SPLIT TYPE
ROOM AIR CONDITIONER

DUCT type
INVERTER

SERVICE INSTRUCTION

Models	Indoor unit	Outdoor unit
	AR*18LUAD	AO*18LMAKL
	AR*24LUAN	AO*24LMAKL
	AR*30LUAN	AO*30LMAWL
	AR*36LUAN	AO*36LMAWL
	AR*45LUAN	AO*45LJBYL
	AR*45LUAK	AO*45LJAYL
	AR*54LUAK	AO*54LJAYL

Refrigerant
R410A

FUJITSU GENERAL LIMITED

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Refrigerant
R410A

DUCT type
INVERTER

1 . SPECIFICATIONS

1. SPECIFICATIONS

TYPE				DUCTED MODELS	
				INVERTER HEAT PUMP TYPE	
MODEL NAME		INDOOR		AR＊18LUAD	AR＊24LUAN
		OUTDOOR		AO＊18LMAKL	AO＊24LMAKL
POWER SOURCE				230V～ 50Hz	
AVAILABLE VOLTAGE RANGE				198-264V	
EUROPAN ENERGY LABEL				B	C
CAPACITY	COOLING	RATED / MAX	kW	5.20 / 5.90	7.10 / 8.00
			BTU/h	17800 / 20100	24200 / 27300
	HEATING	RATED / MAX	kW	6.20 / 7.50	8.00 / 9.00
			BTU/h	21200 / 25600	27300 / 30700
INPUT POWER	COOLING	RATED / MAX	kW	1.70 / 1.99	2.53 / 2.96
	HEATING	RATED / MAX		1.90 / 2.40	2.43 / 2.93
CURRENT	COOLING	RATED / MAX	A	7.4 / 8.8	11.1 / 12.9
	HEATING	RATED / MAX		8.3 / 10.5	10.6 / 12.8
STARTING CURRENT			A	10	10
EER			kW/kW	3.06	2.81
COP				3.26	3.29
MOISTURE REMOVAL			l/h (pints/h)	1.7 (3.6)	1.5 (3.2)
AIR CIRCULATION	INDOOR	High	m^3/h	800	1490
		Med		640	1340
		Low		500	1200
	OUTDOOR	High		2800	2800
		Low		-	-
FAN SPEED	INDOOR	High	r.p.m	1040	980
		Med		890	890
		Low		750	810
	OUTDOOR	High		780	780
		Low		400	400
RECOMMENDED STATIC PRESSURE			Pa	0 to 40	30 to 150
FAN TYPE x Q'ty		INDOOR		Sirocco x 2	Sirocco x 2
		OUTDOOR		Propeller x 1	Propeller x 1
FAN MOTOR OUTPUT		INDOOR	W	45	70
		OUTDOOR		65	65
NOISE LEVEL (SOUND PRESSURE) COOL/HEAT	INDOOR	High	dB(A)	38.0 / 38.0	34.0 / 34.0
		Med		34.0 / 34.0	32.0 / 32.0
		Low		30.0 / 30.0	29.0 / 29.0
	OUTDOOR			50.0/52.0	52.0 / 54.0
COMPRESSOR	TYPE			DC TWIN ROTARY(INVERTER)	
	OUTPUT		W	1300	1300
	STARTING METHOD			Permanent Starting Condenser Method	
HEAT EXCHANGER TYPE	INDOOR	Coil		Copper tube	
		fin		Hydrophilic coating	Hydrophilic coating
		Rows x Stages	mm	3 x 14	2 x 14
		Fin Pitch		1.3	1.3
		Coil Dimensions	mm	294 x 700 x 39.9	294 x 1000 x 26.6
	OUTDOOR	Coil		Copper tube	
		fin		Hydrophilic coating	Hydrophilic coating
		Rows x Stages	mm	2 x 30	2 x 30
		Fin Pitch		1.45	1.45
		Coil Dimensions	mm	630 x 901 x 36.38	630 x 901 x 36.38
CASING COLOR		INDOOR		Galvanized steel sheet	
		OUTDOOR		Beige(10YR7.5/1.0NN)	
DIMENSIONS H × W × D	INDOOR	NET	mm	217 × 953 × 595	270 × 1135 × 700
	OUTDOOR			650 x 830 x 320	650 x 830 x 320
	INDOOR	GROSS		324 × 1075 × 686	300 × 1300 × 790
	OUTDOOR			743 x 984 x 413	743 x 984 x 413
WEIGHT	INDOOR	NET / GROSS	kg(lbs)	25 / 29 (55 / 64)	41 / 48 (90 /106)
	OUTDOOR			54 / 58 (119 / 128)	54 / 58 (119 / 128)
PIPE	CONNECTION METHOD			FLARE	
	SIZE	LIQUID	mm	Φ6.35(1/4 inc.)	Φ9.52(3/8 inc.)
		GAS		Φ12.7(1/2 inc.)	Φ15.88(5/8 inc.)
	MAX LENGTH		m	25	25
	MAX HEIGHT		m	15	15
REFRIGERANT		TYPE		R410A	
		CHARGE	kg	1500	1800
REFRIGERANT OIL		TYPE		Synthetic (POE oil)	
OPERATION(OUTDOOR)		COOLING	°C	0 to 43	
		HEATING		-10 to 24	
REMOTE CONTROLLER				WIRED (AR-3TA1)	WIRED (AR-3TA1)
DRAIN PIPE	MATERIAL			ABS	Steel
	SIZE		mm	Outer diameter 26.0 Inner diameter 21.5	Outer diameter 38.0 Inner diameter 36.0

Note: Specifications are based on the following conditions.
Cooling: Indoor temperature of 27 °CDB / 19 °CWB,and outdoor temperature of 35 °CDB/24 °CWB.
Heating: Indoor temperature of 20 °CDB / 15 °CWB,and outdoor temperature of 7 °CDB/6 °CWB.
Standard static pressure : 0 Pa.(AR*18LUAD) 30Pa(AR*24LUAN)
Pipe length : 7.5 m, Height difference : 0 m.(Outdoor unit - Indoor unit)

TYPE				DUCTED MODELS	
				REVERSE CYCLE TYPE	
MODEL NAME		INDOOR		AR*30LUAN	AR*36LUAN
		OUTDOOR		AO*30LMAWL	AO*36LMAWL
POWER SOURCE				230V～ 50Hz	
AVAILABLE VOLTAGE RANGE				198-264V～ 50Hz	
EUROPEAN ENERGY LABEL				C	E
CAPACITY	COOLING	RATED/MAX	kW	8.50/10.00	10.00/11.20
			BTU/h	29000/34100	34100/38200
	HEATING	RATED/MAX	kW	10.00/11.20	11.20/12.77
			BTU/h	34100/38200	38200/43600
INPUT POWER	COOLING	RATED/MAX	kW	2.96/3.45	4.08/4.20
	HEATING	RATED/MAX		2.68/3.50	3.18/4.15
CURRENT	COOLING	RATED/MAX	A	13.0/15.2	17.9/18.4
	HEATING	RATED/MAX		11.7/15.3	13.9/18.8
STARTING CURRENT			A	15	15
EER		COOLING	kW/kW	2.87	2.45
COP		HEATING		3.73	3.52
MOISTURE REMOVAL			l/h (pints/h)	2.5(5.3)	3.0(6.3)
AIR CIRCULATION	INDOOR	High	m^3/h	2200	
		Med		2050	
		Low		1850	
	OUTDOOR			3600	
RECOMMENDED STATIC PRESSURE			Pa	30 to 150	
FAN TYPE x Q'ty		INDOOR		Sirocco x 2	
		OUTDOOR		Propeller x 1	
FAN MOTOR OUTPUT		INDOOR	W	176	
		OUTDOOR		103	
NOISE LEVEL (SOUND PRESSURE) COOL/HEAT	INDOOR	High	dB(A)	43.0/43.0	
		Med		41.0/41.0	
		Low		39.0/39.0	
	OUTDOOR			53.0/55.0	54.0/55.0
COMPRESSOR	TYPE			DC TWIN SROTARY(INVERTER)	
	OUTPUT		W	1300	
	STARTING METHOD			Permanent Starting Condenser	
HEAT E x CHANGER TYPE	INDOOR	Coil		Plate fin coil	
		Surface treatment		Hydrophilic coating	
		Rows x Stages x Fin Pitch	mm	3 x 14 x 1.40	
		Coil Dimensions	mm	294 x 1000 x 39.9	
	OUTDOOR	Coil		Plate fin coil	
		Surface treatment		Corrosion resistant coating	
		Rows x Stages x Fin Pitch	mm	2 x 38 x 1.30	
		Coil Dimensions	mm	798 x 900 x 36.38	
SAFETY DEVICES		INDOOR		FAN MOTOR THERMAL PROTECTER, PCB FUSE	
		OUTDOOR		FAN MOTOR THERMAL PROTECTOR PCB FUSE COMPRESSOR THERMISTOR	
CASING COLOR		INDOOR		Galvanized steel sheet	
		OUTDOOR		Beige(10YR7.5/1.0NN)	
DIMENSIONS H × W × D	INDOOR	NET	mm	270 x 1135 x 700	
	OUTDOOR			830 x 900 x 330	
	INDOOR	GROSS		300 x 1300 x 790	
	OUTDOOR			970 x 1050 x 445	
WEIGHT	INDOOR	NET / GROSS	kg(lbs)	43 / 50 (95 / 110)	
	OUTDOOR			64/70(141/154)	
PIPE	CONNECTION METHOD			FLARE	
	SIZE	LIQUID	mm	9.52(3/8 inc.)	
		GAS		15.88(5/8 inc.)	
	MA x LENGTH		m	50(chargeless:15m)	
	MA x HEIGHT		m	30	
REFRIGERANT		TYPE		R410A	
		CHARGE	kg	2.2	
REFRIGERANT OIL		TYPE		Synthetic (POE oil)	
OPERATION(OUTDOOR)		COOLING	°C	-10 to 43	
		HEATING		-10 to 24	
REMOTE CONTROLLER				WIRED(AR-3TA1)	
DRAIN PIPE	MATERIAL			Steel	
	SIZE		mm	Outer diameter 38.0mm / Inner diameter 36.0mm	
OPTIONS		INDOOR		Remote Senser(UTD-RS100) Simple Wired Remocon (Fujitsu:UTB-YPB,General:UTB-GPB) Square flange(UTD-SF045T) Round flange(UTD-RF204) Long life filter(UTD-LF25NA) E x ternal cable set(UTD-ECS5A)	
		OUTDOOR		-	-

Note: Specifications are based on the following conditions.
Cooling: Indoor temperature of 27 °CDB / 19 °CWB,and outdoor temperature of 35 °CDB/24 °CWB.
Heating: Indoor temperature of 20 °CDB / 15 °CWB,and outdoor temperature of 7 °CDB/6 °CWB.
Standard static pressure : 30Pa
Pipe length : 7.5 m, Height difference : 0 m.(Outdoor unit - Indoor unit)

TYPE				DUCTED MODELS
				REVERSE CYCLE TYPE
MODEL NAME		INDOOR		AR＊45LUAN
		OUTDOOR		AO＊45LJBYL
POWER SOURCE				230V～ 50Hz
AVAILABLE VOLTAGE RANGE				198-264V
CAPACITY	COOLING	RATED/MAX	kW	12.5/14.0
			BTU/h	42700/47800
	HEATING	RATED/MAX	kW	14.0/17.0
			BTU/h	47800/61500
INPUT POWER	COOLING	RATED/MAX	kW	4.45/5.15
	HEATING	RATED/MAX		3.95/5.15
CURRENT	COOLING	RATED/MAX	A	19.5/22.6
	HEATING	RATED/MAX		17.3/22.5
STARTING CURRENT			A	15
EER		COOLING	kW/kW	2.81
COP		HEATING		3.54
MOISTURE REMOVAL			l/h (pints/h)	4.0(8.5)
AIR CIRCULATION	INDOOR	High	m^3/h	2290
		Med		2150
		Low		2000
	OUTDOOR			6600
RECOMMENDED STATIC PRESSURE			Pa	30 to 150
FAN TYPE x Q'ty		INDOOR		Sirocco x 2
		OUTDOOR		Propeller x 2
FAN MOTOR OUTPUT		INDOOR	W	275
		OUTDOOR		103 × 2
NOISE LEVEL (SOUND PRESSURE) COOL/HEAT	INDOOR	High	dB(A)	44.0/44.0
		Med		42.0/42.0
		Low		40.0/40.0
	OUTDOOR			52.0/53.0
COMPRESSOR	TYPE			DC SCROLL(INVERTER)
	OUTPUT		W	2500
	STARTING METHOD			Inverter Method
HEAT EXCHANGER TYPE	INDOOR	Coil		Plate fin coil
		Surface treatment		Hydrophilic coating
		Rows x Stages	mm	4 x 14
		Fin Pitch		1.4
		Coil Dimensions	mm	294 x 1000 x 53.2
	OUTDOOR	Coil		Plate fin coil
		Surface treatment		Corrosion resistant coating
		Rows x Stages	mm	2 x 60
		Fin Pitch		1.3
		Coil Dimensions	mm	1260 x 900 x 36.38
SAFETY DEVICES		INDOOR		FAN MOTOR THERMAL PROTECTOR PCB FUSE
		OUTDOOR		FAN MOTOR THERMAL PROTECTOR PCB FUSE
CASING COLOR		INDOOR		Galvanized steel sheet
		OUTDOOR		Beige(10YR7.5/1.0NN)
DIMENSIONS H × W × D	INDOOR	NET	mm	270 x 1135 x 700
	OUTDOOR			1290 x 900 x 330
	INDOOR	GROSS		300 x 1300 x 790
	OUTDOOR			1430 x 1050 x 445
WEIGHT	INDOOR	NET / GROSS	kg(lbs)	45/52(99/115)
	OUTDOOR			105/112(231/247)
PIPE	CONNECTION METHOD			FLARE
	SIZE	LIQUID	mm	Φ9.52(3/8 inc.)
		GAS		Φ15.88(5/8 inc.)
	MAX LENGTH		m	70(chargeless:20m)
	MAX HEIGHT		m	30
REFRIGERANT		TYPE		R410A
		CHARGE	kg	3.4
REFRIGERANT OIL		TYPE		Synthetic (POE oil)
OPERATION(OUTDOOR)		COOLING	°C	-15 to 43
		HEATING		-15 to 24
REMOTE CONTROLLER				WIRED(AR-3TA1)
DRAIN PIPE	MATERIAL			Steel
	SIZE		mm	Outer diameter 38.0 Inner diameter 36.0

Note: Specifications are based on the following conditions.
Cooling: Indoor temperature of 27 °CDB / 19 °CWB,and outdoor temperature of 35 °CDB/24 °CWB.
Heating: Indoor temperature of 20 °CDB / 15 °CWB,and outdoor temperature of 7 °CDB/6 °CWB.
Standard static pressure : 30Pa
Pipe length : 7.5 m, Height difference : 0 m.(Outdoor unit - Indoor unit)

TYPE				DUCTED INVERTER MODELS	
				HEAT PUMP TYPE	
MODEL NAME		INDOOR		AR＊45LUAK	AR＊54LUAK
		OUTDOOR		AO＊45LJAYL	AO＊54LJAYL
POWER SOURCE				230V～ 50Hz	
AVAILABLE VOLTAGE RANGE				198-264V～ 50Hz	
CAPACITY	COOLING	RATED / MAX	kW	12.5 / 14.0	14.0 / 15.3
			BTU/h	42700 / 47800	47800 / 52200
	HEATING	RATED / MAX	kW	14.0 / 18.0	16.0 / 19.0
			BTU/h	47800 / 61500	54600 / 64900
INPUT POWER	COOLING	RATED / MAX	kW	4.30 / 5.15	5.36 / 5.90
	HEATING	RATED / MAX		3.80 / 5.15	4.70 / 5.90
CURRENT	COOLING	RATED / MAX	A	18.9 / 22.6	23.6 / 25.9
	HEATING	RATED / MAX		16.7 / 22.5	20.6 / 25.9
STARTING CURRENT			A	15	15
EER		COOLING	kW/kW	2.91	2.61
COP		HEATING		3.68	3.40
MOISTURE REMOVAL			l/h (pints/h)	3.0 (1.4)	4.0 (1.9)
AIR CIRCULATION COOL/HEAT	INDOOR COOL	High	m3/h	3500/3500	
		Med		3000/3000	
		Low		2460/2460	
		QUIET		-	
	OUTDOOR	High		6600/6600	
		Low		-	
FAN SPEED COOL/HEAT	INDOOR	High	r.p.m	1300/1300	
		Med		1130/1130	
		Low		950/950	
		QUIET		-	
	OUTDOOR	High		UPPER FAN : 850 LOWER FAN : 750	
		Low		-	
RECOMMENDED STATIC PRESSURE			Pa	100 to 250	100 to 250
FAN TYPE x Q'ty		INDOOR		Sirocco x 2	
		OUTDOOR		Propeller x 2	
FAN MOTOR OUTPUT		INDOOR	W	539	
		OUTDOOR		103	
NOISE LEVEL (SOUND PRESSURE)	INDOOR	High	dB(A)	49 / 49	
		Med		45 / 45	
		Low		42 / 42	
COOL/HEAT	OUTDOOR			52 / 53	52 / 53
COMPRESSOR	TYPE			DC SCROLL	
	OUTPUT		W	2500	2500
	STARTING METHOD			Inverter Method	
HEAT EXCHANGER TYPE	INDOOR	Coil		Plate fin coil	
		Surface treatment		Hydrophilic coating	
		Rows x Stages	mm	4 x 16	
		Fin Pitch		1.3	
		Coil Dimensions		336.0x890.0x53.2	
	OUTDOOR	Coil		Plate fin coil	
		Surface treatment		Corrosion resistant coating	
		Rows x Stages	mm	2 x 60	
		Fin Pitch		1.3	
		Coil Dimensions		1260.0x900.0x36.38	
SAFETY DEVICES		INDOOR		Fan motor thermal protector,Fuse	
		OUTDOOR		Fan motor thermal protector,Fuse	
CASING COLOR		INDOOR		Hot-dipped galvanized steel sheet	
		OUTDOOR		Beige(10YR7.5/1.0NN)	
DIMENSIONS H ×W ×D	INDOOR	NET	mm	400 × 1050(1150)* × 500(585)*	
	OUTDOOR			1290 x 900 x 330	
	INDOOR	GROSS		460 × 1230 × 640	
	OUTDOOR			1430 x 1050 x 445	
WEIGHT	INDOOR	NET / GROSS	kg(lbs)	50 (110) / 55 (121)	
	OUTDOOR			105 (231) / 112 (247)	
PIPE	CONNECTION METHOD			FLARE	
	SIZE	LIQUID	mm	9.52 (3/8 inc.)	
		GAS		15.88 (5/8 inc.)	
	MAX LENGTH		m	70 (chargeless:20m)	
	MAX HEIGHT		m	30	
REFRIGERANT		TYPE		R410A	
		CHARGE	g	3400	3400
REFRIGERANT OIL		TYPE		Synthetic (POE oil)	
OPERATION(OUTDOOR)		COOLING	℃	-10 to 43	
		HEATING		-15 to 24	
REMOTE CONTROLLER				WIRED	WIRED
DRAIN PIPE	MATERIAL			Steel	
	SIZE		mm	Outer diameter 25.4 / Inner diameter 21.5	

Note: Specifications are based on the following conditions.
Cooling: Indoor temperature of 27 °CDB / 19 °CWB,and outdoor temperature of 35 °CDB/24 °CWB.
Heating: Indoor temperature of 20 °CDB / 15 °CWB,and outdoor temperature of 7 °CDB/6 °CWB.
Standard static pressure : 100 Pa.
Pipe length : 7.5 m, Height difference : 0 m.(Outdoor unit - Indoor unit)
dimensions( )* are indicated the including flange,control box,safety drain pan.

TYPE				DUCTED INVERTER MODELS	
				HEAT PUMP TYPE	
MODEL NAME		INDOOR		ART45LUAK	ART54LUAK
		OUTDOOR		AOT45LJAYL	AOT54LJAYL
POWER SOURCE				240V～ 50Hz	
AVAILABLE VOLTAGE RANGE				198-264V～ 50Hz	
CAPACITY	COOLING	RATED / MAX	kW	12.5 / 14.0	14.5 / 15.3
			BTU/h	42700 / 47800	49500 / 52200
	HEATING	RATED / MAX	kW	14.0 / 18.0	16.0 / 20.0
			BTU/h	47800 / 61500	54600 / 68300
INPUT POWER	COOLING	RATED / MAX	kW	4.30 / 5.35	5.57 / 6.15
	HEATING	RATED / MAX		3.80 / 5.35	4.70 / 6.15
CURRENT	COOLING	RATED / MAX	A	18.1 / 22.5	23.5 / 25.9
	HEATING	RATED / MAX		16.0 / 22.5	19.8 / 25.9
STARTING CURRENT			A	15	15
EER		COOLING	kW/kW	2.91	2.61
COP		HEATING		3.68	3.40
MOISTURE REMOVAL			l/h (pints/h)	3.0 (1.4)	4.0 (1.9)
AIR CIRCULATION COOL/HEAT	INDOOR COOL	High	m3/h	3500/3500	
		Med		3000/3000	
		Low		2460/2460	
		QUIET		-	
	OUTDOOR	High		6600/6600	
		Low		-	
FAN SPEED COOL/HEAT	INDOOR	High	r.p.m	1300/1300	
		Med		1130/1130	
		Low		950/950	
		QUIET		-	
	OUTDOOR	High		UPPER FAN : 850 LOWER FAN : 750	
		Low		-	
RECOMMENDED STATIC PRESSURE			Pa	100 to 250	100 to 250
FAN TYPE x Q'ty		INDOOR		Sirocco x 2	
		OUTDOOR		Propeller x 2	
FAN MOTOR OUTPUT		INDOOR	W	539	
		OUTDOOR		103	
NOISE LEVEL (SOUND PRESSURE)	INDOOR	High	dB(A)	49 / 49	
		Med		45 / 45	
		Low		42 / 42	
COOL/HEAT	OUTDOOR			52 / 53	52 / 53
COMPRESSOR	TYPE			DC SCROLL	
	OUTPUT		W	2500	2500
	STARTING METHOD			Inverter Method	
HEAT EXCHANGER TYPE	INDOOR	Coil		Plate fin coil	
		Surface treatment		Hydrophilic coating	
		Rows x Stages	mm	4 x 16	
		Fin Pitch		1.3	
		Coil Dimensions		336.0x890.0x53.2	
	OUTDOOR	Coil		Plate fin coil	
		Surface treatment		Corrosion resistant coating	
		Rows x Stages	mm	2 x 60	
		Fin Pitch		1.3	
		Coil Dimensions		1260.0x900.0x36.38	
SAFETY DEVICES		INDOOR		Fan motor thermal protector,Fuse	
		OUTDOOR		Fan motor thermal protector,Fuse	
CASING COLOR		INDOOR		Hot-dipped galvanized steel sheet	
		OUTDOOR		Beige(10YR7.5/1.0NN)	
DIMENSIONS H ×W ×D	INDOOR	NET	mm	400 × 1050(1150)* × 500(585)*	
	OUTDOOR			1290 x 900 x 330	
	INDOOR	GROSS		460 × 1230 × 640	
	OUTDOOR			1430 x 1050 x 445	
WEIGHT	INDOOR	NET / GROSS	kg(lbs)	50 (110) / 55 (121)	
	OUTDOOR			105 (231) / 112 (247)	
PIPE	CONNECTION METHOD			FLARE	
	SIZE	LIQUID	mm	9.52 (3/8 inc.)	
		GAS		15.88 (5/8 inc.)	
	MAX LENGTH		m	70 (chargeless:20m)	
	MAX HEIGHT		m	30	
REFRIGERANT		TYPE		R410A	
		CHARGE	g	3400	3400
REFRIGERANT OIL		TYPE		Synthetic (POE oil)	
OPERATION(OUTDOOR)		COOLING	℃	-10 to 43	
		HEATING		-15 to 24	
REMOTE CONTROLLER				WIRED	WIRED
DRAIN PIPE	MATERIAL			Steel	
	SIZE		mm	Outer diameter 25.4 / Inner diameter 21.5	

Note: Specifications are based on the following conditions.
Cooling: Indoor temperature of 27 °CDB / 19 °CWB,and outdoor temperature of 35 °CDB/24 °CWB.
Heating: Indoor temperature of 20 °CDB / 15 °CWB,and outdoor temperature of 7 °CDB/6 °CWB.
Standard static pressure : 100 Pa.
Pipe length : 7.5 m, Height difference : 0 m.(Outdoor unit - Indoor unit)
dimensions( )* are indicated the including flange,control box,safety drain pan.

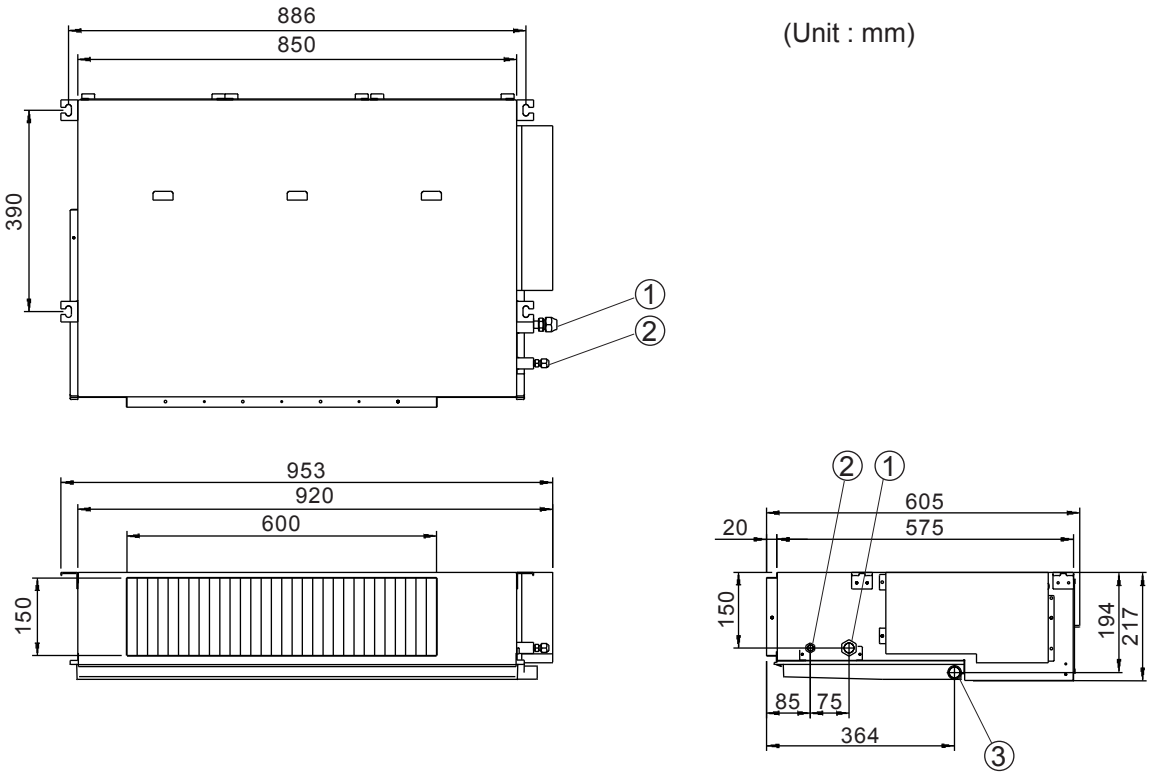
Refrigerant
R410A

DUCT type
INVERTER

2 . DIMENSIONS

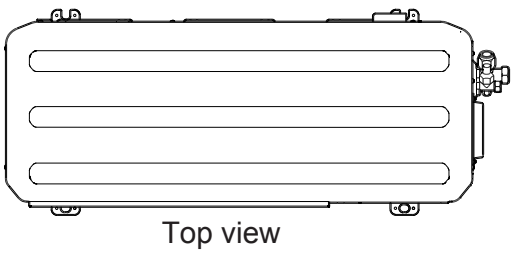
2. DIMENSIONS

■ MODEL : AR*18LUAD / AO*18LMAKL



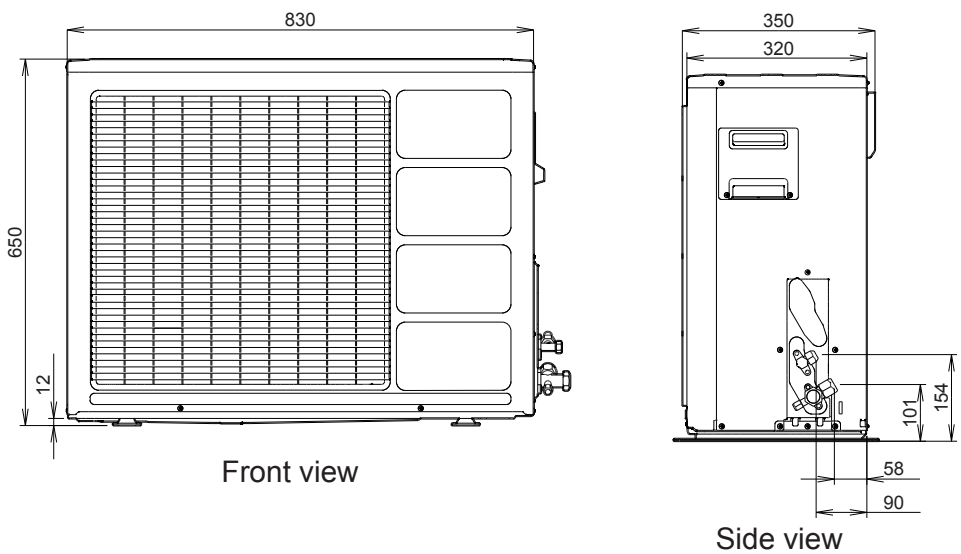
(Unit : mm)

① Refrigerant piping flare connection (Gas)
② Refrigerant piping flare connection (Liquid)
③ Drain piping connection (Drain pipe : I.D. Ø21.5 O.D. Ø26.0)



Top view

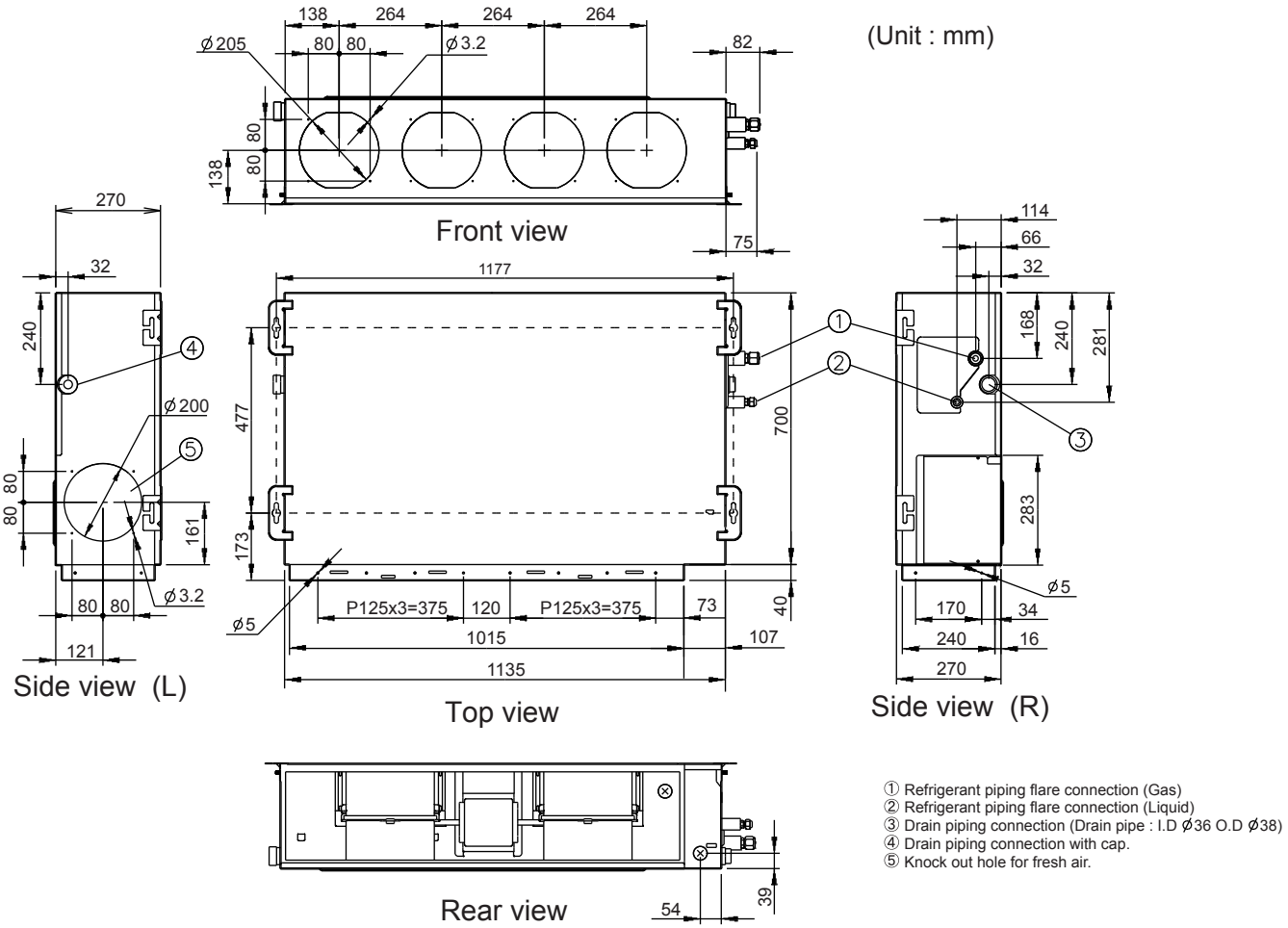
(Unit : mm)

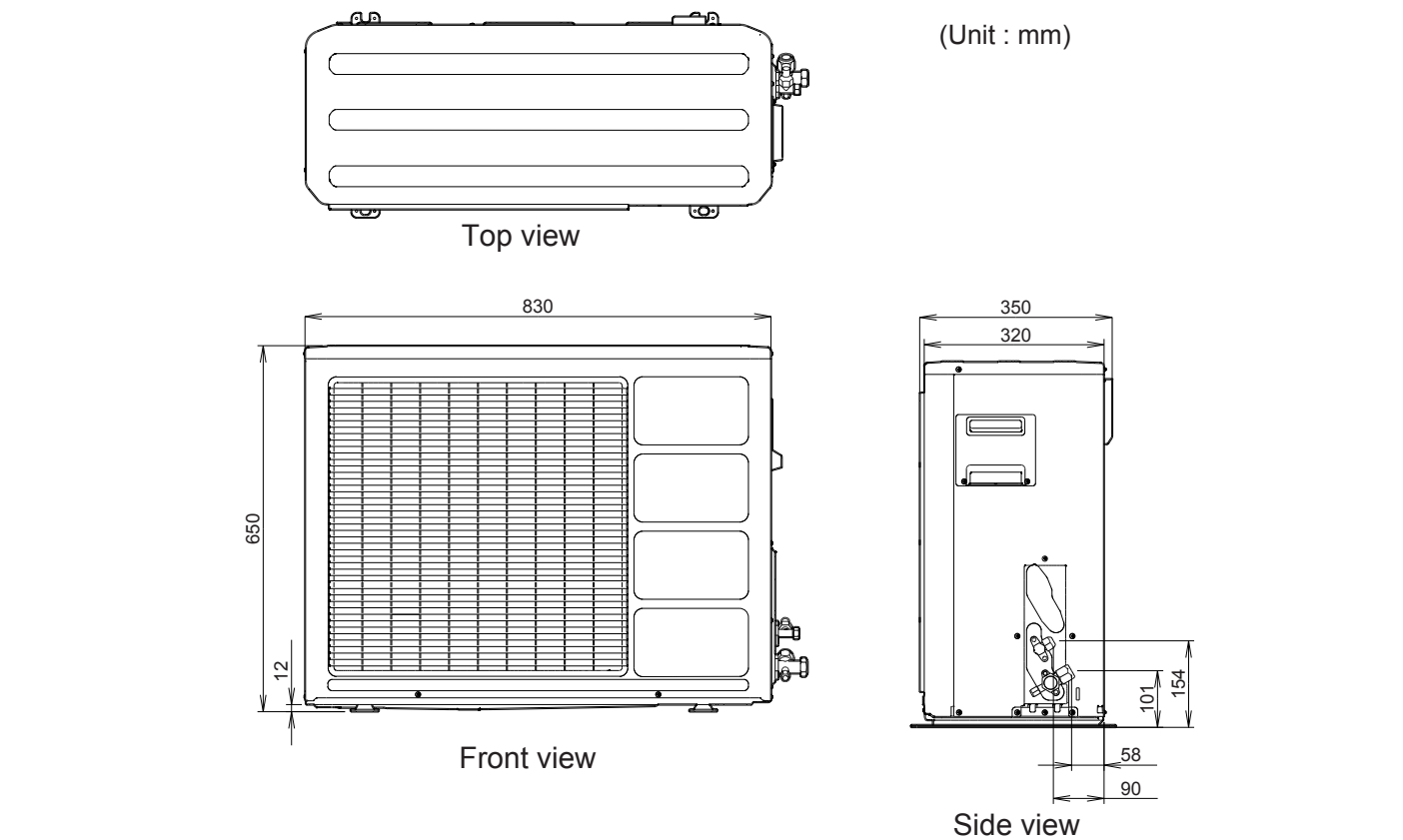


Front view

Side view

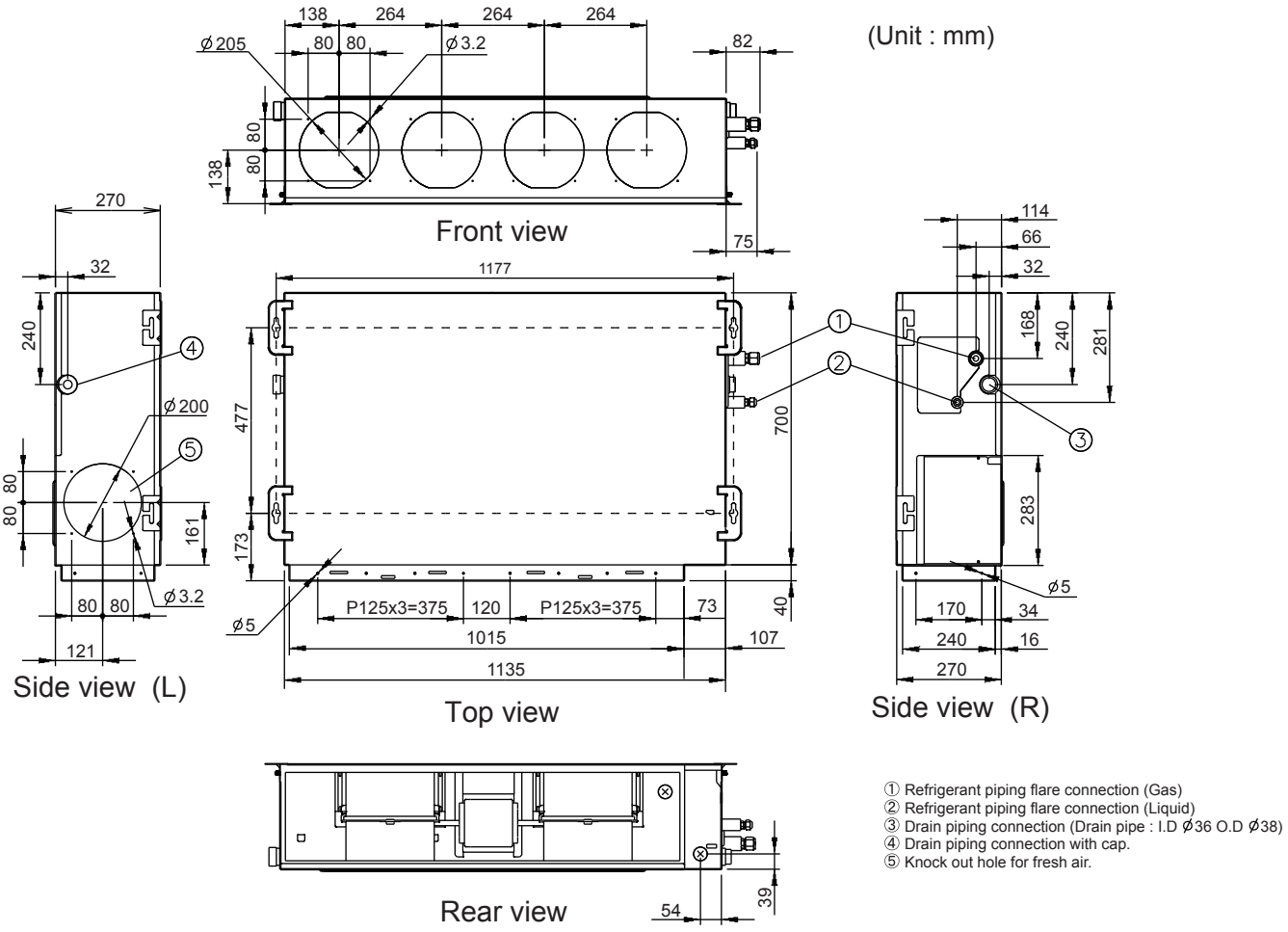
■ MODEL : AR*24LUAN / AO*24LMAKL



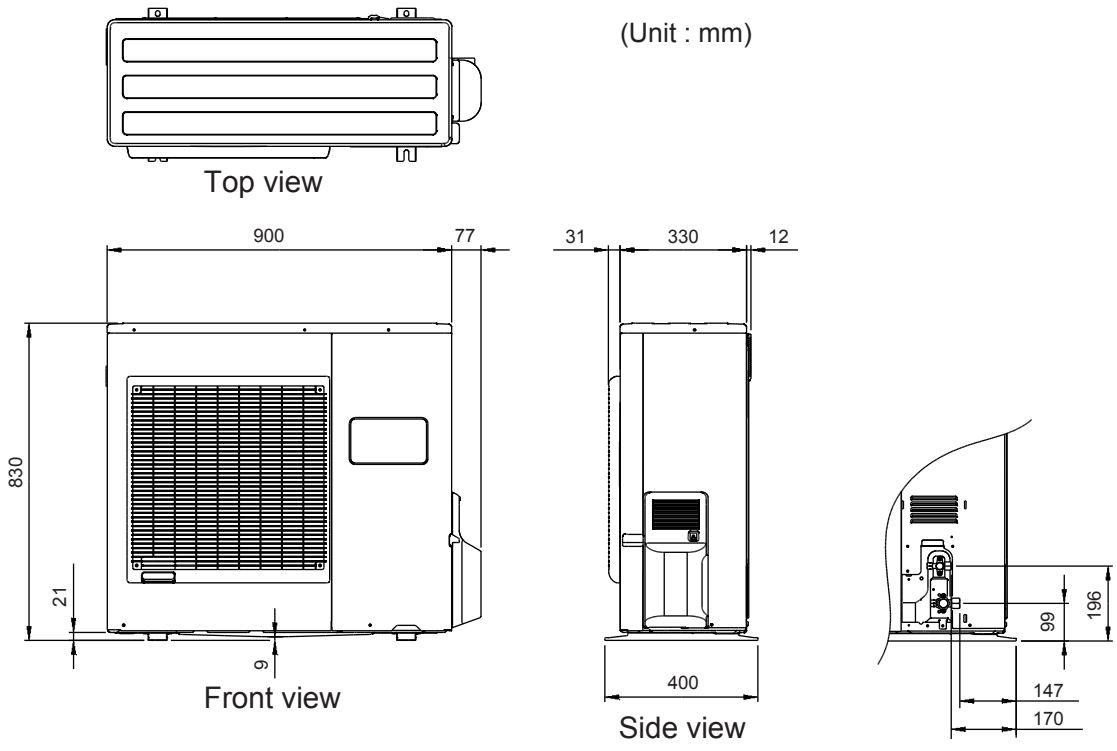


■ MODEL : AR*30/ 36LUAN / AO*30/ 36LMAWL

(Unit : mm)

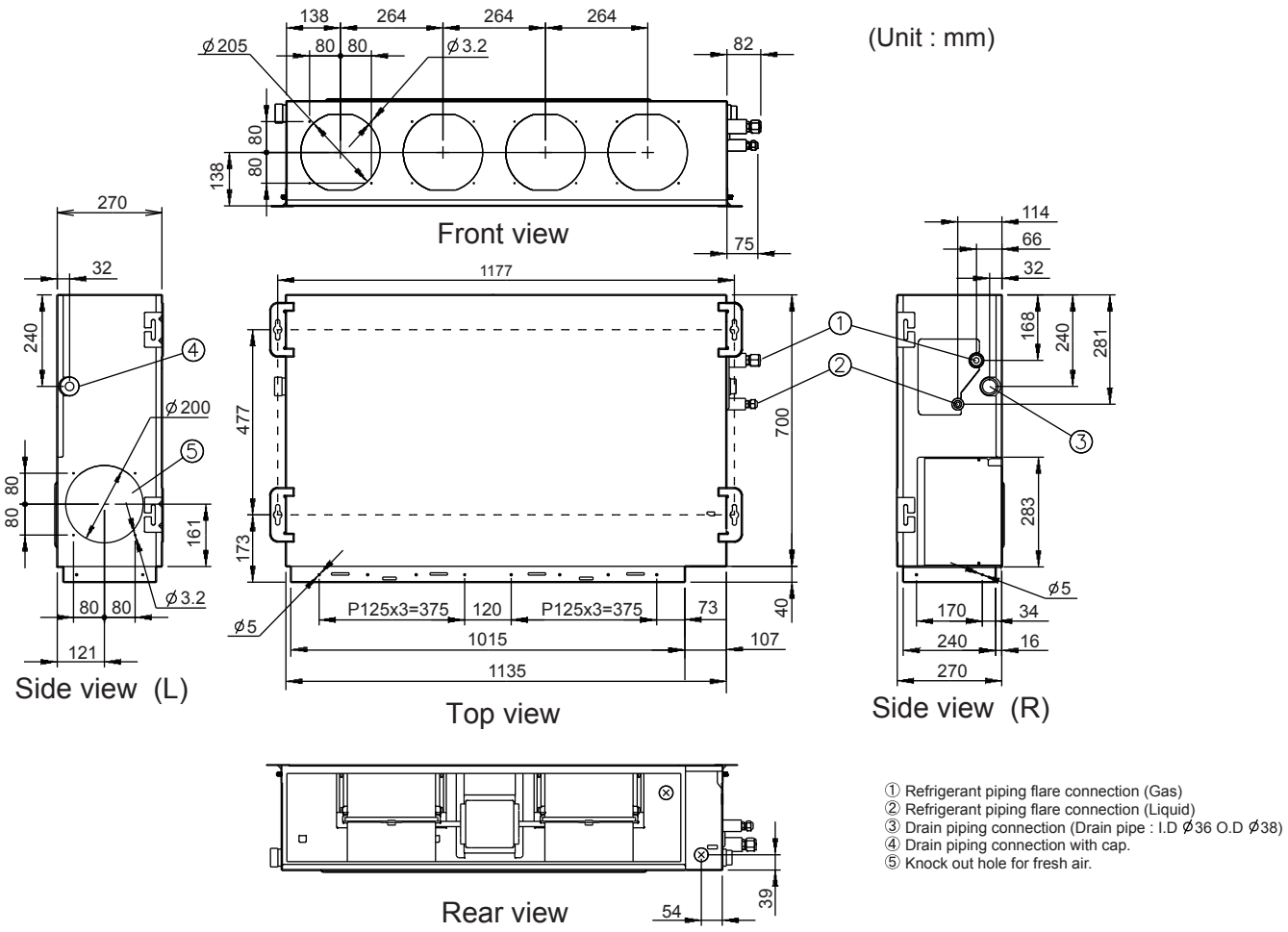


(Unit : mm)



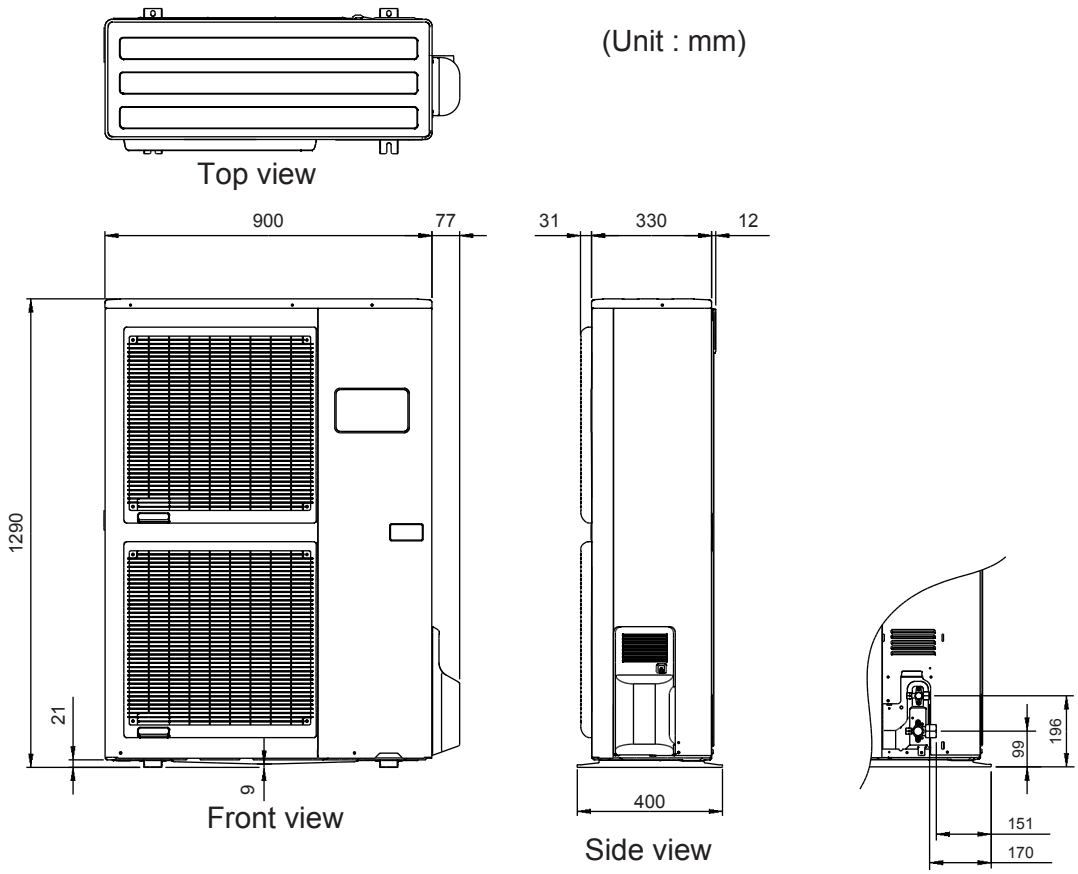
■ MODEL : AR*45LUAN / AO*45LJBYL

(Unit : mm)

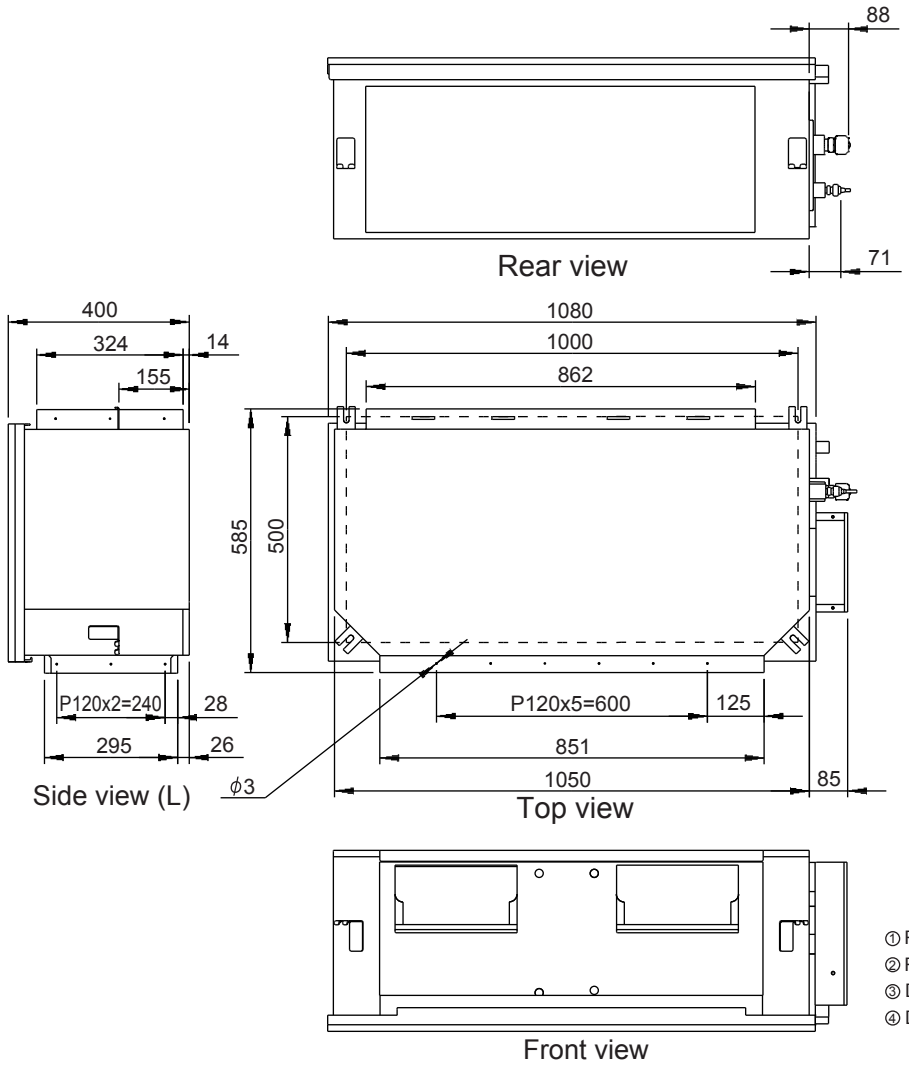


① Refrigerant piping flare connection (Gas)
② Refrigerant piping flare connection (Liquid)
③ Drain piping connection (Drain pipe : I.D Ø36 O.D Ø38)
④ Drain piping connection with cap.
⑤ Knock out hole for fresh air.

(Unit : mm)

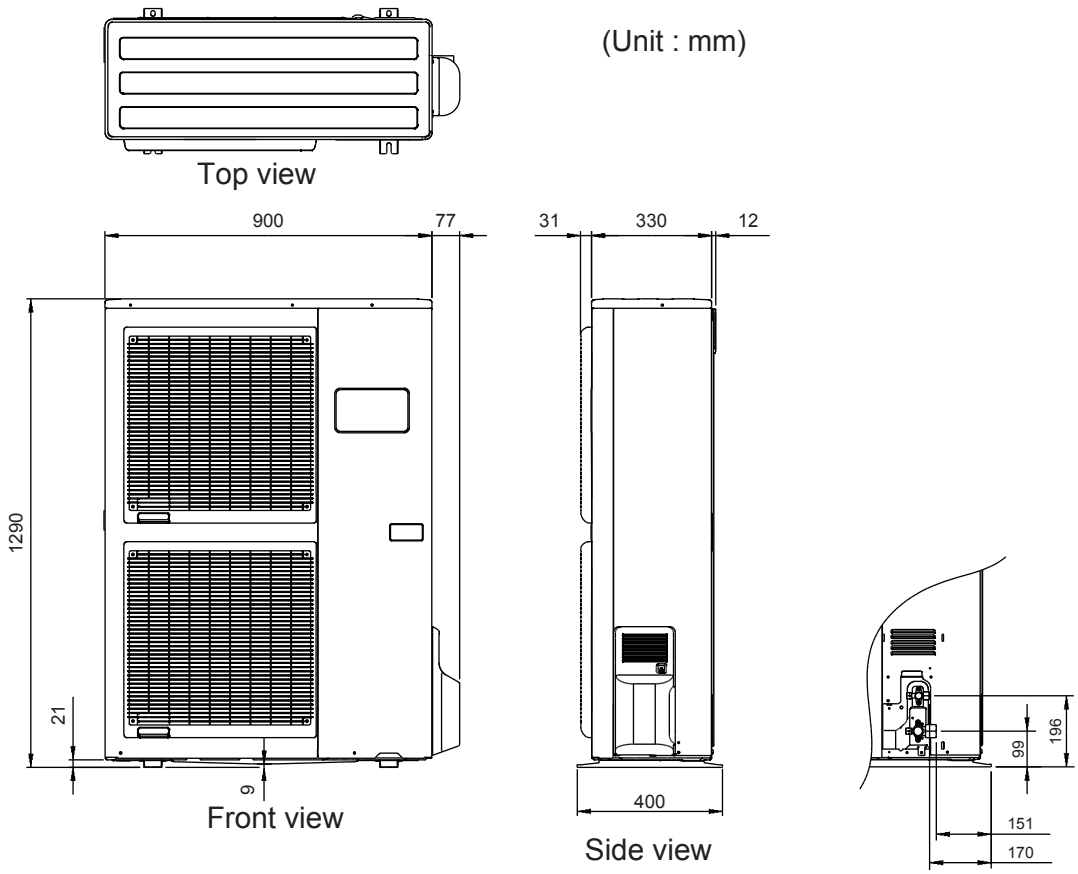


■ MODEL : AR*45/ 54LUAK / AO*45/ 54LJAYL



① Refrigerant piping flare connection (Liquid)
② Refrigerant piping flare connection (Gas)
③ Drain piping connection (Drain pipe : I.D.Ø23.4 O.D.Ø25.4)
④ Drain piping connection (Drain pipe : I.D.Ø23.4 O.D.Ø25.4)

(Unit : mm)



(Unit : mm)

