0°C 1 °F～ 20 °F	4.0°C	4.0°C	4.0°C	°C / °F
C2	Compressor start Min. interval	0 ～ 60	5	3	3	min
C3	Compressor initial start Min. interval	0 ～ 90	5	3	3	min
C4	Cabinet sensor calibration	-10.0°C～ 10.0°C -20 °F～ 20 °F	0.0°C	1°C	-1.5°C	°C / °F
C5	Temperature set lower limit	-50°C～ temperature set value -58 °F～ temperature set value	-6°C	-23°C	-6°C	°C / °F
C6	Temperature set upper limit	temperature set value ～ 85°C temperature set value ～ 185 °F	22°C	-7°C	12°C	°C / °F
C7	Max. standby time after finishing compressor start Min. interval	0 ～ 90 0:Max. standby time calculation is forbidden	9	0	0	min
C8	Refrigeration Min. running time	0 ～ 90 0:Refrigeration Min. running time calculation is forbidden	0	0	0	min
d1	Evaporator sensor selection	0:abled 1:Enabled	1	1	1	/
d2	Evaporator sensor calibration	-10.0°C～ 10.0°C -20 °F～ 20 °F	0.0°C	0	0	°C / °F
d3	Defrost cycle calculation	0:Accumulated refrigeration time 1:Natural time	1	1	1	/
d4	Defrost cycle	0 ～ 90 0:Defrost forbidden	2	6 HRF-R：3	6	hour
d5	Defrost status display	0:Display cabinet temperature 1:Display dEF during defrost and defrost time delay, display cabinet temperature after finishing defrost time delay. 2:Always display dEF during defrost and defrost dripping 3:Always display start-defrost cabinet temperature during defrost and defrost dripping Always display start-defrost cabinet temperature during defrost and defrost dripping	2	1	1	/
d6	The maximum time of defrost	1 ～ 90	25	60	60	min

d7	Defrost termination temperature	0°C～ 50°C 32 °F～ 122 °F	12°C	30°C HF188: 20°C	20°C HRF-R：5°C	°C / °F
d8	Dripping time after defrost	0 ～ 60 0:Defrost dripping time forbidden	2	10	5	min
d9	Cabinet temperature display time delay after defrost	0 ～ 90	10	18 HF-188:10	13	min
d10	Time delay after defrost start	0 ～ 30 0:Defrost start time delay is canceled	10	0	0	min
d11	Defrost type	0:Electric heating defrost. 1:Hot gas defrost.	0	0	0	/
F1	Fan running mode	0:Fan and compressor run or stop synchronically. Fan and compressor run or stop synchronically. 1:Fan runs continuously, stops during defrost. 2:Fan runs continuously, stops during defrost and defrost dripping. 3:Fan runs continuously, stops during defrost, fan time delay after defrost. 4:Controlled by defrost sensor, fan stops during defrost.	3	3	3	/
F2	Fan initial start time delay after electrified	0 ～ 60	4	1	1	min
F3	Fan start time delay after defrost	0 ～ 60 0:Fan time delay canceled	2	15	10	min
F4	Fan working lowest temp.	-50°C～ Fan working highest temp -58 °F～ Fan working highest temp	-12	-50	-50	°C / °F
F5	Fan working highest temp	Fan working highest temp ～ 85°C Fan working highest temp ～ 185 °F	-5	85	85	°C / °F
A1	Compressor run and stop in a proportional time after cabinet sensor failure	0:Cancel the mode of “Run/stop in a proportional time” 1:Start the mode of “Run/stop in a proportional time”	1	1	1	/
A2	Compressor stop time in the mode of “Run/stop in a proportional time”	1 ～ 60	5	15	15	min
A3	Compressor running time in the mode of “Run/stop in a proportional time”	1 ～ 60	30	45	45	min
A4	Buzzer alarm output switch	0:Buzzer output disabled 1:Buzzer output enabled	1	0	0	/
A5	Cabinet temperature upper limit alarm value	-50°C～ Cabinet temperature upper limit alarm value -58 °F～ Cabinet temperature upper limit alarm value	-10°C	-50°C	-50°C	°C / °F

A6	Cabinet temperature upper limit alarm value	Cabinet temperature lower limit alarm value ～ 185 °F～ 85°C	24°C	85°C	85°C	°C / °F
A7	Cabinet over temperature alarm time delay	0 ～ 60	20	5	5	3min
A8	The initial cabinet over temperature alarm time delay after electrified	0 ～ 60	40	20	20	3min
A9	Over temperature alarm upper deviation	1°C～ 30°C 1 °F～ 60 °F	10°C	10°C	10°C	°C / °F
A10	Over temperature alarm lower deviation	1°C～ 30°C 1 °F～ 60 °F	5°C	5°C	5°C	°C / °F
A11	Over temperature alarm mode	0:Absolute temperature point 1:set value+ over temperature alarm deviation	0	0	0	/
A12	Light/Alarm relay selection	0:Light output 1:Alarm output	0	0	0	/
do1	Control output of door switch	0:Door switch is canceled 1:Close fan during door open 2:Turn on the light when door open, turn off the light when door closed 3:Close fan and turn on the light when door open, Turn off the light when door closed 4:When door is open, it is the synchronous signal input of defrost, defrost will start.	0	0	0	/
do2	Buzzer response when door open	0:NO 1:YES	0	0	0	/
cd1	Condenser sensor selection	0:Disabled 1:Enabled	0	1	1	/
cd2	Condenser high temperature alarm start value	30°C～ 90°C 86 °F～ 194 °F	55°C	65	65	°C / °F
cd3	Lower hysteresis of condenser high temperature alarm	1°C～ 15°C 2 °F～ 30 °F	5°C	5	5	°C / °F
u1	Celsius /Fahrenheit selection	Fahrenheit Celsius	1	1	1	/

1、Keys operation

1）Parameter Adjustment

In the status of temperature measuring and controlling, press Set key for three seconds to enter user menu, it displays the code St, then press Set key again, display the value of St. It could be modified by pressing the key ☼ or ↻.

When it displays the code St，press the key ☼，display the code Po，then press Set key, display 00，at this time, press ☼ or ↻ to input the password of administrator menu.

Press Set key again to confirm the password input, and the controller will automatically verify the correctness of password. When it passes, it could select parameter items St. Po. C1. C2……Cd3 (that is, any parameter items both in the administrator menu and user manuals) by pressing the key ☼ or ↻. Or else, only the parameters items St and Po available, others could not be displayed.

When the parameter item is selected, press Set key to enter to the setting of the current item, press ☼ or ↻ to modify the value, and then press Set key to return to the menu.

Under the status of parameter setting, press Rst key or no key operation within 30s, it will exit from parameter setting and automatically save the current parameter value.

Note: The password input of administrator menu only is valid for single entering. After exit from the parameter setting by pressing Rst , it needs to input the correct password again for next parameter adjustment.

2）Temperature viewing

In the status of temperature measuring and controlling, press to view the current evaporator sensor measured temperature value (note: evaporator sensor is enables and works properly).

