LG TOTAL HVAC SOLUTION PROVIDER

ENGINEERING PRODUCT DATA BOOK

Floor Standing

Cooling Only 50/60Hz R410A
0CSP0-01B(Replaces 5CSP0-01A)

LG
Life's Good

P/No. : MFL60778814

Floor Standing
Introduction

Preface

New era brings the more sophisticated and advanced buildings which in turn demands for specialized and optimized direct expansion air conditioning systems. Also energy efficiency, low noise and low maintenance are the features which are essential for these systems.

As a part of vertical integration LG makes all the key components in house, which gives us an edge to LG to make better and latest technology products with best quality in optimized time.

These systems are equipped with inverter technology and R410A refrigerant which is perfect solution to various installation locations.

This Engineering product data book incorporates information about the product itself, and installation, designing for these systems.

The comprehensive study of this book will improve your knowledge about the system and its application in detail.

LG Electronics Inc.

Air Conditioning and Energy Solution Company

Floor Standing

Part 1 General information

1. Model Names

2. Nomenclature

3. Control systems (standard)

Floor Standing
1. Model Names

1.1 Indoor units

Category	Chassis Name		Capacity Index [kW (kBtu/h)]	
			46.9(160)	58.6(200)
Floor Standing		PN	APNQ150LNA0	APNQ200LNA0

1.2 Outdoor Units

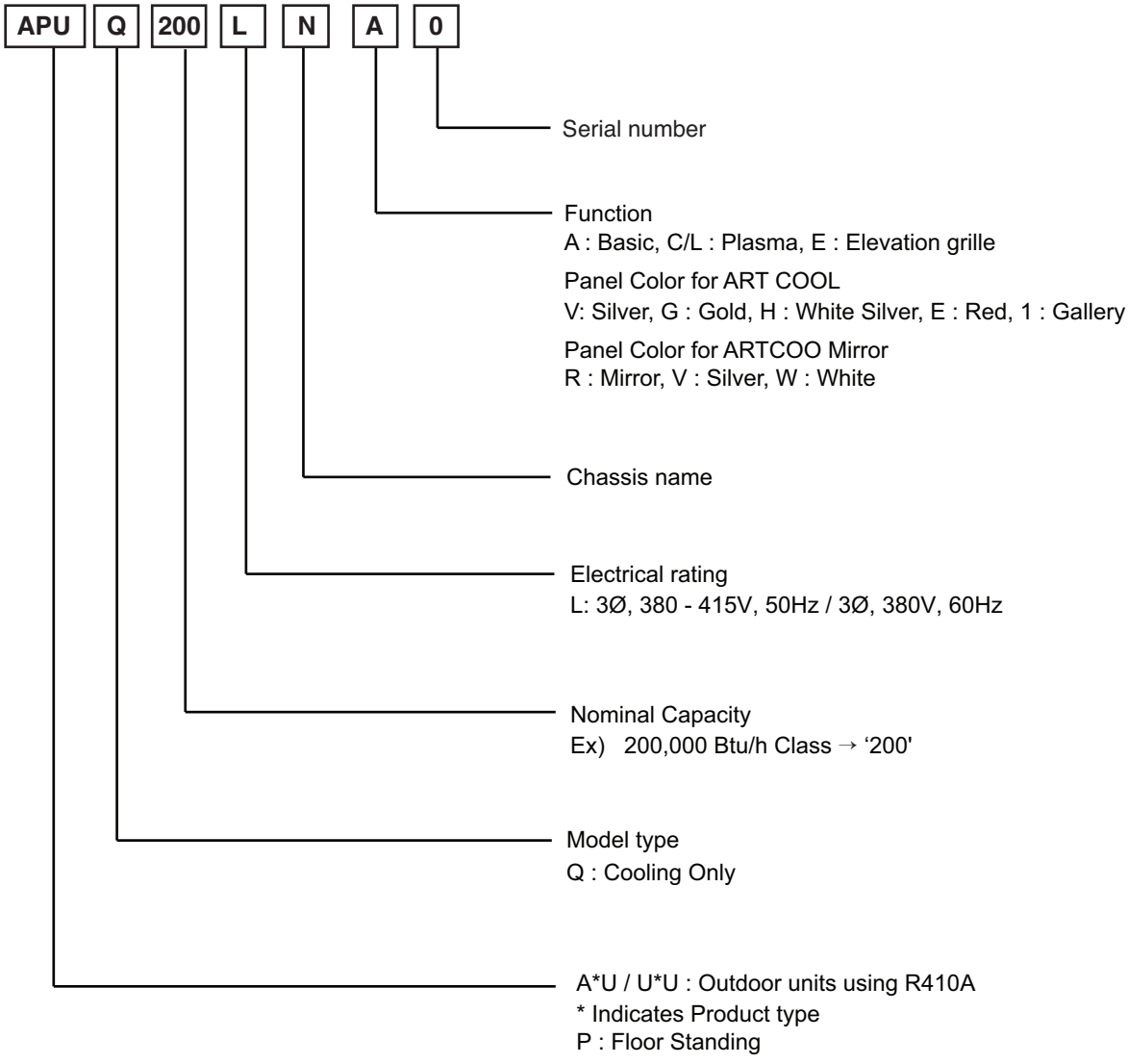
Model Name	APUQ150LNA0	APUQ200LNA0
Total capacity index of connectable indoor units(kW)	46.9	58.6
Power supply	3Ø, 380 - 415V, 50Hz 3Ø, 380V, 60Hz	
Chassis		

Floor Standing
2. Nomenclature

2.1 Indoor units

Floor Standing
2. Nomenclature

2.2 Outdoor Units



Floor Standing

Part 2 Product data

- Indoor units
- Outdoor units

Floor Standing

■ Indoor units

1. List of functions
2. Specifications
3. Dimensions
4. Piping diagrams
5. Wiring Diagrams
6. Air flow and temperature distributions (reference data)
7. Sound levels

Floor Standing
1. List of functions

Category	Functions	APNQ150LNA0	APNQ200LNA0
Air flow	Air supply outlet	1	1
	Airflow direction control (left & right)	Manual	Manual
	Airflow direction control (up & down)	Manual	Manual
	Auto swing (left & right)	X	X
	Auto swing (up & down)	X	X
	Airflow steps (fan/cool/heat)	2 / 2 / -	2 / 2 / -
	Chaos wind(auto wind)	X	X
	Jet cool/heat	X / X	X / X
	Swirl wind*	X	X
Air purifying	Triple filter (Deodorizing)	X	X
	Plasma air purifier	X	X
	Allergy Safe filter	X	X
	Long-life prefilter (washable / anti-fungus)	O	O
Installation	Drain pump	X	X
	E.S.P. control*	X	X
	Electric heater	X	X
	High ceiling operation*	X	X
	Auto Elevation Grille	X	X
Reliability	Hot start	X	X
	Self diagnosis	O	O
	Soft dry operation	O	O
Convenience	Auto changeover	X	X
	Auto cleaning	X	X
	Auto operation(artificial intelligence)	O	O
	Auto Restart	O	O
	Child lock*	O	O
	Forced operation	X	X
	Group control*	X	X
	Sleep mode	X	X
	Timer(on/off)	O	O
	Timer(weekly)*	X	X
	Two thermistor control*	X	X
Individual controller	Wired remote controller	X	X
	Deluxe wired remote controller	X	X
	Simple wired remote controller	X	X
	Simple Wired remote controller(for hotel use)	X	X
	Wireless remote controller*	X	X
Network Solution	General central controller (Non LGAP)	X	X
	Network Solution(LGAP)	O	O
	Dry contact	PQDSA(1)/PQDSB(1) / PQDSBC	PQDSA(1)/PQDSB(1) / PQDSBC
	PI 485(for Indoor Unit)	X	X
Special function kit	Zone controller	X	X
	CTI(Communication transfer interface)	X	X
	Electronic thermostat	X	X
	Telecom shelter controller	X	X
	Independent Power Module	X	X
	CO^2 Sensor	X	X
Others	Remote temperature sensor	X	X
	Group control wire	X	X

Note

1. * : These functions need to connect the wired remote controller.

O : Applied X : Not applied

Accessory model name : Installed at field, ordered and purchased separately by the corresponding model name, supplied with separate package.

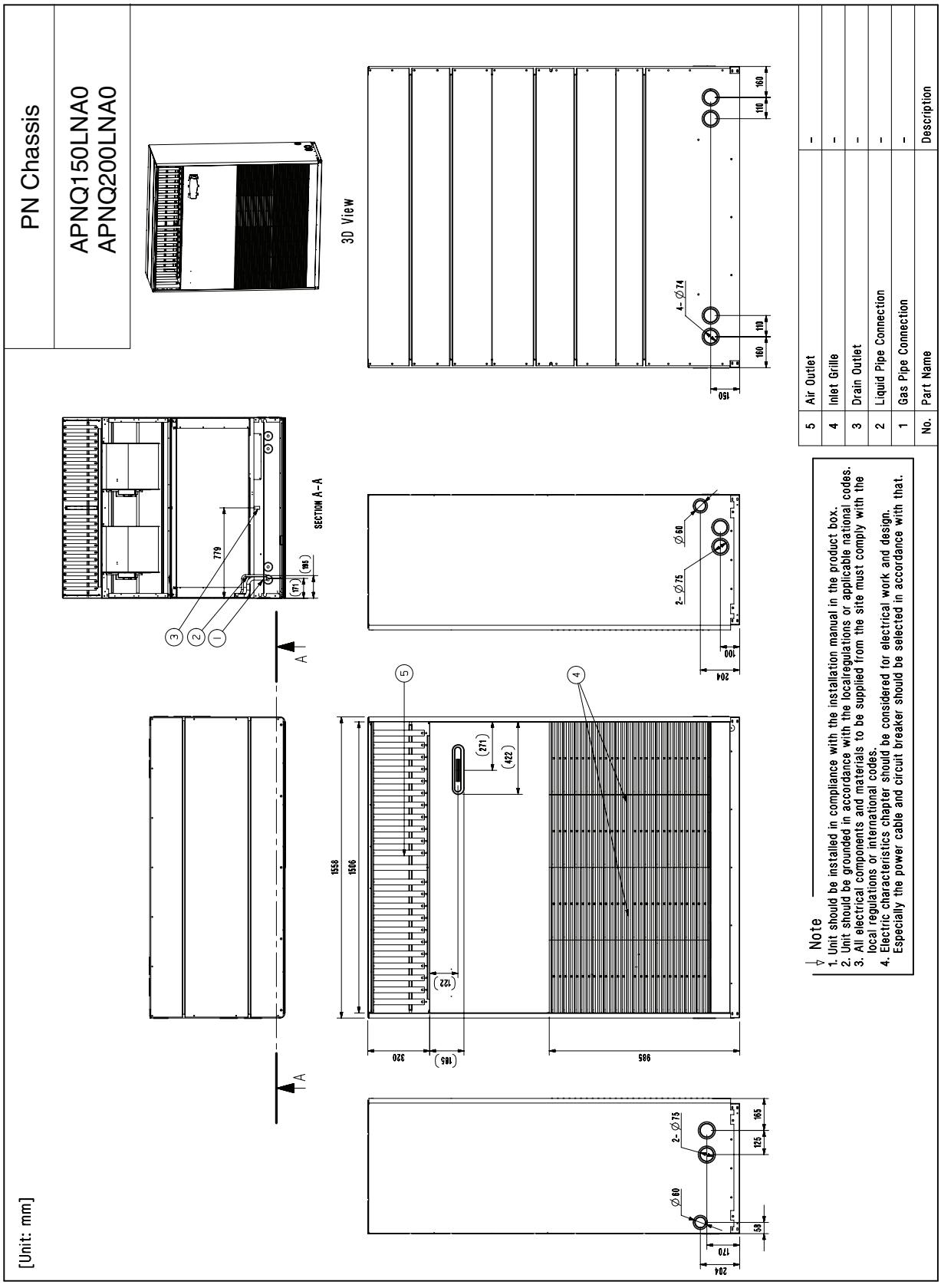
Floor Standing
2. Specifications

Model Name				APNQ150LNA0	APNQ200LNA0
Power Supply			V, Ø, Hz	220-240 , 1 , 50 220 , 1 , 60	220-240 , 1 , 50 220 , 1 , 60
Power Input			W	660	830
Running Current			A	3.0	3.8
Casing Color			-	-	-
Dimensions	Body	W x H x D	mm	1,558 x 1,920 x 700	1,558 x 1,920 x 700
		W x H x D	inch	61-11/32 x 75-19/32 x 27-9/16	61-11/32 x 75-19/32 x 27-9/16
Net Weight	Body		kg (lbs)	237.0 (522.5)	237.0 (522.5)
Heat Exchanger	(Row x Column x Fins per inch) x No.		-	(4 x 34 x 21) x 1	(4 x 34 x 21) x 1
	Face Area		m^2 (ft^2)	0.98 (10.54)	0.98 (10.54)
Fan	Type		-	Sirocco Fan	Sirocco Fan
	Air Flow Rate	H / L	m^3/min	120.0 / 95.0	130.0 / 95.0
		H / L	ft^3/min	4,238 / 3,355	4,591 / 3,355
Fan Motor	Type		-	BLDC	BLDC
	Output		W x No.	750 x 2	750 x 2
Sound Pressure Level		H / L	dB(A)	64 / 57	65 / 57
Sound Power Level		Max.	dB(A)	-	-
Piping Connections	Liquid		mm(inch)	Ø 15.88 (5/8)	Ø 15.88 (5/8)
	Gas		mm(inch)	Ø 28.58 (1-1/8)	Ø 28.58 (1-1/8)
	Drain (O.D. / I.D.)		mm	Ø 21.0 / 17.0	Ø 21.0 / 17.0
Safety Devices			-	Fuse	Fuse
			-	Thermal Protector for Fan Motor	
Communication Cable			No. x mm^2 (AWG)	2C x 1.0~1.5 (H07RN-F)	
Power Cable (Included Earth)			No. x mm^2 (AWG)	3C x 2.5 (H07RN-F)	

Notes :

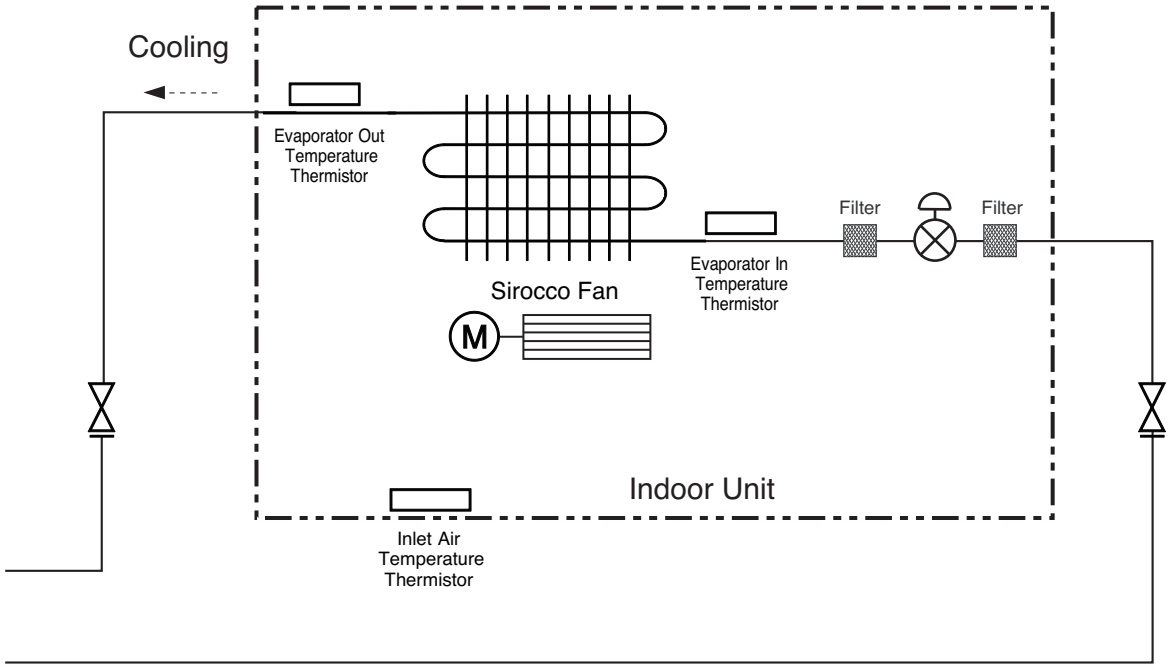
1. Wiring cable size must comply with the applicable local and national code.
2. Due to our policy of innovation some specifications may be changed without notification.
3. Sound Level Values are measured at Anechoic chamber.
   Therefore, these values can be increased owing to ambient conditions during operation.

