



M-SERIES

Air Conditioners

SVZ-KP12,18, 24, 30, 36 NA

SERVICE MANUAL

Table of Contents

1. Safety Precautions	3
1.1. Always observe for safety	3
1.2. Cautions related to R410A refrigerant	3
2. Part Names and Functions	5
3. Specifications	6
4. Fan Performance and Corrected Airflow	8
5. Sound Pressure Levels	17
5.1. Sound pressure level	17
5.2. NC Curves	18
6. Dimensions	23
7. Wiring Diagram	25
8. Refrigerant System Diagram	27
9. Heater Control	28
9.1. Control specifications and function setting	28
9.2. Fan control	31
9.3. CN24RELAY-KIT-CM3 (Optional Parts) installation	32
10. Humidifier	34
11. ERV (Energy Recovery Ventilation)	35
12. Troubleshooting	36
12.1. Cautions on troubleshooting	36
12.2. Self-check	36
12.2.1. Auto restart function	38
12.2.2. Function table	38
12.3. Self-diagnosis action table	40
12.4. Troubleshooting by inferior phenomena	45
12.5. Test point diagram	46
12.5.1. Power supply board	46
12.5.2. Indoor controller board	47
12.6. Trouble criterion of main parts	48
12.7. Thermistor	49
12.8. DC Fan motor (fan motor/indoor controller board)	50
12.8.1. DC Fan motor measuring points	51
12.9. Functions of DIP switch and jumper wire	51
13. Disassembly Procedure	53

1. Safety Precautions

Always observe for safety!

Before obtaining access to terminal, all supply circuits must be disconnected.

1.1. Always observe for safety

1.2. Cautions related to R410A refrigerant

Cautions for units utilizing refrigerant R410A

Make sure that the inside and outside of refrigerant piping is clean and it has no contamination such as sulfur hazardous for use, oxides, dirt, shaving particles, etc. In addition, use pipes with specified thickness.

Contamination inside refrigerant piping can cause deterioration of refrigerant oil etc.

Store the piping to be used indoors during installation and both ends of the piping sealed until just before brazing. (Leave elbow joints, etc. in their packaging.)

If dirt, dust or moisture enters into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

Use ester oil, ether oil or alkylbenzene oil (small amount) as the refrigerant oil applied to flares and flange connections.

If large amount of mineral oil enters, that can cause deterioration of refrigerant oil etc.

Charge refrigerant from liquid phase of gas cylinder.

If the refrigerant is charged from gas phase, composition change may occur in refrigerant and the efficiency will be lowered.

Do not use refrigerant other than R410A.

If other refrigerant (R22 etc.) is used, chlorine in refrigerant can cause deterioration of refrigerant oil etc.

Use a vacuum pump with a reverse flow check valve.

Vacuum pump oil may flow back into refrigerant cycle and that can cause deterioration of refrigerant oil etc.

Use the following tools specifically designed for use with R410A refrigerant.

The following tools are necessary to use R410A refrigerant.

Tools for R410A	
Gauge manifold	Flare tool
Charge hose	Size adjustment gauge
Gas leak detector	Vacuum pump adapter
Torque wrench	Electronic refrigerant charging scale

Handle tools with care.

If dirt, dust or moisture enters into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

Do not use charging cylinder.

If a charging cylinder is used, the composition of refrigerant will change and the efficiency will be lowered.

Ventilate the room if refrigerant leaks during operation.

If refrigerant comes into contact with flame, poisonous gases will be released.

[1] Cautions for service

1. Perform service after recovering the refrigerant left in unit completely.
2. Do not release refrigerant in the air.
3. After completing service, charge the cycle with specified amount of refrigerant.

[2] Additional refrigerant charge

When charging, charge in liquid phase only.

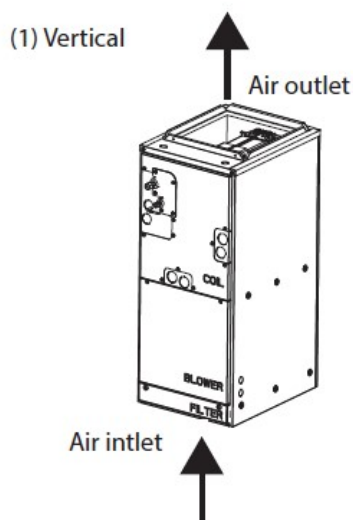
[3] Service tools

Use the below service tools as exclusive tools for R410A refrigerant.

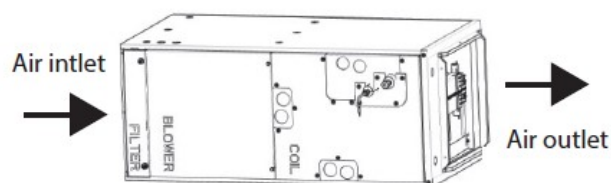
No.	Tool name	Specifications
①	Gauge manifold	Specifications <ul style="list-style-type: none"> • Only for R410A • Use the existing fitting specifications. (UNF1/2) • Use high-tension side pressure of 5.3MPa·G or over.
②	Charge hose	<ul style="list-style-type: none"> • Only for R410A • Use pressure performance of 5.09MPa·G or over.
③	Electronic scale	-
④	Gas leak detector	<ul style="list-style-type: none"> • Use the detector for R134a, R407C or R410A.
⑤	Adaptor for reverse flow check	<ul style="list-style-type: none"> • Attach on vacuum pump.
⑥	Refrigerant charge base	-
⑦	Refrigerant cylinder	<ul style="list-style-type: none"> • Only for R410A • Top of cylinder (Pink) • Cylinder with syphon
⑧	Refrigerant recovery equipment	-

2. Part Names and Functions

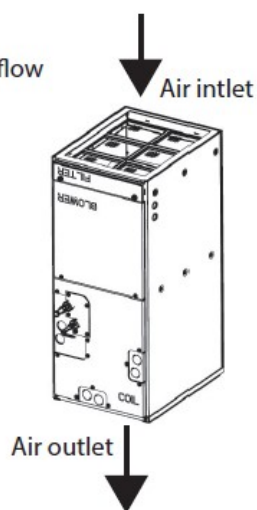
Indoor unit



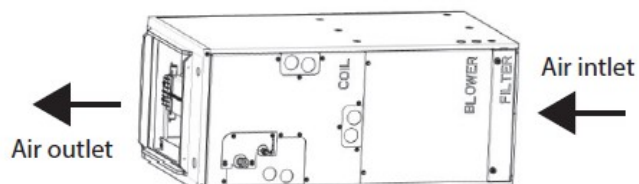
(3) Horizontal right



(2) Downflow



(4) Horizontal left



NOTE

PLEASE SEE DOWNFLOW KIT MANUALS (DFK-S/DFK-M) FOR INSTALLATION INSTRUCTIONS, DOWNFLOW FAN PERFORMANCE, AND CORRECTED AIRFLOW.

3. Specifications

Model code			12	18	24
Power Source			208/230V, 1-phase, 60Hz		
Cooling/Heating capacity		Btu/h	12,000 / 15,000	18,000 / 21,600	24,000 / 25,000
		kW	3.5/4.4	5.3/6.3	7.0 / 7.3
Tonnage			1	1.5	2
Dimensions	Height	mm [in]	1,101 [39-3/4]		
	Width	mm [in]	432 [17]		
	Depth	mm [in]	548 [21-5/8]		
Net weight		kg [lb]	43 [93]		
Fan	Airflow rate (Low - Mid - High)	CFM	314 – 381 – 448	471 – 573 – 675	515 - 625 - 735
	External static pressure	in. WG	0.30 - 0.50 - 0.80		
		[Pa]	[75 - 125 - 200]		
Sound Pressure (Low - Mid - High)		dB(A)	29 - 34 - 37	31 - 35 - 39	30 - 34 - 38

Model code			30	36
Power Source			208/230V, 1-phase, 60Hz	
Cooling/Heating capacity		Btu/h	27,000 / 30,000	33,400 / 33,400
		kW	7.9 / 8.8	9.8 / 9.8
Tonnage			2.5	3
Dimensions	Height	mm [in]	1,113.8 [43-7/8]	
	Width	mm [in]	534 [21]	
	Depth	mm [in]	548 [21-5/8]	
Net weight		kg [lb]	54 [119]	
Fan	Airflow rate (Low - Mid - High)	CFM	613 - 744 - 875	767 - 910 - 910
	External static pressure	in. WG	0.30 - 0.50 - 0.80	
		[Pa]	[75 - 125 - 200]	
Sound Pressure (Low - Mid - High)		dB(A)	32-36-40	35-39-43

Notes:

1. Rating conditions (cooling)
Indoor : 80 °F [26.7 °C] D.B., 67 °F [19.4 °C] W.B.
Outdoor : 95 °F [35 °C] D.B.
 2. Rating conditions (heating)
Indoor : 70 °F [21.1 °C] D.B.
Outdoor : 47 °F [8.3 °C] D.B., 43 °F [6.1 °C] W.B.
 3. The indicated capacity is the value when one indoor unit is connected to the outdoor unit.
 4. Specifications subject to change without notice.
 5. The external static pressure is set to 0.50 in. WG (125 Pa) at factory shipment.
1. Units should be installed by licensed electric contractor accordingly to local code requirements.
 2. For outdoor units to be connected, refer to the Installation Manual that comes with the units.

Table 1. Guaranteed operating range

		Indoor
Cooling	Upper limit	95 °F [35 °C] D.B.
		71 °F [21.7 °C] W.B.
	Lower limit	67 °F [19.4 °C] D.B.
		57 °F [13.9 °C] W.B.
Heating	Upper limit	80 °F [26.7 °C] D.B.
		-
	Lower limit	70 °F [21.1 °C] D.B.
		-

4. Fan Performance and Corrected Airflow



IMPORTANT

*. 200 Pa (0.80 in WG) does not have "Rated point".

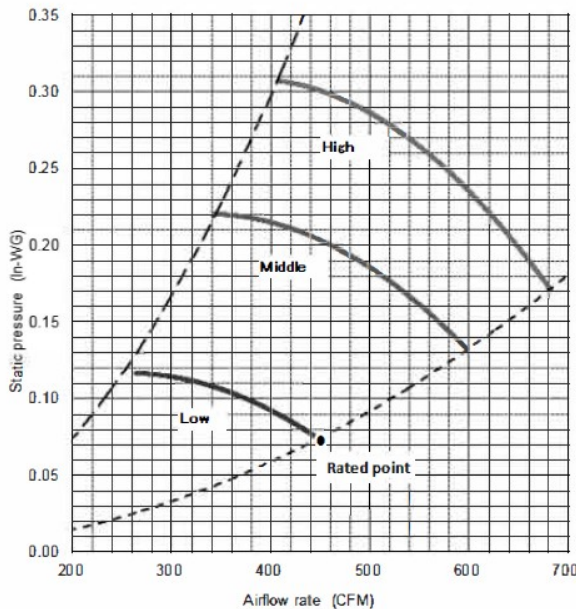
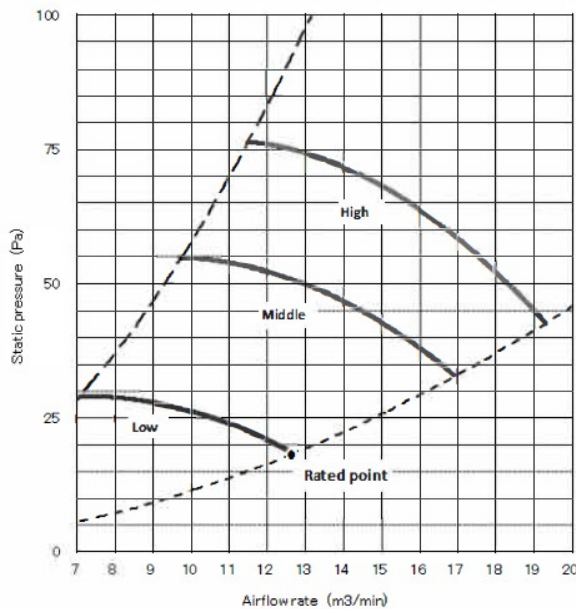


NOTE

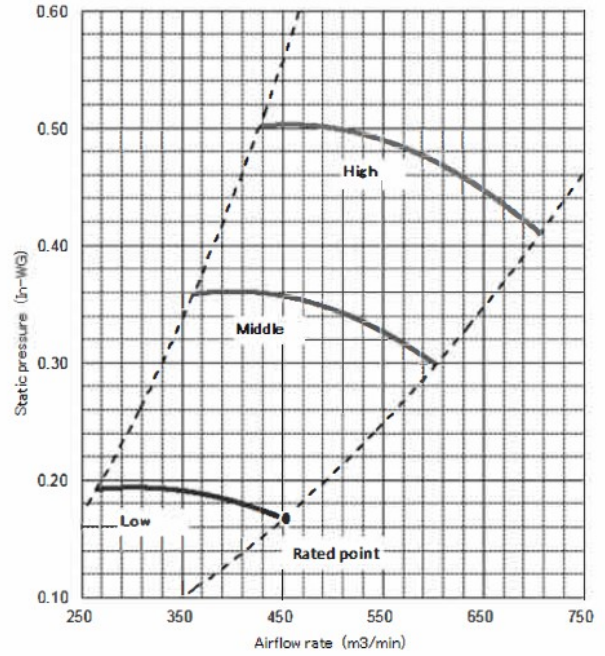
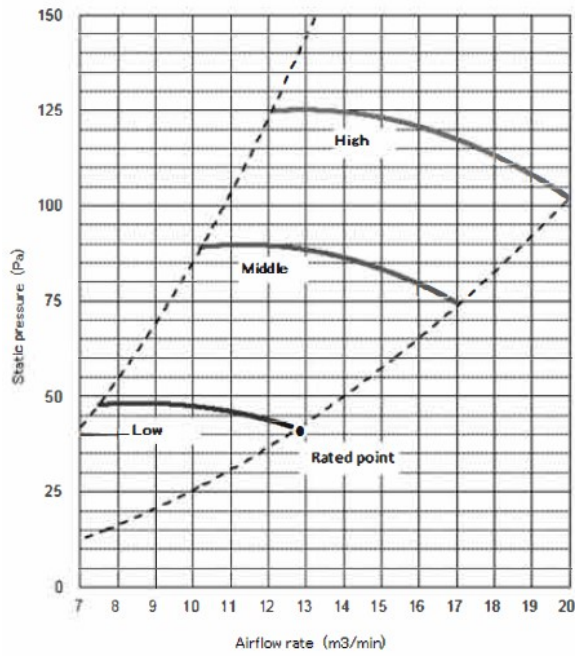
For downflow fan performance and corrected airflow, please see downflow kit manuals.

Table 2. Model code 12 Vertical, Horizontal right, Horizontal left, exclude Downflow position

External static pressure: 75Pa, 0.30 [in. WG], Power source: 208/230 V, 60Hz



External static pressure: 125Pa, 0.50 [in. WG], Power source: 208/230 V, 60Hz



External static pressure: 200Pa, 0.80 [in. WG], Power source: 208/230 V, 60Hz

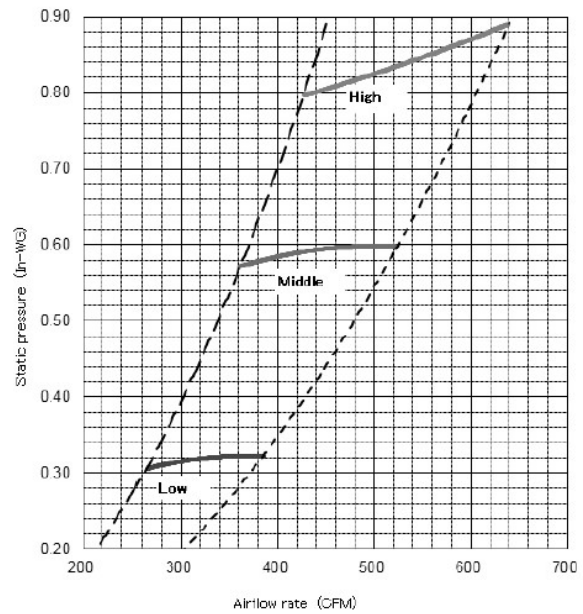
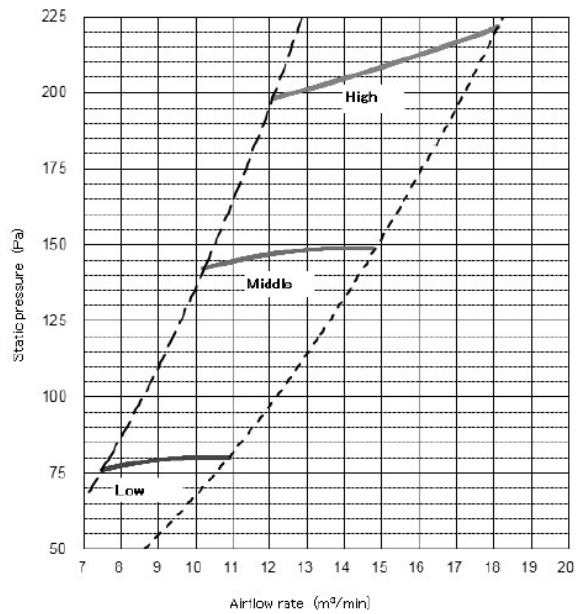
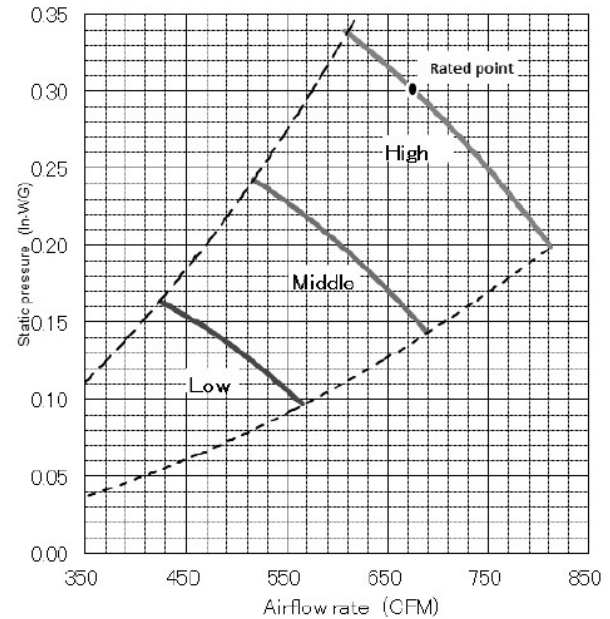
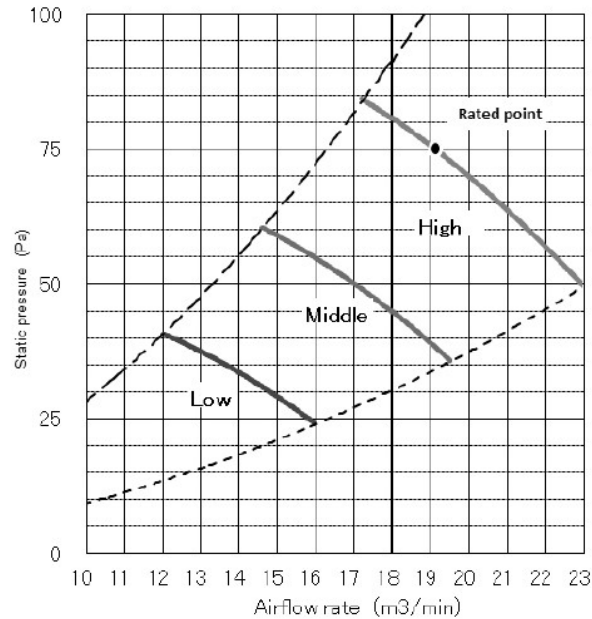
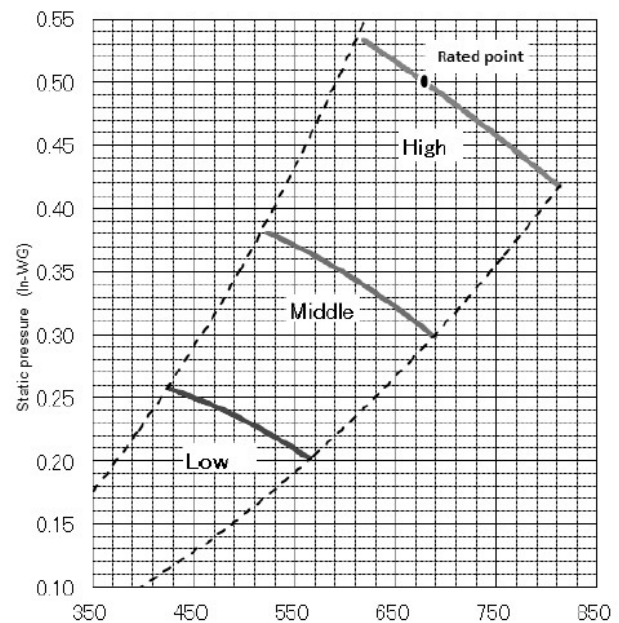
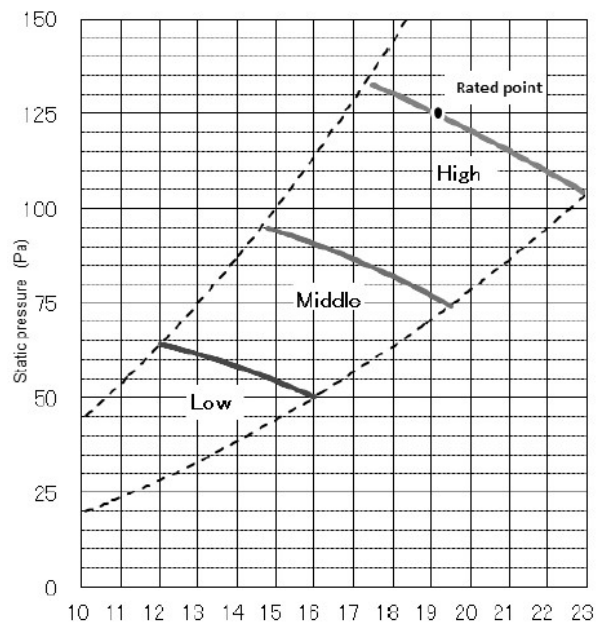


