

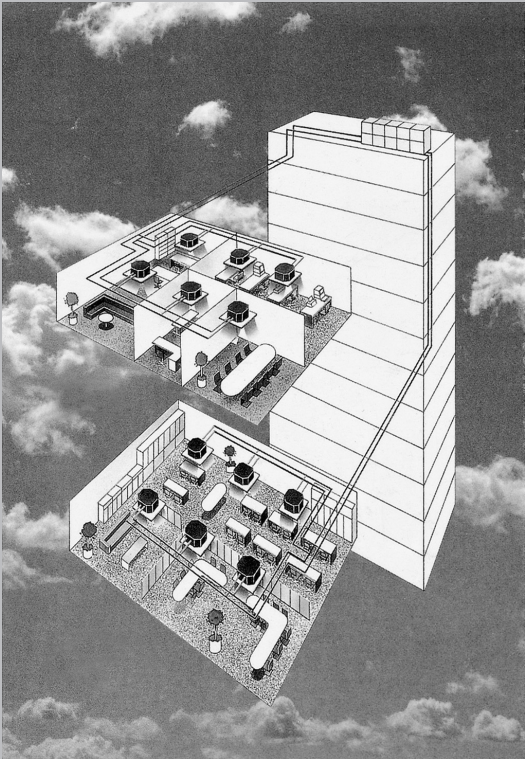
All Fresh Air Indoor Unit

KFNQ SERIES (R410A)

Technical Catalog

All Fresh Air Indoor Unit

KFNQ SERIES	RPI-5.0KFNQ
	RPI-8.0KFNQ
	RPI-10.0KFNQ
	RPI-12.0KFNQ
	RPI-16.0KFNQL
	RPI-16.0KFNQH
	RPI-20.0KFNQL
	RPI-20.0KFNQH
	RPI-20.0KFNQLF
	RPI-20.0KFNQHF



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DESIGN INFORMATION

1. FEATURES

1.1 Features

Create comfortable and healthy indoor environment

Create comfortable and healthy indoor environment by introducing fresh outdoor air. By heating or cooling fresh outdoor air to almost the same temperature as room temperature, fresh ambient air can be adapted and then introduced into indoor room. Besides, after filtered, fresh outdoor air in transition seasons can be drawn to indoor room directly with no need of heating or cooling operation. While fresh outdoor air is introduced, other indoor units don't bear fresh air load.

Advanced control

Various controllers can be choosed. Remote control switch, wireless remote control switch, central station and 7-day time etc.

Can be interfaced to H-LINK system, easy electrical wiring design and installation.

Can be interfaced to CS-NET computer controlled network system.

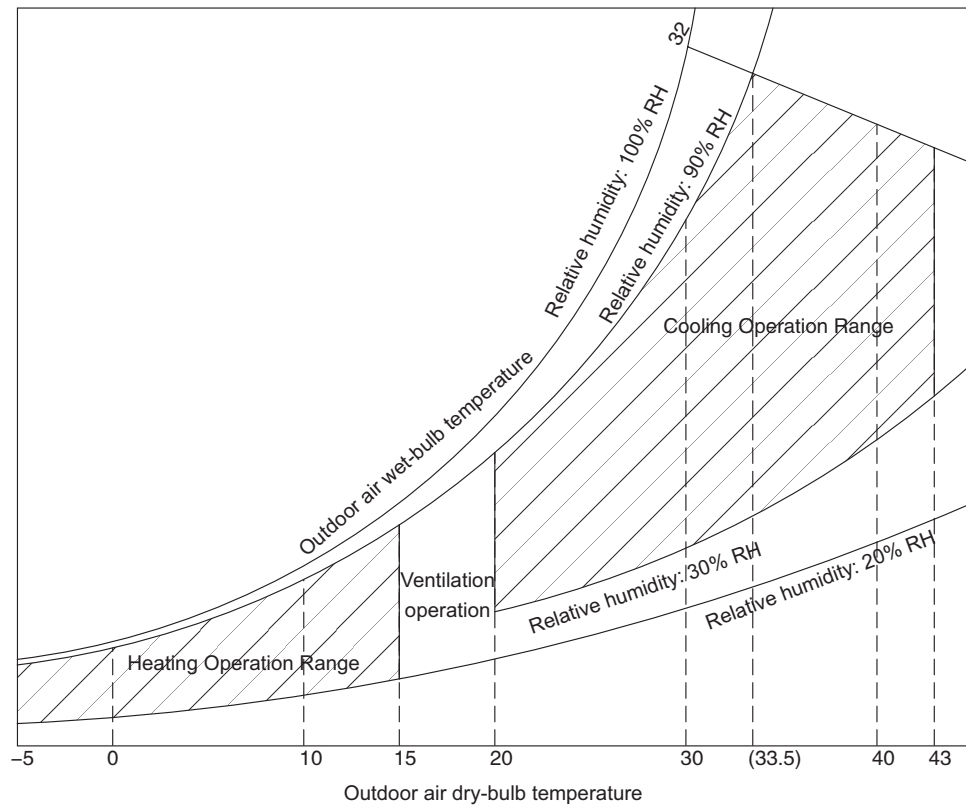
Flexible Line-up to SET-FREE series

All Fresh Air Indoor Unit is applicable to SET-FREE outdoor units. both SET-FREE indoor units and all fresh air indoor unit can be used in SET-FREE system. (5HP, 8HP and 10HP)

Higher external static pressure

Better installation flexibility at site, longer duct can be connected.

1.2 Operation Range



Note:

Under cooling mode, when outdoor temperature is lower than 20°C, the system will automatically shift to ventilation operation; Under heating mode, when outdoor temperature is higher than 15°C, the system will automatically shift to ventilation operation; In case inlet temperature is below -5°C, All Fresh Air Indoor Unit will stop.

2. GENERAL DATA

Model		RPI-5.0KFNQ		RPI-8.0KFNQ		RPI-10.0KFNQ	
Power Supply		AC1Φ, 220–240V/50Hz AC1Φ,220V/60Hz		AC1Φ, 220–240V/50Hz	AC1Φ,220V/60Hz	AC1Φ, 220–240V/50Hz	AC1Φ,220V/60Hz
Cooling Capacity		kW	14.0				
Cooling Power		kW	0.30	0.35	0.48	0.55	0.50 0.58
Nominal Cooling Current		A	1.4	1.61	2.2	2.53	2.3 2.65
Heating Capacity		kW	13.7				
Heating Power		kW	0.30	0.35	0.48	0.55	0.50 0.58
Nominal Heating Current		A	1.4	1.61	2.2	2.53	2.3 2.65
Outer Dimensions	H	mm	370		486		486
	W	mm	1,320		1,270		1,270
	D	mm	800		1,069		1,069
Sound Pressure Level (Overall A Scale)		dB	42		44		47
Net Weight		kg	63		110		110
Refrigerant			R410A				
Indoor Fan Air Flow Rate		m³/min	18		28		35
External Static Pressure		Pa	200		220		220
Drain Piping Size			VP25,Outer Diameter:Φ32mm				
Refrigerant Liquid Line Size		mm	Φ9.53		Φ9.53		Φ9.53
Refrigerant Gas Line Size		mm	Φ15.88		Φ19.05		Φ22.2
Temperature Range of Fresh Air Drawn			Cooling:20°C~43°C, Heating:-7°C~15°C				

NOTES:

- The nominal cooling capacity and heating capacity are based on following conditions:
Cooling operation conditions : 33℃ DB ,28℃ WB, piping length: 7.5m,piping lift :0m
Heating operation conditions: 0℃ DB,-2.9℃ WB,piping length: 7.5m,piping lift :0m
(Heating capacity is tested when defrosting is not available)
- The sound pressure level is based on following conditions: 1.5 meter beneath the unit
The above data was measured in an anechoic chamber so that reflected sound should be taken into consideration in the field.
- An air filter with dust collection efficiency more than 50% needs to be attached to the duct system of the suction side at site.
- When the resistance of the field-supplied duct is small, it may cause abnormal stoppage, malfunction, spraying water, etc. due to excessive air flow. And the duct, which is to be connected to this unit, shall be insulated for dew protection.
- All fresh air indoor unit is for processing fresh air load and not for stabilizing the room temperature. For adjusting the air conditioning load of the room, the additional air conditioner is required.
- This unit shall be connected to SET-FREE outdoor unit. In case of connecting this unit with other indoor units in the same refrigerant cycle, calculate the capacity of this unit as 21.0kW(5HP), 33.6kW(8HP), 42.0kW(10HP).
- When SET-FREE outdoor unit is connected only with all fresh air indoor unit, the configuration rate is 100%.
- Under cooling mode, when outdoor temperature is lower than 20℃ ,the system will automatically shift to ventilation operation;Under heating mode, when outdoor temperature is higher than 15℃ , the system will automatically shift to ventilation operation;In case inlet temperature is below -5℃, All Fresh Air Indoor Unit will stop.

Model			RPI-12.0KFNQ		RPI-16.0KFNQL		RPI-16.0KFNQH		RPI-20.0KFNQL		RPI-20.0KFNQH		RPI-20.0KFNQLF		RPI-20.0KFNQHF	
Power Supply			AC3Φ 380-415V /50Hz	AC3Φ 380V/60Hz	AC3Φ 380-415V /50Hz	AC3Φ 380V/60Hz	AC3Φ 380-415V /50Hz	AC3Φ 380V/60Hz	AC3Φ 380-415V /50Hz	AC3Φ 380V/60Hz	AC3Φ 380-415V /50Hz	AC3Φ 380V/60Hz	AC3Φ 380-415V /50Hz	AC3Φ 380V/60Hz	AC3Φ 380-415V /50Hz	AC3Φ 380V/60Hz
Cooling Capacity		kW	33.5		45.0		45.0		56.0		56.0		56.0		56.0	
Cooling Power		kW	0.68	0.78	0.72	0.83	1.06	1.22	1.06	1.22	1.39	1.6	1.39	1.60	1.72	1.98
Nominal Cooling Current		A	1.43	1.64	1.8	2.07	2.2	2.53	2.22	2.55	3.14	3.61	3.0	3.45	3.9	4.45
Heating Capacity		kW	26.8		36.0		36.0		44.8		44.8		44.8		44.8	
Heating Power		kW	0.68	0.78	0.72	0.83	1.06	1.22	1.06	1.22	1.39	1.6	1.39	1.60	1.72	1.98
Nominal Heating Current		A	1.43	1.64	1.8	2.07	2.2	2.53	2.22	2.55	3.14	3.61	3.0	3.45	3.9	4.45
Outer Dimensions	H	mm	486		635		635		735		735		735		735	
	W	mm	1,270		1,950		1,950		1,950		1,950		1,950		1,950	
	D	mm	1,069		805		805		805		805		805		805	
Sound Pressure Level		dB(A)	56		58		62		61		65		63		67	
Net Weight		kg	110		196		196		222		222		222		222	
Refrigerant			R410A													
Indoor Fan Air Flow Rate		m³/min	50		67		67		83		83		100		100	
External Static Pressure		Pa	220		200		300		200		300		200		300	
Air Inlet Size		mm	1,100 x 415		1,522 x 522		1,522 x 522		1,522 x 622		1,522 x 622		1,522 x 622		1,522 x 622	
Air Outlet Size		mm	1,106 x 338		850 x 272		850 x 272		850 x 272		850 x 272		850 x 272		850 x 272	
Drain Piping Size			VP25		RC1(Internal Screw)											
Refrigerant Liquid Line Size		mm	Φ12.7		Φ12.7		Φ12.7		Φ15.88		Φ15.88		Φ15.88		Φ15.88	
Refrigerant Gas Line Size		mm	Φ25.4		Φ25.4		Φ25.4		Φ28.6		Φ28.6		Φ28.6		Φ28.6	
Temperature Range of Fresh Air Drawn			Cooling:20℃~43℃, Heating:-7℃~15℃													

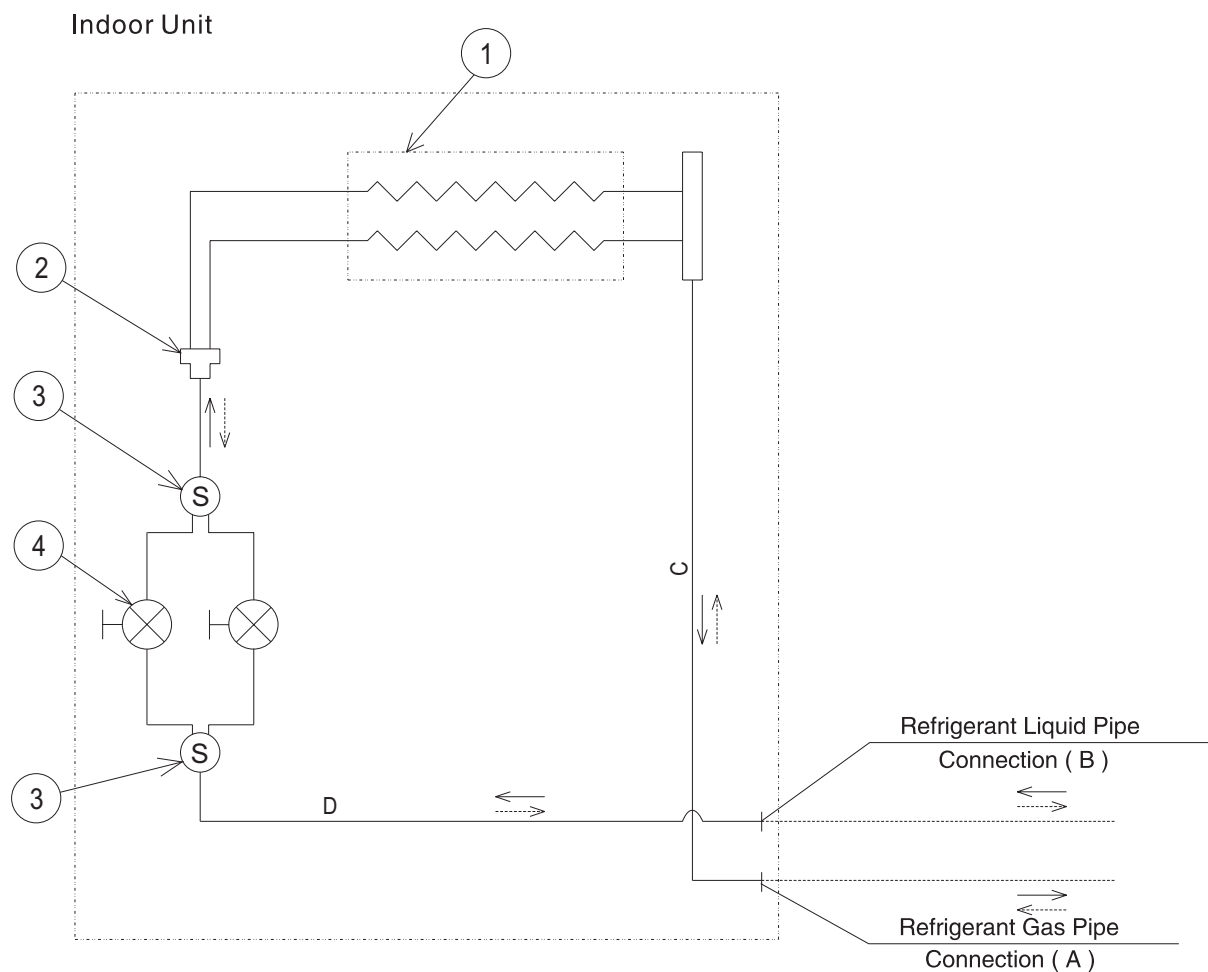
NOTES:

- The nominal cooling capacity and heating capacity are based on following conditions:
Cooling operation conditions : 33℃ DB ,28℃ WB, piping length: 7.5m,piping lift :0m
Heating operation conditions: 0℃ DB,-2.9℃ WB,piping length: 7.5m,piping lift :0m
(Heating capacity is tested when defrosting is not available)
- The sound pressure level is based on following conditions: 1.5 meter beneath the unit
The above data was measured in an anechoic chamber so that reflected sound should be taken into consideration in the field.
- An air filter with dust collection efficiency more than 50% needs to be attached to the duct system of the suction side at site.
- When the resistance of the field-supplied duct is small, it may cause abnormal stoppage, malfunction, spraying water, etc. due to excessive air flow. And the duct, which is to be connected to this unit, shall be insulated for dew protection.
- All fresh air indoor unit is for processing fresh air load and not for stabilizing the room temperature. For adjusting the air conditioning load of the room, the additional air conditioner is required.
- Under cooling mode, when outdoor temperature is lower than 20℃,the system will automatically shift to ventilation operation;Under heating mode, when outdoor temperature is higher than 15℃, the system will automatically shift to ventilation operation;In case inlet temperature. is below -5℃, All Fresh Air Indoor Unit will stop.



3. REFRIGERATION CYCLE

RPI-5.0KFNQ, RPI-8.0KFNQ, RPI-10.0KFNQ and RPI-12.0KFNQ



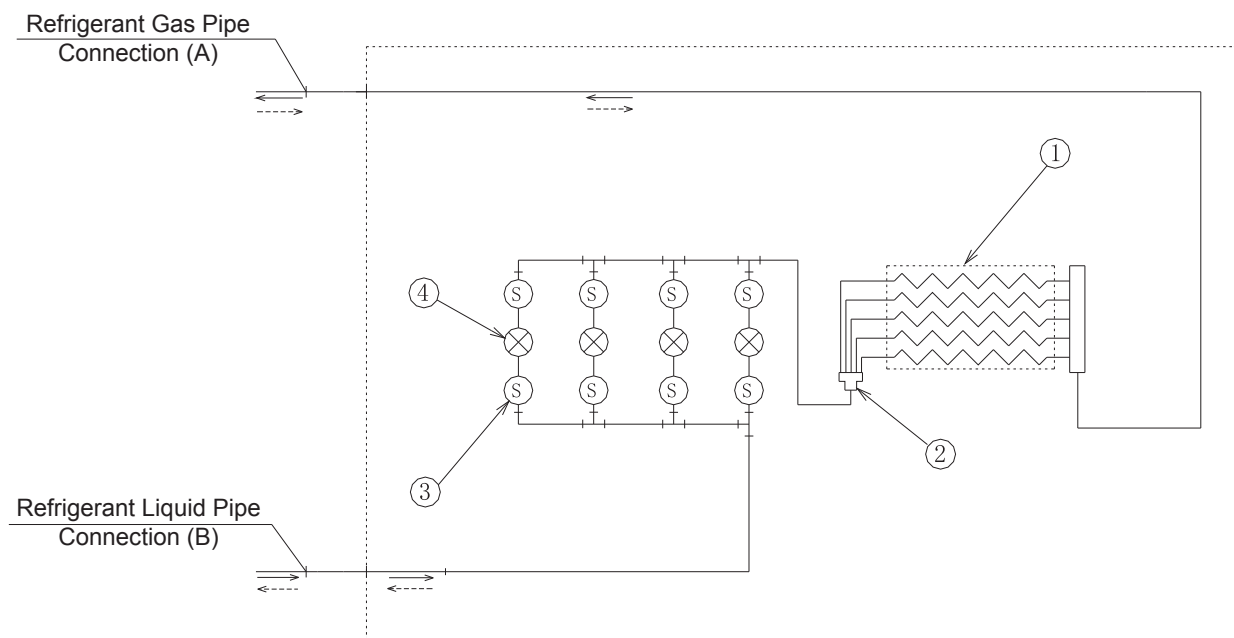
Mark	Part Name
①	Heat Exchanger
②	Distributor
③	Strainer
④	Micro-Computer Control Expansion Valve

MODEL	A	B	C	D
RPI-5.0KFNQ	Φ 15.88 × t1.0	Φ 9.53 × t0.8	Φ 22 × t1.2	Φ 12.7 × t0.8
RPI-8.0KFNQ	Φ 19.05 × t1.0	Φ 9.53 × t1.0	Φ 28.6 × t1.6	Φ 12.7 × t1.0
RPI-10.0KFNQ	Φ 22.2 × t1.2	Φ 9.53 × t1.0	Φ 28.6 × t1.6	Φ 12.7 × t1.0
RPI-12.0KFNQ	Φ 25.4 × t1.2	Φ 12.7 × t1.0	Φ 28.6 × t1.6	Φ 12.7 × t1.0

- ← : Refrigerant Flow Direction (Cooling Operation)
- ← : Refrigerant Flow Direction (Heating Operation)
- : Field Refrigerant Piping
- +— : Blazing or Flare-nut Connection

