FUJITSU

REFRIGERANT R32
INVERTER

AIR CONDITIONER

Wall mounted type

SERVICE MANUAL

INDOOR

ASYG09KHCA
ASYG12KHCA
ASYG14KHCA

OUTDOOR

AOYG09KHCAN
AOYG12KHCAN
AOYG14KHCAN

FUJITSU GENERAL LIMITED

SR_AS032EF_03
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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

REFRIGERANT R32
INVERTER

1. GENERAL INFORMATION

CONTENTS

1. GENERAL INFORMATION

GENERAL INFORMATION

1. Specifications

1-1. Indoor units

Type					Wall mounted		
					Inverter heat pump		
Model name					**ASYG09KHCA**	**ASYG12KHCA**	**ASYG14KHCA**
Power supply					230 V ~ 50 Hz		
Power supply intake					Outdoor unit		
Available voltage range					198—264 V		
Energy rank	Cooling				1		
Capacity	Cooling	Rated		kW	2.50	3.50	4.20
				Btu/h	8,500	11,900	14,300
		Min.—Max.		kW	0.90—4.65	0.90—4.80	0.90—5.50
				Btu/h	3,100—15,800	3,100—16,300	3,100—18,700
	Heating	Rated		kW	3.20	4.00	5.40
				Btu/h	10,900	13,600	18,400
		Min.—Max.		kW	0.90—7.20	0.90—7.40	0.9—8.20
				Btu/h	3,100—24,500	3,100—25,200	3,100—27,900
Input power	Cooling	Rated		kW	0.45	0.76	0.98
		Max.			1.26	1.50	1.53
	Heating	Rated			0.58	0.79	1.16
		Max.			2.20	2.25	2.35
	Fan	HIGH		W	23.0	23.0	32.0
		MED			13.0	13.0	20.0
		LOW			9.0	9.0	12.0
		QUIET			5.0	5.0	6.0
Current	Cooling	Rated		A	2.1	3.5	4.4
	Heating				2.7	3.6	5.2
EER	Cooling			kW/kW	5.56	4.61	4.29
COP	Heating			kW/kW	5.52	5.06	4.66
Sensible capacity	Cooling			kW	2.10	2.94	3.59
Power factor	Cooling			%	93.2	94.4	96.8
	Heating			%	93.4	95.4	97.0
Moisture removal				L/h (pints/h)	1.0 (1.8)	1.1 (1.9)	1.7 (3.0)
Maximum operating current *1	Cooling			A	6.5	7.5	9.0
	Heating				10.5	11.0	11.5
Fan	Airflow rate	Cooling	HIGH	m^3/h	830		900
			MED		680		780
			LOW		580		630
			QUIET		380		440
		Heating	HIGH		830		900
			MED		680		780
			LOW		580		630
			QUIET		380		500
	Type × Q'ty				Cross flow fan × 1		
	Motor output			W	61		
Sound pressure level *2	Cooling	HIGH		dB (A)	42		45
		MED			37		40
		LOW			33		35
		QUIET			23		26
	Heating	HIGH			41		44
		MED			35		39
		LOW			31		33
		QUIET			23		27
Heat exchanger type	Dimensions (H × W × D)			mm	Main1: 384 × 720 × 30 Sub1: 84 × 720 × 13.3 Sub2: 126 × 720 × 13.3		
	Fin pitch				Main1: 1.2 Sub1: 1.4 Sub2: 1.4		
	Rows × Stages				Main1: 3 × 24 Sub1: 1 × 4 Sub2: 1 × 6		
	Pipe type				Copper		
	Fin type				Aluminum		
Enclosure	Material				Polystyrene		
	Color				White Approximate color of MUNSELL 5PB 9.25/0.5		
Dimensions (H × W × D)	Net			mm	295 × 940 × 270		
	Gross				355 × 1,040 × 365		
Weight	Net			kg	14		
	Gross				17		
Connection pipe	Size	Liquid		mm (in)	Ø 6.35 (Ø 1/4)		
		Gas			Ø 9.52 (Ø 3/8)		
	Method				Flare		
Drain hose	Material				PP+HDPE		
	Size			mm	Ø 13.8 (I.D.), Ø 15.8 to Ø 16.7 (O.D.)		
Operation range	Cooling			°C	18 to 32		
				%RH	80 or less		
	Heating			°C	16 to 30		
Remote controller					Wired remote controller, Wireless remote controller, Mobile app*3 (FGLair™)		

GENERAL INFORMATION

Type	Wall mounted		
	Inverter heat pump		
Model name	**ASYG09KHCA**	**ASYG12KHCA**	**ASYG14KHCA**

NOTES:

- Specifications are based on the following conditions:
  - Cooling: Indoor temperature of 27 °CDB/19 °CWB, and outdoor temperature of 35 °CDB/24 °CWB.
  - Heating: Indoor temperature of 20 °CDB/15 °CWB, and outdoor temperature of 7 °CDB/6 °CWB.
  - Pipe length: 5 m, Height difference: 0 m. (Between outdoor unit and indoor unit.)
- Protective function might work when using it outside the operation range.
- *1: Maximum current is maximum value when operated within the operation range.
- *2: Sound pressure level:
  - 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.
- *3: Available on Google Play™ store or on App Store®. Optional WLAN adapter is also required. For details, refer to the setting manual.

GENERAL INFORMATION

Specifications for ErP Lot10						
Model name				**ASYG09KHCA**	**ASYG12KHCA**	**ASYG14KHCA**
Energy efficiency class	Cooling			A^{+++}		A^{++}
	Heating (Average)			A^{+++}	A^{++}	
Pdesign	Cooling		kW	2.5 (35 °C)	3.5 (35 °C)	4.2 (35 °C)
	Heating (Average)			2.5 (-10 °C)	3.5 (-10 °C)	4.2 (-10 °C)
SEER	Cooling		kWh/kWh	9.36	9.06	8.36
SCOP	Heating (Average)			5.21	4.89	4.86
Annual energy consumption	QCE		kWh/a	93	135	176
	QHE (Average)			671	1,001	1,209
Sound power level	Cooling	HIGH	dB (A)	57	57	60
	Heating			57	57	60

GENERAL INFORMATION

1-2. Outdoor units

Type				Inverter heat pump		
Model name				**AOYG09KHCAN**	**AOYG12KHCAN**	**AOYG14KHCAN**
Power supply				230 V ~ 50 Hz		
Power supply intake				Outdoor unit		
Available voltage range				198—264 V		
Starting current			A	2.7	3.6	5.2
Fan	Airflow rate	Cooling	m^3/h	1,810	2,050	2460
		Heating		1,550	1,780	
	Type × Q'ty			Propeller fan × 1		
	Motor output		W	49		
Sound pressure level *		Cooling	dB (A)	43	47	53
		Heating		42	45	47
Sound power level		Cooling	dB (A)	56	60	65
		Heating		55	58	60
Heat exchanger type		Dimensions (H × W × D)	mm	Main1: 588 × 881 × 18.2 Main2: 588 × 851 × 18.2		
		Fin pitch		Main1: 1.3 Main2: 1.3		
		Rows × Stages		1 × 28		
		Pipe type		Copper		
		Fin type	Type (Material)	Corrugate (Aluminum)		
			Surface treatment	PC fin		
Compressor	Type × Q'ty			DC rotary × 1		
	Motor output		W	810		900
Refrigerant		Type (Global warming potential)		R32 (675)		
		Charge	g	1,100		
Refrigerant oil		Type		FW68S		
		Amount	cm^3	350		
Enclosure		Material		Steel sheet		
		Color		Beige Approximate color of Munsell 10YR 7.5/1.0		
Dimensions (H × W × D)	Net		mm	620 × 790 × 290		
	Gross			713 × 945 × 395		
Weight	Net		kg	36		
	Gross			40		
Connection pipe	Size	Liquid	mm (in)	Ø 6.35 (Ø 1/4)		
		Gas		Ø 9.52 (Ø 3/8)		
	Method			Flare		
	Pre-charge length		m	15		
	Max. length			20		
	Max. height difference			15		
Operation range		Cooling	°C	-10 to 46		
		Heating		-25 to 24		

NOTES:

- Specifications are based on the following conditions:
  - Cooling: Indoor temperature of 27 °CDB/ 19 °CWB, and outdoor temperature of 35 °CDB/ 24 °CWB.
  - Heating: Indoor temperature of 20 °CDB/ 15 °CWB, and outdoor temperature of 7 °CDB/ 6 °CWB.
  - Pipe length: 5 m, Height difference: 0 m.
- Protective function might work when using it outside the operation range.
- *: Sound pressure level
  - 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.

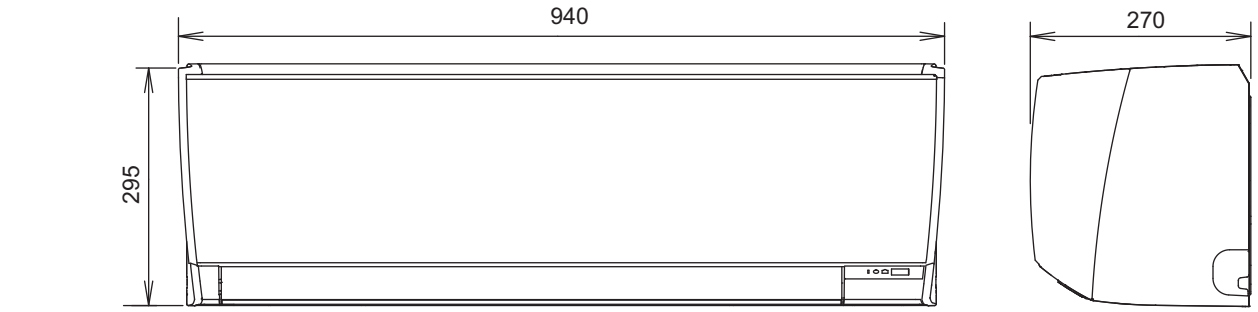
GENERAL INFORMATION

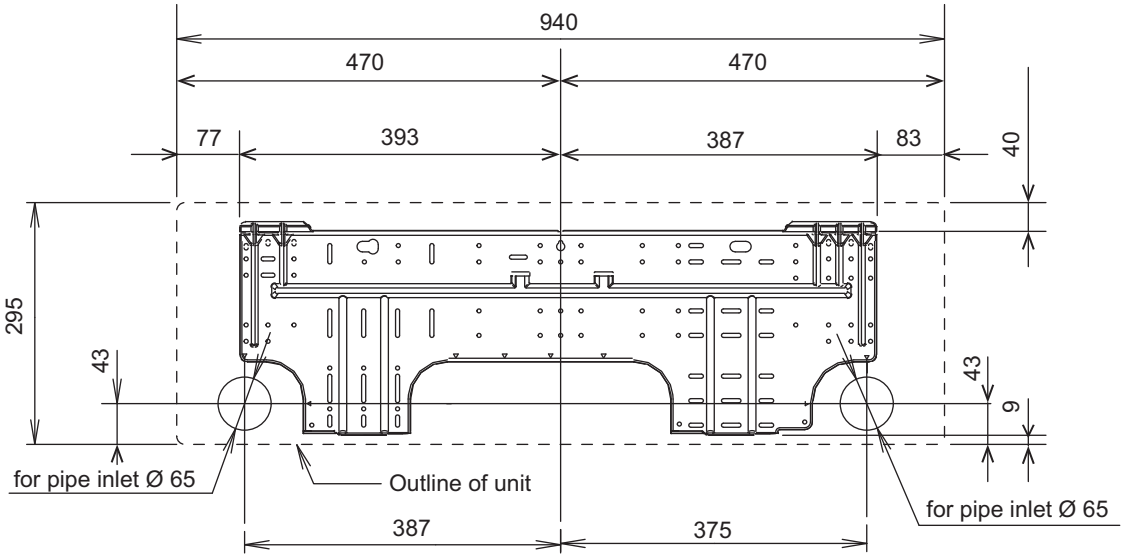
2. Dimensions

2-1. Indoor unit

■ Models: ASYG09KHCA, ASYG12KHCA, and ASYG14KHCA

Unit: mm



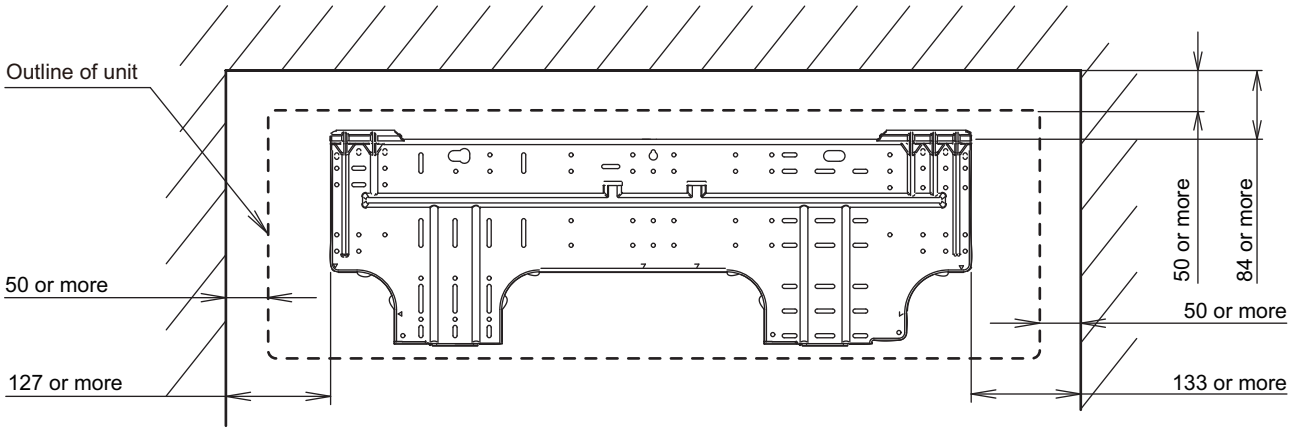


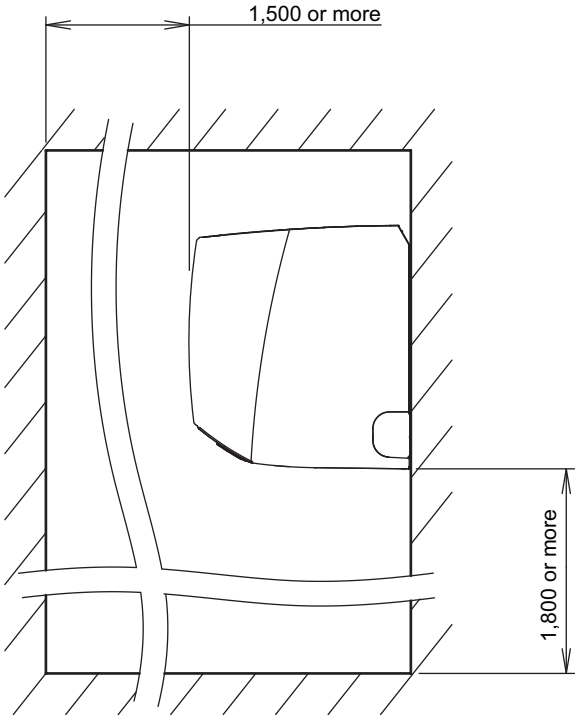
GENERAL INFORMATION

● Installation space requirement

Provide sufficient installation space for product safety.

Unit: mm

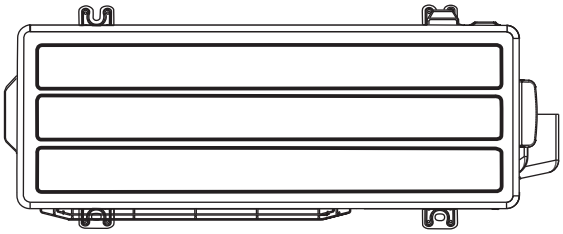




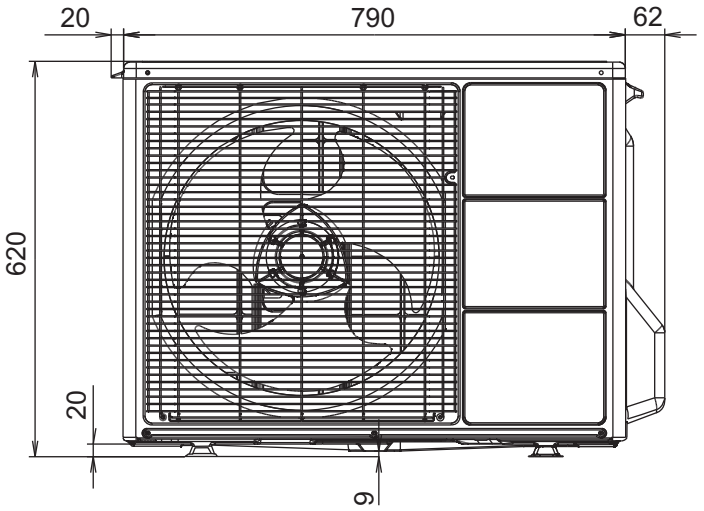
GENERAL INFORMATION

2-2. Outdoor unit

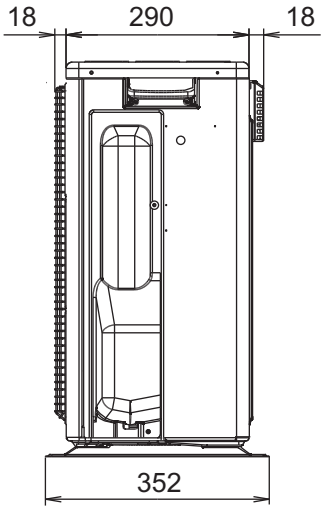
■ Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN



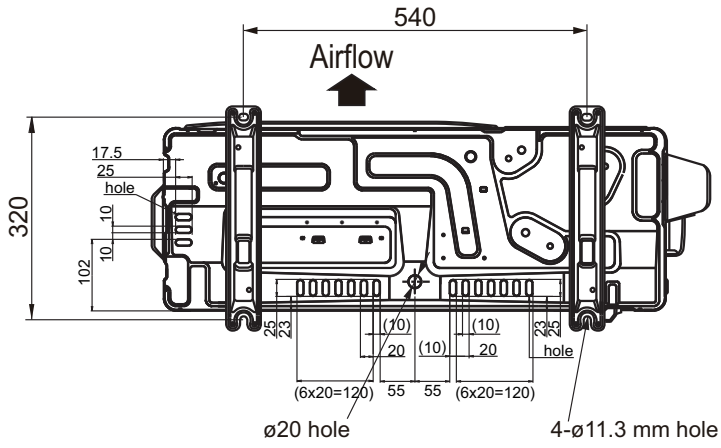
Top view



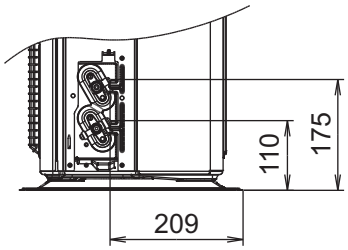
Front view



Side view



Bottom view



GENERAL INFORMATION

REFRIGERANT R32
INVERTER

2. TECHNICAL DATA AND PARTS LIST

CONTENTS

2. TECHNICAL DATA AND PARTS LIST

TECHNICAL DATA AND PARTS LIST

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
  - Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. When repairing the refrigerant system, refer to the precautions written in the installation manual of the products before you start servicing.
  - Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
  - All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out.
  - Work in confined spaces shall be avoided.
  - The area around the workspace shall be sectioned off.
  - Ensure that the conditions within the area have been made safe by control of flammable material.
  - 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.
- Checking for presence of refrigerant
  - The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres.
  - Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

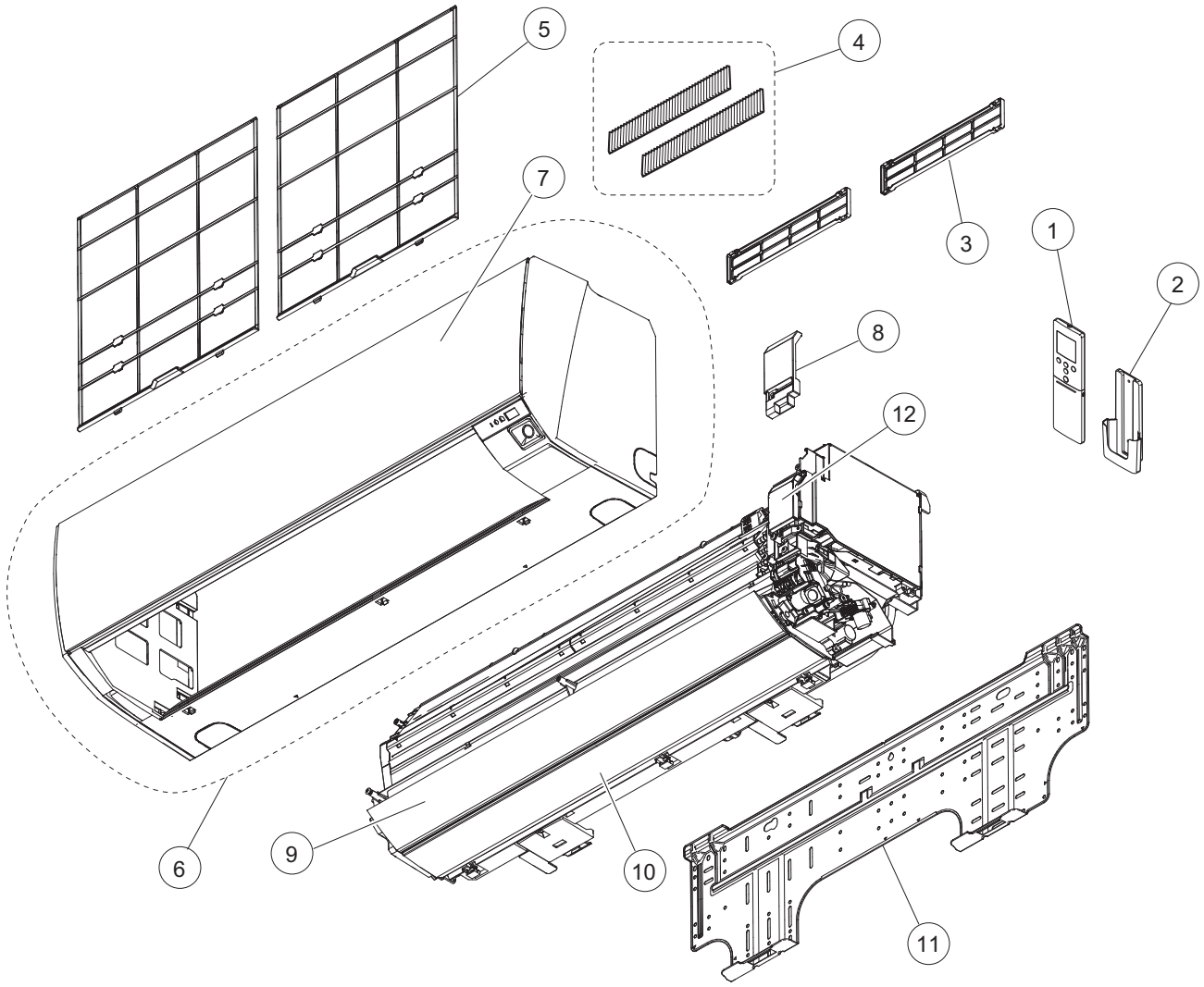
- Service parts information and design are subject to change without notice for product improvement.
- For the latest information of the service parts, refer to our Service Portal.
  https://fujitsu-general.force.com/portal/
- Precise figure of the service parts listed in this manual may differ from the actual service parts.