Table 3. Model code 18 Vertical, Horizontal right, Horizontal left, exclude Downflow position**External static pressure: 75Pa, 0.30 [in. WG], Power source: 208/230 V, 60Hz****External static pressure: 125Pa, 0.50 [in. WG], Power source: 208/230 V, 60Hz**

External static pressure: 200Pa, 0.80 [in. WG], Power source: 208/230 V, 60Hz

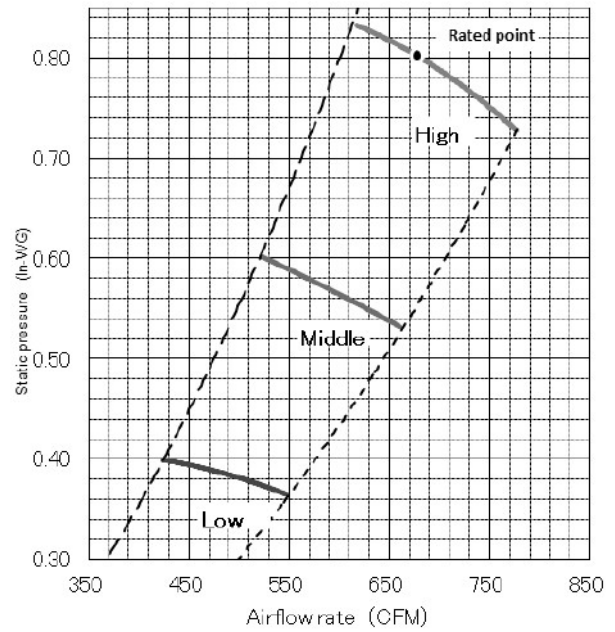
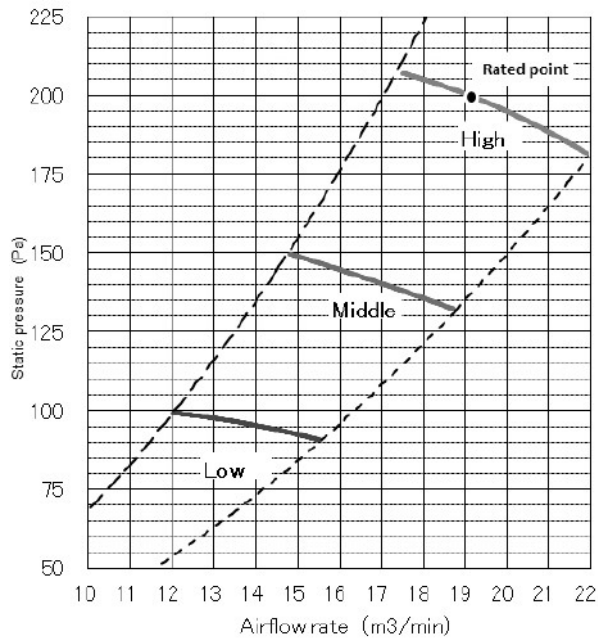
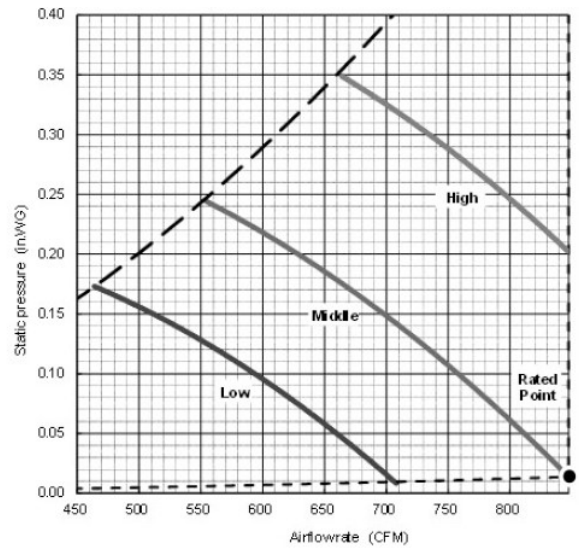
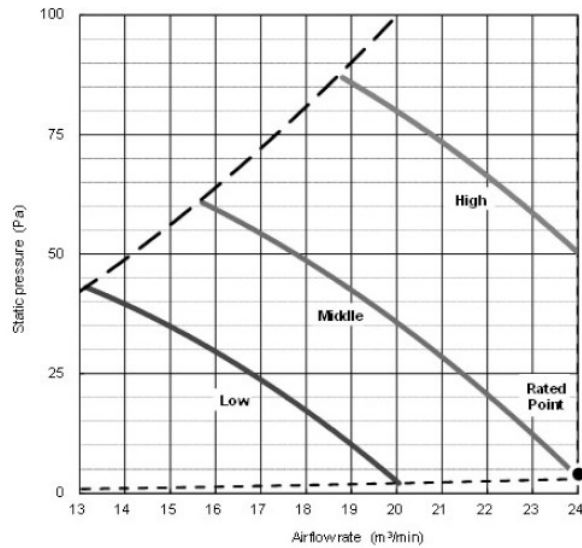
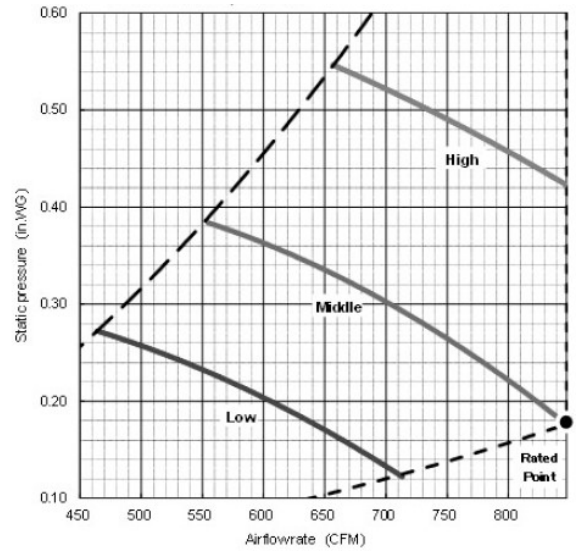
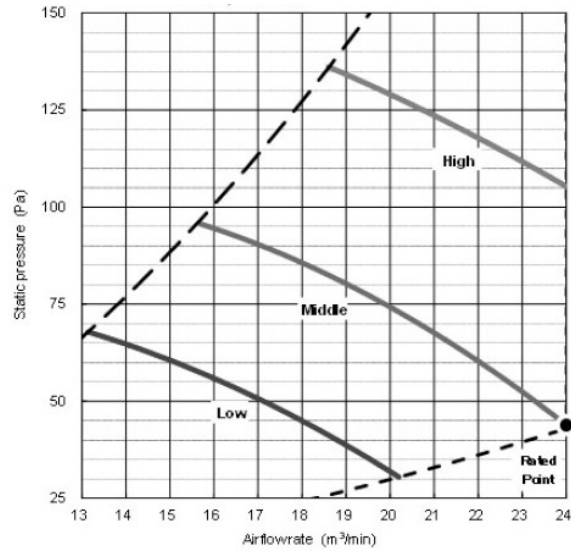


Table 4. Model code 24 Vertical, Horizontal right, Horizontal left, exclude Downflow position

External static pressure: 75Pa, 0.30 [in. WG], Power source: 208/230 V, 60Hz



External static pressure: 125Pa, 0.50 [in. WG], Power source: 208/230 V, 60Hz



External static pressure: 200Pa, 0.80 [in. WG], Power source: 208/230 V, 60Hz

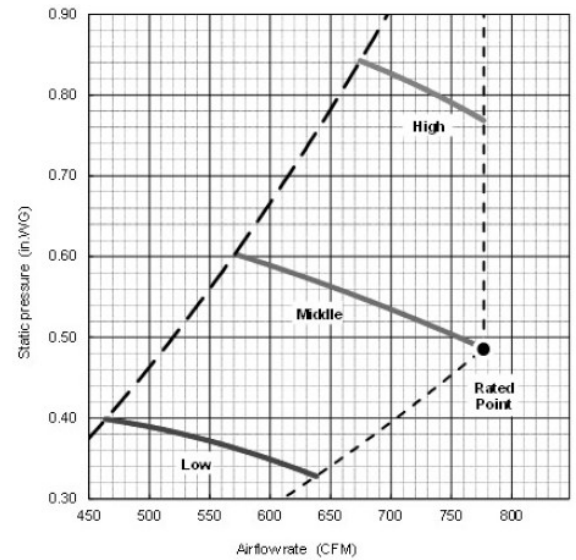
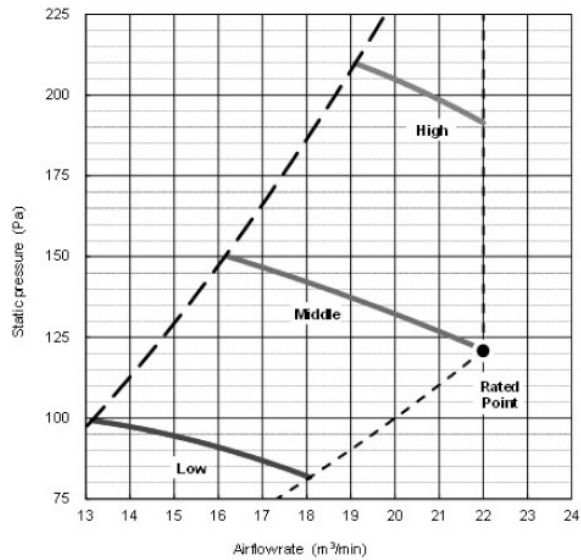
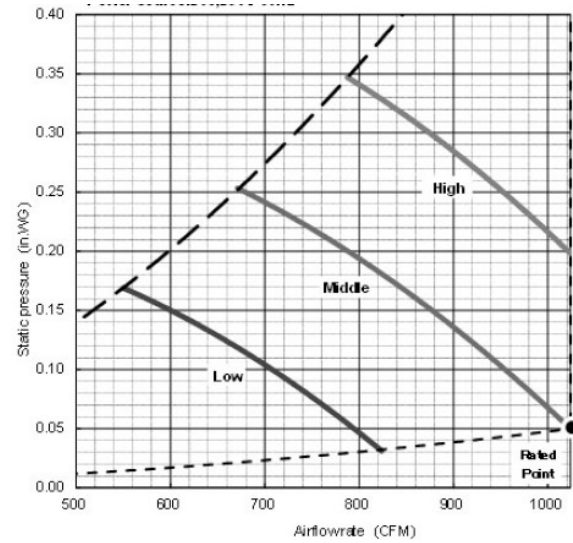
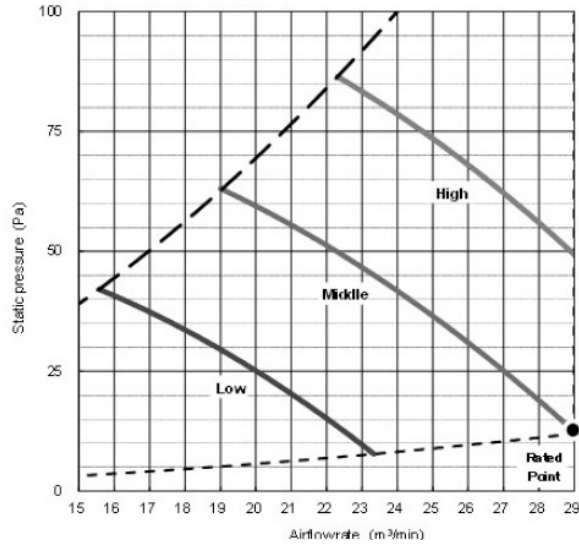
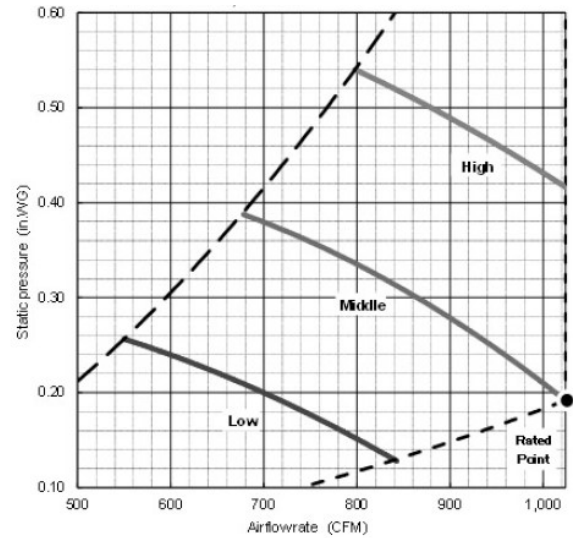
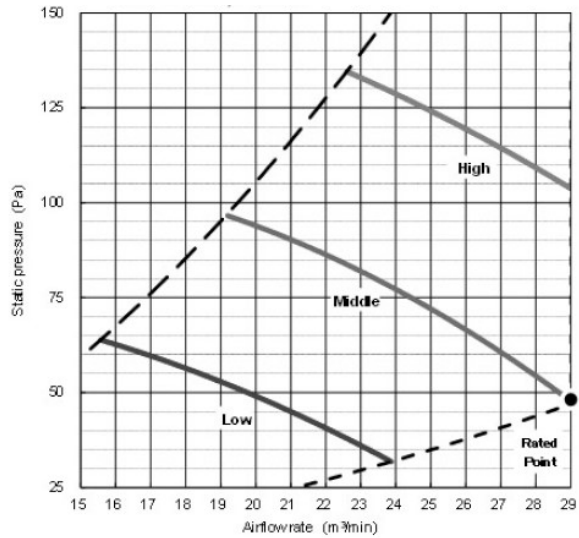


Table 5. Model code 30 Vertical, Horizontal right, Horizontal left, exclude Downflow position**External static pressure: 75Pa, 0.30 [in. WG], Power source: 208/230 V, 60Hz****External static pressure: 125Pa, 0.50 [in. WG], Power source: 208/230 V, 60Hz**

