REFRIGERANT R32
INVERTER

AIR CONDITIONER

Floor type

SERVICE MANUAL

INDOOR

AGYG09KVCA
AGYG12KVCA
AGYG14KVCA

OUTDOOR

AOYG09KVCA
AOYG12KVCA

AOYG14KVCA

SR_AG001EF_04
2022.01.14

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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REFRIGERANT R32
INVERTER

1. GENERAL INFORMATION

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GENERAL INFORMATION

1. Specifications

1-1. Indoor unit

Type					Floor type		
					Inverter heat pump		
Model name					**AGYG09KVCA**	**AGYG12KVCA**	**AGYG14KVCA**
Power supply					230 V ~ 50 Hz		
Available voltage range					198—264 V		
Capacity		Cooling	Rated	kW	2.50	3.50	4.20
				Btu/h	8,500	11,900	14,300
			Min.—Max.	kW	0.9—3.5	0.9—4.0	0.9—5.2
				Btu/h	3,100—11,900	3,100—13,700	3,100—17,700
		Heating	Rated	kW	3.50	4.50	5.20
				Btu/h	11,900	15,400	17,700
			Min.—Max.	kW	0.9—5.1	0.9—5.3	0.9—6.3
				Btu/h	3,100—17,400	3,100—18,100	3,100—21,500
Input power		Cooling	Rated	kW	0.53	0.88	1.06
			Max.		1.29	1.29	2.11
		Heating	Rated		0.81	1.22	1.41
			Max.		1.64	1.64	1.98
Current		Cooling	Rated	A	2.9	4.3	4.7
		Heating			4.1	5.7	6.2
EER		Cooling		kW/kW	4.70	4.00	3.95
COP		Heating			4.30	3.70	3.70
Power factor		Cooling		%	79.5	88.5	98.1
		Heating			85.9	93.1	98.9
Moisture removal				L/h (pints/h)	1.3 (2.3)	1.8 (3.2)	2.1 (3.7)
Maximum operating current *1		Cooling		A	7	7	11
		Heating			8.5	8.5	12
Fan	Airflow rate	Cooling	HIGH	m^3/h	570	570	650
			MED		460	460	520
			LOW		360	360	400
			QUIET		270	270	270
		Heating	HIGH		600	600	650
			MED		480	480	520
			LOW		370	370	390
			QUIET		270	270	270
	Type × Q'ty				Cross flow fan × 2		
	Motor output			W	16 × 2		
Sound pressure level *2		Cooling	HIGH	dB (A)	40	40	44
			MED		35	35	38
			LOW		29	29	31
			QUIET		22	22	22
		Heating	HIGH		41	41	43
			MED		35	35	37
			LOW		29	29	29
			QUIET		22	22	22
Heat exchanger type		Dimensions (H × W × D)		mm	378 × 550 × 26.6		
		Fin pitch			1.2		
		Rows × Stages			2 × 18		
		Pipe type			Copper tube		
		Fin type			Aluminium		
Enclosure		Material			Polystyrene		
		Color			White		
Dimensions (H × W × D)		Net		mm	600 × 740 × 200		
		Gross			700 × 820 × 310		
Weight		Net		kg	14		
		Gross			18		
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 + LLDPE		
		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	30 or less		
Remote controller type					Wireless (Wired, Mobile app*3 [FGLair™] [option])		

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

Model name				AGYG09KVCA	AGYG12KVCA	AGYG14KVCA
Energy efficiency class	Cooling			A+++	A++	A++
	Heating (Average)			A+	A+	A+
Pdesign	Cooling		kW	2.5 (35 °C)	3.5 (35 °C)	4.2 (35 °C)
	Heating (Average)			2.6 (-10 °C)	3.5 (-10 °C)	4.2 (-10 °C)
SEER	Cooling		kWh/kWh	8.50	8.20	8.10
SCOP	Heating (Average)			4.30	4.10	4.00
Annual energy consumption	QCE		kWh/a	103	149	181
	QHE (Average)			845	1,192	1,466
Sound power level	Cooling	High	dB (A)	53	53	57
	Heating			54	54	56

GENERAL INFORMATION

1-2. Outdoor unit

Type				Inverter heat pump		
Model name				**AOYG09KVCA**	**AOYG12KVCA**	**AOYG14KVCA**
Power supply				230 V ~ 50 Hz		
Available voltage range				198—264 V		
Starting current			A	4.1	5.7	6.2
Fan	Airflow rate	Cooling	m^3/h	1,530	1,530	2,210
		Heating		1,510	1,510	2,100
	Type × Q'ty			Propeller × 1		
	Motor output		W	23		
Sound pressure level *1		Cooling	dB (A)	43	45	51
		Heating		47	51	50
Sound power level		Cooling	dB (A)	58	61	63
		Heating		61	64	63
Heat exchanger type		Dimensions (H × W × D)	mm	Main1: 504 × 881 × 18.19 Main2: 504 × 851 × 18.19		
		Fin pitch		1.3		
		Rows × Stages		2 × 24		2 × 28
		Pipe type		Copper		
		Fin type	Type (Material)	Aluminium		
			Surface treatment	PC Fin		
Compressor	Type × Q'ty			DC ROTARY		DC TWIN ROTARY
	Motor output		W	900		925
Refrigerant		Type (Global warming potential)		R32 (675)		
		Charge	g	850		940
Refrigerant oil		Type		RB68A		RmM68AF
		Amount	cm^3	340		400
Enclosure		Material		Steel sheet		
		Color		BEIGE		
Dimensions (H × W × D)	Net		mm	542 × 799 × 290		632 × 799 × 290
	Gross			602 × 940 × 375		692 × 940 × 375
Weight	Net		kg	31		38
	Gross			35		42
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		-15 to 24		
Drain hose		Material		PP		
		Size	mm	φ13.0(I.D.), φ16.0 to φ16.8(O.D.)		

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.
- *1: 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.

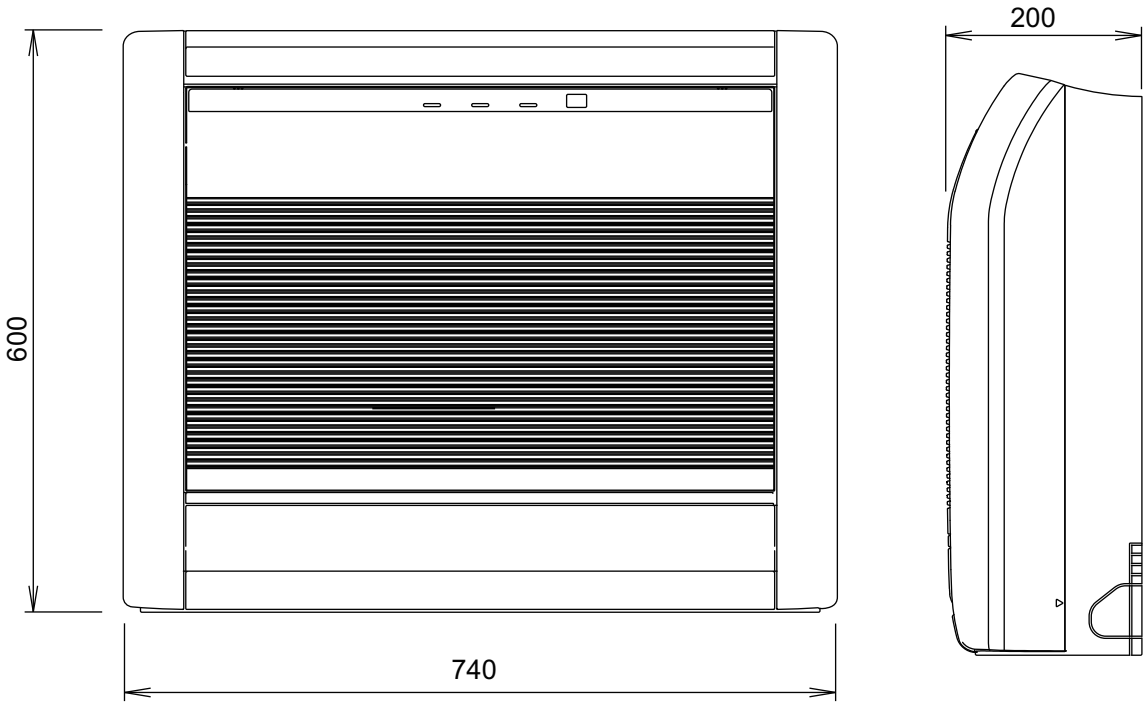
GENERAL INFORMATION

2. Dimensions

2-1. Indoor unit

■ Models: AGYG09KVCA, AGYG12KVCA, and AGYG14KVCA

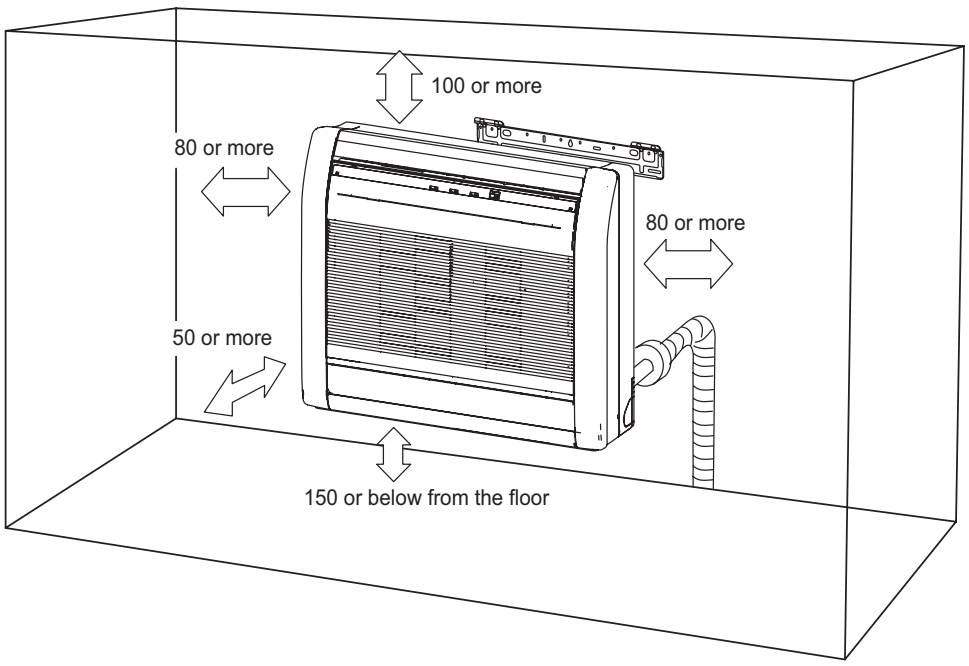
Unit: mm



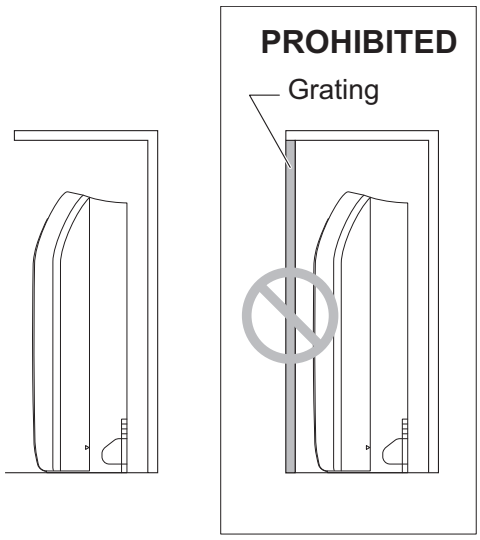
Front view

Side view

● Installation space



GENERAL INFORMATION



⚠ WARNING

- The appliance shall be installed, operated and stored in a room with a floor area larger than X m^2.

Amount of refrigerant charge M (kg)	Minimum room area X (m^2)
M ≤ 1.22	-
1.22 < M ≤ 1.23	12.99
1.23 < M ≤ 1.50	19.31
1.50 < M ≤ 1.75	26.28
1.75 < M ≤ 2.0	34.33
2.0 < M ≤ 2.5	53.63
2.5 < M ≤ 3.0	77.23
3.0 < M ≤ 3.5	105.12
3.5 < M ≤ 4.0	137.29

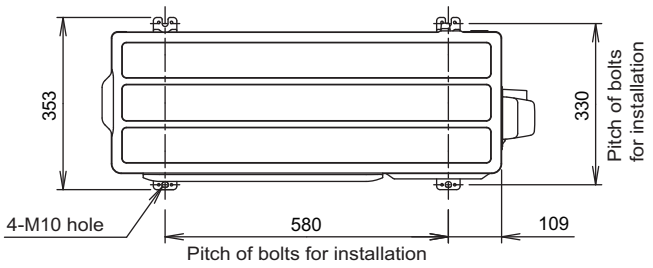
(IEC 60335-2-40)

GENERAL INFORMATION

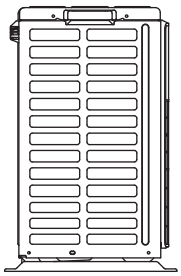
2-2. Outdoor unit

■ Models: AOYG09KVCA and AOYG12KVCA

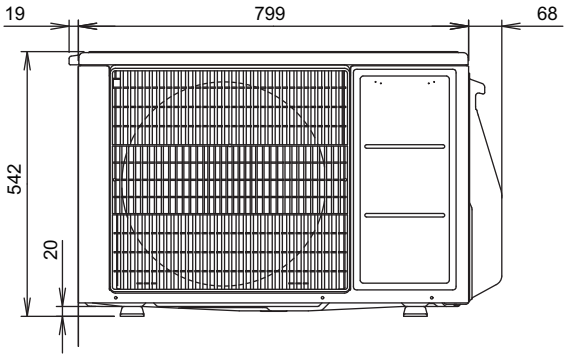
Unit: mm



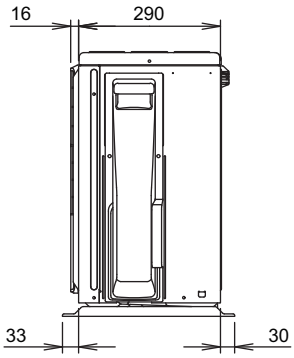
Top view



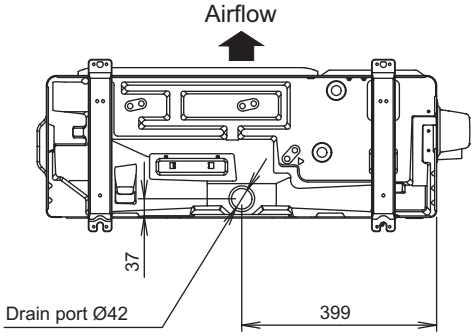
Side view



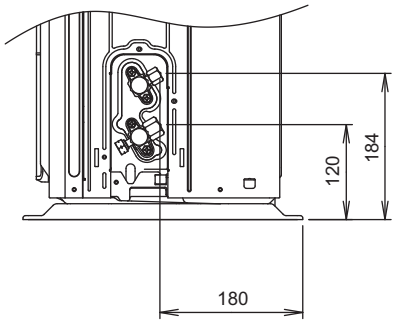
Front view



Side view



Bottom view

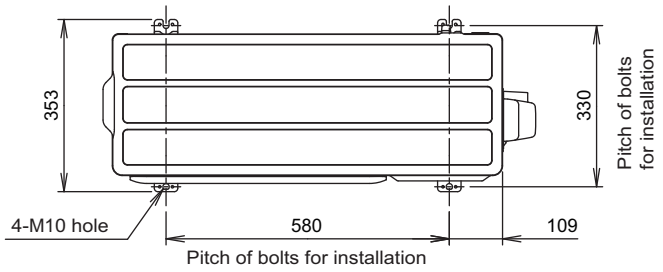


Side view (Valve part)

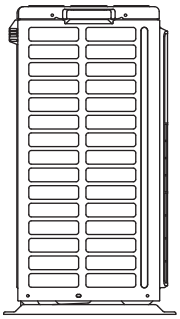
GENERAL INFORMATION

■ Model: AOYG14KVCA

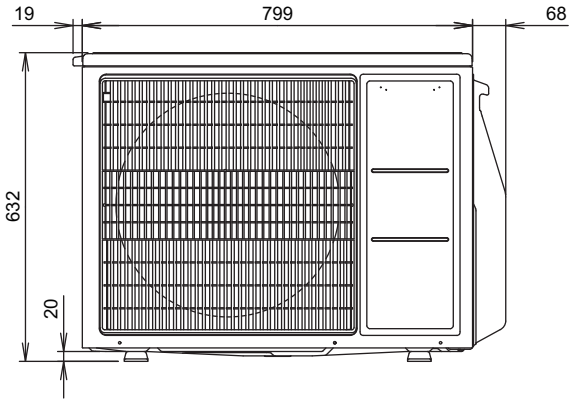
Unit: mm



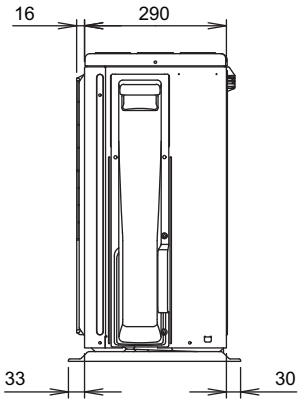
Top view



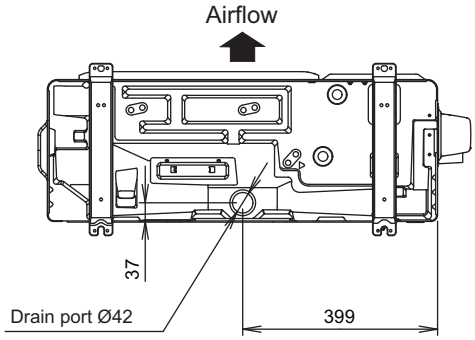
Side view



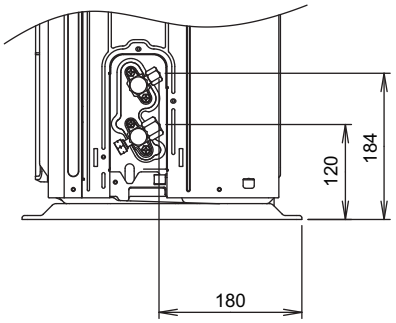
Front view



Side view



Bottom view



Side view (Valve part)

GENERAL INFORMATION

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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.