3. Dimensions



Floor Standing
4. Piping diagrams

Models : APNQ150LNA0 / APNQ200LNA0



Description	PCB Connector
Inlet Air Temperature Thermistor	CN-ROOM/TH
Evaporator In Temperature Thermistor	CN-EVA/TH
Evaporator Out Temperature Thermistor	CN-EVA/TH2

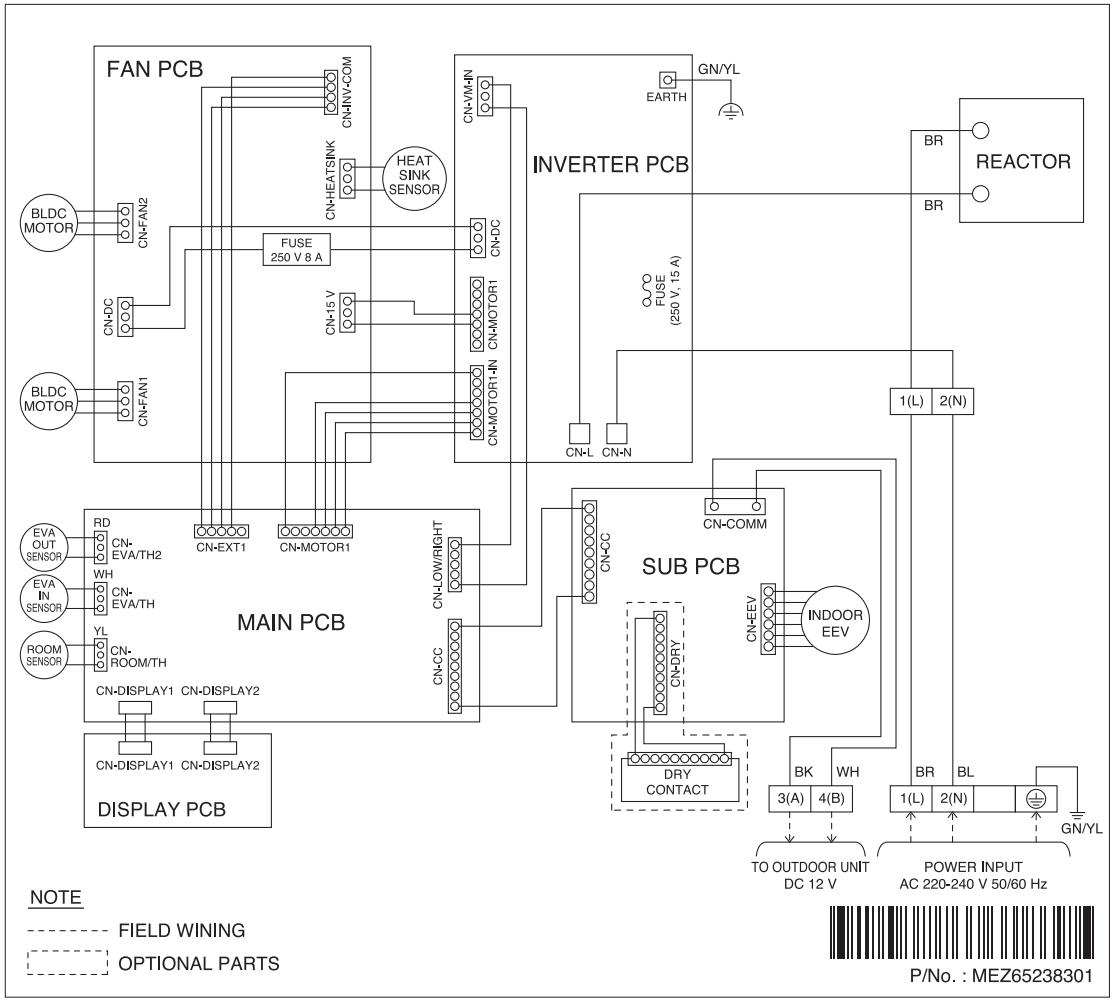
■ Refrigerant pipe connection port diameters

[Unit : mm(inch)]

Model	Gas	Liquid
APNQ150LNA0 APNQ200LNA0	Ø 28.58 (1-1/8)	Ø 15.88 (5/8)

Floor Standing
5. Wiring diagrams

Models: APNQ150LNA0 / APNQ200LNA0

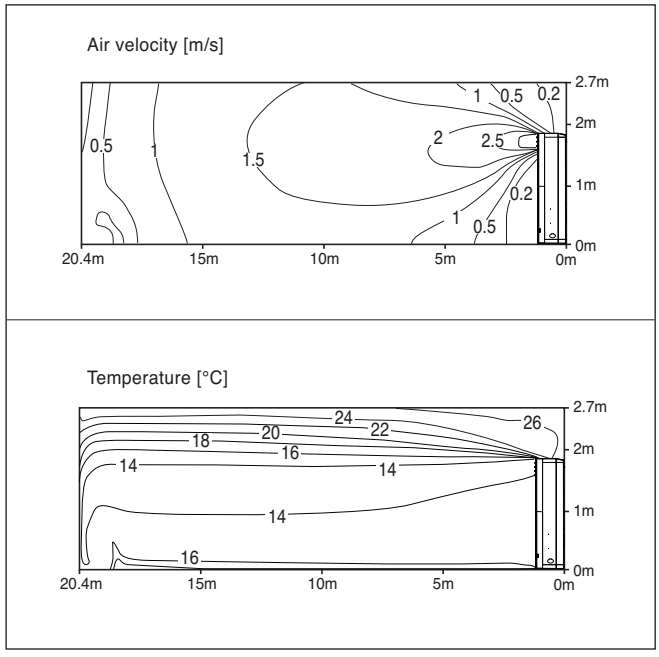


Floor Standing
6. Air flow and temperature distributions (reference data)

Model : APNQ150LNA0

Cooling

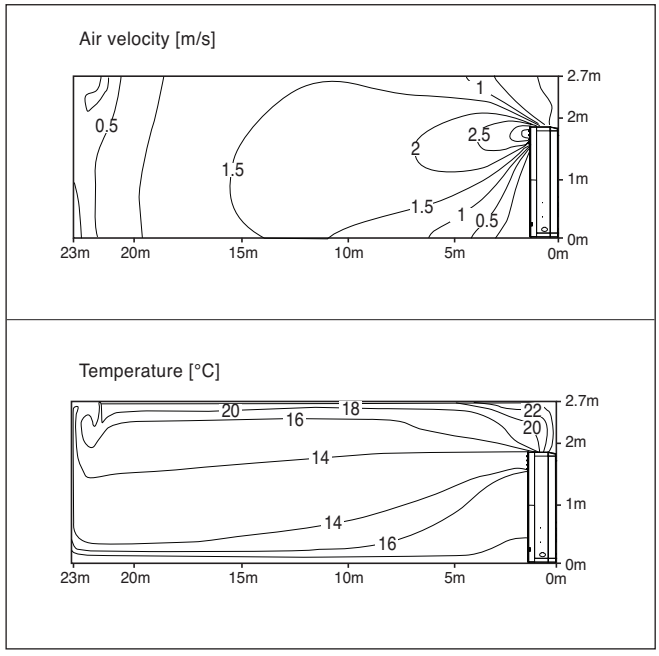
Discharge angle:90°



Model : APNQ200LNA0

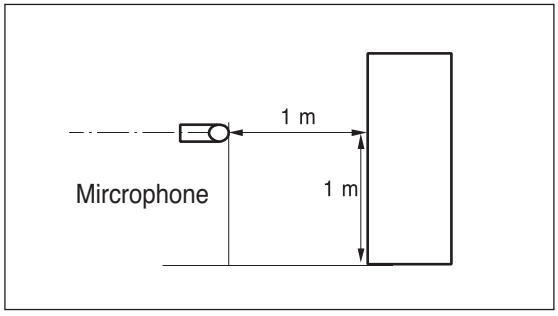
Cooling

Discharge angle:90°



Floor Standing
7. Sound levels

Overall

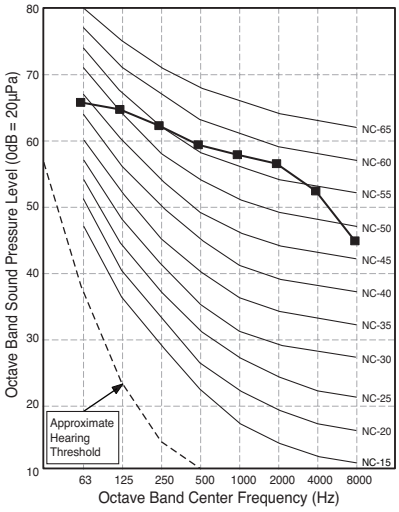


Model	Sound Level [dB(A)]	
	H	L
APNQ150LNA0	64	57
APNQ200LNA0	65	57

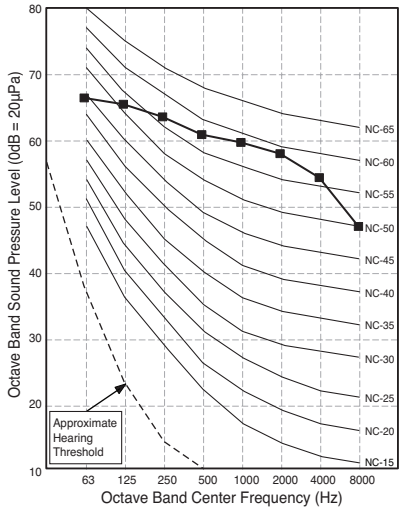
Notes :
1. Sound measured at each 1.0m away from the front and bottom of the unit
2. Operating condition
   - Power source
     *Indoor : 230V 50Hz
     *Outdoor : 400V 50Hz
   - Cooling : Indoor temperature (27°C DB, 19°C WB),
     Outdoor temperature (35°C DB, 24°C WB)
3. Reference accoustic pressure 0dB = 20μPa
4. Sound level will vary depending on a range of factors such as the construction(acoustic absorption coefficient) of particular room in which the equipment in installed.

Sound Pressure Level

APNQ150LNA0



APNQ200LNA0



Floor Standing

■ Outdoor units

Floor Standing
1. List of functions

Category	Functions	APUQ150LNA0	APUQ200LNA0
Reliability	Defrost / Deicing	X	X
	High pressure switch	O	O
	Low pressure switch	X	X
	Phase protection	O	O
	Restart delay (3-minutes)	O	O
	Self diagnosis	O	O
	Soft start	O	O
Convenience	Test function	O	O
	Night Silent Operation	O	O
Network function	Network soluation(LGAP)	O	O

[Note]
• O: Applied, • X: Not applied
Accessory model name : Installed at field, ordered and purchased separately by the corresponding model name, supplied with separate package.

Floor Standing
2. Specifications

Outdoor unit				APUQ150LNA0	APUQ200LNA0
Capacity	Cooling	Min.~Rated.	kW	18.8 ~ 46.9	23.4 ~ 58.6
		Min.~Rated.	Btu/h	64,200 ~ 160,000	79,900 ~ 200,000
	Heating	Min.~Rated.	kW	-	-
		Min.~Rated.	Btu/h	-	-
Power Input	Cooling	Rated	kW	16.1	21.0
	Heating	Rated	kW	-	-
Running Current	Cooling	Rated	A	22.0	28.2
	Heating	Rated	A	-	-
Power Supply			V , Ø , Hz	380-415 , 3 , 50 380 , 3 , 60	380-415 , 3 , 50 380 , 3 , 60
Starting Current	Cooling	Max.	A	-	-
	Heating	Max.	A	-	-
Wiring Connections	Power Supply Cable (included Earth)		No. x mm² (AWG)	5C x 6.0 (10)	5C x 6.0 (10)
Casing Color			-	Warm Gray /Morning Gray	Warm Gray /Morning Gray
Dimensions		W x H x D	mm	1,240 × 1,680 × 760	1,240 × 1,680 × 760
		W x H x D	inch	48-13/16 x 66-5/32 x 29-29/32	48-13/16 x 66-5/32 x 29-29/32
Net Weight			kg (lbs)	270.0 (595.2)	270.0 (595.2)
Compressor	Type		-	Hermetic Motor Compressor	Hermetic Motor Compressor
	Model		Model x No.	JQA048MAC x 2	JQA048MAC x 2
	Motor type		-	BLDC	BLDC
	Motor Output		W x No.	4,200 x 2	4,200 x 2
Refrigerant	Type		-	R410A	R410A
	Precharged Amount		g (oz)	10,000 (352.7)	10,000 (352.7)
	Chargeless-Pipe Length		m (ft)	5.0 (16.4)	5.0 (16.4)
	Additional Charging Volume		g/m (oz/ft)	150 (1.61)	150 (1.61)
	Control		-	Electronic Expansion Valve	Electronic Expansion Valve
Refrigerant Oil	Type		-	FVC68D(PVE)	FVC68D(PVE)
	Charged volume		cc x No.	3,600 x 2	3,600 x 2
Heat Exchanger	(Row x Column x Fins per inch) x No.		-	(2 x 58 x 14) x 1	(2 x 58 x 14) x 1
Fan	Type		-	Propeller	Propeller
	Air Flow Rate		m³/min	290	290
Fan Motor	Type			BLDC	BLDC
	Output		W x No.	900.0 x 2	900.0 x 2
Sound Pressure Level	Cooling	Rated	dB(A)	64	65
	Heating	Rated	dB(A)	-	-
Sound Power Level		Max.	dB(A)	-	-
Piping Connections	Liquid	Outer Dia.	mm(inch)	Ø 15.88 (5/8)	Ø 15.88 (5/8)
	Gas	Outer Dia.	mm(inch)	Ø 28.58 (1-1/8)	Ø 28.58 (1-1/8)
Piping Length		Max.	m (ft)	50 (164.0)	50 (164.0)
Maximum Height Difference	Outdoor Unit ~ Indoor Unit	Max.	m (ft)	30 (98.4)	30 (98.4)
Operation Range (Outdoor Temperature)	Cooling	Min. ~ Max.	°C DB (°F DB)	-10 (14.0) ~ 48 (118.4)	-10 (14.0) ~ 48 (118.4)
	Heating	Min. ~ Max.	°C WB (°F WB)	-	-

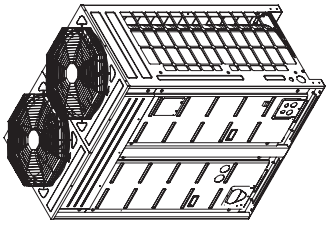
Note :

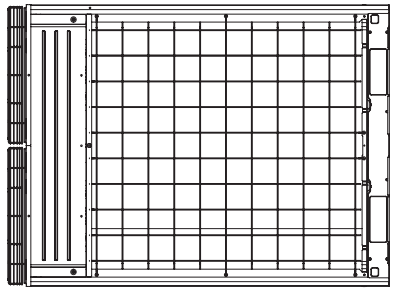
1. All data are based on the following conditions:
   - Cooling Temperature : Indoor 27°C(80.6°F) DB / 19°C(66.2°F) WB
     Outdoor 35°C(95°F) DB / 24°C(75.2°F) WB
   - Piping Length : Interconnected Pipe Length = 5m
   - Difference Limit of Elevation (Outdoor ~ Indoor Unit) is Zero.
2. Wiring cable size must comply with the applicable local and national codes.
3. Due to our policy of innovation some specifications may be changed without notifications.
4. Sound Level Values are measured at Anechoic chamber.
   Therefore, these values can be increased owing to ambient conditions during operation.

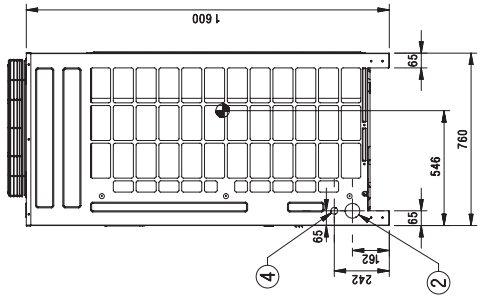
Floor Standing
3. Dimensions

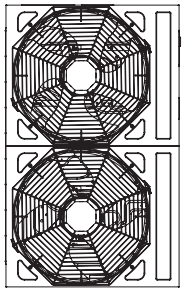
UX3 Chassis

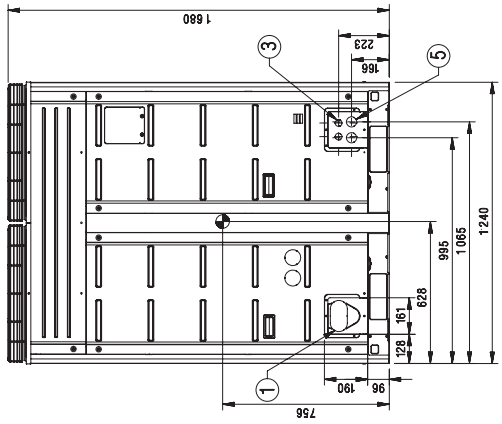
APUQ200LNA0
APUQ150LNA0

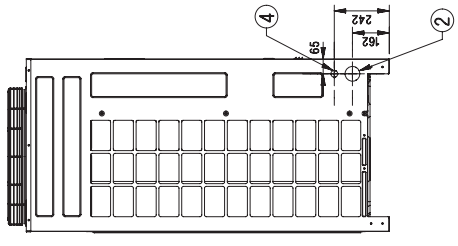


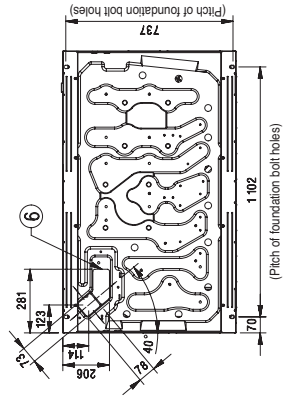












◒ Gravity point
[Unit : mm]

No.	Parts name	Remarks
6	Pipe routing hole(bottom)	-
5	Power cord routing hole(front)	Ø45
4	Wire routing hole(side)	Ø30
3	Wire routing hole(front)	Ø30
2	Pipe routing hole(side)	Ø65
1	Pipe routing hole(front)	-

