MITSUBISHI ELECTRIC

SPLIT-TYPE, HEAT PUMP AIR CONDITIONERS

HFC utilized R410A

April 2024
No. TCH092
REVISED EDITION-A

TECHNICAL & SERVICE MANUAL

<Outdoor unit>

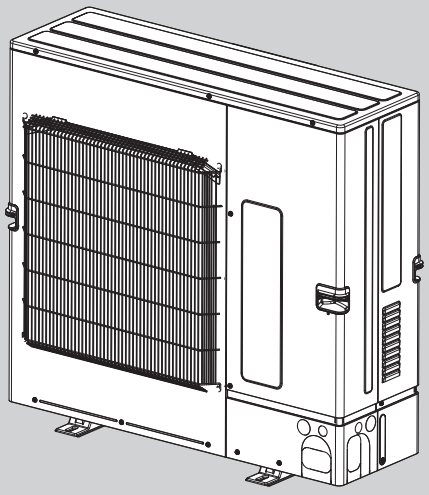
[Model Name]	[Service Ref.]
PUMY-SP112VKM2	PUMY-SP112VKM2.TH
PUMY-SP112VKM2-ET	PUMY-SP112VKM2-ET.TH
PUMY-SP112VKM2-ER	PUMY-SP112VKM2-ER.TH
PUMY-SP125VKM2	PUMY-SP125VKM2.TH
PUMY-SP125VKM2-ET	PUMY-SP125VKM2-ET.TH
PUMY-SP125VKM2-ER	PUMY-SP125VKM2-ER.TH
PUMY-SP140VKM2	PUMY-SP140VKM2.TH
PUMY-SP140VKM2-ET	PUMY-SP140VKM2-ET.TH
PUMY-SP140VKM2-ER	PUMY-SP140VKM2-ER.TH
PUMY-SP112YKM2	PUMY-SP112YKM2.TH
PUMY-SP112YKM2-ET	PUMY-SP112YKM2-ET.TH
PUMY-SP112YKM2-ER	PUMY-SP112YKM2-ER.TH
PUMY-SP125YKM2	PUMY-SP125YKM2.TH
PUMY-SP125YKM2-ET	PUMY-SP125YKM2-ET.TH
PUMY-SP125YKM2-ER	PUMY-SP125YKM2-ER.TH
PUMY-SP140YKM2	PUMY-SP140YKM2.TH
PUMY-SP140YKM2-ET	PUMY-SP140YKM2-ET.TH
PUMY-SP140YKM2-ER	PUMY-SP140YKM2-ER.TH

Salt proof model

PUMY-SP112VKM2-BS	PUMY-SP112VKM2-BS.TH
PUMY-SP112VKM2-ET-BS	PUMY-SP112VKM2-ET-BS.TH
PUMY-SP112VKM2-ER-BS	PUMY-SP112VKM2-ER-BS.TH
PUMY-SP125VKM2-BS	PUMY-SP125VKM2-BS.TH
PUMY-SP125VKM2-ET-BS	PUMY-SP125VKM2-ET-BS.TH
PUMY-SP125VKM2-ER-BS	PUMY-SP125VKM2-ER-BS.TH
PUMY-SP140VKM2-BS	PUMY-SP140VKM2-BS.TH
PUMY-SP140VKM2-ET-BS	PUMY-SP140VKM2-ET-BS.TH
PUMY-SP140VKM2-ER-BS	PUMY-SP140VKM2-ER-BS.TH
PUMY-SP112YKM2-BS	PUMY-SP112YKM2-BS.TH
PUMY-SP112YKM2-ET-BS	PUMY-SP112YKM2-ET-BS.TH
PUMY-SP112YKM2-ER-BS	PUMY-SP112YKM2-ER-BS.TH
PUMY-SP125YKM2-BS	PUMY-SP125YKM2-BS.TH
PUMY-SP125YKM2-ET-BS	PUMY-SP125YKM2-ET-BS.TH
PUMY-SP125YKM2-ER-BS	PUMY-SP125YKM2-ER-BS.TH
PUMY-SP140YKM2-BS	PUMY-SP140YKM2-BS.TH
PUMY-SP140YKM2-ET-BS	PUMY-SP140YKM2-ET-BS.TH
PUMY-SP140YKM2-ER-BS	PUMY-SP140YKM2-ER-BS.TH

Revision:
• Add new indoor model for combination

TCH092 is void.



OUTDOOR UNIT

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PARTS CATALOG (TCB092)

CITY MULTI

1 SAFETY PRECAUTION

1-1. CAUTIONS RELATED TO NEW REFRIGERANT

Cautions for units utilizing refrigerant R410A

Preparation before the repair service

- Prepare the proper tools.
- Prepare the proper protectors.
- Provide adequate ventilation.
- After stopping the operation of the air conditioner, turn off the power-supply breaker.
- Discharge the condenser before the work involving the electric parts.

Use new refrigerant pipes.

Avoid using thin pipes.

**Make sure that the inside and outside of refrigerant piping is clean and it has no contaminants such as sulfur, oxides, dirt, shaving particles, etc.,
which are hazard to refrigerant cycle.
In addition, use pipes with specified thickness.**

Contamination inside refrigerant piping can cause deterioration of refrigerant oil, etc.

**Store the piping indoors, and keep both ends of the piping sealed until just before brazing.
(Leave elbow joints, etc. in their packaging.)**

If dirt, dust or moisture enters into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

The refrigerant oil applied to flare and flange connections must be ester oil, ether oil or alkylbenzene oil in a small amount.

If large amount of mineral oil enters, that can cause deterioration of refrigerant oil, etc.

Charge refrigerant from liquid phase of gas cylinder.

If the refrigerant is charged from gas phase, composition change may occur in refrigerant and the efficiency will be lowered.

Do not use refrigerant other than R410A.

If other refrigerant (R22, etc.) is used, chlorine in refrigerant can cause deterioration of refrigerant oil, etc.

Precautions during the repair service

- Do not perform the work involving the electric parts with wet hands.
- Do not pour water into the electric parts.
- Do not touch the refrigerant.
- Do not touch the hot or cold areas in the refrigerating cycle.
- When the repair or the inspection of the circuit needs to be done without turning off the power, exercise great caution not to touch the live parts.

Use a vacuum pump with a reverse flow check valve.

Vacuum pump oil may flow back into refrigerant cycle and that can cause deterioration of refrigerant oil, etc.

Use the following tools specifically designed for use with R410A refrigerant.

The following tools are necessary to use R410A refrigerant.

Tools for R410A	
Gauge manifold	Flare tool
Charge hose	Size adjustment gauge
Gas leak detector	Vacuum pump adaptor
Torque wrench	Electronic refrigerant charging scale

Handle tools with care.

If dirt, dust or moisture enters into refrigerant cycle, that can cause deterioration of refrigerant oil or malfunction of compressor.

Do not use a charging cylinder.

If a charging cylinder is used, the composition of refrigerant will change and the efficiency will be lowered.

Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.

Use the specified refrigerant only.

Never use any refrigerant other than that specified.
Doing so may cause a burst, an explosion, or fire when the unit is being used, serviced, or disposed of.
Correct refrigerant is specified in the manuals and on the spec labels provided with our products.
We will not be held responsible for mechanical failure, system malfunction, unit breakdown or accidents caused by failure to follow the instructions.

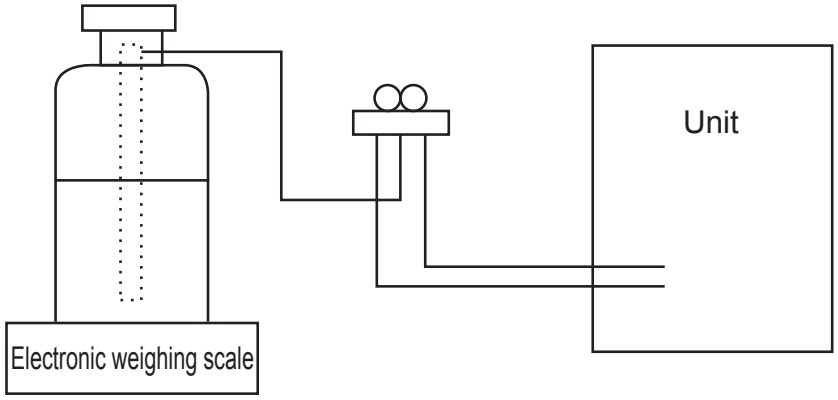
[1] Cautions for service

(1) Perform service after recovering the refrigerant left in unit completely.
(2) Do not release refrigerant in the air.
(3) After completing service, charge the cycle with specified amount of refrigerant.
(4) If moisture or foreign matter might have entered the refrigerant piping during service, ensure to remove them.

[2] Additional refrigerant charge

When charging directly from cylinder

(1) Check that cylinder for R410A on the market is a syphon type.
(2) Charging should be performed with the cylinder of syphon stood vertically. (Refrigerant is charged from liquid phase.)



[3] Service tools

Use the below service tools as exclusive tools for R410A refrigerant.

No.	Tool name	Specifications
①	Gauge manifold	· Only for R410A
		· Use the existing fitting specifications. (UNF1/2)
		· Use high-tension side pressure of 5.3MPa·G or over.
②	Charge hose	· Only for R410A
		· Use pressure performance of 5.09MPa·G or over.
③	Electronic weighing scale	—
④	Gas leak detector	· Use the detector for R134a, R407C or R410A.
⑤	Adaptor for reverse flow check	· Attach on vacuum pump.
⑥	Refrigerant charge base	—
⑦	Refrigerant cylinder	· Only for R410A · Top of cylinder (Pink) · Cylinder with syphon
⑧	Refrigerant recovery equipment	—

1-2. PRECAUTIONS FOR SALT PROOF TYPE "-BS" MODEL

Although "-BS" model has been designed to be resistant to salt damage, observe the following precautions to maintain the performance of the unit.

(1) Avoid installing the unit in a location where it will be exposed directly to seawater or sea breeze.
(2) If the cover panel may become covered with salt, be sure to install the unit in a location where the salt will be washed away by rainwater. (If a sunshade is installed, rainwater may not clean the panel.)
(3) To ensure that water does not collect in the base of the outdoor unit, make sure that the base is level, not at angle. Water collecting in the base of the outdoor unit could cause rust.
(4) If the unit is installed in a coastal area, clean the unit with water regularly to remove any salt build-up.
(5) If the unit is damaged during installation or maintenance, be sure to repair it.
(6) Be sure to check the condition of the unit regularly.
(7) Be sure to install the unit in a location with good drainage.

Cautions for refrigerant piping work

New refrigerant R410A is adopted for replacement inverter series. Although the refrigerant piping work for R410A is the same as for R22, exclusive tools are necessary so as not to mix with different kind of refrigerant. Furthermore as the working pressure of R410A is 1.6 times higher than that of R22, their sizes of flared sections and flare nuts are different.

① Thickness of pipes

Because the working pressure of R410A is higher compared to R22, be sure to use refrigerant piping with thickness shown below. (Never use pipes of 0.7 mm or below.)

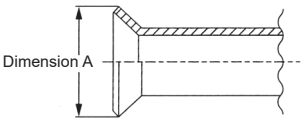
Diagram below: Piping diameter and thickness

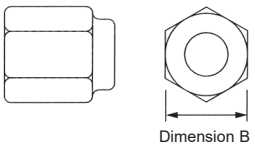
Nominal dimensions (in)	Outside diameter (mm)	Thickness (mm)	
		R410A	R22
1/4	6.35	0.8	0.8
3/8	9.52	0.8	0.8
1/2	12.70	0.8	0.8
5/8	15.88	1.0	1.0
3/4	19.05	—	1.0

② Dimensions of flare cutting and flare nut

The component molecules in HFC refrigerant are smaller compared to conventional refrigerants. In addition to that, R410A is a refrigerant, which has higher risk of leakage because its working pressure is higher than that of other refrigerants. Therefore, to enhance airtightness and strength, flare cutting dimension of copper pipe for R410A has been specified separately from the dimensions for other refrigerants as shown below. The dimension B of flare nut for R410A also has partly been changed to increase strength as shown below. Set copper pipe correctly referring to copper pipe flaring dimensions for R410A below. For 1/2 and 5/8 inch pipes, the dimension B changes.

Use torque wrench corresponding to each dimension.





Flare cutting dimensions

Nominal dimensions (in)	Outside diameter (mm)	Dimension A ($^{+0}_{-0.4}$) (mm)	
		R410A	R22
1/4	6.35	9.1	9.0
3/8	9.52	13.2	13.0
1/2	12.70	16.6	16.2
5/8	15.88	19.7	19.4
3/4	19.05	—	23.3

Flare nut dimensions

Nominal dimensions (in)	Outside diameter (mm)	Dimension B (mm)	
		R410A	R22
1/4	6.35	17.0	17.0
3/8	9.52	22.0	22.0
1/2	12.70	26.0	24.0
5/8	15.88	29.0	27.0
3/4	19.05	—	36.0

③ Tools for R410A (The following table shows whether conventional tools can be used or not.)

Tools and materials	Use	R410A tools	Can R22 tools be used?	Can R407C tools be used?
Gauge manifold	Air purge, refrigerant charge and operation check	Tool exclusive for R410A	×	×
Charge hose		Tool exclusive for R410A	×	×
Gas leak detector	Gas leak check	Tool for HFC refrigerant	×	○
Refrigerant recovery equipment	Refrigerant recovery	Tool exclusive for R410A	×	×
Refrigerant cylinder	Refrigerant charge	Tool exclusive for R410A	×	×
Applied oil	Apply to flared section	Ester oil, ether oil and alkylbenzene oil (minimum amount)	×	Ester oil, ether oil: ○ Alkylbenzene oil: minimum amount
Safety charger	Prevent compressor malfunction when charging refrigerant by spraying liquid refrigerant	Tool exclusive for R410A	×	×
Charge valve	Prevent gas from blowing out when detaching charge hose	Tool exclusive for R410A	×	×
Vacuum pump	Vacuum drying and air purge	Tools for other refrigerants can be used if equipped with adapter for reverse flow check	△ (Usable if equipped with adapter for reverse flow)	△ (Usable if equipped with adapter for reverse flow)
Flare tool	Flaring work of piping	Tools for other refrigerants can be used by adjusting flaring dimension	△ (Usable by adjusting flaring dimension)	△ (Usable by adjusting flaring dimension)
Bender	Bend the pipes	Tools for other refrigerants can be used	○	○
Pipe cutter	Cut the pipes	Tools for other refrigerants can be used	○	○
Welder and nitrogen gas cylinder	Weld the pipes	Tools for other refrigerants can be used	○	○
Refrigerant charging scale	Refrigerant charge	Tools for other refrigerants can be used	○	○
Vacuum gauge or thermistor vacuum gauge and vacuum valve	Check the degree of vacuum. (Vacuum valve prevents back flow of oil and refrigerant to thermistor vacuum gauge)	Tools for other refrigerants can be used	○	○
Charging cylinder	Refrigerant charge	Tool exclusive for R410A	×	-

×: Prepare a new tool. (Use the new tool as the tool exclusive for R410A.)
△: Tools for other refrigerants can be used under certain conditions.
○: Tools for other refrigerants can be used.

2 OVERVIEW OF UNITS

2-1. SYSTEM CONSTRUCTION

Outdoor unit		4.5HP	5HP	6HP
		SP112	SP125	SP140
Applicable indoor unit	Capacity	Type 10 to Type 140		
	Number of units	1 to 12 units	1 to 12 units	1 to 12 units
	Total system capacity range	50 to 130% of outdoor unit capacity *1		

Branching pipe components	CMY-Y62-G-E	CMY-Y64-G-E	CMY-Y68-G-E
	Branch header (2 branches)	Branch header (4 branches)	Branch header (8 branches)

Model / Capacity	Cassette Ceiling					Ceiling concealed		Wall Mounted	Ceiling Suspended	Floor standing		Ceiling concealed		Lossnay
	2 by 2	4-way flow		2-way flow	1-way flow					Exposed	Concealed	Fresh air *2	Built-in	
	PLFY-P	PLFY-P	PLFY-M	PLFY-P	PMFY-P	PEFY-P	PEFY-M	PKFY-P	PCFY-P	PFFY-P	PFFY-P	PEFY-P	PDFY-P	GUF *3
10	–	–	–	–	–	–	–	10VLM-E/ET	–	–	–	–	–	–
15	15VFM-E1 15VCM-E	–	–	–	–	15VMS1(L)-E	–	15VBM-E 15VLM-E/ET	–	–	–	–	–	–
20	20VFM-E1 20VCM-E	–	20VEM-E/ET 20VEM6-E(-ET/-ER)	20VLMD-E 20VMMD-E(-TR/-IN)	20VBM-E	20VMS1(L)-E 20VMA(L)-E(2/3) 20VMR-E-L/R	20VMA(L)-A 20VMA(L)-A1(TR/RU)	20VBM-E 20VLM-E/ET	–	20VLEM-E 20VKM-E	20VLRM-E 20VLRMM-E 20VCM-E	–	20VM-E	–
25	25VFM-E1 25VCM-E	–	25VEM-E/ET 25VEM6-E(-ET/-ER)	25VLMD-E 25VMMD-E(-TR/-IN)	25VBM-E	25VMS1(L)-E 25VMA(L)-E(2/3) 25VMR-E-L/R	25VMA(L)-A 25VMA(L)-A1(TR/RU)	25VBM-E 25VLM-E/ET	–	25VLEM-E 25VKM-E	25VLRM-E 25VLRMM-E 25VCM-E	–	25VM-E	–
32	32VFM-E1 32VCM-E	32VBM-E 32VEM-E	32VEM-E/ET 32VEM6-E(-ET/-ER)	32VLMD-E 32VMMD-E(-TR/-IN)	32VBM-E	32VMS1(L)-E 32VMA(L)-E(2/3) 32VMR-E-L/R	32VMA(L)-A 32VMA(L)-A1(TR/RU)	32VHM-E 32VLM-E/ET	–	32VLEM-E 32VKM-E	32VLRM-E 32VLRMM-E 32VCM-E	–	32VM-E	–
40	40VFM-E1 40VCM-E	40VBM-E 40VEM-E	40VEM-E/ET 40VEM6-E(-ET/-ER)	40VLMD-E 40VMMD-E(-TR/-IN)	40VBM-E	40VMS1(L)-E 40VMA(L)-E(2/3) 40VMH-E 40VMHS-E	40VMA(L)-A 40VMA(L)-A1(TR/RU)	40VHM-E 40VLM-E/ET	40VKM-E	40VLEM-E 40VKM-E	40VLRM-E 40VLRMM-E 40VCM-E	–	40VM-E	–
50	50VFM-E1	50VBM-E 50VEM-E	50VEM-E/ET 50VEM6-E(-ET/-ER)	50VLMD-E 50VMMD-E(-TR/-IN)	–	50VMS1(L)-E 50VMA(L)-E(2/3) 50VMH-E 50VMHS-E	50VMA(L)-A 50VMA(L)-A1(TR/RU)	50VHM-E 50VLM-E/ET	–	50VLEM-E	50VLRM-E 50VLRMM-E 50VCM-E	–	50VM-E	50RD(H)4
63	–	63VBM-E 63VEM-E	63VEM-E/ET 63VEM6-E(-ET/-ER)	63VLMD-E 63VMMD-E(-TR/-IN)	–	63VMS1(L)-E 63VMA(L)-E(2/3) 63VMH-E 63VMHS-E	63VMA(L)-A 63VMA(L)-A1(TR/RU)	63VKM-E	63VKM-E	63VLEM-E	63VLRM-E 63VLRMM-E 63VCM-E	–	63VM-E	–
71	–	–	71VEM6-E(-ET/-ER)	–	–	71VMA(L)-E(2/3) 71VMH-E 71VMHS-E	71VMA(L)-A 71VMA(L)-A1(TR/RU)	–	–	–	–	–	71VM-E	–
80	–	80VBM-E 80VEM-E	80VEM-E/ET 80VEM6-E(-ET/-ER)	80VLMD-E 80VMMD-E(-TR/-IN)	–	80VMA(L)-E(2/3) 80VMH-E 80VMHS-E	80VMA(L)-A 80VMA(L)-A1(TR/RU)	–	–	–	–	80VMH-E-F	80VM-E	–
100	–	100VBM-E 100VEM-E	100VEM-E/ET 100VEM6-E(-ET/-ER)	100VLMD-E 100VMMD-E(-TR/-IN)	–	100VMA(L)-E(2/3) 100VMH-E 100VMHS-E	100VMA(L)-A 100VMA(L)-A1(TR/RU)	100VKM-E	100VKM-E	–	–	–	100VM-E	100RD(H)4
125	–	125VBM-E 125VEM-E	125VEM-E/ET 125VEM6-E(-ET/-ER)	125VLMD-E 125VMMD-E(-TR/-IN)	–	125VMA(L)-E(2/3) 125VMH-E 125VMHS-E	125VMA(L)-A 125VMA(L)-A1(TR/RU)	–	125VKM-E	–	–	125VMHS-E-F	125VM-E	–
140	–	–	–	–	–	140VMA(L)-E(2/3) 140VMH-E 140VMHS-E	140VMA(L)-A 140VMA(L)-A1(TR/RU)	–	–	–	–	140VMH-E-F	–	–

CONNECTION KIT
PAC-LV11M-J

M series indoor unit*4
MSZ-GE Series
MSZ-SF Series
MSZ-EF Series
MSZ-FH Series
MSZ-LN Series
MFZ-KT Series
MSZ-AP Series
MSZ-AY Series
MSZ-GF Series
MSZ-RW Series

M series remote controller

Remote controller	Name	M-NET remote controller	MA remote controller
	Model number	PAR-F27MEA-E, PAR-U02MEDA	PAR-4xMAA, PAR-3xMAA ("x" represents 0 or later)
	Functions	• A handy remote controller for use in conjunction with the Melans centralized management system. • Addresses must be set.	• Addresses setting is not necessary.

*1 When the indoor unit of Fresh Air type is connected with the outdoor unit, the maximum connectable total indoor unit capacity is 110%.
*2 PUMY is connectable to Fresh Air type indoor unit.
It is possible to connect 1 Fresh Air type indoor unit to 1 outdoor unit. (1:1 system)
Operating temperature range (outdoor temperature) for fresh air type indoor units differ from other indoor units.
Refer to "2-4-(3). Operating temperature range".
*3 Do not connect Lossnay remote controller(s). (PZ-61DR-E, PZ-60DR-E, PZ-52SF-E, PZ-43SMF-E)
*4 When connecting the CONNECTION KIT (PAC-LV11M-J) and an M-series indoor unit, refer to the installation manual for the CONNECTION KIT.

2-2. SYSTEM CONSTRUCTION (BRANCH BOX SYSTEM)

Outdoor unit		4.5HP	5HP	6HP
		SP112	SP125	SP140
Applicable indoor unit	Capacity	kW unit: Type 15 to Type 100		
	Number of units	2 to 8 units		
	Total system capacity range	50 to 130% of outdoor unit capacity (6.3 to 16.2 kW)	50 to 130% of outdoor unit capacity (7.1 to 18.2 kW)	50 to 130% of outdoor unit capacity (8.0 to 20.2 kW)
Branch box that can be connected	Number of units	1 to 2 units		

Model / Capacity [kW type]	Wall Mounted									1-way ceiling cassette		
	MSZ-FH	MSZ-GF	MSZ-SF	MSZ-EF	MSZ-GE	MSZ-LN	MSZ-AP	MSZ-AY	MSZ-RW	MLZ-KA	MLZ-KP	MLZ-KY
15	-	-	-	-	-	-	15VF 15VG(-E1/ER1/ET1) 15VG(-E2/ER2/ET2) 15VGK(-E1/ER1/ET1)	15VG(K)	-	-	-	-
18	-	-	-	18VE 18VG(-E1/ER1/ET1) 18VG(-E2/ER2/ET2) 18VGK(-E1/ER1/ET1)	-	-	-	-	-	-	-	18VG-E1
20	-	-	-	-	-	-	20VF 20VG(-E1/ER1/ET1) 20VG(-E2/ER2/ET2) 20VGK(-E1/ER1/ET1)	20VG(K)	-	-	-	-
22	-	-	-	22VE 22VG(-E1/ER1/ET1) 22VG(-E2/ER2/ET2) 22VGK(-E1/ER1/ET1)	22VA-E1	-	-	-	-	-	-	-
25	25VE	-	25VE3	25VE 25VG(-E1/ER1/ET1) 25VG(-E2/ER2/ET2) 25VGK(-E1/ER1/ET1)	25VA-E1	25VG 25VG2	25VG 25VG(K)-E2/E7	25VG(K)(P)	25VG-E1	25VA	25VF	-
35	35VE	-	35VE3	35VE 35VG(-E1/ER1/ET1) 35VG(-E2/ER2/ET2) 35VGK(-E1/ER1/ET1)	35VA-E1	35VG 35VG2	35VG 35VG(K)-E2/E7	35VG(K)(P)	35VG-E1	35VA	35VF	-
42	-	-	42VE3	42VE 42VG(-E1/ER1/ET1) 42VG(-E2/ER2/ET2) 42VGK(-E1/ER1/ET1)	42VA-E1	-	42VG 42VG(K)-E2/E7	42VG(K)(P)	-	-	-	-
50	50VE	-	50VE3	50VE 50VG(-E1/ER1/ET1) 50VG(-E2/ER2/ET2) 50VGK(-E1/ER1/ET1)	50VA-E1	50VG 50VG2	50VG 50VG(K)-E2/E7	50VG(K)(P)	50VG-E1	50VA	50VF	-
60	-	60VE	-	-	60VA-E1	-	-	-	-	-	-	-
71	-	71VE	-	-	71VA-E1	-	-	-	-	-	-	-
80	-	-	-	-	80VA-E1	-	-	-	-	-	-	-
100	-	-	-	-	-	-	-	-	-	-	-	-

Model / Capacity [kW type]	4-way ceiling cassette				Ceiling concealed				Ceiling suspended		Floor standing	
	2 by 2 type		Standard		Low static pressure		Middle static pressure					
	SLZ-KF	SLZ-M	PLA-RP	PLA-M	SEZ-KD	SEZ-M	PEAD-RP	PEAD-M	PCA-RP	PCA-M	MFZ-KJ	MFZ-KT
15	-	15FA 15FA2	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-
25	25VA	25FA 25FA2	-	-	25VA	25DA 25DA(L)2	-	-	-	-	25VE	25VG 25VG-E2
35	35VA	35FA 35FA2	35EA	35EA 35EA2	35VA	35DA 35DA(L)2	-	-	35KAQ	35KA 35KA2	35VE	35VG 35VG-E2
42	-	-	-	-	-	-	-	-	-	-	-	-
50	50VA	50FA 50FA2	50EA	50EA 50EA2	50VA	50DA 50DA(L)2	50JAQ(L)	50JA(L) 50JA(L)2	50KAQ	50KA 50KA2	50VE	50VG 50VG-E2
60	-	-	60EA	60EA 60EA2	60VA	60DA 60DA(L)2	60JAQ(L)	60JA(L) 60JA(L)2	60KAQ	60KA 60KA2	-	-
71	-	-	71EA	71EA 71EA2	71VA	71DA 71DA(L)2	71JAQ(L)	71JA(L) 71JA(L)2	71KAQ	71KA 71KA2	-	-
80	-	-	-	-	-	-	-	-	-	-	-	-
100	-	-	100EA	100EA 100EA2	-	-	100JAQ(L)	100JA(L) 100JA(L)2	100KAQ	100KA 100KA2	-	-

Note: The lineup of a connectable indoor unit depends on a district/areas/country.

Branch box	PAC-MK5*BC	PAC-MK3*BC
Number of branches (Indoor unit that can be connected)	5-branches (MAX. 5 units)	3-branches (MAX. 3 units)

* changes such as 1, 2...

Note:
A maximum of 2 branch boxes can be connected to 1 outdoor unit.
PUMY-SP•VKM2, PUMY-SP•YKM2
cannot connect 31/32/51/52 series.

2-branch pipe (joint): Optional parts	
In the case of using 1- branch box	No need
In the case of using 2- branch boxes	Model name: MSDD-50AR-E — Connection method: flare Model name: MSDD-50BR-E — Connection method: brazing Select a model according to the connection method.

Option	Optional accessories of indoor units and outdoor units are available.

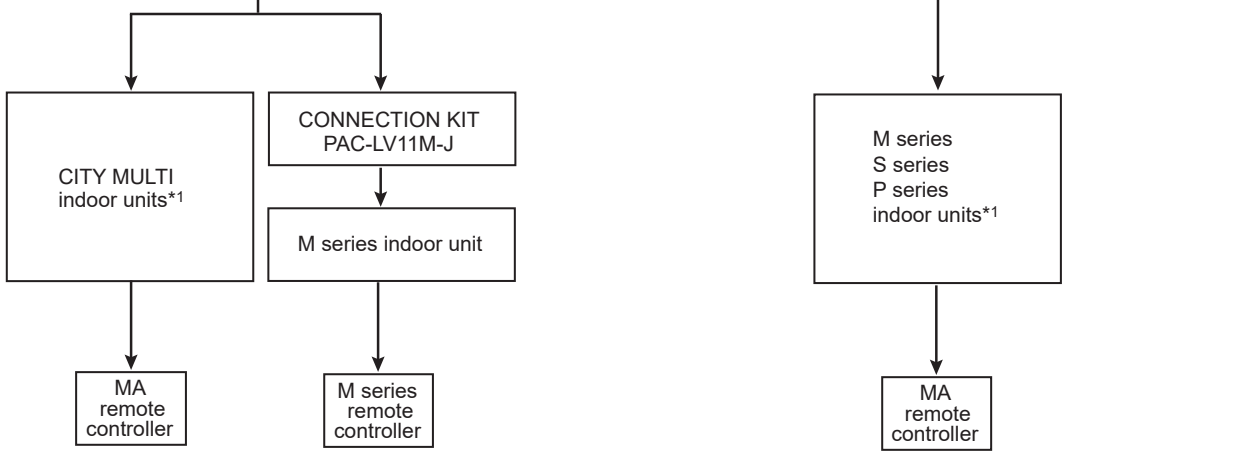
2-3. SYSTEM CONSTRUCTION (MIXED SYSTEM)

Outdoor unit			4.5HP SP112		5HP SP125		6HP SP140	
Applicable indoor unit	Capacity	CITY MULTI indoor unit	Type 10 to Type 140					
		Via branch box	kW unit: Type 15 to Type 100					
	Number of units		Via branch box	CITY MULTI indoor	Via branch box	CITY MULTI indoor	Via branch box	CITY MULTI indoor
		1 branch box	5	5	5	5	5	5
		2 branch boxes	8	3	8	3	8	3
	Total system capacity range		6.3 to 16.2 kW		7.1 to 18.2 kW		8.0 to 20.2 kW	

Branching pipe components	CMY-Y62-G-E	CMY-Y64-G-E	CMY-Y68-G-E
	Branch header (2-branches)	Branch header (4-branches)	Branch header (8-branches)

Branch box Number of branches	PAC-MK5*BC	PAC-MK3*BC
	5-branches (MAX. 5 units)	3-branches (MAX. 3 units)

* changes such as 1, 2...



*1 Refer to “2-1. SYSTEM CONSTRUCTION” or “2-2. SYSTEM CONSTRUCTION (BRANCH BOX SYSTEM)”, for more detail.

2-4. SYSTEM SPECIFICATIONS

(1) Outdoor Unit

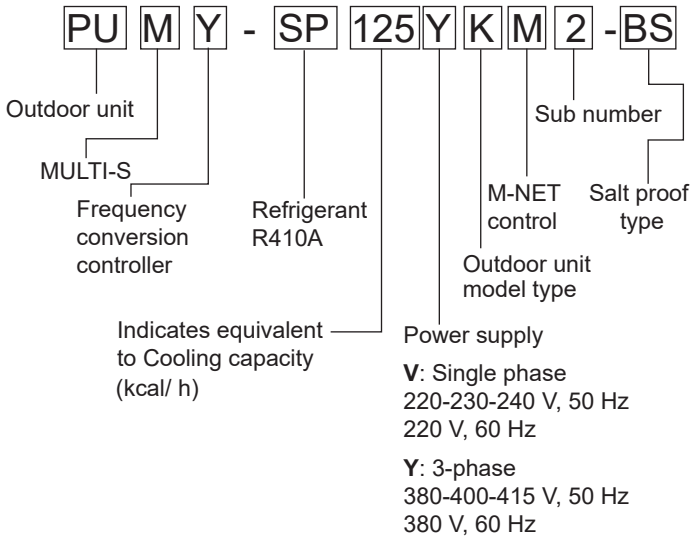
Outdoor unit		SP112	SP125	SP140
Capacity	Cooling (kW)	12.5	14.0	15.5
	Heating (kW)	14.0	16.0	16.5

Cooling capacity indicates the maximum value at operation under the following condition.

*Cooling Indoor : D.B. 27°C/W.B. 19°C
Outdoor : D.B. 35°C
*Heating Indoor : D.B. 20°C
Outdoor : D.B. 7°C/W.B. 6°C

(2) Method for identifying MULTI-S model

■ **Outdoor unit <When using model 125 >**



(3) Operating temperature range

	Cooling	Heating
Indoor intake air temperature	W.B. 15 to 24°C	D.B. 15 to 27°C
Outdoor intake air temperature	D.B. −5 to 52°C[*1]	W.B. −20 to 15°C

Notes: D.B.: Dry Bulb Temperature
W.B.: Wet Bulb Temperature

[*1] 10 to 52°C D.B.: When connecting PKFY-P15/P20/P25VBM, PKFY-P10/15/20/25/32VLM, PFFY-P20/25/32VKM, PFFY-P20/25/32VCM, PFFY-P20/25/32VLE(R)M(M) and; M series, S series, and P series type indoor unit.

■ When connecting fresh air type indoor unit

• PEFY-P·VMH-E-F

	Cooling	Heating
Indoor and Outdoor intake air temperature	D.B. 21 to 43ºC[*2] W.B. 15.5 to 35ºC	D.B. −10 to 20ºC[*3]
	D.B. 21 to 43ºC[*2] W.B. 15.5 to 35ºC	D.B. −5 to 20ºC[*3]

[*2]Thermo-OFF (FAN-mode) automatically starts if the outdoor temperature is lower than 21ºC D.B.
[*3]Thermo-OFF (FAN-mode) automatically starts if the outdoor temperature is higher than 20ºC D.B.

• PEFY-P·VMHS-E-F

	Cooling	Heating
Indoor and Outdoor intake air temperature	D.B. 17 to 43ºC[*4] W.B. 15.5 to 35ºC	D.B. −5 to 20ºC[*5]

[*4]Thermo-OFF (FAN-mode) automatically starts if the outdoor temp. is lower than 17°C D.B..
[*5]Thermo-OFF (FAN-mode) automatically starts if the outdoor temp. is higher than 21°C D.B..

3 SPECIFICATIONS

Model					PUMY-SP112VKM2(-BS) PUMY-SP112VKM2-ET(-BS) PUMY-SP112VKM2-ER(-BS)	PUMY-SP125VKM2(-BS) PUMY-SP125VKM2-ET(-BS) PUMY-SP125VKM2-ER(-BS)	PUMY-SP140VKM2(-BS) PUMY-SP140VKM2-ET(-BS) PUMY-SP140VKM2-ER(-BS)
Power source					1-phase 220-230-240 V, 50 Hz; 1-phase 220 V, 60 Hz		
Cooling capacity (Nominal)		kW		*1	12.5	14.0	15.5
		kcal/h		*1	10,750	12,040	13,330
		Btu/h		*1	42,650	47,768	52,886
	Power input	kW			4.46	5.11	5.34
	Current input	A			20.69 / 19.79 / 18.97	23.71 / 22.68 / 21.73	24.77 / 23.70 / 22.71
	COP	kW/kW			2.80	2.74	2.90
Temp. range of cooling	Indoor temp.	W.B.			15 to 24°C		
	Outdoor temp.	D.B.			-5 to 52°C *3,*4		
Heating capacity (Nominal)		kW		*2	14.0	16.0	16.5
		kcal/h		*2	12,040	13,760	14,190
		Btu/h		*2	47,768	54,592	56,298
	Power input	kW			3.66	4.31	4.36
	Current input	A			16.98 / 16.24 / 15.57	20.00 / 19.13 / 18.33	20.23 / 19.35 / 18.54
	COP	kW/kW			3.83	3.71	3.78
Temp. range of heating	Indoor temp.	D.B.			15 to 27°C		
	Outdoor temp.	W.B.			-20 to 15°C		
Indoor unit connectable	Total capacity				50 to 130% of outdoor unit capacity		
	Model/ Quantity	CITY MULTI			P10-P140/12	P10-P140/12	P10-P140/12
		Branch box		*5	P15-P100/8	P15-P100/8	P15-P100/8
		Mixed system	Branch box 1 unit*5	CITY MULTI	P10-P140/5	P10-P140/5	P10-P140/5
				Branch box	P15-P100/5	P15-P100/5	P15-P100/5
			Branch box 2 units*5	CITY MULTI	P10-P140/3	P10-P140/3	P10-P140/3
				Branch box	P15-P100/8	P15-P100/8	P15-P100/8
Sound pressure level (measured in anechoic room)		dB <A>			52/54	53/56	54/56
Power pressure level (measured in anechoic room)		dB <A>			72/74	73/76	74/76
Refrigerant piping diameter	Liquid pipe	mm (inch)			9.52 (3/8)		
	Gas pipe	mm (inch)			15.88 (5/8)		
Fan*2	Type × Quantity				Propeller Fan × 1		
	Airflow rate	m³/min			77	83	83
		L/s			1283	1383	1383
		cfm			2719	2931	2931
	Control, Driving mechanism				DC control		
	Motor output	kW			0.20 × 1		
	External static press.				0 Pa/30 Pa*6		
Compressor	Type × Quantity				Twin rotary hermetic compressor × 1		
	Manufacturer				Mitsubishi Electric Corporation		
	Starting method				Inverter		
	Capacity control	%			Cooling 26 to 100 Heating 20 to 100	Cooling 24 to 100 Heating 18 to 100	Cooling 21 to 100 Heating 17 to 100
	Motor output	kW			3.9	3.9	4.2
	Case heater	kW			0		
	Lubricant				FV50S (1.4 litter)		
External finish					Galvanized Steel Sheet Munsell No. 3Y 7.8/1.1		
External dimension H × W × D		mm			981 × 1,050 × 330 (+40)		
		inch			38-5/8 × 41-3/8 × 13 (+1-37/64)		
Protection devices	High pressure protection				High pressure Switch		
	Inverter circuit (COMP./FAN)				Overcurrent detection, Overheat detection(Heat sink thermistor)		
	Compressor				Compressor thermistor, Overcurrent detection, Compressor protector		
	Fan motor				Overheating, Voltage protection		
Refrigerant	Type × original charge				R410A 3.5 kg		
	Control				Linear expansion valve		
Net weight		kg (lb)			93 (205)*7		
Heat exchanger					Cross Fin and Copper tube		
HIC circuit (HIC: Heat Inter-Changer)					HIC circuit		
Defrosting method					Reversed refrigerant circuit		
Drawing	External				RK01B171		
	Wiring				BH79J995		
Standard attachment	Document				Installation Manual		
	Accessory				Grounded lead wire		
Optional parts					Joint: CMY-Y62-G-E Header: CMY-Y64/68-G-E		

Remarks

*1 Nominal cooling conditions

Indoor:	27°C D.B./19°C W.B. [81°F D.B/66°F W.B.]
Outdoor:	35°C D.B. [95°F D.B.]
Pipe length:	7.5 m [24-9/16 ft]
Level difference:	0 m [0 ft]

*2 Nominal heating conditions

	20°C D.B. [68°F D.B.]
	7°C DB/6°C W.B. [45°F D.B./43°F W.B.]
	7.5 m [24-9/16 ft]
	0 m [0 ft]

*3 10 to 52°C(D.B): When connecting PFFY-P20/25/32VCM, PKFY-P15/20/25VBM, PKFY-P10/15/20/25/32VLM, PFFY-P20/25/32VKM, PFFY-P20/25/32VLE(R)M(M), and M series, S series, and P series type indoor unit.

*4 −15 to 52°C(D.B): When using an optional air protect guide [PAC-SH95AG-E]. However, this condition does not apply to the indoor unit listed in *3.

*5 At least two indoors must be connected when using branch box.

*6 It is possible to set the External static pressure to 30 Pa by Dip Switch.

*7 94 (207), for PUMY-SP112/125/140VKM2(-ET/-ER)-BS.

Notes :1. Nominal conditions *1, *2 are subject to ISO 15042.

2. Due to continuing improvement, above specifications may be subject to change without notice.

Unit converter

kcal/h = kW × 860
Btu/h = kW × 3,412
cfm = m³/min × 35.31
lb = kg/0.4536

Above specification data is subject to rounding variation.

