MITSUBISHI ELECTRIC
AIR CONDITIONERS

Changes for the Better

Power Multi

MXZ-8A140VA
(Inverter Heat Pump Multi System)

ENGINEERING DATA

CONTENTS

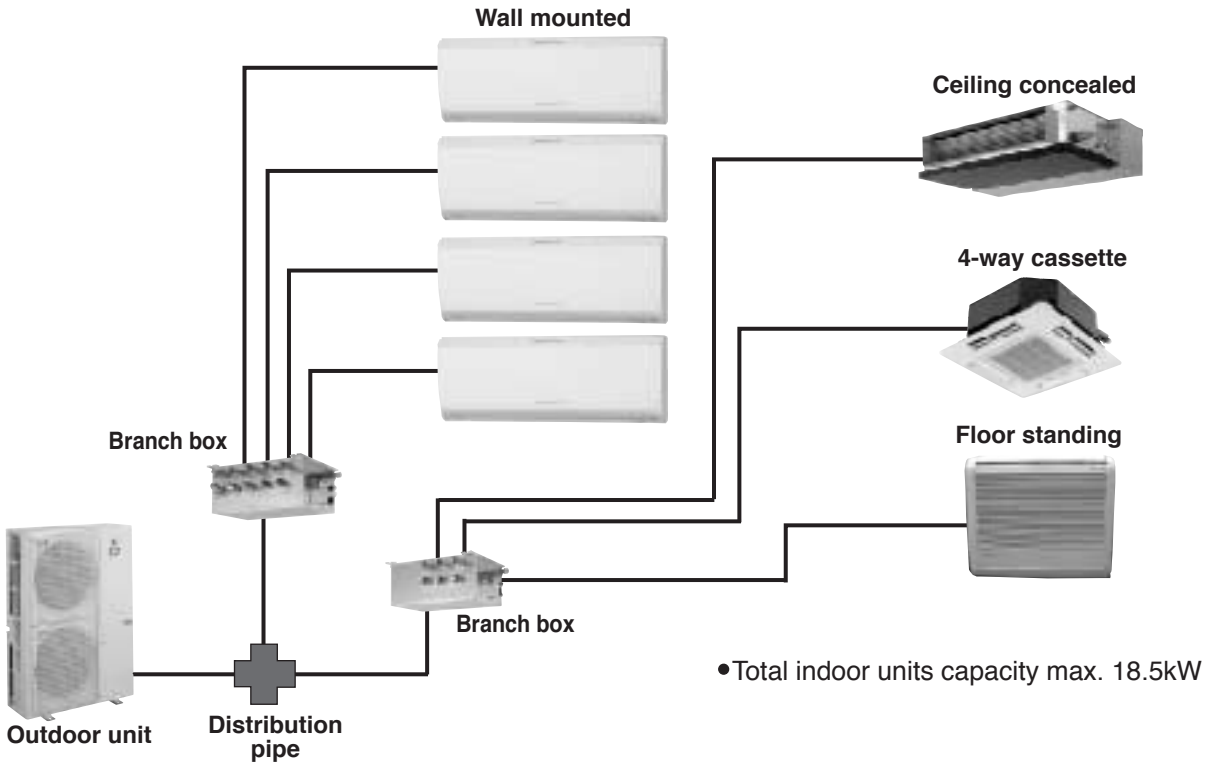
1. OUTLINE OF SYSTEM

(1) Target

- **Big Residences / Houses**
- **Large-Flats / Condominiums**
- **Small Commercial Buildings (Offices, Restaurants, Shops, etc.)**

(2) System Outline

Max. 8 Indoor Units



- Total indoor units capacity max. 18.5kW

(3) Main Features

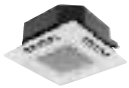
High COP : 3.52(Cool) & 3.91(Heat) !!!

- **14.0kW (5HP) Inverter Multi System**
- **Very high COP / Energy efficiency**
- **Up to 8 indoor units connectable**
- **Various & Brand new indoor units available**
- **3 & 5 ports Branch Box**
- **Single-phase power supply**
- **All flare connection**
- **R410A refrigerant**

(4) Outdoor Unit / Branch Box

Capacity range (Cooling)	14.0kW / 5HP
Outdoor unit	MXZ-8A140VA
No. of Branch Box units to be connected	1 or 2 units
Branch Box unit (Combination model name)	PAC-AK50BC (5 ports) PAC-AK30BC (3 ports)
No. of indoor units to be connected	2 ~ 8 units
Total capacity index of indoor units to be connected	4.4 – 18.5kW (132%)

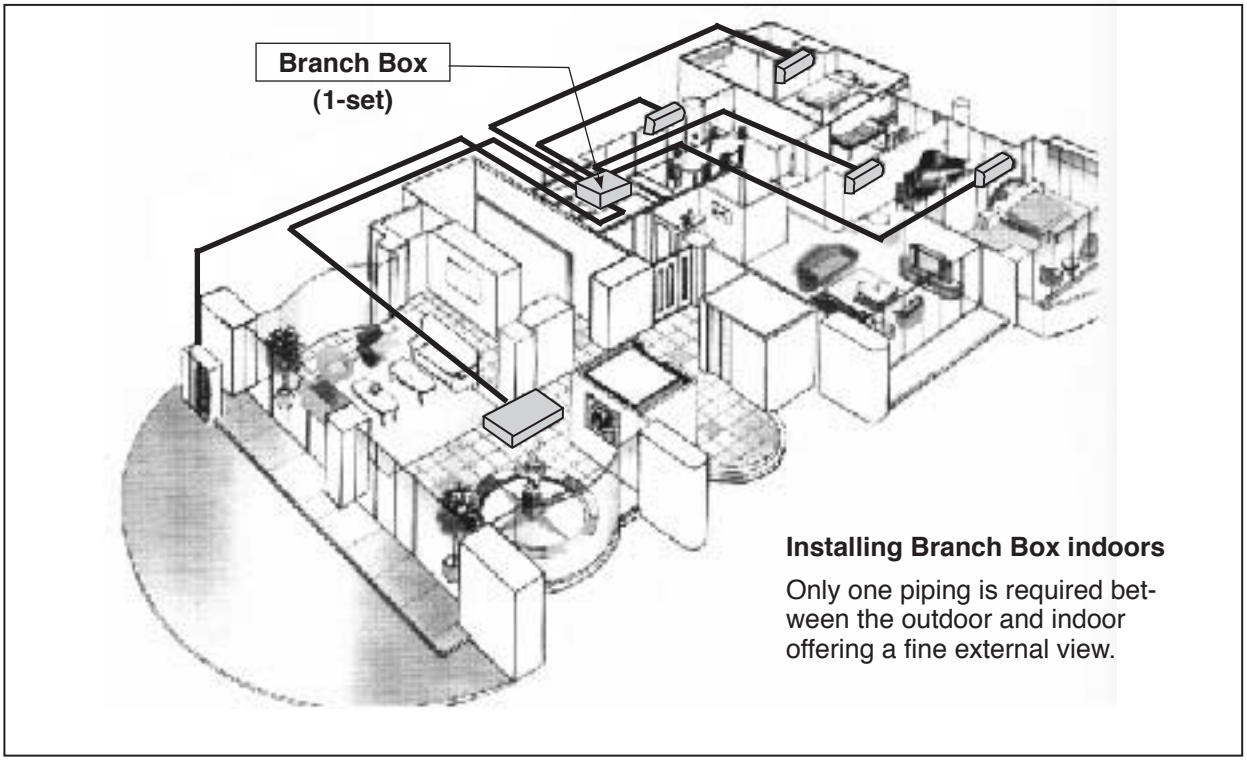
(5) Indoor Unit Line Up

Model name		Capacity class					
		2.2kW	2.5kW	3.5kW	5.0kW	6.0kW	7.1kW
Wall mounted	MSZ-FA25/35VA 		●	●			
	MSZ-GA22/25/35/50/60/71VA 	●	●	●	●	●	●
Ceiling concealed	SEZ-KC25/KA35/50/60VA 		●	●	●	●	
	PEAD-RP50/60/71EA ※ 				●	●	●
	PEAD-RP60/71GA ※ 					●	●
4-way ceiling cassette	SLZ-KA25/35/50VA (L) 		●	●	●		
	PLA-RP35/50/60/71AA ※ 			●	●	●	●
Floor standing	MFZ-KA25/35/50VA ※ 		●	●	●		

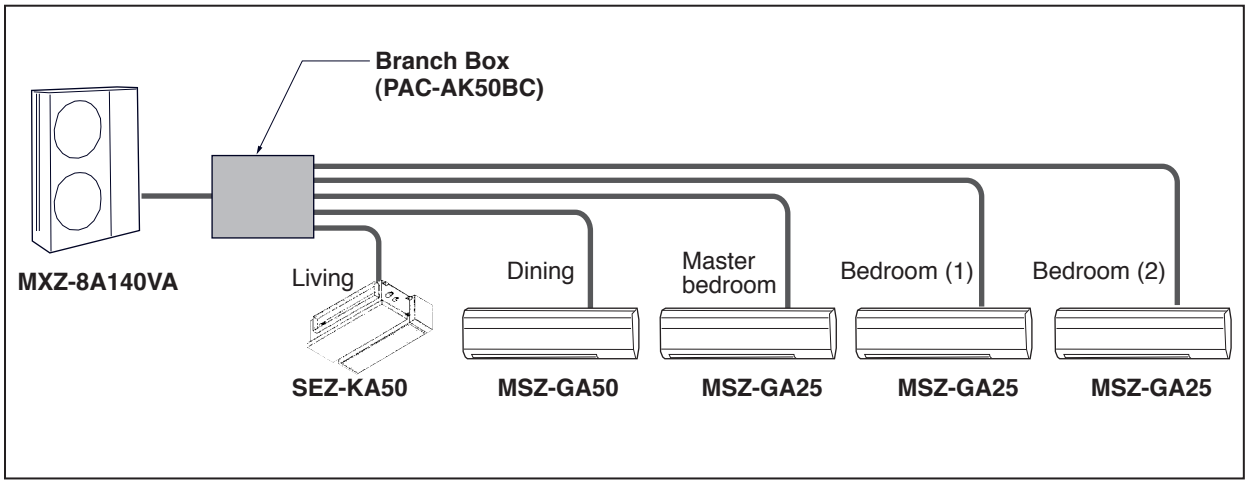
※ Available from Spring, 2005.

2. TYPICAL COMBINATION EXAMPLE

(1) One branch box is located



■ System example of 5 indoor units



■ Verification

The indoor unit's quantities are limited in 2 to 8 units. For the next step, make sure that the total rated capacity selected will stay in a range of 4.4 ~ 18.5kW.

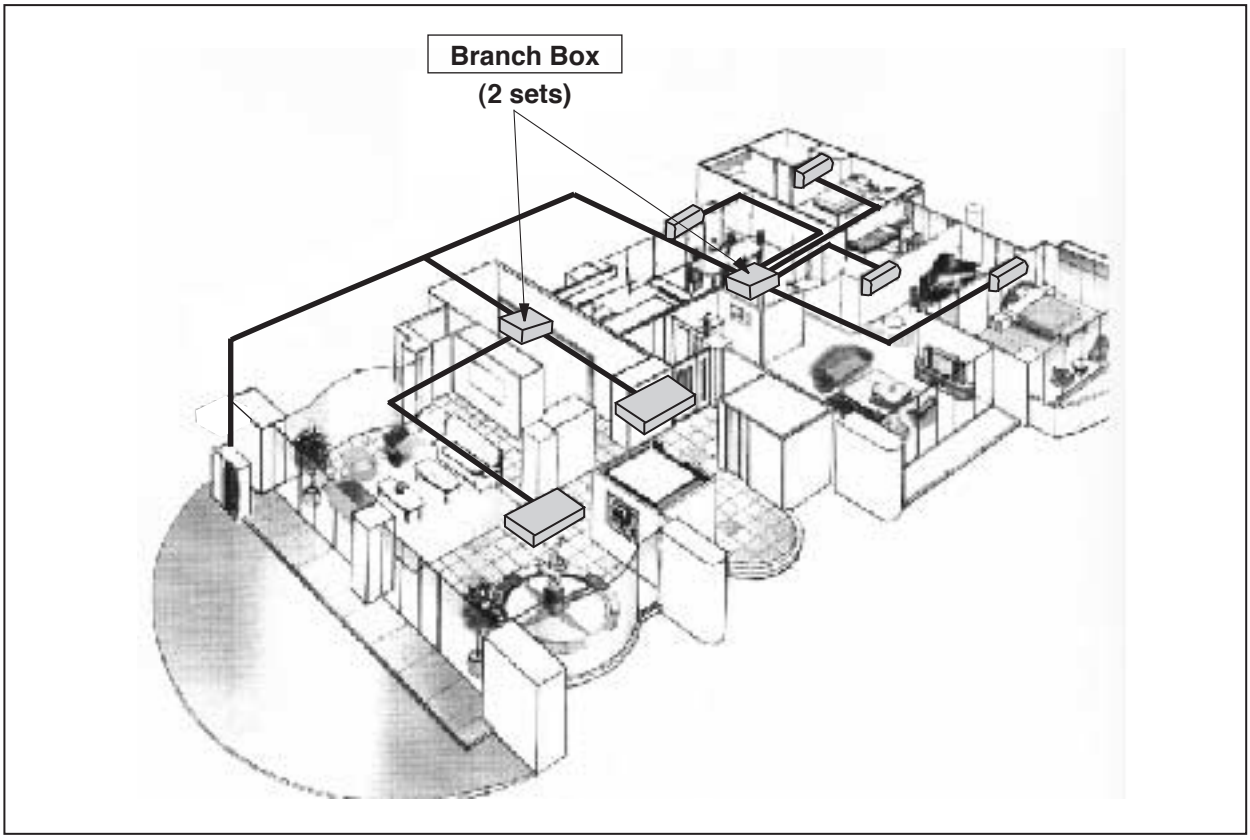
Example :

