

AIR CONDITIONER

**Wall Mounted type**

# **DESIGN & TECHNICAL MANUAL**

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INDOOR



ASU9RLF1  
ASU12RLF1

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OUTDOOR



AOU9RLFW1



AOU12RLFW1

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**FUJITSU GENERAL LIMITED**

# **1. INDOOR UNIT**

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**WALL MOUNTED TYPE :**

**ASU9RLF1**

**ASU12RLF1**

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## 1. INDOOR UNIT

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# 1. FEATURES

## MODELS

ASU9RLF1 / AOU9RLF1  
ASU12RLF1 / AOU12RLF1



AOU9RLF1



AOU12RLF1

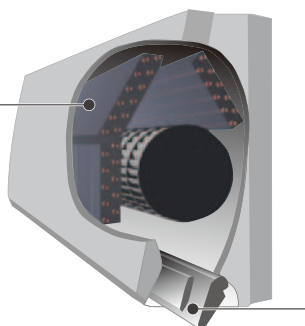
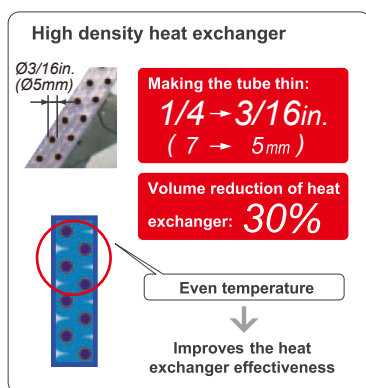
## FEATURES

### Energy efficiency class

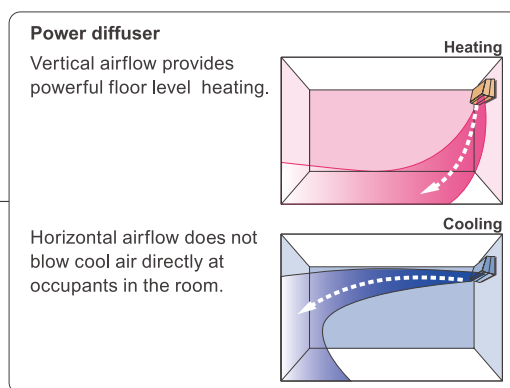
	MODEL	
	ASU9RLF1	ASU12RLF1
Seasonal Energy Efficiency Ratio (SEER)	23.0	22.0
Heating Seasonal Performance Factor (HSPF)	11.0	11.0

MEASUREMENT CONDITIONS  
ANSI/ASHRAE STANDARD 37-1988

### High efficient compact design



### More comfortable airflow

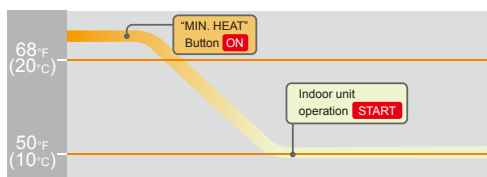


### MIN. HEAT Operation \*Only available with Wireless RC.

The room temperature can be set to go no lower than 50°F (10°C), thus ensuring that the room does not get too cold when not occupied

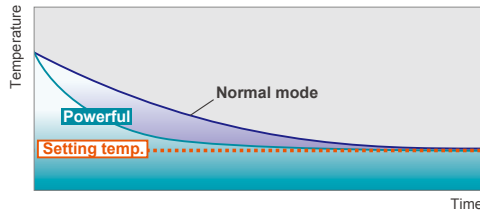
Caution)

- When the room temperature is higher than 50°F (10°C), "MIN. HEAT" operation will not start. Operation starts and maintains the room temperature at 50°F (10°C) when the temperature drops below 50°F (10°C).
- When "MIN. HEAT" operation stops, the room set temperature quickly returns to the preset temperature.



### ● Powerful operation

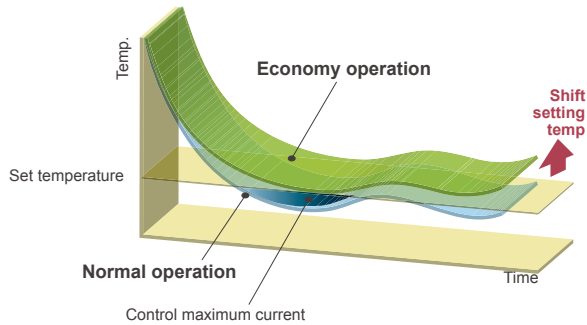
20 minutes continuous operation by maximum airflow and maximum compressor speed is possible. Rapid cooling and heating makes the room comfortable quickly.



### ● Economy operation

Example : Cooling operation

- Economy operation is energy saving, as the set temperature of indoor unit is shifted by 2°F (1°C) and the maximum electric value of the outdoor unit is suppressed.



### ● Low outdoor air temperature correspondence

Corresponds to cooling operation at 14°F (-10°C) outdoor air temperature  
 Corresponds to heating operation at 5°F (-15°C) outdoor air temperature

Cooling	Heating
14 to 115°F (-10 to 46°C)	5 to 75 °F (-15 to 24°C)

## 2. WIRELESS REMOTE CONTROLLER

### ■ FEATURES



- \*4 mode timer setup available (ON / OFF / PROGRAM / SLEEP).
- \*Easy operation.
- \*Easy to change custom code (max. 4 custom codes) by button operation.

#### ● Simple function setting

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

#### ● Built-in timers

Select from four different timer programs (On / Off / Program / Sleep).

#### ● Program timer

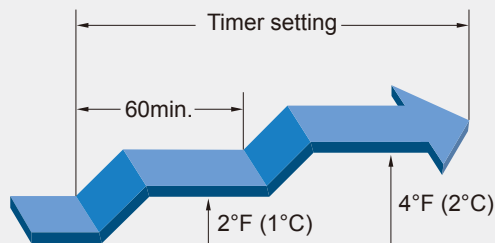
The program timer operates the on and off timer once within a 24-hour period.

#### ● Sleep timer

The sleep timer function automatically corrects the temperature thermostat setting according to the timer setting to prevent excessive cooling and heating while sleeping.

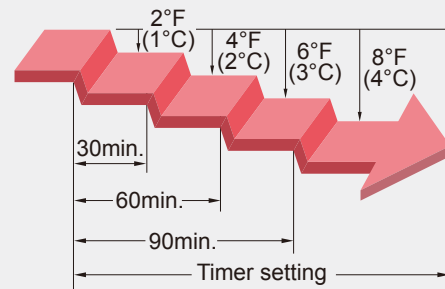
##### Cooling operation/dry operation

When the sleep timer is set, the set temperature automatically rises 2°F (1°C) every hour. The set temperature can rise up to a maximum of 4°F (2°C).



##### Heating operation

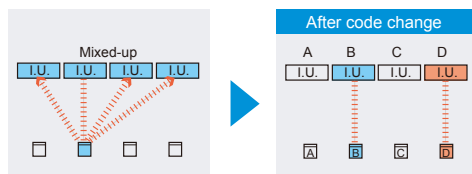
When the sleep timer is set, the set temperature automatically drops 2°F (1°C) every 30 minutes. The set temperature can drop to a maximum of 8°F (4°C).



#### ● Simple function setting

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

#### ● Switching remote controller custom code



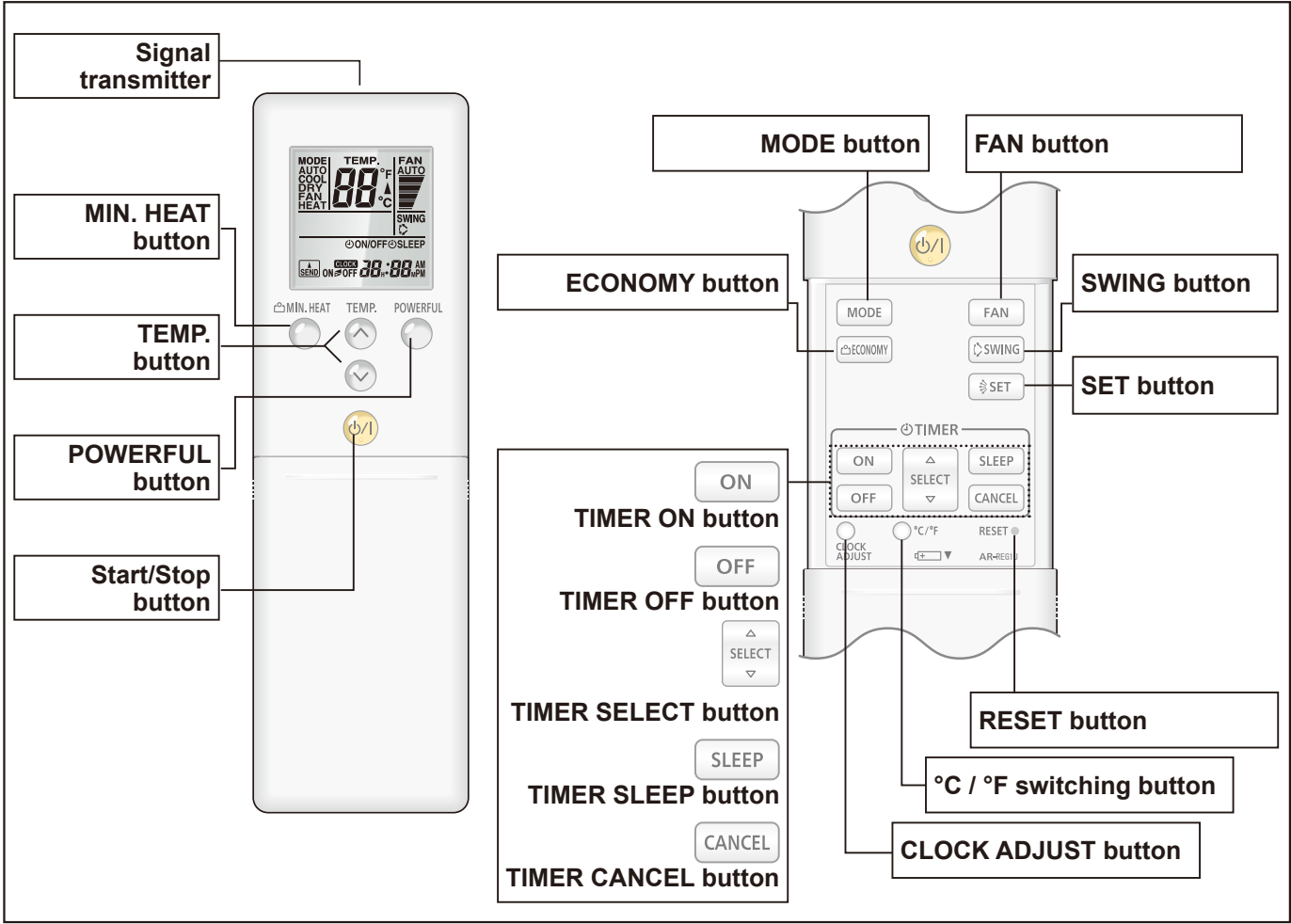
- Code selector switch eliminates unit being wrongly switched.  
(Up to 4 custom codes can be set.)

\*I.U.=Indoor unit

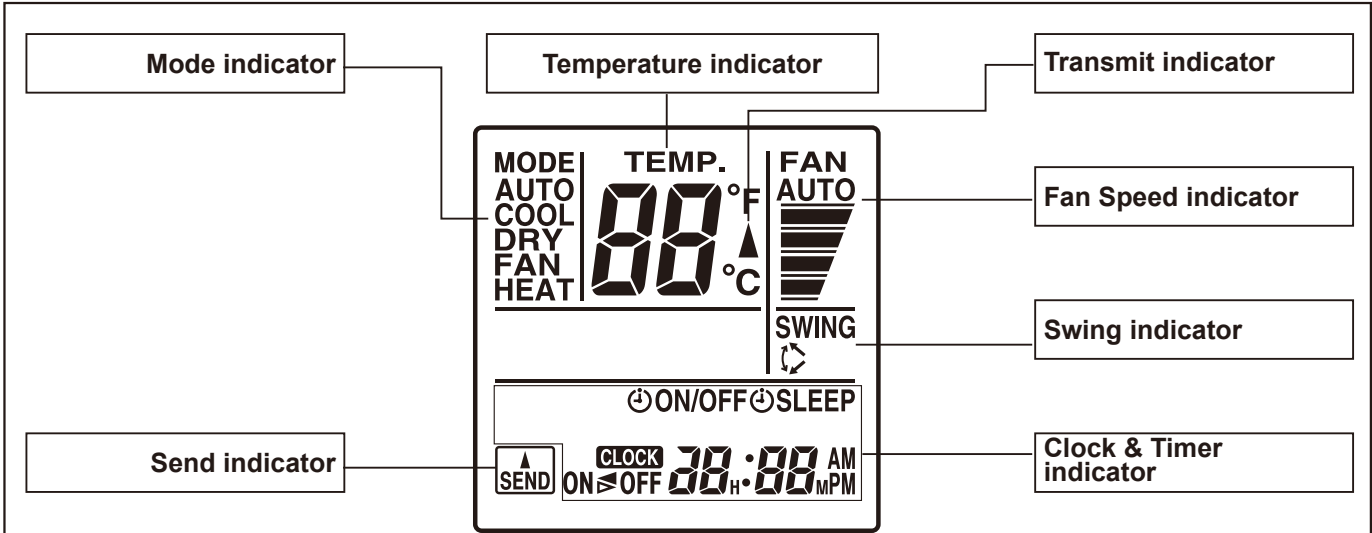
#### ● To change the temperature unit

Easy to change the temperature unit (°F ↔ °C) by button operation.

# FUNCTIONS



## Display panel



To facilitate explanation, the accompanying illustration has been drawn to show all possible indicators; in actual operation, however, the display will only show those indicators appropriate to the current operation.

# SPECIFICATION

DIMENSIONS [H × W × D]: in. (mm)	8-1/16 (205) × 2-3/8 (61) × 11/16 (17)
WEIGHT oz. (g)	4.3 (122)
ACCESSORY	Holder

**NOTE:** Some button operations may not be available for all units or systems. For details, refer to the operation manual.

### 3. SPECIFICATIONS

Type				WALL MOUNTED INVERTER HEAT PUMP		
Model name				ASU9RLF1	ASU12RLF1	
Power source				208/230V~60HZ		
Available voltage range				187-253V~60HZ		
Capacity	Cooling	Rated	kW	2.637	3.516	
			BTU/h	9000	12000	
		Min-Max	kW	0.50-3.20	0.90-3.90	
	Heating	Rated	kW	3.516	4.689	
			BTU/h	12000	16000	
		Min-Max	kW	0.50-4.40	0.90-5.60	
			BTU/h	1700-15000	3100-19100	
Input power	Cooling	Rated	kW	0.65	0.96	
		Min - Max		0.25 - 1.27	0.25 - 1.40	
	Heating	Rated		0.89	1.28	
		Min - Max		0.25 - 1.60	0.25 - 1.99	
Current	Cooling	Rated	A	3.2	4.4	
	Heating		4.2	5.9		
EER	Cooling		kW/kW	4.05	3.66	
			BTU/hW	13.8	12.5	
COP	Heating		kW/kW	3.95	3.66	
			BTU/hW	13.50	12.50	
SEER	Cooling		BTU/hW	23.0	22.0	
HSPF	Heating		BTU/hW	11.0	11.0	
POWER FACTOR	Cooling		%	88	95	
	Heating			92	94	
Moisture removal			pints/h(l/h)	2.75(1.3)	3.80(1.8)	
Maximum operating current *		Cooling	A	6.0	6.5	
		Heating		7.5	9.0	
Fan	Airflow rate	Cooling	High	441(750)		
			Med	376(640)		
			Low	282(480)		
			Quiet	182(310)		
		Heating	High	441(750)		
			Med	376(640)		
			Low	306(520)		
			Quiet	194(330)		
	Type×Q'ty		Cross flow fan×1			
	Motor output		W		30	
Sound pressure level	Cooling		High	43	43	
			Med	40	40	
			Low	32	32	
			Quiet	21	21	
	Heating		High	43	43	
			Med	38	38	
			Low	33	33	
			Quiet	22	22	
Heat exchanger type	Dimensions (H×W×D)		in.(mm)	Main: 12-5/8 x 24-13/16 x 13/16 (320×630×20) Sub: 3-5/16 x 24-13/16 x 1/2 (84×630×13.3)		
	Fin pitch		FPI	Main:23 Sub:18		
	Rows×Stages			Main:2×20 Sub:1×4		
	Pipe type			Copper		
	Fin type			Aluminum		
Enclosure	Material			Polystyrene		
	Color			White Approximate color of MUNSSELL N9.25/		
Dimensions (H×W×D)	Net	mm		268 x 840 x 203		
		in.		10-9/16 x 33-1/16 x 8		
	Gross	mm		270 x 884 x 336		
		in.		10-5/8 x 34-13/16 x 13-1/4		
Weight	Net	lb.(kg)		19(8.5)		
	Gross			24(10.5)		
Connection pipe	Size	Liquid	in.(mm)	Ø1/4(Ø6.35)		
		Gas		Ø3/8(Ø9.52)		
	Method			Flare		
Operation range	Cooling	°F(°C)		64 to 90(18 to 32)		
		%RH		80 or less		
	Heating	°F(°C)		88(30) or less		
Remote controller type			Wireless			
Drain pipe	Material		PP + LLDPE			
	Size		mm (Reference in.)	Ø 9/16 (13.8) (I.D.) Ø5/8 to Ø11/16 (15.8 to 16.7) (O.D.)		

