

AIR CONDITIONER

Wall mounted type

SERVICE MANUAL

INDOOR



ASUH09LMAS
ASUH12LMAS

OUTDOOR



AOUH09LMAS1
AOUH12LMAS1

FUJITSU GENERAL LIMITED

Notices:

- Product specifications and design are subject to change without notice for future improvement.
- For further details, please check with our authorized dealer.

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CONTENTS

1. GENERAL INFORMATION

2. TECHNICAL DATA AND PARTS LIST

3. TROUBLESHOOTING

4. CONTROL AND FUNCTIONS

5. FIELD WORKING

1. GENERAL INFORMATION

CONTENTS

1. GENERAL INFORMATION

1. Specifications	01-1
1-1. Indoor unit	01-1
1-2. Outdoor unit.....	01-3
2. Dimensions	01-4
2-1. Indoor unit	01-4
2-2. Outdoor unit.....	01-6

1. Specifications

1-1. Indoor unit

Type				Wall mounted			
				Inverter heat pump			
Model name				ASUH09LMAS		ASUH12LMAS	
Power supply				208/230 V~ 60 Hz			
Power supply intake				Outdoor unit			
Available voltage range				187—253 V			
Capacity	Cooling	Rated	kW	2.64	3.52		
			Btu/h	9,000	12,000		
		Min.—Max.	kW	1.00—3.20	1.00—3.90		
			Btu/h	3,400—10,900	3,400—13,300		
	Heating	Rated	kW	3.52	4.24		
			Btu/h	12,000	14,500		
		Min.—Max.	kW	0.82—4.40	0.82—5.60		
			Btu/h	2,800—15,000	2,800—19,100		
	Heating (17°F) *1	Rated	kW	2.17	2.58		
			Btu/h	7,400	8,800		
		Max.	kW	2.96	3.72		
			Btu/h	10,100	12,700		
	Heating (5°F) *2	Rated	kW	2.96	3.02		
			Btu/h	10,100	10,300		
		Max.	kW	2.99	3.14		
			Btu/h	10,200	10,700		
Input power	Cooling	Rated	kW	0.63	0.96		
				Min.—Max.	0.14—0.92	0.14—1.27	
	Heating	Rated	kW	0.84	1.03		
				Min.—Max.	0.14—1.61	0.14—1.67	
	Heating (17°F) *1	Rated	kW	0.68	0.88		
				Max.	1.34	1.39	
	Heating (5°F) *2	Rated	kW	1.250	1.275		
				Max.	1.270	1.280	
	Current	Cooling	Rated	A	3.1	4.7	
					Heating	4.0	4.9
EER2	Cooling		kW/kW	4.19	3.66		
				Btu/hW	14.3	12.5	
COP2	Heating		kW/kW	4.20	4.12		
				Btu/hW	14.3	14.1	
SEER2	Cooling		Btu/hW	26.5	23.0		
HSPF2	Heating		Btu/hW	12.6	11.1		
Power factor	Cooling		%	88.4	88.8		
				Heating	91.3	91.4	
Moisture removal			pints/h (L/h)	2.7 (1.3)	3.8 (1.8)		
Maximum operating current *3	Cooling		A	6.4	6.9		
				Heating	7.9	9.4	
Fan	Airflow rate	Cooling	CFM (m ³ /h)	HIGH	453 (770)		
				MED	353 (600)		
				LOW	265 (450)		
				QUIET	147 (250)		
		Heating	HIGH	453 (770)			
			MED	377 (640)			
			LOW	306 (520)			
			QUIET	182 (310)			
	Type × Qty				Crossflow fan × 1		
	Motor output				W		
Sound pressure level *4	Cooling		dB (A)	HIGH	43		
				MED	36		
				LOW	30		
				QUIET	19		
	Heating			dB (A)	HIGH	43	
					MED	38	
					LOW	33	
					QUIET	21	
	Heat exchanger type	Dimensions (H × W × D)		in (mm)	Main1: 8-1/4 × 26-3/8 × 1-1/16 (210 × 670 × 26.6) Main2: 4-7/16 × 26-3/8 × 13/16 (112 × 670 × 20) Sub: 3-5/16 × 26-3/8 × 1/2 (84 × 670 × 13.3)		
		Fin pitch		FPI	Main1: 21 Main2: 23 Sub: 18		
Rows × Stages			Main1: 2 × 10 Main2: 2 × 7 Sub: 1 × 4				
Pipe type			Copper				
Fin type			Aluminum				
Material			Polystyrene				
Enclosure	Color			White Approximate color of Munsell N 9.25/			
	Dimensions (H × W × D)		in (mm)	Net 10-5/8 × 32-13/16 × 8-3/4 (270 × 834 × 222) Gross 10-7/8 × 36 × 13-1/16 (277 × 914 × 332)			
Weight	Net		lb (kg)	22 (10)			
	Gross			29 (13)			
Connection pipe	Size	Liquid	in (mm)	Ø1/4 (Ø6.35)			
		Gas		Ø3/8 (Ø9.52)			
	Method			Flare			
Drain hose	Material			PP+HDPE			
	Tip diameter		in (mm)	Ø17/32 (Ø13.8) (I.D.), Ø19/32 to 21/32 (Ø15.0 to 16.8) (O.D.)			

Type			Wall mounted	
			Inverter heat pump	
Model name			ASUH09LMAS	ASUH12LMAS
Operation range	Cooling	°F (°C)	64 to 90 (18 to 32)	
		%RH	80 or less	
	Heating	°F (°C)	60 to 86 (16 to 30)	
Remote controller type			Wireless (Wired, Mobile app ^{*5} [FGLair™] [option])	
NOTES:				
<ul style="list-style-type: none"> Specifications are based on the following conditions: <ul style="list-style-type: none"> Cooling: Indoor temperature of 80°F (26.67°CDB)/67°F WB (19.44°CWB), and outdoor temperature of 95°F DB (35°CDB)/75°F WB (23.9°CWB). Heating: Indoor temperature of 70°F DB (21.11°CDB)/60°F WB (15.56°CWB), and outdoor temperature of 47°F DB (8.33°CDB)/43°F WB (6.11°CWB). *1: Heating (17°F): Indoor temperature of 70°F DB (21.11°CDB)/60°F WB (15.56°CWB), and outdoor temperature of 17°F DB (-8.33°CDB)/15°F WB (-9.44°CWB). *2: Heating (5°F): Indoor temperature of 70°F DB (21.11°CDB)/60°F WB (15.56°CWB), and outdoor temperature of 5°F DB (-15.0°CDB)/4°F WB (-15.56°CWB). Test conditions are based on AHRI 210/240 2023. Pipe length: 25 ft (7.5 m), Height difference: 0 ft (0 m). (Between outdoor unit and indoor unit.) Protective function might work when using it outside the operation range. *3: Maximum current is maximum value when operated within the operation range. *4: Sound pressure level: <ul style="list-style-type: none"> Measured values in manufacturer's anechoic chamber. Because of the surrounding sound environment, the sound levels measured in actual installation conditions might be higher than the specified values here. *5: Available on Google Play™ store or on App Store®. Optional WLAN Adapter is also required. For details, refer to the setting manual. 				

M condition						
Model name			ASUH09LMAS	ASUH12LMAS		
Capacity	Cooling	Rated	kW	2.64	3.52	
			Btu/h	9,000	12,000	
		Min.—Max.	kW	1.0—3.20	1.0—3.90	
			Btu/h	3,400—10,900	3,400—13,300	
		Heating	Rated	kW	3.52	4.24
				Btu/h	12,000	14,500
	Min.—Max.		kW	0.82—4.40	0.82—5.60	
			Btu/h	2,800—15,000	2,800—19,100	
	Heating (17°F) *	Rated	kW	2.17	2.58	
			Btu/h	7,400	8,800	
		Max.	kW	2.96	3.72	
			Btu/h	10,100	12,700	
Input power	Cooling	Rated	kW	0.63	0.96	
			Min.—Max.	0.14—0.92	0.14—1.27	
	Heating	Rated	kW	0.84	1.03	
			Min.—Max.	0.14—1.61	0.14—1.67	
	Heating (17°F) *	Rated	kW	0.68	0.88	
			Max.	1.34	1.39	
Current	Cooling	Rated	A	3.1	4.7	
			Heating	4.0	4.9	
EER	Cooling		kW/kW	4.19	3.66	
			Btu/hW	14.3	12.5	
COP	Heating		kW/kW	4.20	4.12	
			Btu/hW	14.3	14.1	
SEER	Cooling		Btu/hW	26.5	23.0	
HSPF	Heating		Btu/hW	13.0	12.1	
Power factor	Cooling		%	88.4	88.8	
	Heating			91.3	91.4	
NOTES:						
<ul style="list-style-type: none"> Specifications are based on the following conditions: <ul style="list-style-type: none"> Cooling: Indoor temperature of 80°F (26.67°CDB)/67°F WB (19.44°CWB), and outdoor temperature of 95°F DB (35°CDB)/75°F WB (23.9°CWB). Heating: Indoor temperature of 70°F DB (21.11°CDB)/60°F WB (15.56°CWB), and outdoor temperature of 47°F DB (8.33°CDB)/43°F WB (6.11°CWB). *: Heating (17°F): Indoor temperature of 70°F DB (21.11°CDB)/60°F WB (15.56°CWB), and outdoor temperature of 17°F DB (-8.33°CDB)/15°F WB (-9.44°CWB). Test conditions are based on AHRI 210/240 2017. Pipe length: 25 ft (7.5 m), Height difference: 0 ft (0 m). (Between outdoor unit and indoor unit.) 						

1-2. Outdoor unit

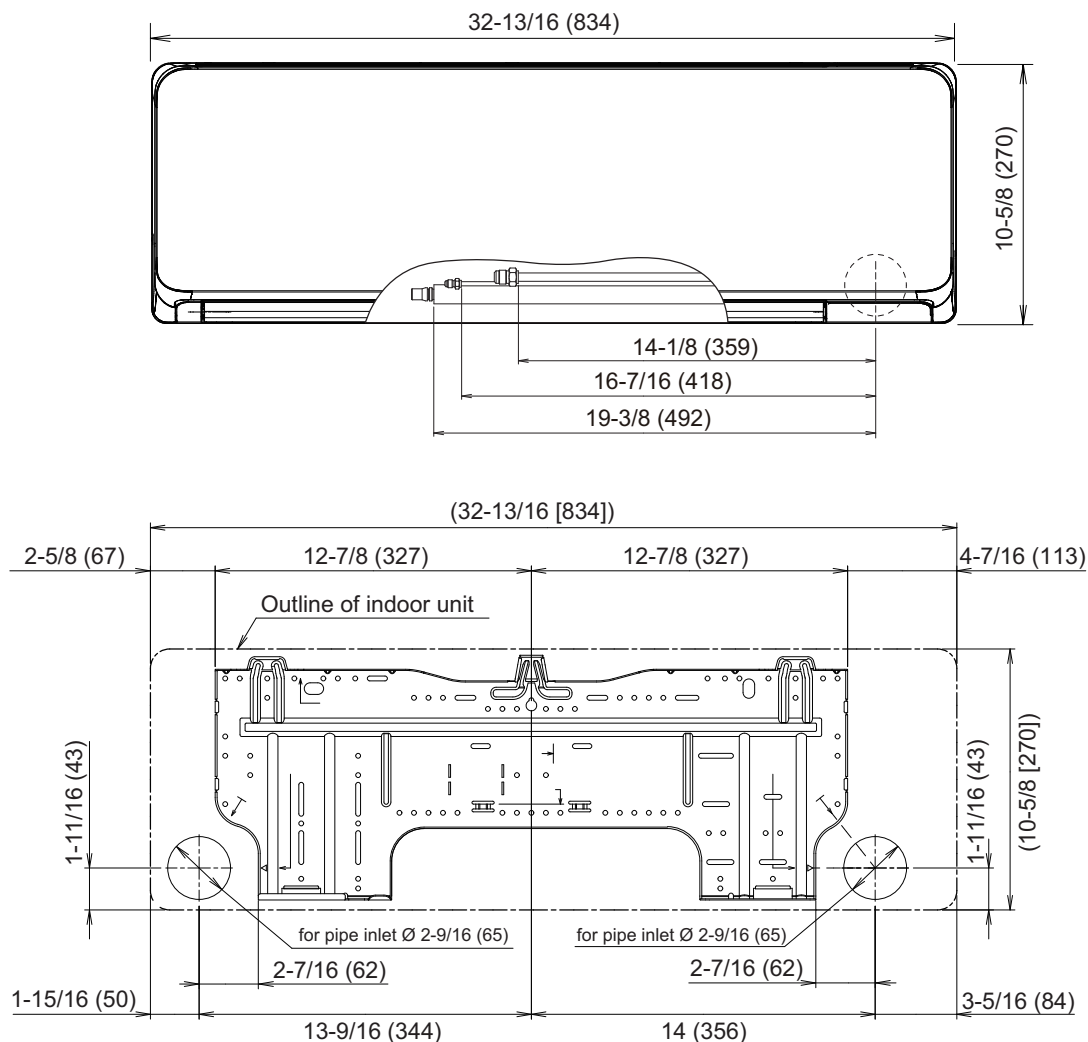
Type			Inverter heat pump		
Model name			AOUH09LMAS1	AOUH12LMAS1	
Power supply			208/230 V~ 60 Hz		
Power supply intake			Outdoor unit		
Available voltage range			187—253 V		
Starting current			A		
			4.0	6.0	
Fan	Airflow rate	Cooling	CFM (m ³ /h)	954 (1,620)	1,065 (1,810)
		Heating			
	Type × Qty	Propeller fan × 1			
Motor output			W	23	
Sound pressure level *1			Cooling	46	49
			Heating	48	51
Heat exchanger type	Dimensions (H × W × D)		in (mm)	Main1: 19-13/16 × 34-15/16 × 11/16 (504 × 888 × 18.19) Main2: 19-13/16 × 20-1/6 × 11/16 (504 × 510 × 18.19)	Main1: 19-13/16 × 34-11/16 × 11/16 (504 × 881 × 18.19) Main2: 19-13/16 × 33-1/2 × 11/16 (504 × 851 × 18.19)
	Fin pitch		FPI	20	
	Rows × Stages	Main1: 1 × 24 Main2: 1 × 24			
	Pipe type	Copper			
	Fin type	Type (Material)	Aluminum		
	Surface treatment	PC fin			
Compressor	Type	DC rotary			
	Motor output	W	900		
Refrigerant	Type	R410A			
	Charge	lb oz	2 lb 2 oz	2 lb 3 oz	
		g	950	1,000	
Refrigerant oil	Type	RB68A			
	Amount	in ³ (cm ³)	20.7 (340)		
Enclosure	Material	Steel sheet			
	Color	Beige Approximate color of Munsell 10YR 7.5/1.0			
Dimensions (H × W × D)	Net	in (mm)			
	Gross	21-5/16 × 31-7/16 × 11-7/16 (542 × 799 × 290) 23-11/16 × 37 × 14-3/4 (602 × 940 × 375)			
Weight	Net	lb (kg)			
	Gross	68 (31) 71 (32) 75 (34) 77(35)			
Connection pipe	Size	Liquid	in (mm)	Ø1/4 (Ø6.35)	
		Gas		Ø3/8 (Ø9.52)	
	Method	Liquid	Flare		
		Gas	Flare		
	Pre-charge length	ft (m)			
	Standard length	49 (15)			
Max. length	25 (7.5)				
Max. height difference	66 (20)				
Operation range	Cooling	14 to 115 (-10 to 46)			
	Heating	5 to 75 (-15 to 24)			
Drain hose	Material	PP			
	Tip diameter	in (mm)	Ø1/2 (Ø13.0) (I.D.), Ø5/8 to 11/16 (Ø16.0 to 16.8) (O.D.)		
NOTES:					
<ul style="list-style-type: none"> Specifications are based on the following conditions: <ul style="list-style-type: none"> Cooling: Indoor temperature of 80°FDB (26.67°CDB) / 67°FWB (19.44°CWB), and outdoor temperature of 95°FDB (35°CDB) / 75°FWB (23.9°CWB). Heating: Indoor temperature of 70°FDB (21.11°CDB) / 60°FWB (15.56°CWB), and outdoor temperature of 47°FDB (8.33°CDB) / 43°FWB (6.11°CWB). Pipe length: 25 ft (7.5 m), Height difference: 0 ft (0 m). (Between outdoor unit and indoor unit) Protective function might work when using it outside the operation range. *1: Sound pressure level <ul style="list-style-type: none"> Measured values in manufacturer's anechoic chamber. Because of the surrounding sound environment, the sound levels measured in actual installation conditions might be higher than the specified values here. 					

2. Dimensions

2-1. Indoor unit

■ Models: ASUH09LMAS and ASUH12LMAS

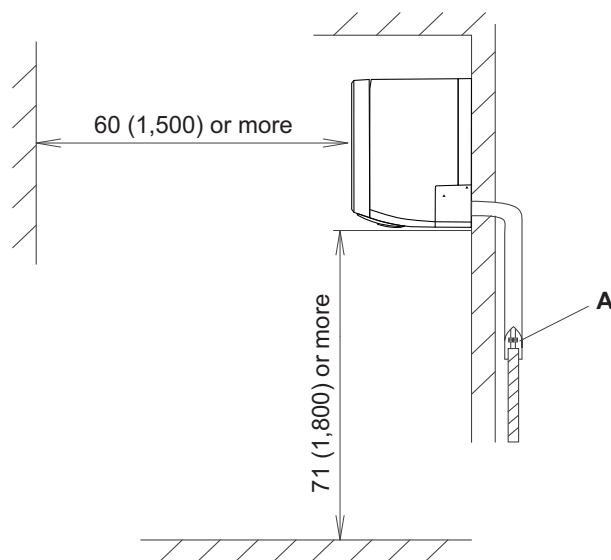
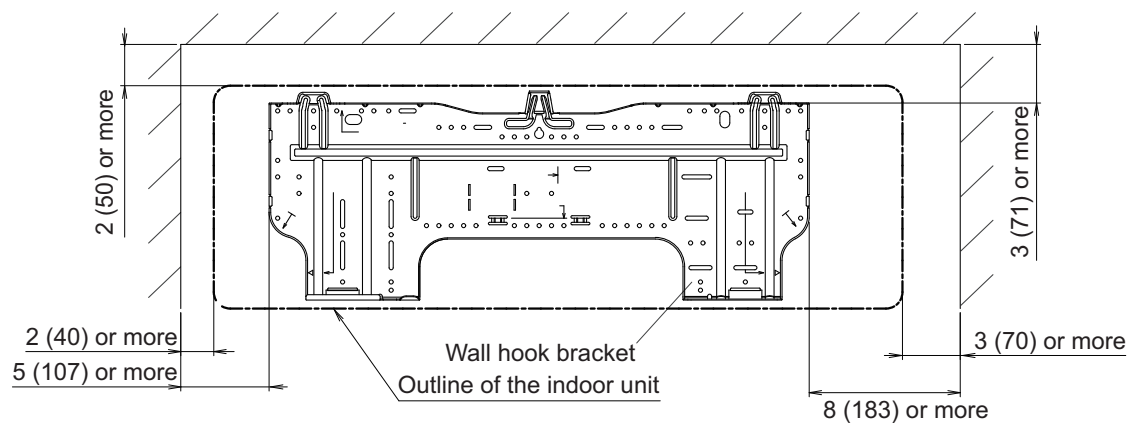
Unit: in (mm)



● Installation space requirement

Provide sufficient installation space for product safety.

Unit: in (mm)

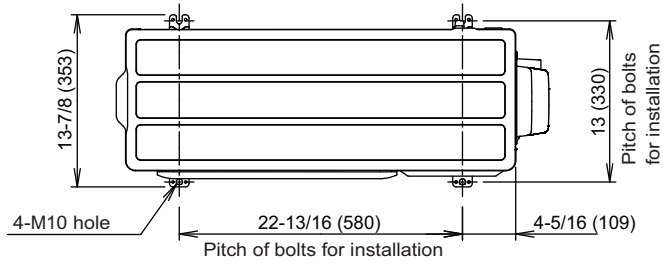


A: Install so that the flare connection part is outdoors.

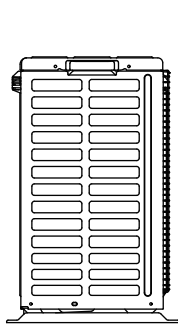
2-2. Outdoor unit

■ Models: AOUH09LMAS1 and AOUH12LMAS1

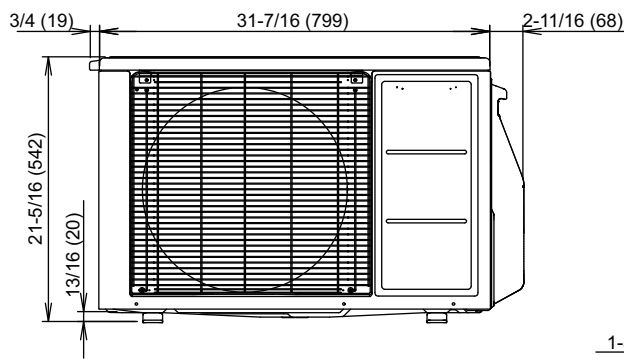
Unit: in (mm)



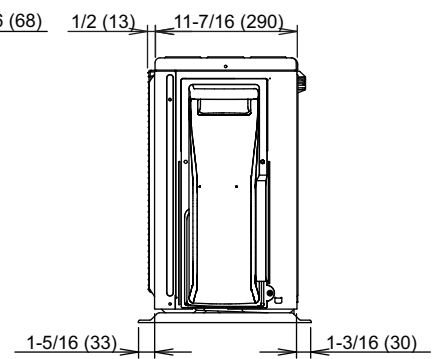
Top view



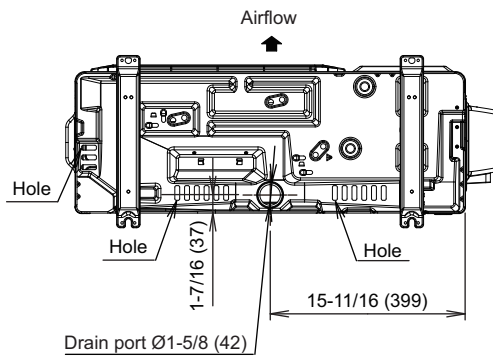
Side view



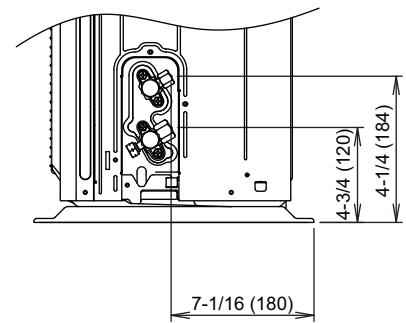
Front view



Side view



Bottom view



Side view (Valve part)

2. TECHNICAL DATA AND PARTS LIST

CONTENTS

2. TECHNICAL DATA AND PARTS LIST

1. Precautions	02-1
2. Indoor unit parts list	02-2
2-1. Models: ASUH09LMAS and ASUH12LMAS.....	02-2
3. Outdoor unit parts list	02-6
3-1. Models: AOUH09LMAS1 and AOUH12LMAS1.....	02-6
4. Accessories	02-10
4-1. Indoor unit	02-10
4-2. Outdoor unit.....	02-10
5. Optional parts	02-11
5-1. Indoor unit	02-11
6. Refrigerant system diagrams	02-13
6-1. Models: AOUH09LMAS1 and AOUH12LMAS1	02-13
7. Wiring diagrams	02-14
7-1. Indoor unit	02-14
7-2. Outdoor unit.....	02-15
8. PC board diagrams	02-16
8-1. Models: ASUH09LMAS and ASUH12LMAS.....	02-16
8-2. Models: AOUH09LMAS1 and AOUH12LMAS1	02-17

1. Precautions

When you start servicing, pay attention to the following points. For detailed precautions, refer to the installation manual of the products.

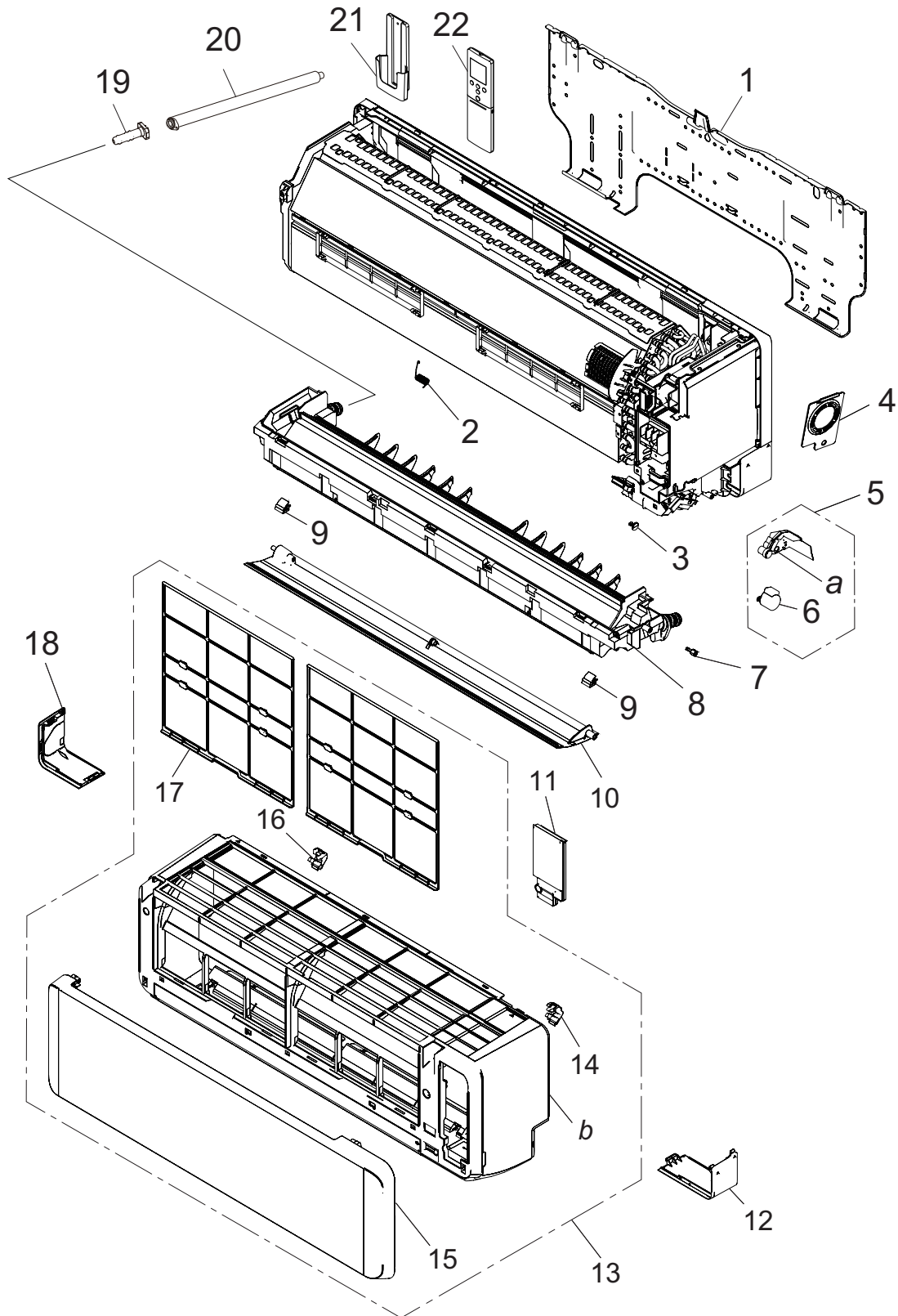
CAUTION

- Service personnel
 - Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with an industry recognized assessment specification.
 - Servicing shall only be performed as recommended by the equipment manufacturer. Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.
 - Servicing shall be performed only as recommended by the manufacturer.
 - Work
 - Work in confined spaces shall be avoided.
 - The area around the workspace shall be sectioned off.
 - Electric shock may occur. After turning off the power, always wait 5 minutes before touching electrical components.
 - Do not touch the fins of the heat exchanger. Touching the heat exchanger fins could result in damage to the fins or personal injury such as skin rupture.
 - Do not place any other electrical products or household belongings under the product.
 - Condensation dripping from the product might get them wet, and may cause damage or malfunction to the property.
-
- Service parts information and design are subject to change without notice for product improvement.
 - For the latest information of the service parts, refer to our Service Portal.
<https://fujitsu-general.force.com/portal/>
 - Precise figure of the service parts listed in this manual may differ from the actual service parts.

2. Indoor unit parts list

2-1. Models: ASUH09LMAS and ASUH12LMAS

■ Exterior parts



TECHNICAL DATA
AND PARTS LIST

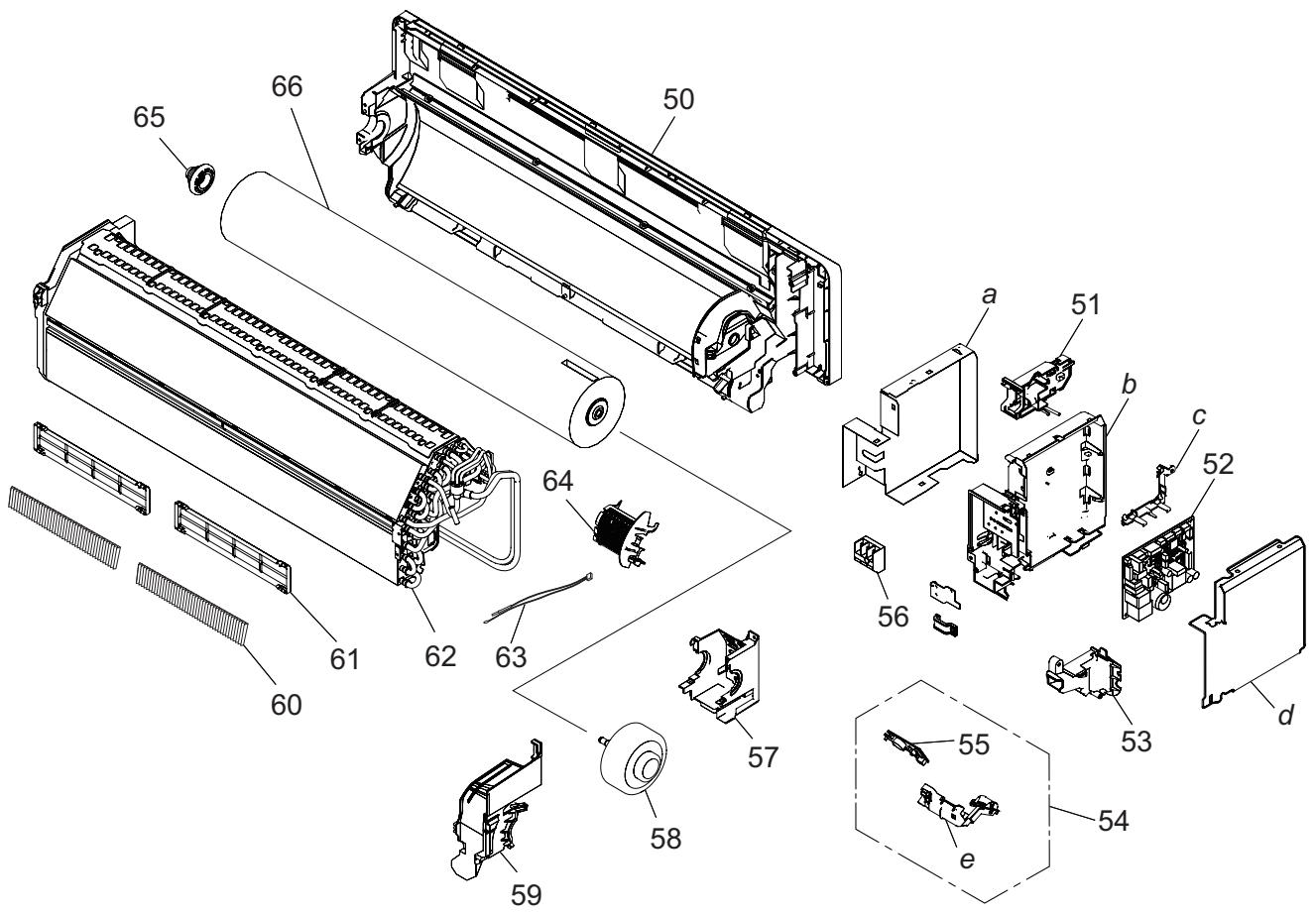
TECHNICAL DATA
AND PARTS LIST

Item no.	Part no.	Part name	Service part
1	9388142005	Bracket panel	◆
2	9387471007	Louver spring	◆
3	9333608006	Bush	◆
4	9313951047	Conduit holder	◆
5	9387714036	Step motor holder assy	◆
6	9901011047	Step motor	◆
7	9332861006	Shaft cover	◆
8	9387590166	Drain pan total assy	◆
9	9387476002	Screw cover	◆
10	9387479003	Horizontal louver assy	◆
11	9387597066	Wire cover assy	◆
12	9387478044	Under cover R	◆
13	9387596984	Front panel total assy	◆
14	9333704005	Grille clamper R	◆
15	9387756227	Intake grill assy	◆
16	9333719009	Grille clamper L	◆
17	9387473001	Air filter	◆
18	9387477047	Under cover L	◆
19	9316177017	Drain cap	◆
20	9316904002	Drain hose assy	◆
21	9318912005	Remote controller holder	◆
22	9332438772	Remote controller	◆
<i>a</i>	—	Step motor holder	—
<i>b</i>	—	Front panel	—

