

AIR CONDITIONER
Duct type

DESIGN & TECHNICAL MANUAL

SINGLE
INDOOR



AR*C72LHTA



AR*C90LHTA

OUTDOOR



AO*A72LALT
AO*A90LALT

1. INDOOR UNIT

DUCT TYPE :

AR*C72LHTA

AR*C90LHTA

CONTENTS

1. INDOOR UNIT

1.	FEATURES	01 - 01
2.	WIRED REMOTE CONTROLLER	01 - 06
3.	SPECIFICATIONS	01 - 08
4.	DIMENSIONS	01 - 09
5.	WIRING DIAGRAMS	01 - 12
6.	CAPACITY TABLE	01 - 13
6-1.	COOLING CAPACITY	01 - 13
6-2.	HEATING CAPACITY	01 - 14
7.	FAN PERFORMANCE AND CAPACITY	01 - 15
8.	OPERATION NOISE	01 - 19
8-1.	NOISE LEVEL CURVE	01 - 19
8-2.	SOUND LEVEL CHECK POINT	01 - 20
9.	ELECTRIC CHARACTERISTICS	01 - 21
10.	SAFETY DEVICES	01 - 22
11.	EXTERNAL INPUT & OUTPUT	01 - 23
11-1.	EXTERNAL INPUT	01 - 23
11-2.	EXTERNAL OUTPUT	01 - 24
12.	FUNCTION SETTINGS	01 - 29
12-1.	INDOOR UNIT	01 - 29
12-2.	INDOOR UNIT (Setting by remote controller)	01 - 31
12-3.	WIRED REMOTE CONTROLLER	01 - 34
13.	OPTIONAL PARTS	01 - 35
13-1.	CONTROLLER	01 - 35
13-2.	OTHERS	01 - 35

1. FEATURES

MODEL

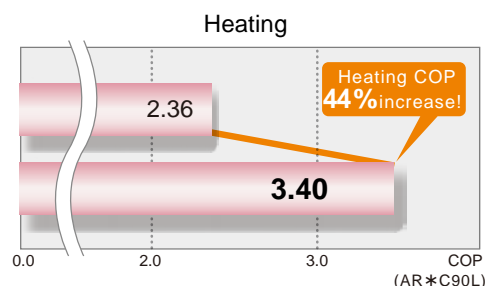
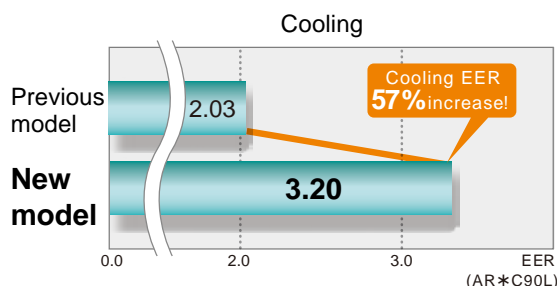
AR*C72LHTA / AO*A72LALT
AR*C90LHTA / AO*A90LALT



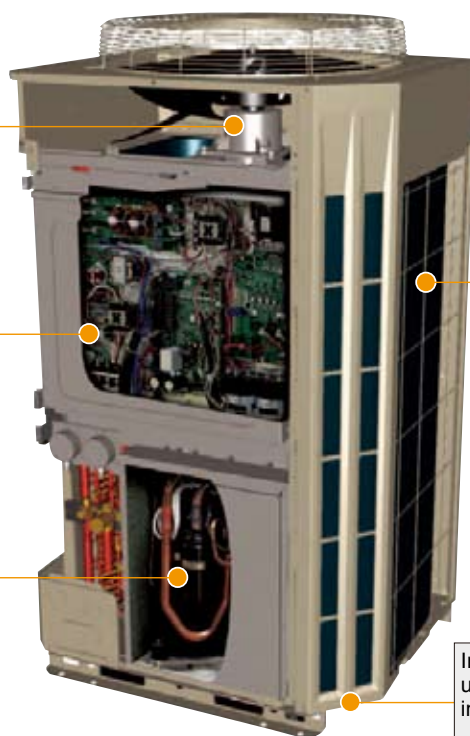
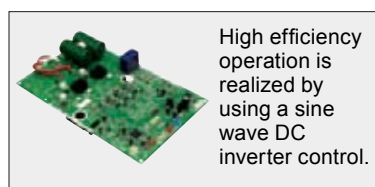
FEATURES

Significantly improved EER/COP

Significantly improved Hi-efficiency is realized by the use of a ALL-DC components, inverter technology, and large heat exchanger.



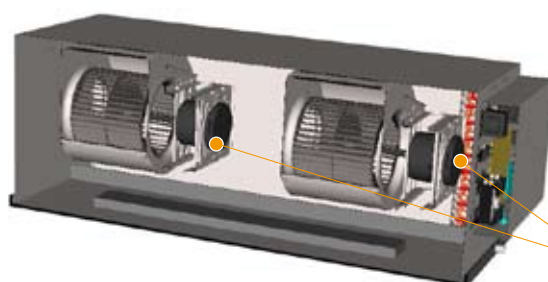
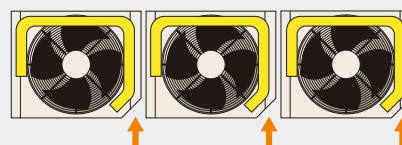
Energy saving technology



OUTDOOR UNIT



In multiple outdoor unit installations, the unique front intake design improves airflow into the Heat exchanger.



INDOOR UNIT

The power consumption has been reduced drastically by the introduction of DC fan motors.

● Space saving and compact size

Compact size has been achieved by significantly reducing the width of the outdoor units compared to previous models.



● Static pressure selection

5 Static Pressure modes are available.

Improvement and design flexibility has allowed multiple fan speeds and static pressure modes.

- The air flow rate has been improved to meet the requirements of complex ductwork layout designs.

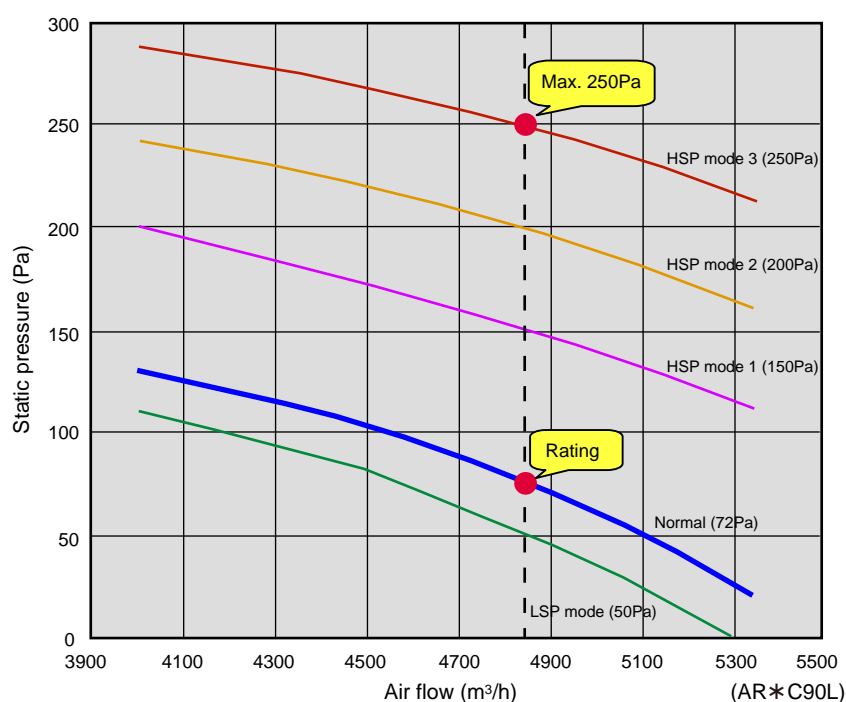
→ By introducing a new DC fan motor, the static pressure range selected by the installer can range between 50 to 250Pa.

- A three speed fan (High, Medium and Low) allows accurate airflow control.
- A decrease in the power consumption of the indoor unit has been realised by optimizing the control of the indoor fan motor rotation frequency.

Low static pressure - High static pressure

Fan motor speed : Low speed - High speed

Efficiency of the indoor unit operation has been improved in both the static pressure and air flow design.



● Outdoor unit quiet operation

Low noise mode (Optional parts: UTY-XWZXZ2)

Introduction of a low outdoor noise operation mode allow the outdoor unit to have two quiet mode operation settings.

* Performance may drop depending on the outside air temperature condition, etc.

1) Level1 (Rated noise value -3dB)

2) Level2 (Rated noise value -5dB)

● Peak cut operation

Peak cut mode (Optional parts: UTY-XWZXZ2)

The introduction of a peak power consumption mode control a 4 step outdoor operation control to cut down energy usage at peak energy usage times.

* Performance drops by reducing the power consumption preferentially.

Level 1 ... Performs operation which suppresses the power consumption to almost 0% by stopping the compressor.

Level 2 ... Performs operation which suppresses the power consumption to 50% of the rated power consumption value.

Level 3 ... Performs operation which suppresses the power consumption to 75% of the rated power consumption value.

Level 4 ... Performs operation which suppresses the power consumption to the rated power consumption value (100%).

● Easy service & maintenance

Outdoor unit



Consolidated electrical components make maintenance easy



Movable PCB panel that allows for easier maintenance work behind the PCB

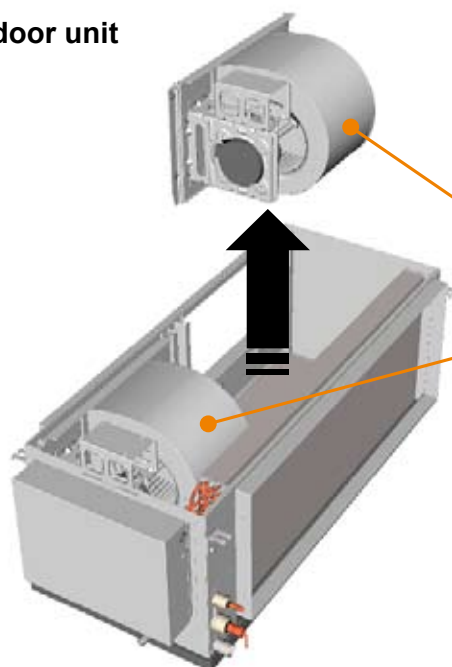
Maintenance of electrical components, valves, and compressor parts from the front is possible.

Easy-to-read 7-segment LED display which explains operational and trouble status



Split front panel allows for maintenance from top or bottom of the outdoor unit

Indoor unit

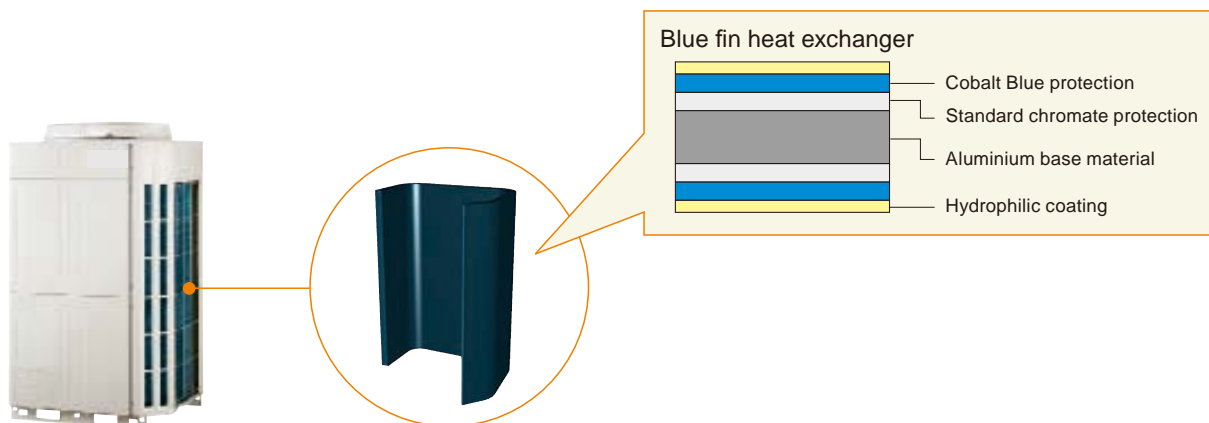


Fan unit

Left and Right fan motors can be removed separately which has made servicing of the indoor unit easier.

● Adoption of blue fin heat exchanger

Corrosion resistant of the heat exchanger has been improved by the introduction of blue fin treatment to the outdoor unit's heat exchanger.



● Improvement of piping length

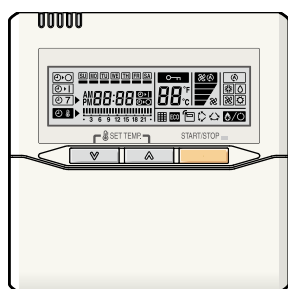
Previous model	New model
50m	75m

● Improvement of low outdoor ambient temperature performance

	Previous model	New model
Cooling	0°C	-5°C
Heating	-10°C	-15°C

2. WIRED REMOTE CONTROLLER

■ FEATURES



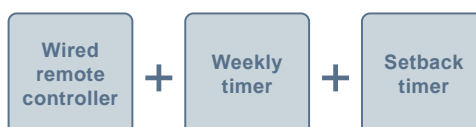
- * Various timer setup (ON / OFF / WEEKLY) are possible.
- * Equipped with weekly timer as standard function.(2 times Start / Stop per day for a week)
- * When setting up a timer, operation mode and a temperature setup can be changed.
- * When a failure occurs, the error code is displayed. (Maximum of 16)
- * Error indication.(A maximum of 16 error histories are memorizable.)
- * Up to 16 indoor units can be simultaneously controlled.
- * The room temperature can be controlled by being detected the temperature accurately with built-in thermo sensor.

● Simple function setting

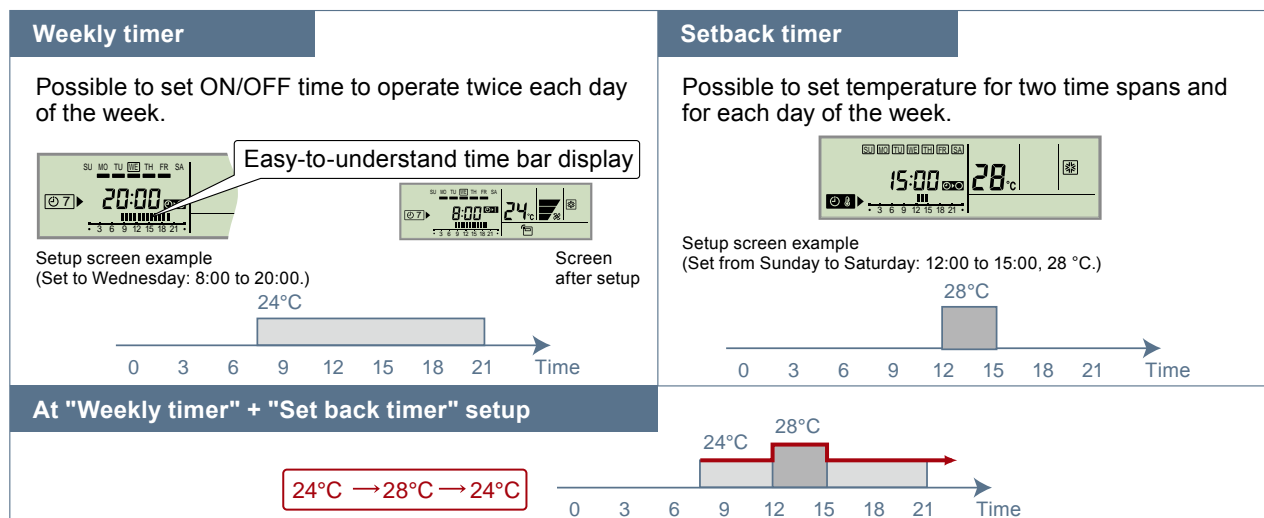
Setting of the air conditioner selection function is performed by remote controller.

● High performance and compact size

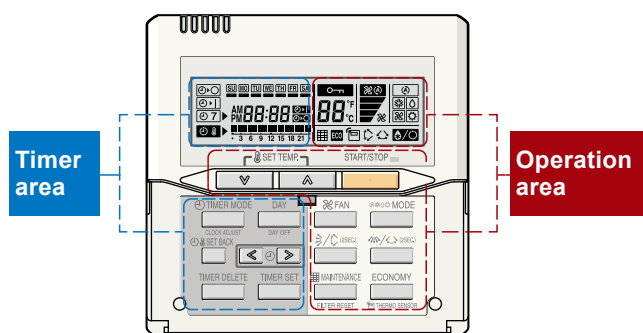
Three functions are combined in one unit.



● Built-in timers



● Easy-to-understand operation

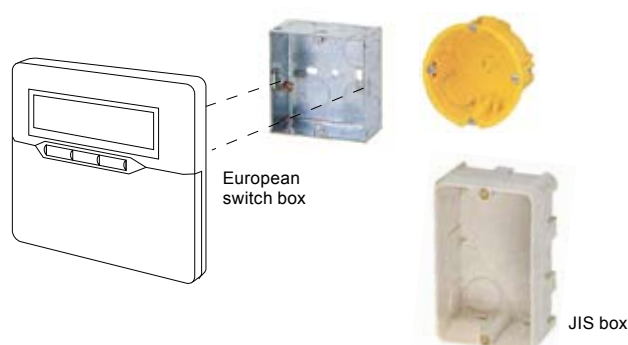


[Variable timer control]

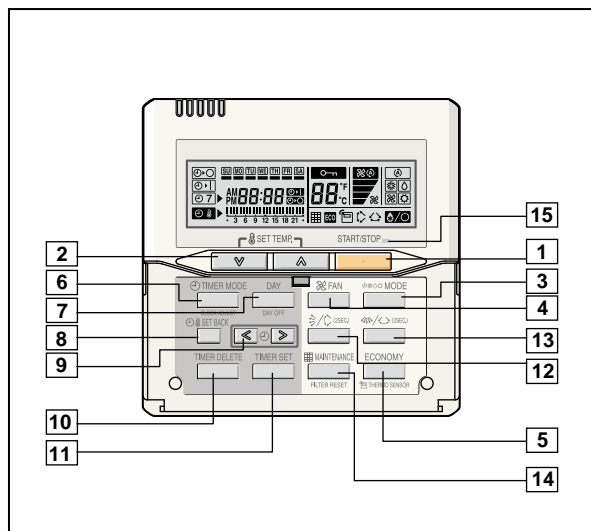
The operation/display sections are zoned according to time and operation, enabling variable programming to match application.

● Simple installation

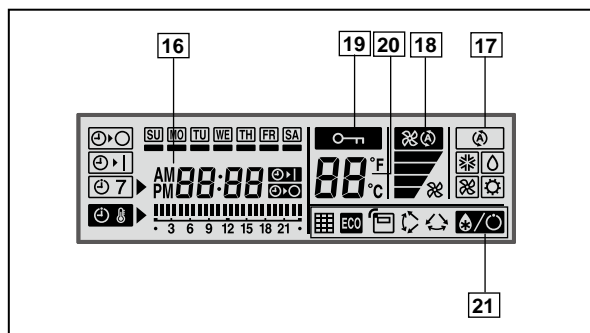
Components are compatible with standard switch boxes. Flat back construction allows equipment to be installed wherever it is needed.



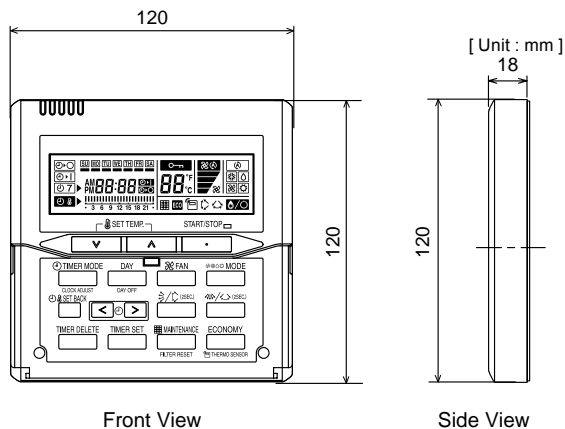
FUNCTIONS



Display panel



DIMENSION



Front View

Side View

SPECIFICATION

SIZE	(H x W x D mm)	120 x 120 x 18
WEIGHT	(g)	160
CABLE LENGTH	(m)	10
POWER	(V)	12

WIRING SPECIFICATIONS

Use	Size	Wire type	Remarks
Remote controller cable	0.33mm ² (22AWG)	Polar 3 core	Use sheathed PVC cable.

- 1 START/STOP button**
Pressed to start and stop operation.
- 2 SET TEMP. button**
Selects the setting temperature.
- 3 MODE button**
Selects the operating mode (AUTO, HEAT, FAN, COOL, DRY).
- 4 FAN button**
Selects the fan speed (AUTO, LOW, MED, HIGH).
- 5 ECONOMY button**
Turns the economy efficient mode on and off.
- 6 TIMER MODE (CLOCK ADJUST) button**
Selects the timer mode (OFF TIMER, ON TIMER, WEEKLY TIMER). Set the current time.
- 7 DAY (DAY OFF) button**
Temporarily cancels of one day timer.
- 8 SET BACK button**
Pressed to select the set back timer.
- 9 Set time button**
Pressed to set time.
- 10 TIMER DELETE button**
The schedule of a weekly timer is deleted.
- 11 TIMER SET button**
Sets the date, hour, minute and on-off time.
- 12 Vertical airflow direction and swing button**
Push for two seconds to change the swing mode.
- 13 Horizontal airflow direction and swing button**
Push for two seconds to change the swing mode.
- 14 FILTER RESET button**
- 15 Operation lamp**
Lights during operation and when the timer is on.
- 16 Timer and clock display**
- 17 Operation mode display**
- 18 Fan speed display**
- 19 Operation lock display**
- 20 Temperature display**
- 21 Function display**
 - Defrost display
 - Thermo sensor display
 - Economy display
 - Vertical swing display
 - Horizontal swing display
 - Filter display

Functions will be different due to type of indoor unit.
For details, please see operation manual.

3. SPECIFICATIONS

Type				Ducted model inverter heatpump			
Model name				AR*C72LHTA		AR*C90LHTA	
Power source				230V~ 50Hz			
Available voltage range				198-264V~ 50Hz			
Capacity	Cooling	Rated	kW	20.3	25.0		
			Btu/h	69300	85300		
		Min. - Max.	kW	10.8 - 23.5	11.2 - 28.0		
			Btu/h	36800 - 80200	38200 - 95500		
	Heating	Rated	kW	22.6	28.0		
			Btu/h	77100	95500		
Min. - Max.		kW	12.0 - 26.5	12.5 - 31.5			
		Btu/h	40900 - 90400	42600 - 107500			
Input power	Cooling	Rated	kW	6.25	7.82		
		Max.		9.80	12.10		
	Heating	Rated		6.27	8.24		
		Max.		9.80	12.10		
Current	Cooling	Rated	A	9.6	11.9		
	Heating	Rated	9.6	12.5			
EER		Cooling	kW/kW	3.25	3.20		
COP		Heating		3.60	3.40		
Moisture removal			l/h (pints/h)	4.5 (9.5)	6.0 (12.7)		
Maximum operating current *		Cooling	A	22.8	25.8		
		Heating		22.8	25.8		
Fan	Air flow rate	Cooling	High	4300	4850		
			Med	3750	4250		
			Low	3150	3600		
		Heating	High	4300	4850		
			Med	3750	4250		
			Low	3150	3600		
	Fan type × Q'ty		Sirocco × 2				
	Motor output		W	700 × 2			
Static pressure range			Pa	50-250 (Standard: 72)			
Sound pressure level		Cooling	High	47	49		
			Med	44	46		
			Low	41	43		
		Heating	High	47	49		
			Med	44	46		
			Low	41	43		
Heat exchanger type		Dimensions		mm	406.4 × 1250 × 76.2	508 × 1250 × 76.2	
		Fin pitch			1.8	1.6	
		Rows x stages		4 × 16	4 × 20		
		Pipe type		Copper			
		Fin type		Aluminium			
Enclosure		Material		Steel			
		Colour		-			
Dimensions (H × W × D)		Net	mm	450 × 1587 × 700	550 × 1587 × 700		
		Gross		550 × 1750 × 825	650 × 1750 × 825		
Weight		Net	kg	100	110		
		Gross		115	125		
Connection pipe	Size	Liquid	mm	Ø12.7 (1/2 in.)			
		Gas		Ø25.4 (1 in.)			
		Method	Brazing				
Operation range		Cooling	°C	18 to 32			
			%RH	80 or less			
		Heating	°C	16 to 30			
Remote controller type				Wired			
Drain port		Material		Steel			
		Size		Ø35.7 (I.D.). Ø38.1 (O.D.)			

Note :

Specifications are based on the following conditions.

Cooling : Indoor temperature of 27 °CDB / 19 °CWB. and outdoor temperature of 35 °CDB/24 °CWB.

Heating : Indoor temperature of 20 °CDB / 15 °CWB. and outdoor temperature of 7 °CDB/6 °CWB.

Standard static pressure : 72Pa

Pipe length : 7.5 m, Height difference : 0 m.(Outdoor unit - Indoor unit)

The protective function may work when using it outside the temperature range mentioned above.

Drain hose should be field supplied.

* : The maximum current is the maximum value when operated within the operation range.