Note:

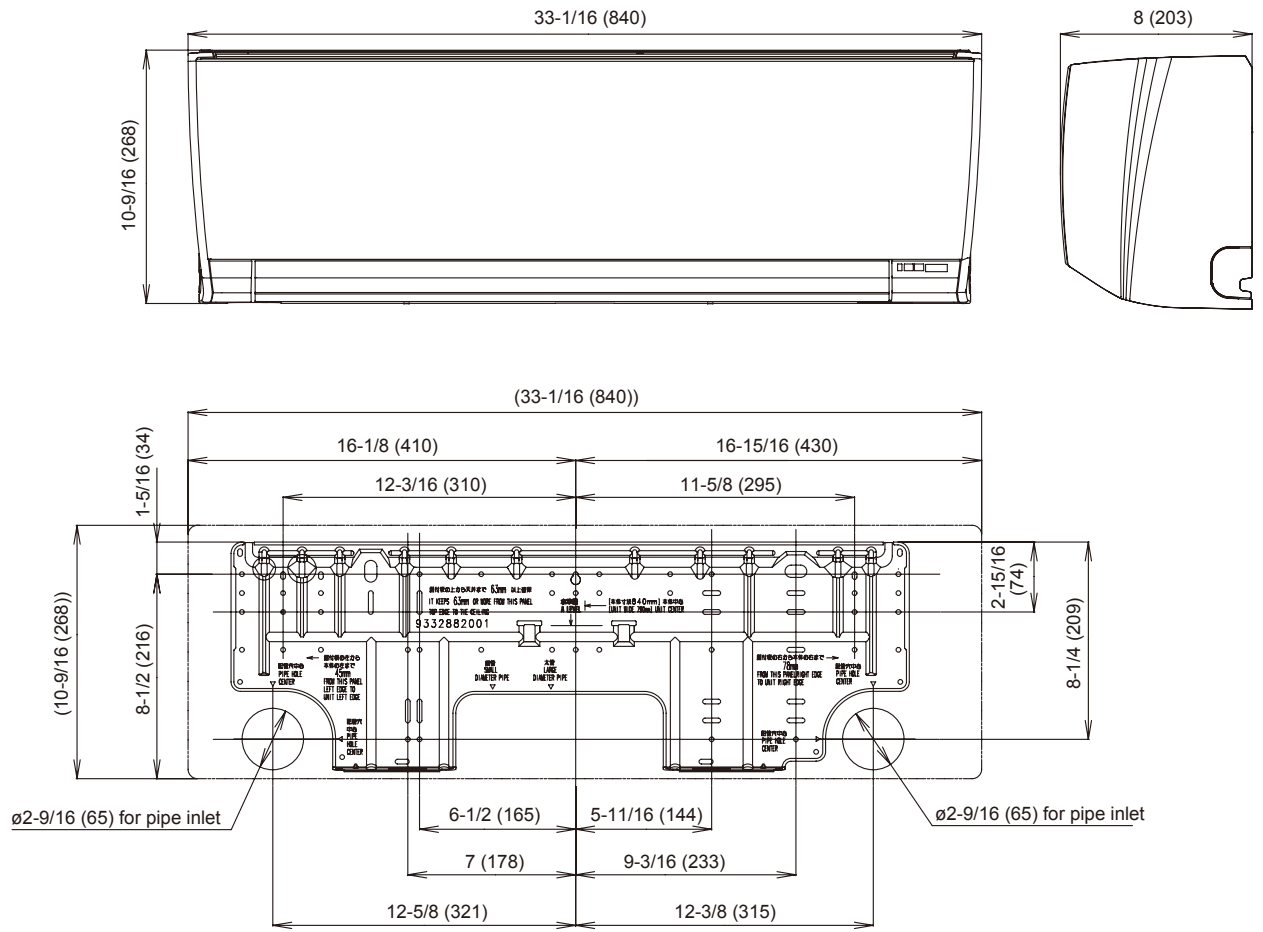
- Specifications are based on the following conditions.  
Cooling: Indoor temperature of 80°F(26.67°C)DB/67°F(19.44°C)WB, and outdoor temperature of 95°F(35°C)DB/75°F(23.9°C)WB.  
Heating: Indoor temperature of 70°F(21.11°C)DB/59°F(15°C)WB, and outdoor temperature of 47°F(8.33°C)DB/43°F(6.11°C)WB.  
Pipe length: 24ft.(7.5m), Height difference: 0ft. (0m) (Outdoor unit-Indoor unit)
- The protective function might work when using it in environment out of the temperature range mentioned above.
- \*: The maximum current is the maximum value when operated within the operation range.



# 4. DIMENSIONS

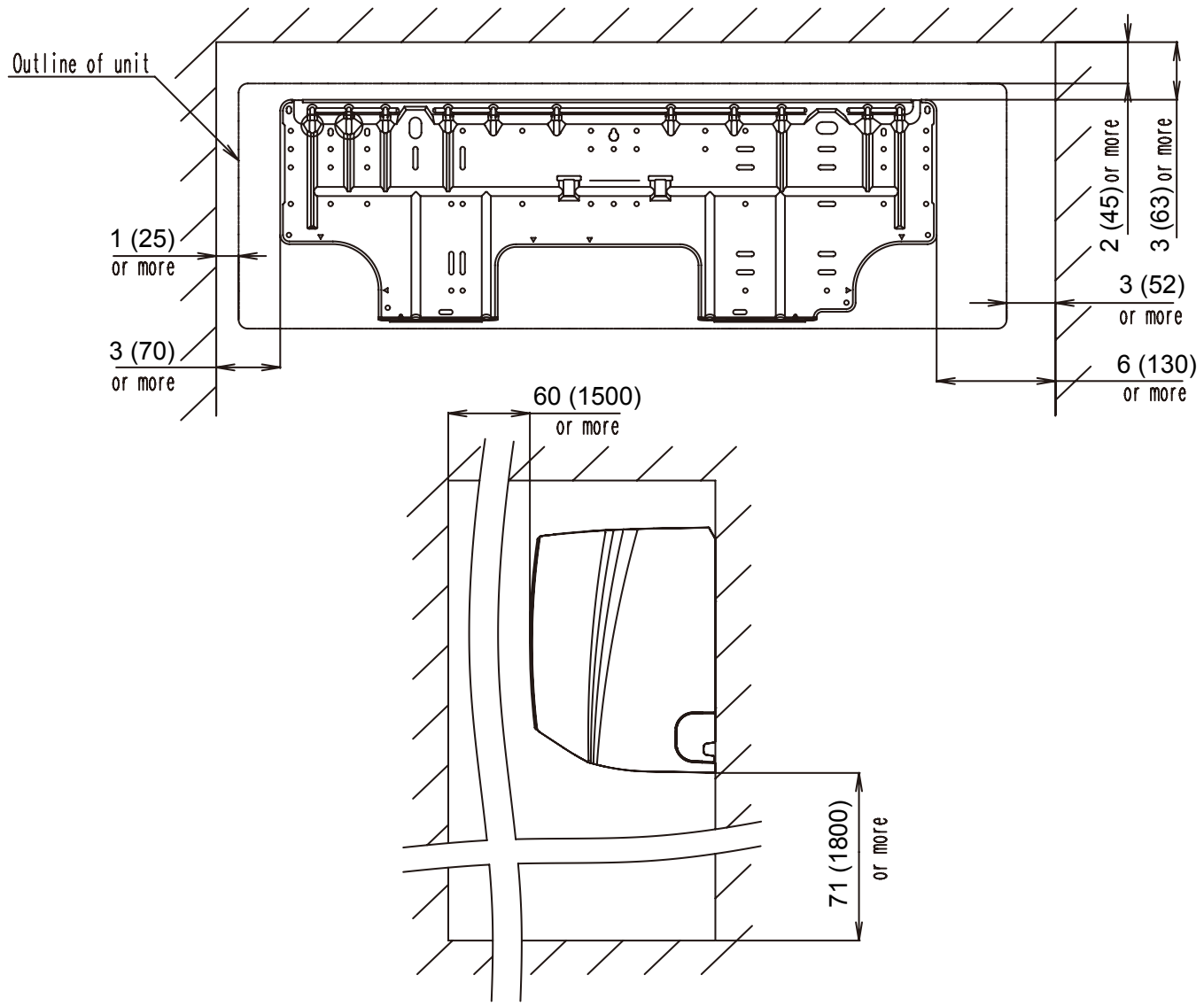
■ MODELS:ASU9RLF1, ASU12RLF1

Unit : in. (mm)



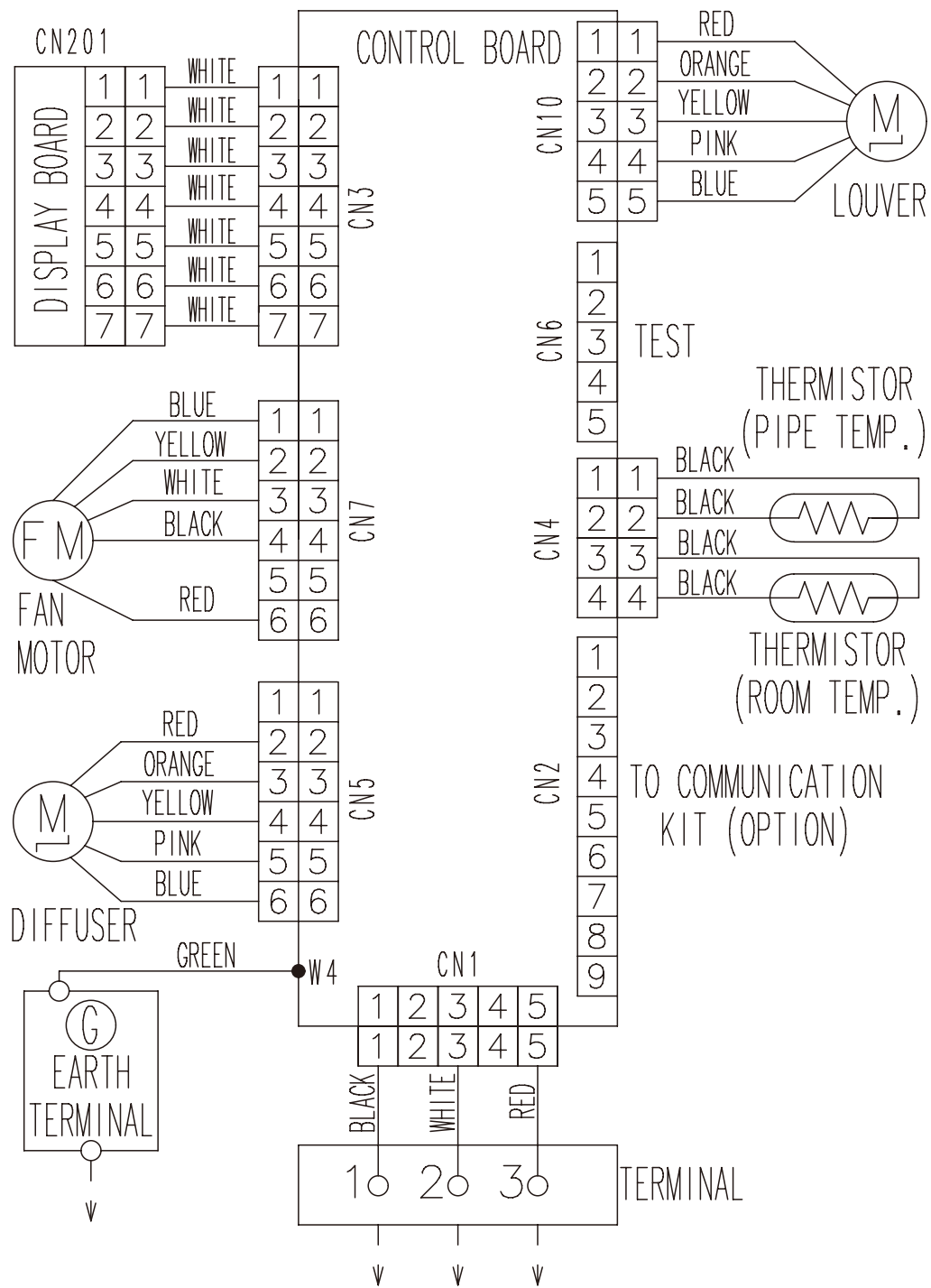
# ■ INSTALLATION PLACE

Unit : in. (mm)



# 5. WIRING DIAGRAMS

## MODELS: ASU9RLF1, ASU12RLF1



# 6. CAPACITY TABLE

## 6-1. COOLING CAPACITY

### MODEL: ASU9RLF1

AFR	441
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		Indoor temperature																				
		°FDB			64			70			75			80			85			90		
		°FWB			54			60			63			67			71			73		
Outdoor temperature	°FDB	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP			
	59	6.41	4.83	0.22	7.14	4.86	0.23	7.87	5.30	0.23	8.11	5.72	0.23	8.60	5.70	0.23	9.08	6.07	0.24			
	67	8.53	5.30	0.44	9.51	5.33	0.45	10.48	5.81	0.46	10.80	6.28	0.46	11.45	6.25	0.46	12.10	6.66	0.47			
	77	8.03	5.30	0.51	8.95	5.34	0.52	9.86	5.82	0.52	10.17	6.29	0.53	10.78	6.26	0.53	11.39	6.67	0.54			
	87	7.53	5.11	0.57	8.38	5.14	0.58	9.24	5.60	0.59	9.53	6.05	0.59	10.10	6.03	0.60	10.67	6.42	0.61			
	95	7.11	4.98	0.63	7.92	5.01	0.64	8.73	5.46	0.65	9.00	5.90	0.65	9.54	5.88	0.66	10.08	6.26	0.66			
	104	5.91	4.64	0.51	6.59	4.67	0.52	7.26	5.09	0.53	7.48	5.50	0.53	7.93	5.48	0.54	8.38	5.83	0.54			
	115	4.18	3.28	0.39	4.66	3.30	0.39	5.13	3.60	0.40	5.29	3.89	0.40	5.61	3.87	0.41	5.93	4.13	0.41			

AFR : Air flow rate (CFM)  
 TC : Total capacity (kBTU)  
 SHC : Sensible Heat capacity (kBTU)  
 IP : Input Power (kW)

AFR	12.5
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		Indoor temperature																				
		°CDB			17.8			21.1			23.9			26.7			29.4			32.2		
		°CWB			12.2			15.6			17.7			19.4			21.7			22.8		
Outdoor temperature	°CDB	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP			
	15.0	1.88	1.42	0.22	2.09	1.42	0.23	2.31	1.55	0.23	2.38	1.68	0.23	2.52	1.67	0.23	2.66	1.78	0.24			
	19.4	2.50	1.55	0.44	2.79	1.56	0.45	3.07	1.71	0.46	3.17	1.84	0.46	3.36	1.83	0.46	3.55	1.95	0.47			
	25.0	2.35	1.55	0.51	2.62	1.56	0.52	2.89	1.70	0.52	2.98	1.84	0.53	3.16	1.83	0.53	3.34	1.95	0.54			
	30.6	2.21	1.50	0.57	2.46	1.51	0.58	2.71	1.64	0.59	2.79	1.77	0.59	2.96	1.77	0.60	3.13	1.88	0.61			
	35.0	2.08	1.46	0.63	2.32	1.47	0.64	2.56	1.60	0.65	2.64	1.73	0.65	2.80	1.72	0.66	2.95	1.83	0.66			
	40.0	1.73	1.36	0.51	1.93	1.37	0.52	2.13	1.49	0.53	2.19	1.61	0.53	2.33	1.60	0.54	2.46	1.71	0.54			
	46.1	1.23	0.96	0.39	1.37	0.97	0.39	1.50	1.06	0.40	1.55	1.14	0.40	1.64	1.13	0.41	1.74	1.21	0.41			