3）Manually forced operation

In the status of temperature measuring and controlling, press Rst for three seconds to force the switch between refrigeration, defrost/defrost delay, defrost dripping. Press to open or close the light (Only valid when Light/alarm relay is used as light and there is no linkage between light control and door switch.)

2.Copy card

2.1 Upload (Copy the parameters of controllers to copy card)

1）Set controller parameters by keys.

2）Insert copy card, hold and press key until it displays “uP” in the front panel.

3）Plug off copy card in 3 seconds, then power on controller gain.

2.2 Download (Copy the parameter of copy card to the controller)

1）Insert copy card, hold and press key until it display “do” in the front panel.

2）Plug off the copy card, and power on the controller again in 3 seconds.

Note: If it displays “Er” , it indicates the failure of programming. At this time, you need to check whether the copy card is reliably inserted, if yes, repeat the above steps again.

If it displays “EP” , it indicates inconsistent data between copy card and controller, programming fails. At this time, need to change to the right copy card and repeat the steps above; or upload the data of copy card again, and repeat the steps above.

(★ For copying process, it requires a reliable power supply and effective connection of copy card, and it is forbidden to plug off the copy card before finishing operation)

3.Control output

3.1Compressor

Normal status

When the cabinet temperature is higher than the set temperature (St) + hysteresis (C1), and finish the compressor start Min. interval, the compressors will start；

When the cabinet temperature is lower than the set temperature (St), and the continuous refrigeration running time is large than C8, the compressor will close.

When the cabinet temperature is between the set temperature(St) and the temperature of the set temperature(St) +hysteresis(C1), if the refrigeration is closed, then after finishing compressor start Min. interval and Max. standby time after finishing compressor start Min. interval (C7), the refrigeration will start.

Note: Compressor start Min. interval is calculated by Compressor initial start Min. interval (C3) after it is electrified for the first time, and it will be calculated by Compressor start Min. interval (C2) in the future.

Cabinet temperature sensor failure

A1=0, cancel the function of “Run/stop in a proportional time” , the compressor closes；

A1=1, open the function of “Run/stop in a proportional time” , the compressor will run in cycle according to the proportion (Refrigeration running time A3 and refrigeration stop time A2).

3.2Defrost

1）d4 = 0，Defrost is forbidden.

2）d4 ≠ 0，when it is not in the state of defrost nor defrost dripping：

① Evaporator sensor is enabled(d1 = 1)，and evaporator sensor temperature is higher than Defrost termination temperature(d7)，then defrost could not be started.

② Evaporator sensor is enabled(d1 = 1)and evaporator sensor temperature is lower than Defrost termination temperature(d7) or evaporator sensor is disabled(d1 = 0)(Any of the following conditions could start defrost)：

a、When defrost cycle(d4)finishes running，defrost is started；Note：Defrost cycle is calculated according to the selected natural time(d3 = 1)or accumulated refrigeration time (d3 = 0)；

b、Hold and press for three seconds，start defrost；

c、If the door switch is as synchronous signal input of defrost (d01 = 4),the door open is the external synchronous defrost signal, the defrost is started.

Note：When finish time delay after defrost start(d10)，there will be an output of defrost。

3）In the state of defrost (Any of the following condition could close defrost):

① Evaporator sensor is enabled(d1 = 1)，and evaporator sensor temperature is higher than defrost termination temperature(d7)，defrost is closed；

② When finish running the maximum time of defrost(d6)，defrost is closed；

③ Hold and press for three seconds，defrost is closed；

4）After defrost, it enters the state of defrost dripping, and within dripping time after defrost(d8), refrigeration output is forbidden. The dripping will be discharged during

this time period. After finishing dripping time after defrost, it enters to the status of refrigeration cycle.
Note: Defrost status display
d5=0: Display cabinet temperature
d5=1: Display dEF during defrost and defrost time delay, display cabinet temperature after finishing defrost time delay.
d5=2: Always display dEF during defrost and defrost dripping.
d5=3: Always display start-defrost cabinet temperature during defrost and defrost dripping.
Defrost type:
d11=0: Electric heating defrost.
d11=1: Hot gas defrosts.

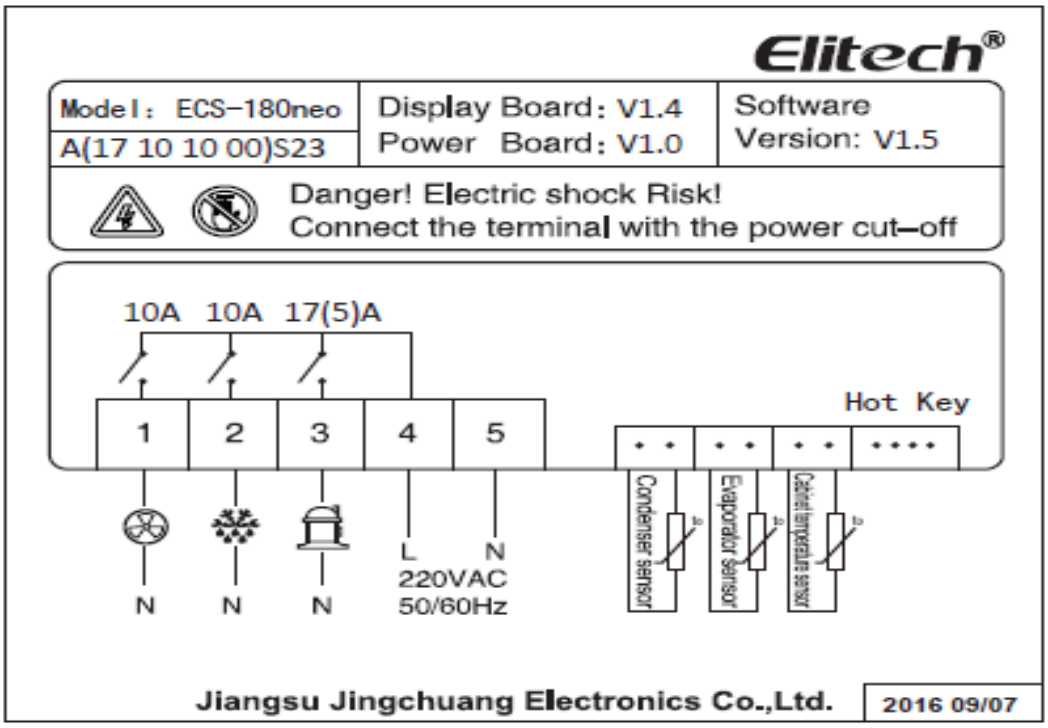
3.3Fan
Fan running mode
F1 = 0: Fan and compressor run or stop synchronically；
F1 = 1Fan runs continuously, stops during defrost；
F1 = 2Fan runs continuously, stops during defrost and defrost dripping；
F1 = 3Fan runs continuously, stops during defrost, fan starts when finish time delay after defrost(F3)；
F1 =4：Controlled by defrost sensor temperature, and it stops during defrosting (defrost sensor temperature >Fan working highest temperature(F5) . Defrost sensor temperature < Fan working lowest temperature (F4). Defrost sensor failure. Defrost sensor is forbidden (d1=0). Controller in the status of defrosting).
Note：Fan will not be permitted to run until finish Fan initial start time delay after electrified(F2).