■ Base, evaporator, and control

TECHNICAL DATA
AND PARTS LIST

TECHNICAL DATA
AND PARTS LIST

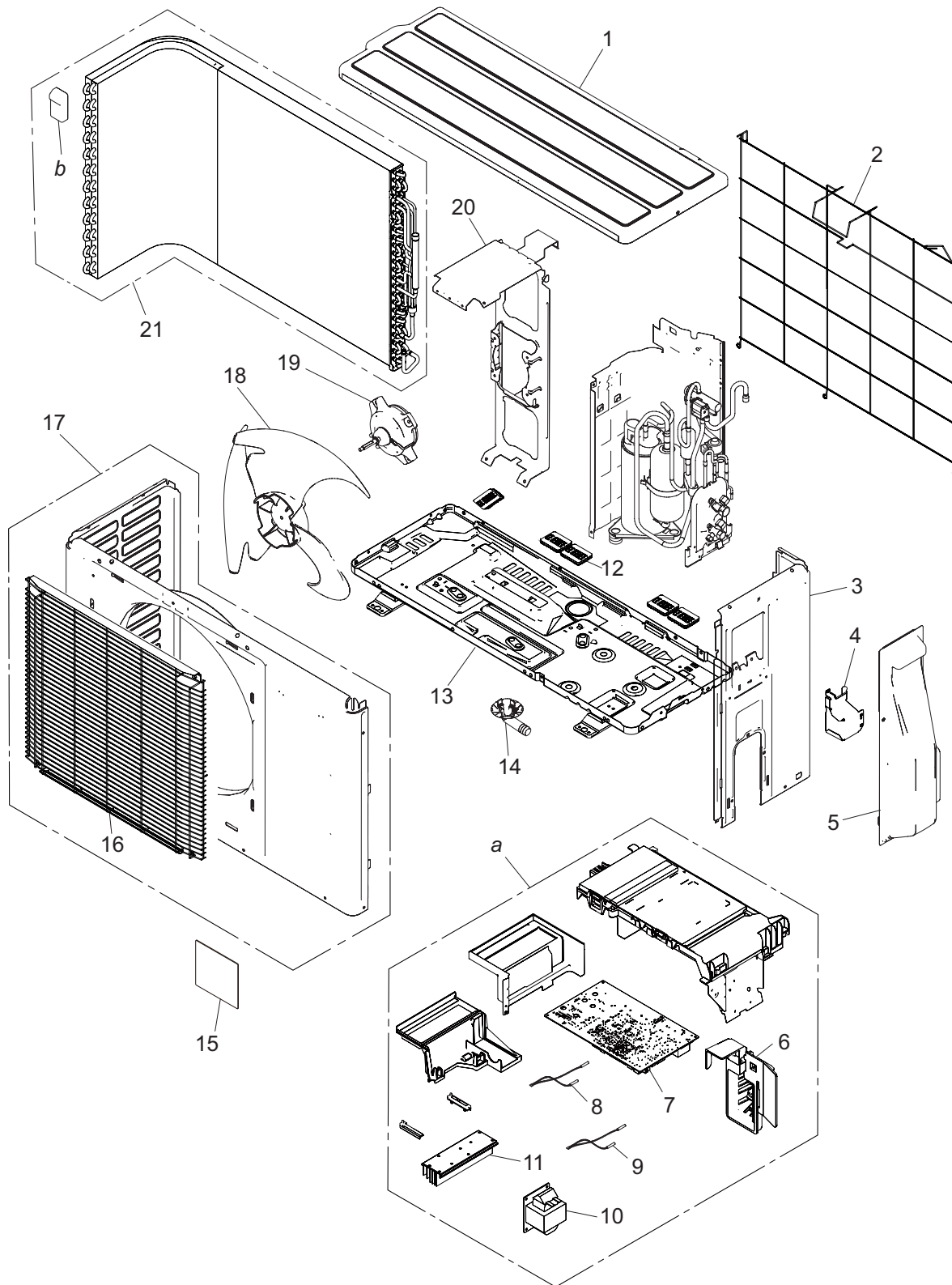


Item no.	Part no.	Part name	Service part
50	9387587128	Base assy	◆
51	9383765056	WLAN adapter holder assy	◆
52	9711732002	Main PCB (For 09 model)	◆
	9711732019	Main PCB (For 12 model)	◆
53	9387488043	Cable guide	◆
54	9711146076	Display assy	◆
55	9711147011	Indicator PCB	◆
56	9901013010	Terminal	◆
57	9384500014	Motor case sub assy	◆
58	9603821012	Brushless motor	◆
59	9387713022	Motor cover assy	◆
60	9317250009	Air clean filter assy	◆
61	9332911008	Electric filter holder	◆
62	9387593396	Evaporator total assy	◆
63	9900627041	Thermistor assy	◆
64	9387467000	Room thermistor holder	◆
65	9333628004	Bearing D assy	◆
66	9387055047	Crossflow fan assy	◆
<i>a</i>	—	Box shield	—
<i>b</i>	—	Control box	—
<i>c</i>	—	PCB holder A	—
<i>d</i>	—	Control cover	—
<i>e</i>	—	Display case assy	—

3. Outdoor unit parts list

3-1. Models: AOUH09LMAS1 and AOUH12LMAS1

■ Exterior parts and Chassis



TECHNICAL DATA
AND PARTS LIST

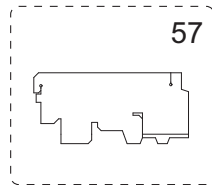
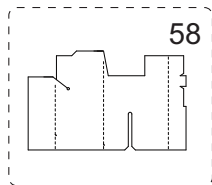
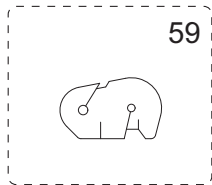
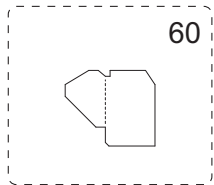
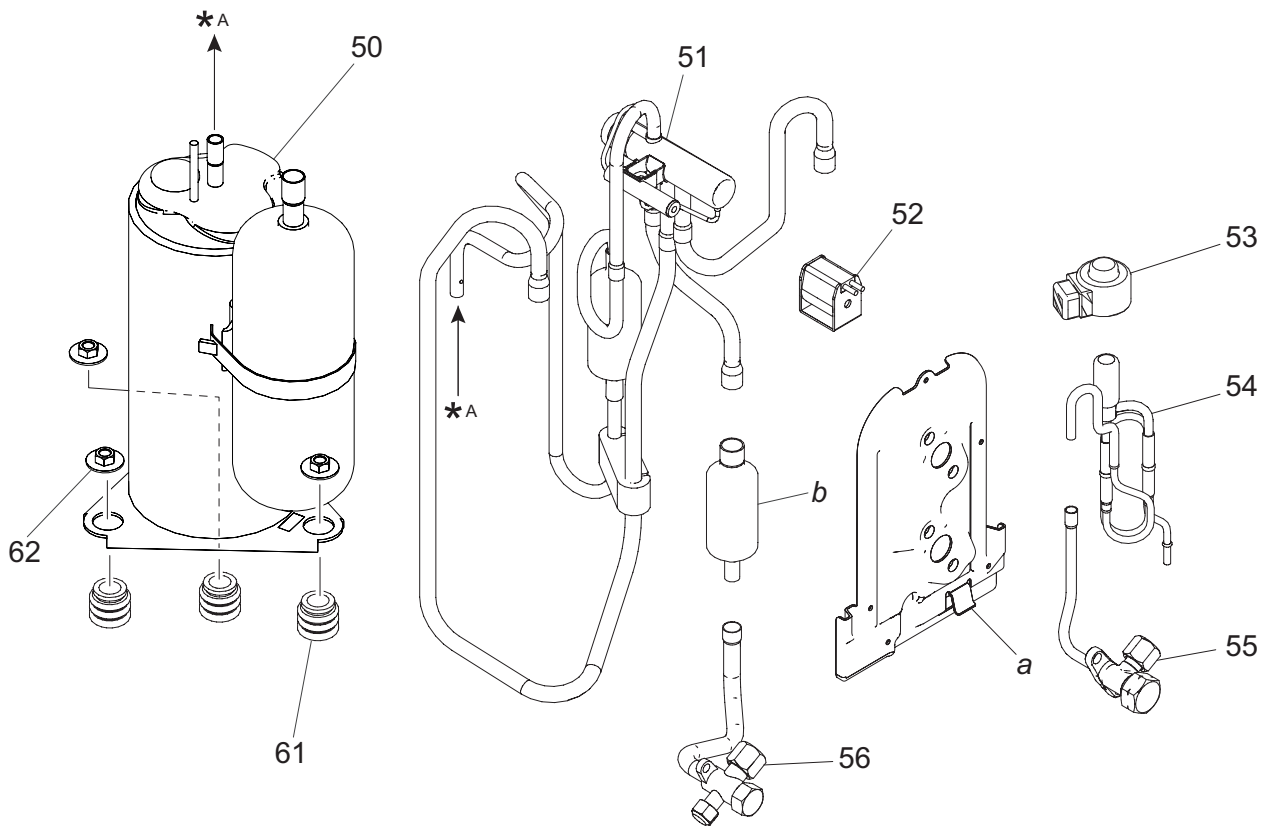
TECHNICAL DATA
AND PARTS LIST

Item no.	Part no.	Part name	Service part
1	9322556028	Top panel assy	◆
2	9377840004	Protective net assy	◆
3	9322552259	Cabinet right assy	◆
4	9384268006	Conduit cover	◆
5	9322570055	Switch cover assy	◆
6	9322138002	Thermistor holder	◆
7	9709686911	Main PCB (Service) (for 09 model)	◆
	9709686928	Main PCB (Service) (for 12 model)	◆
8	9900565060	Thermistor out temp	◆
9	9900727062	Thermistor assy	◆
10	9900583019	Reactor assy	◆
11	9384912008	Heat sink	◆
12	9383720000	Drain cap assy	◆
13	9323550025	Base assy	◆
14	9322144003	Drain pipe	◆
15	9317903011	Emblem	◆
16	9384265005	Fan guard	◆
17	9322555199	Front panel assy (09 model)	◆
	9322555335	Front panel assy (12 model)	◆
18	9322136008	Propeller fan	◆
19	9603553005	Brushless motor	◆
20	9322553010	Motor bracket assy	◆
21	9323834125	Heat exchanger unit (09 model)	◆
	9323834019	Heat exchanger unit (12 model)	◆
a	—	Inverter assy	—
b	—	Hair pin cushion	—

Compressor

TECHNICAL DATA
AND PARTS LIST

TECHNICAL DATA
AND PARTS LIST


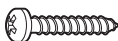


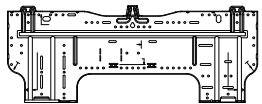




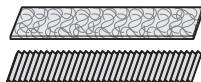



Item no.	Part no.	Part name	Service part
50	9384354006	Compressor assy	◆
51	9322444011	4-way valve assy	◆
52	9970110160	Solenoid	◆
53	9970222016	Expansion valve coil	◆
54	9322463029	Pulse motor valve assy	◆
55	9322474001	2-way valve assy	◆
56	9322475008	3-way valve assy	◆
57	9324024006	S-insulator B	◆
58	9322536020	S-insulator F	◆
59	9322537003	S-insulator H	◆
60	9323045002	S-insulator V	◆
61	9322386007	Cushion rubber	◆
62	9313437008	Nut special assy	◆
a	—	Valve bracket	—
b	—	Muffler	—

4. Accessories




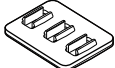
4-1. Indoor unit

■ Models: ASUH09LMAS and ASUH12LMAS

Part name	Exterior	Qty	Part name	Exterior	Qty
Operation manual		1	Tapping screw (large)		5
Installation manual		1	Tapping screw (small)		2
Wall hook bracket		1	Cloth tape		1
Remote controller		1	Filter holder		2
Remote controller holder		1	Air cleaning filters		1
Battery		2			

4-2. Outdoor unit


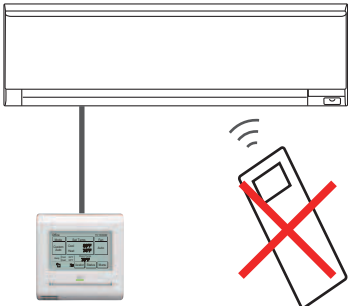
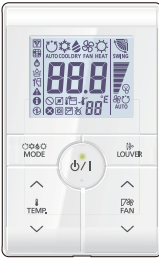
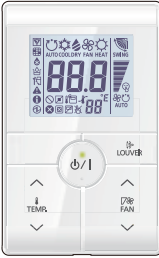
■ Models: AOUH09LMAS1 and AOUH12LMAS1

Part name	Exterior	Qty	Part name	Exterior	Qty
Installation manual		1	Cable tie		2
Drain pipe		1	Drain cap		5

5. Optional parts

5-1. Indoor unit

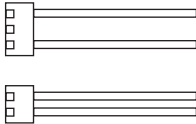


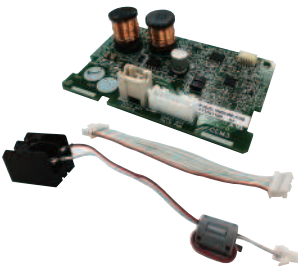


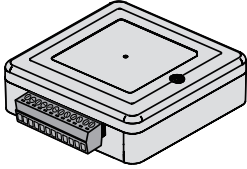

■ Controllers

Exterior	Part name	Model name	Summary
	Wired remote controller	UTY-RNRUZ*	<p>Easy finger touch operation with LCD panel. Backlit LCD enables easy operation in a dark room. Wire type: Non-polar 2-wire Optional communication kit is necessary for installation.</p> <p>NOTE: When this remote controller is connected, wireless remote controller cannot be used.</p>  <p style="text-align: right;">Wireless RC</p>
	Simple remote controller	UTY-RSRY	<p>Compact remote controller concentrates on the basic functions such as Start/Stop, fan control, temperature setting, and operation mode. Wire type: Non-polar 2-wire Optional communication kit is necessary for installation.</p>
	Simple remote controller	UTY-RHRY	<p>Compact remote controller concentrates on the basic functions such as Start/Stop, fan control, and temperature setting. Wire type: Non-polar 2-wire Optional communication kit is necessary for installation.</p>

NOTES:

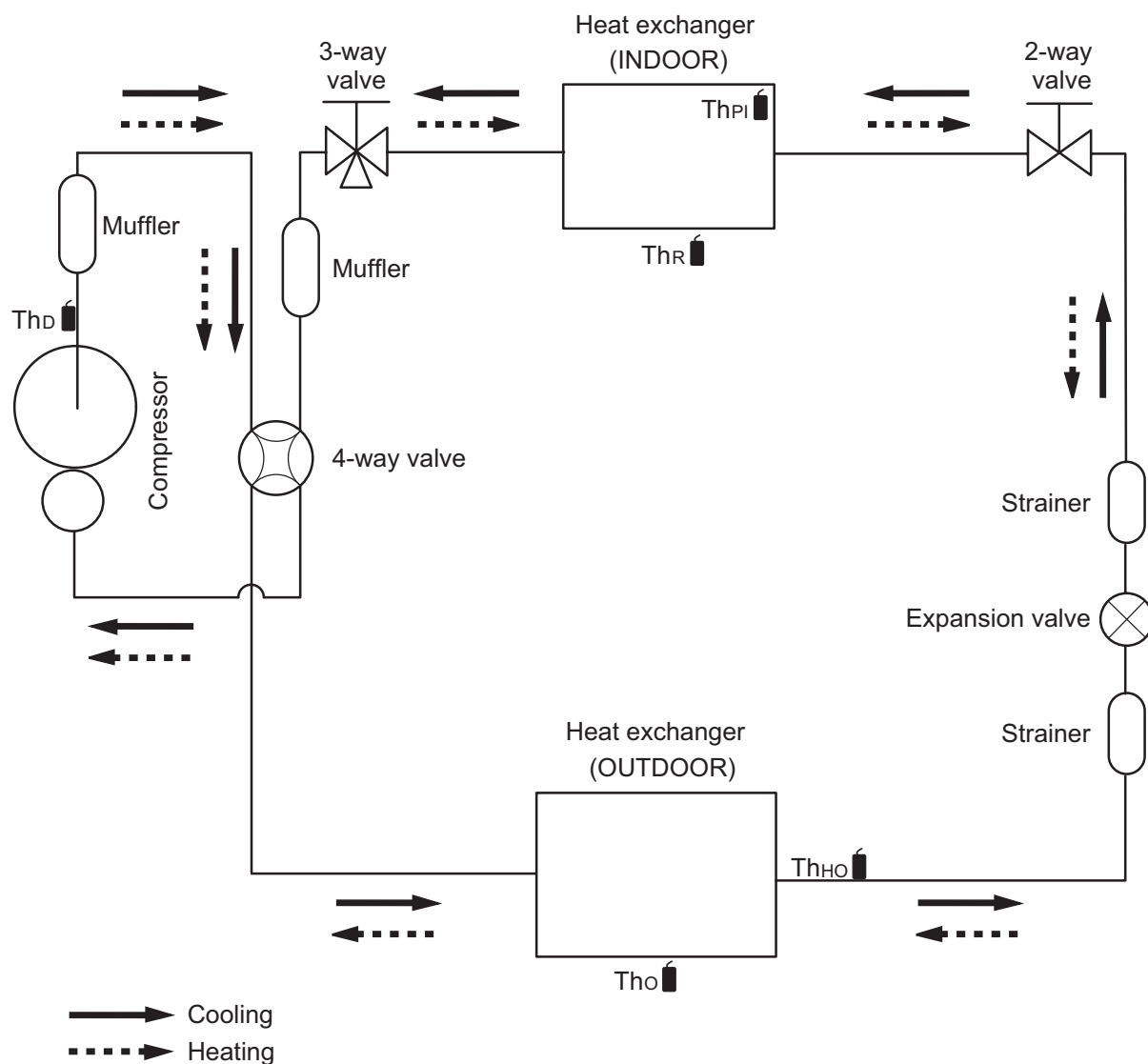
- Available functions may differ by the remote controller. For details, refer to the operation manual.
- When using the group controlling system of the wired remote controller, using Wireless LAN adapter is prohibited.

Others

Exterior	Part name	Model name	Summary
	External Connect Kit	UTY-XWZX	Use to connect with various peripheral devices and air conditioner PCB.
	External Connect Kit	UTY-XWZXZ5	Required when external device is connected.
	External Input and Output PCB	UTY-XCSXZ2	Use to connect with external devices and air conditioner PCB. Optional External Connect Kit is necessary for installation.
	Communication Kit	UTY-TWRXZ2	Use to connect Non-polar 2-core wired remote controller.
	Wireless LAN adapter	UTY-TFSXF1	Remotely manage an air conditioning system using mobile devices such as smartphones and tablets. Appropriate application for each region is required to use this option. For details, contact FGL sales company.
	Modbus Converter	UTY-VMSX	For connection between indoor unit with UART interface and a Modbus open network.
	Thermostat Converter	UTY-TTRX	This converter can control Fujitsu General products using a third-party thermostat controller.
	Network Converter	UTY-VTGX	This converter is required when connecting single split system to VRF network system.

6. Refrigerant system diagrams

6-1. Models: AOUH09LMAS1 and AOUH12LMAS1



Th_D : Thermistor (Discharge temperature)

Th_O : Thermistor (Outdoor temperature)

Th_{HO} : Thermistor (Heat exchanger out temperature)

Th_{PI} : Thermistor (Pipe temperature)

Th_R : Thermistor (Room temperature)

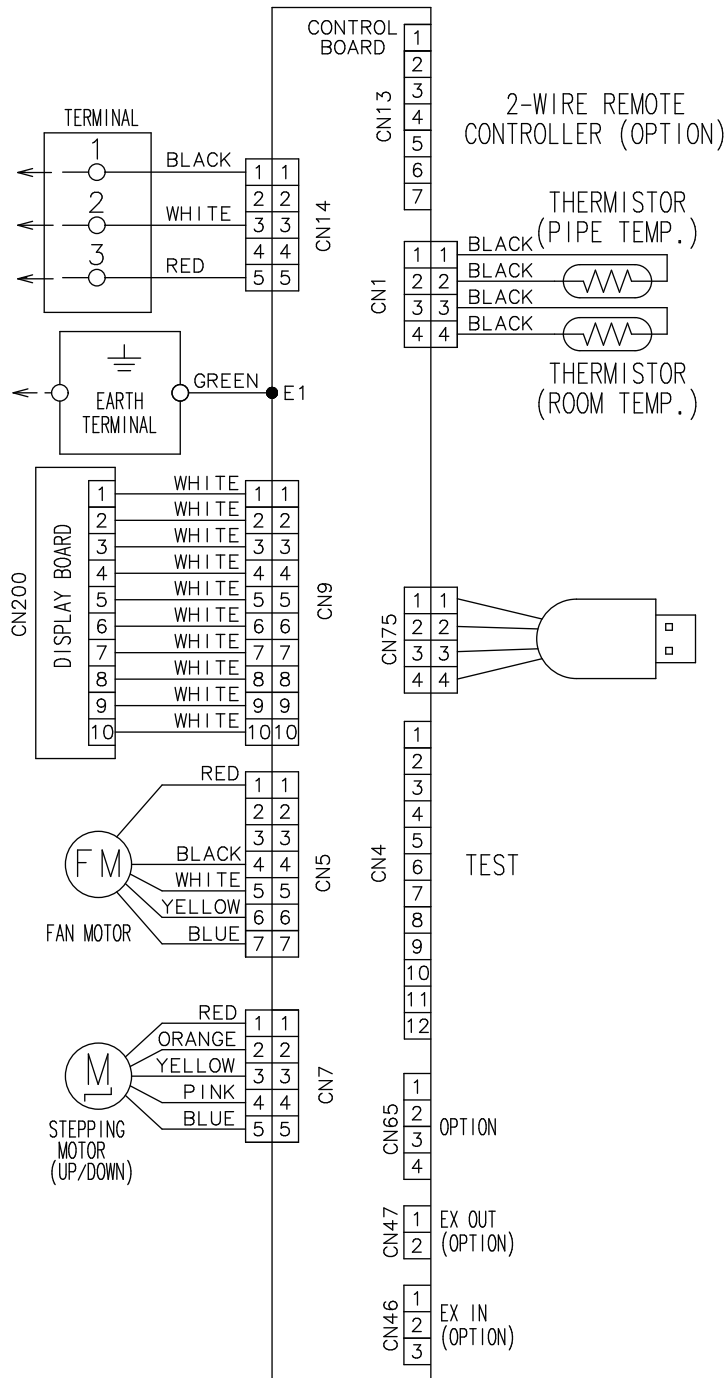
7. Wiring diagrams

7-1. Indoor unit

Models: ASUH09LMAS and ASUH12LMAS

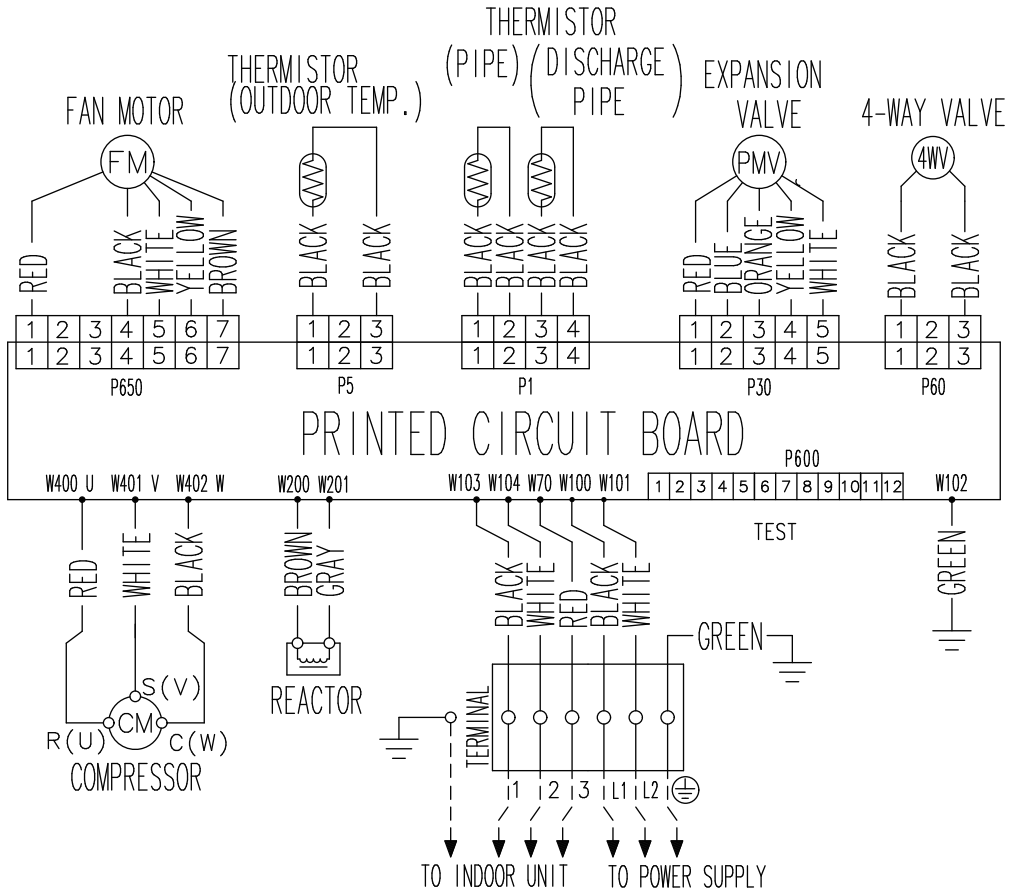
TECHNICAL DATA
AND PARTS LIST

TECHNICAL DATA
AND PARTS LIST



7-2. Outdoor unit

Models: AOUH09LMA51 and AOUH12LMA51



TECHNICAL DATA
AND PARTS LIST

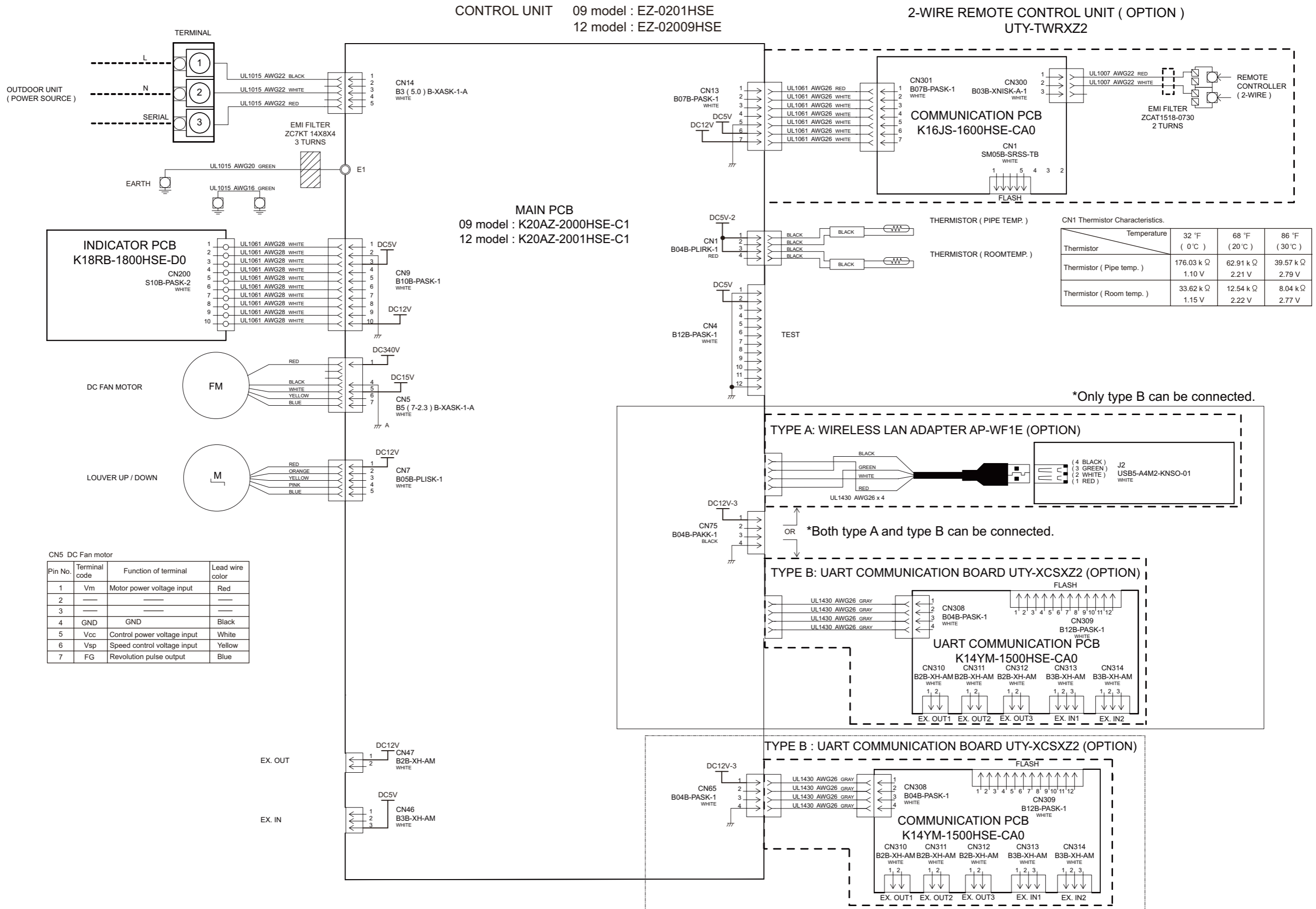
TECHNICAL DATA
AND PARTS LIST

8. PC board diagrams

8-1. Models: ASUH09LMAS and ASUH12LMAS

TECHNICAL DATA AND PARTS LIST

TECHNICAL DATA AND PARTS LIST

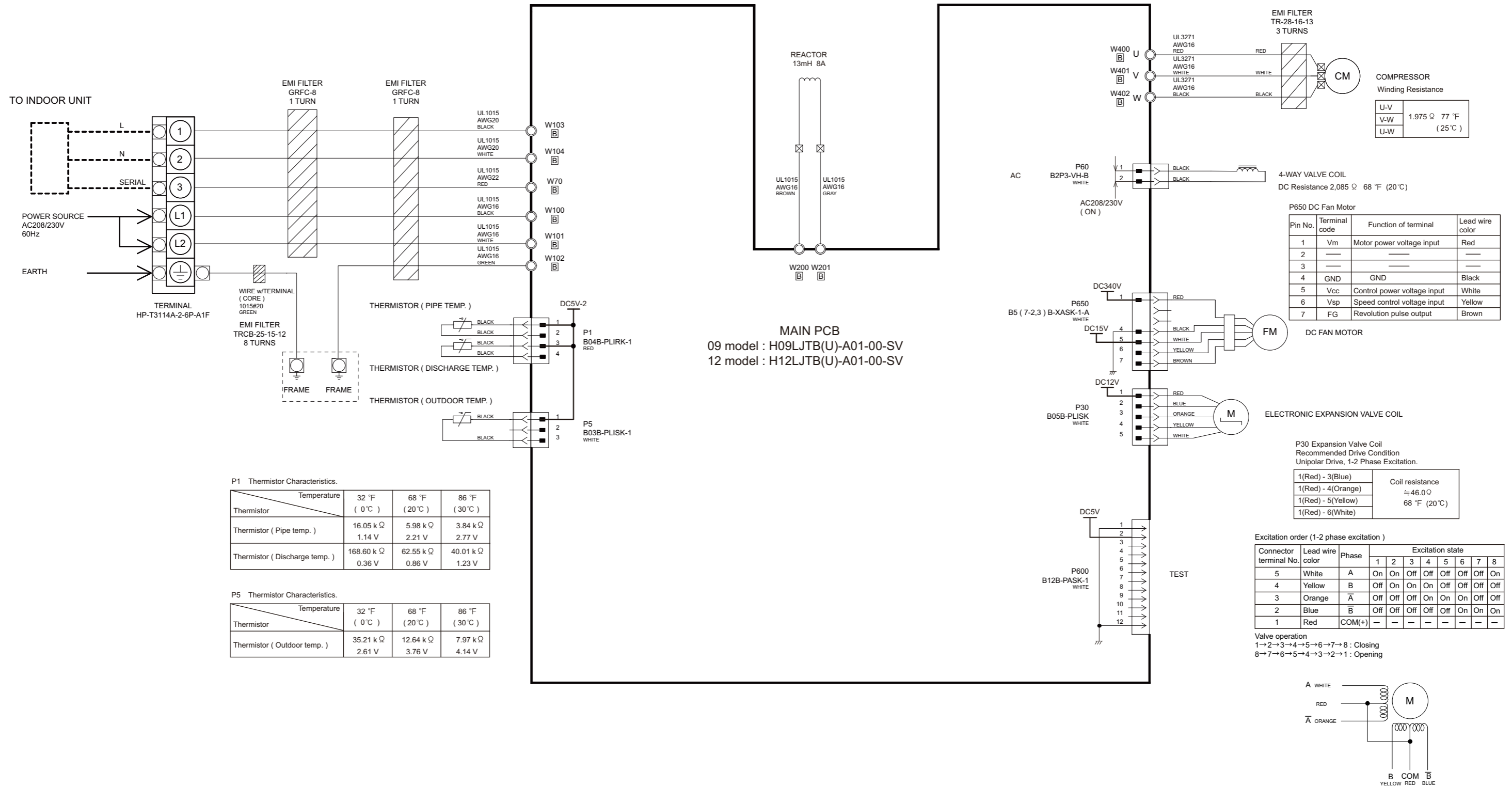


8-2. Models: AOUH09LMAS1 and AOUH12LMAS1

INVERTER ASSEMBLY 09, 12 models : EZ-020FHUE

TECHNICAL DATA
AND PARTS LIST

TECHNICAL DATA
AND PARTS LIST



3. TROUBLESHOOTING

CONTENTS

3. TROUBLESHOOTING

1. Error code	03-1
1-1. How to check the error memory.....	03-1
1-2. How to erase the error memory	03-1
1-3. Error code table (Indoor unit and wired remote controller).....	03-2
2. Troubleshooting with error code	03-3
2-1. E: 11.X. Serial communication error (Serial reverse transfer error) (Outdoor unit)	03-3
2-2. E: 11.X. Serial communication error (Serial forward transfer error) (Indoor unit)	03-5
2-3. E: 12.X. Wired remote controller communication error (Indoor unit)	03-7
2-4. E: 18.X. External communication error (Indoor unit)	03-8
2-5. E: 32.X. Indoor unit main PCB error (Indoor unit)	03-9
2-6. E: 35.X. MANUAL AUTO button error (Indoor unit)	03-10
2-7. E: 41.X. Room temperature sensor error (Indoor unit).....	03-11
2-8. E: 42.X. Indoor unit heat exchanger sensor error (Indoor unit).....	03-12
2-9. E: 51.X. Indoor unit fan motor error (Indoor unit)	03-13
2-10. E: 62.X. Outdoor unit main PCB error (Outdoor unit).....	03-14
2-11. E: 64.X. PFC circuit error (Outdoor unit).....	03-15
2-12. E: 71.X. Discharge thermistor error (Outdoor unit)	03-16
2-13. E: 73.X. Outdoor unit heat exchanger thermistor error (Outdoor unit)	03-17
2-14. E: 74.X. Outdoor temperature thermistor error (Outdoor unit)	03-18
2-15. E: 84.X. Current sensor error (Outdoor unit).....	03-19
2-16. E: 94.X. Trip detection (Outdoor unit)	03-20
2-17. E: 95.X. Compressor motor control error (Outdoor unit).....	03-21
2-18. E: 97.X. Outdoor unit fan motor error (Outdoor unit).....	03-22
2-19. E: 99.X. 4-way valve error (Outdoor unit)	03-23
2-20. E: A1.X. Discharge temperature error (Outdoor unit).....	03-25
3. Troubleshooting without error code	03-27
3-1. Indoor unit—No power.....	03-27
3-2. Outdoor unit—No power	03-28
3-3. No operation (Power is on).....	03-29
3-4. No cooling/No heating	03-30
3-5. Abnormal noise.....	03-32
3-6. Water leaking.....	03-33
4. Service parts information	03-34
4-1. Compressor.....	03-34
4-2. Inverter compressor.....	03-35
4-3. Outdoor unit Electronic Expansion Valve (EEV)	03-36
4-4. Indoor unit fan motor	03-38
4-5. Outdoor unit fan motor.....	03-39
5. Thermistor resistance values	03-40
5-1. Indoor unit	03-40
5-2. Outdoor unit.....	03-41

1. Error code

When a problem occurs in the system or the connected device, the error content is notified by displaying the code.