TECHNICAL DATA AND PARTS LIST

2. Indoor unit parts list

2-1. Models: ASYG09KHCA, ASYG12KHCA, and ASYG14KHCA

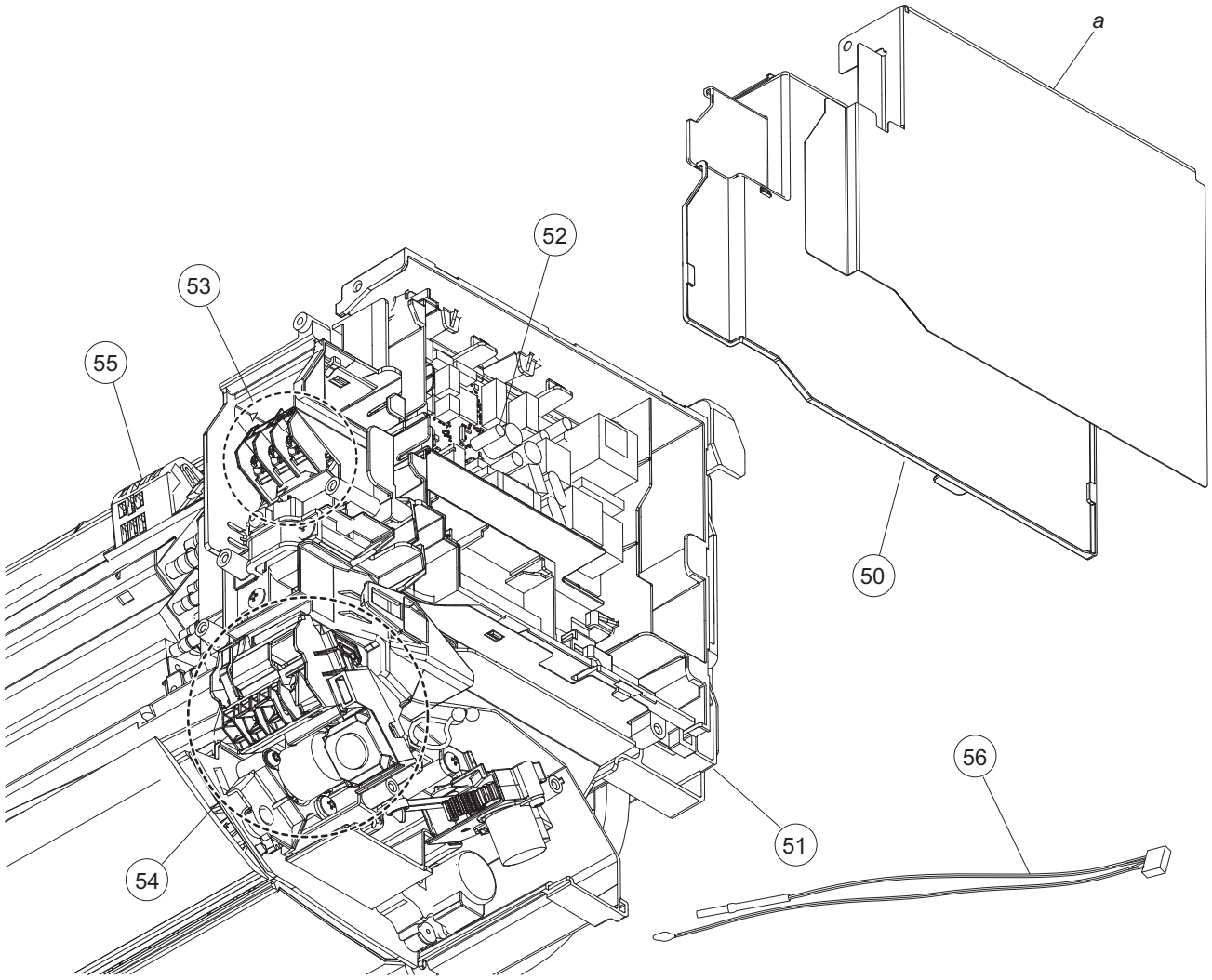
■ Exterior parts and accessories



Item no.	Part no.	Part name	Service part
1	9332438147	Remote controller	♦
2	9318912005	Remote controller holder	♦
3	9332911008	Electric filter holder	♦
4	9317250009	Air clean filter assy	♦
5	9380997009	Air filter	♦
6	9320459000	Front panel sub assy	♦
7	9320449001	Intake grille assy	♦
8	9318786002	Wire cover	♦
9	9318849028	Louver	♦
10	9319232096	Diffuser assy	♦
11	9318861013	Bracket panel	♦
12	9318827002	Wire shield	♦

TECHNICAL DATA AND PARTS LIST

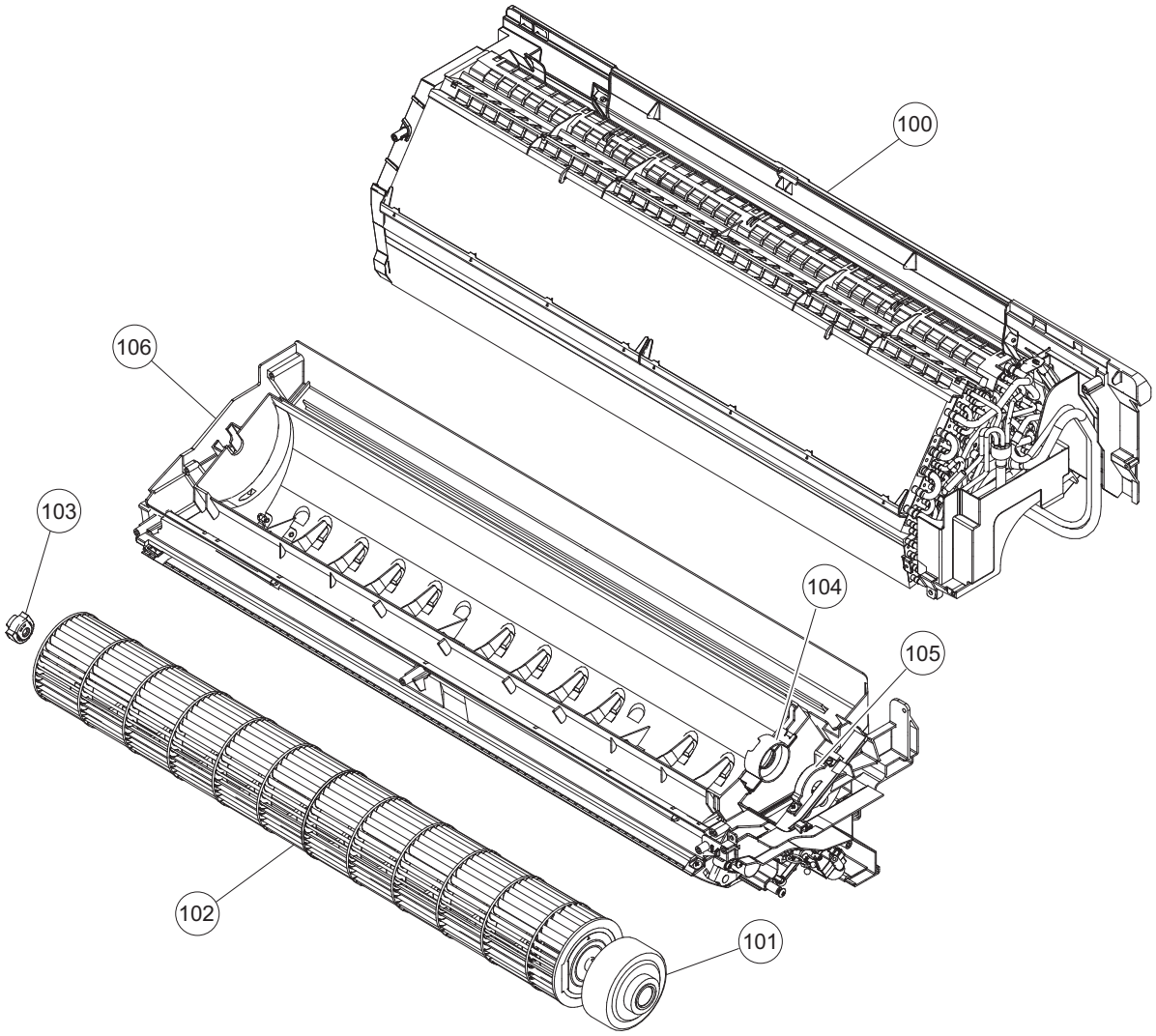
■ Control box



Item no.	Part no.	Part name	Service part
50	9318757019	Control cover	♦
51	9380996002	Control box	♦
52	9710368417	Main PCB (for 09 model)	♦
	9710368424	Main PCB (for 12 model)	♦
	9710368431	Main PCB (for 14 model)	♦
53	9900720025	Terminal	♦
54	9709642023	Display assy	♦
55	9379930000	Room thermistor holder	♦
56	9900627003	Thermistor assy	♦
a	—	Cover shield	—

TECHNICAL DATA AND PARTS LIST

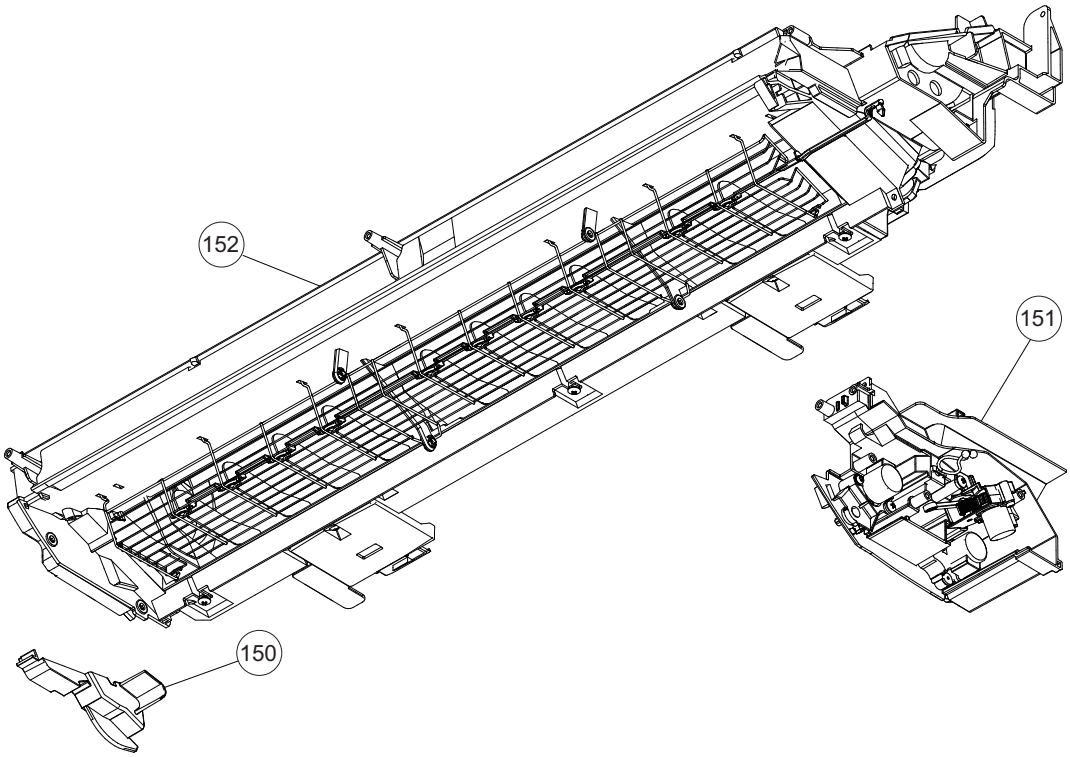
■ Evaporator and fan



Item no.	Part no.	Part name	Service part
100	9323532120	Evaporator total assy	♦
101	9603253066	Fan motor	♦
102	9315024060	Crossflow fan assy	♦
103	9306628024	Bearing C assy	♦
104	9316568006	Motor cover	♦
105	9316601000	Motor cover	♦
106	9319171180	Casing total assy	♦

TECHNICAL DATA AND PARTS LIST

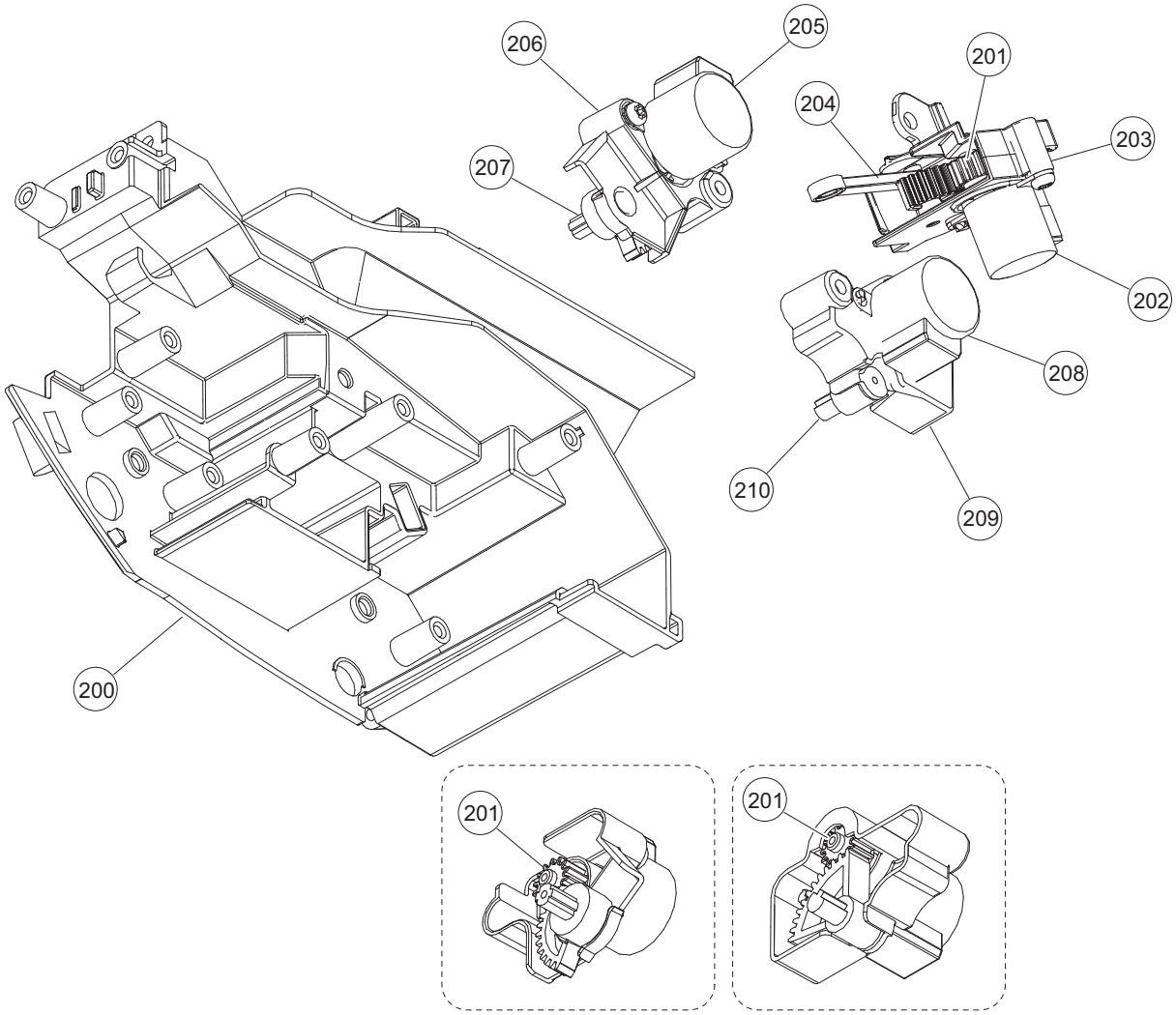
■ Casing total assy



Item no.	Part no.	Part name	Service part
150	9319776002	Outlet cover assy	♦
151	9319173085	Motor case assy	♦
152	9319172101	Casing assy	♦

TECHNICAL DATA AND PARTS LIST

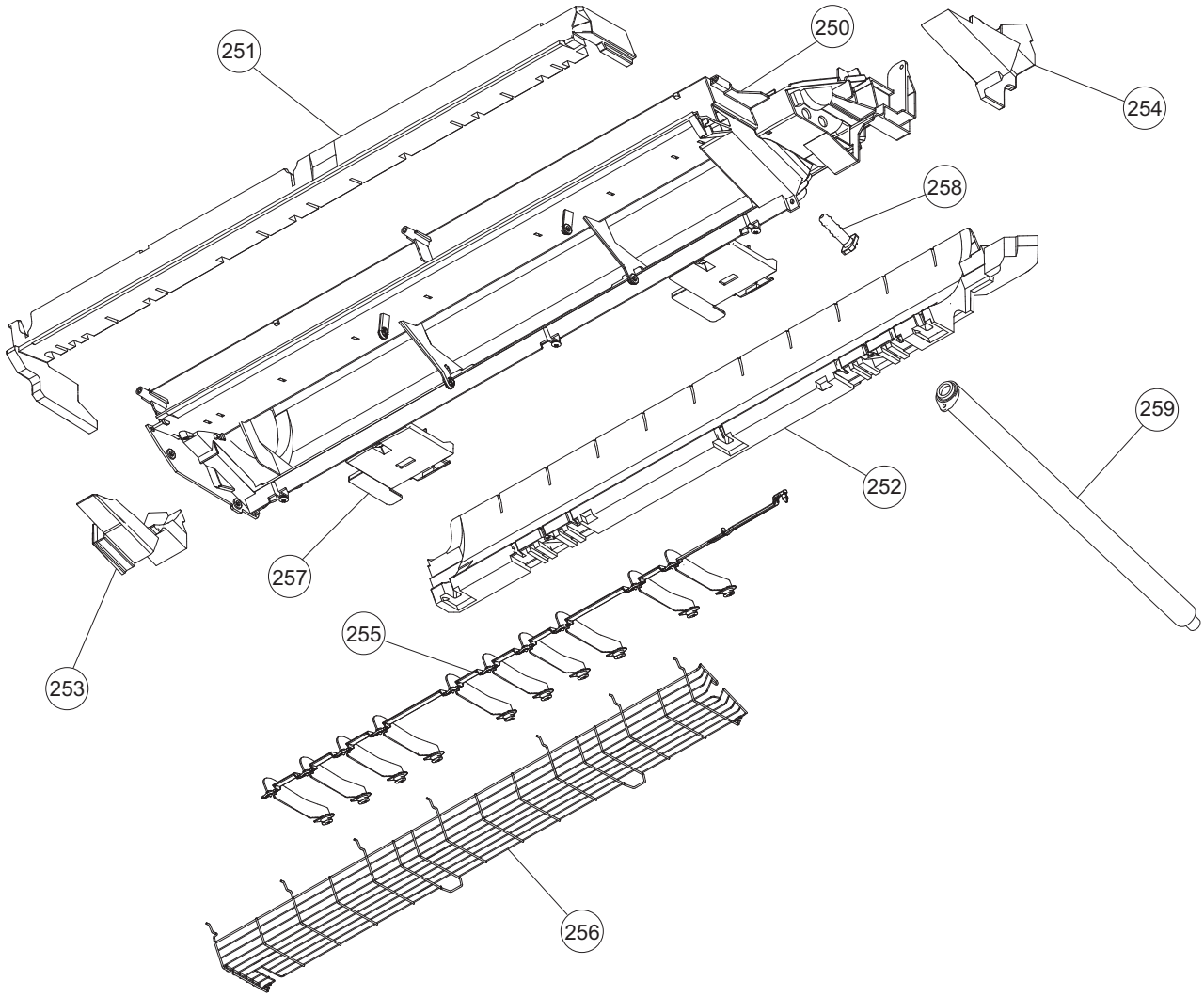
■ Motor case assy



Item no.	Part no.	Part name	Service part
200	9318746020	Motor case	♦
201	9309994003	Gear A	♦
202	9900139230	Step motor (L and R)	♦
203	9319150000	Louver link holder	♦
204	9317507004	Link A	♦
205	9900384135	Step motor (Louver)	♦
206	9318748000	Gear cover A	♦
207	9318749007	Louver gear A	♦
208	9900384142	Step motor (Diffuser)	♦
209	9318750003	Gear cover B	♦
210	9316616004	Louver gear B	♦