Floor Standing
4. Capacity tables

Models : APUQ150LNA0 + APNQ150LNA0

• Cooling Capacity

Model	APNQ150LNA0
AFR	105.0

Outdoor Air Temperature	Indoor Air Temperature : °CDB / °CWB																	
	20.0 / 14.0			22.0 / 16.0			25.0 / 18.0			27.0 / 19.0			30.0 / 22.0			32.0 / 24.0		
°CDB	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
20.0	45.99	34.36	8.97	48.82	34.82	11.75	51.65	35.12	12.71	53.06	35.42	12.85	57.31	36.13	12.85	60.14	36.80	13.11
25.0	43.99	33.25	10.90	46.80	33.77	12.45	49.62	34.13	12.78	51.03	34.46	12.97	55.26	35.24	13.19	58.07	35.95	13.31
32.0	41.30	31.91	12.47	44.10	32.52	14.34	46.91	32.97	15.06	48.31	33.34	15.22	52.51	34.23	15.58	55.32	35.00	15.87
35.0	40.04	30.83	13.57	42.83	31.48	15.40	45.62	31.96	15.97	46.90	32.26	16.10	51.20	33.26	16.45	53.99	34.04	16.78
40.0	38.29	29.89	14.90	41.08	30.61	16.05	43.87	31.16	16.28	45.26	31.57	16.32	49.44	32.57	16.58	52.23	33.40	16.94
43.0	37.23	28.84	14.97	40.02	29.59	15.67	42.81	30.17	15.65	44.21	30.59	15.62	48.39	31.62	15.77	51.18	32.47	16.12
46.0	36.18	27.95	13.10	38.97	28.73	13.26	41.76	29.35	13.28	43.15	29.78	13.16	47.34	30.85	13.16	50.13	31.71	13.48
48.0	34.06	26.59	9.82	36.74	27.37	10.07	39.41	28.00	10.05	40.75	28.42	10.36	44.77	29.49	10.24	47.45	30.33	10.79

Models : APUQ200LNA0 + APNQ200LNA0

• Cooling Capacity

Model	APNQ200LNA0
AFR	115.0

Outdoor Air Temperature	Indoor Air Temperature : °CDB / °CWB																	
	20.0 / 14.0			22.0 / 16.0			25.0 / 18.0			27.0 / 19.0			30.0 / 22.0			32.0 / 24.0		
°CDB	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI	TC	SHC	PI
20.0	57.46	40.78	11.70	61.00	41.32	15.33	64.53	41.68	16.58	66.30	42.04	16.77	71.61	42.88	16.76	75.15	43.68	17.09
25.0	54.96	39.46	14.22	58.48	40.07	16.24	62.00	40.50	16.67	63.76	40.90	16.91	69.04	41.82	17.20	72.56	42.66	17.36
32.0	51.60	37.87	16.27	55.11	38.60	18.71	58.61	39.13	19.64	60.36	39.57	19.86	65.61	40.62	20.32	69.12	41.54	20.70
35.0	50.03	36.59	17.70	53.52	37.36	20.09	57.00	37.93	20.83	58.60	38.29	21.00	63.97	39.47	21.46	67.46	40.40	21.89
40.0	47.84	35.48	19.43	51.32	36.33	20.94	54.81	36.98	21.23	56.55	37.47	21.29	61.78	38.65	21.63	65.26	39.64	22.09
43.0	46.52	34.23	19.53	50.01	35.12	20.44	53.49	35.81	20.41	55.23	36.31	20.37	60.46	37.53	20.57	63.95	38.53	21.03
46.0	45.21	33.17	17.09	48.69	34.09	17.30	52.18	34.83	17.32	53.92	35.34	17.16	59.15	36.61	17.17	62.63	37.63	17.58
48.0	42.56	31.56	12.80	45.90	32.48	13.13	49.25	33.23	13.11	50.92	33.73	13.51	55.94	34.99	13.36	59.29	36.00	14.08

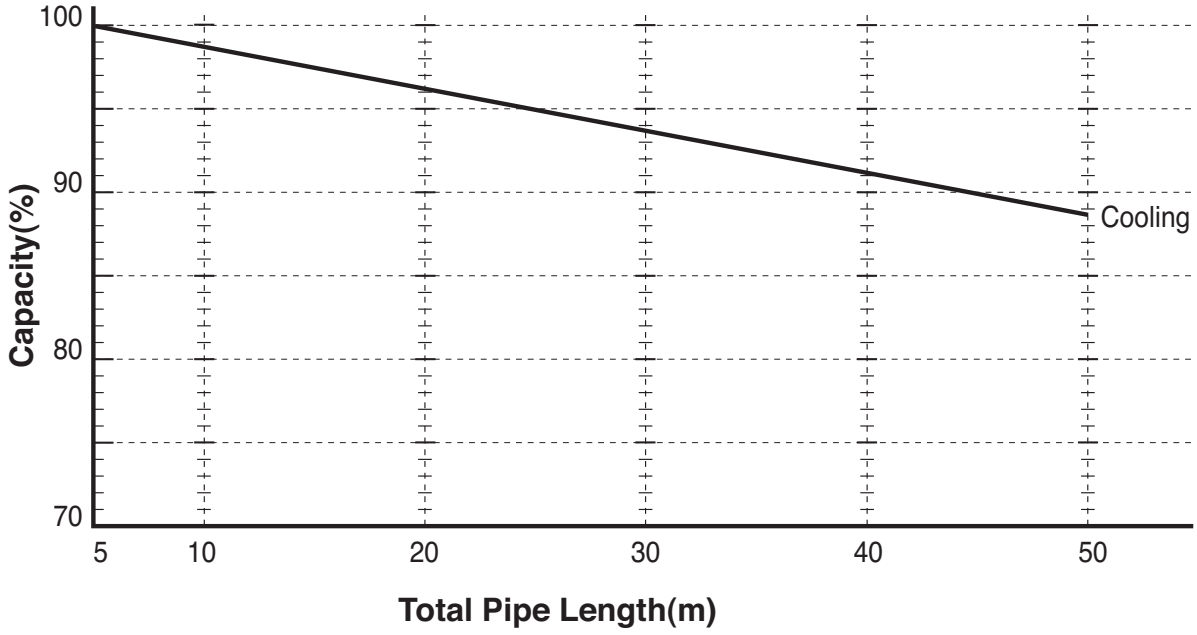
• Symbol

AFR : Air flow rate [m^3/min]
DB : Dry bulb temperature [°C]
WB : Wet bulb temperature [°C]
TC : Total capacity [kW]
SHC : Sensible capacity [kW]
PI : Power Input [kW]
(Comp.+ indoor fan motor+outdoor fan motor)

• Notes

1. All capacities are net. A deduction (cooling mode) or an addition (heating mode) of Capacity due to operating heat of indoor unit motor is reflected.
2. Direct interpolation is permissible. Do not extrapolate.
3. Capacities are based on the following conditions:
   - Interconnecting Piping Length : 5m
   - Level Difference : Zero.

Floor Standing
5. Capacity coefficient factor



Model No.	Max. PipeLength(m)	Max. Elevation (m)	Additional Refrigerant
APUQ150LNA0 / APUQ200LNA0	50	30	150g/m

Notes

❉ Equivalent pipe length = actual pipe length + number of band x 0.3

❉ Additional Refrigerant Charge
Example: For Model No. APUQ150LNA0 / APUQ200LNA0 having 20m pipe length, additional refrigerant to be charged is (20-5)×150 = 2,250g

◆ Wiring of Main Power Supply and Equipment Capacity

1. Use a separate power supply for the Outdoor Unit and Indoor Unit.
2. Bear in mind ambient conditions (ambient temperature,direct sunlight, rain liquid,etc.) when proceeding with the wiring and connections.
3. The wire size is the minimum value for metal conduit wiring. The power cord size should be 1 rank thicker taking into account the line voltage drops. Make sure the power-supply voltage does not drop more than 10%.
4. Specific wiring requirements should adhere to the wiring regulations of the region.
5. Power supply cords of parts of appliances for outdoor use should not be lighter than polychloroprene sheathed flexible cord.
6. Don't install an individual switch or electrical outlet to disconnect each of indoor unit separately from the power supply.

⚠ WARNING

- **Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations and guidance of each electric power company.**
- **Make sure to use specified wires for connections so that no external force is imparted to terminal connections. If connections are not fixed firmly, it may cause heating or fire.**
- **Make sure to use the appropriate type of overcurrent protection switch. Note that generated overcurrent may include some amount of direct current.**

⚠ CAUTION

- **Some installation site may require attachment of an earth leakage breaker. If no earth leakage breaker is installed, it may cause an electric shock.**
- **Do not use anything other than breaker and fuse with correct capacity. Using fuse and wire or copper wire with too large capacity may cause a malfunction of unit or fire.**

Floor Standing
6. Electric Characteristics

■ Outdoor unit

Outdoor Unit Model names	Unit			Power Supply		COMP		OFM	
	Hz	Volts	Voltage-range	MCA	MFA(MOP)	MSC	RLA	kW	FLA
APUQ150LNA0	50	380-415	Min. : 342 Max. : 456	35.4	40	-	24.0	1.8	5.4
	60	380	Min. : 342 Max. : 418	35.4	40	-	24.0	1.8	5.4
APUQ200LNA0	50	380-415	Min. : 342 Max. : 456	35.4	40	-	24.0	1.8	5.4
	60	380	Min. : 342 Max. : 418	35.4	40	-	24.0	1.8	5.4

■ Indoor unit

Outdoor Unit Model names	Unit			Power Supply		IFM	
	Hz	Volts	Voltage-range	MCA	MFA(MOP)	kW	FLA
APNQ150LNA0	50	220-240	Min. : 198 Max. : 264	10.0	15	1.12	3.6
	60	220	Min. : 198 Max. : 242	10.0	15	1.12	3.6
APNQ200LNA0	50	220-240	Min. : 198 Max. : 264	10.0	15	1.12	4.2
	60	220	Min. : 198 Max. : 242	10.0	15	1.12	4.2

Notes :

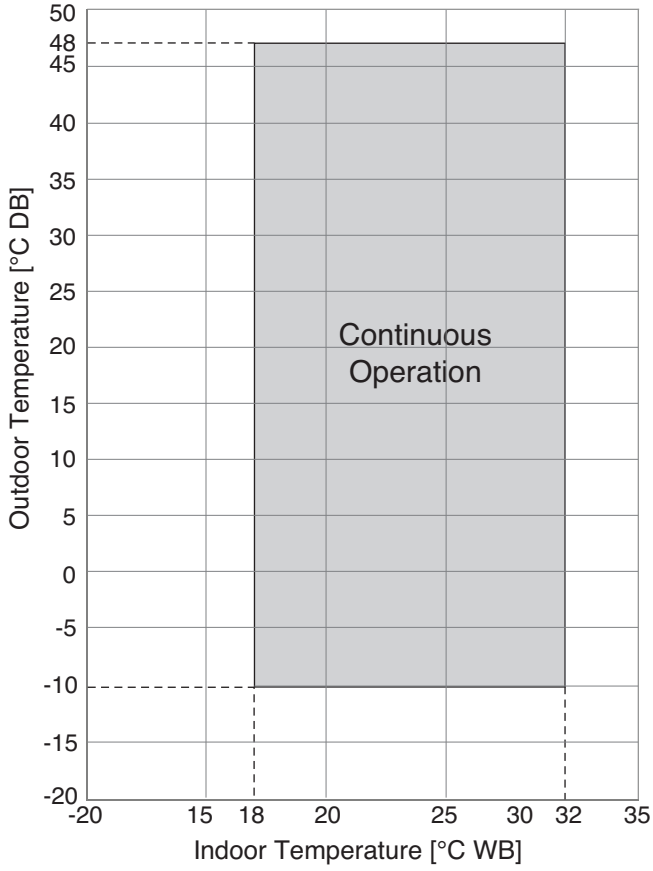
1. Voltage range
   Voltage supplied to the unit terminals should be within the minimum and maximum range.
2. Maximum allowable voltage unbalance between phase is 2%.
3. RLA is based on following conditions : Cooling operation at indoor temp. 27ºCDB, 19ºCWB / outdoor temp. 35ºCDB.
4. FLA is measured as running current of fan motor(s) at rated test condition.
5. Select wire spec. based on the larger value of MCA. The MCA could be substituted for the maximum running current.
6. In accordance with EN/IEC 61000-3-12, it may be necessary to consult the distribution network operator to ensure that the equipment is connected only to a supply with Ssc ≥ minimum Ssc value. (Refer the installation manual)
7. MSC means the Max. current during the starting of compressor.
8. Recommended circuit breaker is ELCB (Earth Leakage Circuit Breaker).
9. MOP is used to select the circuit breaker and ground fault circuit interrupter (earth leakage circuit breaker)

MCA : Minimum Circuit Amperes (A)
MSC : Maximum Starting Current(A)
RLA : Rated Load Amperes (A)
OFM : Outdoor Fan Motor
IFM : Indoor Fan Motor
kW : Fan Motor rated output (kW)
FLA : Full Load Amperes (A)
MOP : Maximum rating of Overcurrent Protective device