3.4Internal Alarm
Temperature sensor failure alarm：
When cabinet sensor fails，the digital tube display E1；
When evaporator sensor fails, the digital tube display E2；
When condenser sensor fails, the digital tube display E3；
Condenser high temperature alarm: If the condenser sensor is selected, when the condenser temperature is higher than the condenser high temperature alarm start value, it will alarm and display cH. While it will not have an effect on the control output. When the temperature falls back to (the condenser high temperature alarm value (cd2)-condenser high temperature alarm lower hysteresis(cd3)), the alarm is released.

Cabinet over temperature alarm: When A11=0, the over-temperature alarm mode uses absolute temperature point; when cabinet temperature is higher than the cabinet temperature upper limit alarm value(A6) and cabinet over temperature alarm time delay has been finished, the digital tube will display rH, and the alarm will not be released until the temperature is lower than the cabinet temperature upper limit alarm value(A6) and when the cabinet temperature is lower than the cabinet temperature lower limit alarm value(A5) and the cabinet over temperature alarm time delay has been finished, the digital tube will display rL and the alarm will not be released until the temperature is higher than the cabinet temperature lower limit alarm value. When A11=1, the over-temperature alarm mode uses set value+over temperature alarm upper deviation; When the cabinet temperature is higher than (set value (St)+ over temperature alarm upper

deviation (A9)), and cabinet over temperature alarm time delay has been finished, the digital tube will display rH, and the alarm will not be released until the temperature is lower than (set value (St)+ over temperature alarm upper deviation (A9)); When the cabinet temperature is lower than (set value (St)- over temperature alarm lower deviation(A10)) and cabinet over temperature alarm time delay has been finished, the digital tube will display rL and the alarm will not be released until the temperature is higher than (set value (St)- over temperature alarm upper deviation (A10)).
Note: the first time delay of cabinet over temperature alarm shall be calculated according to the initial time delay of cabinet over temperature alarm (A8) after power on and be calculated according to time delay of cabinet over temperature alarm (A7).

Wiring Diagram



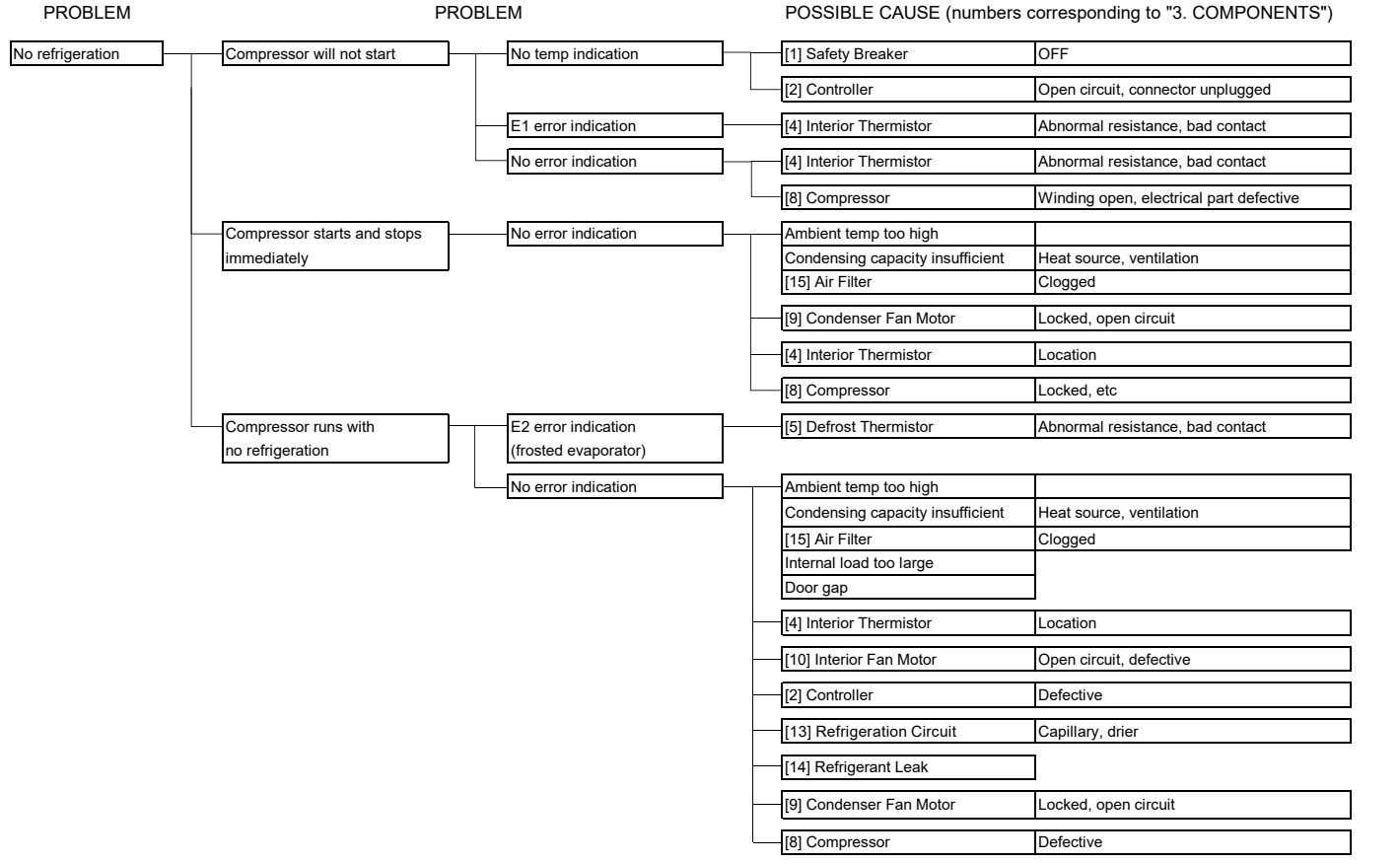
III. SERVICE DIAGNOSIS

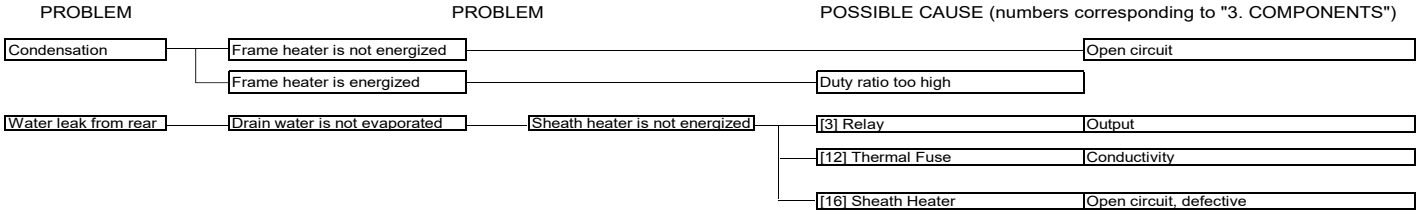
1. ERROR CODES

Display	Error	Possible Cause	Reset
E1	Interior thermistor defective	· Interior thermistor circuit shorted, dusty connector	· Automatically resets after cause is removed
E2	Defrost thermistor defective	· Defrost thermistor circuit shorted, dusty connector	· Automatically resets after cause is removed
E3	Condenser thermistor defective	· Condenser thermistor circuit shorted, dusty connector	· Automatically resets after cause is removed
cH	Condenser high temperature alarmdefective	· Dusty Condenser filter	· Automatically resets after cause is removed

