

TECHNICAL MANUAL

| | |
|----------------------|---|
| FREEZER | : F23-S, F23-SH F49-S, F49-SH F72-S, F72-SH |
| REFRIGERATOR | : R23-S, R23-SH, R23-G R49-S, R49-SH, R49-G R72-S, R72-SH, R72-G |
| MERCHANDISERS | : GR26H, GR48S, GR72H |



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1. SPECIFICATION

1.1 GENERAL - SOLID DOOR FREEZER & REFRIGERATOR (FULL DOOR / HALF DOOR)

| PRODUCT | | SOLID (FULL/HALF) DOOR FREEZER | | | SOLID (FULL/HALF) DOOR REFRIGERATOR | | |
|---|-----|---------------------------------|---------------------------------------|-----------------------------------|-------------------------------------|---------------------------------------|-----------------------------------|
| MODEL | | F23-S / F23-SH | F49-S / F49-SH | F72-S / F72-SH | R23-S / R23-SH | R49-S / R49-SH | R72-S / R72-SH |
| Capacity | | 650ℓ(23ft³)/ 648ℓ(22.9ft³) | 1,385ℓ(49ft³)/ 1,381ℓ(48.8ft³) | 2,035ℓ(72ft³)/ 2,028ℓ(71.6ft³) | 650ℓ(23ft³)/ 648ℓ(22.9ft³) | 1,385ℓ(49ft³)/ 1,381ℓ(48.8ft³) | 2,035ℓ(72ft³)/ 2,028ℓ(71.6ft³) |
| Net Capacity | | 552ℓ(19.5ft³)/ 551ℓ(19.4ft³) | 1,195ℓ(42.2 ft³)/ 1,191ℓ(42.1 ft³) | 1,790ℓ(63.2ft³)/ 1,782ℓ(63ft³) | 552ℓ(19.5ft³)/ 551ℓ(19.4ft³) | 1,195ℓ(42.2 ft³)/ 1,191ℓ(42.1 ft³) | 1,790ℓ(63.2ft³)/ 1,782ℓ(63ft³) |
| Exterior Dimension (Including casters Door Handles) | (W) | 695mm (27.4") | 1,400mm (55.2") | 1,980mm (78.0") | 695mm (27.4") | 1,400mm (55.2") | 1,980mm (78.0") |
| | (D) | 838 mm (33") | | | | | |
| | (H) | 2,127 mm (83.7") | | | | | |
| Interior Dimension | (W) | 600mm (23.6") | 1,305mm (51.4") | 1,885mm (74.2") | 600mm (23.6") | 1,305mm (51.4") | 1,885mm (74.2") |
| | (D) | 635 mm (25") | | | | | |
| | (H) | 1,545 mm (60.8") | | | | | |
| Product Weight | | 124kg(273 lb)/ 126kg(278 lb) | 194kg(428 lb)/ 198kg(437 lb) | 255kg(562 lb)/ 260kg(573 lb) | 121kg(267 lb)/ 123kg(271 lb) | 186kg(410 lb)/ 190kg(419 lb) | 253kg(558 lb)/ 258kg(569 lb) |
| Door Type | | Swing 1EA/ Swing 2EA | Swing 2EA/ Swing 4EA | Swing 3EA/ Swing 6EA | Swing 1EA/ Swing 2EA | Swing 2EA/ Swing 4EA | Swing 3EA/ Swing 6EA |
| Door Material | | Stainless steel (STS) | | | | | |
| Shelves | | 4EA | 8EA | 12EA | 4EA | 8EA | 12EA |
| Power Voltage | | AC 115V/60Hz | | | | | |
| Plug in - Installation | | NEMA 5-15P | | NEMA 5-20P | NEMA 5-15P | | |
| Amps | | 8.5A | 10.5A | 12.0A | 7.5A | 7.5A | 10.0A |
| Compressor | | 3/5HP | 4/5HP | 1HP | 1/3HP | 1/3HP | 3/5HP |
| Refrigerant | | R-404A | | | R-134a | | R-404A |
| | | 250 g (8.8 oz) | 340 g (12.0 oz) | 400 g (14.1 oz) | 210 g (7.4 oz) | 220 g (7.8 oz) | 300 g (10.6 oz) |
| Range of Temperature | | Below -18°C (0°F) | | | 0°C ~ 4°C (+32°F ~ +40°F) | | |
| Door auto-close equipment | | Auto-close for Spring | | | | | |
| Door stop | | 120° Stop | | | | | |
| Air suction equipment | | Air damper | | | | | |
| Caster | | 4" × 4EA | | 4" × 6EA | 4" × 4EA | | 4" × 6EA |
| Condensing unit | | Sliding Type | | | | | |

◆ Above specifications are subjected to change without prior notice for quality improvement.

◆ The nameplate(includes Serial Number) is located on the upper left of the cabinet interior.

1.2 MAIN COMPONENTS - SOLID DOOR FREEZER & REFRIGERATOR

| PRODUCT | SOLID (FULL/HALF) DOOR FREEZER | | | SOLID (FULL/HALF) DOOR REFRIGERATOR | | |
|-----------------------------------|--|------------------------|----------------------------|-------------------------------------|----------------|------------------------|
| | MODEL | F23-S / F23-SH | F49-S / F49-SH | F72-S / F72-SH | R23-S / R23-SH | R49-S / R49-SH |
| Compressor (Manufacture) | NEK2150GK (Embraco) | NT2178GKV (Embraco) | NT2192GKV (Embraco) | NW108LHB1 (DAEWOO-Korea) | | NEK2150GK (Embraco) |
| Compressor Capacity(kcal/h) | LBP 628 | LBP 903 | LBP 1051 | LBP 325 | | LBP 628 |
| Type of Compressor motor | CSR | | | | | |
| Compressor O.L.P | T0873/G9 | MST18RN-3041 | CRA1773-3029 GA3RMU0002 | 4TM801SFBZZ-52 | | T0873/G9 |
| Compressor Relay | RVA9AD3C-121 | | RVA2AE3C-105 | R6R8MD22SS | | RVA9AD3C-121 |
| Starting Capacitor | 189~227 μ F / 165V | 243~292 μ F / 165V | | 125 μ F / 200V | | 189~227 μ F / 165V |
| Running Capacitor | 25 μ F / 400V | 35 μ F / 400V | | 16 μ F / 250V | | 25 μ F / 400V |
| Type of Evaporator | Cu pipe + Al fin + Blue color coating | | | | | |
| Evaporator pipe Diameter | 9.52mm (3/8") | | 12.7mm (1/2") | 9.52mm (3/8") | | |
| Cooling Fan Motor | IS3225LTSA, 120V/60Hz | | | | | |
| Type of Condenser | Cu pipe + Al fin | | | | | |
| Condenser pipe Diameter | 7.00mm (0.28") | | | | | |
| Condenser Fan Motor | MA7425W1, 120V/60Hz | | | | | |
| Dryer | OD 25.4mm (1"), XH-9, 30g(1.06oz) | | | | | |
| Temperature Control | Thermistor | | | | | |
| Running Indication | Digital Display | | | | | |
| Interior Temp. Indication | Digital Display | | | | | |
| Interior Lamp (Incandescent lamp) | 40W x 1EA | | 40W x 2EA | 40W x 1EA | | 40W x 2EA |
| Defrost for evaporator | Heated defrost (Control of thermistor) | | | Off cycle | | |
| Defrost sheath heater | 450W | 670W | 944W | - | | |
| Defrost pan heater | 60W | 90W | 128W | - | | |
| Drain heater | 9W | | | - | | |
| Door switch | SP201R-7DR, AC125V | | | | | |
| Power switch | SL112A, AC125V/12A | | | | | |

2.1 GENERAL - GLASS DOOR REFRIGERATOR

| PRODUCT | | GLASS (FULL) DOOR REFRIGERATOR | | |
|---|-----|----------------------------------|------------------------------------|------------------------------------|
| MODEL | | R23-G | R49-G | R72-G |
| Capacity | | 650 ℓ (23 ft ³) | 1,385 ℓ (49 ft ³) | 2,035 ℓ (72 ft ³) |
| Net Capacity | | 552 ℓ (19.5 ft ³) | 1,195 ℓ (42.2 ft ³) | 1,790 ℓ (63.2 ft ³) |
| Exterior Dimension (Including casters Door Handles) | (W) | 695mm (27.4") | 1,400mm (55.2") | 1,980mm (78.0") |
| | (D) | 835 mm (32.9") | | |
| | (H) | 2,127 mm (83.7") | | |
| Interior Dimension | (W) | 600mm (23.6") | 1,305mm (51.4") | 1,885mm (74.2") |
| | (D) | 635 mm (25") | | |
| | (H) | 1,545 mm (60.8") | | |
| Product Weight | | 126kg (278 lb) | 200kg (441 lb) | 271kg (597 lb) |
| Door Type | | Swing 1EA | Swing 2EA | Swing 3EA |
| Door Material | | Glass + Al(A6063S) | | |
| Shelves | | 4EA | 8EA | 12EA |
| Power Voltage | | AC 115V/60Hz | | |
| Plug in - Installation | | NEMA 5-15P | | |
| Amps | | 7.5A | 7.5A | 8.5A |
| Compressor | | 1/3HP | 1/3HP | 3/5HP |
| Refrigerant | | R-134a | R-134a | R-404A |
| | | 230 g (8.1 oz) | 230 g (8.1 oz) | 330 g (11.6 oz) |
| Range of Temperature | | 0°C ~ 4°C (+32°F ~ +40°F) | | |
| Door auto-close equipment | | Auto-close for Spring | | |
| Door stop | | 120° Stop | | |
| Air suction equipment | | Air damper | | |
| Caster | | 4" × 4EA | | 4" × 6EA |
| Condensing unit | | Sliding Type | | |

◆ Above specifications are subjected to change without prior notice for quality improvement.

◆ The nameplate(includes Serial Number) is located on the upper left of the cabinet interior.

2.2 MAIN COMPONENTS - GLASS DOOR REFRIGERATOR

| PRODUCT | GLASS (FULL) DOOR REFRIGERATOR | | |
|-----------------------------|---------------------------------------|----------|------------------------|
| MODEL | R23-G | R49-G | R72-G |
| Compressor (Manufacture) | NW108LHB1 (DAEWOO-Korea) | | NEK2150GK (Embraco) |
| Compressor Capacity(kcal/h) | LBP 325 | | LBP 628 |
| Type of Compressor motor | CSR | | |
| Compressor O.L.P | 4TM801SFBZZ-52 | | T0873/G9 |
| Compressor Relay | R6R8MD22SS | | RVA9AD3C-121 |
| Starting Capacitor | 125 μ F / 200V | | 189~227 μ F / 165V |
| Running Capacitor | 16 μ F / 250V | | 25 μ F / 400V |
| Type of Evaporator | Cu pipe + Al fin + Blue color coating | | |
| Evaporator pipe Diameter | 9.52mm (3/8") | | |
| Cooling Fan Motor | IS3225LTSA, 120V/60Hz | | |
| Type of Condenser | Cu pipe + Al fin | | |
| Condenser pipe Diameter | 7.00mm (0.28") | | |
| Condenser Fan Motor | MA7425W1, 120V/60Hz | | |
| Dryer | OD 25.4mm (1"), XH-9, 30g(1.06oz) | | |
| Temperature Control | Thermistor | | |
| Running Indication | Digital Display | | |
| Interior Temp. Indication | Digital Display | | |
| Interior Lamp (LED) | 6W x 1EA | 6W x 2EA | 6W x 3EA |
| Defrost for evaporator | Off cycle | | |
| Defrost sheath heater | - | | |
| Defrost pan heater | - | | |
| Drain heater | - | | |
| Door switch | SP201R-7DR, AC125V | | |
| Power switch | SL112A, AC125V/12A | | |
| Light switch | RL1-3, 16A/250V, ON-OFF | | |

3.1 GENERAL - MERCHANDISERS

| PRODUCT | | MERCHANDISERS | | |
|---|-----|-------------------------------|--------------------------------|--------------------------------|
| MODEL | | GR26H | GR48S | GR70H |
| Capacity | | 736 ℓ (26 ft ³) | 1359 ℓ (48 ft ³) | 1982 ℓ (70 ft ³) |
| Net Capacity | | 677 ℓ (23.9 ft ³) | 1339 ℓ (47.3 ft ³) | 1877 ℓ (66.3 ft ³) |
| Exterior Dimension (Including casters Door Handles) | (W) | 720mm (28.4") | 1,350 mm (53.2") | 1,980 mm (78") |
| | (D) | 844mm (33.3") | 780 mm (30.7") | 835 mm (32.9") |
| | (H) | 2,017mm (79.4") | 2,012 mm (79.2") | 2,126 mm (83.7") |
| Interior Dimension | (W) | 640mm (25") | 1,280 mm (50.4") | 1,885 mm (74.2") |
| | (D) | 719mm (28.3") | 642 mm (25.3") | 635 mm (25") |
| | (H) | 1,584mm (62.4") | 1,562 mm (61.5") | 1,545 mm (60.8") |
| Net Weight | | 130kg (287 lb) | 215kg (474 lb) | 325kg (716 lb) |
| Door Type | | Swing 1EA | Sliding 2EA | Swing 3EA |
| Door Material | | Glass + PVC | Glass + PVC | Glass + Al |
| Shelves | | 4EA | 8EA | 12EA |
| Power Voltage | | AC 115V/60Hz | | |
| Plug in - Installation | | NEMA 5-15P | | |
| Amps | | 3.9A | 10.0A | 10.0A |
| Compressor | | 1/4 HP | 1/2 HP | 3/5 HP |
| Refrigerant | | R-134a | | R-404A |
| | | 300g (10.6 oz) | 460g (16.2 oz) | 360g (12.7 oz) |
| Range of Temperature | | 0°C ~ 4°C (32°F ~ 40°F) | | |
| Door auto-close equipment | | Auto-close for Spring | Auto-close for slope | Auto-close for Spring |
| Door stop equipment | | 120° Stop | - | 120° Stop |
| Air suction equipment | | - | - | Air damper |
| Caster | | Adjust foot 4EA | Adjust foot 6EA | Adjust foot 6EA |
| Condensing unit | | Sliding Type | | |
| Door switch | | - | - | - |
| Power(or Lamp) switch | | SL112A, AC125V/12A | | |

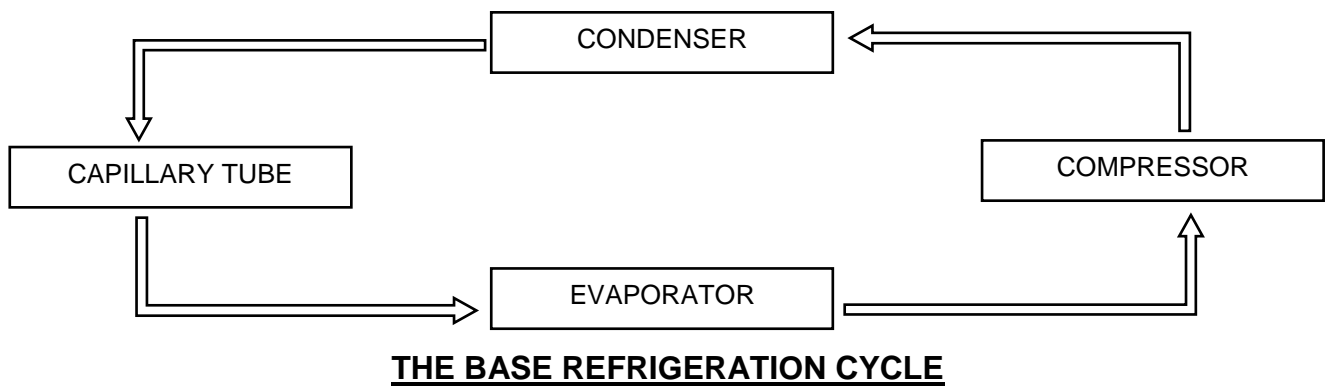
- ◆ Above specifications are subjected to change without prior notice for quality improvement.
- ◆ The nameplate(includes Serial Number) is located on the upper left of the cabinet interior.

3.2 MAIN COMPONENTS - MERCHANDISERS

| PRODUCT | MERCHANDISERS | | |
|----------------------------------|-----------------------------------|-------------------------------|------------------------|
| MODEL | GR26H | GR48S | GR70H |
| Compressor (Manufacture) | SK182C-L2U (SAMSUNG) | CAJ4476Y(A) (Tecumseh-France) | NEK2150GK (Embraco) |
| Compressor Capacity(kcal/h) | LBP 256 | HBP 1946 | LBP 628 |
| Type of Compressor motor | RSCR | CSIR | CSR |
| Compressor O.L.P | 4TM444NHBYY | CRA38014 | T0873/G9 |
| Compressor Relay | J531Q32E4R7M1802 | 3ARR3*2M* | RVA9AD3C-121 |
| Starting Capacitor | - | 250 μ F/160V | 189~227 μ F / 165V |
| Running Capacitor | 12 μ F/250V | - | 25 μ F / 400V |
| Type of Evaporator | Cu pipe + Al fin | | |
| Evaporator pipe Diameter | 9.52 mm (3/8") | | |
| Cooling Fan Motor | IS3225LTSA, 120V/60Hz | | |
| Type of Condenser | Cu pipe + Al fin | | |
| Condenser pipe Diameter | 9.52 mm (3/8") | 7.00mm (0.28") | |
| Condenser Fan Motor | MA7425W1, 120V/60Hz | | |
| Dryer | OD 25.4mm (1"), XH-9, 30g(1.06oz) | | |
| Temperature Control | Thermostat (GNF-250L) | Thermostat (GNF-240L) | Thermostat (GNF-246L) |
| Running Indication | - | | |
| Interior Temp. Indication | - | | |
| Interior Lamp (Fluorescent lamp) | 32W x 1EA | 32W x 1EA | 6W(LED) x 3EA |
| Ad. Panel Fluorescent Lamp | 20W x 1EA | 32W x 1EA | 20W(LED) x 1EA |
| Ballast | 32W(Double)x1EA | 32W(Double)x1EA | - |
| Ballast Name (Manufacture) | B232I120RH-A (ADVANCE) | B232I120RH-A (ADVANCE) | - |
| SMPS | - | - | 60W(DC12V) |
| SMPS Name (Manufacture) | - | - | LVP-60-12 (MEAN WELL) |
| Defrost for evaporator | Off cycle | | |
| Defrost sheath heater | - | - | - |
| Defrost pan heater | - | - | - |
| Drain heater | - | - | - |

2. REFRIGERATION CYCLE

Mechanical refrigeration is accomplished by continuously circulating, evaporating, and condensing a fixed supply of refrigerant in a closed system. Evaporation occurs at low temperature and pressure while condensation occurs at high temperature and pressure. Thus it is possible to transfer heat from an area of low temperature (i.e., refrigerated compartment) to an area of high temperature (i.e., surrounding of refrigerator).



Beginning the cycle at the evaporator inlet the low pressure liquid expands, absorbs heat (so refrigerator inner-cabinet is cooled), and evaporates, changing to low pressure gas at the evaporator outlet.

The compressor pumps this gas from the evaporator, increases its pressure, and discharges the high pressured- temperature gas to the condenser.

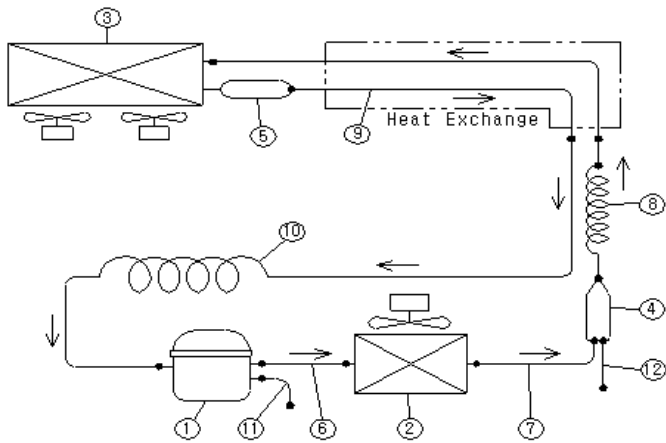
The condenser lets high pressured- temperature gas emit the heat (so surrounding of the condenser is warmed) in order to make it condense.

The capillary tube prevents high pressured- temperature liquid from entering the evaporator in order to lower the pressure in the evaporator and control the flow of refrigerant into the evaporator automatically.

Eventually the desired air temperature in refrigerator inner-cabinet is reached, the thermostat (temperature controller) will break the electrical circuit to the compressor motor and stop the compressor.

As the temperature of the air rises, the thermostat (or controller) remakes the electrical circuit. The compressor starts, and cycle continues.

The schematic refrigeration (or freezing) cycle of F23/F49/F72/R23/R49/R72/GR26/GR48/GR70 is like below.



| MODEL | COMPRESSOR |
|------------------------|-------------|
| F23-S/SH, R72-G,GR70H | NEK2150GK |
| F49-S/SH | NT2178GKV |
| F72-S/SH | NT2192GKV |
| R23/R49-S/SH,R23/R49-G | NW108LHB1 |
| R72-S/SH | CAJ4461Y(A) |
| GR26H | SK182C-L2U |
| GR48S | CAJ4476Y(A) |

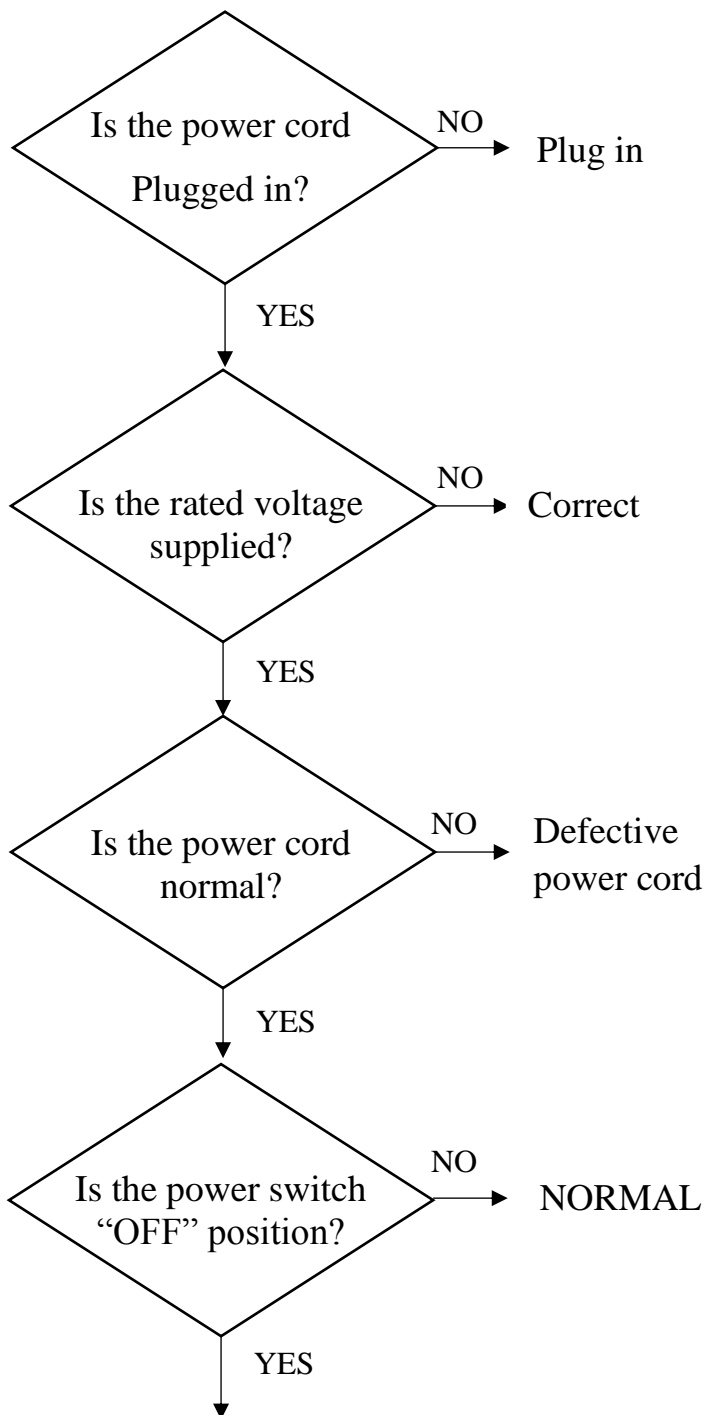
| No. | Part Name | Description | Remark |
|-----|------------------------------|-------------|--------|
| 1 | COMPRESSOR | | |
| 2 | CONDENSER | C1220TS-O,H | |
| 3 | EVAPORATOR | C1220TS-O,H | |
| 4 | DRYER | C1220T-H | |
| 5 | ACCUMULATOR | C1220T-1/4H | |
| 6 | DISCHARGE PIPE | C1220T-O | |
| 7 | DRYER CONNECT PIPE | C1220T-O | |
| 8 | CAPILLARY TUBE | C1220T-H | |
| 9 | SUCTION PIPE (INNER-CABINET) | C1220T-O | |
| 10 | SUCTION PIPE (COMPRESSOR) | C1220T-O | |
| 11 | CHARGE PIPE (COMPRESSOR) | C1220T-O | |
| 12 | CHARGE PIPE (DRYER) | C1220T-O | |

3. TROUBLESHOOTING

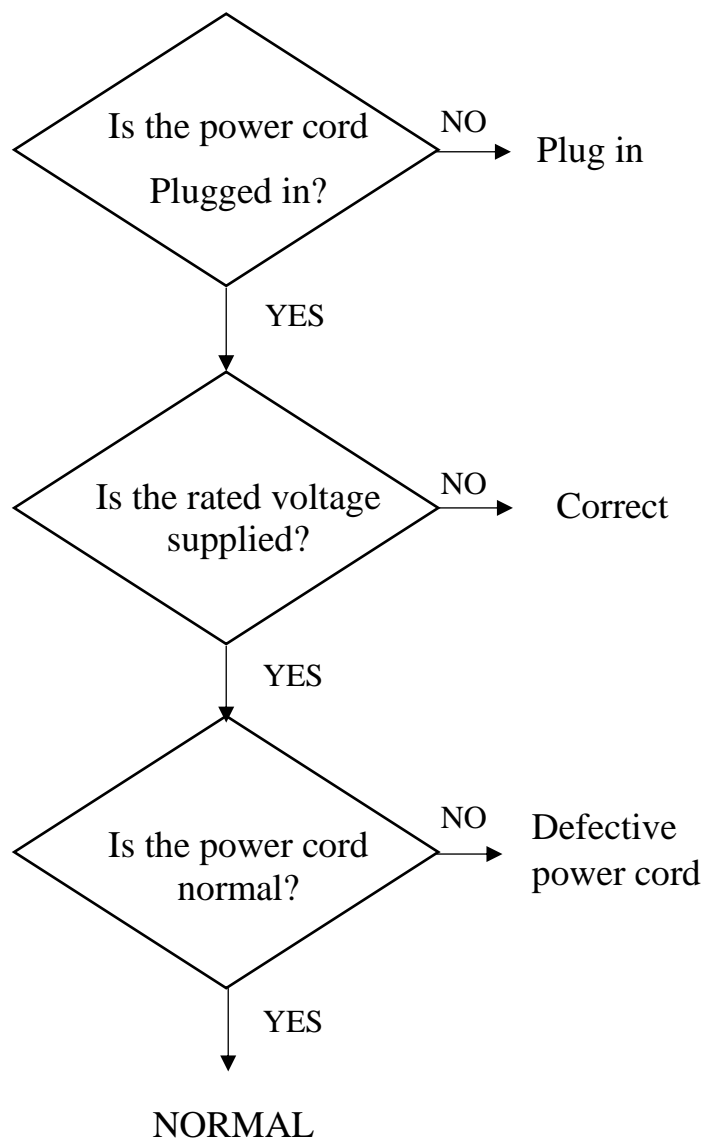
1) CHECKING THE POWER SUPPLY

① F23 / F49 / F72 / R23 / R49 / R72

② GR26H / GR48S / GR70H

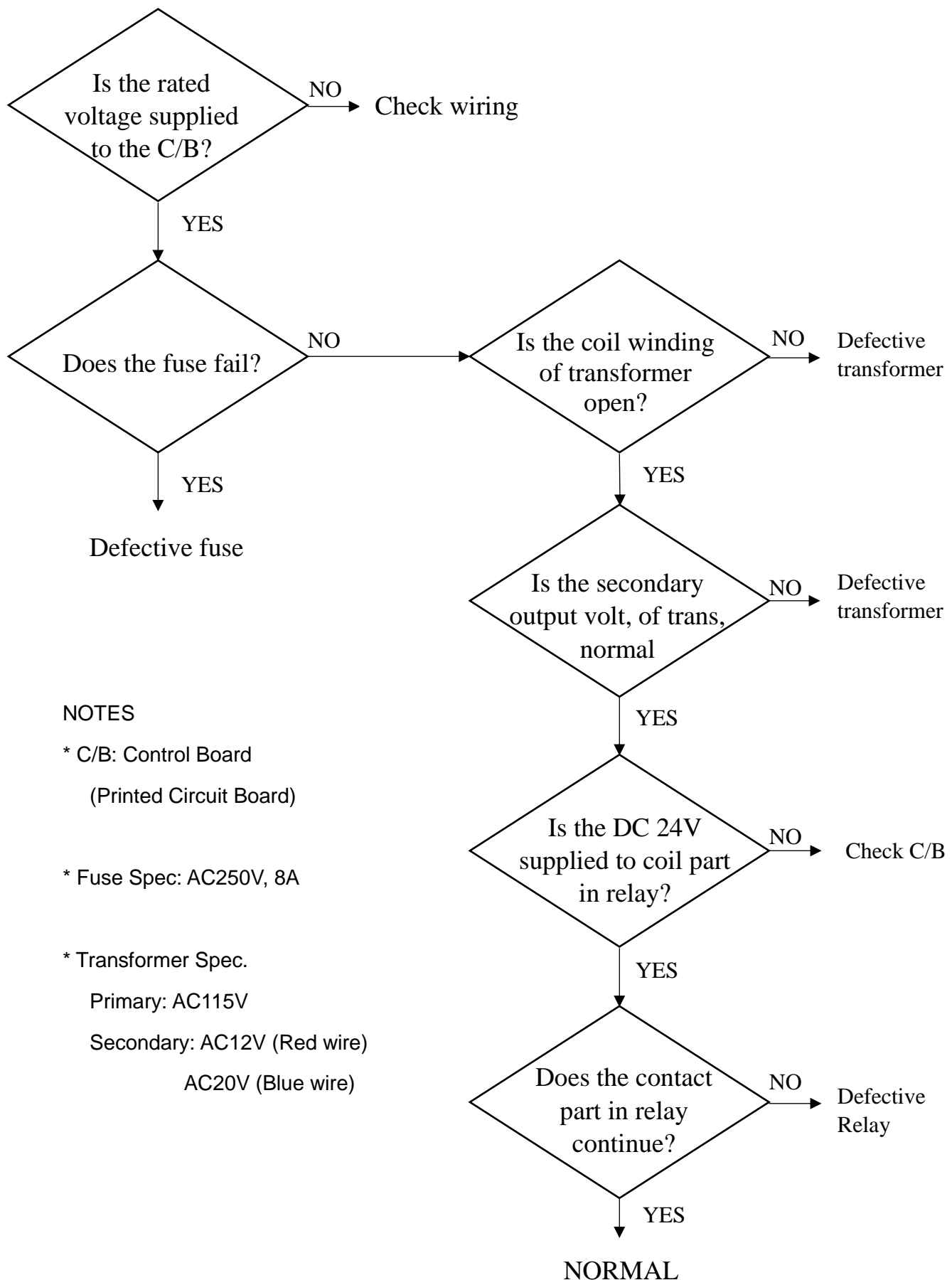


Move to "ON" position



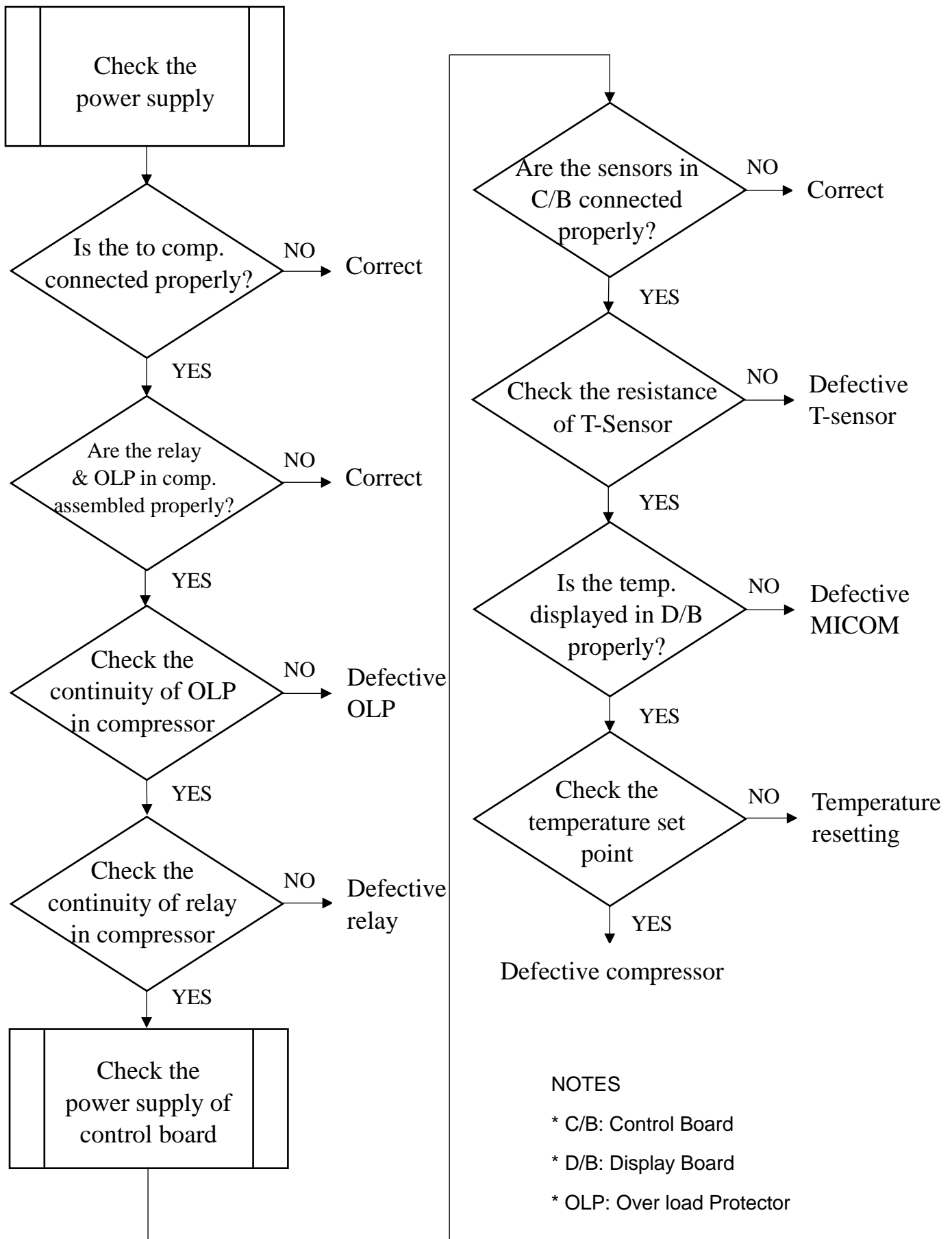
2) CHEKING THE POWER SUPPLY OF CONTROL BOARD

