MITSUBISHI ELECTRIC

Installation manual for the mixed system of M/S/P series indoor units and CityMulti indoor units.

Refer to this manual for restrictions on mixed systems of M/S/P series indoor units that are connected to branch boxes and CityMulti indoor units that are not connected to branch boxes.
For unit-specific information, such as precautions regarding refrigerant handling, piping installation, and electrical wiring, refer to the installation manual for the units.

1. Connectable indoor unit numbers and capacities

You should note that indoor units that can be connected to this outdoor unit are the following models.

- Indoor units with model numbers 15-140 (PUMY-P112:15-125) can be connected. Refer to the table 1 for possible room, indoor unit combinations.

Verification

The rated capacity should be determined by observing the table 1. The unit's quantities are limited as shown in the following table 2. For the next step, make sure that the total rated capacity selected will stay in a range of 50% - 130% of the outdoor unit capacity.

- PUMY-P112 6.3 - 16.2 kW
- PUMY-P125 7.1 - 18.2 kW
- PUMY-P140 8.0 - 20.2 kW

Table 1-1 CityMulti indoor units (PLFY, PMFY, PEFY, PCFY and PKFY series)

Indoor unit type	P15	P20	P25	P32	P40	P50	P63	P71	P80	P100	P125	P140
Rated capacity (Cooling) (kW)	1.7	2.2	2.8	3.6	4.5	5.6	7.1	8.0	9.0	11.2	14.0	16.0

Table 1-2 M series (MSZ, MFZ, MLZ), P series (PLA, PCA, PEAD), S series (SEZ, SLZ) via Branch BOX.

Indoor unit type	15	18	20	22	25	35	42	50	60	71	80	100
Rated capacity (Cooling) (kW)	1.5	1.8	2.0	2.2	2.5	3.5	4.2	5.0	6.0	7.1	8.0	10.0

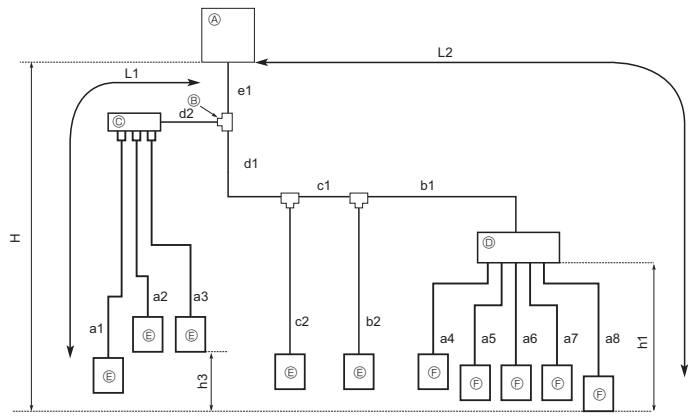
Combinations in which the total capacity of indoor units exceeds the capacity of the outdoor unit will reduce the cooling capacity of each indoor unit below their rated cooling capacity. Thus, combine indoor units with an outdoor unit within the outdoor unit's capacity, if possible.

Table 2 Connectable indoor units quantities

Model	One Branch box		Two Branch boxes	
	via Branch BOX	CityMulti indoor units	via Branch BOX	CityMulti indoor units
PUMY-P112	Max.5	Max.5	Max.7	Max.3
			Max.8	Max.2
PUMY-P125			Max.8	Max.3
PUMY-P140				

2. Pipe length and height difference

2-1. In case of using 1-Branch box

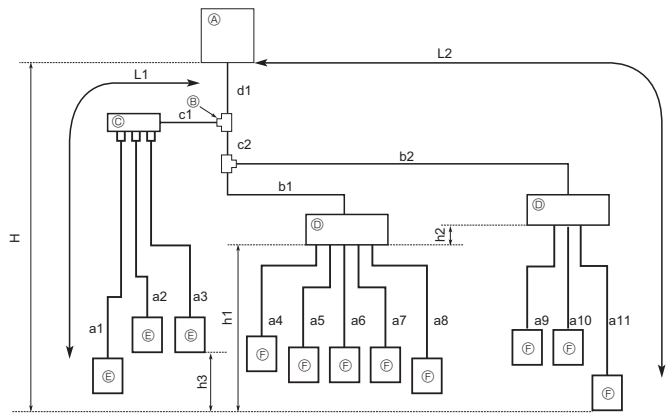


Ⓐ Outdoor Unit
Ⓑ First joint
Ⓒ Branch header (CMY)
Ⓓ Branch box (PAC-MK30/50)
Ⓔ CityMulti Indoor unit
Ⓕ M/S/P series Indoor unit