TECHNICAL DATA AND PARTS LIST

■ Casing assy



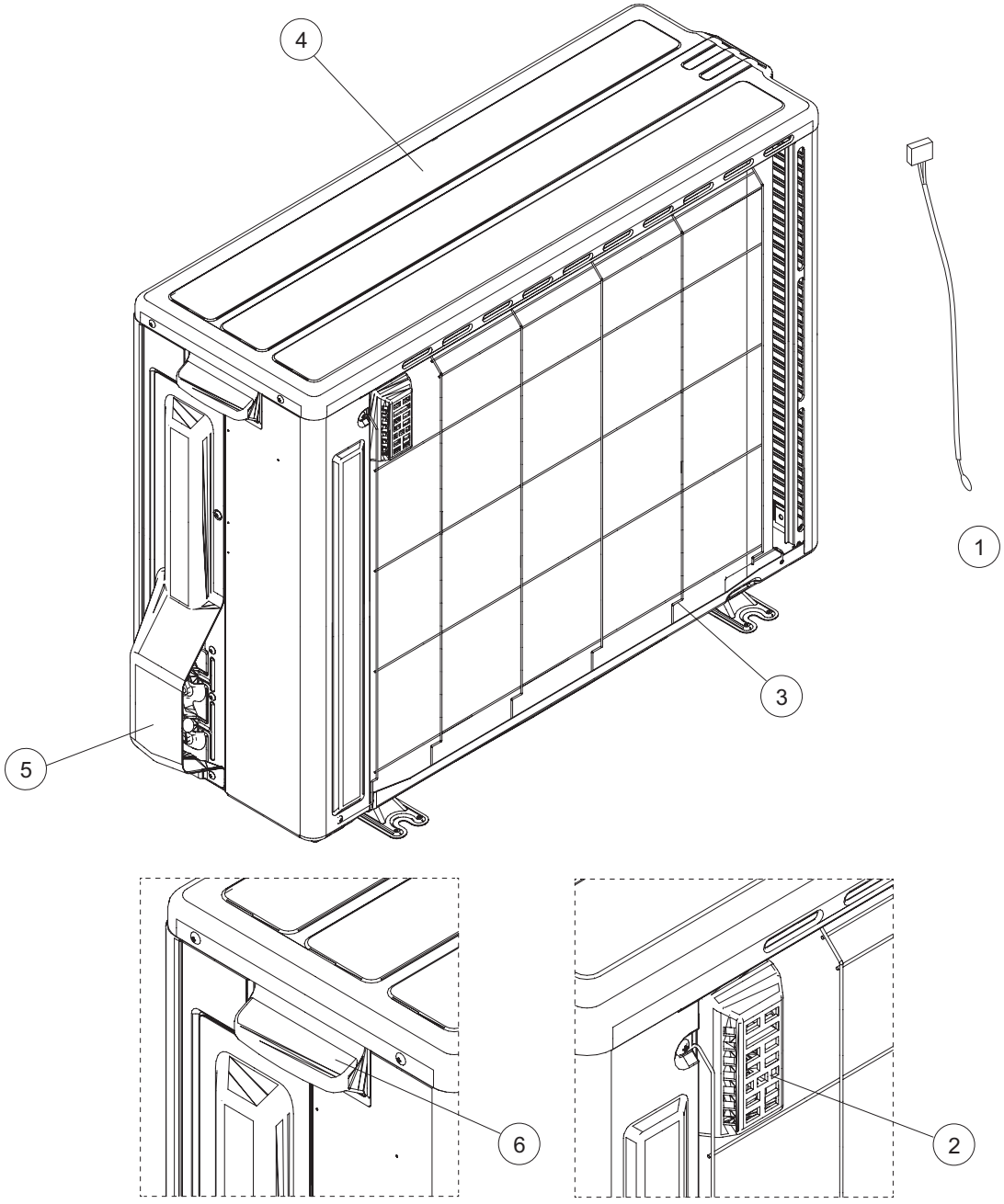
Item no.	Part no.	Part name	Service part
250	9318840025	Casing	♦
251	9382222000	Casing cover F	♦
252	9318862003	Casing cover B	♦
253	9318830002	Casing cover L	♦
254	9318831009	Casing cover R	♦
255	9319229027	L and R louver assy	♦
256	9320458003	Fan guard	♦
257	9318743029	Pipe bracket	♦
258	9316177017	Drain cap	♦
259	9316904019	Drain hose assy	♦

TECHNICAL DATA AND PARTS LIST

3. Outdoor unit parts list

3-1. Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN

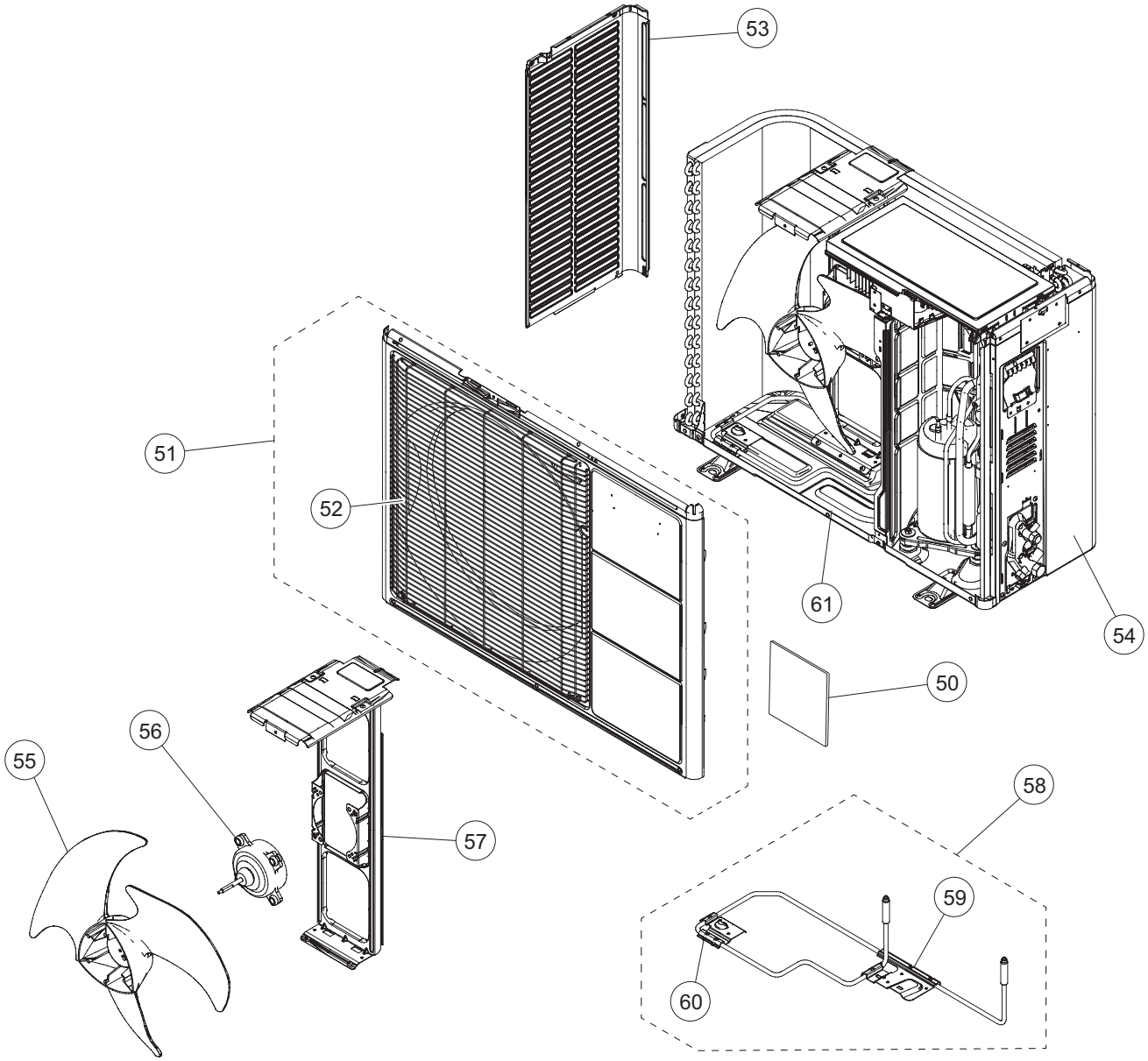
■ Exterior parts



Item no.	Part no.	Part name	Service part
1	9900565008	Thermistor (Outdoor temp.)	♦
2	9313954031	Thermistor holder	♦
3	9332492002	Protective net	♦
4	9317939188	Top panel assy	♦
5	9318499001	Switch cover assy	♦
6	9317588003	Grip	♦

TECHNICAL DATA AND PARTS LIST

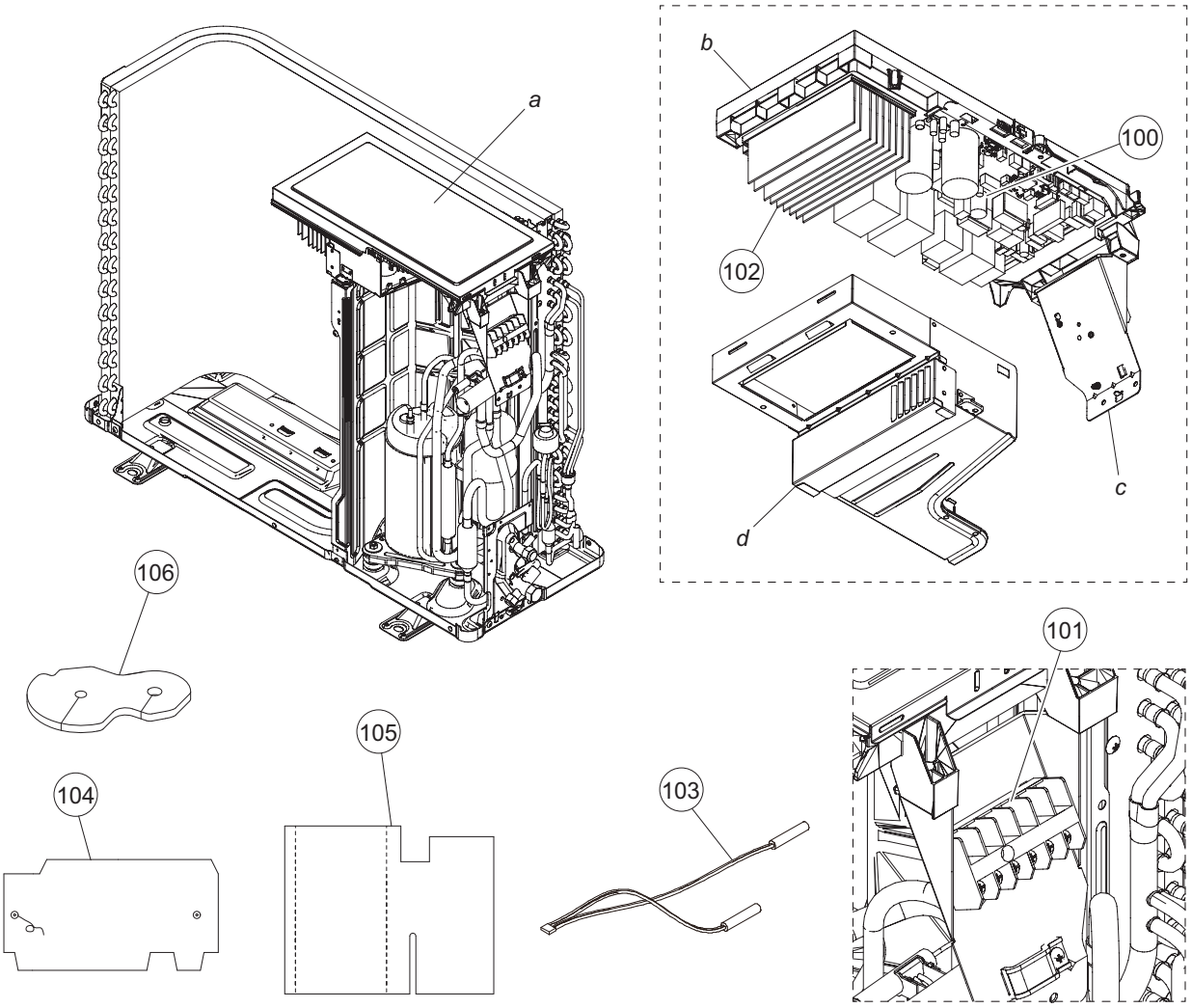
■ Chassis



Item no.	Part no.	Part name	Service part
50	9319151007	Emblem	♦
51	9318463149	Front panel assy	♦
52	9318467017	Fan guard	♦
53	9318461015	Cabinet left assy	♦
54	9318462081	Cabinet right assy	♦
55	9313808013	Propeller fan	♦
56	9603495008	Brushless DC motor	♦
57	9316041011	Motor bracket assy	♦
58	9900616045	Heater unit assy	♦
59	9900616045	Heater holder A	♦
60	9318651003	Heater holder B	♦
61	9316885059	Base assy	♦

TECHNICAL DATA AND PARTS LIST

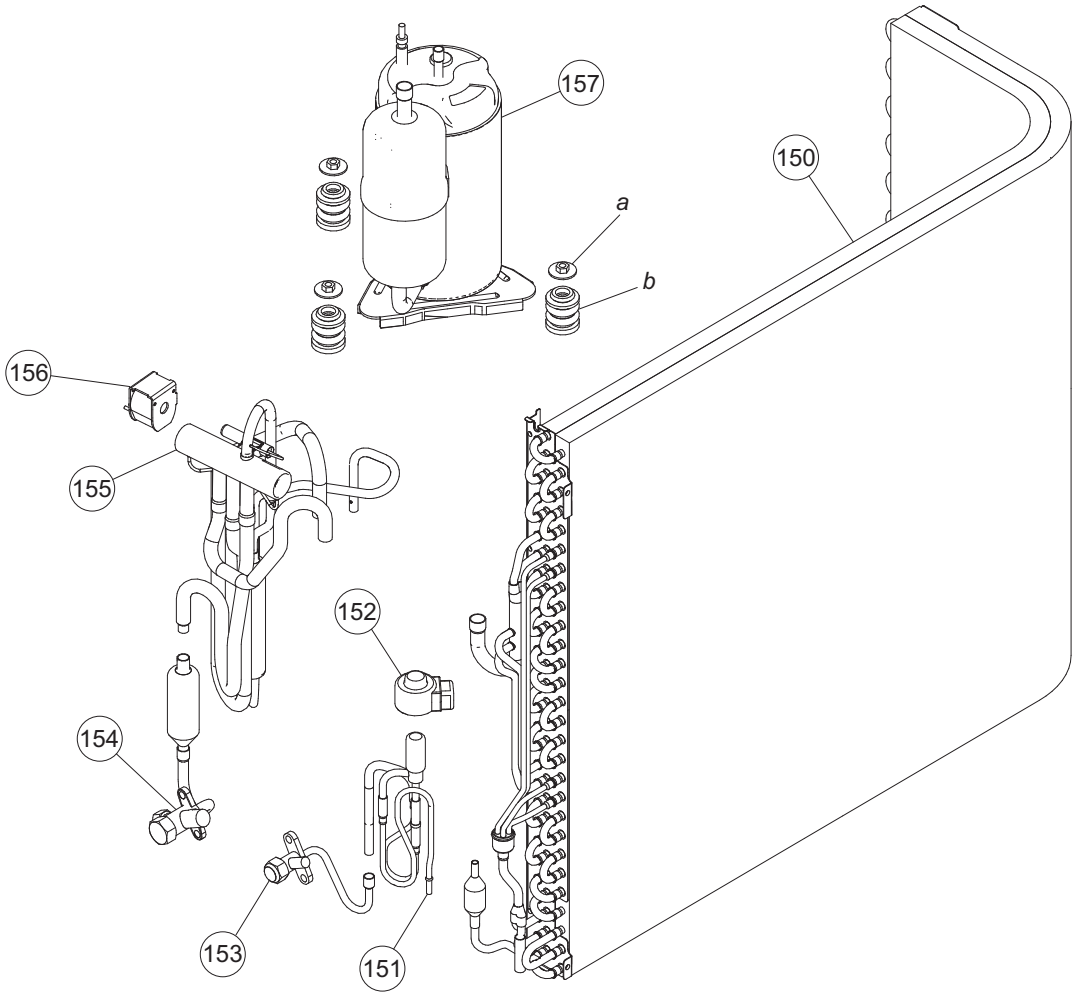
■ Control unit



Item no.	Part no.	Part name	Service part
100	9710802362	Main PCB (for 09 model)	♦
	9710802379	Main PCB (for 12 model)	♦
	9710802386	Main PCB (for 14 model)	♦
101	9900380007	Terminal	♦
102	9319540030	Heat sink	♦
103	9900935016	Thermistor assy	♦
104	9319731025	Noise insulator A	♦
105	9322211002	Noise insulator F	♦
106	9313371012	S-insulator H	♦
a	—	Shield panel	—
b	—	PCB holder	—
c	—	Terminal bracket	—
d	—	Inverter case assy	—

TECHNICAL DATA AND PARTS LIST

■ Refrigeration cycle



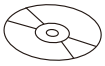
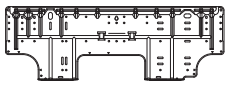
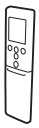
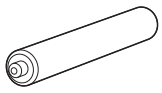
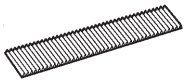
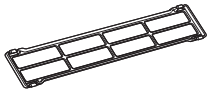
Item no.	Part no.	Part name	Service part
150	9317089777	Condenser total assy (for 09 and 12 models)	♦
	9317089609	Condenser total assy (for 14 model)	♦
151	9320152093	Pulse motor valve sub assy	♦
152	9970095078	Expansion valve coil	♦
153	9318252026	2-way valve assy	♦
154	9320411008	3-way valve assy	♦
155	9300198004	4-way valve assy	♦
156	9970195006	Solenoid	♦
157	9322196002	Compressor assy (for 09 and 12 models)	♦
	9322065001	Compressor assy (for 14 model)	♦
a	—	Special nut	—
b	—	Rubber cushion	—

TECHNICAL DATA AND PARTS LIST

4. Accessories

4-1. Indoor unit

■ Models: ASYG09KHCA, ASYG12KHCA, and ASYG14KHCA

Part name	Exterior	Q'ty	Part name	Exterior	Q'ty
Operating manual		1	Cloth tape		1
Operating manual (CD-ROM)		1	Wall hook bracket		1
Installation manual		1	Tapping screw (large)		5
Remote controller		1	Tapping screw (small)		2
Battery		2	Air cleaning filter		2
Remote controller holder		1	Filter holder		2

4-2. Outdoor unit

■ Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN

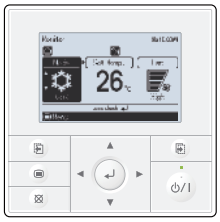
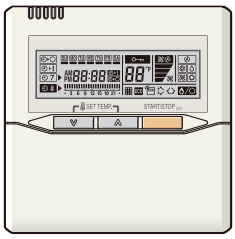
Part name	Exterior	Q'ty	Part name	Exterior	Q'ty
Installation manual		1			

TECHNICAL DATA AND PARTS LIST

5. Optional parts

5-1. Indoor unit

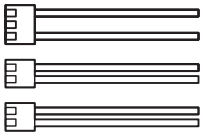
■ Controllers

Exterior	Part name	Model name	Summary
	Wired remote controller	UTY-RVNYM	Large and full-dot liquid crystal screen, wide and large keys easy to press, user-intuitive arrow key. Wire type: Polar 3-wire Optional communication kit is necessary for installation.
	Wired remote controller	UTY-RNNYM	Room temperature can be controlled by detecting the temperature accurately with built-in thermo sensor. Wire type: Polar 3-wire Optional communication kit is necessary for installation.
	Simple remote controller	UTY-RSNYM	Compact remote controller concentrates on the basic functions such as Start/Stop, fan control, temperature setting, and operation mode. Wire type: Polar 3-wire Optional communication kit is necessary for installation.

