DAIKIN

SiBE811111

Service Manual

Condensing Unit

LRMEQ5-20AY1(E)

Booster Unit

LCBKQ3AV1(E)

Table of Contents

Subject models: LRMEQ5-20AY1(E)
LCBKQ3AV1(E)
(*Freezer models: Booster units cannot be connected to LRLEQ5-20AY1)

1. Safety Precautions

☆ Before performing design, construction, or maintenance, thoroughly read the "Safety Precautions" and also the "Installation Manual" and "Operation Manual" that come with this product.

☆ Precautions are classified as "⚠ WARNING" or "⚠ CAUTION" for the purpose of this Section. Items that mishandling highly potentially induces serious consequences such as death or serious injury are specially described under "⚠ WARNING". Furthermore, even items described under "⚠ CAUTION" potentially induce serious consequences depending on circumstances. All are important items for safety and must be followed without fail.

☆ Pictograms

Δ This symbol alerts you to precautions to be taken. Sections under this symbol provide the specific descriptions of precautions. ○ This symbol alerts you to prohibited acts. Sections under or in the vicinity of this symbol provide the specific descriptions of prohibited acts. ● This symbol alerts you to mandatory acts or instructions. Sections under or in the vicinity of this symbol provide the specific descriptions of instructions.

☆ After the completion of construction or repair work, conduct test operation on the equipment to check it for any abnormalities, and also explain precautions for use of the equipment to customer.

<I. Precautions for Construction and Repair>

⚠ WARNING

(1) To overhaul the equipment, be sure to turn OFF all power supplies.
Not doing so will result in an electric shock.
To repair the equipment or check for circuits with power applied, pay utmost attention not to touch any live part.

(2) If a refrigerant gas belches during work, do not touch the refrigerant gas.
Doing so will result in frostbite.

(3) To remove a welded part from the suction or discharge pipe of compressor, remove it in a well-ventilated area after thoroughly discharging a refrigerant gas.
Not doing so will cause the refrigerant gas or refrigerant oil to belch, thus resulting in injury.

(4) If a refrigerant gas leaks during work, ventilate the working area.
If the refrigerant gas comes into contact with a flame, toxic gas will be generated.

(5) The electrical parts of outdoor unit carry a high voltage.
To repair these parts, thoroughly discharge electricity from the capacitor.
Not doing so will result in an electric shock.

⚠ CAUTION

(6) **Do not start or stop the air conditioner using the POWER SUPPLY switch.**
Doing so may result in a failure or water leakage.

(7) **Do not repair electrical parts with wet hand.**
Doing so may result in an electric shock.

(8) **Do not wash the air conditioner in water.**
Doing so may result in an electric shock or a fire.

(9) **Be sure to establish a ground for the equipment.**
Not doing so may result in an electric shock.

(10) **To clean the equipment, be sure to set the POWER SUPPLY switch to "OFF" to turn OFF all power supplies.**
Not doing so may result in injury because the internal fan rotates at high speeds.

(11) **To dismount the equipment, pay careful attention not to tilt it.**
Tilting the equipment may cause water remaining in the equipment to fall in drops, thus wetting goods kept in storage.

(12) **Check whether or not the refrigerating cycle part gets hot, and then repair the equipment.**
Not doing so may result in a burn.

(13) **Use a welder in well ventilated areas.**
Using the welder in an enclosed room may result in lack of oxygen.

<II. Precautions for Equipment after Construction and Repair>

⚠ WARNING

(14) **To repair the equipment, be sure to use parts listed in the List of Service Parts for the applicable model and proper tools. Furthermore, NEVER make any modification to the equipment.**
Not observing this warning will result in an electric shock, heat generation, or a fire.

(15) **To install or relocate an air conditioner, select a location capable of supporting the weight of the air conditioner.**
The insufficient strength of the location or improper installation of the air conditioner will cause the unit to drop, thus resulting in injury.

⚠ WARNING

(16) Conduct electrical works according to information in the "Electrical Equipment Technical Standards", "Internal Wiring Regulations", and Installation Manual, and further be sure to use dedicated circuits. Insufficient capacity of the power supply circuit and faulty electrical works will result in an electric shock or a fire.

(17) To make wirings between indoor and outdoor units, use specified wires to securely connect them, and fix them so that the external force of cables will not be transmitted to terminal connections.
Imperfect connections or fixing will result in heat generation or a fire.

(18) To make wirings between indoor and outdoor units or for power supply, form wires so that structures such as the service lid will not be lifted, and properly mount the lid.
Improperly mounting the lid will result in heat generation of the terminal part, an electric shock, or a fire.

(19) Do not cause damage to or process the power supply cord.
Doing so will result in an electric shock or a fire.
Putting heavy things on, heating, or pulling the power supply cord will result in damage to it.

(20) Do not cause anything other than the specified refrigerant (e.g. air) to get mixed in the refrigerant system.
Doing so will cause the refrigerant system to have abnormally high internal pressure, thus resulting in damage to the equipment or bodily injury.

(21) Should the equipment have leakage of refrigerant gas, locate leaking points, and then repair them without fail. Subsequently, refill the equipment with a specified quantity of refrigerant.
If no leaking points are located and thereby repair work is to be discontinued, perform pump-down operation, and then close the service valve. Not doing so will result in refrigerant gas leakage.
The refrigerant gas itself is harmless, but if it comes into contact with a flame from a fan heater, stove, or stove burner, toxic gas will be generated.

⚠ CAUTION

(22) A ground leakage circuit breaker needs to be mounted.

Mounting no ground leakage circuit breaker may result in an electric shock or a fire.

(23) Do not install the equipment in places with the potential for leakage of flammable gas.
Should a flammable gas leak to accumulate around the equipment, the gas may catch fire.

⚠ WARNING

(24) Check power supply terminals for deposition of dust or for any loose terminals.

Deposition of dust on or imperfect connections of the terminals will result in an electric shock or a fire.

(25) Be sure to replace flawed or deteriorated power supply cord or lead wires.

Not doing so will result in an electric shock, heat generation, or a fire.

(26) Do not connect the power supply cord halfway or with many loads of other electrical fittings on one electric outlet.

Doing so will result in an electric shock, heat generation, or a fire.

⚠ CAUTION

(27) Check to be sure that the mounting positions and wiring conditions of parts as well as the connections of soldered parts and crimp style terminals are all normal.

If any of these items is abnormal, an electric shock, heat generation, or a fire may result.

(28) If the installation base or mounting frames are reduced in strength due to corrosion, replace them.

Not doing so may cause the equipment to drop, thus resulting in injury.

(29) Check for the grounding state. If the ground is in an imperfect state, rectify it.

Imperfect ground may result in an electric shock.

(30) After the completion of repair, be sure to make measurement of insulation resistance to prove that it is not less than 1MΩ.

Insulation failures may result in an electric shock.

(31) After the completion of repair, be sure to check the indoor unit for drainage.

Insufficient draining from the indoor unit may result in the entry of water into a room, thus wetting furniture and household goods.

About the Product Warranty

1 Secondary warranty

Secondary disasters caused by a product abnormality such as those to refrigerated products and sales assurances are not subject to the warranty. When there is a risk of secondary disasters, regularly perform temperature management and install a warning system or reserve equipment after consulting with the dealer where the product was purchased. Also acquire damage insurance in advance.

2 No charge warranty period & subject

- A warranty card is included with this product.
  The necessary information on the warranty card is completed by the dealer where the product was purchased and handed over. After verifying the information written on the warranty card, the persons who manage the refrigerator should store it carefully in a safe place.

Warranty period: 1 year from installation date

Please read the warranty card for details.

- When requesting no charge repairs during the warranty period, first contact the dealer or the Daikin contact center and always present the warranty card when the product is repaired.
  If the warranty card is not presented, a service fee may be charged even during the no charge warranty period, so store the warranty card carefully in a safe place.

However, for the warranty corresponding to the content listed below, the product will be repaired for a service fee even during the no charge warranty period.

3 Situations that do not correspond to the no charge warranty (outside warranty scope)

- Accidents in usage outside the usage specifications
  Refer to the usage specifications for each model series.
- For the below problems in selection, installation, construction, or other problems, "Ex." indicates concrete examples.

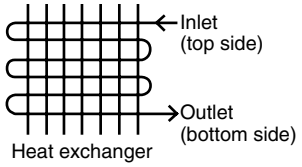
1. **Model selection problems**
   - When making a selection inappropriate for the storage application
     Ex: Cooling goods that are not the storage temperature
   - When selecting a load that is too large or too small for the cooling capacity
   - For problems from the selection error of electronic expansion valve or solenoid valve at refrigeration side.
     Ex: Defective cooling because the electronic expansion valve capacity is too small

2. **Installation problems (installation and installation environment)**
   - When not installed in a level and stable location
     Ex: Unit is not secured
   - When the installed atmosphere differs from normal atmospheric conditions
     Ex: Salt spray atmosphere, oil mist atmosphere, near kitchen exhaust
     Other corrosive gas/adhesive mist atmospheres
   - For exhaust heat problems, exhaust heat remaining from poor ventilation
     Ex: Exhaust air is sucked back into the equipment
   - When there is no solenoid valve at refrigeration side
   - When there is an installation defect in the electronic expansion valve at refrigeration side
     Ex: Feeler bulb is disconnected from the piping
   - When the refrigerant piping size is not specified
   - When drainage water cannot be smoothly discharged from the refrigeration unit
     Ex: The drainage water pipe slope does not reach 6° or higher
     Ex: Not insulated or the heater is not installed (for the freezer stage)
   - When the drain pipe has no trap installed or is inappropriate in the refrigeration unit
     Ex: Water column not 200 mm or higher
   - When vacuum drying in the refrigerant piping system is insufficient
     Ex: Clogging from fine moisture crystals
   - When the air tightness in the refrigerant piping system is insufficient
     Ex: Refrigerant gas leakage
   - When foreign objects contaminate the inside of the refrigerant piping system
     Ex: Clogging in fine sections of the system

- When field improvement construction has a negative effect
  Ex: When used outside the usage temperature range because of field improvements
- When an accident occurs because of mishandling during installation
  Ex: Outer panel looseness/vibration and pipes breaking/bending
- When the product is altered
  Ex: The pressure switch is short circuited
- For problems caused by overcharge refrigerant or insufficient refrigerant
- For construction that does not observe the below showcase restrictions

<Showcase restrictions>

- Install a thermal expansion valve and liquid solenoid valve for each showcase. (Both for R-410A)
- Thermally insulate the feeler bulb of thermal expansion valve.
- Install the showcases connected to outdoor unit on the same floor.
- Use heat exchanger piping with the outlet on the bottom side. (Diagram shown on the right)
- Use the showcase connected only to the freezer load not to the refrigeration load.



3. Problems in usage

- When the temperature setting for stored goods is wrong
  Ex: Storing vegetables at 0°C or lower
- When doors are left open for long periods of time
  Ex: In the period from defrosting to defrosting, when a door is left open for a total of 5 minutes or more while the equipment is operating
- When neglecting periodic maintenance
  Ex: Heat exchanger clogs, rust on parts, gas leaks, refrigeration unit freezing

4. Others

- When a Daikin affiliate has requested prior improvements and they are not implemented
  Ex: When multiple units are installed, simultaneous starting/stopping, simultaneous defrosting, etc.
- Situations caused by natural disasters or fires
  Ex: Electrical components damaged by lightning
- Others, situations caused by lapses in common sense related to installation or usage
  Ex: Usage without piping insulation

- This product is for domestic use. Usage is not warranted when used outside of Japan. After-sales service is also not available.

2. Specifications (when the Condensing Unit is Connected to Booster Units)

For PCB micro-computer software versions below, a software update is required.