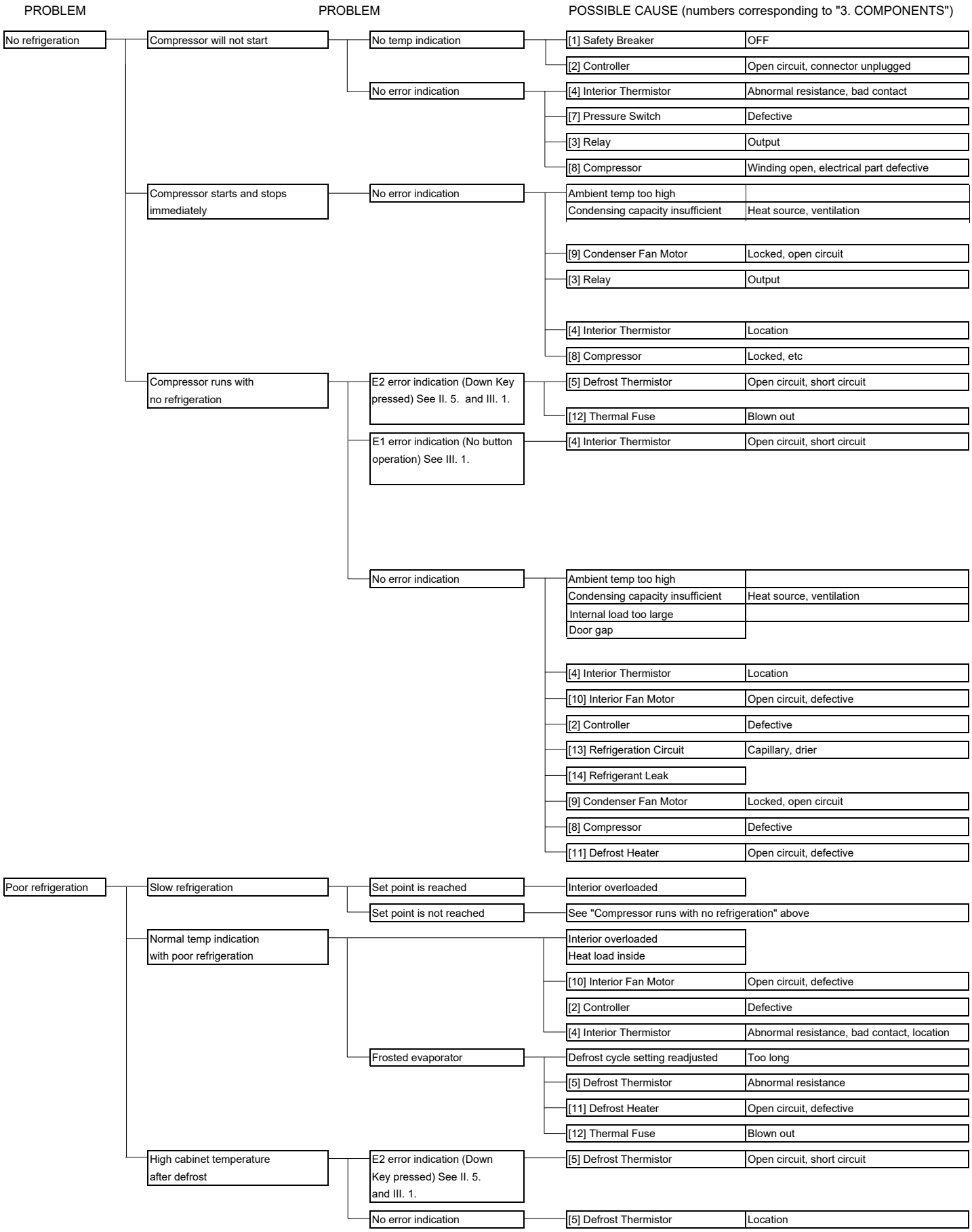
* When the defrost thermistor is defective, error code will not be displayed without [7] down key being pressed. See “5. [b] ” for operation panel detail.

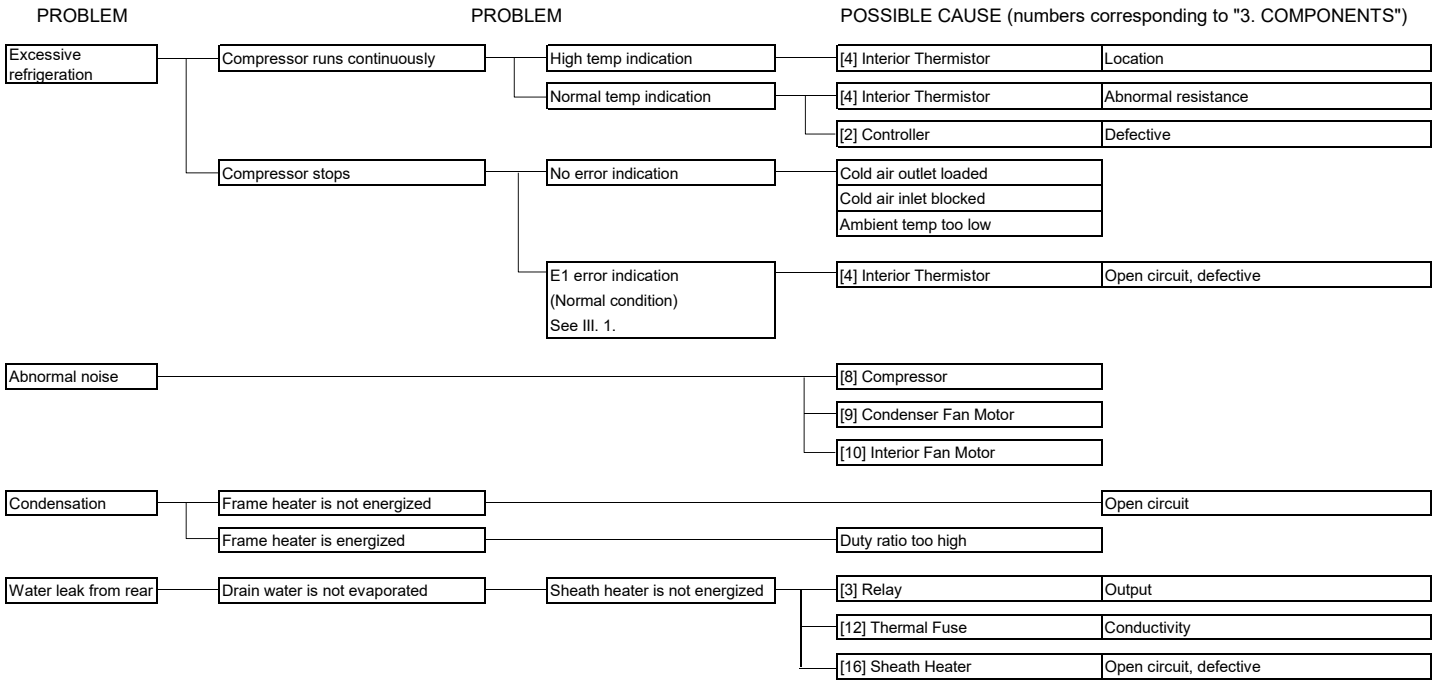
2. FLOWCHART
[a] HR SERIES, HRF SERIES - REFRIGERATOR