SEZ-KA50 = 5.0
MSZ-GA25 = 2.5
MSZ-GA25 = 2.5
MSZ-GA25 = 2.5
MSZ-GA50 = 5.0

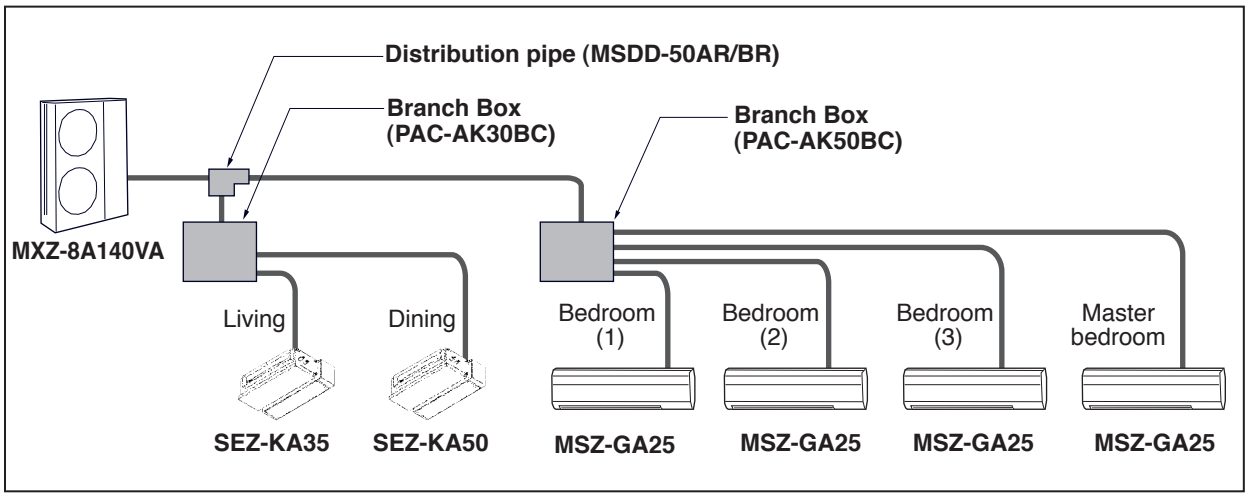
Total rated capacity

17.5 ≤ 18.5kW

(2) Two branch boxes are located



■ **System example of two branch boxes and 6 indoor units**



■ **Verification**

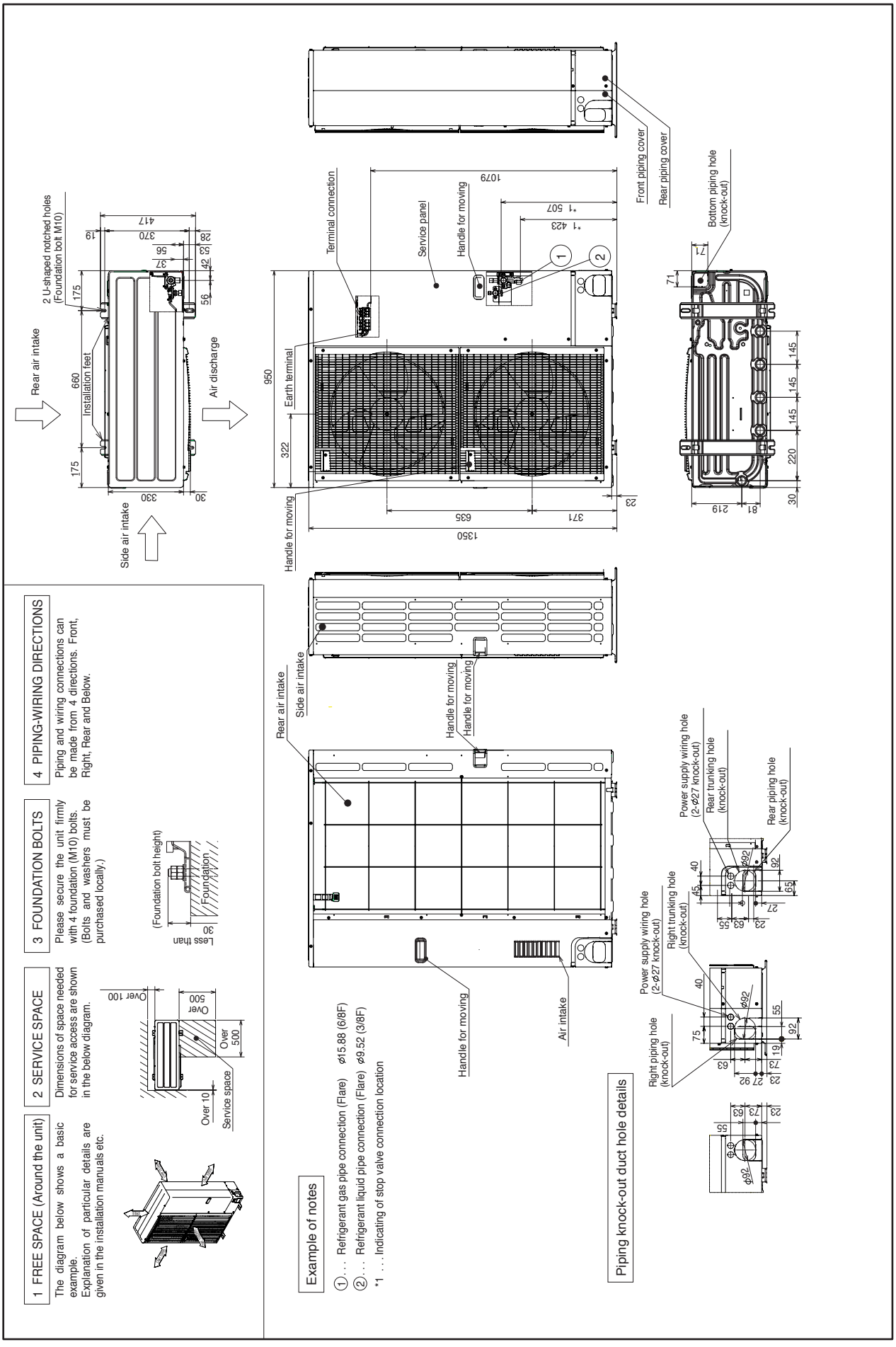
The indoor unit's quantities are limited in 2 to 8 units. For the next step, make sure that the total rated capacity selected will stay in a range of 4.4 ~ 18.5kW.

Example :

SEZ-KA35	=	3.5	Total rated capacity
SEZ-KA50	=	5.0	18.5 ≤ 18.5kW
MSZ-GA25 x 4	=	10.0	

3. EXTERNAL APPEARANCE (Unit : mm)

Outdoor unit



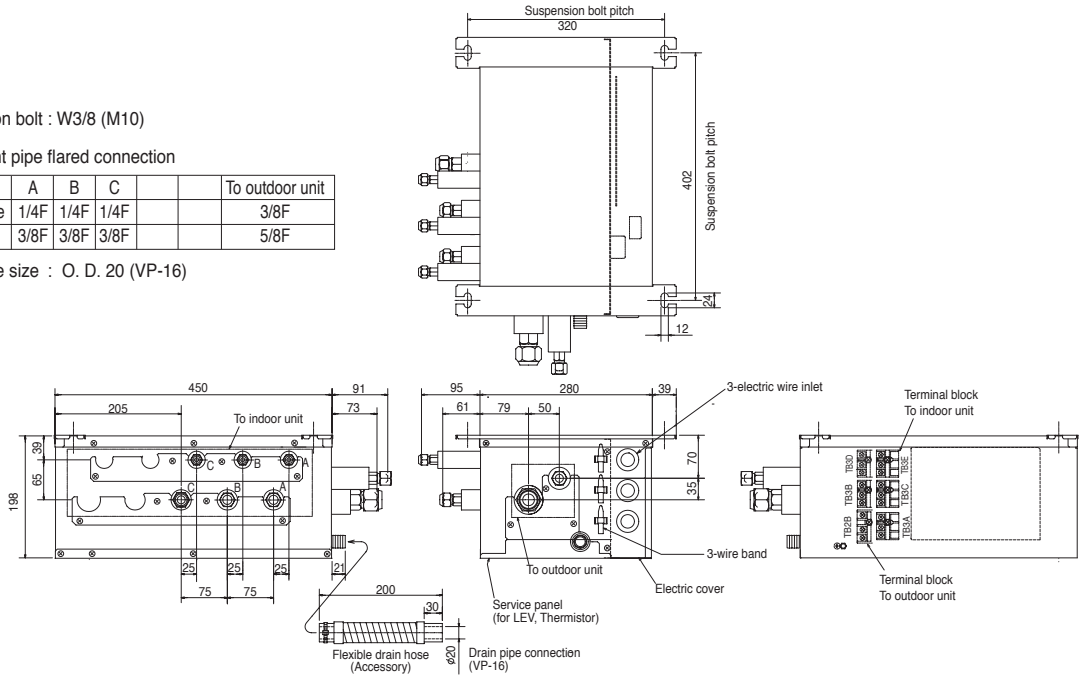
Branch Box
Model PAC-AK30BC

Suspension bolt : W3/8 (M10)

Refrigerant pipe flared connection

	A	B	C			To outdoor unit
Liquid pipe	1/4F	1/4F	1/4F			3/8F
Gas pipe	3/8F	3/8F	3/8F			5/8F

Drain hose size : O. D. 20 (VP-16)



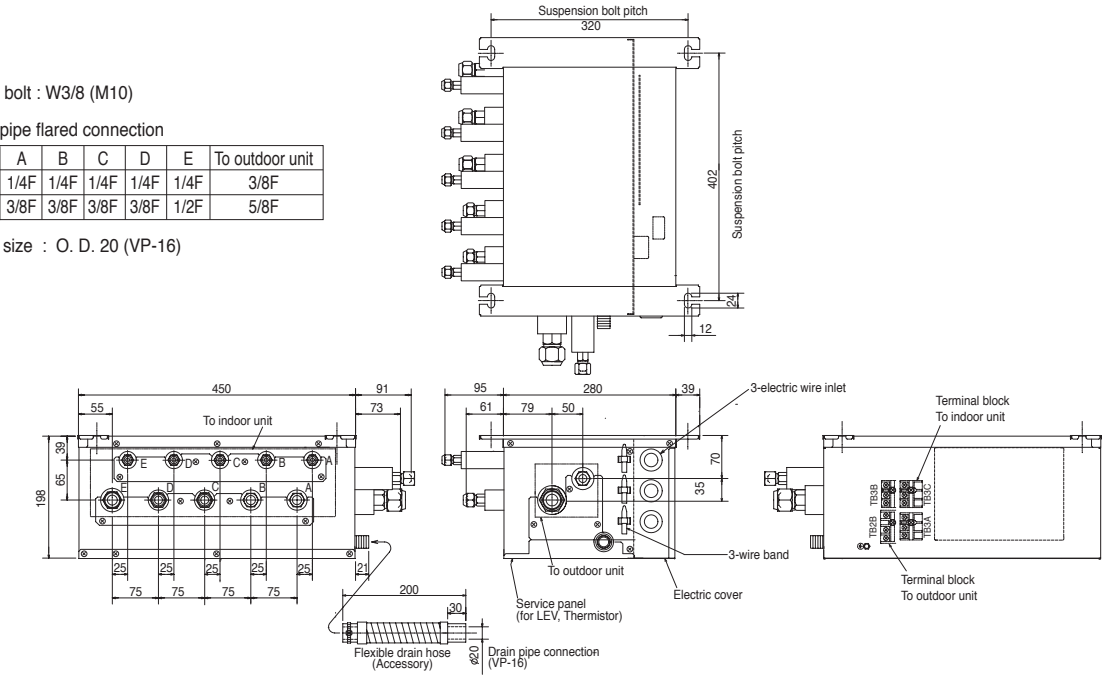
Branch Box
Model PAC-AK50BC

Suspension bolt : W3/8 (M10)

Refrigerant pipe flared connection

	A	B	C	D	E	To outdoor unit
Liquid pipe	1/4F	1/4F	1/4F	1/4F	1/4F	3/8F
Gas pipe	3/8F	3/8F	3/8F	3/8F	1/2F	5/8F

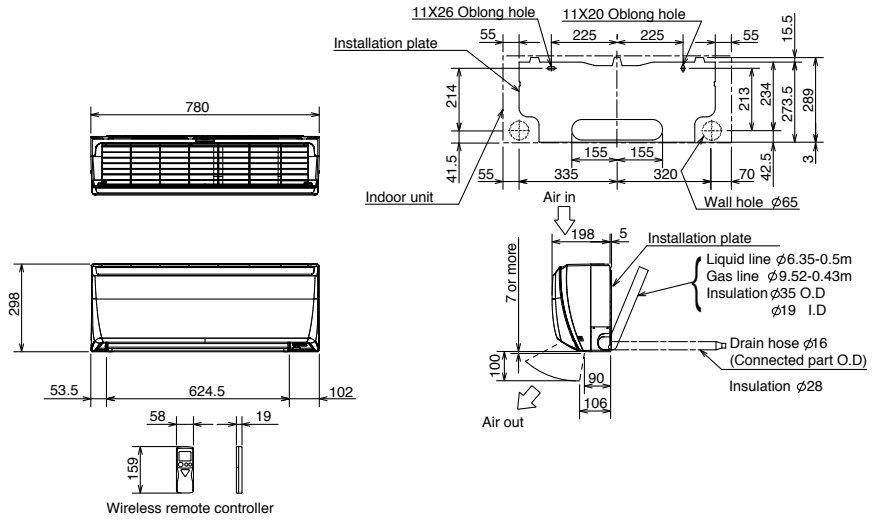
Drain hose size : O. D. 20 (VP-16)