- When a software update is required.
  Condensing unit: ver. 52 (EB09058(D))
  Booster unit: ver. 34 (EC08008(B) or EC08009(B))
- When a software update is not required.
  Condensing unit: ver. 80 or higher (EB09060(D or after) or EB09061(D or after))
  Booster unit: ver. 38 or higher (EC09096(C or after) or EC09097(C or after))

After updating the software, always note the micro-computer software version on PCB.
Condensing unit: ver. 80, Booster unit: ver. 38

2.1 Condensing Unit - LRMEQ5-20AY1(E)

Refrigerant	R-410A
Refrigeration oil	DAPHNE FVC68D
Range of suction pressure equivalent saturation temperature ∗1	–20°C to +10°C
Range of outdoor air temperature	–15°C to 43°C
Suction gas superheated degree	10K or higher, 30K or lower
Power supply voltage regulation	Within ±10% of rated voltage
Power supply voltage imbalance rate	Within ±2% of rated voltage
Power supply frequency regulation	Within ±2% of rated frequency
Compressor ON/OFF frequency	6 times or less/hour
Connection piping length (piping equivalent length) ∗2	130 m or lower
Max. difference in height between indoor and outdoor units	35 m or lower (when the condensing unit is installed higher than the refrigeration-side)
	10 m or lower (when the condensing unit is installed lower than the refrigeration-side)
Installation space	According to the installation service space

Restrictions for the refrigeration-side

Connectable minimum load capacity	1.6 kW or higher ∗4
Liquid solenoid valve installed upstream of electronic expansion valve	For R-410A, maximum operating pressure difference: 3.5 MPa or higher
	Opens/closes to control the solenoid valve output from the condensing unit (refrigeration-side operating output).
Defrost method	Hot gas defrost not possible
	After defrosting ends, resume operation of the refrigeration-side blower within 3 minutes or less.
Restrictor	Use a thermal expansion valve for R-410A.

Note:

∗1. The evaporating pressure equivalent saturation temperature range depends on the condensing unit's evaporating temperature and the piping length from the booster to the branch pipe. Check the operating range for details.

∗2. "Piping equivalent length": Value when installed according to the installation manual, refrigerant is the same as the prescribed amount, and reliable oil return to the installation is guaranteed.

∗3. Set the total value of the internal volume for the evaporator (refrigerator/freezer) to connect and the amount of refrigerant inside the evaporator that can be recovered in the condensing unit by closing the liquid solenoid valve installed on the refrigeration-side to the below amount or lower.
LRMEQ5, 6AY1: 18 L or lower
LRMEQ8, 10, 12AY1: 27 L or lower
LRMEQ15, 20AY1: 40 L or lower

∗4. Connection to the refrigeration load is necessary.

2.2 Booster Unit - LCBKQ3AV1(E)

Refrigerant		R-410A
Refrigeration oil		DAPHNE FVC50K+DAPHNE FVC68D
Range of suction pressure equivalent saturation temperature ∗1		–45°C to –20°C
Range of outdoor air temperature		–20°C to 43°C ∗4
Suction gas superheated degree		10K or more
Suction gas temperature		20°C or lower
Power supply voltage regulation		Within ±10% of rated voltage
Power supply voltage imbalance rate		Within ±2% of between phases
Power supply frequency regulation		Within ±2% of rated frequency
Compressor ON/OFF frequency		6 times or less/hour
Connection piping length (piping equivalent length) ∗2		30 m or lower
Max. difference in height between indoor and outdoor units	Refrigeration-side from booster unit	10 m or lower (when the booster unit is installed lower than the refrigeration-side)
		10 m or lower (when the booster unit is installed higher than the refrigeration-side)
	Booster unit from branch pipe	10 m or lower (when the booster unit is installed lower than the branch pipe)
		10 m or lower (when the booster unit is installed higher than the branch pipe)
Number of connected boosters		LRMEQ5, 6AY1: 1 unit Others: 2 units
Installation space		According to the installation service space

Restrictions for the refrigeration-side

Connectable minimum load capacity	0.43 kW
Liquid solenoid valve installed upstream of electronic expansion valve	For R-410A, maximum operating pressure difference: 3.5 MPa or higher
	Opens/closes to control the output from the booster unit (freezer operation output).
Defrost method	Heater defrost. After defrosting ends, resume operation of the refrigeration-side blower within 3 minutes or less.
Restrictor	Use a thermal expansion valve for R-410A.

Note:

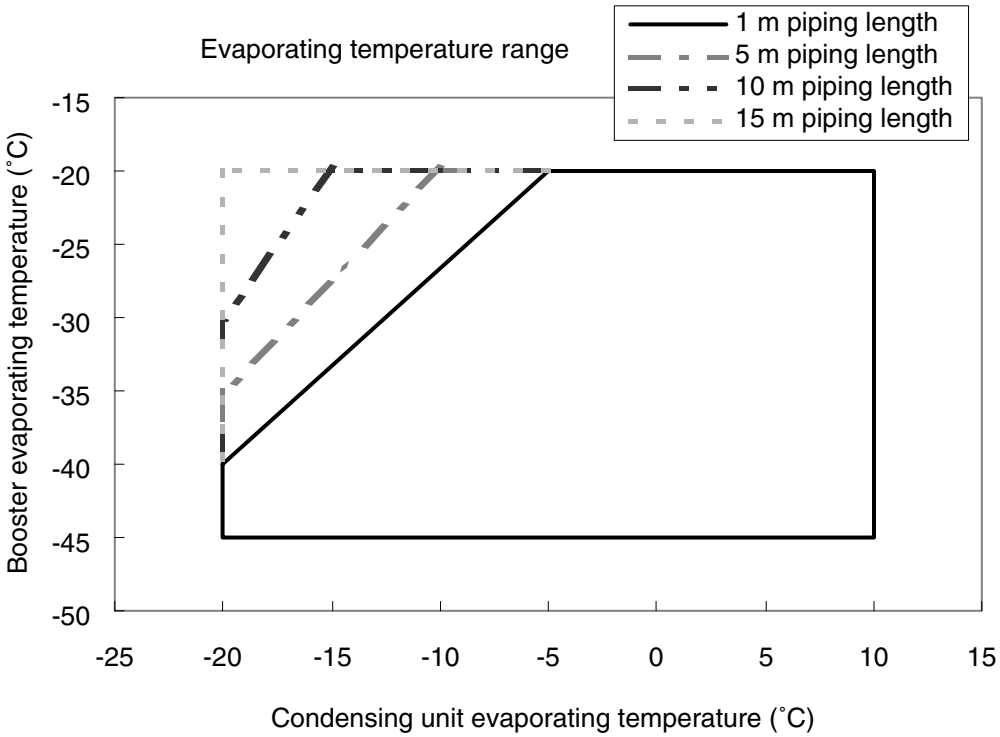
∗1. The evaporating pressure equivalent saturation temperature range depends on the condensing unit's evaporating temperature and the piping length from the booster to the branch pipe. Check the operating range for details.

∗2. "Piping equivalent length": Value when installed according to the installation manual, refrigerant is the same as the prescribed amount, and reliable oil return to the installation is guaranteed.

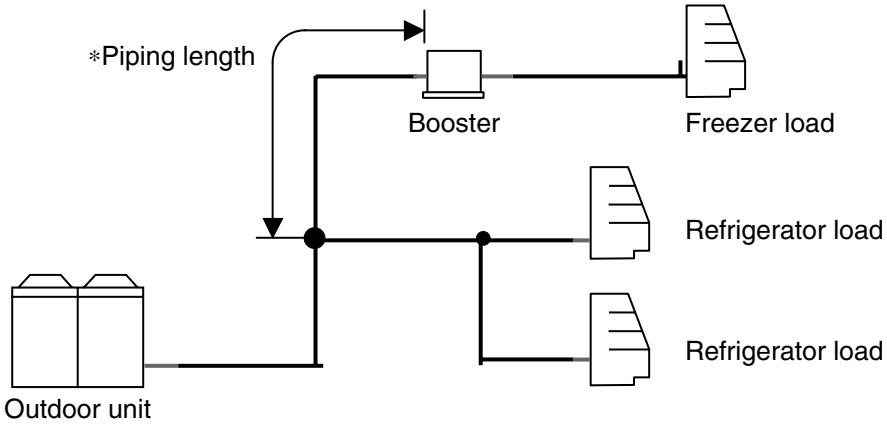
∗3. See the condensing unit usage standards for the total value of the internal volume for the evaporator (refrigerator/freezer) to connect and the amount of refrigerant inside the evaporator that can be recovered in the condensing unit by closing the liquid solenoid valve installed on the refrigeration-side.

∗4. This value differs when connected with CVP.

2.3 Operating Range of Booster Unit and Condensing Unit



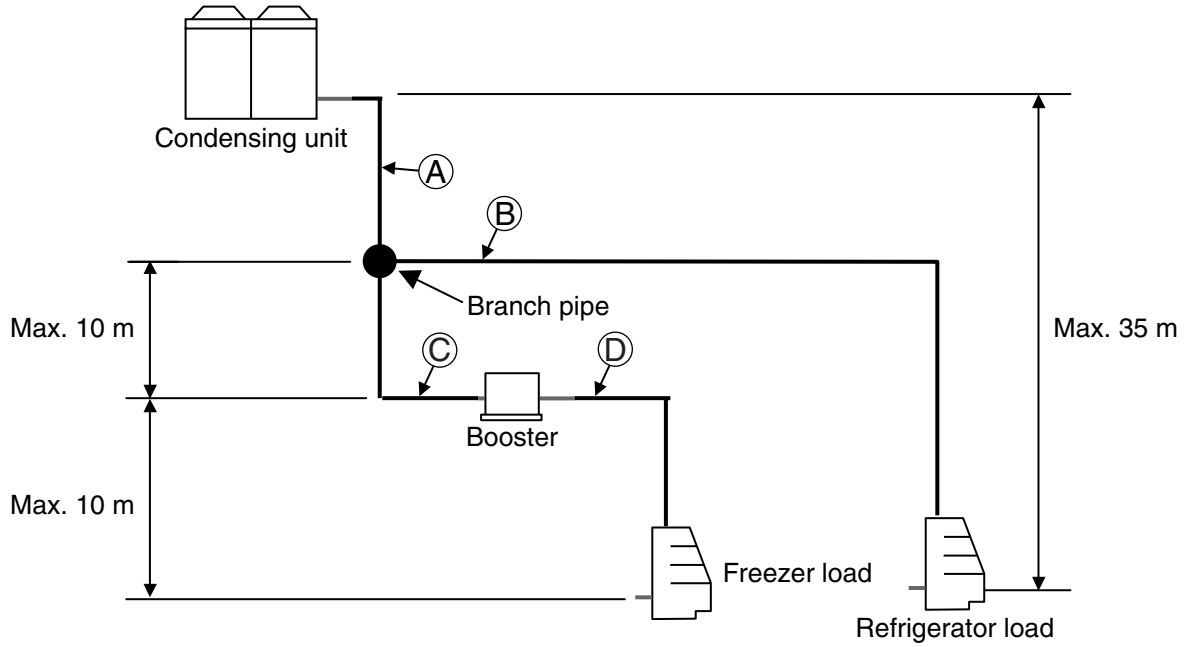
∗Note: Piping length indicates the piping length from the booster unit to the branch as shown in the diagram below.