Floor Standing
7. Operation range

Models : AP-Q150LNA0, AP-Q200LNA0

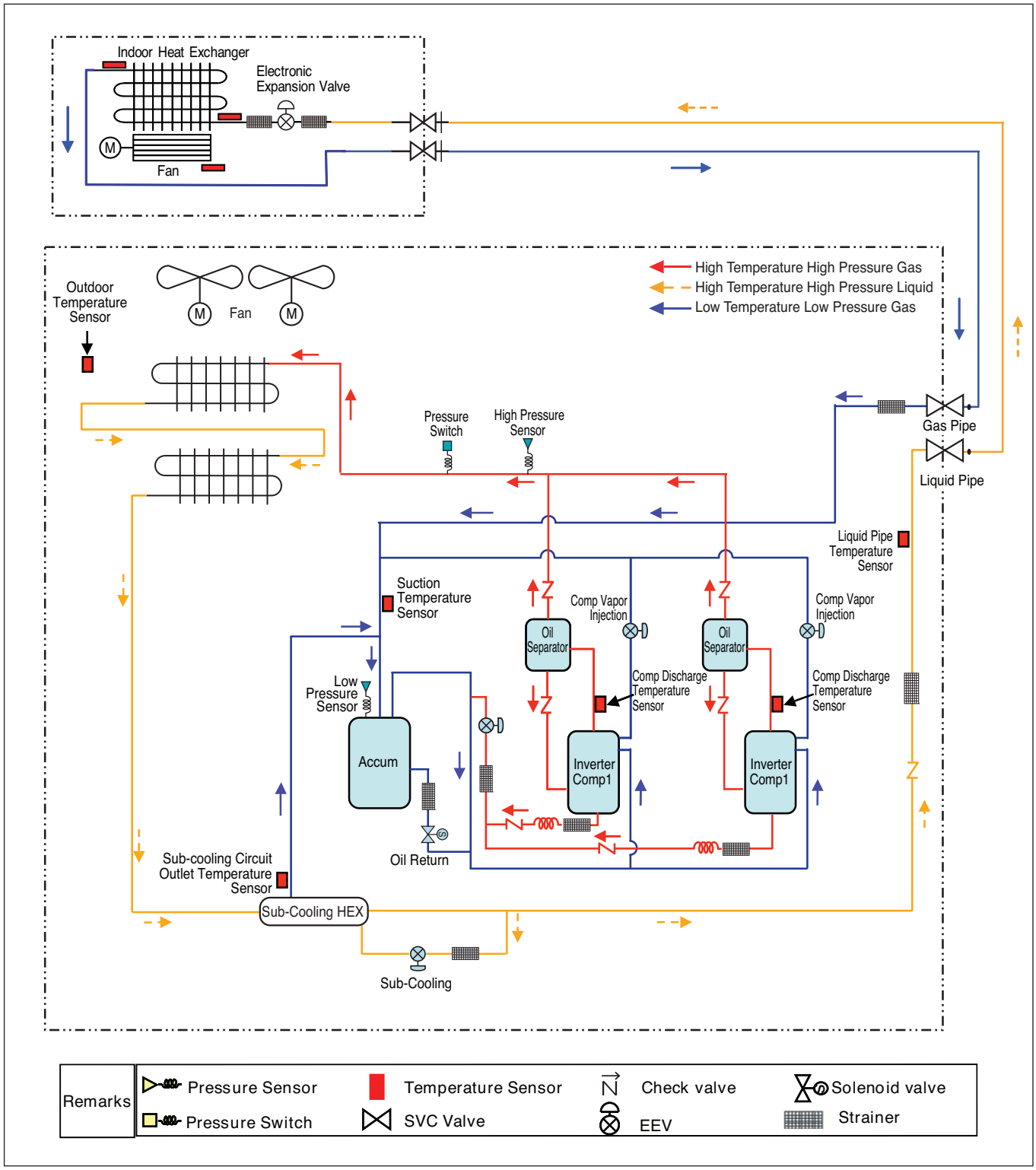
Cooling



Floor Standing
8. Piping diagrams

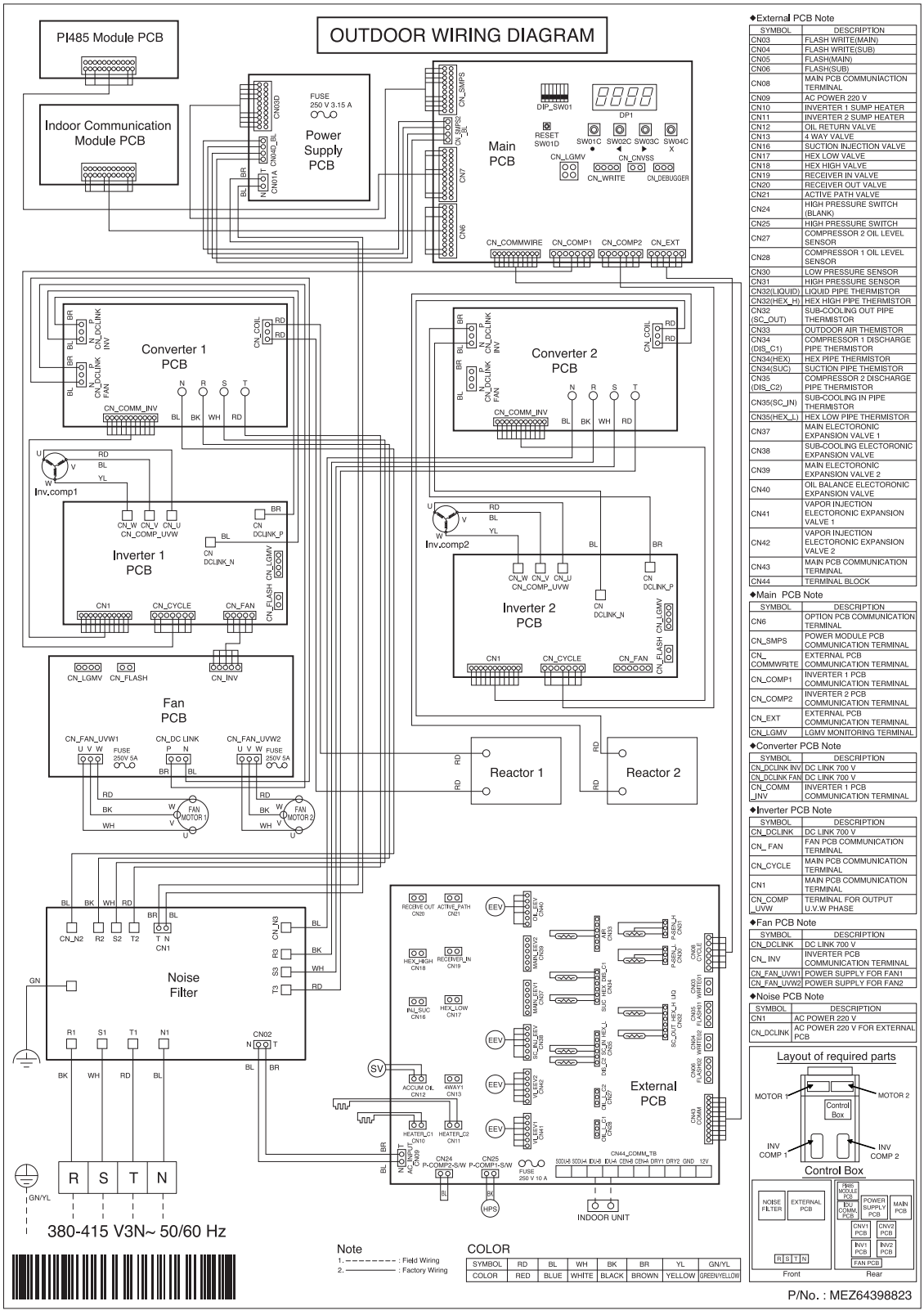
■ APUQ150LNA0 / APUQ200LNA0

Cooling Operation



Floor Standing
9. Wiring diagrams

■ APUQ150LNA0 / APUQ200LNA0



◆External PCB Note

SYMBOL	DESCRIPTION
CN03	FLASH WRITE(MAIN)
CN04	FLASH WRITE(SUB)
CN05	FLASH(MAIN)
CN06	FLASH(SUB)
CN08	MAIN PCB COMMUNIACTION TERMINAL
CN09	AC POWER 220 V
CN10	INVERTER 1 SUMP HEATER
CN11	INVERTER 2 SUMP HEATER
CN12	OIL RETURN VALVE
CN13	4 WAY VALVE
CN16	SUCTION INJECTION VALVE
CN17	HEX LOW VALVE
CN18	HEX HIGH VALVE
CN19	RECEIVER IN VALVE
CN20	RECEIVER OUT VALVE
CN21	ACTIVE PATH VALVE
CN24	HIGH PRESSURE SWITCH (BLANK)
CN25	HIGH PRESSURE SWITCH
CN27	COMPRESSOR 2 OIL LEVEL SENSOR
CN28	COMPRESSOR 1 OIL LEVEL SENSOR
CN30	LOW PRESSURE SENSOR
CN31	HIGH PRESSURE SENSOR
CN32(LIQUID)	LIQUID PIPE THERMISTOR
CN32(HEX_H)	HEX HIGH PIPE THERMISTOR
CN32 (SC_OUT)	SUB-COOLING OUT PIPE THERMISTOR
CN33	OUTDOOR AIR THEMISTOR
CN34 (DIS_C1)	COMPRESSOR 1 DISCHARGE PIPE THERMISTOR
CN34(HEX)	HEX PIPE THERMISTOR
CN34(SUC)	SUCTION PIPE THERMISTOR
CN35 (DIS_C2)	COMPRESSOR 2 DISCHARGE PIPE THERMISTOR
CN35(SC_IN)	SUB-COOLING IN PIPE THERMISTOR
CN35(HEX_L)	HEX LOW PIPE THERMISTOR
CN37	MAIN ELECTORONIC EXPANSION VALVE 1
CN38	SUB-COOLING ELECTORONIC EXPANSION VALVE
CN39	MAIN ELECTORONIC EXPANSION VALVE 2
CN40	OIL BALANCE ELECTORONIC EXPANSION VALVE
CN41	VAPOR INJECTION ELECTORONIC EXPANSION VALVE 1
CN42	VAPOR INJECTION ELECTORONIC EXPANSION VALVE 2
CN43	MAIN PCB COMMUNICATION TERMINAL
CN44	TERMINAL BLOCK

◆Main PCB Note

SYMBOL	DESCRIPTION
CN6	OPTION PCB COMMUNICATION TERMINAL
CN_SMPS	POWER MODULE PCB COMMUNICATION TERMINAL
CN_ COMMWRITE	EXTERNAL PCB COMMUNICATION TERMINAL
CN_COMP1	INVERTER 1 PCB COMMUNICATION TERMINAL
CN_COMP2	INVERTER 2 PCB COMMUNICATION TERMINAL
CN_EXT	EXTERNAL PCB COMMUNICATION TERMINAL
CN_LGMV	LGMV MONITORING TERMINAL

◆Converter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK INV	DC LINK 700 V
CN_DCLINK FAN	DC LINK 700 V
CN_COMM _INV	INVERTER 1 PCB COMMUNICATION TERMINAL

◆Inverter PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 700 V
CN_ FAN	FAN PCB COMMUNICATION TERMINAL
CN_CYCLE	MAIN PCB COMMUNICATION TERMINAL
CN1	MAIN PCB COMMUNICATION TERMINAL
CN_COMP _UVW	TERMINAL FOR OUTPUT U.V.W PHASE

◆Fan PCB Note

SYMBOL	DESCRIPTION
CN_DCLINK	DC LINK 700 V
CN_ INV	INVERTER PCB COMMUNICATION TERMINAL
CN_FAN_UVW1	POWER SUPPLY FOR FAN1
CN_FAN_UVW2	POWER SUPPLY FOR FAN2

◆Noise PCB Note

SYMBOL	DESCRIPTION
CN1	AC POWER 220 V
CN_DCLINK	AC POWER 220 V FOR EXTERNAL PCB

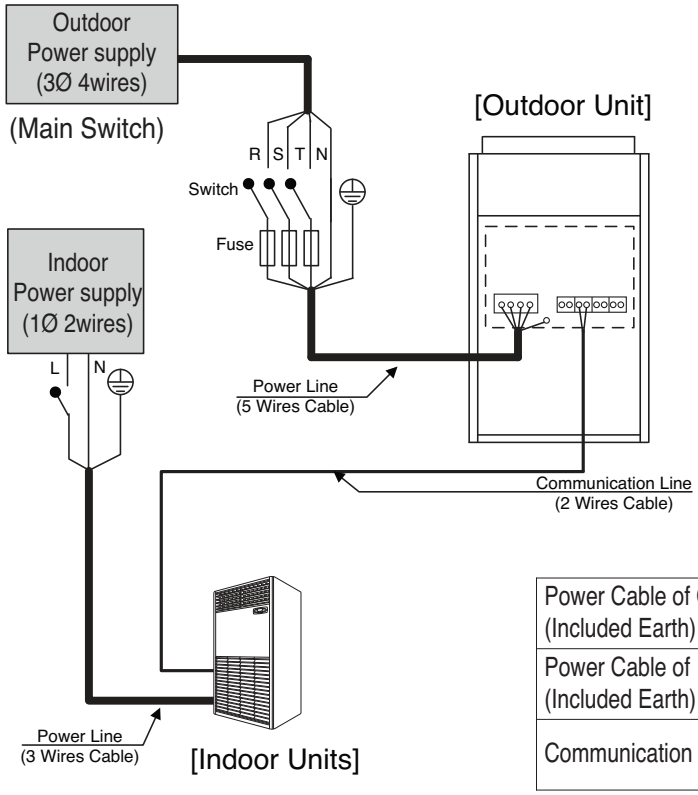
Note
1. ---------- : Field Wiring
2. ---------- : Factory Wiring

COLOR

SYMBOL	RD	BL	WH	BK	BR	YL	GN/YL
COLOR	RED	BLUE	WHITE	BLACK	BROWN	YELLOW	GREEN/YELLOW

◆ Example Connection of Communication Cable

■ Single Outdoor Unit



Frequency	Voltage range(V)	
	Outdoor	Indoor
50Hz	380-415V	220-240V
60Hz	380V	220V

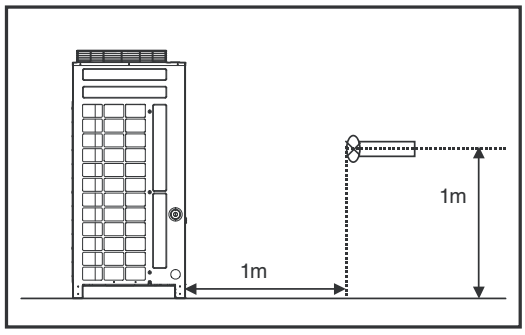
Power Cable of Outdoor Unit (Included Earth)	5C x 6.0 mm^2
Power Cable of Intdoor Unit (Included Earth)	3C x 2.5 mm^2
Communication Cable	2C x 1.0~1.5 mm^2

⚠ WARNING

- **Indoor Unit ground Lines are required for preventing electrical shock accident during current leakage, Communication disorder by noise effect and motor current leakage (without connection to pipe).**
- **Install the main switch that can interrupt all the power sources in an integrated manner because this system consists of the equipment utilizing the multiple power sources.**
- **If there exists the possibility of reversed phase, lose phase, momentary blackout or the power goes on and off while the product is operating, attach a reversed phase protection circuit locally. Running the product in reversed phase may break the compressor and other parts.**

Floor Standing
11. Sound levels

Overall



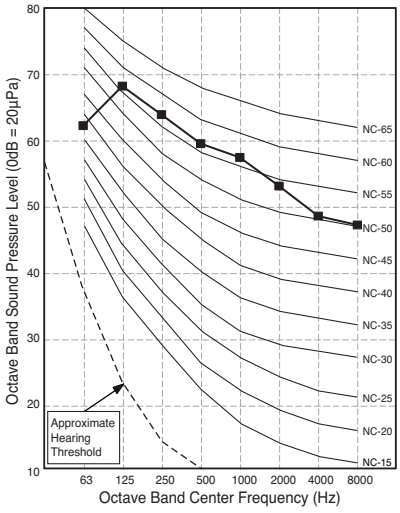
Notes:

- Data is valid at free field condition
- Data is valid at nominal operating condition
- Sound level will vary depending on a range of factors such as the construction (acoustic absorption coefficient) of particular room in which the equipment is installed
- Sound level can be increased in static pressure mode or used air guide.

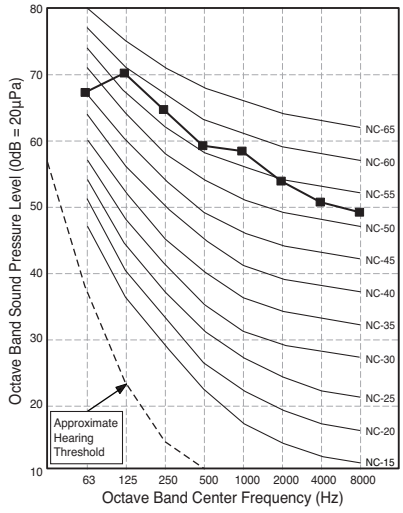
Model	Sound Level [dB(A)]
	Cooling
APUQ150LNA0	64
APUQ200LNA0	65

1.12.1 Sound pressure level

APUQ150LNA0



APUQ200LNA0



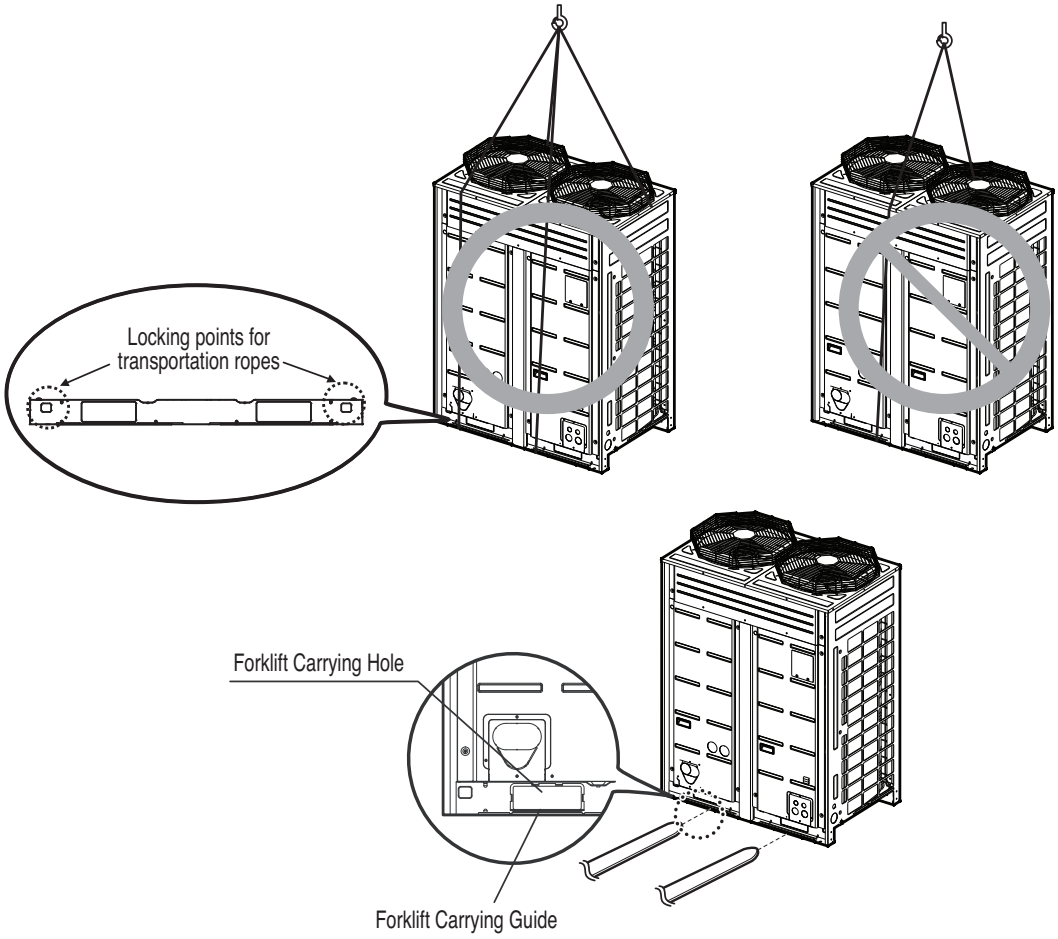
Floor Standing

Part 3 Design and installation

1. Lifting Method
2. Installation of unit
3. Electrical Wiring
4. Leak Test and Vacuum drying
5. Final Check and Test Run
6. The Method of Correct Duct Installation

Floor Standing
1. Lifting Method

- When carrying the suspended, unit pass the ropes under the unit and use the two suspension points each at the front and rear.
- Always lift the unit with ropes attached at four points so that impact is not applied to the unit.
- Attach the ropes to the unit at an angle of 40° or less.



⚠ CAUTION

Be very careful while carrying the product.

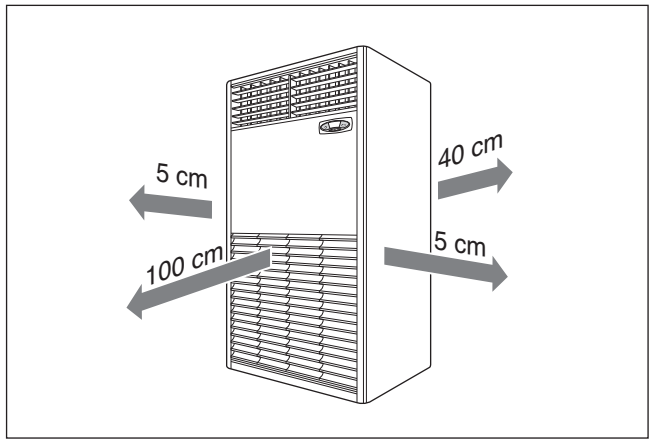
- **Do not have only one person carry product if it is more than 20 kg.**
- **PP bands are used to pack some products. Do not use them as a mean for transportation because they are dangerous.**
- **Do not touch heat exchanger fins with your bare hands. Otherwise you may get a cut in your hands.**
- **Tear plastic packaging bag and scrap it so that children cannot play with it. Otherwise plastic packaging bag may suffocate children to death.**
- **When carrying in Outdoor Unit, be sure to support it at four points. Carrying in and lifting with 3-point support may make Outdoor Unit unstable, resulting in a fall.**
- **Use 2 belts of at least 8 m long.**
- **Place extra cloth or boards in the locations where the casing comes in contact with the sling to prevent damage.**
- **Hoist the unit making sure it is being lifted at its center of gravity.**

Floor Standing
2. Installation of Unit

2.1 Selection of the best location

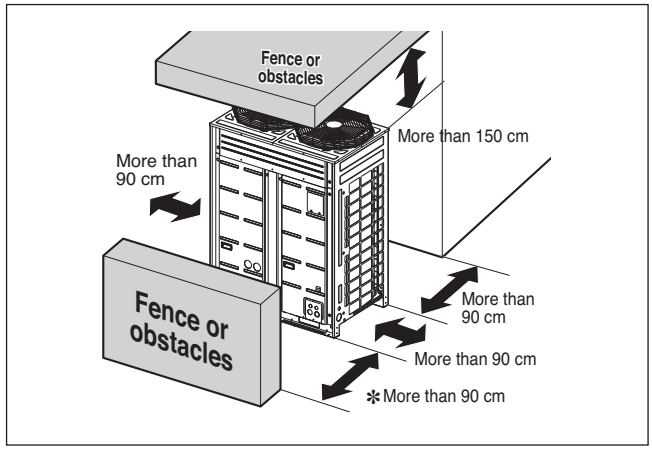
2.1.1 Indoor unit

- There should not be any heat source or steam near the unit.
- There should not be any obstacles to prevent the air circulation.
- A place where air circulation in the room will be good.
- A place where drainage can be easily obtained.
- A place where noise prevention is taken into consideration.
- Do not install the unit near the door way.
- Ensure the spaces indicated by arrows from the wall, ceiling, or other obstacles.
- The indoor unit must keep the maintenance space.



