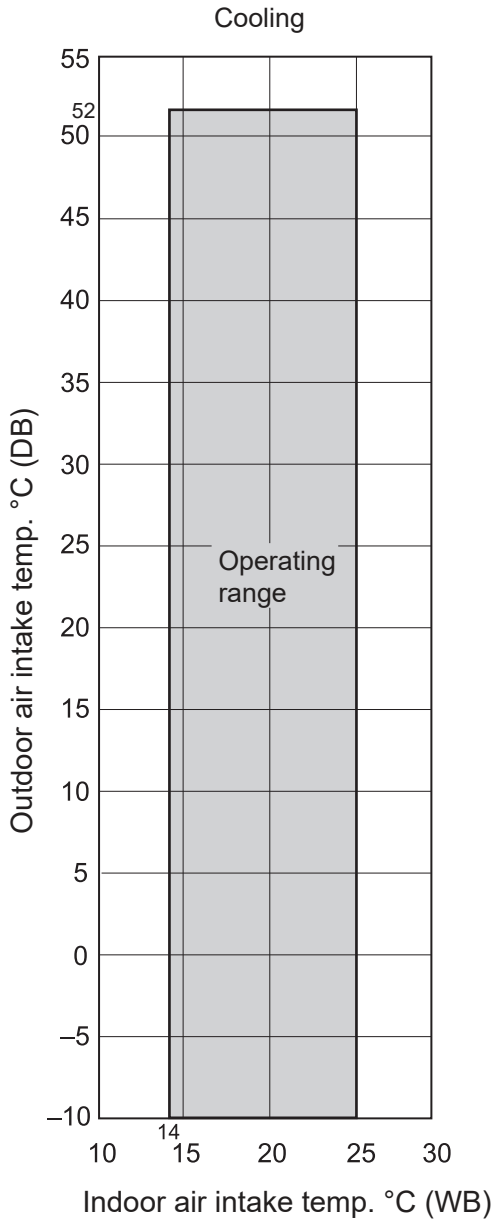
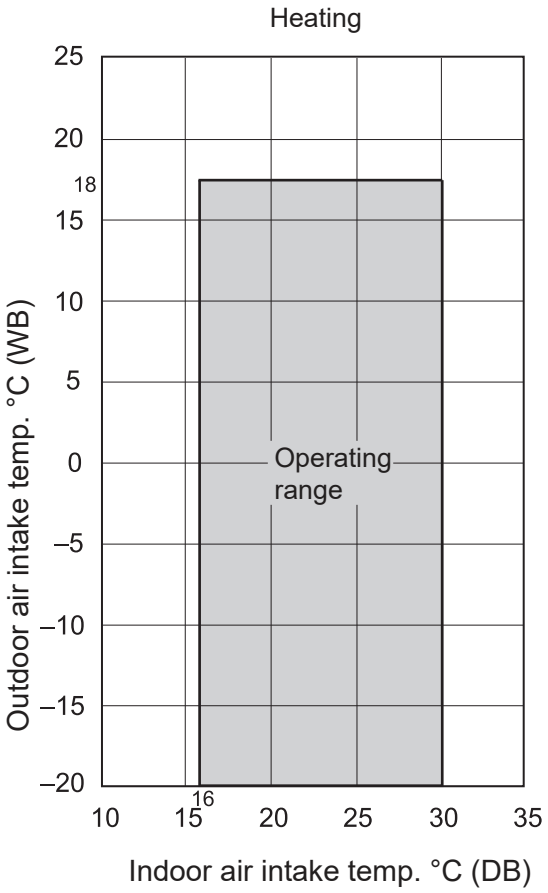
Contents

2. DESIGN OF Mini VRF SYSTEM

1. Model Selection and Capacity Calculator

1-1. Operating Range





1. Model Selection and Capacity Calculator

1-2. Procedure for Selecting Models and Calculating Capacity

■ Model Selection Procedure

Select the model and calculate the capacity for each refrigerant system according to the procedure shown below.

Calculation of the indoor air-conditioning load
- Calculate the maximum air-conditioning load for each room or zone.

↓

Selection of an air conditioning system
- Select the ideal air conditioning system for air conditioning of each room or zone.

↓

Design of the control system
- Design a suitable control system for the selected air conditioning system.

↓

Preliminary selection of indoor and outdoor units
- Make preliminary selections that are within the allowable range for the system. ..... 2-1-3 ~ 2-1-9

↓

Check of the tubing length and elevation difference
- Check that the length of refrigerant tubing and the elevation difference are within the allowable ranges..... 2-1-3

↓

Calculation of actual capacity of indoor units

1. Outdoor unit capacity correction 2-1-17
   - Capacity correction for the outdoor unit temperature conditions, indoor unit temperature and indoor/ outdoor ratio.
   - Capacity correction coefficient for outdoor unit tubing length and elevation difference.
   - Surplus capacity correction coefficient for outdoor unit temperature conditions.
   - Capacity correction coefficient for outdoor unit frosting and defrosting during heating operation.
2. Indoor unit capacity correction 2-1-18
   - Capacity correction for the indoor unit temperature conditions.
   - Calculate the Capacity distribution ratio.
   - Distribute the outdoor unit capacity among each indoor unit.
   - Capacity correction coefficient for tubing length and elevation difference.
   - Capacity correction coefficient for outdoor unit.

↓

Recheck of actual capacity of each indoor unit
- If the capacity is inadequate, reexamine the unit combinations.
  Example 1 : Increasing the indoor unit capacity
  Example 2 : Increasing the outdoor unit capacity

↓

Design of tubing
- Create a tubing design which minimizes the amount of additional refrigerant charge as much as possible. ..... 2-1-3～2-1-9
- If tubing extension for additional unit is expected in the future, create the tubing design with adequate consideration for this extension.
- Select the tubing size for the main tube (LA) up to the 1st distribution joint based on the rated cooling capacity of the outdoor unit. Select tubing sizes after the distribution point based on the total rated cooling capacity of the connected indoor units.

↓

Calculation of additional refrigerant charge amount
- Calculate the additional refrigerant charge from the diameters and lengths of the refrigerant tubing. Even if the wide tubing diameter was increased, determine the additional refrigerant charge based only on the narrow tubing size. 2-1-7,2-1-9
- Check the minimum indoor capacity (limit density) with respect to the amount of refrigerant. If the limit density is exceeded, be sure to install ventilation equipment or take other corrective steps. 2-1-10, 2-1-11

↓

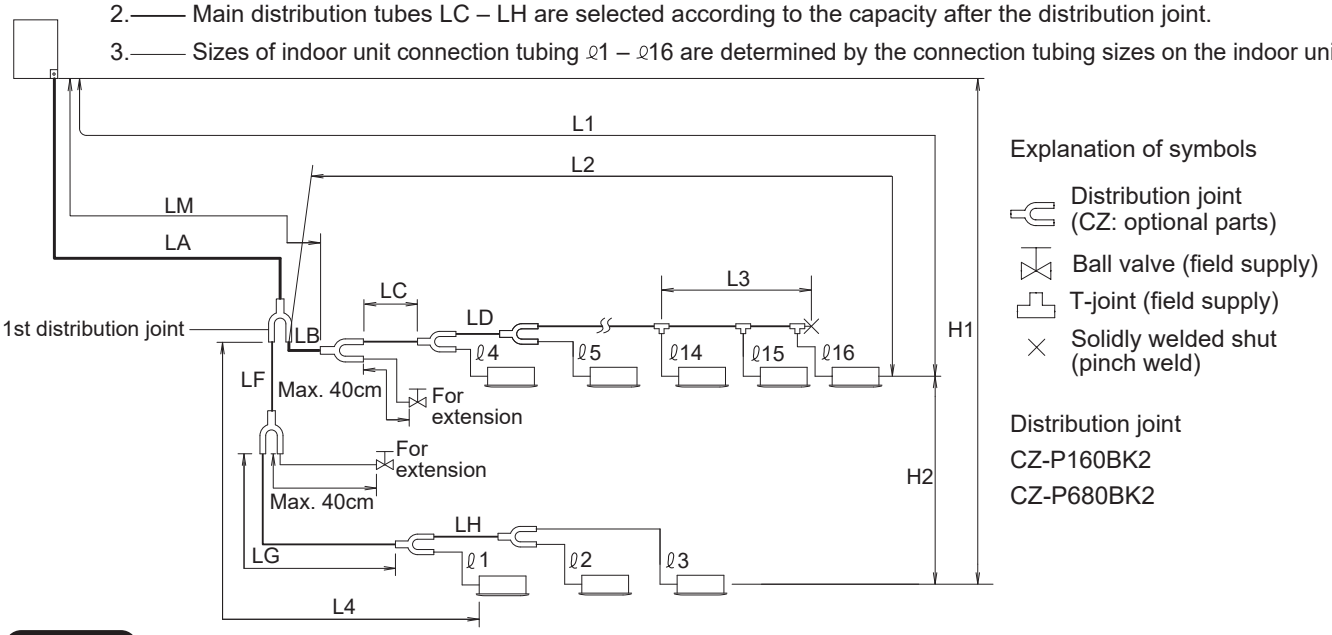
Design of electrical wiring capacity
- Select a wiring capacity according to the method of power supply. 2-3-1

1. Model Selection and Capacity Calculator

1-3. Tubing Length

Select the installation location so that the length and size of refrigerant tubing are within the allowable range shown in the figure below.

1.—— Main tubing length (maximum tubing size) LM = LA + LB …
2.—— Main distribution tubes LC – LH are selected according to the capacity after the distribution joint.
3.—— Sizes of indoor unit connection tubing ℓ1 – ℓ16 are determined by the connection tubing sizes on the indoor units.



NOTE

* Be sure to use special distribution joints (CZ: optional parts) for tubing branches.

Table 2 : Ranges that Apply to Refrigerant Tubing Lengths and to Differences in Installation Heights

Unit: m

Item	Mark	Contents		Length
Allowable tubing length	L1	Max. tubing length	Actual length	≤ 100
			Equivalent length	≤ 120
	ΔL (L2 – L4)	Difference between max. length and min. length from the 1st distribution joint		≤ 50*1
	LM	Max. length of main tubing (at maximum size) * Even after 1st distribution joint, LM is allowed if at maximum tubing length.		—
	ℓ1, ℓ2~ ℓ16	Max. length of each distribution tube		≤ 50*2
	L1 + ℓ1 + ℓ2~ ℓ15 + LF + LG + LH	Total max. tubing length including length of each distribution tube (only liquid tubing)		≤ 300
Allowable elevation difference	H1	When outdoor unit is installed higher than indoor unit		≤ 50
		When outdoor unit is installed lower than indoor unit		≤ 40
	H2	Max. difference between indoor units		≤ 15
Allowable length of joint tubing	L3	T-joint tubing (field supply); Max. tubing length between the first T-joint and solidly welded-shut end point		≤ 2

L = Length H = Height

1. Model Selection and Capacity Calculator

NOTE

*1: When the tubing length exceeds 40 m, increase a longer liquid and gas tubing by 1 rank.
Refer to the Technical Data for the details.

*2: If any of the tubing length exceeds 30 m, increase the size of the liquid and gas tubes by 1 rank.

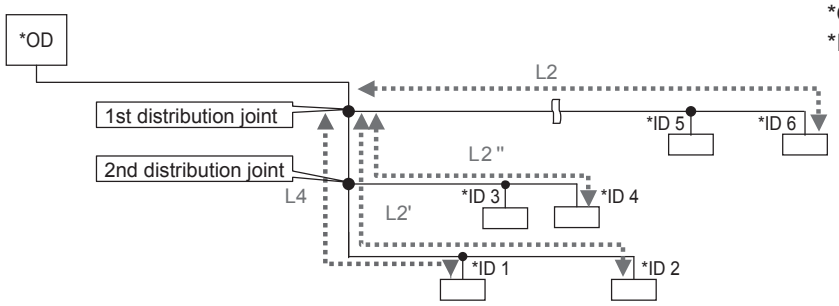
1. Model Selection and Capacity Calculator

■ Refrigerant Pipe

Tubing size increase [Difference △L from the first distribution joint between maximum and minimum length]

If the △L exceeds 40m, it is necessary to increase both the liquid and gas tubes by one size. Follow the steps below to increase the size.

*OD is the abbreviation of outdoor unit.
*ID is the abbreviation of indoor unit.



1. Check the combined indoor units which the △L exceeds 40m.
   Calculate the △L of each combined indoor unit after 1st distribution joint (L2 {L2', L2" ....} -L4).
   The L2 (L2 {L2', L2" ....}) indicates the pipe length connected to the farthest indoor unit among each combined indoor unit from 1st distribution joint. The L4 indicates the pipe length connected from the 1st distribution joint to the nearest indoor unit among all connected indoor units to the system. If the calculated △L exceeds 40m, it is necessary to increase by one size of both the liquid and gas tubes. Follow the steps to increase the size.
2. Check the total capacity of each combined indoor unit system.
   Calculate the total capacity of indoor units from the 1st distribution joint.
   Example: L2": Total capacity of indoor unit 3 and 4
3. Check the portion for increasing the pipe size and length.
   Portion to increase the pipe by one size: Increase the pipe size to be directed towards the indoor units from the 1st distribution joint against the indoor unit which the △L exceeds 40m. Pipe length for sizing up: Pipe length becomes different according to the total capacity of indoor units.

Total capacity of indoor units and pipe length for sizing up

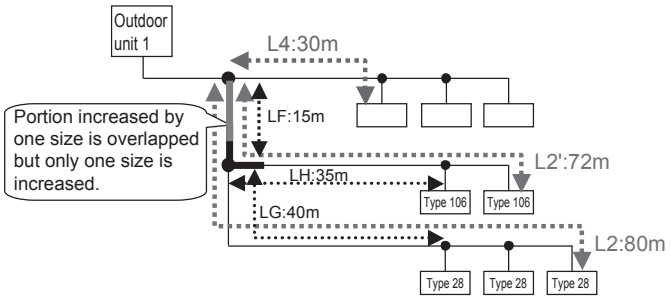
Total capacity of combined indoor units	Length for sizing up
Less than 22.4kW	12m
22.4kW or more	20m

* The larger the total capacity, the more it is necessary to increase the pipe length for sizing up.
* If the range of size up portion is improper, it is available to extend the length for sizing up until the next distribution joint is reached.

NOTE:
1. Be sure to use the reducer (field supply) at joint portion between the original pipe and the pipe increased by one size.
2. If there is the necessity to increase by one size from the original pipe size, there can be only one time effective to increase by one size even though the portion for sizing up is overlapped.
3. It may sometimes happen that the diameter of pipe when sized up becomes wider than that of the main pipe LA.

1. Model Selection and Capacity Calculator

Example 1



1. Check the portion for one size increase.

	ΔL	Total capacity of indoor units	Length for sizing up
L2 system	50m	8.4kW	12m
L2' system	42m	22.4kW	20m

L2 combined indoor units

Increase the gas and liquid tubes 12m by one size from the 1st distribution joint to be directed towards L2 indoor units.

LF: Increase 12m by one size among 15m.

LG: No increase by one size

L2' combined indoor units

Increase the gas and liquid tubes 20m by one size from the 1st distribution joint to be directed towards L2' indoor units.

LF: Increase all 15m by one size

LH: Increase 5m by one size among 35m.

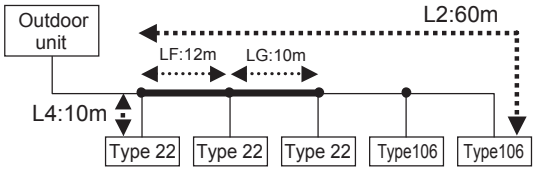
2. Final result

	Before sizing up	After sizing up	Tube length	Size up length
LF	ø 9.52 / ø 22.22	ø 12.7 / ø 25.4	15m	15m
LG	ø 9.52 / ø 15.88	No size up	40m	0m
LH	ø 9.52 / ø 22.22	ø 12.7 / ø 25.4	35m	5m

* The LH is only 5m from the 2nd distribution joint.

* The size increased portion is overlapped at the LF but it has only one size increase.

Example 2



1. Checking the portion for one size increase

	Δ L	Total capacity of indoor units	Length for sizing up
L2 system	50m	29kW	20m

・L2 combined indoor units

Increase the gas and liquid tubes 28m by one size from the 1st distribution joint to be directed towards L2 indoor units.

LF: Increase 12m by one size.

LG: Increase 8m by one size among 10m.

2. Final result

	Before sizing up	After sizing up	Tube length	Size up length
LF	ø 9.52 / ø 22.22	ø 12.7 / ø 25.4	12m	12m
LG	ø 9.52 / ø 22.22	ø 12.7 / ø 25.4	10m	8m

* The LG is only 8m from the 2nd distribution joint.LG

* It is possible to increase the LG to 10m by one size.

1. Model Selection and Capacity Calculator

1-4. Additional Refrigerant Charge

Additional refrigerant charge amount is calculated below.

Required amount of additional refrigerant charge = [(Amount of additional refrigerant charge per meter of each size of liquid tube × its tube length) + (...) + (...)]

* Always charge accurately using a scale for weighing.

Table 8 : Amount of Additional Refrigerant Charge Per Meter, According to Liquid Tubing Size

Liquid tubing size (mm)	6.35	9.52	12.7
Amount of additional refrigerant charge / m (g/m)	23	50	112

Table 9 : Refrigerant Charge Amount at Shipment (for Outdoor Unit)

8 HP	10 HP
4.9 kg	5.1 kg

Table 10 : Total amount of refrigerant in the system

8 HP	10 HP
15.9 kg	

1-5. System Limitations

Table 11 : System Limitations

Outdoor unit horsepower	8 HP	10 HP
Number of max. connectable indoor units	15 (16)	16
Max. allowable indoor/outdoor capacity ratio	50-130%*	

* If the following conditions are satisfied, the effective range is above 130% and below 150%.
  i) Obey the limited number of connectable indoor units.
  ii) The capacity of 1.5 kW indoor unit can not be connected.
  iii) Simultaneous operation is limited to less than 130% of connectable indoor units.

Note : The number in parenthesis is available with the capacity of 1.5 kW indoor unit connection.

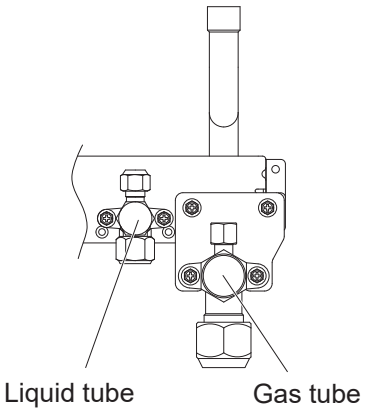
1. Model Selection and Capacity Calculator

1-6. Tubing Size

■ **Table 3 : Main Tubing Size (LA)**

Unit: mm

kW	**22.4**	**28.0**
Outdoor unit horsepower	8 HP	10 HP
Gas tube	ø19.05	ø22.22
	Flare connection	Brazing connection
Liquid tube	ø9.52	
	Flare connection	



* If future extension is planned, select the tubing diameter based on the total horsepower after extension.

* The refrigerant tubing should be used with R410A and R32 refrigerant.

■ **Table 4 : Main Tubing Size After Distribution (LB, LC...)**

Unit: mm

Total capacity after distribution	Below kW	7.1 (2.5 HP)	16.0 (6 HP)	22.5 (8.1 HP)	–
	Over kW	–	7.1 (2.5 HP)	16.0 (6 HP)	22.5 (8.1 HP)
Tubing size	Gas tube	ø12.7	ø15.88	ø19.05	ø22.22
	Liquid tube	ø9.52	ø9.52	ø9.52	ø9.52

Note: In case the total capacity of indoor units connected after distribution exceeds the capacity of the outdoor unit, select the main tubing size for the capacity of the outdoor unit.

■ **Table 5 : Indoor Unit Tubing Connection Size**

Indoor unit type	**15**	**22**	**28**	**36**	**45**	**56**	**60**	**73**	**90**	**106**	**140**	**160**
Gas tube (mm)	ø12.7									ø15.88		
Liquid tube (mm)	ø6.35									ø9.52		

1. Model Selection and Capacity Calculator

Table 2-1-11 : Refrigerant Tubing

Tubing size (mm)			
Material Temper - O		**Material Temper - 1/2 H • H**	
ø6.35	t0.8	ø22.22	t1.0
ø9.52	t0.8	ø25.4	t1.0
ø12.7	t0.8		
ø15.88	t1.0		
ø19.05	t1.2		

* When bending the tubes, use a bending radius that is at least 4 times the outer diameter of the tubes.
  In addition, take sufficient care to avoid crushing or damaging the tubes when bending them.
* Use the material of temper - 1/2 H or - H for tubing ø22.22 or more.

1-7. Straight Equivalent Length of Joints

Design the tubing system by referring to the following table for the straight equivalent length of joints.

Table 2-1-12 : Straight Equivalent Length of Joints

Gas tubing size (mm)	**12.7**	**15.88**	**19.05**	**22.22**	**25.4**
90° elbow 	0.30	0.35	0.42	0.48	0.52
45° elbow 	0.23	0.26	0.32	0.36	0.39
U-shape tube bent (R60-100 mm) 	0.90	1.05	1.26	1.44	1.56
Trap bend 	2.30	2.80	3.20	3.80	4.30
Y-branch distribution joint 	Equivalent length conversion not needed.				
Ball valve for service	Equivalent length conversion not needed.				

1. Model Selection and Capacity Calculator

1-8. Check of Density Limit

Check the amount of refrigerant in the system and floor space of the room according to the legislation on refrigerant drainage. If there is no applicable legislation, follow the standards described below.

The refrigerant (R32), which is used in the air conditioner, is a flammable refrigerant. So the requirements for the maximum refrigerant charge amount [m_{max}] used in the appliance are determined according to installation space of the appliance.

Installation conditions

Procedure of preliminary calculation

1. Determine the room space in accordance with the requirements of installation.
2. Calculate the maximum refrigerant charge amount [m_{max}]. When connecting the refrigerant tubes and installing the indoor unit in each partitioned room, it is necessary to calculate the allowable refrigerant charge amount in each room.

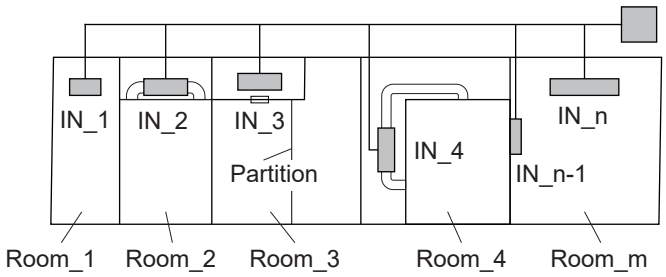


Fig. 1

For all indoor units shown in Fig. 1, calculate the allowable refrigerant charge amount that can be used in each room [m_{IN_1}, m_{IN_2},---, m_{IN_n}].
Calculate the maximum refrigerant charge for each indoor unit from Fig. 2 by referring to the following items.

- Floor area of the room
- Indoor units type
- Installation conditions A, B (Middle Static Pressure Duct and Slim Low Static Ducted)
  * Installation condition A to be recommended. Installation condition B is extremely limited to the refrigerant charge amount. (Refer to Section “Installation Patterns” under the Installation Instructions attached to the indoor unit.)
- Capacity of indoor unit
- Installation height or air outlet height of indoor unit
- Use or nonuse of R32 refrigerant leakage detection sensor

In case that the room equipped with the indoor unit is divided by partition walls with openings.

- Installation height of indoor unit in the minimum area among partitioned areas: h_{instn}
- Floor space of the minimum area among partitioned areas: A_{instn}
- Opening space of the part that meets the required opening conditions: Anvmin (Refer to Section “About Opening in a Partition Wall” under the Installation Instructions attached to the indoor unit.)

1. Model Selection and Capacity Calculator

Room No.	No. of indoor units	Indoor units type	Installation conditions A, B	Capacity of indoor unit	Installation height or air outlet height of indoor unit: h_{inst} or h0 (m)	R32 refrigerant leakage detection sensor	Floor area of the room: A_{inst} (m^2)	First step for calculating allowable refrigerant charge amount for each indoor unit (kg)
Room_1	IN_1	4-Way Cassette 60 × 60	—	15	$h_{inst} \geq 2.2$	Use	10	F-m_{IN_1}
Room_2	IN_2	Slim Low Static Ducted	—	56	h0 ≥ 2.2	Nonuse	15	F-m_{IN_2}
Room_3	IN_3	Slim Low Static Ducted	B	56	h0 ≥ 1.8	Use	20	F-m_{IN_3}
Room_4	IN_4	Middle Static Pressure Duct	A	160	h0 ≥ 2.2	included	40	F-m_{IN_4}
---	---	---	---	---	---	---	---	---
Room_m	IN_n-1	Wall-Mounted	—	45	$h_{inst} \geq 1.8$	Use	30	F-m_{IN_n-1}
Room_m	IN_n	4-Way Cassette (2-way airflow)	—	140	$h_{inst} \geq 2.2$	Use	30	F-m_{IN_n}

Room No.	Partition's effective opening space (m^2)	Installation height of indoor unit in the minimum area among partitioned areas: h_{instn} (m)	Floor space of the minimum area among partitioned areas: A_{instn} (m^2)	Partition's necessary effective opening space: Anvmin (m^2)	Refrigerant charge amount that can be used for each indoor unit (kg)
Room_1	—	—	—	—	m_{IN_1}
Room_2	—	—	—	—	m_{IN_2}
Room_3	0.11	$h_{instn} \geq 1.8$	5	0.20	m_{IN_3}
Room_4	—	—	—	—	m_{IN_4}
---	---	---	---	---	---
Room_m	—	—	—	—	m_{IN_n-1}
Room_m	—	—	—	—	m_{IN_n}

$[m_{max}] = Min. (m_{IN\_1}, m_{IN\_2}, m_{IN\_3}, ---, m_{IN\_n-1}, m_{IN\_n})$

The minimum value of the allowable refrigerant charge amount in each room is the maximum value of the maximum refrigerant charge amount [m_{max}] that can be used in the system.

3. Calculate the maximum refrigerant charge amount [m_c]* by following details of piping installation.
   * [m_c] ≤ 12.0 (Maximum refrigerant charge amount)
   As a reference, see "1-3. Tubing Length", "1-4. Additional Refrigerant Charge", "1-5. System Limitations", "1-6. Tubing Size", "1-7. Straight Equivalent Length of Joints", and "2-3. Installing Distribution Joint".

4. Determine from two values [m_{max}] in Step 2 and [m_c] in Step 3.
   [m_c] ≤ [m_{max}] : Can be installed.
   [m_c] > [m_{max}] : Return to Steps 1 to 3 and change the indoor unit type, capacity and pipe length.

When there are partitioned rooms in the system and [m_{max}] is lower than the minimum value of the allowable refrigerant charge amount under the first step calculating allowable refrigerant charge amount for each indoor unit, change the effective opening of the partition to satisfy the necessary opening condition if available.

1. Model Selection and Capacity Calculator

< Whether or not to use R32 refrigerant leakage detection sensor >

- According to the type of diagrams shown in Fig. 2, it is necessary to install R32 refrigerant leakage detection sensor if the installation space is within the range of using R32 refrigerant leakage detection sensor.
- As to installation method of R32 refrigerant leakage detection sensor, refer to the Installation Instructions attached to the indoor unit and R32 refrigerant leakage detection sensor.
- When connecting R32 refrigerant leakage detection sensor, group connection with a remote controller is not possible. Be sure to prepare a remote controller for each indoor unit.

NOTE

In the case of connecting R32 refrigerant leakage detection sensor :

- For systems using R32 refrigerant, this unit is equipped with a refrigerant leak detector for safety. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

The refrigerant charge amount in accordance with the floor area of the room is roughly described on the pages that follow.

1. Model Selection and Capacity Calculator

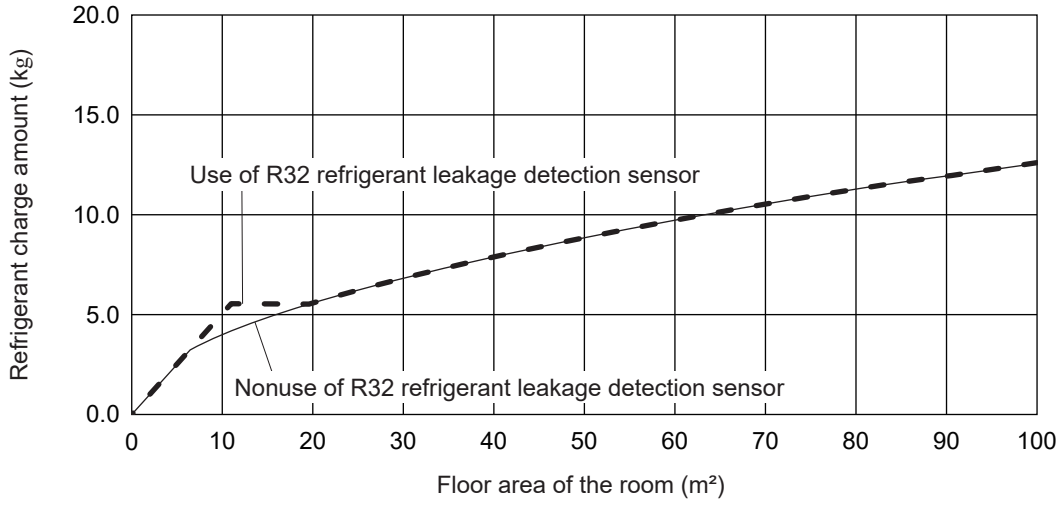
Here is one of an example shown below. The following diagram is subject to change according to the type of the connected indoor units. Refer to the Technical Data of indoor unit.

Example:

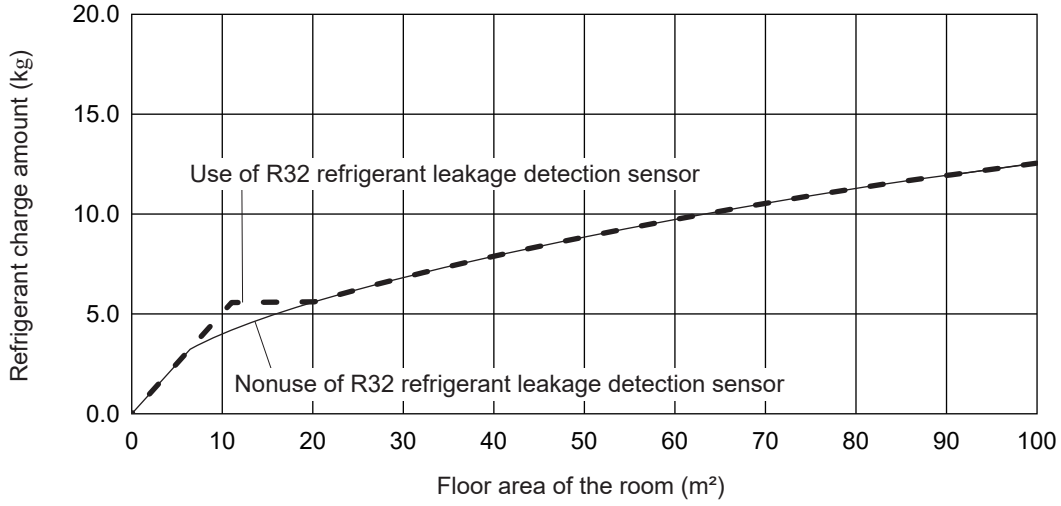
Fig. 2

4-Way Cassette 60 × 60

Type 15



Type 22



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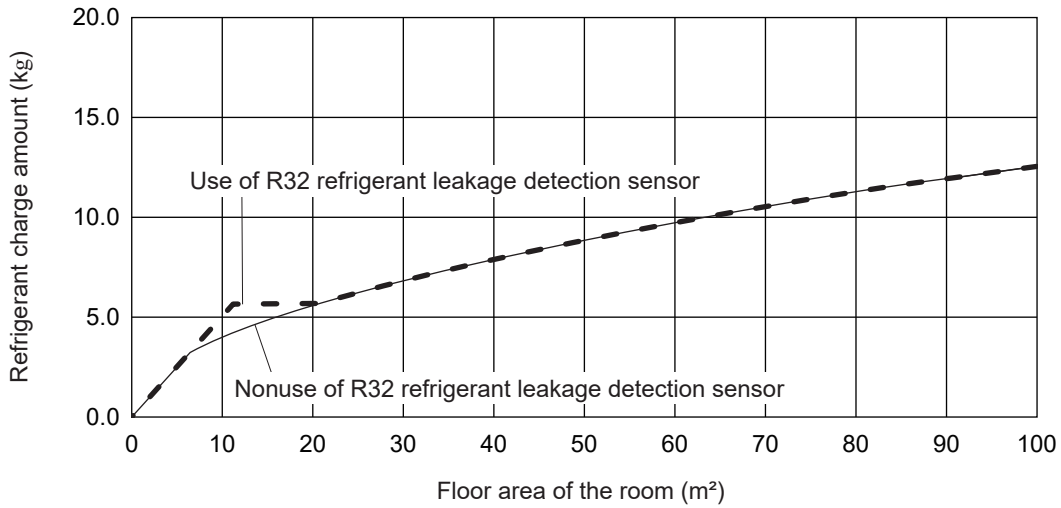
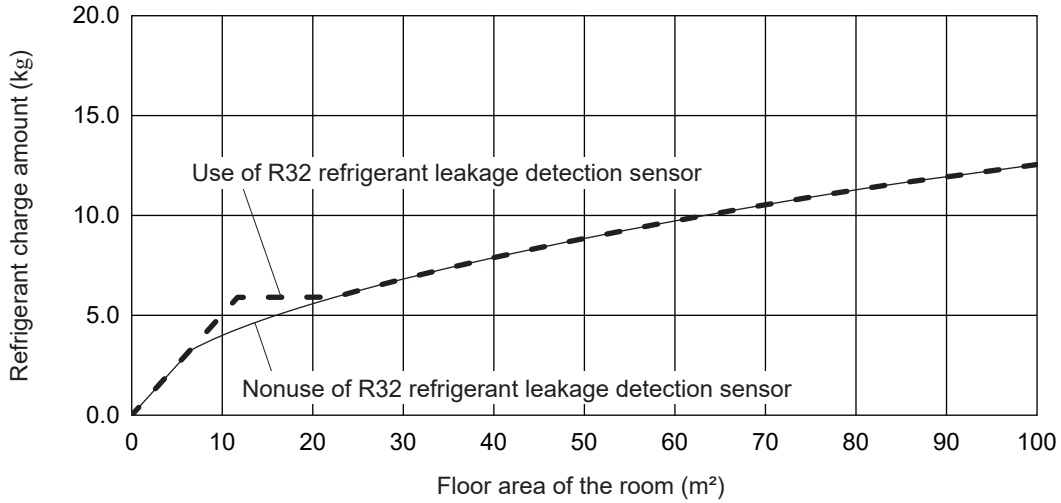
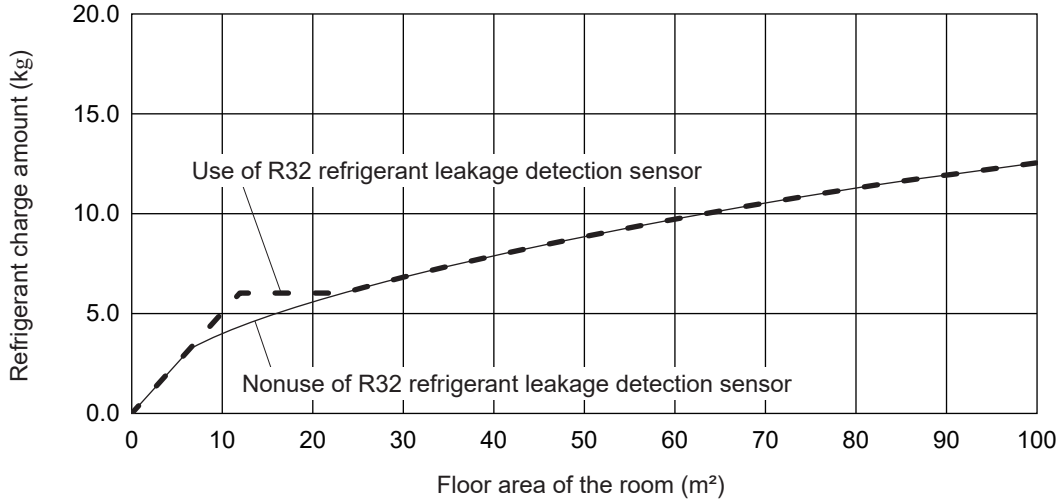


1. Model Selection and Capacity Calculator

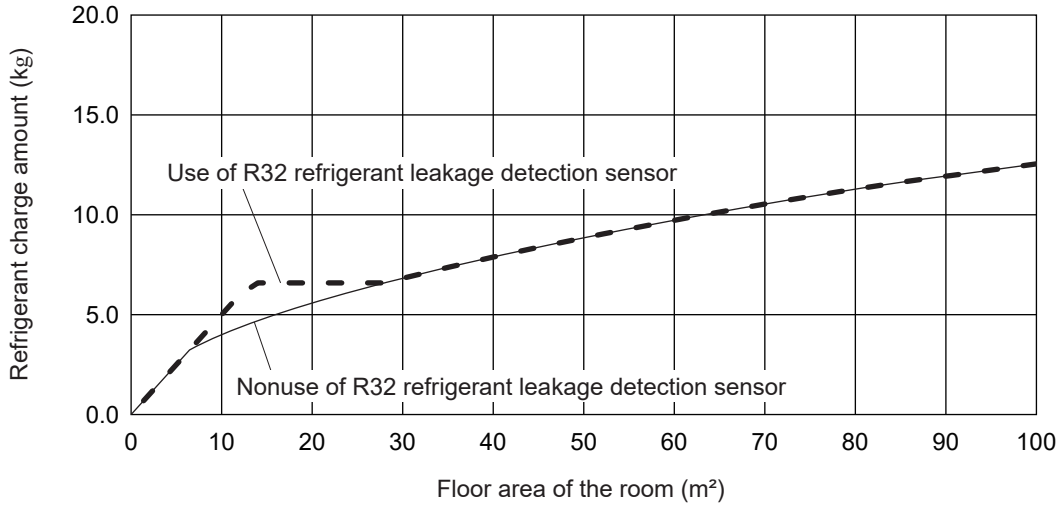
Type 36



Type 45



Type 56



1. Model Selection and Capacity Calculator

Table

4-Way Cassette 60 × 60								
	Use or nonuse of R32 refrigerant leakage detection sensor	Nonuse	Use					
	Capacity of indoor unit	15~56	15	22	28	36	45	56
		Refrigerant charge amount (kg)						
Floor area of the room (m²)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	4	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	6	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	8	3.5	4.0	4.0	4.0	4.0	4.0	4.0
	10	3.9	5.0	5.0	5.0	5.0	5.0	5.0
	12	4.3	5.5	5.6	5.7	5.8	6.0	6.0
	14	4.7	5.5	5.6	5.7	5.8	6.0	6.6
	16	5.0	5.5	5.6	5.7	5.8	6.0	6.6
	18	5.3	5.5	5.6	5.7	5.8	6.0	6.6
	20	5.6	5.6	5.6	5.7	5.8	6.0	6.6
	22	5.8	5.8	5.8	5.8	5.8	6.0	6.6
	24	6.1	6.1	6.1	6.1	6.1	6.1	6.6
	26	6.4	6.4	6.4	6.4	6.4	6.4	6.6
	28	6.6	6.6	6.6	6.6	6.6	6.6	6.6
	30	6.8	6.8	6.8	6.8	6.8	6.8	6.8
	32	7.1	7.1	7.1	7.1	7.1	7.1	7.1
	34	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	36	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	38	7.7	7.7	7.7	7.7	7.7	7.7	7.7
	40	7.9	7.9	7.9	7.9	7.9	7.9	7.9
	42	8.1	8.1	8.1	8.1	8.1	8.1	8.1
	44	8.3	8.3	8.3	8.3	8.3	8.3	8.3
	46	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	48	8.7	8.7	8.7	8.7	8.7	8.7	8.7
	50	8.8	8.8	8.8	8.8	8.8	8.8	8.8
	52	9.0	9.0	9.0	9.0	9.0	9.0	9.0
	54	9.2	9.2	9.2	9.2	9.2	9.2	9.2
	56	9.4	9.4	9.4	9.4	9.4	9.4	9.4
	58	9.5	9.5	9.5	9.5	9.5	9.5	9.5
	60	9.7	9.7	9.7	9.7	9.7	9.7	9.7
	62	9.8	9.8	9.8	9.8	9.8	9.8	9.8
	64	10.0	10.0	10.0	10.0	10.0	10.0	10.0
	66	10.2	10.2	10.2	10.2	10.2	10.2	10.2
	68	10.3	10.3	10.3	10.3	10.3	10.3	10.3
	70	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	72	10.6	10.6	10.6	10.6	10.6	10.6	10.6
	74	10.8	10.8	10.8	10.8	10.8	10.8	10.8
	76	10.9	10.9	10.9	10.9	10.9	10.9	10.9
	78	11.1	11.1	11.1	11.1	11.1	11.1	11.1
	80	11.2	11.2	11.2	11.2	11.2	11.2	11.2

1. Model Selection and Capacity Calculator

Table

4-Way Cassette 60 × 60								
	Use or nonuse of R32 refrigerant leakage detection sensor	Nonuse	Use					
	Capacity of indoor unit	15~56	15	22	28	36	45	56
		Refrigerant charge amount (kg)						
Floor area of the room (m²)	82	11.3	11.3	11.3	11.3	11.3	11.3	11.3
	84	11.5	11.5	11.5	11.5	11.5	11.5	11.5
	86	11.6	11.6	11.6	11.6	11.6	11.6	11.6
	88	11.7	11.7	11.7	11.7	11.7	11.7	11.7
	90	11.9	11.9	11.9	11.9	11.9	11.9	11.9
	92	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	94	12.1	12.1	12.1	12.1	12.1	12.1	12.1
	96	12.3	12.3	12.3	12.3	12.3	12.3	12.3
	98	12.4	12.4	12.4	12.4	12.4	12.4	12.4
	100	12.5	12.5	12.5	12.5	12.5	12.5	12.5

1. Model Selection and Capacity Calculator

1-9. Calculation of Actual Capacity of Indoor Unit

■ Calculating the actual capacity of each indoor unit

Because the capacity of a multi air-conditioner changes according to the temperature conditions, tubing length, elevation difference and other factors, select the correct model after taking into account the various correction values. When selecting the model, calculate the corrected capacities of the outdoor unit and each indoor unit.
Use the corrected outdoor unit capacity and the total corrected capacity of all the indoor units to calculate the actual final capacity of each indoor unit.