RPI-16.0KFNQL/H, RPI-20.0KFNQL/H and RPI-20.0KFNQLF/HF

Indoor Unit



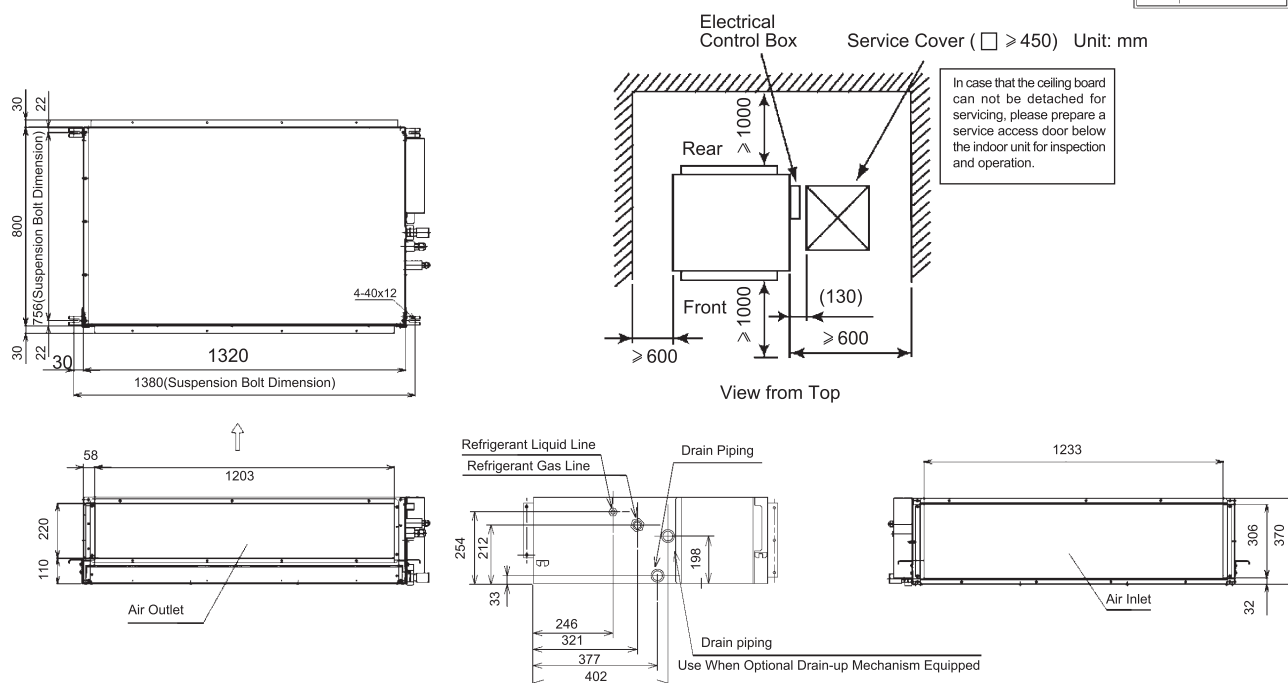
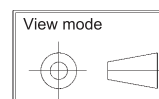
Mark	Part Name
①	Heat Exchanger
②	Distributor
③	Strainer
④	Micro-Computer Control Expansion Valve

MODEL	A	B
RPI-16.0KFNQL/H	$\Phi 25.4 \times t1.6$	$\Phi 12.7 \times t1.0$
RPI-20.0KFNQL/H, RPI-20.0KFNQLF/HF	$\Phi 28.6 \times t1.6$	$\Phi 15.88 \times t1.2$

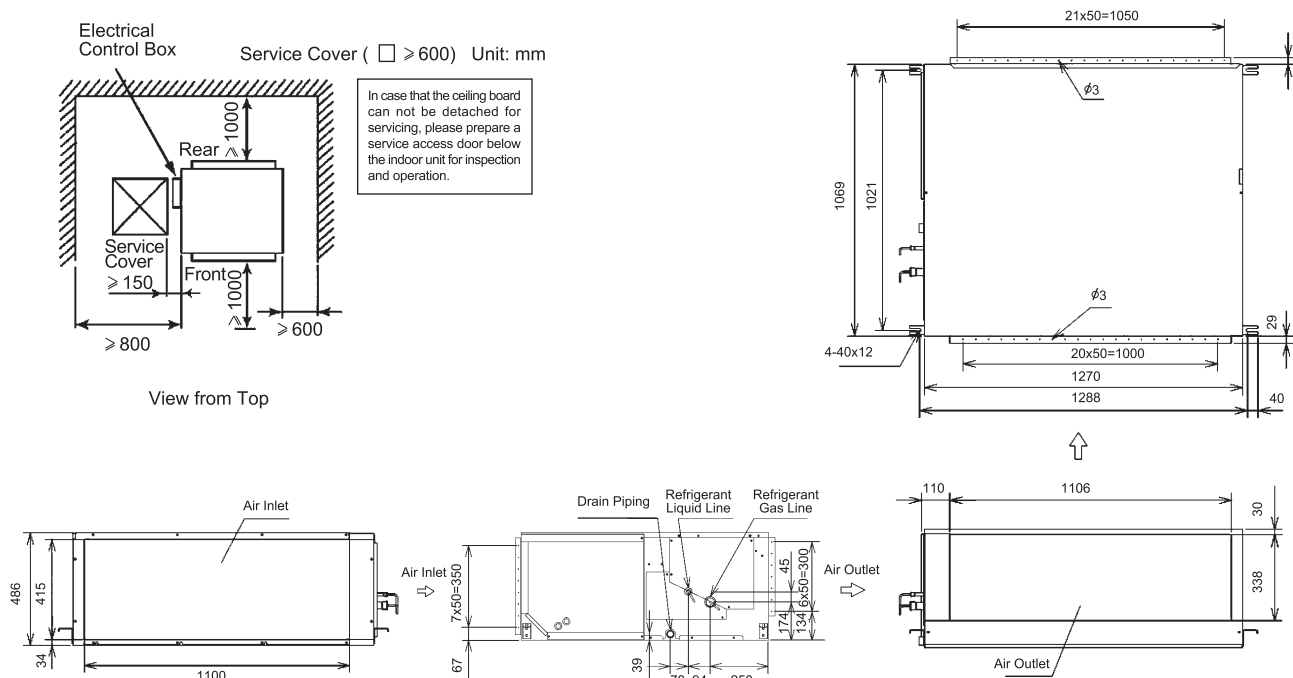
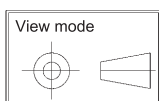
- ← : Refrigerant Flow Direction
 (Cooling Operation)
 ← : Refrigerant Flow Direction
 (Heating Operation)
 ----- : Field Refrigerant Piping
 —+— : Blazing or Flare-nut Connection

4. DIMENSIONAL DATA

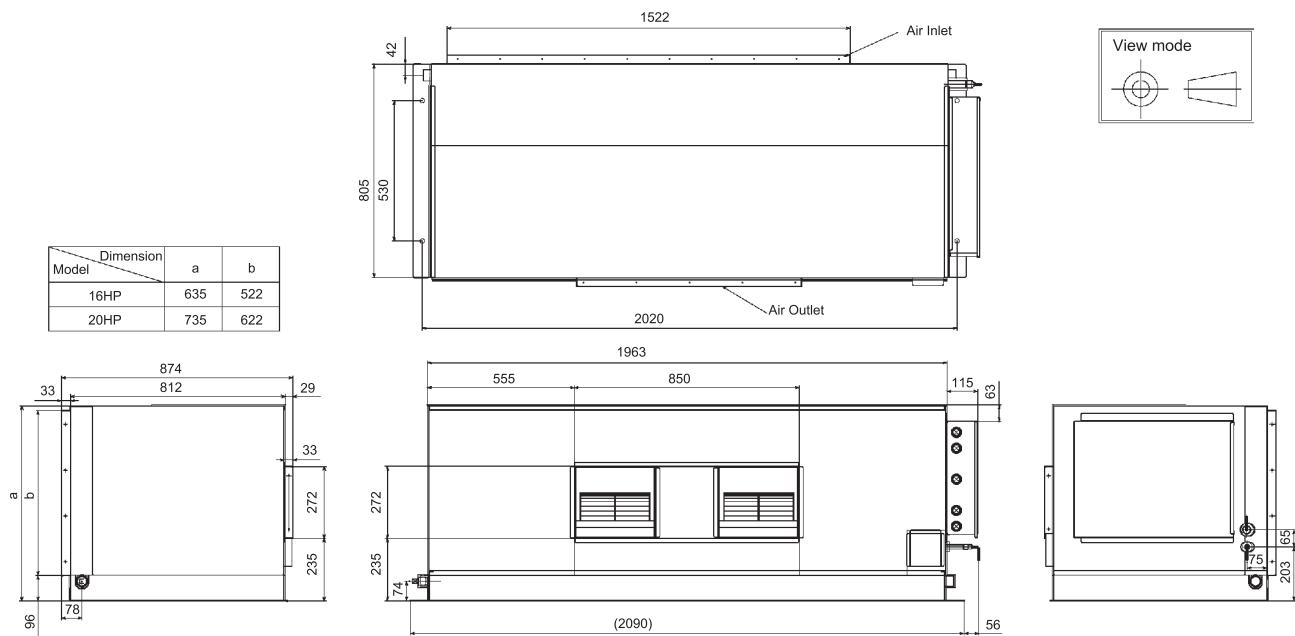
RPI-5.0KFNQ



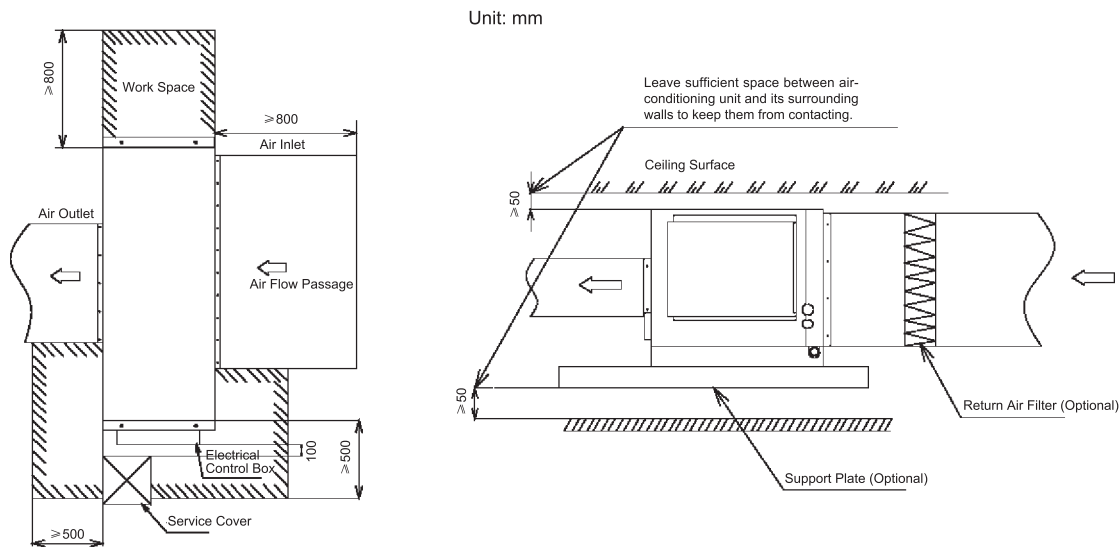
RPI-8.0KFNQ, RPI-10.0KFNQ and RPI-12.0KFNQ



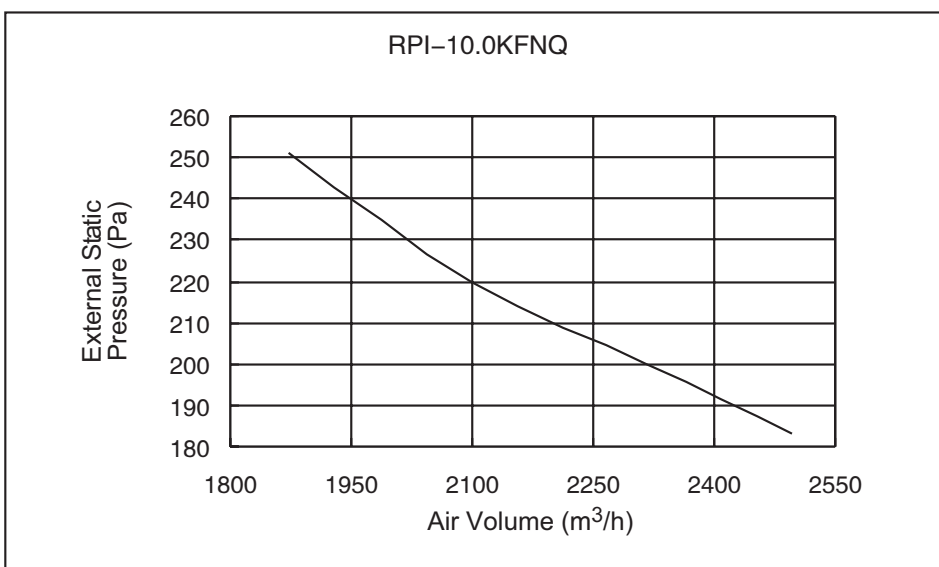
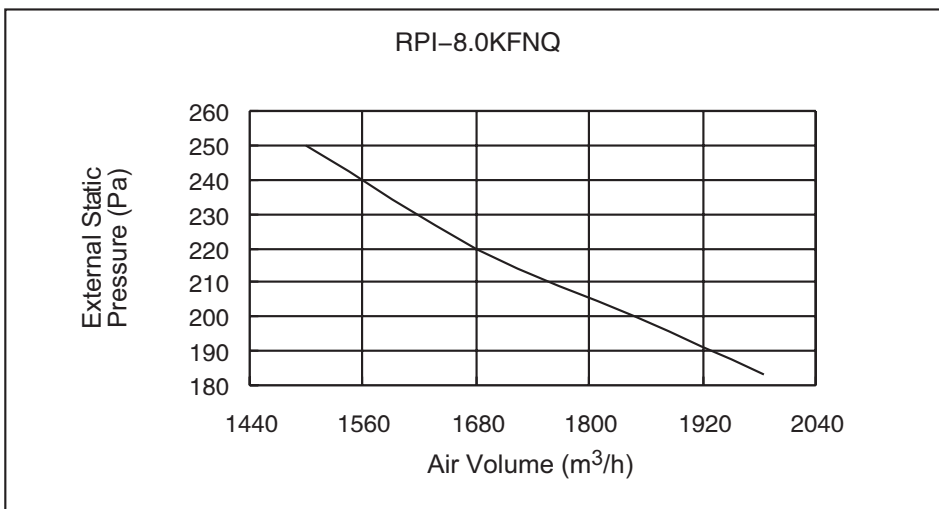
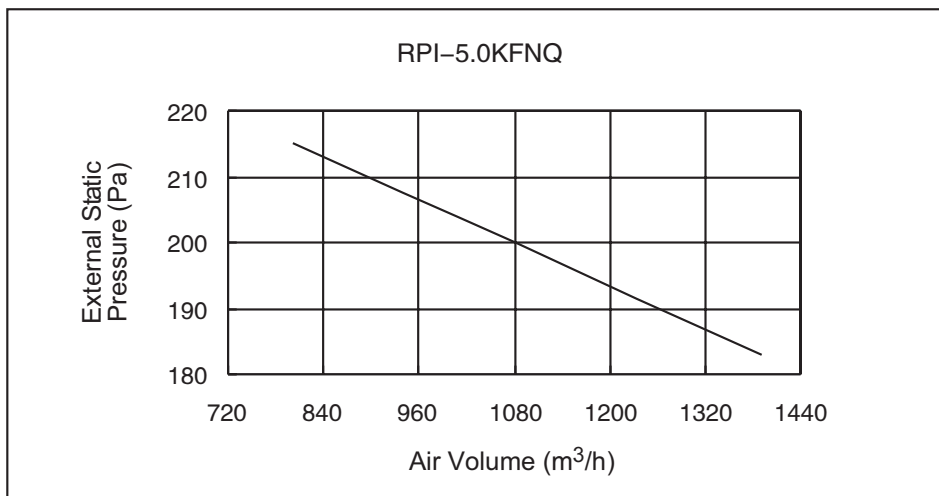
RPI-16.0KFNQL, RPI-16.0KFNQH, RPI-20.0KFNQL,
RPI-20.0KFNQH, RPI-20.0KFNQLF and RPI-20.0KFNQHF

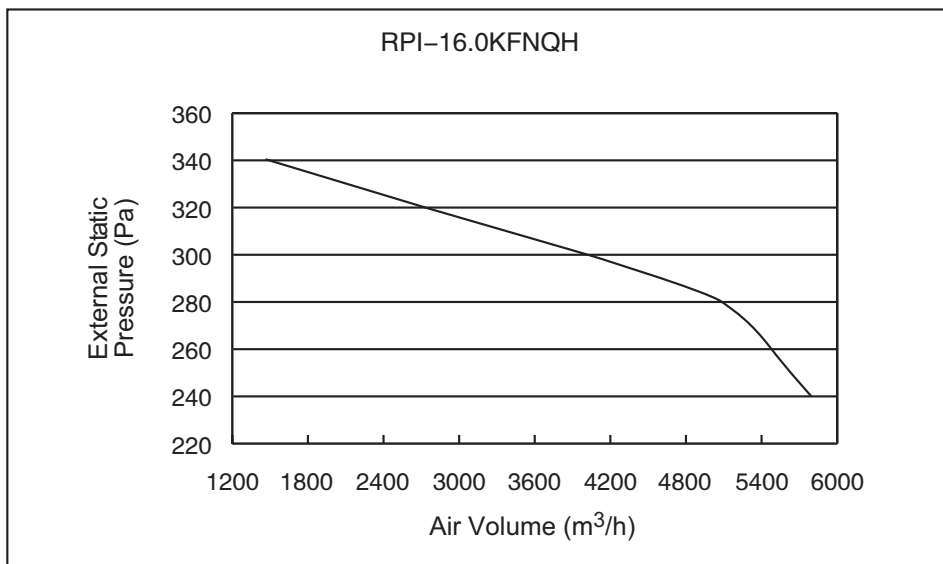
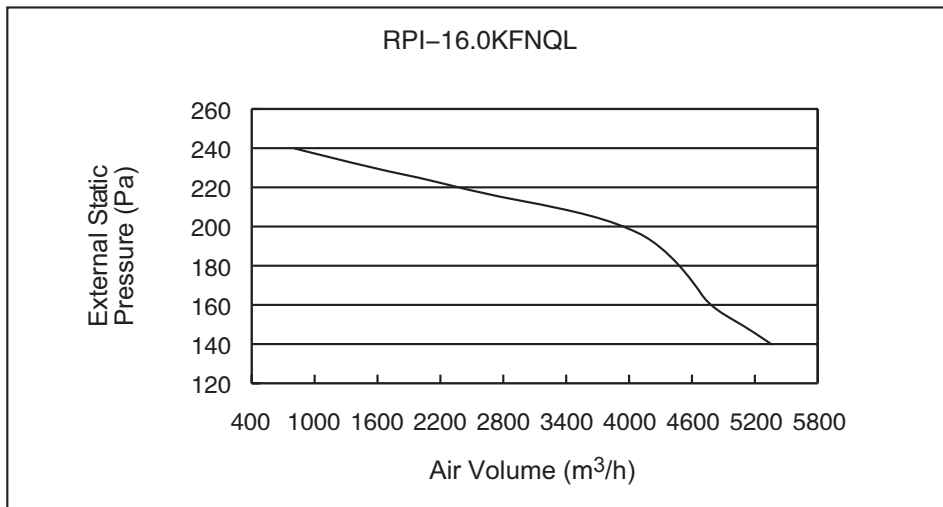
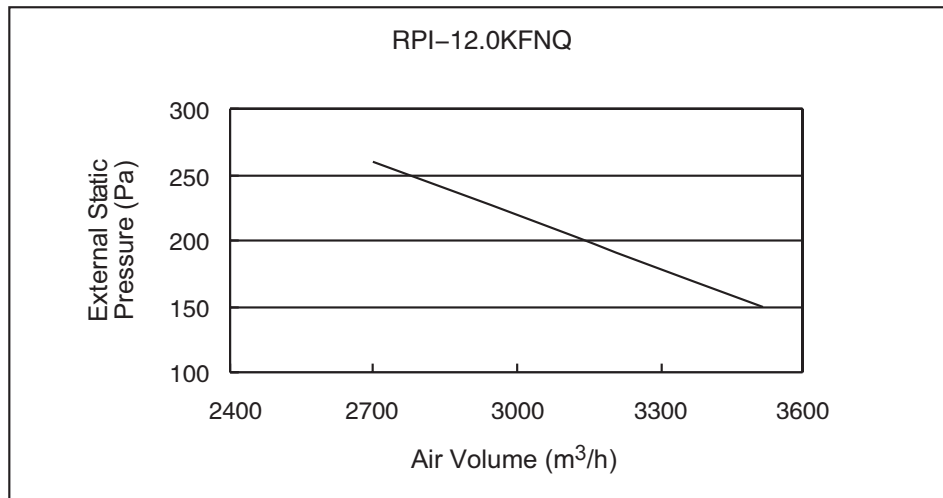


