CITY MULTI
SYSTEM DESIGN WR2 SERIES - 575V

1-1. General cautions

① Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations, and guidance of each electric power company.

② Wiring for control (hereinafter referred to as transmission cable) shall be (50mm[1-5/8in] or more) apart from power source wiring so that it is not influenced by electric noise from power source wiring. (Do not insert transmission cable and power source wire in the same conduit.)

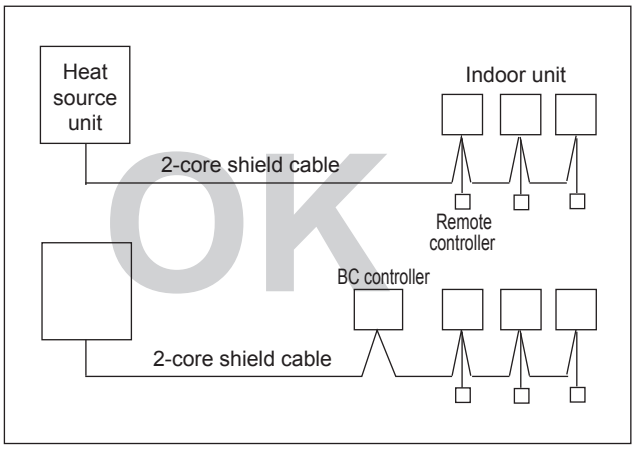
③ Be sure to provide designated grounding work to heat source unit.

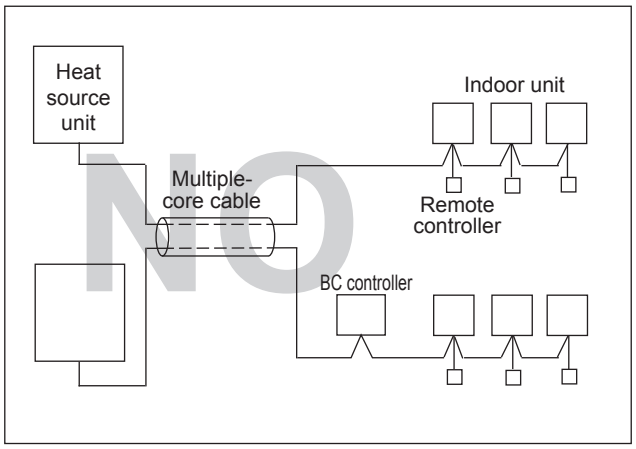
④ Give some allowance to wiring for electrical part box of indoor and heat source unit, because the box is sometimes removed at the time of service work.

⑤ Never connect 100V, 208-230V, 575V power source to terminal block of transmission cable. If connected, electrical parts will be damaged.

⑥ Use 2-core shield cable for transmission cable. If transmission cables of different systems are wired with the same multiplecore cable, the resultant poor transmitting and receiving will cause erroneous operations.

⑦ When extending the transmission line, make sure to extend the shield cable as well.





1-2. Power supply for Indoor unit and Heat source unit

1-2-1. Electrical characteristics of Indoor unit

Symbols: MCA: Minimum Circuit Ampacity (=1.25xFLA) FLA: Full Load Amps
IFM: Indoor Fan Motor Output: Fan motor rated output

Model	Indoor Unit				IFM	
	Hz	Volts	Voltage range	MCA(A)	Output(kW)	FLA(A)
PLFY-P08NCMU-E	60Hz	208 / 230V	198 to 253V	0.29 / 0.29	0.015 / 0.015	0.23 / 0.23
PLFY-P12NCMU-E				0.35 / 0.35	0.020 / 0.020	0.28 / 0.28
PLFY-P15NCMU-E				0.35 / 0.35	0.020 / 0.020	0.28 / 0.28
PLFY-P08NBMU-E2				0.39 / 0.39	0.050 / 0.050	0.31 / 0.31
PLFY-P12NBMU-E2				0.39 / 0.39	0.050 / 0.050	0.31 / 0.31
PLFY-P15NBMU-E2				0.39 / 0.39	0.050 / 0.050	0.31 / 0.31
PLFY-P18NBMU-E2				0.42 / 0.42	0.050 / 0.050	0.33 / 0.33
PLFY-P24NBMU-E2				0.59 / 0.59	0.050 / 0.050	0.47 / 0.47
PLFY-P30NBMU-E2				0.63 / 0.63	0.050 / 0.050	0.50 / 0.50
PLFY-P36NBMU-E2				1.09 / 1.09	0.120 / 0.120	0.87 / 0.87
PMFY-P06NBMU-E	60Hz	208 / 230V	198 to 253V	0.25 / 0.25	0.028 / 0.028	0.20 / 0.20
PMFY-P08NBMU-E				0.25 / 0.25	0.028 / 0.028	0.20 / 0.20
PMFY-P12NBMU-E				0.26 / 0.26	0.028 / 0.028	0.21 / 0.21
PMFY-P15NBMU-E				0.33 / 0.33	0.028 / 0.028	0.26 / 0.26
PEFY-P06NMAU-E3	60Hz	208 / 230V	188 to 253V	1.05 / 1.05	0.085 / 0.085	0.84 / 0.84
PEFY-P08NMAU-E3				1.05 / 1.05	0.085 / 0.085	0.84 / 0.84
PEFY-P12NMAU-E3				1.20 / 1.20	0.085 / 0.085	0.96 / 0.96
PEFY-P15NMAU-E3				1.45 / 1.45	0.085 / 0.085	1.16 / 1.16
PEFY-P18NMAU-E3				1.56 / 1.56	0.085 / 0.085	1.25 / 1.25
PEFY-P24NMAU-E3				2.73 / 2.73	0.121 / 0.121	2.18 / 2.18
PEFY-P27NMAU-E3				2.73 / 2.73	0.121 / 0.121	2.18 / 2.18
PEFY-P30NMAU-E3				2.73 / 2.73	0.121 / 0.121	2.18 / 2.18
PEFY-P36NMAU-E3				3.32 / 3.32	0.244 / 0.244	2.66 / 2.66
PEFY-P48NMAU-E3				3.41 / 3.41	0.244 / 0.244	2.73 / 2.73
PEFY-P54NMAU-E3				3.31 / 3.31	0.244 / 0.244	2.65 / 2.65
PEFY-P06NMSU-E	60Hz	208 / 230V	188 to 253V	0.47 / 0.50	0.023 / 0.023	0.32 / 0.31
PEFY-P08NMSU-E				0.47 / 0.50	0.023 / 0.023	0.41 / 0.39
PEFY-P12NMSU-E				0.68 / 0.74	0.032 / 0.032	0.46 / 0.43
PEFY-P15NMSU-E				1.20 / 1.33	0.130 / 0.130	0.47 / 0.45
PEFY-P18NMSU-E				1.20 / 1.33	0.130 / 0.130	0.64 / 0.60
PEFY-P24NMSU-E				1.57 / 1.73	0.180 / 0.180	0.88 / 0.83
PEFY-P15NMHU-E2				1.63 / 1.50	0.17	1.30 / 1.20
PEFY-P18NMHU-E2				1.63 / 1.50	0.17	1.30 / 1.20
PEFY-P24NMHU-E2				2.11 / 1.83	0.25	1.69 / 1.46
PEFY-P27NMHU-E2				2.35 / 2.13	0.26	1.88 / 1.70
PEFY-P30NMHU-E2				2.70 / 2.45	0.31	2.16 / 1.96
PEFY-P36NMHU-E2				4.16 / 3.67	0.49	3.32 / 2.94
PEFY-P48NMHU-E2				4.16 / 3.67	0.49	3.32 / 2.94
PEFY-P54NMHU-E2				4.18 / 3.69	0.55	3.34 / 2.95
PEFY-P72NMHSU-E			187 to 253V	7.7	0.87	6.2
PEFY-P96NMHSU-E				8.2	0.87	6.6

Symbols: MCA: Minimum Circuit Ampacity (=1.25xFLA) FLA: Full Load Amps
IFM: Indoor Fan Motor Output: Fan motor rated output

Model	Indoor Unit				IFM	
	Hz	Volts	Voltage range	MCA(A)	Output(kW)	FLA(A)
PCFY-P15NKMU-E	60Hz	208 / 230V	198 to 253V	0.44 / 0.44	0.090 / 0.090	0.35 / 0.35
PCFY-P24NKMU-E				0.52 / 0.52	0.095 / 0.095	0.41 / 0.41
PCFY-P30NKMU-E				1.22 / 1.22	0.160 / 0.160	0.97 / 0.97
PCFY-P36NKMU-E				1.22 / 1.22	0.160 / 0.160	0.97 / 0.97
PKFY-P06NBMU-E2	60Hz	208 / 230V	198 to 253V	0.19 / 0.19	0.008 / 0.008	0.15 / 0.15
PKFY-P08NHMU-E2				0.38 / 0.38	0.030 / 0.030	0.30 / 0.30
PKFY-P12NHMU-E2				0.38 / 0.38	0.030 / 0.030	0.30 / 0.30
PKFY-P15NHMU-E2				0.38 / 0.38	0.030 / 0.030	0.30 / 0.30
PKFY-P18NHMU-E2				0.38 / 0.38	0.030 / 0.030	0.30 / 0.30
PKFY-P24NKMU-E2				0.63 / 0.63	0.056 / 0.056	0.50 / 0.50
PKFY-P30NKMU-E2				0.63 / 0.63	0.056 / 0.056	0.50 / 0.50
PFFY-P06NEMU-E	60Hz	208 / 230V	188 to 253V	0.32 / 0.34	0.015 / 0.015	0.25 / 0.27
PFFY-P08NEMU-E				0.32 / 0.34	0.015 / 0.015	0.25 / 0.27
PFFY-P12NEMU-E				0.34 / 0.38	0.018 / 0.018	0.27 / 0.30
PFFY-P15NEMU-E				0.40 / 0.44	0.030 / 0.030	0.32 / 0.35
PFFY-P18NEMU-E				0.48 / 0.53	0.035 / 0.035	0.38 / 0.42
PFFY-P24NEMU-E				0.59 / 0.64	0.063 / 0.063	0.47 / 0.51
PFFY-P06NRMU-E	60Hz	208 / 230V	188 to 253V	0.32 / 0.34	0.015 / 0.015	0.25 / 0.27
PFFY-P08NRMU-E				0.32 / 0.34	0.015 / 0.015	0.25 / 0.27
PFFY-P12NRMU-E				0.34 / 0.38	0.018 / 0.018	0.27 / 0.30
PFFY-P15NRMU-E				0.40 / 0.44	0.030 / 0.030	0.32 / 0.35
PFFY-P18NRMU-E				0.48 / 0.53	0.035 / 0.035	0.38 / 0.42
PFFY-P24NRMU-E				0.59 / 0.64	0.063 / 0.063	0.47 / 0.51
PVFY-P12NAMU-E	60Hz	208 / 230V	188 to 253V	3.00 / 3.00	0.121 / 0.121	2.4 / 2.4
PVFY-P18NAMU-E				3.00 / 3.00	0.121 / 0.121	2.4 / 2.4
PVFY-P24NAMU-E				3.00 / 3.00	0.121 / 0.121	2.4 / 2.4
PVFY-P30NAMU-E				4.13 / 4.13	0.244 / 0.244	3.3 / 3.3
PVFY-P36NAMU-E				4.13 / 4.13	0.244 / 0.244	3.3 / 3.3
PVFY-P48NAMU-E				5.63 / 5.63	0.430 / 0.430	4.5 / 4.5
PVFY-P54NAMU-E				5.63 / 5.63	0.430 / 0.430	4.5 / 4.5

1-2-2. Electrical characteristics of Heat source unit at cooling mode

Symbols: MCA: Minimum Circuit Ampacity
SC: Starting Current, RLA: Rated Load Amps

PQRY-P-Z(S)LMU

Model	Unit Combination	Heat source unit					Compressor	
		Hz	Volts	Voltage range	MCA(A)	MOP(A)	Output (kW)	SC(A)
PQRY-P72ZLMU-A	-	60Hz	575V	518 to 633V	5	15	4.3	7
PQRY-P96ZLMU-A	-				7	15	6.0	7
PQRY-P120ZLMU-A	-				11	15	7.7	7
PQRY-P144ZLMU-A	-				13	20	9.5	7
PQRY-P168ZLMU-A	-				16	25	11.0	7
PQRY-P192ZLMU-A	-				20	30	12.4	7
PQRY-P144ZSLMU-A	PQRY-P72ZLMU-A				5	15	4.3	7
	PQRY-P72ZLMU-A				5	15	4.3	7
PQRY-P168ZSLMU-A	PQRY-P72ZLMU-A				5	15	4.3	7
	PQRY-P96ZLMU-A				7	15	6.0	7
PQRY-P192ZSLMU-A	PQRY-P96ZLMU-A				7	15	6.0	7
	PQRY-P96ZLMU-A				7	15	6.0	7
PQRY-P216ZSLMU-A	PQRY-P96ZLMU-A				7	15	6.0	7
	PQRY-P120ZLMU-A				11	15	7.7	7
PQRY-P240ZSLMU-A	PQRY-P120ZLMU-A				11	15	7.7	7
	PQRY-P120ZLMU-A				11	15	7.7	7
PQRY-P288ZSLMU-A	PQRY-P144ZLMU-A				13	20	9.5	7
	PQRY-P144ZLMU-A				13	20	9.5	7
PQRY-P312ZSLMU-A	PQRY-P144ZLMU-A				13	20	9.5	7
	PQRY-P168ZLMU-A				16	25	11.0	7
PQRY-P336ZSLMU-A	PQRY-P168ZLMU-A				16	25	11.0	7
	PQRY-P168ZLMU-A				16	25	11.0	7

1-2-3. Electrical characteristics of BC controller

Symbols: MCA: Minimum Circuit Ampacity
FLA: Full Load Amps RLA: Rated Load Amps

Model	Hz	Volts	Voltage range	MCA(A)	FLA(A)	RLA(A)
CMB-P104NU-G1	60Hz	208 / 230V	198 to 253V	0.36 / 0.33	15 / 15	0.29 / 0.26
CMB-P105NU-G1				0.44 / 0.40	15 / 15	0.35 / 0.32
CMB-P106NU-G1				0.52 / 0.47	15 / 15	0.41 / 0.37
CMB-P108NU-G1				0.68 / 0.61	15 / 15	0.54 / 0.49
CMB-P1010NU-G1				0.83 / 0.75	15 / 15	0.66 / 0.60
CMB-P1013NU-G1				1.08 / 0.97	15 / 15	0.86 / 0.77
CMB-P1016NU-G1				1.30 / 1.18	15 / 15	1.04 / 0.94
CMB-P108NU-GA1				0.68 / 0.61	15 / 15	0.54 / 0.49
CMB-P1010NU-GA1				0.83 / 0.75	15 / 15	0.66 / 0.60
CMB-P1013NU-GA1				1.08 / 0.97	15 / 15	0.86 / 0.77
CMB-P1016NU-GA1				1.30 / 1.18	15 / 15	1.04 / 0.94
CMB-P104NU-GB1				0.32 / 0.29	15 / 15	0.25 / 0.23
CMB-P108NU-GB1				0.64 / 0.58	15 / 15	0.51 / 0.46
CMB-P108NU-HA1				1.45 / 1.70	15 / 15	1.16 / 1.36
CMB-P1010NU-HA1				1.60 / 1.88	15 / 15	1.28 / 1.50
CMB-P1016NU-HA1			188 to 253V	1.65 / 1.93	15 / 15	1.32 / 1.54
CMB-P1016NU-HB1				1.46 / 1.71	15 / 15	1.17 / 1.37

1-3. Power cable specifications

Thickness of wire for main power supply, capacities of the switch and system impedance

	Model	Minimum wire thickness (mm^2/AWG)		
		Main cable	Branch	Ground
Heat source unit	PQRY-P72ZLMU-A	2.1/14	-	2.1/14
	PQRY-P96ZLMU-A	2.1/14	-	2.1/14
	PQRY-P120ZLMU-A	2.1/14	-	2.1/14
	PQRY-P144ZLMU-A	3.3/12	-	3.3/12
	PQRY-P168ZLMU-A	5.3/10	-	5.3/10
	PQRY-P192ZLMU-A	5.3/10	-	5.3/10
Total operating current of the indoor unit	F0 = 15 or less *1	2.1/14	2.1/14	2.1/14
	F0 = 20 or less *1	3.3/12	3.3/12	3.3/12
	F0 = 30 or less *1	5.3/10	5.3/10	5.3/10

*1 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 Others)/C}

Indoor unit		V1	V2
Type1	PLFY-NBMU, PMFY-NBMU, PEFY-NMSU, PCFY-NKMU, PKFY-NHMU, PKFY-NKMU	18.6	2.4
Type2	PEFY-NMAU	38	1.6
Type3	PEFY-NMHSU	13.8	4.8
Others	Other indoor unit	0	0

C : Multiple of tripping current at tripping time 0.01s

Please pick up "C" from the tripping characteristic of the breaker.

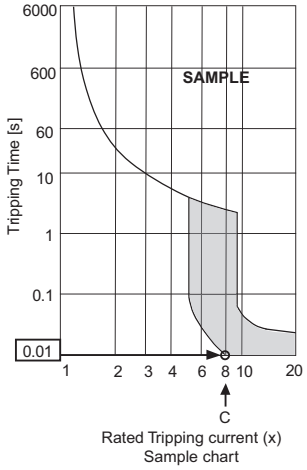
<Example of "F2" calculation>

*Condition PEFY-NMSU × 4 + PEFY-NMAU × 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 0.01s)



*2 Current sensitivity is calculated using the following formula.

G1 = (V2 × Quantity of Type1) + (V2 × Quantity of Type2) + (V2 × Quantity of Type3) + (V2 × Quantity of Others) + (V3 × Wire length [km])

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

Wire thickness	V3
1.5 mm^2	48
2.5 mm^2	56
4.0 mm^2	66

1. Use dedicated power supplies for the heat source unit and indoor unit. Ensure OC and OS are wired individually.
2. Bear in mind ambient conditions (ambient temperature, direct sunlight, rain water, etc.) when proceeding with the wiring and connections.
3. The wire size is the minimum value for metal conduit wiring. If the voltage drops, use a wire that is one rank thicker in diameter. Make sure the power-supply voltage does not drop more than 10%. Make sure that the voltage imbalance between the phases is 2% or less.
4. Specific wiring requirements should adhere to the wiring regulations of the region.
5. Power supply cords of parts of appliances for heat source use shall not be lighter than polychloroprene sheathed flexible cord (design 245 IEC57). For example, use wiring such as YZW.
6. A switch with at least 3 mm [1/8 in.] contact separation in each pole shall be provided by the Air Conditioner installer.

⚠WARNING

- Be sure to use specified wires for connections and ensure no external force is imparted to terminal connections. If connections are not fixed firmly, heating or fire may result.
- Be sure to use the appropriate type of overcurrent protection switch. Note that generated overcurrent may include some amount of direct current.

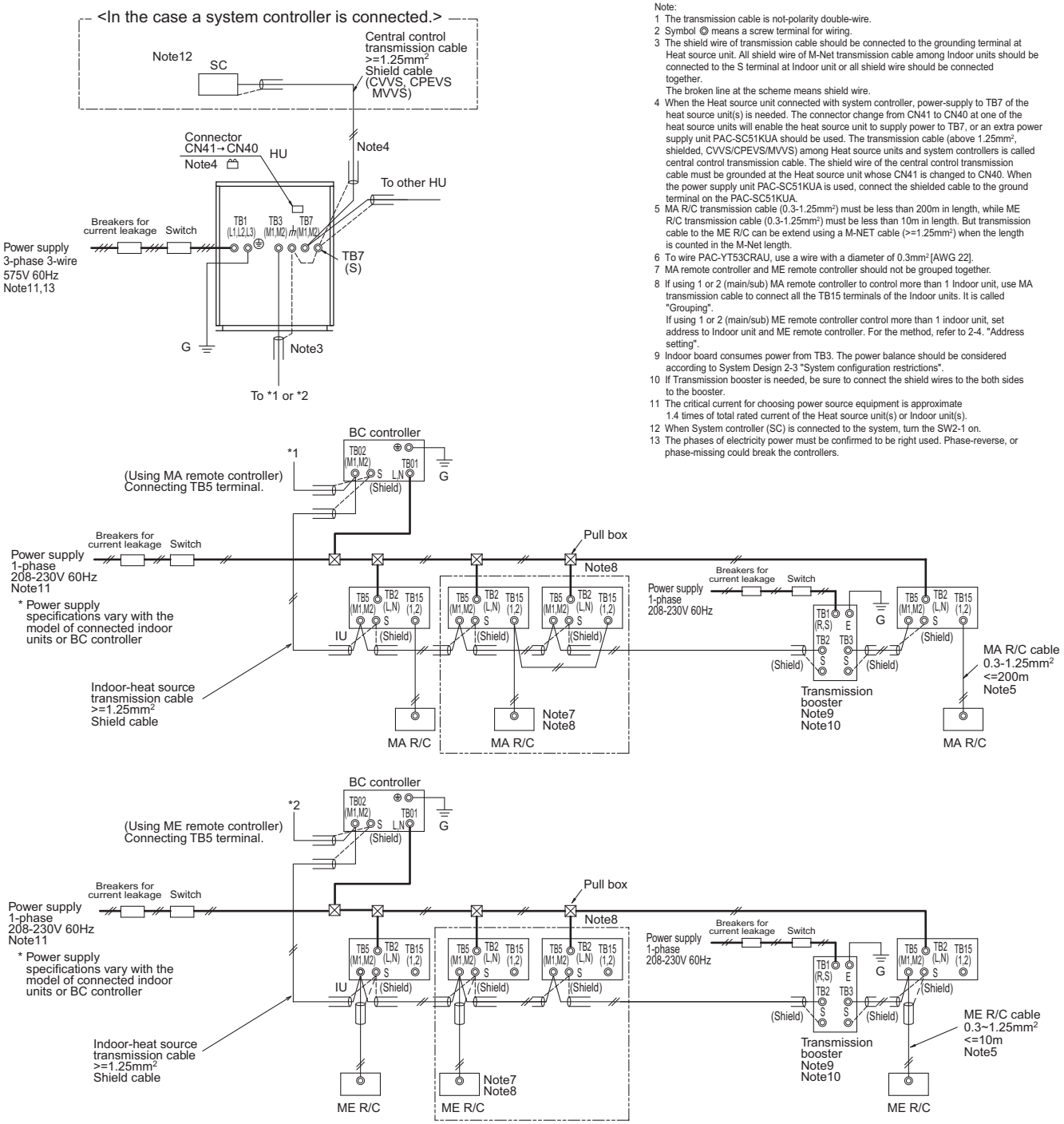
⚠CAUTION

- The breakers for current leakage should support Inverter circuit. (e.g. Mitsubishi Electric's NV-C series or equivalent). If no earth leakage breaker is installed, it may cause an electric shock.
- Breakers for current leakage should combine using of switch.
- Do not use anything other than a breaker with the correct capacity. Using a breaker of too large capacity may cause malfunction or fire.
- If a large electric current flows due to malfunction or faulty wiring, earth-leakage breakers on the unit side and on the upstream side of the power supply system may both operate. Depending on the importance of the system, separate the power supply system or take protective coordination of breakers.