1. Outdoor unit capacity correction

Outdoor unit capacity correction (kW) = (A) × (B) × (C) × (D)

(A) Capacity correction for the outdoor unit temperature conditions, indoor unit temperature and indoor/ outdoor ratio (kW)

Read the capacity correction for outdoor unit temperature, indoor unit temperature and indoor/ outdoor ratio as shown in the section “8. CAPACITY TABLE”, “1. Capacity of Outdoor Unit” and “2. Cooling Capacity of Indoor Unit”.

* Indoor unit temperature is indoor unit rated capacity - weighted average temperature.

Example

Cooling operation

No.	(a) Rated capacity	(b) Intake temperature	(a) × (b)
1	2.8 kW	19 WB	53.2
2	3.6 kW	18 WB	64.8
3	4.5 kW	17 WB	76.5
4	5.6 kW	16 WB	89.6

Rated capacity-weighted average temperature = $\frac{\sum((a)\times(b))}{\sum(a)}$ = 17.2WB

* The indoor/ outdoor ratio should be selected according to the real rated capacity.

Example

There are 4 indoor units for class 28, 36, 45, 56 and the outdoor unit HP is 8 (22.4kW in the cooling-mode, 25.0kW in the heating-mode).

No.	Rated cooling capacity	Rated heating capacity
1	2.8 kW	3.2 kW
2	3.6 kW	4.2 kW
3	4.5 kW	5.0 kW
4	5.6 kW	6.3 kW
Total	16.5 kW	18.7 kW
I/O ratio	73.7%	74.8 %

(B) Capacity correction coefficient for outdoor unit tubing length and elevation difference (%)

From the graph of capacity change characteristics resulting from tubing length and elevation difference on page “ 2-1-14 ”, read the capacity correction coefficient.

* Use the lowest capacity changing ratio. Usually, the furthest and highest or the lowest indoor unit is used.

(C) Surplus capacity correction coefficient for outdoor unit temperature conditions (%)

From the graph of surplus capacity characteristics resulting from outdoor temperature on page “ 2-1-13 ”, read the capacity correction coefficient.

(D) Capacity correction coefficient for outdoor unit frosting and defrosting during heating operation (%)

From the outdoor unit heating capacity correction coefficient during frosting / defrosting on page “ 2-1-13 ”, read the capacity correction coefficient.

1. Model Selection and Capacity Calculator

2. Indoor unit capacity correction coefficient

Indoor unit capacity correction (kW) = (G) × (I) × (D)

* Indoor unit capacity correction ≤ (G)

(E) Capacity correction for the indoor unit temperature conditions (kW)

From the graph of indoor capacity characteristics on page " 2-1-14 ", read the capacity correction coefficient for indoor unit temperature conditions.

(E) = Capacity correction coefficient for indoor unit temperature conditions × Rated capacity

(F) Calculate the Capacity distribution ratio (%)

$$(F) = \frac{(E)}{\sum(E)}$$

(G) Distribute the outdoor unit capacity among each indoor unit (kW)

(G) = (A) × (F)

(H) Capacity correction coefficient for tubing length and elevation difference (%)

From the graph of capacity change characteristics resulting from tubing length and elevation difference on page " 2-1-14 ", read the capacity correction coefficient.

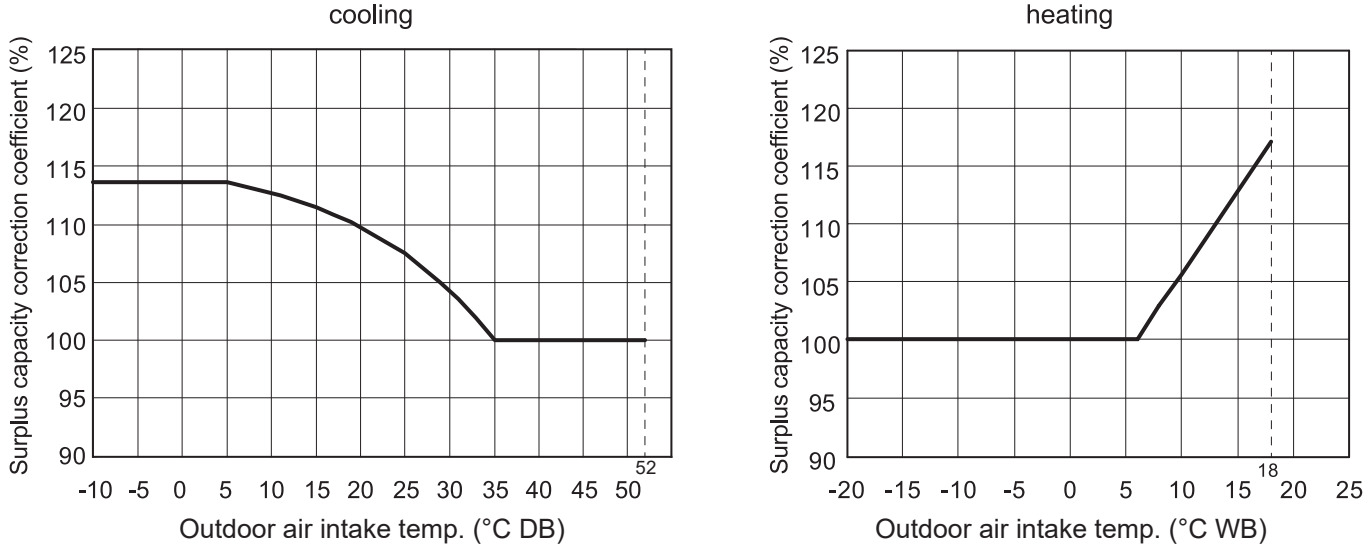
(I) Capacity correction coefficient for outdoor unit (%)

(I) = (H) × (C)

- In the case of (I) ≤ 100%, loss of capacity resulting from the tubing length can be supplied by the outdoor unit capacity.
  - When the outdoor air temperature is lower in cooling mode
  - When the outdoor air temperature is higher in heating mode

1. Model Selection and Capacity Calculator

Surplus capacity correction coefficient (%)



2

3. Graph of capacity correction coefficients

■ **Outdoor unit heating capacity correction coefficient during frosting/defrosting (1 – (4))**

Outdoor intake air temp. (°CWB, RH85%)	–20	–15	–10	–8	–6	–5	–4	–2	–1
Correction coefficient	0.97	0.97	0.97	0.96	0.94	0.91	0.89	0.87	0.87

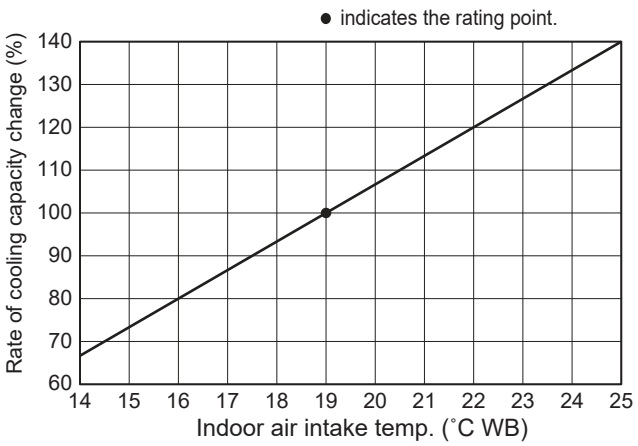
Outdoor intake air temp. (°CWB, RH85%)	0	1	2	3	4	5	6
Correction coefficient	0.87	0.88	0.89	0.91	0.92	0.95	1.0

* To calculate the heating capacity with consideration for frosting/defrosting operation, multiply the heating capacity found from the capacity graph by the correction coefficient from the table above.

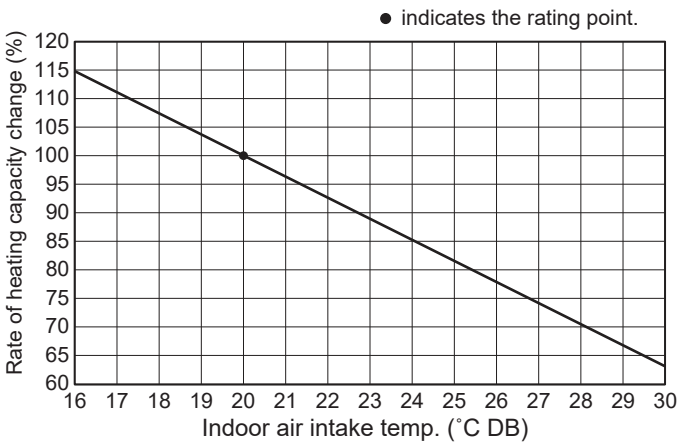
1. Model Selection and Capacity Calculator

■ Graph of indoor unit capacity characteristics (2 – (2))

Indoor unit cooling capacity characteristics



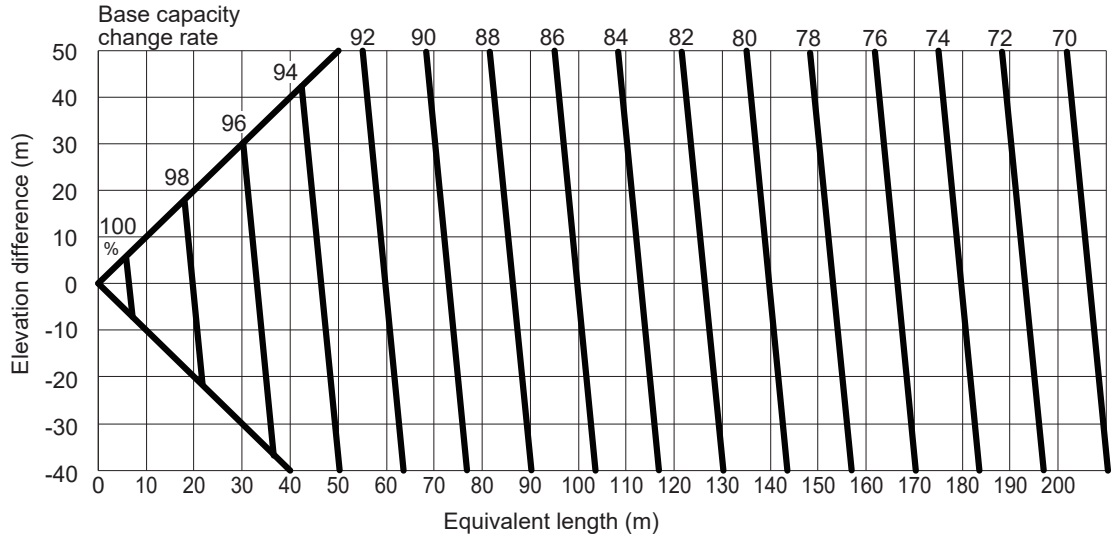
Indoor unit heating capacity characteristics



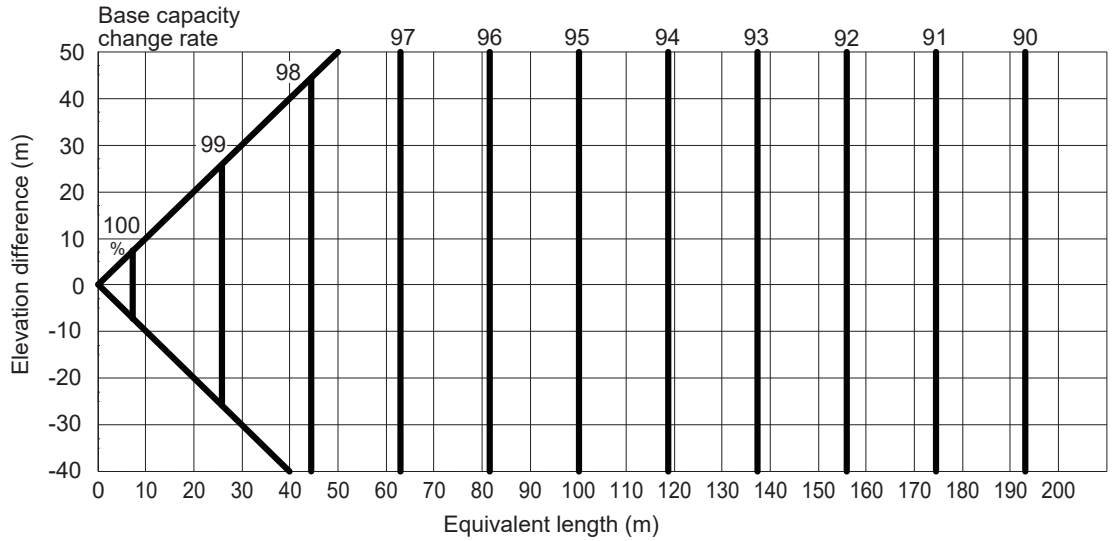
■ Graph of capacity change characteristics resulting from tubing length and elevation difference (1 / 2 – (3))

(Performance correction coefficients by elevation difference of refrigerant tube length [performance change rate ÷ 100] is calculated by the following line map.)

<Cooling>



<Heating>

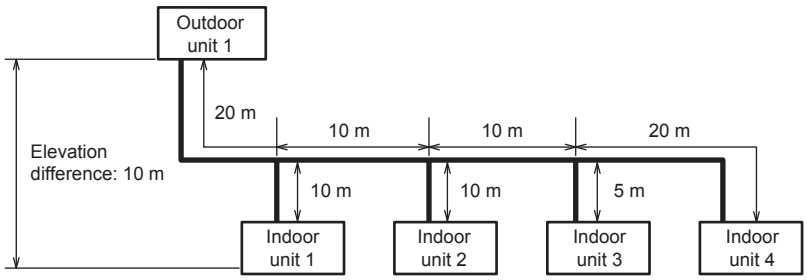


2

2. System Design

2-1. System Example

Below are the tables created using the “PAC System Diagram Software”.



Selection conditions

Assume that installation is in a 50 Hz region.

		Outdoor unit	Room1 (indoor unit 1)	Room2 (indoor unit 2)	Room3 (indoor unit 3)	Room4 (indoor unit 4)
Cooling	Air condition (DB / WB)	34.0 / 22.0	28.0 / 20.0	28.0 / 20.0	28.0 / 20.0	28.0 / 20.0
	Max. load (kW)	-	15.8	13.5	5.0	3.5
Heating	Air condition (DB / WB)	3.0 / 2.0	19.0 / 13.0	19.0 / 13.0	19.0 / 13.0	19.0 / 13.0
	Max. load (kW)	-	16.2	14.3	5.4	4.0
Actual tubing length		60 m	30 m	40 m	45 m	60 m
Equivalent length		72 m	36 m	48 m	54 m	72 m

2

Preliminary selection

	Outdoor unit	Room1 (indoor unit 1)	Room2 (indoor unit 2)	Room3 (indoor unit 3)	Room4 (indoor unit 4)
Selected model	8 HP	Type 22	Type 28	Type 28	Type 140
Load (cooling / heating) (kW)	-	2.0 / 2.1	2.5 / 3.1	2.6 / 2.6	14.0 / 15.0
Rated capacity (cooling / heating) (kW)	22.4 / 25.0	2.2 / 2.5	2.8 / 3.2	2.8 / 3.2	14.0 / 16.0
Actual capacity (cooling / heating) (kW)	-	2.24 / 2.26	2.79 / 2.87	2.75 / 2.86	13.30 / 14.14

Calculate the actual capacity results according to the capacity calculation procedure on page"2-1-11" to "2-1-15".

	Outdoor unit	Room1 (indoor unit 1)	Room2 (indoor unit 2)	Room3 (indoor unit 3)	Room4 (indoor unit 4)
Rated capacity (cooling / heating) (kW)	22.4 / 25.0	2.2 / 2.5	2.8 / 3.2	2.8 / 3.2	14.0 / 16.0
(A) Capacity table	23.3 / 25.8	-	-	-	-
(B) Capa. Estimation Coef. : the Equiv. Tube Length	0.882 / 0.958	-	-	-	-
(C) Capa. Estimation Coef. : Temp. Conditions	-	1.010 / 1.000	1.010 / 1.000	1.010 / 1.000	1.010 / 1.000
(D) Capa. Estimation Coef. : Frosting / defrosting	/ 0.890	-	-	-	-
(E) Estimation Capacity	-	2.3 / 2.6	3.0 / 3.3	3.0 / 3.3	14.9 / 16.6
(F) Capacity distribution ratio	-	0.101 / 0.100	0.128 / 0.129	0.128 / 0.129	0.642 / 0.643
(G) = (A) x (F)	-	2.3 / 2.6	3.0 / 3.3	3.0 / 3.3	14.9 / 16.6
(H) Capa. Estimation Coef. : the Equiv. Tube Length	-	0.945 / 0.981	0.924 / 0.973	0.914 / 0.969	0.882 / 0.958
(I) = (C) x (H)	-	0.954 / 0.981	0.933 / 0.973	0.923 / 0.969	0.891 / 0.958
Actual capacity (cooling / heating) (kW)	-	2.24 / 2.26	2.79 / 2.87	2.75 / 2.86	13.30 / 14.14

Actual capacity = (G) x (I) x (D)

Indoor unit change

Increase by one rank because the capacity of the indoor unit 2 and 4 is lower than the maximum load.
Calculating the actual capacity in the same way as Preliminary selection.

	Outdoor unit	Room1 (indoor unit 1)	Room2 (indoor unit 2)	Room3 (indoor unit 3)	Room4 (indoor unit 4)
Selected model	8 HP	Type 22	Type 36	Type 28	Type 160
Load (cooling / heating) (kW)	-	2.0 / 2.1	2.5 / 3.1	2.6 / 2.6	14.0 / 15.0
Rated capacity (cooling / heating) (kW)	22.4 / 25.0	2.2 / 2.5	3.6 / 4.2	2.8 / 3.2	16.0 / 18.0
Actual capacity (cooling / heating) (kW)	-	2.09 / 2.09	3.34 / 3.48	2.57 / 2.64	14.18 / 14.67

Outdoor unit change

The capacity of the indoor units 3 and 4 is lower than the maximum load.
Increase the capacity of the outdoor unit by one rank because of inability to increase the indoor unit 1 by one rank.
Calculating the actual capacity in the same way as Preliminary selection.

	Outdoor unit	Room1 (indoor unit 1)	Room2 (indoor unit 2)	Room3 (indoor unit 3)	Room4 (indoor unit 4)
Selected model	10 HP	Type 22	Type 36	Type 28	Type 160
Load (cooling / heating) (kW)	-	2.0 / 2.1	2.5 / 3.1	2.6 / 2.6	14.0 / 15.0
Rated capacity (cooling / heating) (kW)	28.0 / 28.0	2.2 / 2.5	3.6 / 4.2	2.8 / 3.2	16.0 / 18.0
Actual capacity (cooling / heating) (kW)	-	2.24 / 2.26	3.58 / 3.77	2.76 / 2.86	15.20 / 15.91

For both cooling and heating in all rooms, actual capacity is now greater than or equal to the maximum load.
Selection is completed.

2-2. Example of Tubing Size Selection and Refrigerant Charge Amount

Additional refrigerant charging

Based on the values in Tables 3, 4, 5 and 8, use the liquid tubing size and length, and calculate the amount of additional refrigerant charge using the formula below.

Required additional refrigerant charge (kg)	=[112 ×(a) + 50 ×(b) + 23 ×(c)] ×10^{-3} + Necessary amount of additional refrigerant charge per outdoor unit.

(a) : Liquid tubing Total length of ø12.7 (m)
(b) : Liquid tubing Total length of ø9.52 (m)
(c) : Liquid tubing Total length of ø6.35 (m)

- Charging procedure

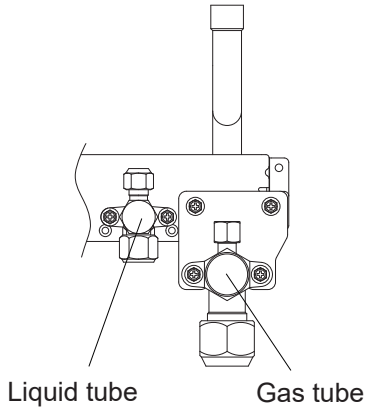
  Be sure to charge with R32 refrigerant in liquid form.

  1. After performing a vacuum, charge with refrigerant from the liquid tubing side. At this time, all valves must be in the “fully closed” position.
  2. If it was not possible to charge the designated amount, operate the system in Cooling mode while charging with refrigerant from the gas tubing side. (This is performed at the time of the test run. For this, all valves must be in the “fully open” position. However if only one outdoor unit is installed, a balance tube is not used. Therefore, leave the valves fully closed.)
     Charge with R32 refrigerant in liquid form.
     With R32 refrigerant, charge while adjusting the amount being fed a little at a time in order to prevent liquid refrigerant from backing up.

- After charging is completed, turn all valves to the “fully open” position.
- Replace the tubing covers as they were before.

CAUTION

1. **R32 additional charging absolutely must be done through liquid charging.**
2. **The R32 refrigerant cylinder has a gray base color, and the top part is light blue.**
3. **The R32 refrigerant cylinder includes a siphon tube. Check that the siphon tube is present. (This is indicated on the label at the top of the cylinder.)**
4. **Due to differences in the refrigerant, pressure, and refrigerant oil involved in installation, it is not possible in some cases to use the same tools for R22, R410A and for R32.**

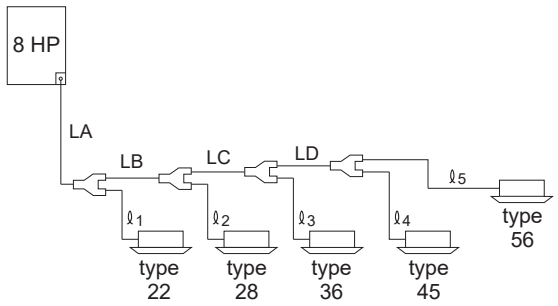


* Use a hexagonal wrench and turn to the left to open.

		Liquid tube		Gas tube	
		Size	Torque	Size	Torque
Hexagonal wrench width	8 HP	4 mm	5 – 7 N·m {50 – 70 kgf·cm}	5 mm	5 – 7 N·m {50 – 70 kgf·cm}
	10 HP	4 mm	5 – 7 N·m {50 – 70 kgf·cm}	5 mm	5 – 7 N·m {50 – 70 kgf·cm}

2. System Design

Example:



- Example of each tubing length

Main tubing	Distribution joint tubing	
LA = 40 m	Indoor side	
LB = 5 m	ℓ 1 = 5 m	ℓ 4 = 6 m
LC = 5 m	ℓ 2 = 5 m	ℓ 5 = 5 m
LD = 15 m	ℓ 3 = 2 m	

- Obtain charge amount for each tubing size

  Note that the charge amounts per 1 meter are different for each liquid tubing size.

ø9.52 → LA + LB + LC + LD : 65 m × 0.050 kg/m = 3.25 kg
ø6.35 → ℓ1+ ℓ2+ ℓ3+ ℓ4+ ℓ5 : 23 m × 0.023 kg/m = 0.529 kg

Total 3.779 kg

Additional refrigerant charge amount is 3.779 kg.

CAUTION

Be sure to check the limit density for the room in which the indoor unit is installed. See "1-8. Check of Density Limit" .

2. System Design

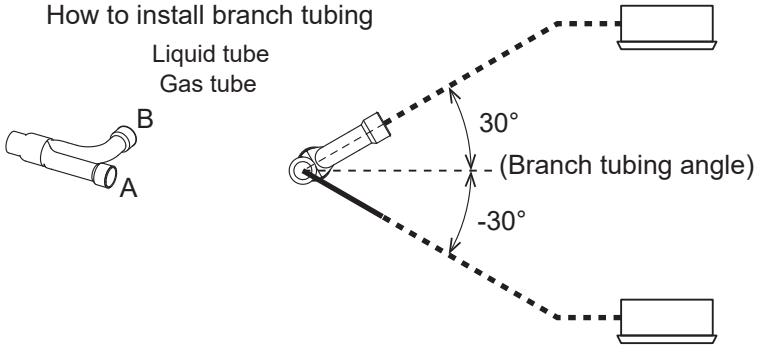
2-3. Installing Distribution Joint

(1) See “How to Attach Distribution Joint” on page 2-7-1 to 2-7-2.

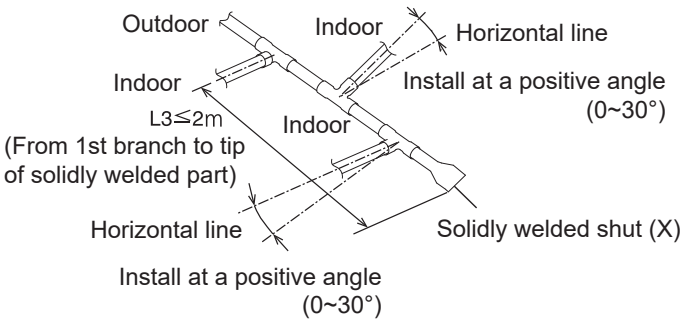
Outdoor Unit Type LZ2 must keep specified angle for each branch tube as shown in the figure.
It takes precedence over the pages 2-7-1 to 2-7-2

Branch tubing system — Restricted - - - - Not restricted

How to install branch tubing



Header branch system (Main tubing is horizontal.)



- Be sure to solidly weld shut the T-joint end (marked by X in the figure). In addition, pay attention to the insertion depth of each connected tube so that the flow of refrigerant within the T-joint is not impeded.

  Be sure to use a commercial available T-joint.
- When using the header joint system, do not make further branches in the tubing.

3. Electrical Wiring

3-1. General Precautions on Wiring

(1) Before wiring, confirm the rated voltage of the unit as shown on its nameplate, then carry out the wiring closely following the wiring diagram under Section 3-3.

⚠ WARNING

(2) This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case of equipment breakdown or insulation breakdown.
The ELCB must be incorporated in the fixed wiring in accordance with the wiring regulations. The ELCB must be an approved circuit capacity, having a contact separation in all poles.
The ELCB or RCD suitable for use with inverters, resistant to high frequency noise, is most suitable.
TheELCB's or RCD's intended for protection to include high frequency currents are unnecessary and should be avoided, as potentially causing nuisance tripping, in this application.

(3) To prevent possible hazards from insulation failure, the unit must be grounded.

(4) Each wiring connection must be done in accordance with the wiring system diagram. Wrong wiring may cause the unit to misoperate or become damaged.

(5) Do not allow wiring to touch the refrigerant tubing, compressor, or any moving parts of the fan.

(6) Unauthorized changes in the internal wiring can be very dangerous. The manufacturer will accept no responsibility for any damage or misoperation that occurs as a result of such unauthorized changes.

(7) Regulations on wire diameters differ from locality to locality. For field wiring rules, please refer to your LOCAL ELECTRICAL CODES before beginning.
You must ensure that installation complies with all relevant rules and regulations.

(8) To prevent malfunction of the air conditioner caused by electrical noise, care must be taken when wiring as follows:

- The remote control wiring and the inter-unit control wiring should be wired apart from the inter-unit power wiring.
- Use shielded wires for inter-unit control wiring between units and ground the shield on both sides.

(9) If the power supply cord of this appliance is damaged, it must be replaced by a repair shop appointed by the manufacturer, because special purpose tools are required.

(10) Using a waterproof conduit is recommended for outdoor unit wiring to avoid damaging the wire and to prevent accumulation of liquid inside the unit.

(11) Protect the outdoor unit wiring with a conduit material or supplied protection bushing to avoid damages by the edges of knockout hole. If any openings occur between the protection bushing and wiring, seal the opening entirely.

(12) Check that the insulation resistant value is more than 1MΩ. Use the 500 V mega-testers to measure the insulation. Check point : between power supply terminal block (L1, L2, L3, or L, N) to earth. Do not use the mega-tester for any other circuit except for voltage of 220-230-240V~ or 380-400-415V 3N~.

3. Electrical Wiring

3-2. Wire Length and Wire Diameter for Power Supply System

Outdoor unit

	(A) Power supply cable		Time delay fuse or circuit capacity
	Min. wire size	**Max. length**	
8 HP	2.5 mm² *1	36 m *2	25 A
10 HP	2.5 mm² *1	25 m *2	30 A

or

	(A) Power supply cable		Time delay fuse or circuit capacity
	Wire size	**Max. length**	
8 HP	4 mm² *1	57 m *2	25 A
10 HP	4 mm² *1	40 m *2	35 A

Indoor unit

Type	(B) Power supply cable	Time delay fuse or circuit capacity
U2, Y3, K2, M1, F3	Refer to the TECHNICAL DATA of the indoor unit.	

Control wiring

(C) Inter-unit (between outdoor and indoor units) control wiring		
0.75 mm² **Use shielded wiring*3**	or	2.0 mm² **Use shielded wiring*3**
Max. 1,000 m		Max. 2,000 m

(D) Remote control wiring
0.75 mm²
Max. 500 m

(E) Remote control wiring for group control
0.75 mm²
Max. 200 m (Total)

NOTE

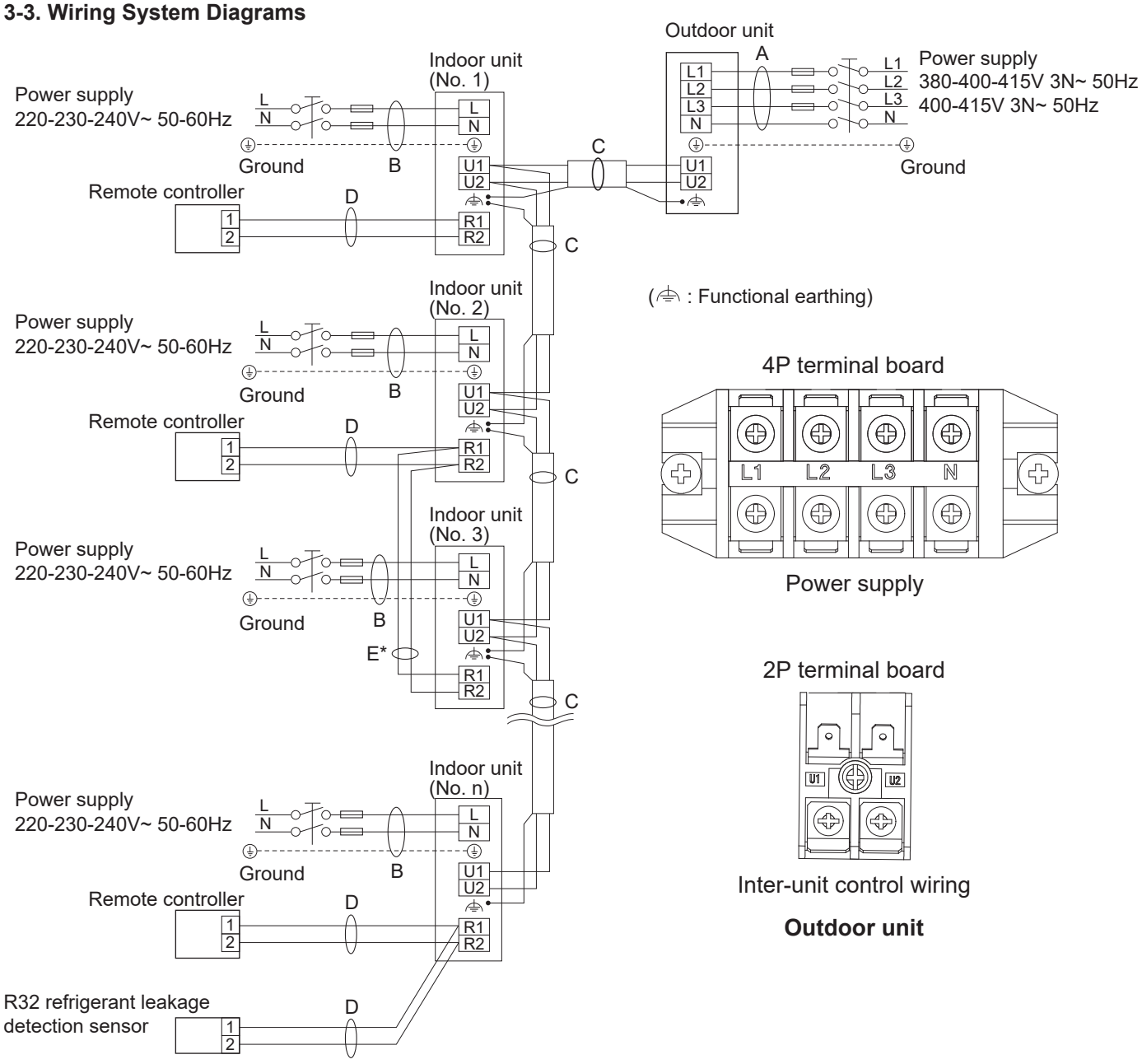
*1 Maximum applicable wire for terminal board of outdoor unit : 8 mm²

*2 Maximum length shows a 2% voltage drop.

*3 With ring-type wire terminal

3. Electrical Wiring

3-3. Wiring System Diagrams



NOTE

(1) See “3-2 Wire Length and Wire Diameter for Power Supply System” for the explanation of “A”, “B”, “C”, “D” and “E” in the above diagram.

(2) The basic connection diagram of the indoor unit shows the 6P terminal board, so the terminal boards in your equipment may differ from the diagram.

(3) Refrigerant Circuit address should be set before turning the power on.

(4) Regarding the Refrigerant Circuit address setting, it can be executed by remote controller automatically. See Section 5 “4. Auto Address Setting”.

(5) In the case of connecting R32 refrigerant leakage detection sensor :

- Be sure to make wirings through the ceiling or the walls so that the wires of R32 refrigerant leakage detection sensor cannot be visible from inside the room.
- A single R32 refrigerant leakage detection sensor cannot be connected to multiple indoor units.

* Group connection “E” with a remote controller is not possible. Be sure to connect a remote controller to each indoor unit.

3. Electrical Wiring

CAUTION

(1) When linking outdoor units in a network, see the section "ATTENTION!".

ATTENTION!

Adjustment of terminating resistance (pin) is necessary.

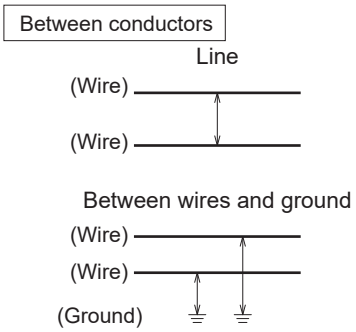
Communication failure will occur unless adjustment is made correctly.

- Terminating resistance (pin) is mounted on outdoor unit control PCB.
- When connecting central controller, interface or peripheral equipment, adjustment of terminating resistance (pin) is necessary. Although the connection is not made, confirmation is necessary for VRF systems.
- In the case of a refrigerant system, the terminating resistance (pin) for this inter-unit control wiring (S-LINK wiring) is one location (See the section 5 "4. Auto Address Setting").
  For 2 or more refrigerant systems, 2 locations should be valid ("SHORT" for VRF systems at shipment). See the section 5 "4. Auto Address Setting".
  In order to make 2 locations valid, let the terminating resistance (pin) of the nearest outdoor unit and the farthest outdoor unit be valid (SHORT side) from the location of central controller.
  In other refrigerant systems excepting 2 locations described above, make them invalid (OPEN side).
  It is prohibited making more than 3 locations of terminating resistance valid.
- Since the use of linking the sub outdoor units of VRF systems is not connected to the inter-unit control wiring, it is not necessary to make the terminating resistance invalid "OPEN side".

Make final confirmation regarding the central controller or interface & inter-unit control wiring (S-LINK wiring) connected to the peripheral equipment.
Measure the line resistance with a tester and check whether the values are in the range of 30Ω - 120Ω.

If the resistance values are out of range, check again the terminating resistance.
Nevertheless, if the values are out of range, the problem comes from wiring.

- Is the connection properly made?
- Are there any scratches or damages on the coated surface?
- Measure the line, between wires and ground with the 500V mega-tester (insulation resistance meter) and check the values are over 100MΩ.
- When measuring, be sure to remove both edges of the wire from the terminal board. If not removed, it will be damaged.
- If the line resistance is within 100MΩ, newly carry out the wiring work.



(2) Do not install the inter-unit control wiring in a way that forms a loop.

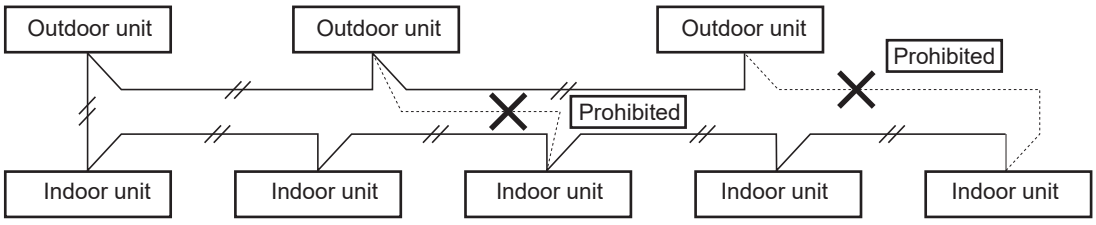


Fig. 2-3-1

3. Electrical Wiring

(3) Do not install the inter-unit control wiring such as star branch wiring. Star branch wiring causes mis-address setting.