[b] HF SERIES, HRF SERIES - FREEZER





3. COMPONENTS

CHART NO.	COMPONENT	CHECK	REMEDY
[1]	Safety Breaker	Safety breaker trips	Locate earth leakage/short circuit
		Safety breaker splashed with water	Dry and replace if necessary
[2]	Controller	Open circuit	Correct or replace
		Input/output (interior fan motor)	Replace
		See wiring label	
		Connector disconnected	Correct
		Connector dusty/dirty	Remove
		7 segment display partially/totally off	Replace
		Electronic parts defective/burnt out	
[3]	Relay	Fast-on terminal/pin disconnected	Correct
		Connector dusty/dirty	Remove
		Open circuit	Correct
		Output to each load	Replace
		Check with wiring diagram/timing chart	
		Abnormal noise	
[4]	Interior Thermistor	Location (holder in front of evaporator)	Correct
		Disconnected, replaced with defrost thermistor, etc	
		Incorrect temp indication	Immerse in ice water to check resistance
			(25 - 30k) Replace if necessary
		Short circuit (temp displayed as "E1")	Clean/dry connector
			Replace
		Open circuit (temp displayed as "E1")	Replace
[5]	Defrost Thermistor	Location (plug in from evaporator back)	Correct
		Disconnected, replaced with interior thermistor, etc	
		Abnormal resistance	Immerse in ice water to check resistance
			(25 - 30k) Replace if necessary
		Short circuit (temp displayed as "E2")	Clean/dry connector
			Replace
		Open circuit (temp displayed as "E2")	Replace

[6]	Condenser Thermistor	Location (plug in from evaporator back)	Correct
		Disconnected, replaced with interior thermistor, etc	
		Abnormal resistance	Immerse in ice water to check resistance
			(25 - 30k) Replace if necessary
		Short circuit (temp displayed as "E3")	Clean/dry connector
			Replace
		Open circuit (temp displayed as "E3")	Replace
[8]	Compressor	Abnormal noise	Replace
		Insufficient compression (discharge temp too low)	Replace if no gas leaks
		Compressor electrical part defective	Replace
		- Run/start capacitor ruptured/deformed	
		- Capacitor defective	
		Check resistance between terminals	
		Gradually reduces: No problem	
		0 from start: Defective	
		- Starter defective	
		Loose terminal, no conductivity, damaged	
		- Overload relay defective	
		Loose terminal, no conductivity, damaged	
[9]	Condenser Fan Motor	Open circuit	Correct
		Locked (not rotating with voltage)	Replace
		Abnormal noise	
		Burning smel l	
[10]	Interior Fan Motor	Open circuit	Correct
		Locked (not rotating with voltage)	Replace
		Abnormal noise	
		Burning smel l	
[11]	Defrost Heater	Open circuit	Correct
		Conductivity	
		Insulation resistance 1MΩ or more at 500V	Replace
[12]	Thermal Fuse	Conductivity	Replace
		Contact welding of relay	Replace relay
[13]	Refrigeration Circuit	Discharge pressure: High	Replace capillary/expansion valve
	Clogged	Suction pressure: Low (vacuum)	(Replace drier at same time)
[14]	Refrigerant Leak	Discharge pressure: Low	Locate leakage and replace
		Suction pressure: Low	(Replace drier at same time)
		Compressor discharge pipe will not heat up	
		Compressor suction pipe will not cool down	
[16]	Sheath Heater *	Open circuit	Correct
		Conductivity	Replace
		Insulation resistance 1MΩ or more at 500V	Replace

4. CONTROLLER

[a] SERVICING CONTROLLER

1) When receiving a service call, ask the user to turn off the power supply and turn it back on after 30 seconds, 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:

* Check that the unit has been earthed properly. If not, the controller will not work properly.

* To get static free, always touch the cabinet (earth) before servicing. Electrostatic discharge will cause severe damage to the controller.

* The controller and thermistor can be replaced separately.

* Do not drop the controller on the floor.

* The thermistor and pressure switch 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, check for disconnected connectors.

* The thermistor is provided with single-wire leads. Do not bend or stretch them.

* Do not pinch or weigh down the thermistor and thermistor leads. The coatings may be broken, resulting in a short circuit.

[b] CHECKING THERMISTOR

1) Remove the thermistor from the controller.

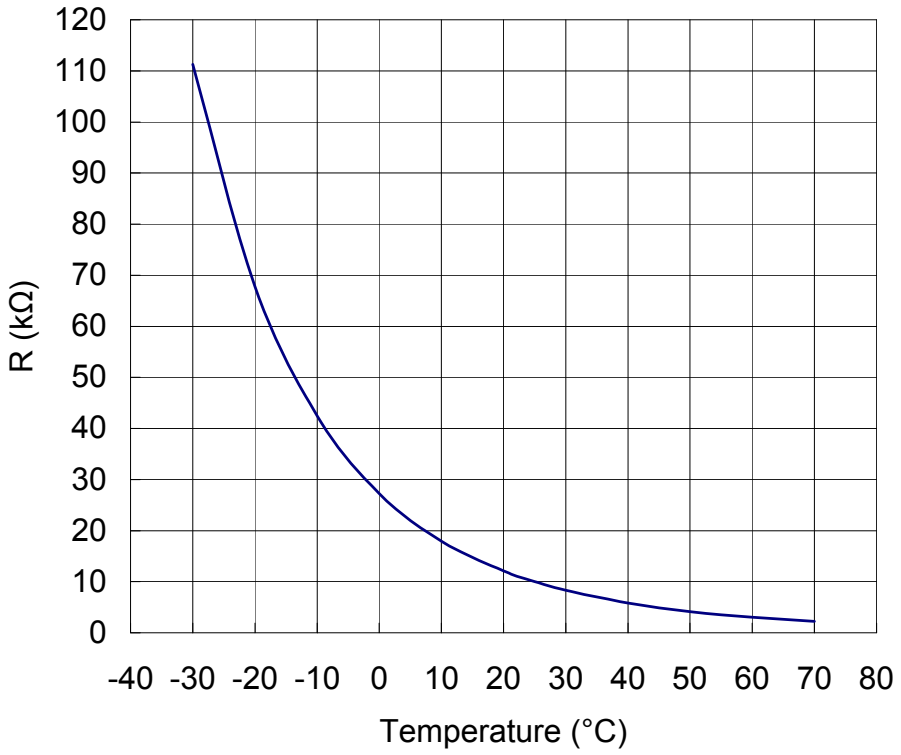
2) Put ice and water in a glass or other container to make 0° C water. Immerse the thermistor bulb in the water for 5 minutes (at the center of the container).