AFR : Air flow rate (m<sup>3</sup>/min)  
 TC : Total capacity (kW)  
 SHC : Sensible Heat capacity (kW)  
 IP : Input Power (kW)

### MODEL: ASU12RLF1

AFR	441
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		Indoor temperature																				
		°FDB			64			70			75			80			85			90		
		°FWB			54			60			63			67			71			73		
Outdoor temperature	°FDB	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP			
	59	8.3	6.34	0.40	9.3	6.38	0.41	10.2	6.96	0.42	10.5	7.51	0.42	11.1	7.48	0.42	11.8	7.97	0.43			
	67	11.4	7.47	0.65	12.7	7.52	0.66	14.0	8.20	0.67	14.5	8.85	0.68	15.3	8.82	0.68	16.2	9.39	0.69			
	77	10.8	7.14	0.75	12.0	7.18	0.76	13.3	7.83	0.77	13.7	8.46	0.77	14.5	8.42	0.78	15.3	8.97	0.79			
	87	10.1	6.99	0.85	11.2	7.03	0.86	12.4	7.67	0.87	12.8	8.28	0.88	13.5	8.25	0.88	14.3	8.78	0.89			
	95	9.5	6.67	0.93	10.6	6.71	0.94	11.6	7.32	0.96	12.0	7.91	0.96	12.7	7.87	0.97	13.4	8.39	0.98			
	104	8.0	6.35	0.87	9.0	6.39	0.89	9.9	6.97	0.90	10.2	7.52	0.91	10.8	7.49	0.92	11.4	7.98	0.92			
	115	5.6	5.15	0.69	6.3	5.18	0.70	6.9	5.65	0.71	7.2	6.10	0.71	7.6	6.07	0.72	8.0	6.47	0.73			

AFR : Air flow rate (CFM)  
 TC : Total capacity (kBTU)  
 SHC : Sensible Heat capacity (kBTU)  
 IP : Input Power (kW)

AFR	12.5
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		Indoor temperature																				
		°CDB			17.8			21.1			23.9			26.7			29.4			32.2		
		°CWB			12.2			15.6			17.7			19.4			21.7			22.8		
Outdoor temperature	°CDB	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP	TC	SHC	IP			
	15.0	2.43	1.86	0.40	2.71	1.87	0.41	2.99	2.04	0.42	3.08	2.20	0.42	3.27	2.19	0.42	3.45	2.34	0.43			
	19.4	3.35	2.19	0.65	3.73	2.20	0.66	4.12	2.40	0.67	4.24	2.59	0.68	4.50	2.58	0.68	4.75	2.75	0.69			
	25.0	3.17	2.09	0.75	3.53	2.10	0.76	3.89	2.30	0.77	4.01	2.48	0.77	4.25	2.47	0.78	4.49	2.63	0.79			
	30.6	2.96	2.05	0.85	3.30	2.06	0.86	3.63	2.25	0.87	3.75	2.43	0.88	3.97	2.42	0.88	4.19	2.57	0.89			
	35.0	2.78	1.96	0.93	3.10	1.97	0.94	3.41	2.15	0.96	3.52	2.32	0.96	3.73	2.31	0.97	3.94	2.46	0.98			
	40.0	2.36	1.86	0.87	2.63	1.87	0.89	2.90	2.04	0.90	2.99	2.20	0.91	3.16	2.20	0.92	3.34	2.34	0.92			
	46.1	1.66	1.51	0.69	1.84	1.52	0.70	2.03	1.65	0.71	2.10	1.79	0.71	2.22	1.78	0.72	2.35	1.90	0.73			

AFR : Air flow rate (m<sup>3</sup>/min)  
 TC : Total capacity (kW)  
 SHC : Sensible Heat capacity (kW)  
 IP : Input Power (kW)

# 6-2. HEATING CAPACITY

## ■ MODEL: ASU9RLF1

AFR	441
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		Indoor temperature								
		°FDB		60		65		70		75
Outdoor temperature	°FDB	°FWB	TC	IP	TC	IP	TC	IP	TC	IP
	5	3	7.18	0.68	7.01	0.69	6.84	0.71	6.66	0.72
	14	12	8.13	0.73	7.94	0.75	7.74	0.76	7.55	0.78
	23	19	9.10	0.76	8.88	0.78	8.66	0.79	8.45	0.81
	32	28	10.48	0.81	10.23	0.83	9.98	0.84	9.73	0.86
	41	37	11.91	0.86	11.63	0.88	11.34	0.90	11.06	0.92
	47	43	12.60	0.85	12.30	0.87	12.00	0.89	11.70	0.91
	50	47	12.26	0.73	11.97	0.75	11.68	0.76	11.39	0.78
	59	50	12.47	0.72	12.18	0.74	11.88	0.75	11.58	0.77
	68	59	12.82	0.67	12.51	0.68	12.21	0.70	11.90	0.71
75	65	13.32	0.67	13.00	0.68	12.68	0.69	12.36	0.71	

AFR : Air flow rate (CFM)  
TC : Total capacity (kBTU)  
IP : Input Power (kW)

AFR	12.5
-----	------

		Indoor temperature								
		°CDB		15.6		18.3		21.1		23.9
Outdoor temperature	°CDB	°CWB	TC	IP	TC	IP	TC	IP	TC	IP
	-15	2.10	2.10	0.68	2.05	0.69	2.00	0.71	1.95	0.72
	-10	2.38	2.38	0.73	2.33	0.75	2.27	0.76	2.21	0.78
	-5	2.67	2.67	0.76	2.60	0.78	2.54	0.79	2.48	0.81
	0	3.07	3.07	0.81	3.00	0.83	2.93	0.84	2.85	0.86
	5	3.49	3.49	0.86	3.41	0.88	3.32	0.90	3.24	0.92
	7	3.69	3.69	0.85	3.61	0.87	3.52	0.89	3.43	0.91
	10	3.59	3.59	0.73	3.51	0.75	3.42	0.76	3.34	0.78
	15	3.66	3.66	0.72	3.57	0.74	3.48	0.75	3.40	0.77
	20	15	3.76	0.67	3.67	0.68	3.58	0.70	3.49	0.71
24	18	3.90	0.67	3.81	0.68	3.72	0.69	3.62	0.71	

AFR : Air flow rate (m<sup>3</sup>/min)  
TC : Total capacity (kW)  
IP : Input Power (kW)

## ■ MODEL: ASU12RLF1

AFR	441
-----	-----

		Indoor temperature								
		°FDB		60		65		70		75
Outdoor temperature	°FDB	°FWB	TC	IP	TC	IP	TC	IP	TC	IP
	5	3	10.71	1.09	10.46	1.12	10.20	1.14	9.95	1.16
	14	12	12.04	1.13	11.76	1.15	11.47	1.18	11.18	1.20
	23	19	13.35	1.18	13.03	1.20	12.71	1.23	12.40	1.25
	32	28	15.17	1.26	14.80	1.29	14.44	1.31	14.08	1.34
	41	37	16.13	1.23	15.75	1.25	15.36	1.28	14.98	1.30
	47	43	16.80	1.23	16.40	1.25	16.00	1.28	15.60	1.31
	50	47	17.20	1.23	16.79	1.25	16.38	1.28	15.97	1.30
	59	50	16.87	1.15	16.47	1.17	16.07	1.20	15.67	1.22
	68	59	15.63	0.91	15.25	0.92	14.88	0.94	14.51	0.96
75	65	15.94	0.89	15.56	0.91	15.18	0.93	14.80	0.95	

AFR : Air flow rate (CFM)  
TC : Total capacity (kBTU)  
IP : Input Power (kW)

AFR	12.5
-----	------

		Indoor temperature								
		°CDB		15.6		18.3		21.1		23.9
Outdoor temperature	°CDB	°CWB	TC	IP	TC	IP	TC	IP	TC	IP
	-15	-16	3.14	1.09	3.07	1.12	2.99	1.14	2.92	1.16
	-10	-11	3.53	1.13	3.45	1.15	3.36	1.18	3.28	1.20
	-5	-7	3.91	1.18	3.82	1.20	3.73	1.23	3.63	1.25
	0	-2	4.44	1.26	4.34	1.29	4.23	1.31	4.13	1.34
	5	3	4.73	1.23	4.62	1.25	4.50	1.28	4.39	1.30
	7	6	4.92	1.23	4.81	1.25	4.69	1.28	4.57	1.31
	10	8	5.04	1.23	4.92	1.25	4.80	1.28	4.68	1.30
	15	10	4.94	1.15	4.83	1.17	4.71	1.20	4.59	1.22
	20	15	4.58	0.91	4.47	0.92	4.36	0.94	4.25	0.96
24	18	4.67	0.89	4.56	0.91	4.45	0.93	4.34	0.95	

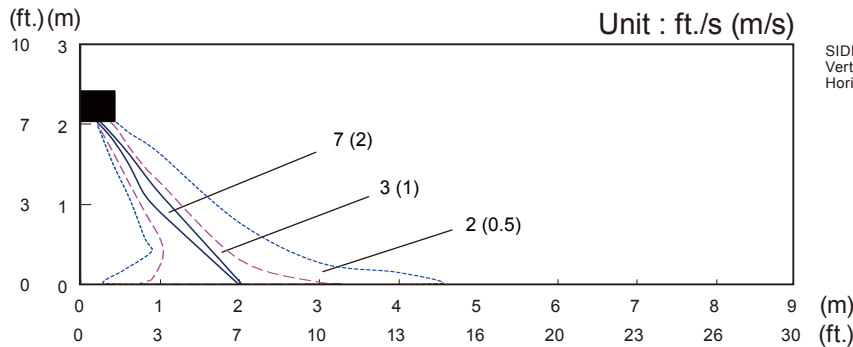
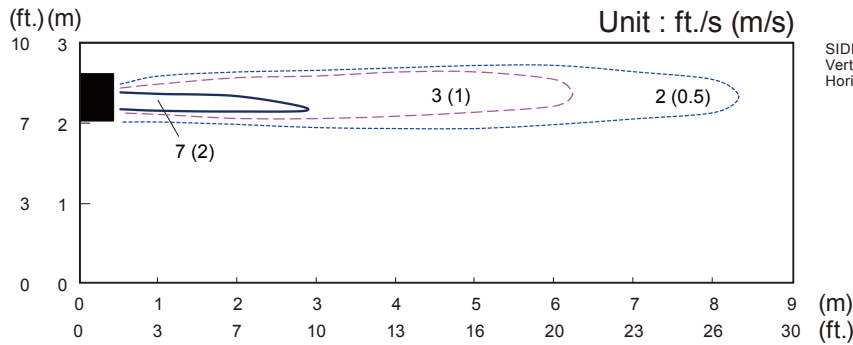
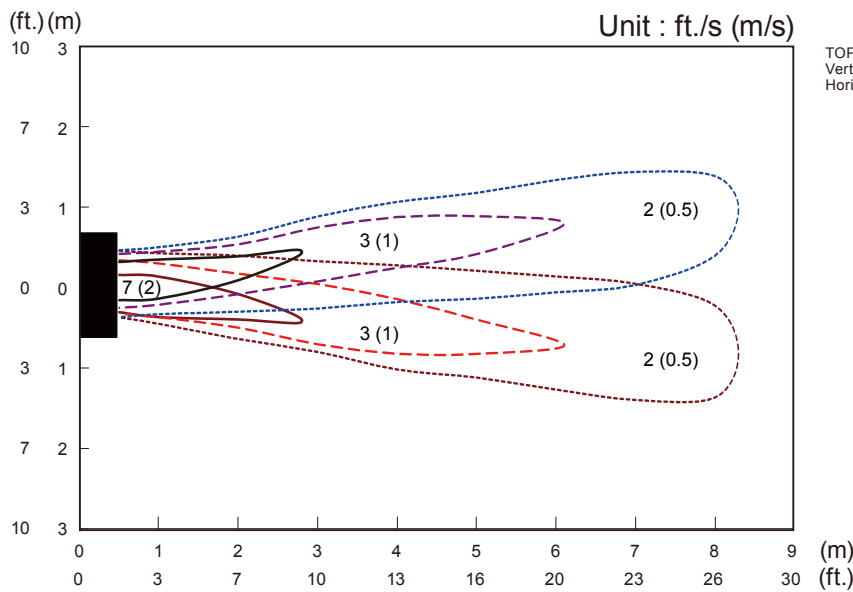
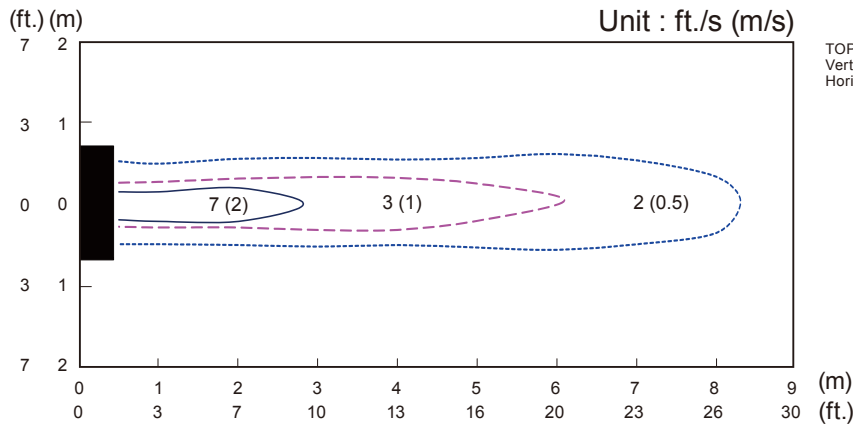
AFR : Air flow rate (m<sup>3</sup>/min)  
TC : Total capacity (kW)  
IP : Input Power (kW)

# 7. FAN PERFORMANCE

## 7-1. AIR VELOCITY DISTRIBUTION

Conditions:  
Fan speed: HIGH  
Operation mode: FAN

### MODELS: ASU9RLF1, ASU12RLF1



## 7-2. AIR FLOW

### ■ MODELS: ASU9RLF1, ASU12RLF1

#### ● Cooling

Fan speed	Number of rotations (r.p.m.)	Air flow	
HIGH	1320	m <sup>3</sup> /h	750
		l/s	208
		CFM	441
MED	1160	m <sup>3</sup> /h	640
		l/s	178
		CFM	376
LOW	930	m <sup>3</sup> /h	480
		l/s	133
		CFM	282
QUIET	680	m <sup>3</sup> /h	310
		l/s	86
		CFM	182

#### ● Heating

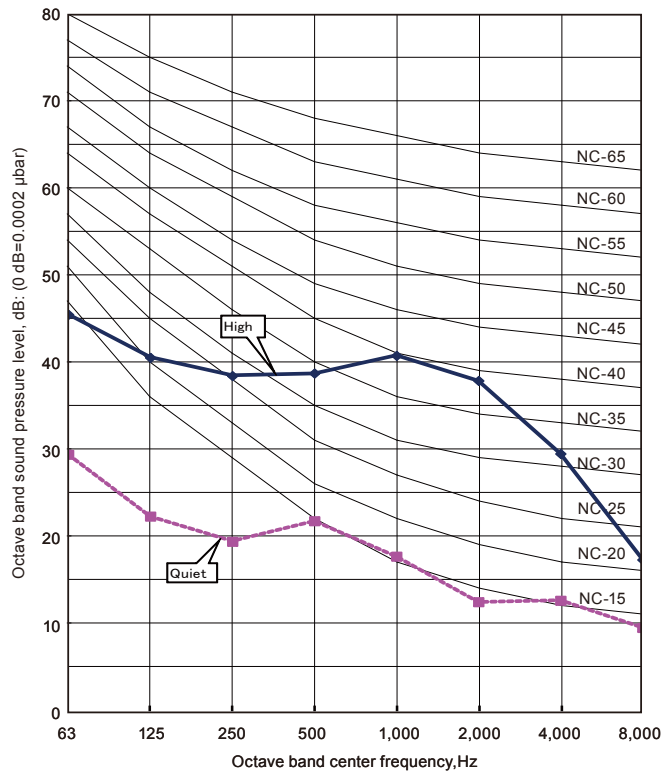
Fan speed	Number of rotations (r.p.m.)	Air flow	
HIGH	1320	m <sup>3</sup> /h	750
		l/s	208
		CFM	441
MED	1160	m <sup>3</sup> /h	640
		l/s	178
		CFM	376
LOW	980	m <sup>3</sup> /h	520
		l/s	144
		CFM	306
QUIET	710	m <sup>3</sup> /h	330
		l/s	92
		CFM	194