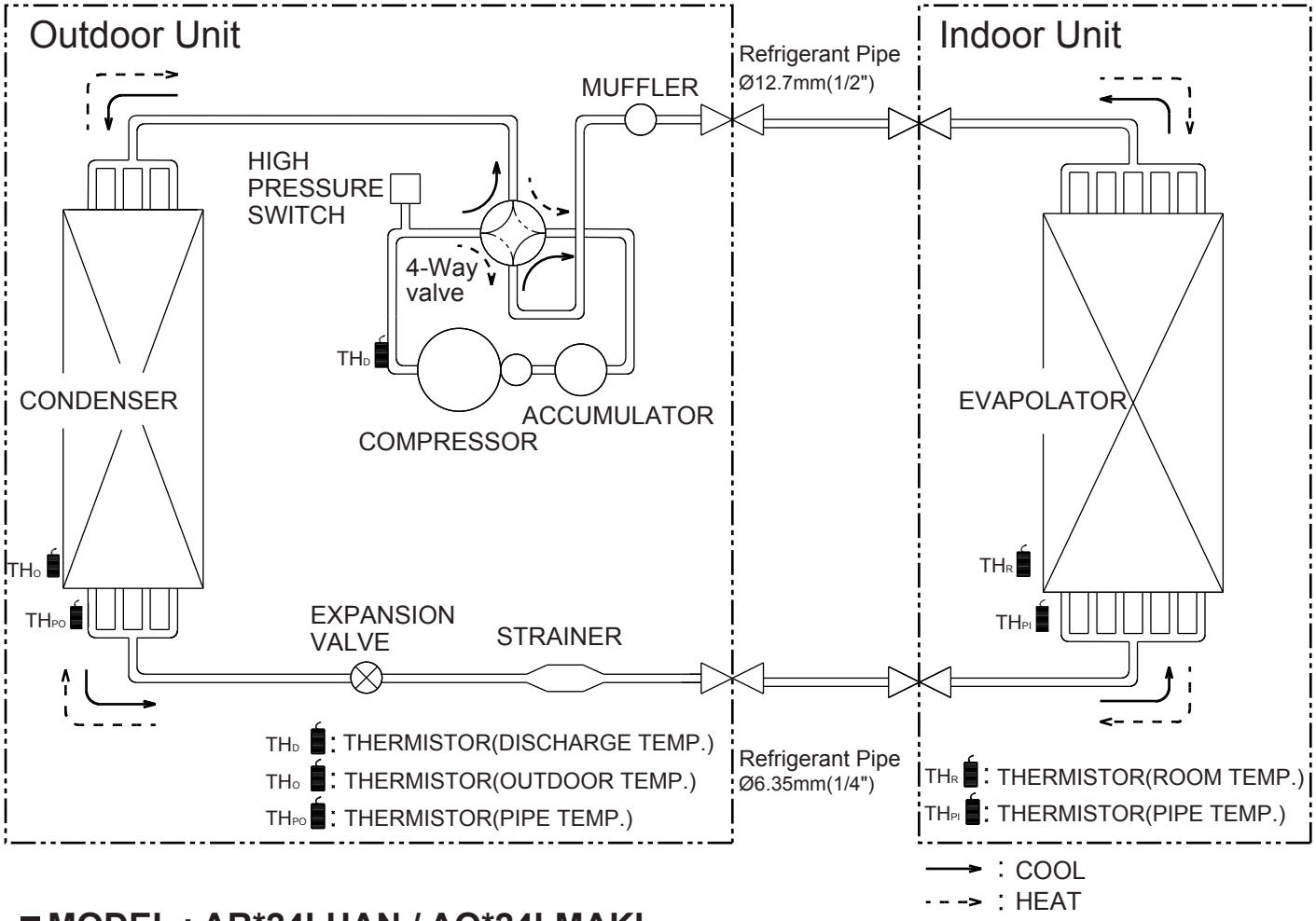
Refrigerant
R410A

DUCT type
INVERTER

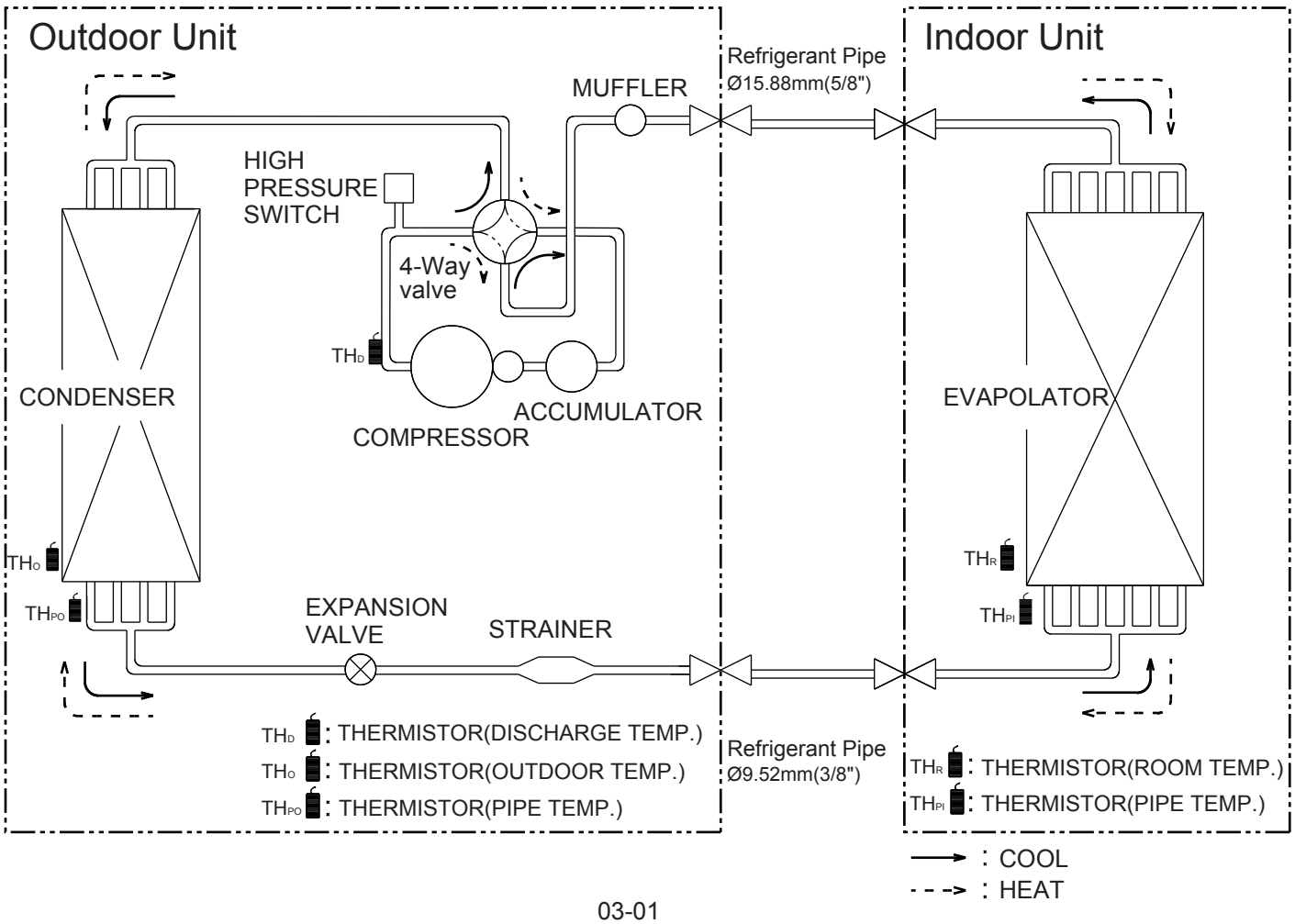
3 . REFRIGERANT SYSTEM DIAGRAM

3. REFRIGERANT CIRCUIT

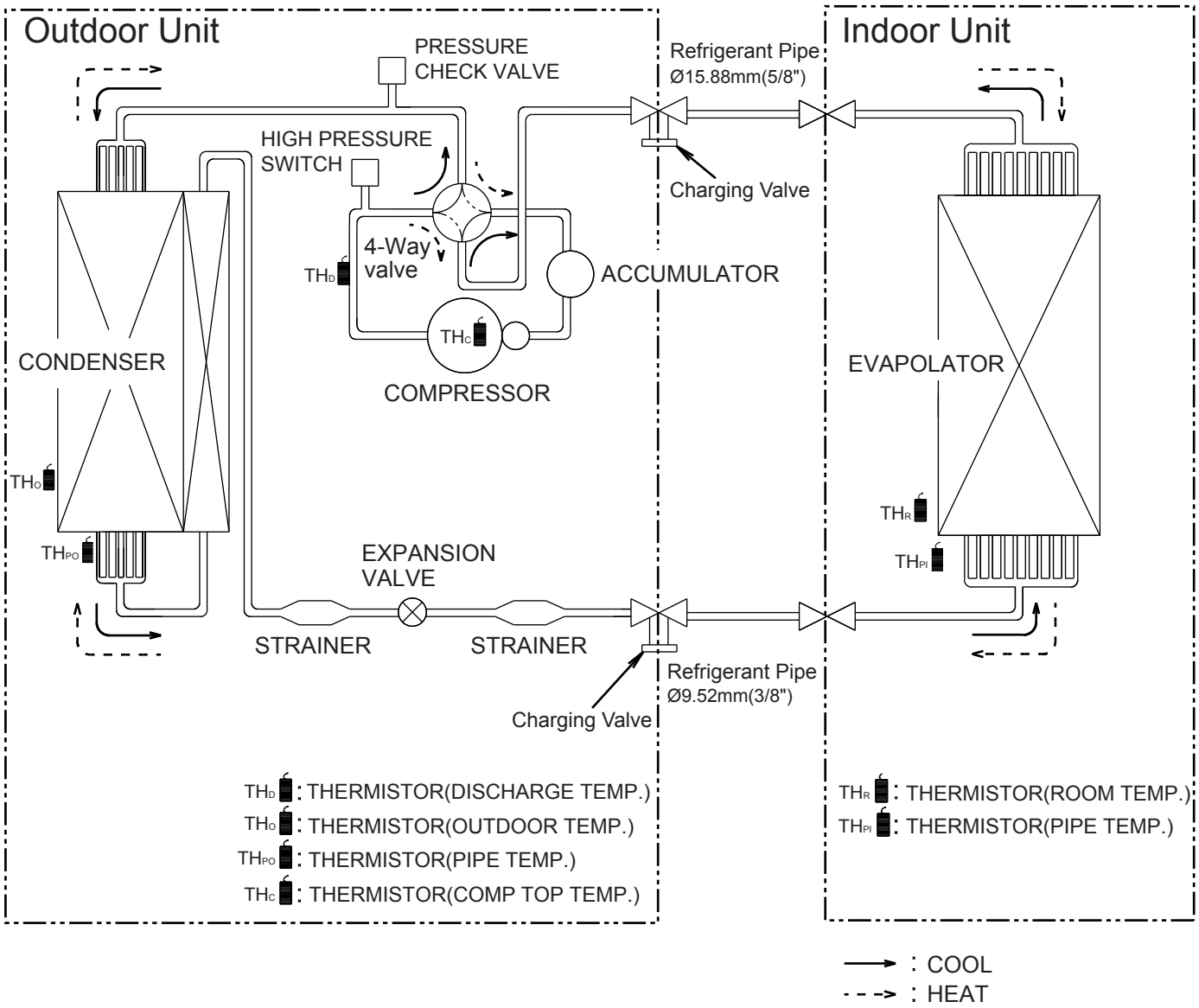
■ MODEL : AR*18LUAD / AO*18LMAKL



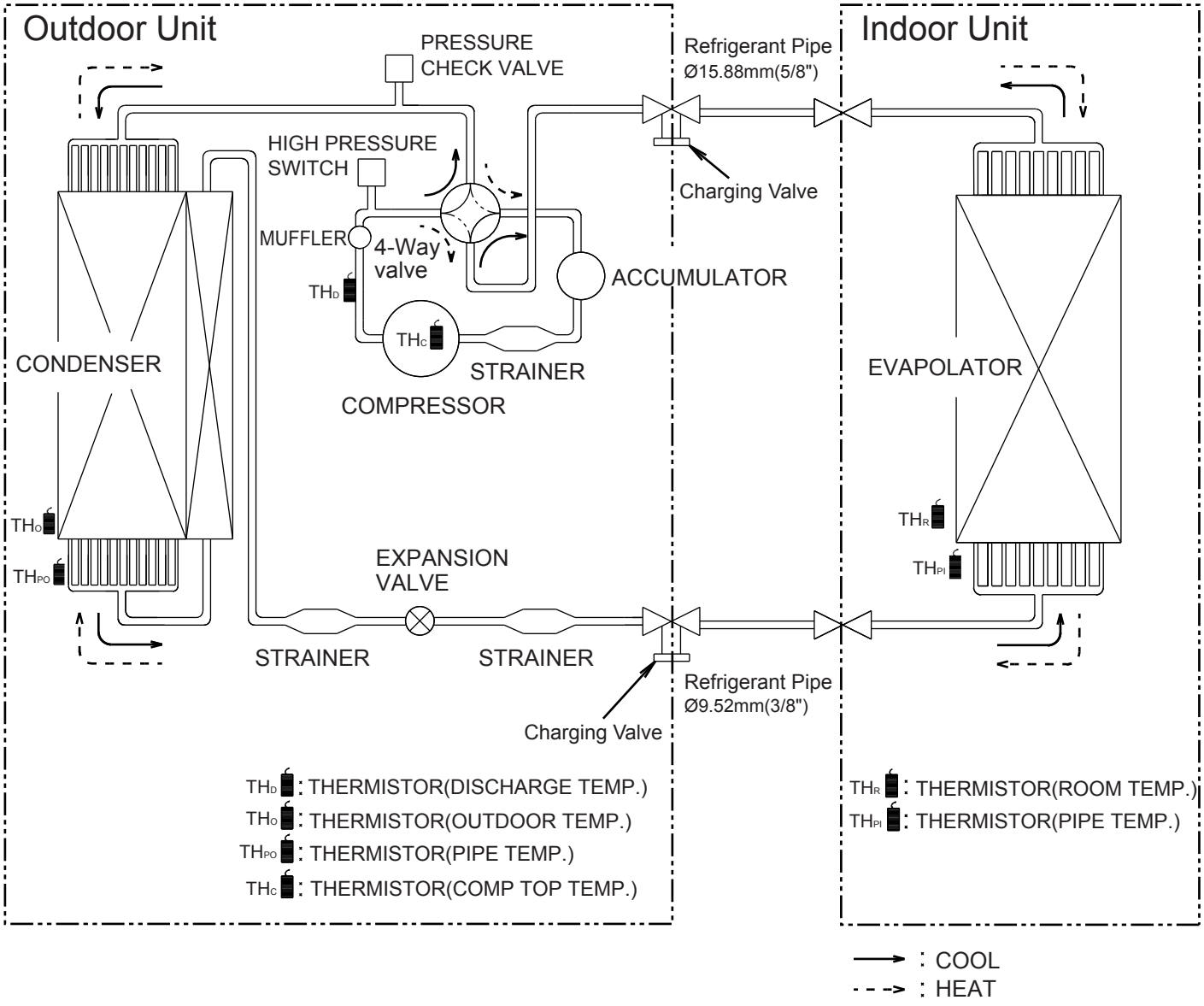
■ MODEL : AR*24LUAN / AO*24LMAKL



■ MODEL : AR*30/ 36LUAN / AO*30/ 36LMAWL



■ MODEL : AR*45L/ 54L / AO*45L/ 54L



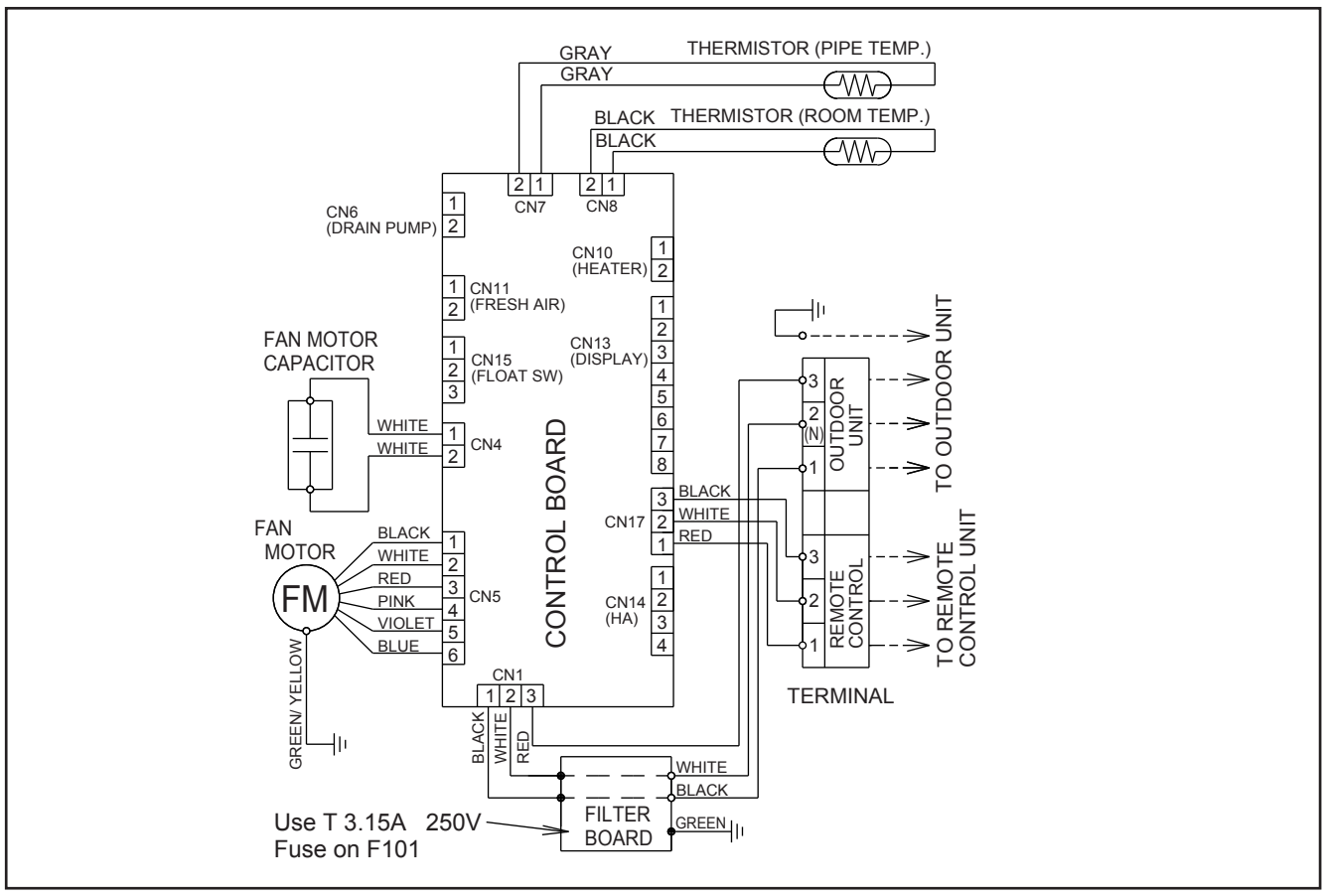
Refrigerant
R410A

DUCT type
INVERTER

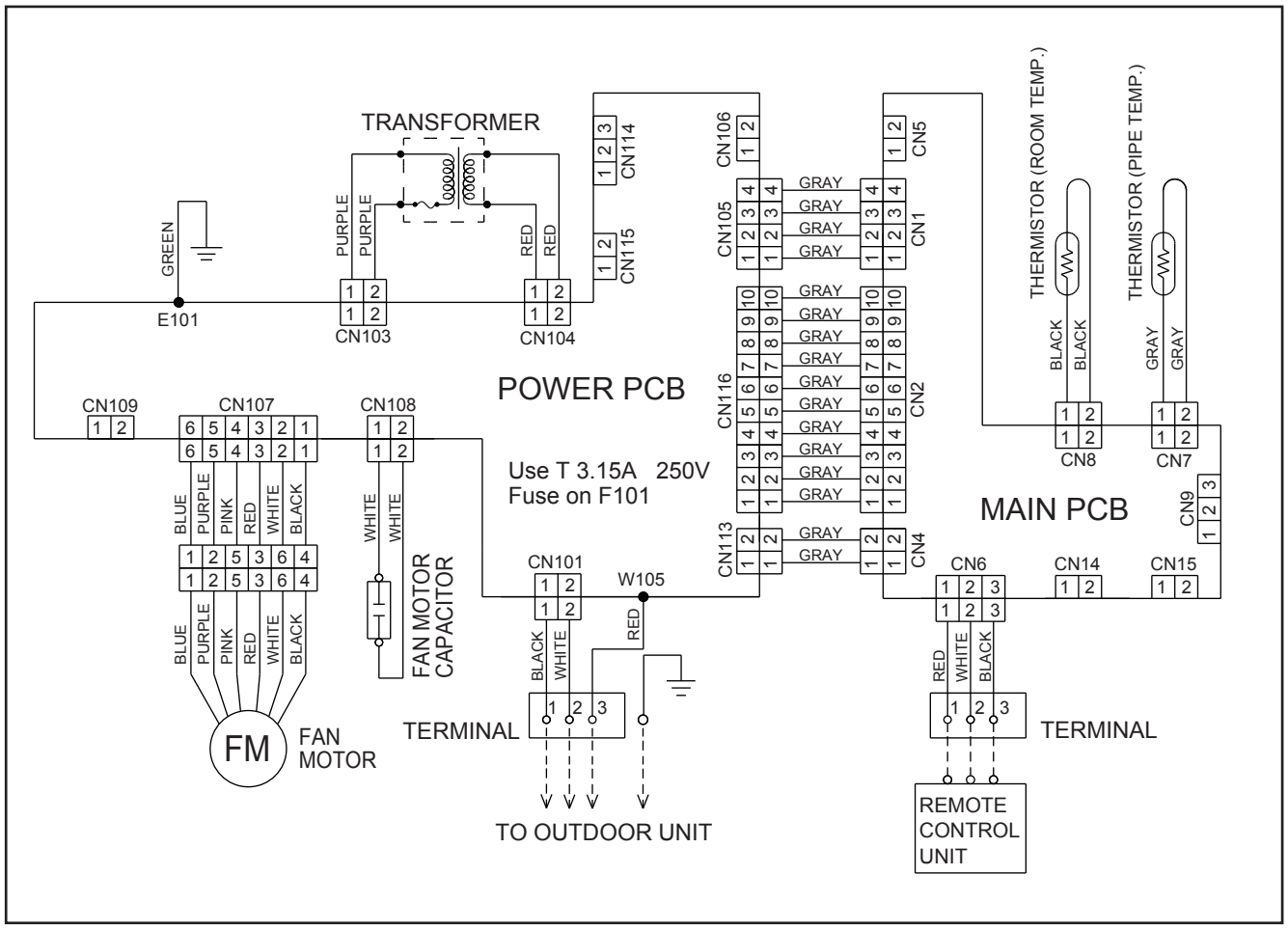
4 . CIRCUIT DIAGRAM

4. CIRCUIT DIAGRAM

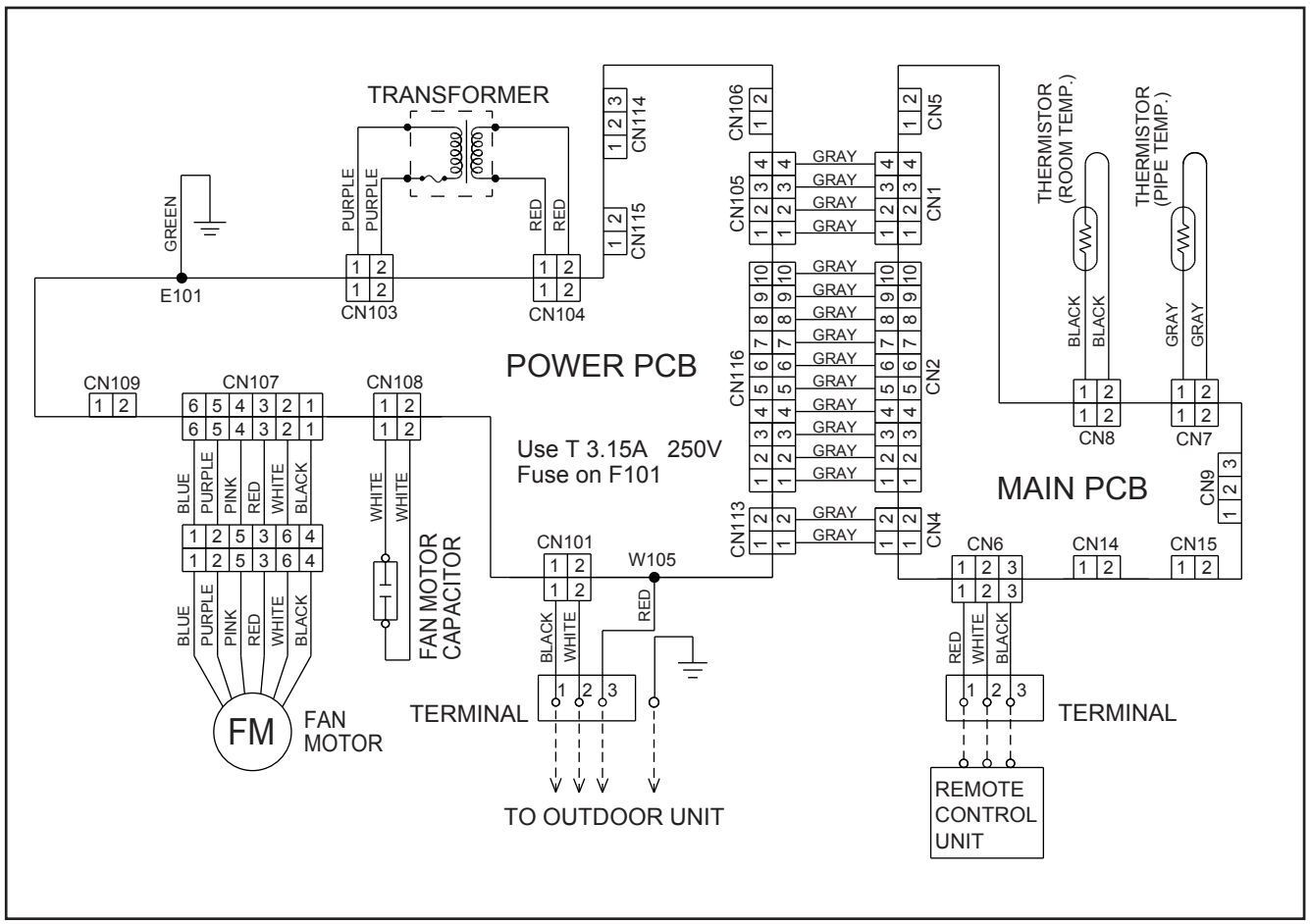
■ MODEL : AR∗18L



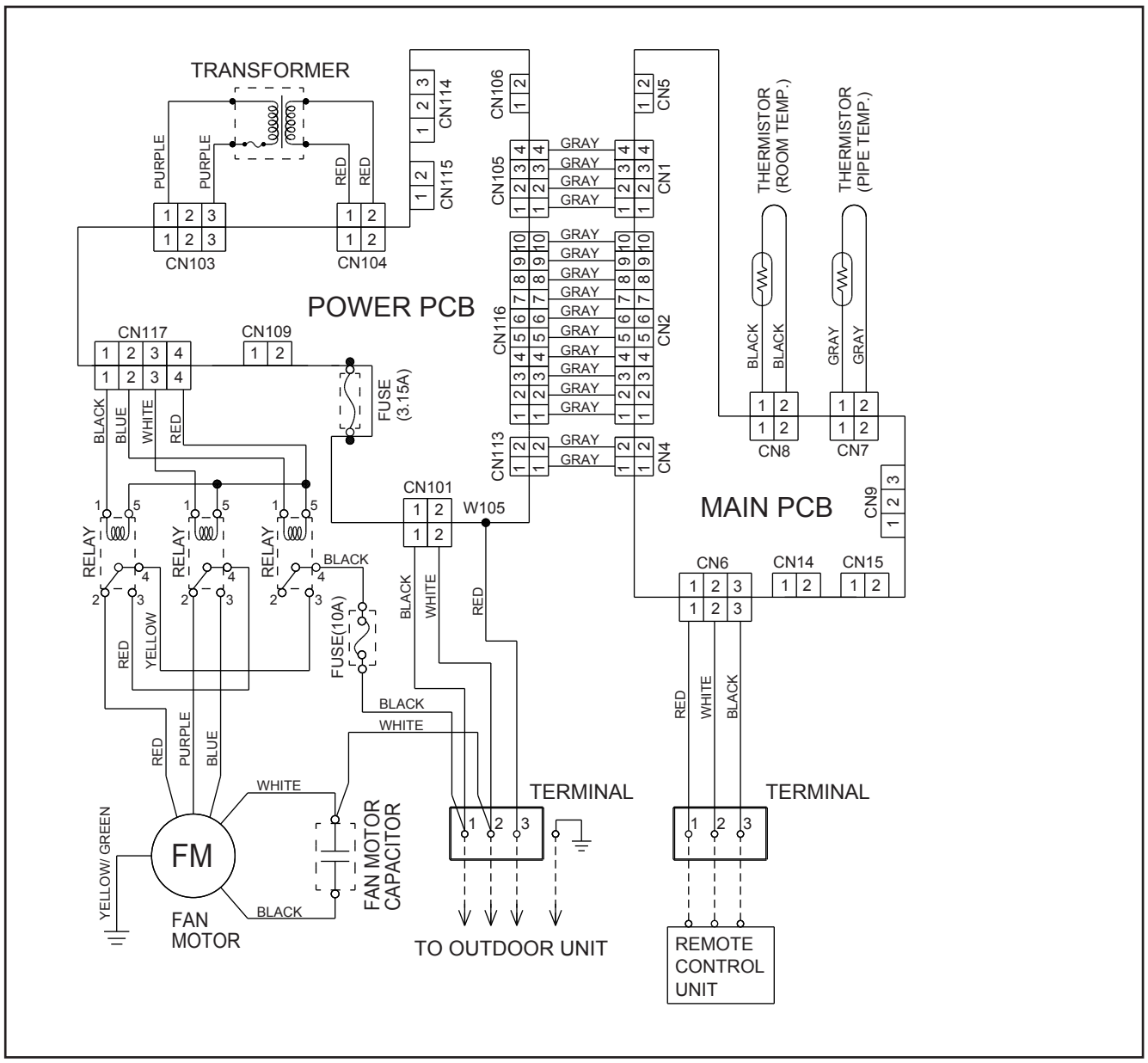
■ MODEL : AR∗24L



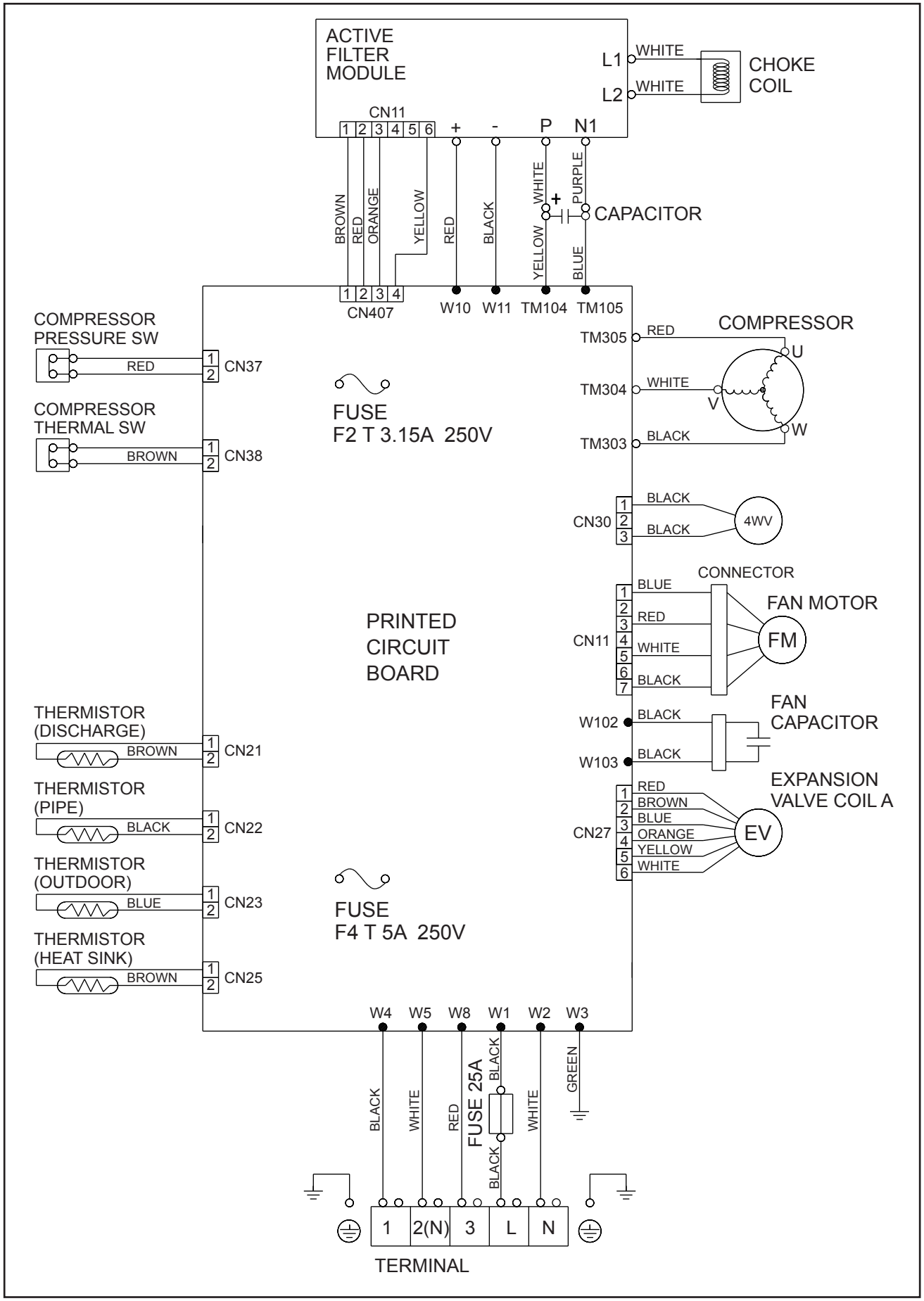
■ MODEL : AR✳24L/ 30L/ 36L/ 45LUAN



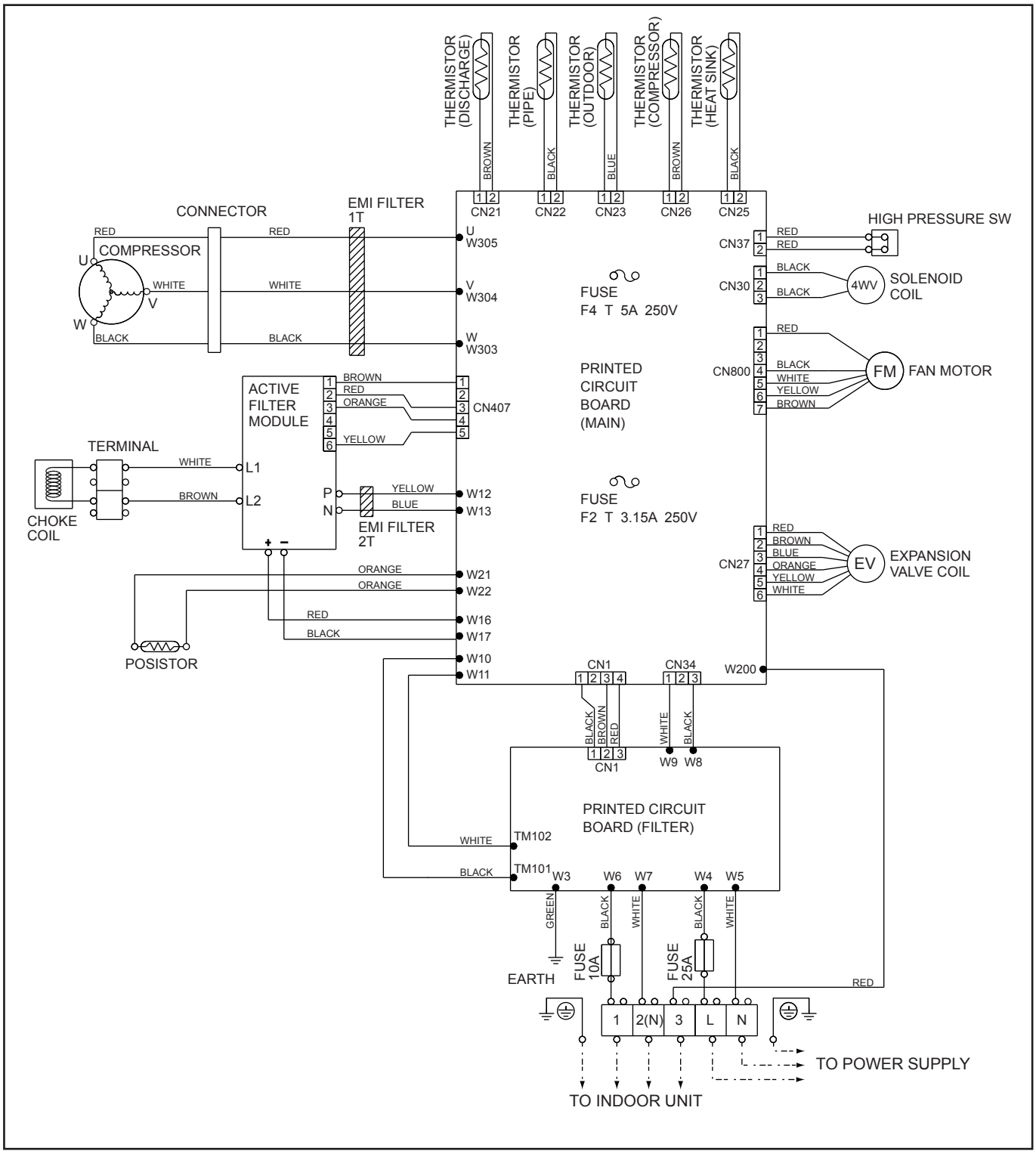
■ MODEL : AR∗45L/ 54LUAK



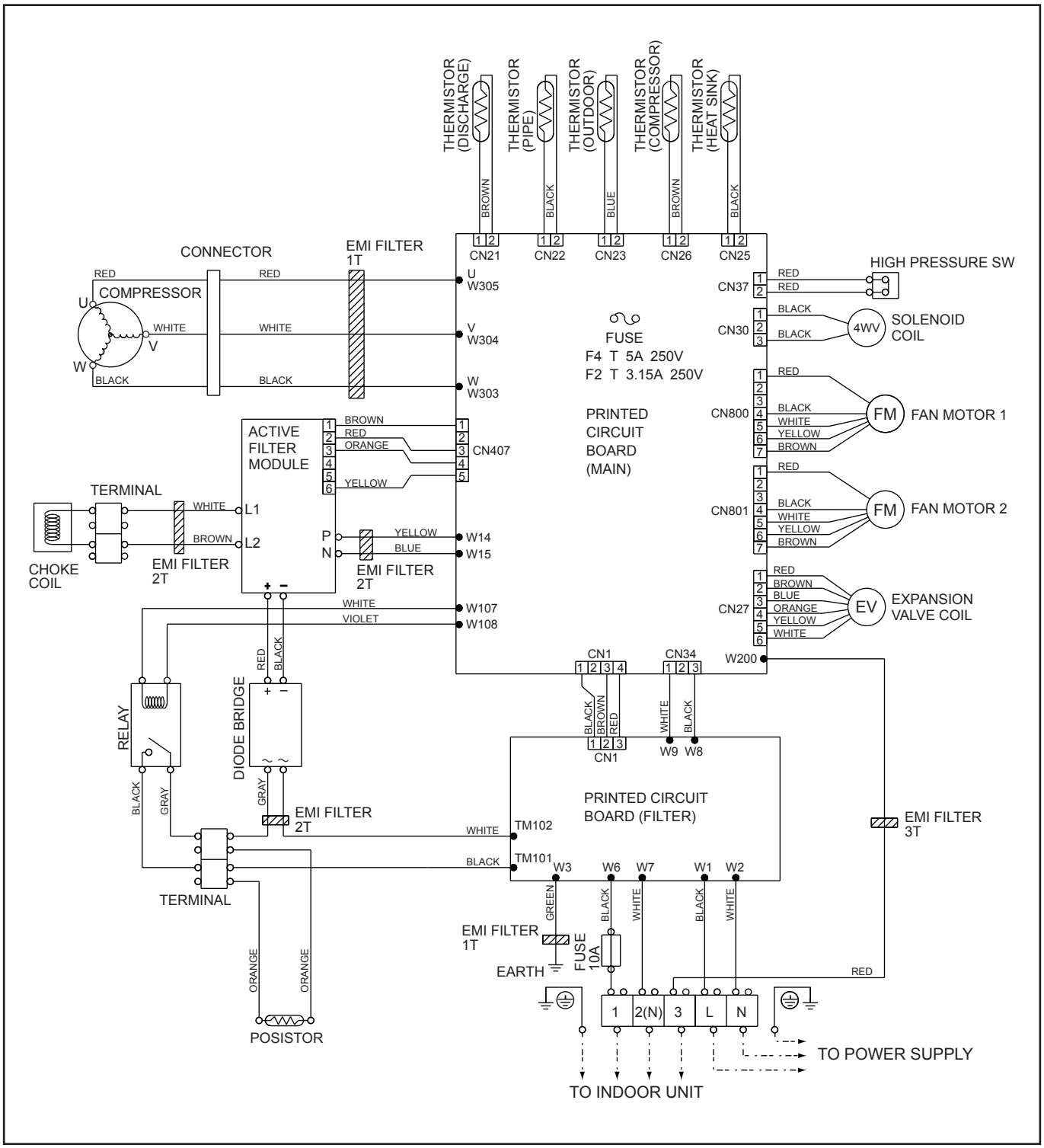
■ MODEL : AO*18L/ 24LMAKL



■ MODEL : AO*30/ 36LMAWL



■ MODEL : AO*45L/ 54L



Refrigerant
R410A

DUCT type
INVERTER

5 . DESCRIPTION OF EACH CONTROL OPERATION

5-1. COOLING OPERATION

5-1-1 COOLING CAPACITY CONTROL

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

* If the room temperature is 2 degC higher than a set temperature, the compressor operation frequency will attain to maximum performance.

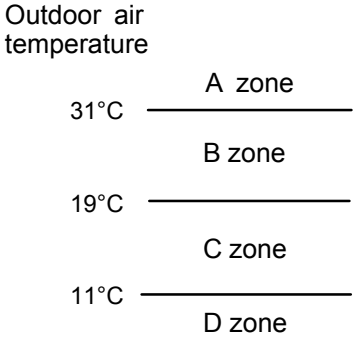
* If the room temperature is 2 degC lower than a set temperature, the compressor will be stopped.

* When the room temperature is between +2 degC to -2 degC of the setting temperature, the compressor frequency is controlled within the range shown in Table1. However, the maximum frequency is limited in the range shown in Figure 1 based on the fan speed mode and the outdoor temperature.

(Table 1 : Compressor Frequency Range)

	minimum frequency	maximum frequency
AR*18LUAD	15Hz	52Hz
AR*24LUAN	15Hz	75Hz
AR*30LUAN	20Hz	90Hz
AR*36LUAN	20Hz	90Hz
AR*45LUAN	20Hz	92Hz
AR*45LUAK		
AR*54LUAK	20Hz	92Hz

(Fig. 1 : Limit of Maximum Frequency based on Outdoor Temperature)



	Fan speed mode	Hi	Me	Lo
AR*18LUAD	A zone	52Hz	44Hz	44Hz
	B zone	44Hz	30Hz	30Hz
	C zone	30Hz	28Hz	28Hz
	D zone	28Hz	24Hz	24Hz
AR*24LUAN	A zone	75Hz	52Hz	52Hz
	B zone	52Hz	42Hz	42Hz
	C zone	42Hz	36Hz	36Hz
	D zone	36Hz	30Hz	30Hz
AR*30LUAN	A zone	90Hz	70Hz	70Hz
	B zone	70Hz	65Hz	65Hz
	C zone	65Hz	55Hz	55Hz
	D zone	55Hz	45Hz	45Hz
AR*36LUAN	A zone	90Hz	75Hz	75Hz
	B zone	75Hz	70Hz	70Hz
	C zone	70Hz	65Hz	65Hz
	D zone	65Hz	55Hz	55Hz
AR*45LUAN AR*45LUAK	A zone	92Hz	72Hz	72Hz
	B zone	72Hz	60Hz	60Hz
	C zone	60Hz	60Hz	60Hz
	D zone	60Hz	53Hz	53Hz
AR*54LUAK	A zone	92Hz	85Hz	85Hz
	B zone	85Hz	72Hz	72Hz
	C zone	72Hz	67Hz	67Hz
	D zone	67Hz	60Hz	60Hz

5-2. HEATING OPERATION

5-2-1 HEATING CAPACITY CONTROL

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

* If the room temperature is lower 3 degC than a set temperature, the compressor operation frequency will attain to maximum performance.

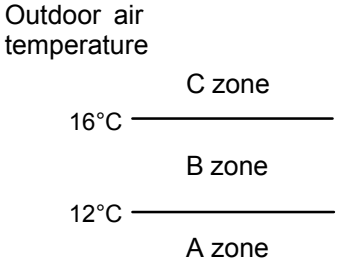
* If the room temperature is higher 2 degC than a set temperature, the compressor will be stopped.

* When the room temperature is between +2 degC to -3 degC of the setting temperature, the compressor frequency is controlled within the range shown in Table2. However, the maximum frequency is limited in the range shown in Figure 2 based on the outdoor temperature.

(Table 2 : Compressor Frequency Range)

	minimum frequency	maximum frequency
AR*18LUAD	15Hz	62Hz
AR*24LUAN	15Hz	75Hz
AR*30LUAN	20Hz	95Hz
AR*36LUAN	20Hz	95Hz
AR*45LUAN	20Hz	92Hz
AR*45LUAK		
AR*54LUAK	20Hz	92Hz

(Fig.2 : Limit of Maximum Frequency based on Outdoor Temperature)



		Limit of Maximum Frequency
AR*18LUAD	A zone	62Hz
	B zone	62Hz
	C zone	62Hz
AR*24LUAN	A zone	75Hz
	B zone	75Hz
	C zone	75Hz
AR*30LUAN	A zone	95Hz
	B zone	90Hz
	C zone	80Hz
AR*36LUAN	A zone	95Hz
	B zone	90Hz
	C zone	80Hz
AR*45LUAN AR*45LUAK	A zone	92Hz
	B zone	90Hz
	C zone	80Hz
AR*54LUAK	A zone	92Hz
	B zone	90Hz
	C zone	80Hz

5-3. DRY OPERATION

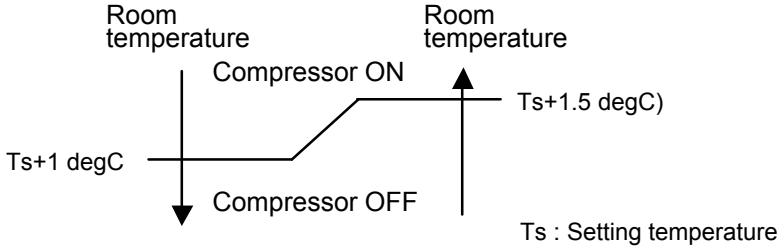
5-3-1 INDOOR UNIT CONTROL

The compressor rotation frequency shall change according to set temperature and room temperature variation which the room temperature sensor of the indoor unit has detected as shown in the Table 3.

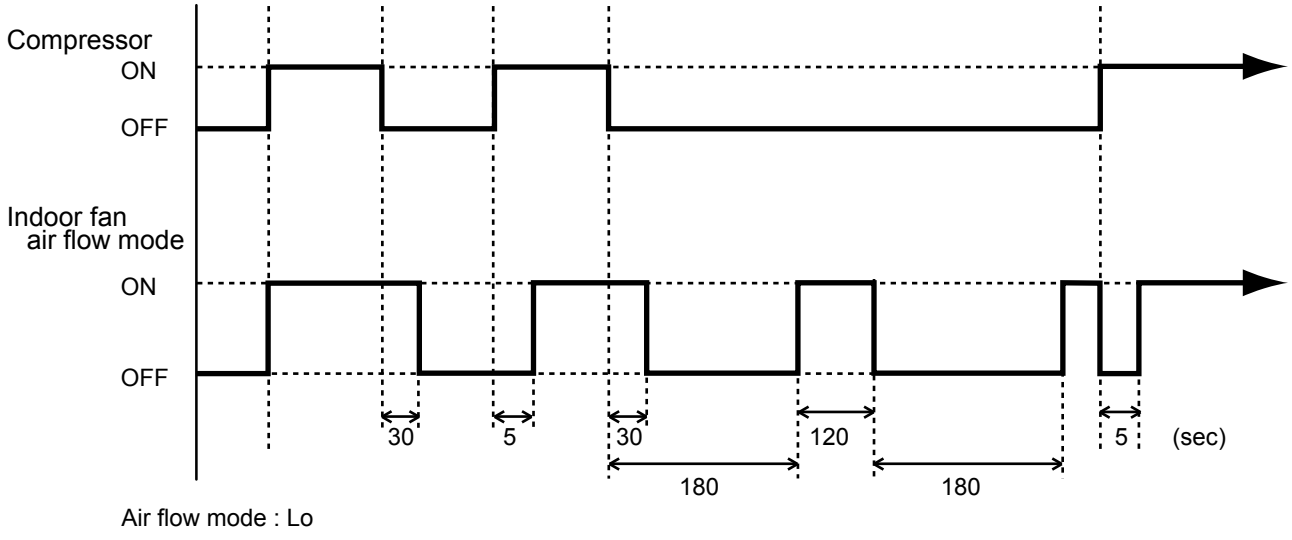
(Table 3 : Compressor frequency)

	Operating frequency
AR*18LUAD	19Hz
AR*24LUAN	28Hz
AR*30LUAN	45Hz
AR*36LUAN	45Hz
AR*45LUAN	30Hz
AR*45LUAK	
AR*54LUAK	53Hz

(Fig.3 : Compressor Control based on Room Temperature)



(Fig.4 : Indoor Fan Control)



Air flow mode : Lo

5-4. AUTO CHANGEOVER OPERATION

When the air conditioner is set to the AUTO mode by remote control, operation starts in the optimum mode from among the HEATING, COOLING and MONITORING modes. During operation, the optimum mode is automatically swiched in accordance with temperature changes. The temperature can be set between 18°C and 30°C in 1 degC steps.

① When operation starts, only the indoor fan is operated for 1 minute.
(Air flow mode: S- Lo, Stop (Only for AR*45LUAK / AR*54LUAK))
After 1 minute, depends on the room temperature and outdoor unit's operarion mode, the operation mode is selected in accordance with the table below.

(Table 4-1 : Operation mode selection table for AR18)

Room temperature :TR	Operation mode
TR ≧ Ts +2 degC	Cooling
Ts +2 degC > TR > Ts-2 degC	Monitoring
Ts +2 degC ≧ TR	Heating

Ts : Setting temperature

(Table 4-2 : Operation mode selection table for AR24/30/36/45/54)

Room temperature :TR	Operation mode
TR ≧ Ts +2.5 degC	Cooling
Ts +2.5 degC > TR > Ts-2.5 degC	Monitoring
Ts +2.5 degC ≧ TR	Heating

Ts : Setting temperature

② When COOLING was selected at ①, the same operation as COOLING OPERATION is performed.

③ When HEATING was selected at ①, the same operation as HEATING OPERATION is performed.

④ When the compressor was stopped for 6 consecutive minutes by the temperature control function after the COOLING or HEATING operation mode was selected at ① above, operation is switched to MONITORING and the operation mode is selected again.

5-5. INDOOR FAN CONTROL

1. Fan speed

(Table 5 : Indoor Fan Speed)

▪ AR*18LUAD

Operation mode	Air flow mode	Speed (rpm)
Heating Cooling	Hi	1040
	Me	890
	Lo	750
	S-Lo	595

▪ AR*24LUAN

Operation mode	Air flow mode	Speed (rpm)
Heating Cooling	Hi	980
	Me	890
	Lo	810
	S-Lo	680

▪ AR*30LUAN

Operation mode	Air flow mode	Speed (rpm)
Heating Cooling	Hi	1250
	Me	1150
	Lo	1050
	S-Lo	840

▪ AR*36LUAN

Operation mode	Air flow mode	Speed (rpm)
Heating Cooling	Hi	1250
	Me	1150
	Lo	1050
	S-Lo	840

▪ AR*45LUAN

Operation mode	Air flow mode	Speed (rpm)
Heating Cooling	Hi	1310
	Me	1240
	Lo	1150
	S-Lo	960

▪ AR*45LUAK

Operation mode	Air flow mode	Speed (rpm)
Heating Cooling	Hi	1300
	Me	1130
	Lo	950

▪ AR*54LUAK

Operation mode	Air flow mode	Speed (rpm)
Heating Cooling	Hi	1300
	Me	1130
	Lo	950

2. FAN OPERATION

The airflow can be switched in 4 steps such as AUTO, LOW, MED, HIGH, while the indoor fan only runs.

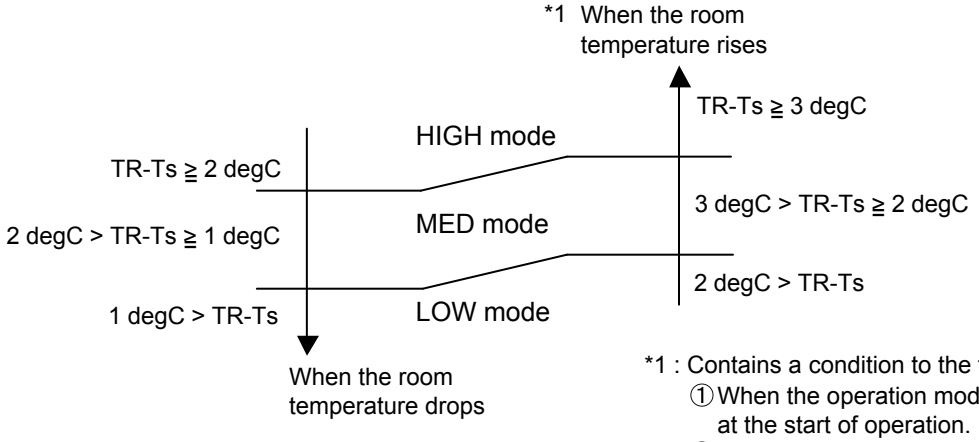
When [AUTO] is selected, the indoor fan motor runs LO and OFF at 1 minute intervals.

3. COOLING OPERATION

Switch the airflow [AUTO], and the indoor fan motor will run according to a room temperature, as shown in Figure 5.

On the other hand, if switched in [HIGH]～[LOW], the indoor motor will run at a constant airflow of [COOL] operation modes LOW, MED, HIGH,as shown in Table 5.

(Fig.5 : Airflow change - over (Cooling : AUTO))



TR : Room temperature
Ts : Setting temperature

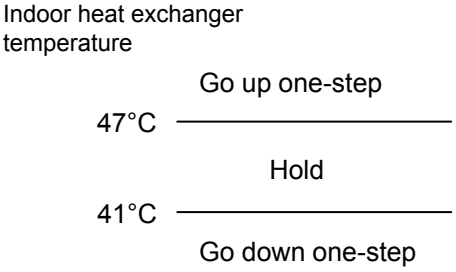
*1 : Contains a condition to the following
① When the operation mode is set to AUTO mode at the start of operation.
② When the setting temperature was changed.
③ When the operation mode was changed to COOLING mode.
④ When the airflow mode was changed to AUTO mode.

4. HEATING OPERATION

When the airflow is set to [AUTO], the indoor fan motor operates [MED] mode.
Then the indoor fan motor will run according to a room temperature, as shown in Figure 6.

On the other hand, if switched in [HIGH] ～ [LOW], the indoor motor will run at a constant airflow of [COOL] operation modes LOW, MED, HIGH, as shown in Table 5.

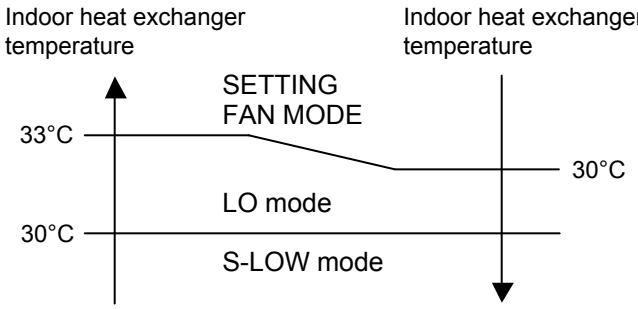
(Fig.6 : Airflow change - over (Heating : AUTO))



5. COOL AIR PREVENTION CONTROL (Heating mode) (For AR*18LUAD/ 24/ 30/ 36/ 45LUAN)

The maximum value of the indoor fan speed is set as shown in Figure 7, based on the detected temperature by the indoor heat exchanger sensor on heating mode.

(Fig.7 : Cool Air Prevention Control)



6. DRY OPERATION

Refer to the Figure 4.
During the dry mode operation, the fan speed setting can not be changed.

5-6. OUTDOOR FAN CONTROL

1. Outdoor Fan Motor

Following table shows the fan speed of the outdoor unit.

(Table 6 : Fan speed of the outdoor unit)

		Cooling	Heating
AR*18LUAD		780/ 400 rpm	780/ 400 rpm
AR*24LUAN			
AR*30LUAN		850/ 780/ 400/ 250/ 170 rpm	900/ 780/ 400/ 250/ 170 rpm
AR*36LUAN			
AR*45LUAN	Upper fan	850/ 780/ 400/ 350/ 300 rpm	850/ 780/ 350/ 200/ 150 rpm
AR*45LUAK			
AR*54LUAK	Lower fan	780/ 750/ 350/ 0 rpm	780/ 750/ 350/ 200/ 150 rpm

* AR*45LUAN/ AR*45LUAK/ AR*54LUAK have two fan motors.
* The outdoor fan speed changs in the range mentioned avobe depending on the compressor frequency and outdoor temperature.
  (When the compressor frequency and outdoor temperature increase, the outdoor fan speed also changes to the higher speed.
  When the compressor frequency and outdoor temperature decrease, the outdoor fan speed also changes to the lower speed.)

* For AR*18LUAD/ AR*24LUAN
  When the outdoor heat exchanger tenperature is lower than 2°C,
  the fan speed switches to 780rpm on heating mode.

* For AR*30/ 36LUAN
  It runs at 500rpm for 20 seconds after starting up the outdoor fan.
  When the outdoor heat exchanger tenperature is lower than 2°C,
  the fan speed switches to 900rpm on heating mode.

* For AR*45LUAN/ AR*45LUAK/ AR*54LUAK
  It runs at 500rpm for 20 seconds after starting up the outdoor fan.
  When the outdoor heat exchanger tenperature is lower than 2°C,
  the fan speed switches to 850rpm(Upper fan) and 750rpm(Lower fan on heating mode.

5-7. COMPRESSOR CONTROL

1. OPERATION FREQUENCY RANGE

The operation frequency of the compressor is different based on the operation mode as shown in Table 7.

(Table 7 : Compressor Operation Frequency Range)

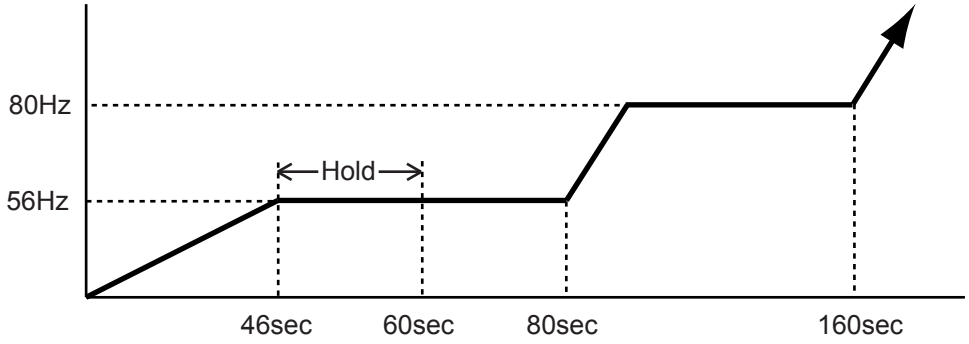
	Cooling		Heating		Dry
	Min	Max	Min	Max	
AR*18LUAD	15Hz	52Hz	15Hz	62Hz	19Hz
AR*24LUAN	15Hz	75Hz	15Hz	75Hz	28Hz
AR*30LUAN	20Hz	90Hz	20Hz	95Hz	45Hz
AR*36LUAN	20Hz	90Hz	20Hz	95Hz	45Hz
AR*45LUAN	20Hz	92Hz	20Hz	92Hz	30Hz
AR*45LUAK					
AR*54LUAK	20Hz	92Hz	20Hz	92Hz	53Hz

2. OPERATION FREQUENCY CONTROL AT START UP

2-1. For AR*18LUAD/ AR*24LUAN

The compressor frequency soon after the start-up is controlled as shown in Figure 8.

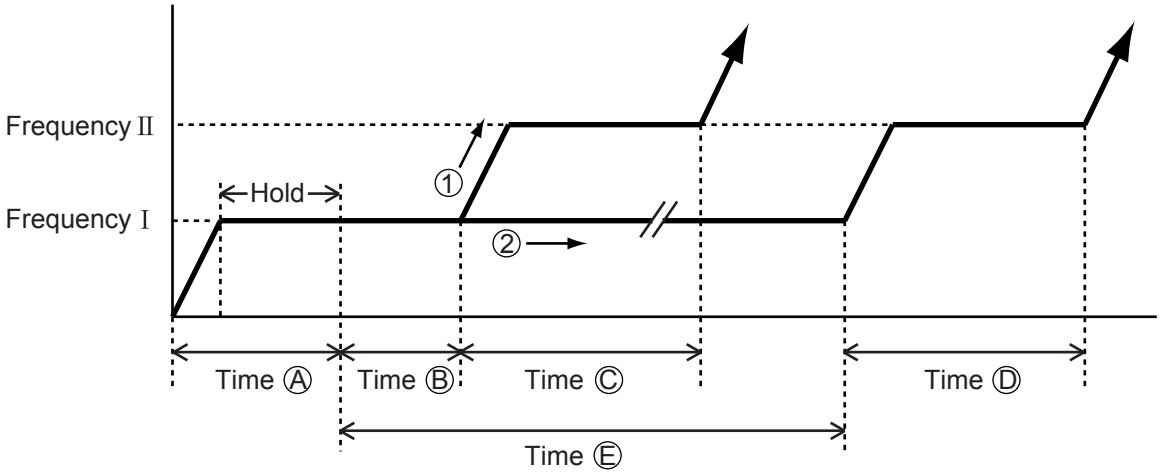
(Fig.8 : Compressor Control at Start-up)



2-2. For AR*30/ 36/ 45LUAN/ AR*45/ 54LUAK

The compressor frequency soon after the start-up is controlled as shown in Figure 9.

(Fig.9 : Compressor Control at Start-up)



For AR*30/ 36LUAN
① Discharge pipe temp. ≧ 30°C
② Discharge pipe temp. < 30°C

For AR*45LUAN / AR*45/ 54LUAK
① Discharge pipe temp. ≧ 35°C
② Discharge pipe temp. < 35°C

(Frequency)

	Frequency Ⅰ	Frequency Ⅱ
AR*30LUAN	40Hz	56Hz
AR*36LUAN		
AR*45LUAN	56Hz	70Hz
AR*45LUAK		
AR*54LUAK		

(Time)

	Time Ⓐ	Time Ⓑ	Time Ⓒ	Time Ⓓ	Time Ⓔ
AR*30LUAN	180sec	60sec	120sec	120sec	720sec
AR*36LUAN					
AR*45LUAN	180sec	80sec	180sec	180sec	720sec
AR*45LUAK					
AR*54LUAK					

5-8. TIMER OPERATION CONTROL

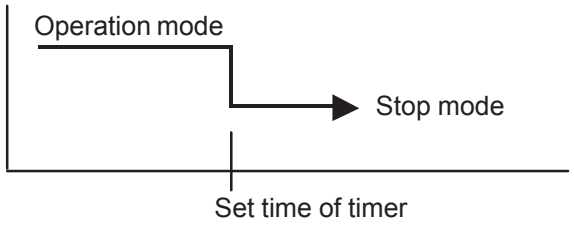
5-8-1 Wired Remote Controller

AR-3TA1

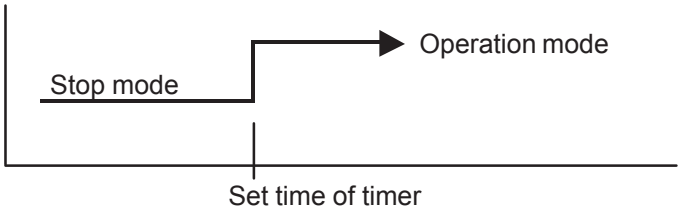
- ON / TIMER
- OFF / TIMER
- WEEKLY TIMER
- TEMPERATURE SET BACK TIMER

1. ON / OFF TIMER

・OFF timer : When the clock reaches the set time, the air conditioner will be turned off.



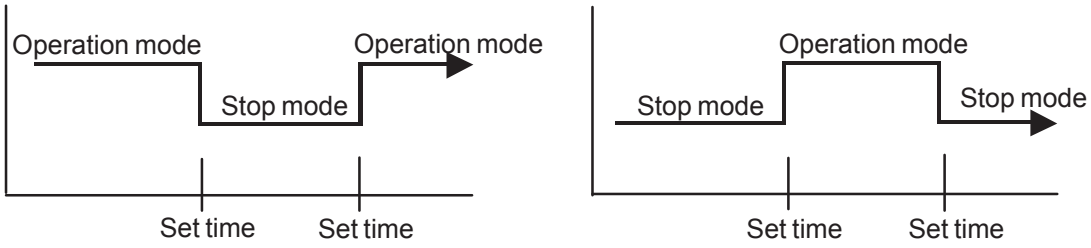
・ON timer : When the clock reaches the set time, the air conditioner will be turned on.



2. WEEKLY TIMER

2-1. WEEKLY TIMER

・Use this timer function to set operating time for each day of the week.
・The weekly timer allows up to two ON and OFF time to set up per day.

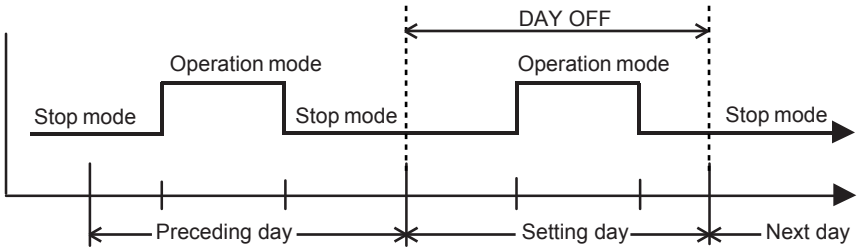


・The operating time can be set in 30 min increments only.
・The OFF time can be carried over to next day.
・The ON timer and the OFF timer functions cannot be set with using the weekly timer.
Both ON and OFF time must be set.

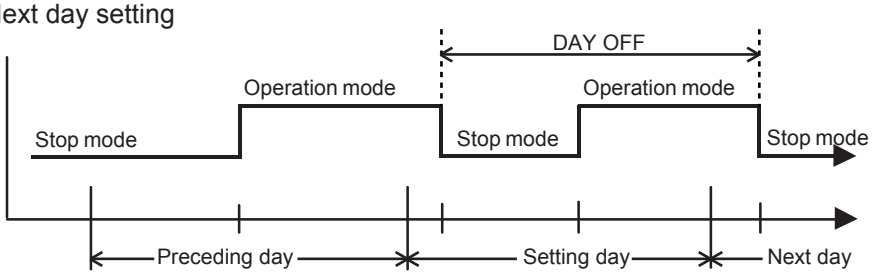
2-2. DAY OFF setting

- The DAY OFF setting is only available for days for which weekly settings already exist.
- If the operating time carries over to the next day (during a next day setting), the effective DAY OFF range will be set as shown below.

- Normal



- Next day setting

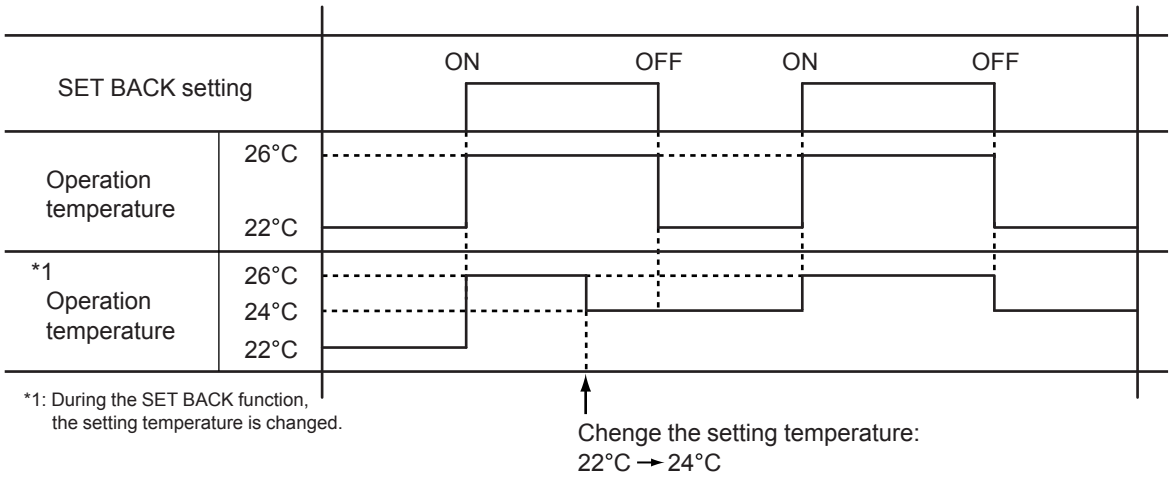


- The DAY OFF setting can only be set one time. The DAY OFF setting is cancelled automatically after the set day has passed.

3. 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 the COOL/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)



5-9. 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 following values.
The compressor frequency, the temperatures detected by the discharge temperature sensor and the outdoor temperature sensor.

* The pulse range of the electronic expansion valve control is between 50 to 480 pulses.
* At the time of supplying the power to the outdoor unit, the initialization of the electronic expansion valve is operated (1000 pulses are input to the closing direction).

5-10. TEST OPERATION CONTROL

- With Wired Remote Controller

  Under the condition where the air conditioner stops, press the MASTER CONTROL button and the FAN CONTROL button simultaneously for 5 seconds or more, and the test operation control mode will appear.
  During test running, "  " will display on the remote controller display.
  Set the test operation mode, and the compressor will continue to run regardless of whatever the room temperature sensor detects.
  The test operation mode is released if 60 minutes have passed after setting up the test operation.

5-11. PREVENT TO RESTART FOR 3 MINUTES (3 MINUTES ST)

The compressor won't enter operation status for 3 minutes after the compressor is stopped, even if any operation is given.

5-12. 4-WAY VALVE EXTENSION SELECT

At the time when the air conditioner is switched from the cooling mode to heating mode, the compressor is stopped, and the 4-way valve is switched in 3 minutes later after the compressor stopped.

5-13. AUTO RESTART

When the power was interrupted by a power failure, etc. during operation, the operation contents at that time are memorized and when power is recovered, operation is automatically resumed with the memorized operation contents.
When the power is interrupted and recovered during timer operation, timer operation is canceled, but only setting time is memorized.

[Operation contents memorized when the power is interrupted]

- Operation mode
- Set temperature
- Set air flow
- Timer mode and timer time
- Thermistor detected position

5-14. PUMP DOWN (For AR*30/ 36/ 45LUAN/ 45/ 54LUAK)

Perform the following procedures to collect the refrigerant when moving the indoor unit or the outdoor unit.

When the product is stopped:

1. Press the PUMP DOWN switch (SW2) on the outdoor unit.
   (The LED on the outdoor unit circuit board flickers every 1second.)
2. The pump down operation (cooling operation) begins right away.
   After operation starts, close the 3-way valve (liquid).
3. After 2-3minutes, operation stops. Close the 3-way valve (gas) within 1minute after operations stops.
4. The LED will go out 3minutes after it stops. Disconnect the power supply after confirming that the LED has gone out.

When the product is operating:

1. Press the PUMP DOWN switch (SW2) on the outdoor unit. The LED on the outdoor unit circuit board flickers every 1second, and operation stops.
   At this point, recovery has not been completed, so do not close the 2 and 3-way valves.
2. The pump down operation (cooling operation) begins after 3minutes.
   Close the 3-way valve (liquid) after operation starts.
3. After 2-3minutes, operation stops. Close the 3-way valve (gas) within 1minute after operations stops.
4. The LED will go out 3minutes after it stops. Disconnect the power supply after confirming that the LED has gone out.

5-15. COMPRESSOR PREHEATING

When the outdoor heat exchanger temperature is lower than Operation temperature (Refer to Table 8) and the heating operation has been stopped for 3 hours, power is applied to the compressor and the compressor is heated.
(By heating the compressor, warm air is quickly discharged when operation is started.)
When operation was started, and when the outdoor temperature rises to Release temperature or greater, preheating is over.

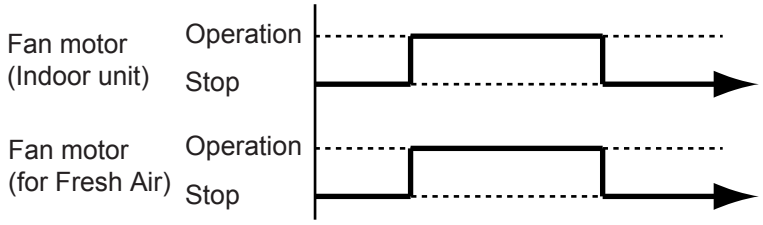
(Table 8 : Preheating Operation / Release Temperature)

Before 24 hour		After 24 hour	
Operation temperature	Release temperature	Operation temperature	Release temperature
3°C	7°C	0°C	4°C

5-16. FRESH AIR CONTROL

The fan motor for Fresh Air is operated in synchronization with the indoor fan operation as shown in Figure 10.

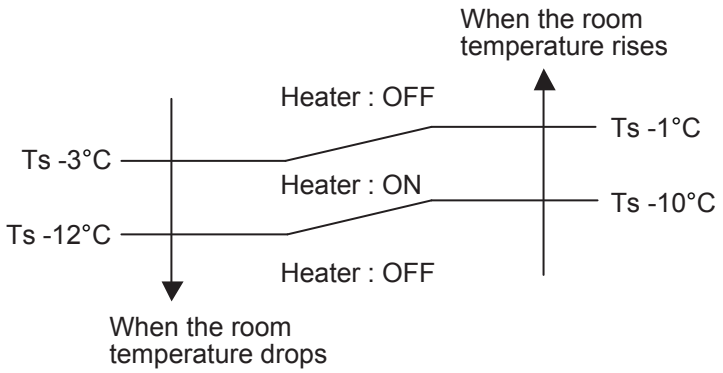
(Fig.10 : Fresh air control)



5-17. EXTERNAL ELECTRICAL HEATER CONTROL

The external electrical heater is operated as shown in Figure 11.

(Fig.11 : External electrical heater control)



- Ts : Setting temperature
- When the compressor stop, External electrical heater is OFF.

5-18. DEFROST OPERATION CONTROL

1. CONDITION OF STARTING THE DEFROST OPERATION

1-1. For AR*18LUAD/ 24LUAN

The defrost operation starts when the outdoor heat exchanger temperature sensor detects the temperature lower than the values shown in Table 9-1.

(Table 9-1 : Condition of starting Defrost Operation)

	Compressor integrating operation :Less than 40min.	Compressor integrating operation :40min and over	
		Less than 6 min. *1 or 10min. *2	After 6 min. *1 or 10min. *2
AR*18LUAD AR*24LUAN	Does not operate		-8°C

*1. It means contiguous operation time.
*2. Compressor stop time: Below 20min. → Select 6min.
Above 20min. → Select 10min.

1-2. For AR*30/ 36/ 45LUAN/ 45/ 54LUAK

The defrost operation starts when the outdoor heat exchanger temperature sensor detects the temperature lower than the values shown in Table 9-2.

(Table 9-2 : Condition of starting Defrost Operation)

	Compressor integrating operation :Less than 45min.	Compressor integrating operation :45min and over		Outdoor temp. - Outdoor heat exchanger temp.	Outdoor heat exchanger temp.
		Less than 6 min. *1 or 10min. *2	After 6 min. *1 or 10min. *2		
AR*30LUAN AR*36LUAN	Does not operate		-8°C *3 -10°C *4	————	————
AR*45LUAN AR*45LUAK	Does not operate		-8°C *3 -10°C *4	12 degC	————
AR*54LUAK			————	————	-20°C

*1. It means contiguous operation time.
*2. Compressor stop time: Below 20min. → Select 6min.
Above 20min. → Select 10min.
*3. Outdoor temp. ≧ -1°C
*4. Outdoor temp. < -1°C

2. CONDITION OF THE DEFROST OPERATION COMPLETION

2-1. For AR*18LUAD/ 24LUAN

Defrost operation is released when the conditions become as shown in Table 10-1.

(Table 10-1 : Defrost Release Condition)

	Release Condition
AR*18LUAD AR*24LUAN	Outdoor heat exchanger temperature sensor value is higher than 10°C or Compressor operation time has passed 15 minutes.

2-2. For AR*30/ 36/ 45LUAN/ 45/ 54LUAK

Defrost operation is released when the conditions become as shown in Table 10-2.

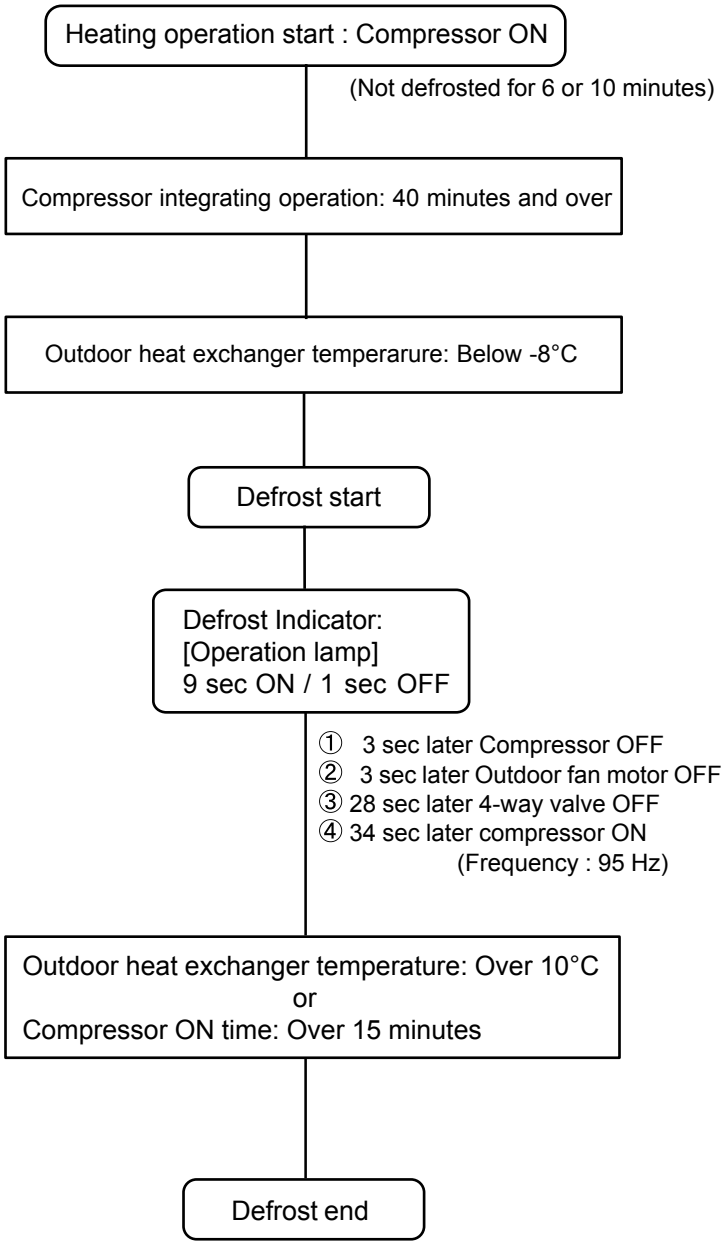
(Table 10-2 : Defrost Release Condition)

	Release Condition
AR*30LUAN AR*36LUAN AR*45LUAN AR*45LUAK AR*54LUAK	Outdoor heat exchanger temperature sensor value is higher than 12°C or Compressor operation time has passed 15 minutes.

3. Defrost Flow Chart

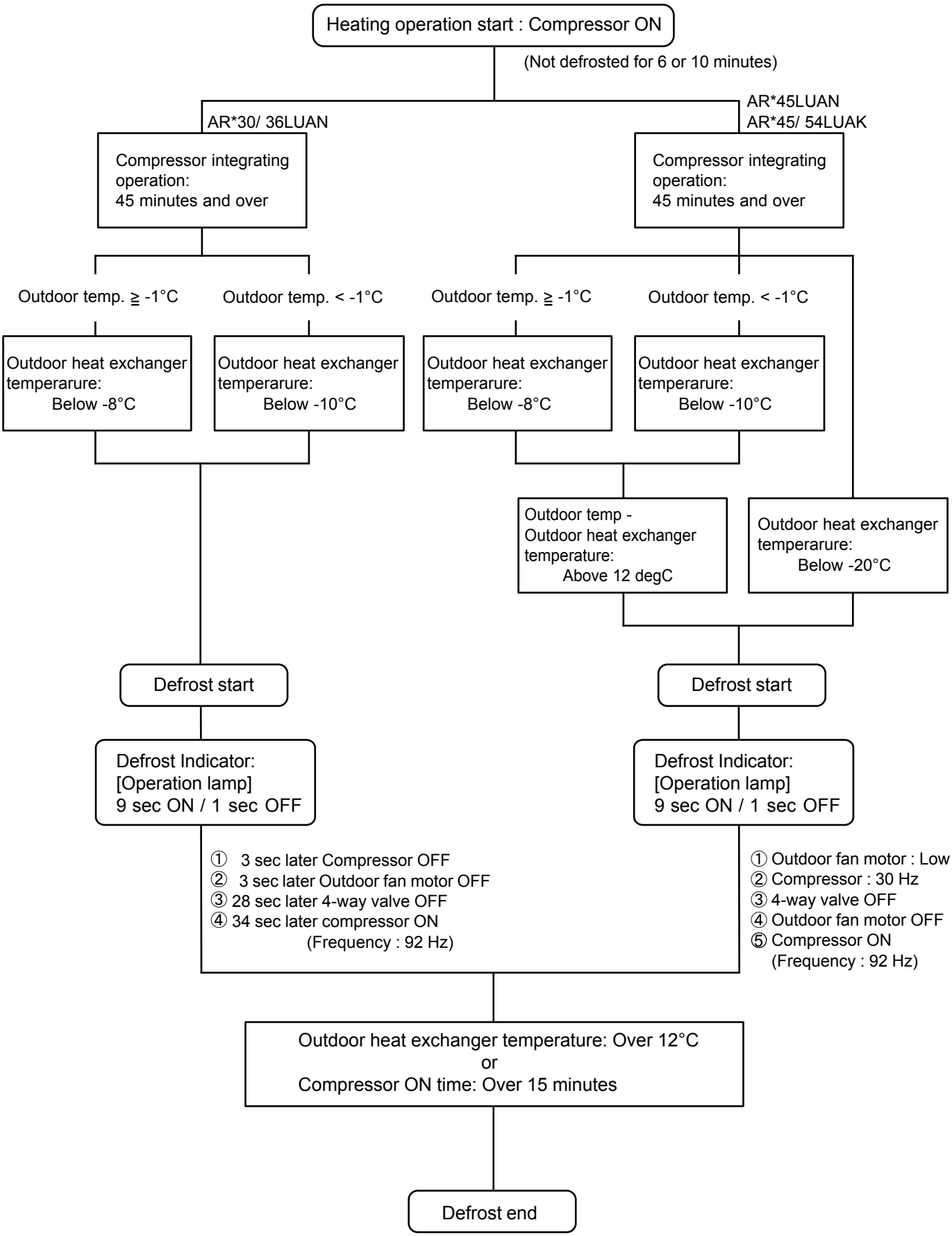
3-1. For AR*18LUAD/ 24LUAN

The defrosting shall proceed by the integrating operation time as follows.



3-2. AR*30/ 36/ 45LUAN/ 45/ 54LUAK

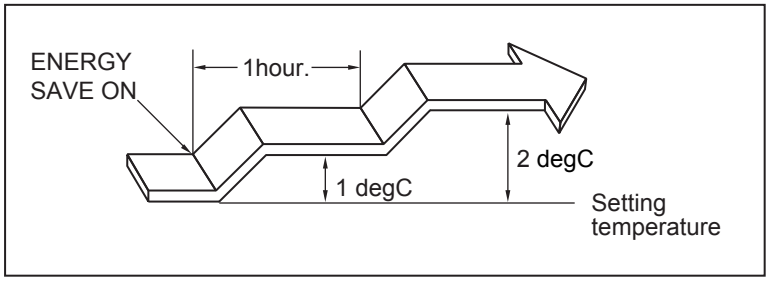
The defrosting shall proceed by the integrating operation time and outdoor heat exchanger temperature as follows.



5-19. ENERGY SAVE FUNCTION

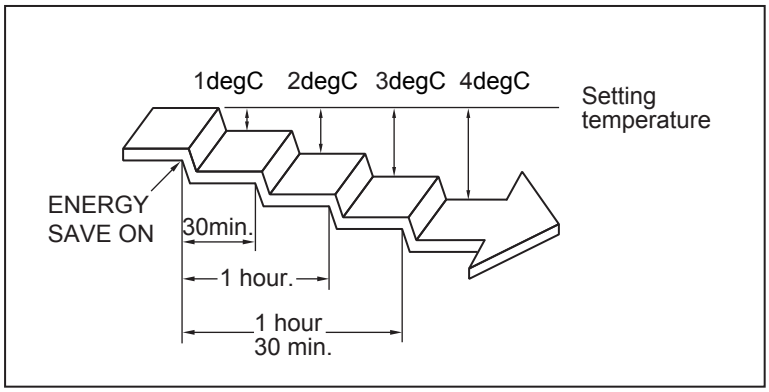
1. During Cooling / Dry operation:

The thermostat temperature setting increases by 1 degC as soon as the ENERGY SAVE button is pressed, and then increases by 1 degC after 1 hour later.
Afterwards, energy consumption is saved by continuing to cool or dry at a thermostat temperature of 2 degC higher than setting temperature.



2. During Heating operation:

The thermostat temperature setting decreases by 1 degC as soon as the ENERGY SAVE button is pressed, and then decreases by another 1 degC every 30 minutes.
Afterwards, energy consumption is saved by continuing to heat at a thermostat temperature of 4 degC lower than setting temperature.



5-20. VARIOUS PROTECTIONS

1. DISCHARGE GAS TEMPERATURE OVER RISE PREVENTION CONTROL

The discharge gas thermosensor (discharge thermistor : Outdoor side) will detect discharge gas temperature.

When the discharge temperature becomes higher than Temperature Ⅰ,the compressor frequency is decreased 10 Hz, and it continues to decrease the frequency for 10 Hz every 120 seconds until the temperature becomes lower than Temperature Ⅰ.
When the discharge temperature becomes lower than Temperature Ⅱ,the control of the compressor frequency is released.

When the discharge temperature becomes higher than Temperature Ⅲ,the compressor stops.
When the discharge temperature becomes lower than Temperature Ⅳ ,the compressor operates.

(Table 11 : Discharge Temperature Over Rise Prevention Control / Release Temperature)

	Temperature Ⅰ	Temperature Ⅱ	Temperature Ⅲ	Temperature Ⅳ
AR*18LUAD	110°C	105°C	120°C	80°C
AR*24LUAN				
AR*30LUAN				
AR*36LUAN				
AR*45LUAN				
AR*45LUAK				
AR*54LUAK				

2. CURRENT RELEASE CONTROL

2-1. For AR*18LUAD/ 24LUAN

The compressor frequency is controlled so that the outdoor unit input current does not exceeds the current limit value.
The compressor frequency returns to the designated frequency of the indoor unit at the time when the frequency becomes lower than the release value.

(Table 12-1 : Current Release Operation Value / Release Value)

	Current Release Operation Value	Release Value
AR*18LUAD	12.0A	11.5A
AR*24LUAN		

2-2. For AR*30/ 36/ 45LUAN/ 45/ 54LUAK

The compressor frequency is controlled so that the outdoor unit input current does not exceeds the current limit value that was set up with the outdoor temperature.
The compressor frequency returns to the designated frequency of the indoor unit at the time when the frequency becomes lower than the release value.

(Table 12-2 : Current Release Operation Value / Release Value)

[Heating]

AR*30LUAN AR*36LUAN	Outdoor unit fan speed				
	900 rpm	780 rpm	400 rpm	250 rpm	170 rpm
T0 ≧ 16°C	15.0A / 14.5A	15.0A / 14.5A	13.0A / 12.5A	10.0A / 9.5A	8.0A / 7.5A
16°C > T0 ≧ 5°C	18.0A / 17.5A				
T0 < 5°C		18.0A / 17.5A	18.0A / 17.5A	18.0A / 17.5A	18.0A / 17.5A

T0: Outdoor temperature

[Heating]

AR*45LUAN AR*45LUAK AR*54LUAK	Outdoor unit fan speed				
	850 rpm	780 rpm	350 rpm	200 rpm	150 rpm
T0 ≧ 12°C	23.5A / 23.0A	20.0A / 19.5A	20.0A / 19.5A	15.0A / 14.5A	12.0A / 11.5A
T0 < 12°C		23.5A / 23.0A	23.5A / 23.0A	23.5A / 23.0A	23.5A / 23.0A

T0: Outdoor temperature

[Cooling]

AR*30LUAN AR*36LUAN	Outdoor unit fan speed				
	850 rpm	780 rpm	400 rpm	250 rpm	170 rpm
T0 ≧ 45°C	10.0A / 9.5A	10.0A / 9.5A	10.0A / 9.5A	7.0A / 6.5A	5.5A / 5.0A
45°C > T0 ≧ 38°C	14.0A / 13.5A	14.0A / 13.5A			
38°C > T0 ≧ 19°C	18.0A / 17.5A				
19°C > T0 ≧ 13°C		15.0A / 14.5A	15.0A / 14.5A		7.0A / 6.5A
13°C > T0 ≧ 0°C				12.0A / 11.5A	
T0 < 0°C					9.5A / 9.0A

T0: Outdoor temperature

[Cooling]

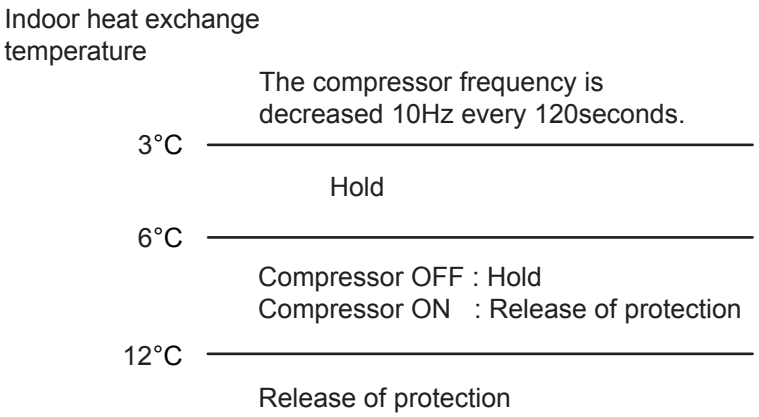
AR*45LUAN AR*45LUAK AR*54LUAK	Outdoor unit fan speed				
	850 rpm	780 rpm	400 rpm	350 rpm	300 rpm
T0 ≧ 45°C	12.0A / 11.5A	12.0A / 11.5A	12.0A / 11.5A	12.0A / 11.5A	12.0A / 11.5A
45°C > T0 ≧ 38°C	20.0A / 19.5A	20.0A / 19.5A			
38°C > T0 ≧ 31°C	23.5A / 23.0A				
31°C > T0 ≧ 25°C			18.0A / 17.5A		
25°C > T0 ≧ 19°C				18.0A / 17.5A	
19°C > T0 ≧ 13°C			20.0A / 19.5A		15.0A / 14.5A
T0 < 13°C					18.0A / 17.5A

T0: Outdoor temperature

3. ANTI-FREEZING CONTROL (Cooling mode)

The compressor frequency decreases on cooling mode when the indoor heat exchanger temperature sensor detects the temperature lower than 3°C.
Then, the anti-freezing control is released when it becomes higher than 6°C.

(Fig.12 : Anti-freezing Protection Operation / Release Temperature)



- When the compressor frequency becomes lower than minimum frequency, the compressor operates at minimum frequency.
  If the indoor heat exchanger temperature sensor detects the temperature lower than 3°C after 2minutes upon operating the compressor at minimum frequency, the compressor stops.

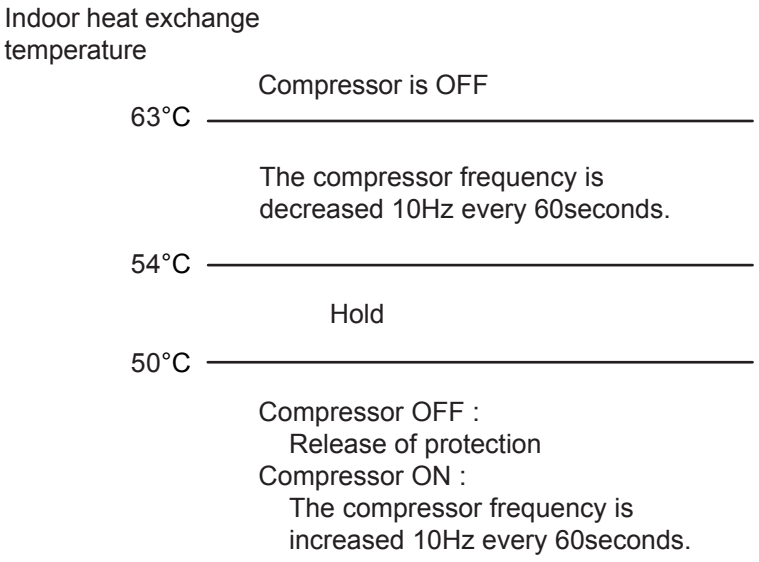
4. COOLING PRESSURE OVER RISE PROTECTION

When the outdoor unit heat exchange sensor temperature rises to 70.5°C or greater, the compressor is stopped and error display is indicated.

5. HIGH TEMPERATURE RELEASE CONTROL (HEATING MODE)

On heating mode, the compressor frequency is controlled as following based on the detection value of the indoor heat exchanger temperature sensor.

(Fig.13 : Heating Overload Protection Control)



Refrigerant
R410A

DUCT type
INVERTER

6 . REFRIGERANT CAUTION -R410A-

6. REFRIGERANT CAUTION -R410A-

6-1. R410A TOOLS

This air conditioner used R410A.
For installation and servicing, it is necessary to prepare the tools and machines that are different from the previous refrigerant.

◎ Mark shows the exclusive use for R410A.

◎ Gauge manifold . . . . . (Fig.4-1)
The specification of the gauge is different due to higher pressure.
The size of connection pipe is also different to prevent mis-use.

◎ Charge hose . . . . . (Fig.4-2)
Since the normal pressure is high, the connection pipe size is also different.

◎ Refrigerant cylinder . . . . . (Fig.4-3)
Confirm the refrigerant type before charging. Always charge liquid-phase refrigerant.

Electronic balance for refrigerant charging . . . . . (Fig.4-4)
Electronic balance is recommended as in the case of R410A.

◎ Vacuum pump with adapter to prevent reverse flow . . . . . .(Fig.4-5)
Conventional pump can be used.

Vacuum holder . . . . . (Fig.4-6)
Conventional pump can be used if adapter for preventing vacuum pump oil from flowing back is used.

◎ Gas leakage tester . . . . . (Fig.4-7)
Exclusive for HFC

Refrigerant cleaner . . . . . (Fig.4-8)
Brown paint as designated by the ARI, USA

◎ Flare tool . . . . . (Fig.4-9)
The shape of flare is different for high pressure condition.

◎ Torque wrench . . . . . (Fig.4-10)

◎ Refrigerant recovering equipment (Collector) . . . . . (Fig.4-11)
The type which can be used for any refrigerant is available

Nitrogen cylinder . . . . . (Fig.4-12)
This prevents an oxide film from forming in the pipe silver-alloy brazing work by turning the air out of the pipe and preventing the inside combustion.

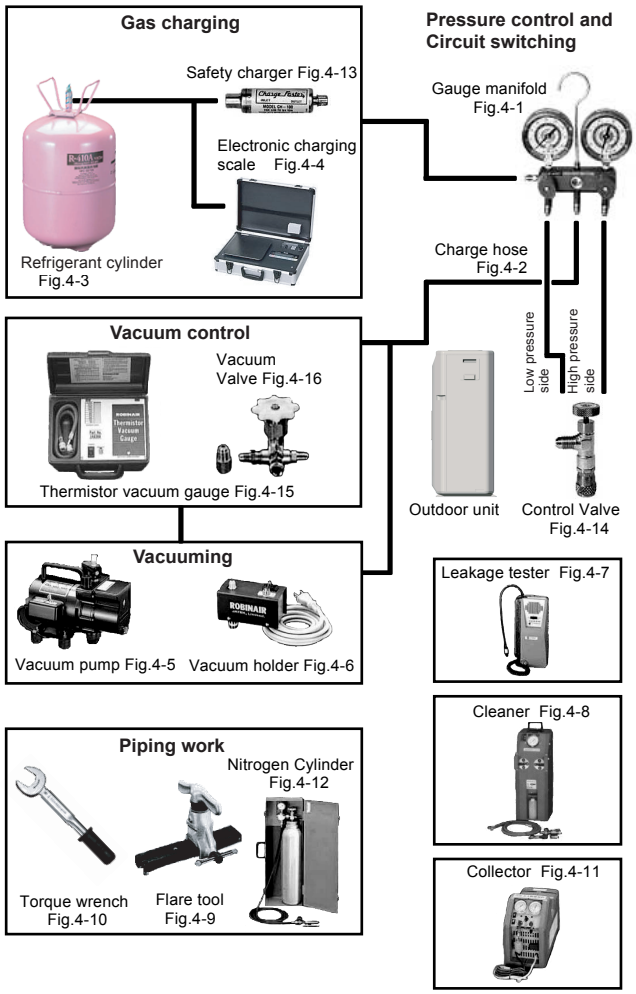
◎ Safety charger . . . . . (Fig.4-13)
It is always compulsory to change the liquid, because R410A is a mixed refrigerant and there is some fear that a mixing ratio changes. In order to avoid the refrigerant from returning to the compressor in a liquid state, the refrigerant can be charged instead of giving a load to the compressor with a safety charger.

Control valve . . . . . (Fig.4-14)
The control valve prevents the refrigerant from spouting when it is removed, as the charging hose side and the service port side are possible to open and close at the same time.

Thermistor vacuum gauge . . . . . (Fig.4-15)
To remove moisture from the refrigerating cycle completely, it is necessary to perform appropriate vacuum drying. For that reason, vacuum conditions can be confirmed certainly.

Vacuum valve . . . . . (Fig.4-16)
This valve builts in a check valve, and it is easily possible to vacuum a refrigerating cycle or check for degree of vacuum with it.

TOOLS AND EQUIPMENT (R410A)



*1 **Gauge Manifold**

	R410A	R22, R407C
High pressure gauge	-0.1～5.3 Mpa	-0.1～3.5 Mpa
Compond gauge	-0.1～3.8 Mpa	-0.1～1.7 Mpa
Port size	1/2UNF 5/16"	7/16UNF 1/4"

*2 **Charge hose**

	R410A	R22, R407C
Normal pressure	5.1 Mpa	3.4 Mpa
Breaking pressure	27.4 Mpa	17.2 Mpa
Port size	1/2UNF	7/16UNF

6-2. PRECAUTION FOR INSTALLATION

Precaution for installation

Pipe diameter, recommended material and wall thickness

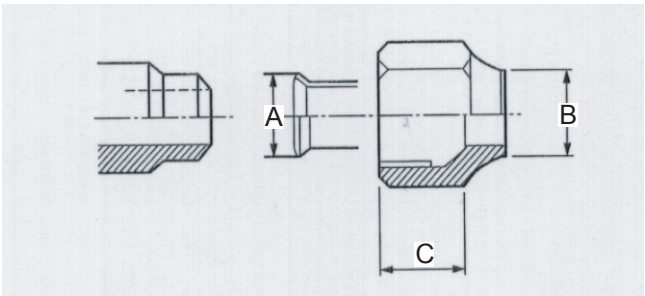
Nominal diameter (in)	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 3/8"	1 1/2"
Outside diameter (mm)	6.35	9.52	12.70	15.88	19.05	22.22	25.40	28.58	31.75	34.92	38.10
Material	COPPER JIS H3300-C1220T-O or equivalent [1]					COPPER JIS H3300-C1220T-H or equivalent [2]					
Wall thickness [3] (mm)	0.8	0.8	0.8	1.0	1.2	1.0	1.0	1.0	1.1	1.2	1.3

1) Allowable tensile stress ≧ 33 (N/mm^2); 2) Allowable tensile stress ≧ 61 (N/mm^2); 3) Design pressure 4.2MPa.

The pipe must be properly pressure rated for R410A
The pipe must be an air-conditioning refrigerant pipe.

Flare and flare nuts

Diameter	1/4"(6.35mm)		3/8"(9.52mm)		1/2"(12.7mm)		3/8"(15.88mm)		3/4"(19.05mm)	
Refrigerant	R410A	R22 /R407C	R410A	R22 /R407C	R410A	R22 /R407C	R410A	R22 /R407C	R410A	R22 /R407C
A	9.1	9.0	13.2	13.0	16.6	16.2	19.7	19.4	24	23.7
B	13	12	20	15	13	20	25	23	29	29
C	12	11	16	12.5	19	16	22	20	24	24
Nut width	17		22		26	24	29	27	36	



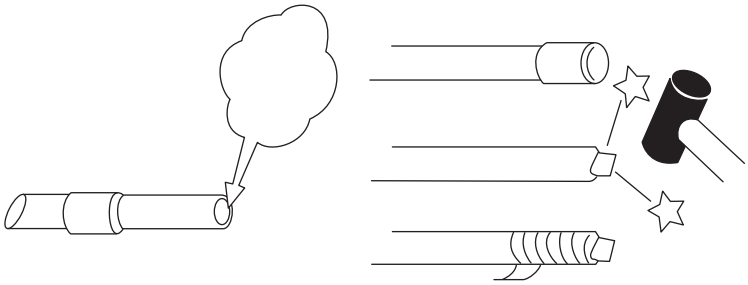
Always use the flare nut that is packed with the product.

Do not use existing (for R22) pipes

- Be sure to use new pipes when replacing conventional (R22) model with HFC (R407C, R410A) model.

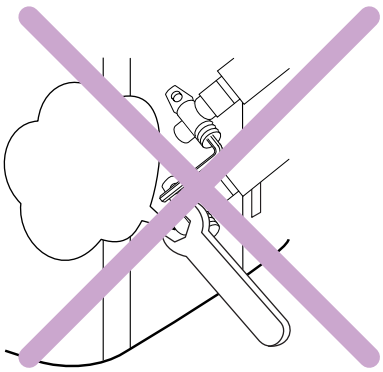
- If you use existing pipes, it may cause resolution of compressor oil by remaining mineral oil.

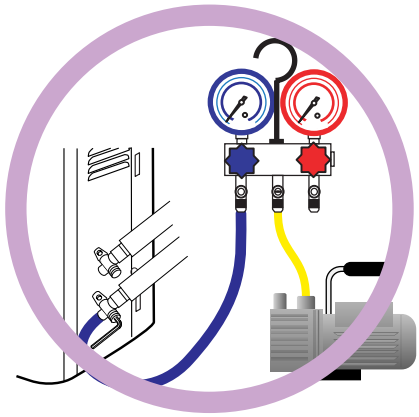
Be careful not to mix moisture and contamination into the pipe



Moisture and contamination in the pipe is a cause of trouble.

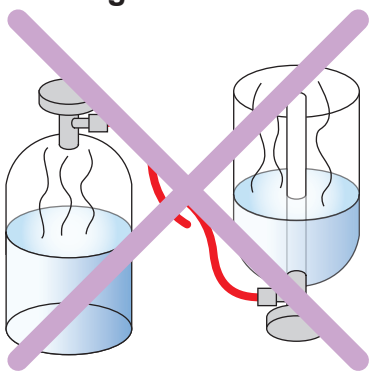
Air purge



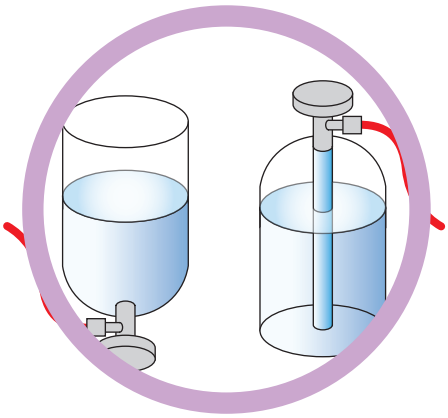


Always use a vacuum pump to purge air.

Refrigerant charge



Don't charge from the gas phase side.



Do it always from the liquid phase side.

Compressor oil is changed

- We developed new synthetic oil, since HFC refrigerant doesn't dissolve in mineral (for R22)oil.
- Be careful to handle synthetic oil, since it resolves easily by moisture and contamination.
- Don't mix new synthetic oil and mineral oil. It may cause trouble.

6-3. PRECAUTION FOR SERVICING

Feature 1 Refrigerant oil is different from before.

Refrigerant oil for New Refrigerant	Different point from previous one	Precaution on Tools
Synthetic oil **Ether** **Esther** ※ Previously it was mineral oil.	• **Absorbent character is high.** • **Contamination occurs when mixed withe other kind of oil.**	• **Use the gauge manifold and charge hose for New Refrigerant(HFC), which shall be segregated from those of R22.** • **Attach the stop valve on the vacuum pump and avoid the oil from reverse frow.** • **It is necessary to use the vacuum pump which can obtain the high vacuum condition.**

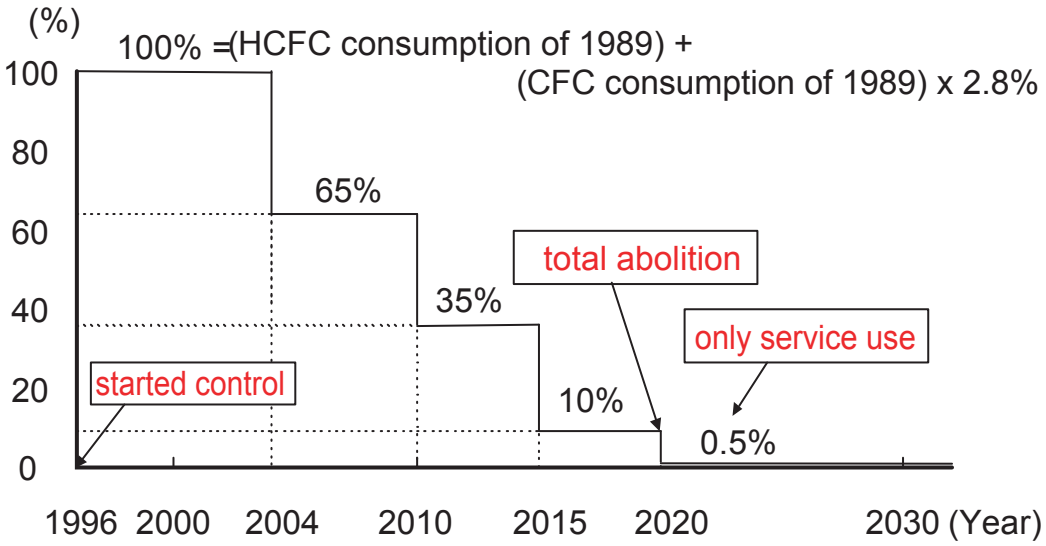
Feature 2 New Refrigerant has Approx 1.6 times higher pressure than previous refrigerant.

R410A	Different point from previous one	Precaution on Tools
High Pressure ※ 1.6 times of R22.	• **Diameter of Service port has been changed from 1/4 Flare to 5/16 Flare.** • **JIS standard of flare process It became lager** • **To keep thethickness of copper tube. (1/4,3/3=more than 0.8mm)**	• **It requires the gauge manifold and charge hose exclusively for R410A.** • **It requires the flare tool and torque wrench that satisfies New JIS standard.** ※ Previous flare tool + flare adapter can be used as well.