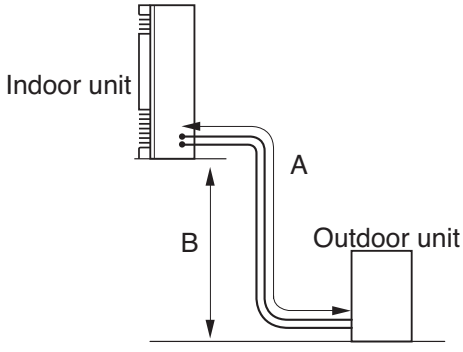
2.1.2 Outdoor unit

- If an awning is built over the unit to prevent direct sunlight or rain exposure, be careful that heat radiation from the condenser is not restricted.
- There should not be any animals or plants which could be affected by hot air discharged.
- Ensure the spaces indicated by arrows from the wall, ceiling, fence or other obstacles.



2.1.3 Piping length and the elevation

Model(Btu/h)	Pipe Size		Max Length A : m(feet)	Max Elevation B : m(feet)
	Gas Side mm(inch)	Liquid Side mm(inch)		
150 k	28.58(1-1/8)	15.88(5/8)	50(164.0)	30(98.4)
200 k	28.58(1-1/8)	15.88(5/8)	50(164.0)	30(98.4)



⚠ CAUTION

- **Capacity is based on standard length and maximum allowance length is on the basis of reliability.**
- **Oil trap should be installed every 5~7 meters.**

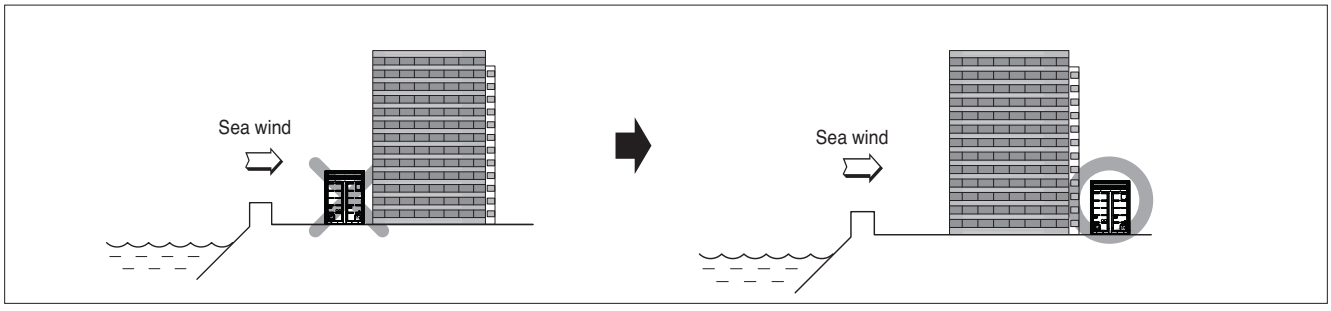
2.2 Installation guide at the seaside

⚠ CAUTION

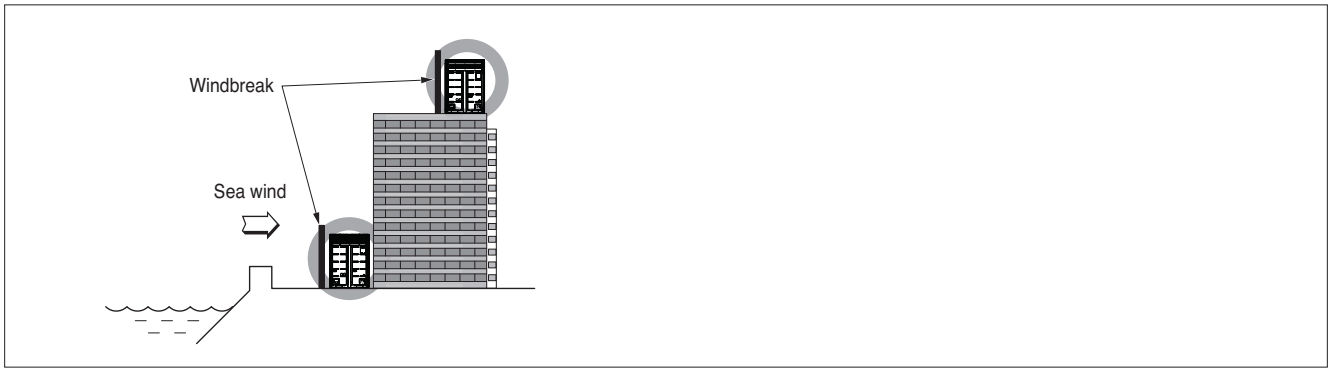
- **Air conditioners should not be installed in areas where corrosive gases, such as acid or alkaline gas, are produced.**
- **Do not install the product where it could be exposed to sea wind (salty wind) directly. It can result corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient performance.**
- **If outdoor unit is installed close to the seaside, it should avoid direct exposure to the sea wind. Otherwise it needs additional anticorrosion treatment on the heat exchanger.**

Selecting the location(Outdoor Unit)

If the outdoor unit is to be installed close to the seaside, direct exposure to the sea wind should be avoided. Install the outdoor unit on the opposite side of the sea wind direction.



In case, to install the outdoor unit on the seaside, set up a windbreak not to be exposed to the sea wind.



- It should be strong enough like concrete to prevent the sea wind from the sea.
- The height and width should be more than 150 % of the outdoor unit.
- It should be keep more than 70 cm of space between outdoor unit and the windbreak for easy air flow.

Select a well-drained place.

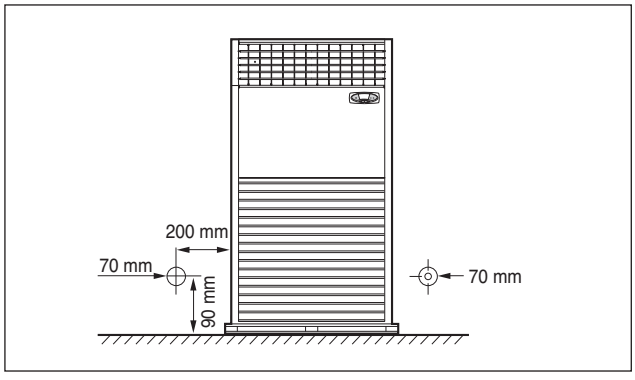
- Periodic (more than once/year) cleaning of the dust or salt particles stuck on the heat exchanger by using water

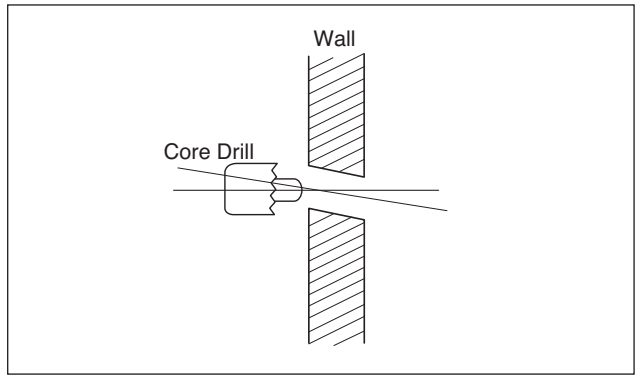
Floor Standing
2. Installation of Unit

2.3 Installation method

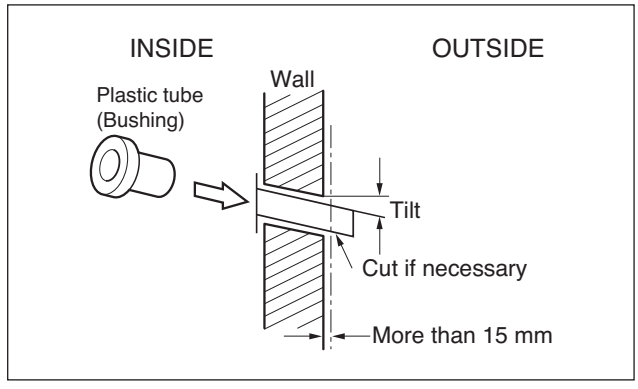
No.	Installation works	Descriptions
1	Preparation of tools and installation parts	Preparation of installation
2	Pipe bending	To reduce the flow resistance of refrigerant.
3	Connection of installation parts (elbows, socket etc)	Connection of long piping
4	Connecting the pipings of the outdoor unit	
5	Blowing the pipings	To remove dust and scale in working.
6	Connecting the pipings of the indoor unit	
7	Check a gas-leakage of the connecting part of the pipings.	
8	Vacuum drying of the piping and indoor unit	The air which contains moisture and which remains in the refrigeration cycle may cause a malfunction on the compressor
9	Open valves	
10	Form the pipings	To prevent heat loss and sweat
11	Checking the drainage (indoor unit)	To ensure if water flow drain hose of indoor unit.
12	Connecting the cable between outdoor and indoor unit	Preparation of the operating
13	Connecting the main cable to outdoor unit	
14	Cooling operation (Use the display of the indoor unit)	

2.4 Indoor unit installation





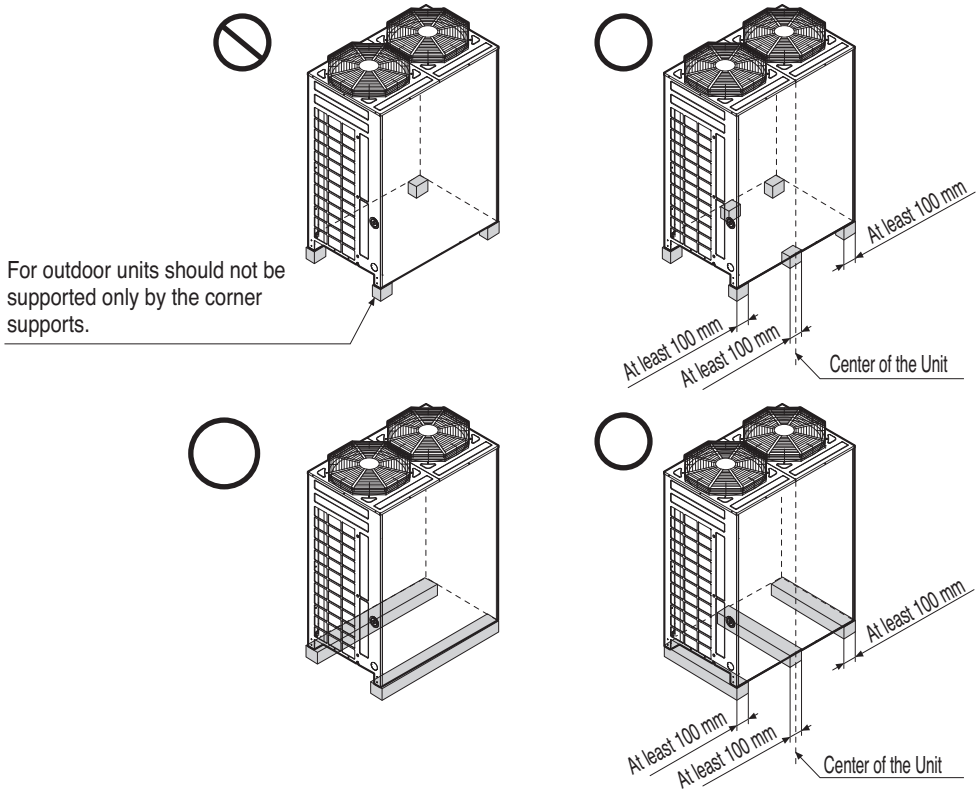
1. The mounting floor should be strong and solid enough to prevent it from vibration.
2. Drill the piping hole with 70 mm diameter hole-core drill at either the right or the left of indoor unit. The hole should be sightly slant to the outdoor side.
3. Insert the plastic tube through the hole.
4. Cut the extruded outside part of the plastic tube, if necessary.



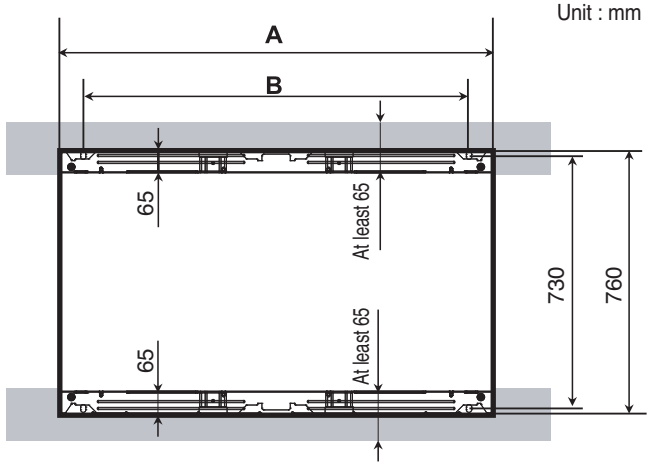
Floor Standing
2. Installation of Unit

2.5 Outdoor unit installation

• Install at places where it can endure the weight and vibration/noise of the outdoor unit.
• The outdoor unit supports at the bottom shall have width of at least 100 mm under the Unit's legs before being fixed.
• The outdoor unit supports should have minimum height of 200 mm.
• Anchor bolts must be inserted at least 75 mm.



The location of the anchor bolts



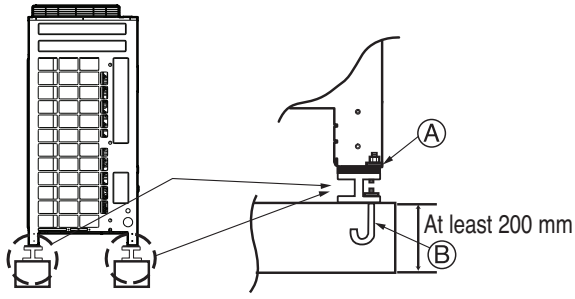
Chassis	A(mm)	B(mm)
UX3	1240	1102

Floor Standing
2. Installation of Unit

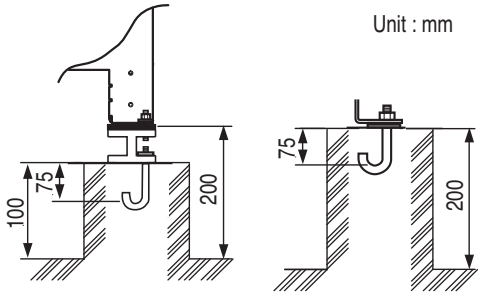
2.6 Foundation for installation

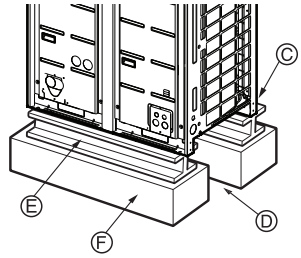
Foundation for installation

- Fix the unit tightly with bolts as shown below so that unit will not fall down due to earthquake or gust.
- Use the H-beam support as a base support
- Noise and vibration may occur from the floor or wall since vibration is transferred through the installation part depending on installation status. Thus, use anti-vibration materials (cushion pad) fully (The base pad shall be more than 200 mm).



Unit : mm





Ⓐ The corner part must be fixed firmly. Otherwise, the support for the installation may be bent.
Ⓑ Get and use M10 Anchor bolt.
Ⓒ Put Cushion Pad between the outdoor unit and ground support for the vibration protection in wide area.
Ⓓ Space for pipes and wiring (Pipes and wirings for bottom side)
Ⓔ H-beam support
Ⓕ Concrete support

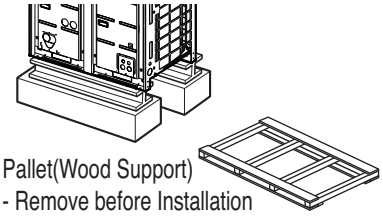
Design and installation

⚠ WARNING

- **Install where it can sufficiently support the weight of the outdoor unit. If the support strength is not enough, the outdoor unit may drop and hurt people.**
- **Install where the outdoor unit may not fall in strong wind or earthquake. If there is a fault in the supporting conditions, the outdoor unit may fall and hurt people.**
- **Please take extra cautions on the supporting strength of the ground, water outlet treatment(treatment of the water flowing out of the outdoor unit in operation), and the passages of the pipe and wiring, when making the ground support.**
- **Do not use tube or pipe for water outlet in the Base pan. Use drainage instead for water outlet. The tube or pipe may freeze and the water may not be drained.**

⚠ CAUTION

- **Be sure to remove the Pallet(Wood Support) of the bottom side of the outdoor unit Base Pan before fixing the bolt. It may cause the unstable state of the outdoor settlement, and may cause freezing of the heat exchanger resulting in abnormal operations.**
- **Be sure to remove the Pallet(Wood Support) of the bottom side of the outdoor unit before welding. Not removing Pallet(Wood Support) causes hazard of fire during welding.**



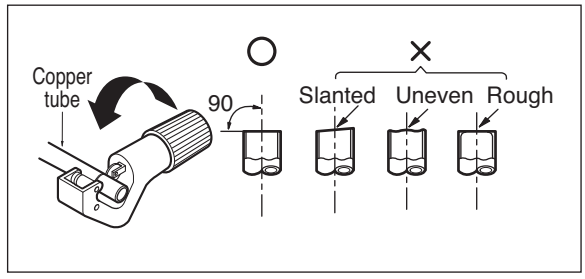
Pallet(Wood Support)
- Remove before Installation

2.7 Preparation of piping

Main cause of gas leakage is defect in flaring work. Carry out correct flaring work in the following procedure.