① F23 / F49 / F72 / R23 / R49 / R72

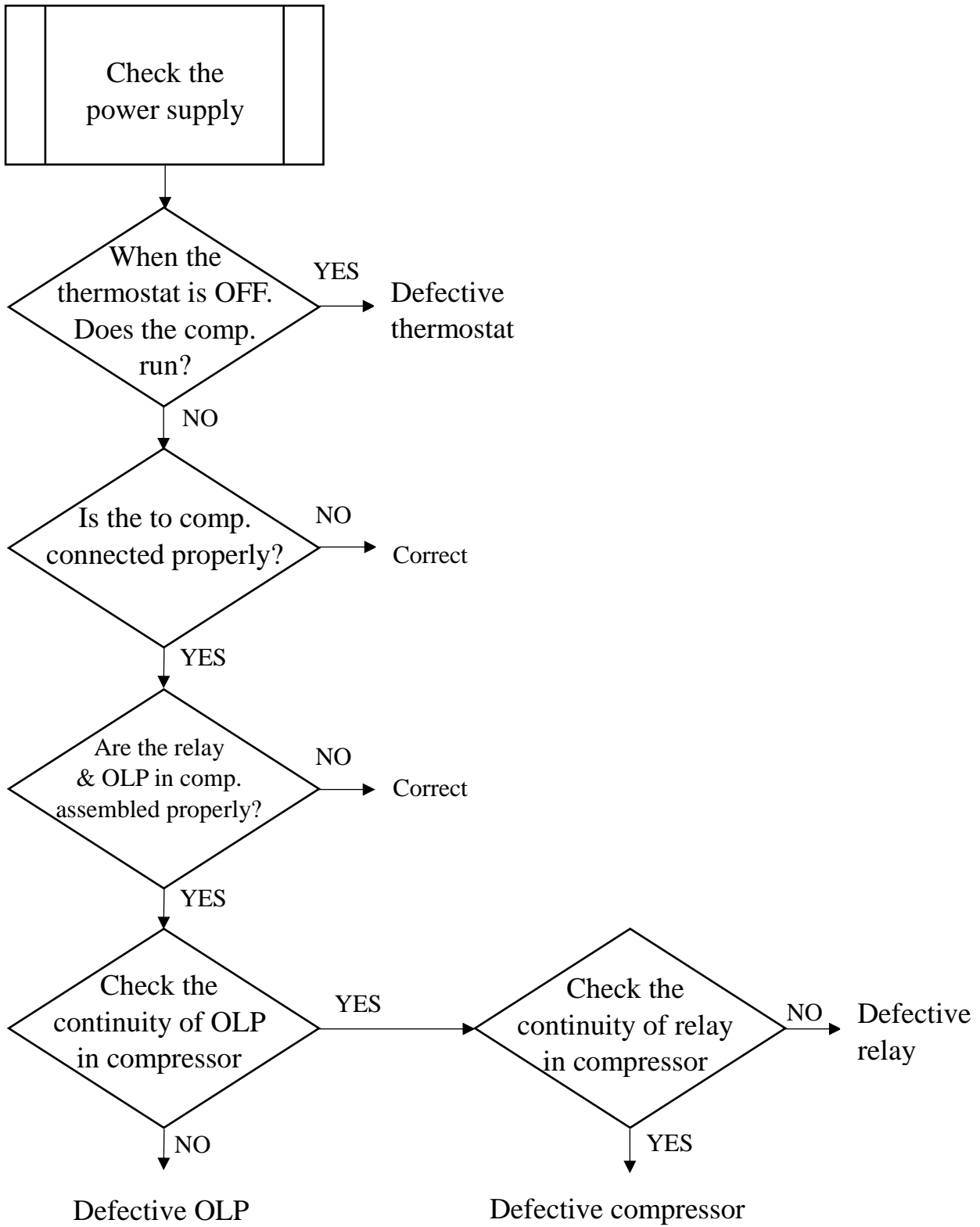


3) CHECKING THE CONTROL PART OF REFRIGERATION CYCLE

① F23 / F49 / F72 / R23 / R49 / R72

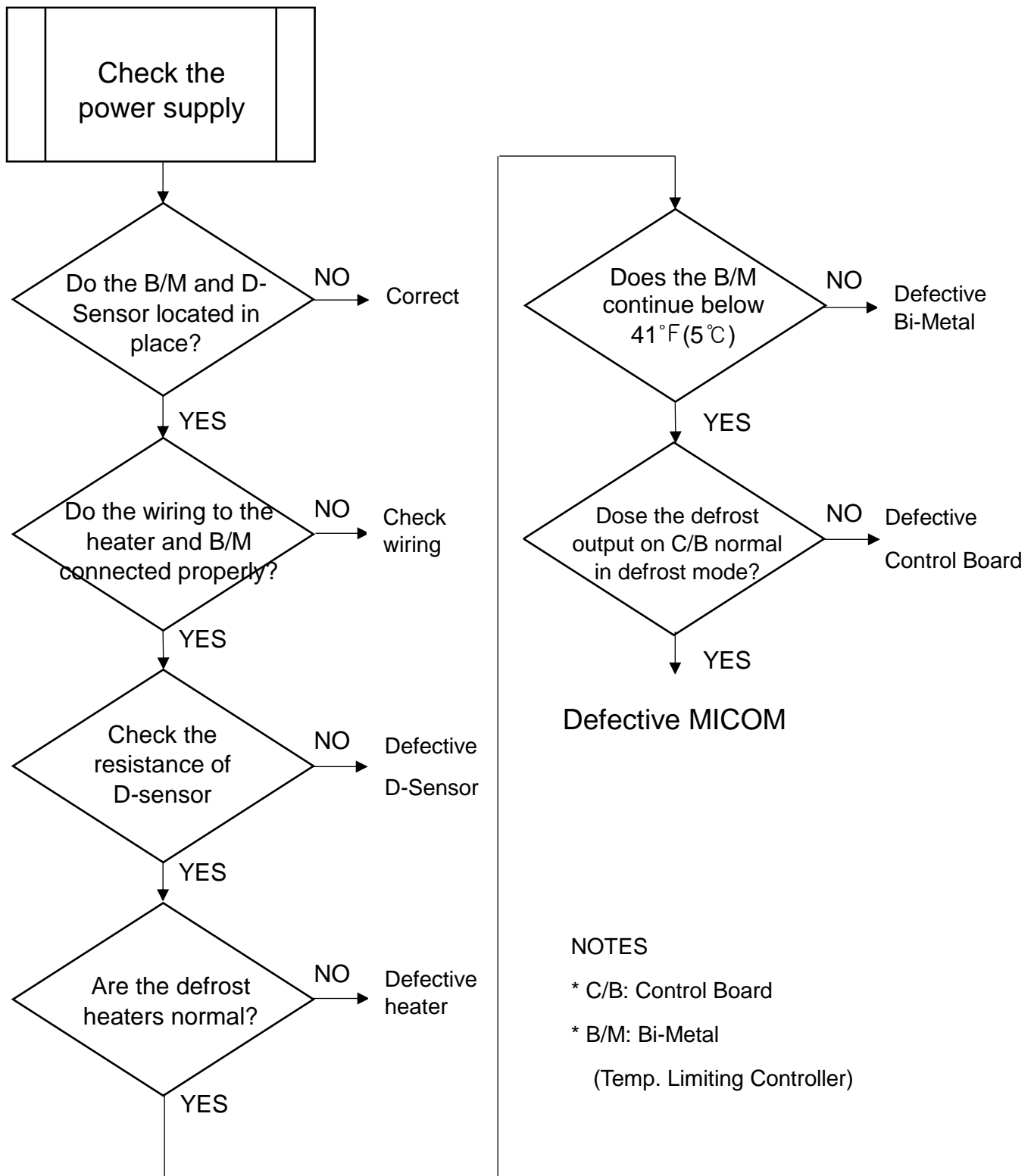


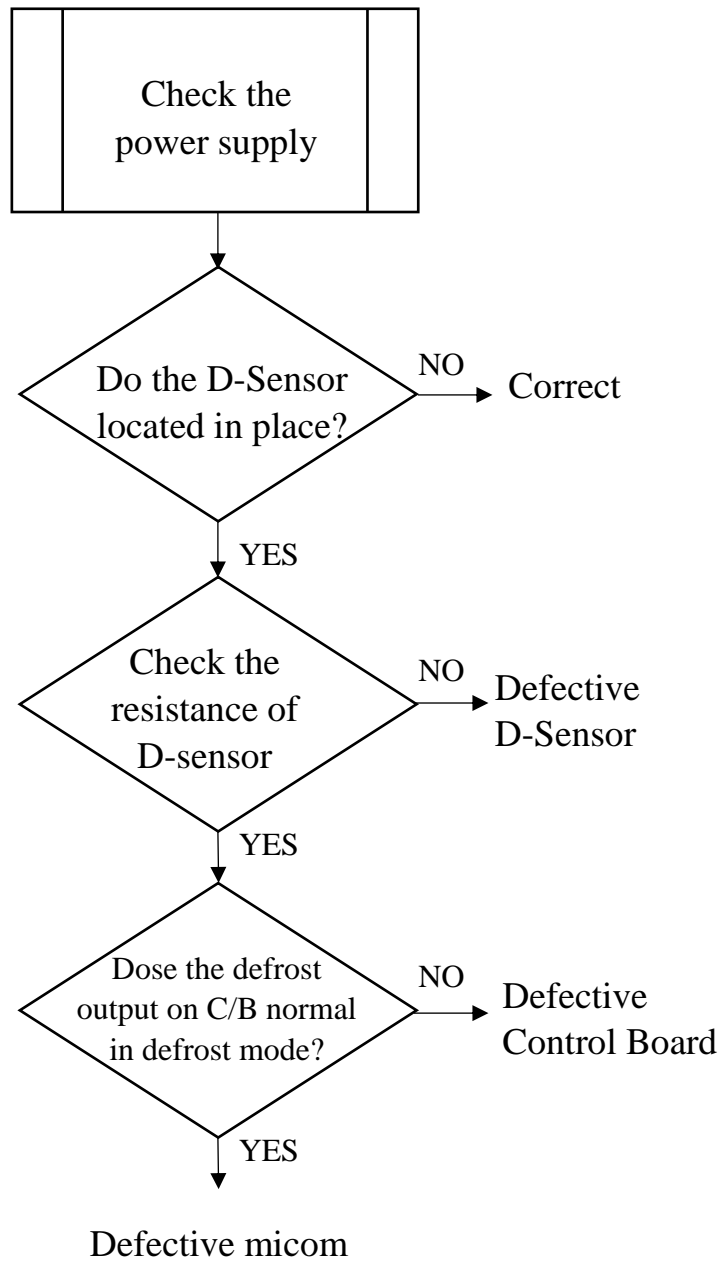
② GR26H / GR48S / GR70H



4) CHECKING THE DEFROST PART

① F23 / F49 / F72



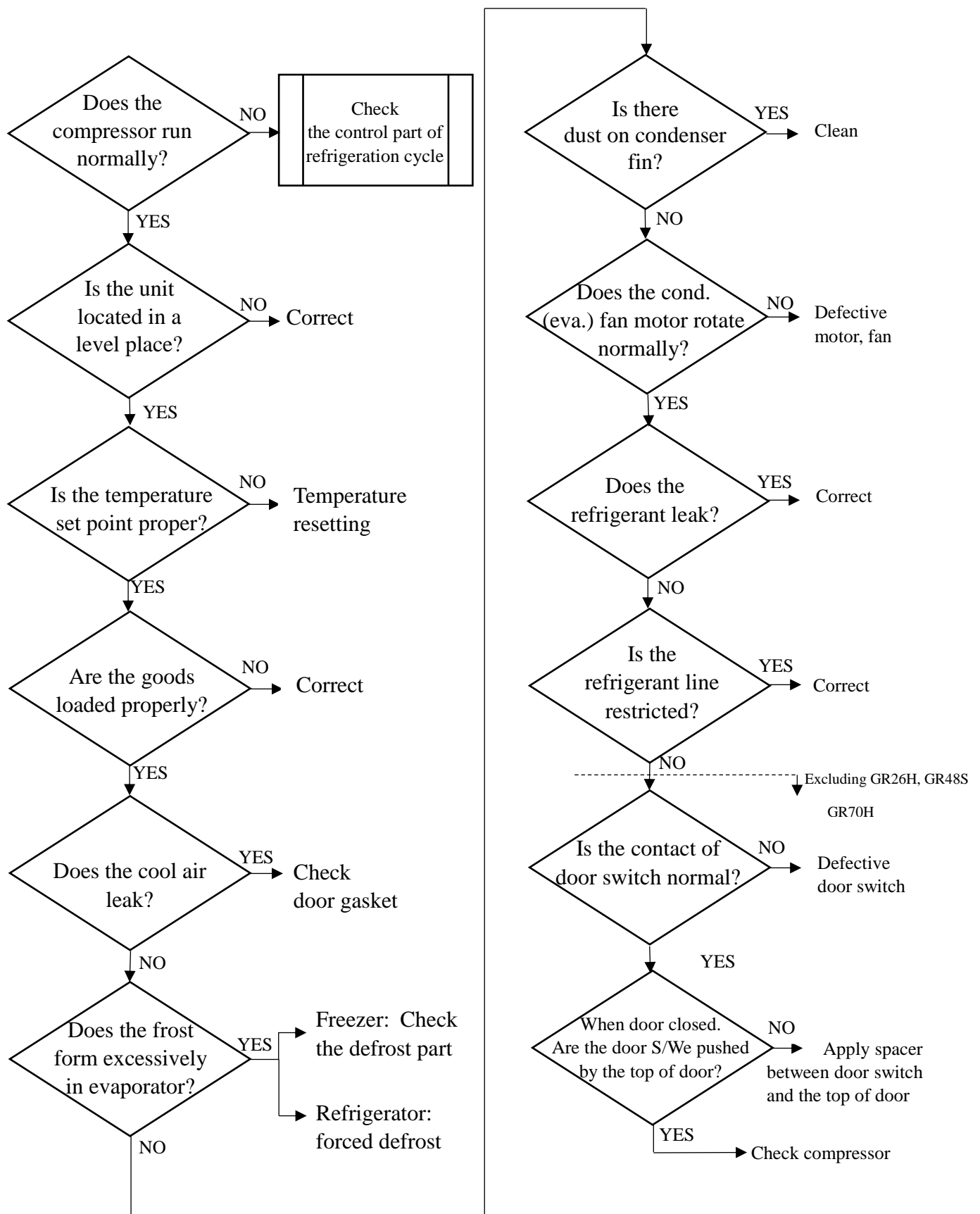


NOTES

* C/B: Control Board

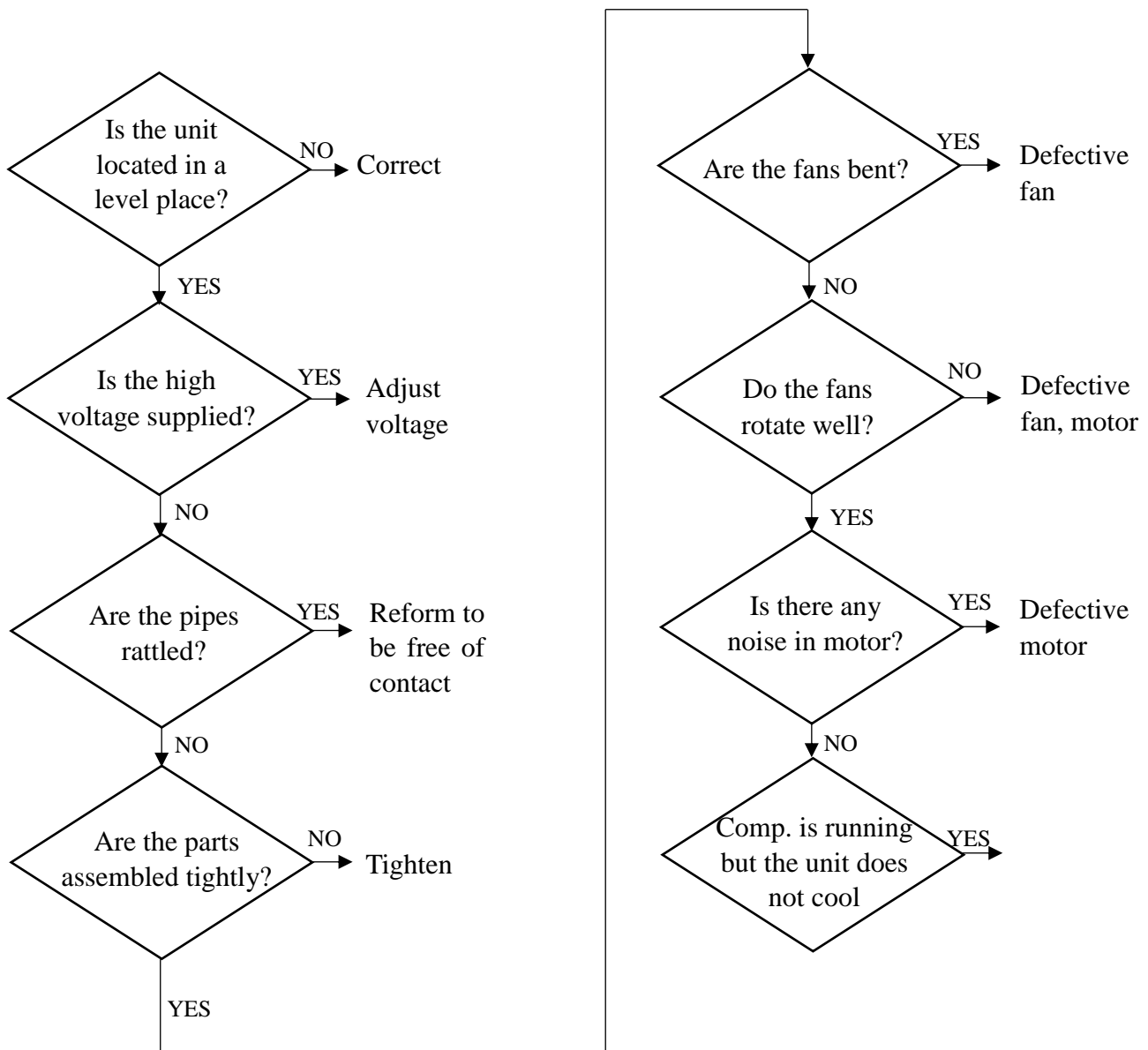
5) WHEN THE UNIT DOES NOT COOL

① All Models



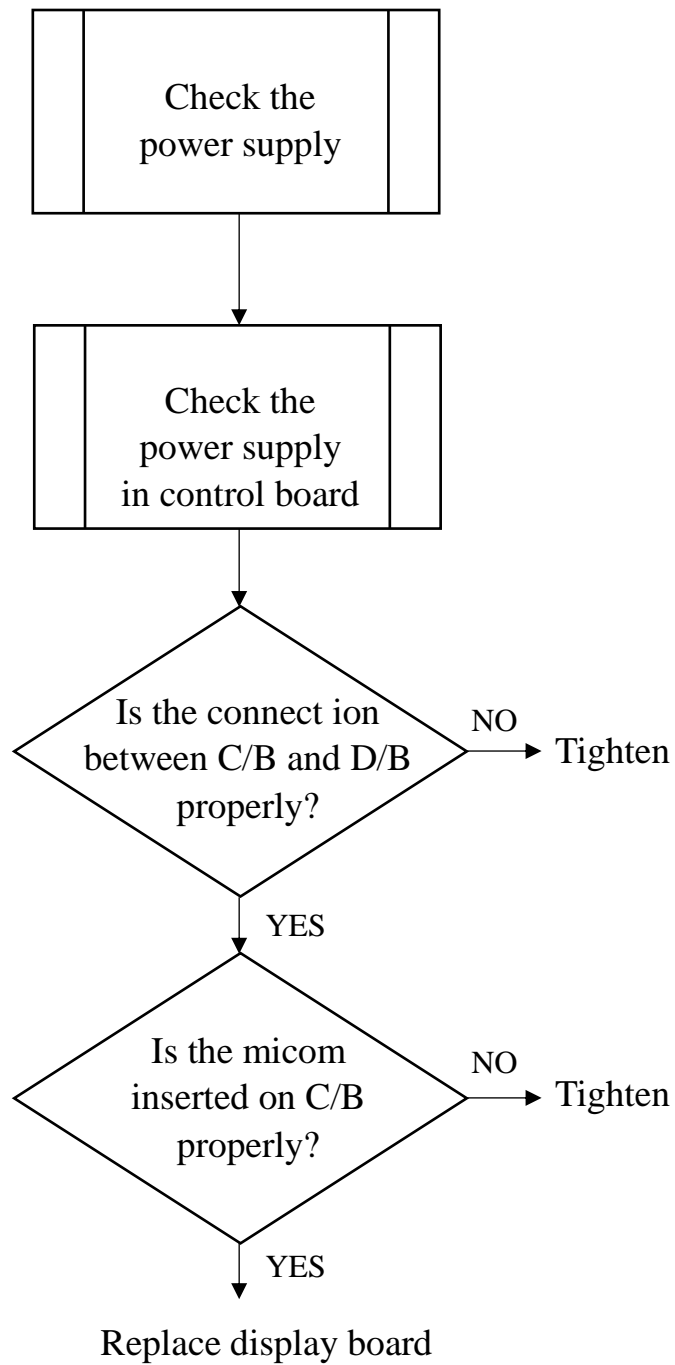
6) WHEN THERE IS A ABNORMAL NOISE

① All Models



7) WHEN THE TEMPERATURE DOES NOT DISPLAY

① F23 / F49 / F72 / R23 / R49 / R72



NOTES

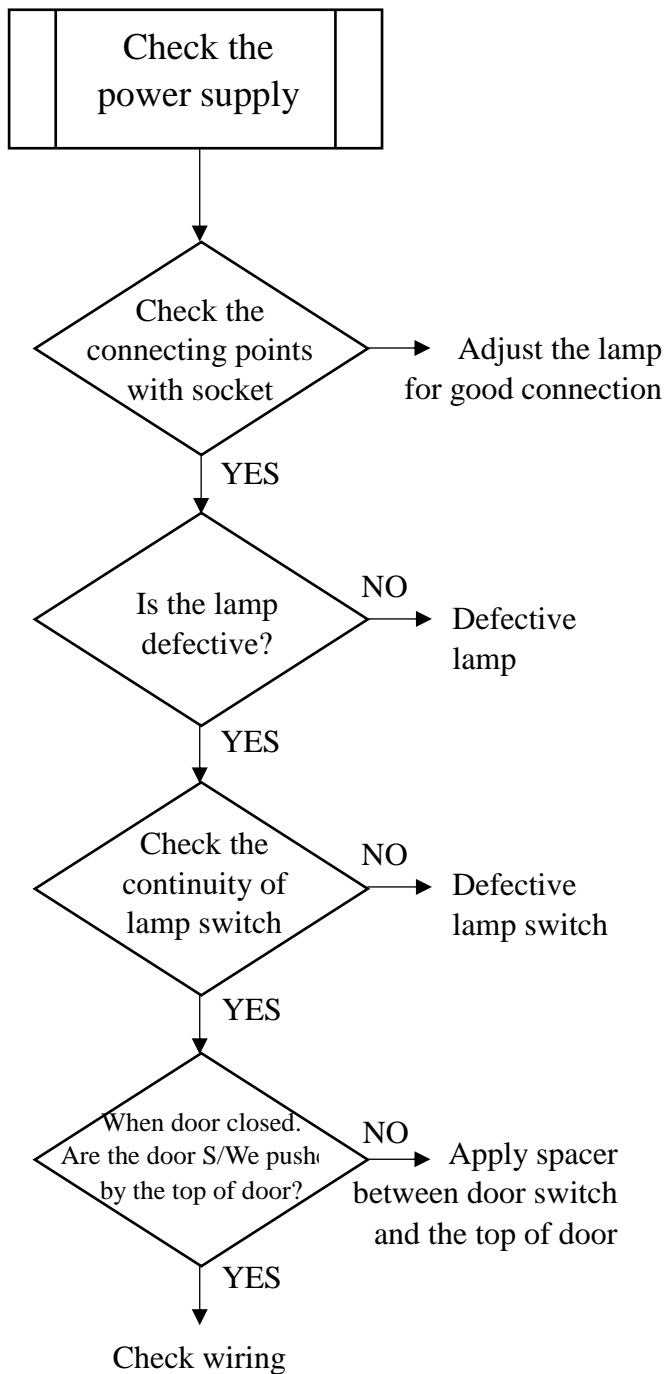
* C/B: Control Board

* D/B: Display Board

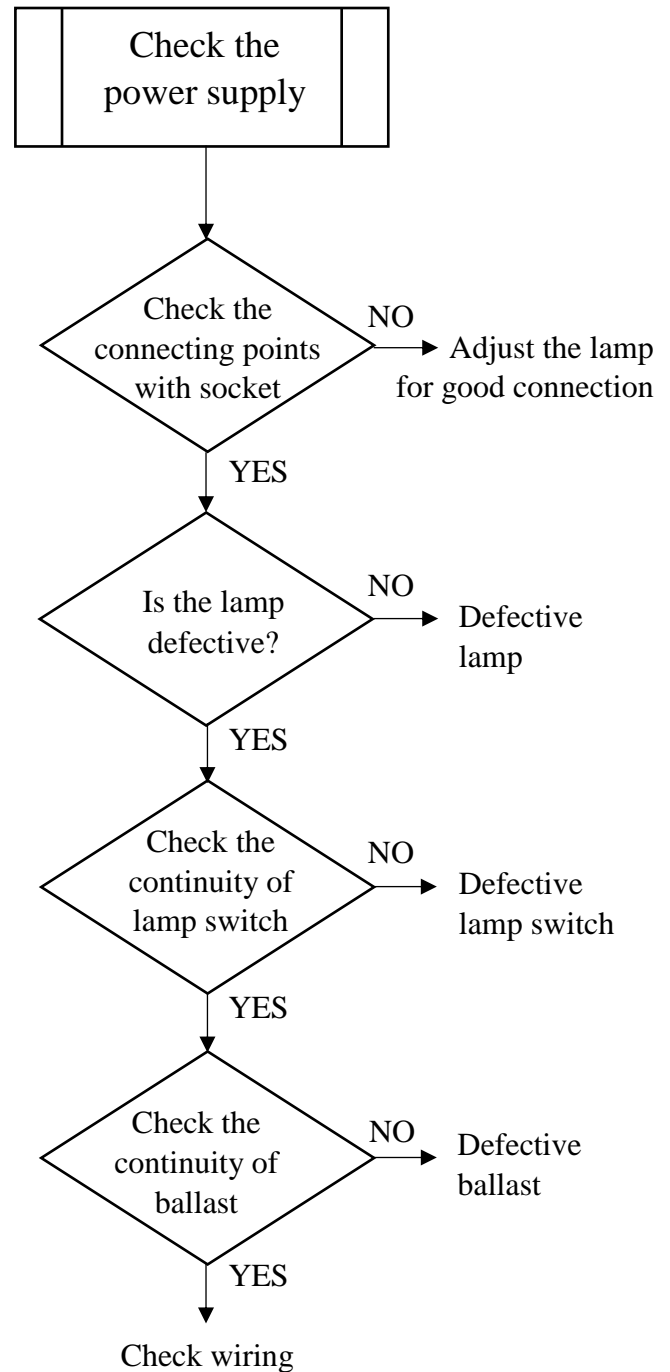
8) WHEN THE LAMP DOES NOT LIGHT

① F23 / F49 / F72 / R23 / R49 / R72

② GR26H / GR48S / GR70H



* Incandescence Lamp: 40W



* Fluorescent Lamp: 32W

9) CHECKING SENSOR

Sensor assembly consists of T-sensor (lead wire: orange) and D-sensor (lead wire: blue).

The T-sensor is used for cabinet temperature control and the D-sensor is used for defrost control.

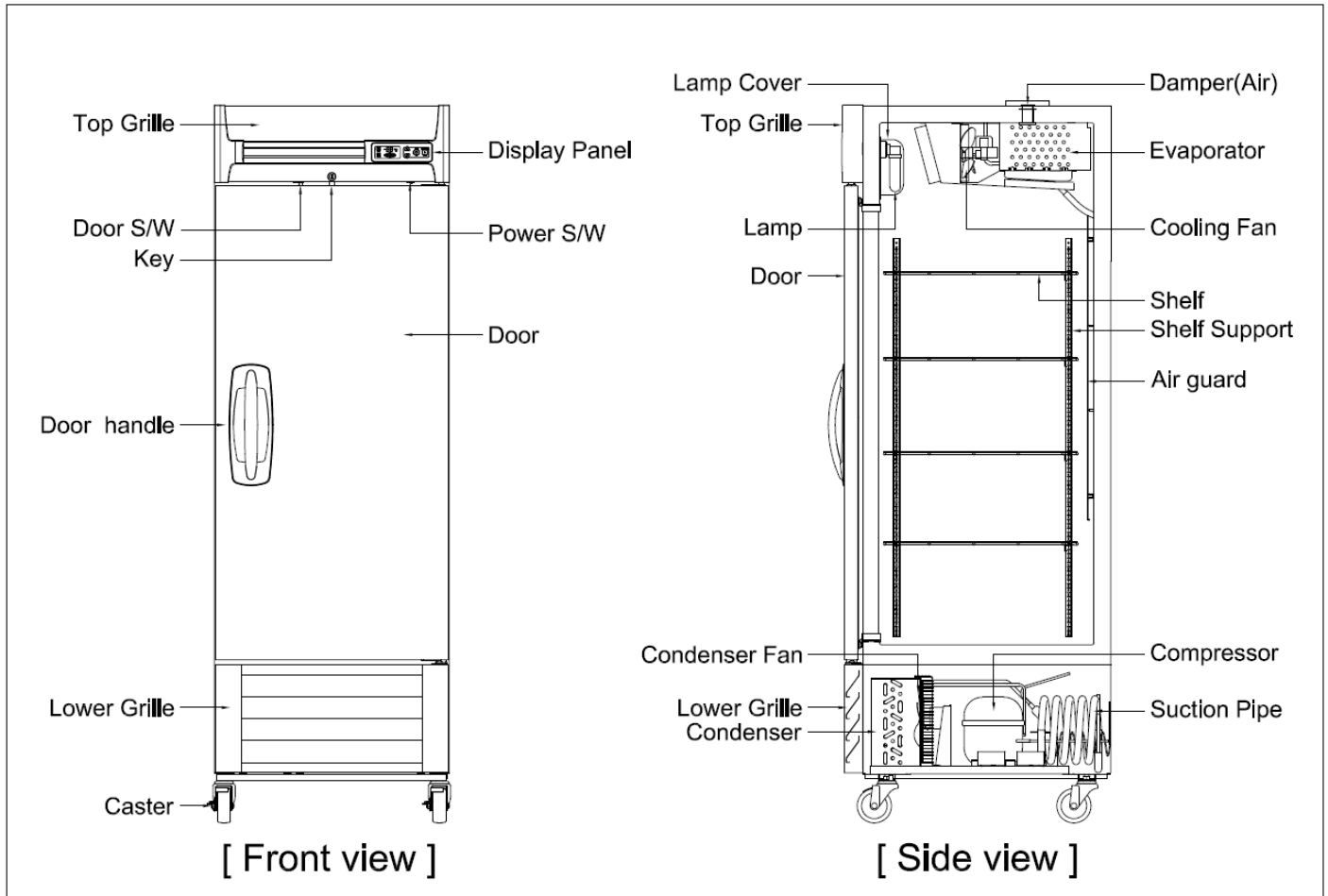
The resistance of the sensor varies depending on temperature.

If you immerse the sensor in a glass containing ice water for 2 minutes and then check for the resistance between sensor leads, the normal reading is 7.88 k Ω (T-sensor) / 30 k Ω (D-sensor).

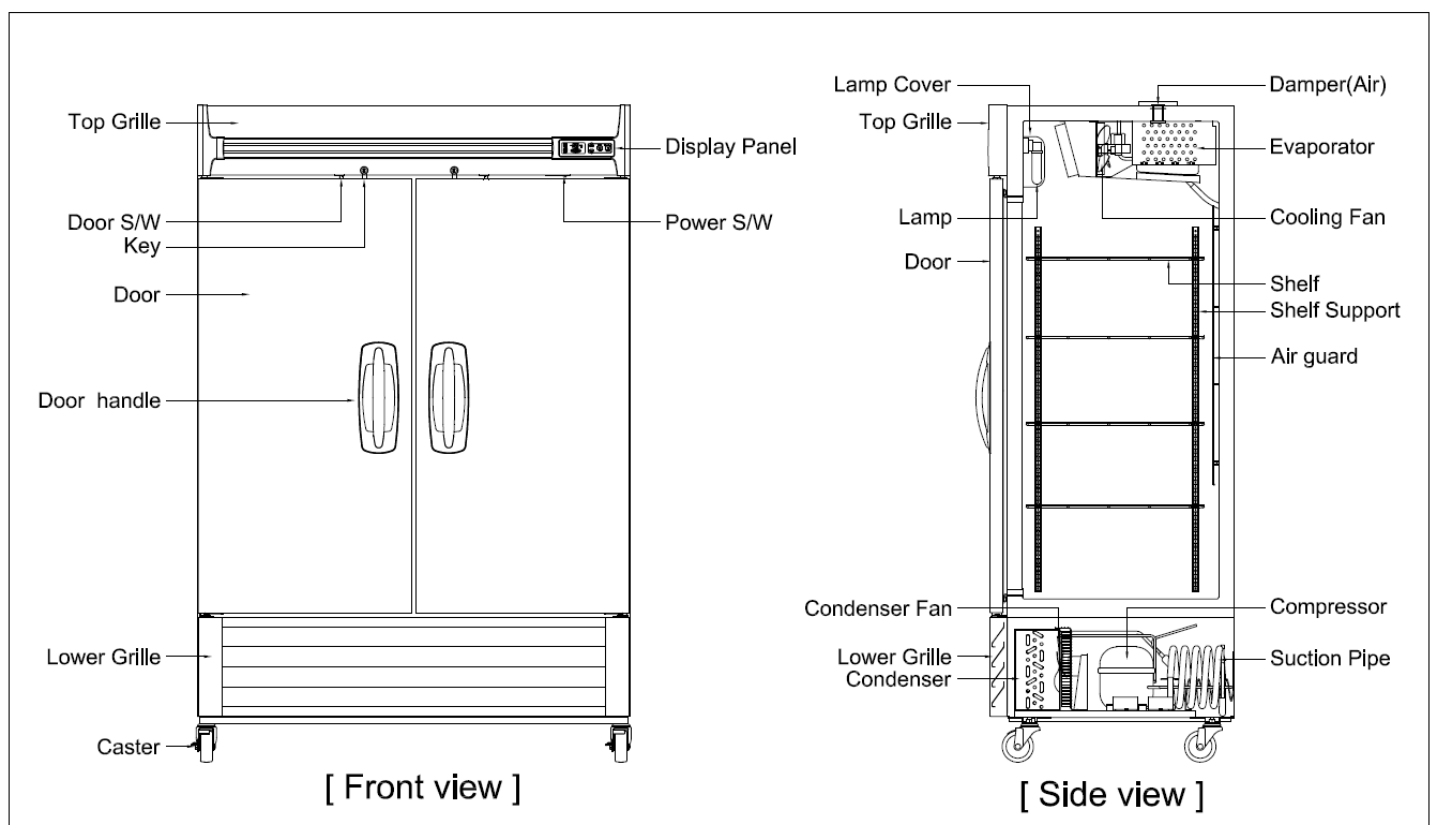
| Temperature (°F/°C) | Resistance (k Ω) | |
|---------------------|--------------------------|--------------------------|
| | T-sensor ($\pm 6.5\%$) | D-sensor ($\pm 5.5\%$) |
| -5 / -21 | 23.04 | 79.17 |
| 0 / -18 | 19.76 | 68.92 |
| 10 / -12 | 14.65 | 52.61 |
| 23 / -5 | 10.10 | 37.55 |
| 32 / 0 | 7.88 | 30.00 |
| 41 / 5 | 6.20 | 24.13 |
| 50 / 10 | 7.91 | 19.53 |
| 60 / 16 | 3.82 | 15.56 |
| 70 / 21 | 3.00 | 12.48 |