External static pressure: 200Pa, 0.80 [in. WG], Power source: 208/230 V, 60Hz

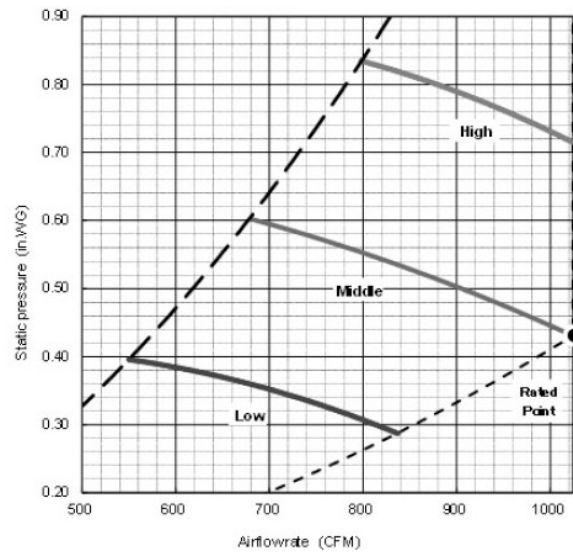
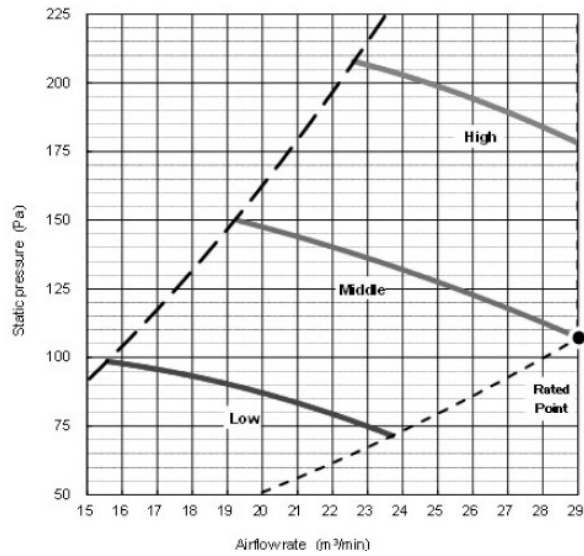
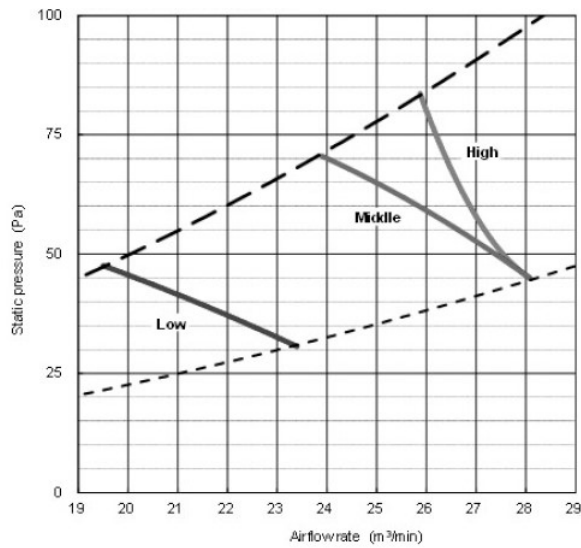
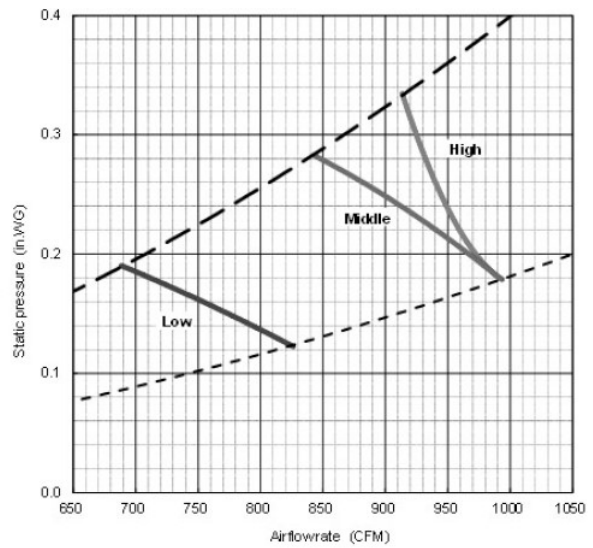


Table 6. Model code 36 Vertical, Horizontal right, Horizontal left, exclude Downflow position

External static pressure: 75Pa, 0.30 [in. WG], Power source: 208/230 V, 60Hz

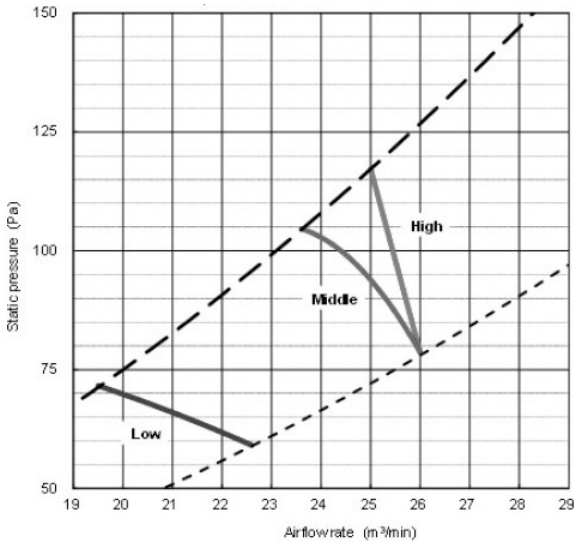


*. "Rated point" may not be inside of the envelope.

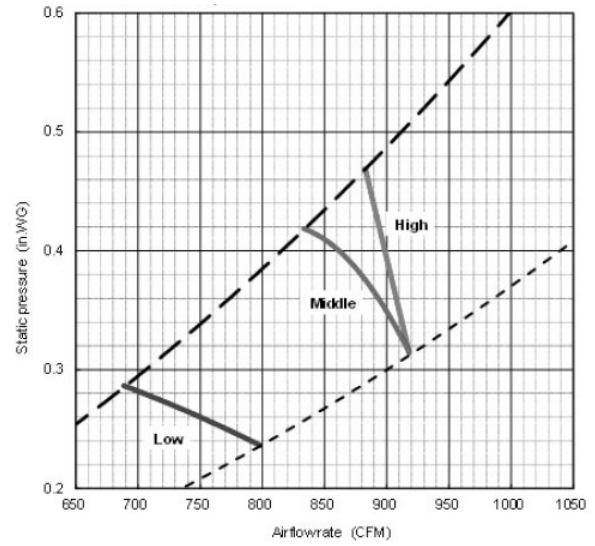


*. "Rated point" may not be inside of the envelope.

External static pressure: 125Pa, 0.50 [in. WG], Power source: 208/230 V, 60Hz

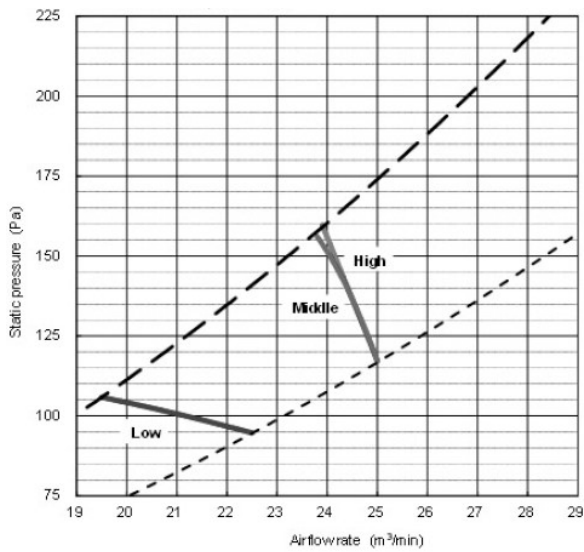


*, "Rated point" may not be inside of the envelope.

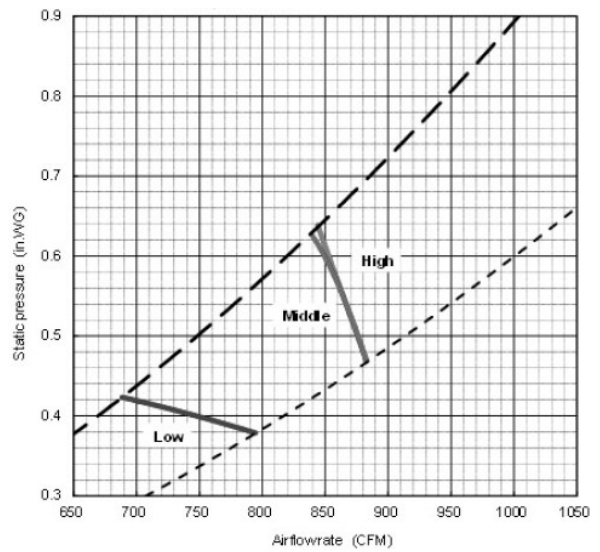


*, "Rated point" may not be inside of the envelope.

External static pressure: 200Pa, 0.80 [in. WG], Power source: 208/230 V, 60Hz

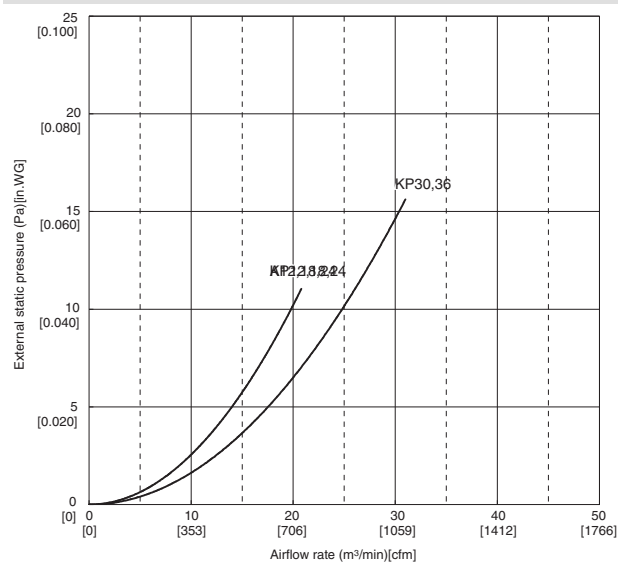


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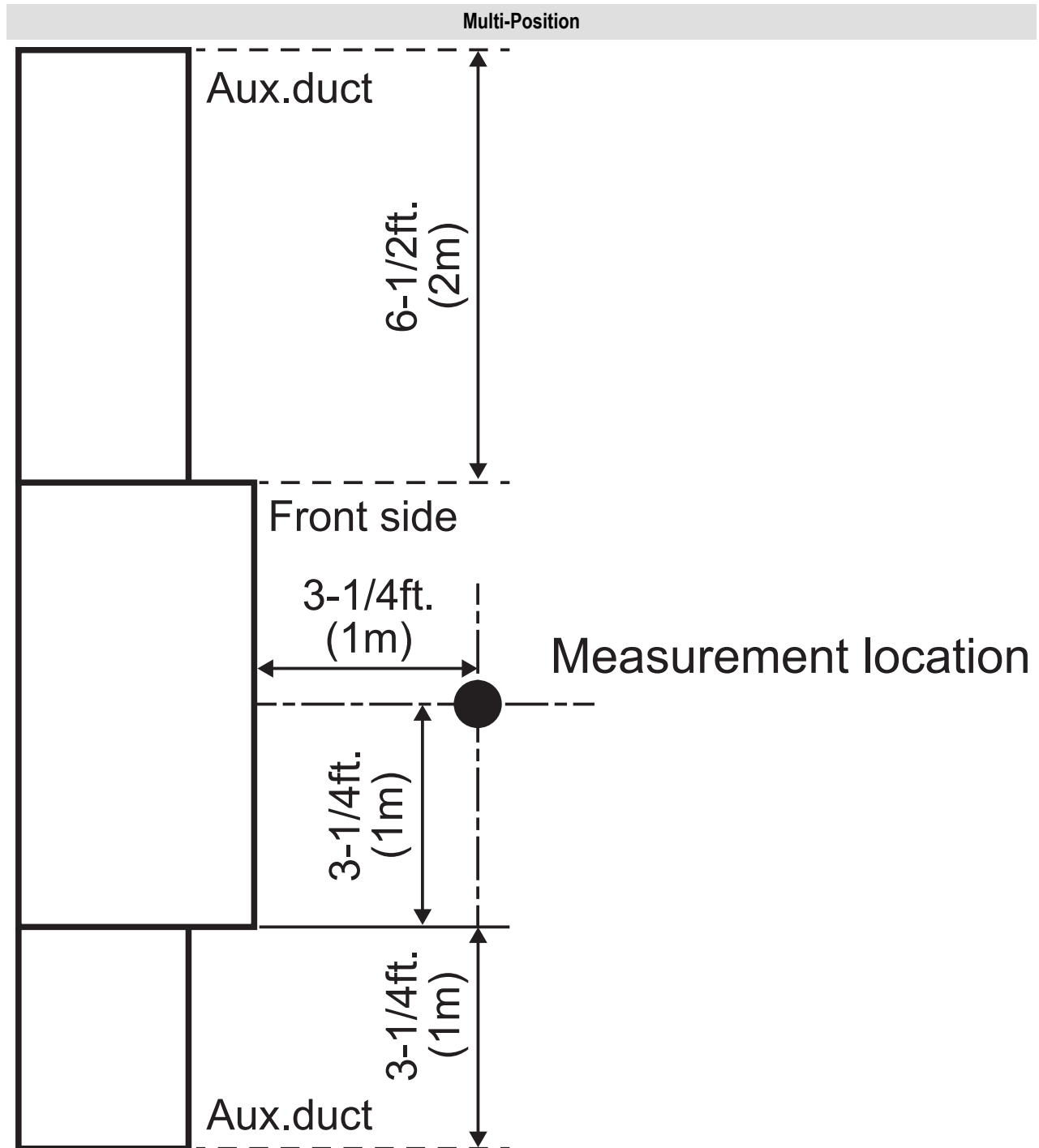
*, "Rated point" may not be inside of the envelope.

Air filter



5. Sound Pressure Levels

5.1. Sound pressure level



5.2. NC Curves

Table 7. Model code 12, External static pressure 0.30, 0.50, 0.80 in WG.

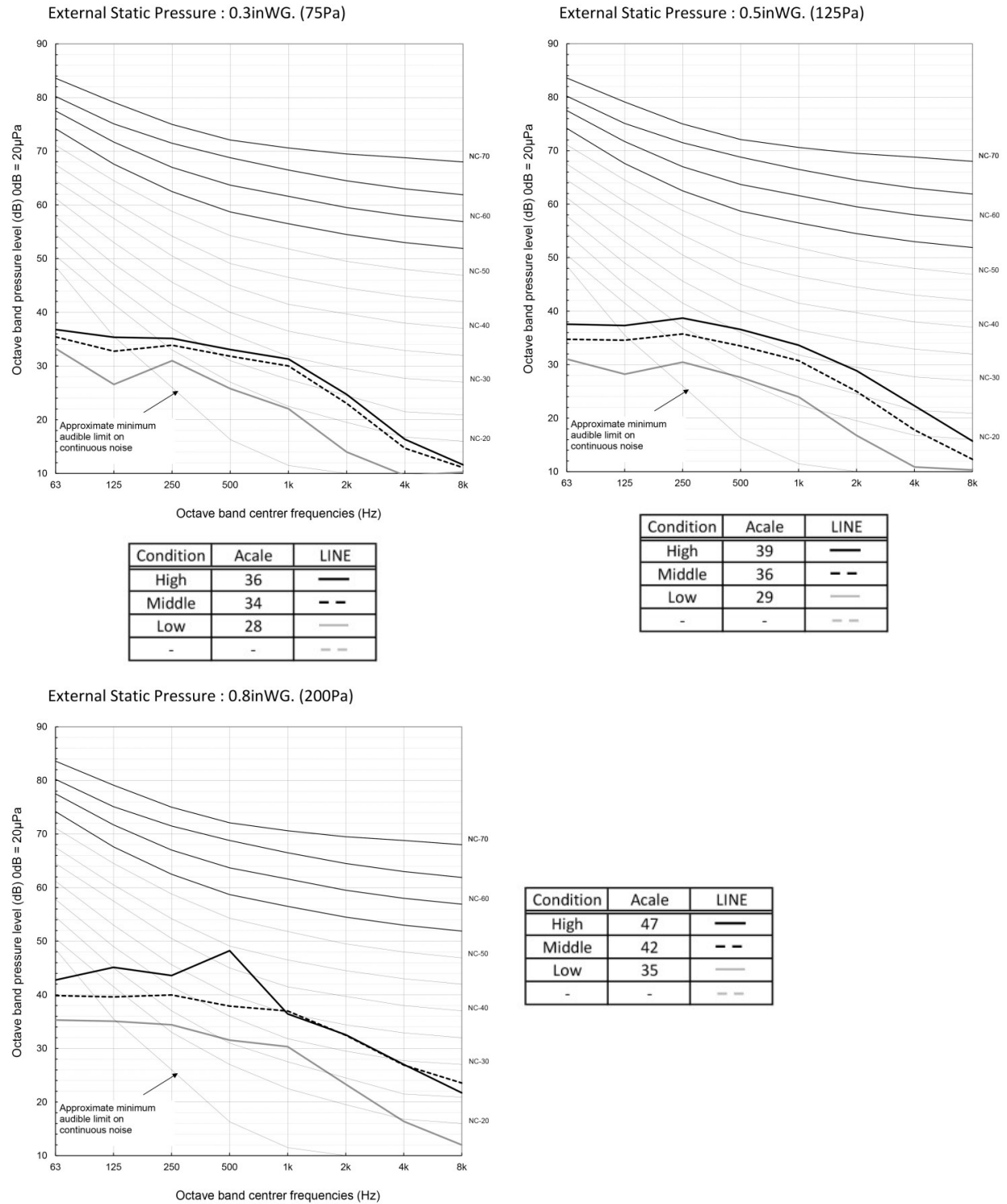
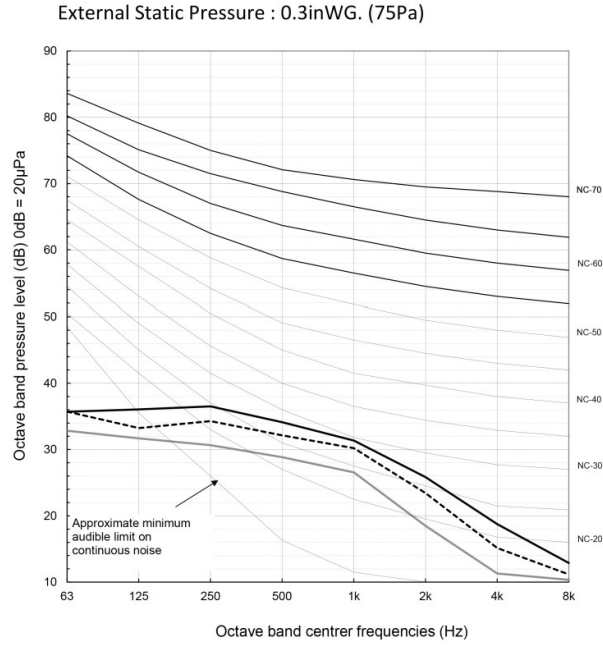
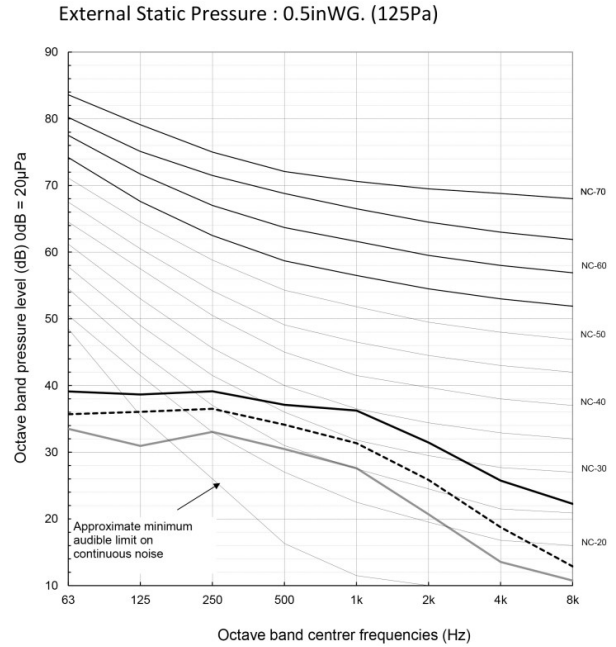
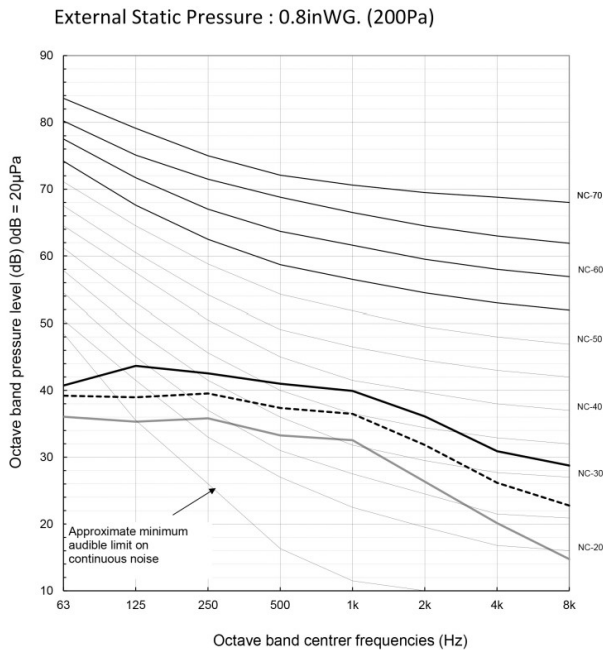


Table 8. Model code 18, External static pressure 0.30, 0.50, 0.80 in WG.