NOTE: This function is only available in a system with indoor or IR receiver units equipped with indicator lamps to show the error content.

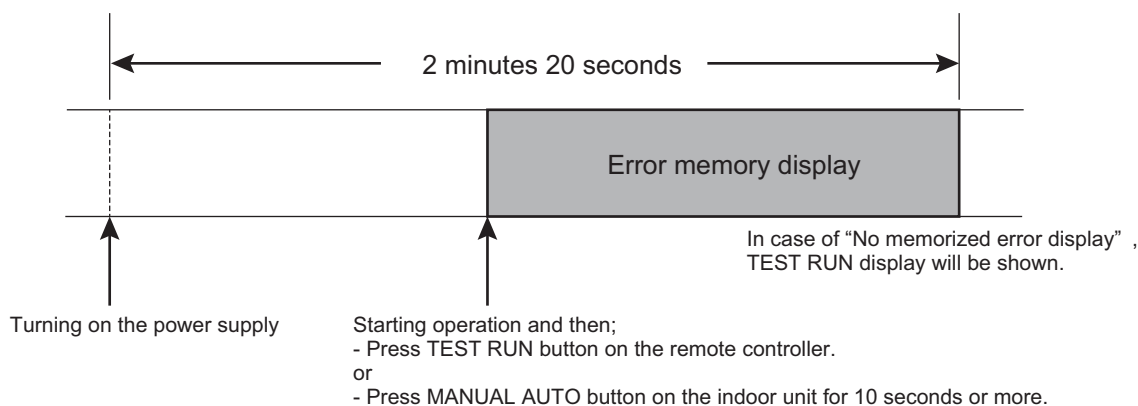
Errors, once displayed, will be automatically stored in the PC board of the indoor unit. Even if the power is disconnected, the memory containing the error history will not be erased.

If another error occurs later, the stored error memory will be updated automatically and replaced with the new one. (Previous error will be erased.)

1-1. How to check the error memory

When an error occurs, the operation lamp (Green) and the timer lamp (Orange) indicate the error content by blinking. To check the error memory, follow the procedures below.

1. Stop the operation of the air conditioner, and then disconnect the power supply.
2. Reconnect the power supply.
3. In one of the following two methods, the memorized error is only displayed during the “3 minutes ST”^{*} state period.
 - Start the operation and then press the TEST RUN button on the remote controller.
 - Press the MANUAL AUTO button on the indoor unit for 10 seconds or more.



*: The “3 minutes ST” period lasts 2 minutes and 20 seconds after turning on the power supply.

1-2. How to erase the error memory

The error memory can be erased in one of the following two methods.

- Manual erase: Pressing the MANUAL AUTO button on the indoor unit while the “Error memory display” is being shown. (Short beep emits for about 3 seconds.)
- Automatic erase: After continuing the normal operation of the air conditioner without error for 2 hours or longer after displaying the error memory as described in [How to check the error memory](#). (Except FAN operation mode.)

1-3. Error code table (Indoor unit and wired remote controller)

The operation, timer, and economy indicators operate according to the error contents.

For confirmation of the error contents, refer the flashing pattern as follows.

Error contents	Indoor unit display			Wired remote controller display
	Operation [■] (Green)	Timer [⌚] (Orange)	Economy [⌚] (Green)	
E: 11.X. Serial communication error (Serial reverse transfer error) (Outdoor unit)	1 times	1 times	Continuous	11
E: 11.X. Serial communication error (Serial forward transfer error) (Indoor unit)	1 times	1 times	Continuous	11
E: 12.X. Wired remote controller communication error (Indoor unit)	1 times	2 times	Continuous	12
E: 18.X. External communication error (Indoor unit)	1 times	8 times	Continuous	18
E: 32.X. Indoor unit main PCB error (Indoor unit)	3 times	2 times	Continuous	32
E: 35.X. MANUAL AUTO button error (Indoor unit)	3 times	5 times	Continuous	35
E: 41.X. Room temperature sensor error (Indoor unit)	4 times	1 times	Continuous	41
E: 42.X. Indoor unit heat exchanger sensor error (Indoor unit)	4 times	2 times	Continuous	42
E: 51.X. Indoor unit fan motor error (Indoor unit)	5 times	1 times	Continuous	51
E: 62.X. Outdoor unit main PCB error (Outdoor unit)	6 times	2 times	Continuous	62
E: 64.X. PFC circuit error (Outdoor unit)	6 times	4 times	Continuous	64
E: 71.X. Discharge thermistor error (Outdoor unit)	7 times	1 times	Continuous	71
E: 73.X. Outdoor unit heat exchanger thermistor error (Outdoor unit)	7 times	3 times	Continuous	73
E: 74.X. Outdoor temperature thermistor error (Outdoor unit)	7 times	4 times	Continuous	74
E: 84.X. Current sensor error (Outdoor unit)	8 times	4 times	Continuous	84
E: 94.X. Trip detection (Outdoor unit)	9 times	4 times	Continuous	94
E: 95.X. Compressor motor control error (Outdoor unit)	9 times	5 times	Continuous	95
E: 97.X. Outdoor unit fan motor error (Outdoor unit)	9 times	7 times	Continuous	97
E: 99.X. 4-way valve error (Outdoor unit)	9 times	9 times	Continuous	99
E: A1.X. Discharge temperature error (Outdoor unit)	10 times	1 times	Continuous	A1

2. Troubleshooting with error code

2-1. E: 11.X. Serial communication error (Serial reverse transfer error) (Outdoor unit)

Indicator	Indoor unit	Operation indicator	1 time flash
		Timer indicator	1 time flash
		Economy indicator	Continuous flash
		Error code	E: 11
Detective actuator	Outdoor unit	Main PCB	When the indoor unit cannot receive the serial signal from outdoor unit more than 2 minutes after power on, or the indoor unit cannot receive the serial signal more than 15 seconds during normal operation.
		Fan motor	
Forecast of cause		Connection failure	
		External cause	
		Main PCB failure	
		Outdoor unit fan motor failure	

Check point 1. Reset the power and operate

Does error indication show again?

→ If no, go to "Check point 1-2".



Check point 2. Check connection

Check any loose or removed connection line of indoor unit and outdoor unit.

Check connection condition is control unit. (If there is loose connector, open cable or mis-wiring.)

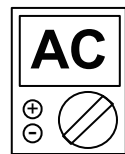
→ If there is an abnormal condition, correct it by referring to the installation manual or the "DESIGN & TECHNICAL MANUAL".



Check point 3. Check the voltage of power supply

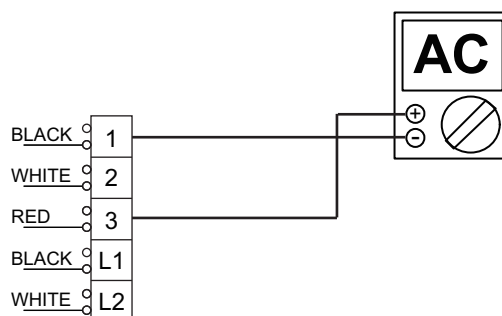
Check the voltage of power supply

Check if AC 187 V (AC 208 V -10%) to AC 253 V (AC 230 V +10%) appears at outdoor unit terminal L1 - L2.



Check point 4. Check serial signal (Reverse transfer signal)

Check serial signal (Reverse transfer signal)



- Check if indicated value swings between AC 90 V and AC 270 V at the outdoor unit terminal 1—3.
- If it is abnormal, check the parts below.
 - Outdoor unit fan motor in "[Service parts information](#)" on page 03-34
- If outdoor fan motor is abnormal, replace outdoor unit fan motor and main PCB.
- If the checked parts are normal, replace the main PCB.



End

Check point 1-2. Check external cause such as noise

- Check the complete insulation of the grounding.
- Check if there is any equipment that causes harmonic wave near the power cable (Neon light bulb or any electronic equipment which causes harmonic wave).



End

2-2. E: 11.X. Serial communication error (Serial forward transfer error) (Indoor unit)

Indicator	Indoor unit	Operation indicator	1 time flash
		Timer indicator	1 time flash
		Economy indicator	Continuous flash
		Error code	E: 11
Detective actuator	Indoor unit	Main PCB	When the indoor unit cannot receive the serial signal from outdoor unit more than 2 minutes after power on, or the indoor unit cannot receive the serial signal more than 15 seconds during normal operation.
		Fan motor	
Forecast of cause		Connection failure	
		External cause	
		Main PCB failure	
		Indoor unit fan motor failure	

Check point 1. Reset the power and operate

Does error indication show again?

→ If no, go to "Check point 1-2".



Check point 2. Check connection

Check any loose or removed connection line of indoor unit and outdoor unit.

Check connection condition is control unit. (If there is loose connector, open cable or mis-wiring.)

→ If there is an abnormal condition, correct it by referring to the installation manual or the *DESIGN & TECHNICAL MANUAL*.



Check point 3. Check the voltage of power supply

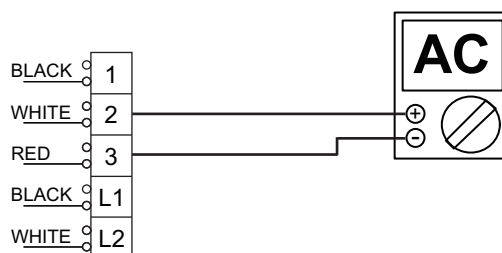
Check the voltage of power supply

Check if AC 187 V (AC 208 V -10%) to AC 253 V (AC 230 V +10%) appears at outdoor unit terminal L—N.



Check point 4. Check serial signal (reverse transfer signal)

Check serial signal (Forward transfer signal)



- Check if indicated value swings between AC 30 V and AC 130 V at outdoor unit terminal 2—3.
- If it is abnormal, replace main PCB.
- If it is abnormal, check indoor unit fan motor. (Indoor unit fan motor in "[Service parts information](#)" on page 03-34)
- If indoor unit fan motor is abnormal, replace indoor unit fan motor and main PCB.



End

Check point 1-2. Check external cause such as noise

- Check the complete insulation of the grounding.
- Check if there is any equipment that causes harmonic wave near the power cable (Neon light bulb or any electronic equipment which causes harmonic wave).



End

2-3. E: 12.X. Wired remote controller communication error (Indoor unit)

Indicator	Indoor unit	Operation indicator	1 time flash
		Timer indicator	2 time flash
		Economy indicator	Continuous flash
		Error code	E: 12
Detective actuator	Indoor unit	Main PCB	When the indoor unit cannot receive the signal from Wired remote controller more than 1 minute during normal operation.
	Wired remote control		
Forecast of cause			Terminal connection abnormal
			Wired remote control failure
			Main PCB failure

Check point 1. Check the connection of terminal

After turning off the power, check & correct the followings.

- Check the connection of terminal between remote controller and indoor unit, and check if there is a disconnection of the cable.



Check point 2. Check connection

Check voltage at CN305 (terminal 1—3) of UTY-XCBXZ1 (Communication kit). (Power supply to the remote controller)



Upon correcting the removed connector or mis-wiring, reset the power.

- If it is DC 13 V, remote controller is failure. (Main PCB is normal)
 - Replace Remote Control
- If it is DC 0 V, main PCB is failure. (Check remote controller once again)
 - Replace main PCB



End

2-4. E: 18.X. External communication error (Indoor unit)

Indicator	Indoor unit	Operation indicator	1 time flash
		Timer indicator	8 time flash
		Economy indicator	Continuous flash
		Error code	E: 18
Detective actuator	Indoor unit	External communication error	After receiving a signal from the external input and output PCB, the same signal has not been received for 15 seconds.
Forecast of cause			Connection failure
			WLAN adapter failure
			Main PCB

Check point 1. Check the connection

- Check any loose or removed connection between the main PCB to the WAN adapter.
-> If there is an abnormal condition, correct it by refer to the installation manual or the "DESIGN & TECHNICAL MANUAL".
- Check the connection condition on the WLAN adapter and the main PCB (If there is loose connector, open cable or mis-wiring.)



Check point 2. Replace the WLAN adapter

If check point 1 do not improve the symptom, change WLAN adapter.



Check point 3. Replace main PCB

If check point 2 do not improve the symptom, change main PCB



End

2-5. E: 32.X. Indoor unit main PCB error (Indoor unit)

Indicator	Indoor unit	Operation indicator	3 time flash
		Timer indicator	2 time flash
		Economy indicator	Continuous flash
		Error code	E: 32
Detective actuator	Indoor unit	main PCB	When power is on and there is some below case. 1. When model information of EEPROM is incorrect. 2. When the access to EEPROM failed.
Forecast of cause			External cause
			Defective connection of electric components
			Main PCB failure

Check point 1. Reset power supply and operate

Does error indication show again?

→ If no, go to "Check point 1-2".



Check point 2. Check Indoor unit electric components

- Check all connectors. (loose connector or incorrect wiring)
- Check any shortage or corrosion on PCB.



Check point 3. Replace main PCB

Change main PCB.



End

Check point 1-2. Check external cause such as noise

- Check if the ground connection is proper.
- Check if there is any equipment that causes harmonic wave near the power cable (Neon light bulb or any electronic equipment which causes harmonic wave).



End

NOTE: EEPROM

EEPROM (Electrically Erasable and Programmable Read Only Memory) is a non-volatile memory which keeps memorized information even if the power is turned off. It can change the contents electronically. To change the contents, it uses higher voltage than normal, and it cannot change a partial contents. (Rewriting shall be done upon erasing the all contents.) There is a limit in a number of rewriting.

2-6. E: 35.X. MANUAL AUTO button error (Indoor unit)

Indicator	Indoor unit	Operation indicator	3 time flash
		Timer indicator	5 time flash
		Economy indicator	Continuous flash
		Error code	E: 35
Detective actuator	Indoor unit controller PCB	When the MANUAL AUTO button becomes on for consecutive 30 or more seconds.	
	Indicator PCB		
	Manual auto switch		
Forecast of cause		MANUAL AUTO button failure	
		Controller PCB and indicator PCB failure	

Check point 1. Check the MANUAL AUTO button

- Check if MANUAL AUTO button is kept pressed.
- Check On/Off switching operation by using a meter.



If MANUAL AUTO button is disabled (on/off switching), replace it.



Check point 2. Replace main PCB and indicator PCB

If Check Point 1 does not improve the symptom, change main PCB and indicator PCB.



End

2-7. E: 41.X. Room temperature sensor error (Indoor unit)

Indicator	Indoor unit	Operation indicator	4 time flash
		Timer indicator	1 time flash
		Economy indicator	Continuous flash
		Error code	E: 41
Detective actuator	Indoor unit main PCB	Room temperature thermistor is open or short is detected always.	
	Room temperature thermistor		
Forecast of cause		Connector failure	
		Thermistor failure	
		Main PCB failure	

Check point 1. Check connection of connector

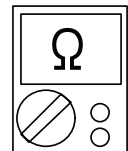
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

-> Reset power when reinstalling due to removed connector or incorrect wiring.



Check point 2. Remove connector and check thermistor resistance value

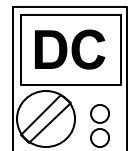
- For the room thermistor resistance value, refer to "[Thermistor resistance values](#)" on page 03-40.
- If thermistor is either open or shorted, replace it and reset the power.



Check point 3. Check voltage of main PCB

Make sure circuit diagram of each indoor unit and check terminal voltage at thermistor (DC 5.0 V).

NOTE: For details of thermistor connector, refer to "[Wiring diagrams](#)" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-14.



If the voltage does not appear, replace main PCB.



End

2-8. E: 42.X. Indoor unit heat exchanger sensor error (Indoor unit)

Indicator	Indoor unit	Operation indicator	4 time flash
		Timer indicator	2 time flash
		Economy indicator	Continuous flash
		Error code	E: 42
Detective actuator	Indoor unit main PCB	When heat exchanger temperature thermistor open or short circuit is detected.	
	Heat exchanger temperature thermistor		
Forecast of cause			Connector connection failure
			Thermistor failure
			Main PCB failure

Check point 1. Check connection of connector

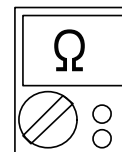
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

-> Reset power when reinstalling due to removed connector or incorrect wiring.



Check point 2. Remove connector and check thermistor resistance value

- For the heat exchanger thermistor resistance value, refer to "[Thermistor resistance values](#)" on page 03-40.
- If thermistor is either open or shorted, replace it and reset the power.



Check point 3. Check voltage of main PCB

Make sure circuit diagram of each indoor unit and check terminal voltage at thermistor (DC 5.0 V).

NOTE: For details of thermistor connector, refer to "[Wiring diagrams](#)" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-14.



If the voltage does not appear, replace main PCB.



End

2-9. E: 51.X. Indoor unit fan motor error (Indoor unit)

Indicator	Indoor unit	Operation indicator	5 time flash
		Timer indicator	1 time flash
		Economy indicator	Continuous flash
		Error code	E: 51
Detective actuator	Indoor unit	main PCB	When the actual rotation number of the indoor unit fan motor is below 1/3 of the target rotation number continuously for more than 56 seconds.
		Fan motor	
Forecast of cause		Fan rotation failure	
		Fan motor winding open	
		Motor protection by surrounding temperature rise	
		Control PCB failure	
		Indoor unit fan motor failure	

Check point 1. Check rotation of fan

Rotate the fan by hand when operation is off. (Check if fan is caught, dropped off or locked motor)
→ If fan or bearing is abnormal, replace it.



Check point 2. Check ambient temperature around motor

Check excessively high temperature around the motor. (If there is any surrounding equipment that causes heat)
→ Upon the temperature coming down, restart operation.



Check point 3. Check indoor unit fan motor

Check Indoor unit fan motor. (Refer to indoor unit fan motor in "[Service parts information](#)" on page 03-34.)
→ If Indoor unit fan motor is abnormal, replace Indoor unit fan motor.



Check point 4. Replace main PCB

If Check Point 1 to 3 do not improve the symptom, replace main PCB.



End

2-10. E: 62.X. Outdoor unit main PCB error (Outdoor unit)

Indicator	Indoor unit	Operation indicator	6 time flash
		Timer indicator	2 time flash
		Economy indicator	Continuous flash
		Error code	E: 62
Detective actuator	Outdoor unit	Main PCB	Access to EEPROM failed due to some cause after outdoor unit started.
Forecast of cause			External cause (Noise, temporary open, voltage drop)
			Main PCB failure

Check point 1. Reset power supply and operate

Does error indication show again?

If no, go to "Check point 1-2".



Check point 2. Replace main PCB

Change main PCB.



End

Check point 1-2. Check external cause

- Check if temporary voltage drop was not generated.
- Check if momentary open was not generated.
- Check if ground is connection correctly or there are no related cables near the power line.



End

2-11. E: 64.X. PFC circuit error (Outdoor unit)

Indicator	Indoor unit	Operation indicator	6 time flash
		Timer indicator	4 time flash
		Economy indicator	Continuous flash
		Error code	E: 64
Detective actuator	Outdoor unit	Main PCB	<ul style="list-style-type: none"> When inverter input DC voltage is higher than 415 V for over 3 seconds, the compressor stops. If the same operation is repeated 5 times, the compressor stops permanently.
Forecast of cause			External cause
			Connector connection failure
			Main PCB failure

Check point 1. Check external cause at indoor and outdoor (Voltage drop or Noise)

- Instant drop: Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure: Check if there is a defective contact or leak current in the power supply circuit.
- Noise: Check if there is any equipment causing harmonic wave near electric line. (Neon bulb or electric equipment that may cause harmonic wave)
Check the complete insulation of grounding.



Check point 2. Check connection of Connector

- Check if connector is removed.
- Check erroneous connection.
- Check if cable is open.

→ Upon correcting the removed connector or mis-wiring, reset the power.



Check point 3. Replace main PCB

If check point 1 to 2 do not improve the symptom, change main PCB.



End

2-12. E: 71.X. Discharge thermistor error (Outdoor unit)

Indicator	Indoor unit	Operation indicator	7 time flash
		Timer indicator	1 time flash
		Economy indicator	Continuous flash
		Error code	E: 71
Detective actuator	Outdoor unit main PCB	When discharge pipe temperature thermistor open or short circuit is detected at power on or while running the compressor	
	Discharge pipe temperature thermistor		
Forecast of cause		Connector failure	
		Thermistor failure	
		Main PCB failure	

Check point 1. Check connection of connector

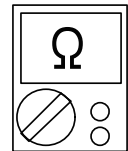
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

→ Reset power when reinstalling due to removed connector or incorrect wiring.



Check point 2. Remove connector and check thermistor resistance value

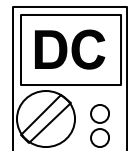
- For the discharge temperature thermistor resistance value, refer to "[Thermistor resistance values](#)" on page 03-40.
- If thermistor is either open or shorted, replace it and reset the power.



Check point 3. Check voltage of main PCB

Make sure circuit diagram of outdoor unit and check terminal voltage at thermistor (DC 5.0 V).

NOTE: For details of thermistor connector, refer to "[Wiring diagrams](#)" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-14.



If the voltage does not appear, replace main PCB.



End

2-13. E: 73.X. Outdoor unit heat exchanger thermistor error (Outdoor unit)

Indicator	Indoor unit	Operation indicator	7 time flash
		Timer indicator	3 time flash
		Economy indicator	Continuous flash
		Error code	E: 73
Detective actuator	Outdoor unit main PCB	When heat exchanger temperature thermistor open or short circuit is detected at power on or while running the compressor	
	Heat exchanger temperature thermistor		
Forecast of cause			Connector failure
			Thermistor failure
			Main PCB failure

Check point 1. Check connection of connector

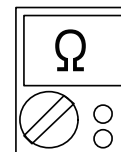
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

→ Reset power when reinstalling due to removed connector or incorrect wiring.



Check point 2. Remove connector and check thermistor resistance value

- For the outdoor unit heat exchanger thermistor resistance value, refer to "[Thermistor resistance values](#)" on page 03-40.
- If thermistor is either open or shorted, replace it and reset the power.



Check point 3. Check voltage of main PCB

Make sure circuit diagram of outdoor unit and check terminal voltage at thermistor (DC 5.0 V).

NOTE: For details of thermistor connector, refer to "[Wiring diagrams](#)" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-14.

If the voltage does not appear, replace main PCB.



End

2-14. E: 74.X. Outdoor temperature thermistor error (Outdoor unit)

Indicator	Indoor unit	Operation indicator	7 time flash
		Timer indicator	4 time flash
		Economy indicator	Continuous flash
		Error code	E: 74
Detective actuator	Outdoor unit main PCB	When outdoor temperature thermistor open or short circuit is detected at power on or while running the compressor	
	Outdoor temperature thermistor		
Forecast of cause			Connector failure
			Thermistor failure
			Main PCB failure

Check point 1. Check connection of connector

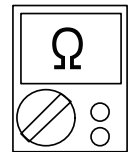
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

-> Reset power when reinstalling due to removed connector or incorrect wiring.



Check point 2. Remove connector and check thermistor resistance value

- For the outdoor temperature thermistor resistance value, refer to "[Thermistor resistance values](#)" on page 03-40.
- If thermistor is either open or shorted, replace it and reset the power.



Check point 3. Check voltage of main PCB

Make sure circuit diagram of outdoor unit and check terminal voltage at thermistor (DC 5.0 V).

NOTE: For details of thermistor connector, refer to "[Wiring diagrams](#)" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-14.



If the voltage does not appear, replace main PCB.



End

2-15. E: 84.X. Current sensor error (Outdoor unit)

Indicator	Indoor unit	Operation indicator	8 time flash
		Timer indicator	4 time flash
		Economy indicator	Continuous flash
		Error code	E: 84
Detective actuator	Outdoor unit	main PCB	When input current sensor has detected 0 A, while inverter compressor is operating at higher than 56 rps, after 1 minute upon starting the compressor. (Except during the defrost operation)
Forecast of cause			Defective connection of electric components
			External cause
			Main PCB failure

Check point 1. Reset power supply and operate

Does error indication show again?

If no, go to "Check point 1-2".



Check point 2. Check connections of outdoor unit electrical components

- Check if the terminal connection is loose.
- Check if connector is removed.
- Check erroneous connection.
- Check if cable is open.

Upon correcting the removed connector or miswiring, reset the power.



Check point 3. Replace main PCB

If Check point 1, 2 do not improve the symptom, change main PCB.



End

Check point 1-2. Check external cause at Indoor and Outdoor (Voltage drop or Noise)

- Instant drop: Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure: Check if there is a defective contact or leak current in the power supply circuit.
- Noise: Check if there is any equipment causing harmonic wave near electric line. (Neon bulb or electric equipment that may cause harmonic wave)
Check the complete insulation of grounding.



End

2-16. E: 94.X. Trip detection (Outdoor unit)

Indicator	Indoor unit	Operation indicator	9 time flash
		Timer indicator	4 time flash
		Economy indicator	Continuous flash
		Error code	E: 94
Detective actuator	Outdoor unit	Main PCB	Protection stop by over-current generation after inverter compressor start processing completed generated consecutively 10 times. NOTE: The number of generations is reset when the compressor starts up.
		Compressor	
Forecast of cause			Outdoor unit fan operation defective, foreign matter on heat-exchanger, excessive rise of ambient temperature
			Main PCB failure
			Inverter compressor failure (lock, winding short)

Check point 1. Check the outdoor unit fan operation, heat-exchanger, ambient temperature

- No obstructions in air passages?
- Heat exchange fins clogged
- Outdoor unit fan motor check
- Ambient temperature not raised by the effect of other heat sources?
- Discharged air not sucked in?



Check point 2. Replace main PCB

If Check point 1 do not improve the symptom, change main PCB.



Check point 3. Replace compressor

If Check point 2 do not improve the symptom, change compressor.



End

2-17. E: 95.X. Compressor motor control error (Outdoor unit)

Indicator	Indoor unit	Operation indicator	9 time flash
		Timer indicator	5 time flash
		Economy indicator	Continuous flash
		Error code	E: 95
Detective actuator	Outdoor unit	Main PCB	<ol style="list-style-type: none"> 1. When running the compressor, if the detected rotor location is out of phase with actual rotor location more than 90°, the compressor stops. 2. After the compressor restarts, if the same operation is repeated within 40 seconds, the compressor stops again. 3. If 1. and 2. repeats 5 times, the compressor stops permanently.
		Compressor	
Forecast of cause		Defective connection of electric components	
		Main PCB failure	
		Compressor failure	

Check point 1. Check Noise from Compressor

Turn on Power and check operation noise.
→ If an abnormal noise show, replace compressor.



Check point 2. Check connection of around the compressor components

For compressor terminal, main PCB

- Check if connector is removed.
- Check erroneous connection.
- Check if cable is open. (Refer to inverter compressor in "[Service parts information](#)" on page 03-34.)

→ Upon correcting the removed connector or mis-wiring, reset the power.



Check point 3. Replace main PCB

If Check point 1, 2 do not improve the symptom, change main PCB.



Check point 4. Replace compressor

If Check point 3 do not improve the symptom, change compressor.



End

2-18. E: 97.X. Outdoor unit fan motor error (Outdoor unit)

Indicator	Indoor unit	Operation indicator	9 time flash
		Timer indicator	7 time flash
		Economy indicator	Continuous flash
		Error code	E: 97
Detective actuator	Outdoor unit	Main PCB	<ol style="list-style-type: none"> When outdoor fan rotation speed is less than 100 rpm in 20 seconds after fan motor starts, fan motor stops. After fan motor restarts, if the same operation within 60 seconds is repeated 3 times in a row, compressor and fan motor stops. If 1. and 2. repeats 5 times in a row, compressor and fan motor stops permanently.
		Fan motor	
Forecast of cause		Fan rotation failure	
		Motor protection by surrounding temperature rise	
		Main PCB failure	
		Outdoor unit fan motor	

Check point 1. Check rotation of fan

Rotate the fan by hand when operation is off. (Check if fan is caught, dropped off or locked motor)
→ If fan or bearing is abnormal, replace it.



Check point 2. Check ambient temperature around motor

Check excessively high temperature around the motor. (If there is any surrounding equipment that causes heat)
→ Upon the temperature coming down, restart operation.



Check point 3. Check outdoor unit fan motor

Check outdoor unit fan motor. (Refer to outdoor unit fan motor in "[Service parts information](#)" on page 03-34.)
→ If outdoor unit fan motor is abnormal, replace outdoor unit fan motor and main PCB.



Check point 4. Check output voltage of main PCB

Check outdoor unit circuit diagram and the voltage. (Measure at main PCB side connector)

NOTE: For details of wiring diagram, refer to "[Wiring diagrams](#)" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-14.



Read wire	DC voltage
Red—Black	280 V ±10%
White—Black	15 ± 1.5 V

-> If the voltage is not correct, replace Main PCB.



End

2-19. E: 99.X. 4-way valve error (Outdoor unit)

Indicator	Indoor unit	Operation indicator	9 time flash
		Timer indicator	9 time flash
		Economy indicator	Continuous flash
		Error code	E: 99
Detective actuator	Indoor unit	main PCB	When the indoor heat exchanger temperature is compared with the room temperature, and either following condition is detected continuously two times, the compressor stops. Indoor heat exchanger temp. - Room temp. > 20 °F (10 °C) (Cooling or Dry operation) Indoor heat exchanger temp. - Room temp. < -20 °F (-10 °C) (Heating operation) If the same operation is repeated 5 times, the compressor stops permanently.
	Heat exchanger temperature thermistor		
	Room temperature thermistor		
	4-way valve		
Forecast of cause			Connector connection failure
			Thermistor failure
			Coil failure
			4-way valve failure
			Main PCB failure

Check point 1. Check connection of connector

- Check if connector is removed.
- Check erroneous connection.
- Check if thermistor cable is open.

→ Upon correcting the removed connector or mis-wiring, reset the power.



Check point 2. Check each thermistor

- Isn't it fallen off the holder?
- Is there a cable pinched?

Check characteristics of room thermistor and indoor unit heat exchanger thermistor.

For the thermistor resistance value, refer to "[Thermistor resistance values](#)" on page 03-40.

→ If defective, replace the thermistor.



Check point 3. Check the solenoid coil and 4-way valve

- **Solenoid coil**
Remove CN501 from PCB and check the resistance value of coil. Resistance value is about 1.22 kΩ — 1.49 kΩ (at 68 °F (20 °C)).
→ If it is open or abnormal resistance value, replace solenoid coil.
- **4-way valve**
Check each piping temperature, and the location of the valve by the temperature difference.
If the value location is not proper, replace 4-way valve.

**Check point 4. Check the voltage of 4-way valve**

Check the voltage CN501 of Main PCB.

→ Check if AC 187 V (AC 208 V -10%) to AC 253 V (AC 230 V +10%) appears at CN501 of Main PCB.

- **Heating operation**
→ If it is not voltage, Replace Main PCB.
- **Cooling operation**
→ If it is voltage, Replace Main PCB.

**Check point 5. Replace main PCB**

If Check Point 1 to 4 do not improve the symptom, replace main PCB.



End

2-20. E: A1.X. Discharge temperature error (Outdoor unit)

Indicator	Indoor unit	Operation indicator	10 time flash
		Timer indicator	1 time flash
		Economy indicator	Continuous flash
		Error code	E: A1
Detective actuator	Outdoor unit main PCB	Protection stop by discharge temperature ≥ 230 °F (110 °C) during compressor operation generated 2 times within 24 hours.	
	Discharge temperature thermistor		
Forecast of cause			3-way valve not opened
			EEV or capillary tube defective, strainer clogged
			Outdoor unit operation failure, foreign matter on heat exchanger
			Discharge temperature thermistor failure
			Insufficient refrigerant
			Main PCB failure

Check point 1. Check if 3-way valve is open

If the 3-way valve is closed, open the 3-way valve and check operation.

NOTE: For cooling operation, check gas side of the 3-way valve.

For heating operation, check liquid side of the 3-way valve.



Check point 2. Check any of the electronic expansion valve (EEV), capillary tube, or strainer, or all

- Check if EEV open or there is a capillary tube defect. Refer to outdoor unit Electronic Expansion Valve (EEV) or Capillary tube in "[Service parts information](#)" on page 03-34.
- Check the strainer clogging.



Check point 3. Check the outdoor unit fan and heat exchanger

- Check for foreign object at heat exchanger
- Check if fan can be rotated by hand.
- Check the motor. (Refer to outdoor unit fan motor in "[Service parts information](#)" on page 03-34.)



Check point 4. Check the discharge thermistor

The discharge temperature thermistor characteristics check. (Check by disconnecting thermistor from PCB.)

NOTE: For the characteristics of the thermistor, refer to "[Thermistor resistance values](#)" on page 03-40.



Check point 5. Check the refrigerant amount

Check the refrigerant leakage.



Check point 6. Replace main PCB

If check point 1 to 5 do not improve the symptom, replace the main PCB.



End

3. Troubleshooting without error code

3-1. Indoor unit—No power

Forecast of cause	Power supply failure
	External cause
	Electrical components defective

Check point 1. Check installation condition

- Isn't the breaker down?
- Check loose or removed connection cable.

-> If abnormal condition is found, correct it by referring to the installation manual or the "DESIGN & TECHNICAL MANUAL".



Check point 2. Check external cause at indoor and outdoor (voltage drop or noise)

- Instant drop: Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure: Check if there is a defective contact or leak current in the power supply circuit.
- Noise: Check if there is any equipment causing harmonic wave near electric line. (Neon bulb or electric equipment that may cause harmonic wave)
Check the complete insulation of grounding.



Check point 3. Check electrical components

Check the voltage of power supply.

Check if AC 187 to 253 V appears at outdoor unit terminal L—N.

-> If no, go to "[Check point 1](#)" and "[Check point 2](#)".