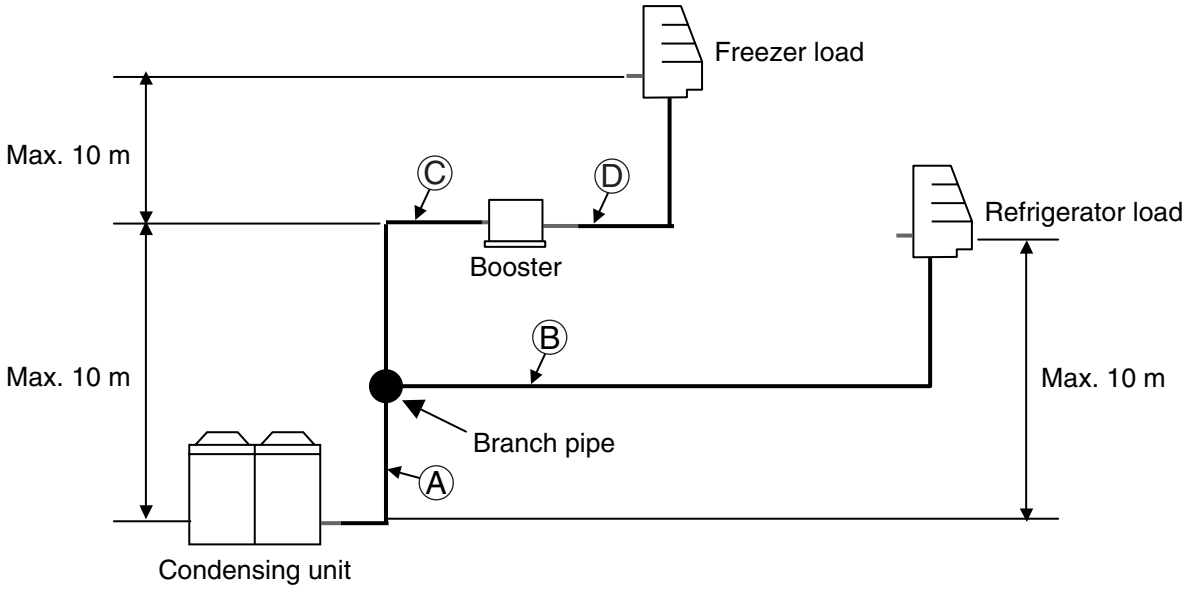
3. Piping Connection Diagram

For details, refer to the installation manual and technical guide included with the unit.

1) When load equipment is installed below the condensing unit



2) When load equipment is installed above the condensing unit



∗**Caution:** Subcooling of the liquid piping after the booster unit ("D" above) may be 20 to 30K or more, so use an insulation material.

Symbol	Piping diameter	Maximum piping equivalent length
A	According to condensing unit piping diameter	A(MAX) ≤ 130m-B
B	According to condensing unit piping diameter	B(MAX) ≤ 50m
C	Liquid pipe inlet: ϕ6.35 Gas pipe: ϕ9.52	C(MAX) ≤ 30m
D	Liquid pipe outlet: ϕ6.35 Gas pipe: ϕ15.88	D(MAX) ≤ 30m

4. Cooling Capacity Characteristics

4.1 Booster Unit Capacity Characteristics

Table 1. Capacity characteristics

Model name	Outdoor air temperature	Suction pressure equivalent saturation temperature (°C)											
		–45°C		–40°C		–35°C		–30°C		–25°C		–20°C	
		Q	W	Q	W	Q	W	Q	W	Q	W	Q	W
	°CDB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
LCBKQ3AV1 LCBKQ3AV1E	20°C	1.85	1.53	2.45	1.60	3.35	1.68	4.12	2.01	5.27	2.34	6.62	2.75
	27°C	1.85	1.53	2.45	1.60	3.35	1.68	4.12	2.01	5.27	2.34	6.62	2.75
	32°C	1.85	1.53	2.45	1.60	3.35	1.68	4.12	2.01	5.27	2.34	6.62	2.75
	38°C	1.77	1.53	2.28	1.60	3.11	1.68	3.85	2.01	4.95	2.34	6.25	2.75
	43°C	1.72	1.53	2.19	1.60	2.95	1.68	3.69	2.01	4.76	2.34	6.04	2.75

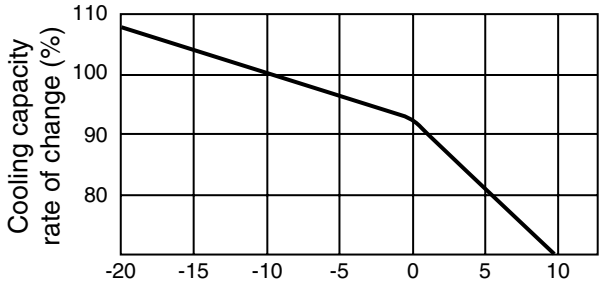
∗ The characteristics in the table above represent values under the conditions below.

Condensing unit evaporating temperature	–10°C
Booster unit suction gas superheated degree	10K
Booster unit to refrigeration-side piping equivalent length (A)	1m
Booster unit to branch pipe piping equivalent length (B)	1m

4.1.1 Cooling capacity calculation method (when 1 m both (A) and (B))

Cooling capacity = Capacity in Table 1
× Cooling capacity rate of change by condensing unit evaporating temperature (A)

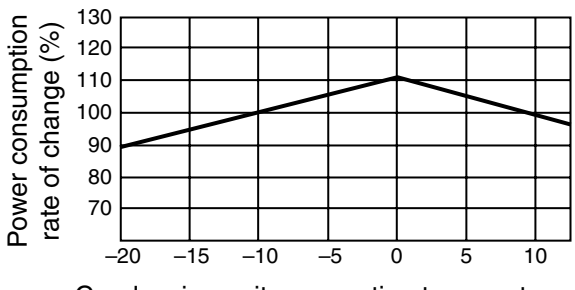
■ **Cooling capacity rate of change by condensing unit evaporating temperature (A)**



4.1.2 Power consumption calculation method (when 1 m both (A) and (B))

Power consumption = Power consumption in Table 1
× Power consumption rate of change by condensing unit evaporating temperature (a)

■ **Power consumption rate of change by condensing unit evaporating temperature (a)**

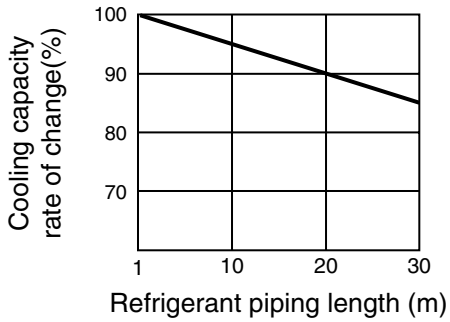


4.2 Correction Method for Capacity Characteristics by Piping Length

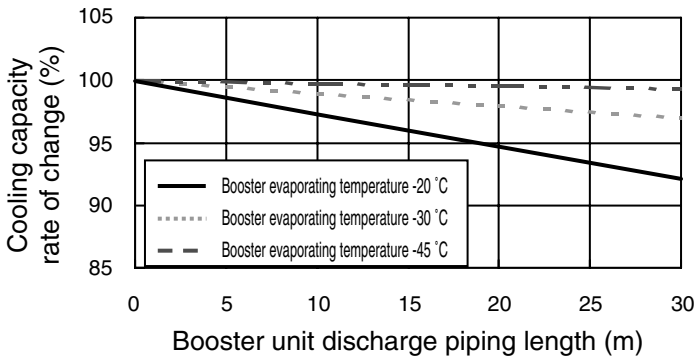
4.2.1 Cooling capacity calculation method (piping length reference)

Cooling capacity = Capacity in Table 1
× Cooling capacity rate of change by condensing unit evaporating temperature (A) (see previous page)
× Cooling capacity rate of change by refrigerant piping length (B)
× Cooling capacity rate of change by booster unit discharge piping length (C)

1. Cooling capacity rate of change by refrigerant piping length
(booster unit to refrigeration-side piping) (B)



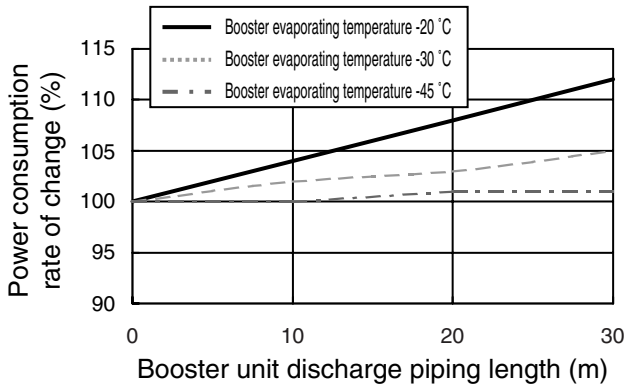
2. Cooling capacity rate of change by booster unit discharge piping length
(booster unit to branch piping) (C)



4.2.2 Power consumption calculation method (piping length reference)

Power consumption = Power consumption in Table 1
× Power consumption rate of change by condensing unit evaporating temperature (a) (see previous page)
× Power consumption rate of change by booster unit discharge piping length (b)

1. Power consumption rate of change by booster unit discharge piping length
(booster unit to branch piping) (b)



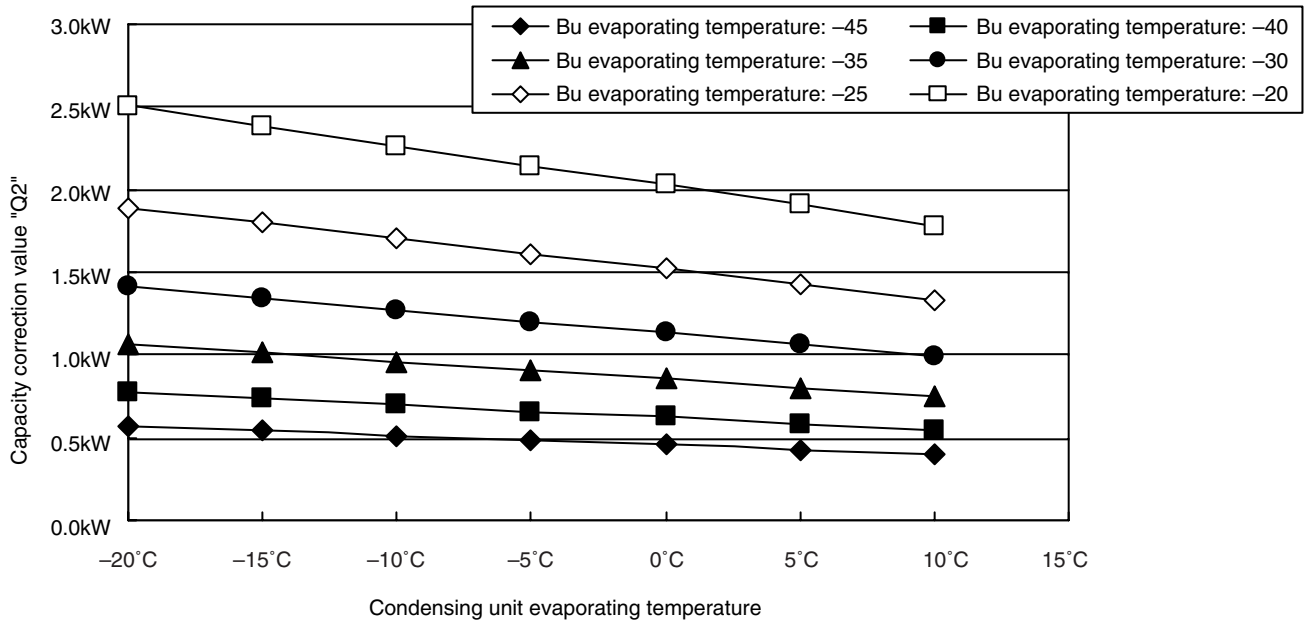
4.3 Condensing Unit Capacity Characteristics

∗**Caution:** When booster units are connected, condensing unit-side cooling capacity decreases.
As shown below, calculate cooling capacity for model selection.

Calculate condensing unit cooling capacity with the formula below for model selection.

Condensing unit cooling capacity when connected to boosters
= "Condensing unit cooling capacity (P.15~17)"
– ("Booster cooling capacity (P.12)" + "Capacity correction value of booster unit (P.13)") × Number of connected boosters

- **Capacity correction value**
  The capacity correction value differs depending on the condensing unit's evaporating temperature and the booster's evaporating temperature. Calculate this value from the diagram below.