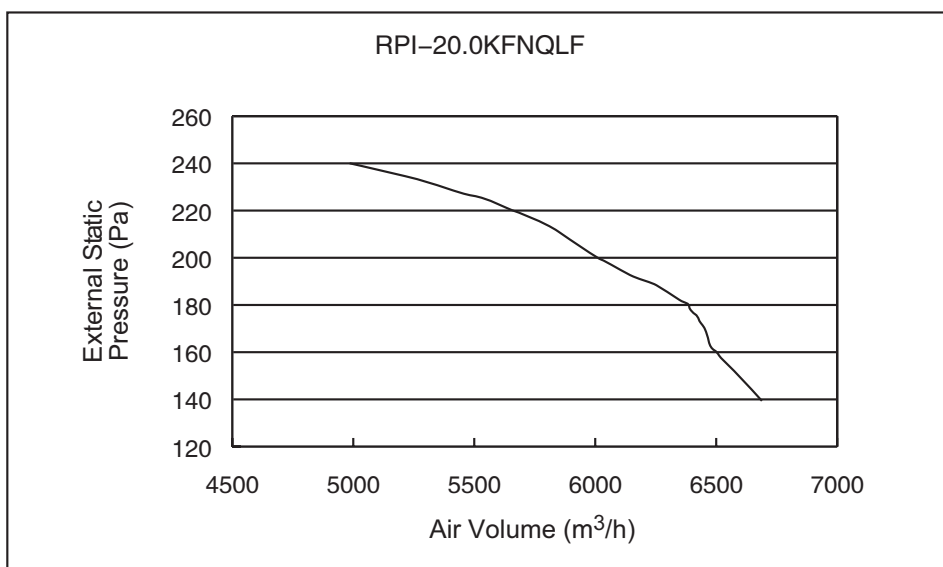
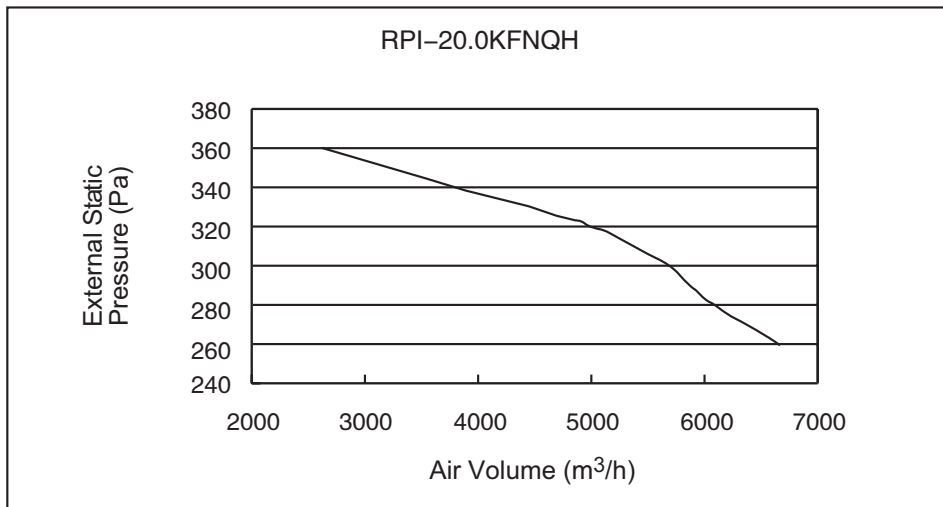
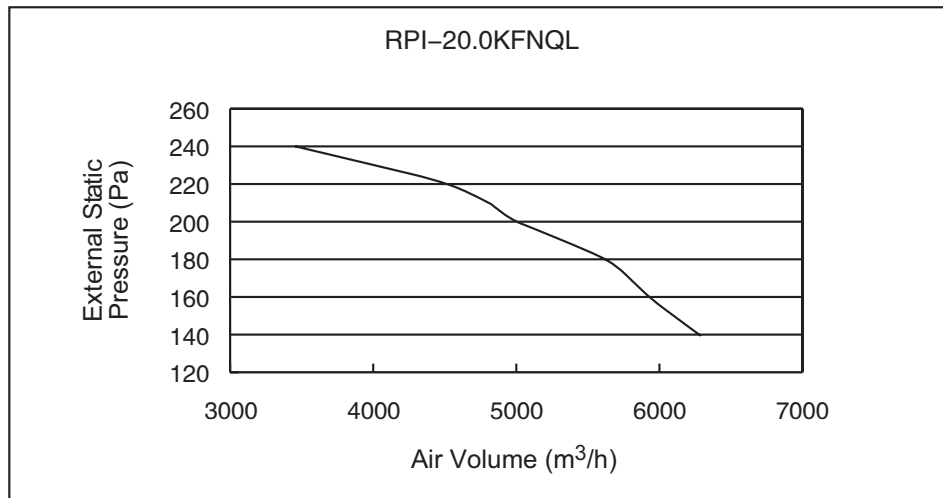
SPACE for OPERATION and MAINTENANCE

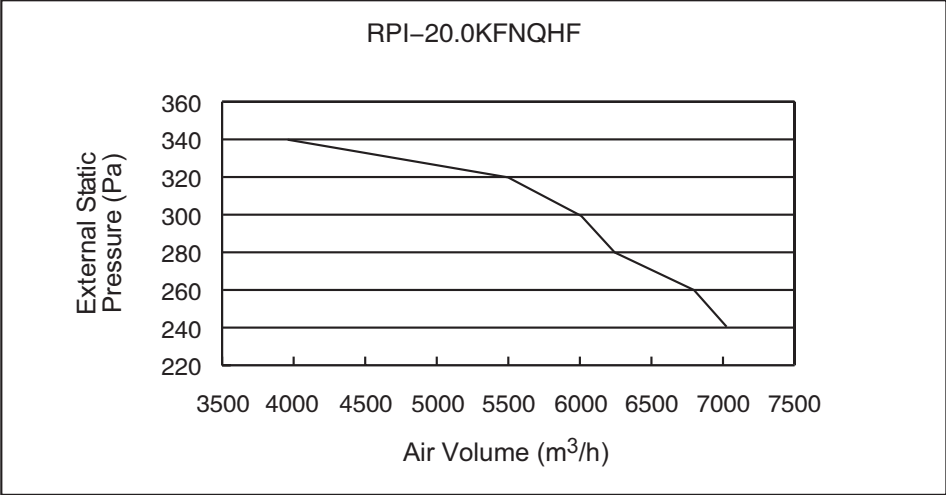


5. FAN PERFORMANCE



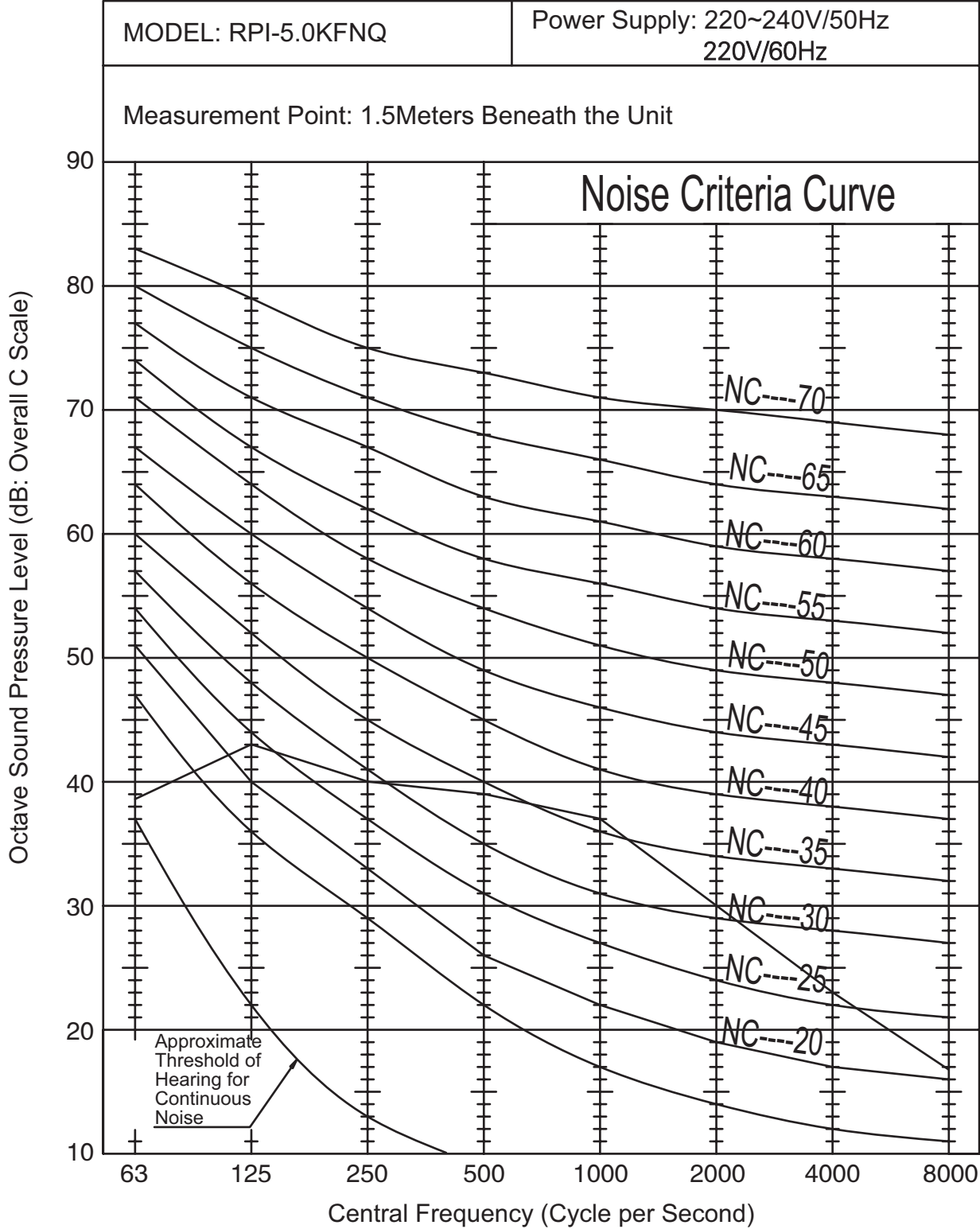




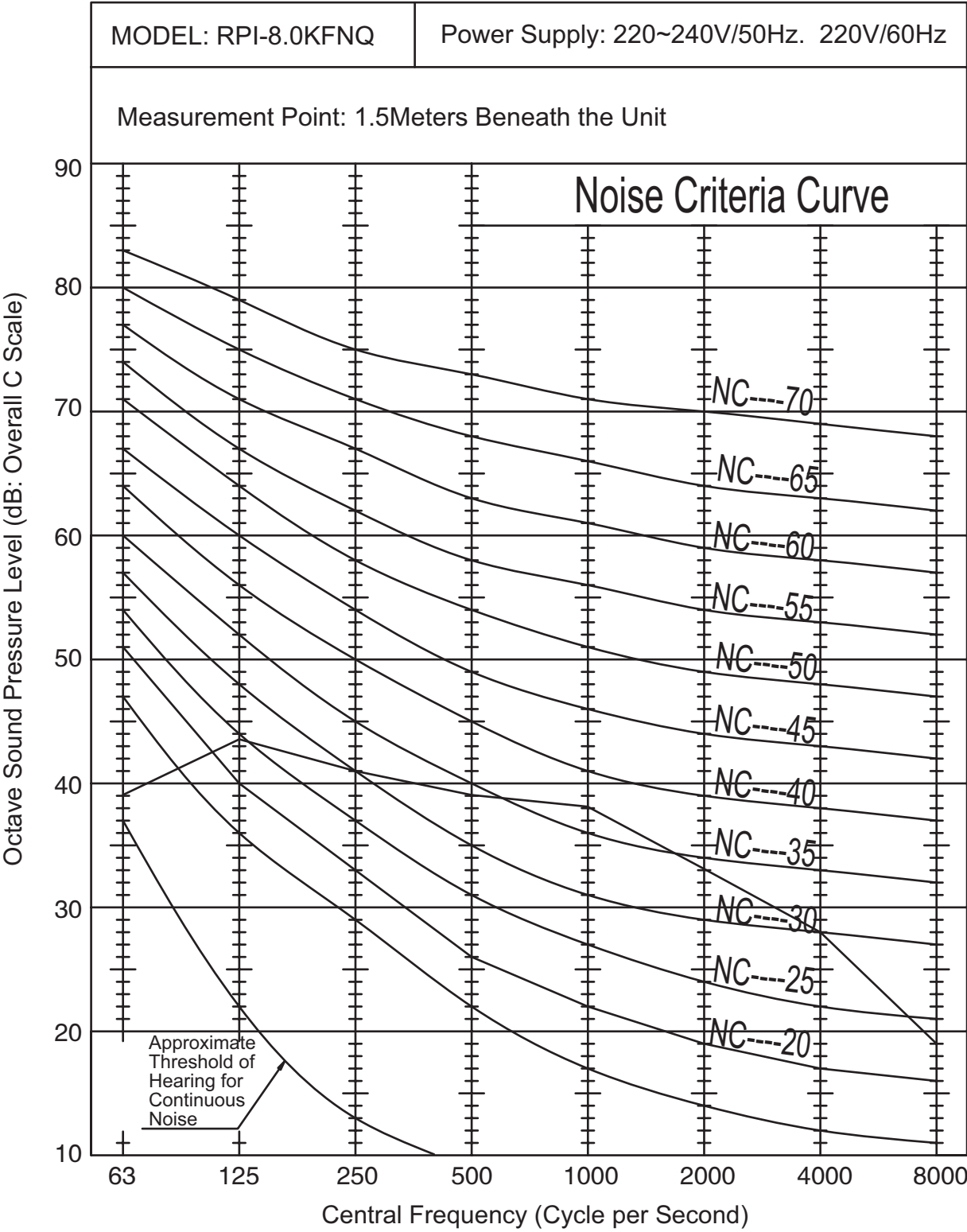


6. SOUND DATA

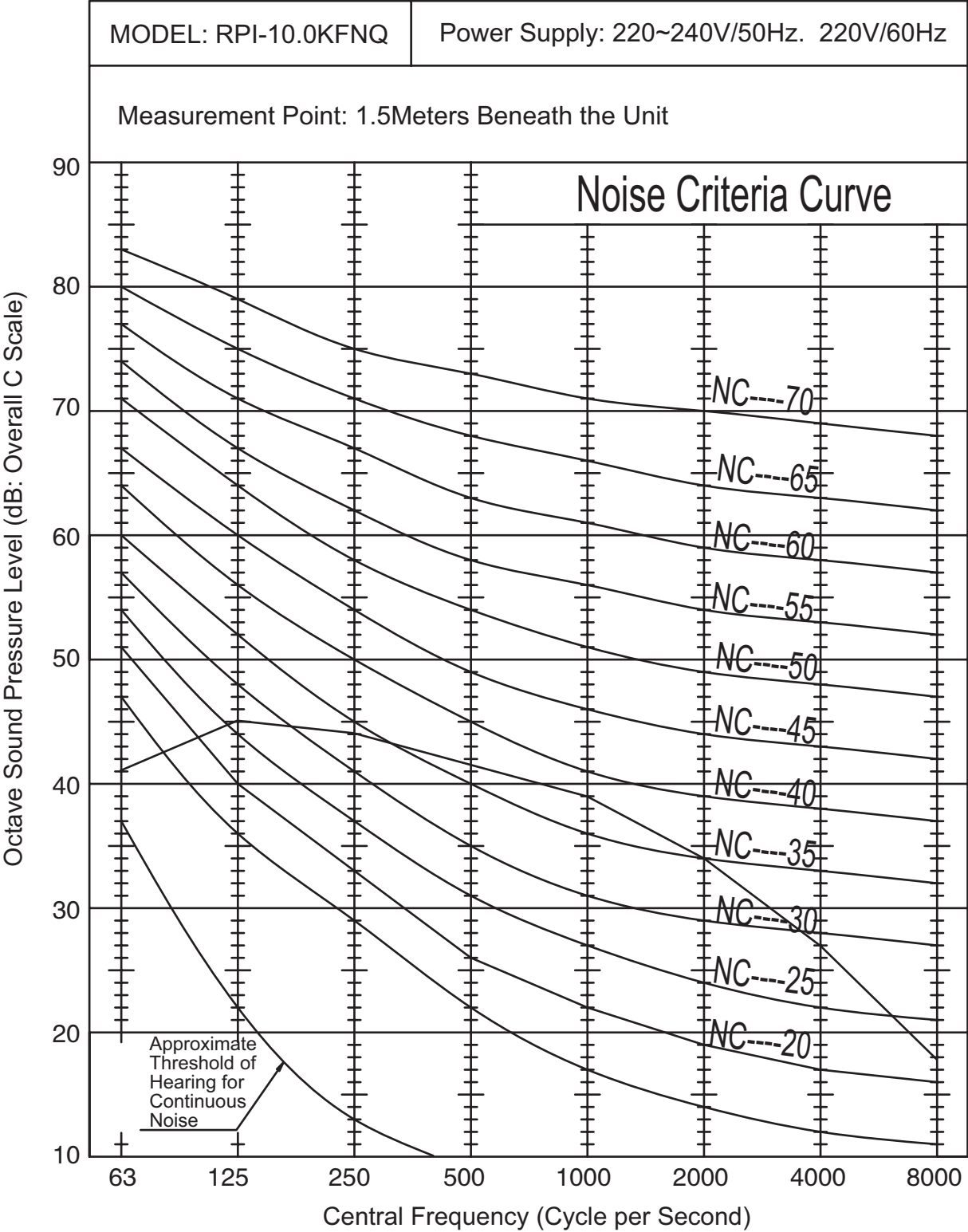
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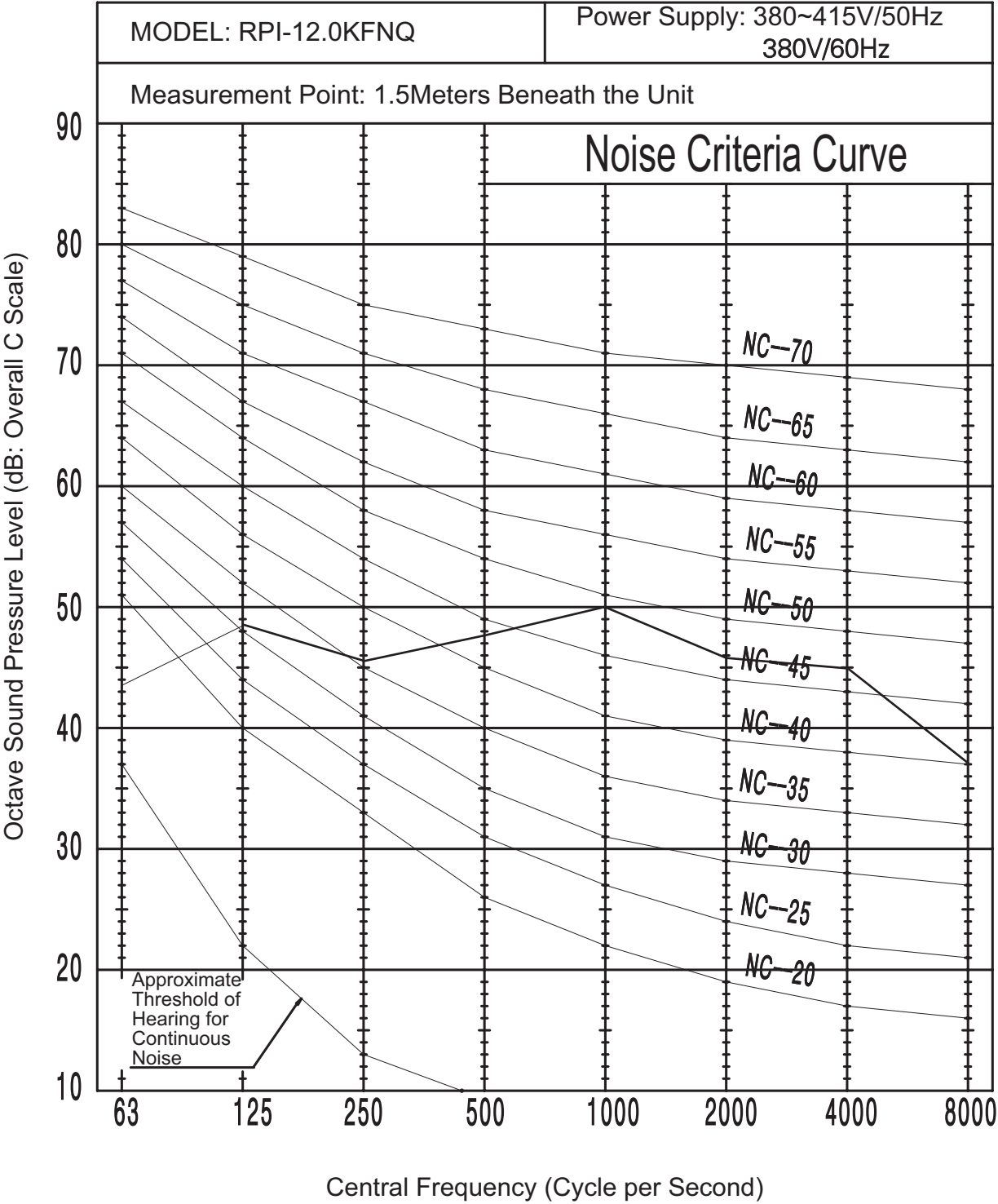
RPI-8.0KFNQ