# 8. OPERATION NOISE (SOUND PRESSURE)

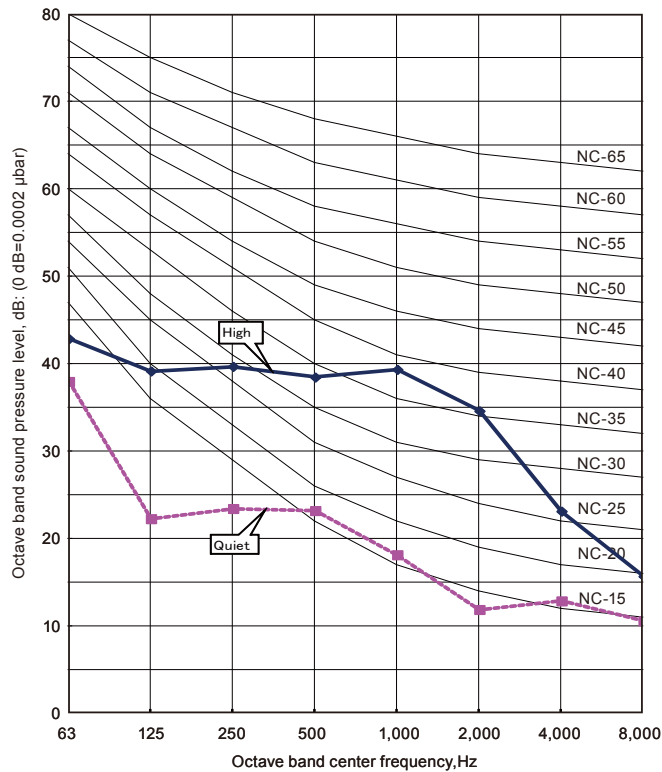
## 8-1. NOISE LEVEL CURVE

### MODEL: ASU9RLF1

#### ● Cooling

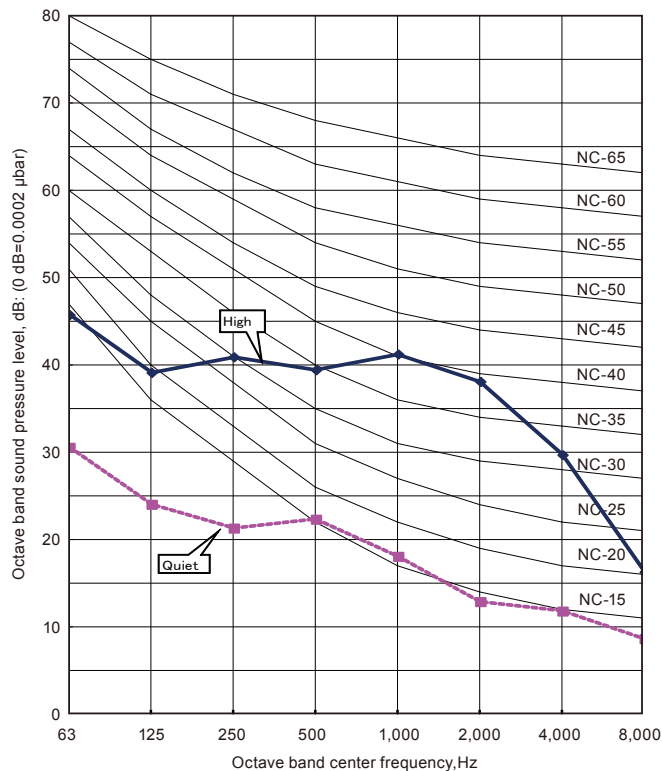


#### ● Heating

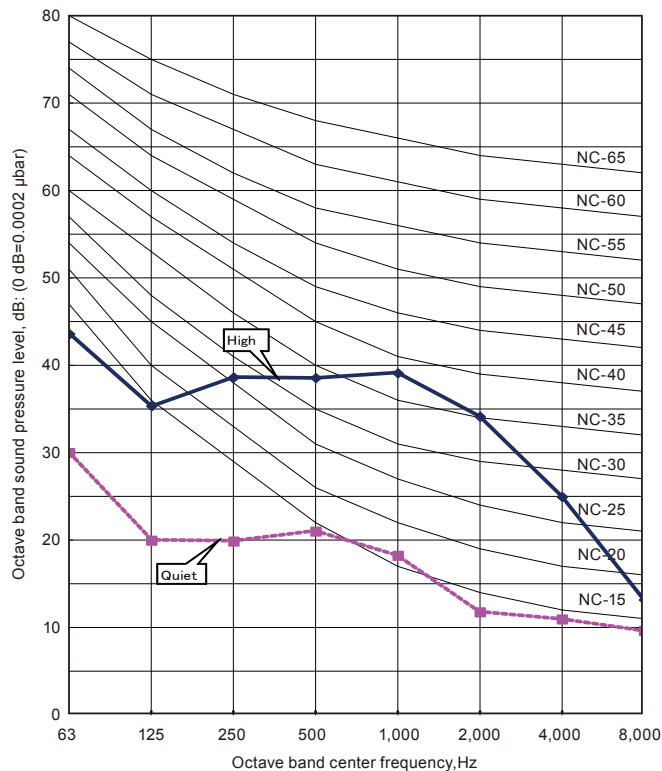


### MODEL: ASU12RLF1

#### ● Cooling

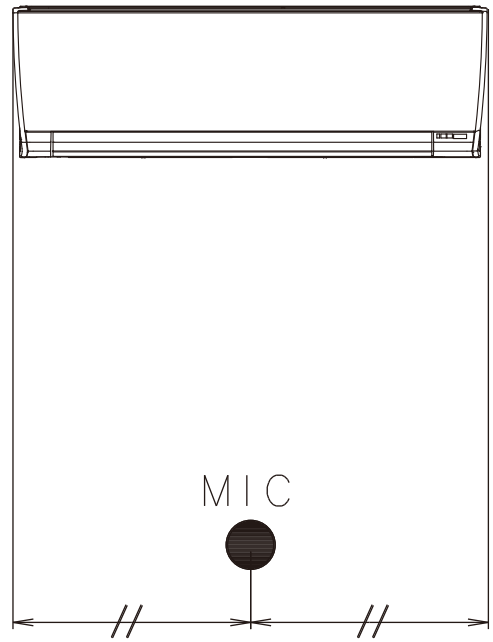
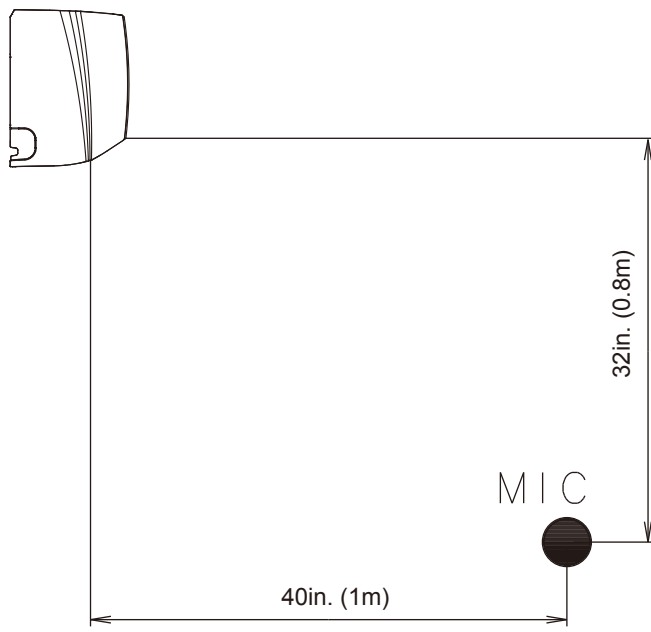


#### ● Heating





## 8-2. SOUND LEVEL CHECK POINT



## 9. ELECTRICAL CHARACTERISTICS

Model name			ASU9RLF1	ASU12RLF1
Power supply	Voltage	V	208 / 230 ~	
	Frequency	Hz	60	
Max. operating current		A	0.4	
Wiring spec. *1	Connection cable	AWG	14	
	Limited wiring length	ft.(m)	68 (21)	

1\*: Wiring specification

Selected sample

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

## 10. SAFETY DEVICES

	Protection form	Model
		ASU9RLF1 ASU12RLF1
Circuit protection	Current fuse (PC board)	250V 3.15A
Fan motor protection	Thermal protector program	OFF: $221 \pm 18$ °F ( $105 \pm 10$ °C) ON: $194 \pm 18$ °F ( $90 \pm 10$ °C)

# 11. EXTERNAL INPUT & OUTPUT

Connector	INPUT	OUTPUT	REMARKS
CNA01	Control input	-	See external input/output settings for details.
CNB01	-	Operation status output	
CNB02	-	Error status output	

## 11-1. EXTERNAL INPUT

### ■ CONTROL INPUT (Operation/Stop or Forced stop)

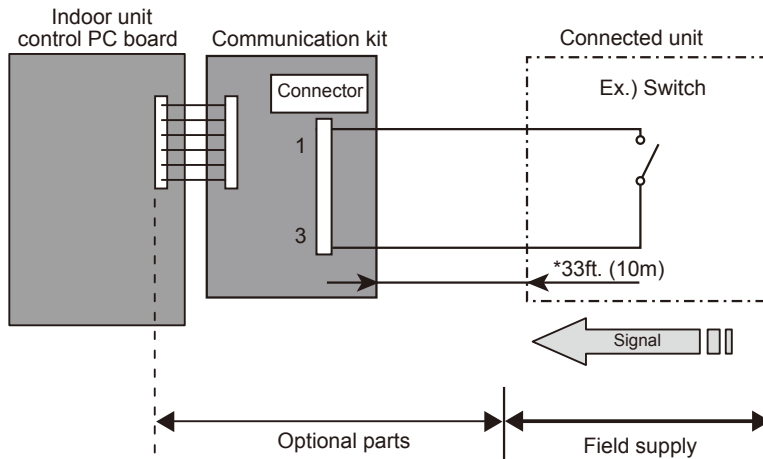
The air conditioner can be remotely operated by means of the following on-site work.

"Operation/Stop" mode or "Forced stop" mode can be selected with function setting of indoor unit.

Unit 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.

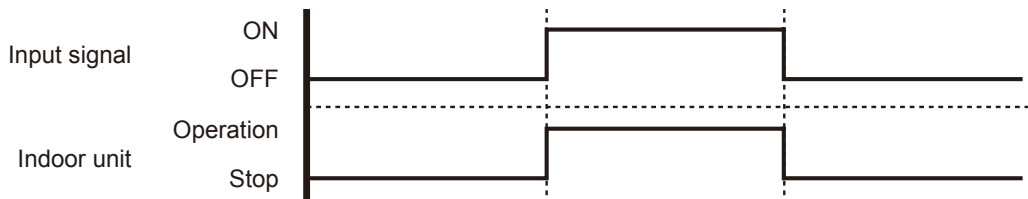
Unit operation	Initial setting after power is ON	Starting mode other than initial setting
Operation mode	Auto changeover	Mode at previous operation
Set temperature	75°F (24°C)	Temperature at previous operation
Air flow mode	AUTO	Mode at previous operation
Up-down air direction (swing)	Standard air direction (swing OFF)	Air direction at previous operation

### ● Circuit diagram example

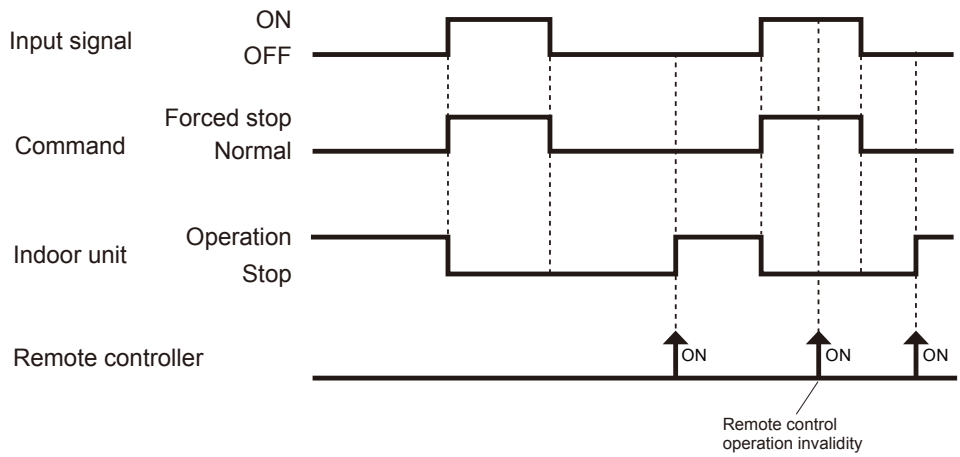


\* Make the distance from the PC board to the connected unit within 33ft. (10m).  
Contact capacity: DC 24 V or more, 10 mA or more.  
Use non-polar relays and switches.

### ● When function setting is in "Operation/Stop" mode



● When function setting is in "Forced stop" mode



● Parts (Optional)

Parts name	Model name
External connect kit	UTY-XWZXZ5
Communication kit	UTY-XCBXZ2

\*For operating the EXTERNAL function, the wall mounted type requires the communication kit in addition to the wire (UTY-XWZXZ5).

Wire (External input) : UTY-XWZXZ5

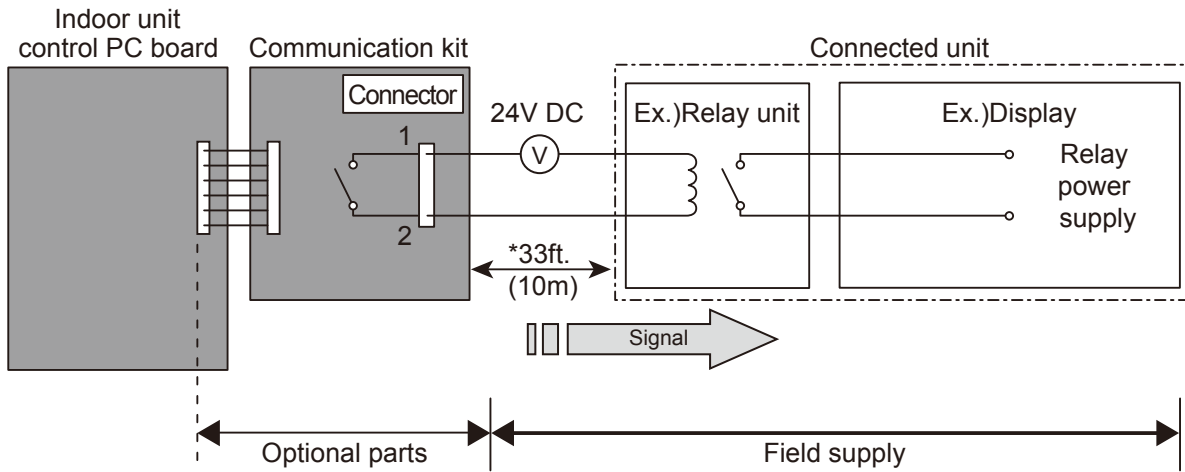


## 11-2. EXTERNAL OUTPUT

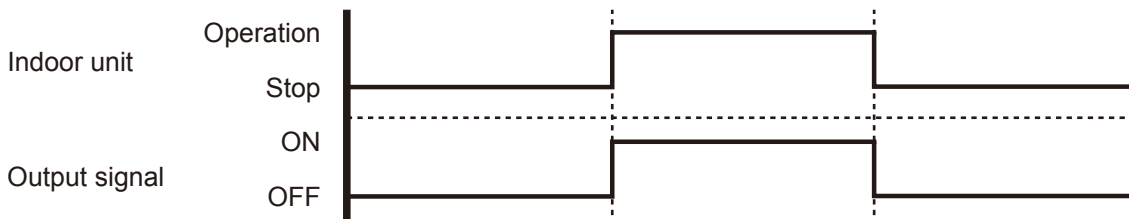
### ■ OPERATION STATUS OUTPUT

An air conditioner operation status signal can be output.