Indoor Unit

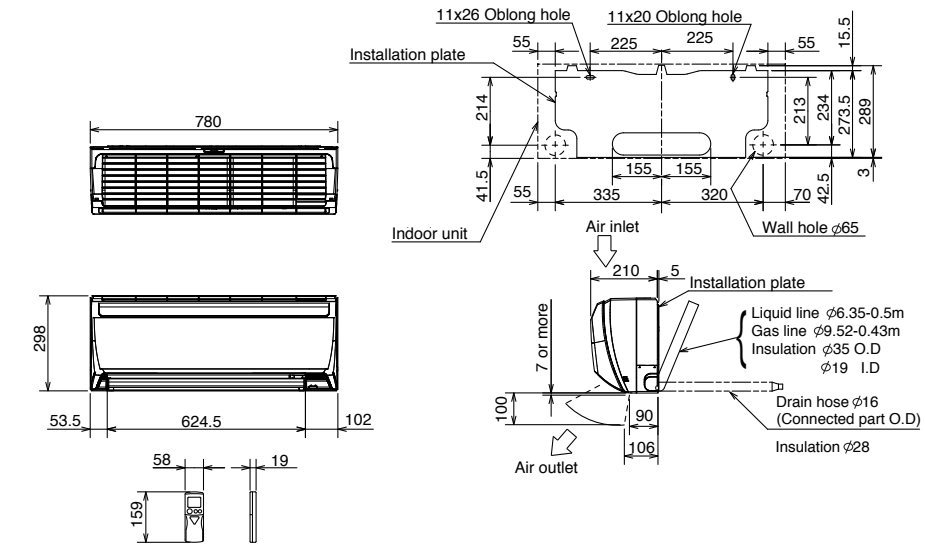
MSZ-FA (Wall mounted)

MSZ-FA25VA
MSZ-FA35VA



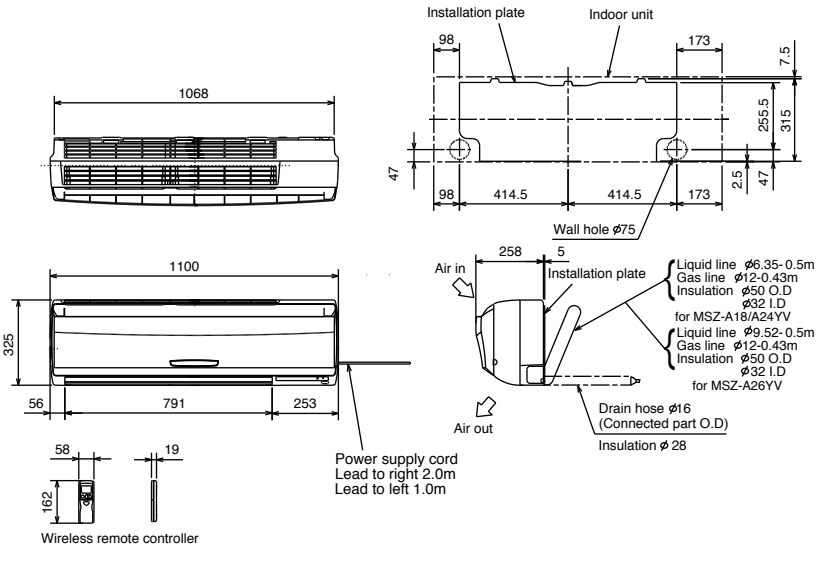
MSZ-GA (Wall mounted)

MSZ-GA22VA
MSZ-GA25VA
MSZ-GA35VA



MSZ-GA (Wall mounted)

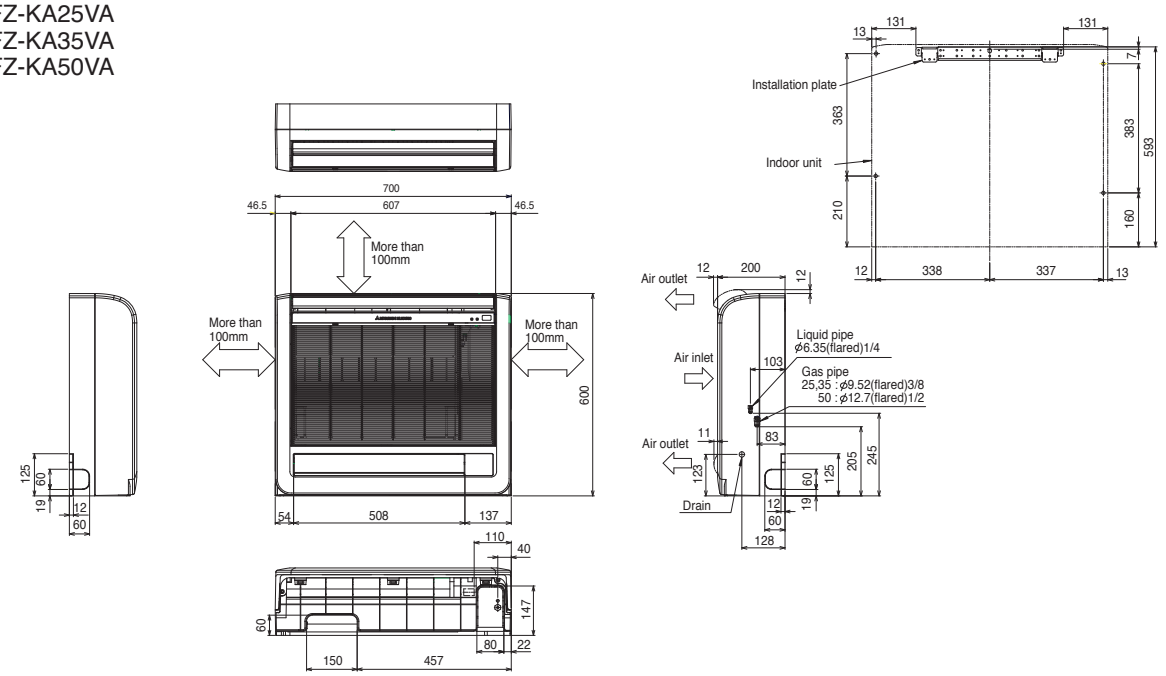
MSZ-GA50VA
MSZ-GA60VA
MSZ-GA71VA



Indoor Unit

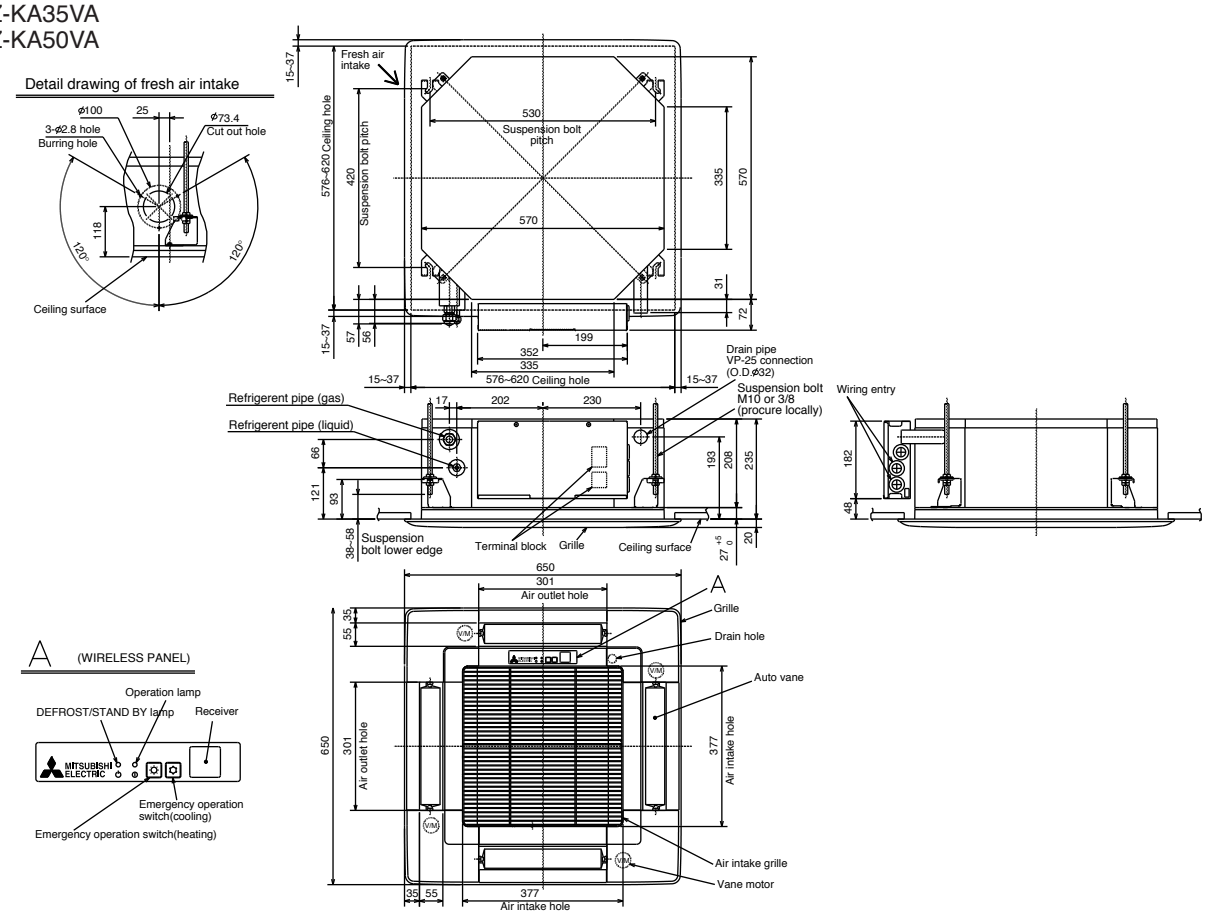
MFZ-KA (Floor standing)

MFZ-KA25VA
MFZ-KA35VA
MFZ-KA50VA



SLZ-KA (Compact 4-way cassette)

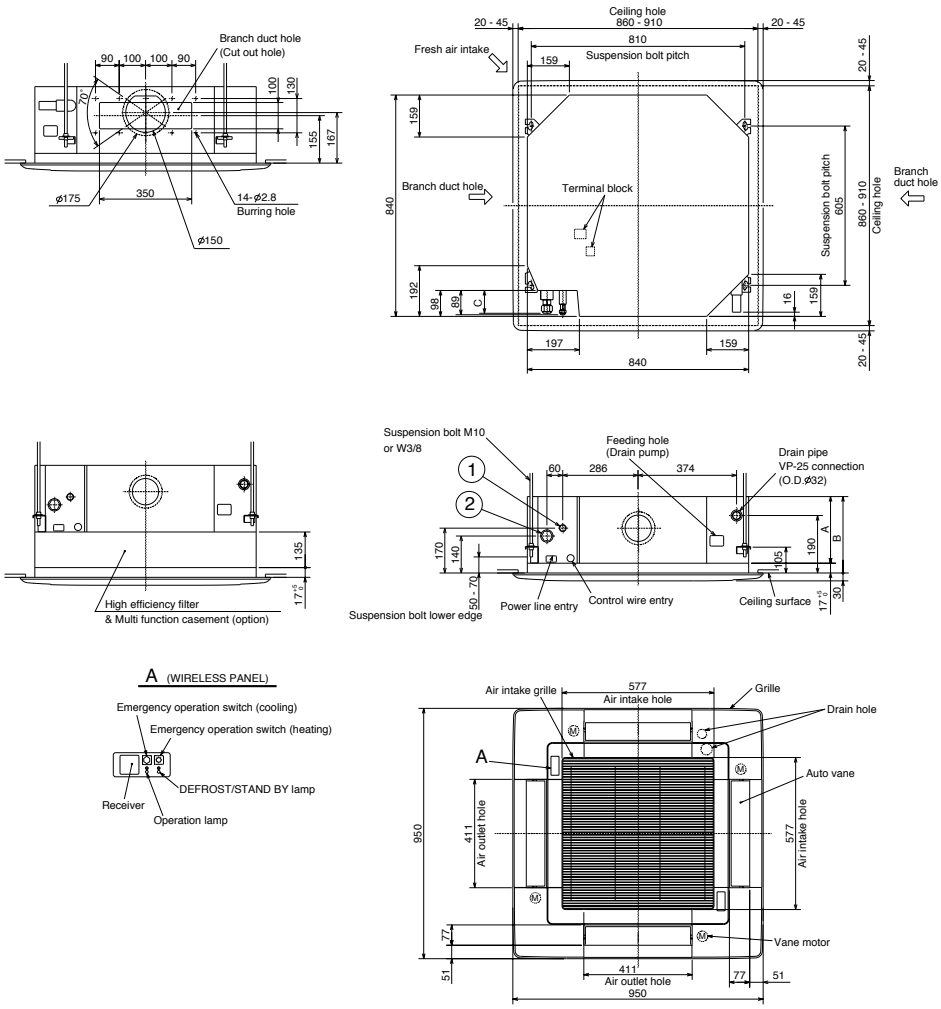
SLZ-KA25VA
SLZ-KA35VA
SLZ-KA50VA



Indoor Unit

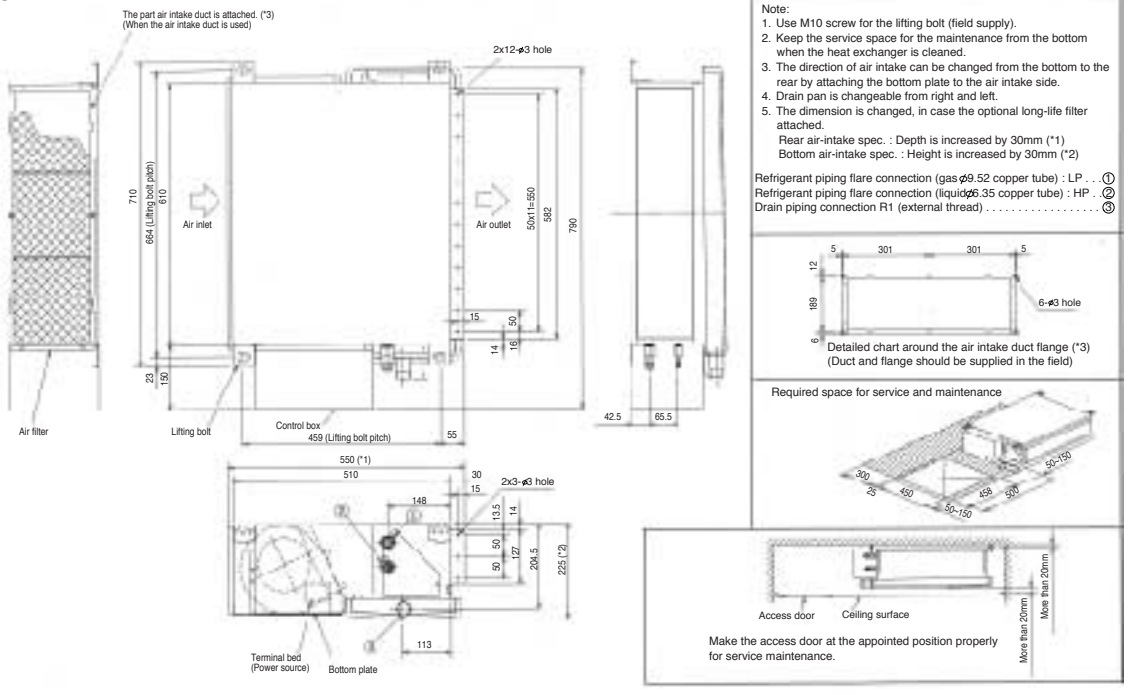
PLA-AA (4-way cassette)