4. FEATURE CHART

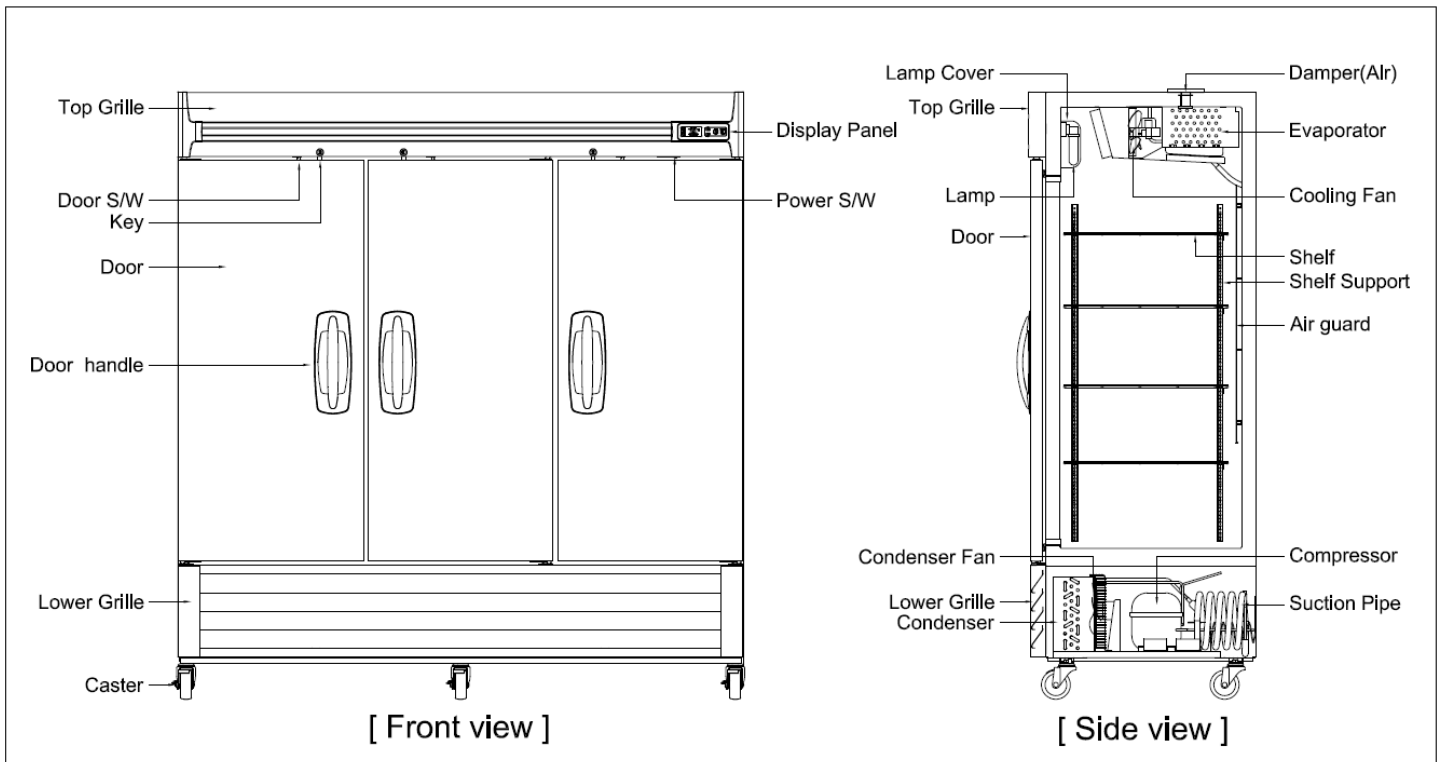
1) F23/R23-S



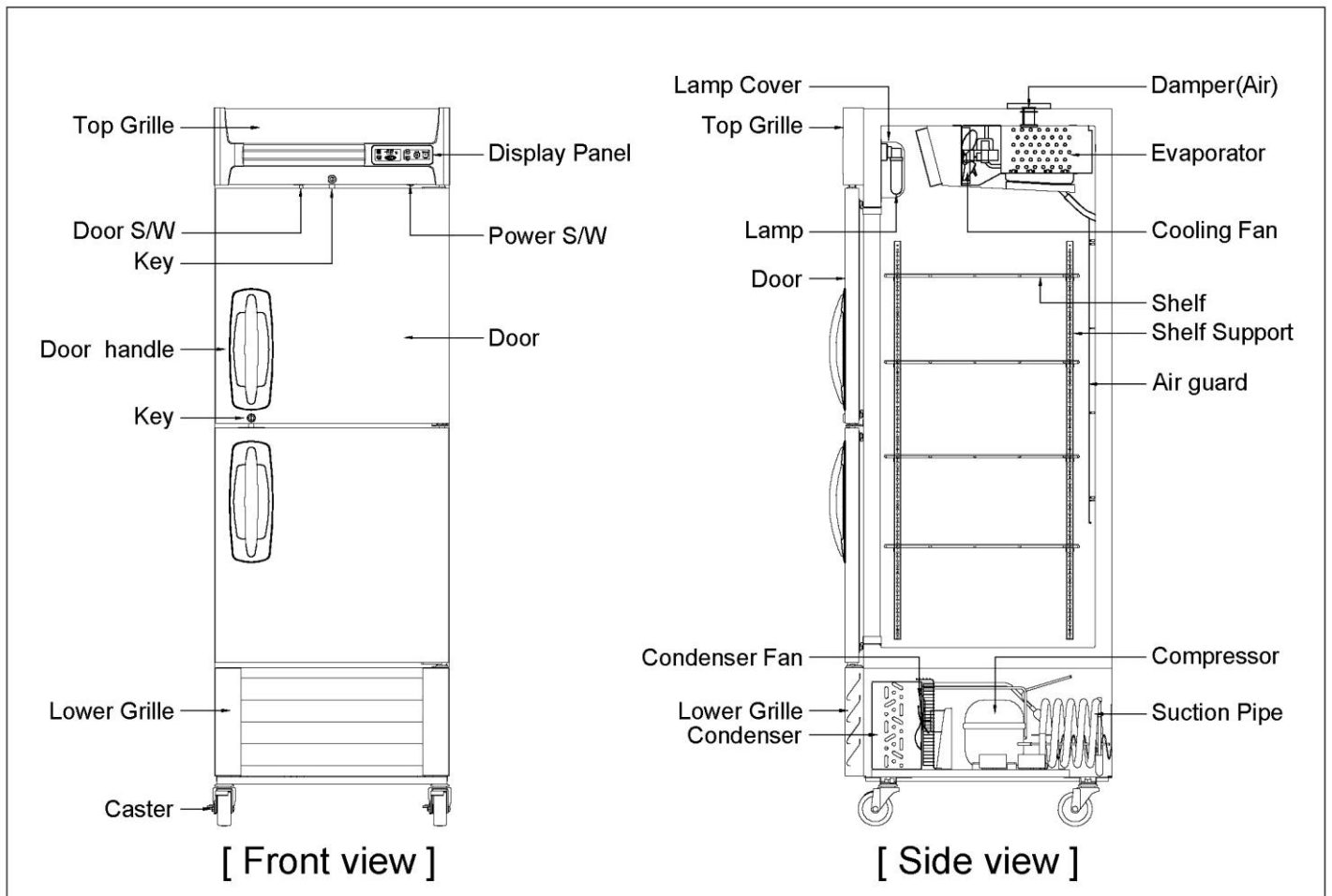
2) F49/R49-S



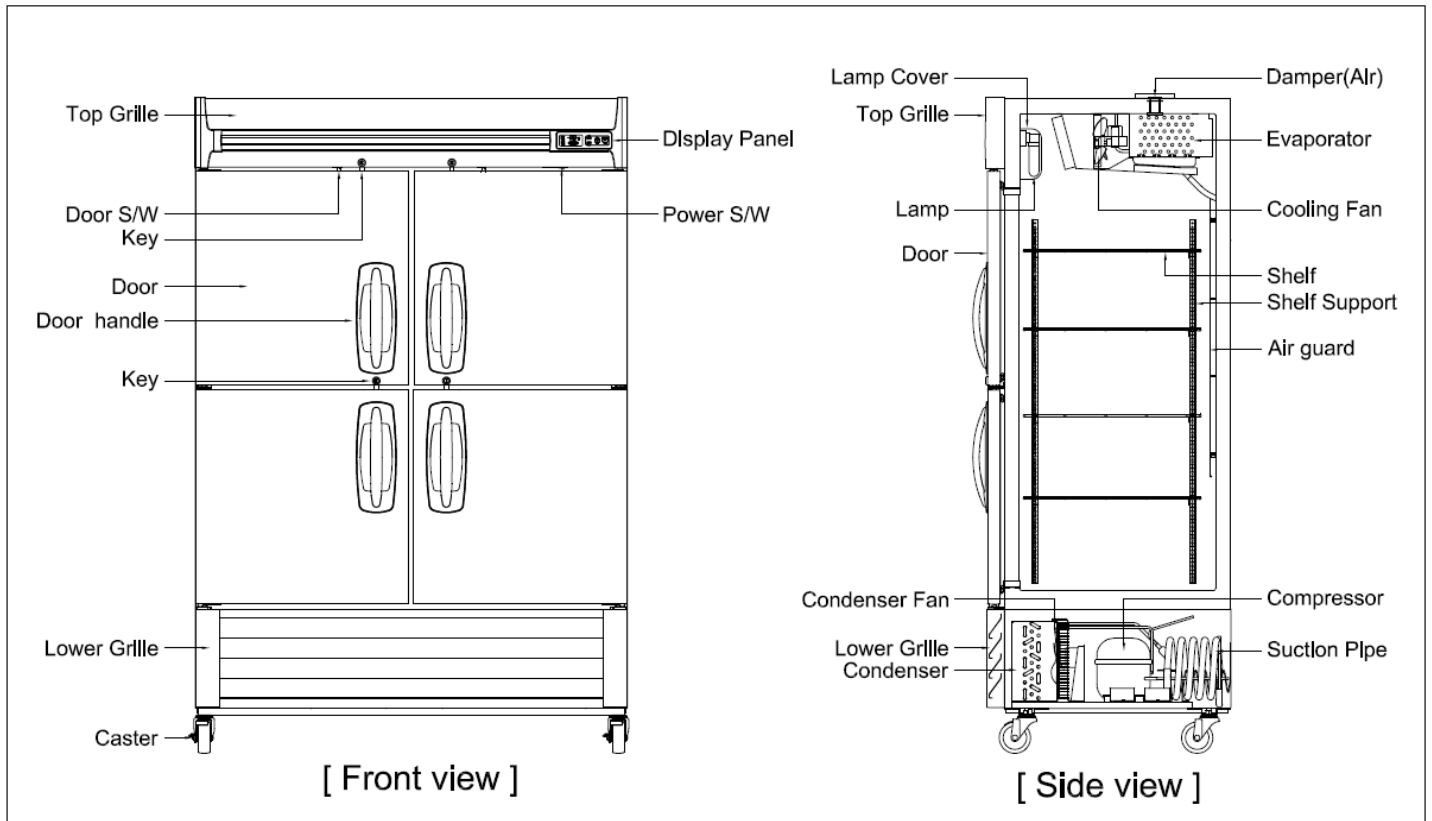
3) F72/R72-S



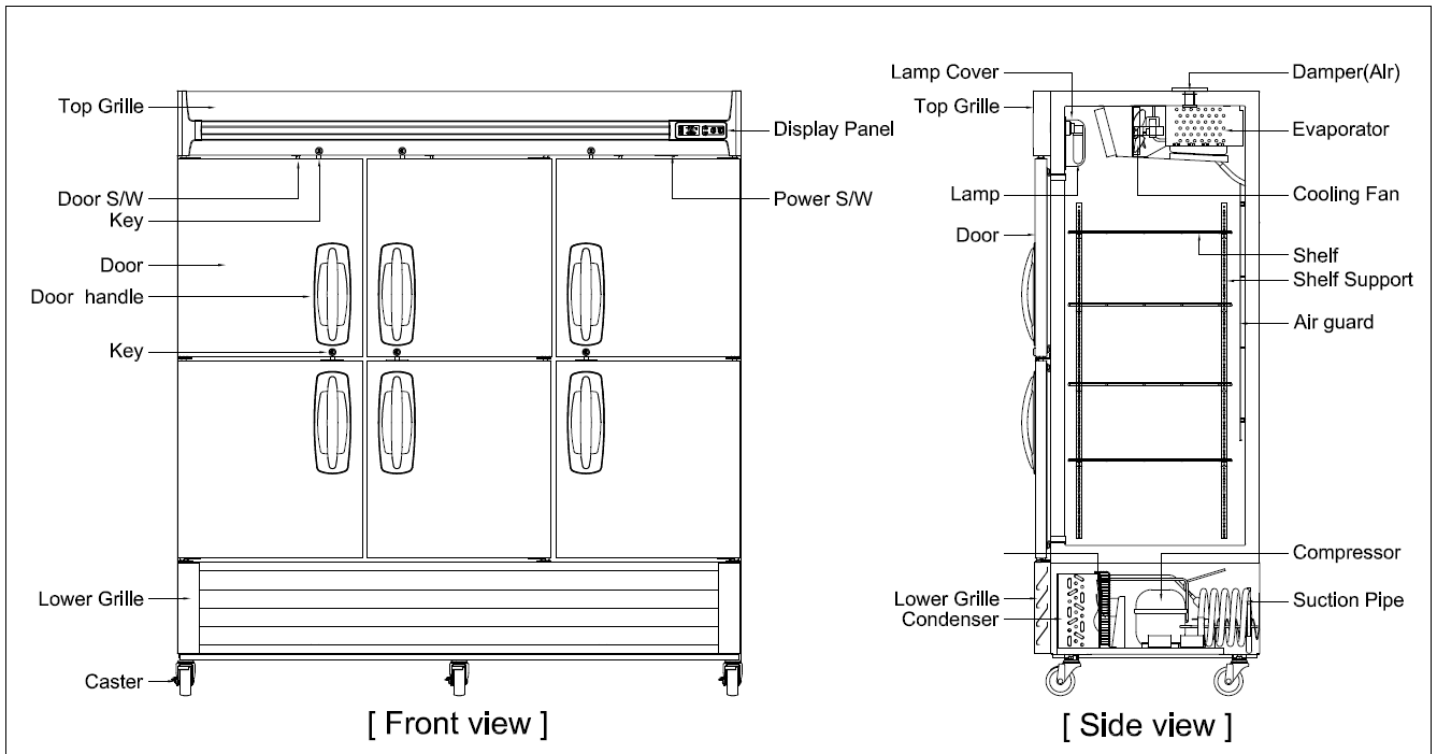
4) F23/R23-SH



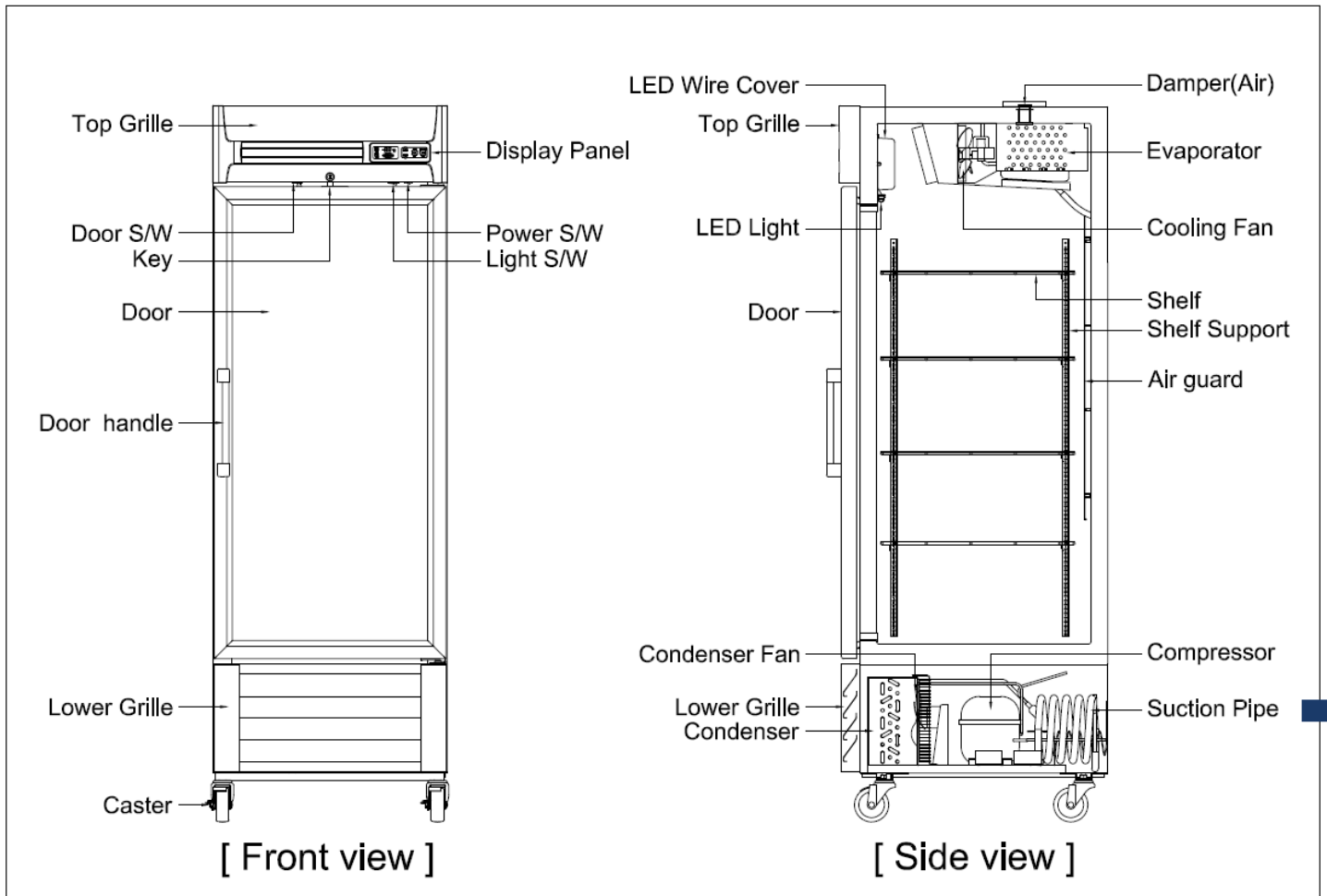
5) F49/R49-SH



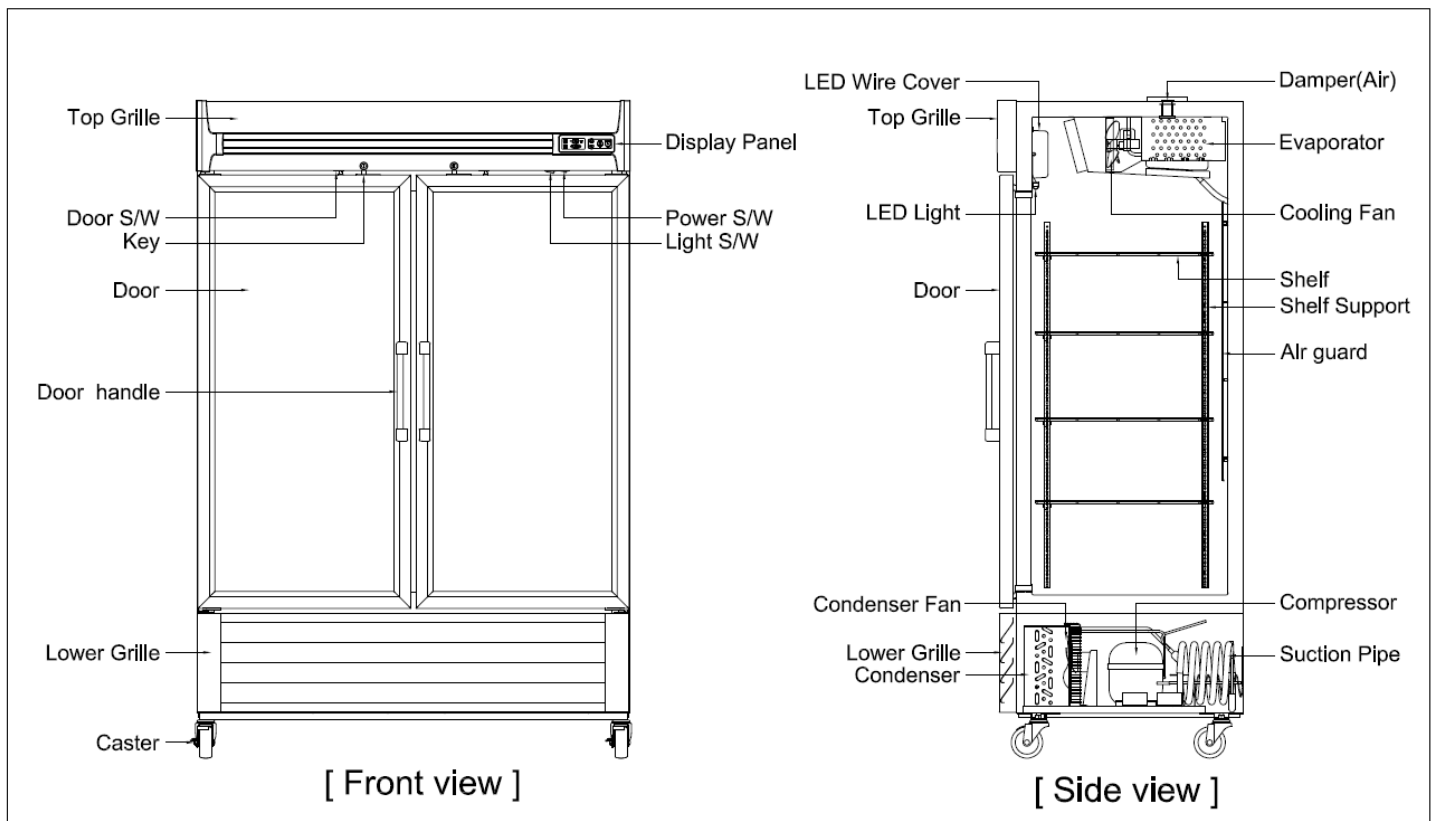
6) F72/R72-SH



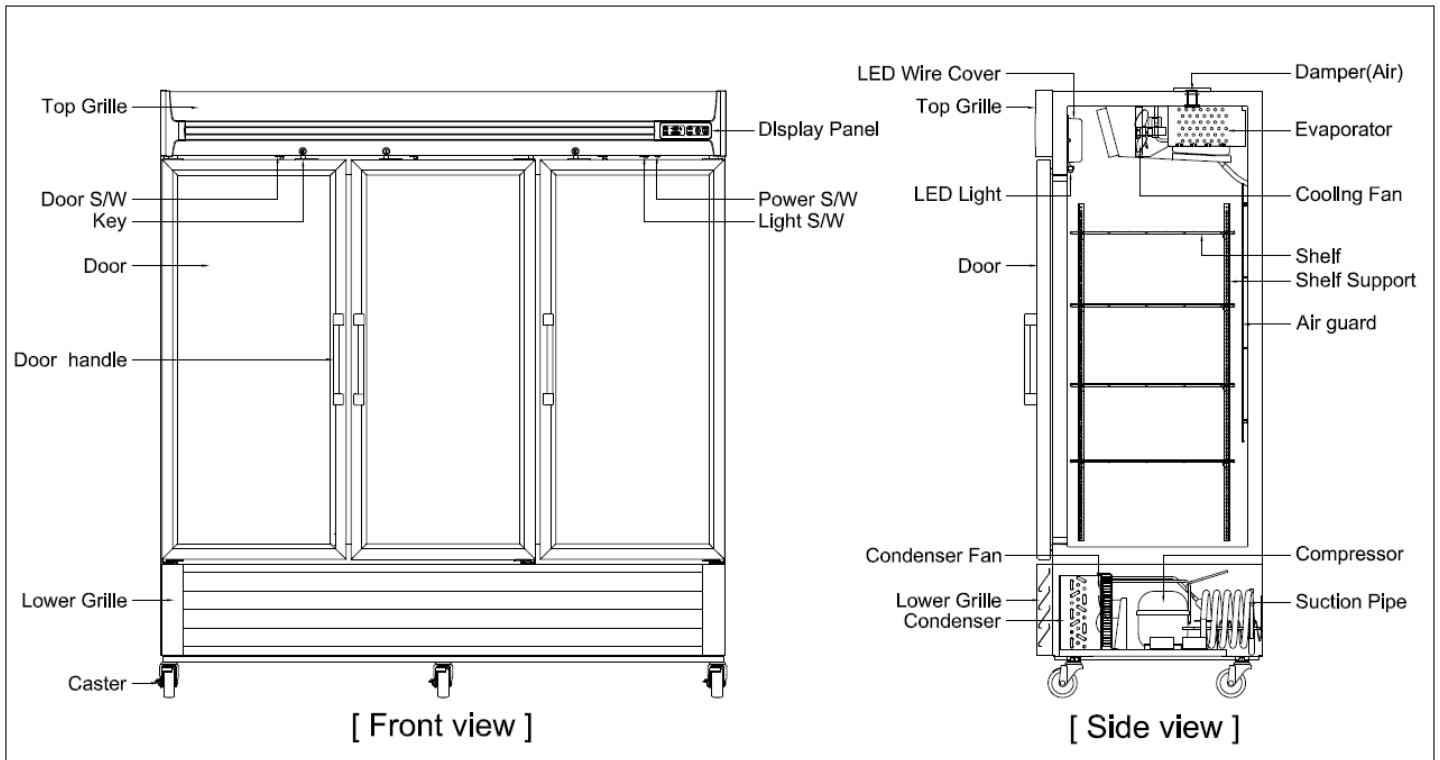
7) R23-G



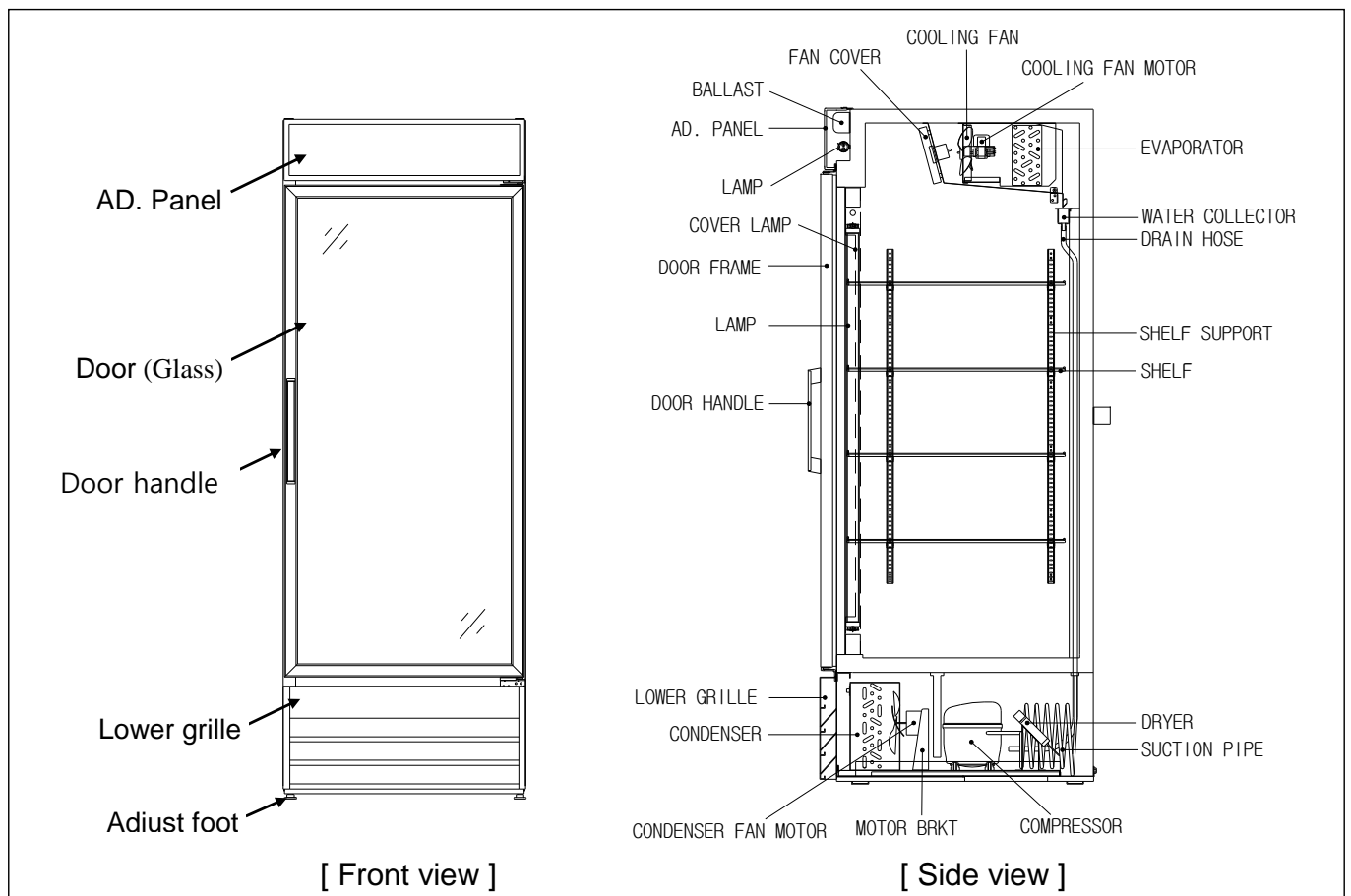
8) R49-G



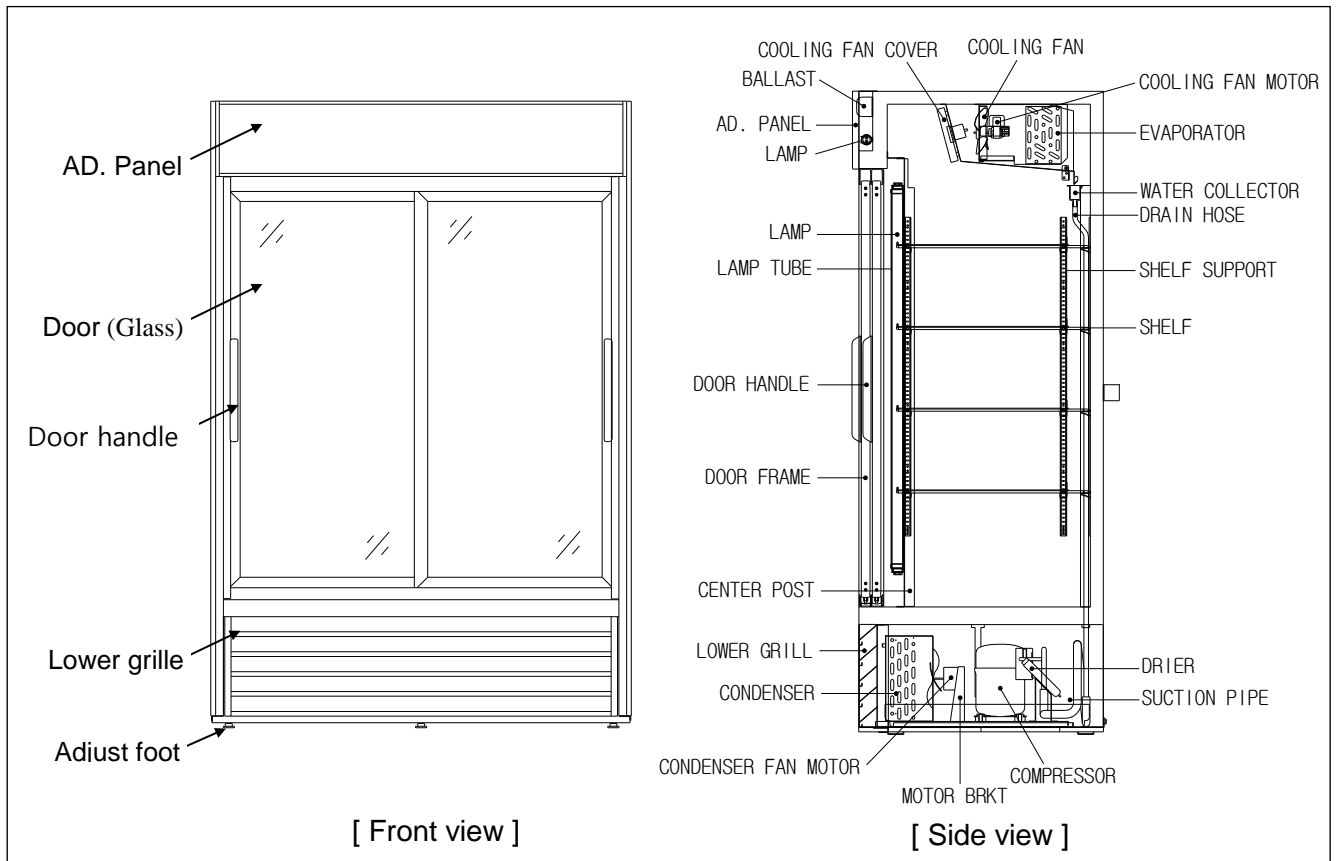
9) R72-G



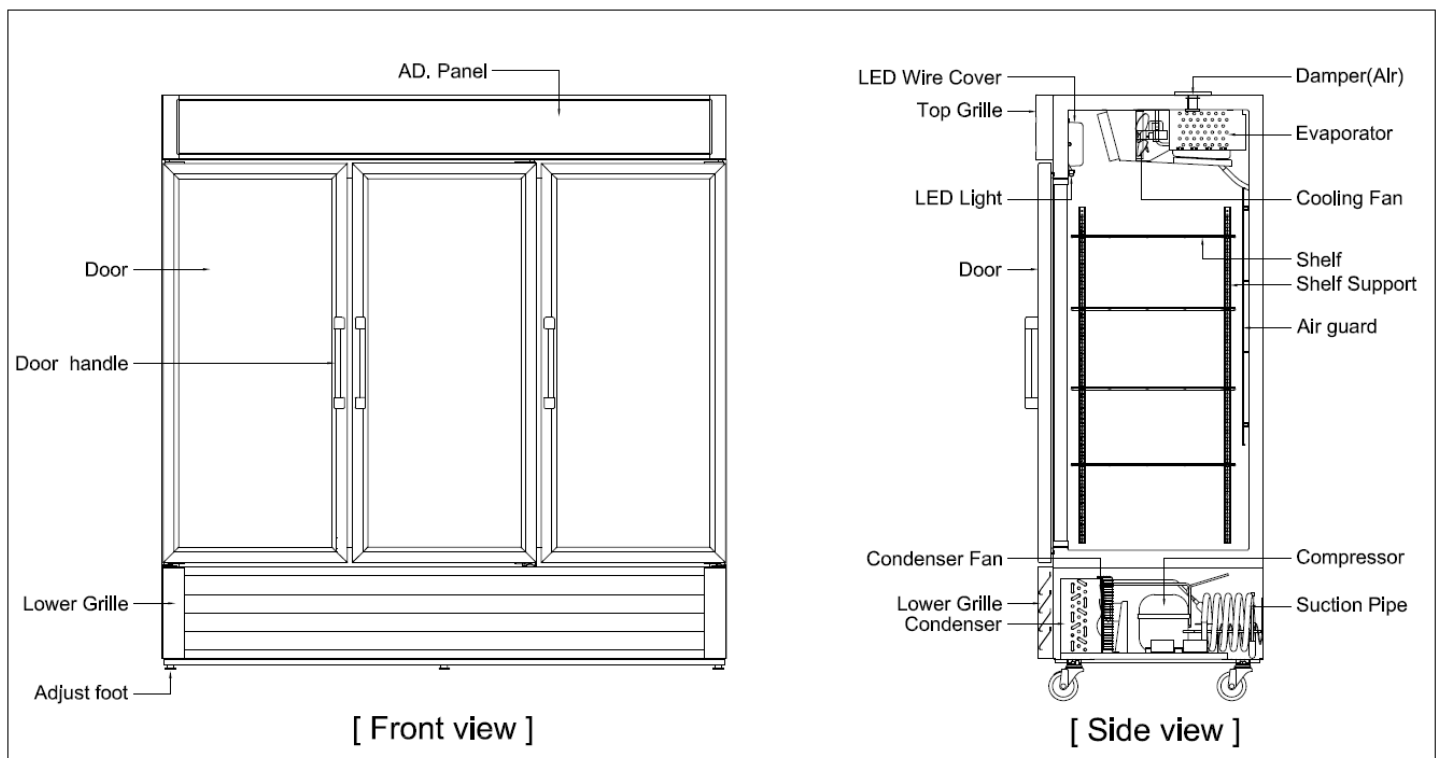
10) GR26H



11) GR48S

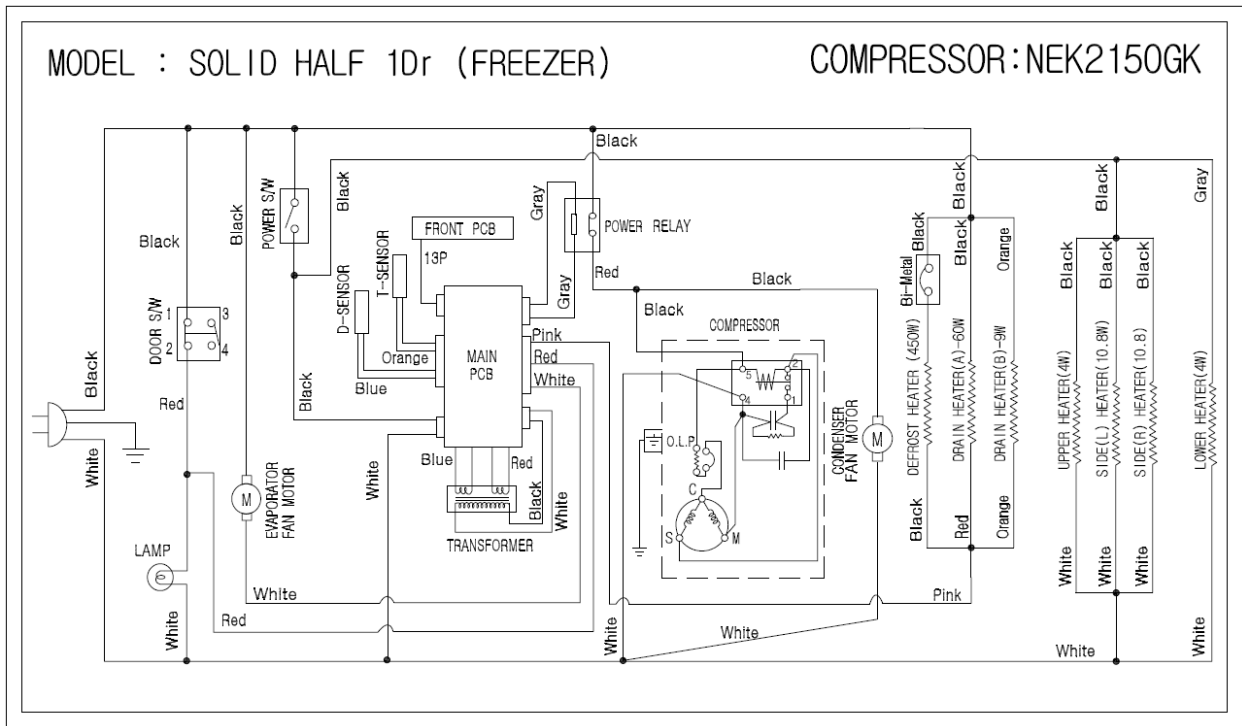


12) GR70H

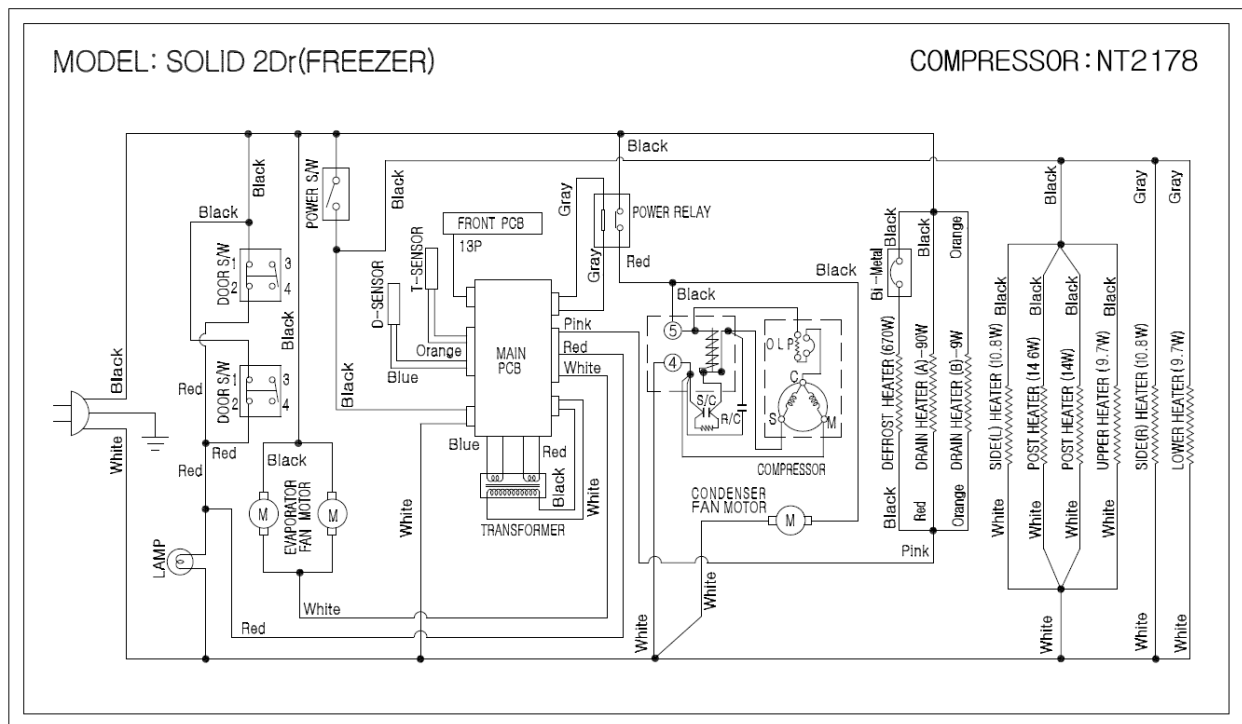


5. WIRING DIAGRAMS

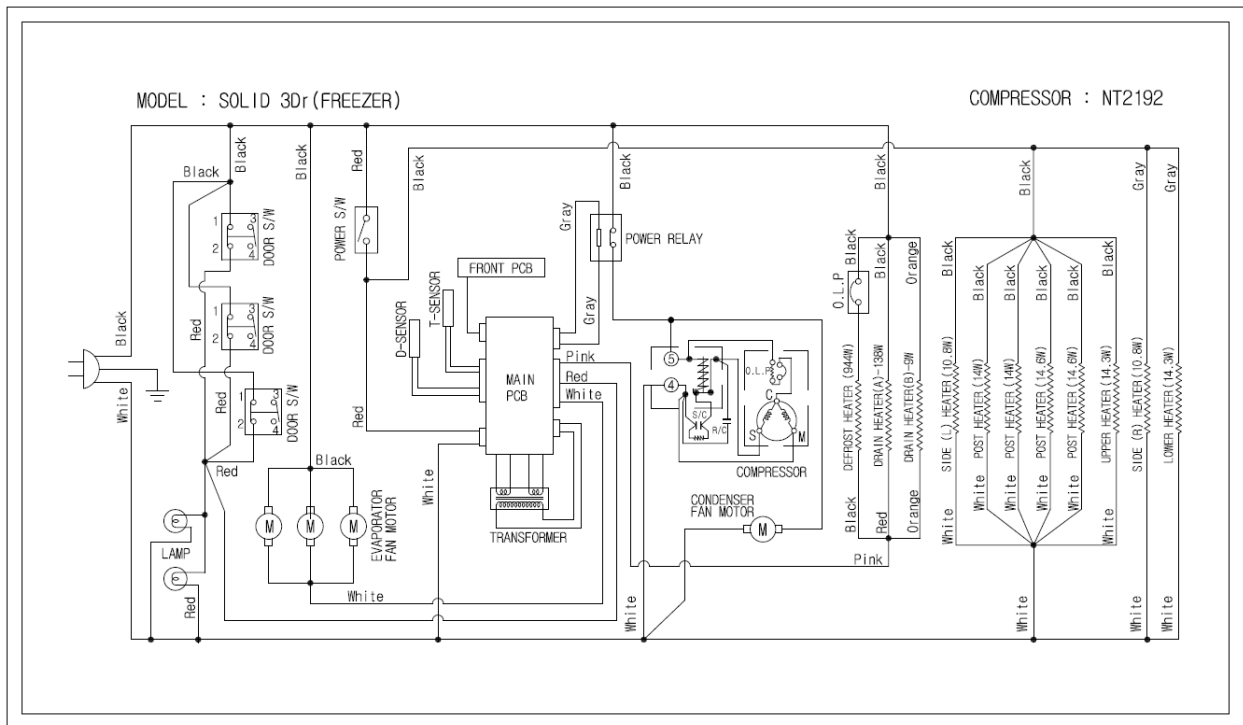
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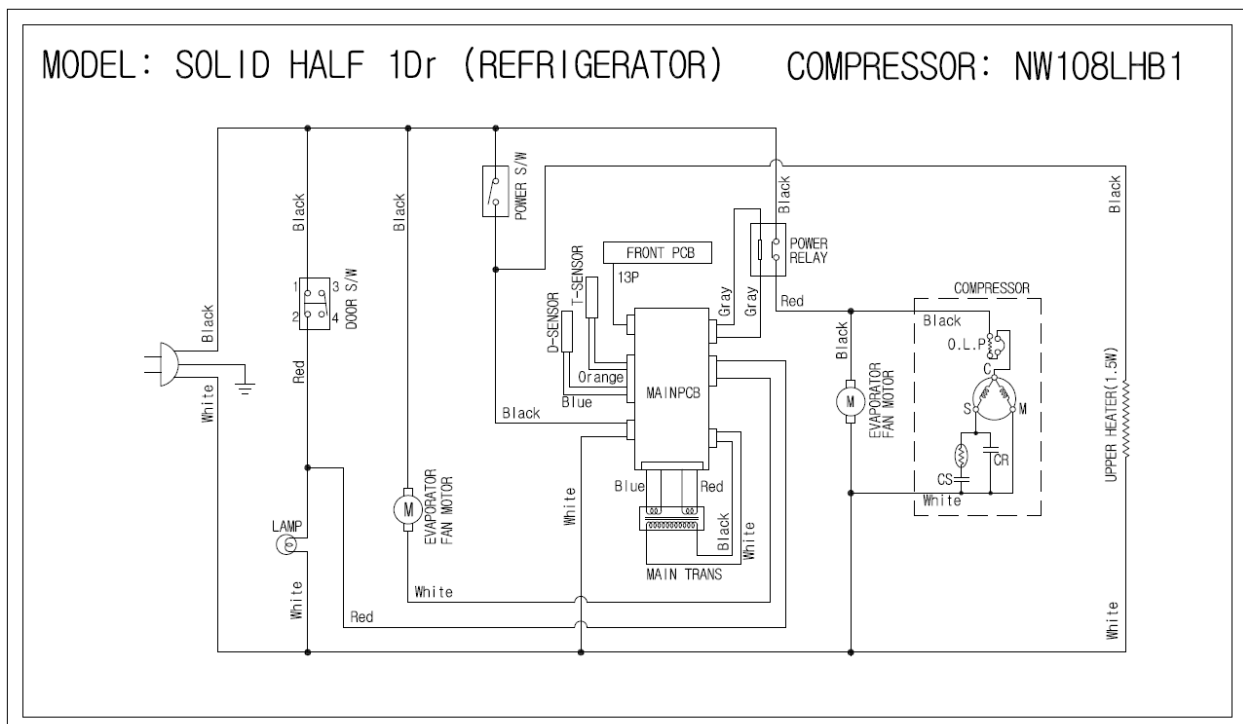
2) F49-S