NOTE: Available functions may differ by the remote controller. For details, refer to the operation manual.

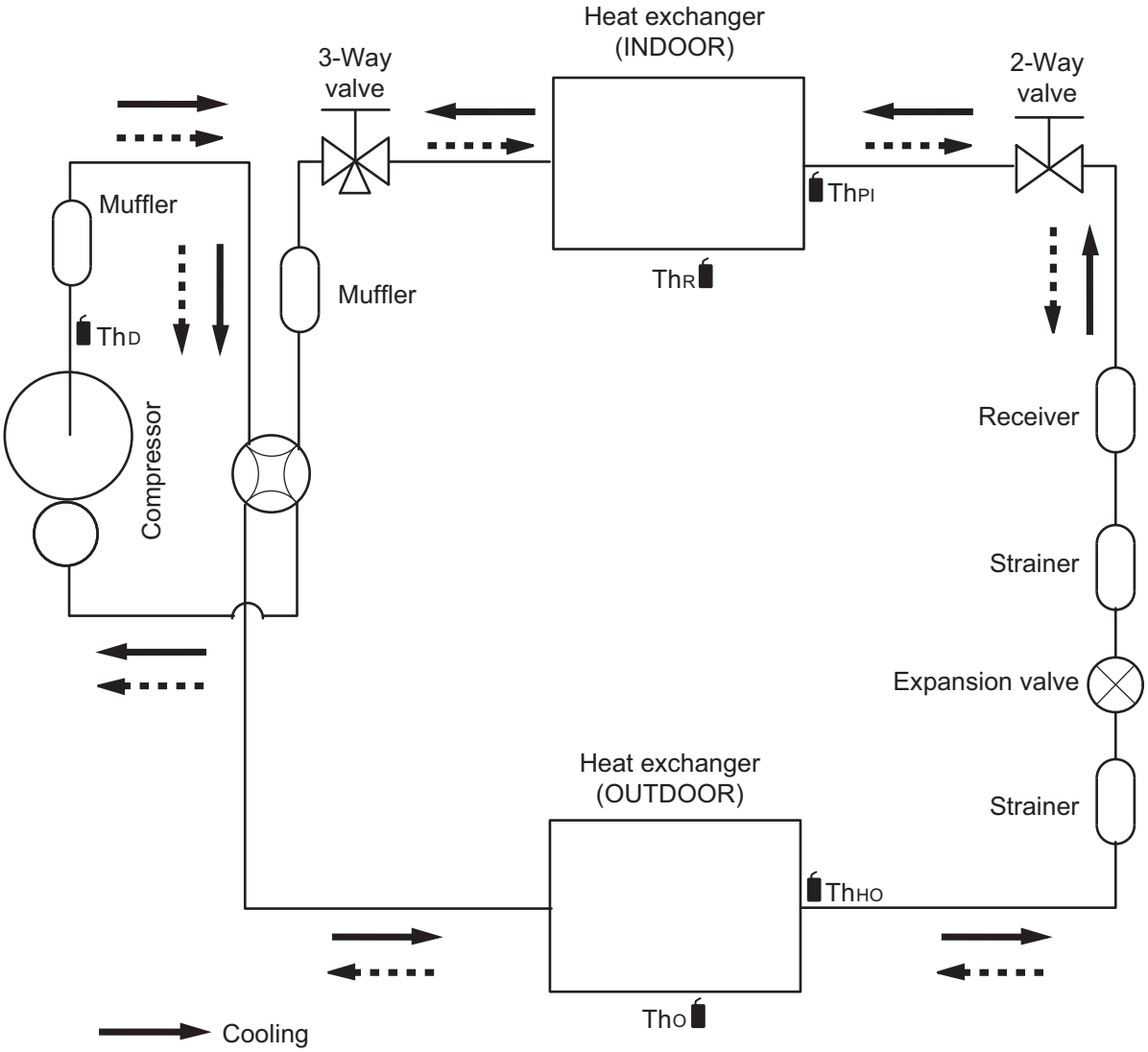
TECHNICAL DATA AND PARTS LIST

■ Others

Exterior	Part name	Model name	Summary
	External connect kit	UTY-XWZXZ5	Required when external device is connected.
	Communication kit	UTY-TWBXF1	Use to connect with optional devices and air conditioner PCB. Optional External connect kit is necessary for installation.
	Wireless LAN adapter	UTY-TFNXZ1	Remotely manage an air conditioning system using mobile devices such as smartphones and tablets.

6. Refrigerant system diagrams

6-1. Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN



ThD : Thermistor (Discharge temp.)

ThO : Thermistor (Outdoor temp.)

ThHO : Thermistor (Heat exchanger out temp.)

ThR : Thermistor (Room temp.)

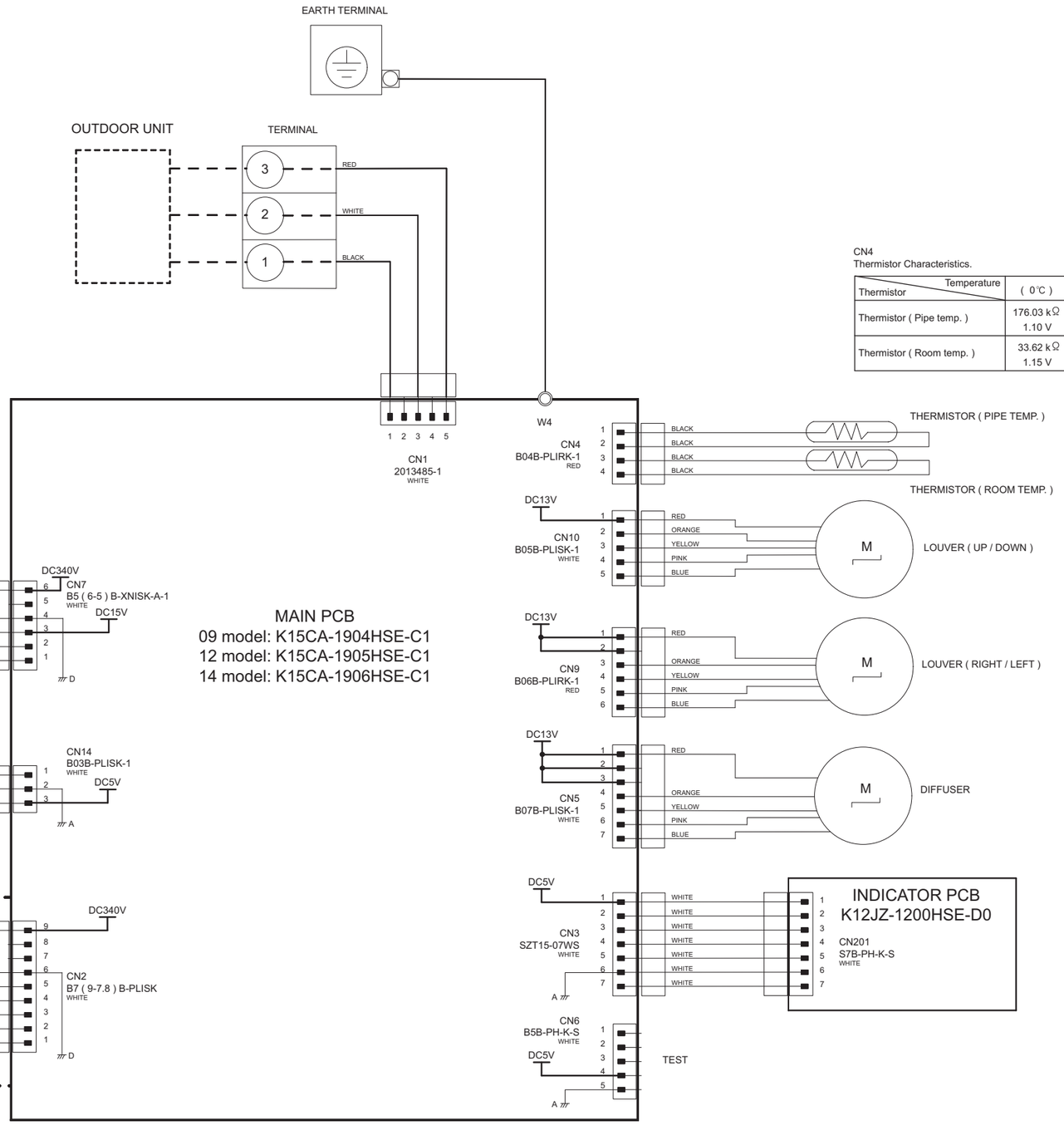
ThPI : Thermistor (Pipe temp.)

7. PC board diagrams

7-1. Models: ASYG09KHCA, ASYG12KHCA, and ASYG14KHCA

CONTROL UNIT

09 model: EZ-0190LHSE
12 model: EZ-0190MHSE
14 model: EZ-0190PHSE



CN4
Thermistor Characteristics.

Thermistor \ Temperature	(0℃)	(20℃)	(30℃)
Thermistor (Pipe temp.)	176.03 kΩ 1.10 V	62.91 kΩ 2.21 V	39.57 kΩ 2.79 V
Thermistor (Room temp.)	33.62 kΩ 1.15 V	12.54 kΩ 2.22 V	8.04 kΩ 2.77 V

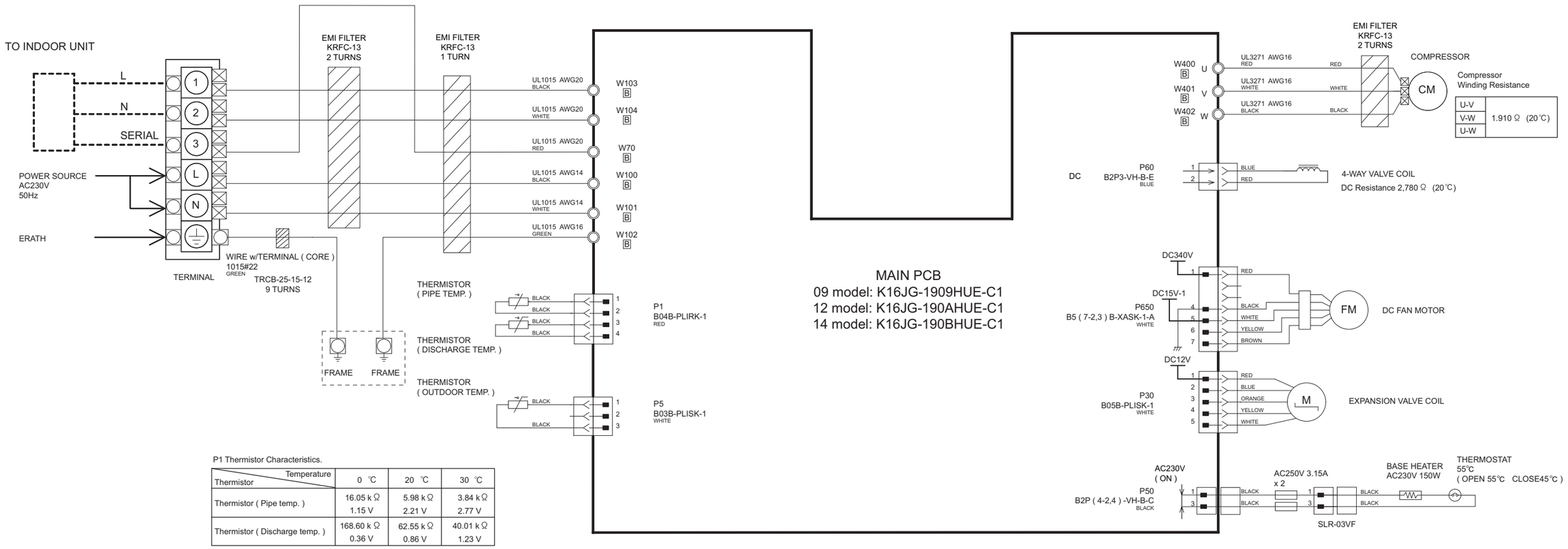
CN7 DC Fan motor

Pin No.	Terminal code	Function of terminal	Lead wire color
6	Vm	Motor power voltage input	Red
5	——	——	——
4	GND	GND	Black
3	Vcc	Control power voltage input	White
2	Vsp	Speed control voltage input	Yellow
1	FG	Revolution pulse output	Blue

7-2. Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN

INVERTER ASSEMBLY

09 model: EZ-0190HHUE
12 model: EZ-0190KHUE
14 model: EZ-0190LHUE



P1 Thermistor Characteristics.

Thermistor \ Temperature	0 ℃	20 ℃	30 ℃
Thermistor (Pipe temp.)	16.05 kΩ 1.15 V	5.98 kΩ 2.21 V	3.84 kΩ 2.77 V
Thermistor (Discharge temp.)	168.60 kΩ 0.36 V	62.55 kΩ 0.86 V	40.01 kΩ 1.23 V

P5 Thermistor Characteristics.

Thermistor \ Temperature	0 ℃	20 ℃	30 ℃
Thermistor (Outdoor temp.)	35.21 kΩ 2.61 V	12.64 kΩ 3.76 V	7.97 kΩ 4.14 V

P650 DC Fan Motor

Pin No.	Terminal code	Function of terminal	Lead wire color
1	Vm	Motor power voltage input	Red
2	——	——	——
3	——	——	——
4	GND	GND	Black
5	Vcc	Control power voltage input	White
6	Vsp	Speed control voltage input	Yellow
7	FG	Revolution pulse output	Brown

P30 Expansion Valve Coil
Recommended Drive Condition
Unipolar Drive, 1-2 Phase Excitation.

1(Red) - 2(Blue)	Coil resistance ≒46.0Ω (20℃)
1(Red) - 3(Orange)	
1(Red) - 4(Yellow)	
1(Red) - 5(White)	

TECHNICAL DATA
AND PARTS LIST

REFRIGERANT R32
INVERTER

3. TROUBLESHOOTING

CONTENTS

3. TROUBLESHOOTING

1. Error code

1-1. 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 [I] (Green)	Timer [⏲] (Orange)	Economy [🐷] (Green)	
E: 11. Serial communication error (Serial reverse transfer error) (Outdoor unit)	1 times	1 times	Continuous	11
E: 11. Serial communication error (Serial forward transfer error) (Indoor unit)	1 times	1 times	Continuous	11
E: 12. Wired remote controller communication error (Indoor unit)	1 times	2 times	Continuous	12
E: 32. Indoor unit main PCB error (Indoor unit)	3 times	2 times	Continuous	32
E: 35. MANUAL AUTO button error (Indoor unit)	3 times	5 times	Continuous	35
E: 41. Room temperature sensor error (Indoor unit)	4 times	1 times	Continuous	41
E: 42. Indoor unit heat exchanger sensor error (Indoor unit)	4 times	2 times	Continuous	42
E: 51. Indoor unit fan motor error (Indoor unit)	5 times	1 times	Continuous	51
E: 62. Outdoor unit main PCB error (Outdoor unit)	6 times	2 times	Continuous	62
E: 64. PFC circuit error (Outdoor unit)	6 times	4 times	Continuous	64
E: 65. IPM error (Outdoor unit)	6 times	5 times	Continuous	65
E: 71. Discharge thermistor error (Outdoor unit)	7 times	1 times	Continuous	71
E: 73. Outdoor unit heat exchanger thermistor error (Outdoor unit)	7 times	3 times	Continuous	73
E: 74. Outdoor temperature thermistor error (Outdoor unit)	7 times	4 times	Continuous	74
E: 84. Current sensor error (Outdoor unit)	8 times	4 times	Continuous	84
E: 94. Trip detection (Outdoor unit)	9 times	4 times	Continuous	94
E: 95. Compressor motor control error (Outdoor unit)	9 times	5 times	Continuous	95
E: 97. Outdoor unit fan motor error (Outdoor unit)	9 times	7 times	Continuous	97
E: 99. 4-way valve error (Outdoor unit)	9 times	9 times	Continuous	99
E: A1. Discharge temperature error (Outdoor unit)	10 times	1 times	Continuous	A1

TROUBLESHOOTING

2. Troubleshooting with error code

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

TROUBLESHOOTING

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".

↓

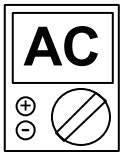
Check point 2. Check connection

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”.

↓

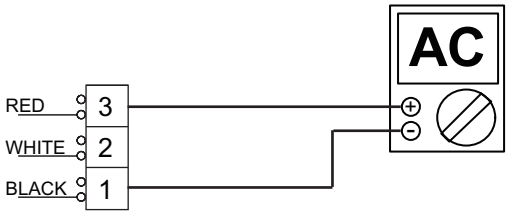
Check point 3. Check the voltage of power supply

Check the voltage of power supply
Check if AC 270 V (AC 230 V -10%) to AC 253 V (AC 230 V +10%) appears at outdoor unit terminal L — N.



↓

TROUBLESHOOTING

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 03-35 • 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. Serial communication error (Serial forward transfer error) (Indoor unit)

TROUBLESHOOTING

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 outdoor unit cannot receive the serial signal from indoor unit more than 10 seconds.
		Fan motor	
	Outdoor unit	Main PCB	
Forecast of cause			Connection failure
			External cause
			Main PCB failure
			Indoor unit fan motor failure
			Outdoor unit Main PCB

Check point 1. Reset the power and operate

Does error indication show again?
→ If no, go to "Check point 1-2".

↓

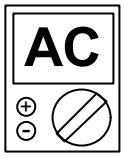
Check point 2. Check connection

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”.

↓

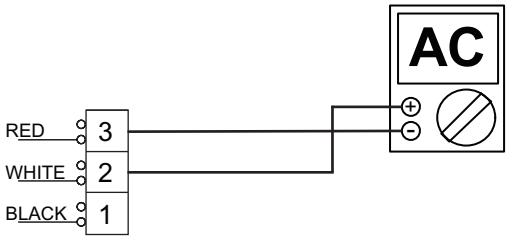
Check point 3. Check the voltage of power supply

Check the voltage of power supply
Check if AC 270 V (AC 230 V -10%) to AC 253 V (AC 230 V +10%) appears at outdoor unit terminal L — N.



↓

TROUBLESHOOTING

Check point 4. Check serial signal (Forward 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 03-35) • If indoor unit fan motor is abnormal, replace indoor unit fan motor and main PCB. • If it is abnormal, replace outdoor unit 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. Wired remote controller communication error (Indoor unit)

TROUBLESHOOTING

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 CN2 (terminal 1—3) of UTY-TWBXF (Communication kit).. (Power supply to the remote controller)
Upon correcting the removed connector or mis-wiring, reset the power.

- If it is DC 5 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: 32. 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

TROUBLESHOOTING

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 (Electronically 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.

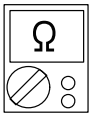
2-5. E: 35. MANUAL AUTO button error (Indoor unit)

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 60 or more seconds.
	Indicator PCB		
	Manual auto switch		
Forecast of cause			MANUAL AUTO button failure
			Controller PCB and indicator PCB failure

TROUBLESHOOTING

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

2-6. E: 41. 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

TROUBLESHOOTING

Check point 1. Check connection of connector

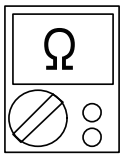
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

-> 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 03-43.
- 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.

If the voltage does not appear, replace main PCB.

↓

End

2-7. E: 42. Indoor unit heat exchanger sensor error (Indoor unit)

TROUBLESHOOTING

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

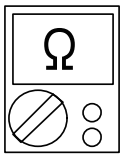
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

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

↓

Check point 2. Remove connector and check thermistor resistance value

- For the room thermistor resistance value, refer to "Thermistor resistance values" on page 03-43.
- 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.

If the voltage does not appear, replace main PCB.

↓

End

2-8. E: 51. 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 condition that actual frequency of indoor fan is below 1/3 of target frequency is continued 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

TROUBLESHOOTING

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 03-35.)
→ 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

2-9. E: 62. 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

TROUBLESHOOTING

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

2-10. E: 64. PFC circuit error (Outdoor unit)

TROUBLESHOOTING

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	• When inverter input DC voltage is higher than 425 V or lower than 80 V. For 14 model, when inverter output DC voltage is higher than 415V 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

2-11. E: 65. IPM error (Outdoor unit)

TROUBLESHOOTING

Indicator	Indoor unit	Operation indicator	6 time flash
		Timer indicator	5 time flash
		Economy indicator	Continuous flash
		Error code	E: 65
Detective actuator	Outdoor unit	Main PCB	1. When more than normal operating current to IPM in main PCB flows, 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
			Outdoor fan operation failure
			Outdoor heat exchanger clogged
			Compressor failure
			Main PCB failure

Check point 1. 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 mis-wiring, reset the power.