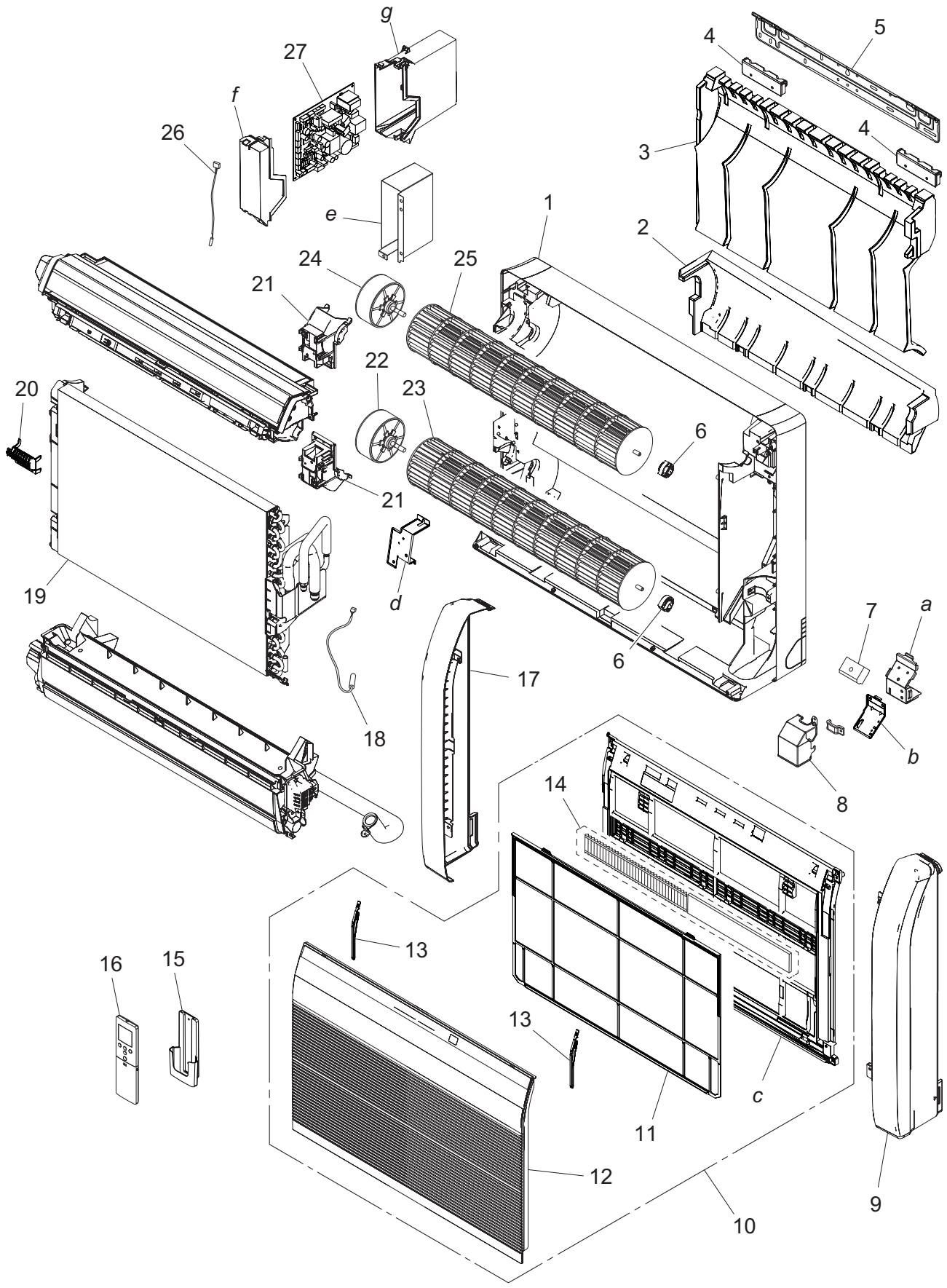
- Service parts information and design are subject to change without notice for product improvement.
- For the latest information of the service parts, refer to our Service Portal.
  https://fujitsu-general.force.com/portal/
- Precise figure of the service parts listed in this manual may differ from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

TECHNICAL DATA AND PARTS LIST

2. Indoor unit parts list

2-1. Models: AGYG09KVCA, AGYG12KVCA, and AGYG14KVCA

■ Exterior parts and chassis

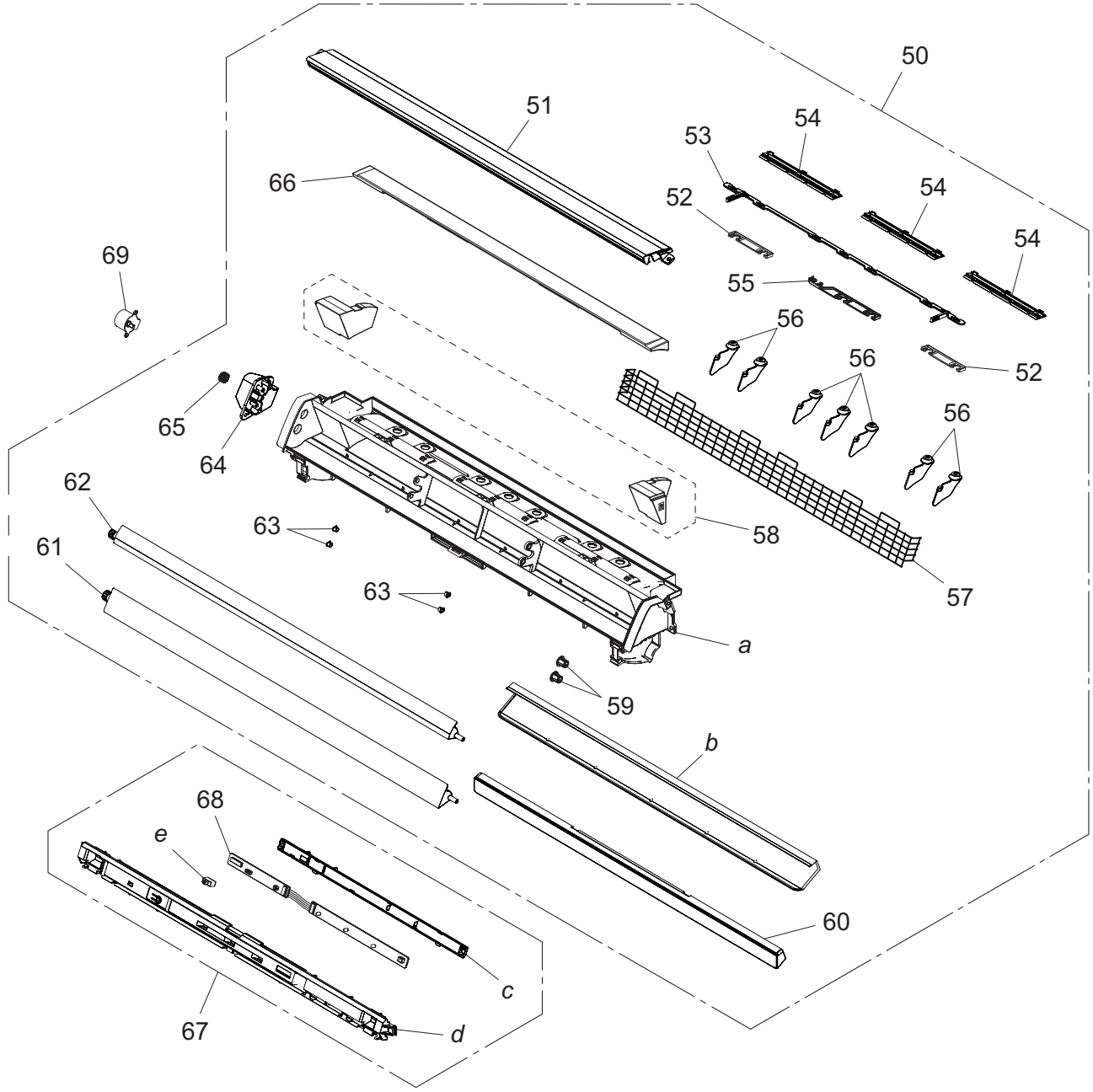


TECHNICAL DATA AND PARTS LIST

Item no.	Part no.	Part name	Service part
1	9316193024	Base	♦
2	9316197015	Base cover A	♦
3	9316373013	Base cover B	♦
4	9316405011	Base bracket	♦
5	9316272019	Bracket panel	♦
6	9306628024	Bearing C assy	♦
7	9900720087	Terminal (3P)	♦
8	9316307025	Terminal cover	♦
9	9316186019	Front panel R	♦
10	9316415164	Front panel total assy	♦
11	9316189027	Air filter	♦
12	9316418059	Intake grille assy	♦
13	9316458017	Rope assy	♦
14	9316474017	Air clean filter assy	♦
15	9318912005	Remote controller holder	♦
16	9332438864	Remote controller	♦
17	9316187016	Front panel L	♦
18	9900991005	Pipe thermistor	♦
19	9316091269	Evaporator total assy	♦
20	9316192027	Thermistor holder	♦
21	9316195011	Motor holder	♦
22	9602851003	Fan motor (MFD-14SXN)	♦
23	9316309012	Crossflow fan B assy	♦
24	9602850006	Fan motor (MFD-14TXN)	♦
25	9312004034	Crossflow fan assy	♦
26	9900975067	Room thermistor	♦
27	9711694065	Main PCB (09 model)	♦
	9711694072	Main PCB (12 model)	♦
	9711694089	Main PCB (14 model)	♦
—	9711684004	Wire with terminal (Main PCB—Earth)	♦
a	—	Terminal bracket	—
b	—	Cable bracket	—
c	—	Front panel	—
d	—	Terminal bracket (COM)	—
e	—	Control box shield	—
f	—	Control box cover	—
g	—	Control box	—

TECHNICAL DATA AND PARTS LIST

■ Casing

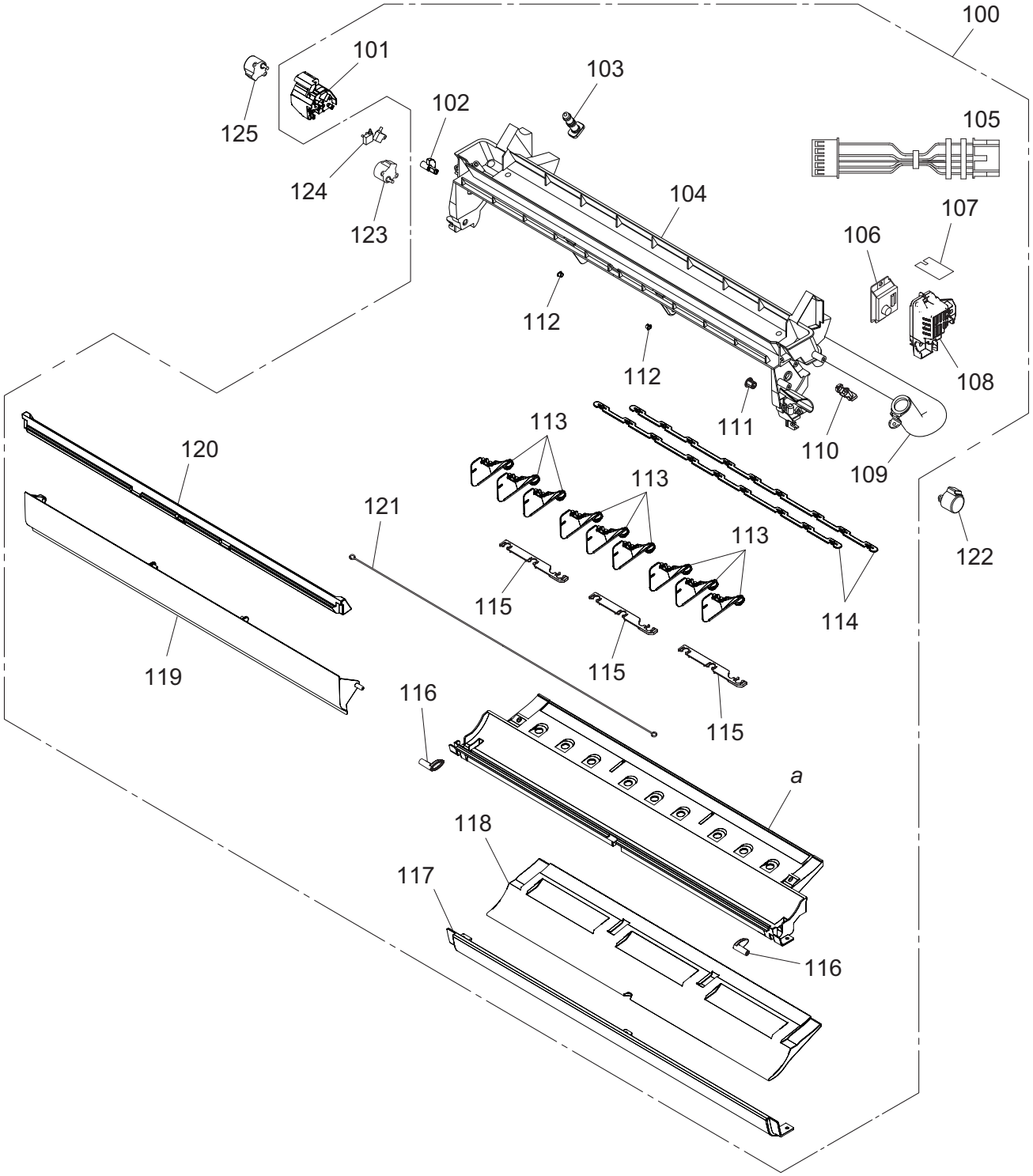


TECHNICAL DATA AND PARTS LIST

Item no.	Part no.	Part name	Service part
50	9316411012	Casing assy	♦
51	9316207011	Top cover	♦
52	9315281012	Spacer C	♦
53	9316209015	Joint U	♦
54	9316210011	Guard holder	♦
55	9315282019	Spacer D	♦
56	9316208018	L and R louver U	♦
57	9316211018	Fan guard	♦
58	9316310018	Casing cover L and R	♦
59	9312156016	Bushing B	♦
60	9316308015	Casing cover F	♦
61	9316206014	Louver Z	♦
62	9316205017	Louver U	♦
63	9303529010	Bushing A	♦
64	9316213012	Gear case	♦
65	9309994003	Gear A	♦
66	9316273016	Casing cover B	♦
67	9711714008	Display assy	♦
68	9711696007	Indicator PCB	♦
69	9900384043	Step motor (Up/Down)	♦
a	—	Casing	—
b	—	Casing reinforcement	—
c	—	Display cover	—
d	—	Display case	—
e	—	Switch cover	—

TECHNICAL DATA AND PARTS LIST

■ Drain pan



TECHNICAL DATA AND PARTS LIST

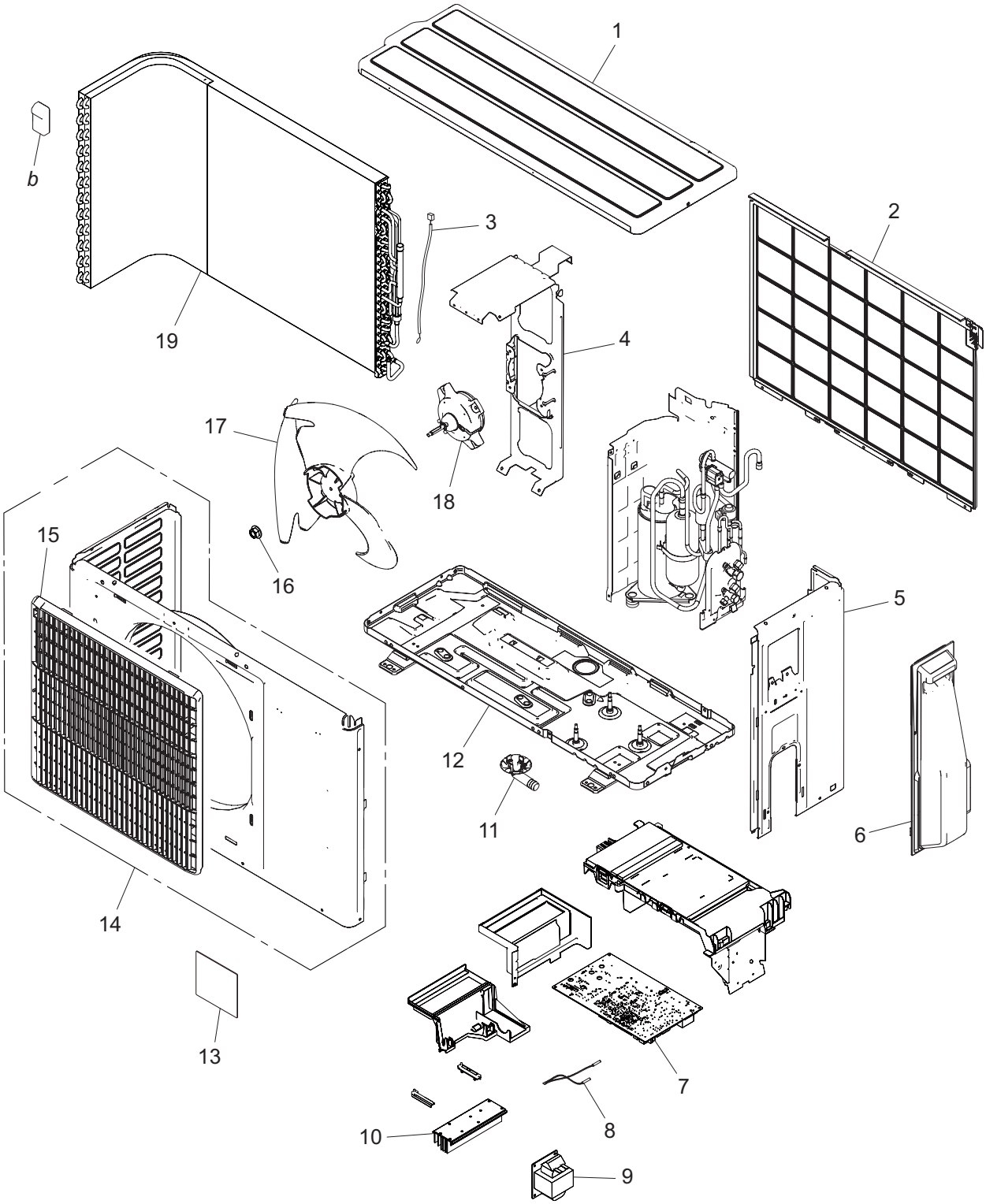
Item no.	Part no.	Part name	Service part
100	9316412057	Drain pan assy	♦
101	9316217010	Limit switch cover	♦
102	9316218017	Key top	♦
103	9316177017	Drain cap	♦
104	9316214026	Drain pan U	♦
105	9711683007	Wire with connector (Refrigerant leak detect sensor—P410 on Main PCB)	♦
106	9901089008	Refrigerant leak detect sensor	♦
107	9384838001	Sensor cover seal	♦
108	9384709004	Sensor cover	♦
109	9314147029	Drain hose assy	♦
110	9316384019	Drain hose holder	♦
111	9312156016	Bushing B	♦
112	9303529010	Bushing A	♦
113	9316334014	L and R louver Z	♦
114	9316335011	Joint Z	♦
115	9315282019	Spacer D	♦
116	9316219014	Stopper	♦
117	9316374010	Lower cover	♦
118	9316386013	Drain pan cover B	♦
119	9316216013	Damper	♦
120	9316274013	Drain pan cover F	♦
121	9316918009	Fan guard Z	♦
122	9900384074	Step motor (Damper lock R)	♦
123	9900384067	Step motor (Damper lock L)	♦
124	9900424015	Micro switch (Limit)	♦
125	9900384050	Step motor (Damper)	♦
a	—	Drain pan Z	—