Model					PUMY-SP112YKM2(-BS) PUMY-SP112YKM2-ET(-BS) PUMY-SP112YKM2-ER(-BS)			PUMY-SP125YKM2(-BS) PUMY-SP125YKM2-ET(-BS) PUMY-SP125YKM2-ER(-BS)			PUMY-SP140YKM2(-BS) PUMY-SP140YKM2-ET(-BS) PUMY-SP140YKM2-ER(-BS)		
Power source					3-phase380-400-415 V, 50 Hz; 3-phase 380 V, 60 Hz								
Cooling capacity (Nominal)		kW *1			12.5			14.0			15.5		
		kcal/h *1			10,750			12,040			13,330		
		Btu/h *1			42,650			47,768			52,886		
	Power input	kW			4.46			5.11			5.34		
	Current input	A			7.14	6.78	6.54	8.18	7.77	7.49	8.55	8.12	7.83
	COP	kW/kW			2.80			2.74			2.90		
Temp. range of cooling	Indoor temp.	W.B.			15 to 24°C								
	Outdoor temp.	D.B.			-5 to 52°C *3,*4								
Heating capacity (Nominal)		kW *2			14.0			16.0			16.5		
		kcal/h *2			12,040			13,760			14,190		
		Btu/h *2			47,768			54,592			56,298		
	Power input	kW			3.66			4.31			4.36		
	Current input	A			5.86	5.57	5.36	6.90	6.55	6.32	6.98	6.63	6.39
	COP	kW/kW			3.83			3.71			3.78		
Temp. range of heating	Indoor temp.	D.B.			15 to 27°C								
	Outdoor temp.	W.B.			-20 to 15°C								
Indoor unit connectable	Total capacity				50 to 130% of outdoor unit capacity								
	Model/ Quantity	CITY MULTI			P10-P140/12			P10-P140/12			P10-P140/12		
		Branch box *5			P15-P100/8			P15-P100/8			P15-P100/8		
		Mixed system	Branch box 1 unit *5	CITY MULTI	P10-P140/5			P10-P140/5			P10-P140/5		
				Branch box	P15-P100/5			P15-P100/5			P15-P100/5		
			Branch box 2 units *5	CITY MULTI	P10-P140/3			P10-P140/3			P10-P140/3		
				Branch box	P15-P100/8			P15-P100/8			P15-P100/8		
Sound pressure level (measured in anechoic room)		dB <A>			52/54			53/56			54/56		
Power pressure level (measured in anechoic room)		dB <A>			72/74			73/76			74/76		
Refrigerant piping diameter	Liquid pipe	mm (inch)			9.52 (3/8)								
	Gas pipe	mm (inch)			15.88 (5/8)								
Fan *2	Type × Quantity				Propeller Fan × 1								
	Airflow rate	m³/min			77			83			83		
		L/s			1283			1383			1383		
		cfm			2719			2931			2931		
	Control, Driving mechanism				DC control								
	Motor output	kW			0.20 × 1								
	External static press.				0 Pa/30 Pa *6								
Compressor	Type × Quantity				Twin rotary hermetic compressor × 1								
	Manufacturer				Mitsubishi Electric Corporation								
	Starting method				Inverter								
	Capacity control	%			Cooling 26 to 100 Heating 20 to 100			Cooling 24 to 100 Heating 18 to 100			Cooling 21 to 100 Heating 17 to 100		
	Motor output	kW			3.9			3.8			4.1		
	Case heater	kW			0								
	Lubricant				FV50S (1.4 litter)								
External finish					Galvanized Steel Sheet Munsell No. 3Y 7.8/1.1								
External dimension H × W × D		mm			981 × 1,050 × 330(+40)								
		inch			38-5/8 × 41-3/8 × 13 (+1-37/64)								
Protection devices	High pressure protection				High pressure Switch								
	Inverter circuit (COMP./FAN)				Overcurrent detection, Overheat detection(Heat sink thermistor)								
	Compressor				Compressor thermistor, Overcurrent detection, Compressor protector								
	Fan motor				Overheating, Voltage protection								
Refrigerant	Type × original charge				R410A 3.5 kg								
	Control				Linear expansion valve								
Net weight		kg (lb)			94 (207) *7								
Heat exchanger					Cross Fin and Copper tube								
HIC circuit (HIC: Heat Inter-Changer)					HIC circuit								
Defrosting method					Reversed refrigerant circuit								
Drawing	External				RK01B171								
	Wiring				BH79J996								
Standard attachment	Document				Installation Manual								
	Accessory				Grounded lead wire								
Optional parts					Joint: CMY-Y62-G-E Header: CMY-Y64/68-G-E								

Remarks

	*1 Nominal cooling conditions	*2 Nominal heating conditions
Indoor :	27°C D.B./19°C W.B. [81°F D.B/66°F W.B.]	20°C D.B. [68°F D.B.]
Outdoor :	35°C D.B. [95°F D.B.]	7°C DB/6°C W.B. [45°F D.B./43°F W.B.]
Pipe length :	7.5 m [24-9/16 ft]	7.5 m [24-9/16 ft]
Level difference :	0 m [0 ft]	0 m [0 ft]

*3 10 to 52°C(D.B): When connecting PFFY-P20/25/32VCM, PKFY-P15/20/25VBM, PKFY-P10/15/20/25/32VLM, PFFY-P20/25/32VKM, PFFY-P20/25/32VLE(R)M(M), and M series, S series, and P series type indoor unit.

*4 −15 to 52°C(D.B): When using an optional air protect guide [PAC-SH95AG-E]. However, this condition does not apply to the indoor unit listed in *3.

*5 At least two indoors must be connected when using branch box.

*6 It is possible to set the External static pressure to 30 Pa by Dip Switch.

*7 95 (209), for PUMY-SP112/125/140YKM2(-ET/-ER)-BS.

Notes : 1. Nominal conditions *1, *2 are subject to ISO 15042.
2. Due to continuing improvement, above specifications may be subject to change without notice.

Unit converter

kcal/h = kW × 860
Btu/h = kW × 3,412
cfm = m³/min × 35.31
lb = kg/0.4536

Above specification data is subject to rounding variation.

4 DATA

4-1. SELECTION OF COOLING/HEATING UNITS

<Cooling>

Design Condition	
Outdoor Design Dry Bulb Temperature	**45ºC**
Total Cooling Load	**10.6 kW**
Room1	
Indoor Design Dry Bulb Temperature	**27ºC**
Indoor Design Wet Bulb Temperature	**20ºC**
Cooling Load	**4.6 kW**
Room2	
Indoor Design Dry Bulb Temperature	**24ºC**
Indoor Design Wet Bulb Temperature	**18ºC**
Cooling Load	**6.0 kW**
<Other>	
Indoor/Outdoor Equivalent Piping Length	**60 m**

Capacity of indoor unit

P•FY Series	Model Number for indoor unit (kW type)	Model 10	Model 15	Model 20	Model 25	Model 32	Model 40	Model 50	Model 63	Model 71	Model 80	Model 100	Model 125	Model 140
	Model Capacity	1.2	1.7	2.2	2.8	3.6	4.5	5.6	7.1	8.0	9.0	11.2	14.0	16.0
M Series S Series P Series	Model Number for indoor unit (kW type)	Model 15	Model 18	Model 20	Model 22	Model 25	Model 35	Model 42	Model 50	Model 60	Model 71	Model 80	Model 100	-
	Model Capacity	1.5	1.8	2.0	2.2	2.5	3.5	4.2	5.0	6.0	7.1	8.0	10.0	-

1. Cooling Calculation

(1) Temporary Selection of Indoor Units

Room1

PEFY-P50 **5.6 kW (Rated)**

Room2

PEFY-P71 **8.0 kW (Rated)**

(2) Total Indoor Units Capacity

P50 + P71 = P121

(3) Selection of Outdoor Unit

The SP125 outdoor unit is selected as total indoor units capacity is P121

PUMY-SP125 **14.0 kW**

(4) Total Indoor Units Capacity Correction Calculation

Room1

Indoor Design Wet Bulb Temperature Correction (20ºC) 1.03 (Refer to Figure 1)

Room2

Indoor Design Wet Bulb Temperature Correction (18ºC) 0.94 (Refer to Figure 1)

Total Indoor Units Capacity (CTi)

CTi = Σ (Indoor Unit Rating × Indoor Design Temperature Correction)

= 5.6 × 1.03 + 8.0 × 0.94

= 13.3 kW

(5) Outdoor Unit Correction Calculation

Outdoor Design Dry Bulb Temperature Correction (45ºC) 0.86 (Refer to Figure 2)

Piping Length Correction (60 m) 0.90 (Refer to Figure 3)

Total Outdoor Unit Capacity (CTo)

CTo = Outdoor Rating × Outdoor Design Temperature Correction × Piping Length Correction

= 14.0 × 0.86 × 0.90

= 10.8 kW

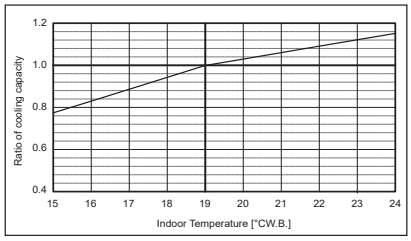


Figure 1 **Indoor unit temperature correction**
To be used to correct indoor unit only

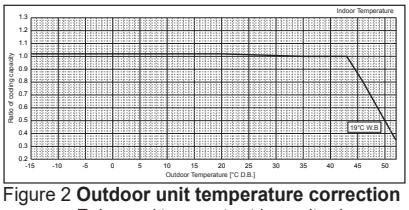


Figure 2 **Outdoor unit temperature correction**
To be used to correct outdoor unit only

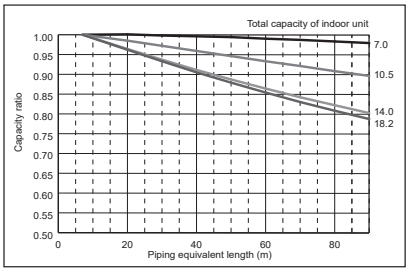


Figure 3 **Correction of refrigerant piping length**

(6) Determination of Maximum System Capacity

Comparison of Capacity between Total Indoor Units Capacity (CTi) and Total Outdoor Unit Capacity (CTo)

CTi = 13.3 > CTo = 10.8, thus, select CTo.

CTx = CTo = 10.8 kW

(7) Comparison with Essential Load

Against the essential load 10.6kW, the maximum system capacity is 10.8 kW: Proper outdoor units have been selected.

(8) Calculation of Maximum Indoor Unit Capacity of Each Room

CTx = CTo, thus, calculate by the calculation below

Room1

Maximum Capacity × Room1 Capacity after the Temperature Correction/(Room1,2 Total Capacity after the Temperature Correction

= 10.8 × (5.6 × 1.03)/(5.6 × 1.03 + 8.0 × 0.94)

= 4.7 kW **OK: fulfills the load 4.6 kW**

Room2

Maximum Capacity × Room2 Capacity after the Temperature Correction/(Room1,2 Total Capacity after the Temperature Correction)

= 10.8 × (8.0 × 0.94)/(5.6 × 1.03 + 8.0 × 0.94)

= 6.1 kW **OK: fulfills the load 6.0 kW**

Note: If CTx = CTi, please refer to the <Heating> section to calculate the Maximum Indoor Unit Capacity of Each Room.

Go on to the heating trial calculation since the selected units fulfill the cooling loads of Room 1, 2.

<Heating>

Design Condition	
Outdoor Design Wet Bulb Temperature	**2ºC**
Total Heating Load	**13.2 kW**
Room1	
Indoor Design Dry Bulb Temperature	**23ºC**
Heating Load	**5.4 kW**
Room2	
Indoor Design Dry Bulb Temperature	**23ºC**
Heating Load	**7.8 kW**
<Other>	
Indoor/Outdoor Equivalent Piping Length	**60 m**

Capacity of indoor unit

P•FY Series	Model Number for indoor unit (kW type)	Model 10	Model 15	Model 20	Model 25	Model 32	Model 40	Model 50	Model 63	Model 71	Model 80	Model 100	Model 125	Model 140
	Model Capacity	1.4	1.9	2.5	3.2	4.0	5.0	6.3	8.0	9.0	10.0	12.5	16.0	18.0
M Series S Series P Series	Model Number for indoor unit (kW type)	Model 15	Model 18	Model 20	Model 22	Model 25	Model 35	Model 42	Model 50	Model 60	Model 71	Model 80	Model 100	-
	Model Capacity	1.7	2.1	2.3	2.5	2.9	4.0	4.8	5.7	6.9	8.1	9.3	11.2	-

2. Heating Calculation

(1) Temporary Selection of Indoor Units

Room1

PEFY-P50 **6.3 kW (Rated)**

Room2

PEFY-P71 **9.0 kW (Rated)**

(2) Total Indoor Units Capacity

P50 + P71 = P121

(3) Selection of Outdoor Unit

The SP125 outdoor unit is selected as total indoor units capacity is P121

PUMY-SP125 **16.0 kW**

(4) Total Indoor Units Capacity Correction Calculation

Room1

Indoor Design Dry Bulb Temperature Correction (23ºC) 0.88 (Refer to Figure 4)

Room2

Indoor Design Dry Bulb Temperature Correction (23ºC) 0.88 (Refer to Figure 4)

Total Indoor Units Capacity (CTi)

CTi = Σ (Indoor Unit Rating × Indoor Design Temperature Correction)

= 6.3 × 0.88 + 9.0 × 0.88

= 13.5 kW

(5) Outdoor Unit Correction Calculation

Outdoor Design Wet Bulb Temperature Correction (2ºC) 1.00 (Refer to Figure 5)

Piping Length Correction (60 m) 0.96 (Refer to Figure 6)

Defrost Correction 0.89 (Refer to Table 1)

Total Outdoor Unit Capacity (CTo)

CTo = Outdoor Unit Rating × Outdoor Design Temperature Correction × Piping Length Correction × Defrost Correction

= 16.0 × 1.00 × 0.96 × 0.89

= 13.7 kW

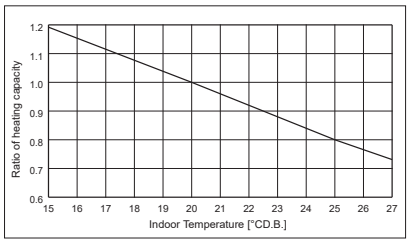


Figure 4 **Indoor unit temperature correction**
To be used to correct indoor unit only

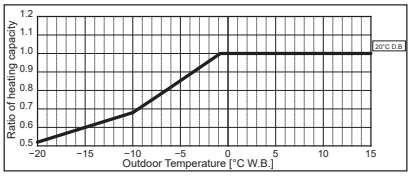


Figure 5 **Outdoor unit temperature correction**
To be used to correct outdoor unit only

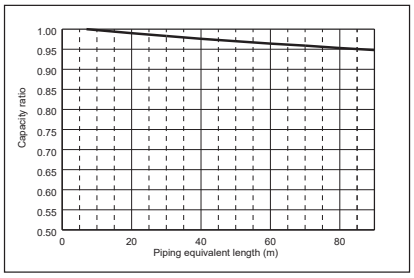


Figure 6 **Correction of refrigerant piping length**

(6) Determination of Maximum System Capacity

Comparison of Capacity between Total Indoor Units Capacity (CTi) and Total Outdoor Unit Capacity (CTo)

CTi = 13.5 < CTo = 13.7, thus, select CTi.

CTx = CTi = 13.5 kW

(7) Comparison with Essential Load

Against the essential load 13.2kW, the maximum system capacity is 13.5 kW: Proper indoor units have been selected.

(8) Calculation of Maximum Indoor Unit Capacity of Each Room

CTx = CTi, thus, calculate by the calculation below

Room1

Indoor Unit Rating × Indoor Design Temperature Correction

= 6.3 × 0.88

= 5.5 kW **OK: fulfills the load 5.4 kW**

Room2

Indoor Unit Rating × Indoor Design Temperature Correction

= 9.0× 0.88

= 7.9 kW **OK: fulfills the load 7.8 kW**

Note: If CTx = CTo, please refer to the <Cooling> section to calculate the Maximum Indoor Unit Capacity of Each Room.

Completed selecting units since the selected units fulfill the heating loads of Room 1, 2.

Table 1 Table of correction factor at frost and defrost

Outdoor Intake Temperature (°C W.B.)	6	4	2	0	-2	-4	-6	-8	-10	-15	-20
Correction factor	1.00	0.98	0.89	0.88	0.89	0.90	0.95	0.95	0.95	0.95	0.95

4-2. CORRECTION BY TEMPERATURE

The outdoor units have varied capacity at different designing temperature. Using the nominal cooling capacity value and the ratio below, the capacity can be observed at various temperature.

<Cooling>

Figure 7 Indoor unit temperature correction
To be used to correct indoor unit capacity only

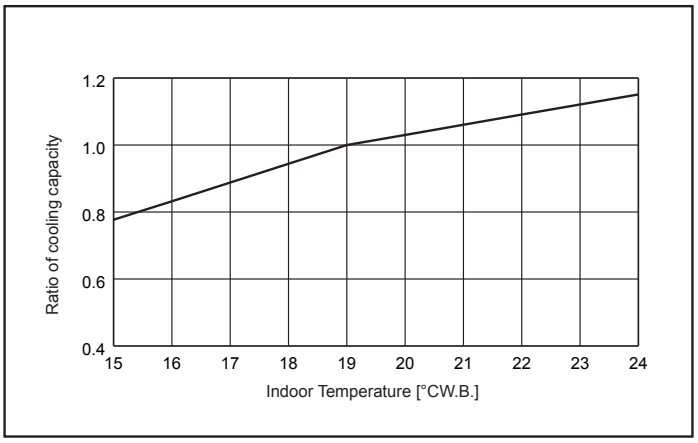
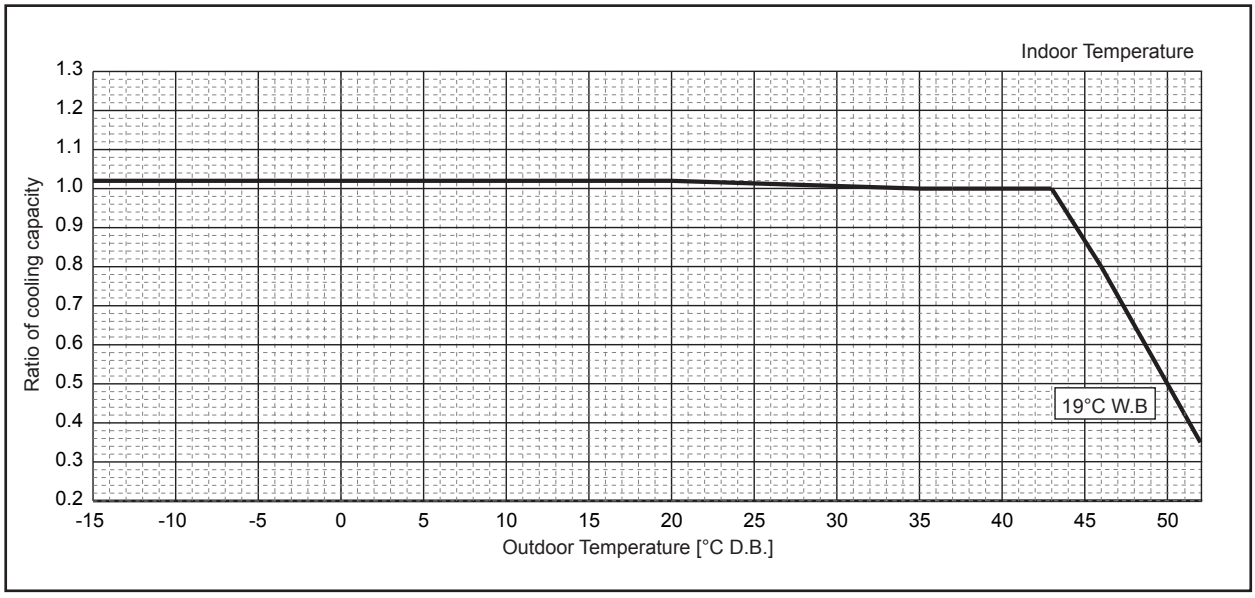


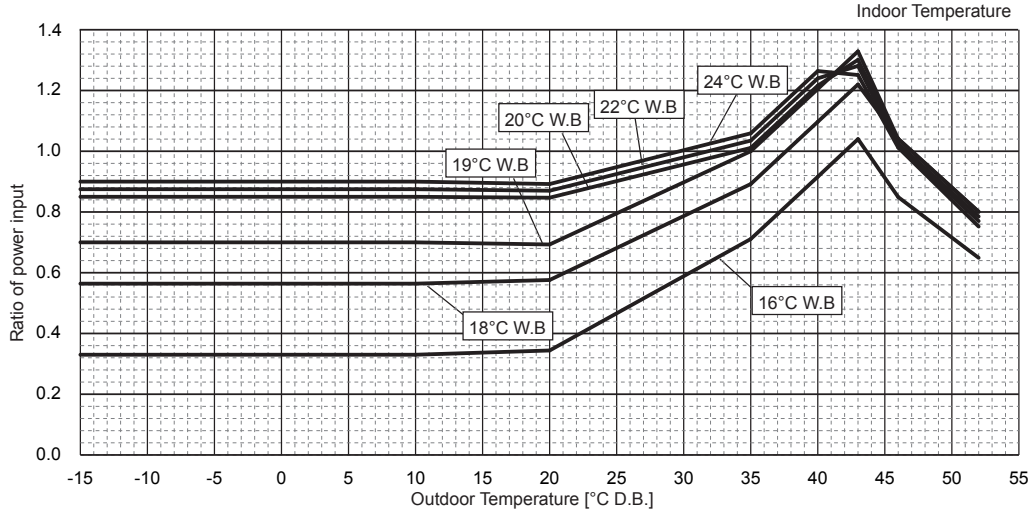
Figure 8 Outdoor unit temperature correction
To be used to correct outdoor unit capacity only



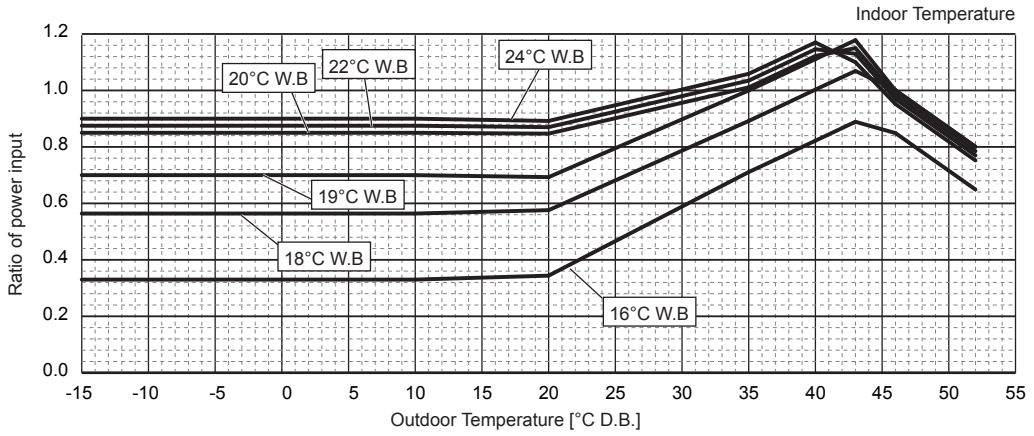
Continue to the next page.

Figure 9 Outdoor unit temperature correction
To be used to correct outdoor unit capacity only

PUMY-SP112VKM2(-BS) **PUMY-SP112VKM2-ET(-BS)** **PUMY-SP112VKM2-ER(-BS)**
PUMY-SP125VKM2(-BS) **PUMY-SP125VKM2-ET(-BS)** **PUMY-SP125VKM2-ER(-BS)**
PUMY-SP112YKM2(-BS) **PUMY-SP112YKM2-ET(-BS)** **PUMY-SP112YKM2-ER(-BS)**
PUMY-SP125YKM2(-BS) **PUMY-SP125YKM2-ET(-BS)** **PUMY-SP125YKM2-ER(-BS)**



PUMY-SP140VKM2(-BS) **PUMY-SP140VKM2-ET(-BS)** **PUMY-SP140VKM2-ER(-BS)**
PUMY-SP140YKM2(-BS) **PUMY-SP140YKM2-ET(-BS)** **PUMY-SP140YKM2-ER(-BS)**



<Heating>

Figure 10 Indoor unit temperature correction

To be used to correct indoor unit capacity only

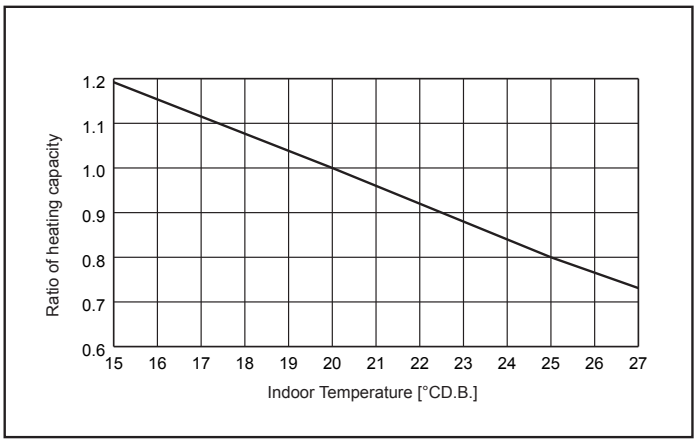
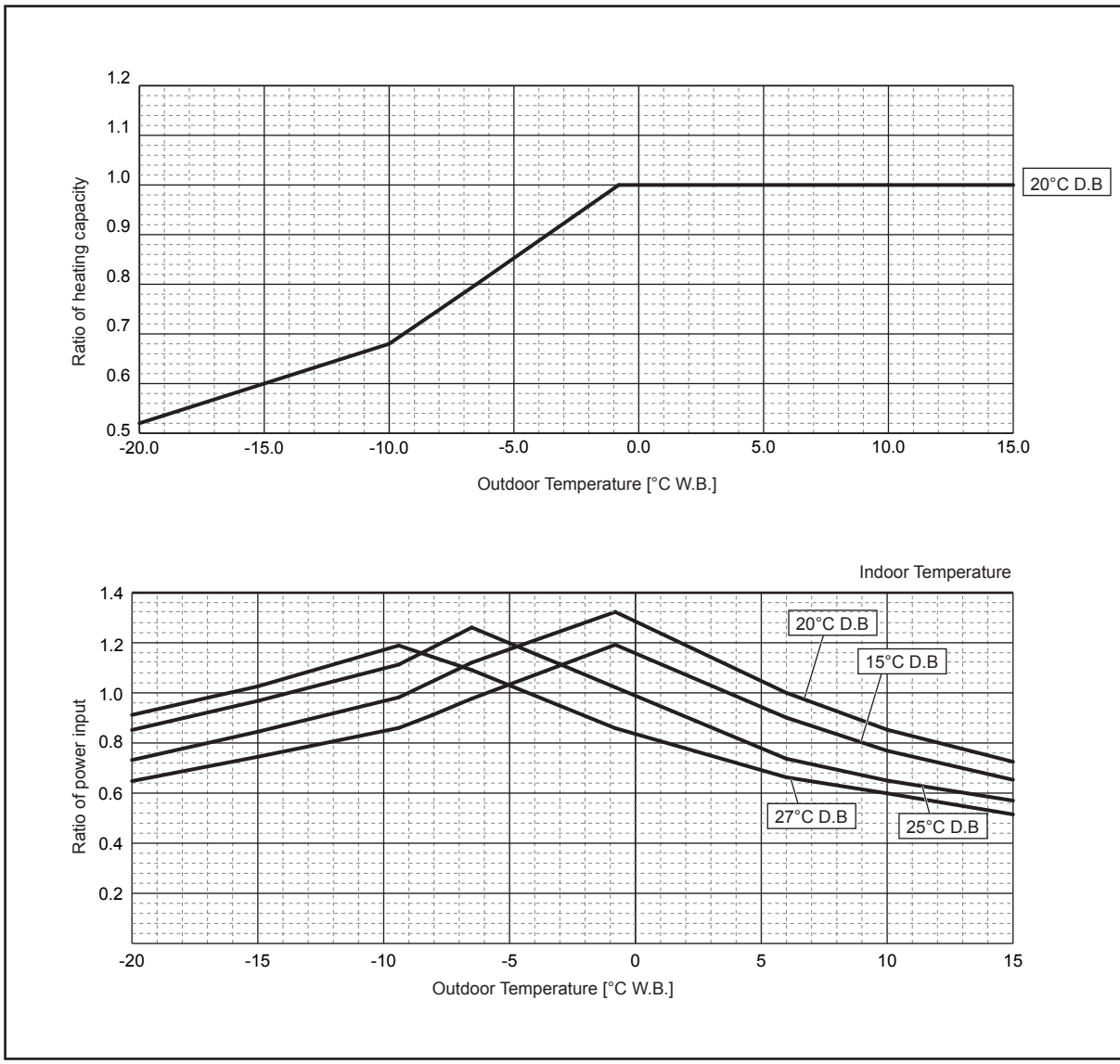


Figure 11 Outdoor unit temperature correction

To be used to correct outdoor unit capacity only



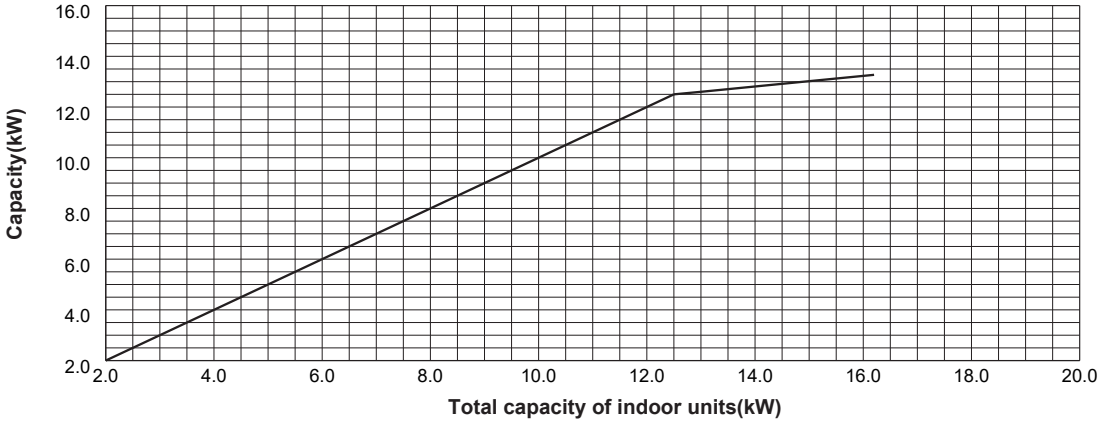
4-3. STANDARD OPERATION DATA (REFERENCE DATA)

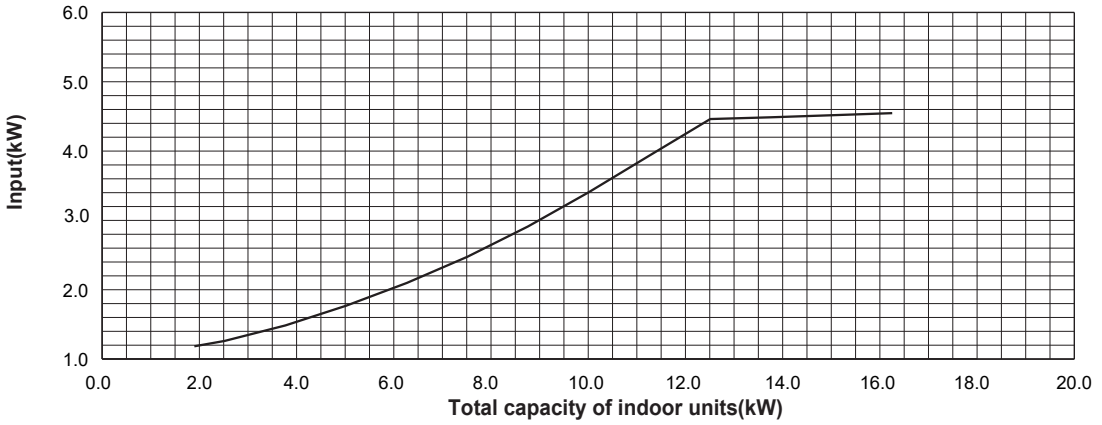
Model name				PUMY-SP112VKM2(-BS) PUMY-SP112VKM2-ET(-BS) PUMY-SP112VKM2-ER(-BS) PUMY-SP112YKM2(-BS) PUMY-SP112YKM2-ET(-BS) PUMY-SP112YKM2-ER(-BS)		PUMY-SP125VKM2(-BS) PUMY-SP125VKM2-ET(-BS) PUMY-SP125VKM2-ER(-BS) PUMY-SP25YKM2(-BS) PUMY-SP125YKM2-ET(-BS) PUMY-SP125YKM2-ER(-BS)		PUMY-SP140VKM2(-BS) PUMY-SP140VKM2-ET(-BS) PUMY-SP140VKM2-ER(-BS) PUMY-SP140YKM2(-BS) PUMY-SP140YKM2-ET(-BS) PUMY-SP140YKM2-ER(-BS)	
Operating conditions	Ambient temperature	Indoor	D.B./ W.B.	27/19°C	20°C	27/19°C	20°C	27/19°C	20°C
		Outdoor		35°C	7/6°C	35°C	7/6°C	35°C	7/6°C
	Indoor unit	No. of connected units	Unit	4		4		4	
		No. of units in operation		4		4		4	
		Capacity × Qty.	—	Type 25×2 + Type 32×2		Type 25×1 + Type 32×3		Type 32×2 + Type 40×2	
	Piping	Main pipe	m	5		5		5	
		Branch pipe		2.5		2.5		2.5	
		Total pipe length		15		15		15	
	Fan speed		—	Hi		Hi		Hi	
	Amount of refrigerant		kg	6.5		6.5		6.5	
Outdoor unit	Electric current		A	11.65/3.99	11.28/3.86	14.74/5.05	14.78/5.06	17.95/6.15	15.74/5.39
	Voltage		V	230/400	230/400	230/400	230/400	230/400	230/400
	Compressor frequency		Hz	71	79	70.5	87	76	88.1
LEV opening	Indoor unit		Pulse	401.5	677.5	310.5	511	242	347.5
Pressure	High pressure/Low pressure		MPaG	2.96/1.08	1.93/0.63	3.12/1.02	2.06/0.60	3.25/0.99	2.08/0.60
Temp. of each section	Outdoor unit	Discharge	°C	66.8	49.6	79.2	52.3	83.2	50.8
		Heat exchanger outlet		48.5	2.0	49.9	1.3	51.2	-0.3
		Accumulator inlet		14.8	-1.2	17.6	-2.0	15.4	-2.4
		Compressor inlet		11.8	-0.5	11.8	-2.0	16.4	-2.8
	Indoor unit	LEV inlet		30.6	25.2	32.7	24.4	33.7	26.5
		Heat exchanger inlet		11.9	41.8	13.8	42	16.2	41.5

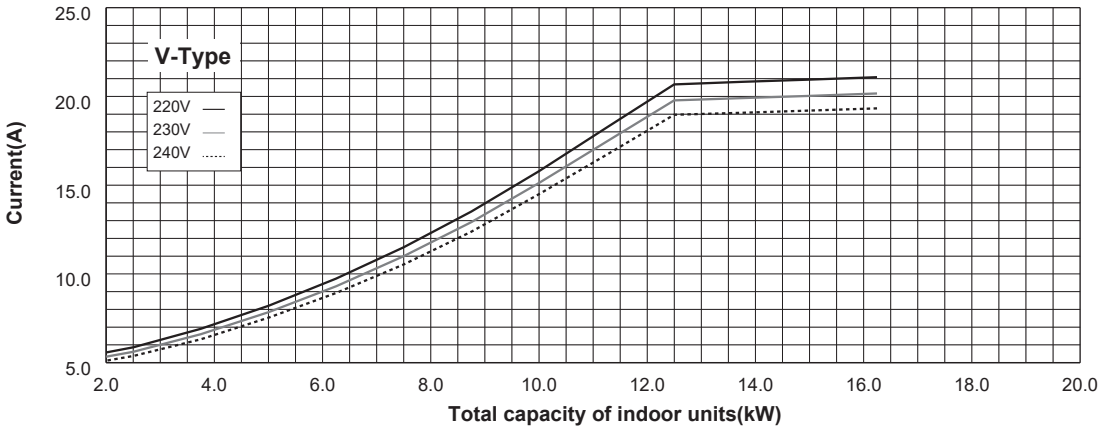
4-4. STANDARD CAPACITY DIAGRAM

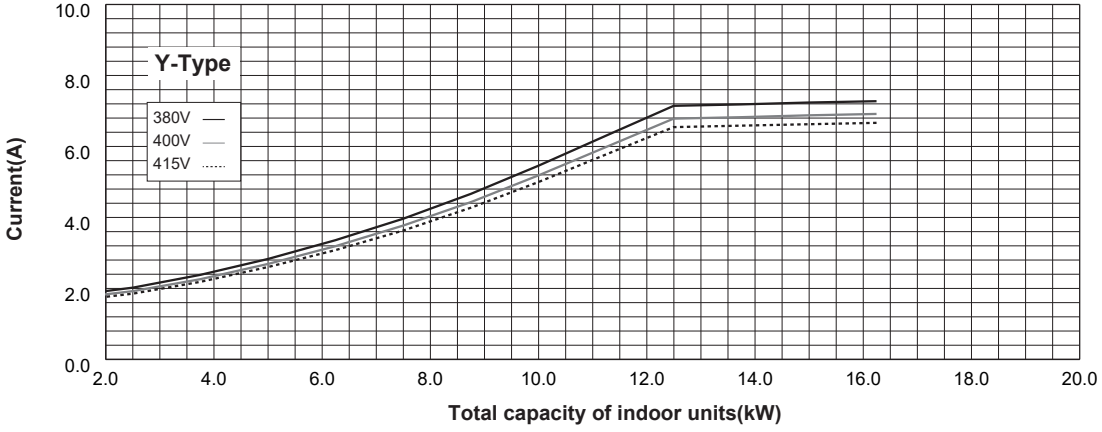
4-4-1. PUMY-SP112VKM2(-BS) PUMY-SP112YKM2(-BS) <Cooling>
PUMY-SP112VKM2-ET(-BS) PUMY-SP112YKM2-ET(-BS)
PUMY-SP112VKM2-ER(-BS) PUMY-SP112YKM2-ER(-BS)

Before calculating the sum of total capacity of indoor units, please convert the value into the kW model capacity following the formula on "4-1. SELECTION OF COOLING/HEATING UNITS".

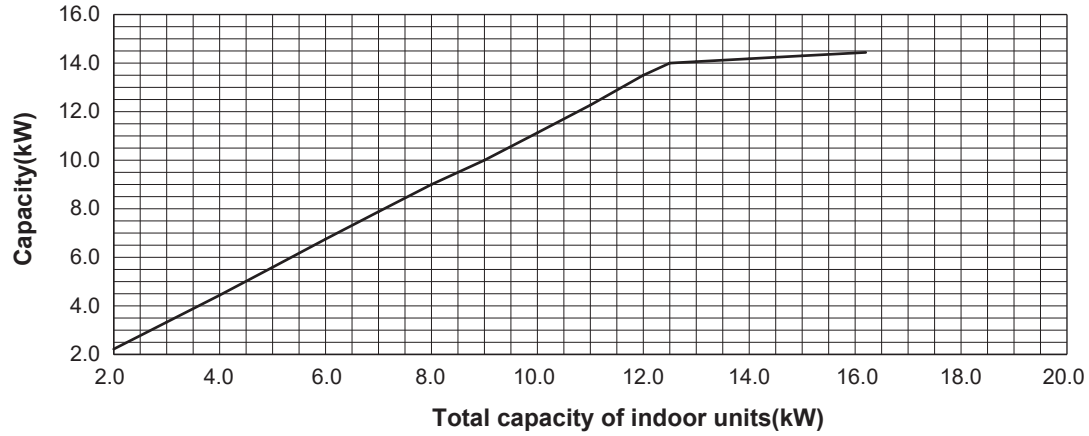


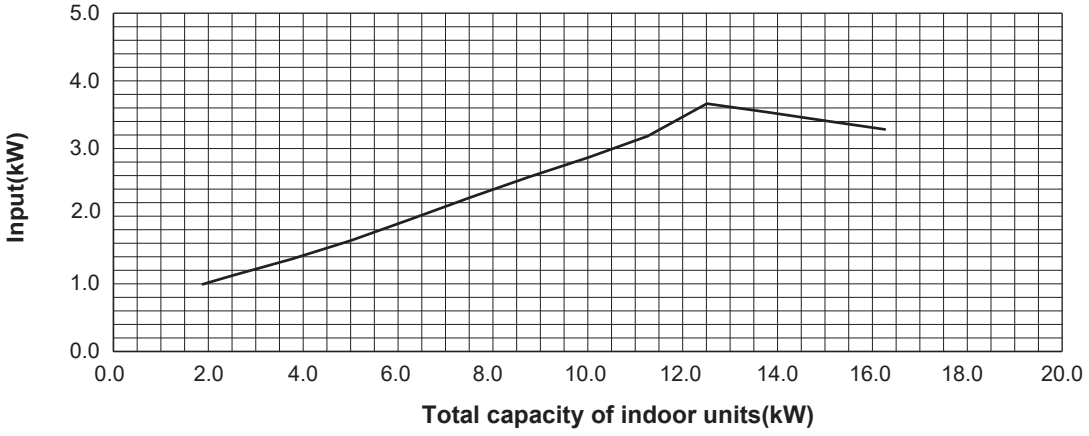


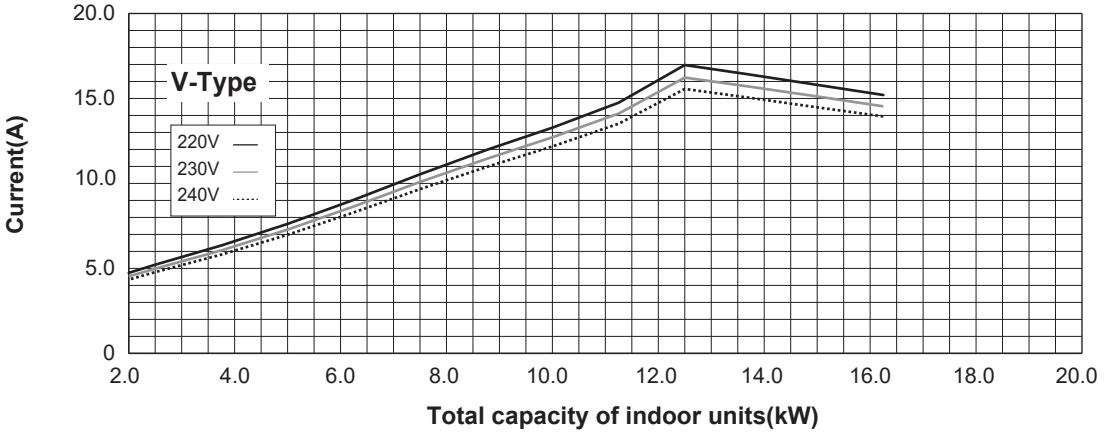


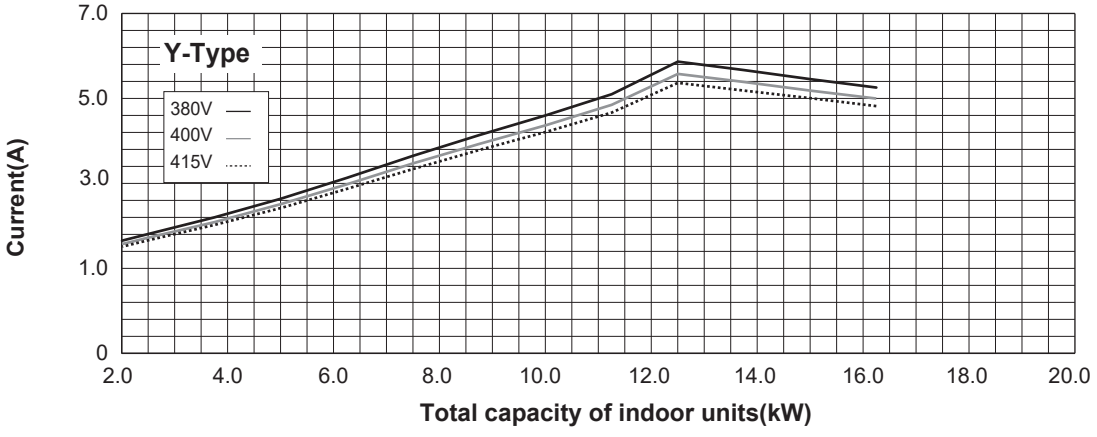


4-4-2. PUMY-SP112VKM2(-BS) **PUMY-SP112YKM2(-BS)** **<Heating>**
PUMY-SP112VKM2-ET(-BS) **PUMY-SP112YKM2-ET(-BS)**
PUMY-SP112VKM2-ER(-BS) **PUMY-SP112YKM2-ER(-BS)**