3) Use the Ω range of the tester to measure the resistance between the thermistors.

4) If the measured resistance is not within 25 - 30 kΩ (standard 27 kΩ), replace the thermistor (see the T-R curve below).

T-R Curve (Interior/Defrost Thermistor)

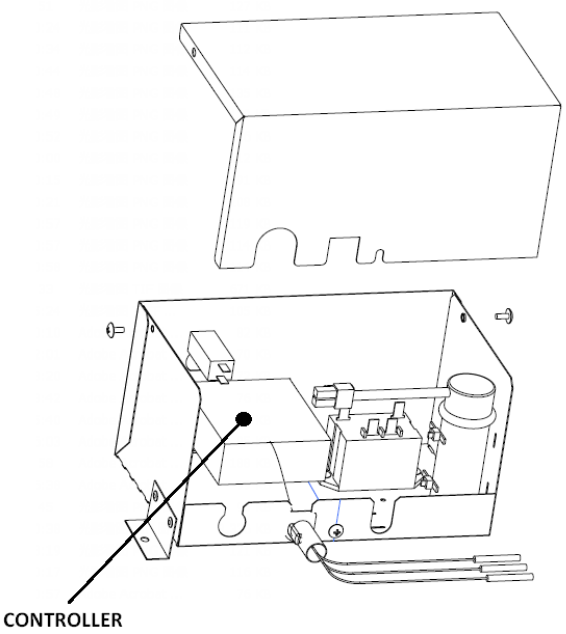
The graph shows reference values only and may differ from actual values.



IV. REMOVAL AND REPLACEMENT OF COMPONENTS

1. CONTROLLER AND THERMISTOR

[a] CONTROLLER



1) Unplug the unit.

2) Loosen the screw at the rear.

3) Remove the two screws at both sides to take off the control box cover.

4) Use a precision screwdriver to remove the wiring cover and wiring.

5) Push the stoppers at both sides of the controller, and slide off the stoppers to the rear.

6) Remove the controller to the front.

7) To replace the removed parts, reverse the above procedure.

8) Check that the operation panel is securely mounted.

[b] THERMISTOR

1) Remove the air duct inside the cabinet. See “3. [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.

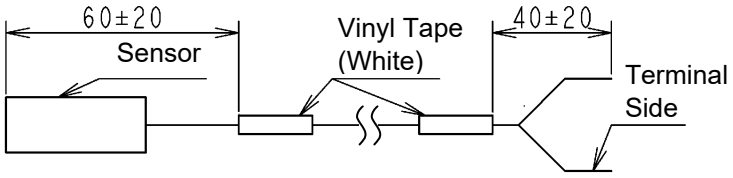
4) Pull out the thermistors through the hole in the refrigeration unit base. Be careful not to press hard on the bulbs and leads.

5) Remove the control box cover, use a precision screwdriver to loosen the terminal block screws, and remove the thermistors.

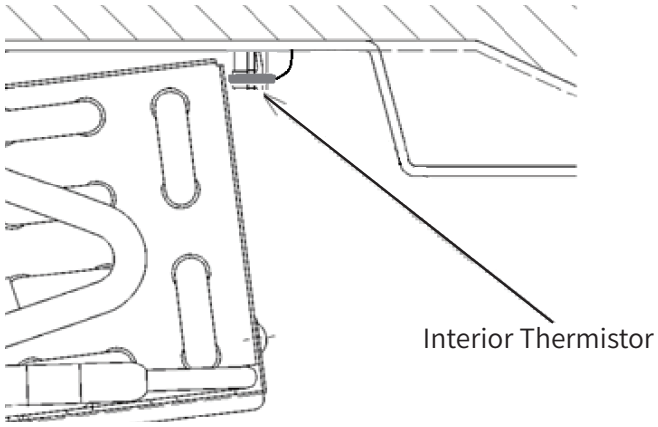
Note: 1. To replace the removed parts, reverse the above procedure.

2. To prevent the evaporator from freezing, putty the wire hole in the refrigeration unit base.

3. If the defrost thermistor color is not white, wind white vinyl tape around the thermistor as shown below for indication.