Permissible length (One-way)	Total piping length	e1 + d1 + d2 + c1 + c2 + b1 + b2 + a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 ≦ 300 m
	Farthest piping length (L1)	e1 + d2 + a1 or e1 + d1 + c1 + b2 ≦ 85 m
	Farthest piping length. Via Branch box (L2)	e1 + d1 + c1 + b1 + a8 ≦ 80 m
	Piping length between outdoor unit and branch box	e1 + d1 + c1 + b1 ≦ 55 m
	Farthest piping length from the first joint	d1 + c1 + b1 or d1 + c1 + b2 ≦ 30 m
	Farthest piping length after branch box	a8 ≦ 25 m
	Total piping length between branch boxes and indoor units	a4 + a5 + a6 + a7 + a8 ≦ 95 m
Permissible height difference (One-way)	In indoor/outdoor section (H)*1	H ≦ 50 m (In case of outdoor unit is set higher than indoor unit)
		H ≦ 40 m (In case of outdoor unit is set lower than indoor unit)
	In branch box/indoor unit section (h1)	h1 ≦ 15 m
	In each indoor unit (h3)	h3 ≦ 12 m
Number of bends		|e1 + d2 + a1|, |e1 + d2 + a2|, |e1 + d2 + a3|, |e1 + d1 + c2|, |e1 + d1 + c1 + b2|, |e1 + d1 + c1 + b1 + a4|, |e1 + d1 + c1 + b1 + a5|, |e1 + d1 + c1 + b1 + a6|, |e1 + d1 + c1 + b1 + a7|, |e1 + d1 + c1 + b1 + a8|

*1: Branch box should be placed within the level between the outdoor unit and indoor units.

2-2. In case of using 2-Branch boxes



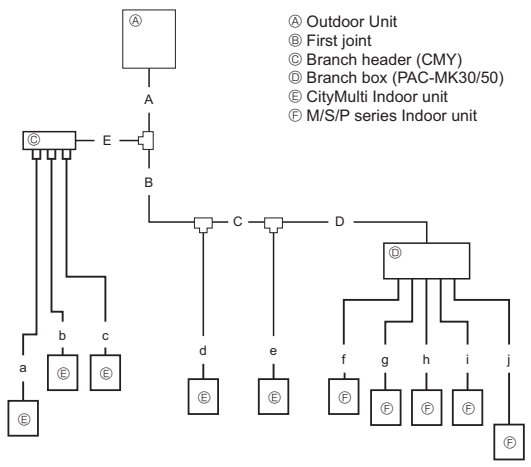
Ⓐ Outdoor Unit
Ⓑ First joint
Ⓒ Branch header (CMY)
Ⓓ Branch box (PAC-MK30/50)
Ⓔ CityMulti Indoor unit
Ⓕ M/S/P series Indoor unit