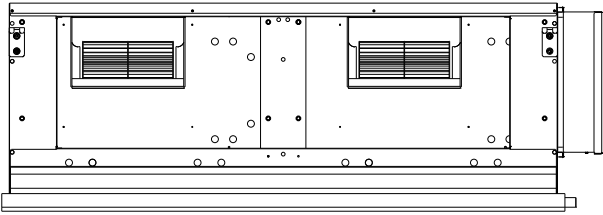
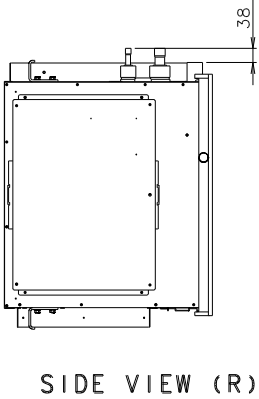
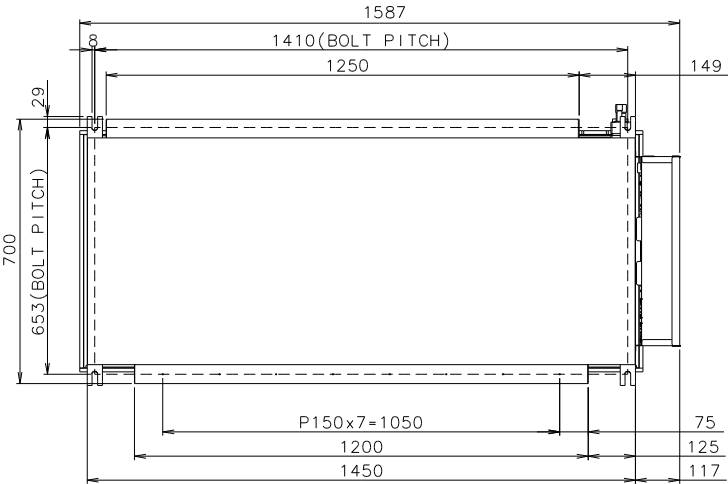
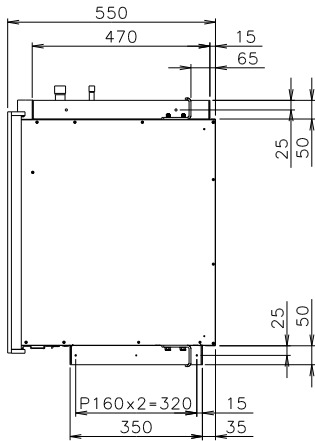
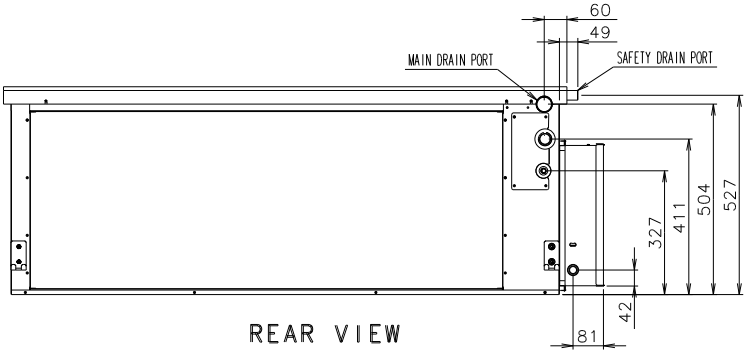
■ **MODEL: AR*C72LHTA**

(Unit : mm)



■ MODEL: AR*C90LHTA

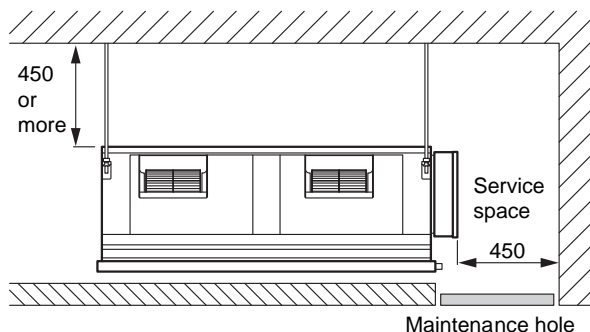
(Unit : mm)



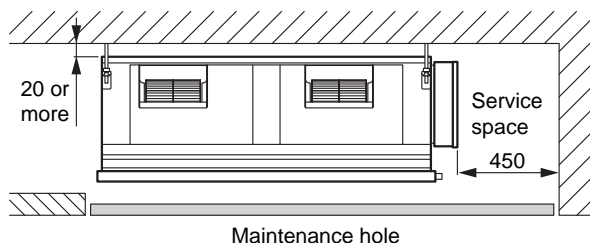
■ INSTALLATION PLACE

(Unit : mm)

- (a) When service access will be carried out above the indoor unit a recommended installation space of 450mm is required.



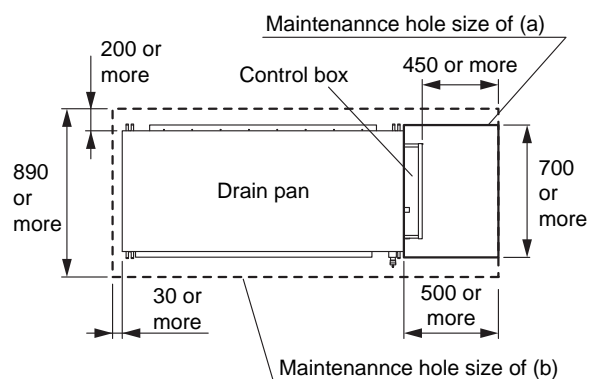
- (b) Installation by which service is carried out from the bottom of the unit



■ MAINTENANCE HOLE

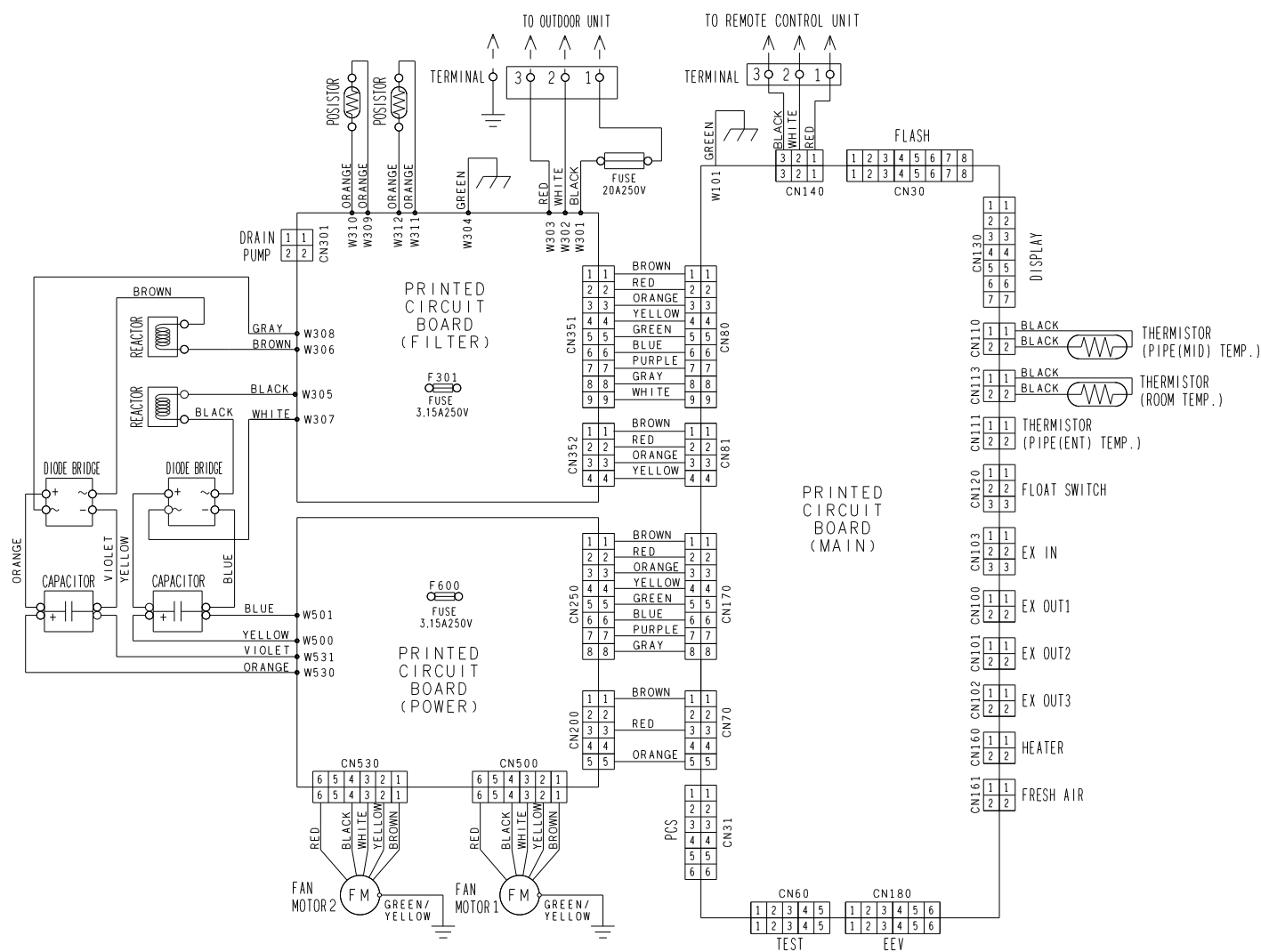
(Unit : mm)

- (a) If maintenance work is to be done from the top, keep the space of the more than 450 mm between the indoor unit and ceiling.
- (b) If maintenance work is to be done from the bottom side, the maintenance hole needs to be larger than the outside dimension of the indoor unit.



5. WIRING DIAGRAMS

■ MODEL: AR*C72LHTA, AR*C90LHTA



6. CAPACITY TABLE

6-1. COOLING CAPACITY

■ MODEL: AR*C72LHTA

AFR	71.7
-----	------

		Indoor temperature																							
	°CDB	18			21			23			25			27			29			32					
	°CWB	12			15			16			18			19			21			23					
Outdoor temperature	°CDB	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP			
	-5	17.64	15.08	3.23	19.65	15.17	3.28	20.32	16.49	3.29	21.66	16.54	3.33	22.33	17.87	3.34	23.67	17.80	3.38	25.01	18.96	3.41			
	0	17.61	15.05	3.28	19.61	15.14	3.33	20.28	16.46	3.34	21.62	16.51	3.38	22.29	17.83	3.40	23.63	17.76	3.43	24.96	18.92	3.46			
	5	17.57	15.02	3.38	19.58	15.11	3.43	20.24	16.43	3.45	21.58	16.48	3.48	22.25	17.80	3.50	23.58	17.72	3.54	24.91	18.88	3.57			
	10	17.39	15.05	3.69	19.37	15.14	3.75	20.03	16.46	3.77	21.35	16.51	3.80	22.01	17.83	3.82	23.33	17.76	3.86	24.65	18.92	3.90			
	15	17.28	14.87	4.07	19.25	14.96	4.13	19.91	16.26	4.16	21.22	16.31	4.20	21.88	17.62	4.22	23.19	17.55	4.26	24.50	18.69	4.30			
	20	17.27	14.85	4.69	19.24	14.93	4.76	19.90	16.24	4.78	21.21	16.29	4.83	21.86	17.59	4.86	23.17	17.52	4.91	24.49	18.66	4.95			
	25	17.27	14.31	5.39	19.23	14.40	5.48	19.89	15.65	5.51	21.20	15.70	5.56	21.86	16.96	5.59	23.17	16.89	5.65	24.48	17.99	5.70			
	30	16.90	14.19	5.90	18.82	14.28	5.99	19.46	15.52	6.02	20.75	15.57	6.08	21.39	16.82	6.11	22.67	16.75	6.17	23.96	17.84	6.24			
	35	16.04	14.67	6.03	17.86	14.76	6.13	18.47	16.04	6.16	19.69	16.09	6.22	20.30	17.38	6.25	21.52	17.31	6.31	22.74	18.44	6.38			
	40	15.97	13.83	7.67	17.79	13.92	7.79	18.40	15.13	7.83	19.61	15.18	7.91	20.22	16.39	7.95	21.43	16.33	8.03	22.65	17.39	8.10			
46	15.16	14.14	8.51	16.89	14.23	8.64	17.46	15.47	8.69	18.62	15.52	8.77	19.19	16.76	8.82	20.34	16.69	8.91	21.50	17.78	8.99				

■ MODEL: AR*C90LHTA

AFR	80.8
-----	------

		Indoor temperature																						
	°CDB	18			21			23			25			27			29			32				
	°CWB	12			15			16			18			19			21			23				
	°CDB	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP		
Outdoor temperature	-5	21.66	18.51	4.85	24.13	18.62	4.92	24.95	20.24	4.95	26.59	20.31	5.00	27.42	21.93	5.02	29.06	21.85	5.07	30.71	23.27	5.12		
	0	21.65	18.50	4.94	24.12	18.61	5.02	24.94	20.24	5.04	26.58	20.30	5.09	27.41	21.92	5.12	29.05	21.84	5.17	30.69	23.26	5.22		
	5	21.54	18.41	5.16	23.99	18.52	5.24	24.81	20.13	5.27	26.44	20.20	5.32	27.26	21.81	5.35	28.90	21.72	5.40	30.53	23.14	5.46		
	10	21.53	18.63	5.80	23.98	18.74	5.89	24.80	20.37	5.92	26.43	20.44	5.98	27.25	22.07	6.01	28.89	21.99	6.07	30.52	23.42	6.13		
	15	21.39	18.51	6.14	23.83	18.62	6.23	24.64	20.25	6.27	26.27	20.31	6.33	27.08	21.94	6.36	28.71	21.85	6.42	30.33	23.28	6.49		
	20	21.37	18.49	6.67	23.80	18.60	6.77	24.61	20.22	6.81	26.23	20.29	6.87	27.05	21.91	6.91	28.67	21.82	6.98	30.29	23.24	7.05		
	25	21.31	17.91	7.20	23.74	18.01	7.32	24.54	19.58	7.35	26.16	19.65	7.43	26.97	21.22	7.47	28.59	21.13	7.54	30.21	22.51	7.61		
	30	21.12	18.09	7.52	23.53	18.20	7.64	24.33	19.78	7.68	25.93	19.85	7.75	26.74	21.44	7.79	28.34	21.35	7.87	29.94	22.74	7.95		
	35	19.75	17.81	7.55	22.00	17.91	7.66	22.75	19.48	7.70	24.25	19.54	7.78	25.00	21.10	7.82	26.50	21.02	7.90	28.00	22.39	7.98		
	40	19.55	16.99	9.65	21.78	17.09	9.80	22.52	18.58	9.85	24.00	18.64	9.95	24.75	20.13	10.00	26.23	20.05	10.10	27.72	21.36	10.20		
	46	17.77	16.49	10.27	19.79	16.59	10.43	20.46	18.03	10.48	21.81	18.09	10.59	22.49	19.54	10.64	23.84	19.46	10.75	25.19	20.73	10.85		

AFR : Air flow rate (m³/min)
 TC : Total capacity (kW)
 SHC : Sensible Heat capacity (kW)
 IP : Input Power (kW)

6-2. HEATING CAPACITY

■ MODEL: AR*C72LHTA

AFR	71.7
-----	------

			Indoor temperature									
		°CDB	16		18		20		22		24	
Outdoor temperature	°CDB	°CWB	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
	-15	-16	17.79	7.07	17.37	7.22	16.95	7.37	16.52	7.52	16.10	7.66
	-10	-11	20.37	7.45	19.89	7.60	19.40	7.76	18.92	7.91	18.43	8.07
	-5	-7	22.32	7.68	21.79	7.84	21.26	8.00	20.73	8.16	20.20	8.32
	0	-2	23.33	7.71	22.77	7.87	22.22	8.03	21.66	8.19	21.11	8.35
	5	3	23.73	6.70	23.17	6.84	22.60	6.98	22.04	7.12	21.47	7.26
	7	6	23.73	6.02	23.17	6.14	22.60	6.27	22.04	6.40	21.47	6.52
	10	8	27.79	6.97	27.13	7.12	26.47	7.26	25.80	7.41	25.14	7.55
	15	10	28.05	6.78	27.38	6.92	26.71	7.06	26.05	7.20	25.38	7.31
	20	15	29.08	6.81	28.38	6.95	27.69	7.09	27.00	7.23	26.31	7.34
	24	18	29.23	6.66	28.53	6.80	27.84	6.94	27.14	7.07	26.44	7.18

■ MODEL: AR*C90LHTA

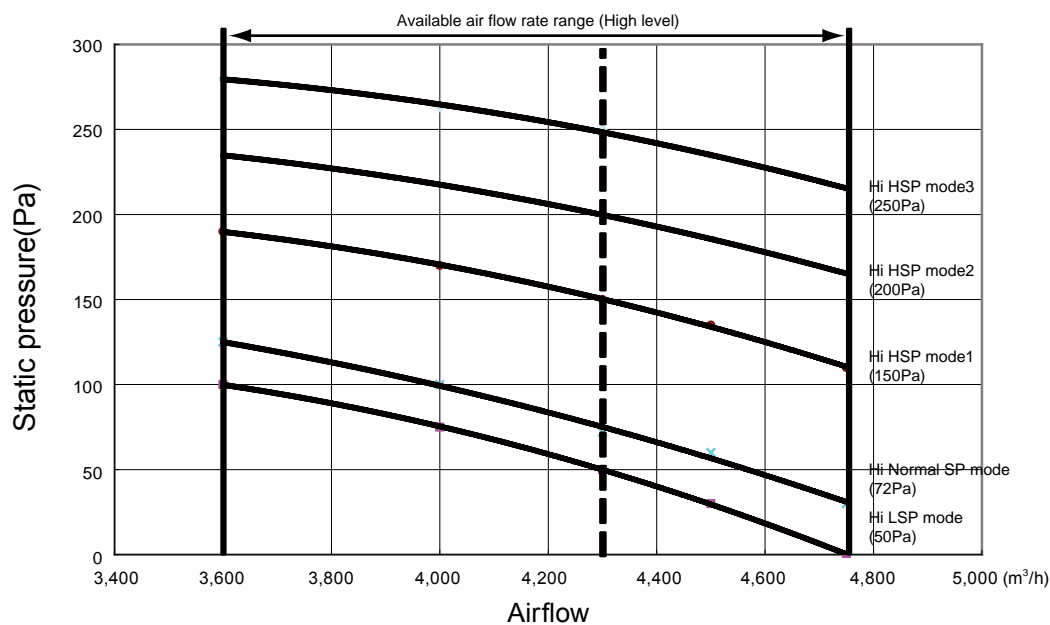
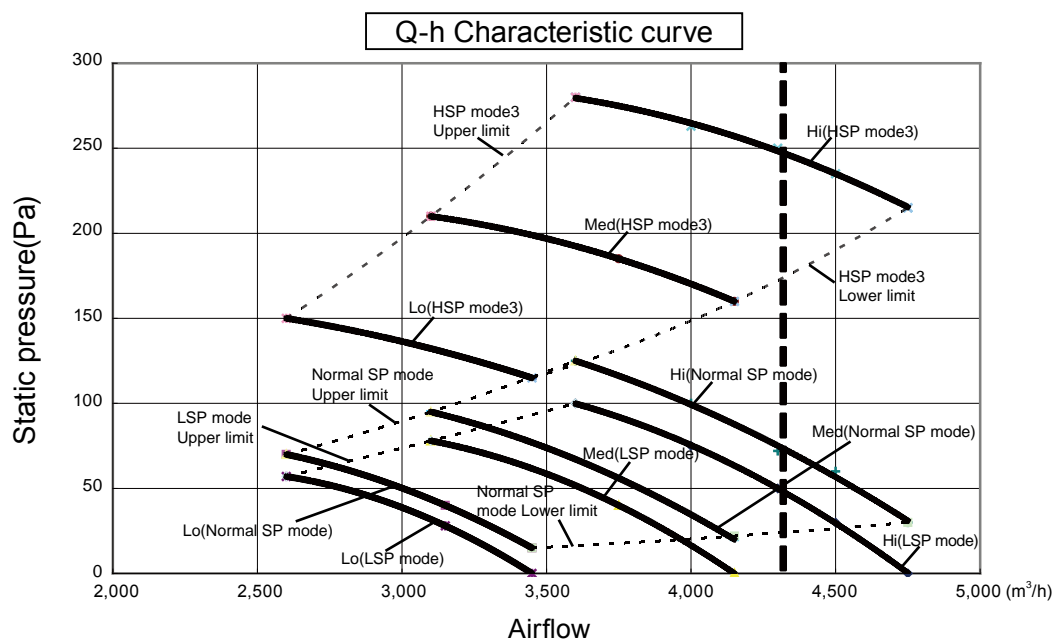
AFR	80.8
-----	------

			Indoor temperature									
		°CDB	16		18		20		22		24	
Outdoor temperature	°CDB	°CWB	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
	-15	-16	20.51	8.48	20.02	8.66	19.53	8.84	19.04	9.01	18.55	9.19
	-10	-11	23.90	9.02	23.33	9.20	22.76	9.39	22.19	9.58	21.62	9.77
	-5	-7	26.54	9.40	25.90	9.60	25.27	9.79	24.64	9.99	24.01	10.19
	0	-2	28.04	9.57	27.37	9.77	26.70	9.97	26.03	10.17	25.37	10.37
	5	3	29.09	8.60	28.40	8.78	27.71	8.96	27.02	9.14	26.32	9.32
	7	6	29.40	7.91	28.70	8.08	28.00	8.24	27.30	8.40	26.60	8.57
	10	8	34.65	9.18	33.82	9.37	33.00	9.56	32.17	9.75	31.35	9.94
	15	10	35.98	9.16	35.12	9.36	34.26	9.55	33.41	9.74	32.55	9.88
	20	15	36.36	8.98	35.50	9.17	34.63	9.36	33.77	9.54	32.90	9.68
	24	18	36.76	8.84	35.89	9.03	35.01	9.21	34.14	9.40	33.26	9.54

AFR : Air flow rate (m³/min)
 TC : Total capacity (kW)
 IP : Input Power (kW)