PLA-RP35AA
PLA-RP50AA
PLA-RP60AA
PLA-RP71AA



SEZ-KC/KA (Ceiling concealed)

SEZ-KC25VA



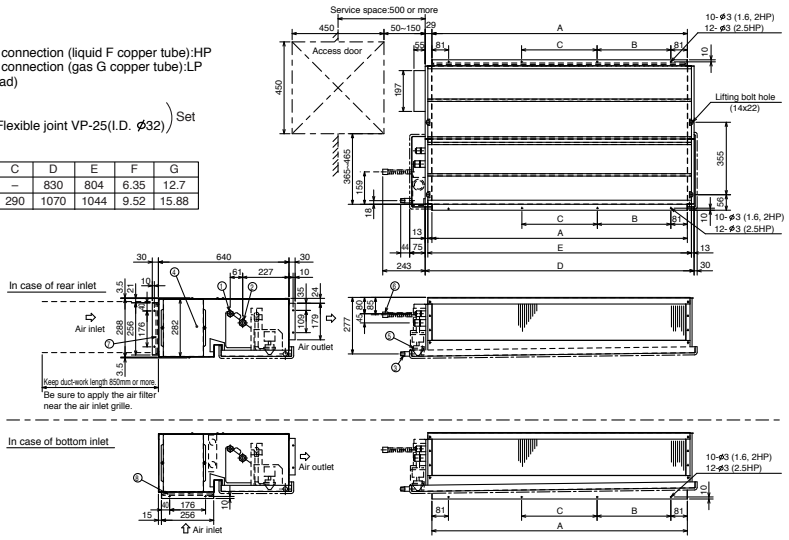
Indoor Unit

PEAD-EA (Ceiling concealed)

PEAD-RP50EA
PEAD-RP60EA

① Refrigerant piping flare connection (liquid F copper tube):HP
② Refrigerant piping flare connection (gas G copper tube):LP
③ Drain R1(External thread)
④ Electrical parts box
⑤ Drain Pump (Option)
⑥ Drain Pipe (Option) ··· Flexible joint VP-25(I.D. ⌀32)) Set
⑦ Filter

Model	A	B	C	D	E	F	G
RP50	772	305	–	830	804	6.35	12.7
RP60	1012	280	290	1070	1044	9.52	15.88

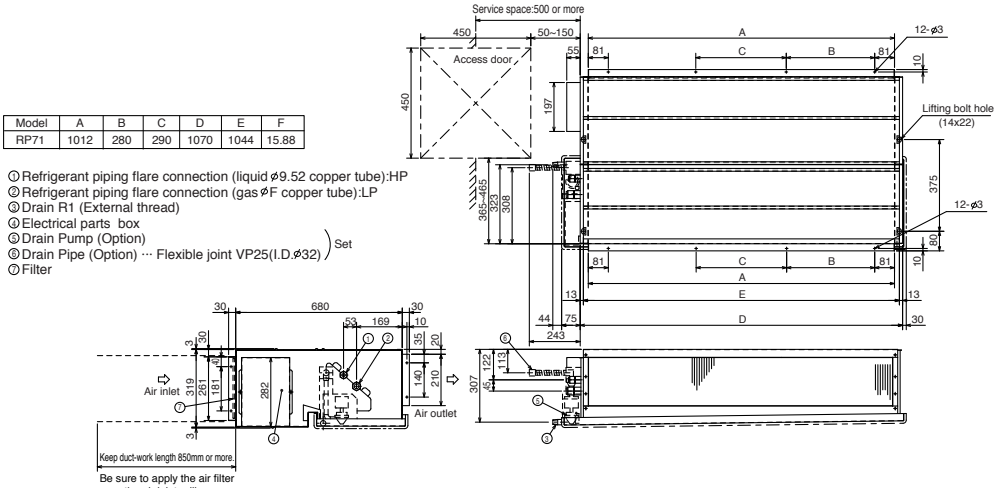


PEAD-EA (Ceiling concealed)

PEAD-RP71EA

Model	A	B	C	D	E	F
RP71	1012	280	290	1070	1044	15.88

① Refrigerant piping flare connection (liquid ⌀9.52 copper tube):HP
② Refrigerant piping flare connection (gas ⌀F copper tube):LP
③ Drain R1 (External thread)
④ Electrical parts box
⑤ Drain Pump (Option)
⑥ Drain Pipe (Option) ··· Flexible joint VP25(I.D.⌀32)) Set
⑦ Filter



PEAD-GA (Ceiling concealed)

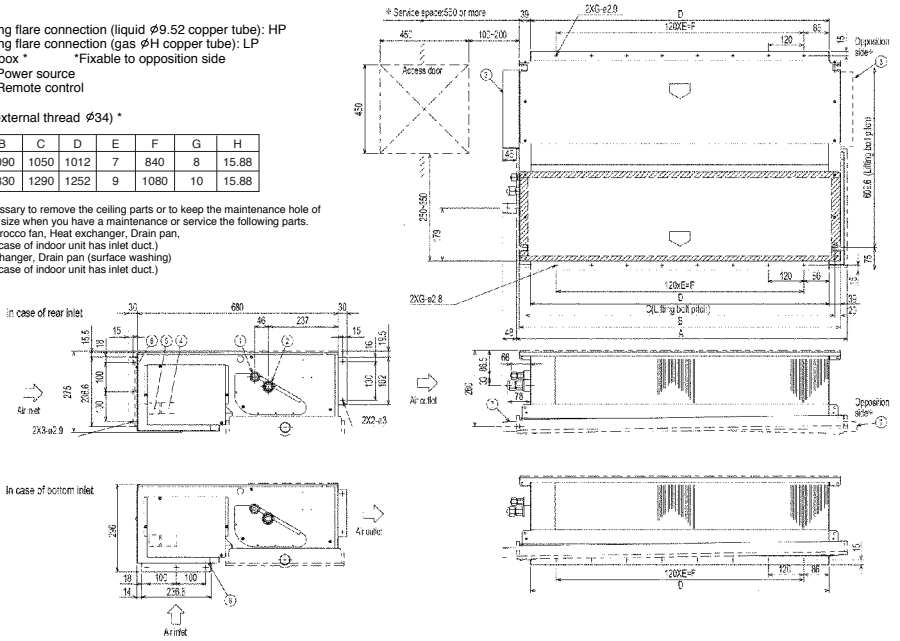
PEAD-RP60GA
PEAD-RP71GA

①Refrigerant piping flare connection (liquid ⌀9.52 copper tube): HP
②Refrigerant piping flare connection (gas ⌀H copper tube): LP
③Electrical parts box * *Fixable to opposition side
④Terminal bed : Power source
⑤Terminal bed : Remote control
⑥Filter
⑦Drain pan (R1 external thread ⌀34) *

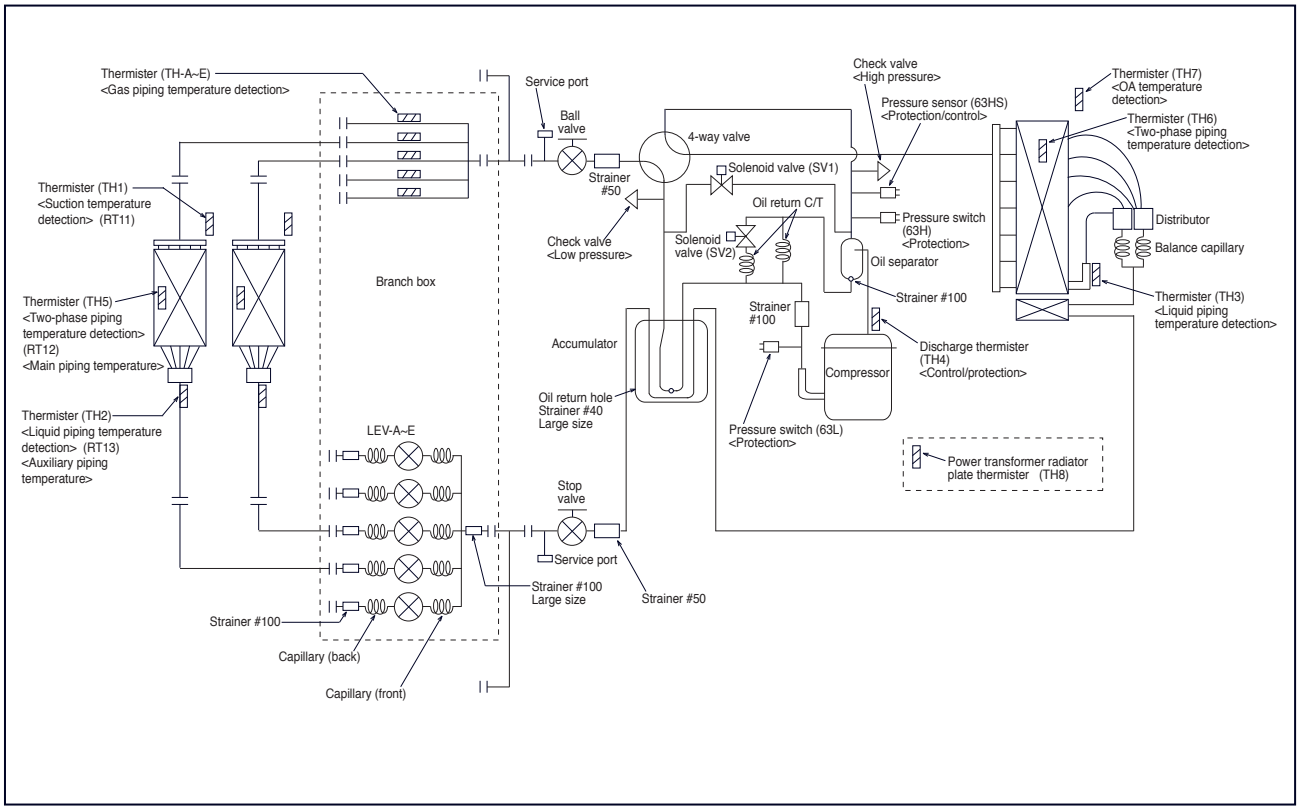
Model	A	B	C	D	E	F	G	H
RP60	1125	1090	1050	1012	7	840	8	15.88
RP71	1365	1330	1290	1252	9	1080	10	15.88

It is necessary to remove the ceiling parts or to keep the maintenance hole of over unit size when you have a maintenance or service the following parts.

Service:	Motor, Sirocco fan, Heat exchanger, Drain pan,
(Exchange)	Filter (in case of indoor unit has inlet duct.)
Maintenance:	Heat exchanger, Drain pan (surface washing)
(Wasging)	Filter (in case of indoor unit has inlet duct.)

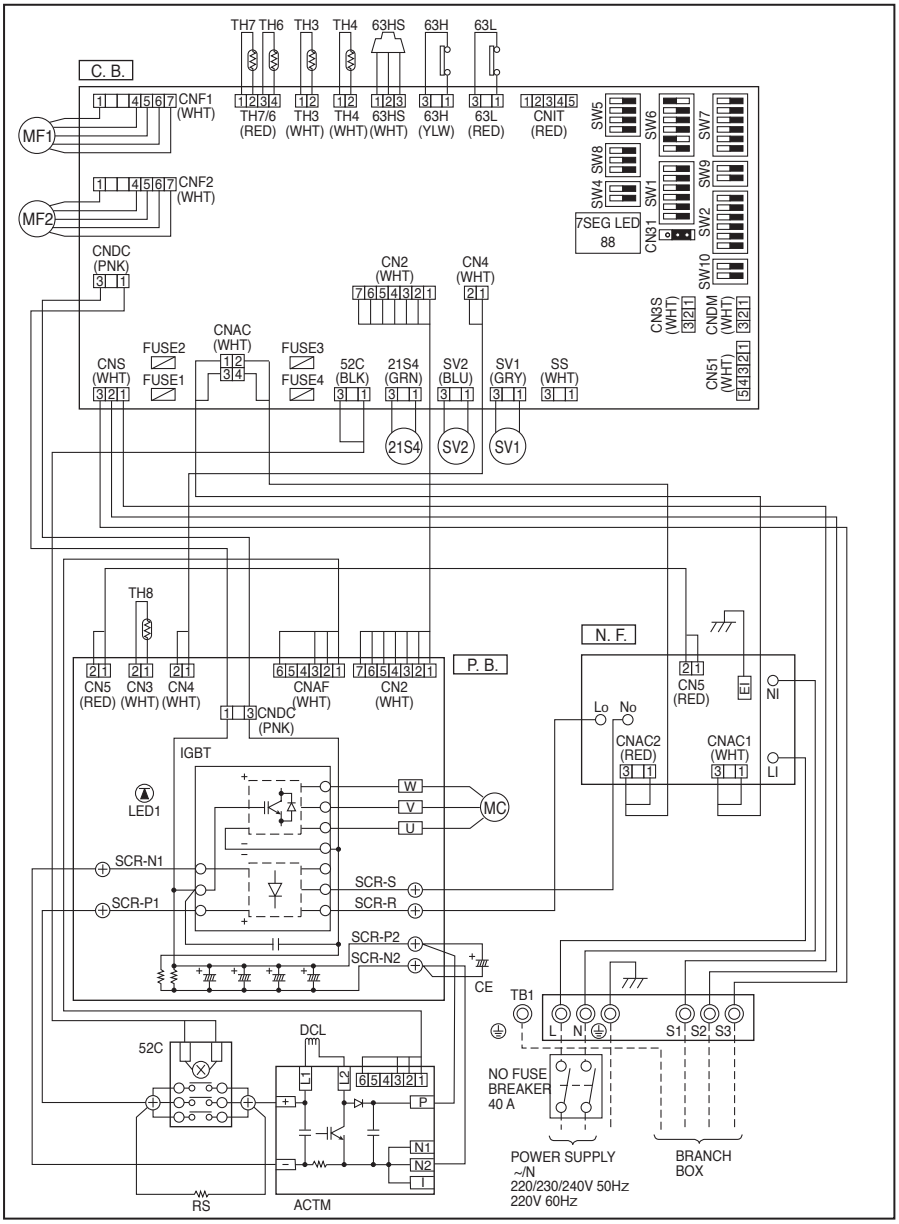


4. REFRIGERANT CIRCUIT DIAGRAM



5. WIRING DIAGRAM

MXZ-8A140VA (Outdoor Unit)