Permissible length (One-way)	Total piping length	d1 + c1 + c2 + b1 + b2 + a1 + a2 + a3 + a4 + a5 + a6 + a7 + a8 + a9 + a10 + a11 ≦ 240 m
	Farthest piping length (L1)	d1 + c1 + a1 ≦ 85 m
	Farthest piping length. Via Branch box (L2)	d1 + c2 + b2 + a11 ≦ 80 m
	Piping length between outdoor unit and branch boxes	d1 + c2 + b1 + b2 ≦ 55 m
	Farthest piping length from the first joint	c2 + b2 or c1 + a1 ≦ 30 m
	Farthest piping length after branch box	a11 ≦ 25 m
	Farthest branch box from outdoor unit	d1 + c2 + b2 ≦ 55 m
	Total piping length between branch boxes and indoor units	a4 + a5 + a6 + a7 + a8 + a9 + a10 + a11 ≦ 95 m
Permissible height difference (One-way)	In indoor/outdoor section (H)*1	H ≦ 50 m (In case of outdoor unit is set higher than indoor unit)
		H ≦ 40 m (In case of outdoor unit is set lower than indoor unit)
	In branch box/indoor unit section (h1)	h1 + h2 ≦ 15 m
	In each branch unit (h2)	h2 ≦ 15 m
	In each indoor unit (h3)	h3 ≦ 12 m
Number of bends		|d1 + c1 + a1|, |d1 + c1 + a2|, |d1 + c1 + a3|, |d1 + c2 + b1 + a4|, |d1 + c2 + b1 + a5|, |d1 + c2 + b1 + a6|, |d1 + c2 + b1 + a7|, |d1 + c2 + b1 + a8|, |d1 + c2 + b2 + a9|, |d1 + c2 + b2 + a10|, |d1 + c2 + b2 + a11| ≦ 15 m

*1: Branch box should be placed within the level between the outdoor unit and indoor units.

3. Selecting pipe size

3-1. System pipe size



Ⓐ Outdoor Unit
Ⓑ First joint
Ⓒ Branch header (CMY)
Ⓓ Branch box (PAC-MK30/50)
Ⓔ CityMulti Indoor unit
Ⓕ M/S/P series Indoor unit

Pipe size

A,B,C,D,E

	A liquid pipe	B Gas pipe
PUMY-P112-140	ø9.52	ø15.88

a,b,c~j

Indoor unit series	Model number	A liquid pipe	B Gas pipe
CityMulti	15~50	ø6.35	ø12.7
	63~140	ø9.52	ø15.88
M series or S series	15~42	ø6.35	ø9.52
	50	ø6.35	ø12.7
	60	ø6.35	ø15.88
	71~80	ø9.52	ø15.88
P series	35, 50	ø6.35	ø12.7
	60~100	ø9.52	ø15.88

2-branch joint	CMY-Y62-G-E
4-branch header	CMY-Y64-G-E
4-branch header	CMY-Y68-G-E

Piping preparation

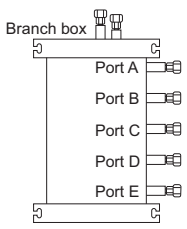
① Table below shows the specifications of pipes commercially available.

Outside diameter	Insulation thickness	Insulation material
mm	mm	
6.35	15	Heat resisting foam plastic 0.045 specific gravity
9.52	15	
12.7	15	
15.88	15	

② Ensure that the 2 refrigerant pipes are insulated to prevent condensation.
③ Refrigerant pipe bending radius must be 100 mm or more.

⚠ Caution:
Be sure to use the insulation of specified thickness. Excessive thickness may cause incorrect installation of the indoor unit and branch box, and lack of thickness may cause dew drippage.

3-2. Branch box pipe size



(1)Valve size for outdoor unit

For liquid	ø9.52 mm
For gas	ø15.88 mm

(2)Valve size for branch box

Ⓐ UNIT	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
Ⓑ UNIT	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
Ⓒ UNIT	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
Ⓓ UNIT	Liquid pipe	ø6.35 mm
	Gas pipe	ø9.52 mm
Ⓔ UNIT	Liquid pipe	ø6.35 mm
	Gas pipe	ø12.7 mm

* 3-branch type : only Ⓐ, Ⓑ, Ⓒ unit

Different-diameter joint (optional parts)

Model name	Connected pipes diameter	Diameter A	Diameter B
	mm	mm	mm
MAC-A454JP	ø9.52 → ø12.7	ø9.52	ø12.7
MAC-A455JP	ø12.7 → ø9.52	ø12.7	ø9.52
MAC-A456JP	ø12.7 → ø15.88	ø12.7	ø15.88
PAC-493PI	ø6.35 → ø9.52	ø6.35	ø9.52
PAC-SG76RJ-E	ø9.52 → ø15.88	ø9.52	ø15.88

2-branch pipe (Joint) : Optional parts (According to the connection method, you can choose the favorite one.)