1-4. Power supply examples

The local standards and/or regulations is applicable at a higher priority.

1-4-1. PQRY-P72, 96, 120, 144, 168, 192ZLMU



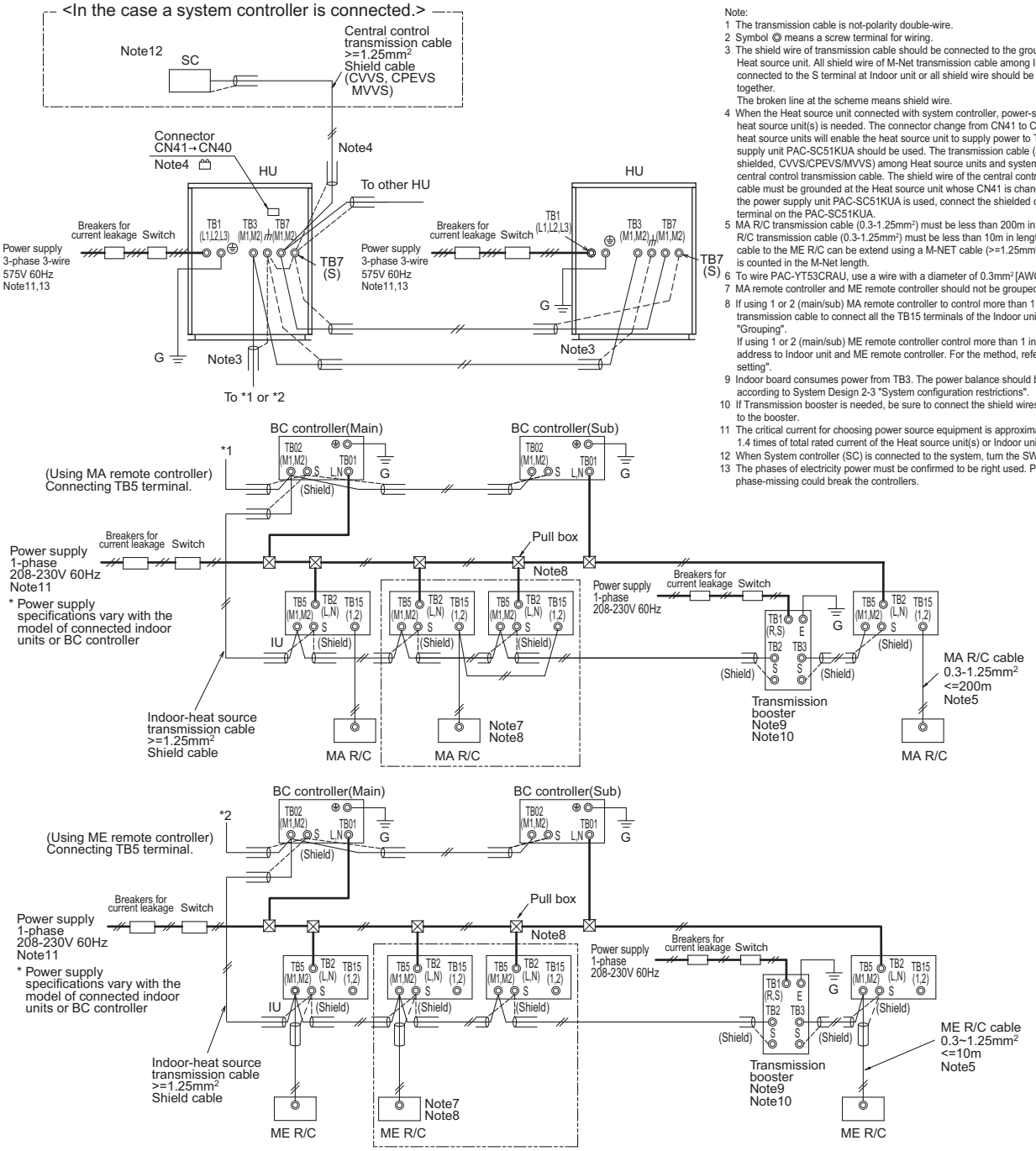
Note:
1 The transmission cable is not-polarity double-wire.
2 Symbol ◎ means a screw terminal for wiring.
3 The shield wire of transmission cable should be connected to the grounding terminal at Heat source unit. All shield wire of M-Net transmission cable among Indoor units should be connected to the S terminal at Indoor unit or all shield wire should be connected together.
The broken line at the scheme means shield wire.
4 When the Heat source unit connected with system controller, power-supply to TB7 of the heat source unit(s) is needed. The connector change from CN41 to CN40 at one of the heat source units will enable the heat source unit to supply power to TB7, or an extra power supply unit PAC-SC51KUA should be used. The transmission cable (above 1.25mm², shielded, CVVS/CPEVS/MVVS) among Heat source units and system controllers is called central control transmission cable. The shield wire of the central control transmission cable must be grounded at the Heat source unit whose CN41 is changed to CN40. When the power supply unit PAC-SC51KUA is used, connect the shielded cable to the ground terminal on the PAC-SC51KUA.
5 MA R/C transmission cable (0.3-1.25mm²) must be less than 200m in length, while ME R/C transmission cable (0.3-1.25mm²) must be less than 10m in length. But transmission cable to the ME R/C can be extend using a M-NET cable (>=1.25mm²) when the length is counted in the M-Net length.
6 To wire PAC-YT53CRAU, use a wire with a diameter of 0.3mm² [AWG 22].
7 MA remote controller and ME remote controller should not be grouped together.
8 If using 1 or 2 (main/sub) MA remote controller to control more than 1 Indoor unit, use MA transmission cable to connect all the TB15 terminals of the Indoor units. It is called "Grouping".
If using 1 or 2 (main/sub) ME remote controller control more than 1 indoor unit, set address to Indoor unit and ME remote controller. For the method, refer to 2-4. "Address setting".
9 Indoor board consumes power from TB3. The power balance should be considered according to System Design 2-3 "System configuration restrictions".
10 If Transmission booster is needed, be sure to connect the shield wires to the both sides to the booster.
11 The critical current for choosing power source equipment is approximate 1.4 times of total rated current of the Heat source unit(s) or Indoor unit(s).
12 When System controller (SC) is connected to the system, turn the SW2-1 on.
13 The phases of electricity power must be confirmed to be right used. Phase-reverse, or phase-missing could break the controllers.

Symbol	
BKC	Breaker capacity
OCP	Over-current protector
NFB	Non-fuse breaker
HU	Heat source unit
IU	Indoor unit
SC	System controller
MA R/C	MA remote controller
ME R/C	ME remote controller

Model	Minimum Wire thickness	
	Power wire <mm²/AWG>	G wire <mm²/AWG>
PQRY-P72ZLMU-A	2.1/14	2.1/14
PQRY-P96ZLMU-A	2.1/14	2.1/14
PQRY-P120ZLMU-A	2.1/14	2.1/14
PQRY-P144ZLMU-A	3.3/12	3.3/12
PQRY-P168ZLMU-A	5.3/10	5.3/10
PQRY-P192ZLMU-A	5.3/10	5.3/10

The local standards and/or regulations is applicable at a higher priority.

1-4-2. PQRY-P144, 168, 192, 216, 240, 288, 312, 336ZSLMU



Note:
1 The transmission cable is not-polarity double-wire.
2 Symbol ◎ means a screw terminal for wiring.
3 The shield wire of transmission cable should be connected to the grounding terminal at Heat source unit. All shield wire of M-Net transmission cable among Indoor units should be connected to the S terminal at Indoor unit or all shield wire should be connected together.
The broken line at the scheme means shield wire.
4 When the Heat source unit connected with system controller, power-supply to TB7 of the heat source unit(s) is needed. The connector change from CN41 to CN40 at one of the heat source units will enable the heat source unit to supply power to TB7, or an extra power supply unit PAC-SC51KUA should be used. The transmission cable (above 1.25mm², shielded, CVVS/CPEVS/MVVS) among Heat source units and system controllers is called central control transmission cable. The shield wire of the central control transmission cable must be grounded at the Heat source unit whose CN41 is changed to CN40. When the power supply unit PAC-SC51KUA is used, connect the shielded cable to the ground terminal on the PAC-SC51KUA.
5 MA R/C transmission cable (0.3-1.25mm²) must be less than 200m in length, while ME R/C transmission cable (0.3-1.25mm²) must be less than 10m in length. But transmission cable to the ME R/C can be extend using a M-NET cable (>=1.25mm²) when the length is counted in the M-Net length.
6 To wire PAC-YT53CRAU, use a wire with a diameter of 0.3mm² [AWG 22].
7 MA remote controller and ME remote controller should not be grouped together.
8 If using 1 or 2 (main/sub) MA remote controller to control more than 1 Indoor unit, use MA transmission cable to connect all the TB15 terminals of the Indoor units. It is called "Grouping".
If using 1 or 2 (main/sub) ME remote controller control more than 1 indoor unit, set address to Indoor unit and ME remote controller. For the method, refer to 2-4. "Address setting".
9 Indoor board consumes power from TB3. The power balance should be considered according to System Design 2-3 "System configuration restrictions".
10 If Transmission booster is needed, be sure to connect the shield wires to the both sides to the booster.
11 The critical current for choosing power source equipment is approximate 1.4 times of total rated current of the Heat source unit(s) or Indoor unit(s).
12 When System controller (SC) is connected to the system, turn the SW2-1 on.
13 The phases of electricity power must be confirmed to be right used. Phase-reverse, or phase-missing could break the controllers.

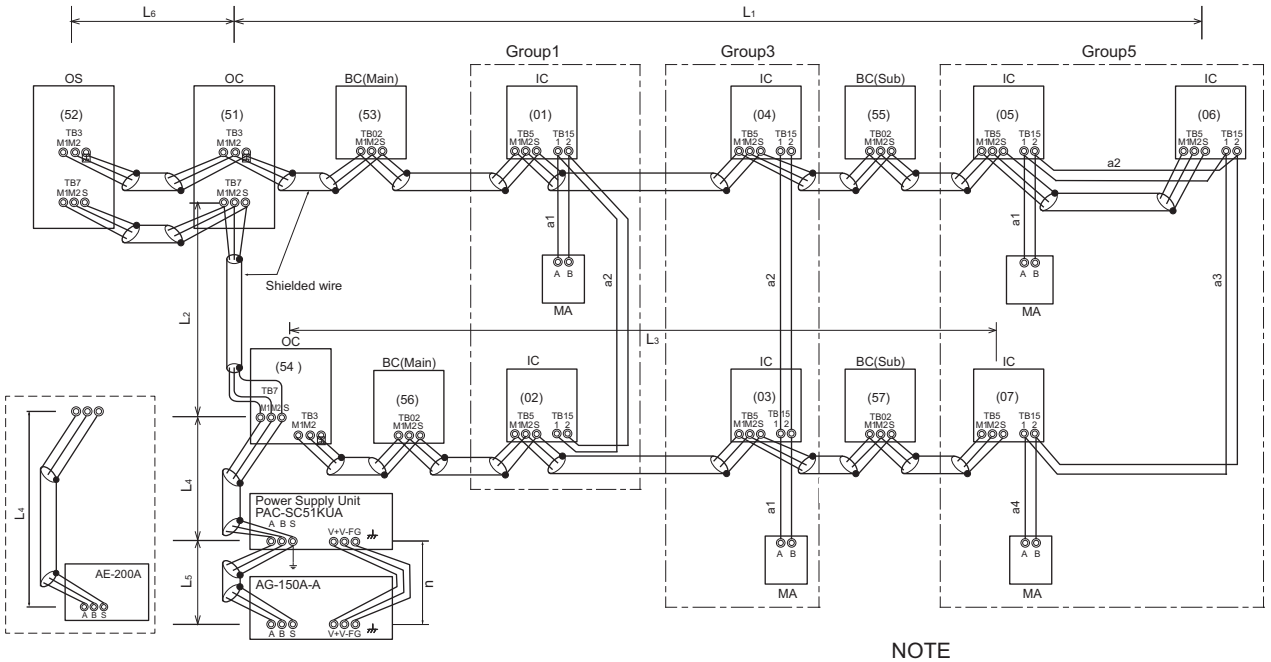
Symbol		Model	Minimum Wire thickness	
			Power wire <mm²/AWG>	G wire <mm²/AWG>
BKC	Breaker capacity	PQRY-P72ZLMU-A	2.1/14	2.1/14
OCP	Over-current protector	PQRY-P96ZLMU-A	2.1/14	2.1/14
NFB	Non-fuse breaker	PQRY-P120ZLMU-A	2.1/14	2.1/14
HU	Heat source unit	PQRY-P144ZLMU-A	3.3/12	3.3/12
IU	Indoor unit	PQRY-P168ZLMU-A	5.3/10	5.3/10
SC	System controller	PQRY-P192ZLMU-A	5.3/10	5.3/10
MA R/C	MA remote controller			
ME R/C	ME remote controller			

2-1. Transmission cable length limitation

2-1-1. Using MA Remote controller

MA remote controller refers to Simple MA remote controller and wireless remote controller.
Long transmission cable causes voltage down, therefore, the length limitation should be obeyed to secure proper transmission.

Max. length via Heat source (M-NET cable)	L1+L2+L3, L1+L2+L4+L5, L3+L4+L5, L6+L2+L3, L6+L2+L4+L5	<=500m[1640ft.]	1.25mm^2 [AWG16] or thicker
Max. length to Heat source (M-NET cable)	L1+L6, L3, L2+L4+L6, L5	<=200m[656ft.]	1.25mm^2 [AWG16] or thicker
Max. length from MA to Indoor for each group	a1+a2, a1+a2+a3+a4	<=200m[656ft.]	0.3-1.25 mm^2 [AWG22-16]
24VDC to AG-150A-A	n	<=50m[164ft.]	0.75-2.0 mm^2 [AWG18-14]



OC, OS: Heat source unit controller; IC: Indoor unit controller; ME: ME remote controller

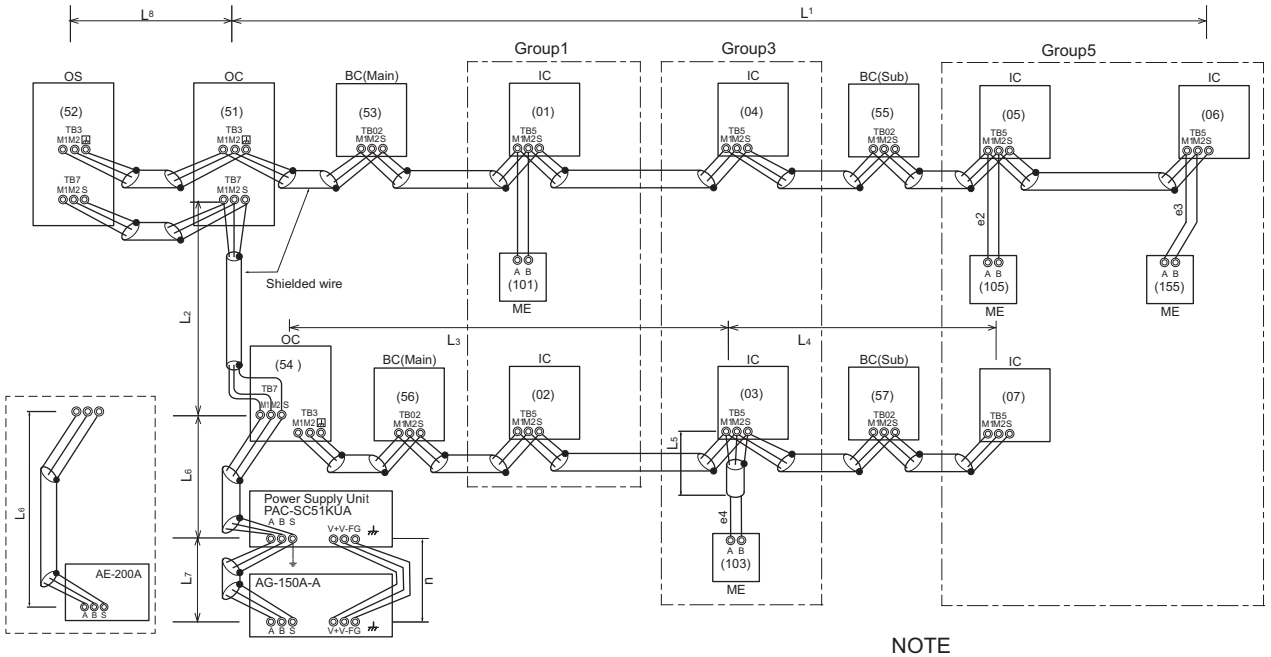
NOTE
Do not daisy-chain remote controllers.

2-1-2. Using ME Remote controller

ME remote controller refers to Smart ME Controller.
Long transmission cable causes voltage down, therefore, the length limitation should be obeyed to secure proper transmission.

Max. length via Heat source (M-NET cable)	L1+L2+L3+L4, L1+L2+L6+L7,L1+L2+L3+L5, L3+L4+L6+L7, L8+L2+L3+L4, L8+L2+L3+L5, L8+L2+L6+L7	<=500m[1640ft.]	1.25mm^2 [AWG16] or thicker
Max. length to Heat source (M-NET cable)	L1+L8, L3+L4, L2+L6+L8, L7, L3+L5	<=200m[656ft.]	1.25mm^2 [AWG16] or thicker
Max. length from ME to Indoor	e1, e2+e3, e4	<=10m[32ft.]*1	0.3-1.25 mm^2 [AWG22-16]*1
24VDC to AG-150A-A	n	<=50m[164ft.]	0.75-2.0 mm^2 [AWG18-14]

*1. If the length from ME to Indoor exceed 10m, use 1.25 mm^2 [AWG16] shielded cable, but the total length should be counted into Max. length via Heat source.



OC, OS: Heat source unit controller; IC: Indoor unit controller; ME: ME remote controller

NOTE
Do not daisy-chain remote controllers.

2-2. Transmission cable specifications

	Transmission cables (Li)	ME Remote controller cables	MA Remote controller cables
Type of cable	Shielding wire (2-core) CVVS, CPEVS or MVVS	Sheathed 2-core cable (unshielded) CVV	
Cable size	More than 1.25mm^2 [AWG16]	0.3～1.25mm^2 [AWG22～16]	0.3～1.25mm^2 [AWG22～16]*1
Remarks	—	When 10m [32ft] is exceeded, use cables with the same specification as transmission cables.	Max length : 200m [656ft]

*1 To wire PAC-YT53CRAU, use a wire with a diameter of 0.3 mm^2 [AWG22]

CVVS, MVVS: PVC insulated PVC sheathed shielded control cable
CPEVS: PE insulated PVC sheathed shielded communication cable
CVV: PVC insulated PVC sheathed control cable

2-3. System configuration restrictions

2-3-1. Common restrictions for the CITYMULTI system

For each Outdoor/Heat source unit, the maximum connectable quantity of Indoor unit is specified at its Specifications table.

A) 1 Group of Indoor units can have 1-16 Indoor units;

B) Maximum 2 remote controllers for 1 group;
*MA/ME remote controllers cannot be present together in 1group.
*To wire PAC-YT53CRAU, use a wire with a diameter of 0.3 mm^2 [AWG22]

C) 1 LOSSNAY unit can interlock maximum 16 Indoor units; 1 Indoor unit can interlock only 1 LOSSNAY unit.

D) Maximum 3 System controllers are connectable when connecting to TB3 of the Outdoor/Heat source unit.