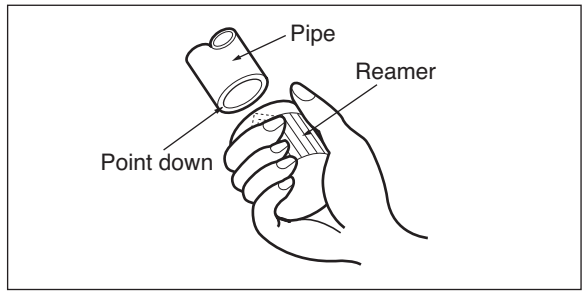
2.7.1 Cut the pipes and the cable.

- Use the accessory piping kit or the pipes purchased locally.
- Measure the distance between the indoor and the outdoor unit.
- Cut the pipes a little longer than measured distance.
- Cut the cable 1.5 m longer than the pipe length.



2.7.2 Burrs removal

- Completely remove all burrs from the cut cross section of pipe/tube.
- Put the end of the copper tube/pipe to downward direction as you remove burrs in order to avoid to let burrs drop in the tubing.

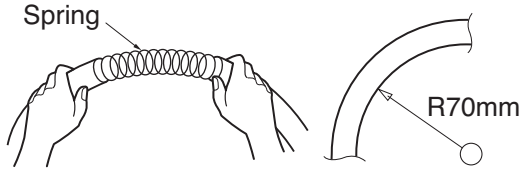


2.8 Precautions in bending

1. If it is necessary to bend or stretch the tubing, use the spring which is attached to the tubing in stead of pipe bender.
- Please make a careful notice to make a smooth line.
- Hold the tubing with your two hands closely and then bend or stretch it slowly not to make any crack.
- Remember that the radius (R) should not exceed 70 mm (Refer to Fig. 1)

2. Do not repeat the bending process to prevent the tubing from cracking or crushing.

3. Keep in mind that the bending part should not be cracked and make the radius (R) as long as possible (Refer to Fig. 2)



(Fig. 1)

(Fig. 2)

2.9 Refrigerant amount

Before shipment, this air conditioner is filled with the rated amount of refrigerant including additional amount required for air-purging, subject to 7.5 m piping length. (The rated amount of refrigerant is indicated on the name plate.) But when the piping length exceeds 5 meters, additional charge is required according to the following table.

(Unit: g)

Capacity(Btu/h)	Refrigerant Charge
150 k	150 g/m (1.61 oz/ft)
200 k	150 g/m (1.61 oz/ft)

Example) 200 k
In case of 10 m long pipe(one-way),
the amount of refrigerant to be replenished is : (10 – 5) x 150 = 750 g
(10 – 5) x 1.61 = 8.05 oz

2.10 Environment-friendly alternative refrigerant R410A

The refrigerant R410A has the property of higher operating pressure in comparison with R22.
Therefore, all materials have the characteristics of higher resisting pressure than R22 ones and this characteristic should be also considered during the installation.
R410A is an azeotrope of R32 and R125 mixed at 50:50, so the ozone depletion potential (ODP) of R410A is 0. These days the developed countries have approved it as the environment-friendly refrigerant and encouraged to use it widely to prevent environment pollution.

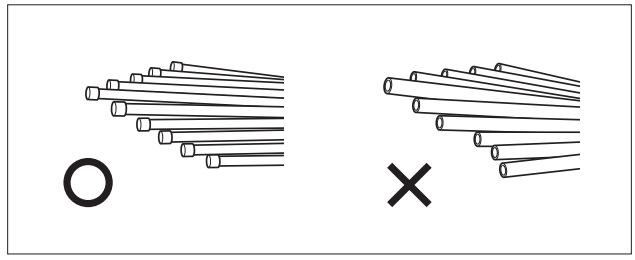
⚠ CAUTION

- **The wall thickness of the piping should comply with the relevant local and national regulations for the designed pressure 3.8 MPa**
- **Since R410A is a mixed refrigerant, the required additional refrigerant must be charged in its liquid state. If the refrigerant is charged in its gaseous state, its composition changes and the system will not work properly.**
- **Do not place the refrigerant container under the direct rays of the sun to prevent it from exploding.**
- **For high-pressure refrigerant, any unapproved pipe must not be used.**
- **Do not heat pipes more than necessary to prevent them from softening.**
- **Be careful not to install wrongly to minimize economic loss because it is expensive in comparison with R22.**

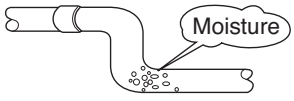
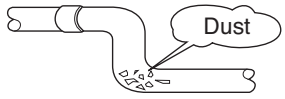
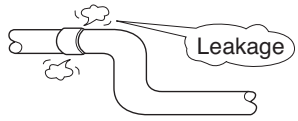
2.11 Plumbing materials and storage methods

Pipe must be able to obtain the specified thickness and should be used with low impurities.
Also when handling storage, pipe must be careful to prevent a fracture, deformity and wound.

Should not be mixed with contaminations such as dust, moisture.

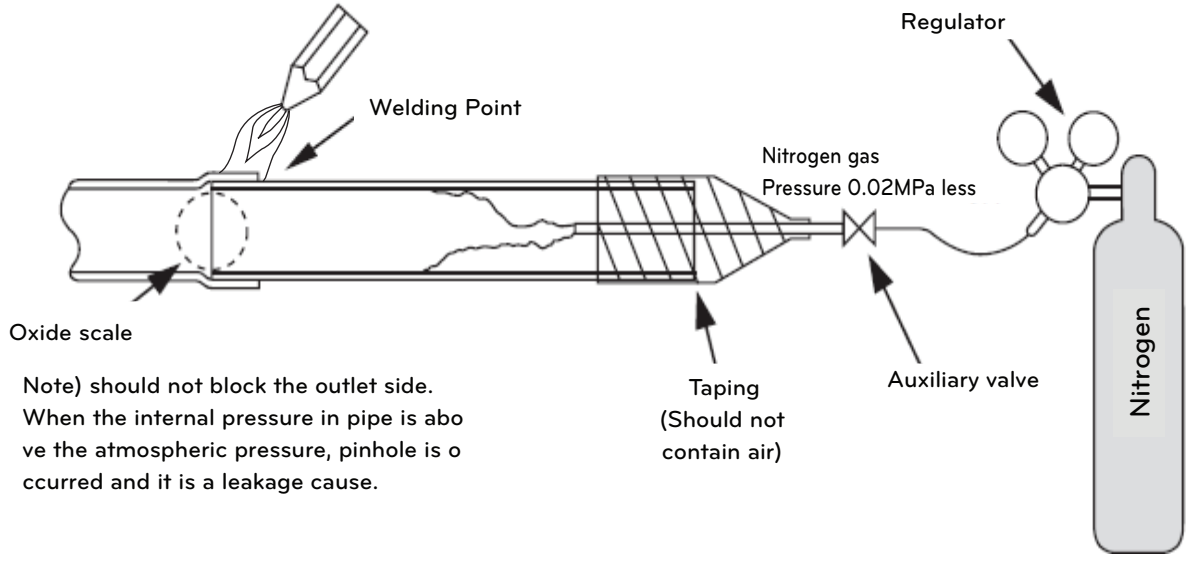


Refrigerant piping on three principles

	Drying	Cleanliness	Airtight
	Should be no moisture inside	**No dust inside.**	**There is no refrigerant leakage**
Items			
Cause failure	- Significant hydrolysis of refrigerant oil - Degradation of refrigerant oil - Poor insulation of the compressor - Do not cold and warm - Clogging of EEV, Capillary	- Degradation of refrigerant oil - Poor insulation of the compressor - Do not cold and warm - Clogging of EEV, Capillary	- Gas shortages - Degradation of refrigerant oil - Poor insulation of the compressor - Do not cold and warm
Countermeasure	- No moisture in the pipe - Until the connection is completed, the plumbing pipe entrance should be strictly controlled. - Stop plumbing at rainy day. - Pipe entrance should be taken side or bottom. - When removal burr after cutting pipe, pipe entrance should be taken down. - Pipe entrance should be fitted cap when pass through the walls.	- No dust in the pipe. - Until the connection is completed, the plumbing pipe entrance should be strictly controlled. - Pipe entrance should be taken side or bottom. - When removal burr after cutting pipe, pipe entrance should be taken down. - Pipe entrance should be fitted cap when pass through the walls.	- Airtightness test should be. - Brazing operations to comply with standards. - Flare to comply with standards. - Flange connections to comply with standards.

2.12 Nitrogen substitution method

Welding, as when heating without nitrogen substitution a large amount of the oxide film is formed on the internal piping.
The oxide film is a caused by clogging EEV, Capillary, oil hole of accumulator and suction hole of oil pump in compressor.
It prevents normal operation of the compressor.
In order to avoid this problem, Welding should be done after replacing air by nitrogen gas.
When welding plumbing pipe, the work is required.

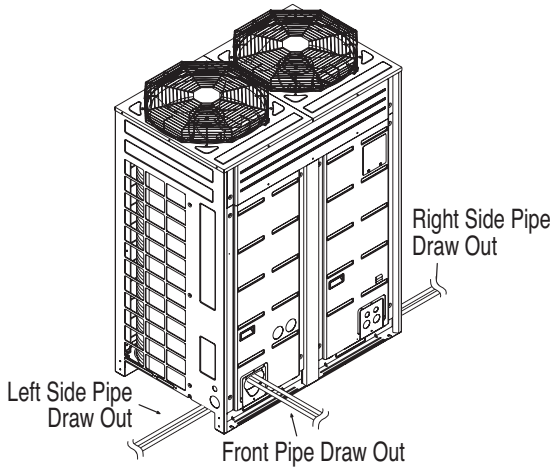


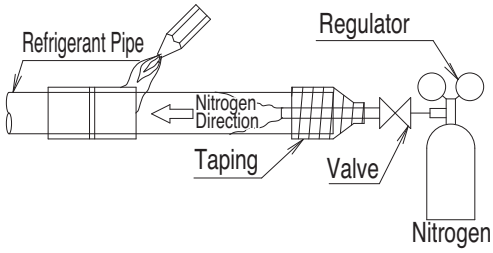
⚠ CAUTION

- **Always use the nitrogen.(not use oxygen, carbon dioxide, and a Chevron gas):**
  Please use the following nitrogen pressure 0.02 MPa
  Oxygen – Promotes oxidative degradation of refrigerant oil.
  Because it is flammable, it is strictly prohibited to use
  Carbon dioxide – Degrade the drying characteristics of gas
  Chevron Gas – Toxic gas occurs when exposed to direct flame.
- **Always use a pressure reducing valve.**
- **Please do not use commercially available antioxidant.**
  The residual material seems to be the oxide scale is observed.
  In fact, due to the organic acids generated by oxidation of the alcohol contained in the anti-oxidants, ants nest corrosion occurs. (causes of organic acid ⇨ alcohol + copper + water + temperature)

2.13 Pipe connections between indoor and outdoor unit

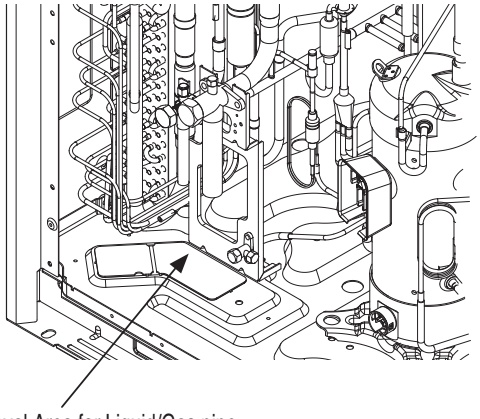
- Install at places where it can endure the weight and vibration/noise of the outdoor unit.
- The outdoor unit supports at the bottom shall have width of at least 100 mm under the Unit's legs before being fixed.
- The outdoor unit supports should have minimum height of 200 mm.
- Anchor bolts must be inserted at least 75 mm.





2.14 Preparation work

- Use Knock Outs of Base Pan of the outdoor unit for Left/Right or Bottom pipe drawing outs.

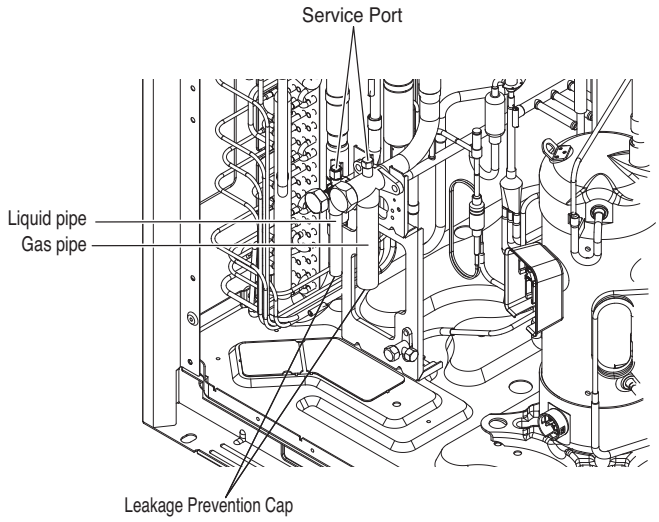


⚠ CAUTION

- **Do not give damage to the pipe/base during the Knock Out work.**
- **Proceed to pipe work after removing burr after Knock Out work.**
- **Perform sleeve work to prevent damage to the wire when connecting wires using knock Outs.**
- **Refrigerant charging Port is not available.**

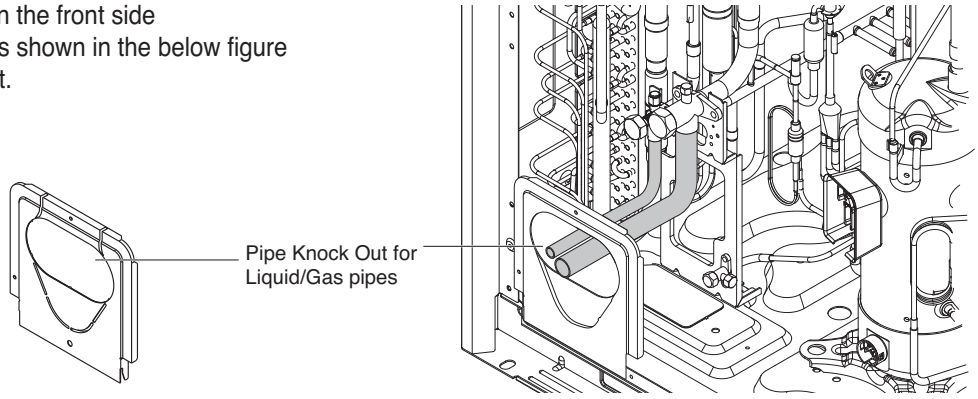
Remove leakage prevention cap

- Remove the leakage prevention cap attached to the outdoor unit service valve before pipe work.
- Proceed the leakage prevention cap removal as follows:
  - Verify whether the liquid/gas pipes are locked.
  - Extract remaining refrigerant or air inside using the service port.
  - Remove the leakage prevention cap



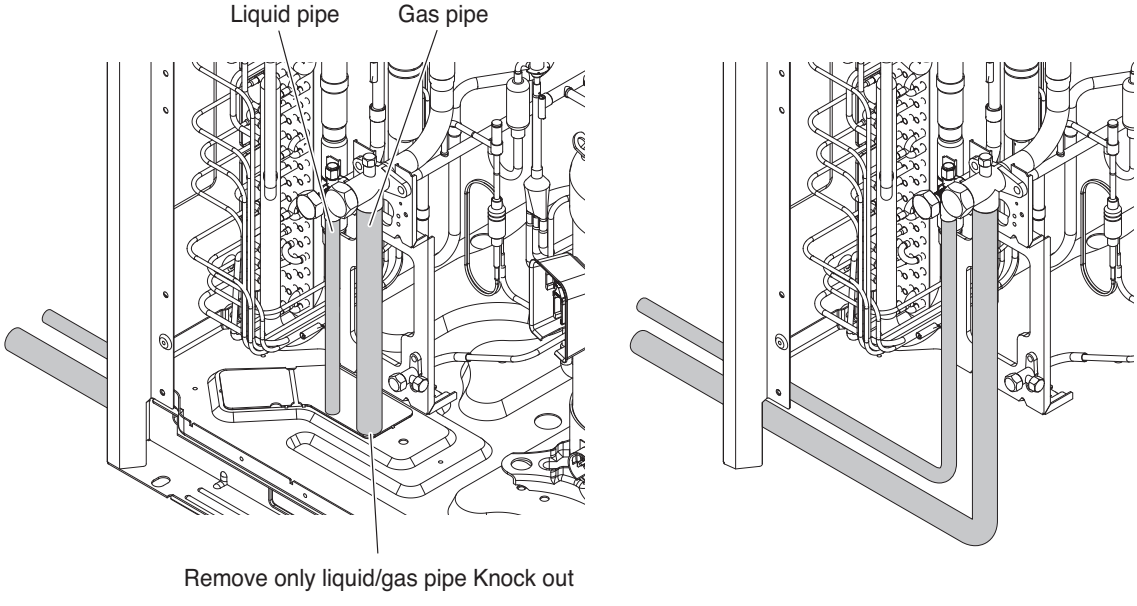
2.15 Pipe drawing out during single / series connection

Method of drawing out pipes on the front side
- Proceed with the pipe work as shown in the below figure for front side pipe drawing out.