Model name	Connection method
MSDD-50AR-E	flare
MSDD-50BR-E	brazing

4. Additional refrigerant charge

Additional refrigerant charge

Refrigerant for the extended piping is not included in the outdoor unit when the unit is shipped from the factory. Therefore, charge each refrigerant piping system with additional refrigerant at the installation site. In addition, in order to carry out service, enter the size and length of each liquid pipe and additional refrigerant charge amounts in the spaces provided on the "Refrigerant amount" plate on the outdoor unit.

Calculation of additional refrigerant charge

- Calculate the additional charge using the liquid pipe size and length of the extended piping and total capacity of connected indoor units.
- Calculate the additional refrigerant charge using the procedure shown to the right, and charge with the additional refrigerant.
- For amounts less than 0.1 kg, round up the calculated additional refrigerant charge. (For example, if the calculated charge is 6.01 kg, round up the charge to 6.1 kg.)

<Additional Charge>

Calculation of refrigerant charge

Pipe size Liquid pipe		Pipe size Liquid pipe		Total capacity of connected indoor units	Amount for the indoor units
ø6.35	+	ø9.52	+	~ 8.0 kW	1.5 kg
(m) × 19.0 (g/m)		(m) × 50.0 (g/m)		8.1 ~ 16.0 kW	2.5 kg
				16.1 kW ~	3.0 kg

Included refrigerant amount when shipped from the factory

Included refrigerant amount
4.8 kg

<Example>
Outdoor model : P125
Indoor 1 : P63 (7.1 kW) A : ø9.52 30 m a : ø9.52 15 m
2 : P40 (4.5 kW) b : ø6.35 10 m
3 : P25 (2.8 kW) c : ø6.35 10 m
4 : P20 (2.2 kW) d : ø6.35 20 m
} At the conditions below:
The total length of each liquid line is as follows:
ø9.52 : A + a = 30 + 15 = 45 m
ø6.35 : b + c + d = 10 + 10 + 20 = 40 m
The total capacity of connected indoor unit is as follows:
7.1 + 4.5 + 2.8 + 2.2 = 16.6
<Calculation example>
Additional refrigerant charge

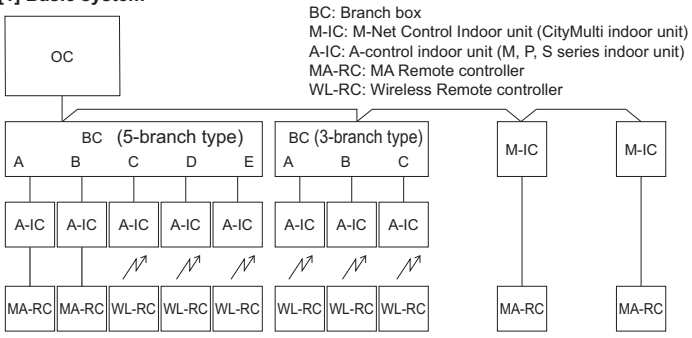
$$40 \times \frac{19.0}{1000} + 45 \times \frac{50.0}{1000} + 3.0 = 6.1 \text{ kg (rounded up)}$$

5. Electrical work

5-1. System chart

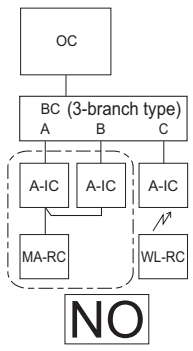
[1] Basic system

OC: Outdoor unit
BC: Branch box
M-IC: M-Net Control Indoor unit (CityMulti indoor unit)
A-IC: A-control indoor unit (M, P, S series indoor unit)
MA-RC: MA Remote controller
WL-RC: Wireless Remote controller