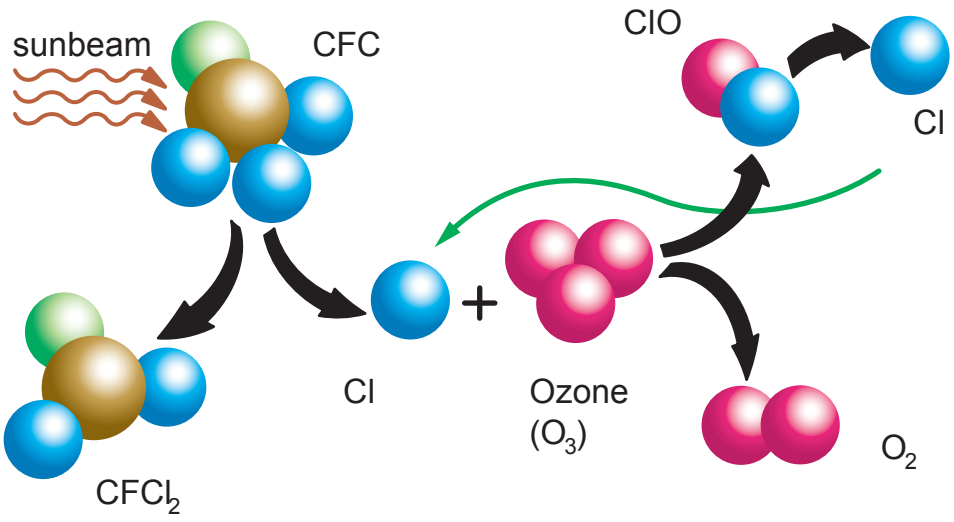
6-4. NEW REFRIGERANT R410A

∗What is HFC ?

Phase-out schedule of HCFC according to Montreal protocol



Ozone Layer depleting mechanism



What is CFC and HCFC?

CFC : Chloro-Fluoro-Carbon

High ODP(ozone depletion potential) chemical compound, including chlorine. (ODP:0.6-1.0)
For example : R12 (for refrigerator and car air-conditioner)

HCFC : Hydro-Chloro-Fluoro-Carbon

Low ODP chemical compound, including chlorine and hydrogen. (ODP:0.02-01)
For example : R22 (for air-conditioner)

HFC_3 : Hydro-Fluoro-Carbon

R134a (for Car air conditioner)
R407C (for air conditioner)

Refrigerant characteristics

	R410A	R407C	R22
Composition (wt%)	R32/R125 (50/50)	R32/R125/R134a (23/25/52)	R22 (100)
Boiling Point	- 51.4	- 43.6	- 40.8
Behavior	near azeotrope	zeotrope	---
Pressure at 54.5 °C (kPa)	3,406	2,262	2,151
Temperature Glide (deg)	0.11	5.4	0
ODP	0	0	0.055

Summary of R407C and R410A characteristics

	R410A	R407C
Advantage	• higher system performance • Near-Azeotropic refrigerant	• similar pressure as R22 (possible to design large equipment)
Disadvantage	• 1.6 times higher pressure than R22 (difficult to design against pressure resistance)	• Zeotropic refrigerant (handle with care)
Suitable for	• Small Air-Conditioners	• Large Air-Conditioners

* Desighed pressure of R410A refrigerant

Relation between R410A condensing temperature and saturated pressure.

< Pressure →Temp >

Pressure (Mpa)	Temp (℃)
2.20	37.9
2.25	38.7
2.30	39.6
2.35	40.5
2.40	41.3
2.45	42.1
2.55	43.8
2.60	44.6
2.65	45.3
2.70	46.1
2.75	46.8
2.80	47.6
2.85	48.3
2.90	49.0
2.95	49.8
3.00	50.5
3.05	51.2
3.10	51.9
3.15	52.6
3.20	53.2
3.25	53.9
3.30	54.6
3.35	55.3
3.40	55.9
3.45	56.5
3.50	57.1
2.55	57.8
3.60	58.4
3.65	59.0
3.70	59.6
3.75	60.2
3.80	60.8
3.85	61.4
3.90	52.0
3.95	62.5
4.00	63.1
4.05	63.6
4.10	64.2
4.15	64.8

< Temp→Pressure >

Temp (℃)	Pressure (Mpa)
39	2.27
40	2.32
41	2.38
42	2.44
44	2.57
45	2.63
46	2.69
47	2.76
48	2.83
49	2.90
51	3.04
52	3.11
53	3.18
54	3.26
56	3.41
57	3.49
58	3.57
59	3.65
61	3.82
62	3.90
63	3.99
64	4.08

6-5. DEFFERENCE FROM CONVENTIONAL MODEL (R22) AND PRECAUTIONS

OIL

- Use new synthetic oils such as ester because HFC series refrigerant has less solubility with mineral oils conventionally used for R22.
- As these new synthetic oils are easily influenced by moisture and dusts, they must be treated more carefully than the conventional lubricating oils.

CAUTION

For installation/servicing, take more precautions than the case of conventional refrigerants to avoid moisture and dusts entering the refrigerant circuit. Also, for storing parts, more precautions must be taken.

COMPRESSOR

- Use better grade of material for sliding parts for securing good lubrication of sliding part as HFC refrigerant does not contain chloride.
- Review insulating materials
- Increase pressure resistance strength

CAUTION

Check if the compressor is suitable for the refrigerant (model) when replacing. Complete welding within 15minutes after opening the cap when replacing.

HEAT EXCHANGER

- Review the water,contaminants controlling level
- Use thinner tube to increase pressure Increase capacity for resistance strength (only outdoor unit) improving performance

CAUTION

During storage, due care must be taken so that foreign matters such as dust and water do not enter.

4-WAY VALVE

- Review materials

CAUTION

Check if the valve is suitable for the refrigerant (model) when replacing.

2, 3-WAY VALVE

- Review material O-ring, valve core seal for securing suitability with oil.

CAUTION

Check if the valve is suitable for the refrigerant (model) when replacing.

Check Valve

- Review materials
- Change shape of pipe ends to increase pressure resistance strength.

CAUTION

Check if the valve is suitable for the refrigerant (model) when replacing.

Other Piping

- Review the water, contaminants controlling level.
- Review thickness of pipes.

CAUTION

During storage, due care must be taken so that foreign matters such as dust and water do not enter.

Refrigerant
R410A

DUCT type
INVERTER

7 . TROUBLE SHOOTING

7. TROUBLESHOOTING

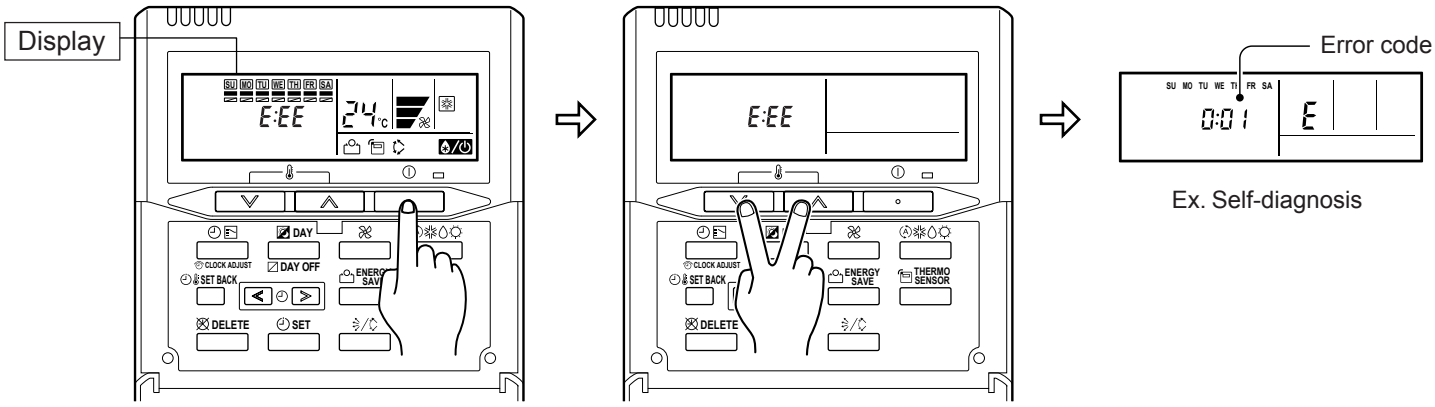
7-1 ERROR DISPLAY

7-1-1 WIRED REMOTE CONTROLLER DISPLAY

1. SELF - DIAGNOSIS

When the error indication "E:EE" is displayed, inspection of the air conditioning system is necessary. Please consult authoilzed servise personnel.

Run [Self-Diagnosis] if [E:EE] flashes on the clock display of the remote controller.



1. Stop the air conditioner operation.
2. Press the SET TEMPERATURE buttons ⋁ and ⋀ simultaneously for 5 seconds or more to start the self-diagnosis.
3. Press the SET TEMPERATURE buttons ⋁ and ⋀ simultaneously for 5 seconds or more or there is no key input for 20 seconds to stop the self-diagnosis.

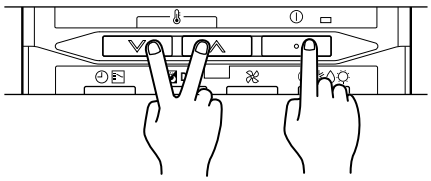
Error code	Error contents	Trouble shooting
E:00	Communication error (indoor unit ← remote control)	1
E:01	Communication error (Serial reverse transfer error)	2
E:02	Room temperature sensor open	3
E:03	Room temperature sensor short-circuited	
E:04	Indoor heat exchanger temperature sensor open	4
E:05	Indoor heat exchanger temperature sensor short-circuited	
E:06	Outdoor heat exchanger temperature sensor error	5
E:09	Water drain abnormal	6
E:0A	Outdoor temperature sensor error	7
E:0C	Outdoor discharge pipe temperature sensor error	8
E:11	Indoor EEPROM abnormal (Model No.)	9
E:12	Indoor fan motor abnormal	10
E:13	Outdoor communication signal error (Forward transfer signal error)	11
E:15	Compressor temperature sensor error	12
E:16	Pressure switch error	13
E:17	IPM error	14
E:18	CT error	15
E:19	Active filter module (AFM) error	16
E:1A	Compressor rotor location cannot detect (permanent stop)	17
E:1b	Outdoor unit fan motor error	18

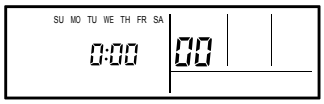
2. ERROR CODE HISTORY DISPLAY

Up to 16 memorized error codes may be displayed for the indoor unit connected to the remote controller.

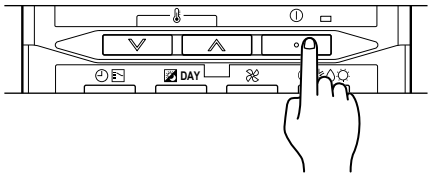
1. Stop the air conditioner operation.

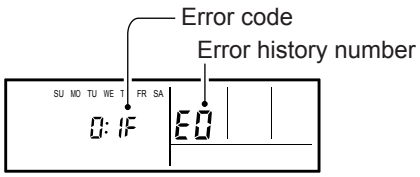
2. Press the SET TEMPERATURE buttons ⋁, ⋀ and the START/STOP button ⏻ simultaneously for 5 seconds or more to start the self-diagnosis.



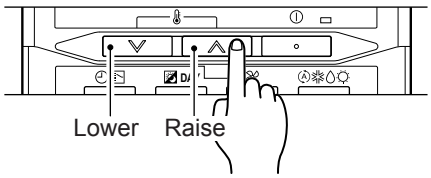


3. Press the START/STOP button.





4. Press the SET TEMPERATURE button to select the error history number.



0 ↔ 1 ↔ 2 ↔ 3 ↔ 4 ↔ 5 ↔ 6 ↔ 7
F ↔ E ↔ d ↔ c ↔ b ↔ A ↔ 9 ↔ 8

5. Press the SET TEMPERATURE buttons ⋁, ⋀ and START/STOP button ⏻ simultaneously for 5 seconds or more or there is no key input for 20 seconds to stop the display.

7-1-2 OUTDOOR UNIT DISPLAY

1. ERROR DISPLAY

For AR*18LUAD/ 24LUAN (AO*18/ 24LMAKL)

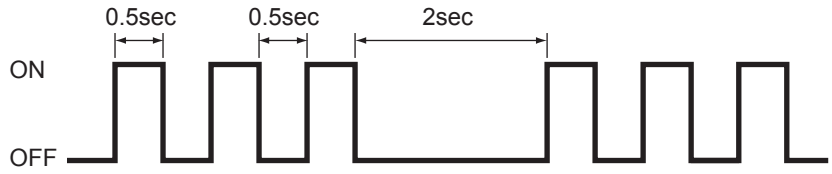
Error contents	LED Flashing Pattern	Display priority	Trouble shooting
Outdoor communication signal error (Forward transfer signal error)	1 time flash	1	11
Outdoor discharge pipe temperature sensor error	2 times blink	2	8
Outdoor heat exchanger temperature sensor error	3 times blink	3	5
Outdoor temperature sensor error	4 times blink	4	7
Pressure switch abnormal	8 times blink	5	13
IPM error	10 times blink	6	14
CT error	11 times blink	7	15
Compressor rotor location cannot detect	12 times blink	8	17
Compressor Start-up error	13 times blink	9	20

For AR*30L/ 36L/ 45L/ 54L (AO*30L/ 36L/ 45L/ 54L)

Error contents	LED Flashing Pattern	Display priority	Trouble shooting
Outdoor communication signal error (Forward transfer signal error)	1 time flash	1	11
Outdoor discharge pipe temperature sensor error	2 times blink	2	8
Outdoor heat exchanger temperature sensor error	3 times blink	3	5
Outdoor temperature sensor error	4 times blink	4	7
Compressor temperature sensor error	7 times blink	5	12
Heat sink temperature sensor error	8 times blink	6	19
Pressure switch abnormal	9 times blink	7	13
IPM error	12 times blink	8	14
Compressor rotor location cannot detect	13 times blink	9	17
Compressor Start-up error	14 times blink	10	20
Outdoor unit fan motor error (upper fan)	15 times blink	11	18
Outdoor unit fan motor error (lower fan)	16 times blink	12	

2. ERROR DISPLAY METHOD

Outdoor LED Blink (1 to 16 times) 0.5sec ON / 0.5sec OFF blinking



3. NORMAL OPERATION DISPLAY

Operation	LED Blinking Pattern
Normal operation	Continuously lighting
Protected operation	5sec ON / 1sec OFF
Pump down operation	1sec ON / 1sec OFF

7-2 TROUBLE SHOOTING WITH ERROR CODE

Trouble shooting 1 **INDOOR UNIT Error Method:** **Communication Error** **(Indoor unit ← Remote control)**	**Indicate or Display:** **Outdoor Unit : No indication** **ERROR CODE : E : 00**
Detective Actuators: Indoor unit controller PCB circuit Wired Remote Control	**Detective details:** When the indoor unit cannot receive the signal from Wired Remote more than 10seconds after power ON, or the indoor unit cannot receive the signal more than 1minute during normal operation.

Forecast of Cause:

1. Terminal connection abnormal 2. Wired Remote Control failure 3. Controller PCB failure

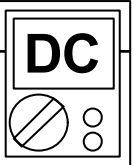
Check Point 1 : Check the connection of terminal

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

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

OK

Check Point 2 : Check Remote Control and Controller PCB



- Check Voltage at CN17 (For AR18L) or CN6 (For AR24L- 54L) of Controller PCB. (Power supply to Remote Control)

>> If it is DC12V, Remote Control is failure. (Controller PCB is normal) >> Replace Remote Control
>> If it is DC 0V, Controller PCB is failure. (Check Remote Control once again) >> Replace Controller PCB

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

Trouble shooting 2 **OUTDOOR UNIT Error Method:** **Communication Error** **(Serial Reverse Transfer Error)**	**Indicate or Display:** **Outdoor Unit : No indication** **ERROR CODE : E : 01**
Detective Actuators: Outdoor Unit Main PCB Circuit Active Filter Module	**Detective details:** When the indoor unit cannot receive the serial signal from Outdoor unit more than 10seconds.

Forecast of Cause:

1. Connection failure 2. External cause 3. Main PCB failure 4. Active Filter Module failure

Check Point 1-1 : Reset the power and operate

- Does Error indication show again?

NO → **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).

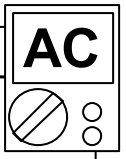
YES

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 Installation Manual or Data & Technical Manual.
- Check connection between Outdoor Unit Main PCB and Filter PCB.
  (If there is loose connector or open cable)

OK

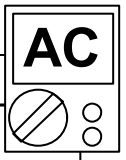
Check Point 3 : Check the voltage of power supply



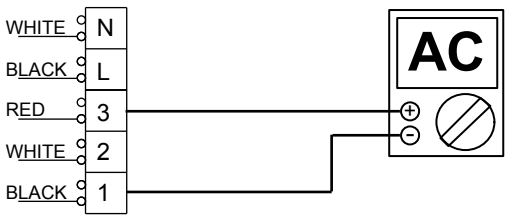
- Check the voltage of power supply
  >> Check if AC198 - 264V appears at Outdoor Unit Terminal L - N.

OK

Check Point 4 : Check Serial Signal (Reverse Transfer Signal)



- Check Serial Signal (Reverse Transfer Signal)
  >> Check if Indicated value swings between AC70V and AC130V at Outdoor Unit Terminal 1 - 3.
  >> If it is abnormal, Check Active Filter Module. (PARTS INFORMATION 3)
  >>If Active Filter Module is abnormal, replace it.
  >>If Active Filter Module is normal, replace Main PCB.



Trouble shooting 3 **INDOOR UNIT Error Method:** **Room Temperature Sensor Error**	**Indicate or Display:** **Outdoor Unit : No indication** **ERROR CODE : E : 02 / 03**
Detective Actuators: Indoor Unit Controller PCB Circuit Room Temperature Thermistor	**Detective details:** When Room Temperature Thermistor open or short-circuit is detected at power ON.

Forecast of Cause :

1. Connector connection failure 2.Thermistor failure 3. Controller PCB failure

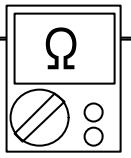
Check Point 1 : Check connection of Connector

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

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

OK

Check Point 2 : Remove connector and check Thermistor resistance value



Thermistor Characteristics (Approx. value)

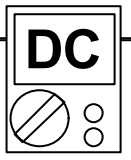
Temperature	0°C	5°C	10°C	15°C	20°C	25°C	30°C	35°C
Resistance Value (kΩ)	33.6	25.9	20.2	15.8	12.5	10.0	8.04	6.51

Temperature	40°C	45°C	50°C
Resistance Value (kΩ)	5.30	4.35	3.59

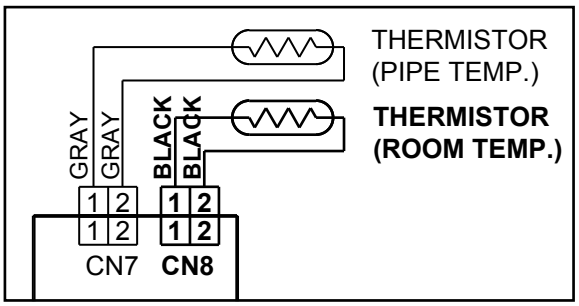
▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

Check Point 3 : Check voltage of Controller PCB (DC5.0V)



Make sure circuit diagram of indoor unit and check terminal voltage at Thermistor (DC5.0V)



▶ **If the voltage does not appear, replace Controller PCB.**

Trouble shooting 4 **INDOOR UNIT Error Method:** **Indoor Heat Exchanger Temperature Sensor Error**	**Indicate or Display:** **Outdoor Unit : No indication** **ERROR CODE : E : 04 / 05**

Detective Actuators:	**Detective details:**
Indoor Unit Controller PCB Circuit Heat Exchanger Temperature Thermistor	When Heat Exchanger Temperature Thermistor open or short-circuit is detected at power ON.

Forecast of Cause :

1. Connector connection failure 2.Thermistor failure 3. Controller PCB failure

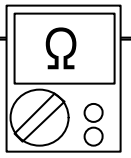
Check Point 1 : Check connection of Connector

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

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

OK

Check Point 2 : Remove connector and check Thermistor resistance value



Thermistor Characteristics (Approx. value)

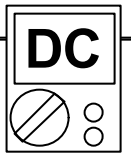
Temperature	0°C	5°C	10°C	15°C	20°C	25°C	30°C	35°C
Resistance Value (kΩ)	176	134	103	80.3	62.9	49.7	39.6	31.7

Temperature	40°C	45°C	50°C
Resistance Value (kΩ)	25.6	20.8	17.1

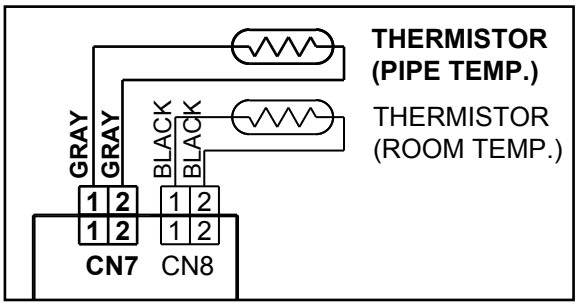
▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

Check Point 3 : Check voltage of Controller PCB (DC5.0V)



Make sure circuit diagram of indoor unit and check terminal voltage at Thermistor (DC5.0V)



▶ **If the voltage does not appear, replace Controller PCB.**

Trouble shooting 5 **OUTDOOR UNIT Error Method:** **Outdoor Heat Exchanger Temperature Sensor Error**	**Indicate or Display:** **Outdoor Unit : LED 3 times blink** **ERROR CODE : E : 06**
Detective Actuators: Outdoor Unit Main PCB Circuit Heat Exchanger Temperature Thermistor	**Detective details:** When Heat Exchanger Temperature Thermistor open or short-circuit is detected at power ON or while running the compressor.

Forecast of Cause :

1. Connector connection failure 2.Thermistor failure 3. Main PCB failure

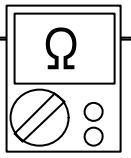
Check Point 1 : Check connection of Connector

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

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

OK

Check Point 2 : Remove connector and check Thermistor resistance value



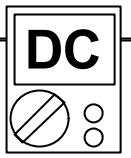
Thermistor Characteristics (Approx. value)

Temperature	-10°C	-5°C	0°C	5°C	10°C	15°C	20°C	25°C	30°C
Resistance Value (kΩ)	27.5	20.9	16.1	12.4	9.73	7.67	6.10	4.89	3.95

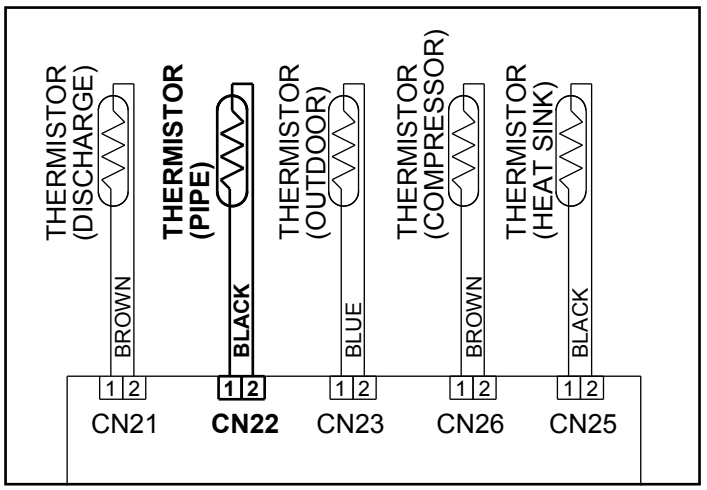
▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

Check Point 3 : Check voltage of Main PCB (DC5.0V)



Make sure circuit diagram of outdoor unit and check terminal voltage at Thermistor (DC5.0V)



▶ **If the voltage does not appear, replace Main PCB.**

Trouble shooting 7 **OUTDOOR UNIT Error Method:** **Outdoor Temperature Sensor Error**	**Indicate or Display:** **Outdoor Unit : LED 4 times blink** **ERROR CODE : E : 0A**

Detective Actuators:	**Detective details:**
Outdoor Unit Main PCB Circuit Outdoor Temperature Thermistor	When Outdoor Temperature Thermistor open or short-circuit is detected at power ON or while running the compressor.

Forecast of Cause :

1. Connector connection failure 2.Thermistor failure 3. Main PCB failure

Check Point 1 : Check connection of Connector

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

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

OK

Check Point 2 : Remove connector and check Thermistor resistance value

Thermistor Characteristics (Approx. value)

Temperature	-20°C	-10°C	-5°C	0°C	5°C	10°C	15°C	20°C
Resistance Value (kΩ)	115	62.3	46.6	35.2	26.9	20.7	16.1	12.6

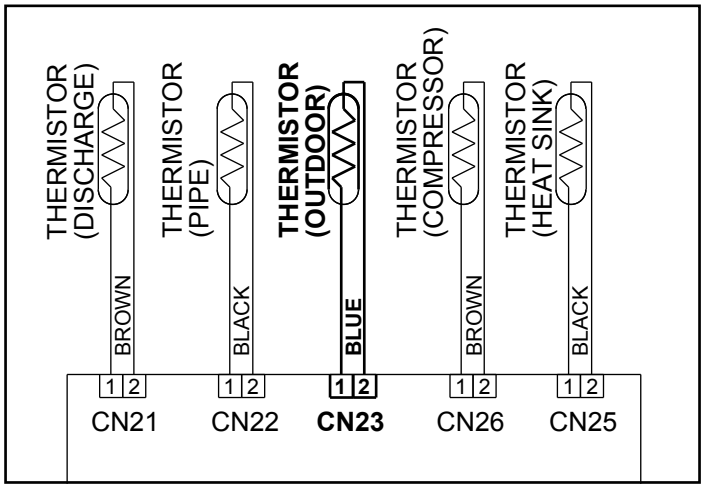
Temperature	30°C	40°C	50°C	60°C	70°C
Resistance Value (kΩ)	7.97	5.18	3.45	2.36	1.65

▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

Check Point 3 : Check voltage of Main PCB (DC5.0V)

Make sure circuit diagram of outdoor unit and check terminal voltage at Thermistor (DC5.0V)



▶ **If the voltage does not appear, replace Main PCB.**

Trouble shooting 8 **OUTDOOR UNIT Error Method:** **Outdoor Discharge Pipe Temperature Sensor Error**	**Indicate or Display:** **Outdoor Unit : LED 2 times blink** **ERROR CODE : E : 0C**

Detective Actuators:	**Detective details:**
Outdoor Unit Main PCB Circuit Discharge Pipe Temperature Thermistor	When Discharge Pipe Temperature Thermistor open or short-circuit is detected at power ON or while running the compressor.

Forecast of Cause :

1. Connector connection failure 2.Thermistor failure 3. Main PCB failure

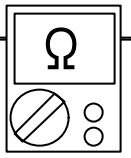
Check Point 1 : Check connection of Connector

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

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

OK

Check Point 2 : Remove connector and check Thermistor resistance value



Thermistor Characteristics (Approx. value)

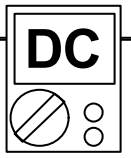
Temperature	0°C	5°C	10°C	15°C	20°C	30°C	40°C	50°C	60°C
Resistance Value (kΩ)	176	135	105	81.8	64.5	41.1	26.9	18.1	12.5

Temperature	70°C	80°C	90°C	100°C	120°C	140°C	160°C	180°C
Resistance Value (kΩ)	8.78	6.31	4.61	3.43	1.98	1.21	0.77	0.51

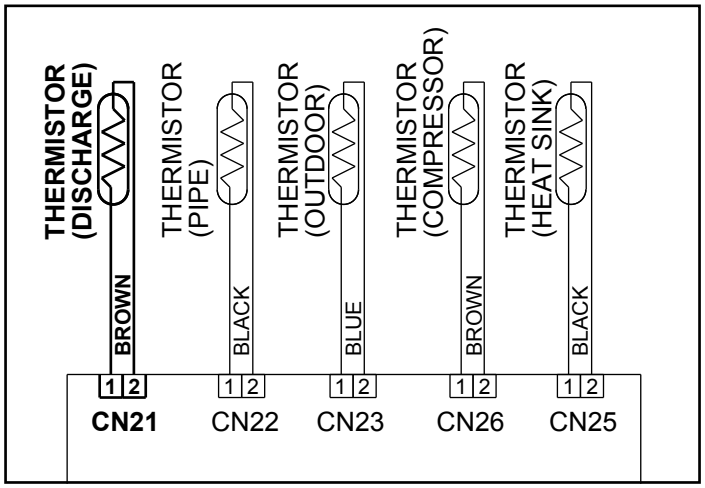
▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

Check Point 3 : Check voltage of Main PCB (DC5.0V)



Make sure circuit diagram of outdoor unit and check terminal voltage at Thermistor (DC5.0V)



▶ **If the voltage does not appear, replace Main PCB.**

Trouble shooting 9 **INDOOR UNIT Error Method:** **Indoor EEPROM abnormal (Model No.)**	**Indicate or Display:** **Outdoor Unit : No indication** **ERROR CODE : E : 11**

Detective Actuators:	**Detective details:**
Indoor Unit Controller PCB circuit	When the model information being read from EEPROM has an apparent error.

Forecast of Cause:

1. External cause 2. Defective connection of electric components 3. Controller PCB failure

Check Point 1-1 : Reset Power Supply and operate

- Does Error indication show again?

NO → 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.

YES → 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 Controller PCB

▶ **Change Controller PCB.**

Note : EEPROM

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

Trouble shooting 10 **INDOOR UNIT Error Method:** **Indoor Fan Motor abnormal**	**Indicate or Display:** **Outdoor Unit : No indication** **ERROR CODE : E : 12**
Detective Actuators: Indoor Unit Controller PCB Circuit Indoor Fan Motor	**Detective details:** When the condition that actual frequency of Indoor Fan is below 1/3 of target frequency is continued more than 56 seconds.

Forecast of Cause:

1. Fan rotation failure 2. Fan motor winding open 3. Motor protection by surrounding temperature rise
4. Capacitor failure 5. Control PCB failure

Check Point 1 : Check rotation of Fan

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

OK

Check Point 2 : Check Motor winding

- Check Indoor Fan motor. **(PARTS INFORMATION 5)**
  >>If Fan motor is abnormal, replace it.

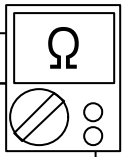
OK

Check Point 3 : Check ambient temp. 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.

OK

Check Point 4 : Check Motor Capacitor



- Check continuity of motor capacitor
  >>If it is shorted, replace the capacitor.

OK

Check Point 5 : Replace Controller PCB

▶ **If Check Point 1- 4 do not improve the symptom, replace Controller PCB.**

Trouble shooting 11 **INDOOR UNIT Error Method:** **Outdoor Communication Signal Error (Forward Transfer Signal Error)**	**Indicate or Display:** **Outdoor Unit : LED 1 time blink** **ERROR CODE : E : 13**
Detective Actuators: Indoor Unit Controller PCB Circuit	**Detective details:** When the outdoor unit cannot receive the serial signal from Indoor unit more than 10seconds.

Forecast of Cause:

1. Connection failure 2. External cause 3. Controller PCB failure

Check Point 1-1 : Reset the power

- Does Error indication reappear?

NO → **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).

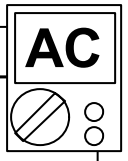
YES

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 Installation Manual or Data & Technical Manual.
- Check connection between Indoor Unit Controller PCB and Filter PCB.
  (If there is loose connector or open cable)

OK

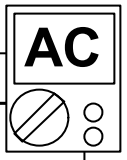
Check Point 3 : Check the voltage of power supply



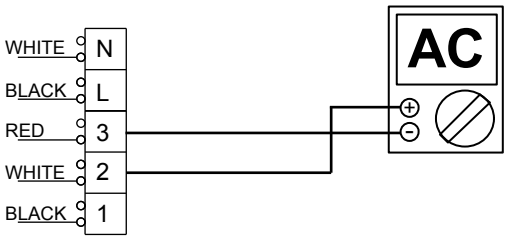
- Check the voltage of power supply
  >> Check if AC198 - 264V appears at Outdoor Unit Terminal L - N.

OK

Check Point 4 : Check Serial Signal (Forward Transfer Signal)



- Check Serial Signal (Forward Transfer Signal)
  >> Check if Indicated value swings between AC70V and AC130V at Outdoor Unit Terminal 2 - 3.
  >> If it is abnormal, Controller PCB is failure. >> Replace Controller PCB



(For AR*30L/36L/ 45L/ 54L)

Trouble shooting 12 **OUTDOOR UNIT Error Method:** **Compressor Temperature Sensor Error**	**Indicate or Display:** **Outdoor Unit : LED 7 times blink** **ERROR CODE : E : 15**

Detective Actuators: Outdoor Unit Main PCB Circuit Compressor Temperature Thermistor	**Detective details:** When Compressor Temperature Thermistor open or short-circuit is detected at power ON or while running the compressor.

Forecast of Cause :

1. Connector connection failure 2. Thermistor failure 3. Main PCB failure

Check Point 1 : Check connection of Connector

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

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

OK

Check Point 2 : Remove connector and check Thermistor resistance value

Thermistor Characteristics (Rough value)

Temperature	0°C	5°C	10°C	15°C	20°C	30°C	40°C	50°C	60°C
Resistance Value (kΩ)	176	135	105	81.8	64.5	41.1	26.9	18.1	12.5

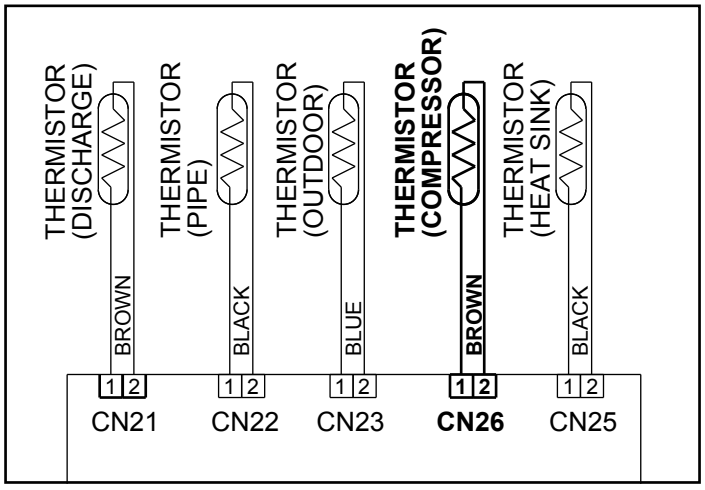
Temperature	70°C	80°C	90°C	100°C	120°C	140°C	160°C	180°C
Resistance Value (kΩ)	8.78	6.31	4.61	3.43	1.98	1.21	0.77	0.51

▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

Check Point 3 : Check voltage of Main PCB (DC5.0V)

Make sure circuit diagram of outdoor unit and check terminal voltage at Thermistor (DC5.0V)



▶ **If the voltage does not appear, replace Main PCB.**

Trouble shooting 13 **OUTDOOR UNIT Error Method:** **Pressure Switch Error**	**Indicate or Display:** **Outdoor Unit : LED 8 times blink (For AR*18L/ 24L)** **9 times blink (For AR*30L/ 36L/ 45L/ 54L)** **ERROR CODE : E : 16**
Detective Actuators: Outdoor Unit Main PCB Circuit Pressure Switch	**Detective details:** When pressure switch open is detected in 10 seconds after the power is turned on.

Forecast of Cause :

1. Connector connection failure 2. Pressure Switch failure 3. Main PCB failure

Check Point 1 : Reset Power Supply and operate

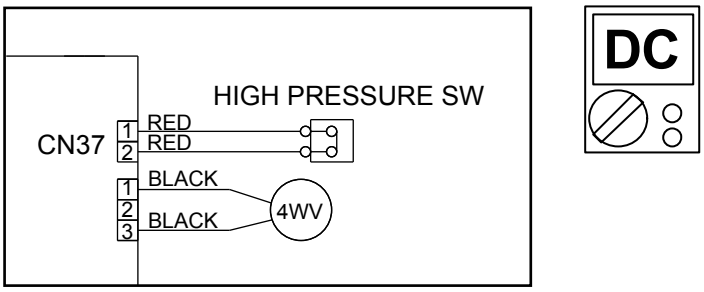
- Does abnormal LED indication show again?

NO

YES

Check Point 2 : Check voltage of Main PCB (DC5.0V)

- Make sure circuit diagram of outdoor unit and check terminal voltage at Pressure Switch. (DC5.0V)



▶ **If the voltage does not appear, replace Main PCB.**

OK

Check Point 3 : Check Pressure Switch

- Check if connector is loose or cable is open.
  >> If no abnormal connection is found, replace Pressure Switch.

▶ **After replacing Pressure Switch, check operating condition and pressure in operation.**

Trouble shooting 14 **OUTDOOR UNIT Error Method:** **IPM error (Permanent Stop)**	**Indicate or Display:** **Outdoor Unit : LED 10 times blink (For AR*18L/ 24L)** **12 times blink (For AR*30L/ 36L/ 45L/ 54L)** **ERROR CODE : E : 17**
Detective Actuators: Outdoor Unit Main PCB Circuit Compressor	**Detective details:** ① When more than normal operating current to IPM in Main PCB flows, the compressor stops. ② After the compressor restarts, if the same operation is repeated within 40sec, the compressor stops again. ③ If ① and ② repeats 5 times, the compressor stops permanently.

Forecast of Cause :

1. Defective connection of electric components
2. Outdoor Fan Operation failure
3. Outdoor Heat Exchanger clogged
4. Compressor failure
5. Main PCB failure

Check Point 1 : Check connections of Outdoor Unit Electrical Components

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

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

OK

Check Point 2 : Check Outdoor Fan, Heat Exchanger

- Is there anything obstructing the air distribution circuit?
- Is there any clogging of Outdoor Heat Exchanger?
- Is the Fan rotating by hand when operation is off ?

>> If the Fan Motor is locked, replace it.

AR*18L/ 24L

OK

Check Point 3 : Check Outdoor Fan

- Check Outdoor Fan Motor. (Refer to Trouble shooting 18)

>> If the Fan Motor is failure, replace it.

OK

Check Point 4 : Check Compressor

- Check Compressor. **(PARTS INFORMATION 2)**

OK

Check Point 5 : Replace Main PCB

▶ If Check Point 1～4 do not improve the symptom, change Main PCB.

Trouble shooting 15 **OUTDOOR UNIT Error Method:** CT error	**Indicate or Display:** Outdoor Unit : LED 11 times blink (For AR*18L/ 24L) No indication (For AR*30L/ 36L/ 45L/ 54L) ERROR CODE : E : 18
Detective Actuators: Outdoor Unit Main PCB Circuit Outdoor Unit Filter PCB Circuit (Input current sensor unit)	**Detective details:** When Input Current Sensor has detected lower than 0.5A while Inverter Compressor is operating at higher than 56Hz, after 1minute upon starting the Compressor. (Except during the defrost operation)

Forecast of Cause :

1. Defective connection of electric components 2. External cause 3. Filter PCB failure 4. Main PCB failure

Check Point 1-1 : Reset Power Supply and operate

- Does Error indication show again?

NO

YES

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.

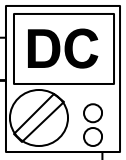
Check Point 1-2 :
Check external cause at Indoor and Outdoor (Voltage drop or Noise)

- 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.

OK

AR*18L/ 24L

Check Point 3 : Check Filter PCB and Main PCB



- Check DC voltage of CN1 (between 2 (Brown) and 3 (Red)) on Filter PCB.

>> After 40seconds upon starting the Compressor,
If it is higher than 0.2V, Main PCB is failure. (Filter PCB is normal) >> Replace Main PCB
>> If it is lower than 0.2V, Filter PCB is failure. >> Replace Filter PCB

▶ **If it does not improve the symptom, change Main PCB.**

Check Point 4 : Replace Main PCB

▶ **If Check Point 1, 2 do not improve the symptom, change Main PCB.**

Trouble shooting 16 **OUTDOOR UNIT Error Method:** **Active Filter Module (AFM) error**	**Indicate or Display:** **Outdoor Unit : No indication** **ERROR CODE : E : 19**

Detective Actuators:	**Detective details:**
Outdoor Unit Main PCB Circuit Active Filter Module	When inverter input DC voltage is higher than 467V or lower than 237V. When a momentary power cut off occurred on low voltage.

Forecast of Cause :

1. External cause 2. Connector connection failure 3. Active Filter Module failure 4 . Main PCB failure

Check Point 1 : Check external cause at Indoor and Outdoor (Voltage drop or Noise)

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

OK

Check Point 2 : Check connection of Connector

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

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

OK

Check Point 3 : Check Active Filter Module

- Check Active Filter Module. **(PARTS INFORMATION 3)**

>>If Active Filter Module is abnormal, replace it.

OK

Check Point 4 : Replace Main PCB

▶ **If Check Point 1, 2 do not improve the symptom, change Main PCB.**

Trouble shooting 17 **OUTDOOR UNIT Error Method:** **Compressor rotor location cannot detect (Permanent Stop)**	**Indicate or Display:** **Outdoor Unit : LED 12 times blink (For AR*18L/ 24L)** **13 times blink (For AR*30L/ 36L/ 45L/ 54L)** **ERROR CODE : E : 1A**
Detective Actuators: Outdoor Unit Main PCB Circuit Compressor	**Detective details:** ① While running the compressor, if the detected rotor location is out of phase with actual rotor location more than 90 degrees, the compressor stops. ② After the compressor restarts, if the same operation is repeated within 40sec, the compressor stops again. ③ If ① and ② repeats 5 times, the compressor stops permanently.

Forecast of Cause :

1. Defective connection of electric components 2. Main PCB failure 3. Compressor failure

Check Point 1 : Check Noise from Compressor

・Turn on Power and check operation noise.

▶ **If an abnormal noise show, replace Compressor.**

OK

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 PARTS INFORMATION 2)

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

OK

Check Point 3: Replace Main PCB

▶ **If Check Point 1,2 do not improve the symptom, change Main PCB.**

(For AR*30L/36L/ 45L/ 54L)

Trouble shooting 18 **OUTDOOR UNIT Error Method:** **Outdoor Unit Fan Motor Error**	**Indicate or Display:** **Outdoor Unit : LED 15 (Fan motor 1) times blink** **16 (Fan motor 2) times blink** **ERROR CODE : E : 1b**
Detective Actuators: Outdoor Unit Main PCB Circuit Outdoor Fan Motor	**Detective details:** ①When outdoor fan rotation speed is less than 100rpm in 20 seconds after fan motor starts, fan motor stops. ②After fan motor restarts, if the same operation within 60sec is repeated 3 times in a row, compressor and fan motor stops. ③If ① and ② repeats 5 times in a row, compressor and fan motor stops permanently.

Forecast of Cause:

1. Fan rotation failure 2. Motor protection by surrounding temperature rise 3. Main PCB failure

Check Point 1 : Check rotation of Fan

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

OK

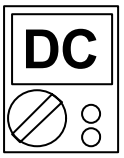
Check Point 2 : Check ambient temp. around motor

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

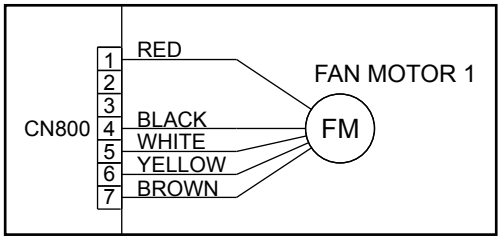
OK

Check Point 3 : Check Output Voltage of Main PCB

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

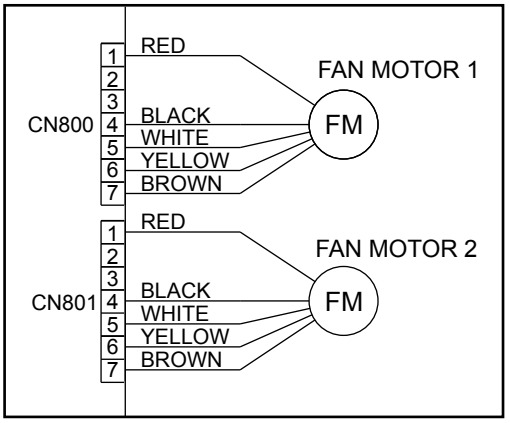


AR*30L/ 36L



Read wire	DC voltage
Red - Black	300～400V
White - Black	15±1.5V

AR*45L/ 54L



▶ **If the voltage is not correct, replace Main PCB.**

Trouble shooting 19 **OUTDOOR UNIT Error Method:** **Heat Sink Temperature Sensor Error**	**Indicate or Display:** **Outdoor Unit : LED 8 times blink** **ERROR CODE : No indication**

Detective Actuators:	**Detective details:**
Outdoor Unit Main PCB Circuit Heat Sink Temperature Thermistor	When Heat Sink Temperature Thermistor open or short-circuit is detected at power ON or while running the compressor.

Forecast of Cause :

1. Connector connection failure 2.Thermistor failure 3. Main PCB failure

Check Point 1 : Check connection of Connector

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

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

OK

Check Point 2 : Remove connector and check Thermistor resistance value

Thermistor Characteristics (Approx. value)

Temperature		0°C	5°C	10°C	15°C	20°C	30°C	40°C	50°C
Resistance Value (kΩ)	AR*18L/ 24L	176	135	105	81.8	64.5	41.1	26.9	18.1
	AR*30L/36L/45L/54L	16.1	12.4	9.73	7.67	6.10	3.95	2.62	1.79

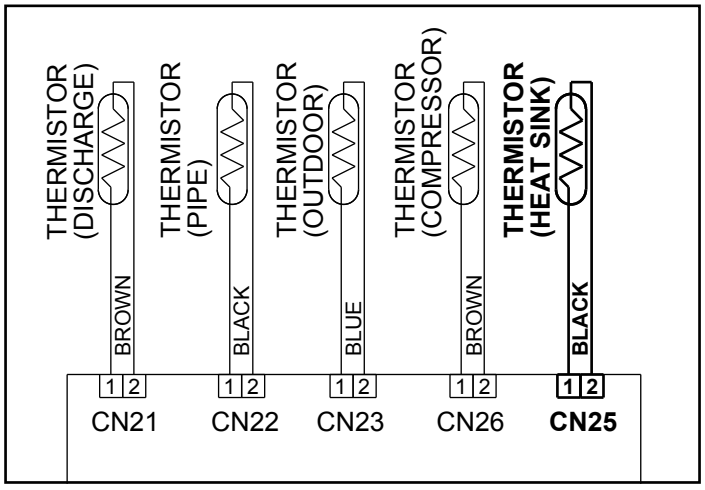
Temperature		60°C	70°C	80°C	90°C	100°C	120°C
Resistance Value (kΩ)	AR*18L/ 24L	12.5	8.78	6.31	4.61	3.43	1.98
	AR*30L/36L/45L/54L	1.25	0.89	0.65	0.48	0.36	0.21

▶ **If Thermistor is either open or shorted, replace it and reset the power.**

OK

Check Point 3 : Check voltage of Main PCB (DC5.0V)

Make sure circuit diagram of outdoor unit and check terminal voltage at Thermistor (DC5.0V)



▶ **If the voltage does not appear, replace Main PCB.**

Trouble shooting 20 **OUTDOOR UNIT Error Method:** Compressor Start-up error (Permanent Stop)	**Indicate or Display:** Outdoor Unit : LED 13 times blink (For AR*18L/ 24L) 14 times blink (For AR*30L/ 36L/ 45L/ 54L) ERROR CODE : No indication
Detective Actuators: Outdoor Unit Main PCB Circuit Compressor	**Detective details:** ① On start-up the compressor, when detected rotor position is out of phase with actual rotor position more than 90 degrees,the compressor stops. ② After the compressor restarts, if the same operation is repeated within 40sec, the compressor stops again. ③ If ① and ② repeats 5 times, the compressor stops permanently.

Forecast of Cause :

1. Defective connection of electric components 2. Main PCB failure 3. Compressor failure

Check Point 1 : Check Noise from Compressor

- Turn on Power and check operation noise.

▶ **If an abnormal noise show, replace Compressor.**

OK

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 PARTS INFORMATION 2)

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

OK

Check Point 3 : Replace Main PCB

▶ **If Check Point 1,2 do not improve the symptom, replace Main PCB.**

7-3 TROUBLE SHOOTING WITH NO ERROR CODE

Trouble shooting 21

Indoor Unit - No Power

Forecast of Cause:

1. Power Supply failure 2. External cause
3. Electrical Components defective

Check Point 1 : Check Installation Condition

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

>>If abnormal condition is found, correct it by referring to Installation Manual or Data & Technical Manual.

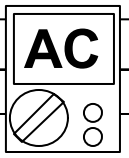
OK

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.

OK

Check Point 3 : Check Electrical Components



- Check Voltage of power supply.

>> Check AC198 - 264V appears at Indoor Unit Terminal 1 - 2 (Power Supply).

NO

YES

- Check Fuse (F101) in Filter PCB.

>> If Fuse is open, check if the wiring between Terminal and Filter PCB is loose, and replace Fuse.

- Check Varistor (VA101, VA102) in Filter PCB.

>> If Varistor is defective, there is a possibility of an abnormal power supply. Check the correct power supply and replace Varistor.

OK

▶ If the symptom does not change by above Check3, replace Filter PCB.

Trouble shooting 22

Outdoor Unit - No Power

Forecast of Cause:

1. Power Supply failure 2. External cause
3. Electrical Components defective

Check Point 1 : Check Installation Condition

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

>>If abnormal condition is found, correct it by referring to Installation Manual or Data & Technical Manual.

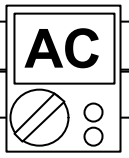
OK

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.

OK

Check Point 3 : Check Electrical Components



- Check the voltage of power supply.

>> Check if AC198 - 264V appears at Outdoor Unit Terminal L - N.

NO

YES

- Check Fuse (F2, F4) in Main PCB.

>> If Fuse is open, check loose terminal or removed connector (CN1) , and replace Fuse.

- Check Varistor in Main PCB (VA103).

>> 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.

YES

- Check Active Filter Module. **(PARTS INFORMATION 3)**

>>If Active Filter Module is abnormal, replace it.

OK

▶ **If the symptom does not change by above Check 3, replace Main PCB.**

Trouble shooting 23

No Operation (Power is ON)

Forecast of Cause:

1. Setting/ Connection failure 2. External cause
3. Electrical Component defective

Check Point 1 : Check indoor and outdoor installation condition

- Indoor Unit - Check incorrect wiring between Indoor Unit - Remote Control, or terminals between Indoor Units. Or, check if there is an open cable connection.
- Are these Indoor Unit, Outdoor Unit, and Remote Control suitable model numbers to connect?

>> If there is some abnormal condition, correct it by referring to Installation manual and Data & Technical Manual.

OK

Turn off Power and check/ correct followings.

- Is there loose or removed communication line of Indoor Unit and Outdoor Unit?

OK

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.

OK

Check Point 3 : Check Electrical Components at Indoor and Outdoor

- Check Voltage at CN17 (For AR18L) or CN6 (For AR24L- 54L) of Controller PCB. (Power supply to Remote Control)

>> If it is DC12V, Remote Control is failure. (Controller PCB is normal) >> Replace Remote Control
>> If it is DC 0V, Controller PCB is failure. (Check Remote Control once again) >> Replace Controller PCB

>> If the symptom does not change by above Check 1, 2, 3, replace Main PCB of Outdoor unit.

Trouble shooting 24

No Cooling / No Heating

Forecast of Cause:

1. Indoor Unit error 2. Outdoor Unit error
3. Effect by Surrounding environment
4. Connection Pipe / Connection Wire failure 5. Refrigeration cycle failure

Check Point 1 : Check Indoor Unit

- Does Indoor Unit FAN run on HIGH FAN?
- Is Air Filter dirty?
- Is Heat Exchanger clogged?
- Check if Energy save function is operated.

OK

Check Point 2 : Check Outdoor Unit Operation

- Check if Outdoor Unit is operating
  (If not, refer to Trouble shooting 23)
- Check any objects that obstruct the air flow route.
- Check clogged Heat Exchanger.
- Is the Valve open?

OK

Check Point 3 : Check Site Condition

- Is capacity of Indoor Unit fitted to Room size?
- Any windows open? Or direct sunlight ?

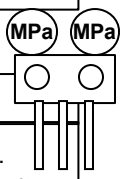
OK

Check Point 4 :
Check Indoor/ Outdoor Installation Condition

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

>> If there is an abnormal condition, correct it by referring to Installation Manual or Data & Technical Manual.

OK



Check Point 5 : Check Refrigeration Cycle

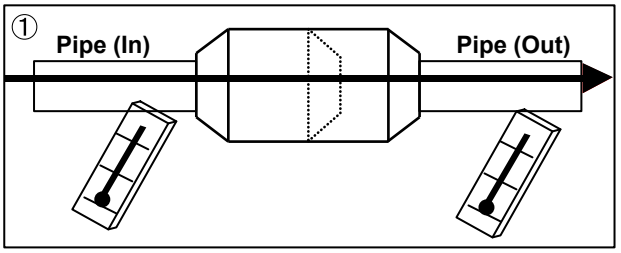
- Check if Strainer is clogged (Refer to the figure at right).
- Measure Gas Pressure and if there is a leakage, correct it.

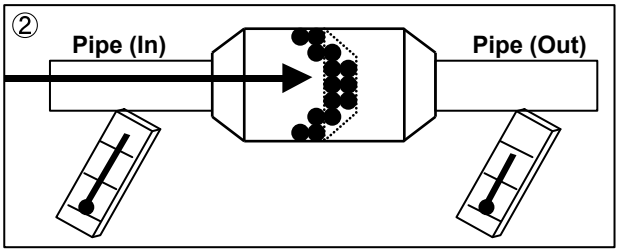
>> When recharging the refrigerant, make sure to perform vacuuming, and recharge the specified amount.

- Check EEV (PARTS INFORMATION 4)
- Check Compressor (PARTS INFORMATION 1,2)

Attention

Strainer normally does not have temperature difference between inlet and outlet as shown in ①, but if there is a difference like shown in ②, there is a possibility of inside clogged. In this case, replace Strainer.





Trouble shooting 25

Abnormal Noise

Forecast of Cause :

1. Abnormal installation (Indoor/ Outdoor) 2. Fan failure(Indoor/ Outdoor)
3. Compressor failure (Outdoor)

Diagnosis method when Abnormal Noise is occurred

- Abnormal noise is coming from Indoor Unit. (Check and correct followings)
  - Is Main Unit installed in stable condition?
  - Is the installation of Air suction grille and front panel normal?

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

- Abnormal noise is coming from Outdoor Unit. (Check and correct followings)
  - Is Main Unit installed in stable condition?
  - Is Fan Guard installed normally?

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

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

  OK
  - Is Compressor locked? >> Check Compressor (PARTS INFORMATION 1,2)

Trouble shooting 26

Water Leaking

Forecast of Cause:

1. Erroneous installation 2. Drain hose failure

Diagnosis method when water leak occurs

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

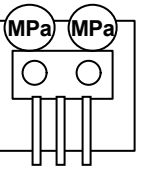
OK
- Is Drain Hose connection loose?
- Is there a trap in Drain Hose?
- Is Drain Hose clogged?

OK
- Is Fan rotating? >> Check Fan Motor (PARTS INFORMATION 5)

Diagnosis method when water is spitting out.

- Is the filter clogged?

OK
- Check Gas Pressure and correct it if there was a gas leak.



7-4 SERVICE PARTS INFORMATION

SERVICE PARTS INFORMATION 1

Compressor

Diagnosis method of Compressor (If Outdoor Unit LED displays Error, refer to Trouble shooting)

Does not start up

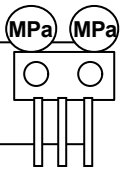
- Is there open or loose connection cable?
- Check Filter PCB, Main PCB, connection of Compressor,and winding resistance. (Refer to the next page).

>> If there is no failure, the defect of Compressor is considered (Locked compressor due to clogged dirt or less oil)

Replace Compressor

Stops soon after starting up

- Is there open or loose connection cable?
- Is Gas Pipe Valve open? (Low Pressure is too low)
- Check if Refrigerant is leaking. (Recharge Refrigerant)



- Check if Strainer is clogged. (PARTS INFORMATION 4)
- Check Filter PCB, 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

Abnormal noise

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

▶Defective Compressor can be considered. (due to inside dirt clogging or broken component)

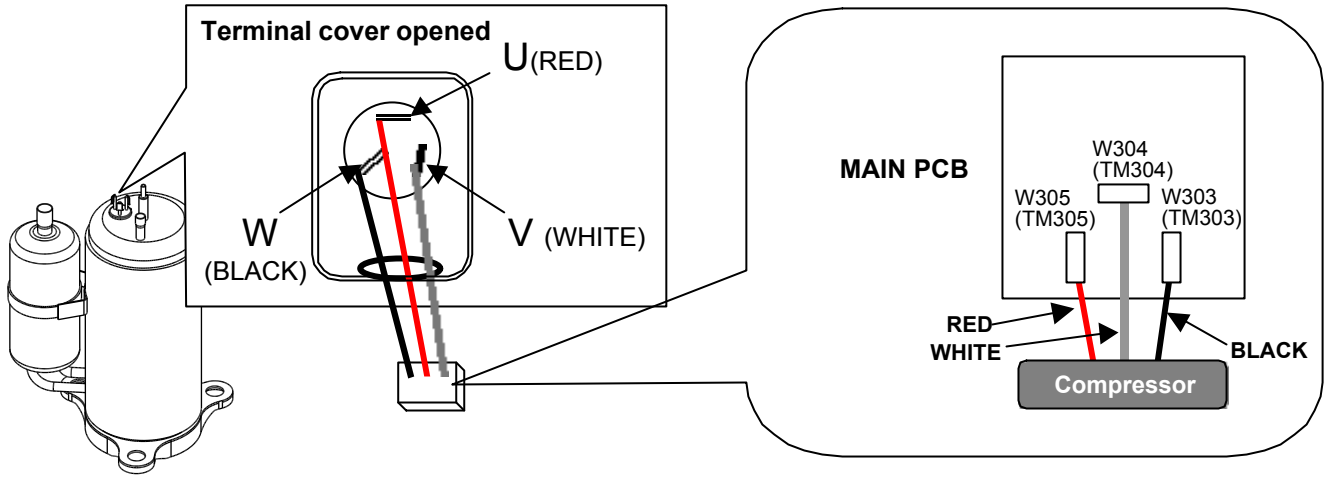
Replace Compressor

SERVICE PARTS INFORMATION 2

Inverter Compressor

Check Point 1 : Check Connection

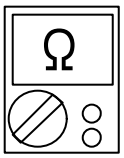
- Check terminal connection of Compressor (loose or incorrect wiring)
- Check connection of Main PCB (Loose or incorrect wiring)

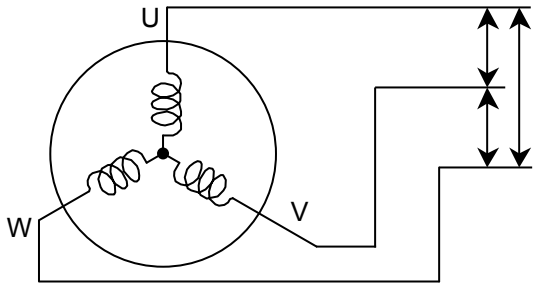


Check Point 2 : Check Winding Resistance

- Check winding resistance of each terminal

▶ **If the resistance value is 0Ω or infinite, replace Compressor.**





Resistance Value :
1.41 Ω (For AR*18L/ 24L)
0.88 Ω (For AR*30L/ 36L)
0.188 Ω (For AR*45L/ 54L)
at 20°C

Check Point 3 : Replace Main PCB

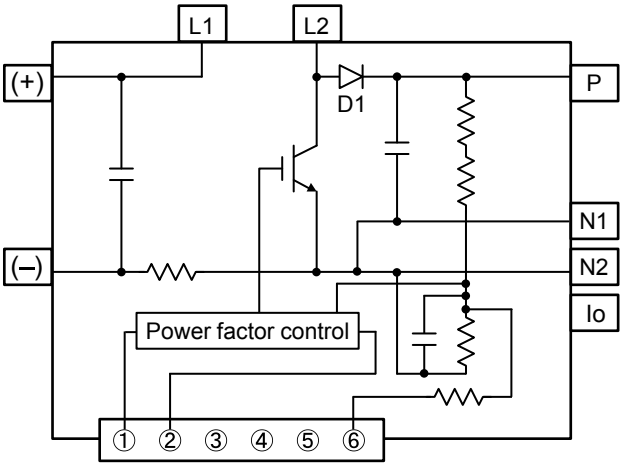
▶ **If the symptom does not change with above Check 1, 2, replace Main PCB.**

SERVICE PARTS INFORMATION 3

Active Filter Module

Check Point 1 : Check Open or Short-circuit and Diode (D1)

・Remove connector, check the open or short-circuit and the diode in the module



Check the open or short-circuit

Terminal		Resistance value
Tester(+)	Tester(-)	
(+)	(–)	**360kΩ ±20%**
(–)	N1	**0Ω**
P	(+)	**720kΩ ±20%**
L1	L2	**1.01MΩ / 761kΩ** (Ref. value 1) (Ref. value 2)
P	N1	**360kΩ ±20%**
L1,L2	Control Box	**∞Ω**
L2	N2	**1.65MΩ / 1.14MΩ** (Ref. value 1) (Ref. value 2)

Check the diode

Terminal		Resistance value
Tester(+)	Tester(-)	
L2	P	**1.32MΩ / 663kΩ** (Ref. value 1) (Ref. value 2)
P	L2	**1.01MΩ / 762kΩ** (Ref. value 1) (Ref. value 2)

Ref. value 1
Specifications for Multimeter
Manufacturer : FLUKE
Model name : FLUKE11
Power source : DC9V.

Ref. value 2
Specifications for Multimeter
Manufacturer : Sanwa
Model name : PM3
Power source : DC3V.

▶ **If it is abnormal,replace ACTIVE FILTER MODULE**

Check Point 2 : Check the Output DC voltage (between P and N1)

・Check the Output DC voltage (between P and N1) of compressor stopping and operating.

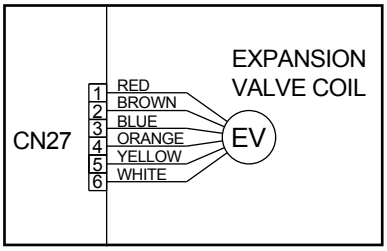
>> If the output voltage of compressor operating is less than the output voltage of compressor stopping, Active Filter Module is detective. >> **Replace Active Filter Module**

SERVICE PARTS INFORMATION 4

Outdoor unit Electronic Expansion Valve
(EEV)

Check Point 1 : Check Connections

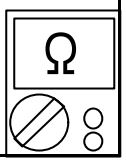
・Check connection of connector (CN27)
(Loose connector or open cable)



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 - Brown	
Orange - Red	
Blue - Brown	



▶ **If Resistance value is abnormal, replace EEV.**

Check Point 3 : Check Voltage from Main PCB.

・Remove Connector and check Voltage (DC12V)

▶ **If it does not appear, replace Main PCB.**

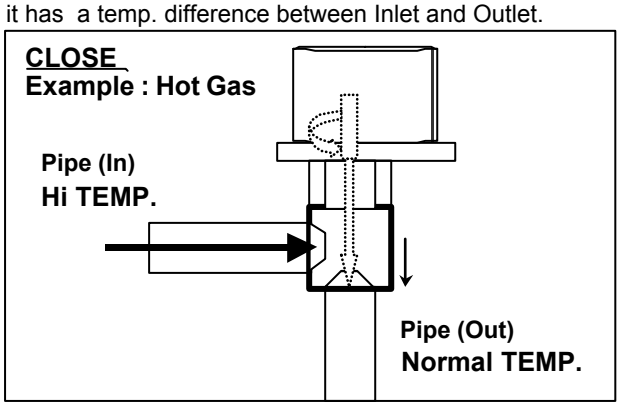
Check Point 4 : Check Noise at start up

・Turn on Power and check operation noise.

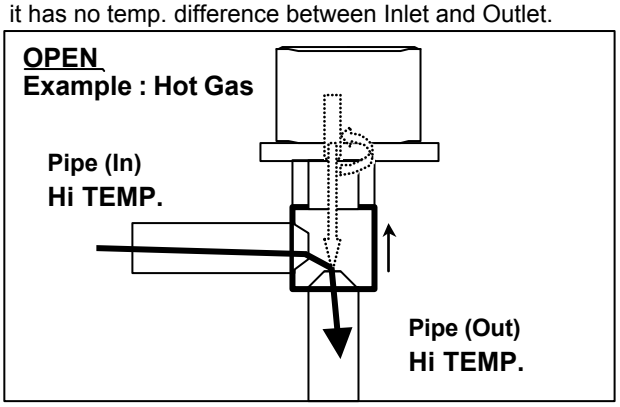
▶ **If an abnormal noise does not show, replace Main PCB.**

Check Point 5 : Check Opening and Closing Operation of Valve

When Valve is closed,
it has a temp. difference between Inlet and Outlet.

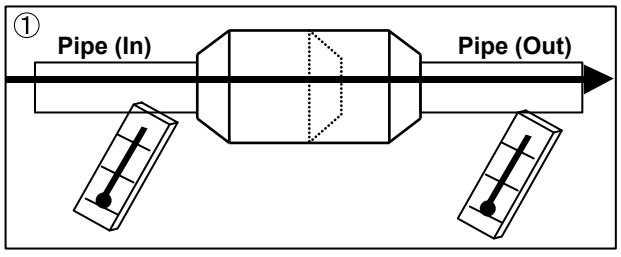


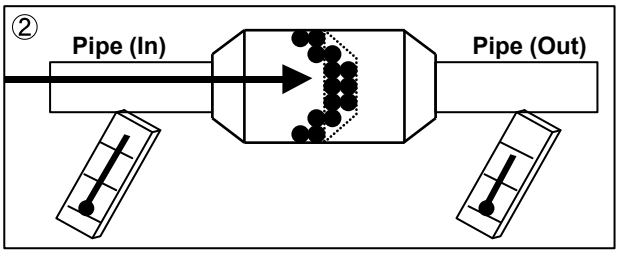
If it is open,
it has no temp. difference between Inlet and Outlet.



Check Point 6 : Check Strainer

Strainer normally does not have temperature difference between inlet and outlet as shown in ① ,
but if there is a difference as shown in ② , there is a possibility of inside clogged. In this case, replace Strainer.

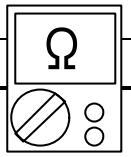




SERVICE PARTS INFORMATION 5

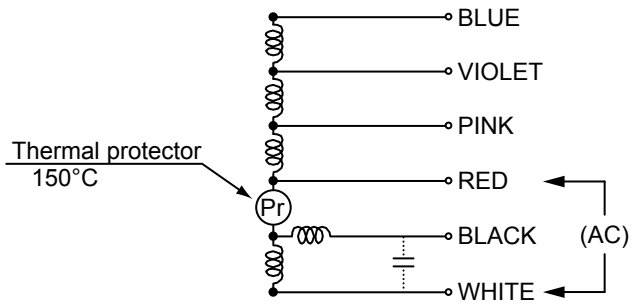
Indoor Unit Fan Motor

Check Point : AR*18LUAD/ AR*24/ 30/ 36/ 45LUAN



・Check each winding resistance of the motor

▶ **If Resistance value is abnormal, replace motor.**



AR*18LUAD

Read Wire	Resistance value
White – Red	**90.3** Ω ±**8%**
Red – Black	**152** Ω ±**8%**
Red – Pink	**42.9** Ω ±**8%**
Pink – Violet	**42.9** Ω ±**8%**
Violet – Blue	**222** Ω ±**8%**

at 20°C

AR*24LUAN

Read Wire	Resistance value
White – Red	**50.9** Ω ±**8%**
Red – Black	**29.1** Ω ±**8%**
Red – Pink	**8.96** Ω ±**8%**
Pink – Violet	**8.96** Ω ±**8%**
Violet – Blue	**8.96** Ω ±**8%**

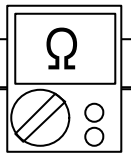
at 20°C

AR*30/ 36/ 45LUAN

Read Wire	Resistance value
White – Red	**19.7** Ω ±**8%**
Red – Black	**13.0** Ω ±**8%**
Red – Pink	**5.86** Ω ±**8%**
Pink – Violet	**5.86** Ω ±**8%**
Violet – Blue	**5.86** Ω ±**8%**

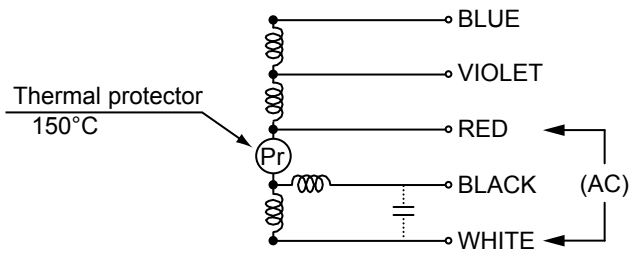
at 20°C

Check Point : AR*45/ 54LUAK



・Check each winding resistance of the motor

▶ **If Resistance value is abnormal, replace motor.**



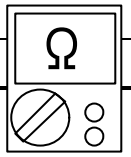
Read Wire	Resistance value
White – Red	**6.84** Ω ±**8%**
Red – Black	**9.78** Ω ±**8%**
Red – Violet	**6.10** Ω ±**8%**
Violet – Blue	**6.10** Ω ±**8%**

at 20°C

SERVICE PARTS INFORMATION 6

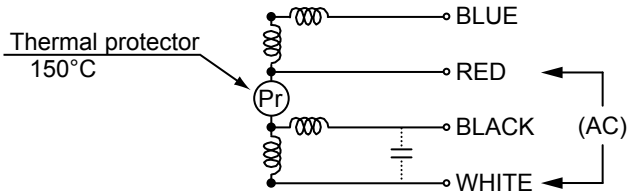
Outdoor Unit Fan Motor

Check Point : AR*18LUAD/ 24LUAN (AO*18/ 24LMAKL)



- Check each winding resistance of the motor

▶ **If Resistance value is abnormal, replace motor.**



Read Wire	Resistance value
White - Red	**54.7** Ω ±**8%**
Red - Black	**96.3** Ω ±**8%**
Red - Blue	**185** Ω ±**8%**

at 20°C

Refrigerant
R410A

DUCT type
INVERTER

8 . APPENDING DATA

8. APPENDING DATA

8-1. CAPACITY TABLE

■ MODEL : AR*18LUAD/ AO*18LMAKL

● COOLING

AFR	17.3

		Indoor temperature																							
		18°CDB			21°CDB			23°CDB			26°CDB			27°CDB			29°CDB			30°CDB			32°CDB		
		12°CWB			15°CWB			16°CWB			18°CWB			19°CWB			21°CWB			22°CWB			23°CWB		
Outdoor temperature	(°CDB)	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
	0	3.63	3.05	0.30	3.70	2.88	0.31	3.77	3.05	0.31	3.88	3.17	0.32	3.93	3.15	0.32	4.01	3.09	0.32	4.05	3.06	0.32	4.09	3.19	0.33
	5	3.73	3.12	0.38	3.82	2.96	0.39	3.91	3.15	0.39	4.05	3.31	0.40	4.10	3.29	0.40	4.20	3.24	0.41	4.25	3.22	0.41	4.29	3.36	0.42
	10	4.42	3.70	0.60	4.53	3.51	0.62	4.64	3.74	0.62	4.83	3.95	0.64	4.91	3.93	0.64	5.04	3.89	0.65	5.10	3.86	0.66	5.15	4.04	0.66
	15	4.16	3.46	0.67	4.26	3.27	0.68	4.37	3.51	0.69	4.55	3.71	0.70	4.62	3.70	0.71	4.75	3.67	0.72	4.81	3.65	0.73	4.87	3.82	0.73
	20	4.08	3.38	0.76	4.17	3.20	0.77	4.27	3.42	0.78	4.43	3.62	0.79	4.50	3.61	0.80	4.63	3.58	0.81	4.70	3.56	0.82	4.75	3.74	0.82
	25	5.28	4.40	1.24	5.41	4.17	1.25	5.53	4.44	1.26	5.74	4.69	1.28	5.83	4.67	1.29	5.99	4.62	1.30	6.06	4.60	1.31	6.13	4.82	1.32
	30	5.04	4.18	1.39	5.19	3.98	1.40	5.31	4.25	1.41	5.50	4.50	1.44	5.59	4.49	1.45	5.76	4.45	1.47	5.84	4.43	1.47	5.91	4.65	1.48
	35	5.35	4.41	1.92	5.45	4.16	1.93	5.59	4.47	1.95	5.80	4.74	1.98	5.90	4.73	1.99	6.09	4.70	2.02	6.18	4.68	2.03	6.27	4.94	2.04
	40	5.04	4.15	2.14	5.11	3.89	2.15	5.23	4.18	2.16	5.44	4.45	2.19	5.55	4.45	2.21	5.74	4.43	2.24	5.83	4.42	2.26	5.93	4.68	2.28
	43	4.79	3.92	2.21	4.87	3.69	2.22	4.99	3.98	2.23	5.20	4.26	2.26	5.31	4.26	2.28	5.50	4.24	2.32	5.61	4.24	2.33	5.71	4.51	2.34

● HEATING

AFR	17.3

			Indoor temperature													
			16°CDB		18°CDB		20°CDB		23°CDB		25°CDB		27°CDB		30°CDB	
Outdoor temperature	(°CDB)	(°CWB)	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
	-10	-11	5.77	2.45	5.68	2.53	5.50	2.60	5.32	2.68	5.23	2.72	5.06	2.80	4.88	2.84
	-5	-6	5.67	2.46	5.59	2.53	5.43	2.60	5.27	2.67	5.19	2.71	5.03	2.78	4.87	2.82
	0	-1	5.91	2.42	5.83	2.49	5.69	2.55	5.54	2.61	5.46	2.64	5.32	2.71	5.17	2.74
	2	1	6.09	2.51	6.03	2.56	5.90	2.62	5.78	2.67	5.72	2.70	5.59	2.75	5.47	2.78
	7	6	7.73	2.30	7.65	2.35	7.50	2.40	7.35	2.45	7.28	2.47	7.13	2.52	6.98	2.54
	10	8	8.03	2.36	7.96	2.41	7.81	2.45	7.67	2.50	7.59	2.52	7.45	2.57	7.30	2.59
	15	12	8.23	2.40	8.15	2.45	8.01	2.49	7.86	2.54	7.78	2.56	7.63	2.61	7.49	2.63
	20	15	8.39	2.35	8.30	2.40	8.14	2.45	7.98	2.49	7.90	2.52	7.74	2.57	7.57	2.59
	24	18	8.51	2.30	8.43	2.35	8.25	2.40	8.08	2.45	7.99	2.48	7.81	2.53	7.64	2.55

AFR: Air flow rate (m^3/min)
TC : Total capacity (kW)
SHC: Sensible Heat capacity (kW)
PI : Power Input (kW)

■ MODEL : AR*24LUAN/ AO*24LMAKL

● COOLING

AFR	24.8

		Indoor temperature																							
		18°CDB			21°CDB			23°CDB			26°CDB			27°CDB			29°CDB			30°CDB			32°CDB		
		12°CWB			15°CWB			16°CWB			18°CWB			19°CWB			21°CWB			22°CWB			23°CWB		
	(°CDB)	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
Outdoor temperature	0	4.92	4.28	0.45	5.02	4.04	0.46	5.12	4.27	0.46	5.26	4.44	0.47	5.33	4.41	0.47	5.44	4.33	0.48	5.49	4.29	0.48	5.54	4.47	0.48
	5	5.06	4.37	0.57	5.17	4.14	0.58	5.30	4.41	0.59	5.49	4.63	0.60	5.56	4.61	0.60	5.70	4.54	0.61	5.76	4.50	0.61	5.82	4.70	0.62
	10	6.00	5.18	0.90	6.15	4.91	0.92	6.30	5.23	0.93	6.55	5.53	0.95	6.65	5.51	0.96	6.83	5.45	0.97	6.91	5.41	0.98	6.99	5.65	0.98
	15	5.64	4.85	0.99	5.78	4.58	1.02	5.93	4.91	1.03	6.16	5.20	1.05	6.26	5.18	1.06	6.44	5.13	1.07	6.52	5.10	1.08	6.60	5.35	1.09
	20	5.53	4.74	1.12	5.65	4.47	1.14	5.79	4.79	1.15	6.01	5.07	1.18	6.11	5.06	1.19	6.28	5.01	1.21	6.37	4.99	1.22	6.45	5.24	1.23
	25	7.16	6.16	1.84	7.34	5.83	1.86	7.50	6.22	1.88	7.78	6.57	1.90	7.90	6.54	1.92	8.12	6.47	1.94	8.22	6.44	1.95	8.31	6.74	1.96
	30	6.84	5.85	2.07	7.03	5.57	2.09	7.19	5.96	2.10	7.46	6.30	2.14	7.59	6.28	2.15	7.81	6.23	2.18	7.91	6.20	2.19	8.02	6.52	2.21
	35	7.25	6.18	2.86	7.39	5.82	2.87	7.58	6.26	2.90	7.86	6.64	2.94	8.00	6.62	2.96	8.26	6.58	3.00	8.38	6.56	3.02	8.50	6.92	3.04
	40	6.83	5.80	3.18	6.93	5.45	3.19	7.09	5.86	3.21	7.38	6.24	3.26	7.52	6.23	3.28	7.78	6.20	3.33	7.91	6.19	3.35	8.04	6.56	3.40
	43	6.49	5.48	3.29	6.60	5.17	3.30	6.76	5.57	3.32	7.05	5.96	3.37	7.20	5.96	3.39	7.46	5.94	3.44	7.61	5.94	3.46	7.75	6.31	3.49

● HEATING

AFR	24.8

			Indoor temperature													
			16°CDB		18°CDB		20°CDB		23°CDB		25°CDB		27°CDB		30°CDB	
	(°CDB)	(°CWB)	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
Outdoor temperature	-10	-11	6.92	2.99	6.81	3.08	6.60	3.18	6.39	3.27	6.28	3.32	6.07	3.42	5.86	3.46
	-5	-6	6.80	3.00	6.71	3.09	6.52	3.18	6.33	3.26	6.23	3.31	6.04	3.40	5.85	3.44
	0	-1	7.09	2.96	7.00	3.03	6.82	3.11	6.65	3.19	6.56	3.23	6.38	3.30	6.20	3.34
	2	1	7.31	3.07	7.23	3.13	7.09	3.20	6.94	3.26	6.86	3.30	6.71	3.36	6.56	3.40
	7	6	9.27	2.81	9.18	2.87	9.00	2.93	8.82	2.99	8.73	3.02	8.55	3.08	8.37	3.11
	10	8	9.64	2.88	9.55	2.94	9.37	2.99	9.20	3.05	9.11	3.08	8.94	3.13	8.76	3.16
	15	12	9.87	2.93	9.78	2.99	9.61	3.04	9.43	3.10	9.34	3.13	9.16	3.18	8.98	3.21
	20	15	10.06	2.87	9.97	2.93	9.77	2.99	9.58	3.04	9.48	3.07	9.28	3.13	9.09	3.16
	24	18	10.22	2.81	10.11	2.87	9.90	2.93	9.69	2.99	9.59	3.03	9.37	3.09	9.16	3.12

AFR: Air flow rate (m^3/min)
TC : Total capacity (kW)
SHC: Sensible Heat capacity (kW)
PI : Power Input (kW)

■ MODEL : AR*30LUAN/ AO*30LMAWL

● COOLING

AFR	37

		Indoor temperature																							
		21°CDB			23°CDB			26°CDB			27°CDB			29°CDB			30°CDB			32°CDB					
		15°CWB			16°CWB			18°CWB			19°CWB			21°CWB			22°CWB			23°CWB					
	(°CDB)	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
Outdoor temperature	-10	7.59	6.41	1.97	7.73	6.85	1.99	7.99	7.18	2.01	8.12	7.09	2.02	8.36	6.96	2.04	8.48	6.79	2.04	8.58	7.18	2.05			
	0	8.73	7.19	1.73	8.96	7.93	1.73	9.40	8.44	1.75	9.62	8.41	1.75	10.05	8.29	1.76	10.27	8.24	1.76	10.47	8.78	1.76			
	10	7.58	6.33	2.05	7.77	6.81	2.05	8.15	7.34	2.07	8.34	7.24	2.08	8.71	7.16	2.09	8.88	7.03	2.09	9.05	7.50	2.09			
	20	10.04	7.90	2.31	10.40	8.66	2.31	11.14	9.38	2.30	11.52	9.35	2.29	12.28	9.29	2.27	12.67	9.25	2.26	13.05	9.94	2.25			
	30	8.74	7.31	2.77	9.07	8.07	2.78	9.73	8.80	2.78	10.07	8.78	2.79	10.77	8.73	2.78	11.11	8.69	2.78	11.46	9.39	2.77			
	35	8.66	7.28	3.41	8.99	8.04	3.42	9.66	8.77	3.44	10.00	8.75	3.45	10.61	8.67	3.41	10.96	8.64	3.41	11.30	9.34	3.41			
	40	7.09	6.00	3.30	7.37	6.72	3.30	7.95	7.44	3.30	8.25	7.52	3.30	8.86	7.62	3.30	9.08	7.54	3.30	9.38	8.21	3.30			
	43	6.53	5.80	3.30	6.79	6.42	3.30	7.25	7.03	3.30	7.53	7.09	3.30	8.08	7.13	3.30	8.36	7.12	3.30	8.64	7.76	3.30			

● HEATING

AFR	37

			Indoor temperature													
			16°CDB		18°CDB		20°CDB		23°CDB		25°CDB		27°CDB		30°CDB	
	(°CDB)	(°CWB)	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
Outdoor temperature	-10	-11	7.73	2.79	7.56	2.85	7.49	3.00	7.22	3.08	6.99	3.09	6.76	3.10	6.38	3.10
	-4	-6	8.87	3.02	8.69	3.08	8.44	3.09	8.02	3.09	7.77	3.11	7.52	3.12	7.11	3.11
	1	-1	10.21	3.10	9.95	3.11	9.58	3.09	9.11	3.09	8.83	3.10	8.54	3.12	8.04	3.11
	7	6	11.77	3.50	11.50	3.50	11.20	3.50	10.57	3.50	10.22	3.50	9.79	3.50	9.20	3.50
	12	10	13.83	3.50	13.35	3.50	13.12	3.50	12.35	3.50	11.92	3.50	11.48	3.50	10.77	3.50
	18	13	13.32	3.13	13.15	3.22	12.95	3.30	12.61	3.41	12.30	3.48	11.92	3.55	11.34	3.68
	20	15	12.77	3.02	12.62	3.10	12.45	3.18	11.95	3.18	11.56	3.19	11.21	3.21	10.52	3.22

AFR: Air flow rate (m^3/min)
TC : Total capacity (kW)
SHC: Sensible Heat capacity (kW)
PI : Power Input (kW)