- **Example calculation of condensing unit cooling capacity**

<Calculation conditions>

Power supply frequency: 50 Hz
Outdoor air temperature: 32°C
Condensing unit: LRMEQ20AY1
Condensing unit evaporating temperature: –10°C
Booster unit evaporating temperature: –40°C
Number of connected booster units: 1 unit (1 m: piping length)

<Condensing unit capacity calculation>

1. Condensing unit capacity: 37.0 kW (calculated from P.17 capacity table)
2. Booster unit capacity: 2.45 kW (calculated from P.12 capacity table)
3. Capacity correction value: 0.7 kW (calculated from the graph above)

Condensing unit capacity when connected to boosters = 37.0 kW – (2.45 kW + 0.7 kW) × 1 unit
= <u>33.85 kW</u>

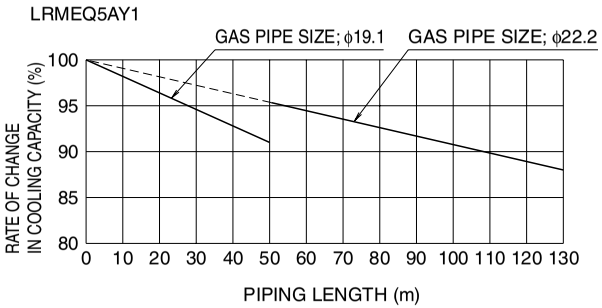
• LRMEQ5/6AY1(E)

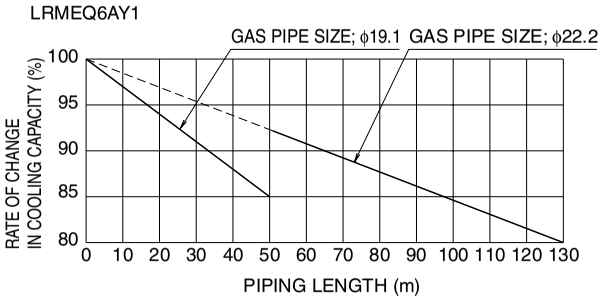
COOLING CAPACITY TABLE

MODEL	Amb. Temp.	SUCTION PRESSURE EQUIVALENT SATURATION TEMPERATURE ˚C													
		-20		-15		-10		-5		0		5		10	
		Q	W	Q	W	Q	W	Q	W	Q	W	Q	W	Q	W
	˚C DB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
LRMEQ5AY1	20	10.4	3.66	11.8	3.69	13.3	3.72	14.4	3.76	15.7	3.80	17.0	3.84	18.3	3.97
	27	9.74	4.26	11.1	4.32	12.5	4.39	13.7	4.46	15.0	4.55	16.2	4.64	17.5	4.82
	32	9.24	4.85	10.6	4.93	12.0	5.00	13.1	5.12	14.4	5.26	15.6	5.39	16.9	5.60
	38	8.56	5.64	9.84	5.75	11.2	5.86	12.3	6.03	13.5	6.23	14.7	6.43	16.0	6.75
	43	7.82	6.37	9.06	6.57	10.4	6.79	11.4	7.19	12.7	7.44	13.8	7.62	15.0	7.84
LRMEQ6AY1	20	12.7	4.49	14.4	4.51	16.1	4.54	17.7	4.60	19.3	4.63	20.9	4.72	22.6	4.79
	27	11.9	5.38	13.5	5.46	15.1	5.54	16.7	5.62	18.3	5.71	19.9	5.78	21.5	5.91
	32	11.2	6.05	12.8	6.17	14.4	6.30	16.0	6.44	17.6	6.60	19.2	6.75	20.7	6.99
	38	10.3	6.86	11.9	7.04	13.4	7.22	14.9	7.44	16.5	7.68	18.0	7.92	19.6	8.28
	43	9.36	7.33	10.8	7.62	12.3	7.93	13.8	8.38	14.7	8.39	15.1	8.08	15.1	7.72

Q: COOLING CAPACITY
W: POWER CONSUMPTION

■RATE OF CHANGE IN COOLING CAPACITY BY PIPING LENGTH





CALCULATION METHOD OF COOLING CAPACITY

COOLING CAPACITY = READING VALUE FROM COOLING CAPACITY TABLE × RATE OF CHANGE IN COOLING CAPACITY BY PIPING LENGTH

NOTES)
1. ▭ IS SPECIFIED POINT.
2. THE CONDITION OF CHARACTERISTICS OF THE TABLE: 10˚C (SUCTION SH).
3. CONSIDER DECREASE OF CAPACITY DEPENDED ON FROSTING, AND TIME OF DEFROSTING, PLEASE SELECT LARGER MODEL. (ABOUT 15%)

3D065031

COOLING CAPACITY TABLE

MODEL	Amb. Temp.	SUCTION PRESSURE EQUIVALENT SATURATION TEMPERATURE ˚C													
		-20		-15		-10		-5		0		5		10	
		Q	W	Q	W	Q	W	Q	W	Q	W	Q	W	Q	W
	˚C DB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
LRMEQ8AY1	20	16.3	5.91	18.5	5.96	20.7	6.00	22.9	6.08	25.0	6.12	27.1	6.17	29.3	6.23
	27	15.3	7.14	17.4	7.27	19.5	7.40	21.6	7.52	23.7	7.64	25.9	7.76	28.0	7.86
	32	14.4	8.10	16.5	8.29	18.6	8.50	20.7	8.70	22.8	8.92	24.8	9.15	26.9	9.39
	38	13.3	9.29	15.3	9.56	17.3	9.84	19.3	10.1	21.4	10.5	23.4	10.9	25.4	11.3
	43	12.0	10.6	14.0	10.9	15.9	11.4	17.9	12.1	19.9	12.6	21.9	13.0	23.8	13.2
LRMEQ10AY1	20	19.1	7.07	21.8	7.12	24.3	7.18	26.9	7.26	29.4	7.30	32.0	7.33	34.5	7.38
	27	17.9	8.46	20.4	8.62	22.9	8.78	25.4	8.93	27.9	9.07	30.4	9.20	32.9	9.32
	32	16.9	9.52	19.3	9.75	21.8	10.0	24.3	10.2	26.7	10.5	29.2	10.8	31.7	11.1
	38	15.5	10.8	17.9	11.1	20.3	11.5	22.6	11.8	25.1	12.2	27.5	12.7	29.9	13.2
	43	14.0	11.8	16.3	12.4	18.6	12.8	20.9	13.7	23.3	14.4	25.6	14.8	27.7	14.9
LRMEQ12AY1	20	21.4	8.01	24.4	8.09	27.3	8.15	30.1	8.26	33.0	8.31	35.8	8.36	38.7	8.41
	27	20.0	9.57	22.8	9.78	25.7	9.96	28.5	10.1	31.3	10.3	34.1	10.5	36.9	10.6
	32	18.8	10.7	21.6	11.0	24.4	11.3	27.2	11.6	29.9	11.9	32.7	12.2	35.5	12.5
	38	17.3	12.1	20.0	12.5	22.7	12.9	25.3	13.3	28.1	13.8	30.8	14.3	33.5	14.8
	43	15.6	13.0	18.2	13.6	20.8	14.2	23.2	14.9	24.9	14.9	26.9	14.9	28.1	14.5

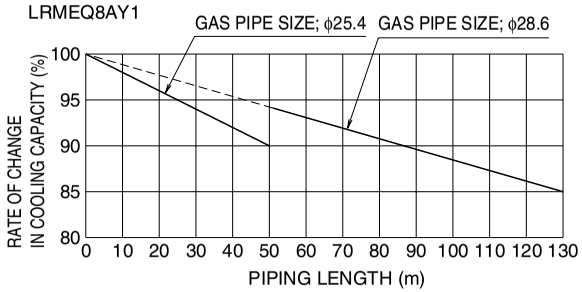
Q: COOLING CAPACITY
W: POWER CONSUMPTION

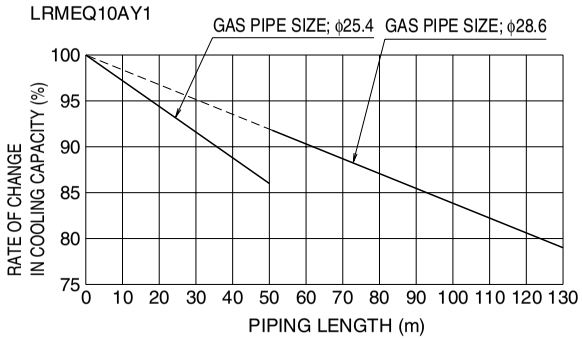
CALCULATION METHOD OF COOLING CAPACITY

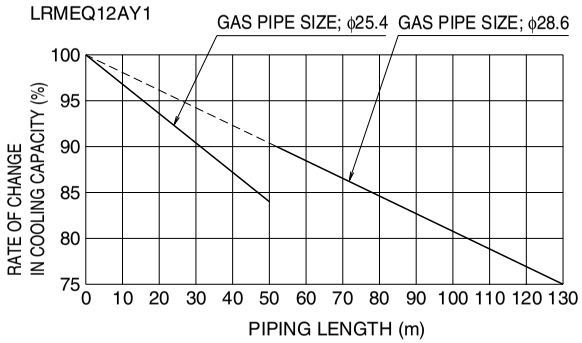
COOLING CAPACITY = READING VALUE FROM COOLING CAPACITY TABLE × RATE OF CHANGE IN COOLING CAPACITY BY PIPING LENGTH

NOTES)
1. ▭ IS SPECIFIED POINT.
2. THE CONDITION OF CHARACTERISTICS OF THE TABLE: 10˚C (SUCTION SH).
3. CONSIDER DECREASE OF CAPACITY DEPENDED ON FROSTING, AND TIME OF DEFROSTING, PLEASE SELECT LARGER MODEL. (ABOUT 15%)

■RATE OF CHANGE IN COOLING CAPACITY BY PIPING LENGTH







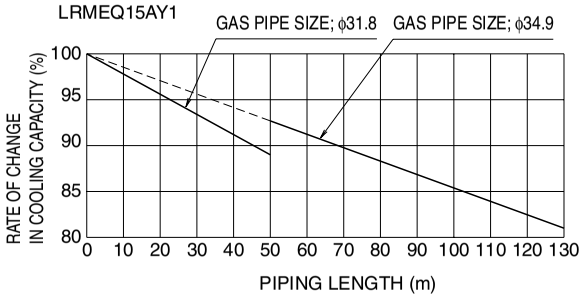
3D065032

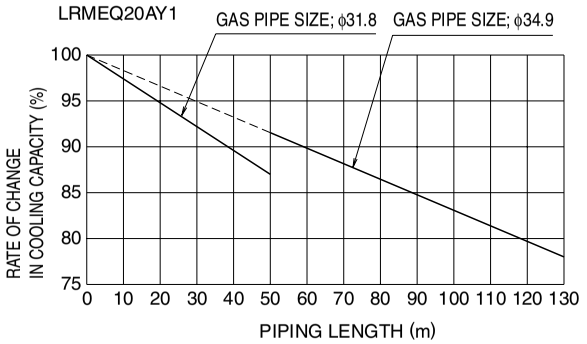
COOLING CAPACITY TABLE

MODEL	Amb. Temp.	SUCTION PRESSURE EQUIVALENT SATURATION TEMPERATURE ˚C													
		-20		-15		-10		-5		0		5		10	
		Q	W	Q	W	Q	W	Q	W	Q	W	Q	W	Q	W
	˚C DB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
LRMEQ15AY1	20	28.1	10.2	32.0	10.3	36.0	10.4	39.8	10.5	43.7	10.6	47.6	10.7	51.4	10.9
	27	26.2	12.3	30.0	12.5	33.9	12.7	37.6	13.0	41.4	13.2	45.3	13.4	49.1	13.6
	32	24.7	13.8	28.5	14.1	32.2	14.5	35.9	14.9	39.7	15.3	43.4	15.7	47.2	16.2
	38	22.7	15.6	26.3	16.1	29.9	16.6	33.5	17.2	37.2	17.8	40.8	18.5	44.5	19.3
	43	20.5	17.1	23.9	17.9	27.4	18.8	31.0	19.9	34.5	20.9	38.0	21.4	38.8	20.4
LRMEQ20AY1	20	32.3	11.6	36.9	11.9	41.4	12.0	45.8	12.2	50.3	12.2	54.8	12.3	59.3	12.5
	27	30.1	13.9	34.5	14.4	38.9	14.6	43.3	14.9	47.7	15.1	52.1	15.4	56.5	15.7
	32	28.4	15.8	32.7	16.2	37.0	16.6	41.3	17.0	45.7	17.5	50.0	17.9	54.4	18.5
	38	26.0	17.5	30.2	18.4	34.3	18.9	38.5	19.6	42.8	20.2	47.0	21.0	50.2	21.4
	43	23.5	19.1	27.5	19.9	31.5	20.9	34.5	21.4	37.1	21.4	38.1	20.3	38.1	19.1

Q: COOLING CAPACITY
W: POWER CONSUMPTION

■RATE OF CHANGE IN COOLING CAPACITY BY PIPING LENGTH





CALCULATION METHOD OF COOLING CAPACITY

COOLING CAPACITY = READING VALUE FROM COOLING CAPACITY TABLE × RATE OF CHANGE IN COOLING CAPACITY BY PIPING LENGTH

NOTES)
1. ▭ IS SPECIFIED POINT.
2. THE CONDITION OF CHARACTERISTICS OF THE TABLE: 10˚C (SUCTION SH).
3. CONSIDER DECREASE OF CAPACITY DEPENDED ON FROSTING, AND TIME OF DEFROSTING, PLEASE SELECT LARGER MODEL. (ABOUT 15%)

3D065033

4.4 Precautions when Selecting a Thermal Expansion Valve

The condensing unit cools liquid refrigerant with a plate type heat exchanger, so the liquid refrigerant subcooling degree (subcooling degree = condensation temperature – liquid refrigerant temperature) is larger than small refrigerators with no subcooling mechanism.
Additionally, the booster unit further cools liquid refrigerant with a large subcooling degree from the condensing unit's outlet.
Expansion valves have a characteristic where capacity changes according to the subcooling degree of liquid refrigerant.