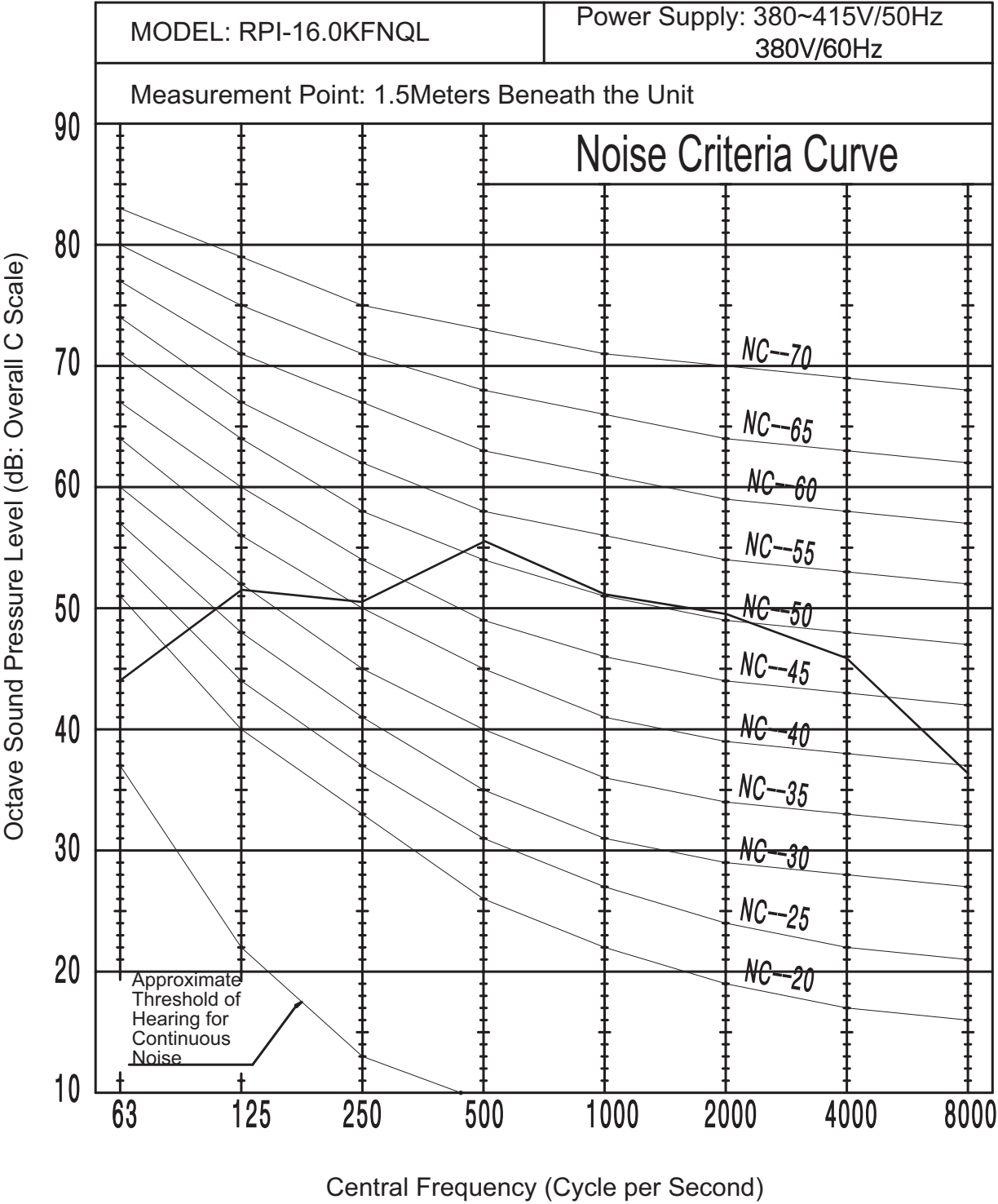
RPI-10.0KFNQ



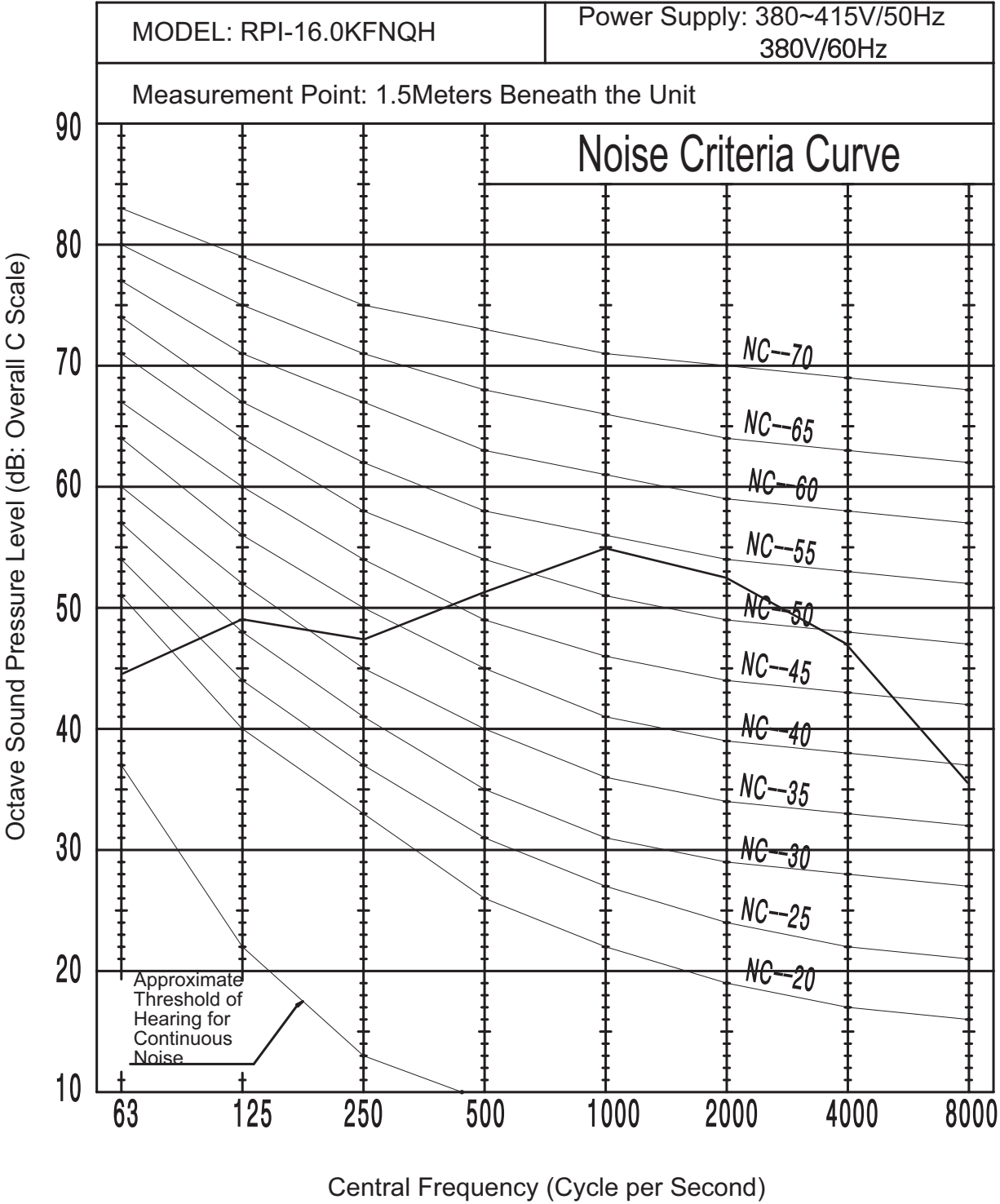
RPI-12.0KFNQ



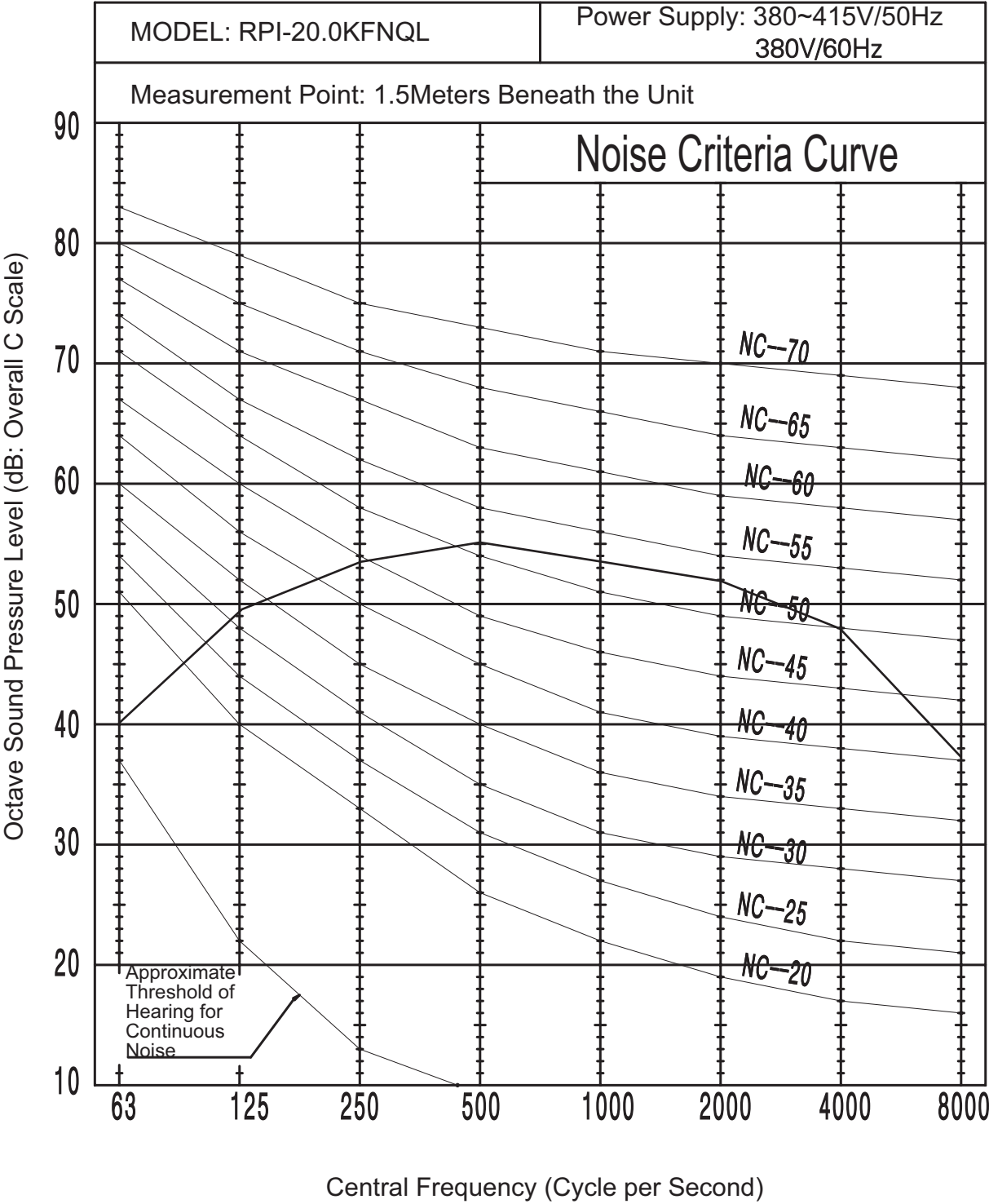
RPI-16.0KFNQ



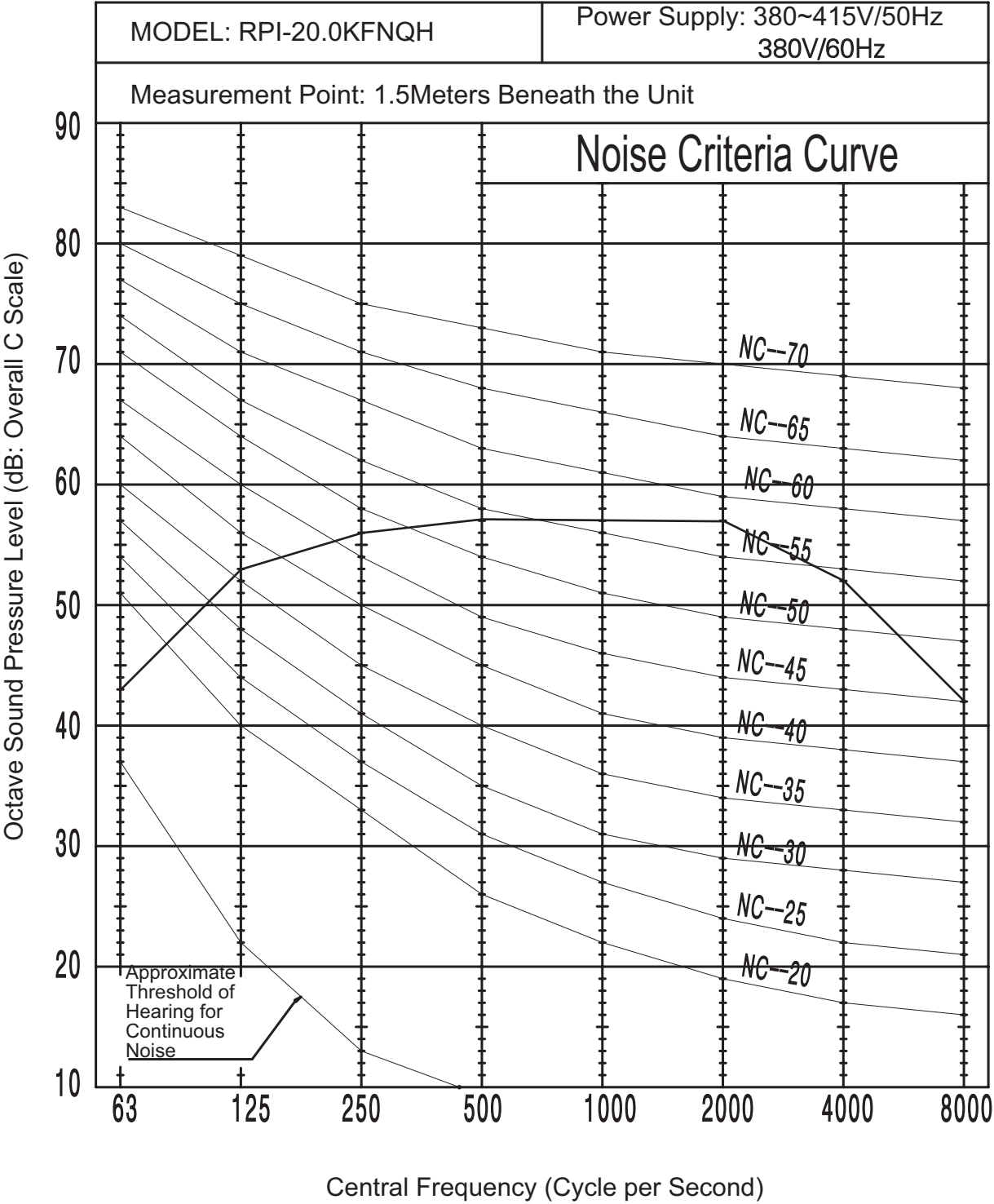
RPI-16.0KFNQH



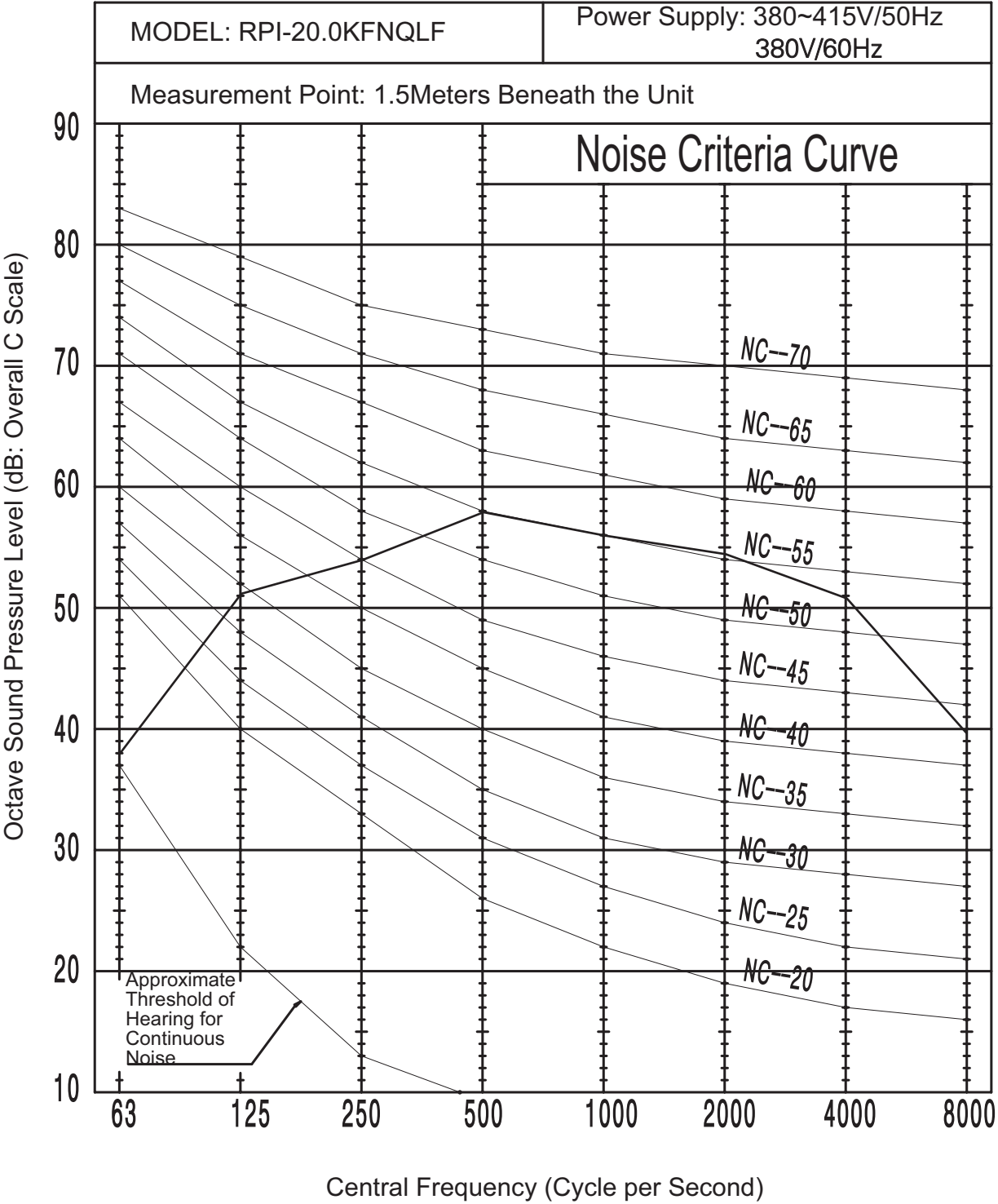
RPI-20.0KFNQL



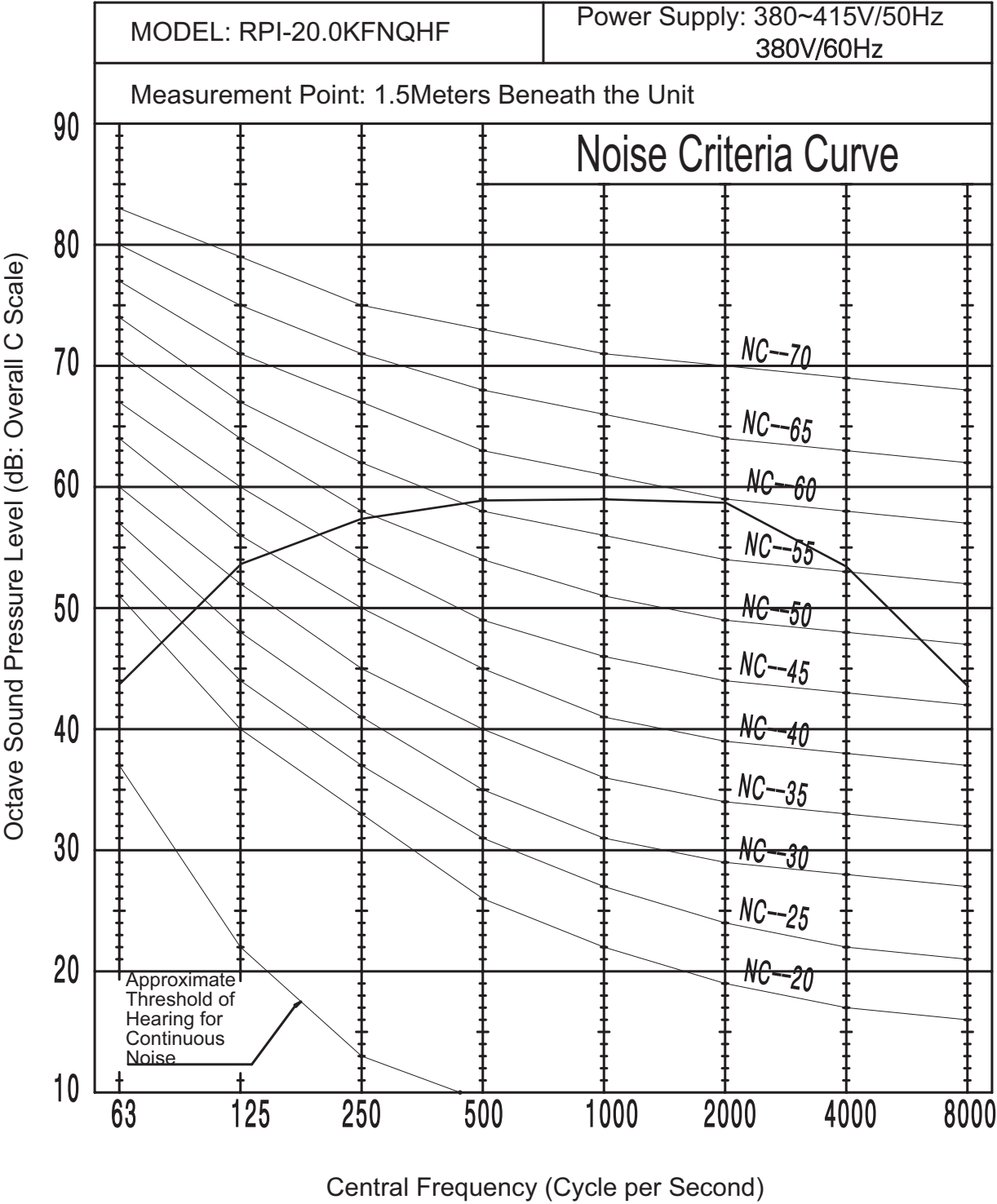
RPI-20.0KFNQH



RPI-20.0KFNQLF



RPI-20.0KFNQHF



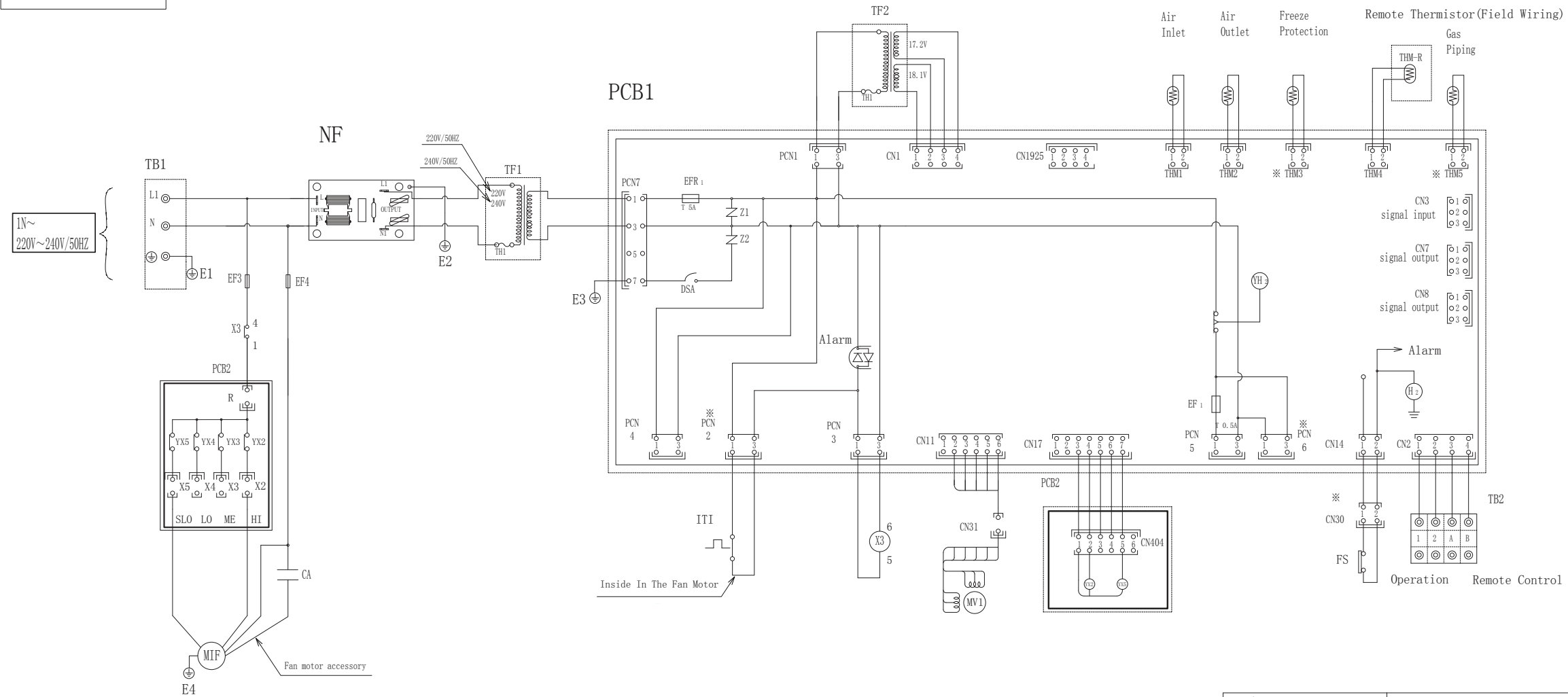
7. ELECTRICAL WIRING DIAGRAM

7.1 RPI-5.0KFNQ Electrical Wiring Diagram

HEAT PUMP

ELECTRICAL WIRING DIAGRAM

(MODELS: RPI-5.0KFNQ)



WARNING

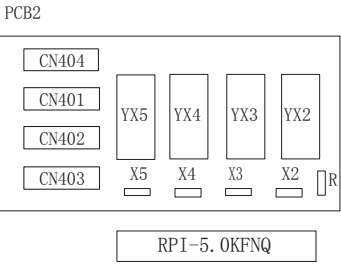
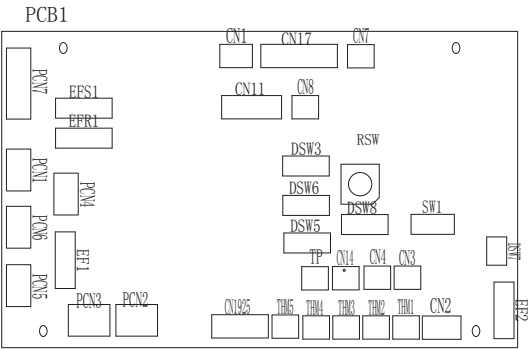
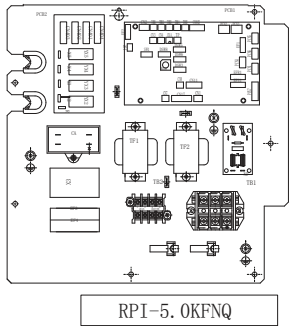
Before inspecting the electrical parts, set the Operation Switch to **OFF** and cut **OFF** the power supply.

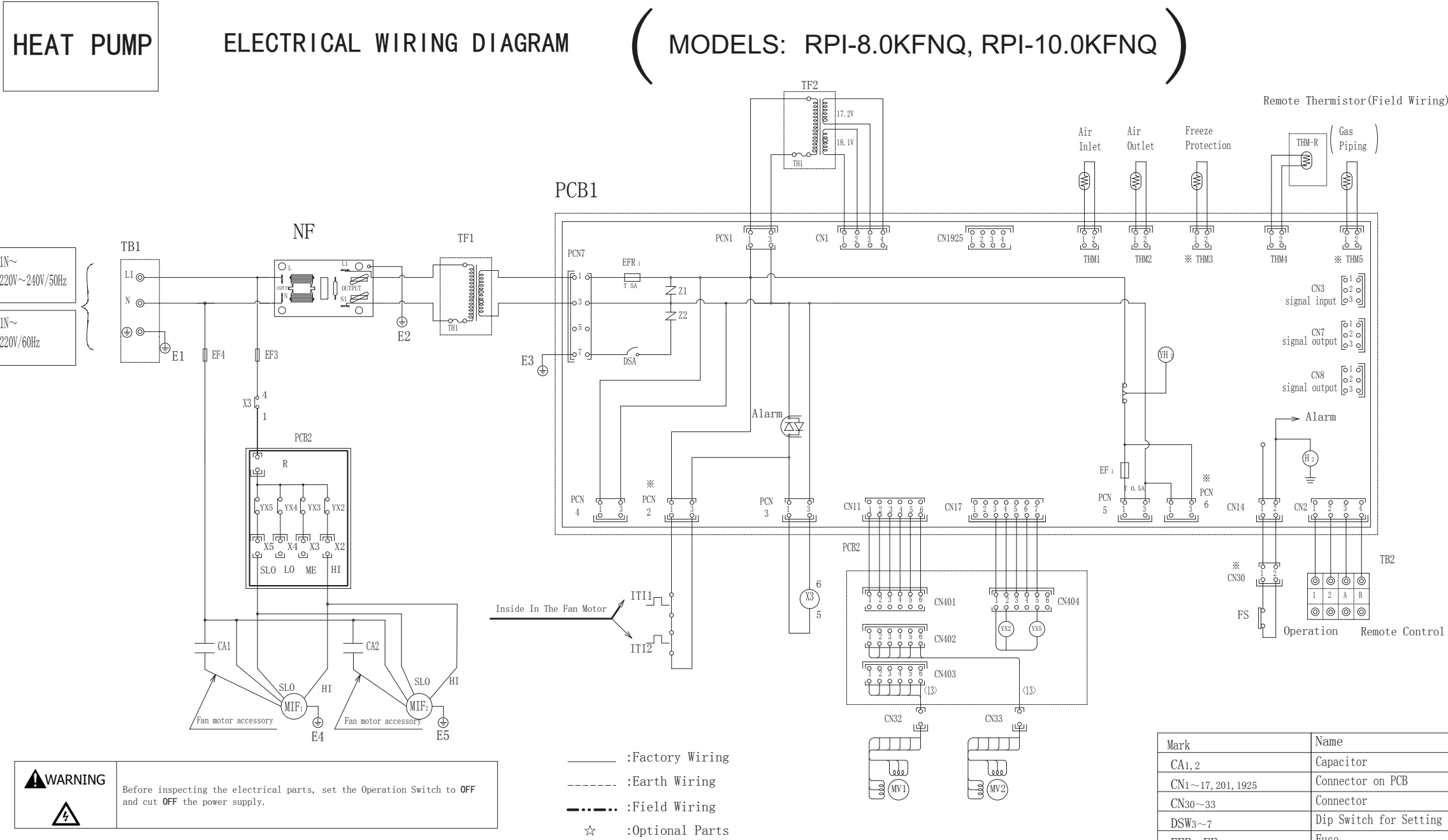
- : Factory Wiring
- : Earth Wiring
- - - - - : Field Wiring
- ☆ : Optional Parts

Note :
1. All the field wiring and equipment must comply with local codes.

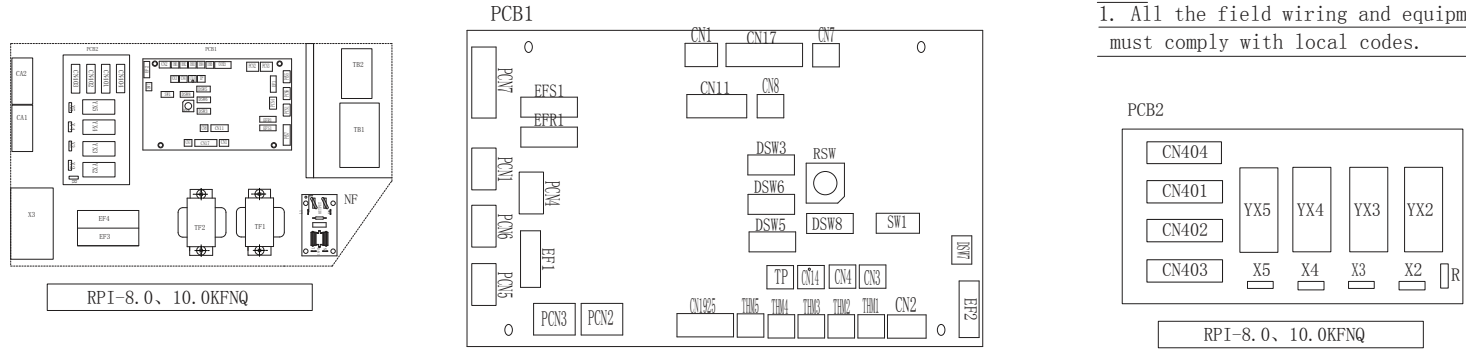
Mark	Name
CA1	Capacitor
CN1~17, 201, 1925	Connector on PCB
CN30~31	Connector
DSW3~7	Dip Switch for Setting
EFR1, EF1~4	Fuse
FS	Float Switch
ITI	Internal Thermostat for Indoor Fan Motor
MIF	Motor for Indoor Fan
MV	Micro-Computer Control Expansion Valve