#### ● Circuit diagram example



\*: Make the distance from the PC board to the connected unit within 33ft. (10m)  
Relay spec.: Max. DC 24 V, 10 mA to less than 500 mA.



#### ● Parts (Optional)

Parts name	Model name
External connect kit	UTY-XWZXZ5
Communication kit	UTY-XCBXZ2

\*For operating the EXTERNAL function, the wall mounted type requires the communication kit in addition to the wire (UTY-XWZXZ5).

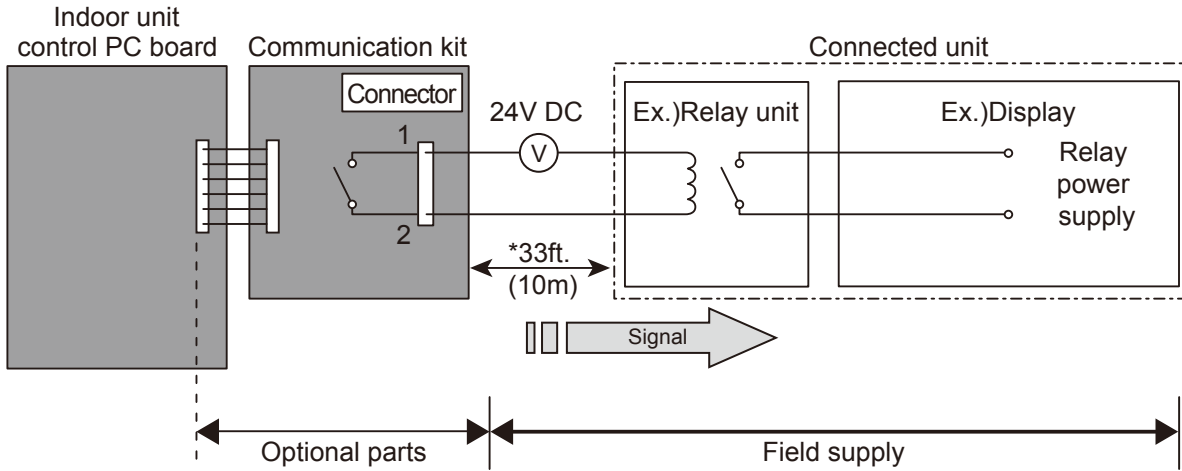
Wire (External output) : UTY-XWZXZ5



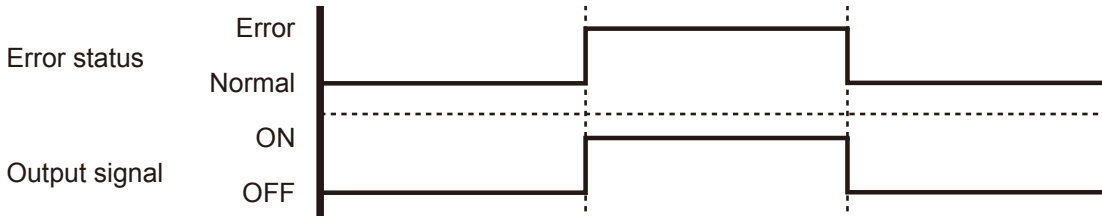
## ■ ERROR STATUS OUTPUT

An air conditioner error status signal can be output.

### ● Circuit diagram example



\*: Make the distance from the PC board to the connected unit within 33ft. (10m)  
Relay spec.: Max. DC 24 V, 10 mA to less than 500 mA.



### ● Parts (Optional)

Parts name	Model name
External connect kit	UTY-XWZXZ5
Communication kit	UTY-XCBXZ2

\*For operating the EXTERNAL function, the wall mounted type requires the communication kit in addition to the wire (UTY-XWZXZ5).

Wire (External output) : UTY-XWZXZ5



## 12. FUNCTION SETTINGS

### 12-1. 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 and Setting Value.
- Settings will not be changed if invalid numbers or setting values are selected.

#### ■ PREPARATION

- Before turning on the power of the indoor unit:
  - Confirm whether the piping air-tight test and vacuuming have been conducted.
  - Reconfirm whether there is no miswiring.
- Turn on the power of the indoor units.

#### ■ FUNCTION SETTING METHOD (for Wireless remote controller)

##### Entering the Function Setting Mode

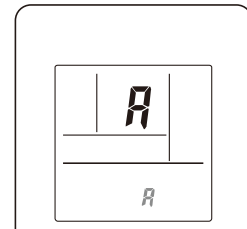
- While pressing the POWERFUL button and SET TEMP. (▲) simultaneously, press the RESET button to enter the function setting mode.

##### STEP 1

##### Setting the Remote controller Custom code

Use the following steps to select the custom code of the remote controller. (Note that the air conditioner cannot receive a custom code if the air conditioner has not been set for the custom code.) The custom codes that are set through this process are applicable only during the Function Setting process. For details on how to set the custom codes through the normal process, refer to "REMOTE CONTROLLER CUSTOM CODE SETTING".

1. Press the SET TEMP. (▲) (▼) button to change the custom code between  $\bar{A} \rightarrow \bar{b} \rightarrow \bar{c} \rightarrow \bar{d}$ .  
Match the code on the display to the air conditioner custom code. (initially set to  $\bar{A}$ )  
(If the custom code does not need to be selected, press the MIN. HEAT button and proceed to **STEP 2**.)
2. Press the MODE button and check that the indoor unit can receive signals at the displayed custom code.
3. Press the MIN. HEAT button to accept the custom code, and proceed to **STEP 2**.



The air conditioner custom code is set to "A" prior to shipment.

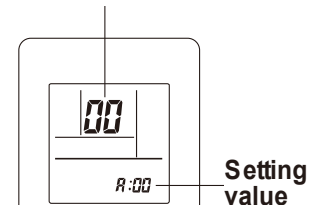
The remote controller resets to custom code A when the batteries in the remote controller are replaced. If you use a custom code other than custom code A, reset the custom code after replacing the batteries.  
If you do not know the air conditioner custom code setting, try each of the custom codes ( $\bar{A} \rightarrow \bar{b} \rightarrow \bar{c} \rightarrow \bar{d}$ ) until you find the code which operates the air conditioner.

##### STEP 2

##### Selecting the Function Number and Setting Value

1. Press the SET TEMP. (▲) (▼) buttons to select the function number.  
(Press the MIN. HEAT button to switch between the left and right digits.)
2. Press the POWERFUL button to proceed to setting the value.  
(Press the POWERFUL button again to return to the function number selection.)
3. Press the SET TEMP. (▲) (▼) buttons to select the setting value.  
(Press the MIN. HEAT button to switch between the left and right digits.)
4. Press the MODE button, then the START/STOP button in order to fix the settings.
5. Press the RESET button to end the function setting mode.
6. After completing the Function Setting, be sure to turn off the power and turn it on again.

##### Function number



#### ⚠ 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.



## FUNCTION DETAILS

Functions	
1)	Filter sign
2)	Room temperature control for cooling
3)	Room temperature control for heating
4)	Auto restart
5)	Room temperature sensor switching
6)	Remote controller custom code
7)	External input control
8)	Room temperature sensor switching (Aux.)
9)	Indoor unit fan control for energy saving for cooling

### 1) Filter sign

Select appropriate intervals for displaying the filter sign on the indoor unit according to the estimated amount of dust in the air of the room.

If the indication is not required, select "No indication" (03).

(◆... Factory setting)

Setting description	Function number	Setting value
Standard (400 hours)	11	00
Long interval (1000 hours)		01
Short interval (200 hours)		02
No indication		03

### 2) Room temperature control for cooling

Depending on the installed environment, correction of the room temperature sensor may be required.

Select the appropriate control setting according to the installed environment.

(◆... Factory setting)

Setting description	Function number	Setting value
Standard	30	00
Slightly lower control		01
Lower control		02
Higher control		03

### 3) Room temperature control for heating

Depending on the installed environment, correction of the room temperature sensor may be required.

Select the appropriate control setting according to the installed environment.

(◆... Factory setting)

Setting description	Function number	Setting value
Standard	31	00
Lower control		01
Slightly higher control		02
Higher control		03

#### 4) Auto restart

Enable or disable automatic restart after a power interruption.

(◆... Factory setting)

Setting description	Function number	Setting value
◆ Enable	40	00
Disable		01

\*Auto restart is an emergency function such as for power outage etc. Do not attempt to use this function in normal operation. Be sure to operate the unit by remote controller or external input device.

#### 5) Room temperature sensor switching

(Only for wired remote controller)

When using the Wired remote controller temperature sensor, change the setting to "Both" (01).

(◆... Factory setting)

Setting description	Function number	Setting value
◆ Indoor unit	42	00
Both		01

\*00: Sensor on the indoor unit is active.

\*01: Sensors on both indoor unit and wired remote controller is active.

\*Remote controller sensor must be turned on by using the remote controller.

#### 6) Remote controller custom code

(Only for wireless remote controller)

The indoor unit custom code can be changed.

Select the appropriate custom code.

(◆... Factory setting)

Setting description	Function number	Setting value
◆ A	44	00
B		01
C		02
D		03

#### 7) External input control

"Operation/Stop" mode or "Forced stop" mode can be selected.

(◆... Factory setting)

Setting description	Function number	Setting value
◆ Operation/Stop mode	46	00
(Setting prohibited)		01
Forced stop mode		02

#### 8) Room temperature sensor switching (Aux.)

To use the sensor on the wired remote controller only, change the setting to "Wired remote controller" (01). This function will only work if the function setting 42 is set at "Both" (01)

(◆... Factory setting)

Setting description	Function number	Setting value
◆ Both	48	00
Wired remote controller		01

### 9) Indoor unit fan control for energy saving for cooling

Enables or disables the power-saving function by controlling the indoor unit fan rotation when the outdoor unit is stopped during cooling operation.

(◆... Factory setting)

Setting description	Function number	Setting value
◆ Disable	49	00
Enable		01

\*00: When the outdoor unit is stopped, the indoor unit fan operates continuously following the setting on the remote controller..

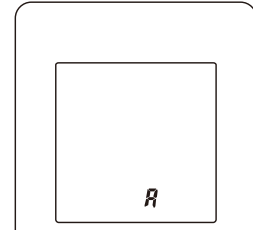
\*01: When the outdoor unit is stopped, the indoor unit fan operates intermittently at a very low speed.

## ■ REMOTE CONTROLLER CUSTOM CODE SETTING

Use the following steps to select the custom code of the remote controller.

(Note that the air conditioner cannot receive a signal if the right custom code has not been set.)

1. Press the START/STOP button until only the clock is displayed on the remote controller display.
2. Press the MODE button for at least five seconds to display the current custom code (initially set to **A**).
3. Press the SET TEMP. ( $\wedge$ ) ( $\vee$ ) button to change the custom code between **A**  $\rightarrow$  **b**  $\rightarrow$  **c**  $\rightarrow$  **d**.  
Match the code on the display to the air conditioner custom code.
4. Press the MODE button again to return to the clock display. The custom code will be changed.



If no buttons are pressed within 30 seconds after the custom code is displayed, the system returns to the original clock display. In this case, start again from step 1.

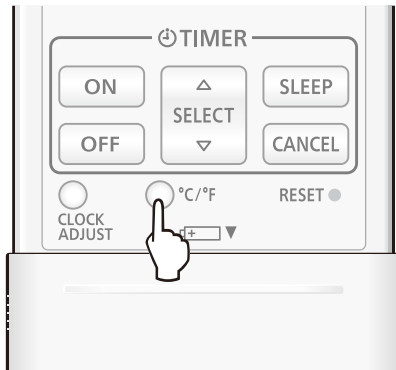
The air conditioner custom code is set to A prior to shipment.

The remote controller resets to custom code A when the batteries in the remote controller are replaced. If you use a custom code other than custom code A, reset the custom code after replacing the batteries. If you do not know the air conditioner custom code setting, try each of the custom codes (**A**  $\rightarrow$  **b**  $\rightarrow$  **c**  $\rightarrow$  **d**) until you find the code which operates the air conditioner.

## ■ REMOTE CONTROLLER TEMPERATURE UNIT

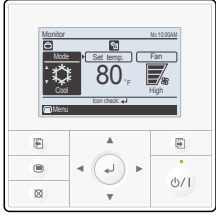
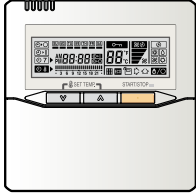

To change the temperature unit:

- Press the °C / °F switching button to select the preferred temperature unit. (Factory setting is °F.)

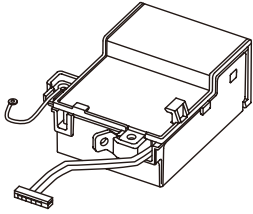
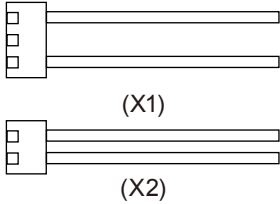


# 13. OPTIONAL PARTS

## 13-1. CONTROLLERS

Exterior	Parts name	Model No.	Summary
	Wired remote controller	UTY-RVNUM	Large and full-dot liquid crystal screen, wide and large keys easy to press, user-intuitive arrow key. *Optional communication kit is necessary for installation.
	Wired remote controller	UTY-RNNUM	The room temperature can be controlled by detecting the temperature accurately with built-in thermo sensor. *Optional communication kit is necessary for installation.
	Simple remote controller	UTY-RSNUM	Compact remote controller concentrates on the basic functions such as Start/Stop, Fan Control, Temperature Setting and Operation mode. *Optional communication kit is necessary for installation.

## 13-2. OTHERS

Exterior	Parts name	Model No.	Summary
	Communication kit	UTY-XCBXZ2	Use to connect with optional devices and air conditioner PC board.
	External connect kit	UTY-XWZXZ5	Required when external device is connected. *Optional communication kit is necessary for installation.

## **2. OUTDOOR UNIT**

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**SINGLE TYPE :**

**AOU9RLFW1**

**AOU12RLFW1**

# CONTENTS

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## 2. OUTDOOR UNIT

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# 1. SPECIFICATIONS

OUTDOOR UNIT  
AOU9-12RLF1

OUTDOOR UNIT  
AOU9-12RLF1

Type				INVERTER HEAT PUMP			
Model name				AOU9RLF1		AOU12RLF1	
Power source				208/230V~60HZ			
Available voltage range				187-253V~60HZ			
Starting current			A	4.2		5.9	
Fan	Airflow rate	Cooling	CFM	995(1690)		1036(1760)	
		Heating	(m <sup>3</sup> /h)	906(1540)		889(1510)	
	Type×Qty	Propeller fan×1					
Motor output			W	23		37	
Sound pressure level		Cooling	dB(A)	48		49	
		Heating		48		49	
Heat exchanger type		Dimensions (H×W×D)	in.	19-13/16×25-1/4×1-7/16		19-13/16×35-1/4×1-7/16	
			mm	504×642×36.4		504×896×36.4	
		Fin pitch	FPI	18			
		Rows×Stages	2×24				
		Pipe type	Copper				
		Fin Type	Aluminum				
Compressor	Type×Qty			Rotary×1			
	Motor output		W	500		750	
Refrigerant		Type		R410A			
		Charge	lb.oz.	1lb. 14oz.		2lb. 5oz.	
	kg		0.85		1.05		
Refrigerant oil		Type		RB68		VG74	
Enclosure		Material		Steel			
		Color		Beige Approximate color of MUNSELL 10YR7.5/1.0			
Dimensions (H×W×D)	Net	mm		540×660×290		540×790×290	
		in.		21-1/4×26×11-7/16		21-1/4×31-1/8×11-7/16	
	Gross	mm		611×797×401		648×934×400	
		in.		24-1/16×31-3/8×15-13/16		25-1/2×36-3/4×15-3/4	
Weight	Net	lb.(kg)		60(27)		80(36)	
		Gross		67(30)		86(39)	
Connenction pipe	Size	Liquid	in.	Ø1/4(Ø6.35)			
		Gas	(mm)	Ø3/8(Ø9.52)			
	Method		Flare				
	Pre - charge length		49(15)				
	Min. length		ft. (m)	9(3)			
	Max.length			66(20)			
Max.height difference		49(15)					
Operation range		Cooling	°F	14to115(-10 to 46)			
		Heating	(°C)	5 to 75(-15to 24)			

Note:

Specifications are based on the following conditions.