E) Maximum 6 System controllers are connectable when connecting to TB7 of the Outdoor/Heat source unit, if the transmission power is supplied by the Outdoor/Heat source unit.
(Not applicable to the PUMY model and PUHY/PURY-TLMU/TKMU model)

F) 4 System controllers or more are connectable when connecting to TB7 of the Outdoor/Heat source unit, if the transmission power is supplied by the power supply unit PAC-SC51KUA. Details refer to 2-3-3-C.
*System controller connected as described in D) and E) would have a risk that the failure of connected Outdoor/Heat source unit would stop power supply to the System controller.

2-3-2. Ensuring proper communication power and the number of connected units for M-NET

In order to ensure proper communication among Outdoor/Heat source unit, Indoor unit, LOSSNAY, and Controllers, the transmission power situation for the M-NET should be observed. In some cases, Transmission booster should be used. Taking the power consumption of Indoor unit sized P06-P54 as 1, the equivalent power consumption or supply of others are listed at Table 1 and Table 2.
Both the transmission line for centralized controller and indoor-outdoor transmission line must meet the conditions listed below. (Both conditions a) and b) must be met.)

a) [Total equivalent power consumption] ≤ [The equivalent power supply]
b) [Total equivalent number of units] ≤ [40]

Table 1 The equivalent power consumption and the equivalent number of units

Category	Model	The equivalent power consumption	The equivalent number of units
Indoor unit	Sized P06-P54	1	1
	Sized P72, P96	2	2
BC controller	CMB	2	1
PWFY	P36NMU-E-BU	6	1
	P36NMU-E2-AU	1	1
	P72NMU-E2-AU	5	1
MA remote controller/LOSSNAY	PAC-YT53CRAU PAR-FA32MA LGH-F-RX5-E1 PZ-60DR-E PZ-41SLB	0	0
LOSSNAY remote controller	PZ-52SF	0.25	1
ME remote controller	PAR-U01MEDU PAC-IF01AHC-J	0.5	1
System controller	AE-200A AE-50A EW-50A	0	0
	AG-150A-A EB-50GU-A	0.5	1
	TC-24B	1.5	5
	PAC-YG60MCA PAC-YG66DCA PAC-YG63MCA	0.25	1
ON/OFF controller	PAC-YT40ANRA	1	1
MN converter	CMS-MNG-E	2	1
Outdoor/Heat source unit	TB7 power consumption	0	0
M-NET adapter	MAC-333IF-E	0	0
	PAC-IF01MNT-E	1	2

Table 2 The equivalent power supply

Category	Model	The equivalent power supply
Transmission Booster	PAC-SF46EPA	25
Power supply unit	PAC-SC51KUA	5
Expansion controller	PAC-YG50ECA	6
BM ADAPTER	BAC-HD150	6
System controller	AE-200A/AE-50A	0 *1
	EW-50A	1.5 *1
Outdoor/Heat source unit	Connector TB3 and TB7 total *	32 (except S series)/12 (S series)
	Connector TB7 only	6 (except S series and TLMU/TKMU)
	Connector TB7 only (TLMU/TKMU)	0

*If PAC-SC51KUA is used to supply power at TB7 side, no power supply need from Outdoor/Heat source unit at TB7, Connector TB3 itself will therefore have 32. Not applicable to the PUMY model.

*1 AE-200A/AE-50A/EW-50A has a built-in function to supply power to the M-NET transmission line. The amount of power that an AE-200A or an AE-50A can supply is equivalent to the power required by an MN converter (CMS-MNG-E) that is used for maintenance. An MN converter is connectable to EW-50A only when the equivalent power consumption is less than 1.5.

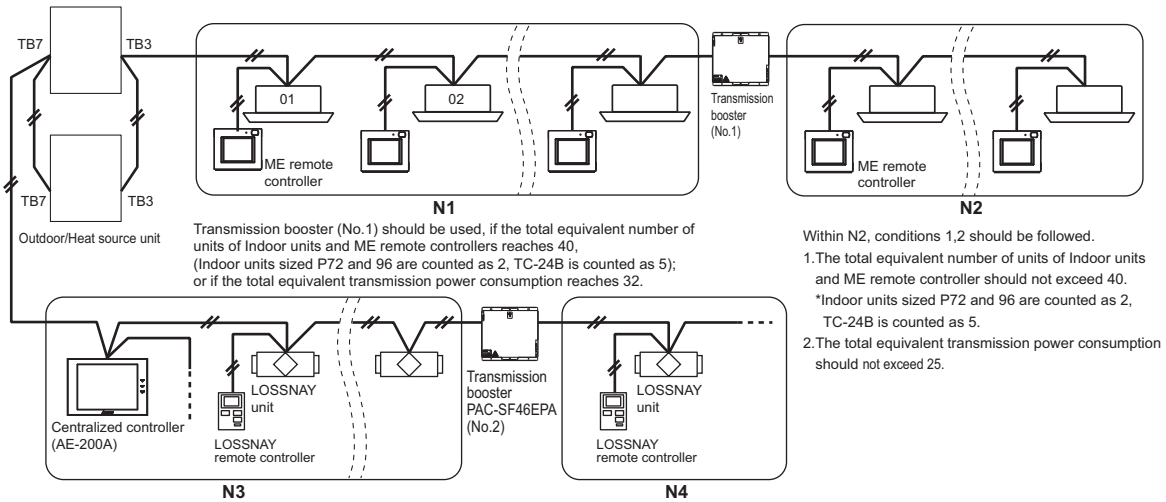
With the equivalent power consumption values and the equivalent number of units in Table 1 and Table 2, PAC-SF46EPA can be designed into the air-conditioner system to ensure proper system communication according to (A), (B), (C).

(A) Firstly, count from TB3 at TB3 side the total equivalent number of units of Indoor units, ME remote controller, and System controllers. If the total equivalent number of units reaches 40, a PAC-SF46EPA should be set. In this case, Indoor units sized P72 and 96 are counted as 2, TC-24B is counted as 5, but MA remote controller(s), PZ-60DR-E, PZ-41SLB, and PZ-52SF are NOT counted.

(B) Secondly, count from TB7 side to TB3 side the total transmission power consumption. If the total power consumption reaches 32, a PAC-SF46EPA should be set. Yet, if a PAC-SC51KUA or another controller with a built-in power supply, such as PAC-YG50ECA, is used to supply power at TB7 side, count from TB3 side only.

(C) Thirdly, count from TB7 at TB7 side the total transmission power consumption, If the total power consumption reaches 6, a PAC-SF46EPA should be set. Also, count from TB7 at TB7 side the total equivalent number of units of System controllers, and so on. If the total equivalent number of units reaches 40, a PAC-SF46EPA should be set.

■ System example



2-3-3. Ensuring proper power supply to System controller

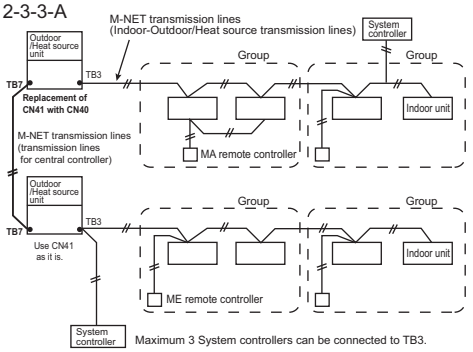
The power to System controller (excluding AE-200A, AE-50A, EW-50A, BAC-HD150, LM-AP) is supplied via M-NET transmission line. M-NET transmission line at TB7 side is called Centralized control transmission line while one at TB3 side is called Indoor-Outdoor/Heat source transmission line. There are 3 ways to supply power to the System controller .

A) Connecting to TB3 of the Outdoor/Heat source unit and receiving power from the Outdoor/Heat source unit.
B) Connecting to TB7 of the Outdoor/Heat source unit and receiving power from the Outdoor/Heat source unit.
(Not applicable to the PUMY model and PUHY/PURY-TLMU/TKMU model)
C) Connecting to TB7 of the Outdoor/Heat source unit but receiving power from power supply unit PAC-SC51KUA.
* System controllers (AE-200A, AE-50A, EW-50A, BAC-HD150, LM-AP) have a built-in function to supply power to the M-NET transmission lines, so no power needs to be supplied to the M-NET transmission lines from the Outdoor/Heat source units or from PAC-SC51KUA.

2-3-3-A. When connecting to TB3 of the Outdoor/Heat source unit and receiving power from the Outdoor/Heat source unit.

Maximum 3 System controllers can be connected to TB3.
If there is more than 1 Outdoor/Heat source unit, it is necessary to replace power supply switch connector CN41 with CN40 on one Outdoor/Heat source unit.

Fig. 2-3-3-A

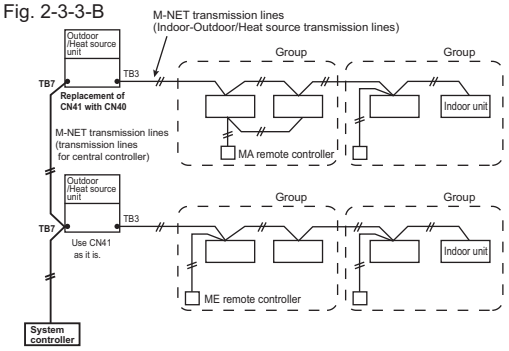


2-3-3-B. When connecting to TB7 of the Outdoor/Heat source unit and receiving power from the Outdoor/Heat source unit. (Not applicable to the PUMY model and PUHY/PURY-TLMU/TKMU model)

Maximum 6 System controllers can be connected to TB7 and receiving power from the Outdoor/Heat source unit.
(Not applicable to the PUMY model and PUHY/PURY-TLMU/TKMU model)
It is necessary to replace power supply switch connector CN41 with CN40 on one Outdoor/Heat source unit.

Note (only for PUHY/PURY model)
· When YLMU/YKMU Outdoor unit model is used, the male power supply connector can be connected to CN40, and the System controller can be connected to TB7 side.
· When the male power supply connector is connected from TLMU/TKMU Outdoor unit to CN40, the power is supplied to TB7 side even when the main power of the TLMU/TKMU outdoor unit is switched off, and the System controller may store an error in the error history and emit an alarm signal.
· If only LOSSNAY units or outdoor units in different refrigerant circuits are connected to TB7 side, the male power supply connector can be connected from TLMU/TKMU outdoor unit to CN40.

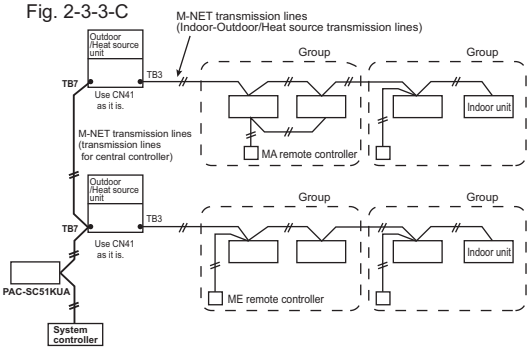
Fig. 2-3-3-B



2-3-3-C. When connecting to TB7 of the Outdoor/Heat source unit but receiving power from PAC-SC51KUA.

When using PAC-SC51KUA to supply transmission power, the power supply connector CN41 on the Outdoor/Heat source units should be kept as it is. It is also a factory setting.
1 PAC-SC51KUA supports maximum 1 AG-150A-A or 1 EB-50GU-A unit due to the limited power 24VDC at its TB3.
However, 1 PAC-SC51KUA supplies transmission power at its TB2 equal to 5 Indoor units, which is referable at Table 2.
If PZ-52SF, System controller, ON/OFF controller connected to TB7 consume transmission power more than 5 (Indoor units), Transmission booster PAC-SF46EPA is needed. PAC-SF46EPA supplies transmission power equal to 25 Indoor units.

Fig. 2-3-3-C

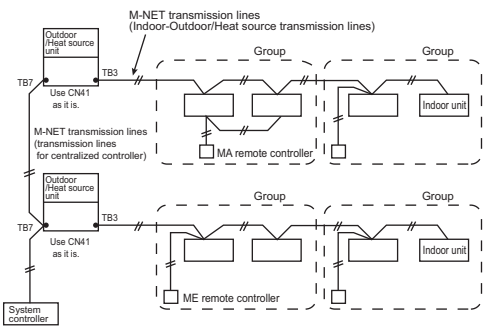


⚠ CAUTION

■AG-150A-A/EB-50GU-A*1 are recommended to connect to TB7 because it performs back-up to a number of data.
In an air conditioner system has more than 1 Outdoor/Heat source units, AG-150A-A/EB-50GU-A receiving transmission power through TB3 or TB7 on one of the Outdoor/Heat source units would have a risk that the connected Outdoor/Heat source unit failure would stop power supply to AG-150A-A/EB-50GU-A and disrupt the whole system.
When applying apportioned electric power function, AG-150A-A/EB-50GU-A are necessary to connected to TB7 and has its own power supply unit PAC-SC51KUA.
Note: Power supply unit PAC-SC51KUA is for AG-150A-A/EB-50GU-A.
*1: AG-150A-A is an example model of system controllers.

■How to connect system controllers (AE-200A, AE-50A, EW-50A, BAC-HD150, LM-AP) to a given system
System controllers (AE-200A, AE-50A, EW-50A, BAC-HD150, LM-AP) have a built-in function to supply power to the M-NET transmission lines, so no power needs to be supplied to the M-NET transmission lines from the Outdoor/Heat source units or from PAC-SC51KUA.
Leave the power supply connector on the Outdoor/Heat source unit connected to CN41 as it is.
Refer to 2-3-2 for information about the power-supply capacity of each system controller (EW-50A, BAC-HD150, LM-AP) to the low-level system controllers.

Fig. 2-3-3-D



2-3-4. Power supply to LM-AP

1-phase 208-230V AC power supply is needed.
The power supply unit PAC-SC51KUA is not necessary when connecting only the LM-AP. Yet, make sure to change the power supply changeover connector CN41 to CN40 on the LM-AP.

2-3-5. Power supply to expansion controller

1-phase 100-240VAC power supply is needed.
The power supply unit PAC-SC51KUA is not necessary.
The expansion controller supplies power through TB3, which equals 6 indoor units. (refer to Table 2)

2-3-6. Power supply to BM ADAPTER

1-phase 100-240VAC power supply is needed.
The power supply unit PAC-SC51KUA is not necessary when only BM ADAPTER is connected.
Yet, make sure to move the power jumper from CN41 to CN40 on the BM ADAPTER.

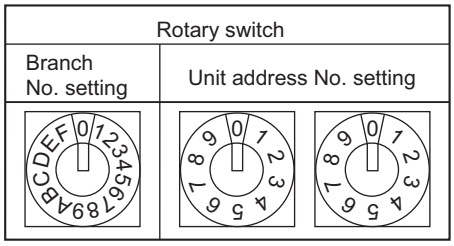
2-3-7. Power supply to AE-200A/AE-50A/EW-50A

1-phase 100-240VAC power supply is needed.
The power supply unit PAC-SC51KUA is not necessary when connecting only the AE-200A/AE-50A/EW-50A.

2-4. Address setting

2-4-1. Switch operation

In order to constitute CITY MULTI in a complete system, switch operation for setting the unit address No. and connection No. is required.



① Address No. of heat source unit, indoor unit and ME remote controller.
The address No. is set at the address setting board.
In the case of WR2 system, it is necessary to set the same No. at the branch No. switch of indoor unit as that of the BC controller connected. (When connecting two or more branches, use the lowest branch No.)

② Caution for switch operations

- Be sure to shut off power source before switch setting. If operated with power source on, switch can not operate properly.
- No units with identical unit address shall exist in one whole air conditioner system. If set erroneously, the system can not operate.

③ MA remote controller

- When connecting only one remote controller to one group, it is always the main remote controller. When connecting two remote controllers to one group, set one remote controller as the main remote controller and the other as the sub remote controller.
- The factory setting is "Main".

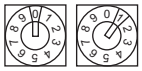
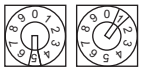
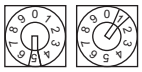
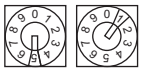
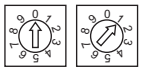
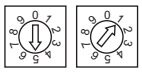
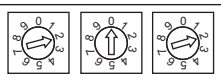
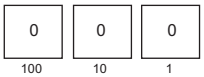
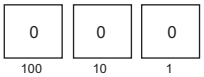
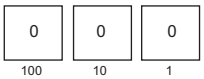
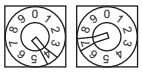
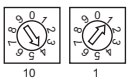
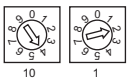
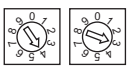
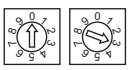
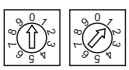
PAC-YT53CRAU

Setting the dip switches

There are switches on the back of the top case. Remote controller Main/Sub and other function settings are performed using these switches. Ordinarily, only change the Main/Sub setting of SW1.
(The factory settings are ON for SW1, 3, and 4 and OFF for SW2.)

SW No	SW contents Main	ON	OFF	Comment
1	Remote controller Main/Sub setting	Main	Sub	Set one of the two remote controllers at one group to "ON".
2	Temperature display units setting	Celsius	Fahrenheit	When the temperature is displayed in [Fahrenheit], set to "OFF".
3	Cooling/heating display in AUTO mode	Yes	No	When you do not want to display "Cooling" and "Heating" in the AUTO mode, set to "OFF".
4	Indoor temperature display	Yes	No	When you do not want to display the indoor temperature, set to "OFF".

2-4-2. Rule of setting address

Unit		Address setting	Example	Note
Indoor unit System control interface (MAC-333IF-E) A-M converter (PAC-IF01MNT-E)		01 ~ 50		Use the most recent address within the same group of indoor units. Make the indoor units address connected to the BC controller (Sub) larger than the indoor units address connected to the BC controller (Main). If applicable, set the sub BC controllers in an PQRY system in the following order: (1) Indoor unit to be connected to the BC controller (Main) (2) Indoor unit to be connected to the BC controller (No.1 Sub) (3) Indoor unit to be connected to the BC controller (No.2 Sub) Set the address so that (1)<(2)<(3)
Heat source unit		51 ~ 99, 100 (Note1)		The smallest address of indoor unit in same refrigerant system + 50 Assign sequential address numbers to the heat source units in one refrigerant circuit system. OC and OS are automatically detected. (Note 2) * Please reset one of them to an address between 51 and 99 when two addresses overlap. * The address automatically becomes "100" if it is set as "01~ 50"
BC controller (Main)		52 ~ 99, 100		The address of heat source unit + 1 * Please reset one of them to an address between 51 and 99 when two addresses overlap. * The address automatically becomes "100" if it is set as "01~ 50"
BC controller (Sub)		52 ~ 99, 100		Lowest address within the indoor units connected to the BC controller (Sub) plus 50.
Local remote controller	ME, LOSSNAY Remote controller (Main)	101 ~ 150	1 Fixed 	The smallest address of indoor unit in the group + 100 * The place of "100" is fixed to "1"
	ME, LOSSNAY Remote controller (Sub)	151 ~ 199, 200	1 Fixed 	The address of main remote controller + 50 * The address automatically becomes "200" if it is set as "00"
System controller	ON/OFF remote controller	201 ~ 250		The smallest group No. to be managed + 200 * The smallest group No. to be managed is changeable.
	AE-200A/AE-50A AG-150A-A EB-50GU-A EW-50A TC-24B	000, 201 ~ 250		* TC-24B cannot be set to "000".
	PAC-YG50ECA	000, 201 ~ 250		* Settings are made on the initial screen of AG-150A-A.
	BAC-HD150	000, 201 ~ 250		* Settings are made with setting tool of BM ADAPTER.
	LMAP04U-E	201 ~ 250	2 Fixed 	
PI, AI, DIDO	PAC-YG60MCA	01 ~ 50		
	PAC-YG63MCA	01 ~ 50		
	PAC-YG66DCA	01 ~ 50		
LOSSNAY		01 ~ 50		After setting the addresses of all the indoor units, assign an arbitrary address.
PAC-IF01AHC-J		201 ~ 250	2 Fixed 	

Note1: To set the address to "100", set it to "50"
Note2: Heat source units OC and OS in one refrigerant circuit system are automatically detected.
OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.