When selecting the refrigeration-side thermal expansion valve, first check the liquid refrigerant subcooling degree in the table below, then select an expansion valve according to expansion valve manufacturer's selection methods.
(A correction value may be added to the expansion valve capacity depending on the subcooling degree.)

- The values in the table below are the condensing unit subcooling degree.
- For the booster unit outlet's liquid refrigerant subcooling degree, add 5K to the condensing unit subcooling degree.

- **Calculation example**
  Calculation conditions
  - Condensing unit evaporating temperature: –10°C
  - Booster unit evaporating temperature: –45°C
  - Condensation temperature: 45°C

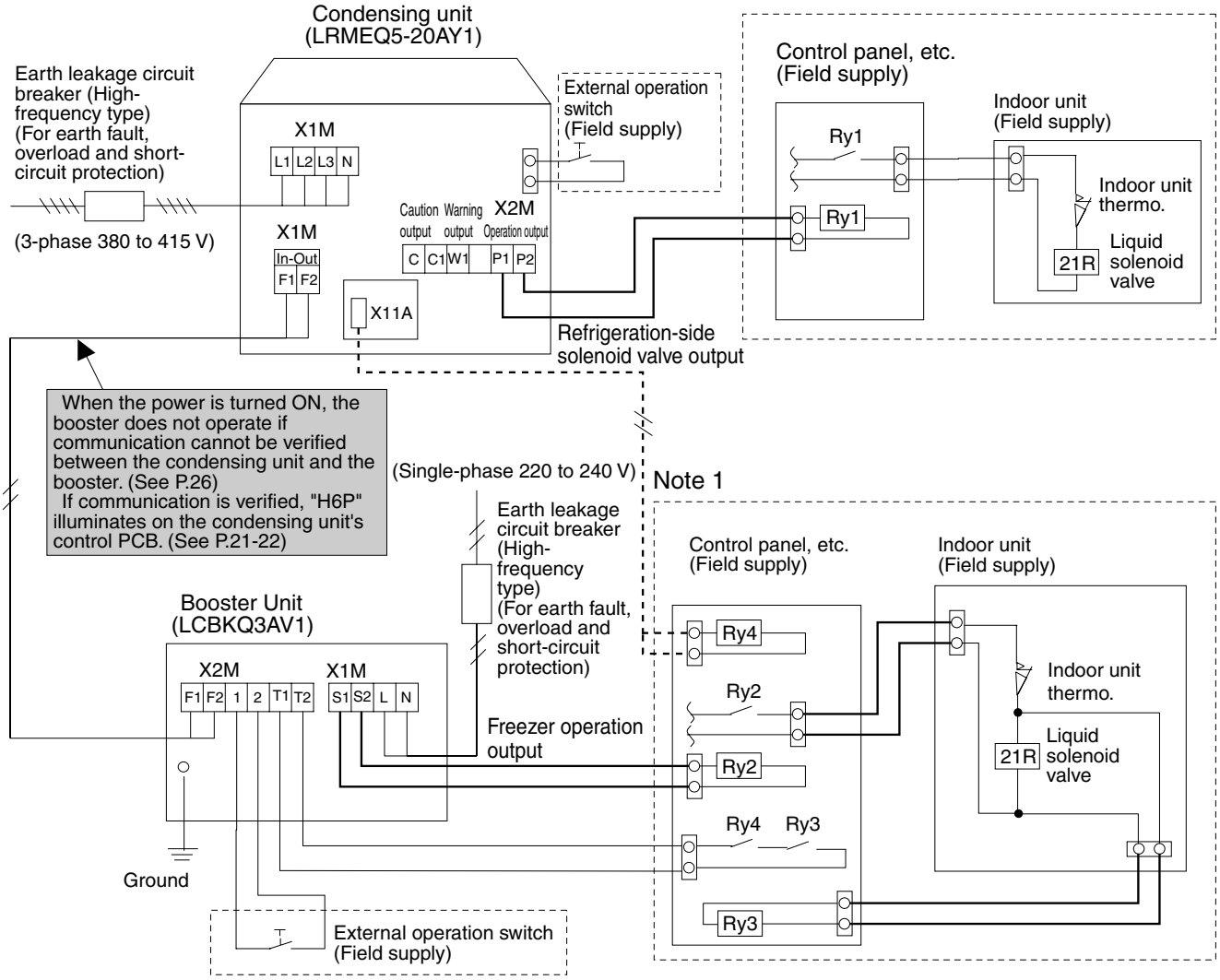
  <For the condensing unit>
  From the table below
  - Subcooling degree: 19K
  - Liquid refrigerant temperature: 26°C (= 45°C – 19°C)

  <For the booster unit>
  Condensing unit subcooling degree: 19K (from the results calculated above)
  Because the booster adds an additional 5K to the subcooling degree,
  - Subcooling degree: 24K (= 19K + 5K)
  - Liquid refrigerant temperature: 21°C (= 45°C – 24°C)

Subcooling degree (K) (Subcooling degree = Condensation temperature - Liquid refrigerant temperature)												
Evaporating temperature / Condensation temperature	–45°C	–40°C	–35°C	–30°C	–25°C	–20°C	–15°C	–10°C	–5°C	0°C	5°C	10°C
20°C	31K	28K	26K	23K	20K	18K	15K	13K	11K	9K	6K	4K
25°C	31K	29K	26K	24K	21K	19K	16K	14K	12K	10K	8K	6K
30°C	32K	29K	27K	24K	22K	19K	17K	15K	13K	11K	9K	7K
35°C	32K	30K	27K	25K	23K	20K	18K	16K	14K	12K	10K	9K
40°C	32K	30K	28K	26K	23K	21K	19K	17K	16K	14K	12K	10K
45°C	33K	31K	29K	26K	24K	22K	21K	19K	17K	15K	14K	12K
50°C	34K	31K	29K	27K	25K	24K	22K	20K	18K	17K	15K	14K
55°C	34K	32K	30K	28K	27K	25K	23K	22K	20K	18K	17K	16K

5. External Wiring Diagram

For details, refer to the installation manual and technical guide included with the unit.

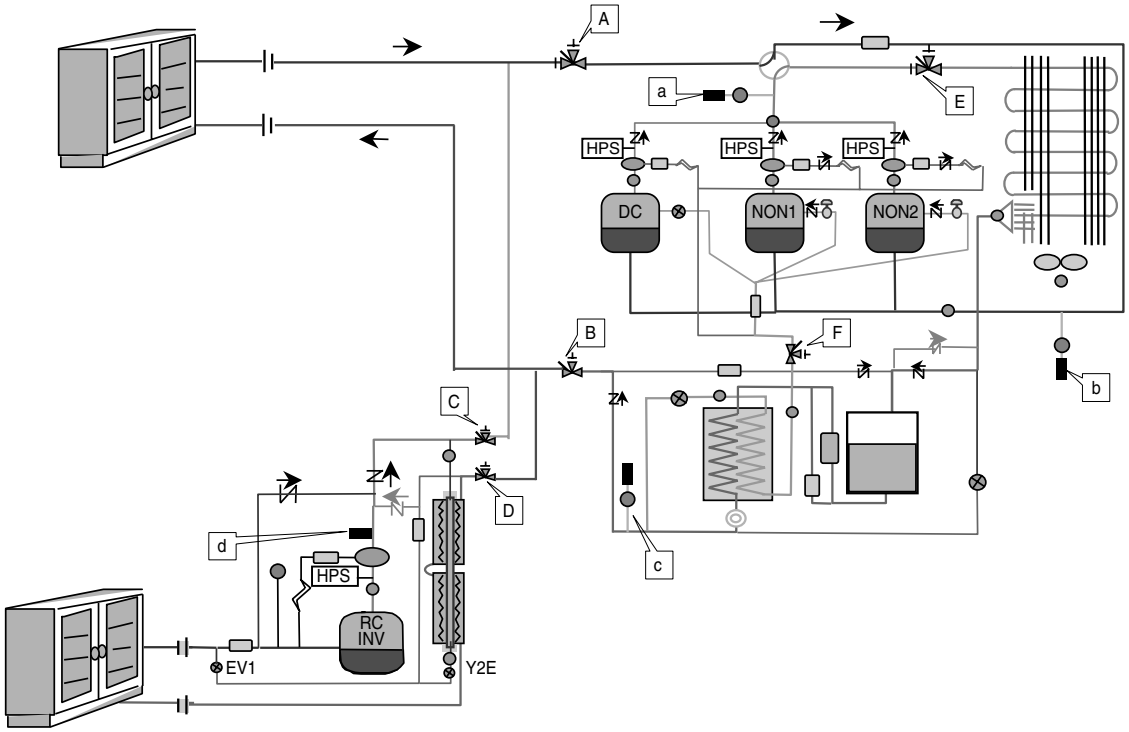


1) All wiring, components and materials to be procured on the site must comply with the applicable local and national codes.
2) Use copper conductors only.
3) As for details, see wiring diagram.
4) Install circuit breaker for safety.
5) All field wiring and components must be provided by licensed electrician.
6) Unit shall be grounded in compliance with the applicable local and national codes.
7) Wiring shown are general points-of-connection guides only and are not intended for or to include all details for a specific installation.
8) If there exists the possibility of reversed phase, open phase, momentary blackout or the power goes ON and OFF while the product is operating, attach a reversed phase protection circuit locally. Running the product in reversed phase may break the compressor and other parts.
9) In case of used remote switch, use non-voltage contact for micro current (not more than 1mA, 12V DC).
10) Total capacity for caution, warning: 0.5A or less at AC 220 to 240V.
    Capacity for operation output: 0.5A or less at AC 220 to 240V.
11) Be sure to install the switch and the fuse to the power line of each equipment.

<Note>
When turning the unit ON/OFF with the condensing unit's breaker, etc., run wiring from the "X11A" connector on the condensing unit's PCB (A1P) to the freezer control panel as shown in the diagram above.
X11A specification: Housing - VHR-3N (gray)
Contact - SVH-21T-1.1
Wiring - VSF0.5S or UL1015 AWG20

6. Inspection & Refrigerant Charging Methods

For details, refer to the installation manual and technical guide included with the unit.



1. Vacuum drying method
   1) Close both stop valves A and B. (Factory setting)
   2) Open stop valves C and D. (Factory setting is open, check that they are open)
   3) Perform vacuum drying from stop valves A and B.
2. Tightness leak method
   1) Apply each design pressure with nitrogen gas from stop valves A and B and service port d.
   (∗The air tightness between the freezer showcase and booster unit can only be done from service port d)
3. Refrigerant charging method
   1) Charge refrigerant from stop valve B.
   <Caution> After refrigerant charging, there is a possibility of creating a liquid seal when closing stop valves B and D.