- Check fuse in filter PCB.
If fuse is open, check if the wiring between terminal and filter PCB is loose, and replace fuse.
- Check varistor in filter PCB.
If varistor is defective, there is a possibility of an abnormal power supply.
Check the correct power supply and replace varistor.
Upon checking the normal power supply, replace varistor.



End

3-2. Outdoor unit—No power

Forecast of cause	Power supply failure
	External cause
	Electrical components defective

Check point 1. Check installation condition

- Is the circuit breaker on or off?
- Check loose or removed connection cable.

→ If abnormal condition is found, correct it by referring to the installation manual or the "DESIGN & TECHNICAL MANUAL".



Check point 2. Check external cause at indoor and outdoor (voltage drop or noise)

- Instant drop: Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure: Check if there is a defective contact or leak current in the power supply circuit.
- Noise: Check if there is any equipment causing harmonic wave near electric line. (Neon bulb or electric equipment that may cause harmonic wave)
Check the complete insulation of grounding.

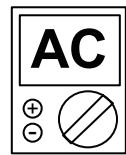


Check point 3. Check electrical components

Check the voltage of power supply.

Check if AC 187 to 253 V appears at outdoor unit terminal L1 - L2

→ If no, go to "[Check point 1](#)" and "[Check point 2](#)".



- Check fuse in main PCB.
If fuse is open, check if the wiring between terminal and main PCB is loose, and replace fuse.
- Check varistor in main PCB.
If varistor is defective, there is a possibility of an abnormal power supply. Check the correct power supply and replace varistor.
→ Upon checking the normal power supply, replace varistor.



Check point 4. Replace main PCB

If check point 1 to 3 do not improve the symptom, change main PCB.



End

3-3. No operation (Power is on)

Forecast of cause	Setting/ Connection failure
	External cause
	Electrical components defective

Check point 1. Check indoor and outdoor installation condition

- Indoor unit:
 - Check incorrect wiring between indoor unit and remote controller.
 - Check if there is an open cable connection.
- Are these indoor unit, outdoor unit, and remote controller suitable model names to connect?

-> If there is some abnormal condition, correct it by referring to the installation manual and "DESIGN & TECHNICAL MANUAL".



Turn off the power and check correct followings.

- Is there loose or removed communication line of indoor unit and outdoor unit?



Check point 2. Check external cause at indoor and outdoor (Voltage drop or Noise)

- Instant drop: Check if there is a large load electric apparatus in the same circuit.
- Momentary power failure: Check if there is a defective contact or leak current in the power supply circuit.
- Noise: Check if there is any equipment causing harmonic wave near electric line. (Neon bulb or electric equipment that may cause harmonic wave)
Check the complete insulation of grounding.



Check point 3. Check wired remote controller and controller PCB

Check voltage at CN305 (terminal 1—3) of UTY-XCBXZ1(Communication kit).
(Power supply to remote controller)

- If it is DC 13 V, remote controller is failure. (The controller PCB is normal)
-> Replace remote controller.
- If it is DC 0 V, controller PCB is failure. (Check the remote controller once again)
-> Replace controller PCB.



Check point 4. Replace main PCB

If check point 1 to 3 do not improve the symptom, change main PCB.



End

3-4. No cooling/No heating

Forecast of cause	Indoor unit error
	Outdoor unit error
	Effect by surrounding environment
	Connection pipe/Connection wire failure
	Refrigeration cycle failure

Check point 1. Check Indoor unit

- Does Indoor unit fan run in the HIGH mode?
- Is air filter dirty?
- Is heat exchanger clogged?
- Check if energy save function is operated.



Check point 2. Check outdoor unit operation

- Check if outdoor unit is operating.
- Check any objects that obstruct the air flow route.
- Check if heat exchanger is clogged.
- Is the valve open?



Check point 3. Check site condition

- Is capacity of Indoor unit fitted to the room size?
- Any windows open or direct sunlight?



Check point 4. Check Indoor/ Outdoor installation condition

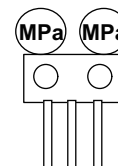
- Check connection pipe (specified pipe length and pipe diameter?)
- Check any loose or removed communication line.

→ If there is an abnormal condition, correct it by referring to the installation manual or the "DESIGN & TECHNICAL MANUAL".



Check point 5. Check Refrigeration cycle

- Check if strainer is clogged (Refer to the figure below).
- Measure gas pressure, and if there is a leakage, correct it.
- Check if EEV open or there is a capillary tube defect.
Refer to outdoor unit Electronic Expansion Valve (EEV) or Capillary tube in "[Service parts information](#)" on page 03-34.
- Check compressor.
Refer to compressor in "[Service parts information](#)" on page 03-34.
Refer to inverter compressor in "[Service parts information](#)" on page 03-34.



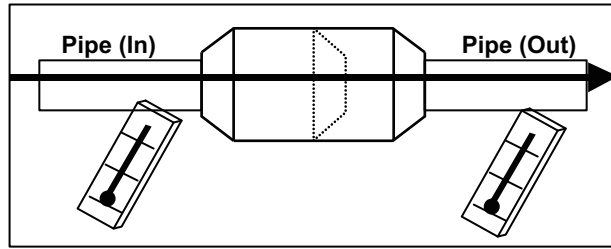
NOTE: When recharging the refrigerant, make sure to perform vacuuming, and recharge the specified amount.



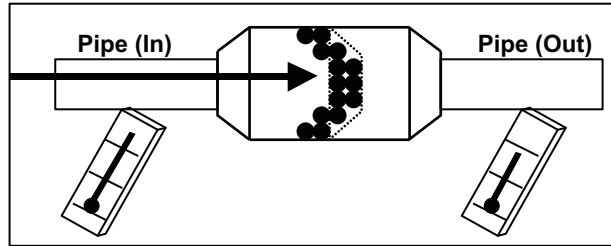
End

NOTES:

- Strainer normally does not have temperature difference between inlet and outlet as shown below.



- If there is a difference like shown below, there is a possibility of inside clogged. In this case, replace the strainer.



3-5. Abnormal noise

Forecast of cause	Abnormal installation (indoor unit/outdoor unit)
	Fan failure (indoor unit/outdoor unit)
	Compressor failure (outdoor)

Diagnosis method when abnormal noise is occurred

Abnormal noise is coming from Indoor unit.
(Check and correct followings)



- Is main unit installed in stable condition?
- Is the installation of air suction grille and front panel normal?



- Is fan broken or deformed?
- Is the screw of fan loose?
- Is there any object which obstruct the fan rotation?



End

Abnormal noise is coming from Outdoor unit.
(Check and correct followings)



- Is main unit installed in stable condition?
- Is fan guard installed normally?



- Is fan broken or deformed?
- Is the screw of fan loose?
- Is there any object which obstruct the fan rotation?



Check if vibration noise by loose bolt or contact noise of piping is happening.



Is compressor locked?

- Check Compressor
Refer to compressor and inverter compressor in "[Service parts information](#)" on page 03-34.



End

3-6. Water leaking

Forecast of cause

Erroneous installation

Drain hose failure

Diagnosis method when water leak occurs

- Is main unit installed in stable condition?
- Is main unit broken or deformed at the time of transportation or maintenance?



- Is drain hose connection loose?
- Is there a trap in drain hose?
- Is drain hose clogged?



Is fan rotating?



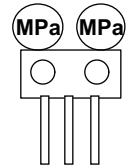
End

Diagnosis method when water is spitting out

Is the filter clogged?



Check gas pressure and correct it if there was a gas leak.

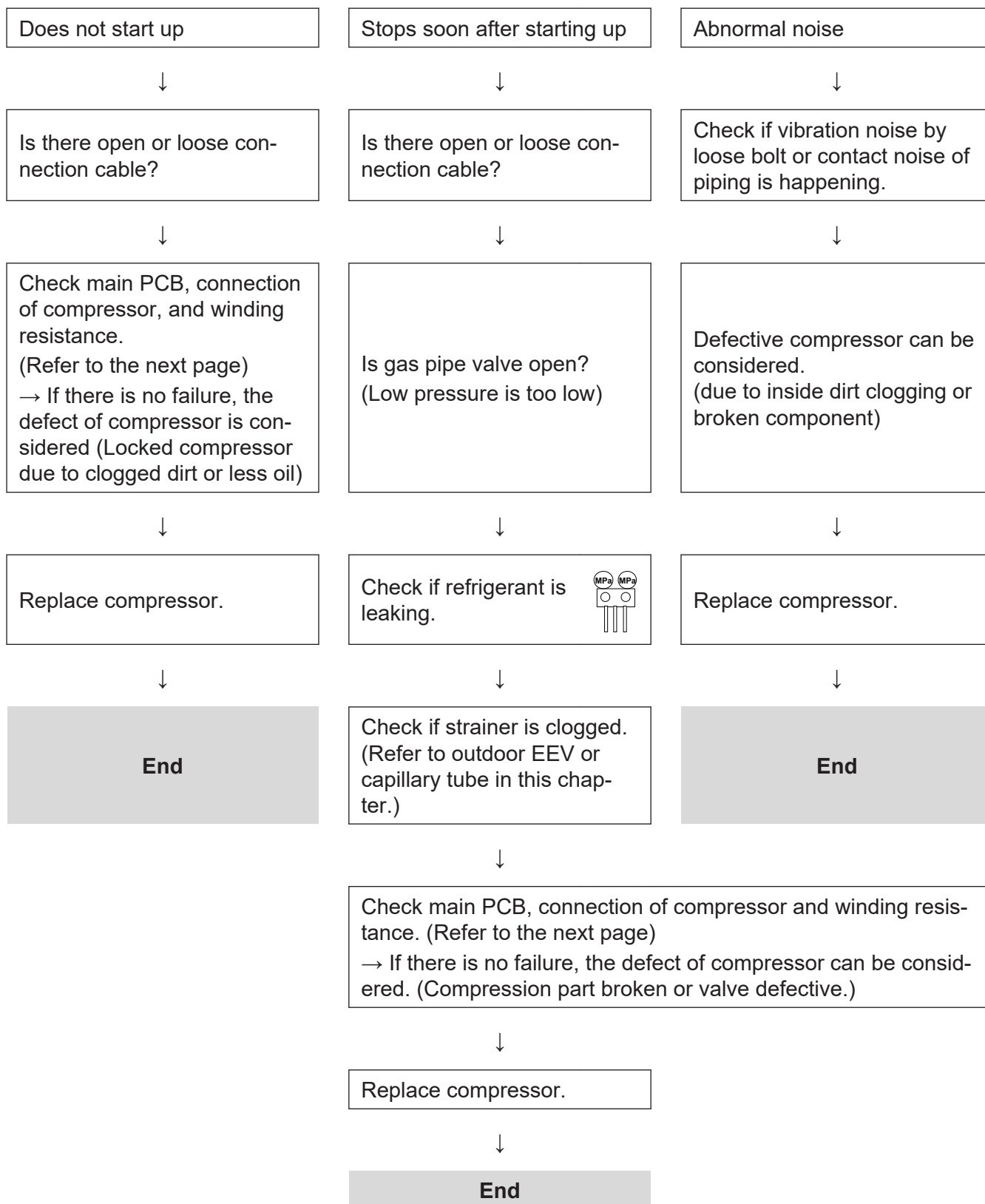


End

4. Service parts information

4-1. Compressor

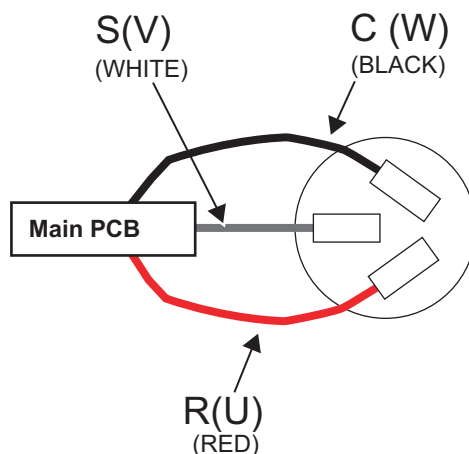
Diagnosis method of compressor (If outdoor unit LED displays error, refer to troubleshooting)



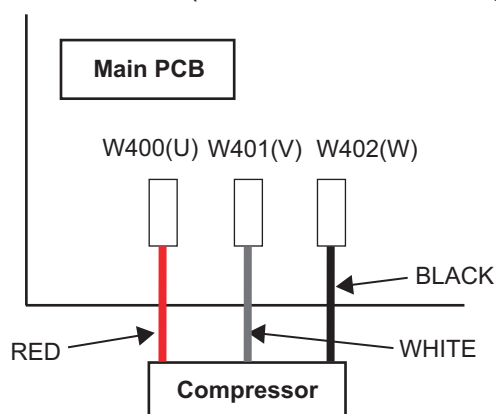
4-2. Inverter compressor

Check point 1. Check connection

- Check terminal connection of compressor (loose or incorrect wiring)



- Check terminal connection of main PCB (loose or incorrect wiring)

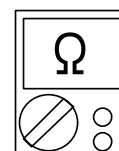
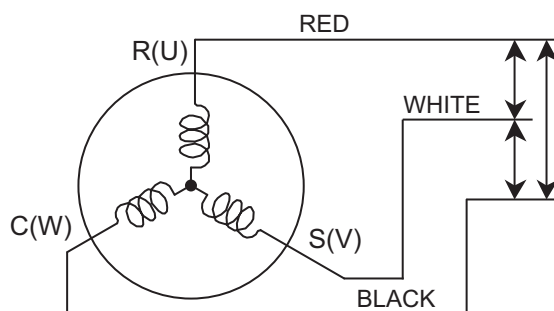


↓

Check point 2. Check winding resistance

Check winding resistance of each terminal.

Resistance value: $1.975 \Omega \pm 7\%$ at 77°F (25°C)



→ If the resistance value is 0Ω or infinite, replace compressor.

↓

Check point 3. Replace inverter PCB

If check point 1 to 2 do not improve the symptom, replace main PCB.

4-3. Outdoor unit Electronic Expansion Valve (EEV)

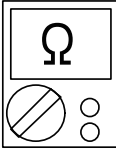
Check point 1. Check connections

Check connection of connector. (Loose connector or open cable)

NOTE: For details of wiring diagram, refer to "Wiring diagrams" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-14.

Check point 2. Check coil of EEV

Remove connector, check each winding resistance of coil.

Read wire	Resistance value
1 (Red)—2 (Blue)	$46 \Omega \pm 3.7 \Omega$ at 68°F (20°C) 
1 (Red)—3 (Orange)	
1 (Red)—4 (Yellow)	
1 (Red)—5 (White)	

→ If Resistance value is abnormal, replace EEV.

Check point 3. Check Voltage from main PCB

Remove connector and check voltage (DC 12 V)

→ If it does not appear, replace main PCB.



Check point 4. Check noise at start up

Turn on the power and check the operation noise.

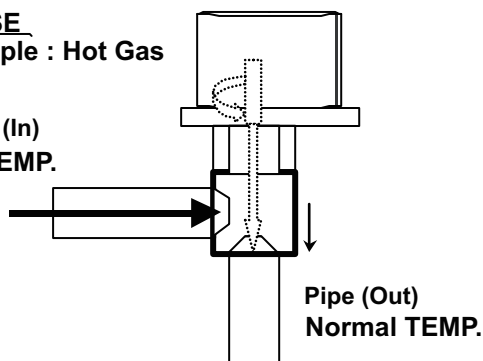
→ If an abnormal noise does not show, replace main PCB.

Check point 5. Check Opening and Closing Operation of Valve

When valve is closed, it has a temp. difference between inlet and outlet

CLOSE
 Example : Hot Gas

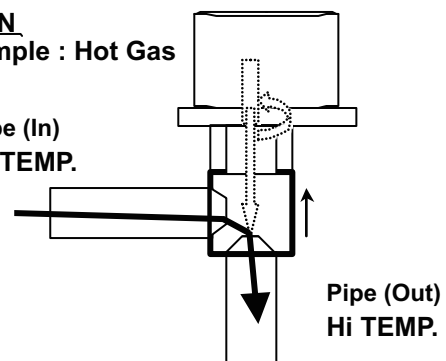
Pipe (In)
 Hi TEMP.



If it is open, it has no temp. difference between inlet and outlet

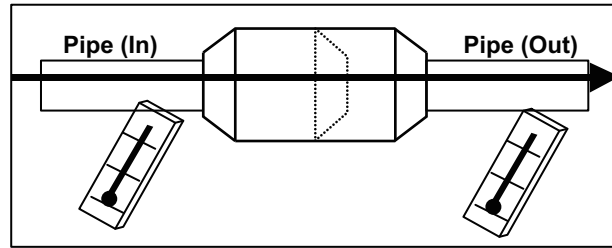
OPEN
 Example : Hot Gas

Pipe (In)
 Hi TEMP.

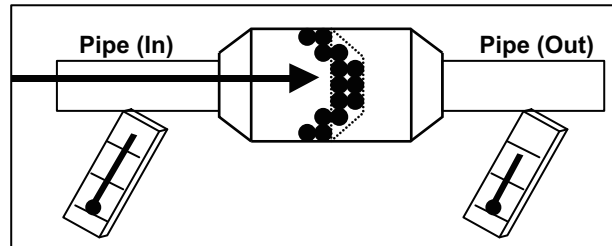


Check point 6. Check strainer

- Strainer normally does not have temperature difference between inlet and outlet as shown below.



- If there is a difference like shown below, there is a possibility of inside clogged. In this case, replace the strainer.



4-4. Indoor unit fan motor

Check point 1. Check rotation of fan

Rotate the fan by hand when operation is off.
 (Check if fan is caught, dropped off or locked motor)
 → If fan or bearing is abnormal, replace it.

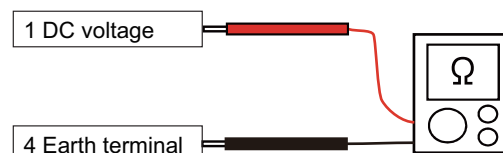
Check point 2. Check resistance of indoor fan motor

Refer to below. Circuit-test “Vm” and “GND” terminal

NOTE: Vm: DC voltage, GND: Earth terminal

→ If they are short-circuited (below 300 kΩ), replace indoor fan motor and controller PCB.

Pin number (wire color)	Terminal function (symbol)
1 (Red)	DC voltage (Vm)
2	No function
3	No function
4 (Black)	Earth terminal (GND)
5 (White)	Control voltage (Vcc)
6 (Yellow)	Speed command (Vsp)
7 (Blue)	Feed back (FG)



4-5. Outdoor unit fan motor

Check point 1. Check rotation of fan

Rotate the fan by hand when operation is off.
 (Check if fan is caught, dropped off or locked motor)
 → If fan or bearing is abnormal, replace it.

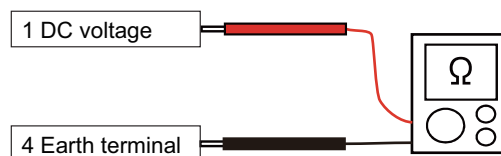
Check point 2. Check resistance of outdoor fan motor (P650)

Refer to below. Circuit-test “Vm” and “GND” terminal

NOTE: Vm: DC voltage, GND: Earth terminal

→ If they are short-circuited (below 300 kΩ), replace outdoor fan motor and controller PCB.

Pin number (wire color)	Terminal function (symbol)
1 (Red)	DC voltage (Vm)
2	No function
3	No function
4 (Black)	Earth terminal (GND)
5 (White)	Control voltage (Vcc)
6 (Yellow)	Speed command (Vsp)
7 (Brown)	Feed back (FG)



5. Thermistor resistance values

5-1. Indoor unit

■ Room temperature thermistor

Temperature °F (°C)	Resistance (kΩ)	Voltage (V)
14.0 (-10.0)	58.25	0.73
23.0 (-5.0)	44.03	0.93
32.0 (0.0)	33.62	1.15
41.0 (5.0)	25.93	1.39
50.0 (10.0)	20.18	1.66
59.0 (15.0)	15.84	1.94
68.0 (20.0)	12.54	2.22
77.0 (25.0)	10.00	2.50
86.0 (30.0)	8.04	2.77
95.0 (35.0)	6.51	3.03
104.0 (40.0)	5.30	3.27
113.0 (45.0)	4.35	3.49

■ Heat exchanger temperature thermistor

Temperature °F (°C)	Resistance (kΩ)	Voltage (V)
-22.0 (-30.0)	1,131.91	0.21
-13.0 (-25.0)	804.52	0.29
-4.0 (-20.0)	579.59	0.40
5.0 (-15.0)	422.89	0.53
14.0 (-10.0)	312.27	0.69
23.0 (-5.0)	233.21	0.88
32.0 (0.0)	176.03	1.10
41.0 (5.0)	134.23	1.36
50.0 (10.0)	103.34	1.63
59.0 (15.0)	80.28	1.92
68.0 (20.0)	62.91	2.21
77.0 (25.0)	49.70	2.51
86.0 (30.0)	39.57	2.79
95.0 (35.0)	31.74	3.06
104.0 (40.0)	25.64	3.30
113.0 (45.0)	20.85	3.53
122.0 (50.0)	17.06	3.73
131.0 (55.0)	14.05	3.90
140.0 (60.0)	11.64	4.05
149.0 (65.0)	9.69	4.19

5-2. Outdoor unit

■ Discharge temperature thermistor

Temperature °F (°C)	Resistance (kΩ)	Voltage (V)
-22.0 (-30.0)	1,000.13	0.06
-12.0 (-25.0)	720.28	0.09
-4.0 (-20.0)	525.51	0.12
5.0 (-15.0)	388.12	0.16
14.0 (-10.0)	289.97	0.22
23.0 (-5.0)	219.01	0.28
32.0 (0.0)	167.12	0.36
41.0 (5.0)	128.77	0.46
50.0 (10.0)	100.14	0.58
59.0 (15.0)	78.56	0.71
68.0 (20.0)	62.14	0.87
77.0 (25.0)	49.54	1.04
86.0 (30.0)	39.79	1.23
95.0 (35.0)	32.19	1.44
104.0 (40.0)	26.22	1.66
113.0 (45.0)	21.49	1.89
122.0 (50.0)	17.73	2.12
131.0 (55.0)	14.71	2.35
140.0 (60.0)	12.27	2.57
149.0 (65.0)	10.29	2.79
158.0 (70.0)	8.68	3.00
167.0 (75.0)	7.35	3.19
176.0 (80.0)	6.26	3.38
185.0 (85.0)	5.35	3.54
194.0 (90.0)	4.60	3.69
203.0 (95.0)	3.96	3.83
212.0 (100.0)	3.43	3.96
221.0 (105.0)	2.98	4.07
230.0 (110.0)	2.60	4.17
239.0 (115.0)	2.28	4.26
248.0 (120.0)	2.00	4.33

■ Heat exchanger temperature thermistor

Temperature °F (°C)	Resistance (kΩ)	Voltage (V)
-22.0 (-30.0)	1,078.85	0.02
-12.0 (-25.0)	777.69	0.03
-4.0 (-20.0)	567.89	0.04
5.0 (-15.0)	419.77	0.06
14.0 (-10.0)	313.87	0.08
23.0 (-5.0)	237.25	0.10
32.0 (0.0)	181.17	0.13
41.0 (5.0)	139.70	0.16
50.0 (10.0)	108.72	0.21
59.0 (15.0)	85.34	0.26
68.0 (20.0)	67.55	0.33
77.0 (25.0)	53.89	0.41
86.0 (30.0)	43.31	0.49
95.0 (35.0)	35.06	0.60
104.0 (40.0)	28.57	0.71
113.0 (45.0)	23.43	0.84
122.0 (50.0)	19.34	0.99
131.0 (55.0)	16.05	1.14
140.0 (60.0)	13.40	1.31
149.0 (65.0)	11.24	1.49
158.0 (70.0)	9.48	1.67
167.0 (75.0)	8.04	1.86
176.0 (80.0)	6.85	2.05

■ Outdoor temperature thermistor

Temperature °F (°C)	Resistance (kΩ)	Voltage (V)
-22.0 (-30.0)	224.33	0.73
-12.0 (-25.0)	159.71	0.97
-4.0 (-20.0)	115.24	1.25
5.0 (-15.0)	84.21	1.56
14.0 (-10.0)	62.28	1.90
23.0 (-5.0)	46.58	2.26
32.0 (0.0)	35.21	2.61
41.0 (5.0)	26.88	2.94
50.0 (10.0)	20.72	3.25
59.0 (15.0)	16.12	3.52
68.0 (20.0)	12.64	3.76
77.0 (25.0)	10.00	3.97
86.0 (30.0)	7.97	4.14
95.0 (35.0)	6.40	4.28
104.0 (40.0)	5.18	4.41
113.0 (45.0)	4.21	4.51
122.0 (50.0)	3.45	4.59
131.0 (55.0)	2.85	4.65

4. CONTROL AND FUNCTIONS

CONTENTS

4. CONTROL AND FUNCTIONS

1. Rotation number control of compressor.....	04-1
1-1. Cooling operation	04-1
1-2. Heating operation	04-2
1-3. Dry operation	04-3
1-4. Rotation number of compressor at normal start-up	04-3
1-5. Limitation of compressor rotation number by outdoor temperature.....	04-4
2. Auto changeover operation.....	04-5
3. Fan control.....	04-7
3-1. Indoor fan control.....	04-7
3-2. Outdoor fan control	04-11
4. Louver control	04-13
4-1. Horizontal louver control	04-13
4-2. Adjust the horizontal louver	04-13
4-3. Swing operation.....	04-14
5. Timer operation control	04-15
5-1. Wireless remote control	04-15
5-2. Wired remote control	04-16
6. Defrost operation control	04-17
6-1. Defrost operation in heating operation stopped	04-18
7. Various control	04-19
7-1. Auto restart.....	04-19
7-2. MANUAL AUTO operation.....	04-19
7-3. Forced cooling operation	04-20
7-4. MIN. HEAT operation	04-20
7-5. ECONOMY operation	04-20
7-6. POWERFUL operation	04-21
7-7. Fresh air control.....	04-21
7-8. Compressor preheating	04-21
7-9. External electrical heater control	04-21
7-10. Electronic expansion valve control	04-22
7-11. Prevention to restart for 3 minutes (3 minutes st)	04-22
7-12. 4-way valve control	04-22
7-13. Unit status monitoring and the detected value indication	04-23
8. Various protections.....	04-25
8-1. Discharge gas temperature over-rise prevention control	04-25
8-2. Anti-freezing control (cooling and dry mode)	04-25
8-3. Current release control	04-26
8-4. Cooling pressure over-rise protection.....	04-26
8-5. Low outdoor temperature protection.....	04-27
8-6. High temperature and high pressure release control	04-27

1. Rotation number control of compressor

1-1. Cooling operation

A sensor (room temperature thermistor) built in the indoor unit body will usually perceive difference or variation between a set temperature and present room temperature, and controls the operation rotation number of the compressor.

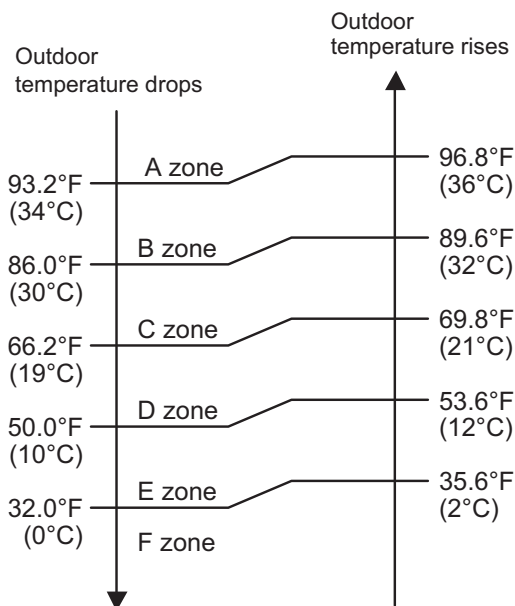
- If the room temperature is 11 °F (6.0 °C) higher than a set temperature, the operation rotation number of compressor will attain to maximum performance.
- If the room temperature is 2 °F (1.0 °C) lower than a set temperature, the compressor will be stopped.
- When the room temperature is within the range of +11 °F (6.0 °C) to -2 °F (1.0 °C) of the setting temperature, the rotation number of compressor is controlled within the range shown in the table below. However, the maximum rotation number is limited in the range shown in the figure below based on the indoor fan mode and the outdoor temperature.

• Rotation number range of compressor

Unit: rps

Model name	Minimum frequency	Maximum frequency
ASUH09LMAS ASUH12LMAS	12	89

• Limit of maximum speed based on outdoor temperature



Unit: rps

Model name	Outdoor temperature zone	Indoor unit fan mode			
		HIGH	MED	LOW	QUIET
ASUH09LMAS ASUH12LMAS	A zone	89	54	38	26
	B zone	89	54	38	26
	C zone	89	54	38	26
	D zone	62	44	38	26
	E zone	62	44	38	26
	F zone	62	44	38	26

1-2. Heating operation

A sensor (room temperature thermistor) built in indoor unit body will usually perceive difference or variation between setting temperature and present room temperature, and controls operation rotation number of compressor.

- If the room temperature is 11 °F (6.0 °C) lower than a set temperature, the operation rotation number of compressor will attain to maximum performance.
- If the room temperature is 2 °F (1.0 °C) higher than a set temperature, the compressor will be stopped.
- When the room temperature is within the range of +2 °F (1.0 °C) to -11 °F (6.0°C) of the setting temperature, the rotation number of compressor is controlled within the range shown below.

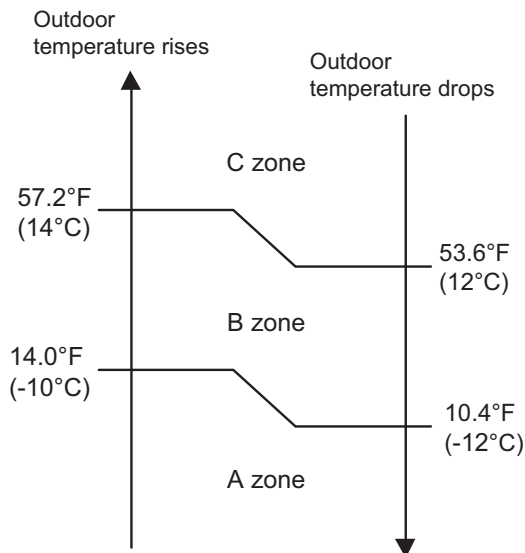
- **Rotation number range of compressor**

Unit: rps

Model name	Minimum frequency	Maximum frequency
ASUH09LMAS ASUH12LMAS	12	110

- **Limit of maximum speed based on outdoor temperature**

In heating operation, maximum rotation number is defined by outdoor temperature and fan mode.



Unit: rps

Model name	Outdoor temperature zone	Indoor unit fan mode			
		HIGH	MED	LOW	QUIET
ASUH09LMAS ASUH12LMAS	A zone	110	89	77	67
	B zone	110	89	77	67
	C zone	110	89	77	36

1-3. Dry operation

The rotation number of compressor shall change according to the temperature, set temperature, and room temperature variation which the room temperature sensor of the indoor unit has detected as shown in the table below.

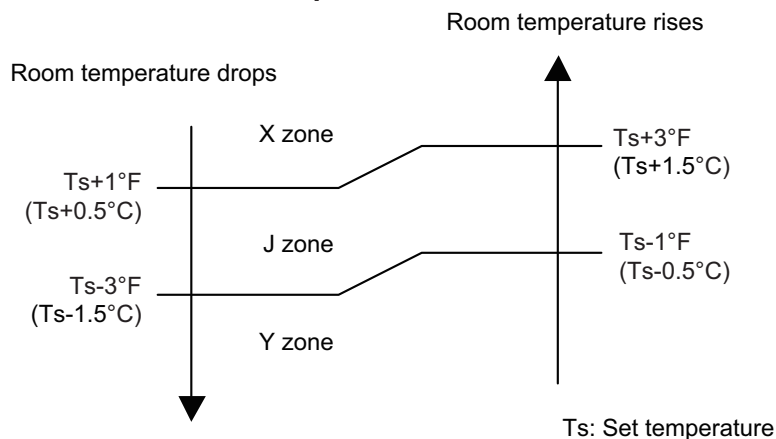
Zone is defined by set temperature and room temperature.

- **Rotation number range of compressor**

Unit: rps

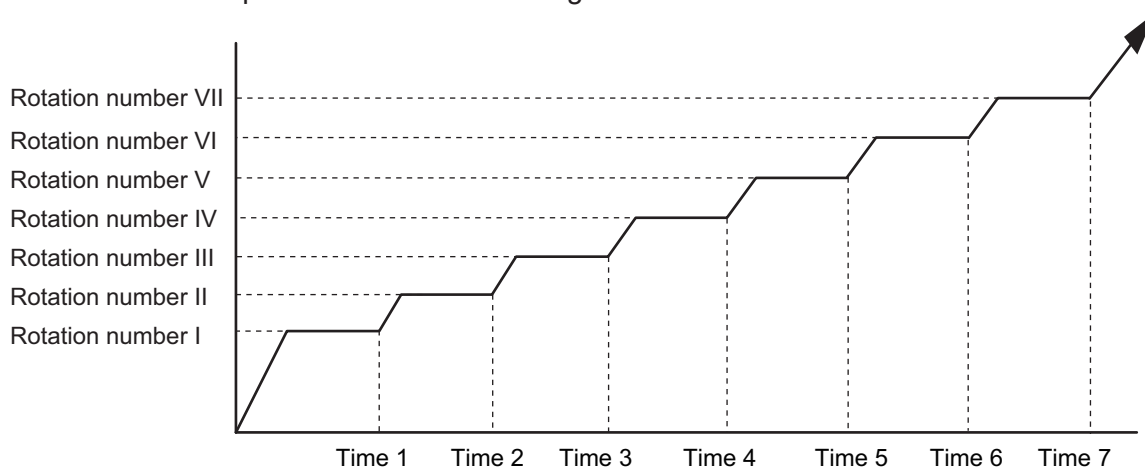
Model name	Outdoor temperature zone	Operating frequency
ASUH09LMAS ASUH12LMAS	X zone	22
	J zone	16
	Y zone	0

- **Compressor control based on room temperature**



1-4. Rotation number of compressor at normal start-up

Rotation number of compressor soon after starting is controlled as below.



Rotation number (rps)	I	II	III	IV	V	VI	VII
	45	56	68	77	84	93	103
Time (sec)	1	2	3	4	5	6	7
	60	140	170	220	280	360	430

1-5. Limitation of compressor rotation number by outdoor temperature

The minimum rotation number of compressor is limited by outdoor temperature as below.