↓

Check point 2. Check outdoor fan and heat exchanger

- Is there anything obstructing the air distribution circuit?
- Is there any clogging of outdoor heat exchanger?
- Is the fan rotating by hand when operation is off?

→ If the fan motor is locked, replace it.

↓

Check point 3. Check outdoor fan

Check outdoor fan motor. (Refer to "E: 97. Outdoor unit fan motor error (Outdoor unit)" on page 03-22.)
→ If the fan motor is failure, replace it.

↓

Check point 4. Check compressor
Check compressor. (Refer to inverter compressor in "Service parts information".)

↓

Check point 5. Replace main PCB
If Check point 1 to 4 do not improve the symptom, change main PCB.

↓

End

TROUBLESHOOTING

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

TROUBLESHOOTING

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

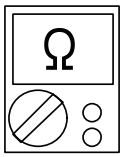
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

→ 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 03-43.
- 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.

If the voltage does not appear, replace main PCB.

↓

End

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

TROUBLESHOOTING

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

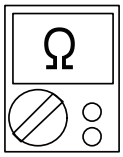
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

→ 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 03-43.
- 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.

If the voltage does not appear, replace main PCB.

↓

End

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

TROUBLESHOOTING

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

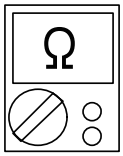
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

-> 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 03-43.
- 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.

If the voltage does not appear, replace main PCB.

↓

End

2-15. E: 84. 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. Trip detection (Outdoor unit)

TROUBLESHOOTING

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. Compressor motor control error (Outdoor unit)

TROUBLESHOOTING

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 Compressor	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.
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 03-35.)

→ 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. Outdoor unit fan motor error (Outdoor unit)

TROUBLESHOOTING

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	1. When outdoor fan rotation speed is less than 100 rpm in 20 seconds after fan motor starts, fan motor stops. 2. After fan motor restarts, if the same operation within 60 seconds is repeated 3 times in a row, compressor and fan motor stops. 3. 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.

↓

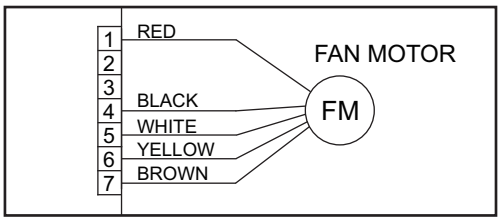
Check point 3. Check outdoor unit fan motor

Check outdoor unit fan motor. (Refer to outdoor unit fan motor in "Service parts information" on page 03-35.)
→ 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.

Read wire	DC voltage
Red—Black	240—400 V
White—Black	13.5—16.5 V

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

↓

End

TROUBLESHOOTING

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

TROUBLESHOOTING

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. > 10 °C (Cooling or Dry operation) Indoor heat exchanger temp. - Room temp. < -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 03-43.
→ If defective, replace the thermistor.

↓

TROUBLESHOOTING

Check point 3. Check the solenoid coil and 4-way valve
• **Solenoid coil** Remove CN30 (for 9/12 model) and CN500 (for 14 model) from PCB and check the resistance value of coil. Resistance value is about1.88 kΩ to 2.29 kΩ (at 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 CN30 (for 9/12 model) and CN500 (for 14 model) of Main PCB. → Check if AC 270 V (AC 230 V -10%) to AC 253 V (AC 230 V +10%) appears at CN30 (for 9/12 model) and CN500 (for 14 model) 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. Discharge temperature error (Outdoor unit)

TROUBLESHOOTING

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 ≥ 110 °C during compressor operation generated 2 times within 24 hours.
	Discharge temperature thermistor		
Forecast of cause			3-way valve not opened
			EEV 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 the electronic expansion valve (EEV) and strainer

- Check if EEV open.
  Refer to outdoor unit Electronic Expansion Valve (EEV) in "Service parts information" on page 03-35.
- 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 03-35.)

↓

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 03-43.

↓

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

TROUBLESHOOTING

3. Troubleshooting without error code

3-1. Indoor unit—No power

Forecast of cause	Power supply failure
	External cause
	Electrical components defective

TROUBLESHOOTING

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".

↓

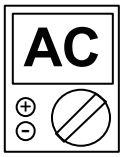
Check point 2. Check external cause at indoor and outdoor (voltage drop or noise)

- 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

TROUBLESHOOTING

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".

↓

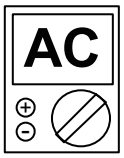
Check point 2. Check external cause at indoor and outdoor (voltage drop or noise)

- 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 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

TROUBLESHOOTING

Check point 1. Check indoor and outdoor installation condition
-> 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 . Replace main PCB
If check point 1 to 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

TROUBLESHOOTING

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

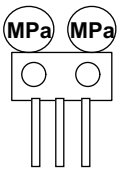
- Check connection pipe (specified pipe length and pipe diameter?)
- Check any loose or removed communication line.

→ 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 the electronic expansion valve.
  Refer to outdoor unit Electronic Expansion Valve (EEV) in "Service parts information" on page 03-35.
- Check compressor.
  Refer to compressor in "Service parts information" on page 03-35.
  Refer to inverter compressor in "Service parts information" on page 03-35.



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

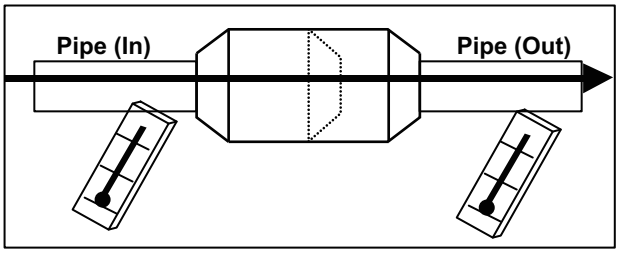
↓

End

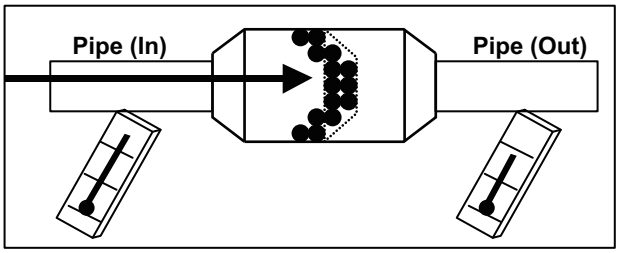
TROUBLESHOOTING

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 Indoor 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 03-35.

↓

End

TROUBLESHOOTING

3-6. Water leaking

Forecast of cause	Erroneous installation
	Drain hose failure

TROUBLESHOOTING

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?

↓

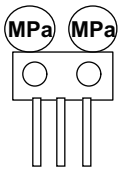
End

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

TROUBLESHOOTING

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

Does not start up	Stops soon after starting up	Abnormal noise
↓	↓	↓
Is there open or loose connection cable?	Is there open or loose connection cable?	Check if vibration noise by loose bolt or contact noise of piping is happening.
↓	↓	↓
Check main PCB, connection of compressor, and winding resistance. (Refer to the next page) → If there is no failure, the defect of compressor is considered (Locked compressor due to clogged dirt or less oil)	Is gas pipe valve open? (Low pressure is too low)	Defective compressor can be considered. (due to inside dirt clogging or broken component)
↓	↓	↓
Replace compressor.	Check if refrigerant is leaking. 	Replace compressor.
↓	↓	↓
End	Check if strainer is clogged. (Refer to outdoor EEV in this chapter.)	**End**
	↓	
	Check main PCB, connection of compressor and winding resistance. (Refer to the next page) → If there is no failure, the defect of compressor can be considered. (Compression part broken or valve defective.)	
	↓	
	Replace compressor.	
	↓	
	End	

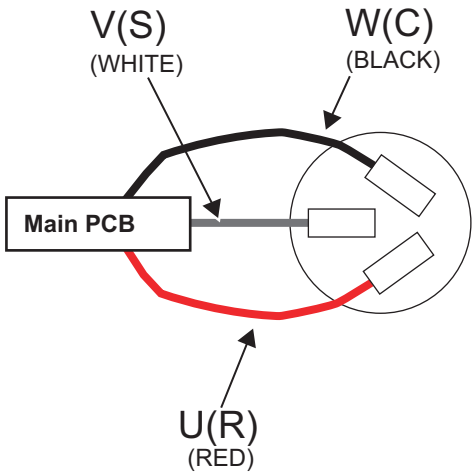
TROUBLESHOOTING

4-2. Inverter compressor

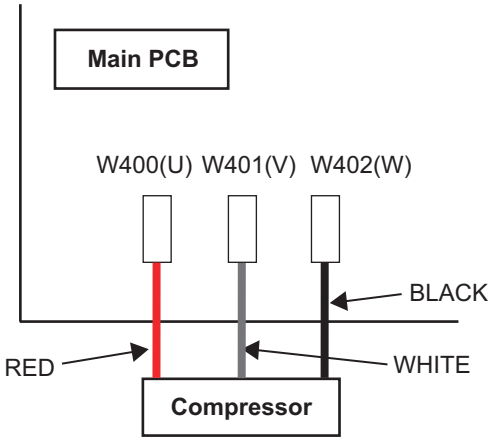
■ Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN

Check point 1. Check connection

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



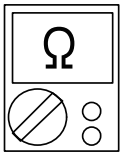
- Check terminal connection of main PCB (loose or incorrect wiring)

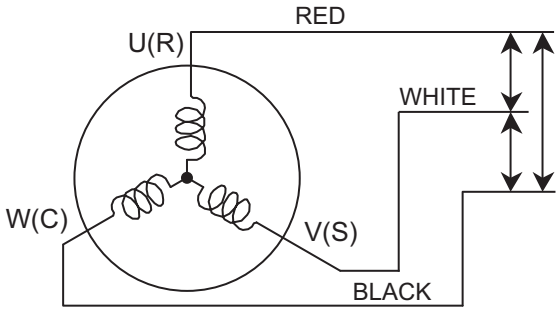


↓

Check point 2. Check winding resistance

Check winding resistance of each terminal.
Resistance value: 1.910 Ω at 20 °C





→ If the resistance value is 0 Ω 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)

■ Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN

TROUBLESHOOTING

Check point 1. Check connections

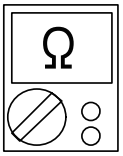
Check connection of connector. (Loose connector or open cable)

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

Check point 2. Check coil of EEV

Remove connector, check each winding resistance of coil.

Read wire	Resistance value
White - Red	46 Ω ± 4 Ω at 20°C
Yellow - Red	
Orange - Red	
Blue - Red	



→ 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.

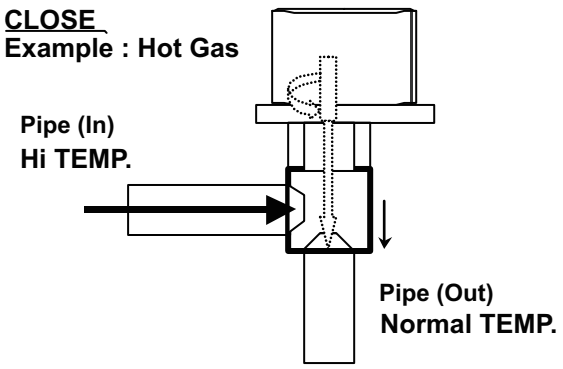
Check point 4. Check noise at start up

Turn on the power and check the operation noise.

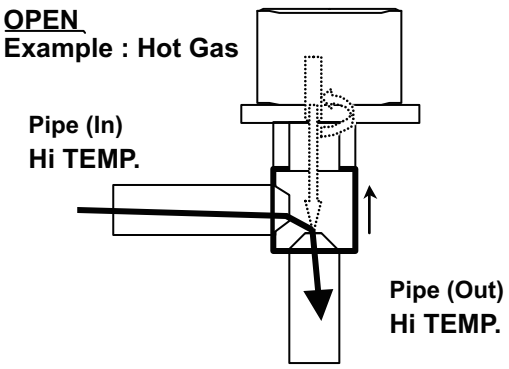
→ If an abnormal noise does not show, replace main PCB.

Check point 5. Check opening and closing operation of valve

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



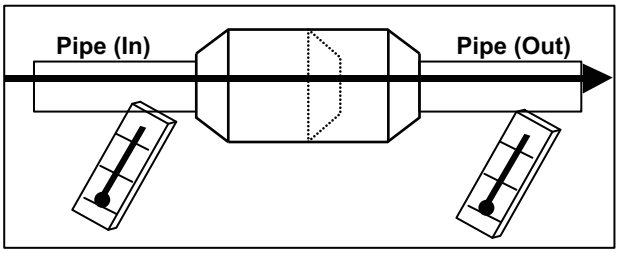
If it is open, it has no temp. difference between inlet and outlet



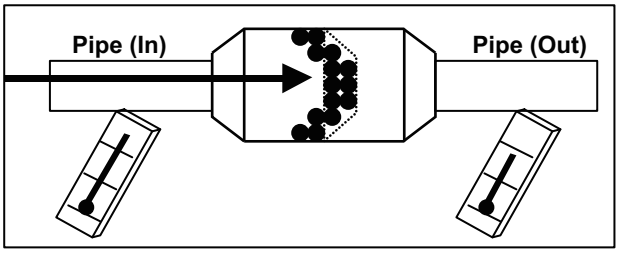
TROUBLESHOOTING

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

■ Models: ASYG09KHCA, ASYG12KHCA, and ASYG14KHCA

TROUBLESHOOTING

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 (Blue)	Feed back (FG)
2 (Yellow)	Speed command (Vsp)
3 (White)	Control voltage (Vcc)
4 (Black)	Earth terminal (GND)
5	No function
6 (Red)	DC voltage (Vm)

4-5. Outdoor unit fan motor

■ Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN

TROUBLESHOOTING

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

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)

4-6. Heater unit

■ Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN

TROUBLESHOOTING

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.

Check point 2. Check electrical components
Check Check Fuses. If Fuse is open, check connection, and replace Fuse.

Check point 3. Check heater wire
Remove connector, check each winding resistance of heater wire.

Read wire	Resistance value
Black — White	321.0 to 366.0 Ω at 25°C

→ If Resistance value is abnormal, replace heater Unit.

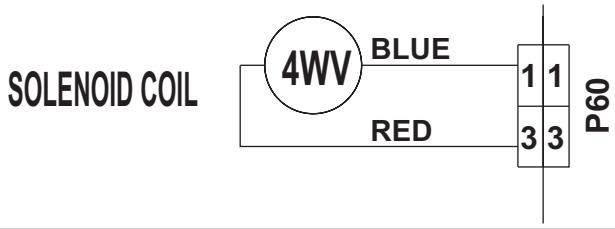
4-7. 4-way valve coil (solenoid coil)/4-way valve

■ Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN

TROUBLESHOOTING

Check point 1. Check connection

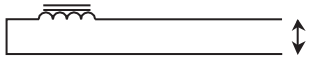
- Check the connection of connector P60.

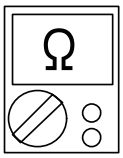


↓

Check Point 2 : Check Solenoid Coil

Remove P60 from PCB and check the resistance value of coil.
Resistance Value ≈ 2.78 kΩ



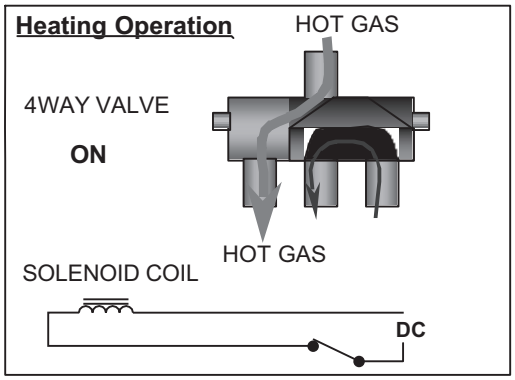


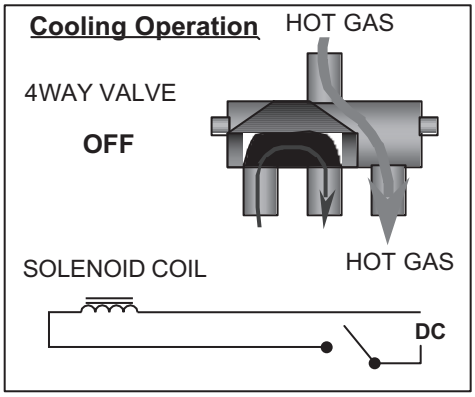
→ If it is Open or abnormal resistance value, replace Solenoid Coil.

↓

Check Point 3: Check Operation of 4 Way Valve

Check each piping temperature, and confirm the location of the valve by the temperature difference





→ If the valve location is not proper, replace 4 way valve.

↓

Check Point 4: Replace Main PCB

If none of Checks 1 to 3 apply, replace the Main PCB.

5. Thermistor resistance values

5-1. Indoor unit

■ Room temperature thermistor

Temperature (°C)	Resistance (kΩ)	Voltage (V)
-10.0	58.2	0.73
-5.0	44.0	0.93
0.0	33.6	1.15
5.0	25.9	1.39
10.0	20.2	1.66
15.0	15.8	1.94
20.0	12.5	2.22
25.0	10.00	2.50
30.0	8.0	2.77
35.0	6.5	3.03
40.0	5.3	3.27
45.0	4.4	3.49

■ Heat exchanger temperature thermistor

Temperature (°C)	Resistance (kΩ)	Voltage (V)
-30.0	1,131.9	0.21
-25.0	804.5	0.29
-20.0	579.6	0.40
-15.0	422.9	0.53
-10.0	312.3	0.69
-5.0	233.2	0.88
0.0	176.0	1.10
5.0	134.2	1.36
10.0	103.3	1.63
15.0	80.3	1.92
20.0	62.9	2.21
25.0	49.7	2.51
30.0	39.6	2.79
35.0	31.7	3.06
40.0	25.6	3.30
45.0	20.8	3.53
50.0	17.1	3.73
55.0	14.1	3.90
60.0	11.6	4.05
63.0	10.4	4.14

TROUBLESHOOTING

5-2. Outdoor unit

■ Discharge temperature thermistor

Temperature (°C)	Resistance (kΩ)	Voltage (V)
-30.0	1,013.1	0.06
-25.0	729.1	0.09
-20.0	531.6	0.12
-15.0	392.3	0.16
-10.0	292.9	0.21
-5.0	221.1	0.28
0.0	168.6	0.36
5.0	129.8	0.46
10.0	100.9	0.57
15.0	79.1	0.71
20.0	62.5	0.86
25.0	49.8	1.03
30.0	40.0	1.23
35.0	32.4	1.43
40.0	26.3	1.65
45.0	21.6	1.88
50.0	17.8	2.11
55.0	14.8	2.34
60.0	12.3	2.57
65.0	10.3	2.79
70.0	8.7	3.00
75.0	7.4	3.19
80.0	6.3	3.37
85.0	5.4	3.54
90.0	4.6	3.69
95.0	4.0	3.83
100.0	3.4	3.96
105.0	3.0	4.07
110.0	2.6	4.17
115.0	2.3	4.26
120.0	2.0	4.33

TROUBLESHOOTING

TROUBLESHOOTING

■ Heat exchanger temperature thermistor

Temperature (°C)	Resistance (kΩ)	Voltage (V)
-30.0	95.6	0.24
-25.0	68.9	0.32
-20.0	50.3	0.43
-15.0	37.2	0.57
-10.0	27.8	0.73
-5.0	21.0	0.92
0.0	16.1	1.14
5.0	12.4	1.39
10.0	9.6	1.65
15.0	7.6	1.93
20.0	6.0	2.21
25.0	4.8	2.49
30.0	3.8	2.77
35.0	3.1	3.02
40.0	2.5	3.26
45.0	2.1	3.48
50.0	1.7	3.68
55.0	1.4	3.85
60.0	1.2	4.00
65.0	1.0	4.13
70.0	0.8	4.25
75.0	0.7	4.35
80.0	0.6	4.43

■ Outdoor temperature thermistor

Temperature (°C)	Resistance (kΩ)	Voltage (V)
-30.0	224.3	0.73
-25.0	159.7	0.97
-20.0	115.2	1.25
-15.0	84.2	1.56
-10.0	62.3	1.90
-5.0	46.6	2.26
0.0	35.2	2.61
5.0	26.9	2.94
10.0	20.7	3.25
15.0	16.1	3.52
20.0	12.6	3.76
25.0	10.0	3.97
30.0	8.0	4.14
35.0	6.4	4.28
40.0	5.2	4.41
45.0	4.2	4.51
50.0	3.5	4.59
55.0	2.8	4.65

TROUBLESHOOTING

REFRIGERANT R32
INVERTER

4. CONTROL AND FUNCTIONS

CONTENTS

4. CONTROL AND FUNCTIONS

1. Compressor frequency control

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 frequency of the compressor.