2-4-3. System examples

Factory setting

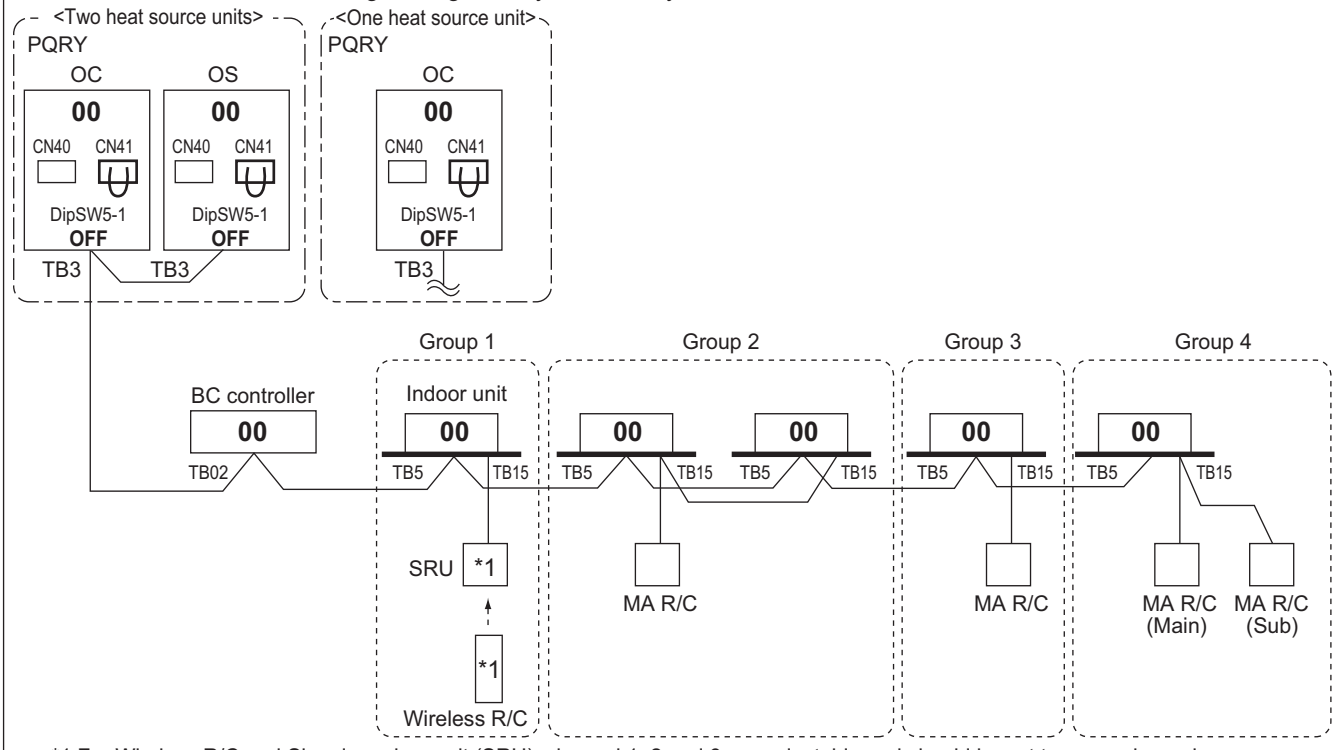
Original switch setting of the heat sources, indoors, controllers, LM-AP, and BM ADAPTER at shipment is as follows.

- Heat source unit : Address: 00, CN41: ON (Jumper), DipSW5-1: OFF
- Indoor unit : Address: 00
- BC controller : Address: 00
- ME remote controller : Address: 101
- LM-AP : Address: 247, CN41: ON (Jumper), DipSW1-2: OFF
- BM ADAPTER : Address: 000, CN41: ON (Jumper)
- AE-200A/AE-50A/EW-50A : Address: 000, CN21: ON (Jumper)

Setting at the site

- DipSW5-1(Heat source) : When the System Controller is used, all the Dip SW5-1 at the heat source units should be set to "ON". * Dip SW5-1 remains OFF when only LM-AP is used.
- DipSW1-2(LM-AP) : When the LM-AP is used together with System Controller, DipSW1-2 at the LM-AP should be set to "ON".
- CN40/CN41 : Change jumper from CN41 to CN 40 at heat source control board will activate central transmission power supply to TB7;
  (Change jumper at only one heat source unit when activating the transmission power supply without using a power supply unit.)
  Change jumper from CN41 to CN 40 at LM-AP/BM ADAPTER will activate transmission power supply to LM-AP/BM ADAPTER itself;
  Power supply unit is recommended to use for a system having more than 1 heat source unit, because the central transmission power supply from TB7 of one of heat source units is risking that the heat source unit failure may let down the whole central control system.
- CN21(AE-200A/AE-50A/EW-50A) : Activates the power supply to M-NET transmission line from AE-200A/AE-50A/EW-50A (CN21: ON (power supplied), OFF (power not supplied)

2-4-3-1. MA remote controller, Single-refrigerant-system, No System Controller

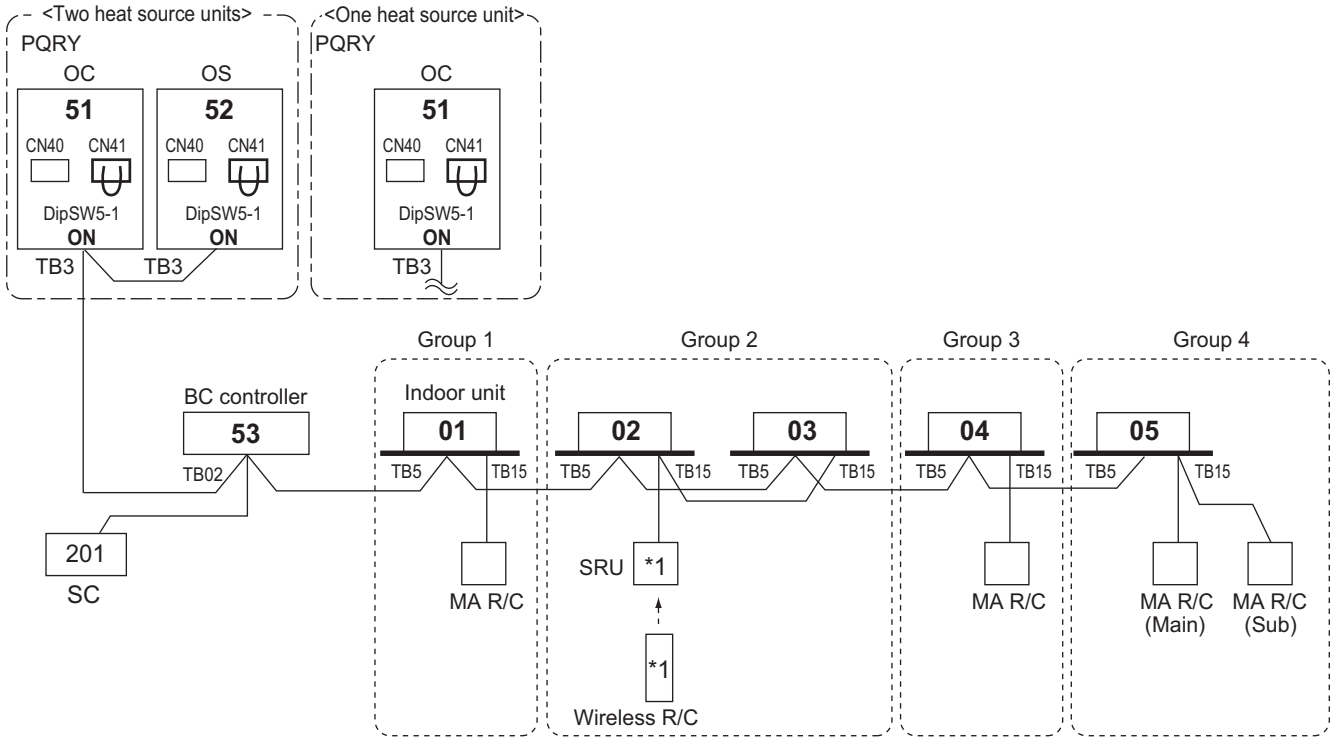


*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

NOTE:

1. Heat source units OC and OS in one refrigerant circuit system are automatically detected.
   OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
2. No address setting is needed.
3. For a system having more than 32 indoor unit (P06-P54), confirm the need of Booster at **2-3 "System configuration restrictions".**
4. Indoor units should be set with a branch number.
5. Address setting is required if a sub BC controller is connected.

2-4-3-2. MA remote controller, Single-refrigerant-system, System Controller

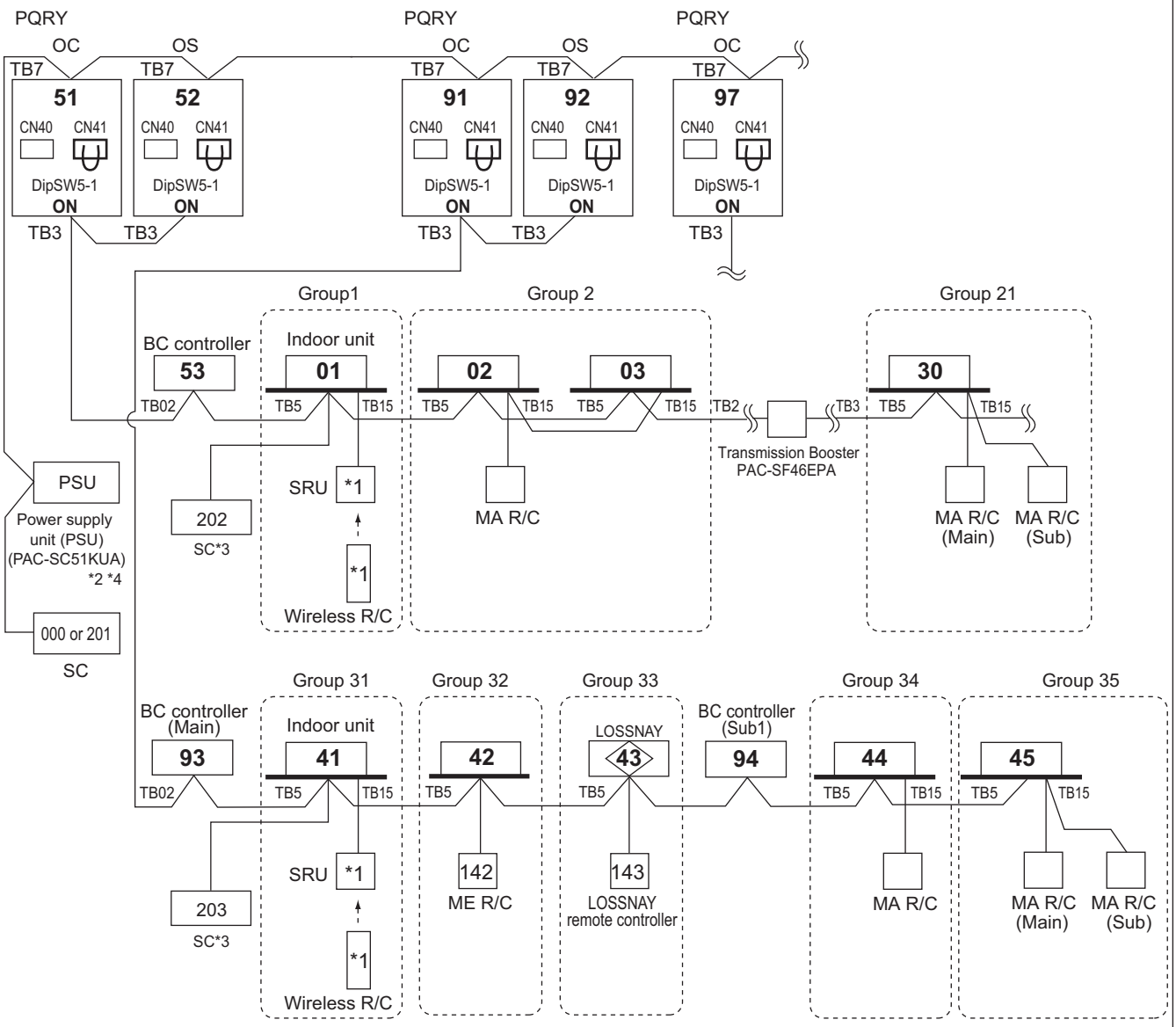


*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

*SC can be connected to TB3 side or TB7 side;
Should SC connected to TB7 side, change Jumper from CN41 to CN40 at the Heat source unit module so as to supply power to the SC.

NOTE:
1. Heat source units OC and OS in one refrigerant circuit system are automatically detected.
   OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
2. Address should be set to Indoor units and central controller.
3. For a system having more than 32 indoor unit (P06-P54), confirm the need of Booster at **2-3 "System configuration restrictions".**
4. Indoor units should be set with a branch number.

2-4-3-3. MA remote controller, Multi-refrigerant-system, System Controller at TB7/TB3 side, Booster for long M-NET wiring



*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

*2 System controller should connect to TB7 at the Heat source unit and use power supply unit together in Multi-Refrigerant-System.
For AG-150A-A, 24VDC should be used with the PAC-SC51KUA.

For AE-200A, AE-50A, and EW-50A the power supply unit PAC-SC51KUA is unused.

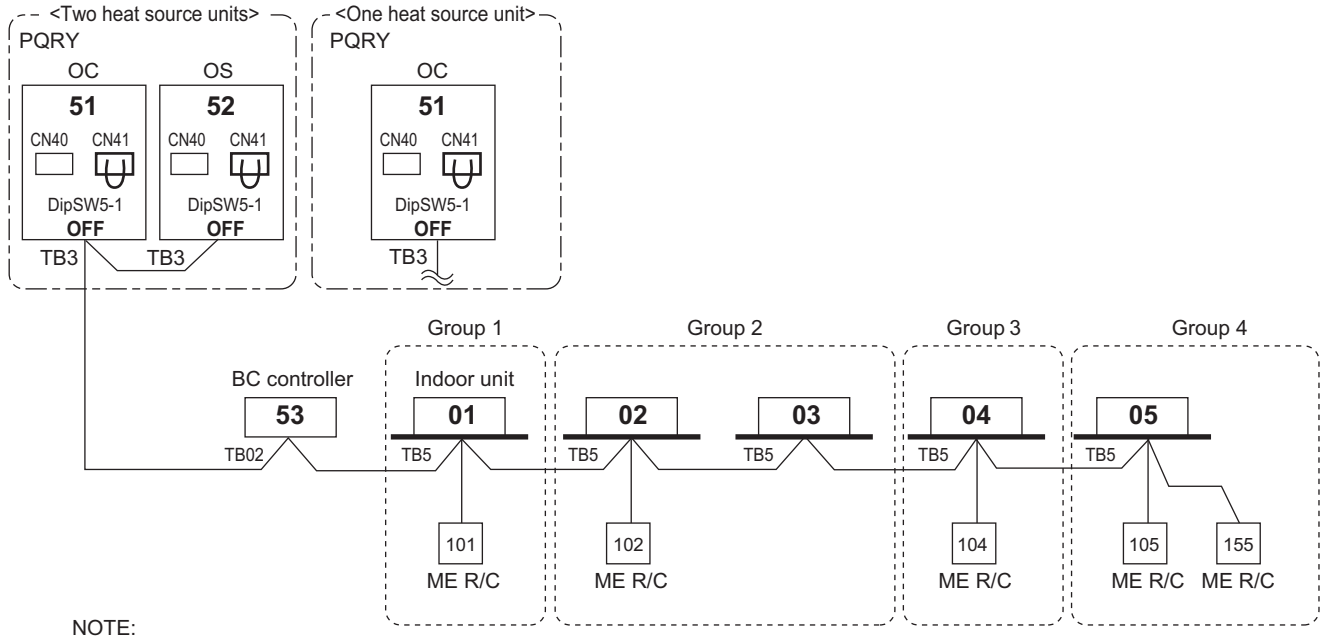
*3 When multiple system controllers are connected in the system, set the controller with more functions than others as a "main" controller and others as "sub".
AE-200A, AE-50A, EW-50A, BAC-HD150, and LM-AP are for exclusive use as a "main" system controller and cannot be used as a “sub” system controller. Make the setting to only one of the system controllers for "prohibition of operation from local remote controller".

*4 The power supply unit is not necessary for AE-200A, AE-50A, EW-50A, BAC-HD150, and LM-AP.

NOTE:

1. Heat source units OC and OS in one refrigerant circuit system are automatically detected.
OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
2. Address should be set to Indoor units, LOSSNAY and system controller.
3. M-NET power is supplied by the Heat source unit at TB3, while Indoor unit and ME remote controller consume the M-NET power for transmission use. The power balance is needed to consider for long M-NET wiring. Details refer to **2-3 "System configuration restrictions".**
4. Indoor units should be set with a branch number.
5. Assign an address to each of the sub BC controllers which equals the sum of the smallest address of the indoor units that are connected to each sub BC controller and 50.

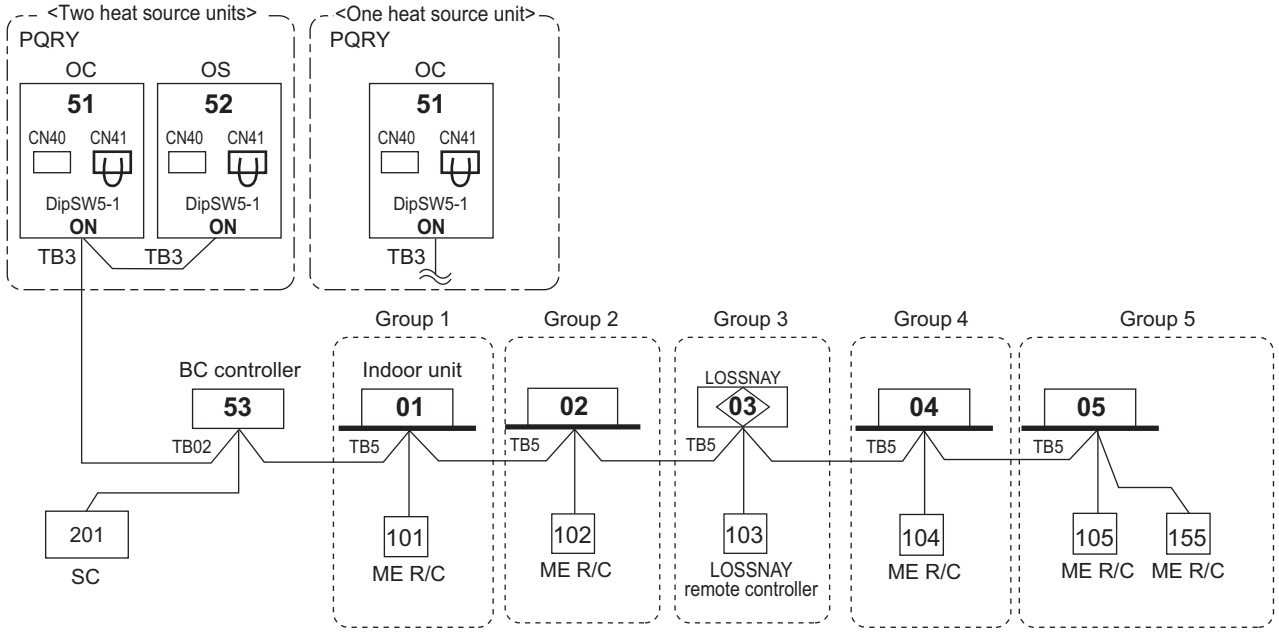
2-4-3-4. ME remote controller, Single-refrigerant-system, No system controller



NOTE:

1. Heat source units OC and OS in one refrigerant circuit system are automatically detected.
   OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
2. Address should be set to Indoor units, system controller and ME remote controllers.
3. M-NET power is supplied by the Heat source unit at TB3, while Indoor unit and ME R/C consume the M-NET power for transmission use. The power balance is needed to consider for long M-NET wiring. Details refer to **2-3 "System configuration restrictions".**
4. Indoor units should be set with a branch number.

2-4-3-5. ME remote controller, Single-refrigerant-system, System controller, LOSSNAY



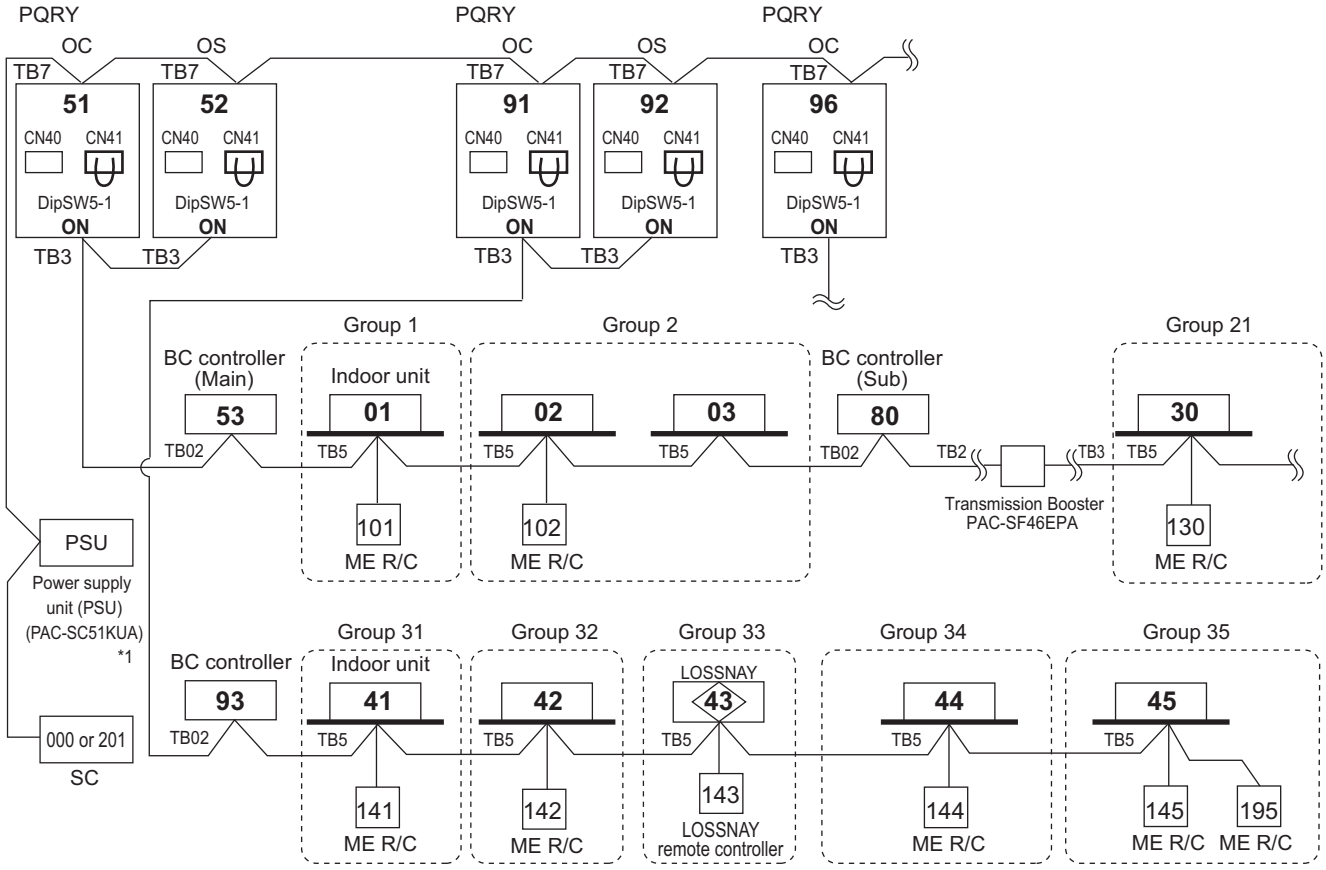
*SC can be connected to TB3 side or TB7 side;
Should SC connected to TB7 side, change Jumper from CN41 to CN40 at the Heat source unit module so as to supply power to the SC.