Method of drawing out pipes on the bottom side

- Drawing out common pipe through side panel

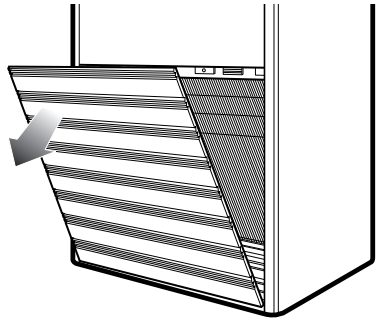


Floor Standing
3. Electrical Wiring

3.1 Connecting the cable to indoor unit

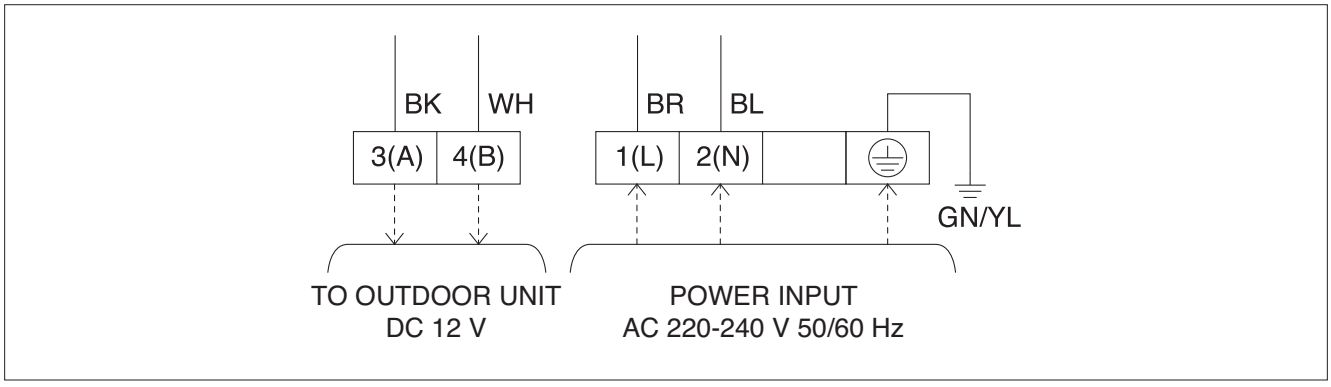
• In order to protect cable, it should be inserted “Bushing Rubber”.
• The inside and outside connecting cable can be connected after opening the inlet grille.

1. Open the inlet grille manually.



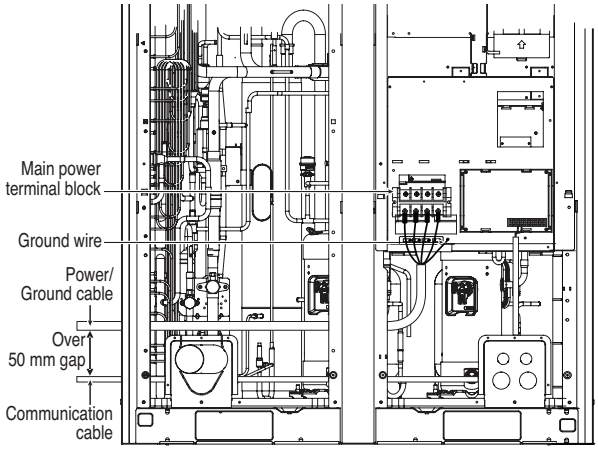
2. Open the control cover with Driver(⊕).

3. Connect the supplied cables to the connector in the control box.

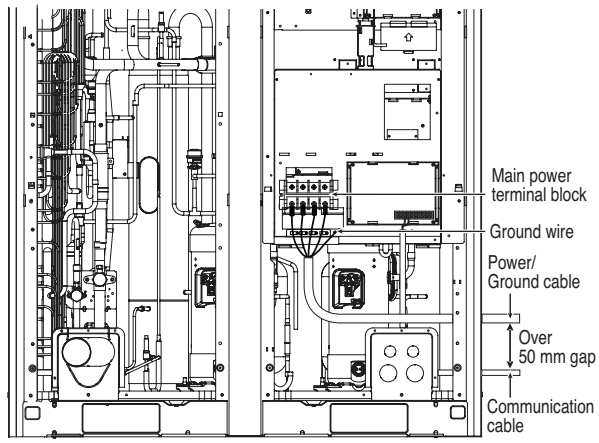


3.2 Connecting the cable to outdoor unit

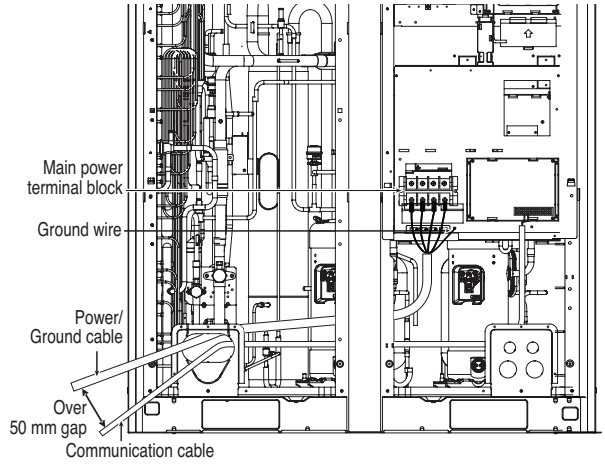
Left Side



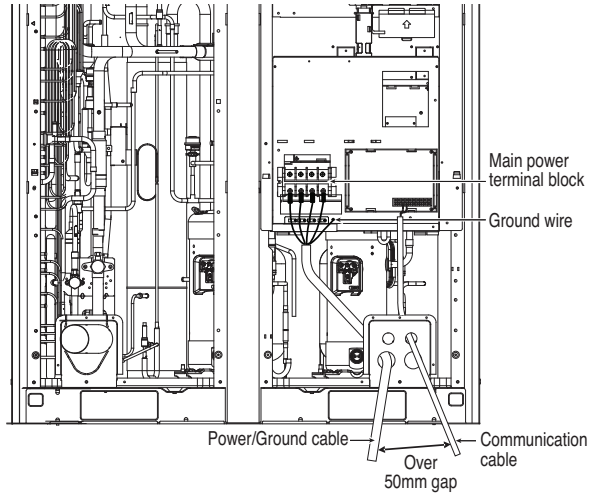
Right Side



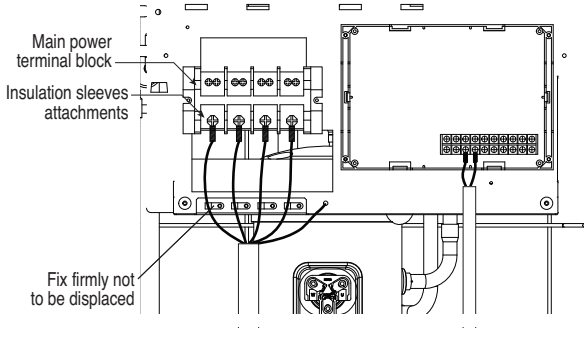
Front Side 1



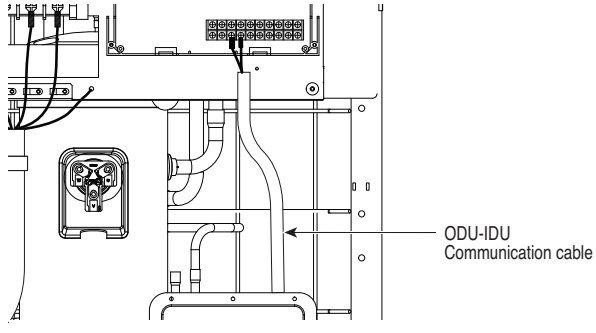
Front Side 2



Main Power Connection



Communication Connection



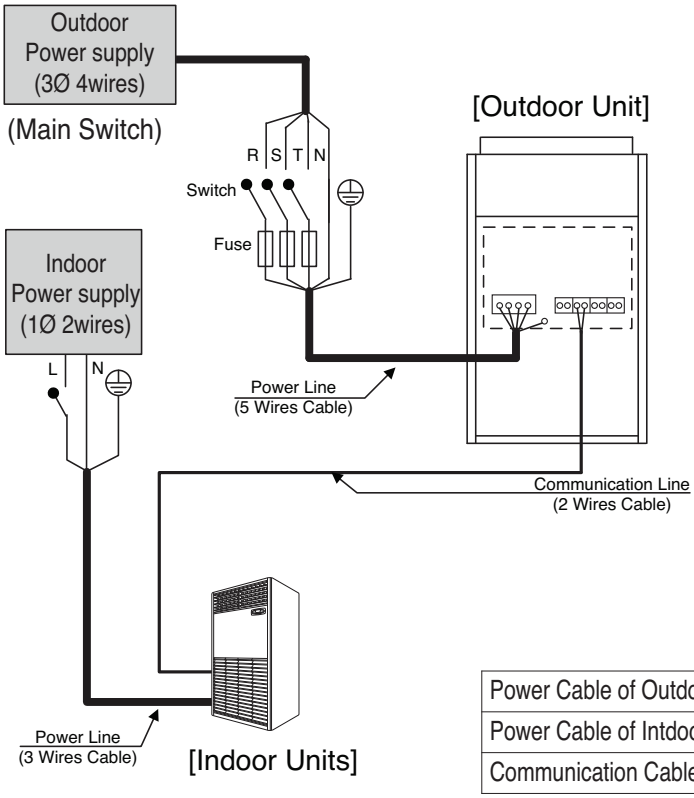
⚠ CAUTION

- **It should be wiring power cables or communication cables to avoid interference with the oil level sensor. Otherwise, That oil level sensor would be operated abnormally.**

Floor Standing
3. Electrical Wiring

3.3 Field wiring

• In order to protect cable, it should be inserted “Bushing Rubber”.
• The inside and outside connecting cable can be connected after opening the inlet grille.



Frequency	Voltage range(V)	
	Outdoor	Indoor
50Hz	380-415V	220-240V
60Hz	380V	220V

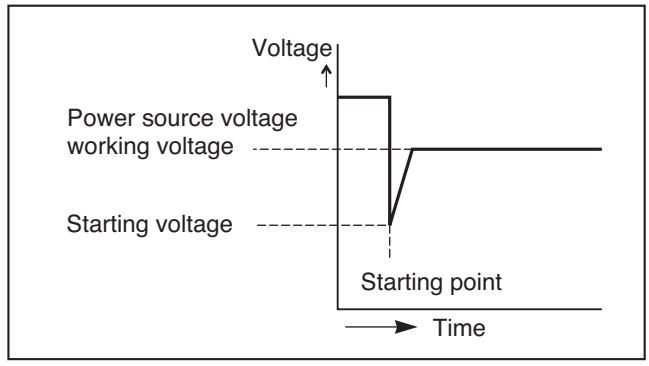
Power Cable of Outdoor Unit(Included Earth)	5C x 6.0 mm^2
Power Cable of Intdoor Unit(Included Earth)	3C x 2.5 mm^2
Communication Cable	2C x 1.0~1.5 mm^2

⚠ WARNING

- **Indoor Unit ground Lines are required for preventing electrical shock accident during current leakage, Communication disorder by noise effect and motor current leakage (without connection to pipe).**
- **Install the main switch that can interrupt all the power sources in an integrated manner because this system consists of the equipment utilizing the multiple power sources.**
- **If there exists the possibility of reversed phase, lose phase, momentary blackout or the power goes on and off while the product is operating, attach a reversed phase protection circuit locally. Running the product in reversed phase may break the compressor and other parts.**

3.4 Power supply and wiring

The unit is completely wired internally at the factory according to general rule of electrical technology, but local rules, if they are required, should be complied with.



3.4.1 Power supply

Power source must fulfill the following conditions:

- **The working voltage should be higher than 90% and lower than 110% of the rated voltage marked on the name plate.**
- **The starting voltage should be higher than 85% of the rated voltage marked on the name plate.**

3.4.2 Wiring

After the confirmation of the above conditions, prepare the wiring as follows:

- **Use the power supply cable and communication cable (Rubber insulation, type H07RN-F approved by HAR or SAA) suitable for the product's electrical capacity.**
- **Provide a recognized circuit breaker as below between power source and unit.**
  A disconnection device to adequately disconnect all supply lines must be fitted.
  (for service operations)

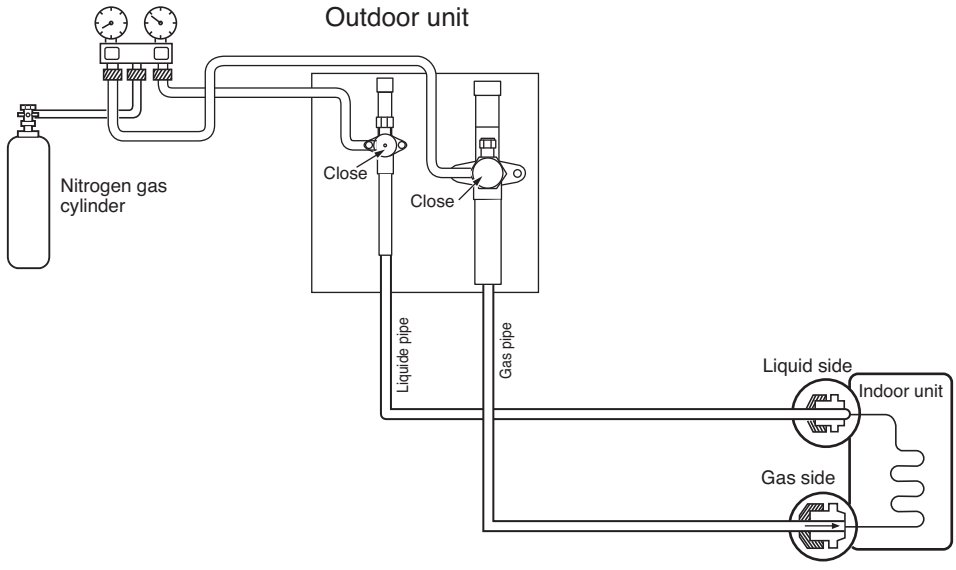
Capacity(Btu/h)		Rated Current(A)	Max Current(A)	Circuit Breaker(A)
150 k	INDOOR	3.0	3.6	15
	OUTDOOR	22.0	29.4	40
200 k	INDOOR	3.8	4.2	15
	OUTDOOR	28.2	31.8	40

- **The screws which fasten the wiring in the casing of electrical fittings are liable to come loose from vibrations to which the unit is subjected during the course of transportation. Check them and make sure that they are all tightly fastened.**
  (If they are loose, it could give rise to burn-out of the wires.)
- **See to it that the starting voltage is maintained at more than 90 percent of the rated voltage marked on the name plate.**
- **The following troubles would be caused by voltage drop-down.**
  Vibration of a magnetic switch, damage on the contact point there of, fuse breaking, disturbance to the normal function of a overload protection device.

Floor Standing
4. Leak Test and Vacuum drying

4.1 Leak test

Leak test should be made by pressurizing nitrogen gas to 3.8 MPa(38.7 kgf/cm^2). If the pressure does not drop for 24 hours, the system passes the test. If the pressure drops, check where the nitrogen leaks. For the test method, refer to the following figure. (Make a test with the service valves closed. Be also sure to pressurize liquid pipe, gas pipe and high/low pressure common pipe) The test result can be judged good if the pressure has not be reduced after leaving for about one day after completion of nitrogen gas pressurization.



⚠ WARNING

- **Use a vacuum pump or Inert(nitrogen) gas when doing leakage test or air purge. Do not compress air or Oxygen and do not use Flammable gases. Otherwise, it may cause fire or explosion.**
  - There is the risk of death, injury, fire or explosion.

NOTE

If the ambient temperature differs between the time when pressure is applied and when the pressure drop is checked, apply the following correction factor
There is a pressure change of approximately 0.1 kg/cm^2 (0.01 MPa) for each 1 °C of temperature difference.
Correction= (Temp. at the time of pressurization – Temp. at the time of check) X 0.1
For example: Temperature at the time of pressurization (3.8 MPa) is 27 °C
24 hour later: 3.73 MPa, 20 °C
In this case the pressure drop of 0.07 is because of temperature drop
And hence there is no leakage in pipe occurred.

⚠ WARNING

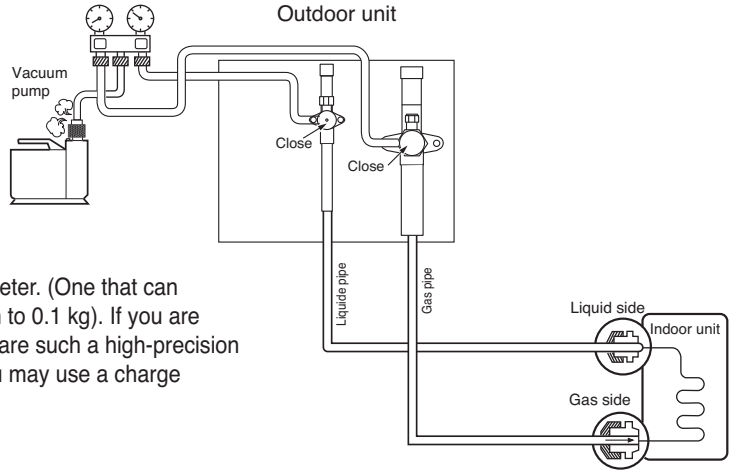
- **To prevent the nitrogen from entering the refrigeration system in the liquid state, the top of the cylinder must be at higher position than the bottom when you pressurize the system. Usually the cylinder is used in a vertical standing position.**

4.2 Vacuum

Vacuum drying should be made from the service port provided on the outdoor unit's service valve to the vacuum pump commonly used for liquid pipe, gas pipe and high/low pressure common pipe. (Make Vacuum from liquid pipe, gas pipe and high/low pressure common pipe with the service valve closed.)
* Never perform air purging using refrigerant.