■ MODEL : AR*36LUAN/ AO*36LMAWL

● COOLING

AFR	37

		Indoor temperature																				
		21°CDB			23°CDB			26°CDB			27°CDB			29°CDB			30°CDB			32°CDB		
		15°CWB			16°CWB			18°CWB			19°CWB			21°CWB			22°CWB			23°CWB		
	(°CDB)	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
Outdoor temperature	-10	10.91	8.62	1.93	11.18	9.34	1.95	11.72	9.96	1.99	12.01	9.90	2.01	12.58	9.75	2.04	12.87	9.67	2.06	13.14	10.34	2.07
	0	9.83	7.88	2.31	10.07	8.61	2.32	10.54	9.25	2.36	10.78	9.17	2.37	11.23	9.01	2.39	11.46	8.93	2.40	11.66	9.59	2.41
	10	9.73	7.84	2.12	10.01	8.58	2.12	10.57	9.26	2.13	10.85	9.20	2.13	11.40	9.07	2.13	11.67	9.01	2.13	11.93	9.68	2.13
	20	10.77	8.31	2.58	11.15	9.09	2.58	11.93	9.82	2.58	12.33	9.80	2.57	13.14	9.73	2.56	13.55	9.69	2.55	13.95	10.39	2.54
	30	10.04	8.22	3.38	10.40	9.05	3.39	11.15	9.85	3.40	11.54	9.82	3.41	12.31	9.76	3.41	12.71	9.72	3.41	13.09	10.48	3.41
	35	9.73	7.84	4.18	10.11	8.62	4.21	10.80	9.36	4.18	11.20	9.34	4.20	11.93	9.27	4.16	12.33	9.24	4.18	12.73	9.96	4.19
	40	7.31	6.18	3.40	7.60	6.92	3.40	8.20	7.67	3.40	8.51	7.75	3.40	9.13	7.85	3.40	9.36	7.78	3.40	9.67	8.47	3.40
	43	6.73	5.98	3.40	7.00	6.62	3.40	7.48	7.25	3.40	7.76	7.31	3.40	8.33	7.35	3.40	8.62	7.34	3.40	8.91	8.00	3.40

● HEATING

AFR	37

AFR: Air flow rate (m^3/min)
TC : Total capacity (kW)
SHC: Sensible Heat capacity (kW)
PI : Power Input (kW)

			Indoor temperature													
			16°CDB		18°CDB		20°CDB		23°CDB		25°CDB		27°CDB		30°CDB	
	(°CDB)	(°CWB)	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
Outdoor temperature	-10	-11	7.73	2.85	7.56	2.90	7.49	3.07	7.22	3.14	7.05	3.20	6.87	3.25	6.60	3.33
	-4	-6	8.87	3.09	8.69	3.14	8.51	3.20	8.22	3.29	8.03	3.34	7.84	3.40	7.53	3.49
	1	-1	10.29	3.20	10.10	3.27	9.88	3.33	9.55	3.43	9.32	3.49	9.09	3.56	8.72	3.66
	7	6	13.27	3.98	13.05	4.06	12.77	4.15	12.30	4.28	11.99	4.36	11.65	4.45	10.97	4.46
	12	10	13.95	3.79	13.74	3.88	13.51	3.96	13.03	4.09	12.67	4.18	12.29	4.26	11.68	4.40
	18	13	13.32	3.20	13.15	3.28	12.95	3.37	12.61	3.48	12.30	3.55	11.92	3.63	11.34	3.76
	20	15	12.77	3.08	12.62	3.17	12.45	3.25	11.95	3.25	11.56	3.25	11.21	3.27	10.52	3.28

■ MODEL : AR*45LUAN/ AO*45LJBYL

● COOLING

AFR	38.2

		Indoor temperature																				
		21 °CDB			23 °CDB			26 °CDB			27 °CDB			29 °CDB			30 °CDB			32 °CDB		
		15 °CWB			16 °CWB			18 °CWB			19 °CWB			21 °CWB			22 °CWB			23 °CWB		
	(°CDB)	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
Outdoor temperature	-15	10.59	9.24	2.06	11.13	10.01	2.08	12.07	11.33	2.11	12.55	11.35	2.13	13.50	11.39	2.17	13.99	11.41	2.19	14.49	12.31	2.20
	-10	12.64	10.10	2.45	12.97	11.00	2.46	13.63	11.79	2.49	13.95	11.70	2.51	14.57	11.48	2.53	14.86	11.35	2.54	15.12	12.12	2.55
	0	11.59	9.20	3.05	11.86	10.08	3.07	12.42	10.85	3.11	12.69	10.76	3.13	13.23	10.57	3.15	13.48	10.47	3.16	13.73	11.27	3.17
	10	11.02	8.95	3.36	11.30	9.84	3.38	11.85	10.63	3.42	12.13	10.55	3.43	12.66	10.37	3.46	12.94	10.28	3.48	13.19	11.09	3.49
	20	13.27	9.96	3.53	13.69	10.88	3.53	14.54	11.76	3.52	14.99	11.72	3.52	15.91	11.67	3.50	16.33	11.62	3.48	16.78	12.48	3.47
	30	11.71	9.26	4.24	12.12	10.19	4.25	12.95	11.06	4.26	13.37	11.03	4.27	14.23	10.93	4.27	14.66	10.88	4.27	15.06	11.73	4.27
	35	11.68	9.25	5.13	12.09	10.18	5.16	12.86	11.04	5.13	14.00	11.00	5.15	14.02	11.14	5.18	14.43	10.79	5.13	14.82	11.64	5.15
	40	10.12	8.41	5.00	10.37	9.27	5.00	10.97	10.08	5.00	11.34	10.09	5.00	12.55	10.00	5.00	12.29	9.99	5.00	12.63	10.83	5.00
	43	9.28	8.05	5.00	9.62	8.95	5.00	10.26	9.79	5.00	10.63	9.76	5.00	11.18	9.63	5.00	11.51	9.58	5.00	11.84	10.40	5.00

● HEATING

AFR	38.2

			Indoor temperature													
			16°CDB		18°CDB		20°CDB		23°CDB		25°CDB		27°CDB		30°CDB	
	(°CDB)	(°CWB)	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
Outdoor temperature	-15	-16	7.98	3.64	7.81	3.71	7.66	3.76	7.01	3.82	6.92	3.90	6.79	3.98	6.61	4.06
	-10	-11	10.41	4.24	10.18	4.31	9.95	4.38	9.59	4.50	9.47	4.74	9.09	4.70	8.64	4.72
	-4	-6	11.99	4.43	11.72	4.51	11.46	4.59	10.98	4.69	10.65	4.71	10.31	4.73	9.74	4.74
	1	-1	13.80	4.69	13.44	4.70	13.09	4.73	12.45	4.73	11.98	4.70	11.59	4.72	10.93	4.72
	7	6	18.00	5.15	17.60	5.15	17.00	5.15	16.00	5.15	14.79	5.15	14.12	5.15	13.24	5.15
	12	10	19.07	5.15	18.50	5.15	17.91	5.15	17.16	5.15	16.43	5.15	15.85	5.15	14.82	5.15
	18	13	19.94	5.15	19.52	5.15	18.91	5.15	18.03	5.15	17.43	5.15	16.76	5.15	15.64	5.15
	20	15	19.65	5.15	19.11	5.15	18.71	5.15	17.84	5.15	17.08	5.15	16.49	5.15	15.46	5.15

AFR: Air flow rate (m^3/min)
TC : Total capacity (kW)
SHC: Sensible Heat capacity (kW)
PI : Power Input (kW)

■ MODEL : AR*45LUAK/ AO*45LJAYL

● COOLING

AFR	58

		Indoor temperature																				
		21 °CDB			23 °CDB			26 °CDB			27 °CDB			29 °CDB			30 °CDB			32 °CDB		
		15 °CWB			16 °CWB			18 °CWB			19 °CWB			21 °CWB			22 °CWB			23 °CWB		
	(°CDB)	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
Outdoor temperature	-10	13.30	10.85	2.45	13.65	11.82	2.46	14.35	12.67	2.49	14.69	12.58	2.51	15.34	12.34	2.53	15.64	12.20	2.54	15.92	13.02	2.55
	0	12.33	9.99	3.08	12.62	10.94	3.10	13.20	11.78	3.14	13.49	11.68	3.16	14.07	11.48	3.18	14.33	11.36	3.19	14.59	12.23	3.20
	10	11.96	9.92	3.46	12.25	10.90	3.49	12.85	11.77	3.52	13.16	11.68	3.54	13.74	11.48	3.57	14.04	11.39	3.58	14.31	12.29	3.59
	20	13.97	10.70	3.53	14.41	11.69	3.53	15.31	12.64	3.52	15.78	12.60	3.52	16.74	12.54	3.50	17.19	12.49	3.48	17.66	13.41	3.47
	30	12.33	9.95	4.24	12.76	10.95	4.25	13.63	11.89	4.26	14.07	11.85	4.27	14.98	11.75	4.27	15.43	11.69	4.27	15.85	12.60	4.27
	35	12.30	9.94	5.13	12.73	10.94	5.16	13.54	11.86	5.13	14.00	11.82	5.15	14.76	11.67	5.12	15.19	11.60	5.13	15.60	12.51	5.15
	40	10.65	9.04	5.00	10.92	9.96	5.00	11.55	10.83	5.00	11.94	10.84	5.00	12.55	10.75	5.00	12.94	10.74	5.00	13.29	11.64	5.00
	43	9.77	8.65	5.00	10.13	9.62	5.00	10.80	10.52	5.00	11.18	10.49	5.00	11.77	10.35	5.00	12.12	10.30	5.00	12.46	11.18	5.00

● HEATING

AFR	58

AFR: Air flow rate (m^3/min)
TC : Total capacity (kW)
SHC: Sensible Heat capacity (kW)
PI : Power Input (kW)

			Indoor temperature											
			16 °CDB		18 °CDB		20 °CDB		23 °CDB		25 °CDB		27 °CDB		30 °CDB	
	(°CDB)	(°CWB)	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
Outdoor temperature	-10	-11	11.94	4.70	11.68	4.78	11.40	4.86	10.99	4.99	10.86	5.15	10.43	5.15	9.90	5.15
	-4	-6	14.15	4.91	13.85	5.00	13.53	5.09	12.97	5.15	12.57	5.15	12.17	5.15	11.50	5.15
	1	-1	16.30	5.15	15.88	5.15	15.45	5.15	14.71	5.15	14.15	5.15	13.68	5.15	12.91	5.15
	7	6	19.03	5.15	18.45	5.15	18.00	5.15	17.18	5.15	16.48	5.15	15.74	5.15	14.76	5.15
	12	10	20.07	5.15	19.47	5.15	18.85	5.15	18.06	5.15	17.30	5.15	16.68	5.15	15.60	5.15
	18	13	20.99	5.15	20.55	5.15	19.91	5.15	18.98	5.15	18.35	5.15	17.64	5.15	16.46	5.15
	20	15	20.68	5.15	20.12	5.15	19.69	5.15	18.78	5.15	17.98	5.15	17.36	5.15	16.27	5.15

■ MODEL : AR*54LUAK/ AO*54LJAYL

● COOLING

AFR	58

		Indoor temperature																				
		21 °CDB			23 °CDB			26 °CDB			27 °CDB			29 °CDB			30 °CDB			32 °CDB		
		15 °CWB			16 °CWB			18 °CWB			19 °CWB			21 °CWB			22 °CWB			23 °CWB		
	(°CDB)	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
Outdoor temperature	-10	14.11	10.88	2.86	14.46	11.80	2.88	15.13	12.60	2.93	15.48	12.49	2.95	16.14	12.22	2.98	16.49	12.11	3.00	16.80	12.93	3.02
	0	13.12	10.42	3.55	13.41	11.37	3.58	13.95	12.18	3.63	14.20	12.06	3.65	14.75	11.82	3.70	15.01	11.70	3.72	15.25	12.57	3.73
	10	12.79	10.36	3.96	13.11	11.35	3.99	13.71	12.22	4.05	14.01	12.12	4.08	14.59	11.90	4.12	14.84	11.77	4.14	15.12	12.68	4.16
	20	14.27	10.81	3.63	14.71	11.80	3.63	15.65	12.75	3.63	16.12	12.69	3.63	17.08	12.62	3.61	17.56	12.57	3.60	18.04	13.51	3.59
	30	13.62	10.51	5.02	14.09	11.51	5.05	15.04	12.44	5.09	15.49	12.37	5.11	16.52	12.29	5.14	17.01	12.23	5.15	17.46	13.12	5.16
	35	13.37	10.40	5.90	13.72	11.34	5.90	14.54	12.23	5.90	15.00	12.20	5.90	15.82	12.11	5.90	16.16	12.05	5.90	16.62	13.00	5.90
	40	10.98	9.32	5.15	11.26	10.27	5.15	11.91	11.17	5.15	12.30	11.18	5.15	12.94	11.08	5.15	13.34	11.07	5.15	13.71	12.00	5.15
	43	10.07	8.91	5.15	10.44	9.92	5.15	11.14	10.84	5.15	11.53	10.81	5.15	12.14	10.67	5.15	12.49	10.62	5.15	12.85	11.53	5.15

● HEATING

AFR	58

			Indoor temperature											
			16 °CDB		18 °CDB		20 °CDB		23 °CDB		25 °CDB		27 °CDB		30 °CDB	
	(°CDB)	(°CWB)	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
Outdoor temperature	-10	-11	12.70	4.88	12.41	4.97	12.12	5.05	11.67	5.18	11.36	5.27	11.27	5.54	10.82	5.68
	-4	-6	14.44	5.00	14.35	5.32	14.05	5.41	13.59	5.54	13.28	5.63	12.96	5.72	12.45	5.87
	1	-1	16.59	5.23	16.21	5.33	16.30	5.67	15.76	5.82	15.39	5.90	15.01	5.90	14.10	5.90
	7	6	19.66	5.65	19.35	5.78	19.00	5.90	17.98	5.90	17.39	5.90	16.82	5.90	15.61	5.90
	12	10	20.07	5.15	19.47	5.15	18.85	5.15	18.06	5.15	17.30	5.15	16.68	5.15	15.60	5.15
	18	13	20.99	5.15	20.55	5.15	19.91	5.15	18.98	5.15	18.35	5.15	17.64	5.15	16.46	5.15
	20	15	20.68	5.15	20.12	5.15	19.69	5.15	18.78	5.15	17.98	5.15	17.36	5.15	16.27	5.15

AFR: Air flow rate (m^3/min)
TC : Total capacity (kW)
SHC: Sensible Heat capacity (kW)
PI : Power Input (kW)

8-2. OPERATION RANGE

■ MODEL : AR*18LUAD/ 24LUAN / AO*18/ 24LMAKL

Mode	Operation Range		
	Indoor temperature	Indoor humidity	Outdoor temperature
Cooling Dry	18 to 32°C	About 80% or less	0 to 43°C
Heating	30°C or less	–	-10 to 24°C

■ MODEL : AR*30/ 36LUAN / AO*30/ 36LMAWL

Mode	Operation Range		
	Indoor temperature	Indoor humidity	Outdoor temperature
Cooling Dry	18 to 32°C	About 80% or less	-10 to 43°C
Heating	30°C or less	–	-10 to 24°C

■ MODEL : AR*45LUAN / AO*45LJBYL

Mode	Operation Range		
	Indoor temperature	Indoor humidity	Outdoor temperature
Cooling Dry	18 to 32°C	About 80% or less	-15 to 43°C
Heating	16 to 30°C	–	-15 to 24°C

■ MODEL : AR*45/ 54LUAK / AO*45/ 54LJAYL

Mode	Operation Range		
	Indoor temperature	Indoor humidity	Outdoor temperature
Cooling Dry	18 to 32°C	About 80% or less	-15 to 43°C
Heating	30°C or less	–	-15 to 24°C

8-3. ELECTRIC CHARACTERISTICS

Model Name	Indoor unit		AR*18LUAD		AR*24LUAN	
	Outdoor unit		AO*18LMAKL		AO*24LMAKL	
Power Supply		V	230 ~			
		Hz	50			
Rated Value	Mode		Cooling	Heating	Cooling	Heating
	Current	A	7.4	8.3	11.1	10.6
	Input	Kw	1.70	1.90	2.53	2.43
Max Operating Current		A	12.5	12.5	12.5	12.5
Starting Current		A	10			
*1) Wiring Spec	Main Fuse (Circuit breaker) Current	A	20		20	
	Power Cable	mm^2	2.5		3.5	
	*2)Limited wiring length	m	20		20	
Indoor Fan Motor	Input	Kw	0.970		0.15	
	Full Load Amp.	A	0.40		0.67	
Outdoor Fan Motor	Input	Kw	0.15			
	Full Load Amp.	A	0.73			

Model Name	Indoor unit		AR*30LUAN		AR*36LUAN	
	Outdoor unit		AO*30LMAWL		AO*36LMAWL	
Power Supply		V	230 ~			
		Hz	50			
Rated Value	Mode		Cooling	Heating	Cooling	Heating
	Current	A	13.0	11.7	17.9	13.9
	Input	Kw	2.96	2.68	4.08	3.18
Max Operating Current		A	15.2	15.3	18.4	18.8
Starting Current		A	15			
*1) Wiring Spec	Main Fuse (Circuit breaker) Current	A	30			
	Power Cable	mm^2	4.0			
	*2)Limited wiring length	m	27		21	
Indoor Fan Motor	Input	Kw	0.34			
	Full Load Amp.	A	1.52			
Outdoor Fan Motor	Input	Kw	0.13			
	Full Load Amp.	A	-			

*1) Wiring Spec : Selected Sample
(Selected based on Japan Electrotechnical Standard and Codes Committee E0005)

*2 Limited Wiring length : This is the wiring length in case voltage descent is less than 2%
When the wiring length becomes long, please select the wiring of a more larger diameter.

Model Name	Indoor unit		AR*45LUAN	
	Outdoor unit		AO*45LJBYL	
Power Supply		V	230 ～	
		Hz	50	
Rated Value	Mode		Cooling	Heating
	Current	A	19.5	17.3
	Input	Kw	4.45	3.95
Max Operating Current		A	22.6	22.5
Starting Current		A	15	
*1) Wiring Spec	Main Fuse (Circuit breaker) Current	A	30	
	Power Cable	mm^2	6.0	
	*2)Limited wiring length	m	27	
Indoor Fan Motor	Input	Kw	0.150	
	Full Load Amp.	A	0.670	
Outdoor Fan Motor	Input	Kw	0.067 × 2	
	Full Load Amp.	A	0.34 x 2	

	Indoor unit		AR＊54LUAK		AR＊45LUAK		ART54LUAK		ART45LUAK	
	Outdoor unit		AO＊54LJAYL		AO＊45LJAYL		AOT54LJAYL		AOT45LJAYL	
Power Supply	Voltage	V	230 ～				240 ～			
	Frequency	Hz	50							
Rated Value	Mode		Cooling	Heating	Cooling	Heating	Cooling	Heating	Cooling	Heating
	Current	A	23.6	20.6	18.9	16.7	23.5	19.8	18.1	16.0
	Input	kW	5.36	4.70	4.30	3.80	5.57	4.70	4.30	3.80
Max Operating Current		A	25.9	25.9	22.6	22.5	25.9	25.9	22.5	22.5
Starting Current		A	15	15	15	15	15	15	15	15
*1) Wiring Spec	Main Fuse (Circuit breaker) Current	A	30							
	Power Cable	mm^2	13.3-5.3							
	*2)Limited wiring length	m	55-22							
Indoor Fan Motor	Input	kW	0.7							
	Full Load Amp.	A	3.5							
Outdoor Fan Motor	Input	kW	0.067 x 2							
	Full Load Amp.	A	0.34 x 2							

*1) Wiring Spec : Selected Sample
(Selected based on Japan Electrotechnical Standard and Codes Committee E0005)

*2 Limited Wiring length : This is the wiring length in case voltage descent is less than 2%
When the wiring length becomes long, please select the wiring of a more larger diameter.

8-4. SAFETY DEVICE

■ OUTDOOR UNIT

	PROTECTION FORM	AO*18LMAKL	AO*24LMAKL
FUSE (SIDE OF POWER SUPPLY TERMINAL)	-	25A 250V	
FUSE (SIDE OF INDOOR UNIT)	-	3.15A 250V	
FUSE ON MAIN PCB	-	5.0A 250V	
FAN MOTOR PROTECTOR	THERMAL PROTECTOR	150°C ± 5°C OFF	
COMPRESSOR	THERMAL SWITCH	OFF 120 ± 5°C ON 85 ± 7°C	
	PRESSURE SWITCH	4.2MPa OFF	

MODEL NAME	PROTECTION FORM	AO*30LMAWL	AO*36LMAWL
FUSE (SIDE OF POWER SUPPLY TERMINAL)	-	25A 250V	25A 250V
	-	10A 250V	10A 250V
FUSE ON MAIN PCB	-	3.15A 250V	3.15A 250V
	-	5A 250V	5A 250V
FUSE ON POWER PCB	-	-	-
FAN MOTOR PROTECTOR	THERMAL PROTECTOR	150°C ± 5°C OFF	150°C ± 5°C OFF
COMPRESSOR	-	-	-
HIGH PRESSURE PROTECTION	-	OFF:4.2 ± 0.1MPa ON:3.2 ± 0.15MPa	OFF:4.2 ± 0.1MPa ON:3.2 ± 0.15MPa
LOW PRESSURE PROTECTION	-	-	-
TERMINAL FUSE	-	-	-
DISCHARGE THERMOSTAT	-	OFF:120 ± 5°C ON:80 ± 15°C	OFF:120 ± 5°C ON:80 ± 16°C
COMPRESSOR THERMOSTAT	-	OFF:130 ± 5°C ON:80 ± 16°C	OFF:130 ± 5°C ON:80 ± 17°C

MODEL NAME	PROTECTION FORM	AO ∗ 45LJAYL AO ∗ 45LJBYL	AO ∗ 54LJAYL
FUSE (SIDE OF INDOOR UNIT)	-	10A 250V	10A 250V
FUSE ON MAIN PCB	-	3.15A 250V	3.15A 250V
	-	5A 250V	5A 250V
FAN MOTOR PROTECTOR	THERMAL PROTECTOR	150°C ± 5°C OFF	150°C ± 5°C OFF
COMPRESSOR	-	165°C±5°C OFF	165°C ± 5°C OFF
HIGH PRESSURE PROTECTION	-	DC5V 4.2MPa	DC5V 4.2MPa

■ INDOOR UNIT

	PROTECTION FORM	AR*18LUAD	AR*24LUAN
PCB FUSE	-	3.15A 250V	
FAN MOTOR PROTECTION	THERMAL PROTECTOR	150 ± 5°C OFF	

	PROTECTION FORM	AR*30LUAN	AR*36LUAN
PCB FUSE	-	3.15A 250V	
FAN MOTOR PROTECTION	THERMAL PROTECTOR	150 ± 5°C OFF	

	PROTECTION FORM	AR*45LUAN
PCB FUSE	-	3.15A 250V
FAN MOTOR PROTECTION	THERMAL PROTECTOR	150 ± 5°C OFF

	PROTECTION FORM	AR*45LUAK	AR*54LUAK
PCB FUSE	-	3.15A 250V	
FAN MOTOR PROTECTION	THERMAL PROTECTOR	150 ± 5°C OFF	
FUSE FOR FAN MOTOR	-	10A 400V	

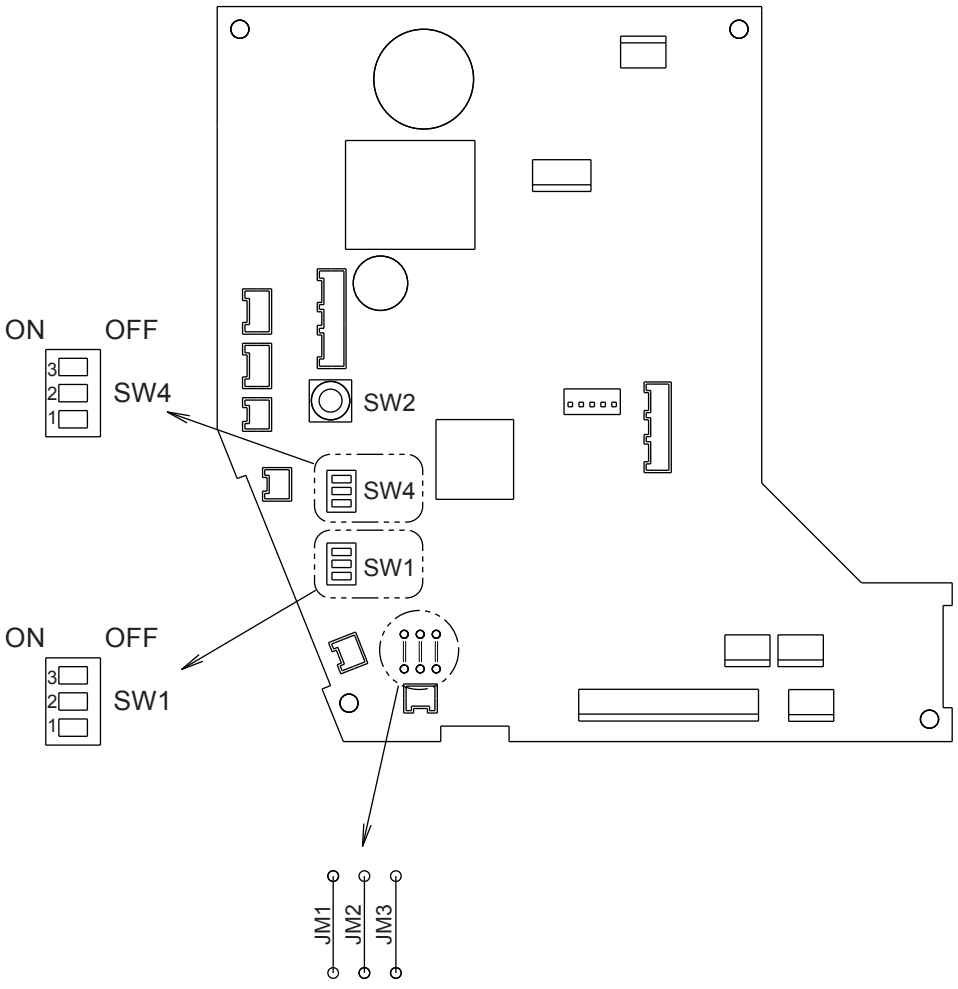
8-5. FUNCTION SETTING

8-5-1 INDOOR UNIT (AR*18LUAD)

INDOOR UNIT			
DIP SW	SW 1	1	Auto restart validity/invalidity
		2	Room temperature correct coefficient
		3	Room temperature correct coefficient
	SW 4	1	Forbidden
		2	High(Low) static pressure function setting
		3	Fan delay setting
Rotary SW	SW 2		Indoor unit number setting
Jumper Wire		JM1	Forbidden
		JM2	Forbidden
		JM3	Forbidden

■SWITCH POSITION

●Indoor unit control circuit board



■ DIP SWITCH SETTING

1-1.Auto restart setting

Auto restart function can be selected by turning this switch ON/OFF.

AUTO RESTART SETTING

(◆. . . Factory setting)

	SW 1-1	SW state
	OFF	Invalidity
◆	ON	Validity

1-2.Room temperature correct coefficient of heating.

Decide the heating temperature correct coefficient vale of heating.

TEMPERATURE CORRECTION

(◆. . . Factory setting)

	SW 1-2	SW 1-3	SW state		
			heating	dry	cooling
	OFF	OFF	+2 deg	-2 deg	-2 deg
	ON	OFF	-2 deg	-2 deg	-2 deg
	OFF	ON	0 deg	0 deg	0 deg
◆	ON	ON	+4 deg	0 deg	0 deg

4-1.Dip SW 4-1setting forbidden

(◆. . . Factory setting)

	SW 4-1	OFF

4-2.High(Low) static pressure function setting

In case of installing in high(low) static, you can maximize(minimize) air flow and noise.

Model:AR*24

(◆. . . Factory setting)

	SW 4-2	SW state
◆	OFF	Normal
	ON	Low static pressure

4-3.Fan delay setting

This setting can be used when the auxiliary heater is mounted.
When the fan operation is stopped when the indoor unit is operating with an auxiliary heater, the fan operation continues one minutes.

(◆. . . Factory setting)

	SW 4-3	SW state
◆	OFF	Invalidity
	ON	Validity

■ROTARY SWITCH SETTING

This switch can be used when group control system.
Set the indoor unit address in the 0,1-15 order.

(◆. . . Factory setting)

	SW 2	SW state
◆	0	Single
	1 - 15	Indoor unit address

■JUMPER WIRE SETTING

1-1.JM 1, 2, 3 setting forbidden

(◆. . . Factory setting)

	JM 1, 2, 3	JM state
◆	Connect	Forbidden
	Disconnect	

■EXTERNAL INPUT AND OUTPUT

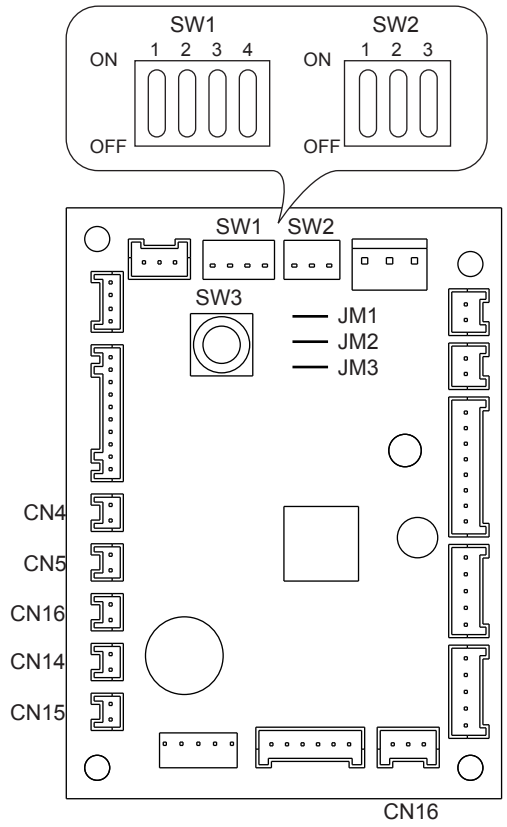
Connector	INPUT	OUTPUT	REMARKS
CN10	-	ELECTRICAL HEATER	See external input/output settings for details.
CN11	-	FRESH AIR	

8-5-2 INDOOR UNIT (AR*24LUAN)

INDOOR UNIT			
DIP SW	SW 1	1	Low static pressure function setting
		2	Forbidden
		3	Forbidden
		4	Forbidden
	SW 2	1	Room temperature correct coefficient of heating
		2	External input setting
		3	Auto restart validity/invalidity
Rotary SW	SW 3		Indoor unit number setting
Jumper Wire		JM1	Room temperature correct coefficient of cooling
		JM2	Commercial mode setting
		JM3	Fan delay setting

■ SWITCH POSITION

● Indoor unit control circuit board



■ DIP SWITCH SETTING

1-1 Low static pressure function setting

In case of installing in low static , you can minimize air flow and noise.

(◆. . . Factory setting)

	SW1-1	SW state
◆	OFF	Normal
	ON	Low static pressure

1-2 Dip SW 1-2,1-3,1-4 setting forbidden

(◆. . . Factory setting)

◆	SW1-2	OFF
◆	SW1-3	OFF
◆	SW1-4	OFF

2-1 Room temperature correct coefficient of heating.

Decide the heating temperature correct coefficient vale of heating.

HEAT TEMPERATURE CORRECTION (◆. . . Factory setting)

	SW2-1	SW state
◆	OFF	+4 deg (Ceiling setting)
	ON	0 deg (Room setting)

2-2 External input select edge/pulse

This switch is used to select the format of external input command as shown in the table below.

(◆. . . Factory setting)

	SW2-2	SW state
◆	OFF	Edge
	ON	Pulse

2-3 Auto restart setting

Auto restart function can be selected by turning this switch ON/OFF.

AUTORESTART SETTING (◆. . . Factory setting)

	SW2-3	SW state
◆	OFF	Validity
	ON	Invalidity

■ ROTARY SWITCH SETTING

This switch can be used when group control system.
Set the indoor unit address in the 1,2,-,15 order.

(◆. . . Factory setting)

	SW3	SW state
◆	0	single
	1-15	Indoor unit address

■JUMPER WIRE SETTING

Room temperature correct coefficient of cooling

Decide the cooling temperature correct coefficient value of cooling.

Cool temperature corrction (◆. . . Factory setting)

	JM1	JM state
◆	Connect	0 deg
	Disconnect	+ 2 deg

Commercial mode setting

"Hot start" can be canceled,fan operates continously when indoor unit is ON on every mode.
When you select "FAN:AUTO"mode fan goes in "HIGH"

(◆. . . Factory setting)

	JM2	JM state
◆	Connect	Residencial
	Disconnect	Commercial

Fan delay setting

This setting can be used when the auxiliary heater is mounted.
When the fan operation is stopped when the indoor unit is operating with an auxiliary heater, the fan operation continues one minutes.

(◆. . . Factory setting)

	JM3	JM state
◆	Connect	Invalidity
	Disconnect	Validity

■EXTERNAL INPUT AND OUTPUT

Connector	INPUT	OUTPUT	REMARKS
CN114	CONTROL INPUT (OPERATION/STOP)	-	See external input/output settings for details.
CN115	-	OPERATION DISPLAY	
CN14	-	FRESH AIR	
CN15	-	ELECTRICAL HEATER	

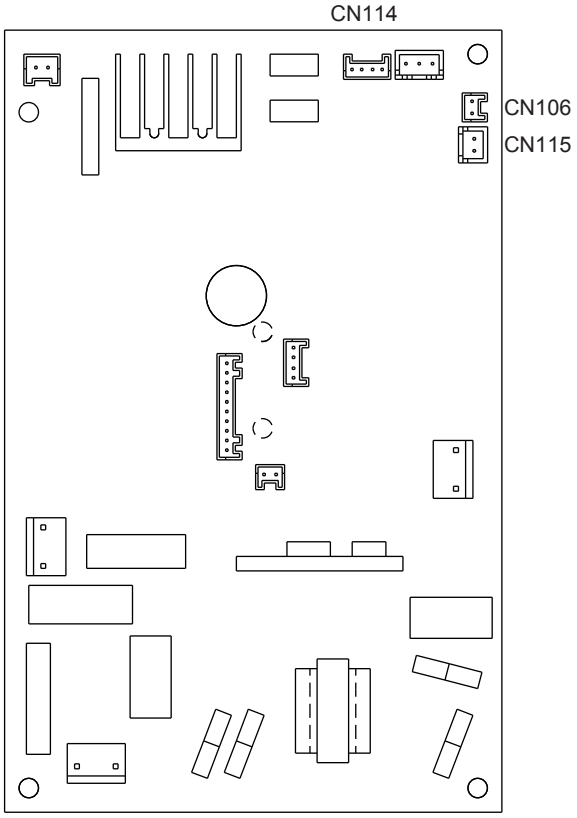
8-5-3 INDOOR UNIT (AR*30/ 36/ 45LUAN)

INDOOR UNIT			
DIP SW	SW 1	1	Low static pressure function setting
		2	Forbidden
		3	
		4	
	SW 2	1	Room temperature correct coefficient of heating
		2	External input select
		3	Auto restart validity/invalidity
Rotary SW	SW 3		Indoor unit number setting
Jumper Wire		JM1	Room temperature correct coefficient of cooling
		JM2	Commercial mode setting
		JM3	Fan delay setting

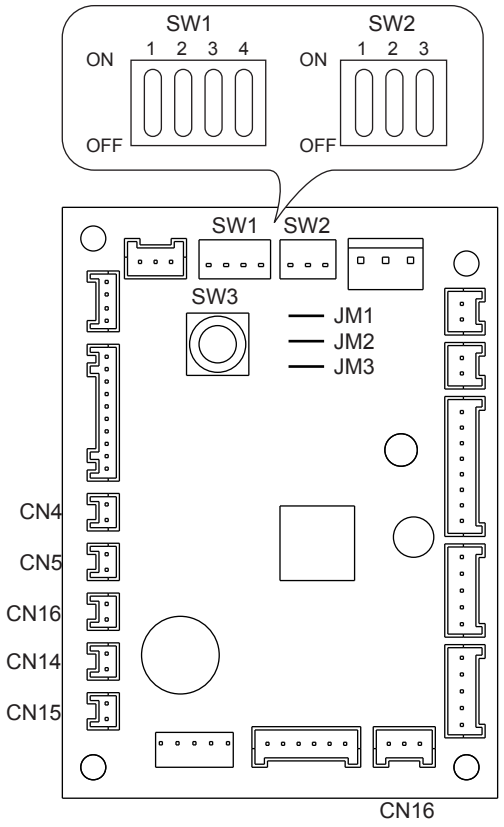
■ SWITCH POSITION

• Duct type Indoor unit control circuit board

POWER PCB



MAIN PCB



■ DIP SWITCH SETTING

1. SW1 setting

1-1 Low static pressure function setting

In case of installing in low static , you can minimize air flow and noise.

(◆ · · ·Factory setting)

	SW1-1	SW state
◆	OFF	Normal
	ON	Low static pressure

1-2 Dip SW 1-2,1-3,1-4 setting forbidden

(◆ · · ·Factory setting)

◆	SW1-2	OFF
◆	SW1-3	OFF
◆	SW1-4	OFF

2-1 Room temperature correct coefficient of heating.

Decide the heating temperature correct coefficient vale of heating.

Heat temperature correction (◆ · · ·Factory setting)

	SW2-1	SW state
◆	OFF	+4 deg (Ceiling setting)
	ON	0 deg (Room setting)

2-2 External input select edge/pulse

This switch is used to select the format of external input command as shown in the table below.

(◆ · · ·Factory setting)

	SW2-2	SW state
◆	OFF	Edge
	ON	Pulse

2-3 Auto restart setting

Auto restart function can be selected by turning this switch ON/OFF.

AUTORESTART SETTING (◆ · · ·Factory setting)

	SW2-3	SW state
◆	OFF	Validity
	ON	Invalidity

■ROTARY SWITCH SETTING

This switch can be used when group control system.
Set the indoor unit address in the 1,2,-,15 order.

(◆ · · ·Factory setting)

	SW3	SW state
◆	0	single
	1-15	Indoor unit address

■JUMPER WIRE SETTING

Room temperature correct coefficient of cooling.

Decide the cooling temperature correct coefficient value of cooling.

Cool temperature corrction (◆ - - -Factory setting)

	JM1	JM state
◆	Connect	0 deg
	Disconnect	+ 2 deg

Commercial mode setting

"Hot start" can be canceled,fan operates continously when indoor unit is ON on every mode.
When you select "FAN:AUTO"mode fan goes in "HIGH".

(◆ - - -Factory setting)

	JM2	JM state
◆	Connect	Residencial
	Disconnect	Commercial

Fan delay setting

This setting can be used when the auxiliary heater is mounted.
When the fan operation is stopped when the indoor unit is operating
with an auxiliary heater,the fan operation continues one minutes.

(◆ - - -Factory setting)

	JM3	JM state
◆	Connect	Invalidity
	Disconnect	Validity

■EXTERNAL INPUT AND OUTPUT

Connector	INPUT	OUTPUT	REMARKS
CN114	CONTROL INPUT (OPERATION/STOP)	-	See external input/output settings for details.
CN115	-	OPERATION DISPLAY	
CN14	-	FRESH AIR	
CN15	-	ELECTRICAL HEATER	

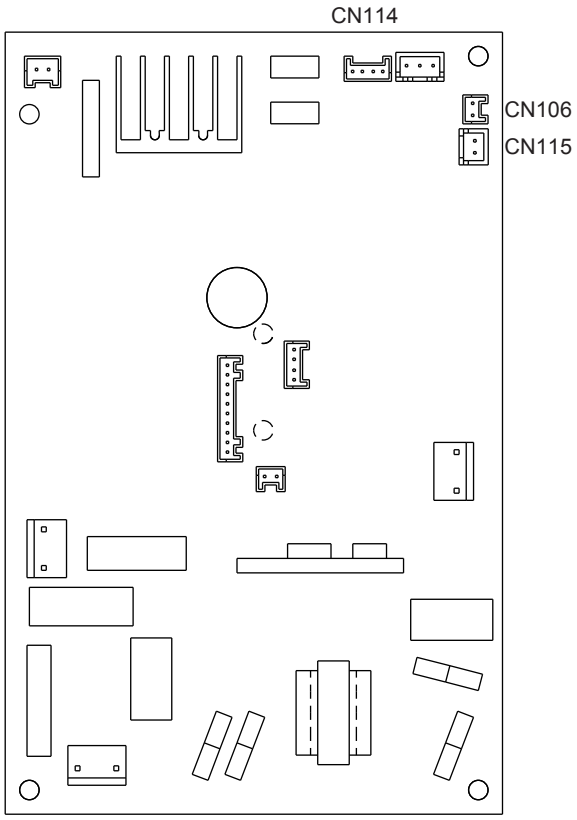
8-5-4 INDOOR UNIT (AR*45/ 54LUAK)

INDOOR UNIT			
DIP SW	SW 1	1	Forbidden
		2	
		3	
		4	
	SW 2	1	Room temperature correct coefficient of heating
		2	External input select
		3	Auto restart validity/invalidity
Rotary SW	SW 3		Indoor unit number setting
Jumper Wire		JM1	Forbidden
		JM2	Commercial mode setting
		JM3	Fan delay setting

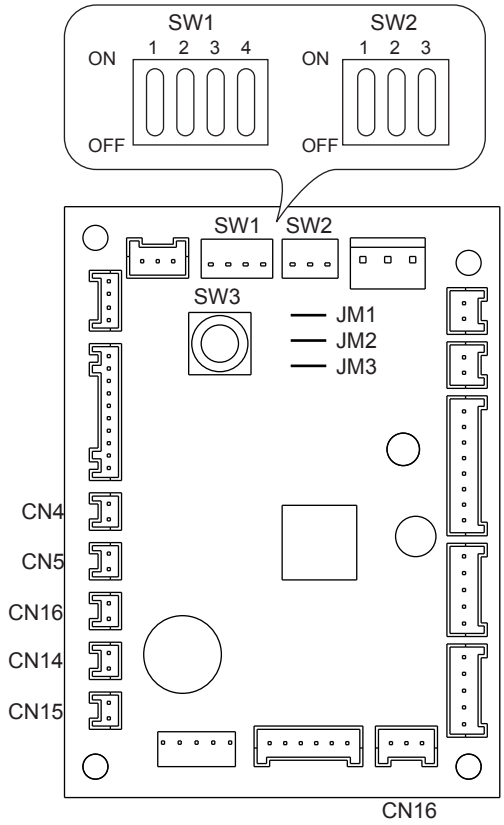
■ SWITCH POSITION

- **Duct type Indoor unit control circuit board**

POWER PCB



MAIN PCB



■DIP SWITCH SETTING

1. SW1 setting

1-1 Dip SW 1-1,1-2,1-3,1-4 setting forbidden

(◆ - - -Factory setting)

◆	SW1-1	OFF
◆	SW1-2	OFF
◆	SW1-3	OFF
◆	SW1-4	OFF

2. SW2 setting

2-1 Room temperature correct coefficient of heating.

Decide the heating temperature correct coefficient vale of heating.

Heat temperature corrction (◆ - - -Factory setting)

	SW2-1	SW state
◆	OFF	Ceiling setting (+4°C)
	ON	Room setting (0°C)

2-2 Control input setting

This switch is used to select the format of external input command as shown in the table below.

(◆ - - -Factory setting)

	SW2-2	SW state
◆	OFF	Edge
	ON	Pulse

2-3 Auto restart setting

Auto restart function can be selected by turning this switch ON/OFF.

(◆ - - -Factory setting)

	SW2-3	SW state
◆	OFF	Validity
	ON	Invalidity

■ROTARY SWITCH SETTING

This switch can be used when group control system.
Set the indoor unit address in the 1,2,-,15 order.

(◆ - - -Factory setting)

	SW3	SW state
◆	0	single
	1-15	Indoor unit address

■JUMPER WIRE SETTING

JM1 setting forbidden

(◆ ▪ ▪ ▪Factory setting)

	JM1	SW state
◆	Connect	Forbidden
	Disconnect	

Commercial mode setting

"Hot start" can be canceled,fan operates continously when indoor unit is ON on every mode.
When you select "FAN:AUTO"mode fan goes in "HIGH"

(◆ ▪ ▪ ▪Factory setting)

	JM2	SW state
◆	Connect	Residencial
	Disconnect	Commercial

Fan delay setting

This setting can be used when the auxiliary heater is mounted.
When the fan operation is stopped when the indoor unit is operating with an auxiliary heater,the fan operation continues one minutes.

(◆ ▪ ▪ ▪Factory setting)

	JM3	SW state
◆	Connect	Invalidity
	Disconnect	Validity

■EXTERNAL INPUT AND OUTPUT

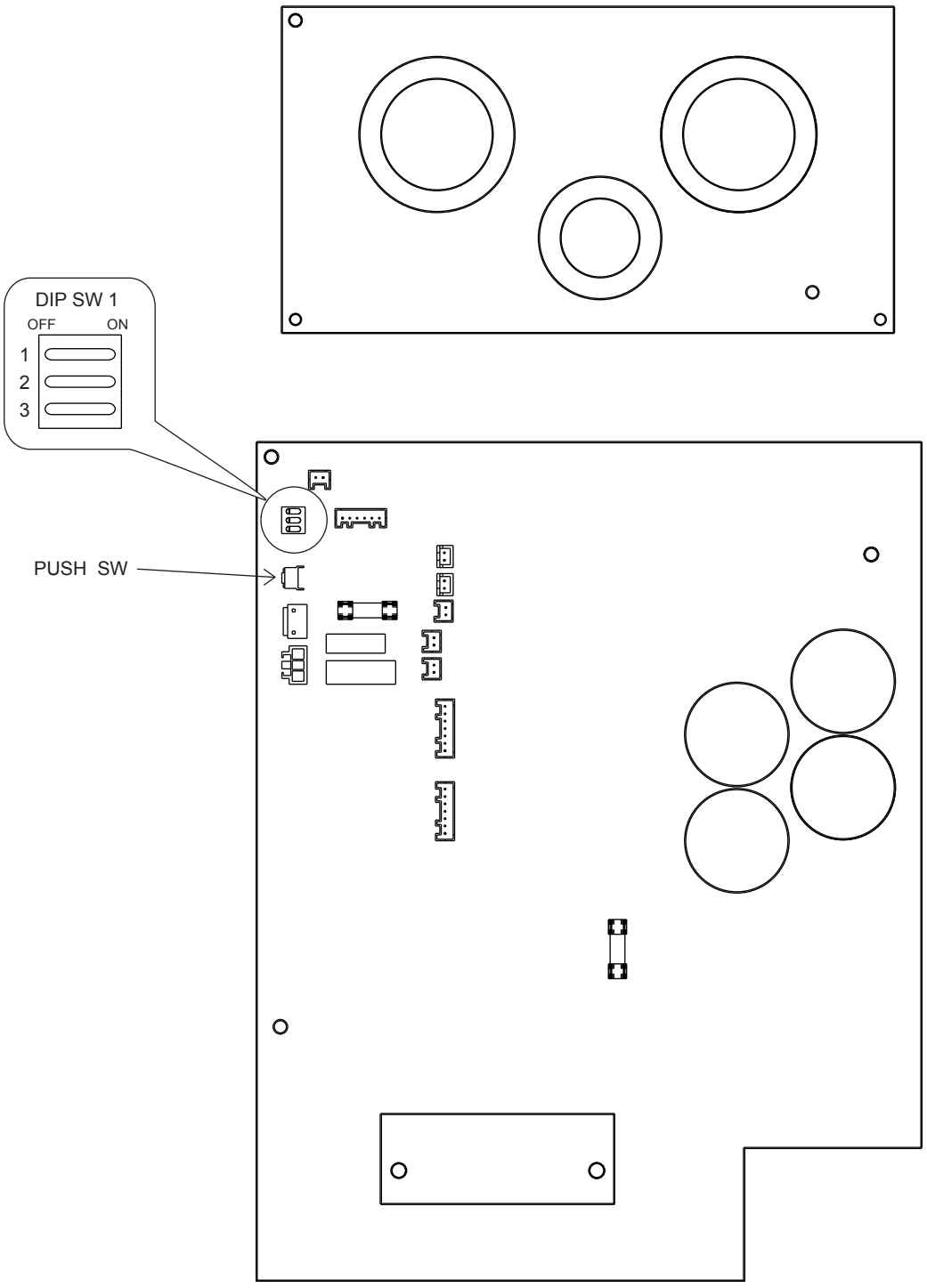
Connector	INPUT	OUTPUT	REMARKS
CN114	CONTROL INPUT (OPERATION/STOP)	-	See external input/output settings for details.
CN115	-	OPERATION DISPLAY	
CN14	-	FRESH AIR	
CN15	-	ELECTRICAL HEATER	

8-5-5 OUTDOOR UNIT (AO*30/ 36LMAWL/ AO*45/ 54LJ*YL)

OUTDOOR UNIT		
DIP SW 1	1	Change current capacity
	2	
	3	No use (OFF)
PUSH SW		Pump down switch

■ SWITCH POSITION

- **Outdoor unit control circuit board**



■ DIP SWITCH SETTING

● Current capacity setting

For AO*30/ 36LMAWL

DIP-SW			CURRENT (MAX.)
1	2	3	
OFF	OFF	OFF	18.0A *1
ON	OFF	OFF	15.0A *2
OFF	ON	OFF	13.5A
ON	ON	OFF	12.0A

*1=36000BTU model's factory setting (AO*36LMAWL)
*2=30000BTU model's factory setting (AO*30LMAWL)

For AO*45/ 54LJ*YL

DIP-SW			CURRENT (MAX.)
1	2	3	
OFF	OFF	OFF	23.5A *1
ON	OFF	OFF	20.0A *2
OFF	ON	OFF	18.0A
ON	ON	OFF	15.5A

*1=54000BTU model's factory setting (AO*54LJAYL)
*2=45000BTU model's factory setting (AO*45LJ*YL)

■ PUSH SWITCH SETTING

● SW2 setting

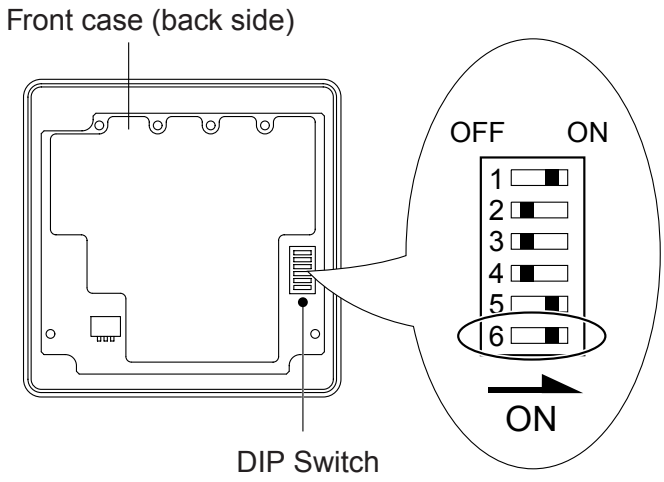
Press the this push-button switch, and "PUMP DOWN OPERATION" is starting.

8-5-6 WIRED REMOTE CONTROLLER

Wired remote controller		
DIP SW	1	Dual remote controller setting
	2	
	3	Group control setting
	4	Model setting
	5	Auto changeover setting
	6	Memory backup setting

■ SWITCH POSITION

● Wired remote controller



■ DIP SWITCH SETTING

1. SW setting

1-1 Dual remote controller setting

Set the remote controller DIP switch No.1 and 2 according to the following table.

(◆ ▪ ▪ ▪Factory setting)

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

1-2 Group control setting

Number of indoor unit connection (One/Multiple)
This is switched according to the number of connected indoor units.

(◆ ▪ ▪ ▪Factory setting)

	DIP-SW No.3	Number of indoor unit
◆	OFF	One unit connection
	ON	Multiple unit connection

1-3 Model setting

The system type of the outdoor unit can be selected by setting up DIP switch No.4 as follows.

(◆ ▪ ▪ ▪Factory setting)

	DIP-SW No.4	Model
◆	OFF	Heat Pump model
	ON	Cooling only model

1-4 Auto changeover setting

Selecting auto changeover validity / invalidity.

(◆ ▪ ▪ ▪Factory setting)

	DIP-SW No.5	Auto changeover
◆	OFF	Invalidity
	ON	Validity

1-5 Memory backup setting

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

※ This function is wired remotecontroll only.

(◆ ▪ ▪ ▪Factory setting)

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

Refrigerant
R410A

DUCT type
INVERTER

9 . INSTALLATION MANUAL

Duct Type
SPLIT TYPE AIR CONDITIONER
INSTALLATION INSTRUCTION SHEET
(PART NO. 9374815012-02)

⚠ CAUTION
R410A REFRIGERANT
This Air Conditioner contains and operates with refrigerant R410A and Polyol Ester oil.
THIS PRODUCT MUST ONLY BE INSTALLED OR SERVICED BY QUALIFIED PERSONNEL.
Refer to Commonwealth, State, Territory and local legislation, regulations, codes, installation & operation manuals, before the installation, maintenance and /or service of this product.

Indoor unit is an appliance not accessible to the general public.

For authorized service personnel only.

⚠ DANGER	This mark indicates procedures which, if improperly performed, are most likely to result in the death of or serious injury to the user or service personnel.
⚠ WARNING	This mark indicates procedures which, if improperly performed, might lead to the death or serious injury of the user.
⚠ CAUTION	This mark indicates procedures which, if improperly performed, might possibly result in personal harm to the user, or damage to property.

⚠ DANGER

Never touch electrical components immediately after the power supply has been turned off. Electrical shock may occur. After turning off the power, always wait 5 minutes or more before touching electrical components.

This air conditioner uses new refrigerant HFC (R410A).

The basic installation work procedures are the same as conventional refrigerant models. However, pay careful attention to the following points:

① **Since the working pressure is 1.6 times higher than that of conventional refrigerant models, some of the piping and installation and service tools are special. (See the table below.) Especially, when replacing a conventional refrigerant model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.**

② **Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant and for safety. Therefore, check beforehand. [The charging port thread diameter for R410A is 1/2 UNF 20 threads per inch.]**

③ **Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant models. Also, when storing the piping, securely seal the openings by pinching, taping, etc.**

④ **When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.**

Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals –0.1 to 5.3 MPa (–76 cmHg to 53 kgf/cm²) for high pressure. –0.1 to 3.8 MPa (–76 cmHg to 38 kgf/cm²) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes
It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.
As an air conditioner using R410A incurs pressure higher than when using conventional refrigerant, it is necessary to choose adequate materials.
Thicknesses of copper pipes used with R410A are as shown in the table. Never use copper pipes thinner than that in the table even when it is available on the market.

Thicknesses of Annealed Copper Pipes (R410A)

Pipe outside diameter	Thickness
6.35 mm (1/4 in.)	0.80 mm
9.52 mm (3/8 in.)	0.80 mm
12.70 mm (1/2 in.)	0.80 mm

For authorized service personnel only.

⚠ WARNING

① **For the room air conditioner to operate satisfactorily, install it as outlined in this installation instruction sheet.**

② **Connect the indoor unit and outdoor unit with the room air conditioner piping and cords available standards parts. This installation instruction sheet describes the correct connections using the installation set available from our standard parts.**

③ **Installation work must be performed in accordance with national wiring standards by authorized personnel only.**

④ **If refrigerant leaks while work is being carried out, ventilate the area. If the refrigerant comes in contact with a flame, it produces a toxic gas.**

⑤ **Do not use an extension cord.**

⑥ **Do not turn on the power until all installation work is complete.**

⚠ CAUTION

This installation instruction sheet describes how to install the indoor unit only.
To install the outdoor unit, refer to the installation instruction sheet included with the outdoor unit.

- **Be careful not to scratch the room air conditioner when handling it.**
- **After installation, explain correct operation to the customer, using the operating manual.**
- **Let the customer keep this installation instruction sheet because it is used when the air conditioner is serviced or moved.**

SELECTING THE MOUNTING POSITION

⚠ WARNING

Install at a place that can withstand the weight of the indoor and outdoor units and install positively so that the units will not topple or fall.

⚠ CAUTION

① **Do not install where there is the danger of combustible gas leakage.**

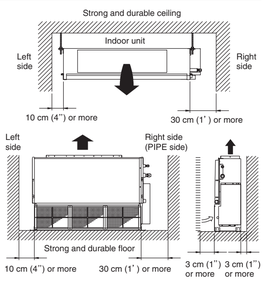
② **Do not install near heat sources.**

③ **If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.**

④ **Take precautions to prevent the unit from falling.**

Decide the mounting position with the customer as follows:

INDOOR UNIT
(1) Install the indoor unit level on a strong wall, floor, ceiling which is not subject to vibration.
(2) The inlet and outlet ports should not be obstructed : the air should be able to blow all over the room.
(3) Install the unit near an electric outlet or special branch circuit.
(4) Do not install the unit where it will be exposed to direct sunlight.
(5) Install the unit where connection to the outdoor unit is easy.
(6) Install the unit where the drain pipe can be easily installed.
(7) Take servicing, etc. into consideration and leave the spaces shown on the right. Also install the unit where the filter can be removed.
(8) Install the indoor unit where vibrations and noise are not amplified.
(9) When installing the unit on the floor, provide an opening that will allow sufficient air to reach the air inlet panel.



STANDARD PARTS
The following installation parts are furnished. Use them as required.
INDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Installation template	1	For positioning the indoor unit
Hanger	4	For suspending the indoor unit from ceiling
Tapping screw (ø4 × 10)	8	For installing the hanger
Special nut A (large flange)	4	For suspending the indoor unit from ceiling
Special nut B (small flange)	4	
Coupler heat insulation (large)	1	For indoor side pipe joint (large pipe)
Coupler heat insulation (small)	1	For indoor side pipe joint (small pipe)

Name and Shape	Q'ty	Application
Binder	(Small) 1	For remote controller and remote controller cord binding
	(Large) 4	For fixing the coupler heat insulation
Remote controller	1	
Remote controller cord	1	For connecting the remote controller
Tapping screw (ø4 × 16)	2	For installing the remote controller
Filter	2	9000 BTU/h model
	3	12000 - 22000 BTU/h models
Drain hose insulation	1	Insulates the drain hose and vinyl hose connection

OPTIONAL PARTS
The following options are available.
• Remote sensor : UTD-RS100 (P/N 9072619004)

CONNECTING PIPE REQUIREMENT

⚠ CAUTION

Refer to the installation instruction sheet of the outdoor unit for description of the length of connecting pipe or for difference of its elevation.

MODEL		9000 and 12000 BTU/h models	14000 - 22000 BTU/h models
Diameter	Small	6.35 mm (1/4 in.)	6.35 mm (1/4 in.)
	Large	9.52 mm (3/8 in.)	12.70 mm (1/2 in.)

- Use pipe with water-resistant heat insulation.
- Use pipe that can withstand a pressure of 4150 kpa.

⚠ CAUTION

Install heat insulation around both the gas and liquid pipes. Failure to do so may cause water leaks.
Use heat insulation with heat resistance above 120 °C. (Reverse cycle model only)
In addition, if the humidity level at the installation location of the refrigerant piping is expected to exceed 70%, install heat insulation around the refrigerant piping. If the expected humidity level is 70-80%, use heat insulation that is 15 mm or thicker and if the expected humidity exceeds 80%, use heat insulation that is 20 mm or thicker.
If heat insulation is used that is not as thick as specified, condensation may form on the surface of the insulation.
In addition, use heat insulation with heat conductivity of 0.045 W/(m·K) or less (at 20 °C).

ELECTRICAL REQUIREMENT
• Electric wire size :

Connection cord (mm²)	
MAX.	MIN.
2.5	1.5

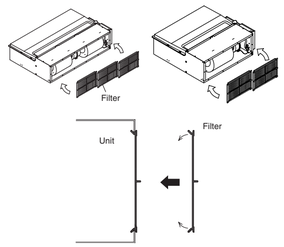
- Always use H07RN-F or equivalent to the connection cord.
- Install all electrical works in accordance to the standard.
- Install the disconnect device with a contact gap of at least 3 mm in all poles nearby the units. (Both indoor unit and outdoor unit)

1 INDOOR UNIT INSTALLATION

A. CEILING CONCEALED TYPE

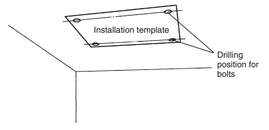
1. INSTALL THE FILTERS
• Install the filters to the unit.

[12000 - 22000 BTU/h models] **[9000 BTU/h model]**

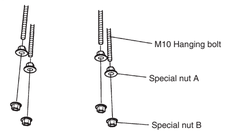


This unit may also be installed with the air inlet facing down.
See also 1 - B - 1 for such cases.

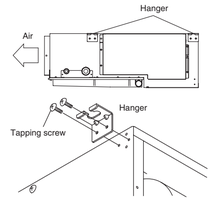
2. DRILLING HOLES FOR BOLTS AND INSTALLING THE BOLTS
• Using the installation template, drill holes for bolts (4 holes).



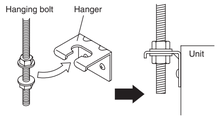
3. INSTALLING THE HANGERS
• Fasten the hanging bolts to the ceiling and install special nuts A and B.



• Install the hangers to the unit (4 places).



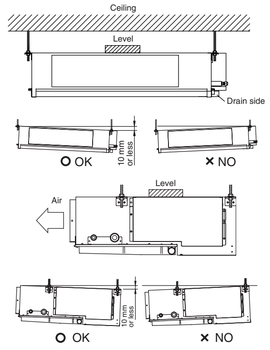
• Hang the unit.
Pass the hanging bolts through the hangers (4 places).



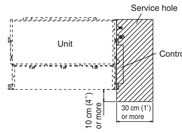
⚠ CAUTION

Fasten the unit securely with special nuts A and B.

4. LEVELING
Base horizontal direction leveling on top of the unit.



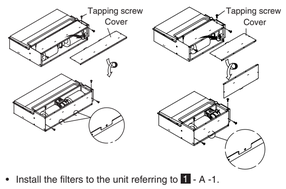
5. SERVICE HOLE DIMENSIONS
Open a service hole with the dimensions shown.



B. FLOOR STANDING CONCEALED TYPE

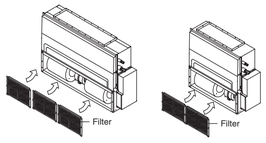
1. INSTALL THE FILTERS
• Remove the 4 tapping screws, and then remove cover.
• Install the cover with the 4 tapping screws as shown in the illustration below.

[12000 - 22000 BTU/h models] **[9000 BTU/h model]**

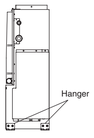


• Install the filters to the unit referring to 1 - A -1.

[12000 - 22000 BTU/h models] **[9000 BTU/h model]**

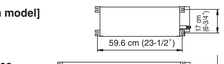


2. INSTALLING THE HANGERS
• Install the hangers to the unit (4 places).

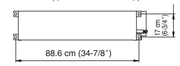


3. DRILLING HOLES FOR BOLTS AND INSTALLING THE BOLTS
• Drilling position for bolts.

[9000 BTU/h model]



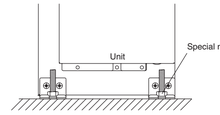
[12000 - 22000 BTU/h models]



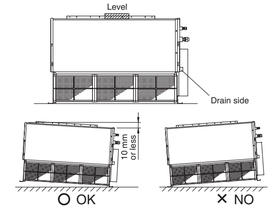
⚠ CAUTION

Secure with an M10 anchor bolts. If securing the unit to the floor is difficult, first build a stand or platform.

4. INSTALL THE UNIT
• Fix the unit.
Install the unit and fasten with special nut B.



5. LEVELING
Base horizontal and vertical direction leveling on top of the unit.



⚠ CAUTION

In order to prevent water from leaking around the outlet port, make sure to insulate it (on both the CEILING CONCEALED type and the FLOOR STANDING CONCEALED type).

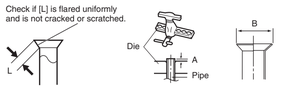
2 CONNECTING THE PIPE

⚠ CAUTION

① **Do not use mineral oil on flared part. Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.**

② **While welding the pipes, be sure to blow dry nitrogen gas through them.**

1. FLARING
(1) Cut the connection pipe to the necessary length with a pipe cutter.
(2) Hold the pipe downward so that cuttings will not enter the pipe and remove the burrs.
(3) Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool.
Use the special R410A flare tool, or the conventional (for R22) flare tool.



Pipe outside diameter	Dimension A (mm)
	Flare tool for R410A, clutch type
6.35 mm (1/4 in.)	0 to 0.5
9.52 mm (3/8 in.)	
12.70 mm (1/2 in.)	

Pipe outside diameter	Dimension B $^{0}_{-0.4}$ (mm)
6.35 mm (1/4 in.)	9.1
9.52 mm (3/8 in.)	13.2
12.70 mm (1/2 in.)	16.6

When using conventional flare tools to flare R410A pipes, the dimension A should be approximately 0.5 mm more than indicated in the table (for flaring with R410A flare tools) to achieve the specified flaring. Use a thickness gauge to measure the dimension A.

Pipe outside diameter	Width across flats of Flare nut
6.35 mm (1/4 in.)	17 mm
9.52 mm (3/8 in.)	22 mm
12.70 mm (1/2 in.)	26 mm

2. BENDING PIPES
The pipes are shaped by your hands. Be careful not to collapse them.
Do not bend the pipes in an angle more than 90°.
When pipes are repeatedly bent or stretched, the material will harden, making it difficult to bend or stretch them any more. Do not bend or stretch the pipes more than three times.

⚠ CAUTION

① **To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 150 mm or over.**

② **If the pipe is bent repeatedly at the same place, it will break.**

3. CONNECTION PIPES
Indoor unit
(1) Detach the caps and plugs from the pipes.

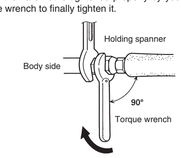
⚠ CAUTION

① **Be sure to apply the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.**

② **Do not remove the flare nut from the indoor unit pipe until immediately before connecting the connection pipe.**

(2) Centering the pipe against port on the indoor unit, turn the flare nut with your hand.

(3) When the flare nut is tightened properly by your hand, use a torque wrench to finally tighten it.



⚠ CAUTION

Hold the torque wrench at its grip, keeping it in the right angle with the pipe, in order to tighten the flare nut correctly.

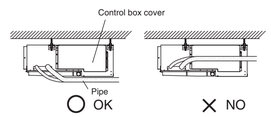
Flare nut	Tightening torque
6.35 mm (1/4 in.) dia.	14 to 18 N·m (140 to 180 kgf·cm)
9.52 mm (3/8 in.) dia.	33 to 42 N·m (330 to 420 kgf·cm)
12.70 mm (1/2 in.) dia.	50 to 62 N·m (500 to 620 kgf·cm)

⚠ CAUTION

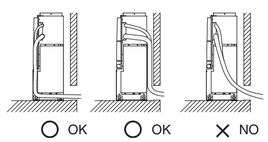
Be sure to connect the large pipe after connecting the small pipe completely.

• Lay the piping.

A. CEILING CONCEALED TYPE



B. FLOOR STANDING CONCEALED TYPE

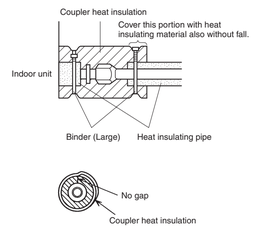


⚠ CAUTION

① **Install the piping so that the control box cover can be removed for servicing.**

② **In order to prevent water from leaking into the control box, make sure that the piping is well insulated.**

4. HEAT INSULATION ON THE PIPE JOINTS (INDOOR SIDE ONLY)
- After checking for gas leaks, insulate by wrapping insulation around the two parts (large and small) of the indoor unit coupling, using the coupler heat insulation.
- After installing the coupler heat insulation, wrap both ends with vinyl tape so that there is no gap.
- After wrapping tape around the ends of the coupler heat insulation, secure the heat insulation pipe and the taped portion with large binders in two places, as shown below.



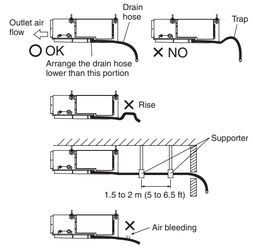
- Continued on back -

3 INSTALLING DRAIN HOSE

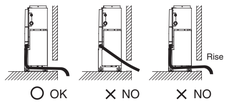
INSTALL THE DRAIN HOSE

- Install the drain hose with downward gradient (1/50 to 2/50) and so there are no rises or traps in the hose.
- Use general hard polyvinyl chloride pipe and connect it with adhesive (polyvinyl chloride) so that there is no leakage.
- When the hose is long, install supporters.
- Do not perform air bleeding.
- Always heat insulate the indoor side of the drain hose.

A. CEILING CONCEALED TYPE



B. FLOOR STANDING CONCEALED TYPE



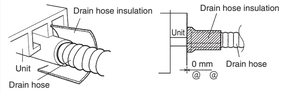
⚠ CAUTION

① **Install the drain hose so that the control box cover can be removed for servicing.**

② **In order to prevent water from leaking into the control box, make sure that the drain hose is well insulated.**

③ **After the wiring is connected and installation of the piping and drain hose is complete, make a seal around the opening in the wall.**

The outside diameter of drain port is 26 mm, use a suitable drain hose.



4 ELECTRICAL WIRING

⚠ WARNING

① **Before starting work, check that power is not being supplied to the indoor unit and outdoor unit.**

② **Match the terminal board numbers and connection cord colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric parts.**

③ **Connect the connection cords firmly to the terminal board. Imperfect installation may cause a fire.**

④ **Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)**

⑤ **Always connect the ground wire.**

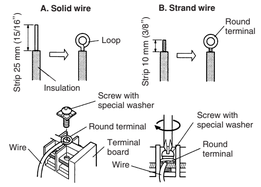
HOW TO CONNECT WIRING TO THE TERMINALS

A. For solid core wiring (or F-cable)

(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 25 mm (15/16") of expose the solid wire.
(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
(3) Using pliers, bend the solid wire to form a loop suitable for the terminal screw.
(4) Shape the loop wire properly, place it on the terminal board and tighten securely with the terminal screw using a screwdriver.

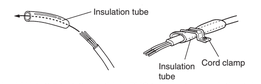
B. For strand wiring

(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 10 mm (3/8") of expose the strand wiring.
(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
(3) Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.
(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.



HOW TO FIX CONNECTION CORD AND POWER CABLE AT THE CORD CLAMP

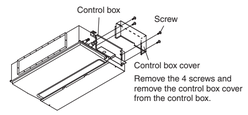
After passing the connection cord and power cable through the insulation tube, fasten it with the cord clamp.



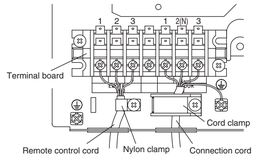
Use VW-1, 0.5 to 1.0 mm thick, PVC tube as the insulation tube.

1. INDOOR UNIT SIDE

(1) Remove the control box cover from the control box.



(2) Cord connection.
- Clamp the connection cord with the cord clamp.
- Connect the connection cord to the terminal board.
- Clamp the remote control cord with nylon clamp.
- Connect the remote control cord to the terminal board.



⚠ CAUTION

① **Tighten the indoor unit connection cord (to the outdoor unit) and power supply indoor and outdoor unit terminal board connections firmly with the terminal board screws. Faulty connection may cause a fire.**

② **If the indoor unit connection cord (to the outdoor unit) and power supply are wired incorrectly, the air conditioner may be damaged.**

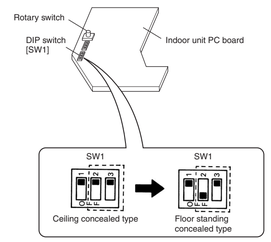
③ **Wire the indoor unit connection cord (to the outdoor unit) by matching the numbers of the outdoor and indoor units terminal board numbers as shown in terminal label.**

④ **Ground both the indoor and outdoor units by attaching a ground wire.**

⑤ **Unit shall be grounded in compliance with the applicable local and national codes.**

2. Floor standing concealed/ceiling concealed select switch

(1) The DIP switches were set for use as a ceiling concealed type at the factory.
(2) The following changes must be made to the settings if the unit is to be used as a floor standing concealed type.
(3) Changing the settings for the electrical circuits.
DIP Switch 1 (SW1) on the printed circuit board inside the electric component box must be set as follows.



5 REMOTE CONTROLLER SETTING

⚠ CAUTION

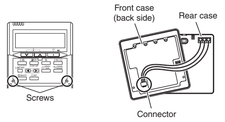
① **In order to detect the room temperature correctly when using the temperature sensor of the remote controller, do not install the remote controller in a place where it will be exposed to direct sunlight or directly below the air outlet of the indoor unit.**

② **When installing the remote controller and cord near a source of electromagnetic waves, separate the remote controller from the source of the electromagnetic waves and use shielded cord.**

③ **Do not touch the remote controller PC board and PC board parts directly with your hands.**

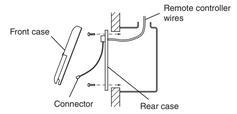
1. INSTALLING THE REMOTE CONTROLLER

(1) Open the operation panel on the front of the remote controller, remove the two screws indicated in the following figure, and then remove the front case of the remote controller.



When installing the remote controller, remove the connector from the front case. The wires may break if the connector is not removed and the front case hangs down.
When installing the front case, connect the connector to the front case.

(2) Install the rear case to the wall, etc. with the two tapping screws.
Refer to the following information to install the remote controller wires.

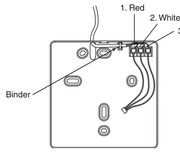


Install the remote controller wires so as not to be direct touched with your hand.

2. ROUTING THE REMOTE CONTROLLER WIRES

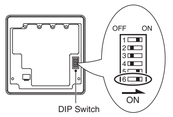
(1) Install the remote controller wires to the terminals on the top of the rear case as shown in the following figure.
(2) Fasten the wires with the binder.

(Example)



3. SETTING THE DIP SWITCHES

When using a battery (memory backup)



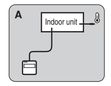
Change the DIP switch setting to use batteries. (The DIP switch is not set to use batteries at the factory.)
Change DIP switch No. 6 from OFF to ON.
If batteries are not used, all of the settings stored in memory will be deleted if there is a power failure.

4. SETTING THE ROOM TEMPERATURE DETECTION LOCATION

The detection location of the room temperature can be selected from the following three examples. Choose the detection location that is best for the installation location.

A. Indoor unit setting (factory setting)

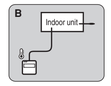
The room temperature is detected by the indoor unit temperature sensor.



(1) When the THERMO SENSOR button is pressed, the lock display flashes because the function is locked at the factory.

B. Remote controller setting

The room temperature is detected by the remote controller temperature sensor.

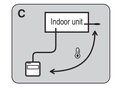


(1) Press the THERMO SENSOR button for 5 seconds or more to unlock the function. The thermo sensor display flashes and then disappears when the function is unlocked.
(2) Press the THERMO SENSOR button.
The thermo sensor display appears.

(3) Press the THERMO SENSOR button again for 5 seconds or more to lock the function. The thermo sensor display flashes and then remains on when the function is locked.
(4) Make sure that the function is locked.

C. Indoor unit/remote controller setting (room temperature sensor selection)

The temperature sensor of the indoor unit or the remote controller can be used to detect the room temperature.



(1) Press the THERMO SENSOR button for 5 seconds or more to unlock the function. The thermo sensor display flashes and then disappears when the function is unlocked.
(2) Press the THERMO SENSOR button to select the temperature sensor of the indoor unit or the remote controller.

1 NOTES

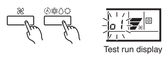
If the function to change the temperature sensor is used as shown in examples A and B (other than example C), be sure to lock the detection location. If the function is locked, the lock display will flash when the THERMO SENSOR button is pressed.

6 TEST RUN

⚠ CAUTION

Always turn on the power 12 hours prior to the start of the operation in order to ensure compressor protection.

(1) Stop the air conditioner operation.
(2) Press the master control button and the fan control button simultaneously for 2 seconds or more to start the test run.



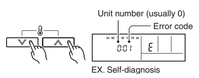
(3) Press the start/stop button to stop the test run.

[SELF-DIAGNOSIS]

When the error indication "E:EE" is displayed, follow the following items to perform the self-diagnosis. "E:EE" indicates an error has occurred.

1. REMOTE CONTROLLER DISPLAY

(1) Stop the air conditioner operation.
(2) Press the set temperature buttons ∧/∨ simultaneously for 5 seconds or more to start the self-diagnosis.
Refer to the following tables for the description of each error code.



(3) Press the set temperature buttons ∧/∨ simultaneously for 5 seconds or more to stop the self-diagnosis.

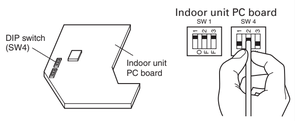
Error code	Error contents
00	Communication error (indoor unit ←— remote controller)
01	Communication error (outdoor unit —→ indoor unit)
02	Room temperature sensor open
03	Room temperature sensor short-circuited
04	Indoor heat exchanger temperature sensor open
05	Indoor heat exchanger temperature sensor short-circuited
06	Outdoor heat exchanger temperature sensor
08	Power source connection error
09	Float switch operated
0A	Outdoor temperature sensor
0c	Discharge pipe temperature sensor
11	Model abnormal
12	Indoor fan abnormal
13	Outdoor signal abnormal
14	Outdoor EEPROM abnormal
15	Compressor temperature sensor
16	Pressure switch abnormal
17	IPM error
1A	Compressor cannot operate
1b	Outdoor fan abnormal

7 AIR FLOW SETTING

Static range is 0 to 40 Pa.
If static pressure is over 20 Pa, we recommend High static mode. Change the High static and Normal mode. If select the High static mode, air flow increases.
About 9000 BTU model and 22000 BTU model, High static mode and normal mode are same air flow.
The air flow is set according to the DIP switch settings in the following tables.

[12000 - 18000 BTU/h models]

Fan mode	DIP-SW4		
	1	2	3
Normal mode (0 ≦ Pa ≦ 20)	—	OFF	OFF
High static pressure mode (20 < Pa ≦ 40)	—	ON	OFF



⚠ CAUTION

Do not set any switches other than those specified in this sheet. The air conditioner may not operate correctly if any switches other than those specified are changed.

8 SPECIAL INSTALLATION METHODS

⚠ CAUTION

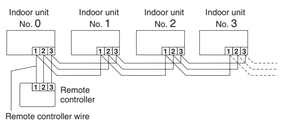
① **When setting the rotary switch and DIP switches, do not touch any other parts on the circuit board directly with your bare hands.**

② **Be sure to turn off the main power.**

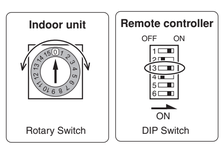
1. GROUP CONTROL SYSTEM

A number of indoor units can be operated at the same time using a single remote controller.

(1) Wiring method (indoor unit to remote controller)



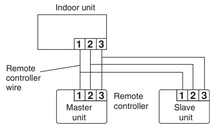
(2) Rotary switch setting (indoor unit)
Set the unit number of each indoor unit using the rotary switch on the indoor unit circuit board.
The rotary switch is normally set to 0.
(3) DIP switch setting (remote controller)
Change DIP switch No. 3 on the remote controller from OFF to ON.



2. DUAL REMOTE CONTROLLERS (OPTIONAL)

Two separate remote controllers can be used to operate the indoor units.

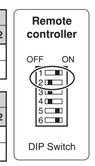
(1) Wiring method (indoor unit to remote controller)



(2) DIP switch setting (remote controller)
Set the remote controller DIP switch Nos. 1 and 2 according to the following table.

Number of remote controllers	Master unit	
	DIP-SW No. 1	DIP-SW No. 2
1 (Normal)	ON	OFF
2 (Dual)	OFF	OFF

Number of remote controllers	Slave unit	
	DIP-SW No. 1	DIP-SW No. 2
1 (Normal)	–	–
2 (Dual)	ON	ON

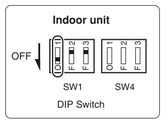


3. AUTO RESTART

- When the air conditioner power was temporarily turned off by a power failure etc., it restarts automatically after the power recovers.
(Operated by setting before the power failure)

The auto restart function can be canceled.

(1) DIP switch setting (indoor unit)
Change the DIP switch (SW1-1) on the indoor unit circuit board from ON to OFF. The auto restart function will be canceled.



[DIP-SWITCH SETTING]

● **Indoor unit**

	NO.	SW state		Detail
		OFF	ON	
DIP-Switch 1	1	Invalidity	Validity ✻	Auto restart setting
	2	—	— ✻	Temperature correction setting for heating
	3	—	— ✻	
DIP-Switch 4	1	— ✻	—	Remote controller setting
	2	— ✻	—	Air flow setting
	3	— ✻	—	

● **Remote controller**

	NO.	SW state		Detail
		OFF	ON	
DIP-Switch	1		✻	Dual remote controller setting
	2	✻		
	3	One unit ✻	Multiple unit	Group control setting
	4	Heat & Cool model	Cooling only model	Model setting
	5	Invalidity	Validity ✻	Auto changeover setting
	6	Invalidity✻	Validity	Memory backup setting

✻ : Factory setting

PART NO. 9374815012-02

Refrigerant
R410A Duct Type

SPLIT TYPE AIR CONDITIONER
INSTALLATION INSTRUCTION SHEET
(PART NO. 9374318063)

Indoor unit is an appliance not accessible to the general public.

For authorized service personnel only.

⚠ WARNING	This mark indicates procedures which, if improperly performed, might lead to the death or serious injury of the user.
⚠ CAUTION	This mark indicates procedures which, if improperly performed, might possibly result in personal harm to the user, or damage to property.

This air conditioner uses new refrigerant HFC (R410A).

The basic installation work procedures are the same as conventional refrigerant models. However, pay careful attention to the following points:

① **Since the working pressure is 1.6 times higher than that of conventional refrigerant models, some of the piping and installation and service tools are special. (See the table below.) Especially, when replacing a conventional refrigerant model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.**

② **Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant and for safety. Therefore, check beforehand. [The charging port thread diameter for R410A is 1/2 UNF 20 threads per inch.]**

③ **Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with conventional refrigerant models. Also, when storing the piping, securely seal the openings by pinching, taping, etc.**

④ **When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.**

⑤ **When moving, if the compressor stops during pump down, close the valve immediately.**

Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals –0.1 to 5.3 MPa (–76 cmHg to 53 kgf/cm²) for high pressure. –0.1 to 3.8 MPa (–76 cmHg to 38 kgf/cm²) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.
As an air conditioner using R410A incurs pressure higher than when using conventional refrigerant, it is necessary to choose adequate materials. Thicknesses of copper pipes used with R410A are as shown in Table. Never use copper pipes thinner than that in the table even when it is available on the market.

Thicknesses of Annealed Copper Pipes

Pipe outside diameter	Thickness
9.52 mm (3/8 in)	0.80 mm
15.88 mm (5/8 in)	1.00 mm

For authorized service personnel only.

⚠ WARNING

① **For the air conditioner to operate satisfactorily, install it as outlined in this installation instruction sheet.**

② **Connect the indoor unit and outdoor unit with the air conditioner piping and cords available standards parts. This installation instruction sheet describes the correct connections using the installation set available from our standard parts.**

③ **Installation work must be performed in accordance with national wiring standards by authorized personnel only.**

④ **If refrigerant leaks while work is being carried out, ventilate the area. If the refrigerant comes in contact with a flame, it produces a toxic gas.**

⑤ **Do not use an extension cord.**

⑥ **Do not turn on the power until all installation work is complete.**

⚠ CAUTION

This installation instruction sheet describes how to install the indoor unit only.
To install the outdoor unit, refer to the installation instruction sheet included with the outdoor unit.

- **Be careful not to scratch the air conditioner when handling it.**
- **After installation, explain correct operation to the customer, using the operating manual.**
- **Let the customer keep this installation instruction sheet because it is used when the air conditioner is serviced or moved.**

SELECTING THE MOUNTING POSITION

⚠ WARNING

Install at a place that can withstand the weight of the indoor and outdoor units and install positively so that the units will not topple or fall.