<Caution>
Do not open both liquid/gas stop valves when performing tightness leak testing/vacuum drying of on-site piping. (This unit is charged with refrigerant.)

- Always use R-410A dedicated tools because they withstand pressure and prevent impurity contamination.

Manifold gauge Charge hose	• Use R-410A dedicated products because they withstand pressure and prevent impurity contamination (water, debris, dust). (Screw specifications are different for R-410A and for R-407C.)
Vacuum pump	• Use extreme caution to ensure pump oil does not flow back into the system when the pump is stopped. • Use a pump that can draw a vacuum up to -100.7 kPa (5 Torr, -755 mmHg).
Tightness leak testing gas	• Nitrogen gas

- Tightness leak testing
  High pressure portions (liquid piping) are 4.0 MPa. For low pressure portions (gas piping), up to the design pressure (∗1) for the refrigeration unit (field supply), apply pressure from the service port (do not exceed the design pressure). Passes if there is no pressure drop. If there is a pressure drop, check the leak locations and repair.
- Vacuum drying
  Operate a vacuum pump from both liquid and gas piping service ports for 2 hours or more and draw the vacuum until –100.7 kPa or lower. Afterwards, leave at –100.7 kPa or lower for 1 hour or more and check that the vacuum gauge value does not increase. (If it increases, moisture might be remaining in the system or there is a leak.)

∗1. For the design pressure of the refrigeration unit (field supply), contact the manufacturer in advance.
∗2. See the diagram above for the service port locations.

7. Test Operation Method

For details, refer to the installation manual and technical guide included with the unit.

- **Verification before turning ON the power supply**
  1. Check that the target evaporating temperature for the condensing unit and booster units is set.
  2. Set the condensing unit gas-side stop valve/liquid-side stop valve to "Full Open".
  3. Check that the system is wired according to the external wiring diagram.
     - Freezer operation input
     - Refrigeration-side operating output
     - Freezer operation output
     - Booster unit - condensing unit communication line
  4. Check that the piping covers/El. compo. box covers for the condensing unit, booster units, and refrigeration units are shut, then turn ON the power supply.
  5. When the system has been changed from the initial test operation, such as a change in the number of connected booster units, press and hold the BS button BS5 for 5 seconds. It is not necessary to press this button for the initial test operation.

- **Condensing unit operation**
  6. Turn "ON" the condensing unit operation switch.
  7. Check the seal state with the condensing unit sight glass.
  8. If the system lacks refrigerant, check if the specified amount of refrigerant is in the system, add more if insufficient.
  9. Check that the load-side (refrigerator) liquid solenoid valve control is being used with "Refrigeration-side operating output" from the condensing unit.
  10. Check that compression operates when the condensing unit suction pressure is a low pressure ON value or higher.
  11. Check that compression stops when the condensing unit suction pressure is a low pressure OFF value or lower.

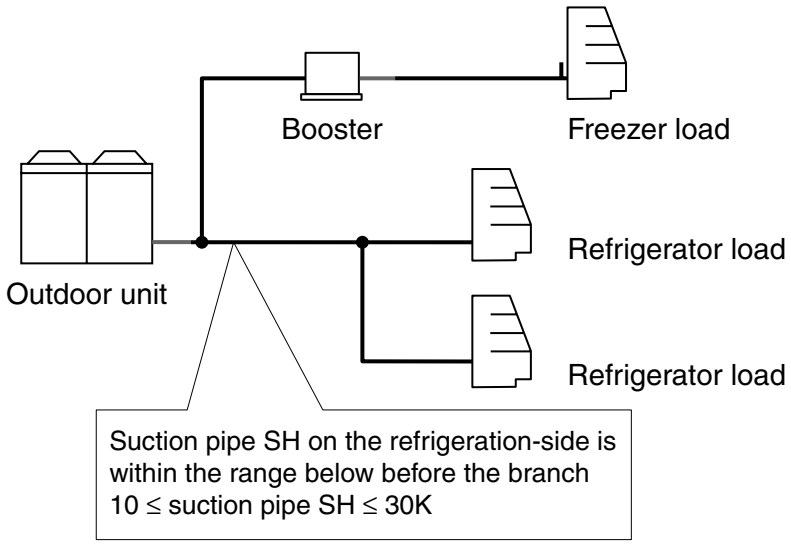
- **Booster unit operation**
  12. Check that 4 on the condensing unit DS2 is switched to the OFF side.
  13. Turn "ON" the booster unit operation switch.
  14. Check that the load-side (freezer) liquid solenoid valve control is being used with "Freezer operation output" from the booster unit.
  15. Check that the booster unit operates the compressor if the refrigeration-side thermo. is ON and the booster suction pressure is a low pressure ON value or higher.

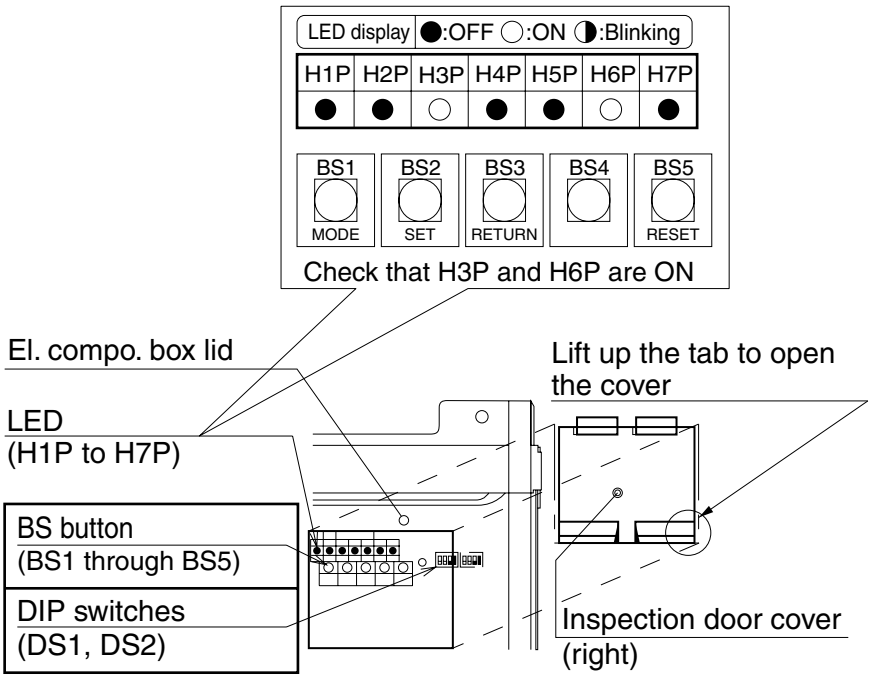
- **Final verification**
  16. Check that the target evaporating temperature for both the condensing unit and booster units is set without errors.
  17. Check that the condensing unit "H3P, H6P" LEDs are ON.
  18. Check if the low pressure saturation temperature becomes the target evaporating temperature for both the condensing unit and booster units.
  19. Check that the booster unit suction pipe temperature is 20°C or lower and that suction superheated degree is 10K or more.
  20. Check that suction pipe SH of the condensing unit refrigeration-side outlet's main pipe (piping after merging with refrigeration-side equipment) is 10K or higher and 30K or lower.

- **Precautions**
  21. With the booster unit running, do not turn OFF the condensing unit operation switch and do not turn OFF the power supply.
      (This can damage the compressor.)

∗1 Refrigeration-side liquid solenoid valve control specification
1. Condition where the refrigeration-side liquid solenoid valve opens
   &{ Refrigeration-side liquid solenoid valve output: ON
   &{ Refrigeration thermo.: ON
2. Condition where the refrigeration-side liquid solenoid valve closes
   &{ Refrigeration-side liquid solenoid valve output: OFF
   &{ Refrigeration thermo.: OFF

∗2 Refrigeration-side liquid solenoid valve control specification
1. Condition where the refrigeration-side liquid solenoid valve opens
   &{ Freezer operation output: ON
   &{ Refrigeration thermo.: ON
2. Condition where the refrigeration-side liquid solenoid valve closes
   &{ Freezer operation output: OFF
   &{ Refrigeration thermo.: OFF





Inspection door (right)
(Upper-right section of el. compo. box)

8. Service Diagnosis

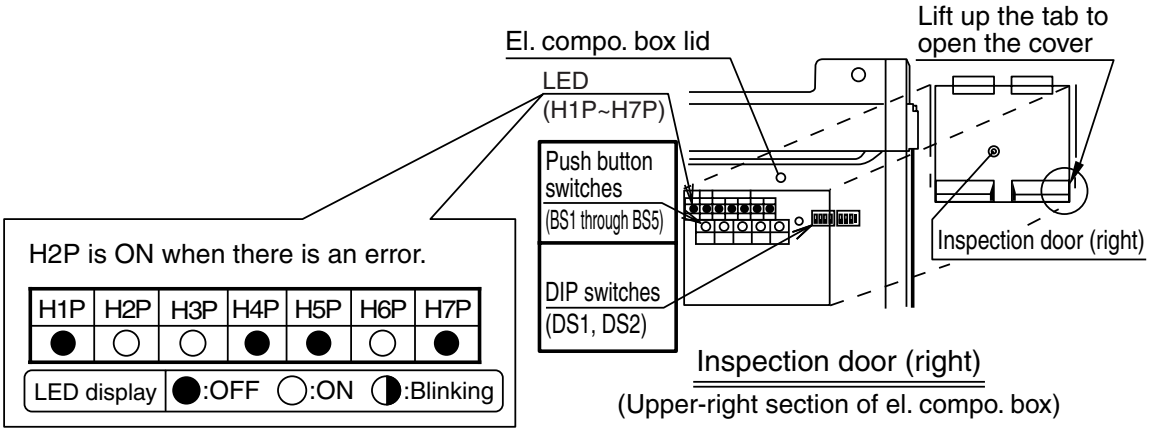
8.1 Checking Error Codes (Condensing Unit)

For details, refer to the installation manual and technical guide included with the unit.

The condensing unit displays error code items by operating the BS buttons on the PCB.

[Verification method]

1. Check that LED "H1P" is OFF.
   (If ON, press the MODE (BS1) once.)
2. Press the MODE (BS1) once. LED "H1P" blinks.
3. Press the RETURN (BS3) to display the first digit of the error code in the LEDs.
4. Press the SET (BS2) to display the second digit of the error code in the LEDs.
5. Press the MODE (BS1) to return to the original state.