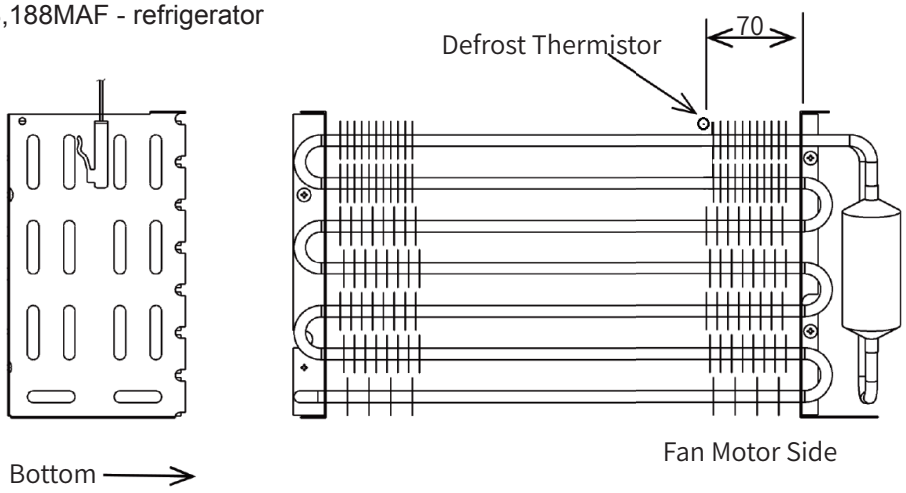


Interior Thermistor Bulb Location

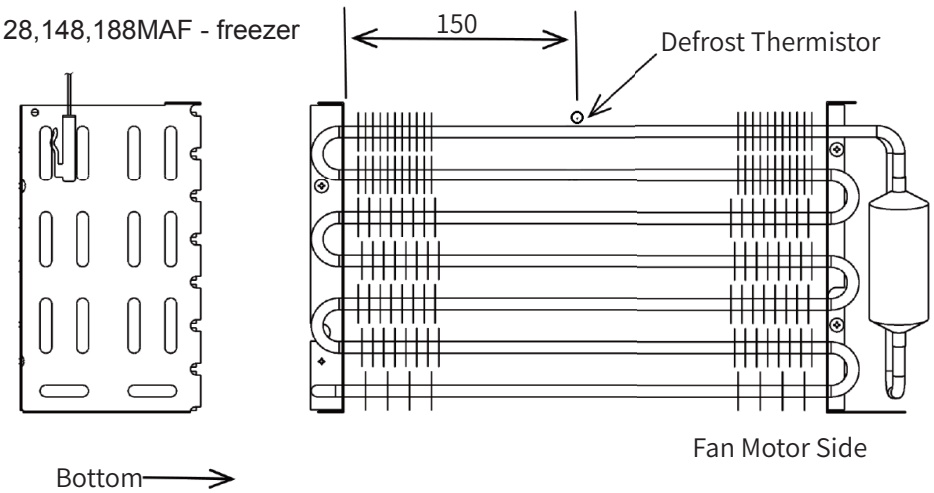


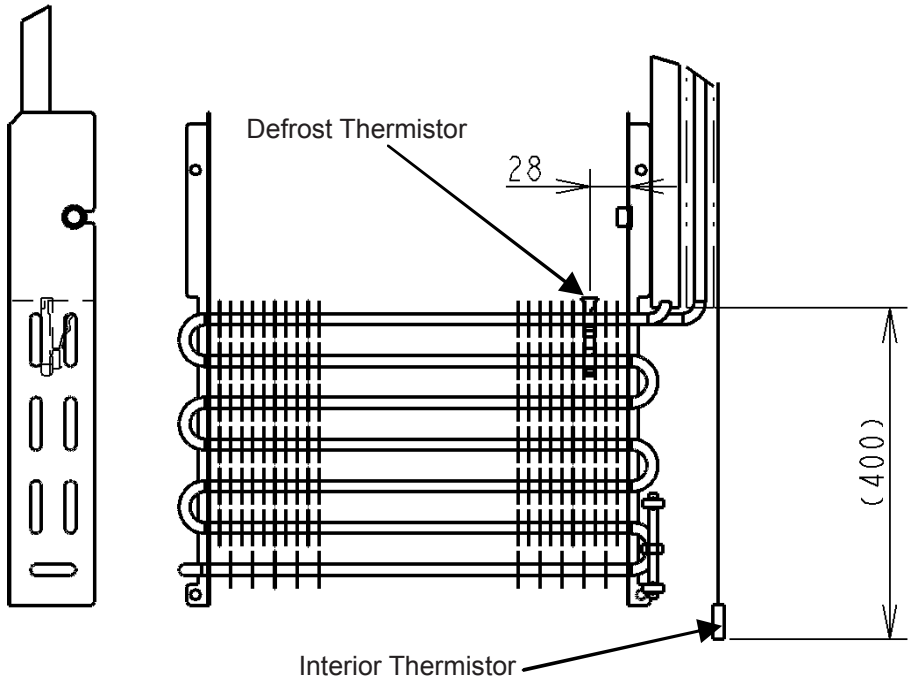
Defrost Thermistor Bulb Location

HR
HRF-128,148,188MAF - refrigerator



HF
HRF-78MA, 128,148,188MAF - freezer




Defrost Thermistor
28
(400)
Interior Thermistor

2. REFRIGERATION CIRCUIT

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

[a] COMPRESSOR

1) Unplug the unit.

2) Remove the front panel.

3) Remove the top panel.

4) Remove the protector cover enclosing the electrical parts. Remove the overload relay, starting relay, and other parts.

5) Recover the refrigerant from the low side access valve.

6) Disconnect the discharge and suction pipes by using brazing equipment.

7) Remove the hexagon bolts securing the compressor.

8) To replace the removed parts, reverse the above procedure.

[b] 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 condenser from the upper inlet pipe connection using brazing equipment.

6) Remove the condenser and drier from the refrigeration unit base, and disconnect them using brazing equipment.

7) 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.

[c] 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.

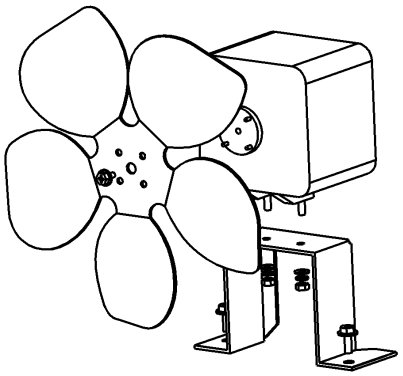
5) Remove the air duct.

6) Disconnect the defrost heater wires. See “[e] DEFROST HEATER AND THERMAL FUSE”.

7) Unscrew and remove the evaporator.

8) To replace the removed parts, reverse the above procedure.

[d] CONDENSER FAN MOTOR



1) Unplug the unit.

2) Remove the front panel.

3) Disconnect the condenser fan motor.

4) Remove the two screws securing the bracket on the refrigeration unit base.

5) Pull up the fan motor together with the bracket.

6) Loosen the nut securing the fan motor shaft, and remove the fan motor.

7) Remove the fan motor from the bracket.

8) To replace the removed parts, reverse the above procedure.

Note: After replacement, check for abnormal noise or vibration noise by trial run.

[e] DEFROST HEATER AND THERMAL FUSE

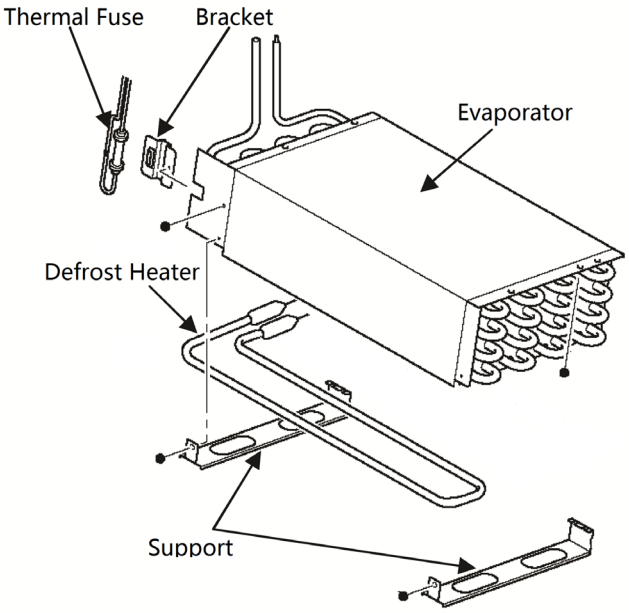
1) Unplug the unit.

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 “3. [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.



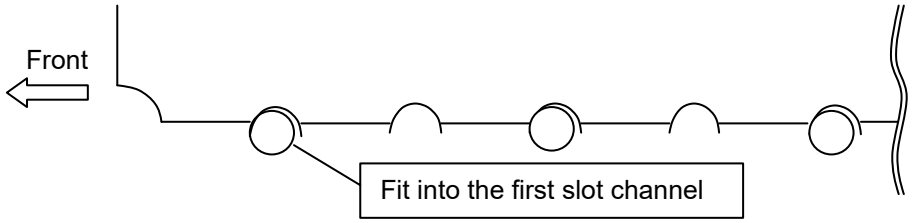
6) Remove the defrost heater from the evaporator by pulling each U bend from the front to the back.

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 slot channel, and position the rest according to the U-bend dimensions.