NOTE:

1. Heat source units OC and OS in one refrigerant circuit system are automatically detected.
   OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
2. Address should be set to Indoor units, LOSSNAY, system controller, and ME remote controllers.
3. For a system having more than 32 indoor unit (P06-P54), confirm the need of Booster at **2-3 "System configuration restrictions".**
4. Indoor units should be set with a branch number.

S.D. WR2 575V

2-4-3-6. ME remote controller, Multi-refrigerant-system, System Controller at TB7 side, LOSSNAY, Booster for long M-NET wiring



*1 System controller should connect to TB7 at the Heat source unit and use power supply unit together in Multi-Refrigerant-System.
For AG-150A-A, 24VDC should be used with the PAC-SC51KUA. For AE-200A, AE-50A, and EW-50A the power supply unit PAC-SC51KUA is unused.

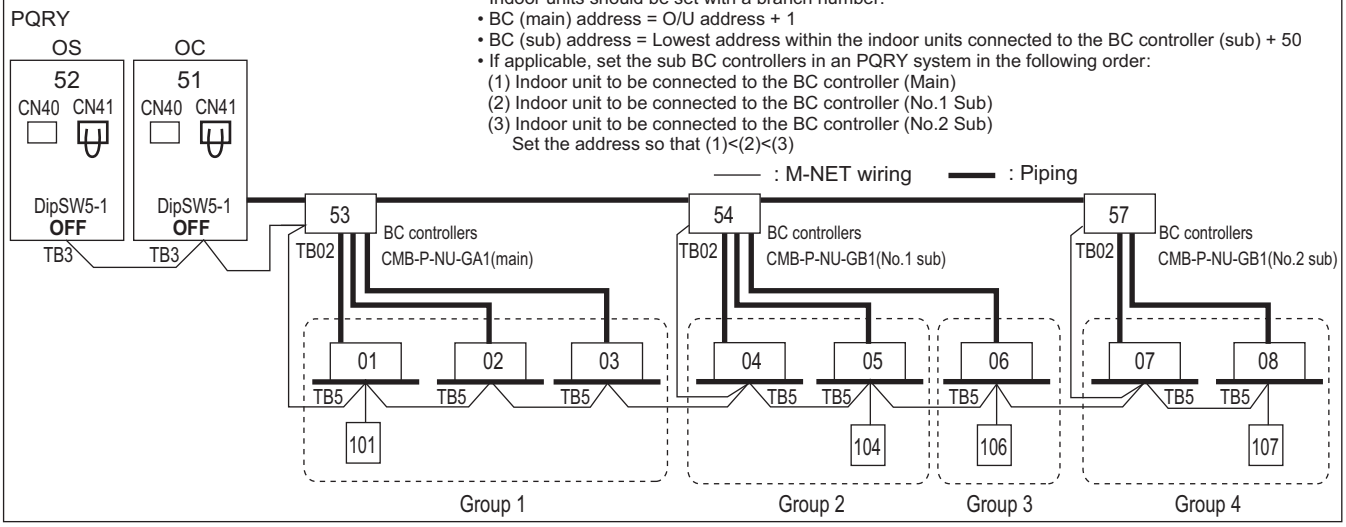
NOTE:

1. Heat source units OC and OS in one refrigerant circuit system are automatically detected.
   OC and OS are ranked in descending order of capacity. If units are the same capacity, they are ranked in ascending order of their address.
2. M-NET power is supplied by the Heat source unit at TB3, while Indoor unit and ME R/C consume the M-NET power for transmission use. The power balance is needed to consider for long M-NET wiring. Details refer to **2-3 "System configuration restrictions".**
3. Indoor units should be set with a branch number.
4. Assign an address to each of the sub BC controllers which equals the sum of the smallest address of the indoor units that are connected to each sub BC controller and 50.
   When the address assigned to sub BC controller overlaps those of any other units including heat source units (OC/OS) or main BC controller, sub BC controller will be given priority to have the address.

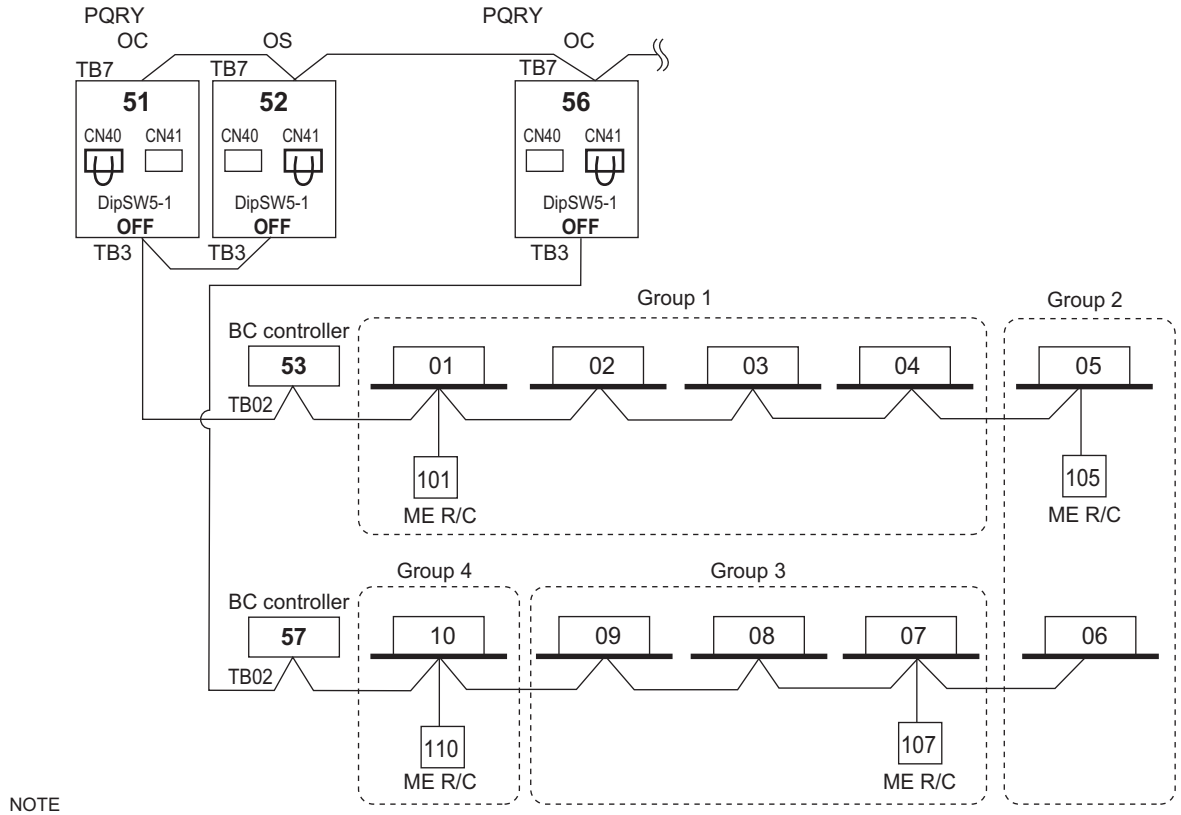
2-4-3-7. Example: BC, BC sub

NOTE

- Indoor units should be set with a branch number.
- BC (main) address = O/U address + 1
- BC (sub) address = Lowest address within the indoor units connected to the BC controller (sub) + 50
- If applicable, set the sub BC controllers in an PQRY system in the following order:
  (1) Indoor unit to be connected to the BC controller (Main)
  (2) Indoor unit to be connected to the BC controller (No.1 Sub)
  (3) Indoor unit to be connected to the BC controller (No.2 Sub)
  Set the address so that (1)<(2)<(3)

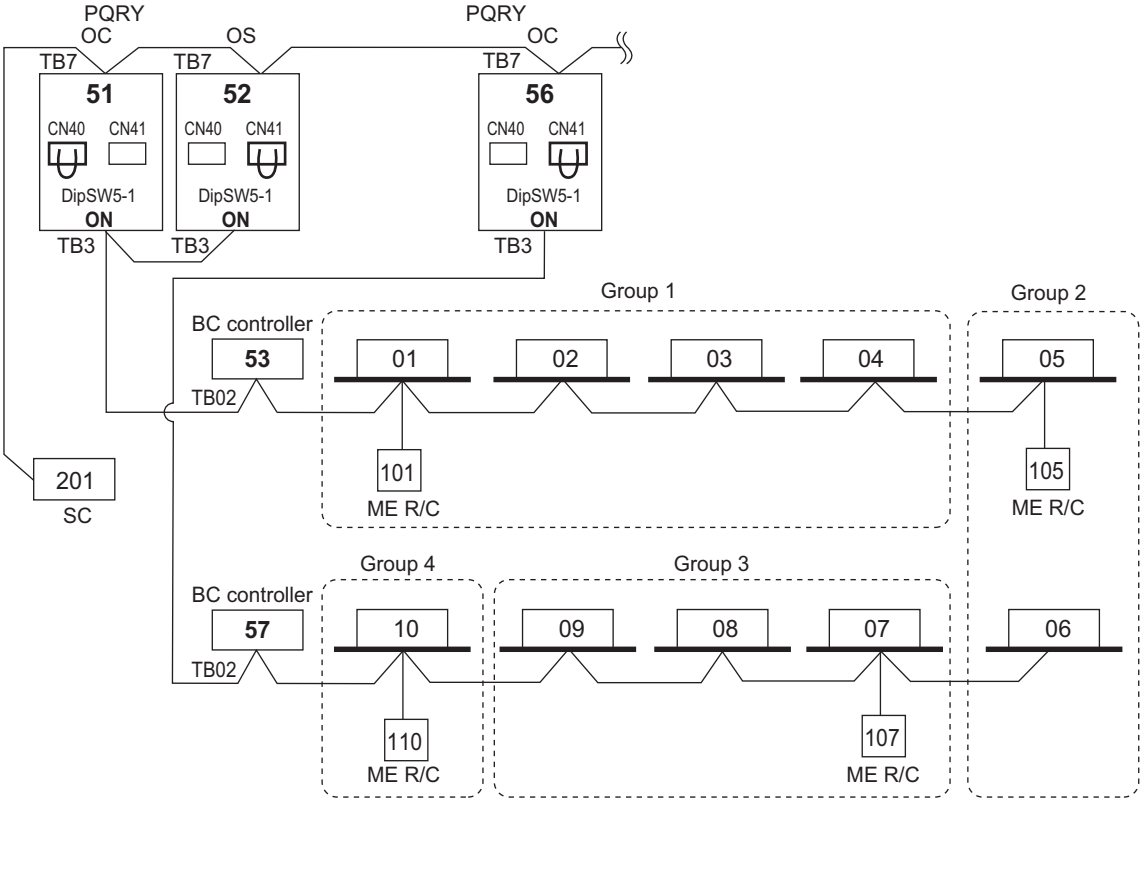


2-4-3-8. ME remote controller, Multi-refrigerant-system, No Power supply unit



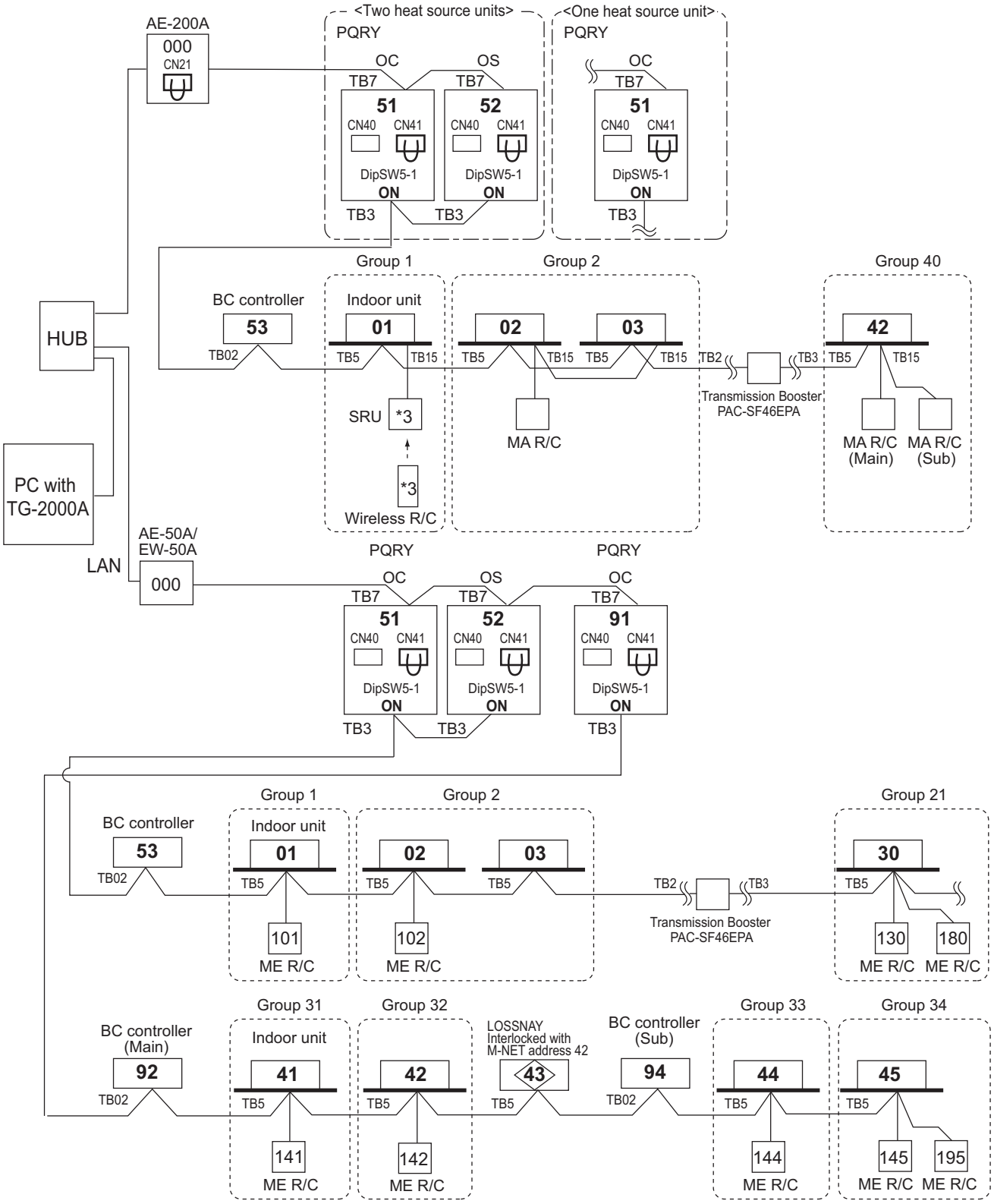
NOTE
- It is necessary to change the connecter to CN40 on the heat source unit control board (only one heat source unit) when the group is set between other refrigerant systems.
- It is necessary to set on the remote controller by manual when group sets on the different refrigerant system. Please refer to remote controller installation manual.

2-4-3-9. ME remote controller, Multi-refrigerant-system, System Controller at TB7 side, No Power supply unit



2-4-3-10. TG-2000A(*1)+AE-200A/AE-50A/EW-50A

AE-200A can control max. 50 indoor units;
TG-2000A can control max. 40 AE-200A, AE-50A, and EW-50A;*2
TG-2000A can control max. 2000 indoor units.

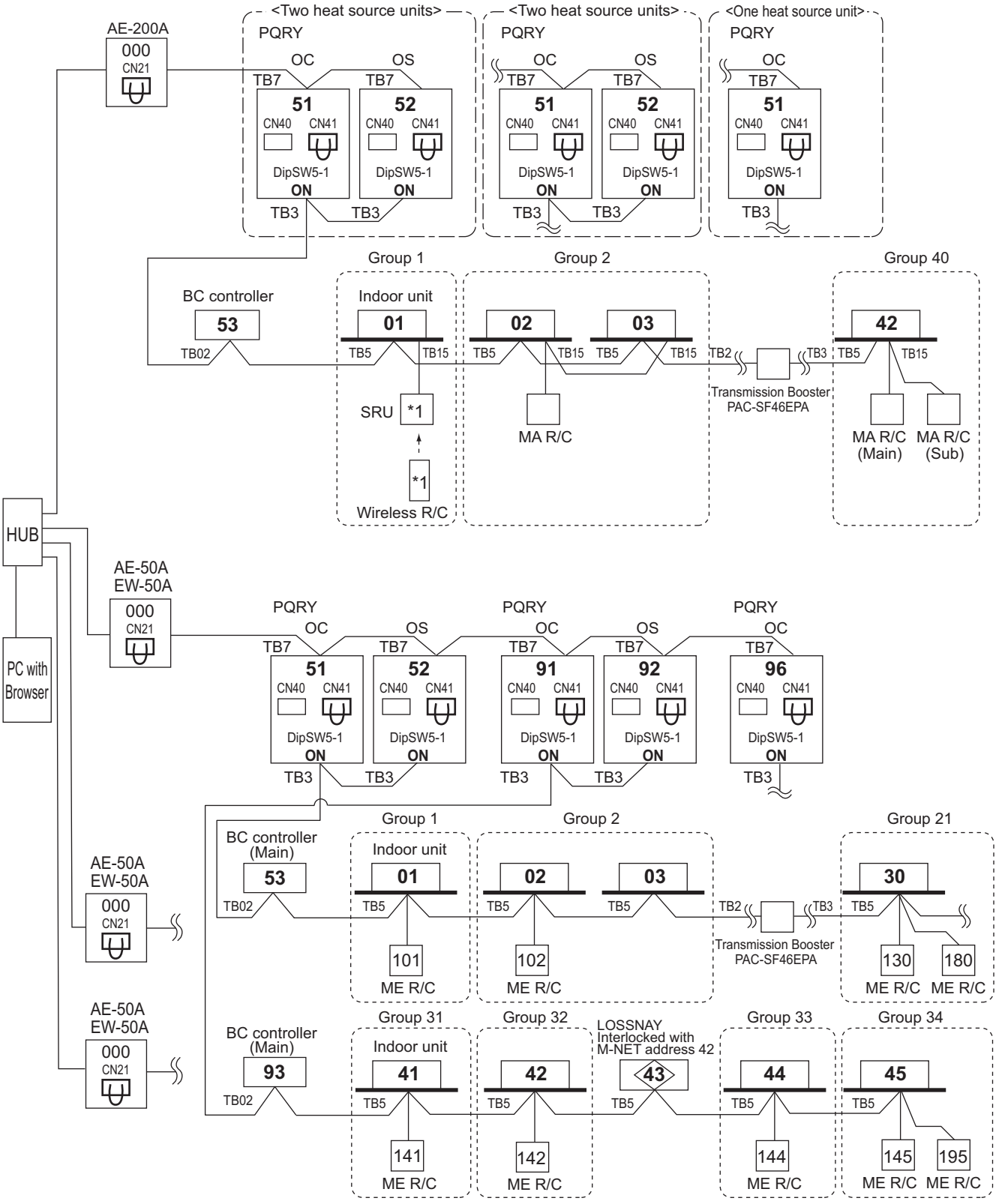


*1 TG-2000A (Ver.6.5 or later) supports AE-200A/AE-50A (Ver.7.10 or later).
TG-2000A (Ver.6.60 or later) supports EW-50A.

*2 When AE-200A connected with AE-50A is connected, the number of AE-50A will be the maximum controllable number.
TG-2000A can control up to 40 AE-200A/AE-50A or AE-200A without AE-50A connection.