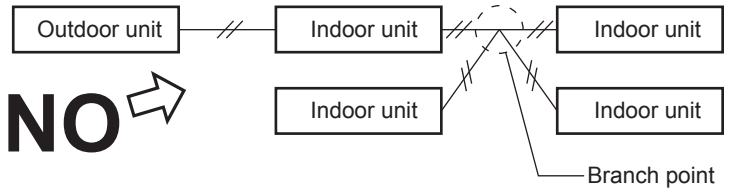


Fig.2-3-2

(4) If branching the inter-unit control wiring, the number of branch points should be 16 or fewer.

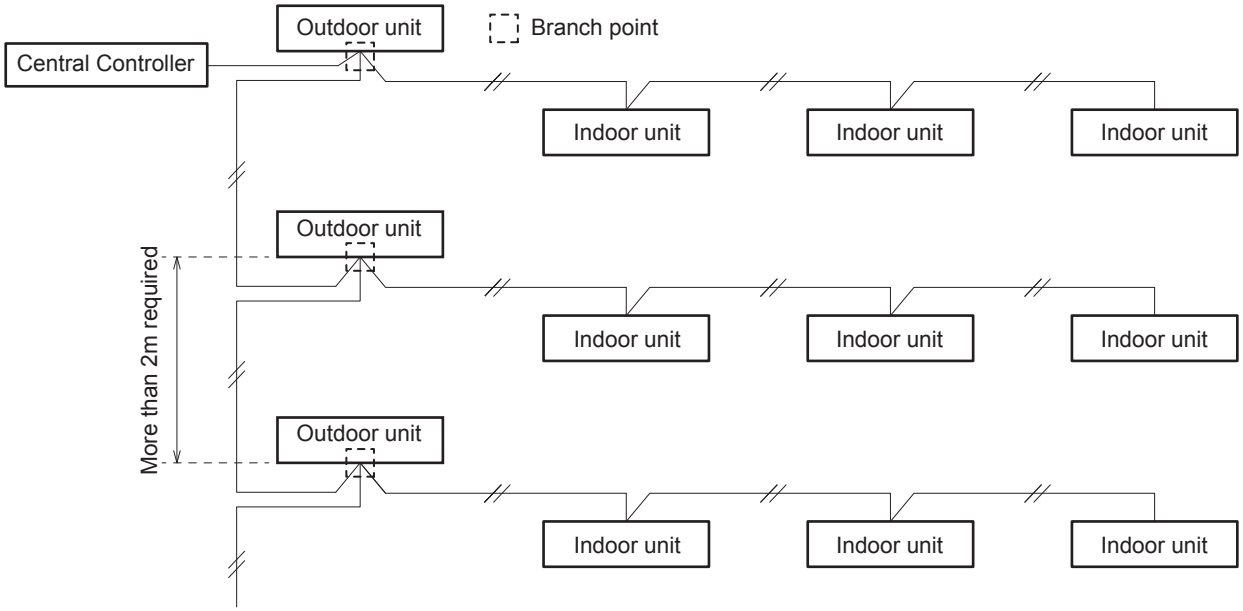
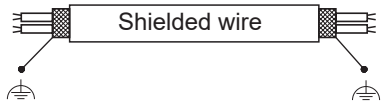


Fig.2-3-3

2

3. Electrical Wiring

(5) Use shielded wires for inter-unit control wiring (C) and ground the shield on both sides, otherwise misoperation from noise may occur.
Connect wiring as shown in the section "3-3 Wiring System Diagrams".



(6) Use the standard power supply cables for Europe (such as H05RN-F or H07RN-F which conform to CENELEC (HAR) rating specifications) or use the cables based on IEC standard. (60245 IEC57, 60245 IEC66)

WARNING

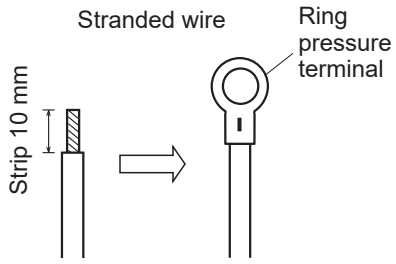
Loose wiring may cause the terminal to overheat or result in unit malfunction. A fire hazard may also occur. Therefore, ensure that all wiring is tightly connected.

When connecting each power wire to the terminal, follow the instructions on "How to connect wiring to the terminal" and fasten the wire securely with the terminal screw.

How to connect wiring to the terminal

■ For stranded wiring

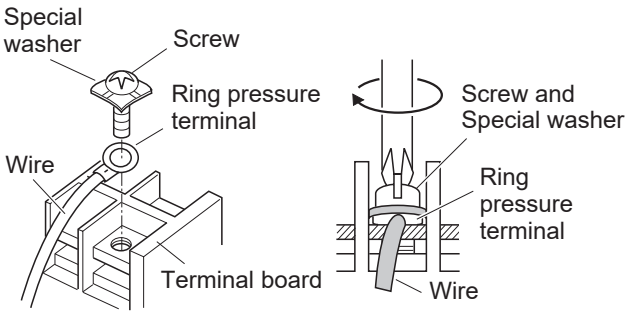
(1) Cut the wire end with cutting pliers, then strip the insulation to expose the stranded wiring about 10 mm and tightly twist the wire ends. Then attach the ring pressure terminal.



(2) Using a Phillips head screwdriver, remove the terminal screw(s) on the terminal board.

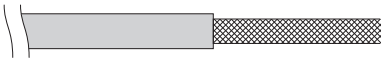
(3) Using a ring connector fastener or pliers, securely clamp each stripped wire end with a ring pressure terminal.

(4) Place the ring pressure terminal, and replace and tighten the removed terminal screw using a screwdriver.

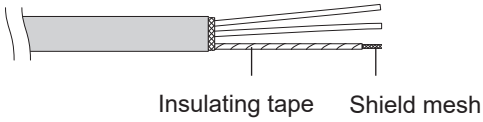


■ Examples of shield wires

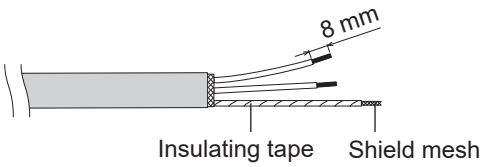
(1) Remove cable coat not to scratch braided shield.



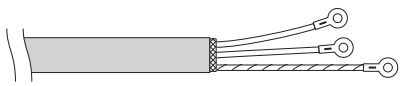
(2) Unbraid the braided shield carefully and twist the unbraided shield wires tightly together. Insulate the shield wires by covering them with an insulation tube or wrapping insulating tape around them.



(3) Remove coat of signal wire.

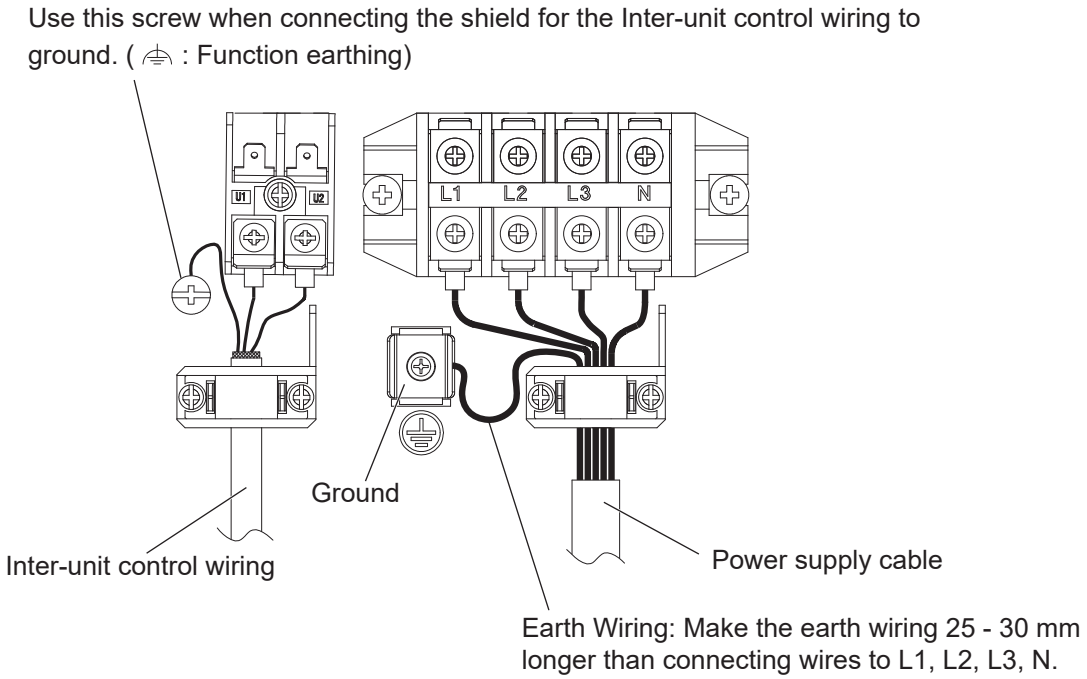


(4) Attach ring pressure terminals to the signal wires and the shield wires insulated in Step (2).



3. Electrical Wiring

■ Wiring sample



Torque value of power supply terminal board:
2.0 N·m ± 0.05 N·m {20 kgf·cm ± 0.5 kgf·cm}

Torque value of Inter-unit control wiring terminal board:
1.3 N·m ± 0.1 N·m {13 kgf·cm ± 1 kgf·cm}

ATTENTION:
Comply with the torque values.
If tightening over torque values, the screw will be damaged.

ATTENTION:
Apply an adjustable wrench to the valve vertically not to damage the outdoor unit control PCB.

3. Electrical Wiring

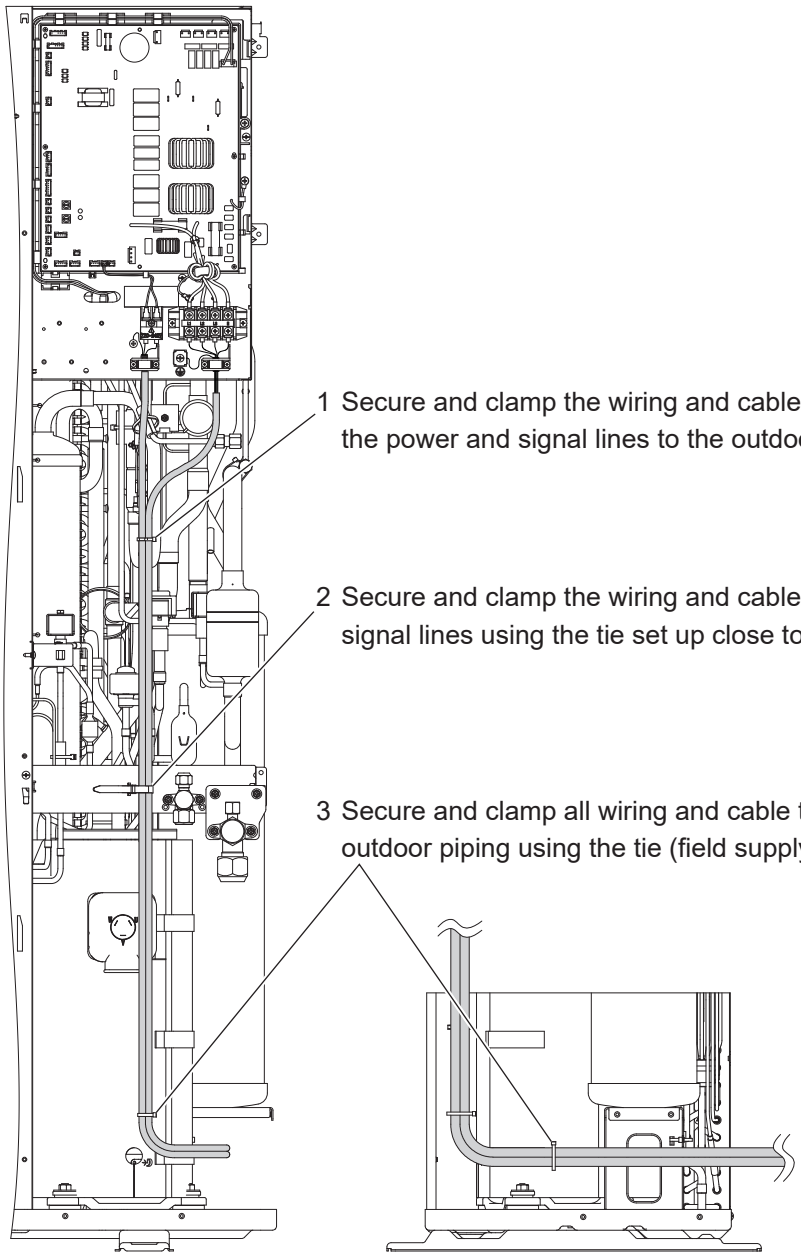
■ Wiring procedure

Follow the wiring procedure below for terminal connection.

(1) Set the wiring and cables for the power and signal lines to the outdoor unit together, and secure each wire and cable with the tie.

(2) Secure and clamp the power and signal lines with the tie, set up close to the valve.

(3) Set up the wiring and cable for the outdoor unit piping and secure with a tie.



1 Secure and clamp the wiring and cable with the tie (field supply) for the power and signal lines to the outdoor unit.

2 Secure and clamp the wiring and cable together with power and signal lines using the tie set up close to the valve.

3 Secure and clamp all wiring and cable together with the indoor/ outdoor piping using the tie (field supply).

■ In order to respond to Demand Response Management (DRM)

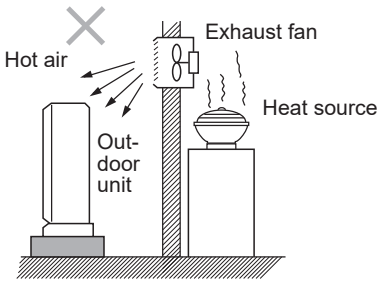
It is necessary to install the Demand terminal kit (CZ-CAPDC3), particularly in the regions of Oceania.

4. Installation Instructions

4-1. Selecting the Installation Site for Outdoor Unit

AVOID:

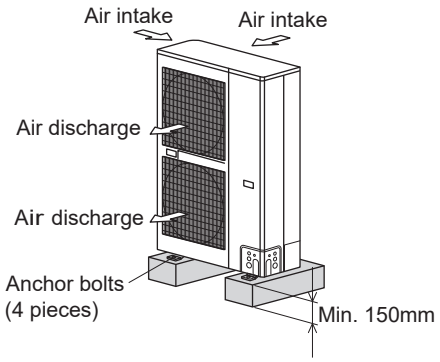
- heat sources, exhaust fans, etc.



- damp, humid or uneven locations
- indoors (no-ventilation location)

DO:

- choose a place as cool as possible.
- choose a place that is well ventilated and outside air temperature does not exceed maximum 52°C constantly.
- allow enough room around the unit for air intake/ exhaust and possible maintenance. For the details, see the following installation examples (1) to (10).
- provide a solid base (concrete block, 100 × 400 mm beams or equal), a minimum of 150 mm above ground level to reduce humidity and protect the unit against possible water damage and decreased service life.



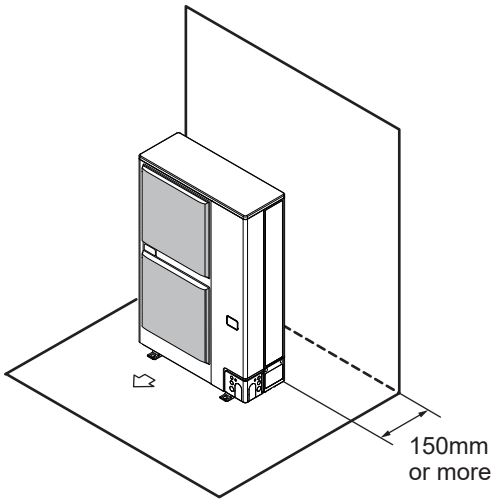
- use lug bolts or equal to bolt down unit, reducing vibration and noise.

Installation space for outdoor unit

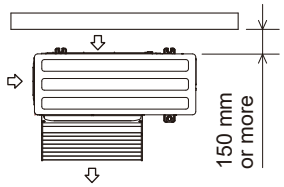
Install the outdoor unit at a place where there is enough space for ventilation. Otherwise the unit may not operate properly. Required space for installation shows in the descriptions (1) to (10). For other installation examples, refer to the Technical Data.
It is possible to reduce the space between the air discharge outlet and an obstacle by installing the field supplied air-discharge chamber for top discharge. See the note in the figure. When installing the air-discharge chamber for top discharge, keep the unit above free from obstruction.

■ Single-Unit Installation

(1) Obstacle on the rear side
(Front side, left side, right side and above the unit are opened.)

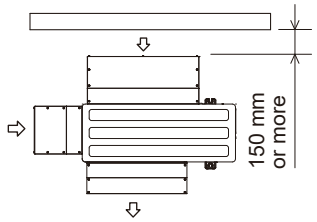


When installing air-discharge chamber



The distance between the outdoor unit and an obstacle as shown in the above installation example must be measured from the outside surface of the outdoor unit and then the open space should be provided.

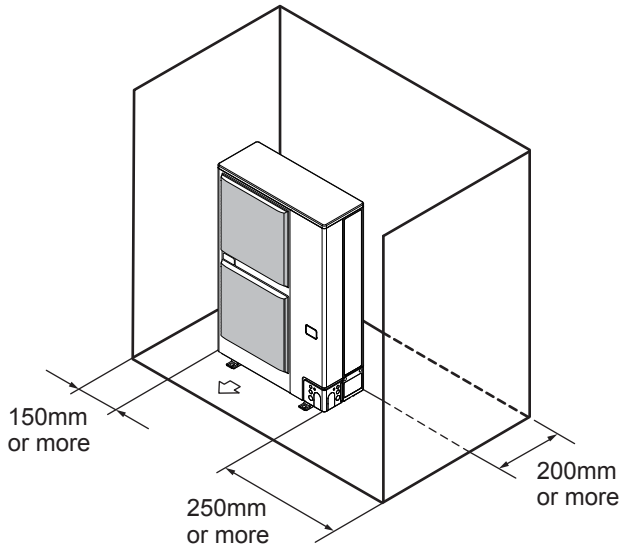
When installing snow-proof vents



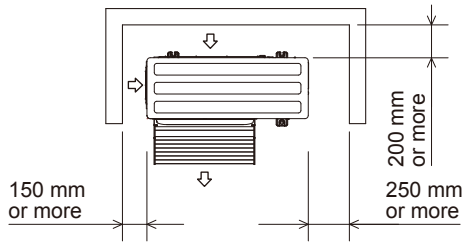
The distance between the outdoor unit and an obstacle as shown in the above installation example must be measured from the additional external surface of the snow-proof ducts facing the air intake side of the outdoor unit and then the open space should be provided.

4. Installation Instructions

(2) Obstacle on the left side, right side and rear side (Front side and above the unit are opened.)

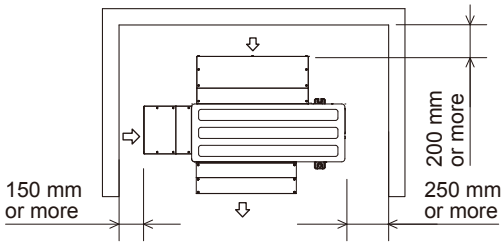


When installing air-discharge chamber



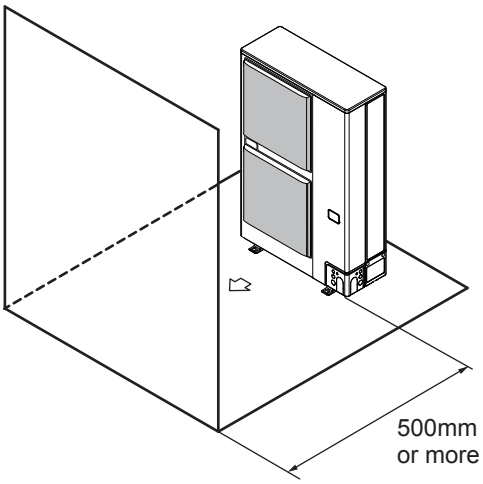
The distance between the outdoor unit and obstacles as shown in the above installation example must be measured from the outside surface of the outdoor unit and then the open space should be provided.

When installing snow-proof vents

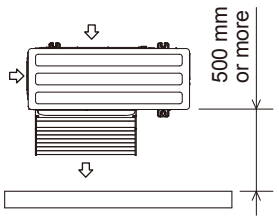


The distance between the outdoor unit and obstacles as shown in the above installation example must be measured from the additional external surface of the snow-proof duct facing the air intake side and be measured from the outside surface facing the air discharge side of the outdoor unit and then the open space should be provided.

(3) Obstacle on the front side (Rear side, left side, right side and above the unit are opened.)

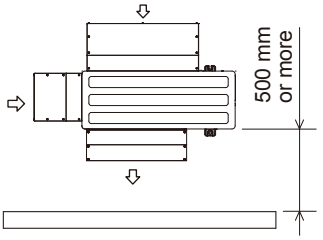


When installing air-discharge chamber



The distance between the outdoor unit and an obstacle as shown in the above installation example (equal to sections (4) to (16), excepting (5), (6), (8) and (11)) must also be measured from the outside surface of the outdoor unit and then the open space should be provided.

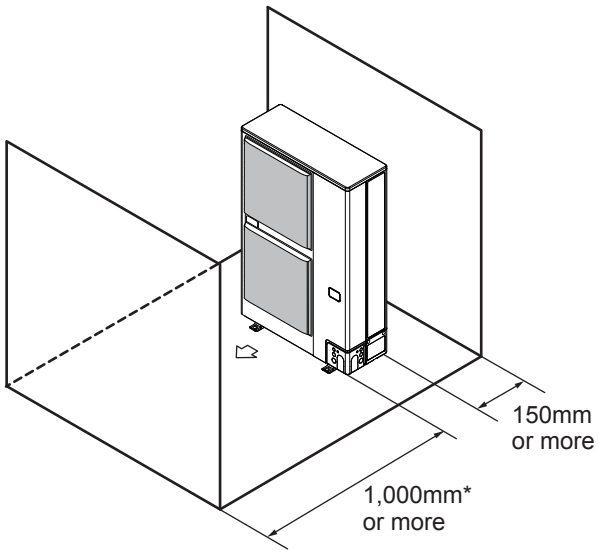
When installing snow-proof vents



The distance between the outdoor unit and an obstacle as shown in the above installation example (equal to the section (4) to (16)) must also be measured from the external surface of the snow-proof duct facing the air intake side and be measured from the outside surface facing the air discharge side of the outdoor unit and then the open space should be provided.

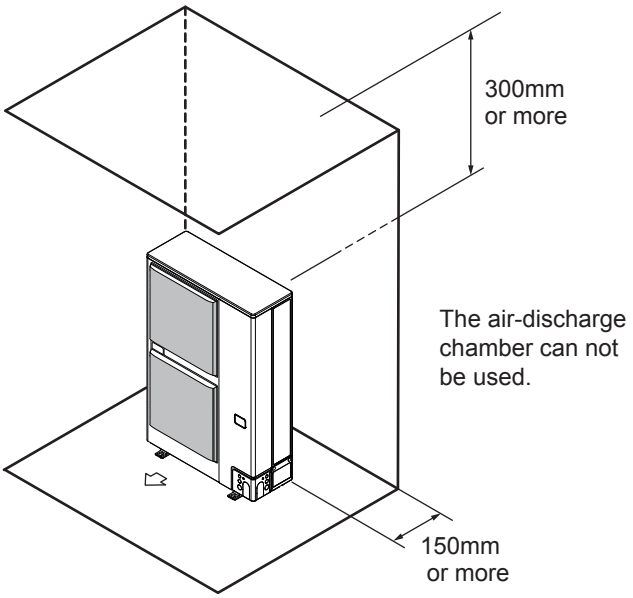
4. Installation Instructions

(4) Obstacle on the front side and rear side
(Left side, right side and above the unit are opened.)



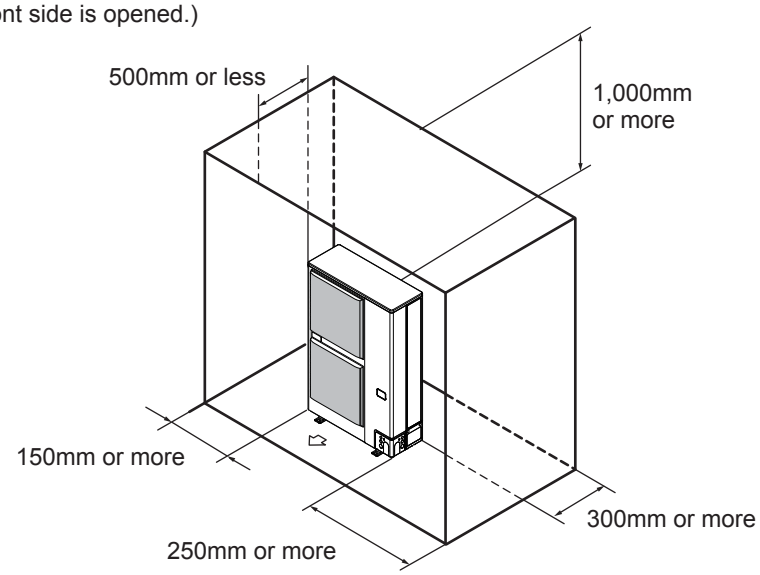
*When using the air-discharge chamber
: 500mm or more

(5) Obstacle on the rear side and top side
(Front side, left side and right side are opened.)



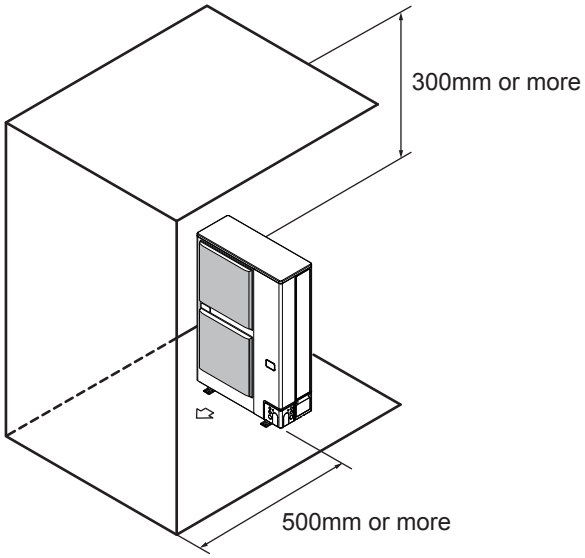
4. Installation Instructions

(6) Obstacle on the rear side, left side, right side and top side
(Front side is opened.)

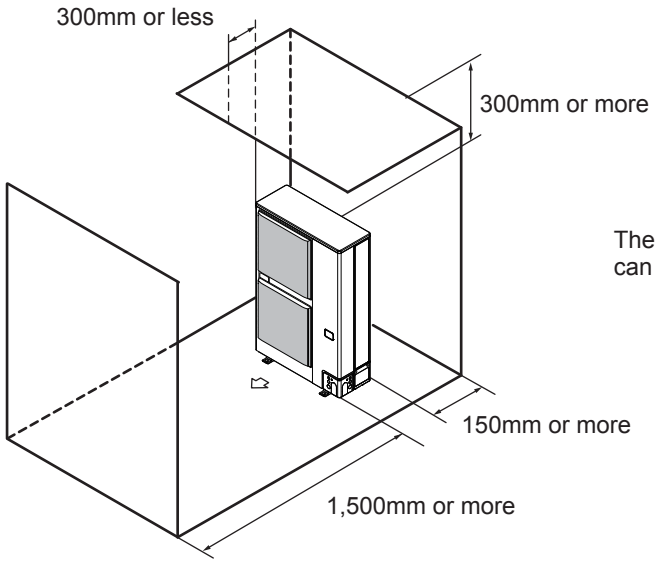


The air-discharge chamber can not be used.

(7) Obstacle on the front side and top side
(Rear side, left side and right side are opened.)



(8) Obstacle on the rear side, front side and top side
(Left side and right side are opened.)



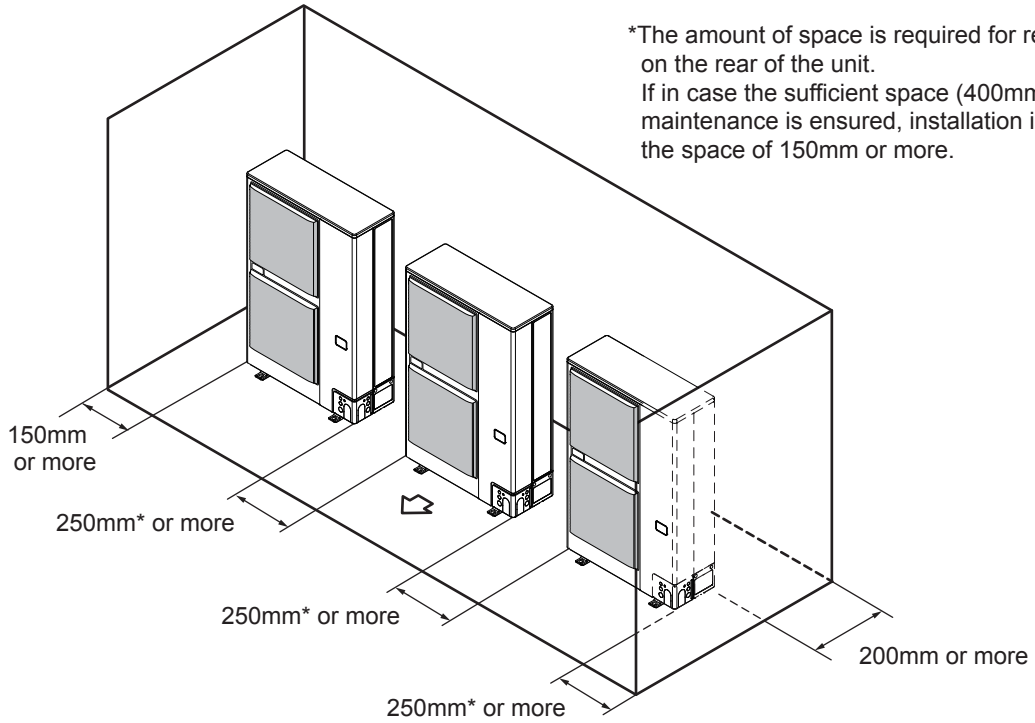
The air-discharge chamber can not be used.

4. Installation Instructions

■ Multiple-Unit Installation

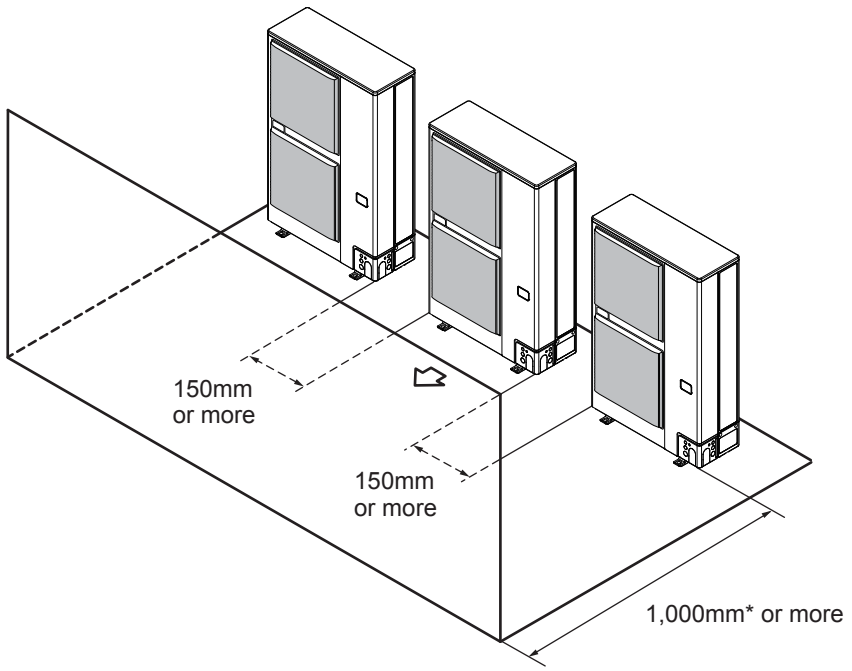
(9) Obstacle on the rear side, left side and right side
(Front side and above the unit are opened.)

- It is recommended that the maintenance space of 500mm or more every 3 units is provided.



*The amount of space is required for removing screws on the rear of the unit.
If in case the sufficient space (400mm or more) for maintenance is ensured, installation is possible with the space of 150mm or more.

(10) Obstacle on the front side
(Rear side, left side, right side and above the unit are opened.)

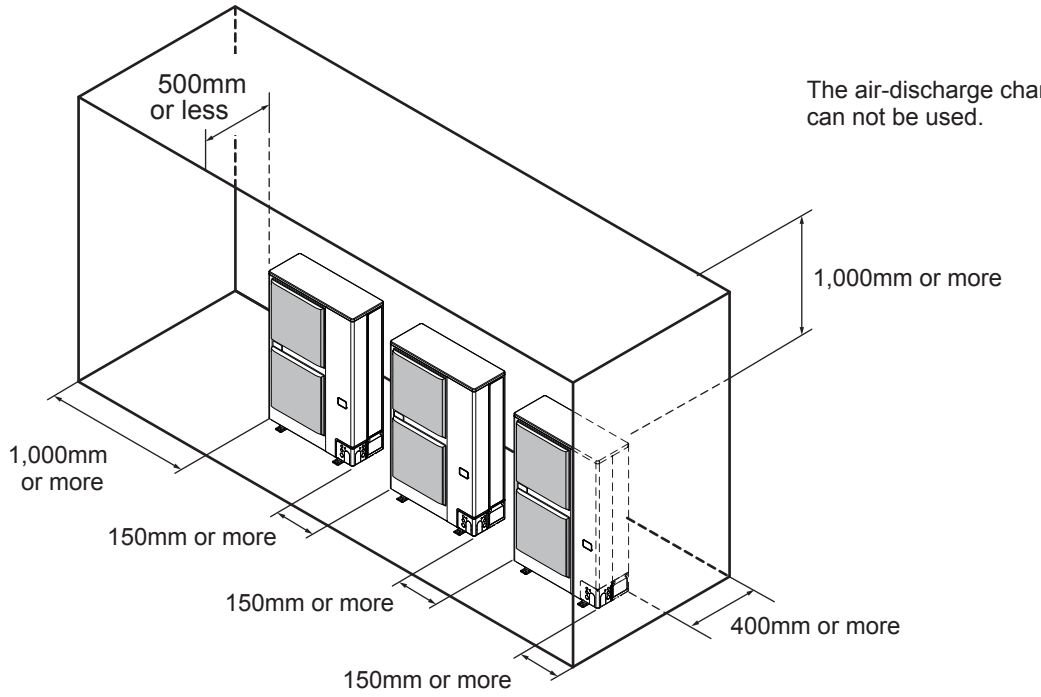


*When using the air-discharge chamber : 500mm or more

4. Installation Instructions

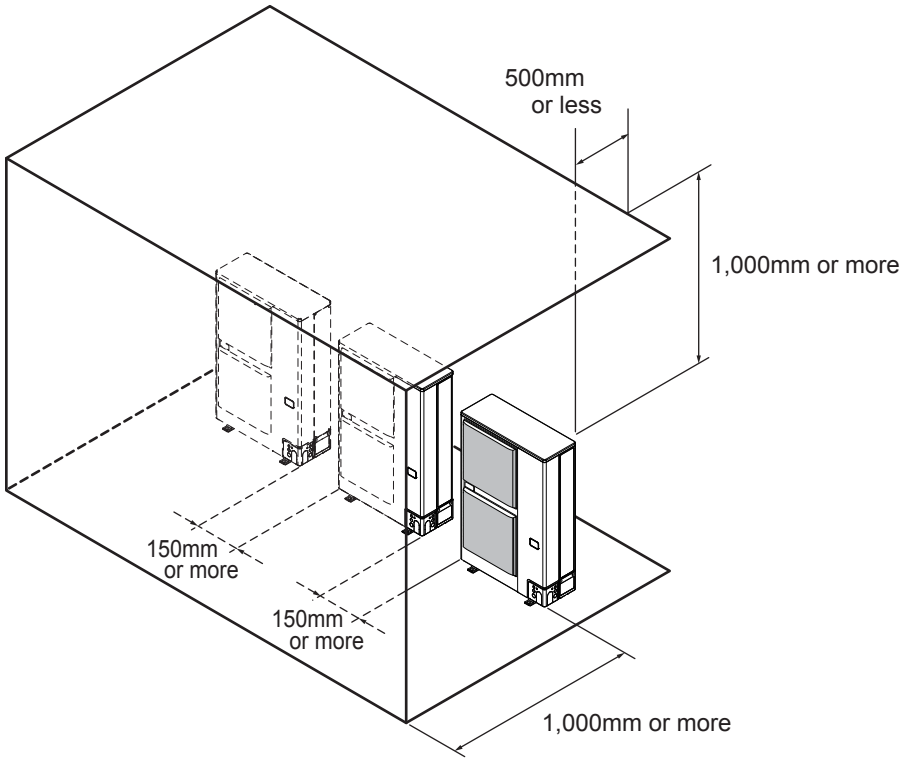
(11) Obstacle on the rear side, left side, right side and top side
(Front side is opened.)

- In the case of continuous installation of over three units, provide 1,500mm or more every three units for the airflow.



(12) Obstacle on the front side and top side
(Rear side, left side and right side are opened.)

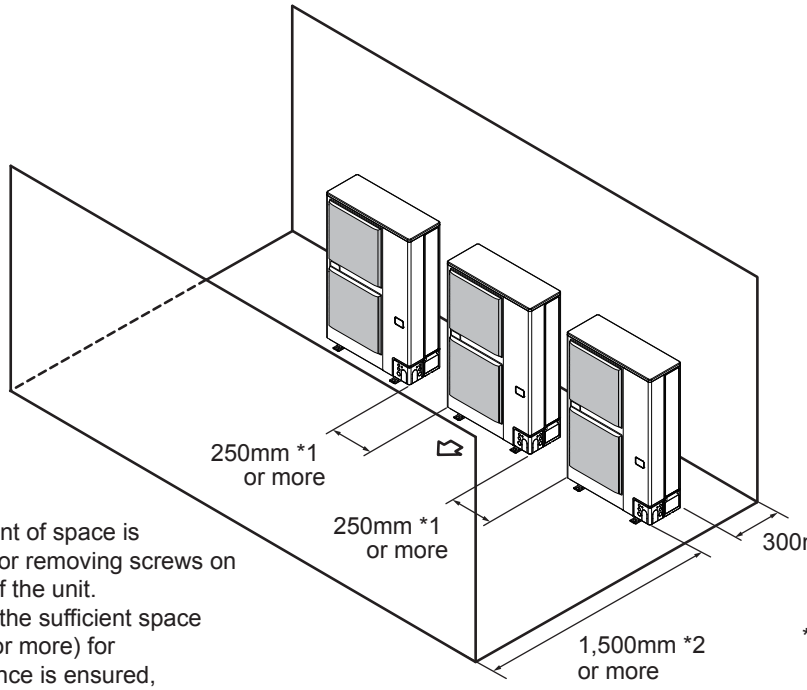
- It is recommended that the maintenance space of 500mm or more every 3 units is provided.



4. Installation Instructions

(13) Obstacle on the rear side and front side
(Left and right sides and above the unit are opened.)