• Vacuum drying: Use a vacuum pump that can evacuate to -100.7 kPa (5 Torr, -755 mmHg).

- Evacuate the system from the liquid and gas pipes with a vacuum pump for over 2 hrs and bring the system to -100.7 kPa. After maintaining system under that condition for over 1 hr, confirm the vacuum gauge rises. The system may contain moisture or leak.
- Following should be executed if there is a possibility of moisture remaining inside the pipe.
  (Rainwater may enter the pipe during work in the rainy season or over a long period of time)
  After evacuating the system for 2 hrs, give pressure to the system to 0.05 MPa(vacuum break) with nitrogen gas and then evacuate it again with the vacuum pump for 1hr to -100.7 kPa(vacuum drying). If the system cannot be evacuated to -100.7 kPa within 2 hrs, repeat the steps of vacuum break and its drying. Finally, check if the vacuum gauge does not rise or not, after maintaining the system in vacuum for 1 hr.



Scale
Use a graviometer. (One that can measure down to 0.1 kg). If you are unable to prepare such a high-precision gravimeter you may use a charge cylinder.

⚠ WARNING

• Use a vacuum pump or Inert(nitrogen) gas when doing leakage test or air purge. Do not compress air or Oxygen and do not use Flammable gases. Otherwise, it may cause fire or explosion.
- There is the risk of death, injury, fire or explosion.

NOTE

Always add an appropriate amount of refrigerant. (For the refrigerant additional charge)
Too much or too little refrigerant will cause trouble.
To use the Vacuum Mode (If the Vacuum mode is set, all valves of Indoor units and Outdoor units will be opened.)

⚠ WARNING

• When installing and moving the air conditioner to another site, recharge after perfect evacuation.
- If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.

Floor Standing
5. Final Check and Test Run

After installing the unit, perform the final check and running test as follows:

• Final check points

① Is the unit securely mounted?

② Is the installation location adequate?

③ Is the water piping work adequately and without leakage?

④ Are trapped drain lines installed at condensate drain connections?

⑤ Has the refrigeration cooling cycle been kept sealed?

⑥ Is the electrical wiring adequate and are the screws tightened on terminals?

After the above final checkings, prepare the running test as follows:

① Connect compound gauges to the check joints at discharge and suction sides of the compressor.

② Turn all switches "OFF".

③ Turn the main switch "ON".

Running test should be accomplished as follows:

① Set operation switch at "FAN" and the fan will start. Check to ensure that the fan sounds normal.

② Next, set it at "COOL" and the compressor will start. Check to ensure that the compressor sounds normal.

③ Check discharge and suction pressure on the compound gauges.

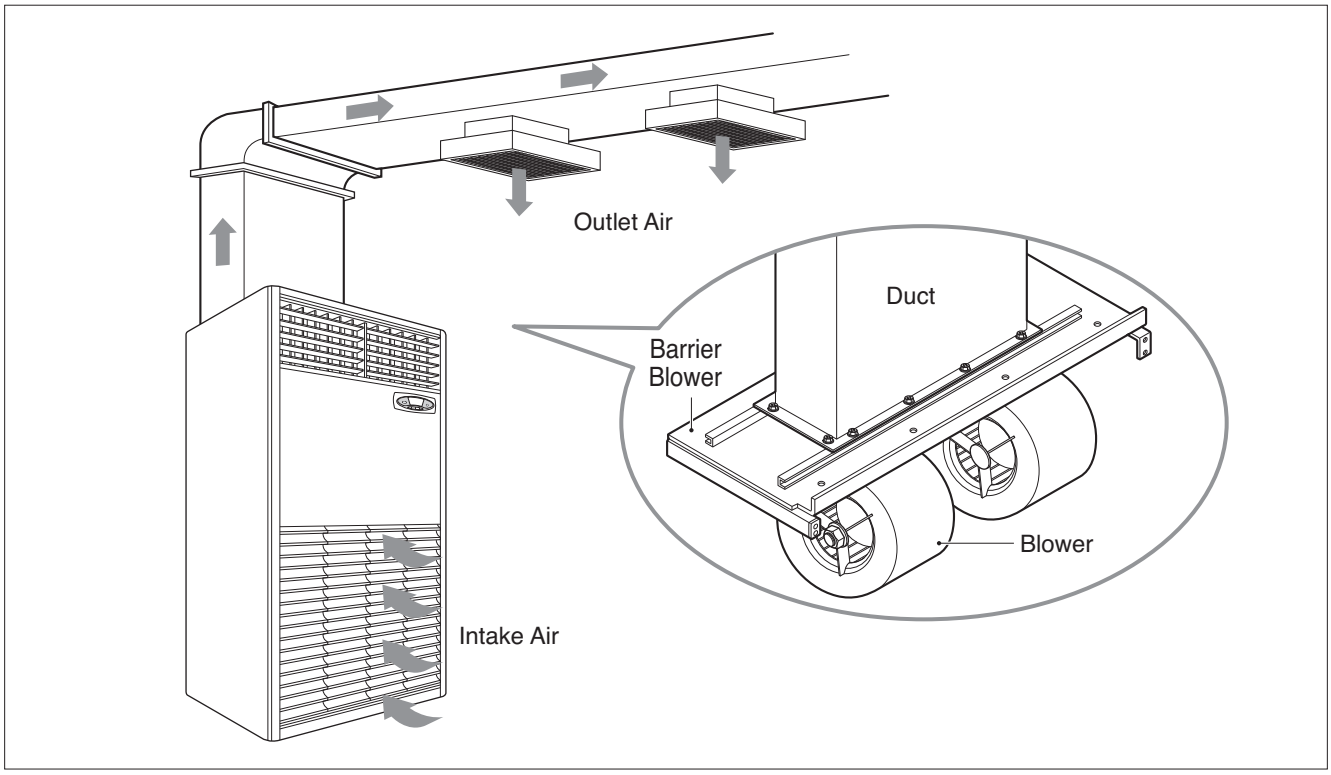
④ Check working voltage, phase balance and running current.

⑤ Check to ensure that the thermistor functions properly.

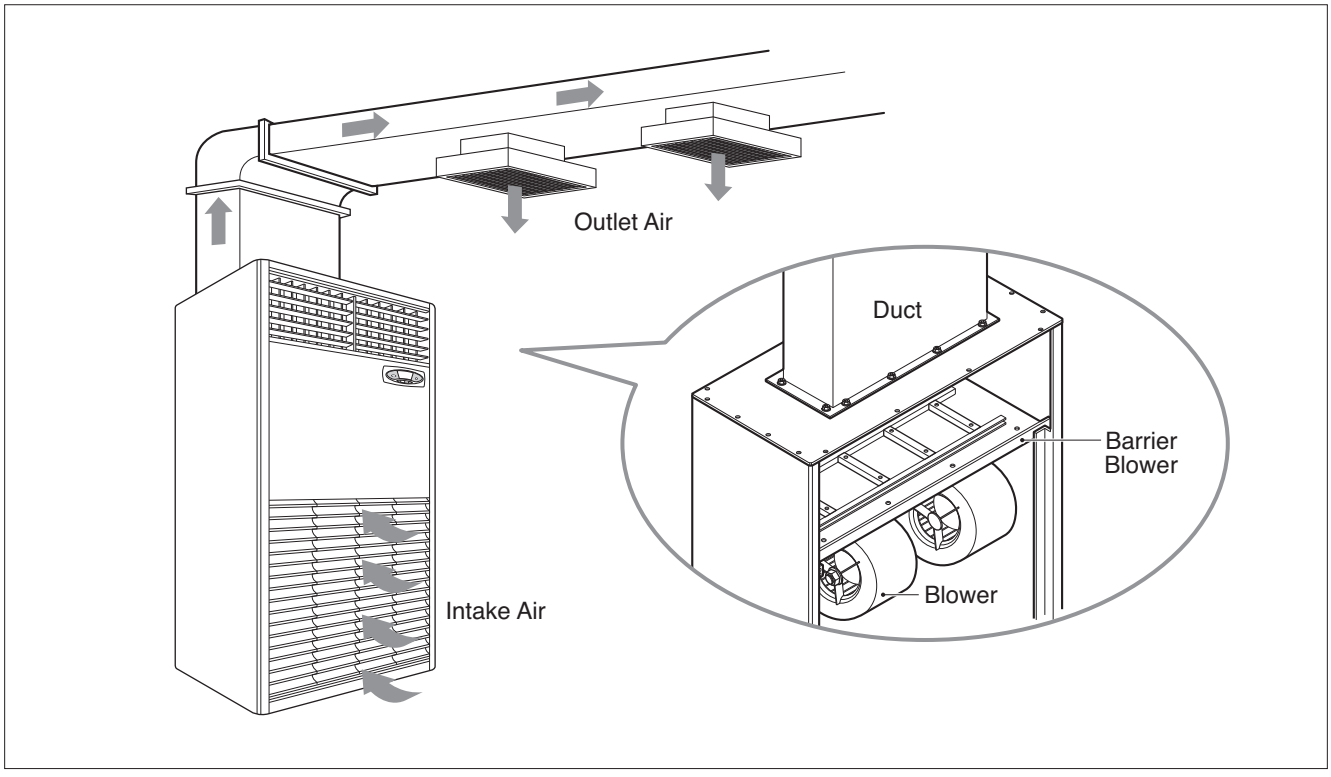
⑥ Check to ensure that the high pressure control switch functions correctly.

Floor Standing
6. The Method of Correct Duct Installation

6.1 Correct installation



6.2 Bad installation

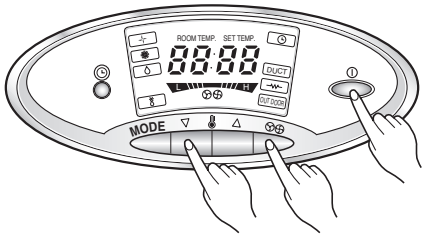


Floor Standing
6. The Method of Correct Duct Installation

6.3 Duct air flow operation procedure

1 First of all, turn off.

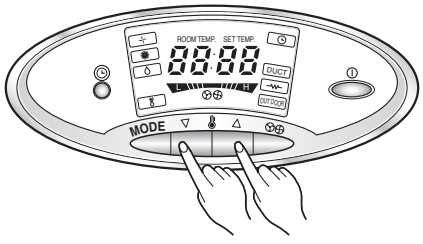
Press the start/stop button and fan speed button and lower temperature button simultaneously for 3 seconds.
The unit will respond with beep.



2 Select the step.

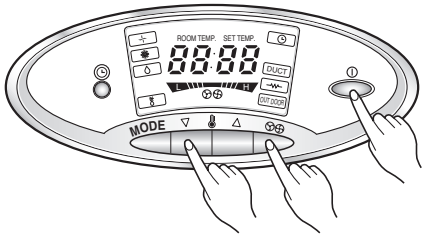
The step can be set within a range of 0~2.

mmAq	Step
5	00
10	01
15	02



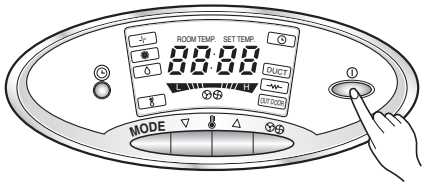
• Press the △ or ▽ button { △ To raise the Step / ▽ To lower the Step

3 After setting the step, press the start/stop button and fan speed button and lower temperature button simultaneously for 3 seconds again. The unit will respond with beep.



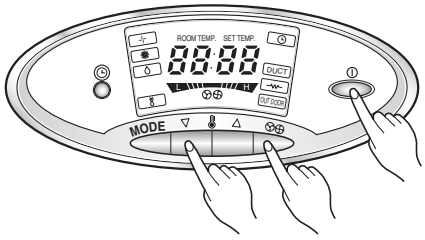
Floor Standing
6. The Method of Correct Duct Installation

4 Press the start/stop button.
The unit will operate.



5 For releasing duct air flow operation

- First of all, turn off.
  Press the start/stop button and fan speed button and lower temperature button simultaneously for 3 seconds. The unit will respond with beep, duct air flow operation will be removed.



During duct air flow operation

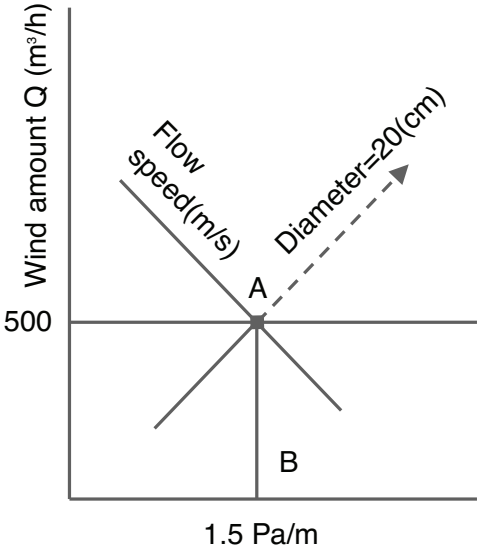
- It is impossible to switch the indoor fan speed.

6.4 Duct specification and material

1. Duct shall not generate contamination material and incombustible material that does not absorb moisture.
2. Duct shall be installed with insulator that is non corrosive and incombustible material .

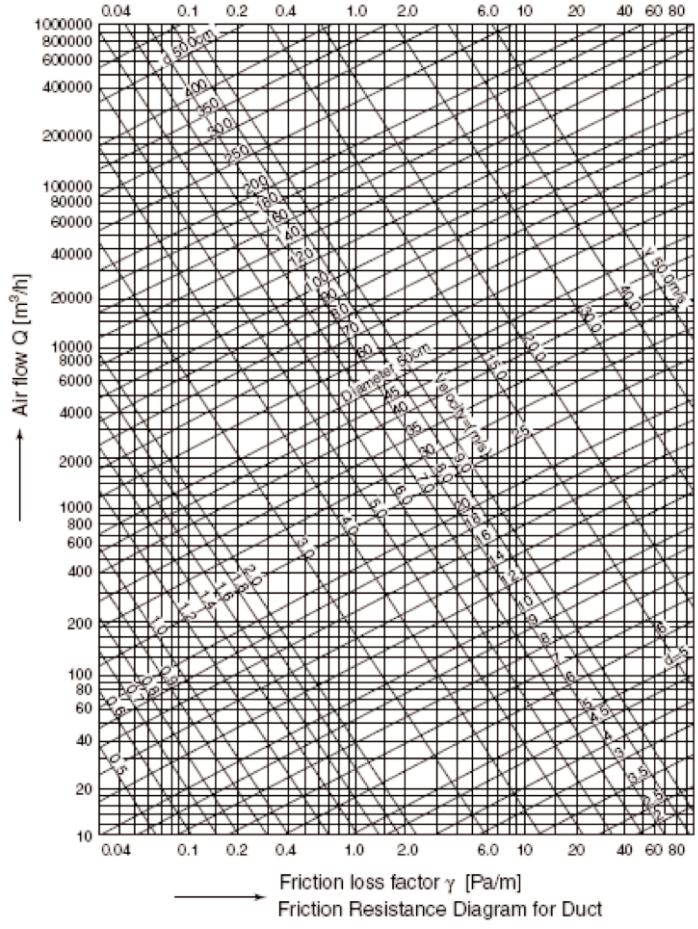
6.5 How to decide duct dimension

1. Duct diameter is based on equal friction method (equalizing friction losses).
2. The friction loss per unit length that is the basis of the friction method design for duct size decision shall be 0.08 mmAq~0.20 mmAq based on low speed duct design.
3. The friction loss per unit length to decide permitted diameter of the duct shall be 0.15 mmAq in principle, but if the permitted friction loss becomes bigger by the duct length or site condition, duct size designed based on 0.10 mmAq can be permitted.



[Picture] Example of duct diameter design

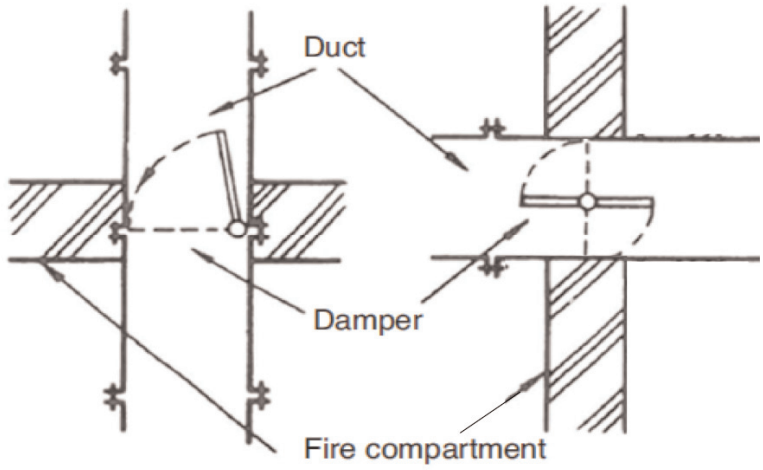
If duct sector passing wind amount is 500m³/h and friction method design unit friction loss is 1.5 Pa/m (0.15 mmAq/m), duct diameter is 200mm (20 cm)



Friction Resistance Diagram for Duct

6.6 Fire damper installation

1. If the ducts pass through fire compartment must install fire dampers.
2. Material shall be steel plate of thickness 1.5mm or more. And it shall be resistant to deformation due to heat.
3. When you install a fire damper must be installed on compartment through the center part of the wall.
4. The attachment method shall be firm attachment to the structure to ensure no damage from duct falling off and drop in case of fire.



⚠ WARNING

- **This product shall have the rated pressure of 15 mmAq or less when a duct is installed and used.**

mmAq	Step
5	00
10	01
15	02

NOTE

The sensor detecting the current temperature is inside the product, so the temperature on indoor unit display and the temperature at duct outlet may be different.

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