SYMBOL	NAME
TB1	Terminal Block (Power Supply, Blanch)
MC	Motor for Compressor
MF1, MF2	Fan Motors
21S4	Solenoid Valve (Four-Way Valve)
SV1	Solenoid Valve (Hot Gas Bypass)
SV2	Solenoid Valve (Returning oil Bypass)
63HS	High pressure Sensor
63H	High pressure Switch
63L	Low pressure Switch
TH3	Thermistor (Outdoor Pipe)
TH4	Thermistor (Discharge)
TH6	Thermistor (Outdoor2 - Phase Pipe)
TH7	Thermistor (Outdoor)
TH8	Thermistor (Radiator Panel)
DCL	Reactor
52C	52C Relay
RS	Rush Current Protect Resistor
ACTM	Active Filter Module
CE	Main Smoothing Capacitor
P. B	Power Circuit Board
U / V / W	Connection Terminal (U / V / W - Phase)

SYMBOL	NAME
SC - R / S	Screw Type Terminal (L / N - Phase)
SC - P1, P2	Screw Type Terminal (DC Voltage)
SC - N1, N2	Screw Type Terminal (DC Voltage)
CN2 ~ 5	Connector
CNDC	Connector
CNAF	Connector
IGBT	Converter, Inverter
LED1	Light Emitting Diodes (Inverter Control Status)
N. F.	Noise Filter Circuit Board
LI / LO	Connection Lead (L - Phase)
NI / NO	Connection Lead (N - Phase)
EI	Connection Terminal (Ground)
CNAC1 / 2	Connector
CN5	Connector
C. B.	Controller Circuit Board
FUSE1 ~ 4	Fuse (6.3A)
SW1	Switch (Forced Defrost, Error History Record Reset)
SW2	Switch (Self Diagnosis Switch)
SW4	Switch (Test Operation)
SW5	Switch (Function Swich)

SYMBOL	NAME
SW6	Switch (Model Select)
SW7	Switch (Function Setup)
SW8	Switch
SW9	Switch (Function for option)
SW10	Switch (Function for option)
CN31	Connector
LED	Light Emitting Diodes (Operation Inspection Indicators)
CNAC	Connector
CNDC	Connector
CNS	Connector
CNF1	Connector
CNF2	Connector
SS	Connector (Connection for Option)
SV1	Connector
SV2	Connector
CN3S	Connector (Connection for Option)
CNDM	Connector <Connection for Option (Contact Input)>
CN51	Connector (Connection for Option)
CNIT	Connector (Connection for Option)

Operation / Inspection Display

LED on the controller board display the operation and inspection status as follows.
If LED does not light, it indicates that on power is supplied to the board:

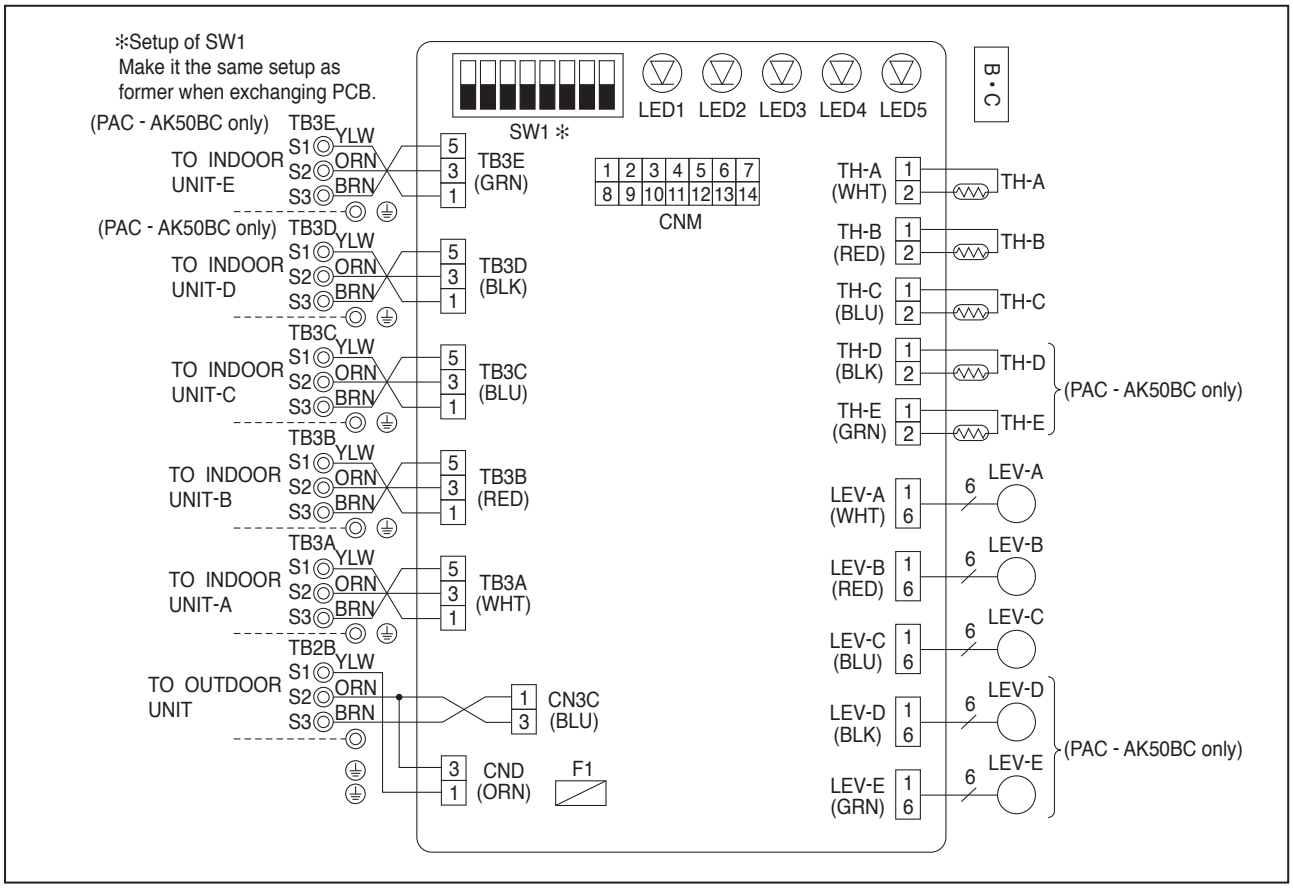
	Details	Code
Power turned on		⟺ (blinks)
Normal status		Operation status display, such as C5. H7
Faulty status (blinking)	Connector (63H) open, connector (63L) open	F3
	At least 2 connectors open	F9
	Incorrect wiring in indoor / outdoor unit connection	EA, Eb, EC
	Indoor / outdoor unit communication error	E6~E9
	Remote controller communication errer	E0, E3~E5
	Combination errer, undefined error	EE, EF
	Serial communication error	Ed
	Discharge temperature fault	U2
	Low-discharge superheating fault, Erroneous connection of refrigerant pipes or the connecting wires	U7
	High pressure fauit (63H operates)	U1
	Low pressure fauit (63L operates)	UL
	Abnormality of power moduls	U6
	Compressor over current shutoff (Start up locked)	UF
	Current sensor fault (P. B.)	UH
	Compressor overcurrent shutoff fault	UP
	Discharge pipe/compressor thermistor (TH4) open or short-circuit	U3
	Outdoor unit thermistors (TH3, TH6, TH7, and H8), 63HS, and branch dox thermistors open or short-circuit	U4
	Radiator panel temperature fault	U5
	Abnormality in outdoor fan motor	U8
	Voltage fault, current sensor fault (N. F.)	U9
	Forced compressor stop (Overlap malfunction of drain pump in indoor unit and linear expansion valve in branch box)	PA

Cautions when Servicing

- ⚠ WARNING: When the main supply is turned off, the voltage [340V] in the main capacitor will drop to 20V in approx. 2 minutes (input voltage : 240V). When servicing, make sure that LED on the outdoor circuit board gose out, and then wait for at least 1 minute.
- Components other than the outdoor board may be faulty : Check and take corrective action, referring to the service manual. Do not replace the outdoor board without checking.

Branch Box

PAC-AK30, 50BC



Note : PAC-AK30, 50BC are only for R410A and not connectable with MXZ-7A140VC.

SYMBOL	NAME
B.C	Branch box controller board
F1 (B.C)	Fuse 250V 6.3A
SW1 (B.C)	Switch for service
CNM (B. C)	Connector
LED1~5 (B.C)	Light emitting diode
LEV-A~E	Linear expansion valve
TH-A~E	Thermistor Pipe temp.detection/Gas (0˚C/15kΩ, 25˚C/5.4kΩ)
TB2B	Terminal block/To outdoor unit
TB3A	Terminal block/To indoor unit - A
TB3B	Terminal block/To indoor unit - B
TB3C	Terminal block/To indoor unit - C
TB3D	Terminal block/To indoor unit - D
TB3E	Terminal block/To indoor unit - E

Note:
1. At servicing for outdoor unit, always follow the wiring diagram of outdoor unit.
2. Symbols used in wiring diagram above are,
◎ : terminal block, □□□ : connector.

6. SPECIFICATIONS

(1) Outdoor Unit

MXZ-8A140VA

Type				Inverter Multi-Split
Model name				MXZ-8A140VA
Power supply [V. Phase, Hz]				220/230/240, Single, 50
Cooling	Capacity [rated]		kW	14.0
	Power input [rated]	*1	kW	3.79
	EER	*2		3.52
		EEL rank		A
	SPL [rated-silent]		dB (A)	50 - 47
	Running current [rated]	*1	A	16.55
	Air volume		CMM (m^3/min)	100
			CFM	3,530
Heating	Capacity [rated]		kW	16.0
	Power input [rated]	*1	kW	3.90
	COP	*2		3.91
		EEL rank		A
	SPL		dB (A)	52
	Running current [rated]	*1	A	17.05
	Air volume		CMM (m^3/min)	100
			CFM	3,530
Starting current			A	14
Max. running current			A	29.5
Dimensions [H x W x D]			mm	1,350 x 950 x 330
Weight			kg (lbs)	128 (282)
Piping	Liquid [diameter]		mm (inch)	9.52 (3/8)
	Gas [diameter]		mm (inch)	15.88 (5/8)
	Chargeless		m	40
Connection method	Indoor side / Outdoor side			Flared
Refrigerant				R410A
Guaranteed operating range	Cooling	Outdoor	˚C	DB: –5 ~ +46
		Indoor	˚C	DB: +19 ~ +35 / WB: +15 ~ +22.5
	Heating	Outdoor	˚C	DB: –10 ~ +21 / WB: –11 ~ +15
		Indoor	˚C	+17 ~ +28

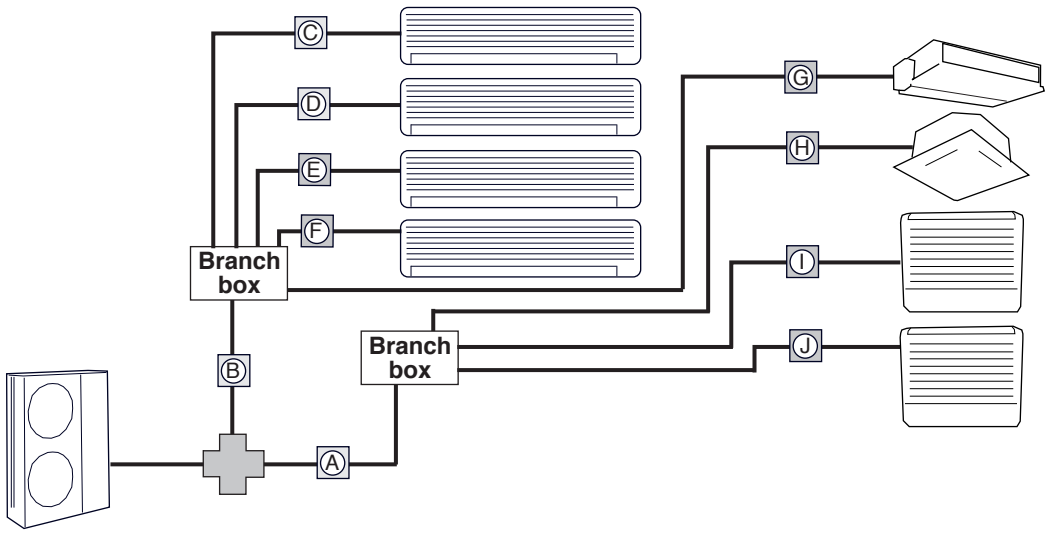
*1 In case of connecting 3 units x MSZ-GA60VA and the electrical data is only outdoor unit.

*2 Included branch box and indoor units (3 units x MSZ-GA60VA).