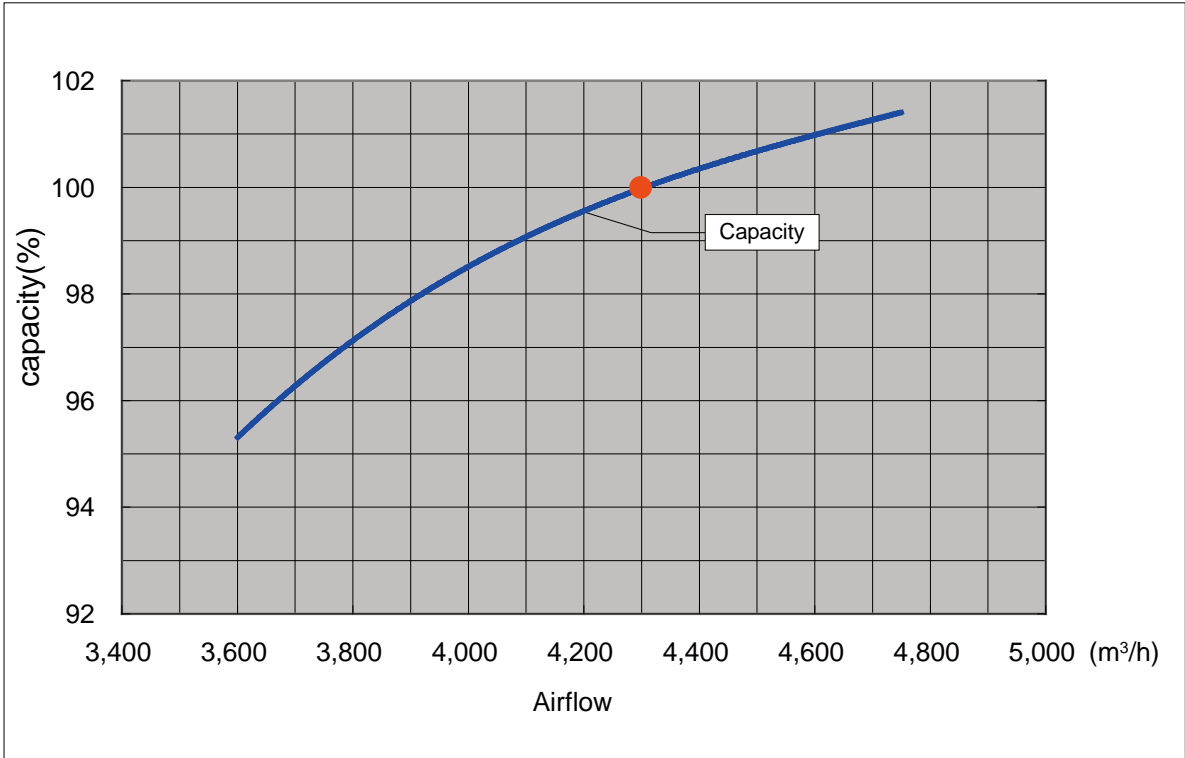
7. FAN PERFORMANCE AND CAPACITY

■ MODEL: AR*C72LHTA

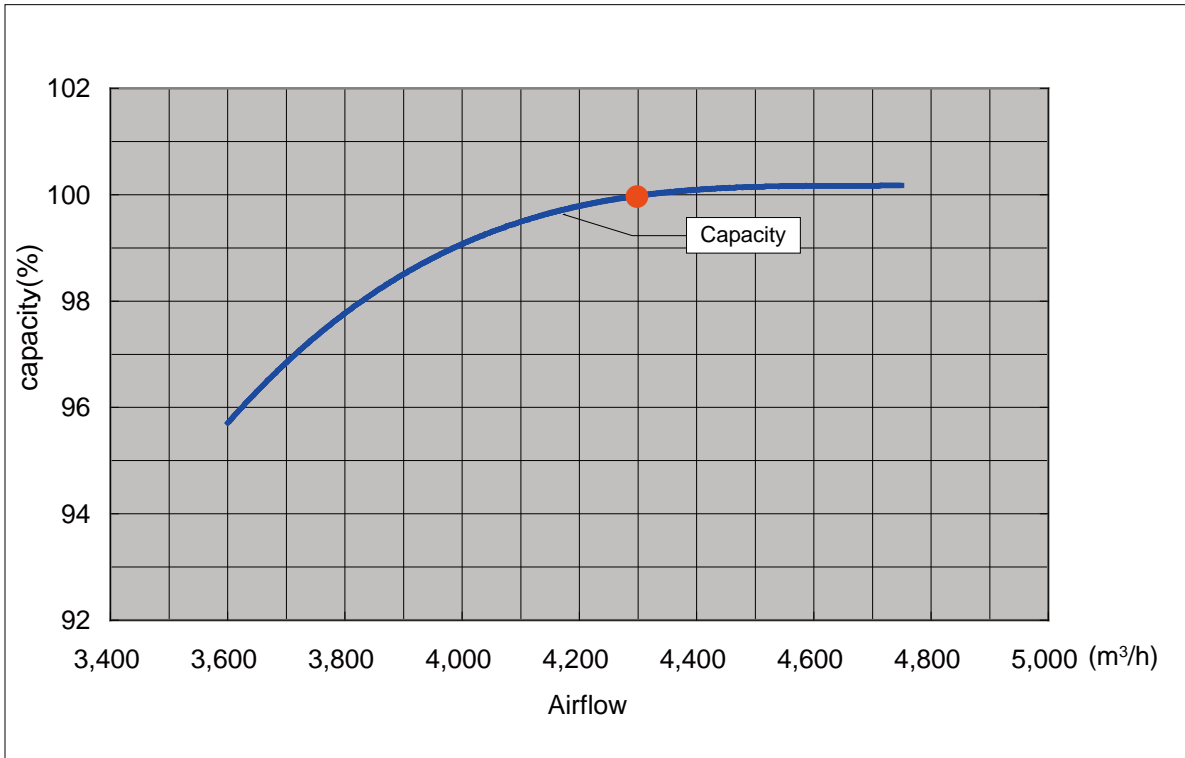


■ **MODEL: AR*C72LHTA**

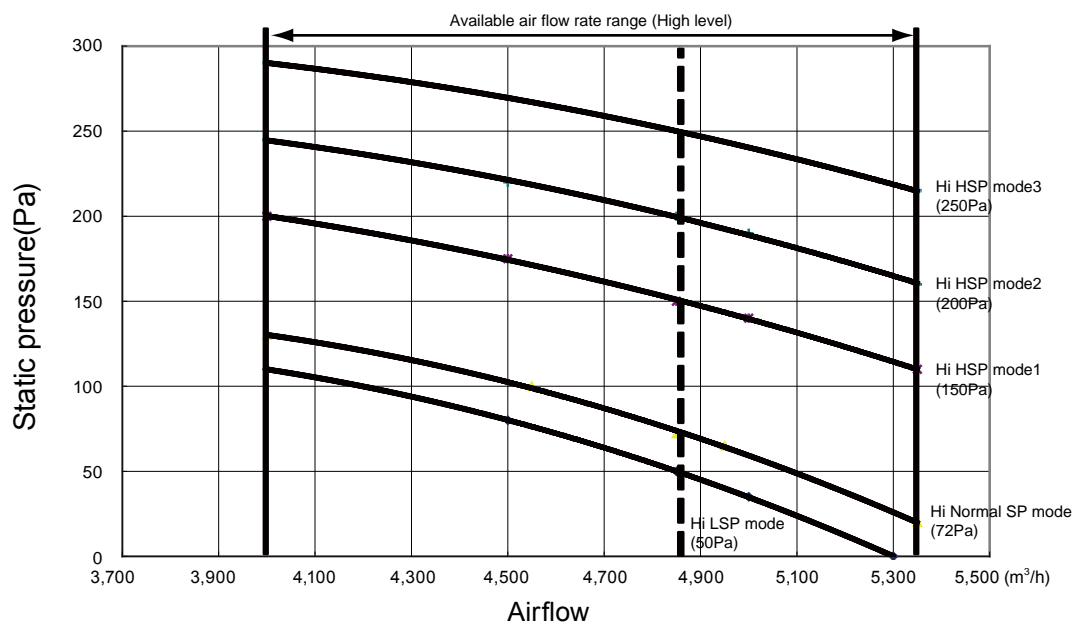
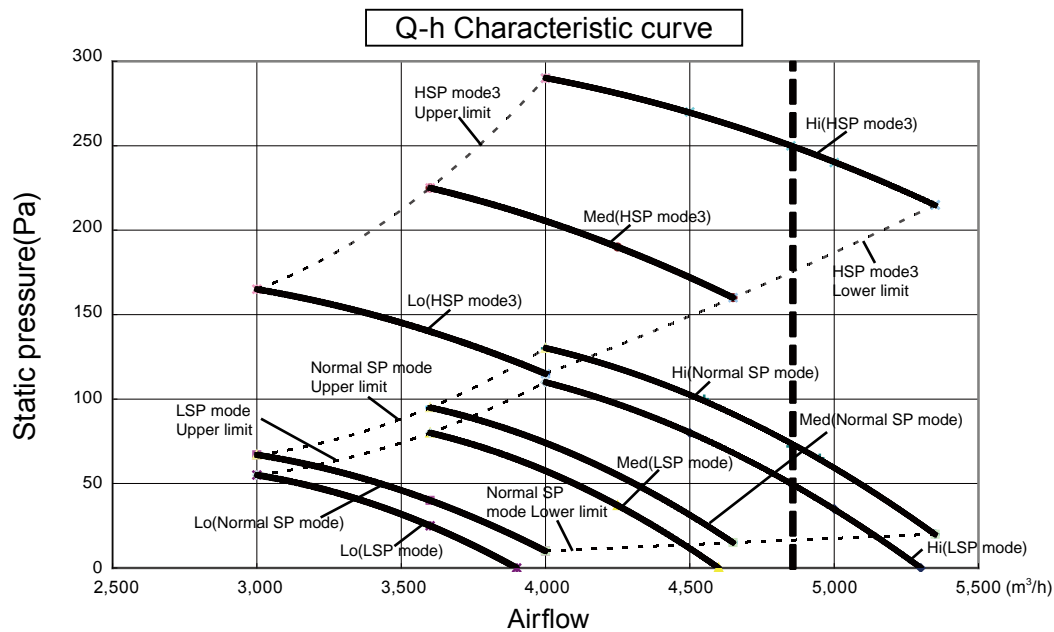
● **Cooling**



● **Heating**

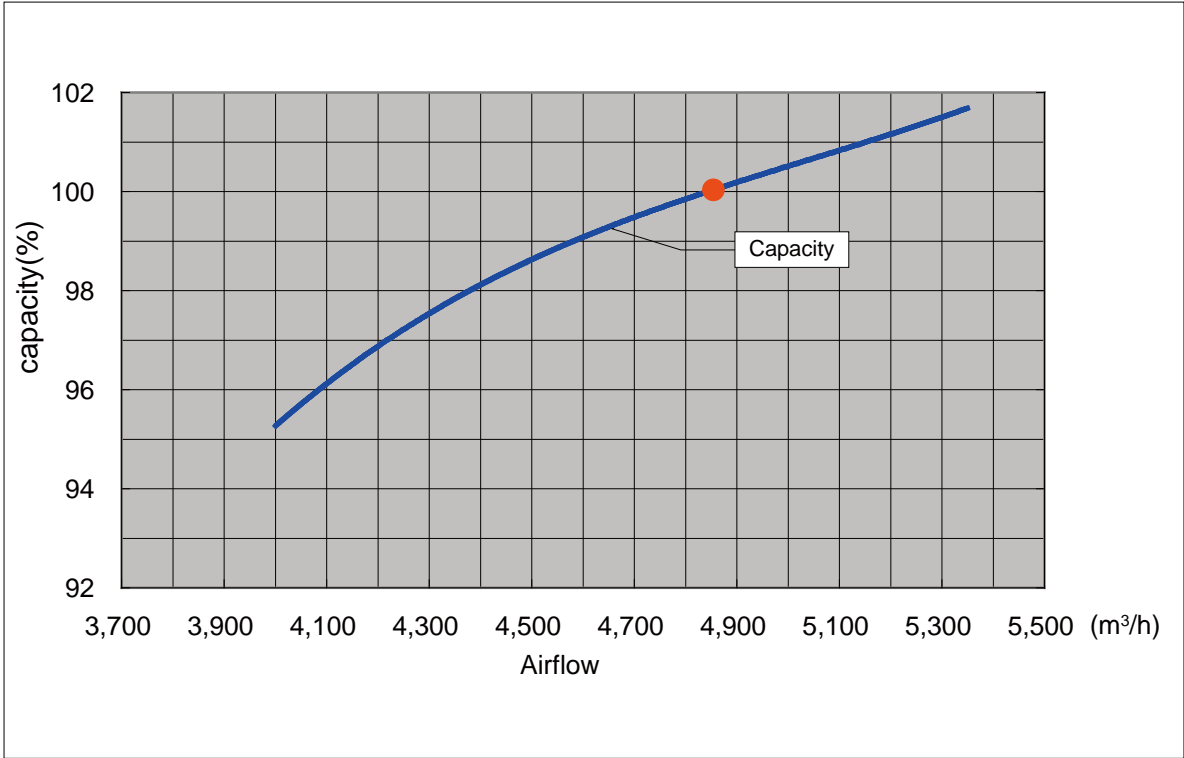


MODEL: AR*C90LHTA

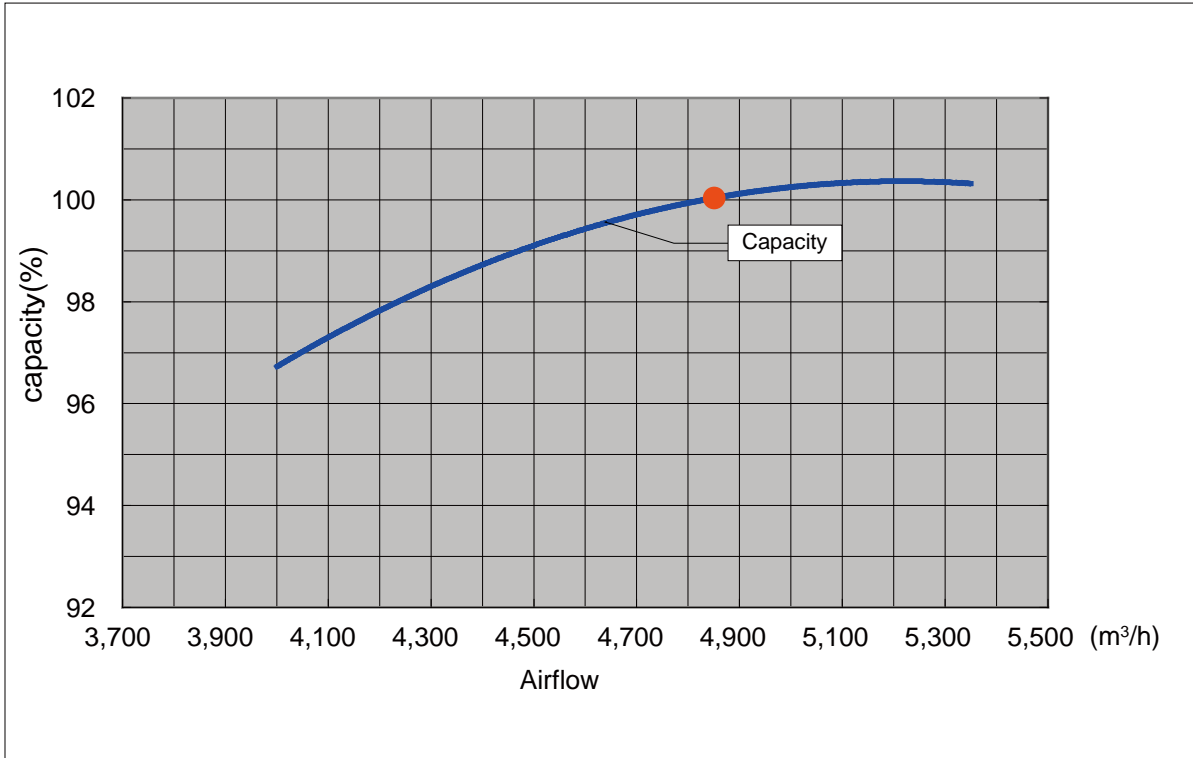


■ **MODEL: AR*C90LHTA**

● **Cooling**



● **Heating**



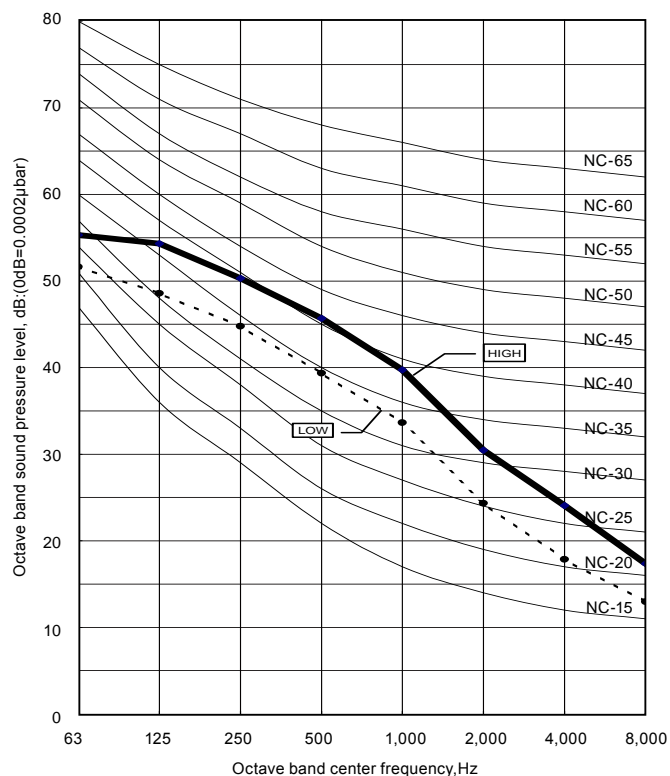
8. OPERATION NOISE

8-1. NOISE LEVEL CURVE

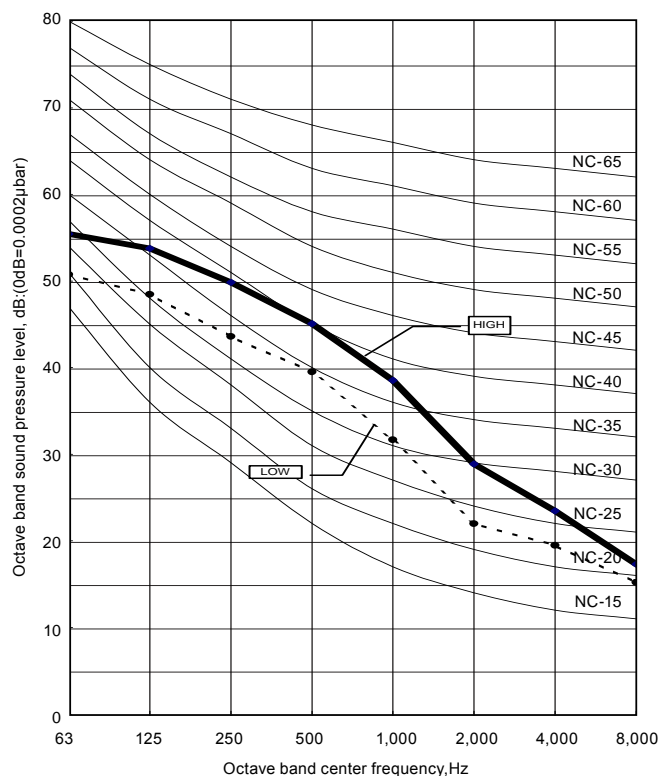
MODEL: AR*C72LHTA

Condition
Static pressure : 72Pa
Static pressure mode : Normal

● Cooling

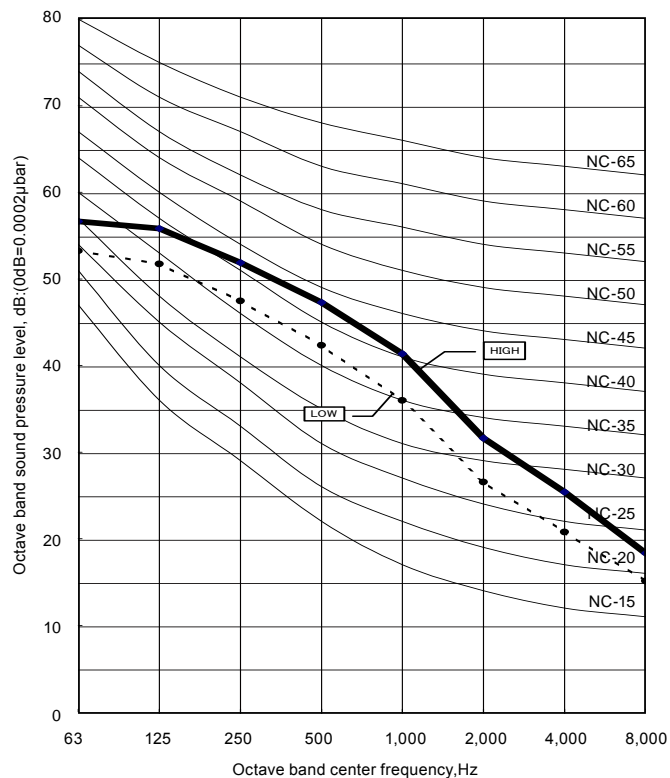


● Heating

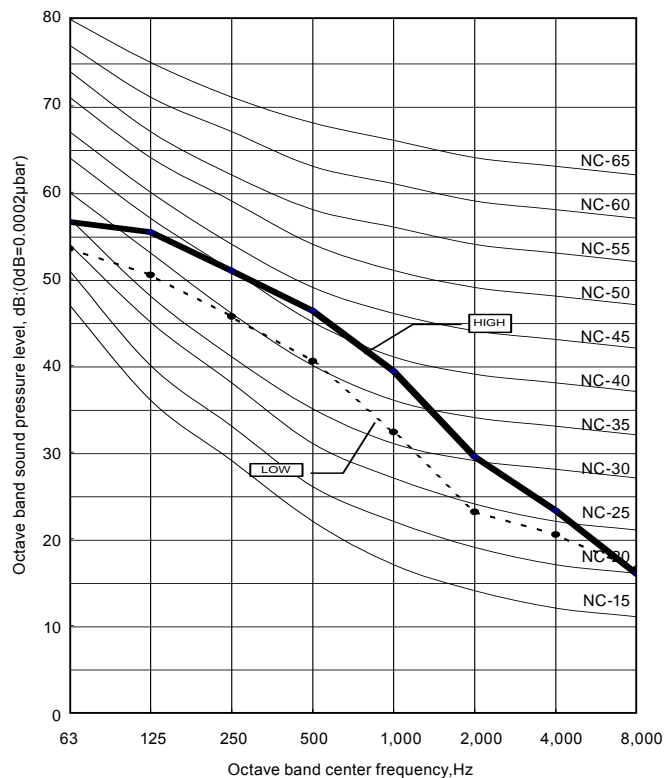


MODEL: AR*C90LHTA

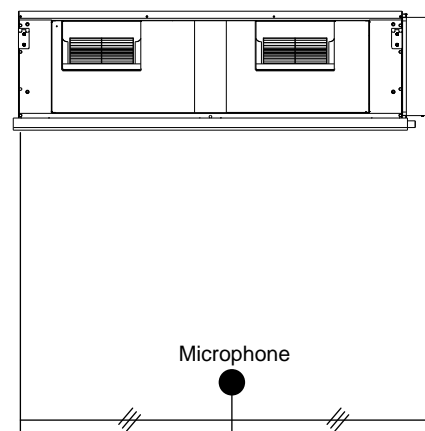
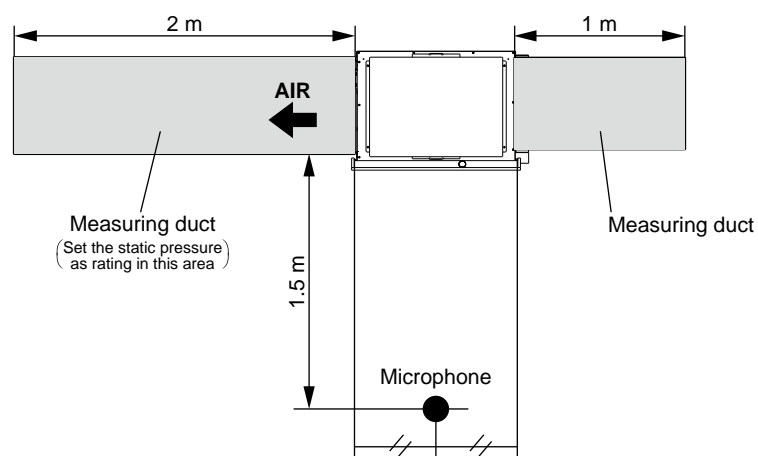
● Cooling



● Heating



8-2. SOUND LEVEL CHECK POINT



9. ELECTRIC CHARACTERISTICS

Model name			AR*C72LHTA AR*C90LHTA	
Power supply	Voltage	V	230 ~	
	Frequency	Hz	50	
Max. operating current (Indoor unit)		A	9.3	
Wiring spec. (Indoor unit to outdoor unit)	Connection cable	mm ²	1.5	2.5
	Limited wiring length	m	50 or less	50 to 76

Note: Wiring specification

1. Selected sample
(Selected based on Japan Electrotechnical Standard and Codes Committee E0005)
2. Limited wiring length : Limit voltage drop to less than 2%. Increase cable gauge if voltage drop is 2% or more.
3. If the transmission wire is longer than 50m, use the bigger conductor size.

10. SAFETY DEVICES

	Protection form	Model
		AR*C72LHTA AR*C90LHTA
Circuit protection	Current fuse (PCB)	250V 3.15A
Fan motor protection	Thermal protection program	100°C ^{+15°C} _{-10°C} OFF 95°C ^{+15°C} _{-10°C} ON

11. EXTERNAL INPUT & OUTPUT

INPUT	OUTPUT	Connector	REMARKS
CONTROL INPUT (OPERATION/STOP)	—	CN103	See external input/output settings for details.
—	OPERATION STATUS	CN100	
—	ERROR STATUS	CN101	
—	FRESH AIR CONTROL	CN161	
—	AUXILIARY HEATER	CN160	

11-1. EXTERNAL INPUT

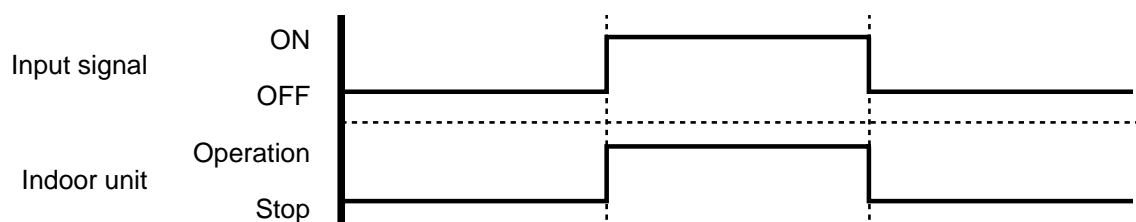
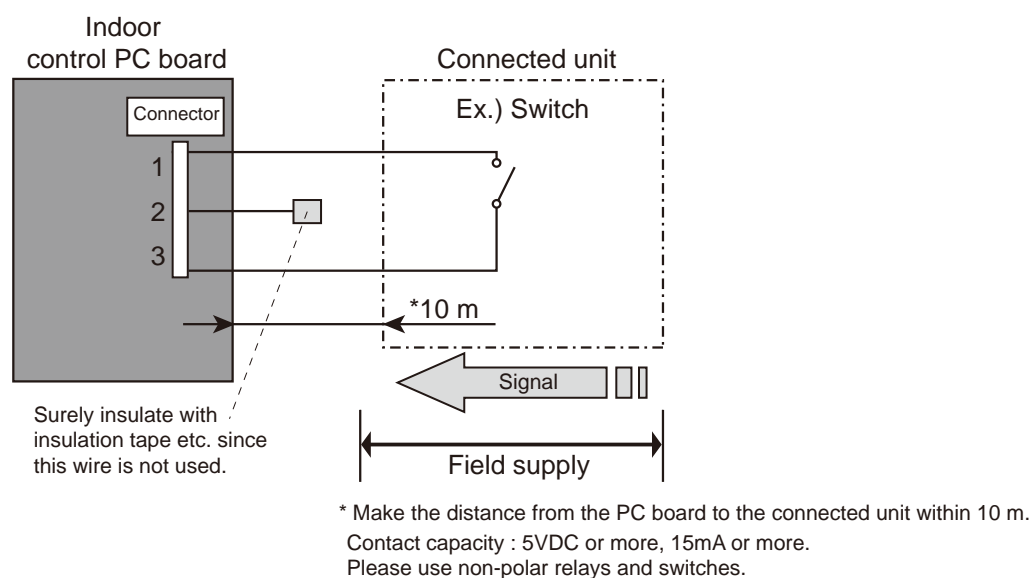
■ CONTROL INPUT (Operation/Stop)

The air conditioner can be remotely operated by means of the following on-site work.

Operation is started at the following contents by adding the contact input of a commercial ON/OFF switch to a connector on the external control PC board and turning it ON.

Unit operation	Initial setting after power is ON	Starting mode other than initial setting
Operation mode	Auto changeover	Mode at previous operation
Set temperature	24°C	Temperature at previous operation
Air flow mode	AUTO	Mode at previous operation

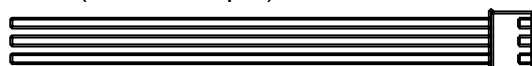
● Circuit diagram example



● Parts (Optional)

Model name
UTD-ECS5A

Wire (External input)

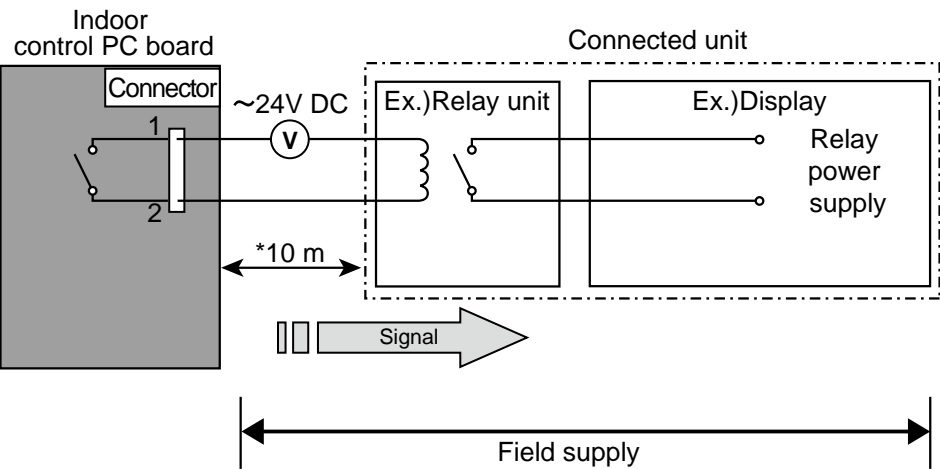


11-2. EXTERNAL OUTPUT

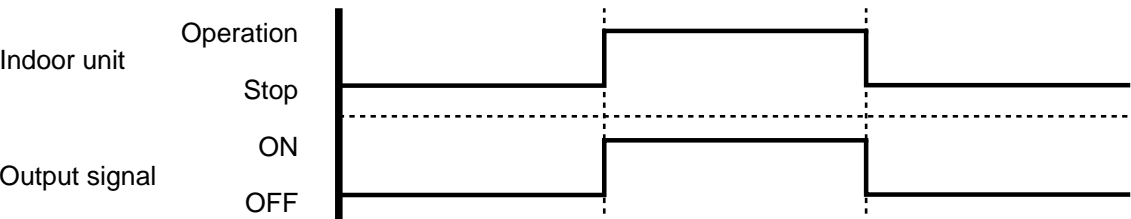
■ OPERATION STATUS OUTPUT

An air conditioner operation status signal can be output.