- **Cooling/Dry mode**

100.4°F (38°C)	F zone
66.2°F (19°C)	E zone
50.0°F (10°C)	D zone
32.0°F (0°C)	C zone
14.0°F (-10°C)	B zone
	A zone

Model name	Outdoor temperature zone	Limitation of compressor frequency
AOUH09LMAS1 AOUH12LMAS1	A zone	35 rps
	B zone	35 rps
	C zone	35 rps
	D zone	15 rps
	E zone	15 rps
	F zone	36 rps

- **Heating mode**

66.2°F (19°C)	F zone
41.0°F (5°C)	E zone
32.0°F (0°C)	D zone
5.0°F (-15°C)	C zone
-13.0°F (-25°C)	B zone
	A zone

Model name	Outdoor temperature zone	Limitation of compressor frequency
AOUH09LMAS1 AOUH12LMAS1	A zone	37 rps
	B zone	37 rps
	C zone	36 rps
	D zone	15 rps
	E zone	15 rps
	F zone	1 rps

2. Auto changeover operation

When the air conditioner is set to AUTO mode by remote controller, operation starts in the optimum mode from among heating, cooling, dry and monitoring modes. During operation, the optimum mode is automatically switched in accordance with temperature changes. The temperature can be set between 64.4°F (18°C) and 86.0°F (30°C) in 1.8°F (1.0°C) steps.

- When operation starts, indoor fan and outdoor fan are operated for around 1 minute. Room temperature and outdoor temperature are sensed, and the operation mode is selected in accordance with the table below.

Room temperature	Operation mode
$Tr > Ts + 3.6^{\circ}\text{F}$ (2°C)	Cooling
$Ts + 3.6^{\circ}\text{F}$ (2°C) $\geq Tr \geq Ts - 3.6^{\circ}\text{F}$ (2°C)	Middle zone
$Tr < Ts - 3.6^{\circ}\text{F}$ (2°C)	Heating

Tr: Room temperature

Ts: Setting temperature

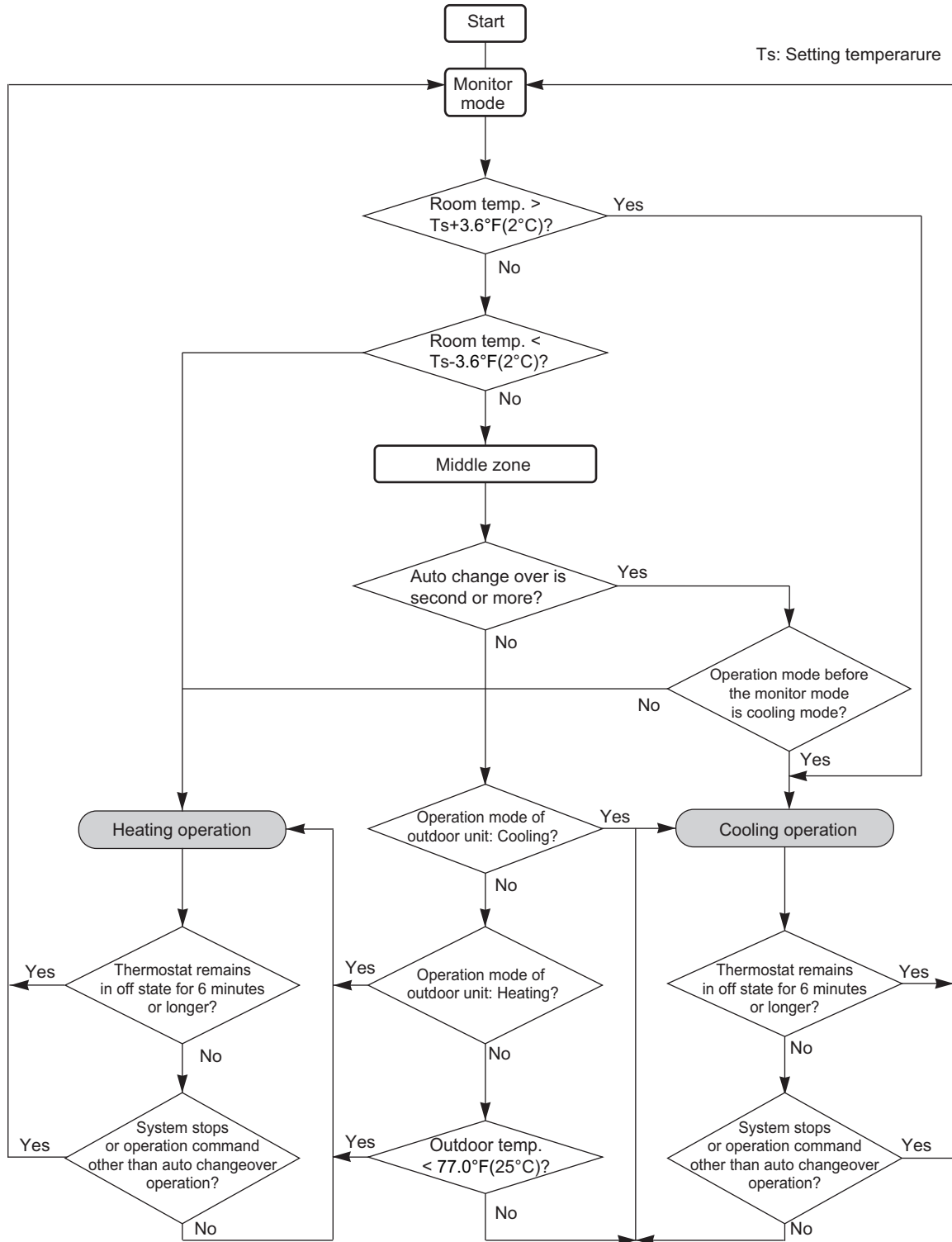
NOTE: When the operation mode is middle zone, indoor unit operation mode is selected as below.

- Same operation mode is selected as outdoor unit.
If outdoor unit is operating in cooling and heating mode, indoor unit will be operated by the same operation mode.
- Selected by outdoor temperature.
If outdoor unit is operating in other than cooling and heating mode, indoor unit will be operated according to the outdoor temperature as below.

Outdoor temp.	Operation mode
77.0°F (25°C) or more	Cooling
Less than 77.0°F (25°C)	Heating

- When the compressor was stopped for 6 consecutive minutes by temperature control function after the cooling or heating mode was selected as above, operation is switched to monitoring mode and the operation mode selection is done again.
- When the middle zone is selected on the predetermining of the operation mode, the operation mode before the changing to the monitoring mode is selected.

Operation flow chart



CONTROL AND FUNCTIONS

CONTROL AND FUNCTIONS

3. Fan control

Tr: Room temperature

Ts: Setting temperature

3-1. Indoor fan control

■ Fan speed

Indoor fan speed is defined as below.

Operation mode	Fan mode	Speed (rpm)
Heating	POWERFUL	1,290
	HIGH	1,220
	MED+	1,140
	MED	1,060
	LOW	900
	QUIET	630
	Cool air prevention	550
	S-LOW	470
Cooling/Fan	POWERFUL	1,290
	HIGH	1,220
	MED	1,000
	LOW	810
	QUIET	550
	Soft quiet	490*1
	S-LOW	470*2
Dry		X zone: 550 J zone: 550

*1: Fan mode only

*2: Cooling mode only

■ Fan operation

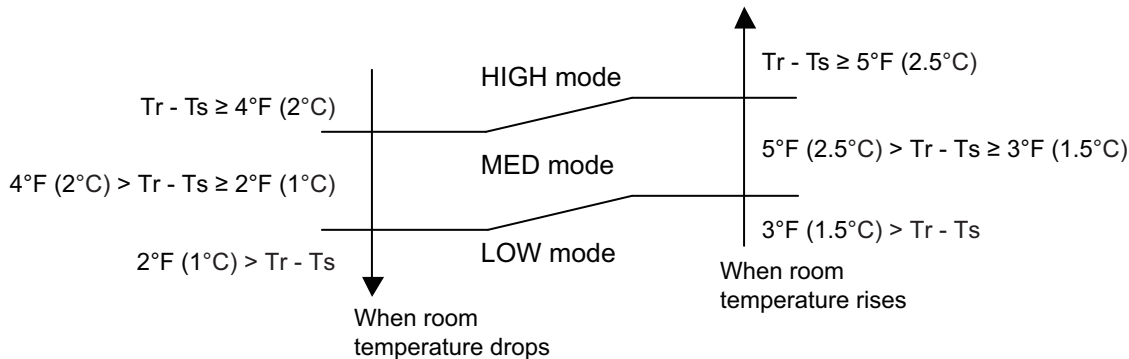
Airflow can be switched in 5 steps such as AUTO, QUIET, LOW, MED, HIGH while indoor unit fan only runs.

When fan mode is set at AUTO, it operates on MED fan speed.

■ Cooling operation

Switch the airflow AUTO, and indoor fan motor will run according to room temperature, as below. On the other hand, if switched in HIGH—QUIET, indoor motor will run at a constant airflow of COOL operation modes QUIET, LOW, MED, HIGH as shown in “Fan speed” above.

Airflow change over (Cooling: Auto)



■ Dry operation

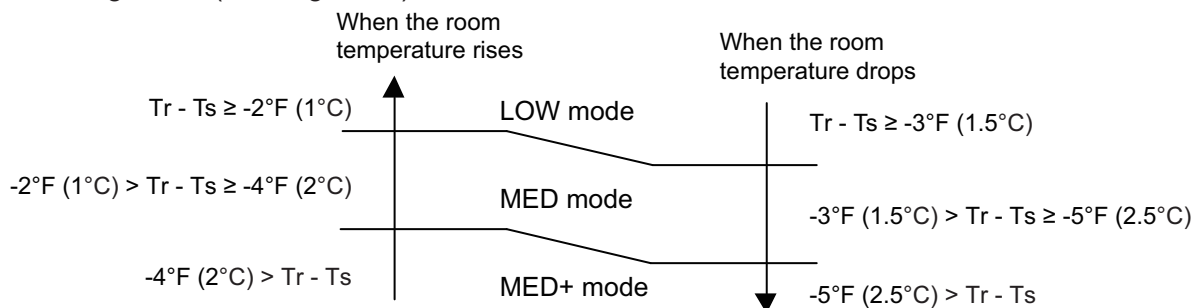
During dry operation, fan speed setting can not be changed as shown in “Fan speed” above.

■ Heating operation

Switch the airflow AUTO, and the indoor fan motor will run according to a room temperature, as below.

On the other hand, if switched in HIGH—QUIET, the indoor motor will run at a constant airflow of HEAT operation modes QUIET, LOW, MED, HIGH as shown in “Fan speed” above.

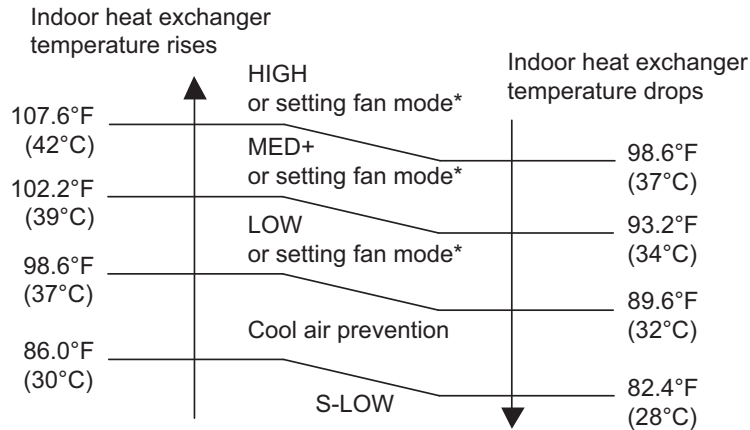
Airflow change over (Heating: Auto)



■ Cool air prevention control (heating mode)

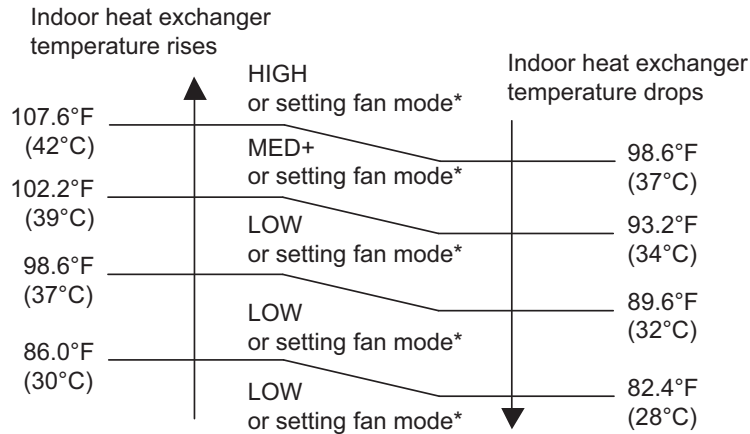
The maximum value of the indoor fan speed is set as shown below, based on the detected temperature by the indoor heat exchanger sensor on heating mode.

- Normal operation



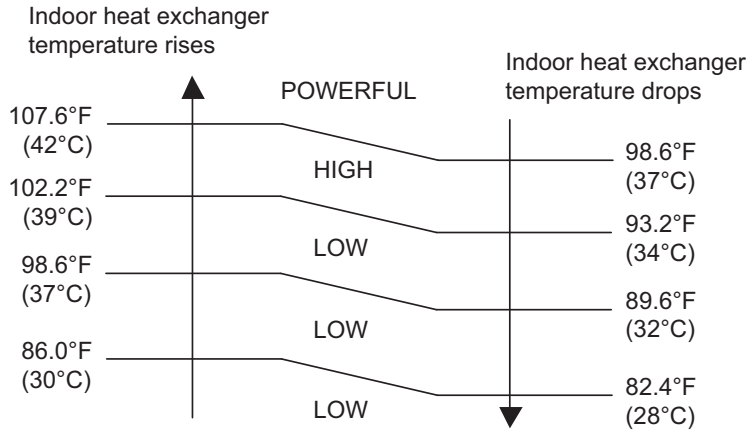
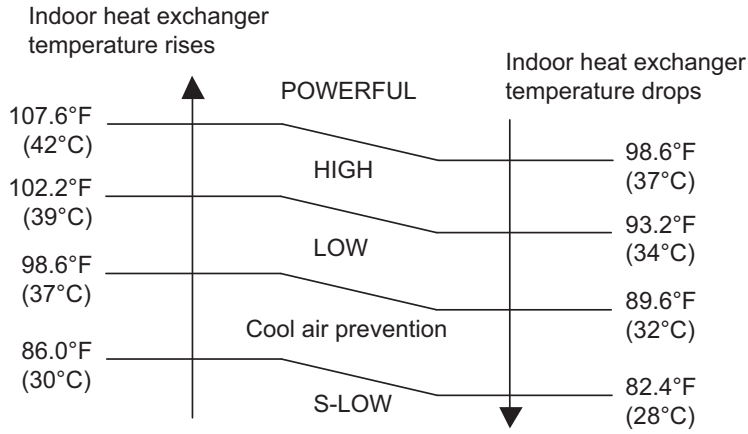
*: Lower speed is selected.

7 minutes later:

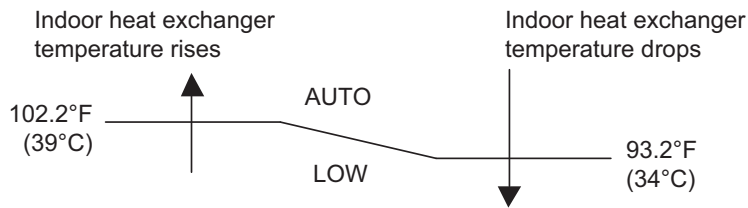


*: Lower speed is selected.

• **Powerful operation**

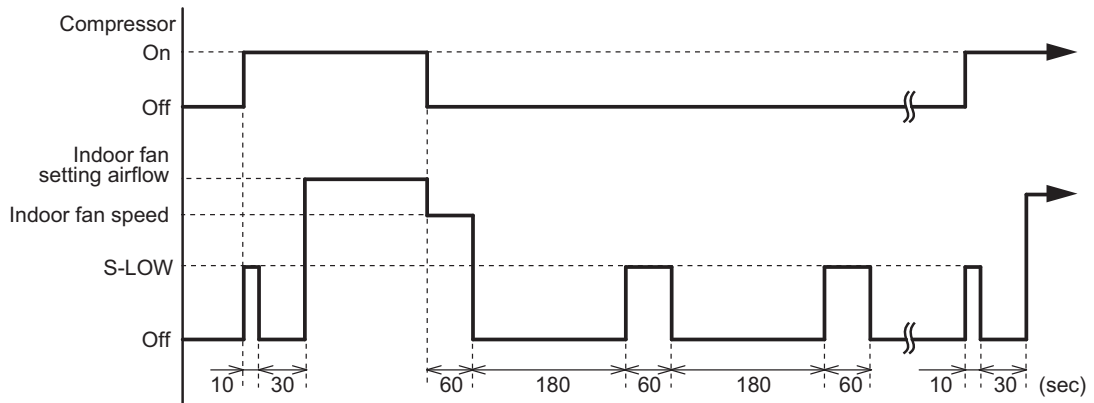


• **MIN. HEAT operation**



■ **Moisture return prevention control (cooling and dry mode)**

Switch the airflow AUTO at cooling mode, and the indoor fan motor will run as shown below.



3-2. Outdoor fan control

■ Outdoor fan motor

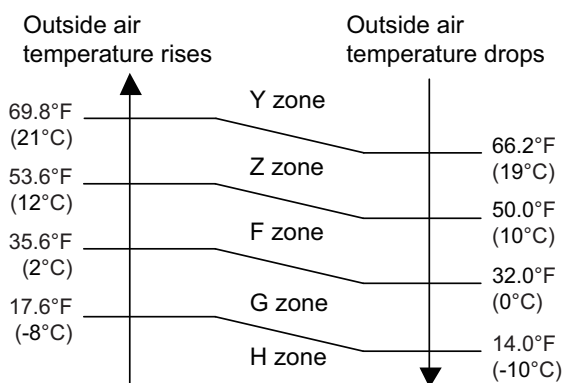
This outdoor unit has a DC fan motor. (Control method is different between AC and DC motors.)

■ Fan speed

● Model: AOUH09LMAS1

Fan speed is defined by outdoor temperature and rotation number of compressor.

• Outside air temperature zone selection



Unit: rpm

Fan step	Cooling	Heating	Dry	Cooling or dry at low outdoor temp.				
	Y zone		Y zone	Z zone	F zone	G zone	H zone	
S-HIGH2	—	1,070	—	—	—	—	—	—
S-HIGH1	990	1,070	—	—	—	—	—	—
HIGH	990	1,070	—	—	—	—	—	—
10	—	1,070	—	—	—	—	—	—
9	990	1,070	990	350	260	200	200	
8	990	1,070	990	350	260	200	200	
7	820	1,040	820	350	260	200	200	
6	820	820	820	250	200	170	170	
5	820	700	820	220	200	170	170	
4	740	610	740	220	200	170	170	
3	660	510	660	220	200	170	170	
2	610	510	610	220	200	170	170	
1	600	510	600	220	200	170	170	

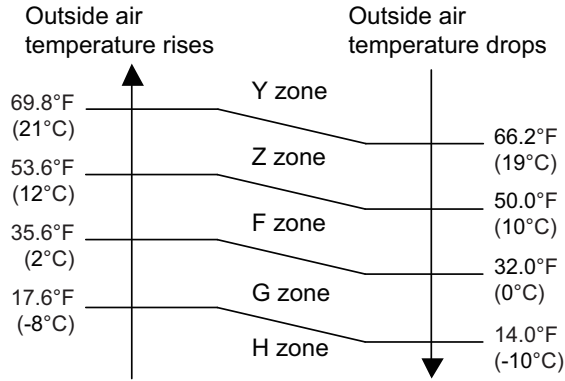
NOTE: After defrost control on the heating mode, the fan speed is kept higher regardless of the compressor rotation number.

Fan speed after defrost control: 1,070 rpm

● Model: AOUH12LMAS1

Fan speed is defined by outdoor temperature and rotation number of compressor.

• **Outside air temperature zone selection**



Unit: rpm

Fan step	Cooling	Heating	Dry	Cooling or dry at low outdoor temp.				
	Y zone		Y zone	Z zone	F zone	G zone	H zone	
S-HIGH2	—	1,120	—	—	—	—	—	—
S-HIGH1	990	1,120	—	—	—	—	—	—
HIGH	990	1,120	—	—	—	—	—	—
10	—	1,120	—	—	—	—	—	—
9	990	1,120	990	390	320	240	240	240
8	940	1,120	940	390	320	240	240	240
7	940	940	940	390	320	240	240	240
6	940	810	940	300	240	200	200	200
5	890	690	890	250	240	200	200	200
4	790	630	790	250	240	200	200	200
3	710	570	710	250	240	200	200	200
2	660	570	660	250	240	200	200	200
1	620	570	620	250	240	200	200	200

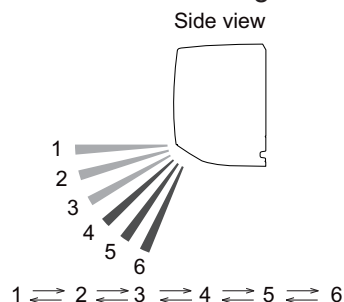
NOTE: After defrost control on the heating mode, the fan speed is kept higher regardless of the compressor rotation number.

Fan speed after defrost control: 1,120 rpm

4. Louver control

4-1. Horizontal louver control

Each time the button is pressed, the airflow direction range will change as below:



- Remote controller display is not changed.
- Up/down airflow direction is set automatically as shown, in accordance with the type of operation selected.

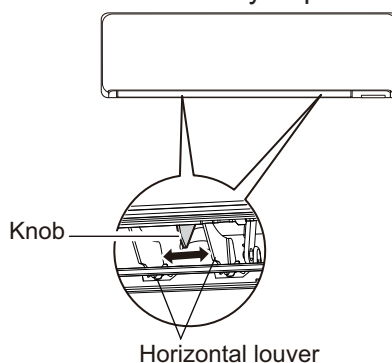
Cooling / Dry mode : Horizontal flow 1

Heating mode : Downward flow 6

- During AUTO operation, for the first a few minutes after beginning operation, airflow will be horizontal 1; the air direction cannot be adjusted during this period. The airflow direction setting will temporarily become 1 when the temperature of the airflow is low at the start of the Heating mode.
- After beginning of AUTO/HEAT mode operated and automatic defrosting operation, the airflow will be horizontal 1. However, the airflow direction cannot be adjusted at beginning AUTO operation mode.

4-2. Adjust the horizontal louver

Move the horizontal louvers to adjust airflow direction you prefer.



4-3. Swing operation

- To select up/down airflow swing operation
When the swing signal is received, the horizontal louver starts to swing.
 - Swinging range
 - Cooling mode/dry mode/fan mode (1 to 3): 1 ↔ 4
 - Heating mode/fan mode (4 to 6): 3 ↔ 6
 - When the indoor fan is S-LOW or stop mode, the swing operation is interrupted and it stops at either upper end or bottom end.

- To select left/right airflow swing operation
No function

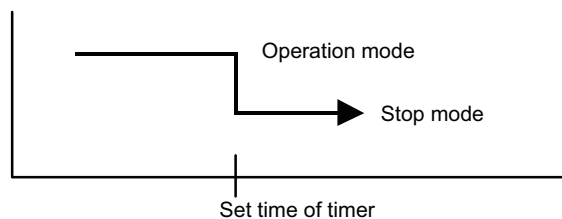
5. Timer operation control

5-1. Wireless remote control

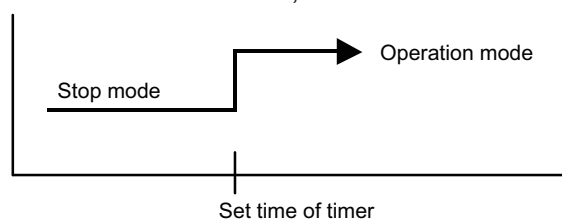
On/Off timer	Program timer	Sleep timer	Weekly timer
○	○	○	—

■ On/Off timer

- Off timer: When the clock reaches the set timer, the air conditioner will be turned off.

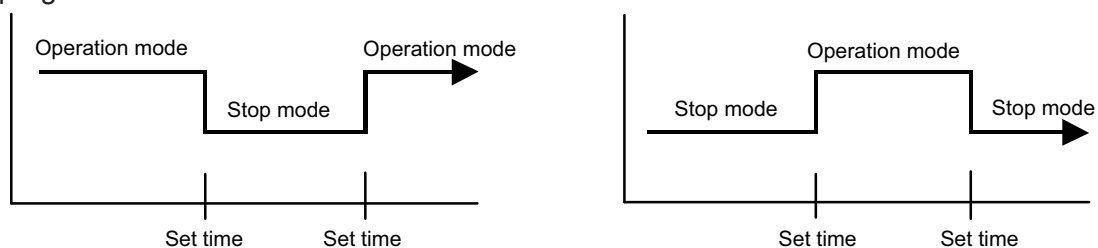


- On timer: When the clock reaches the set timer, the air conditioner will be turned on.



■ Program timer

- The program timer allows the off timer and the on timer to be used in combination one time.



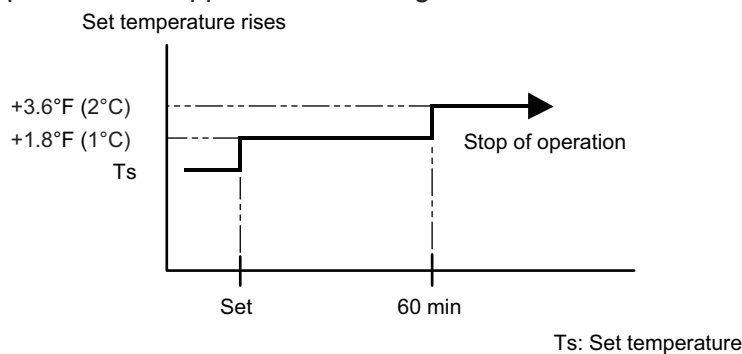
- Operation will start from the timer setting (either off timer and on timer) whichever is closest to the clock current timer setting. The order of operations is indicated by the allow in the remote controller screen.
- Sleep timer operation cannot be combined with on timer operation.

■ Sleep timer

If the sleep timer is set, the room temperature is monitored and the operation is stopped automatically. If the operation mode or the set temperature is change after the sleep timer is set, the operation is continued according to the changed setting of the sleep timer from that time on.

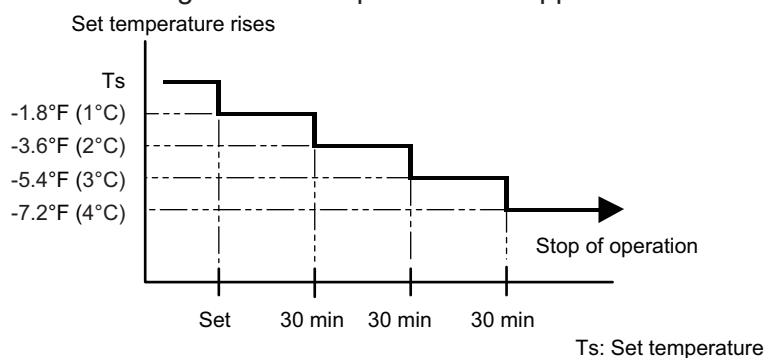
- In the cooling operation mode

When the sleep timer is set, the setting temperature is increased 1.8°F (1°C). It increases the setting temperature another 1.8°F (1°C) after 1 hour. After that, the setting temperature is not changed and the operation is stopped at the setting time.



- In the heating operation mode

When the sleep timer is set, the setting temperature is decreased 1.8°F (1°C). It decreases the setting temperature another 1.8°F (1°C) every 30 minutes. Upon lowering 7.2°F (4°C), the setting temperature is not changed and the operation is stopped at the setting time.



5-2. Wired remote control

For details of timer control for wired remote controller, refer to *Operating Manual* for each controller.

6. Defrost operation control

Tn: Outdoor unit heat exchanger temperature

Ta: Outdoor temperature

Tn10: Temperature at 10 minutes after compressor start

Tnb: Temperature before 5 minutes

• Triggering condition

The defrost operation starts when outdoor unit heat exchanger temperature sensor detects the temperature lower than the values shown below.

– 1st time defrosting after starting operation

Compressor integrating operation time	Less than 17 min.	17 to 57 min.	More than 57 min.
Condition	Does not operate	$T_n \leq 15.8 \text{ °F } (-9 \text{ °C})$ and $T_n - T_a \geq 9.0 \text{ °F } (5 \text{ °C})$	$T_n \leq 23.0 \text{ °F } (-5 \text{ °C})$

– 2nd time and after

Compressor integrating operation time	Less than 40 min.	More than 40 min.
Condition	Does not operate	$T_n - T_{n10} < -9.0 \text{ °F } (-5 \text{ °C})$ ($T_n \leq 21.2 \text{ °F } [-6 \text{ °C}]$) $T_n - T_{nb} < -3.6 \text{ °F } (-2 \text{ °C})$ ($T_n \leq 21.2 \text{ °F } [-6 \text{ °C}]$) $T_n \leq 1.4 \text{ °F } (-17 \text{ °C})$ ($T_a \geq 14.0 \text{ °F } [-10 \text{ °C}]$) $T_n \leq 19.4 \text{ °F } (-7 \text{ °C})$ or $T_n \leq -4.0 \text{ °F } (-20 \text{ °C})$ ($T_a < 14.0 \text{ °F } [-10 \text{ °C}]$)

– Integrating defrost (Constant monitoring)

Compressor integrating operation time	More than 240 min. (For long continuous operation)	More than 215 min. (For long continuous operation)	Less than 10 min.* (For intermittent operation)
Condition	$T_n \leq 26.6 \text{ °F } (-3 \text{ °C})$	$T_n \leq 23.0 \text{ °F } (-5 \text{ °C})$	Count of the compressor off: 40 times

*: If the compressor continuous operation time is less than 10 minutes, the number of the compressor off is counted. If any defrost operated, the compressor off count is cleared.

• Release condition

Depending on the triggering condition, different release conditions apply.

– Normal defrost operation

The defrost operation is released when either one of the conditions below is satisfied.

Outdoor unit heat exchanger temperature (after 1 minute or later since compressor start)	60.8 °F (16 °C) or more ($T_a \leq 33.8 \text{ °F } [1 \text{ °C}]$) 50.0 °F (10 °C) or more ($T_a > 33.8 \text{ °F } [1 \text{ °C}]$)
Compressor operation time	15 minutes

– Integrating defrost (constant monitoring)

The defrost operation is released when either one of the conditions below is satisfied.

Outdoor unit heat exchanger temperature (after 1 minute or later since compressor start)	60.8 °F (16 °C) or more
Compressor operation time	15 minutes

6-1. Defrost operation in heating operation stopped

If the outdoor unit is frosted when stopping the heating operation, it stops after performing the automatic defrosting operation.

In this time, if the indoor unit operation lamp flashes slowly (6 sec on/2 sec off), the outdoor unit allow the heat exchanger to defrost, and then stop.

• Triggering condition

When all of the following conditions are satisfied in heating operation

- Compressor operation integrating time: 30 minutes or more
- Compressor continuous operation time: 10 minutes or more
- Outdoor unit heat exchanger temperature: 24.8 °F (-4 °C) or less

• Release condition

Depending on the triggering condition, different release conditions apply.

– Normal defrost operation

The defrost operation is released when either one of the conditions below is satisfied.

Outdoor unit heat exchanger temperature (after 1 minute or later since compressor start)	60.8 °F (16 °C) or more ($T_a \leq 33.8$ °F [1 °C]) 50.0 °F (10 °C) or more ($T_a > 33.8$ °F [1 °C])
Compressor operation time	15 minutes

– Integrating defrost (constant monitoring)

The defrost operation is released when either one of the conditions below is satisfied.

Outdoor unit heat exchanger temperature (after 1 minute or later since compressor start)	60.8 °F (16 °C) or more
Compressor operation time	15 minutes

7. Various control

7-1. Auto restart

When the power was interrupted by a power failure etc. during operation, the operation contents at that time are memorized and when the power is recovered, operation is automatically started with the memorized operation contents.

Operation contents memorized when the power is interrupted	
Operation mode	
Setting temperature	
Fan mode setting	
Timer mode and set time (set by wireless remote controller)	
Airflow direction setting	
Swing	
ECONOMY operation	
MIN. HEAT operation	
Remote control setting	
WLAN indicator lamp setting	

7-2. MANUAL AUTO operation

When the wireless remote controller is lost or battery power dissipated, this function will work without the remote controller.

When MANUAL AUTO button is pressed more than 3 seconds and less than 10 seconds, MANUAL AUTO operation starts as shown in the table below. To stop operation, press the MANUAL AUTO button for 3 seconds.

Operation mode	Auto changeover
Fan mode	AUTO
Timer mode	Continuous (no timer setting available)
Setting temperature	75.2°F (24°C)
Horizontal louver setting	Standard
SWING	Off
ECONOMY	Off
Human sensor	Off

7-3. Forced cooling operation

The outdoor unit may not operate depending on the room temperature.

When FORCED COOLING OPERATION button is pressed more than 10 seconds, forced cooling operation starts as shown in the table below.

Operation mode	Cooling
Fan mode	HIGH
Timer mode	Continuous (no timer setting available)
Setting temperature	75.2°F (24°C)
Horizontal louver setting	Standard
Vertical louver setting	According to memory position
SWING	Off
ECONOMY	Off
Human sensor	Off

- During the forced cooling operation, it operates regardless of room temperature sensor.
- The operation indicator lamp and the timer indicator lamp blink simultaneously during the forced cooling operation.
They blink for 1 second ON and 1 second OFF on both the operation indicator lamp and the timer indicator lamp (same as test operation).

By performing one of the following action, test operation will be canceled:

- Pressing the remote controller START/STOP button
- Pressing FORCED COOLING OPERATION button for 3 seconds
- 60 minutes passed after starting forced cooling operation

NOTE: When HEAT operation is selected on the remote controller during forced cooling operation, heating test run will begin in about 3 minutes.

7-4. MIN. HEAT operation

MIN. HEAT operation performs as below setting when pressing MIN. HEAT button.

Operation mode	Heating
Setting temperature	50°F (10°C)
Fan mode	AUTO
LED display	Economy
Defrost operation	Operate as normal

7-5. ECONOMY operation

The ECONOMY operation starts by pressing ECONOMY button on the remote controller.

The ECONOMY operation is almost the same operation as below settings.

Mode	Cooling/Dry	Heating
Target temperature	Setting temperature +2°F (1°C)	Setting temperature -2°F (1°C)

7-6. POWERFUL operation

The POWERFUL operation starts by pressing POWERFUL button on the remote controller. The indoor unit and outdoor unit operate at maximum power as shown in the table below.