Condition	Acale	LINE
High	36	—
Middle	35	- -
Low	31	----
-	-	----



Condition	Acale	LINE
High	41	—
Middle	36	- -
Low	33	----
-	-	----



Condition	Acale	LINE
High	45	—
Middle	41	- -
Low	37	----
-	-	----

Table 9. Model code 24, External static pressure 0.30, 0.50, 0.80 in WG.

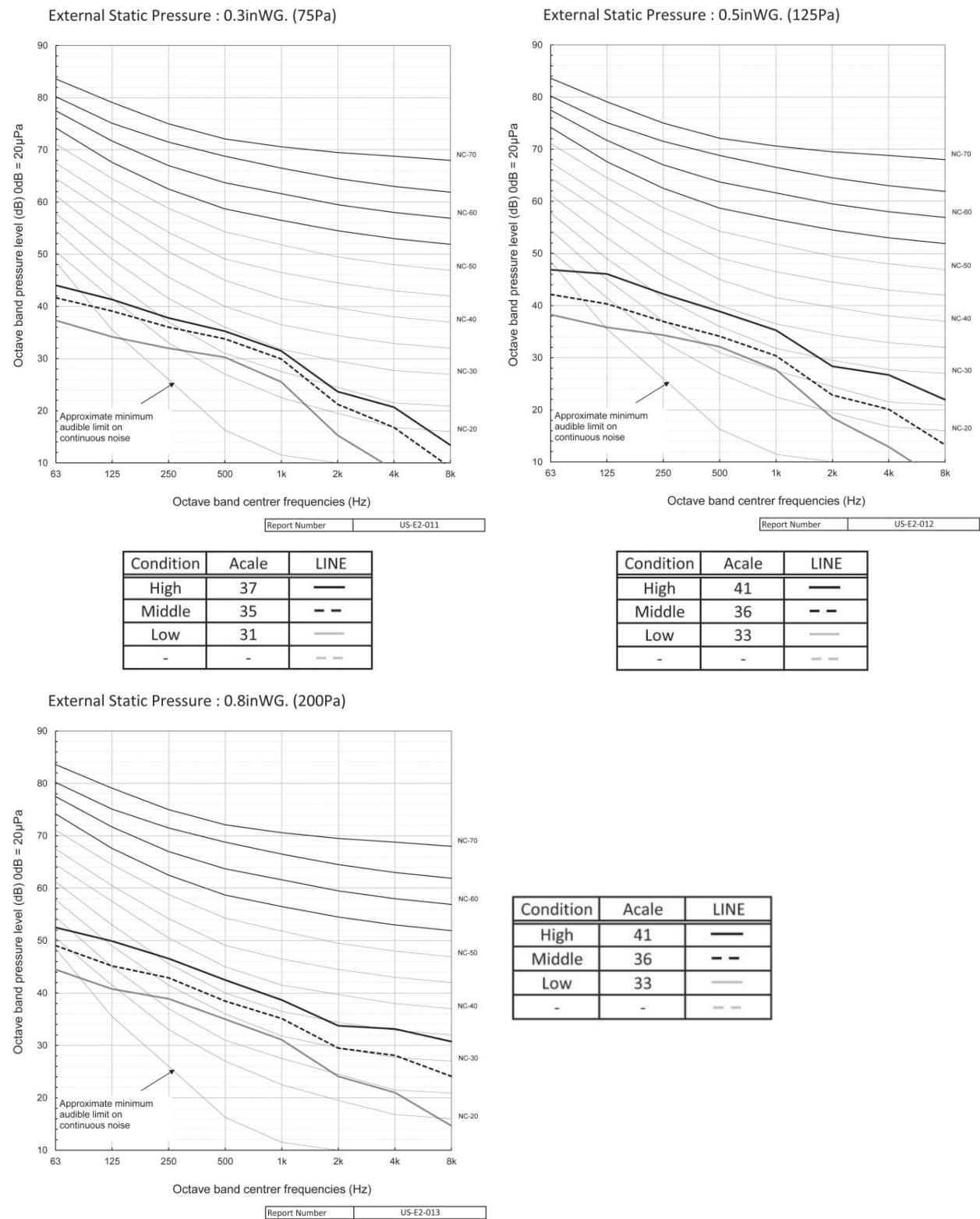
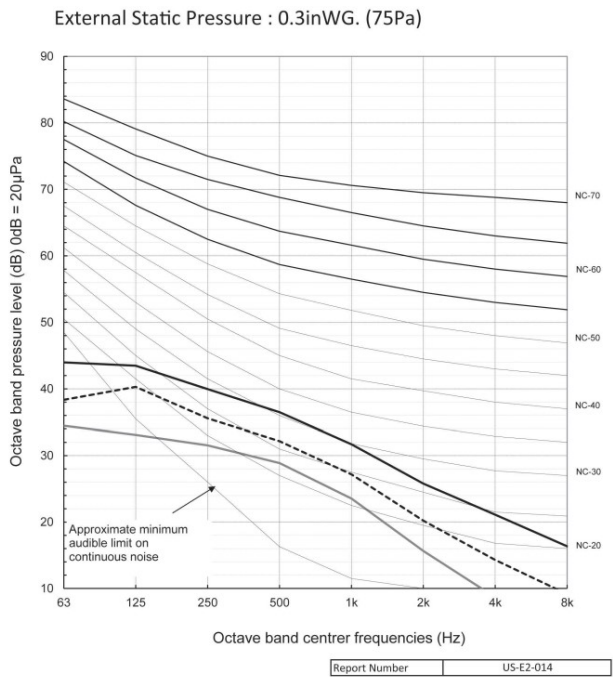
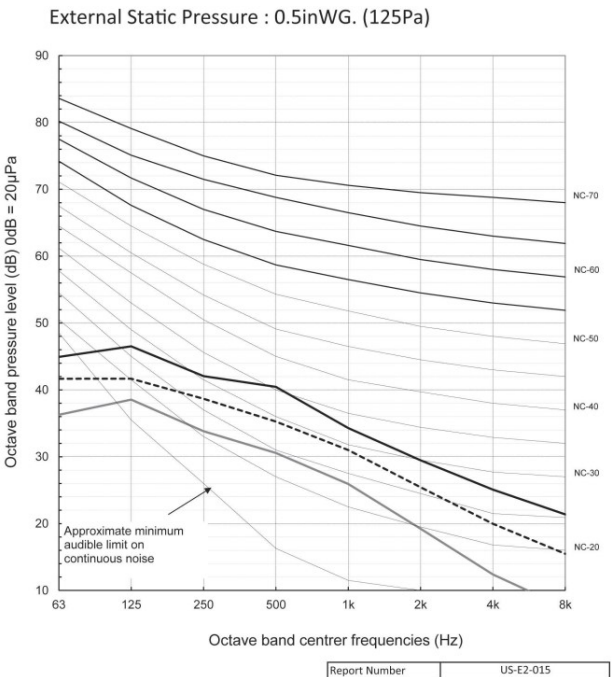


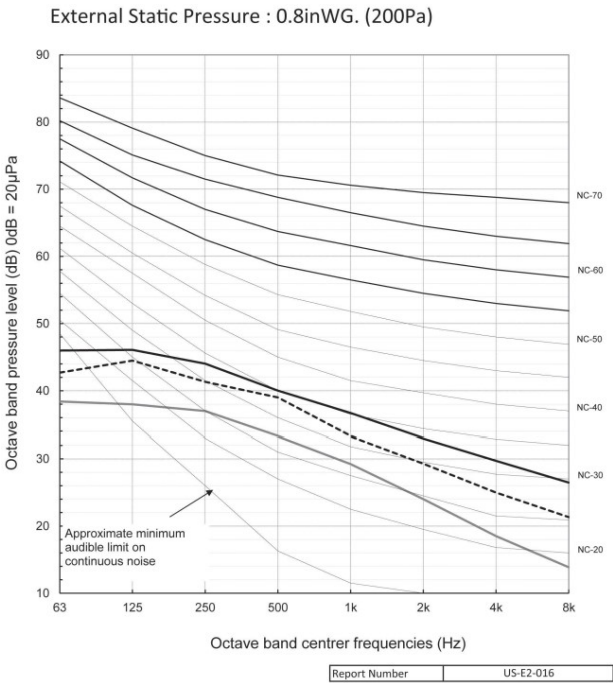
Table 10. Model code 30, External static pressure 0.50 in WG.



Condition	Acale	LINE
High	38	—
Middle	34	- -
Low	30	—
-	-	- -

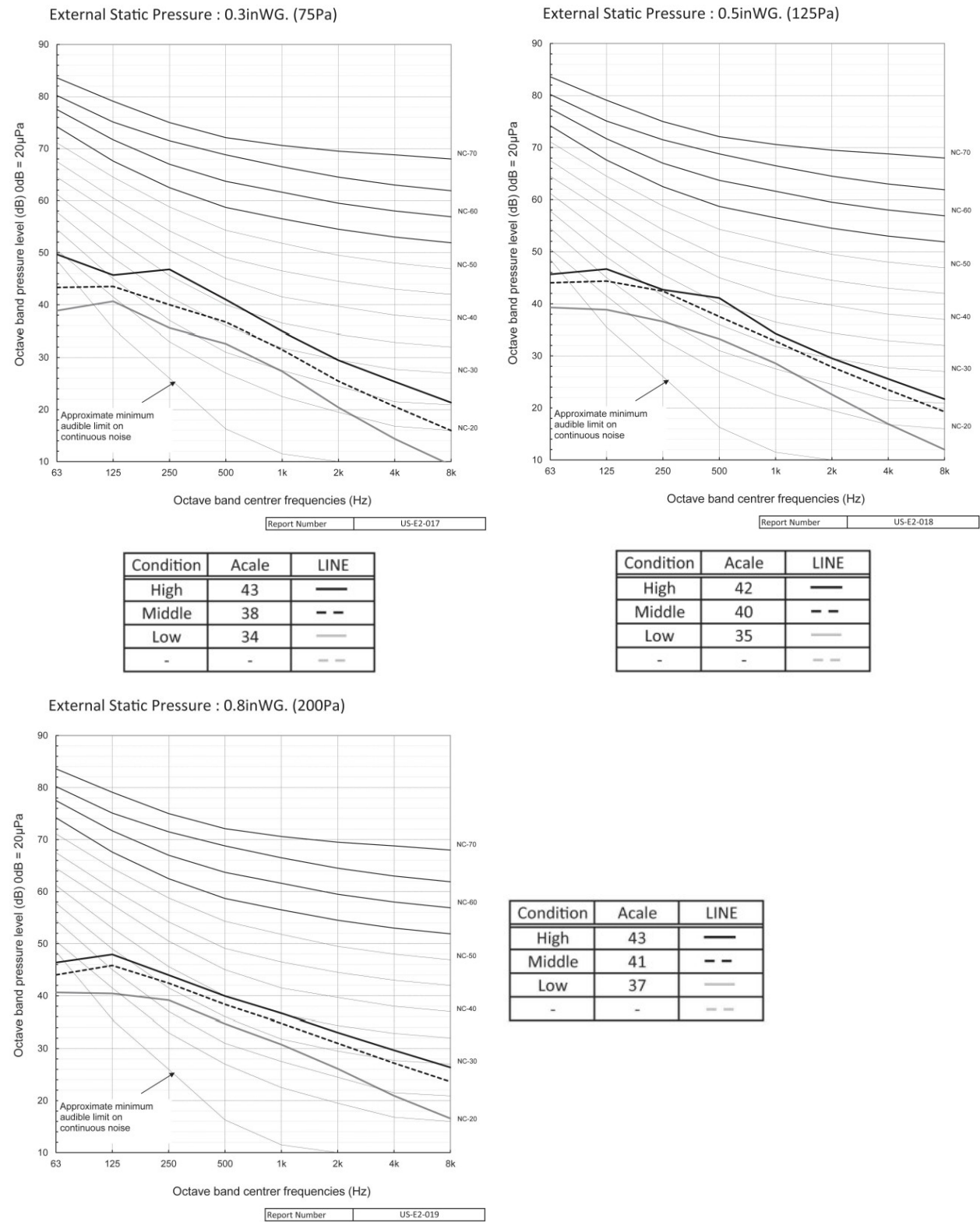


Condition	Acale	LINE
High	41	—
Middle	37	- -
Low	32	—
-	-	- -

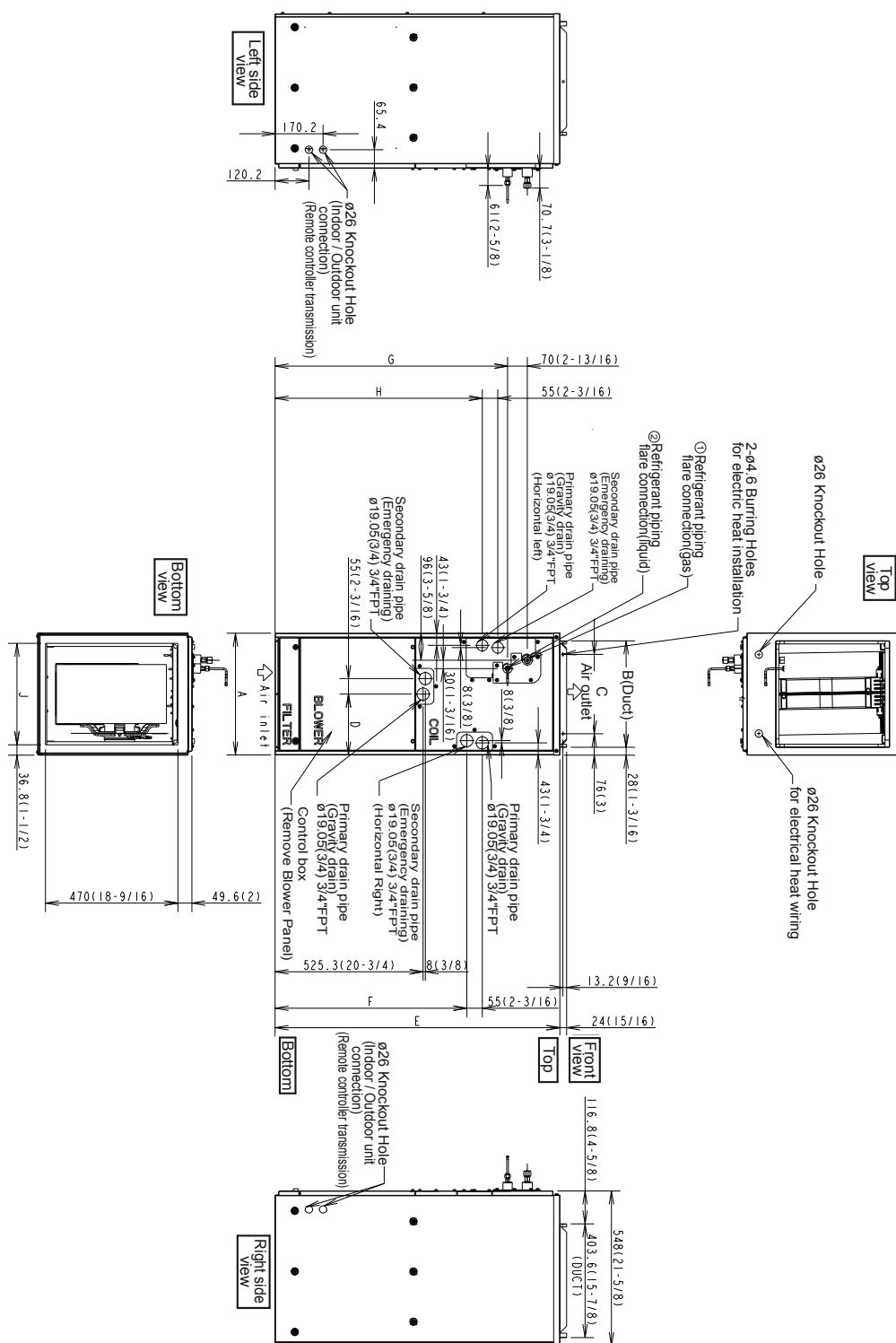


Condition	Acale	LINE
High	43	—
Middle	40	- -
Low	35	—
-	-	- -

Table 11. Model code 36, External static pressure 0.30, 0.50, 0.80 in WG.



Units: mm (in.)



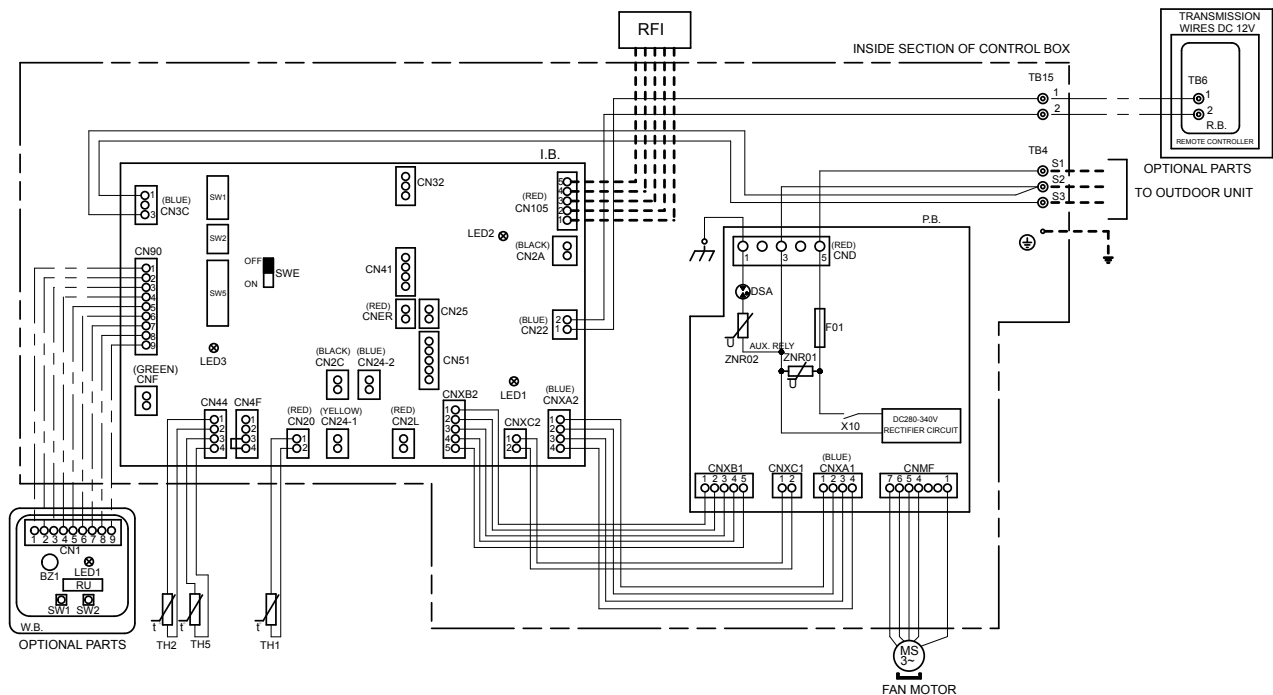
Units: mm (in.)