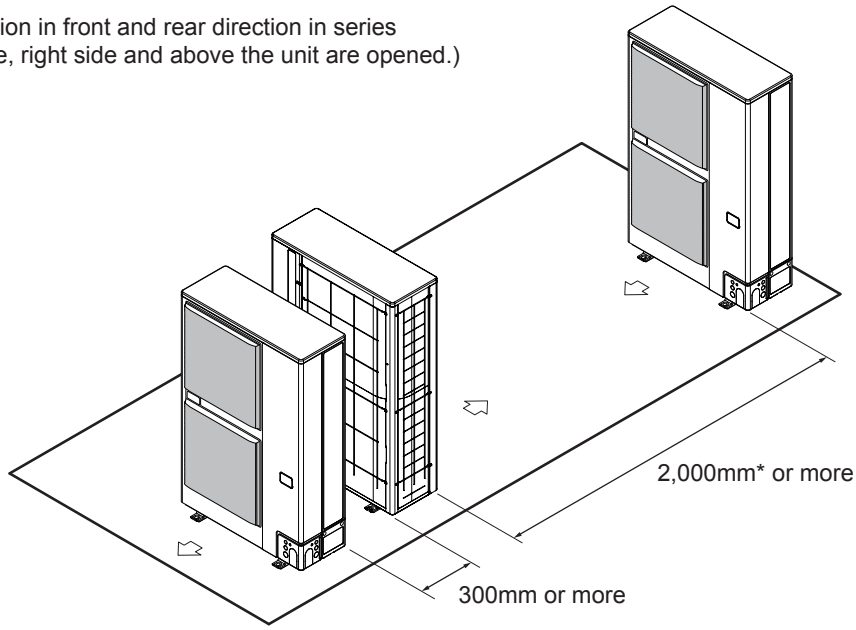
- It is recommended that the maintenance space of 500mm or more every 3 units is provided.
- Either of the obstacles must be no taller than 2m.



*1 The amount of space is required for removing screws on the rear of the unit.
If in case the sufficient space (400mm or more) for maintenance is ensured, installation is possible with the space of 150mm or more.

*2 When using the air-discharge chamber : 1,000mm or more

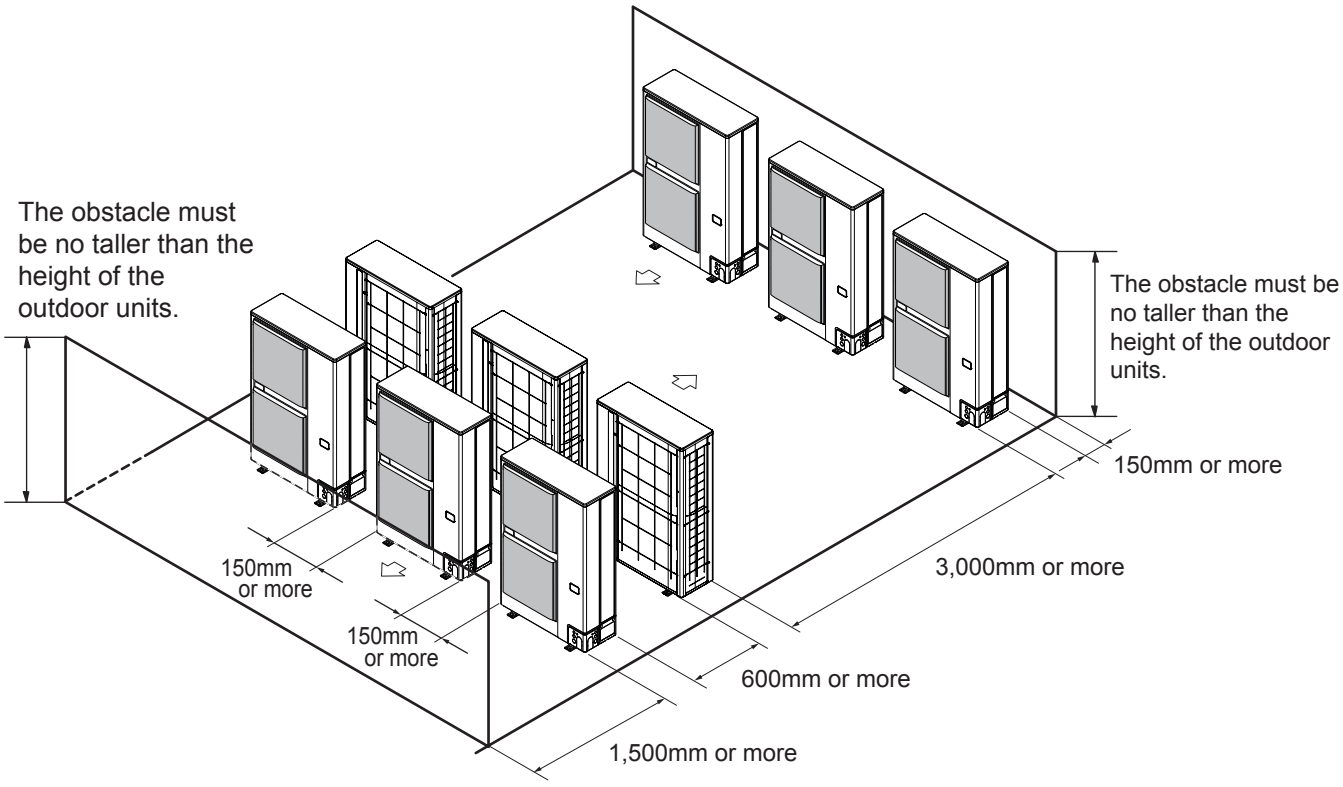
(14) Installation in front and rear direction in series
(Left side, right side and above the unit are opened.)



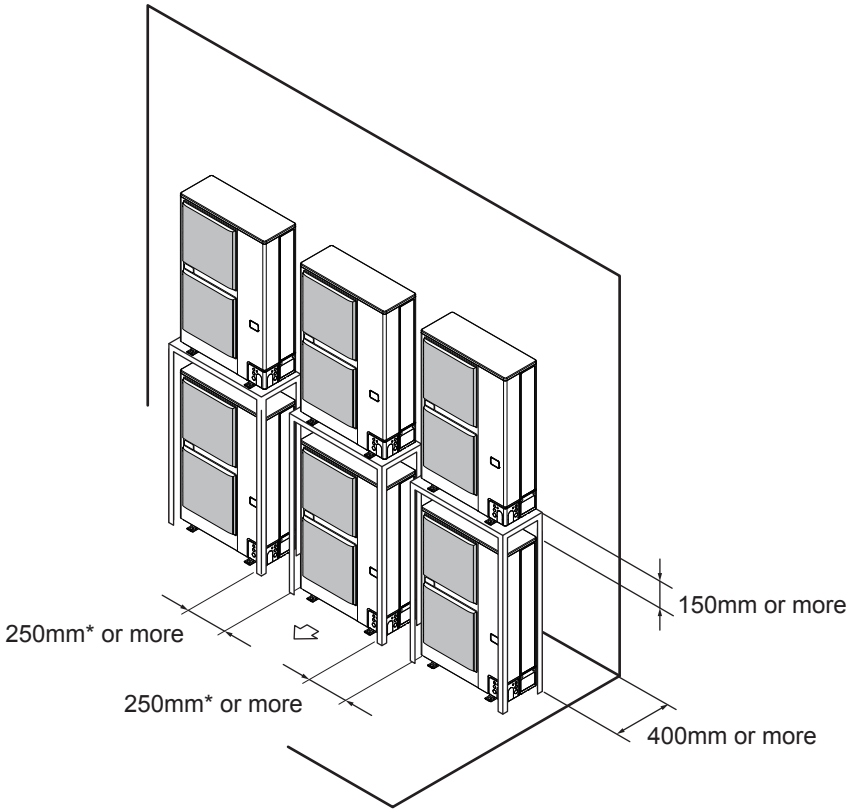
* When using the air-discharge chamber : 1,000mm or more

4. Installation Instructions

(15) Installation in multiple rows in series
(Left side, right side and above the unit are opened.)



(16) Installation in double stack
(Front side, left side, right side and above the unit are opened.)

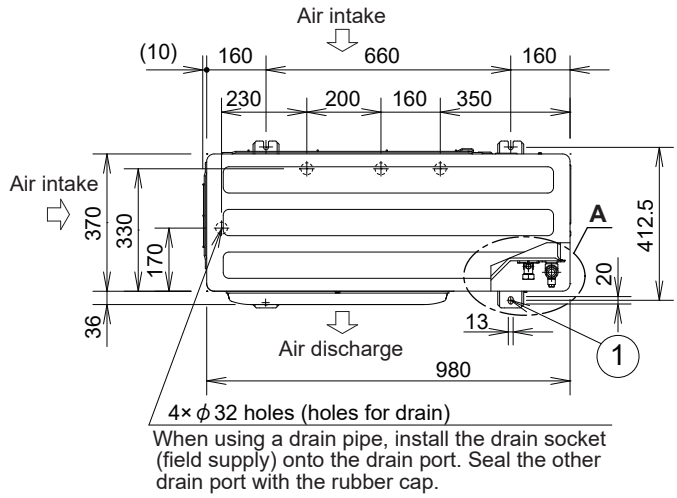


*The amount of space is required for emoving screws on the rear of the unit.
If in case the sufficient space (700mm or more) for maintenance is ensured, installation is possible with the pace of 150mm or more.

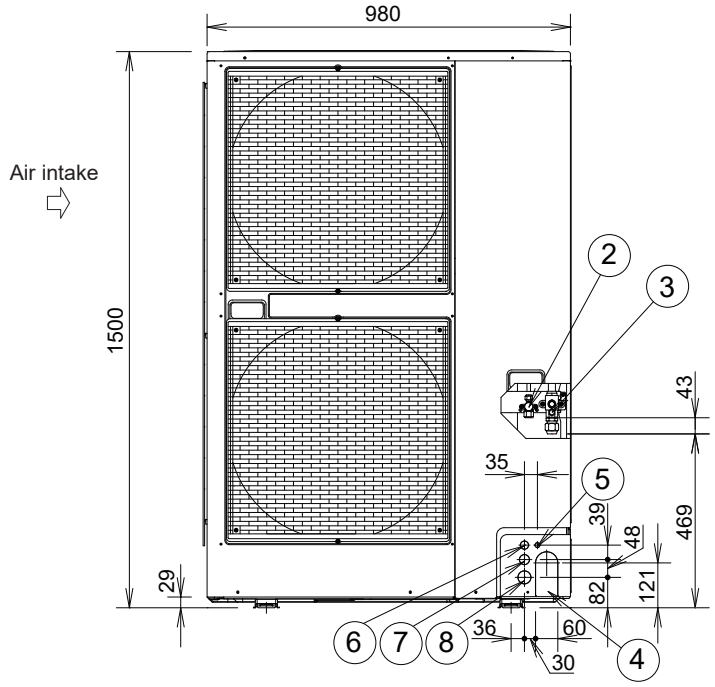
4. Installation Instructions

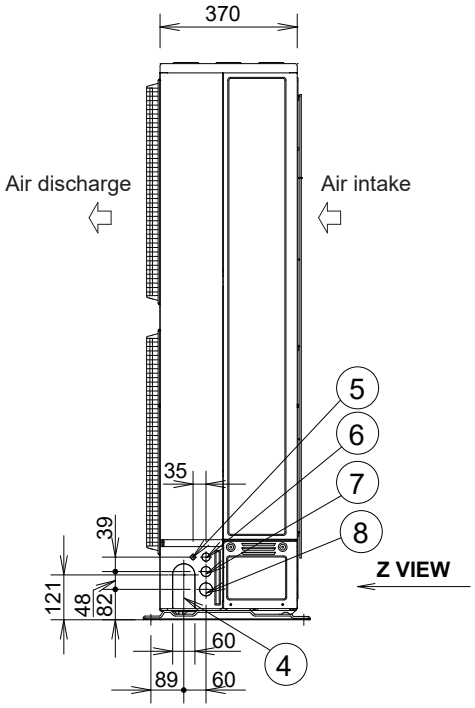
U-8LZ2E8

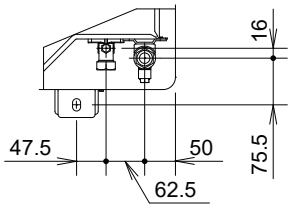
Unit: mm



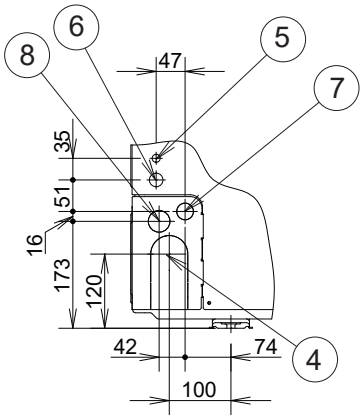
①	Mounting hole (4-R6.5), anchor bolt : M10
②	Refrigerant tubing (liquid tube), flared connection (ø9.52)
③	Refrigerant tubing (gas tube), flared connection (ø19.05)
④	Refrigerant tubing port
⑤	Electrical wiring port (ø13)
⑥	Electrical wiring port (ø22)
⑦	Electrical wiring port (ø27)
⑧	Electrical wiring port (ø35)







A VIEW

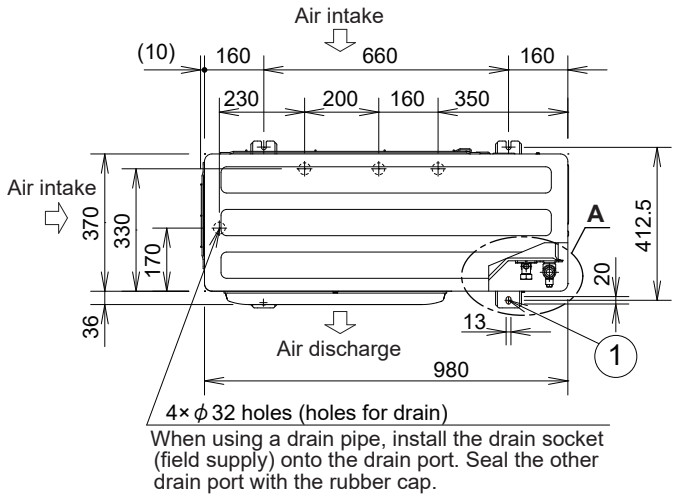


Z VIEW

4. Installation Instructions

U-10LZ2E8

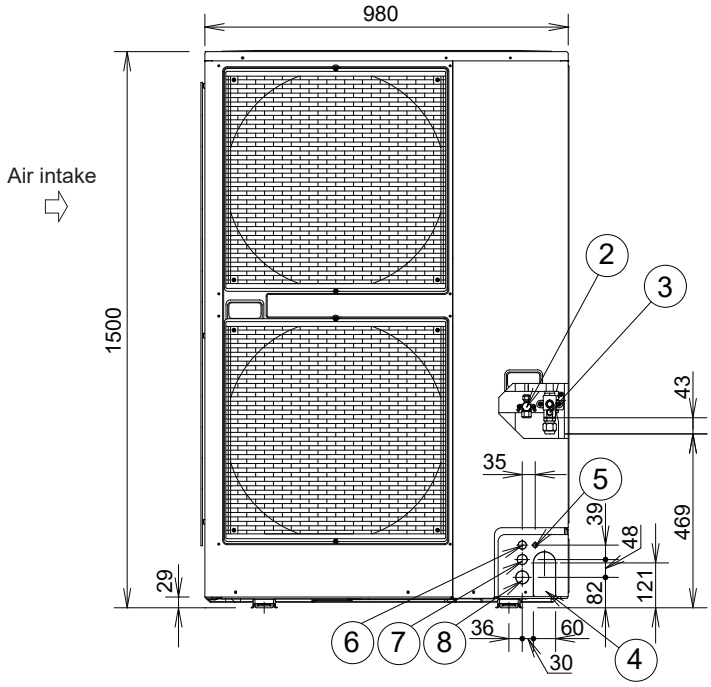
Unit: mm

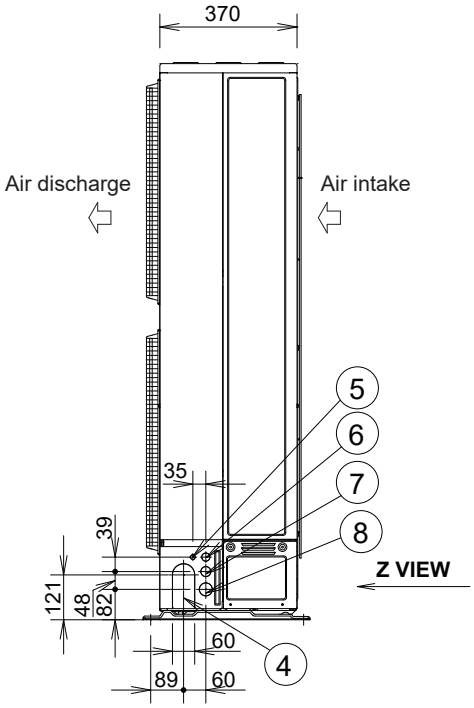


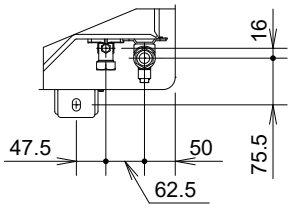
When using a drain pipe, install the drain socket (field supply) onto the drain port. Seal the other drain port with the rubber cap.

①	Mounting hole (4-R6.5), anchor bolt : M10
②	Refrigerant tubing (liquid tube), flared connection (ø9.52)
③	Refrigerant tubing (gas tube), flared connection (ø19.05)
④	Refrigerant tubing port
⑤	Electrical wiring port (ø13)
⑥	Electrical wiring port (ø22)
⑦	Electrical wiring port (ø27)
⑧	Electrical wiring port (ø35)

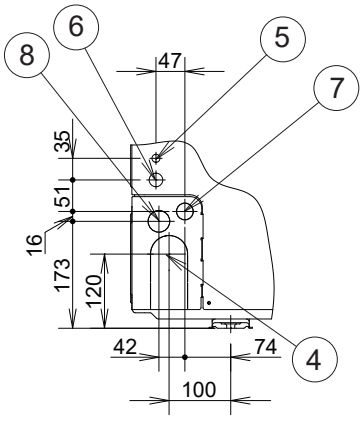
The tubing of the gas main has a diameter of ø22.22, but the connection to the service valve of the outdoor unit has a diameter of ø19.05, so a flare has to be used. Consequently, be sure to use the enclosed joint tube B and joint tube A in making connections (braze).







A VIEW



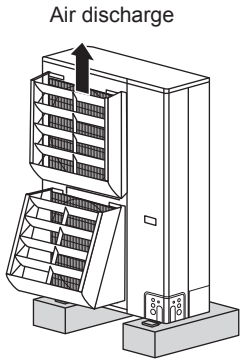
Z VIEW

4. Installation Instructions

4-2. Air-Discharge Chamber for Top Discharge

Be sure to install an air-discharge chamber in the field when:

- it is difficult to keep a sufficient space between the air discharge outlet and an obstacle.
- the air discharge outlet is facing a sidewalk and discharged hot air may annoy passers-by.



In regions with significant snowfall, the outdoor unit should be provided with a platform and snow-proof duct.

4-3. Installing the Outdoor Unit in Heavy Snow Areas

In locations with strong wind, snow-proof ducting should be fitted and direct exposure to the wind should be avoided as much as possible.

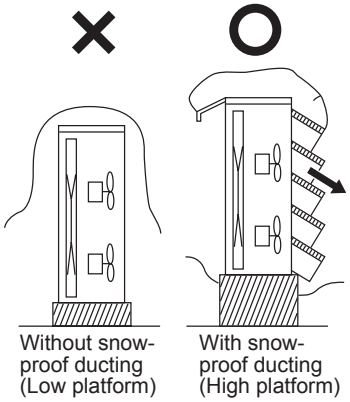
■ Countermeasures against snow and wind

In regions with snow and strong wind, the following problems may occur when the outdoor unit is not provided with a platform and snow-proof ducting:

a) The outdoor fan may not run and damage to the unit may occur.
b) There may be no air flow.
c) The tubing may freeze and burst.
d) The condenser pressure may drop because of strong wind, and the indoor unit may freeze.

4-4. Precautions for Installation in Heavy Snow Areas

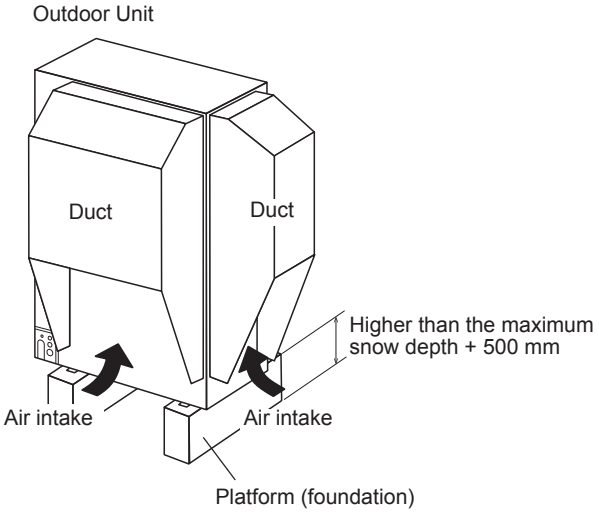
(1) The platform should be higher than the max. snow depth.



(2) The 2 anchoring feet of the outdoor unit should be used for the platform, and the platform should be installed beneath the air intake side of outdoor unit.

(3) The platform foundation must be firm and the unit must be secured with anchor bolts.

(4) In case of installation on a roof subject to strong wind, countermeasures must be taken to prevent the unit from being blown over.

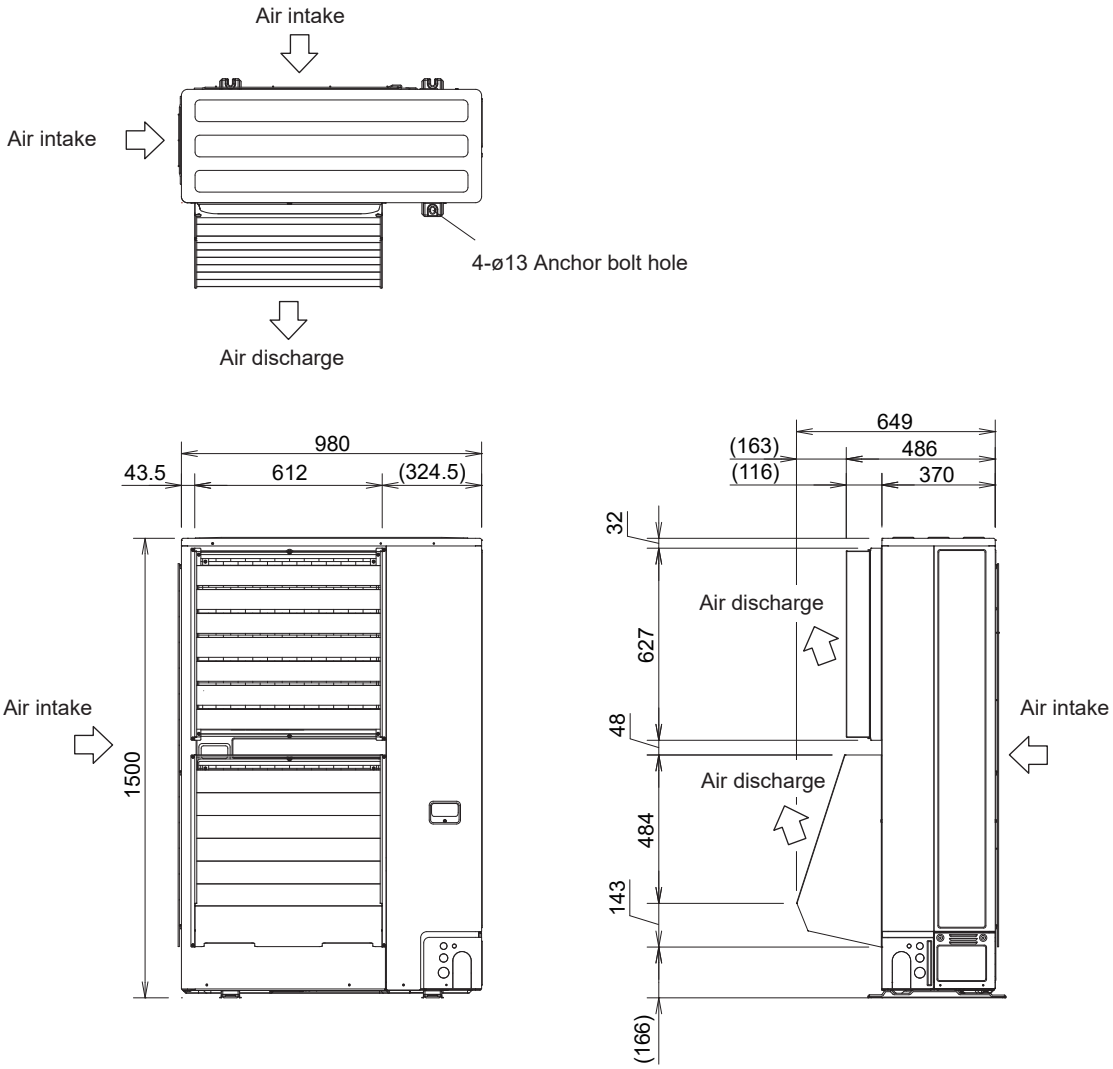


4. Installation Instructions

4-5. Dimensions of Air-Discharge Chamber

Reference diagram for air-discharge chamber (field supply)

Unit: mm

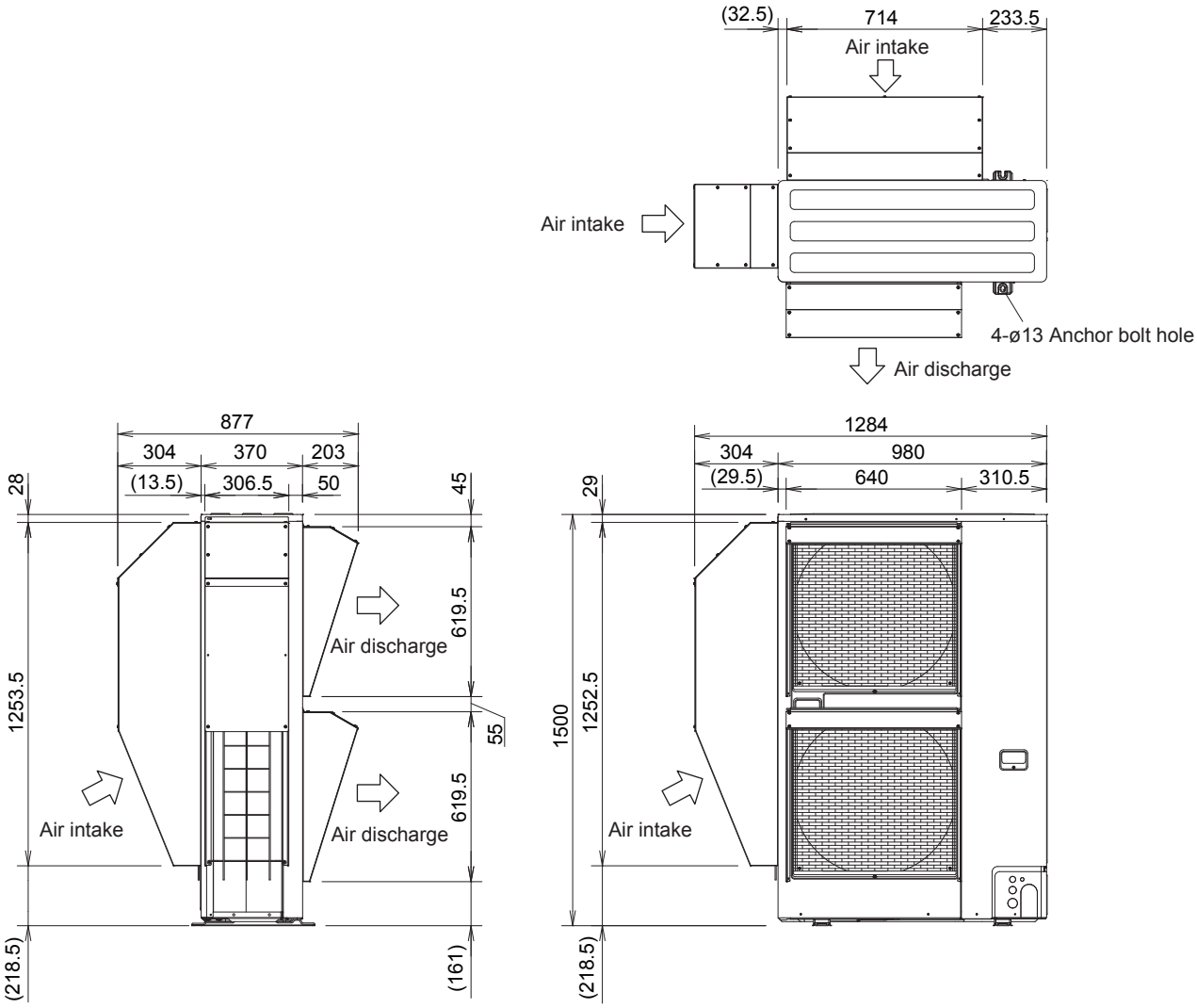


4. Installation Instructions

4-6. Dimensions of Snow-Proof Vents

Reference diagram for snow-proof vents (field supply)

Unit: mm

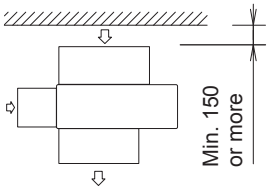


Required space around outdoor unit when using snow-proof vents
[Obstacle to the rear of unit]

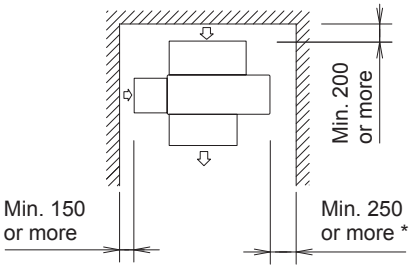
● **Top is open:**

Unit: mm

(1) Single-unit installation



(2) Obstacles on both sides



Note:
The amount of space is required for removing the screw on the rear of the unit. If in case the sufficient space for maintenance is ensured on the rear of the outdoor unit, installation is possible with the space of both sides of not less than 150 mm where marked with * mark.

For other installation examples, see the instructions on pages 2-4-1 to 2-4-8.

4. Installation Instructions

4-7. Installing the Outdoor Unit

- Use concrete or a similar material to create the base, and ensure good drainage.
- Ordinarily, ensure a base height of 5 cm or more. If a drain pipe is used, or for use in cold-weather regions, ensure a height of 15 cm or more at the feet on both sides of the unit. (In this case, leave clearance below the unit for the drain pipe, and to prevent freezing of drainage water in cold-weather regions.)
- See Fig. 2-4-1 for the anchor bolt dimensions.
- Be sure to anchor the feet with anchor bolts (M10 or 3/8"). In addition, use anchoring washers on the top side. (Use SUS washers with nominal diameter of 10 or 3/8".) (Field supply)

Unit: mm

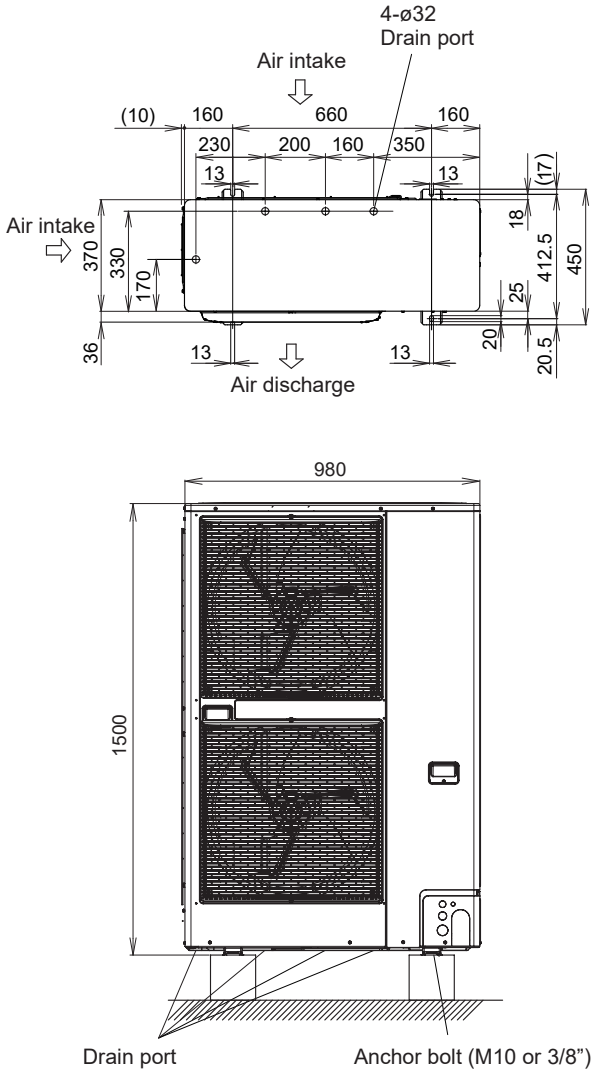


Fig. 2-4-1

4-8. Drainage Work

Follow the procedure below to ensure adequate draining for the outdoor unit.

- For the drain port dimensions, see Fig. 2-4-1.
- Ensure a base height of 15 cm or more at the feet on both sides of the unit.
- When using a drain pipe, install the drain socket (field supply) onto the drain port. Seal the other drain port with the rubber cap (field supply).
- For details, refer to the instruction manual of the drain socket (field supply).
- After completing the installation work of the drain socket, make sure that the water does not leak from any part of connection.

4-9. Routing the Tubing and Wiring

- The tubing and wiring can be extended out in 4 directions (front, rear, right, and down):
- The service valves are housed inside the unit. To access them, remove the inspection panel. (To remove the inspection panel, remove the 2 screws, then slide the panel downward and pull it toward you.)

(1) If the routing direction is through the front, rear, or right, use a nipper or similar tool to cut out the knockout holes for the inter-unit control wiring outlet, power wiring outlet, and tubing outlet from the appropriate covers A and B. When routing the wiring, be sure to attach each supplied protection bushing to the edges around the wiring outlet holes in order to protect the wiring from scratches by the cutting burr.

(2) If the routing direction is down, use a nipper or similar tool to cut out the lower flange from cover A.

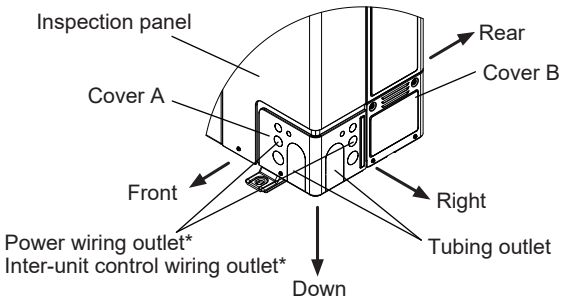


Fig. 2-4-2

NOTE

* Protect the outdoor unit wiring with a conduit material or supplied protection bushing to avoid damages by the edges of knockout hole.

* Use sealing putty to seal off the hole to prevent the dust and insects from entering the wiring outlet holes and the tubing outlet.

CAUTION

- **Route the tubing so that it does not contact the compressor, panel, or other parts inside the unit. Increased noise will result if the tubing contacts these parts.**
- **When routing the tubing, use a tube bender to bend the tubes.**

4. Installation Instructions

4-10. Prepare the Tubing

- Material: Use seamless phosphorous deoxidized copper tube for refrigeration. Wall thickness shall comply with the applicable legislation. The minimal wall thickness must be in accordance with the table below. For tubes of ø22.22 or larger, use the material of temper 1/2H or H (Hard copper tube). Do not bend the hard copper tube.
- Tubing size
  Use the tubing size indicated in the table below.
- When cutting the tubing, use a tube cutter, and be sure to remove any burrs.
  The same applies to distribution tubing (optional).
- When bending the tubes, bend each tube using a radius that is at least 4 times the outer diameter of the tube.
  When bending, use sufficient care to avoid crushing or damaging the tube.
- For flaring, use a flare tool, and be sure that flaring is performed correctly.

CAUTION

Use sufficient caution during preparation of the tubing.
Seal the tube ends by means of caps or taping to prevent dust, moisture, or other foreign substances from entering the tubes.

Refrigerant tubing

Tubing size (mm)			
Material Temper - O (Soft copper tube)		**Material Temper - 1/2 H, H (Hard copper tube)**	
Outer dia.	**Thickness**	**Outer dia.**	**Thickness**
ø6.35	t0.8	ø22.22	t1.0
ø9.52	t0.8	ø25.4	t1.0
ø12.7	t0.8		
ø15.88	t1.0		
ø19.05	t1.2		

5. HOW TO PROCESS TUBING

The liquid tubing side is connected by a flare nut, and the gas tubing side is connected by brazing.

5-1. Connecting the Refrigerant Tubing

Use of the Flaring Method

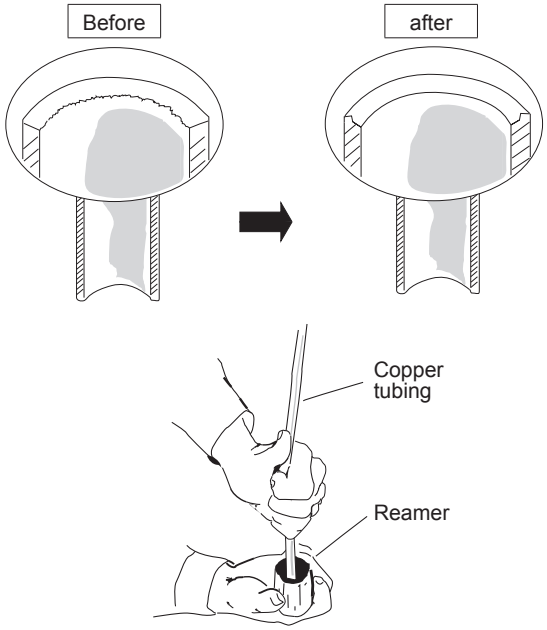
Many of conventional split system air conditioners employ the flaring method to connect refrigerant tubes which run between indoor and outdoor units. In this method, the copper tubes are flared at each end and connected with flare nuts.

Flaring Procedure with a Flare Tool

(1) Cut the copper tube to the required length with a tube cutter. It is recommended to cut approx. 30 – 50 cm longer than the tubing length you estimate.

(2) Remove burrs at the end of the copper tube with a tube reamer or a similar tool. This process is important and should be done carefully to make a good flare.
Be sure to keep any contaminants (moisture, dirt, metal filings, etc.) from entering the tubing.

Deburring

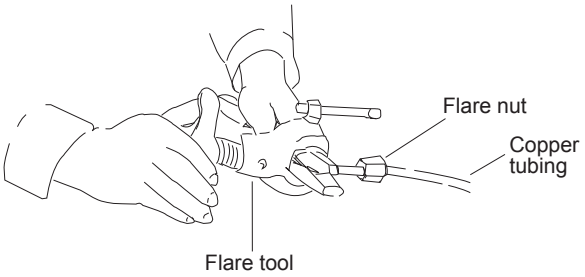


NOTE

When reaming, hold the tube end downward and be sure that no copper scraps fall into the tube.

(3) Remove the flare nut from the unit and be sure to mount it on the copper tube.

(4) Make a flare at the end of copper tube with a flare tool.



NOTE

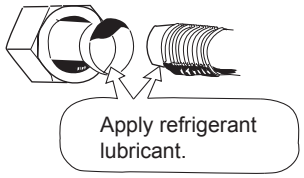
A good flare should have the following characteristics:

- Inside surface is glossy and smooth
- Edge is smooth
- Tapered sides are of uniform length

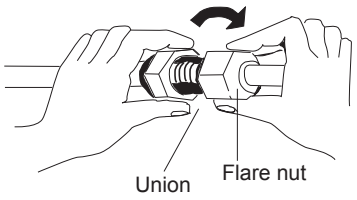
Caution Before Connecting Tubes Tightly

(1) Apply a sealing cap or water-proof tape to prevent dust or water from entering the tubes before they are used.

(2) Be sure to apply refrigerant lubricant (ether oil) to the inside of the flare nut before making piping connections. This is effective for reducing gas leaks.



(3) For proper connection, align the union tube and flare tube straight with each other, then screw in the flare nut lightly at first to obtain a smooth match.