Optional parts for MXZ-8A140VA

No.	Description	Parts Name	Note
1	Air outlet guide	PAC-SG59SG-E	
2	Drain socket	PAC-SG61DS-E	
3	Drain pan	PAC-SG64DP-E	
4	Distribution pipe	MSDD-50AR-E	For flare connection
5	(In case of 2 branch box connection)	MSDD-50BR-E	For brazing connection
6	Joint pipe	PAC-SG76RJ-E	(ϕ9.52 → ϕ15.88)
7		PAC-493PI	(ϕ6.35 → ϕ9.52)
8		MAC-A456JP-E	(ϕ12.7 → ϕ15.88)
9		MAC-A455JP-E	(ϕ12.7 → ϕ 9.52)
10		MAC-A454JP-E	(ϕ9.52 → ϕ12.7)
11	Special cover of branch box	PAC-AK350CVR-E	For outdoor installation of branch box
12	Pipe dryer	PAC-SG82DR-E	For liquid piping

Piping length, height difference



		Max			Max
Total piping	(A+B+C+D+E+F+G+H+I+J)	115m	Height difference	Outdoor – Indoor	30m*
Outdoor ⟶ Branch Box	(A+B)	55m		Outdoor – Branch Box	30m
Branch Box ⟶ Indoor	(C+D+E+F+G+H+I+J)	60m		Branch Box – Indoor	15m
	(Each C, D, E, F, G, H, I, J)	15m		Indoor – Indoor	12m
Outdoor ⟶ Indoor	(Farthest)	70m			

* In case of installing outdoor unit higher than indoor unit : 20m

(2) Branch Box

PAC-AK50/30BC

Type				**Branch box**	
Model name				PAC-AK50BC	PAC-AK30BC
Connectable number of indoor units				Max. 5	Max. 3
Power supply [Source, V, Phase, Hz]				from outdoor unit, 220/230/240, single, 50	
Power input			kW	0.003	0.003
Running current			A	0.05	0.05
Drain hose size			mm	O.D. 20 (VP-16)	
Dimensions [H x W x D]			mm	198 x 450 x 280	
Weight			kg	9.3	8.1
Piping [Diameter]	Branch [Indoor side]	Liquid	mm (inch)	6.35 x 5 {A, B, C, D, E}	6.35 x 3 {A, B, C}
		Gas	mm (inch)	9.52 x 4 {A,B,C,D}, 12.7 x 1{E}	9.52 x 3 {A, B, C}
	Main [Outdoor side]	Liquid	∅	9.52	9.52
		Gas	∅	15.88	15.88
	Connection method			Flared	Flared
Wiring	To indoor unit			3-wire + Earth wire	
	To outdoor unit			3-wire + Earth wire	

(3) Indoor Unit

MSZ-FA (Wall mounted - Deluxe type)

Model name		MSZ-FA25VA	MSZ-FA35VA
Rated capacity	kW	2.5	3.5
Fan speed		4 steps + Auto	4 steps + Auto
Air volume (Lo-Hi)	m³/min	6.6-9.9	6.9-9.9
Sound level (Lo-Hi)	dB	21-42	22-42
Dimensions (HxWxD)	mm	298x780x198	298x780x198
Weight	kg	10	10
Pipe size (Liquid/Gas)	mm	6.35/9.52	6.35/9.52
Remote controller		Wireless	Wireless
Special features		"I-see" sensor, Auto-moving panel, "Plasma Duo" filter system etc.	

MSZ-GA (Wall mounted - Standard type)

Model name		MSZ-GA22VA	MSZ-GA25VA	MSZ-GA35VA	MSZ-GA50VA	MSZ-GA60VA	MSZ-GA71VA
Rated capacity	kW	2.2	2.5	3.5	5.0	6.0	7.1
Fan speed		4 steps + Auto	4 steps + Auto	4 steps + Auto	3 steps + Auto	3 steps + Auto	3 steps + Auto
Air volume (Lo-Hi)	m³/min	6.2-10.0	6.2-10.0	6.4-10.0	8.3-14.2	8.7-17.2	9.4-17.2
Sound level (Lo-Hi)	dB	21-43	21-43	22-43	31-48	32-54	33-54
Dimensions (HxWxD)	mm	298x780x210	298x780x210	298x780x210	325x1,100x258	325x1,100x258	325x1,100x258
Weight	kg	9	9	9	16	16	16
Pipe size (Liquid/Gas)	mm	6.35/9.52	6.35/9.52	6.35/9.52	6.35/15.88	6.35/15.88	9.52/15.88
Remote controller		Wireless	Wireless	Wireless	Wireless	Wireless	Wireless
Special features		Quick Clean / Catechin Filter / Flat Panel			Catechin Filter / Flat Panel		

MFZ-KA (Floor standing)

Model name		MFZ-KA25VA	MFZ-KA35VA	MFZ-KA50VA
Rated capacity	kW	2.5	3.5	5.0
Fan speed		3 steps + Auto	3 steps + Auto	3 steps + Auto
Air volume	m³/min	Pending	Pending	Pending
Sound level (Lo-Hi)	dB	22-37	23-38	32-43
Dimensions (HxWxD)	mm	600x700x200	600x700x200	600x700x200
Weight	kg	14	14	14
Pipe size (Liquid/Gas)	mm	6.35/9.52	6.35/9.52	6.35/12.7
Remote controller		Wireless	Wireless	Wireless
Special features		Double Air Outlet / Catechin Filter		

SLZ-KA (Compact 4-way cassette)

Model name		SLZ-KA25VA(L)	SLZ-KA35VA(L)	SLZ-KA50VA(L)
Rated capacity	kW	2.5	3.5	5.0
Fan speed		3 steps	3 steps	3 steps
Air volume (Lo-Mid-Hi)	m³/min	8-9-10	8-9-11	8-9-11
Sound level (Lo-Mid-Hi)	dB	28-31-37	29-33-38	30-34-39
Dimensions (HxWxD) (Panel)	mm	208x570x570 20x650x650	208x570x570 20x650x650	208x570x570 20x650x650
Weight (Panel)	kg	16.5 3	16.5 3	16.5 3
Pipe size (Liquid/Gas)	mm	6.35/9.52	6.35/9.52	6.35/12.7
Remote controller		Wireless/Wired	Wireless/Wired	Wireless/Wired
Special features		2x2 ceiling size		

* VA: Wired type / VAL: Wireless type

PLA-AA (4-way cassette)

Model name		PLA-RP35AA	PLA-RP50AA	PLA-RP60AA	PLA-RP71AA
Rated capacity	kW	3.5	5.0	6.0	7.1
Fan speed		4 steps	4 steps	4 steps	4 steps
Air volume (Lo-Mid 1-Mid 2-Hi)	m^3/min	11-12-13-14	14-15-16-18	14-15-16-18	15-16-18-20
Sound level (Lo-Mid 1-Mid 2-Hi)	dB	27-28-29-31	28-19-31-33	28-19-31-33	28-30-32-34
Dimensions (HxWxD) (Panel)	mm	258x840x840 30x950x950	258x840x840 30x950x950	258x840x840 30x950x950	258x840x840 30x950x950
Weight (Panel)	kg	24 5	24 5	24 5	24 5
Pipe size (Liquid/Gas)	mm	6.35/12.7	6.35/12.7	9.52/15.88	9.52/15.88
Remote controller		Wireless/Wired	Wireless/Wired	Wireless/Wired	Wireless/Wired
Special features		72 Airflow Patterns / High Ceiling Airflow			

SEZ-KC/KA (Ceiling concealed)

Model name		SEZ-KC25VA	SEZ-KA35VA	SEZ-KA50VA	SEZ-KA60VA
Rated capacity	kW	2.5	3.5	5.0	6.0
Fan speed		2 steps	2 steps	2 steps	2 steps
Air volume (Lo-Hi)	m^3/min	4.8-7.9	10-13	12-17	12-20
Sound level (Lo-Hi)	dB	25-36	30-35	31-39	32-43
External static pressure	Pa	5	30 (Max. 50)	30 (Max. 50)	30 (Max. 50)
Dimensions (HxWxD)	mm	225x790x550	270x1,100x700	270x1,100x700	270x1,100x700
Weight	kg	19	33.5	33.5	33.5
Pipe size (Liquid/Gas)	mm	6.35/9.52	6.35/9.52	6.35/12.7	6.35/15.88
Remote controller		Wired	Wired	Wired	Wired
Special features		Low height			

PEAD-EA/GA (Ceiling concealed)

Model name		PEAD-RP50EA	PEAD-RP60EA	PEAD-RP71EA	PEAD-RP60GA	PEAD-RP71GA
Rated capacity	kW	5.0	6.0	7.1	6.0	7.1
Fan speed		2 steps	2 steps	2 steps	2 steps	2 steps
Air volume (Lo-Hi)	m^3/min	13.5-17	17-21	20-25	16.5-21	20-25
Sound level (Lo-Hi)	dB	36-40	37-41	37-41	35-40 (at 50Pa)	37-41 (at 50Pa)
External static pressure	Pa	30/70	30/70	70 (Option: 130)	10/50/70	10/50/70
Dimensions (HxWxD)	mm	295x935x700	295x1,175x700	325x1,175x740	275x1,171x740	275x1,171x740
Weight	kg	33	42	44	42	42
Pipe size (Liquid/Gas)	mm	6.35/12.7	9.52/15.88	9.52/15.88	9.52/15.88	9.52/15.88
Remote controller		Wired	Wired	Wired	Wired	Wired
Special features		Mid. static pressure				

■ Conditions for all units

Rating conditions (ISO T1)	Cooling	Indoor	DB: 27∞C (80∞F)/WB: 19∞C (66∞F)
		Outdoor	DB: 35∞C (95∞F)/WB: 24∞C (75∞F)
	Heating	Indoor	DB: 20∞C (68∞F)
		Outdoor	DB: 7∞C (45∞F)/WB: 6∞C (43∞F)

7. INSTALLATION

(1) Ventilation and service space (Outdoor Unit)

• Windy location installation

When installing the outdoor unit on a rooftop or other location unprotected from the wind, situate the air outlet of the unit so that it is not directly exposed to strong winds.
Strong wind entering the air outlet may impede the normal airflow and a malfunction may result.
The following shows three examples of precautions against strong winds.

(1) Face the air outlet towards the nearest available wall about 50 cm away from the wall. (Fig. 1)
(2) Install an optional air outlet guide and air guide if the unit is installed in a location where strong winds from a typhoon, etc. may directly enter the air outlet. (Fig. 2)
   Ⓐ Air outlet guide
(3) Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible. (Fig. 3)
   Ⓑ Wind direction

• When installing a single outdoor unit

Minimum dimensions are as follows, except for Max., meaning Maximum dimensions, indicated.
Refer to the figures for each case.

(1) Obstacles at rear only (Fig. 4)
(2) Obstacles at rear and above only (Fig. 5)
(3) Obstacles at rear and sides only (Fig. 6)
(4) Obstacles at front only (Fig. 7)
   * When using an optional air outlet guide, the clearance is 500 mm or more.
(5) Obstacles at front and rear only (Fig. 8)
   * When using an optional air outlet guide, the clearance is 500 mm or more.
(6) Obstacles at rear, sides, and above only (Fig. 9)
   * Do not install the optional air outlet guides for upward airflow.

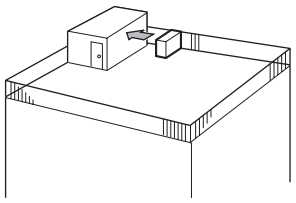


Fig. 1

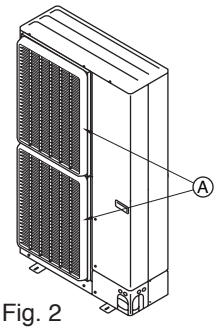


Fig. 2

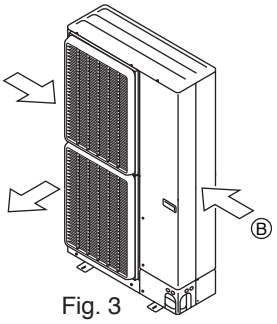


Fig. 3

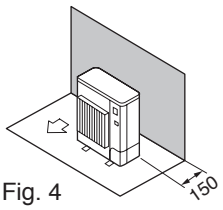


Fig. 4

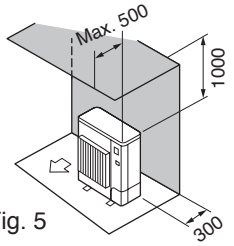


Fig. 5

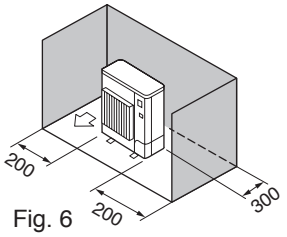


Fig. 6

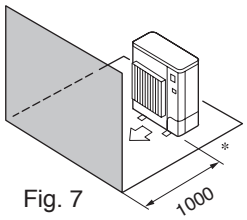


Fig. 7

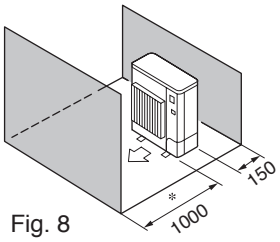


Fig. 8

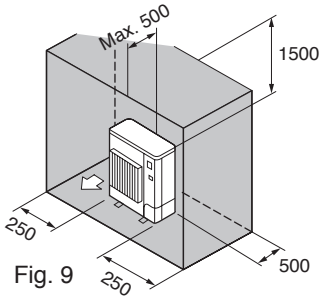


Fig. 9

• When installing multiple outdoor units

Leave a 10 mm space or more between the units.

(1) Obstacles at rear only (Fig. 10)

(2) Obstacles at rear and above only (Fig. 11)

* No more than three units must be installed side by side.
In addition, leave space as shown.

* Do not install the optional air outlet guides for upward airflow.

(3) Obstacles at front only (Fig. 12)

When using an optional air outlet guide, the clearance is 1000 mm or more.

(4) Obstacles at front and rear only (Fig. 13)

When using an optional air outlet guide, the clearance is 1000 mm or more.

(5) Single parallel unit arrangement (Fig. 14)

When using an optional air outlet guide installed for upward airflow, the clearance is 500 (1000) mm or more.

(6) Multiple parallel unit arrangement (Fig. 15)

When using an optional air outlet guide installed for upward

(7) Stacked unit arrangement (Fig. 16)

* The units can be stacked up to two units high.

* No more than two stacked units must be installed side by side.
In addition, leave space as shown.