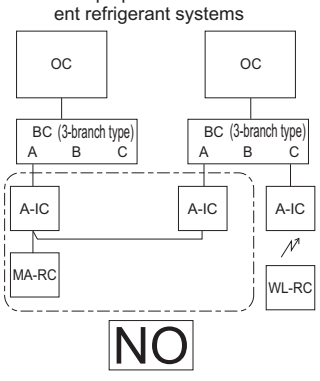


[2] Incorrect systems

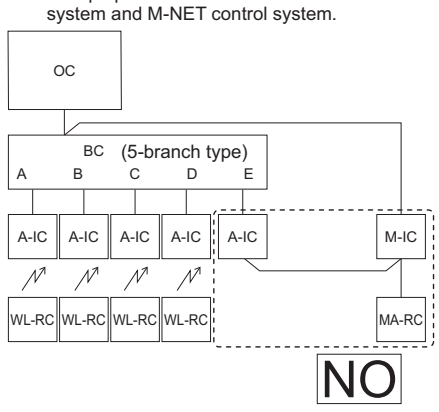
3-1. Group operation by single remote controller



3-2. Group operation between different refrigerant systems

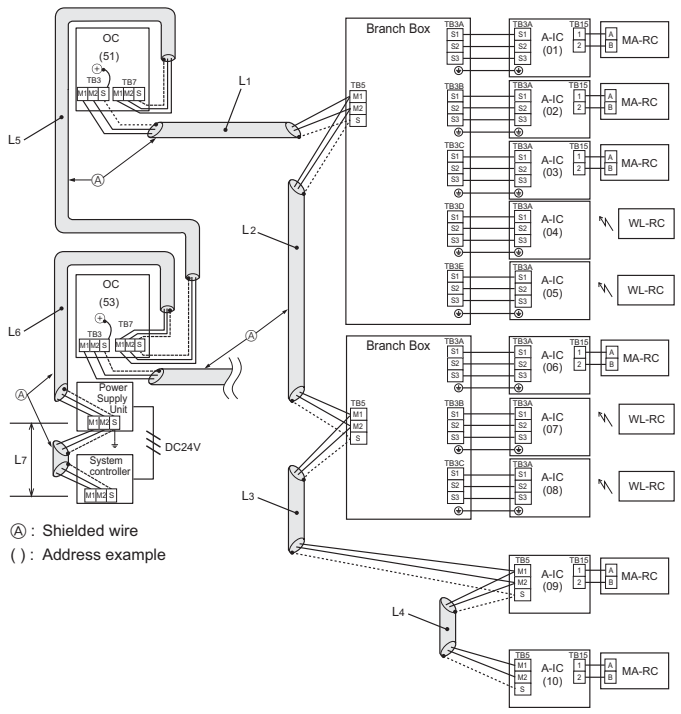


3-3. Group operation between A-control system and M-NET control system.



3-1. Plural indoor units cannot be operated by a single remote controller.
3-2. Different refrigerant systems cannot be connected together.
3-3. Different types control systems (A-IC/M-IC) cannot be connected together.