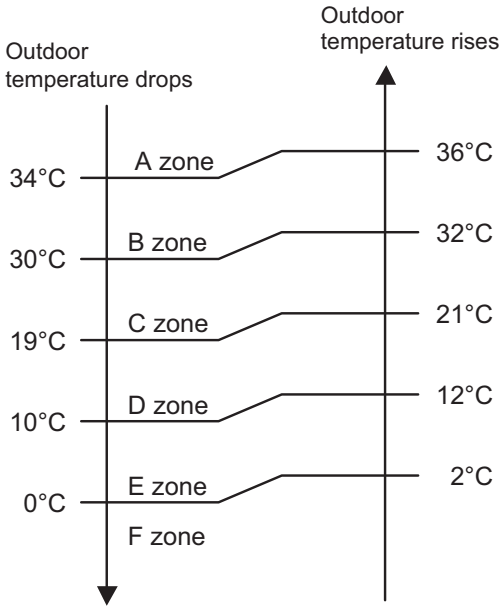
- If the room temperature is 6.0 °C higher than a set temperature, the compressor operation frequency will attain to maximum performance.
- If the room temperature is 1.0 °C lower than a set temperature, the compressor will be stopped.
- When the room temperature is within the range of +6.0°C to -1.0°C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

CONTROL AND FUNCTIONS

- **Compressor frequency range**

Model name	Minimum frequency	Maximum frequency
ASYG09KHCA ASYG12KHCA	8 rps	74 rps
ASYG14KHCA	8 rps	74 rps

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



CONTROL AND FUNCTIONS

Unit: rps

Model name	Outdoor temperature zone	Indoor unit fan mode			
		HIGH	MED	LOW	QUIET
ASYG09KHCA ASYG12KHCA	A zone	74	36	30	18
	B zone	74	36	30	18
	C zone	74	36	30	18
	D zone	42	24	20	14
	E zone	42	24	20	14
	F zone	39	24	20	14
ASYG14KHCA	A zone	74	32	26	20
	B zone	74	32	26	20
	C zone	54	32	26	20
	D zone	36	24	18	14
	E zone	36	24	18	14
	F zone	36	24	18	14

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 frequency of compressor.

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

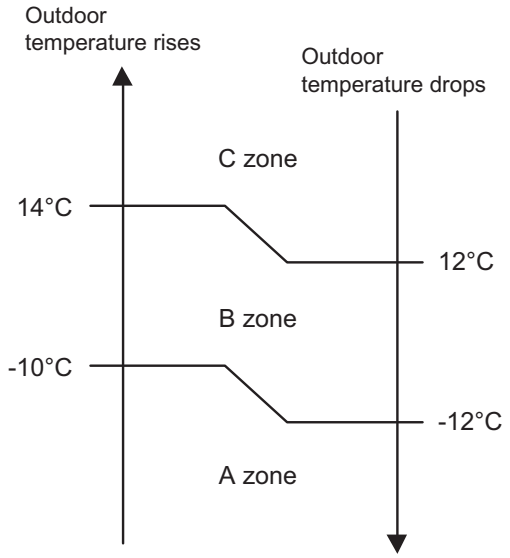
- **Compressor frequency range**

Unit: rps

Model name	Minimum frequency	Maximum frequency
ASYG09KHCA ASYG12KHCA	8	120
ASYG14KHCA	8	120

CONTROL AND FUNCTIONS

- **Limit of maximum speed based on outdoor temperature**
  In heating operation, maximum frequency is defined by outdoor temperature and fan mode.



Unit: rps

Model name	Outdoor temperature zone	Indoor unit fan mode			
		HIGH	MED	LOW	QUIET
ASYG09KHCA	A zone	120	58	46	26
	B zone	120	58	46	32
	C zone	120	58	46	39
ASYG12KHCA	A zone	120	58	46	32
	B zone	120	68	54	36
	C zone	120	68	54	46
ASYG14KHCA	A zone	120	102	63	54
	B zone	120	102	63	54
	C zone	120	102	63	54

1-3. Dry operation

The compressor rotation frequency 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.

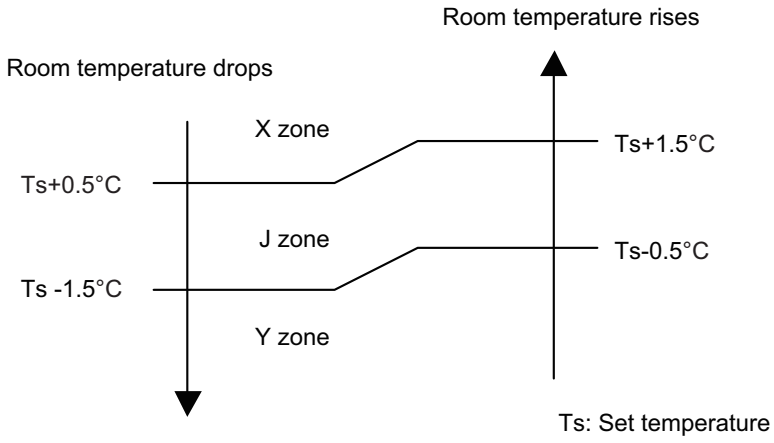
- **Compressor frequency range**

Unit: rps

Model name	Outdoor temperature zone	Operating frequency
ASYG09KHCA ASYG12KHCA	X zone	18
	J zone	12
	Y zone	0
ASYG14KHCA	X zone	20
	J zone	12
	Y zone	0

CONTROL AND FUNCTIONS

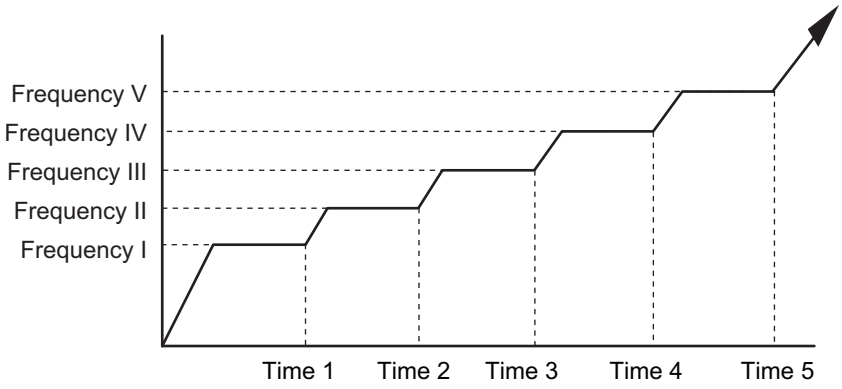
- **Compressor control based on room temperature**



1-4. Compressor frequency at normal start-up

■ Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN

Compressor frequency soon after starting is controlled as below.

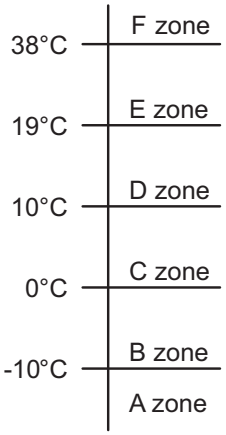


Frequency (rps)	I	II	III	IV	V
	40	56	77	90	99
Time (sec)	1	2	3	4	5
	60	240	280	360	400

1-5. Compressor frequency limitation by outdoor temperature

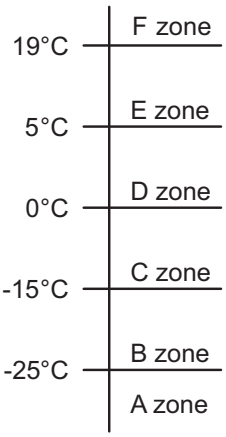
The minimum compressor frequency is limited by outdoor temperature as below.

- **Cooling/Dry mode**



Model name	Outdoor temperature zone	Limitation of compressor frequency
AOYG09KHCAN AOYG12KHCAN AOYG14KHCAN	A zone	18 rps
	B zone	18 rps
	C zone	18 rps
	D zone	1 rps
	E zone	1 rps
	F zone	22 rps

- **Heating mode**



Model name	Outdoor temperature zone	Limitation of compressor frequency
AOYG09KHCAN AOYG12KHCAN AOYG14KHCAN	A zone	39 rps
	B zone	39 rps
	C zone	17 rps
	D zone	10 rps
	E zone	1 rps
	F zone	1 rps

CONTROL AND FUNCTIONS

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 18°C and 30°C in 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 + 2°C	Cooling
Ts + 2°C ≥ Tr ≥ Ts - 2°C	Middle zone
Tr < Ts - 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.

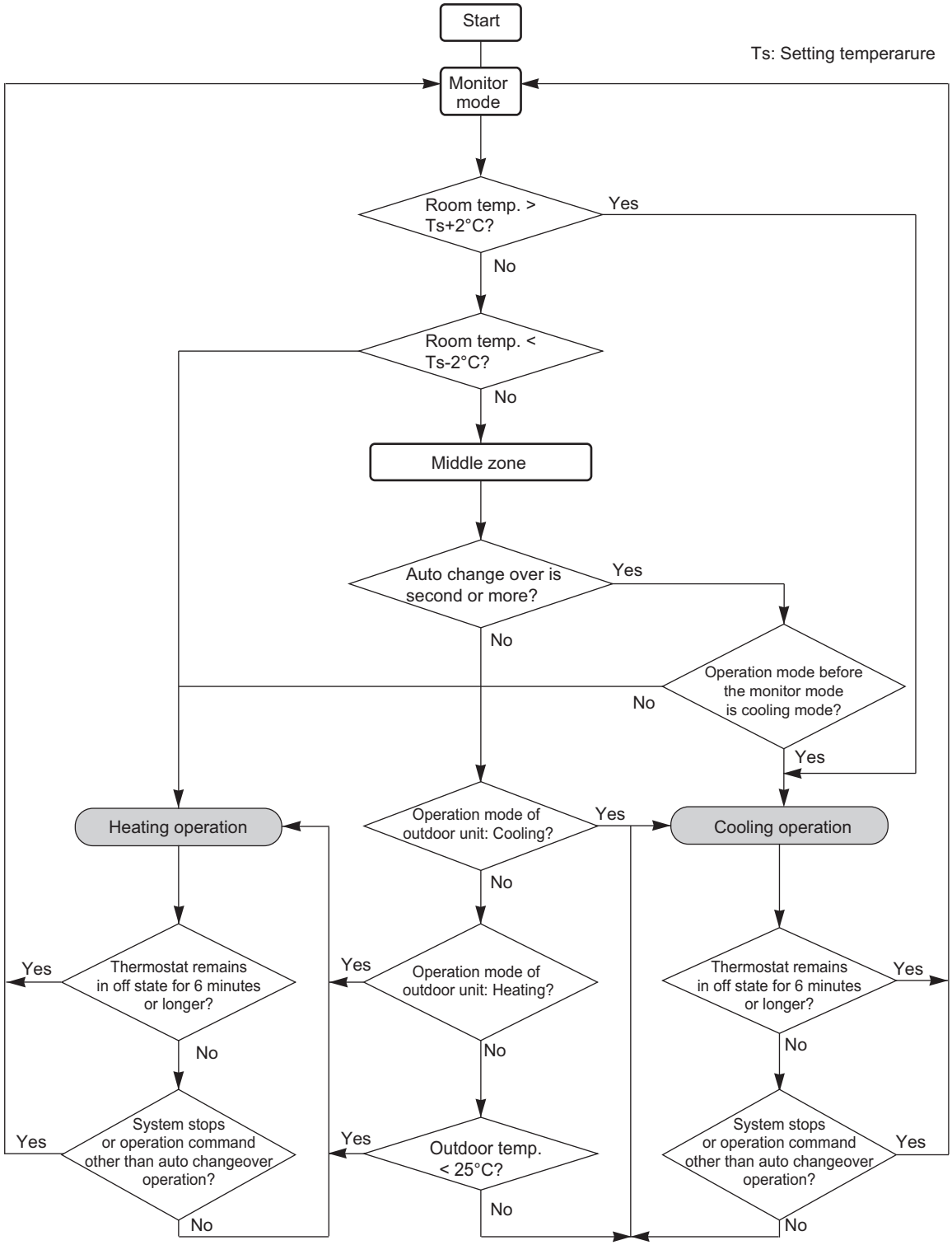
Outdoor temp.	Operation mode
25°C or more	Cooling
Less than 25°C	Heating

- 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.

CONTROL AND FUNCTIONS

Operation flow chart



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)	
		ASYG09KHCA ASYG12KHCA	ASYG14KHCA
Heating	POWERFUL	1,320	1,370
	HIGH	1,100	1,210
	MED+	1,040	1,140
	MED	940	1,040
	LOW	820	880
	QUIET	600	740
	Cool air prevention	600	600
	S-LOW	540	540
Cooling/Fan	POWERFUL	1,320	1,370
	HIGH	1,100	1,210
	MED	940	1,040
	LOW	820	880
	QUIET	600	680
	Soft quiet	540*1	600*1
	S-LOW	540*2	540*2
Dry		X zone: 600 J zone: 600	X zone: 680 J zone: 640

*1: Fan mode only
*2: Cooling mode only

■ Fan operation

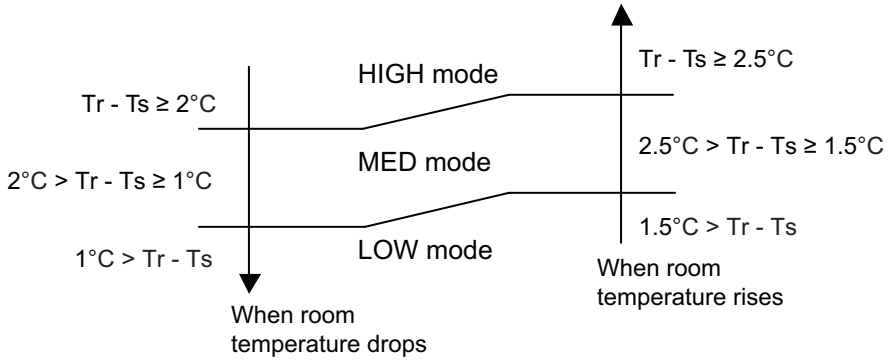
Airflow can be switched in 5 steps such as AUTO, QUIET, LOW, MED, HIGH while indoor unit fan only runs.
When fan mode is set at AUTO, it operates on MED fan speed.

CONTROL AND FUNCTIONS

■ 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)



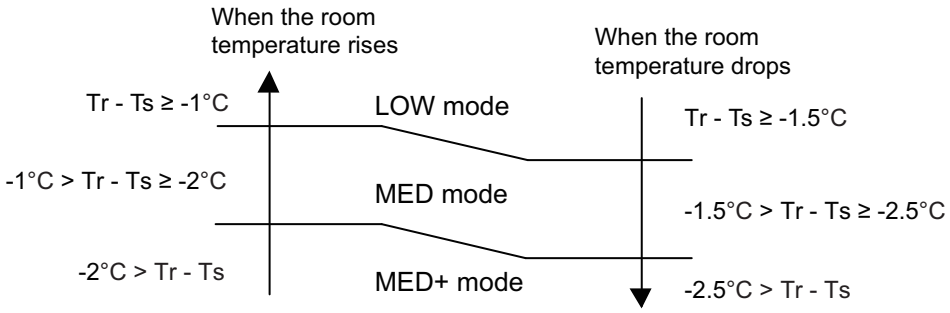
■ Dry operation

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.

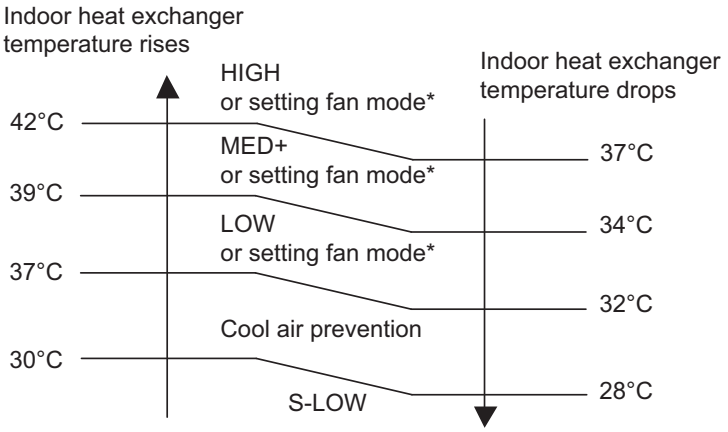
Airflow change over (Heating: Auto)



■ Cool air prevention control (heating mode)

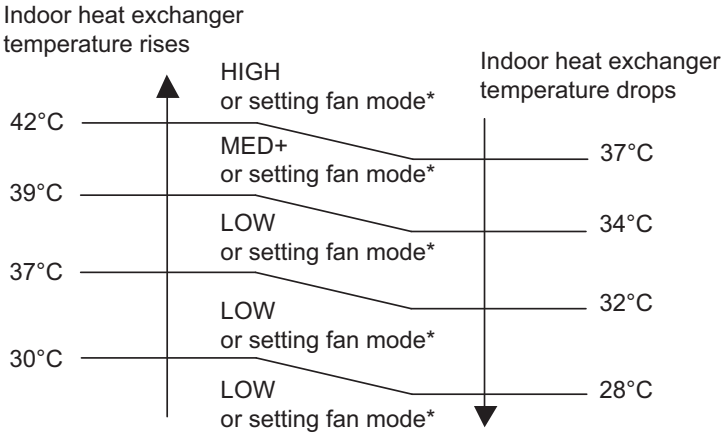
The maximum value of the indoor fan speed is set as shown below, based on the detected temperature by the indoor heat exchanger sensor on heating mode.

- **Normal operation**



*: Lower speed is selected.

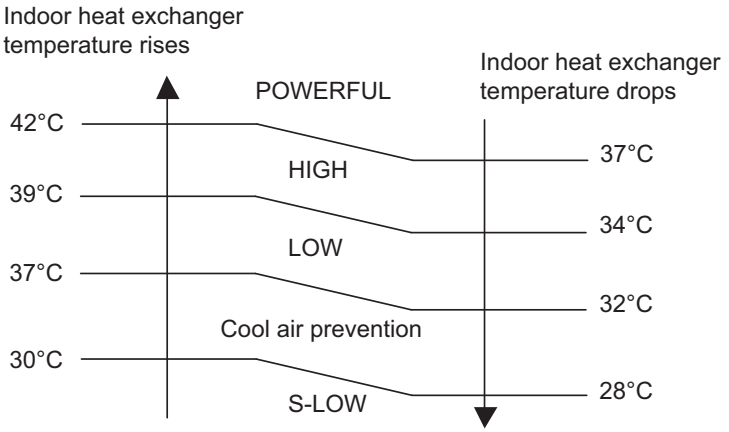
7 minutes later:



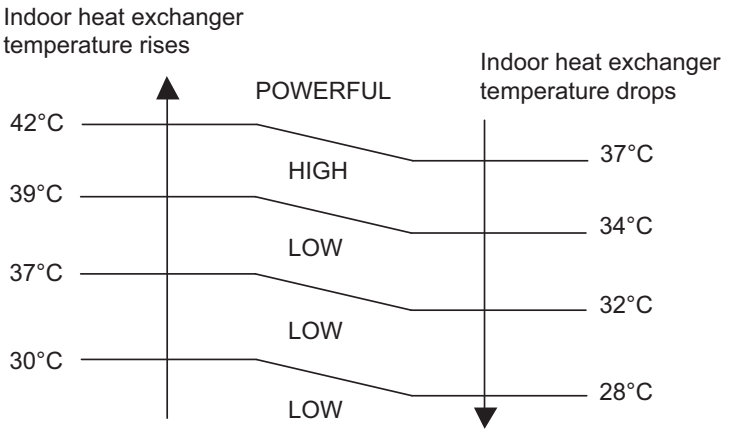
*: Lower speed is selected.

CONTROL AND FUNCTIONS

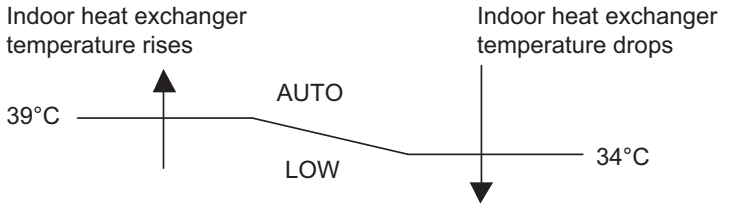
- **Powerful operation**



7 minutes later:

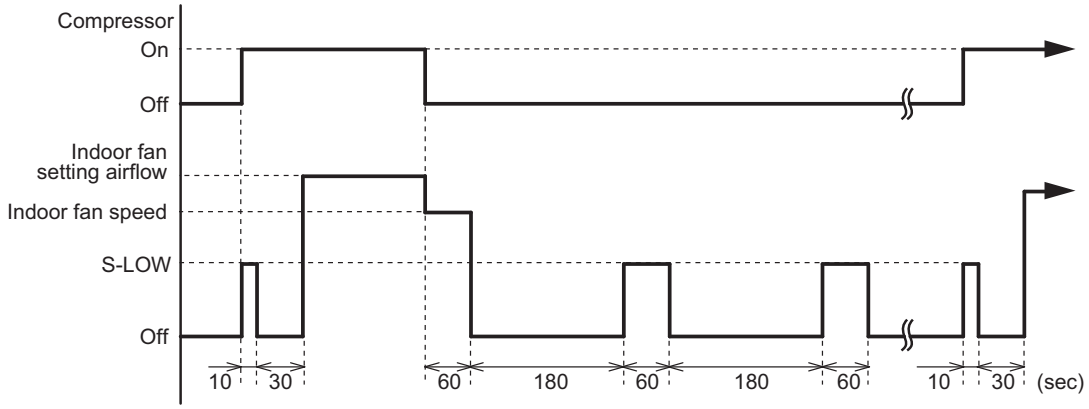


- **10 °C HEAT operation**



■ 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

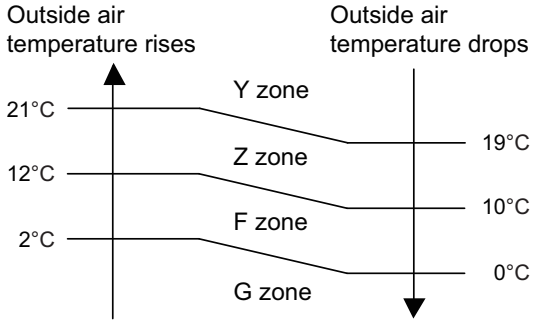
This outdoor unit has a DC fan motor. (Control method is different between AC and DC motors.)