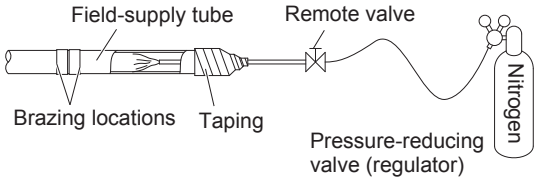


- Adjust the shape of the liquid tube using a tube bender at the installation site and connect it to the liquid tubing side valve using a flare.

Cautions During Brazing

- **Replace air inside the tube with nitrogen gas to prevent copper oxide film from forming during the brazing process. (Oxygen, carbon dioxide and Freon are not acceptable.)**
- **Do not allow the tubing to get too hot during brazing. The nitrogen gas inside the tubing may overheat, causing refrigerant system valves to become damaged. Therefore allow the tubing to cool when brazing.**
- **Use a reducing valve for the nitrogen cylinder.**
- **Do not use agents intended to prevent the formation of oxide film. These agents adversely affect the refrigerant and refrigerant oil, and may cause damage or malfunctions.**

Work method



5. HOW TO PROCESS TUBING

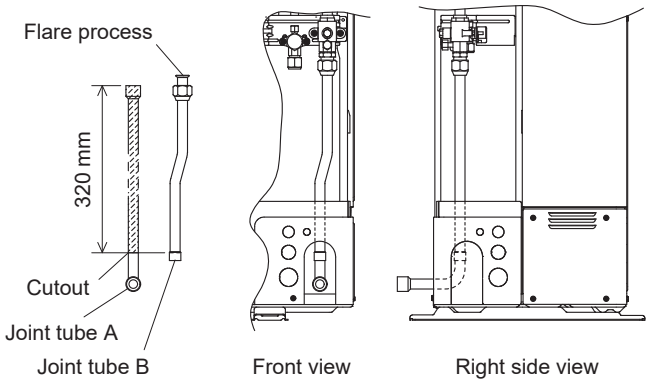
5-2. Connecting Tubing Between Indoor and Outdoor Units

(1) Preparing the Joint Tube (10 HP only).

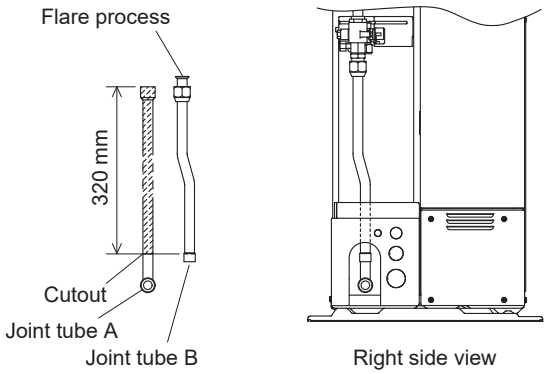
- The tubing of the gas main has a diameter of ø22.22, but the connection to the service valve of the outdoor unit has a diameter of ø19.05, so a flare has to be used. Consequently, be sure to use the enclosed joint tube B and joint tube A in making connections (braze).
- Align the joint tube in the direction the tubing comes out and see the following references “Examples of Making Tube Connections” 1 to 4 in cutting it to the required length and then braze it.
- For the connection to the service valve on the outdoor unit, use the supplied joint tube B. Thereby, perform flaring process in a ø19.05 on the joint tube end B (connecting side to the service valve).
- Cut out the supplied joint tube A according to the required length by referring to the following connection tubing samples 1 to 4.
- Perform brazing the supplied joint tube A with the supplied joint tube B in the appropriate direction.
- To protect the wiring and parts inside the unit, perform the brazing outside the unit. (Also, take note that each of the joint tubes in 1 to 3 have to be installed in a specific direction, so make sure they are as depicted in the figure when you braze them.)
- Make a flare connection of the supplied joint tubes A and B to the gas side service valve on the outdoor unit.

Examples of Making Tube Connections

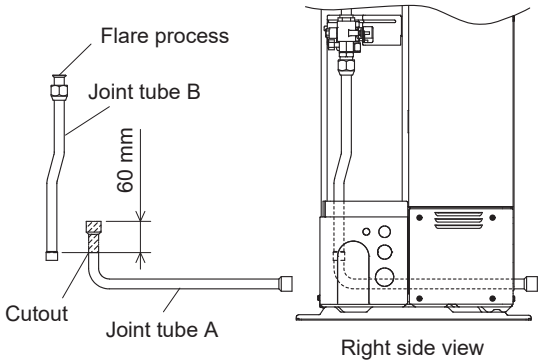
1. Out Front



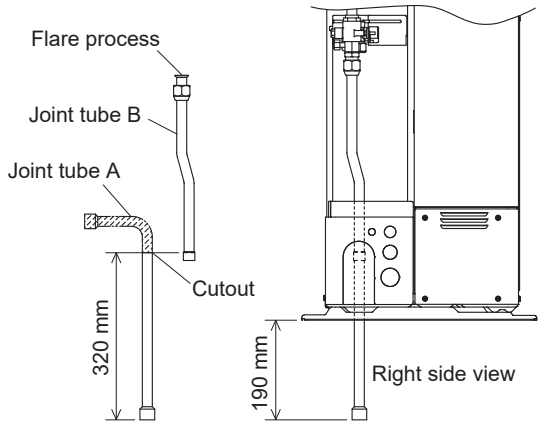
2. Out Right



3. Out Rear



4. Out Bottom



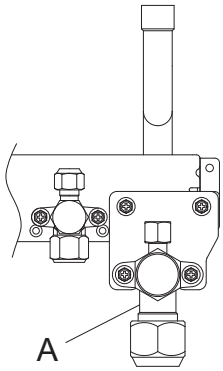
5. HOW TO PROCESS TUBING

The ø25.4 gas main will not pass easily into the opening for coolant pipes in the pipe cover, so make sure you connect the ø22.22 pipe with the ø19.05 pipe outside of the outdoor unit.

(2) Tightly connect the indoor-side refrigerant tubing extended from the wall with the outdoor-side tubing.

(3) To fasten the flare nuts, apply specified torque.

- When removing the flare nuts from the tubing connections, or when tightening them after connecting the tubing, be sure to use two spanners. When tightening the flare nuts, use a torque wrench.
  If the flare nuts are over-tightened, the flare may be damaged, which could result in refrigerant leakage and cause injury or asphyxiation to room occupants.
- When removing or tightening the gas tube flare nut, use 2 adjustable wrenches together: one at the gas tube flare nut, and the other at part A.



- For the flare nuts at tubing connections, be sure to use the flare nuts that were supplied with the unit, or else flare nuts for R410A, R32 (type 2).
  The refrigerant tubing that is used must be of the correct wall thickness as shown in the following table.

Tube diameter	Tightening torque (approximate)	Tube thickness
ø6.35 (1/4”)	14 – 18 N · m {140 – 180 kgf · cm}	0.8 mm
ø9.52 (3/8”)	34 – 42 N · m {340 – 420 kgf · cm}	0.8 mm
ø12.7 (1/2”)	49 – 61 N · m {490 – 610 kgf · cm}	0.8 mm
ø15.88 (5/8”)	68 – 82 N · m {680 – 820 kgf · cm}	1.0 mm
ø19.05 (3/4”)	100 – 120 N · m {1,000 – 1,200 kgf · cm}	1.2 mm

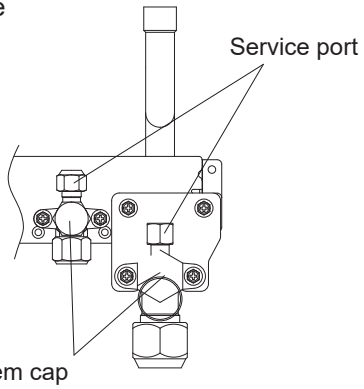
Because the pressure is approximately 1.6 times higher than conventional refrigerant R22 pressure, the use of ordinary flare nuts (type 1) or thin-walled tubes may result in tube rupture, injury, or asphyxiation caused by refrigerant leakage.

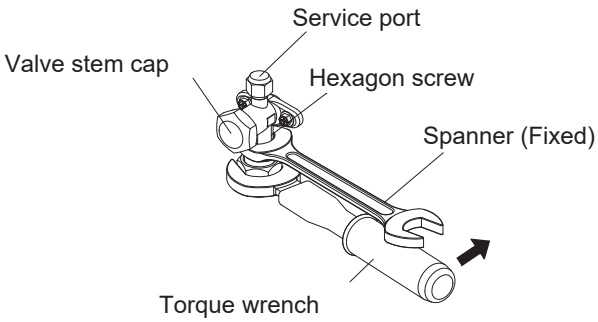
- In order to prevent damage to the flare caused by over-tightening of the flare nuts, use the table as a guide when tightening.
- When tightening the flare nut on the liquid tube, use an adjustable wrench with a nominal handle length of 200 mm.
- Do not use a spanner to tighten the valve stem caps. Doing so may damage the valves.
- Depending on the installation conditions, applying excessive torque may cause the nuts to crack.

Precautions for Packed Valve Operation

- If the packed valve is left for a long time with the valve stem cap removed, refrigerant will leak from the valve.
  Therefore, do not leave the valve stem cap removed.

Packed valve





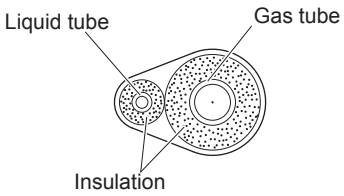
- Use a torque wrench to securely tighten the valve stem cap.
- Tightening torque:

Service port	ø9.52 (liquid)	8 – 10 N · m {80 – 100 kgf · cm}
	ø19.05 (gas)	6.9 – 11.8 N · m {69 – 118 kgf · cm}
Valve stem cap	ø9.52 (liquid)	19 – 21 N · m {190 – 210 kgf · cm}
	ø19.05 (gas)	13 – 14 N · m {130 – 140 kgf · cm}
Flare nut	ø9.52 (liquid)	34 – 42 N · m {340 – 420 kgf · cm}
	ø19.05 (gas)	100 – 120 N · m {1,000 – 1,200 kgf · cm}

5. HOW TO PROCESS TUBING

5-3. Insulating the Refrigerant Tubing

Two tubes arranged together

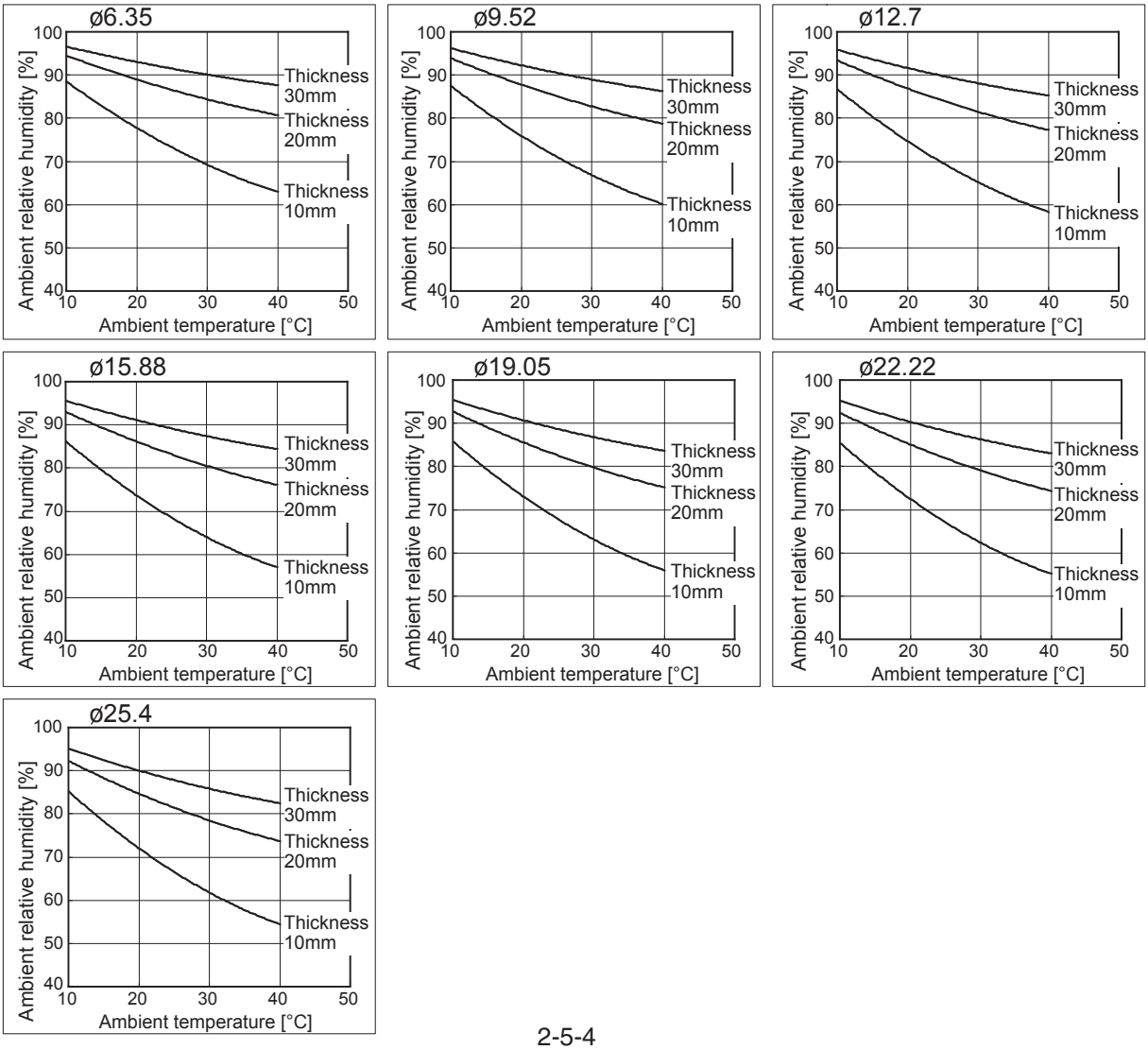


Tubing Insulation

- Standard Selection of Insulation Material
  Under the environment of the high temperature and high humidity, the surface of the insulation material is easy to become condensation. This will result in leakage and dew drop. See the chart “Standard Selection of Tubing Instruction” shown below when selecting the insulation material. In case that the ambient temperature and relative humidity are placed above the line of the insulation thickness, the condensation may occasionally make a dew drop on the surface of the insulation material. In this case, select the better insulation efficiency.
  * However, since the condition will be different due to the sort of the insulaton material and the environmental condition of the installation place, see the chart shown below as a reference when making a selection.

Standard Selection of Tubing Insulation

Sort of insulation material	Polyethylene heat resisting material
Upper limits of usage temperature	Gas tubing : 120 °C or above Other tubing : 80 °C or above
Calculating condition	
Thermal conductivity of insulation material	0.043 W/(m · K) (Average temperature 23 °C)
Refrigerant temperature	2 °C

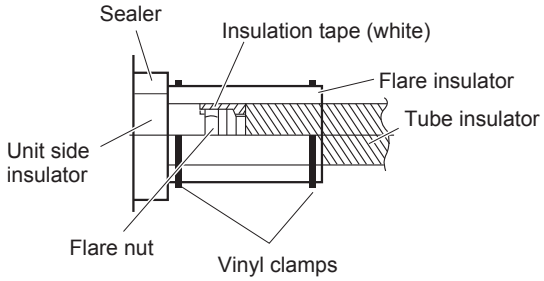


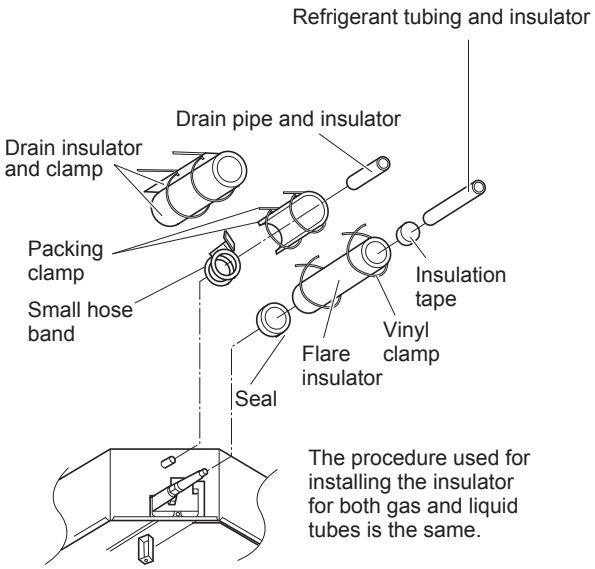
5. HOW TO PROCESS TUBING

CAUTION **If the exterior of the outdoor unit valves has been finished with a square duct covering, make sure you allow sufficient space to use the valves and to allow the panels to be attached and removed.**

Taping the flare nuts

Wind the white insulation tape around the flare nuts at the gas tube connections. Then cover up the tubing connections with the flare insulator, and fill the gap at the union with the supplied black insulation tape. Finally, fasten the insulator at both ends with the supplied vinyl clamps.





Never grasp the drain or refrigerant connecting outlets when moving the unit.

Insulation material

The material used for insulation must have good insulation characteristics, be easy to use, be age resistant, and must not easily absorb moisture.

Be sure to use the heat-resistant insulator corresponding to the gas tube of 120 °C or above and other tubes of 80 °C or above.

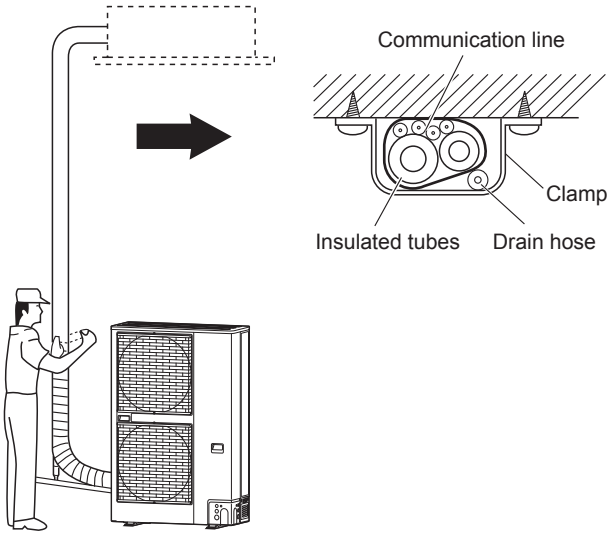
CAUTION **After a tube has been insulated, never try to bend it into a narrow curve because it can cause the tube to break or crack.**

5-4. Taping the Tubes

(1) At this time, the refrigerant tubes (and electrical wiring if local codes permit) should be taped together with armoring tape in 1 bundle. To prevent the condensation from overflowing the drain pan, keep the drain hose separate from the refrigerant tubing.

(2) Wrap the armoring tape from the bottom of the outdoor unit to the top of the tubing where it enters the wall. As you wrap the tubing, overlap half of each previous tape turn.

(3) Clamp the tubing bundle to the wall, using 1 clamp approx. each meter.

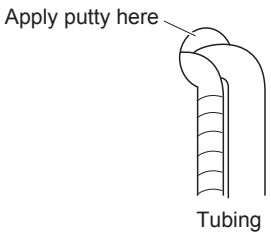


NOTE

Do not wind the armoring tape too tightly since this will decrease the heat insulation effect. Also ensure that the condensation drain hose splits away from the bundle and drips clear of the unit and the tubing.

5-5. Finishing the Installation

After finishing insulating and taping over the tubing, use sealing putty to seal off the hole in the wall to prevent rain and draft from entering.



6. AIR PURGING

Air and moisture in the refrigerant system may have undesirable effects as indicated below.

- pressure in the system rises
- operating current rises
- cooling (or heating) efficiency drops
- moisture in the refrigerant circuit may freeze and block capillary tubing
- water may lead to corrosion of parts in the refrigerant system

Therefore, the indoor unit and tubing between the indoor and outdoor unit must be leak tested and evacuated to remove any noncondensables and moisture from the system.

■ Air Purging with a Vacuum Pump (for Test Run) Preparation

Check that each tube (both liquid and gas tubes) between the indoor and outdoor units have been properly connected and all wiring for the test run has been completed. Remove the valve caps from both the gas and liquid service valves on the outdoor unit. Note that both liquid and gas tube service valves on the outdoor unit are kept closed at this stage.

Leak test

(1) With the service valves on the outdoor unit closed, remove the 1/4 in. flare nut and its bonnet on the gas tube service valve. (Save for reuse.)

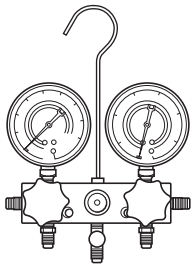
(2) Attach a manifold valve (with pressure gauges) and dry nitrogen gas cylinder to this service port with charge hoses.

CAUTION **Use a manifold valve for air purging. If it is not available, use a stop valve for this purpose. The "Lo" knob of the manifold valve must always be kept closed.**

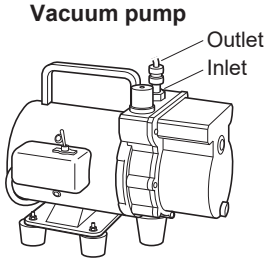
(3) Pressurize the system to no more than 4.15 MPa with dry nitrogen gas and close the cylinder valve when the gauge reading reaches 4.15 MPa. Then, test for leaks with liquid soap.

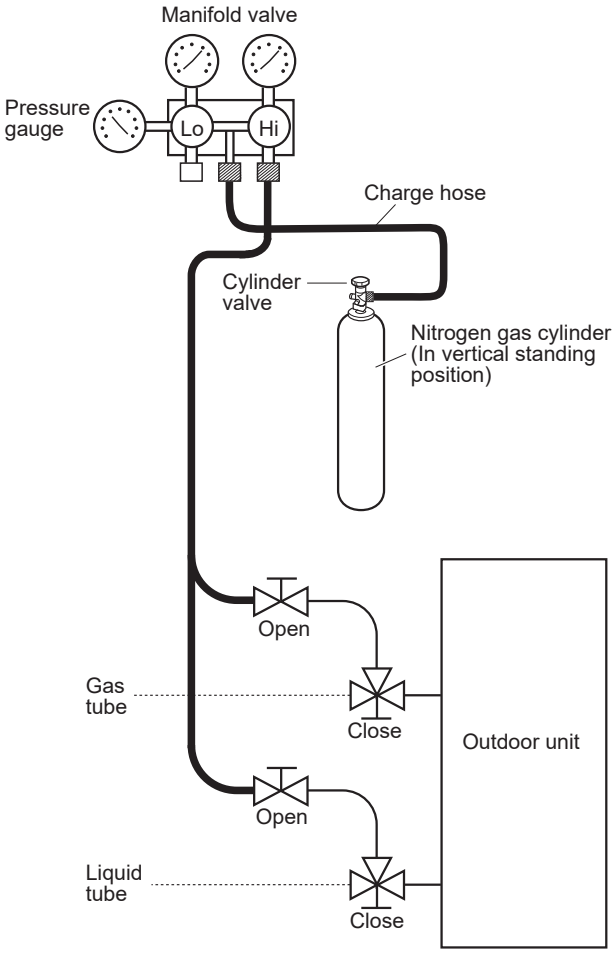
CAUTION **To avoid nitrogen entering the refrigerant system in a liquid state, the top of the cylinder must be higher than the bottom when you pressurize the system. Usually, the cylinder is used in a vertical standing position.**

Manifold gauge



Vacuum pump





6. AIR PURGING

(4) Do a leak test of all joints of the tubing (both indoor and outdoor) and both gas and liquid service valves. Bubbles indicate a leak. Wipe off the soap with a clean cloth after a leak test.

(5) After the system is found to be free of leaks, relieve the nitrogen pressure by loosening the charge hose connector at the nitrogen cylinder. When the system pressure is reduced to normal, disconnect the hose from the cylinder.

Evacuation

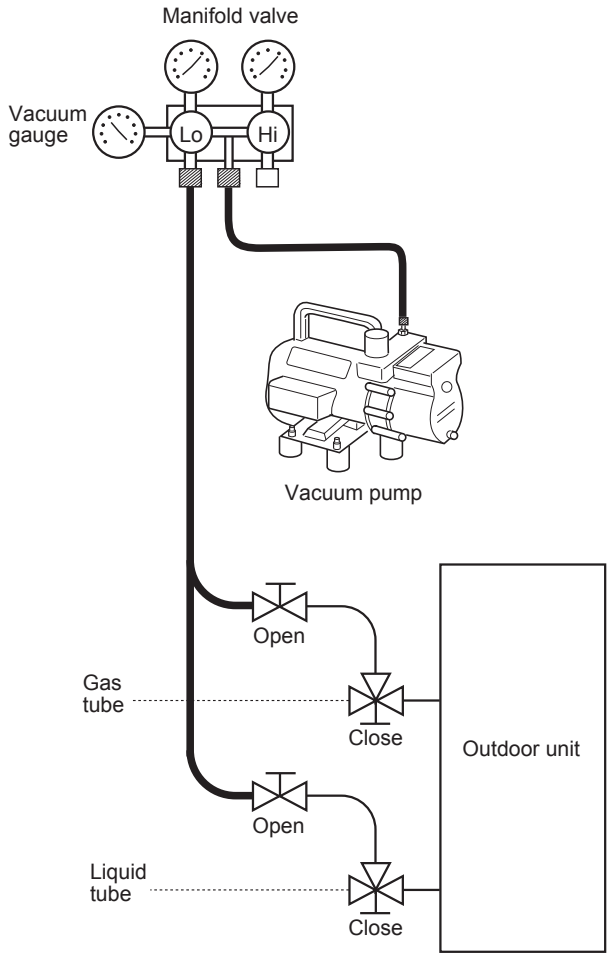
(1) Attach the charge hose end described in the preceding steps to the vacuum pump to evacuate the tubing and indoor unit. Confirm that the “Lo” knob of the manifold valve is open. Then, run the vacuum pump. The operation time for evacuation varies with the tubing length and capacity of the pump. The following table shows the amount of time for evacuation:

Required time for evacuation when 30 gal/min. vacuum pump is used	
If tubing length is less than 15 m	If tubing length is longer than 15 m
45 min. or more	**90 min. or more**

NOTE

The required time in the above table is calculated based on the assumption that the ideal (or target) vacuum condition is less than –101 kPa {–755 mmHg, 5 Torr}.

(2) When the desired vacuum is reached, close the “Lo” knob of the manifold valve and turn off the vacuum pump. Please confirm that the gauge pressure is under –101 kPa {–755 mmHg, 5 Torr} after 4 to 5 minutes of vacuum pump operation.



6. AIR PURGING

CAUTION **Use a cylinder designed for use with R410A respectively.**

Charging additional refrigerant

- Charging additional refrigerant (calculated from the liquid tube length as shown in the section “Additional Refrigerant Charge” on page 2-1-7) using the liquid tube service valve.
- Use a balance to measure the refrigerant accurately.
- If the additional refrigerant charge amount cannot charged at once, charge the remaining refrigerant in liquid form by using the gas tube service valve with the system in cooling operation mode at the time of test run.

Finishing the job

(1) With a hex wrench, turn the liquid tube service valve stem counter-clockwise to fully open the valve.

(2) Turn the gas tube service valve stem counterclockwise to fully open the valve.

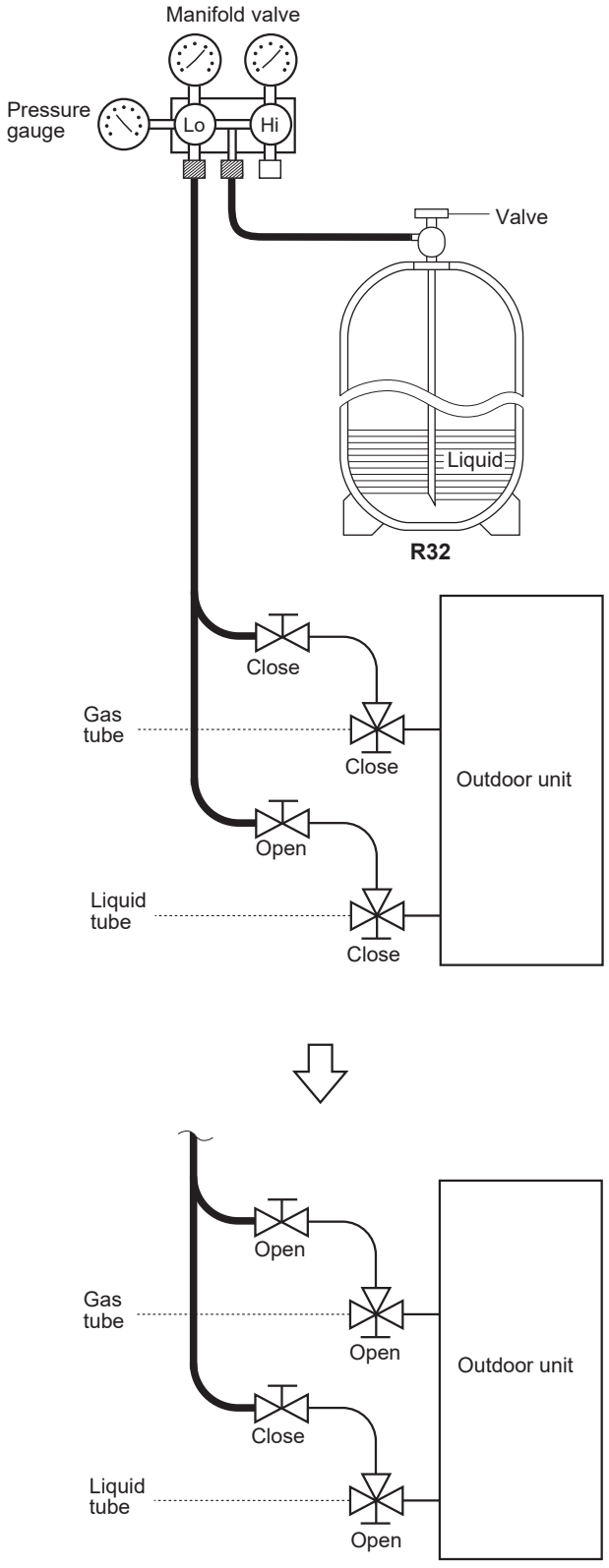
CAUTION **To avoid gas from leaking when removing the charge hose, make sure the stem of the gas tube is turned all the way out (“BACK SEAT” position).**

(3) Loosen the charge hose connected to the gas tube service port (1/4 in.) slightly to release the pressure, then remove the hose.

(4) Replace the 1/4 in. flare nut and its bonnet on the gas tube service port and fasten the flare nut securely with an adjustable wrench or box wrench. This process is very important to prevent gas from leaking from the system.

(5) Replace the valve caps at both gas and liquid service valves and fasten them securely.

This completes air purging with a vacuum pump. The air conditioner is now ready for a test run.



7. Optional Parts

7-1. Distribution Joint Kits

Model name	Cooling capacity after distribution	Remarks
1. CZ-P160BK2	22.4 kW or less*	For indoor unit
2. CZ-P680BK2	more than 22.4 kW *	For indoor unit

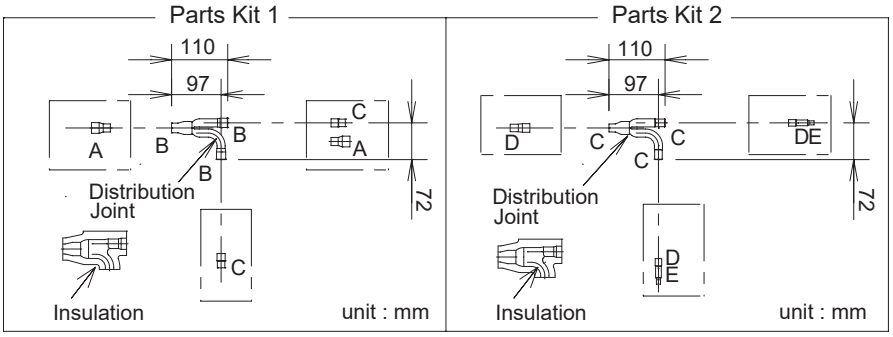
*In case the total capacity of indoor units connected after distribution exceeds the total capacity of the outdoor units, select the distribution tubing size for the total capacity of the outdoor units.

Regarding the cautions when connecting to the indoor unit, see " ■ Installing distribution joint" on page 2-2-4.

■ CZ-P160BK2

How to Attach Distribution Joint

1. Accompanying Parts
   Check the contents of your distribution joint kit.
2. Distribution Joint Kits (with insulation)



- Size of connection point on each part (Shown are inside diameters of tubing)

Size	mm	Inch
Part A	ø19.05	3/4
Part B	ø15.88	5/8
Part C	ø12.7	1/2
Part D	ø9.52	3/8
Part E	ø6.35	1/4

3. Making Branch Connections

- For branching tubes, install 150mm or larger (including reducer) straight tubing up to the point where the tube branches (or after the point where the tubes join together). (Fig. 2-7-1)

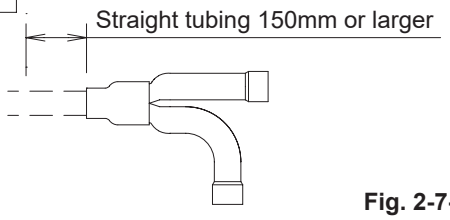


Fig. 2-7-1

- Using a tube cutter, cut the joints at the diameter required to match the outside diameter of the tubing you are connecting. (This is usually done at the installation site.) The tube diameter depends on the total capacity of the indoor unit. Note that you do not have to cut the joints if it already matches the tubing end size. For size selection of the tube diameter, see " Table 2-1-10 Indoor Unit Tubing Connection Size".

NOTE

Avoid forceful cutting that may harm the shape of the joints or tubing. (Inserting the tubing will not be possible if the tube shape is not proper.)

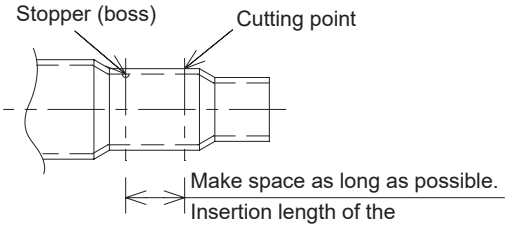
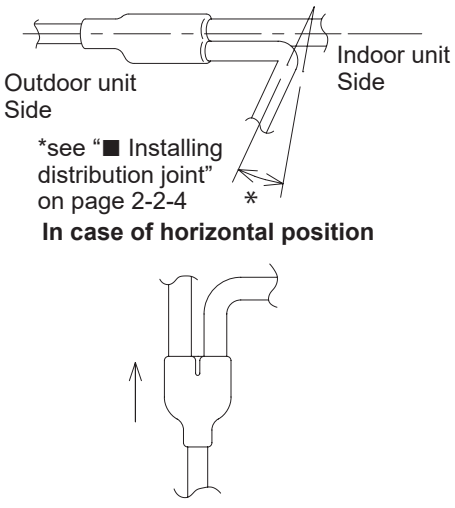


Fig. 2-7-2

- Cut off as far away from stopper as possible. (Fig. 2-7-2)
- After cutting the joints, be sure to remove burrs on the inside of the joints. (If the joints have been squashed or dented badly, reshaped them using a tube spreader.)
- Make sure there is no dirt or other foreign substances inside the distribution joint.
- The distribution joint can be either horizontal or vertical. (Fig. 2-7-3) In the case of horizontal, see "■ Installing distribution joint" on page 2-2-4.
- When brazing a pipe E to the reducer of which middle pipe inner dimension is D as shown above chart, cut the middle pipe as long as possible so that the pipe E can be inserted.
- When brazing, replace air inside the tube with nitrogen gas to prevent copper oxide from forming.
- To insulate the distribution joint, use the supplied tubing insulation. (If using insulation other than that supplied, make sure that its heat resistance is 120°C or higher.)
- For additional details, see "■ Installing distribution joint" on page 2-2-4.



In case of horizontal position

In case of vertical position (directed upward)

Fig. 2-7-3

7. Optional Parts

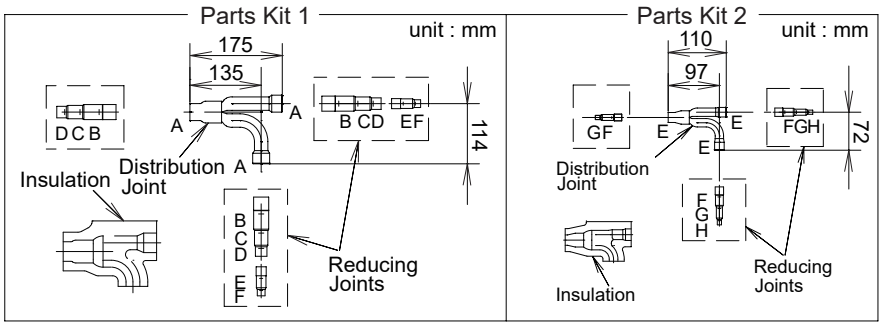
■ CZ-P680BK2

How to Attach Distribution Joint

Part Name	Parts Kit 1	Parts Kit 2
Distribution Joints	1	1
Insulations	1	1
Reducing Joints	5	3

1. Accompanying Parts
   Check the contents of your distribution joint kit.

2. Distribution Joint Kits (with insulation)



- Size of connection point on each part (Shown are inside diameters of tubing)

Size	mm	Inch
Part A	ø28.58	1-1/8
Part B	ø25.4	1
Part C	ø22.22	7/8
Part D	ø19.05	3/4
Part E	ø15.88	5/8
Part F	ø12.7	1/2
Part G	ø9.52	3/8
Part H	ø6.35	1/4

3. Making Branch Connections

- For branching tubes, install 150mm or larger (including reducer) straight tubing up to the point where the tube branches (or after the point where the tubes join together). (Fig. 2-7-4)
- Using a tube cutter, cut the joints at the diameter required to match the outside diameter of the tubing you are connecting. (This is usually done at the installation site.) The tube diameter depends on the total capacity of the indoor unit. Note that you do not have to cut the joints if it already matches the tubing end size. For size selection of the tube diameter, see " Table 2-1-10 Indoor Unit Tubing Connection Size".

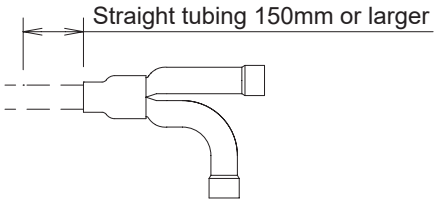


Fig. 2-7-4

NOTE

Avoid forceful cutting that may harm the shape of the joints or tubing. (Inserting the tubing will not be possible if the tube shape is not proper.)

- Cut off as far away from stopper as possible. (Fig. 2-7-5)
- After cutting the joints, be sure to remove burrs on the inside of the joints. (If the joints have been squashed or dented badly, reshaped them using a tube spreader.)

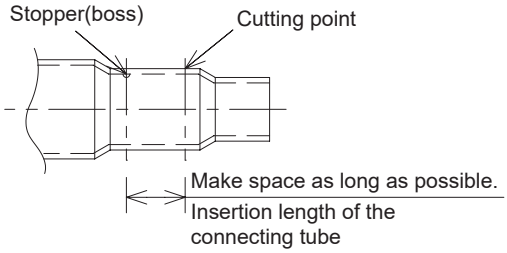
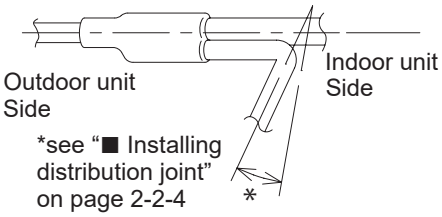
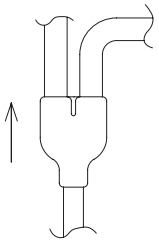


Fig. 2-7-5

- Make sure there is no dirt or other foreign substances inside the distribution joint.
- The distribution joint can be either horizontal or vertical. (Fig. 2-7-6)
  In the case of horizontal, see "■ Installing distribution joint" on page 2-2-4.
- When brazing, replace air inside the tube with nitrogen gas to prevent copper oxide from forming.
- To insulate the distribution joint, use the supplied tubing insulation. (If using insulation other than that supplied, make sure that its heat resistance is 120°C or higher.)
- For additional details, see "■ Installing distribution joint" on page 2-2-4.