TECHNICAL DATA AND PARTS LIST

3. Outdoor unit parts list

3-1. Models: AOYG09KVCA and AOYG12KVCA

■ Exterior parts and chassis

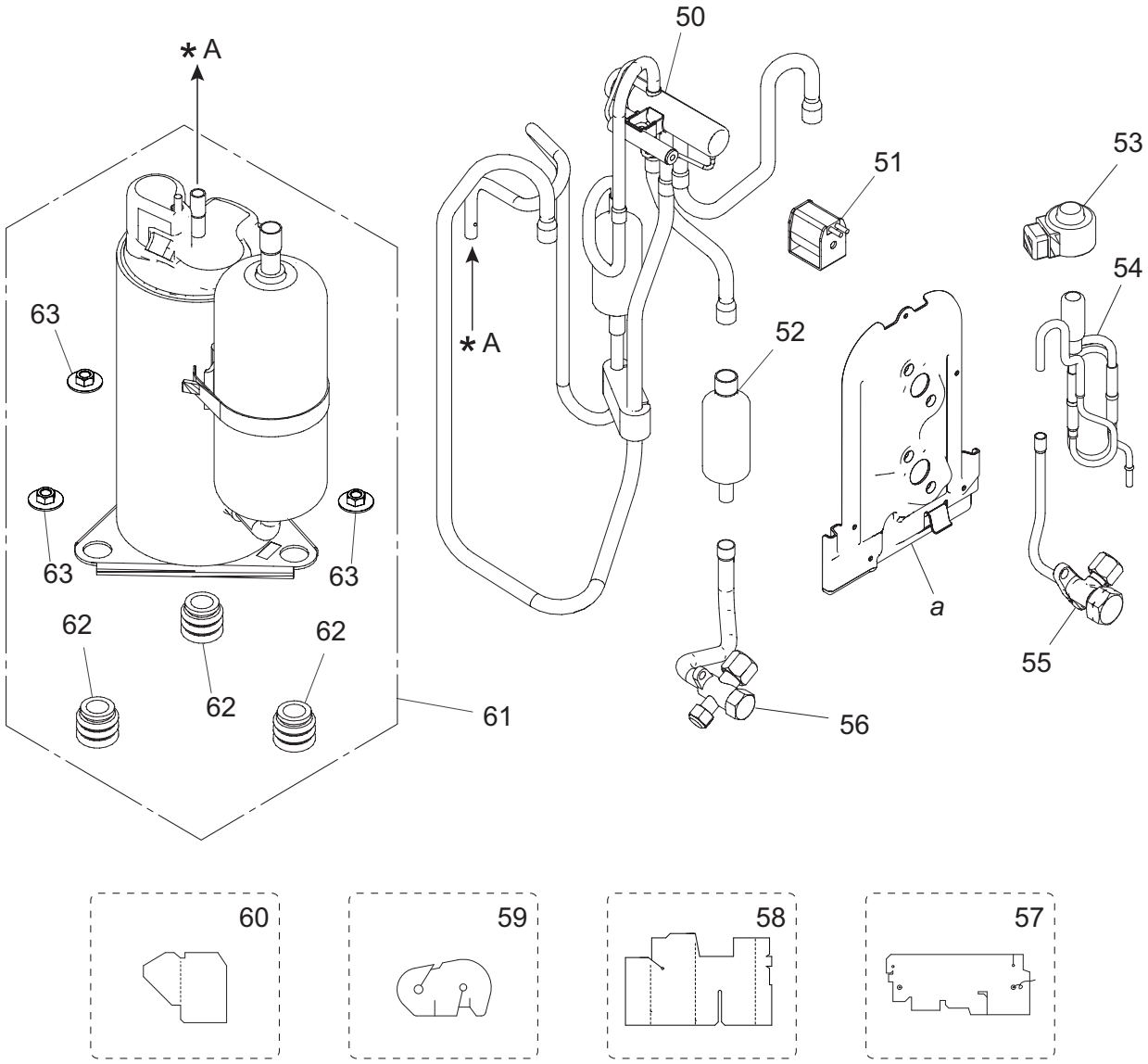


TECHNICAL DATA AND PARTS LIST

Item no.	Part no.	Part name	Service part
1	9322556028	Top panel assy	♦
2	9322811011	Protective net	♦
3	9900850012	Thermistor (Outdoor temp.)	♦
4	9322553010	Motor bracket assy	♦
5	9322552020	Cabinet right assy	♦
6	9322570000	Switch cover assy	♦
7	9709685426	Main PCB (09 model)	♦
	9709685433	Main PCB (12 model)	♦
8	9900849016	Thermistor assy	♦
9	9900583019	Reactor assy	♦
10	9322418005	Heat sink	♦
11	9322144003	Drain pipe	♦
12	9322314000	Base assy	♦
13	9319151007	Emblem	♦
14	9322555014	Front panel assy	♦
15	9322135001	Fan guard	♦
16	0700103070	Nut	♦
17	9322136008	Propeller fan	♦
18	9603553005	Brushless motor	♦
19	9322275004	Condenser total assy	♦
—	9708704012	Wire with terminal (Terminal—Earth)	♦
a	—	Hair pin cushion	—

■ Compressor

TECHNICAL DATA AND PARTS LIST



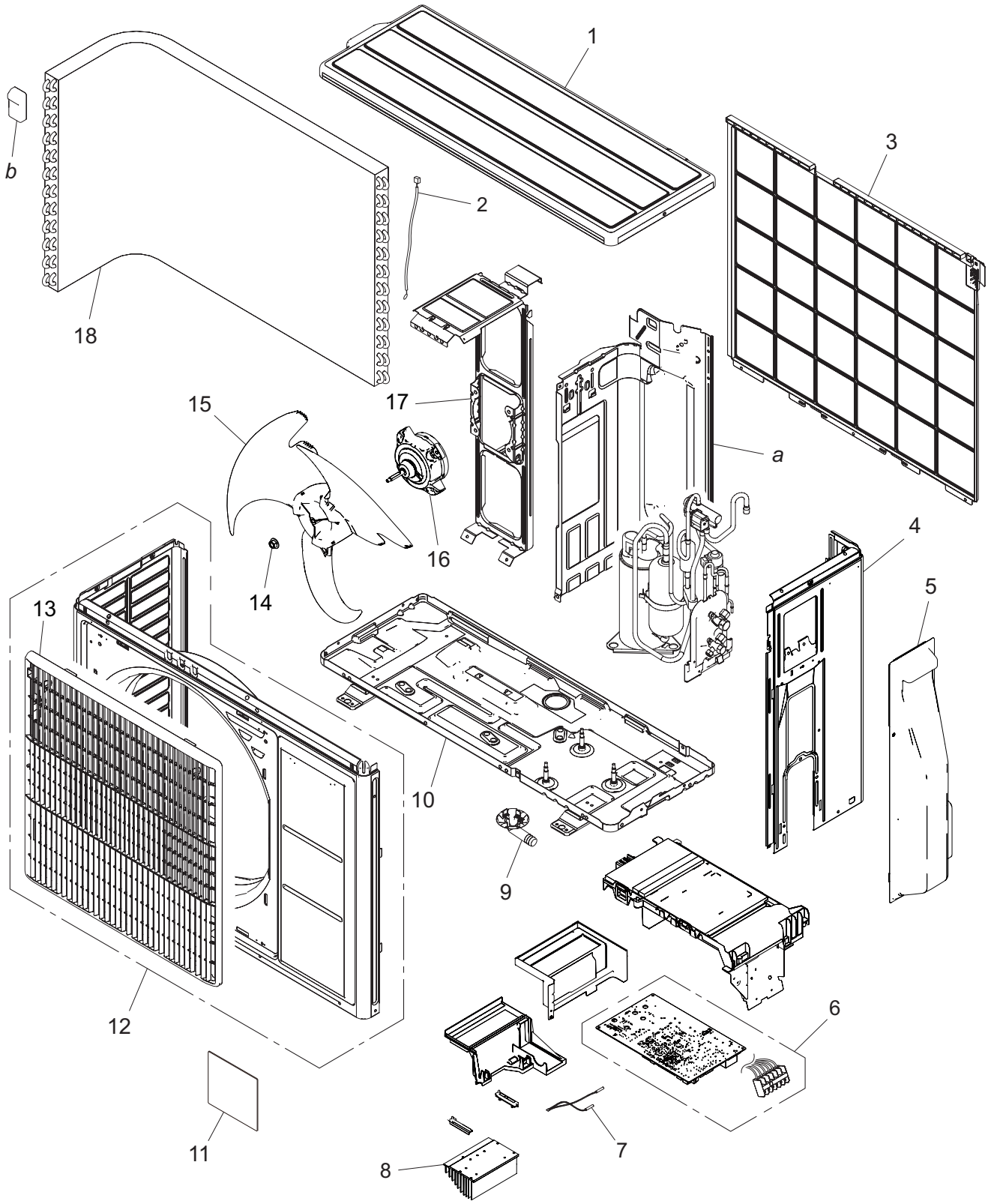
TECHNICAL DATA AND PARTS LIST

Item no.	Part no.	Part name	Service part
50	9333840024	4-way valve assy	♦
51	9970194023	Solenoid	♦
52	9322435002	Muffler	♦
53	9970095122	Expansion valve coil	♦
54	9322463005	Pulse motor valve assy	♦
55	9322474001	2-way valve assy	♦
56	9322475008	3-way valve assy	♦
57	9324024006	S-insulator B	♦
58	9322536006	S-insulator F	♦
59	9322537003	S-insulator H	♦
60	9323045002	S-insulator V	♦
61	9322427007	Compressor assy	♦
62	9322386007	Rubber cushion	♦
63	9313437008	Special nut (M8)	♦
a	—	Valve bracket	—

TECHNICAL DATA AND PARTS LIST

3-2. Model: AOYG14KVCA

■ Exterior parts and Chassis

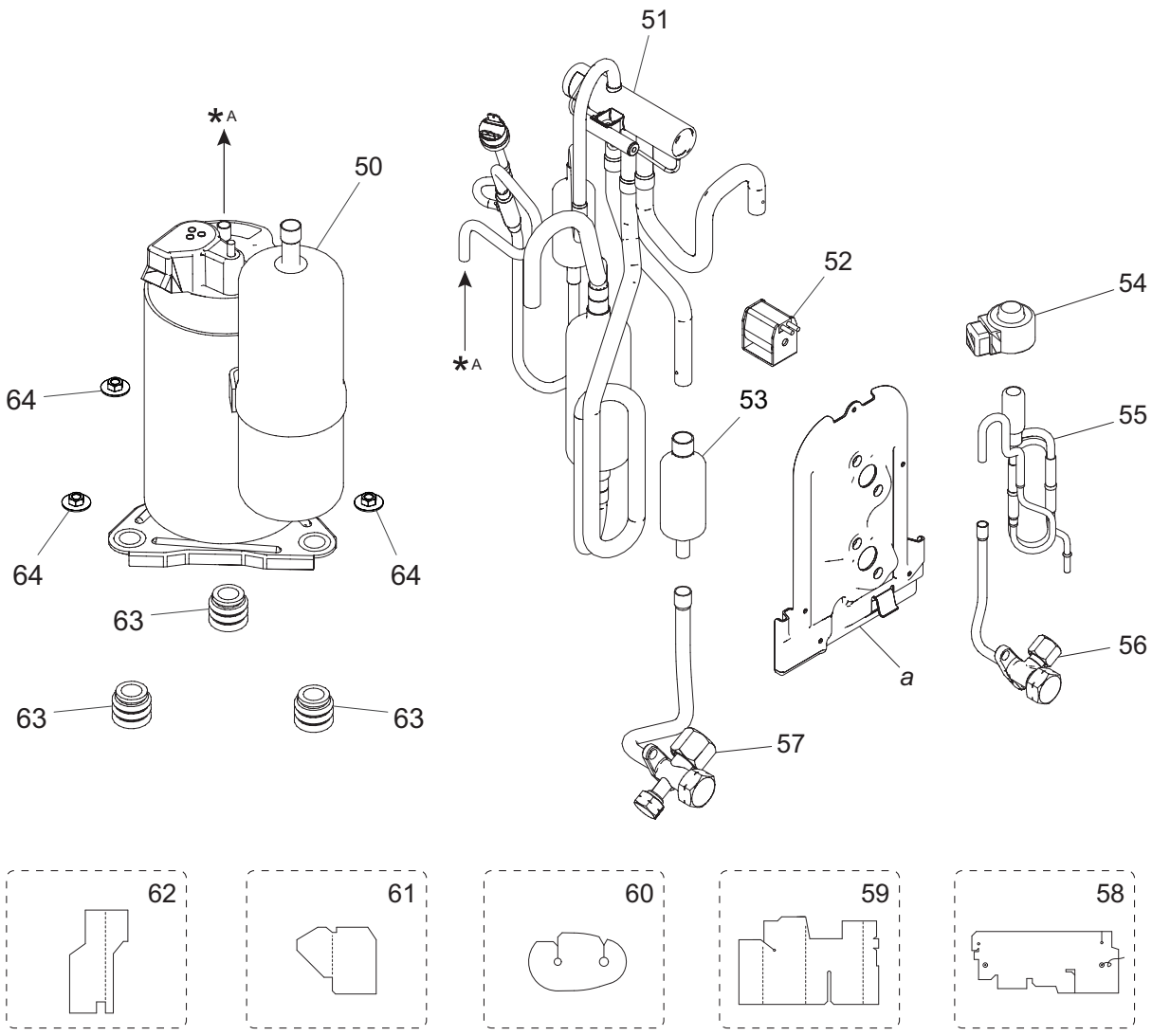


TECHNICAL DATA AND PARTS LIST

Item no.	Part no.	Part name	Service part
1	9322556066	Top panel assy	♦
2	9900565060	Thermistor (Outdoor temp.)	♦
3	9322811028	Protective net	♦
4	9322552099	Cabinet right assy	♦
5	9322570024	Switch cover assy	♦
6	9709685389	Main PCB (Service unit)	♦
7	9900727079	Thermistor assy	♦
8	9322420039	Heat sink	♦
9	9322144003	Drain pipe	♦
10	9322314000	Base assy	♦
11	9319151007	Emblem	♦
12	9322555250	Front panel assy	♦
13	9322149008	Blow grille	♦
14	0700103070	Nut	♦
15	9322150004	Propeller fan	♦
16	9603601003	Fan motor	♦
17	9322553027	Motor bracket assy	♦
18	9317089661	Condenser total assy	♦
—	9708704012	Wire with terminal (Terminal—Earth)	♦
—	9710542008	Wire assy	♦
a	—	Separator	—
b	—	Hair pin cushion	—

■ Compressor

TECHNICAL DATA AND PARTS LIST



TECHNICAL DATA AND PARTS LIST

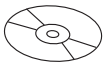
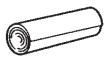
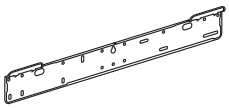
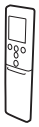
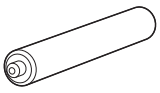
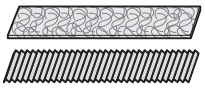
Item no.	Part no.	Part name	Service part
50	9810523006	Compressor assy	♦
51	9383129063	4-way valve assy	♦
52	9970194023	Solenoid	♦
53	9322436009	Muffler	♦
54	9970173028	Expansion valve coil	♦
55	9322463029	Pulse motor valve assy	♦
56	9322474001	2-way valve assy	♦
57	9322850010	3-way valve assy	♦
58	9324014014	S-insulator B	♦
59	9322847003	S-insulator F	♦
60	9322501004	S-insulator H	♦
61	9323045002	S-insulator V	♦
62	9322824004	S-insulator K	♦
63	9322386007	Rubber cushion	♦
64	9313437008	Special nut (M8)	♦
a	—	Valve bracket	—
b	—	Muffler	—

TECHNICAL DATA AND PARTS LIST

4. Accessories

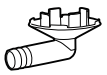
4-1. Indoor unit

■ Models: AGYG09KVCA, AGYG12KVCA, and AGYG14KVCA

Part name	Exterior	Q'ty	Part name	Exterior	Q'ty
Operating manual		1	Operating manual (CD-ROM)		1
Installation manual		1	Cloth tape		1
Wall hook bracket		1	Tapping screws (large)		9
Remote controller		1	Tapping screws (small)		2
Battery		2	Air cleaning filters		1
Remote controller holder		1			

4-2. Outdoor unit

■ Models: AOYG09KVCA, AOYG12KVCA, and AOYG14KVCA

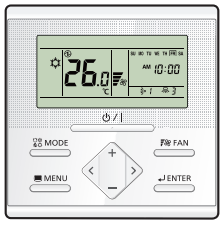
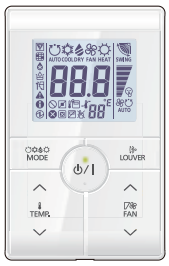
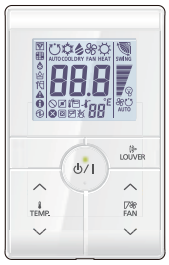
Part name	Exterior	Q'ty	Part name	Exterior	Q'ty
Installation manual		1	Drain pipe		1

TECHNICAL DATA AND PARTS LIST

5. Optional parts

5-1. Indoor unit

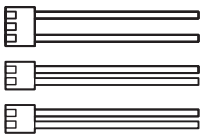
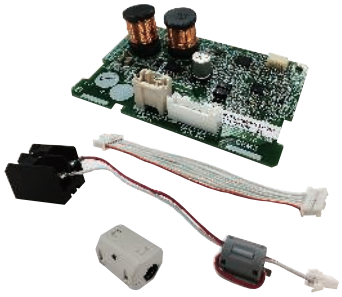
■ Controllers

Exterior	Part name	Model name	Summary
	Wired remote controller	UTY-RNRYZ*	Easy finger touch operation with LCD panel. Backlit LCD enables easy operation in a dark room. Wire type: Non-polar 2-wire
	Wired remote controller	UTY-RLRY	High visibility and easy operation. Room temperature can be accurately controlled using the built-in thermo sensor. Wire type: Non-polar 2-wire
	Compact wired remote controller	UTY-RCRYZ1	Compact body and easy operation. Room temperature can be accurately controlled using the built-in thermo sensor. Wire type: Non-polar 2-wire
	Simple remote controller	UTY-RSRY	Compact remote controller concentrates on the basic functions such as Start/Stop, fan control, temperature setting, and operation mode. Wire type: Non-polar 2-wire
	Simple remote controller	UTY-RHRY	Compact remote controller concentrates on the basic functions such as Start/Stop, fan control, and temperature setting. Wire type: Non-polar 2-wire

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-TWRXZ3	Use to connect Non-polar 2-core wired remote controller.
	Wireless LAN adapter	UTY-TFSXZ1	Remotely manage an air conditioning system using mobile devices such as smartphones and tablets. For connection indoor unit with UART interface. Appropriate application for each region is required to use this option. For details, contact FGL sales company.
	Modbus converter	UTY-VMSX	For connection between indoor unit with UART interface and a Modbus open network.
	KNX converter	UTY-VKSX	For connection between indoor unit with UART interface and a KNX open network.

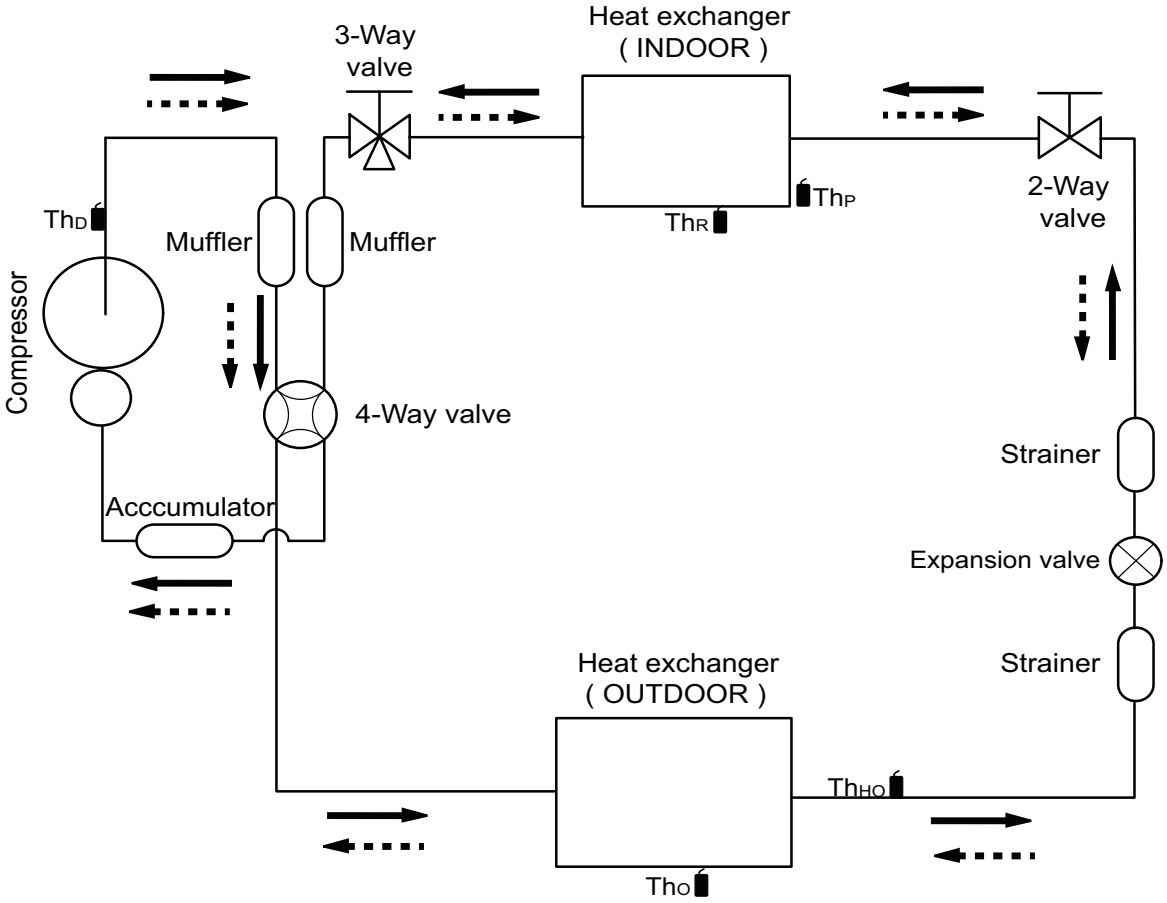
NOTE: Combined use of following optional parts and Wireless LAN adapter (UTY-TFSXZ1) is not allowed.