PCB1, 2	Printed Circuit Board
PCN1~7, 201~204, 301, 302	Connector on PCB
YX2~5	Relay on PCB
TB1, 2	Terminal Board
TF1, 2	Transformer
THM1~5	Thermistor
YH2	Relay on PCB
⊙	Terminals
X3	Relay
NF	Noise Filter

Electrical Control Box of Indoor Unit





Electrical Control Box of Indoor Unit

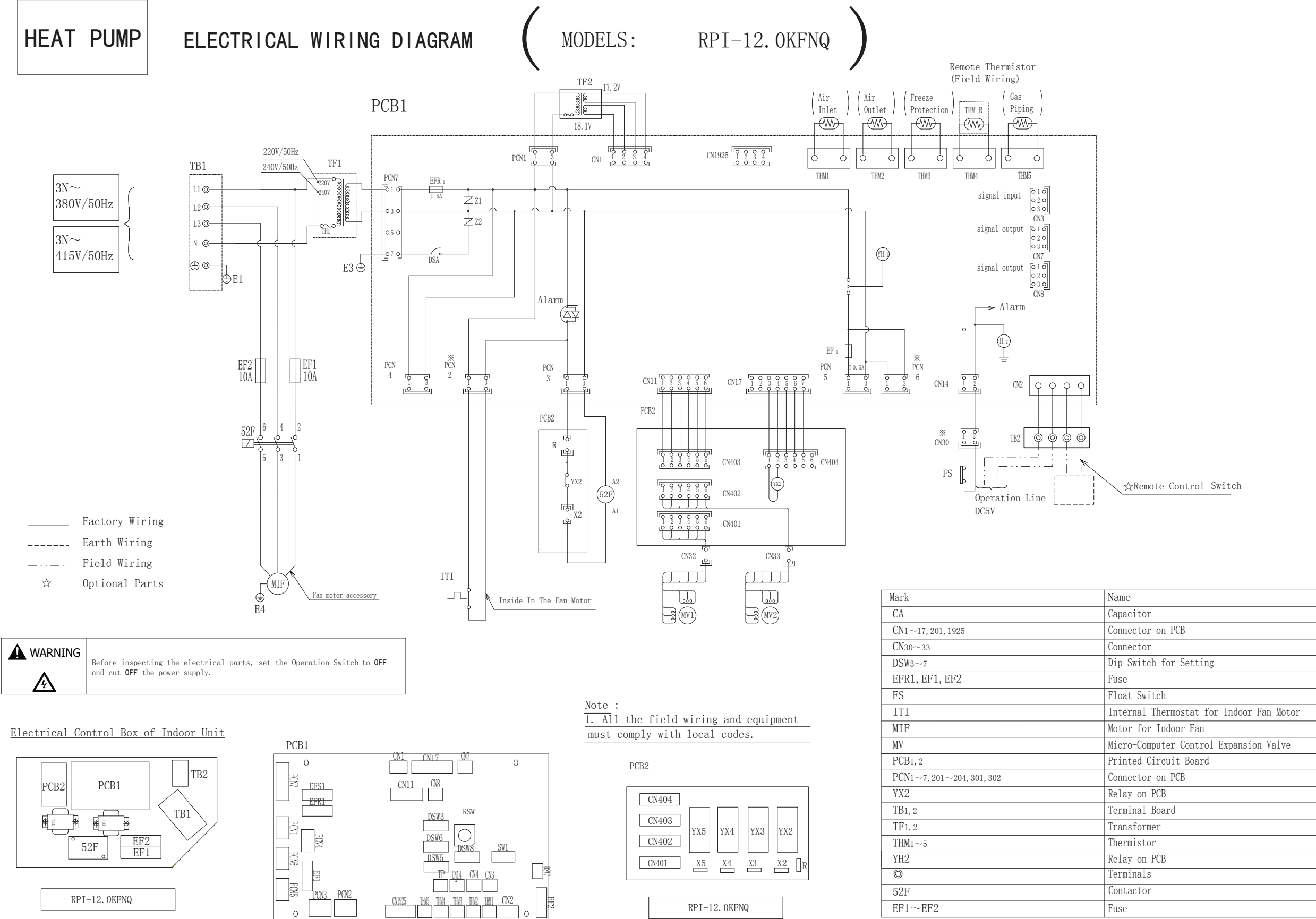


Note :

1. All the field wiring and equipment must comply with local codes.

Mark	Name
CA1,2	Capacitor
CN1~17, 201, 1925	Connector on PCB
CN30~33	Connector
DSW3~7	Dip Switch for Setting
EFR1, EF1~4	Fuse
FS	Float Switch
ITI1,2	Internal Thermostat for Indoor Fan Motor
MIF1,2	Motor for Indoor Fan
MV1,2	Micro-Computer Control Expansion Valve
PCB1,2	Printed Circuit Board
PCN1~7, 201~204, 301, 302	Connector on PCB
YX2~5	Relay on PCB
TB1,2	Terminal Board
TF1,2	Transformer
THM1~5	Thermistor
YH2	Relay on PCB
◎	Terminals
X3	Relay
NF	Noise Filter

7.3 RPI-12.0KFNQ Electrical Wiring Diagram

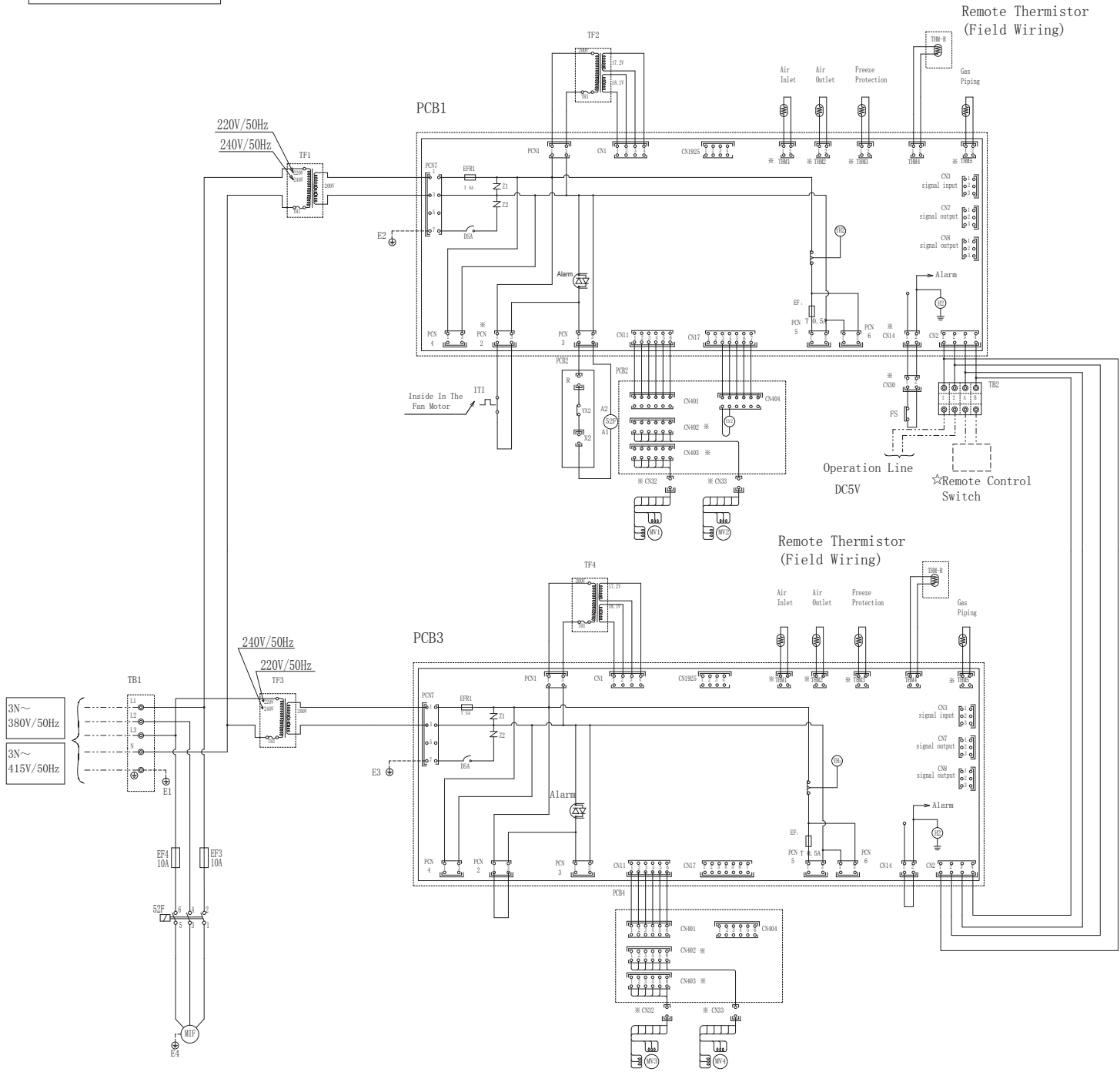


HEAT PUMP

ELECTRICAL WIRING DIAGRAM

MODELS:

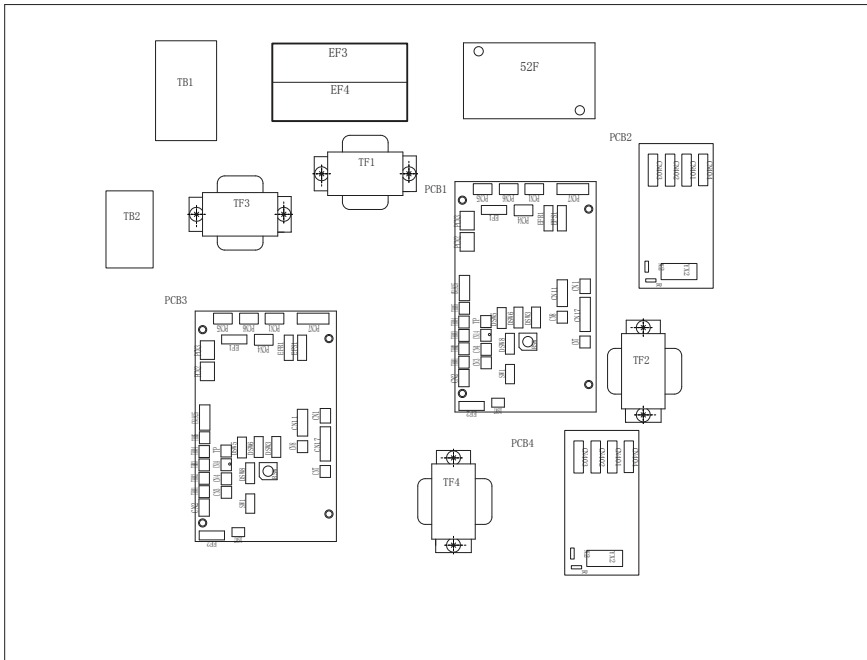
RPI-16.0KFNQL, RPI-16.0KFNQH, RPI-20.0KFNQL
RPI-20.0KFNQH, RPI-20.0KFNQLF, RPI-20.0KFNQHF



WARNING

Before inspecting the electrical parts, set the Operation Switch to **OFF** and cut **OFF** the power supply.