■ Fan speed

● Model: AOYG09KHCAN

Fan speed is defined by outdoor temperature and compressor frequency.

- **Outside air temperature zone selection**



Unit: rpm

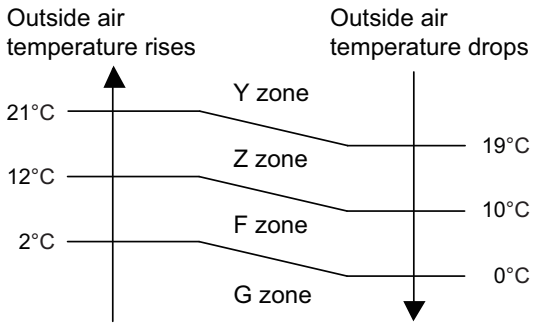
Fan step	Cooling	Heating	Dry	Cooling or dry at low outdoor temp.		
	Y zone		Y zone	Z zone	F zone	G zone
S-HIGH2	—	1,100	—	—	—	—
S-HIGH1	1,050	1,100	—	—	—	—
HIGH	1,050	1,100	—	—	—	—
10	—	1,100	—	—	—	—
9	1,050	1,100	1,050	1,050	270	190
8	1,050	850	1,050	1,050	270	190
7	1,030	760	1,030	1,030	220	190
6	870	670	870	870	220	190
5	770	670	770	770	220	190
4	570	670	570	570	220	190
3	510	510	510	510	220	190
2	400	420	400	400	220	190
1	400	420	400	400	220	190

CONTROL AND FUNCTIONS

● Model: AOYG12KHCAN

Fan speed is defined by outdoor temperature and compressor frequency.

- **Outside air temperature zone selection**



Unit: rpm

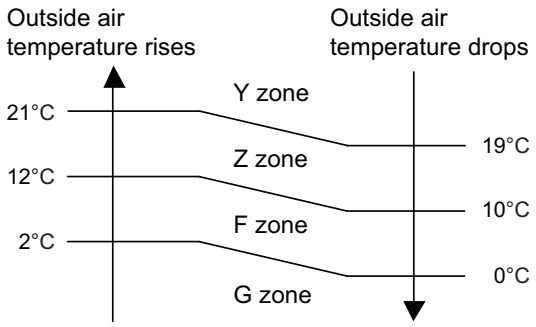
Fan step	Cooling	Heating	Dry	Cooling or dry at low outdoor temp.		
	Y zone		Y zone	Z zone	F zone	G zone
S-HIGH2	—	1,100	—	—	—	—
S-HIGH1	1,050	1,100	—	—	—	—
HIGH	1,050	1,100	—	—	—	—
10	—	1,100	—	—	—	—
9	1,050	1,100	1,050	1,050	270	190
8	1,050	850	1,050	1,050	270	190
7	1,030	760	1,030	1,030	220	190
6	870	670	870	870	220	190
5	770	510	770	770	220	190
4	570	470	570	570	220	190
3	510	470	510	510	220	190
2	400	420	400	400	220	190
1	400	420	400	400	220	190

CONTROL AND FUNCTIONS

● Model: AOYG14KHCAN

Fan speed is defined by outdoor temperature and compressor frequency.

- **Outside air temperature zone selection**



Unit: rpm

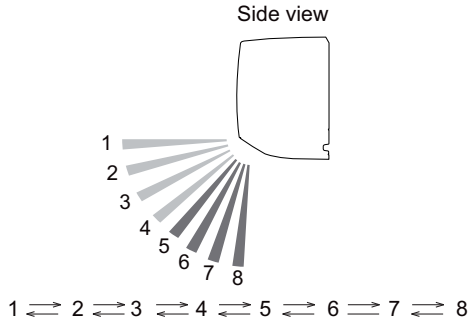
Fan step	Cooling	Heating	Dry	Cooling or dry at low outdoor temp.		
	Y zone		Y zone	Z zone	F zone	G zone
S-HIGH2	—	1,100	—	—	—	—
S-HIGH1	1,050	1,100	—	—	—	—
HIGH	1,050	1,100	—	—	—	—
10	—	1,100	—	—	—	—
9	1,050	1,100	1,050	1,050	270	190
8	1,050	850	1,050	1,050	270	190
7	1,030	760	1,030	1,030	220	190
6	870	670	870	870	220	190
5	770	510	770	770	220	190
4	570	470	570	570	220	190
3	510	420	510	510	220	190
2	400	420	400	400	220	190
1	400	420	400	400	220	190

CONTROL AND FUNCTIONS

4. Louver control

4-1. Vertical airflow direction louver control

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



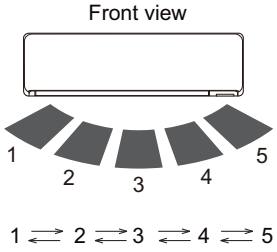
- Remote controller display is not changed.
- Vertical airflow direction is set automatically as shown, in accordance with the type of operation selected.

  Cooling / Dry mode : Horizontal flow 1

  Heating mode : Downward flow 7
- 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. Horizontal airflow direction louver control

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



Remote controller display is not changed.

CONTROL AND FUNCTIONS

4-3. Swing operation

- To select vertical airflow swing operation
  When the swing signal is received, the vertical airflow direction louver starts to swing.
  - Swinging range
    - Cooling mode/dry mode/fan mode (1 to 5): 1 ↔ 5
    - Heating mode/fan mode (6 to 8): 5 ↔ 8 (assist louver works with the vertical airflow direction louver notch)
  - 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.

CONTROL AND FUNCTIONS

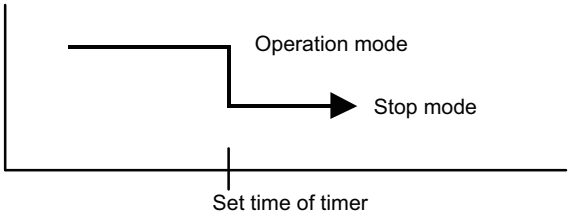
5. Timer operation control

5-1. Wireless remote control

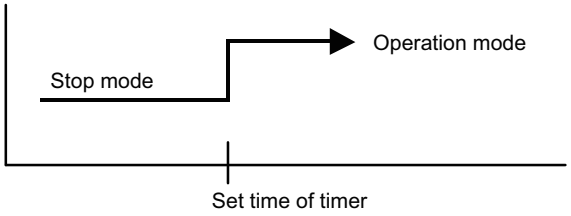
On/Off timer	Program timer	Sleep timer	Weekly timer
○	○	○	○

■ On/Off timer

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

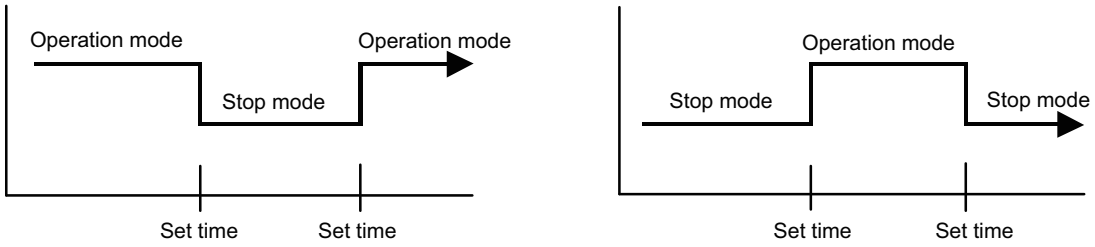


- On timer: When the clock reaches the set timer, the air conditioner will be turned on.



■ Program timer

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



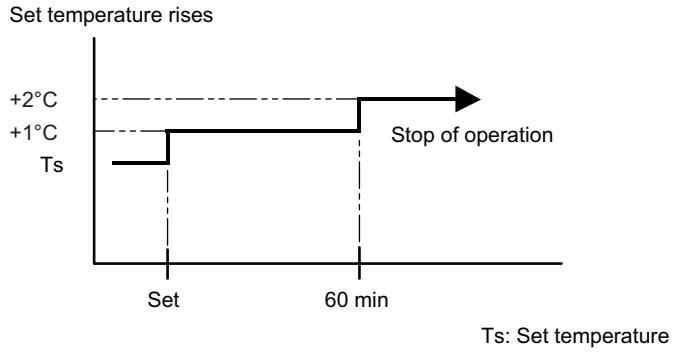
- Operation will start from the timer setting (either off timer and on timer) whichever is closest to the clock current timer setting. The order of operations is indicated by the allow in the remote controller screen.
- Sleep timer operation cannot be combined with on timer operation.

CONTROL AND FUNCTIONS

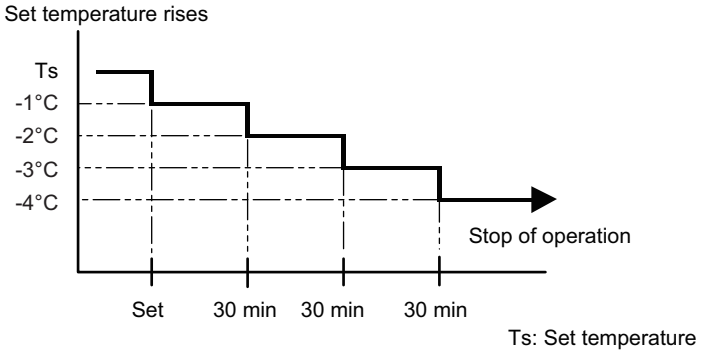
■ Sleep timer

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°C. It increases the setting temperature another 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°C. It decreases the setting temperature another 1°C every 30 minutes. Upon lowering 4°C, the setting temperature is not changed and the operation is stopped at the setting time.



■ Weekly timer

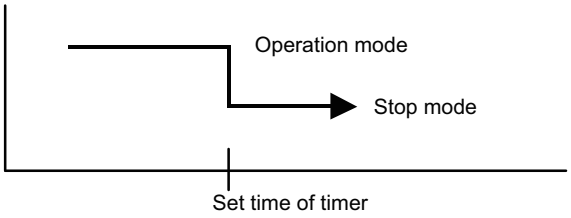
On and off timer can be combined, and up to 4 reservations per day and 28 reservations per week. Before setting the program, set the week and time of the air conditioner at first. If the week and time are not set, the weekly timer will not operate correctly at the setting time.

5-2. Wired remote control

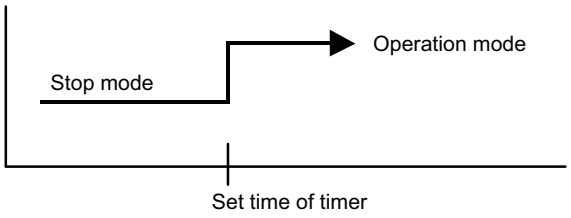
On/Off timer	Program timer	Sleep timer	Weekly timer	Temperature set back timer
○	○	○	○	○

■ On/Off timer

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



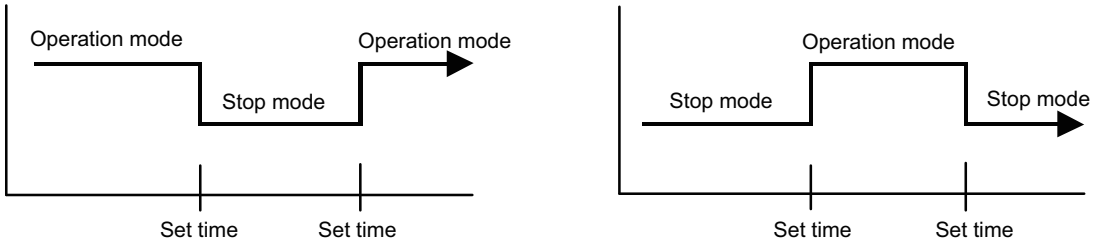
- On timer: When the clock reaches the set timer, the air conditioner will be turned on.



CONTROL AND FUNCTIONS

■ Program timer

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



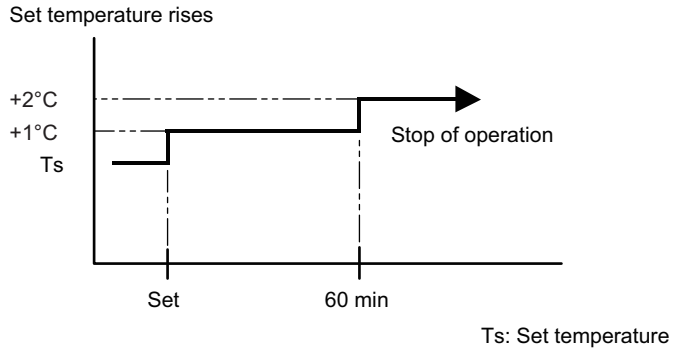
- Operation will start from the timer setting (either off timer and on timer) whichever is closest to the clock current timer setting. The order of operations is indicated by the allow in the remote controller screen.
- Sleep timer operation cannot be combined with on timer operation.

CONTROL AND FUNCTIONS

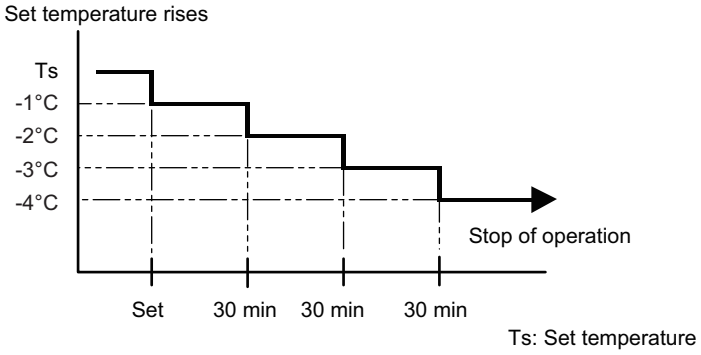
■ Sleep timer

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°C. It increases the setting temperature another 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°C. It decreases the setting temperature another 1°C every 30 minutes. Upon lowering 4°C, the setting temperature is not changed and the operation is stopped at the setting time.



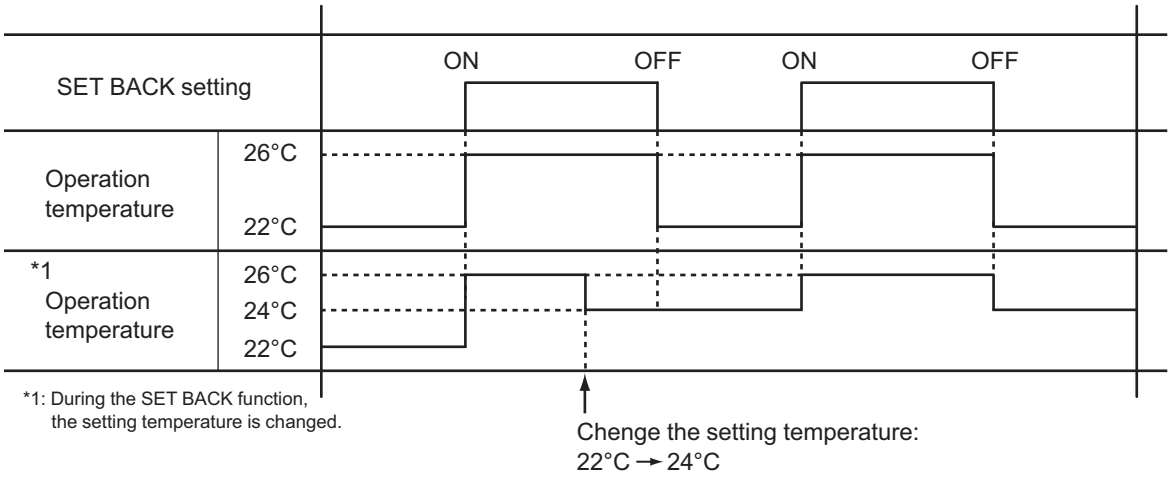
■ Weekly timer

On and off timer can be combined, and up to 4 reservations per day and 28 reservations per week. Before setting the program, set the week and time of the air conditioner at first. If the week and time are not set, the weekly timer will not operate correctly at the setting time.

■ Temperature set back timer

- The SET BACK timer only changes the set temperature for 7 days, it cannot be used to start or stop air conditioner operation.
- The SET BACK timer can be set to operate up to two times per day but only one temperature setting can be used.
- During COOLING/DRY mode, the air conditioner will operate at a minimum of 18°C even if the SET BACK temperature is set to 17°C or lower.

Case of SET BACK timer on the Cooling operation. (Setting temperature :22°C, SET BACK temperature :26°C)



CONTROL AND FUNCTIONS

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	Tn ≤ -9°C and Tn-Ta ≥ 5 deg	Tn ≤ -5°C

– **2nd time and after**

Compressor integrating operation time	Less than 40 min.	More than 40 min.
Condition	Does not operate	Tn-Tn10 < -5 deg (Tn ≤ -6°C) Tn-Tnb < -2 deg (Tn ≤ -6°C) Tn ≤ -17°C (Ta ≥ -10°C) Tn ≤ Ta-7°C or Tn ≤ -30°C (Ta < -10°C)

– **Integrating defrost (Constant monitoring)**

Compressor integrating operation time	More than 240 min. (For long continuous operation)	More than 213 min. (For long continuous operation	Less than 10 min.* (For intermittent operation)
Condition	Tn ≤ -3°C	Tn ≤ -5°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

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)	16°C or more
Compressor operation time	15 minutes

CONTROL AND FUNCTIONS

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: -4°C or less

• Release condition

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)	16°C or more
Compressor operation time	15 minutes

CONTROL AND FUNCTIONS

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
10 °C HEAT operation
Outdoor low noise operation

CONTROL AND FUNCTIONS

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	24°C
Vertical airflow direction 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	24°C
Vertical airflow direction louver setting	Standard
Horizontal airflow direction 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.
- Operation LED and timer LED blink at the same time during the forced cooling operation. They blink for 1 second ON and 1 second OFF on both operation LED and timer LED (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. 10 °C HEAT operation

10 °C HEAT operation performs as below setting when pressing 10 °C HEAT button.

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

CONTROL AND FUNCTIONS

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 +1°C	Setting temperature -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
Vertical airflow direction louver setting	Cooling	3
	Dry	
	Heating	7

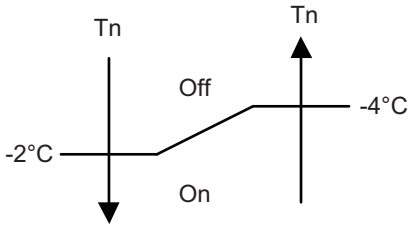
Release condition:

- Cooling/Dry
  Room temperature ≤ Setting temperature -0.5°C or Operation time has passed 20 minutes.
- Heating
  Room temperature ≥ Setting temperature +0.5°C or Operation time has passed 20 minutes.

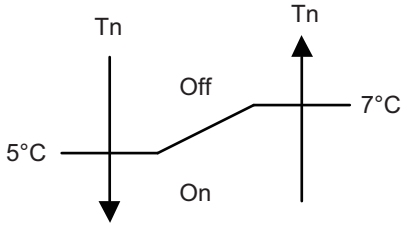
7-7. Compressor preheating

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 (Tn)



When the jumper wire (JM2) is disconnected:



7-8. 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).