Model code	③Nominal filter size	Duct connection	②Liquid pipe	①Gas pipe
12	508 x 406.4 x 25.4 (20 x 16 x 1)	376 x 402 (14 -13/16 x 15-7/8)	Ø 6.35 (1/4)	Ø 9.52 (3/8)
18				Ø 12.7 (1/2)
24				Ø 15.88 (5/8)
30	508 x 508 x 25.4 (20 x 20 x 1)	477 x 402 (18-13/16 x 15-7/8)	Ø 9.52 (3/8)	
36				

Model code	A	B	C	D
12	432 (17)	376 (14-13/16)	281 (11-1/8)	224 (8-7/8)
18				
24				
30	534 (21)	477 (18-13/16)	382.6 (15-1/8)	266.5 (10-1/2)
36				

Model code	E	F	G	H	J
12	1,010.8 (39-13/16)	680 (26-13/16)	823 (32-7/16)	735.5 (29)	360 (14-3/16)
18					
24					
30	1,113.8 (43-7/8)	737 (19-1/16)	935.5 (37-9/16)	792 (31-3/16)	461 (18-3/16)
36					

7. Wiring Diagram



SYMBOL EXPLANATION

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
I.B.	INDOOR CONTROLLER BOARD	I.B.	INDOOR CONTROLLER BOARD	OPTIONAL PARTS	
CN24-1	CONNECTOR (HEATER CONTROL 1ST)	SW1	SWITCH (FOR MODEL SELECTION)	W.B.	IR WIRELESS REMOTE CONTROLLER BOARD
CN24-2	CONNECTOR (HEATER CONTROL 2ND)	SW2	SWITCH (FOR CAPACITY CODE)	RU	RECEIVING UNIT
CN25	CONNECTOR (HUMIDITY OUTPUT)	SW5	SWITCH (FOR MODE SELECTION)	BZ1	BUZZER
CN2A	CONNECTOR (0-10V ANALOG INPUT)	SWE	CONNECTOR (EMERGENCY OPERATION)	LED1	LED(RUN INDICATOR)
CN2C	CONNECTOR (ERV OUTPUT)	P.B.	POWER SUPPLY BOARD	SW1	SWITCH(HEATING ON/OFF)
CN2L	CONNECTOR (LOSSNAY)	F01	FUSE AC250V 6.3A	SW2	SWITCH(COOLING ON/OFF)
CN32	CONNECTOR (REMOTE SWITCH)	ZNR01,02	VARISTOR	R.B.	WIRED REMOTE CONTROLLER BOARD
CN41	CONNECTOR (HA TERMINAL-A)	DSA	ARRESTOR	TB6	TERMINAL BLOCK (REMOTE CONTROLLER TRANSMISSION LINE)
CN51	CONNECTOR (CENTRALLY CONTROL)	X10	AUX. RELY		
CN90	CONNECTOR (WIRELESS)	TH1	INTAKE AIR TEMP. THERMISTOR		
CN105	CONNECTOR (RADIO FREQUENCY INTERFACE)	TH2	PIPE TEMP. THERMISTOR/LIQUID		
CNER	CONNECTOR (ERV INPUT)	TH5	COND./EVA.TEMP. THERMISTOR		
CNF	CONNECTOR (HUMIDITY INPUT)	TB4	TERMINAL BLOCK (INDOOR/OUTDOOR CONNECTING LINE)		
LED1	LED(POWER SUPPLY)	TB15	TERMINAL BLOCK (REMOTE CONTROLLER TRANSMISSION LINE)		
LED2	LED(REMOTE CONTROLLER SUPPLY)	RFI	RADIO FREQUENCY INTERFACE FOR RF THERMOSTAT		
LED3	LED(TRANSMISSION INDOOR-OUTDOOR)				

Model code	SWITCH		
12	SW1 ON 	SW2 ON 	SW5 ON
18	SW1 ON 	SW2 ON 	SW5 ON
24	SW1 ON 	SW2 ON 	SW5 ON
30	SW1 ON 	SW2 ON 	SW5 ON
36	SW1 ON 	SW2 ON 	SW5 ON



NOTE

1. Since the outdoor side electric wiring may change be sure to check the outdoor unit electric wiring for servicing.
2. Indoor and outdoor connecting wires are made with polarities, make wiring matching terminal numbers (S1, S2, S3).
3. Symbols used in wiring diagram above are as follows:

	: CONNECTOR
	: TERMINAL
	: (HEAVY DOTTED LINE): FIELD WIRING
	- : (THIN DOTTED LINE): OPTIONAL PARTS

4. Use copper supply wire. UTILISER DES FILS D'ALIMENTATION EN CUIVRE.

Manipulation Details

To perform a test run for the fan, turn on the SWE on the control board while the indoor unit is being powered.

OPERATION of LED for indoor circuit board service:



IMPORTANT

Be sure to turn off the SWE after completing a test run.

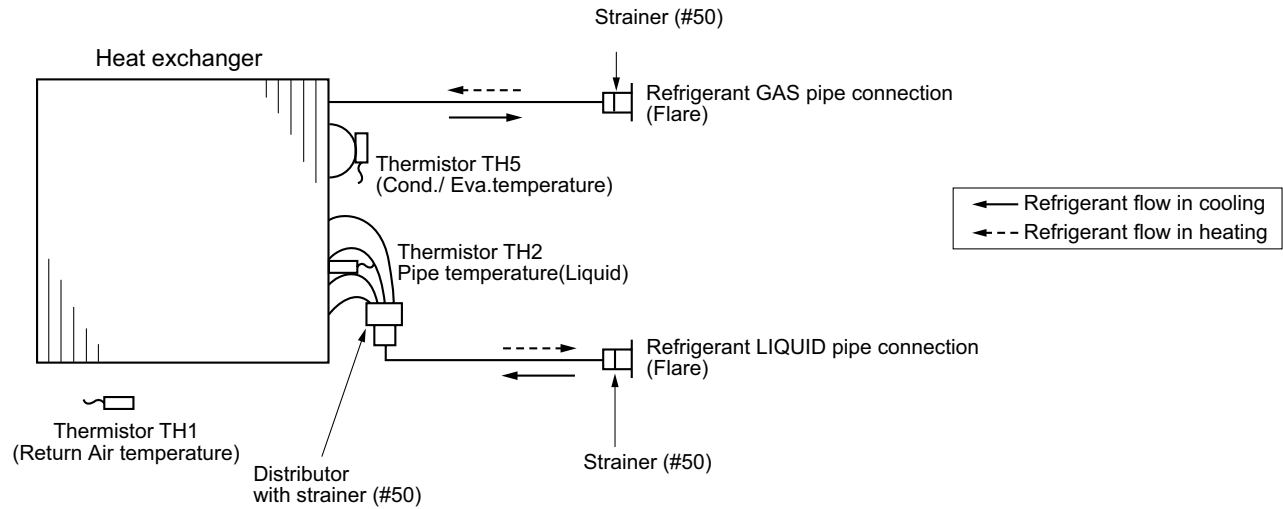


NOTE

The SWE should not be left turned on for longer than 10 hours.

Symbol	LED operation under normal state
LED1	At applying main power source → Lighting
LED2	At receiving MA transmission power source → Lighting
LED3	At transmitting indoor-outdoor units → Lighting

8. Refrigerant System Diagram



9. Heater Control

9.1. Control specifications and function setting

- **Table 12. Function table: shows the mode setting for the field-installed heater.**

Mode (function) no.		Mode	Heater Operation in Error	Heater Operation in defrost	Fan Control when Heater ON ¹
11	23				
1	1	No Heater Present ²			
2	1	Heater Available	OFF	OFF	High
		Disable Heater during Defrost and Error			
2	2	Heater Available	ON	ON	High
		Enable heater and fan during Defrost and Error ³			

¹While the heater is on, the fan will operate at high speed regardless of the fan setting on the remote controller.

²Factory setting

³The heater will not operate if the following errors are active. In these cases, the error must be corrected, and the system restarted in order to recover heater function:

- Remote controller communication error (E4, E5)
- M-NET communication error (A0-A8)
- Air intake sensor error (P1)

Installers are strongly advised never to physically uninstall a wired controller while the system is running. In addition to the safety concerns, this practice can also trigger a remote controller communication error.



IMPORTANT

If the system detects an error that could potentially create a safety hazard, **the heater will not operate.**



CAUTION

If a heater is installed in a duct, do not use Panel Heater Connector. By doing so, the fan will turn off when the heater is on, which may result in fire.



NOTE

When using the SPTB1 accessory, take special care when restarting power to the system to ensure that both the indoor unit and outdoor unit are powered up at the same time to avoid triggering a communication error.

- **Table 13. Heater control table: shows how the field-installed heater is controlled.**

Mode Change	Condition								
	(To -T _{RA}) > 2.7 ° F [1.5 °C]	AND	T _{RA} has not increased by 0.9 °F [0.5° C] i <u>X</u> min	EH1 ON for > 7 mi	AND	(To -T _{RA}) > 2.7 ° F [1.5 ° C]	AND	T _{RA} has not increased by 0.9 ° F [0.5° C] in 7 min	(To -T _{RA}) < 0.9 °F [0.5° C]
EH1 ON	○	AND	○						
EH2 ON				○	AND	○	AND	○	
EH1 OFF									○
EH2 OFF									○
KEY									
• EH1: Electric Heater									
• EH2: Electric Heater									
• To: Set point temperature									
• T _{RA} : Return Air temperature									
• X Time delay (Selectable. Default is 24 min. Selectable to 14, 19, or 29 min)									

- **Table 14. Time delay selection table: shows how the time delay is selected**

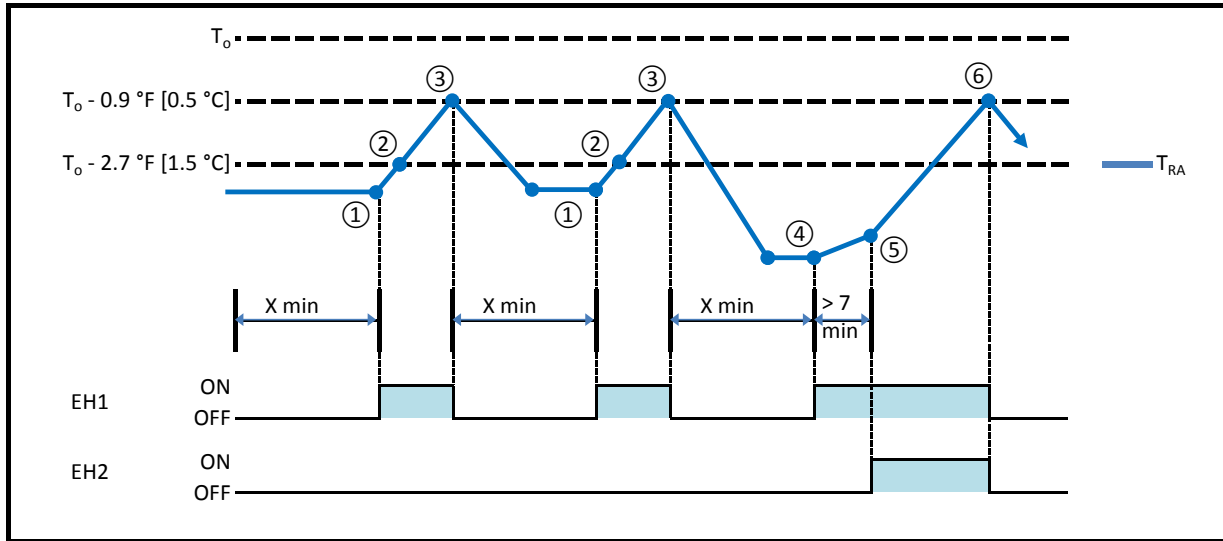
Request Code ¹	Action ²
390	Monitor Time Delay Setting
391	Set Time Delay to <u>14</u> minutes
392	Set Time Delay to <u>19</u> minutes
393	Set Time Delay to <u>24</u> minutes ³
394	Set Time Delay to <u>29</u> minutes

¹Time delay can only be selected with MA controller. If use of a non-MA controller is desired, the time delay must first be selected with the MA controller. Then the non-MA controller can be attached and used.

²All delay times are approximate.

³The default time delay setting is 24 minutes.

• **Table 15. Heater operation example: shows example of heater operation.**



Step	Condition			Result
①	$(T_o - T_{RA}) > 2.7\text{ °F [1.5 °C]}$	AND	T_{RA} has not increased by 0.9 °F [0.5 °C] in $X\text{ min}$	EH1 ON
②	$(T_o - T_{RA}) < 2.7\text{ °F [1.5 °C]}$	AND	T_{RA} increasing faster than 0.9 °F [0.5 °C] in 7 min	EH2 not ON
③	$(T_o - T_{RA}) < 0.9\text{ °F [0.5 °C]}$			EH1 OFF
④	$(T_o - T_{RA}) > 2.7\text{ °F [1.5 °C]}$	AND	T_{RA} has not increased by 0.9 °F [0.5 °C] in $X\text{ min}$	EH1 ON
⑤	$(T_o - T_{RA}) > 2.7\text{ °F [1.5 °C]}$	AND	T_{RA} not increasing faster than 0.9 °F [0.5 °C] in 7 min	EH2 ON
⑥	$(T_o - T_{RA}) < 0.9\text{ °F [0.5 °C]}$			EH1 OFF EH2 OFF

9.2. Fan control

By setting Mode No. 23 in the Function Table in section 9-1 and using CN4Y from the CN24RELAY-KIT-CM3 kit, the following patterns of fan control will become possible.

Table 16. Fan Control Patterns

CN4Y for FAN control (CN24RELAY-KIT-CM3)	Mode (function) No. 23	Heater operation in DEFROST and ERROR ¹	Fan mode in DEFROST and ERROR	Fan (all other modes)
Enabled	1 ²	OFF	STOP	Set (heater ON)
	2	ON	STOP	High (heater ON) ³

¹The heater will not operate if the following errors are active. In these cases, the error must be corrected, and the system restarted in order to recover heater function:

- Remote controller communication error (E4, E5)
- M-NET communication error (A0-A8)
- Air intake sensor error (P1)

Installers are strongly advised never to physically uninstall a wired controller while the system is running. In addition to the safety concerns, this practice can also trigger a remote controller communication error.



IMPORTANT

If the system detects an error that could potentially create a safety hazard, **the heater will not operate.**



CAUTION

If a heater is installed in a duct, do not use Panel Heater Connector. By doing so, the fan will turn off when the heater is on, which may result in fire.



NOTE

When using the SPTB1 accessory, take special care when restarting power to the system to ensure that both the indoor unit and outdoor unit are powered up at the same time to avoid triggering a communication error.

²Factory setting

³While the heater is on, the fan will operate at high speed regardless of the fan setting on the remote controller.

Table 17. Fan Speed Setting¹

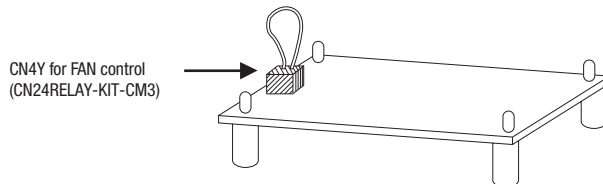
Mode	Setting		Mode No.	Setting
	Heating Thermo-OFF	DEFROST or ERROR		
Fan Control	Very Low	Very Low	25	1 2
	STOP	Remote Controller Setting	25	2
	Remote Controller Setting	Remote Controller Setting	25	3

¹Refer to Installation Manual for function settings.²Factory setting

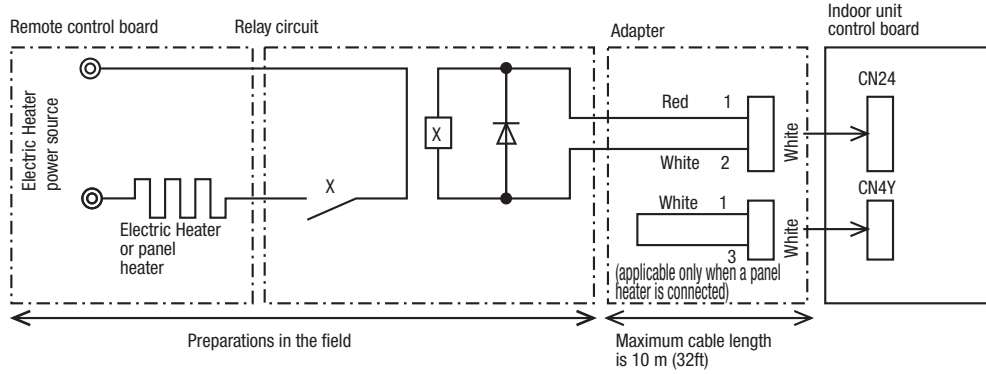
9.3. CN24RELAY-KIT-CM3 (Optional Parts) installation

The following section describes installation of the External Heater Adapter that connects to SVZ-KP-NA series indoor unit. This products is the special wiring parts to drive an electric heater with the air conditioner.

1. Parts list: Check that the following parts are included in the package.
 - a. External output cable. (Two types of cables with different connectors are included.) 2 in total
 - b. Panel heater connector (White: 3) 3 in total
2. (2) Connection to the indoor unit: Use the cables that fit the connectors on the indoor unit control board.
 - a. External output cable
 - This cable is used to connect a relay circuit for an interlocked operation with either an electric or a panel heater.
 - Select the heater output pattern (1st = CN24-1 or 2nd = CN24-2) to use, and connect the cable to the connector on the indoor unit control board that corresponds to the selection.
 - b. Panel heater connector
 - This connector is used to perform an interlocked operation with a panel heater. Depending on the indoor unit control board specification, connect the cable to CN4Y as appropriate.