- Factory Wiring
- Earth Wiring
- Field Wiring
- ☆ Optional Parts



Mark	Name
TB1,2	Terminal Board
PCB1~4	Printed Circuit Board
EF1, EFR1	Fuse
CN30, 32, 33	Connector
MIF	Motor for Indoor Fan
ITI	Internal Thermostat for Indoor Fan Motor
MV	Micro-Computer Control Expansion Valve
FS	Dip Switch for Setting
TF1~4	Transformer
THM1~5	Thermistor
THM-R	Remote Thermistor
Z1,2	Voltage Dependent Resistor
DSA	Discharge Tube
EF2, EF4	Fuse for Motor

Note :

1. All the field wiring and equipment must comply with local codes.

Electrical Control Box of Indoor Unit

8. ELECTRICAL DATA

Table8.1 Electrical Data

Model	Unit Main Power			Applicable Voltage		Indoor Fan Motor		
	VOL	PH	Hz	Max.	Min.	RNC	IPT	MRC
RPI-5.0KFNQ	220-240	1	50	264	198	1.40	0.30	2.6
	220	1	60	242	198	1.61	0.35	2.99
RPI-8.0KFNQ	220-240	1	50	264	198	2.20	0.48	4.3
	220	1	60	242	198	2.53	0.55	4.72
RPI-10.0KFNQ	220-240	1	50	264	198	2.30	0.50	4.3
	220	1	60	242	198	2.65	0.55	4.95
RPI-12.0KFNQ	380-415	3	50	456	342	1.43	0.68	5.0
	380	3	60	456	342	1.64	0.78	5.75
RPI-16.0KFNQL	380-415	3	50	456	342	1.8	0.72	10
	380	3	60	418	342	2.07	0.83	11.5
RPI-16.0KFNQH	380-415	3	50	418	342	2.2	1.06	10
	380	3	60	456	342	2.53	1.22	11.5
RPI-20.0KFNQL	380-415	3	50	418	342	2.22	1.06	10
	380	3	60	456	342	2.55	1.22	11.5
RPI-20.0KFNQH	380-415	3	50	418	342	3.14	1.39	10
	380	3	60	456	342	3.61	1.6	11.5
RPI-20.0KFNQLF	380-415	3	50	418	342	3.0	1.39	10
	380	3	60	456	342	3.45	1.60	11.5
RPI-20.0KFNQHF	380-415	3	50	418	342	3.9	1.72	10
	380	3	60	456	342	4.49	1.98	11.5

RNC: Running Current(A), IPT: Input(KW), MRC: Max Running Current(A)

Field Minimum Wire Sizes for Power Source

Model	Power Source	Maximum Current	Power Source Cable Size		Transmitting Cable Size	
			EN60 335-1 ※1	MLFC ※2	EN60 335-1 ※1	MLFC ※2
RPI-5.0KFNQ	220~240V/1 φ/50Hz 220V/1 φ/60Hz	5A	0.75mm ²	0.5mm ²	0.75mm ²	0.5mm ²
RPI-8.0KFNQ	220~240V/1 φ/50Hz	10A	2.5mm ²	0.75mm ²	0.75mm ²	0.5mm ²
RPI-10.0KFNQ	220V/1 φ/60Hz	10A	2.5mm ²	0.75mm ²	0.75mm ²	0.5mm ²
RPI-12.0KFNQ	380~415V/3 φ/50Hz 380V/3 φ/60Hz	10A	2.5mm ²	0.75mm ²	0.75mm ²	0.5mm ²
RPI-16.0KFNQL/H RPI-16.0KFNQLF/HF		10A	2.5mm ²	0.75mm ²	0.75mm ²	0.5mm ²
RPI-20.0KFNQL/H RPI-20.0KFNQLF/HF		10A	2.5mm ²	0.75mm ²	0.75mm ²	0.5mm ²

NOTES:

- 1) Follow local codes and regulations when selecting field wires.
- 2) The wire sizes marked with *1 in the above table are selected at the rated current of the unit according to the European Standard, EN60335-1. Use the wires which are not lighter than the ordinary polyvinyl chloride sheathed flexible cord (code designation H05VV-F).
- 3) Use a shielded cable for the transmitting circuit and connect it to ground.
- 4) In the case that power cables are connected in series, add each unit maximum current and select wires below.

Selection According to EN60 335-1

Rated current of appliance A	Nominal cross-sectional area mm ²
≤3	1 to 2.5
>3 and ≤6	1 to 2.5
>6 and ≤10	1 to 2.5
>10 and ≤16	1.5 to 4
>16 and ≤25	2.5 to 6
>25 and ≤32	4 to 10
>32 and ≤50	6 to 16
>50 and ≤63	10 to 25

* In the case that current exceeds 63A, do not connect cables in series.

CAUTION

Install a multi-pole main switch with a space of 3.5mm or more between each phase.

9. FIELD WIRING PROVISION

Simple Electrical Wiring

Example of FSN6Q System (380~415V/50Hz, 380V/60Hz)

OUTDOOR UNIT

Model: RAS-8~18FSN6Q

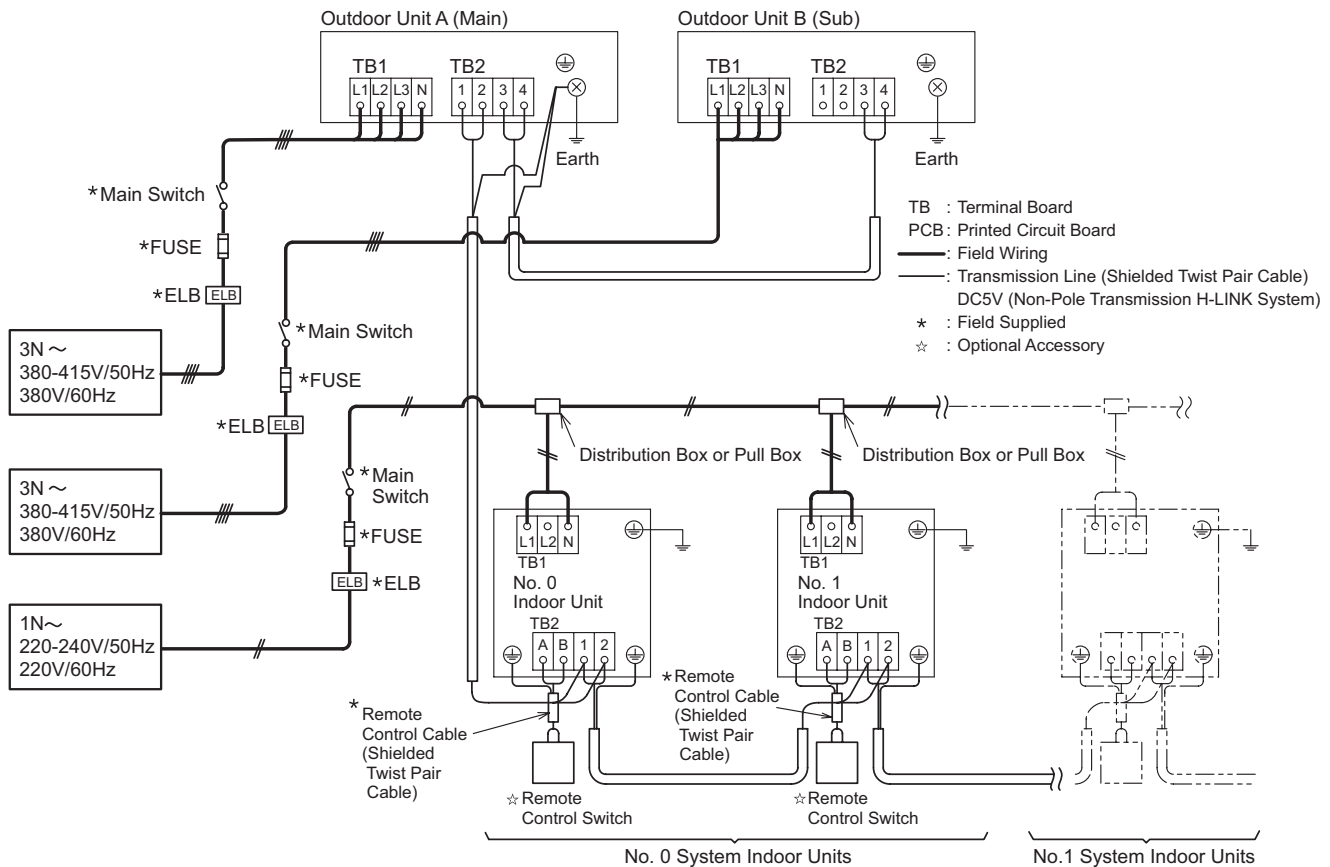


Table for Terminal Connection

Wiring	Connection Object	[Connection(Connection of Terminals)]
Power Supply	Outdoor Unit- Outdoor Unit	L1-L1,L2-L2,L3-L3,N-N
	Indoor Unit-Indoor Unit	L-L,N-N / L1-L1,L2-L2,L3-L3,N-N
Operating	Outdoor Unit-Outdoor Unit,Outdoor Unit-Indoor Unit,Indoor Unit-Indoor Unit	1-1,2-2

It is necessary to install a field-supplied Earth Leakage Breaker (ELB). If not, it may cause electric shock or fire.
All the field wiring must comply with national and local codes.

A power supply line for No.0 indoor unit can be connected from the 1 ϕ power supply line as shown in the above figure and 3 ϕ power supply line of other indoor unit can be connected from the terminal of each indoor unit.

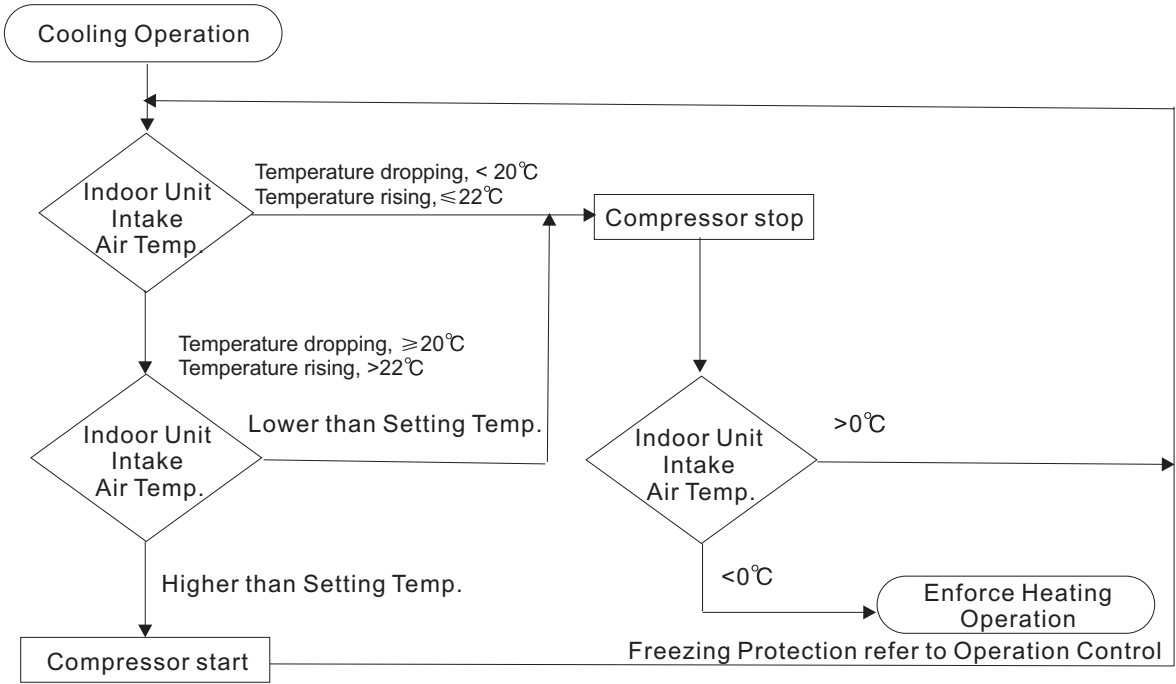
10. CONTROL SYSTEM

All Fresh Air Indoor Unit can be controlled by Liquid Crystal Remote Control Switch (PC-AR), Wireless Remote Control Switch (PC-LH3A), Central Station (PSC-A64S) and 7-day Timer (PSC-5T).

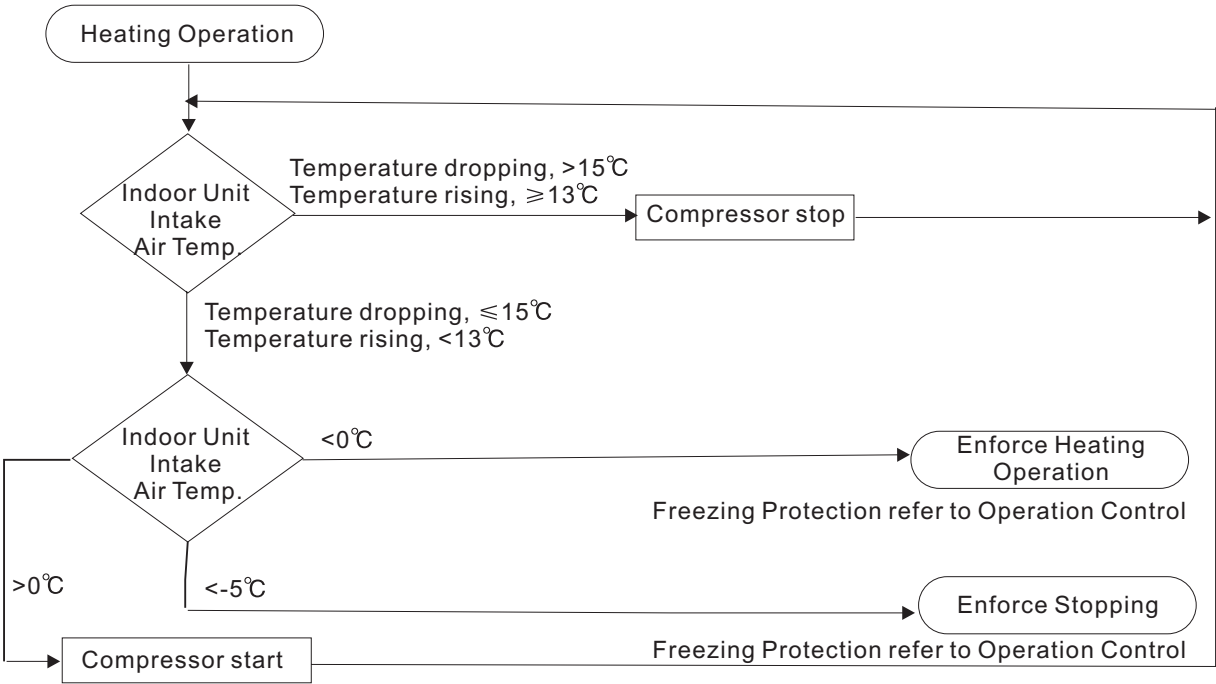
10.1 Operation Control

3 Minutes Shutdown Protection		To prevent the compressor frequency starts and stops in short intervals. Enforced 3minutes minimum stopping time of compressor
3 Minutes Operation Protection		To prevent the compressor frequency starts and stops in short intervals. Enforced 3minutes minimum operation time of compressor
Filter Indicator		The filter sign is indicated according to setting accumulated operating time (the filter cleaning time)
Heating Operation	To avoid unnecessary defrosting	Defrosting is controlled by operation time and temperature difference between outdoor temperature and evaporating temperature at heat exchanger, ensures small defrosting frequency and heating effect.
	Hot Start	To avoid blowing cold air in hot start, All Fresh Air Indoor Unit operates at slow fan speed first, after air discharge temperature raising, operates at setting fan speed.
	To avoid discharge temperature overheat	Discharge airflow reduces and intake air temperature overheat by dirty filter, compressor operating is controlled to prevent air discharge temperature overheat.
	The use of retaining heat	When heating operation is stopped, if air discharge temperature is higher, the unit will be operated at slow fan speed at most 2 minutes in order to use the retaining heat.
	Protecting control	When heating operation, to prevent discharge pressure overhigh and air discharge temperature overheat, it is controlled by outdoor airflow and opening degree of electronic expansion valve.
Cooling Operation	Anti-freezing	In case that compressor operates for more than 30 min., and pipe surface temp. of indoor heat exchanger is lower than 0℃ for more than 3 min. All Fresh Air Unit operates at Set Fan Speed. After frost on the heat exchanger melts completely, the system will convert to cooling operation.
	Outdoor air temperature is low	When cooling operation, the outdoor fan motor according outdoor air temperature is changed airflow to keep the high pressure. When the intake air temperature is lower than 20℃, the system will convert to ventilation operation.
Freezing Protection		When the intake air temperature is lower than 0℃, the system will convert to heating operation automatically. When the intake air temperature is lower than -5℃, the system will stop automatically.

10.2 Cooling Operation



10.3 Heating Operation



10.4 Remote Thermistor

Remote thermistor is a necessary part when the unit works. The system will not be operated without connecting the remote thermistor; If not connected, it will result in the alarm "16".

10.4.1 Position of Remote Thermistor

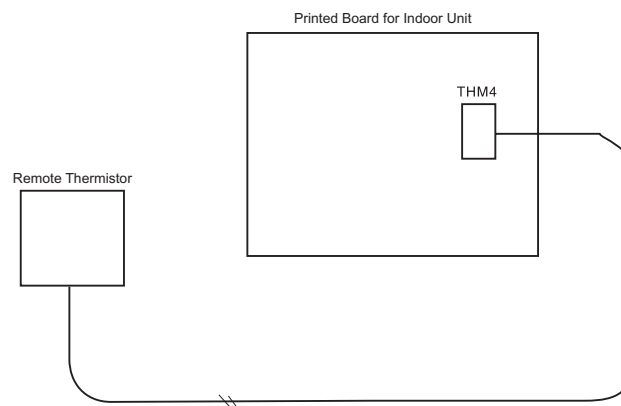
The fitting position of the thermistor should be carefully selected according to the following issues.

- 1) Place where the normal room temperature can be detected.
- 2) Place where not exposing to direct sunlight.
- 3) Place where surrounded by no heat source.
- 4) Place where not exposing to the discharged air from air conditioner.
- 5) Place where no effects of the outdoor air by closing and opening of the door.

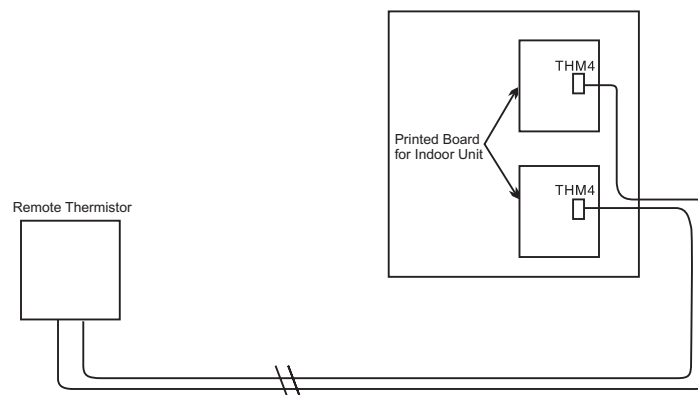
10.4.2 Wiring Procedure

Connect the cord from remote thermistor to the THM4 on the printed board.