- Modbus converter
- KNX converter

TECHNICAL DATA AND PARTS LIST

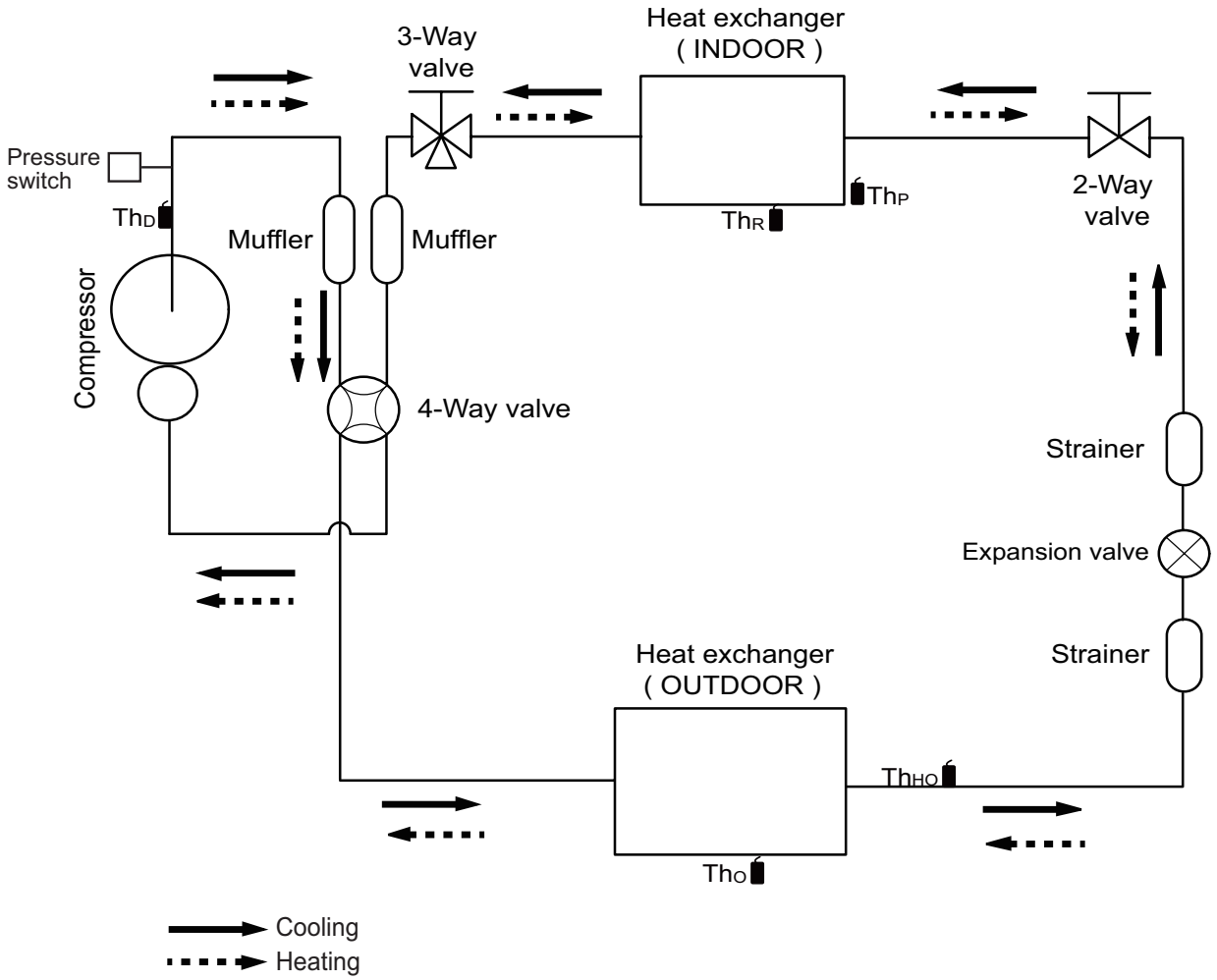
6. Refrigerant system diagrams

6-1. Models: AOYG09KVCA and AOYG12KVCA



ThD : Thermistor (Discharge Temp.)
ThO : Thermistor (Outdoor Temp.)
ThHO : Thermistor (Heat Exchanger Out Temp.)
ThR : Thermistor (Room Temp.)
ThP : Thermistor (Pipe Temp.)

6-2. Model: AOYG14KVCA



ThD : Thermistor (Discharge Temp.)

ThO : Thermistor (Outdoor Temp.)

ThHO : Thermistor (Heat Exchanger Out Temp.)

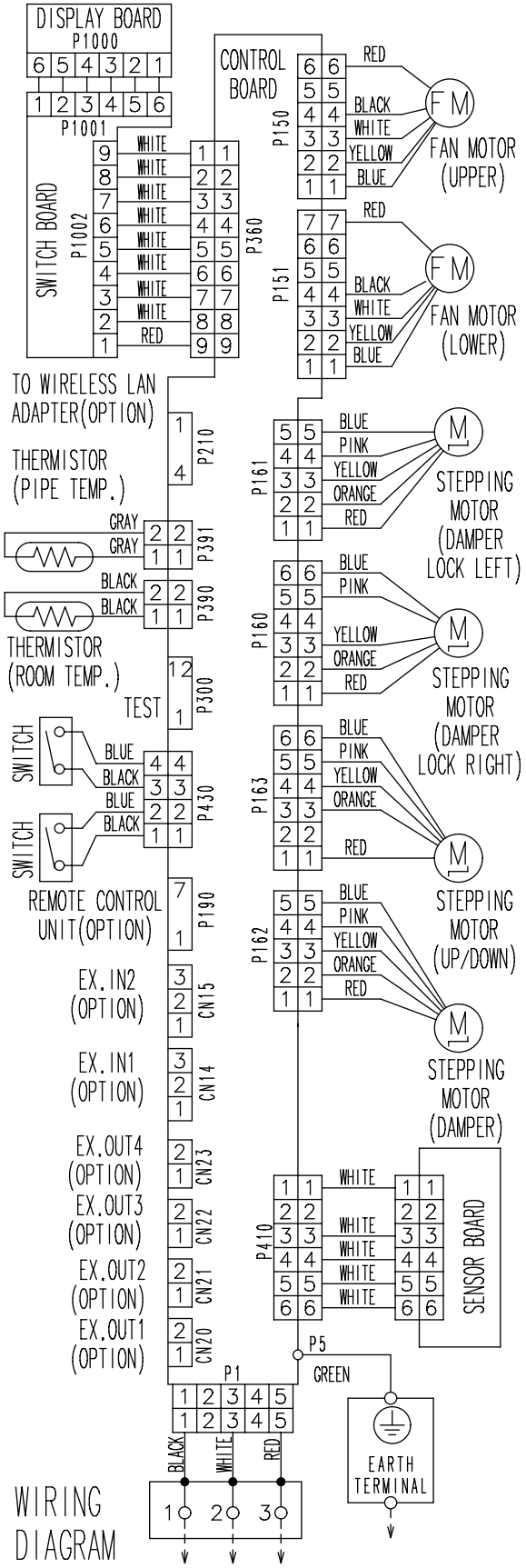
ThR : Thermistor (Room Temp.)

ThP : Thermistor (Pipe Temp.)

7. Wiring diagrams

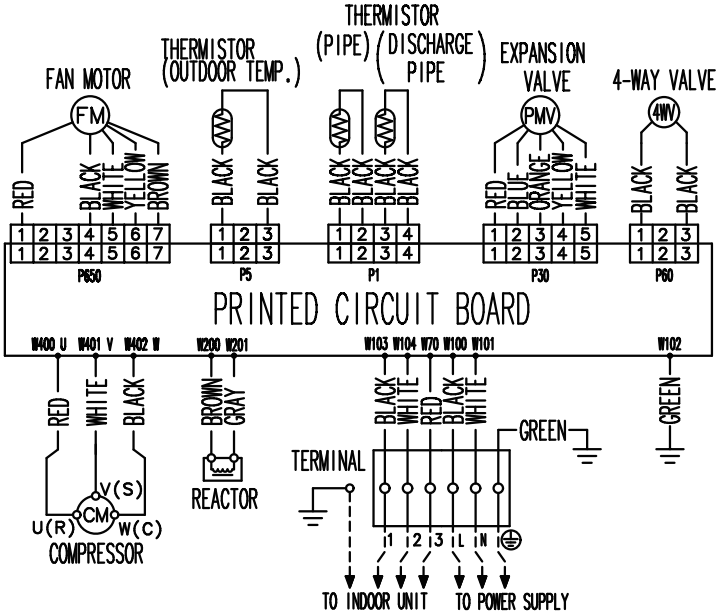
7-1. Indoor unit

■ Models: AGYG09KVCA, AGYG12KVCA, and AGYG14KVCA

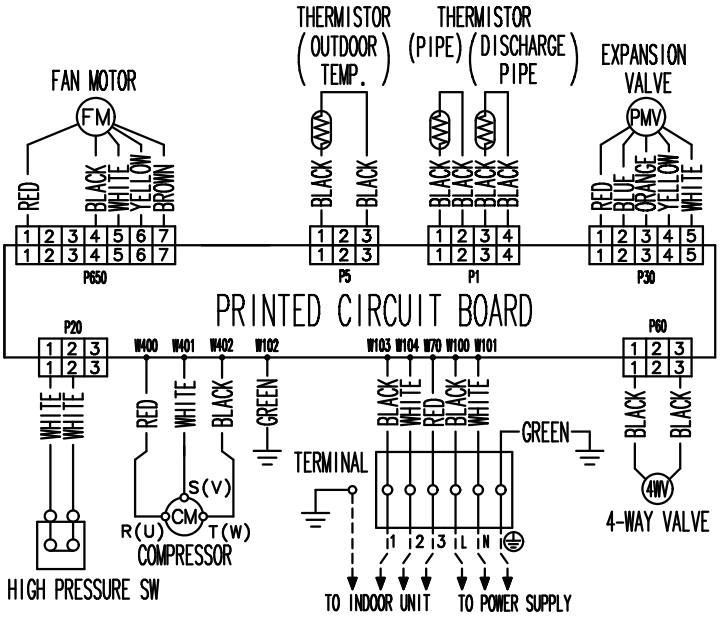


7-2. Outdoor unit

■ Models: AOYG09KVCA and AOYG12KVCA

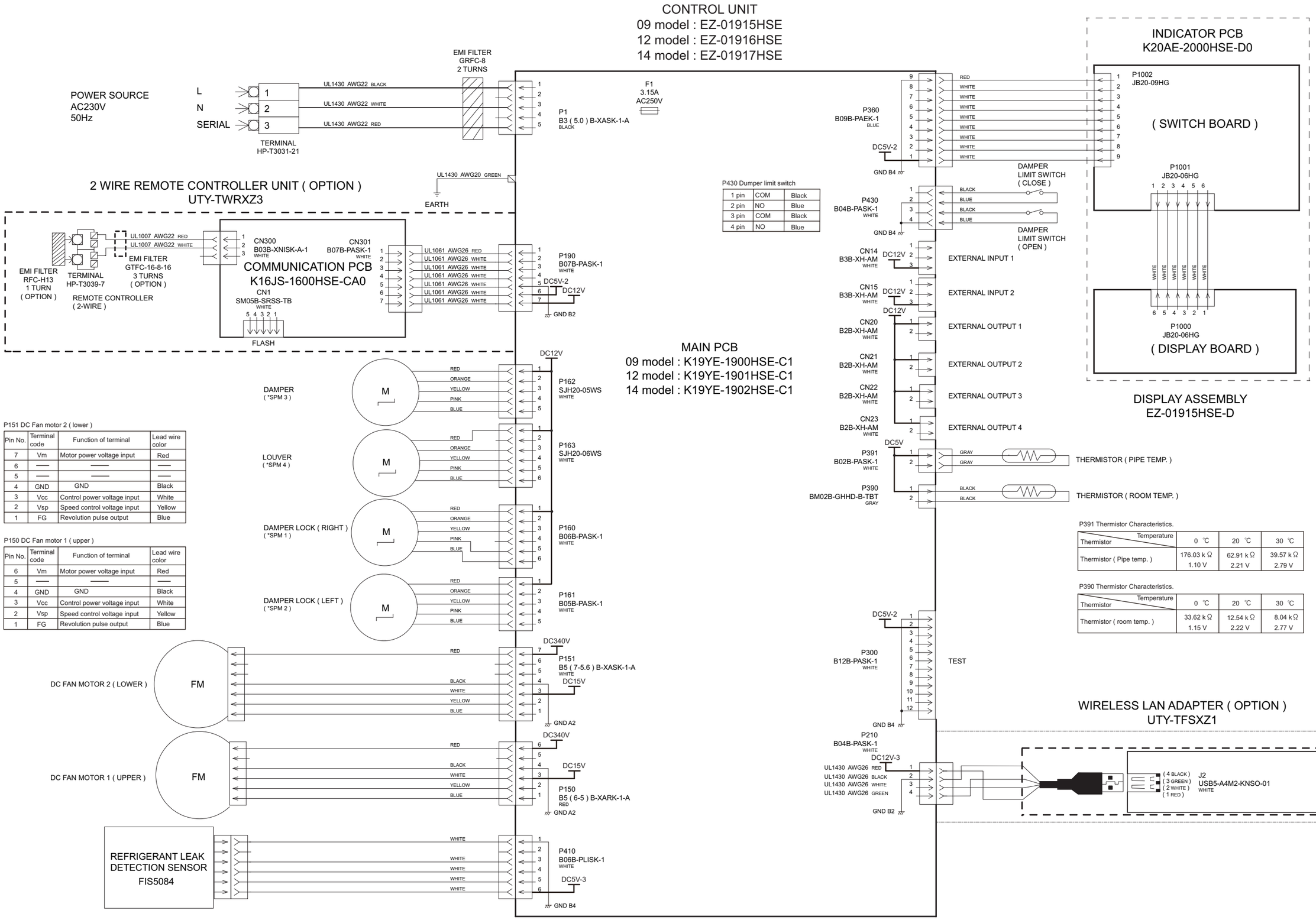


■ Model: AOYG14KVCA



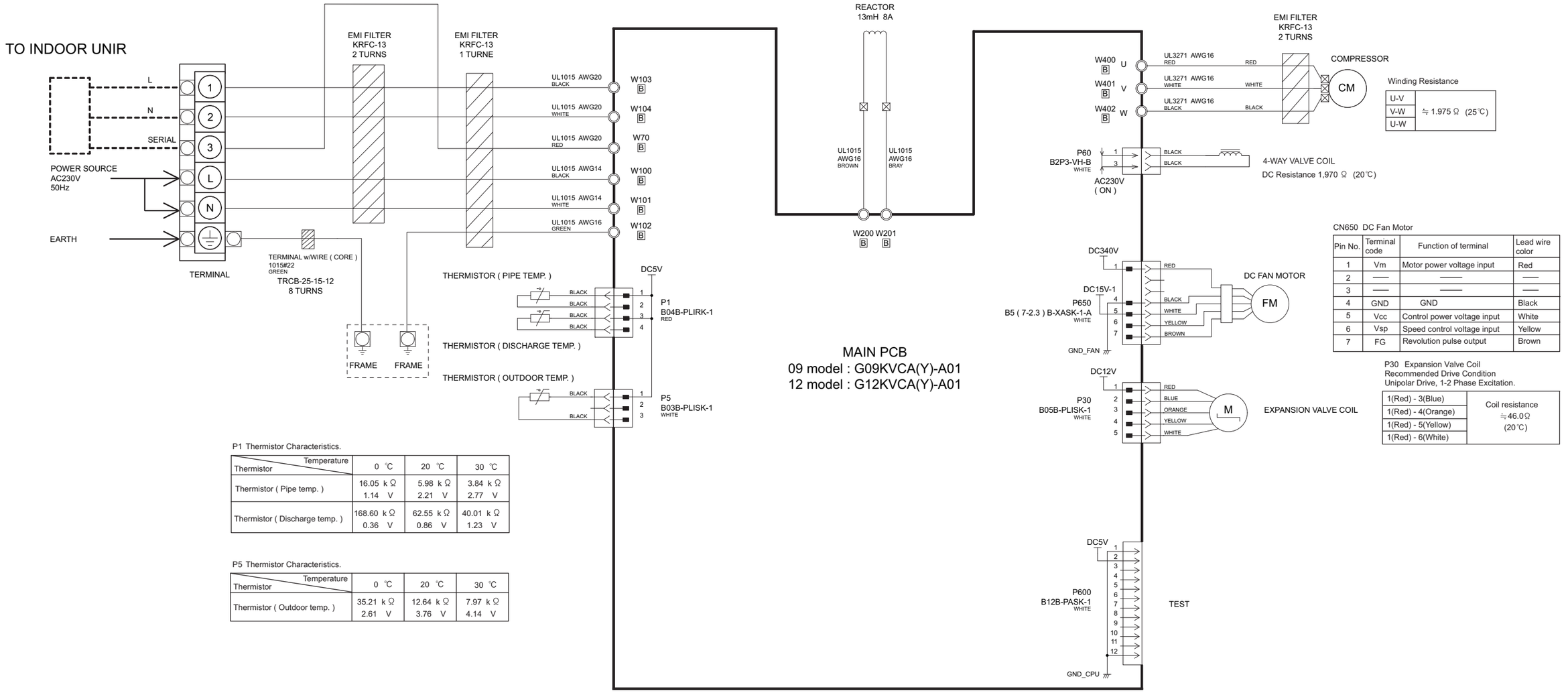
8. PC board diagrams

8-1. Models: AGYG09KVCA, AGYG12KVCA, and AGYG14KVCA



8-2. Models: AOYG09KVCA and AOYG12KVCA

INVERTER ASSEMBLY
09, 12 models : EZ-020MHUE



CN650 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) - 3(Blue)	Coil resistance ≒46.0Ω (20℃)
1(Red) - 4(Orange)	
1(Red) - 5(Yellow)	
1(Red) - 6(White)	

P1 Thermistor Characteristics.

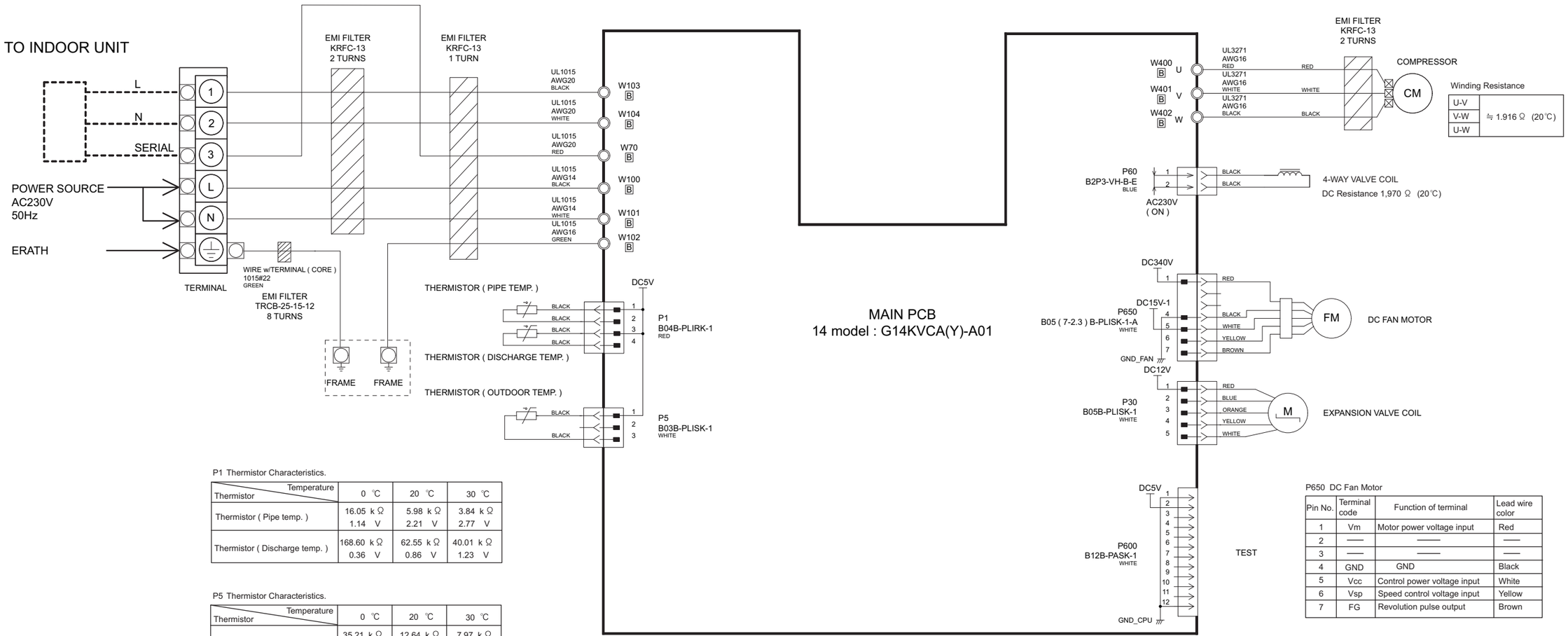
Thermistor \ Temperature	0 ℃	20 ℃	30 ℃
Thermistor (Pipe temp.)	16.05 k Ω 1.14 V	5.98 k Ω 2.21 V	3.84 k Ω 2.77 V
Thermistor (Discharge temp.)	168.60 k Ω 0.36 V	62.55 k Ω 0.86 V	40.01 k Ω 1.23 V

P5 Thermistor Characteristics.