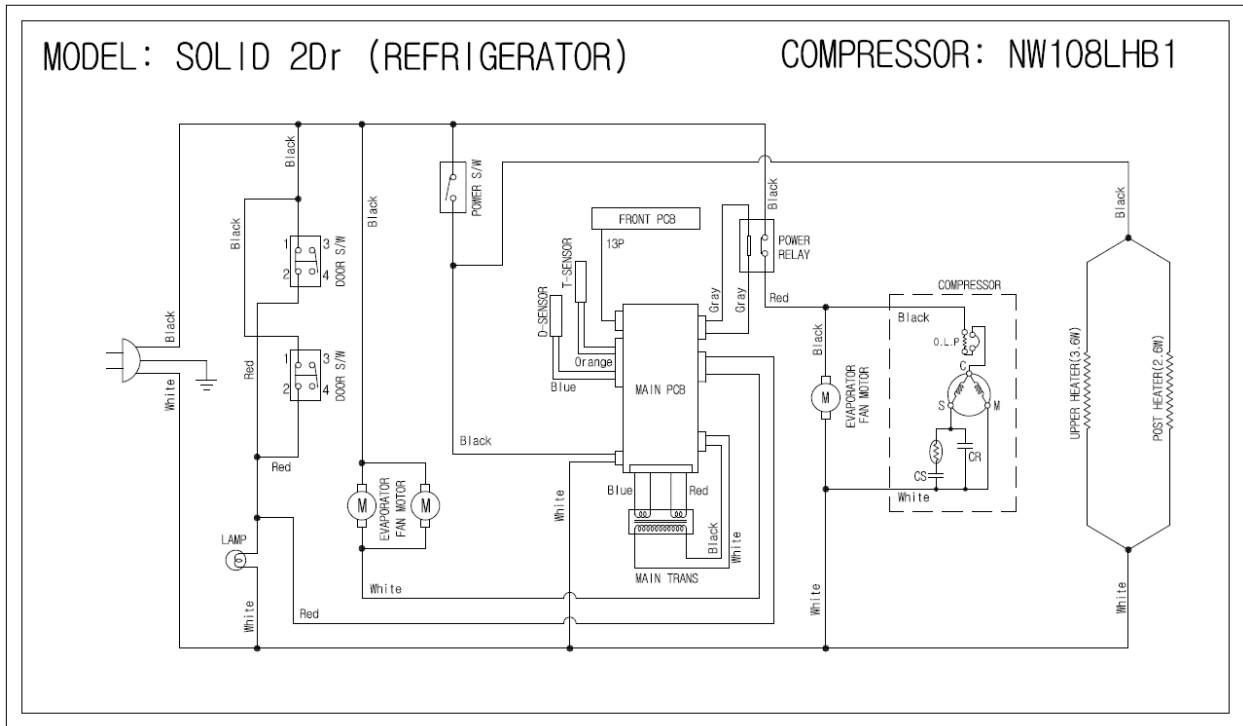
3) F72-S



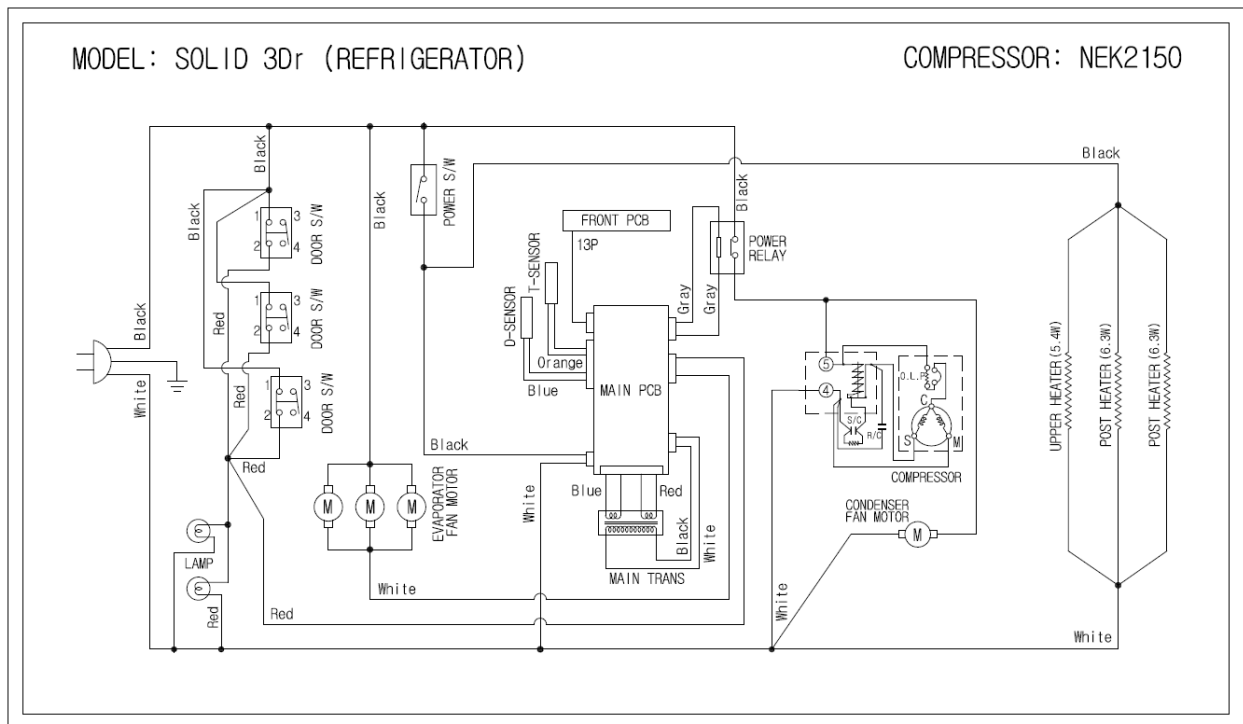
4) R23-S



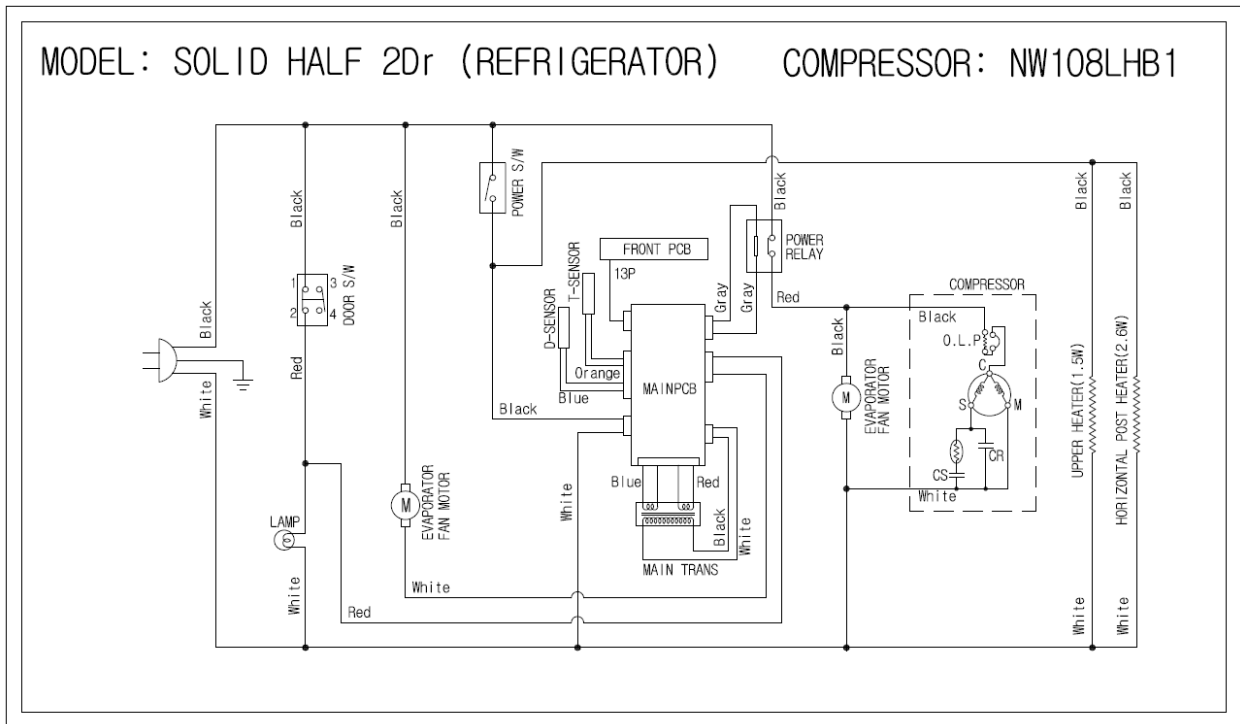
5) R49-S



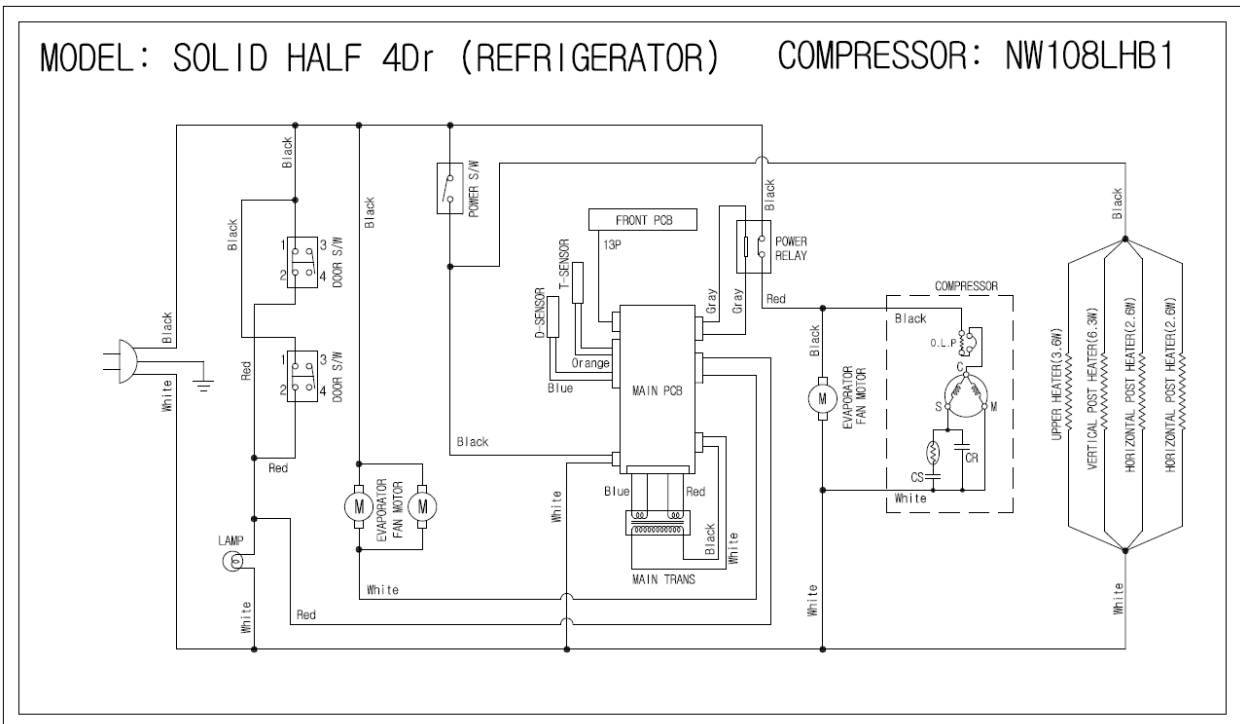
6) R72-S



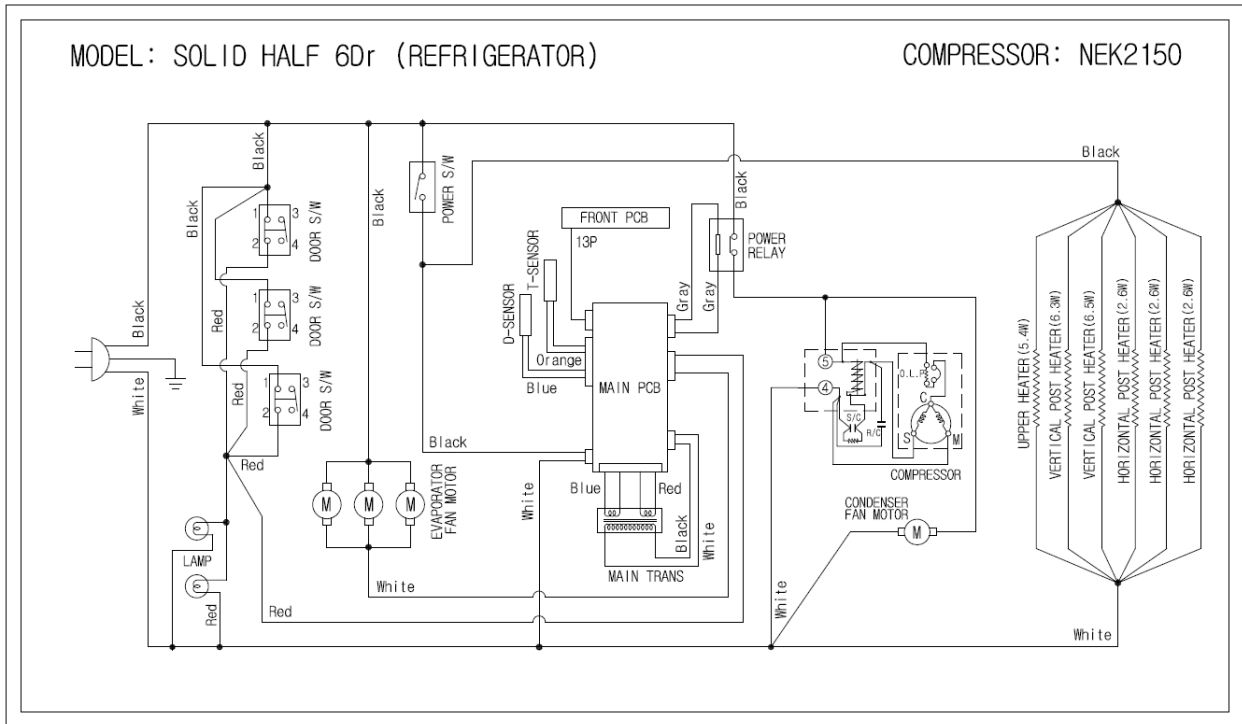
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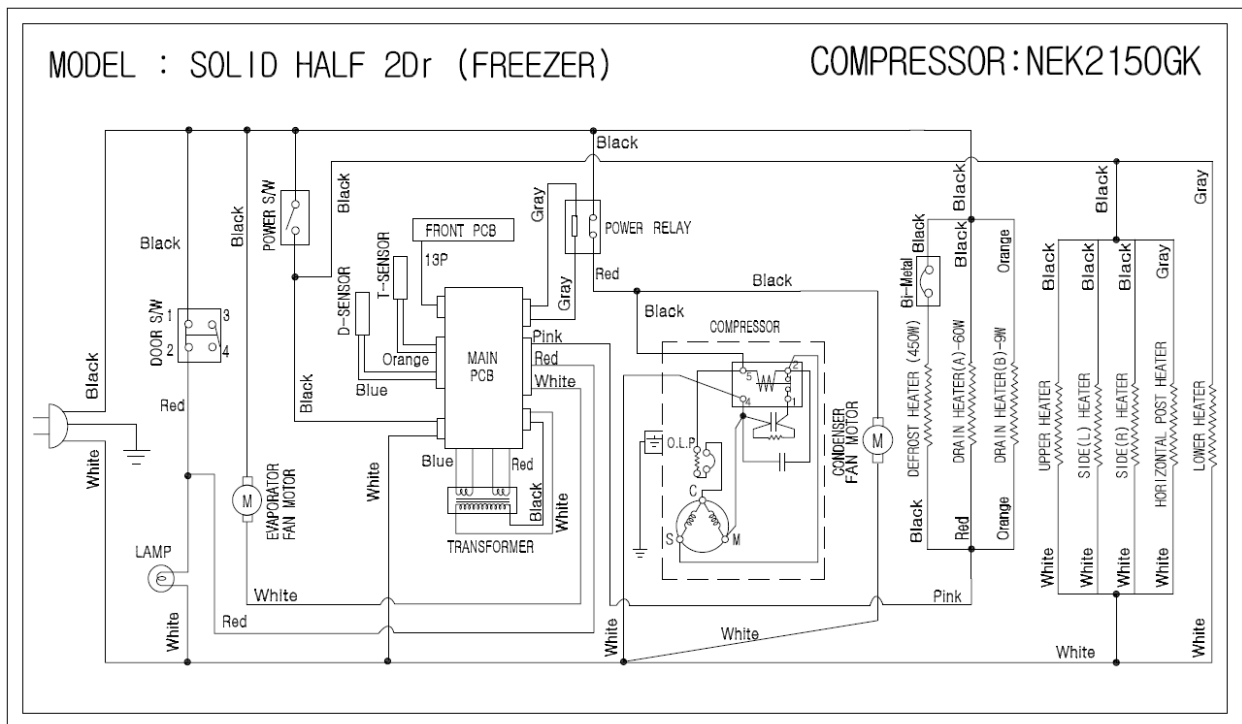
8) R49-SH



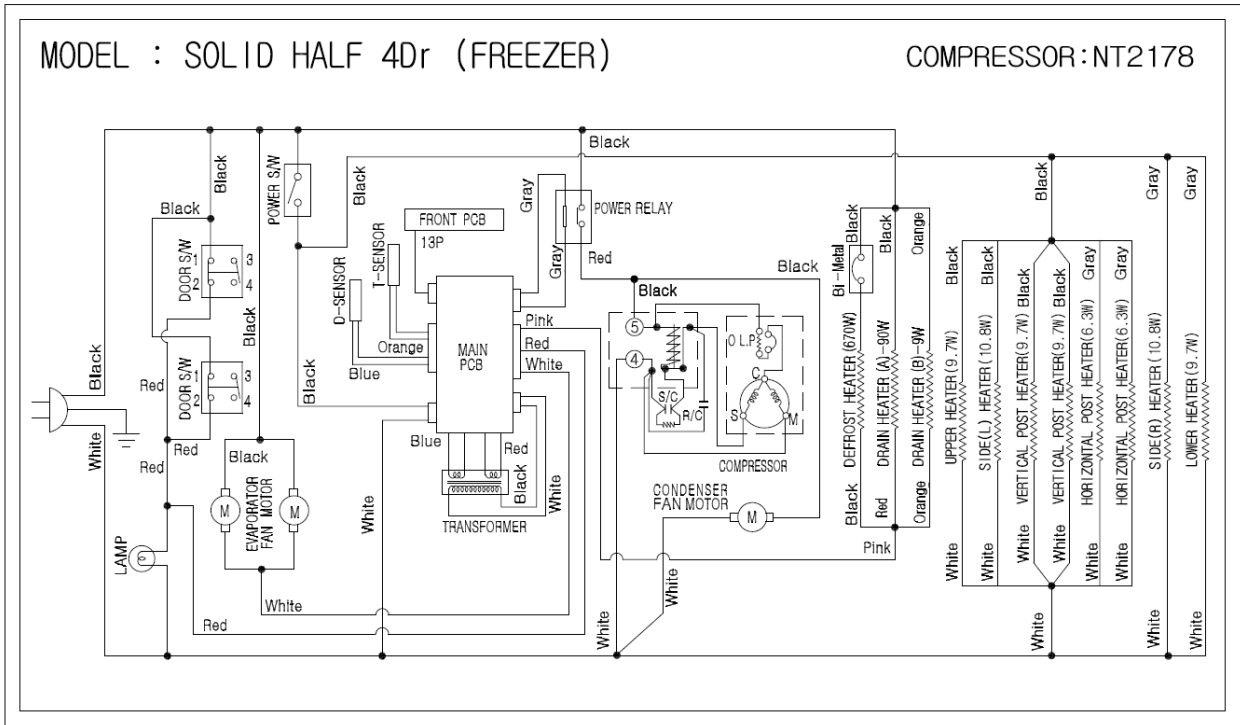
9) R72-SH



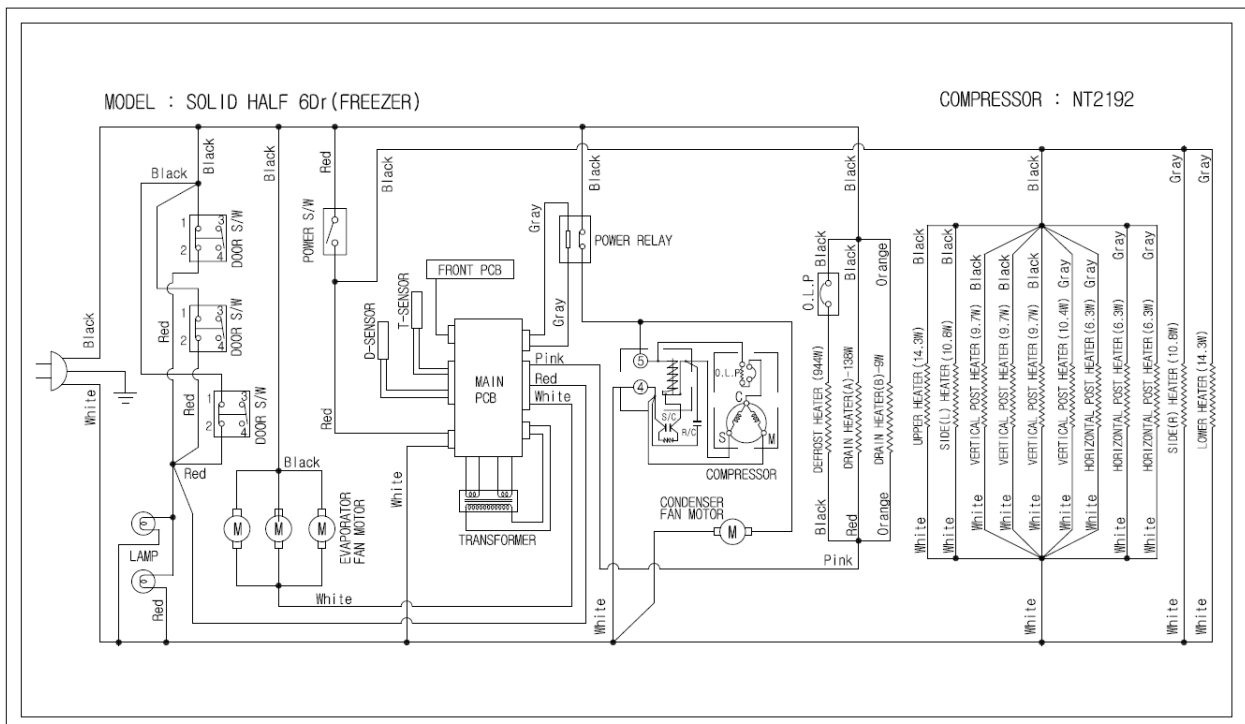
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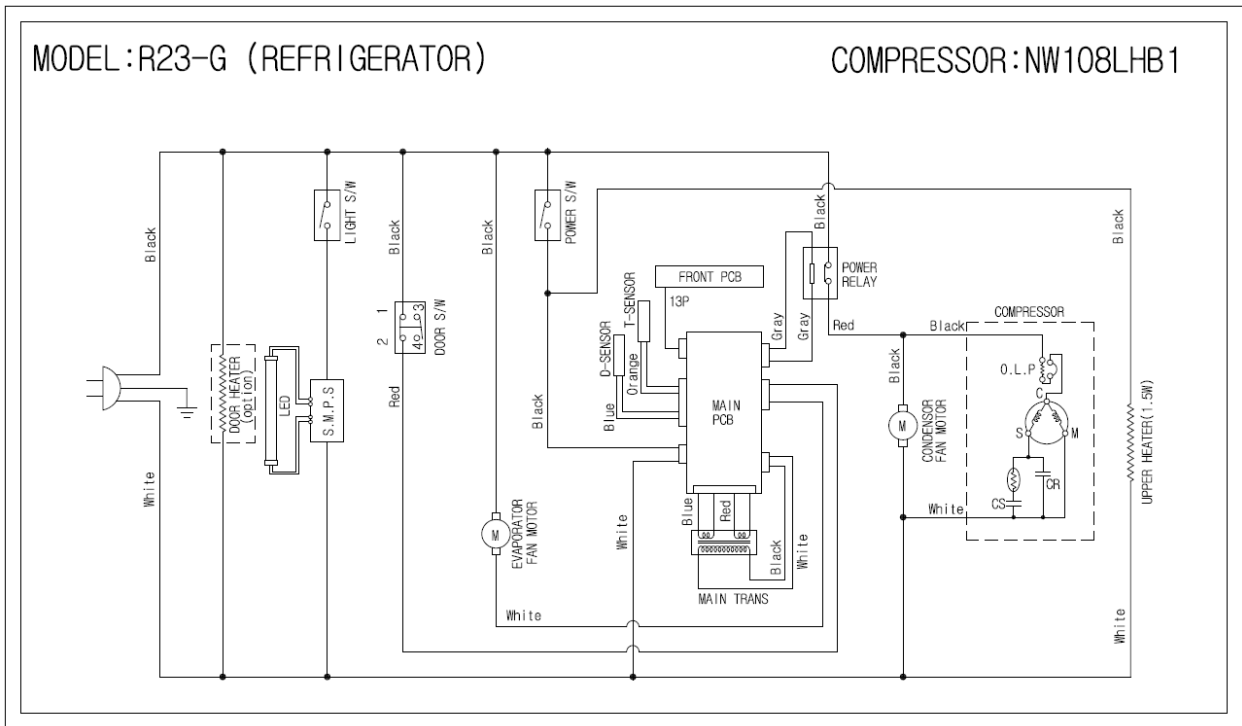
11) F49-SH



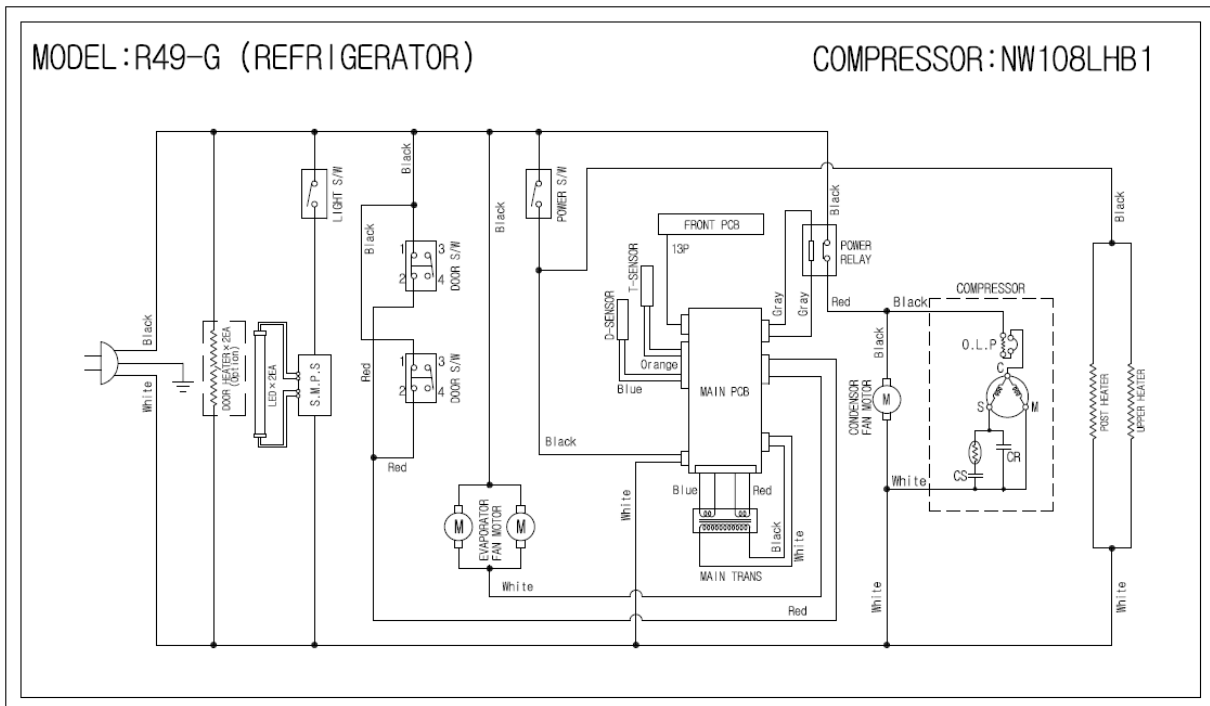
12) F72-SH



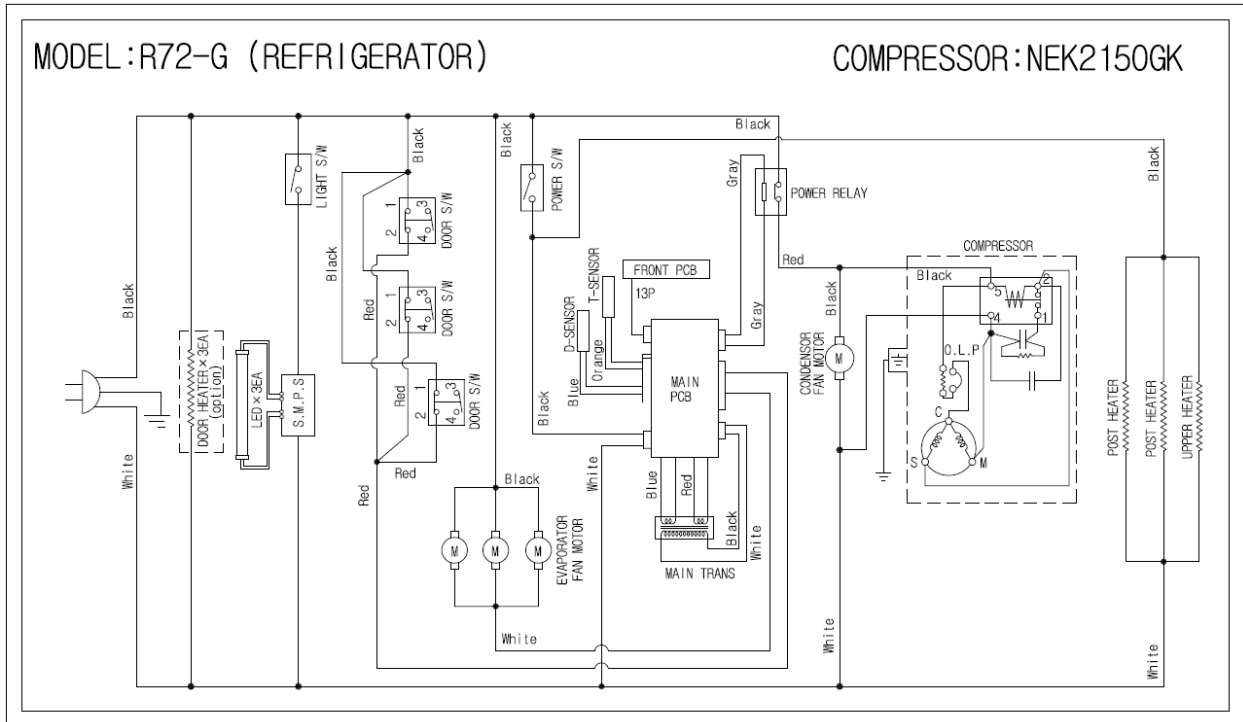
13) R23-G



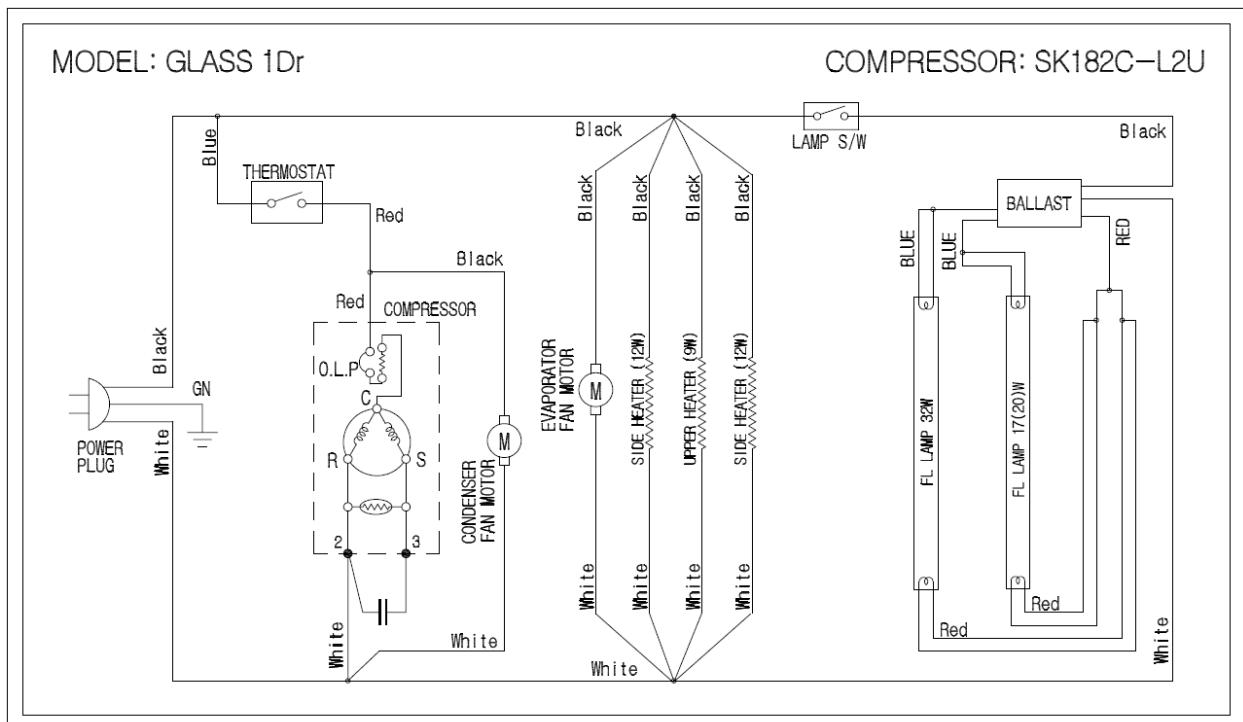
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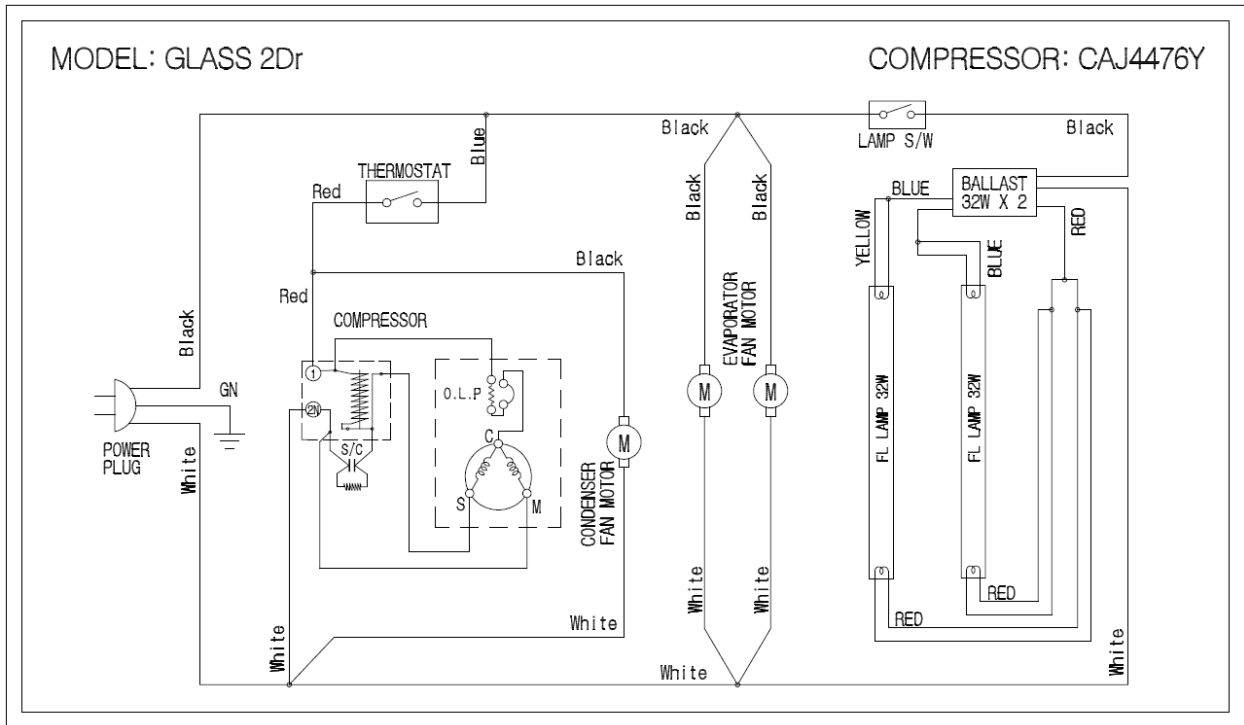
6) R72-G