⚠ CAUTION

① **Do not install where there is the danger of combustible gas leakage.**

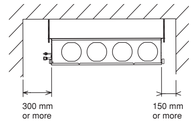
② **Do not install the unit near heat source of heat, steam, or flammable gas.**

③ **If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.**

Decide the mounting position with the customer as follows:

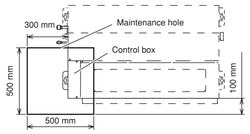
INDOOR UNIT

(1) Install the indoor unit on a place having a sufficient strength so that it withstand against the weight of the indoor unit.
(2) The inlet and outlet ports should not be obstructed; the air should be able to blow all over the room.
(3) Leave the space required to service the air conditioner.
(4) Install the unit where the drain pipe can be easily installed.
(5) Providing as much space as possible between the indoor unit and the ceiling will make work much easier.
(6) If installing in a place where its humidity exceeds 80%, use heat insulation to prevent condensation.

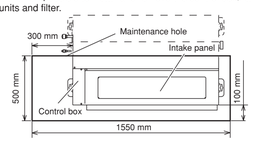


Maintenance hole dimension

It shall be possible to install and remove the control box.



It shall be possible to install and remove the control box, fan units and filter.



INSTALLATION PROCEDURE

Install the air conditioner as follows:

1 INDOOR UNIT INSTALLATION

RECOMMENDED RANGE OF EXTERNAL STATIC PRESSURE
30Pa to 150Pa

⚠ WARNING

① **Install the air conditioner in a location which can withstand a load of at least five times the weight of the main unit and which will not amplify sound or vibration.**
If the installation location is not strong enough, the indoor unit may fall and cause injuries.

② **If the job is done with the panel frame only, there is a risk that the unit will come loose. Please take care.**

⚠ CAUTION

For installation, refer to the technical data.

1. INSTALLING THE HANGERS

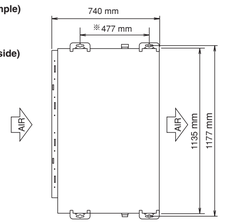
⚠ WARNING

When fastening the hangers, make the bolt positions uniform.

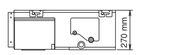
Hanging bolt installation diagram.

(Example)

(Top side)

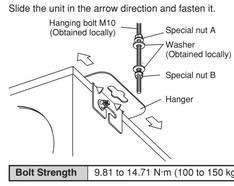


(Left side)



The distance of ※ is adjustable according to the place of the hanging bolts.
(MAX : 550 mm, MIN : 410 mm)

Slide the unit in the arrow direction and fasten it.



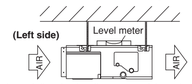
Bolt Strength	9.81 to 14.71 N·m (100 to 150 kgf·cm)

⚠ WARNING

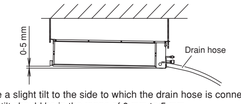
Fasten the unit securely with special nuts A and B.

2. LEVELING

Base vertical direction leveling on the unit (right and left).



Base horizontal direction leveling on top of the unit.

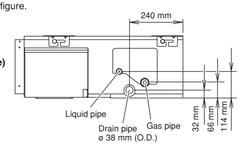


Give a slight tilt to the side to which the drain hose is connected. The tilt should be in the range of 0 mm to 5 mm

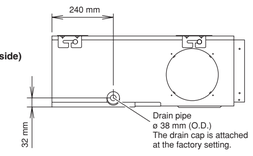
3. INSTALLING DRAIN HOSE

Install the drain hose according to the measurements given in the following figure.

(Left side)



(Right side)

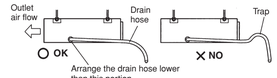


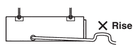
⚠ CAUTION

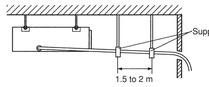
Install the drain hose in accordance with the instructions in this installation instruction sheet and keep the area warm enough to prevent condensation. Problems with the piping may lead to water leaks.

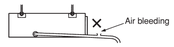
NOTE: INSTALL THE DRAIN HOSE

- Install the drain hose with downward gradient (1/50 to 1/100) and so there are no rises or traps in the hose.
- Use general hard polyvinyl chloride pipe (VP25) [outside diameter 38mm] and connect it with adhesive (polyvinyl chloride) so that there is no leakage.
- When the hose is long, install supporters.
- Do not perform air bleeding.
- Always heat insulate the indoor side of the drain hose.

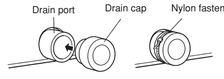








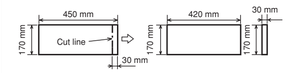
- When the unit is shipped from the factory, the drain port is on the left side (control box side).
- When using the drain port on the right side of the unit, reinstall the drain cap to the left side drain port.

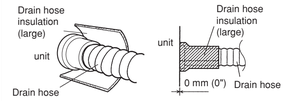


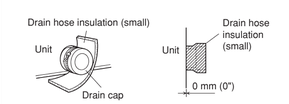
⚠ CAUTION

Always check that the drain cap is installed to the unused drain port and is fastened with the nylon fastener.
If the drain cap is not installed, or is not sufficiently fastened by the nylon fastener, water may drip during the cooling operation.

- Cut the drain hose insulation at a position approximately 30mm from the end with cutters, etc.
- Stick the large drain hose insulation at the drain hose installation side.
- Stick the small drain hose insulation at the drain cap side.

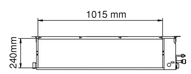




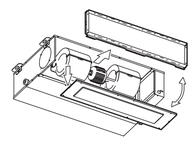


4. INTAKE DUCT CONNECTION

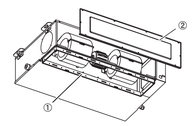
Follow the procedure in the following figure to the ducts.



The air inlet duct can be changed by replacing the intake grille and flange.



For the bottom air intake, follow the procedure of ① → ② for installation.
(The factory setting is back air intake.)



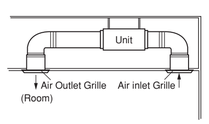
⚠ CAUTION

When air is taken in from the bottom side, the operating sound of the product will easily eater the room. Install the product and intake grilles where the affect of the operating sound is small.

⚠ CAUTION

① **If an intake duct is installed, take care not to damage the temperature sensor (the temperature sensor is attached to the intake port flange).**

② **Be sure to install the air inlet grille and the air outlet grille for air circulation. The correct temperature cannot be detected.**



③ **Grills must be fixed so that man cannot touch indoor unit fan, and cannot be removed by only hand operation without tool.**

④ **Be sure to install the air filter in the air inlet. If the air filter is not installed, the heat exchanger may be clogged and its performance may decrease.**

5. OUTLET DUCT CONNECTION

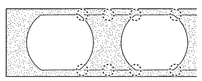
Duct installation pattern (■ CUT PART)

(1) Square duct

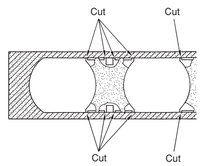
(2) Round duct outlet ×4
(This is the factory setting.)

When using as a square duct

(1) Cut the slit seam ⋯ with a cutter.

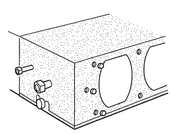


(2) Turn up the insulation around the points to be cut according to the outlet port shape working points so that the insulation does not stick out at the ////// part.



(3) Cut with nippers and remove the sheet metal.

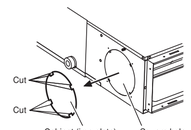
(4) Since there is a slit in the insulation, use radio pliers, tweezers, etc. to stretch the screw hole part used when installing the round flange and square flange when connecting the duct.



6. FRESH AIR INTAKE

(Processing before use)

(1) When taking in fresh air, cut a slit shaped cabinet in the left side of the outer case with nippers.

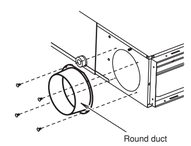


⚠ CAUTION

① **When removing the cabinet (iron plate), be careful not to damage the indoor unit internal parts and surrounding area (outer case).**

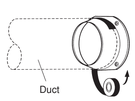
② **When processing the cabinet (iron plate), be careful not to injure yourself with burrs, etc.**

(2) Install the round flange (option parts) to the fresh air intake.



(3) Connect the duct to the round flange.

(4) Seal with a band and vinyl tape, etc. so that air does not leak from the connection.



STANDARD PARTS

The following installation parts are furnished. Use them as required.

INDOOR UNIT ACCESSORIES

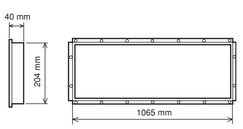
Name and Shape	Q'ty	Application
Hanger	4	For suspending the indoor unit from ceiling
Special nut A (large flange)	4	For suspending the indoor unit from ceiling
Special nut B (small flange)	4	
Coupler heat insulation (large)	1	For indoor side pipe joint (large pipe)
Coupler heat insulation (small)	1	For indoor side pipe joint (small pipe)

Name and Shape	Q'ty	Application
Binder	1 (large)	For fixing the drain hose
	1 (small)	For fixing the remote controller cord
Remote controller	1	
Tapping screw (flush heads)	2	For installing the remote controller
Remote controller cord	1	For connecting the remote controller
Drain hose insulation	1	Insulates the drain hose and vinyl hose

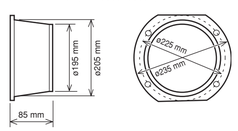
OPTIONAL PARTS

When connecting the square duct and round duct, use the optional square flange or round flange and flexible duct.

Square flange
Model name : UTD–SF045T (P/N 9098180007)

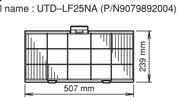


Round flange
Model name : UTD–RF204 (P/N 9093160004)



Flexible duct
Model name : UTD–RD202 (P/N 9074165004)

Long-life filter
Model name : UTD–LF25NA (P/N9079892004)



Simple remote controller
Model name : UTB–YPB (P/N9077582006)

Remote sensor
Model name : UTD–RS100 (P/N9072619004)

CONNECTING PIPE REQUIREMENT

Diameter	Small	9.52 mm (3/8 in.)
	Large	15.88 mm (5/8 in.)

- **Use pipe with water-resistant heat insulation.**

⚠ CAUTION

Install heat insulation around both the gas and liquid pipes. Failure to do so may cause water leaks.
Use heat insulation with heat resistance above 120 °C. (Reverse cycle model only)
In addition, if the humidity level at the installation location of the refrigerant piping is expected to exceed 70%, install heat insulation around the refrigerant piping. If the expected humidity level is 70-80%, use heat insulation that is 15 mm or thicker and if the expected humidity exceeds 80%, use heat insulation that is 20 mm or thicker. If heat insulation is used that is not as thick as specified, condensation may form on the surface of the insulation. In addition, use heat insulation with heat conductivity of 0.045 W/(m·K) or less (at 20 °C).

ELECTRICAL REQUIREMENT

- **Electric wire size :**

Connection cord (mm²)	MAX.	2.5
	MIN.	1.5

- **Install the disconnect device with a contact gap of at least 3 mm nearby the units. (Both indoor unit and outdoor unit)**
- **Always use H07RN-F or equivalent to the connection cord.**

2 CONNECTING THE PIPING

⚠ WARNING

Do not use the existing piping and flare nuts.
- If the existing materials are used, the pressure inside the refrigerant cycle will rise and cause breakage, injury, etc. (Use the special R410A materials.)

⚠ CAUTION

① **Do not use mineral oil on flared part. Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.**

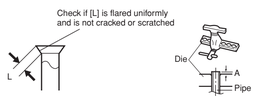
② **While welding the pipes, be sure to blow dry nitrogen gas through them.**

1. FLARING

(1) Cut the connection pipe to the necessary length with a pipe cutter.

(2) Hold the pipe downward so that cuttings will not enter the pipe and remove the burrs.

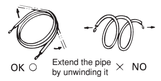
(3) Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool.
Use the special R410A flare tool, or the conventional flare tool.
When using the conventional flare tool, always use an allowance adjustment gauge and secure the A dimension.



Pipe outside diameter	A (mm)
	Flare tool for R410A, clutch type
9.52 mm (3/8 in.)	0 to 0.5
15.88 mm (5/8 in.)	0 to 0.5

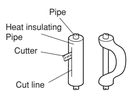
2. BENDING PIPES

The pipes are shaped by your hands. Be careful not to collapse them.



Do not bend the pipes in an angle more than 90°.
When pipes are repeatedly bent or stretched , the material will harden, making it difficult to bend or stretch them any more. Do not bend or stretch the pipes more than three times.

When bending the pipe, do not bend it as is. The pipe will be collapsed. in this case, cut the heat insulating pipe with a sharp cutter as shown on the right, and bend it after exposing the pipe. After bending the pipe as you want, be sure to put the heat insulating pipe back on the pipe, and secure it with tape.



⚠ CAUTION

① **To prevent breaking of the pipe, avoid sharp bends.**
Bend the pipe with a radius of curvature of 150 mm or over.

② **If the pipe is bent repeatedly at the same place, it will break.**

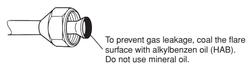
3. CONNECTION PIPES

Indoor unit side
Detach the caps and plugs from the pipes.

⚠ CAUTION

① **Be sure to apply the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.**

② **Do not remove the flare nut from the indoor unit pipe until immediately before connecting the connection pipe.**

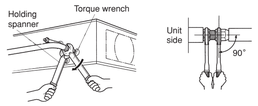


Centering the pipe against port on the indoor unit, turn the flare nut with your hand.

⚠ CAUTION

Hold the torque wrench at its grip, keeping it in the right angle with the pipe , in order to tighten the flare nut correctly.

When the flare nut is tightened properly by your hand, use a torque wrench to finally tighten it.



Flare nut tightening torque

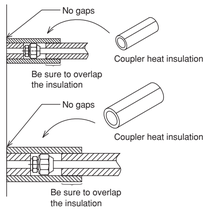
Flare nut	Tightening torque
9.52 mm (3/8 in.) dia.	33 to 42 N·m (330 to 420 kgf·cm)
15.88 mm (5/8 in.) dia.	63 to 77 N·m (630 to 770 kgf·cm)

⚠ CAUTION

Be sure to connect the gas pipe after connecting the liquid pipe completely.

4. HEAT INSULATION ON THE PIPE JOINTS (INDOOR SIDE ONLY)

Stick coupler heat insulation (large and small) to the place where connecting pipes.



⚠ CAUTION

There should be no gaps between the insulation and the product.

3 ELECTRICAL WIRING

⚠ CAUTION

Do not bundle the remote controller cord, or wire the remote controller cord in parallel, with the indoor unit connection wire (to the outdoor unit) and the power supply cord. It may cause erroneous operation.

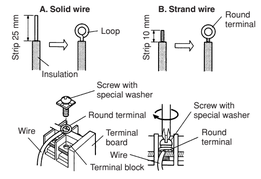
HOW TO CONNECT WIRING TO THE TERMINALS

A. For solid core wiring (or F-cable)

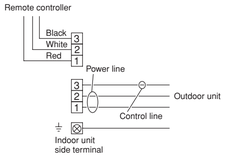
(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 25 mm (15/16") to expose the solid wire.
(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
(3) Using pliers, bend the solid wire to form a loop suitable for the terminal screw.
(4) Shape the loop wire properly, place it on the terminal board and tighten securely with the terminal screw using a screwdriver.

B. For strand wiring

(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 10 mm (3/8") to expose the strand wiring.
(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
(3) Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.
(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.



1. CONNECTION DIAGRAMS



2. INDOOR UNIT SIDE

⚠ WARNING

① **Before starting work, check that power is not being supplied to the indoor unit and outdoor unit.**

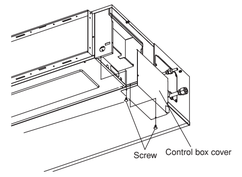
② **Match the terminal board numbers and connection cord colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric parts.**

③ **Connect the connection cords firmly to the terminal board. Imperfect installation may cause a fire.**

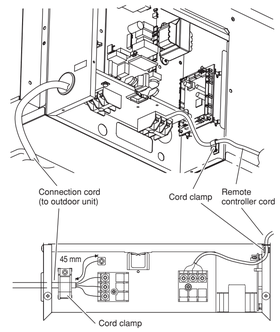
④ **Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)**

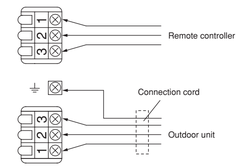
⑤ **Always connect the ground wire.**

(1) Remove the control box cover and install each connection wire.



(2) After wiring is complete, secure the remote controller cord, connection cord, and power cord with the cord clamps.





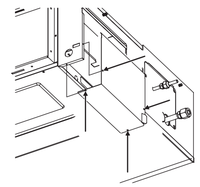
⚠ CAUTION

① **Use care not to mistake the power supply cord and connection wires when installing.**

② **Install so that the wires for the remote controller will not come in contact with other connection wires.**

③ **If there is a risk of entering insects and small animals into the hole for cords, fill in the gap with putty.**

(3) Install control box cover.



Adjust the position of the screws for control box cover according to the installation.

4 REMOTE CONTROLLER SETTING

⚠ CAUTION

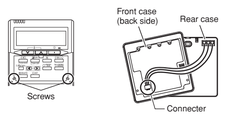
① **In order to detect the room temperature correctly when using the temperature sensor of the remote controller, do not install the remote controller in a place where it will be exposed to direct sunlight or directly below the air outlet of the indoor unit.**

② **When installing the remote controller and cord near a source of electromagnetic waves, separate the remote controller from the source of the electromagnetic waves and use shielded cord.**

③ **Do not touch the remote controller PC board and PC board parts directly with your hands.**

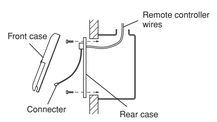
1. INSTALLING THE REMOTE CONTROLLER

(1) Open the operation panel on the front of the remote controller, remove the two screws indicated in the following figure, and then remove the front case of the remote controller.



When installing the remote controller, remove the connector from the front case. The wires may break if the connector is not removed and the front case hangs down.
When installing the front case, connect the connector to the front case.

(2) Install the rear case to the wall, etc. with the two tapping screws. Refer to the following information to install the remote controller wires.



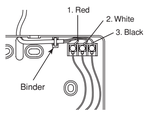
2. ROUTING THE REMOTE CONTROLLER WIRES

(1) Install the remote controller wires to the terminals on the top of the rear case as shown in the following figure.

(2) Fasten the wires with the binder.

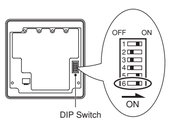
Install the remote controller wires so as not to be direct touched with your hand.

(Example)



3. SETTING THE DIP SWITCHES

When using a battery (memory backup)



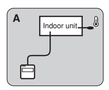
Change the DIP switch setting to use batteries. (The DIP switch is not set to use batteries at the factory.)
Change DIP switch No. 6 from OFF to ON.
If batteries are not used, all of the settings stored in memory will be deleted if there is a power failure.

4. SETTING THE ROOM TEMPERATURE DETECTION LOCATION

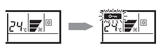
The detection location of the room temperature can be selected from the following three examples. Choose the detection location that is best for the installation location.

A. Indoor unit setting (factory setting)

The room temperature is detected by the indoor unit temperature sensor.

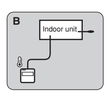


(1) When the THERMO SENSOR button is pressed, the lock display flashes because the function is locked at the factory.



B. Remote controller setting

The room temperature is detected by the remote controller temperature sensor.



(1) Press the THERMO SENSOR button for 5 seconds or more to unlock the function. The thermo sensor display flashes and then disappears when the function is unlocked.

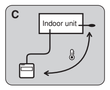
(2) Press the THERMO SENSOR button.
The thermo sensor display appears.

(3) Press the THERMO SENSOR button again for 5 seconds or more to lock the function. The thermo sensor display flashes and then remains on when the function is locked.

(4) Make sure that the function is locked.

C. Indoor unit/remote controller setting (room temperature sensor selection)

The temperature sensor of the indoor unit or the remote controller can be used to detect the room temperature.



(1) Press the THERMO SENSOR button for 5 seconds or more to unlock the function. The thermo sensor display flashes and then disappears when the function is unlocked.

(2) Press the THERMO SENSOR button to select the temperature sensor of the indoor unit or the remote controller.

NOTES

If the function to change the temperature sensor is used as shown in examples A and B (other than example C), be sure to lock the detection location. If the function is locked, the lock display will flash when the THERMO SENSOR button is pressed.

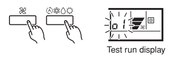
5 TEST RUN

⚠ CAUTION

Supply power to the crankcase heater for at least 12 hours before the start of operation in winter.

(1) Stop the air conditioner operation.

(2) Press the master control button and the fan control button simultaneously for 2 seconds or more to start the test run.



(3) Press the start/stop button to stop the test run.

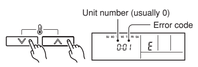
[SELF-DIAGNOSIS]

When the error indication "E:EE" is displayed, follow the following items to perform the self-diagnosis. "E:EE" indicates an error has occurred.

REMOTE CONTROLLER DISPLAY

(1) Stop the air conditioner operation.

(2) Press the set temperature buttons ∧/∨ simultaneously for 5 seconds or more to start the self-diagnosis.
Refer to the following tables for the description of each error code.



(3) Press the set temperature buttons ∧/∨ simultaneously for 5 seconds or more to stop the self-diagnosis.

Error code	Error contents
00	Communication error (indoor unit ⟷ remote controller)
01	Communication error (indoor unit ⟷ outdoor unit)
02	Room temperature sensor open
03	Room temperature sensor short-circuited
04	Indoor heat exchanger temperature sensor open
05	Indoor heat exchanger temperature sensor short-circuited
06	Outdoor heat exchanger temperature sensor
08	Power source connection error
09	Float switch operated
0A	Outdoor temperature sensor
0c	Discharge pipe temperature sensor
0E	Outdoor high pressure abnormal
11	Model abnormal
12	Indoor fan abnormal
13	Outdoor signal abnormal
14	Outdoor EEPROM abnormal
15	Compressor temperature sensor
16	Pressure switch error
17	IPM error
18	CT error
19	Active filter module (AFM) error
1A	Compressor does not operate
1b	Outdoor unit fan error
1c	Communication error (inverter ⟷ multicontroller)
1d	2 way valve sensor error
1E	Expansion valve error
1F	Connection indoor unit error

6 SPECIAL INSTALLATION METHODS

⚠ CAUTION

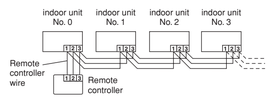
① **When setting the rotary switch and DIP switches, do not touch any other parts on the circuit board directly with your bare hands.**

② **Be sure to turn off the main power.**

1. GROUP CONTROL SYSTEM

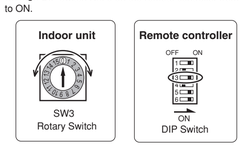
A number of indoor units can be operated at the same time using a single remote controller.

(1) Wiring method (indoor unit to remote controller)



(2) Rotary switch setting (indoor unit)
Set the unit number of each indoor unit using the rotary switch on the indoor unit circuit board.
The rotary switch is normally set to 0.

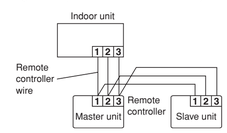
(3) DIP switch setting (remote controller)
Change DIP switch No. 3 on the remote controller from OFF to ON.



2. DUAL REMOTE CONTROLLERS (OPTIONAL)

Two separate remote controllers can be used to operate the indoor units.

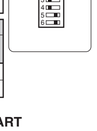
(1) Wiring method (indoor unit to remote controller)



(2) DIP switch setting (remote controller)
Set the remote controller DIP switch Nos. 1 and 2 according to the following table.

Number of remote controllers	Master unit DIP-SW No. 1	Master unit DIP-SW No. 2
1 (Normal)	ON	OFF
2 (Dual)	OFF	OFF

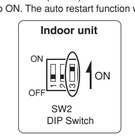
Number of remote controllers	Slave unit DIP-SW No. 1	Slave unit DIP-SW No. 2
1 (Normal)	–	–
2 (Dual)	ON	ON



3. CANCELING AUTO RESTART

The auto restart function can be canceled.

(1) DIP switch setting (indoor unit)
Change the DIP switch (SW2-3) on the indoor unit circuit board from OFF to ON. The auto restart function will be canceled.



[DIP-SWITCH SETTING]

• Indoor unit

	NO.	SW state OFF	SW state ON	Detail
SW2 DIP-Switch	1	– ✻	–	Remote sensor setting
	2	Edge ✻	Pulse	Control input setting
	3	Validity ✻	Invalidity	Auto restart setting

• Remote controller

	NO.	SW state OFF	SW state ON	Detail
DIP-Switch	1		✻	Dual remote controller setting
	2	✻		
	3	One unit ✻	Multiple unit	Group control setting
	4	Heat &Cool model	Cooling only model	
	5	Invalidity	Validity ✻	Auto changeover setting
	6	Invalidity ✻	Validity	Memory backup

✻: Factory setting

Refrigerant
R410A Duct Type
SPLIT TYPE AIR CONDITIONER
INSTALLATION INSTRUCTION SHEET
(PART NO. 9374693016)

Indoor unit is an appliance not accessible to the general public.

For authorized service personnel only.

⚠ DANGER	This mark indicates procedures which, if improperly performed, are most likely to result in the death of or serious injury to the user or service personnel.
⚠ WARNING	This mark indicates procedures which, if improperly performed, might lead to the death or serious injury of the user.
⚠ CAUTION	This mark indicates procedures which, if improperly performed, might possibly result in personal harm to the user, or damage to property.

⚠ DANGER

Never touch electrical components immediately after the power supply has been turned off. Electrical shock may occur. After turning off the power, always wait 5 minutes or more before touching electrical components.

This air conditioner uses new refrigerant HFC (R410A).

The basic installation work procedures are the same as conventional refrigerant models. However, pay careful attention to the following points:

① **Since the working pressure is 1.6 times higher than that of conventional refrigerant models, some of the piping and installation and service tools are special. (See the table below.) Especially, when replacing a conventional refrigerant model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.**

② **Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant and for safety. Therefore, check beforehand. [The charging port thread diameter for R410A is 1/2 UNF 20 threads per inch.]**

③ **Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant models. Also, when storing the piping, securely seal the openings by pinching, taping, etc.**

④ **When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.**

Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals –0.1 to 5.3 MPa (–76 cmHg to 53 kgf/cm²) for high pressure. –0.1 to 3.8 MPa (–76 cmHg to 38 kgf/cm²) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.
As an air conditioner using R410A incurs pressure higher than when using conventional refrigerant, it is necessary to choose adequate materials.
Thicknesses of copper pipes used with R410A are as shown in the table.
Never use copper pipes thinner than that in the table even when it is available on the market.

Thicknesses of Annealed Copper Pipes (R410A)

Pipe outside diameter	Thickness
6.35 mm (1/4 in.)	0.80 mm
9.52 mm (3/8 in.)	0.80 mm
12.70 mm (1/2 in.)	0.80 mm
15.88 mm (5/8 in.)	1.00 mm
19.05 mm (3/4 in.)	1.20 mm

STANDARD PARTS

The following installation parts are furnished. Use them as required.

INDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Special nut A (large flange)	4	For suspending the indoor unit from ceiling
Special nut B (small flange)	4	
Coupler heat insulation (large)	1	For indoor side pipe joint (gas pipe)
Coupler heat insulation (small)	1	For indoor side pipe joint (liquid pipe)
Binder	1	For fixing the remote controller cord
Remote controller	1	
Tapping screw (flush heads)	2	For installing the remote controller
Remote controller cord	1	For connecting the remote controller

OUTDOOR UNIT ACCESSORIES

Name and Shape	Q'ty	Application
Drain pipe	1	For outdoor unit drain piping work (May not be supplied, depending on the model.)
Drain cap	2	
Insulation (seal)	1	For filling in a gap at the entrance of connection cords.

OPTIONAL PARTS

The following options are available.
- Long-life filter : UTD-LF60KA (P/N 9017230004)
- Simple remote controller : UTB-YPB (P/N 9077582006)
- Remote sensor : UTD-RS100 (P/N 9072619004)
- External control set : UTD-ECS5A (P/N 9077359004)

CONNECTING PIPE REQUIREMENT

⚠ CAUTION

The maximum lengths of this product are shown in the following table. If the units are further apart than this, correct operation can not be guaranteed.

Pipe outside diameter		Pipe length		Maximum height (between indoor and outdoor)
Liquid	Gas	MAX.	MIN.	
9.52 mm (3/8 in.)	15.88 mm (5/8 in.)	70 m	5 m	30 m

- Use pipe with water-resistant heat insulation.

⚠ CAUTION

Install heat insulation around both the gas and liquid pipes. Failure to do so may cause water leaks.
Use heat insulation with heat resistance above 120 °C. (Reverse cycle model only)
In addition, if the humidity level at the installation location of the refrigerant piping is expected to exceed 70%, install heat insulation around the refrigerant piping. If the expected humidity level is 70-80%, use heat insulation that is 15 mm or thicker and if the expected humidity exceeds 80%, use heat insulation that is 20 mm or thicker. If heat insulation is used that is not as thick as specified, condensation may form on the surface of the insulation. In addition, use heat insulation with heat conductivity of 0.045 W/(m·K) or less (at 20 °C).

ELECTRICAL REQUIREMENT

- Electric wire size and breaker capacity:

Power supply cord (mm²)		Connection cord (mm²)		Breaker capacity (A)
MAX.	MIN.	MAX.	MIN.	
13.3	5.3	3.5	2.5	30

- Always use H07RN-F or equivalent to the connection cord.
- Install all electrical works in accordance to the standard.
- Install the disconnect device with a contact gap of at least 3 mm in all poles nearby the units. (Both indoor unit and outdoor unit)
- Install the circuit breaker nearby the units.

SELECTING THE MOUNTING POSITION

Decide the mounting position with the customer as follows:

⚠ WARNING

Select installation locations that can properly support the weight of the indoor and outdoor units. Install the units securely so that they do not topple or fall.

⚠ CAUTION

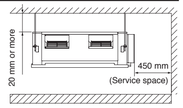
① **Do not install where there is the danger of combustible gas leakage.**

② **Do not install the unit near heat source of heat, steam, or flammable gas.**

③ **If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.**

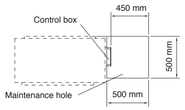
INDOOR UNIT

(1) Install the indoor unit on a place having a sufficient strength so that it withstand against the weight of the indoor unit.
(2) The inlet and outlet ports should not be obstructed; the air should be able to blow all over the room.
(3) Leave the space required to service the air conditioner.
(4) Install the unit where the drain pipe can be easily installed.
(5) Providing as much space as possible between the indoor unit and the ceiling will make work much easier.



(For maintenance)

(1) Maintenance work of the control box is possible with the maintenance hole of the measurement shown in the figure.
(2) If maintenance work is to be done from the bottom side, the maintenance hole needs to be larger than the outside dimension of the indoor unit.
(3) If maintenance work is to be done from the top, keep the space of the more than 500 mm between the indoor unit and ceiling.



OUTDOOR UNIT

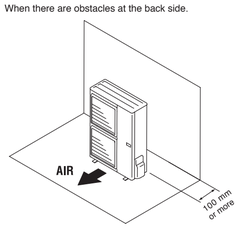
⚠ WARNING

① **Install the unit where it will not be tilted by more than 5°.**

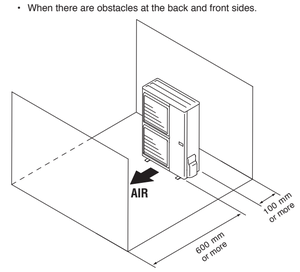
② **When installing the outdoor unit where it may exposed to strong wind, fasten it securely.**

(1) Install the outdoor unit in a location which can withstand the weight of the unit and vibration, and which can install horizontally.
(2) Provide the indicated space to ensure good airflow.
(3) If possible, do not install the unit where it will be exposed to direct sunlight.
(If necessary, install a blind that does not interfere with the airflow.)
(4) Do not install the unit near a source of heat, steam, or flammable gas.
(5) During heating operation, drain water flows from the outdoor unit.
Therefore, install the outdoor unit in a place where the drain water flow will not be obstructed. (Reverse cycle model only)
(6) Do not install the unit where strong wind blows or where it is very dusty.
(7) Do not install the unit where people pass.
(8) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
(9) Install the unit where connection to the indoor unit is easy.

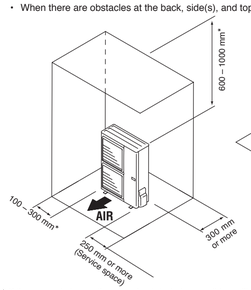
• When there are obstacles at the back side.



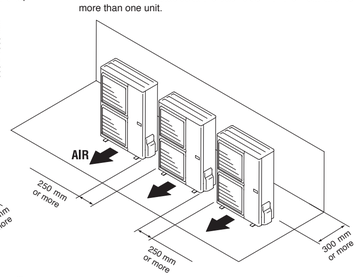
• When there are obstacles at the back and front sides.



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



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



* If the space is larger than that is stated, the condition will be the same as that there are no obstacles.

INSTALLATION PROCEDURE

1 INDOOR UNIT INSTALLATION

⚠ WARNING

① **Install the air conditioner in a location which can withstand a load of at least five times the weight of the main unit and which will not amplify sound or vibration.**
If the installation location is not strong enough, the indoor unit may fall and cause injuries.

② **If the job is done with the panel frame only, there is a risk that the unit will come loose. Please take care.**

⚠ CAUTION

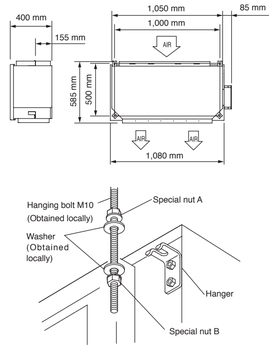
For installation, refer to the technical data.

RECOMMENDED RANGE OF EXTERNAL STATIC PRESSURE

100Pa~250Pa

1. INSTALLING THE HANGERS

Hanging bolt installation diagram.

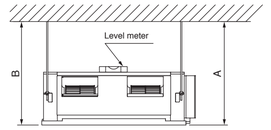


⚠ CAUTION

Fasten the unit securely with special nuts A and B.

2. LEVELING

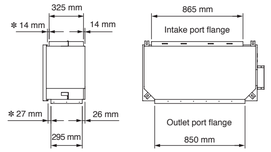
Use the procedure in the following figure to adjust the levelness.



The side A of the unit with the drain port should be slightly lower than the opposite side B of the unit. The height difference between sides A and B should be from 0 to 20 mm.

3. MOUNTING THE DUCT

Follow the procedure in the following figure to install the ducts.

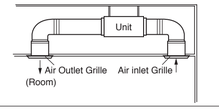


✻ Spacing between flange and drain pan.

⚠ CAUTION

① **If an intake duct is installed, take care not to damage the temperature sensor (the temperature sensor is attached to the intake port flange).**

② **Be sure to install the air inlet grille and the air outlet grille for air circulation. The correct temperature cannot be detected. Grills must be installed so that man can't touch unit fan, and can't be removed by only hand operation with tool.**

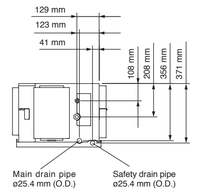


③ **Be sure to install the air filter in the air inlet. If the air filter is not installed, the heat exchanger may be clogged and its performance may decrease.**

4. INSTALLING THE DRAIN PIPES

Install the drain pipes according to the measurements given in the following figure.

Flange position for connecting the drain pipes



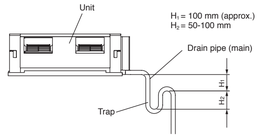
⚠ CAUTION

① **This product has drain ports in two locations. Follow the procedure in the figure to connect drain pipes to each of them.**

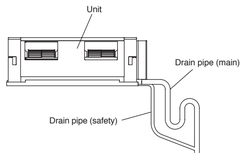
② **Be sure to properly insulate the drain pipes.**

Use general hard polyvinyl chloride pipe (VP25) and connect it with adhesive (polyvinyl chloride) so that there is no leakage.
Do not perform air bleeding.

① Main drain pipe
Provide one trap on the main drain pipe near the indoor unit.



② Safety drain
There is no need to provide a trap for the safety drain pipe. If the safety drain pipe is connected to the main drain pipe, make the connection below the trap on the main drain pipe.

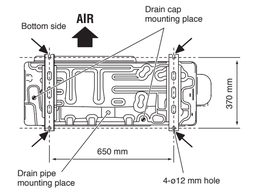


• Once installation is complete, check the flow of the drain water.

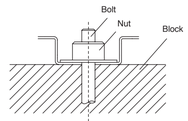
2 OUTDOOR UNIT INSTALLATION

1. OUTDOOR UNIT PROCESSING

(1) Outdoor unit to be fasten with bolts at the four places indicated by the arrows without fail.



(2) Fix securely with bolts on a solid block. (Use 4 sets of commercially available M10 bolt, nut and washer.)

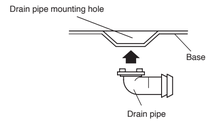


(3) Since the drain water flows out of the outdoor unit during heating operation, install the drain pipe and connect it to an commercial 16 mm hose.
(Reverse cycle model only)

(4) When installing the drain pipe, plug all the holes other than the drain pipe mounting hole in the bottom of the outdoor unit with putty so there is no water leakage.
(Reverse cycle model only)

⚠ CAUTION

When the outdoor temperature is 0°C or less, do not use the accessory drain pipe and drain cap.
If the drain pipe and drain cap are used, the drain water in the pipe may freeze in extremely cold weather.
(Reverse cycle model only)



3 CONNECTING THE PIPE

⚠ CAUTION

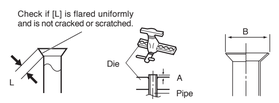
① **Do not use mineral oil on flared part. Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.**

② **While welding the pipes, be sure to blow dry nitrogen gas through them.**

③ **The maximum lengths of this product are shown in the table. If the units are further apart than this, correct operation can not be guaranteed.**

1. FLARING

(1) Cut the connection pipe to the necessary length with a pipe cutter.
(2) Hold the pipe downward so that cuttings will not enter the pipe and remove the burrs.
(3) Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool.
Use the special R410A flare tool, or the conventional (for R22) flare tool.



Pipe outside diameter	Dimension A (mm)
	Flare tool for R410A, clutch type
6.35 mm (1/4 in.)	0 to 0.5
9.52 mm (3/8 in.)	
12.70 mm (1/2 in.)	
15.88 mm (5/8 in.)	
19.05 mm (3/4 in.)	

Pipe outside diameter	Dimension B $^{0}_{-0.4}$ (mm)
6.35 mm (1/4 in.)	9.1
9.52 mm (3/8 in.)	13.2
12.70 mm (1/2 in.)	16.6
15.88 mm (5/8 in.)	19.7
19.05 mm (3/4 in.)	24.0

When using conventional flare tools to flare R410A pipes, the dimension A should be approximately 0.5 mm more than indicated in the table (for flaring with R410A flare tools) to achieve the specified flaring. Use a thickness gauge to measure the dimension A.

Width across flats

Pipe outside diameter	Width across flats of Flare nut
6.35 mm (1/4 in.)	17 mm
9.52 mm (3/8 in.)	22 mm
12.70 mm (1/2 in.)	26 mm
15.88 mm (5/8 in.)	29 mm
19.05 mm (3/4 in.)	36 mm

2. BENDING PIPES

The pipes are shaped by your hans. Be careful not to collapse them. Do not bend the pipes in an angle more than 90°.
When pipes are repeatedly bend or stretched, the material will harden, making it diffecult to bend or stretch them any more. Do not bend or stretch the pipes more than three times.

⚠ CAUTION

① **To prevent breaking of the pipe, avoid sharp bends.**
Bend the pipe with a radius of curvature of 150 mm or over.

② **If the pipe is bent repeatedly at the same place, it will break.**

3. CONNECTION PIPES

Indoor unit

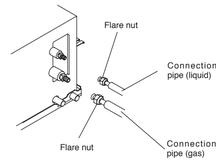
(1) Detach the caps and plugs from the pipes.

⚠ CAUTION

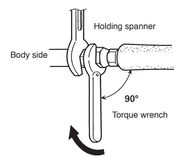
① **Be sure to apply the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.**

② **Do not remove the flare nut from the indoor unit pipe until immediately before connecting the connection pipe.**

(2) Centering the pipe against port on the indoor unit, turn the flare nut with your hand.



(3) When the flare nut is tightened properly by your hand, use a torque wrench to finally tighten it.



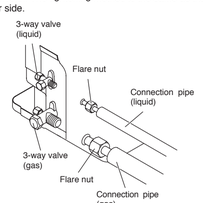
⚠ CAUTION

Hold the torque wrench at its grip, keeping it in the right angle with the pipe, in order to tighten the flare nut correctly.

Flare nut	Tightening torque
6.35 mm (1/4 in.) dia.	14 to 18 N·m (140 to 180 kgf·cm)
9.52 mm (3/8 in.) dia.	33 to 42 N·m (330 to 420 kgf·cm)
12.70 mm (1/2 in.) dia.	50 to 62 N·m (500 to 620 kgf·cm)
15.88 mm (5/8 in.) dia.	63 to 77 N·m (630 to 770 kgf·cm)
19.05 mm (3/4 in.) dia.	100 to 110 N·m (1000 to 1100 kgf·cm)

Outdoor unit

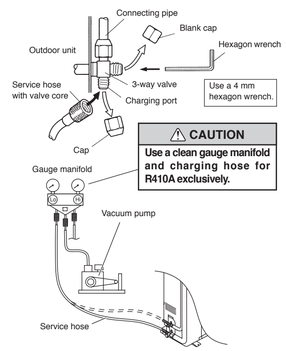
Tighten the flare nut of the connection pipe at the outdoor unit valve connector. The tightening method is the same as that as at the indoor side.



4. VACUUM

(1) Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.
(2) Vacuum the indoor unit and the connecting pipes until the pressure gauge indicates –0.1 MPa (–76 cmHg).
(3) When –0.1 MPa (–76 cmHg) is reached, operate the vacuum pump for at least 60 minutes.
(4) Disconnect the service hoses and fit the cap to the charging valve to the specified torque.
(5) Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench [Torque: 6~7 N·m (60 to 70 kgf·cm)].
(6) Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque.

		Tightening torque
Blank cap	6.35 mm (1/4 in.)	20 to 25 N·m (200 to 250 kgf·cm)
	9.52 mm (3/8 in.)	20 to 25 N·m (200 to 250 kgf·cm)
	12.70 mm (1/2 in.)	25 to 30 N·m (250 to 300 kgf·cm)
	15.88 mm (5/8 in.)	30 to 35 N·m (300 to 350 kgf·cm)
	19.05 mm (3/4 in.)	35 to 40 N·m (350 to 400 kgf·cm)
Charging port cap		10 to 12 N·m (100 to 120 kgf·cm)



⚠ CAUTION

Use a clean gauge manifold and charging hose for R410A exclusively.

⚠ CAUTION

① **Do not purge the air refrigerants but use a vacuum pump to vacuum the installation! There is no extra refrigerant in the outdoor unit for air purging!**

② **Use a vacuum pump and gauge manifold and charging hose for R410A exclusively. Using the same vacuum for different refrigerants may damage the vacuum pump or the unit.**

(Continued to the next page)

3 CONNECTING THE PIPE

5. ADDITIONAL CHARGE

Refrigerant suitable for a piping length of 20 m is charged in the outdoor unit at the factory.
When the piping is longer than 20 m, additional charging is necessary.
For the additional amount, see the table below.

Pipe length	20 m	30 m	40 m	50 m
Additional refrigerant (R410A)	None	400 g	800 g	1200 g

Pipe length	60 m	70 m	g/m
Additional refrigerant (R410A)	1600 g	2000 g	40 g/m

⚠ CAUTION

① **When moving and installing the air conditioner, do not mix gas other than the specified refrigerant R410A inside the refrigerant cycle.**

② **When charging the refrigerant R410A, always use an electronic balance for refrigerant charging (to measure the refrigerant by weight).**

③ **When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.**

④ **Add refrigerant from the charging valve after the completion of the work.**

⑤ **If the units are further apart than the maximum pipe length, correct operation can not be guaranteed.**

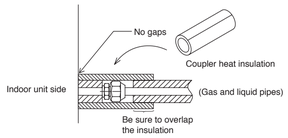
6. GAS LEAKAGE INSPECTION

⚠ CAUTION

① **After connecting the piping, check the all joints for gas leakage with gas leak detector.**

② **When inspecting gas leakage, always use the vacuum pump for pressure. Do not use nitrogen gas.**

7. HEAT INSULATION ON THE PIPE JOINTS (INDOOR SIDE ONLY)



⚠ CAUTION

There should be no gaps between the insulation and the product.

4 POWER

⚠ WARNING

① **The rated voltage of this product is 220-240 V AC 50 Hz.**

② **Before turning on, verify that the voltage is within the 198 V to 256 V range.**

③ **Always use a special branch circuit and install a special receptacle to supply power to the air conditioner.**

④ **Use a special branch circuit breaker and receptacle matched to the capacity of the air conditioner. (Install in accordance with standard.)**

⑤ **Perform wiring work in accordance with standards so that the air conditioner can be operated safely and positively.**

⑥ **Install a leakage special branch circuit breaker in accordance with the related laws and regulations and electric company standards.**

⑦ **The circuit breaker is installed in the permanent wiring. Always use a circuit that can trip all the poles of the wiring and has an isolation distance of at least 3 mm between the contacts of each pole.**

⚠ CAUTION

① **The power source capacity must be the sum of the air conditioner current and the current of other electrical appliances. When the current contracted capacity is insufficient, change the contracted capacity.**

② **When the voltage is low and the air conditioner is difficult to start, contact the power company the voltage raised.**

③ **This air conditioner must be connected to a power source that has an electrical impedance of 0.16 Ω or less or has a supply current of 100 A or greater. If the power supply does not meet the specifications, contact the power company.**

5 ELECTRICAL WIRING

⚠ WARNING

① **Before starting work, check that power is not being supplied to the indoor unit and outdoor unit.**

② **Match the terminal board numbers and connection cord colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric parts.**

③ **Connect the connection cords firmly to the terminal board. Imperfect installation may cause a fire.**

④ **Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)**

⑤ **Always connect the ground wire.**

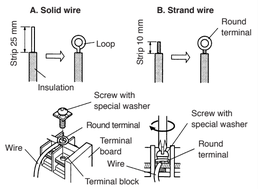
HOW TO CONNECT WIRING TO THE TERMINALS

A. For solid core wiring (or F-cable)

(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 25 mm to expose the solid wire.
(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
(3) Using pliers, bend the solid wire to form a loop suitable for the terminal screw.
(4) Shape the loop wire properly, place it on the terminal board and tighten securely with the terminal screw using a screwdriver.

B. For strand wiring

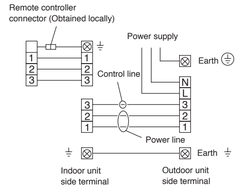
(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 10 mm to expose the strand wiring.
(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
(3) Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.
(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.



⚠ CAUTION

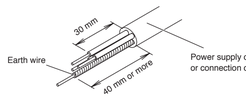
Do not bundle the remote controller cord, or wire the remote controller cord in parallel, with the indoor unit connection wire (to the outdoor unit) and the power supply cord. It may cause erroneous operation.

1. CONNECTION DIAGRAMS



2. CONNECTION CORD PREPARATION

Keep the earth wire longer than the other wires.



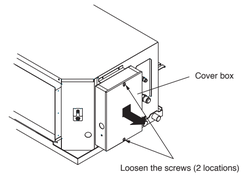
3. INDOOR UNIT

⚠ CAUTION

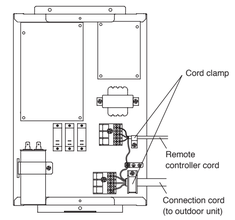
① **Use care not to mistake the power supply cord and connection wires when installing.**

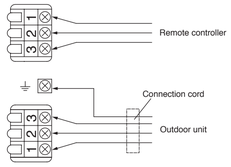
② **Install so that the wires for the remote controller will not come in contact with other connection wires.**

(1) Remove the control box cover and install each connection wire.



(2) After wiring is complete, secure the remote controller cord, connection cord, and power supply cord with the cord clamps.
(3) Install the control box cover.



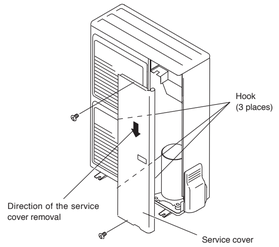


4. OUTDOOR UNIT

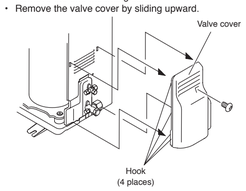
⚠ CAUTION

When connecting the power supply cord, make sure that the phase of the power supply matches with the phase of the terminal board. If the phases do not match, the compressor will rotate in reverse and will not be able to compress.

(1) Service cover removal
- Remove the two mounting screws.
- Remove the service cover by pushing downwards.

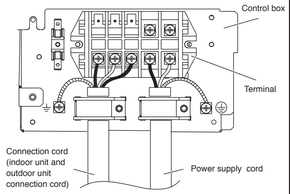


(2) Valve cover removal.
- Remove the one mounting screw.
- Remove the valve cover by sliding upward.

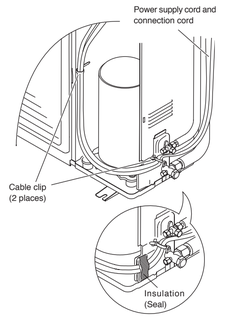


(3) Connect the power supply cord and the connection cord to terminal.

(4) Fasten the power supply cord and connection cord with cord clamp.

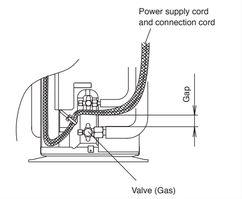


(5) Power supply cord and connection cord should be fixed with cable clip as shown in the figure.
Fill in a gap at the entrance of the cords with insulation (seal).



⚠ CAUTION

Do not make power supply cord and connection cord come in contact with valve (Gas).



(6) Put the service cover and valve cover back after completion of the work.

6 REMOTE CONTROLLER SETTING

⚠ CAUTION

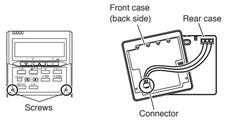
① **In order to detect the room temperature correctly when using the temperature sensor of the remote controller, do not install the remote controller in a place where it will be exposed to direct sunlight or directly below the air outlet of the indoor unit.**

② **When installing the remote controller and cord near a source of electromagnetic waves, separate the remote controller from the source of the electromagnetic waves and use shielded cord.**

③ **Do not touch the remote controller PC board and PC board parts directly with your hands.**

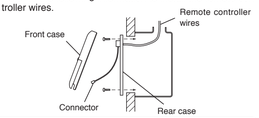
1. INSTALLING THE REMOTE CONTROLLER

(1) Open the operation panel on the front of the remote controller, remove the two screws indicated in the following figure, and then remove the front case of the remote controller.



When installing the remote controller, remove the connector from the front case. The wires may break if the connector is not removed and the front case hangs down.
When installing the front case, connect the connector to the front case.

(2) Install the rear case to the wall, etc. with the two tapping screws.
Refer to the following information to install the remote controller wires.

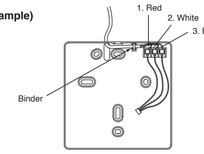


Install the remote controller wires so as not to be direct touched with your hand.

2. ROUTING THE REMOTE CONTROLLER WIRES

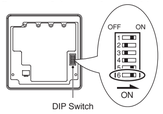
(1) Install the remote controller wires to the terminals on the top of the rear case as shown in the following figure.
(2) Fasten the wires with the binder.

(Example)



3. SETTING THE DIP SWITCHES

When using a battery (memory backup)



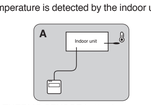
Change the DIP switch setting to use batteries. (The DIP switch is not set to use batteries at the factory.)
Change DIP switch No. 6 from OFF to ON.
If batteries are not used, all of the settings stored in memory will be deleted if there is a power failure.

4. SETTING THE ROOM TEMPERATURE DETECTION LOCATION

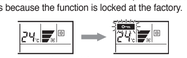
The detection location of the room temperature can be selected from the following three examples. Choose the detection location that is best for the installation location.

A. Indoor unit setting (factory setting)

The room temperature is detected by the indoor unit temperature sensor.

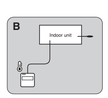


(1) When the THERMO SENSOR button is pressed, the lock display flashes because the function is locked at the factory.



B. Remote controller setting

The room temperature is detected by the remote controller temperature sensor.

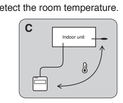


(1) Press the THERMO SENSOR button for 5 seconds or more to unlock the function. The thermo sensor display flashes and then disappears when the function is unlocked.
(2) Press the THERMO SENSOR button.
The thermo sensor display appears.

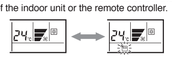
(3) Press the THERMO SENSOR button again for 5 seconds or more to lock the function. The thermo sensor display flashes and then remains on when the function is locked.
(4) Make sure that the function is locked.

C. Indoor unit/remote controller setting (room temperature sensor selection)

The temperature sensor of the indoor unit or the remote controller can be used to detect the room temperature.



(1) Press the THERMO SENSOR button for 5 seconds or more to unlock the function. The thermo sensor display flashes and then disappears when the function is unlocked.
(2) Press the THERMO SENSOR button to select the temperature sensor of the indoor unit or the remote controller.



NOTES

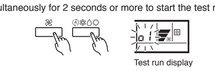
If the function to change the temperature sensor is used as shown in examples A and B (other than example C), be sure to lock the detection location. If the function is locked, the lock display will flash when the THERMO SENSOR button is pressed.

7 TEST RUN

⚠ CAUTION

Always turn on the power 12 hours prior to the start of the operation in order to ensure compressor protection.

(1) Stop the air conditioner operation.
(2) Press the master control button and the fan control button simultaneously for 2 seconds or more to start the test run.



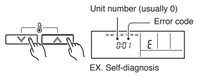
(3) Press the start/stop button to stop the test run.

[SELF-DIAGNOSIS]

When the error indication "E:EE" is displayed, follow the following items to perform the self-diagnosis. "E:EE" indicates an error has occurred.

1. REMOTE CONTROLLER DISPLAY

(1) Stop the air conditioner operation.
(2) Press the set temperature buttons ∧/∨ simultaneously for 5 seconds or more to start the self-diagnosis.
Refer to the following tables for the description of each error code.



(3) Press the set temperature buttons ∧/∨ simultaneously for 5 seconds or more to stop the self-diagnosis.

Error code	Error contents
00	Communication error (indoor unit ⟶ remote controller)
01	Communication error (outdoor unit ⟶ indoor unit)
02	Room temperature sensor open
03	Room temperature sensor short-circuited
04	Indoor heat exchanger temperature sensor open
05	Indoor heat exchanger temperature sensor short-circuited
06	Outdoor heat exchanger temperature sensor
08	Power source connection error
09	Float switch operated
0A	Outdoor temperature sensor
0c	Discharge pipe temperature sensor
11	Model abnormal
12	Indoor fan abnormal
13	Outdoor signal abnormal
14	Outdoor EEPROM abnormal
15	Compressor temperature sensor
16	Pressure switch abnormal
17	IPM error
1A	Compressor cannot operate
1b	Outdoor fan abnormal

2. OUTDOOR UNIT LEDS

Heat & Cool model (reverse cycle) only

When a malfunction occurs in the outdoor unit, the LED on the circuit board lights to indicate the error. Refer to the following table for the description of each error according to the LED.

LED	Error contents
1 flash	Communication error (Indoor unit ⟶ Outdoor unit)
2 flash	Discharge pipe temperature sensor
3 flash	Outdoor heat exchanger temperature sensor
4 flash	Outdoor temperature sensor
7 flash	Compressor temperature sensor
8 flash	Heatsink temperature sensor
9 flash	Pressure switch abnormal
12 flash	IPM error
13 flash	Compressor rotor position cannot detect
14 flash	Compressor cannot operate
15 flash	Outdoor fan abnormal (upper fan)
16 flash	Outdoor fan abnormal (lower fan)
5 sec. ON/ 1 sec. OFF repeated	Protect operation
lighting	No error

8 SPECIAL INSTALLATION METHODS

⚠ CAUTION

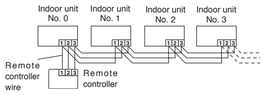
① **When setting the rotary switch and DIP switches, do not touch any other parts on the circuit board directly with your bare hands.**

② **Be sure to turn off the main power.**

1. GROUP CONTROL SYSTEM

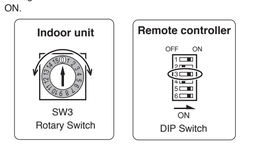
A number of indoor units can be operated at the same time using a single remote controller.

(1) Wiring method (indoor unit to remote controller)



(2) Rotary switch setting (indoor unit)
Set the unit number of each indoor unit using the rotary switch on the indoor unit circuit board.
The rotary switch is normally set to 0.

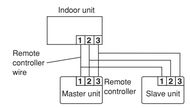
(3) DIP switch setting (remote controller)
Change DIP switch No. 3 on the remote controller from OFF to ON.



2. DUAL REMOTE CONTROLLERS (OPTIONAL)

Two separate remote controllers can be used to operate the indoor units.

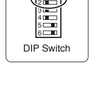
(1) Wiring method (indoor unit to remote controller)



(2) DIP switch setting (remote controller)
Set the remote controller DIP switch Nos. 1 and 2 according to the following table.

Number of remote controllers	Master unit DIP-SW No. 1	Master unit DIP-SW No. 2
1 (Normal)	ON	OFF
2 (Dual)	OFF	OFF

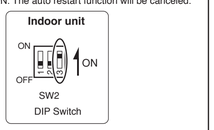
Number of remote controllers	Slave unit DIP-SW No. 1	Slave unit DIP-SW No. 2
1 (Normal)	–	–
2 (Dual)	ON	ON



3. CANCELING AUTO RESTART

The auto restart function can be canceled.

(1) DIP switch setting (indoor unit)
Change the DIP switch (SW2-3) on the indoor unit circuit board from OFF to ON. The auto restart function will be canceled.



[DIP-SWITCH SETTING]

• Indoor unit

	NO.	SW state OFF	SW state ON	Detail
SW2 DIP-Switch	1	– ✻	–	Remote sensor setting
	2	Edge ✻	Pulse	Control input setting
	3	Validity ✻	Invalidity	Auto restart setting

• Remote controller

	NO.	SW state OFF	SW state ON	Detail
DIP-Switch	1		✻	Dual remote controller setting
	2	✻		
	3	One unit ✻	Multiple unit	Group control setting
	4	Heat &Cool model	Cooling only model	Model setting
	5	Invalidity	Validity ✻	Auto changeover setting
	6	Invalidity ✻	Validity	Memory backup setting

✻: Factory setting

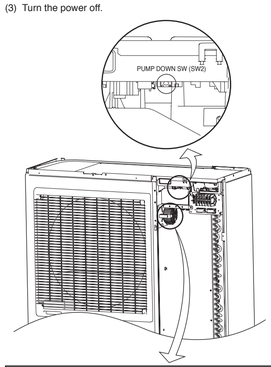
4. PUMP DOWN (Refrigerant collecting operation)

Perform the following procedures to collect the refrigerant when moving the indoor unit or the outdoor unit.

(1) Press the push-button switch (SW2) on the circuit board once. The LED on the circuit board starts flashing (one second ON/ one second OFF). This indicates the start of PUMP DOWN operation.
When the switch is pressed while the compressor is in operation, PUMP DOWN operation starts automatically.
When the switch is pressed while the compressor is in stop, the compressor starts to operate automatically, and then move on to PUMP DOWN operation.

(2) PUMP DOWN operation continues for about 1 minute. When PUMP DOWN operation is completed, the compressor stops automatically. Then close the 2-way valve and 3-way valve immediately.

(3) Turn the power off.



⚠ DANGER

This part (Choke coil) generates high voltages. Never touch this part.

SPLIT TYPE AIR CONDITIONER
INSTALLATION INSTRUCTION SHEET

⚠ CAUTION

R410A
REFRIGERANT

This Air Conditioner contains and operates with refrigerant R410A and Polyol Ester oil.

THIS PRODUCT MUST ONLY BE INSTALLED OR SERVICED BY QUALIFIED PERSONNEL.

Refer to Commonwealth, State, Territory and local legislation, regulations, codes, installation & operation manuals, before the installation, maintenance and/or service of this product.

(PART NO. 9374318049)

For authorized service personnel only.

⚠ DANGER	**This mark indicates procedures which, if improperly performed, are most likely to result in the death of or serious injury to the user or service personnel.**
⚠ WARNING	**This mark indicates procedures which, if improperly performed, might lead to the death or serious injury of the user.**
⚠ CAUTION	**This mark indicates procedures which, if improperly performed, might possibly result in personal harm to the user, or damage to property.**

This air conditioner uses new refrigerant HFC (R410A).

The basic installation work procedures are the same as conventional refrigerant models.
However, pay careful attention to the following points:

(1) Since the working pressure is 1.6 times higher than that of conventional refrigerant models, some of the piping and installation and service tools are special. (See the table below.)
Especially, when replacing a conventional refrigerant model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.

(2) Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant and for safety. Therefore, check beforehand. [The charging port thread diameter for R410A is 1/2 UNF 20 threads per inch.]

(3) Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant models. Also, when storing the piping, securely seal the openings by pinching, taping, etc.

(4) When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals –0.1 to 5.3 MPa (–76 cmHg to 53 kgf/cm²) for high pressure. –0.1 to 3.8 MPa (–76 cmHg to 38 kgf/cm²) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10 m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.
As an air conditioner using R410A incurs pressure higher than when using R22, it is necessary to choose adequate materials.
Thicknesses of copper pipes used with R410A are as shown in Table 1. Never use copper pipes thinner than 0.8 mm (Nominal diameter is 1/4 in., 3/8 in. 1/2 in.), 1.0 mm (Nominal diameter is 5/8 in.) even when it is available on the market.

Table 1 Thicknesses of Annealed Copper Pipes

		Thickness (mm)
Nominal diameter (inch)	**Outer diameter (mm)**	R410A
1/4	**6.35**	0.80
3/8	**9.52**	0.80
1/2	**12.70**	0.80
5/8	**15.88**	1.00

STANDARD ACCESSORIES

The following accessories are supplied with the outdoor unit. Use them as required.

Name and Shape	Q'ty	Application
Drain pipe 	1	For outdoor unit drain piping work [Heat & Cool model (Reverse cycle) only]
Drain cap 	1	

CONNECTION PIPE REQUIREMENT

⚠ CAUTION

Install heat insulation around both the gas and liquid pipes. Failure to do so may cause water leaks.
Use heat insulation with heat resistance above 120 °C. (Reverse cycle model only)
In addition, if the humidity level at the installation location of the refrigerant piping is expected to exceed 70%, install heat insulation around the refrigerant piping. If the expected humidity level is 70-80%, use heat insulation that is 15 mm or thicker and if the expected humidity exceeds 80%, use heat insulation that is 20 mm or thicker.
If heat insulation is used that is not as thick as specified, condensation may form on the surface of the insulation.
In addition, use heat insulation with heat conductivity of 0.045 W/(m·K) or less (at 20 °C).

Connect the connection pipes according to "2 CONNECTING THE PIPING" in this installation instruction sheet.

Table 2

MODEL		18000 BTU/h model	24000 BTU/h model
Diameter	**Small**	6.35 mm (1/4 in.)	9.52 mm (3/8 in.)
	Large	12.70 mm (1/2 in.)	15.88 mm (5/8 in.)
Maximum length		25 m (82 ft)	25 m (82 ft)
Maximum Height (between indoor and outdoor)		15 m (49 ft)	15 m (49 ft)

- Use pipe with water-resistant heat insulation.
- Use pipe that can withstand a pressure of 4,150 kPa.

ELECTRICAL REQUIREMENT

- Electric wire size and fuse capacity:

Table 3

MODEL		18,000 BTU class	24,000 BTU class
Power supply cord (mm²)	**MAX.**	3.5	4.0
	MIN.	2.5	3.5
Connection cord (mm²)	**MAX.**	2.5	2.5
	MIN.	1.5	1.5
Fuse capacity (A)		20	25

- Install the disconnect device with a contact gap of at least 3 mm nearby the units.
- Always make the air conditioner power supply a special branch circuit and provide a special breaker.
- Always use H07RN-F or equivalent as the power supply cord and the connection cord.

INSTALLATION PROCEDURE

1 OUTDOOR UNIT INSTALLATION

1. OUTDOOR UNIT PROCESSING

⚠ WARNING

(1) Install the unit where it will not be tilted by more than 5°.

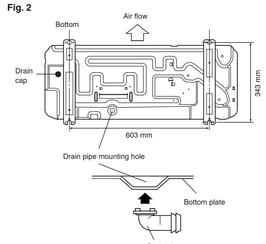
(2) When installing the outdoor unit where it may exposed to strong wind, fasten it securely.

- Set the unit on a strong stand, such as one made of concrete blocks to minimize shock and vibration.
- Do not set the unit directly on the ground because it will cause trouble.
- Since the drain water flows out of the outdoor unit during heating operation, install the drain pipe and connect it to a commercial 16 mm hose. (Heat & Cool model (Reverse cycle) only)
- When installing the drain pipe, plug all the holes (• hole at one place) other than the drain pipe mounting hole in the bottom of the outdoor unit with putty so there is no water leakage. (Fig. 2) (Heat & Cool model (Reverse cycle) only)

⚠ CAUTION

Installation in cold regions. Do not use the accessory drain pipe and drain cap.
(If the drain pipe and drain cap are used, the drain water in the pipe may freeze in extremely cold weather.)

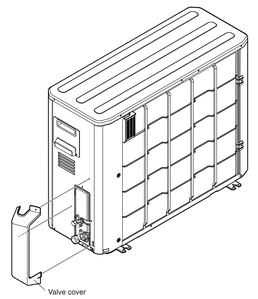
Fig. 2



2. OUTDOOR UNIT CONNECTION CORD AND PIPE CONNECTION PREPARATIONS

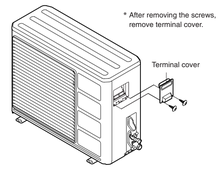
Remove outdoor unit valve cover.

Fig. 3



Remove outdoor unit terminal cover.

Fig. 4



2 CONNECTING THE PIPING

⚠ WARNING

Do not use the existing piping and flare nuts.
- If the existing materials are used, the pressure inside the refrigerant cycle will rise and cause breakage, injury, etc. (Use the special R410A materials.)

⚠ CAUTION

(1) Do not use mineral oil on flared part. Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.

(2) While welding the pipes, be sure to blow dry nitrogen gas through them.

(3) The maximum lengths of this product are shown in table 2. If the units are further apart than this, correct operation can not be guaranteed.

1. FLARING

(1) Cut the connection pipe to the necessary length with a pipe cutter.
(2) Hold the pipe downward so that cuttings will not enter the pipe and remove the burrs.
(3) Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool.
Use the special R410A flare tool, or the conventional flare tool.
When using the conventional flare tool, always use an allowance adjustment gauge and secure the A dimension shown in table 4.

Fig. 5

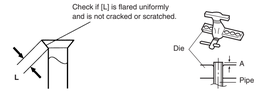


Table 4 Pipe outside diameter

Pipe outside diameter	A (mm)
	Flare tool for R410A, clutch type
6.35 mm (1/4 in.)	0 to 0.5
9.52 mm (3/8 in.)	0 to 0.5
12.70 mm (1/2 in.)	0 to 0.5
15.88 mm (5/8 in.)	0 to 0.5

2. BENDING PIPES

(1) When bending the pipe, be careful not to crush it.
(2) To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 150 mm or over.
(3) If the copper pipe is bend the pipe or pulled to often, it will become stiff. Do not bend the pipes more than three times at one place.

3. CONNECTION

(1) Install the outdoor unit wall cap (supplied with the optional installation set or procured at the site) to the wall hole pipe.
(2) Connect the outdoor unit and indoor unit piping.
(3) After matching the center of the flare surface and tightening the nut hand tight, tighten the nut to the specified tightening torque with a torque wrench.

Fig. 6

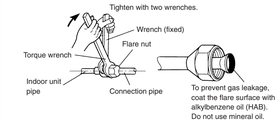


Table 5 Flare nut tightening torque

Flare nut	Tightening torque
6.35 mm (1/4 in.) dia.	14 to 18 N · m (140 to 180 kgf · cm)
9.52 mm (3/8 in.) dia.	33 to 42 N · m (330 to 420 kgf · cm)
12.70 mm (1/2 in.) dia.	50 to 62 N · m (500 to 620 kgf · cm)
15.88 mm (5/8 in.) dia.	63 to 77 N · m (630 to 770 kgf · cm)

Do not remove the cap from the connection pipe before connecting the pipe.

3 VACUUM PROCESS

⚠ CAUTION

(1) Do not purge the air with refrigerants but use a vacuum pump to vacuum the installation! There is no extra refrigerant in the outdoor unit for air purging!

(2) Use a vacuum pump for R410A exclusively. Using the same vacuum pump for different refrigerants may damage the vacuum pump or the unit.

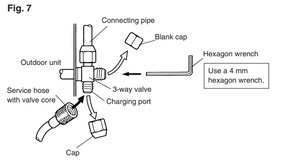
1. VACUUM

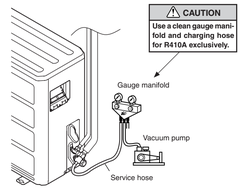
(1) Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.
(2) Vacuum the indoor unit and the connecting pipes until the pressure gauge indicates –0.1 MPa (–76 cmHg).
(3) When –0.1 MPa (–76 cmHg) is reached, operate the vacuum pump for at least 15 minutes.
(4) Disconnect the service hoses and fit the cap to the charging valve to the specified torque.
(5) Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench (Torque : 6 to 7 N · m (60 to 70 kgf · cm).
(6) Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque.

Table 6

		Tightening torque
Blank cap (2-way valve)		20 to 25 N · m (200 to 250 kgf · cm)
Blank cap	12.70 mm (1/2 in.)	25 to 30 N · m (250 to 300 kgf · cm)
(3-way valve)	15.88 mm (5/8 in.)	30 to 35 N · m (300 to 350 kgf · cm)
Charging port cap		10 to 12 N · m (100 to 120 kgf · cm)

Fig. 7





⚠ CAUTION

Use a clean gauge manifold and charging hose for R410A exclusively.

2. ADDITIONAL CHARGE

Refrigerant suitable for a piping length of 10 m is charged in the outdoor unit at the factory.
When the piping is longer than 10 m, additional charging is necessary.
For the additional amount, see the table below.

Table 7

Additional refrigerant	Pipe length	10 m (33 ft)	15 m (49 ft)	20 m (66 ft)	25 m (82 ft)	g/m (oz/ft)
Heat & Cool model (Reverse cycle)	**18,000 BTU/h class**	None	100 g (3.5 oz)	200 g (7.1 oz)	300 g (10.6 oz)	20 g/m (0.71 oz/3.3 ft)
	24,000 BTU/h class	None	200 g (7.1 oz)	400 g (14.1 oz)	600 g (21.2 oz)	40 g/m (1.41 oz/3.3 ft)

⚠ CAUTION

(1) When moving and installing the air conditioner, do not mix gas other than the specified refrigerant (R410A) inside the refrigerant cycle.

(2) When charging the refrigerant R410A, always use an electronic balance for refrigerant charging (to measure the refrigerant by weight).

(3) When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

(4) Add refrigerant from the charging valve after the completion of the work.

(5) If the units are further apart than the maximum pipe length, correct operation can not be guaranteed.

3. GAS LEAKAGE INSPECTION

⚠ CAUTION

After connecting the piping, check the joints for gas leakage with gas leak detector.

- Continued on back -

For authorized service personnel only.

⚠ DANGER

Never touch electrical components immediately after the power supply has been turned off. Electrical shock may occur. After turning off the power, always wait 5 minutes or more before touching electrical components.

⚠ WARNING

(1) For the air conditioner to operate satisfactorily, install it as outlined in this installation instruction sheet.

(2) Connect the indoor unit and outdoor unit with the air conditioner piping and cords available standards parts. This installation instruction sheet describes the correct connections using the installation set available from our standard parts.

(3) Installation work must be performed in accordance with national wiring standards by authorized personnel only.

(4) Do not use an extension cord.

(5) Do not turn on the power until all installation work is complete.

(6) Do not purge the air with refrigerants but use a vacuum pump to vacuum the installation.

(7) There is not extra refrigerant in the outdoor unit for air purging.

(8) Use a vacuum pump for R410A exclusively.

(9) Using the same vacuum pump for different refrigerants may damage the vacuum pump or the unit.

(10) Use a clean gauge manifold and charging hose for R410A exclusively.

(11) If refrigerant leaks while work is being carried out, ventilate the area. If the refrigerant comes in contact with a flame, it produces a toxic gas.

⚠ CAUTION

This installation instruction sheet describes how to install the outdoor unit only.
To install the indoor unit, refer to the installation instruction sheet included with the indoor unit.

- **Be careful not to scratch the air conditioner when handling it.**
- **After installation, explain correct operation to the customer, using the operating manual.**
- **Let the customer keep this installation instruction sheet because it is used when the air conditioner is serviced or moved.**

SELECTING THE MOUNTING POSITION

⚠ WARNING

Install at a place that can withstand the weight of the indoor and outdoor units and install positively so that the units will not topple or fall.

⚠ CAUTION

(1) Do not install where there is the danger of combustible gas leakage.

(2) Do not install near heat sources.

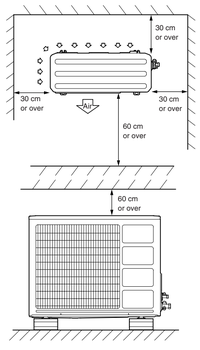
(3) If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.

Decide the mounting position with the customer as follows:

(1) If possible, do not install the unit where it will be exposed to direct sunlight. (If necessary, install a blind that does not interfere with the air flow.)
(2) Do not install the unit where a strong wind blows or where it is very dusty.
(3) Do not install the unit where people pass.
(4) Take your neighbors into consideration so that they are not disturbed by air blowing into their windows or by noise.
(5) Provide the space shown in Fig. 1 so that the air flow is not blocked. Also for efficient operation, leave open three of the four directions front, rear, and both sides.

- When selecting the installation location of the indoor unit, consult the customer and refer to the installation instruction sheet included with the indoor unit.

Fig. 1



4 ELECTRICAL WIRING

⚠ WARNING

(1) Before starting work, check that power is not being supplied to indoor unit and the outdoor unit.

(2) Match the terminal block numbers and connection cord colors of the indoor unit and the outdoor unit. Erroneous wiring may cause burning of the electric parts.

(3) Connect the connection cords firmly to the terminal block. Imperfect installation may cause a fire.

(4) Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)

(5) Always connect the ground wire.

HOW TO CONNECT WIRING TO THE TERMINALS

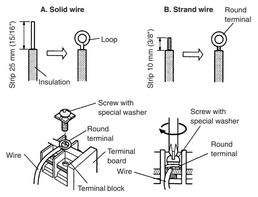
A. For solid core wiring (or F-cable)

(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 25 mm (15/16") to expose the solid wire.
(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
(3) Using pliers, bend the solid wire to form a loop suitable for the terminal screw.
(4) Shape the loop wire properly, place it on the terminal board and tighten securely with the terminal screw using a screwdriver.

B. For strand wiring

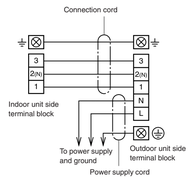
(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 10 mm (3/8") to expose the strand wiring.
(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
(3) Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.
(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.

Fig. 8



1. CONNECTION DIAGRAM

Fig. 9



2. OUTDOOR UNIT SIDE

(1) Process the end of the connection cords to the dimensions shown in Fig. 8.
(2) Connect the end of the connection cord fully into the terminal block and fasten with the screws.
(3) Fasten the sheath with a cord clamp. (Fig. 10)
(4) Pass the connection cord and power cord through the hole of the 3-way valve bracket and run them to the outside of the cabinet.
Do not block the ventilation slots in the cabinet when wiring the power cord and connection cords.
(5) Install the terminal cover and valve cover as shown in (Fig. 12, 13). Pass the power cord and connections cords through the valve cover when wiring them.

Fig. 10

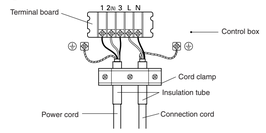


Fig. 11

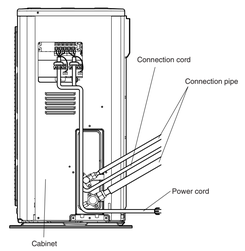


Fig. 12

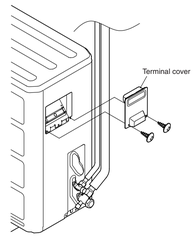
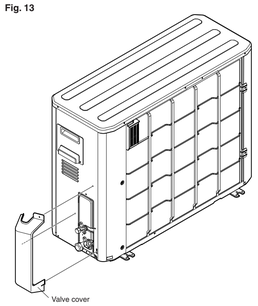


Fig. 13



5 POWER

⚠ WARNING

(1) The rated voltage of this product is 220-240 V A.C. 50 Hz.

(2) Before turning on the verify that the voltage is within the 198 V to 264 V range.

(3) Always use a special branch circuit and install a special breaker to supply power to the air conditioner.

(4) Use a circuit breaker matched to the capacity of the air conditioner. (Install in accordance with standard)

(5) The circuit breaker is installed in the permanent wiring. Always use a circuit that can trip all the poles of the wiring and has an isolation distance of at least 3 mm between the contacts of each pole.

(6) Perform wiring work in accordance with standards so that the air conditioner can be operated safely and positively.

(7) Install a leakage circuit breaker in accordance with the related laws and regulations and electric company standards.

⚠ CAUTION

(1) The power source capacity must be the sum of the air conditioner current and the current of other electrical appliances. When the current contracted capacity is insufficient, change the contracted capacity.

(2) When the voltage is low and the air conditioner is difficult to start, contact the power company the voltage raised.

6 TEST RUNNING

⚠ CAUTION

Always turn on the power 4 hours prior to the start of the operation in order to ensure compressor protection.

- Perform test operation and check items (1) to (3) below.
- For the operation method, refer to the operating manual.
- The outdoor unit may not run, depending on the room temperature. In this case, the 'TEST RUN' signal is received during air conditioner operation. (For information on the 'TEST RUN', refer to the installation instruction sheet included with the indoor unit or the operating manual.)

Operation can be checked by lighting and flashing of the display section OPERATION and TIMER lamps.
Perform judgement in accordance with the following.

- Test running

When the air conditioner is run by pressing the remote control unit TEST RUN button, the OPERATION and TIMER lamps flash slowly at the same time.

- Error

The LED lamp of an outdoor unit operates as follows (Table 8) according to the contents of an error.

Table 8

Error contents	LED (RED)
Serial signal error	1 time blink
Discharge pipe thermistor error	2 times blink
Heat exchanger thermistor error	3 times blink
Outdoor temperature thermistor error	4 times blink
2-way valve thermistor A, B error	5 times blink
3-way valve thermistor A, B error	6 times blink
Compressor thermistor error	7 times blink
Pressure switch error	8 times blink
Indoor unit connection error	9 times blink
Current trip error	10 times blink
CT error	11 times blink
Compressor position detection error	12 times blink
Compressor starting error	13 times blink
Timer error	14 times blink

CHECK ITEMS

OUTDOOR UNIT

(1) Is there any abnormal noise and vibration during operation?
(2) Will noise, wind, or drain water from the unit disturb the neighbors?
(3) Is there any gas leakage?

- Do not operate the air conditioner in the test running state for a long time.
- For the operation method, refer to the operating manual and perform operation check.

7 CUSTOMER GUIDANCE

Explain the following to the customer in accordance with the operating manual:

(1) Starting and stopping method, operation switching, temperature adjustment, timer, air flow switching, and other remote control unit operations.
(2) Air filter removal and cleaning, and how to use the air louvers.
(3) Give the operating manual and installation instruction sheet to the customer.

PART NO. 9374318049

SPLIT TYPE AIR CONDITIONER
INSTALLATION INSTRUCTION SHEET

⚠ CAUTION
R410A REFRIGERANT
This Air Conditioner contains and operates with refrigerant R410A and Polyol Ester oil.
THIS PRODUCT MUST ONLY BE INSTALLED OR SERVICED BY QUALIFIED PERSONNEL.
Refer to Commonwealth, State, Territory and local legislation, regulations, codes, installation & operation manuals, before the installation, maintenance and/or service of this product.

(PART NO. 9374995011)

For authorized service personnel only.
This installation instruction sheet describes how to install the outdoor unit only. To install the indoor unit, refer to the installation instruction sheet included with the indoor unit.

⚠ DANGER	This mark indicates procedures which, if improperly performed, are most likely to result in the death of or serious injury to the user or service personnel.
⚠ WARNING	This mark indicates procedures which, if improperly performed, might lead to the death or serious injury of the user.
⚠ CAUTION	This mark indicates procedures which, if improperly performed, might possibly result in personal harm to the user, or damage to property.

⚠ DANGER

Never touch electrical components immediately after the power supply has been turned off. Electrical shock may occur. After turning off the power, always wait 5 minutes or more before touching electrical components.

This air conditioner uses new refrigerant HFC (R410A).

The basic installation work procedures are the same as conventional refrigerant models.
However, pay careful attention to the following points:

1. **Since the working pressure is 1.6 times higher than that of conventional refrigerant models, some of the piping and installation and service tools are special. (See the table below.)**
   Especially, when replacing a conventional refrigerant model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.
2. **Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant and for safety. Therefore, check beforehand. [The charging port thread diameter for R410A is 1/2 UNF 20 threads per inch.]**
3. **Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant models. Also, when storing the piping, securely seal the openings by pinching, taping, etc.**
4. **When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.**

Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals –0.1 to 5.3 MPa (–76 cmHg to 53 kgf/cm²) for high pressure. –0.1 to 3.8 MPa (–76 cmHg to 38 kgf/cm²) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10 m. Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants. As an air conditioner using R410A incurs pressure higher than when using conventional refrigerant, it is necessary to choose adequate materials. Thicknesses of copper pipes used with R410A are as shown in the table. Never use copper pipes thinner than that in the table even when it is available on the market.

Thicknesses of Annealed Copper Pipes (R410A)

Pipe outside diameter	Thickness
6.35 mm (1/4 in.)	0.80 mm
9.52 mm (3/8 in.)	0.80 mm
12.70 mm (1/2 in.)	0.80 mm
15.88 mm (5/8 in.)	1.00 mm
19.05 mm (3/4 in.)	1.20 mm

⚠ WARNING

1. **For the air conditioner to operate satisfactorily, install it as outlined in this installation instruction sheet.**
2. **Connect the indoor unit and outdoor unit with the room air conditioner piping and cords available standards parts. This installation instruction sheet describes the correct connections using the installation set available from our standard parts.**
3. **Installation work must be performed in accordance with national wiring standards by authorized personnel only.**
4. **Also, do not use an extension cord.**
5. **Do not turn on the power until all installation work is complete.**
6. **Do not purge the air with refrigerants but use a vacuum pump to vacuum the installation.**
7. **There is not extra refrigerant in the outdoor unit for air purging.**
8. **Use a vacuum pump for R410A exclusively.**
9. **Using the same vacuum pump for different refrigerants may damage the vacuum pump or the unit.**
10. **Use a clean gauge manifold and charging hose for R410A exclusively.**
11. **If refrigerant leaks while work is being carried out, ventilate the area. If the refrigerant comes in contact with a flame, it produces a toxic gas.**

- **Be careful not to scratch the air conditioner when handling it.**
- **After installation, explain correct operation to the customer, using the operating manual.**
- **Let the customer keep this installation instruction sheet because it is used when the air conditioner is serviced or moved.**

STANDARD PARTS

The following installation parts are furnished.
Use them as required.