Cooling:Indoor temperature of 80°F(26.67°C)DB/67°F(19.44°C)WB,and outdoor temperature of 95°F(35°C)DB/75°F(23.9°C)WB.

Heating:Indoor temperature of 70°F(21.11°C)DB/59°F(15°C)WB,and outdoor temperature of 47°F(8.33°C)DB/43°F(6.11°C)WB.

Pipe length:24ft.(7.5m),Height difference:0ft. (0m)(Outdoor unit-Indoor unit)

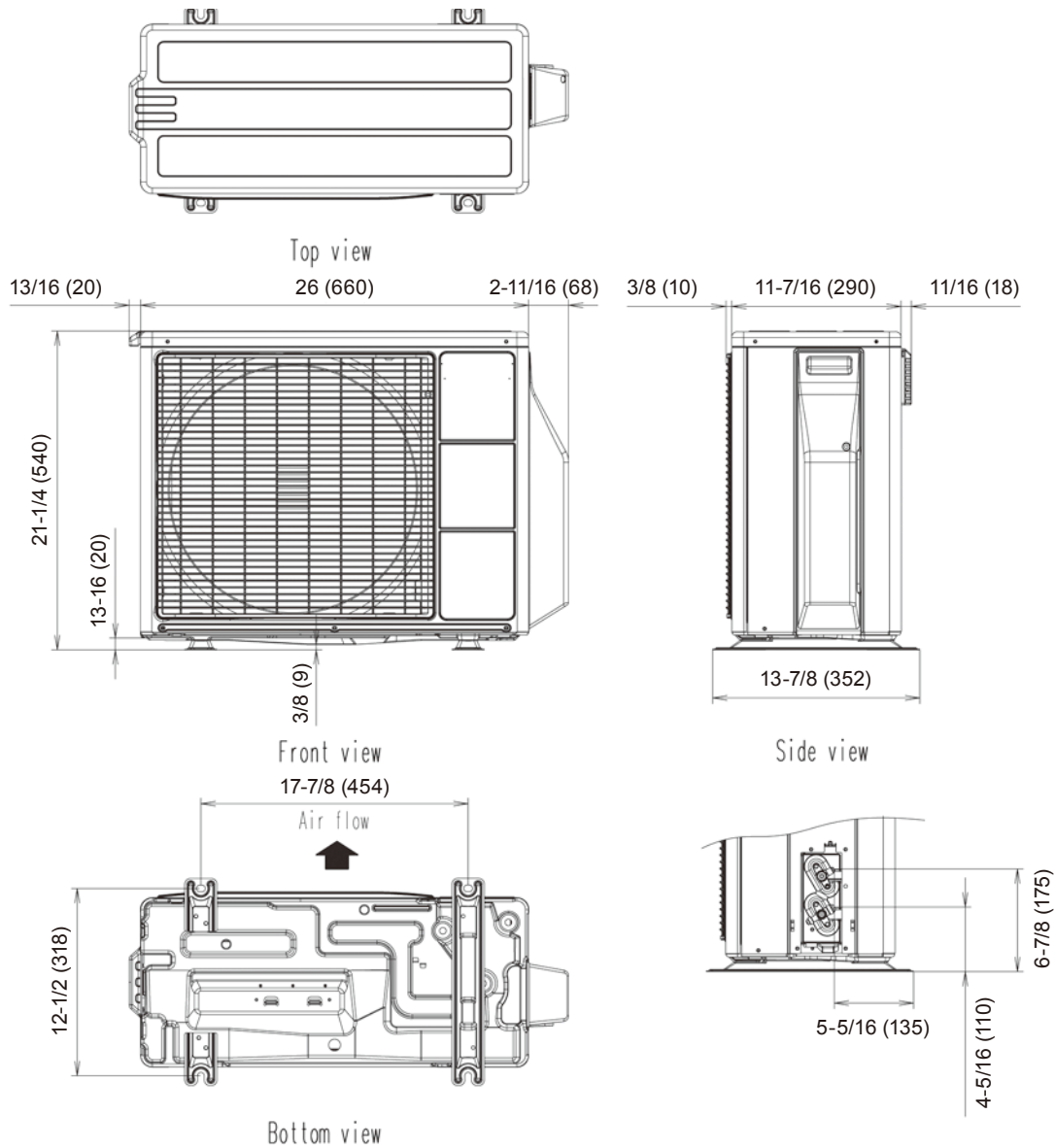


## 2. DIMENSIONS

### MODEL: AOU9RLFW1

OUTDOOR UNIT  
AOU9-12RLFW1

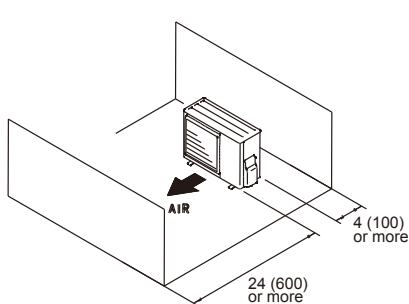
OUTDOOR UNIT  
AOU9-12RLFW1



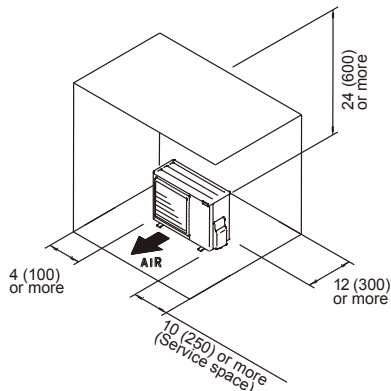
Unit : in.(mm)

### INSTALLATION PLACE

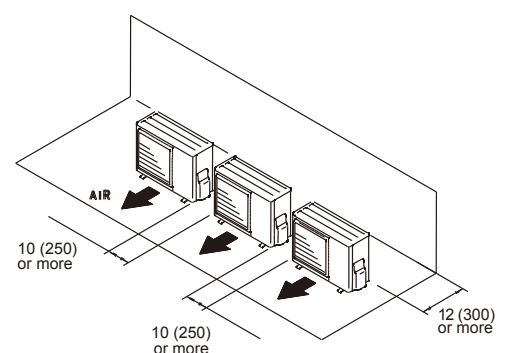
When there are obstacles at the back or front sides.



When there are obstacles at the back, side(s), and top.



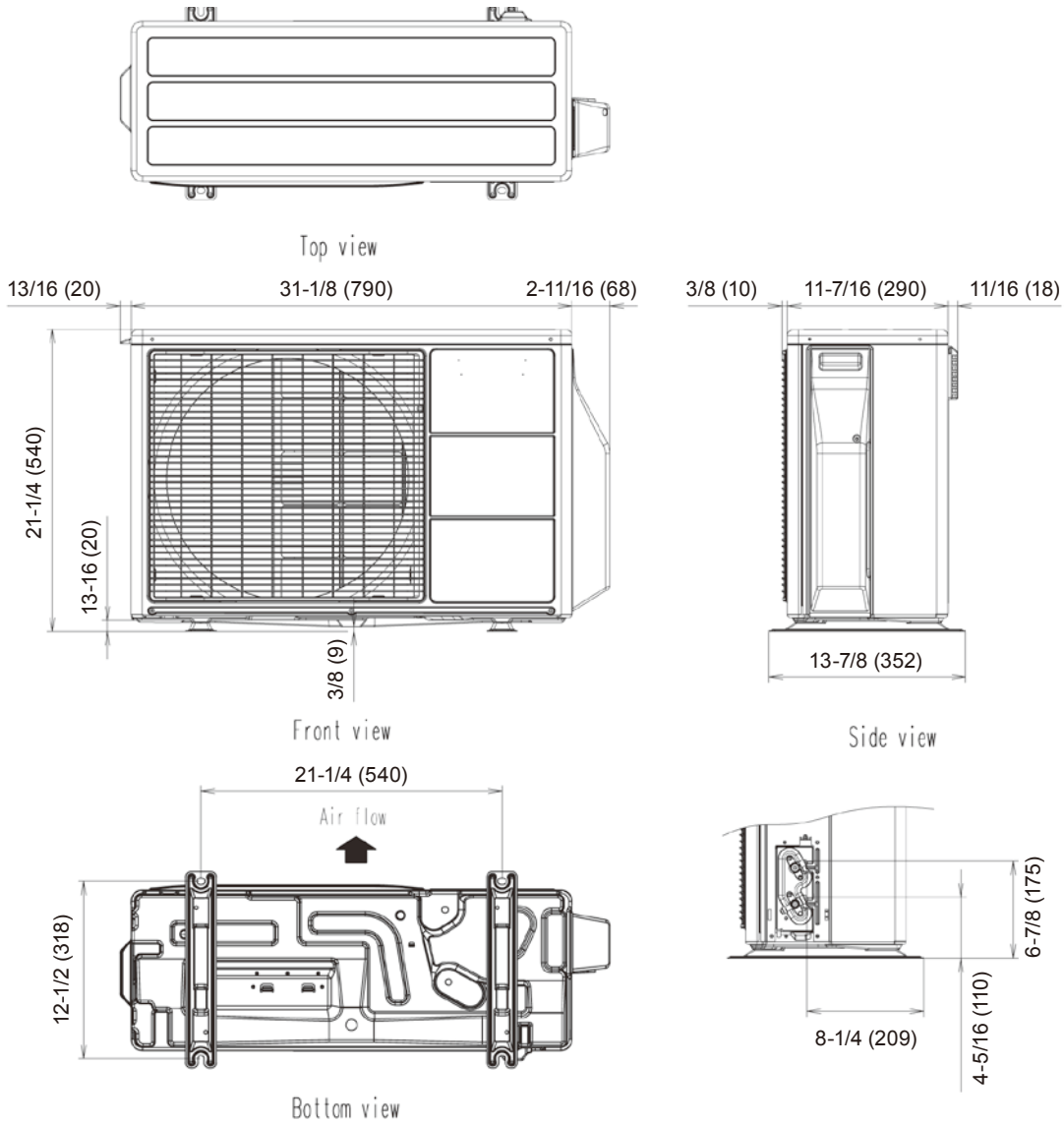
When there are obstacles at the back, side with the installation of more than one unit.



# MODEL: AOU12RLF1

OUTDOOR UNIT  
AOU9-12RLF1

OUTDOOR UNIT  
AOU9-12RLF1



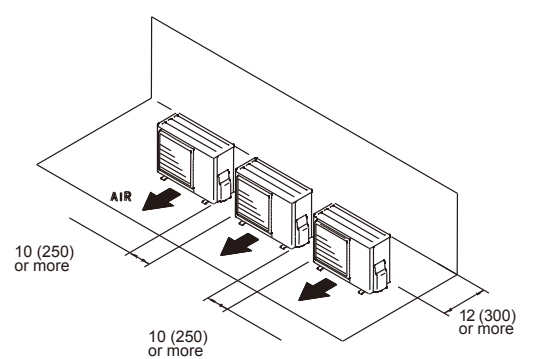
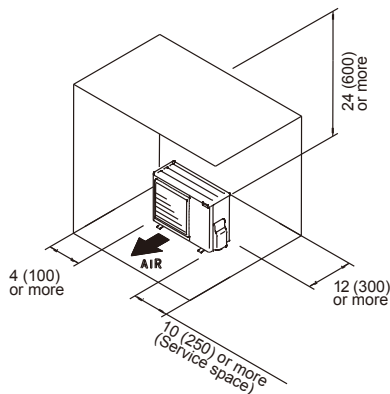
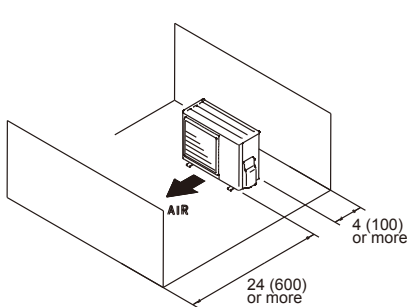
Unit : in.(mm)

## INSTALLATION PLACE

When there are obstacles at the back or front sides.

When there are obstacles at the back, side(s), and top.

When there are obstacles at the back, side with the installation of more than one unit.