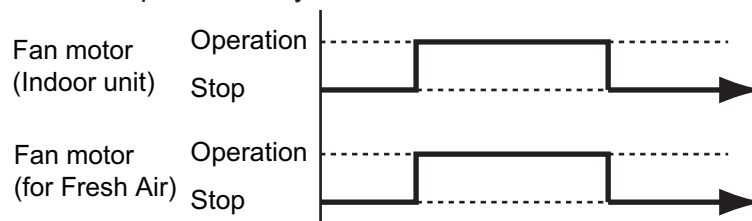
Compressor frequency		Maximum
Fan mode		POWERFUL
Horizontal louver setting	Cooling	3
	Dry	
	Heating	6

Release condition:

- Cooling/Dry
Room temperature \leq Setting temperature -1°F (-0.5°C) or Operation time has passed 20 minutes.
- Heating
Room temperature \geq Setting temperature $+1^{\circ}\text{F}$ ($+0.5^{\circ}\text{C}$) or Operation time has passed 20 minutes.

7-7. Fresh air control

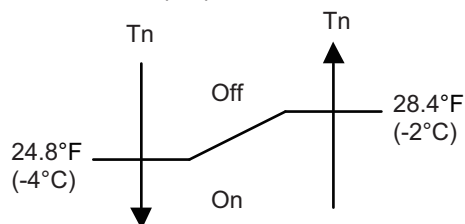
The fan motor for Fresh Air is operated in synchronization with the indoor fan operation as below.



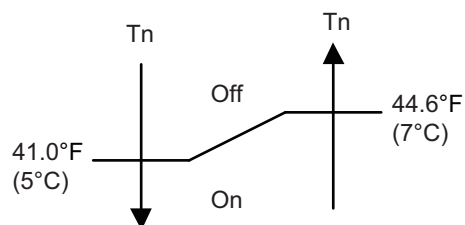
7-8. Compressor preheating

By preheating the compressor, warm airflow is quickly discharged when the operation is started.

- **Triggering condition**
 - 30 minutes after compressor stopped.
 - Outdoor unit heat exchanger temperature (T_n)



When the jumper wire (JM2) is disconnected:



7-9. External electrical heater control

For details of external heater control, refer to ["External input and output"](#) in Chapter 5. FIELD WORKING on page 05-11.

7-10. Electronic expansion valve control

The most proper opening of the electronic expansion valve is calculated and controlled under the present operating condition based on the table below.

Operation mode	Pulse range
Cooling/dry mode	Between 52 and 480 pulses
Heating mode	

NOTE: At the time of supplying the power to the outdoor unit, the initialization of the electronic expansion valve is operated (528 pulses are input to the closing direction).

7-11. Prevention to restart for 3 minutes (3 minutes st)

When the compressor fails to start for the number of times below, it does not enter operation status for 3 minutes.

Retry number	50
Retry set number	3

When the compressor fails to start in the retry set number above, the compressor is stopped.

7-12. 4-way valve control

- If heating mode is selected at the compressor start, 4-way valve is energized for heating.
- When the air conditioner is switched between cooling and heating mode, compressor is stopped, and the 4-way valve is switched when the 140 seconds passes and the compressor is started.

7-13. Unit status monitoring and the detected value indication

The wired remote controller can monitor the indoor and outdoor units' status and display the detected result as a relevant ID.

For details of the display method, refer to the Chapter of "Display Sensor Values" in the *Installation Manual* of Wired Remote Controller (Touch Panel).

The status can be monitored and displayed on the wired remote controller by assigning an arbitrary ID. For available ID list, refer to the table below.

NOTE: Operating time for each part cannot be reset when the part is replaced. Take notes of the operating time before replacing to count the operating time of the replaced part.

Available Sensor ID				
Sensor ID	Item	Unit	Remarks	
00: Indoor unit				
00	000	Suction temp.	01: °F or °C	
00	001	Room temp.	01: °F or °C	When the wired remote controller thermistor is enabled, temperature of the wired remote controller thermistor is displayed.
00	002	Wired remote controller detected temp.	01: °F or °C	
00	006	Heat exchanger middle temp.	01: °F or °C	
00	020	Fan rotation number	03: rpm	
00	080	Indoor unit total energized hours	11: h	
00	081	Total filtering hours	11: h	
00	082	Indoor unit fan total operation hours	11: h	
00	140	Operation or Stop (External input)	00: —	0: Off, 1: On —: When the function setting 46 is not set NOTE: Available only for external input port of the indoor unit
00	142	Forced stop (External input)	00: —	0: Off, 1: On —: When the function setting 46 is not set NOTE: Available only for external input port of the indoor unit
00	143	Operation or Stop 2 (External input)	00: —	0: Off, 1: On —: When the function setting 46 is not set NOTE: Available only for external input port of the indoor unit
00	155	Operation or Stop On/Off (External output)	00: —	0: Off, 1: On NOTE: The value is output even if the function setting or rotary switch is not set.
00	156	Error On/Off (External output)	00: —	0: Off, 1: On NOTE: The value is output even if the function setting or rotary switch is not set.
00	157	Indoor unit fan interlocking On/Off (External output)	00: —	0: Off, 1: On NOTE: The value is output even if the function setting or rotary switch is not set.
00	158	Cooling thermostat On/Off (External output)	00: —	0: Off, 1: On NOTE: The value is output even if the function setting or rotary switch is not set.

Available Sensor ID				
Sensor ID		Item	Unit	Remarks
00	159	Requested cooling strength On/Off (External output)	00: —	0: Off, 1: On NOTE: The value is output even if the function setting or rotary switch is not set.
00	160	External heater On/Off (External output)	00: —	0: Off, 1: On NOTE: The value is output even if the function setting or rotary switch is not set.
00	161	Heating operation status (External output)	00: —	0: Off, 1: On NOTE: The value is output even if the function setting or rotary switch is not set.
00	162	External output command by remote controller (External output)	00: —	0: Off, 1: On NOTE: The value is output even if the function setting or rotary switch is not set.
00	163	Set-point temp. not reached in server room function On/Off (External output)	00: —	0: Off, 1: On NOTE: The value is output even if the function setting or rotary switch is not set.
01: Outdoor unit				
01	001	Discharge temp.	01: °F or °C	
01	003	Heat exchanger middle temp.	01: °F or °C	
01	004	Heat exchanger outlet temp.	01: °F or °C	
01	007	Compressor temp.	01: °F or °C	
01	042	Gas pipe pressure for outdoor unit	02: MPa	
01	050	Fan 1 rotation number	03: rpm	
01	055	Compressor rotation number	04: rps	
01	060	Expansion valve (Upstream during heating)	05: pls	
01	080	4-way valve output status	07: Cooling/ Heating	0: Cooling, 1: Heating
01	085	Pressure switch (High pressure)	08: On/Off	0: Off (Close), 1: On (Open)
01	100	Operating current	09: A	
01	110	Outdoor unit total power-on hours	11: h	
01	111	Compressor total heating operation hours	11: h	
01	112	Compressor total cooling operation hours	11: h	
01	113	Compressor total operation hours	11: h	
01	114	Outdoor unit fan 1 total operation hours	11: h	
01	145	Outdoor low noise input (External input)	00: —	0: Off, 1: On
01	146	Outdoor peak cut (External input)	00: —	0: Off 1: Mode 4 (100%) 2: Mode 3 (75%) 3: Mode 2 (50%) 4: Mode 1 (Forced thermostat off)
01	147	Demand response (External input)	00: —	0: Normal, 1: DRM1, 2: DRM2, 3: DRM3
01	148	Switching cooling and heating mode (External input)	00: —	0: Cooling, 1: Heating
01	149	Emergency stop (External input)	00: —	0: Off, 1: On
01	155	Compressor status (External output)	00: —	0: Off, 1: On
01	156	Error status (External output)	00: —	0: Off, 1: On

8. Various protections

8-1. Discharge gas temperature over-rise prevention control

The discharge gas temperature sensor (discharge thermistor: outdoor unit side) detects the discharge gas temperature.

- When the discharge temperature becomes higher than the trigger condition, the compressor frequency is decreased as the table below, and it continues to decrease until the discharge temperature becomes lower than the trigger condition.
- When the discharge temperature becomes lower than the release condition, control of compressor frequency is released.
- When the discharge temperature becomes higher than the compressor protection temperature, the compressor is stopped and the indoor unit indicator lamp starts blinking.

Trigger condition	219.2°F (104°C)
Compressor frequency	-20 rps/120 seconds
Release condition	213.8°F (101°C)
Compressor protection temperature	230.0°F (110°C)

8-2. Anti-freezing control (cooling and dry mode)

The rotation number of compressor is decrease in cooling and dry mode when the indoor unit heat exchanger temperature sensor detects the temperature lower than the trigger condition.

When the indoor unit heat exchanger temperature reaches release condition, the anti-freezing control is stopped.

Trigger condition		39.2°F (4°C)
Release condition	Outdoor temp. \geq 50°F (10°C)*1	44.6°F (7°C)
	Outdoor temp. \geq 53.6°F (12°C)*2	
	Outdoor temp. $<$ 50°F (10°C)*1	55.4°F (13°C)
	Outdoor temp. $<$ 53.6°F (12°C)*2	

*1: During the outdoor temperature dropping

*2: During the outdoor temperature rising

8-3. Current release control

The rotation number of compressor is controlled so that the outdoor unit input current does not exceeds current limit value set according to the outdoor temperature.

The rotation number of compressor returns according to the operation mode, when the current becomes lower than the release value.

■ Model: AOUH09LMAS1

Operation mode	Outdoor temp. (Ta)	Trigger condition	Release condition
Cooling	$122.0^{\circ}\text{F} (50^{\circ}\text{C}) \leq \text{Ta}$	3.5 A	3.0 A
	$114.8^{\circ}\text{F} (46^{\circ}\text{C}) \leq \text{Ta} < 122.0^{\circ}\text{F} (50^{\circ}\text{C})$	3.5 A	3.0 A
	$104.0^{\circ}\text{F} (40^{\circ}\text{C}) \leq \text{Ta} < 114.8^{\circ}\text{F} (46^{\circ}\text{C})$	4.0 A	3.5 A
	$53.6^{\circ}\text{F} (12^{\circ}\text{C}) \leq \text{Ta} < 104.0^{\circ}\text{F} (40^{\circ}\text{C})$	5.5 A	5.0 A
	$35.6^{\circ}\text{F} (2^{\circ}\text{C}) \leq \text{Ta} < 53.6^{\circ}\text{F} (12^{\circ}\text{C})$	5.5 A	5.0 A
	$\text{Ta} < 35.6^{\circ}\text{F} (2^{\circ}\text{C})$	5.5 A	5.0 A
Heating	$62.6^{\circ}\text{F} (17^{\circ}\text{C}) \leq \text{Ta}$	5.5 A	5.0 A
	$53.6^{\circ}\text{F} (12^{\circ}\text{C}) \leq \text{Ta} < 62.6^{\circ}\text{F} (17^{\circ}\text{C})$	6.0 A	5.5 A
	$41.0^{\circ}\text{F} (5^{\circ}\text{C}) \leq \text{Ta} < 53.6^{\circ}\text{F} (12^{\circ}\text{C})$	7.0 A	6.5 A
	$\text{Ta} < 41.0^{\circ}\text{F} (5^{\circ}\text{C})$	7.0 A	6.5 A

■ Model: AOUH12LMAS1

Operation mode	Outdoor temp. (Ta)	Trigger condition	Release condition
Cooling	$122.0^{\circ}\text{F} (50^{\circ}\text{C}) \leq \text{Ta}$	4.0 A	3.5 A
	$114.8^{\circ}\text{F} (46^{\circ}\text{C}) \leq \text{Ta} < 122.0^{\circ}\text{F} (50^{\circ}\text{C})$	4.0 A	3.5 A
	$104.0^{\circ}\text{F} (40^{\circ}\text{C}) \leq \text{Ta} < 114.8^{\circ}\text{F} (46^{\circ}\text{C})$	5.0 A	4.5 A
	$53.6^{\circ}\text{F} (12^{\circ}\text{C}) \leq \text{Ta} < 104.0^{\circ}\text{F} (40^{\circ}\text{C})$	6.0 A	5.5 A
	$35.6^{\circ}\text{F} (2^{\circ}\text{C}) \leq \text{Ta} < 53.6^{\circ}\text{F} (12^{\circ}\text{C})$	6.0 A	5.5 A
	$\text{Ta} < 35.6^{\circ}\text{F} (2^{\circ}\text{C})$	6.0 A	5.5 A
Heating	$62.6^{\circ}\text{F} (17^{\circ}\text{C}) \leq \text{Ta}$	5.5 A	5.0 A
	$53.6^{\circ}\text{F} (12^{\circ}\text{C}) \leq \text{Ta} < 62.6^{\circ}\text{F} (17^{\circ}\text{C})$	7.0 A	6.5 A
	$41.0^{\circ}\text{F} (5^{\circ}\text{C}) \leq \text{Ta} < 53.6^{\circ}\text{F} (12^{\circ}\text{C})$	7.5 A	7.0 A
	$\text{Ta} < 41.0^{\circ}\text{F} (5^{\circ}\text{C})$	8.5 A	8.0 A

8-4. Cooling pressure over-rise protection

When the outdoor unit heat exchanger temperature reaches trigger condition below, the compressor is stopped and trouble display is performed.

Trigger condition	149.0°F (65°C)
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8-5. Low outdoor temperature protection

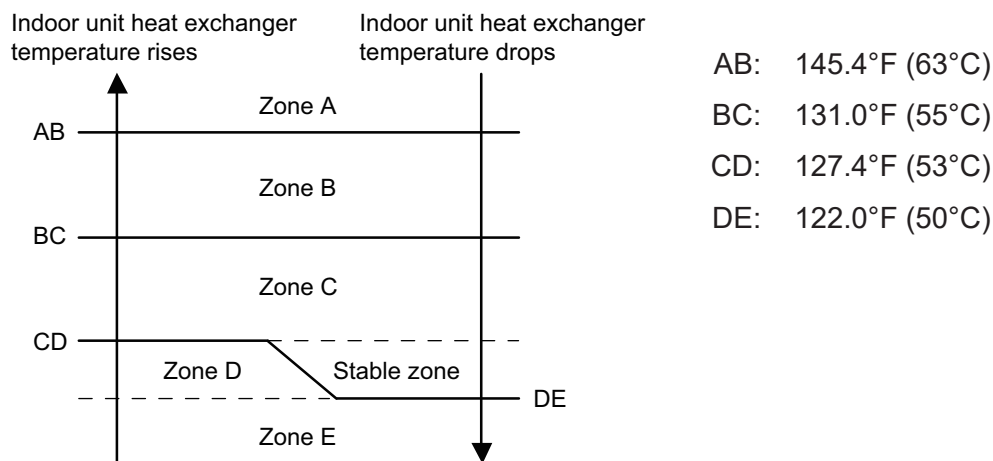
When the outdoor temperature sensor detects lower than the trigger condition below, the compressor is stopped.

Operation mode	Cooling/Dry
Trigger condition	5°F (-15°C)
Release condition	14°F (-10°C)

8-6. High temperature and high pressure release control

The compressor is controlled as follows.

■ Models: AOUH09LMAS1 and AOUH12LMAS1



Zone	Operation	
Zone A	Compressor is stopped.	
Zone B	The rotation number of compressor is decreased.	-25 rps/120 sec.
Zone C		-3 rps/60 sec.
Zone D	The protection is released and the operation is returned to normal mode.	
Zone E		

5. FILED WORKING

CONTENTS

5. FILED WORKING

1. Function settings	05-1
1-1. Function settings by using remote controller	05-1
1-2. Custom code setting for wireless remote controller	05-10
2. External input and output	05-11
2-1. External input.....	05-12
2-2. External output	05-14
2-3. Combination of external input and output	05-16
2-4. Details of function	05-18

1. Function settings

To adjust the functions of this product according to the installation environment, various types of function settings are available.

NOTE: Incorrect settings can cause a product malfunction.

1-1. Function settings by using remote controller

Some function settings can be changed on the remote controller. After confirming the setting procedure and the content of each function setting, select appropriate functions for your installation environment.

■ Setting procedure by using wireless remote controller

The function number and the associated setting value are displayed on the LCD of the remote controller. Follow the instructions written in the local setup procedure supplied with the remote controller, and select appropriate setting according to the installation environment.

Before connecting the power supply of the indoor unit, reconfirm following items:

- Cover for the electrical enclosure on the outdoor unit is in place.
- There is no wiring mistake.
- Piping air tightness test and vacuuming have been performed firmly.
- All the necessary wiring work for outdoor unit has been finished.

After reconfirming the items listed above, connect the power supply of the indoor unit.

NOTES:

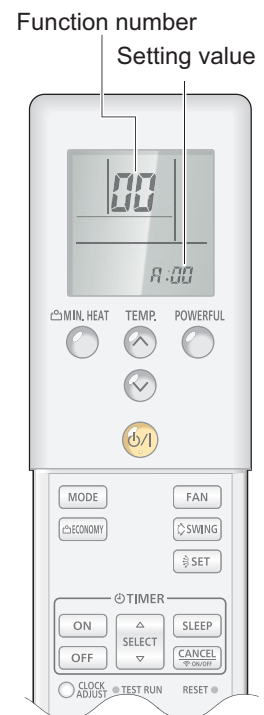
- Settings will not be changed if invalid numbers or setting values are selected.
- When optional wired remote controller is used, refer to the installation manual enclosed with the remote controller.

Entering function setting mode:

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

Selecting the function number and setting value:

1. Press the MIN. HEAT button. TEMP. (^) (v) 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 value setting. To return the function number selection, press the POWERFUL button again.
3. Press the TEMP. (^) (v) buttons to select the setting value. To switch between the left and right digits, press the MIN. HEAT button.
4. Press the MODE button once. Confirm that you hear the beep sound.
5. Press the START/STOP button to fix the function setting. Confirm that you hear the beep sound.
6. Press the RESET button to end the function setting mode.
7. After completing the function setting, be sure to disconnect the power supply and then reconnect it.



⚠ CAUTION

After disconnecting the power supply, wait 30 seconds or more before reconnecting it. The function setting will not become active unless the power supply is disconnected and then reconnected.

NOTES:

- The air conditioner custom code is set to \overline{H} prior to shipment.
- If you do not know the air conditioner custom code setting, try each of the custom codes ($\overline{H} \rightarrow \overline{b}$
 $\rightarrow \overline{c} \rightarrow \overline{d}$) until you find the code that operates the air conditioner.

■ Contents of function setting

Each function setting listed in this section is adjustable in accordance with the installation environment.

NOTE: Setting will not be changed if invalid numbers or setting values are selected.

● Function setting list

	Function no.	Functions
1)	11	Filter sign
2)	30/31	Room temperature control for indoor unit sensor
3)	35/36	Room temperature control for wired remote controller sensor
4)	40	Auto restart
5)	42	Room temperature sensor switching
6)	44	Remote controller custom code
7)	46	External input control
8)	48	Room temperature sensor switching (Aux.)
9)	49	Indoor unit fan control for energy saving for cooling
10)	60	Switching functions for external output terminal
11)	61	Control switching of external heaters
12)	62	Operating temperature switching of external heaters
13)	66	Outdoor temperature zone boundary temperature A
14)	67	Outdoor temperature zone boundary temperature B
15)	71	Standby time for auxiliary equipment operation
16)	72	Heat pump backup setting
17)	73	Emergency heat for external output terminal
18)	94	Fixed operation mode switching
19)	95	Heat insulation condition (building insulation)

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).

Function number	Setting value	Setting description	Factory setting
11	00	Standard (400 hours)	
	01	Long interval (1,000 hours)	
	02	Short interval (200 hours)	
	03	No indication	◆

2) Room temperature control for indoor unit sensor

NOTE: Before performing this setting, refer to Function 95.

Depending on the installed environment, correction of the room temperature sensor may be required. Select the appropriate control setting according to the installed environment.

The temperature of the room temperature sensor is corrected as follows:

Corrected temp. = Temp. of the room temp. sensor - Correction temp. value

Example of correction:

When the temperature of the room temp. sensor is 78°F and the setting value is "03" (-2°F), the corrected temp. will be 80°F (78°F - [-2°F]).

The temperature correction values show the difference from the Standard setting "00" (manufacturer's recommended value).

*When Function 95-01 (High insulation) is set, the Standard setting "00" will be the same as "No correction 0.0 °F (0.0 °C)" (01).

Function number		Setting value	Setting description	Factory setting	
30 (For cooling)	31 (For heating)	00	Standard setting*	◆	
		01	No correction 0.0 °F (0.0 °C)		
		02	-1 °F (-0.5 °C)	More cooling Less heating	
		03	-2 °F (-1.0 °C)		
		04	-3 °F (-1.5 °C)		
		05	-4 °F (-2.0 °C)		
		06	-5 °F (-2.5 °C)		
		07	-6 °F (-3.0 °C)		
		08	-7 °F (-3.5 °C)		
		09	-8 °F (-4.0 °C)		
		10	+1 °F (+0.5 °C)	Less cooling More heating	
		11	+2 °F (+1.0 °C)		
		12	+3 °F (+1.5 °C)		
		13	+4 °F (+2.0 °C)		
		14	+5 °F (+2.5 °C)		
		15	+6 °F (+3.0 °C)		
		16	+7 °F (+3.5 °C)		
17	+8 °F (+4.0 °C)				

3) Room temperature control for wired remote controller sensor

NOTE: Before performing this setting, refer to Function 95.

Depending on the installed environment, correction of the wire remote temperature sensor may be required. Select the appropriate control setting according to the installed environment.

To change this setting, set Function 42 to "Both" (01).

Ensure that the Thermo Sensor icon is displayed on the remote controller screen.

*When Function 95-01 (High insulation) is set, the Standard setting "00" will be the same as "No correction 0.0 °C" (01).

Function number		Setting value	Setting description	Factory setting	
35 (For cooling)	36 (For heating)	00	Standard setting*	◆	
		01	No correction 0.0 °F (0.0 °C)		
		02	-1 °F (-0.5 °C)	More cooling Less heating	
		03	-2 °F (-1.0 °C)		
		04	-3 °F (-1.5 °C)		
		05	-4 °F (-2.0 °C)		
		06	-5 °F (-2.5 °C)		
		07	-6 °F (-3.0 °C)		
		08	-7 °F (-3.5 °C)		
		09	-8 °F (-4.0 °C)		
		10	+1 °F (+0.5 °C)	Less cooling More heating	
		11	+2 °F (+1.0 °C)		
		12	+3 °F (+1.5 °C)		
		13	+4 °F (+2.0 °C)		
		14	+5 °F (+2.5 °C)		
		15	+6 °F (+3.0 °C)		
		16	+7 °F (+3.5 °C)		
17	+8 °F (+4.0 °C)				

4) Auto restart

Enables or disables automatic restart after a power interruption.

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

NOTE: 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 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).

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

00: Sensor on the indoor unit is active.

01: Sensors on both indoor unit and wired remote controller are active.

NOTE: 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.

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

7) External input control

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

Function number	Setting value	Setting description	Factory setting
46	00	Operation/Stop mode 1 (R.C. enabled)	◆
	01	(Setting prohibited)	
	02	Forced stop mode	
	03	Operation/Stop mode 2 (R.C. disabled)	

8) Room temperature sensor switching (Aux.)

To use the temperature 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).

When the setting value is set to "Both" (00), more suitable control of the room temperature is possible by setting function setting 30 and 31 too.

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

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.

Function number	Setting value	Setting description	Factory setting
49	00	Disable	
	01	Enable	
	02	Remote controller	◆

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.

02: Enable or disable this function by remote controller setting.

NOTES:

- As the factory setting, this setting is initially invalidated.
- Set to "00" or "01" when connecting a remote controller that cannot set the Fan control for energy saving function or connecting a network converter.
To confirm if the remote controller has this setting, refer to the operating manual of each remote controller.

10) Switching functions for external output terminal

Functions of the external output terminal can be switched. For details, refer to “External input and output”.

Function number	Setting value	Setting description	Factory setting
60	00	Operation status	◆
	01—04	Cooling thermostat On	
	05	Heating operation	
	06	Operation/Stop	
	07—08	Cooling thermostat On	
	09	Error status	
	10	Indoor unit fan operation status	
	11	External heater	

11) Control switching of external heaters

Sets the control method for external heater to be used.

For details, refer to “External heater output” in [Chapter 2-4. "Details of function"](#) on page 05-18.

Function number	Setting value	Setting description	Factory setting
61	00	Auxiliary heater control 1	◆
	01	Auxiliary heater control 2	
	02	Heat pump prohibition control	
	03	Auxiliary heater control by outdoor temperature 1	
	04	Auxiliary heater control by outdoor temperature 2	
	05	Auxiliary heater control by outdoor temperature 3	
	06	Auxiliary heat pump control	
	07	Auxiliary heat pump control by outdoor temperature 1	
	08	Auxiliary heat pump control by outdoor temperature 2	
	09	Auxiliary heat pump control by outdoor temperature 3	

12) Operating temperature switching of external heaters

Sets the temperature conditions when the external heater is ON.

For details, refer to “External heater output” in [Chapter 2-4. "Details of function"](#) on page 05-18.

Function number	Setting value	Setting description		Factory setting
		Heater: On	Heater: Off	
62	00	-5.4 °F (-3 °C)	-1.8 °F (-1 °C)	◆
	01	-3.6 °F (-2 °C)	-1.8 °F (-1 °C)	
	02	-3.6 °F (-2 °C)	-1.8 °F (-1 °C)	
	03	-5.4 °F (-3 °C)	-1.8 °F (-1 °C)	
	04	-7.2 °F (-4 °C)	-1.8 °F (-1 °C)	
	05	-9.0 °F (-5 °C)	-1.8 °F (-1 °C)	

13) Outdoor temperature zone boundary temperature A

Setting required if changing of the outdoor temperature setting for heat pump prohibition zone is required when auxiliary heater control by outdoor temperature 1 and 2 are performed on the indoor unit. For details, refer to "External heater output" in [Chapter 2-4. "Details of function"](#) on page 05-18.

Function number	Setting value	Setting description	Factory setting
66	00	-4.0 °F (-20 °C)	◆
	01	-0.4 °F (-18 °C)	
	02	3.2 °F (-16 °C)	
	03	6.8 °F (-14 °C)	
	04	10.4 °F (-12 °C)	
	05	14.0 °F (-10 °C)	
	06	17.6 °F (-8 °C)	
	07	21.2 °F (-6 °C)	
	08	24.8 °F (-4 °C)	

14) Outdoor temperature zone boundary temperature B

Setting required if changing of the outdoor temperature setting for heat pump only zone is required when auxiliary heater control by outdoor temperature 1 is performed on the indoor unit. For details, refer to "External heater output" in [Chapter 2-4. "Details of function"](#) on page 05-18.

Function number	Setting value	Setting description	Factory setting
67	00	42.8 °F (6 °C)	◆
	01	14.0 °F (-10 °C)	
	02	17.6 °F (-8 °C)	
	03	21.2 °F (-6 °C)	
	04	24.8 °F (-4 °C)	
	05	28.4 °F (-2 °C)	
	06	32.0 °F (0 °C)	
	07	35.6 °F (2 °C)	
	08	39.2 °F (4 °C)	
	09	42.8 °F (6 °C)	
	10	46.4 °F (8 °C)	
	11	50.0 °F (10 °C)	
	12	53.6 °F (12 °C)	
	13	57.2 °F (14 °C)	
	14	60.8 °F (16 °C)	
	15	64.4 °F (18 °C)	

15) Standby time for auxiliary equipment operation

Sets the standby time until the auxiliary equipment operation starts during primary equipment operation.

For details, refer to [Chapter 2-4. "Details of function"](#) on page 05-18.

Function number	Setting value	Setting description	Factory setting
71	00	Disable	◆
	01	1 minute	
	02	2 minutes	
	•	•	
	•	•	
	•	•	
	98	98 minutes	
	99	99 minutes	

16) Heat pump backup setting

Enables or disables the heat pump backup instruction from the outdoor unit.

This function will be usable provided that the corresponding outdoor unit is connected.

Function number	Setting value	Setting description	Factory setting
72	00	Disable	◆
	01	Enable	

17) Emergency heat for external output terminal

Enables or disables emergency heat input.

Function number	Setting value	Setting description	Factory setting
73	00	Disable	◆
	01	Enable	

NOTE: When this function is used, IR Receiver Unit is necessary.

18) Fixed operation mode switching

Sets the operation mode to heat pump, heating only, or cooling only.

Function number	Setting value	Setting description	Factory setting
94	00	Heat pump	◆
	01	Heating only	
	02	Cooling only	

19) Heat insulation condition (building insulation)

Heat insulation conditions differ according to the installed environment.

"Standard insulation" (00) allows system to rapidly respond to the cooling or heating load changes.

"High insulation" (01) is when the heat insulation structure of the building is high and does not require system to rapidly respond to cooling or heating load changes.

When "High insulation" (01) is selected:

- Overheating (overcooling) is prevented at the start-up.
- All room-temperature control settings (Function 30, 31, 35, and 36) will reset to "No correction 0.0 °F (0.0 °C)".

Function number	Setting value	Setting description	Factory setting
95	00	Standard insulation	◆
	01	High insulation	

NOTE: When changing Function 95, perform this setting before other room-temperature control settings (Function 30, 31, 35, and 36). If Function 95 is not set first, room-temperature control settings (Function 30, 31, 35, and 36) will be reset and you must re-do them again.

1-2. Custom code setting for wireless remote controller

To interconnect the air conditioner and the wireless remote controller, assignment of the custom code for the wireless remote controller is required.

NOTE: Air conditioner cannot receive a signal if the air conditioner has not been set for the custom code.

When 2 or more air conditioners are installed in a room, and the remote controller is operating an air conditioner other than the one you wish to set, change the custom code of the remote controller to operate only the air conditioner you wish to set. (4 selections possible.)

Confirm the setting of the remote controller custom code and the function setting. If these do not match, the remote controller cannot be used to operate for the air conditioner.

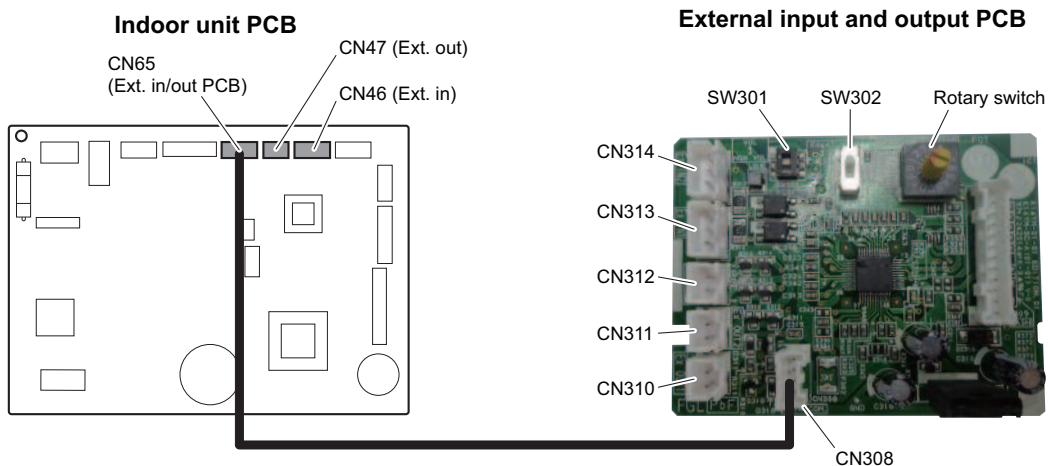
1. Press the START/STOP button until only the clock is displayed on the remote controller display.
2. Press the MODE button for at least 5 seconds to display the current custom code. (Initially set to H .)
3. Press the TEMP. (\wedge) (\vee) buttons to change the custom code between $\text{H} \rightarrow \text{b} \rightarrow \text{c} \rightarrow \text{d}$. Match the code on the display to the air conditioner custom code. (Initially set to H .)
4. Press the MODE button again to return to the clock display. The custom code will be changed.



NOTES:

- If no button is pressed within 30 seconds after the custom code is displayed, the system returns to the original clock indicator. In this case, start again from step 1.
- The air conditioner custom code is set to H prior to shipment. To change the custom code, contact your retailer.
- If you do not know the assigned code for the air conditioner, try each of the custom code ($\text{H} \rightarrow \text{b} \rightarrow \text{c} \rightarrow \text{d}$) until you find the code which operates the air conditioner.

2. External input and output



PCB	External input	External output	Connector	Input select	Input signal
Indoor unit	Operation/Stop	—	CN46	Dry contact	Edge
	Forced stop				
	—	Operation status	CN47	—	—
		Error status			
		Indoor unit fan operation status			
		Cooling thermostat On			
Heating thermostat On	External heater output				
External input and output (UTY-XCSXZ2)	Operation/Stop	—	CN313/ CN314	Dry contact/ Apply voltage	Edge/Pulse
	Forced stop		CN313		Edge
	Forced thermostat off				
	—	Operation status	CN310/ CN311/ CN312	—	—
		Error status			
		Indoor unit fan operation status			
		External heater output			
		Remote controller output			
Cooling high/low output	Heating thermostat On				

FIELD WORKING

FIELD WORKING

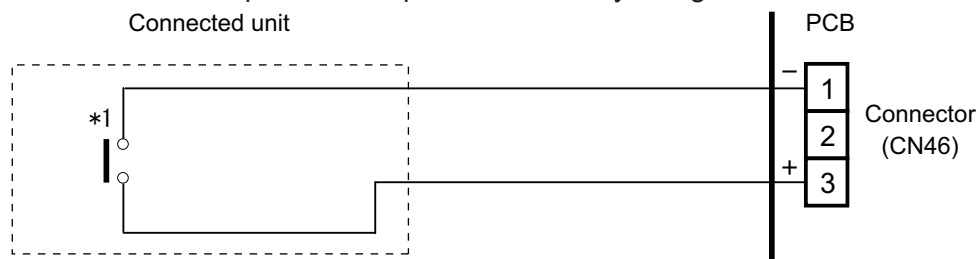
2-1. External input

With using external input function, some functions on this product can be controlled from an external device.

- "Operation/Stop" mode or "Forced stop" mode can be selected with function setting of indoor unit.
- A twisted pair cable (22AWG) should be used. Maximum length of cable is 492 ft (150 m).
- The wire connection should be separate from the power cable line.

■ Indoor unit

Indoor unit functions such as Operation/Stop can be done by using indoor unit connectors.



*1: The switch can be used on the following condition: DC 12 V to 24 V, 1 mA to 15 mA.