● Circuit diagram example



* Make the distance from the PC board to the connected unit within 10m.
Relay spec. : Max.24VDC, 10mA to less than 500mA.



● Parts (Optional)

Model name
UTD-ECS5A

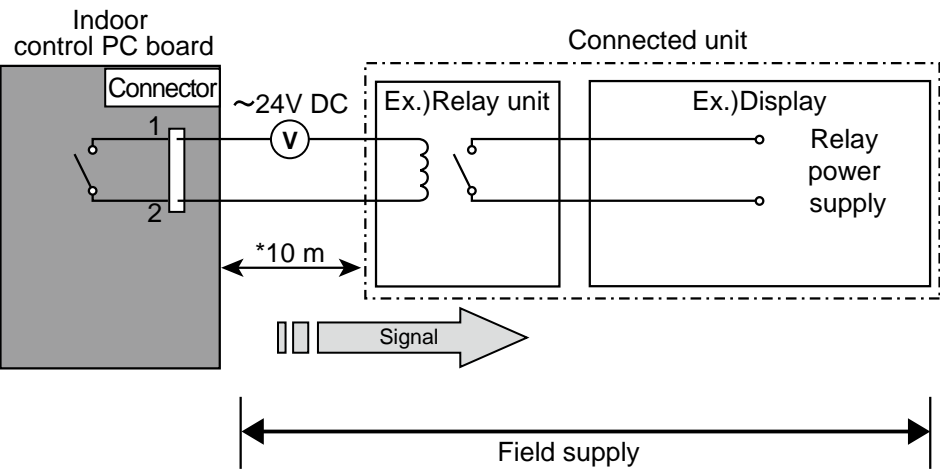
Wire (External output)



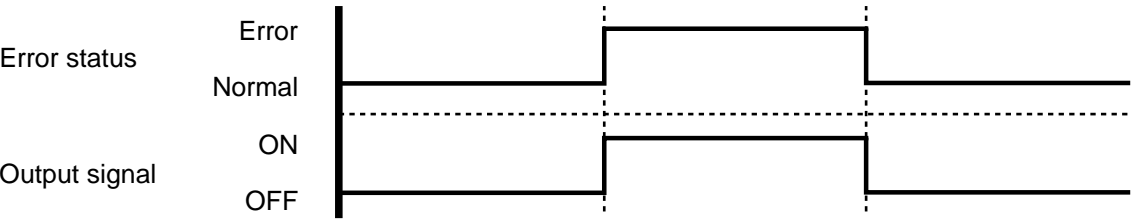
■ ERROR STATUS OUTPUT

An air conditioner condition normal/error status signal can be output.

● Circuit diagram example



* Make the distance from the PC board to the connected unit within 10m.
Relay spec. : Max.24VDC, 10mA to less than 500mA.



● Parts (Optional)

Model name
UTD-ECS5A

Wire (External output)

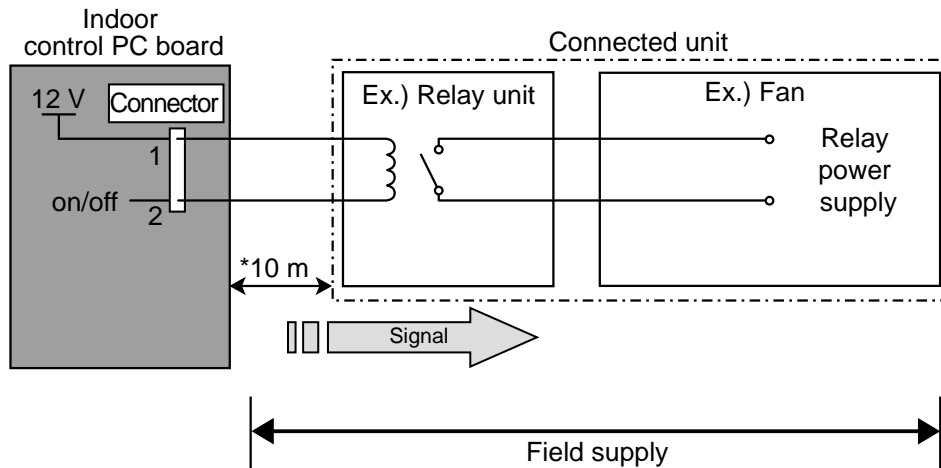


■ FRESH AIR CONTROL OUTPUT

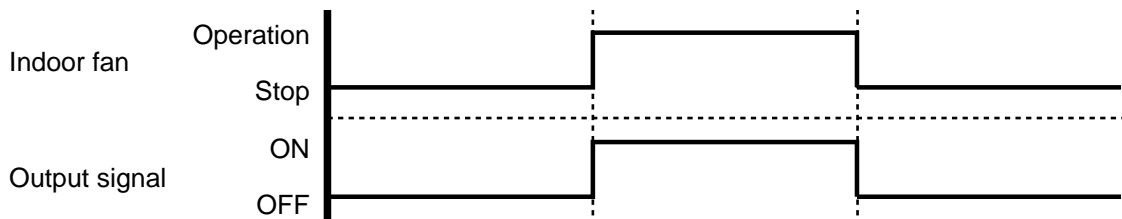
A signal linked to air conditioner indoor fan ON can be output.

* However, signal becomes OFF during cold air prevention control operation.

● Circuit diagram example



* Make the distance from the PC board to the connected unit within 10m.
Relay spec. : Rated 12VDC, 50mA or less.



● Parts (Optional)

Model name
UTD-ECS5A

Wire (Fresh air output)



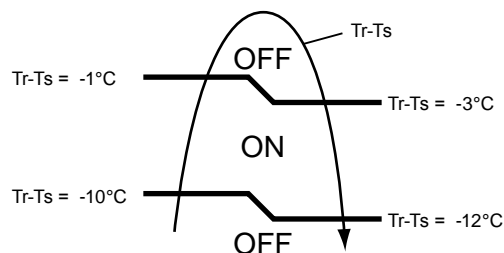
AUXILIARY HEATER OUTPUT

A signal is outputted from Connector when indoor fan and compressor is turned on under heating operation.

*Signal output performance specifications are as shown on the right

Ex. When Set Temperature(T_s) is 22°C;

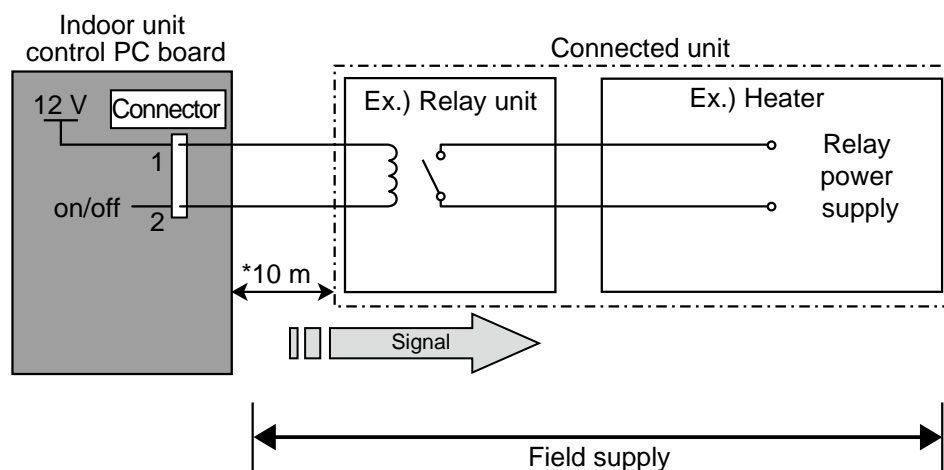
- and Room Temperature(T_r) increase above 12°C, signal output is on.
- and Room Temperature(T_r) increase above 21°C, signal output is off.
- and Room Temperature(T_r) decrease below 19°C, signal output is on.
- and Room Temperature(T_r) decrease below 10°C, signal output is off.



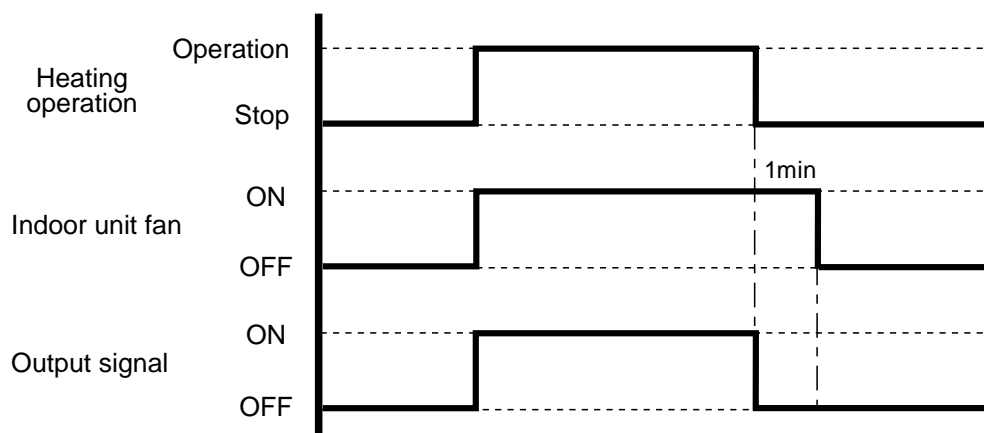
Jumper wire (Indoor Unit)

This is used to continue indoor unit fan operation for 1 minute after thermo OFF in heating mode. 1 minute delay control set by cutting jumper wire on PCB.

Circuit diagram example

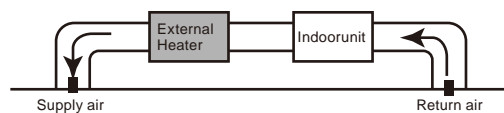


* Make the distance from the PC board to the connected unit within 10m.
Relay spec. : Rated 12VDC, 50mA or less.



⚠ CAUTION

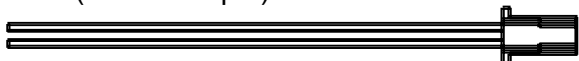
Please place an external a heater between the indoor unit and the ductwork.
Please be sure to use delay control of the fan.



● **Parts (Optional)**

Model name
UTD-ECS5A

Wire (Heater output)



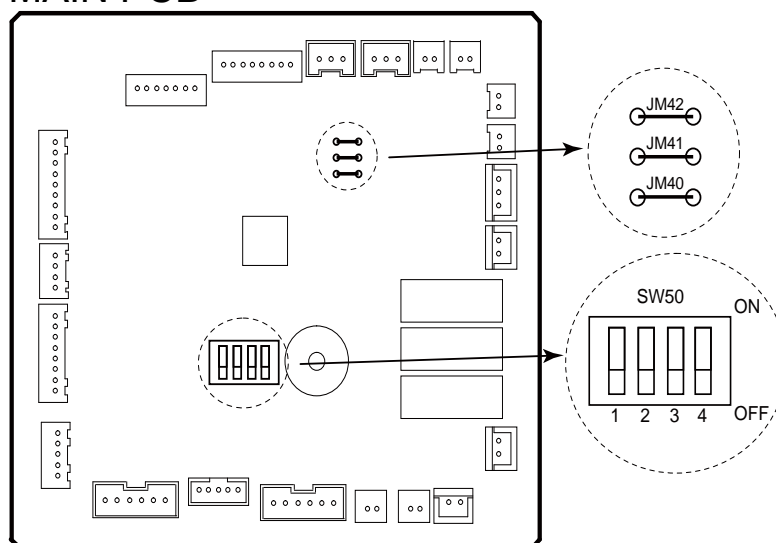
12. FUNCTION SETTINGS

12-1. INDOOR UNIT

INDOOR UNIT		
DIP-SW50	1	Remote controller address setting
	2	
	3	
	4	
Jumper Wire	JM40	Setting forbidden
	JM41	
	JM42	Fan delay setting

■ SWITCH POSITION

MAIN PCB



■ DIP-SW SETTING

● Remote controller address setting (SW50)

A number of indoor units can be operated at the same time using a single remote controller. Set the unit number of each indoor unit using the DIP switches on the indoor unit circuit board. (See the following table.)

The DIP switches are normally set to make the unit number 00.

(◆ . . . Factory setting)

Remote controller address	DIP switch No.			
	1	2	3	4
◆ 00	OFF	OFF	OFF	OFF
01	ON	OFF	OFF	OFF
02	OFF	ON	OFF	OFF
03	ON	ON	OFF	OFF
04	OFF	OFF	ON	OFF
05	ON	OFF	ON	OFF
06	OFF	ON	ON	OFF
07	ON	ON	ON	OFF
08	OFF	OFF	OFF	ON
09	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

■ JUMPER WIRE SETTING

● Fan delay setting (JM42)

When the indoor unit is stopped while operating in conjunction with auxiliary heater, the indoor unit fan operation will continue for one minute..

(◆... Factory setting)

	JM 42	JM state
◆	Connect	Invalidity
	Disconnect	Validity

12-2. INDOOR UNIT (Setting by remote controller)

- The function settings of the control of the indoor unit can be changed by this procedure according to the installation conditions. Incorrect settings can cause the indoor unit to malfunction.
- After the power is turned on, perform The Function Setting according to the installation conditions using the remote controller.
- The settings may be selected between the following two: Function Number or Setting Value.
- Settings will not be changed if invalid numbers or setting values are selected.

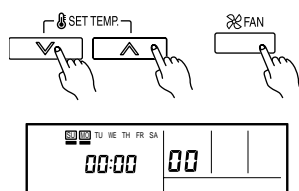
■ PREPARATION

- Turn on the power.
- * Before turning on the power of the indoor units, make sure the piping air-tight test and vacuuming have been conducted.
- * Also check again to make sure no wiring mistakes were made before turning on the power.

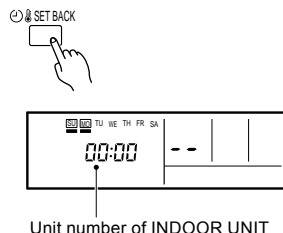
■ FUNCTION SETTING METHOD (for Wired remote controller)

● Setting method

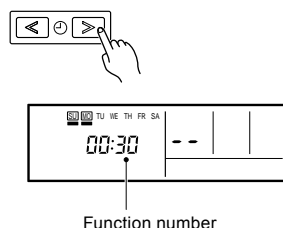
(1) Press the SET TEMP. buttons (▼) (▲) and FAN button simultaneously for more than 5 seconds to enter the function setting mode.



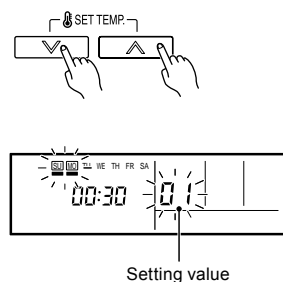
(2) Press the SET BACK button to select the indoor unit number.



3) Press the Set time buttons to select the function number.



(4) Press the SET TEMP. buttons (▼) (▲) to select the setting value. The display flashes during setting value selection.



- (5) Press the TIMER SET button to confirm the setting. Press the TIMER SET button for a few seconds until the setting value stops flashing. If the setting value display changes or if “-” is displayed when the flashing stops, the setting value has not been set correctly. (An invalid setting value may have been selected for the indoor unit.)
- (6) Repeat steps 2 to 5 to perform additional settings. Press the SET TEMP. buttons (▼) (▲) and FAN button simultaneously again for more than 5 seconds to cancel the function setting mode. In addition, the function setting mode will be automatically canceled after 1 minute if no operation is performed.
- (7) After completing the FUNCTION SETTING, be sure to turn off the power and turn it on again.

⚠ CAUTION

- After turning off the power, wait 30 seconds or more before turning it on again. The Function Setting will not become active unless the power is turned off then on again.

■ CONTENTS OF FUNCTION SETTING

- Follow the instructions in the Local Setup Procedure, which is supplied with the remote control, in accordance with the installed condition.
After the power is turned on, perform the Function Setting on the remote control.
- The settings may be selected between the following two: Function Number or Setting Value.
- Settings will not be changed if invalid numbers or setting values are selected.

1)	Static pressure
2)	Cooler room temperature correction
3)	Heater room temperature correction
4)	Auto restart
5)	Indoor room temperature sensor switching function
6)	Cool air prevention
7)	Room temperature control switching

1) Static pressure

Select appropriate static pressure according to the installation conditions. Refer to the technical manual for details or follow the instructions of the duct designer.

(◆ . . . Factory setting)

Setting Description	Function Number	Setting Value
◆ Normal (72Pa)	21	00
Low static pressure (50Pa)		02
High static pressure 1 (150Pa)		03
High static pressure 2 (200Pa)		04
High static pressure 3 (250Pa)		05

2) Cooler room temperature correction

Depending on the installed environment, the room temperature sensor may require a correction. The settings may be selected as shown in the table below.

(◆ . . . Factory setting)

Setting Description	Function Number	Setting Value
◆ Standard (No correction)	30	00
Warmer control (+1.0°C)		01
Slightly warmer control (+0.5°C)		02
Slightly lower control (-0.5°C)		03
Lower control (-1.0°C)		04

3) Heater room temperature correction

Depending on the installed environment, the room temperature sensor may require correction. The settings may be changed as shown in the table below.

(◆ . . . Factory setting)

Setting Description	Function Number	Setting Value
◆ Standard (No correction)	31	00
Warmer control (+1.0°C)		01
Slightly warmer control (+0.5°C)		02
Slightly lower control (-0.5°C)		03
Lower control (-1.0°C)		04

4) Auto restart

Enable or disable automatic system restart after a power outage.

(◆ . . . Factory setting)

Setting Description	Function Number	Setting Value
◆ Yes	40	00
No		01

* Auto restart is an emergency function such as for power failure etc.

Do not start and stop the indoor unit by this function in normal operation.

Be sure to operate by the control unit, or external input device.

5) Indoor room temperature sensor switching function

(Only for Wired remote controller)

The following settings are needed when use the control by Wired remote controller temperature sensor.

(◆ . . . Factory setting)

Setting Description	Function Number	Setting Value
◆ No	42	00
Yes		01

* If setting value is "00":

Room temperature is controlled by the indoor unit temperature sensor.

* If setting value is "01":

Room temperature is controlled by either indoor unit temperature sensor or remote controller unit sensor.

6) Cool air prevention

This setting is used to set the fan speed when the compressor stops once the room temperature has reached the set temperature during heating operation.

(◆ . . . Factory setting)

Setting Description	Function Number	Setting Value
◆ Super low	43	00
Follow the setting on the remote controller (corresponding to ventilation)		01

7) Room temperature control switching

This setting is used to set the room temperature control method when the wired remote controller is selected by the Indoor Room Temperature Sensor Switching Function.

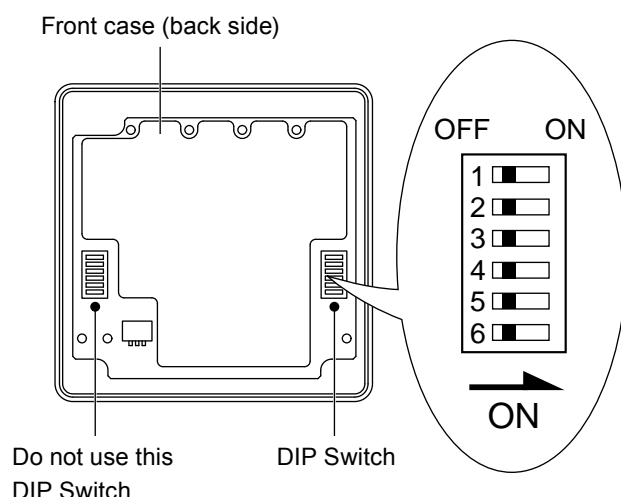
(◆ . . . Factory setting)

Setting Description	Function Number	Setting Value
Control by the sensors of both the indoor unit and the wired remote controller.	48	00
◆ Control only by the sensor of the wired remote controller		01

12-3. WIRED REMOTE CONTROLLER

DIP SW	1	Can not be used. (Do not change)
	2	Dual remote controller setting
	3	Can not be used. (Do not change)
	4	Can not be used. (Do not change)
	5	Can not be used. (Do not change)
	6	Memory backup setting

■ SWITCH POSITION



■ DIP SWITCH SETTING

● Dual remote controller setting

Set the remote controller DIP switch No.2 according to the following table.

(◆...Factory setting)

	Number of remote controller	Primary unit	Secondary unit
		DIP-SW No.2	DIP-SW No.2
◆	1 (Normal)	OFF	—
	2 (Dual)	OFF	ON

● Memory backup setting

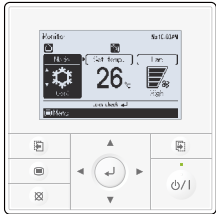
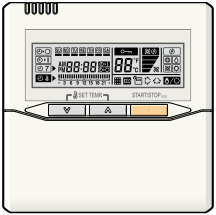

Set to ON to use batteries for the memory backup. If batteries are not used, all of the settings stored in memory will be deleted if there is a power failure.

(◆...Factory setting)






	DIP-SW No.6	Memory backup
◆	OFF	Invalidity
	ON	Validity

13. OPTIONAL PARTS

13-1. CONTROLLER

Exterior	Parts name	Model No.	Summary
	Wired remote controller	UTY-RVN*M	Large and full-dot liquid crystal screen, wide and large keys easy to press, user-intuitive arrow key.
	Wired remote controller	UTY-RNN*M	The room temperature can be controlled by being detected the temperature accurately with built-in thermo sensor.
	Simple remote controller	UTY-RSN*M	Compact remote controller concentrates on the basic functions such as Start/Stop, Fan Control, Temperature Setting and Operation mode.

13-2. OTHERS

Exterior	Parts name	Model No.	Summary
	Remote sensor	UTY-XSZX	New amenity space can be offered by installing the Remote sensor in the remote controller.
 (x 1)  (x 2)  (x 1)  (x 2)	External control set	UTD-ECS5A	Use to connect with various peripheral devices and air conditioner PC board. (Set of 6)

2. OUTDOOR UNIT

SINGLE TYPE :

AO*A72LALT

AO*A90LALT

CONTENTS

2. OUTDOOR UNIT

1.	SPECIFICATIONS.....	02 - 01
2.	DIMENSIONS.....	02 - 02
3.	INSTALLATION PLACE	02 - 07
3-1.	WHEN INSTALL NEAR BY LIMITED HEIGHT WALL	02 - 07
3-2.	WHEN INSTALL NEAR BY UNLIMITED HEIGHT WALL	02 - 08
3-3.	WHEN THERE IS AN OBSTRUCTION ABOVE THE PRODUCT	02 - 09
4.	REFRIGERANT CIRCUIT	02 - 10
5.	WIRING DIAGRAMS.....	02 - 11
6.	CAPACITY COMPENSATION RATE FOR PIPE LENGTH AND HEIGHT DIFFERENCE	02 - 12
7.	PIPE SIZE SELECTION & LIMITATION.....	02 - 14
8.	ADDITIONAL CHARGE CALCULATION.....	02 - 14
9.	AIRFLOW.....	02 - 15
10.	OPERATION NOISE.....	02 - 16
10-1.	NOISE LEVEL CURVE	02 - 16
10-2.	SOUND LEVEL CHECK POINT	02 - 17
11.	ELECTRIC CHARACTERISTICS.....	02 - 18
12.	SAFETY DEVICES	02 - 19
13.	EXTERNAL INPUT & OUTPUT	02 - 20
13-1.	EXTERNAL INPUT	02 - 20
13-2.	EXTERNAL OUTPUT	02 - 22

CONTENTS

2. OUTDOOR UNIT

14. FUNCTION SETTING	02 - 25
14-1. FIELD SETTING SWITCHES	02 - 25
14-2. FUNCTION SETTINGS	02 - 25
14-2-1. SETTING METHOD	02 - 26
14-2-2. PEAK CUT MODE	02 - 28
14-2-3. LOW NOISE MODE	02 - 28
15. OPTIONAL PARTS	02 - 29
16. LOCALLY PROCURED PARTS	02 - 30
16-1. AIR DISCHARGE DUCT	02 - 30
16-2. SNOW HOOD	02 - 32
16-3. CENTRAL DRAIN PAN	02 - 35

1. SPECIFICATIONS

Type					INVERTER HEATPUMP				
Model name					AO*A72LALT		AO*A90LALT		
Power source					3N ~ 400V, 50Hz				
Available voltage range					3N ~ 342V - 457V, 50Hz				
Starting current					9.6		12.5		
Fan	Type × Quantity				Propeller fan × 1				
	Airflow rate	Cooling		m³/h	9,300		10,700		
		Heating			9,300		10,800		
	Motor	Type × Quantity			DC motor × 1				
		Output		W	600				
Sound pressure level		Cooling	High	dB (A)	57		58		
		Heating	High		57		59		
Heat exchanger		Length		mm	1750		1750		
		Fin pitch			1.45		1.45		
		Rows × Stages			3 × 60		3 × 60		
		Face area		m²	2.2		2.2		
		Pipe type (Material)			Grooved H-pin (Copper)				
		Fin	Type (Material)		Corrugate (Aluminium)				
					Corrosion resistance (Blue fin)				
Compressor	Type × Quantity				Twin rotary × 1				
	Motor output			kW	3.9				
	Crankcase heater			W	25				
Refrigerant		Type			R410A				
		Charge		kg	11.2				
Refrigerant oil		Type			PVE				
Enclosure		Material			Painted galvanized steel				
		Colour			BEIGE Approximate colour of MUNSELL 10YR 7.5/1.0				
Dimensions (H × W × D)		Net		mm	1690 × 930 × 765				
		Gross			1811 × 1002 × 847				
Weight		Net		kg	215				
		Gross			243				
Connection pipe		Size	Liquid	mm	Ø12.7 (Ø1/2in.)				
			Gas		Ø25.4 (Ø1in.)				
		Method	Liquid		Brazing				
			Gas		Brazing				
		Pre-charge length			m	20			
		Max. length				75			
Max. height difference			30						
Operation temperature range		Cooling		°CDB	-5 to 46				
		Heating			-15 to 24				
Defrost method					Reversed cycle				

Note :

Specifications are based on the following conditions.