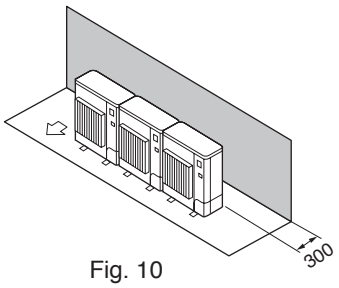


Fig. 10

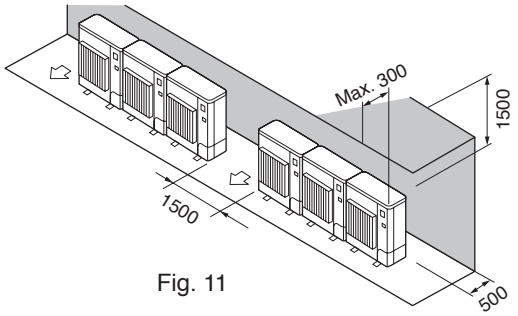


Fig. 11

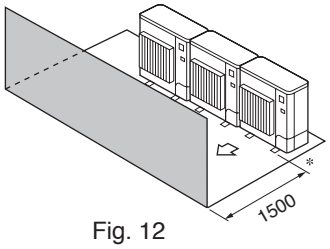


Fig. 12

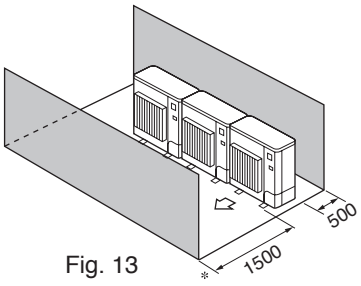


Fig. 13

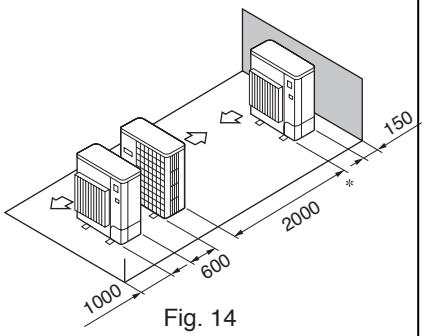


Fig. 14

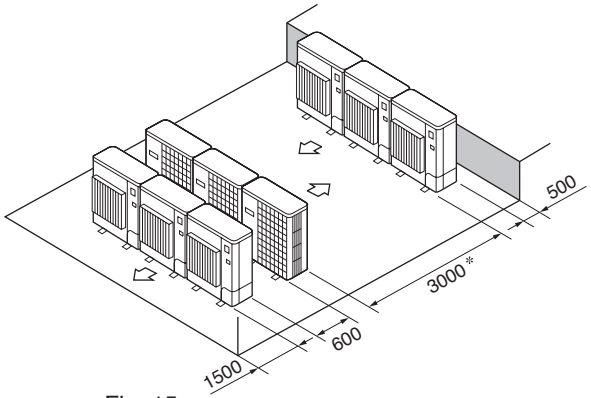


Fig. 15

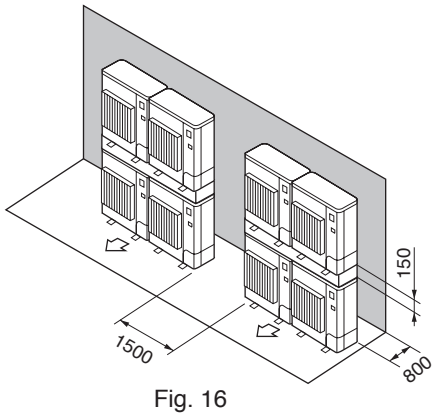


Fig. 16

(2) Space required for installation and servicing (Branch Box)

- **Front view** (Fig. 1)
  - Ⓐ Branch box
  - Ⓑ On the side of piping
- **Side view** (Fig. 2, 3)
  - Ⓒ For indoor installations
  - Ⓓ Ceiling board
  - Ⓔ Maintenance hole
  - Ⓕ PCB side

*1: A minimum radius of 350 mm is required for 90˚ bends in refrigerant piping.

*2: A is "Min. 200 mm" <recommendation>.
(Premise: The slope of drain piping is securable 1/100 or more. Required 200 mm or more, when not securable.)
In the case of less than 200 mm (for example A is 100 mm), the exchange work of Branch box from a maintenance hole becomes difficult (Only exchange work of a PCB, linear expansion valve coils, sensors and drain pan is possible).

*3: B is " □600" <recommendation>.
In the case of " □450", prepare a maintenance hole at a PCB side (as it is shown in Fig. 3), and "Min. 300 mm" is needed as distance A .
In the case of less than 300 mm (for example A is 100 mm), the exchange work of Branch box, linear expansion valve coils, sensors, and drain pan from a maintenance hole becomes difficult (Only exchange work of a PCB is possible).

- **Top View** (Fig. 4)
  - Ⓖ Refrigerant piping
  - Ⓗ When facing in the opposite direction to the refrigerant piping.

(3) Refrigerant piping

Always follow the specifications written in the installation manual of the outdoor unit. Exceeding these requriements may cause reduced performance of the equipment, and malfunctions.

(4) Mounting the branch box

1) Install the suspension bolts (procure locally) at the specified pitch.
2) Fit the washers and nuts (①, ②, procure locally) to the suspension bolts. (Fig. 5)
3) Hang the unit on the suspension bolts.

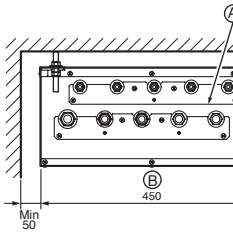


Fig. 1

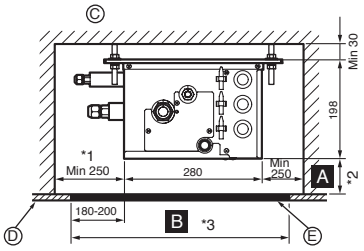


Fig. 2

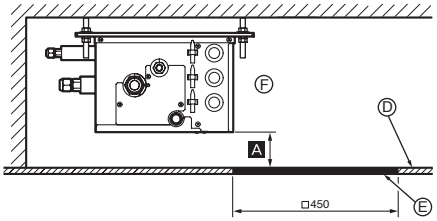


Fig. 3

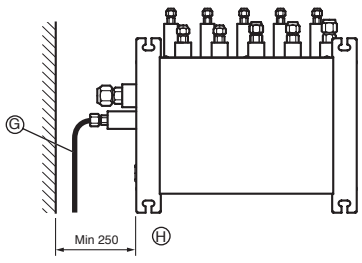
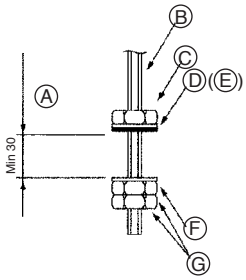


Fig.4



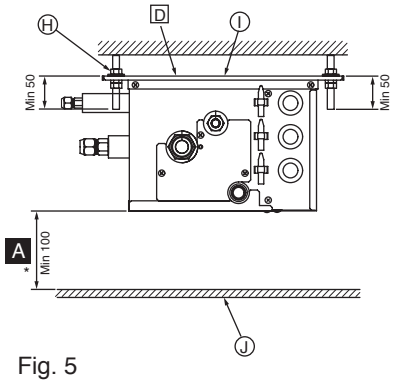


Fig. 5

4) Fully tighten the nuts (check ceiling height).
5) Use a level to adjust the branch box to the horizontal.

Ⓐ When unit is hung and nuts tightened
Ⓑ Suspension bolt
Ⓒ Nuts
Ⓓ Washer (with cushion) ①
Ⓔ Ensure that cushion faces downwards
Ⓕ Washer (without cushion) ②
Ⓖ Nut (procure locally)
Ⓗ Suspension bolt
Ⓘ Ensure that this face is always installed upwards.
Ⓙ Ceiling board.

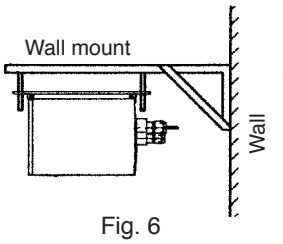
Note:
Refer to "**(2)**" on page 20.

⚠Caution:
- Always install the unit horizontally.
- This unit may be installed suspended from the ceiling.
- This unit may only be installed vertically, as shown in the diagram. (Side D in Fig. 5 is facing up.)
- Incorrect installation may result in the drain overflowing.

(5) Installing refrigerant piping

♦Connect the liquid and gas pipes of each indoor unit to the same end connection numbers as indicated on the indoor unit flare connection section of each Branch Box. If connected to wrong end connection numbers, it doesn't work normally. (Fig. 7)

♦When connecting indoor units, make sure to connect refrigerant pipes and connection wires to the appropriate connection ports marked with matching alphabets. (Ex. A, B, C, D, E)



* Purchase an appropriate bracket locally if the unit is to be mounted on a wall.

Fig. 6

Ⓐ Flare cutting dimensions Ⓑ Flare nut tightening torque

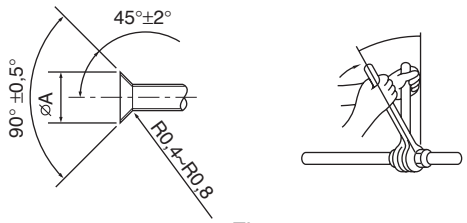


Fig. 7

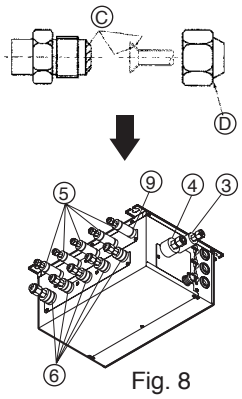


Fig. 8

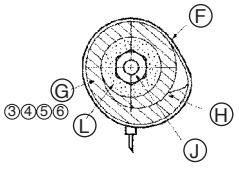


Fig. 9

Ⓐ Flare cutting dimensions
Table-1

Copper pipe O. D. (mm)	Flare dimensions ø A dimensions (mm)
ø6.35	8.7 ~ 9.1
ø9.52	12.8 ~ 13.2
ø12.7	16.2 ~ 16.6
ø15.88	19.3 ~ 19.7

Ⓑ Flare nut tightening torque
Table-2

Copper pipe O. D. (mm)	Flare nut O. D. (mm)	Tightening torque (N•m)*
ø6.35	17	14 ~ 18
ø6.35	22	34 ~ 42
ø9.52	22	34 ~ 42
ø12.7	26	49 ~ 61
ø12.7	29	68 ~ 82
ø15.88	29	68 ~ 82□
ø15.88	36	100 ~ 120

* (N•m) ≒10kgf•cm

Note:

Be sure to mark all the local refrigerant piping (liquid pipes, gas pipes, etc.) for each indoor unit designating clearly which room it belongs in. (Ex. A, B, C, D, E)

- ♦ List indoor unit model names in the name plate on the control box of Branch Box (for identification purposes).
- ♦ To prevent water dripping from the refrigerant piping, install sufficient thermal insulation.
- ♦ When using commercially available refrigerant piping, ensure that both liquid and gas piping are wrapped with commercially available thermal insulation materials (insulation materials at least 12 mm thick and able to withstand temperatures in excess of 100˚C).
- ♦ Refer to the installation manual of the outdoor unit when creating a vacuum and opening or closing valves.

1) Remove the flared nuts and caps from the branch box.
2) Flare the ends of the liquid and gas piping, and apply refrigeration oil (procure locally) to the flared seat.
3) Connect the refrigerant piping immediately. Always tighten the flared nuts to the torque specified in the table below using a torque wrench and double spanner.
4) Press the pipe covers ③ and ⑤ on the liquid piping against the unit and wrap to hold in place. (Fig. 8)
5) Press the pipe covers ④ and ⑥ on the gas piping against the unit and wrap to hold in place. (Fig. 8)
6) Apply the supplied bands ⑨ at a position 10 ~ 20 mm from each end of the pipe covers (③④⑤⑥).
7) If the indoor unit is not connected, fit the supplied pipe covers (with caps, ⑦ and ⑧) to the branch box refrigerant piping connections to prevent condensation dripping from the pipes.
8) Clamp the pipe covers (⑦⑧) in place with the supplied bands ⑨.

⚠Caution:

Tighten the flare nut with a torque wrench in the specified method.

Overtightening will cause the flare nut to crack and it will cause refrigerant leakage over a period of time.

Ⓒ Apply refrigeration oil to the entire surface of the flared seat. (Fig. 8)

Ⓓ Basically use flared nuts fitted to the body (commercially available flared nuts may crack).

Note:

A special nut (optional or in the indoor unit accessory) needs to be purchased about some indoor units. Please refer to the installation manual of outdoor unit for details.

Ⓔ Section of connection (Fig. 9)

Ⓕ Band ⑨

Ⓖ Pipe covers ③④⑤⑥

Ⓗ Tighten

Ⓘ Thermal insulation for refrigerant piping

Ⓙ Refrigerant piping

In order to prevent gas leaks, tighten the flared nuts to the specified torque before fitting the pipe covers (⑦⑧). (Fig. 10) (Table-2)

- ♦ Refrigerant charge:
  Refer to the installation manual of the outdoor unit.
  Use only R410A refrigerant (use of other refrigerants may cause troubles).
- ♦ Use the following procedures for indoor connection part which indoor unit is not connected.

1) Tighten flared nuts (see Table-1, -2) to prevent refrigerant leaks.
2) Fit pipe covers ⑦⑧ to pipes with bands ⑨ to prevent condensation.

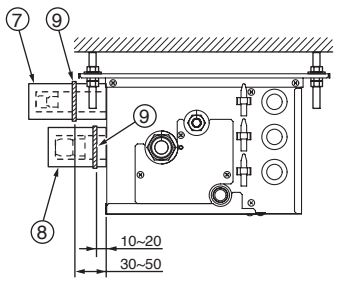


Fig.10

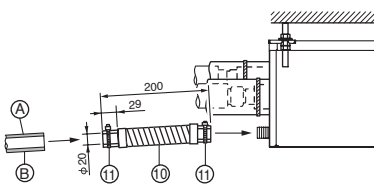


Fig. 11

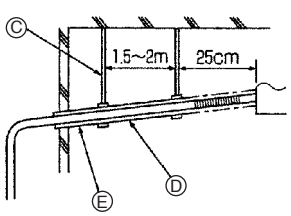


Fig. 12

(6) Installing drain piping

- To ensure that the drain piping has a down-gradient (greater than 1/100), do not make traps or humps in piping.
- Install thermal insulation to prevent condensation dripping.
- Ensure that the horizontal length (not diagonal length) of drain piping does not exceed 20 m. If the drain piping extends over a significant distance, install supports to ensure that the piping does not sag. Do not fit air bleed pipes under any circumstances (water may exit from air bleed pipes).
- Do not fit odor traps at drain piping outlets.
- Install drain outlets in locations where odors will not present problems.
- Do not place drain piping directly in drains which may contain sulfurous gases.
- Drain piping may be installed in any direction provided the above requirements are followed.
- Keep bends of attached drain hose to a maximum of 45°.