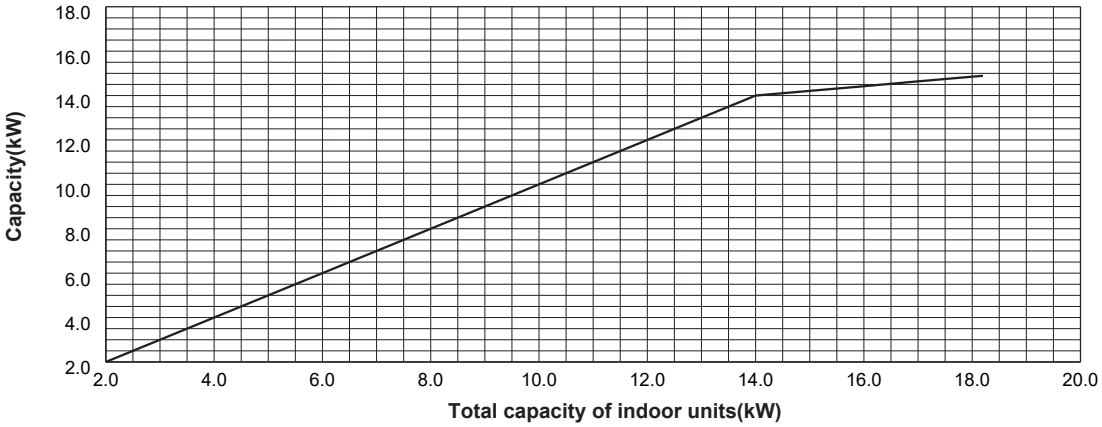


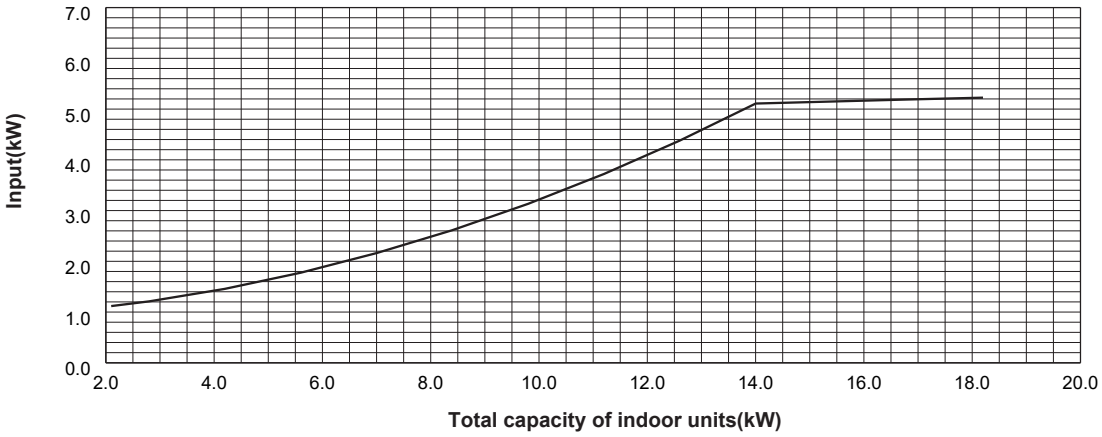


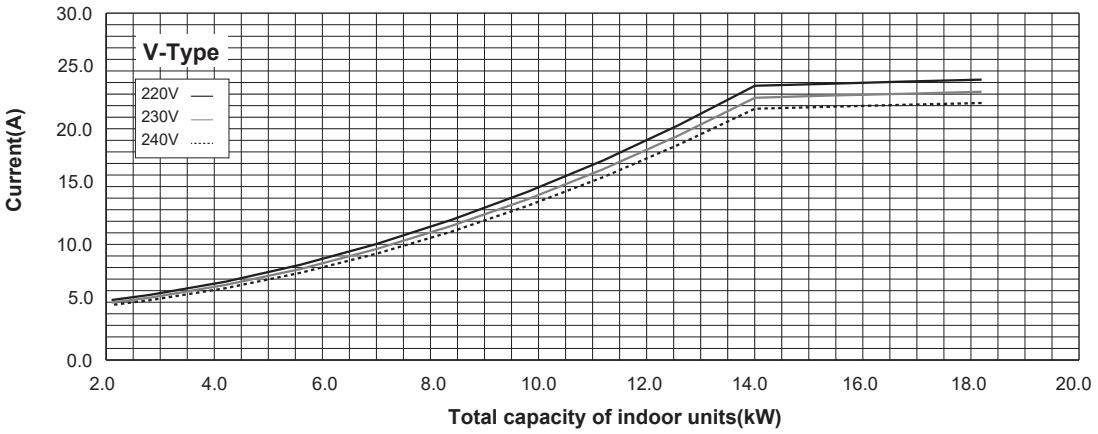


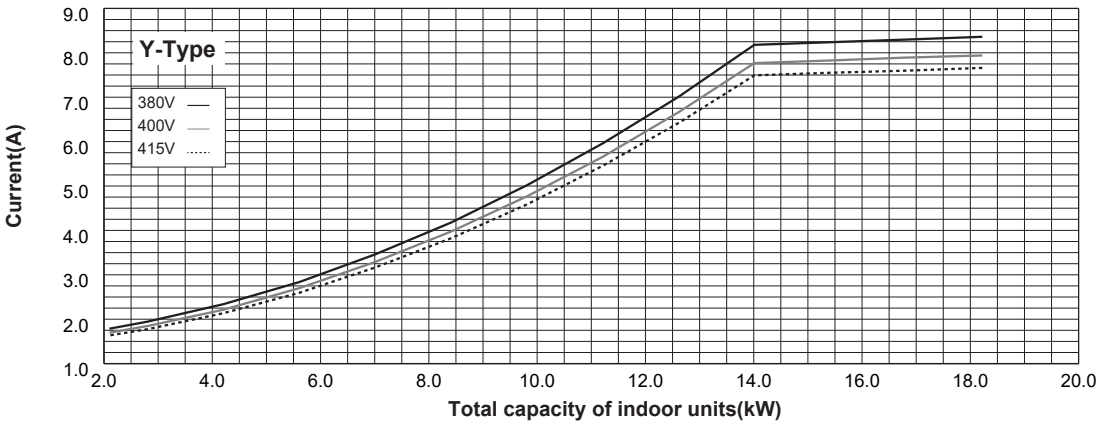
4-4-3. PUMY-SP125VKM2(-BS) PUMY-SP125YKM2(-BS) <Cooling>
PUMY-SP125VKM2-ET(-BS) PUMY-SP125YKM2-ET(-BS)
PUMY-SP125VKM2-ER(-BS) PUMY-SP125YKM2-ER(-BS)

Before calculating the sum of total capacity of indoor units, please convert the value into the kW model capacity following the formula on "4-1. SELECTION OF COOLING/HEATING UNITS".

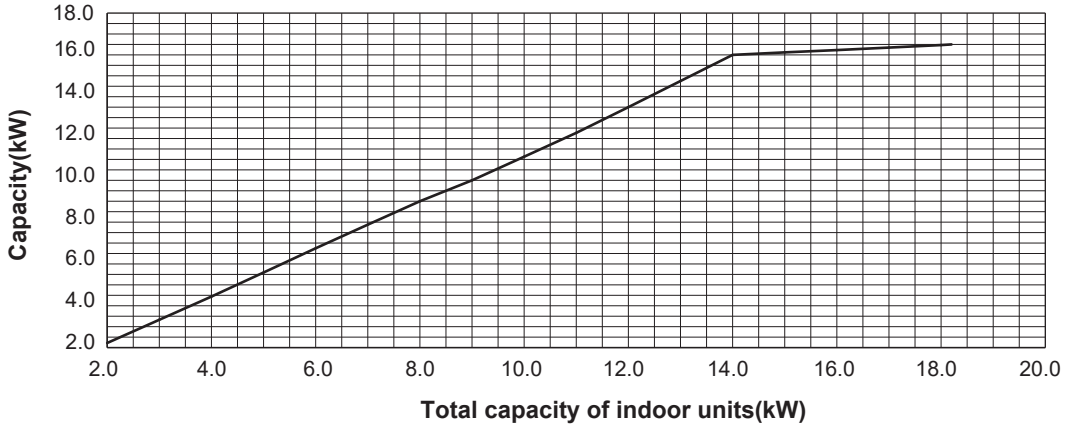


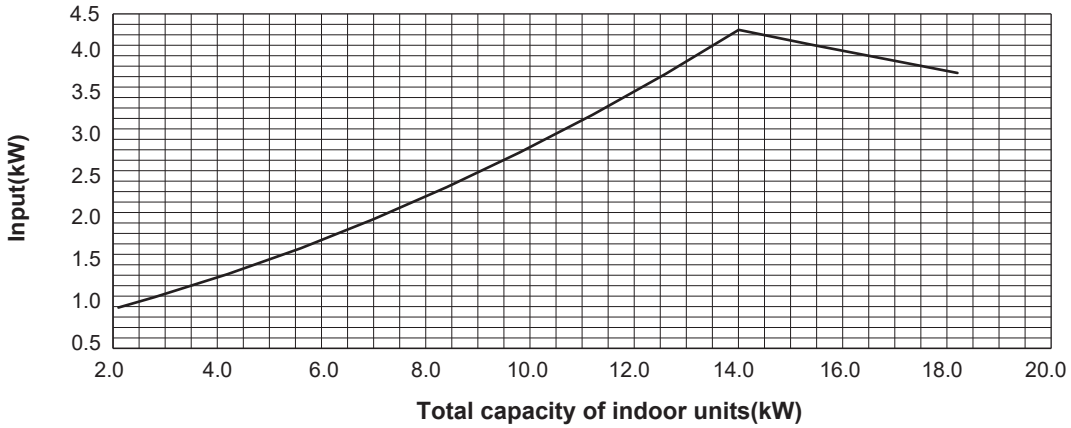


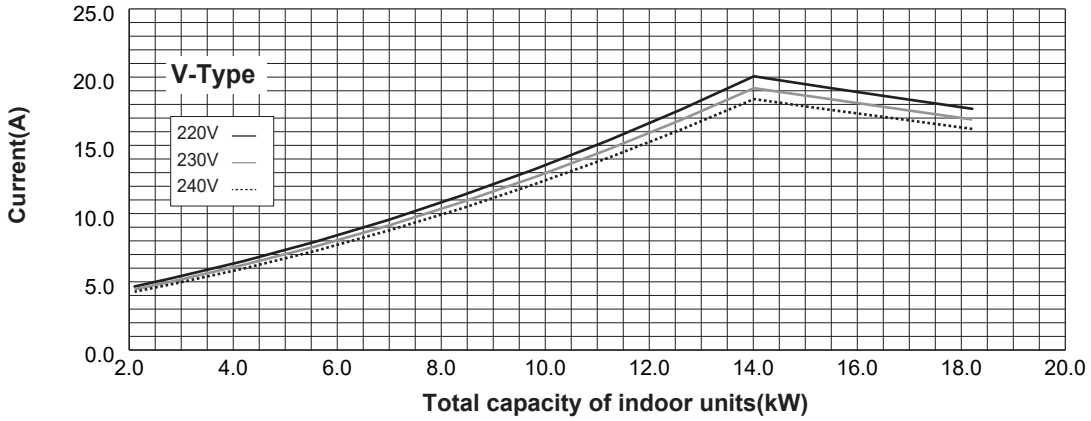


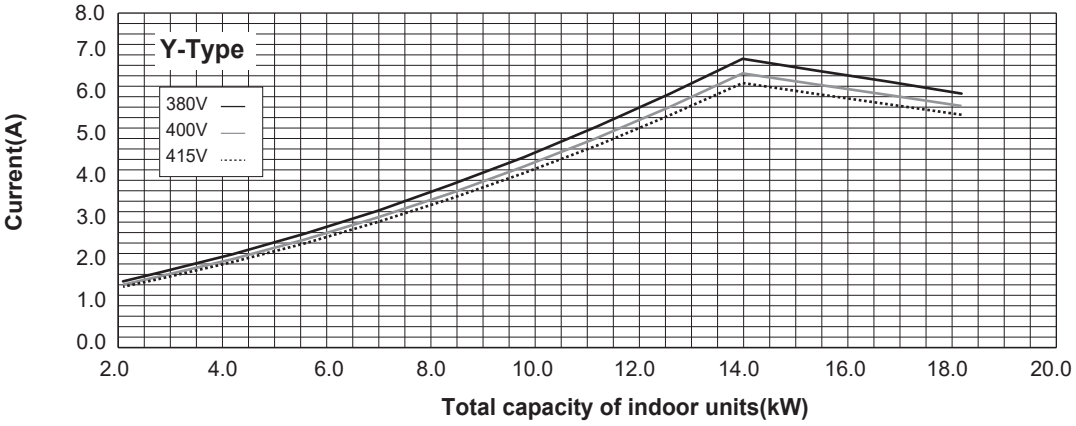


4-4-4. PUMY-SP125VKM2(-BS) **PUMY-SP125YKM2(-BS)** **<Heating>**
PUMY-SP125VKM2-ET(-BS) **PUMY-SP125YKM2-ET(-BS)**
PUMY-SP125VKM2-ER(-BS) **PUMY-SP125YKM2-ER(-BS)**



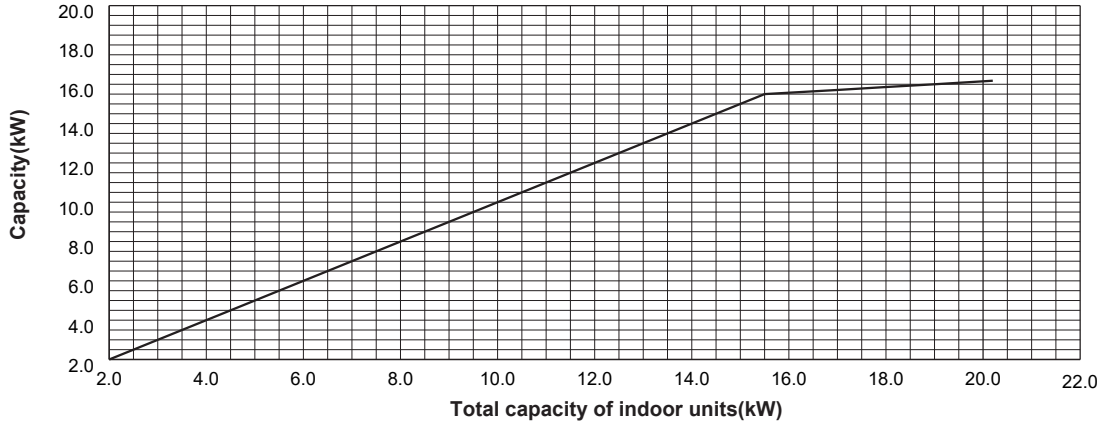


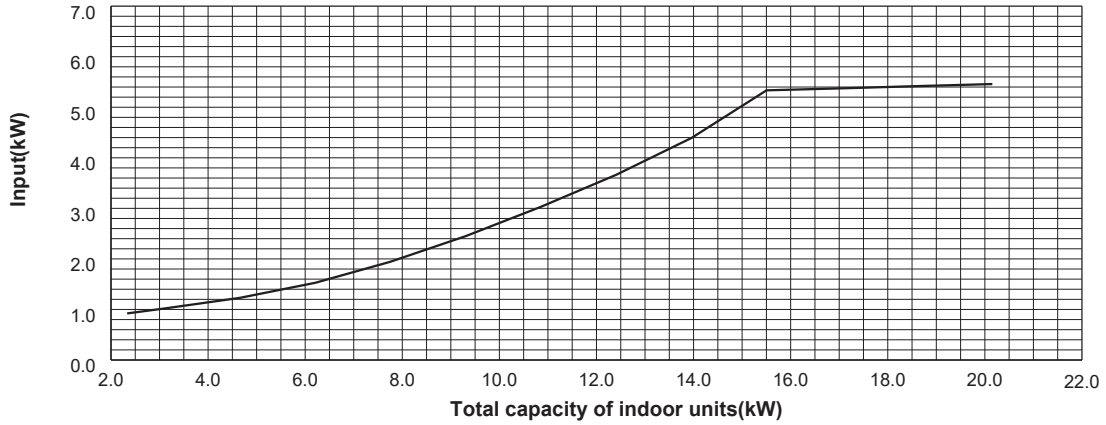


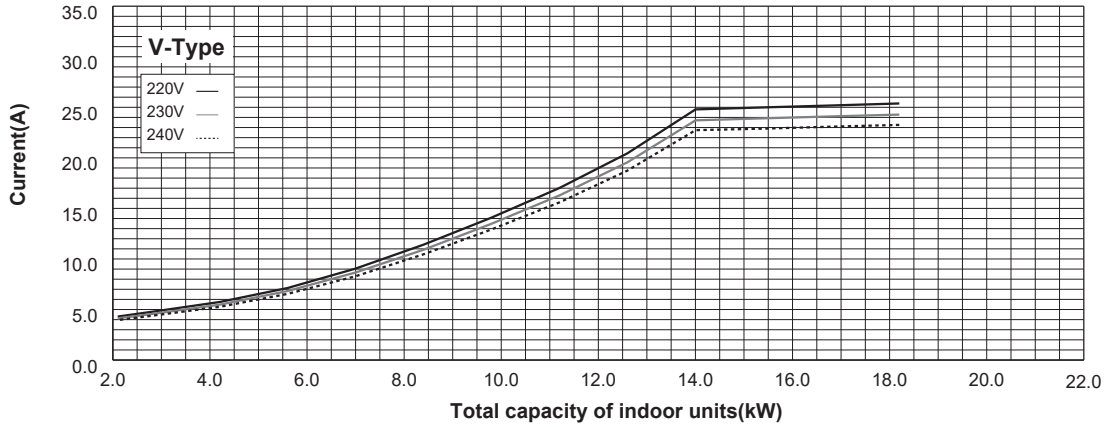


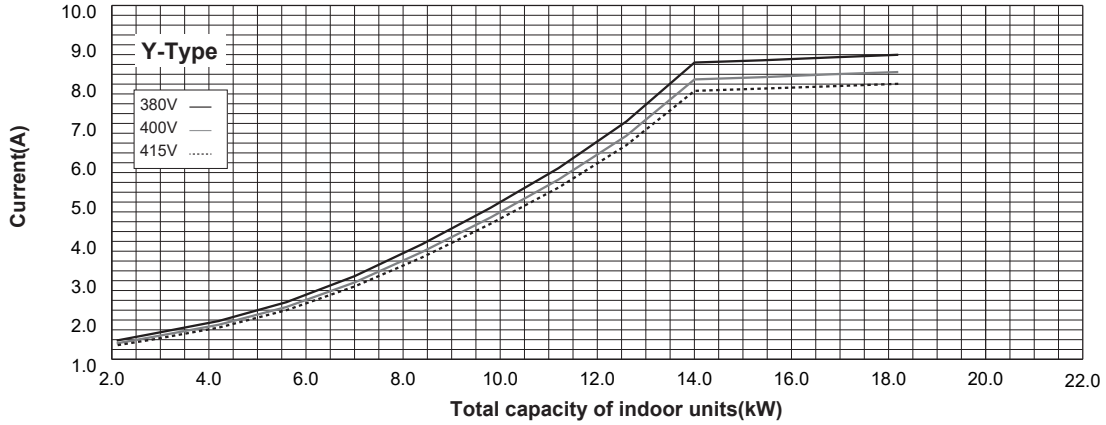
4-4-5. PUMY-SP140VKM2(-BS) PUMY-SP140YKM2(-BS) <Cooling>
PUMY-SP140VKM2-ET(-BS) PUMY-SP140YKM2-ET(-BS)
PUMY-SP140VKM2-ER(-BS) PUMY-SP140YKM2-ER(-BS)

Before calculating the sum of total capacity of indoor units, please convert the value into the kW model capacity following the formula on "4-1. SELECTION OF COOLING/HEATING UNITS".

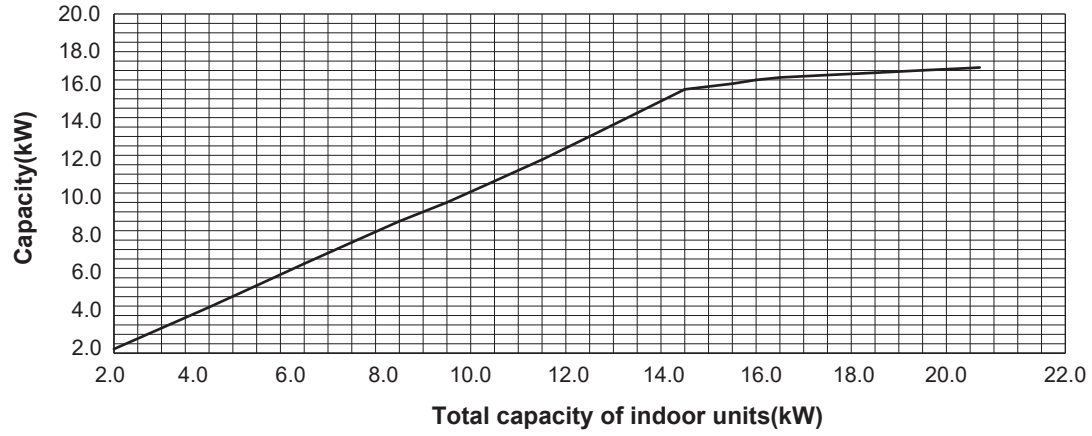


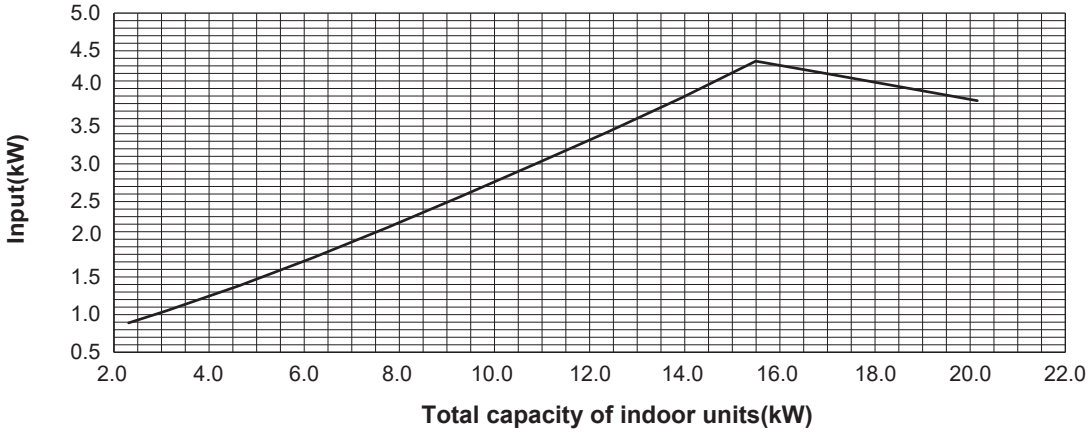


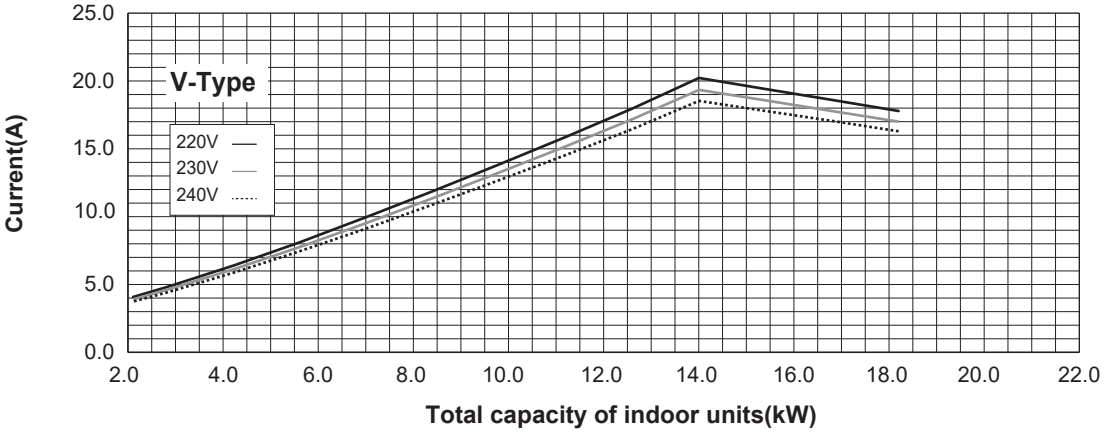


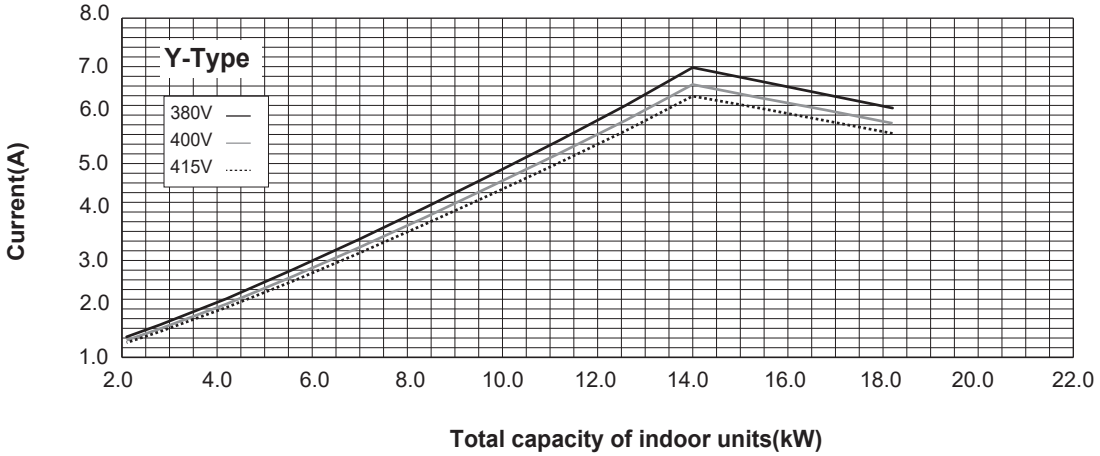


4-4-6. PUMY-SP140VKM2(-BS) **PUMY-SP140YKM2(-BS)** **<Heating>**
PUMY-SP140VKM2-ET(-BS) **PUMY-SP140YKM2-ET(-BS)**
PUMY-SP140VKM2-ER(-BS) **PUMY-SP140YKM2-ER(-BS)**









4-5. CORRECTING CAPACITY FOR CHANGES IN THE LENGTH OF REFRIGERANT PIPING

During cooling, obtain the ratio (and the equivalent piping length) of the outdoor units rated capacity and the total in-use indoor capacity, and find the capacity ratio corresponding to the standard piping length from Figure 12 to 14. Then multiply by the cooling capacity from Figure 7 to 9 in "4-2. CORRECTION BY TEMPERATURE" to obtain the actual capacity.
During heating, find the equivalent piping length, and find the capacity ratio corresponding to standard piping length from Figure 15. Then multiply by the heating capacity from Figure 10 and 11 in "4-2. CORRECTION BY TEMPERATURE" to obtain the actual capacity.

(1) Capacity Correction Curve

Figure 12 <Cooling>
PUMY-SP112VKM2(-BS) PUMY-SP112VKM2-ET(-BS) PUMY-SP112VKM2-ER(-BS)
PUMY-SP112YKM2(-BS) PUMY-SP112YKM2-ET(-BS) PUMY-SP112YKM2-ER(-BS)

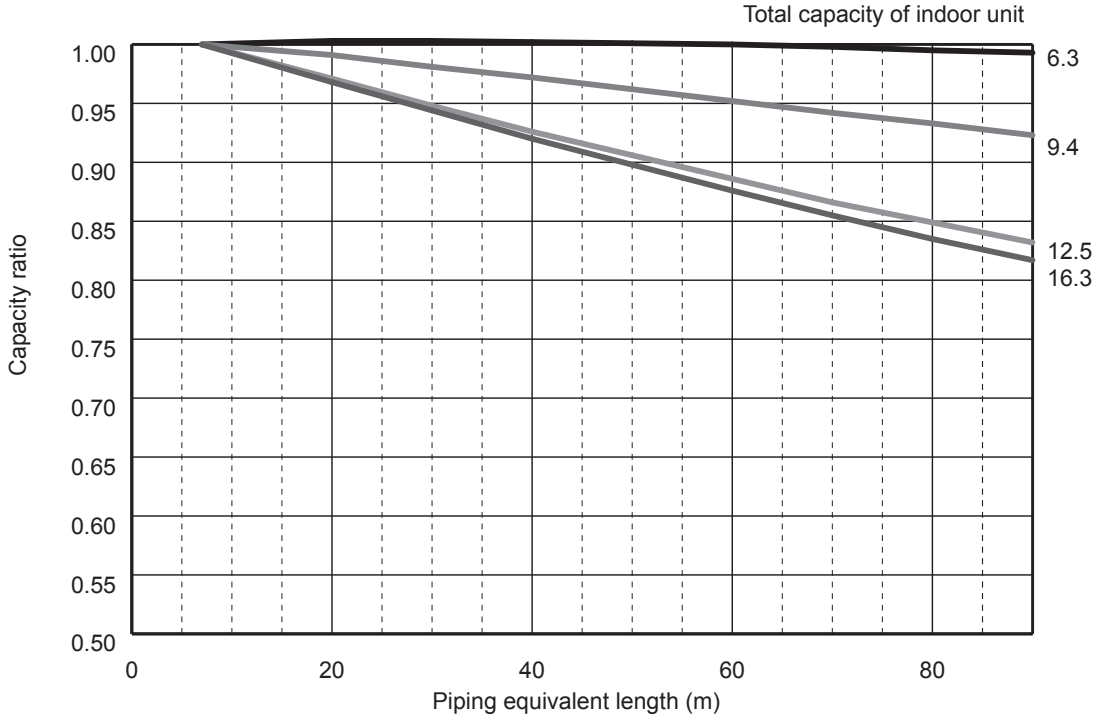


Figure 13 <Cooling>
PUMY-SP125VKM2(-BS) PUMY-SP125VKM2-ET(-BS) PUMY-SP125VKM2-ER(-BS)
PUMY-SP125YKM2(-BS) PUMY-SP125YKM2-ET(-BS) PUMY-SP125YKM2-ER(-BS)

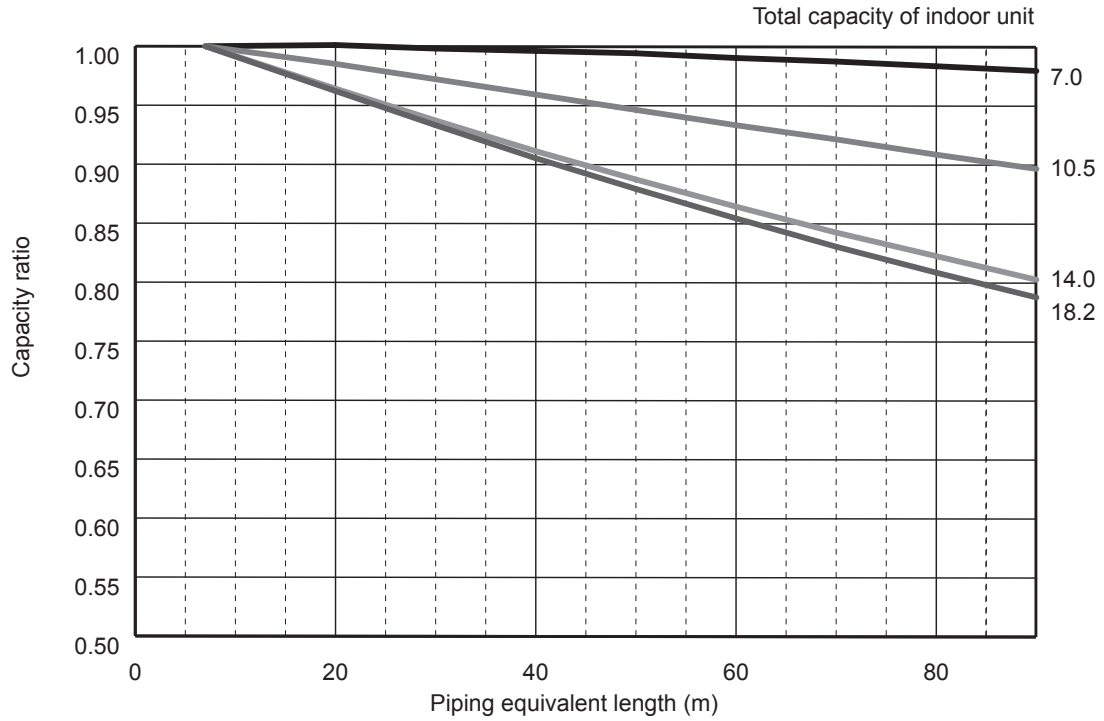


Figure 14 <Cooling>

PUMY-SP140VKM2(-BS) PUMY-SP140VKM2-ET(-BS) PUMY-SP140VKM2-ER(-BS)
PUMY-SP140YKM2(-BS) PUMY-SP140YKM2-ET(-BS) PUMY-SP140YKM2-ER(-BS)

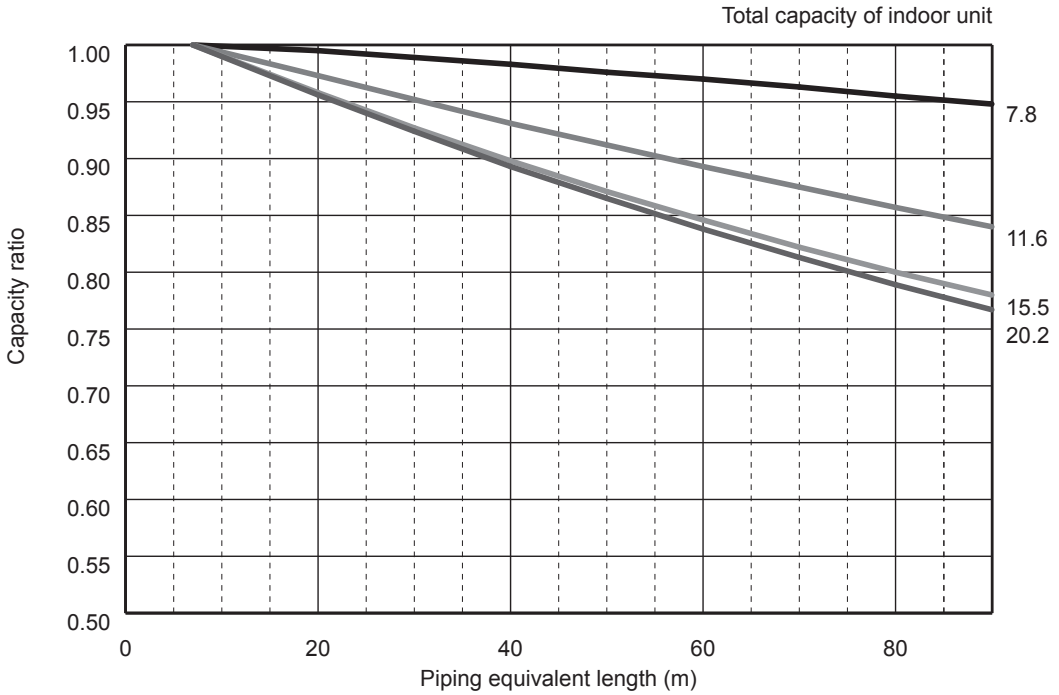
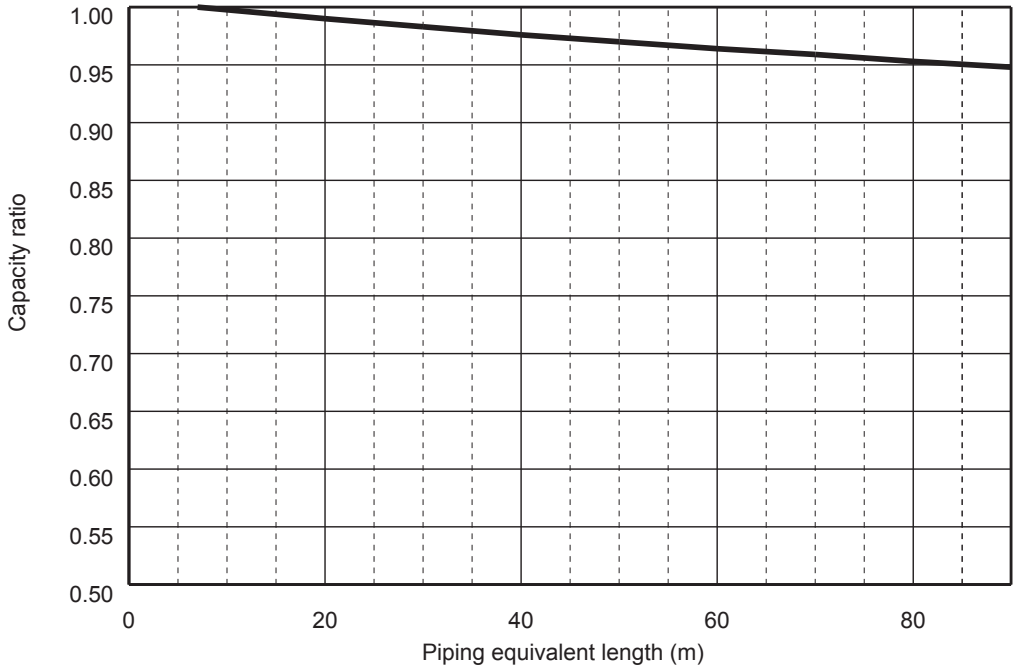


Figure 15 <Heating>

PUMY-SP112VKM2(-BS) PUMY-SP112VKM2-ET(-BS) PUMY-SP112VKM2-ER(-BS)
PUMY-SP112YKM2(-BS) PUMY-SP112YKM2-ET(-BS) PUMY-SP112YKM2-ER(-BS)
PUMY-SP125VKM2(-BS) PUMY-SP125VKM2-ET(-BS) PUMY-SP125VKM2-ER(-BS)
PUMY-SP125YKM2(-BS) PUMY-SP125YKM2-ET(-BS) PUMY-SP125YKM2-ER(-BS)
PUMY-SP140VKM2(-BS) PUMY-SP140VKM2-ET(-BS) PUMY-SP140VKM2-ER(-BS)
PUMY-SP140YKM2(-BS) PUMY-SP140YKM2-ET(-BS) PUMY-SP140YKM2-ER(-BS)



(2) Method for Obtaining the Equivalent Piping Length

Equivalent length = (length of piping to farthest indoor unit) + (0.3 × number of bends in the piping) (m)

(3) Correction of Heating Capacity for Frost and Defrosting

If heating capacity has been reduced due to frost formation or defrosting, multiply the capacity by the appropriate correction factor from the following table to obtain the actual heating capacity.