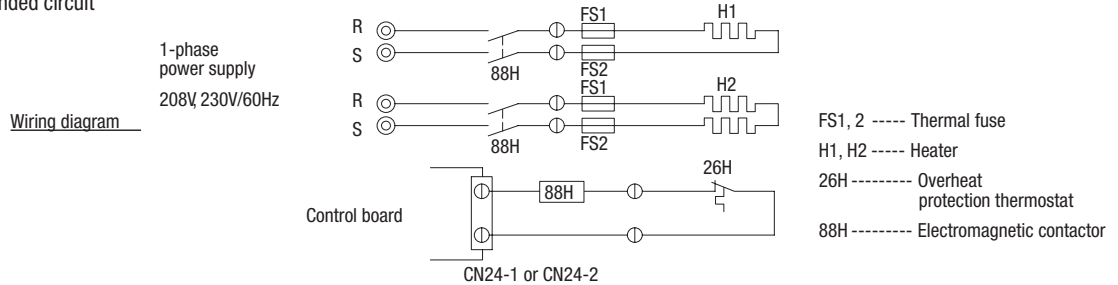


3. Wiring: A basic connection method is shown below.



- The length of the electrical wiring for the CN24RELAY-KIT-CM3 is 2 meters (6-1/2 ft.)
- To extend this length, use sheathed 2-core cable.
 - Control cable type: CVV, CVS, CPEV or equivalent. Cable size: 0.5 mm² ~ 1.25 mm² (16 to 22 AWG)
 - Don't extend the cable more than 10 meters (32ft)

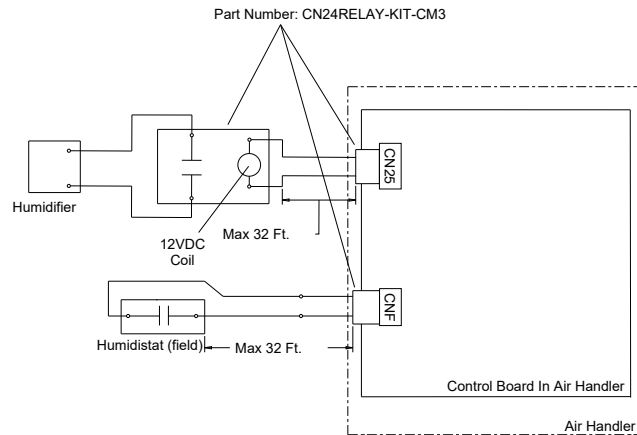
Recommended circuit



4. Wiring restrictions

- Keep the length of the cable connecting to the circuit board of the indoor unit shorter than 10 meters (32 ft).
- Longer than 10 meters (32 ft) could cause improper operation.
- Use a transit relay when extending wiring such as remote wiring.

10. Humidifier



Humidifier Control (CN25 Output is ON)

Sequence of operation:

1. The humidistat closes CNF
2. The fan starts on high
3. CN25 provides 12VDC to turn on the Humidifier (do not exceed 1 Watt draw per relay)
4. When the Humidistat opens, the fan continues to run for 30 seconds to clear the ductwork of moist air
5. If defrost starts during humidifier operation, CN25 de-energizes

Humidistat:

- Non-Voltage a-contact input
- Contact rating voltage ≥ 15 VDC
- Contact Rating Current ≥ 0.1 A
- Minimum Applicable Load ≤ 1 mA at DC

Mode (function) No.		Humidistat Output	Condition	CN25 Output	Fan Speed
13	16	CNF Input	(No Defrost/No Error)		
2	1 ^a .	OFF	Heat operation & Thermo OFF	OFF	RC ^b . Setting
			Heat operation & Thermo ON		
		ON	Heat operation & Thermo OFF	OFF	RC Setting
			Heat operation & Thermo ON	ON	High
	2	OFF	Heat operation & Thermo OFF	OFF	RC Setting
			Heat operation & Thermo ON		
1 ^a .	-	-	Heat operation & Thermo OFF	ON	High
			Heat operation & Thermo ON		
1 ^a .	-	-	No humidifier operation	OFF	RC Setting

The fan continues to run for 30 seconds after the humidifier stops.



CAUTION

If a heater is installed in a duct, do not use Panel Heater Connector. By doing so, the fan will turn off when the heater is on, which may result in fire.



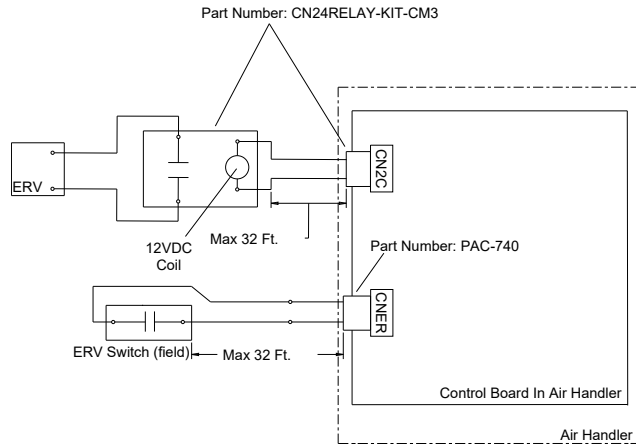
NOTE

When using the SPTB1 accessory, take special care when restarting power to the system to ensure that both the indoor unit and outdoor unit are powered up at the same time to avoid triggering a communication error.

^a Factory setting

^b Remote controller

11. ERV (Energy Recovery Ventilation)



ERV Control

Sequence of operation:

1. The ERV demand switch closes CNER
2. 12 VDC is provided to CN2C to turn on ERV
3. If the unit goes into defrost, CN2C stops 12 VDC output

ERV Switch:

- Non-Voltage a-contact input
- Contact rating voltage ≥ 15 VDC
- Contact rating current ≥ 0.1 A
- Minimum applicable load ≤ 1 mA at DC

ERV output CNER input	Function Mode 26	Condition	Fan speed	CN2C output (=Fan output)
OFF	-	Cool/Heat/Fan operation	RC ^a setting	ON
		Defrost	STOP	OFF
		STOP	STOP	OFF
ON	1 ^b	Cool/Heat/Fan operation	RC setting	ON
		Defrost	STOP	OFF
		STOP	STOP	OFF
	2	Cool/Heat/Fan operation	RC setting	ON
		Defrost	STOP	OFF
		STOP	RC setting ^{c,d}	ON

^a Remote controller

^b Factory setting

^c If ERV control is effective when STOP, IDU doesn't report fan status or PB error (Fan motor error).

^d When fan speed setting by RC is "Auto", Fan speed is fixed to "HIGH".

12. Troubleshooting

12.1. Cautions on troubleshooting



CAUTION

(1) Before troubleshooting, check the following:

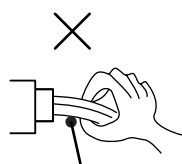
1. Check the power supply voltage.
2. Check the indoor/outdoor connecting wire for miswiring.



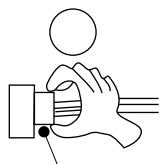
CAUTION

(2) Take care of the following during servicing.

1. Before servicing the air conditioner, be sure to turn off the remote controller first to stop the main unit, and then turn off the breaker.
2. When removing the indoor controller board, hold the edge of the board with care NOT to apply stress on the components.
3. When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



Lead wires



Housing point

12.2. Self-check

Refer to the installation manual that comes with each remote controller for details.

Remote controller	[Output pattern A] Errors detected by indoor unit
Check code (on LCD)	Symptom
P1	Intake sensor error
P2 / P9	Pipe (liquid or 2-phase pipe) sensor error
E6 / E7	Indoor / outdoor unit communication error
P4	Drain sensor error
P5	Drain pump error
P6	Freezing / overheating safeguard operation
EE	Communication error between indoor and outdoor units
P8	Pipe temperature error
E4	Remote controller signal receiving error
PB	Fan motor error
Fb	Indoor unit control system error (memory error, etc.)

Remote controller	[Output pattern B] Errors detected by unit other than indoor unit (outdoor unit, etc.)
Check code (on LCD)	Symptom
E9	Indoor/outdoor unit communication error (transmitting error) (outdoor unit)
UP	Compressor overcurrent interruption
U3 / U4	Open/short of outdoor unit thermistors
UF	Compressor overcurrent interruption (when compressor locked)
U2	Abnormal high discharging temperature / 49C worked / insufficient refrigerant
U1 / Ud	Abnormal high pressure (63H worked) / overheating safeguard operation
U5	Abnormal temperature of heat sink
U8	Outdoor unit fan protection stop
U6	Compressor overcurrent interruption / abnormal of power module
U7	Abnormality of super heat due to low discharge temperature
U9 / UH	Abnormality such as overvoltage, voltage shortage, abnormal and synchronous signal to main circuit / current sensor error
Others	Other errors (refer to the technical manual for the outdoor unit)

If the unit cannot be operated properly after the above test run has been performed, use this table to remove the cause:			
Symptom			Cause
Remote controller		LED 1, 2 (PCB in outdoor unit)	
PLEASE WAIT	For about 2 minutes following power-on	After LED 1, 2 are lit → LED 2 is turned off Only LED 1 is lit (correct operation)	<ul style="list-style-type: none">For about 2 minutes after power-on, operation of the remote controller is not possible due to system start-up. (correct operation)
PLEASE WAIT → Error code	After about 2 minutes has expired following power-on	Only LED 1 is lit → LED 1, 2 blink.	<ul style="list-style-type: none">Connector for the outdoor unit's protection device is not connected.Reverse or open phase wiring for the outdoor unit's power terminal block (L1, L2, L3)
Display messages do not appear even when operation switch is turned ON (operation lamp does not light up).		Only LED 1 is lit → LED 1, 2 blinks twice LED 2 blinks once	<ul style="list-style-type: none">Incorrect wiring between indoor and outdoor units (incorrect polarity of S1, S2, S3)Remote controller wire short
Operation is not possible for about 30 seconds after cancellation of function selection. (correct operation)			

Description of LED 1, 2, and 3 on the indoor controller	
LED 1: power for microcomputer	Indicates whether control power is supplied. Make sure that this LED is always lit.
LED 2: power for remote controller	Indicates whether power is supplied to the remote controller. This LED lights only in the case of the indoor unit which is connected to the outdoor unit refrigerant address "0".
LED 3: communication between indoor and outdoor units	Indicates state of communication between the indoor and outdoor units. Make sure that this LED is always blinking.

12.2.1. Auto restart function

Indoor unit control board

This model is equipped with the AUTO RESTART FUNCTION.

When the indoor unit is controlled with the remote controller, the operation mode, set temperature, and the fan speed are memorized by the indoor unit control board.

The AUTO RESTART FUNCTION will restart the unit within a time delay of 5 to 10 minutes after power is restored.

Set the AUTO RESTART FUNCTION using the remote controller. (Mode no. 01)

12.2.2. Function table

Mode	Settings	Mode (function) No.	Setting no.	Initial setting
Power failure auto restart	Not available	01	1	1
	Available		2	
Indoor temperature detect	Indoor unit operating average	02	1	1
	Indoor unit's internal sensor		2	
	Remote controller's internal sensor		3	
LOSSNAY	Not supported	03	1	1

Mode	Settings	Mode (function) No.	Setting no.	Initial setting
connectivity	Supported (indoor unit is not equipped with outdoor air intake)		2	
	Supported (indoor unit is equipped with outdoor air intake)		3	
Power voltage	240V (230V)	04	1	1
	220V (208V)		2	
Filter sign	100 Hr	07	1	3
	2500 Hr		2	
	No filter sign indicator		3	
External static pressure	See section 13.4 of the installation manual	08	1	2
			2	
			3	
		10	1	1
			2	
Humidifier control	Heat mode & Thermo ON	16	1	1
	Heat mode		2	
Humidifier	Humidifier not present	13	1	1
	Humidifier present		2	
Heater control	Heater not present	11	1	1
	Heater present ^a .		2	
Heater control during defrost and error	Disable heater during Defrost and Error	23	1	1
	Enable heater and fan during Defrost and Error ^b .		2	
Fan speed thermo off heating	Extra low	25	1	1
	Stop		2	
	RC Setting		3	
Fan speed thermo off cooling	RC setting	27	1	1
	Stop		2	

^aWhile the heater is on, the fan will operate at high speed regardless of the fan setting on the remote controller.

^bThe heater will not operate if the following errors are active. In these cases, the error must be corrected, and the system restarted in order to recover heater function:

- Remote controller communication error (E4, E5)
- M-NET communication error (A0-A8)
- Air intake sensor error (P1)

Installers are strongly advised never to physically uninstall a wired controller while the system is running. In addition to the safety concerns, this practice can also trigger a remote controller communication error.



IMPORTANT

If the system detects an error that could potentially create a safety hazard, the heater will not operate.

**CAUTION**

If a heater is installed in a duct, do not use Panel Heater Connector. By doing so, the fan will turn off when the heater is on, which may result in fire.



**NOTE**

When using the SPTB1 accessory, take special care when restarting power to the system to ensure that both the indoor unit and outdoor unit are powered up at the same time to avoid triggering a communication error.

12.3. Self-diagnosis action table

Error Code	Abnormal point and detection method	Cause	Countermeasure
P1	Room temperature thermistor (TH1) <ol style="list-style-type: none"> The unit is in three-minute resume prevention mode if short/open of thermistor is detected. Abnormal if the unit does not reset normally after three minutes. (The unit returns to normal operation, if it has normally reset.) Constantly detected during cooling, drying and heating operation Short: 90 °C [194 °F] or more Open: -40 °C [-40 °F] or less 	<ol style="list-style-type: none"> Defective thermistor characteristics Contact failure of connector (CN20) on the indoor controller board (Insert failure) Breaking of wire or contact failure of thermistor wiring Defective indoor controller board 	<p>1–3. Check resistance value of thermistor.</p> <p>0 °C [32 °F].....15.0kΩ 10 °C [50 °F].....9.6kΩ 20 °C [68 °F].....6.3kΩ 30 °C [86 °F].....4.3kΩ 40 °C [104 °F]...3.0kΩ</p> <p>If you put force on (draw or bend) the lead wire with measuring resistance value of thermistor breaking of wire or contact failure can be detected.</p> <p>2. Check contact failure of connector (CN20) on the indoor controller board. Refer to 12-5. Turn the power on again and check restart after inserting connector again.</p> <p>4. Check room temperature display on remote controller. Replace indoor controller board if there is abnormal difference with actual room temperature. Turn the power off, and on again to operate after check.</p>
P2	Pipe temperature thermistor/Liquid (TH2) <ol style="list-style-type: none"> The unit is in three-minute resume prevention mode if short/open of thermistor is detected. Abnormal if the unit does not reset normally after three minutes. (The unit returns to normal operation, if it has normally reset.) Constantly detected during cooling, drying, and heating (except defrosting) operation. Short: 90 °C [194 °F] or more Open: -40 °C [-40 °F] or less 	<ol style="list-style-type: none"> Defective thermistor characteristics Contact failure of connector (CN44) on the indoor controller board (Insert failure) Breaking of wire or contact failure of thermistor wiring Defective refrigerant circuit is causing thermistor temperature of 90 °C [194 °F] or more or -40 °C [-40 °F] or less. 5 Defective indoor controller board 	<p>1–3. Check resistance value of thermistor. For characteristics, refer to (P1) above.</p> <p>2. Check contact failure of connector (CN44) on the indoor controller board. Refer to 12-5. Turn the power on again and check restart after inserting connector again.</p> <p>4. Check pipe <liquid> temperature with remote controller in test run mode. If pipe<liquid> temperature is extremely low (in cooling mode) or high (in heating mode), refrigerant circuit may have defective.</p> <p>5. Check pipe <liquid> temperature with remote controller in test run mode. If there is extreme difference with actual pipe <liquid> temperature, replace indoor controller board. Turn the power off, and on again to operate after check.</p>

Error Code	Abnormal point and detection method	Cause	Countermeasure
P4 (5701)	<p>Contact failure of drain float switch (CN4F)</p> <ol style="list-style-type: none"> 1. Extract when the connector of drain float switch is disconnected. (3 and 4 of connector CN4F is not short-circuited.) 2. Constantly detected during operation. 	<ol style="list-style-type: none"> 1. Contact failure of connector (Insert failure) 2. Defective indoor controller board 	<ol style="list-style-type: none"> 1. Check contact failure of float switch connector. Turn the power on again and check after inserting connector again. 2. Operate with connector (CN4F) short-circuited. Refer to 12-5. Replace indoor controller board if abnormality reappears.
P6	<p>Freezing/overheating protection is working</p> <ol style="list-style-type: none"> 1. Freezing protection (Cooling mode) The unit is in six-minute resume prevention mode if pipe <liquid or condenser/evaporator> temperature stays under -15 °C [5 °F] for three minutes after the compressor started. Abnormal if it stays under -15 °C [5 °F] for three minutes again within 16 minutes after six-minute resume prevention mode. 2. Overheating protection (Heating mode) The units is in six-minute resume prevention mode if pipe <Liquid or condenser / evaporator>temperature is detected as over 70 °C [158 °F] after the compressor started. Abnormal if the temperature of over 70 °C [158 °F] is detected again within 10 minutes after six-minute resume prevention mode. 	<p>(Cooling or drying mode)</p> <ol style="list-style-type: none"> 1. Clogged filter (reduced airflow) 2. Short cycle of air path 3. Low-load (low temperature) operation beyond the tolerance range 4. 4 Defective indoor fan motor <ul style="list-style-type: none"> • Fan motor is defective. • Indoor controller board is defective. 5. Defective outdoor fan control 6. Overcharge of refrigerant 7. Defective refrigerant circuit (clogs) <p>(Heating mode)</p> <ol style="list-style-type: none"> 1. Clogged filter (reduced airflow) 2. Short cycle of air path 3. Over-load (high temperature) operation beyond the tolerance range 4. Defective indoor fan motor <ul style="list-style-type: none"> • Fan motor is defective. • Indoor controller board is defective. 5. Defective outdoor fan control 6. Overcharge of refrigerant 7. 7 Defective refrigerant circuit (clogs) 8. Bypass circuit of outdoor unit is defective 	<p>(Cooling or drying mode)</p> <ol style="list-style-type: none"> 1. Check clogging of the filter 2. Remove shields 4. Refer to 12-8. DC Fan motor (FAN MOTOR/ INDOOR CONTROLLER BOARD) 5. Check outdoor fan motor 6~7. Check operating condition of refrigerant circuit. <p>(Heating mode)</p> <ol style="list-style-type: none"> 1. Check clogs of the filter 2. Remove shields 4. Refer to 12-8. DC Fan motor (FAN MOTOR/ INDOOR CONTROLLER BOARD) 5. Check outdoor fan motor 6~8. Check operating condition of refrigerant circuit