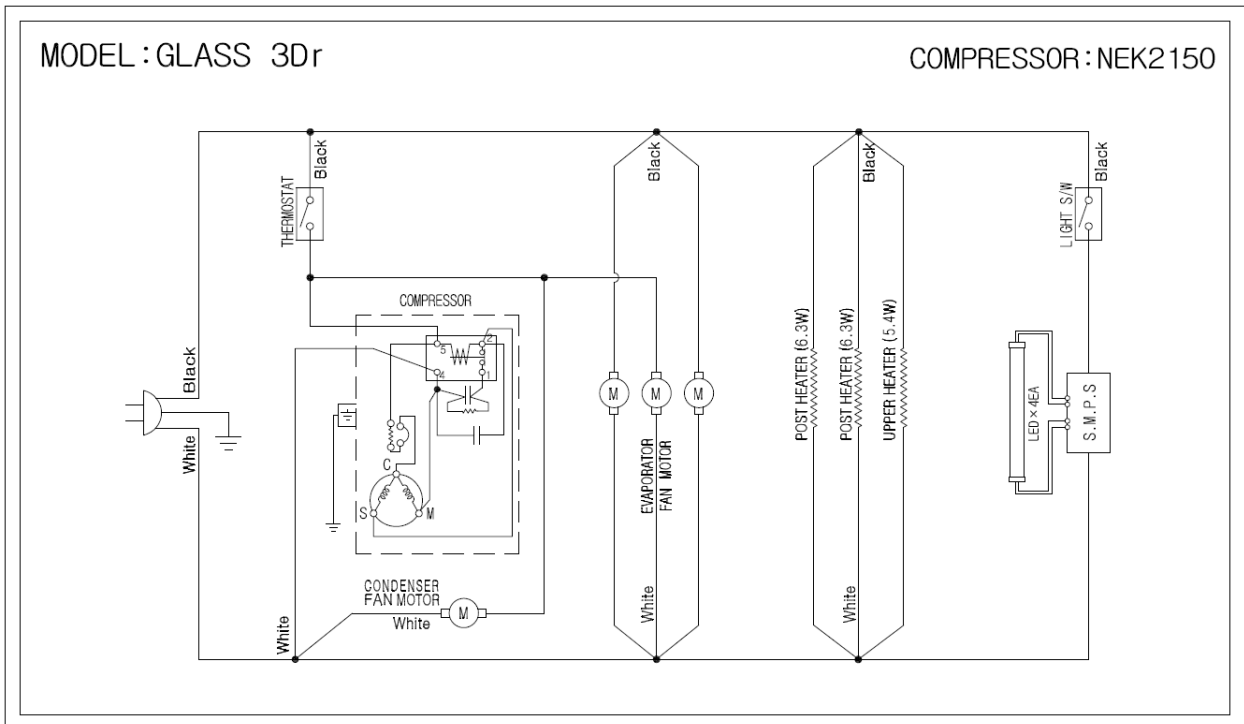
7) GR26H



8) GR48S

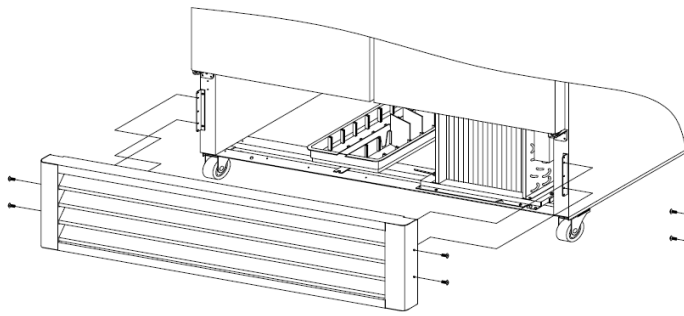


9) GR70H

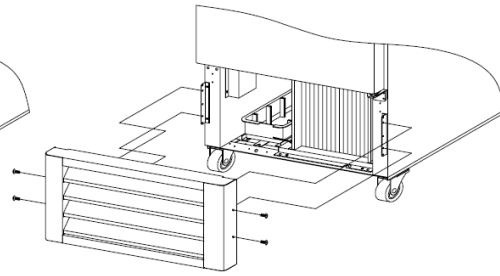


6. REPLACEMENT OF COMPONENTS

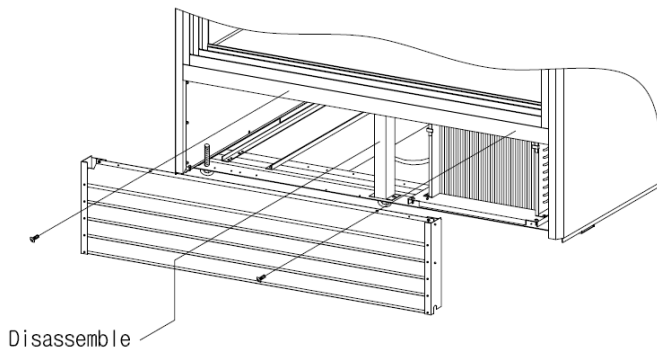
1) CONDENSING UNIT



(F49/F72/R49/R72/GR70H)

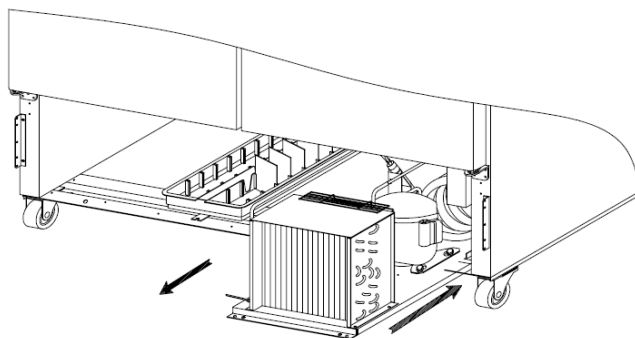


(F23/R23/GR26H)

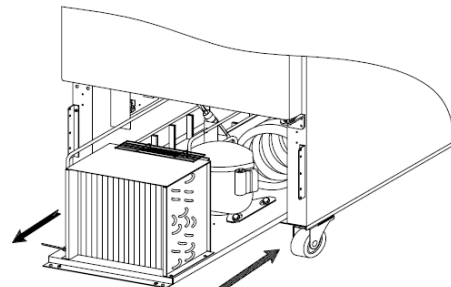


(GR48S)

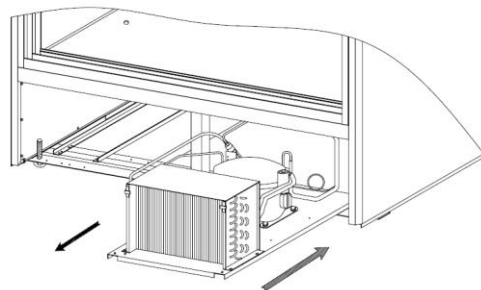
- a) Unplug the power cord before service.
- b) Remove screw securing the lower grille.
- * Remove screw securing the reinforce angle.(GR48S)



(F49/F72/R49/R72/GR70H)



(F23/R23/GR26H)



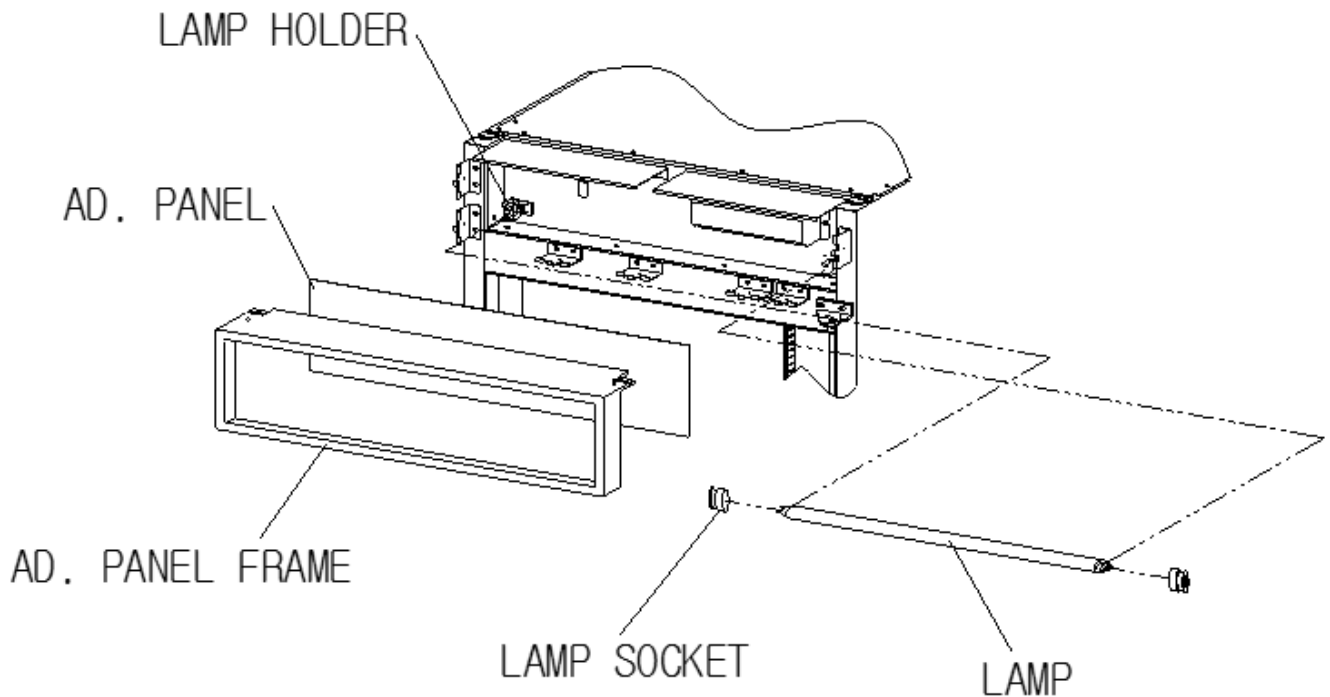
(GR48S)

- a) Separate the compressor harness out of the terminal block.
- b) Remove screws securing the unit base plate and pull out condensing unit with care.
- c) Replace the necessary component.

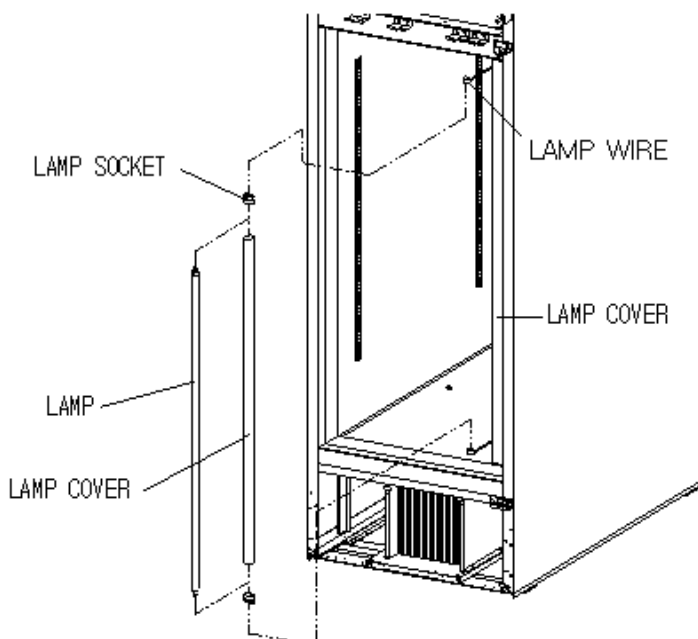
※ CAUTION

1. Please pull out or push in the unit base plate carefully to prevent capillary tube, pipes and wires from damaging.
2. It is recommend to arrange wires after you push in the unit base plate.

2-1) LAMP (GR26H)



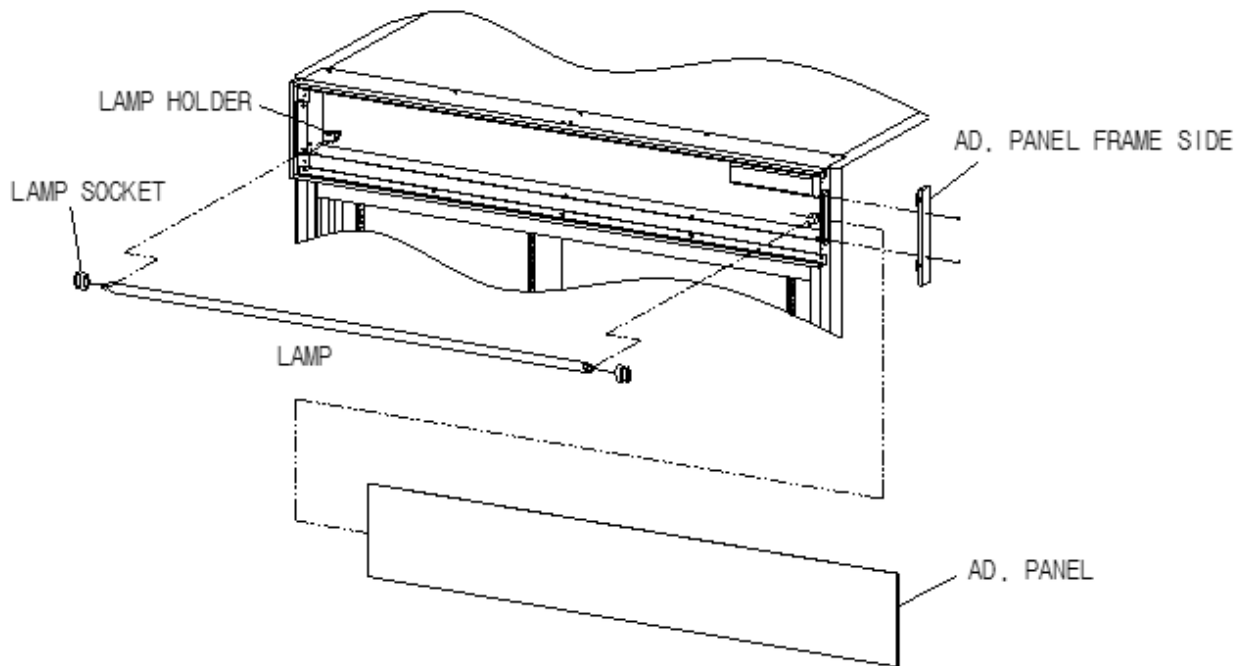
- a) Unplug the power cord before service.
- b) Remove screw securing the Ad. Panel Frame and pull out the Ad. Panel Frame with care.
- c) Separate the Ad. Panel.
- d) Separate the Lamp from the Lamp Holder.
- e) Separate the Lamp Socket and replace the Lamp with care.



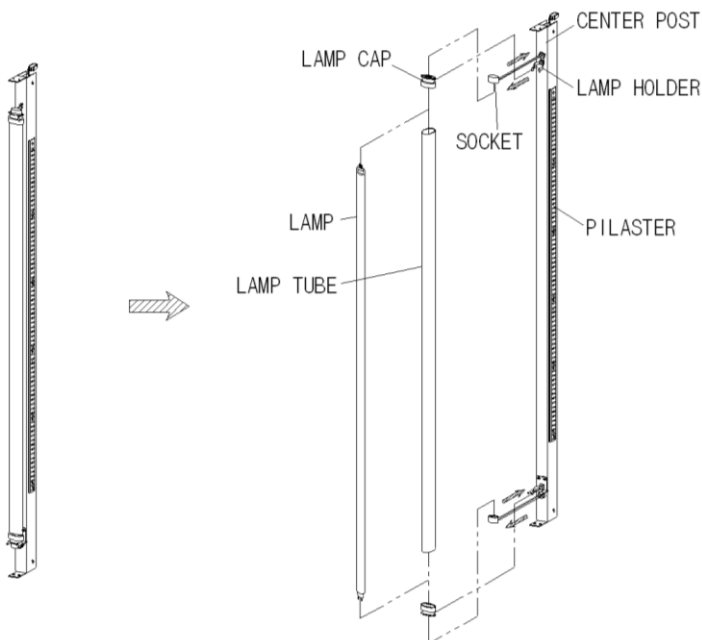
- a) Unplug the power cord before service.
- b) Separate the Lamp from the Lamp Holder.
- c) Separate the Lamp Socket and the Lamp wire.
- d) Replace the Lamp with care.

♣ Lamp Description: AC115V, F17T8/TL950

2-2) LAMP (GR48S)



- Unplug the power cord before service.
- Remove screw securing the Ad. Panel Side.
- Separate the Ad. Panel.
- Separate the Lamp from the Lamp Holder.
- Separate the Lamp Socket and replace the Lamp with care.



- Unplug the power cord before service.
- Separate the Lamp from the Lamp Holder.
- Separate the Lamp Socket and the Lamp wire.
- Replace the Lamp with care

♠ Lamp Description: AC115V, FHF32SSEX-D-5

B. OPERATION AND ELECTRONIC CONTROLLER FUNCTION

1. OPERATION FOR F23, F49, F72, R23, R49, R72 MODELS ----- B2

- 1) BASIC OPERATION
- 2) ELECTRONIC CONTROLLER SETTING MODE
- 3) NORMAL CONTROL PROCESS
- 4) ERROR CODE

2. OPERATION FOR GR26H, GR48S, GR70H MODELS ----- B12

- 1) BASIC OPERATION
- 2) DEFROST
- 3) CONTROL TEMPERATURE
- 4) LAMP

3. INSTRUCTION FOR RE-HINGING DOOR ----- B13

1. OPERATION FOR F23/F49/F72(FREEZER), R23/R49/R72(REFRIGERATOR)

1) BASIC OPERATION

- ① Plug in the power cord and turn on the power switch located on the bottom of the top grille right side.
[The unit should be plugged into a **115V±10%, 60Hz** (F23, F49, F72, R23, R49, R72 models)]
- ② Display panel will be lit for 2 seconds with buzzer then displays cabinet interior temperature (T-sensor) and running conditions.
 - * Freezer : If cabinet interior temperature is higher than 14°F (-10°C) compressor will run without delay, and lower than 14°F (-10°C), compressor will run after 3 minutes.
 - * Refrigerator : If cabinet interior temperature is higher than 50°F (10°C) compressor will run without delay, and lower than 50°F (10°C), compressor will run after 3 minutes.
- ③ The default OPERATING TEMPERATURE SETTING
 - * Freezer :Temperature set point (setting mode sign [St]) is -5°F (-20°C)
Temperature differential set point (setting mode sign [di]) is 8°F (4°C)
Range of adjustable set point: -22°F ~ 8°F (-30°C ~ -10°C)
 - * Refrigerator : Temperature set point (setting mode sign [St]) is 36°F (4°C) in solid door refrigerator
Temperature set point (setting mode sign [St]) is 35°F (4°C) in glass door refrigerator
Temperature differential set point (setting mode sign [di]) is 8°F (4°C)
Range of adjustable set point: 25°F ~ 50°F (2°C ~ 10°C)
- ④ Defrost frequency
 - * Freezer : It is controlled by MICOM and the default defrost frequency is 12 hours.
 - * Refrigerator : It is controlled by MICOM and the default defrost frequency is 12 hours.
- ⑤ The light inside the cabinet comes on when the door is opened in Solid Door models while light is always on in Glass Door models.
The cabinet interior cooling fan has 3 seconds delay when the door is closed.
When COMP. is OFF, EVA. fan repeats ON and OFF according to setting times
If door is opened , EVA. fan OFF and then closed the door, EVA. fan repeats ON and OFF according to setting times

⑥ If door is opened, door open warning sign (LED) will turn on.

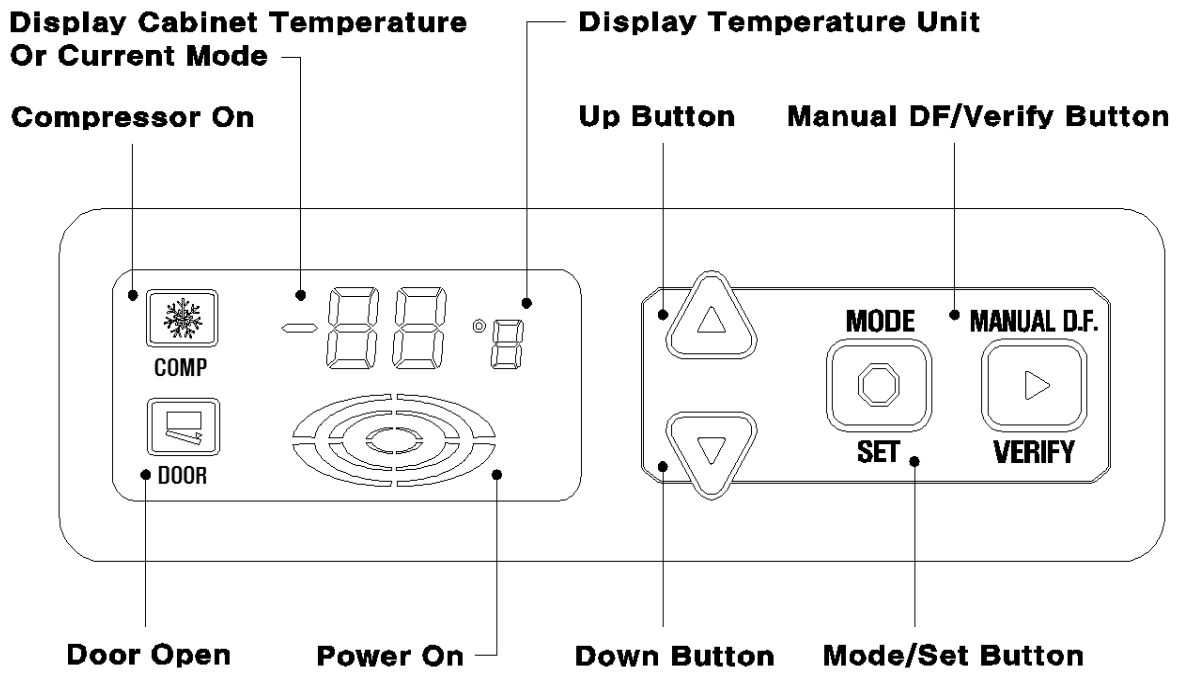
If door is opened more than 30 seconds, the sound alarm beeps 3 times,
if open more than 60 seconds, the sound alarm beeps 5 times and if open more than 5 minutes,
the sound alarm will beep continuously.

⑦ Cabinet interior temperature

* Freezer : If it is higher than 14°F (-5°C), the panel displays [Hi] and
lower than -50°F (-40°C), the panel displays [Lo].

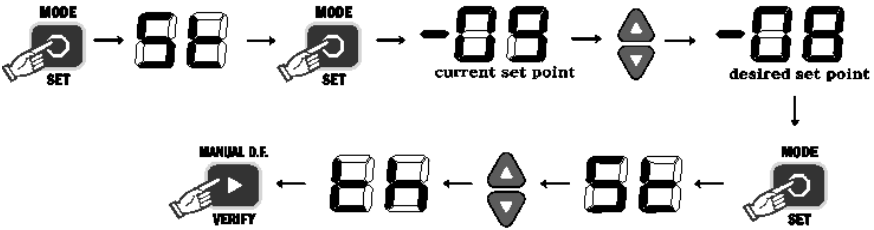
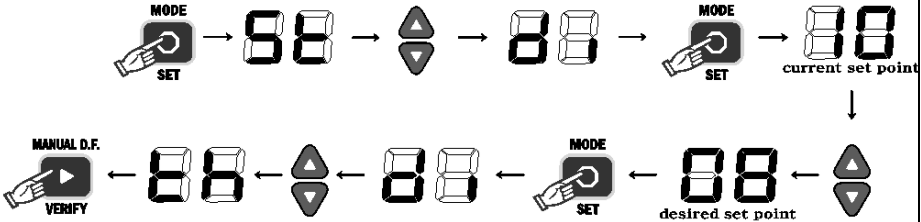
* Refrigerator : If it is higher than 68°F (15°C), the panel displays [Hi] and
lower than 14°F (-2°C), the panel displays [Lo].

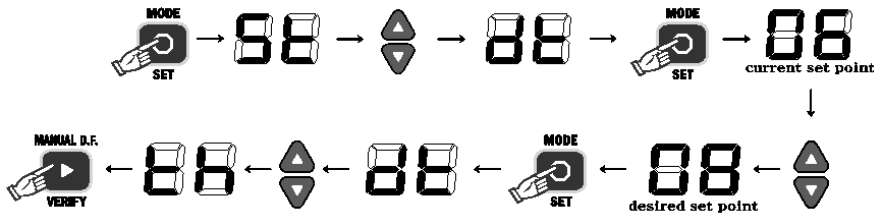
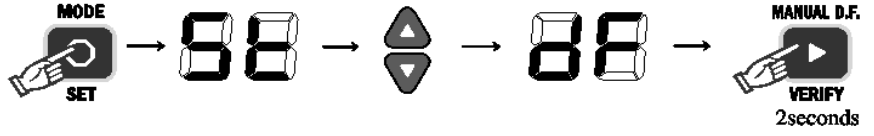

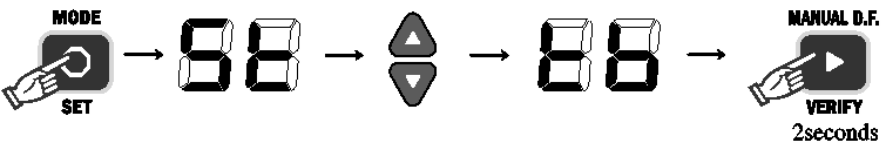
2) ELECTRONIC CONTROLLER SETTING MODE



| Display | Description |
|---------|--|
| St | Temperature Setting Mode |
| di | Temperature Differential Setting Mode |
| th | Cabinet Temperature Verification Mode |
| dt | Defrost Frequency Setting Mode |
| tb | Rapid Freeze Mode (Freezer Only) |
| dF | Forced Defrost Mode |
| SE | Temperature Unit Converter mode(°F↔°C) |

※ In converting Temperature Unit (°F↔°C), 1°F (1°C) deviation can occur.

| No | Setting Mode | Mode Sign | How to Setting |
|----|---------------------------------------|-----------|---|
| 1 | Temperature Setting Mode | "St" | <p>1.To enter this mode, press [MODE/SET] and [UP or DOWN] simultaneously until [St] is displayed.</p> <p>2. Then press [MODE/SET] to see current temperature set point.</p> <p>3. To change the set point, press [UP or DOWN] until the desired value is displayed.</p> <p>4. At the end of the sequence, press [MODE/SET] to set the value.</p> <p>5. To display the cabinet temperature again, press [UP or DOWN] until [th] is displayed and then press [VERIFY].</p>  <p>6. Range of adjustable set point : -22°F~8°F (-30°C~ -10°C) (Freezer) Range of adjustable set point : 25°F~50°F (2°C ~ 10°C) (Refrigerator)</p> |
| 2 | Temperature Differential Setting Mode | "di" | <p>1. To enter this mode, press [MODE/SET] and [UP or DOWN] simultaneously until [di] is displayed.</p> <p>2. Then press [MODE/SET] to see current temperature differential.</p> <p>3. To change the set point, press [UP or DOWN] until the desired value is displayed.</p> <p>4. At the end of the sequence, press [MODE/SET] to set the value.</p> <p>5. To display the cabinet temperature again, press [UP or DOWN] until [th] is displayed and then press [VERIFY].</p>  <p>6. Range of adjustable set point : 4°F~16°F (2°C~10°C) (Freezer) Range of adjustable set point : 4°F~16°F (2°C~10°C) (Refrigerator) (The Unit of Setting : 2°F(2°C))</p> |

| No | Setting Mode | Mode Sign | How to Setting |
|----|------------------------------------|------------|---|
| 3 | Defrost Frequency Setting Mode | "dt" | <p>1. To enter this mode, press [MODE/SET] and [UP or DOWN] simultaneously until [dt] is displayed.</p> <p>2. Then press [MODE/SET] to see current defrost frequency.</p> <p>3. To change the defrost frequency, press [UP or DOWN] until the desired value is displayed.</p> <p>4. At the end of the sequence, press [MODE/SET] to set the value.</p> <p>5. To display the cabinet temperature again, press [UP or DOWN] until [th] is displayed and then press [VERIFY].</p>  <p>6. Range of adjustable defrost frequency : 4Hr to 12Hr (The Unit of frequency : 2Hr)</p> |
| 4 | Forced Defrost Mode | "dF" | <p>1. To enter this mode, press [MODE/SET] and [UP or DOWN] simultaneously until [dF] is displayed.</p> <p>2. Then press [MANUAL DF] more than 2 seconds to start forced defrost.</p>  <p>3. During defrosting, [dF] is displayed instead of the cabinet temperature.</p> |
| 5 | Cancelation of Forced Defrost Mode | Flash "dF" | <p>1. During forced defrost, press [MANUAL DF] more than 2 seconds to stop forced defrost.</p> <p>2. The [dF] will be flash 5 times and then return to normal display mode.</p>  |
| 6 | Rapid Freeze Mode (Freezer) | "tb" | <p>1. To enter this mode, press [MODE/SET] and [UP or DOWN] simultaneously until [tb] is displayed.</p> <p>2. Then press [MODE/SET] more than 2 seconds to start rapid freeze mode.</p>  <p>3. During rapid freeze, [tb] is displayed instead of the cabinet temperature.</p> |

| No | FUNCTION | FUNCTION SPEC | | | | | | | | | | | | | | | |
|----------------------|--|---|---------|-----------------|-------------|----------|---|---|---------|---|--|-------|--|------------------|----------------------|--|---|
| 3 | Rapid Freeze (Freezer) | <ol style="list-style-type: none"> Compressor and cabinet interior cooling fan is running continuously for 120 minutes without control by sensor. It is impossible to set the other modes during Rapid Freeze Mode. It is necessary to cancel the Rapid Freeze Mode before setting the other modes. If Defrost Mode become in the Rapid Freeze Mode duration, Defrost Mode will start after the Rapid Freeze Mode finished. Rapid Freeze Mode will be start after Defrost Mode finished not during Defrost Mode. [tb] is displayed from starting the Rapid Freeze Mode. | | | | | | | | | | | | | | | |
| 4 | Defrost (Freezer) | <ol style="list-style-type: none"> Defrost process is like below <table border="1" data-bbox="427 633 1501 1361"> <thead> <tr> <th>Process</th> <th>Controlled Part</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Pre-Cool</td> <td>Compress or On Evaporator Fan On Condenser Fan On Defrost Heater Off</td> <td>① It prevent exceed temperature rise during defrosting, ② Cycle is run continuously until current compressor cut-out temperature reach. ③ Maximum time: 30minutes</td> </tr> <tr> <td>Defrost</td> <td>Compress or Off Evaporator Fan Off Condenser Fan Off Defrost Heater On</td> <td>① Preprogrammed frequency interval ② If D-sensor is higher than 50°F, defrost heater off ③ Maximum time: 40minutes</td> </tr> <tr> <td>Pause</td> <td>Compress or Off Evaporator Fan Off Condenser Fan Off Defrost Heater Off</td> <td>① Time: 5minutes</td> </tr> <tr> <td>Evaporator Fan Delay</td> <td>Compress or On Evaporator Fan Off Condenser Fan On Defrost Heater Off</td> <td>① If D-sensor is lower than -4°F, fan delay terminated ② Maximum time: 10minutes</td> </tr> </tbody> </table> | Process | Controlled Part | Description | Pre-Cool | Compress or On Evaporator Fan On Condenser Fan On Defrost Heater Off | ① It prevent exceed temperature rise during defrosting, ② Cycle is run continuously until current compressor cut-out temperature reach. ③ Maximum time: 30minutes | Defrost | Compress or Off Evaporator Fan Off Condenser Fan Off Defrost Heater On | ① Preprogrammed frequency interval ② If D-sensor is higher than 50°F, defrost heater off ③ Maximum time: 40minutes | Pause | Compress or Off Evaporator Fan Off Condenser Fan Off Defrost Heater Off | ① Time: 5minutes | Evaporator Fan Delay | Compress or On Evaporator Fan Off Condenser Fan On Defrost Heater Off | ① If D-sensor is lower than -4°F, fan delay terminated ② Maximum time: 10minutes |
| Process | Controlled Part | Description | | | | | | | | | | | | | | | |
| Pre-Cool | Compress or On Evaporator Fan On Condenser Fan On Defrost Heater Off | ① It prevent exceed temperature rise during defrosting, ② Cycle is run continuously until current compressor cut-out temperature reach. ③ Maximum time: 30minutes | | | | | | | | | | | | | | | |
| Defrost | Compress or Off Evaporator Fan Off Condenser Fan Off Defrost Heater On | ① Preprogrammed frequency interval ② If D-sensor is higher than 50°F, defrost heater off ③ Maximum time: 40minutes | | | | | | | | | | | | | | | |
| Pause | Compress or Off Evaporator Fan Off Condenser Fan Off Defrost Heater Off | ① Time: 5minutes | | | | | | | | | | | | | | | |
| Evaporator Fan Delay | Compress or On Evaporator Fan Off Condenser Fan On Defrost Heater Off | ① If D-sensor is lower than -4°F, fan delay terminated ② Maximum time: 10minutes | | | | | | | | | | | | | | | |
| | Defrost (Refrigerator) | <ol style="list-style-type: none"> Defrost cycle can be set up by button on control panel from 4h to 12hr. (measurement unit: 2hr / default: 12hr) Defrost control change <ol style="list-style-type: none"> Defrost start : according to the defrost cycle by set up. Defrost end : Comp OFF (during MAX time), Eva fan ON, dF ON (on display screen) Defrost ends regardless of time when the temp is higher than pre-set defrost end temp. 'dF' is displayed on screen for 3min after defrost end. <ul style="list-style-type: none"> - Defrost end time (MAX) : 30min - Defrost end temp : 41°F (5°C) | | | | | | | | | | | | | | | |

| No | FUNCTION | FUNCTION SPEC |
|----|---------------------------------------|--|
| 5 | Default Setting (Freezer) | 1. Temperature Setting : -5°F(-20°C) , Temp.Differential Setting : 8°F(4°C) in display 2. Displayed Temperature : -8°F(-21°C)(comp. off) ~ 0°F(-17°C)(comp. on) owing to correction factor 3. T-Sensor Operating Temperature : -9°F(-22°C)(comp. off) ~ -1°F(-18°C)(comp. on) 4. Defrost Frequency Setting : 12Hr |
| | Default Setting (Refrigerator) | 1. Temperature Setting : 36°F(4°C) , Temperature Differential Setting : 8°F(4°C) 2. Operating Temperature : 40°F(6°C)(comp. on) ~ 32°F(2°C)(comp. off) 3. Defrost Frequency Setting : 12Hr |
| 6 | Setting Back UP | 1. In case of unexpected power failure or power off, does not require resetting. 2. The setting is memorized. |
| 7 | Error Display | 1. If cabinet interior temp. is higher than 14°F(-5°C) Freezer or 68°F (15°C) Refrigerator, the panel displays [Hi] , and lower than -50°F(-40°C) Freezer or 14°F(-2°C) Refrigerator, the panel displays [Lo] . 2. Press [down] button 5 times with pressing and holding [up] button, the Error display mode is activated and it displays errors. 3. When there are more than 2 errors, the errors are displayed alternately. 4. If you press [MODE/SET] button, the error display mode will be finished |

4) ERROR CODE

4-1) Freezer

| Error Code | Condition | Possible Cause | When error occurring, operation |
|------------|---|---|--|
| C1 | During normal mode (not defrost mode), D-sensor sensing is higher than 23°F and Compressor does not run for 60min after compressor off | <ul style="list-style-type: none"> • Ambient Temperature too low (below-5°F) • T-sensor defective | <ol style="list-style-type: none"> 1) Register "C1" 2) Compressor ON:20Minutes 3) Compressor OFF:5Minutes 4) Operate 2),3) three times 5) Operate Normal Mode |
| C2 | Entering defrost mode, D-sensor sensing is higher than 50°F and T-sensor sensing is lower than 14°F | <ul style="list-style-type: none"> • D-sensor defective | <ol style="list-style-type: none"> 1) Register "C2" 2) Operate Pre-Cool step: 30Minutes 3) Defrost Heater ON: 20Minutes 4) Operate the rest Defrost Mode |
| C3 | After defrost mode elapsed for 40minutes, D-sensor sensing is lower than 23°F | <ul style="list-style-type: none"> • D-sensor defective • Defrost heater defective | <ol style="list-style-type: none"> 1) Register "C3" 2) Operate the rest Defrost Mode |
| C4 | T-sensor sensing is more than 18°F higher than temperature set point for 4hours Additional Possible Cause: Too many hot goods loaded!! | <ul style="list-style-type: none"> • Refrigerant leak • Control board defective • Door not sealing • Not enough defrosts • Condenser dirty • Sensor defective | <ol style="list-style-type: none"> 1) Register "C4" 2) Compressor ON:20Minutes 3) Compressor OFF:5Minutes 4) Operate 2),3) three times 5) Operate Normal Mode |
| C- | No error code | <ul style="list-style-type: none"> • N/A | N/A |

4-2) Refrigerator

| Error Code | Condition | Possible Cause | When error occurring |
|------------|---|--|---|
| C1 | During normal mods, T-sensor sensing lasts "Lo" status more than 60 minutes | <ul style="list-style-type: none"> • T-Sensor defective • Lead defective | <ol style="list-style-type: none"> 1) Register "C1" 2) Compressor ON : 15 Minutes 3) Compressor OFF: 5 Minutes 4) Operate 2), 3) repeatedly until the error is clear 5) Operate Normal Mode 6) Defrost cycle is operated by D-sensor |
| C2 | During normal mode T-sensor sensing lasts "Hi" status more than 60 minutes | <ul style="list-style-type: none"> • Sensor housing defective (due to other substance) • Sensor internal defective | <ol style="list-style-type: none"> 1) Register "C2" 2) Compressor OFF: 22 Minutes 3) Compressor ON : 15 Minutes 4) Operate 2), 3) repeatedly until the error is clear 5) Operate Normal Mode 6) Defrost cycle is operated by D-sensor |
| C3 | After defrost mode elapsed for 30 minutes. D-sensor sensing is lower than 32°F | <ul style="list-style-type: none"> • Not enough defrosts | <ol style="list-style-type: none"> 1) Register "C3" 2) Error check 3) Main power reset |
| C4 | T-Sensor sensing is more than 18°F higher than temperature set point for 4 hours and more | <ul style="list-style-type: none"> • Too many hot goods loaded • Refrigerant leak • Control board defective • Door not sealing • Not enough defrosts • Condenser dirty • Sensor defective | <ol style="list-style-type: none"> 1) Register "C4" 2) Compressor OFF: 15 Minutes 3) Compressor ON : 5 Minutes 4) Operate 2), 3) repeatedly until the error is clear 5) Operate Normal Mode 6) Defrost cycle is operated by D-sensor |
| C5 | D-Sensor Sensing is over 140°F or under -55.4°F for 1 minute | <ul style="list-style-type: none"> • D-Sensor defective • Lead defective | <ol style="list-style-type: none"> 1) Register "C5" 2) Defrost end is operated by time (30 Minutes) |

2. OPERATION FOR GR26H, GR48S, GR70H MODELS

1) BASIC OPERATION

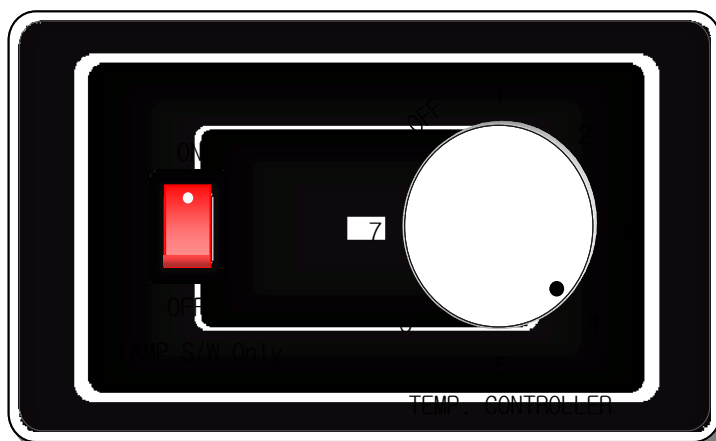
- ① Plug in the power cord and turn on the lamp switch located on the left of the temperature controller.
[The unit should be plugged into a **115V±10%, 60Hz**]
- ② The controller(Thermostat) has been preset "3" position at the factory

2) DEFROST

- ① This unit uses an off cycle defrost. No needs any programming.

3) CONTROL TEMPERATURE

- ① The temperature controller is mounted on top of the cabinet interior.
- ② The controller has been preset "4" position at the factory to maintain the average cabinet temperature of 38°F (3°C)



4) LAMP

- ① The light comes on when the lamp switch is on.