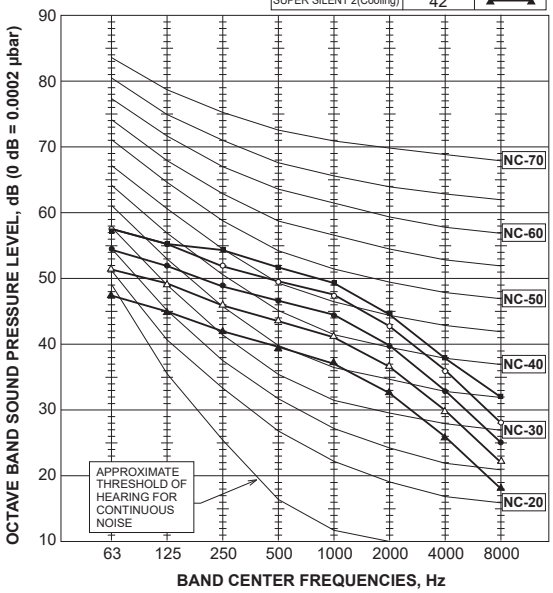
Correction factor diagram

Outdoor Intake temperature (°C W.B.)	6	4	2	0	−2	−4	−6	−8	−10	−15	−20
Correction factor	1.00	0.98	0.89	0.88	0.89	0.90	0.95	0.95	0.95	0.95	0.95

4-6. NOISE CRITERION CURVES

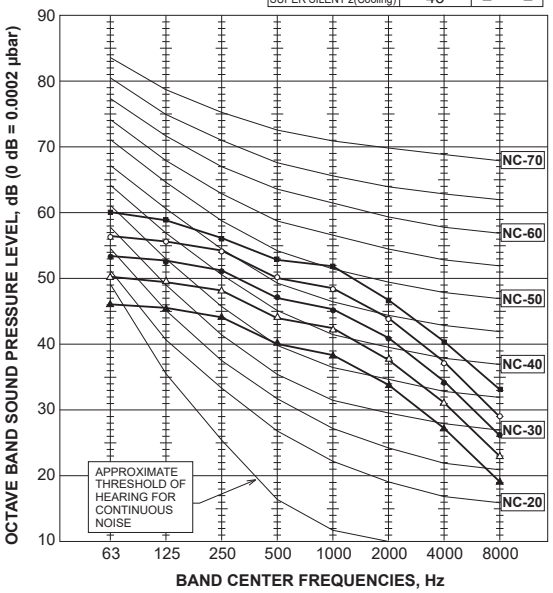
PUMY-SP112VKM2(-BS)
PUMY-SP112YKM2(-BS)
PUMY-SP112VKM2-ET(-BS)
PUMY-SP112YKM2-ET(-BS)
PUMY-SP112VKM2-ER(-BS)
PUMY-SP112YKM2-ER(-BS)

MODE	SPL(dB)	LINE
HEATING	54	
COOLING	52	
SILENT(Cooling)	49	
SUPER SILENT 1(Cooling)	46	
SUPER SILENT 2(Cooling)	42	



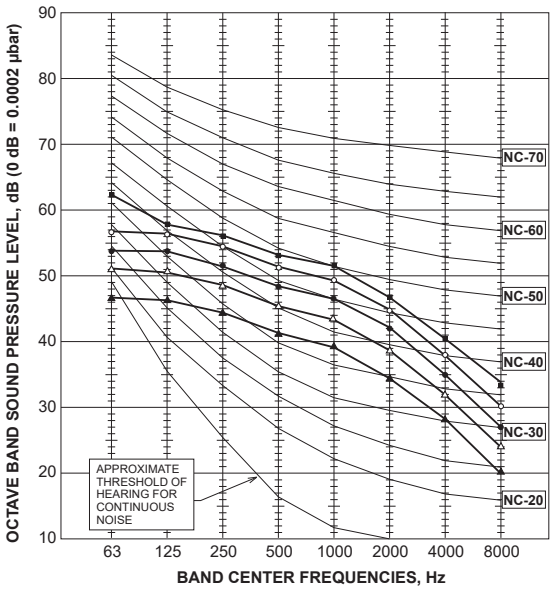
PUMY-SP125VKM2(-BS)
PUMY-SP125YKM2(-BS)
PUMY-SP125VKM2-ET(-BS)
PUMY-SP125YKM2-ET(-BS)
PUMY-SP125VKM2-ER(-BS)
PUMY-SP125YKM2-ER(-BS)

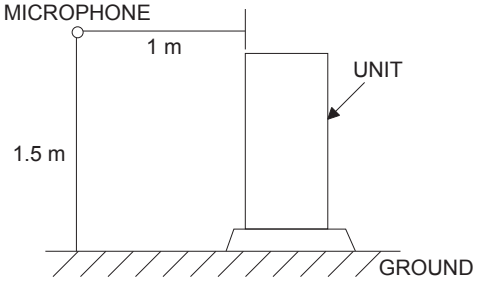
MODE	SPL(dB)	LINE
HEATING	56	
COOLING	53	
SILENT(Cooling)	50	
SUPER SILENT 1(Cooling)	47	
SUPER SILENT 2(Cooling)	43	



PUMY-SP140VKM2(-BS)
PUMY-SP140YKM2(-BS)
PUMY-SP140VKM2-ET(-BS)
PUMY-SP140YKM2-ET(-BS)
PUMY-SP140VKM2-ER(-BS)
PUMY-SP140YKM2-ER(-BS)

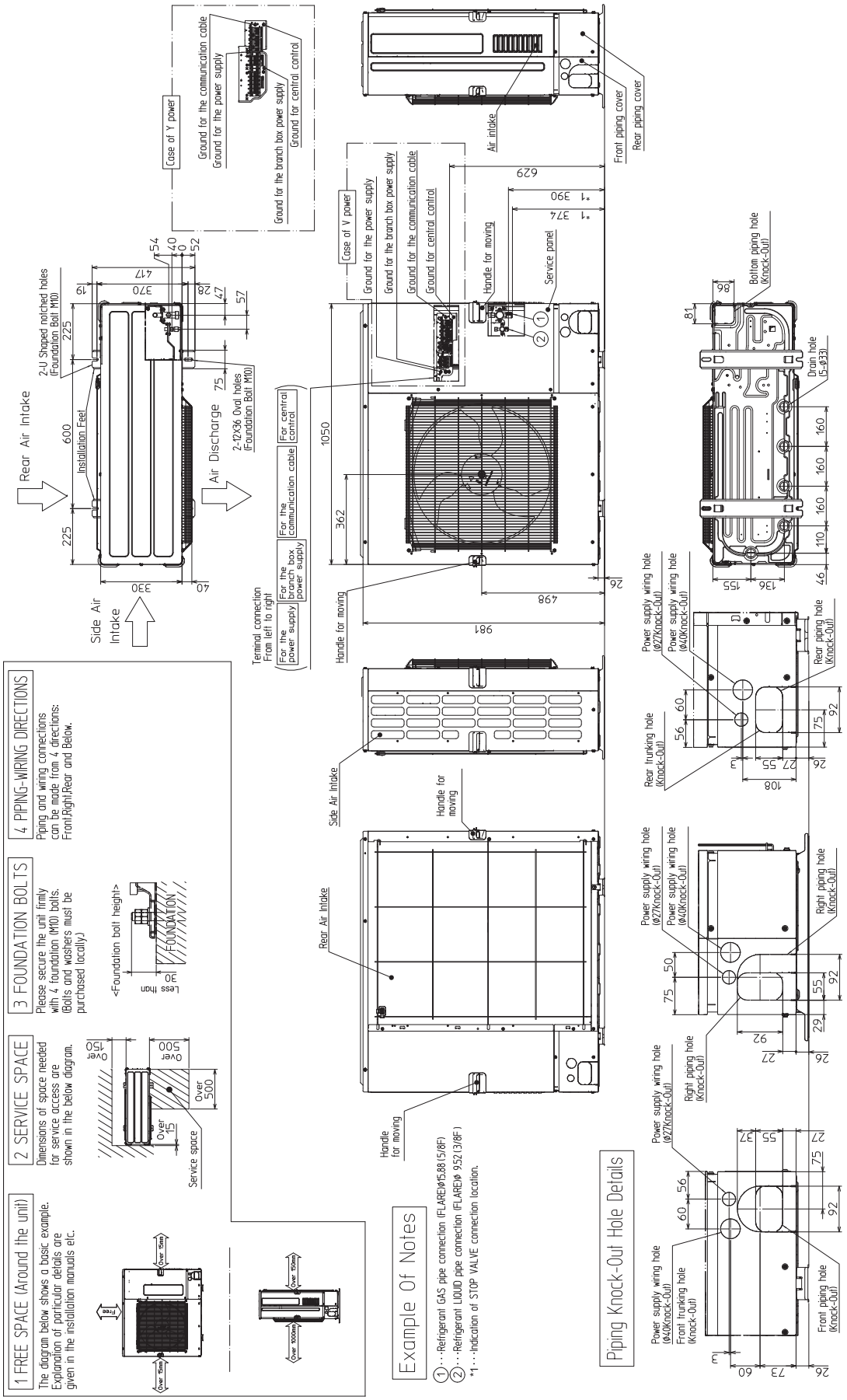
MODE	SPL(dB)	LINE
HEATING	56	
COOLING	54	
SILENT(Cooling)	51	
SUPER SILENT 1(Cooling)	48	
SUPER SILENT 2(Cooling)	44	





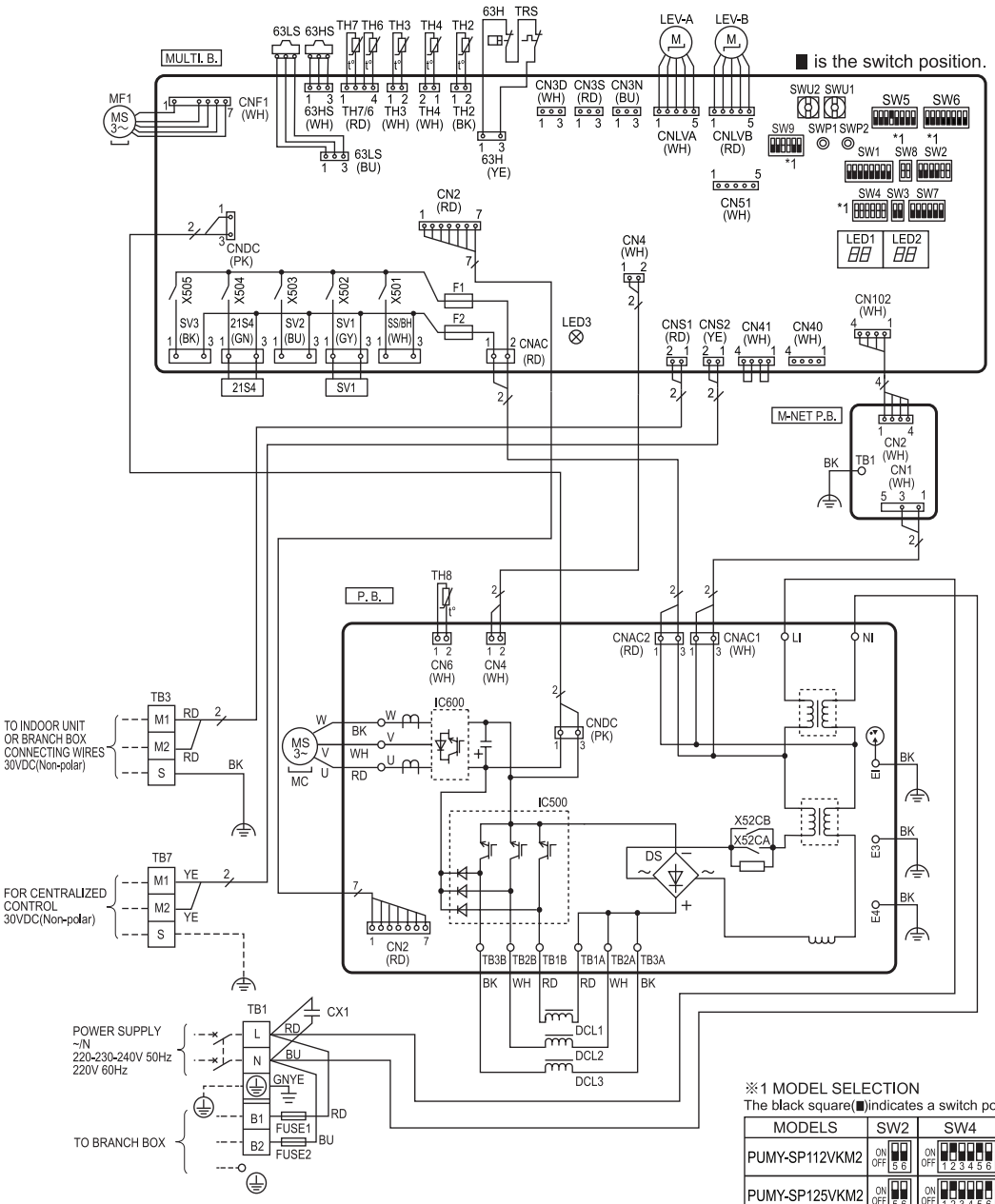
5 OUTLINES AND DIMENSIONS

Unit: mm



6 WIRING DIAGRAM

PUMY-SP112VKM2(-BS) **PUMY-SP125VKM2(-BS)** **PUMY-SP140VKM2(-BS)**
PUMY-SP112VKM2-ET(-BS) **PUMY-SP125VKM2-ET(-BS)** **PUMY-SP140VKM2-ET(-BS)**
PUMY-SP112VKM2-ER(-BS) **PUMY-SP125VKM2-ER(-BS)** **PUMY-SP140VKM2-ER(-BS)**



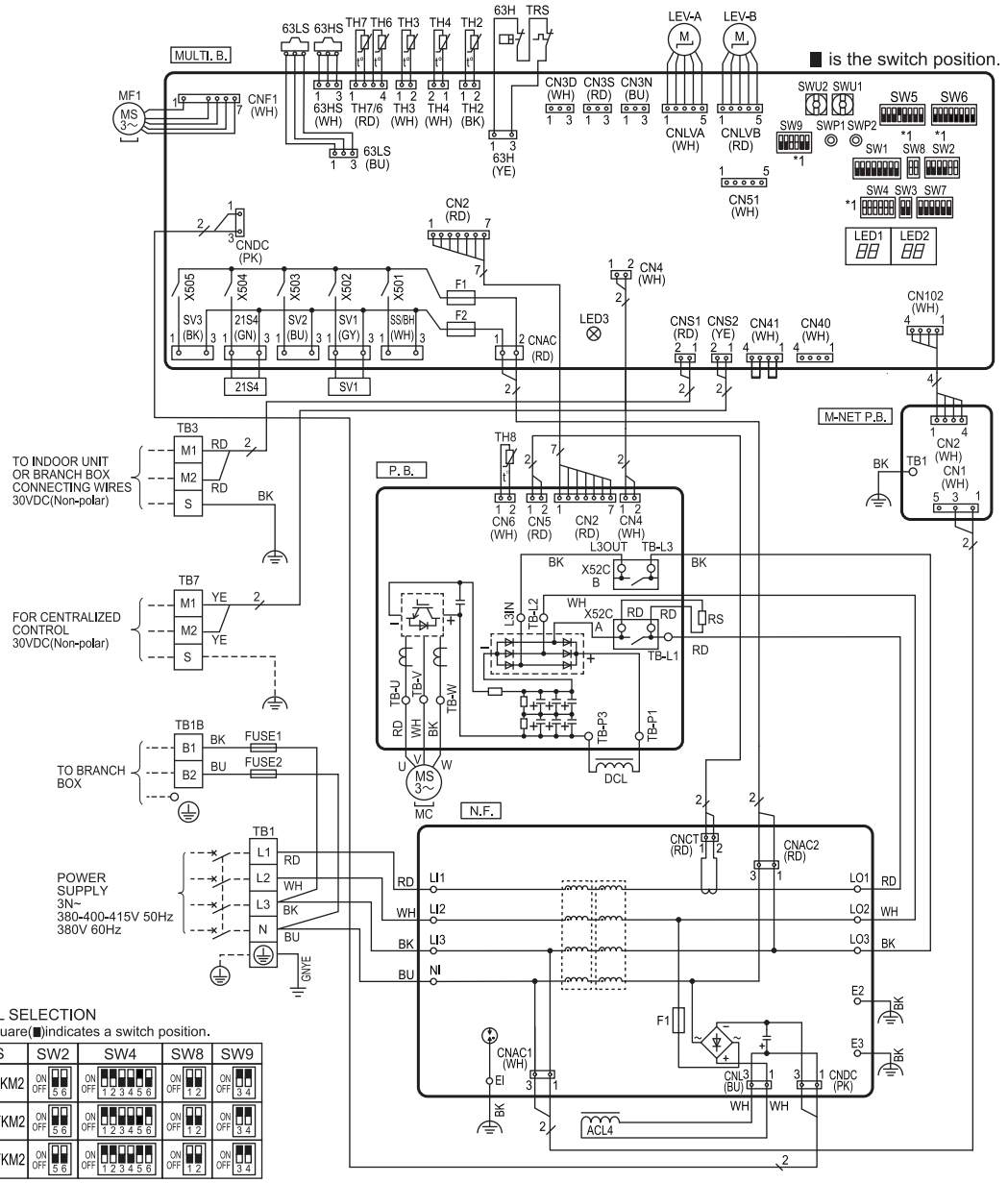
※1 MODEL SELECTION
The black square(■)indicates a switch position.

MODELS	SW2	SW4	SW8	SW9
PUMY-SP112VKM2	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 3 4
PUMY-SP125VKM2	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 3 4
PUMY-SP140VKM2	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 3 4

【LEGEND】

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block <Power Supply/Branch Box>	TH8	Thermistor<Heat Sink>	SW7	Switch<Function Selection>
TB3	Terminal Block <Indoor/Outdoor, Branch Box/Outdoor Transmission Line>	LEV-A, LEV-B	Linear Expansion Valve	SW8	Switch<Model Selection>
		DCL1, DCL2, DCL3	Reactor	SW9	Switch<Function Selection>
TB7	Terminal Block <Centralized Control Transmission Line>	CX1	Capacitor	SWU1	Switch<Unit Address Selection, ones digit>
		P.B.	Power Circuit Board	SWU2	Switch<Unit Address Selection, tens digit>
TBD1	Terminal Block <DRED>	U/V/W	Connection Terminal<U/V/W-Phase>	CNS1	Connector<Indoor/Outdoor, Branch Box/ Outdoor Transmission Line>
TRS	Compressor protector	LI	Connection Terminal<L-Phase>		
FUSE1,FUSE2	Fuse <T20AL250V>	NI	Connection Terminal<N-Phase>	CNS2	Connector<Centralized Control Transmission Line>
MC	Motor for Compressor	TB1A, TB2A, TB3A, TB1B, TB2B, TB3B	Connection Terminal<Reactor>	SS	Connector<Connection for Option>
MF1	Fan Motor			CN3D	Connector<Connection for DRED>
63H	High Pressure Switch	E1, E3, E4	Connection Terminal<Electrical Parts Box>	CN3S	Connector<Connection for DRED>
63HS	High Pressure Sensor	X52C A/B	52C Relay	CN3N	Connector<Connection for Option>
63LS	Low Pressure Sensor	MULTI.B.	Multi Controller Circuit Board	CN51	Connector<Connection for Option>
SV1	Solenoid Valve Coil<Bypass Valve>	SW1	Switch<Display Selection>	LED1,LED2	LED<Operation Inspection Display>
21S4	Solenoid Valve Coil<4-Way Valve>	SW2	Switch<Function Selection>	LED3	LED<Power Supply to Main Microcomputer>
TH2	Thermistor<Hic Pipe>	SW3	Switch<Test Run>	F1,F2	Fuse<T6.3AL250V>
TH3	Thermistor<Outdoor Liquid Pipe>	SW4	Switch<Model Selection>	X501～505	Relay
TH4	Thermistor<Compressor>	SW5	Switch<Function Selection>	M-NET P.B.	M-NET Power Circuit Board
TH6	Thermistor<Suction Pipe>	SW6	Switch<Function Selection>	TB1	Connection Terminal<Electrical Parts Box>
TH7	Thermistor<Ambient>				

PUMY-SP112YKM2(-BS) **PUMY-SP125YKM2(-BS)** **PUMY-SP140YKM2(-BS)**
PUMY-SP112YKM2-ET(-BS) **PUMY-SP125YKM2-ET(-BS)** **PUMY-SP140YKM2-ET(-BS)**
PUMY-SP112YKM2-ER(-BS) **PUMY-SP125YKM2-ER(-BS)** **PUMY-SP140YKM2-ER(-BS)**



※1 MODEL SELECTION
The black square(■)indicates a switch position.

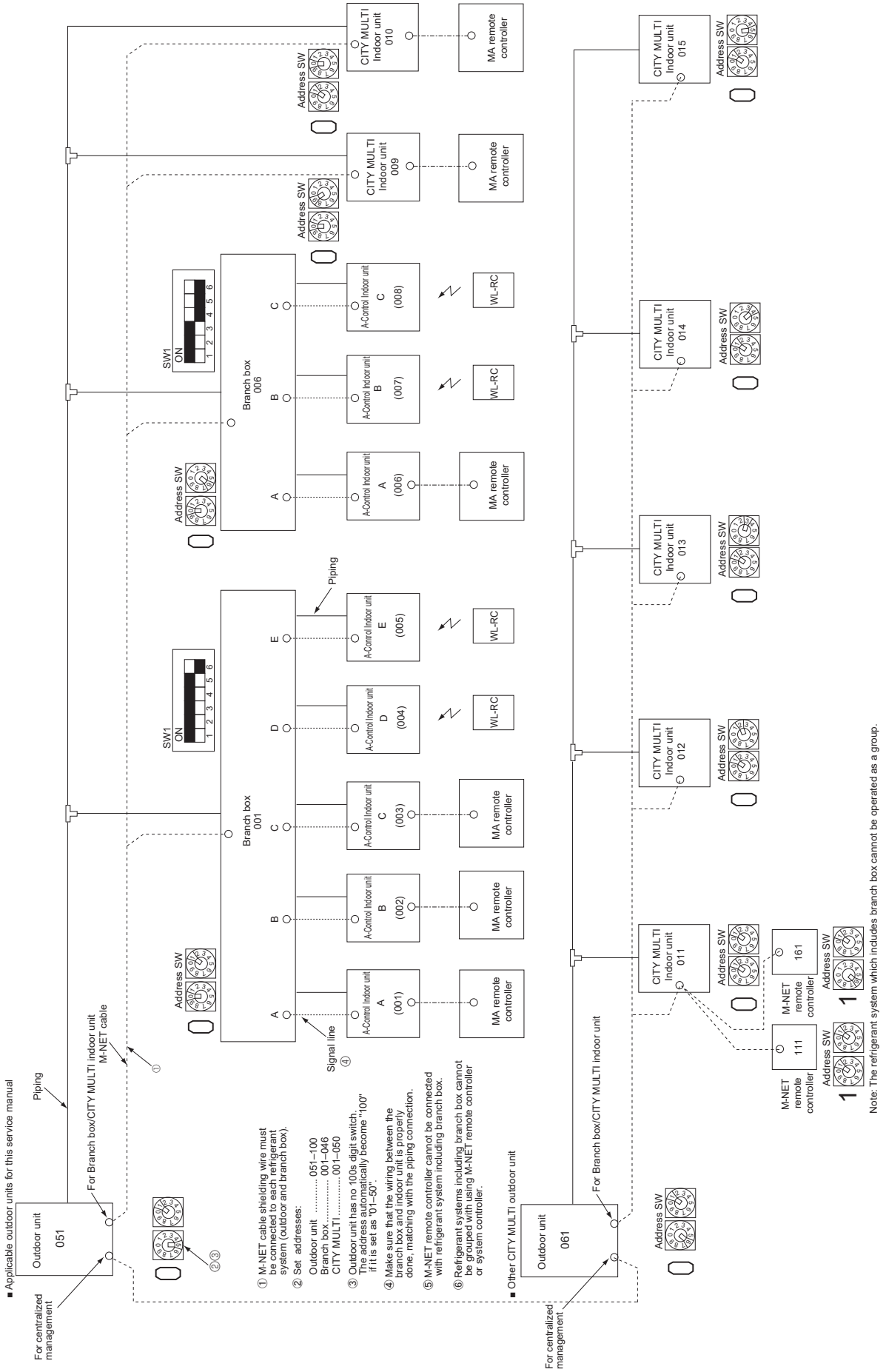
MODELS	SW2	SW4	SW8	SW9
PUMY-SP112YKM2	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 3 4
PUMY-SP125YKM2	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 3 4
PUMY-SP140YKM2	ON OFF 5 6	ON OFF 1 2 3 4 5 6	ON OFF 1 2	ON OFF 3 4

【LEGEND】

SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
TB1	Terminal Block<Power Supply>	TH8	Thermistor<Heat Sink>	SW6	Switch<Function Selection>
TB1B	Terminal Block<Branch Box>	RS	Rush Current Protect Resistor	SW7	Switch<Function Selection>
TB3	Terminal Block<Indoor/Outdoor, Branch Box/Outdoor Transmission Line>	LEV-A, LEV-B	Linear Expansion Valve	SW8	Switch<Model Selection>
		ACL4	Reactor	SW9	Switch<Function Selection>
TB7	Terminal Block <Centralized Control Transmission Line>	DCL	Reactor	SWU1	Switch<Unit Address Selection, ones digit>
		P.B.	Power Circuit Board	SWU2	Switch<Unit Address Selection, tens digit>
TBD1	Terminal Block <DRED>	TB-U/V/W	Connection Terminal<U/V/W-Phase>	CNS1	Connector<Indoor/Outdoor, Branch Box/ Outdoor Transmission Line>
TRS	Compressor protector	TB-L1/L2/L3	Connection Terminal<L1/L2/L3-Power Supply>		
FUSE1,FUSE2	Fuse<T20AL250V>	TB-P1/P3	Connection Terminal	CNS2	Connector<Centralized Control Transmission Line>
MC	Motor for Compressor	X52CA/B	52C Relay	SS	Connector<Connection for Option>
MF1	Fan Motor	N.F.	Noise Filter Circuit Board	CN3D	Connector<Connection for DRED>
63H	High Pressure Switch	LO1/LO2/LO3	Connection Terminal<L1/L2/L3-Power Supply>	CN3S	Connector<Connection for DRED>
63HS	High Pressure Sensor	LI1/LI2/LI3/NI	Connection Terminal<L1/L2/L3-Power Supply>	CN3N	Connector<Connection for Option>
63LS	Low Pressure Sensor	EI, E2, E3	Connection Terminal<Electrical Parts Box>	CN51	Connector<Connection for Option>
SV1	Solenoid Valve Coil<Bypass Valve>	F1	Fuse<T6.3AL250V>	LED1,LED2	LED<Operation Inspection Display>
21S4	Solenoid Valve Coil<4-Way Valve>	MULTI.B.	Multi Controller Circuit Board	LED3	LED<Power Supply to Main Microcomputer>
TH2	Thermistor<Hic Pipe>	SW1	Switch<Display Selection>	F1,F2	Fuse<T6.3AL250V>
TH3	Thermistor<Outdoor Liquid Pipe>	SW2	Switch<Function Selection>	X501～505	Relay
TH4	Thermistor<Compressor>	SW3	Switch<Test Run>	M-NET P.B.	M-NET Power Circuit Board
TH6	Thermistor<Suction Pipe>	SW4	Switch<Model Selection>	TB1	Connection Terminal<Electrical Parts Box>
TH7	Thermistor<Ambient>	SW5	Switch<Function Selection>		

7 NECESSARY CONDITIONS FOR SYSTEM CONSTRUCTION

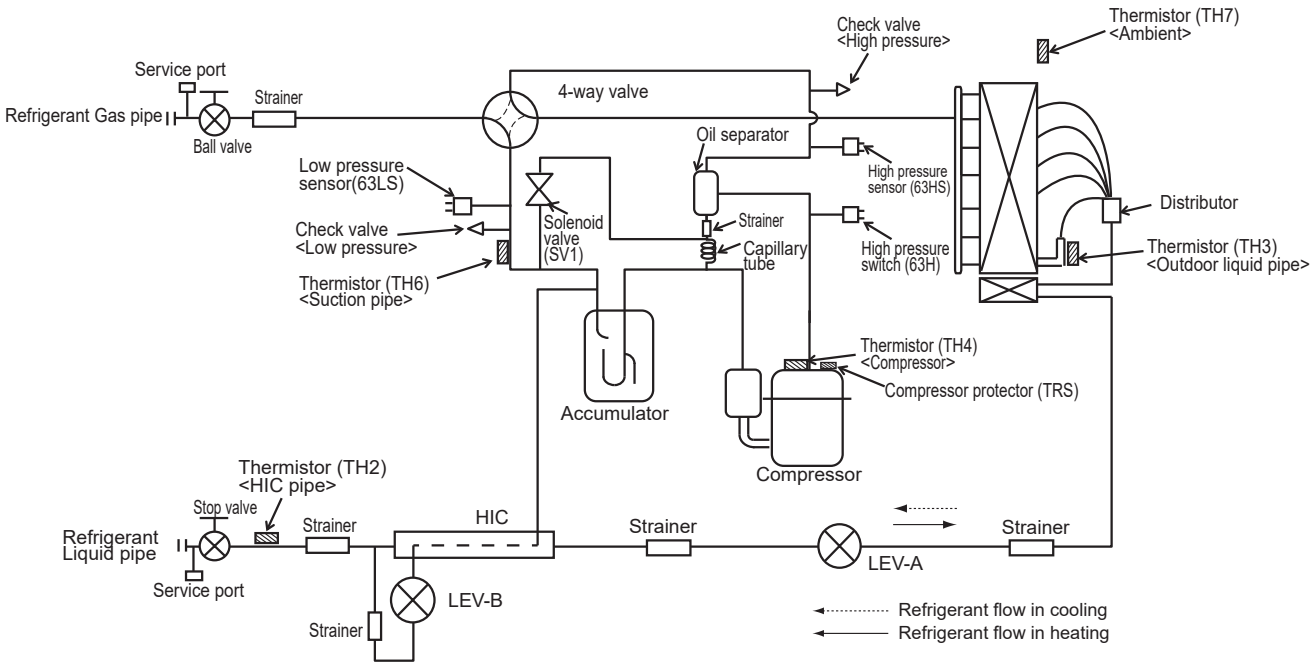
7-1. TRANSMISSION SYSTEM SETUP



7-2. Special Function Operation and Settings for M-NET Remote Controller

Refer to 12-11. "SPECIAL FUNCTION OPERATION AND SETTINGS" for setting details.

7-3. REFRIGERANT SYSTEM DIAGRAM



Capillary tube for oil separator : ø2.5 × ø0.6 × L1000

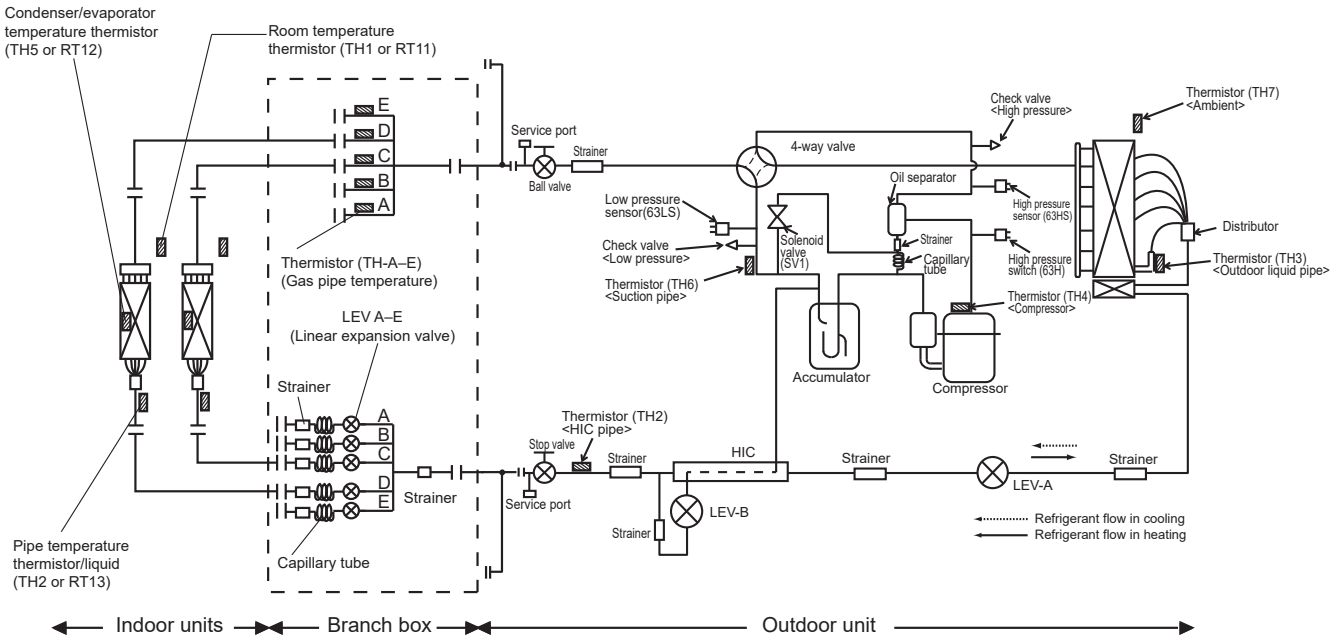
Refrigerant piping specifications <dimensions of flared connector>

Unit: mm <in>

Capacity \ Item		Liquid piping		Gas piping
CITY MULTI indoor unit	P10, P15, P20, P25, P32, P40, P50	The farthest piping length from the first joint ≦ 30 m	ø6.35 <1/4>	ø12.7 <1/2>
		The farthest piping length from the first joint > 30 m	ø9.52 <3/8>	
	P63, P80, P100, P125, P140	ø9.52 <3/8>		ø15.88 <5/8>
Outdoor unit	SP112, SP125, SP140	ø9.52 <3/8>		ø15.88 <5/8>

Note:
When connecting the CONNECTION KIT (PAC-LV11M-J) and an M-series indoor unit, refer to the installation manual for the CONNECTION KIT.

7-4. REFRIGERANT SYSTEM DIAGRAM (WHEN USING BRANCH BOX)



Unit: mm

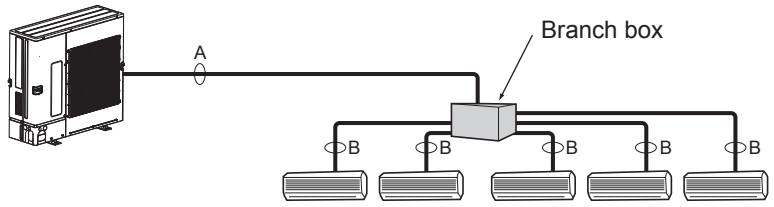
		Capillary tube behind LEV (in cooling mode)
Branch box	PAC-MK3*BC(B)	(ø4.0 × ø3.0 × L130) × 3
	PAC-MK5*BC(B)	(ø4.0 × ø3.0 × L130) × 5

Note:
A maximum of 2 branch boxes can be connected to 1 outdoor unit.
PUMY-SP•VKM.TH(-BS), PUMY-SP•YKM.TH(-BS) cannot connect 32/33/52/53 series.
PUMY-SP•VKMR1/R2.TH(-BS), PUMY-SP•YKMR1/R2.TH(-BS) cannot connect 31/32/51/52 series.

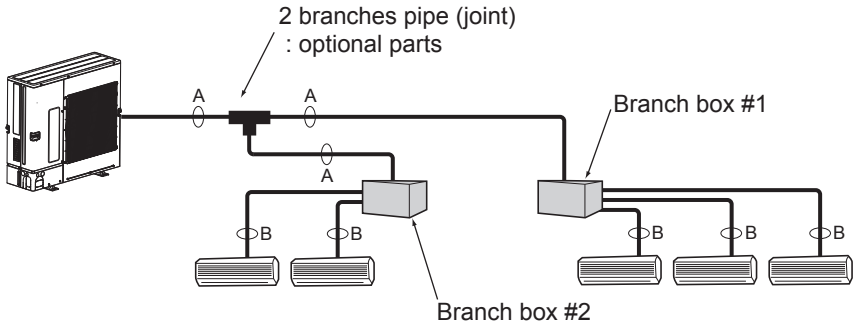
Piping connection size

	A	B
Liquid (mm)	ø9.52	The pipe connection size differs according to the type and capacity of indoor units. Match the piping connection size of branch box with indoor unit. If the piping connection size of branch box does not match the piping connection size of indoor unit, use optional different-diameter (deformed) joints to the branch box side. (Connect deformed joint directly to the branch box side.)
Gas (mm)	ø15.88	

■ In the case of using 1-branch box
Flare connection employed (No brazing)



■ In the case of using 2-branch boxes



■ Installation procedure (2 branch pipe (joint))
Refer to the installation manuals of MSDD-50AR-E.

■ Pipe size (Branch box-indoor unit)

Indoor unit series	Model number	Liquid pipe (mm)	Gas pipe (mm)
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

* If the pipe size of indoor unit is different, use a different-diameter joint.

When using 35, 50 type indoor unit of P series, use the flare nut (for R410A) attached to the indoor unit.
Do not use the flare nut (for R407C) in the indoor unit accessory. If it is used, a gas leakage or even a pipe extraction may occur.

(1) Valve size of branch box for outdoor unit

For liquid	ø9.52 mm
For gas	ø15.88 mm

(2) Valve size of branch box for indoor unit

Ⓐ 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 is only for Ⓐ, Ⓑ, and Ⓒ unit.

Different-diameter joint (optional parts)

Type	Model name	Connected pipes diameter	Diameter A	Diameter B
		mm	mm	mm
Flare (Fig.7-1)	MAC-A454JP-E	ø9.52 → ø12.7	ø9.52	ø12.7
	MAC-A455JP-E	ø12.7 → ø9.52	ø12.7	ø9.52
	MAC-A456JP-E	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

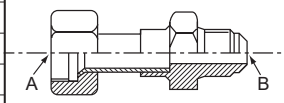


Fig.7-1

Conversion formula

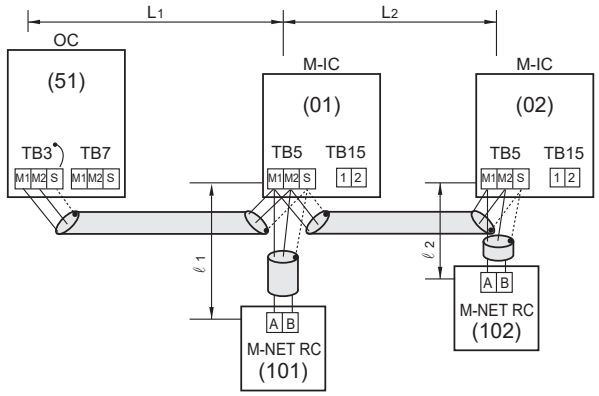
1/4 inch	ø6.35 mm
3/8 inch	ø9.52 mm
1/2 inch	ø12.7 mm
5/8 inch	ø15.88 mm
3/4 inch	ø19.05 mm

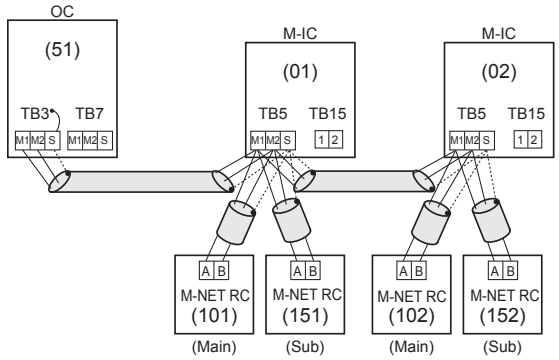
7-5. SYSTEM CONTROL

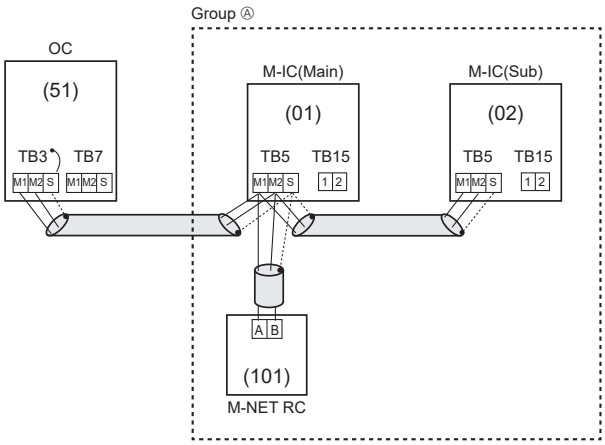
7-5-1. Example for the System

• Example for wiring control cables, wiring method and address setting, permissible lengths, and the constraint items are listed in the standard system with detailed explanation.

A. Example of an M-NET remote controller system (address setting is necessary.)

<table>
<tr><th>Example of wiring control cables</th><th>Wiring Method and Address Setting</th></tr>
<tr><td>1. Standard operation
 

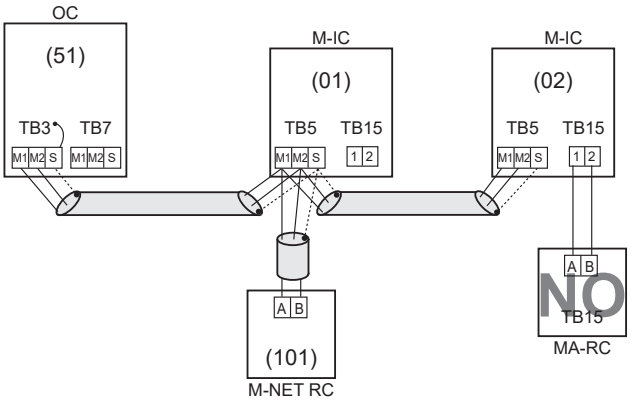
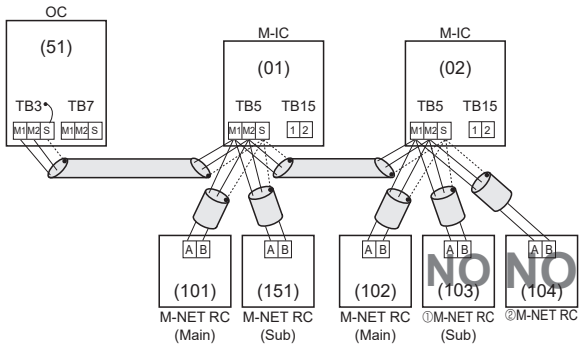
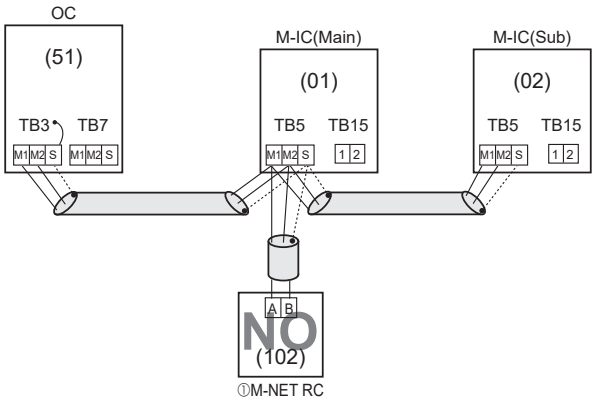
• 1 M-NET remote controller for each CITY MULTI series indoor unit.
• There is no need for setting the 100 position on the M-NET remote controller.</td><td>a. Use feed wiring to connect terminals M1 and M2 on transmission cable block (TB3) for the outdoor unit (OC) to terminals M1 and M2 on the transmission cable block (TB5) of each indoor unit (M-IC). Use non-polarized 2-core wire.
b. Connect terminals M1 and M2 on transmission cable terminal block (TB5) for each indoor unit with the terminal block (TB5) for the M-NET remote controller (M-NET RC).
c. Set the address setting switch (on outdoor unit P.C.B) as shown below.
<table>
<tr><th>Unit</th><th>Range</th><th>Setting Method</th></tr>
<tr><td>CITY MULTI series indoor unit (M-IC)</td><td>001 to 050</td><td>—</td></tr>
<tr><td>Outdoor unit(OC)</td><td>051 to 100</td><td>Use the smallest address of all the indoor unit plus 50.</td></tr>
<tr><td>M-NET remote controller (M-NET RC)</td><td>101 to 150</td><td>Indoor unit address plus 100</td></tr>
</table></td></tr>
<tr><td>2. Operation using 2 M-NET remote controllers
 

• Using 2 M-NET remote controllers for each CITY MULTI series indoor unit.</td><td>a. Same as above 1.a
b. Same as above 1.b
c. Set address switch (on outdoor unit P.C.B) as shown below.
<table>
<tr><th>Unit</th><th>Range</th><th>Setting Method</th></tr>
<tr><td>CITY MULTI series indoor unit (M-IC)</td><td>001 to 050</td><td>—</td></tr>
<tr><td>Outdoor unit (OC)</td><td>051 to 100</td><td>Use the smallest address of all the indoor units plus 50.</td></tr>
<tr><td>Main M-NET remote controller (M-NET RC)</td><td>101 to 150</td><td>Indoor unit address plus 100</td></tr>
<tr><td>Sub M-NET remote controller (M-NET RC)</td><td>151 to 200</td><td>Indoor unit address plus 150</td></tr>
</table></td></tr>
<tr><td>3. Group operation
 

• Multiple indoor units operated together by 1 remote controller</td><td>a. Same as above 1.a
b. Connect terminals M1 and M2 on transmission cable terminal block (TB5) of the M-IC main unit with the most recent address within the same indoor unit (M-IC) group to terminal block (TB5) on the remote controller.
c. Set the address setting switch (on outdoor unit P.C.B) as shown below.
<table>
<tr><th>Unit</th><th>Range</th><th>Setting Method</th></tr>
<tr><td>M-IC (Main)</td><td>001 to 050</td><td>Use the smallest address within the same group of M-NET control indoor units.</td></tr>
<tr><td>M-IC (Sub)</td><td>001 to 050</td><td>Use an address, other than that of the M-IC (Main) from among the units within the same group of indoor units. This must be in sequence with the M-IC (Main).</td></tr>
<tr><td>Outdoor unit</td><td>051 to 100</td><td>Use the smallest address of all the M-NET control indoor units plus 50.</td></tr>
<tr><td>Main M-NET Remote Controller (M-NET RC)</td><td>101 to 150</td><td>Set at an M-IC (Main) address within the same group plus 100.</td></tr>
</table>
d. Use the CITY MULTI series indoor unit (M-IC) within the group with the most functions as the M-IC (Main) unit.</td></tr>
<tr><td colspan="2">Combinations of 1 through 3 above are possible.</td></tr>
</table>

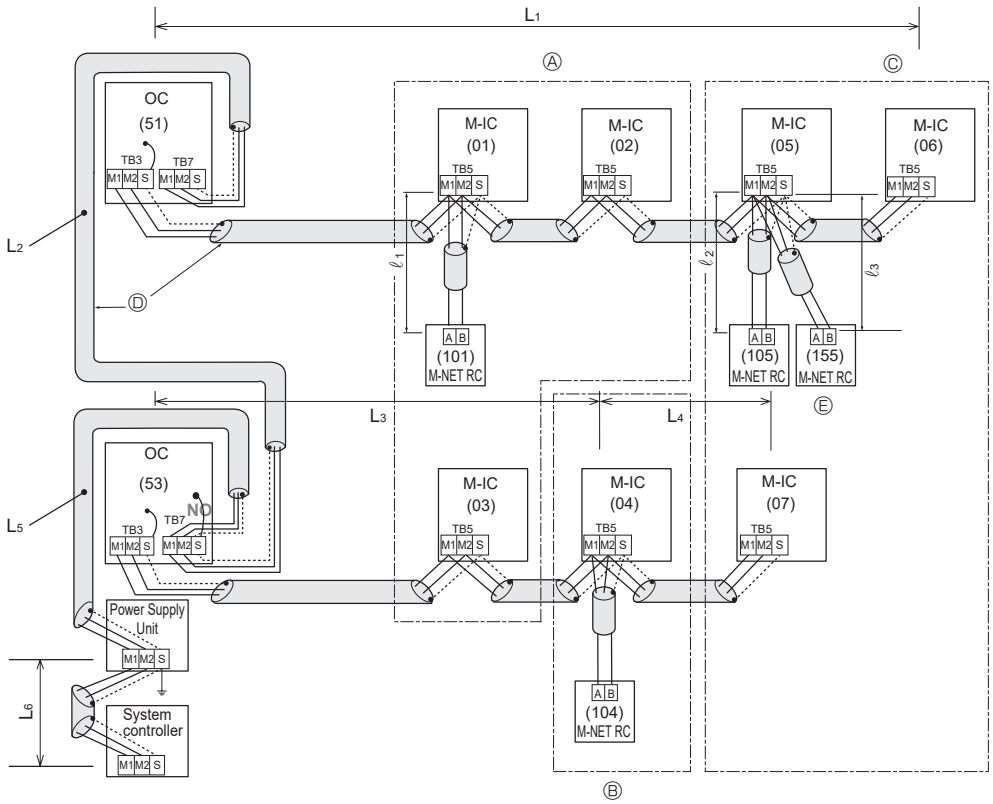
• Name, Symbol and the Maximum Remote controller Units for Connection

Name	Symbol	Maximum units for connection
Outdoor unit	OC	—
M-NET control Indoor unit	M-IC	Refer to "2-1. SYSTEM CONSTRUCTION"
M-NET remote controller	M-NET RC	Maximum 2 M-NET RC for 1 indoor unit, Maximum 12 M-NET RC for 1 OC

Permissible Lengths	Constraint items
Longest transmission cable length (1.25 mm²) $L_1 + L_2 \leqq 200$ m M-NET Remote controller cable length 1. If 0.5 to 1.25 mm² ℓ_1, $\ell_2 \leqq 10$ m 2. If the length exceeds 10 m, use a 1.25 mm² shielded wire. The section of the cable that exceeds 10 m must be included in the longest length via outdoor units and longest transmission cable length.	• M-NET RC and MA remote controller (MA) cannot be used together. • Do not connect anything with TB15 of indoor unit (M-IC). 
Same as above	• Use the indoor unit (M-IC) address plus 150 as the sub remote controller address. In this case, it should be 152. • 3 or more remote controllers (RC) cannot be connected to 1 indoor unit. 
Same as above	• The remote controller address is the indoor unit main address plus 100. In this case, it should be 101. 