Cooling : Indoor temperature of 27 °CDB / 19 °CWB. and outdoor temperature of 35 °CDB/24 °CWB.

Heating : Indoor temperature of 20 °CDB / 15 °CWB. and outdoor temperature of 7 °CDB/6 °CWB.

Pipe length : 7.5 m, Height difference between outdoor unit and indoor unit : 0 m.

The protective function may work when using it outside the temperature range mentioned above.

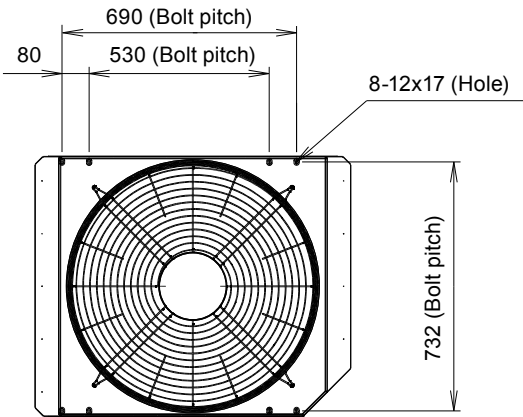
2. DIMENSIONS

■ MODEL: AO*A72LALT, AO*A90LALT

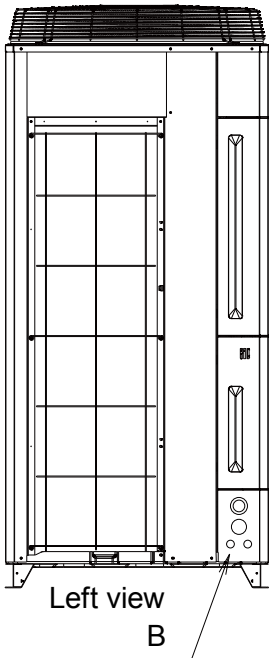
(Unit : mm)

OUTDOOR UNIT
AO*A72-90LALT

OUTDOOR UNIT
AO*A72-90LALT

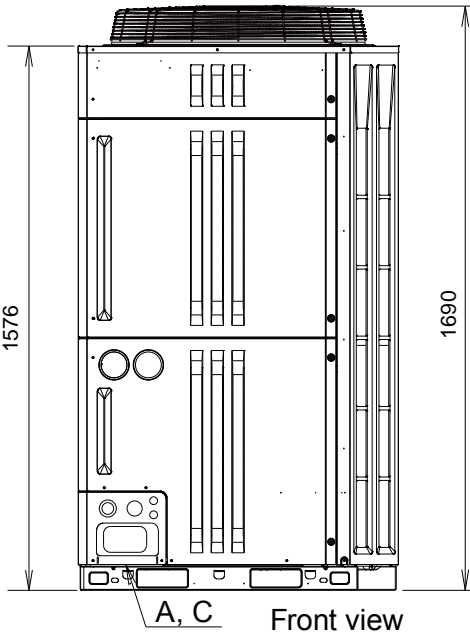


Top view



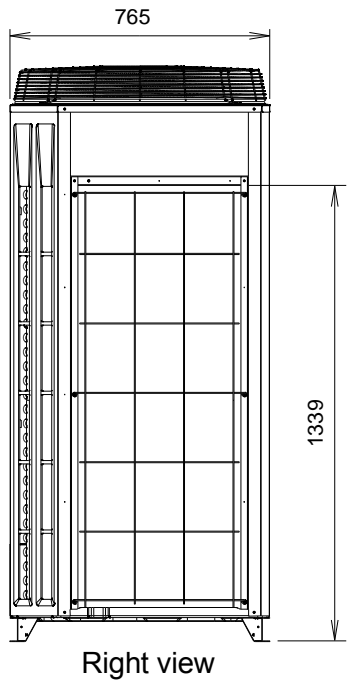
Left view

B

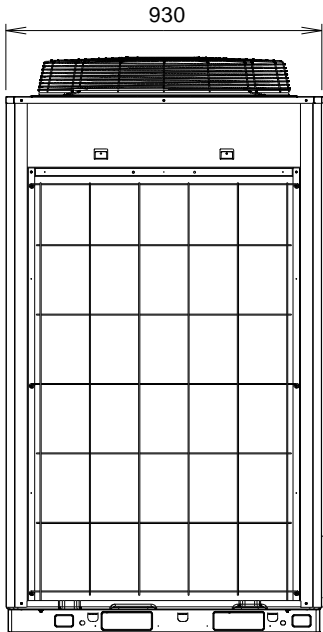


Front view

A, C



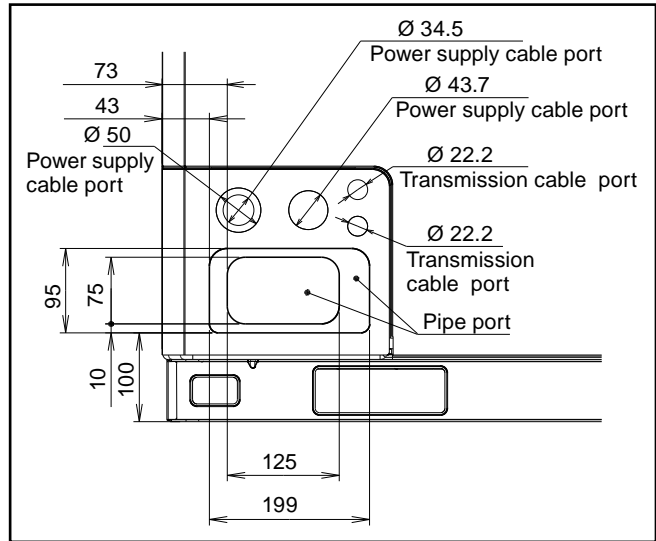
Right view



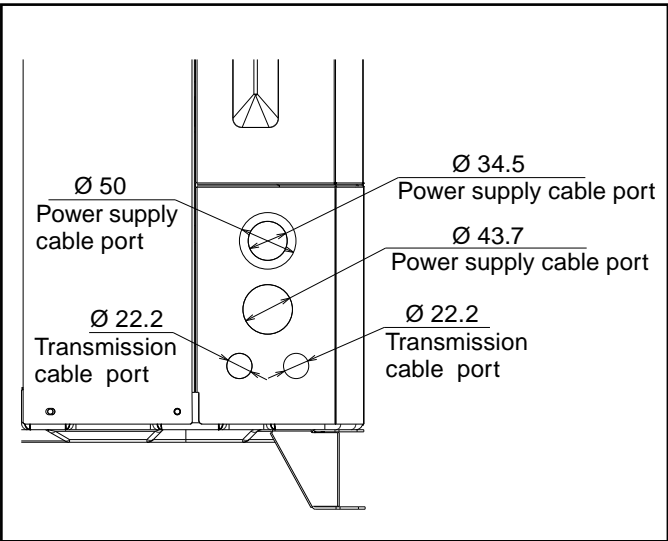
Rear view

■ KNOCKOUT HOLE POSITION

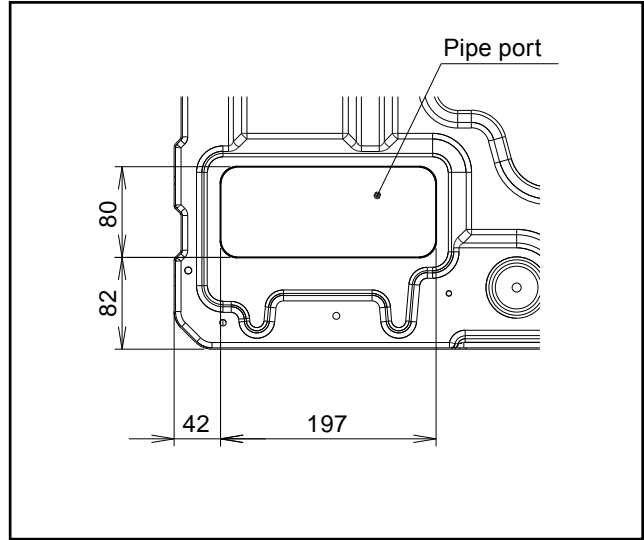
(Unit : mm)



Detail A : Front view



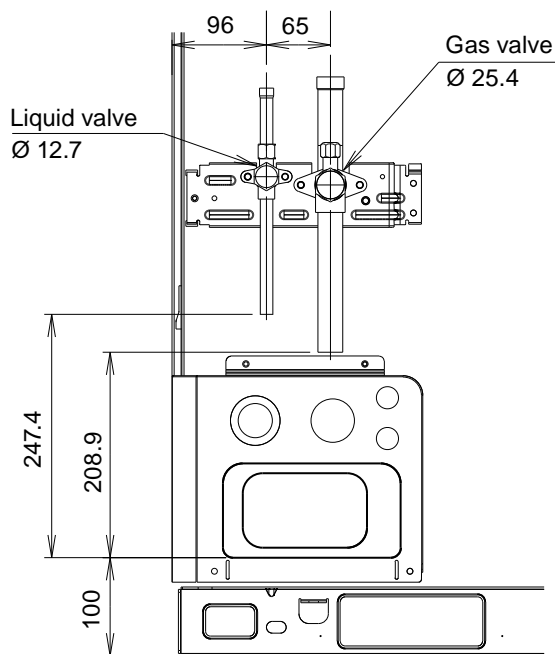
Detail B : Left view



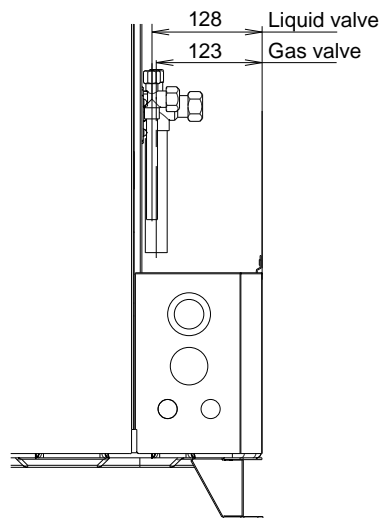
Detail C : Top view

■ VALVE POSITION

(Unit : mm)



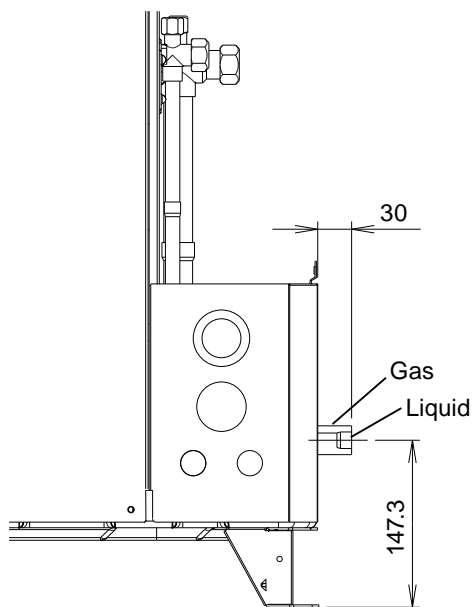
D : Front view



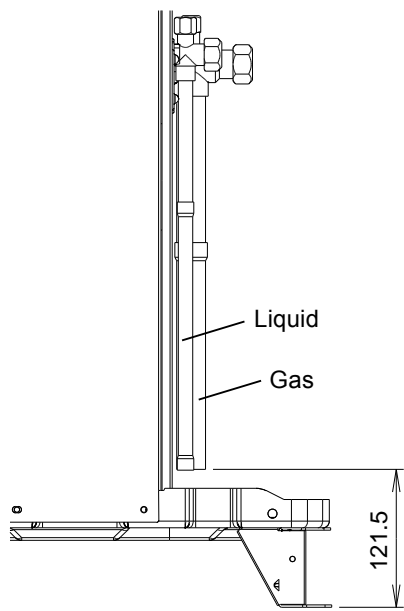
E : Left view

■ ACCESSORY PIPE

(Unit : mm)



F : Left view
(Accessory pipe A setting)



G : Left view
(Accessory pipe B setting)

■ INSTALLATION (FOUNDATION)

- Install the unit horizontally (within 3 degrees).
- Install 4 or more anchor bolts at the 8 locations indicated by arrows (Fig. A).
- Place the left and right anchor bolts at a distance further away than 610 mm. (Excluding the case where anchor bolts are installed at 8 locations.)
- To minimize vibration, do not install the outdoor unit directly on the ground. Instead, install it on top of a firm platform (such as concrete block) (Fig. B).
- Keep the height of foundation base over 200 mm from the floor surface (Fig. C).
- The foundation base should be able to support the product and the foot width of the product should be more than 46.5 mm.
- Depending on the installation condition, vibration during the operation of the unit may cause noise and vibration.
- Install vibration-proofing materials (such as rubber pads).
- Consider the removal space of the connection piping when installing the foundation.
- Secure the equipment firmly with anchor bolts, washers, and nuts.

Fig. A (Unit : mm)

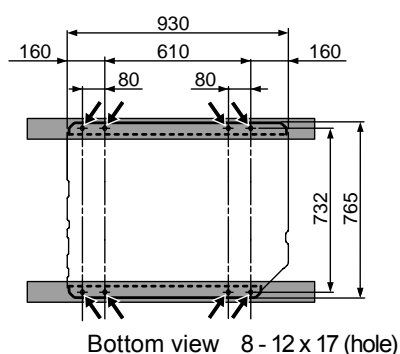


Fig. B

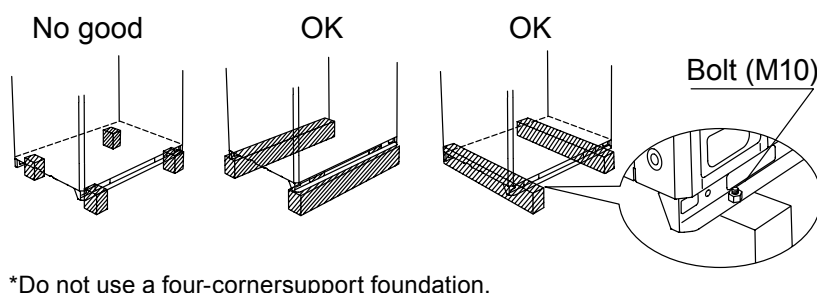
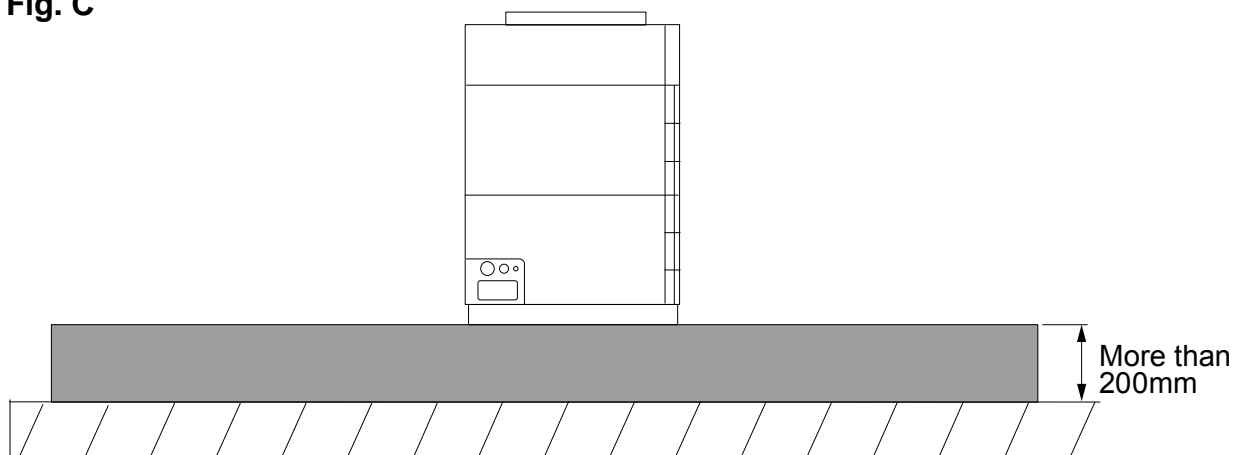


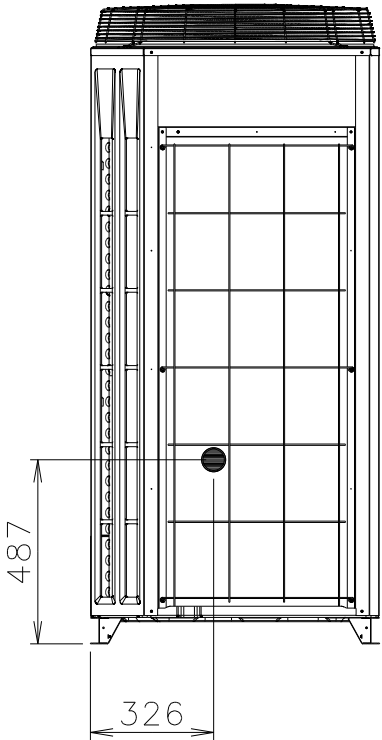
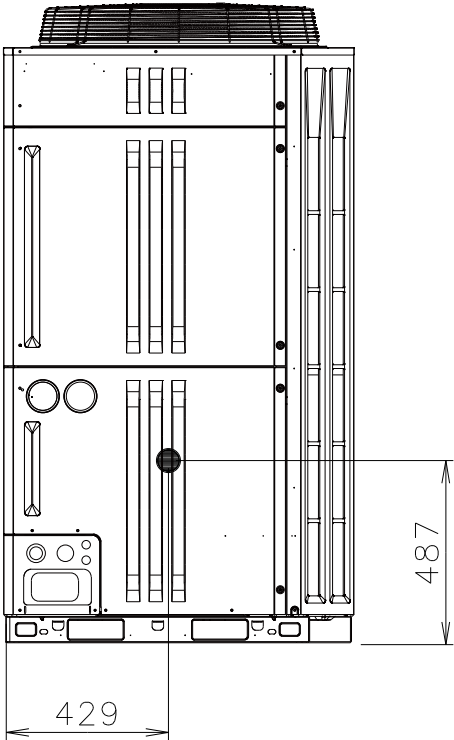
Fig. C



■ CENTER OF GRAVITY POSITION

● Models : AO*A72LALT, AO*A90LALT

(Unit : mm)



● : Center of gravity

3. INSTALLATION PLACE

⚠ Caution

When installing the outdoor unit, pay attention to the following items.

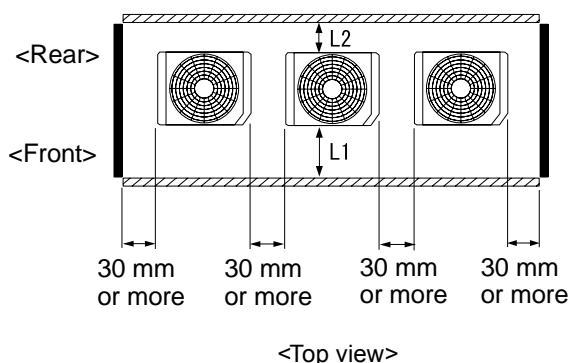
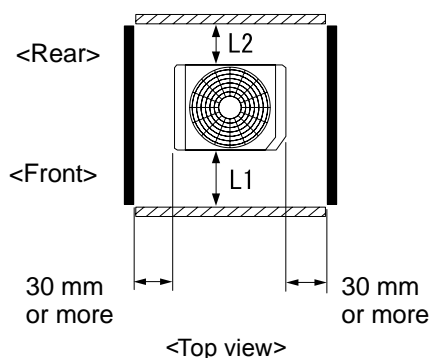
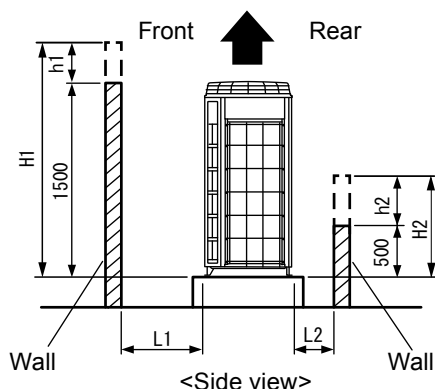
- To prevent stopping of operation by short circuit and worsening of performance and high pressure protection, refer to the installation space shown in the figure and secure enough space.
- Install in sufficient space considering the carrying in route, installation space, maintenance space, passage of people, etc.
- Do not place obstructions in the air flow outlet direction. If there is an obstruction in the outlet direction, install an outlet duct.
- When there is a wall in front of the unit, provide a space of 500mm or more as maintenance space.
- When there is a wall at the side of the unit, provide a space of 30mm or more as maintenance space.
- An outdoor temperature of 35 degrees in air-conditioned operation is assumed for the installation space in this item. If the outdoor temperature exceeds 35 degrees, provide a larger inlet space.
- When installing, also consider the refrigerant piping space.

3-1. WHEN INSTALL NEAR BY LIMITED HEIGHT WALL

■ SINGLE AND MULTIPLE INSTALLATIONS

- There are no restrictions on the height of the side wall.
- Provide installation spaces L1 and L2 in accordance with the table below according to the wall height (front side, rear side) conditions.
- Provide installation spaces other than L1 and L2 in accordance with the conditions shown in the figure below.
- Ventilation resistance can be ignorable when the distance from a wall or product, etc. is larger than 2m.

Wall height condition	Necessary installation space
When H1 is 1500(mm) or less	$L1 \geq 500 \text{ (mm)}$
When H1 is 1500(mm) or more	$L1 \geq 500 + h1 \div 2 \text{ (mm)}$
When H2 is 500(mm) or less	$L2 \geq 300 \text{ (mm)}$
When H2 is 500(mm) or more	$L2 \geq 300 + h2 \div 2 \text{ (mm)}$



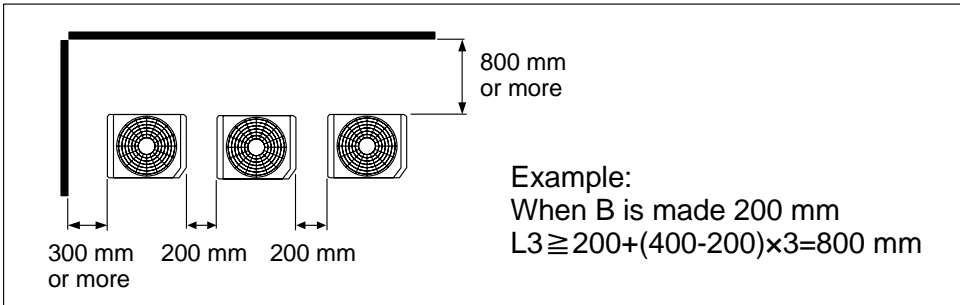
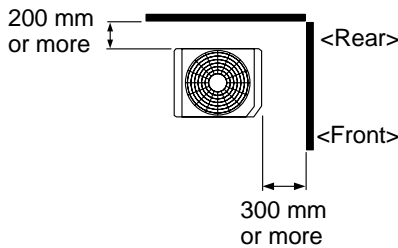
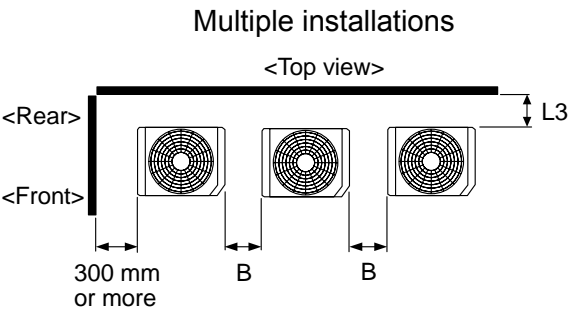
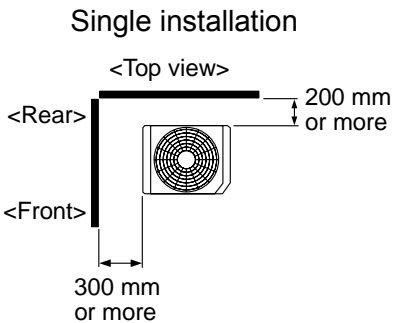
3-2. WHEN INSTALL NEAR BY UNLIMITED HEIGHT WALL

■ SINGLE AND MULTIPLE INSTALLATIONS

- There are no restrictions on the height of the wall.
- The wall (without height restrictions) must not exist on the both sides (left / right) of outdoor unit. Also, must not exist on the both sides (front / rear) of outdoor unit.
- Provide installation spaces other than L3 in accordance with the conditions shown in the figure below.
- Ventilation resistance can be ignorable when the distance from a wall or product, etc. is larger than 2m.