In case of horizontal position



In case of vertical position (directed upward or downward)

Fig. 2-7-6

7. Optional Parts

7-2. Demand Terminal For Outdoor Unit (CZ-CAPDC3)

■ **Installation Manual for Europe**

- This module is used to conduct a forced stop operation for the air conditioner.
- This module is used for demand control on an outdoor unit.

■ Before installing the demand terminal, be sure to thoroughly read the “Precautions in terms of safety” section in the installation manual.

Precautions in terms of safety Always Observe Safety Precautions	All important descriptions regarding safety are listed here, and always observe them without fail. The following shows the safety marks and their meanings.

■ An explanation for the following safety marks/symbols is provided and indicates the level of harm or damage incurred from improper installation or disregarding the safety precautions.

■ An explanation for the following safety symbols is provided and describes the type of precautions that are required.

⚠ WARNING This warning mark indicates that “There exists a possibility the serious injury or death may result”.	This symbol indicates something that is PROHIBITED.
⚠ CAUTION This cautionary mark indicates that “There only exists a possibility that injury or damage to property may result”.	This symbol indicates something that is REQUIRED.

7. Optional Parts

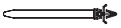
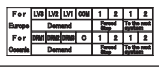
⚠ WARNING

- Ask the vendor or a qualified technician to perform the installation. A faulty installation carried out by the customer may lead to electric shock or fire.
- Be sure to carry out proper installation according to the installation manual. A faulty installation may lead to electric shock or fire.
- The unit must be installed in accordance with applicable national and local regulations. Any electrical work should only be carried out by qualified technician and use exclusive circuits without fail. Presence of insufficient capacity in power circuit or imperfection in execution leads to electric shock, fire, etc.
- Be sure to always use the parts accessories or the specified parts for the connection and installation. Failure to do so may lead to electric shock or fire.
- Connect all wiring and cables securely with the specified cables or wires so that external force from the cables does not transfer to the terminal connection section. An insecure or faulty connection may lead to unit failure, excessive heat, or fire.
- Be sure to always turn the power off before proceeding with wire and cable set up. Failure to do so may lead to electric shock or fire.

⚠ CAUTION

- Do not install near a place where there is risk of leaking flammable gas. Failure to do so can lead to electric shock or fire.

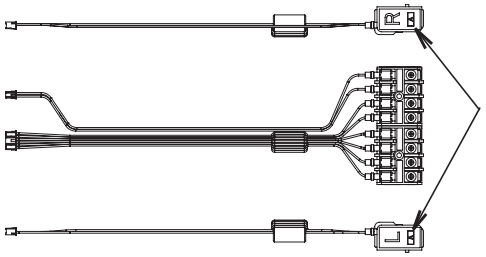
Accessories Check that you have the following accessories.

Name	Qty.	Diagram	Remark
Demand Terminal	3		For installing the demand controller For the forced stop output Demand A, Demand B, and Demand C
Cord Clamp	1		For bundling lead wires
Tie	4		For securing the cord connection
Screw	3		For functional earthing
Screw	2		For installing the Demand Terminal
Indication Label	1		Label for Demand Terminal

Select the appropriate Demand Terminal and indication label depending on the applicable model.

7. Optional Parts

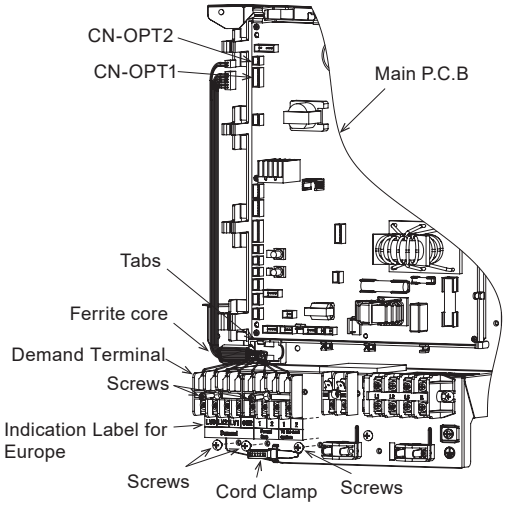
1. OUTSIDE DIMENSIONS



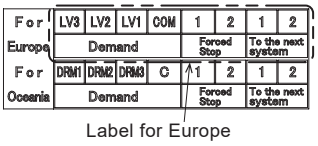
Demand	Applicable models
A	U-4/5/6LZ2E5
B	U-4/5/6LZ2E8
C	U-8/10LZ2E8

2. DEMAND TERMINAL INSTALLATION PROCEDURE

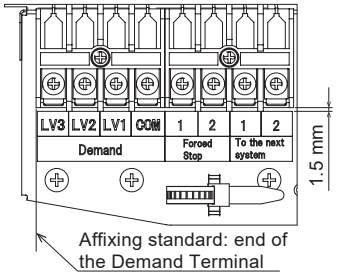
1. Control Board (U-***LZ2**)
   Securely fasten the Demand Terminal with the screws (supplied). {Tightening-torque: 157 to 196 cN•m (16 to 20 kgf•cm)}
   So that the ferrite core does not become detached, put it inside the tabs and insert the connectors.
   Affix the indication label (supplied) to the bottom of the Demand Terminal.
   Securely tighten the 3 screws for functional earthing (supplied). {Tightening-torque: 157 to 196 cN•m (16 to 20 kgf•cm)}



The illustration shows the 3-phase model as an example.

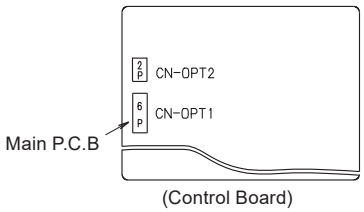


Label for Europe



Peel the label for Europe off of the backing paper, and affix it to the bottom of the Demand Terminal.

2. Connect the connecting the wires from the Demand Terminal to the Main P.C.B by the connectors.
   <Position of CN-OPT1 and CN-OPT2 on the Main P.C.B>



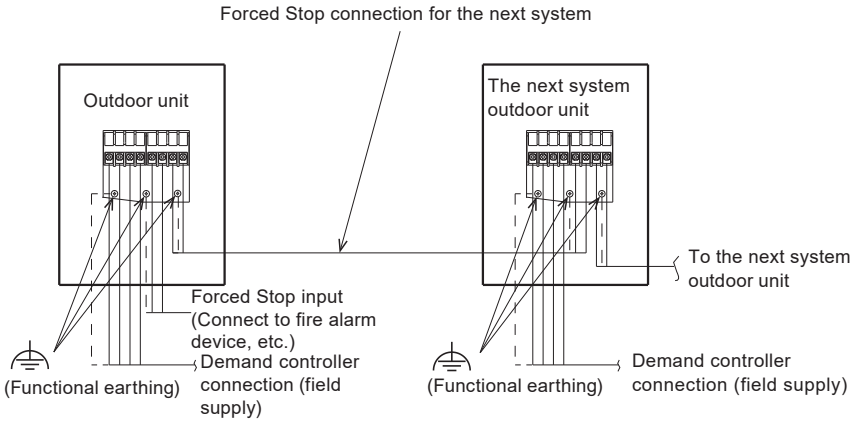
(Control Board)

Connect 6P to CN-OPT1, 2P to CN-OPT2

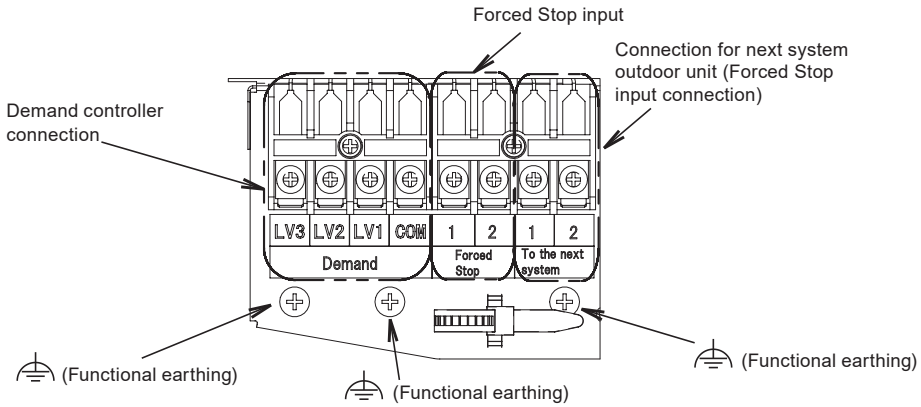
7. Optional Parts

3. CONNECTION PROCEDURE

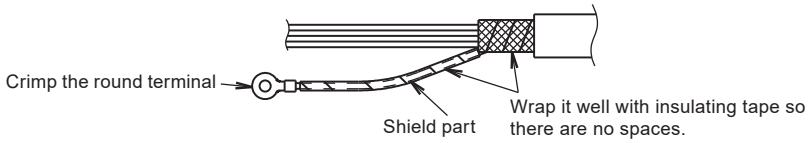
Be sure to always turn the power off first when setting up the wire and cable connections.
Failure to do so may lead to electric shock or unit failure.



The demand terminal set up is shown in the following illustration.



• Use a shielded cable for the cable connection.
For the shield part of the shielded cable twist the end out, crimp it with a round terminal, and connect it to functional earthing screw.
After crimping it with a round terminal, wrap it with insulating tape so there are no spaces and adjust it so the shield part does not touch any live parts.

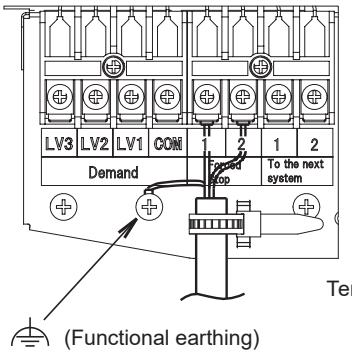


⚠ CAUTION	Be sure that the shield part of the shielded cable does not touch the terminal block or any live parts. Failure to do so may lead to electric shock or fire.

7. Optional Parts

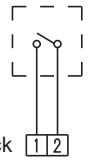
WHEN CONNECTION TO THE FORCED STOP INPUT

With the Forced Stop input, it is possible to override the air conditioning operation to force a stop if a signal is received from a fire alarm device, etc.



Connect the wiring (2-wire) to points 1 and 2 on the left side of the terminal block.
The shield part of the shielded cable is connected with ⏚ (Functional earthing) under the terminal block.
Secure the wiring with the cord clamp located on the lower part of the terminal block.

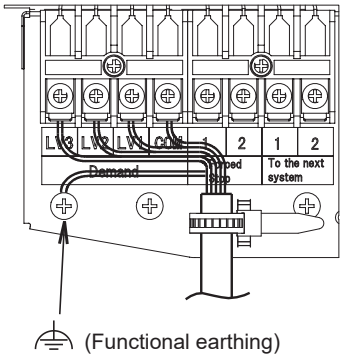
Fire alarm device



Relay contact point: No voltage relay
Current input is DC 24V 2mA
Use a very small electric current contact point for the relay.

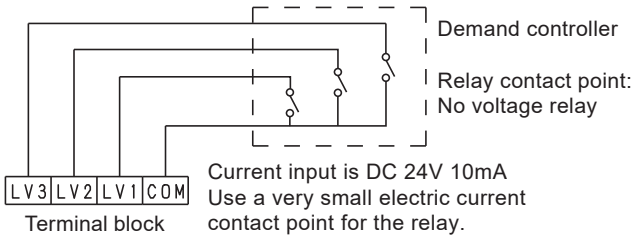
WHEN CONNECTING THE DEMAND CONTROLLER INPUT

It is possible to choose various demand levels.
Refer to the table shown on the right.



Demand terminal block COM short circuit	Control	Demand meaning
Non	No control	Operates to the maximum capacity.
LV1	Operates to 100% of the upper limit for the rated current.	Current is limited to the set values.
LV2	Operates to 70% of the upper limit for the rated current.	Current is limited to the set values.
LV3	Forced thermostat OFF setting	—

Connect the wiring (4-wire) to the Demand section (LV1, LV2, LV3, COM) on the terminal block. The shield part of the shielded cable is connected with ⏚ (Functional earthing) under the terminal block. Secure the wiring with the cord clamp located on the lower part of the terminal block.

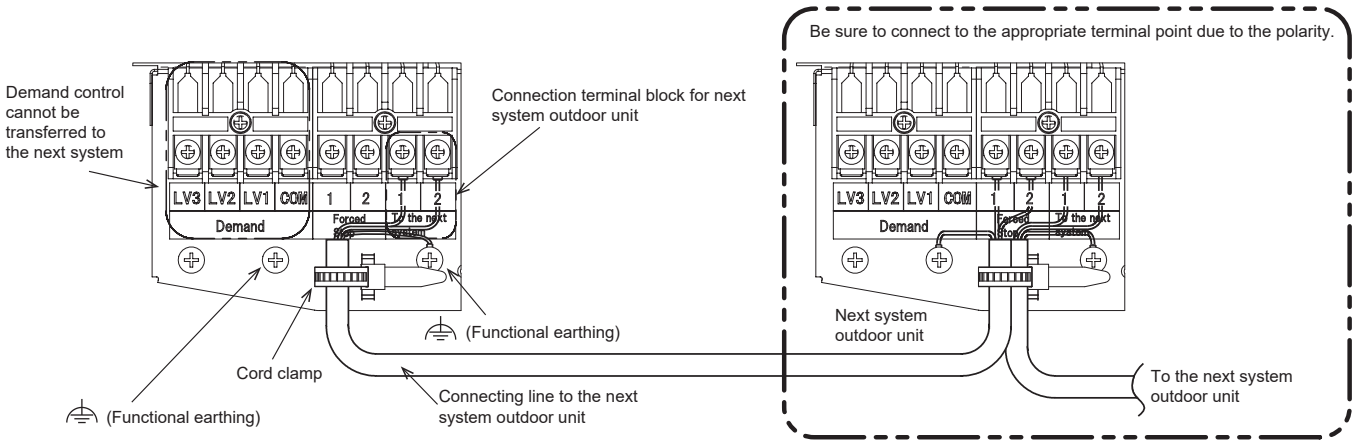


7. Optional Parts

WHEN CONNECTING TO THE NEXT SYSTEM UNIT

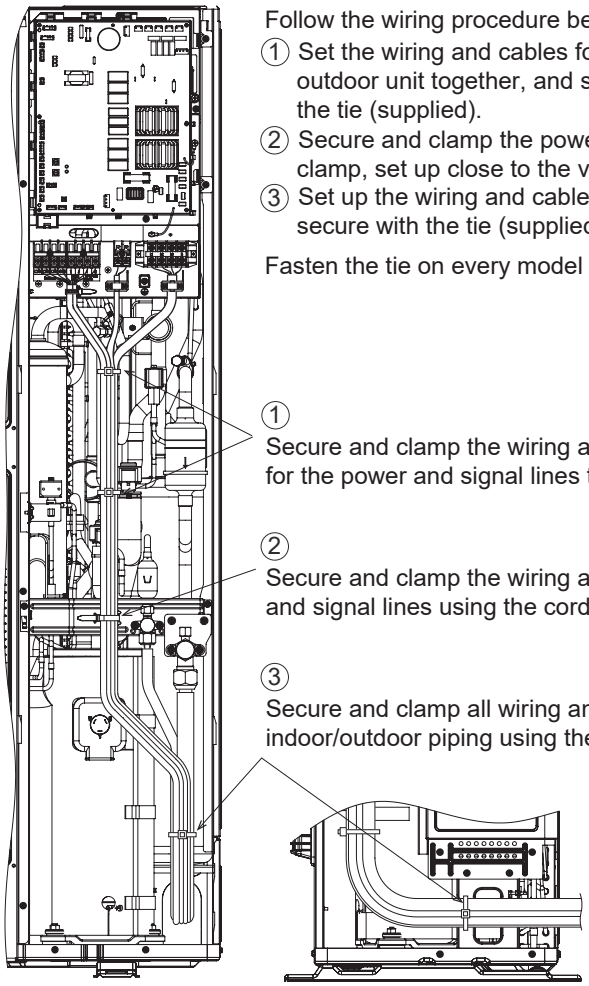
- Forced Stop input can be transferred to the next system unit.
- When using the Forced Stop input, connect the wiring to the terminal points 1 and 2 on the right side of the lower part of the terminal block.
- The maximum wire/cable length is 100 m.
- The demand control cannot be transferred to the next system unit.
- When transferring to the next system, the maximum number of connecting units is 30.

1. Connecting the wiring to the lower part of the terminal block.
   When transferring the Forced Stop input to the next system connect the wiring (2-wire) to the terminal points 1 and 2 at the lower right side of the terminal block. The shield part of the shielded cable is connected with ⏚ (Functional earthing) under the terminal block.
   Secure the wiring with the cord clamp located on the lower part of the terminal block.
2. Connecting the shielded cable to the terminal block for the next system.
   For the Forced Stop input, connect the wiring to the terminal points 1 and 2 at the lower right side of the terminal block.
   When connecting to the next system be sure to connect to the appropriate terminal point due to the polarity.



7. Optional Parts

4. WIRING PROCEDURE



Follow the wiring procedure below for terminal connection.

① Set the wiring and cables for the power and signal lines to the outdoor unit together, and secure each wire and cable with the tie (supplied).

② Secure and clamp the power and signal lines with the cord clamp, set up close to the valve.

③ Set up the wiring and cable for the outdoor unit piping and secure with the tie (supplied).

Fasten the tie on every model in the same type of position.

①
Secure and clamp the wiring and cable with the tie (supplied) for the power and signal lines to the outdoor unit.

②
Secure and clamp the wiring and cable together with power and signal lines using the cord clamp set up close to the valve.

③
Secure and clamp all wiring and cable together with the indoor/outdoor piping using the tie (supplied).

5. CHECK AFTER COMPLETING INSTALLATION

Check the signals to make sure the unit operates properly using an external input device.

■ **Installation Manual for Oceania**

- This module is used to conduct a forced stop operation for the air conditioner.
- This module is used for demand control on an outdoor unit.
- If using in Oceania, the settings must be changed. For how to change settings, refer to the appendix “Settings for Oceania”.

■ Before installing the demand terminal, be sure to thoroughly read the “Precautions in terms of safety” section in the installation manual.

Precautions in terms of safety Always Observe Safety Precautions	All important descriptions regarding safety are listed here, and always observe them without fail. The following shows the safety marks and their meanings.

■ An explanation for the following safety marks/symbols is provided and indicates the level of harm or damage incurred from improper installation or disregarding the safety precautions.

■ An explanation for the following safety symbols is provided and describes the type of precautions that are required.

⚠ WARNING This warning mark indicates that “There exists a possibility the serious injury or death may result”.	This symbol indicates something that is PROHIBITED.
⚠ CAUTION This cautionary mark indicates that “There only exists a possibility that injury or damage to property may result”.	This symbol indicates something that is REQUIRED.

7. Optional Parts

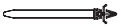
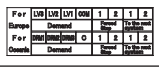
⚠ WARNING

- Ask the vendor or a qualified technician to perform the installation. A faulty installation carried out by the customer may lead to electric shock or fire.
- Be sure to carry out proper installation according to the installation manual. A faulty installation may lead to electric shock or fire.
- The unit must be installed in accordance with applicable national and local regulations. Any electrical work should only be carried out by qualified technician and use exclusive circuits without fail. Presence of insufficient capacity in power circuit or imperfection in execution leads to electric shock, fire, etc.
- Be sure to always use the parts accessories or the specified parts for the connection and installation. Failure to do so may lead to electric shock or fire.
- Connect all wiring and cables securely with the specified cables or wires so that external force from the cables does not transfer to the terminal connection section. An insecure or faulty connection may lead to unit failure, excessive heat, or fire.
- Be sure to always turn the power off before proceeding with wire and cable set up. Failure to do so may lead to electric shock or fire.

⚠ CAUTION

- Do not install near a place where there is risk of leaking flammable gas. Failure to do so can lead to electric shock or fire.

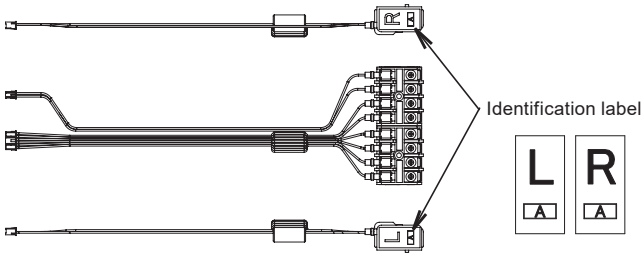
Accessories Check that you have the following accessories.

Name	Qty.	Diagram	Remark
Demand Terminal	3		For installing the demand controller For the forced stop output Demand A, Demand B, and Demand C
Cord Clamp	1		For bundling lead wires
Tie	4		For securing the cord connection
Screw	3		For functional earthing
Screw	2		For installing the Demand Terminal
Indication Label	1		Label for Demand Terminal

Select the appropriate Demand Terminal and indication label depending on the applicable model.

7. Optional Parts

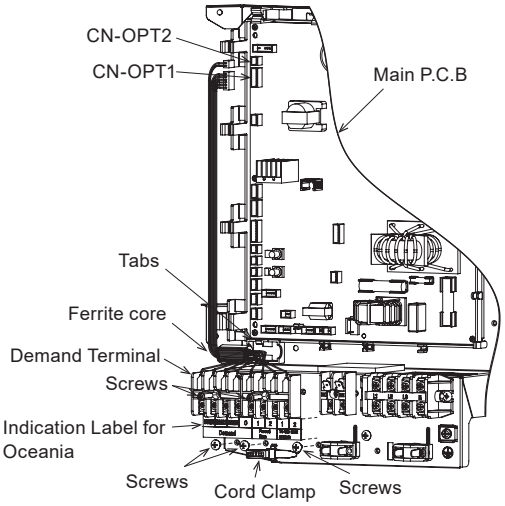
1. OUTSIDE DIMENSIONS



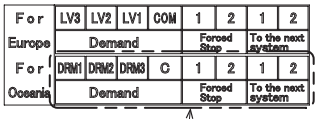
Demand	Applicable models
A	U-4/5/6LZ2E5
B	U-4/5/6LZ2E8
C	U-8/10LZ2E8

2. DEMAND TERMINAL INSTALLATION PROCEDURE

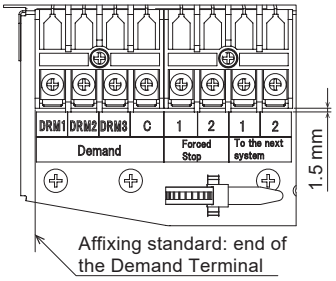
1. Control Board (U-***LZ2**)
   Securely fasten the Demand Terminal with the screws (supplied). {Tightening-torque: 157 to 196 cN•m (16 to 20 kgf•cm)}
   So that the ferrite core does not become detached, put it inside the tabs and insert the connectors.
   Affix the indication label (supplied) to the bottom of the Demand Terminal.
   Securely tighten the 3 screws for functional earthing (supplied). {Tightening-torque: 157 to 196 cN•m (16 to 20 kgf•cm)}



The illustration shows the 3-phase model as an example.

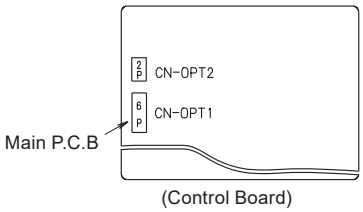


Label for Oceania



Peel the label for Oceania off of the backing paper, and affix it to the bottom of the Demand Terminal.

2. Connect the connecting the wires from the Demand Terminal to the Main P.C.B by the connectors.
   <Position of CN-OPT1 and CN-OPT2 on the Main P.C.B>

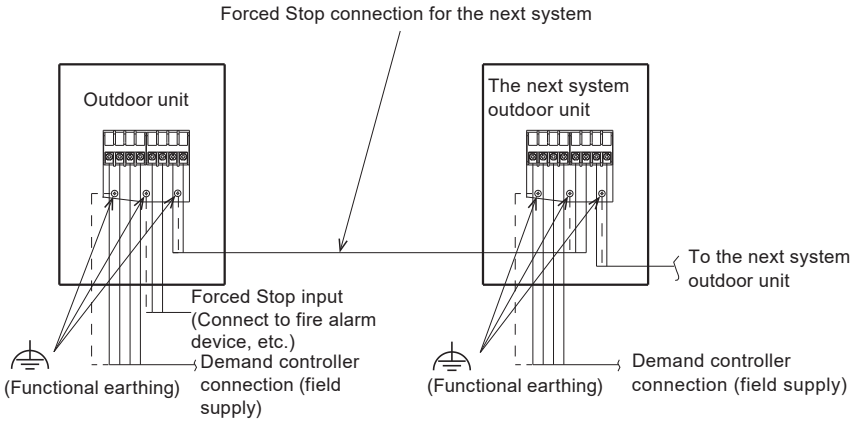


Connect 6P to CN-OPT1, 2P to CN-OPT2

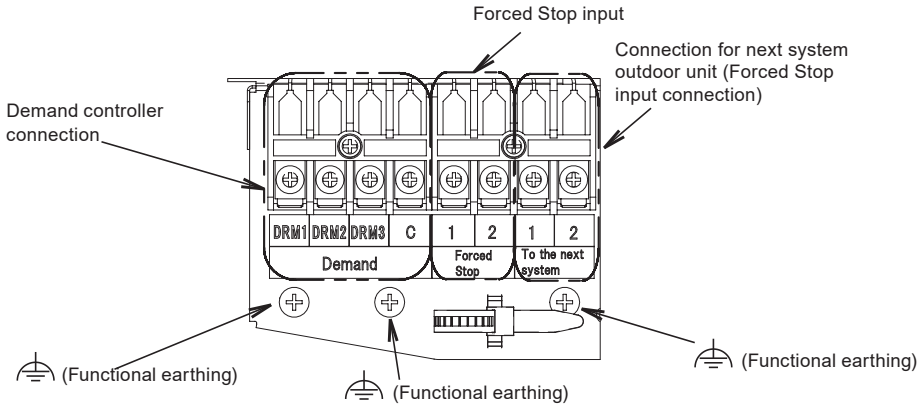
7. Optional Parts

3. CONNECTION PROCEDURE

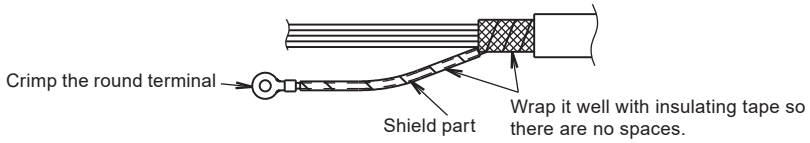
Be sure to always turn the power off first when setting up the wire and cable connections.
Failure to do so may lead to electric shock or unit failure.



The demand terminal set up is shown in the following illustration.



• Use a shielded cable for the cable connection.
For the shield part of the shielded cable twist the end out, crimp it with a round terminal, and connect it to functional earthing screw.
After crimping it with a round terminal, wrap it with insulating tape so there are no spaces and adjust it so the shield part does not touch any live parts.

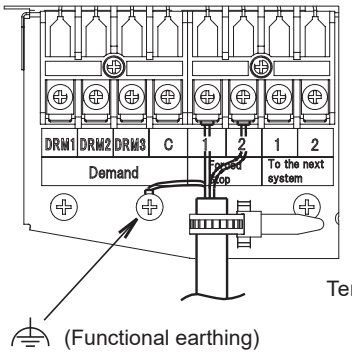


⚠ CAUTION	Be sure that the shield part of the shielded cable does not touch the terminal block or any live parts. Failure to do so may lead to electric shock or fire.

7. Optional Parts

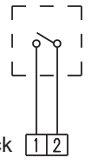
WHEN CONNECTION TO THE FORCED STOP INPUT

With the Forced Stop input, it is possible to override the air conditioning operation to force a stop if a signal is received from a fire alarm device, etc.



Connect the wiring (2-wire) to points 1 and 2 on the left side of the terminal block.
The shield part of the shielded cable is connected with ⏚ (Functional earthing) under the terminal block.
Secure the wiring with the cord clamp located on the lower part of the terminal block.

Fire alarm device

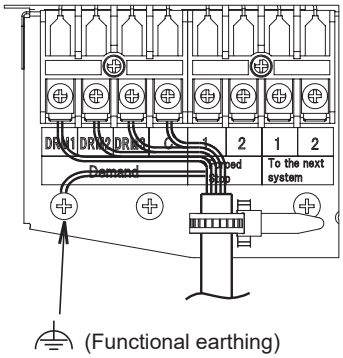


Relay contact point: No voltage relay
Current input is DC 24V 2mA
Use a very small electric current contact point for the relay.

(Functional earthing)

WHEN CONNECTING THE DEMAND CONTROLLER INPUT

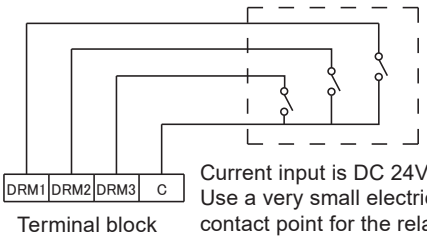
It is possible to choose various demand levels.
Refer to the table shown on the right.



(Functional earthing)

Terminal no. for demand section	Description
DRM3	Approx. 75% of rated current
DRM2	Approx. 50% of rated current
DRM1	Compressor off

Connect the wiring (4-wire) to the Demand section (DRM1, DRM2, DRM3, C) on the terminal block. The shield part of the shielded cable is connected with ⏚ (Functional earthing) under the terminal block. Secure the wiring with the cord clamp located on the lower part of the terminal block.



Current input is DC 24V 10mA
Use a very small electric current contact point for the relay.

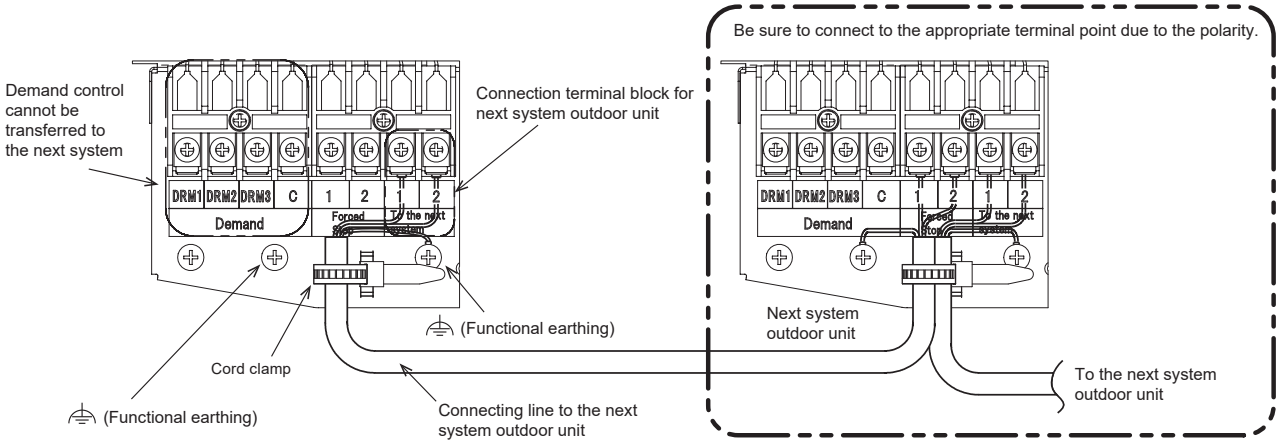
NOTE
To use the demand function, it is necessary to configure the EEPROM settings of the outdoor unit before test operation. For how to change the settings, refer to the section “5. DRED method for R32 mini VRF system”.

7. Optional Parts

WHEN CONNECTING TO THE NEXT SYSTEM UNIT

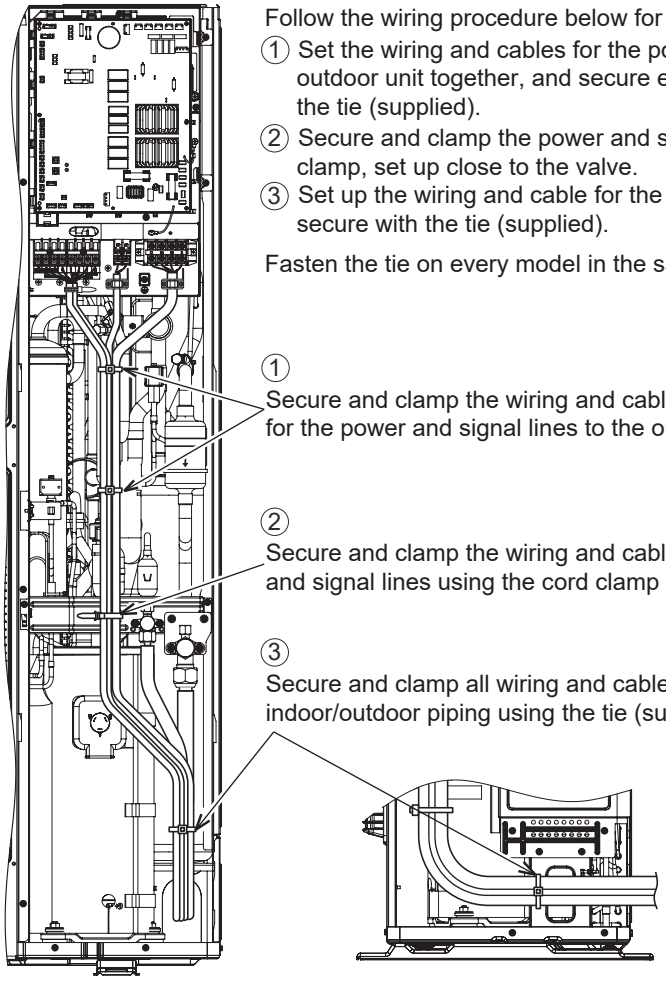
- Forced Stop input can be transferred to the next system unit.
- When using the Forced Stop input, connect the wiring to the terminal points 1 and 2 on the right side of the lower part of the terminal block.
- The maximum wire/cable length is 100 m.
- The demand control cannot be transferred to the next system unit.
- When transferring to the next system, the maximum number of connecting units is 30.

1. Connecting the wiring to the lower part of the terminal block.
   When transferring the Forced Stop input to the next system connect the wiring (2-wire) to the terminal points 1 and 2 at the lower right side of the terminal block. The shield part of the shielded cable is connected with ⏚ (Functional earthing) under the terminal block.
   Secure the wiring with the cord clamp located on the lower part of the terminal block.
2. Connecting the shielded cable to the terminal block for the next system.
   For the Forced Stop input, connect the wiring to the terminal points 1 and 2 at the lower right side of the terminal block.
   When connecting to the next system be sure to connect to the appropriate terminal point due to the polarity.



7. Optional Parts

4. WIRING PROCEDURE



Follow the wiring procedure below for terminal connection.

① Set the wiring and cables for the power and signal lines to the outdoor unit together, and secure each wire and cable with the tie (supplied).

② Secure and clamp the power and signal lines with the cord clamp, set up close to the valve.

③ Set up the wiring and cable for the outdoor unit piping and secure with the tie (supplied).

Fasten the tie on every model in the same type of position.

①
Secure and clamp the wiring and cable with the tie (supplied) for the power and signal lines to the outdoor unit.

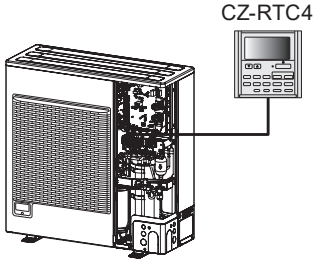
②
Secure and clamp the wiring and cable together with power and signal lines using the cord clamp set up close to the valve.

③
Secure and clamp all wiring and cable together with the indoor/outdoor piping using the tie (supplied).

5. DRED method for R32 mini VRF system

Set the parameter to enable DRED control by outdoor unit maintenance remote controller (CZ-RTC4).

1) Connect the remote controller (CZ-RTC4) to the control P.C.B of the outdoor unit
2) Change SET DATA of Code No. to the following values when used in Oceania.



	SET DATA	
CODE No.	For Europe (Initial)	For Oceania
1A	100	75
1b	70	50

NOTE
For how to connect to the control P.C.B. of the outdoor unit of CZ-RTC4, and for how to configure the EEPROM, see “How to setting for Oceania” on next page.

6. CHECK AFTER COMPLETING INSTALLATION

Check the signals to make sure the unit operates properly using an external input device.

7. Optional Parts

■ How to setting for Oceania

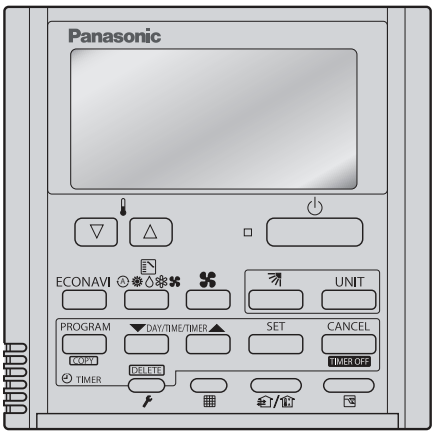
1. Overview

OUTDOOR UNIT MAINTENANCE REMOTE CONTROLLER (CZ-RTC4)

■ About the outdoor unit maintenance remote controller

The outdoor unit utilizes nonvolatile memory (EEPROM) on its PCB. This allows EEPROM data to replace the setting switches that were present on previous PCBs. The outdoor unit maintenance remote controller is used to set and change these EEPROM data.
In addition to setting and checking the outdoor unit EEPROM data, this remote controller can also be used to monitor the outdoor unit alarm history, monitor the various indoor and outdoor temperatures, and check the indoor unit connection status (number of units, operating mode, etc.).

[Service Checker Section]

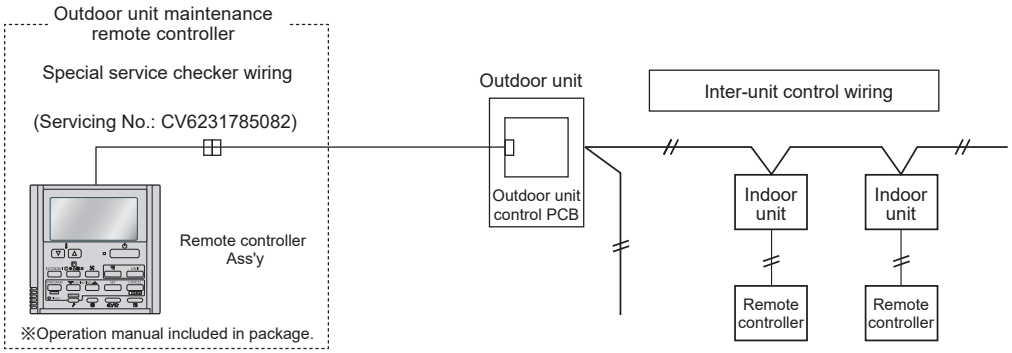


CZ-RTC4

NOTE

Outdoor unit maintenance remote controller does not function as an ordinary remote controller. It is therefore only used for test runs and during servicing.