7-9. Prevention to restart for 3 minutes (3 minutes st)

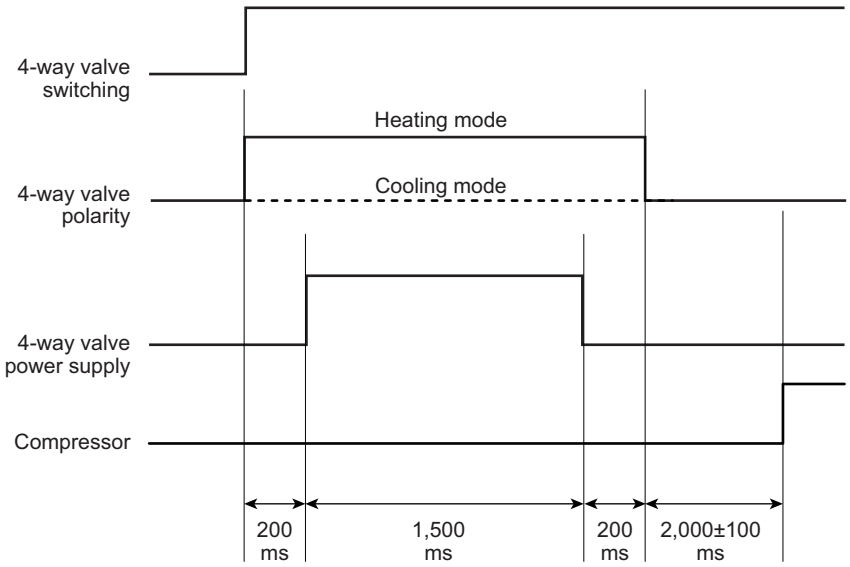
When the compressor fails to start for the number of times below, it does not enter operation status for 3 minutes.

Retry number	50
Retry set number	3

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

7-10. 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 3 minutes passes and the compressor is started.



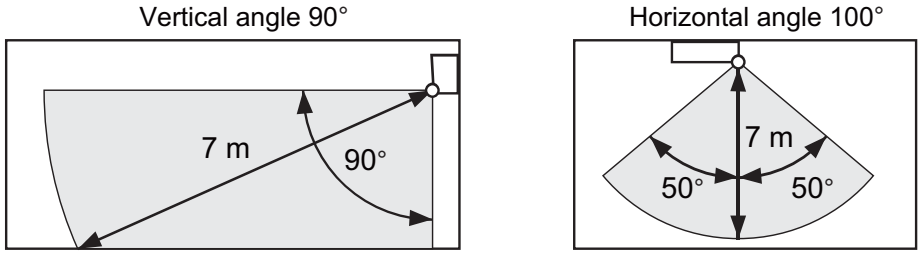
CONTROL AND FUNCTIONS

7-11. Human sensor for energy saving

If no one enters the room for approximately 20 minutes, the set temperature is automatically controlled. (When someone comes back into the room, the human sensor detect this, and automatically revert to the original settings.)

Operation mode	Operation details (If there is no one in the room for a while)
Cool/Dry	The setting temperature is increased by maximum 2°C. (Maximum setting temperature: 30°C)
Heat	The setting temperature is decreased by maximum 4°C. (Minimum setting temperature: 16°C)
Auto	Energy saving function is performed automatically for the selected mode (cool/heat/dry).

- Application range:



Side view　　Top view

Energy saving function may not work when the room temperature is very different from the temperature defined in the temperature setting, such as when immediately after starting the operation.

- Details about detection with the human sensor:
  The human sensor detects whether there are people in the room by looking for movement by people in the room.

CONTROL AND FUNCTIONS

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 LED starts blinking.

Trigger condition	104°C
Compressor frequency	-20 rps/120 seconds
Release condition	101°C
Compressor protection temperature	110°C

CONTROL AND FUNCTIONS

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

The compressor frequency 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		4°C
Release condition	Outdoor temp. ≥ 10°C*1 Outdoor temp. ≥ 12°C*2	7°C
	Outdoor temp. < 10°C*1 Outdoor temp. < 12°C*2	13°C

*1: During the outdoor temperature dropping

*2: During the outdoor temperature rising

8-3. Current release control

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

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

■ Model: AOYG09KHCAN

Operation mode	Outdoor temp. (Ta)	Trigger condition	Release condition
Cooling	50°C ≤ Ta	4.5 A	4.0 A
	46°C ≤ Ta < 50°C	4.5 A	4.0 A
	40°C ≤ Ta < 46°C	4.5 A	4.0 A
	12°C ≤ Ta < 40°C	5.5 A	5.0 A
	2°C ≤ Ta < 12°C	5.5 A	5.0 A
	Ta < 2°C	5.5 A	5.0 A
Heating	17°C ≤ Ta	7.0 A	6.5 A
	12°C ≤ Ta < 17°C	9.0 A	8.5 A
	5°C ≤ Ta < 12°C	9.5 A	9.0 A
	Ta < 5°C	9.5 A	9.0 A

■ Model: AOYG12KHCAN

Operation mode	Outdoor temp. (Ta)	Trigger condition	Release condition
Cooling	50°C ≤ Ta	4.5 A	4.0 A
	46°C ≤ Ta < 50°C	4.5 A	4.0 A
	40°C ≤ Ta < 46°C	6.0 A	5.5 A
	12°C ≤ Ta < 40°C	6.5 A	6.0 A
	2°C ≤ Ta < 12°C	6.5 A	6.0 A
	Ta < 2°C	6.5 A	6.0 A
Heating	17°C ≤ Ta	7.0 A	6.5 A
	12°C ≤ Ta < 17°C	9.0 A	8.5 A
	5°C ≤ Ta < 12°C	10.0 A	9.5 A
	Ta < 5°C	10.0 A	9.5 A

■ Model: AOYG14KHCAN

Operation mode	Outdoor temp. (Ta)	Trigger condition	Release condition
Cooling	50°C ≤ Ta	4.5 A	4.0 A
	46°C ≤ Ta < 50°C	4.5 A	4.0 A
	40°C ≤ Ta < 46°C	6.0 A	5.5 A
	12°C ≤ Ta < 40°C	8.5 A	8.0 A
	2°C ≤ Ta < 12°C	8.5 A	8.0 A
	Ta < 2°C	8.5 A	8.0 A
Heating	17°C ≤ Ta	7.0 A	6.5 A
	12°C ≤ Ta < 17°C	9.0 A	8.5 A
	5°C ≤ Ta < 12°C	10.0 A	9.5 A
	Ta < 5°C	10.0 A	9.5 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	65°C

CONTROL AND FUNCTIONS

8-5. Compressor temperature protection

When the compressor temperature sensor detects higher than the trigger condition below, the compressor is stopped. When the compressor temperature sensor detects the release condition, the protection is released.

Trigger condition	108°C
Release condition	80°C (3 minutes after compressor stop)

8-6. High pressure protection

Trigger condition	Pressure switch: Off (Open: Higher than 4.2 MPa) Compressor stop
Release condition	Pressure switch: On (Close: Lower than 3.2 MPa) (3 minutes after compressor stop) Compressor restart

CONTROL AND FUNCTIONS

8-7. Low outdoor temperature protection

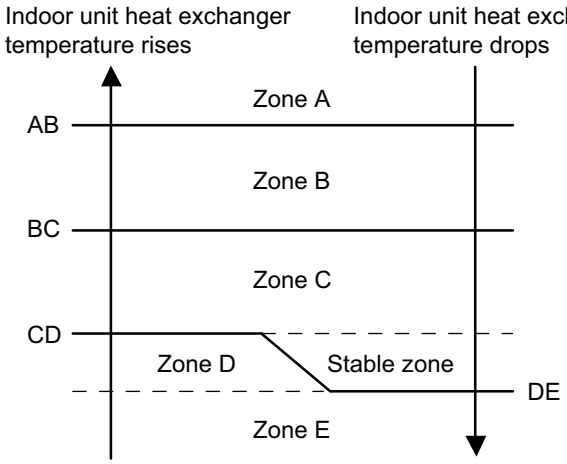
When the outdoor temperature sensor detects lower than the trigger condition below, the compressor is stopped.

Operation mode	Cooling/Dry	Heating
Trigger condition	-15°C	-20°C
Release condition	-10°C	-15°C

8-8. High temperature and high pressure release control

The compressor is controlled as follows.

■ Models: AOYG09KHCAN, AOYG12KHCAN, and AOYG14KHCAN



AB: 63°C
BC: 55°C
CD: 53°C
DE: 50°C

Zone	Operation	
Zone A	Compressor is stopped.	
Zone B	The compressor frequency 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		

CONTROL AND FUNCTIONS

5. FILED WORKING

CONTENTS

5. FILED WORKING

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 tight 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.

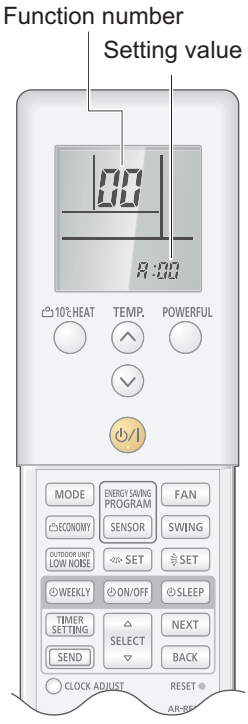
NOTES:

- 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.

FIELD WORKING

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 TEMP. (∧) (∨) buttons to select the function number. To switch between the left and right digits, press the 10 °C HEAT button.
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. (∧) (∨) buttons to select the setting value. To switch between the left and right digits, press the 10 °C 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 A prior to shipment.
- If you do not know the air conditioner custom code setting, try each of the custom codes (A →b →c →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	Room temperature sensor control for cooling
3)	31	Room temperature sensor control for heating
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

FIELD WORKING

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 sensor control for cooling

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

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

3) Room temperature sensor control for heating

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

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

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

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.

FIELD WORKING

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	♦
	01	(Setting prohibited)	
	02	Forced stop mode	

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	♦

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.

FIELD WORKING

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 A.)
3. Press the TEMP. (∧) (∨) buttons to change the custom code between A →b →c →d. Match the code on the display to the air conditioner custom code. (Initially set to A.)
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 A 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 (A →b →c →d) until you find the code which operates the air conditioner.

FIELD WORKING

2. External input and output

With using external input and output functions, this product can be operated inter-connectedly with an external device.

Connector	Input	Output	Remarks
CNA01	Control input	—	See external input/output settings for details.
CNB01	—	Operation status output	
CNB02	—	Error status output	

2-1. External input

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

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

■ Control input (Operation/Stop or Forced stop)

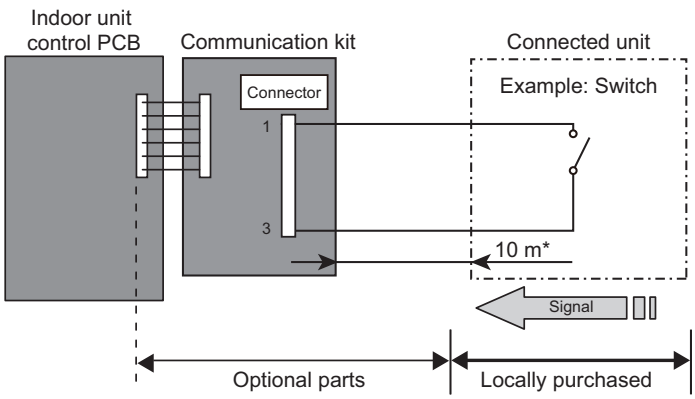
The air conditioner can be remotely operated by means of the following on-site work.

Unit operation is started at the following contents by adding the contact input of a commercial on/off switch to a connector on the external control PCB and turning it on.

Unit operation	Initial setting after power is on	Starting mode other than initial setting
Operation mode	Auto changeover	Mode at previous operation
Set temperature	24 °C	Temperature at previous operation
Airflow mode	AUTO	Mode at previous operation
Air direction (swing)	Standard air direction (swing: off)	Air direction at previous operation

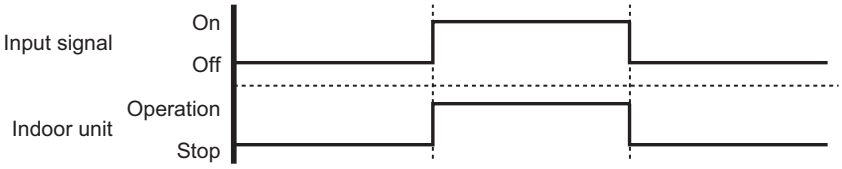
FIELD WORKING

- **Circuit diagram example**

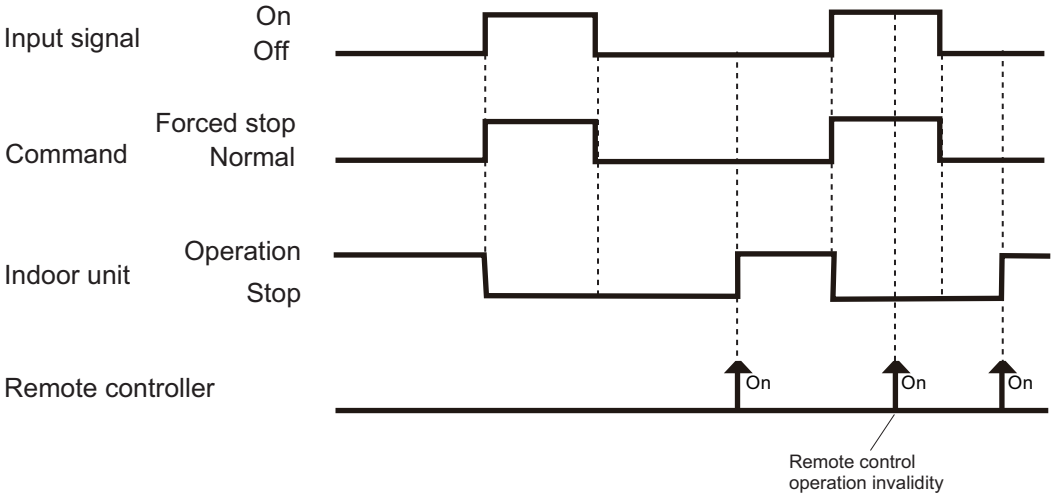


- Contact capacity: DC 24 V or more, 10 mA or more.
- *: Make the distance from the PCB to the connected unit within 10 m.
- Use non-polar relays and switches.

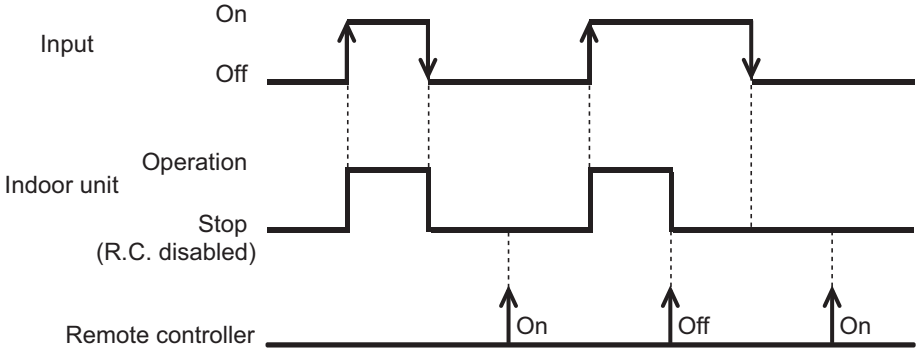
– When function setting is “Operation/Stop” mode



– When function setting is “Forced stop” mode



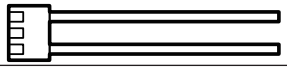
– When function setting is "Operation/Stop" mode 2



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

- **Optional part**

Part name	Model name	Exterior
External connect kit	UTY-XWZXZ5	External input wire 
Communication kit	UTY-TWBXF1	

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

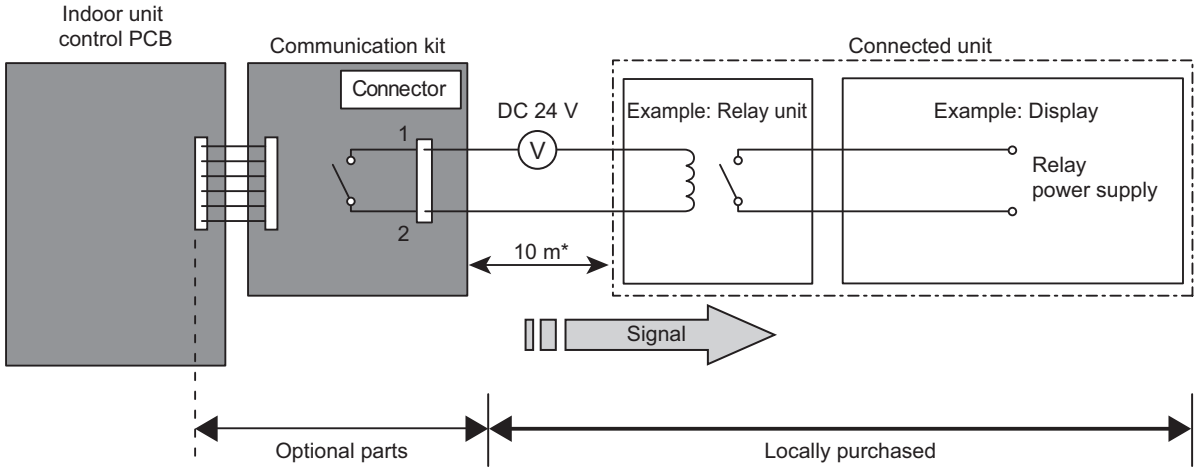
FIELD WORKING

2-2. External output

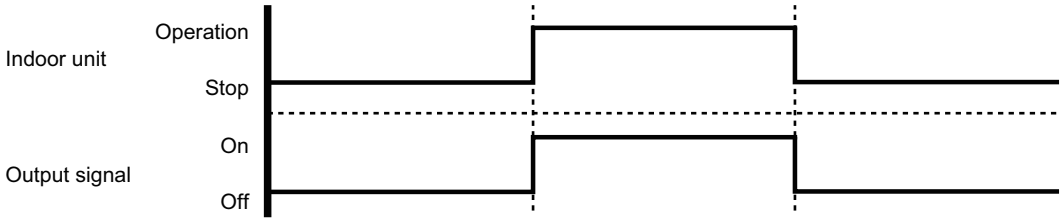
With using external output function, operating status of this product can be transmitted to the external device, and also, this product can be inter-connected with the external device.

■ Operation status output

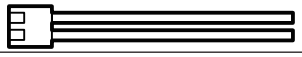
● Circuit diagram example



- *: Make the distance from the PCB to the connected unit within 10 m.
- Relay spec: Max. DC 24 V, 10 mA to less than 500 mA.



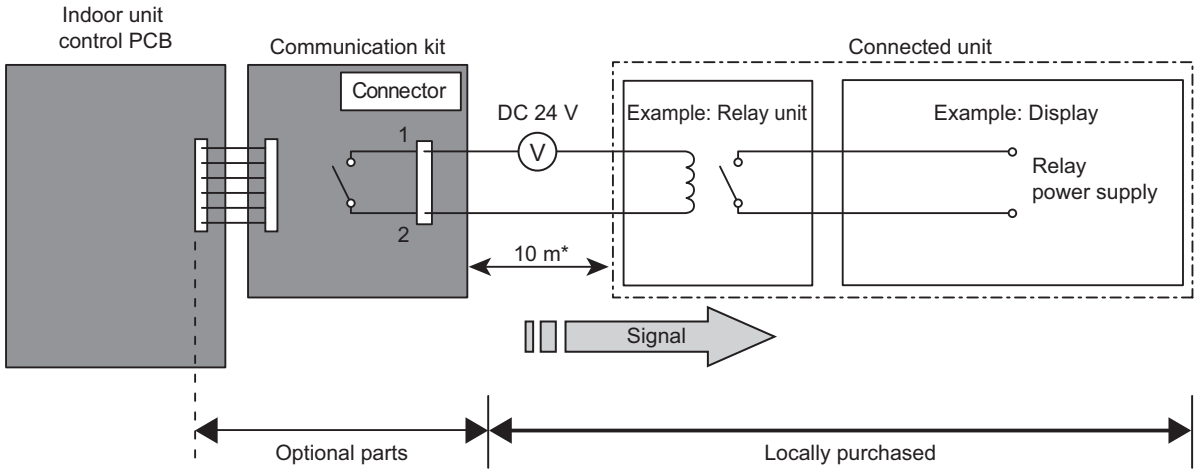
● Optional part

Part name	Model name	Exterior
External connect kit	UTY-XWZXZ5	External output wire 
Communication kit	UTY-TWBXF1	

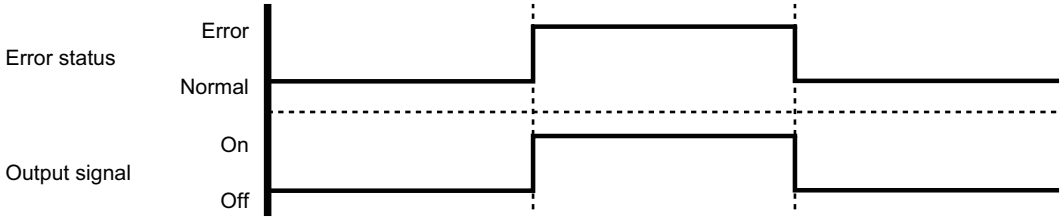
* For operating the external function, the wall mounted type requires the communication kit in addition to the wire (UTY-XWZXZ5).

■ Error status output

● Circuit diagram example



- *: Make the distance from the PCB to the connected unit within 10 m.
- Relay spec: Max. DC 24 V, 10 mA to less than 500 mA.



● Optional part

Part name	Model name	Exterior
External connect kit	UTY-XWZXZ5	External output wire 
Communication kit	UTY-TWBXF1	

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