Name and Shape	Q'ty	Application
Drain pipe 	1	For outdoor unit drain piping work (May not be supplied, depending on the model.)
Drain cap 	2	
Insulation (seal) 	1	For filling in a gap at the entrance of connection cords

CONNECTION PIPE REQUIREMENT

⚠ CAUTION

The maximum lengths of this product are shown in the following table. If the units are further apart than this, correct operation can not be guaranteed.

Model Type	Diameter		Pipe length		Maximum height (between indoor and outdoor)
	Liquid	Gas	MAX.	MIN.	
30,000 BTU/h class	9.52 mm (3/8 in.)	15.88 mm (5/8 in.)	50 m	5 m	30 m
36,000 BTU/h class					
45,000 BTU/h class			70 m		
54,000 BTU/h class					

- Use pipe with water-resistant heat insulation.

⚠ CAUTION

Install heat insulation around both the gas and liquid pipes. Failure to do so may cause water leaks.
Use heat insulation with heat resistance above 120 °C. (Reverse cycle model only)
In addition, if the humidity level at the installation location of the refrigerant piping is expected to exceed 70%, install heat insulation around the refrigerant piping. If the expected humidity level is 70-80%, use heat insulation that is 15 mm or thicker and if the expected humidity exceeds 80%, use heat insulation that is 20 mm or thicker.
If heat insulation is used that is not as thick as specified, condensation may form on the surface of the insulation.
In addition, use heat insulation with heat conductivity of 0.045 W/(m·K) or less (at 20 °C).

ELECTRICAL REQUIREMENT

- Electric wire size and breaker capacity:

Model Type	Power supply cord (mm²)		Connection cord (mm²)		Breaker capacity (A)
	MAX.	MIN.	MAX.	MIN.	
30,000 BTU/h class	4.0	3.5	2.5	1.5	30
36,000 BTU/h class					
45,000 BTU/h class	6.0	5.3	3.5	2.5	30
54,000 BTU/h class					

- Always use H07RN-F or equivalent to the connection cord.
- Install all electrical works in accordance to the standard.
- Install the disconnect device with a contact gap of at least 3 mm in all poles nearby the units. (Both indoor unit and outdoor unit)
- Install the circuit breaker nearby the units.

SELECTING THE MOUNTING POSITION

Decide the mounting position with the customer as follows:

⚠ WARNING

Select installation locations that can properly support the weight of the indoor and outdoor units. Install the units securely so that they do not topple or fall.

⚠ CAUTION

1. **Do not install where there is the danger of combustible gas leakage.**
2. **Do not install the unit near heat source of heat, steam, or flammable gas.**
3. **If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.**

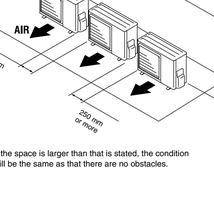
⚠ WARNING

1. **Install the unit where it will not be tilted by more than 3˚. However, do not install the unit with it tilted towards the side containing the compressor.**
2. **When installing the outdoor unit where it may exposed to strong wind, fasten it securely.**

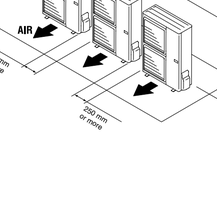
(1) Install the outdoor unit in a location which can withstand the weight of the unit and vibration, and which can install horizontally.
(2) Provide the indicated space to ensure good airflow.
(3) If possible, do not install the unit where it will be exposed to direct sunlight.
(If necessary, install a blind that does not interfere with the airflow.)
(4) Do not install the unit near a source of heat, steam, or flammable gas.
(5) During heating operation, drain water flows from the outdoor unit.
Therefore, install the outdoor unit in a place where the drain water flow will not be obstructed. (Reverse cycle model only)
(6) Do not install the unit where strong wind blows or where it is very dusty.
(7) Do not install the unit where people pass.
(8) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
(9) Install the unit where connection to the indoor unit is easy.

• 30,000 BTU/h class
• 36,000 BTU/h class

When there are obstacles at the back side.



• 45,000 BTU/h class
• 54,000 BTU/h class



When there are obstacles at the back and front sides.

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

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

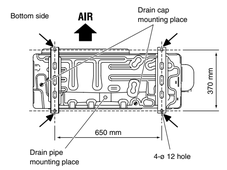
* If the space is larger than that is stated, the condition will be the same as that there are no obstacles.

INSTALLATION PROCEDURE

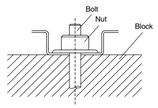
1 OUTDOOR UNIT INSTALLATION

1. OUTDOOR UNIT PROCESSING

(1) Outdoor unit to be fasten with bolts at the four places indicated by the arrows without fail.



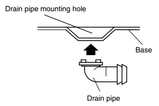
(2) Fix securely with bolts on a solid block. (Use 4 sets of commercially available M10 bolt, nut and washer.)



(3) Since the drain water flows out of the outdoor unit during heating operation, install the drain pipe and connect it to a commercial 16 mm hose. (Reverse cycle model only)
(4) When installing the drain pipe, plug all the holes other than the drain pipe mounting hole in the bottom of the outdoor unit with putty so there is no water leakage. (Reverse cycle model only)

⚠ CAUTION

When the outdoor temperature is 0 °C or less, do not use the accessory drain pipe and drain cap. If the drain pipe and drain cap are used, the drain water in the pipe may freeze in extremely cold weather. (Reverse cycle model only)



2 CONNECTING THE PIPE

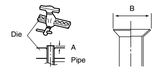
⚠ CAUTION

1. **Do not use mineral oil on flared part. Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.**
2. **While welding the pipes, be sure to blow dry nitrogen gas through them.**
3. **The maximum lengths of this product are shown in the table. If the units are further apart than this, correct operation can not be guaranteed.**

1. FLARING

(1) Cut the connection pipe to the necessary length with a pipe cutter.
(2) Hold the pipe downward so that cuttings will not enter the pipe and remove the burrs.
(3) Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool.
Use the special R410A flare tool, or the conventional flare tool.

Check if [L] is flared uniformly and is not cracked or scratched.



Pipe outside diameter	Dimension A (mm)
	Flare tool for R410A, clutch type
6.35 mm (1/4 in.)	0 to 0.5
9.52 mm (3/8 in.)	
12.70 mm (1/2 in.)	
15.88 mm (5/8 in.)	
19.05 mm (3/4 in.)	

Pipe outside diameter	Dimension B +0.4 0 (mm)
6.35 mm (1/4 in.)	9.1
9.52 mm (3/8 in.)	13.2
12.70 mm (1/2 in.)	16.6
15.88 mm (5/8 in.)	19.7
19.05 mm (3/4 in.)	24.0

When using conventional flare tools to flare R410A pipes, the dimension A should be approximately 0.5 mm more than indicated in the table (for flaring with R410A flare tools) to achieve the specified flaring. Use a thickness gauge to measure the dimension A.

Pipe outside diameter	Width across flats of Flare nut
6.35 mm (1/4 in.)	17 mm
9.52 mm (3/8 in.)	22 mm
12.70 mm (1/2 in.)	26 mm
15.88 mm (5/8 in.)	29 mm
19.05 mm (3/4 in.)	36 mm

2. BENDING PIPES

The pipes are shaped by your hands. Be careful not to collapse them.
Do not bend the pipes in an angle more than 90°.
When pipes are repeatedly bend or stretched, the material will harden, making it difficult to bend or stretch them any more. Do not bend or stretch the pipes more than three times.

⚠ CAUTION

1. **To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 150 mm or over.**
2. **If the pipe is bent repeatedly at the same place, it will break.**

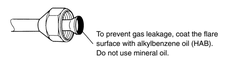
3. CONNECTION PIPES

Outdoor unit
(1) Detach the caps and plugs from the pipes.

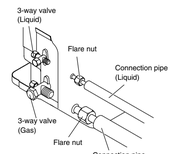
⚠ CAUTION

1. **Be sure to apply the pipe against the port on the indoor unit and the outdoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.**
2. **Do not remove the flare nut from the indoor unit pipe until immediately before connecting the connection pipe.**

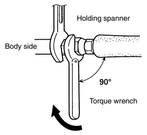
(2) Centering the pipe against port on the outdoor unit, turn the flare nut with your hand.



(3) Tighten the flare nut of the connection pipe at the outdoor unit valve connector.



(4) When the flare nut is tightened properly by your hand, use a torque wrench to finally tighten it.



⚠ CAUTION

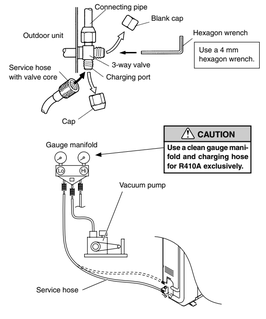
Hold the torque wrench at its grip, keeping it in the right angle with the pipe, in order to tighten the flare nut correctly.

Flare nut	Tightening torque
6.35 mm (1/4 in.) dia.	14 to 18 N·m (140 to 180 kgf·cm)
9.52 mm (3/8 in.) dia.	33 to 42 N·m (330 to 420 kgf·cm)
12.70 mm (1/2 in.) dia.	50 to 62 N·m (500 to 620 kgf·cm)
15.88 mm (5/8 in.) dia.	63 to 77 N·m (630 to 770 kgf·cm)
19.05 mm (3/4 in.) dia.	100 to 110 N·m (1000 to 1100 kgf·cm)

4. VACUUM

(1) Remove the cap, and connect the gauge manifold and the vacuum pump to the charging valve by the service hoses.
(2) Vacuum the indoor unit and the connecting pipes until the pressure gauge indicates –0.1 MPa (–76 cmHg).
(3) When –0.1 MPa (–76 cmHg) is reached, operate the vacuum pump for at least 60 minutes.
(4) Disconnect the service hoses and fit the cap to the charging valve to the specified torque.
(5) Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench [Torque: 6–7 N·m (60 to 70 kgf·cm)].
(6) Tighten the blank caps of the 2-way valve and 3-way valve to the specified torque.

		Tightening torque
Blank cap	6.35 mm (1/4 in.)	20 to 25 N·m (200 to 250 kgf·cm)
	9.52 mm (3/8 in.)	20 to 25 N·m (200 to 250 kgf·cm)
	12.70 mm (1/2 in.)	25 to 30 N·m (250 to 300 kgf·cm)
	15.88 mm (5/8 in.)	30 to 35 N·m (300 to 350 kgf·cm)
	19.05 mm (3/4 in.)	35 to 40 N·m (350 to 400 kgf·cm)
Charging port cap		10 to 12 N·m (100 to 120 kgf·cm)



⚠ CAUTION
Use a clean gauge manifold and charging hose for R410A exclusively.

⚠ CAUTION

1. **Do not purge the air with refrigerants, but use a vacuum pump to vacuum the installation! There is no extra refrigerant in the outdoor unit for air purging!**
2. **Use a vacuum pump and gauge manifold and charging hose for R410A exclusively. Using the same vacuum for different refrigerants may damage the vacuum pump or the unit.**

5. ADDITIONAL CHARGE

• 30,000 BTU/h class
• 36,000 BTU/h class
Refrigerant suitable for a piping length of 15 m is charged in the outdoor unit at the factory.
When the piping is longer than 15 m, additional charging is necessary.
For the additional amount, see the table below.

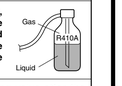
Pipe length / Model type	15 m	20 m	30 m	45 m	50 m	g/m
30,000 BTU/h class	None	200 g	600 g	1000 g	1400 g	40 g/m
36,000 BTU/h class						

• 45,000 BTU/h class
• 54,000 BTU/h class
Refrigerant suitable for a piping length of 20 m is charged in the outdoor unit at the factory.
When the piping is longer than 20 m, additional charging is necessary.
For the additional amount, see the table below.

Pipe length / Model type	20 m	30 m	40 m	50 m	60 m	70 m	g/m
45,000 BTU/h class	None	400 g	800 g	1200 g	1600 g	2000 g	40 g/m
54,000 BTU/h class							

⚠ CAUTION

1. **When moving and installing the air conditioner, do not mix gas other than the specified refrigerant R410A inside the refrigerant cycle.**
2. **When charging the refrigerant R410A, always use an electronic balance for refrigerant charging (to measure the refrigerant by weight).**
3. **When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.**



4. **Add refrigerant from the charging valve after the completion of the work.**
5. **If the units are further apart than the maximum pipe length, correct operation can not be guaranteed.**

6. GAS LEAKAGE INSPECTION

⚠ CAUTION

1. **After connecting the piping, check the all joints for gas leakage with gas leak detector.**
2. **When inspecting gas leakage, always use the vacuum pump for pressure. Do not use nitrogen gas.**

3 POWER

⚠ WARNING

1. **The rated voltage of this product is 230 V a.c. 50 Hz.**
2. **Before turning on, verify that the voltage is within the 198 V to 264 V range.**
3. **Always use a special branch circuit and install a special receptacle to supply power to the air conditioner.**
4. **Use a special branch circuit breaker and receptacle matched to the capacity of the air conditioner. (Install in accordance with standard.)**
5. **Perform wiring work in accordance with standards so that the air conditioner can be operated safely and positively.**
6. **Install a leakage special branch circuit breaker in accordance with the related laws and regulations and electric company standards.**
7. **The circuit breaker is installed in the permanent wiring. Always use a circuit that can trip all the poles of the wiring and has an isolation distance of at least 3 mm between the contacts of each pole.**

⚠ CAUTION

1. **The power source capacity must be the sum of the air conditioner current and the current of other electrical appliances. When the current contracted capacity is insufficient, change the contracted capacity.**
2. **When the voltage is low and the air conditioner is difficult to start, contact the power company the voltage raised.**

(Continued to the next page)

4 ELECTRICAL WIRING

⚠ WARNING

① **Before starting work, check that power is not being supplied to the indoor unit and outdoor unit.**

② **Match the terminal board numbers and connection cord colors with those of the outdoor unit. Erroneous wiring may cause burning of the electric parts.**

③ **Connect the connection cords firmly to the terminal board. Imperfect installation may cause a fire.**

④ **Always fasten the outside covering of the connection cord with the cord clamp. (If the insulator is chafed, electric leakage may occur.)**

⑤ **Always connect the ground wire.**

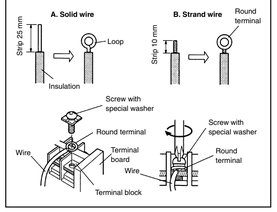
HOW TO CONNECT WIRING TO THE TERMINALS

A. For solid core wiring (or F-cable)

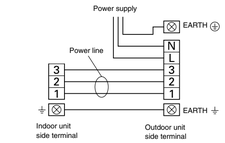
(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 25 mm to expose the solid wire.
(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
(3) Using pliers, bend the solid wire to form a loop suitable for the terminal screw.
(4) Shape the loop wire properly, place it on the terminal board and tighten securely with the terminal screw using a screwdriver.

B. For strand wiring

(1) Cut the wire end with a wire cutter or wire-cutting pliers, then strip the insulation to about 10 mm to expose the strand wiring.
(2) Using a screwdriver, remove the terminal screw(s) on the terminal board.
(3) Using a round terminal fastener or pliers, securely clamp a round terminal to each stripped wire end.
(4) Position the round terminal wire, and replace and tighten the terminal screw using a screwdriver.

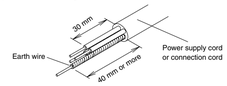


1. CONNECTION DIAGRAMS



2. CONNECTION CORD PREPARATION

Keep the earth wire longer than the other wires.



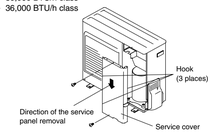
3. OUTDOOR UNIT

⚠ CAUTION

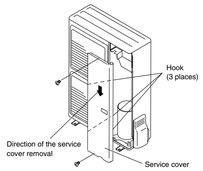
When connecting the power supply cord, make sure that the phase of the power supply matches with the phase of the terminal board. If the phases do not match, the compressor will rotate in reverse and will not be able to compress.

(1) Service cover removal
- Remove the two mounting screws.
- Remove the service cover by pushing downwards.

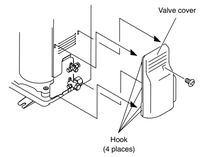
- 30,000 BTU/h class
- 36,000 BTU/h class



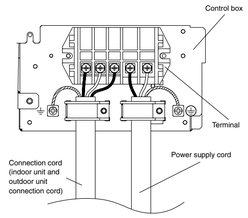
- 45,000 BTU/h class
- 54,000 BTU/h class

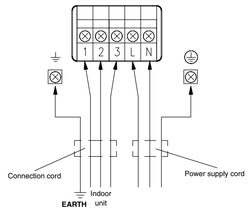


(2) Valve cover removal.
- Remove the one mounting screw.
- Remove the valve cover by sliding upward.



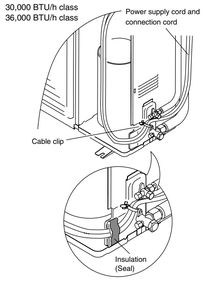
(3) Connect the power supply cord and the connection cord to terminal.
(4) Fasten the power supply cord and connection cord with cord clamp.



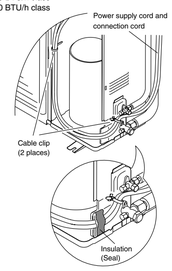


(5) Power supply cord and connection cord should be fixed with cable clip as shown in the figure.
Fill in a gap at the entrance of the cords with insulation (seal).

- 30,000 BTU/h class
- 36,000 BTU/h class

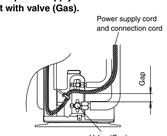


- 45,000 BTU/h class
- 54,000 BTU/h class



⚠ CAUTION

Do not make power supply cord and connection cord come in contact with valve (Gas).



(6) Put the service cover and valve cover back after completion of the work.

5 TEST RUN

⚠ CAUTION

Always turn on the power 12 hours prior to the start of the operation in order to ensure compressor protection

1. Make a TEST RUN in accordance with the installation instruction sheet for the indoor unit.

2. OUTDOOR UNIT LEDS

When a malfunction occurs in the outdoor unit, the LED on the circuit board lights to indicate the error. Refer to the following table for the description of each error according to the LED.

LED	Error contents
1 flash	Communication error (Indoor unit – Outdoor unit)
2 flash	Discharg pipe temperature sensor
3 flash	Outdoor heat exchanger temperature sensor
4 flash	Outdoor temperature sensor
7 flash	Compressor temperature sensor
8 flash	Heat sink temperature sensor
9 flash	Pressure switch abnormal
12 flash	IPM error
13 flash	Compressor rotor position cannot detect
14 flash	Compressor cannot operate
15 flash	Outdoor fan abnormal (upper fan)
16 flash	Outdoor fan abnormal (lower fan)
5 sec. ON/ 1 sec. OFF repeated	Protect operation
lighting	No error

6 SPECIAL INSTALLATION SETTING

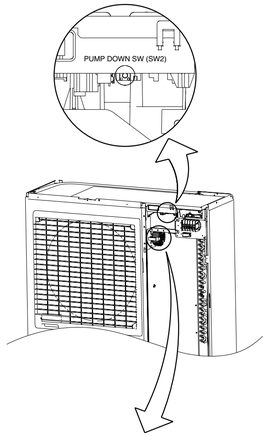
PUMP DOWN (Refrigerant collecting operation)

Perform the following procedures to collect the refrigerant when moving the indoor unit or the outdoor unit.

(1) Press the push-button switch (SW2) on the circuit board once.
The LED on the circuit board starts flashing (one second ON/one second OFF). This indicates the start of PUMP DOWN operation.
When the switch is pressed while the compressor is in operation, PUMP DOWN operation starts automatically.
When the switch is pressed while the compressor is in stop, the compressor starts to operate automatically, and then move on to PUMP DOWN operation.

(2) PUMP DOWN operation continues for about 1 minute. When PUMP DOWN operation is completed, the compressor stops automatically. Then close the 2-way valve and 3-way valve immediately.

(3) Turn the power off.



⚠ DANGER

This part (Choke coil) generates high voltages.
Never touch this part.

PART NO. 9374995011

Refrigerant
R410A

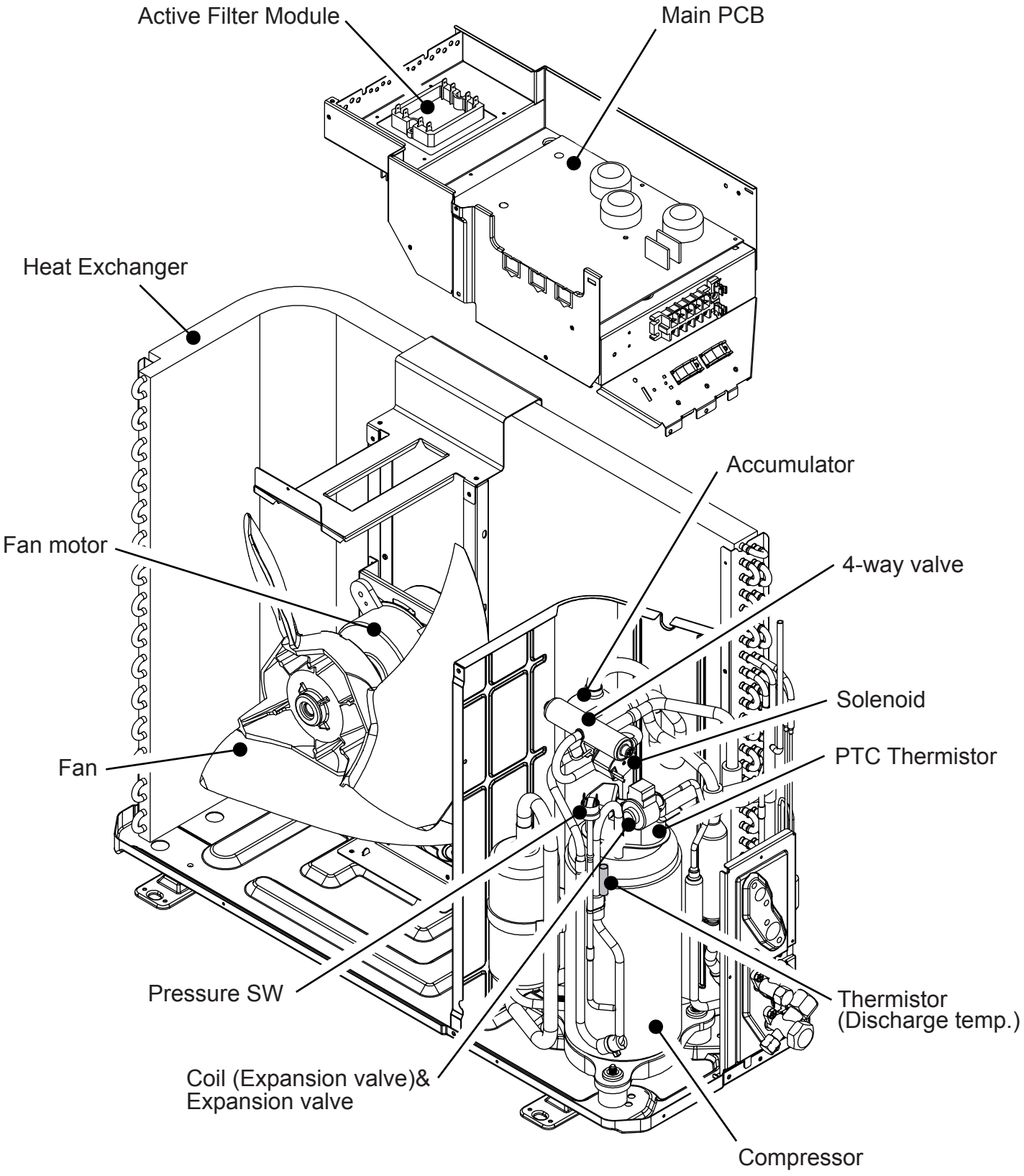
DUCT type
INVERTER

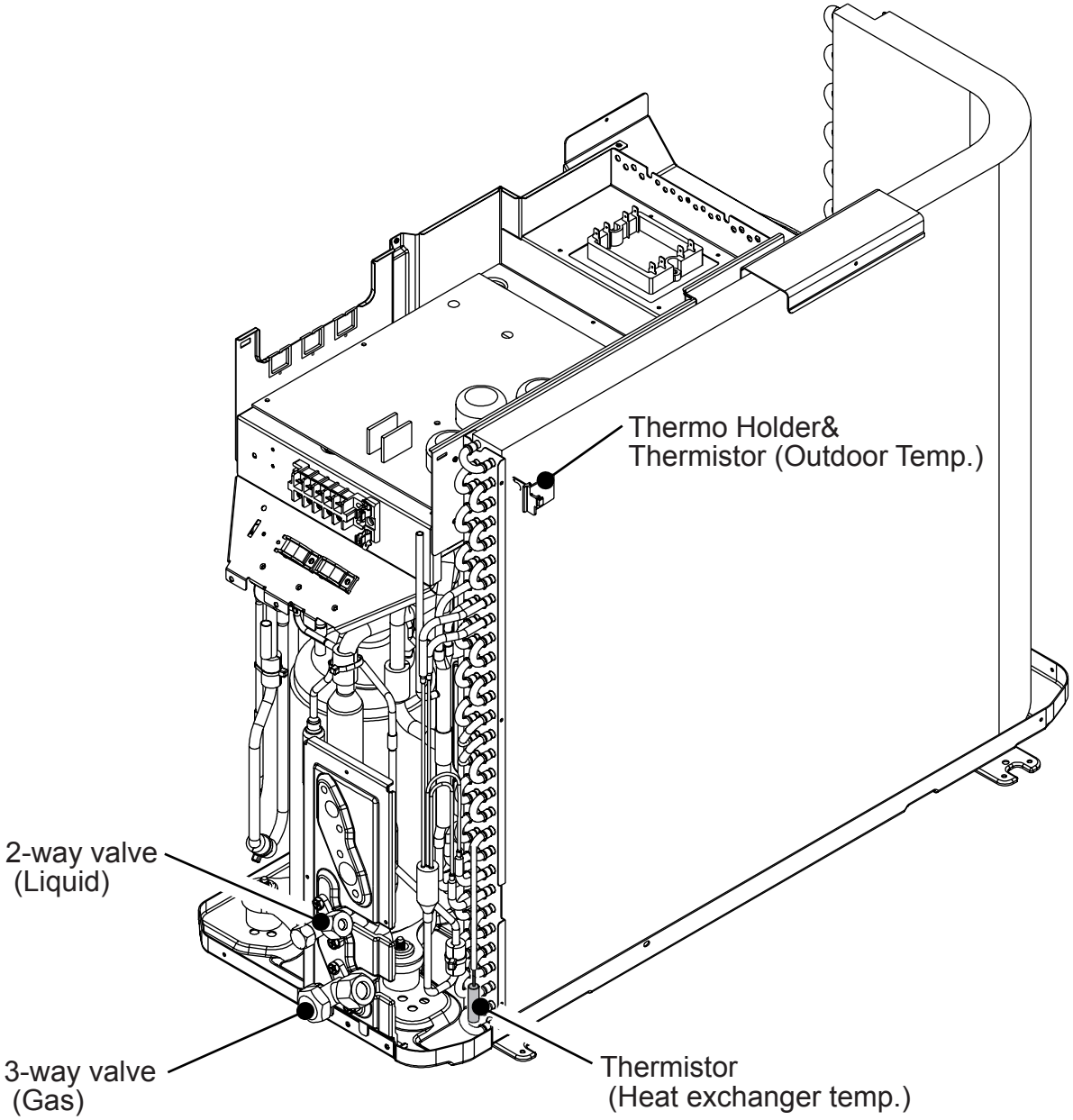
10 . REPLACEMENT PARTS

1. REPLACEMENT PARTS (For OUTDOOR UNIT)

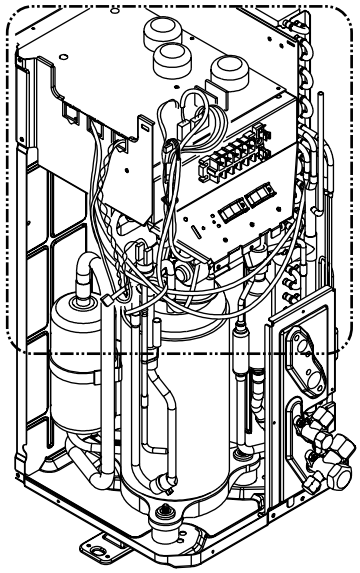
1-1 For AO*18/ 24LMAKL

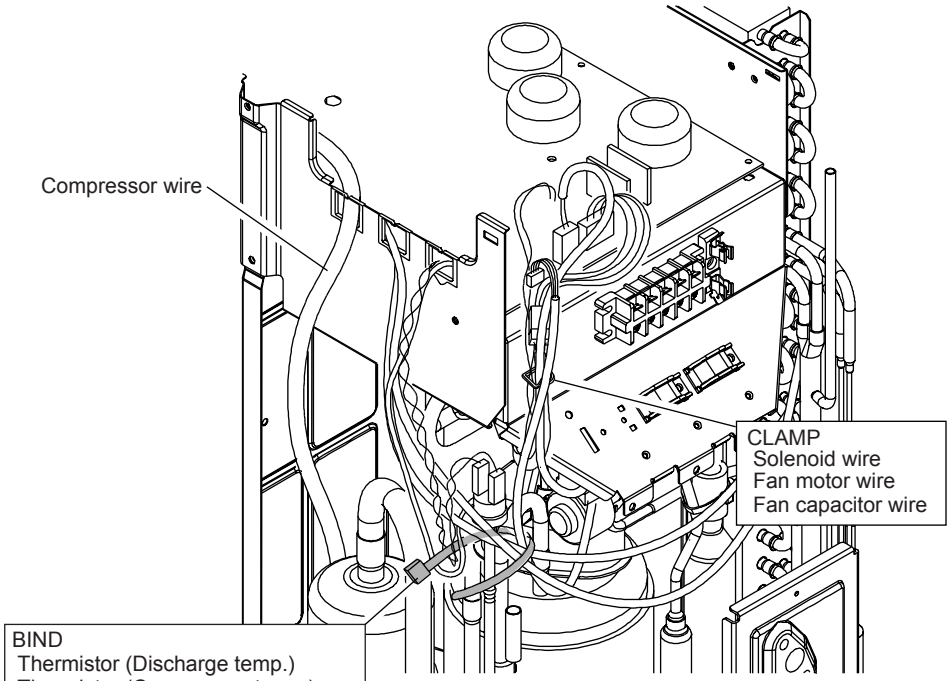
1-1-1 PARTS LAYOUT DRAWING

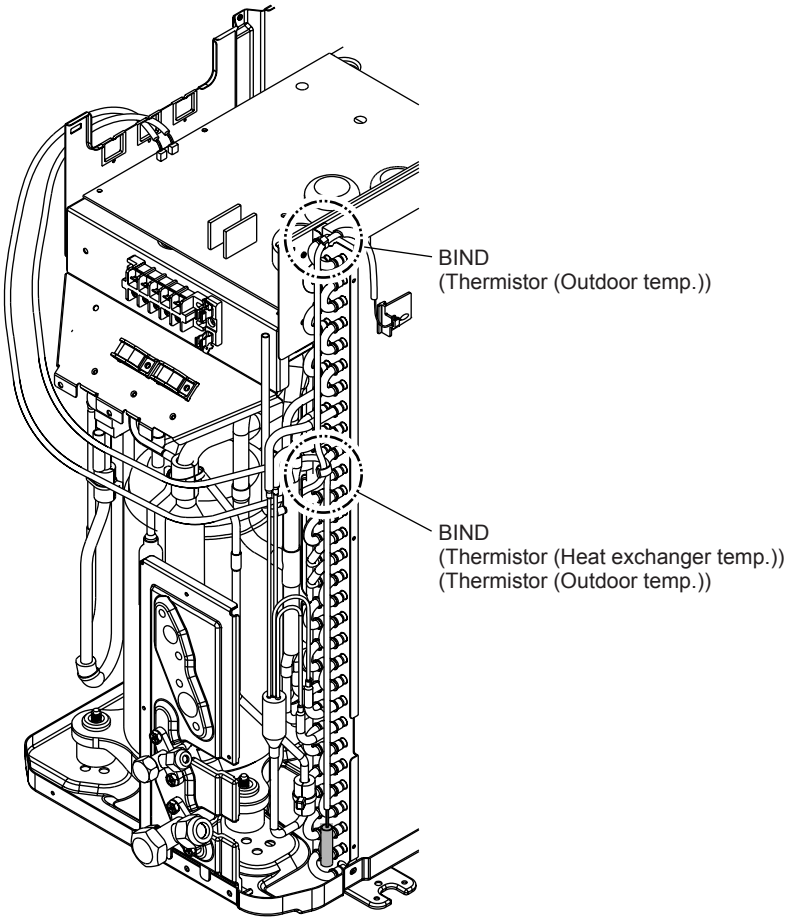



Thermo Holder&
Thermistor (Outdoor Temp.)
2-way valve
(Liquid)
3-way valve
(Gas)
Thermistor
(Heat exchanger temp.)

1-1-2 WIRING (For AO*18/ 24LMAKL)



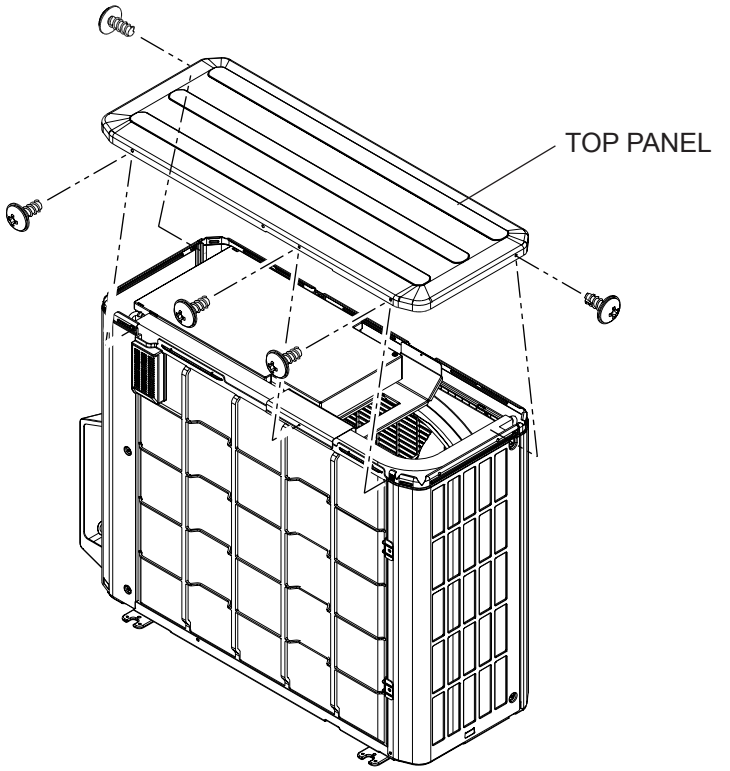




1-1-3 DISASSEMBLY PROCESS (For AO*18/ 24LMAKL)

1. TOP PANEL removal

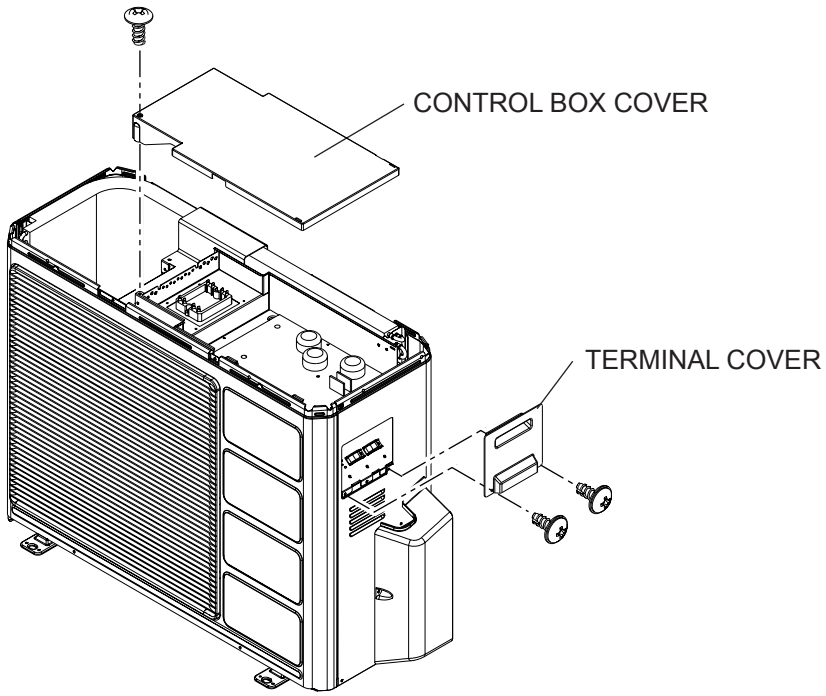
- Remove the 5 mounting screws.
- Remove the TOP PANEL upward.



REAR VIEW

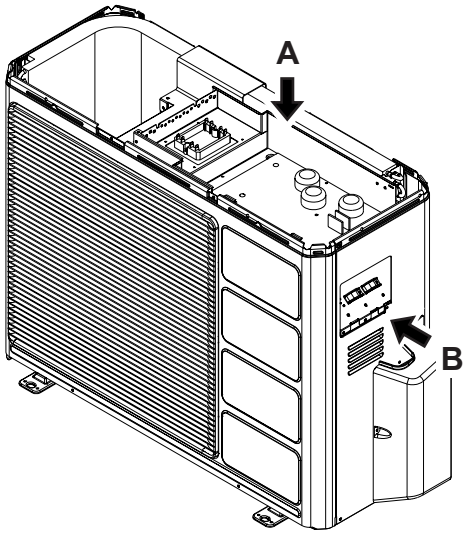
2. CONTROL BOX COVER removal

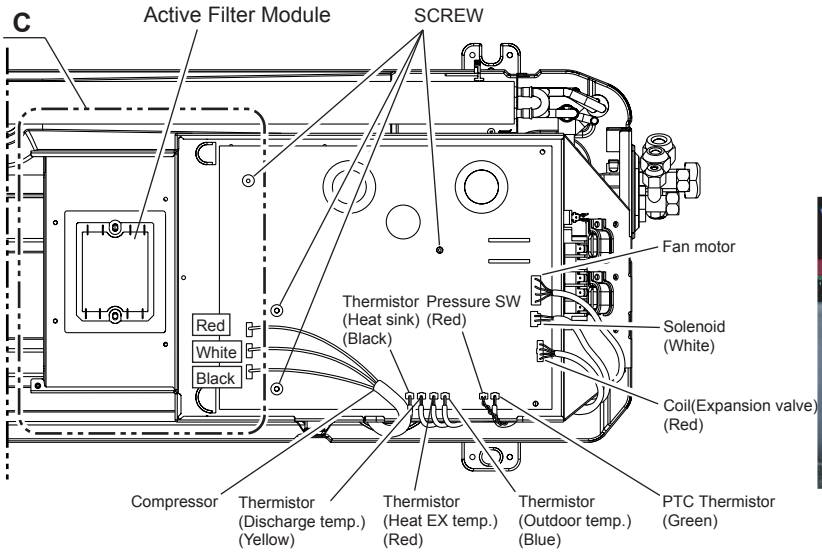
- Remove the 3 mounting screws.
- Remove the CONTROL BOX COVER and TERMINAL COVER.



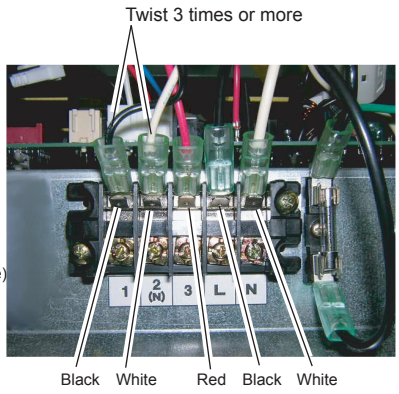
3. MAIN PCB removal

- Remove the 4 mounting screws.
- Remove the connectors and cords. (Refer to VIEW -A,-B)
- Remove the MAIN PCB.

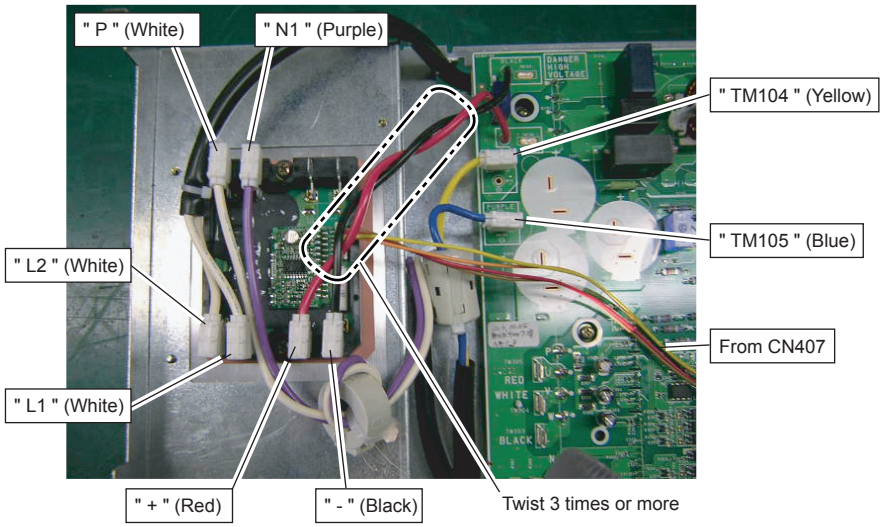




VIEW - A



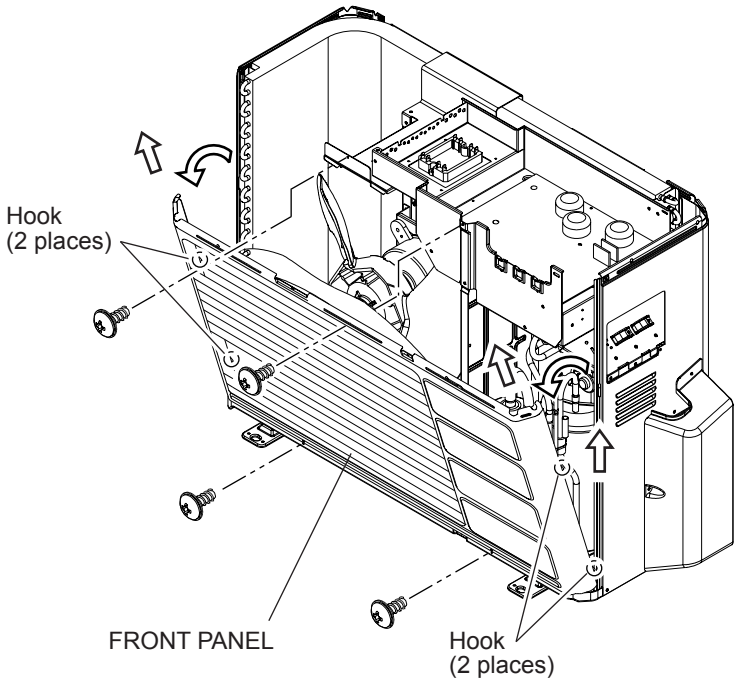
VIEW - B



DETAIL C

4. FRONT PANEL removal

- Remove the 4 mounting screws.
- Remove the FRONT PANEL by sliding upward.

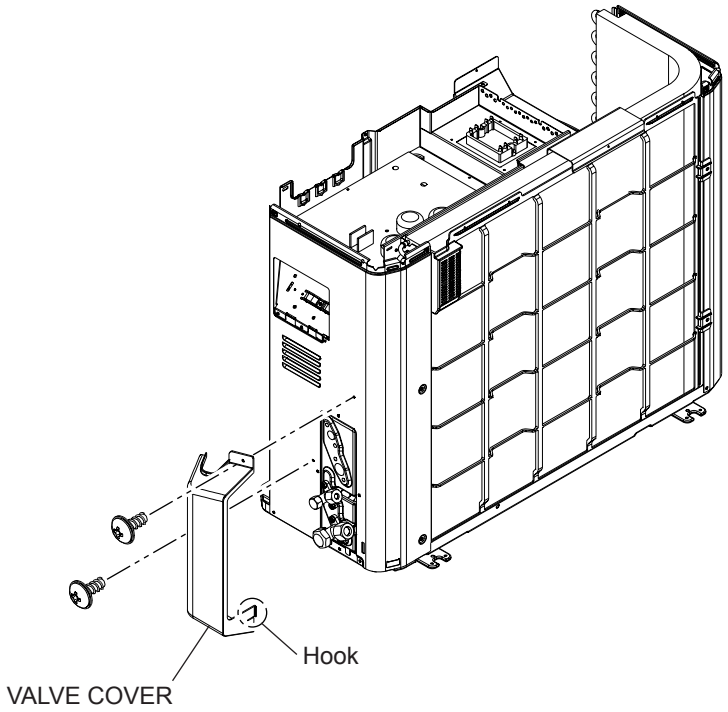


Replaceable Component

Compressor
Accumulator
Solenoid
Thermistor (Discharge temp.)
Thermistor (Outdoor temp.)
PTC Thermistor
Pressure SW
Coil (Expansion valve)
Fan motor & Fan

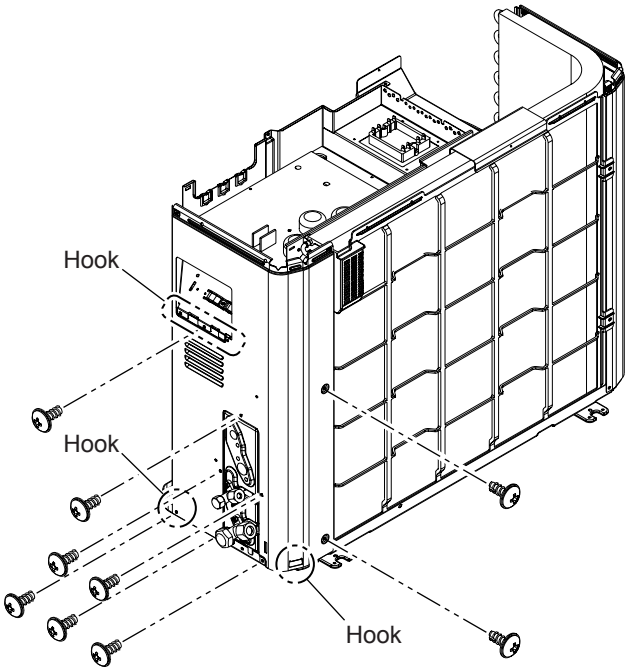
5. VALVE COVER removal

- Remove the VALVE COVER.

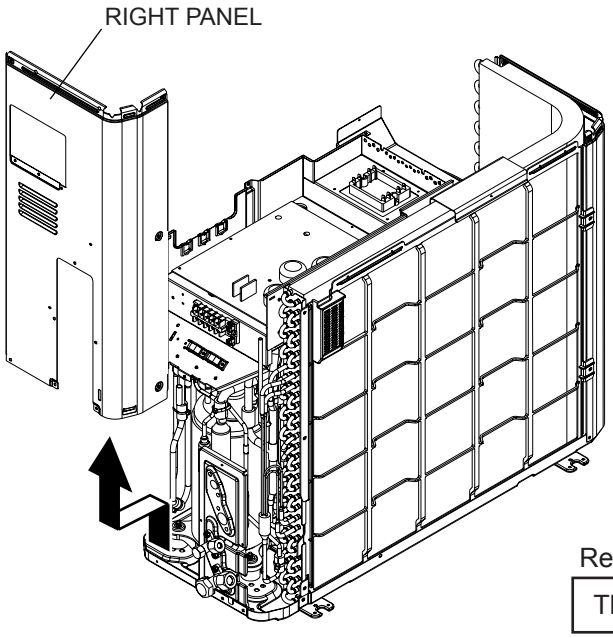


6. RIGHT PANEL removal

- Remove the 9 mounting screws.



- Remove the RIGHT PANEL by sliding upward.

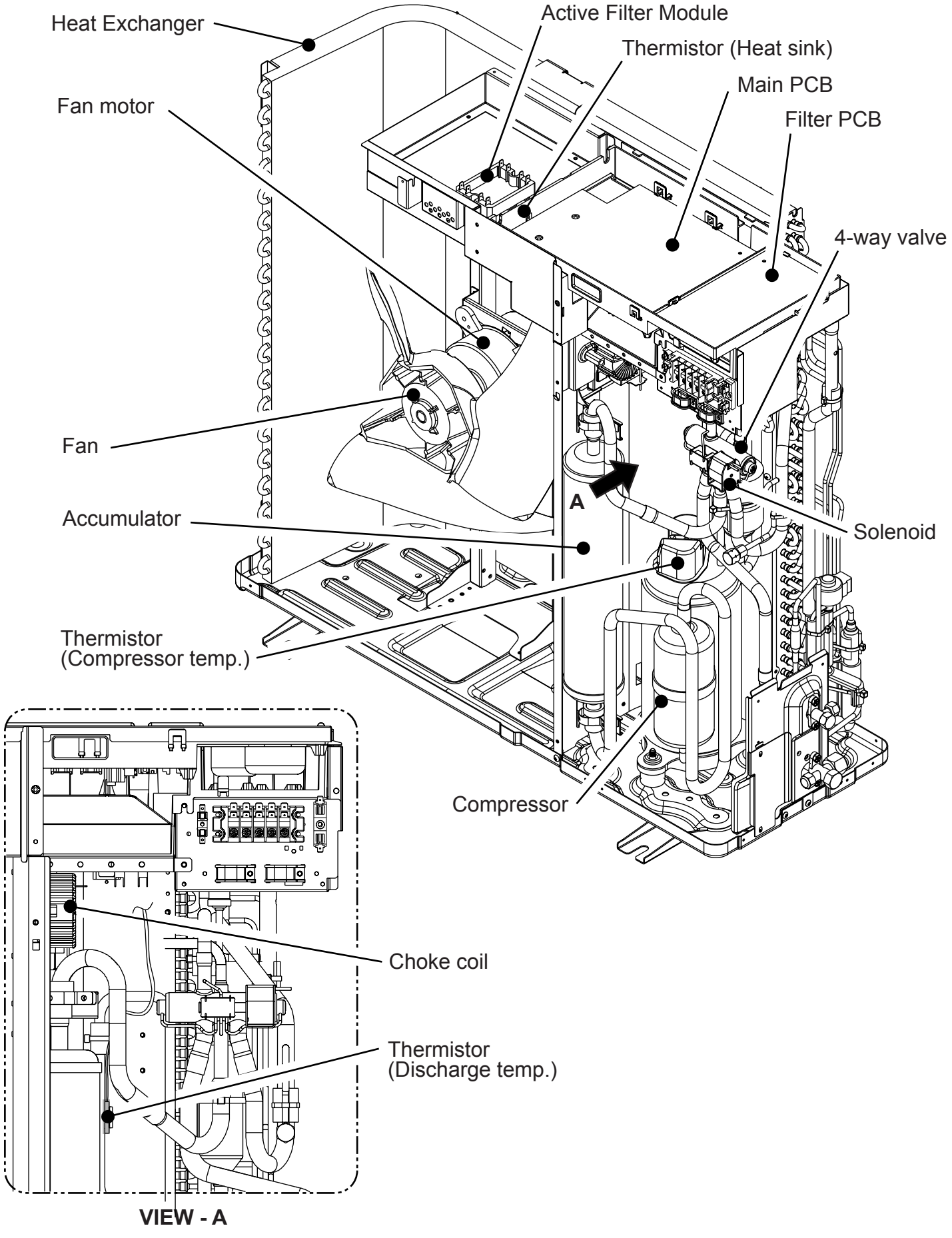


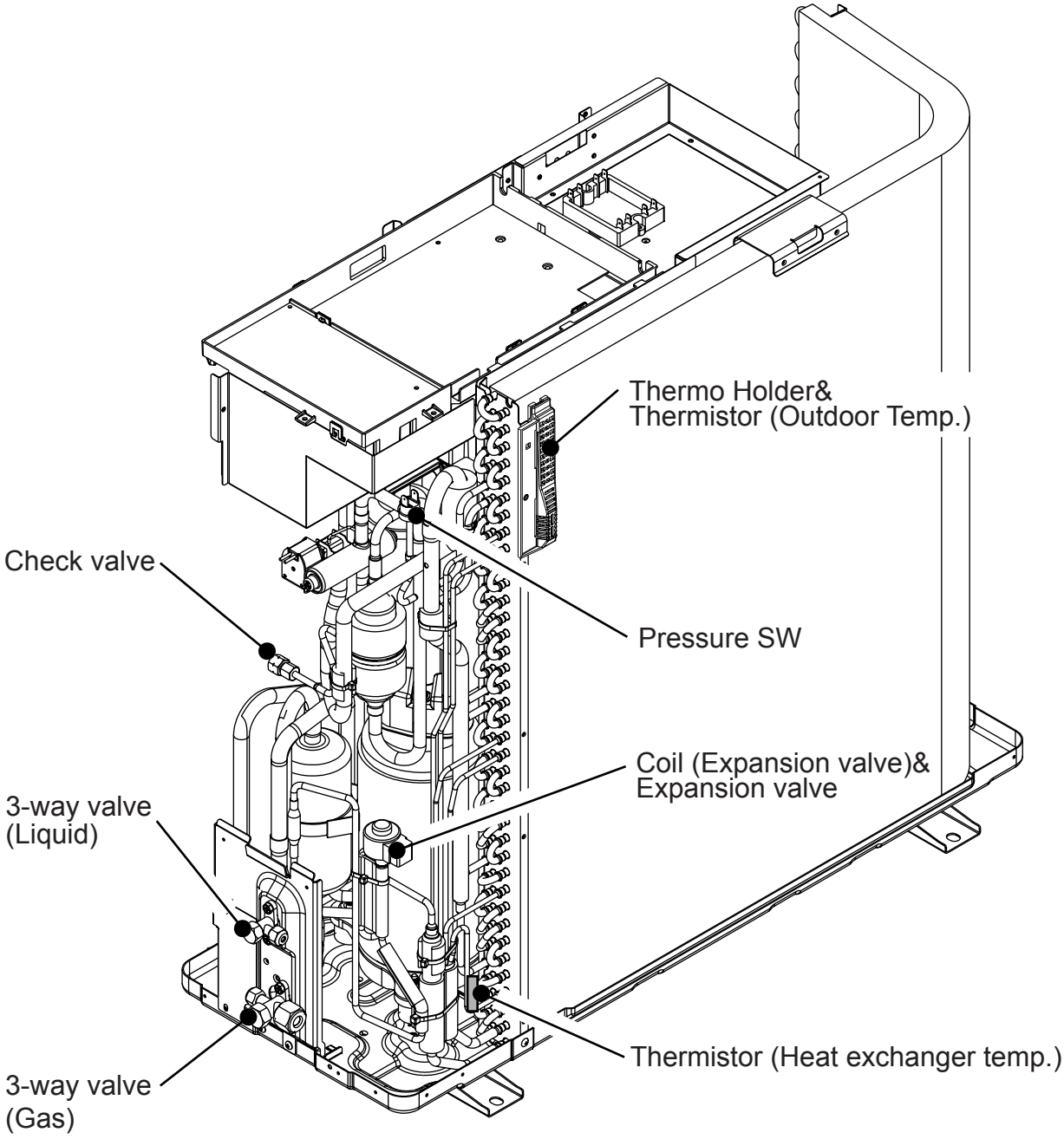
Replaceable Component

Thermistor (Heat exchanger temp.)

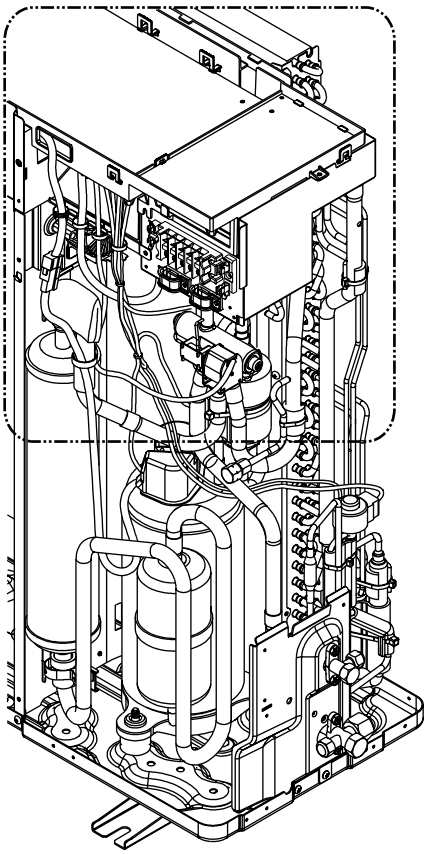
1-2 For AO*30/ 36LMAWL

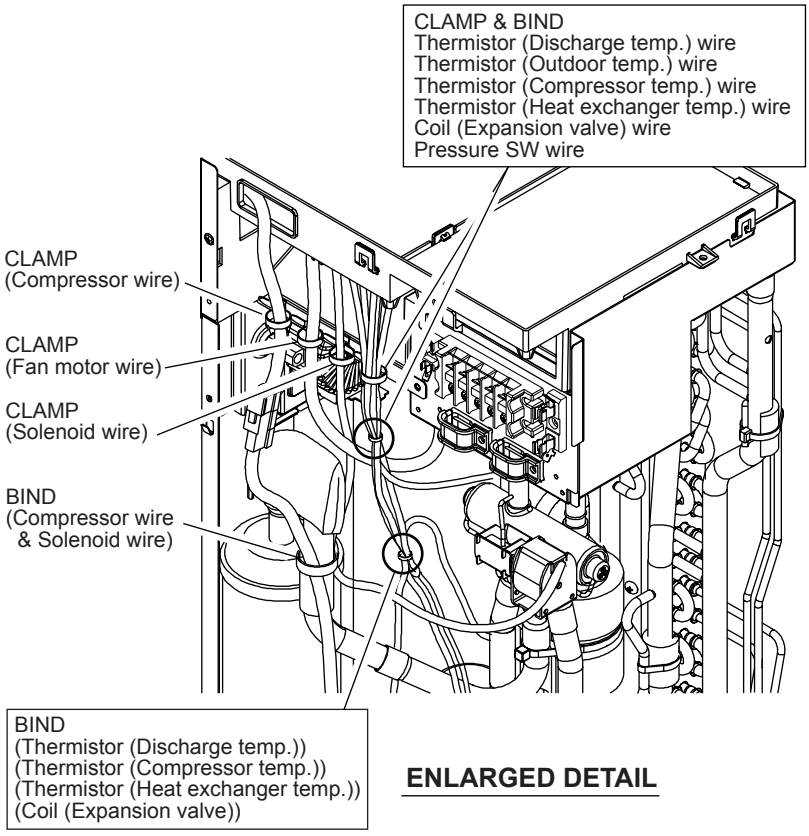
1-2-1 PARTS LAYOUT DRAWING



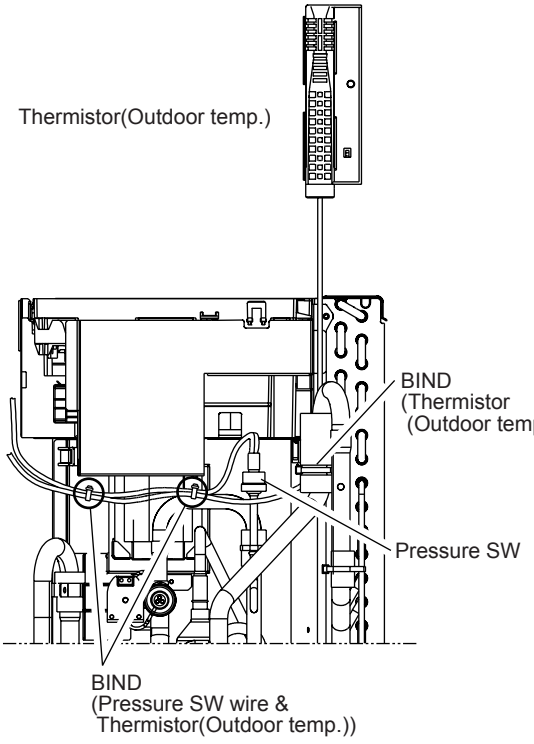

Thermo Holder&
Thermistor (Outdoor Temp.)
Check valve
Pressure SW
Coil (Expansion valve)&
Expansion valve
3-way valve
(Liquid)
Thermistor (Heat exchanger temp.)
3-way valve
(Gas)

1-2-2 WIRING (For AO*30/ 36LMAWL)

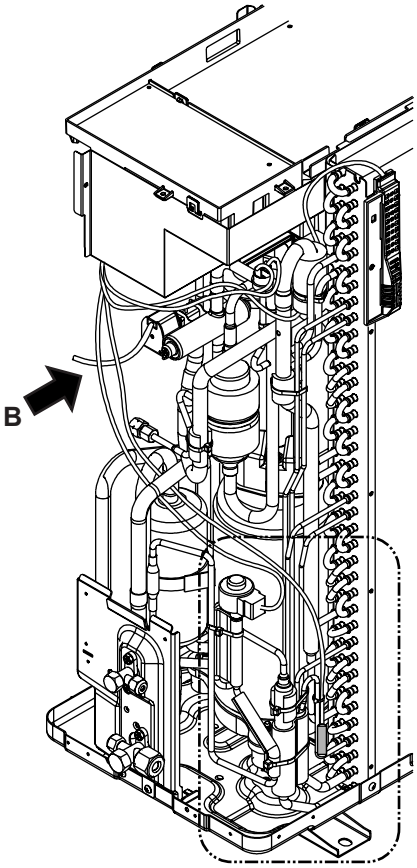


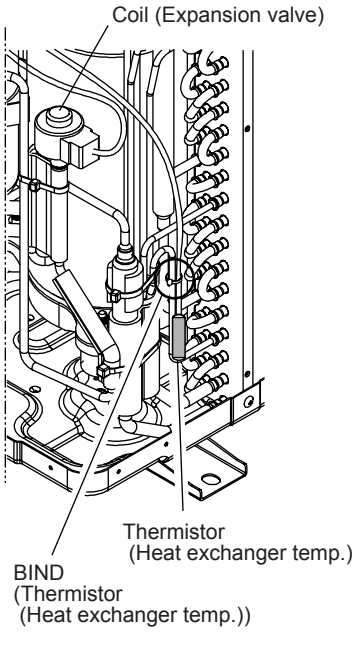


ENLARGED DETAIL



VIEW - B



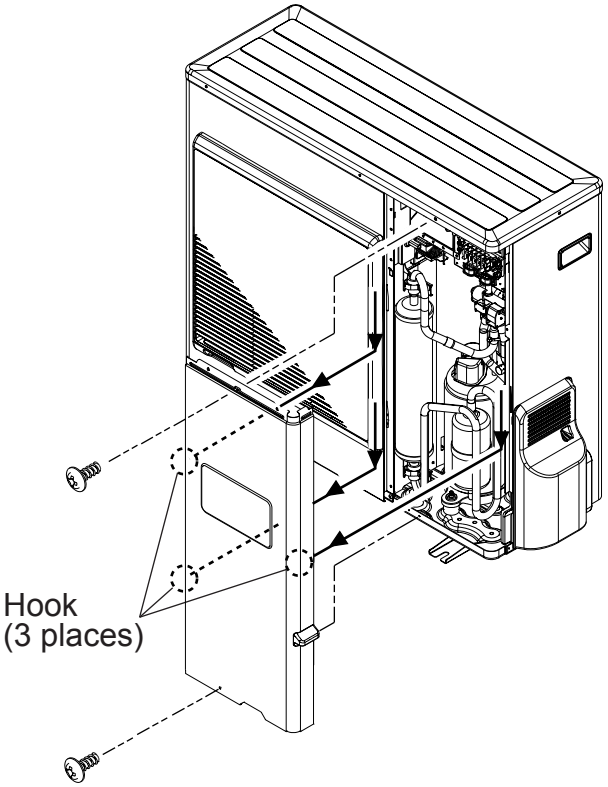


ENLARGED DETAIL

1-2-3 DISASSEMBLY PROCESS (For AO*30/ 36LMAWL)

1. SERVICE PANEL removal

- Remove the 2 mounting screws.
- Remove the SERVICE PANEL by sliding downward.

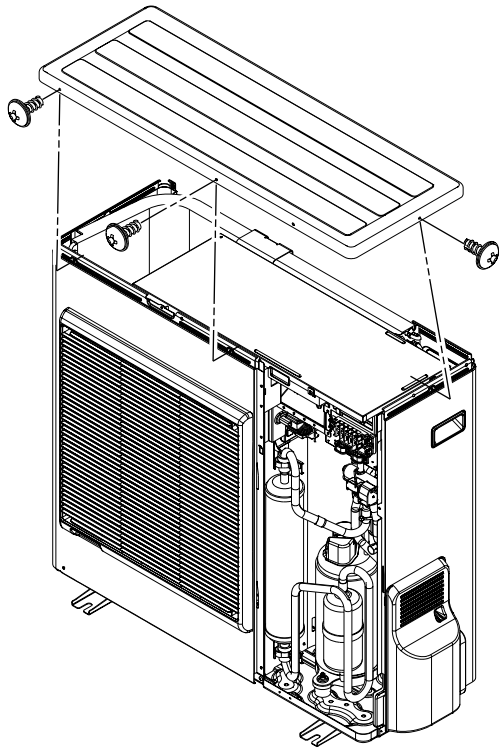


Replaceable Component

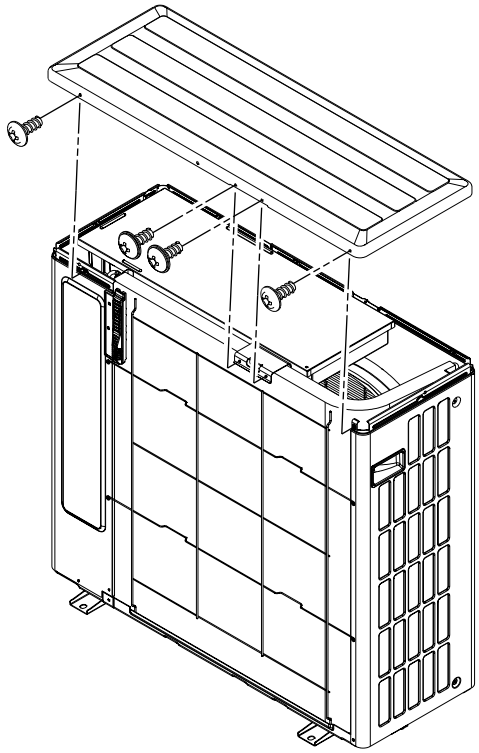
Compressor
Accumulator
4-way valve
Solenoid
Thermistor (Compressor temp.)
Thermistor (Discharge temp.)
Thermistor (Outdoor temp.)
Thermistor (Heat exchanger temp.)
Pressure SW
Coil (Expansion valve)

2. TOP PANEL removal

- Remove the 7 mounting screws.
- Remove the TOP PANEL upward.



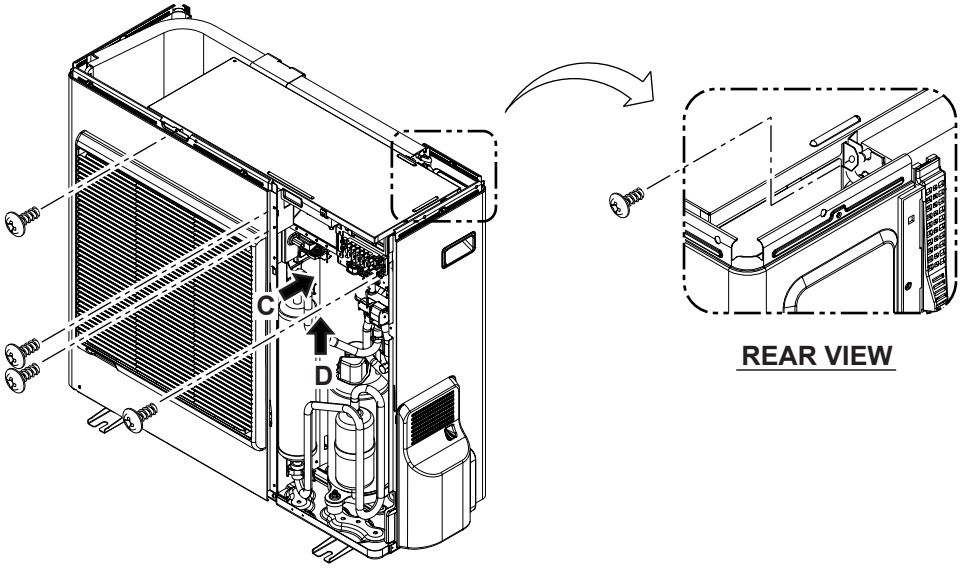
FRONT VIEW



REAR VIEW

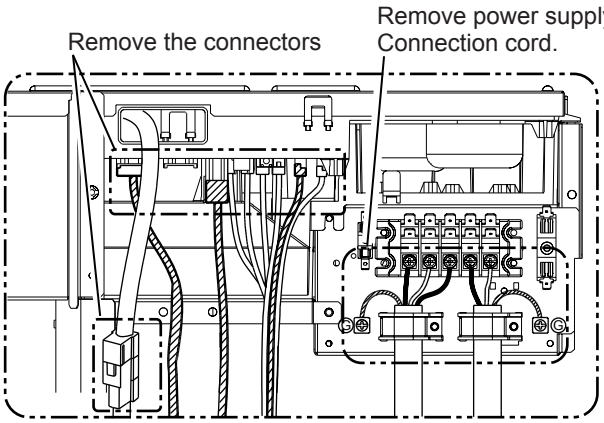
3. INVERTER BOX removal

- Remove the 5 mounting screws.
- Remove the connectors and cords. (Refer to VIEW -C,-D)
- Remove the INVERTER BOX upward.

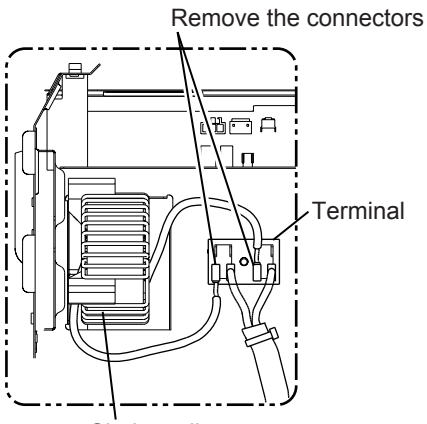


FRONT VIEW

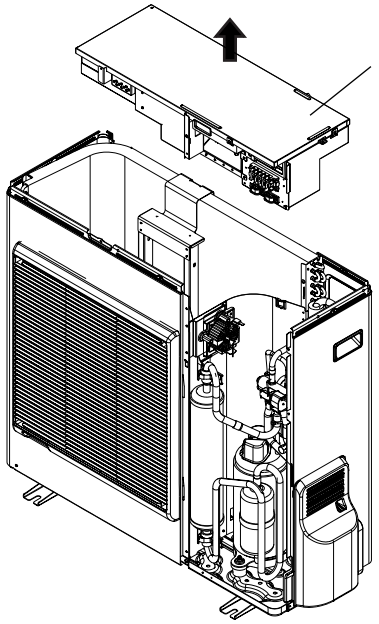
REAR VIEW



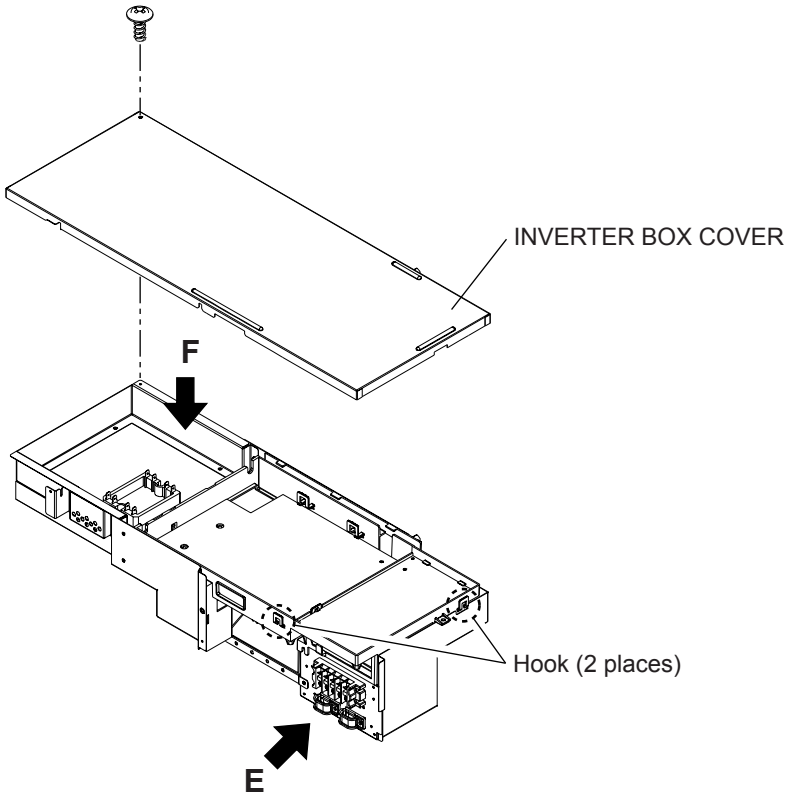
VIEW - C



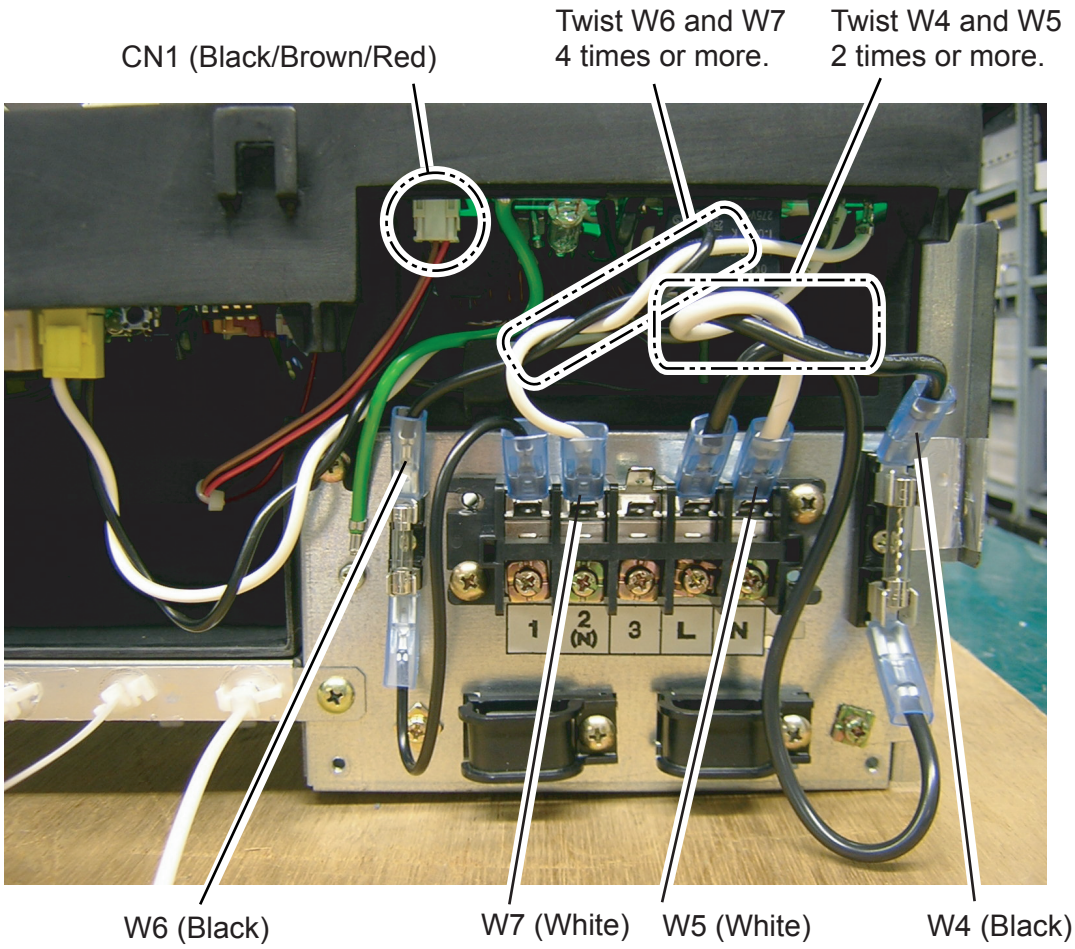
VIEW - D



- Remove the 1 mounting screw.
- Remove the INVERTER BOX COVER upward.

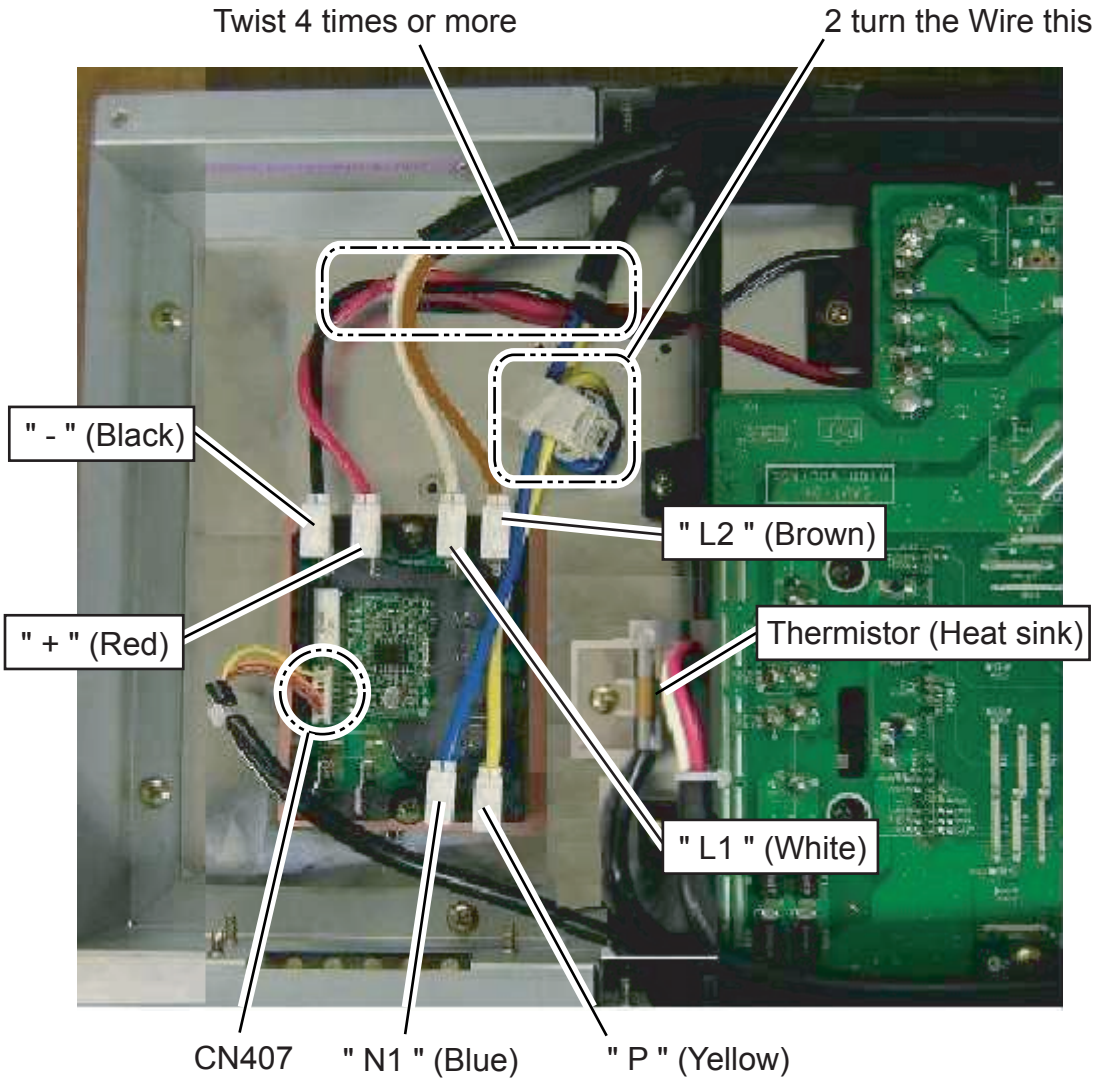


- Remove the connector and cords.

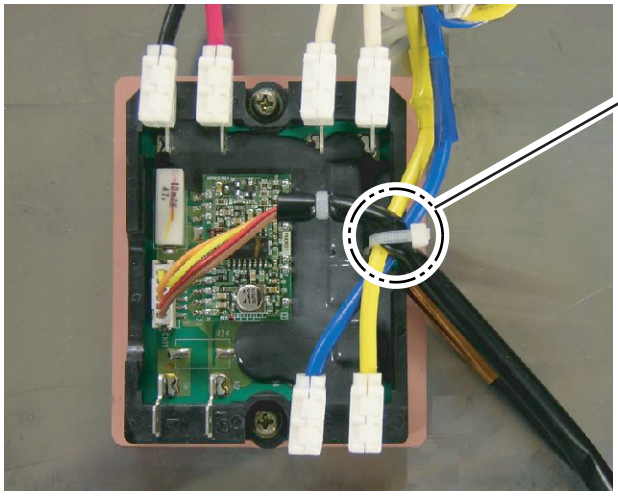


VIEW - E

▪ Remove the connector and cords.

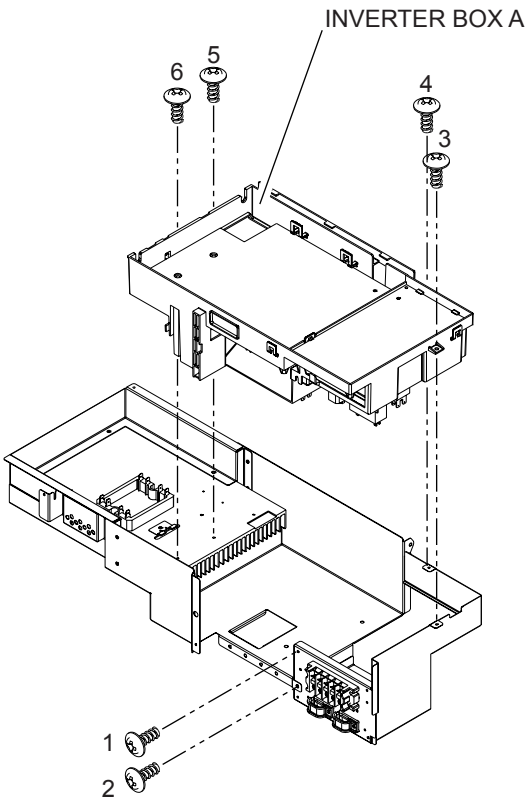


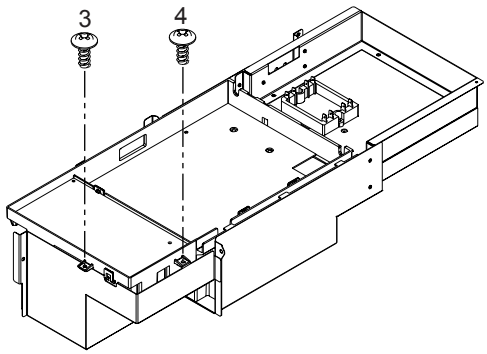
VIEW - F



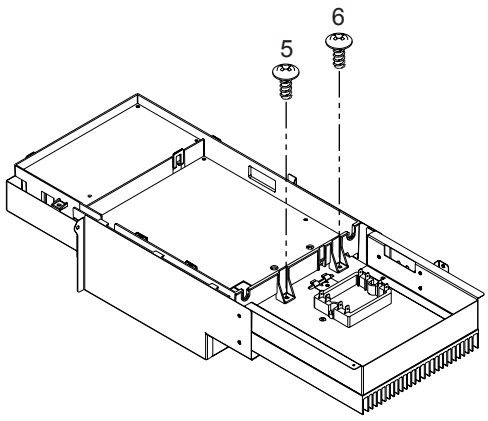
DETAIL

- Remove the 6 mounting screws.
- Remove the INVERTER BOX A upward.