B. Example of a group operation system with 2 or more outdoor units and an M-NET remote controller.
(Address settings are necessary.)

Examples of Transmission Cable Wiring



Ⓐ : Group
Ⓑ : Group
Ⓒ : Group
Ⓓ : Shielded Wire
Ⓔ : Sub M-NET Remote Controller
( ): Address example

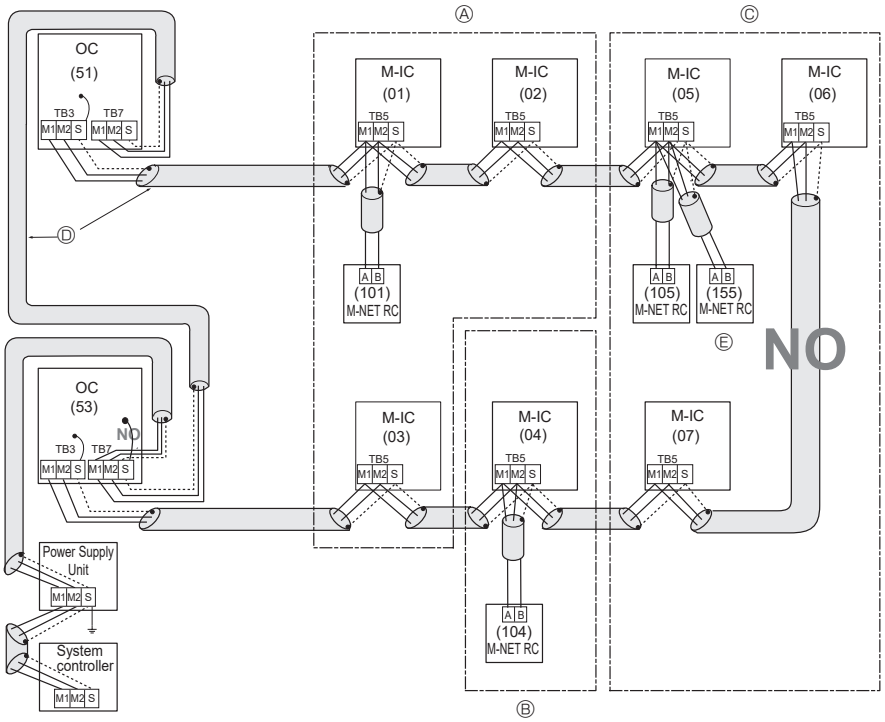
Wiring Method Address Settings

a. Always use shielded wire when making connections between the outdoor unit (OC) and the M-NET control indoor unit (M-IC), as well for all OC-OC, and IC-IC wiring intervals.
b. Use feed wiring to connect terminals M1 and M2 and the ground terminal on the transmission cable terminal block (TB3) of each outdoor unit (OC) to terminals M1 and M2 on the terminal S on the transmission cable terminal block of the M-NET control indoor unit (M-IC).
c. Connect terminals M1 and M2 on the transmission cable terminal block of the M-NET control indoor unit (M-IC) that has the most recent address within the same group to the terminal block on the M-NET remote controller (M-NET RC).
d. Connect together terminals M1, M2 and terminal S on the terminal block for centralized control (TB7) for the outdoor unit (OC).
e. DO NOT change the jumper connector CN41 on outdoor multi controller circuit board.
f. The earth processing of S terminal for the centralized control terminal block (TB7) is unnecessary. Connect the terminal S on the power supply unit with the earth.
g. Set the address setting switch as follows.

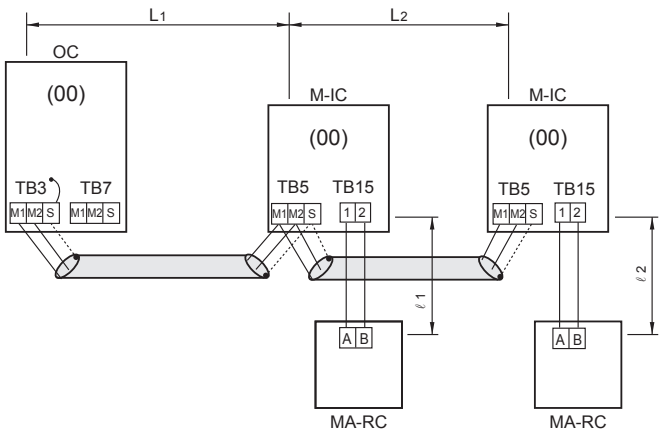
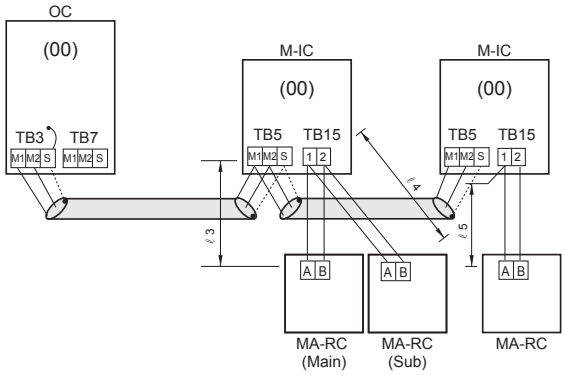
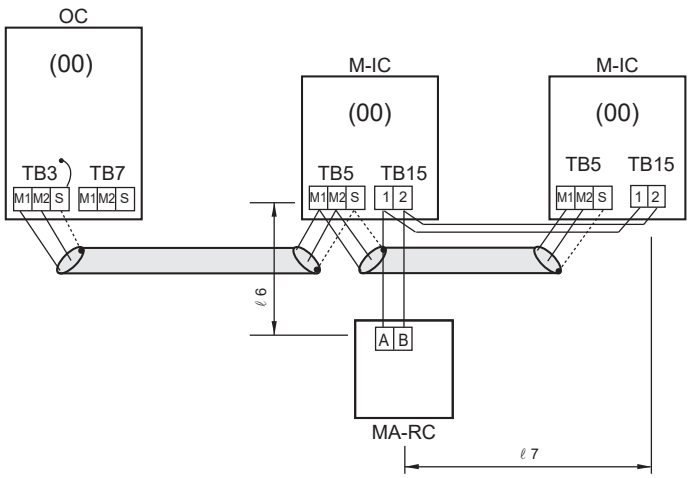
Unit	Range	Setting Method
M-IC (Main)	01 to 50	Use the smallest address within the same group of indoor units.
M-IC (Sub)	01 to 50	Use an address, other than the M-IC (Main) in the same group of indoor units. This must be in sequence with the M-IC (Main).
OC	51 to 100	Use the smallest address of all the indoor units plus 50. The address automatically becomes “100” if it is set as “01–50”.
Main M-NET remote controller	101 to 150	Set at an M-IC (Main) address within the same group plus 100.
Sub M-NET remote controller	151 to 200	Set at an M-IC (Main) address within the same group plus 150.
MA remote controller	—	Address setting is not necessary. (Main/ sub setting is necessary.)

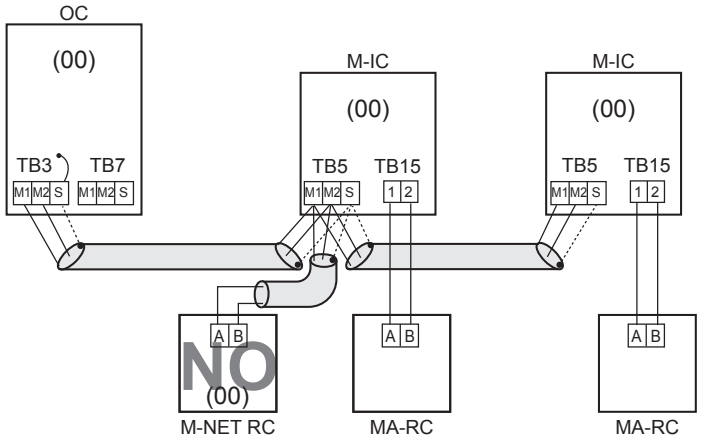
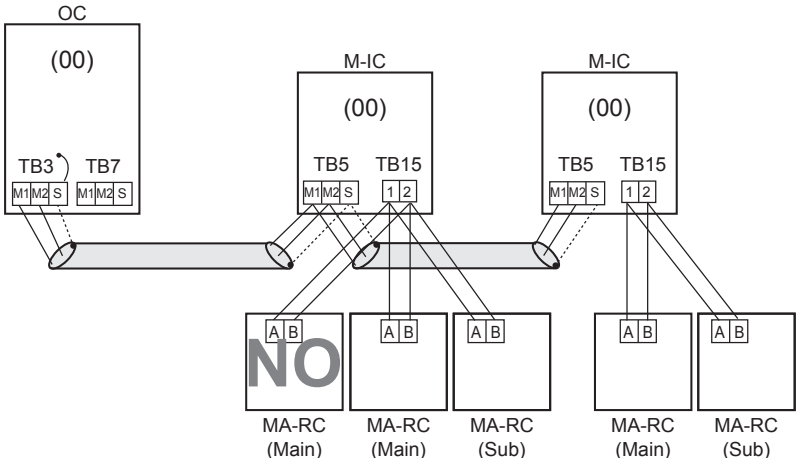
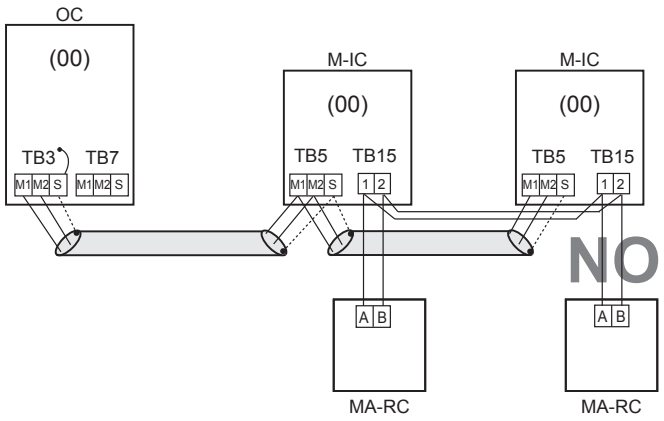
h. The group setting operations among the multiple M-NET control indoor units are done by the M-NET remote controller (M-NET RC) after the electrical power has been turned on.

• Name, Symbol, and the Maximum Units for Connection

Permissible Length	• Longest length via outdoor units : $L_1+L_2+L_3+L_4$, $L_3+L_4+L_5+L_6$, $L_1+L_2+L_5+L_6 \leqq 500$ m (1.25 mm²) • Longest transmission cable length : L_1, L_3+L_4, L_2+L_5, $L_6 \leqq 200$ m (1.25 mm²) • Remote controller cable length : ℓ_1, $\ell_2+\ell_3 \leqq 10$ m (0.5 to 1.25 mm²) If the length exceeds 10 m, use a 1.25 mm² shielded wire. The section of the cable that exceeds 10 m must be included in the longest length via outdoor units and longest transmission cable length.
Constraint items	 Ⓐ : Group Ⓑ : Group Ⓒ : Group Ⓓ : Shielded Wire Ⓔ : Sub M-NET Remote Controller ( ): Address example • Never connect together the terminal blocks (TB5) for transmission wires for M-NET control indoor units (M-IC) that have been connected to different outdoor units (OC). • Set all addresses to ensure that they are not overlapped. • M-NET remote controller and MA remote controller cannot be connected with the M-NET control indoor unit of the same group wiring together.

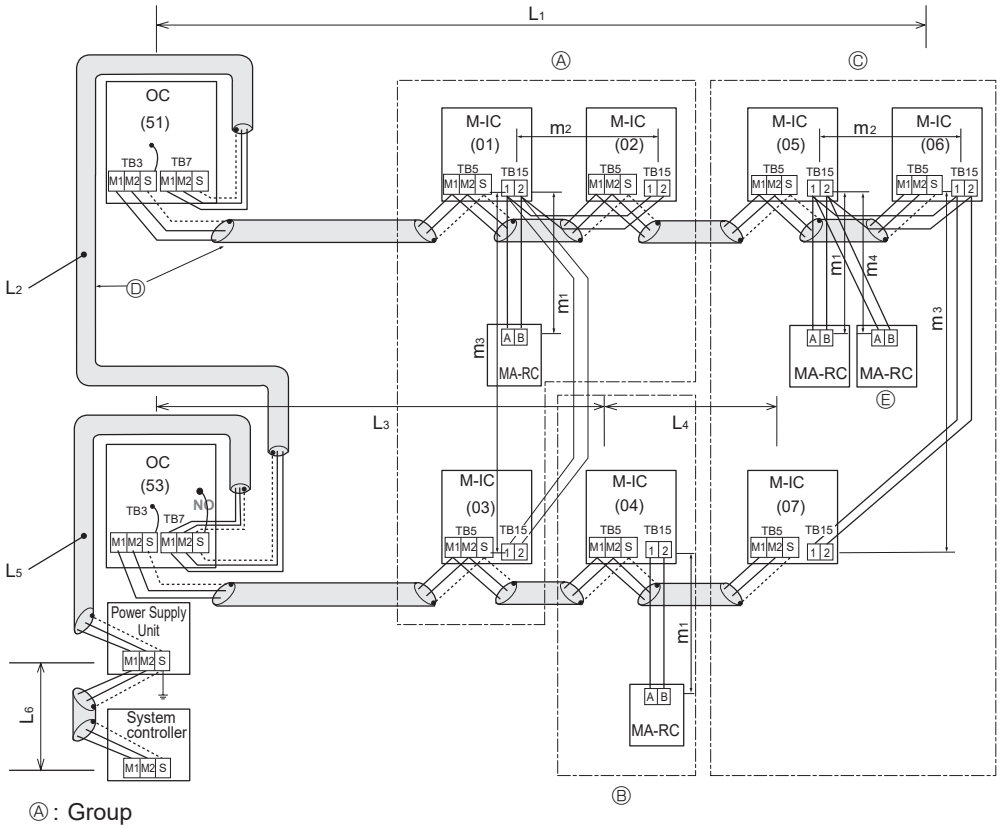
C. Example of an MA remote controller system (address setting is not necessary.)
NOTE: In the case of same group operation, need to set the address that is only main CITY MULTI series indoor unit.

Example of wiring control cables	Wiring Method and Address Setting
1. Standard operation  • 1 MA remote controller for each indoor unit	a. Use feed wiring to connect terminals M1 and M2 on transmission cable block (TB3) for the outdoor unit (OC) to terminals M1 and M2 on the transmission cable block (TB5) of each CITY MULTI series indoor unit (M-IC). Use non-polarized 2-core wire. b. Connect terminals 1 and 2 on transmission cable terminal block (TB15) for each CITY MULTI series indoor unit with the terminal block for the MA remote controller (MA-RC).
2. Operation using 2 remote controllers  • Using 2 MA remote controllers for each CITY MULTI series indoor unit	a. The same as above 1.a b. The same as above 1.b c. In the case of using 2 remote controllers, connect terminals 1 and 2 on transmission cable terminal block (TB15) for each indoor unit with the terminal block for 2 MA remote controllers. · Set either one of the MA remote controllers to "sub remote controller". Refer to the installation manual of MA remote controller.
3. Group operation  • Multiple indoor units operated together by 1 MA remote controller	a. The same as above 1.a b. The same as above 1.b c. Connect terminals 1 and 2 on transmission cable terminal block (TB15) of each CITY MULTI series indoor unit, which is doing group operation with the terminal block the MA remote controller. Use non-polarized 2-core wire. d. In the case of same group operation, need to set the address that is only main CITY MULTI series indoor unit. Please set the smallest address within number 01–50 of the CITY MULTI series indoor unit with the most functions in the same group.
Combinations of 1 through 3 above are possible.	

Permissible Lengths	Constraint items
Longest transmission cable length: $L_1 + L_2 \leqq 200$ m (1.25 mm²) MA remote controller cable length: $\ell_1, \ell_2 \leqq 200$ m (0.3 to 1.25 mm²)	 The MA remote controller and the M-NET remote controller cannot be used together with the CITY MULTI series indoor unit of the same group.
Longest transmission cable length: $L_1 + L_2 \leqq 200$ m (1.25 mm²) MA remote controller cable length: $\ell_3 + \ell_4, \ell_5 \leqq 200$ m (0.3 to 1.25 mm²)	 3 MA remote controllers or more cannot be connected with the CITY MULTI series indoor unit of the same group.
Longest transmission cable length: $L_1 + L_2 \leqq 200$ m (1.25 mm²) MA remote controller cable length: $\ell_6 + \ell_7 \leqq 200$ m (0.3 to 1.25 mm²)	 The second MA remote controller is connected with the terminal block (TB15) for the MA remote controller of the same CITY MULTI series indoor unit (M-IC) as the first MA remote control.

D. Example of a group operation with 2 or more outdoor units and an MA remote controller.
(Address settings are necessary.)

Examples of Transmission Cable Wiring



Ⓐ : Group
Ⓑ : Group
Ⓒ : Group
Ⓓ : Shielded Wire
Ⓔ : Sub MA Remote Controller
( ): Address example

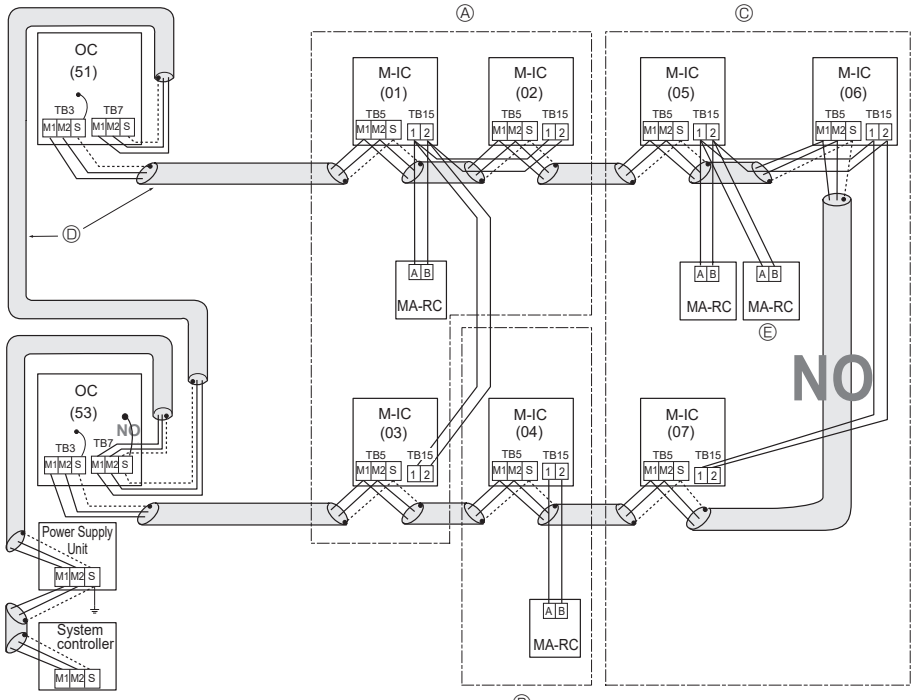
Wiring Method Address Settings

a. Always use shielded wire when making connections between the outdoor unit (OC) and the CITY MULTI series indoor unit (M-IC), as well for all OC-OC, and IC-IC wiring intervals.
b. Use feed wiring to connect terminals M1 and M2 and the ground terminal on the transmission cable terminal block (TB3) of each outdoor unit (OC) to terminals M1 and M2 on the terminal S on the transmission cable terminal block of the CITY MULTI series indoor unit (M-IC).
c. Connect terminals 1 and 2 on the terminal block for MA remote controller line (TB15) on the indoor unit (IC) to the terminal block on the MA remote controller (MA-RC). (Nonpolarized two-wire).
d. Connect together terminals M1, M2 and terminal S on the terminal block for centralized control (TB7) for the outdoor unit (OC).
e. DO NOT change the jumper connector CN41 on outdoor multi controller circuit board.
f. The earth processing of S terminal for the centralized control terminal block (TB7) is unnecessary. Connect the terminal S on the power supply unit with the earth.
g. Set the address setting switch as follows.

Unit	Range	Setting Method
M-IC (Main)	01 to 50	Use the smallest address within the same group of indoor units.
M-IC (Sub)	01 to 50	Use an address, other than the M-IC (Main) in the same group of CITY MULTI series indoor units. This must be in sequence with the M-IC (Main).
Outdoor Unit	51 to 100	Use the smallest address of all the indoor units plus 50. The address automatically becomes “100” if it is set as “01–50”.
Main M-NET Remote Controller	101 to 150	Set at an M-IC (Main) address within the same group plus 100.
Sub M-NET Remote Controller	151 to 200	Set at an M-IC (Main) address within the same group plus 150.
MA Remote Controller	—	Address setting is not necessary. (Main/sub setting is necessary.)

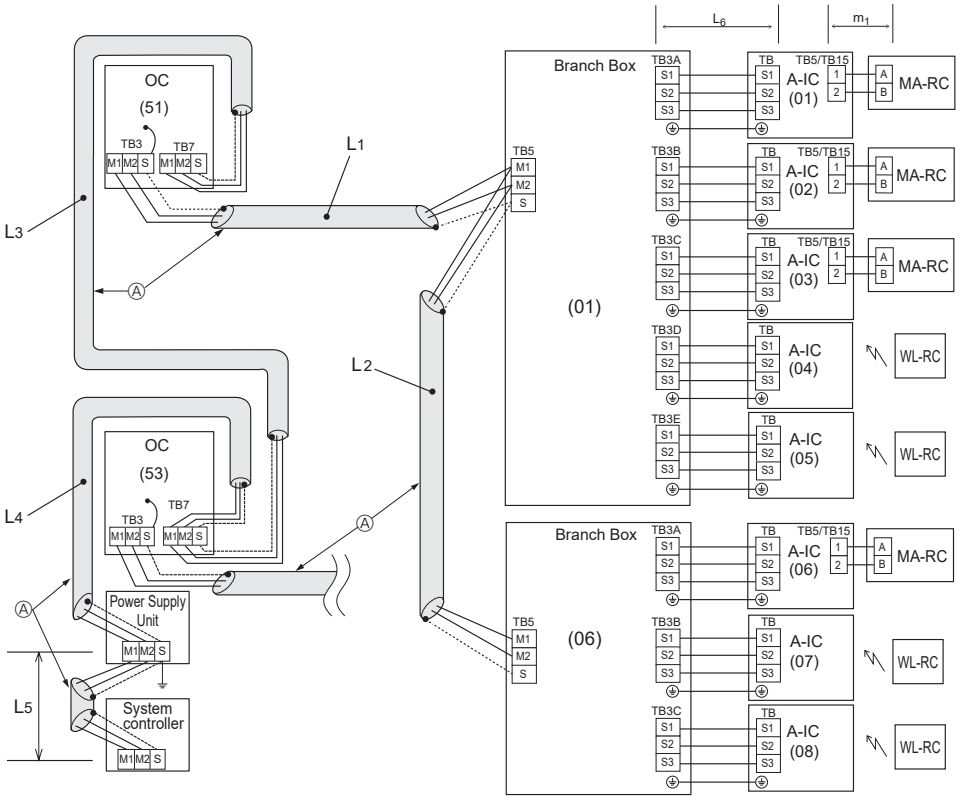
h. The group setting operations among the multiple CITY MULTI series indoor units is done by the M-NET remote controller (M-NET RC) after the electrical power has been turned on.

• Name, Symbol, and the Maximum Units for Connection

Permissible Length	Longest length via outdoor unit (M-NET cable): $L_1+L_2+L_3+L_4$ and $L_1+L_2+L_5+L_6 \leqq 500$ m (1.25 ㎟ more) Longest transmission cable length (M-NET cable): L_1 and L_3+L_4 and L_2+L_5 and $L_6 \leqq 200$ m (1.25 ㎟ or more) MA Remote controller cable length: m_1 and $m_1+m_2+m_3$ and $m_1+m_2+m_3+m_4 \leqq 200$ m (0.3 to 1.25 ㎟)
Constraint items	 Ⓐ : Group Ⓑ : Group Ⓒ : Group Ⓓ : Shielded Wire Ⓔ : Sub MA Remote Controller ( ): Address example • Never connect together the terminal blocks (TB5) for transmission wires for CITY MULTI series indoor units (M-IC) that have been connected to different outdoor units (OC). • M-NET remote controller and MA remote controller cannot be connected with the CITY MULTI series indoor unit of the same group wiring together.

E. Example of a system using Branch Box and A-Control indoor unit

Examples of Transmission Cable Wiring



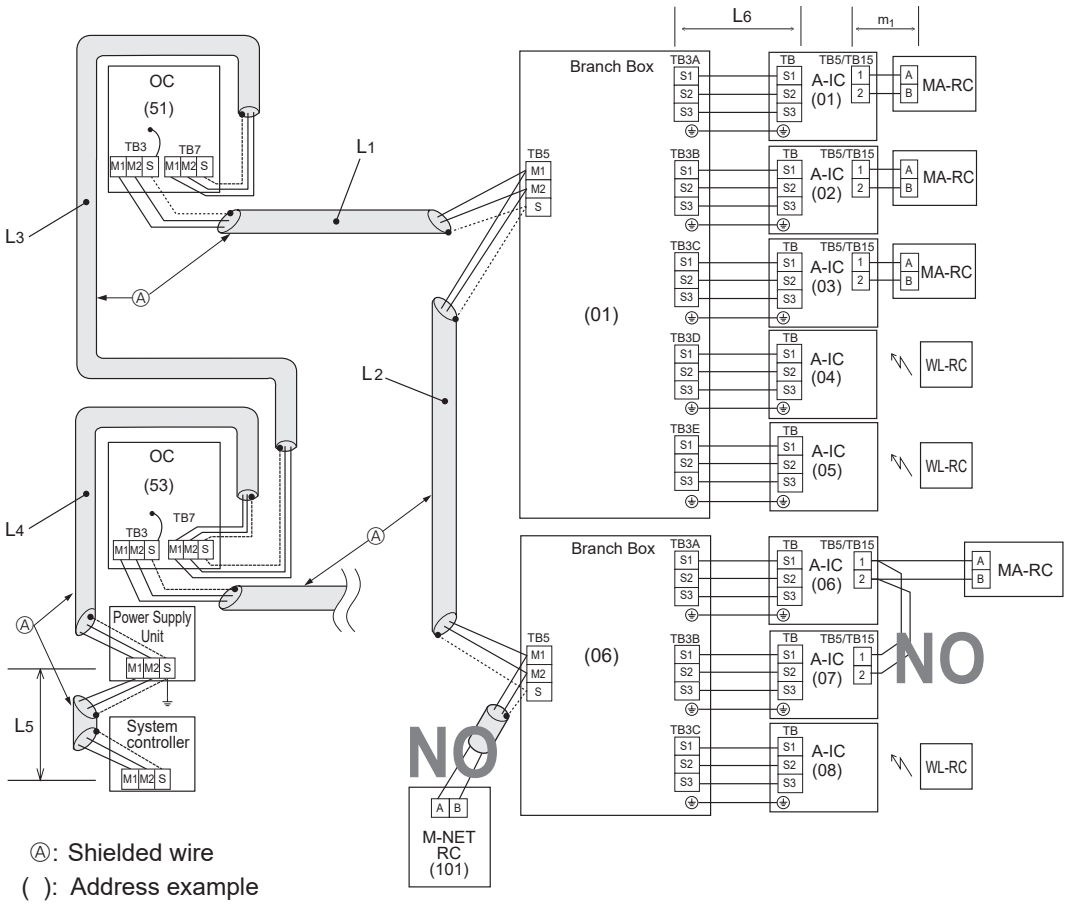
Ⓐ: Shielded wire
( ): Address example

Wiring Method Address Settings

a. Always use shielded wire when making connections between the outdoor unit (OC) and the Branch Box, as well for all OC-OC wiring intervals.
b. Use feed wiring to connect terminals M1 and M2 and the ground terminal on the transmission cable terminal block (TB3) of each outdoor unit (OC) to terminals M1 and M2 on the terminal S on the transmission cable terminal block (TB5) of the Branch Box.
c. Connect terminals 1 and 2 on the transmission cable terminal block (TB5/TB15) of the A-control indoor unit (A-IC), to the terminal block on the MA remote controller (MA-RC).
d. Connect together terminals M1, M2 and terminal S on the terminal block for centralized control (TB7) for the outdoor unit (OC).
e. DO NOT change the jumper connector CN41 on outdoor multi controller circuit board.
f. The earth processing of S terminal for the centralized control terminal block (TB7) is unnecessary. Connect the terminal S on the power supply unit to the earth.
g. Set the address setting switch as follows.

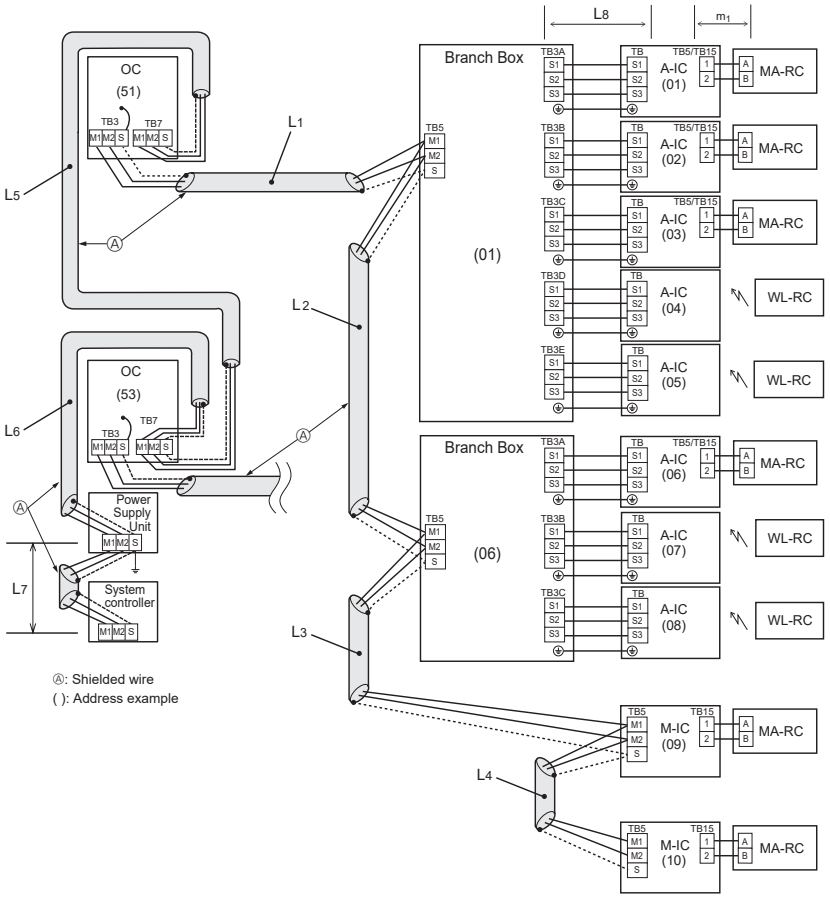
Unit	Range	Setting Method
A-IC	01 to 50	According to the set address of connected Branch Box, set the A-IC addresses sequentially by SW1 on Branch Box. (For example, when setting the Branch Box address to 01, A-IC addresses set 02,03,04, and 05.)
Branch Box	01 to 50	Use a number within the range 1–50, but it should not make the highest address of connected A-IC exceed 50.
Outdoor Unit	51 to 100	Use the smallest address of all the Branch Box plus 50. The address automatically becomes “100” if it is set as “01–50”.
MA Remote Controller	–	Address setting is not necessary.

• **Name, Symbol, and the Maximum Units for Connection**

Permissible Length	Longest length via outdoor unit (M-NET cable): $L_1+L_2+L_3+L_4+L_5 \leqq 500$ m (1.25 ㎟ or more) Longest transmission cable length (M-NET cable): L_1+L_2, L_3+L_4, $L_5 \leqq 200$ m (1.25 ㎟ or more) Longest transmission cable length (A-Control cable): $L_6 \leqq 25$ m (1.5 ㎟) Remote controller cable length: $m_1 \leqq 200$ m (0.3 to 1.25 ㎟)
Constraint items	 • Plural indoor units cannot be operated by a single remote controller. • Different refrigerant systems cannot be connected together. • M-NET remote controller cannot be connected.

F. Example of a system using Branch Box, A-Control indoor unit, and CITY MULTI series indoor unit.

Examples of Transmission Cable Wiring

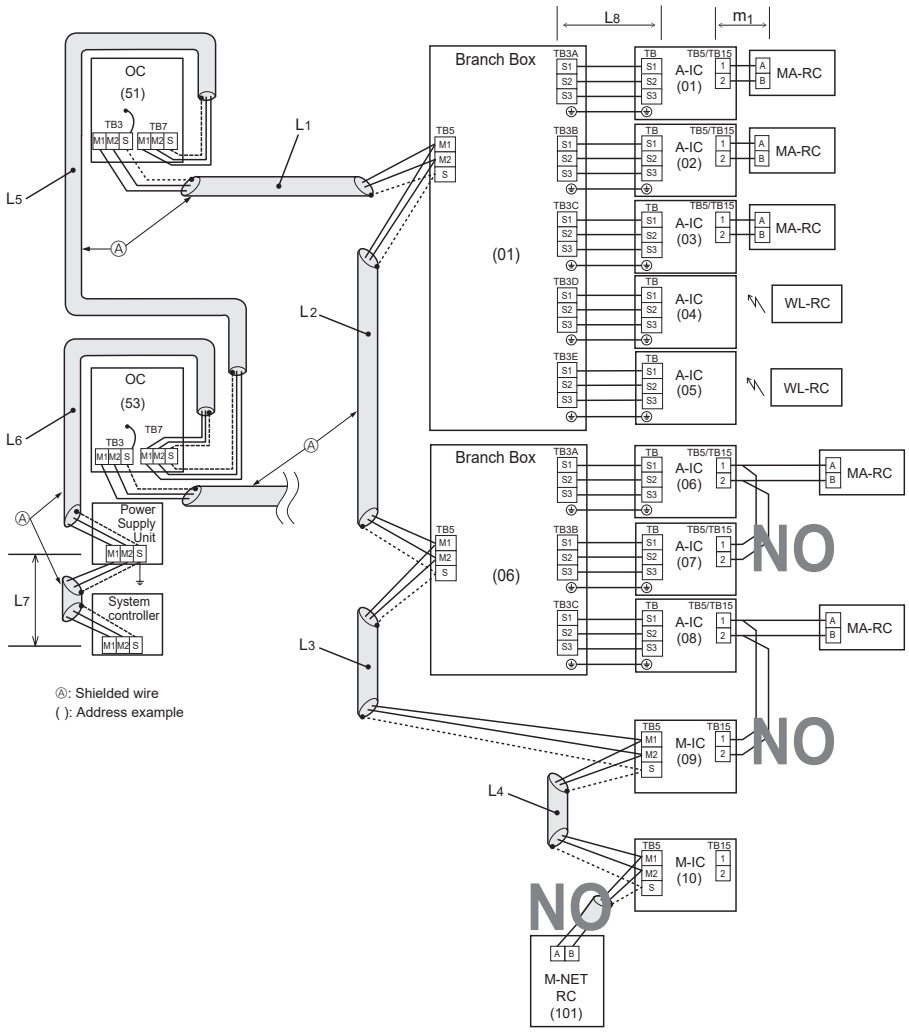


Wiring Method Address Settings

a. Always use shielded wire when making connections between the outdoor unit (OC) and the Branch Box or CITY MULTI series indoor unit (M-IC), as well for all OC-OC wiring intervals.
b. Use feed wiring to connect terminals M1 and M2 and the ground terminal on the transmission cable terminal block (TB3) of each outdoor unit (OC) to terminals M1 and M2 on the terminal S on the transmission cable terminal block (TB5) of the Branch Box or CITY MULTI series indoor unit (M-IC).
c. Connect terminals 1 and 2 on the transmission cable terminal block (TB5/TB15) of the A-control indoor unit (A-IC) or CITY MULTI series indoor unit (M-IC), to the terminal block on the MA remote controller (MA-RC).
d. Connect together terminals M1, M2 and terminal S on the terminal block for centralized control (TB7) for the outdoor unit (OC).
e. DO NOT change the jumper connector CN41 on MULTI controller board.
f. The earth processing of S terminal for the centralized control terminal block (TB7) is unnecessary. Connect the terminal S on the power supply unit to the earth.
g. Set the address setting switch as follows.

Unit	Range	Setting Method
M-IC	01 to 50	–
A-IC	01 to 50	According to the set address of connected Branch Box, set the A-IC addresses sequentially by SW1, SW11, SW12 on Branch Box. (For example, when the Branch Box address is set to 01, set the A-IC addresses to 01, 02, 03, 04 and 05.)
Branch Box	01 to 50	Use a number within the range 1-50, but it should not make the highest address of connected A-IC exceed 50.
Outdoor Unit	51 to 100	Use the smallest address of all the Branch Box plus 50. The address automatically becomes “100” if it is set as “01–50”.
MA Remote Controller	–	Address setting is not necessary.

• Name, Symbol, and the Maximum Units for Connection

Permissible Length	Longest length via outdoor unit (M-NET cable): $L_1+L_2+L_3+L_4+L_5+L_6+L_7 \leqq 500$ m (1.25 ㎟ or more) Longest transmission cable length (M-NET cable): $L_1+L_2+L_3+L_4$, L_5+L_6 and $L_7 \leqq 200$ m (1.25 ㎟ or more) Longest transmission cable length (A-Control cable): $L_8 \leqq 25$ m (1.5 ㎟) Remote controller cable length: $m_1 \leqq 200$ m (0.3 to 1.25 ㎟)
Constraint items	 • Plural indoor units cannot be operated by a single remote controller. • Different refrigerant systems cannot be connected together. • M-NET remote controller cannot be connected.

8 TROUBLESHOOTING

8-1. CHECKPOINTS FOR TEST RUN

8-1-1. Procedures before test run

(1) Before a test run, make sure that the following work is completed.
- Installation related:
  Make sure that the panel of cassette type and electrical wiring are done.
  Otherwise electrical functions like auto vane will not operate normally.
- Piping related:
  Perform leakage test of refrigerant and drain piping.
  Make sure that all joints are perfectly insulated.
  Check stop valves on both liquid and gas side for full open.
- Electrical wiring related:
  Check ground wire, transmission cable, remote controller cable, and power supply cable for secure connection.
  Make sure that all switch settings of address or adjustments for special specification systems are correctly settled.

(2) Safety check:
With the insulation tester of 500 V, inspect the insulation resistance.
Do not touch the transmission cable and remote controller cable with the tester.
The resistance should be over 1.0 MΩ. Do not proceed inspection if the resistance is less than 1.0 MΩ.
Inspect between the outdoor unit power supply terminal block and ground first, metallic parts like refrigerant pipes or the electrical box next, then inspect all electrical wiring of outdoor unit, indoor unit, and all linked equipment .

(3) Before operation:
a) Turn the power supply switch of the outdoor unit to on for compressor protection. For a test run, wait at least 12 hours from this point.
b) Register control systems into remote controller(s). Never touch the on/off switch of the remote controller(s). Refer to “7-2. Special Function Operation and Settings (for M-NET Remote Controller)” as for settings. In MA remote controller(s), this registration is unnecessary.

(4) More than 12 hours later from power supply to the outdoor unit, turn all power switch to on for the test run. Perform test run according to the “Operation procedure” table of the bottom of this page. While test running, make test run reports .

8-1-1-1. Test run for M-NET Remote controller

Refer to 12-4. "TEST RUN" for operation procedure.

8-1-2. Countermeasures for Error During Test Run

• If a problem occurs during test run, a code number will appear on the remote controller (or LED on the outdoor unit), and the air conditioning system will automatically cease operating.

Determine the nature of the abnormality and apply corrective measures.