5-2. Branch box/outdoor wire connection and outdoor power supply cord connection



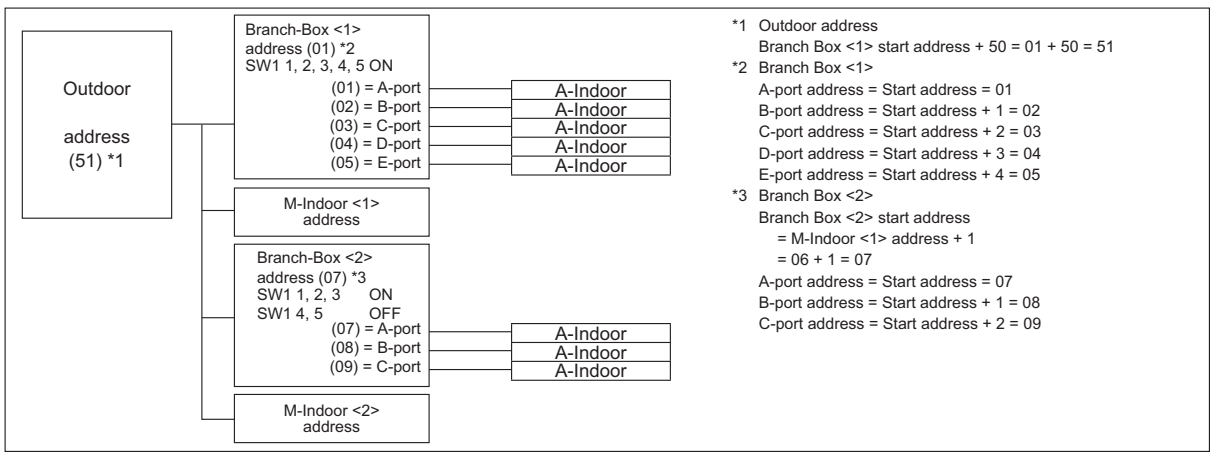
<Permissible length>
Longest length via outdoor units:
$L_1 + L_2 + L_3 + L_4 + L_5 + L_6 + L_7 \leqq 500$ m (1640 ft.) (1.25 mm² or more)
Longest transmission cable length:
$L_1 + L_2 + L_3 + L_4, L_5, L_5 + L_6, L_7 \leqq 200$ m (656 ft.) (1.25 mm² or more)

5-3. Switch address setting

	Outdoor	Branch Box		A-control Indoor	M-NET Control Indoor
		Address	Connection Setting		
Switch	SWU2 SWU1	SW12 SW11	A B C D E – / 1 2 3 4 5 6 / SW1 ON: Indoor connect OFF: No connection (SW1-6 not use)	None	SW12 SW11
Range	51 - 100	1 - 50	–	–	1 - 50
Setting	M-Control Indoor or Branch Box address +50	• According to the set address (for example, 01), the addresses for the connected indoor units are set sequentially (for example, 02, 03, 04, and 05). SW1: 1 ON, 2 ON, 3 ON, 4 ON, 5 ON Port: A, B, C, D, E Address: 01, 02, 03, 04, 05 (sequential numbers) (SW11, 12)	• Specify whether indoor units are connected to each port (A, B, C, D, and E). SW1: 1, 2, 3, 4, 5, (6) Port: A, B, C, D, E, not use Indoor units are connected ON Indoor units are not connected OFF	There are no address settings for the indoor units.	–

Note: 1. Branch box address
When setting the address, use a number within the range 1–50.
Ex. The set address is (47) and there are 5 indoor units (A, B, C, D, and E).
If A: (47), B: (48), C: (49), D: (50), and E: (51), E is incorrect because it exceeds 50.

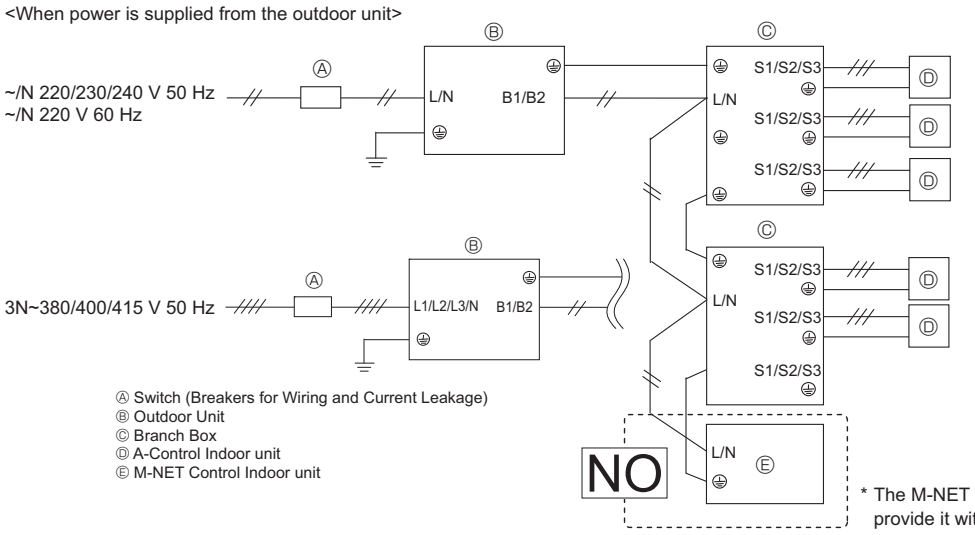
Ex1. Outdoor + Branch <1> (A-Indoor A, B, C, D, E) + Branch <2> (A-Indoor A, B, C) + M-Indoor <1> + M-Indoor <2>