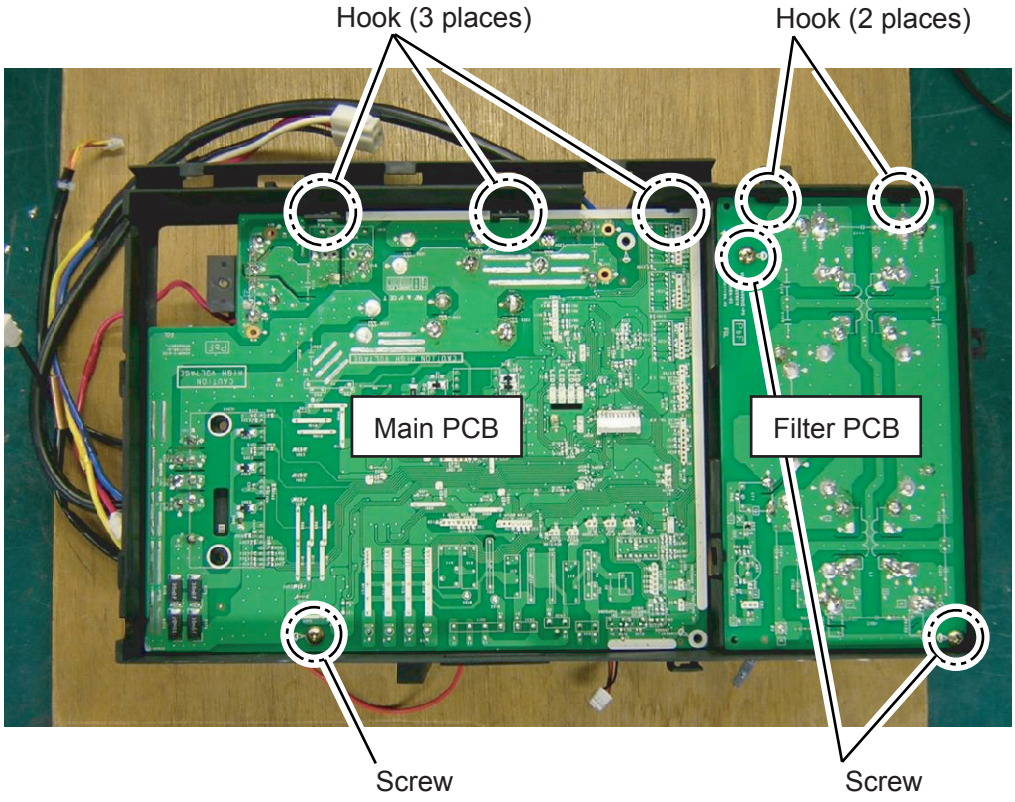
REAR VIEW



LEFT SIDE VIEW

Main PCB
- Remove the 1 mounting screw.
- Remove the Main PCB upward.

Filter PCB
- Remove the 2 mounting screws.
- Remove the Filter PCB upward.



1-2-4 ASSEMBLY PROCESS of INVERTER UNIT (For AO*30/ 36LMAWL)

1. FILTER PCB

- As shown in Fig.1, assemble FILTER PCB to INVERTER BOX A.
- As shown in Fig.2, pull out the wires of FILTER PCB.

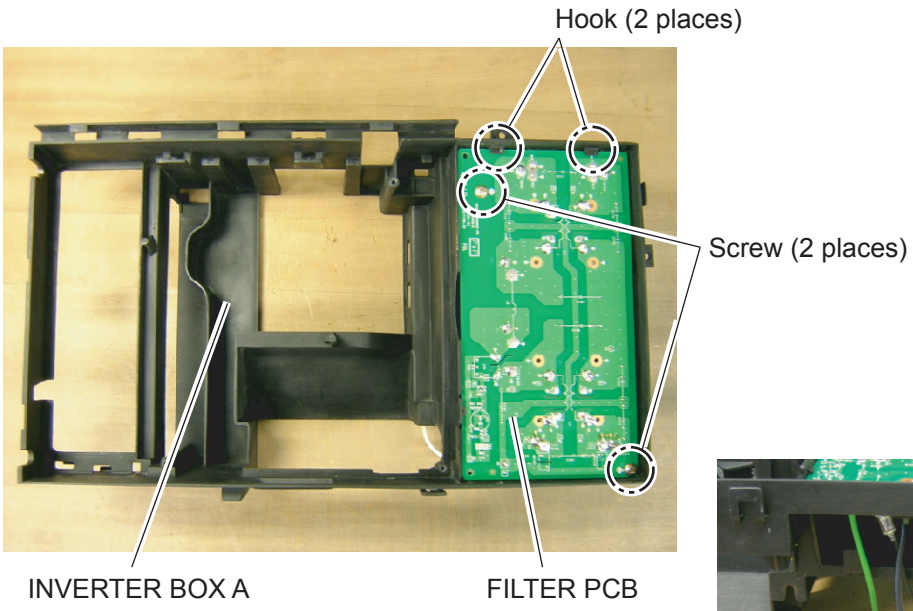


Fig.1

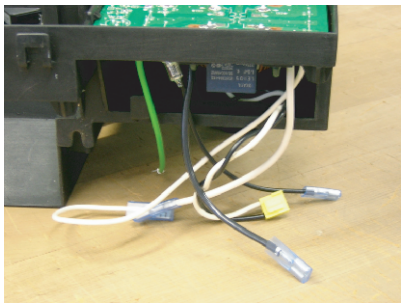


Fig.2

2. MAIN PCB

- As shown in Fig.3, temporarily fix MAIN PCB to INVERTER BOX A.
- After it is temporary fix of MAIN PCB, As shown in the Fig 4 - 7, pull out the wires of MAIN PCB.

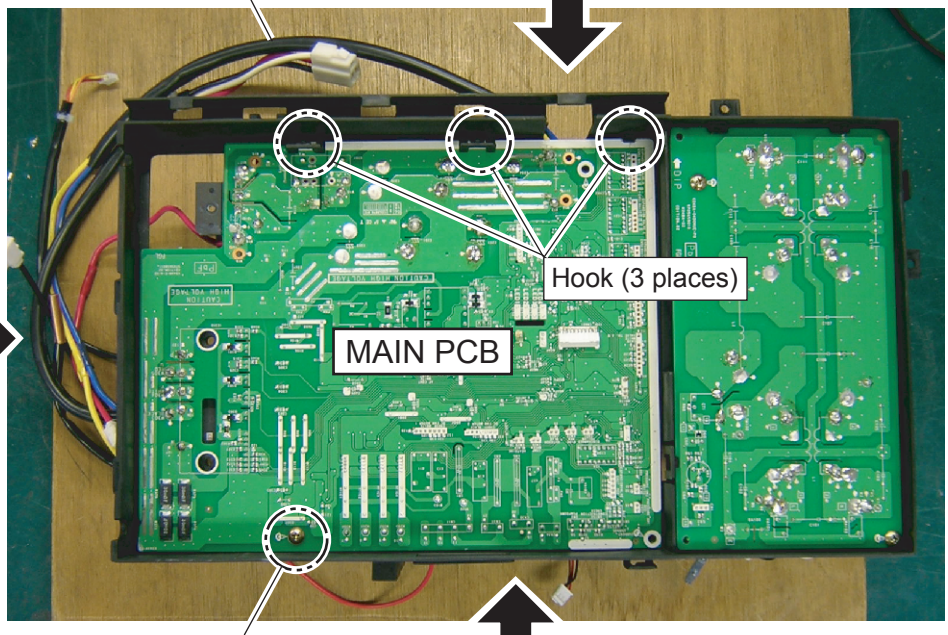


Fig.4

Fig.5

Fig.6/ 7

Fig.3

▪ As shown in Fig.4, pull out the wires.

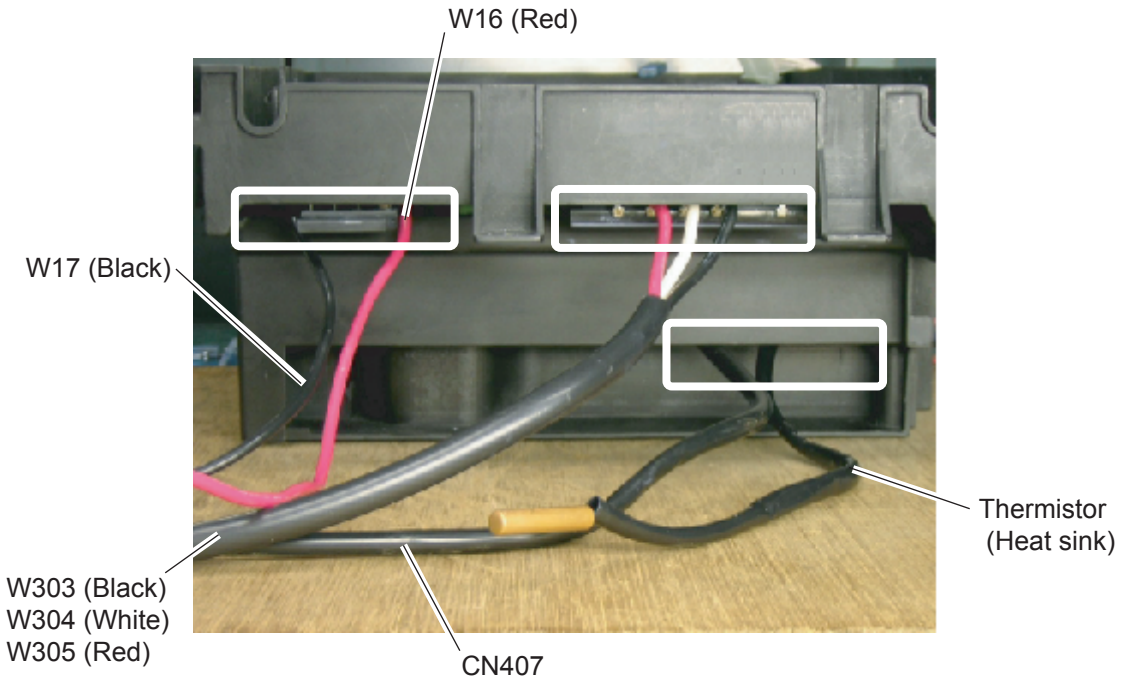


Fig. 4

▪ As shown in Fig.5, pull out the wires and fix them.

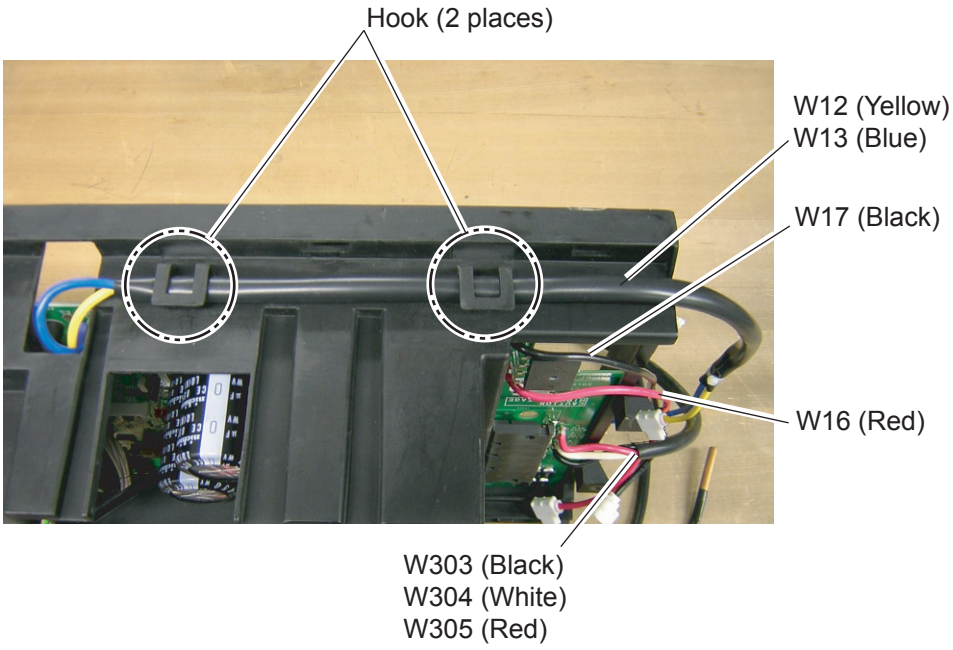


Fig. 5

▪ As shown in Fig.6, pull out the wires.

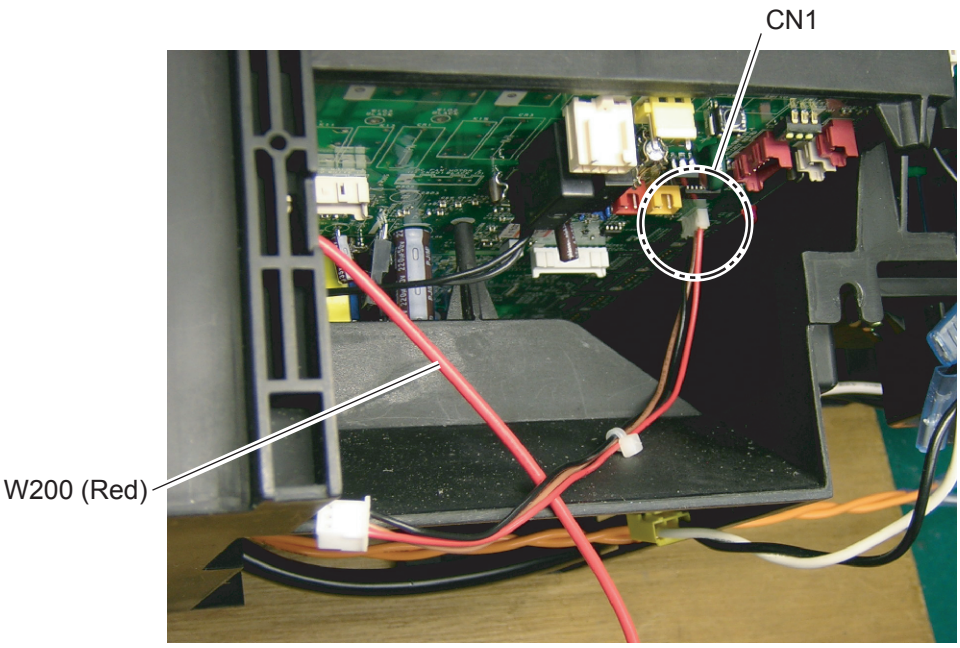


Fig. 6

▪ As shown in Fig.7, pull out the wires.

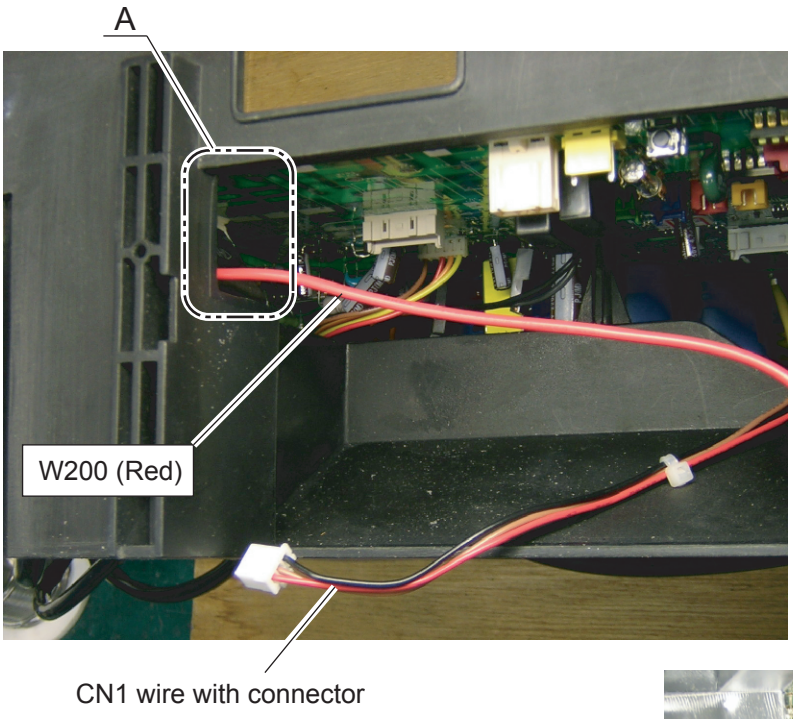
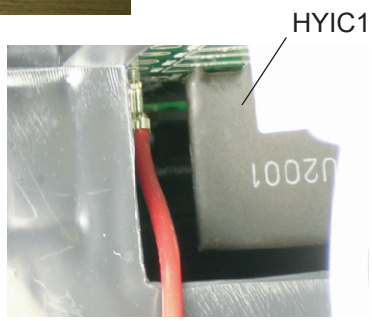


Fig. 7



Don't come in contact with HYIC1.

DETAIL - A

▪ As shown in Fig.8, connect wires.

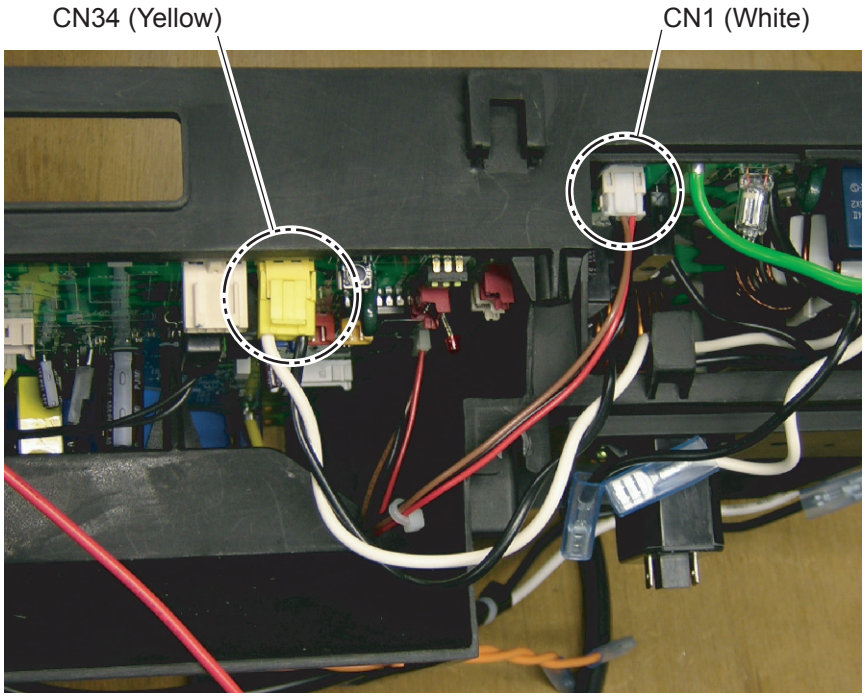


Fig. 8

▪ As shown in Fig.9, connect wires.

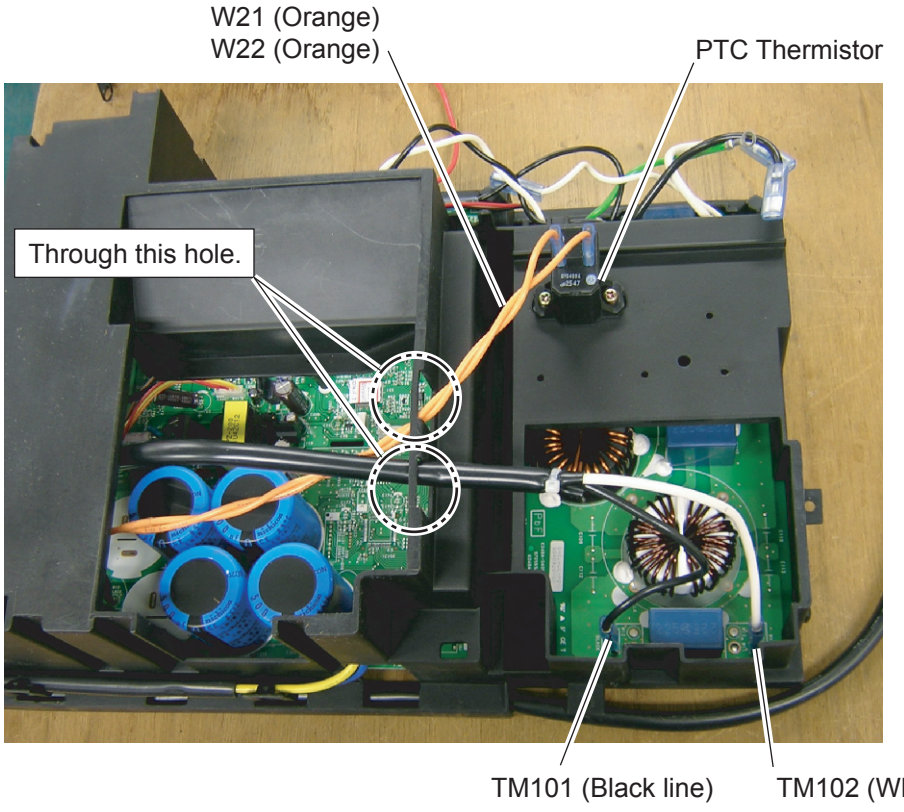


Fig. 9

▪ As shown in Fig.10, fix the wire to INVERTER BOX A.

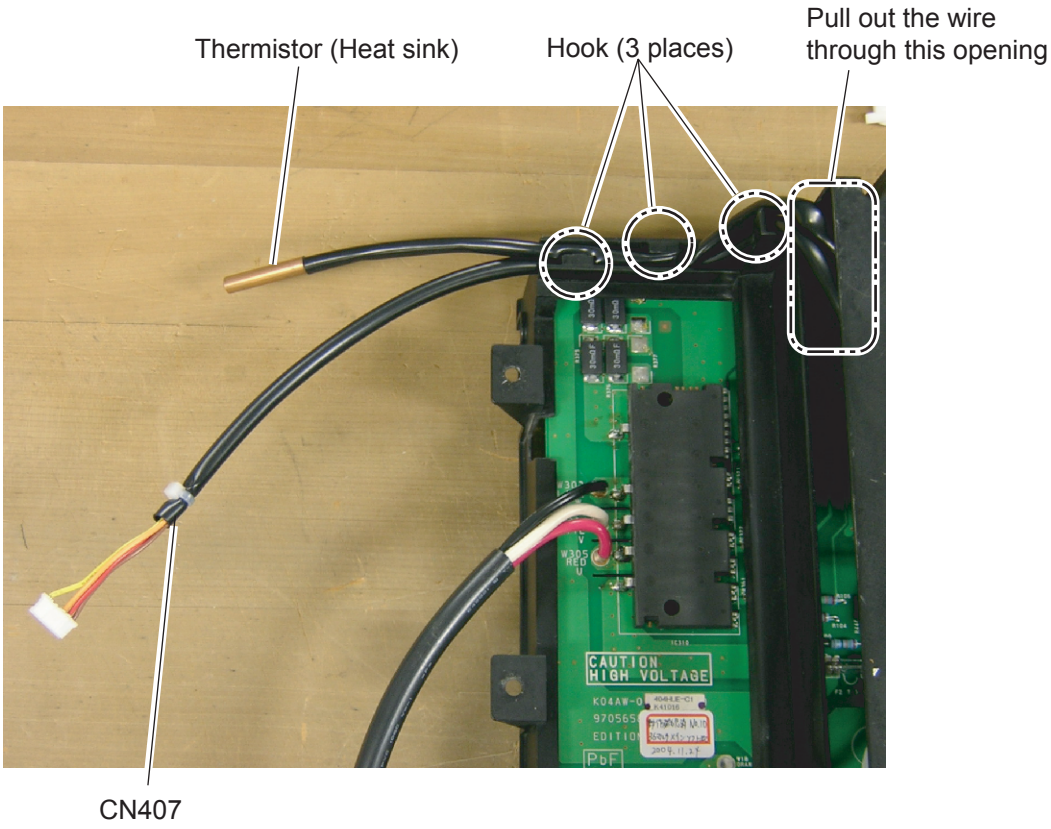


Fig. 10

▪ As shown in the figures, set wire with connector and bind it to INVERTER BOX A.

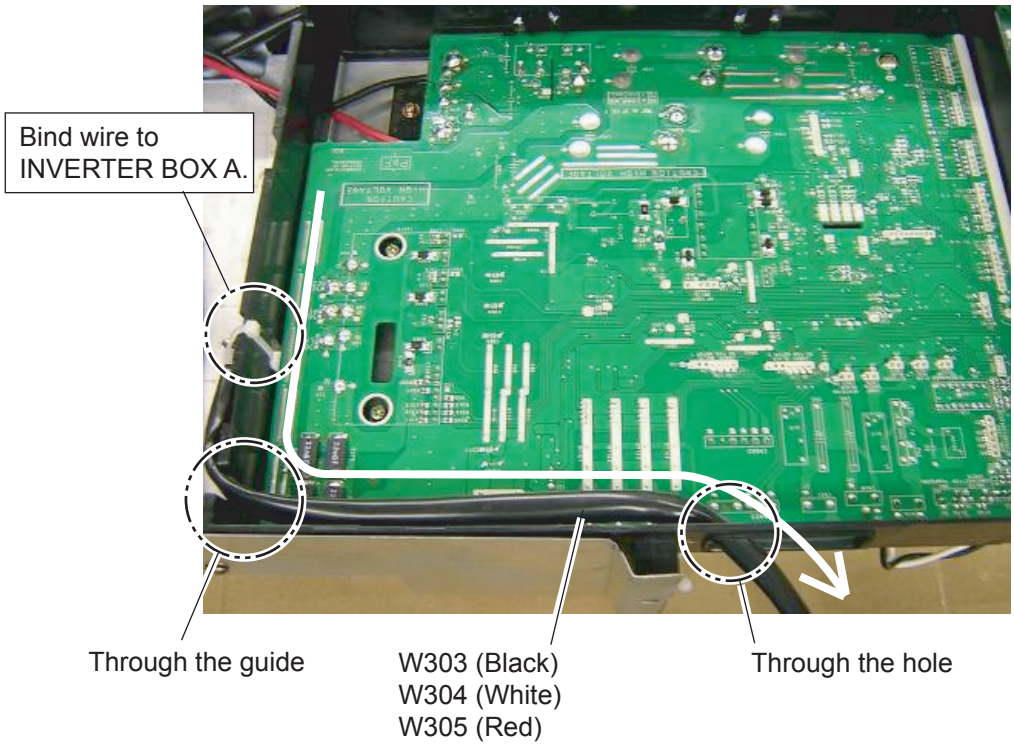
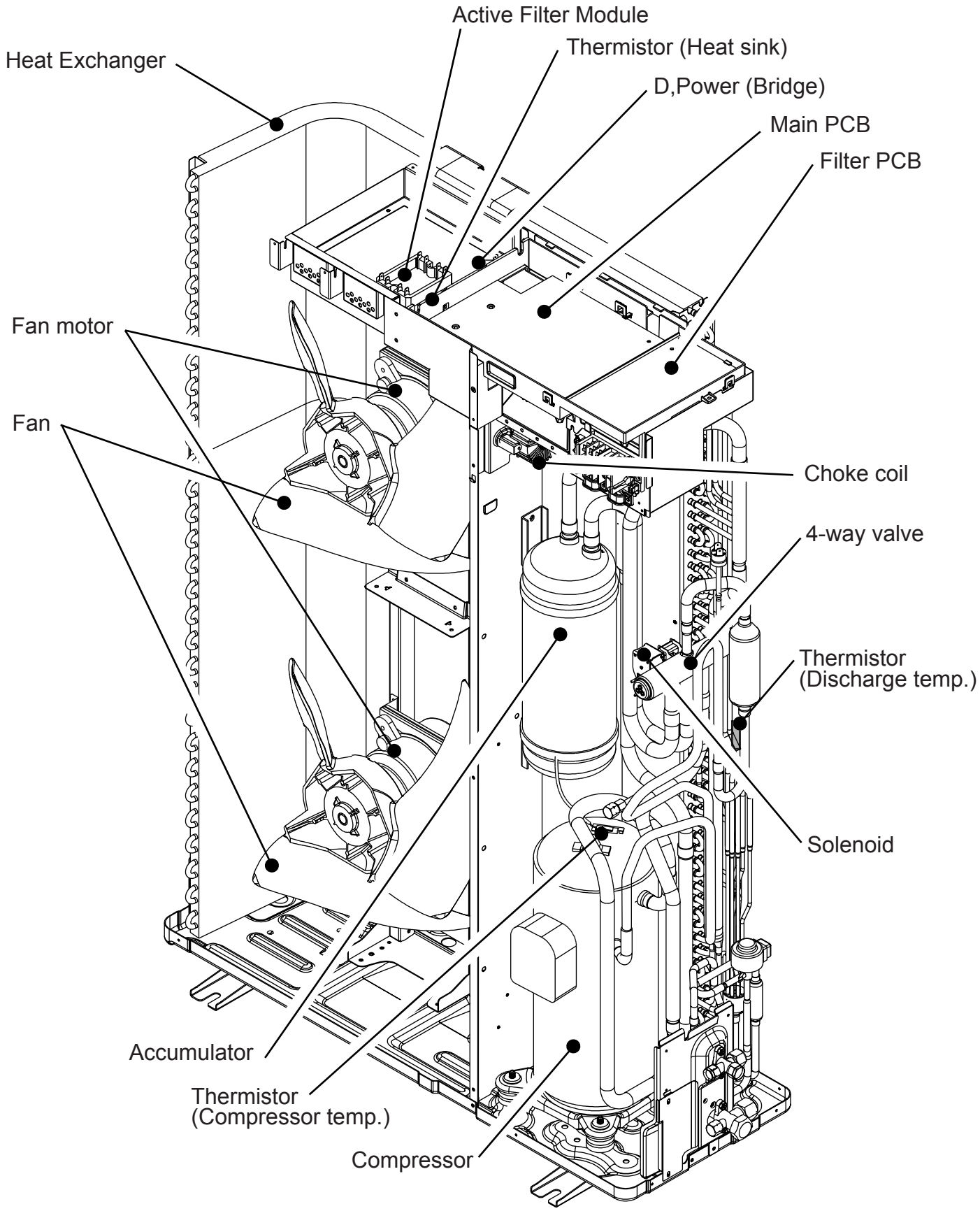
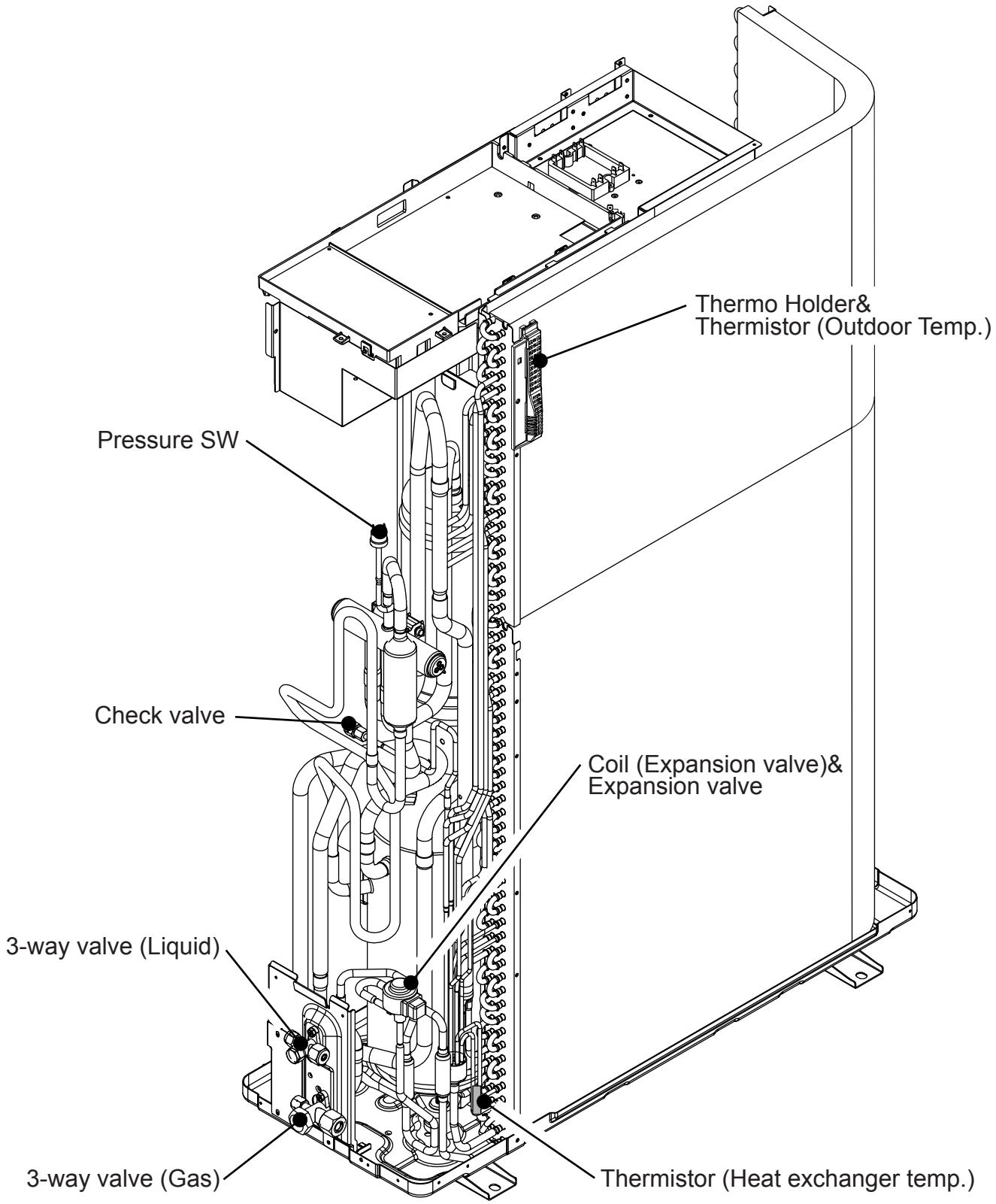


Fig. 11

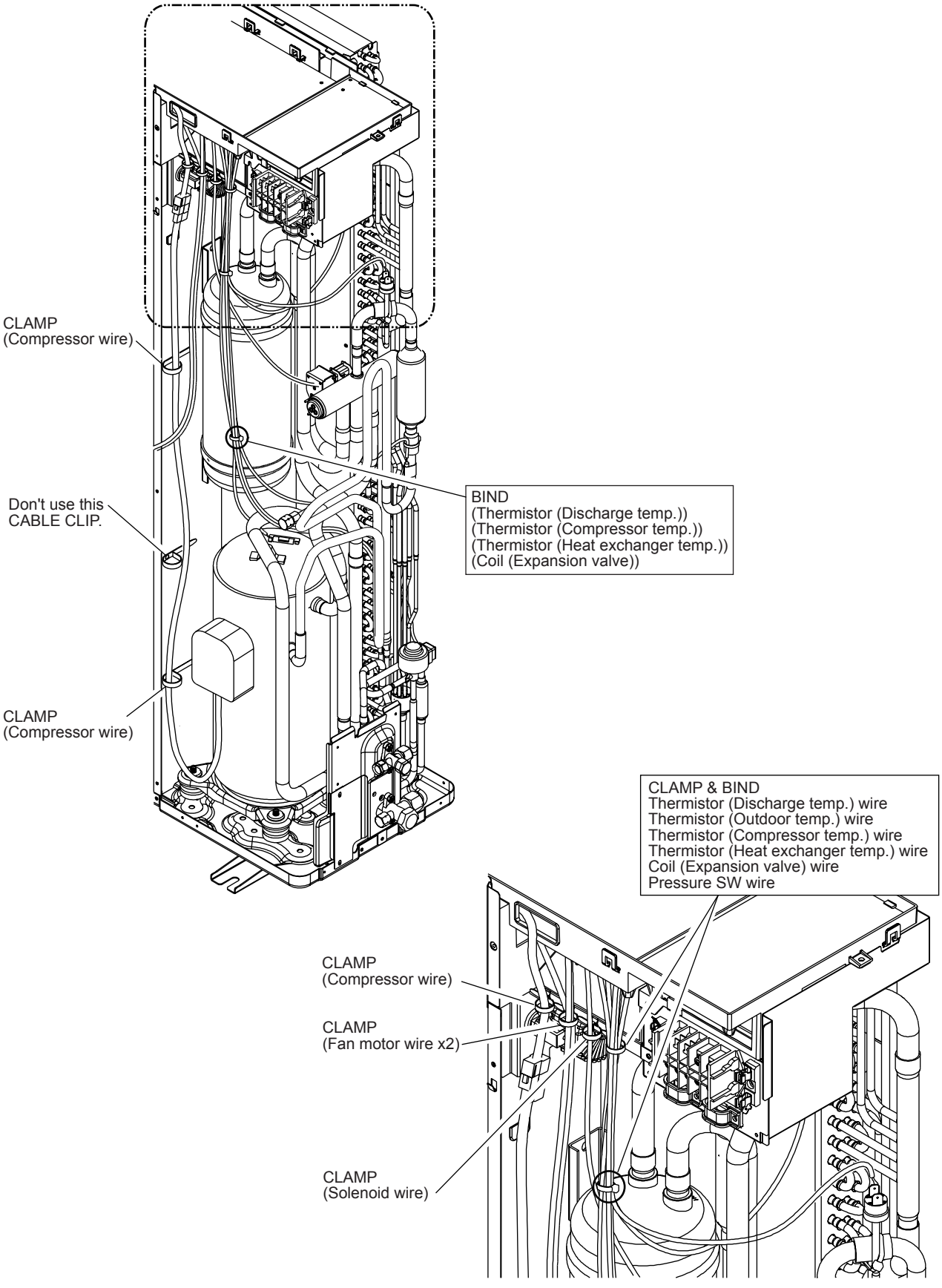
1-3 For AO*45LJ*YL/ 54LJAYL

1-3-1 PARTS LAYOUT DRAWING

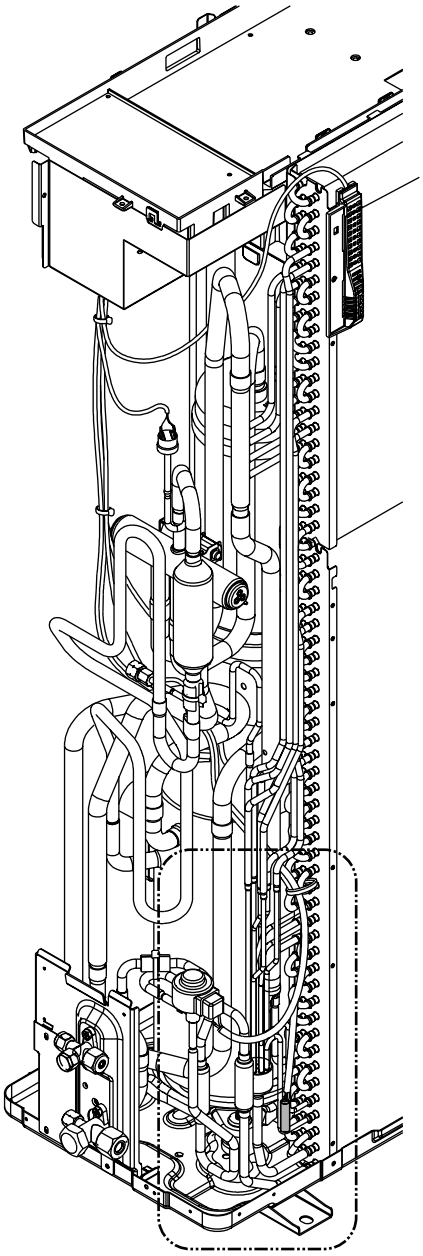


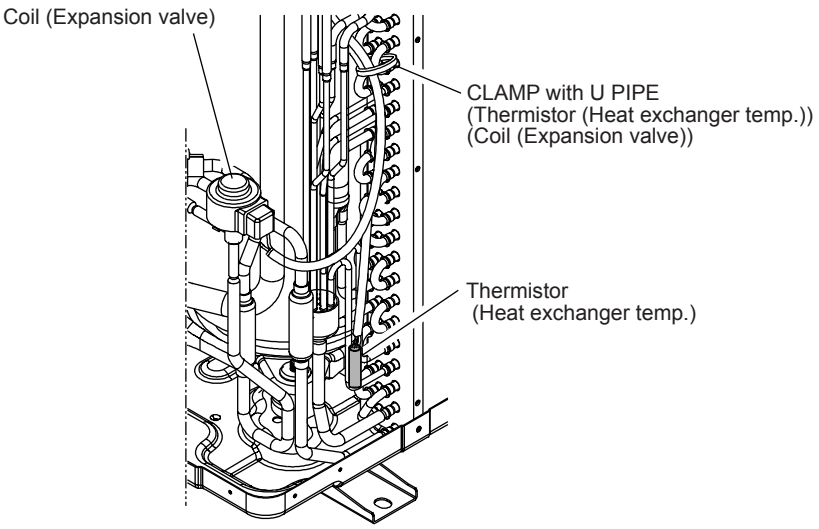

Thermo Holder&
Thermistor (Outdoor Temp.)
Pressure SW
Check valve
Coil (Expansion valve)&
Expansion valve
3-way valve (Liquid)
3-way valve (Gas)
Thermistor (Heat exchanger temp.)

1-3-2 WIRING (For AO*45LJ*YL/ 54LJAYL)



ENLARGED DETAIL



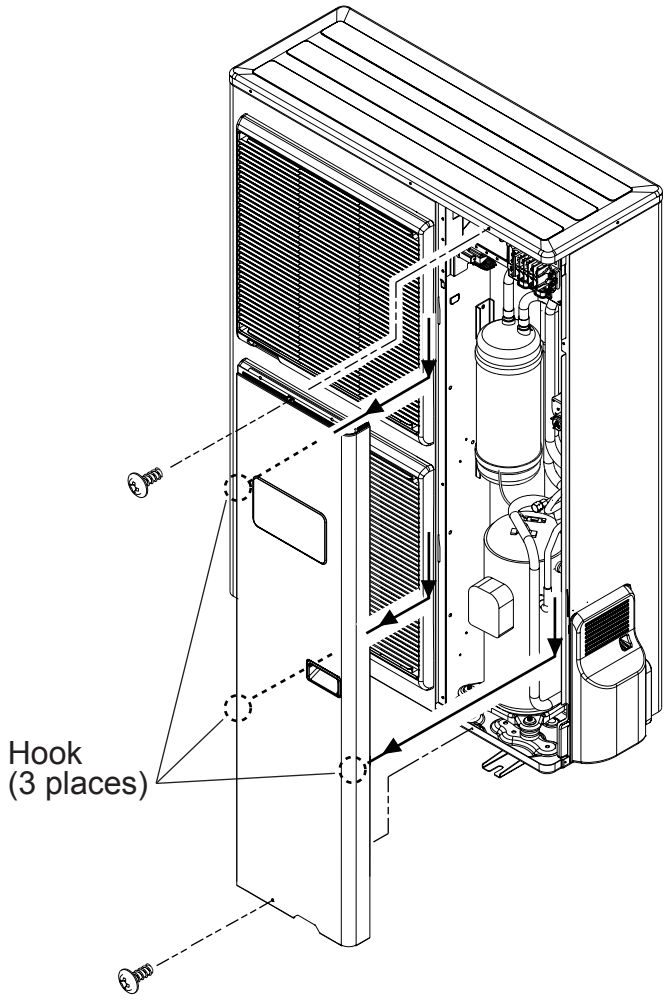


ENLARGED DETAIL

1-3-3 DISASSEMBLY PROCESS (AO*45LJ*YL/ 54LJAYL)

1. SERVICE PANEL removal

- Remove the 2 mounting screws.
- Remove the SERVICE PANEL by sliding downward.

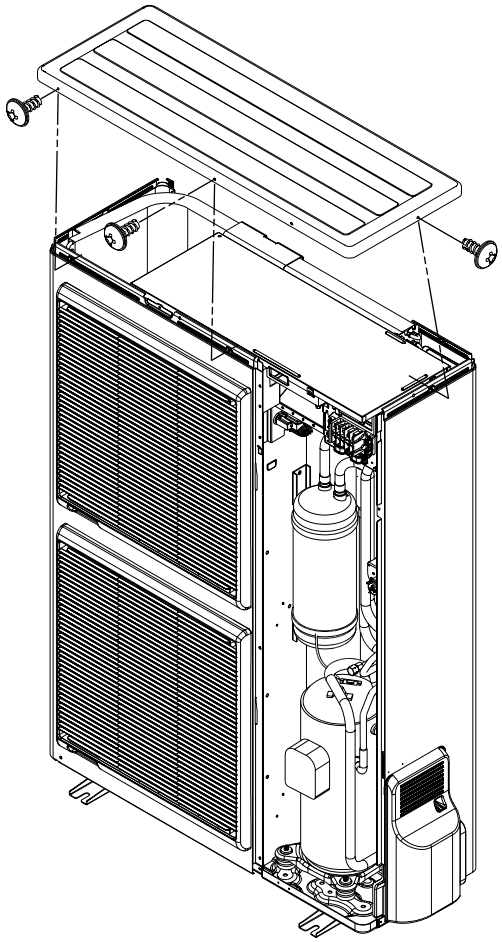


Replaceable Component

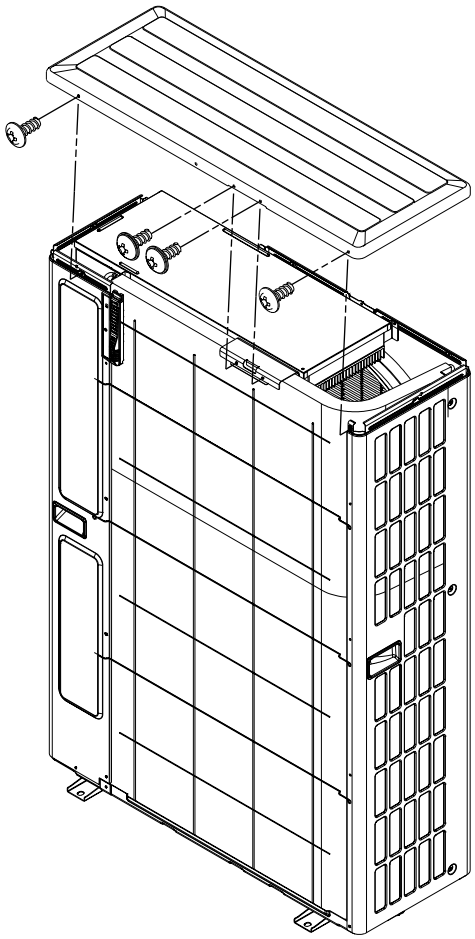
Compressor
Accumulator
4-way valve
Solenoid
Thermistor (Compressor temp.)
Thermistor (Discharge temp.)
Thermistor (Outdoor temp.)
Thermistor (Heat exchanger temp.)
Pressure SW
Coil (Expansion valve)

2. TOP PANEL removal

- Remove the 7 mounting screws.
- Remove the TOP PANEL upward.



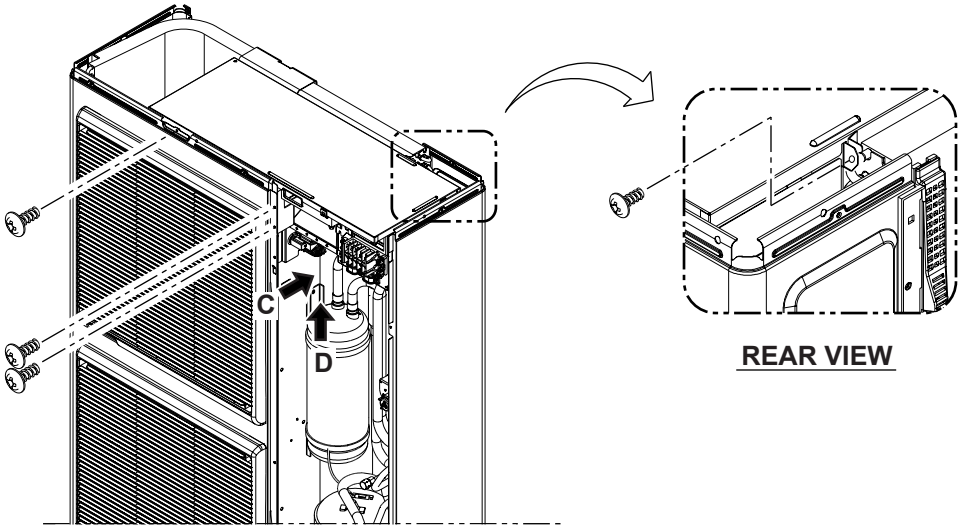
FRONT VIEW



REAR VIEW

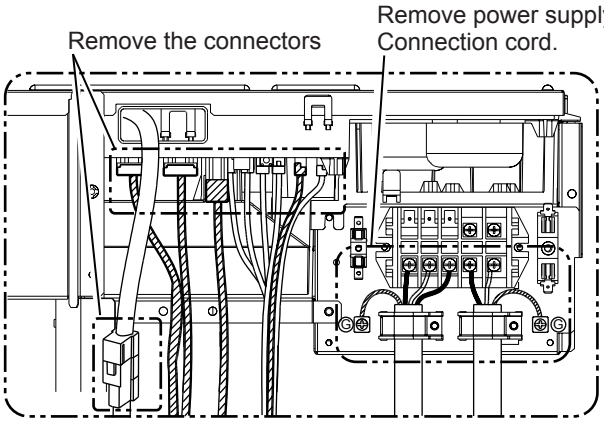
3. INVERTER BOX removal

- Remove the 4 mounting screws.
- Remove the connectors and cords. (Refer to VIEW -C,-D)
- Remove the INVERTER BOX upward.

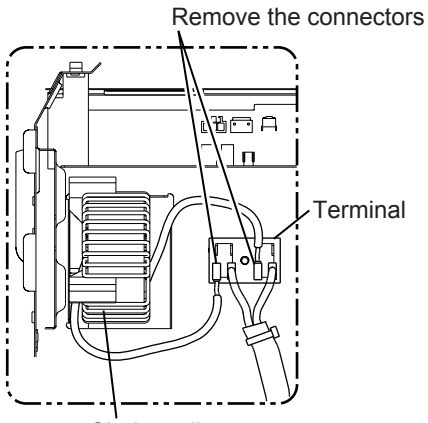


REAR VIEW

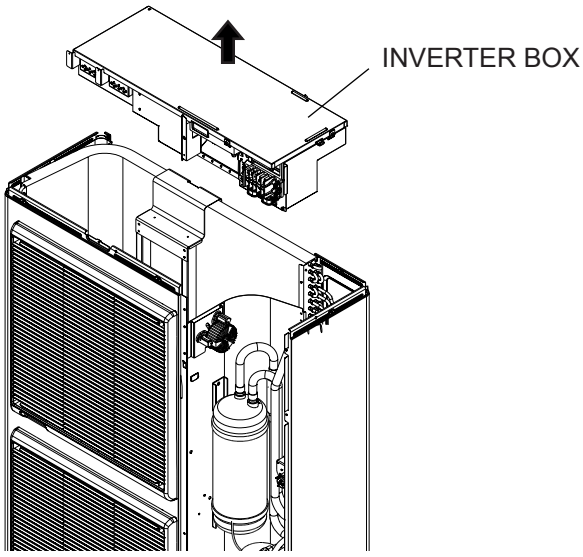
FRONT VIEW



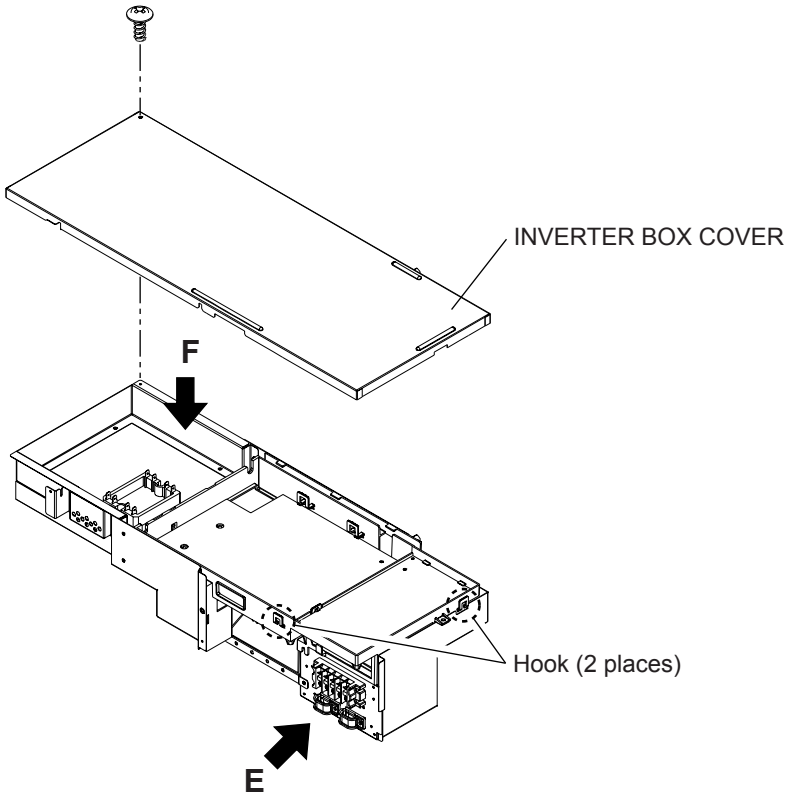
VIEW - C



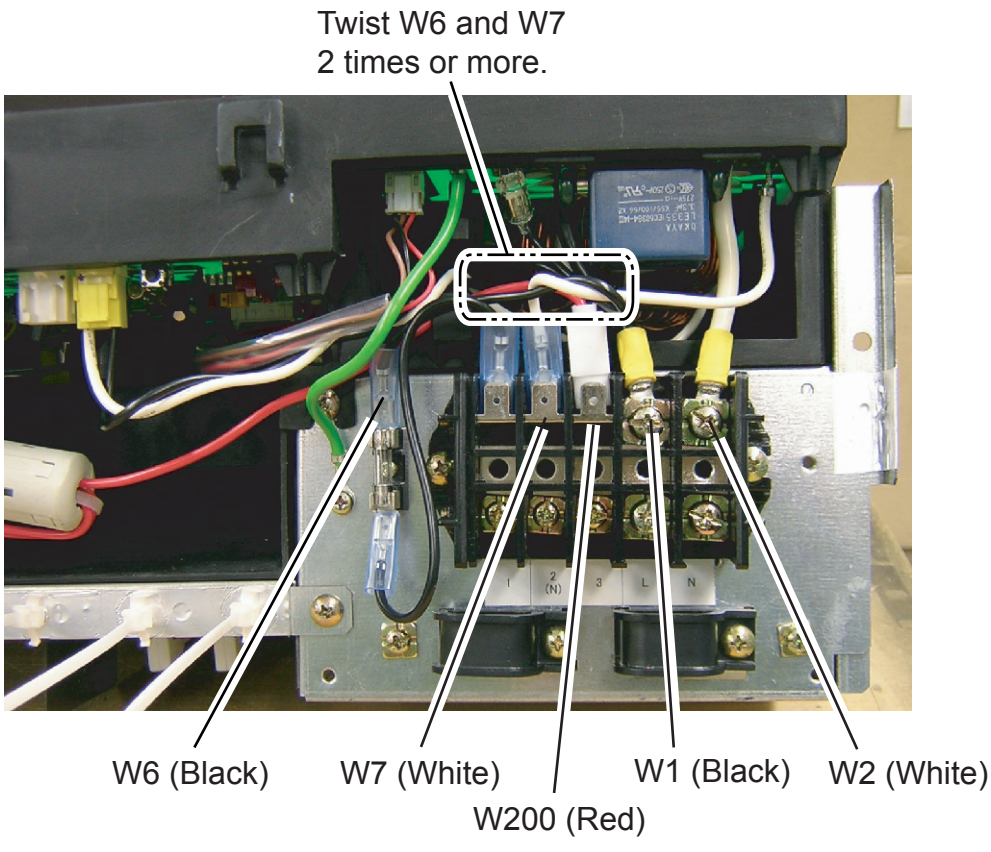
VIEW - D



- Remove the 1 mounting screw.
- Remove the INVERTER BOX COVER upward.

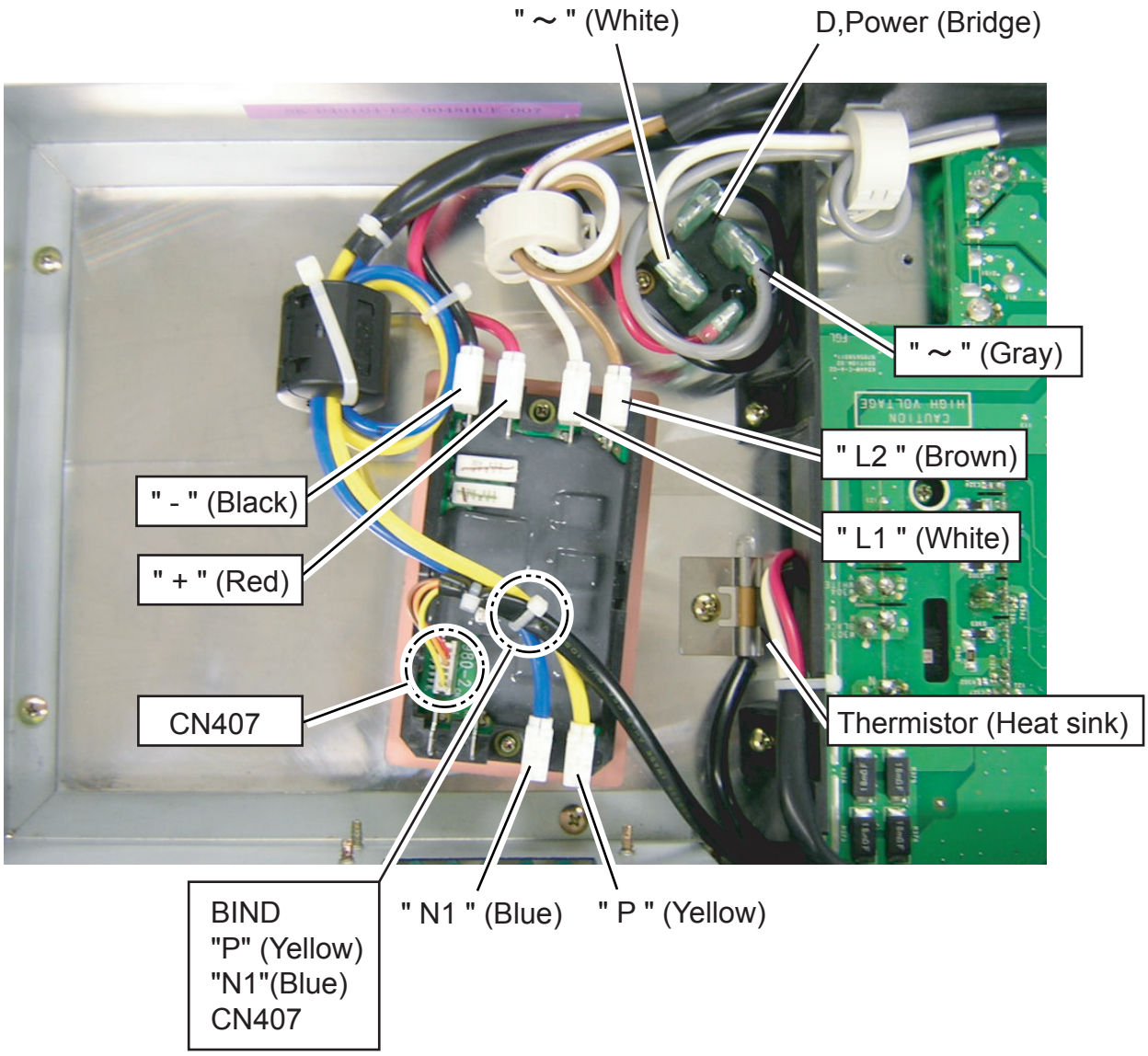


- Remove the connector and cords.



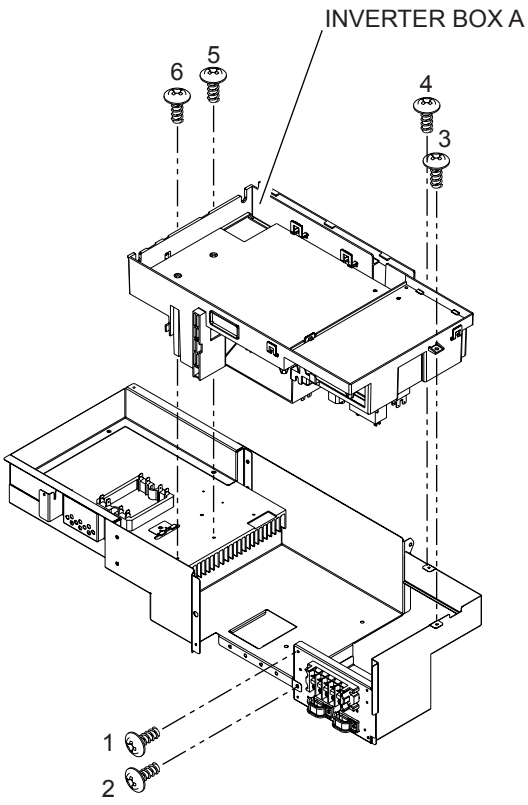
VIEW - E

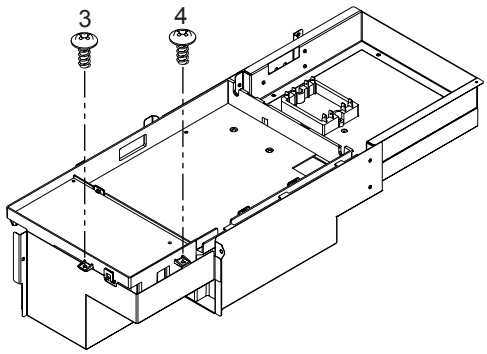
▪ Remove the connector and cords.



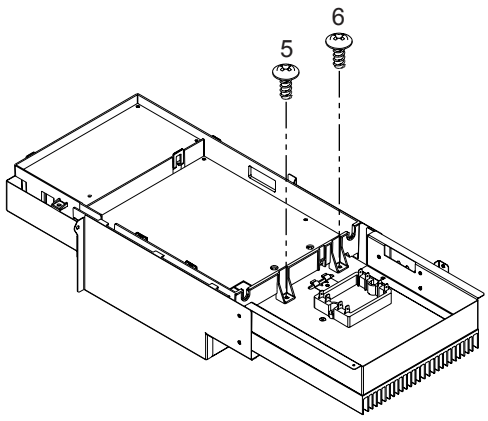
VIEW - F

- Remove the 6 mounting screws.
- Remove the INVERTER BOX A upward.





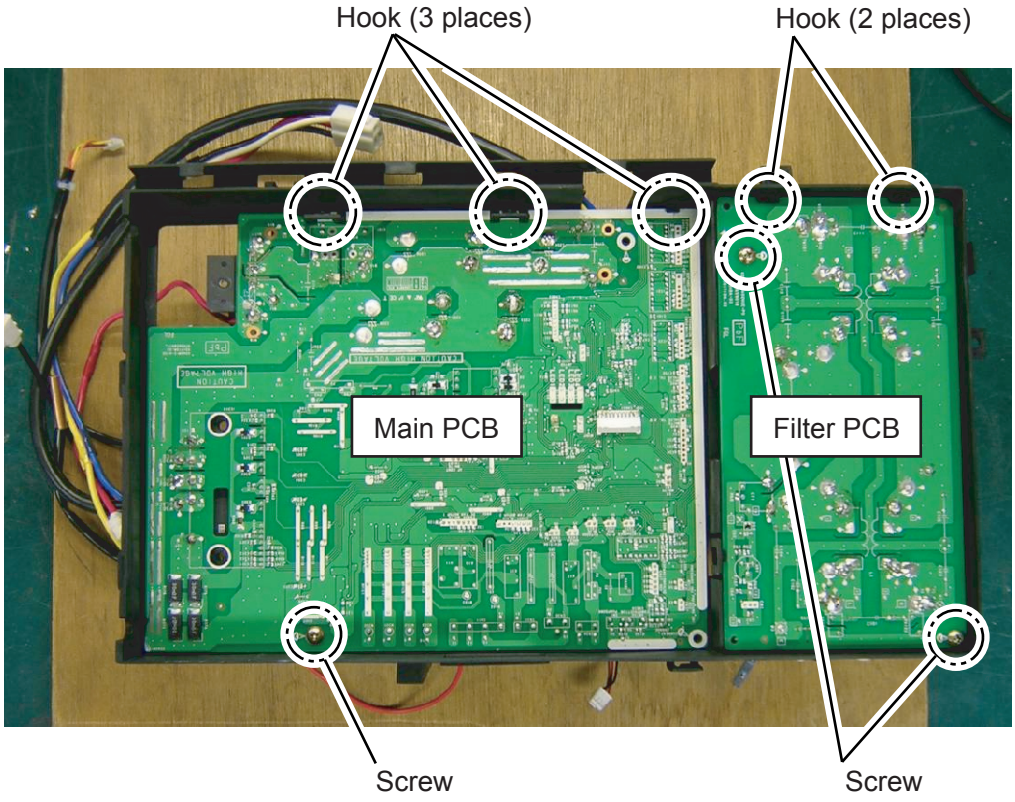
REAR VIEW



LEFT SIDE VIEW

Main PCB
- Remove the 1 mounting screw.
- Remove the Main PCB upward.

Filter PCB
- Remove the 2 mounting screws.
- Remove the Filter PCB upward.



1-3-4 ASSEMBLY PROCESS of INVERTER UNIT (For AO*45LJ*YL/ 54LJAYL)

1. FILTER PCB

- As shown in Fig.1, assemble FILTER PCB to INVERTER BOX A.
- As shown in Fig.2, pull out the wires of FILTER PCB.

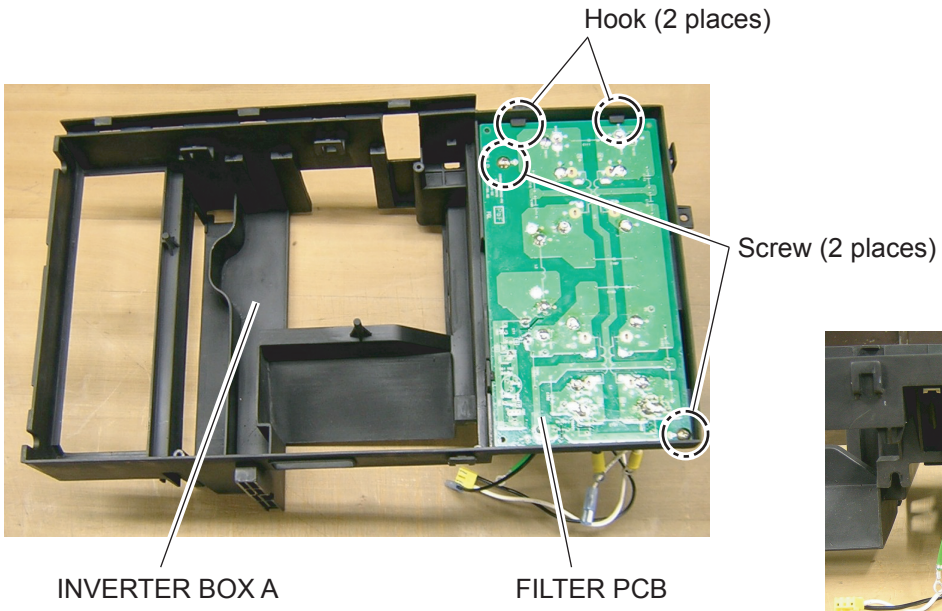


Fig.1

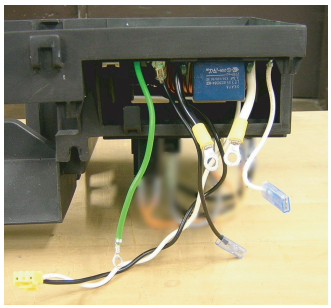


Fig.2

2. MAIN PCB

- As shown in Fig.3, temporarily fix MAIN PCB to INVERTER BOX A.
- After it is temporary fix of MAIN PCB, As shown in the Fig 4 - 6, pull out the wires of MAIN PCB.

Fig.5

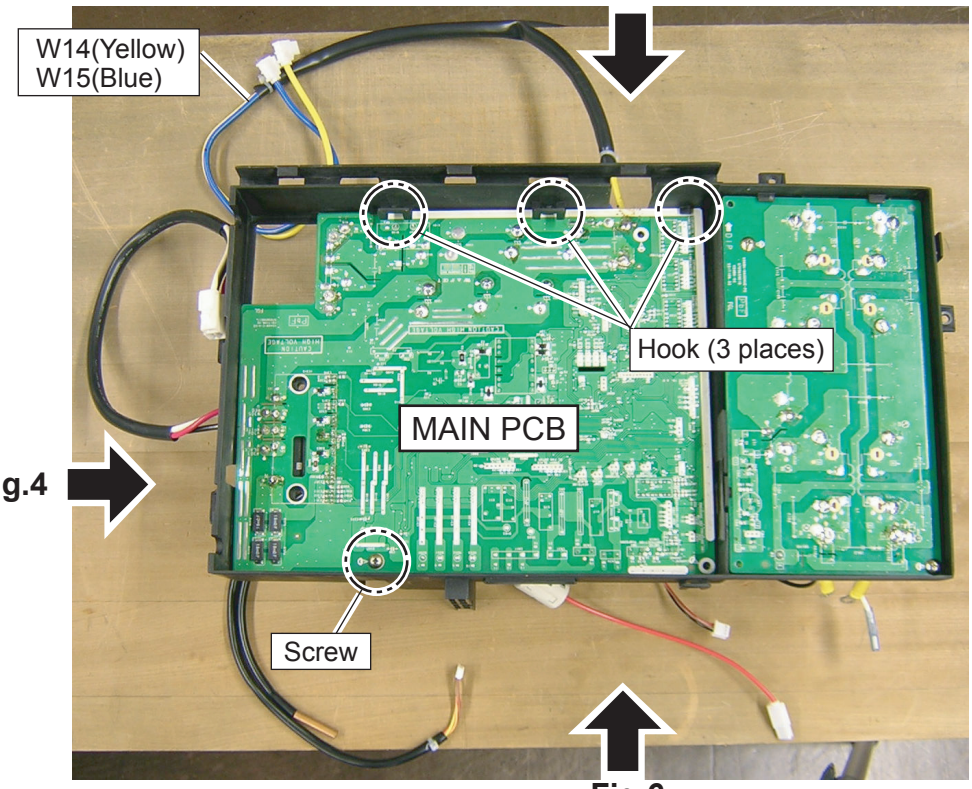


Fig.4

Fig.6

Fig.3

▪ As shown in Fig.4, pull out the wires.

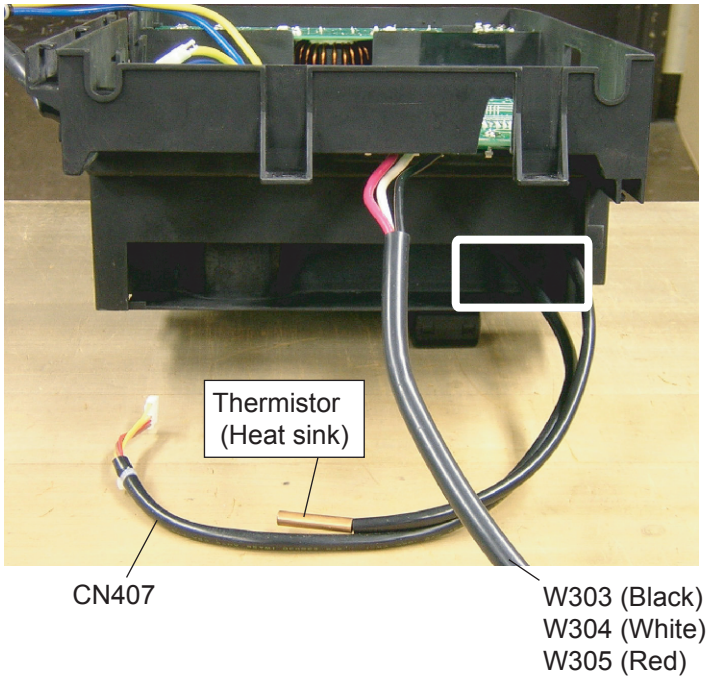


Fig. 4

▪ As shown in Fig.5, pull out the wires and fix them.

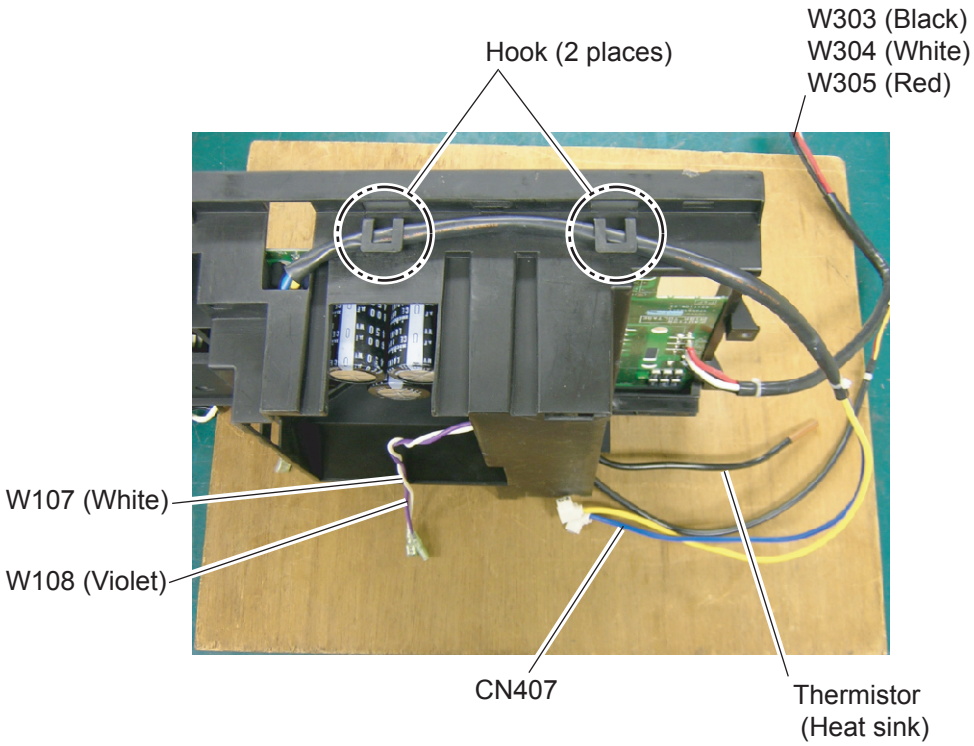


Fig. 5

▪ As shown in Fig.6, pull out the wires.

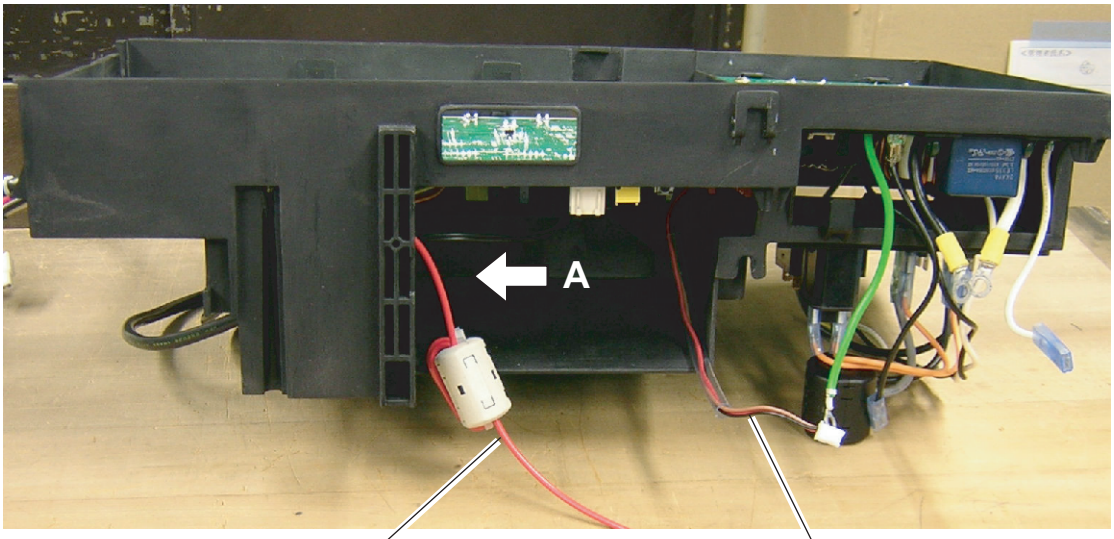
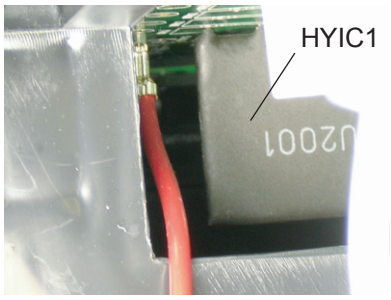


Fig. 6



Don't come in contact with HYIC1.

VIEW - A

▪ As shown in Fig.7, connect wires.

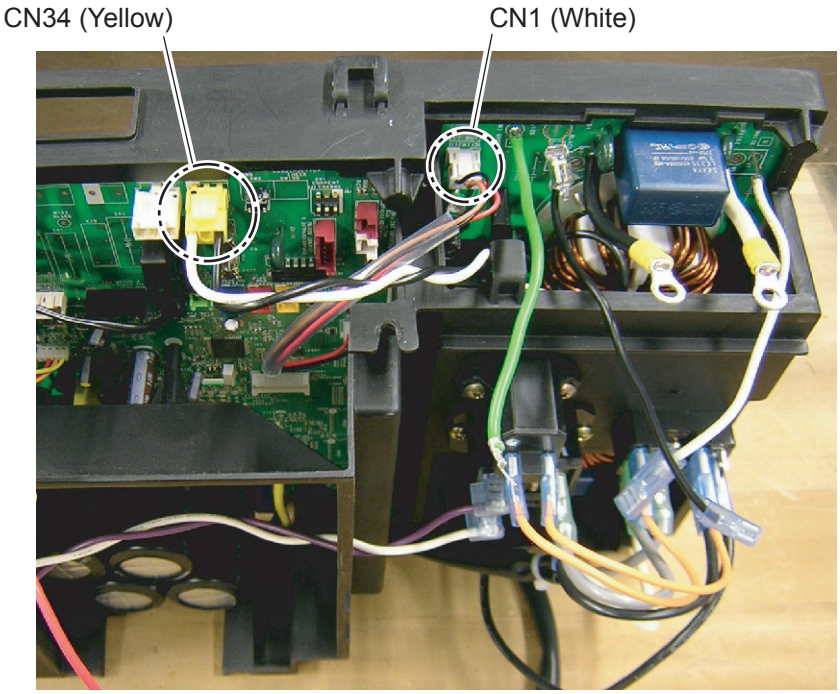


Fig. 7

▪ As shown in Fig.8, connect wires.

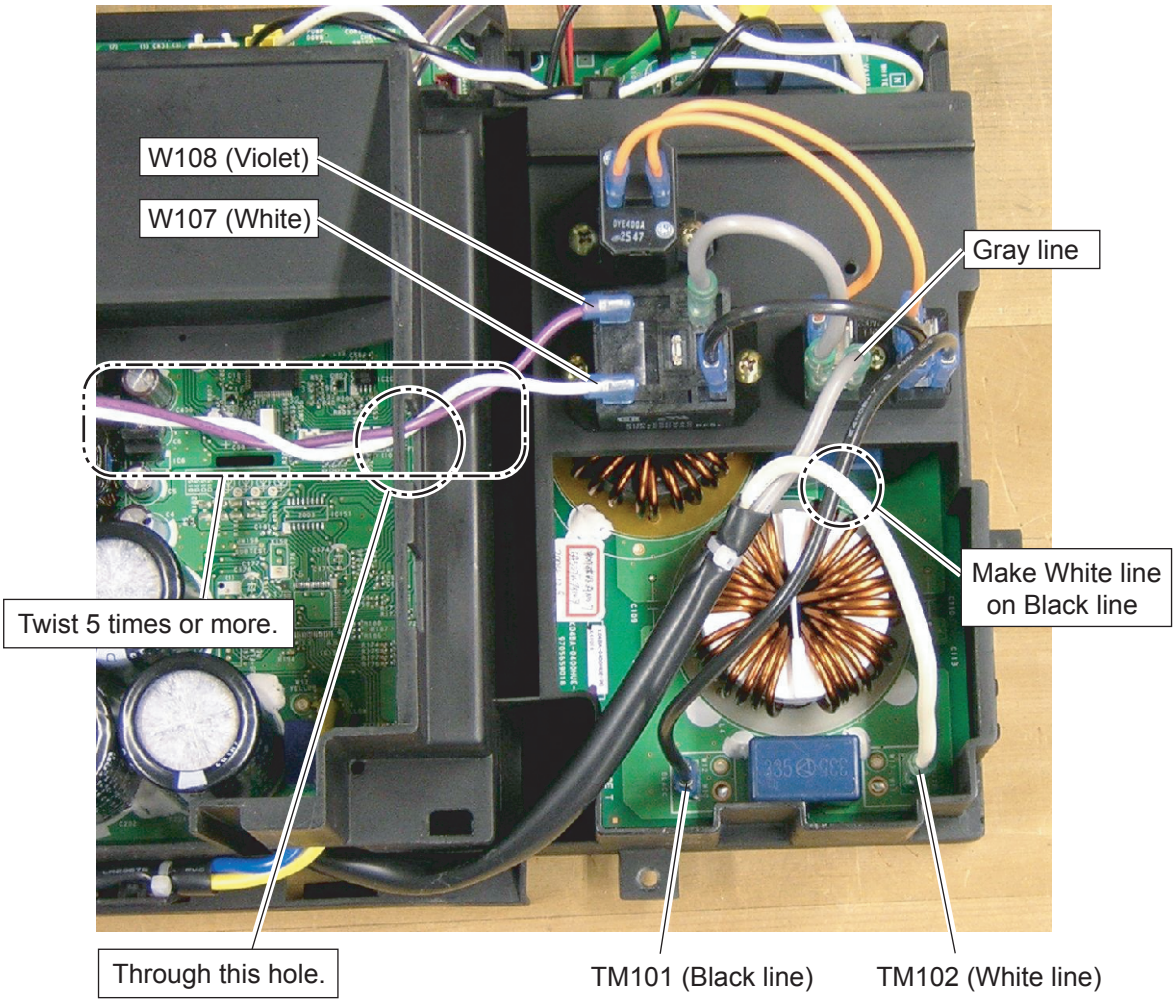


Fig. 8

▪ As shown in Fig.9, fix the wire to INVERTER BOX A.