*3 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

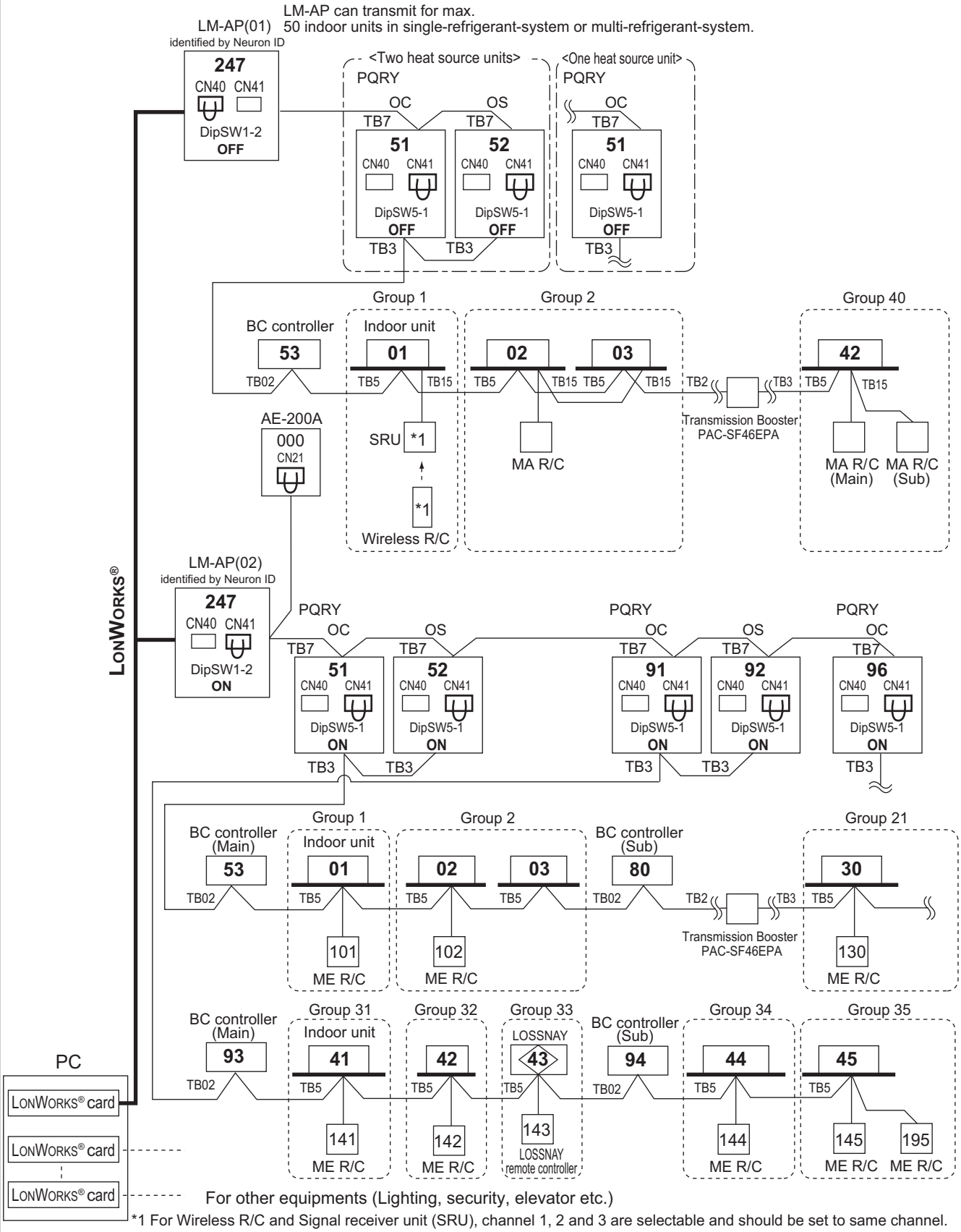
2-4-3-11. AE-200A + AE-50A, EW-50A
AE-200A can control max. 200 indoor units/via AE-50A.



*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

2-4-3-12. LM-AP

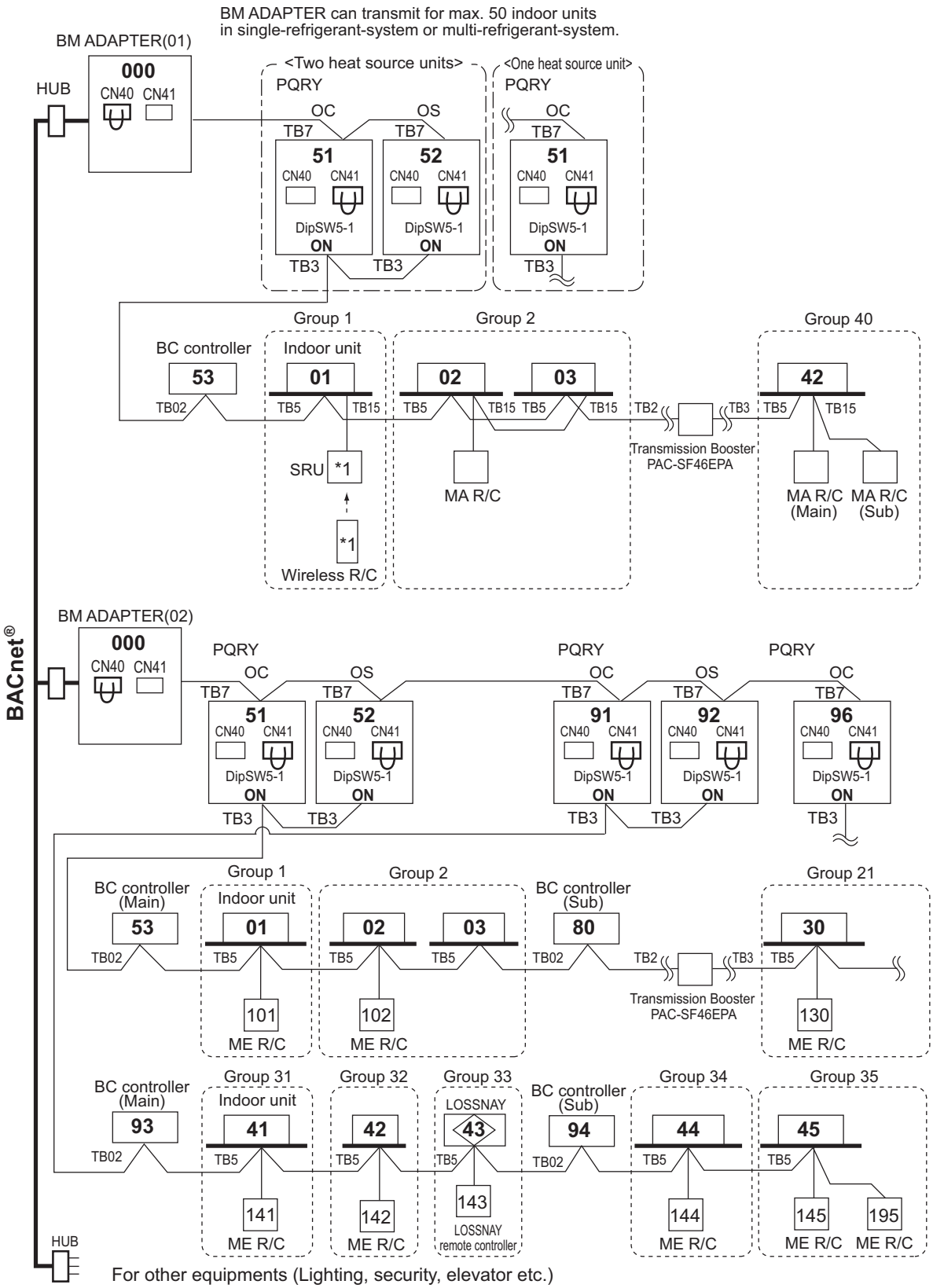
LM-AP can transmit max. 50 indoor units;
If system controller (SC) is used, DipSW1-2 at LM-AP and DipSW5-1 at Heat source unit should set to "ON".
Change Jumper from CN41 to CN40 to activate power supply to LM-AP itself for those LM-AP connected without system controller (SC).



*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

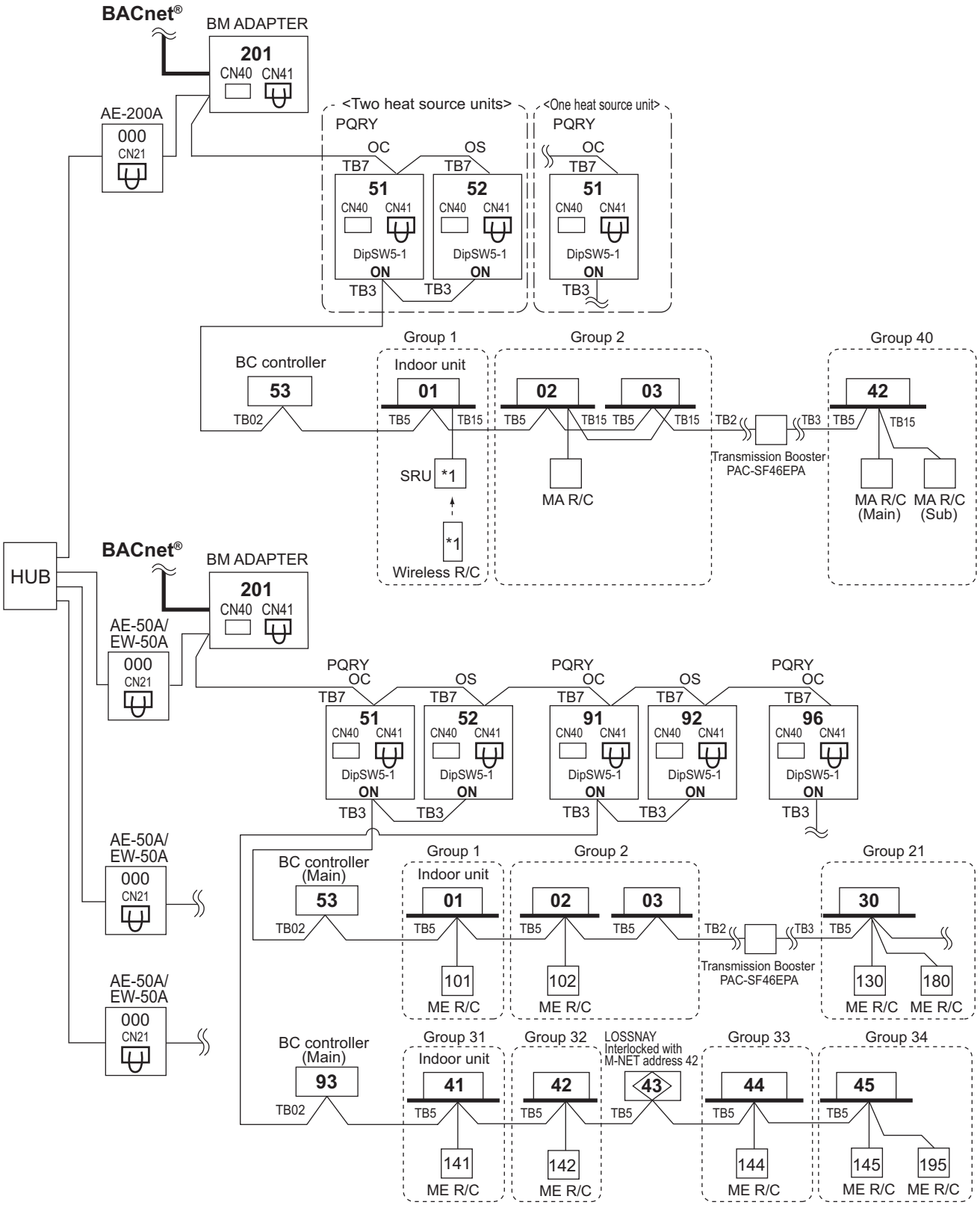
2-4-3-13. BM ADAPTER

BM ADAPTER can transmit max. 50 indoor units;
Change Jumper from CN41 to CN40 to activate power supply to BM ADAPTER itself for those BM ADAPTER connected without the power supply unit.



*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

2-4-3-14. BM ADAPTER+AE-200A/AE-50A/EW-50A



NOTE

•It is not necessary to connect the M-NET transmission line to the TB3 on BM ADAPTER. Leave the power jumper of BM ADAPTER connected to CN41.

*1 For Wireless R/C and Signal receiver unit (SRU), channel 1, 2 and 3 are selectable and should be set to same channel.

*2 Consult your dealer for restrictions when connecting both AE-200A/AE-50A and BM ADAPTER.

*3 In a system that uses AE-200A and/or AE-50A, each BM-ADAPTER must be connected to the M-NET line.

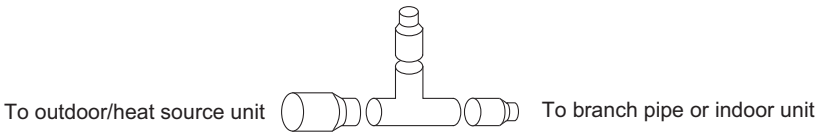
3-1. R410A Piping material

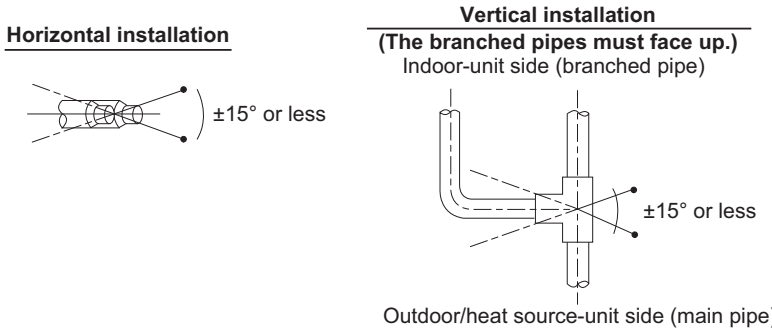
The maximum operation pressure of R410A air conditioner is 4.15 MPa [601 psi]. The refrigerant piping should ensure the safety under the maximum operation pressure. You shall follow the local industrial standard.

Procedures for installing the branched pipes

Refer to the instructions that came with the branched pipe kit (separately sold) for details.
[1] Branches on the indoor-unit side

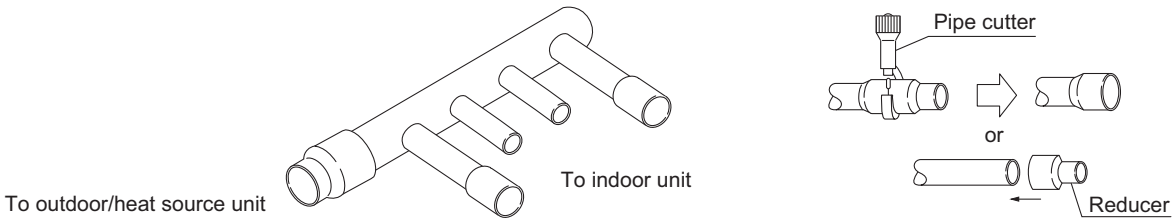
■Joint





- Restrictions for installing the joint described here only apply to CMY-Y202S-G2 and CMY-Y302S-G2 in the gas line.
- CMY-Y202S-G2 and CMY-Y302S-G2 in the gas line must be installed horizontally (see figure above) or with the branched pipes facing up.
- If the size of the refrigerant pipe that is selected by following the instructions under 3-2. Piping Design does not match the size of the joint, use a reducer to connect them. A reducer is included in the kit.

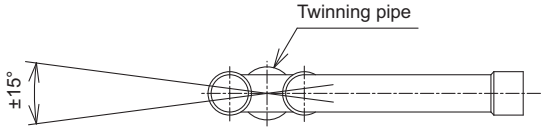
■Header



- No restrictions apply to the installation of the header.
- If the size of the refrigerant pipe that is selected by following the instructions under 3-2. Piping Design does not match the size of the header, cut the pipe to an appropriate size using a pipe cutter, or use a reducer to connect them.
- If the number of header branches exceeds the number of pipes to be connected, cap the unused header branches. Caps are included in the kit.

[2] Branches on the outdoor/heat source-unit side

Note. Refer to the figure below for the installation position of the twinning pipe.



Slope of the twinning pipes are at an angle within ±15° to the horizontal plane.

- Inclination of the branched pipes
  The inclination of the branched pipes must be ±15° or less against the horizontal plane.
  Excessive inclination of the branched pipes may damage the unit.

- Minimum length of the straight section of the pipe before the branched pipes
  Always use the pipes supplied in the branched pipe kit, and make sure the straight section of the pipe immediately before it connects to the branched pipe is at least 500 mm. Failure to do so may damage the unit.

3-2. Piping Design

3-2-1. IF 16 ports or less are in use, i.e., if only one BC controller is in use with no sub BC controller.

Note1. PQRY systems do not require headers.
Note2. Indoor units sized P72-P96 should be connected to a BC controller using the Y-shaped CMY-R160-J1 joint adapter. These indoor units cannot use the same BC controller ports as other units. (They must use their own individual BC controller port.)
Note3. As bends cause pressure loss on transportation of refrigerant, the fewer bends in the system, the better it is. Piping length needs to factor in the actual length and equivalent length in which the bends are counted.
Note4. Indoor units connected to the BC controller sharing one port cannot operate separately in heating and cooling modes simultaneously; i.e., they must function in either heating or cooling in tandem.
Note5. Indoor unit capacities are included in the model name. For example, PEFY-P24NMSU-E has a capacity of 24,000 BTUs.
Note6. Total "downstream indoor capacity" is the total of all the indoor units connected downstream. For example, PEFY-P24NMSU-E + PEFY-P12NMSU-E: Total Indoor Unit Capacity = P24 + P12 = P36.

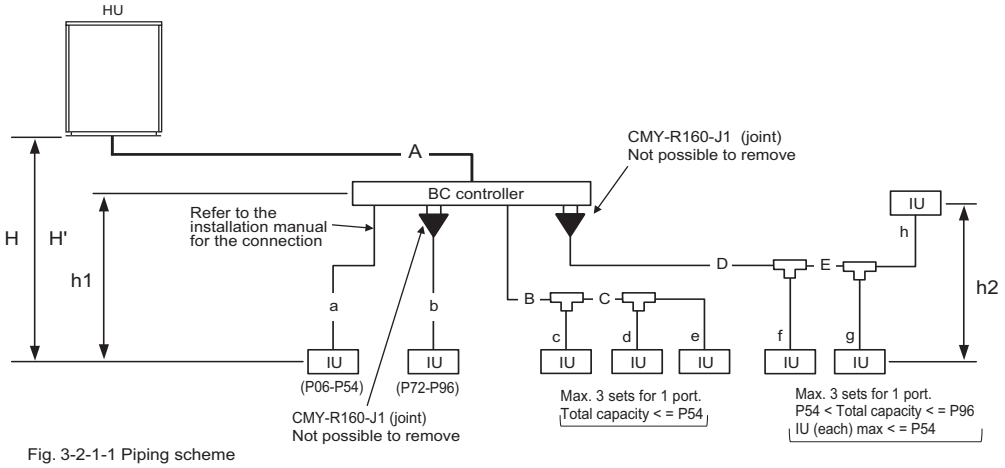


Fig. 3-2-1-1 Piping scheme

Piping length limitation **(m [ft.])**

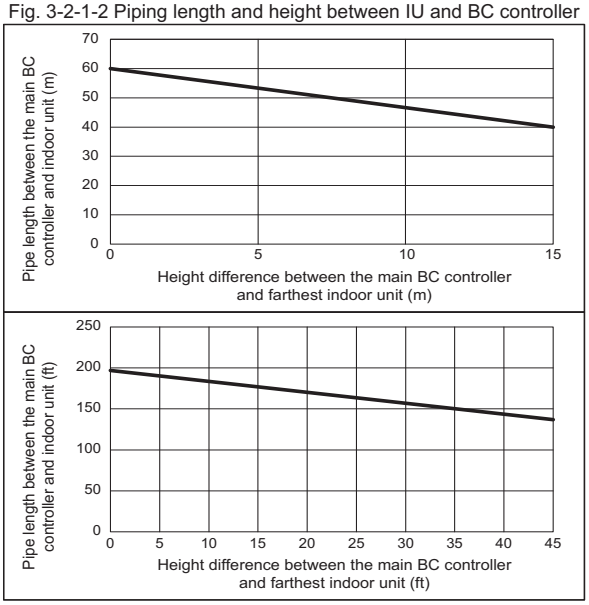
Item	Piping in the figure	Max. length	Max. equivalent length
Total piping length	A+B+C+D+E+a+b+c+d+e+f+g+h	*1	-
Farthest IU from HU	A+D+E+h	165 [541']	190 [623']
Distance between HU and BC	A	110 [360'] *1	110 [360'] *1
Farthest IU from BC controller	D+E+h	40 [131'] *2	40 [131'] *2
Height between HU and IU (HU above IU)	H	50 [164']	-
Height between HU and IU (HU under IU)	H'	40 [131']	-
Height between IU and BC	h1	15 [49'] (10 [32']) *3	-
Height between IU and IU	h2	30 [98'] (20 [65']) *4	-

Bends equivalent length "M"

Heat source Model	M (m/bends [ft./bends])
P72ZLMU	0.35 [1.15']
P96ZLMU	0.42 [1.38']
P120ZLMU	0.47 [1.54']
P144ZLMU	0.50 [1.64']
P168ZLMU	0.50 [1.64']
P192ZLMU	0.50 [1.64']

HU: Heat source Unit; IU: Indoor Unit; BC: BC controller
*1. Please refer to 3-2-4.
*2. Farthest Indoor from BC controller "D+E+h" can exceed 40 m [131 ft.] till 60 m [197 ft.] if no Indoor sized P72, P96 connected. Details refer to Fig.3-2-1-2
*3. Distance of Indoor sized P72, P96 from BC must be less than 10 m [32 ft.], if any.
*4. Distance of Indoor sized P72, P96 from IU must be less than 20 m [65 ft.], if any.