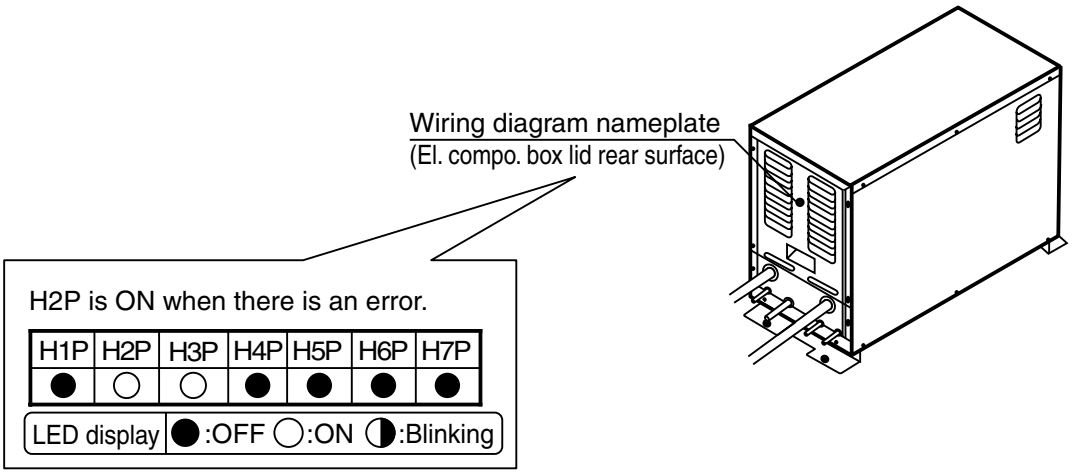
LED display														Reference Remote Control Display Equivalent		Contents of error
Error Code 1st Digit (Press switch BS3 once)							Error Code 2nd Digit (Press switch BS2 once)									
H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	1st digit	2nd digit	
◑	●	○	●	●	◑	◑	◑	○	●	●	●	●	●	E	0	STD compressor OC operation
										●	●	◑	●		2	Ground-fault device operation
										●	●	◑	◑		3	High pressure error
										●	◑	●	●		4	Low pressure error
										●	◑	●	◑		5	INV. compressor lock
										●	◑	◑	◑		7	Outdoor unit fan motor error
										◑	●	●	◑		9	Electronic expansion valve error
										◑	●	◑	◑		H	Communication error between booster and condensing unit
										◑	◑	●	●		C	Booster sensor error
										◑	◑	●	◑		J	Booster abnormal stop
										◑	◑	◑	●		E	Condensing unit in freezer configuration
◑	●	○	●	◑	●	◑	◑	○	●	●	●	◑	◑	F	3	Discharge pipe abnormal temperature
										●	◑	●	●		4	Liquid back error
◑	●	○	●	◑	●	●	◑	○	●	●	●	●	●	H	0	3 sensor error
										●	●	◑	◑		3	High pressure switch error
										◑	●	●	◑		9	Outdoor air thermistor error
◑	●	○	●	◑	◑	●	◑	○	●	●	●	◑	●	J	2	Current sensor error
										●	●	◑	◑		3	Discharge pipe thermistor error
										●	◑	●	◑		5	Suction pipe thermistor error
										◑	●	●	●		8	Subcooling heat exchanger inlet thermistor error
										◑	●	●	◑		9	Subcooling heat exchanger outlet thermistor error
										◑	●	◑	●		A	High pressure sensor error
										◑	◑	●	●		C	Low pressure sensor error
◑	●	○	●	◑	◑	◑	◑	○	●	●	●	●	◑	L	1	INV. error
										●	◑	●	●		4	INV. radiator fin temperature abnormality
										●	◑	●	◑		5	INV. compressor error
										◑	●	●	●		8	Compressor current error
										◑	●	●	◑		9	Compressor start error
										◑	◑	●	●		C	Transmission system error (INV-control PCB)
◑	●	○	◑	●	●	●	◑	○	●	●	●	●	◑	P	1	Open-phase/power supply imbalance
										●	◑	●	●		4	Radiator fin thermistor error
◑	●	○	◑	●	●	◑	◑	○	●	●	●	●	◑	U	1	Reverse phase
										●	●	◑	●		2	Power supply voltage error

8.2 Checking Error Codes (Booster Unit)

For details, refer to the installation manual and technical guide included with the unit.
The booster unit displays error code items by operating the BS buttons on the PCB.

[Verification method]

1. Check that LED "H1P" is OFF.
   (If ON, press the MODE (BS1) once.)
2. Press the MODE (BS1) once. LED "H1P" blinks.
3. Press the RETURN (BS3) to display the first digit of the error code in the LEDs.
4. Press the SET (BS2) to display the second digit of the error code in the LEDs.
5. Press the RESET (BS1) to return to the original state.



LED Display														Reference Remote Control Display Equivalent		Contents of error
Error Code 1st Digit (Press switch BS3 once)							Error Code 2nd Digit (Press switch BS2 once)									
H1P	H2P	H3P	H4P	H5P	H6P	H7P	H1P	H2P	H3P	H4P	H5P	H6P	H7P	1st digit	2nd digit	
◑	●	○	●	●	◑	◑	◑	○	●	●	●	●	●	E	0	Booster unit PCB error
										●	●	◑	●		2	Ground-fault device operation
										●	●	◑	◑		3	High pressure error
										●	◑	●	●		4	Low pressure error
										●	◑	●	◑		5	INV. compressor lock
										◑	●	◑	◑		H	Communication error between booster and condensing unit
◑	●	○	●	◑	●	◑	◑	○	●	●	●	◑	◑	F	3	Discharge pipe abnormal temperature
										●	◑	●	●		4	Liquid back error
◑	●	○	●	◑	●	●	◑	○	●	●	●	◑	◑	H	3	High pressure switch error
◑	●	○	●	◑	◑	●	◑	○	●	●	●	◑	◑	J	3	Discharge pipe thermistor error
										◑	●	●	●		8	Heat exchange inlet thermistor error
										◑	●	●	◑		9	Heat exchange outlet thermistor error
										◑	◑	●	●		C	Low pressure sensor error
◑	●	○	●	◑	◑	◑	◑	○	●	●	●	●	◑	L	1	INV. error
										●	◑	●	●		4	INV. radiation fin temperature abnormality
										●	◑	●	◑		5	INV. compressor error
										◑	●	●	●		8	Compressor current error
										◑	●	●	◑		9	Compressor start error
										◑	◑	●	●		C	Transmission system error (INV-control PCB)
◑	●	○	◑	●	●	●	◑	○	●	●	●	●	◑	P	1	Open-phase/power supply imbalance
										●	◑	●	●		4	Radiation fin thermistor error
◑	●	○	◑	●	●	◑	◑	○	●	●	●	●	●	U	0	Refrigerant shortage
										●	●	◑	●		2	Power supply voltage error

8.3 Error Codes (Condensing Unit)

Error codes when booster units are connected

Determination Value	Error Determination Frequency	Error Level	Warning Output	Caution Output	Recovery method	Reference
Booster sensor error	--	Caution	--	ON	• Except for the LP sensor, automatic recovery dependent on sensor returning to normal • For the LP sensor, after it returns to normal, reset the power supply or operation SW (booster-side)	Continued condensing unit and booster unit operation possible
Freezer configuration when connected to boosters	--	Caution	--	ON	Change from freezer configuration to refrigerator configuration and reset the power supply	Continued condensing unit and booster unit operation possible
Booster error determination	--	Caution	--	ON	After returning to normal, reset the power supply or operation SW (booster-side)	Continued condensing unit operation possible Booster unit operation is possible after implementing the recovery method to the left
Transmission error after establishing communication	--	Caution	--	ON	Automatic recovery after the transmission line recovers to normal	Continued condensing unit and booster unit operation possible

Note:

∗1. "Abnormal Stop" is an abnormal stop only when an error is determined. Operation continues while retrying.

∗2. "Caution" is continued operation and caution output even if an error is determined.

For details on other booster unit and condensing unit error codes, refer to the Installation manual and Service manual.

8.4 Service Diagnosis

The error codes in the table below are displayed on the condensing unit-side.

No.	Error Code	Contents of Error	Probable Cause		Verification Method	Reset Method
1	E0	Booster sensor error	1)	Booster sensor error	Check for a booster sensor wire break or uncoupled connector	Take action for each sensor
2	E6	Condensing unit in freezer configuration	1)	Freezer configuration when connected to boosters	• Are boosters connected to a freezer CCU (LRLEQ5-20AY1)? • When using a spare PCB, check that DS2's 4 on the condensing unit is "OFF"	Set DS2's 4 on the condensing unit to "OFF"
3	EJ	Booster error determined	1)	Booster error determination	Check the error code with the booster's BS button	After returning to normal, reset the power supply or operation SW (booster-side)
4	EH	Communication error with booster and condensing unit	1)	After communication established, a transmission wire break	Check the transmission wire's destinations and if the transmission wire has broken	Restore the transmission wire to normal
			2)	The booster's power supply was turned "OFF" while the condensing unit or booster is operating	Check the power supply for the booster and condensing unit	Turn ON the power supply for the booster and condensing unit for automatically recovery

For service diagnosis of booster unit and condensing unit error codes other than those in the table above, refer to the technical guides.

8.5 Others, Diagnosis Details

Error Item	Operation SW State		Operating State when Each Unit Errors		Reference
	Condensing Unit	Booster Unit	Condensing Unit	Booster Unit	
Transmission error (when power supply turned ON) (Between condensing - booster units) (Ex: Forgotten wiring during trial operation)	Operation SW "OFF"	Operation SW "OFF"	Not operating	Not operating	Error code is not displayed. If there are no problems with the on-site wiring, press BS button BS5 for 5 seconds.
	Operation SW "OFF"	Operation SW "ON"	Not operating	Not operating	
	Operation SW "ON"	Operation SW "OFF"	Operating	Not operating	
	Operation SW "ON"	Operation SW "ON"	Operating	Not operating	
Transmission wire break After communication error, operation SW ON → OFF (Ex: Communication error during operation)	Operation SW "OFF"	Operation SW "OFF"	Not operating (Error issued: EH)	Not operating (Error issued: EH)	
	Operation SW "OFF"	Operation SW "ON"	Not operating (Error issued: EH)	Not operating (Error issued: EH)	
	Operation SW "ON"	Operation SW "OFF"	Operating (Error issued: EH)	Not operating (Error issued: EH)	
	Operation SW "ON"	Operation SW "ON"	Operating (Error issued: EH)	Operating (Error issued: EH)	
Condensing unit abnormal stop	Operation SW "OFF"	Operation SW "OFF"	Not operating (Error issued)	Not operating	Check the error code list located in the condensing unit technical guide and the service diagnosis.
	Operation SW "OFF"	Operation SW "ON"	Not operating (Error issued)	Not operating	
	Operation SW "ON"	Operation SW "OFF"	Not operating (Error issued)	Not operating	
	Operation SW "ON"	Operation SW "ON"	Not operating (Error issued)	Not operating	
Booster unit abnormal stop	Operation SW "OFF"	Operation SW "OFF"	Not operating (Error issued: EJ)	Not operating (Error issued)	Check the error code located in CVP technical guide and the service diagnosis.
	Operation SW "OFF"	Operation SW "ON"	Not operating (Error issued: EJ)	Not operating (Error issued)	
	Operation SW "ON"	Operation SW "OFF"	Operating (Error issued: EJ)	Not operating (Error issued)	
	Operation SW "ON"	Operation SW "ON"	Operating (Error issued: EJ)	Not operating (Error issued)	

8.6 Diagnosis of Condensing Unit Droop Factors

Item	Condition	Control Details	Verification Details	Action Details
High pressure droop	High pressure: 3.23 MPa	INV. compressor frequency decrease	• Evaporating temperature is +10°C or higher • Condenser suction air temperature is 43°C or higher	• On-site factor Follow usage standards
			• Condenser clog, corrosion	• On-site factor Clean condenser, replace condenser
	High pressure: 3.43 MPa	STD compressor stopped	• Pressure sensor failure	• Replace defective parts
			• Condenser fan error	• Replace condenser fan
			• Refrigerant overcharge • Non-condensable gas contamination	• Check the refrigerant fill nameplate and charge with the appropriate amount of refrigerant.
Differential pressure availability	Outdoor air temperature < Target evaporating temperature	Because of differential pressure availability, set the target evaporating temperature as the outdoor air temperature. (Different than the target evaporating temperature set with the DIP switches)	• Compare the evaporating temperature during cooling operation with the outdoor air temperature	• Explain that this is a protective control to guarantee cooling capacity.
	High pressure - (0.196 × LP) < 0.294	INV. compressor frequency increase	• Measure high pressure, low pressure	
	Pressure ratio (absolute pressure) > 25 for continuous 10 seconds or more	INV. compressor frequency decrease		
Fin temperature protection	Fin temperature < 84°C	INV. compressor frequency decrease	• Condenser suction air temperature is 43°C or higher • Condenser clog	Power unit radiator error (On-site factor) • Correct usage environment • Clean condenser
			• Compare the actual temperature with the thermistor resistance value	• Replace thermistor
Overcurrent protection	INV. secondary current Ta > 38 ... Am = 14.7 A Ta ≤ 38 ... Am = 14.7 A	INV. compressor frequency decrease	• Evaporating temperature is +10°C or higher • Condenser suction air temperature is 43°C or higher	• On-site factor: Follow usage standards
			• Condenser clog, corrosion	• On-site factor Clean condenser, replace condenser
	STD compressor Current value > 14.95 A For 2.1 seconds or longer (8 HP or higher)	STD compressor stopped	• Measure voltage: 180 V or lower?	• On-site factor: Correct usage environment
			• Wet operation? • Overheating operation? • Check the error history	• Replace the compressor • Follow usage standards (Correct wet operation, overheating operation)
Discharge pipe temperature protection	Discharge pipe temperature > 100°C & rapid	STD compressor stopped INV. compressor frequency decrease	• Compare the actual temperature with the thermistor resistance value	• Replace the thermistor
			• Suction gas SH before branch is 30K or higher	• On-site factor: Follow usage standards