Check code (2 digits)	Check code (4 digits)	Trouble	Detected Unit			Remarks
			Indoor	Outdoor	Remote Controller	
Ed	0403	Serial communication error		○		Outdoor unit outdoor multi controller circuit board – Power circuit board communication trouble
U2	1102	Compressor temperature trouble		○		Check delay code 1202
UE	1302	High pressure trouble or High compressor temperature (TRS) trouble		○		Check delay code 1402
U7	1500	Superheat due to low discharge temperature trouble		○		Check delay code 1600
U2	1501	Refrigerant shortage trouble		○		Check delay code 1601
		Closed valve in cooling mode		○		Check delay code 1501
P6	1503	Freeze protection of branch box or indoor unit	○			
EF	1508	4-way valve trouble in heating mode		○		Check delay code 1608
L6	2135	Circulation water freeze protection	○			
PA	2500	Water leakage	○			
P5	2502	Drain overflow protection	○			
P4	2503	Drain sensor abnormality	○			
UF	4100	Compressor current interruption (locked compressor)		○		Check delay code 4350
Pb	4114	Fan trouble (Indoor unit)	○			
UP	4210	Compressor overcurrent interruption		○		
U9	4220	Voltage shortage/overvoltage/PAM error/L1 open phase/ primary current sensor error/power synchronization signal error		○		Check delay code 4320
U5	4230	Heat sink temperature trouble		○		Check delay code 4330
U6	4250	Power module trouble or Overcurrent trouble		○		Check delay code 4350
U8	4400	Fan trouble (Outdoor unit)		○		Check delay code 4500
U3	5101	Air inlet thermistor (TH21) open/short	○			
		Compressor temperature thermistor (TH4) open/short		○		Check delay code 1202
U4	5102	Liquid pipe temperature thermistor (TH22) open/short	○			
		Suction pipe temperature thermistor (TH6) open/short		○		Check delay code 1211
U4	5103	Gas pipe temperature thermistor (TH23) open/short	○			
U4	5105	Outdoor liquid pipe temperature thermistor (TH3) open/short		○		Check delay code 1205
U4	5106	Ambient temperature thermistor (TH7) open/short		○		Check delay code 1221
U4	5109	HIC pipe temperature thermistor (TH2) open/short		○		Check delay code 1222
U4	5110	Heat sink temperature thermistor (TH8) open/short		○		Check delay code 1214
F5	5201	High pressure sensor (63HS) trouble		○		Check delay code 1402
F3	5202	Low pressure sensor (63LS) trouble		○		Check delay code 1400
UH	5300	Primary current error		○		Check delay code 4310
P4	5701	Contact failure of drain float switch	○			
A0	6600	Duplex address error	○	○	○	Only M-NET Remote controller is detected.
A2	6602	Transmission processor hardware error	○	○	○	Only M-NET Remote controller is detected.
A3	6603	Transmission bus BUSY error	○	○	○	Only M-NET Remote controller is detected.
A6	6606	Signal communication error with transmission processor	○	○	○	Only M-NET Remote controller is detected.
A7	6607	No ACK error	○		○	Only M-NET Remote controller is detected.
A8	6608	No response frame error	○		○	Only M-NET Remote controller is detected.
E0/E4	6831	MA communication receive error	○		○	Only MA Remote controller is detected.
E3/E5	6832	MA communication send error	○		○	Only MA Remote controller is detected.
E3/E5	6833	MA communication send error	○		○	Only MA Remote controller is detected.
E0/E4	6834	MA communication receive error	○		○	Only MA Remote controller is detected.
EF	7100	Total capacity error		○		
EF	7101	Capacity code error	○	○		
EF	7102	Connecting excessive number of units and branch boxes		○		
EF	7105	Address setting error		○		
EF	7130	Incompatible unit combination		○		

Notes:

1. When the outdoor unit detects No ACK error/No response error, an object indoor unit is treated as a stop, and not assumed to be abnormal.

2. The check codes displayed on the units may be different between the error source and others. In that case, please refer to the check code of error source by displayed attribute and address.

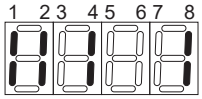
3. Refer to the service manual of indoor unit or remote controller for the detail of error detected in indoor unit or remote controller.

• Self-diagnosis function
The indoor and outdoor units can be diagnosed automatically using the self-diagnosis switch (SW1) and LED1, LED2 (LED indication) found on the multi-controller of the outdoor unit.
LED indication: Set all contacts of SW1 to OFF.

• During normal operation
The LED indicates the drive state of the controller in the outdoor unit.

Bit	1	2	3	4	5	6	7	8
Indication	Compressor operated	52C	21S4	SV1	(SV2)	—	—	Always lit

[Example]
When the compressor and SV1 are turned during cooling operation.



Check code

0403
(Ed)

Serial communication error

Abnormal points and detection methods	Causes and checkpoints
If serial communication between the outdoor multi controller circuit board and outdoor power circuit board is defective.	①Wire breakage or contact failure of connector CN2 or CN4 ②Malfunction of communication circuit to power circuit board on outdoor multi controller circuit board ③Malfunction of communication circuit on outdoor power circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy
Check the connection of the communication line (CN2 and CN4) between the outdoor controller board and power board. Are they connected normally? No → Connect the CN2 and CN4 properly. Replace them in the case of breakage. Yes Check the wiring. Are they connected normally? No → Connect the wiring properly. Replace them in the case of breakage. Yes The communication circuit of either the outdoor controller board or power board is defective. If unable to identify the defective circuit; ①Replace the outdoor controller board if it does not recover, ②Replace the outdoor power board.	

Check code

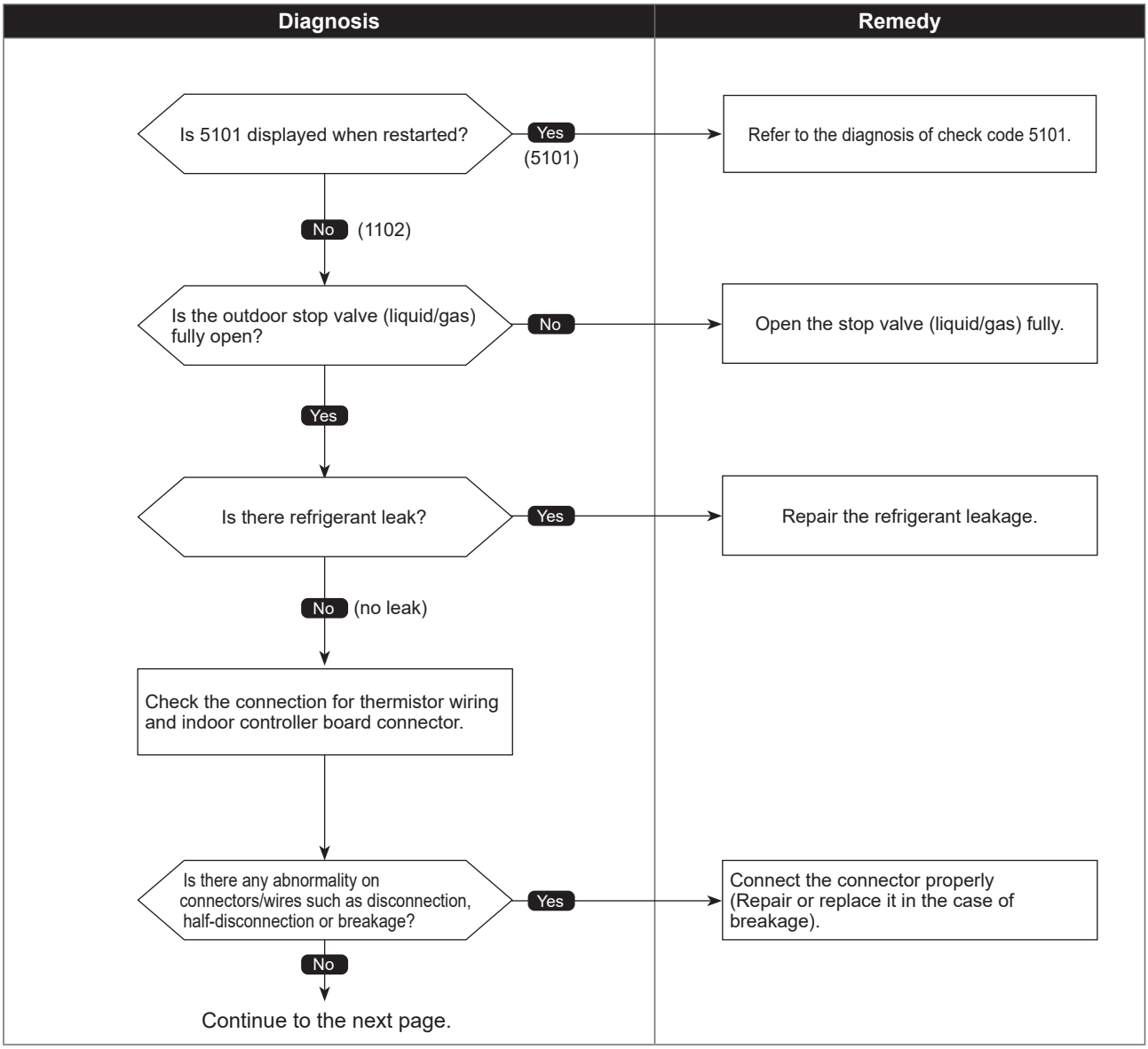
1102
(U2)

Compressor temperature trouble

Abnormal points and detection methods	Causes and checkpoints
(1) If TH4 falls into following temperature conditions; ●exceeds 105°C [221°F] continuously for 5 minutes ●exceeds 115°C [239°F] TH4: Thermistor <Compressor> LEV: Linear expansion valve	1. Malfunction of stop valve 2. Over-heated compressor operation caused by shortage of refrigerant 3. Defective thermistor 4. Defective outdoor multi controller circuit board 5. LEV performance failure 6. Defective indoor controller board 7. Clogged refrigerant system caused by foreign object 8. Refrigerant shortage (Refrigerant liquid accumulation in compressor while indoor unit is OFF/thermo-OFF.)

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



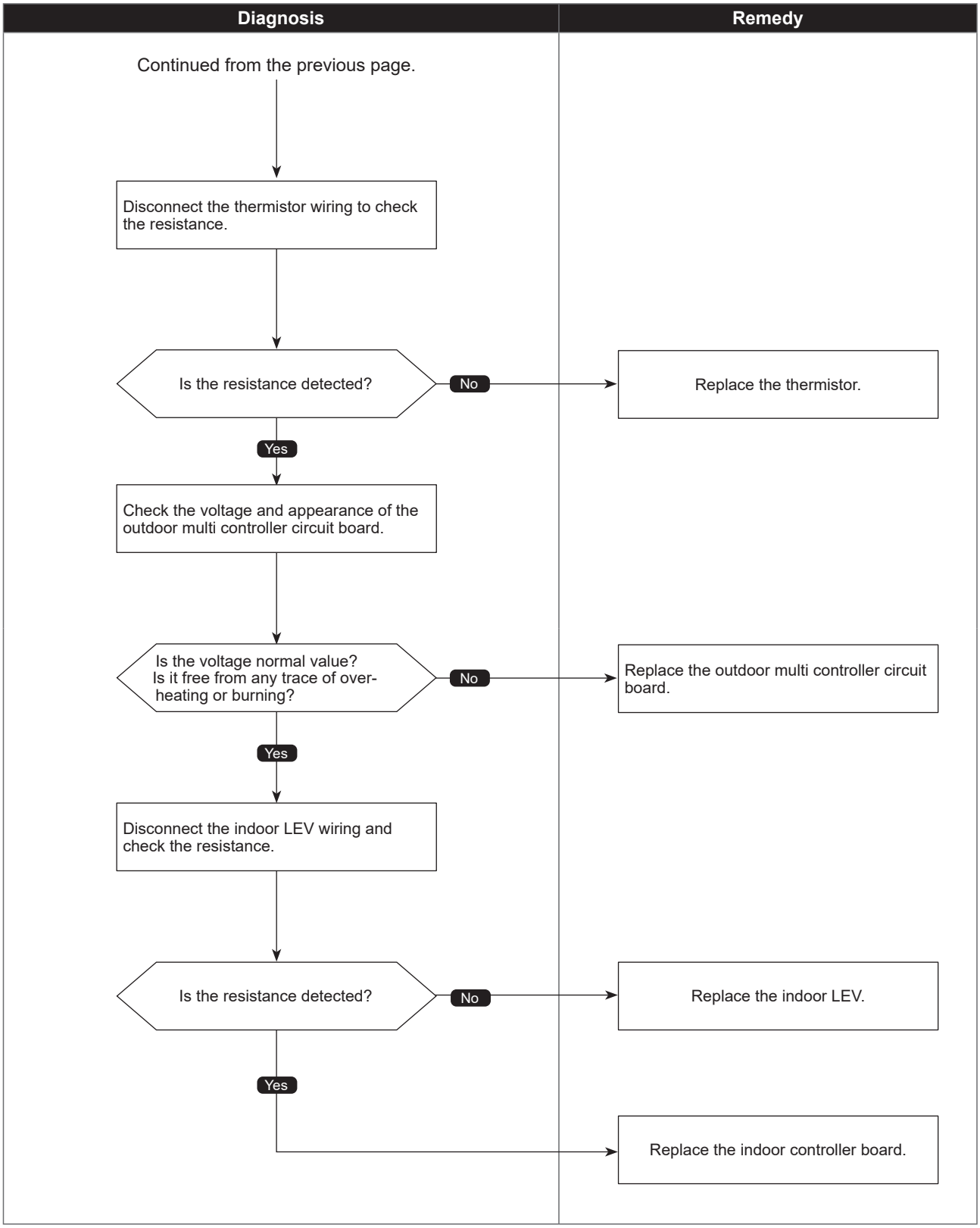
Check code

1102
(U2)

Compressor temperature trouble

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

1302 (UE)

High pressure (63H/63HS) trouble or High compressor temperature (TRS) trouble

Abnormal points and detection methods	Causes and checkpoints
(1) High pressure abnormality (63H operation) Abnormal if 63H operates(*) during compressor operation. (* 4.15 MPaG [602 PSIG]) (2) High pressure abnormality (63HS detected) 1. Abnormal if a pressure detected by 63HS is 4.31 MPaG [625 PSIG] or more during compressor operation. 2. Abnormal if a pressure detected by 63HS is 4.14 MPaG [600 PSIG] or more for 3 minutes during compressor operation. (3) High compressor temperature abnormality (TRS operation) Abnormal if TRS operates (125°C) during compressor operation. 63H : High pressure switch 63HS: High pressure sensor LEV : Linear expansion valve SV1 : Solenoid valve TH7 : Thermistor <Ambient> TRS : Compressor protector	1. Defective operation of stop valve (not fully open) 2. Clogged or broken pipe 3. Malfunction or locked outdoor fan motor 4. Short-cycle of outdoor unit 5. Dirt of outdoor heat exchanger 6. Remote controller transmitting error caused by noise interference 7. Contact failure of the outdoor multi controller circuit board connector 8. Defective outdoor multi controller circuit board 9. Short-cycle of indoor unit 10. Decreased airflow, clogged filter, or dirt on indoor unit. 11. Malfunction or locked indoor fan motor 12. Decreased airflow caused by defective inspection of outdoor temperature thermistor (It detects lower temperature than actual temperature.) 13. Indoor LEV performance failure 14. Malfunction of fan driving circuit 15. SV1 performance failure 16. Defective High pressure sensor 17. Defective High pressure sensor input circuit on outdoor multi controller circuit board 18. Refrigerant shortage (Refrigerant liquid accumulation in compressor while indoor unit is OFF/thermo-OFF.)

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy
Is 5201 displayed when restarted? — Yes (5201)	Refer to the diagnosis of check code 5201.
No (1302)	
Is the outdoor stop valve (liquid/gas) fully open? — No	Open the stop valve (liquid/gas) fully.
Yes	
Does the outdoor fan rotate while the operation? — No	Check the outdoor fan motor. Refer to "How to check the parts" on the outdoor unit service manual.
Yes	
Does the indoor unit fan rotate while the operation? — No	Check the indoor unit fan motor. Refer to "How to check the parts" on the indoor unit service manual.
Yes	
Is the indoor unit short-cycled? — Yes (short-cycled)	Resolve the short-cycle.
No (no short-cycle)	
Continue to the next page.	

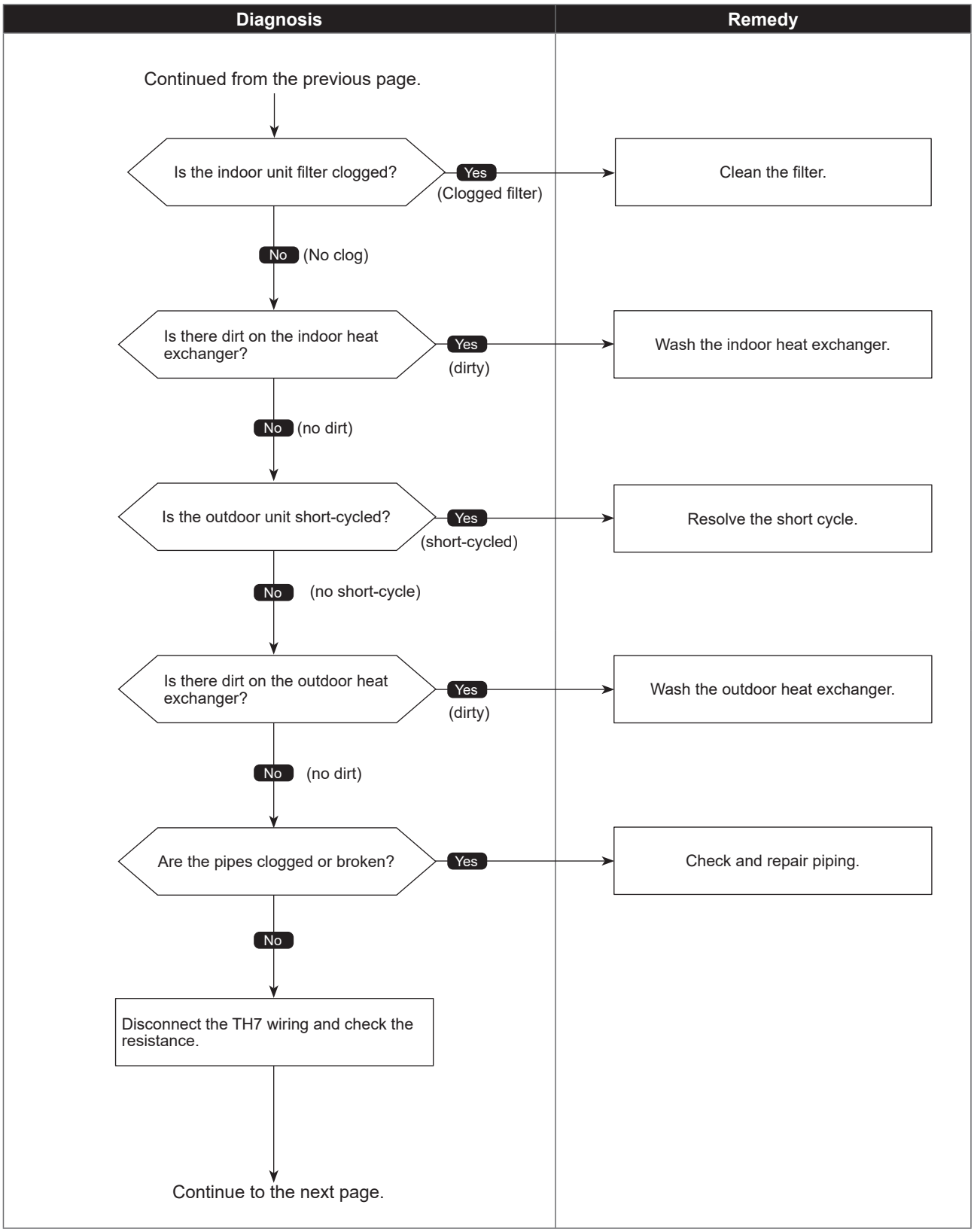
Check code

1302
(UE)

High pressure (63H/63HS) trouble or High compressor temperature (TRS) trouble

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



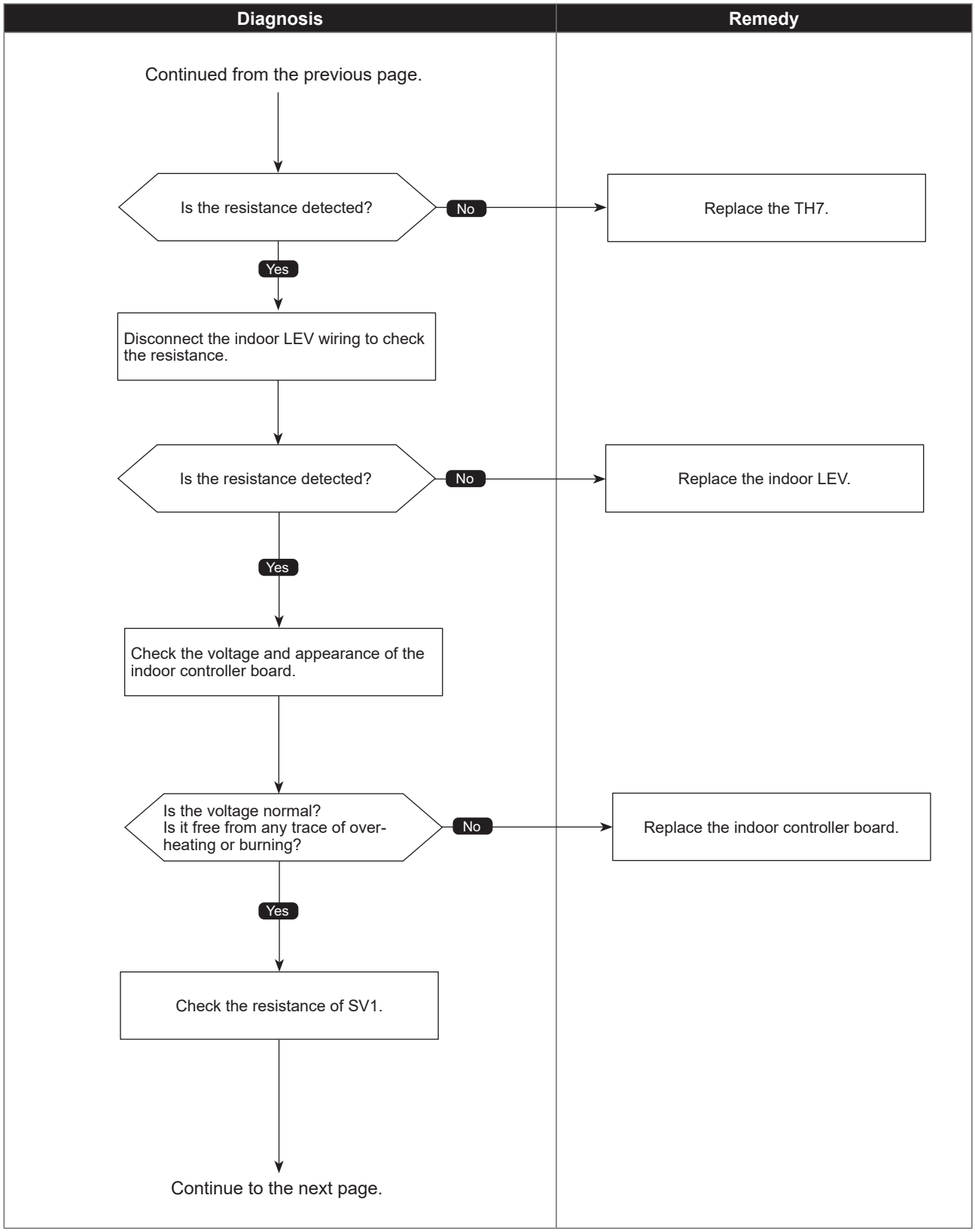
Check code

1302
(UE)

High pressure (63H/63HS) trouble or High compressor temperature (TRS) trouble

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



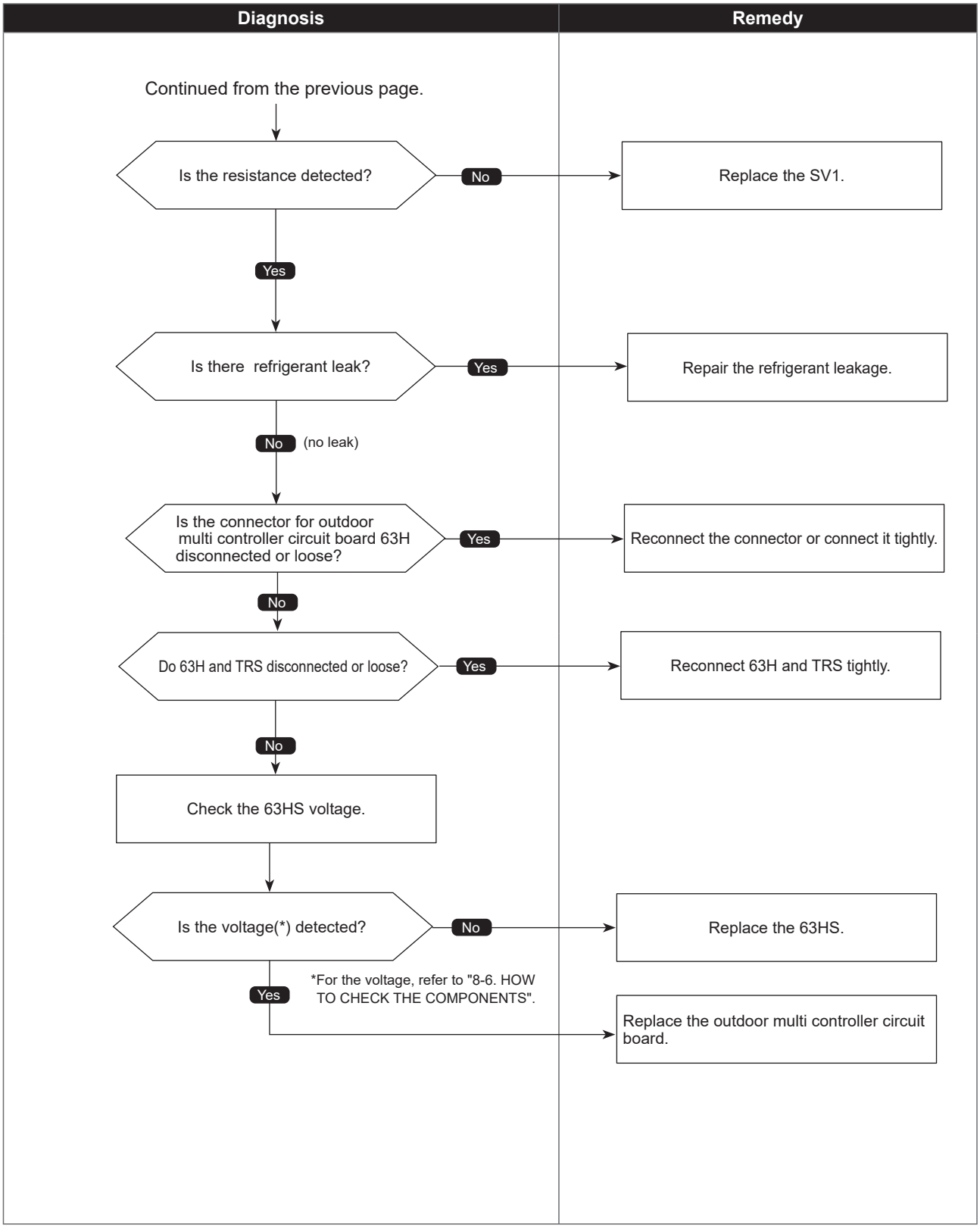
Check code

1302
(UE)

High pressure (63H/63HS) trouble or High compressor temperature (TRS) trouble

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

1500
(U7)

Superheat due to low discharge temperature trouble

Abnormal points and detection methods	Causes and checkpoints
If the discharge superheat is continuously detected −15°C [−27°F](*) or less for 5 minutes even though the indoor LEV has minimum open pulse after the compressor starts operating for 10 minutes. LEV : Linear expansion valve TH4 : Thermistor <Compressor> 63HS : High pressure sensor *At this temperature, conditions for the abnormality detection will not be satisfied if no abnormality is detected on either TH4 or 63HS.	1. Disconnection or loose connection of TH4 2. Defective holder of TH4 3. Disconnection of LEV coil 4. Disconnection of LEV connector 5. LEV performance failure

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis

Is the TH4 wiring disconnected?

Yes (disconnected) → Connect the wiring properly.

No (connected properly)

Check the resistance of TH4.

temp. - resistance characteristic

0°C	700 kΩ
10°C	410 kΩ
20°C	250 kΩ
30°C	160 kΩ
40°C	104 kΩ

Is the resistance normal?

No → Replace the TH4.

Yes

Check the connector contact and wiring of the indoor LEV.

Is there any abnormality such as half-disconnection or breakage?

Yes → Connect the connector properly, or replace the LEV.

No

Disconnect the indoor LEV wiring to check the resistance.

Continue to the next page.

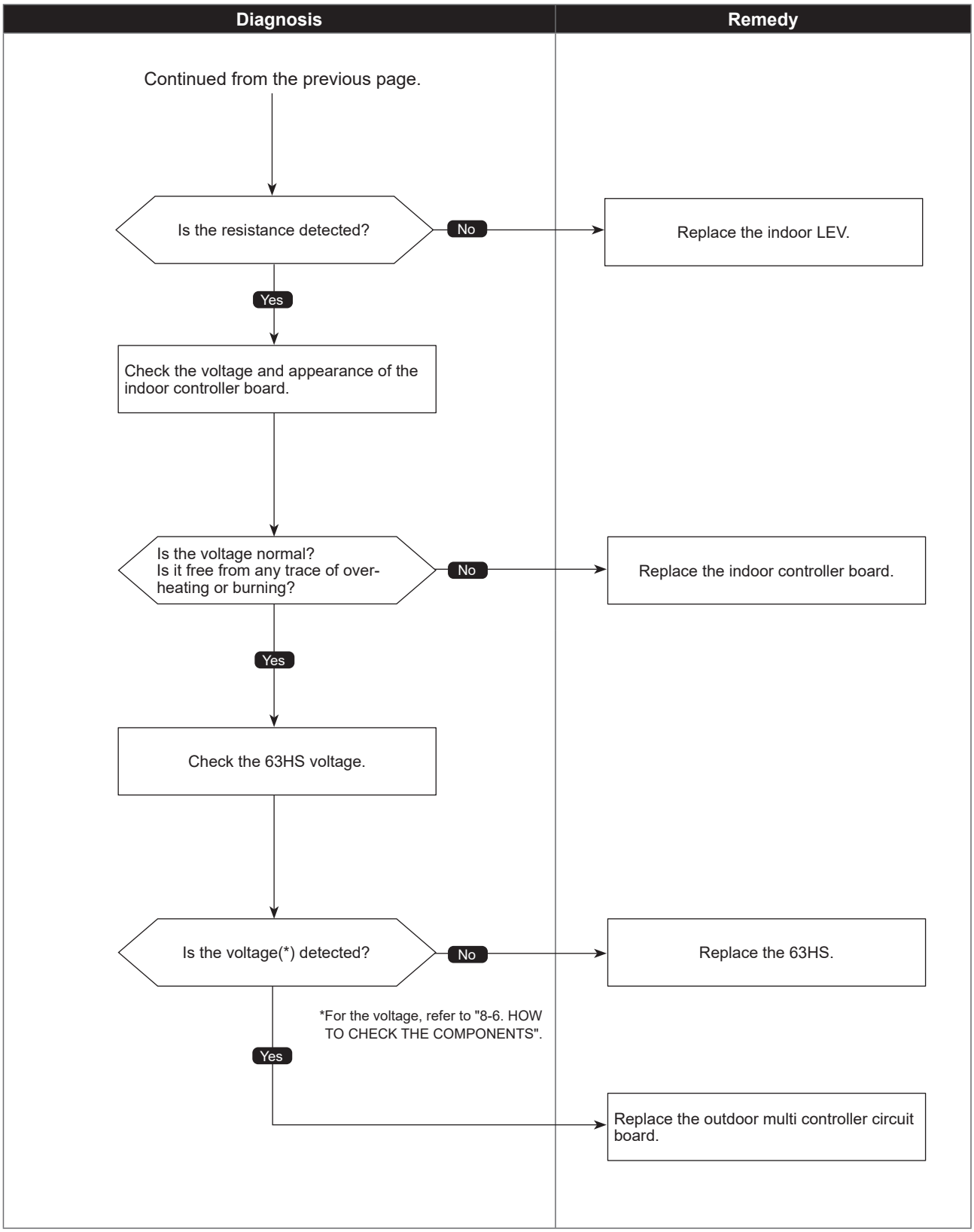
Check code

1500
(U7)

Superheat due to low discharge temperature trouble

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

1501
(U2)

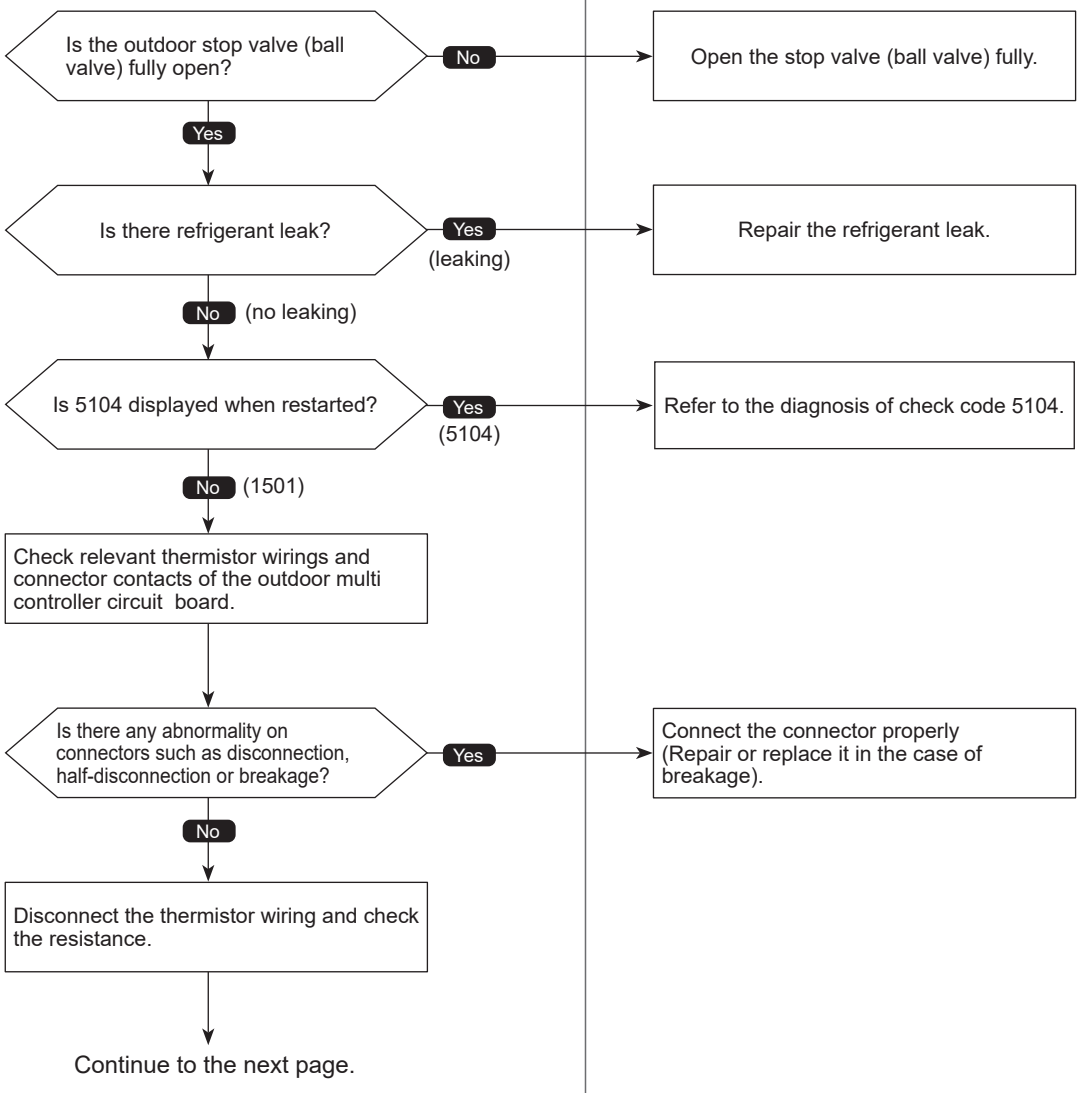
Refrigerant shortage trouble

Abnormal points and detection methods	Causes and checkpoints
(1) When all of the following conditions have been satisfied for 15 consecutive minutes: 1. The compressor is operating in HEAT mode. 2. Discharge superheat is 80°C [144°F] or more. 3. Difference between TH7 and TH3 applies to the formula of (TH7−TH3 < 5°C[9°F]) 4. The saturation temperature converted from a high pressure sensor detects below 35°C [95°F]. (2) When all of the following conditions have been satisfied: 1. The compressor is in operation. 2. When cooling, discharge superheat is 80°C [144°F] or more, and the saturation temperature converted from a high pressure sensor is over −40°C [−40°F]. 3. When heating, discharge superheat is 90°C [162°F] or more.	1. Defective operation of stop valve (not fully open) 2. Defective thermistor 3. Defective outdoor multi controller circuit board 4. Indoor LEV performance failure 5. Gas leakage or shortage 6. Defective 63HS TH3 : Thermistor <Outdoor liquid pipe> TH7 : Thermistor <Ambient> LEV : Linear expansion valve 63HS: High pressure sensor

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy



Continue to the next page.