1) Apply PVC adhesive (procure locally) to the drain connection on the branch box and push the attached drain hose ⑩ onto the connection as far as it will go. (Fig. 11)
2) Insert a hard PVC pipe (VP-16, procure locally) into the attached drain hose ⑩ and glue it together and fix it. (Fig. 11)
   Ⓐ VP-16 procured locally
   Ⓑ Thermal insulation
3) Fit a band A to the attached drain hose ⑩. (Fig. 11)
4) Ensure that the drain piping down-gradient is greater than 1/100. (Fig. 12)
   Ⓒ Supports
   Ⓓ Down-gradient greater than 1/100.
   Ⓔ Thermal insulation

(7) Electrical work

♦Cautions for electrical work.

⚠ Warning:

- Always use dedicated circuits with breakers, and at the rated voltage.
  Power supply circuits with insufficient capacity, and bad workmanship during installation, may result in electric shock or fire.
- Always ensure that electrical wiring inlets are sealed when the branch box is installed outdoors.
  Rainwater on the terminal blocks may result in fire or malfunction.

⚠ Caution:

- Be sure to establish an earth. Do not earth the unit to a utility pipe, arrester, or telephone earth.
  Incomplete earth may cause electrical shock. A high surge current from lightning or other sources may cause damage to the air conditioner.
- Use the specified electrical wiring and ensure that it is connected properly, and that it is not under tension.
  Failure to follow these requirements may result in broken wiring, heating, or fire.

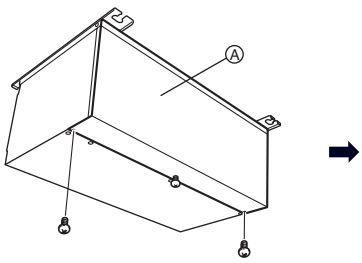


Fig. 13

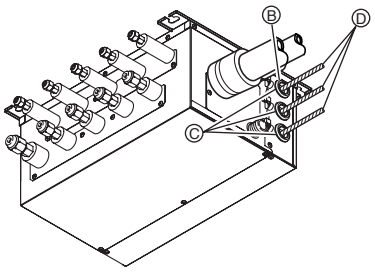


Fig. 14

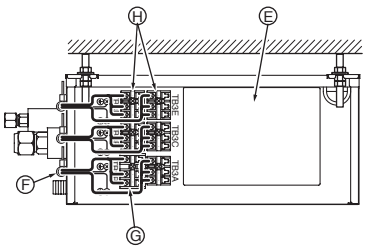


Fig. 15

♦ Wiring connecting branch box and outdoor unit, and branch box and indoor units, functions as both power supply and signal cable. Connect this wiring in accordance with the terminal block numbers to ensure correct polarity.
♦ Ensure that the appropriate refrigerant piping and electrical wiring are connected to each indoor unit. Incorrect wiring will interfere with the correct operation of the unit.
♦ Connect refrigerant pipes and connection wires to the appropriate ports marked with matching alphabets (Ex. A, B, C, D, E) on this unit.
♦ Always fix each ground wire separately with a ground screw.
♦ To prevent that wiring installed in the ceiling is chewed by rats etc., it should be installed in wiring conduit.

1) Remove the screws in the cover. (Fig. 13)
2) Remove the cover.
3) Pass the wiring into the branch box. (Fig. 14)
4) Fix each wire in place with a wiring clamp. (Fig. 15)
5) Firmly connect each wire to the appropriate terminal block. (Fig. 15)
6) Replace the cover.
7) When the branch box is installed outdoors, ensure that the wiring inlets are sealed with putty to prevent entry of rainwater. (Fig. 14)

Ⓐ Electric cover
Ⓑ 3-Bush
Ⓒ Seal
Ⓓ Wiring
Ⓔ BC controller
Ⓕ Band
Ⓖ Terminal block: TB2B <To outdoor unit> ϕ1.6 ~ ϕ2.0
Ⓗ Terminal block: TB3A-TB3E <To indoor unit> ϕ1.6

(7)-1 When using wiring conduit (Fig. 16)

Replace the horizontal cover when the wiring conduit has been fixed in place.

Ⓐ Cover
Ⓑ Wiring conduit
Ⓒ Washer
Ⓓ Nut
Ⓔ Wiring conduit

Wiring conduit of up to 1" OD may be used.

1) When using 1" OD wiring conduit, remove the bush and fix to the branch box. Remove the horizontal cover while fixing to the branch box.
2) When using wiring conduit of 3/4" OD or smaller, notch the bush and insert the wiring conduit approximately 100 mm into the branch box.
   * Replace the horizontal cover when the wiring conduit has been fixed in place.

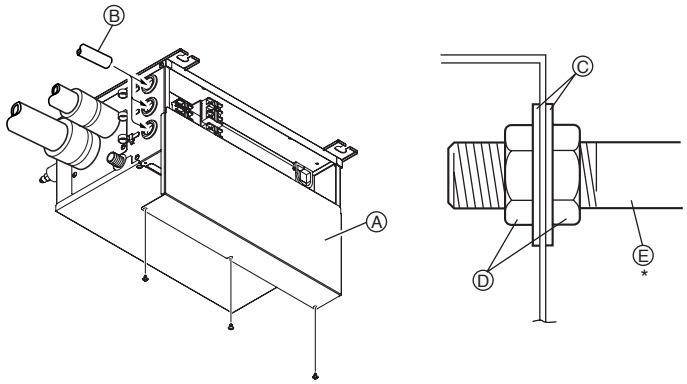


Fig. 16

(7)-2 External wiring procedure (Fig. 17)

Ⓔ Power supply: Single phase 220/230/240 V, 50 Hz 220 V, 60 Hz

Note:

① Power supply input: Outdoor unit only. Connect the lines (C), (D) in accordance with the terminal block names to ensure correct polarity.

② As for lines (C), S1 and S2 are for connecting the power source.
And S2 and S3 are for signals. S2 is a common cable for the power source and signal.

Wire diameter				Breaker	
(A) Main power line	(B) Earth line	(C) Signal line *1	(D) Signal line *1	Interrupting current	Performance characteristic
6.0mm2	6.0mm2	2.5mm2	2.5mm2	40A	40A, 30mA for 0.1 sec. or less

When using twisted for the wiring, the use of round terminal is required.

*1 The figures are NOT always against the ground.
S3 terminal has DC 24 V against S2 terminal. However between S3 and S1, these terminals are not electrically insulated by the transformer or other device.

Notes:

1. Wiring size must comply with the applicable local and national code.
2. Power supply cords and Indoor unit/ Branch box/Outdoor unit connecting cords shall not be lighter than polychloroprene sheathed flexible cord. (Design 245 IEC 57)
3. Install an earth line longer than power cables.

Important

Make sure that the current leakage breaker is one compatible with higher harmonics.
Always use a current leakage breaker that is compatible with higher harmonics as this unit is equipped with an inverter.
Not using occur an incorrect operation of a breaker.

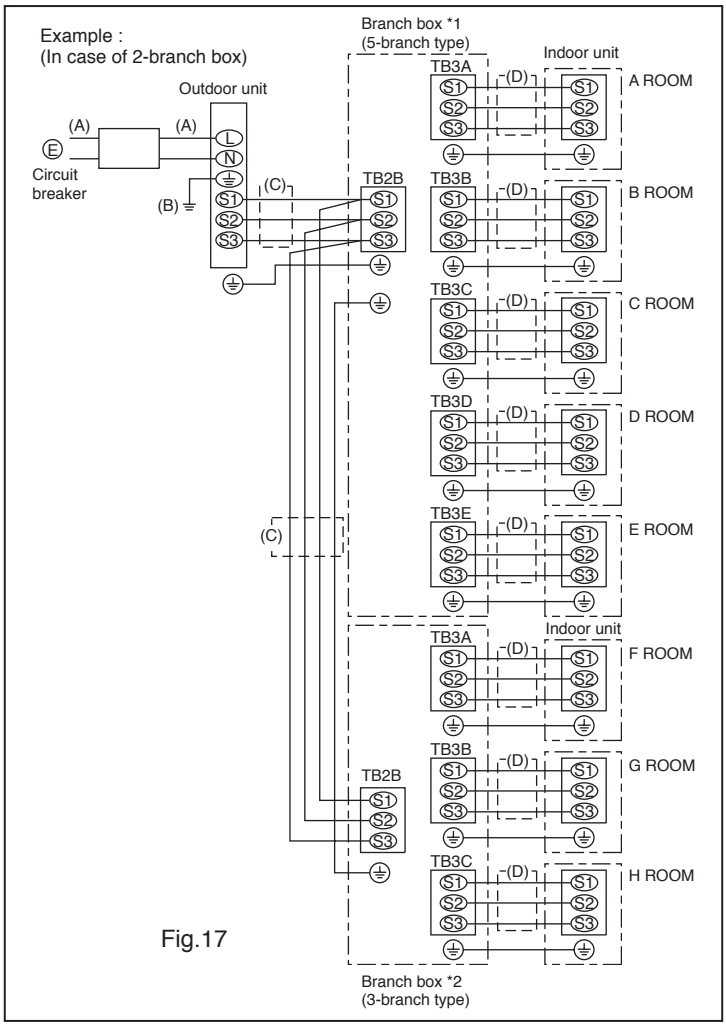


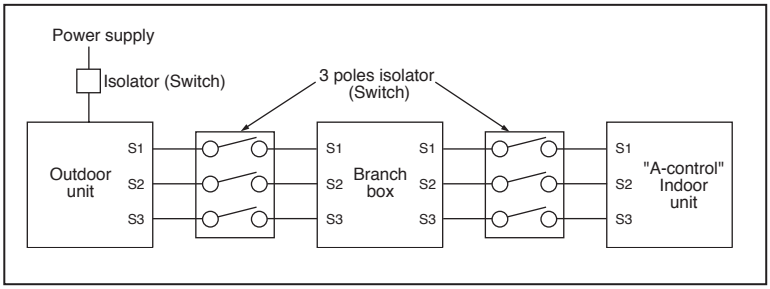
Fig.17

⚠ Warning:

In case of A-control wiring, there is high voltage potential on the S3 terminal caused by electrical circuit design that has no electrical insulation between power line and communication signal line. Therefore, please turn off the main power supply when servicing. And do not touch the S1, S2, S3 terminals when the power is energized. If isolator should be used between outdoor unit and branch box/indoor unit and branch box, please use 3-poles type.

Caution

After usng isolator, be sure to turn off and on the main power supply to reset the system. If don't do so, it may become impossible for outdoor unit to recognize the system of branch box or indoor unit.

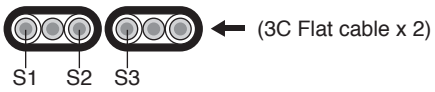


Wiring Specifications

(Outdoor-Branch box connecting cable)

Cross section of cable	Wire size (mm^2)	Number of wires	Polarity	L(m) *6
Round 	2.5	3	Clockwise : S1-S2-S3 *Pay attention to stripe of yellow and green	(50) *2
Flat 	2.5	3	Not applicable (Because center wire has no cover finish)	Not applicable *5
Flat 	1.5	4	From left to right : S1-Open-S2-S3	(45) *3
Round 	2.5	4	Clockwise : S1-S2-S3-Open *Connect S1 and S3 to the opposite angle	(55) *4

*1 : Power supply cords of appliances shall not be lighter than design 245 IEC or 227 IEC.
*2 : In case that cable with stripe of yellow and green is available.
*3 : In case of regular polarity connection (S1-S2-S3), wire size is 1.5 mm^2.
*4 : In case of regular polarity connection (S1-S2-S3).
*5 : In the flat cables are connected as this picture, they can be used up to 55 m.
*6 : Mentioned cable length is just a reference value.
It may be different depending on the condition of installation, Humidity or materials, etc.

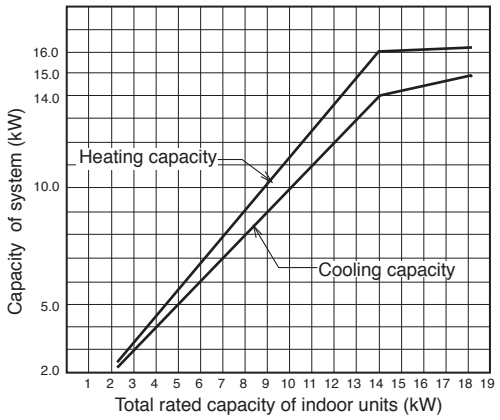


Be sure to connect the outdoor-branch box/indoor-branch box connecting cables directly to the units (no intermediate connections).
Intermediate connections can lead to communication errors if water enters the cables and causes insufficient insulation to ground or a poor electrical contact at the intermediate connection point.
(If an intermediate connection is necessary, be sure to take measures to prevent water from entering the cables.)

8. CAPACITY CALCULATION

(1) Method for obtaining system capacity

To obtain the system capacity, first add up the ratings of all the indoor units connected and then find the standard capacity with the help of the figures below.



Capacity of system

Note:
Cooling capacity is based on; indoor temperature 27˚CDB, 19.0˚CWB, outdoor temperature 35˚CDB.
Heating capacity is based on; indoor temperature 20˚CDB, outdoor temperature 7˚CDB.
The rated capacities above show the rise in the total indoor unit capacity when operating frequency is constant.
Values for changes in capacity are fixed after accounting for variations in operating frequency and should be used as reference values.

(2) Method for obtaining capacity of each indoor uniit

$$\text{The capacity of each indoor unit (kW)} = \text{The capacity of system obtained in "(1)"} \times \frac{\text{Rated capacity of the indoor unit in question}}{\text{Total rated capacity of all indoor units}}$$

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