3. INSTRUCTION FOR RE-HINGING DOOR (F23/R23)

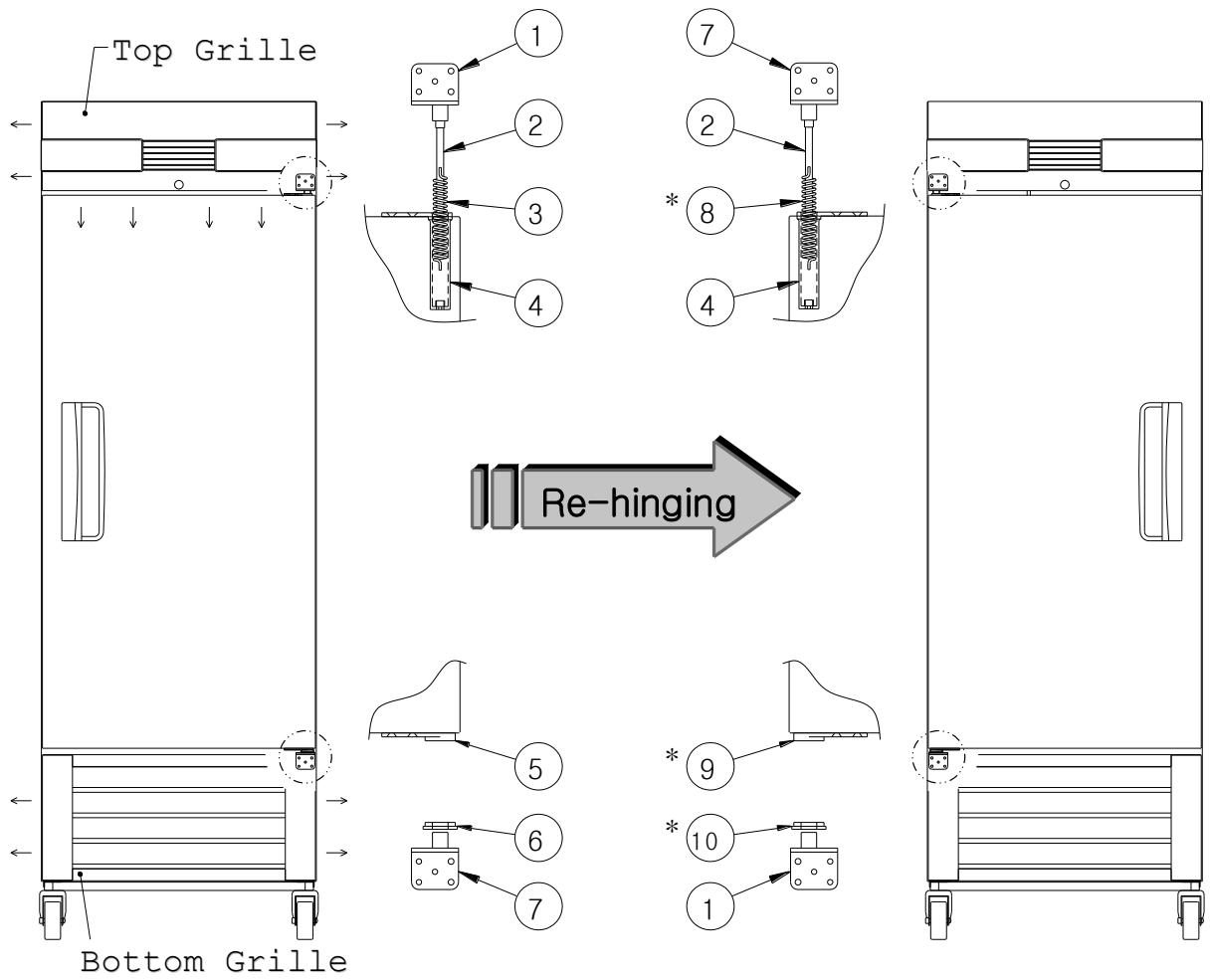


Figure 1.

Figure 2.

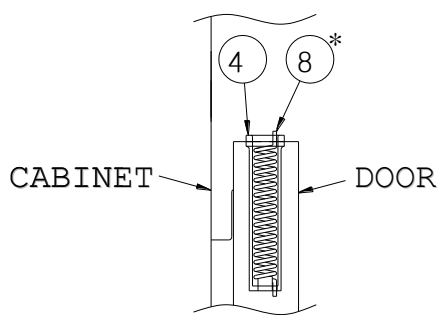


Figure 3.

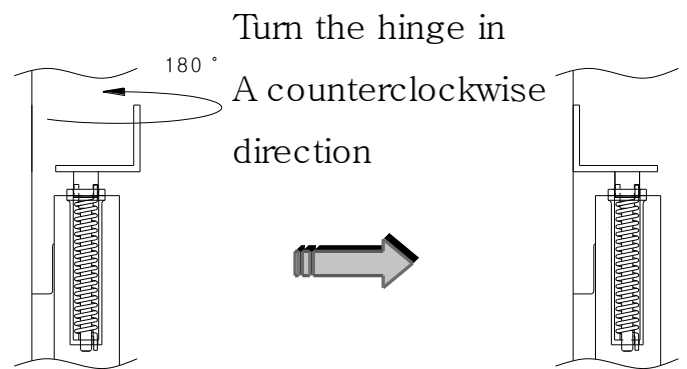


Figure 4.

■ To change the door mounting from right hand to left hand hinges you will need the following;

- Medium to large size Phillips Screwdriver
- 146413 Door Hinge Kit - Lower Left
- 146442 Door Hinge Kit - Top Left

STEP1. Remove the door (Figure 1)

- a) Remove the Top Grille (seven screws)
- b) Remove the Lower Grille (four screws)
- c) Remove the Top Hinge (#1) (four screws)
- d) Lift and remove the Door
- e) Remove the Bottom Hinge (#7) (four screws)

STEP2. Convert the Door

- a) Replace the Spring Guide (#4) with Bushing (#9)-(SEE 146413 HINGE KIT)
- b) Replace the Bushing (#5) with the Spring Guide (#4).

STEP3. Reinstall the Door (figure 2)

- a) Install Bottom Left Hinge (#1) with Bushing (#10)-(SEE 146413 HINGE KIT)
- b) Set Door in place on Bottom Hinge
- c) Insert Spring (#8) (silver) into Spring Guide (#4) as shown in figure 3-(SEE 146442 HINGE KIT)
- d) Install the Top Hinge (#7) as shown in figure 4-(SEE 146442 HINGE KIT)
(confirm that spring ends are engaged in the spring guide and hinge)
- e) Replace the Top and Lower Grilles

Note:

The silver colored spring (#8) is for left hand hinged door and the yellow color spring (#3) is for right hand hinged doors.

The letter "L" is marked on the left hand bushings (#9 and #10)

C. SERVICE LIST AND EXPLODED VIEW

1. COMMERCIAL FREEZERS AND REFRIGERATORS ----- C2

- 1) F23/F49/F72-S, R23/R49/R72-S SERVICE LIST & EXPLODED VIEW**
- 2) F23/F49/F72-SH, R23/R49/R72-SH SERVICE LIST & EXPLODED VIEW**
- 3) R23/R49/R72-G SERVICE LIST & EXPLODED VIEW**

2. MERCHANDISERS ----- C23

- 1) GR26H, GR48S, GR70H SERVICE LIST & EXPLODED VIEW**

1. COMMERCIAL FREEZERS AND REFRIGERATORS

1-1. SERVICE LIST (F23/F49/F72-S , R23/R49/R72-S)

| No. | PART NAME | PART No. | | | | | |
|------|--|----------|--------|--------|--------|--------|--------|
| | | F23-S | F49-S | F72-S | R23-S | R49-S | R72-S |
| 1 | Door Hinge Kit - Top Right | 146441 | 146441 | 146441 | 146441 | 146441 | 146441 |
| 2 | Door Hinge Kit - Top Left | NA | 146442 | 146442 | NA | 146442 | 146442 |
| 3 | Door Hinge Kit - Lower Right | 146412 | 146412 | 146412 | 146412 | 146412 | 146412 |
| 4 | Door Hinge Kit - Lower Left | NA | 146413 | 146413 | NA | 146413 | 146413 |
| 5 | Door Hinge Kit - Lower Center | NA | NA | 146414 | NA | NA | 146414 |
| 6 | Control PCB Assembly (115V) Used thru 12/2014 | 146416 | 146417 | 146418 | 150313 | 150313 | 150313 |
| | Control PCB Assembly (115V) Universal (°F/°C) PCB | 150539 | 150540 | 150541 | 150538 | 150538 | 150538 |
| 7 | Main Transformer (115V) | 146420 | 146420 | 146420 | 146420 | 146420 | 146420 |
| 8 | DC Relay | 146421 | 146421 | 146421 | 146421 | 146421 | 146421 |
| 9 | Relay Wire Harness | 146423 | 146423 | 146423 | 146423 | 146423 | 146423 |
| 10 | Front PCB Wire Harness | 146424 | 146424 | 146424 | 146424 | 146424 | 146424 |
| 11 | Temperature Sensor use up to 12/2011 | | | | 146425 | 146427 | 146429 |
| 11-1 | Sensor Kit (Includes T-sensor and D-sensor) | 146426 | 146428 | 146430 | 146426 | 146428 | 146430 |
| 12 | Pilaster | 146411 | 146411 | 146411 | 146411 | 146411 | 146411 |
| 13 | Shelf Clip | 146489 | 146489 | 146489 | 146489 | 146489 | 146489 |
| 14 | Door Assembly - Right Hand | 146436 | 146437 | 146439 | 146436 | 146437 | 146439 |
| 15 | Door Assembly - Left Hand | NA | 146438 | 146440 | NA | 146438 | 146440 |
| 16 | Door Gasket | 146444 | 146444 | 146445 | 146444 | 146444 | 146445 |
| 17 | Lamp (115V) | 146408 | 146408 | 146408 | 146408 | 146408 | 146408 |
| 18 | Lamp Socket | 146409 | 146409 | 146409 | 146409 | 146409 | 146409 |
| 19 | Lamp Cover | 146410 | 146410 | 146410 | 146410 | 146410 | 146410 |
| 20 | Top Grille Assembly (115V) | 146433 | 146434 | 146435 | 146433 | 146434 | 146435 |
| 21 | Top Grill Cover - Right | 146431 | 146431 | 146431 | 146431 | 146431 | 146431 |
| 22 | Front PCB Assembly Used thru 12/2014 | 146419 | 146419 | 146419 | 146419 | 146419 | 146419 |
| | Front PCB Assembly Universal (°F/°C) PCB | 150537 | 150537 | 150537 | 150537 | 150537 | 150537 |
| 23 | Control Decal | 146432 | 146432 | 146432 | 146432 | 146432 | 146432 |

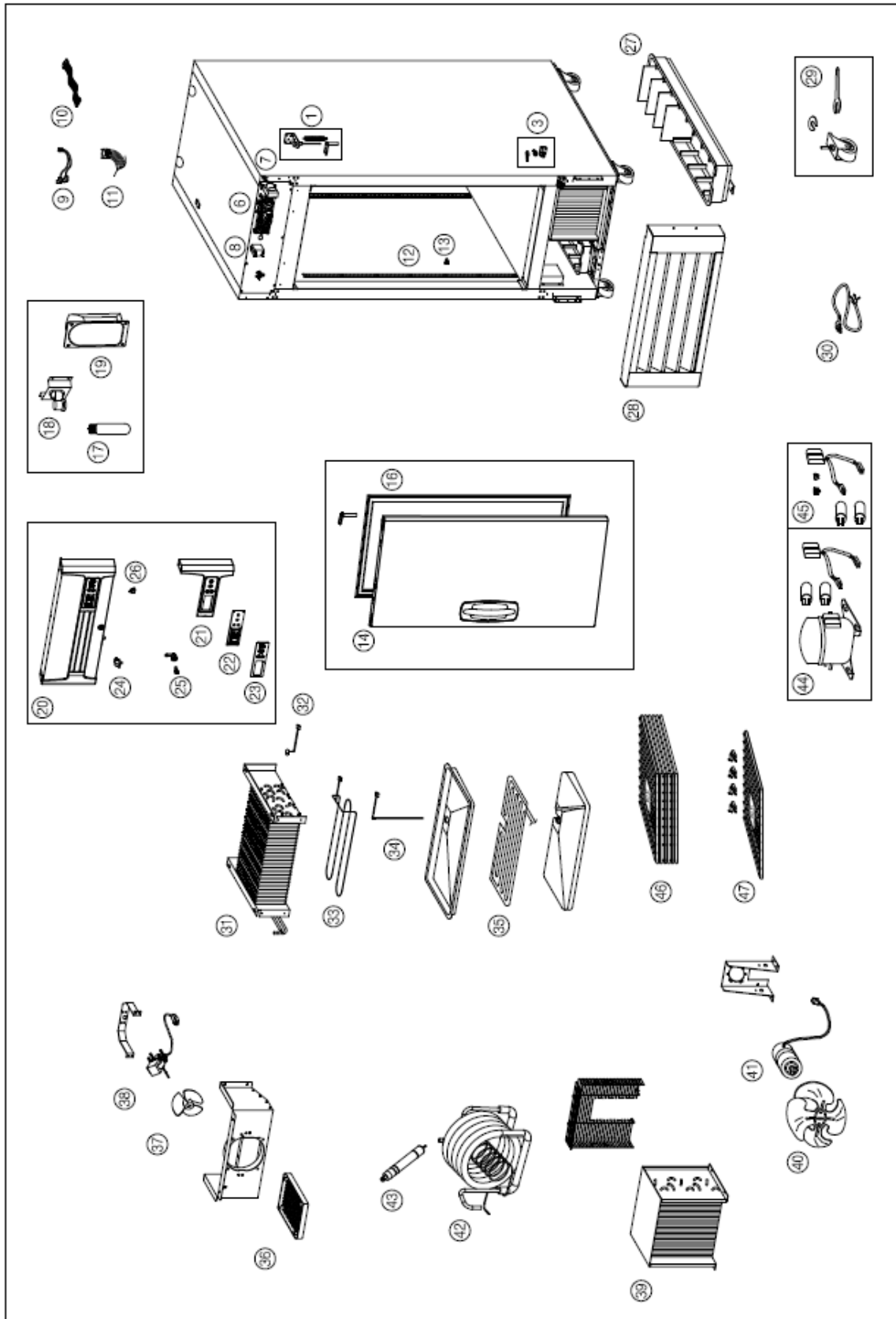
| No. | PART NAME | PART No. | | | | | |
|-----|-----------------------------|----------|--------|--------|--------|--------|--------|
| | | F23-S | F49-S | F72-S | R23-S | R49-S | R72-S |
| 24 | Light Switch | 146449 | 146449 | 146449 | 146449 | 146449 | 146449 |
| 25 | Door Lock& Key | 146443 | 146443 | 146443 | 146443 | 146443 | 146443 |
| 26 | Power Switch | 146450 | 146450 | 146450 | 146450 | 146450 | 146450 |
| 27 | Condensate Pan w/paper | 146386 | 146387 | 146387 | 146386 | 146387 | 146387 |
| 28 | Lower Grille Assembly | 146388 | 146389 | 146390 | 146388 | 146389 | 146390 |
| 29 | Caster Kit | 100436 | 100436 | 100437 | 100436 | 100436 | 100437 |
| 30 | Power Cord | 138533 | 138533 | 161576 | 138533 | 138533 | 138533 |
| 31 | Evaporator Coil | 146392 | 146394 | 146396 | 146391 | 146393 | 161569 |
| 32 | Defrost Limit Switch | 146404 | 146404 | 146404 | NA | NA | NA |
| 33 | Defrost Heater (115V) | 146397 | 146398 | 146399 | NA | NA | NA |
| 34 | Drain Heater (115V) | 146403 | 146403 | 146403 | NA | NA | NA |
| 35 | Drain Pan Heater (115V) | 146400 | 146401 | 146402 | NA | NA | NA |
| 36 | Evaporator Fan Guard | 146405 | 146405 | 146405 | 146405 | 146405 | 146405 |
| 37 | Evaporator Fan Blade | 146406 | 146406 | 146406 | 146406 | 146406 | 146406 |
| 38 | Evaporator Fan Motor (115V) | 146407 | 146407 | 146407 | 146407 | 146407 | 146407 |
| 39 | Condenser Coil | 161567 | 161570 | 161570 | 161562 | 161562 | 161567 |
| 40 | Condenser Fan Blade | 146371 | 146371 | 146371 | 146371 | 146371 | 146371 |
| 41 | Condenser Fan Motor (115V) | 146370 | 146370 | 146370 | 146370 | 146370 | 146370 |
| 42 | Suction pipe(B) Assembly | 161568 | 161571 | 161574 | 161563 | 161563 | 161568 |
| 43 | Dryer | 161564 | 161564 | 161575 | 161564 | 161564 | 161564 |
| 44 | Compressor (115V) | 150556 | 161572 | 161577 | 161565 | 161565 | 150556 |
| 45 | Compressor Electrical Kit | 150557 | 161573 | 161578 | 161566 | 161566 | 150557 |
| 46 | Shelf | 146446 | 146447 | 146446 | 146446 | 146447 | 146446 |
| | | | | 146448 | | | 146448 |
| 47 | Shelf Kit(1Shelf + 4 Clips) | 146516 | 146517 | 146516 | 146516 | 146517 | 146516 |
| | | | | 146518 | | | 146518 |

* Shelf: F(R) 72 - 146446 (ENDS), 146448 (CENTER)

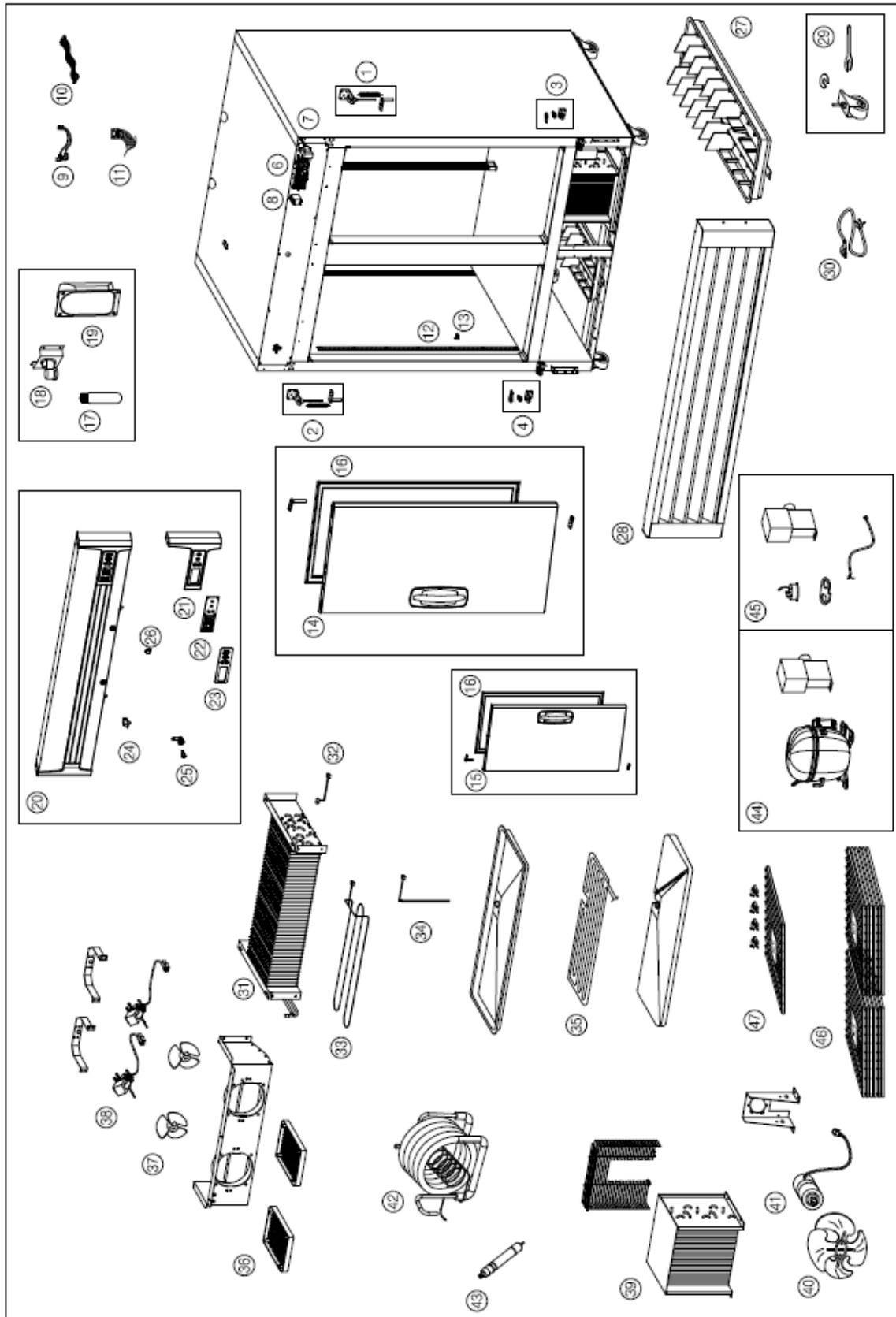
* Shelf Kit: F(R) 72 - 146516 (ENDS), 146518 (CENTER)

* Cap. Tube: 161592(F23/49, R23/49/72), 161593(F72)

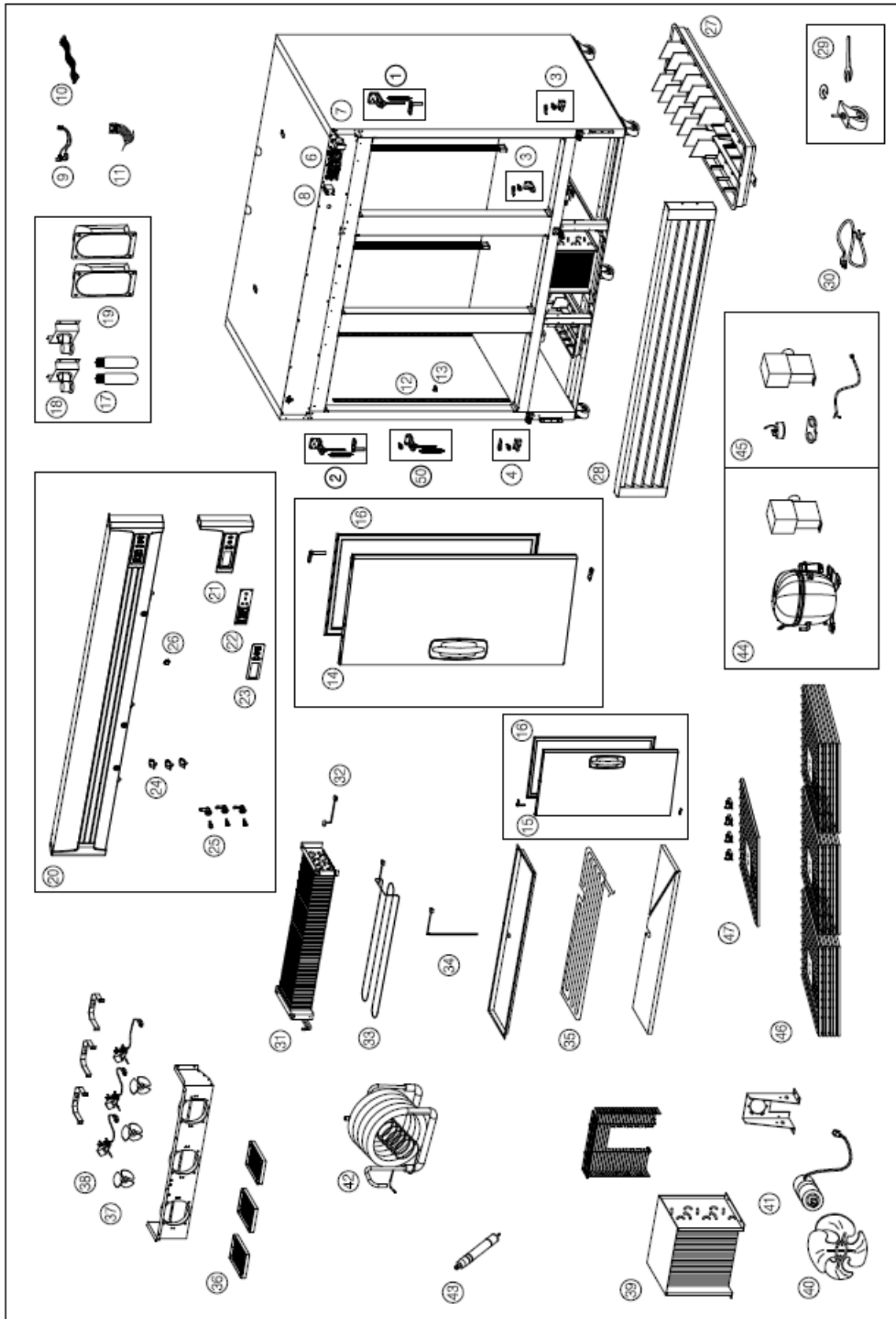
1-2. F23-S EXPLODED VIEW



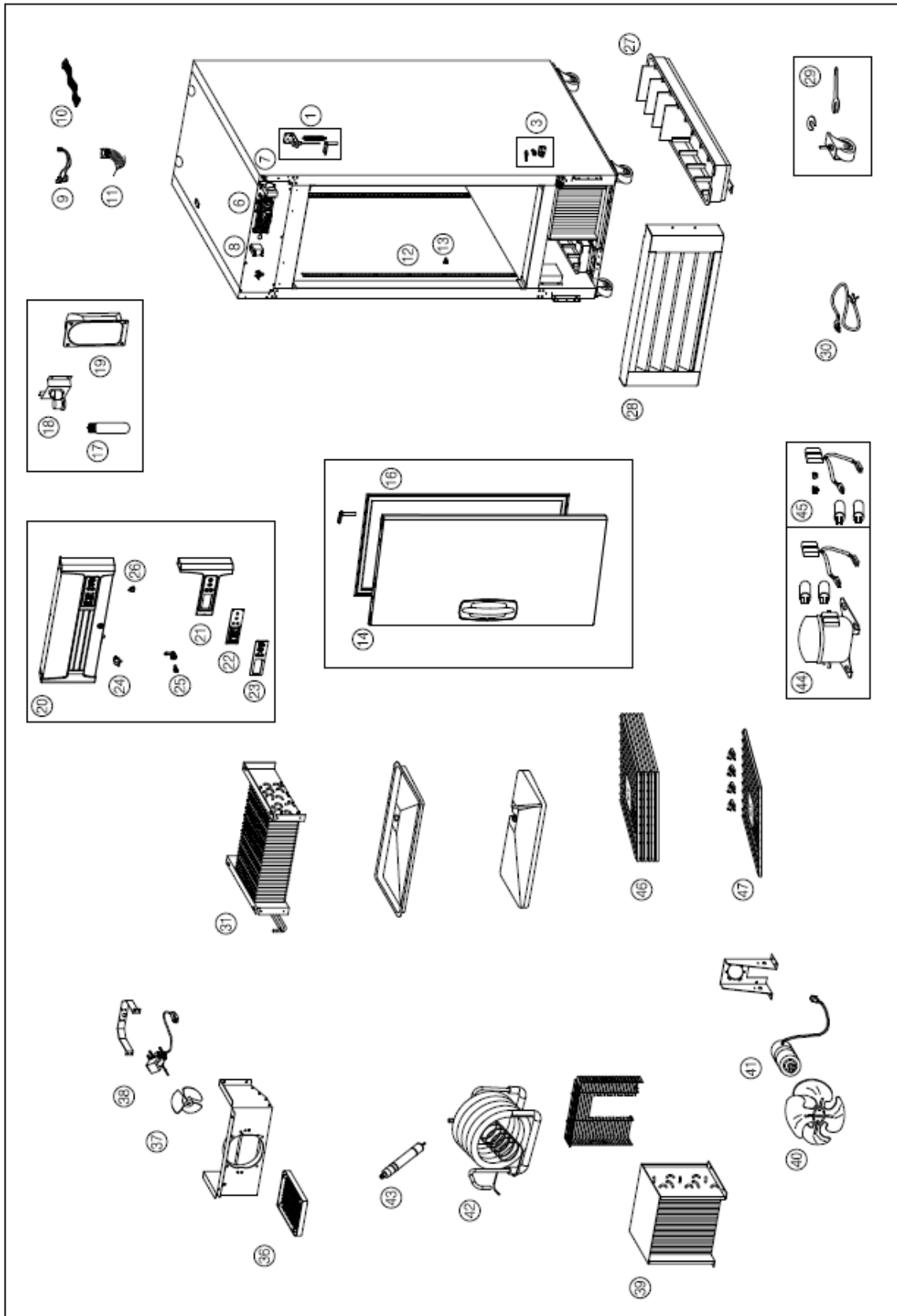
1-3. F49-S EXPLODED VIEW



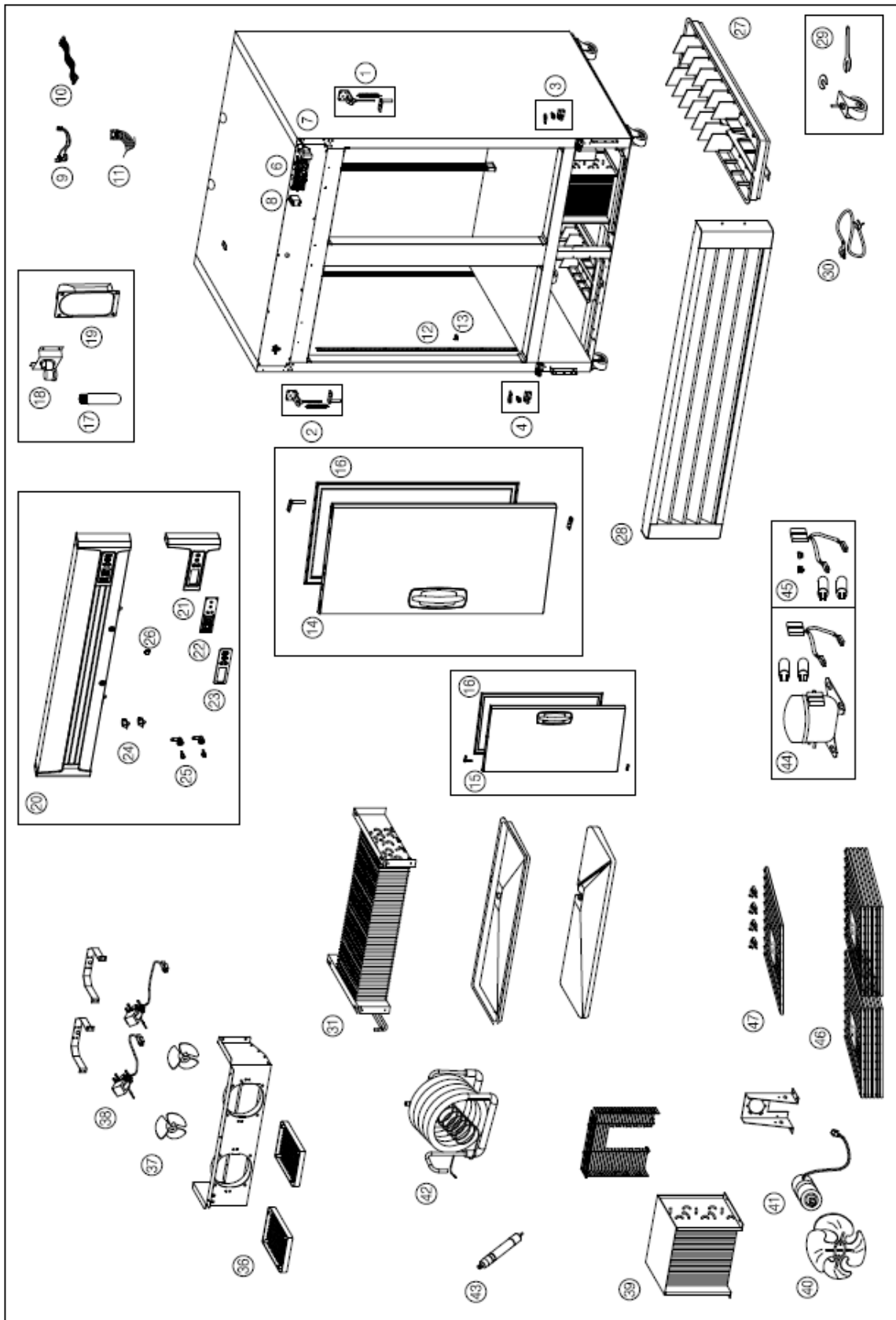
1-4. F72-S EXPLODED VIEW



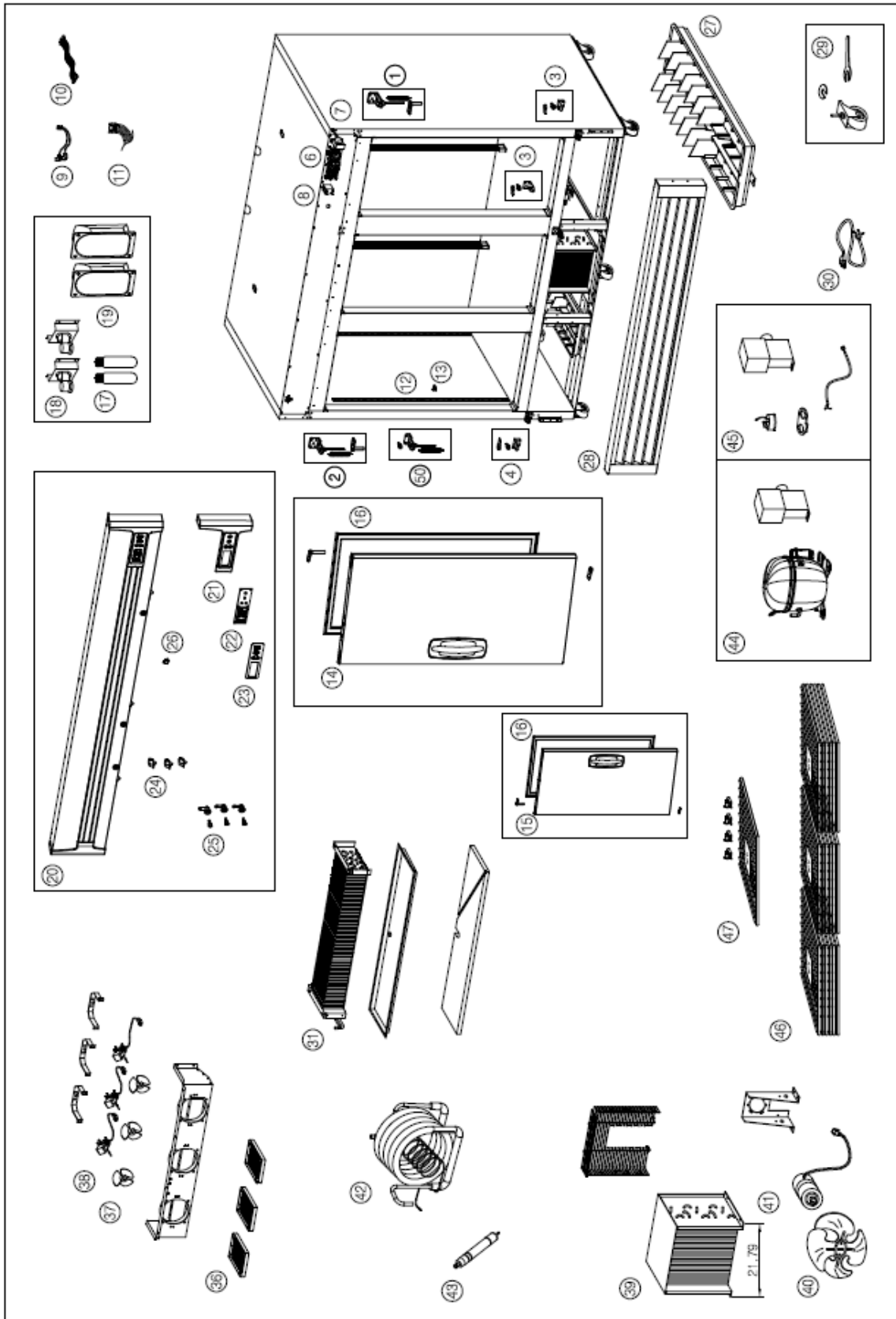
1-5. R23-S EXPLODED VIEW



1-6. R49-S EXPLODED VIEW



1-7. R72-S EXPLODED VIEW



2-1. SERVICE LIST(F23/F49/F72-SH , R23/R49/R72-SH)

| No. | PART NAME | PART No. | | | | | |
|------|--|----------|--------|--------|--------|--------|--------|
| | | F23-SH | F49-SH | F72-SH | R23-SH | R49-SH | R72-SH |
| 1 | Door Hinge Kit - Top Right | 146441 | 146441 | 146441 | 146441 | 146441 | 146441 |
| 2 | Door Hinge Kit - Top Left | NA | 146442 | 146442 | NA | 146442 | 146442 |
| 3 | Door Hinge Kit - Lower Right | 146412 | 146412 | 146412 | 146412 | 146412 | 146412 |
| 4 | Door Hinge Kit - Lower Left | NA | 146413 | 146413 | NA | 146413 | 146413 |
| 5 | Door Hinge Kit - Lower Center | NA | NA | 146414 | NA | NA | 146414 |
| 6 | Control PCB Assembly (115V) Used thru 12/2014 | 146416 | 146417 | 146418 | 150313 | 150313 | 150313 |
| | Control PCB Assembly (115V) Universal (°F/°C) PCB | 150539 | 150540 | 150541 | 150538 | 150538 | 150538 |
| 7 | Main Transformer (115V) | 146420 | 146420 | 146420 | 146420 | 146420 | 146420 |
| 8 | DC Relay | 146421 | 146421 | 146421 | 146421 | 146421 | 146421 |
| 9 | Relay Wire Harness | 146423 | 146423 | 146423 | 146423 | 146423 | 146423 |
| 10 | Front PCB Wire Harness | 146424 | 146424 | 146424 | 146424 | 146424 | 146424 |
| 11 | Temperature Sensor use up to 12/2011 | NA | NA | NA | 146425 | 146427 | 146429 |
| 11-1 | Sensor Kit (Includes T-sensor and D-sensor) | 146426 | 146428 | 146430 | 146426 | 146428 | 146430 |
| 12 | Pilaster | 146411 | 146411 | 146411 | 146411 | 146411 | 146411 |
| 13 | Shelf Clip | 146489 | 146489 | 146489 | 146489 | 146489 | 146489 |
| 14 | Door Assembly - Upper Right Hand | 160501 | 160505 | 160510 | 160501 | 160505 | 160510 |
| 14-1 | Door Assembly - Upper Left Hand | NA | 160507 | 160512 | NA | 160507 | 160512 |
| 15 | Door Assembly – Lower Right Hand | 160502 | 160502 | 160511 | 160502 | 160502 | 160511 |
| 15-1 | Door Assembly – Lower Left Hand | NA | 160508 | 160513 | NA | 160508 | 160513 |
| 16 | Door Gasket | 160503 | 160503 | 160514 | 160503 | 160503 | 160514 |
| 17 | Lamp (115V) | 146408 | 146408 | 146408 | 146408 | 146408 | 146408 |
| 18 | Lamp Socket | 146409 | 146409 | 146409 | 146409 | 146409 | 146409 |
| 19 | Lamp Cover | 146410 | 146410 | 146410 | 146410 | 146410 | 146410 |
| 20 | Top Grille Assembly (115V) | 146433 | 146434 | 146435 | 146433 | 146434 | 146435 |
| 21 | Top Grill Cover - Right | 146431 | 146431 | 146431 | 146431 | 146431 | 146431 |
| 22 | Front PCB Assembly Used thru 12/2014 | 146419 | 146419 | 146419 | 146419 | 146419 | 146419 |
| | Front PCB Assembly Universal (°F/°C) PCB | 150537 | 150537 | 150537 | 150537 | 150537 | 150537 |
| 23 | Control Decal | 146432 | 146432 | 146432 | 146432 | 146432 | 146432 |