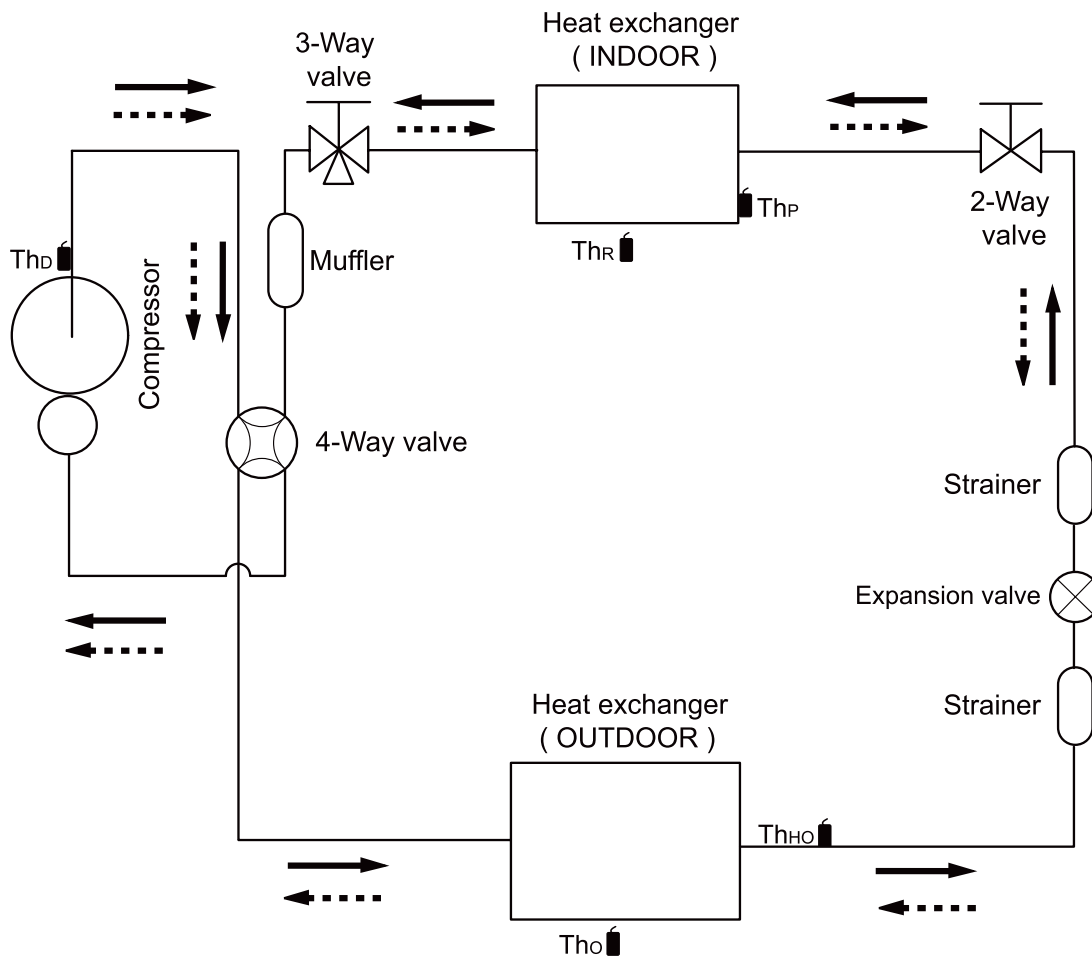


### 3. REFRIGERANT CIRCUIT

#### ■ MODEL: AOU9RLFW1

OUTDOOR UNIT  
AOU9-12RLFW1

OUTDOOR UNIT  
AOU9-12RLFW1



———→ : Cooling  
 - - - - -→ : Heating

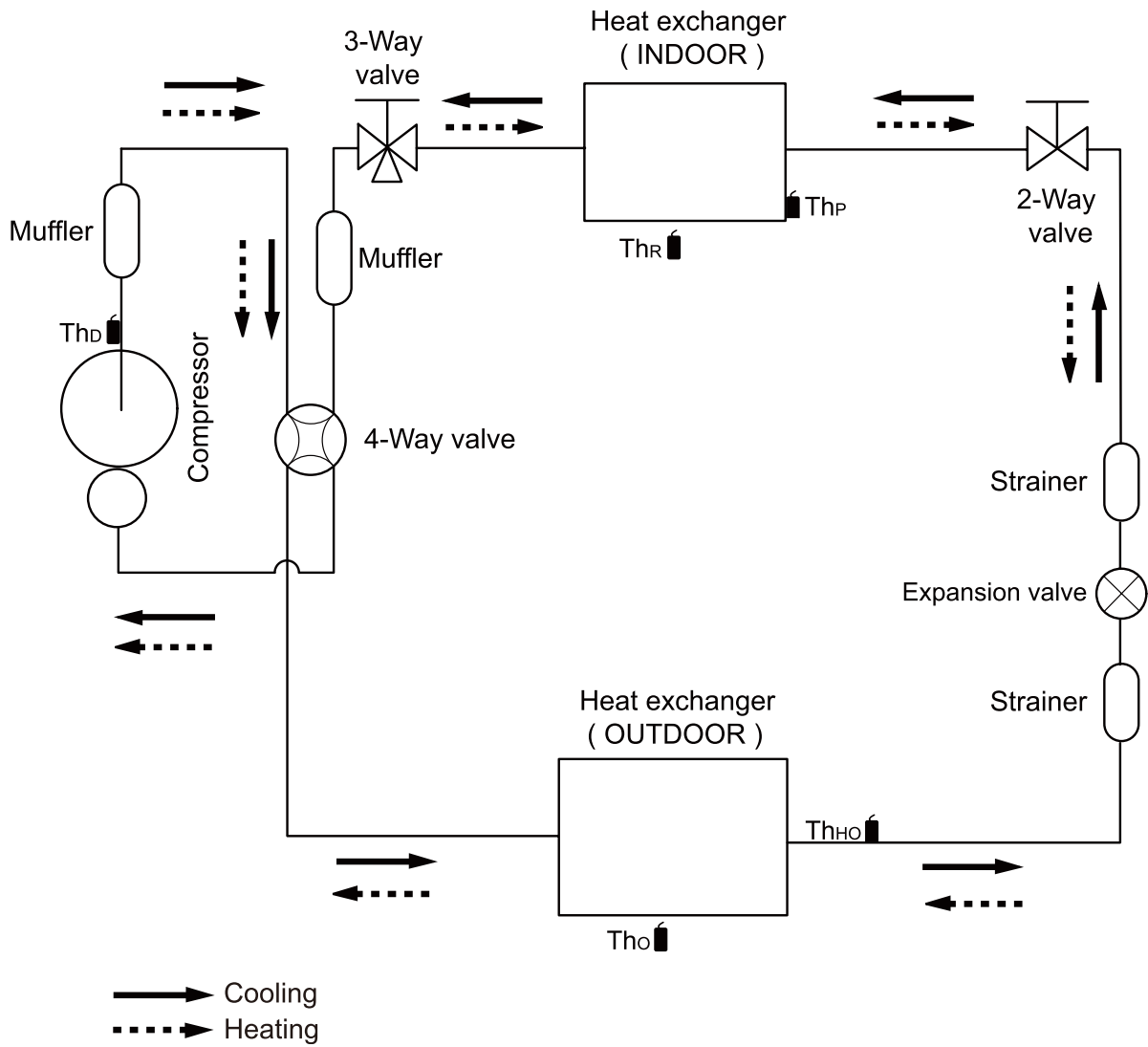
- Th<sub>D</sub> : Thermistor (Discharge Temp.)
- Th<sub>O</sub> : Thermistor (Outdoor Temp.)
- Th<sub>HO</sub> : Thermistor (Heat Exchanger Out Temp.)
- Th<sub>R</sub> : Thermistor (Room Temp.)
- Th<sub>P</sub> : Thermistor (Pipe Temp.)

Refrigerant pipe diameter  
 Liquid: 1/4" (6.35mm)  
 Gas: 3/8" (9.52 mm)

# MODEL: AOU12RLF01

OUTDOOR UNIT  
AOU9-12RLF01

OUTDOOR UNIT  
AOU9-12RLF01

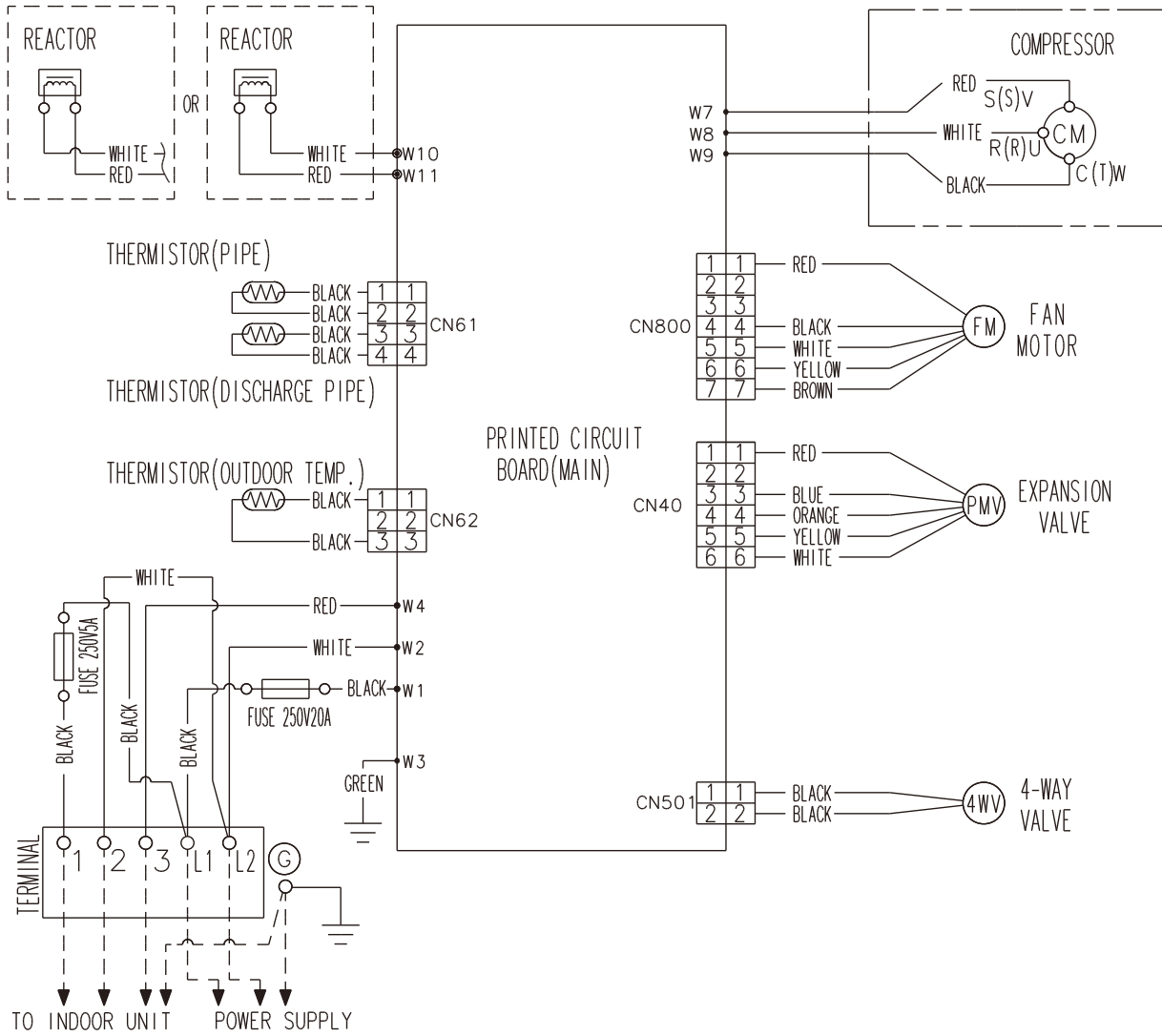


- $Th_D$ : Thermistor (Discharge Temp.)
- $Th_o$ : Thermistor (Outdoor Temp.)
- $Th_{HO}$ : Thermistor (Heat Exchanger Out Temp.)
- $Th_R$ : Thermistor (Room Temp.)
- $Th_P$ : Thermistor (Pipe Temp.)

Refrigerant pipe diameter  
 Liquid : 1/4" (6.35 mm)  
 Gas : 3/8" (9.52 mm)

# 4. WIRING DIAGRAMS

## MODEL: AOU9RLF01



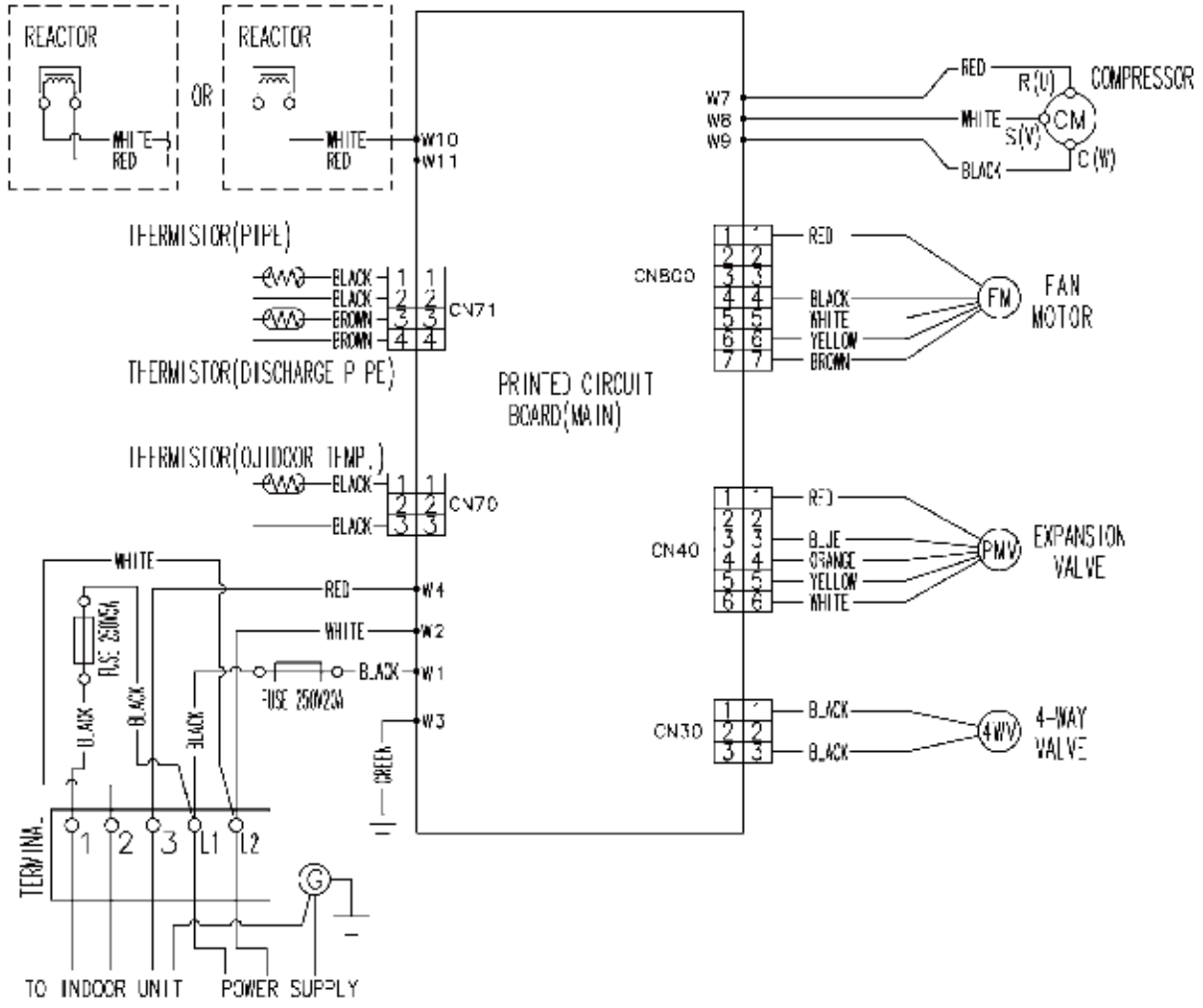
OUTDOOR UNIT  
AOU9-12RLF01

OUTDOOR UNIT  
AOU9-12RLF01

# MODEL: AOU12RLF01

OUTDOOR UNIT  
AOU9-12RLF01

OUTDOOR UNIT  
AOU9-12RLF01



# 5. CAPACITY COMPENSATION RATE FOR PIPE LENGTH AND HEIGHT DIFFERENCE

## MODEL: AOU9RLFW1

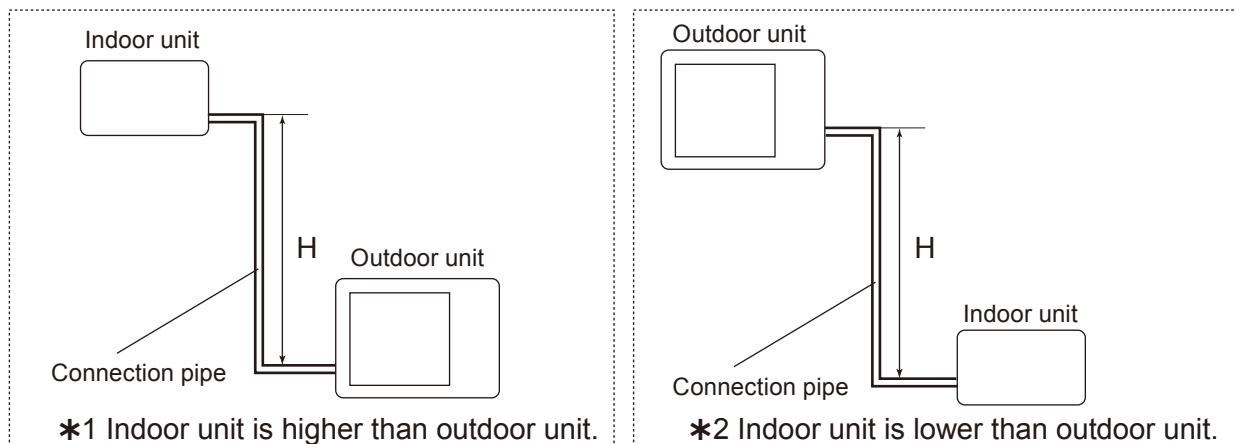
OUTDOOR UNIT  
AOU9-12RLFW1

OUTDOOR UNIT  
AOU9-12RLFW1

COOLING				Pipe length				
				5m	7.5m	10m	15m	20m
				16ft.	25ft.	33ft.	49ft.	66ft.
Height difference H	*1 Indoor unit is higher than outdoor unit.	15m	49ft.	-	-	-	0.872	0.910
		10m	33ft.	-	-	0.961	0.886	0.925
		7.5m	25ft.	-	0.979	0.965	0.890	0.929
		5m	16ft.	0.992	0.983	0.969	0.893	0.933
	0m		0ft.	1.000	0.991	0.976	0.901	0.940
	*2 Indoor unit is lower than outdoor unit	-5m	-16ft.	1.000	0.991	0.976	0.901	0.940
		-7.5m	-25ft.	-	0.991	0.976	0.901	0.940
		-10m	-33ft.	-	-	0.976	0.901	0.940
		-15m	-49ft.	-	-	-	0.901	0.940