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

8-3. Model: AOYG14KVCA

INVERTER ASSEMBLY
14 model : EZ-020KHUE



P1 Thermistor Characteristics.

Thermistor \ Temperature	0 ℃	20 ℃	30 ℃
Thermistor (Pipe temp.)	16.05 kΩ 1.14 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) - 3(Blue)	Coil resistance ≒46.0Ω (20℃)
1(Red) - 4(Orange)	
1(Red) - 5(Yellow)	
1(Red) - 6(White)	

REFRIGERANT R32
INVERTER

3. TROUBLESHOOTING

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3. TROUBLESHOOTING

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TROUBLESHOOTING

1. Error code

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

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

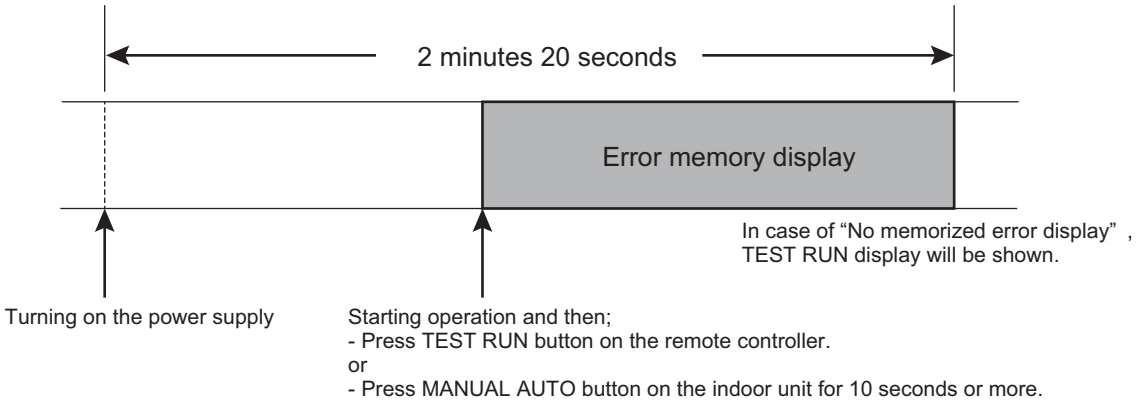
Errors, once displayed, will be automatically stored in the PC board of the indoor unit. Even if the power is disconnected, the memory containing the error history will not be erased.

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

1-1. How to check the error memory

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

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



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

1-2. How to erase the error memory

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

- Manual erase: Pressing the MANUAL AUTO button on the indoor unit while the “Error memory display” is being shown. (Short beep emits for about 3 seconds.)

- Automatic erase: After continuing the normal operation of the air conditioner without error for 2 hours or longer after displaying the error memory as described in How to check the error memory. (Except FAN operation mode.)

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

The operation, timer, and economy indicators operate according to the error contents.
For confirmation of the error contents, refer the flashing pattern as follows.

Error contents	Indoor unit display			Wired remote controller display
	Operation [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: 45. Refrigerant leakage sensor error (Indoor unit)	4 times	5 times	Continuous	45
E: 45. Refrigerant leakage sensor deterioration (Indoor unit)	4 times	5 times	Continuous	45
E: 51. Indoor unit fan motor error (Indoor unit)	5 times	1 times	Continuous	51
E: 57. Damper (Open/Close) detection limit switch error	5 times	7 times	Continuous	57
E: 57. Damper (Open/Close) simultaneous detection limit switch error (Indoor unit)	5 times	7 times	Continuous	57
E: 62. Outdoor unit main PCB error (Outdoor unit)	6 times	2 times	Continuous	62
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
E: A8. Refrigerant leakage sensor error (Indoor unit)	10 times	8 times	Continuous	A8

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".

↓

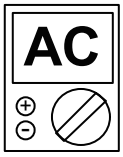
Check point 2. Check connection

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 207 V (AC 230 V -10%) to AC 253 V (AC 230 V +10%) appears at outdoor unit terminal L - N.

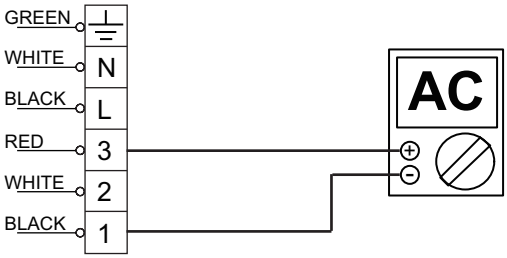


↓

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 03-37
- 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 properly receive the serial signal from indoor unit for 10 seconds or more.
		Fan motor	
	Outdoor unit	Main PCB	
Forecast of cause			Connection failure
			External cause
			Main PCB failure

Check point 1. Reset the power and operate

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

↓

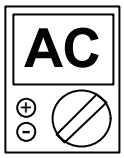
Check point 2. Check connection

Check any loose or removed connection line of indoor unit and outdoor unit.
→ If there is an abnormal condition, correct it by referring to the installation manual or the “DESIGN & TECHNICAL MANUAL”.
Check connection condition is control unit. (If there is loose connector, open cable or mis-wiring.)

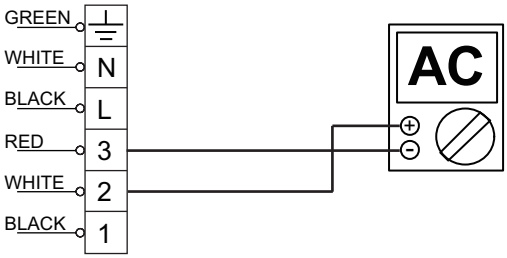
↓

Check point 3. Check the voltage of power supply

Check the voltage of power supply
Check if AC 207 V (AC 230 V -10%) to AC 253 V (AC 230 V +10%) appears at outdoor unit terminal L - N.



↓

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.

↓

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

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 CN6 (terminal 1—3) of main PCB. (Power supply to the remote controller)

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

- If it is DC 12 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.

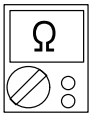
2-5. E: 35. MANUAL AUTO button error (Indoor unit)

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

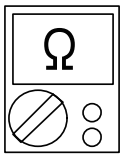
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

-> 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 03-44.
- If thermistor is either open or shorted, replace it and reset the power.



↓

Check point 3. Check voltage of main PCB

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

NOTE: For details of thermistor connector, refer to "Wiring diagrams" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-22.

If the voltage does not appear, replace main PCB.

↓

End

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

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

TROUBLESHOOTING

Check point 1. Check connection of connector

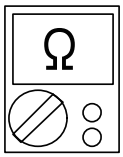
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

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

↓

Check point 2. Remove connector and check thermistor resistance value

- For the heat exchanger thermistor resistance value, refer to "Thermistor resistance values" on page 03-44.
- If thermistor is either open or shorted, replace it and reset the power.



↓

Check point 3. Check voltage of main PCB

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

NOTE: For details of thermistor connector, refer to "Wiring diagrams" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-22.

If the voltage does not appear, replace main PCB.

↓

End

2-8. E: 45. Refrigerant leakage sensor error (Indoor unit)

Indicator	Indoor unit	Operation indicator	4 time flash
		Timer indicator	5 time flash
		Economy indicator	Continuous flash
		Error code	E: 45
Detective actuator	Refrigerant leakage sensor		When refrigerant leakage sensor open, short circuit, or abnormal voltage of drive circuits detected.
Forecast of cause			Connector connection failure
			Harness disconnection
			Refrigerant leakage sensor deterioration

TROUBLESHOOTING

System is down.

Check point 1. Check connection of connector
• Check if connector is loose or removed. • Check erroneous connection. • Check if refregerant leakage sensor cable is open. -> Reset power when reinstalling due to removed connector or incorrect wiring.

↓

Check point 2. Replace refrigerant leakage sensor
• If an abnormality (failure) occurs, the refrigerant leakage sensor needs to be replaced.

↓

End

2-9. E: 45. Refrigerant leakage sensor deterioration (Indoor unit)

Indicator	Indoor unit	Operation indicator	4 time flash
		Timer indicator	5 time flash
		Economy indicator	Continuous flash
		Error code	E: 45
Detective actuator	Refrigerant leakage sensor		When refrigerant leakage sensor open, short circuit, or abnormal voltage of drive circuits detected.
Forecast of cause			Connector connection failure
			Harness disconnection
			Refrigerant leakage sensor deterioration

TROUBLESHOOTING

Continuous operation for a certain period is possible.

Check point 1. Replace refregirant leakage sensor
• Replace due to expiration of refregirant leakage sensor. • Refregirant leakage sensor needs to be replaced regulary.

↓

End

2-10. 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 actual rotation number of the indoor unit fan motor is below 1/3 of the target rotation number continuously for more than 56 seconds.
		Fan motor	
Forecast of cause			Fan rotation failure
			Fan motor winding open
			Motor protection by surrounding temperature rise
			Control PCB failure
			Indoor unit fan motor failure

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 03-37.)
→ 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

2-11. E: 57. Damper (Open/Close) detection limit switch error

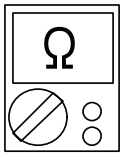
Indicator	Indoor unit	Operation indicator	5 time flash
		Timer indicator	7 time flash
		Economy indicator	Continuous flash
		Error code	E: 57
Detective actuator	Indoor unit main PCB		• When limit switch were not able to detect the close though the damper close.(Upper air flow) • When limit switch were not able to detect the open though the damper open.(Upper & Lower air flow)
	Limit switch		
	Damper		
Forecast of cause			Limit switch failure
			Shorted connector/wire
			Damper faulure
			Controller PCB failure

TROUBLESHOOTING

Check point 1. Check limit switch

- Check operation of limit switch. (any blocking by dust, etc.)
- Remove limit switch and check ON/OFF switching operation by using a meter.

-> If limit switch is detective, replace it.



↓

Check point 2. Check connector (CN18)/wire

Check loose contact of CN18/shorted wire (pinched wire).
-> Replace limit switch if the wire is abnormal

↓

Check point 3. Check Damper

- Check the obstruction of damper movement.
- Check the damper movement.

-> Replace damper if the damper is abnormal

↓

Check point 4. Replace main PCB

If Check Point 1 and 3 do not improve the symptom, change main PCB.

↓

End

2-12. E: 57. Damper (Open/Close) simultaneous detection limit switch error (Indoor unit)

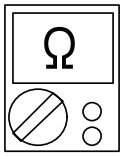
TROUBLESHOOTING

Indicator	Indoor unit	Operation indicator	5 time flash
		Timer indicator	7 time flash
		Economy indicator	Continuous flash
		Error code	E: 57
Detective actuator	Indoor unit main PCB		When the limit switch detects open and close at the simultaneous.
	Limit switch		
Forecast of cause			Limit switch failure
			Shorted connector/wire
			Controller PCB failure

Check point 1. Check limit switch

- Check operation of limit switch. (any blocking by dust, etc.)
- Remove limit switch and check ON/OFF switching operation by using a meter.

-> If limit switch is detective, replace it.



↓

Check point 2. Check connector (CN18)/wire

Check loose contact of CN18/shorted wire (pinched wire).
-> Replace limit switch if the wire is abnormal

↓

Check point 3. Replace main PCB

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

↓

End

2-13. 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

2-14. E: 71. Discharge thermistor error (Outdoor unit)

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

TROUBLESHOOTING

Check point 1. Check connection of connector

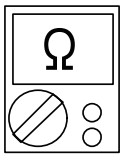
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

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

↓

Check point 2. Remove connector and check thermistor resistance value

- For the discharge temperature thermistor resistance value, refer to "Thermistor resistance values" on page 03-44.
- If thermistor is either open or shorted, replace it and reset the power.



↓

Check point 3. Check voltage of main PCB

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

NOTE: For details of thermistor connector, refer to "Wiring diagrams" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-22.

If the voltage does not appear, replace main PCB.

↓

End

2-15. 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

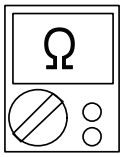
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

→ 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 03-44.
- If thermistor is either open or shorted, replace it and reset the power.



↓

Check point 3. Check voltage of main PCB

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

NOTE: For details of thermistor connector, refer to "Wiring diagrams" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-22.

If the voltage does not appear, replace main PCB.

↓

End

2-16. 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

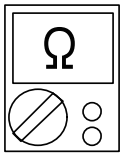
- Check if connector is loose or removed.
- Check erroneous connection.
- Check if thermistor cable is open

-> 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 03-44.
- If thermistor is either open or shorted, replace it and reset the power.



↓

Check point 3. Check voltage of main PCB

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

NOTE: For details of thermistor connector, refer to "Wiring diagrams" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-22.

If the voltage does not appear, replace main PCB.

↓

End

2-17. E: 84. Current sensor error (Outdoor unit)

TROUBLESHOOTING

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 mis-wiring, 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

2-18. 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

2-19. 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	1. When running the compressor, if the detected rotor location is out of phase with actual rotor location more than 90°, the compressor stops. 2. After the compressor restarts, if the same operation is repeated within 40 seconds, the compressor stops again. 3. If 1. and 2. repeats 5 times, the compressor stops permanently.
		Compressor	
Forecast of cause			Defective connection of electric components
			Main PCB failure
			Compressor failure

Check point 1. Check Noise from Compressor

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

↓

Check point 2. Check connection of around the compressor components

For compressor terminal, main PCB

- Check if connector is removed.
- Check erroneous connection.
- Check if cable is open. (Refer to inverter compressor in "Service parts information" on page 03-37.)

→ 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

2-20. 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 03-37.)
→ If outdoor unit fan motor is abnormal, replace outdoor unit fan motor and main PCB.

↓

Check point 4. Check output voltage of main PCB

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

NOTE: For details of wiring diagram, refer to "Wiring diagrams" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-22.

Read wire	DC voltage
Red—Black	207 V (AC 230 V -10 %) to 253 V (AC 230 V +10 %)
White—Black	15 ± 1.5 V

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

↓

End

2-21. 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			Air filter clogged
			Connector connection failure
			Thermistor failure
			Coil failure
			4-way valve failure
			Main PCB failure

Check point 1. Check air filter condition

Check air filter dirty.
→ If the air filter dirty, clean up the air filter.

↓

Check point 2. 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 3. 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 03-44.
→ If defective, replace the thermistor.

↓

Check point 4. Check the solenoid coil and 4-way valve
NOTE: Refer solenoid coil and 4-way valve in "Service parts information" on page 03-37. • **Solenoid coil** Remove CN30 (for 09/12 model) and CN500 (for 14 model) from PCB and check the resistance value of coil. Resistance value is 1.88 kΩ~2.29 kΩ. → 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 5. Replace main PCB
If Check Point 1 to 4 do not improve the symptom, replace main PCB.

↓

End

2-22. 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 or capillary tube defective, strainer clogged
			Outdoor unit operation failure, foreign matter on heat exchanger
			Discharge temperature thermistor failure
			Insufficient refrigerant
			Main PCB failure

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

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

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

↓

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

- Check if EEV open or there is a capillary tube defect.
  Refer to outdoor unit Electrronic Expansion Valve (EEV) or Capillary tube in "Service parts information" on page 03-37.
- 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 03-37.)

↓

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 03-44.

↓

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

2-23. E: A8. Refrigerant leakage sensor error (Indoor unit)

Indicator	Indoor unit	Operation indicator	10 time flash
		Timer indicator	8 time flash
		Economy indicator	Continuous flash
		Error code	E: A8
Detective actuator			Refrigerant leakage sensor
Forecast of cause			Refrigerant leakage

TROUBLESHOOTING

Check point 1. Refrigerant leakage detection conditions

- When the refrigerant leakage sensor detects refrigerant.
- System stop -> Cooling/heating cannot be operated.
- Stir operation by fan -> Safety is important, and fan operation cannot be stopped.

-> Check for refrigerant leaks and take corrective action.

↓

Check point 2. Error release condition

Power on again.

- If the power is not turned on again, the error will not be cleared even if the gas concentration drops.
- If the refrigerant leakage is detected again after the power is turned on again, an error will occur again.
- Replace the refrigerant leakage sensor as it will not recover if exposed to a high concentration of gas or if exposed multiple times even if the concentration is not high.

↓

End

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".

↓

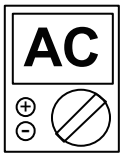
Check point 2. Check external cause at indoor and outdoor (voltage drop or noise)

- 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 207 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

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

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

↓

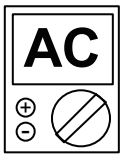
Check point 2. Check external cause at indoor and outdoor (voltage drop or noise)

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

↓

Check point 3. Check electrical components

Check the voltage of power supply.
Check if AC 207 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 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

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

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

↓

Turn off the power and check correct followings.

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

↓

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

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

↓

Check point 3. Check wired remote controller and controller PCB

Check voltage at CN6 (terminal 1—3) of main PCB.
(Power supply to remote controller)

- If it is DC 12 V, remote controller is failure. (The controller PCB is normal)
  -> Replace remote controller.
- If it is DC 0 V, controller PCB is failure. (Check the remote controller once again)
  -> Replace controller PCB.

↓

Check point 4. Replace main PCB

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

↓

End

3-4. No cooling/No heating

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

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

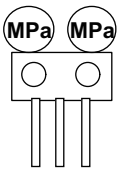
- Check connection pipe (specified pipe length and pipe diameter?)
- Check any loose or removed communication line.

→ 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 if EEV open or there is a capillary tube defect.
  Refer to outdoor unit Electrronic Expansion Valve (EEV) or Capillary tube in "Service parts information" on page 03-37.
- Check compressor.
  Refer to compressor in "Service parts information" on page 03-37.
  Refer to inverter compressor in "Service parts information" on page 03-37.



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

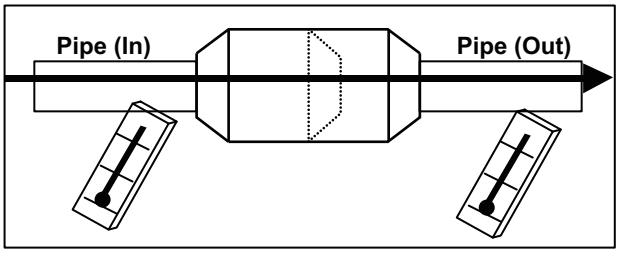
↓

End

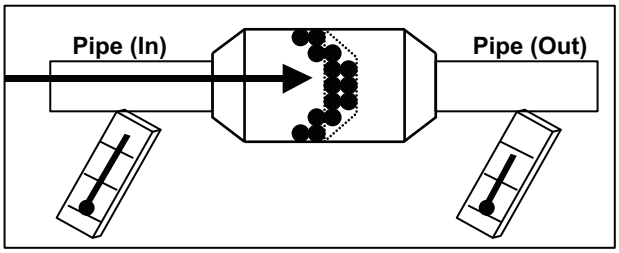
TROUBLESHOOTING

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)

TROUBLESHOOTING

Diagnosis method when abnormal noise is occurred

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

↓

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

↓

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

↓

End

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

↓

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

↓

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

↓

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

↓

Is compressor locked?