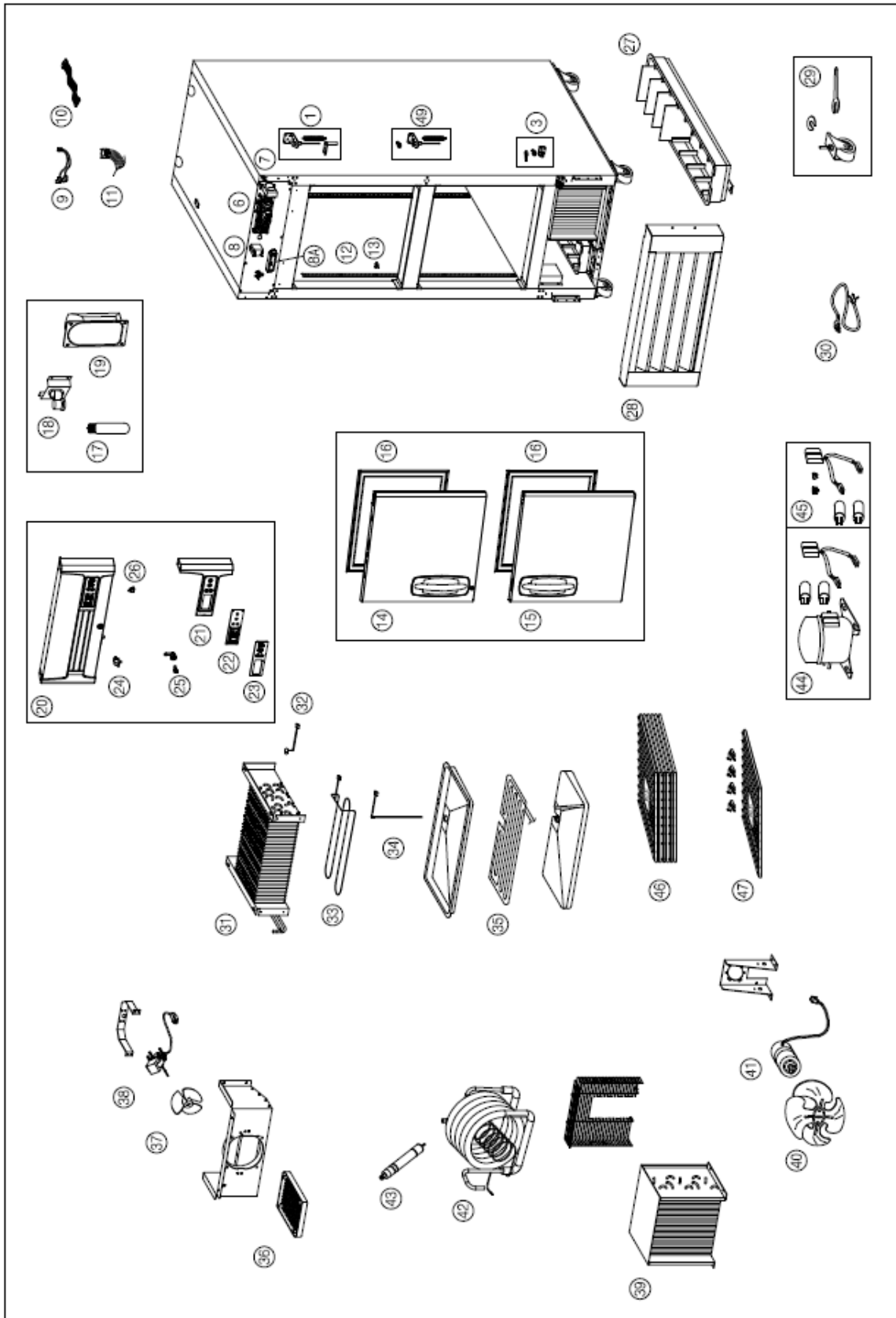
| No. | PART NAME | PART No. | | | | | |
|-----|-------------------------------|----------|--------|------------------|--------|--------|------------------|
| | | F23-SH | F49-SH | F72-SH | R23-SH | R49-SH | R72-SH |
| 24 | Light Switch | 146449 | 146449 | 146449 | 146449 | 146449 | 146449 |
| 25 | Door Lock& Key | 146443 | 146443 | 146443 | 146443 | 146443 | 146443 |
| 26 | Power Switch | 146450 | 146450 | 146450 | 146450 | 146450 | 146450 |
| 27 | Condensate Pan w/paper | 146386 | 146387 | 146387 | 146386 | 146387 | 146387 |
| 28 | Lower Grille Assembly | 146388 | 146389 | 146390 | 146388 | 146389 | 146390 |
| 29 | Caster Kit | 100436 | 100436 | 100437 | 100436 | 100436 | 100437 |
| 30 | Power Cord | 138533 | 138533 | 161576 | 138533 | 138533 | 138533 |
| 31 | Evaporator Coil | 146392 | 146394 | 146396 | 146391 | 146393 | 161569 |
| 32 | Defrost Limit Switch | 146404 | 146404 | 146404 | NA | NA | NA |
| 33 | Defrost Heater (115V) | 146397 | 146398 | 146399 | NA | NA | NA |
| 34 | Drain Heater (115V) | 146403 | 146403 | 146403 | NA | NA | NA |
| 35 | Drain Pan Heater (115V) | 146400 | 146401 | 146402 | NA | NA | NA |
| 36 | Evaporator Fan Guard | 146405 | 146405 | 146405 | 146405 | 146405 | 146405 |
| 37 | Evaporator Fan Blade | 146406 | 146406 | 146406 | 146406 | 146406 | 146406 |
| 38 | Evaporator Fan Motor (115V) | 146407 | 146407 | 146407 | 146407 | 146407 | 146407 |
| 39 | Condenser Coil | 161567 | 161570 | 161570 | 161562 | 161562 | 161567 |
| 40 | Condenser Fan Blade | 146371 | 146371 | 146371 | 146371 | 146371 | 146371 |
| 41 | Condenser Fan Motor (115V) | 146370 | 146370 | 146370 | 146370 | 146370 | 146370 |
| 42 | Suction pipe(B) Assembly | 161568 | 161571 | 161574 | 161563 | 161563 | 161568 |
| 43 | Dryer | 161564 | 161564 | 161575 | 161564 | 161564 | 161564 |
| 44 | Compressor (115V) | 150556 | 161572 | 161577 | 161565 | 161565 | 150556 |
| 45 | Compressor Electrical Kit | 150557 | 161573 | 161578 | 161566 | 161566 | 150557 |
| 46 | Shelf | 146446 | 146447 | 146446 146448 | 146446 | 146447 | 146446 146448 |
| 47 | Shelf Kit(1Shelf + 4 Clips) | 146516 | 146517 | 146516 146518 | 146516 | 146517 | 146516 146518 |
| 48 | Door Hinge Kit - Center Right | 160504 | 160504 | 160504 | 160504 | 160504 | 160504 |
| 49 | Door Hinge Kit - Center Left | NA | 160509 | 160509 | NA | 160509 | 160509 |

* Shelf: F(R) 72 - 146446 (ENDS), 146448 (CENTER)

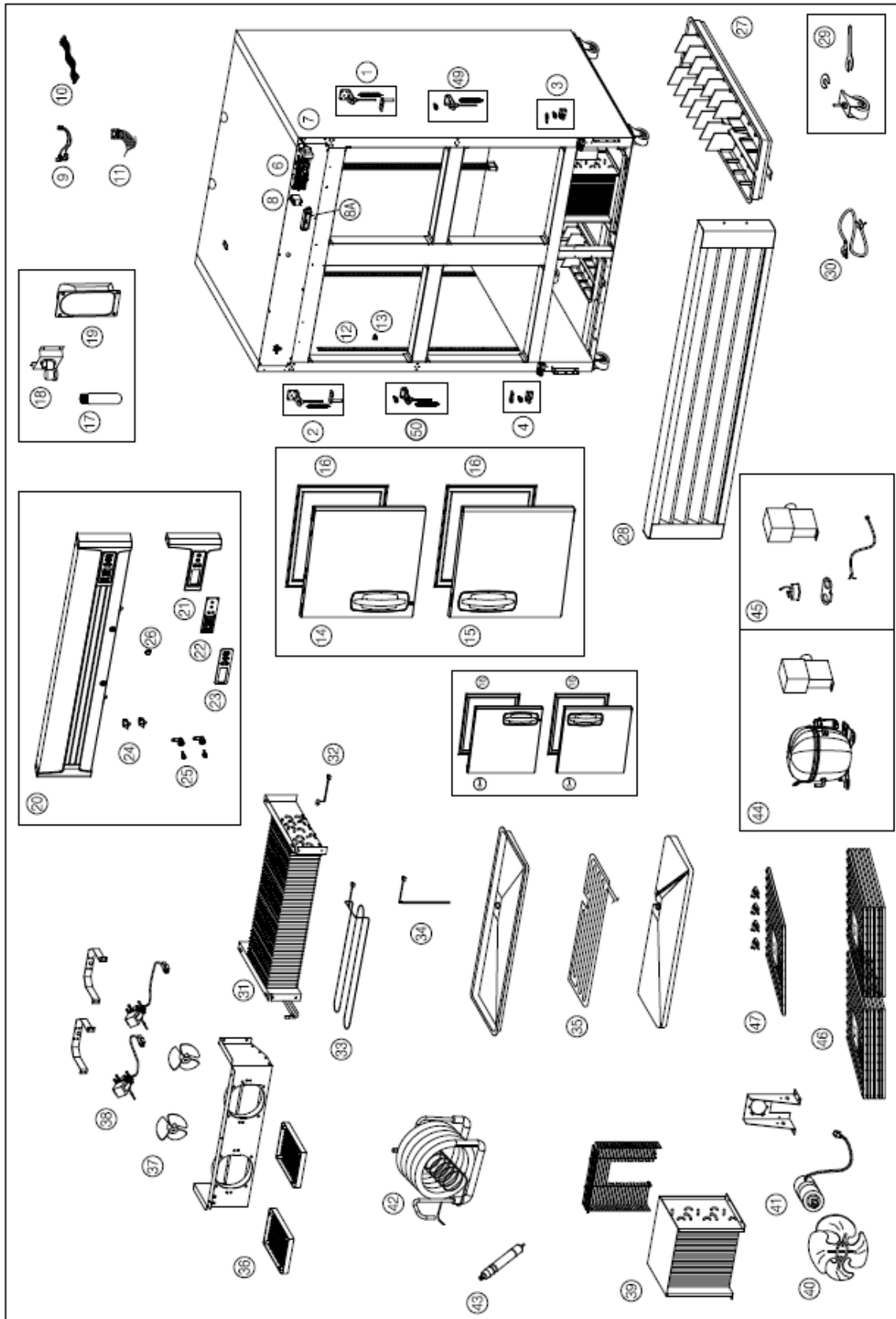
* Shelf Kit: F(R) 72 - 146516 (ENDS), 146518 (CENTER)

* Cap. Tube: 161592(F23/49-SH, R23/49/72-SH), 161593(F72-SH)

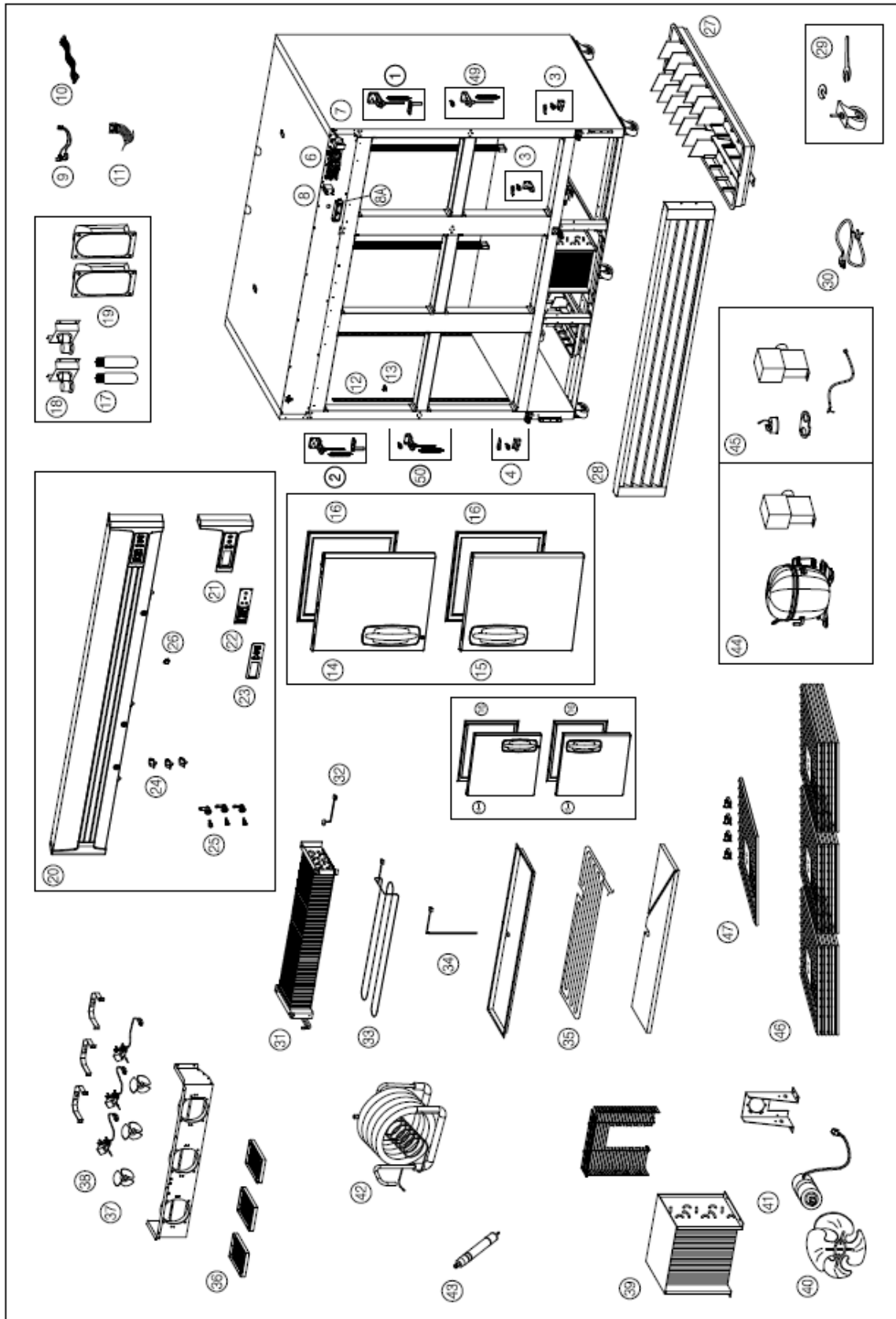
2-2. F23-SH EXPLODED VIEW



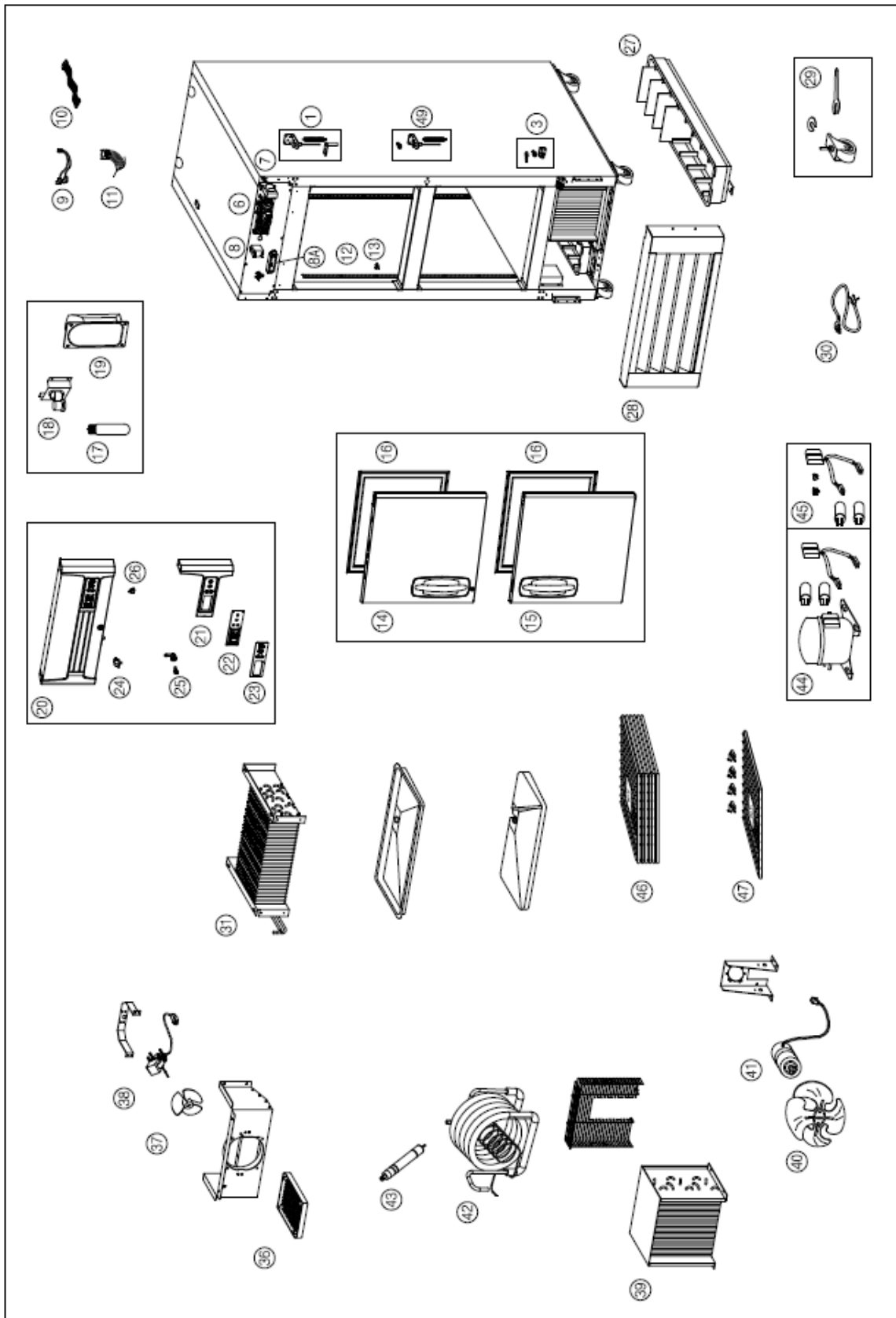
2-3. F49-SH EXPLODED VIEW



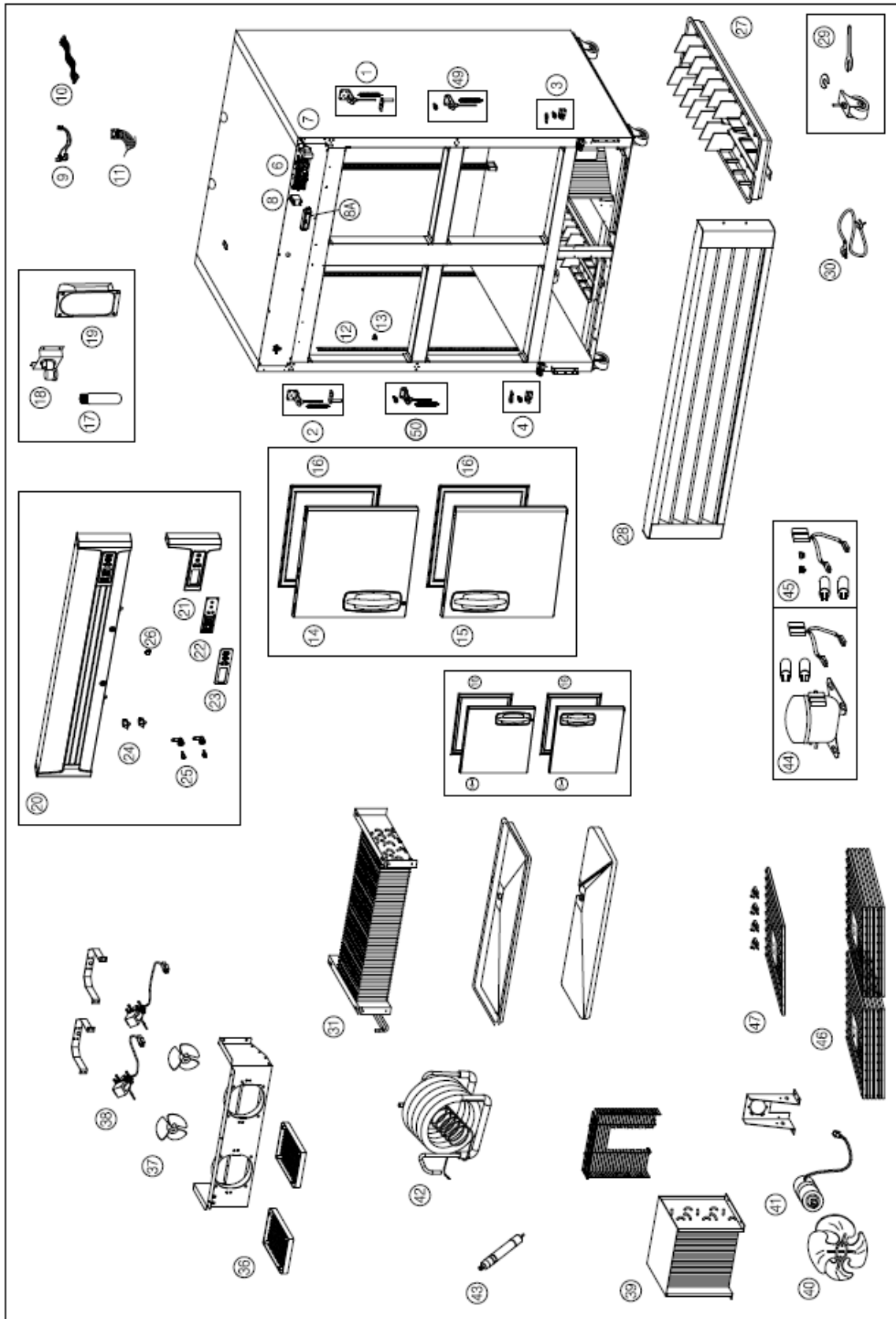
2-4. F72-SH EXPLODED VIEW



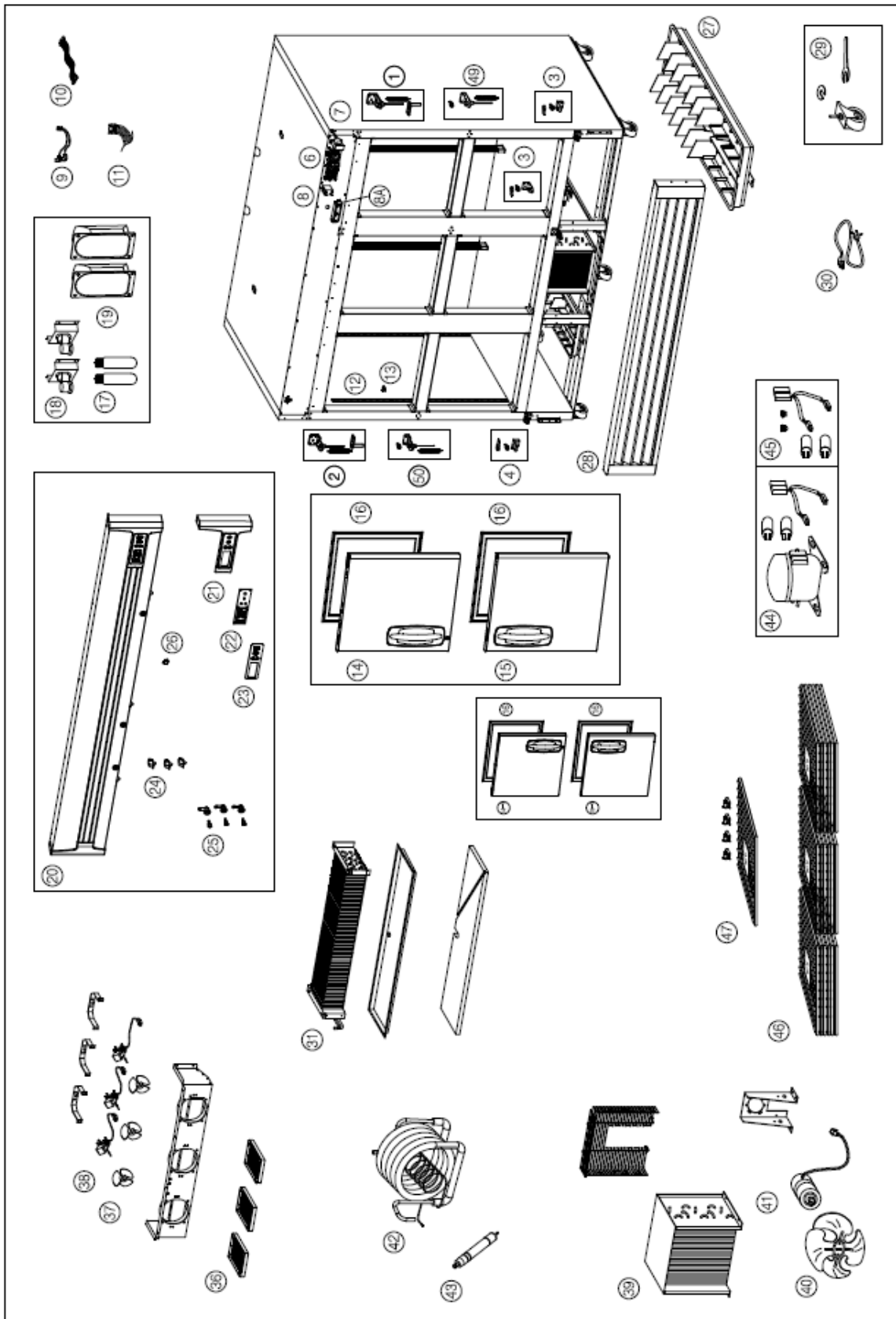
2-5. R23-SH EXPLODED VIEW



2-6. R49-SH EXPLODED VIEW



2-7. R72-SH EXPLODED VIEW



3-1. SERVICE LIST (R23/R49/R72-G)

| No. | PART NAME | PART No. | | |
|------|--|----------|--------|--------|
| | | R23-G | R49-G | R72-G |
| 1 | Door Hinge Kit - Top Right | 160515 | 160515 | 160515 |
| 2 | Door Hinge Kit - Top Left | NA | 160516 | 160516 |
| 3 | Door Hinge Kit - Lower Right | 160517 | 160517 | 160517 |
| 4 | Door Hinge Kit - Lower Left | NA | 160518 | 160518 |
| 5 | Door Hinge Kit - Lower Center | NA | NA | 160519 |
| 6 | Control PCB Assembly (115V) Used thru 12/2014 | 150313 | 150313 | 150313 |
| | Control PCB Assembly (115V) Universal (°F/°C) PCB | 150538 | 150538 | 150538 |
| 7 | Main Transformer (115V) | 146420 | 146420 | 146420 |
| 8 | DC Relay | 146421 | 146421 | 146421 |
| 8A | LED DRIVER | 160530 | 160530 | 150571 |
| 9 | Relay Wire Harness | 146423 | 146423 | 146423 |
| 10 | Front PCB Wire Harness | 146424 | 146424 | 146424 |
| 10A | LED Wire Harness | 160529 | 160533 | 160535 |
| 11 | Temperature Sensor use up to 12/2011 | 146425 | 146427 | 146429 |
| 11-1 | Sensor Kit (Includes T-sensor and D-sensor) | 146426 | 146428 | 146430 |
| 12 | Pilaster | 146411 | 146411 | 146411 |
| 13 | Shelf Clip | 146489 | 146489 | 146489 |
| 14 | Door Assembly - Right Hand | 160520 | 160521 | 160522 |
| 15 | Door Assembly - Left Hand | NA | 160523 | 160524 |
| 16 | Door Gasket | 160525 | 160525 | 146482 |
| 17 | LED (6W) | 160526 | 160526 | 160526 |
| 18 | LED Fixture | 160527 | 160527 | 160527 |
| 19 | LED wire cover | 160528 | 160528 | 160528 |
| 20 | Top Grille Assembly | 160531 | 160534 | 160536 |
| 21 | Top Grill Cover - Right | 146431 | 146431 | 146431 |
| 22 | Front PCB Assembly Used thru 12/2014 | 146419 | 146419 | 146419 |
| | Front PCB Assembly Universal (°F/°C) PCB | 150537 | 150537 | 150537 |
| 23 | Control Decal | 146432 | 146432 | 146432 |

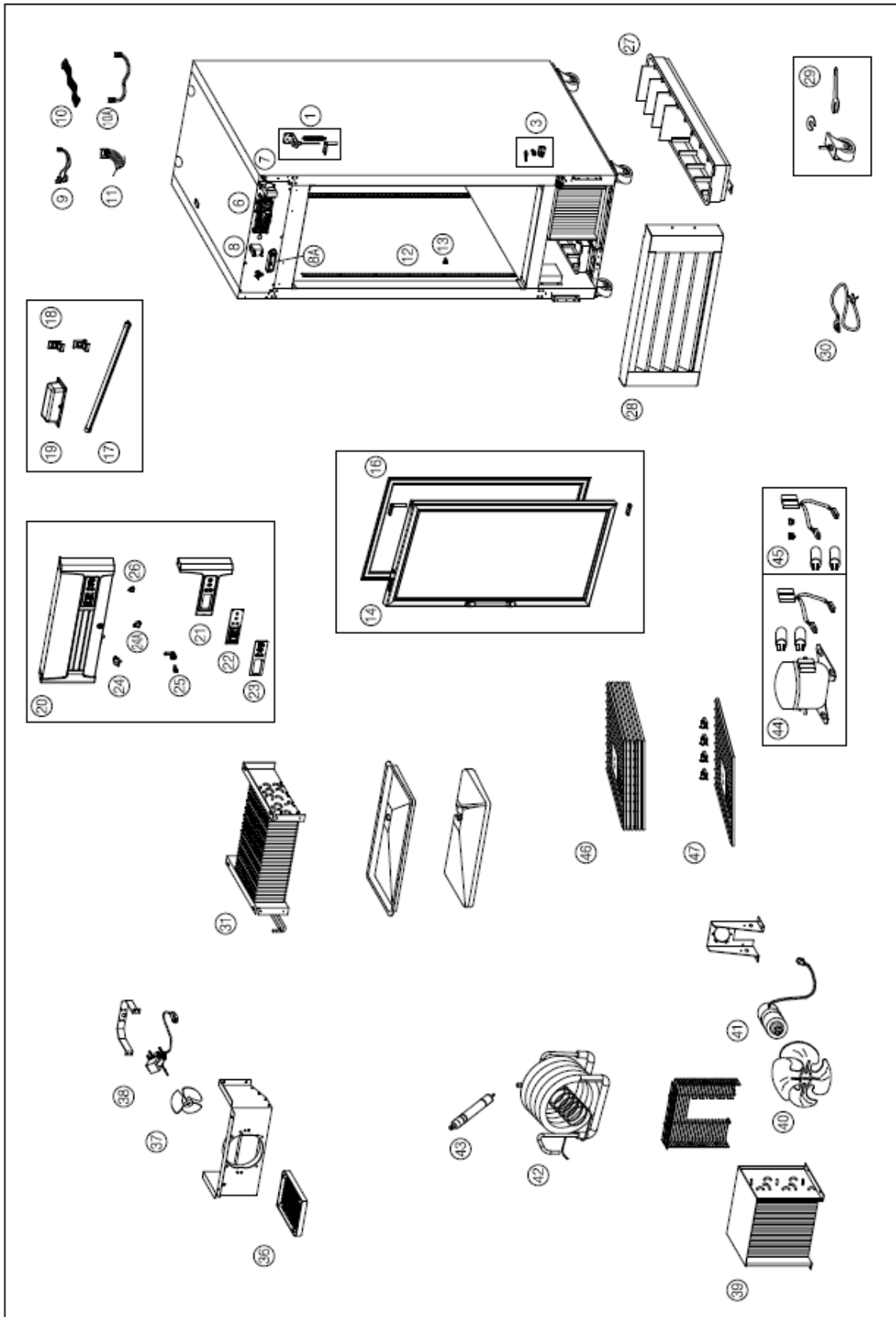
| No. | PART NAME | PART No. | | |
|-----|---------------------------------|----------|--------|-----------------|
| | | R23-G | R49-G | R72-G |
| 24 | Light SW → Door Switch (rename) | 146449 | 146449 | 146449 |
| 24A | Light Switch | 160532 | 160532 | 160532 |
| 25 | Door Lock& Key | 146443 | 146443 | 146443 |
| 26 | Power Switch | 146450 | 146450 | 146450 |
| 27 | Condensate Pan w/paper | 146386 | 146387 | 146387 |
| 28 | Lower Grille Assembly | 146388 | 146389 | 146390 |
| 29 | Caster Kit | 100436 | 100436 | 100437 |
| 30 | Power Cord | 138533 | 138533 | 138533 |
| 31 | Evaporator Coil | 146391 | 146393 | 161569 |
| 32 | Defrost Limit Switch | NA | NA | NA |
| 33 | Defrost Heater (115V) | NA | NA | NA |
| 34 | Drain Heater (115V) | NA | NA | NA |
| 35 | Drain Pan Heater (115V) | NA | NA | NA |
| 36 | Evaporator Fan Guard | 146405 | 146405 | 146405 |
| 37 | Evaporator Fan Blade | 146406 | 146406 | 146406 |
| 38 | Evaporator Fan Motor (115V) | 146407 | 146407 | 146407 |
| 39 | Condenser Coil | 161562 | 161562 | 161567 |
| 40 | Condenser Fan Blade | 146371 | 146371 | 146371 |
| 41 | Condenser Fan Motor (115V) | 146370 | 146370 | 146370 |
| 42 | Suction pipe(B) Assembly | 161563 | 161563 | 161568 |
| 43 | Dryer | 161564 | 161564 | 161564 |
| 44 | Compressor (115V) | 161565 | 161565 | 150556 |
| 45 | Compressor Electrical Kit | 161566 | 161566 | 150557 |
| 46 | Shelf | 146446 | 146447 | 146446 / 146448 |
| 47 | Shelf Kit(1Shelf + 4 Clips) | 146516 | 146517 | 146516 / 146518 |
| | | | | |

* Shelf: F(R) 72 - 146446 (ENDS), 146448 (CENTER)

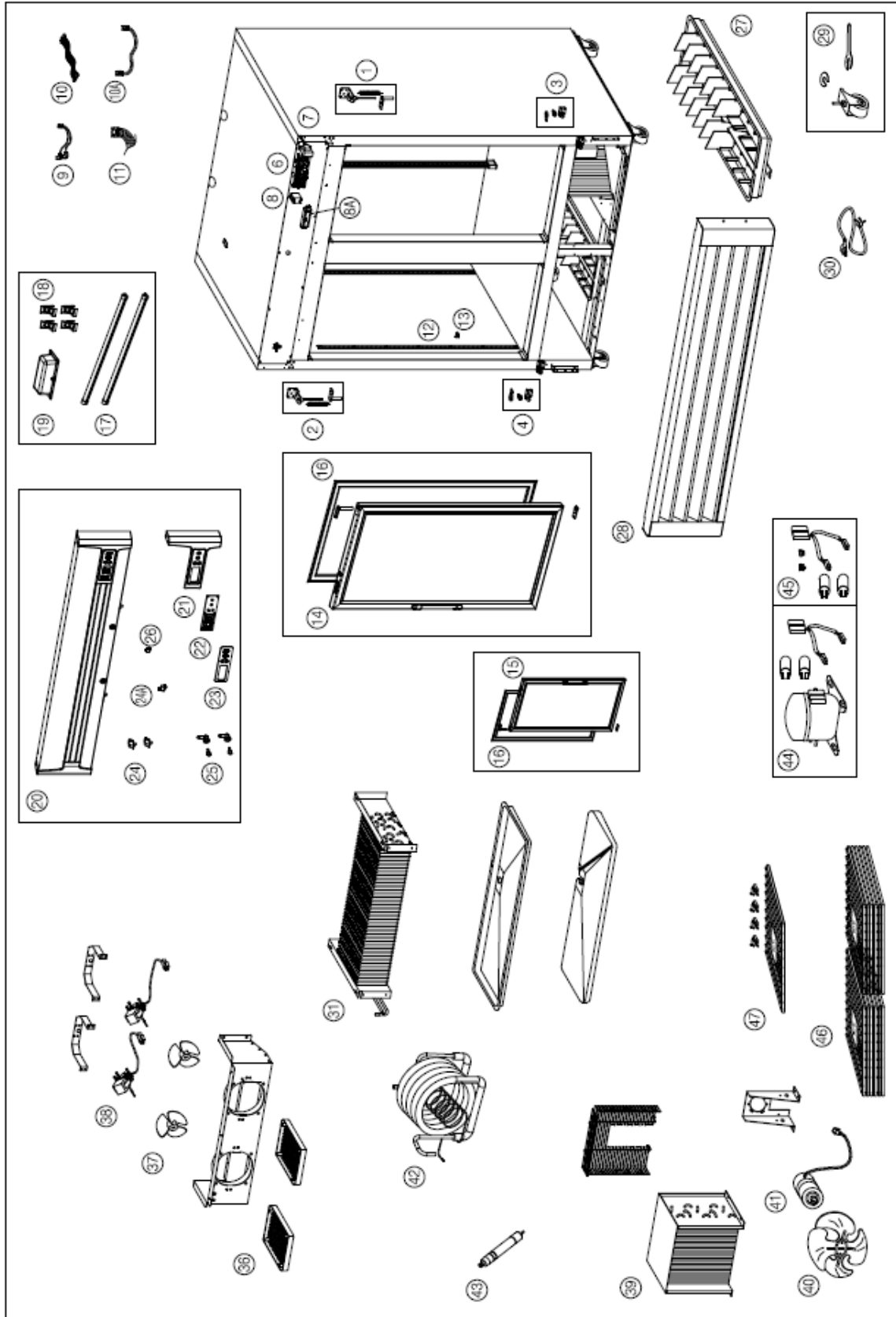
* Shelf Kit: F(R) 72 - 146516 (ENDS), 146518 (CENTER)

* Cap. Tube: 161592(R23/49/72-G)