Fig. 3-2-1-2 Piping length and height between IU and BC controller



Piping "A"size selection rule **(mm [in.])**

Heat source Model	Pipe(High pressure)	Pipe(Low pressure)
P72ZLMU	ø15.88 [5/8"]	ø19.05 [3/4"]
P96-120ZLMU	ø19.05 [3/4"]	ø22.20 [7/8"]
P144-192ZLMU	ø22.20 [7/8"]	ø28.58 [1-1/8"]

Piping "B", "C", "D", "E" size seleciton rule **(mm [in.])**

Total down-stream Indoor capacity	Pipe(Liquid)	Pipe(Gas)
P54 or less	ø9.52 [3/8"]	ø15.88 [5/8"]
P55-P72	ø9.52 [3/8"]	ø19.05 [3/4"]
P73-P96	ø9.52 [3/8"]	ø22.20 [7/8"]

Piping "a", "b", "c", "d", "e", "f", "g", "h" size selection rule (mm [in.])

Indoor Unit size	Pipe(Liquid)	Pipe(Gas)
P06 to P18	ø6.35 [1/4"]	ø12.70 [1/2"]
P24 to P54	ø9.52 [3/8"]	ø15.88 [5/8"]
P72	ø9.52 [3/8"]	ø19.05 [3/4"]
P96	ø9.52 [3/8"]	ø22.20 [7/8"]

3-2-2. IF more than 16 ports are in use, or if there is more than one BC controller in use for one heat source unit

Note1. PQRY systems do not require headers.
Note2. Indoor units sized P72-P96 should be connected to a BC controller using the Y-shaped CMY-R160-J1 joint adapter. These indoor units cannot use the same BC controller ports as other units. (They must use their own individual BC controller port.)
Note3. As bends cause pressure loss on transportation of refrigerant, the fewer bends in the system, the better it is. Piping length needs to factor in the actual length and equivalent length in which the bends are counted.
Note4. Indoor units connected to the BC controller sharing one port cannot operate separately in heating and cooling modes simultaneously; i.e., they must function in either heating or cooling in tandem.
Note5. For sub BC controller CMB-P-NU-GB1, the total connectable indoor unit capacity can be 126,000 BTUs or less. If two sub BC controllers are used, the total indoor unit capacity connected to BOTH sub BC controllers also cannot exceed 126,000 BTUs. For sub BC controller CMB-P1016NU-HB1 the total connectable indoor unit capacity can be 126,000 BTUs or less. However, if two sub controllers are used, the total indoor unit capacity connected to BOTH sub controllers must NOT exceed 168,000 BTUs.
Note6. Indoor unit capacities are included in the model name. For example, PEFY-P24NMSU-E has a capacity of 24,000 BTUs.
Note7. Total "downstream indoor capacity" is the total of all the indoor units connected downstream. For example, PEFY-P24NMSU-E + PEFY-P12NMSU-E: Total Indoor Unit Capacity = P24 + P12 = P36.

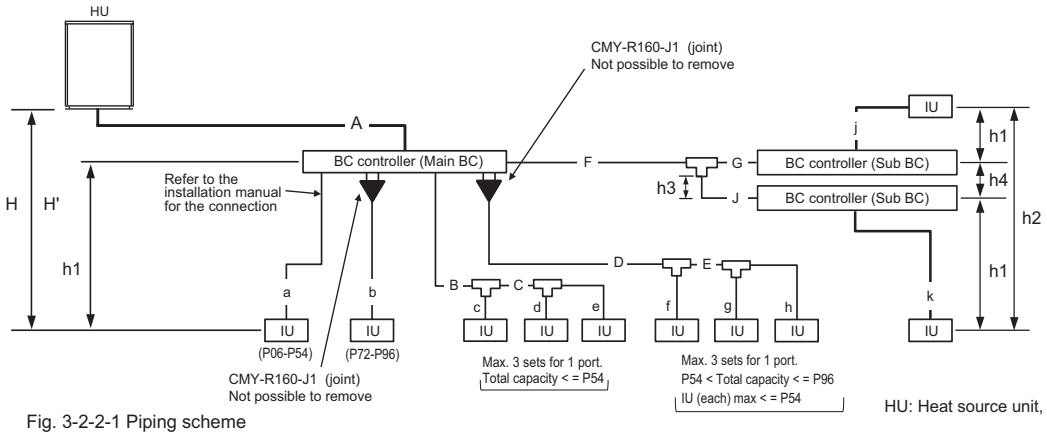


Fig. 3-2-2-1 Piping scheme

Piping length limitation **(m [ft.])**

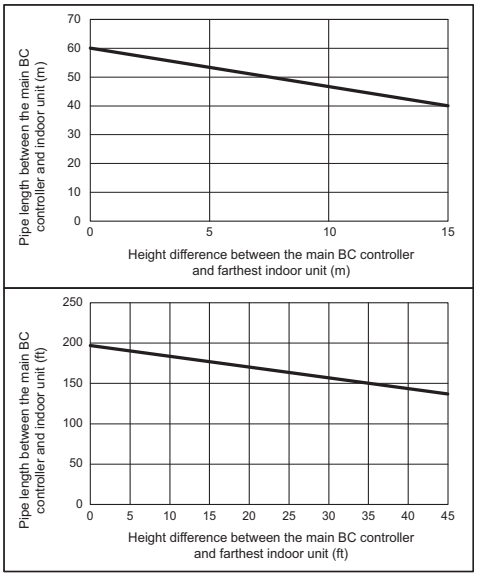
Item	Piping in the figure	Max. length	Max. equivalent length
Total piping length	A+B+C+D+E+F+G+J+a+b+c+d+e+f+g+h+j+k	*1	-
Farthest IU from HU	A+F+J+k	165 [541']	190 [623']
Distance between HU and BC	A	110 [360'] *1	110 [360'] *1
Farthest IU from BC controller	D+E+h or F+J+k	40 [131'] *2	40 [131'] *2
Height between HU and IU (HU above IU)	J	50 [164']	-
Height between HU and IU (HU under IU)	H'	40 [131']	-
Height between IU and BC	h1	15 [49'] (10 [32']) *3	-
Height between IU and IU	h2	30 [98'] (20 [65']) *4	-
Height between BC(Main) and BC(Sub)	h3	15 [49'] (10 [32']) *5	-
Height between BC(Sub) and BC(Sub)	h4	10 [32']	-

Bends equivalent length "M"

Heat source Model	M (m/bends [ft./bends])
P72ZLMU	0.35 [1.15']
P96ZLMU	0.42 [1.38']
P120ZLMU	0.47 [1.54']
P144ZLMU	0.50 [1.64']
P168ZLMU	0.50 [1.64']
P192ZLMU	0.50 [1.64']

HU: Heat source Unit; IU: Indoor Unit; BC: BC controller
*1. Please refer to 3-2-4.
*2. Farthest Indoor from BC controller "D+E+h or F+J+k" can exceed 40 m [131 ft.] till 60 m [197 ft.] if no Indoor sized P72, P96 connected. Details refer to Fig.3-2-2-2
*3. Distance of Indoor sized P72, P96 from BC must be less than 10 m [32 ft.], if any.
*4. Distance of Indoor sized P72, P96 from IU must be less than 20 m [65 ft.], if any.
*5. Distance between BC (Main) and BC (Sub) must be less than 10 m, if two BC (Sub) are installed or Indoor sized P72 and/or P96 is connected.

Fig. 3-2-2-2 Piping length and height between IU and BC controller



Piping "A"size selection rule **(mm [in.])**

Heat source Model	Pipe(High pressure)	Pipe(Low pressure)
P72ZLMU	ø15.88 [5/8"]	ø19.05 [3/4"]
P96-120ZLMU	ø19.05 [3/4"]	ø22.20 [7/8"]
P144-192ZLMU	ø22.20 [7/8"]	ø28.58 [1-1/8"]

Piping "B", "C", "D", "E" size selection rule **(mm [in.])**

Total down-stream Indoor capacity	Pipe(Liquid)	Pipe(Gas)
P54 or less	ø9.52 [3/8"]	ø15.88 [5/8"]
P55-P72	ø9.52 [3/8"]	ø19.05 [3/4"]
P73-P96	ø9.52 [3/8"]	ø22.20 [7/8"]

Piping "F", "G", "J" size selection rule **(mm [in.])**

Total down-stream Indoor capacity	Pipe(Liquid)	Pipe(HP Gas)	Pipe(LP Gas)
P72 or less	ø9.52 [3/8"]	ø15.88 [5/8"]	ø19.05 [3/4"]
P73 to P108	ø9.52 [3/8"]	ø19.05 [3/4"]	ø22.20 [7/8"]
P109 to P126	ø12.70 [1/2"]	ø19.05 [3/4"]	ø28.58 [1-1/8"]
P127 to P144	ø12.70 [1/2"]	ø22.20 [7/8"]	ø28.58 [1-1/8"]
P145 to P168	ø15.88 [5/8"]	ø22.20 [7/8"]	ø28.58 [1-1/8"]

HP: High pressure, LP: Low pressure

Piping "a", "b", "c", "d", "e", "f", "g", "h", "j", "k" size selection rule (mm [in.])

Indoor Unit size	Pipe(Liquid)	Pipe(Gas)
P06 to P18	ø6.35 [1/4"]	ø12.70 [1/2"]
P24 to P54	ø9.52 [3/8"]	ø15.88 [5/8"]
P72	ø9.52 [3/8"]	ø19.05 [3/4"]
P96	ø9.52 [3/8"]	ø22.20 [7/8"]

3-2-3. IF more than 16 ports are in use, or if there is more than one BC controller in use for two heat source units

Note1. PQRY systems do not require headers.
Note2. Indoor units sized P72-P96 should be connected to a BC controller using the Y-shaped CMY-R160-J1 joint adapter. These indoor units cannot use the same BC controller ports as other units. (They must use their own individual BC controller port.)
Note3. As bends cause pressure loss on transportation of refrigerant, the fewer bends in the system, the better it is. Piping length needs to factor in the actual length and equivalent length in which the bends are counted.
Note4. Indoor units connected to the BC controller sharing one port cannot operate separately in heating and cooling modes simultaneously; i.e., they must function in either heating or cooling in tandem.
Note5. For sub BC controller CMB-P-NU-GB1, the total connectable indoor unit capacity can be 126,000 BTUs or less. If two sub BC controllers are used, the total indoor unit capacity connected to BOTH sub BC controllers also cannot exceed 126,000 BTUs.
For sub BC controller CMB-P1016NU-HB1 the total connectable indoor unit capacity can be 126,000 BTUs or less. However, if two sub controllers are used, the total indoor unit capacity connected to BOTH sub controllers must NOT exceed 168,000 BTUs.
Note6. Indoor unit capacities are included in the model name. For example, PEFY-P24NMSU-E has a capacity of 24,000 BTUs.
Note7. Total "downstream indoor capacity" is the total of all the indoor units connected downstream.
For example, PEFY-P24NMSU-E + PEFY-P12NMSU-E: Total Indoor Unit Capacity = P24 + P12 = P36.

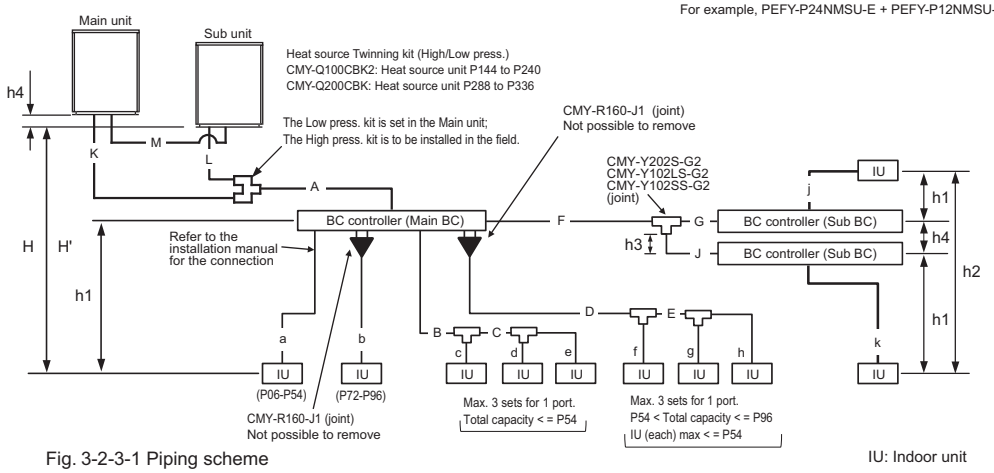


Fig. 3-2-3-1 Piping scheme

IU: Indoor unit

Piping length limitation (m [ft.])

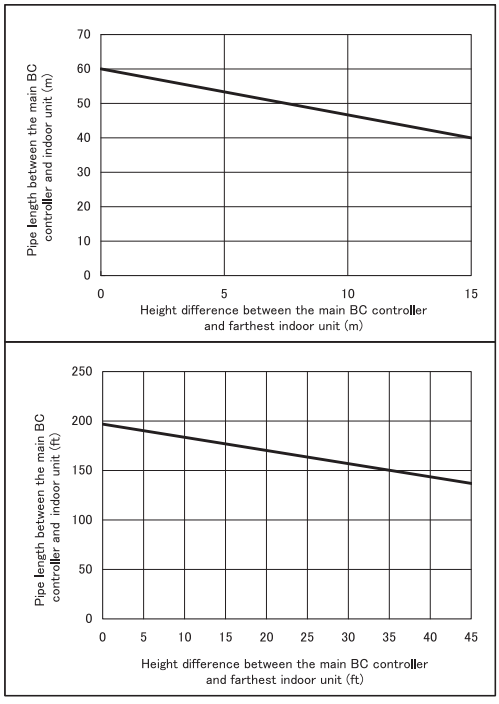
Item	Piping in the figure	Max. length	Max. equivalent length
Total piping length	K+L+M+A+B+C+D+E+F+G+J+a+b+c+d+e+f+g+h+j+k	*1	-
Farthest IU from HU	K(L)+A+F+J+k	165 [541']	190 [623']
Distance between HU and BC	K(L)+A	110 [360'] *1	110 [360'] *1
Farthest IU from BC controller	D+E+h or F+G+j or F+J+k	40 [131'] *2	40 [131'] *2
Height between HU and IU (HU above IU)	H	50 [164']	-
Height between HU and IU (HU under IU)	H'	40 [131']	-
Height between IU and BC	h1	15 [49'] (10 [32']) *3	-
Height between IU and IU	h2	30 [98'] (20 [65']) *4	-
Height between BC(Main or Sub) and BC(Sub)	h3	15 [49'] (10 [32']) *5	-
Distance between Main unit and Sub unit	K+L or M	5 [16']	-
Height between Main unit and Sub unit	h4	0.1 [0.3']	-
Height between BC(Sub) and BC(Sub)	h4	10 [32']	-

Bent equivalent length "M"

Heat source Model	M (m/bends [ft./bends])
P144ZSLMU	0.50 [1.64']
P168ZSLMU	0.50 [1.64']
P192ZSLMU	0.50 [1.64']
P216ZSLMU	0.50 [1.64']
P240ZSLMU	0.50 [1.64']
P288ZSLMU	0.70 [2.29']
P312ZSLMU	0.70 [2.29']
P336ZSLMU	0.80 [2.62']

HU: Heat source Unit; IU: Indoor Unit; BC: BC controller
*1. Please refer to 3-2-4.
*2. Farthest Indoor from BC controller "D+E+h or F+G+j or F+J+k" can exceed 40 m [131 ft.] till 60 m [197 ft.] if no Indoor sized P72, P96 connected. Details refer to Fig.3-2-3-2
*3. Distance of Indoor sized P72, P96 from BC must be less than 10 m [32 ft.], if any.
*4. Distance of Indoor sized P72, P96 from IU must be less than 20 m [65 ft.], if any.
*5. Distance between BC (Main) and BC (Sub) must be less than 10 m, if two BC (Sub) are installed or Indoor sized P72 and/or P96 is connected.

Fig. 3-2-3-2 Piping length and height between IU and BC controller



Piping "A"size selection rule (mm [in.])

Heat source Model	Pipe(High pressure)	Pipe(Low pressure)
P144-192ZSLMU	ø22.20 [7/8"]	ø28.58 [1-1/8"]
P216ZSLMU	ø22.20 [7/8"] *5	ø28.58 [1-1/8"]
P240ZSLMU	ø22.20 [7/8"] *5	ø34.93 [1-3/8"]
P288-312ZSLMU	ø28.58 [1-1/8"]	ø34.93 [1-3/8"]
P336ZSLMU	ø28.58 [1-1/8"]	ø41.28 [1-5/8"]

*5. When the piping length is 65 m or longer, use the ø28.58 [1-1/8] pipe for the part that exceeds 65 m.

Piping "B", "C", "D", "E" size seleciton rule (mm [in.])

Total down-stream Indoor capacity	Pipe(Liquid)	Pipe(Gas)
P54 or less	ø9.52 [3/8"]	ø15.88 [5/8"]
P55-P72	ø9.52 [3/8"]	ø19.05 [3/4"]
P73-P96	ø9.52 [3/8"]	ø22.20 [7/8"]

Piping "F", "G", "J" size selection rule (mm [in.])

Total down-stream Indoor capacity	Pipe(Liquid)	Pipe(HP Gas)	Pipe(LP Gas)
P72 or less	ø9.52 [3/8"]	ø15.88 [5/8"]	ø19.05 [3/4"]
P73 to P108	ø9.52 [3/8"]	ø19.05 [3/4"]	ø22.20 [7/8"]
P109 to P126	ø12.70 [1/2"]	ø19.05 [3/4"]	ø28.58 [1-1/8"]
P127 to P144	ø12.70 [1/2"]	ø22.20 [7/8"]	ø28.58 [1-1/8"]
P145 to P168	ø15.88 [5/8"]	ø22.20 [7/8"]	ø28.58 [1-1/8"]

HP: High pressure, LP: Low pressure

Piping "K", "L", "M" size selection rule (mm [in.])

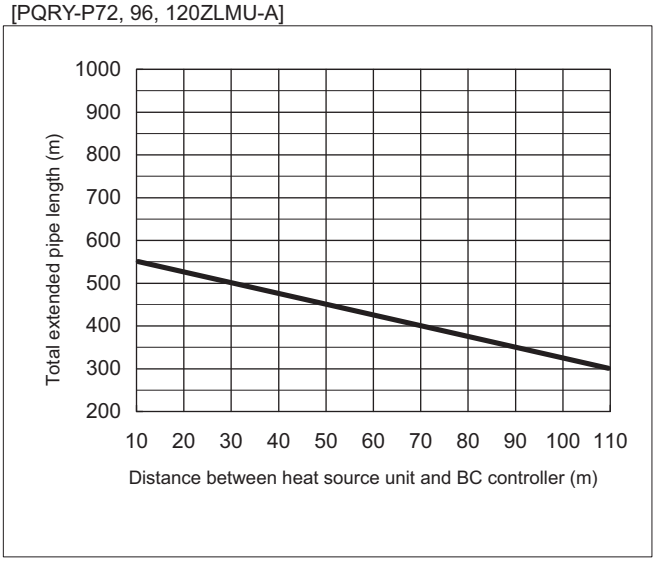
Heat source Model	Pipe(High pressure)	Pipe(Low pressure)
P144ZSLMU	ø15.88 [5/8"]	ø19.05 [3/4"]
P168-240ZSLMU	ø19.05 [3/4"]	ø22.20 [7/8"]
P288-336ZSLMU	ø22.20 [7/8"]	ø28.58 [1-1/8"]

Piping "a", "b", "c", "d", "e", "f", "g", "h", "j", "k"size selection rule (mm [in.])