- Check Compressor
  Refer to compressor and inverter compressor in "Service parts information" on page 03-37.

↓

End

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?

↓

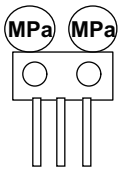
End

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 or capillary tube 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	

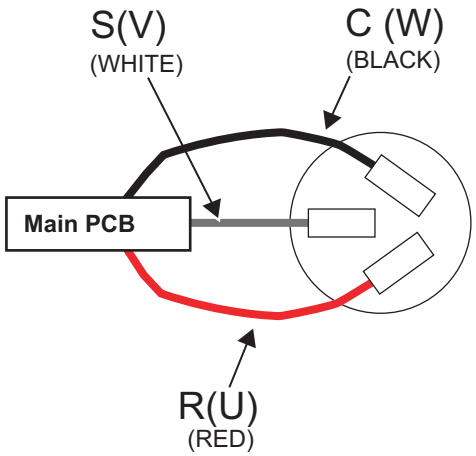
TROUBLESHOOTING

4-2. Inverter compressor

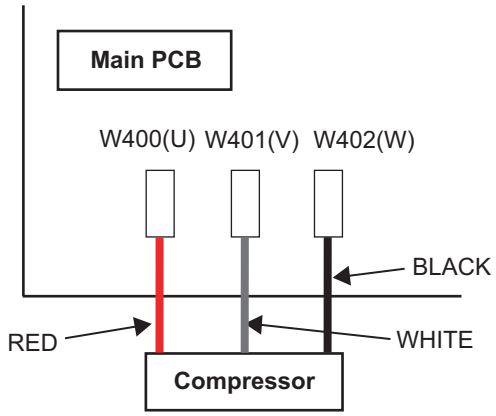
■ Models: AOYG09KVCA and AOYG12KVCA

Check point 1. Check connection

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



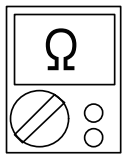
- Check terminal connection of main PCB (loose or incorrect wiring)

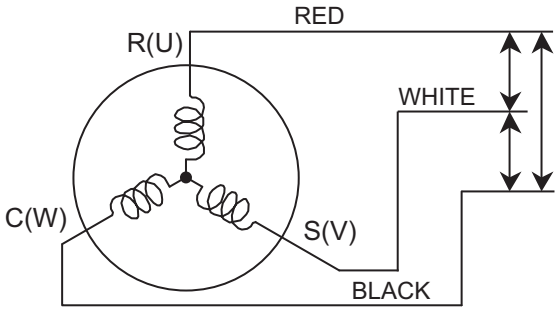


↓

Check point 2. Check winding resistance

Check winding resistance of each terminal.
Resistance value: 1.975 Ω ±7 % at 25 °C





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

↓

Check point 3. Replace inverter PCB

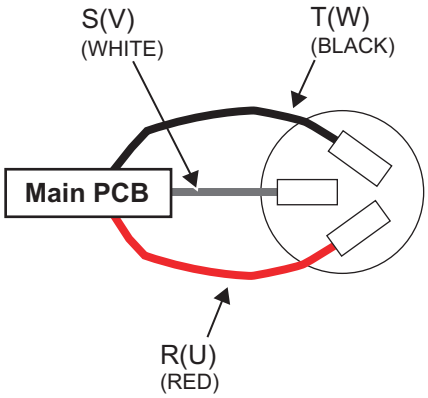
If check point 1 to 2 do not improve the symptom, replace main PCB.

■ Model: AOYG14KVCA

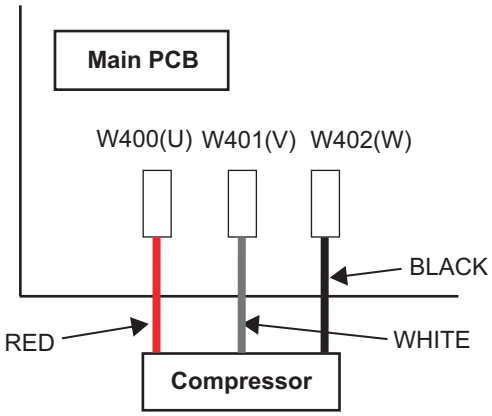
TROUBLESHOOTING

Check point 1. Check connection

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



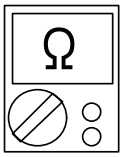
- Check terminal connection of main PCB (loose or incorrect wiring)

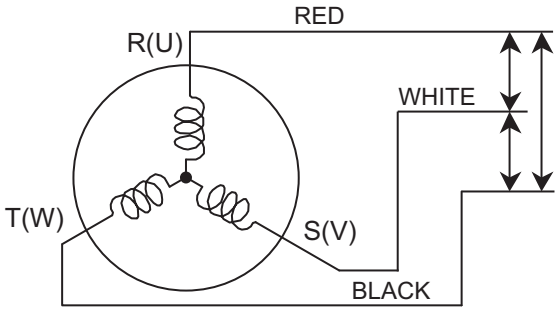


↓

Check point 2. Check winding resistance

Check winding resistance of each terminal.
Resistance value: 1.916 Ω ±8 % 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: AOYG09KVCA, AOYG12KVCA, and AOYG14KVCA

TROUBLESHOOTING

Check point 1. Check connections

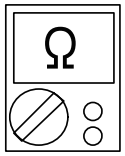
Check connection of connector. (Loose connector or open cable)

NOTE: For details of wiring diagram, refer to "Wiring diagrams" in Chapter 2. TECHNICAL DATA AND PARTS LIST on page 02-22.

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

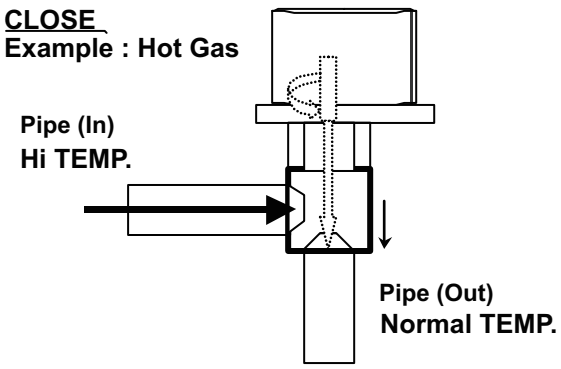
Remove connector and check voltage (DC 12 V)
→ If it does not appear, replace main PCB.

Check point 4. Check noise at start up

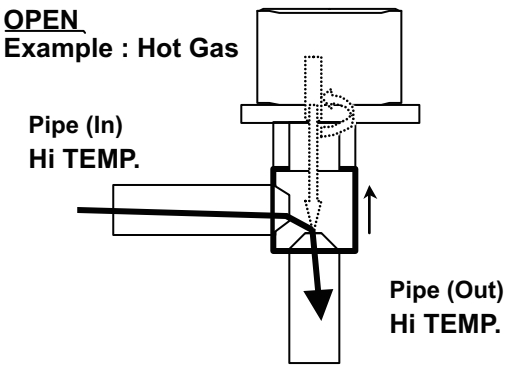
Turn on the power and check the operation noise.
→ If an abnormal noise does not show, replace main PCB.

Check point 5. Check opening and closing operation of valve

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



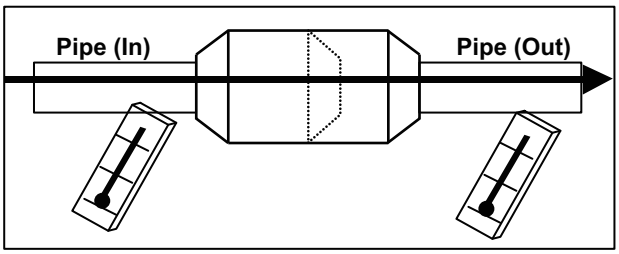
If it is open, it has no temp. difference between inlet and outlet



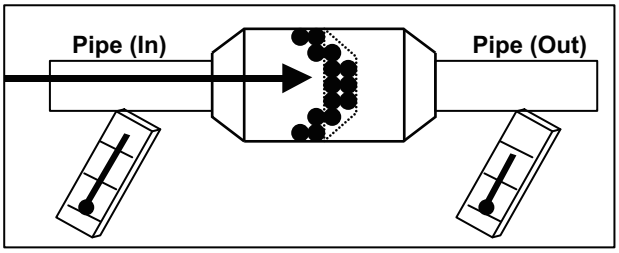
TROUBLESHOOTING

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: AGYG09KVCA, AGYG12KVCA, and AGYG14KVCA

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.

Upper fan motor

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

Lower fan motor

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

4-5. Outdoor unit fan motor

■ Models: AOYG09KVCA, AOYG12KVCA, and AOYG14KVCA

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 or Blue)	Feed back (FG)

5. Thermistor resistance values

5-1. Indoor unit

■ Room temperature thermistor

Temperature (°C)	Resistance (kΩ)	Voltage (V)
-10.0	58.25	0.73
-5.0	44.03	0.93
0.0	33.62	1.15
5.0	25.93	1.39
10.0	20.18	1.66
15.0	15.84	1.94
20.0	12.54	2.22
25.0	10.00	2.50
30.0	8.04	2.77
35.0	6.51	3.03
40.0	5.30	3.27
45.0	4.35	3.49

■ Heat exchanger temperature thermistor

Temperature (°C)	Resistance (kΩ)	Voltage (V)
-30.0	1,131.91	0.21
-25.0	804.52	0.29
-20.0	579.59	0.40
-15.0	422.89	0.53
-10.0	312.27	0.69
-5.0	233.21	0.88
0.0	176.03	1.10
5.0	134.23	1.36
10.0	103.34	1.63
15.0	80.28	1.92
20.0	62.91	2.21
25.0	49.70	2.51
30.0	39.57	2.79
35.0	31.74	3.06
40.0	25.64	3.30
45.0	20.85	3.53
50.0	17.06	3.73
55.0	14.05	3.90
60.0	11.64	4.02
65.0	9.69	4.19

TROUBLESHOOTING

5-2. Outdoor unit

■ Discharge temperature thermistor

Temperature (°C)	Resistance (kΩ)	Voltage (V)
-30.0	1,000.13	0.06
-25.0	720.28	0.09
-20.0	525.51	0.12
-15.0	388.12	0.16
-10.0	289.97	0.21
-5.0	219.01	0.28
0.0	167.12	0.36
5.0	128.77	0.46
10.0	100.14	0.57
15.0	78.56	0.71
20.0	62.14	0.87
25.0	49.54	1.04
30.0	39.79	1.23
35.0	32.19	1.44
40.0	26.22	1.66
45.0	21.49	1.88
50.0	17.73	2.12
55.0	14.71	2.35
60.0	12.27	2.57
65.0	10.29	2.79
70.0	8.68	3.00
75.0	7.35	3.19
80.0	6.26	3.38
85.0	5.35	3.54
90.0	4.59	3.69
95.0	3.96	3.83
100.0	3.43	3.96
105.0	2.98	4.07
110.0	2.60	4.17
115.0	2.28	4.26
120.0	2.00	4.33

TROUBLESHOOTING

TROUBLESHOOTING

■ Heat exchanger temperature thermistor

Temperature (°C)	Resistance (kΩ)	Voltage (V)
-30.0	95.57	0.24
-25.0	68.89	0.32
-20.0	50.31	0.43
-15.0	37.19	0.57
-10.0	27.81	0.73
-5.0	21.02	0.92
0.0	16.05	1.14
5.0	12.38	1.39
10.0	9.63	1.65
15.0	7.56	1.93
20.0	5.98	2.21
25.0	4.77	2.49
30.0	3.84	2.77
35.0	3.11	3.02
40.0	2.53	3.26
45.0	2.08	3.48
50.0	1.71	3.67
55.0	1.42	3.85
60.0	1.19	4.00
65.0	1.00	4.13
70.0	0.84	4.25
75.0	0.71	4.35
80.0	0.61	4.43

■ Outdoor temperature thermistor

Temperature (°C)	Resistance (kΩ)	Voltage (V)
-30.0	224.33	0.73
-25.0	159.71	0.97
-20.0	115.24	1.25
-15.0	84.21	1.56
-10.0	62.28	1.90
-5.0	46.58	2.26
0.0	35.21	2.61
5.0	26.88	2.94
10.0	20.72	3.25
15.0	16.12	3.52
20.0	12.64	3.76
25.0	10.00	3.97
30.0	7.97	4.14
35.0	6.40	4.28
40.0	5.18	4.41
45.0	4.21	4.51
50.0	3.45	4.59
55.0	2.85	4.65

REFRIGERANT R32
INVERTER

4. CONTROL AND FUNCTIONS

CONTENTS

4. CONTROL AND FUNCTIONS

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1. Rotation number control of compressor

1-1. Cooling operation

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

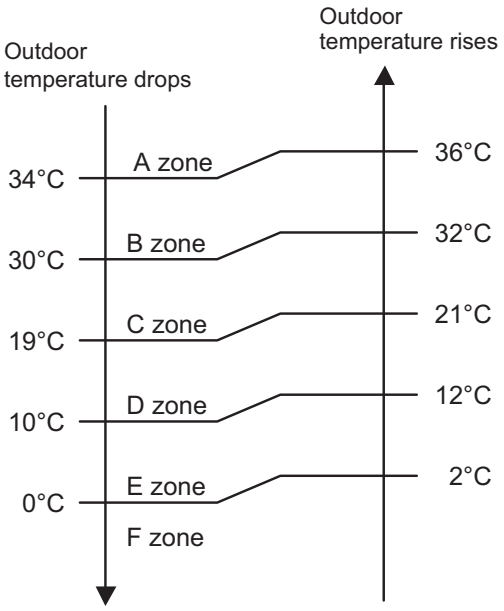
- If the room temperature is 6.0 °C higher than a set temperature, the operation rotation number of compressor will attain to maximum performance.
- If the room temperature is 1.0 °C lower than a set temperature, the compressor will be stopped.
- When the room temperature is within the range of +6.0°C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

CONTROL AND FUNCTIONS

- **Rotation number range of compressor**

Model name	Minimum frequency	Maximum frequency
AGYG09KVCA AGYG12KVCA	12 rps	89 rps
AGYG14KVCA	10 rps	102 rps

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



Unit: rps

Model name	Outdoor temperature zone	Indoor unit fan mode			
		HIGH	MED	LOW	QUIET
AGYG09KVCA AGYG12KVCA	A zone	89	44	38	30
	B zone	89	44	38	30
	C zone	77	44	38	28
	D zone	47	38	32	22
	E zone	47	38	32	22
	F zone	47	38	32	22
AGYG14KVCA	A zone	102	50	39	28
	B zone	102	50	39	28
	C zone	80	42	28	18
	D zone	39	26	20	16
	E zone	39	26	20	16
	F zone	39	26	20	16

CONTROL AND FUNCTIONS

1-2. Heating operation

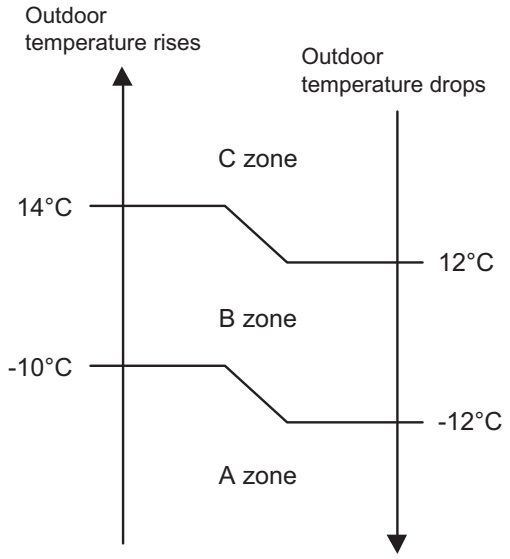
A sensor (room temperature thermistor) built in indoor unit body will usually perceive difference or variation between setting temperature and present room temperature, and controls operation rotation number of compressor.

- If the room temperature is 6.0 °C lower than a set temperature, the operation rotation number of compressor 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 rotation number of compressor is controlled within the range shown below.

- **Rotation number range of compressor**

Model name	Minimum frequency	Maximum frequency
AGYG09KVCA AGYG12KVCA	12	110
AGYG14KVCA	10	130

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



Unit: rps

Model name	Outdoor temperature zone	Indoor unit fan mode			
		HIGH	MED	LOW	QUIET
AGYG09KVCA AGYG12KVCA	A zone	110	110	77	50
	B zone	110	110	72	47
	C zone	96	96	67	30
AGYG14KVCA	A zone	130	94	68	42
	B zone	130	94	68	42
	C zone	130	94	68	28

CONTROL AND FUNCTIONS

1-3. Dry operation

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

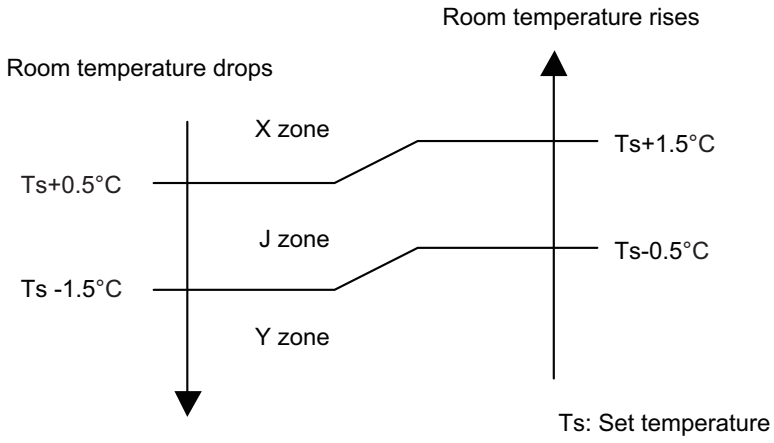
Zone is defined by set temperature and room temperature.

- **Rotation number range of compressor**

Unit: rps

Model name	Outdoor temperature zone	Operating frequency
AGYG09KVCA AGYG12KVCA	X zone	32
	J zone	24
	Y zone	0
AGYG14KVCA	X zone	22
	J zone	18
	Y zone	0

- **Compressor control based on room temperature**

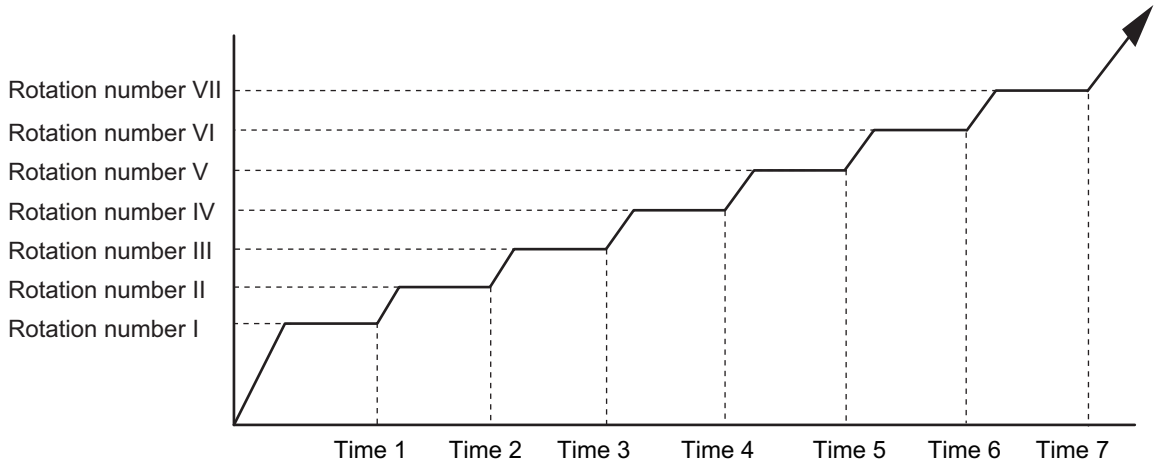


CONTROL AND FUNCTIONS

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

■ Models: AOYG09KVCA and AOYG12KVCA

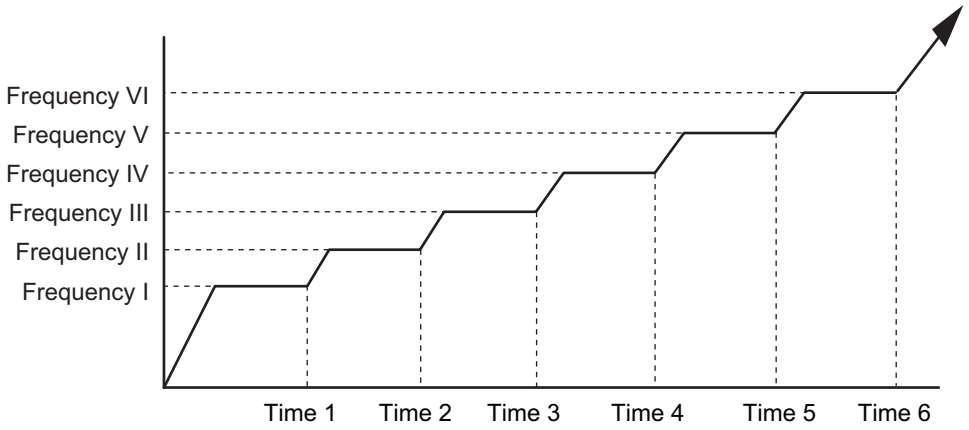
Rotation number of compressor soon after starting is controlled as below.