RPI-5.0KFNQ, RPI-8.0KFNQ, RPI-10.0KFNQ, RPI-12.0KFNQ



RPI-16.0KFNQL/H, RPI-16.0KFNQLF/HF, RPI-20.0KFNQL/H, RPI-20.0KFNQLF/HF



11. COMPONENT DATA

Heat Exchanger and Fan

Model		RPI-5.0KFNQ	RPI-8.0KFNQ	RPI-10.0KFNQ	RPI-12.0KFNQ	RPI-16.0KFNQL
Heat Exchanger Type	–	Multi-Pass Cross Finned Tube				
Tube Material	–	Copper Tube				
Outer Diameter	mm	7.0	9.53	9.53	9.53	9.53
Rows	–	3	4	4	3	3
Fin Material	–	Aluminum				
Pitch	mm	1.8	1.6	1.6	1.8	1.8
Maximum Operating Pressure	MPa	4.15	4.15	4.15	4.15	4.15
Total Face Area	m ²	0.46	0.56	0.62	0.62	0.94
Number of Coil/Unit	–	1	1	1	1	1
Indoor Fan	–	Multi-Blade Centrifugal Fan				
Number/Unit	–	1	2	2	1	1
Outer Diameter	mm	200.4	227.4	227.4	254.5	387
Revolution	rpm	1310	1220	1270	1200	1390
Nominal Air Flow	m ³ /min	1080	1680	2100	3000	4000
Indoor Fan Motor	–	Drip-Proof Type Enclosure				
Starting Method	–	PSC (Permanent Split Capacitor)				
Nominal Output	W	0.16	0.16	0.16	0.60	0.75
Quantity	–	1	2	2	1	1
Insulation Class	–	F	F	F	F	F

Heat Exchanger and Fan

Model		RPI-16.0KFNQH	RPI-20.0KFNQL	RPI-20.0KFNQH	RPI-20.0KFNQLF	RPI-20.0KFNQHF
Heat Exchanger Type	–	Multi-Pass Cross Finned Tube				
Tube Material	–	Copper Tube				
Outer Diameter	Φ mm	9.53	9.53	9.53	9.53	9.53
Rows	–	3	3	3	3	3
Fin Material	–	Aluminum				
Pitch	mm	1.8	1.8	1.8	1.8	1.8
Maximum Operating Pressure	MPa	4.15	4.15	4.15	4.15	4.15
Total Face Area	m ²	0.94	1.11	1.11	1.11	1.11
Number of Coil/Unit	–	1	1	1	1	1
Indoor Fan	–	Multi-Blade Centrifugal Fan				
Number/Unit	–	1	1	1	1	1
Outer Diameter	Φ mm	387	387	387	387	387
Revolution	rpm	1400	1400	1400	1400	1420
Nominal Air Flow	m ³ /min	4000	5000	5000	6000	6000
Indoor Fan Motor	–	Drip-Proof Type Enclosure				
Starting Method	–	PSC (Permanent Split Capacitor)				
Nominal Output	W	1.1	1.1	1.5	1.5	2.2
Quantity	–	1	1	1	1	1
Insulation Class	–	F	F	F	F	F

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

IMPORTANT NOTICE

- HITACHI pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- HITACHI cannot anticipate every possible circumstance that might involve a potential hazard.
- This heat pump air conditioner is designed for standard air conditioning only. Do not use this heat pump air conditioner for other purposes such as drying clothes, refrigerating foods or for any other cooling or heating process.
- The installer and system specialist shall secure safety against leakage according to local regulations or standards. The following standards may be applicable if local regulations are not available. British Standard, BS4434 or Japan Standard, KHKS0010.
- No part of this manual may be reproduced without written permission.
- Signal words (DANGER, WARNING and CAUTION) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.

 DANGER	:	Immediate hazards which WILL result in severe personal injury or death.
 WARNING	:	Hazards or unsafe practices which COULD result in severe personal injury or death.
 CAUTION	:	Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.
NOTE	:	Useful information for operation and/or maintenance.

- It is assumed that this heat pump air conditioner will be operated and serviced by English speaking people. If this is not the case, the customer should add safety, caution and operating signs in the native language.
- If you have any questions, contact your distributor or dealer of HITACHI.
- This manual gives a common description and information for this heat pump fresh air conditioner which you operate as well as or other models.

This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

CHECKING PRODUCT RECEIVED

- Upon receiving this product, inspect it for any shipping damage.
Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct.

The standard utilization of the unit shall be explained in these instructions.

Therefore, the utilization of the unit other than those indicated in these instructions is not recommended.

Please contact your local agent, as the occasion arises.

HITACHI's liability shall not cover defects arising from the alteration performed by a customer without HITACHI's consent in a written form.

1. SAFETY SUMMARY

WARNING

- Do not perform installation work, refrigerant piping work, drain piping and electrical wiring connection without referring to the installation manual.
- Check that the ground wire is securely connected.
- Connect a fuse of specified capacity.
- Pay a special attention to the place, such as a basement, etc. where refrigerant can stay, since refrigerant is heavier than air.

CAUTION

Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 3 meters from strong electromagnetic wave radiators such as medical equipment.

2. NECESSARY TOOLS AND INSTRUMENT LIST FOR INSTRLATION

No.	Tool	No.	Tool
1	Screwdriver	10	Charging Cylinder
2	Vacuum Pump	11	Gauge Manifold
3	Refrigerant Gas Hose	12	Cutter for Wires
4	Megohmmeter	13	Gas Leak Detector
5	Copper Pipe Bender	14	Leveller
6	Pipe Cutter	15	Clamper for Solderless Terminals
7	Brazing Kit	16	Hoist (for Indoor Unit)
8	Hexagon Wrench	17	Ammeter
9	Spanner	18	Voltage Meter

NOTE

About vacuum pump, gas hose, charging cylinder, gauge manifold, please use suitable equipments for R410A respectively. Do not mix other refrigerant.

3. TRANSPORTATION AND HANDLING

3.1 Transportation

Transport the product as close to the installation location as practical before unpacking.

CAUTION

Do not put any material on the product.

3.2 Handling of Indoor Unit

WARNING

Do not put any foreign material into the indoor unit and check to ensure that none exists in the indoor unit before the installation and test run. Otherwise, a fire or failure, etc. may occur.

CAUTION

Be careful not to damage on insulation materials of unit's surface when lifting.

4. INDOOR UNIT INSTALLATION

DANGER

Do not install the indoor unit in a flammable environment to avoid fire or an explosion.

WARNING

- Check to ensure that the ceiling slab is strong enough. If not strong enough, the indoor unit may fall down on you.
- Do not install the indoor unit outdoors. If installed outdoors, an electric hazard or electric leakage will occur.

It is recommended that indoor units be installed higher than 2.3 meters from the floor level.

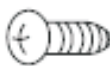
4.1 Factory-Supplied Accessories

Check to ensure that the following accessories are packed with the indoor unit.

NOTE

If any of these accessories are not packed with the unit, please contact your contractor.

Table 4.1 Factory-Supplied Accessories

HP	Accessory		Q'ty	Purpose
5-12	Washer		8	For Unit Suspension
	Hose Clamp		1	For Drain Hose Connection
	Insulation (26 IDx105)		1	For Refrigerant Liquid Piping
	Insulation (28 IDx85)		1	For Refrigerant Gas Piping
	Cord Clamp	5.0	5	For Fixing Thermal Insulation for Refrigerant Pipings
		8.0,10.0,12.0	2	
	Cord Clamp	5.0	5	For Fixing Thermal Insulation for Refrigerant Pipings
8.0,10.0,12.0		6		
Drain Hose		8.0,10.0,12.0	1	For Drain
5-20	Remote Temperature Sensor		1	For Detecting Indoor Temperature
	Screw(m4)		2	For Fixing Temperature Sensor

4.2 Initial Check

- Install the indoor unit with a proper clearance around it for operation and maintenance working space, as shown in 4. Dimensional Data Of Design Information
- Consider the air distribution from the indoor unit to the space of the room, and select a suitable location so that uniform air temperature in the room can be obtained.
- Do not install flammable parts in the service space for the indoor unit.
- Avoid obstacles which may hamper the air intake or the air discharge flow.
- Do not install the indoor unit in a machine shop or kitchen where vapor from oil or its mist flows to the indoor unit.
The oil will deposit on the heat exchanger, thereby reducing the indoor unit performance, and may deform and in the worst case, break the plastic parts of the indoor unit.
- Pay attention to the following points when the indoor unit is installed in a hospital or other facilities where there are electronic waves from medical equipment.

- (A) Do not install the indoor unit where the electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.
 - (B) Install the indoor unit and components as far as practical or at least 3 meters from the electromagnetic wave radiator.
 - (C) Prepare a steel box and install the remote control switch in it. Prepare a steel conduit tube and wire the remote control cable in it. Then, connect the ground wire with the box and the tube.
 - (D) Install a noise filter when the power supply emits harmful noises.
- To avoid any corrosive action to the heat exchangers, do not install the indoor unit in an acid or alkaline environment.

4.3 Installation

4.3.1 Suspension Bolts

Step 1

Select final location and installation direction of the indoor unit paying careful attention to the space for the piping, wiring and maintenance.

Step 2

Mount suspension bolts, as shown in Fig. 4.1

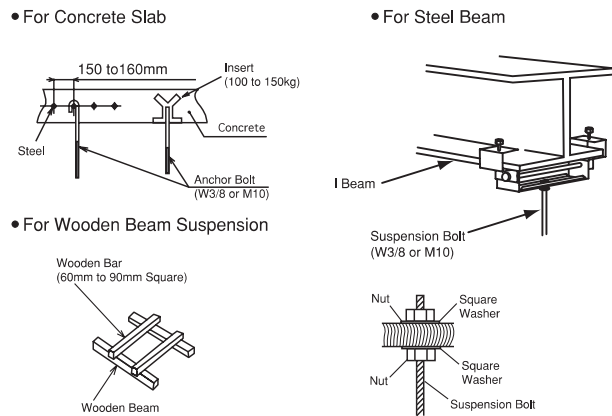


Fig. 4.1 Mounting of Suspension Bolts

4.3.2 Marking of the Positions of the Sling Bolts and Piping Connections

- (1) Mark the positions of the sling bolts, refrigerant piping connections and drain connection.
- (2) Installation dimensions are shown in 4. Dimensional Data of Design Information

4.3.3 Mounting the Indoor Unit

Hang the indoor unit as shown in Fig. 4.2.

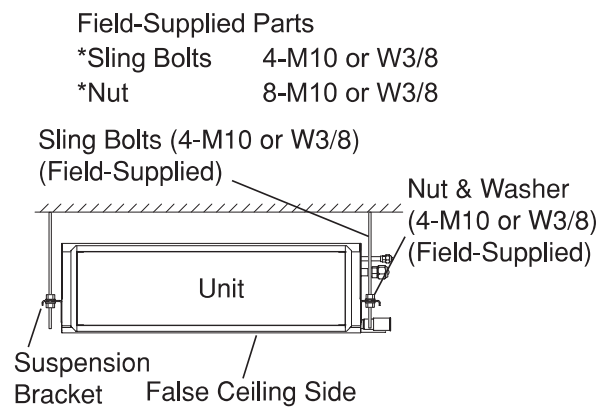


Fig. 4.2 Hanging Indoor Unit

(1) How to put Nuts or Sling Bolts

Put nuts on each of the four hanging bolts, as shown in Fig. 4.3

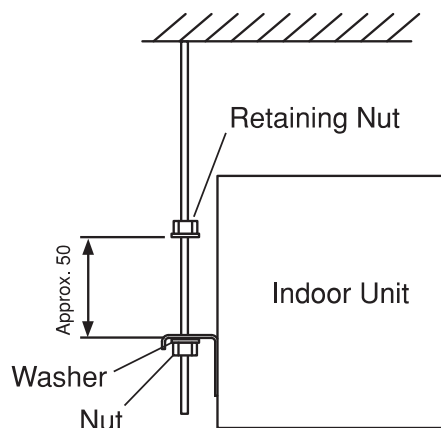


Fig. 4.3 Sling Bolts and Nut

(2) Hanging the Indoor Unit

- * Hook suspension bracket to the nut and washer of each hanging bolt, as shown, starting at the opposite side to service cover side.
- * After checking that the nut and washer are correctly fixed by the retainers of the suspension bracket, hook the suspension bracket of the service cover side to the nut and washer.

(Put the sling bolts away from the unit when hooking.)

<RPI-5.0-12.0KFNQ>

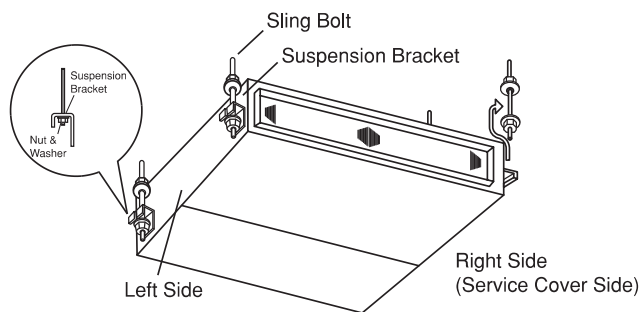


Fig. 4.4 (1) Hanging Indoor Unit

<RPI-16.0-20.0KFNQL/H, RPI-20.0KFNQLF/HF>

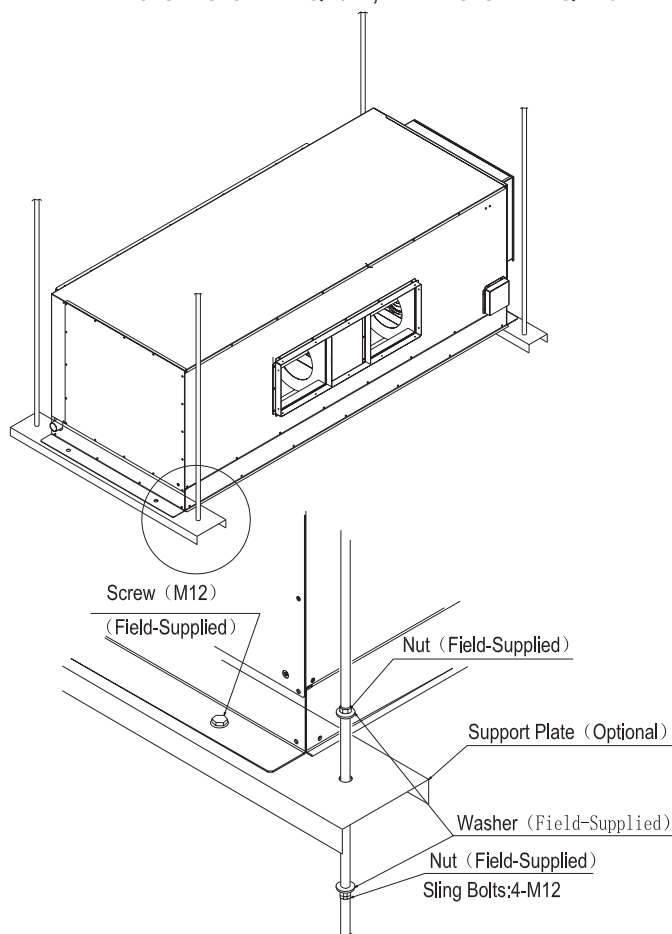


Fig. 4.4 (2) Hanging Indoor Unit

4.3.4 Adjusting of the Unit Level

- (A) Check to ensure that the foundation is flat, taking into account the maximum foundation gradient.

<RPI-5.0-12.0KFNQ>

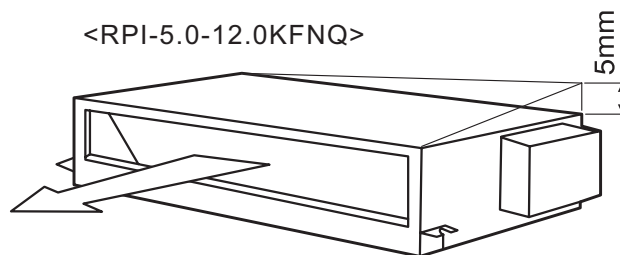


Fig. 4.5(1) Foundation Gradient

<RPI-16.0-20.0KFNQL/H, RPI-16.0-20.0KFNQLF/HF>

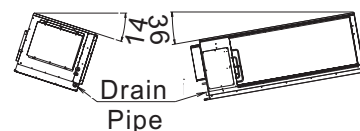
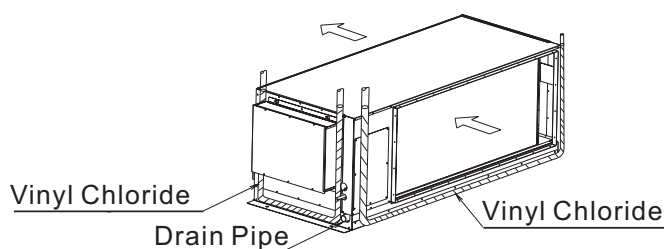


Fig. 4.5(2) Foundation Gradient

- (B) The unit should be installed so that the rear side of the unit is slightly lower than the front side, in order to avoid the incorrect position of the drain discharge.

- (C) Tighten the bolts of the sling nuts with the suspension brackets after adjustment is completed.

Special plastic paint must be applied to the bolts in order to prevent them from loosening.

NOTE

Keep the unit as well as relevant equipment covered with the vinyl cover during installation work.

4.3.5 Connecting Supply Duct

- (1) The supply duct should be connected with the indoor unit through canvas ducts, in order to avoid abnormal sound vibration (Refer to Fig. 4.6). The unit is equipped with a pre-drilled duct flange for the supply duct connection.
- (2) Attach the vibration proof rubber to Sling Bolt in order to avoid abnormal sound vibration.
- (3) Duct material should be non-flammable material.
- (4) Perform the heat insulation work over the duct for dew protection.

CAUTION

- If a lower sound level is further required, install silencer (field-supplied).
 - Design duct arrangement as “Unit External Static Pressure=Pressure Drop of Duct+Pressure Drop of Air Outlet and Air Inlet”.
- If duct design is not appropriate, big sound and splash will occur.

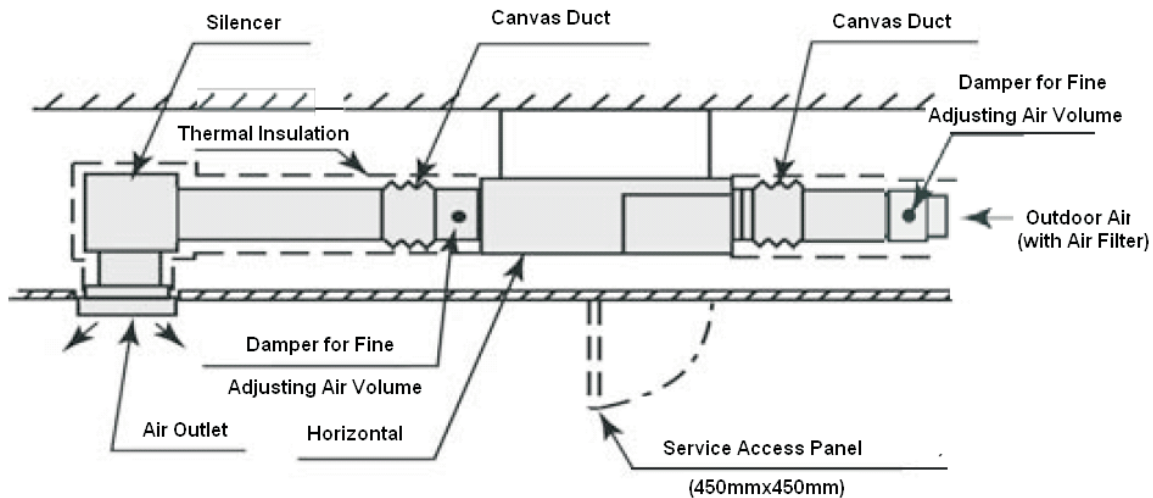


Fig. 4.6 Duct Connection

5. REFRIGERANT PIPING WORK

DANGER

Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these types of tests.

5.1 Piping Materials

- (1) Prepare locally-supplied copper pipes.
- (2) Select clean copper tubes making sure there is no dust and moisture inside the tubes.
Before connecting pipes, blow the inside of the tubes with nitrogen or dry air, to remove any dust or foreign materials.

5.2 Piping Connection

- (1) Position of piping connection is shown in Fig. 5.1 and Fig.5.2.

<RPI-5.0KFNQ>

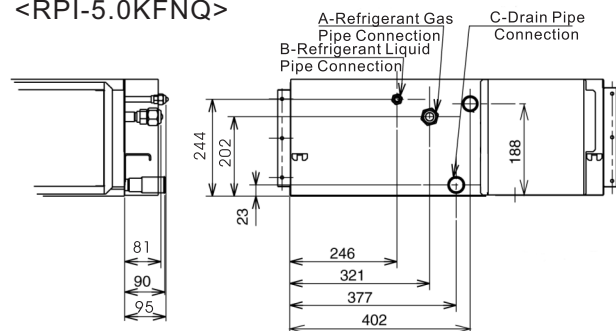


Fig. 5.1(1) Position of Piping Connection

<RPI-8.0、10.0、12.0KFNQ>

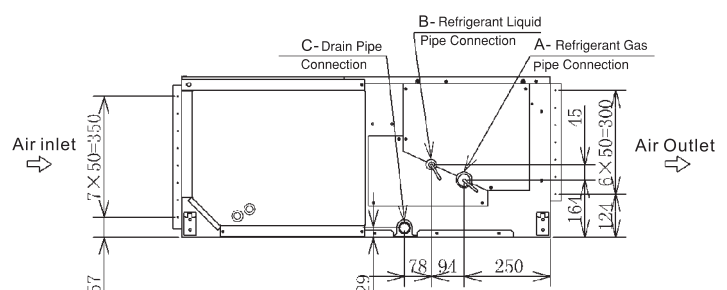


Fig. 5.1(2) Position of Piping Connection

<RPI-16.0-20.0KFNQL/H,RPI-16.0-20.0KFNQLF/HF>

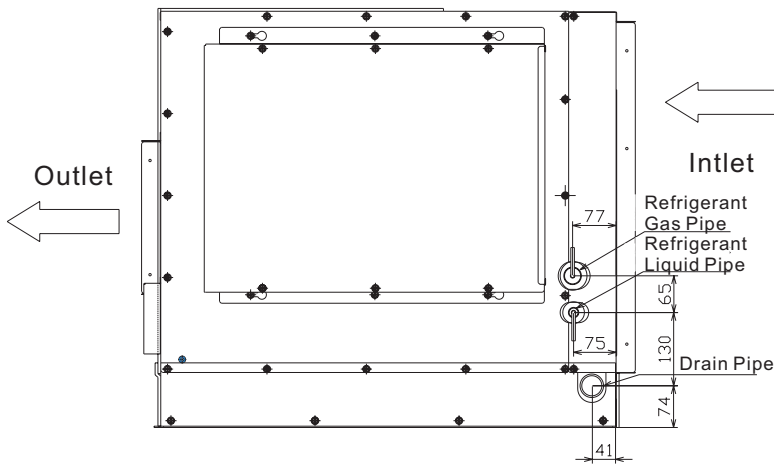


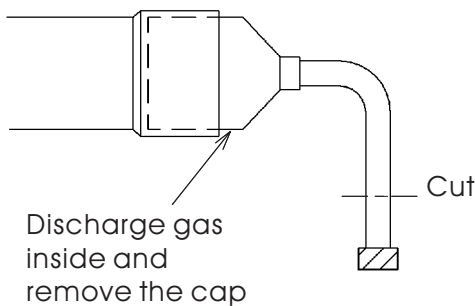
Fig. 5.1(3) Position of Piping Connection

MODEL	A	B	C
RPI-5.0KFNQ	φ 15.88 (5/8)	φ 9.53 (3/8)	VP 25
RPI-8.0KFNQ	φ 19.05 (3/4)	φ 9.53 (3/8)	
RPI-10.0KFNQ	φ 22.2 (7/8)	φ 9.53 (3/8)	
RPI-12.0KFNQ	φ 25.4 (1/1)	φ 12.7 (1/2)	
RPI-16.0KFNQL/H RPI-16.0KFNQLF/HF	φ 25.4 (1/1)	φ 12.7 (1/2)	Rp1 screw
RPI-20.0KFNQL/H RPI-20.0KFNQLF/HF	φ 28.6 (9/8)	φ 15.88 (5/8)	

Fig. 5.2 Pipe Size

CAUTION

- Cut the pipe end before blazing to remove the cap, and discharge gas inside the pipe. If not discharged, blazing material will be blown off.