Error Code	Abnormal point and detection method	Cause	Countermeasure
P8	<p>Pipe temperature <Cooling mode> Detected as abnormal when the pipe temperature is not in the cooling range 3 minutes after compressor start and 6 minutes after the liquid or condenser/evaporator pipe is out of cooling range.</p> <div>  <p>NOTE 1) It takes at least 9 minutes. to detect. 2) Abnormality P8 is not detected in drying mode.</p> </div> <p>Cooling range : -3 °C (-5.4 °F)] (TH-TH1) TH: Lower temperature between: liquid pipe temperature (TH2) and condenser/evaporator temperature (TH5) TH1: Intake temperature <Heating mode> When 10 seconds have passed after the compressor starts operation and the hot adjustment mode has finished, the unit is detected as abnormal when condenser/evaporator pipe temperature is not in heating range within 20 minutes.</p> <div>  <p>NOTE 3) It takes at least 27 minutes to detect abnormality. 4) It excludes the period of defrosting (Detection restarts when defrosting mode is over)</p> </div> <p>Heating range : 3°C(5.4°F) [(TH5-TH1)</p>	<ol style="list-style-type: none"> 1. Slight temperature difference between indoor room temperature and pipe <liquid or condenser / evaporator> temperature thermistor <ul style="list-style-type: none"> • Shortage of refrigerant • Disconnected holder of pipe <liquid or condenser / evaporator> thermistor • Defective refrigerant circuit 2. Converse connection of extension pipe (on plural units connection) 3. Converse wiring of indoor/ outdoor unit connecting wire (on plural units connection) 4. Defective detection of indoor room temperature and pipe <condenser / evaporator> temperature thermistor 5. Stop valve is not opened completely 	<p>1~4. Check pipe <liquid or condenser / evaporator> temperature with room temperature display on remote controller and outdoor controller circuit board.</p> <div> <p>Conduct temperature check with outdoor controller circuit board after connecting 'A-Control Service Tool (PAC-SK52ST)'.</p> </div> <p>2~3. Check converse connection of extension pipe or converse wiring of indoor/outdoor unit connecting wire.</p>
P9	<p>Abnormality of pipe temperature thermistor / Condenser-Evaporator (TH5)</p> <ol style="list-style-type: none"> 1. The unit is in three-minute resume protection mode if short/open of thermistor is detected. Abnormal if the unit does not get back to normal within three minutes. (The unit returns to normal operation, if it has normally reset.) 2. Constantly detected during cooling, drying, and heating operation (except defrosting) Short: 90 °C [194 °F] or more Open: -40 °C [-40 °F] or less 	<ol style="list-style-type: none"> 1. Defective thermistor characteristics 2. Contact failure of connector (CN44) on the indoor controller board (Insert failure) 3. Breaking of wire or contact failure of thermistor wiring 4. Temperature of thermistor is 90 °C [194 °F] or more or -40 °C [-40 °F] or less caused by defective refrigerant circuit 5. Defective indoor controller board 	<p>1~3. Check resistance value of thermistor. For characteristics, refer to (P1) above.</p> <p>2. Check contact failure of connector (CN44) on the indoor controller board. Refer to 12-5. Turn the power on and check restart after inserting connector again.</p> <p>4. Operate in test run mode and check pipe <condenser / evaporator>temperature. If pipe <condenser / evaporator> temperature is extremely low (in cooling mode) or high (in heating mode), refrigerant circuit may have defect.</p> <p>5. When no problems are found in 1~4 above, replace the indoor unit control board.</p>

Error Code	Abnormal point and detection method	Cause	Countermeasure
E0 or E4	<p>Remote controller transmission error(E0)/signal receiving error(E4)</p> <ol style="list-style-type: none"> 1. Abnormal if main or sub remote controller can not receive normally any transmission from indoor unit of refrigerant address "0" for three minutes. (Error code : E0) 2. Abnormal if sub remote controller could not receive for any signal for two minutes. (Error code: E0) 1. Abnormal if indoor controller board can not receive normally any data from remote controller board or from other indoor controller board for three minutes. (Error code: E4) 2. Indoor controller board cannot receive any signal from remote controller for two minutes. (Error code: E4) 	<ol style="list-style-type: none"> 1. Contact failure at transmission wire of remote controller 2. All remote controllers are set as "sub" remote controller. In this case, E0 is displayed on remote controller, and E4 is displayed at LED (LED 1, LED 2) on the outdoor controller circuit board. 3. Mis-wiring of remote controller 4. Defective transmitting receiving circuit of remote controller 5. Defective transmitting receiving circuit of indoor controller board of refrigerant address "0" 6. Noise has entered into the transmission wire of remote controller 	<ol style="list-style-type: none"> 1. Check disconnection or looseness of indoor unit or transmission wire of remote controller. 2. Set one of the remote controllers "main". If there is no problem with the action above. 3. Check wiring of remote controller. • Total wiring length: max 500m (Do not use cable 5 3 or more) <ul style="list-style-type: none"> • The number of connecting indoor units: max 16 units • The number of connecting remote controller: max 2 units When it is not the above-mentioned problem of 1~3 4. Diagnose remote controllers. <ol style="list-style-type: none"> a) When "RC OK" is displayed, Remote controllers have no problem. Turn the power off, and on again to check. If abnormality generates again, replace indoor controller board. b) When "RC NG" is displayed, Replace remote controller. c) When "RC E3" is displayed, d) When "ERC 00-06" is displayed, [c),d)→Noise may be causing abnormality.] <p>* If the unit is not normal after replacing indoor controller board in group control, indoor controller board of address "0" may be abnormal.</p>
E3 or E5	<p>Remote controller transmission error(E3)/signal receiving error(E5)</p> <ol style="list-style-type: none"> 1. Abnormal if remote controller could not find blank of transmission path for six seconds and could not transmit. (Error code: E3) 2. Remote controller receives transmitted data at the same time, compares the data, and when detecting it, judges different data to be abnormal 30 continuous times. (Error code: E3) 1. Abnormal if indoor controller board could not find blank of transmission path. (Error code: E5) 2. Indoor controller board receives transmitted data at the same time, compares the data, and when detecting it, judges different data to be abnormal 30 continuous times. (Error code: E5) 	<ol style="list-style-type: none"> 1. Two remote controller are set as "main." (In case of 2 remote controllers) 2. Remote controller is connected with two indoor units or more 3. Repetition of refrigerant address 4. Defective transmitting receiving circuit of remote controller 5. Defective transmitting receiving circuit of indoor controller board 6. Noise has entered into transmission wire of remote controller. 	<ol style="list-style-type: none"> 1. Set a remote controller to main, and the other to sub 2. Remote controller is connected with only one indoor unit 3. The address changes to a separate setting 4~6. Diagnose remote controller <ol style="list-style-type: none"> a) When "RC OK" is displayed, remote controllers have no problem. Turn the power off, and on again to check. When becoming abnormal again, replace indoor controller board. b) When "RC NG" is displayed, replace remote controller. c) When "RC E3" or "ERC 00-66" is displayed, noise may be causing abnormality.

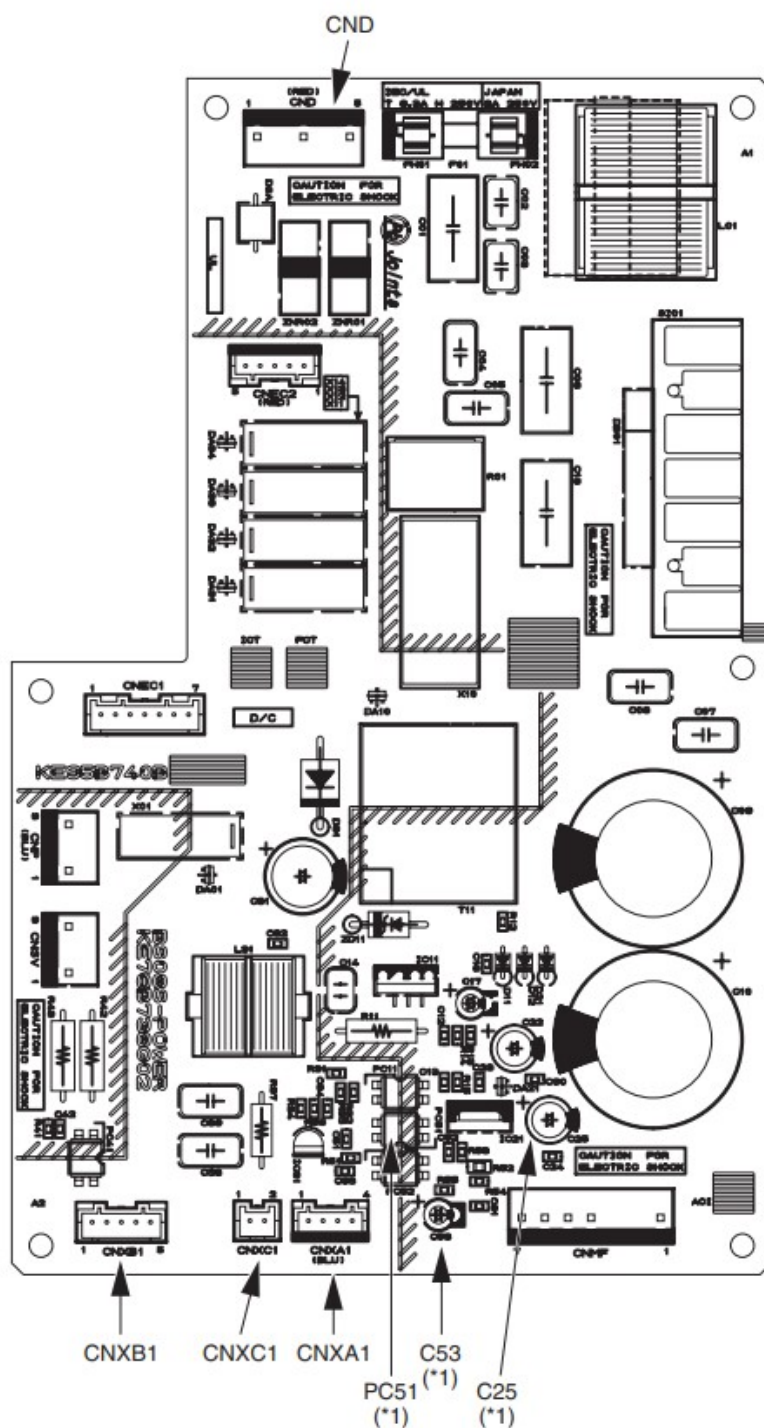
Error Code	Abnormal point and detection method	Cause	Countermeasure
E6	<p>Indoor/outdoor unit communication error (Signal receiving error)</p> <ol style="list-style-type: none"> 1. Abnormal if indoor controller board cannot receive any signal normally for six minutes after turning the power on. 2. Abnormal if indoor controller board cannot receive any signal normally for three minutes. 3. Consider the unit as abnormal under the following condition: When two or more indoor units are connected to an outdoor unit, indoor controller board cannot receive a signal for three minutes from outdoor controller circuit board, a signal which allows outdoor controller circuit board to transmit signals. 	<ol style="list-style-type: none"> 1. Contact failure, short circuit or, mis-wiring (converse wiring) of indoor/outdoor unit connecting wire 2. Defective transmitting receiving circuit of indoor controller board 3. Defective transmitting receiving circuit of indoor controller board 4. Noise has entered into indoor/ outdoor unit connecting wire 	<p>* Check LED display on the outdoor control circuit board. (Connect A-control service tool, PAC-SK52ST.) Refer to EA-EC item if LED displays EA-EC.</p> <ol style="list-style-type: none"> 1. Check disconnection or looseness of indoor/ outdoor unit connecting wire of indoor unit or outdoor unit. Check all the units in case of twin triple indoor unit system. 2~4. Turn the power off, and on again to check. If abnormality generates again, replace indoor controller board or outdoor controller circuit board. <p>* Other indoor controller board may have defect in case of twin triple indoor unit system.</p>
E7	<p>Indoor/outdoor unit communication error (Transmitting error)</p> <p>Abnormal if "1" receiving is detected 30 times continuously though indoor controller board has transmitted "0".</p>	<ol style="list-style-type: none"> 1. Defective transmitting receiving circuit of indoor controller board 2. Noise has entered into power supply 3. Noise has entered into outdoor control wire 	<p>1~3. Turn the power off, and on again to check. If abnormality generates again, replace indoor controller board.</p>
Fb	<p>Indoor controller board</p> <p>Abnormal if data cannot be read normally from the nonvolatile memory of the indoor controller board.</p>	<ol style="list-style-type: none"> 1. Defective indoor controller board 	<ol style="list-style-type: none"> 1. Replace indoor controller board.
E1 or E2	<p>Remote controller control board</p> <ol style="list-style-type: none"> 1. Abnormal if data cannot be read normally from the nonvolatile memory of the remote controller control board. (Error code: E1) 2. Abnormal if the clock function of remote controller cannot be operated normally. (Error code: E2) 	<ol style="list-style-type: none"> 1. Defective remote controller 	<ol style="list-style-type: none"> 1. Replace indoor controller board.
PB	<p>Fan motor error</p> <p>Abnormal if a) or b) is detected during fan motor operation.</p> <p>a) When the number of rotations is detected to be below the lower limit for 30 seconds.</p> <p>b) When the number of rotations is detected to be above the upper limit for 30 seconds.</p>	<ol style="list-style-type: none"> 1. Motor or fan cannot rotate because of foreign object, etc. 2. Motor wire disconnection or connector disconnection or looseness 3. Motor failure 	<ol style="list-style-type: none"> 1. Remove the foreign object causing the problem. 2. Check disconnection of the motor wiring or connector disconnection. 3. Replace the failed motor.

12.4. Troubleshooting by inferior phenomena

Phenomena	Cause	Countermeasure
(1) LED 2 on indoor controller board is off.	<p>When LED 1 on indoor controller board is also off.</p> <ol style="list-style-type: none"> Power supply of rated voltage is not supplied to outdoor unit Defective outdoor controller circuit board Power supply of 208~230V is not supplied to indoor unit Defective indoor controller board 	<ol style="list-style-type: none"> Check the voltage of outdoor power supply terminal block (L, N) or (L3, N). <ul style="list-style-type: none"> When AC 208~230V is not detected. Check the power wiring to outdoor unit and the breaker. When AC 208~230V is detected. – Check 2 (below) Check the voltage between outdoor terminal block S1 and S2. <ul style="list-style-type: none"> When AC 208~230V is not detected. Check the fuse on outdoor controller circuit board. Check the wiring connection. When AC 208~230V is detected. – Check 3 (below) Check the voltage between indoor terminal block S1 and S2. <ul style="list-style-type: none"> When AC 208~230V is not detected. Check indoor/outdoor unit connecting wire for miswiring. When AC 208~230V is detected. – Check 4 (below) Check the fuse on indoor controller board. <ul style="list-style-type: none"> Check the wiring connection. If no problem are found, indoor controller board is defective.
(2) LED 2 on indoor controller board is blinking.	<ol style="list-style-type: none"> When LED 1 on indoor controller board is also blinking. Connection failure of indoor/outdoor unit connecting wire. When LED 1 is lit. <ol style="list-style-type: none"> Miswiring of remote controller wires Under twin triple indoor unit system, 2 or more indoor units are wired together. Refrigerant address for outdoor unit is wrong or not set. Under grouping control system, there are some units whose refrigerant address is 0. Short-cut of remote controller wires Defective remote controller 	<p>Check indoor/outdoor unit connecting wire for connection failure.</p> <ol style="list-style-type: none"> Check the connection of remote controller wires in case of twin triple indoor unit system. When 2 or more indoor units are wired in one refrigerant system, connect remote controller wires to one of those units. Check the setting of refrigerant address in case of grouping control system. If there are some units whose refrigerant addresses are 0 in one group, set one of the units to 0 using SW1 (3-6) on outdoor controller circuit board. 3~4. Remove remote controller wires and check LED 2 on indoor controller board. <ul style="list-style-type: none"> When LED 2 is blinking, check the short-cut of remote controller wires. When LED 2 is lit, connect remote controller wires again and: if LED 2 is blinking, remote controller is defective; if LED 2 is lit, connection failure of remote controller terminal block etc. has returned to normal.

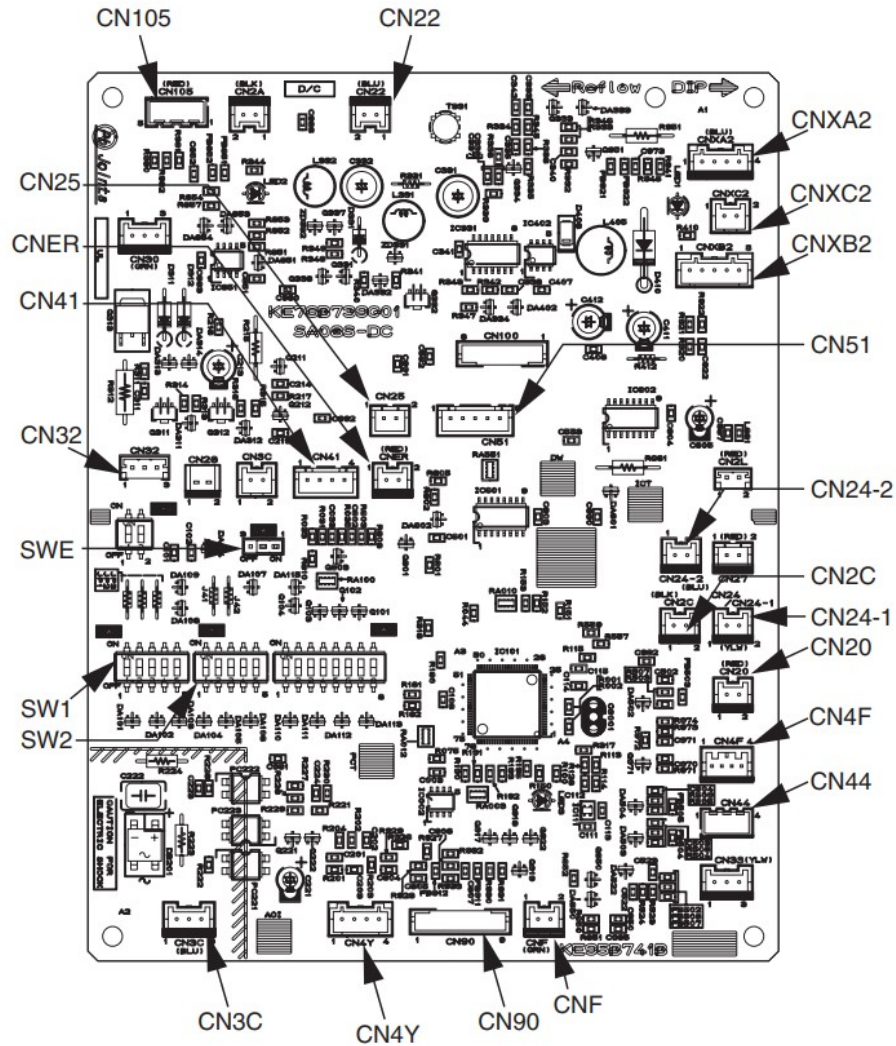
12.5. Test point diagram

12.5.1. Power supply board



- (1*)
 - V_{FG} : Voltage on the (-) side of PC51 and C25
 - (same with the voltage between 7 (+) and 4 (-) of CNMF)
 - V_{CC} : Voltage between the C25 pins 15 VDC
 - (same with the voltage between 5 (+) and 4 (-) of CNMF)
 - V_{SP} : Voltage between the C53 pins 0 VDC (with the fan stopped)
 - (same with the voltage between 6 (+) and 4 (-) of CNMF)
- CND: Power supply voltage (208-230VAC)
- CNMF: Fan motor output
 - 1 - 4: 310 - 340 VDC
 - 5 - 4: 15 VDC
 - 6 - 4: 0 - 6.5 VDC
 - 7 - 4: Stop 0 to 15 VDC, Run 7.5 VDC (0 - 15 pulse)
- CNXA1: Connect to the indoor controller board
- CNXB1: Connect to the indoor controller board
- CNXC1: Connect to the indoor controller board
- CNXA2: Connect to the indoor power board
- CNXB2: Connect to the indoor power board
- CNXC2: Connect to the indoor power board