9. Reference Data

9.1 Protection Parts List (Condensing Unit)

Component				Electric Symbol	LRMEQ5AY1,6AY1 LRLEQ5AY1,6AY1	LRMEQ8AY1,10AY1,12AY1 LRLEQ8AY1,10AY1,12AY1	LRMEQ15AY1,20AY1 LRLEQ15AY1,20AY1
Compressor	INV.	Type		M1C	JT1GFDKTNYR@SB		
		Overcurrent protection device			14.7A		
	STD1	Type		M2C	–	JT17GFKTNYE@SB	
		Overcurrent protection device			–	13A	
	STD2	Type		M3C	–	–	JT17GFKTNYE@SB
		Overcurrent protection device			–	–	13A
Fan motor		Output		M1F	350W	750W	
		Overcurrent protection device			1.5A	3.0A	
		Output		M2F	–	–	750W
		Overcurrent protection device			–	–	3.0A
PCB		Main PCB		A1P	Standard: EB09058		
		PCB for compressor INV.		A3P	Standard: PC0509-2		
		PCB for fan INV.		A4P	PC0511-3(A)	PC0511-1(A)	
				A8P	–	–	PC0511-2(A)
		PCB for operation input		A5P	EB0568(A)		
		PCB for noise filter		A2P	FN354-H-1(A)		
		PCB for current sensor		A6P	–	EB0292(C)	
				A7P	–	–	EB0292(C)
		PCB for earth leakage detection		A9P	EC0726(A)-9		EC0729(A)-29
Electronic expansion valve			Coil	Y1E (Main)	UKV-A023	UKV-A023	UKV-A024
					DC12V,0.26A	DC12V, 0.26A	DC12V, 0.26A
			Body		UKV-32D49		
					0~480pls		
			Coil	Y2E (Gas)	UKV-A023	UKV-A023	UKV-A024
					DC12V,0.26A	DC12V, 0.26A	DC12V, 0.26A
			Body		UKV-18D20		
					0~480pls		
			Coil	Y3E (M1C)	–	UKV-A023	UKV-A024
					–	DC12V, 0.26A	DC12V, 0.26A
			Body		–	UKV-32D49	
					–	0~480pls	
Four way valve			Coil	Y3S	STF-G01AQ531A1	STF-G01AQ532A1	STF-G01AQ537A1
			Body		STF-0404G	STF-0713G	STF2011G
Solenoid valve			Coil	Y2S (M2C)	–	NEV-MOAJ562D1	NEV-MOAJ562D1
			Body		–	VPV-603D	VPV-603D
			Coil	Y5S (M3C)	–	–	NEV-MOAJ562C1
			Body		–	–	VPV-603D
Pressure protection device		High pressure switch	Type	S1PH	ACB-1TB29W	ACB-1TB28W	ACB-1TB27W
			Set value		OFF $3.8^{+0}_{-0.1}$ MPa ON 2.85±0.15MPa		
			Type	S2PH	–	ACB-1TB27W	ACB-1TB27W
			Set value		–	OFF $3.8^{+0}_{-0.1}$ MPa ON 2.85±0.15MPa	
			Type	S3PH	–	–	ACB-1TB27W
			Set value		–	–	OFF $3.8^{+0}_{-0.1}$ MPa ON2.85±0.15MPa
			Type	S4PH	ACB-JB285		
			Set value		DC5V ON: $2.96^{+0}_{-0.1}$ MPa OFF: 2.16±0.15MPa		
		Low pressure sensor		S1NPL	150NH4-L2	200NH4-L2	200NH4-L2
		High pressure sensor		S1NPH	150NH4-H4	150NH4-H4	200NH4-H4
		Fusible plug		–	Open: 70~75°C		

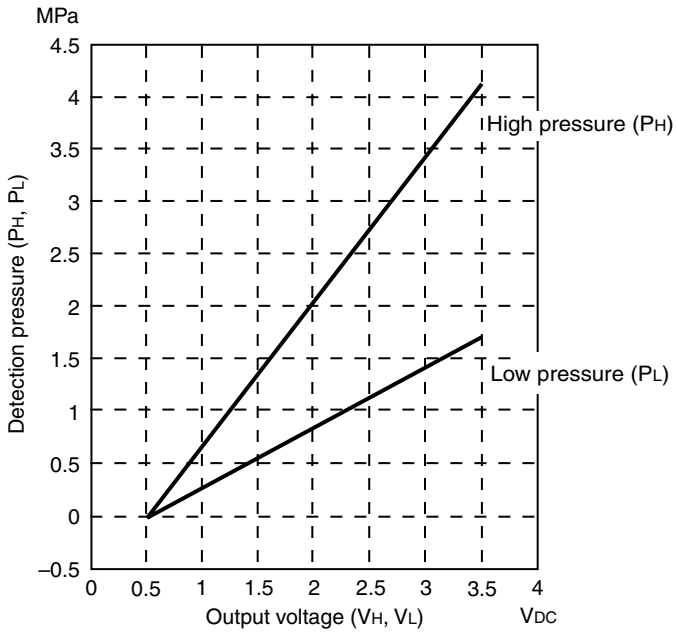
Component		Electric Symbol	**LRMEQ5AY1,6AY1 LRLEQ5AY1,6AY1**	**LRMEQ8AY1,10AY1,12AY1 LRLEQ8AY1,10AY1,12AY1**	**LRMEQ15AY1,20AY1 LRLEQ15AY1,20AY1**
Thermistor	Outdoor air thermistor	R1T	ST8603		
	Suction pipe thermistor	R2T	ST0602		
	Outdoor heat exchanger outlet thermistor	R3T	ST8602A		
	Subcooling heat exchanger outlet thermistor	R5T	ST0601		
	Subcooling heat exchanger inlet thermistor	R6T	ST0601		
	Discharge pipe thermistor	R31T	ST0901		
		R32T	–	ST0901	
		R33T	–	–	ST0901
Fuse (A1P)		F1U, F2U	250VAC 3.15A, Class T		
Fuse		F3U, F4U	250VAC 1.0A, Class T		
Operation switch		S1S	AR22PR-311B Z9		

9.2 Protection Parts List (Booster Unit)

Component			Electric Symbol	**LCBKQ3AV1(E)**
Compressor			M1C	2YC63KXD#D Swing compressor
Fan motor	Output		M1F	–
	Overcurrent protection device			Impedance protect
PCB	Control/Inverter		A1P	Standard: EC08008 Heavy anti-corrosion: EC08009
	For operation		A2P	Standard: EC08010 Heavy anti-corrosion: EC08011
	Operation input		A3P	Standard: EC0263-1 Anti-corrosion: EC0263-2
Function components	Electronic expansion valve	Coil	Y1E (Injection)	UKV-A019
		Body		UKV-18D20
		Coil	Y2E (Subcooling)	UKV-A019
		Body		UKV-18D20
Pressure protection device	High pressure switch	Type	S1PH	ACB-4UB89W
		Set value		OFF $2.5^{+0}_{-0.1}$ MPa ON 2.0±0.15MPa
	Low pressure sensor		S1NPL	150NH4-L2
Thermistor	Thermistor (Discharge pipe)		R2T	PTM-312-D1-3
	Thermistor (Heat exchanger inlet)		R3T	PXM-36I-D5-2
	Thermistor (Heat exchanger outlet)		R5T	PXM-36I-D5-2
	Thermistor (Power module)		R10T	Control/Inverter PCB(A1P) DTN-C193H3T-DKK130B
Fuse			F1U	250V 6.3A Class T
			F2U, F3U	250V 1.0A Class T

9.3 Sensor Characteristics

Application	Outdoor Unit Heat Exchanger Outlet Subcooling Heat Exchanger Outlet Subcooling Heat Exchanger Inlet	Suction Pipe	Discharge Pipe	Inverter Radiation Fins	
Model	ST8603 ST8602 ST0601	ST0602	ST0901 ST9701	PTP-46D-D1	DTN-C193H3T-DKK130B
Temperature (°C)	Resistance value (kΩ)	Resistance value (kΩ)	Resistance value (kΩ)	Resistance value (kΩ)	
–10	112	10.9	1403.8	111.4	
–5	85.5	8.6	1059.5	84.1	
0	65.8	6.9	806.5	64.1	
5	51.1	5.5	618.9	49.4	
10	40	4.4	487.8	38.4	
15	31.6	3.6	373.1	30.1	
20	25.1	2.9	292.9	23.8	
25	20.1	2.4	231.4	18.9	
30	16.2	2	184.1	15.2	
35	13.1	1.6	141.1	12.3	
40	10.7	1.4	118.7	10	
45	8.8	1.1	96.1	8.2	
50	7.2	1	78.3	6.8	
55	6	0.82	64.1	5.6	
60	5	0.7	52.8	4.7	
65	4.2	0.6	43.6	3.9	
70	3.5	0.51	36.3	3.3	
75	3	0.44	30.3	2.8	
80	2.5	0.38	25.4	2.4	
85	2.1	0.33	21.4	2	
90	1.8	0.29	18.1	1.7	
95	1.6	0.25	15.3	1.5	
100	1.4	0.22	13.1	1.3	
105	1.2	0.2	11.2	1.1	
110	1	0.17	9.6	1	
115	0.9	0.15	8.3	0.9	
120	0.8	0.14	7.1	0.8	



Warning

- Daikin products are manufactured for export to numerous countries throughout the world. Prior to purchase, please confirm with your local authorised importer, distributor and/or retailer whether this product conforms to the applicable standards, and is suitable for use, in the region where the product will be used. This statement does not purport to exclude, restrict or modify the application of any local legislation.
- Ask a qualified installer or contractor to install this product. Do not try to install the product yourself. Improper installation can result in water or refrigerant leakage, electrical shock, fire or explosion.
- Use only those parts and accessories supplied or specified by Daikin. Ask a qualified installer or contractor to install those parts and accessories. Use of unauthorised parts and accessories or improper installation of parts and accessories can result in water or refrigerant leakage, electrical shock, fire or explosion.
- Read the User's Manual carefully before using this product. The User's Manual provides important safety instructions and warnings. Be sure to follow these instructions and warnings.

If you have any enquiries, please contact your local importer, distributor and/or retailer.

Cautions on product corrosion

1. Air conditioners should not be installed in areas where corrosive gases, such as acid gas or alkaline gas, are produced.
2. If the outdoor unit is to be installed close to the sea shore, direct exposure to the sea breeze should be avoided. If you need to install the outdoor unit close to the sea shore, contact your local distributor.

JMI-0107

Organization:
DAIKIN INDUSTRIES, LTD.
AIR CONDITIONING MANUFACTURING DIVISION

Scope of Registration:
THE DESIGN/DEVELOPMENT AND MANUFACTURE OF COMMERCIAL AIR CONDITIONING, HEATING, COOLING, REFRIGERATING EQUIPMENT, COMMERCIAL HEATING EQUIPMENT, RESIDENTIAL AIR CONDITIONING EQUIPMENT, HEAT RECLAIM VENTILATION, AIR CLEANING EQUIPMENT, MARINE TYPE CONTAINER REFRIGERATION UNITS, COMPRESSORS AND VALVES.

JQA-1452

Organization:
DAIKIN INDUSTRIES (THAILAND) LTD.

Scope of Registration:
THE DESIGN/DEVELOPMENT AND MANUFACTURE OF AIR CONDITIONERS AND THE COMPONENTS INCLUDING COMPRESSORS USED FOR THEM

EC99J2044

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