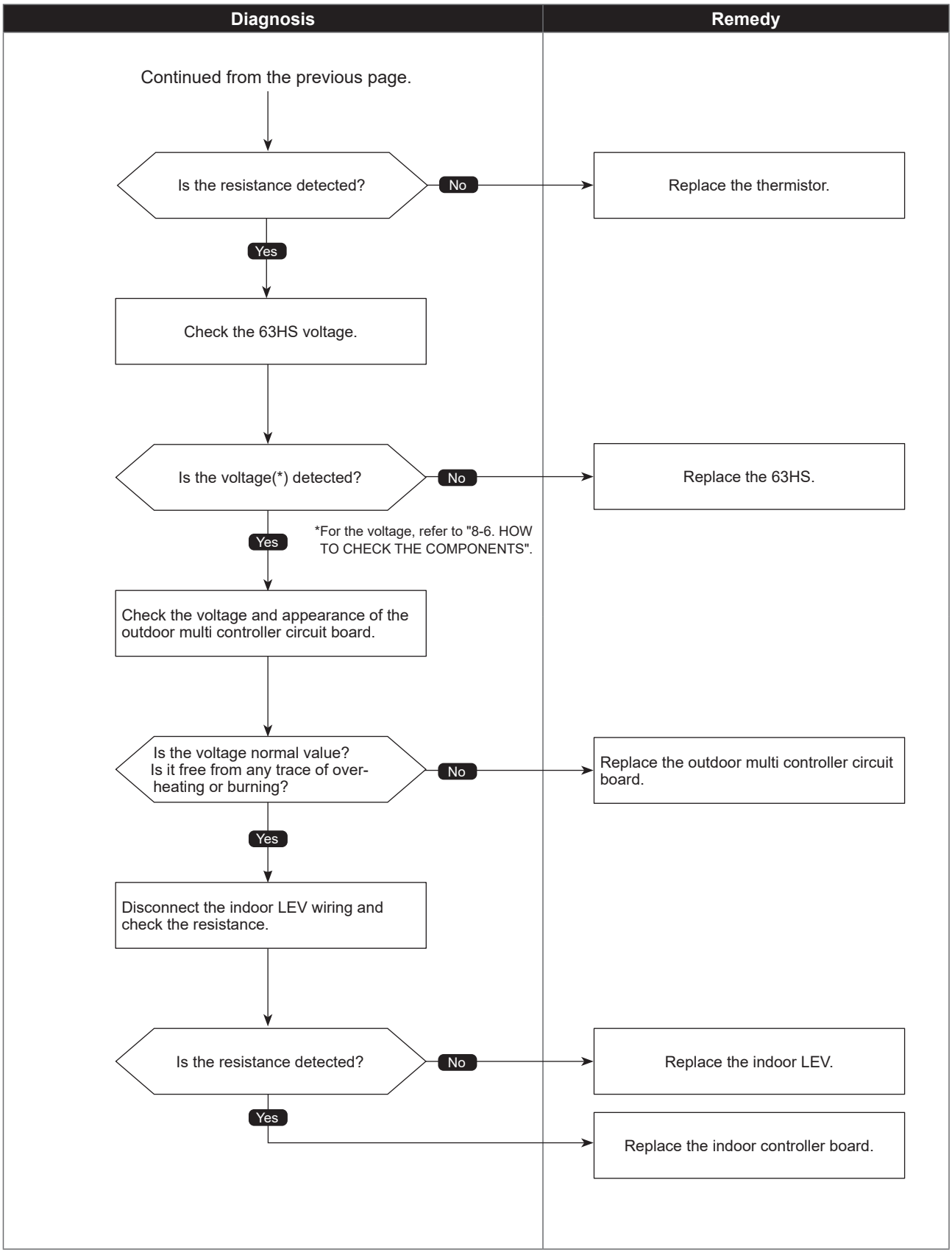
Check code

1501
(U2)

Refrigerant shortage trouble

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

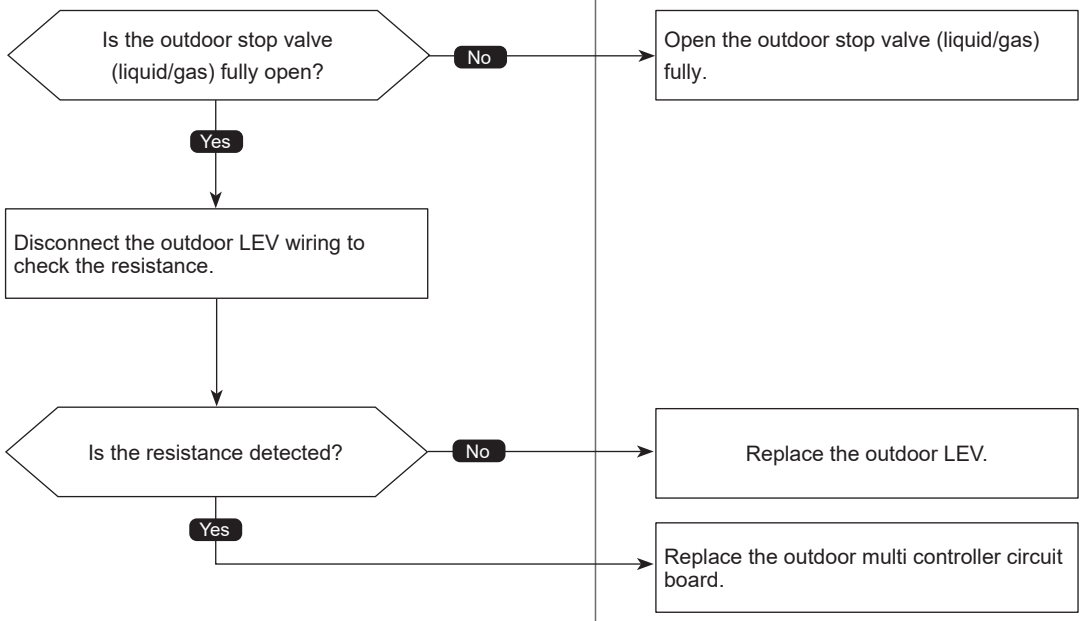
1501
(U2)

Closed valve in cooling mode

Abnormal points and detection methods	Causes and checkpoints
If stop valve is closed during cooling operation. When both of the following temperature conditions have been satisfied for 20 minutes or more during cooling operation. 1. TH22j−TH21j ≧ −2°C [−3.6°F] 2. TH23j−TH21j ≧ −2°C [−3.6°F] Note: For indoor unit, the abnormality is detected if an operating unit satisfies the condition.	1. Outdoor liquid/gas valve is closed. 2. Malfunction of outdoor LEV (LEV-A)(blockage) TH21: Indoor intake temperature thermistor (RT11 or TH1) TH22: Indoor liquid pipe temperature thermistor (RT13 or TH2) TH23: Indoor gas pipe temperature thermistor (TH-A to E) LEV: Linear expansion valve

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy
	

Check code

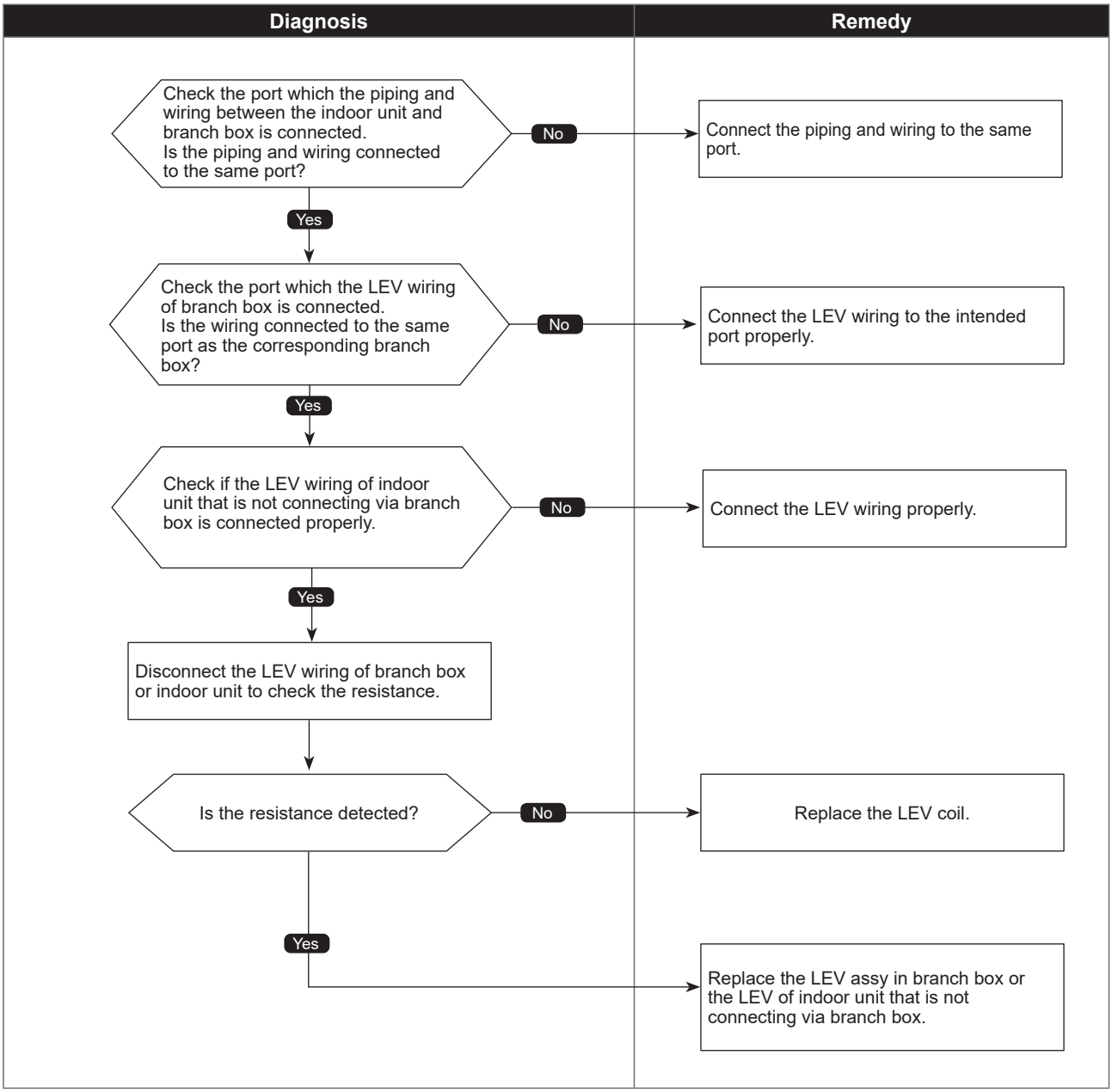
1503
(P6)

Freeze protection of branch box or indoor unit

Abnormal points and detection methods	Causes and checkpoints
The purpose of the check code is to prevent indoor unit from freezing or dew condensation which is caused when a refrigerant keeps flowing into the unit in STOP. When all of the following conditions are satisfied: 1. The compressor is operating in COOL mode. 2. 15 minutes have passed after the startup of the compressor, or the change in the number of operating indoor units is made (including a change by turning thermo-ON/OFF). 3. After the condition 2 above is satisfied, the thermistor of indoor unit in STOP detects TH22j ≦ −5°C [23°F] for 5 consecutive minutes.	1. Wrong piping connection between indoor unit and branch box 2. Miswiring between indoor unit and branch box 3. Miswiring of LEV in branch box or indoor unit 4. Malfunction of LEV in branch box or indoor unit

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

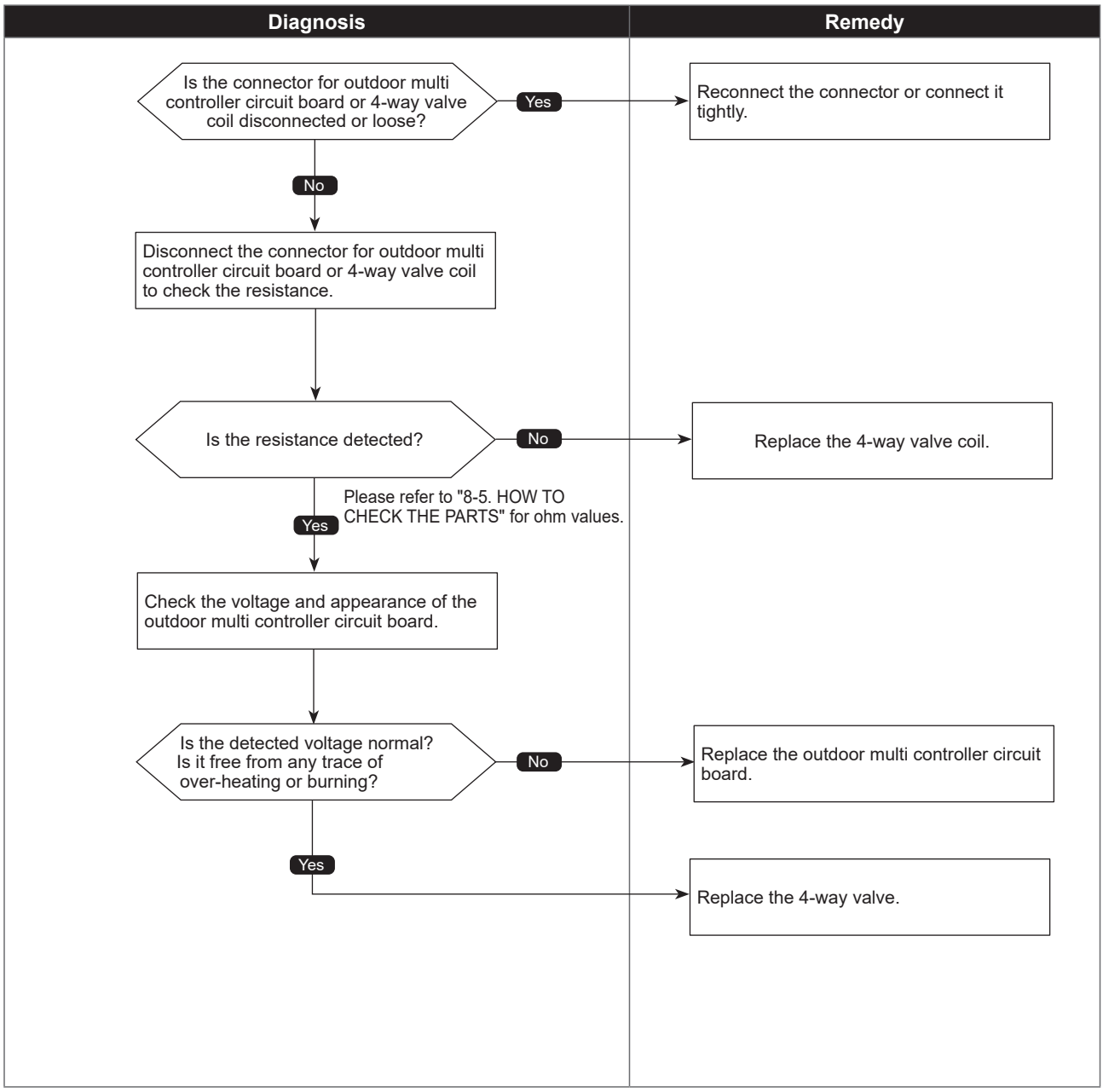
1508
(EF)

4-way valve trouble in heating mode

Abnormal points and detection methods	Causes and checkpoints
If 4-way valve does not operate during heating operation. When any of the following temperature conditions is satisfied for 3 min or more during heating operation 1. TH22j−TH21j ≦ −10°C [−18°F] 2. TH23j−TH21j ≦ −10°C [−18°F] 3. TH22j ≦ 3°C [37.4°F] 4. TH23j ≦ 3°C [37.4°F] Note: For indoor unit, the abnormality is detected if an operating unit satisfies the condition.	1. 4-way valve failure 2. Disconnection or failure of 4-way valve coil 3. Clogged drain pipe 4. Disconnection or loose connection of connectors 5. Malfunction of input circuit on outdoor multi controller circuit board 6. Defective outdoor power circuit board TH21: Indoor intake temperature thermistor (RT11 or TH1) TH22: Indoor liquid pipe temperature thermistor (RT13 or TH2) TH23: Indoor gas pipe temperature thermistor (TH-A to E)

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

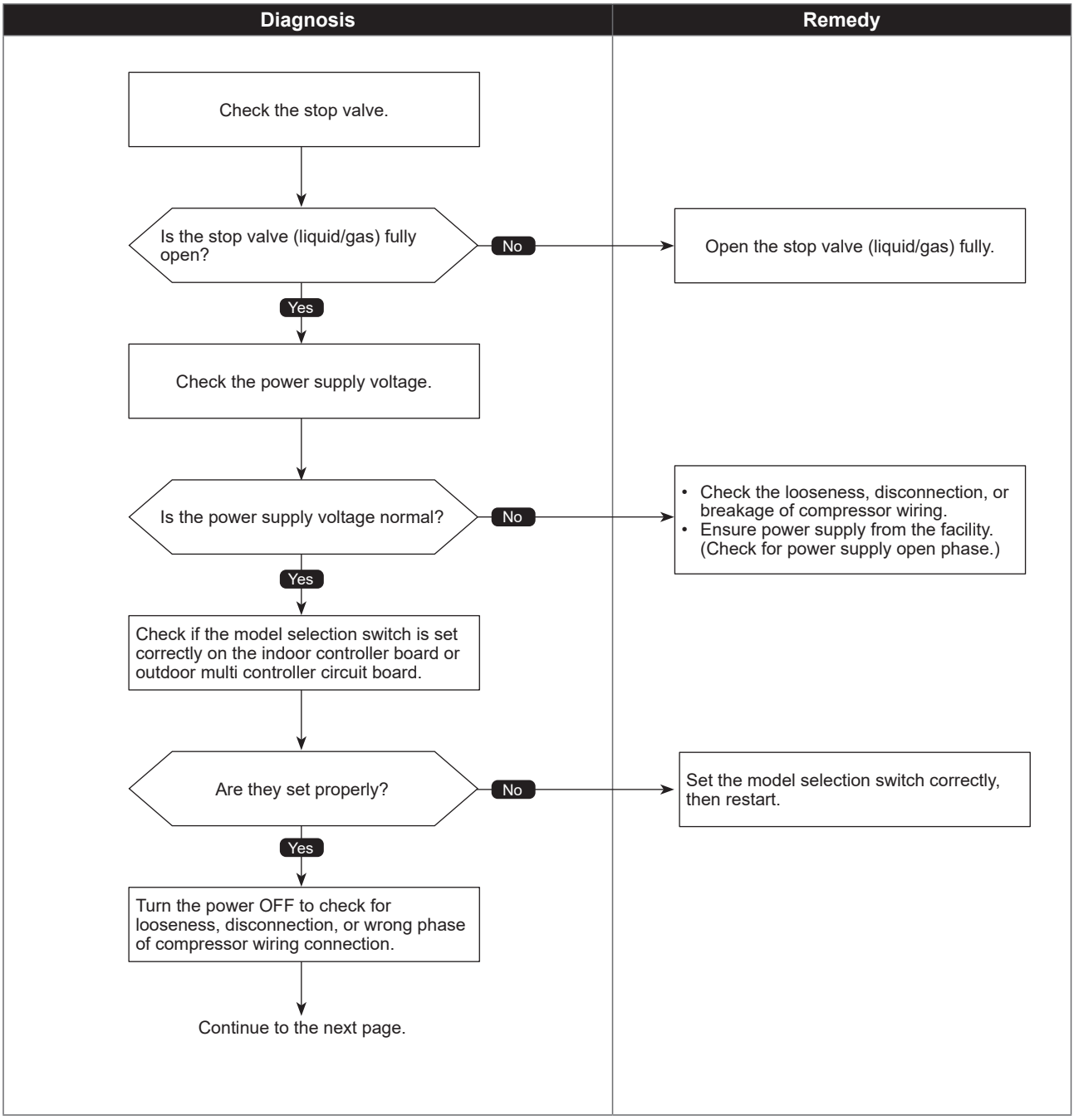
4100
(UF)

Compressor current interruption (Locked compressor)

Abnormal points and detection methods	Causes and checkpoints
If overcurrent of DC bus or compressor is detected before 30 seconds since the compressor starts operating.	1. Closed stop valve 2. Decrease of power supply voltage 3. Looseness, disconnection, or wrong phase of compressor wiring connection 4. Incorrect DIP-SW setting of model selection on the outdoor controller board 5. Defective compressor 6. Defective outdoor power circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

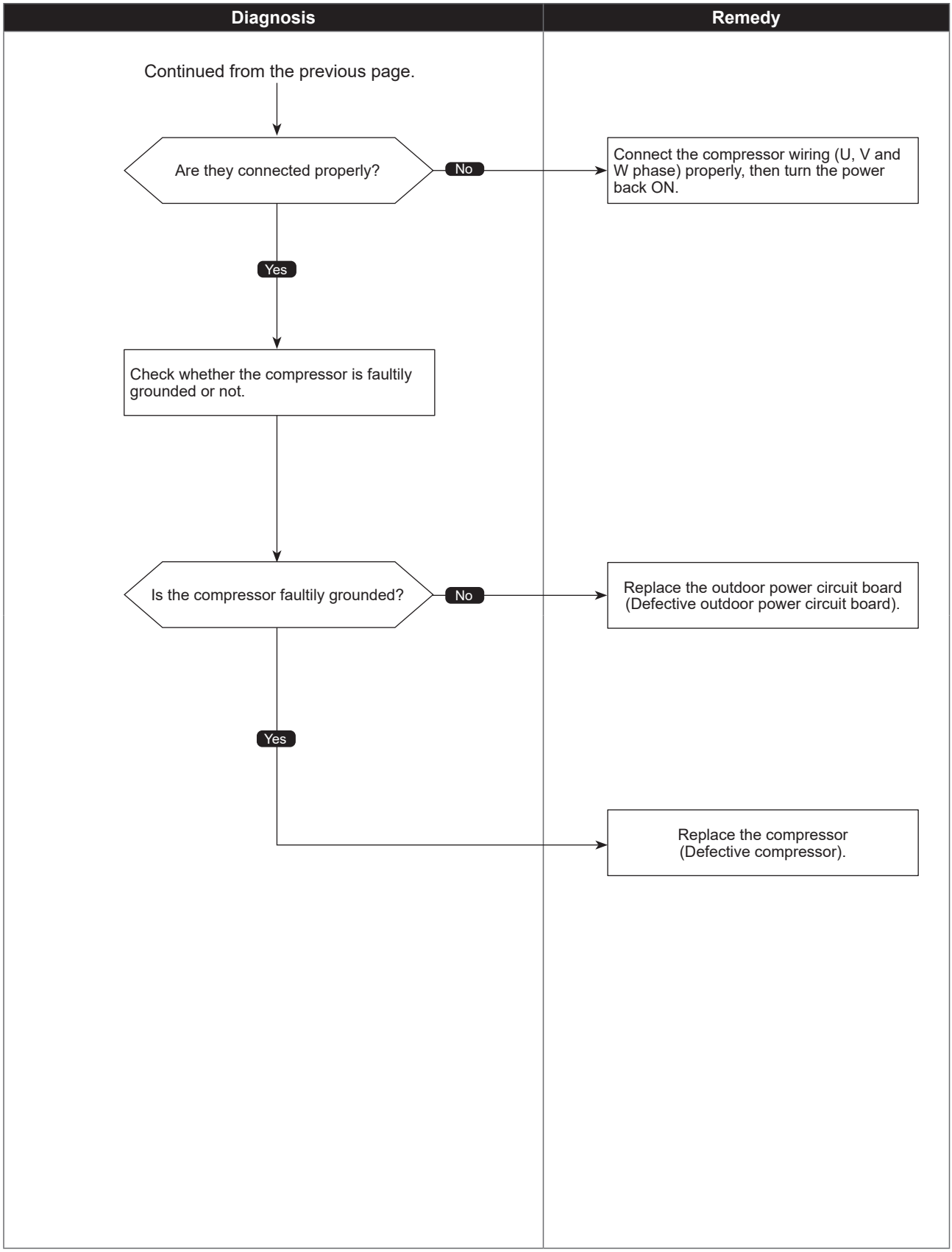


Check code

4100
(UF)

Compressor current interruption (Locked compressor)

●Diagnosis of defects
Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

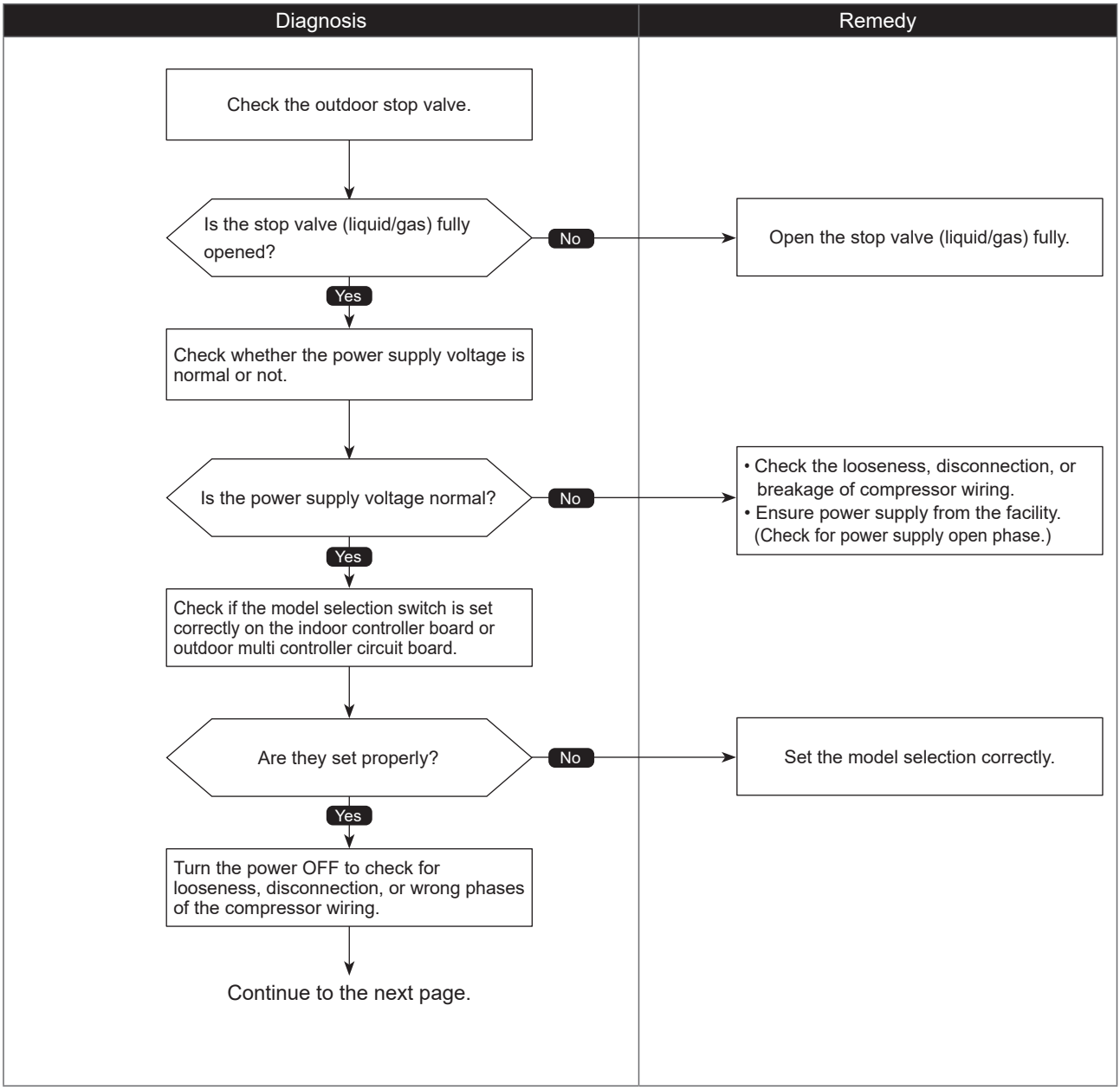
4210 (UP)

Compressor overcurrent interruption

Abnormal points and detection methods	Causes and checkpoints
If overcurrent of DC bus or compressor is detected after 30 seconds since the compressor starts operating.	1. Closed outdoor stop valve 2. Decrease of power supply voltage 3. Looseness, disconnection, or wrong phase of compressor wiring connection 4. Model selection error on indoor controller board or outdoor multi controller circuit board 5. Defective compressor 6. Defective outdoor power circuit board 7. Defective outdoor multi controller circuit board 8. Malfunction of indoor/outdoor unit fan 9. Short-cycle of indoor/outdoor unit

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



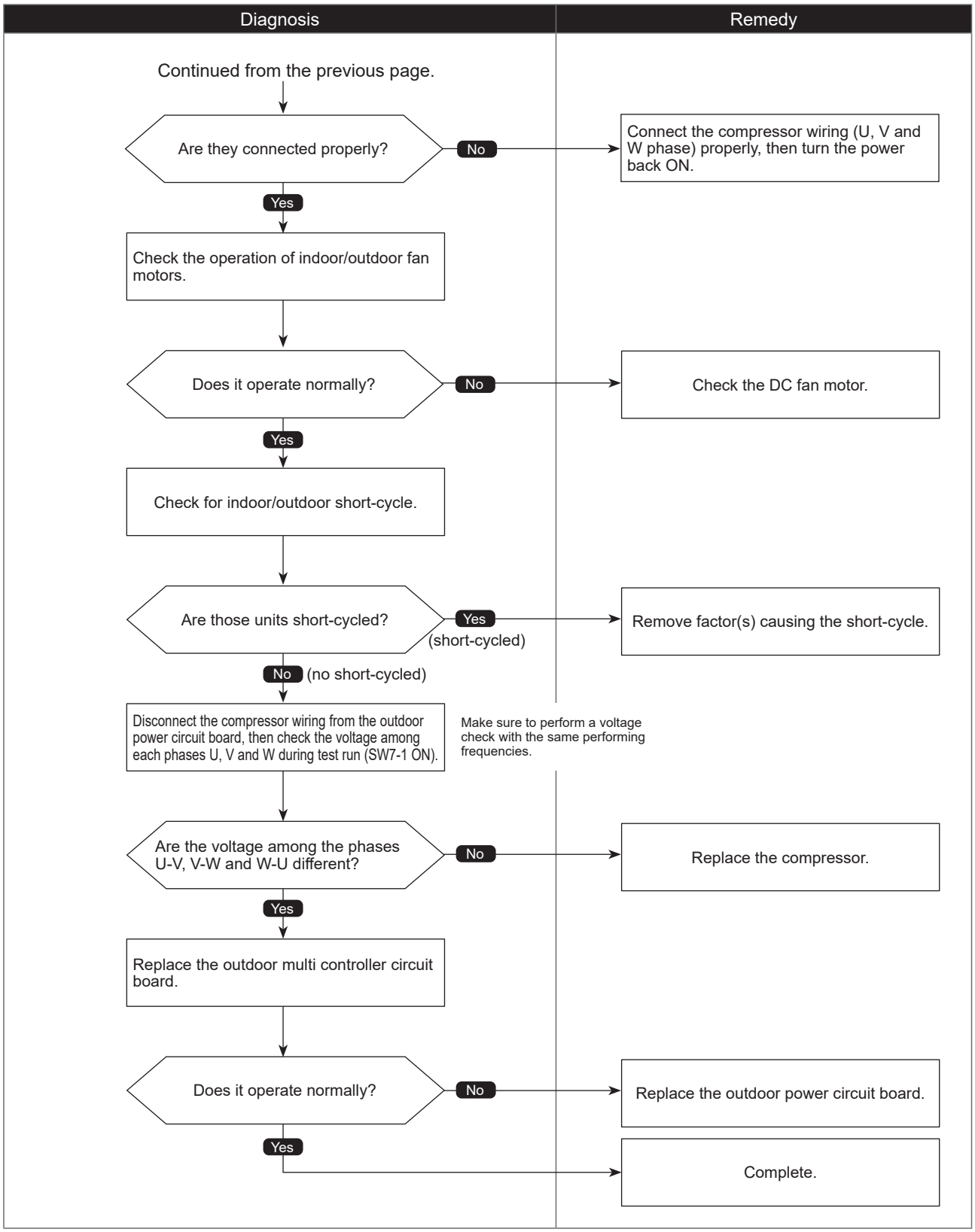
Check code

4210
(UP)

Compressor overcurrent interruption

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

4220 (U9)

Voltage shortage /Overvoltage/PAM error/L1 open phase/ Primary current sensor error/Power synchronization signal error

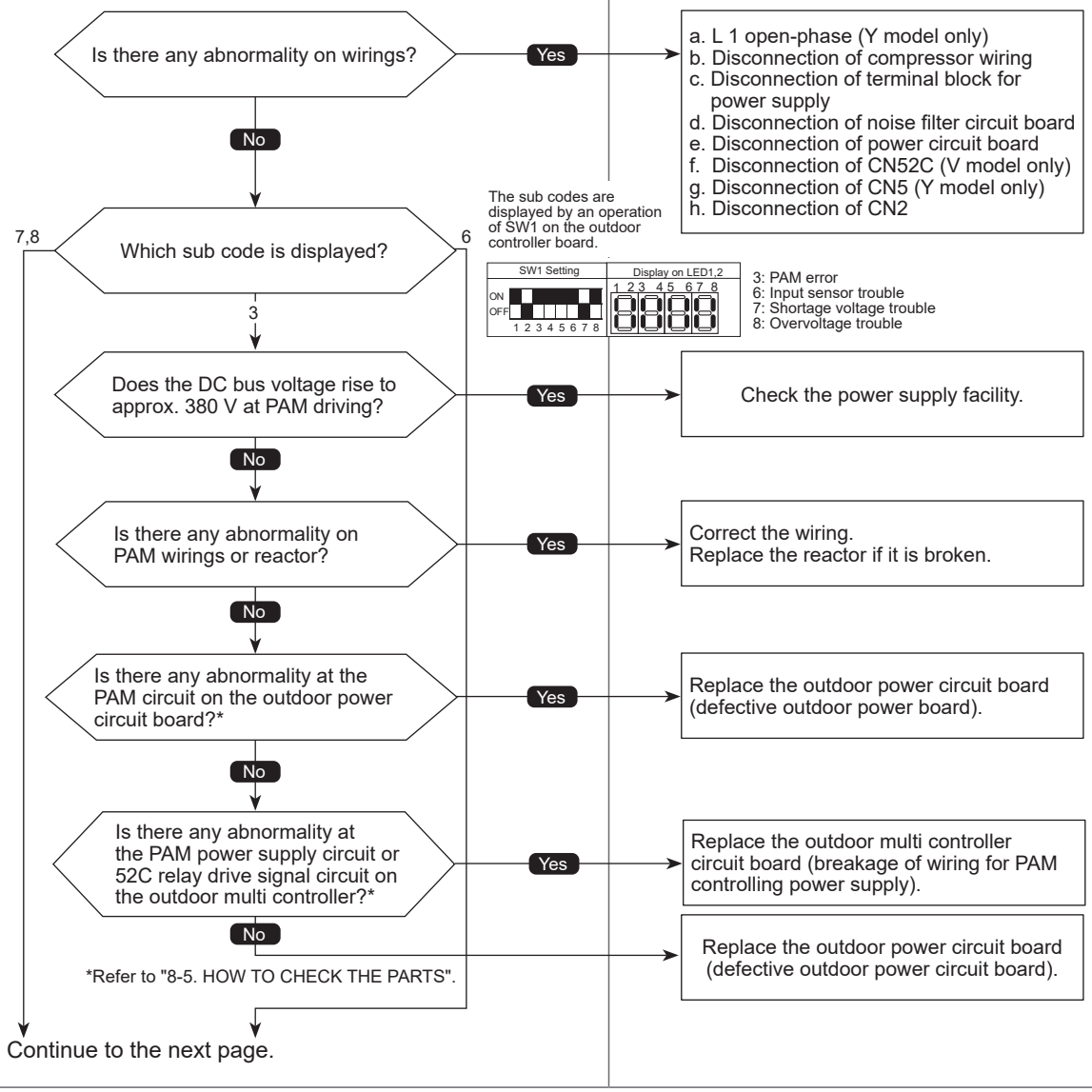
Abnormal points and detection methods	Causes and checkpoints
If any of following symptoms are detected; ●Decrease of DC bus voltage to 200 V (V model), 350 V (Y model) ●Increase of DC bus voltage to 430 V (V model), 760 V (Y model) ●DC bus voltage stays at 310 V or less for consecutive 30 seconds when the operational frequency is over 20 Hz. ●When any of following conditions is satisfied while the detections value of primary current is 0.1 A or less. 1. The operational frequency is 40 Hz or more. 2. The compressor current is 6 A or more.	① Decrease/increase of power supply voltage ② L1 open-phase (Y model only) ③ Primary current sensor failure ④ Disconnection of compressor wiring ⑤ Malfunction of 52C relay ⑥ Defective outdoor power circuit board ⑦ Malfunction of 52C relay driving circuit on outdoor multi controller circuit board ⑧ Disconnection of CN5 (Y model only) ⑨ Disconnection of CN2 ⑩ Malfunction of primary current detecting circuit on outdoor power circuit board ⑪ Malfunction of resistor connected to 52C relay on outdoor power circuit board (Y model only)

●Diagnosis of defects
Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

V model : single phase model
Y model : three phase four wire model

The black square (■) indicates a switch position.

Diagnosis



Remedy

a. L 1 open-phase (Y model only)
b. Disconnection of compressor wiring
c. Disconnection of terminal block for power supply
d. Disconnection of noise filter circuit board
e. Disconnection of power circuit board
f. Disconnection of CN52C (V model only)
g. Disconnection of CN5 (Y model only)
h. Disconnection of CN2

Check the power supply facility.

Correct the wiring.
Replace the reactor if it is broken.

Replace the outdoor power circuit board (defective outdoor power board).

Replace the outdoor multi controller circuit board (breakage of wiring for PAM controlling power supply).

Replace the outdoor power circuit board (defective outdoor power circuit board).

Check code

4220 (U9)

Voltage shortage/overvoltage/PAM error/L1 open phase/primary current sensor error/power synchronization signal error

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.

Diagnosis	Remedy

Continued from the previous page.

7, 8 / 6

Is the outdoor unit V model or Y model?

V model → Replace the outdoor power circuit board (Defective outdoor power circuit board).

Y model

Is CN5 connected properly without any contact failure?

No → Correct the CN5 wiring.

Yes

Is there any breakage of ACCT on the noise filter circuit board?

Yes → Replace the noise filter circuit board.

No → Replace the outdoor power circuit board (Defective outdoor power circuit board).

Check the power supply voltage on the terminal block of the outdoor unit.

Is the power supply normal?

No → Check the power supply facility.

Yes

Check the bus voltage read by the microprocessor with an operation of SW1 on the outdoor multi controller circuit board.

The bus voltage can be displayed by an operation of SW1 on the outdoor multi controller circuit board.

SW1 Setting	Display on LED1,2	Unit
ON / OFF 1 2 3 4 5 6 7 8	0–9999	V

Check the bus voltage at the test points below on the outdoor power circuit board using a multimeter.
Test points: CNDC 1-3 pin

Is the bus voltage normal?

No → Check the resistor connected to 52C relay and reactor. Replace it if the resistor is broken. Replace the outdoor power circuit board if the resistor is not broken.

Yes

Operate the unit and check if the problem occurs again.

Check code

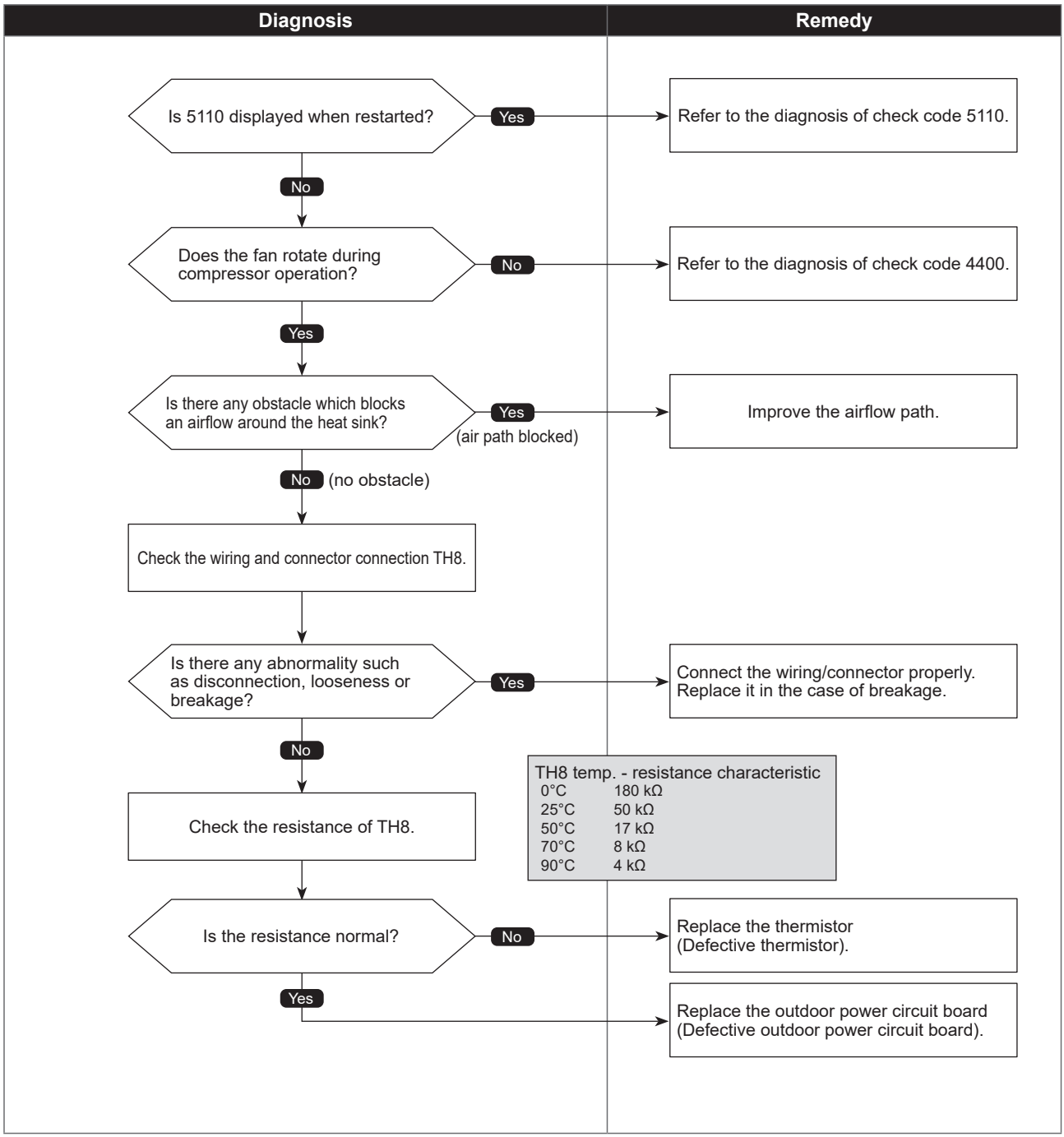
4230
(U5)

Heat sink temperature trouble

Abnormal points and detection methods	Causes and checkpoints
If TH8 detects a temperature outside the specified range during compressor operation. TH8: Thermistor <Heat sink>	1. Blocked outdoor fan 2. Malfunction of outdoor fan motor 3. Blocked airflow path 4. Rise of ambient temperature 5. Characteristic defect of thermistor 6. Malfunction of input circuit on outdoor power circuit board 7. Malfunction of outdoor fan driving circuit

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

4250
(U6)

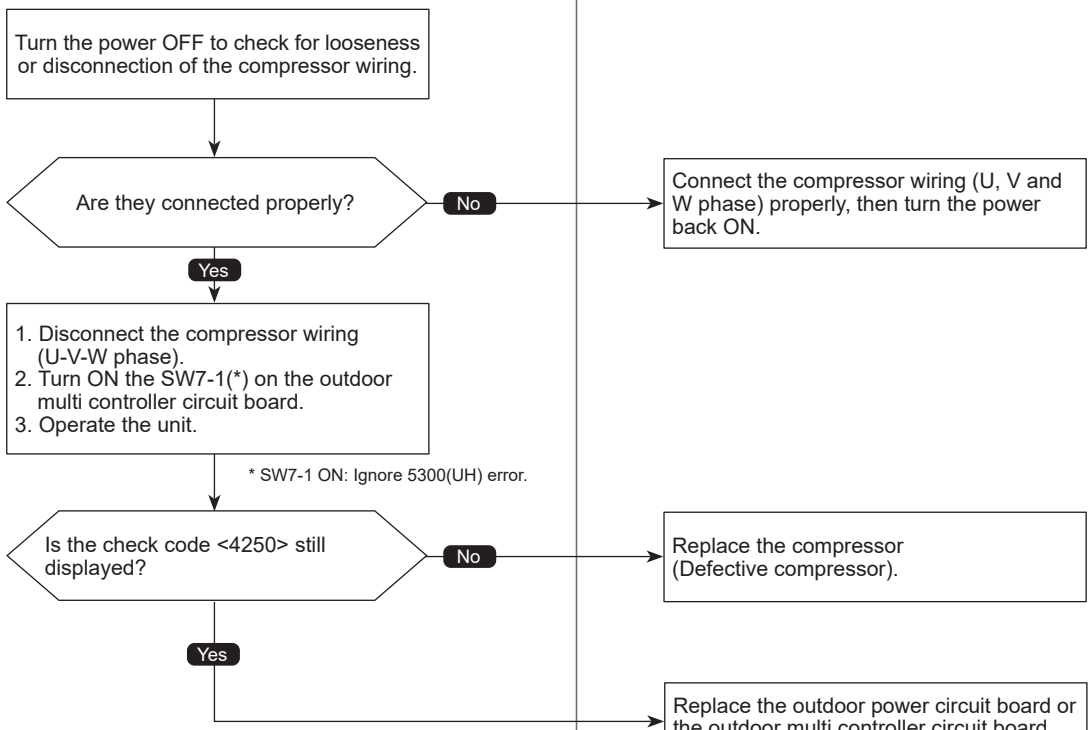
Power module trouble or Overcurrent trouble

Abnormal points and detection methods	Causes and checkpoints
If both of the following conditions have been satisfied: 1. Overcurrent of DC bus or compressor is detected during compressor operation. 2. Inverter power module is determined to be defected.	1. Short-circuit caused by looseness or disconnection of compressor wiring 2. Defective compressor 3. Defective outdoor power circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy



Check code

4400
(U8)

Fan trouble (Outdoor unit)

Abnormal points and detection methods	Causes and checkpoints
If no rotational frequency is detected, or detected a value outside the specified range during fan motor operation.	1. Malfunction of fan motor 2. Disconnection of CNF connector 3. Defective outdoor multi controller circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis

Check the fuse on the outdoor multi controller circuit board.

Has the fuse melted?

Yes (melted) → • Replace the outdoor multi controller circuit board. • Replace the defective fan motor.*

*For the detail, refer to "Check method of DC fan motor (fan motor/outdoor multi controller circuit board)" in chapter 8-5.

No (Not melted)

Check the fan motor connector (CNF1) for disconnection or looseness.

Is there any abnormality such as disconnection, looseness or breakage?

Yes → Connect the wiring/connector properly. Replace it in the case of breakage.

No

1. While the breaker is OFF, disconnect the compressor wirings (U/V/W) from the outdoor power circuit board.
2. While the breaker is OFF, disconnect the fan motor connector CNF1.
3. When 5 minutes have passed since turning ON the breaker, turn SW7-1 ON.
4. Check the voltage of the outdoor multi controller circuit board.

Test points are;
· VDC approx. 310 to 380 VDC (fan connector 1–4)
· VCC approx. 15 VDC (fan connector 5–4)
· VCC approx. 0–6.5 VDC (fan connector 6–4)

Is the voltage normal?

No → Replace the outdoor multi controller circuit board.

Yes → Replace the defective fan motor.

Notes
· Set SW7-1 OFF after the troubleshooting completes.
· The fan sometimes starts on-off cycle operation during low-load operation or cooling at low outside temperature. It is not abnormal; the operation ensures reliability of the product.

Check code

5101
(U3)

Compressor temperature thermistor (TH4) open/short

<Detected in outdoor unit>

Abnormal points and detection methods	Causes and checkpoints
If TH4 detects to be open/short. (The open/short detection is disabled for 10 minutes after compressor starts, during defrosting operation, or for 10 minutes after returning from the defrosting operation.) Open: 3°C [37°F] or less Short: 217°C [423°F] or more TH4: Thermistor <Compressor>	1. Disconnection or contact failure of connectors 2. Characteristic defect of thermistor 3. Defective outdoor multi controller circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.