- (2) When brazing the refrigerant pipes, be sure to blaze, after covering the part with shown below a wet cloth to the insulation pipes of the units in order to prevent the thermistors on liquid and gas pipes from damaging by heating.

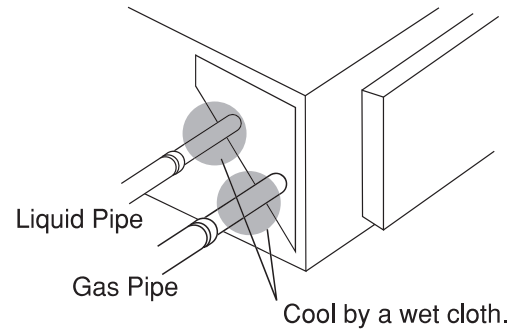
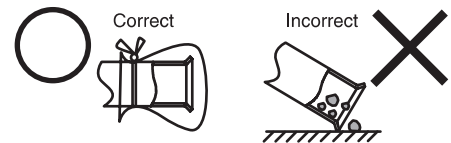


Fig. 5.3 Blazing Pipes

- Pay attention so that the flame does not come into contact with the main body itself.

CAUTION

- Cap the end of the pipe when the pipe is to be inserted through a hole.
- Do not put pipes on the ground directly without a cap or vinyl tape at the end of the pipe.



- (3) After blazing, insulate the pipes after checking that there is no leakage. At that time, be sure to cover the space between two insulating peaces by insulation pipe (factory-supplied accessory).

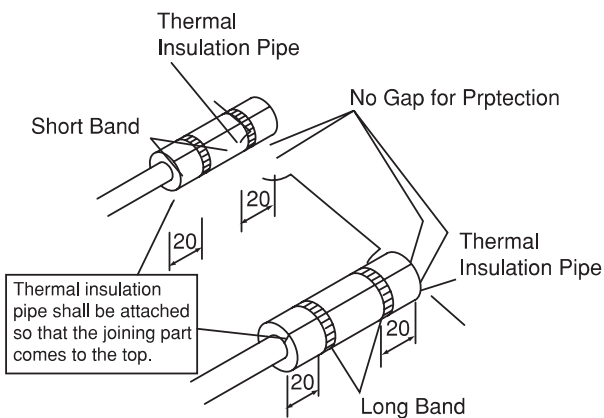
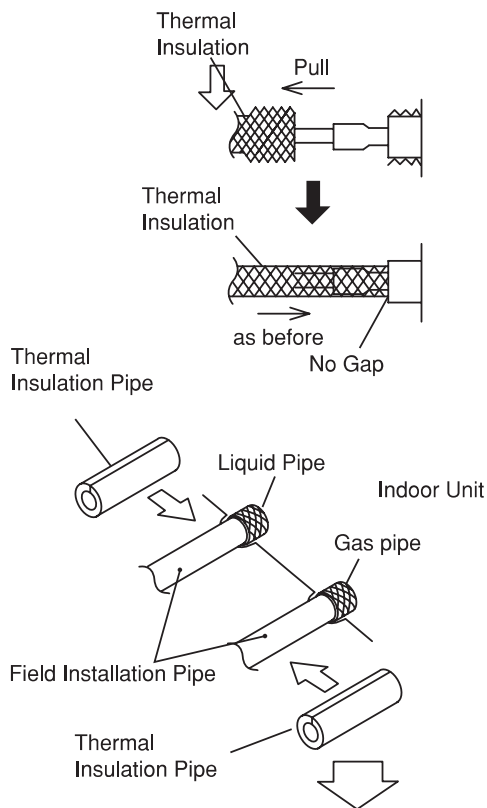


Fig. 5.4 Insulating Pipes

- (4) Evacuation and refrigerant charging procedures should be performed according to "Installation & Maintenance Manual" of the outdoor unit.

CAUTION

An excess or a shortage of refrigerant is the main cause of trouble to the units. Charge the correct refrigerant quantity.

6. DRAIN PIPING

<RPI-5.0-12.0KFNQ>

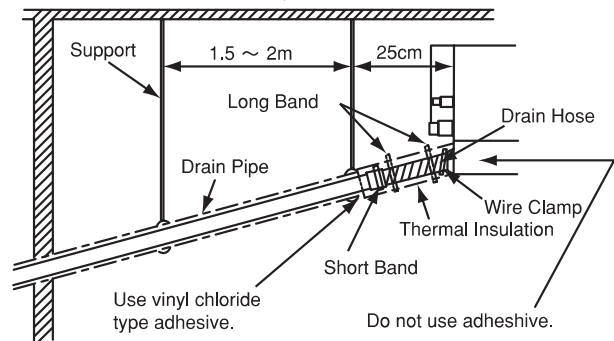
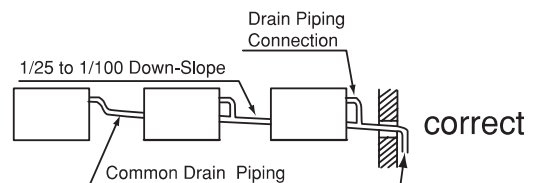
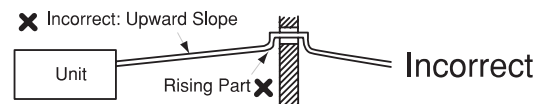


Fig. 6.1 Drain Piping (1)

- (A) The position of the drain piping connection is shown in Fig. 6.1.
 - (B) Prepare polyvinyl chloride pipe with a 32mm outer diameter.
 - (C) Fasten the tube to the drain hose with the adhesive agent and the factory-supplied clamp. The drain piping must be performed with a DOWN-SLOPE pitch of 1/25 to 1/100.
 - (D) Insulate the drain pipe after connecting the drain hose.
- Do not connect the drain-hose to the drain outlet pipe of indoor unit BY ADHESIVE. If used, the servicing of drain-up mechanism is not available, and drain outlet pipe of indoor unit may be cracked due to invasion of the adhesive. But other pipe connecting part, use vinyl chloride type adhesive.



This drain pipe shall be separating from other pipes.

Fig. 6.2 Drain Piping (2)

NOTE

When the relative humidity of inlet or ambient air exceeds 80%, apply an (field-supplied) auxiliary drain pan beneath the indoor unit as shown in Fig. 6.3.

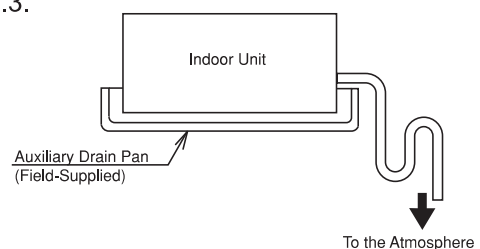


Fig. 6.3 Auxiliary Drain Pan

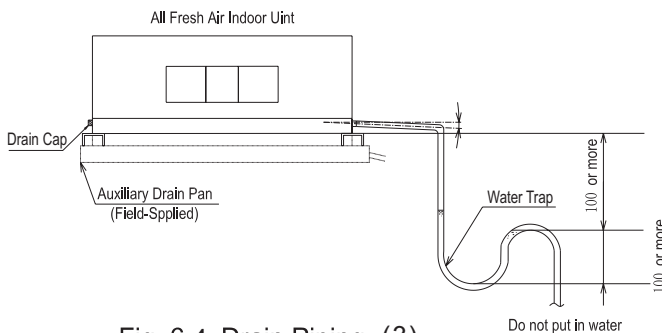


Fig. 6.4 Drain Piping (3)

- Perform the heat insulation work over the duct for dew protection.

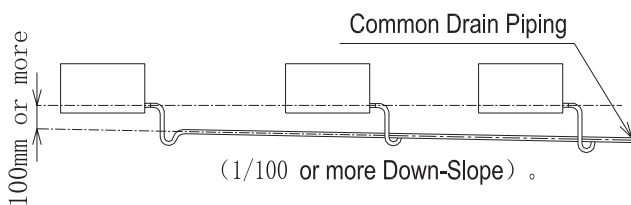


Fig. 6.5 Drain Piping (4)

NOTE

- (1) Do not create an upper-slope or rise for the drain piping, since drain water can flow back to the unit and leakage to the room will occur when the unit operation is stopped.
- (2) Do not connect the drain pipe with sanitary or sewage piping or any other drainage piping.
- (3) When the common drain piping is connected with other indoor units, the connected position of each indoor unit must be higher than the common piping. The pipe size of the common drain pipe must be large enough according to the unit size and number of units.
- (4) After performing drain piping work and electrical wiring, check to ensure that water flows smoothly as in the following procedure.
Checking with the Float Switch
 - a. Switch ON the power supply.
 - b. Pour 2 or 2.5 liters of water into the drain pan.
 - c. Check to ensure that the water flows smoothly or whether no water leakage occurs. When water cannot be found at the end of the drain piping, pour another 2 liters of water into the drain.

7. ELECTRICAL WIRING

! WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor fan and the outdoor fan have stopped before electrical wiring work or a periodical check is performed.
- Protect the wires, drain pipe, electrical parts, etc. from rats or other small animals. If not protected, rats may gnaw at unprotected parts and at the worst, a fire will occur.
- Tighten screws according to the following torque.
 - M3.5: 1.2 N-m
 - M5: 2.0~2.4 N-m

! CAUTION

- Wrap the accessory packing around the wires, and plug the wiring connection hole with the seal material to protect the product from any condensate water or insects.
- Tightly secure the wires with the cord clamp inside the indoor unit.
- Secure the cable of the remote control switch using the cord clamp inside the electrical box.

7.1 General Check

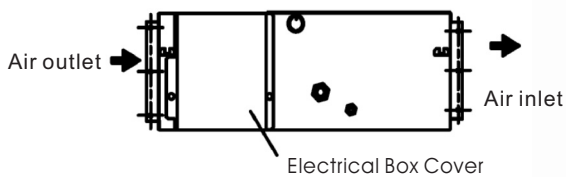
- (1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data given in "Technical Catalog I". Make sure that the components comply with National Electrical Code (NEC).
- (2) Check to ensure that the power supply voltage is within $\pm 10\%$ of the rated voltage.
- (3) Check the capacity of the electrical wires.
 If the power source capacity is too low, the system cannot be started due to the voltage drop.
- (4) Check to ensure that the ground wire is connected.
- (5) Power Source Main Switch
 Install a multi-pole main switch with a space of 3.5mm or more between each phase.

7.2 Electrical Wiring Connection

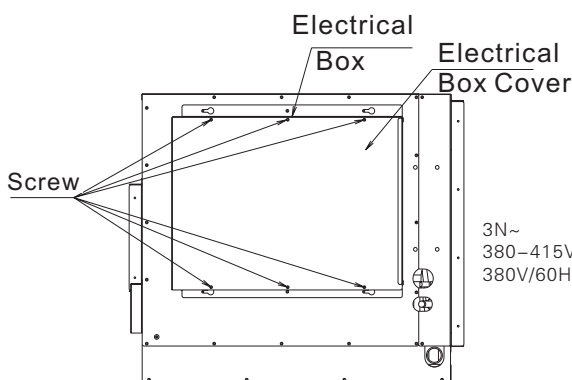
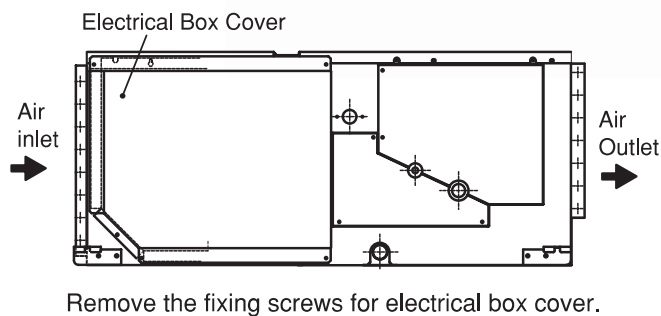
The electrical wiring connection for the indoor unit is shown in Fig. 7.2.

- (1) Connect the cable of an optional remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box through the connecting hole in the cabinet.
- (2) Connect the power supply and earth wires to the terminals in the electrical box.
- (3) Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.
- (4) Tightly clamp the wires using the cord clamp inside the electrical box.

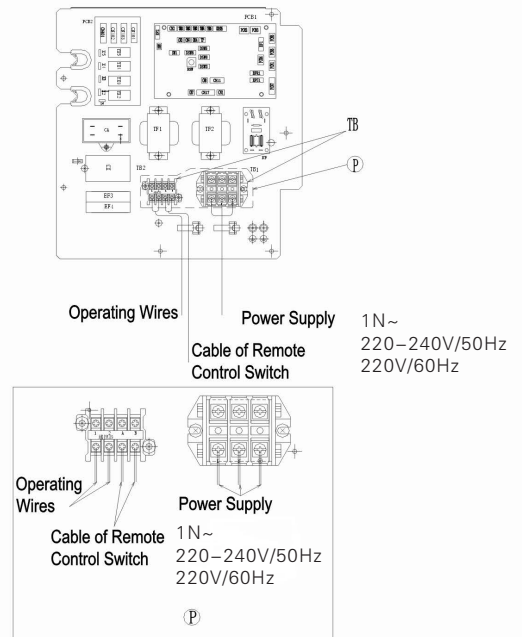
RPI-5.0KFNQ



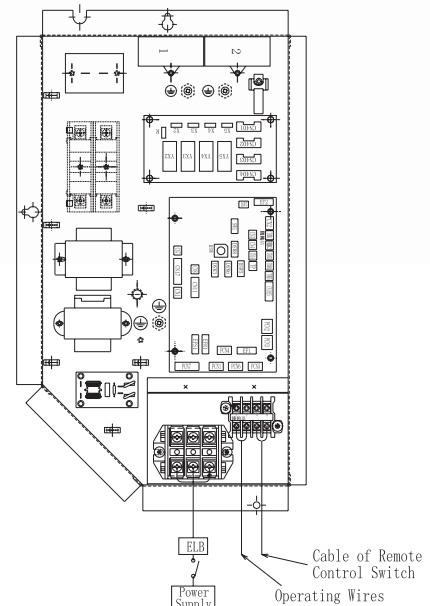
RPI-8.0、10.0、12.0KFNQ



RPI-5.0KFNQ



RPI-8.0、10.0、12.0KFNQ



<RPI-16.0-20.0KFNQL/H,RPI-16.0-20.0KFNQLF/HF>

3N~ 380-415V/50HZ 380V/60Hz

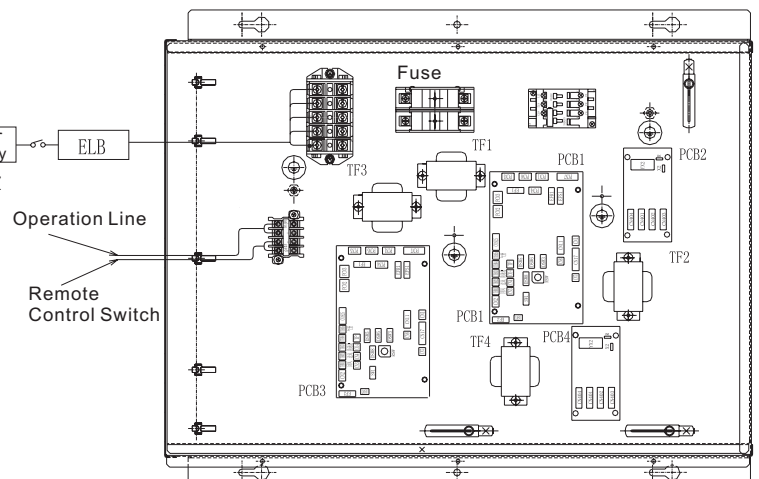


Fig. 7.2 Electrical Wiring Connection

8. TEST RUN

Test run should be performed according to “Installation & Maintenance Manual” of the outdoor unit.

WARNING

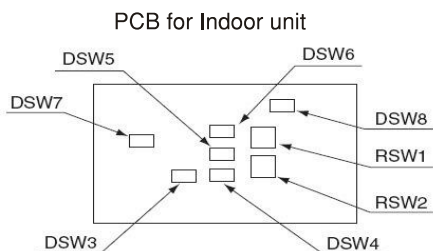
- Do not operate the system until all the check points have been cleared.
 - (A) Check to ensure that the electrical resistance is more than 1 megohm, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.
 - (B) Check to ensure that the stop valves of the outdoor unit are fully opened, and then start the system.
 - (C) Check to ensure that the switch on the main power source has been ON for more than 12 hours, to warm the compressor oil by the crankcase heater.
- Pay attention to the following items while the system is running.
 - (A) Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 90°C.
 - (B) DO NOT PUSH THE BUTTON OF THE MAGNETIC SWITCH(ES). It will cause a serious accident.

9. SAFETY AND CONTROL DEVICE SETTING

Model		RPI-5.0 KFNQ	RPI-8.0 KFNQ	RPI-10.0 KFNQ	RPI-12.0 KFNQ	RPI-16.0 KFNQL/H	RPI-20.0 KFNQL/H RPI-20.0 KFNQLF/HF
For Evaporator Fan Motor Thermostat	Cut-Out °C Cut-In °C	130±5 83±15	130±5 83±15	130±5 83±15	145±5 80±15	145±5 80±15	145±5 80±15
For Control Circuit Fuse Capacity	A	5	5	5	5	5	5
Freeze Protection Thermostat	Cut-Out °C	0	0	0	0	0	0
	Cut-In °C	14	14	14	14	14	14
Thermostat Differential	°C	2	2	2	2	2	2

10. Setting of Dip Switches

(1) Position of Dip Switches



- (2) The PCB in the indoor unit is equipped with 8 types of dip switches and rotary switches. Before testing unit, set these dip switches according to the following instructions. Unless these dip switches are set in the field, the unit can not be operated.

(a) Unit No. Setting (DSW6&RSW1)

Setting is required. Set the unit No. of all indoor units respectively and serially, by following setting position shown in the table below. Numbering must start from "0" for every outdoor unit.

Unit No. Setting

DSW6 (Tens Digit)	RSW1 (Units Digit)	Ex.) Set at No.16 Unit
Before shipment, DSW6 and RSW1 are set to "0". Max. 64 units are available to set when all the equipment to be connected are corresponding to HI-NET.		

(b) Capacity Code Setting (DSW3)

No setting is required, due to setting before shipment. This switch is utilized for setting the capacity code which corresponds to the Horse Power of the indoor unit.

Model	RPI-5.0KFNQ	RPI-8.0KFNQ	RPI-10.0, 12.0KFNQ
Setting Position			
Model	RPI-16.0KFNQL/H RPI-16.0KFNQLF/HF	RPI-20.0KFNQL/H RPI-20.0KFNQLF/HF	
Setting Position			

(c) Unit Model Code Setting (DSW4)

No setting is required.



(d) Refrigerant Cycle No. Setting (DSW5&RSW2)

Setting is required.

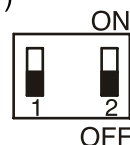
Setting position before shipment is all OFF.

Refrigerant Cycle No. Setting

DSW5 (Tens Digit)	RSW2 (Units Digit)	Ex.) Set at No.5 Cycle
Before shipment, DSW5 and RSW2 are set to "0". Max. 64 cycles are available to set when all the equipment to be connected are corresponding to HI-NET. Max. 16 cycles when the units corresponding/non-corresponding to HI-NET are combined.		

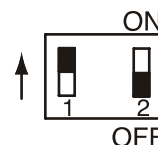
(e) Fuse Recover (DSW7)

* Factory Setting



*No.1 Pin: Fuse Recover

When fuse is cut,
turn No.1 Pin ON.



(f) Optional Function Setting (DSW8)

No setting is required.

Setting position before shipment is all OFF.