External Input and Output PCB

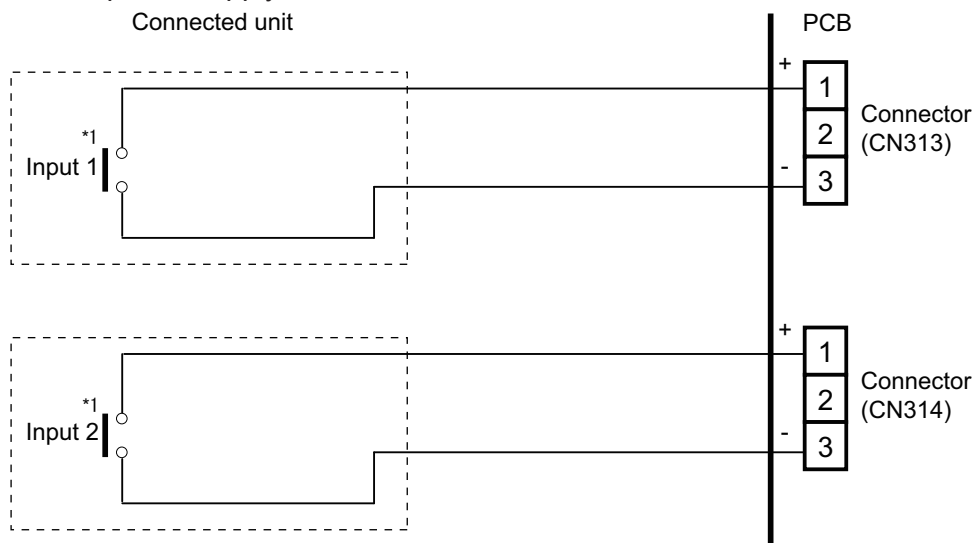
The indoor unit Operation/Stop can be set by using the input connector on the PCB.

• Input select:

Use either one of these types of connectors according to the application. (Both types of connectors cannot be used simultaneously.)

– Dry contact

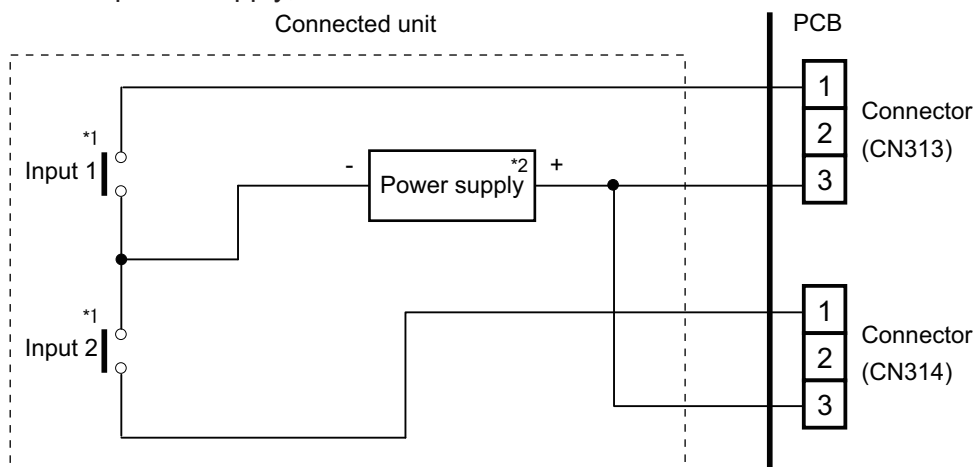
In case of internal power supply, set the slide switch of SW301 to "NON VOL" side.



*1: The switches can be used on the following condition: DC 12 V to 24 V, 1 mA to 15 mA.

– Apply voltage

In case of external power supply, set the slide switch of SW301 to "VOL" side.



*1: The switches can be used on the following condition: DC 12 V to 24 V, 1 mA to 15 mA.

*2: Make the power supply DC 12 to 24 V, 10 mA or more.

2-2. External output

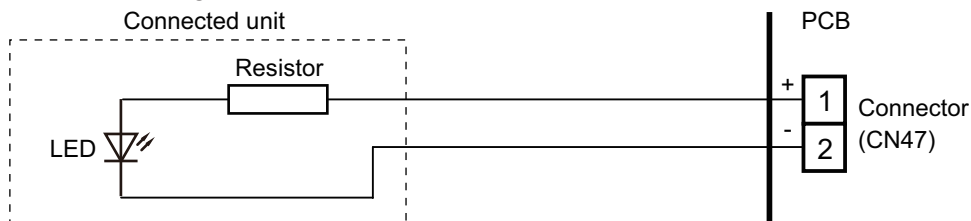
Use an external output cable with appropriate external dimension, depending on the number of cables to be installed.

■ Indoor unit

- A twisted pair cable (22AWG) should be used. Maximum length of cable is 82 ft (25 m).
- Output voltage: High DC 12 V \pm 2 V, Low 0 V.
- Permissible current: 50 mA
- For details, refer to ["Combination of external input and output"](#) on page 05-16.

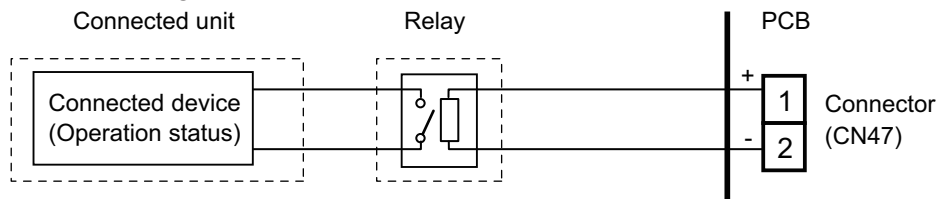
● When indicator or other components are connected directly

Example: Function setting 60 is set to "00"



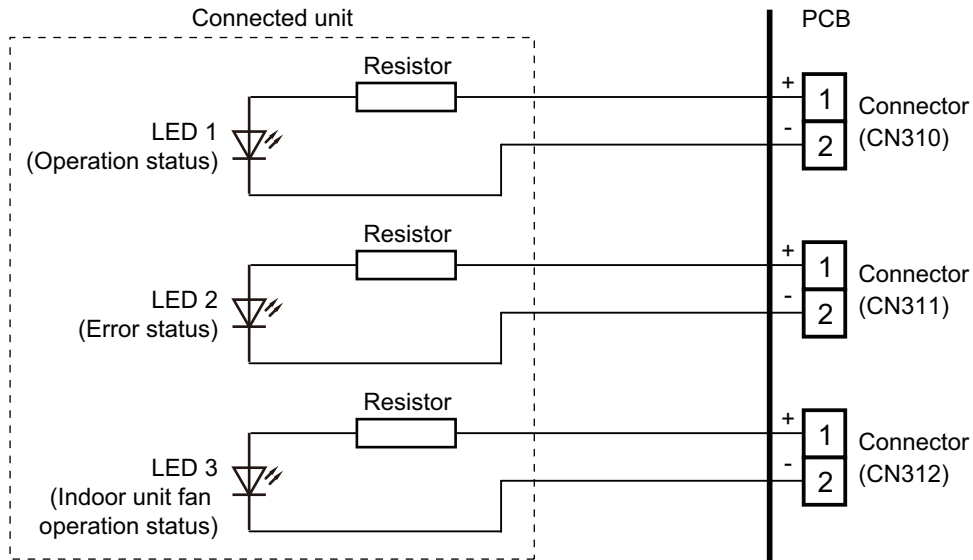
● When connecting with a device equipped with a power supply

Example: Function setting 60 is set to "00"

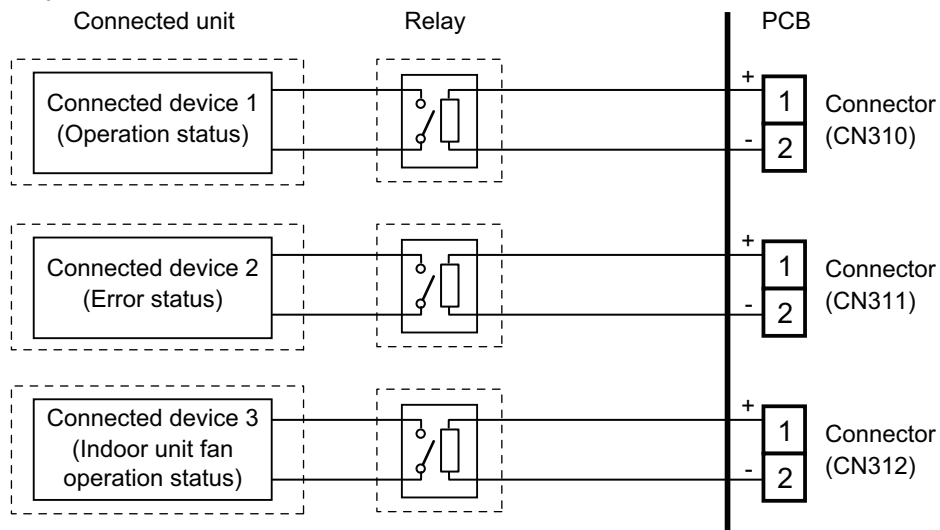


External Input and Output PCB

- A twisted pair cable (22AWG) should be used. Maximum length of cable is 82 ft (25 m).
 - Output voltage: High DC 12 V \pm 2 V, Low 0 V.
 - Permissible current: 50 mA
 - For details, refer to "[Combination of external input and output](#)" on page 05-16.
- **When indicator or other components are connected directly:**
Example: Rotary SW on External Input and Output PCB is set to "1".



- **When connecting with a device equipped with a power supply:**
Example: Rotary SW on External Input and Output PCB is set to "1".



2-3. Combination of external input and output

By combining the function setting of the indoor unit and rotary switch setting of the External Input and Output PCB, you can select various combinations of functions.

Combination examples of external input and output are as follows:

Mode	Function setting	Rotary SW	External input		
			Indoor unit	External Input and Output PCB	
			CN46	1 CN313	2 CN314
0-1	60—00	1	Operation/Stop mode1 (Function setting 46-00) or Forced stop mode (Function setting 46-02) or Operation/Stop mode2 (Function setting 46-03)	Operation/Stop	Not available
0-2	60-00	2		Operation	Stop
1	60-01	3		Forced thermostat Off	Not available
2	60-02	4		Mechanical cooling Off	
3	60-03	5		Forced thermostat Off	
4	60-04	6		Mechanical cooling On	
5	60-05	7		Forced thermostat Off	
6	60-06	8		Forced thermostat Off	
7	60-07	9		Mechanical cooling Off	
8	60-08	A		Forced thermostat Off	
9	60-09	B		Forced thermostat Off	
10	60-10	C	Forced thermostat Off		
11	60-11	D	Forced thermostat Off		

NOTE: Input of Operation/Stop depends on the setting of function setting 46.

00: Operation/Stop mode 1 (Remote controller enabled)

01: (Setting prohibited)

02: Forced stop

03: Operation/Stop mode 2 (Remote controller disabled)

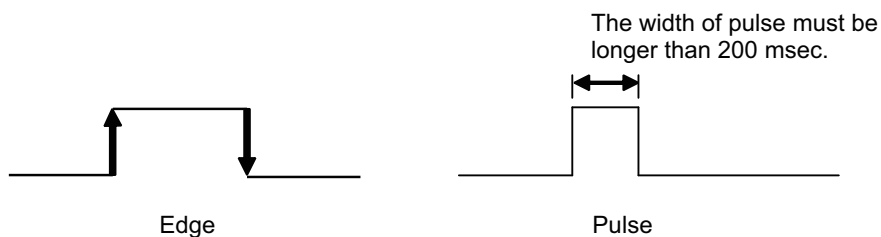
Mode	Function setting	Rotary SW	External output			
			Indoor unit	External Input and Output PCB		
			CN47	1 CN310	2 CN311	3 CN312
0-1	60-00	1	Operation/Stop	Operation/Stop	Error status	Indoor unit fan operation status
0-2	60-00	2	Operation/Stop	Error status	Indoor unit fan operation status	External heater output
1	60-01	3	Cooling thermostat On	Error status	Indoor unit fan operation status	External heater output
2	60-02	4	Cooling thermostat On	Error status	Remote controller output	External heater output
3	60-03	5	Cooling thermostat On	Cooling high/low output	Remote controller output	External heater output
4	60-04	6	Cooling thermostat On	Error status	Remote controller output	Cooling high/low output
5	60-05	7	Heating thermostat On	Error status	Indoor unit fan operation status	External heater output
6	60-06	8	Operation/Stop	Error status	Indoor unit fan operation status	Heating thermostat On
7	60-07	9	Cooling thermostat On	Error status	Heating thermostat On	External heater output
8	60-08	A	Cooling thermostat On	Heating thermostat On	Remote controller output	External heater output
9	60-09	B	Error status	Operation/Stop	Indoor unit fan operation status	External heater output
10	60-10	C	Indoor unit fan operation status	Operation/Stop	Error status	External heater output
11	60-11	D	External heater output	Operation/Stop	Indoor unit fan operation status	Error status

Input signal type

External Input and Output PCB:

The input signal type can be selected.

Signal type (edge or pulse) can be switched by the DIP switch SW302 on the External Input and Output PCB.

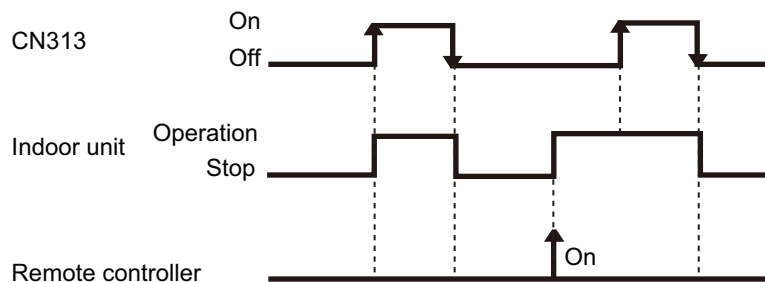


2-4. Details of function

■ Control input function

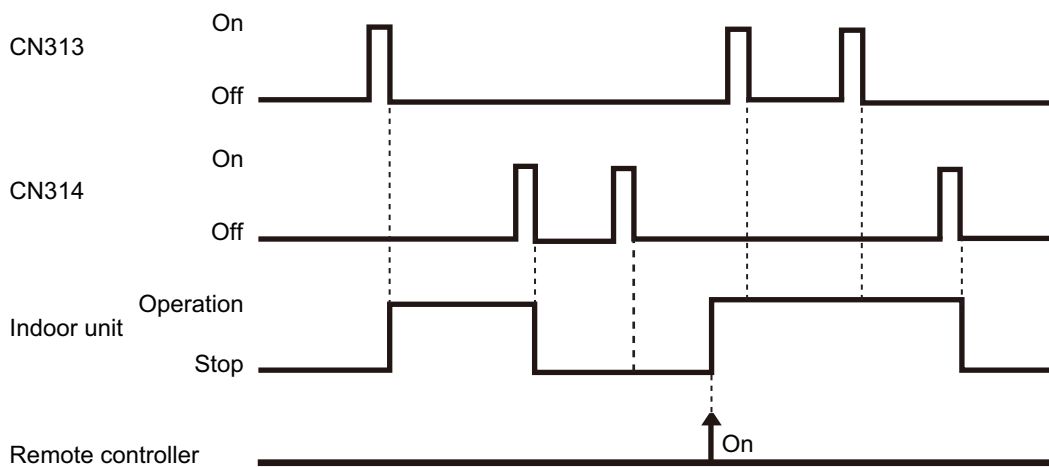
- When function setting is “Operation/Stop” mode 1
 - In the case of “Edge” input:

Function setting	Rotary SW on External Input and Output PCB	External input		Input signal	Command
		External Input and Output PCB	CN313		
46-00	1			Off → On	Operation
				On → Off	Stop



- In the case of “Pulse” input:

Function setting	Rotary SW on External Input and Output PCB	External input		Input signal	Command
		External Input and Output PCB	CN313		
46-00	1		CN313	Pulse	Operation
			CN314	Pulse	Stop



NOTES:

- The last command has priority.
- The indoor units within the same remote controller group operates in the same mode.

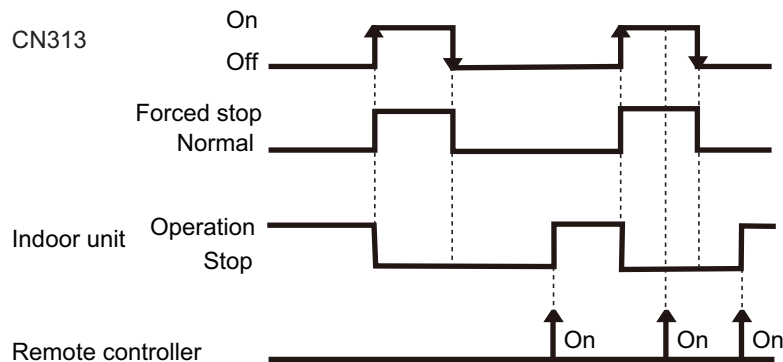
FIELD WORKING

FIELD WORKING

• When function setting is “Forced stop” mode

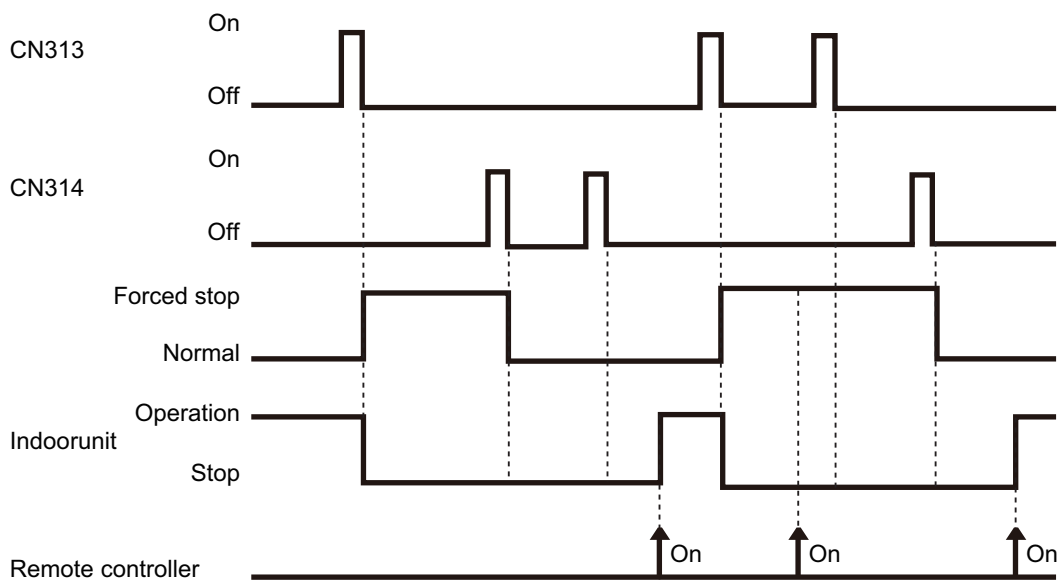
– In the case of “Edge” input:

Function setting	Rotary SW on External Input and Output PCB	External input		Input signal	Command
		External Input and Output PCB	CN313		
46-02	1			Off → On	Forced stop
				On → Off	Normal



– In the case of “Pulse” input:

Function setting	Rotary SW on External Input and Output PCB	External input		Input signal	Command
		External Input and Output PCB	CN313		
46-02	1		CN313	Pulse	Forced stop
			CN314	Pulse	Normal



NOTES:

- When the forced stop is triggered, indoor unit stops and Operation/Stop operation by the remote controller is restricted.
- When forced stop function is used with forming a remote controller group, connect the same equipment to each indoor unit within the group.

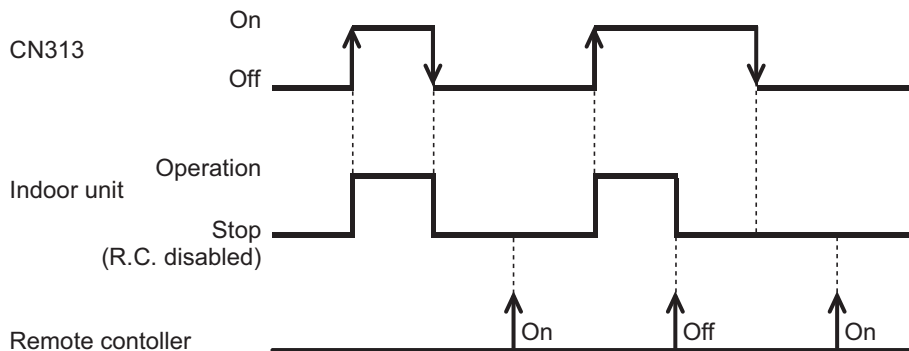
FIELD WORKING

FIELD WORKING

• When function setting is “Operation/Stop” mode 2

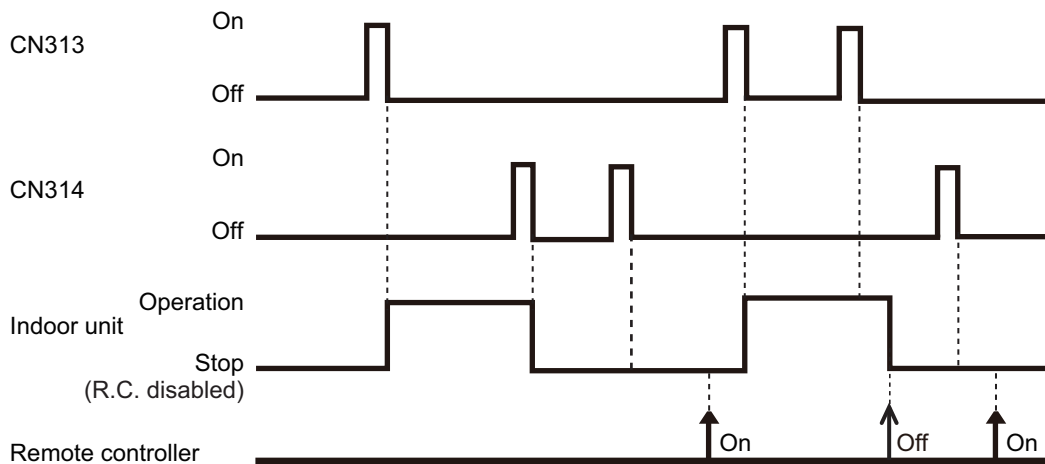
– In the case of “Edge” input:

Function setting	Rotary SW on External Input and Output PCB	External input		Input signal	Command
46-03	1	External Input and Output PCB	CN313	Off → On	Operation
				On → Off	Stop (R.C. disabled)



– In the case of “Pulse” input:

Function setting	Rotary SW on External Input and Output PCB	External input		Input signal	Command
46-03	1	External Input and Output PCB	CN313	Pulse	Operation
			CN314	Pulse	Stop (R.C. disabled)



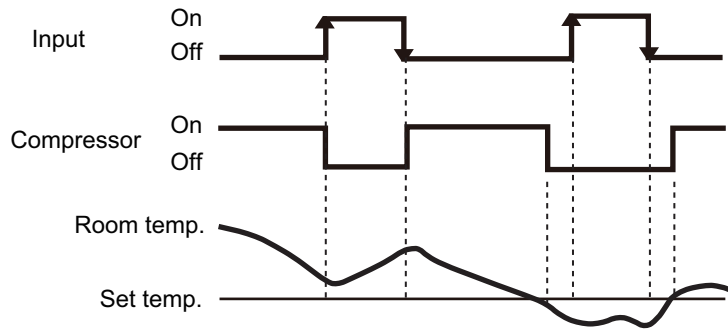
NOTE: When “Operation/Stop” mode 2 function is used with forming a remote controller group, connect the same equipment to each indoor unit within the group.

FIELD WORKING

FIELD WORKING

• Forced thermostat off function

Function setting / Rotary SW on External Input and Output PCB	External input	Input signal	Command
60-00 / 2 60-02 / 4 60-05 / 7 60-06 / 8 60-08 / A 60-09 / B 60-10 / C 60-11 / D	External Input and Output PCB CN313	Off → On	Thermostat off
On → Off		Normal operation	



FIELD WORKING

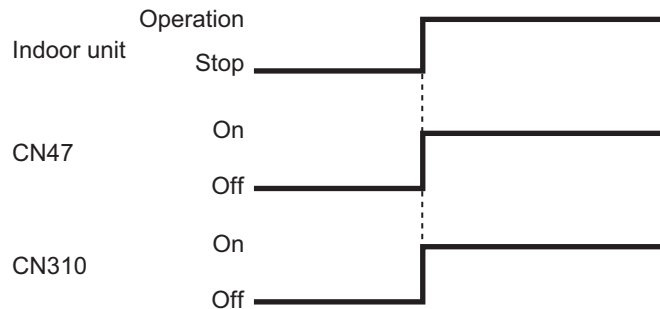
FIELD WORKING

■ Control output function

- Operation/Stop status

Function setting / Rotary SW on External Input and Output PCB	External output	Output signal	Command
60-00 / 1 60-00 / 2 60-06 / 8	Output of indoor unit CN47	Off → On	Operation
		On → Off	Stop
60-00 / 1 60-09 / B 60-10 / C 60-11 / D	External Input and Output PCB CN310	Off → On	Operation
		On → Off	Stop

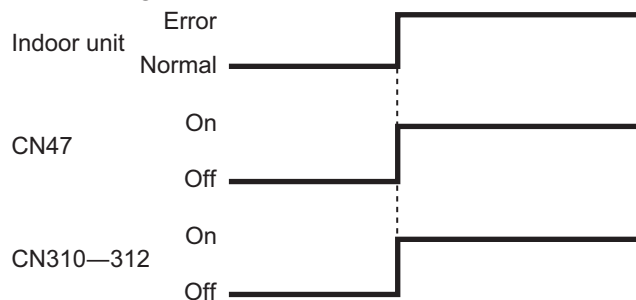
The output is low when the unit is stopped.



- Error status

Function setting / Rotary SW on External Input and Output PCB	External output	Output signal	Command
60-09 / B	Output of indoor unit CN47	Off → On	Error
		On → Off	Normal
60-00 / 2	External Input and Output PCB CN310	Off → On	Error
		On → Off	Normal
60-00 / 1 60-01 / 3 60-02 / 4 60-04 / 6 60-05 / 7 60-06 / 8 60-07 / 9 60-10 / C	External Input and Output PCB CN311	Off → On	Error
		On → Off	Normal
60-11 / D	External Input and Output PCB CN312	Off → On	Error
		On → Off	Normal

The output is ON when an error is generated for the indoor unit.



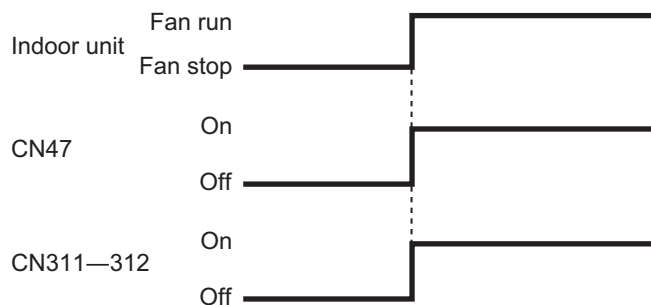
FIELD WORKING

FIELD WORKING

- Indoor unit fan operation status

Function setting / Rotary SW on External Input and Output PCB	External output	Output signal	Command	
60-10 / C	Output of indoor unit	CN47	Off → On	Fan run
			On → Off	Fan stop
60-00 / 2 60-01 / 3 60-05 / 7 60-06 / 8 60-09 / B 60-11 / D	External Input and Output PCB	CN311	Off → On	Fan run
			On → Off	Fan stop
		CN312	Off → On	Fan run
			On → Off	Fan stop
60-00 / 1				

Output signal	Condition
On Low → High	The indoor unit fan is operating.
Off High → Low	The fan is stopped or during cold air prevention. During thermostat off when in dry mode operation.



- External heater output

Function setting / Rotary SW on External Input and Output PCB	External output	Output signal	Command	
60-11 / D	Output of indoor unit	CN47	Off → On	Heater on
			On → Off	Heater off
60-00 / 2 60-01 / 3 60-02 / 4 60-03 / 5 60-05 / 7 60-07 / 9 60-08 / A 60-09 / B 60-10 / C	External Input and Output PCB	CN312	Off → On	Heater on
			On → Off	Heater off
			Off → On	Heater on
			On → Off	Heater off

External heater output

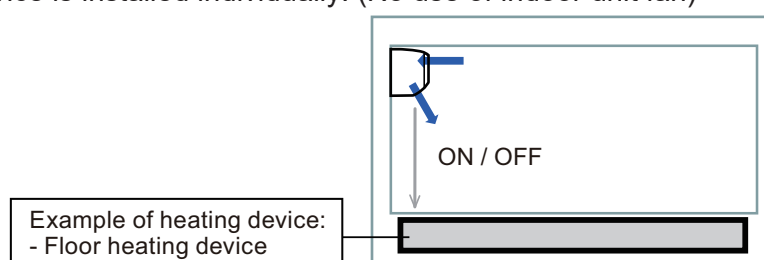
Control	Primary heater	Auxiliary heater	Function setting	
			Indoor unit	Wired R. C.
			Control switching external heaters No. 61	Sensor activation*2
Auxiliary heater control 1	Heat pump	External device*1	61-00	—
Auxiliary heater control 2	Heat pump	External device	61-01	—
Heat pump prohibition control	External device	None	61-02	On (Enabled)
Auxiliary heater control by outdoor temperature 1	Heat pump	External device	61-03	On (Enabled)
Auxiliary heater control by outdoor temperature 2	Heat Pump	External device	61-04	On (Enabled)
Auxiliary heater control by outdoor temperature 3	Heat Pump	External device	61-05	On (Enabled)
Auxiliary heat pump control	External device	Heat pump	61-06	On (Enabled)
Auxiliary heat pump control by outdoor temperature 1	External device	Heat pump	61-07	On (Enabled)
Auxiliary heat pump control by outdoor temperature 2	External device	Heat pump	61-08	On (Enabled)
Auxiliary heat pump control by outdoor temperature 3	External device	Heat pump	61-09	On (Enabled)

NOTES:

- After turning off the heater, 3 minutes of standby time is required by next power-on of the heater.
- For items marked “—” in the table, any of validate or invalidate of the setting are acceptable.
- *1: External device means Hot water, Electrical heater, etc.
- *2: Sensor activation:
 - Setting change from the factory setting is required.
 - Indoor unit fan setting will be on for safety reason without sensor activation of wired remote controller.

Installation configuration of individual connection

External heating device is installed individually. (No use of indoor unit fan)



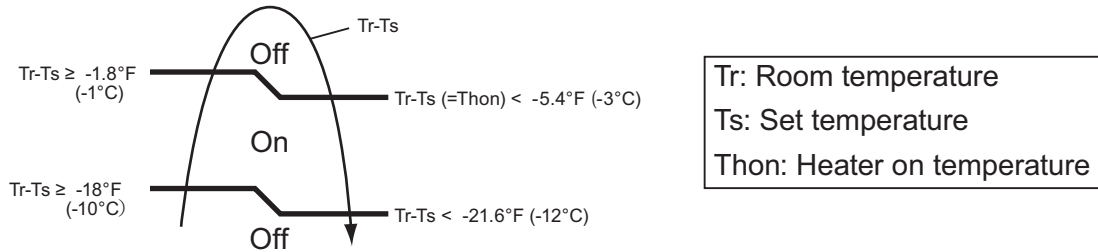
⚠ WARNING

- Design and install external heater appropriately with considering its protection.
 - Inappropriate designing and installation of external heater may cause a fire by emitted heat from the external heater.
 - Fujitsu General Ltd. is not responsible for inappropriate designing or installation of external heating device.
-

● Auxiliary heater control 1

Operation	Condition
Heater on	Heater is on as shown in following diagram of heating temperature.
Heater off	<ul style="list-style-type: none"> • Heater is off as shown in following diagram of heating temperature. • Other than heating mode • Error occurred • Forced thermostat off • Fan stop protection

- Temperature of heater on (Thon): Adjustable by function number 62 (Operating temperature switching of external heaters).
- All control temperatures will shift by adjusting “Thon”.



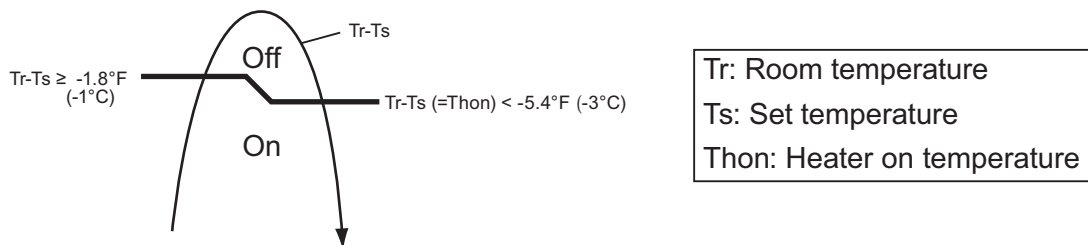
Example: When set temperature (Ts) is 72°F (22°C) (Factory setting),

- and room temperature (Tr) increases above 53.6°F (12°C), signal output is on.
- and room temperature (Tr) increases above 69.8°F (21°C), signal output is off.
- and room temperature (Tr) decreases below 66.2°F (19°C), signal output is on.
- and room temperature (Tr) decreases below 50°F (10°C), signal output is off.

● Auxiliary heater control 2

Operation	Condition
Heater on	Heater is on as shown in following diagram of heating temperature.
Heater off	<ul style="list-style-type: none"> • Heater is off as shown in following diagram of heating temperature. • Other than heating mode • Error occurred • Forced thermostat off • Fan stop protection

- Temperature of heater on (Thon): Adjustable by function number 62 (Operating temperature switching of external heaters).
- All control temperatures will shift by adjusting “Thon”.