3. AIR DUCT

[a] AIR DUCT

1) Remove the screws securing the air duct.

2) Hold both sides of the air duct, and pull it out towards you. The air duct for the HF series is provided with a gasket in the drain pipe and must be pulled hard to remove.

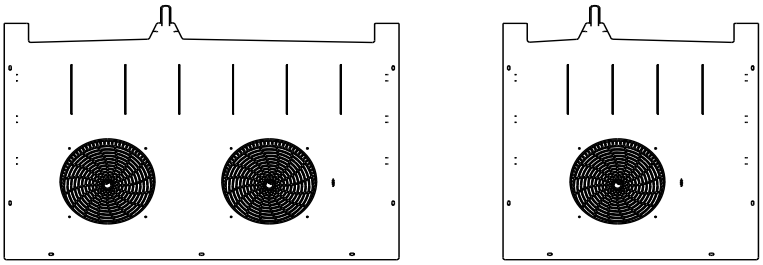
3) To prevent tension on the wires, place the removed air duct on a shelf.

4) To replace the air duct, first insert the drain pipe into the drain outlet at the rear of the unit.

5) Fit the air duct in the back.

6) Tighten all the screws.

Note: Be careful not to catch the interior fan motor leads in the air duct.



[b] INTERIOR FAN MOTOR (Except HRF-78MA)

1) Unplug the unit.

2) Disconnect the interior fan motor connector 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 fan internal motor from the internal mounting plate above the body

7) To replace the removed parts, reverse the above procedure. Cover the interior fan motor leads with the insulation tube as a cushion through the hole in the refrigeration unit.

Note: To prevent the leads from being caught between the fan blades, fix the leads with the wire retainer inside the air duct before fitting the air duct.

[c] INTERIOR FAN MOTOR (HRF-78MA)

1) Unplug the unit.

2) Open the door to the refrigerator. Unscrew and remove the cooling duct.

3) Unscrew and remove the interior fan motor assembly.

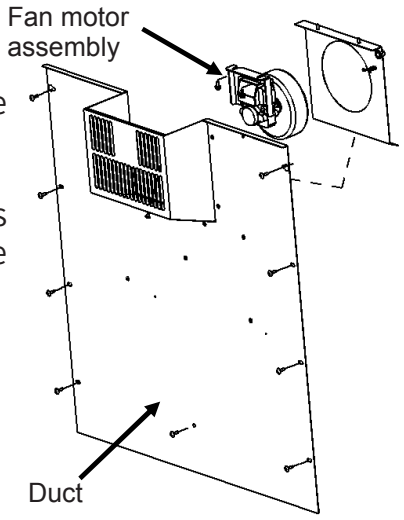
4) Remove the screws securing the interior fan motor to the bracket, and take off the interior fan motor.

5) Cut the fan motor leads at their connection. (Keep the lead re-connectable.)

6) Loosen the screws securing the fan cover, and remove the fan cover.

7) Remove the interior fan motor from the air duct.

8) To replace the removed parts, reverse the above procedure.



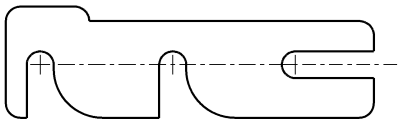
Note: 1. To prevent water from coming in, the lead terminals must be caulked and covered with plastic bag. Be sure to connect the leads outside the unit.

2. Seal the lead hole with putty later.

4. DOOR PARTS

[a] 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

[b] 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 or equivalent food grade grease. If the lift hinge is severely worn out, replace the hinge collar (lift hinge) on both the door and hinge sides.

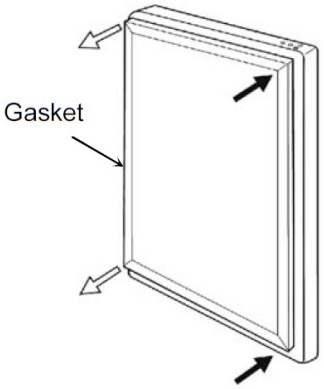
* Apply White Alcom Grease also when the door is replaced in the field.

[c] DOOR GASKET

To replace the door gasket:

1) Pinch and pull out the door gasket from the corners.

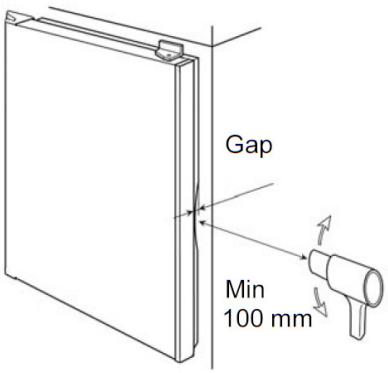
2) Push the convex of the new door gasket into the concave of the door interior. Insert the corners first to facilitate replacement.



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.

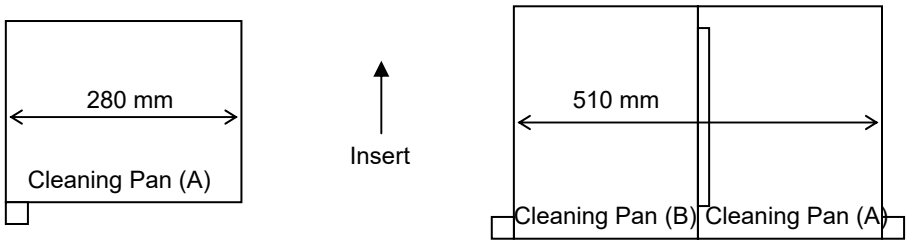
2) Move the drier up and down to heat the entire gap.



5. 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 [HR / HRF-78/128/148/188, HF-78], and connect the cleaning pan (A) and cleaning pan (B) for the 500 mm wide condenser [HF-128/148/188].



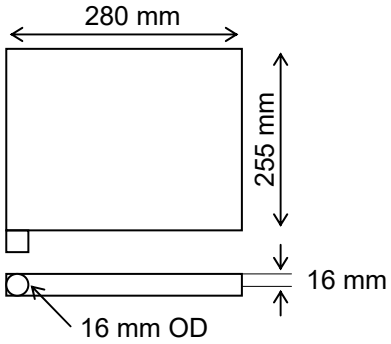
* Cover the cleaning pan with a waste cloth to prevent wastewater from splashing around (especially the compressor and condenser fan motor).

* 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



6. OPTIONAL PARTS

[a] HINGE KIT

The door hinges for HR-78MA, HF-78MA and HRF-78MA can be moved to the other side of the door by using the following hinge kit.

Hinge Kit (R)		
Door Hinge (R) - Lo	375316G01	1 pc
Door Hinge (R) - Up	375317G01	1 pc
Door Hinge (R) - CT	375315G01	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] LEG

Width			700/1200/1400mm	1800mm
Leg	H=90	P00316-01	4 pcs	6 pcs
Leg	H=150	446733-01	4 pcs	6 pcs
Leg	SUS H=90	4Y2043-01	4 pcs	6 pcs

[c] 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 washer (M20) provided before fixing the caster to the cabinet. The fixing part of caster may deform without the plain washer (M20).