HEATING				Pipe length				
				5m	7.5m	10m	15m	20m
				16ft.	25ft.	33ft.	49ft.	66ft.
Height difference H	*1 Indoor unit is higher than outdoor unit.	15m	49ft.	-	-	-	0.832	0.822
		10m	33ft.	-	-	0.917	0.832	0.822
		7.5m	25ft.	-	0.961	0.917	0.832	0.822
		5m	16ft.	1.000	0.961	0.917	0.832	0.822
	0m		0ft.	1.000	0.961	0.917	0.832	0.822
	*2 Indoor unit is lower than outdoor unit	-5m	-16ft.	0.995	0.956	0.912	0.828	0.818
		-7.5m	-25ft.	-	0.954	0.910	0.826	0.816
		-10m	-33ft.	-	-	0.908	0.824	0.814
		-15m	-49ft.	-	-	-	0.815	0.805

Height difference H



# MODEL: AOU12RLFW1

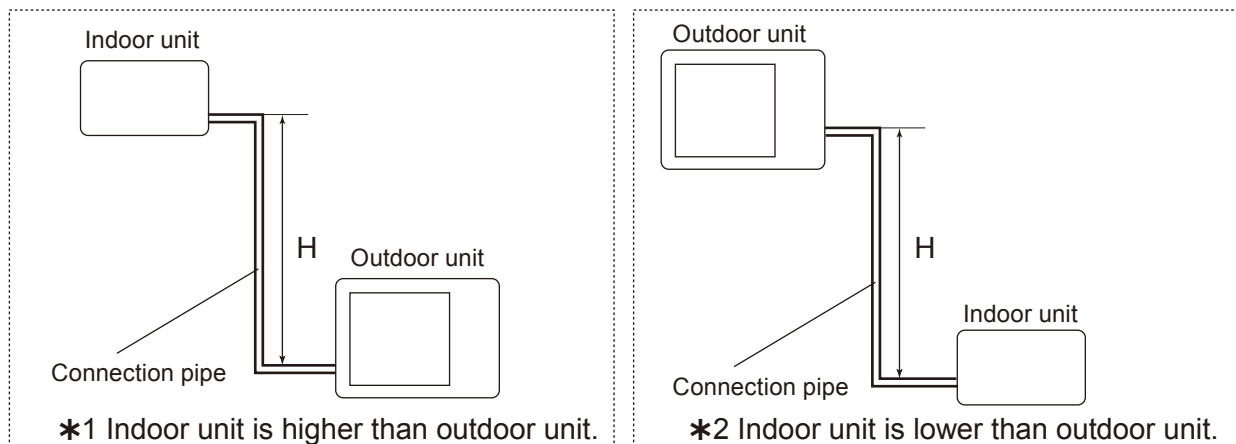
OUTDOOR UNIT  
AOU9-12RLFW1

OUTDOOR UNIT  
AOU9-12RLFW1

COOLING				Pipe length				
				5m	7.5m	10m	15m	20m
				16ft.	25ft.	33ft.	49ft.	66ft.
Height difference H	*1 Indoor unit is higher than outdoor unit.	15m	49ft.	-	-	-	0.858	0.868
		10m	33ft.	-	-	0.929	0.872	0.882
		7.5m	25ft.	-	0.960	0.933	0.876	0.885
		5m	16ft.	0.992	0.964	0.937	0.879	0.889
	0m		0ft.	1.000	0.972	0.944	0.887	0.896
	*2 Indoor unit is lower than outdoor unit	-5m	-16ft.	1.000	0.972	0.944	0.887	0.896
		-7.5m	-25ft.	-	0.972	0.944	0.887	0.896
		-10m	-33ft.	-	-	0.944	0.887	0.896
		-15m	-49ft.	-	-	-	0.887	0.896

HEATING				Pipe length				
				5m	7.5m	10m	15m	20m
				16ft.	25ft.	33ft.	49ft.	66ft.
Height difference H	*1 Indoor unit is higher than outdoor unit.	15m	49ft.	-	-	-	0.896	0.879
		10m	33ft.	-	-	0.968	0.890	0.879
		7.5m	25ft.	-	0.994	0.968	0.896	0.879
		5m	16ft.	1.000	0.994	0.968	0.896	0.879
	0m		0ft.	1.000	0.994	0.968	0.896	0.879
	*2 Indoor unit is lower than outdoor unit	-5m	-16ft.	0.995	0.989	0.963	0.891	0.875
		-7.5m	-25ft.	-	0.987	0.961	0.889	0.873
		-10m	-33ft.	-	-	0.959	0.887	0.871
		-15m	-49ft.	-	-	-	0.878	0.862

Height difference H





## 6. ADDITIONAL CHARGE CALCULATION

### ■ MODEL: AOU9RLF1

Refrigerant type		R410A
Refrigerant amount	lb. oz.	1lb.14oz.
	g	850

### ● REFRIGERANT CHARGE

Pipe length	ft.	49 or less	66 (MAX)	0.22oz./ft. (20g/m)
	m	15 or less	20 (MAX)	
Additional charge	oz.	0	3.5	
	g	0	+100	

### ■ MODEL: AOU12RLF1

Refrigerant type		R410A
Refrigerant amount	lb. oz.	2lb.5oz.
	g	1050

### ● REFRIGERANT CHARGE

Pipe length	ft.	49 or less	66 (MAX)	0.22oz./ft. (20g/m)
	m	15 or less	20 (MAX)	
Additional charge	oz.	0	3.5	
	g	0	+100	

OUTDOOR UNIT  
AOU9-12RLF1

OUTDOOR UNIT  
AOU9-12RLF1

## 7. AIR FLOW

### ■ MODEL: AOU9RLF1

#### ● Cooling

Number of rotations (r.p.m.)	Air flow	
780	1690	m <sup>3</sup> /h
	469	l/s
	995	CFM

#### ● Heating

Number of rotations (r.p.m.)	Air flow	
720	1540	m <sup>3</sup> /h
	428	l/s
	906	CFM

### ■ MODEL: AOU12RLF1

#### ● Cooling

Number of rotations (r.p.m.)	Air flow	
780	1760	m <sup>3</sup> /h
	489	l/s
	1036	CFM

#### ● Heating

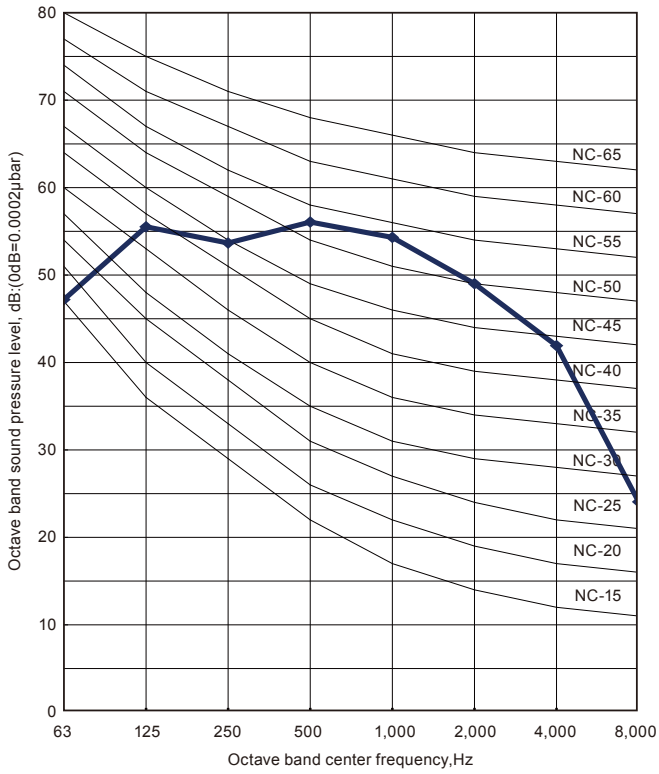
Number of rotations (r.p.m.)	Air flow	
680	1510	m <sup>3</sup> /h
	419	l/s
	889	CFM

# 8. OPERATION NOISE

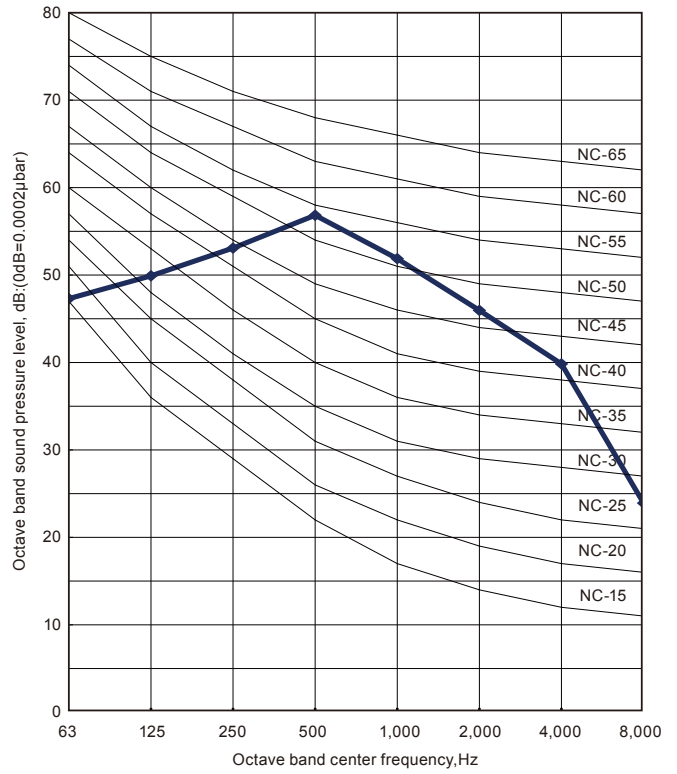
## 8-1. NOISE LEVEL CURVE (SOUND PRESSURE)

### MODEL: AOU9RLFW1

#### ● Cooling

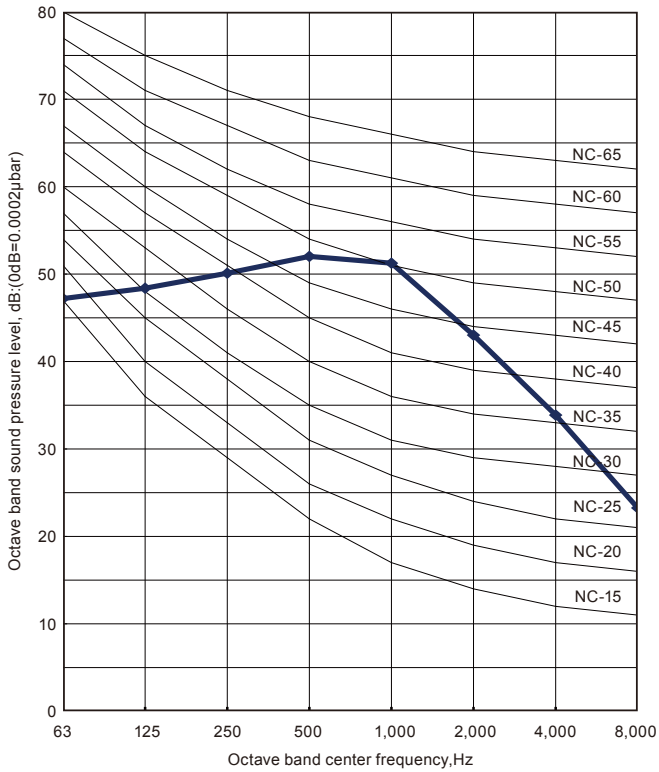


#### ● Heating

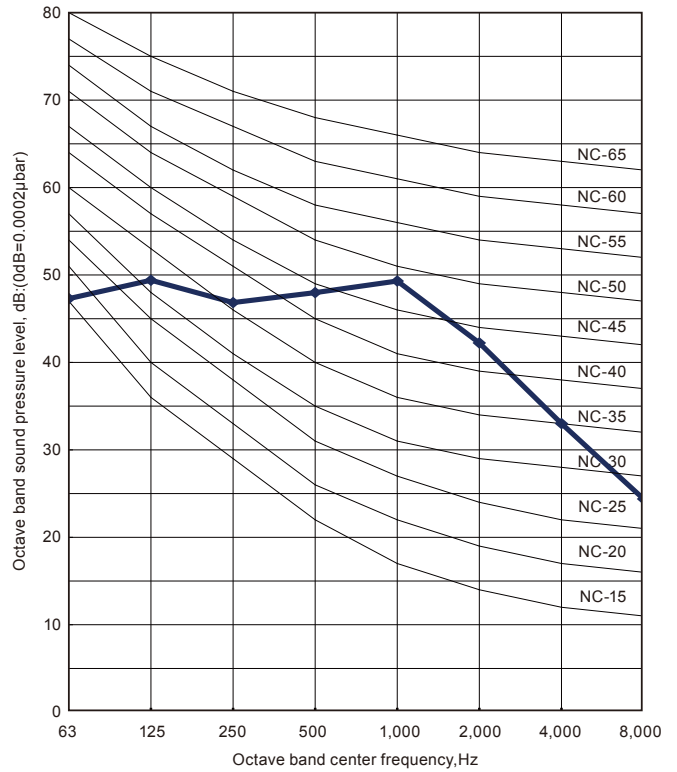


### MODEL: AOU12RLFW1

#### ● Cooling



#### ● Heating

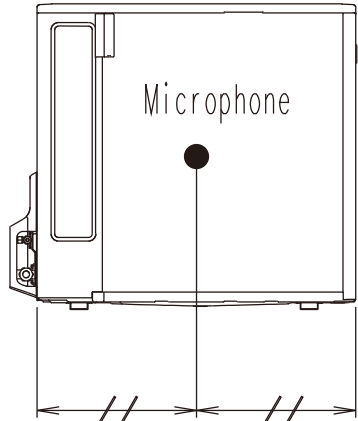
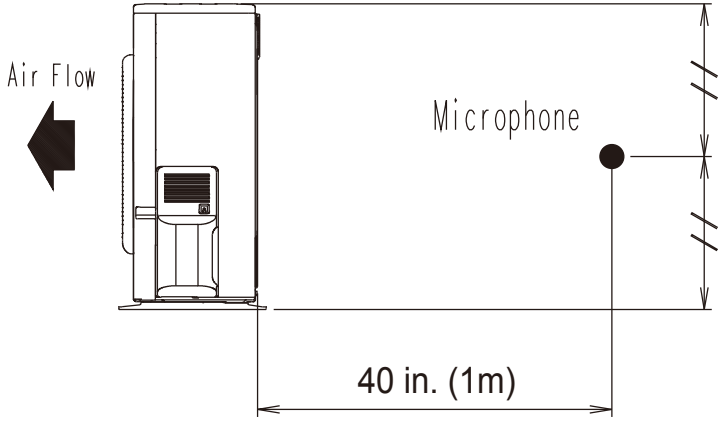


OUTDOOR UNIT  
AOU9-12RLFW1

OUTDOOR UNIT  
AOU9-12RLFW1

# 8-2. SOUND LEVEL CHECK POINT

OUTDOOR UNIT  
AOU9-12RLFW1



OUTDOOR UNIT  
AOU9-12RLFW1

# 9. ELECTRIC CHARACTERISTICS

OUTDOOR UNIT  
AOU9-12RLFW1

OUTDOOR UNIT  
AOU9-12RLFW1

Model Name			AOU9RLFW1	AOU12RLFW1
Power Supply	Voltage	V	208 / 230~	
	Frequency	Hz	60	
MCA		A	10	12
Starting Current		A	4.2	5.9
*1) Wiring Spec.	MAX. CKT. BKR	A	15	20
	Power Cable	AWG	14	

\*1) Wiring Spec.

Selected Sample

(Selected based on Japan Electrotechnical Standard and Codes Committee E00005)

MCA: Min Circuit Amp(Calculation based on UL1995)

MAX. CKT. BKR: Maximum Circuit Breaker

# 10. SAFETY DEVICES

OUTDOOR UNIT  
AOU9-12RLFW1

OUTDOOR UNIT  
AOU9-12RLFW1

	Protection form	Model	
		AOU9RLFW1	AOU12RLFW1
Circuit protection	Current fuse (IN THE INVERTER CASE)	250V 20A 250V 5A	
	Current fuse (MAIN PRINTED CIRCUIT BOARD)	—	250V 15A 250V 3.15A
Fan motor protection	Terminal protection program	OFF: 212±27°F (100±15°C) ON: 203±18°F (95±10°C)	OFF: 302±27°F (150±15°C) ON: 230±18°F (120±15°C)
Compressor protection	Terminal protection program COMPRESSOR TEMP.	OFF:230°F (110°C) ON:After 7 minutes	