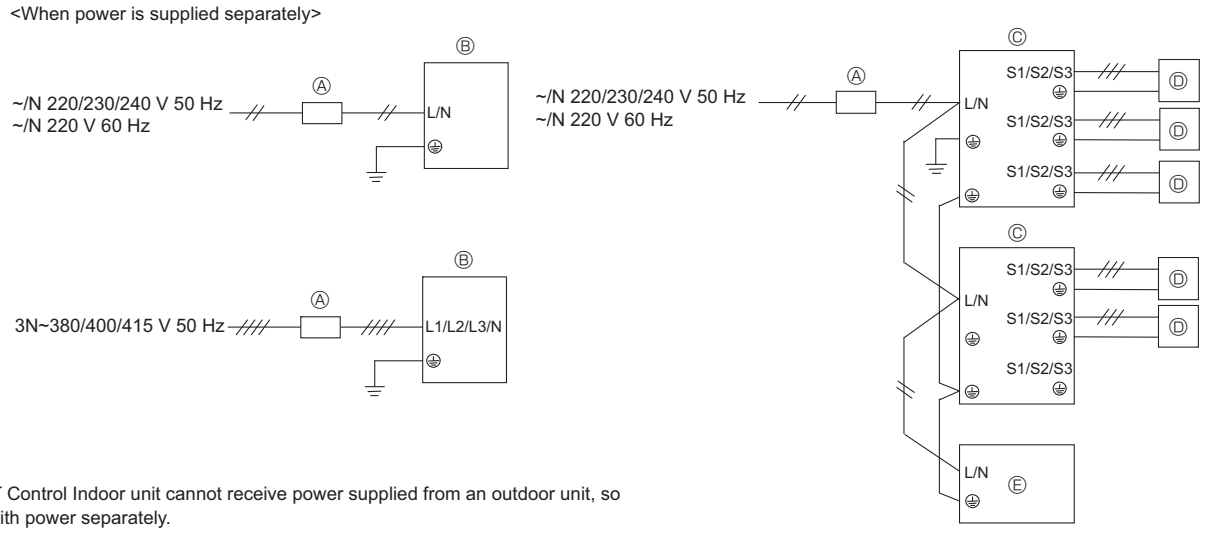
*1 Outdoor address
Branch Box <1> start address + 50 = 01 + 50 = 51
*2 Branch Box <1>
A-port address = Start address = 01
B-port address = Start address + 1 = 02
C-port address = Start address + 2 = 03
D-port address = Start address + 3 = 04
E-port address = Start address + 4 = 05
*3 Branch Box <2>
Branch Box <2> start address
= M-Indoor <1> address + 1
= 06 + 1 = 07
A-port address = Start address = 07
B-port address = Start address + 1 = 08
C-port address = Start address + 2 = 09

5-4. Wiring of main power supply and equipment capacity

<When power is supplied from the outdoor unit>



<When power is supplied separately>



* The M-NET Control Indoor unit cannot receive power supplied from an outdoor unit, so provide it with power separately.

Cross-sectional area of Wire for Main Power Supply and On/Off Capacities

Model		Power Supply	Minimum Wire Cross-sectional area (mm²)			Breaker for Wiring *1	Breaker for Current Leakage
			Main Cable	Branch	Ground		
Outdoor Unit	P112-140V	~/N 220/230/240 V 50 Hz	5.5(6)	–	5.5(6)	32 A	32 A 30 mA 0.1 sec. or less
	P112-140Y	3N~380/400/415 V 50 Hz	1.5	–	1.5	16 A	16 A 30 mA 0.1 sec. or less

*1. A breaker with at least 3.0 mm contact separation in each poles shall be provided. Use non-fuse breaker (NF) or earth leakage breaker (NV).