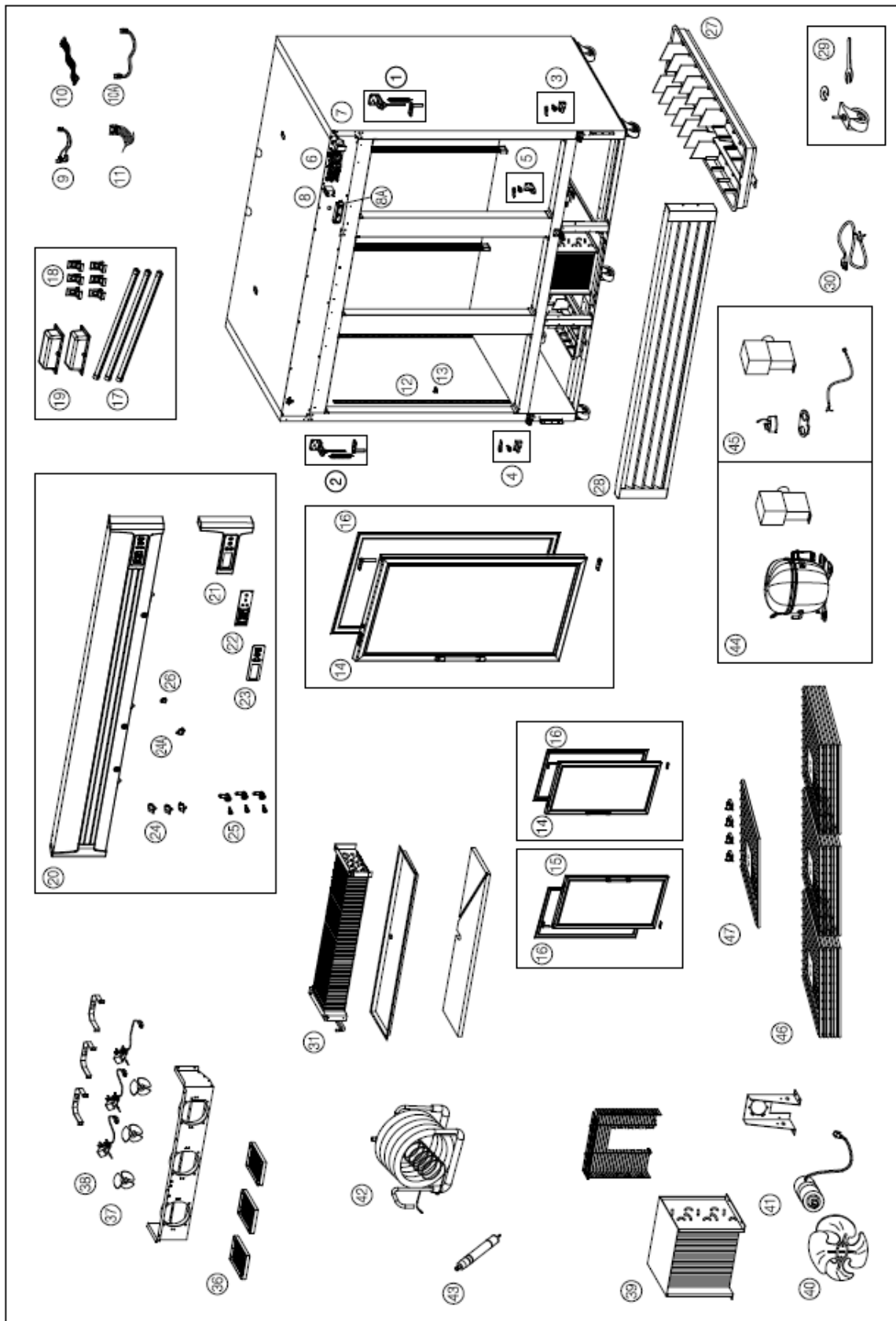
3-2. R23-G EXPLODED VIEW



3-3. R49-G EXPLODED VIEW



3-4. R72-G EXPLODED VIEW



2. MERCHANDISERS

1-1. SERVICE LIST (GR26H, GR48S, GR70H)

| No. | PART NAME | PART No. | | |
|------|--------------------------------|-----------------|--------|--------|
| | | GR26H | GR48S | GR70H |
| 1 | Door Hinge Kit - Top Right | 146481 | NA | 160515 |
| 2 | Door Hinge Kit - Top Left | NA | NA | 160516 |
| 3 | Door Hinge Kit - Lower Right | 146471 | NA | 160517 |
| 4 | Door Hinge Kit - Lower Left | NA | NA | 160518 |
| 5 | Door Hinge Kit - Lower Center | NA | NA | 160519 |
| 6 | Ballast | 146491 | 146491 | NA |
| 7 | Pilaster | 146470 | 146470 | 146411 |
| 8 | Shelf Clip | 146489 | 146489 | 146489 |
| 9 | Door Assembly - Right Hand | 146478 | 146477 | 161582 |
| 10 | Door Assembly - Left Hand | NA | 146480 | 161584 |
| 11 | Door Gasket | 146483 | NA | 146482 |
| 12-1 | Advertising Panel Wire A | 150190 | 150524 | NA |
| 12-2 | Advertising Panel Wire B | NA | 150525 | NA |
| 13-1 | Interior Light Wire A | NA | 150526 | NA |
| 13-2 | Interior Light Wire B | NA | 150527 | NA |
| 14 | Lamp (115V) | 146466 / 146467 | 146466 | NA |
| 15 | Lamp Cover End | 146468 | 146468 | NA |
| 16 | Lamp Cover | 146469 | 146469 | NA |
| 17 | Advertising Panel - Blank | 146495 | 146494 | 146493 |
| 18 | Advertising Panel Frame | 146497 | NA | NA |
| 19 | Advertising Panel Frame-Left | NA | 146505 | 146500 |
| 20 | Advertising Panel Frame-Right | NA | 146506 | 146501 |
| 21 | Advertising Panel Frame-Bottom | NA | 146503 | 146498 |
| 22 | Advertising Panel Frame-Top | NA | 146504 | 146499 |
| 23 | Condensate Pan w/paper | 146386 | 146460 | 146387 |
| 24 | Lower Grille Assembly | 146463 | 146462 | 146461 |
| 25 | Foot Kit | 146502 | 146502 | 146502 |

| No. | PART NAME | PART No. | | |
|-----|----------------------------|----------|-----------------|-----------------|
| | | GR26H | GR48S | GR70H |
| 26 | Power Cord | 146475 | 146475 | 138533 |
| 27 | Evaporator Coil | 146465 | 146464 | 161569 |
| 28 | Evaporator Fan Guard | 146405 | 146405 | 146405 |
| 29 | Evaporator Fan Blade | 146406 | 146406 | 146406 |
| 30 | Evaporator Fan Motor | 146407 | 146407 | 146407 |
| 31 | Temperature Control | 146474 | 146473 | 146472 |
| 32 | Light Switch | 146450 | 146450 | 146450 |
| 33 | Capillary Tube | 146458 | NA | NA |
| 34 | Suction pipe(B) Assembly | 146457 | 146456 | 161568 |
| 35 | Dryer | 146384 | 146384 | 161564 |
| 36 | Condenser Coil | 146372 | 146455 | 161567 |
| 37 | Condenser Fan Blade | 146371 | 146371 | 146371 |
| 38 | Condenser Fan Moto | 146370 | 146370 | 146370 |
| 39 | Compressor | 146452 | 146451 | 150556 |
| 40 | Compressor Electrical Kit | 146454 | 146453 | 150557 |
| 41 | Shelf | 146488 | 146486 / 146487 | NA / NA |
| 42 | Shelf Kit(1Shelf + 4Clips) | 146523 | 146521 / 146522 | 161586 / 161588 |
| 43 | SMPS (60W) | NA | NA | 161580 |
| 44 | LED (20W) | NA | NA | 161581 |
| 45 | LED (6W) | NA | NA | 160526 |
| 46 | LED Fixture | NA | NA | 160527 |
| 47 | LED wire cover | NA | NA | 160528 |

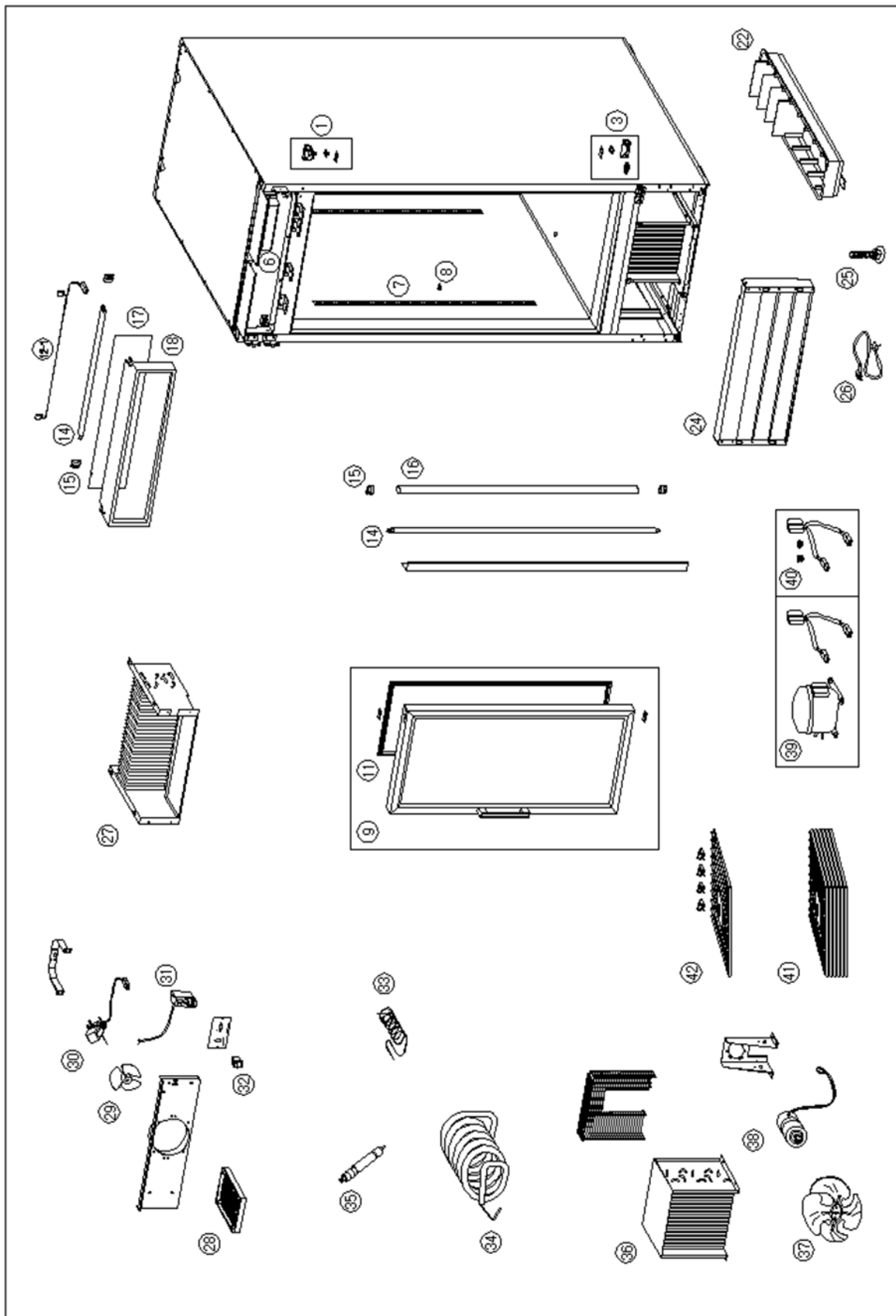
* Shelf: GR48S - 146486 (LEFT), 146487 (RIGHT)

* Shelf Kit: GR48S - 146521 (LEFT), 146522 (RIGHT)

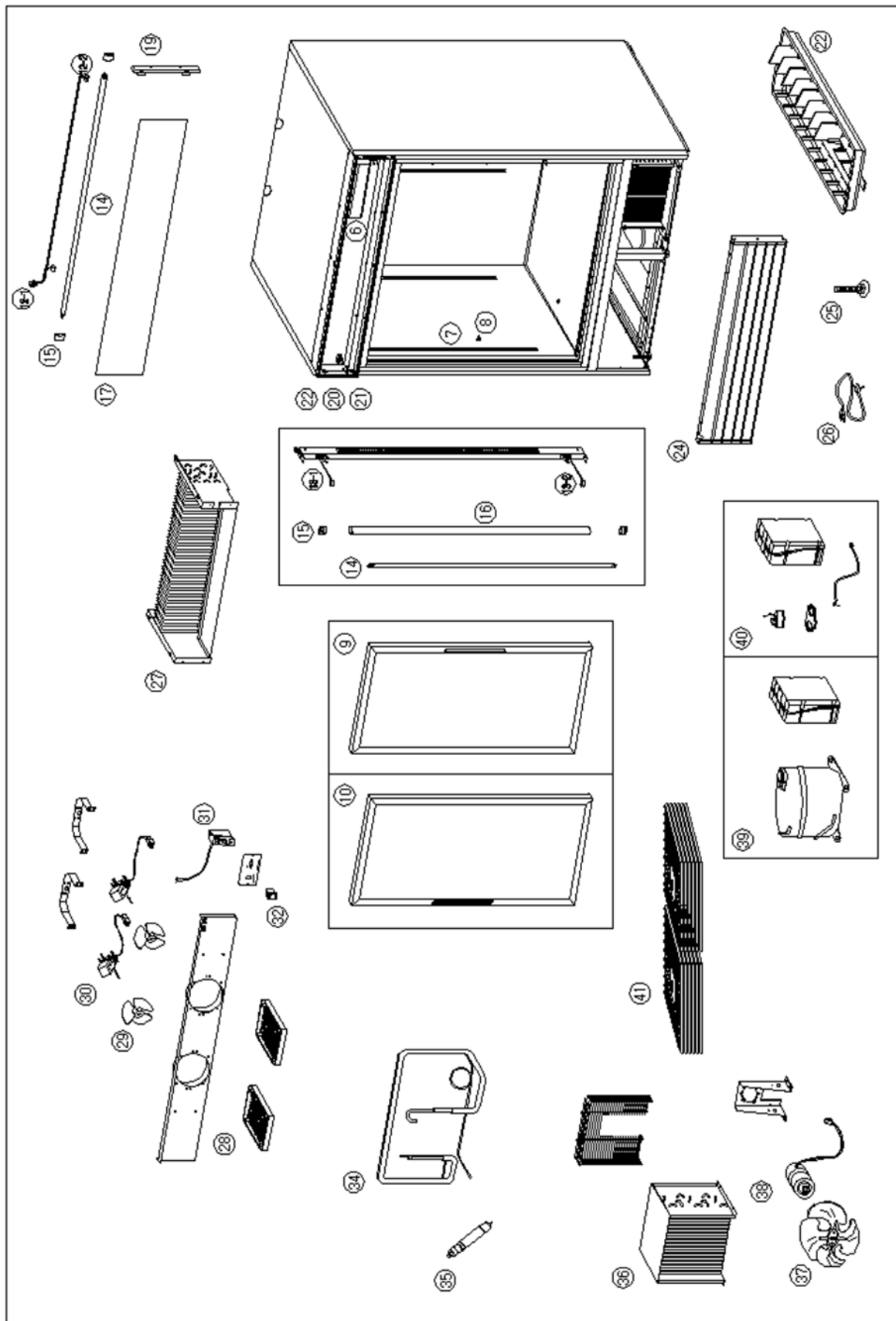
GR70H - 161586 (ENDS), 161588 (CENTER)

* Cap. Tube: 161592(GR70H)

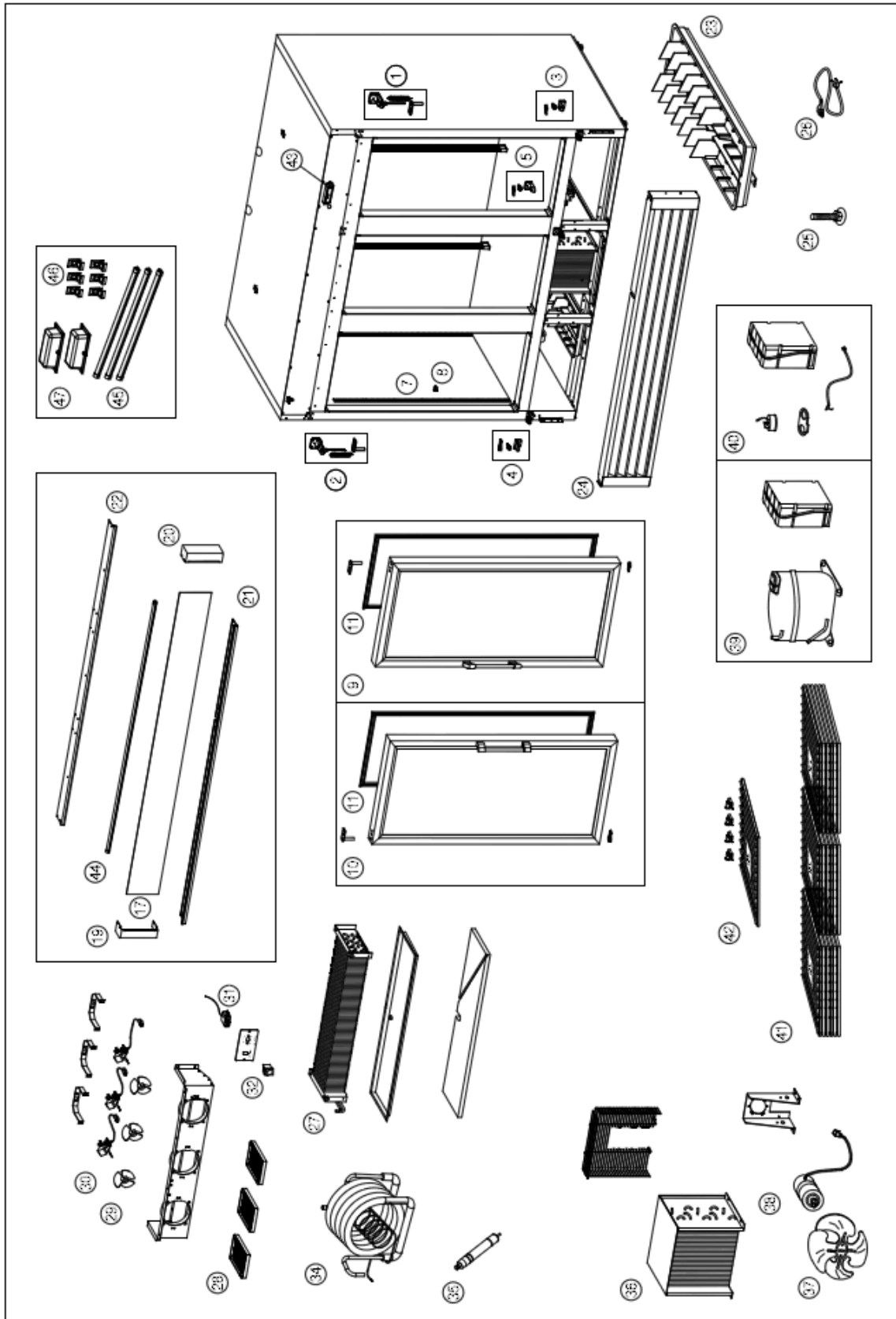
1-2. GR26H EXPLODED VIEW



1-3. GR48S EXPLODED VIEW



1-4. GR70H EXPLODED VIEW

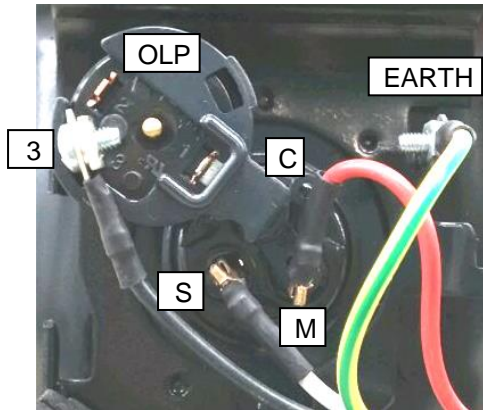


D. COMPRESSOR & ACCESSORIES CHECK LIST

- 1. F23-S/SH, R72-G, R72-S/SH, GR70H ----- D2
- 2. F49-S/SH ----- D3
- 3. F72-S/SH ----- D4
- 4. R23/R49-S/SH, R23/49-G ----- D5
- 5. GR26H ----- D6
- 6. GR48S ----- D7

1. F23-S/SH, R72-S/SH/G, GR70H

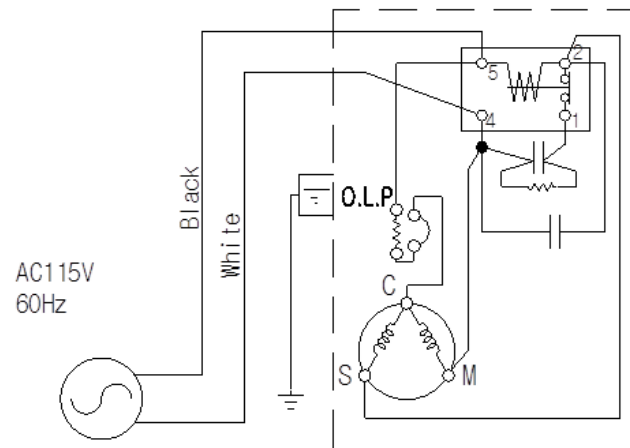
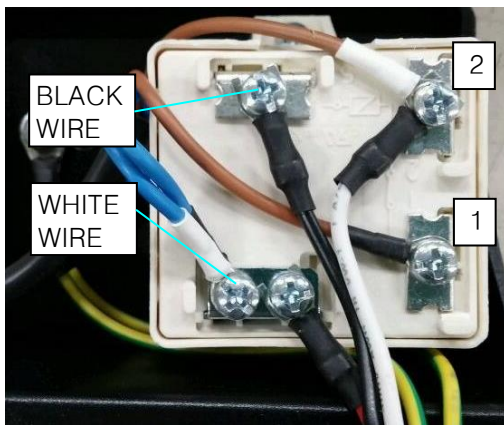
- ① Compressor Spec. : NEK2150GK (R-404A), 115V/60Hz, CSR Type
- ② Maker : EMBRACO
- ③ Cooling Capacity : 628kcal/Hr - LBP
- ④ Starting Capacitor Spec. : 189~227 μF / 165V
- ⑤ Running Capacitor Spec. : 25 μF / 400V
- ⑥ Relay Spec. : RVA9AD3C-121
- ⑦ O.L.P Spec. : T0873/G9



* Comp. Winding Resistance: C - M \rightarrow 0.77 Ω , C - S \rightarrow 4.5 Ω (RT 25 $^{\circ}\text{C}$ (77 $^{\circ}\text{F}$))

* O.L.P Winding Resistance: 3- C \rightarrow 0 Ω (OK), ∞ Ω (NG)

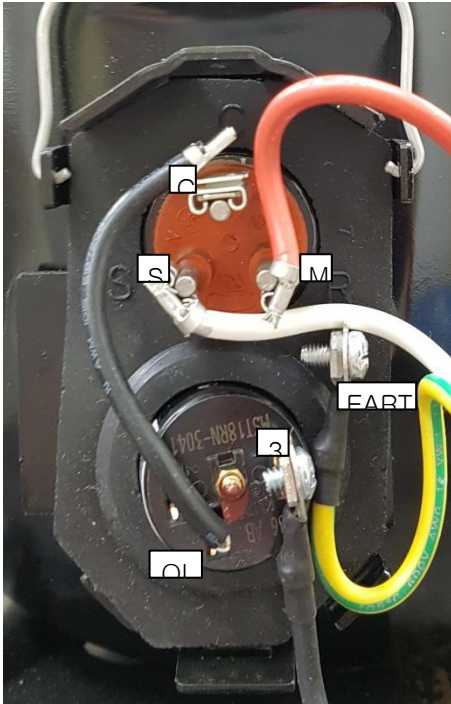
* Relay Winding Resistance: 1-2 \rightarrow 0 Ω (OK), ∞ Ω (NG)



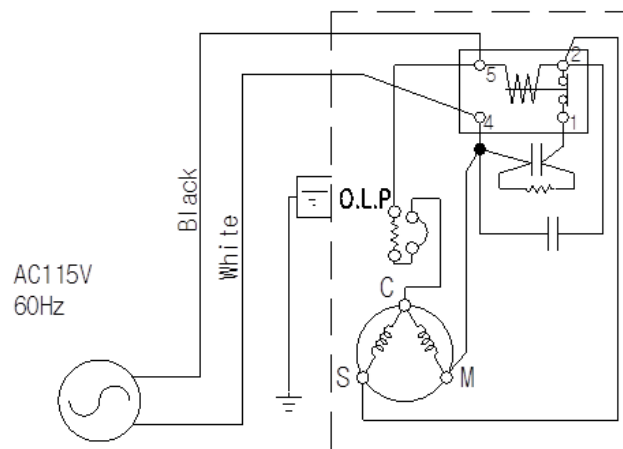
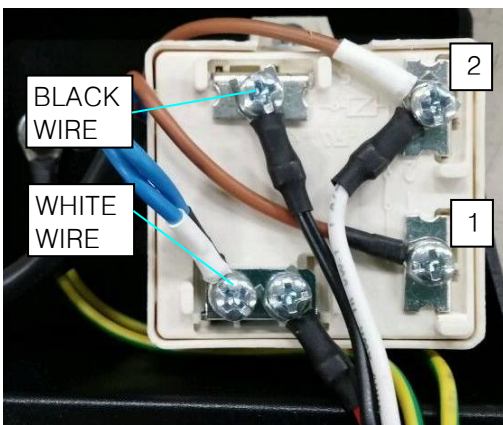
< COMP. Wiring Diagram >

2. F49-S/SH

- ① Compressor Spec. : NT2178GKV (R-404A), 115V/60Hz, CSR Type
- ② Maker : EMBRACO
- ③ Cooling Capacity : 903kcal/Hr - LBP
- ④ Starting Capacitor Spec. : 243~292 μF / 165V
- ⑤ Running Capacitor Spec. : 35 μF / 400V
- ⑥ Relay Spec. : RVA9AD3C-121
- ⑦ O.L.P Spec. : MST18RN-3041



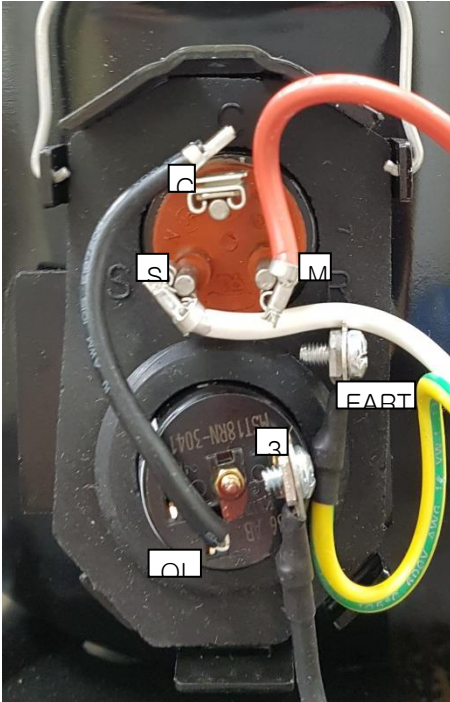
- * Comp. Winding Resistance: C - M \rightarrow 0.40 Ω , C - S \rightarrow 2.60 Ω (RT 25 $^{\circ}\text{C}$ (77 $^{\circ}\text{F}$))
- * O.L.P Winding Resistance: 3 - C \rightarrow 0 Ω (OK), ∞ Ω (NG)
- * Relay Winding Resistance: 1 - 2 \rightarrow 0 Ω (OK), ∞ Ω (NG)



< COMP. Wiring Diagram >

3. F72-S/SH

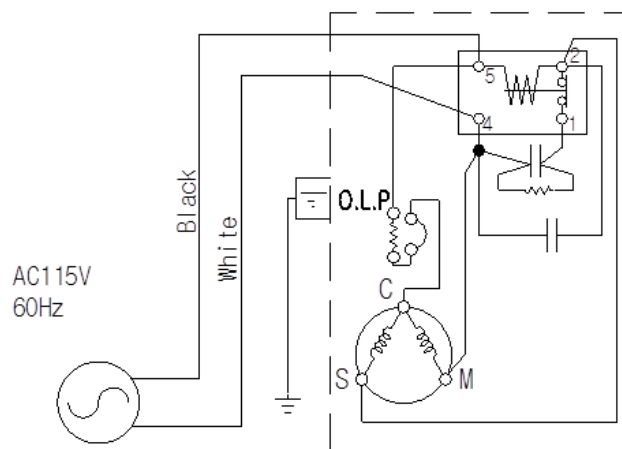
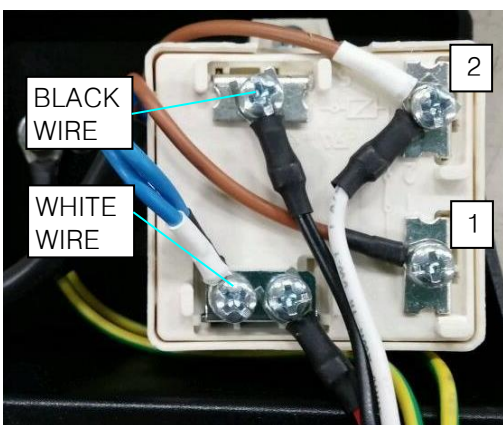
- ① Compressor Spec. : NT2192GKV (R-404A), 115V/60Hz, CSR Type
- ② Maker : EMBRACO
- ③ Cooling Capacity : 1,051kcal/Hr - LBP
- ④ Starting Capacitor Spec. : 243~292 μF / 165V
- ⑤ Running Capacitor Spec. : 35 μF / 400V
- ⑥ Relay Spec. : RVA2AE3C-105
- ⑦ O.L.P Spec. : CRA1773-3029 GA3RMU0002



* Comp. Winding Resistance: C - M \rightarrow 0.34 Ω , C - S \rightarrow 2.59 Ω (RT 25 $^{\circ}\text{C}$ (77 $^{\circ}\text{F}$))

* O.L.P Winding Resistance: 3 - C \rightarrow 0 Ω (OK), ∞ Ω (NG)

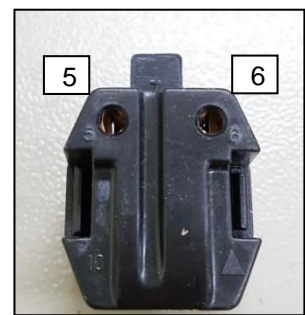
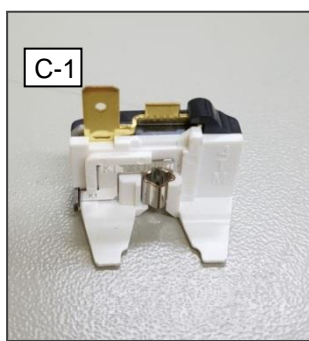
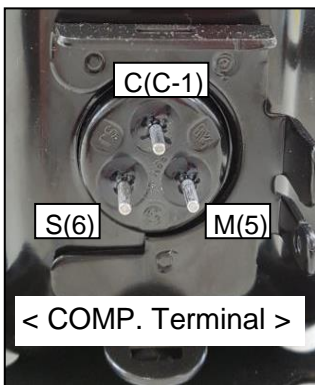
* Relay Winding Resistance: 1 - 2 \rightarrow 0 Ω (OK), ∞ Ω (NG)



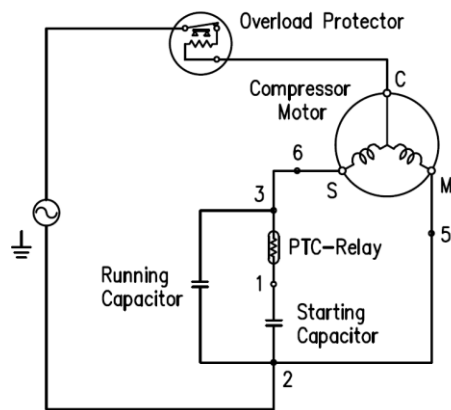
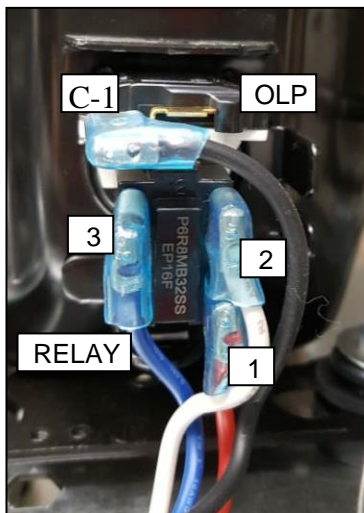
< COMP. Wiring Diagram >

4. R23/R49-S/SH, R23/R49-G

- ① Compressor Spec. : NW108LHB1 (R-134a), 115V/60Hz, CSR Type
- ② Maker : DAEWOO-KOREA
- ③ Cooling Capacity : 325kcal/Hr - LBP
- ④ Starting Capacitor Spec. : 125 μF / 200V
- ⑤ Running Capacitor Spec. : 16 μF / 250V
- ⑥ Relay Spec. : R6R8MD22SS
- ⑦ O.L.P Spec. : 4TM801SFBZZ-52



CSR Type



< COMP. Wiring Diagram >

* Comp. Winding Resistance: C - M \rightarrow 1.20 Ω , C - S \rightarrow 6.18 Ω (RT 25 $^{\circ}\text{C}$, 77 $^{\circ}\text{F}$)

* O.L.P Winding Resistance: 1 - 1-1 \rightarrow 0 Ω (OK), ∞ Ω (NG)

On/Off Temperature - O/T: 135 $^{\circ}\text{C}$, C/T: 61 $^{\circ}\text{C}$

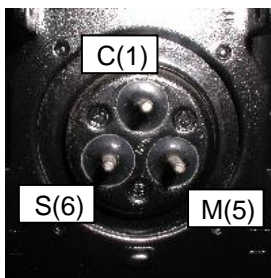
* Relay Winding Resistance: M (5) - C-1 \rightarrow 0 Ω (OK), ∞ Ω (NG)

S (6) - C-1 \rightarrow ∞ Ω (OK)

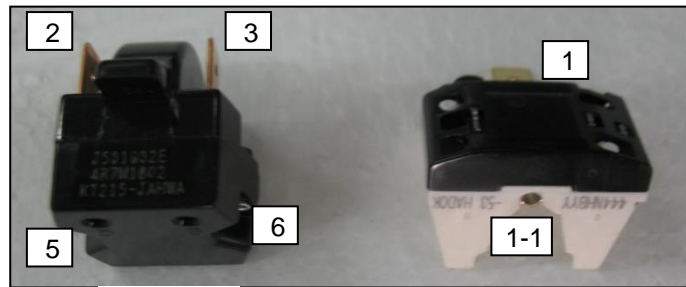
* PTC: 6.8 Ω

6. GR26H

- ① Compressor Spec. : SK182C-L2U (R-134a), 115V/60Hz, RSCR Type
- ② Maker : SAMSUNG-KOREA
- ③ Cooling Capacity : 243kcal/Hr - LBP
- ④ Relay Spec. : PTHAR-T4R7M180D/J531Q32E4R7M1802
- ⑤ O.L.P Spec. : 4TM444NHBYY-53



< Comp. Terminal >



< RELAY >

< OLP >

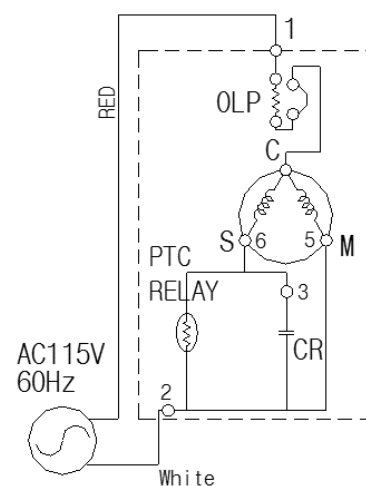
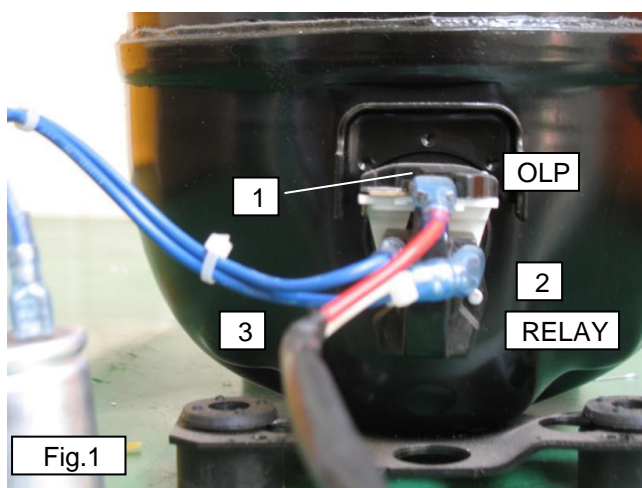
* Comp. Winding Resistance: C - M → 2.3Ω, C - S → 3.8Ω (RT 25°C (77°F))

* O.L.P Winding Resistance: 1 - 1-1 → 0 Ω (OK), ∞ Ω (NG)

* Relay Winding Resistance: 5 - 6 → 0 Ω (OK), ∞ Ω (NG)

2 - 3 → 0 Ω (OK), ∞ Ω (NG)

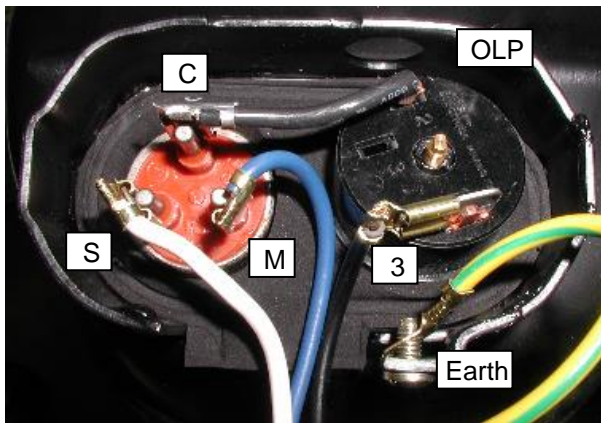
* Measuring the resistance, the bottom of the relay must be downward (like fig.1)



< COMP. Wiring Diagram >

7. GR48S

- ① Compressor Spec. : CAJ4476Y (A) (R-134a), 115V/60Hz, CSIR Type
- ② Maker : TECUMSEH-FRANCE
- ③ Cooling Capacity : 1,946kcal/Hr - HBP
- ④ Starting Capacitor Spec. : 250 μ F / 160V
- ⑤ Relay Spec. : 3ARR3*2M*
- ⑥ O.L.P Spec. : CRA38014

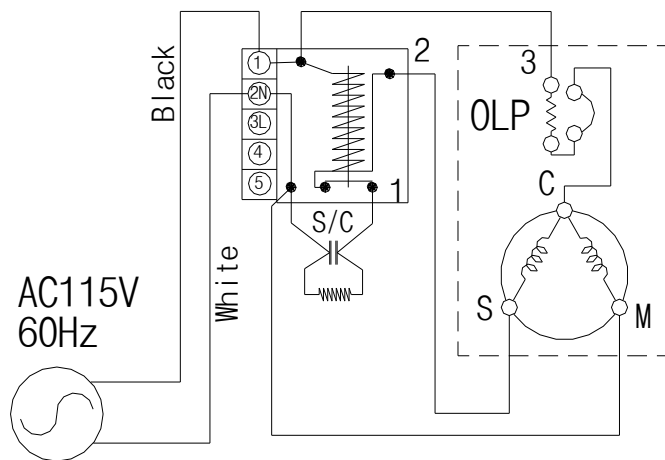
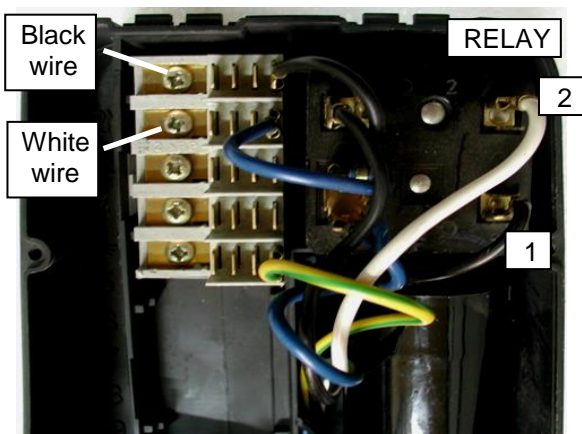


< RELAY BOX >

* Comp. Winding Resistance: C - M \rightarrow 0.72 Ω , C - S \rightarrow 3.68 Ω (RT 20 $^{\circ}$ C (68 $^{\circ}$ F))

* O.L.P Winding Resistance: 3 - C \rightarrow 0 Ω (OK), ∞ Ω (NG)

* Relay Winding Resistance: 1 - 2 \rightarrow 0 Ω (OK), ∞ Ω (NG)



< COMP. Wiring Diagram >