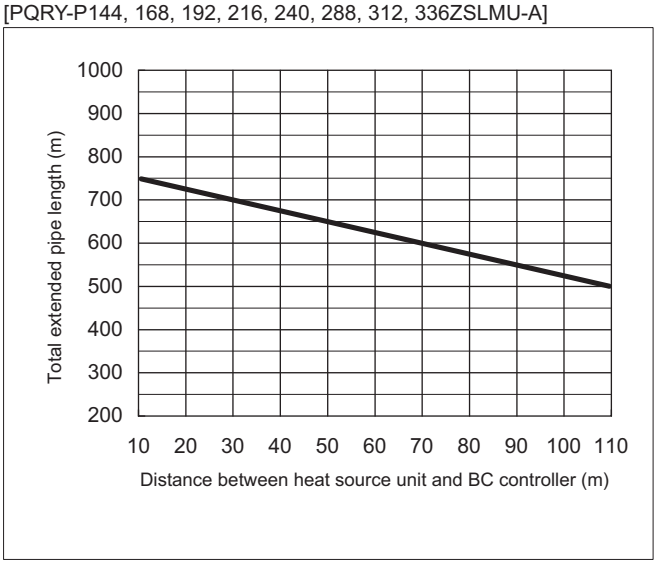
Indoor Unit size	Pipe(Liquid)	Pipe(Gas)
P06 to P18	ø6.35 [1/4"]	ø12.70 [1/2"]
P24 to P54	ø9.52 [3/8"]	ø15.88 [5/8"]
P72	ø9.52 [3/8"]	ø19.05 [3/4"]
P96	ø9.52 [3/8"]	ø22.20 [7/8"]

3-2-4. Total piping length restrictions (m)

[PQRY-P72, 96, 120ZLMU-A]

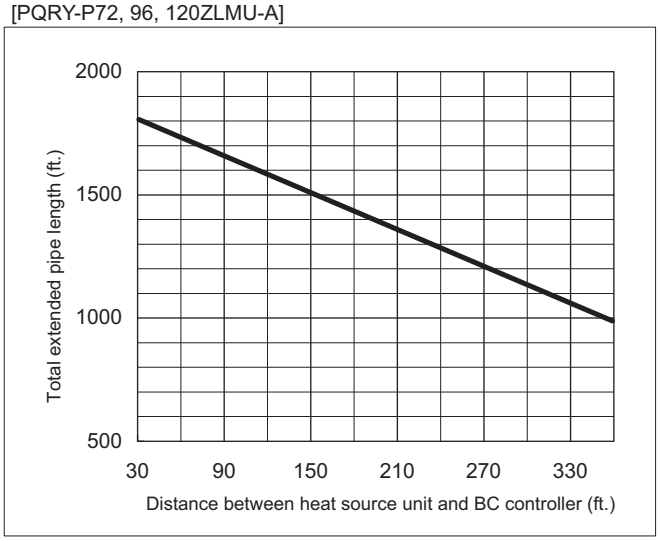


[PQRY-P144, 168, 192ZLMU-A]
[PQRY-P144, 168, 192, 216, 240, 288, 312, 336ZSLMU-A]

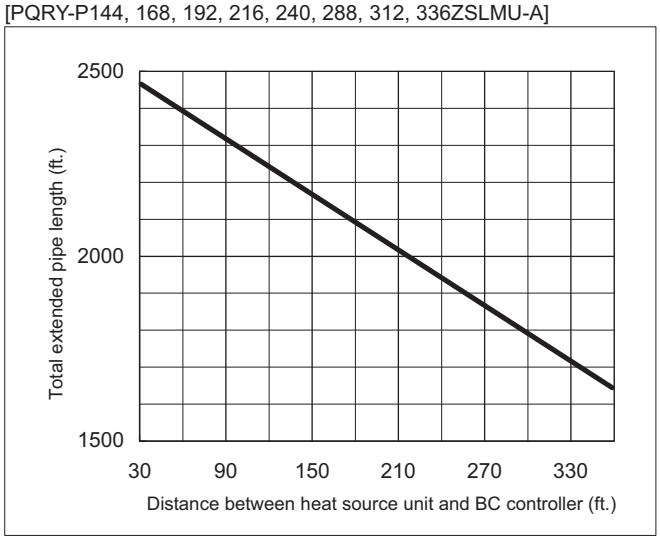


3-2-5. Total piping length restrictions (ft.)

[PQRY-P72, 96, 120ZLMU-A]

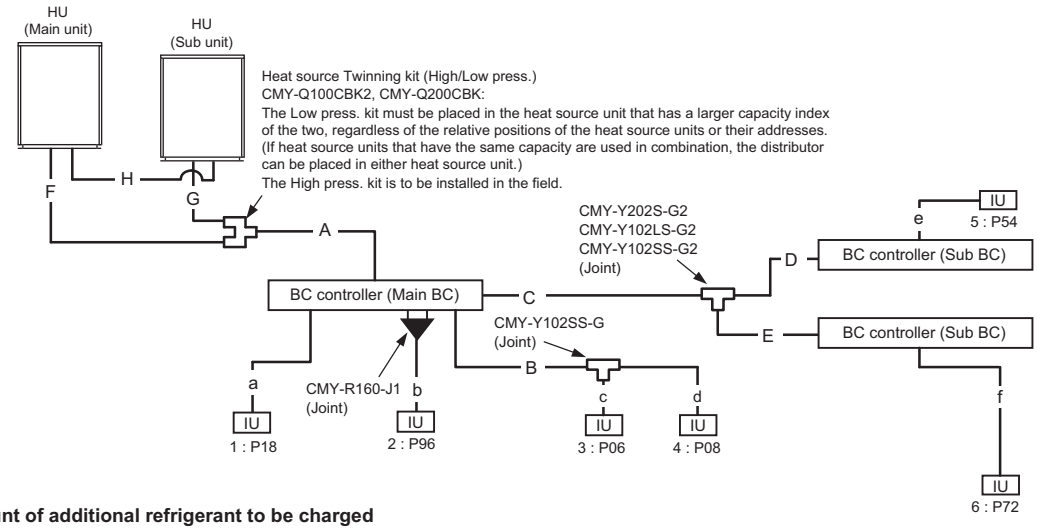


[PQRY-P144, 168, 192ZLMU-A]
[PQRY-P144, 168, 192, 216, 240, 288, 312, 336ZSLMU-A]



3-3. Refrigerant charging calculation

Sample connection (with 3 BC controller and 6 indoor units)



■Amount of additional refrigerant to be charged

Refrigerant for extended pipes (field piping) is not factory-charged to the heat source unit. Add an appropriate amount of refrigerant for each pipes on site. Record the size of each high pressure pipe and liquid pipe, and the amout of refrigerant that was charged on the heat source unit for future reference.

■Calculating the amount of additional refrigerant to be charged

The amount of refrigerant to be charged is calculated with the size of the on-site-installed high pressure pipes and liquid pipes, and their length.
Calculate the amount of refrigerant to be charged according to the formula below.
* When connecting PLFY-P08NBMU-E2, add 0.3kg (10.6 oz) of refrigerant per indoor unit.
Round up the calculation result to the nearest 0.1kg[4oz]. (i.e., 16.08 kg = 16.1 kg)

<Amount of additional refrigerant to be charged>

■Calculating the amount of additional refrigerant to be charged

- Piping length from heat source unit to the most farthest indoor unit ≤ 30.5 m [100 ft] use the table [A]
- Piping length from heat source unit to the most farthest indoor unit > 30.5 m [100 ft] use the table [B]

Additional refrigerant charge	
[A]	(kg) [oz]
[B]	(kg) [oz]

=

High pressure pipe size Total length of ø 28.58mm [1-1/8 in]	
[A]	(m) × 0.36 (kg/m) (ft) × 3.88 (oz/ft)
[B]	(m) × 0.33 (kg/m) (ft) × 3.55 (oz/ft)

+

High pressure pipe size Total length of ø 22.2mm [7/8 in]	
[A]	(m) × 0.23 (kg/m) (ft) × 2.48 (oz/ft)
[B]	(m) × 0.21 (kg/m) (ft) × 2.26 (oz/ft)

+

High pressure pipe size Total length of ø 19.05mm [3/4 in]	
[A]	(m) × 0.16 (kg/m) (ft) × 1.73 (oz/ft)
[B]	(m) × 0.14 (kg/m) (ft) × 1.51 (oz/ft)

+

High pressure pipe size Total length of ø 15.88mm [5/8 in]	
[A]	(m) × 0.11 (kg/m) (ft) × 1.19 (oz/ft)
[B]	(m) × 0.10 (kg/m) (ft) × 1.08 (oz/ft)

+

Liquid Piping size Total length of ø 15.88mm [5/8 in]	
[A]	(m) × 0.20 (kg/m) (ft) × 2.16 (oz/ft)
[B]	(m) × 0.18 (kg/m) (ft) × 1.94 (oz/ft)

+

Liquid Piping size Total length of ø 12.7mm [1/2 in]	
[A]	(m) × 0.12 (kg/m) (ft) × 1.30 (oz/ft)
[B]	(m) × 0.11 (kg/m) (ft) × 1.19 (oz/ft)

+

Liquid Piping size Total length of ø 9.52mm [3/8 in]	
[A]	(m) × 0.06 (kg/m) (ft) × 0.65 (oz/ft)
[B]	(m) × 0.054 (kg/m) (ft) × 0.59 (oz/ft)

+

Liquid Piping size Total length of ø 6.35mm [1/4 in]	
[A]	(m) × 0.024 (kg/m) (ft) × 0.26 (oz/ft)
[B]	(m) × 0.021 (kg/m) (ft) × 0.23 (oz/ft)

+

BC controller (Standard / Main)
3.0 kg[106oz]

+

BC controller (Main) HA-Type
2.0 kg[71oz]

+

BC controller (Sub) Total Units	Charged amount
1	1.0 kg[36oz]
2	2.0 kg[71oz]

+

Total Capacity of Connected Indoor Units	Charged amount
Models ~ 27	2.0 kg [71 oz]
Models 28 ~ 54	2.5 kg [89 oz]
Models 55 ~ 126	3.0 kg [106 oz]
Models 127 ~ 144	3.5 kg [124 oz]
Models 145 ~ 180	4.5 kg [159 oz]
Models 181 ~ 234	5.0 kg [177 oz]
Models 235 ~ 273	6.0 kg [212 oz]
Models 274 ~ 307	8.0 kg [283 oz]
Models 308 ~ 342	9.0 kg [318 oz]
Models 343 ~ 411	10.0 kg [353 oz]
Models 412 ~	12.0 kg [424 oz]

■Amount of factory charged refrigerant

Heat source unit Model	Charged amount
P72	5.0 kg
P96	
P120	
P144	6.0 kg
P168	
P192	
P216	11.7 kg
P240	

■Sample calculation

Indoor

A :	ø28.58 [1-1/8"]	40m [131ft.]	1 : P18	a : ø6.35 [1/4"]	5m [16ft.]
B :	ø9.52 [3/8"]	10m [32ft.]	2 : P96	b : ø9.52 [3/8"]	3m [10ft.]
C :	ø12.70 [1/2"]	10m [32ft.]	3 : P06	c : ø6.35 [1/4"]	2m [6ft.]
D :	ø9.52 [3/8"]	5m [16ft.]	4 : P08	d : ø6.35 [1/4"]	3m [10ft.]
E :	ø9.52 [3/8"]	5m [16ft.]	5 : P54	e : ø9.52 [3/8"]	3m [10ft.]
F :	ø22.20 [7/8"]	2m [6ft.]	6 : P72	f : ø9.52 [3/8"]	10m [32ft.]
G :	ø22.20 [7/8"]	1m [4ft.]			

Total length for each pipe size :
ø28.58 A = 40m [131ft.]
ø22.20 F+G = 2+1 = 3m [10ft.]
ø12.70 C = 10m [32ft.]
ø9.52 B+D+E+b+e+f = 36m [116ft.]
ø6.35 a+c+d =10m [32ft.]

Therefore, additional refrigerant charge (kg) = 40×0.33+3×0.21+10×0.11+36×0.054+10×0.021+3.0+2.0+6.0
= 28.08kg
≒ 28.1kg

or

Therefore, additional refrigerant charge (oz) = 131×3.55+10×2.26+32×1.19+116×0.59+32×0.23+106+71+212
= 990.5oz
≒ 991oz

■Limitation of the amount of refrigerant to be charged

The above calculation result of the amount of refrigerant to be charged must become below the value in the table below.

Total index of the heat source units		P72 ZLMU	P96 ZLMU	P120 ZLMU	P144 ZLMU	P168 ZLMU	P192 ZLMU	P144 ZSLMU	P168 ZSLMU
Maximum refrigerant charge	Factory charged	5.0kg	5.0kg	5.0kg	6.0kg	6.0kg	6.0kg	10.0kg	10.0kg
	Charged on site	28.0kg	32.0kg	33.0kg	44.0kg	45.0kg	52.0kg	44.0kg	45.0kg
	Total for system	33.0kg	37.0kg	38.0kg	50.0kg	51.0kg	58.0kg	54.0kg	55.0kg
	Factory charged	11 lbs 1 oz	11 lbs 1 oz	11 lbs 1 oz	13 lbs 4 oz	13 lbs 4 oz	13 lbs 4 oz	22 lbs 1 oz	22 lbs 1 oz
	Charged on site	61 lbs 12 oz	70 lbs 9 oz	72 lbs 13 oz	97 lbs 1 oz	99 lbs 4 oz	114 lbs 11 oz	97 lbs 1 oz	99 lbs 4 oz
	Total for system	72 lbs 13 oz	81 lbs 10 oz	83 lbs 13 oz	110 lbs 4 oz	112 lbs 7 oz	127 lbs 14 oz	119 lbs 1 oz	121 lbs 5 oz

Total index of the heat source units		P192 ZSLMU	P216 ZSLMU	P240 ZSLMU	P288 ZSLMU	P312 ZSLMU	P336 ZSLMU
Maximum refrigerant charge	Factory charged	10.0kg	10.0kg	10.0kg	12.0kg	12.0kg	12.0kg
	Charged on site	50.0kg	56.0kg	59.0kg	74.0kg	74.0kg	76.0kg
	Total for system	60.0kg	66.0kg	69.0kg	86.0kg	86.0kg	88.0kg
	Factory charged	22 lbs 1 oz	22 lbs 1 oz	22 lbs 1 oz	26 lbs 8 oz	26 lbs 8 oz	26 lbs 8 oz
	Charged on site	110 lbs 4 oz	123 lbs 8 oz	130 lbs 2 oz	163 lbs 3 oz	163 lbs 3 oz	167 lbs 9 oz
	Total for system	132 lbs 5 oz	145 lbs 9 oz	152 lbs 2 oz	189 lbs 10 oz	189 lbs 10 oz	194 lbs 1 oz

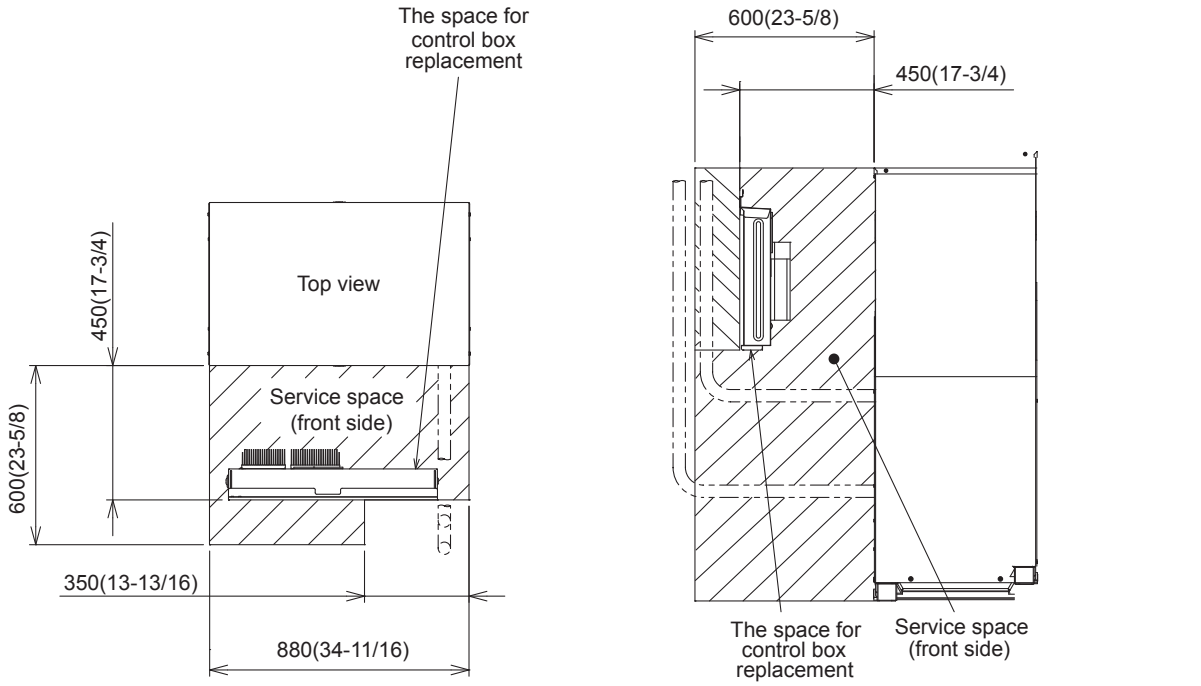
4-1. General requirements for installation

1. If possible, locate the unit to reduce the direct thermal radiation to the unit.
2. Consider the amount of noise the unit produces when choosing an installation location.
   Valves and refrigerant flow on the outdoor/heat source unit may generate noise.
3. Avoid sites that may encounter strong winds.
4. Ensure the installation site can bear the weight of the unit.
5. Condensation should be moved away from the unit, particularly in heating mode.
6. Provide enough space for installation and service as shown in section .
7. Avoid sites where acidic solutions or chemical sprays (such as sulfur sprays) are used frequently.
8. The unit should be provided from combustible gas, oil, steam, chemical gas like acidic solution, sulfur gas and so on.

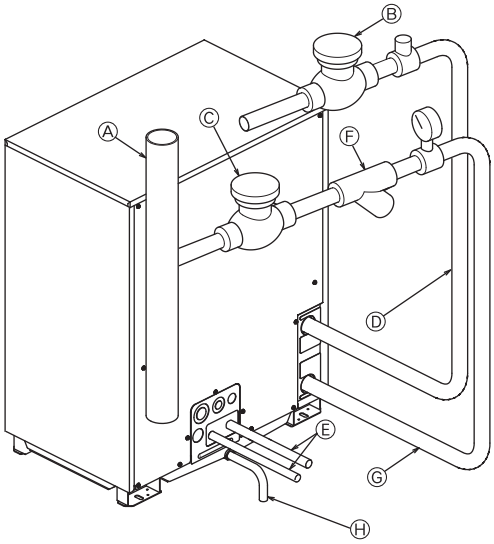
4-2. Spacing

In case of single installation, 600mm or more of back space as front space makes easier access when servicing the unit from rear side.

Unit: mm (in.)



4-3. Piping direction



Ⓐ Main circulating water pipe
Ⓑ Shutoff valve
Ⓒ Shutoff valve
Ⓓ Water outlet (upper)
Ⓔ Refrigerant pipes
Ⓕ Y-type strainer
Ⓖ Water inlet (lower)
Ⓗ Drain pipe

1. Insulation installation

With City Multi WY/ WR2 Series piping, as long as the temperature range of the circulating water is kept to average temperatures year-round (29.4°C[85°F] in the summer, 21.1°C[70°F] in the winter), there is no need to insulate or otherwise protect indoor piping from exposure. You should use insulation in the following situations:

- Any heat source piping.
- Indoor piping in cold-weather regions where frozen pipes are a problem.
- When air coming from the outside causes condensation to form on piping.
- Any drainage piping.

2. Water processing and water quality control

To preserve water quality, use the closed type of cooling tower for WY/ WR2. When the circulating water quality is poor, the water heat exchanger can develop scales, leading to a reduction in heat-exchange power and possible corrosion of the heat exchanger. Please pay careful attention to water processing and water quality control when installing the water circulation system.

- Removal of foreign objects or impurities within the pipes.
  During installation, be careful that foreign objects, such as welding fragments, sealant particles, or rust, do not enter the pipes.
- Water Quality Processing

① Depending on the quality of the cold-temperature water used in the air conditioner, the copper piping of the heat exchanger may become corroded. We recommend regular water quality processing.
Cold water circulation systems using open heat storage tanks are particularly prone to corrosion.
When using an open-type heat storage tank, install a water-to-water heat exchanger, and use a closed-loop circuit on the air conditioner side. If a water supply tank is installed, keep contact with air to a minimum, and keep the level of dissolved oxygen in the water no higher than 1mg/ℓ.

② Water quality standard

Items			Lower mid-range temperature water system		Tendency	
			Recirculating water [20<T<60°C] [68<T<140°F]	Make-up water	Corrosive	Scale-forming
Standard items	pH (25°C)[77°F]		7.0 ~ 8.0	7.0 ~ 8.0	○	○
	Electric conductivity (mS/m) (25°C)[77°F] (μS/cm) (25°C)[77°F]		30 or less [300 or less]	30 or less [300 or less]	○	○
	Chloride ion	(mg Cl^-/ ℓ)	50 or less	50 or less	○	
	Sulfate ion	(mg SO_4^{2-}/ ℓ)	50 or less	50 or less	○	
	Acid consumption (pH4.8)	(mg $CaCO_3$/ ℓ)	50 or less	50 or less		○
	Total hardness	(mg $CaCO_3$/ ℓ)	70 or less	70 or less		○
	Calcium hardness	(mg $CaCO_3$/ ℓ)	50 or less	50 or less		○
	Ionic silica	(mg SiO_2/ ℓ)	30 or less	30 or less		○
Reference items	Iron	(mg Fe/ ℓ)	1.0 or less	0.3 or less	○	○
	Copper	(mg Cu/ ℓ)	1.0 or less	0.1 or less	○	
	Sulfide ion	(mg S^{2-}/ ℓ)	not to be detected	not to be detected	○	
	Ammonium ion	(mg NH_4^+/ ℓ)	0.3 or less	0.1 or less	○	
	Residual chlorine	(mg Cl/ ℓ)	0.25 or less	0.3 or less	○	
	Free carbon dioxide	(mg CO_2/ ℓ)	0.4 or less	4.0 or less	○	
	Ryzner stability index		–	–	○	○

Reference : Guideline of Water Quality for Refrigeration and Air Conditioning Equipment. (JRA GL02E-1994)

③ Please consult with a water quality control specialist about water quality control methods and water quality calculations before using anti-corrosive solutions for water quality management.

④ When replacing a previously installed air conditioning device (even when only the heat exchanger is being replaced), first conduct a water quality analysis and check for possible corrosion.
Corrosion can occur in cold-water systems even if there has been no prior signs of corrosion. If the water quality level has dropped, please adjust water quality sufficiently before replacing the unit.

for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

⚠Warning

■ Do not use refrigerant other than the type indicated in the manuals provided with the unit and on the nameplate.
- Doing so may cause the unit or pipes to burst, or result in explosion or fire during use, during repair, or at the time of disposal of the unit.
- It may also be in violation of applicable laws.
- MITSUBISHI ELECTRIC CORPORATION cannot be held responsible for malfunctions or accidents resulting from the use of the wrong type of refrigerant.

■ Our air-conditioning equipments and heat pumps contain a fluorinated greenhouse gas, R410A.

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