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

■ Model: AOYG14KVCA

Compressor frequency soon after starting is controlled as below.



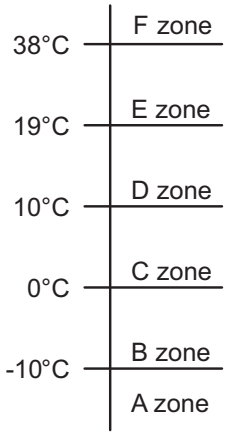
Frequency (rps)	I	II	III	IV	V	VI
	35	52	64	71	89	97
Time (sec)	1	2	3	4	5	6
	60	140	170	200	350	410

CONTROL AND FUNCTIONS

1-5. Compressor frequency limitation by outdoor temperature

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

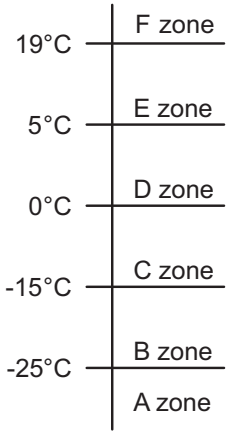
- **Cooling/Dry mode**



Model name	Outdoor temperature zone	Limitation of compressor frequency
AOYG09KVCA AOYG12KVCA	A zone	40 rps
	B zone	40 rps
	C zone	40 rps
	D zone	1 rps
	E zone	1 rps
	F zone	20 rps
AOYG14KVCA	A zone	26 rps
	B zone	26 rps
	C zone	26 rps
	D zone	1 rps
	E zone	1 rps
	F zone	22 rps

CONTROL AND FUNCTIONS

- **Heating mode**



Model name	Outdoor temperature zone	Limitation of compressor frequency
AOYG09KVCA AOYG12KVCA	A zone	25 rps
	B zone	25 rps
	C zone	17 rps
	D zone	10 rps
	E zone	1 rps
	F zone	1 rps
AOYG14KVCA	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.

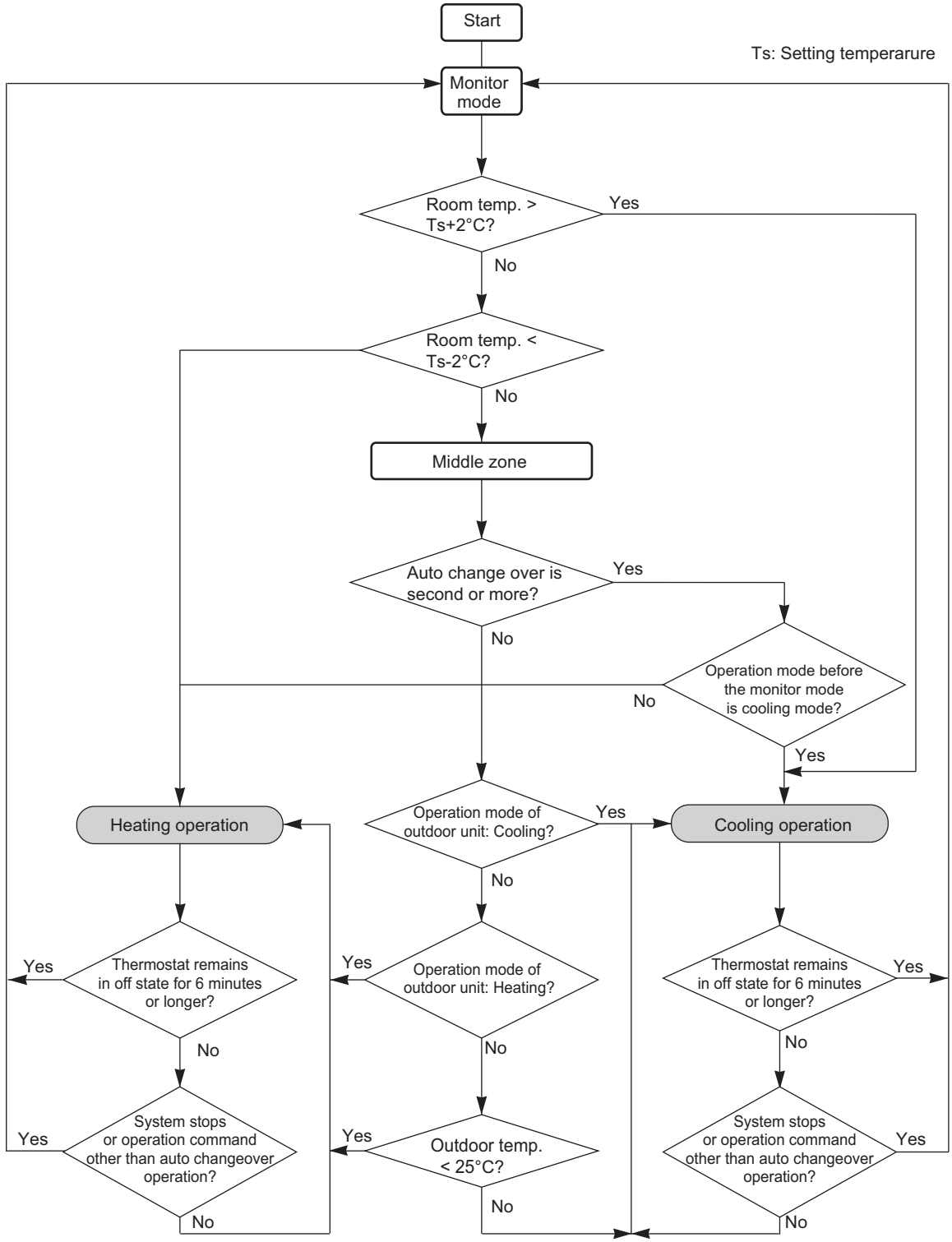
Outdoor temp.	Operation mode
25°C or more	Cooling
Less than 25°C	Heating

- 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.

- Models: AGYG09KVCA and AGYG12KVCA

Operation mode	Fan mode (Upper/Lower)	Speed (rpm)	
		Upper & Lower air flow mode	Upper air flow mode
Heating	POWERFUL	1,350/1,150	1,350/ —
	HIGH	1,240/1,040	1,280/ —
	MED+	1,040/880	1,080/ —
	MED	1,040/880	1,080/ —
	LOW-	840/700	870/ —
	QUIET	660/560	680/ —
	Cool air prevention	660/560	680/ —
	S-LOW	660/560	680/ —
Cooling/Fan	POWERFUL	1,300/1,100	1,300/ —
	HIGH	1,190/1,000	1,230/ —
	MED	1,000/850	1,030/ —
	LOW	820/690	850/ —
	QUIET	660/560	680/ —
	Soft quiet	570/480*1	630/ —*1
	S-LOW	660/560*2	680/ —*2
Dry		X zone: — / — J zone: — / —	X zone: 680/ — J zone: 680/ —

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

CONTROL AND FUNCTIONS

- Model: AGYG14KVCA

Operation mode	Fan mode (Upper/Lower)	Speed (rpm)	
		Upper & Lower air flow mode	Upper air flow mode
Heating	POWERFUL	1,440/1,230	1,440/ —
	HIGH	1,330/1,120	1,370/ —
	MED+	1,100/930	1,130/ —
	MED	1,100/930	1,130/ —
	LOW-	860/730	890/ —
	QUIET	660/560	680/ —
	Cool air prevention	660/560	680/ —
	S-LOW	660/560	680/ —
Cooling/Fan	POWERFUL	1,440/1,230	1,440/ —
	HIGH	1,330/1,120	1,370/ —
	MED	1,100/930	1,130/ —
	LOW	890/750	890/ —
	QUIET	660/560	680/ —
	Soft quiet	570/480*1	630/ —*1
	S-LOW	660/560*2	680/ —*2
Dry		X zone: — / — J zone: — / —	X zone: 680/ — J zone: 680/ —

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

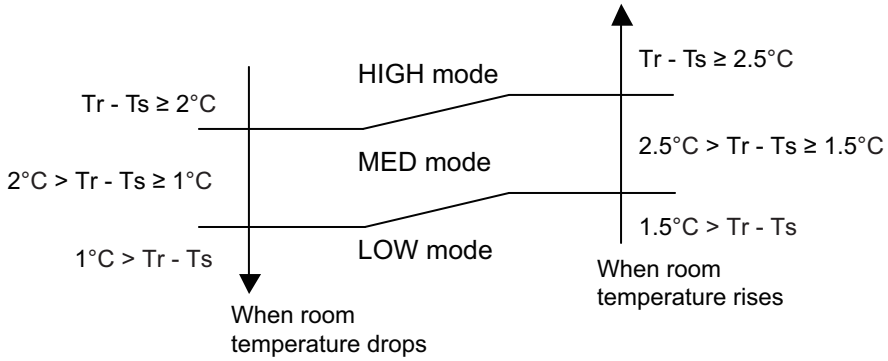
■ Fan operation

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

■ Cooling operation

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

Airflow change over (Cooling: Auto)



CONTROL AND FUNCTIONS

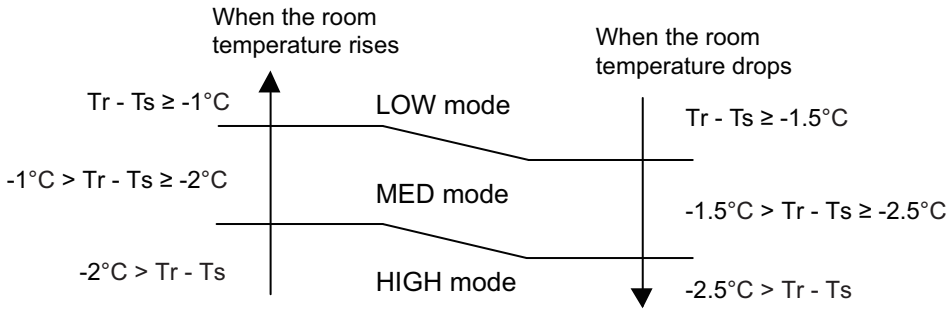
■ Dry operation

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

■ Heating operation

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

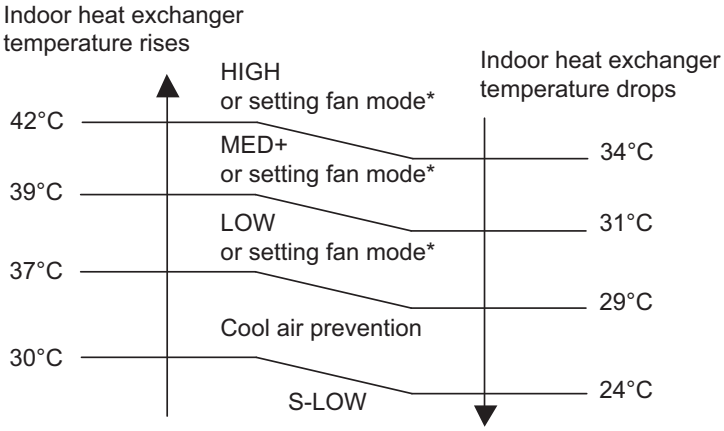
Airflow change over (Heating: Auto)



■ Cool air prevention control (heating mode)

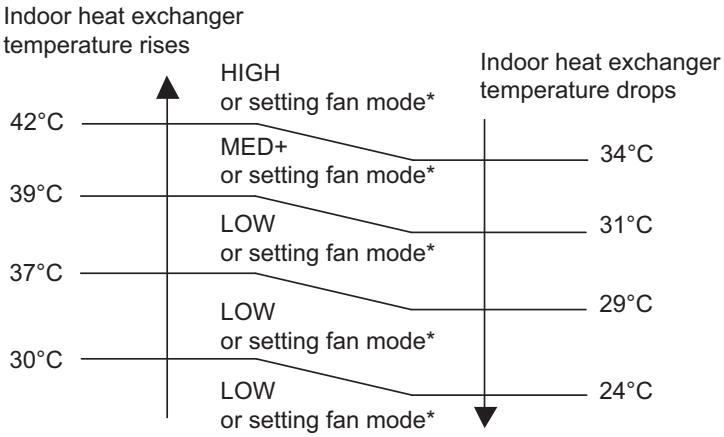
The maximum value of the indoor fan speed is set as shown below, based on the detected temperature by the indoor heat exchanger sensor on heating mode.

- **Normal operation**



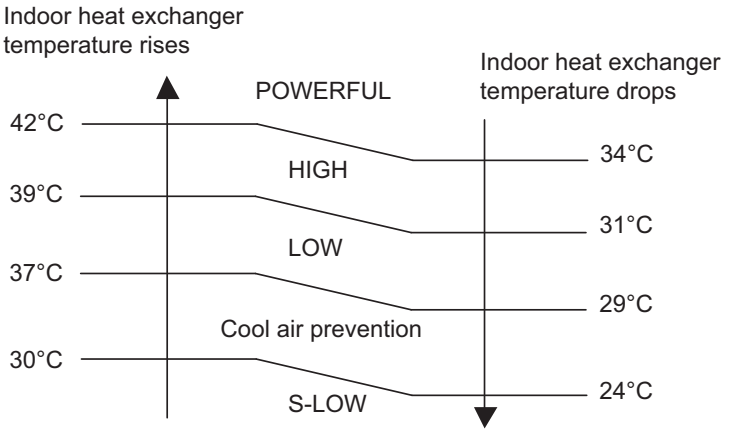
*: Lower speed is selected.

7 minutes later:

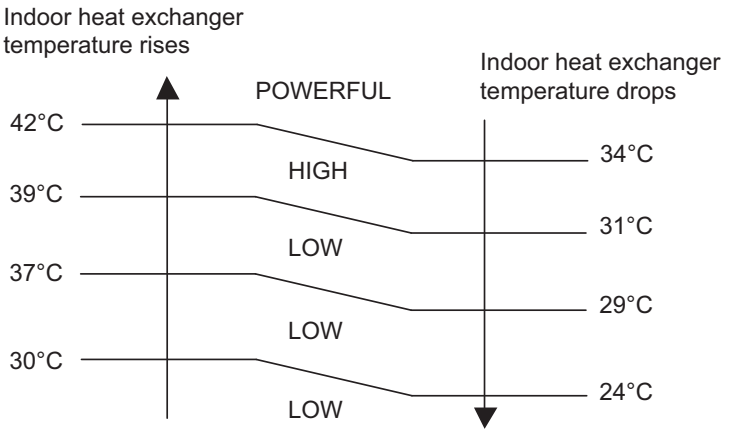


*: Lower speed is selected.

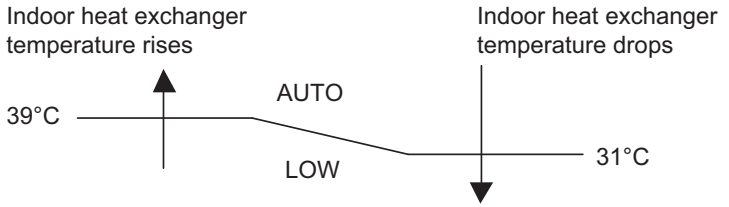
- **Powerful operation**



7 minutes later:

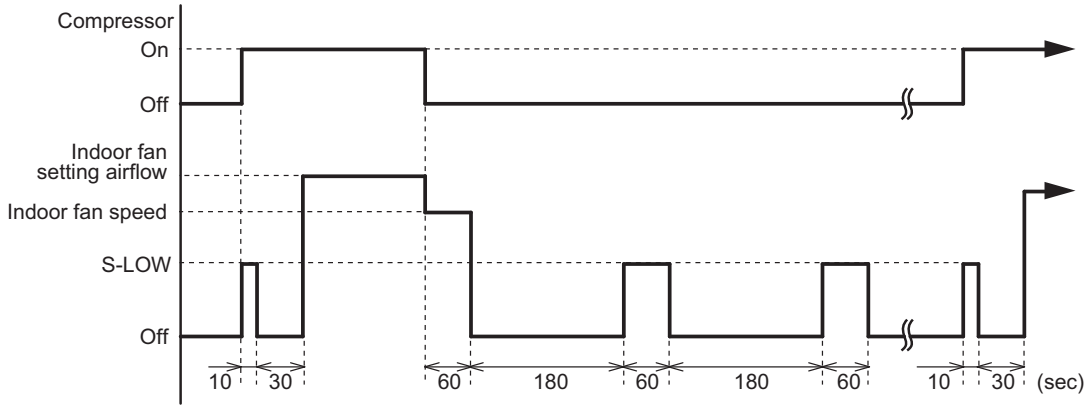


- **10 °C HEAT operation**



■ 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.



CONTROL AND FUNCTIONS

3-2. Outdoor fan control

■ Outdoor fan motor

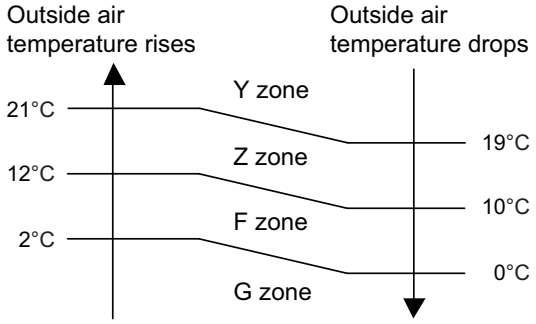
This outdoor unit has a DC fan motor. (Control method is different between AC and DC motors.)