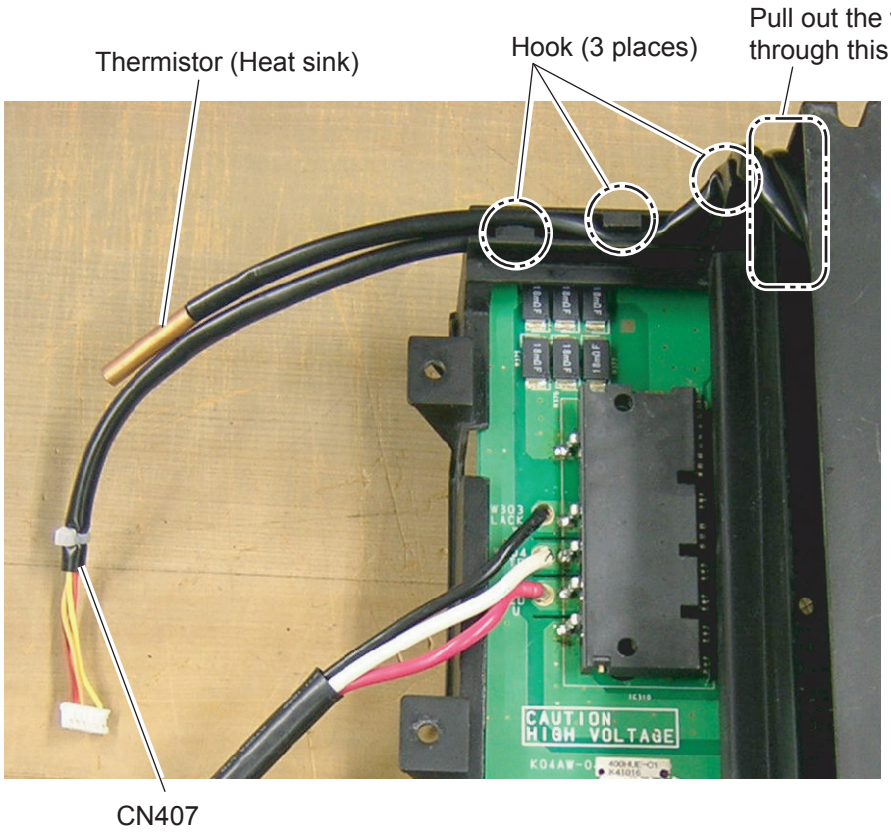


Fig. 9

▪ As shown in the figures, set wire with connector and bind it to INVERTER BOX A.

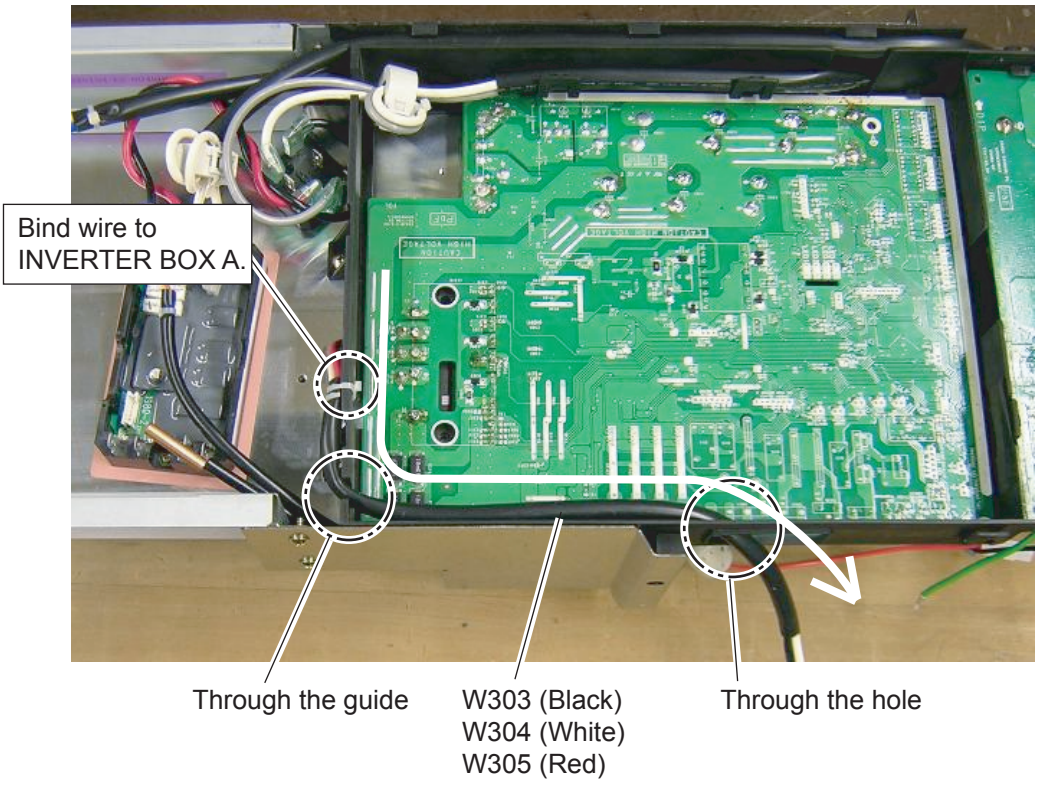


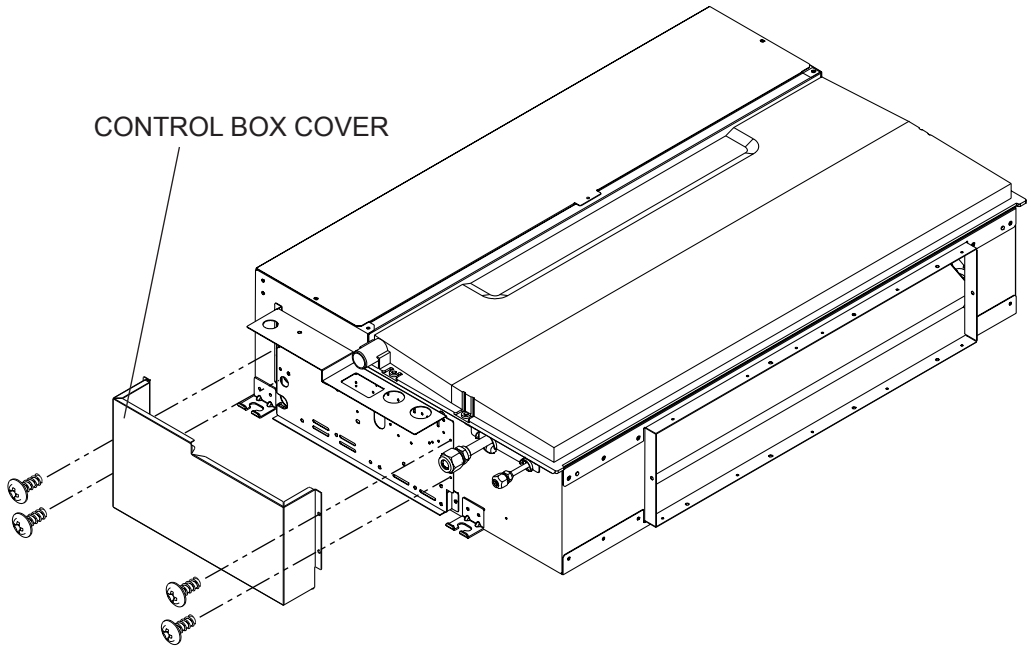
Fig. 10

2. REPLACEMENT PARTS (For INDOOR UNIT)

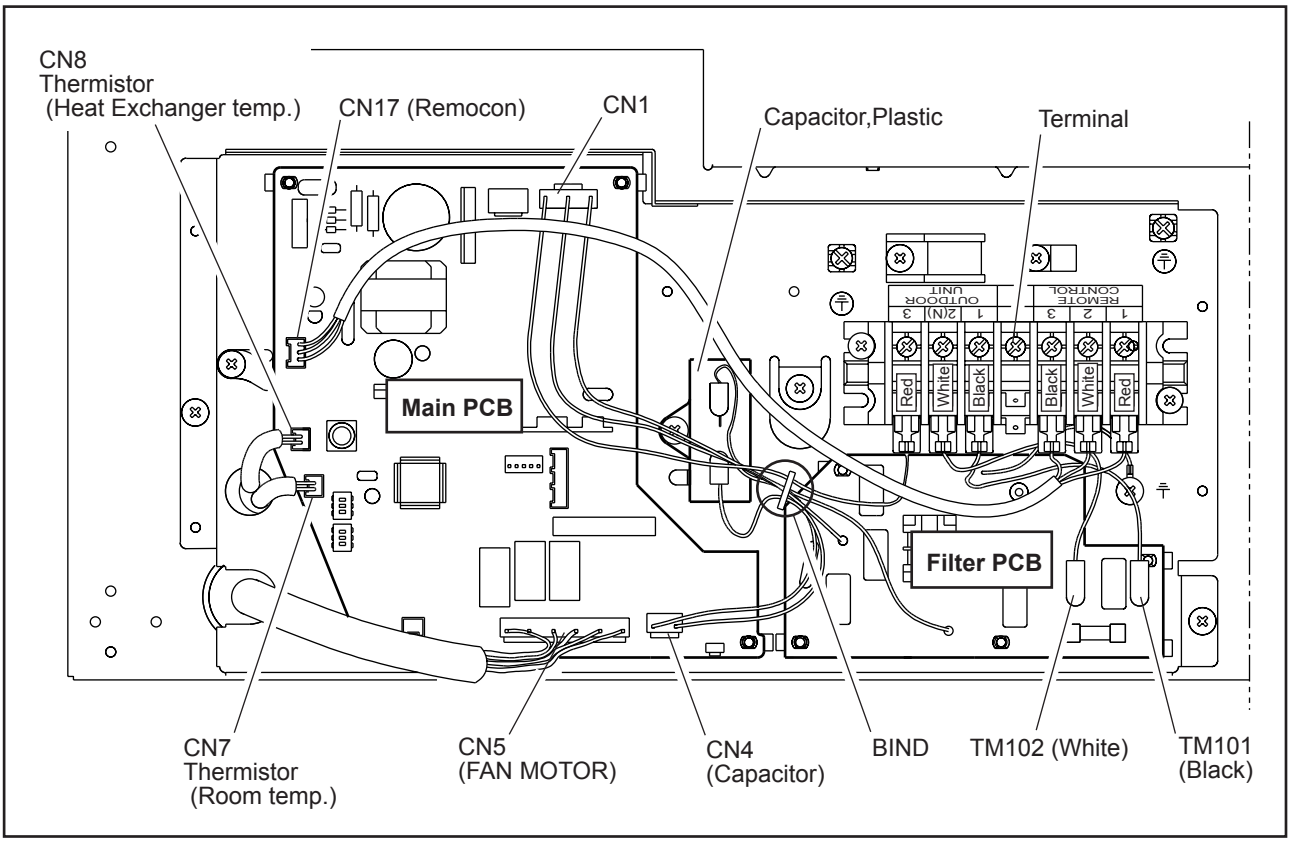
2-1 PARTS LAYOUT DRAWING (For AR*18LUAD)

1. CONTROL BOX COVER removal

- Remove the 4 mounting screws.
- Remove the CONTROL BOX COVER.

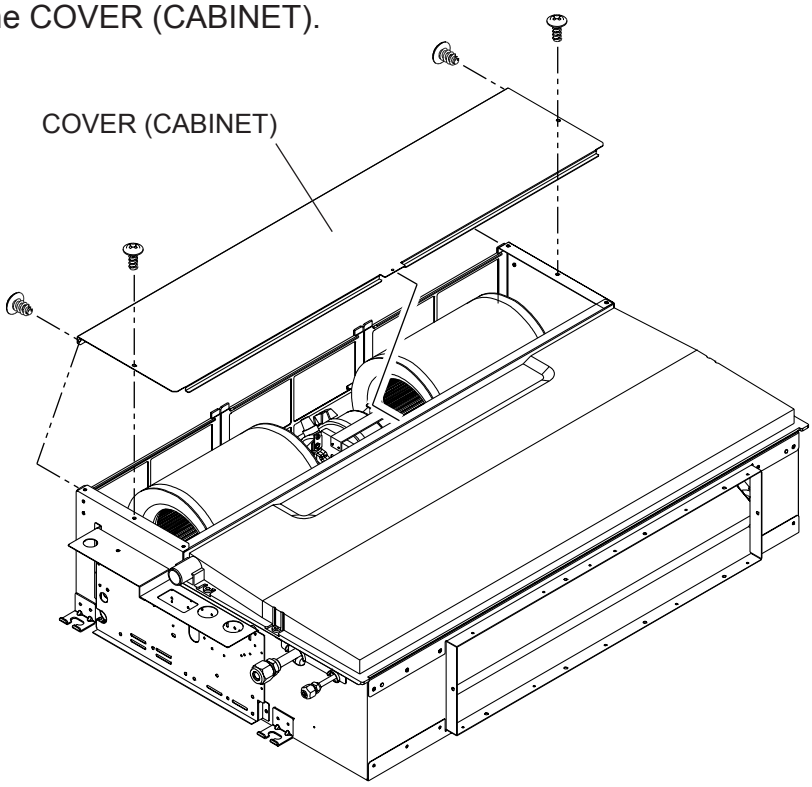


2. Wiring and Parts layout



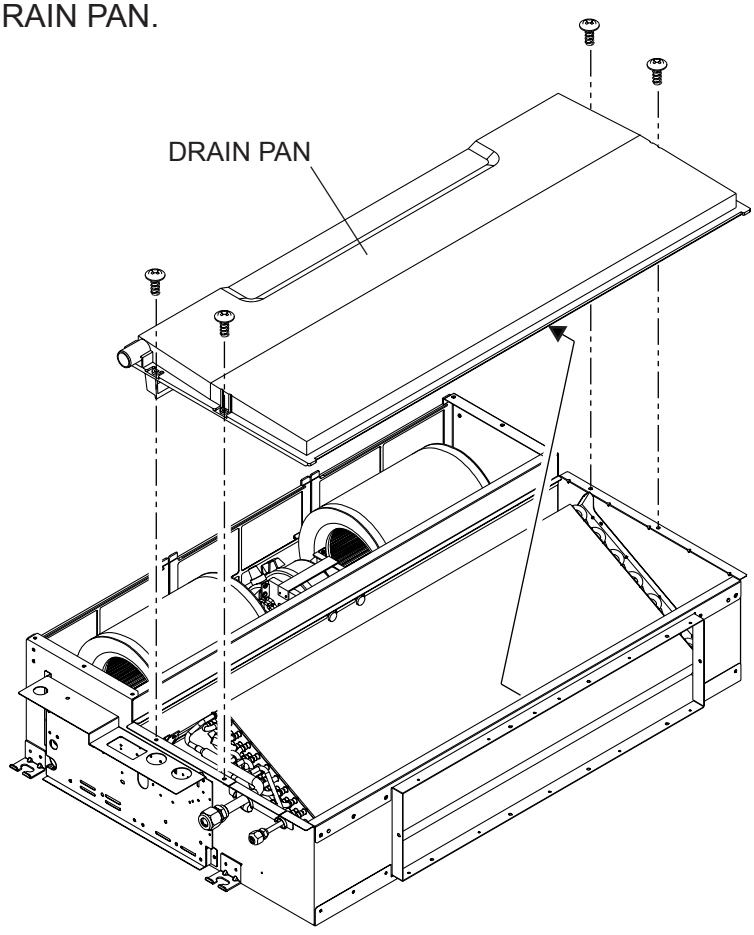
3. COVER (CABINET) removal

- Remove the 4 mounting screws.
- Remove the COVER (CABINET).



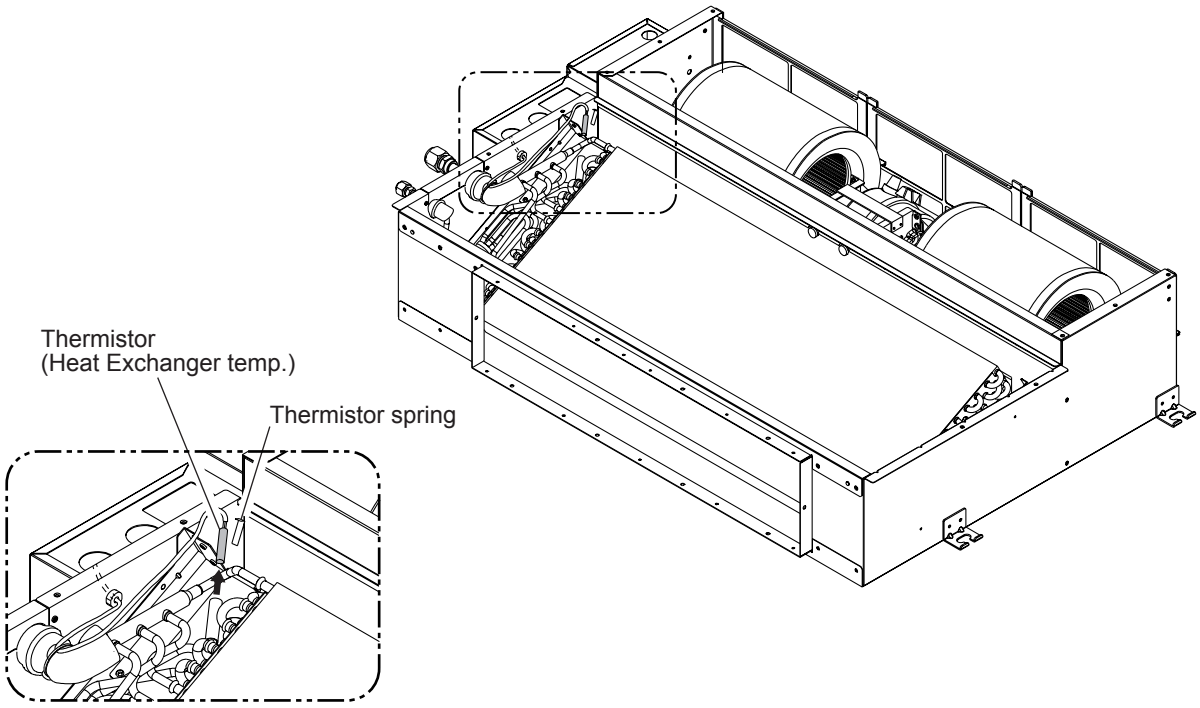
4. DRAIN PAN removal

- Remove the 4 mounting screws.
- Remove the DRAIN PAN.



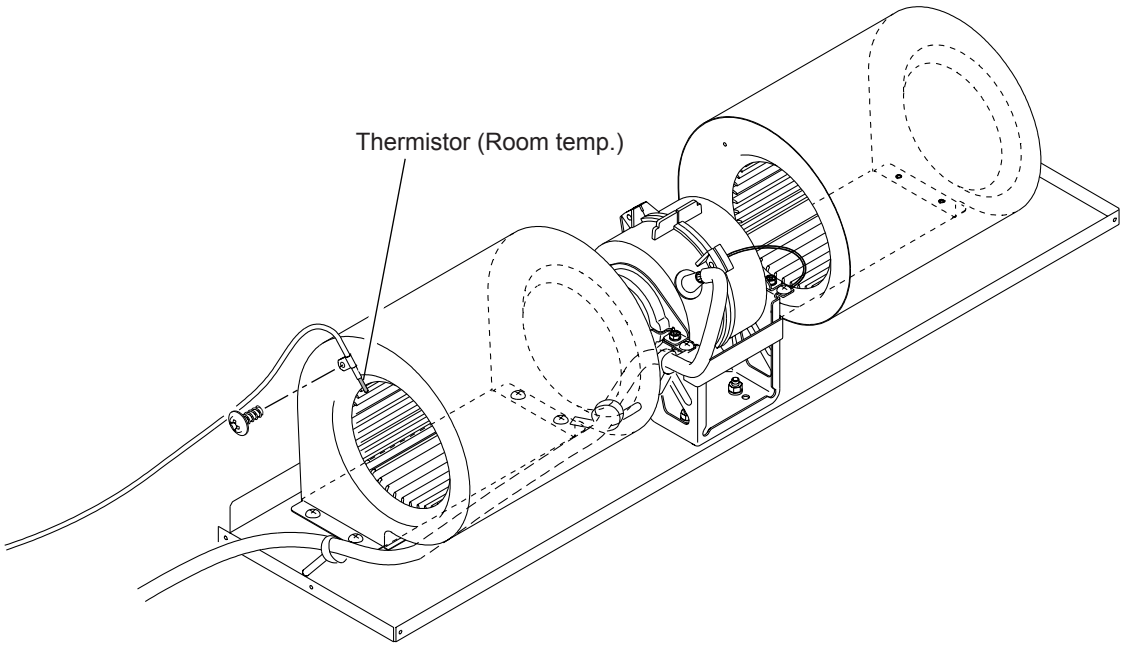
5. THERMISTOR removal

- Remove the Thermistor (Heat Exchanger temp.).



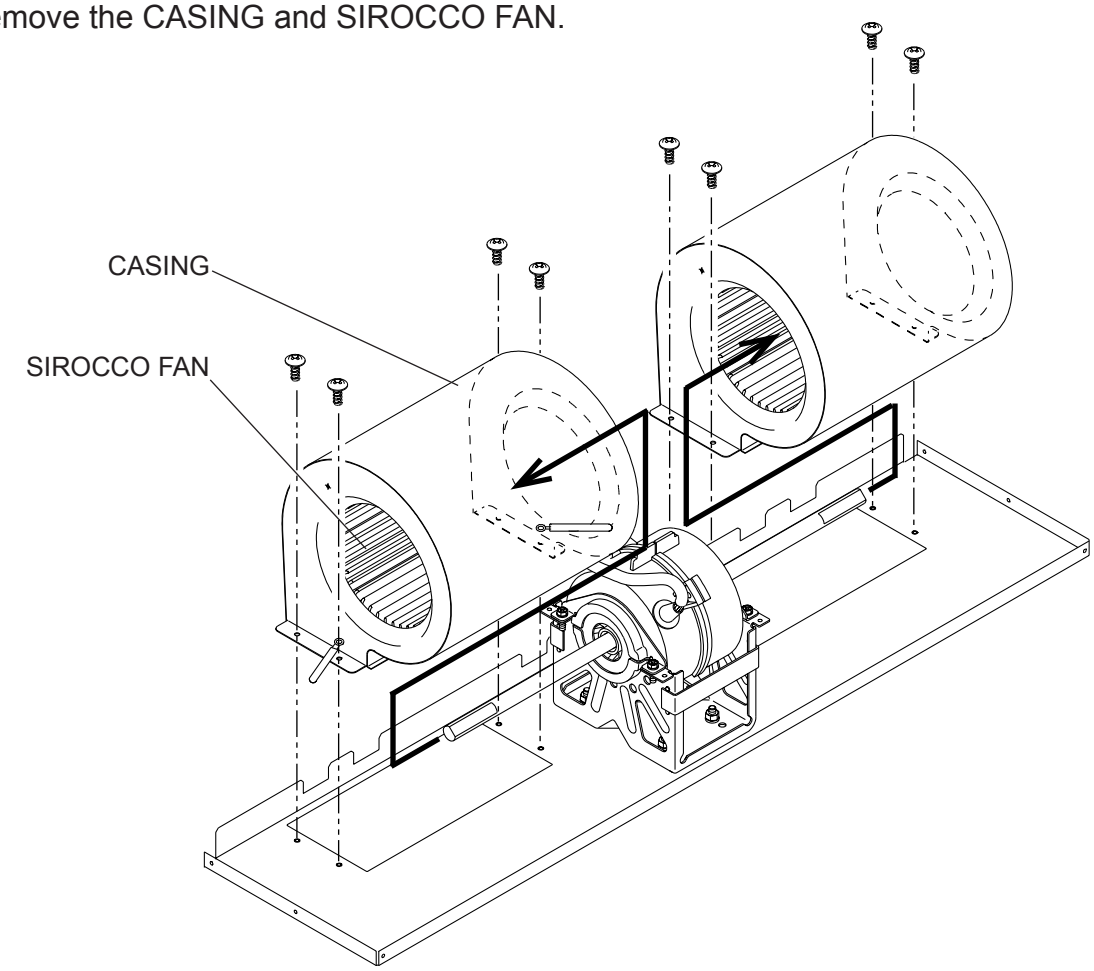
Detail View

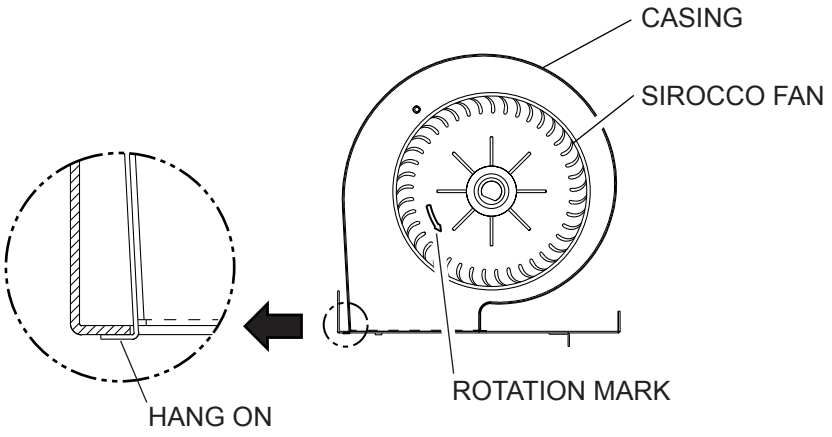
- Remove the 1 mounting screw.
- Remove the Thermistor (Room temp.).

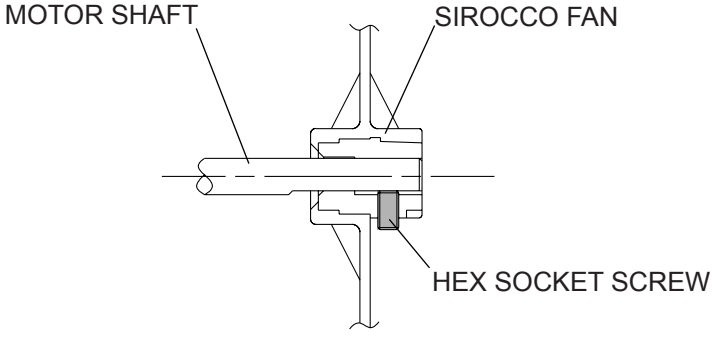


6. CASING & SIROCCO FAN removal

- Remove the 2 Hex socket screws.
- Remove the 8 mounting screws.
- Remove the CASING and SIROCCO FAN.

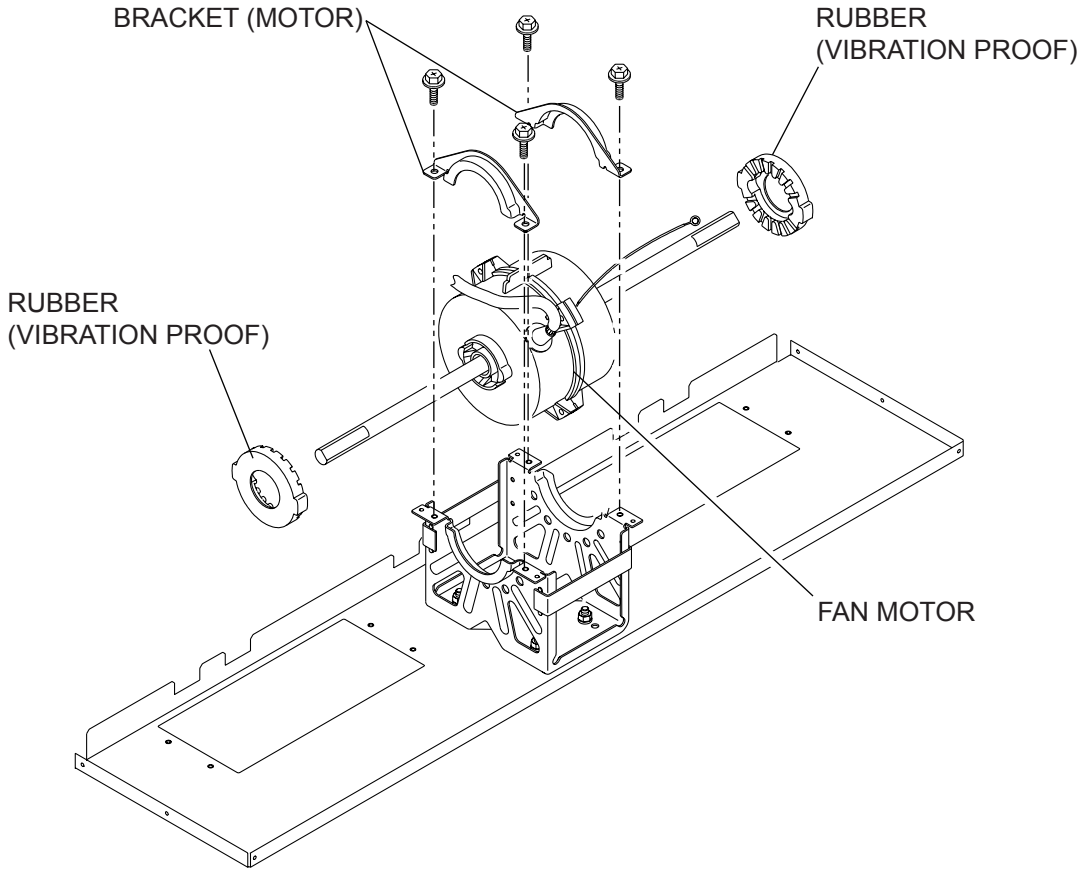






7. FAN MOTOR removal

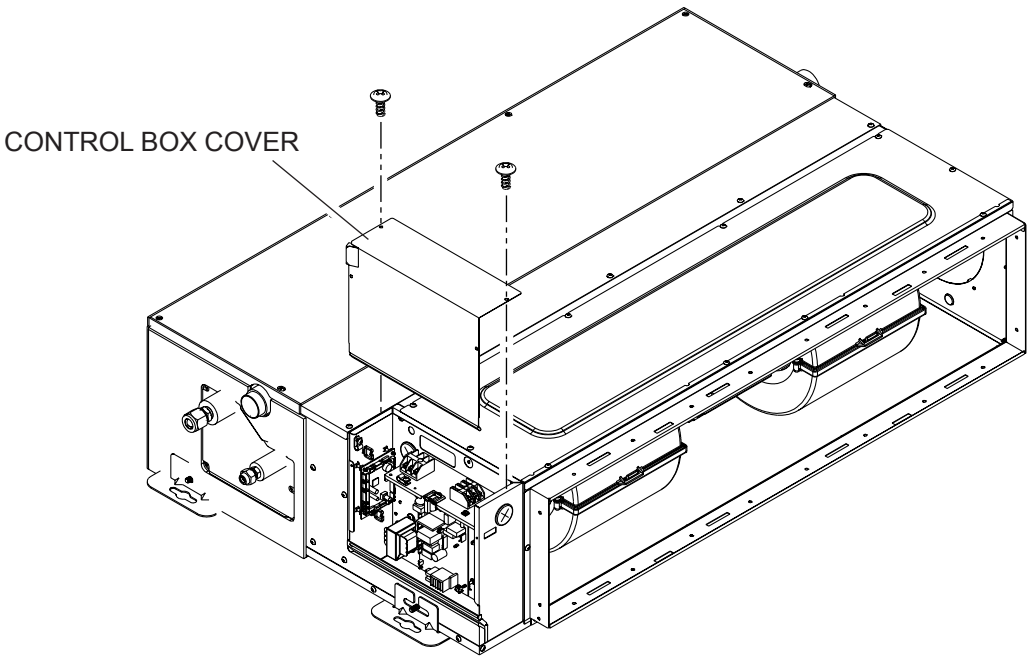
- Remove the 4 mounting bolts.
- Remove the FAN MOTOR.



2-2 PARTS LAYOUT DRAWING (For AR*24/ 30/ 36/ 45LUAN)

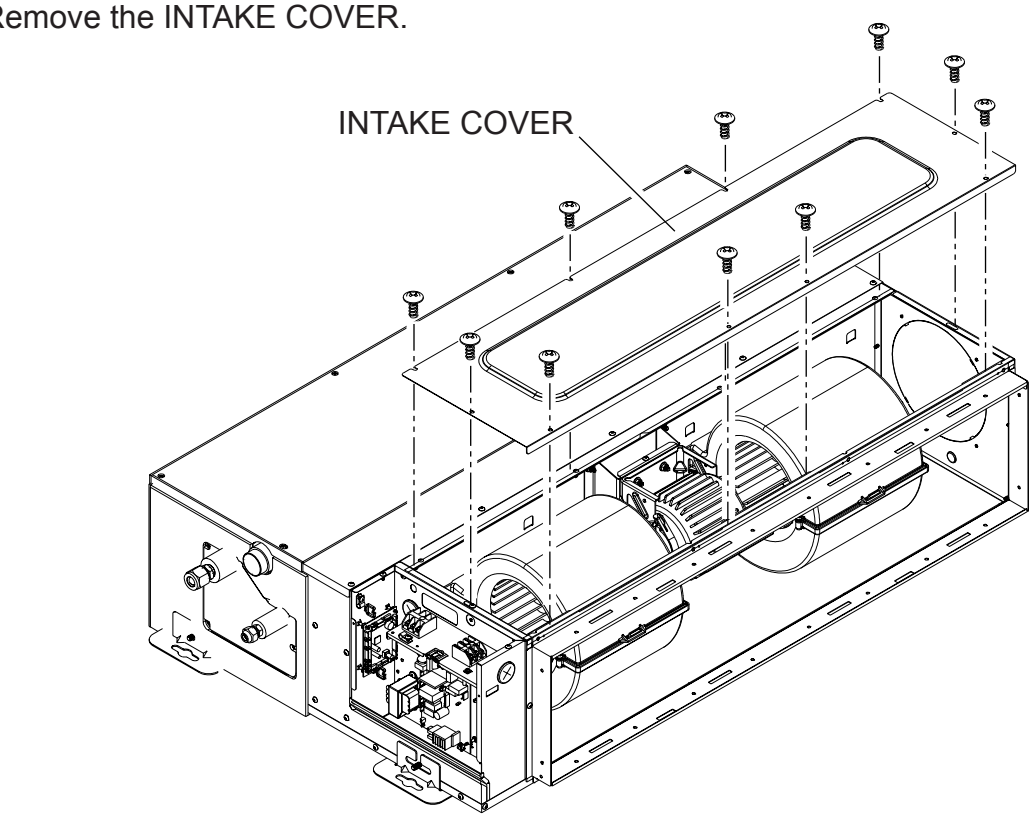
1. CONTROL BOX COVER removal

- Remove the 2 mounting screws.
- Remove the CONTROL BOX COVER.



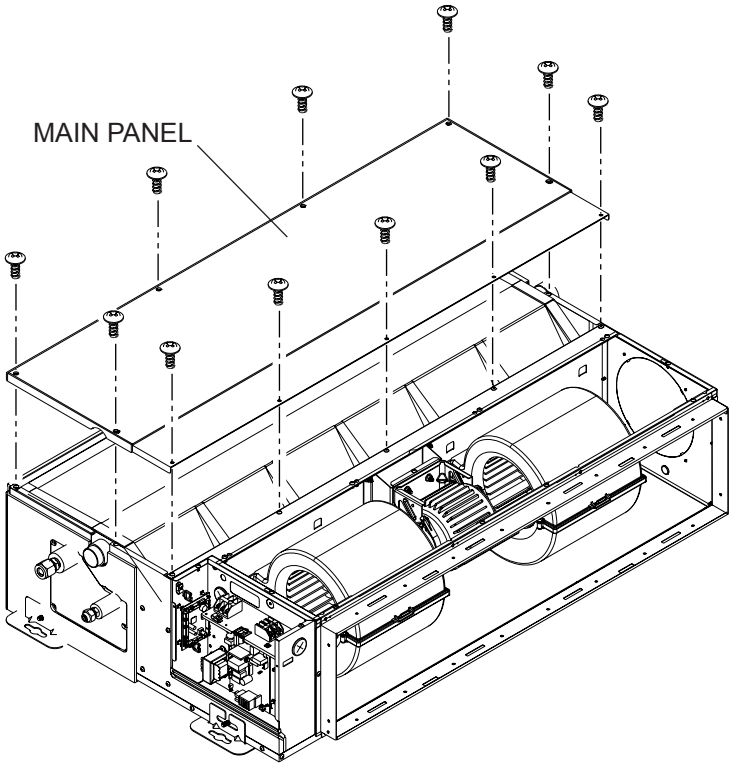
2. INTAKE COVER removal

- Remove the 10 mounting screws.
- Remove the INTAKE COVER.



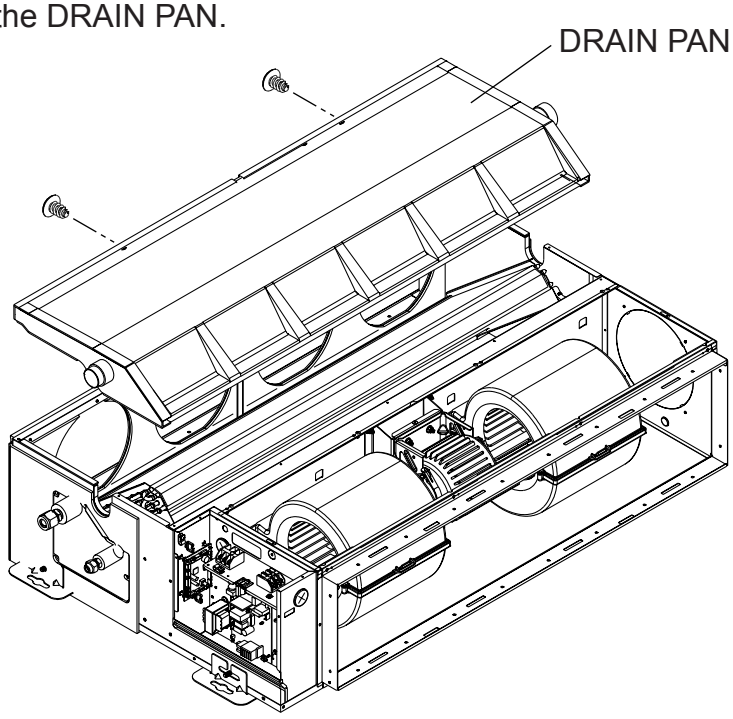
3. MAIN PANEL removal

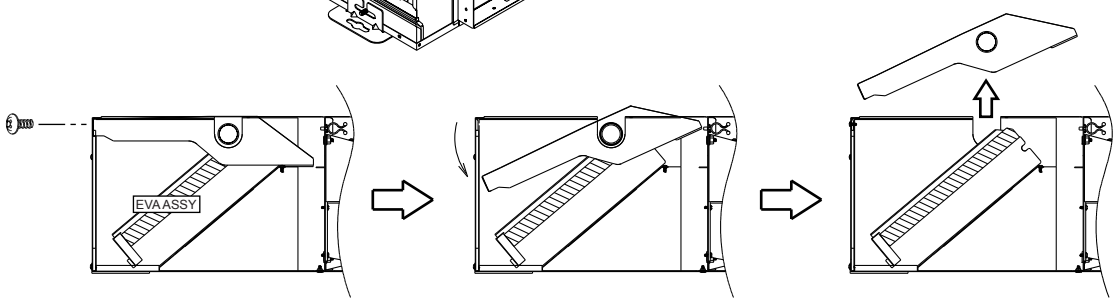
- Remove the 11 mounting screws.
- Remove the MAIN PANEL.



4. DRAIN PAN removal

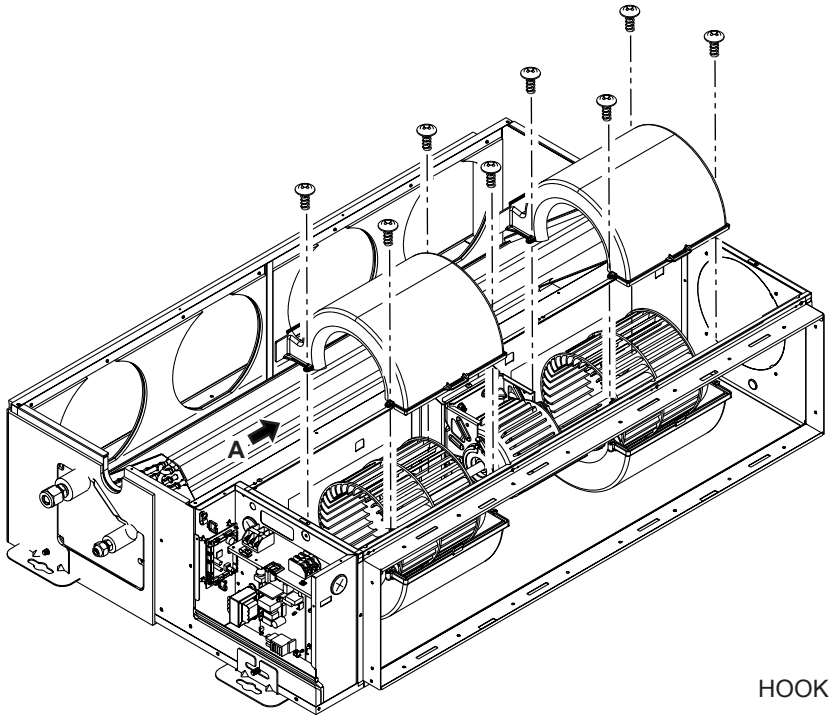
- Remove the 2 mounting screws.
- Remove the DRAIN PAN.

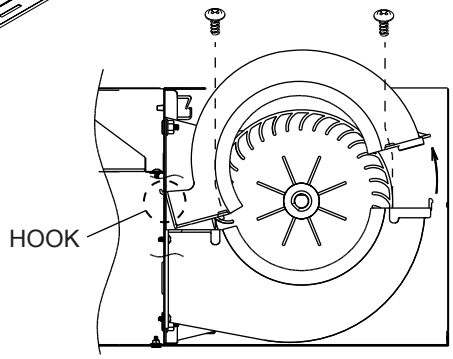




5. CASING A removal

- Remove the 8 mounting screws.
- Remove the CASING A.

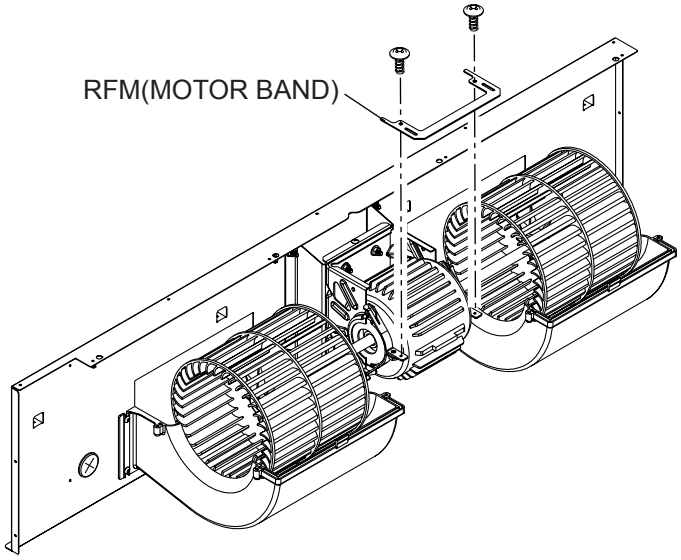




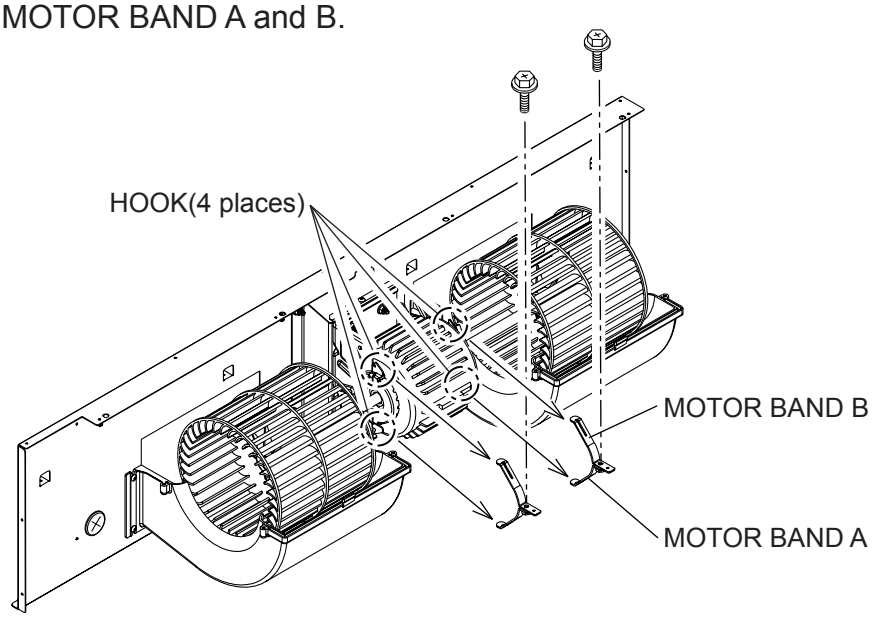
VIEW A

6. FAN MOTOR removal

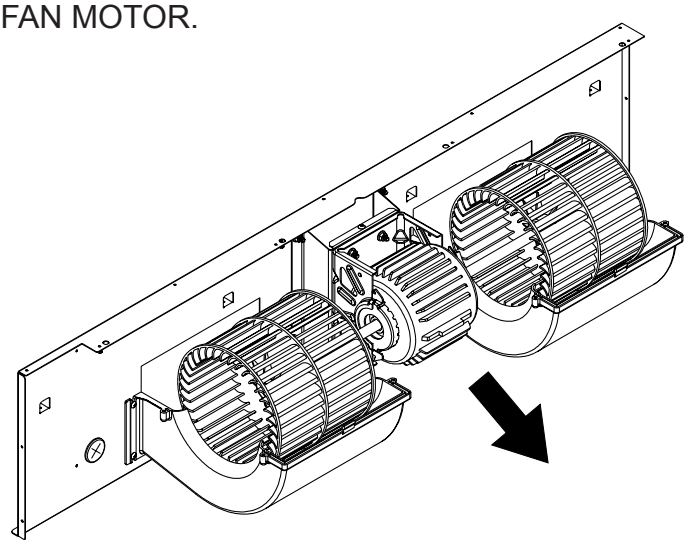
- Remove the 2 mounting screws.
- Remove the RFM(MOTOR BAND).



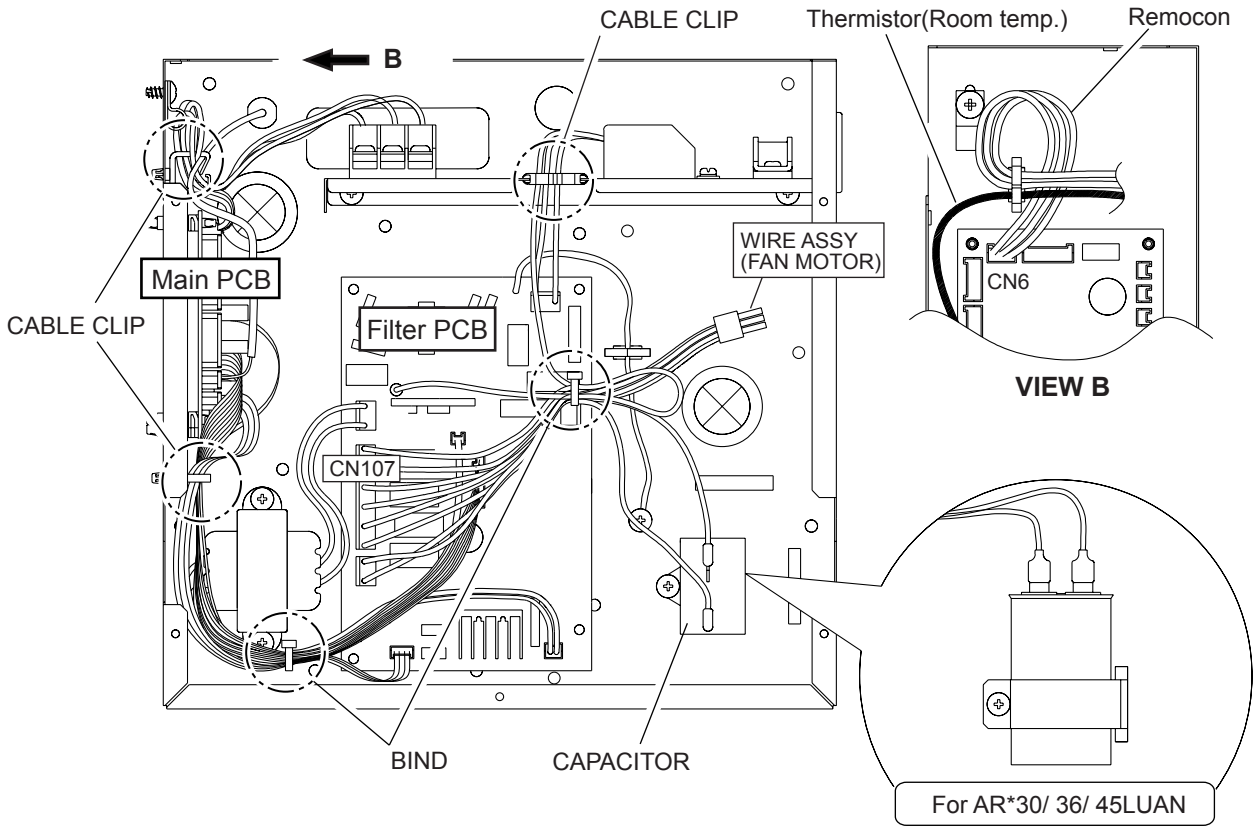
- Remove the 2 mounting bolts.
- Remove the MOTOR BAND A and B.

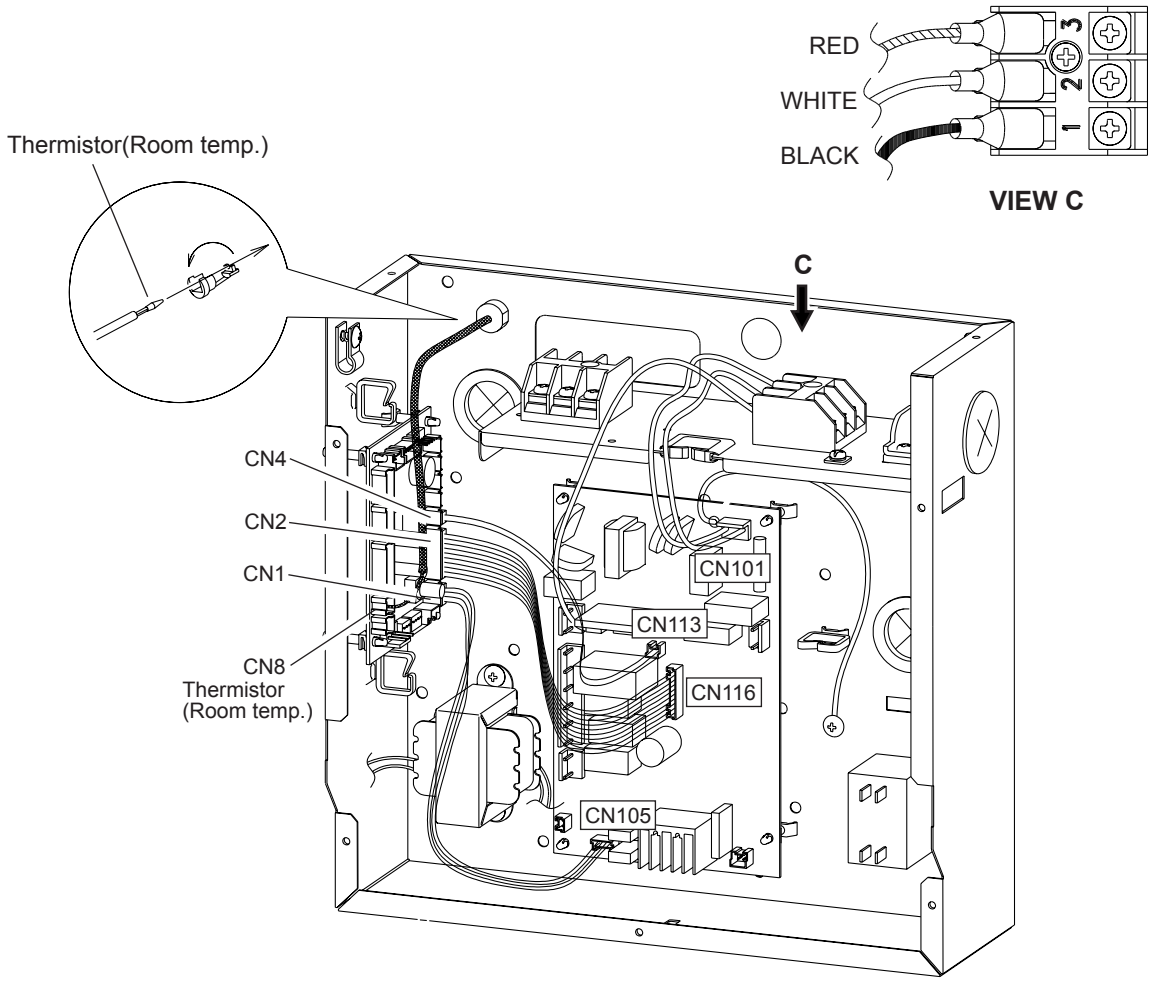


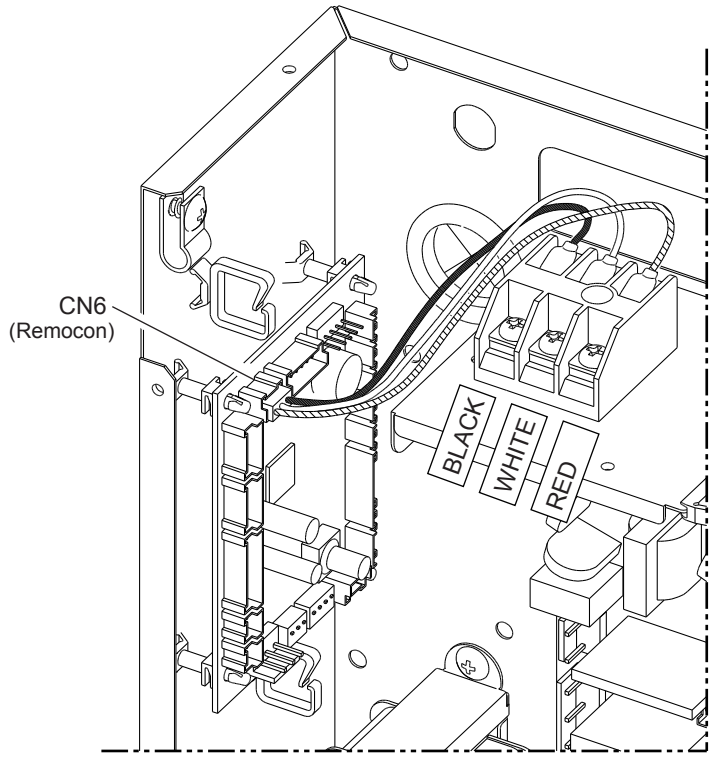
- Remove the FAN MOTOR.

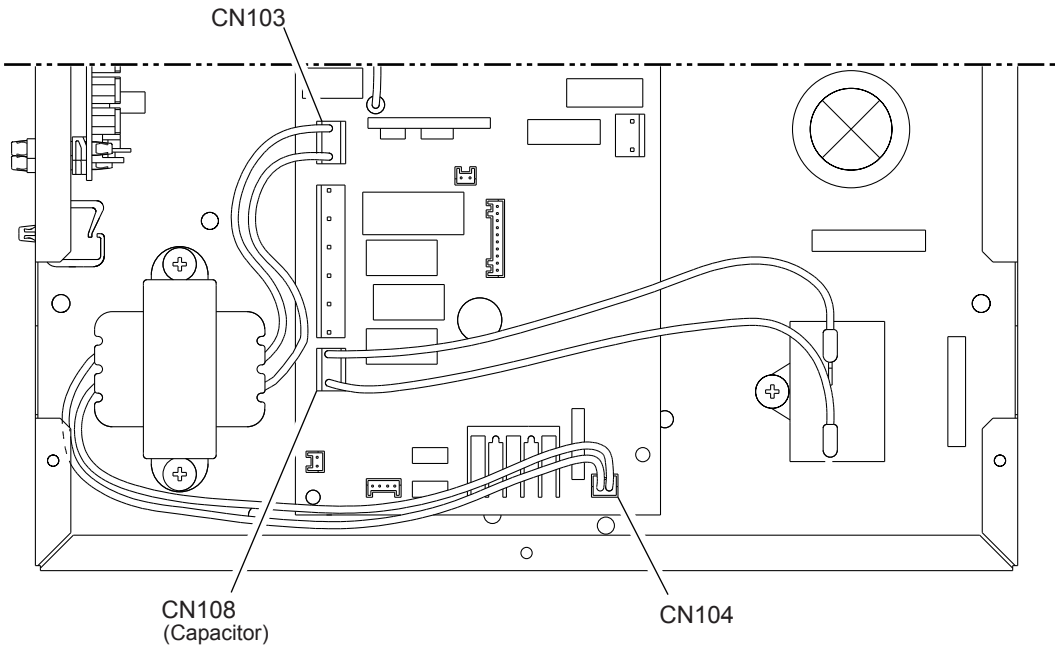


7. Wiring and Parts layout





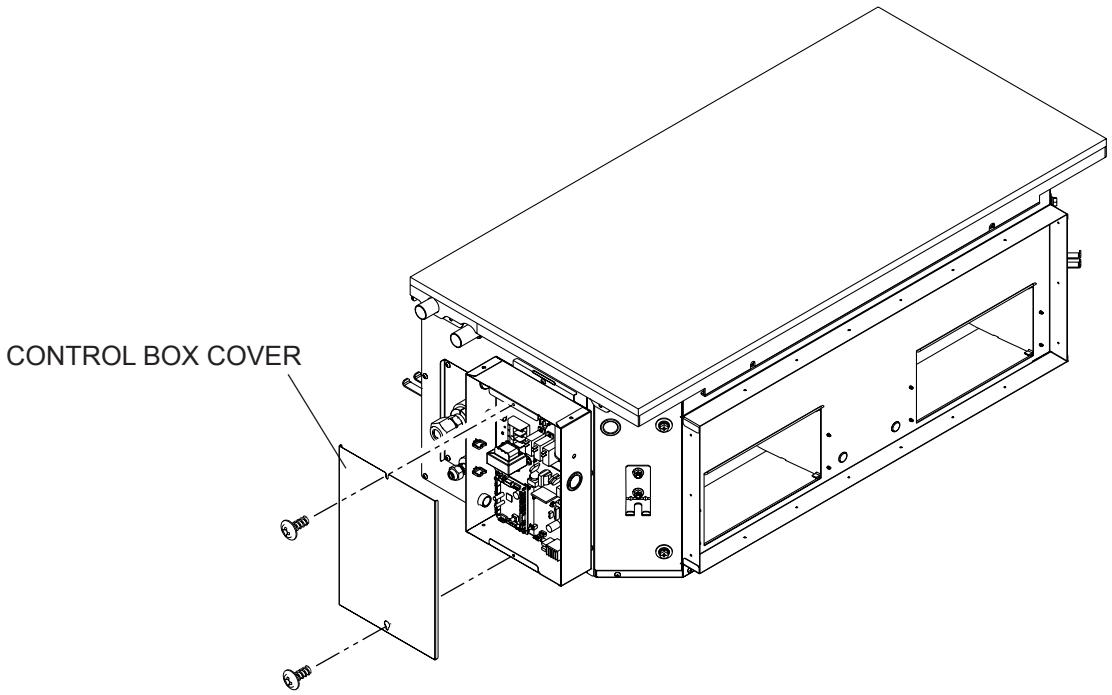

CN6
(Remocon)
BLACK
WHITE
RED


CN103
CN108
(Capacitor)
CN104

2-3 PARTS LAYOUT DRAWING (For AR*45/ 54LUAK)

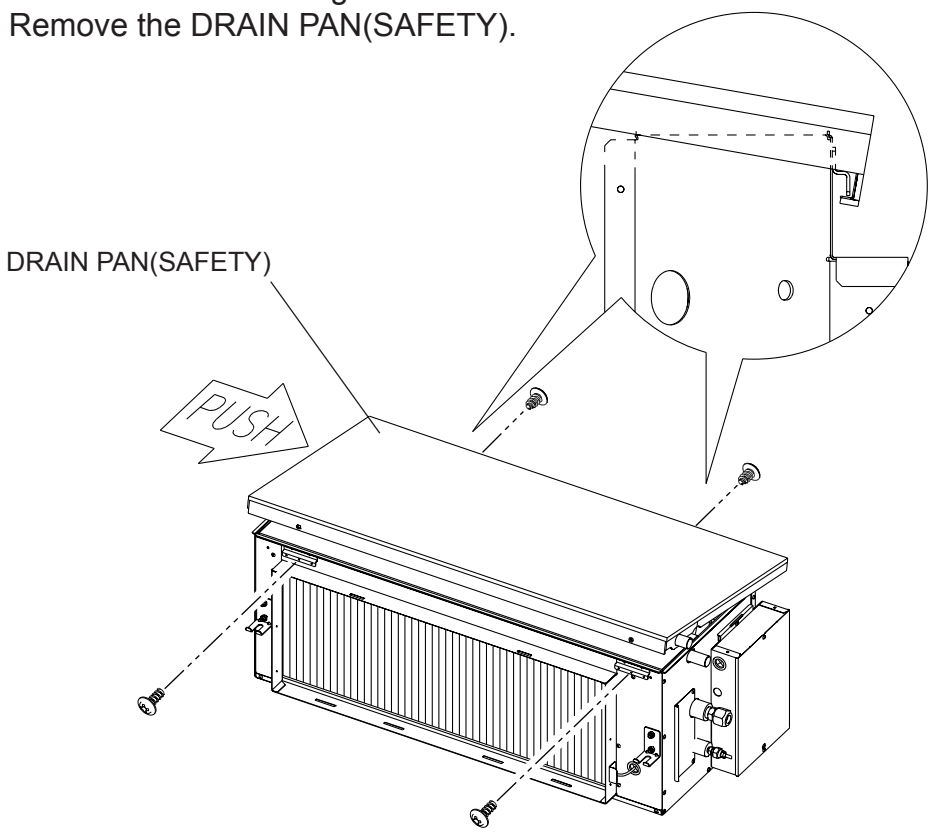
1. CONTROL BOX COVER removal

- Remove the 2 mounting screws.
- Remove the CONTROL BOX COVER.



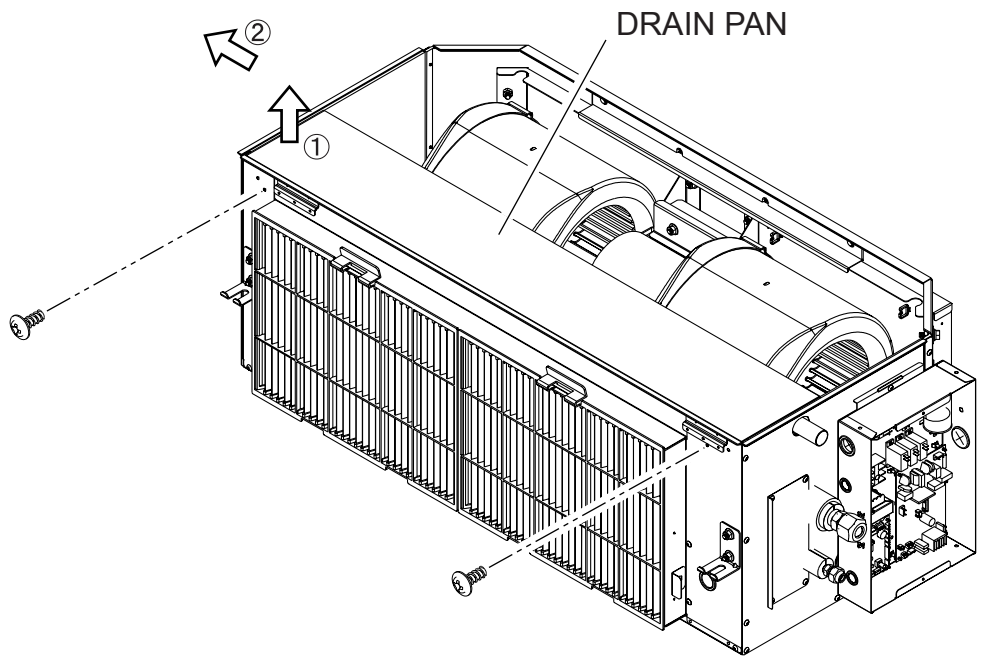
2. DRAIN PAN(SAFETY) removal

- Remove the 4 mounting screws.
- Remove the DRAIN PAN(SAFETY).



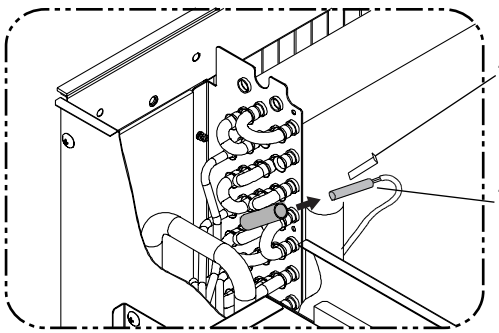
3. DRAIN PAN removal

- Remove the 2 mounting screws.
- Remove the DRAIN PAN.

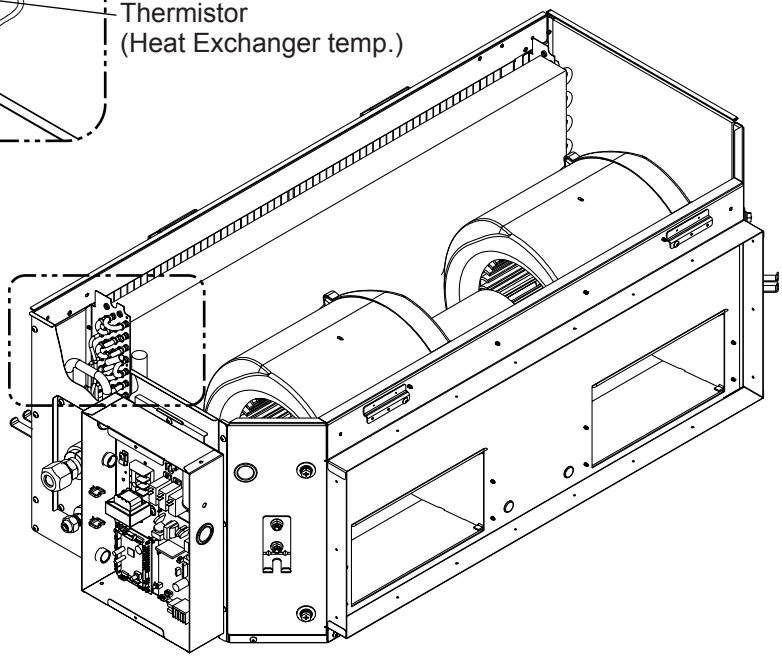


4. THERMISTOR removal

- Remove the Thermistor (Heat Exchanger temp.).

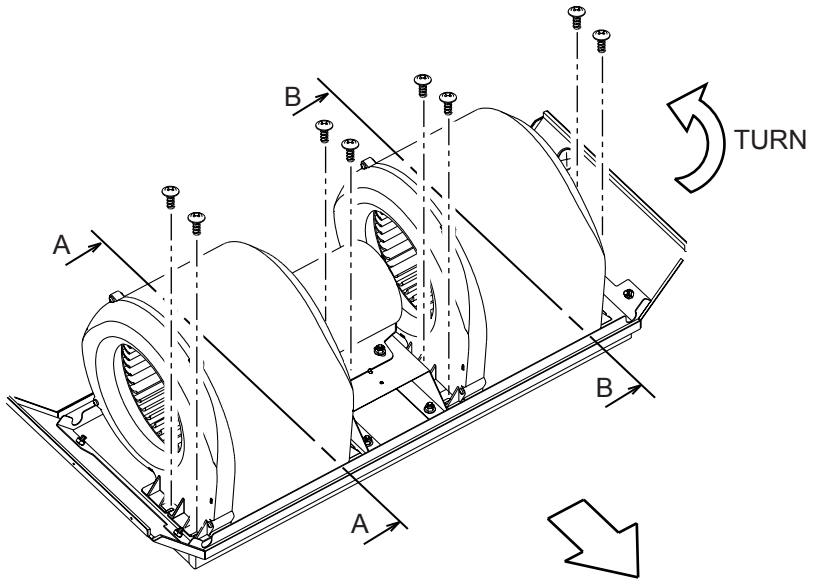


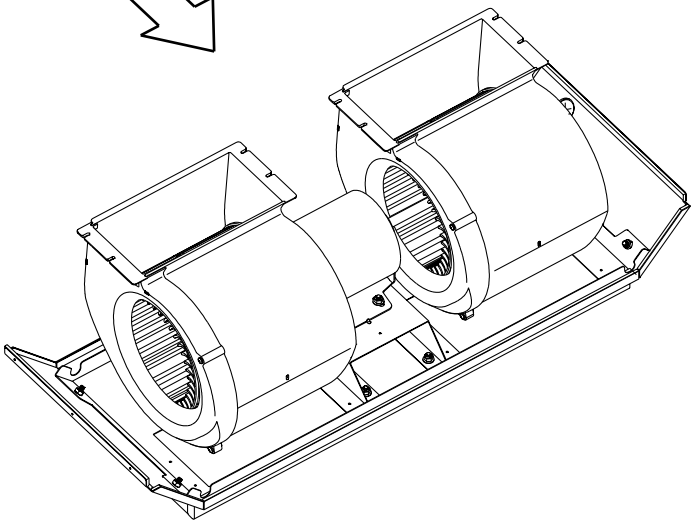
Detail View

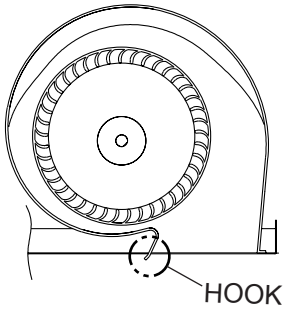


6. CASING & SIROCCO FAN removal

▪ Remove the 8 mounting screws.

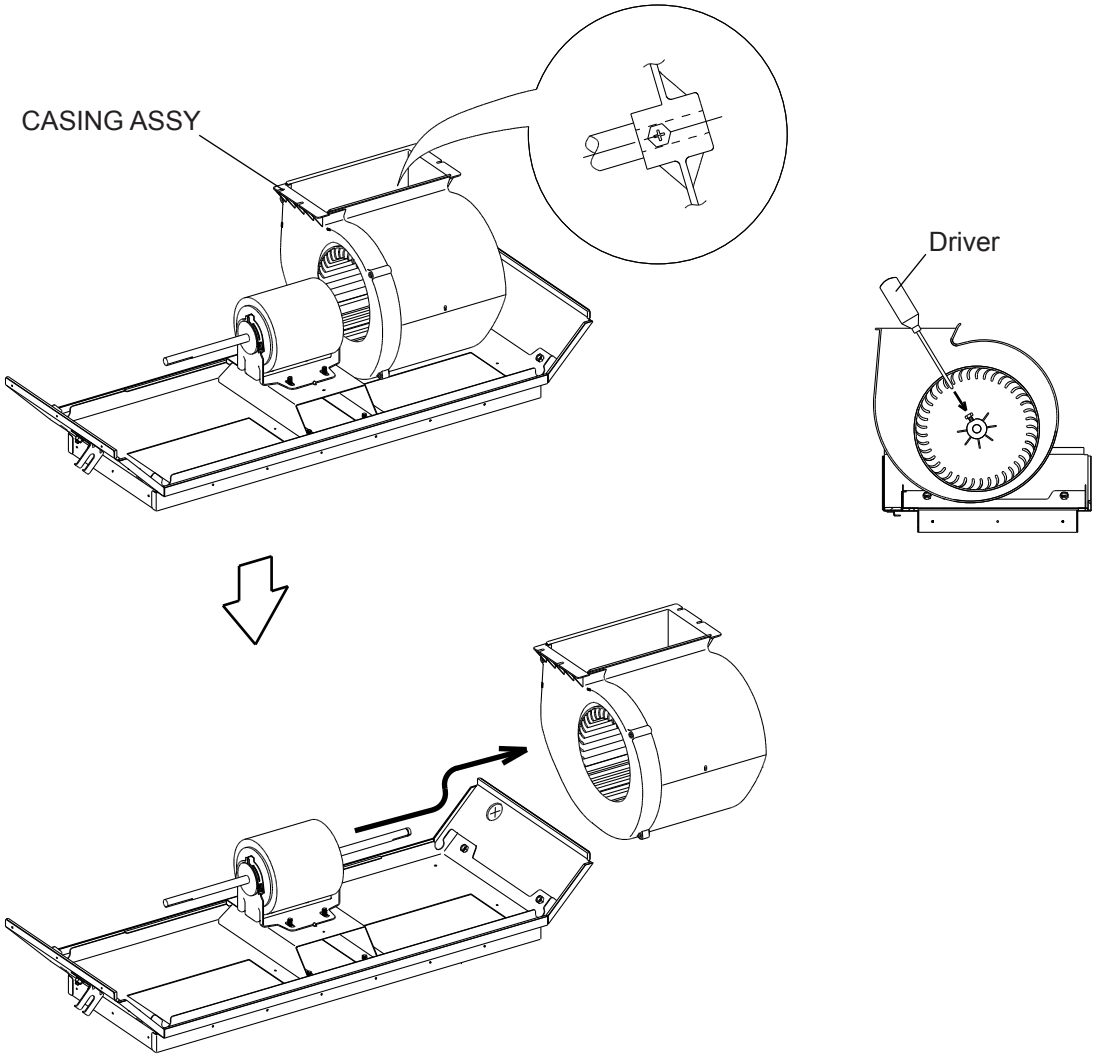




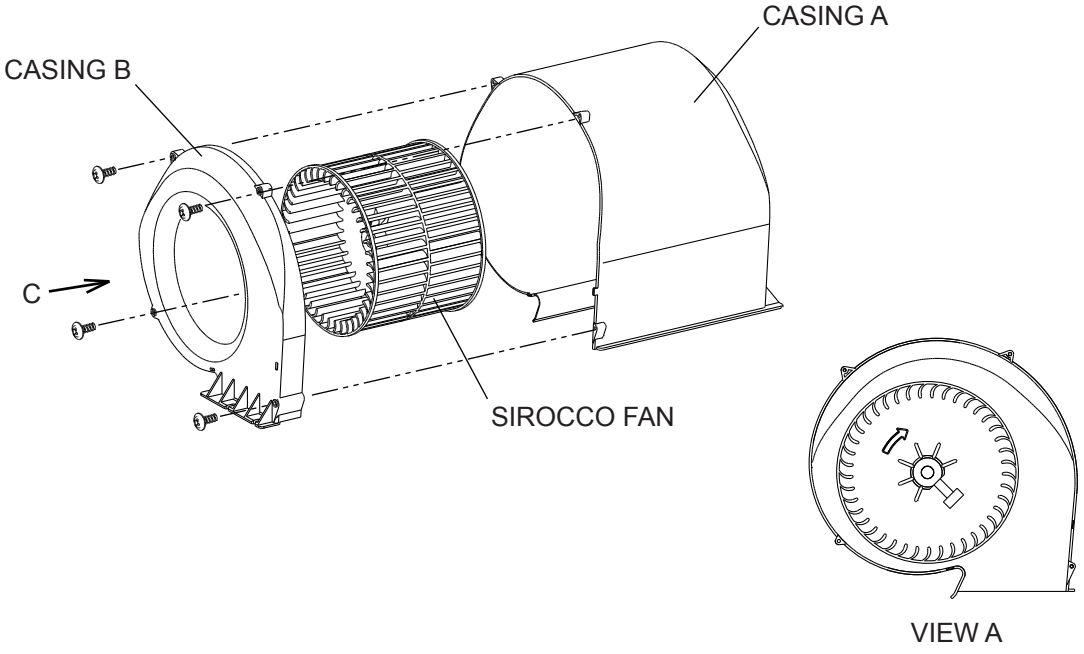


SECTION A-A / B-B

- Remove the 2 mounting screws.
- Remove the CASING ASSY.

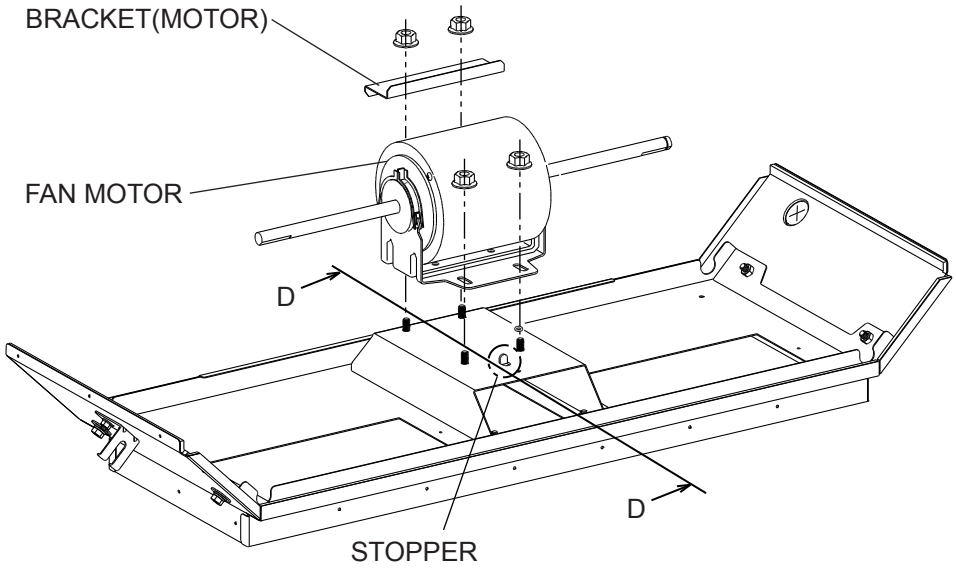


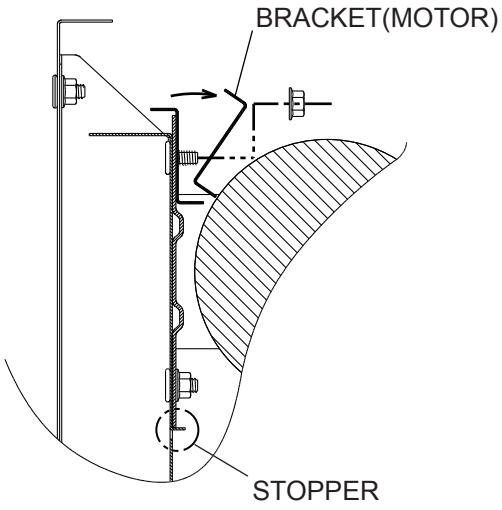
- Remove the 8 mounting screws.
- Remove the SIROCCO FAN.



7. FAN MOTOR removal

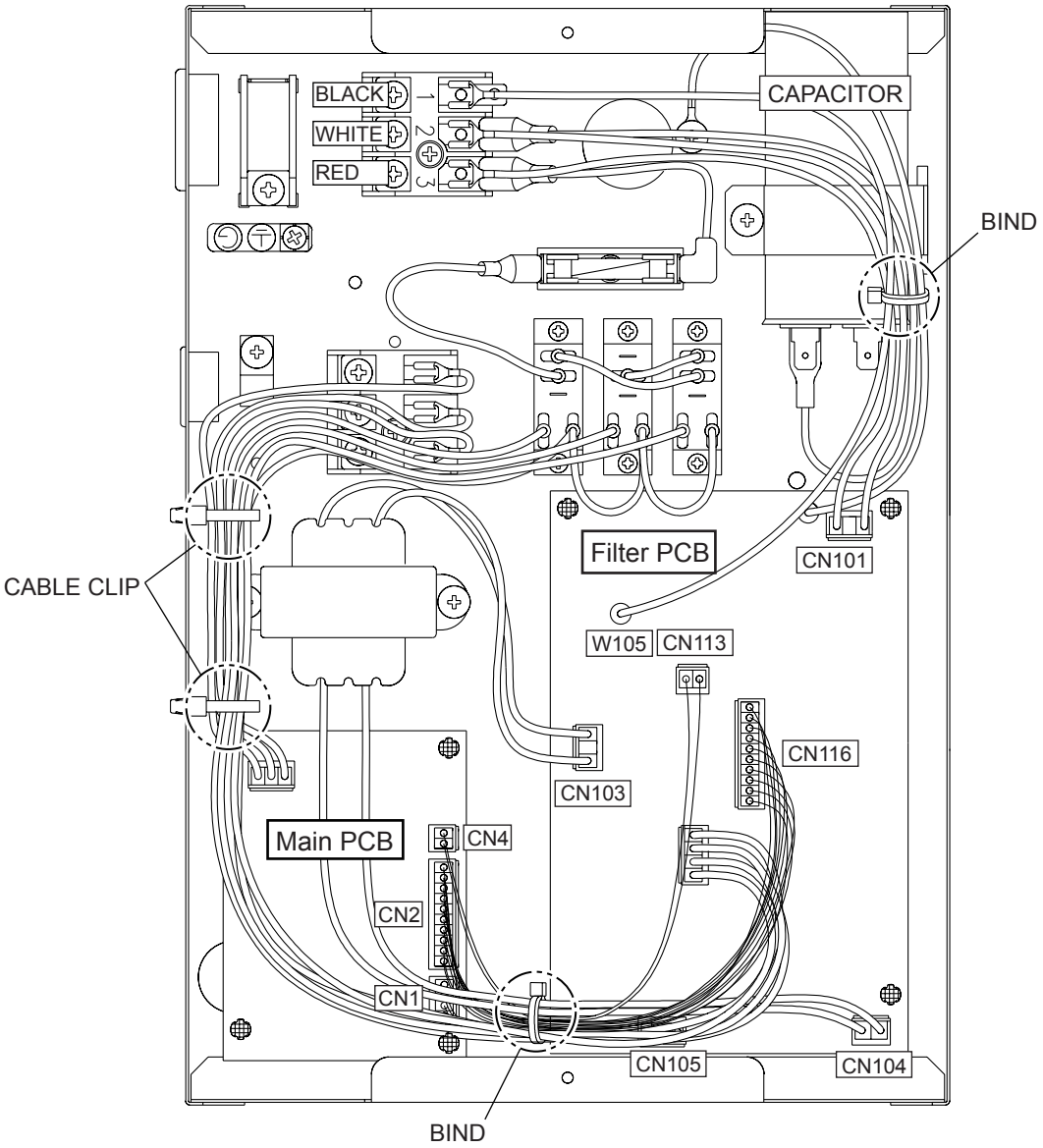
- Remove the 4 mounting nuts.
- Remove the BRACKET(MOTOR).
- Remove the FAN MOTOR.

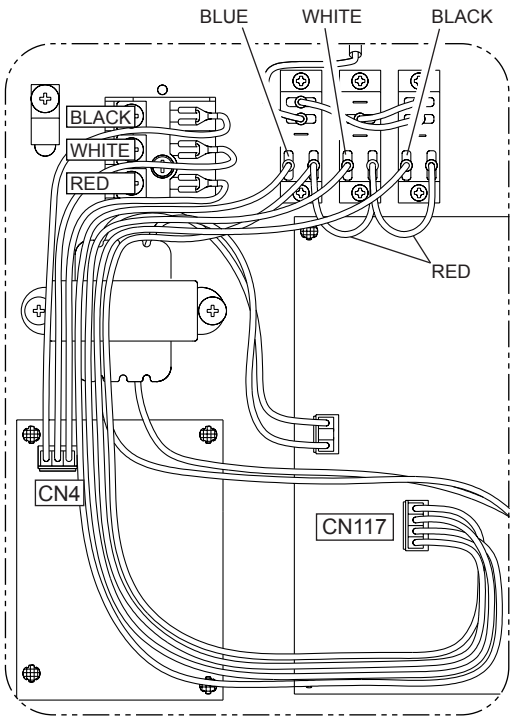


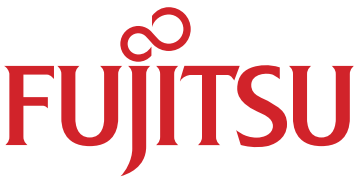


SECTION D-D

8. Wiring and Parts layout







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