● When installing with the REAR of the outdoor unit facing the wall side

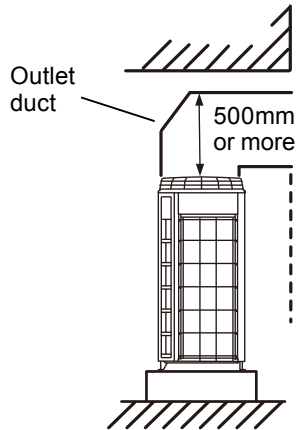
Condition	Necessary installation space
When $B \geq 400$ (mm)	$L3 \geq 200$ (mm)
When $30 \leq B < 400$ (mm)	$L3 \geq 200 + (400 - B) \times 3$ (mm)



3-3. WHEN THERE IS AN OBSTRUCTION ABOVE THE PRODUCT

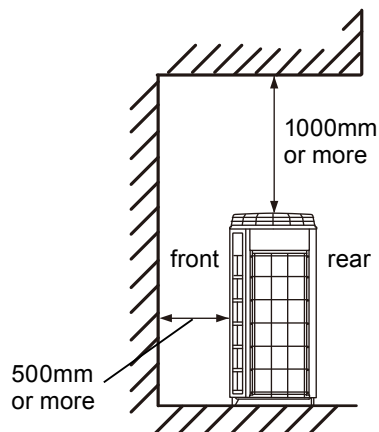
When there are obstacles above the product, keep the minimum installation height as shown in the figure and install the outlet duct.

The efficiency might decrease when the outlet duct etc. are installed.



● **When an outlet duct is not installed, install the product as shown below.**

- 1) Make the ceiling height after setting 1m or greater.
- 2) Be sure there is no wall at the rear side.
- 3) When installing products adjacently, install up to 3 units.

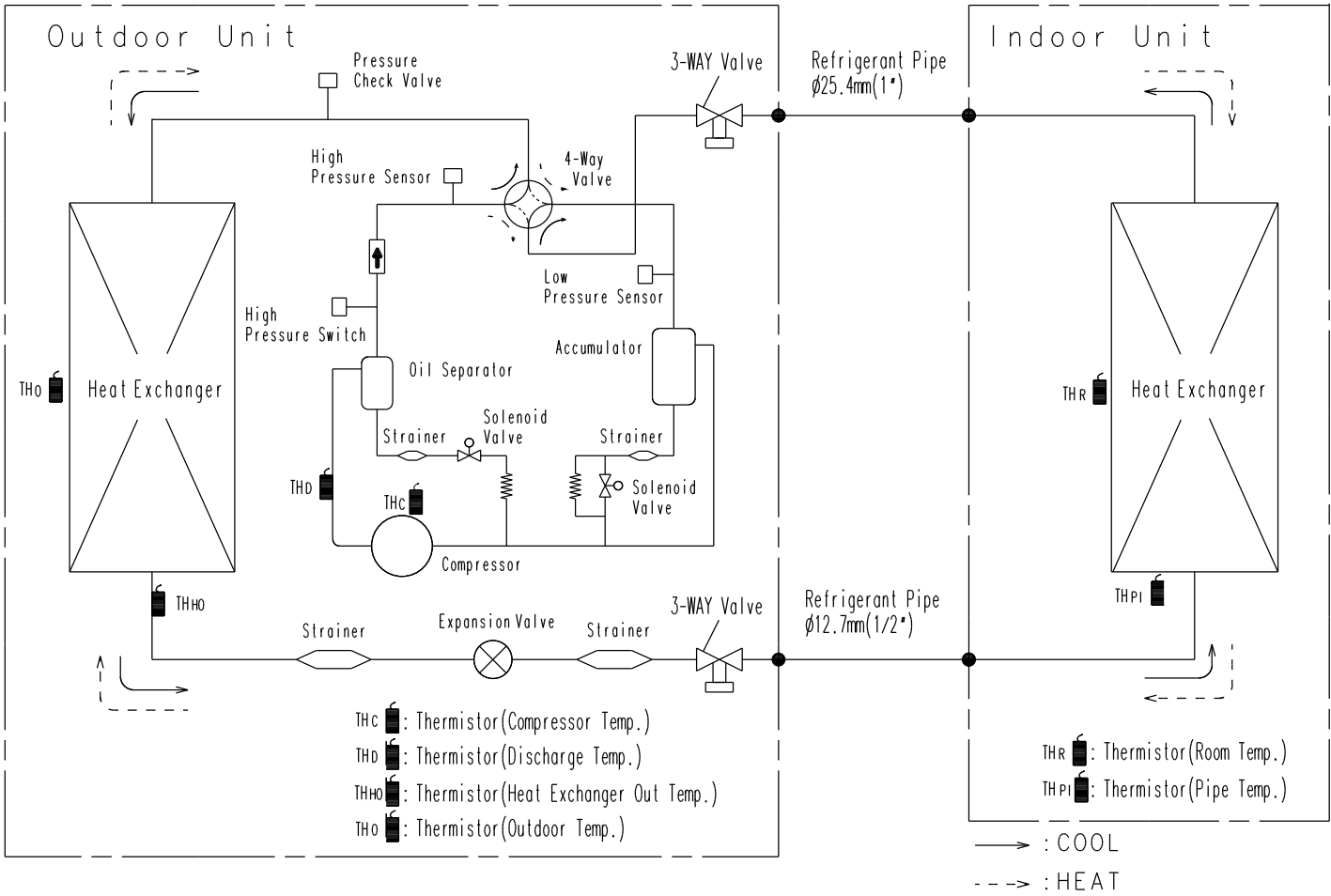


4. REFRIGERANT CIRCUIT

■ MODEL: AO*A72LALT, AO*A90LALT

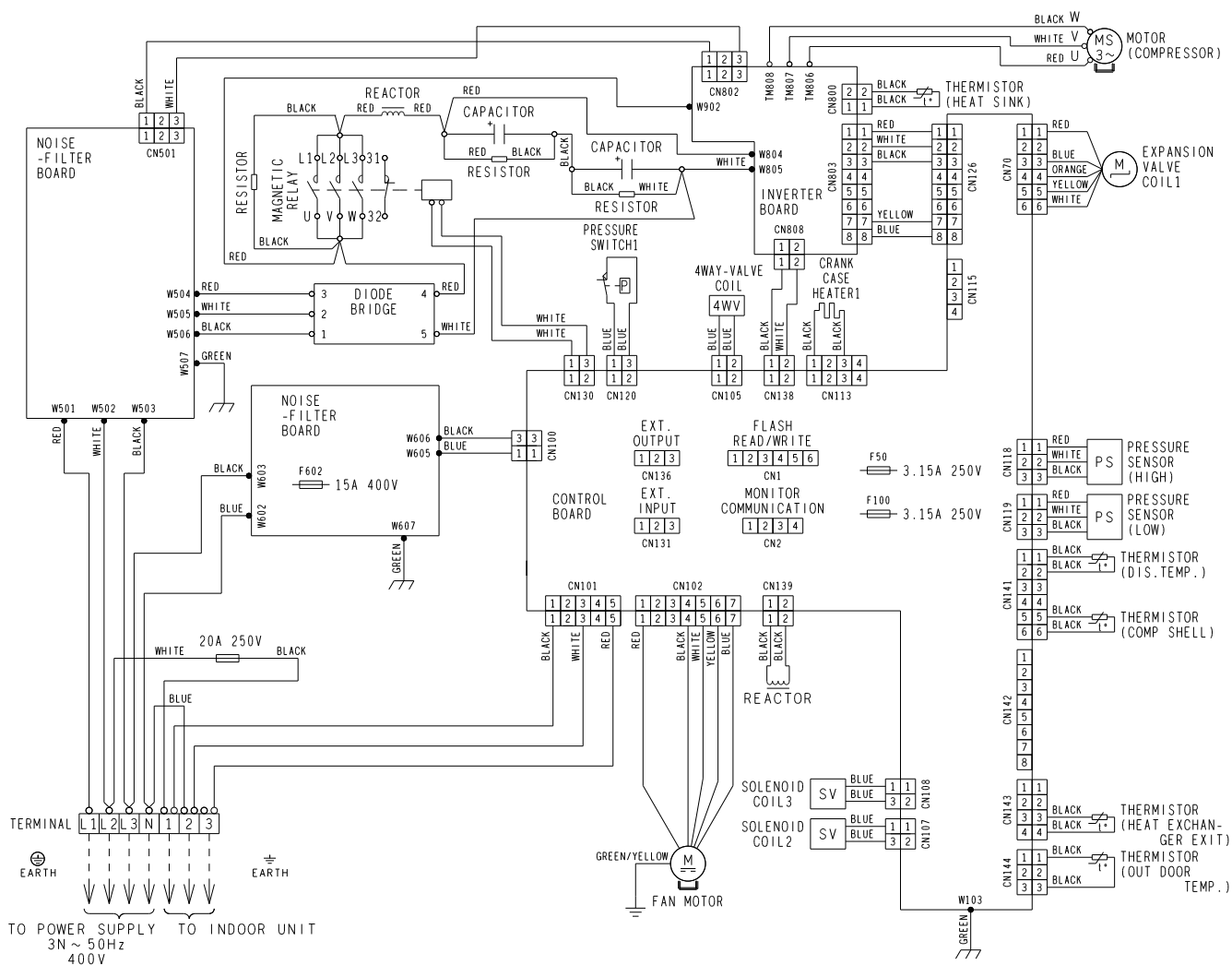
OUTDOOR UNIT
AO*A72-90LALT

OUTDOOR UNIT
AO*A72-90LALT



5. WIRING DIAGRAMS

■ MODEL: AO*A72LALT, AO*A90LALT



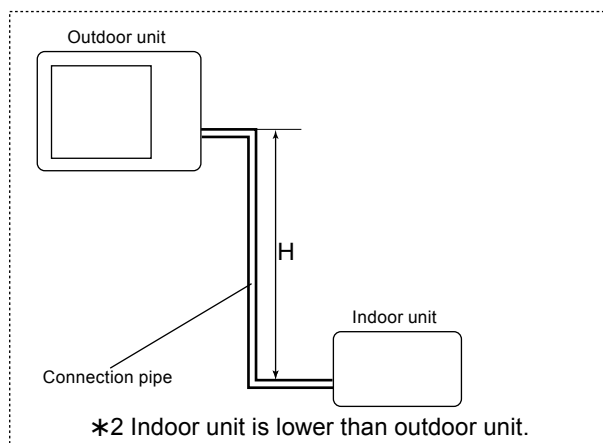
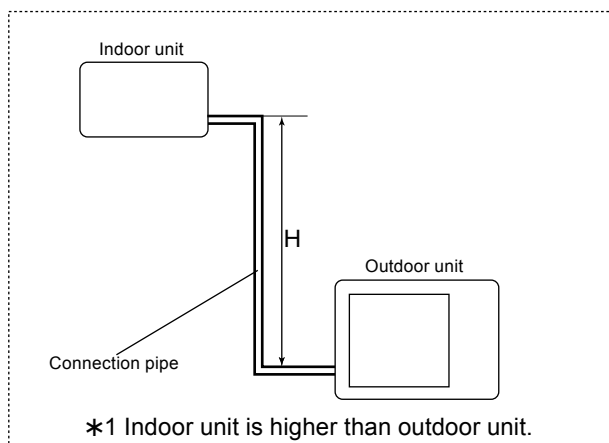
6. CAPACITY COMPENSATION RATE FOR PIPE LENGTH AND HEIGHT DIFFERENCE

■ MODEL: AO*A72LALT

COOLING			Pipe length (m)								
			5	7.5	10	20	30	40	50	60	75
Height difference H (m)	*1 Indoor unit is higher than outdoor unit	30	-	-	-	-	0.901	0.878	0.855	0.832	0.798
		20	-	-	-	0.939	0.916	0.892	0.869	0.846	0.811
		10	-	-	0.978	0.954	0.931	0.907	0.884	0.860	0.825
		7.5	-	0.988	0.982	0.958	0.935	0.911	0.887	0.864	0.828
		5	0.992	0.992	0.986	0.962	0.938	0.915	0.891	0.867	0.831
		0	1.000	1.000	0.994	0.970	0.946	0.922	0.898	0.874	0.838
	*2 Indoor unit is lower than outdoor unit.	-5	1.000	1.000	0.994	0.970	0.946	0.922	0.898	0.874	0.838
		-7.5	-	1.000	0.994	0.970	0.946	0.922	0.898	0.874	0.838
		-10	-	-	0.994	0.970	0.946	0.922	0.898	0.874	0.838
		-20	-	-	-	0.970	0.946	0.922	0.898	0.874	0.838
		-30	-	-	-	-	0.946	0.922	0.898	0.874	0.838

HEATING			Pipe length (m)								
			5	7.5	10	20	30	40	50	60	75
Height difference H (m)	*1 Indoor unit is higher than outdoor unit	30	-	-	-	-	0.977	0.966	0.956	0.946	0.930
		20	-	-	-	0.987	0.977	0.966	0.956	0.946	0.930
		10	-	-	0.997	0.987	0.977	0.966	0.956	0.946	0.930
		7.5	-	1.000	0.997	0.987	0.977	0.966	0.956	0.946	0.930
		5	1.000	1.000	0.997	0.987	0.977	0.966	0.956	0.946	0.930
		0	1.000	1.000	0.997	0.987	0.977	0.966	0.956	0.946	0.930
	*2 Indoor unit is lower than outdoor unit.	-5	0.995	0.995	0.992	0.982	0.972	0.961	0.951	0.941	0.925
		-7.5	-	0.993	0.990	0.980	0.970	0.959	0.949	0.939	0.923
		-10	-	-	0.987	0.977	0.967	0.956	0.946	0.937	0.921
		-20	-	-	-	0.967	0.957	0.947	0.937	0.927	0.911
		-30	-	-	-	-	0.948	0.937	0.927	0.918	0.902

Height difference H

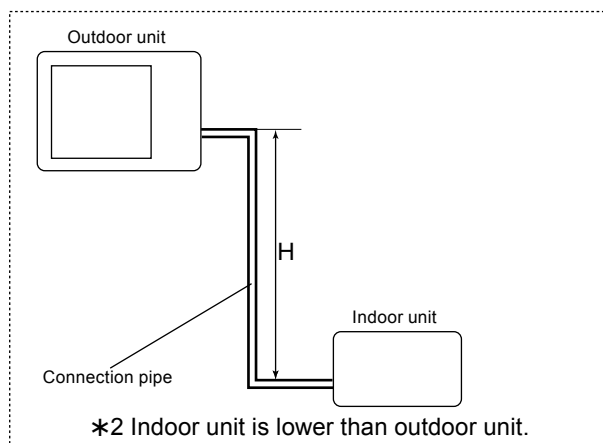
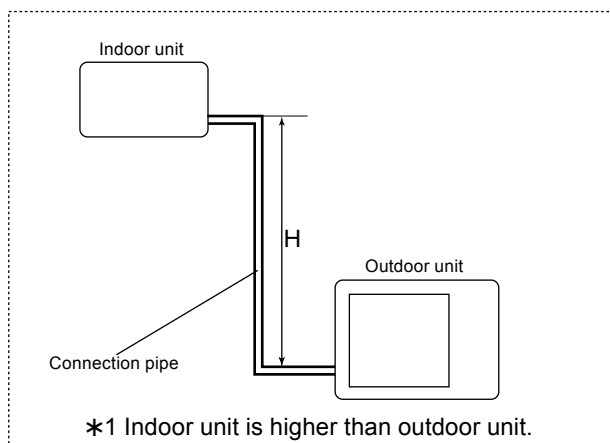


■ MODEL: AO*A90LALT

COOLING			Pipe length (m)								
			5	7.5	10	20	30	40	50	60	75
Height difference H (m)	*1 Indoor unit is higher than outdoor unit	30	-	-	-	-	0.898	0.874	0.850	0.826	0.790
		20	-	-	-	0.938	0.913	0.889	0.864	0.840	0.803
		10	-	-	0.978	0.953	0.928	0.903	0.879	0.854	0.817
		7.5	-	0.988	0.982	0.957	0.932	0.907	0.882	0.858	0.820
		5	0.992	0.992	0.986	0.961	0.935	0.911	0.886	0.861	0.823
		0	1.000	1.000	0.994	0.969	0.943	0.918	0.893	0.868	0.830
	*2 Indoor unit is lower than outdoor unit.	-5	1.000	1.000	0.994	0.969	0.943	0.918	0.893	0.868	0.830
		-7.5	-	1.000	0.994	0.969	0.943	0.918	0.893	0.868	0.830
		-10	-	-	0.994	0.969	0.943	0.918	0.893	0.868	0.830
		-20	-	-	-	0.969	0.943	0.918	0.893	0.868	0.830
		-30	-	-	-	-	0.943	0.918	0.893	0.868	0.830

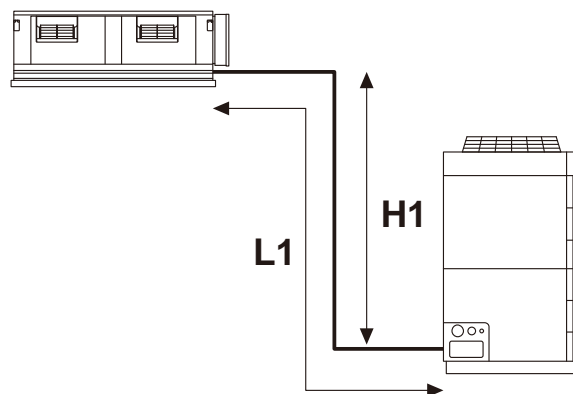
HEATING			Pipe length (m)								
			5	7.5	10	20	30	40	50	60	75
Height difference H (m)	*1 Indoor unit is higher than outdoor unit	30	-	-	-	-	0.977	0.966	0.956	0.946	0.930
		20	-	-	-	0.987	0.977	0.966	0.956	0.946	0.930
		10	-	-	0.997	0.987	0.977	0.966	0.956	0.946	0.930
		7.5	-	1.000	0.997	0.987	0.977	0.966	0.956	0.946	0.930
		5	1.000	1.000	0.997	0.987	0.977	0.966	0.956	0.946	0.930
		0	1.000	1.000	0.997	0.987	0.977	0.966	0.956	0.946	0.930
	*2 Indoor unit is lower than outdoor unit.	-5	0.995	0.995	0.992	0.982	0.972	0.961	0.951	0.941	0.925
		-7.5	-	0.993	0.990	0.980	0.970	0.959	0.949	0.939	0.923
		-10	-	-	0.987	0.977	0.967	0.956	0.946	0.937	0.921
		-20	-	-	-	0.967	0.957	0.947	0.937	0.927	0.911
		-30	-	-	-	-	0.948	0.937	0.927	0.918	0.902

Height difference H



7. PIPE SIZE SELECTION & LIMITATION

■ MODEL : AO*A72LALT, AO*A90LALT



			Size down	Standard	Size up
Pipe diameter [mm (in.)]	Liquid pipes		12.70 (1/2)		
	Gas pipes		22.22 (7/8)	25.40 (1)	28.58 (9/8)
Piping length	Max. piping length (L1) (Max. chargeless length)	[m (m)]	75 (20)	75 (20)	50 (20)
	Min. piping length (L1)	[m]	5		
Max. height difference (H1) <Indoor unit to outdoor unit>		[m]	30		

8. ADDITIONAL CHARGE CALCULATION

■ MODEL : AO*A72LALT, AO*A90LALT

Refrigerant type	R410A	
Refrigerant amount	g	11,200

● Refrigerant charge

Refrigerant pipe size [mm (in.)]		Piping length							
Standard		~20 m	30 m	40 m	50 m	60 m	70 m	75 m	g/m
Liquid	12.70 (1/2)	None	1,100 g	2,200 g	3,300 g	4,400 g	5,500 g	6,050 g	110 g/m
Gas	25.40 (1)								
Size down		~20 m	30 m	40 m	50 m	60 m	70 m	75 m	g/m
Liquid	12.70 (1/2)	None	1,100 g	2,200 g	3,300 g	4,400 g	5,500 g	6,050 g	110 g/m
Gas	22.22 (7/8)								
Size up		~20 m	30 m	40 m	50 m				g/m
Liquid	12.70 (1/2)	None	1,100 g	2,200 g	3,300 g				110 g/m
Gas	28.58 (9/8)								

9. AIRFLOW

■ MODEL: AO*A72LALT

● Cooling

Number of rotations (r.p.m)	Airflow	
730	m ³ /h	9300
	l/s	2583
	CFM	5474

● Heating

Number of rotations (r.p.m)	Airflow	
730	m ³ /h	9300
	l/s	2583
	CFM	5474

■ MODEL: AO*A90LALT

● Cooling

Number of rotations (r.p.m)	Airflow	
830	m ³ /h	10700
	l/s	2972
	CFM	6298

● Heating

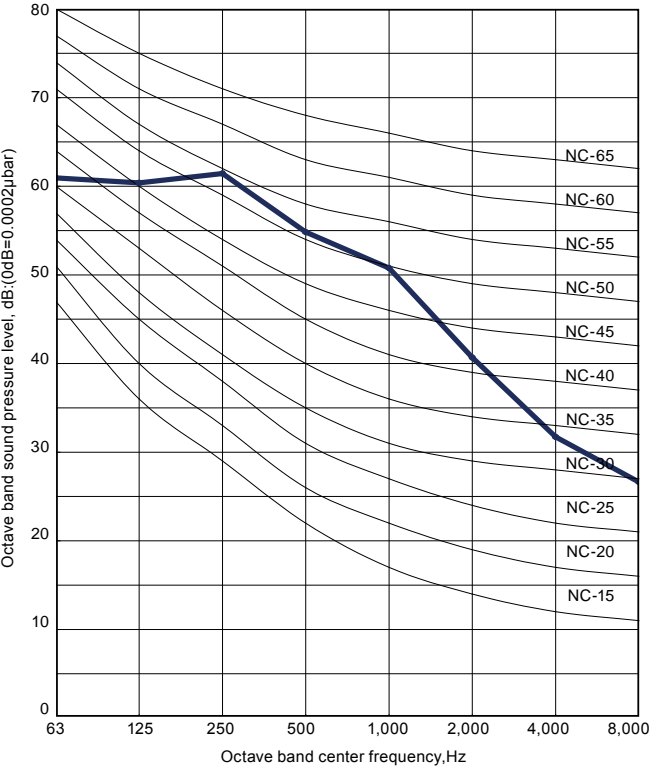
Number of rotations (r.p.m)	Airflow	
840	m ³ /h	10800
	l/s	3000
	CFM	6357