■ Fan speed

● Model: AOYG09KVCA

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	—	1,120	—	—	—	—
S-HIGH1	990	1,120	—	—	—	—
HIGH	990	870	—	—	—	—
10	—	870	—	—	—	—
9	990	870	990	990	270	250
8	920	870	920	630	270	250
7	920	800	920	630	270	230
6	810	800	810	630	250	220
5	810	710	810	610	250	220
4	810	710	810	450	250	220
3	570	500	570	310	220	220
2	570	500	570	200	210	200
1	520	500	520	200	200	200

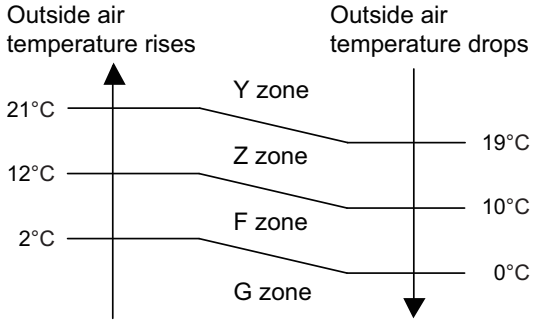
NOTE: After defrost control on the heating mode, the fan speed is kept higher regardless of the compressor frequency.
Fan speed after defrost control: 1,120 rpm

CONTROL AND FUNCTIONS

● Model: AOYG12KVCA

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	—	1,120	—	—	—	—
S-HIGH1	990	1,120	—	—	—	—
HIGH	990	870	—	—	—	—
10	—	870	—	—	—	—
9	990	870	990	990	270	250
8	920	870	920	630	270	250
7	920	800	920	630	270	230
6	810	800	810	630	250	220
5	810	710	810	610	250	220
4	810	710	810	450	250	220
3	670	500	670	310	220	220
2	570	500	570	200	210	200
1	520	500	520	200	200	200

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

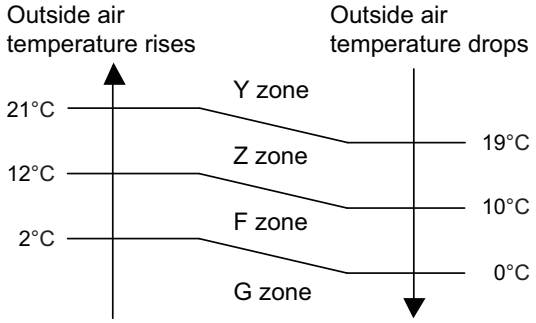
Fan speed after defrost control: 1,120 rpm

CONTROL AND FUNCTIONS

● Model: AOYG14KVCA

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	—	1,140	—	—	—	—
S-HIGH1	1,050	1,140	—	—	—	—
HIGH	1,050	870	—	—	—	—
10	—	870	—	—	—	—
9	1,050	870	1,050	1,050	210	190
8	970	850	970	970	210	190
7	890	850	890	890	210	190
6	890	570	890	890	210	190
5	770	510	770	770	210	190
4	630	470	630	630	210	190
3	510	420	510	510	210	190
2	400	420	400	400	210	190
1	400	420	400	400	210	190

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

Fan speed after defrost control: 1,140 rpm

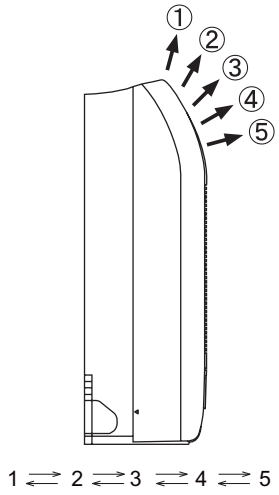
CONTROL AND FUNCTIONS

4. Louver control

4-1. Vertical airflow direction louver control

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

Side view



- 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 4

- 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. 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 ↔ 5
    - Heating mode/fan mode: 1 ↔ 5
  - 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

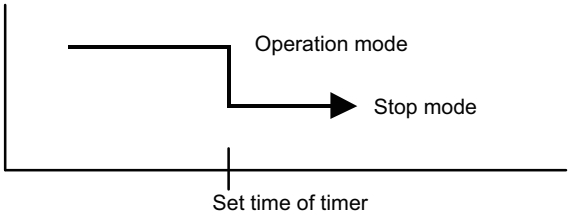
5. Timer operation control

5-1. Wireless remote control

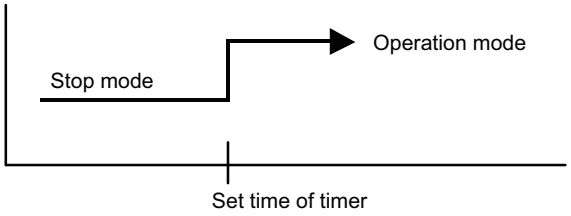
On/Off timer	Program timer	Sleep timer	Weekly timer
○	○	○	○

■ On/Off timer

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

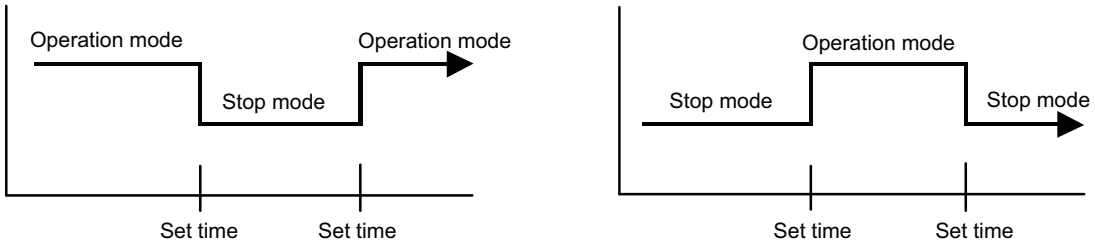


- On timer: When the clock reaches the set timer, the air conditioner will be turned on.



■ 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.

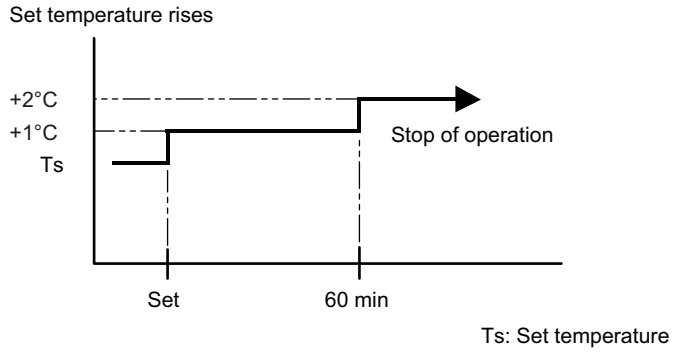
CONTROL AND FUNCTIONS

CONTROL AND FUNCTIONS

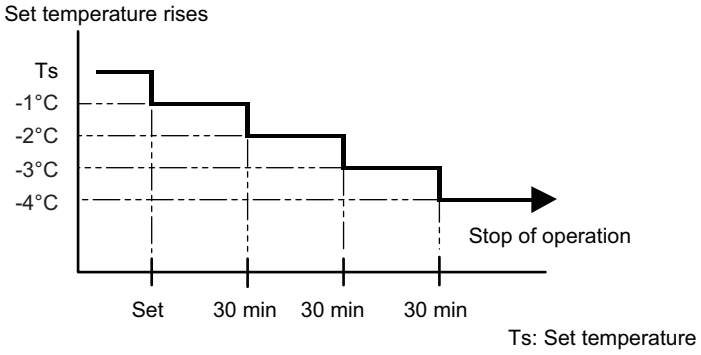
■ Sleep timer

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

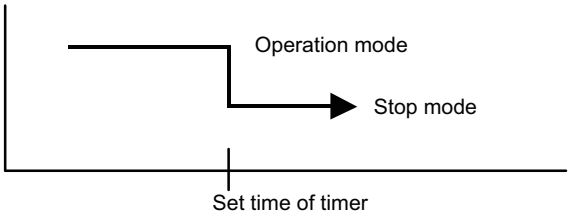
On and off timer can be combined, and up to 4 reservations per day and 28 reservations per week. Before setting the program, set the week and time of the air conditioner at first. If the week and time are not set, the weekly timer will not operate correctly at the setting time.

5-2. Wired remote control

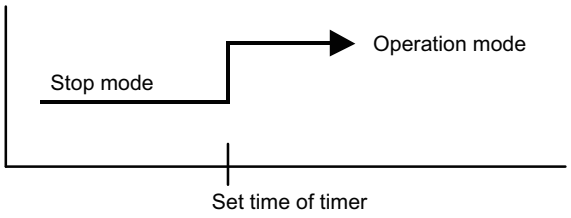
On/Off timer	Program timer	Sleep timer	Weekly timer	Temperature set back timer
○	○	○	○	○

■ On/Off timer

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



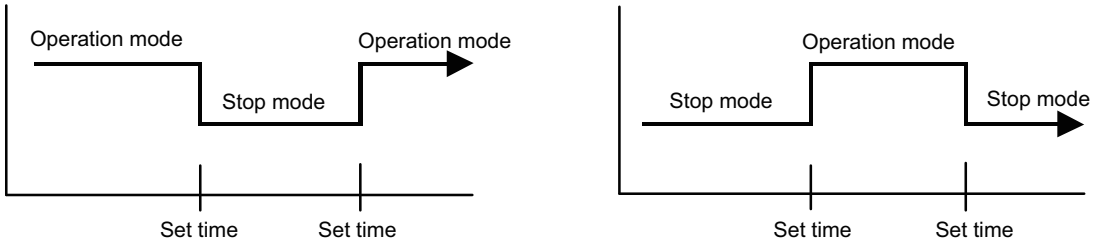
- On timer: When the clock reaches the set timer, the air conditioner will be turned on.



CONTROL AND FUNCTIONS

■ Program timer

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



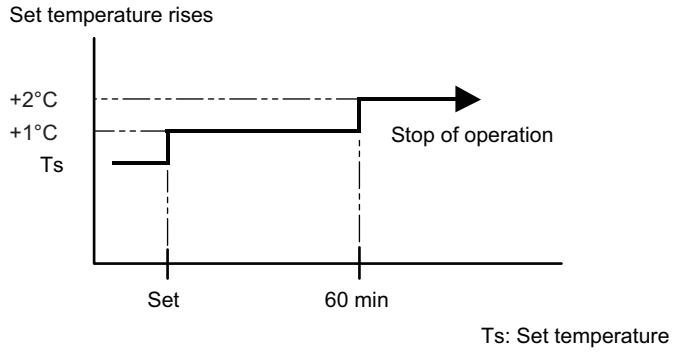
- Operation will start from the timer setting (either off timer and on timer) whichever is closest to the clock current timer setting. The order of operations is indicated by the allow in the remote controller screen.
- Sleep timer operation cannot be combined with on timer operation.

CONTROL AND FUNCTIONS

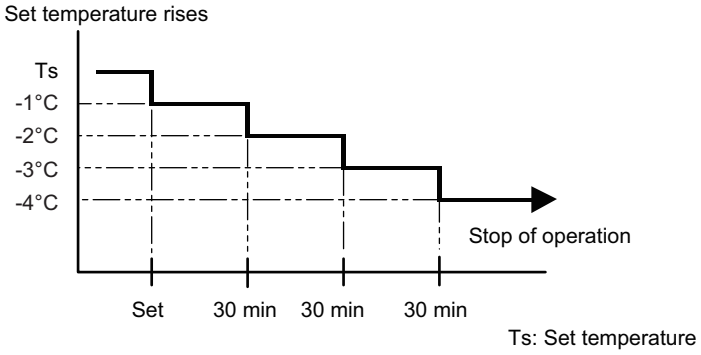
■ Sleep timer

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.



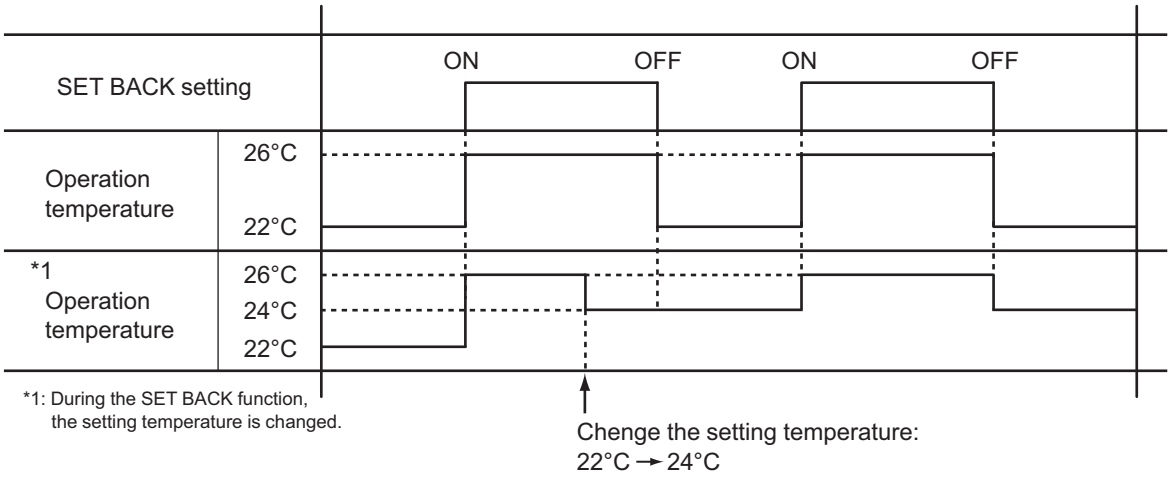
■ Weekly timer

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 ≤ -20°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

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
SWING	Off
ECONOMY	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

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.

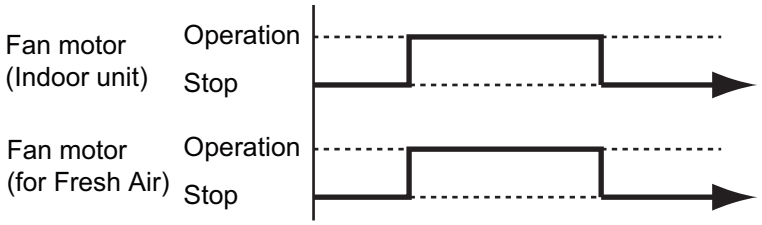
Compressor frequency		Maximum
Fan mode		POWERFUL
Vertical airflow direction louver setting	Cooling	3
	Dry	
	Heating	5

Release condition:

- Cooling/Dry
  Room temperature ≤ Setting temperature -1.5°C or Operation time has passed 20 minutes.
- Heating
  Room temperature ≥ Setting temperature +1.5°C or Operation time has passed 20 minutes.

7-7. Fresh air control

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



7-8. Refrigerant leak detection function

System operation after refrigerant leak detection:

- Indoor unit starts diffusion operation by high fan speed.
  Due to safety reasons, a remote controller cannot stop this operation.
- Indoor unit indicates Error code A8.
- Indoor unit makes a waring beep. (The beep stops by pressing START/STOP button of the remote controller or MANUAL AUTO button on the indoor unit.)
- System stops the cooling/heating operation. Forced cooling operation is not available.

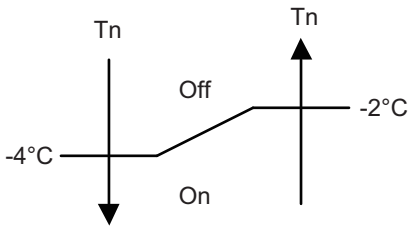
RELATED LINKS

"Error code" in Chapter 3. TROUBLESHOOTING on page 03-1

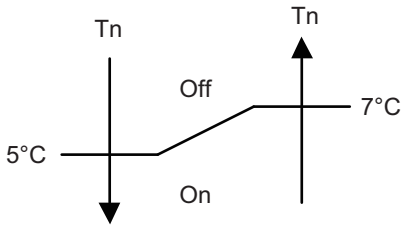
7-9. Compressor preheating

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:



CONTROL AND FUNCTIONS

7-10. Electronic expansion valve control

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

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

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

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

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

Retry number	50
Retry set number	3

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

7-12. 4-way valve control

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

7-13. Outdoor unit low noise operation

The outdoor unit low noise operation functions by OUTDOOR UNIT LOW NOISE button on the remote controller.

This operation stops the PFC control, and changes the current value.

- **Models: AOYG09KVCA and AOYG12KVCA**

Operation mode	Current	
	Trigger condition	Release condition
Cooling/Dry mode	1.9 A	1.4 A
Heating mode		

- **Model: AOYG14KVCA**

Operation mode	Current	
	Trigger condition	Release condition
Cooling/Dry mode	3.5 A	3.0 A
Heating mode		

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

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

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

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

■ Models: AOYG09KVCA and AOYG12KVCA

Operation mode	Outdoor temp. (Ta)	Trigger condition	Release condition
Cooling	50°C ≤ Ta	4.0 A	3.5 A
	46°C ≤ Ta < 50°C	4.0 A	3.5 A
	40°C ≤ Ta < 46°C	5.0 A	4.5 A
	12°C ≤ Ta < 40°C	6.0 A	5.5 A
	2°C ≤ Ta < 12°C	6.0 A	5.5 A
	Ta < 2°C	6.0 A	5.5 A
Heating	17°C ≤ Ta	5.5 A	5.0 A
	12°C ≤ Ta < 17°C	7.0 A	6.5 A
	5°C ≤ Ta < 12°C	7.5 A	7.0 A
	Ta < 5°C	7.5 A	7.0 A

■ Model: AOYG14KVCA

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	10.0A	9.5 A
	2°C ≤ Ta < 12°C	10.0 A	9.5 A
	Ta < 2°C	10.0 A	9.5 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	11.0 A	10.5 A
	Ta < 5°C	11.0 A	10.5 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. 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

8-6. Low outdoor temperature protection

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

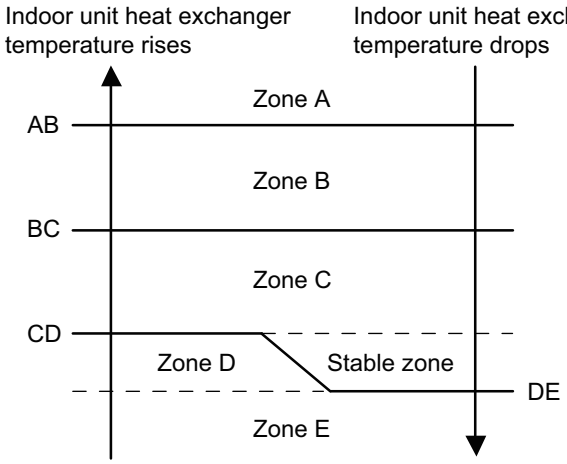
Operation mode	Cooling/Dry
Trigger condition	-15°C
Release condition	-10°C

CONTROL AND FUNCTIONS

8-7. High temperature and high pressure release control

The compressor is controlled as follows.

■ Models: AOYG09KVCA, AOYG12KVCA, and AOYG14KVCA



AB: 63°C
BC: 55°C
CD: 53°C
DE: 50°C

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

5. FILED WORKING

CONTENTS

5. FILED WORKING

1. Function settings 05-1

1-1. Function settings by using remote controller 05-1

1-2. Custom code setting for wireless remote controller 05-7

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.

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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.

■ 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)	00	Remote controller address setting
2)	11	Filter sign
3)	23	Vertical airflow direction range control
4)	30/31	Room temperature control for indoor unit sensor
5)	35/36	Room temperature control for wired remote controller sensor
6)	40	Auto restart
7)	42	Room temperature sensor switching
8)	43	Cold air prevention
9)	44	Remote controller custom code
10)	46	External input control
11)	49	Indoor unit fan control for energy saving for cooling
12)	60	Switching functions for external output terminal

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1) Remote controller address setting

Multiple indoor units can be operated by using one wired remote controller.
Set the unit number of each indoor unit.

Function number	Setting value	Setting description	Factory setting
00	00	Unit no. 0	♦
	01	Unit no. 1	
	02	Unit no. 2	
	03	Unit no. 3	
	04	Unit no. 4	
	05	Unit no. 5	
	06	Unit no. 6	
	07	Unit no. 7	
	08	Unit no. 8	
	09	Unit no. 9	
	10	Unit no. 10	
	11	Unit no. 11	
	12	Unit no. 12	
	13	Unit no. 13	
	14	Unit no. 14	
	15	Unit no. 15	

NOTES:

- When connecting Polar 3-wired remote controller, set the remote controller address in the order of 0, 1, 2, ..., and 15.
- When different type of indoor units (such as wall mounted type and cassette type, cassette type and duct type, or other combinations) are connected using group control system, some functions may no longer be available.

2) 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	♦

3) Vertical airflow direction range control

In a concealed installation, change the setting to "Fixed" (02) to restrict the movement of the upper air outlet so that the airflow is only towards the horizontal direction.

Function number	Setting value	Setting description	Factory setting
23	00	Standard	♦
	01	(Setting prohibited)	
	02	Fixed (Concealed)	

4) Room temperature control for indoor unit sensor

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

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

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

Example of correction:

When the temperature of the room temp. sensor is 26°C and the setting value is “03” (-1.0°C), corrected temp. will be 27°C (26°C - [-1.0°C]).

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

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

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5) Room temperature control for wired remote controller sensor

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

To change this setting, set Function 42 to Both “01”.

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

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

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6) 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.

7) Room temperature sensor switching

(Only for wired remote controller)

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

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

00: Sensor on the indoor unit is active.

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

NOTE: Remote controller sensor must be turned on by using the remote controller.

8) Cold air prevention

This setting is to disable the cold air prevention function during heating operation. When disabled, the fan setting will always follow the setting on the remote controller. (Excluding defrost mode)

Function number	Setting value	Setting description	Factory setting
43	00	Enable	♦
	01	Disable	

9) 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	

10) External input control

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

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

11) Indoor unit fan control for energy saving for cooling

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

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

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

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

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

NOTES:

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

12) Switching functions for external output terminal

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

Function number	Setting value	Setting description	Factory setting
60	00	Operation status	♦
	01—08	(Setting prohibited)	
	09	Error status	
	10	Indoor unit fan operation status	
	11	External heater	

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