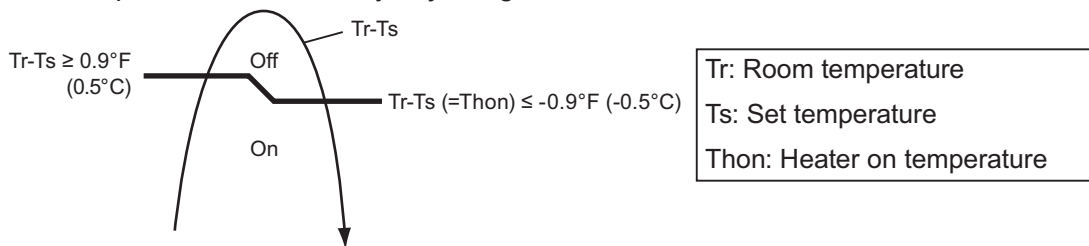


● Heat pump prohibition control

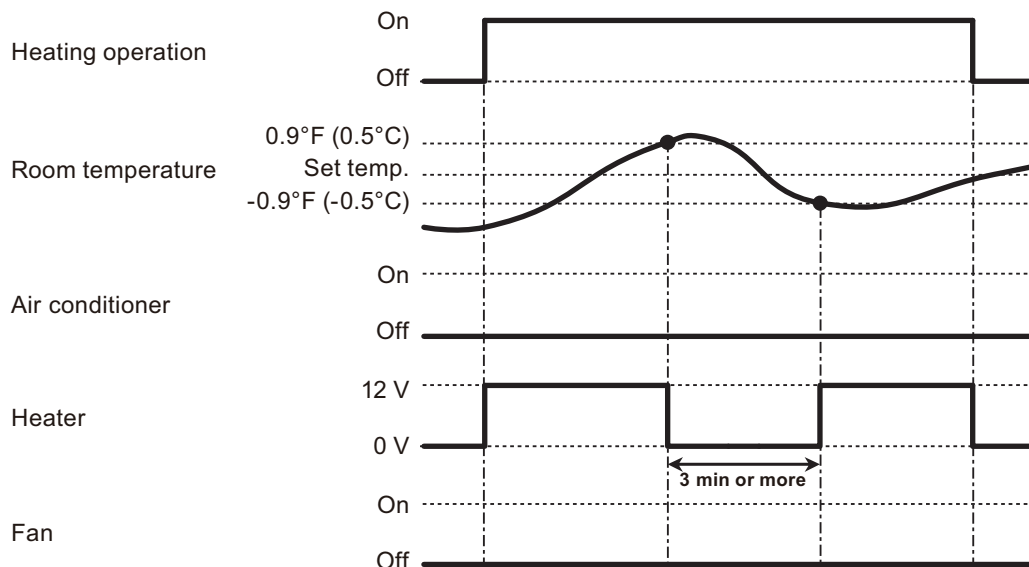
Perform heating by external heater only. Indoor unit is continuous thermostat off.

Operation	Condition
Heater on	Heater is on as shown in following diagram of heating temperature.
Heater off	<ul style="list-style-type: none"> • Heater is off as shown in following diagram of heating temperature. • Other than heating mode • Error occurred • Forced thermostat off

- Temperature of heater on (Thon): Adjustable by function number 62 (Operating temperature switching of external heaters).
- All control temperatures will shift by adjusting “Thon”.



• Operation status



NOTE: In following operations, compressor will be on.

- Other than heating
- Test run

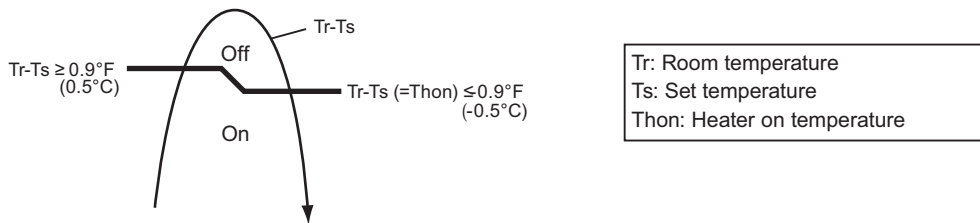
● Auxiliary heater control by outdoor temperature 1

This control selects heat pump or external heater according to the outdoor temperature. When outdoor temperature is high, the heating is performed by using heat pump only.

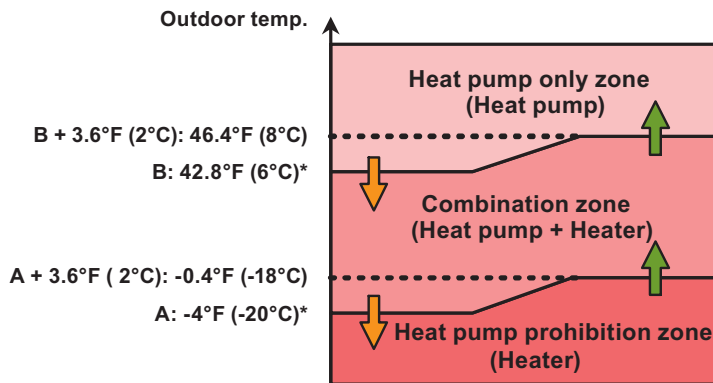
Operation	Condition
Heater on	Heater is on as shown in following diagram of heating temperature.
Heater off	<ul style="list-style-type: none"> • Heater is off as shown in following diagram of heating temperature. • Other than heating mode • Error occurred • Forced thermostat off • Heat pump only zone

- Temperature of heater on (Thon): Adjustable by function number 62 (Operating temperature switching of external heaters).
- All control temperatures will shift by adjusting "Thon".
- Outdoor temperature zone boundary A and B: Adjustable individually by function setting number 66 and 67.

• External heater output



• Outdoor temperature zone

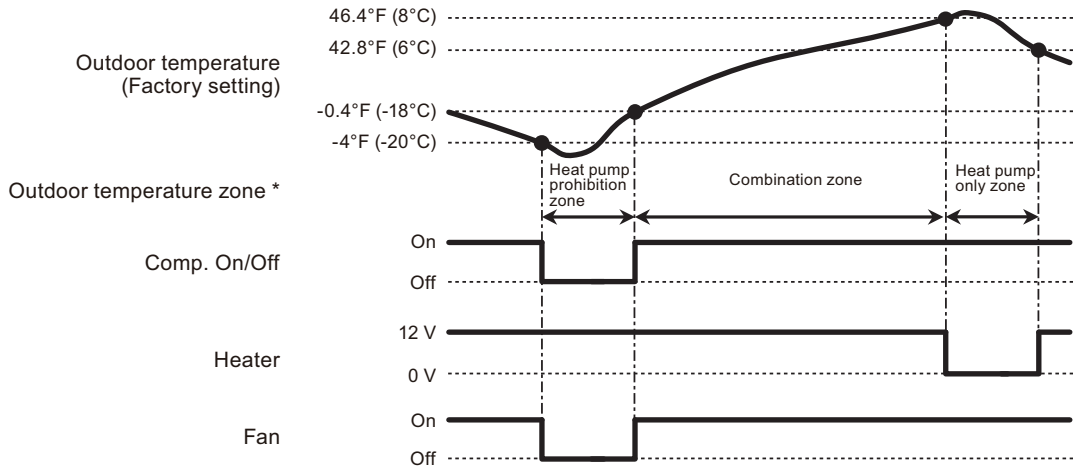


*: Adjustable by function setting 66 and 67

FIELD WORKING

FIELD WORKING

• Operation status



* The outdoor temperature zone transition from one to another will stay in that zone for minimum of 30 min.

NOTE: In following operations, compressor will be on in heat pump prohibition zone.

- Other than heating
- Test run

FIELD WORKING

FIELD WORKING

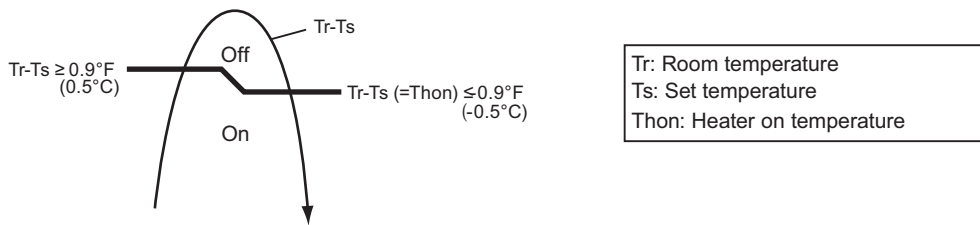
● Auxiliary heater control by outdoor temperature 2

This control selects heat pump or external heater according to the outdoor temperature. Even when outdoor temperature is high, the heating is performed by using both of heat pump and external heater.

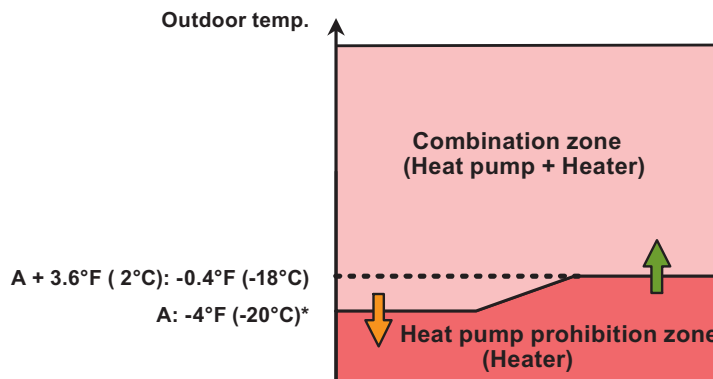
Operation	Condition
Heater on	Heater is on as shown in following diagram of heating temperature.
Heater off	<ul style="list-style-type: none"> • Heater is off as shown in following diagram of heating temperature. • Other than heating mode • Error occurred • Forced thermostat off

- Temperature of heater on (Thon): Adjustable by function number 62 (Operating temperature switching of external heaters).
- All control temperatures will shift by adjusting "Thon".
- Outdoor temperature zone boundary A: Adjustable by function setting number 66.

• External heater output



• Outdoor temperature zone

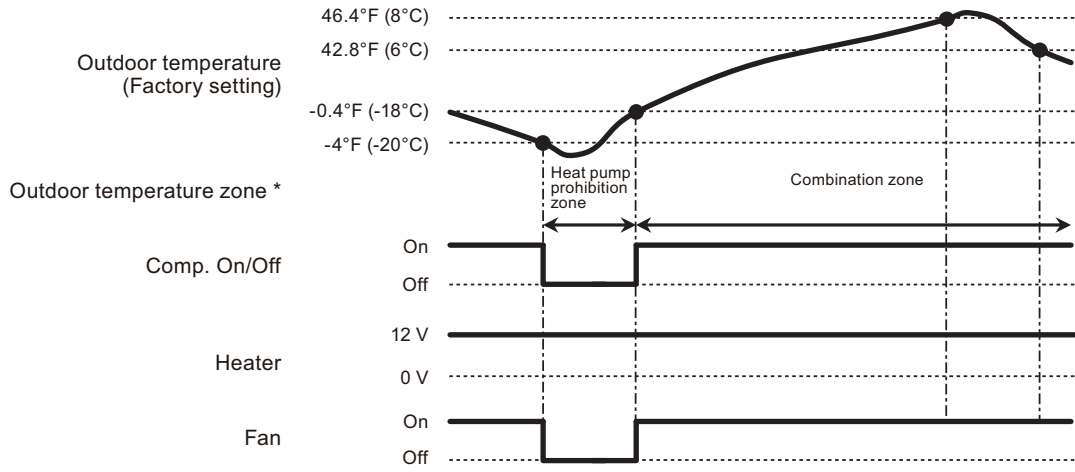


*: Adjustable by function setting 66

FIELD WORKING

FIELD WORKING

• Operation status



* The outdoor temperature zone transition from one to another will stay in that zone for minimum of 30 min.

NOTE: In following operations, compressor will be on in heat pump prohibition zone.

- Other than heating
- Test run

FIELD WORKING

FIELD WORKING

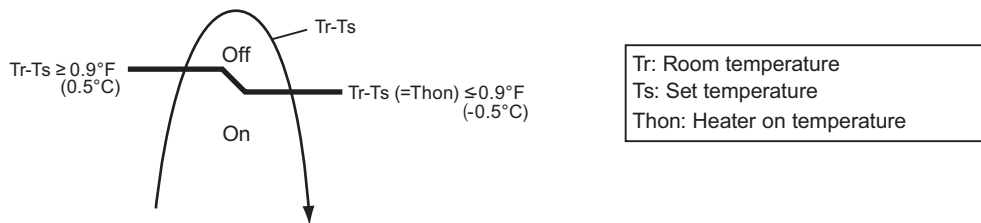
● Auxiliary heater control by outdoor temperature 3

This control selects heat pump or external heater according to the outdoor temperature. Even when outdoor temperature is high, the heating is performed by using both of heat pump and external heater.

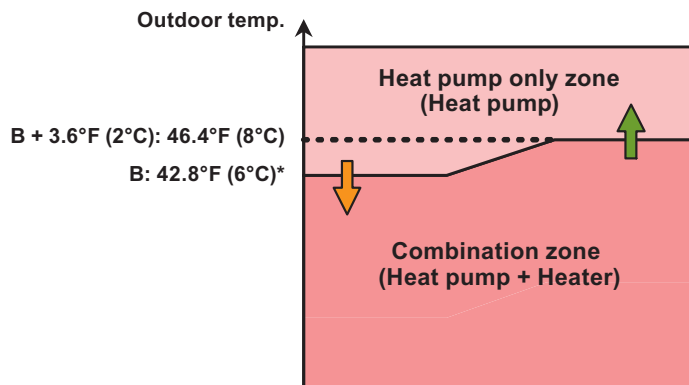
Operation	Condition
Heater on	Heater is on as shown in following diagram of heating temperature.
Heater off	<ul style="list-style-type: none"> • Heater is off as shown in following diagram of heating temperature. • Other than heating mode • Error occurred • Forced thermostat off

- Temperature of heater on (Thon): Adjustable by function number 62 (Operating temperature switching of external heaters).
- All control temperatures will shift by adjusting “Thon”.
- Outdoor temperature zone boundary B: Adjustable by function setting number 67.

• External heater output



• Outdoor temperature zone

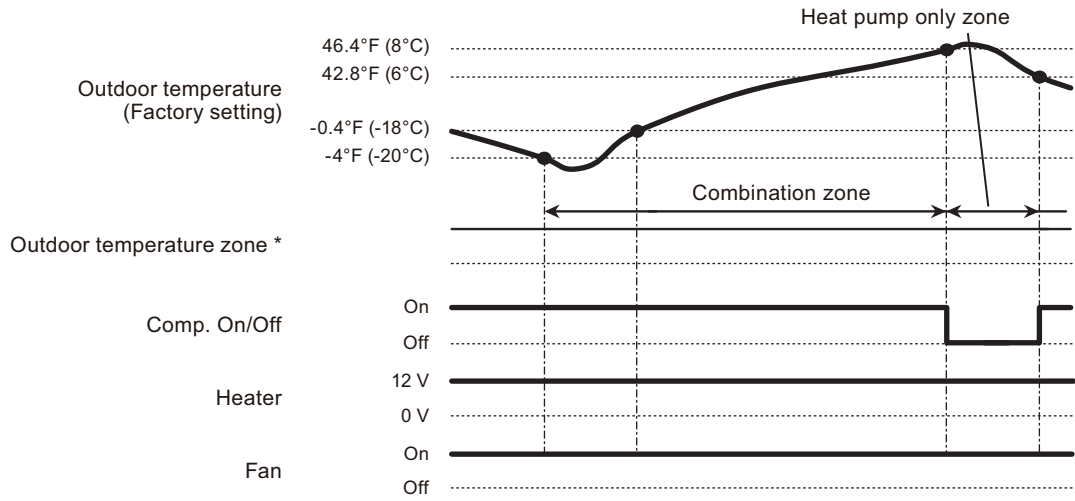


*: Adjustable by function setting 67

FIELD WORKING

FIELD WORKING

• Operation status



* The outdoor temperature zone transition from one to another will stay in that zone for minimum of 30 min.

NOTE: In following operations, compressor will be on in heat pump prohibition zone.

- Other than heating
- Test run

FIELD WORKING

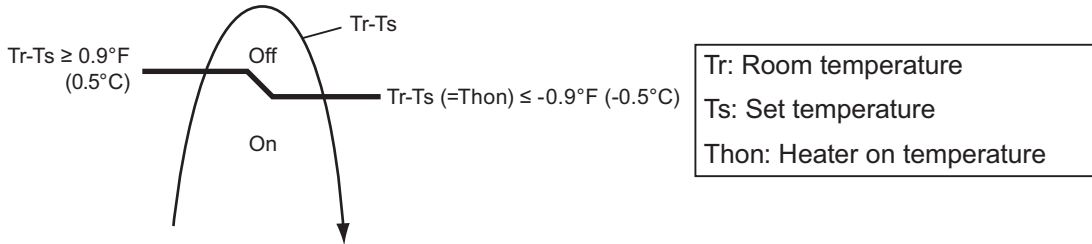
FIELD WORKING

● Auxiliary heat pump control

• External heater output

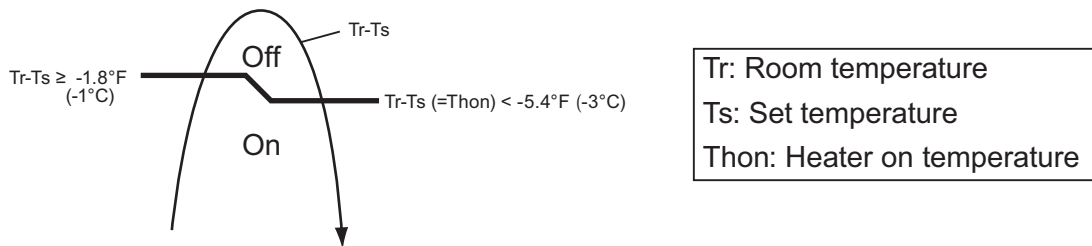
Operation	Condition
Heater on	Heater is on as shown in following diagram of heating temperature.
Heater off	<ul style="list-style-type: none"> • Heater is off as shown in following diagram of heating temperature. • Other than heating mode • Error occurred • Forced thermostat off

- Temperature of heater on (Thon): Set temperature (Ts) - 0.9 °F (- 0.5 °C)
- Temperature of heater off: Set temperature (Ts) + 0.9 °F (+ 0.5 °C)



• Auxiliary heat pump On/Off

- Temperature of heater on (Thon): Adjustable by function number 62 (Operating temperature switching of heat pump).
- All control temperatures will shift by adjusting “Thon”.



FIELD WORKING

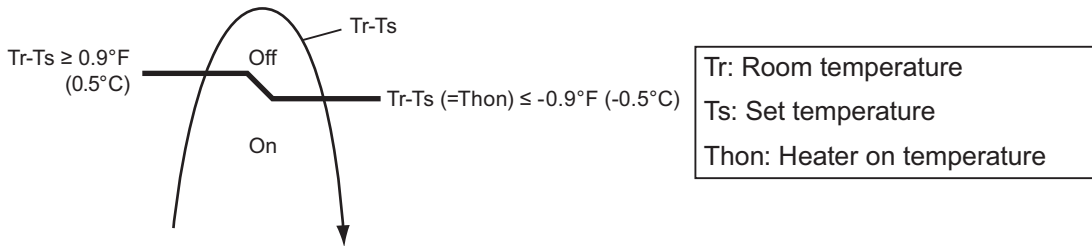
FIELD WORKING

● Auxiliary heat pump control by outdoor temperature 1

• External heater output

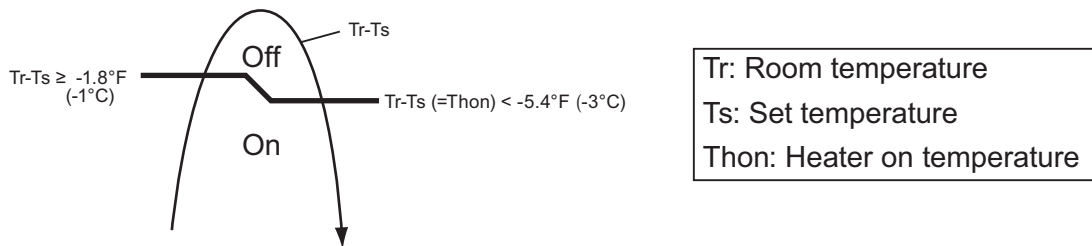
Operation	Condition
Heater on	Heater is on as shown in following diagram of heating temperature.
Heater off	<ul style="list-style-type: none"> • Heater is off as shown in following diagram of heating temperature. • Other than heating mode • Error occurred • Forced thermostat off

- Temperature of heater on (Thon): Set temperature (Ts) - 0.9 °F (- 0.5 °C)
- Temperature of heater off: Set temperature (Ts) + 0.9 °F (+ 0.5 °C)

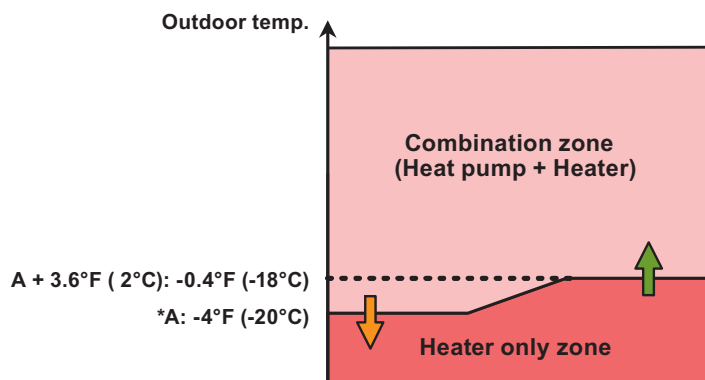


• Auxiliary heat pump On/Off

- Temperature of heater on (Thon): Adjustable by function number 62 (Operating temperature switching of heat pump).
- All control temperatures will shift by adjusting “Thon”.

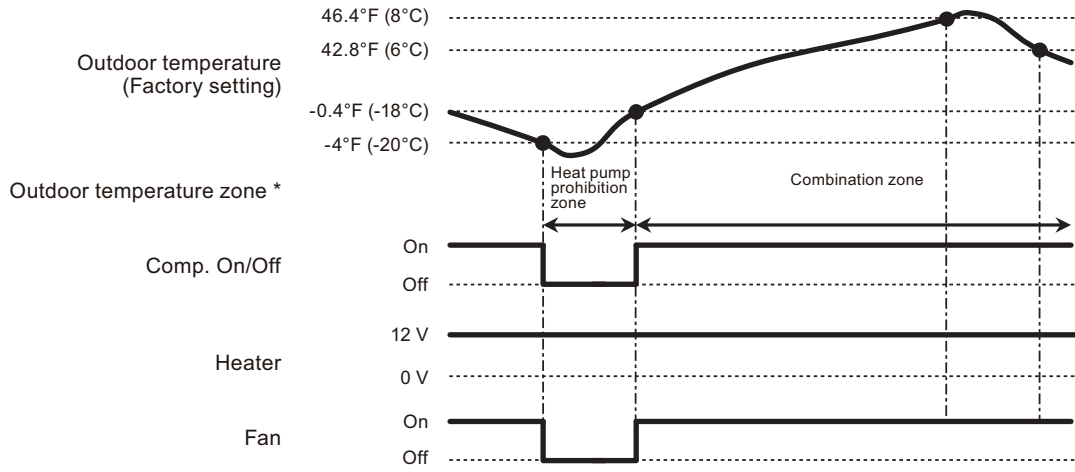


• Outdoor temperature zone



*: Adjustable by function setting 66

• Operation status



* The outdoor temperature zone transition from one to another will stay in that zone for minimum of 30 min.

NOTE: In following operations, compressor will be on in heat pump prohibition zone.

- Other than heating
- Test run

FIELD WORKING

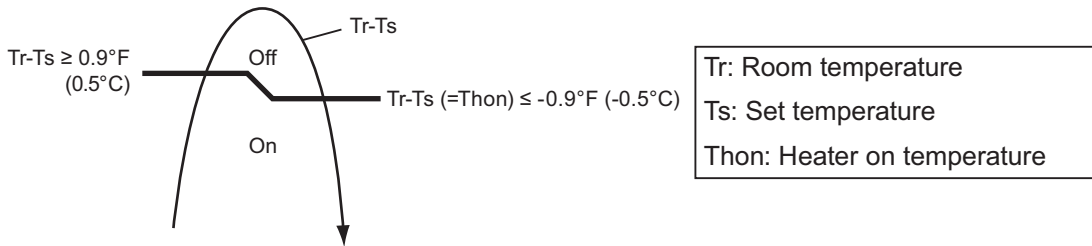
FIELD WORKING

● Auxiliary heat pump control by outdoor temperature 2

• External heater output

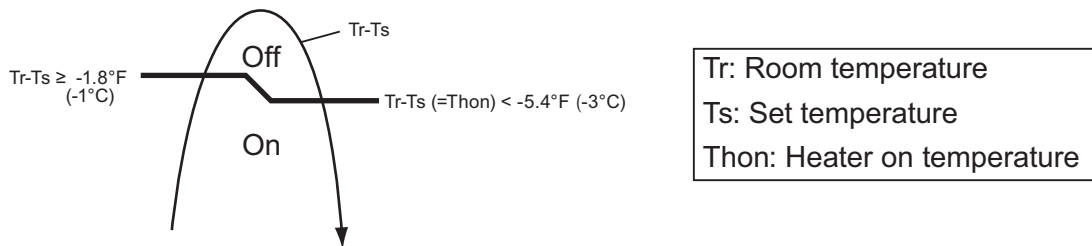
Operation	Condition
Heater on	Heater is on as shown in following diagram of heating temperature.
Heater off	<ul style="list-style-type: none"> • Heater is off as shown in following diagram of heating temperature. • Other than heating mode • Error occurred • Forced thermostat off

- Temperature of heater on (Thon): Set temperature (Ts) - 0.9 °F (- 0.5 °C)
- Temperature of heater off: Set temperature (Ts) + 0.9 °F (+ 0.5 °C)

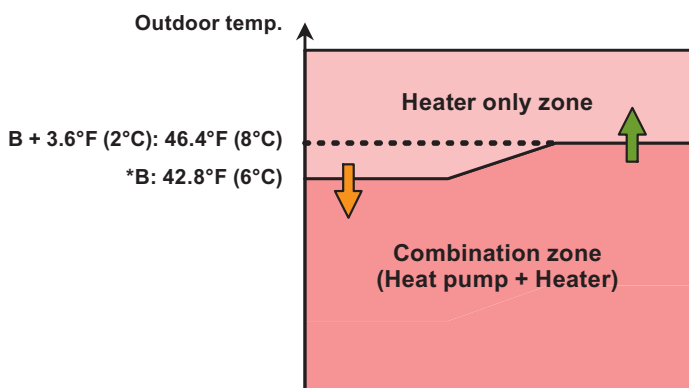


• Auxiliary heat pump On/Off

- Temperature of heater on (Thon): Adjustable by function number 62 (Operating temperature switching of heat pump).
- All control temperatures will shift by adjusting “Thon”.

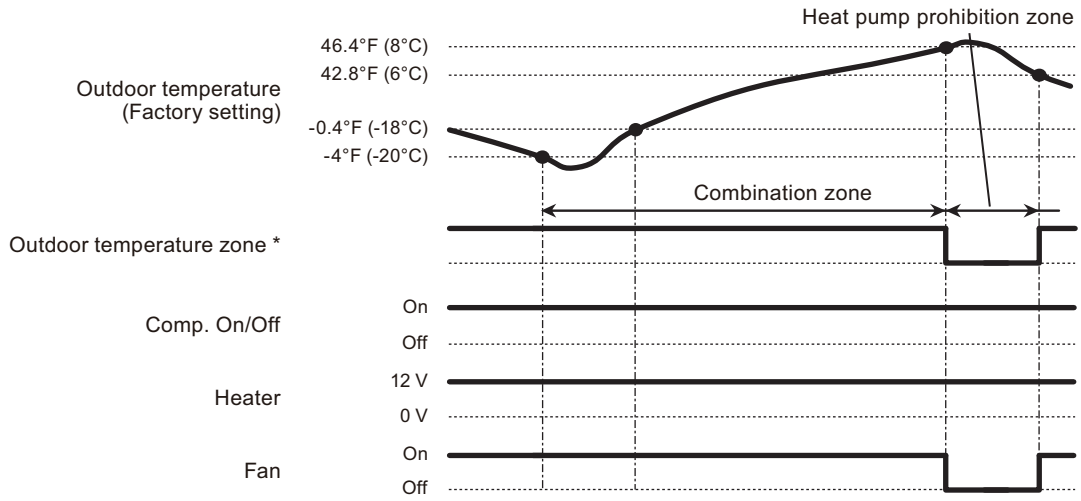


• Outdoor temperature zone



*: Adjustable by function setting 67

• Operation status



* The outdoor temperature zone transition from one to another will stay in that zone for minimum of 30 min.

NOTE: In following operations, compressor will be on in heat pump prohibition zone.

- Other than heating
- Test run

FIELD WORKING

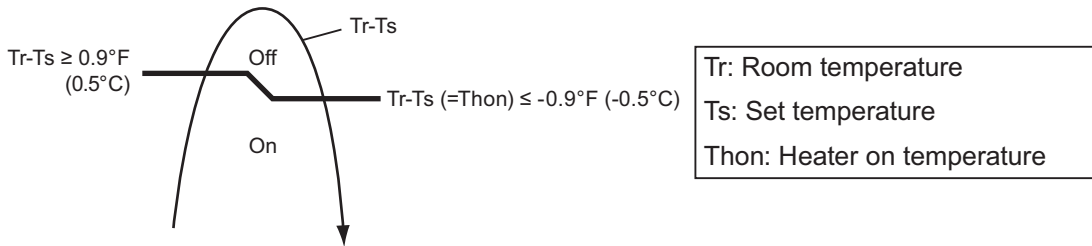
FIELD WORKING

● Auxiliary heat pump control by outdoor temperature 3

• External heater output

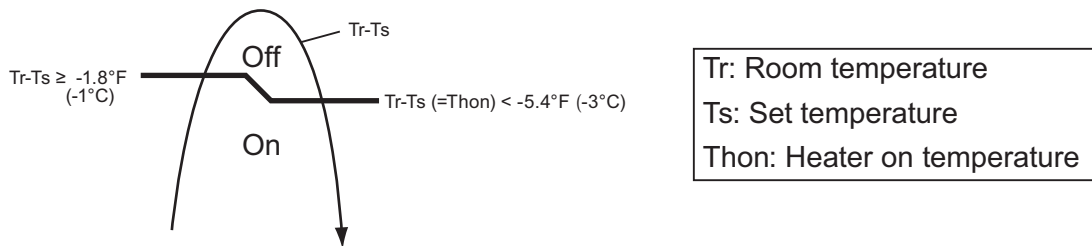
Operation	Condition
Heater on	Heater is on as shown in following diagram of heating temperature.
Heater off	<ul style="list-style-type: none"> • Heater is off as shown in following diagram of heating temperature. • Other than heating mode • Error occurred • Forced thermostat off

- Temperature of heater on (Thon): Set temperature (Ts) - 0.9 °F (- 0.5 °C)
- Temperature of heater off: Set temperature (Ts) + 0.9 °F (+ 0.5 °C)

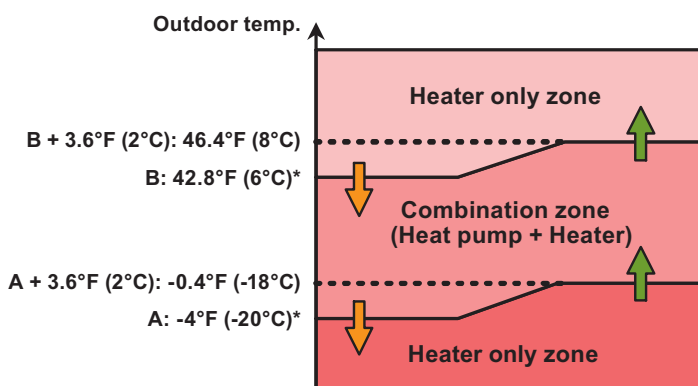


• Auxiliary heat pump On/Off

- Temperature of heater on (Thon): Adjustable by function number 62 (Operating temperature switching of heat pump).
- All control temperatures will shift by adjusting “Thon”.



• Outdoor temperature zone

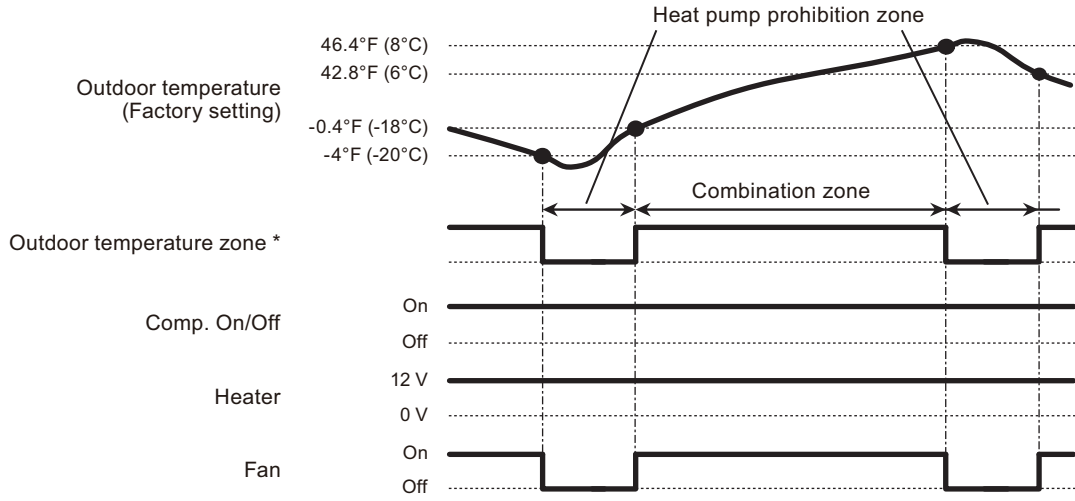


*: Adjustable by function setting 66 and 67

FIELD WORKING

FIELD WORKING

• Operation status



* The outdoor temperature zone transition from one to another will stay in that zone for minimum of 30 min.

NOTE: In following operations, compressor will be on in heat pump prohibition zone.

- Other than heating
- Test run

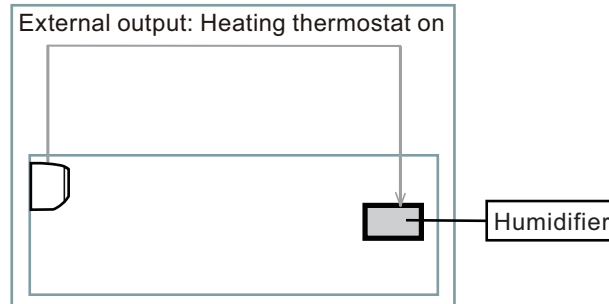
FIELD WORKING

FIELD WORKING

■ Heating thermostat on for humidifier

Situation	Indoor unit				
	Mode	Function setting	Rotary SW	External output	
		Heating thermostat on no. 60		Heating thermostat on	Indoor unit fan operation status
Example of individual connection	5	60-05	7	CN47	Not used
	6	60-06	8	CN312	
	7	60-07	9	CN311	
	8	60-08	A	CN310	

- Example of individual connection



- Operation status

The heating thermostat output for CNB01 (1-2 or 1-3 or 1- or 1-5) will be on when comp on or external heater on.

The heating thermostat output will be off when comp off and external heater off.