10. OPERATION NOISE

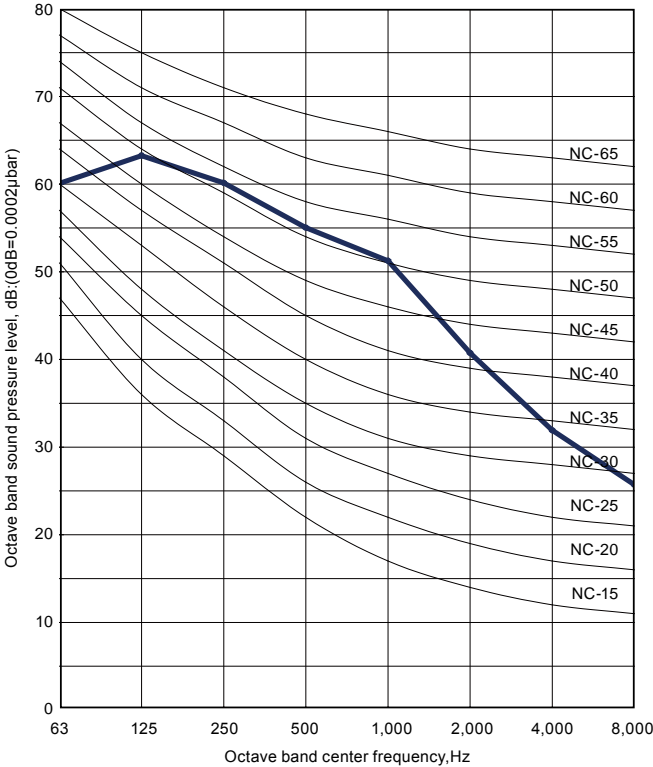
10-1. NOISE LEVEL CURVE

MODEL: AO*A72LALT

● Cooling

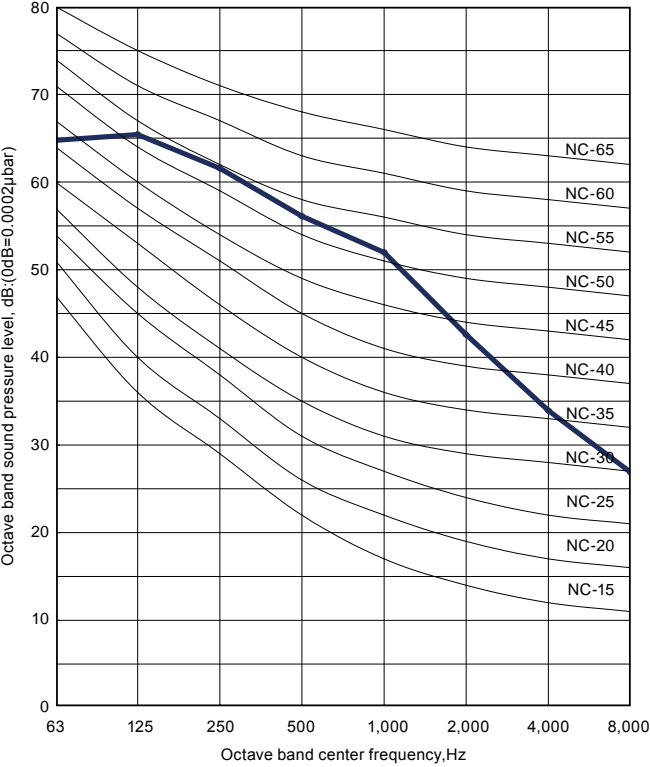


● Heating

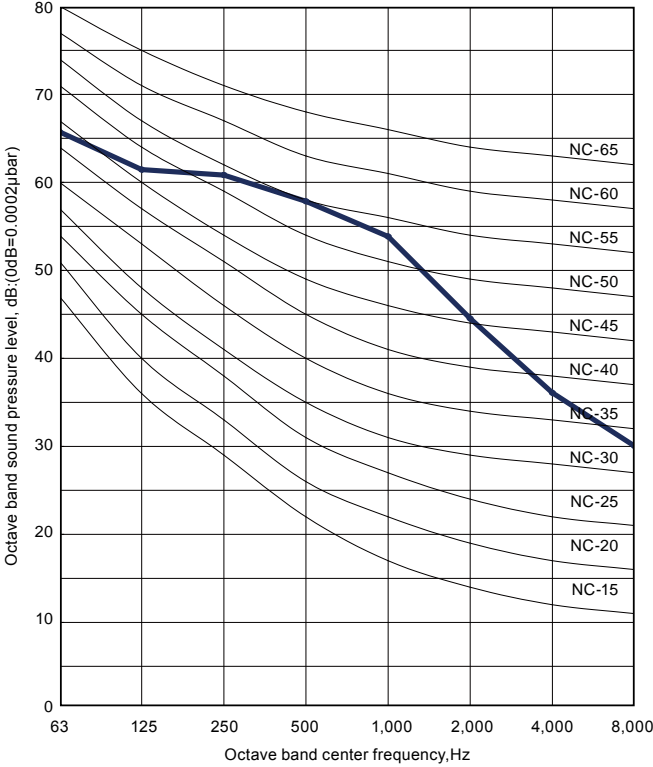


MODEL: AO*A90LALT

● Cooling

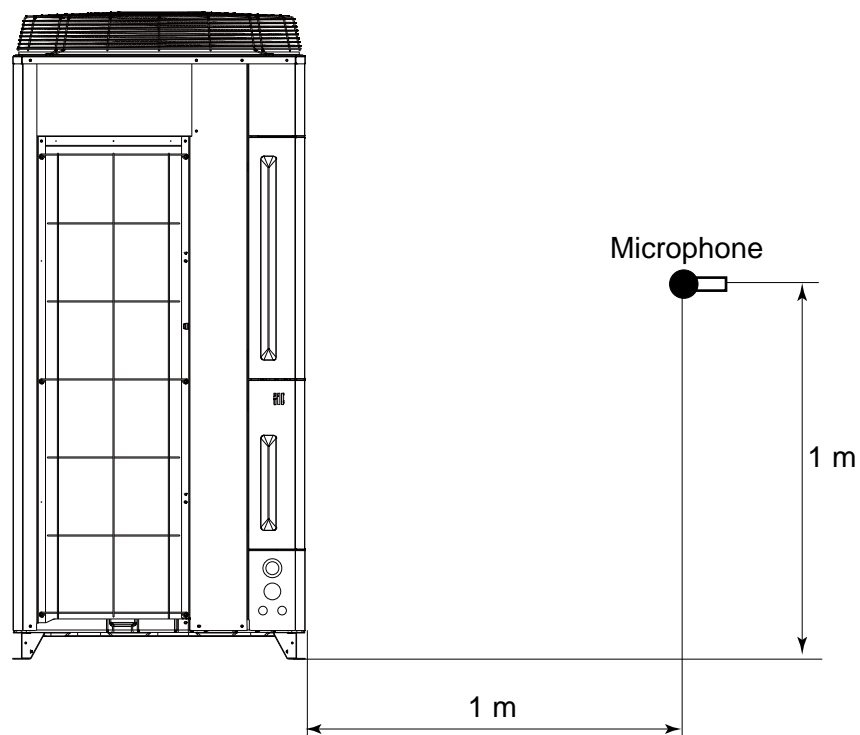


● Heating

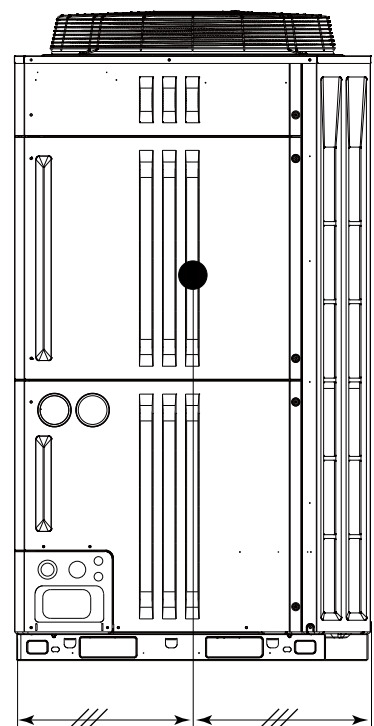


10-2. SOUND LEVEL CHECK POINT

OUTDOOR UNIT
AO*A72-90LALT



OUTDOOR UNIT
AO*A72-90LALT



11. ELECTRIC CHARACTERISTICS

Model			AO*A72LALT	AO*A90LALT
Power supply	Voltage	V	400	
	Frequency	Hz	50	
*1) Max. operating current		A	22.8	25.8
Starting current		A	9.6	12.5
Breaker	MCCB Capacity	A	30	
	ELCB Leakage current		30mA 0.1sec or less	
Outdoor unit power supply cable	Power supply cable	mm ²	6	
	Ground wire	mm ²	6	

*1) The maximum current is the total current of indoor unit and outdoor unit.

*2) Wiring spec. :

Selected sample

(Selected based on Japan Electrotechnical Standard and Codes Committee E0005)

12. SAFETY DEVICES

	Protection form	Model	
		AO*A72LALT	AO*A90LALT
Circuit protection	Fuse (Main PCB)	AC400V 15A	
		AC250V 3.15A	
	Protector (FILTER PCB)	AC500V 25A	
Indoor unit protection	Fuse	AC250V 20A	
Compressor protection	Thermal protection program (Compressor temp.)	OFF : 112°C ON : 80°C	
	Thermal protection program (Discharge temp.)	OFF : 115°C ON : After 7 minutes.	
High pressure protection	Pressure switch	OFF : 4.2MPa ON : 3.2MPa	
Low pressure protection	Pressure sensor	OFF : 0.02MPa ON : 0.05MPa	
Fan motor protection	Thermal protection program	OFF : 100 ⁺¹⁵ ₋₁₀ °C ON : 95 ⁺¹⁵ ₋₁₀ °C	

13. EXTERNAL INPUT & OUTPUT

Input	Output	Connector	Remarks
Low noise mode	—	CN131	See external input/output settings for details.
Peak cut mode	—	CN131	
—	Error status	CN136	
—	Compressor status	CN136	
—	Base heater	CN115	

13-1. EXTERNAL INPUT

ON/OFF of the "Low noise mode" and "Peak cut mode" functions can be specified by external signal.

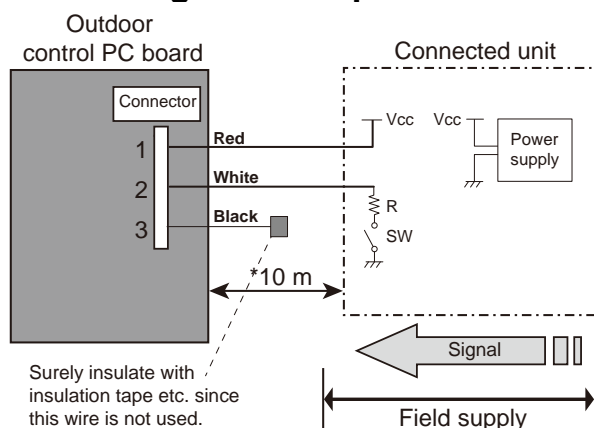
■ LOW NOISE MODE

- On-site work like the following also reduces the operating sound of the outdoor unit from the normal sound.

The air conditioner is set to the "Low noise mode" by applying the contact input of a commercial timer or ON/OFF switch to a connector on the outdoor control PC board.

* Performance may drop depending on the outside air temperature condition, etc.

● Circuit diagram example



- Power supply
 - Voltage (Chart sign=Vcc) : DC 5V to 24V
 - The current capacity : About 100mA
 - Switch (Chart sign=SW)
 - Toggle switch or Rocker switch, etc : Switch which maintains the states.
 - Prepare switches which are enough capable for DC 10mA current or more
 - Resistance (Chart sign=R)
 - Adjust the resistance for current to about DC 10mA
- (Example)
- In case of Vcc=DC 5V : Rated resistance value 470Ω 1/4W
 - In case of Vcc=DC 12V : Rated resistance value 1kΩ 1/4W
 - In case of Vcc=DC 24V : Rated resistance value 2.2kΩ 1/4W

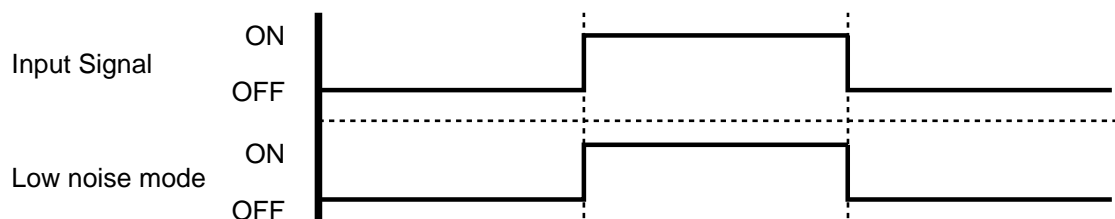
* Make the distance from the PC board to the connected unit within 10 m.

- Use the following parts and construct a circuit like that shown above.

● Input Signal

ON : Low noise mode / OFF : Normal operation

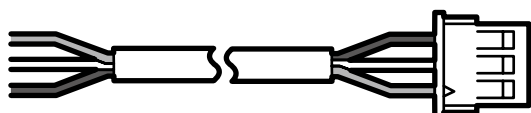
* Set the "Low noise mode" level by "Push switch" on the outdoor control PC board.



● Parts (Optional)

Model name
UTY-XWZXZ2

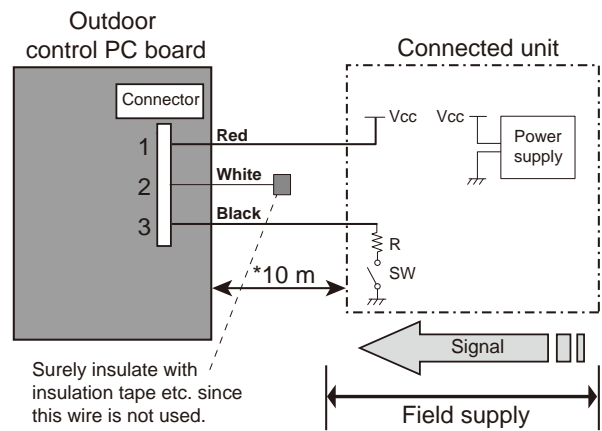
Wire (External input)



PEAK CUT MODE

- Operation that suppressed the current value can be performed by means of the following on-site work. The air conditioner is set to the Peak cut mode by applying the contact input of a commercial ON/OFF switch to a connector on the outdoor control PC board.

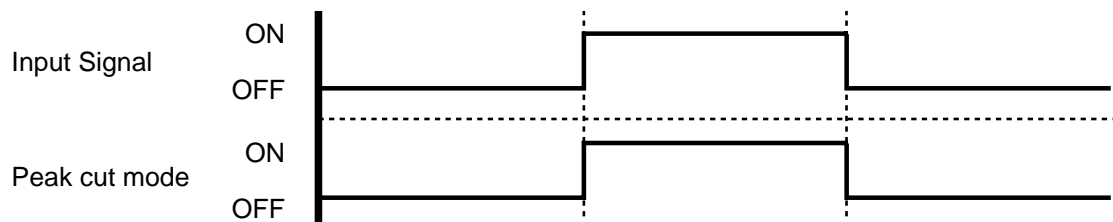
Circuit diagram example



- 1) Power supply
 - Voltage (Chart sign=Vcc) : DC 5V to 24V
 - The current capacity : About 100mA
 - 2) Switch (Chart sign=SW)
 - Toggle switch or Rocker switch, etc : Switch which maintains the states.
 - Prepare switches which are enough capable for DC 10mA current or more
 - 3) Resistance (Chart sign=R)
 - Adjust the resistance for current to about DC 10mA
- (Example)
- In case of Vcc=DC 5V : Rated resistance value 470Ω 1/4W
 - In case of Vcc=DC 12V : Rated resistance value 1kΩ 1/4W
 - In case of Vcc=DC 24V : Rated resistance value 2.2kΩ 1/4W

* Make the distance from the PC board to the connected unit within 10 m.

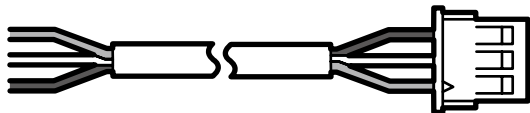
- Use the following parts and construct a circuit like that shown above.
- Input Signal...ON : Peak cut mode/OFF : Normal operation
- *Set the "Peak cut mode" level by "Push switch" on the outdoor control PC board.



Parts (Optional)

Model name
UTY-XWZXZ2

Wire (External input)

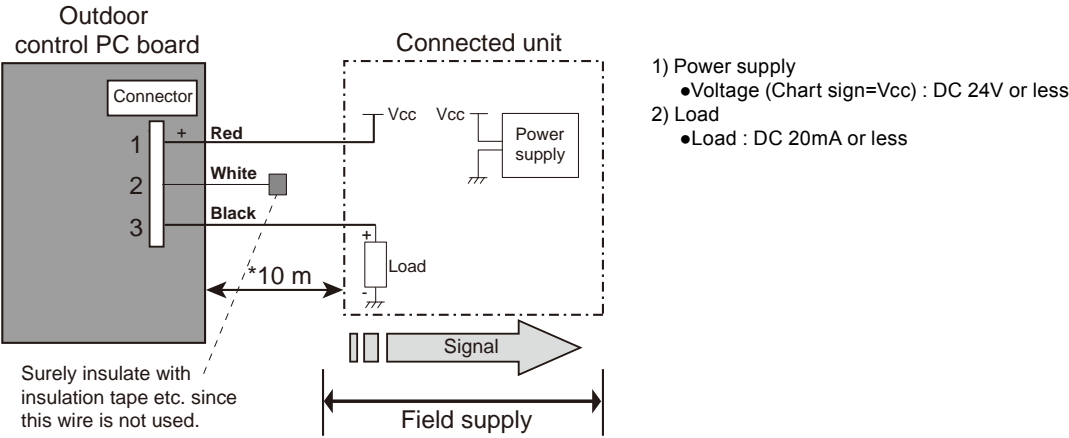


13-2. EXTERNAL OUTPUT

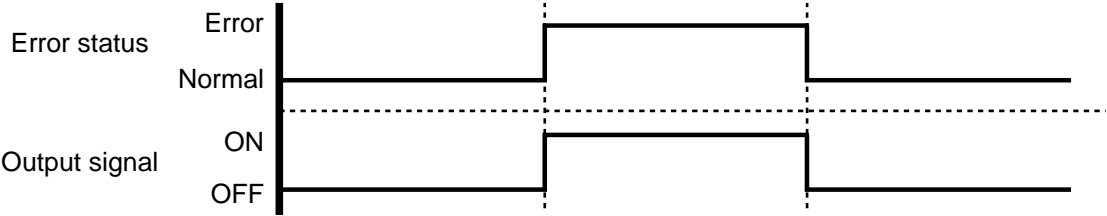
■ ERROR STATUS OUTPUT

• An air conditioner error status signal can be output by means of the following on-site work.

● Circuit diagram example



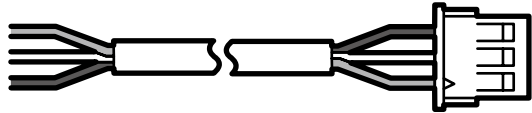
* Make the distance from the PC board to the connected unit within 10 m.



● Parts (Optional)

Model name
UTY-XWZXZ2

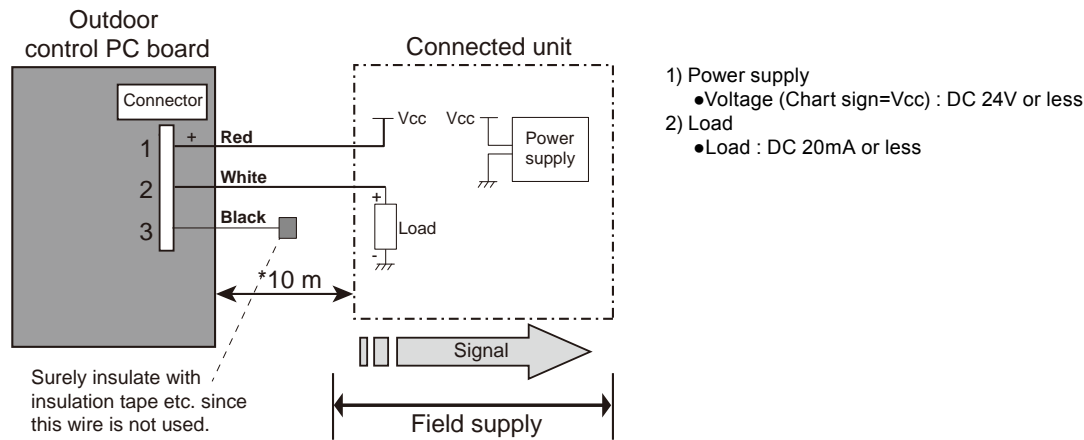
Wire (External output)



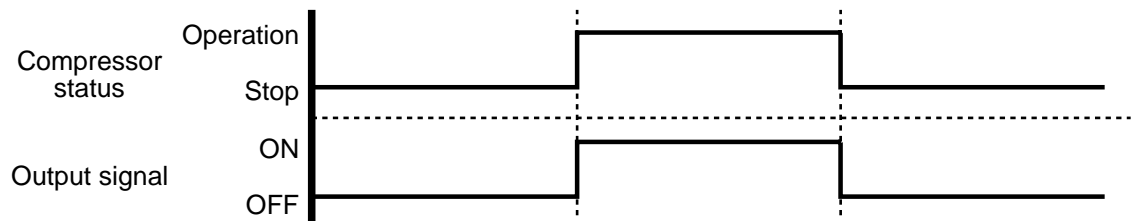
COMPRESSOR STATUS OUTPUT

• Compressor operation status signal can be output by means of the following on-site work.

● Circuit diagram example



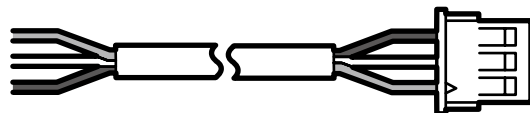
* Make the distance from the PC board to the connected unit within 10 m.



● Parts (Optional)

Model name
UTY-XWZXZ2

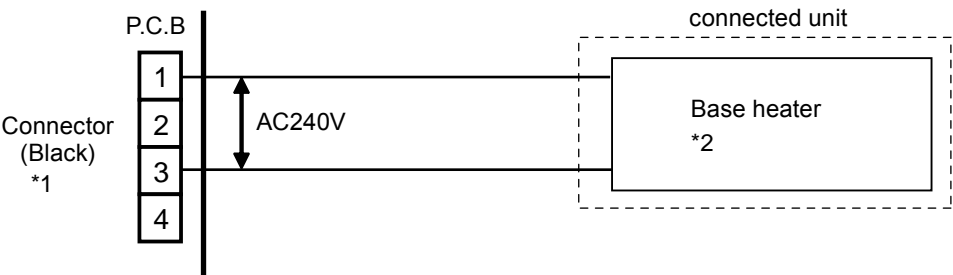
Wire (External output)



■ BASE HEATER

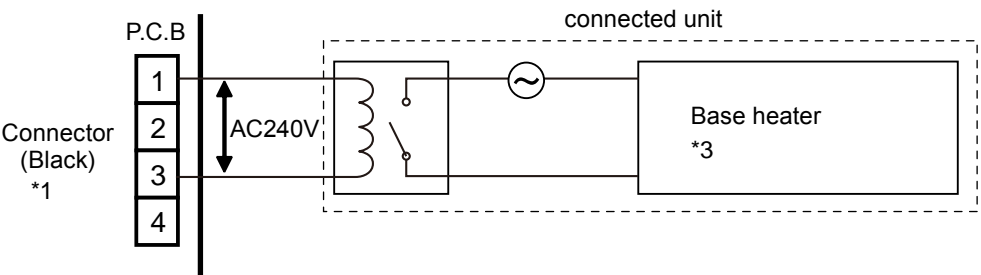
- This output the signal when temperature goes down 2°C, and release at 4°C.

● Circuit diagram example

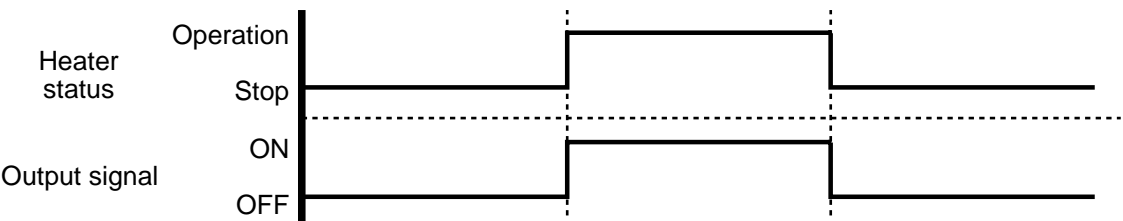


*1: Connect to pin 1 and pin 3. No connection pin2 and pin4.

*2: The allowable power consumption is 25W or less.



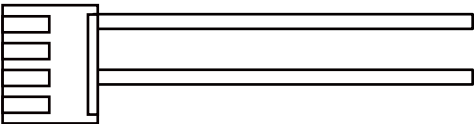
*3: The case of using load more than 25W, have to using another method for preparation is Contactor or Relay etc.



● Parts (Optional)

Model name
UTY-XWZXZ4

Wire (External output)



14. FUNCTION SETTING

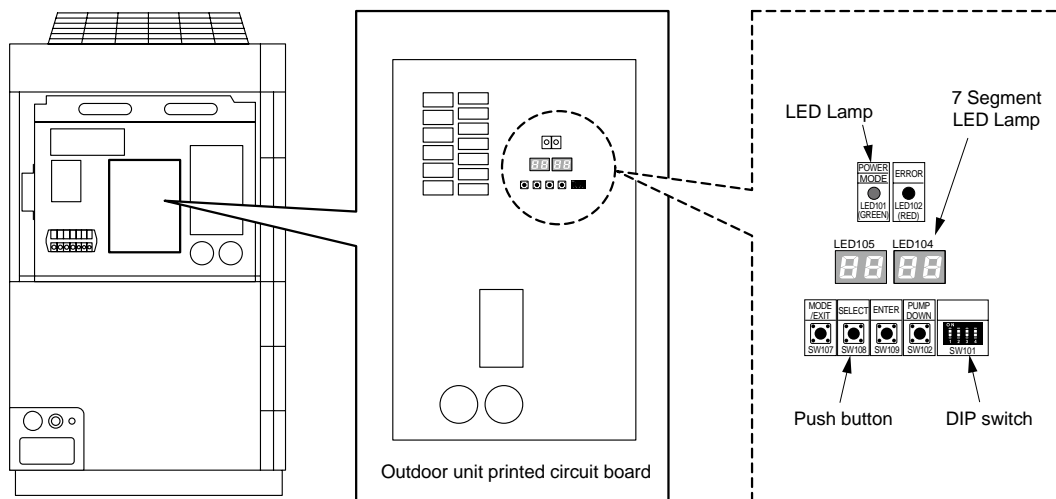
⚠ Caution

Discharge the static electricity from your body before setting up the DIP switches.
Never touch the terminals or the patterns on the parts that are mounted on the board.

14-1. FIELD SETTING SWITCHES

Remove the front panel of the outdoor unit and the cover of the electrical component box to access the print circuit board of the outdoor unit.

Print circuit board switches for various settings and LED displays are shown in the figure.



14-2. FUNCTION SETTINGS

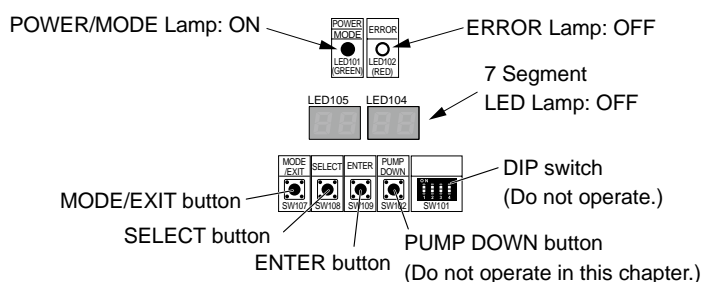
Various functions can be set. Follow the setting method described in 14-2-1. to set as per the requirement. Perform these settings after the indoor unit stops.

Table. Settings List

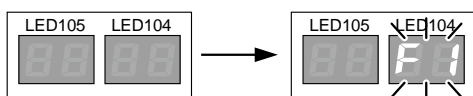
No	Setting Item		7 segment LED				Factory setting	Content
			First 2 digits		Last 2 digits			
0	Forbidden		0	0	0	0	●	
13	Forbidden		1	3	0	0	●	
14	Forbidden		1	4	0	0	●	
30	Peak cut mode : Energy-saving level	Level 1 (stop operation)	3	0	0	0		Settings for limited capacity operation or stopping the compressor can be done. Settings will enable when input signal has been entered the external input terminal "CN131".
		Level 2 (Limited at 50%)			0	1		
		Level 3 (Limited at 75%)			0	2	●	
		Level 4 (100%)			0	3		
41	Low noise mode : Operation setting	Normal operation	4	1	0	0	●	Noise of the outdoor unit can be kept low. Set Low noise operation, which will enable when the input signal has been entered the external input terminal "CN131".
		Low noise operation			0	1		
42	Low noise mode : Operation level setting	Level 1	4	2	0	0	●	This item allows you to configure the noise level when the unit operates under low noise operation level.
		Level 2			0	1		
		Forbidden			0	2		

14-2-1. SETTING METHOD

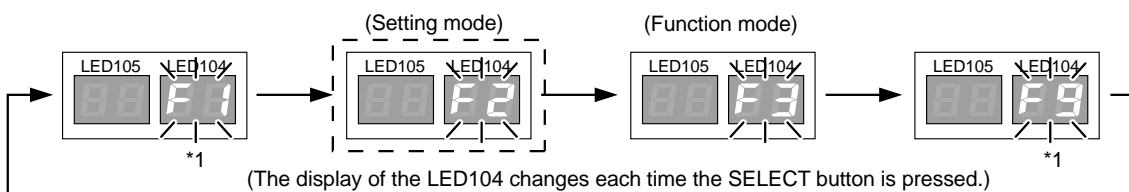
- (1) Turn on the power of the outdoor unit and enter standby mode.
POWER/MODE lamp lights up.
(ERROR Lamp is off.)



- (2) Press the MODE/EXIT button (SW107) once.