System diagram



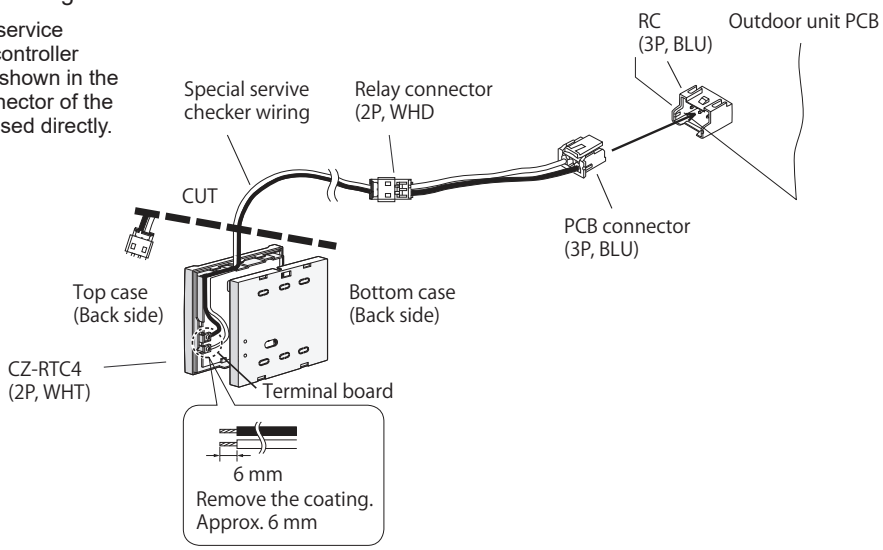
- The special service checker wiring is required in order to connect the outdoor unit maintenance remote controller to the outdoor unit PCB.
- Ordinary remote controllers or other controller are still required for the indoor units, even when the outdoor unit maintenance remote controller is connected.

2. Ordinary Display Controls and Functions

■ Functions on the ordinary display

• Connect the special service checker wiring to the outdoor unit PCB.
The connection is shown in the figure below.

When connecting the special service checker wiring to the remote controller CZ-RTC4, cut out the wire as shown in the figure below because the connector of the remote controller cannot be used directly.



7. Optional Parts

- If the communications line in the inter-unit control wiring is connected, it can be left as-is.
- In case of an independent outdoor unit (1 maintenance remote controller connected to 1 outdoor unit, auto address setting for indoor units not completed), both setting mode 1 and setting mode 2 can be used.
- The overall system status for that refrigerant system is displayed.
- " SETTING " is displayed until auto address setting is completed.

3. Mode Settings

<Operating procedure>

① Press and hold the (Check) button and (Ventilation) button simultaneously for 4 seconds or longer.

② Press the temperature setting △ and ▽ buttons to change the item code. The item codes and setting data are shown in the table below.

③ Press the timer time DAY and TIMER buttons to change the setting data.

To confirm the changed setting data, press the SET button.

(At this time, " SETTING " display stops blinking and remains lit.)

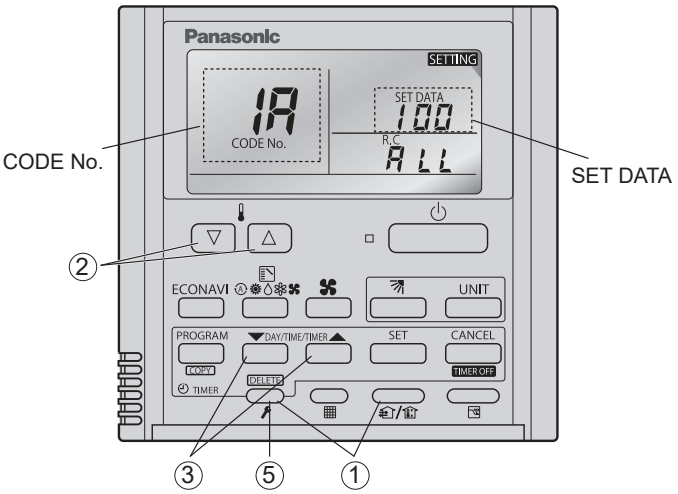
Change SET DATA of Code No. to the following values when used in Oceania.

	SET DATA	
CODE No.	For Europe (Initial)	For Oceania
1A	100	75
1b	70	50

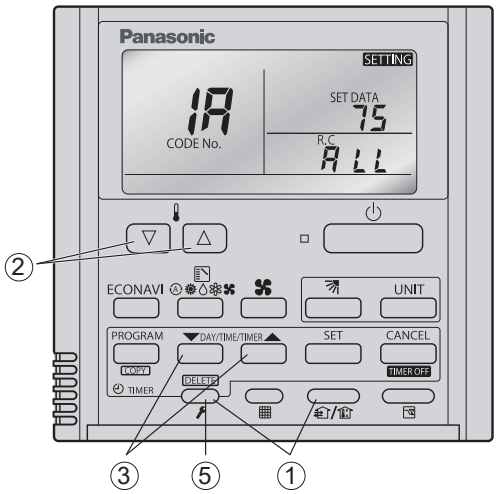
④ During this mode, " SETTING " is displayed, blinking. The outdoor unit address display section displays "ALL," the item code and number (DN value in the table), and the setting data (6 digits).

⑤ To exit the setting mode, press the (Check) button.

For Europe (Initial setting)



For Oceania



8. Supplement

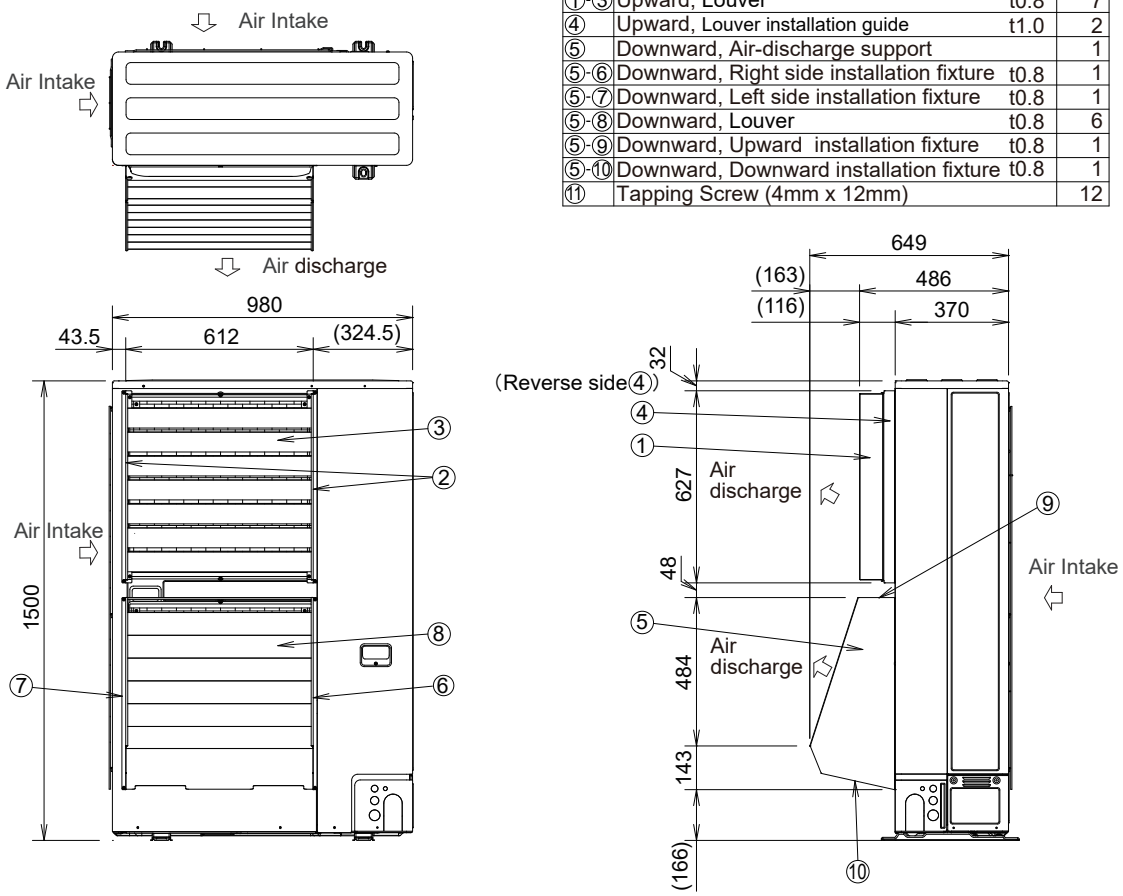
8-1. Dimensions of Air-Discharge Chamber

In snowy regions, if there is concern that snow may enter the air discharge chamber, remove the base of the chamber before using.

Reference diagram

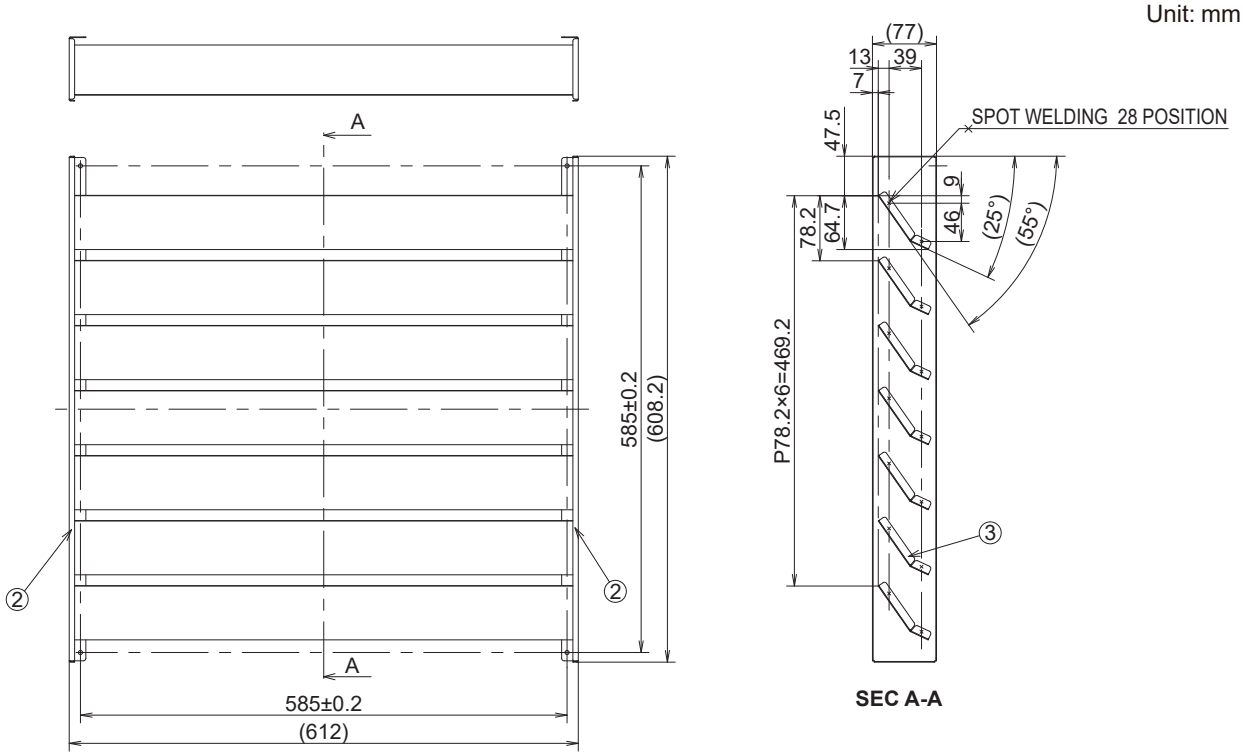
Unit: mm

			Q'ty
①	Upward, Air-discharge support		1
①-②	Upward, side installation fixture	t0.8	2
①-③	Upward, Louver	t0.8	7
④	Upward, Louver installation guide	t1.0	2
⑤	Downward, Air-discharge support		1
⑤-⑥	Downward, Right side installation fixture	t0.8	1
⑤-⑦	Downward, Left side installation fixture	t0.8	1
⑤-⑧	Downward, Louver	t0.8	6
⑤-⑨	Downward, Upward installation fixture	t0.8	1
⑤-⑩	Downward, Downward installation fixture	t0.8	1
⑪	Tapping Screw (4mm x 12mm)		12



① Reference diagram for Upward Air-discharge support (field supply)

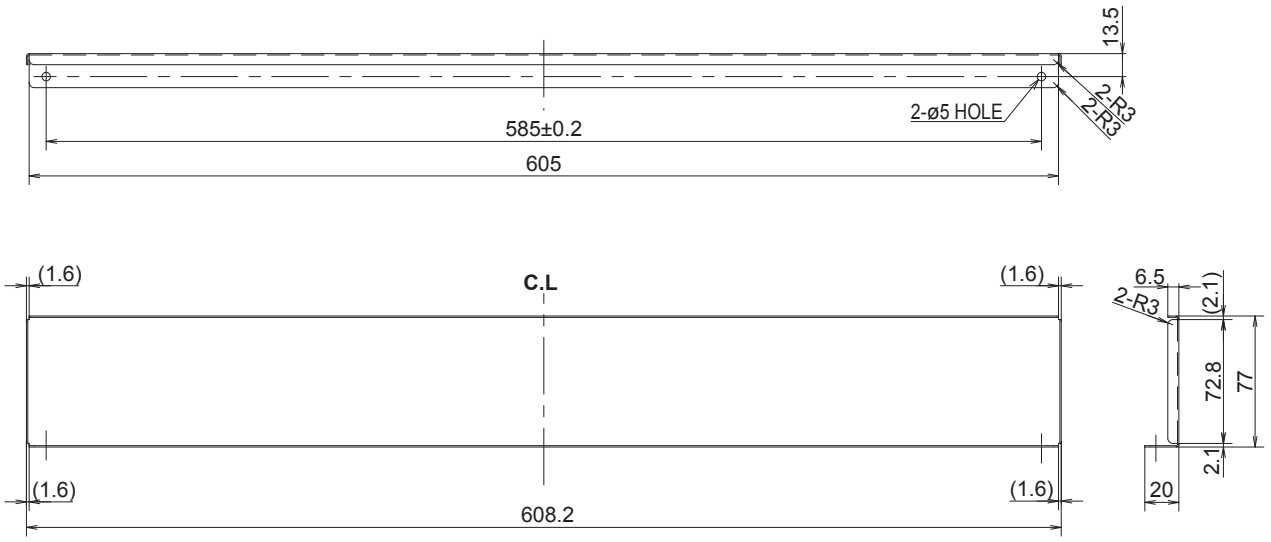
Unit: mm



8. Supplement

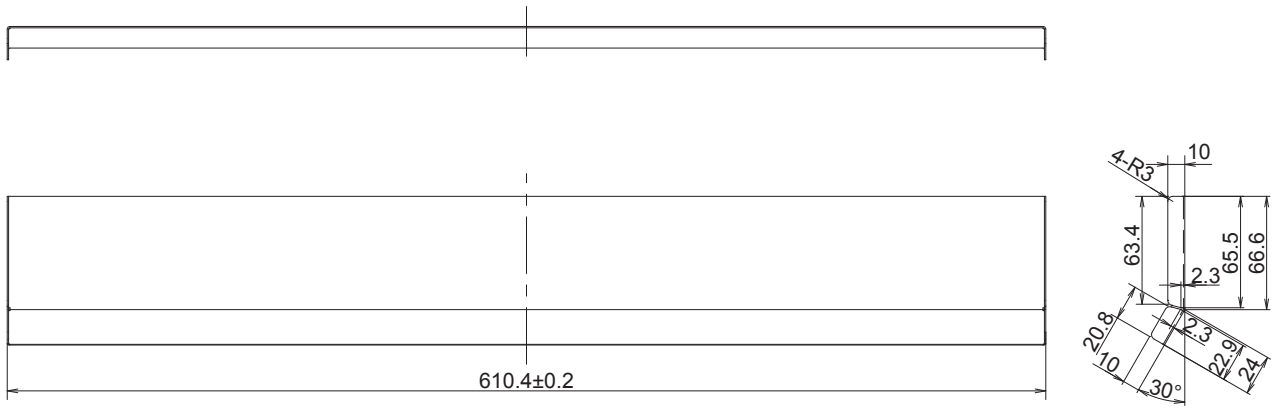
② Reference diagram for **Upward, side installation fixture** (field supply)

Unit: mm



③ Reference diagram for **Upward, Louver** (field supply)

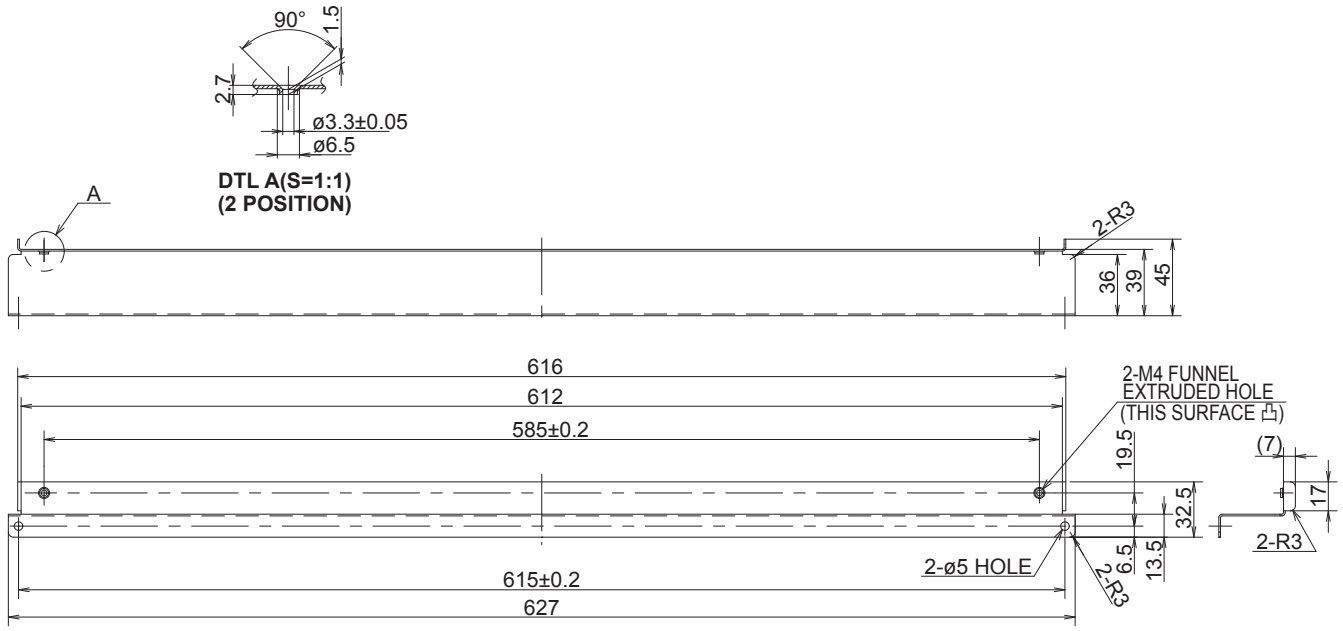
Unit: mm



8. Supplement

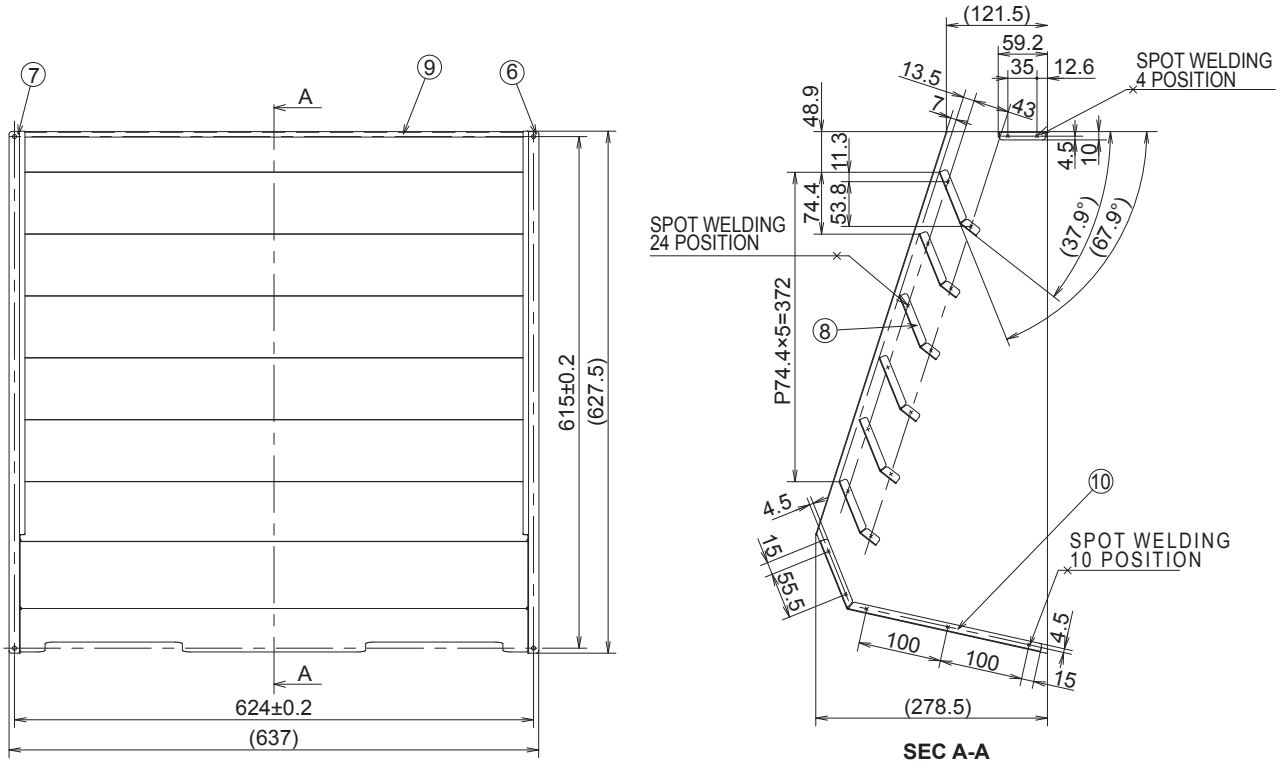
④ Reference diagram for **Upward, Louver installation guide** (field supply)

Unit: mm



⑤ Reference diagram for **Downward, Air-discharge support** (field supply)

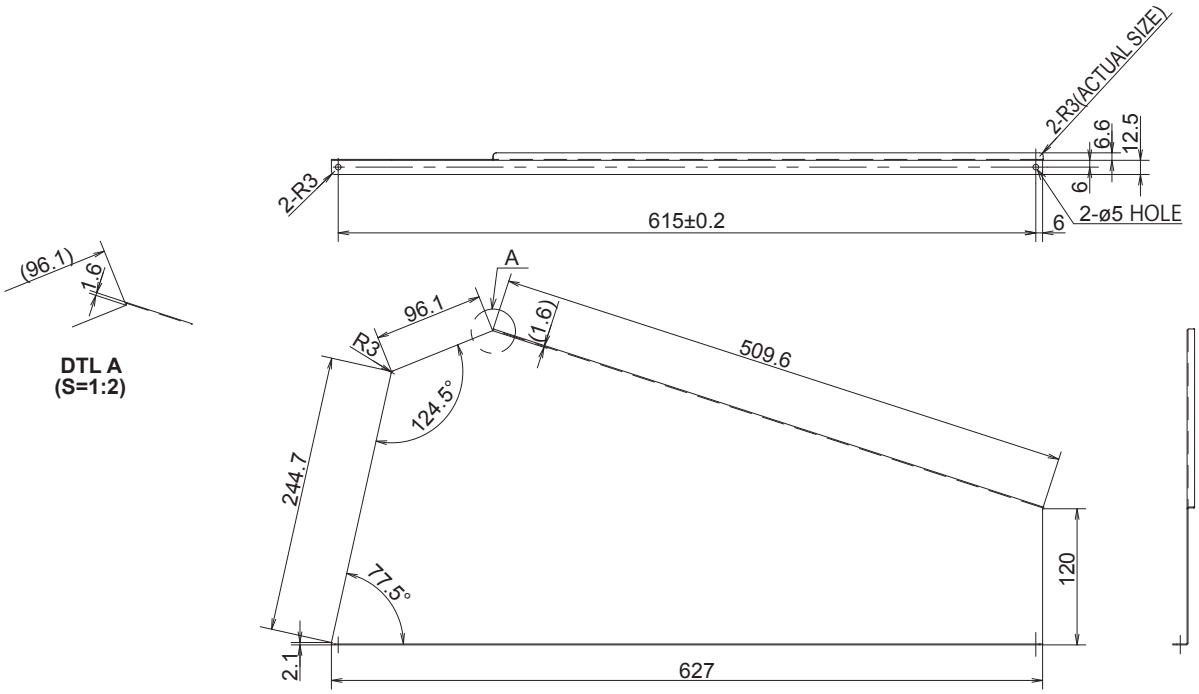
Unit: mm



8. Supplement

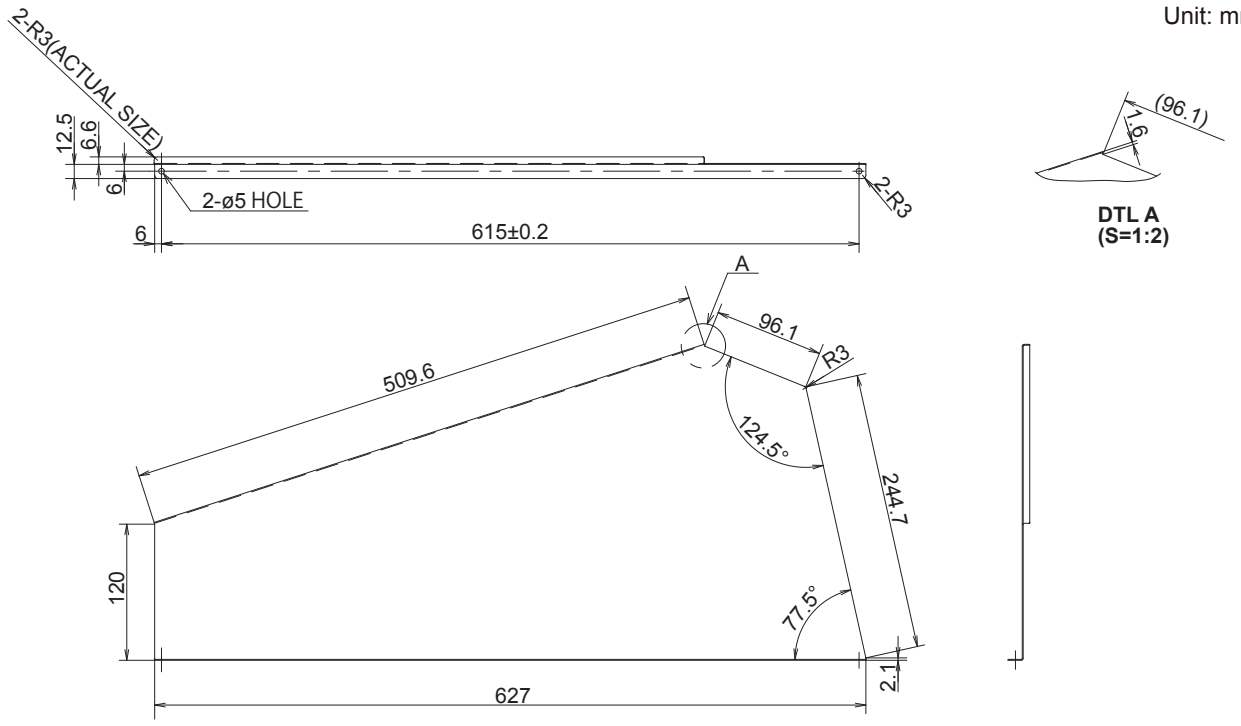
⑥ Reference diagram for **Downward, Right side installation fixture** (field supply)

Unit: mm



⑦ Reference diagram for **Downward, Left side installation fixture** (field supply)

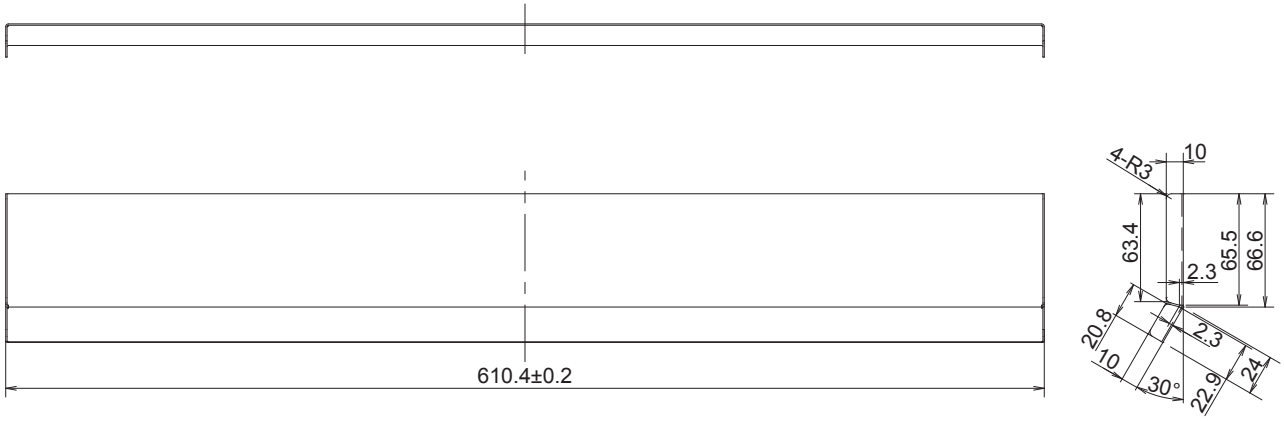
Unit: mm



8. Supplement

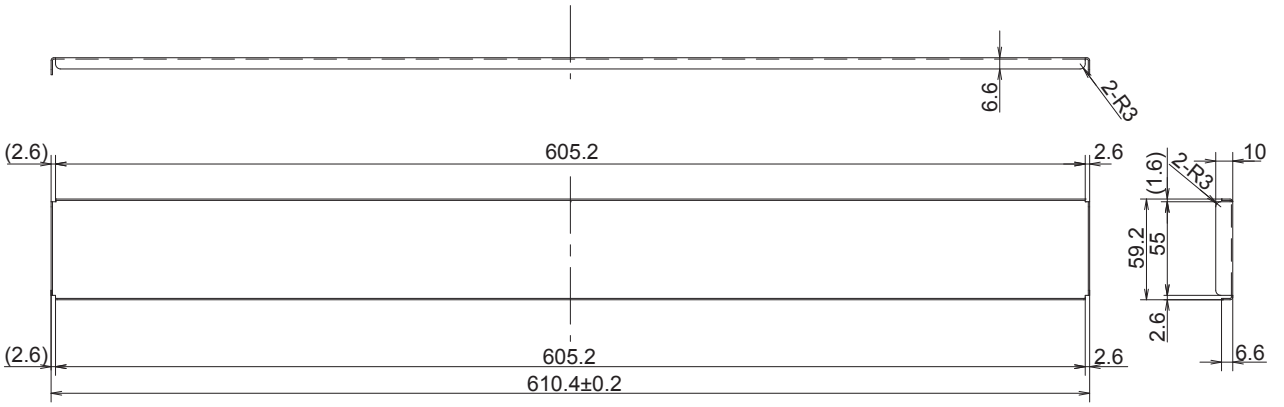
⑧ Reference diagram for **Downward, Louver** (field supply)

Unit: mm



⑨ Reference diagram for **Downward, Upward installation fixture** (field supply)

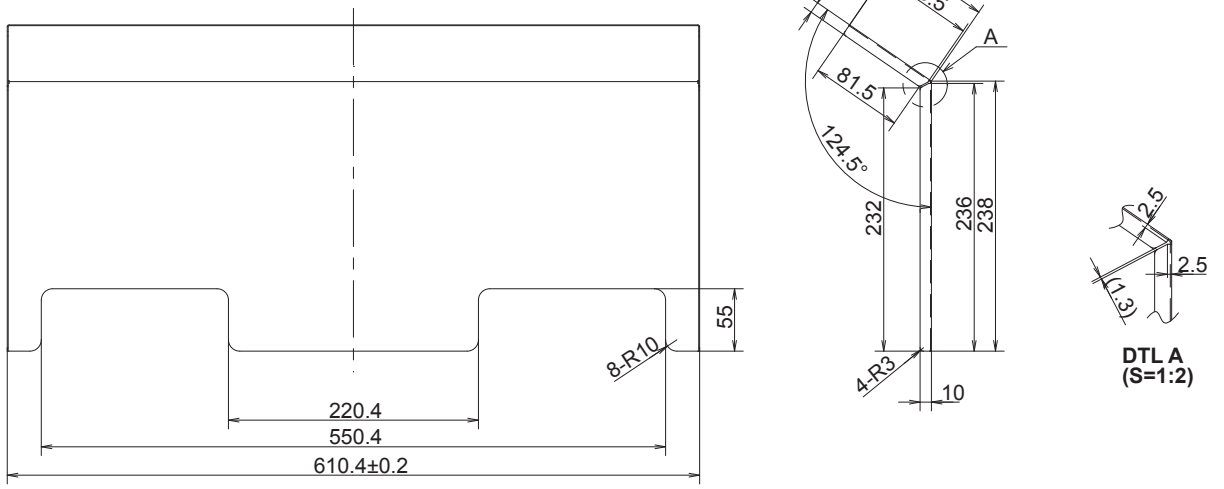
Unit: mm



8. Supplement

⑩ Reference diagram for **Downward, Downward installation fixture** (field supply)

Unit: mm

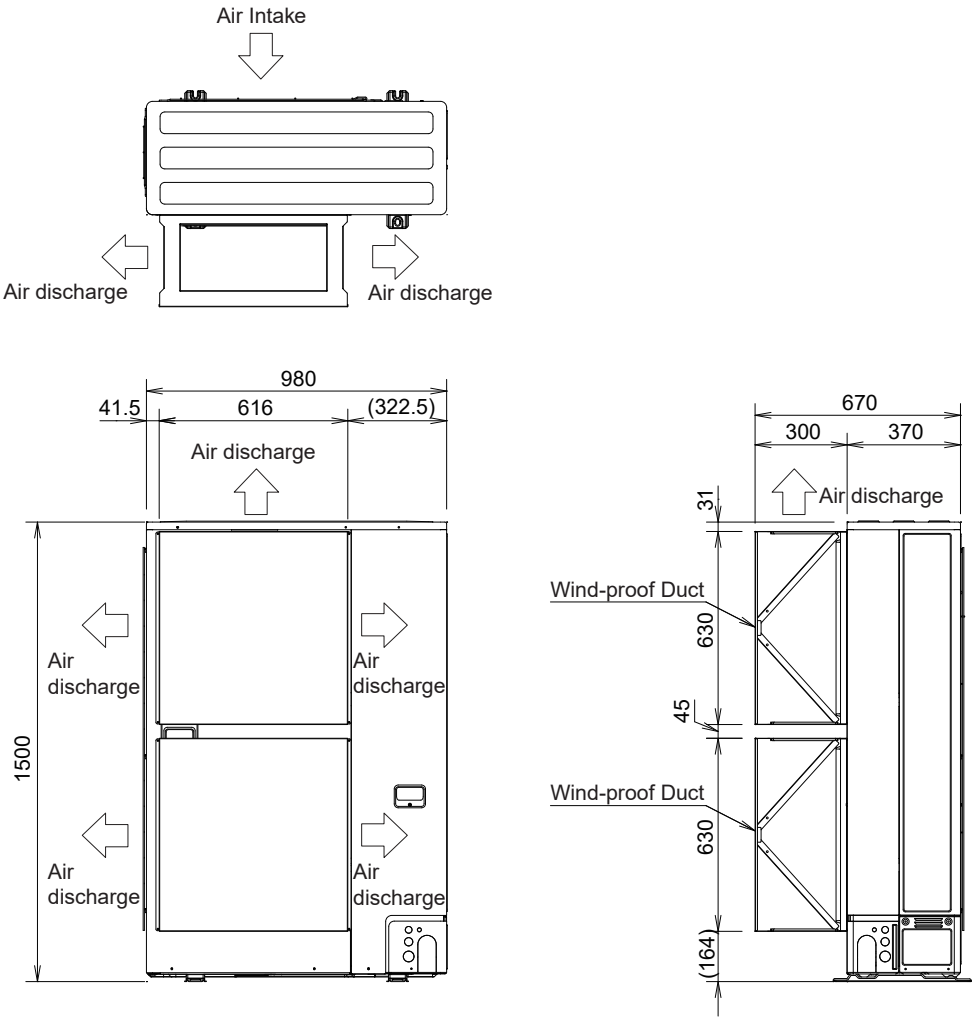


8. Supplement

8-2. Dimensions of Wind-proof Duct

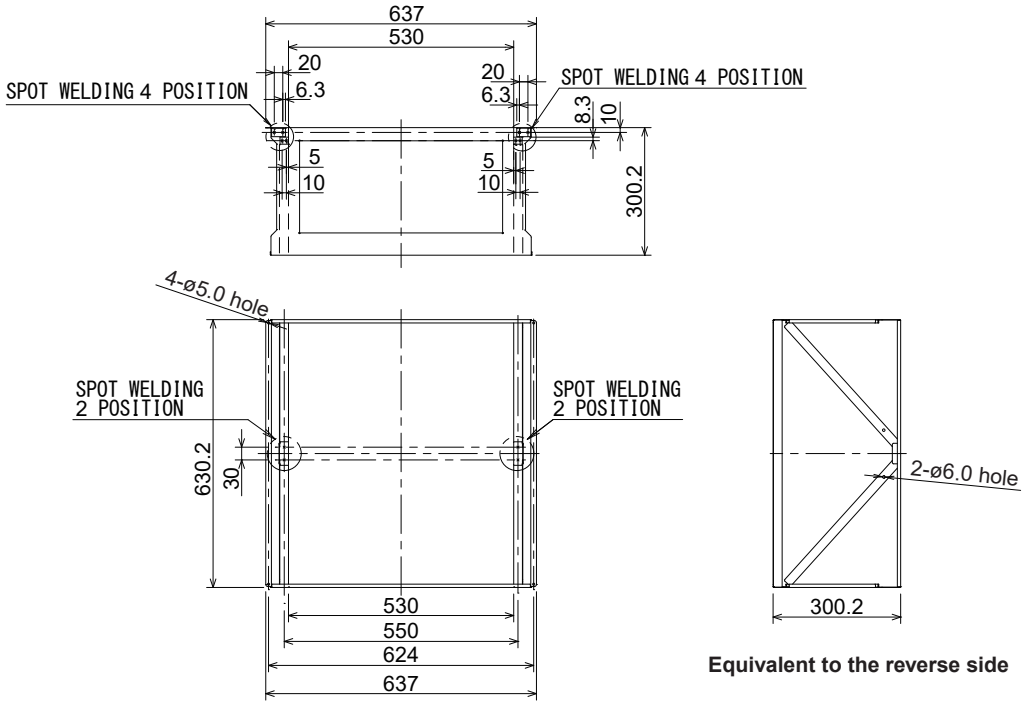
Reference diagram

Unit: mm



Reference diagram for wind-proof duct (field supply)