Total operating current of the indoor unit	Minimum wire thickness (mm²)			Ground-fault interrupter *1	Local switch (A)		Breaker for wiring (NFB)
	Main Cable	Branch	Ground		Capacity	Fuse	
F0 = 16 A or less *2	1.5	1.5	1.5	20 A current sensitivity *3	16	16	20
F0 = 25 A or less *2	2.5	2.5	2.5	30 A current sensitivity *3	25	25	30
F0 = 32 A or less *2	4.0	4.0	4.0	40 A current sensitivity *3	32	32	40

Apply to IEC61000-3-3 about max. permissive system impedance.
*1 The Ground-fault interrupter should support inverter circuit.
The Ground-fault interrupter should combine using of local switch or wiring breaker.
*2 Please take the larger of F1 or F2 as the value for F0.
F1 = Total operating maximum current of the indoor units × 1.2
F2 = {V1 × (Quantity of Type1)/C} + {V1 × (Quantity of Type2)/C} + {V1 × (Quantity of Type3)/C} + {V1 × (Quantity of Type4)/C} + {V1 × (Quantity of Type5)/C} + {V1 × (Quantity of Type6)/C}

Connect to Branch box (PAC-MK·BC)

Indoor unit		V1	V2
Type 1	SEZ-KD·VA, PCA-RP·KAQ, PLA-ZRP·BA(.UK)	19.8	2.4
Type 2	PEAD-RP·JAQ(L).UK	26.9	
Type 3	MLZ-KA·VA, SLZ-KA, VAQ(L)3	9.9	
Type 4	MSZ-FH·VE, MSZ-SF·VE, MSZ-EF·VE, MSZ-SF·VA	6.8	
Type 5	MFZ-KJ·VE	7.4	
Type 6	Branch box (PAC-MK·BC)	5.1	3.0

Connect to Connection kit (PAC-LV11M)

Indoor unit		V1	V2
Type 1	MSY-EF·VE, MSY-GE·VA, MSY-GH, MSZ-GE·VA, MSZ-SF·VA, MSZ-SF·VE, MSZ-EF·VE, MSZ-FH·VE	6.8	2.4
Type 2	MFZ-KJ·VE	7.4	
Type 3	Connection kit (PAC-LV11M)	3.5	

Indoor unit		V1	V2
Type 1	PMFY-VBM, PLFY-VBM, PEFY-VMS1, PCFY-VKM, PKFY-VHM, PKFY-VKM, PFFY-VKM, PFFY-VLRMM	19.8	2.4
Type 2	PLFY-VCM	9.9	
Type 4	PKFY-VBM	3.5	
Type 5	PEFY-VMA	38	1.6
Type 6	PLFY-VLMD, PEFY-VMH, PEFY-VMR, PDFY-VM, PFFY-VLEM, PFFY-VLRM	0	0

C : Multiple of tripping current at tripping time 0.01 s
Please pick up "C" from the tripping characteristic of the breaker.

<Example of "F2" calculation>
* Condition PEFY-VMS × 4 + PEFY-VMA × 1, C = 8 (refer to right sample chart)
F2 = 18.6 × 4/8 + 38 × 1/8
= 14.05
→ 16 A breaker (Tripping current = 8 × 16 A at 0.01 s)
* 3 Current sensitivity is calculated using the following formula.
G1 = V2 × (Quantity of Type1) + V2 × (Quantity of Type2) + V2 × (Quantity of Type3) + V2 × (Quantity of Type4) + V2 × (Quantity of Type5) + V2 × (Quantity of Type6) + V3 × (Wire length [km])

G1	Current sensitivity
30 or less	30 mA 0.1 sec or less
100 or less	100 mA 0.1 sec or less

Wire thickness	V3
1.5 mm²	48
2.5 mm²	56
4.0 mm²	66

Sample chart