12.5.2. Indoor controller board



- CN32: Remote start/stop adapter
- CN22: For MA remote controller cable connection (10 - 13 VDC)
- CN105: Radio frequency interface
- CN51: Centralized control
- CN41: JAMA standard HA terminal A
- CN44: Thermistor (liquid/condenser/evaporator temperature)
- CN4F: Float sensor
- CN20: Thermistor (inlet temperature)
- CN24-1: 1st heater control (12 VDC)
- CN24-2: 2nd heater control
- CN4Y: For fan control
- CN3C: Indoor - outdoor transmission (0 - 24 VDC)
- CN90: Wireless remote controller
- CNXA2: Connect to the indoor controller board
- CNXB2: Connect to the indoor controller board
- CNXC2: Connect to the indoor controller board
- CNXA1: Connect to the indoor power board
- CNXB1: Connect to the indoor power board
- CNXC1: Connect to the indoor power board
- CNER: ERV control
- CN2C: ERV input
- CN25: Humidity control
- CNF: Humidity input
- SWE: Emergency operation
- SW1: Model selection
- SW2: Capacity setting

12.6. Trouble criterion of main parts

Part name	Check method and criterion				
Room temperature thermistor (TH1)	Measure the resistance with a tester. (Part temperature 10C (50F) ~ 30C (86F)) <table><tr><td>Normal</td><td>Abnormal</td></tr><tr><td>4.3k~9.6k</td><td>Opened or short-circuited</td></tr></table>	Normal	Abnormal	4.3k~9.6k	Opened or short-circuited
Normal		Abnormal			
4.3k~9.6k		Opened or short-circuited			
Pipe temperature thermistor/liquid (TH2)					
Condenser/evaporator temperature thermistor (TH5)					
Wiring diagram	<p>The wiring diagram illustrates the electrical connections for the motor control system. External inputs on the left include Vm (Power supply for motor), Vcc (Power supply for control), Vsp (Speed command voltage), PG (Pulse output for rotation), and GND. These are connected to internal components: a Regulator, a Hall IC, a Power device, and a Pre driver. The Power device and Pre driver are connected to the Motor winding, which is shown as a dashed box. A current detecting resistor is connected between the Power device and the Pre driver. The Motor is shown as a dashed box containing the Board with build-in motor and the Motor winding.</p>				

12.7. Thermistor

<Thermistor Characteristic graph>

Thermistor for
lower temperature

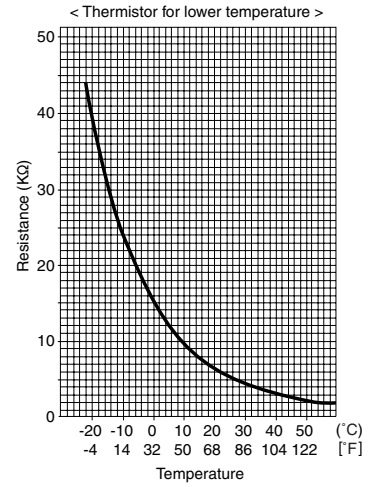
Room temperature thermistor (TH1)
Pipe temperature thermistor (TH2)
Condenser/evaporator temperature
thermistor (TH5)

Thermistor $R_0 = 15 \text{ k}\Omega \pm 3\%$

Fixed number of $B = 3480 \text{ k}\Omega \pm 2\%$

$$R_t = 15 \exp \left\{ 3480 \left(\frac{1}{273+t} - \frac{1}{273} \right) \right\}$$

0°C	(32°F)	15 kΩ
10°C	(50°F)	9.6 kΩ
20°C	(68°F)	6.3 kΩ
25°C	(77°F)	5.2 kΩ
30°C	(86°F)	4.3 kΩ
40°C	(104°F)	3.0 kΩ



12.8. DC Fan motor (fan motor/indoor controller board)

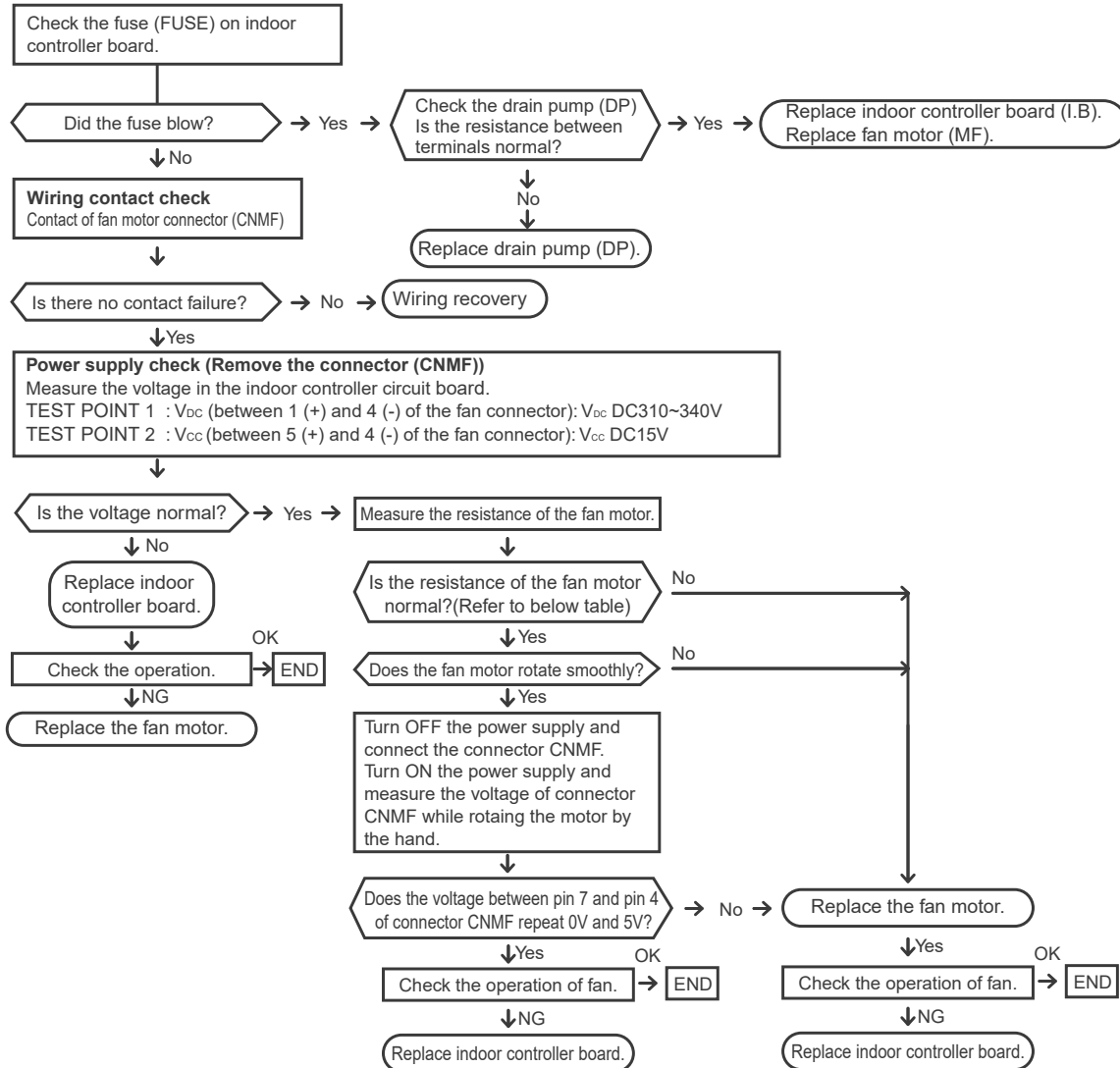
Check method of DC fan motor (fan motor/indoor controller circuit board)

1 Notes

- High voltage is applied to the connector (CNMF) for the fan motor. Give attention to the service.
- Do not pull out the connector (CNMF) for the motor with the power supply on.
(It causes trouble of the indoor controller circuit board and fan motor.)

2 Self check

Symptom : The indoor fan cannot turn around.



12.8.1. DC Fan motor measuring points

Measuring points	Resistance
pin 1 - pin 4	O.L.
pin 5 - pin 4	50k Ω
pin 6 - pin 4	150k Ω
pin 7 - pin 4	O.L.



NOTE

* To measure the resistance, connect the negative (-) end of the tester to pin 4.

12.9. Functions of DIP switch and jumper wire

Each function is controlled by the dip switch and the jumper wire on control p.c. board. SW1 and SW2 are equipped only for service parts.

Model setting and capacity setting are memorized in the nonvolatile memory of the control p.c. board of the unit.

Jumper wire	Functions	Setting by the dip switch and jumper wire	Remarks												
SW1	Model settings	For service board <div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div>													
SW2	Capacity settings	<table><tr><th>Model code</th><th>Service Board</th></tr><tr><td>12</td><td><div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div></td></tr><tr><td>18</td><td><div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div></td></tr><tr><td>24</td><td><div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div></td></tr><tr><td>30</td><td><div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div></td></tr><tr><td>36</td><td><div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div></td></tr></table>	Model code	Service Board	12	<div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div>	18	<div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div>	24	<div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div>	30	<div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div>	36	<div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div>	
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36	<div><div><div>1</div><div>2</div><div>3</div><div>4</div><div>5</div></div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div></div></div>ON OFF</div>														

Jumper wire	Functions	Setting by the dip switch and jumper wire			Remarks																	
J41 J42	Pair number setting with wireless remote controller	<table><tr><th rowspan="2">Wireless remote controller setting</th><th colspan="2">Control PCB setting</th></tr><tr><th>J41</th><th>J42</th></tr><tr><td>0</td><td>○</td><td>○</td></tr><tr><td>1</td><td>X</td><td>○</td></tr><tr><td>2</td><td>○</td><td>X</td></tr><tr><td>3 ~ 9</td><td>X</td><td>X</td></tr></table>	Wireless remote controller setting	Control PCB setting		J41	J42	0	○	○	1	X	○	2	○	X	3 ~ 9	X	X	< Settings at time of factory shipment> Wireless remote controller: 0 Control PCB: ○ (for both J41 and J42) Four pair number settings are supported. The pair number settings of the wireless remote controller and indoor control PCB (J41/J42) are given in the table on the left. (' ' in the table indicates the jumper line is disconnected.)		
Wireless remote controller setting	Control PCB setting																					
	J41	J42																				
0	○	○																				
1	X	○																				
2	○	X																				
3 ~ 9	X	X																				
JP1	Unit type setting	<table><tr><th>Model</th><th>JP1</th></tr><tr><td>Without TH5</td><td>○</td></tr><tr><td>With TH5</td><td>X</td></tr></table>	Model	JP1	Without TH5	○	With TH5	X	There is no jumper (JP1) because these models have the cond./eva. temperature thermistor (TH5).													
Model	JP1																					
Without TH5	○																					
With TH5	X																					
JP3	Indoor controller board type setting	<table><tr><th>Indoor controller board type</th><th>JP3</th></tr><tr><td>Factory shipment</td><td>○</td></tr><tr><td>Service parts</td><td>○</td></tr></table>	Indoor controller board type	JP3	Factory shipment	○	Service parts	○														
Indoor controller board type	JP3																					
Factory shipment	○																					
Service parts	○																					

13. Disassembly Procedure

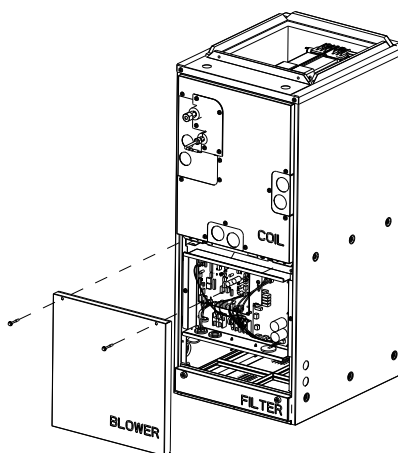


CAUTION

Exercise caution when removing heavy parts.

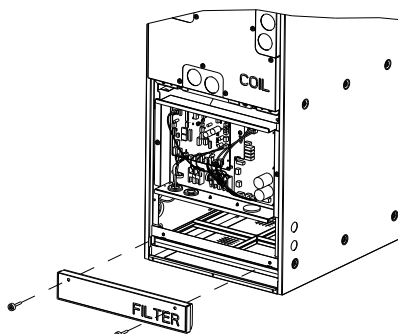
Control box

1. Remove blower panel.

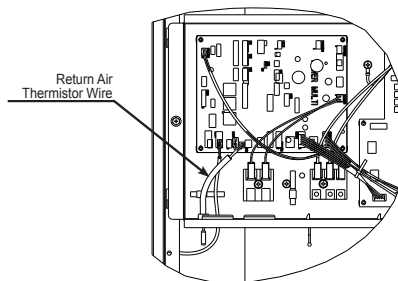


Thermistor (Return Air)

1. Remove the Filter panel

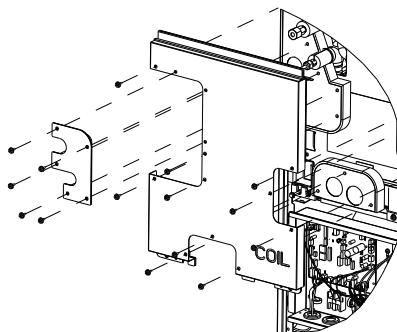


3. Return air thermistor is located as shown in the image inside the control box and is connected to the control board on CN20.

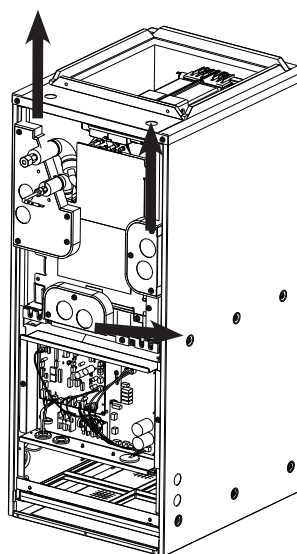


Coil assembly

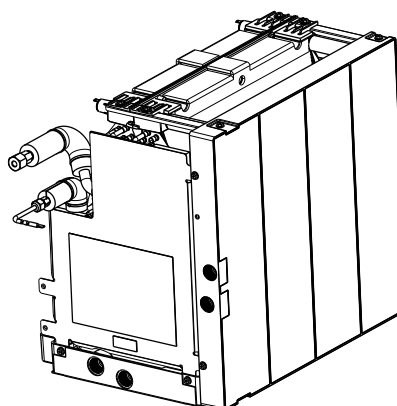
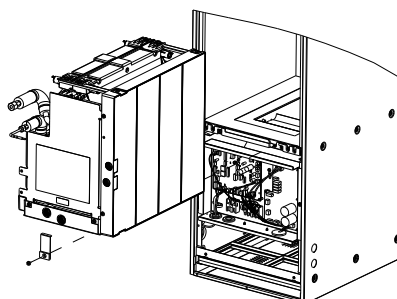
1. Remove the Blower and Filter panel indicated in sections 1 and 2.
2. Remove the Coil panel by removing all of the screws securing it to the (3) smaller panels for refrigerant and drain lines.



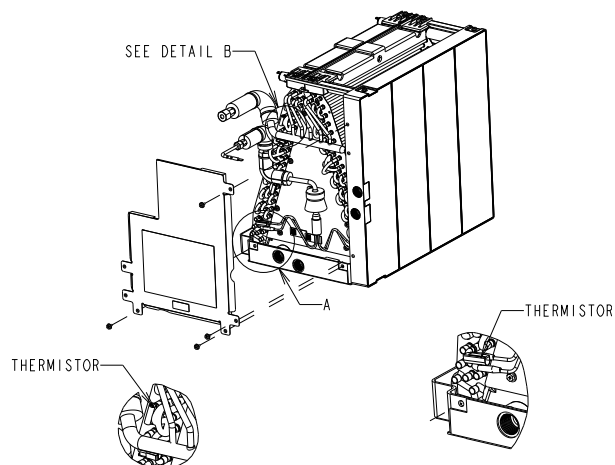
3. Slide the smaller panels in the directions indicated and remove.



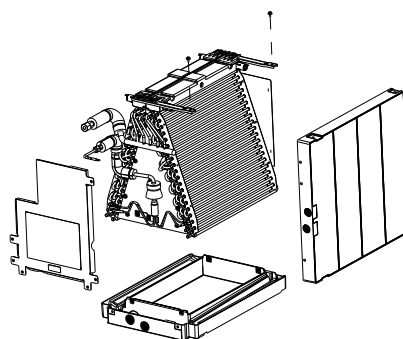
4. Remove the (1 or 2) brackets that secure the coil, unplug the thermistors by separating the water proof connector in the coil area. Next, slide the coil from the frame.



5. Remove the plate covering the coil assembly to access the thermistors.

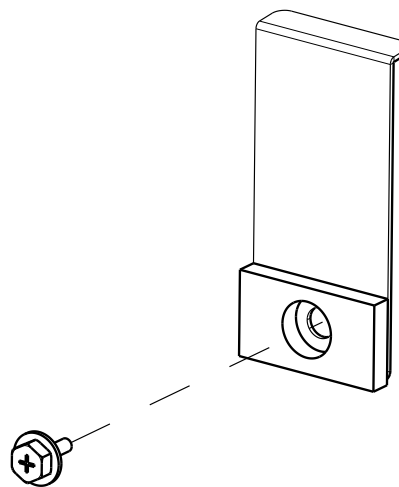


6. Remove lower and side drain pan.

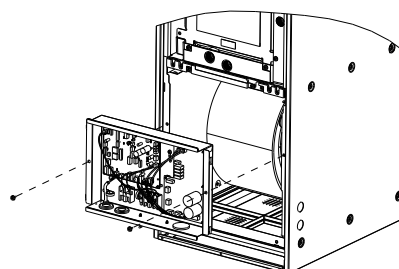


Blower/fan assembly

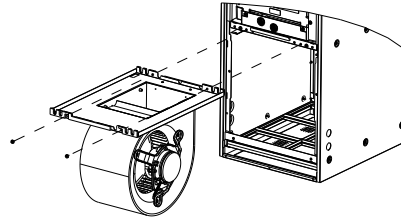
1. Remove the Blower and Filter panel (along with filter if installed) indicated in section 2.
2. Remove the (1 or 2) brackets that secure the coil assembly.



3. Unplug CN44 and motor plug (CNMF) from control box.
4. Remove the (2) screws that secure the control box and then remove the control box.



5. Remove coil panel and smaller drain panel.
6. Remove the (2) screws that secure the fan assembly and slide out.



This product is designed and intended for use in the residential, commercial and light-industrial environment.

MITSUBISHI ELECTRIC US, INC.



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