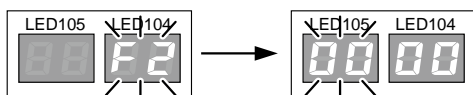


- (3) Press the SELECT button (SW108), and display "F2" on the LED104.



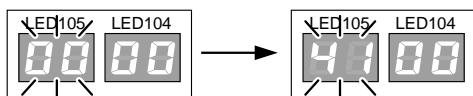
*1: The "F1" and "F9" modes are used for maintenance, so do not set them in regular operation.

- (4) When "F2" appears on the LED104, press the ENTER button (SW109).

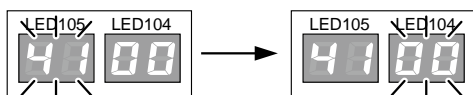


- (5) Referring to the Settings List shown below, press the SELECT button (SW108) and display the code number of the mode you want to set on the LED105.

Ex.) To select the Low noise operation setting.



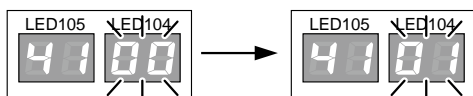
Next, press the ENTER button (SW109), and confirm the selection of the mode you want to set.



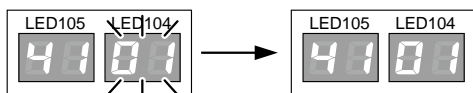
A flashing display on the LED105 changes to an illuminated display, and an illuminated display on the LED104 changes to flashing display.

- (6) Again, referring to the Settings List shown below, press the SELECT button (SW108), and display the code number of the function you want to set on the LED104.

Ex.) To select the Low noise operation setting.

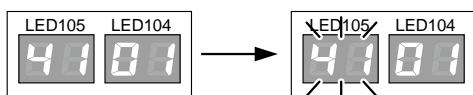


Next, press the ENTER button (SW109), and confirm the selection of the mode you want to set.



A flashing display on the LED104 changes to an illuminated display. Settings are complete with the procedures described above.

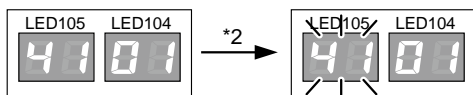
- (7) To set another function, press the ENTER button (SW109) in the setting completed status shown in step (5) above.



Repeat steps (5) and (6) above to set other functions.

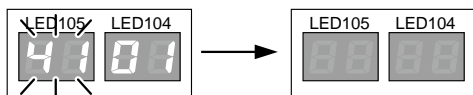
When all settings are complete, perform the operation described in step (8) above to exit.

- (8) To exit FUNCTION SETTING, press the ENTER button (SW109) in the setting completed status shown in step (6) above.



*2: 5 seconds after, even if ENTER button (SW109) is not pressed, LED105 changes to a flashing display automatically.

Then, press the MODE/EXIT button (SW107) to exit FUNCTION SETTING MODE.



14-2-2. PEAK CUT MODE

■ ENERGY SAVING LEVEL SETTING

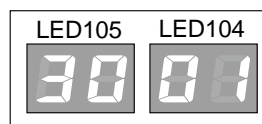
This operation saves the capacity and reduces the power consumption.

Energy-saving level can be set by adding the contact input of commercially available ON-OFF change-over switch to CN131 connector (external contact input sold separately) located on the control board of outdoor unit.

● Setting method

- Perform the following settings according to the function setting method described in previous section.
Set "F2" with "1: FUNCTION SETTING".
Set "2: Set the first two digits of setting item" to "30".
Set "3: Set the last two digits of setting item" to "00 (Level 1)" - "03 (Level 4)".
* Factory default setting is "02 (Level 3)".

Example) For setting energy-saving level to 50% (Level 2).



14-2-3. LOW NOISE MODE

■ OPERATION SETTING

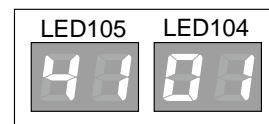
Outdoor unit is operated in such a way that noise level is reduced below normal level.

Low noise operation level is possible by adding the contact input of commercially available timer, or ON-OFF change-over switch to CN131 connector (external contact input sold separately) located on the control board of outdoor unit.

● Setting method

- Perform the following settings according to the function setting method described in previous section.
Set "F2" in "1: FUNCTION SETTING".
Set "2: Set the first two digits of setting item" to "41".
Set "3: Set the last two digits of setting item" to "00 (Normal Operation)" or "01 (Low Noise Operation)".
* Factory default setting is "00 (Normal Operation)".

Example) For setting low noise operation.



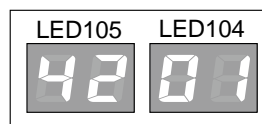
■ OPERATION LEVEL SETTING

Noise level of low noise operation can be set.

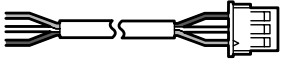
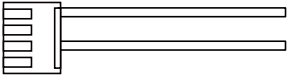
● Setting method

- Perform the following settings according to the function setting method described in previous section.
Set "F2" in "1: FUNCTION SETTING".
Set "2: Set the first two digits of setting item" to "42".
Set "3: Set the last two digits of setting item" to "00 (Level 1)" - "01 (Level 2)".
* Factory default setting is "00 (Level 1)".

Example) For setting operation noise level to Level 2.



15. OPTIONAL PARTS

Exterior	Parts name	Model No.	Summary
	External connect kit	UTY - XWZXZ2	Use to operate the External input and output function of Outdoor unit.
	External connect kit	UTY - XWZXZ4	Use to operate the External input and output function of Outdoor unit.

16. LOCALLY PROCURED PARTS

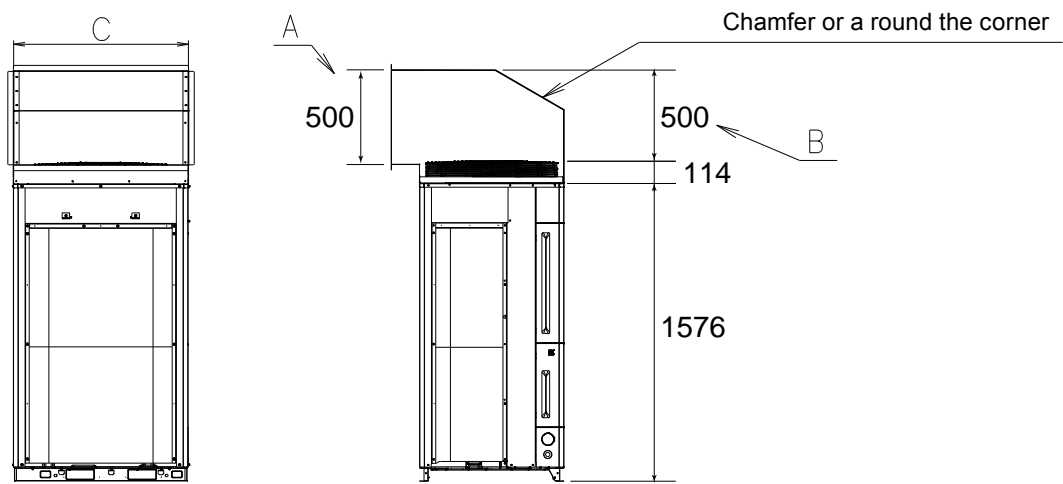
16-1. AIR DISCHARGE DUCT

■ PRECAUTION

- All the components/parts such as the duct, frame, and screws are to be locally procured.
- Do not install the duct where seasonal wind blow directly against to the discharge port.
- Install so that the static pressure of the air flow path, including the duct is 33Pa or less.
- Note that installation of the duct increases the height of the cabinet.
- If installation space may narrow, like as consecutive unit layout, be sure to fix the duct to the unit before placing the unit.
- When the duct is installed, the noise may become louder.

■ DUCT LAYOUT EXAMPLE

(Unit : mm)

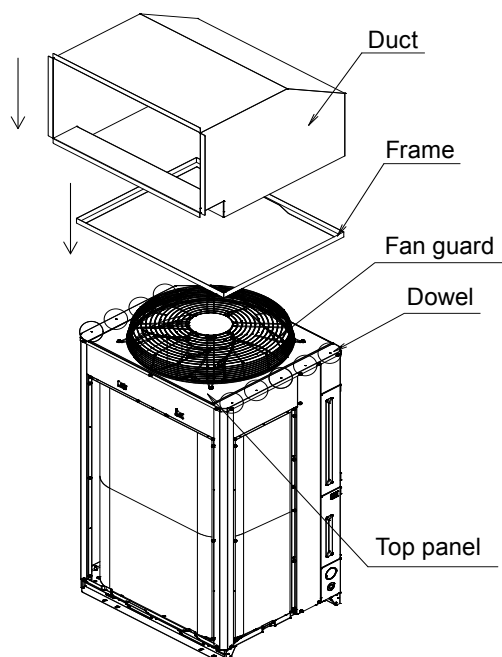


Dimension C	
(Minimum)	(Maximum)
862	928

⚠ Caution

- Make the height A of the duct opening section 500mm or greater.
- Make the height B of the duct, excluding the flange 500mm or greater.
- Make the width (dimension C) of the duct within the range of the table shown above.
- Provide a Chamfer or round the corner at the air flow path.
- Design the duct weight with 100kg or less as the standard.
- Design the duct so that maintenance of the motor is possible.

■ DUCT INSTALLATION PROCEDURE

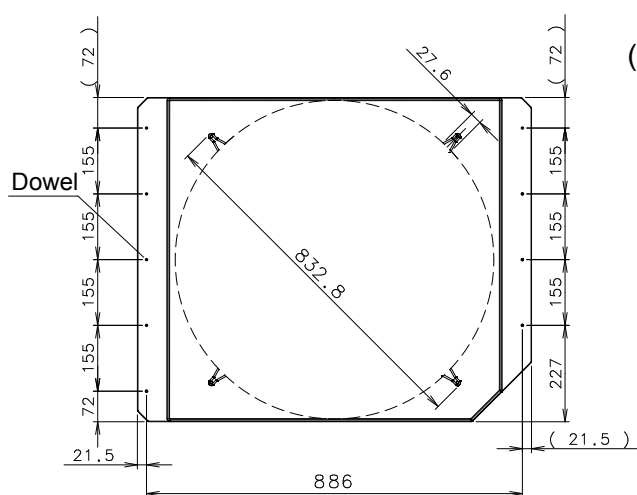


Example of Installation

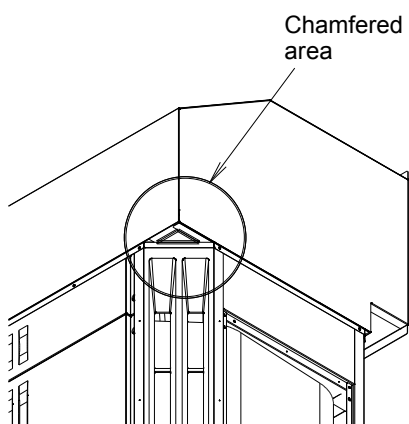
- Remove the top panel from the cabinet, and make a $\varnothing 6\text{mm}$ hole in each dowel of the top panel. (9 dowels in total of the right and left ones)
- After drilling a hole in the dowel of the top panel, fasten the duct to the $\varnothing 5$ tapping screw size hole at the bottom.

Caution

- Use $\varnothing 5$ tapping screws having a thread length of 10 to 20 mm.
- Do not make holes anywhere other than the dowels.
- Otherwise, damage to the internal parts will cause performance degradation or trouble.



Drilling position



Caution

- Presence of a gap in the junction may cause performance degradation.
- Cover to close a gap(s).
- To prevent an air leakage, close a gap in the chamfered area with a steel plate or the like.

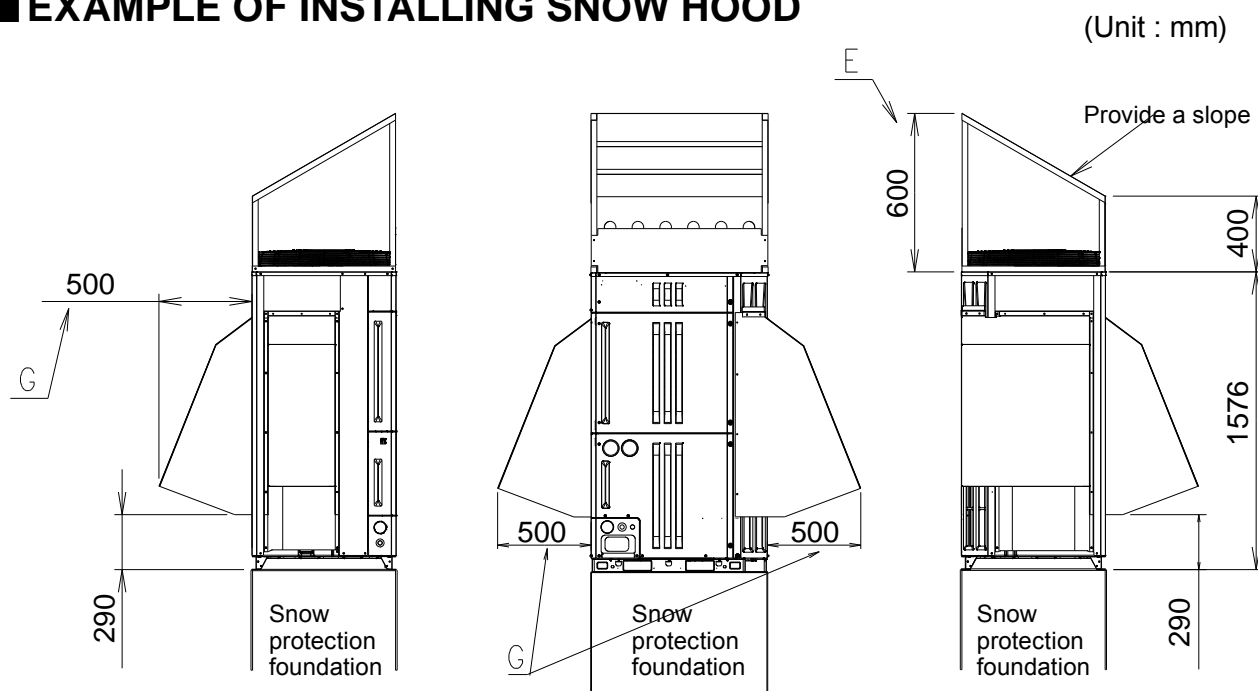
16-2. SNOW HOOD

In cold or snowy area, install inlet and outlet hood in order to maintain stable operation and avoid snow damage.

■ PRECAUTION

- All the components or parts such as the snow hood, frame, and screws are to be locally procured.
- Before snow hood installation, snow protection foundation must be installed as shown below.
- Height of snow protection foundation should be at least twice higher than expected snow accumulation. Width of foundation should not be exceed the unit.
- Do not install the snow hood not to blow directly against to the hood.
- Note that installation of the snow hood increases the height of the cabinet.
- If space for cabinet installation is tight because of the consecutive installation of equipment, install the snow hood before the cabinet.
- When the snow hood is installed, the noise may become louder.

■ EXAMPLE OF INSTALLING SNOW HOOD



⚠ Caution

- Make the width G of the side of the snow hood 500mm or greater.
- Provide an ample slope so that snow will not accumulate on the top of the snow hood. At this time, do not make the direction of the slope such that the front becomes the bottom so that the snow will not fall off at the front.
- Make the front opening section E of the snow hood 600mm or greater.

■ SNOW HOOD INSTALLATION PROCEDURE

● Installing the upper part of snow hood

- The upper part of snow hood can be installed in the same manner as for the duct. For details such as where to fix it, see the duct installation procedure.
- Using the fixing positions on the top panel, install the components such as the frame, column, front panel, top panel, and rear panel.

● Installing the sides of snow hood

- Before starting snow hood installation, remove the screws from the external net to remove the net.
- Install the snow hood, using the screw holes shown in the figure on the next page.
- Remove the screws from where circles are marked in the figure, and make a $\varnothing 4.6\text{mm}$ hole in each dowel.

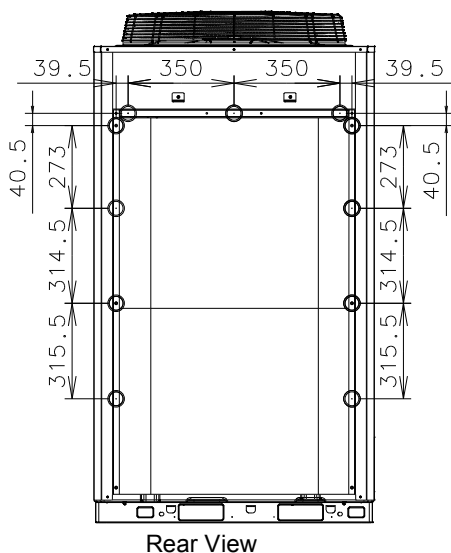
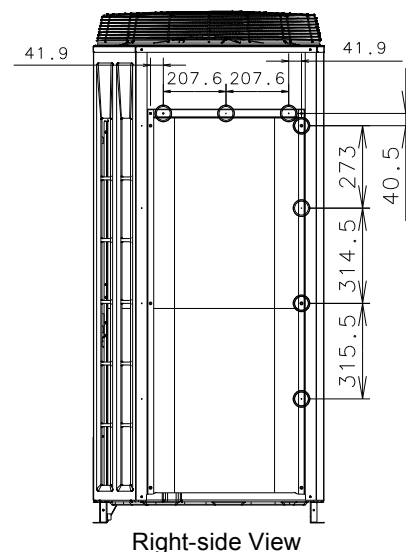
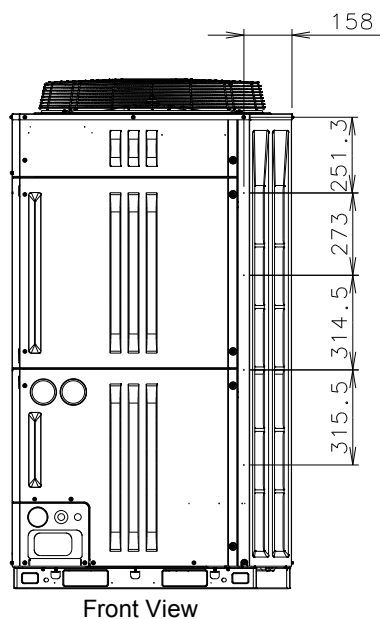
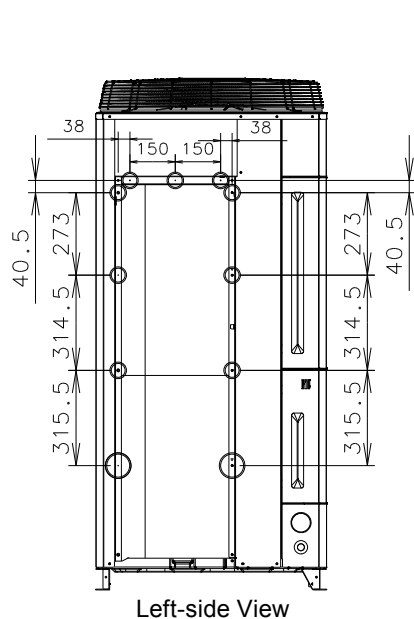
Caution

- Use $\varnothing 5$ tapping screws having a thread length of 10 to 20mm.
- Do not remove any screws from where a circle is not marked.
- Do not make a hole in the dowels where a circle is not marked. Otherwise, damage to the internal parts will cause performance degradation or trouble.

■ SCREW POSITIONS ON THE SIDES OF SNOW HOOD

(Unit : mm)

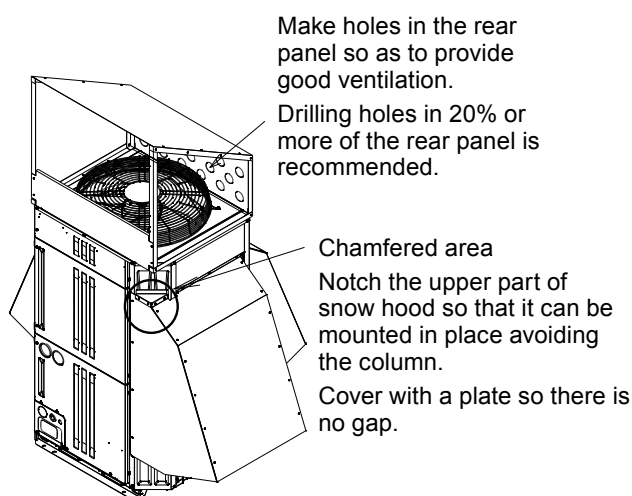
OUTDOOR UNIT
AO*A72-90LALT



OUTDOOR UNIT
AO*A72-90LALT

■ NOTES ON INSTALLING SNOW HOOD

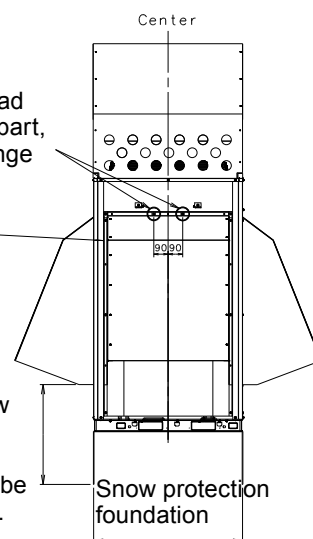
(Unit : mm)



Since there is the head of the screws at this part, cut a notch in the flange of the snow hood

Be careful that the flange of snow hood does not get onto the stepped area.

Install the snow protection foundation for the inlet not to be buried in snow.



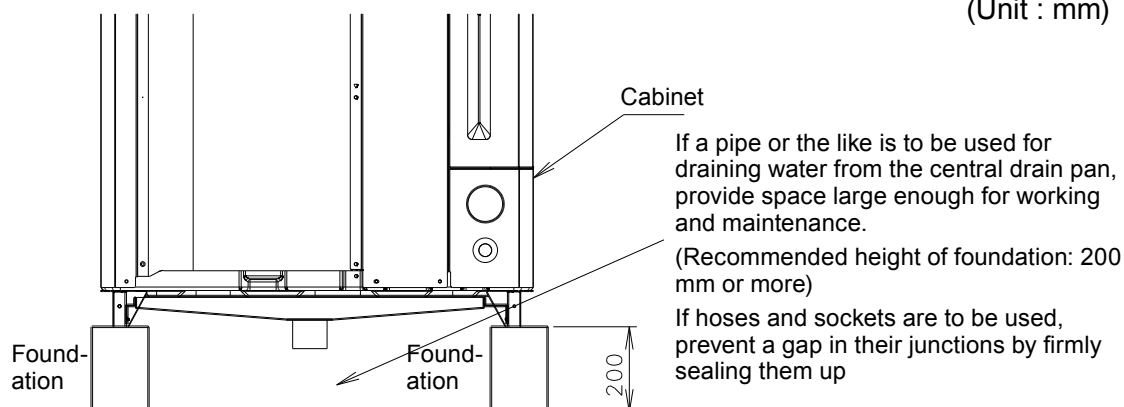
To avoid snow accumulation on the snow protection foundation, make the foundation as wide as the cabinet.

16-3. CENTRAL DRAIN PAN

■ HOW TO INSTALL CENTRAL DRAIN PAN

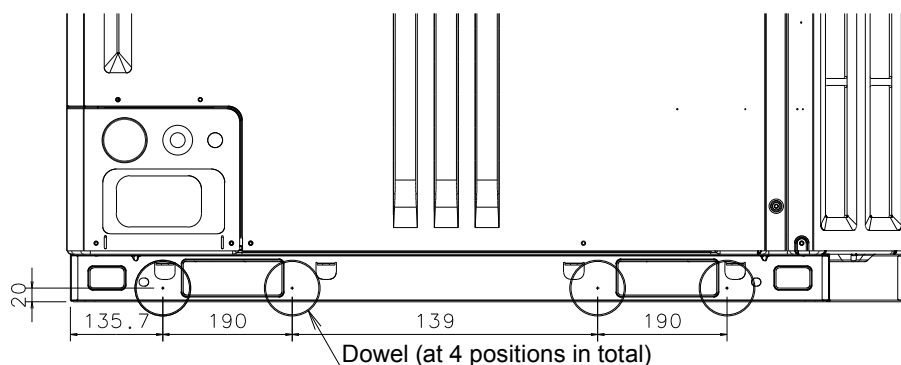
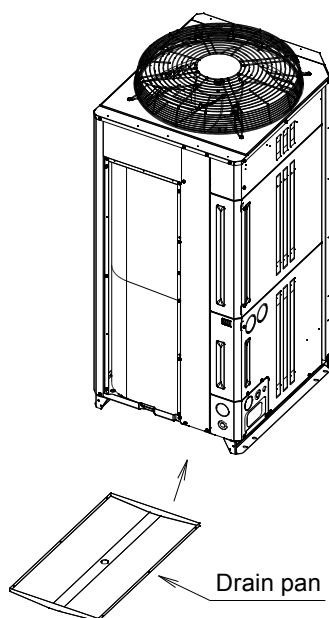
- All the components/parts such as the central drain pan and metal fittings are to be locally procured.
- Note that the refrigerant pipe cannot be come out of the bottom.
- Do not mount the unit on an object which must not be wetted.
- When humidity is high or the drain outlet is clogged, dew drops may fall from the central drain pan.
- Do not use the central drain pan in a cold region where the drain pipes may be frozen.
- If hoses or sockets are to be used during installation, install the foundation as shown in the figure below.
- Do not use in cold regions. The drain pipe may freeze.

(Unit : mm)



■ DRAIN PAN INSTALLATION PROCEDURE

(Unit : mm)



First make screw holes in the dowels of base feet in the above figure. (8 dowels in total of the front and rear ones)

Secure the central drain pan by tightening the screws into the holes.

■ NOTES ON INSTALLING CENTRAL DRAIN PAN

- Make sure to design and install drain pan to cover the all drain hole on base completely.
- The gap between drain pan and base should be less than 2mm.
- Be careful of the foot place during the working or design process.
- If the foundation or foot place makes working difficult, the metal fittings should be used as shown below.
- Keep in mind that a drain pan not having the recommended outside dimensions can cause a water leakage or cannot be installed.
- Gaps other than the drain holes cause a water leakage. Completely close all the gaps in the bottom and sides by welding.