Unit: mm



Equivalent to the reverse side

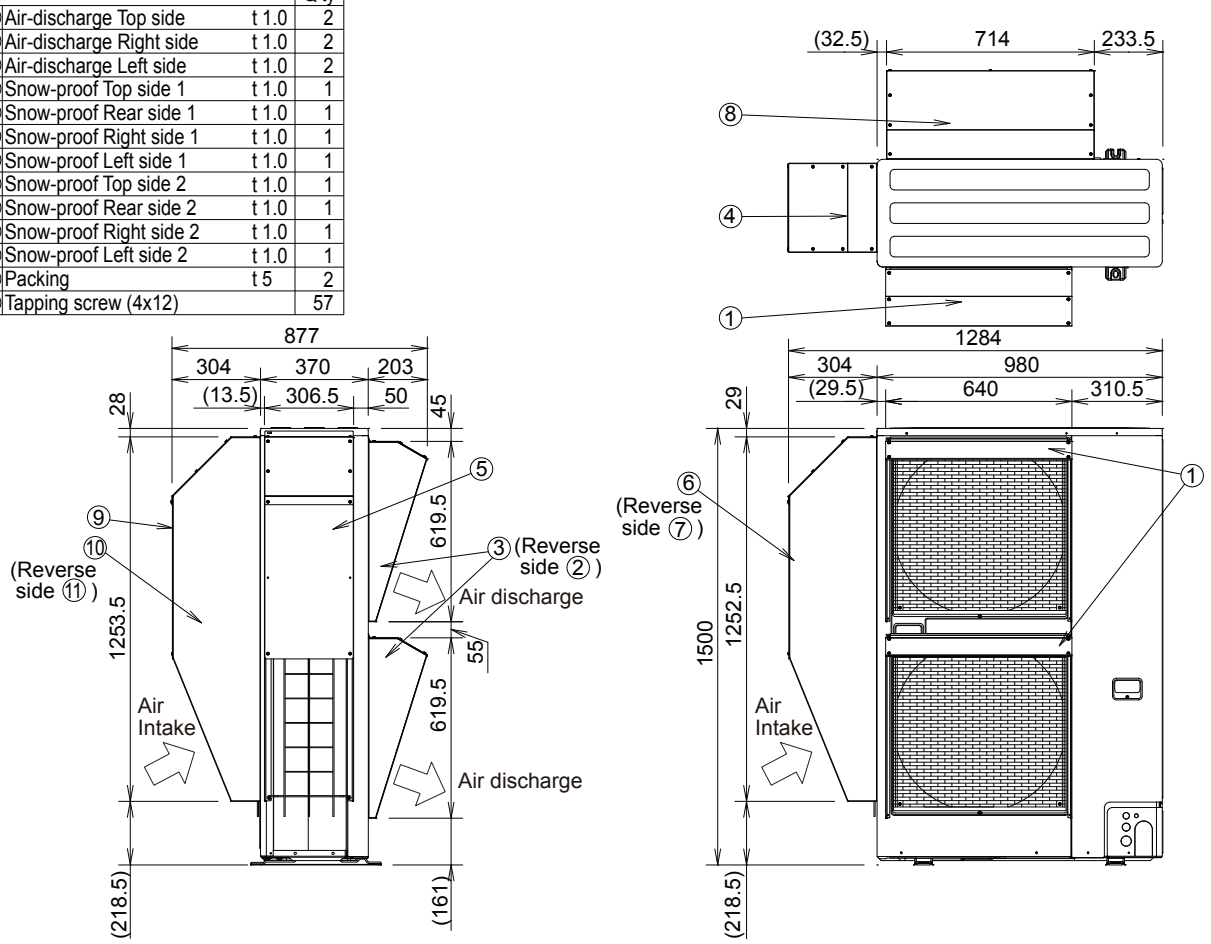
8. Supplement

8-3. Dimensions of Snow-proof Vents

Reference diagram

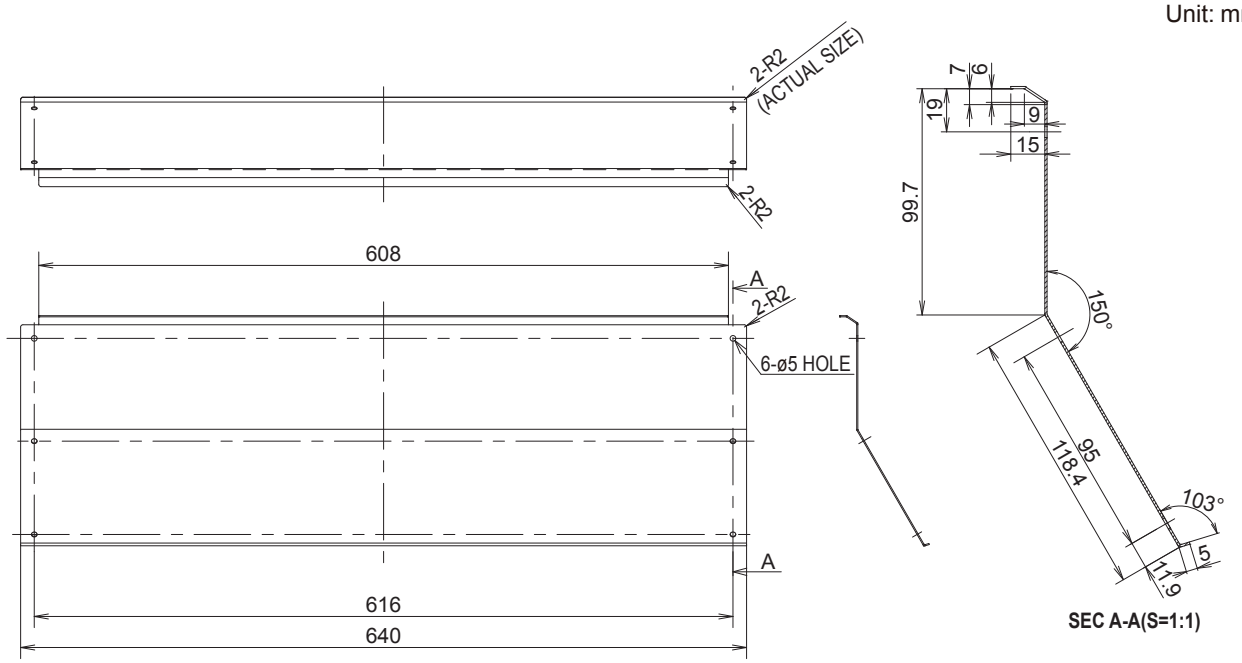
		Q'ty
① Air-discharge Top side	t 1.0	2
② Air-discharge Right side	t 1.0	2
③ Air-discharge Left side	t 1.0	2
④ Snow-proof Top side 1	t 1.0	1
⑤ Snow-proof Rear side 1	t 1.0	1
⑥ Snow-proof Right side 1	t 1.0	1
⑦ Snow-proof Left side 1	t 1.0	1
⑧ Snow-proof Top side 2	t 1.0	1
⑨ Snow-proof Rear side 2	t 1.0	1
⑩ Snow-proof Right side 2	t 1.0	1
⑪ Snow-proof Left side 2	t 1.0	1
⑫ Packing	t 5	2
⑬ Tapping screw (4x12)		57

Unit: mm



① Reference diagram for Air-discharge Top side (field supply)

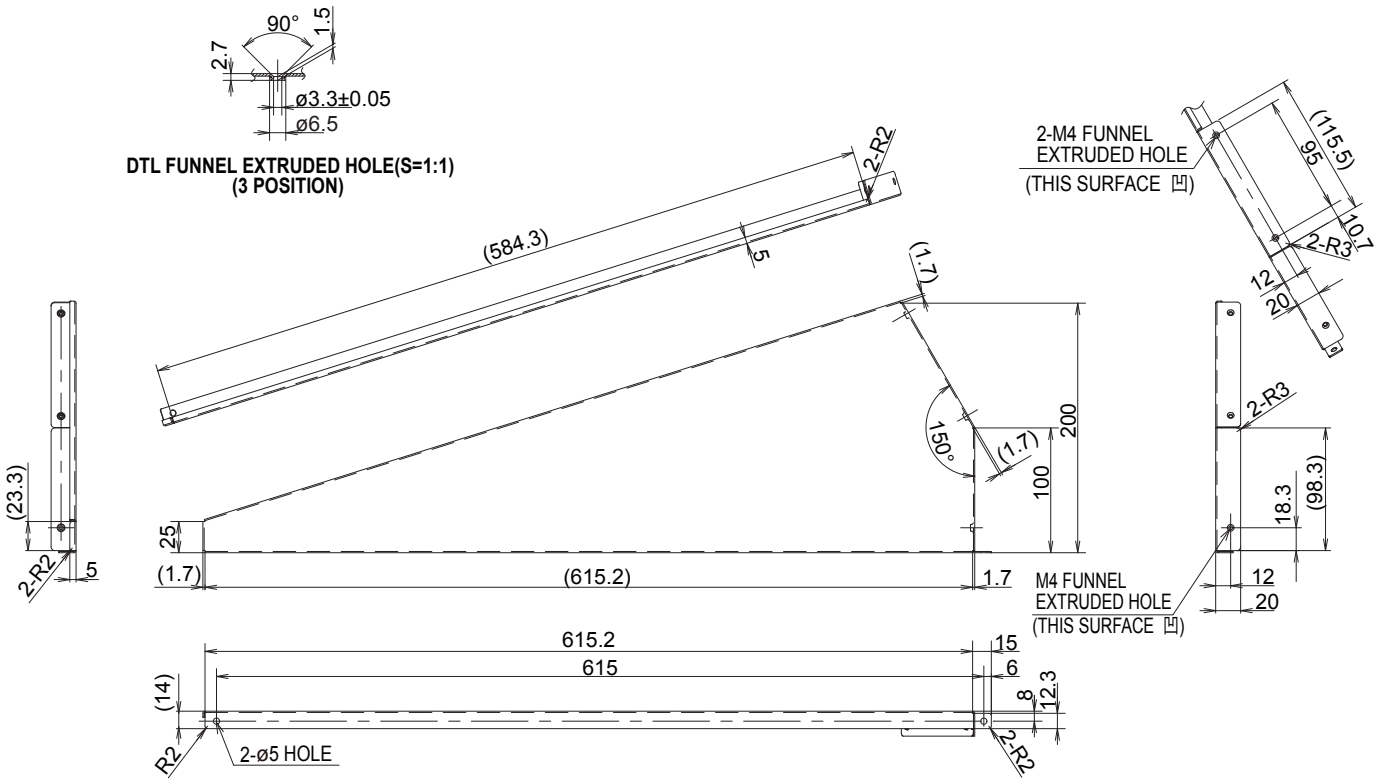
Unit: mm



8. Supplement

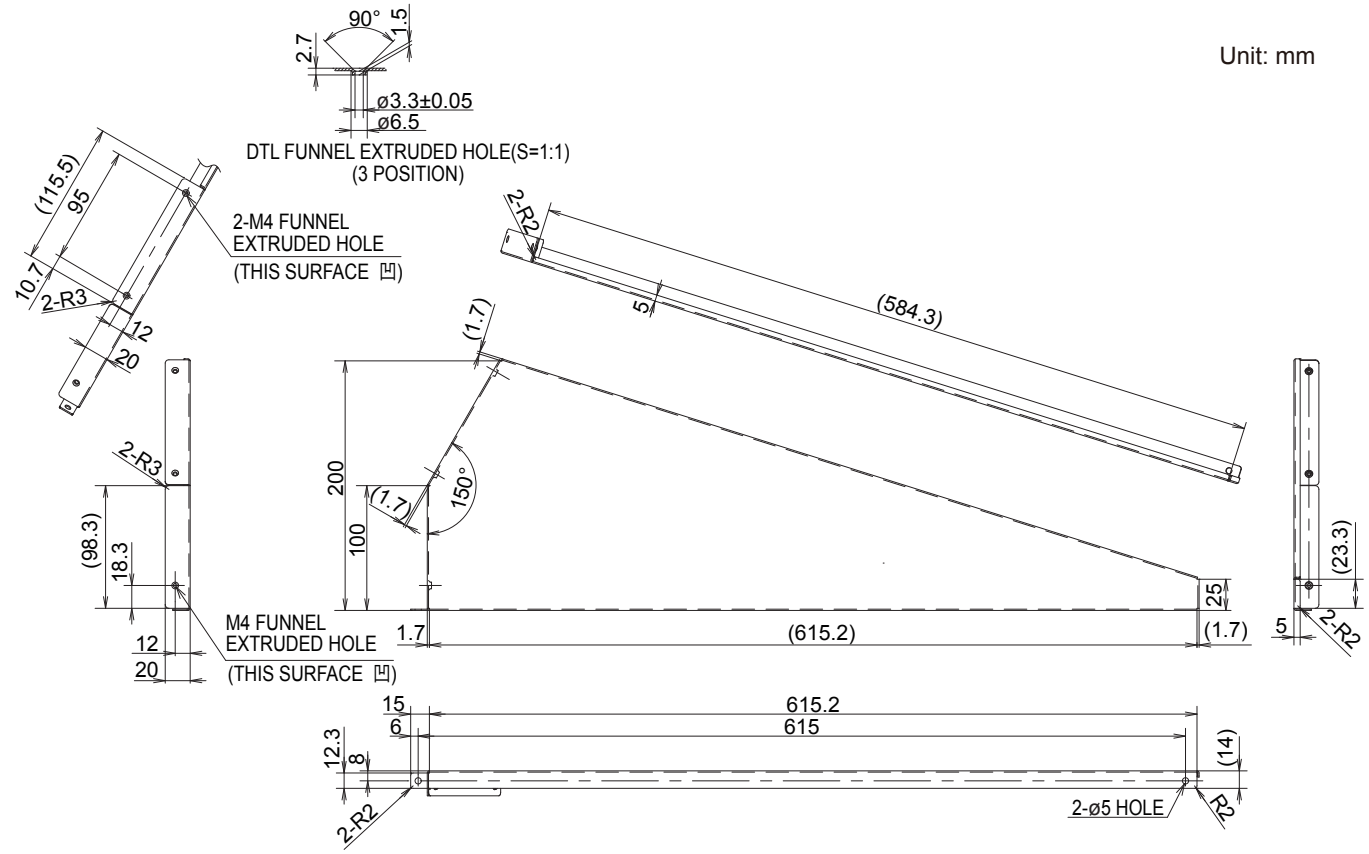
② Reference diagram for Air-discharge Right side (field supply)

Unit: mm



③ Reference diagram for Air-discharge Left side (field supply)

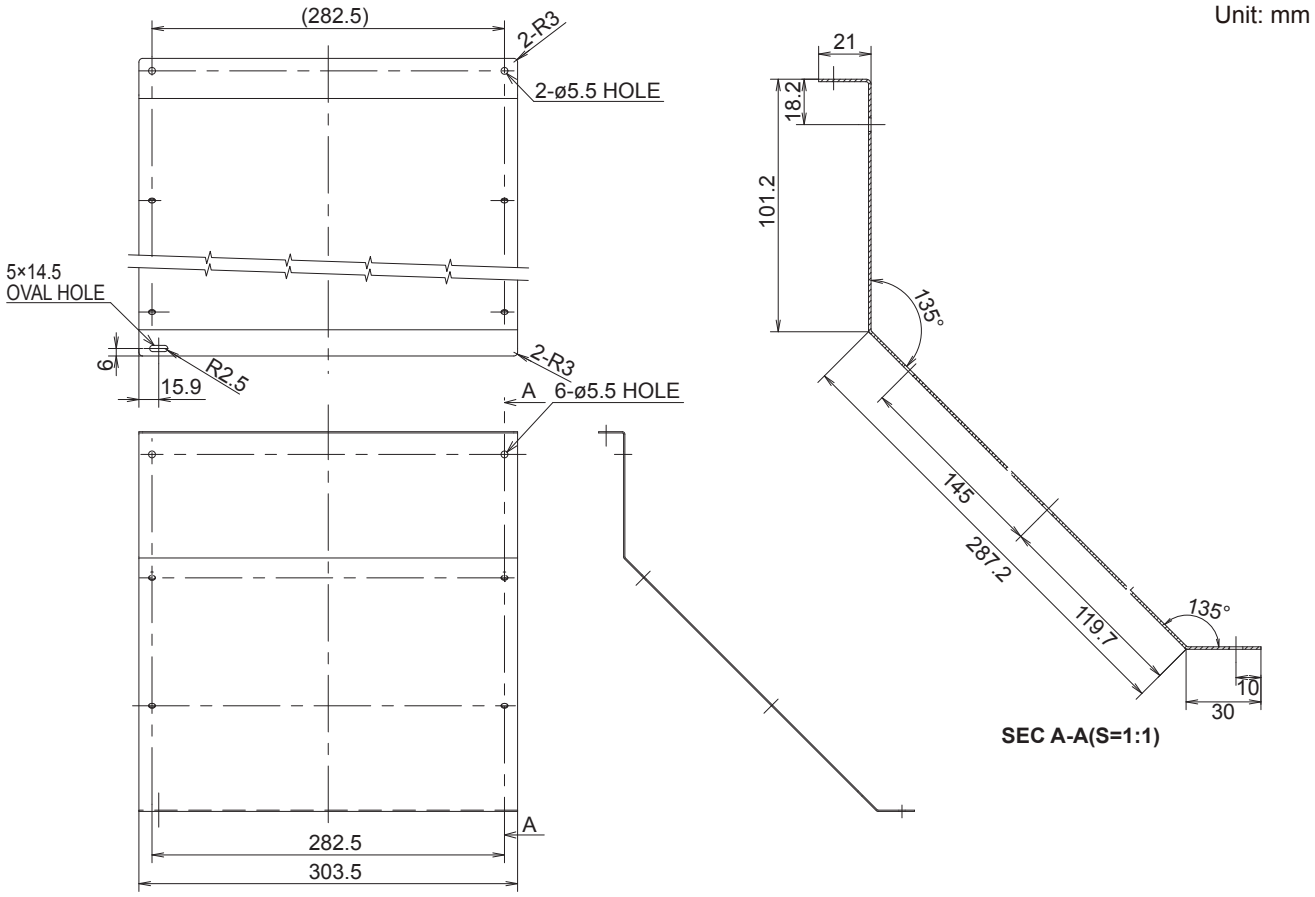
Unit: mm



8. Supplement

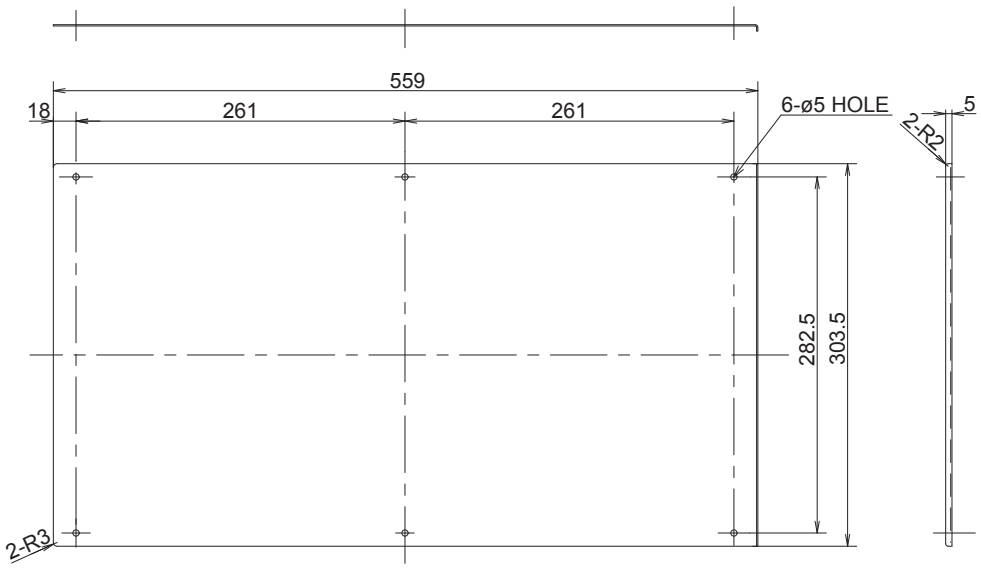
④ Reference diagram for Snow-proof Top side 1 (field supply)

Unit: mm



⑤ Reference diagram for Snow-proof Rear side 1 (field supply)

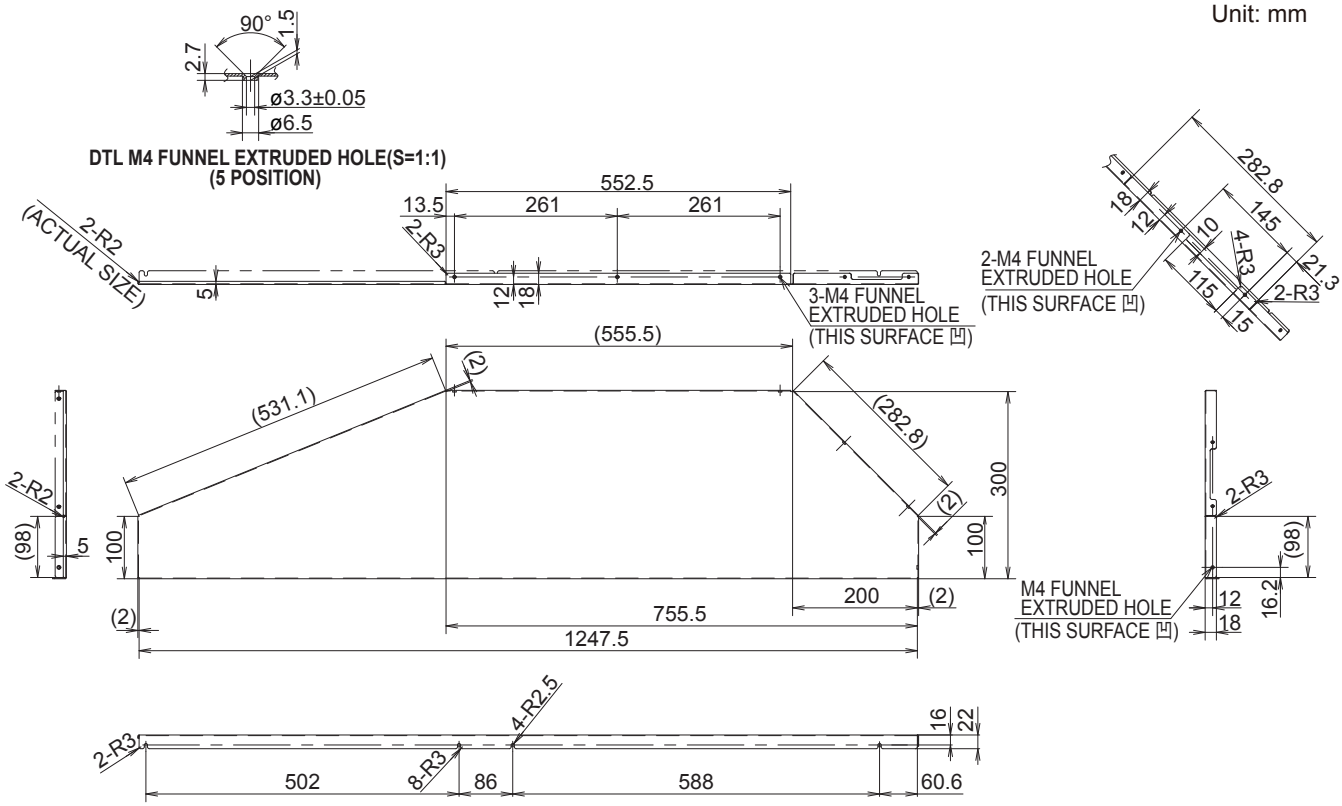
Unit: mm



8. Supplement

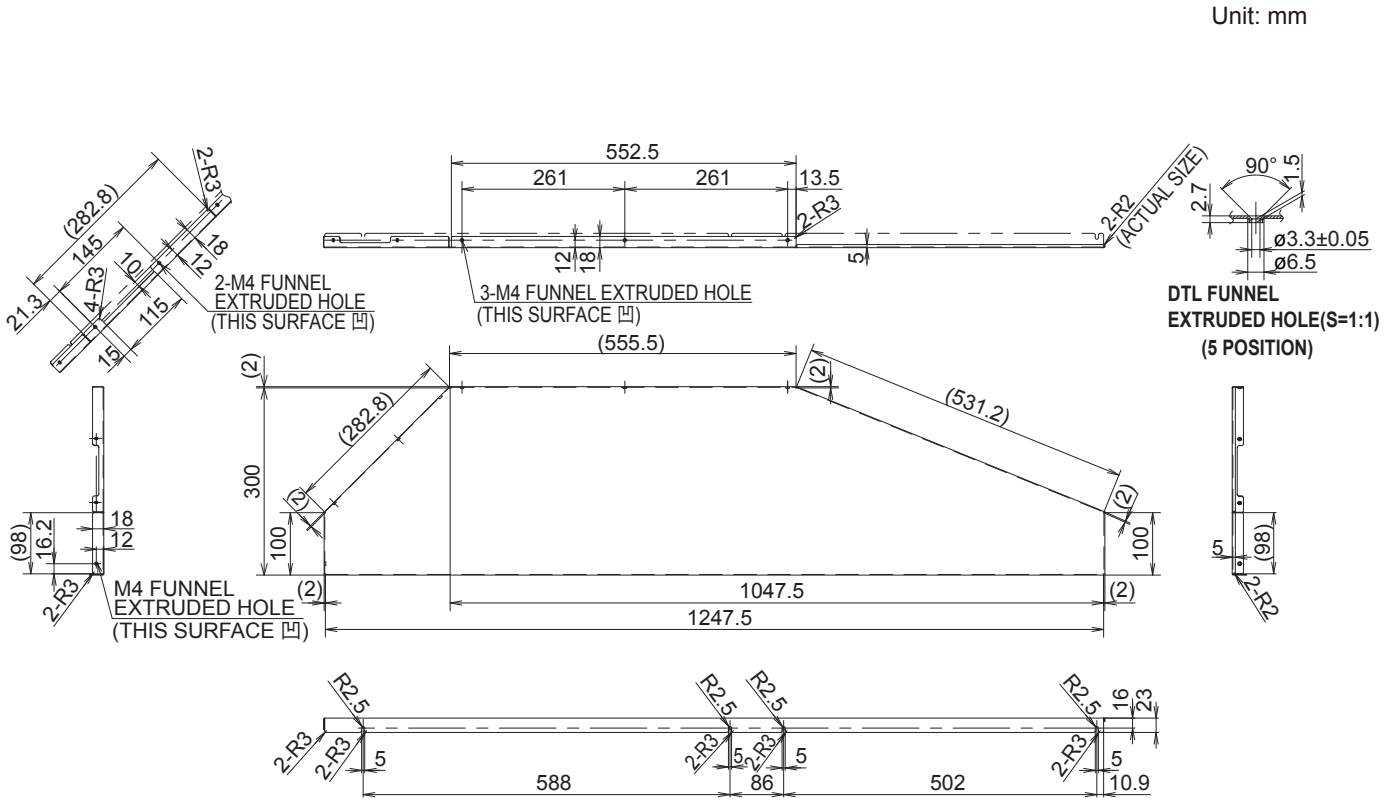
⑥ Reference diagram for Snow-proof Right side 1 (field supply)

Unit: mm



⑦ Reference diagram for Snow-proof Left side 1 (field supply)

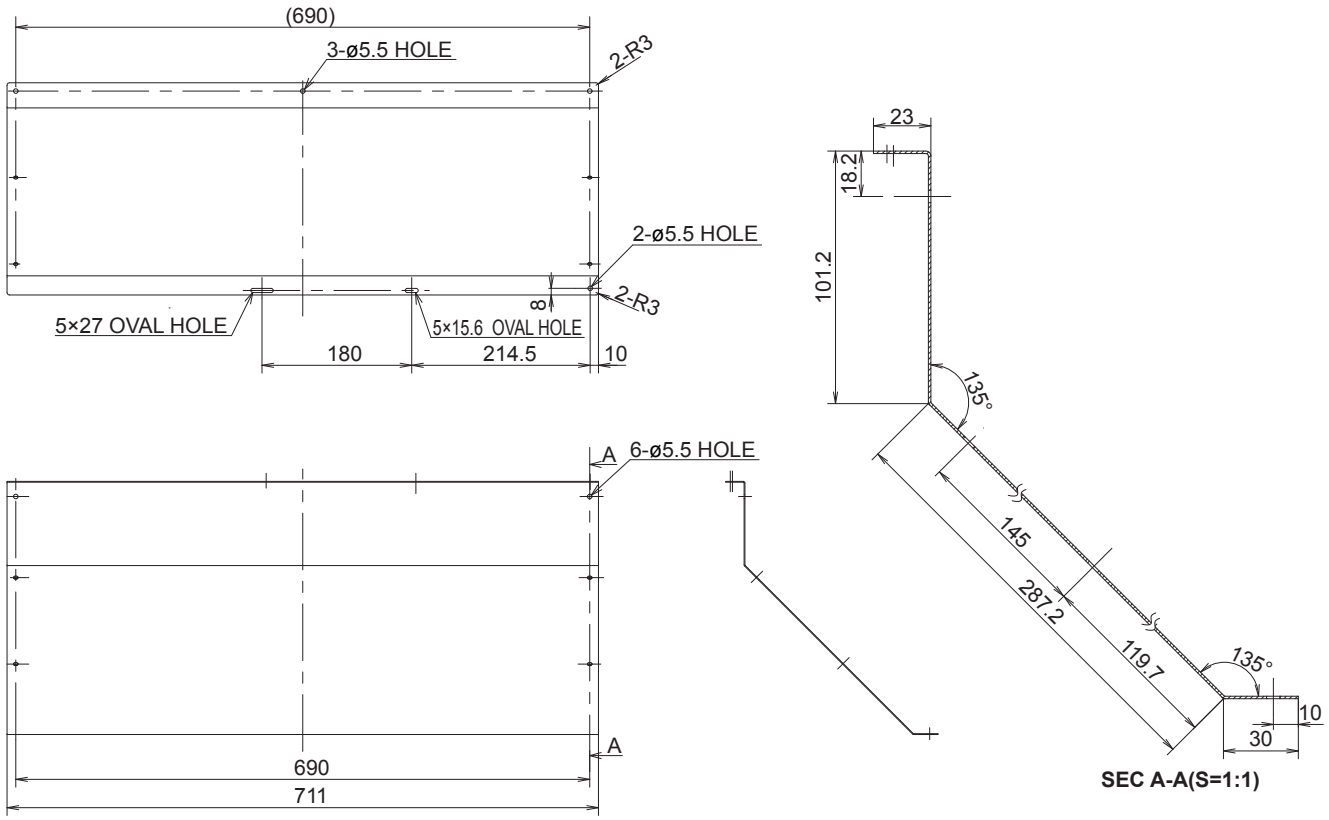
Unit: mm



8. Supplement

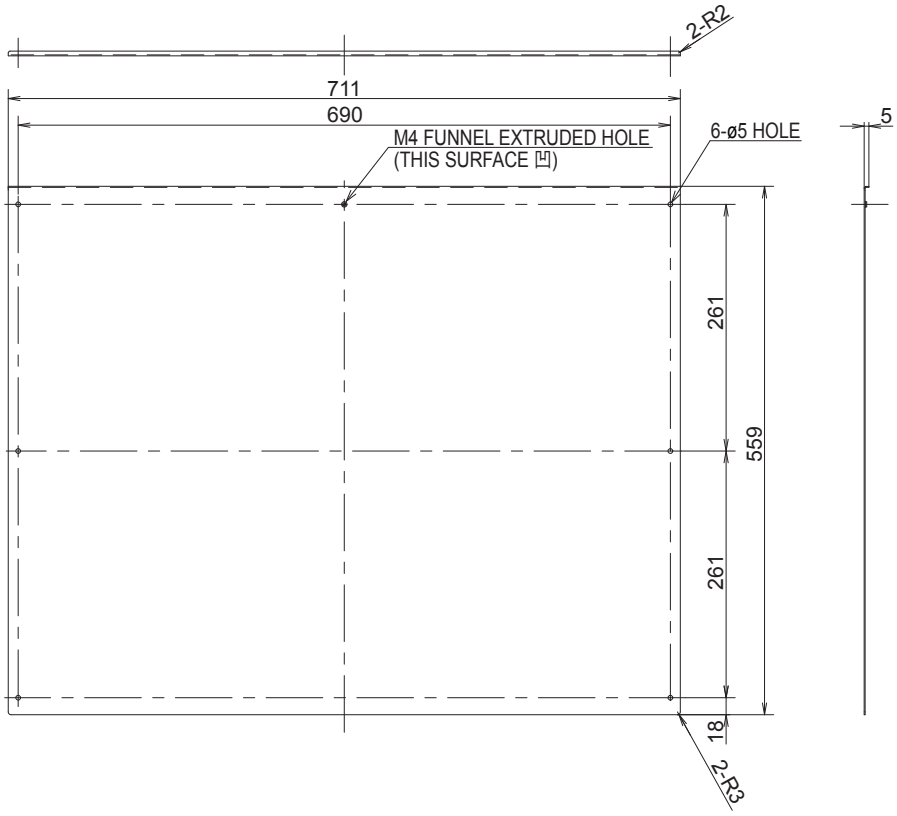
⑧ Reference diagram for Snow-proof Top side 2 (field supply)

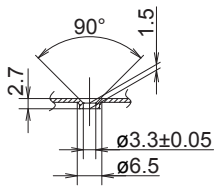
Unit: mm



⑨ Reference diagram for Snow-proof Rear side 2 (field supply)

Unit: mm



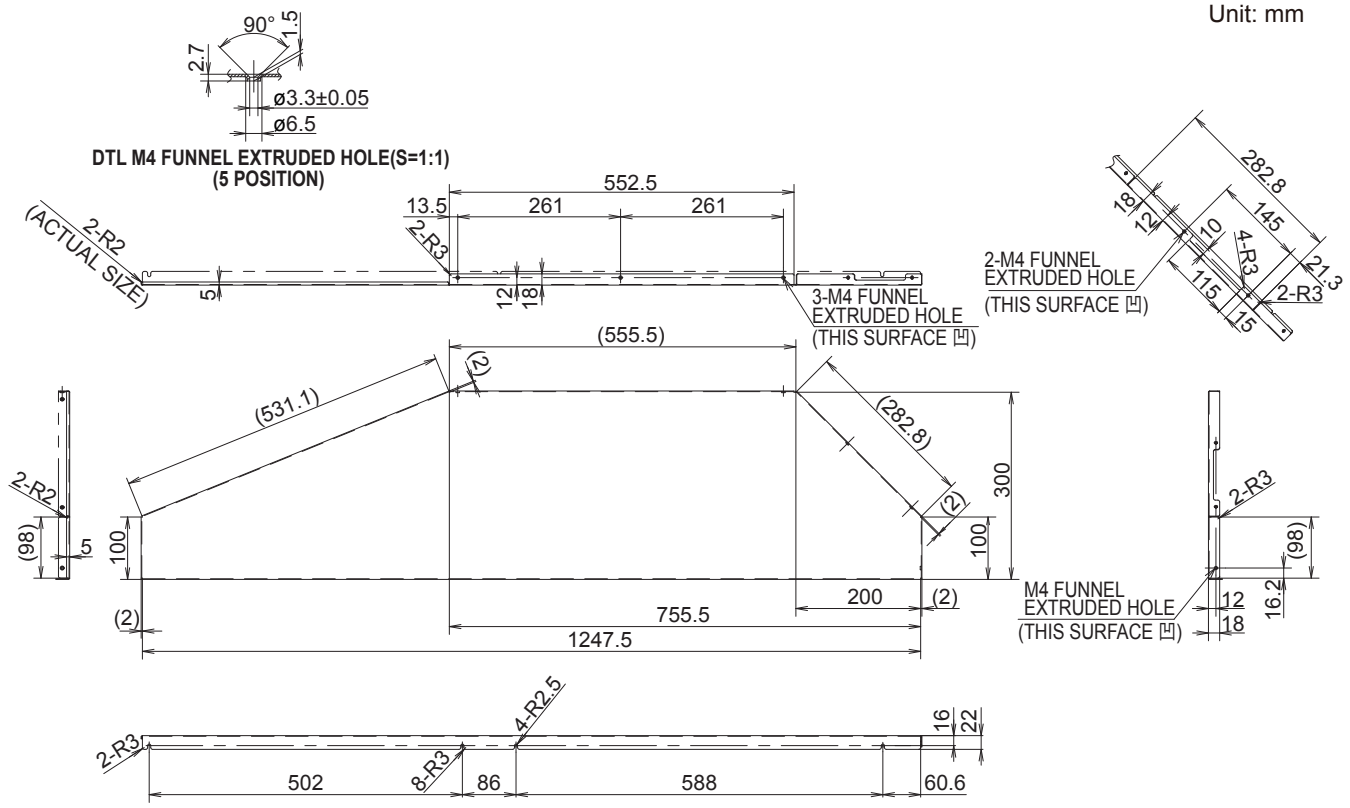


DLT FUNNEL EXTRUDED HOLE(S=1:1)
(1 POSITION)

8. Supplement

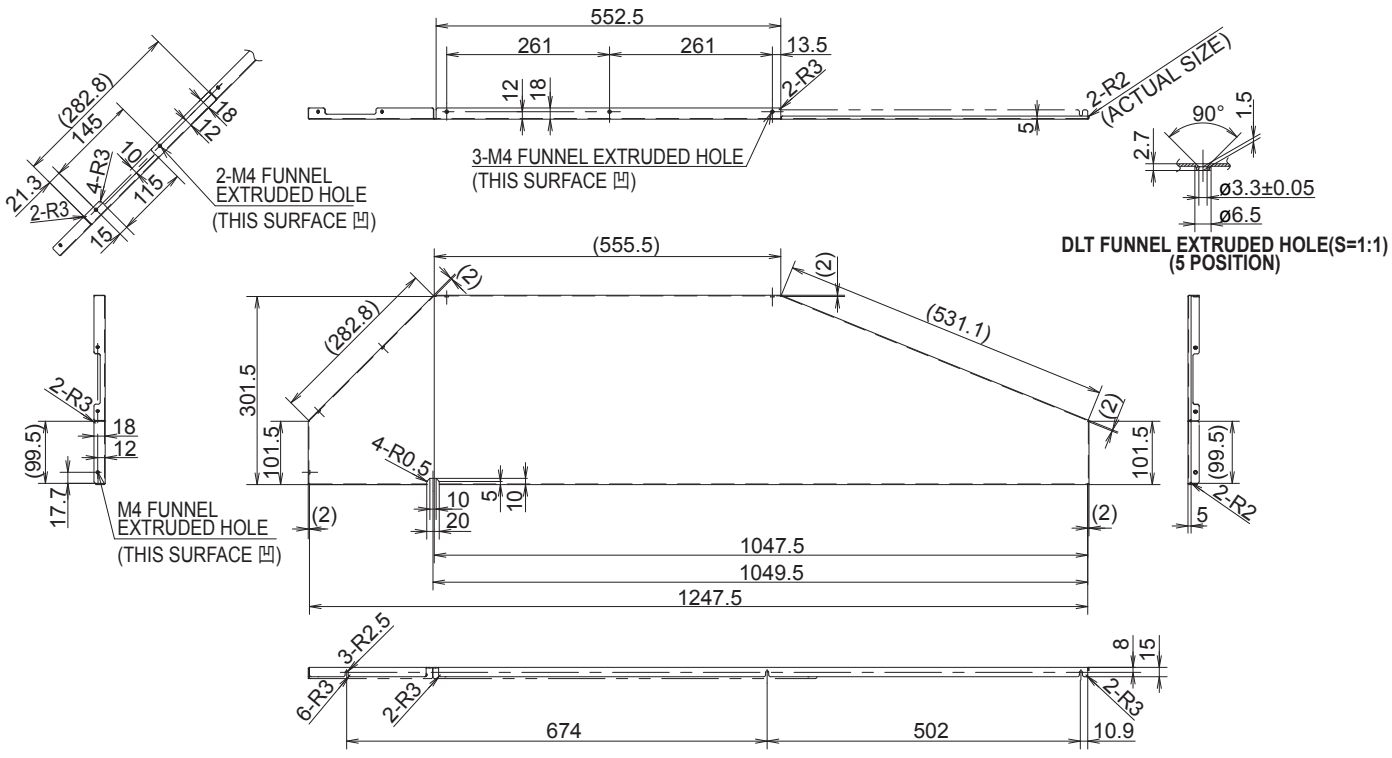
⑩ Reference diagram for Snow-proof Right side 2 (field supply)

Unit: mm



⑪ Reference diagram for Snow-proof Left side 2 (field supply)

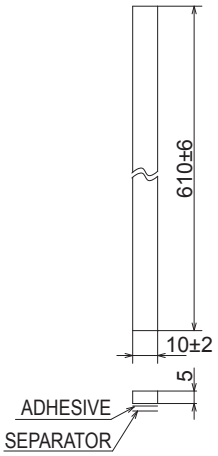
Unit: mm



8. Supplement

⑫ Reference diagram for Packing (field supply)

Unit: mm



EPT SEAL