Diagnosis | **Remedy**

Check the wiring and connector connection of TH4.

Is there any abnormality such as disconnection, looseness or breakage?

Yes → Connect the wiring/connector properly. Replace the connector in the case of breakage.

No

Disconnect the connector to check the resistance of TH4 using a multimeter.

Is the detected resistance normal?

No → Replace the thermistor.

Yes

Check the temperature of TH4.

The detected temperature of TH4 can be displayed by an operation of SW1 on the outdoor multi controller circuit board.

SW1 Setting	Display on LED1, 2	Unit
ON / OFF 1 2 3 4 5 6 7 8	−99.9–999.9	°C

Is the detected temperature normal?

No → Replace the outdoor multi controller circuit board (Malfunction of thermistor circuit).

Yes → No abnormality
(A connector contact failure is suspected.)

Check code

5102
(U4)

Suction pipe temperature thermistor (TH6) open/short

<Detected in outdoor unit>

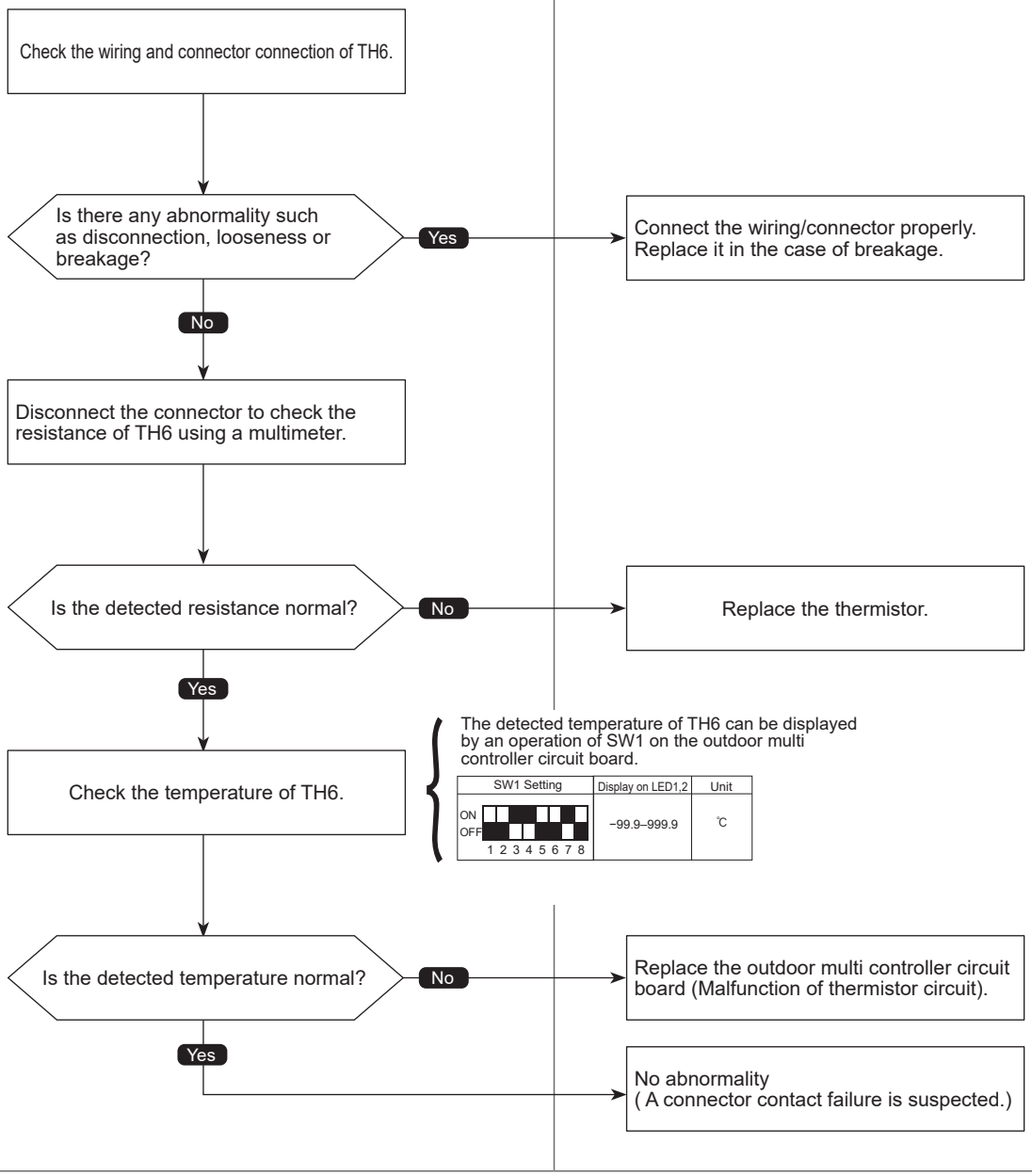
Abnormal points and detection methods	Causes and checkpoints
If TH6 detects to be open/short. (The open/short detection is disabled during 10 seconds to 10 minutes after compressor starts, during defrosting operation, or for 10 minutes after returning from the defrosting operation.) Open: −40°C [−40°F] or less Short: 90°C [194°F] or more TH6: Thermistor <Suction pipe>	1. Disconnection or contact failure of connectors 2. Characteristic defect of thermistor 3. Defective outdoor multi controller circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.

Diagnosis	Remedy



Check code

5105
(U4)

Outdoor liquid pipe temperature thermistor (TH3) open/short

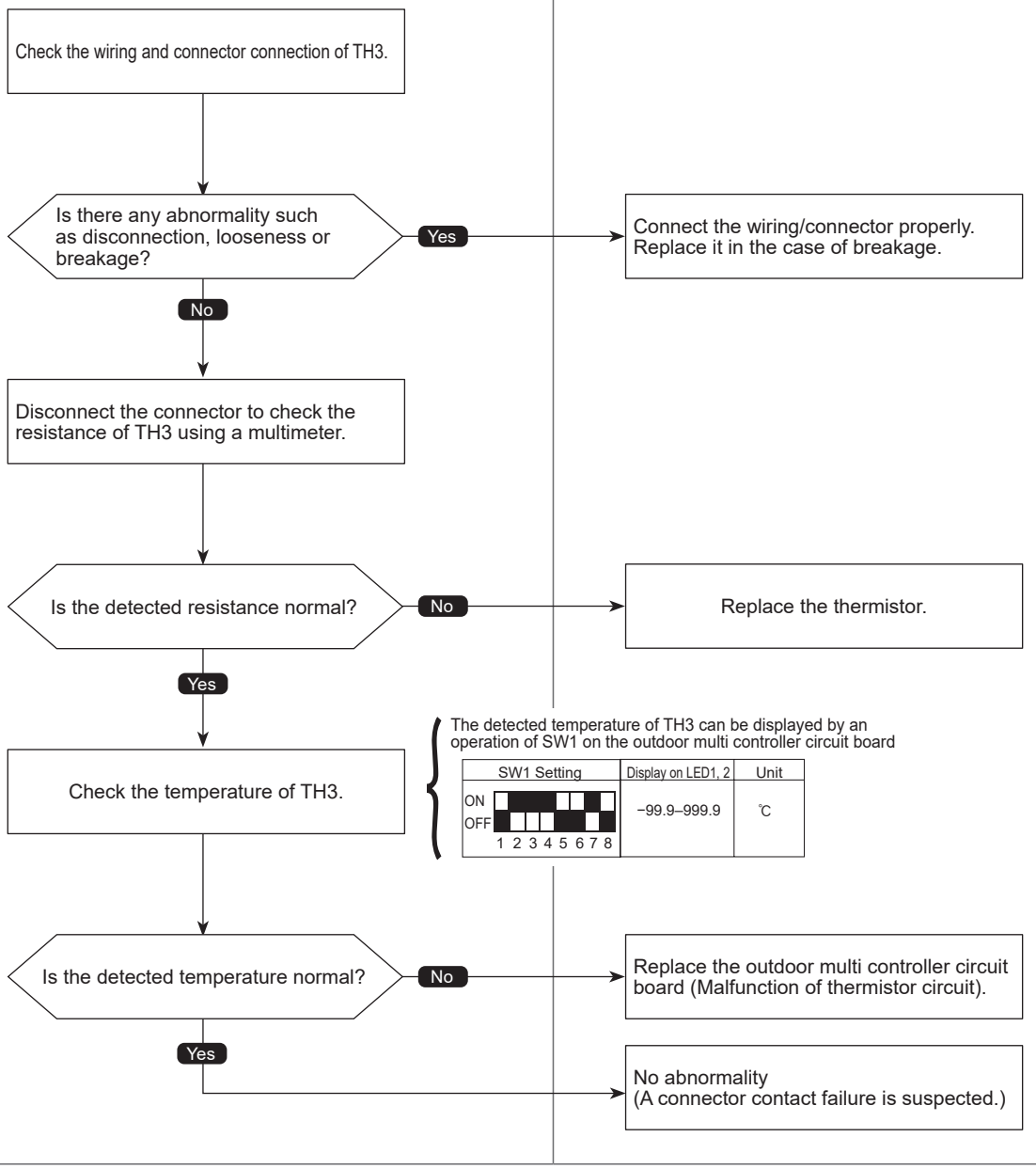
Abnormal points and detection methods	Causes and checkpoints
If TH3 detects to be open/short. (The open/short detection is disabled during 10 seconds to 10 minutes after compressor starts, during defrosting operation, or for 10 minutes after returning from the defrosting operation.) Open:−40°C [−40°F] or less Short: 90°C [194°F] or more TH3: Thermistor <Outdoor liquid pipe>	1. Disconnection or contact failure of connectors 2. Characteristic defect of thermistor 3. Defective outdoor multi controller circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.

Diagnosis	Remedy



Check code

5106
(U4)

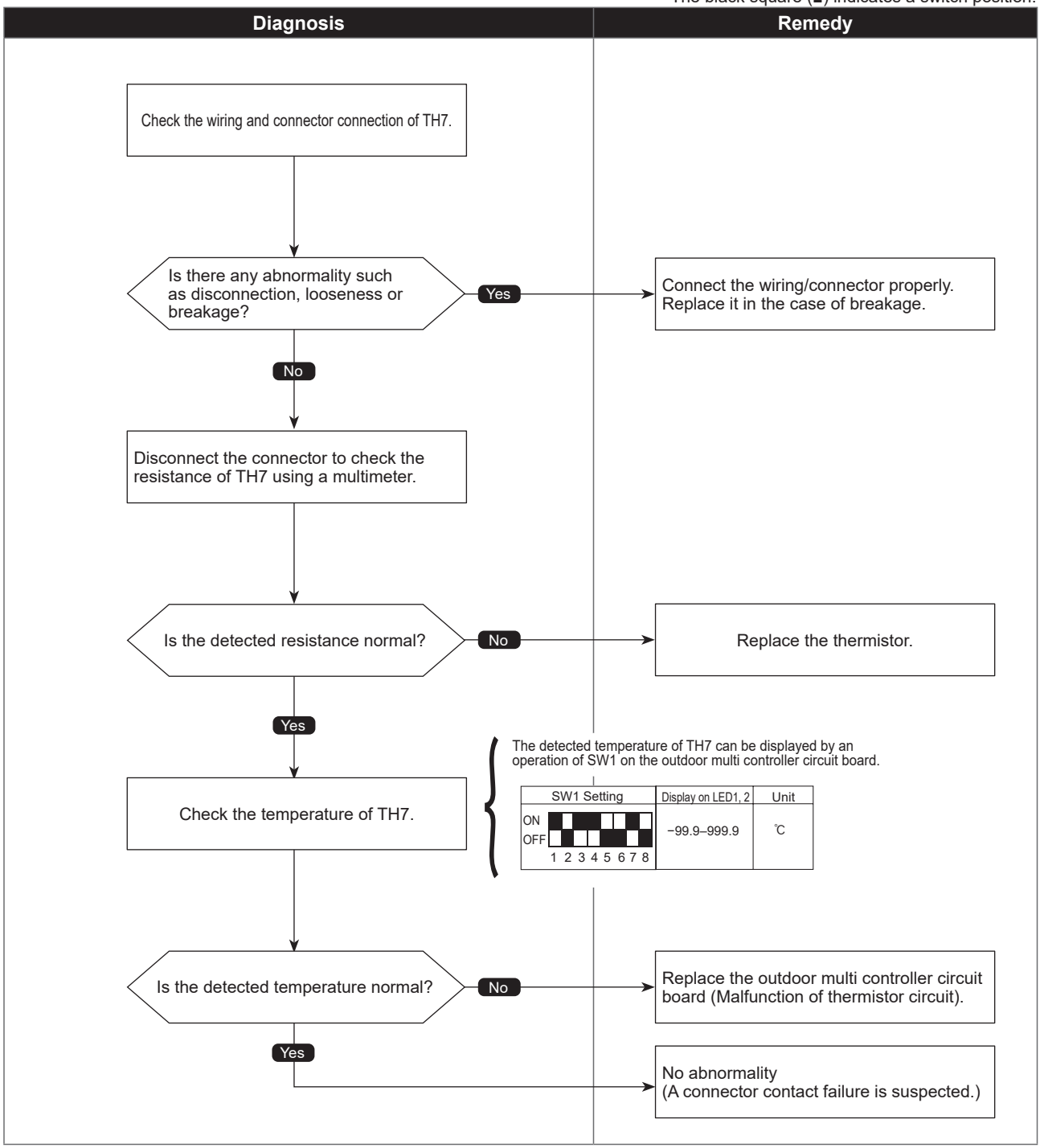
Ambient temperature thermistor (TH7) open/short

Abnormal points and detection methods	Causes and checkpoints
If TH7 detects to be open/short Open: −40°C [−40°F] or less Short: 90°C [194°F] or more TH7: Thermistor <Ambient>	1. Disconnection or contact failure of connectors 2. Characteristic defect of thermistor 3. Defective outdoor multi controller circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.



Check code

5109
(U4)

HIC pipe temperature thermistor (TH2) open/short

Abnormal points and detection methods	Causes and checkpoints
If TH2 detects to be open/short. Open: −40°C [−40°F] or less Short: 90°C [194°F] or more TH2: Thermistor <HIC pipe>	1. Disconnection or contact failure of connectors 2. Characteristic defect of thermistor 3. Defective outdoor multi controller circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.

Diagnosis

Check the wiring and connector connection of TH2.

Is there any abnormality such as disconnection, looseness or breakage?

Yes → Connect the wiring/connector properly. Replace it in the case of breakage.

No

Disconnect the connector to check the resistance of TH2 using a multimeter.

Is the detected resistance normal?

No → Replace the thermistor.

Yes

Check the temperature of TH2.

The detected temperature of TH2 can be displayed by an operation of SW1 on the outdoor multi controller circuit board.

SW1 Setting	Display on LED1,2	Unit
ON / OFF 1 2 3 4 5 6 7 8	−99.9–999.9	°C

Is the detected temperature normal?

No → Replace the outdoor multi controller circuit board (Malfunction of thermistor circuit).

Yes → No abnormality
(A connector contact failure is suspected.)

Check code

5110
(U4)

Heat sink temperature thermistor(TH8) open/short

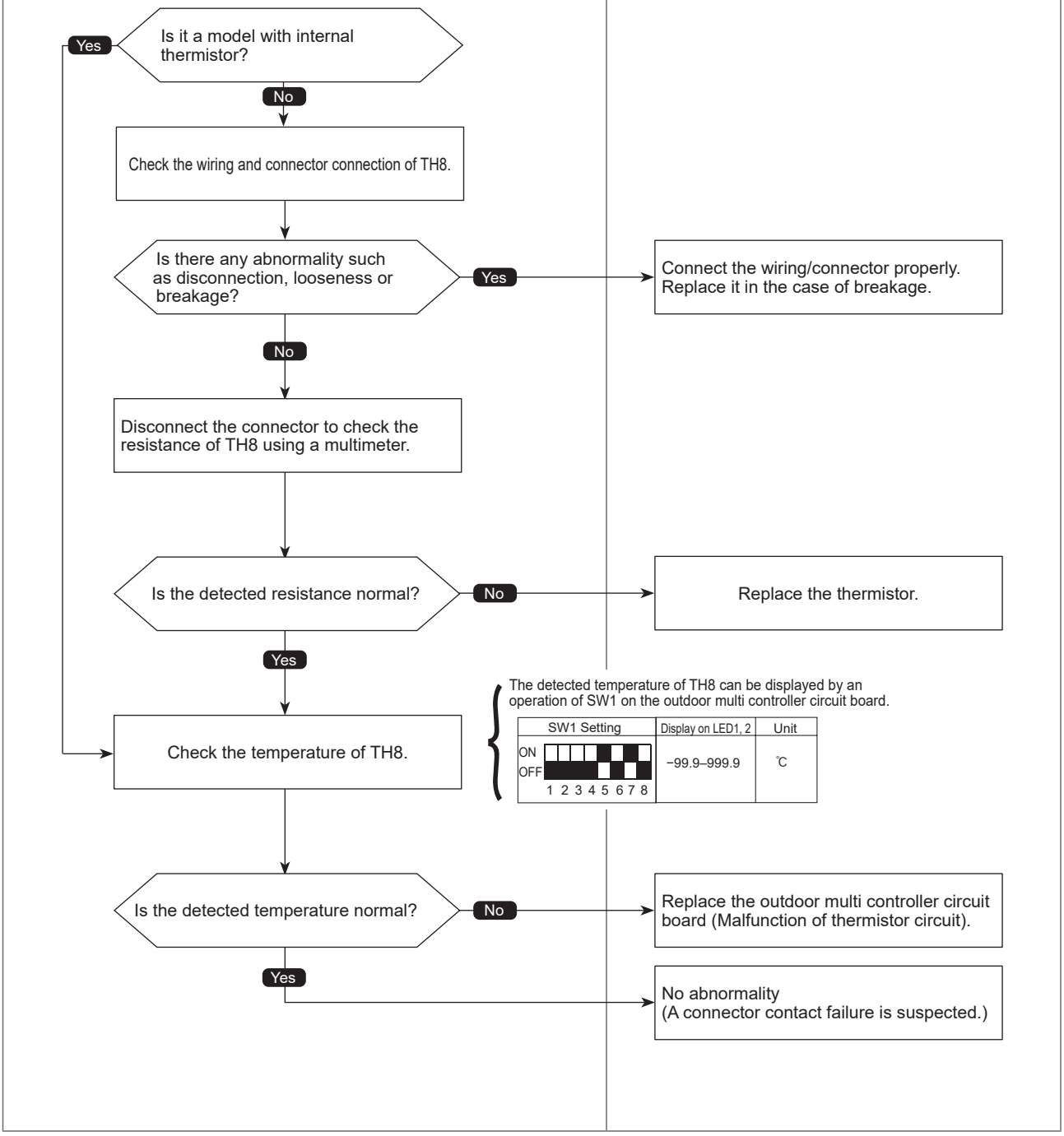
Abnormal points and detection methods	Causes and checkpoints
If TH8 (Internal thermistor) detects to be open/short. Open: −34.8°C [−30.6°F] or less Short: 102°C [215.6°F] or more TH8: Thermistor <Heat sink>	1. Disconnection or contact failure of connectors 2. Characteristic defect of thermistor 3. Defective outdoor multi controller circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.

Diagnosis	Remedy



Check code

5201
(F5)

High pressure sensor (63HS) trouble

Abnormal points and detection methods	Causes and checkpoints
1. When the detected pressure in the High pressure sensor is 1kgf/㎠ or less during operation, the compressor stops operation and enters into an anti-restart mode for 3 minutes. 2. When the detected pressure is 1 kgf/㎠ or less immediately before restarting, the compressor falls into an abnormal stop with a check code <5201>. 3. For 3 minutes after compressor restarting, during defrosting operation, and for 3 minutes after returning from defrosting operation, above mentioned symptoms are not determined as abnormal.	1. Defective High pressure sensor 2. Decrease of internal pressure caused by gas leakage 3. Disconnection or contact failure of connector 4. Malfunction of input circuit on outdoor multi controller circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.

Diagnosis

Remedy

63HS: High pressure sensor

Check the wiring and connector connection.

Is there any abnormality such as disconnection, looseness or breakage?

Yes → Connect the wiring/connector properly. Replace it in the case of breakage.

No

Check an internal pressure of the refrigerant circuit.

Is the detected internal pressure normal?

No → Check the refrigerant circuit, and recharge refrigerant after repairing the leakage.

Yes

Check the detected pressure in 63HS, then compare it with the internal pressure.

*For the voltage, refer to "8-6. HOW TO CHECK THE COMPONENTS".

The detected pressure in 63HS can be displayed by an operation of SW1 on the outdoor multi controller circuit board.

SW1 Setting	Display on LED1, 2	Unit
ON / OFF (1 2 3 4 5 6 7 8)	−99.9–999.9	kgf/㎠

Is the detected pressure normal?

No → Replace the 63HS.

Yes

Replace the outdoor multi controller circuit board.

Check code

5202
(F3)

Low pressure sensor (63LS) trouble

Abnormal points and detection methods	Causes and checkpoints
1. When the detected pressure in the Low pressure sensor is −2.3kgf/㎠ or less, or 23.1kgf/㎠ or more during operation, the compressor stops operation with a check code <5202>. 2. For 3 minutes after compressor restarting, during defrosting operation, and for 3 minutes after returning from defrosting operation, above mentioned symptoms are not determined as abnormal.	1. Defective Low pressure sensor 2. Decrease of internal pressure caused by gas leakage 3. Disconnection or contact failure of connector 4. Malfunction of input circuit on outdoor multi controller circuit board

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

The black square (■) indicates a switch position.

Diagnosis

Check the wiring and connector connection.

Is there any abnormality such as disconnection, looseness or breakage?

Yes → Connect the wiring/connector properly. Replace it in the case of breakage.

No

Check an internal pressure of the refrigerant circuit.

Is the detected internal pressure normal?

No → Check the refrigerant circuit, and recharge refrigerant after repairing the leakage.

Yes

Check the detected pressure in 63LS, then compare it with the internal pressure.

The detected pressure in 63LS can be displayed by an operation of SW1 on the outdoor multi controller circuit board.

SW1 Setting	Display on LED1,2	Unit
ON / OFF 1 2 3 4 5 6 7 8	−99.9–999.9	kgf/cm²

Is the detected pressure normal?

No → Replace the 63LS.

Yes → Replace the outdoor multi controller circuit board.

Remedy

63LS: Low pressure sensor

Check code

5300
(UH)

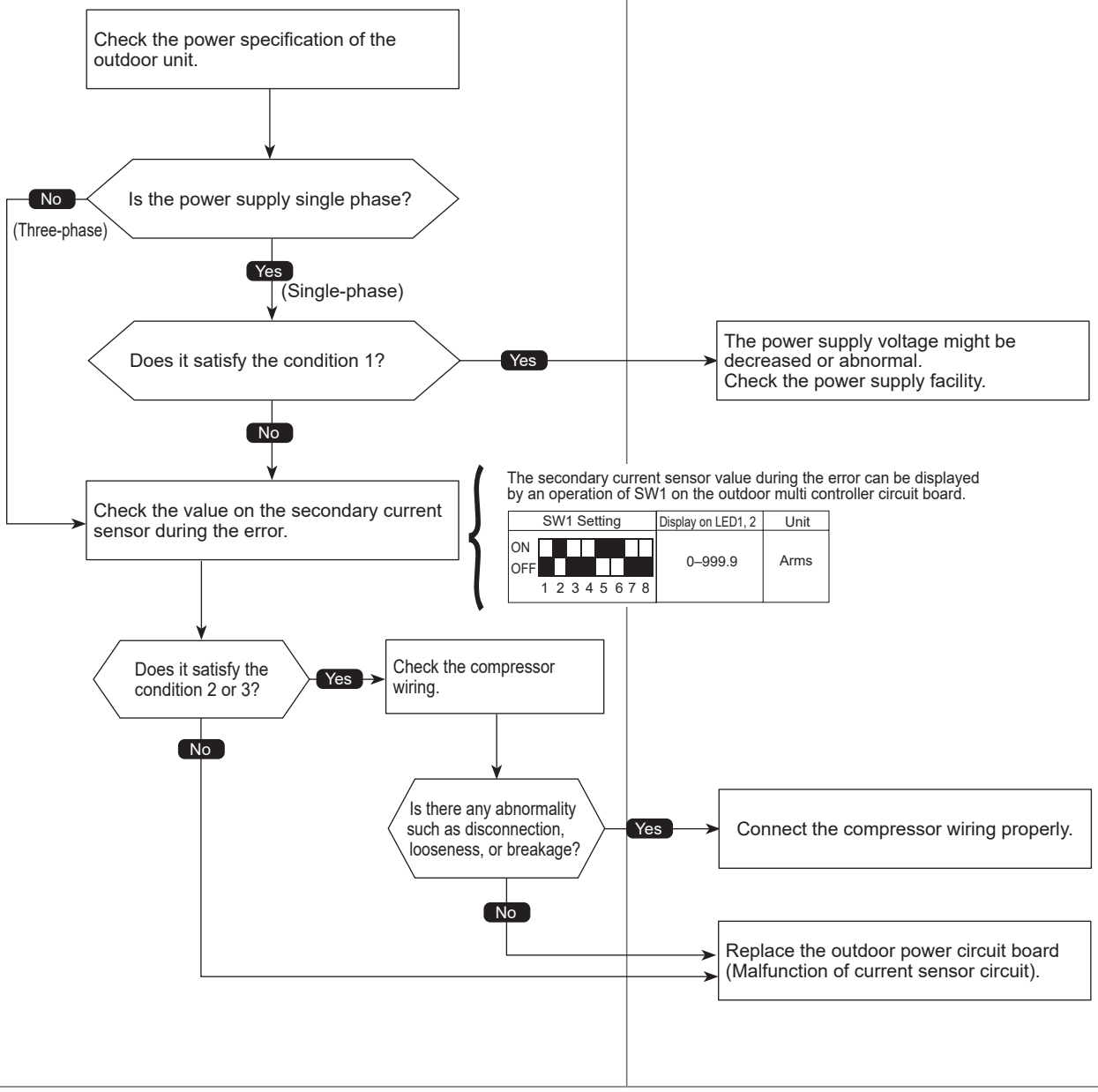
Primary current error

Abnormal points and detection methods	Causes and checkpoints
If any of the following conditions is detected: 1 Primary current sensor detects any of the following conditions (single phase unit only): 10 consecutive-second detection: 34 A One-time detection: 38 A 2 Secondary current sensor detects 25 A or more. 3 Secondary current sensor detects 1.0 A or less.	1. Decrease/trouble of power supply voltage 2. Disconnection of compressor wiring 3. Current sensor trouble on outdoor power circuit board 4. Wiring through current sensor (penetration type) is not done.

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis



Remedy

Check code

6600
(A0)

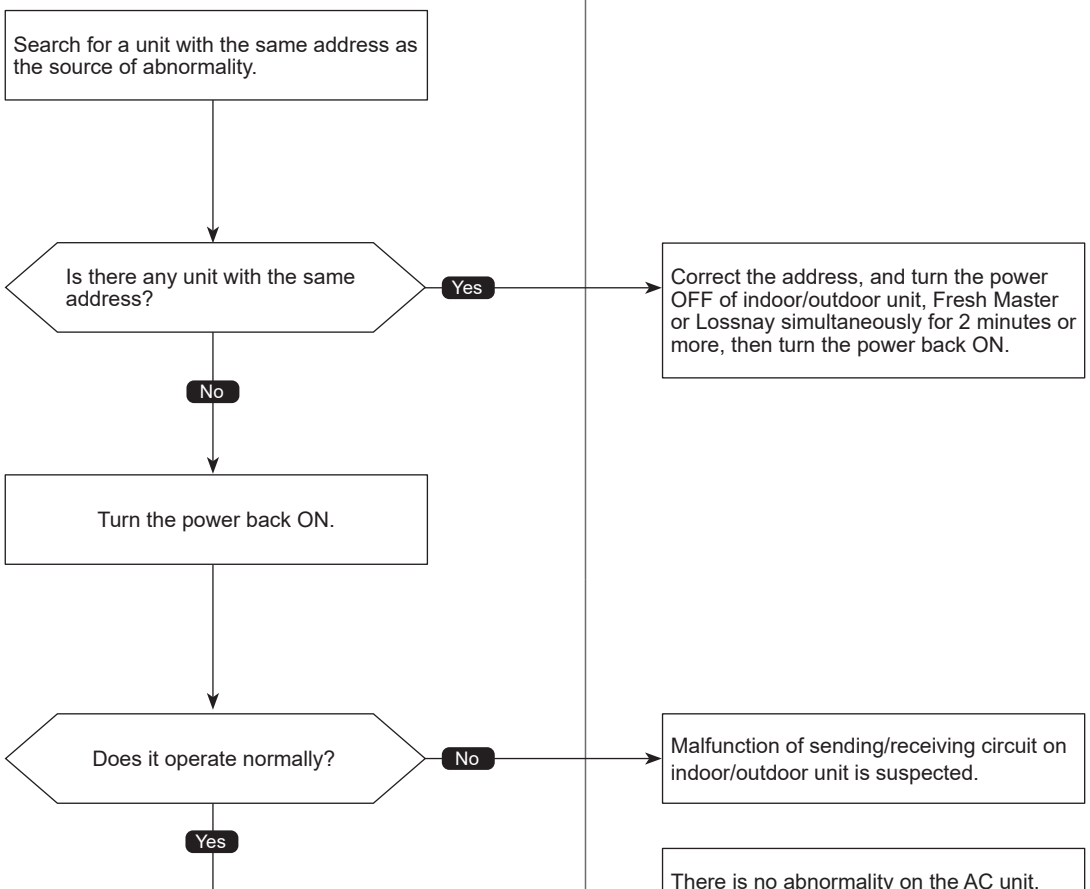
Duplex address error

Abnormal points and detection methods	Causes and checkpoints
If 2 or more units with the same address exist.	1. There are 2 units or more with the same address in their controller among outdoor unit, indoor unit, Fresh Master, Lossnay or remote controller 2. Noise interference on indoor/outdoor connectors

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis



Remedy

Correct the address, and turn the power OFF of indoor/outdoor unit, Fresh Master or Lossnay simultaneously for 2 minutes or more, then turn the power back ON.

Malfunction of sending/receiving circuit on indoor/outdoor unit is suspected.

There is no abnormality on the AC unit.
It might be caused by an external noise, so check the transmission line to remove the factor(s).

Check code

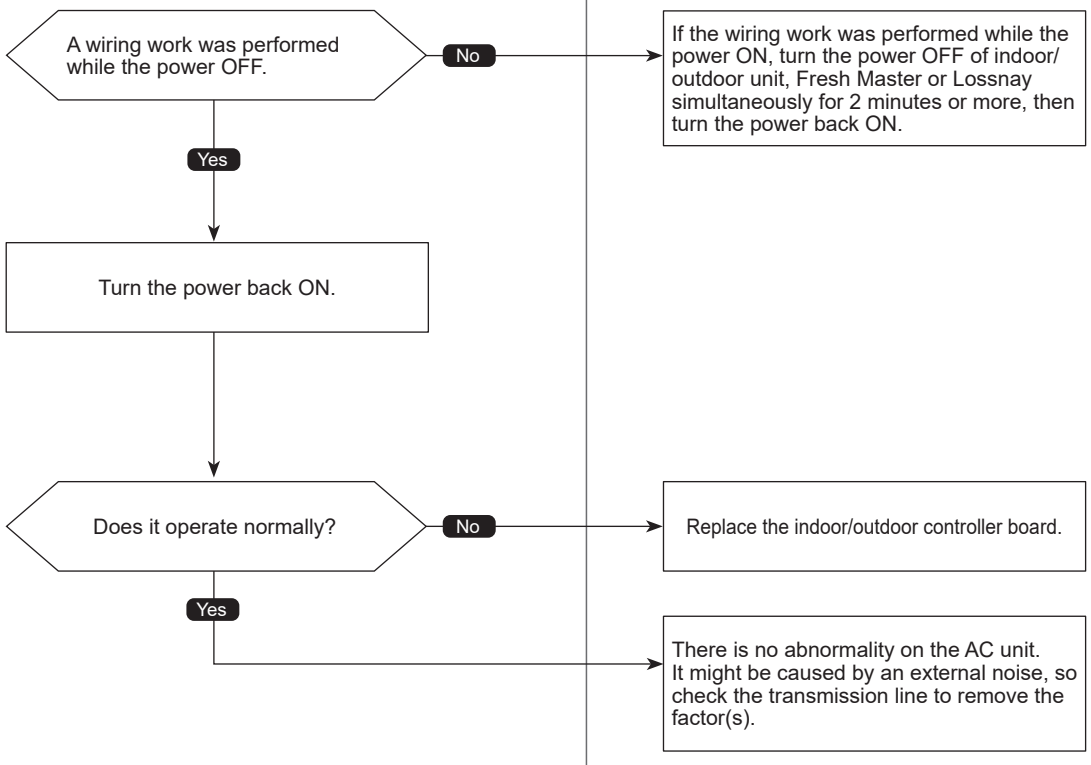
6602
(A2)

Transmission processor hardware error

Abnormal points and detection methods	Causes and checkpoints
If the transmission line shows "1" although the transmission processor transmitted "0".	1. A transmitting data collision occurred because of a wiring work or polarity change has performed while the power is ON on either of the indoor/outdoor unit, Fresh Master or Lossnay 2. Malfunction of transmitting circuit on transmission processor 3. Noise interference on indoor/outdoor connectors

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy
	

Check code

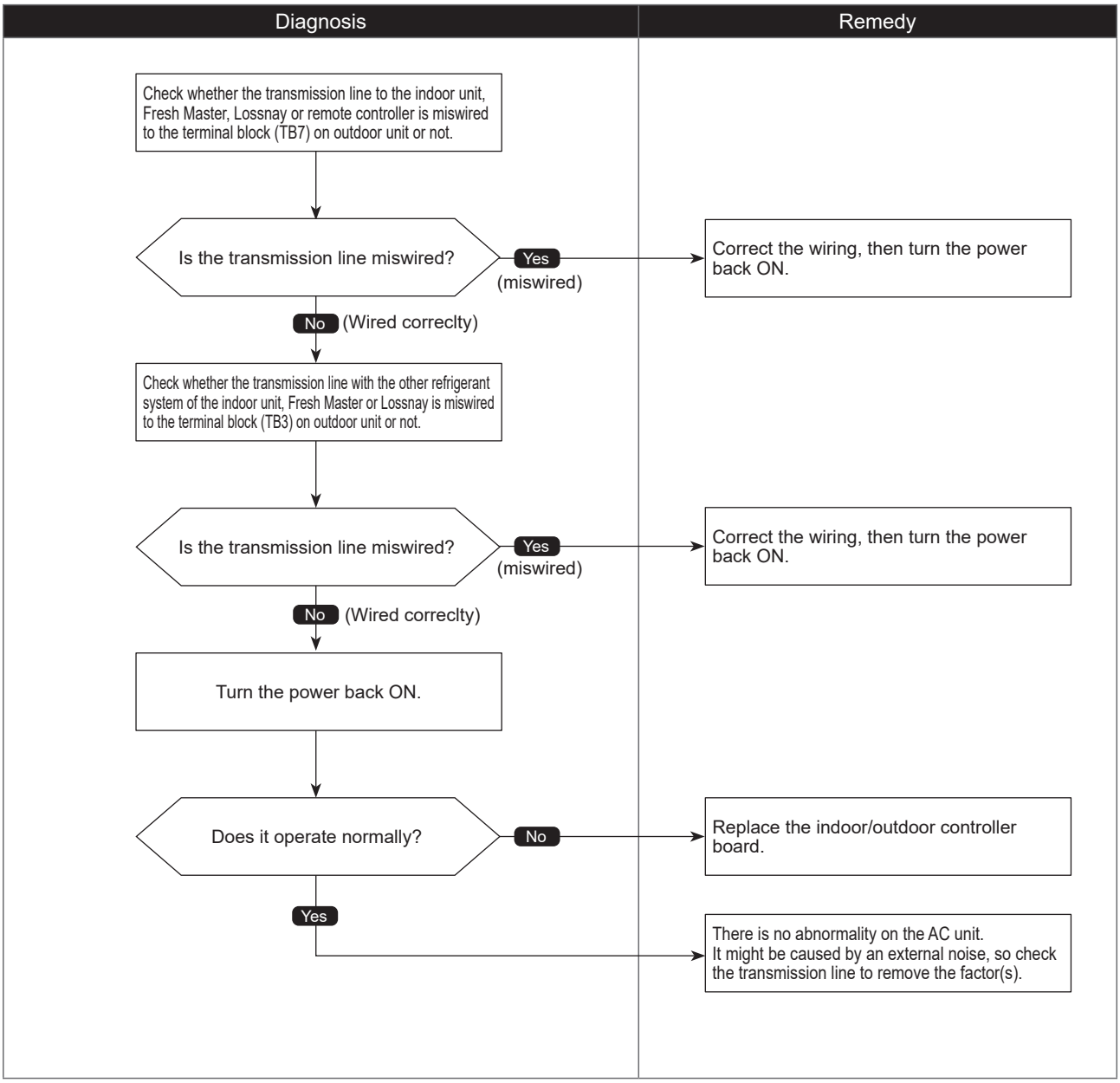
6603
(A3)

Transmission bus BUSY error

Abnormal points and detection methods	Causes and checkpoints
1. An abnormality when no transmission status caused by transmitting data collision continues for 8 to 10 minutes. 2. An abnormality when data cannot be output on the transmission line consecutively because of noise etc. for 8 to 10 minutes.	1. The transmission processor is unable to transmit due to a short-cycle voltage such as noise is mixed on the transmission line. 2. The transmission processor is unable to transmit due to an increase of transmission data amount caused by a miswiring of the terminal block (transmission line) (TB3) and the terminal block (centralized control line) (TB7) on the outdoor unit. 3. The share on transmission line becomes high due to a mixed transmission caused by a malfunction of repeater on the outdoor unit, which is a function to connect/disconnect transmission from/to control system and centralized control system.

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

6606
(A6)

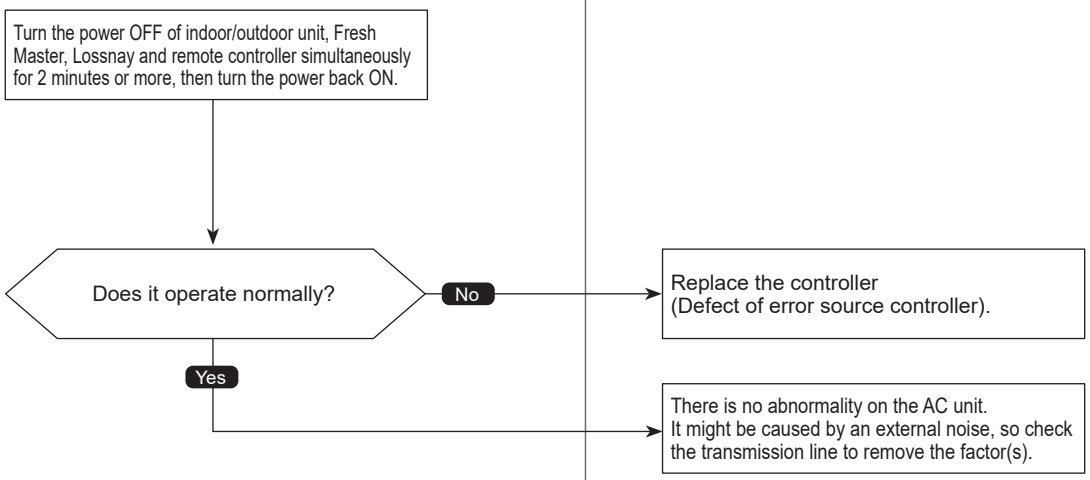
Signal communication error with transmission processor

Abnormal points and detection methods	Causes and checkpoints
1. If the data of unit/transmission processor were not normally transmitted. 2. If the address transmission from the unit processor was not normally transmitted.	1. Accidental disturbance such as noise or lightning surge 2. Hardware malfunction of transmission processor

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy



Check code

6607
(A7)

No ACK error

Chart 1 of 4

Abnormal points and detection methods	Causes and checkpoints
① Represents a common error detection An abnormality detected by the sending side controller when receiving no ACK from the receiving side, though signal was once sent. The sending side searches the error in 30 seconds interval for 6 times continuously.	1. The previous address unit does not exist since the address switch was changed while in electric continuity status. 2. Decline of transmission voltage/signal caused by tolerance over on transmission line ·At the furthest end: 200 m ·On remote controller line: (12 m) 3. Decline of transmission voltage/signal due to unmatched transmission line types ·Types for shield line: CVVS, CPEVS, or MVVS ·Line diameter: 1.25 ㎟ or more 4. Decline of transmission voltage/signal due to excessive number of connected units 5. Malfunction due to accidental disturbance such as noise or lightning surge 6. Defect of error source controller
② The cause of displayed address and attribute is on the outdoor unit side. An abnormality detected by the indoor unit if receiving no ACK when transmitting signal from the indoor unit to the outdoor unit.	1. Contact failure of indoor/outdoor unit transmission line 2. Disconnection of transmission connector (CN2M) on indoor unit 3. Malfunction of sending/receiving circuit on indoor/outdoor unit 4. Disconnection of the connectors on the circuit board
③ The cause of displayed address and attribute is on the indoor unit side. An abnormality detected by the remote controller if receiving no ACK when sending data from the remote controller to the indoor unit.	1. While operating with multi refrigerant system indoor units, an abnormality is detected when the indoor unit transmit signal to the remote controller during the other refrigerant-system outdoor unit is turned OFF, or within 2 minutes after it turned back ON. 2. Contact failure of indoor unit or remote controller transmission line 3. Disconnection of transmission connector (CN2M) on indoor unit 4. Malfunction of sending/receiving circuit on indoor unit or remote controller
④ The cause of the displayed address and attribute is on the remote controller side. An abnormality detected by the indoor unit if receiving no ACK when transmitting signal from the indoor unit to the remote controller.	1. While operating with multi refrigerant system indoor units, an abnormality is detected when the indoor unit transmit signal to the remote controller during the other refrigerant-system outdoor unit is turned OFF, or within 2 minutes after it turned back ON. 2. Contact failure of indoor unit or remote controller transmission line 3. Disconnection of transmission connector (CN2M) on indoor unit 4. Malfunction of sending/receiving circuit on indoor unit or remote controller

Check code

6607
(A7)

No ACK error

Chart 2 of 4

Abnormal points and detection methods	Causes and checkpoints
⑤ The cause of displayed address and attribute is on the Fresh Master side. An abnormality detected by the indoor unit if receiving no ACK when transmitting signal from the indoor unit to the Fresh Master.	1. While the indoor unit is operating with multi refrigerant system Fresh Master, an abnormality is detected when the indoor unit transmits signal to the remote controller while the outdoor unit with the same refrigerant system as the Fresh Master is turned OFF, or within 2 minutes after it turned back ON. 2. Contact failure of indoor unit or Fresh Master transmission line 3. Disconnection of transmission connector (CN2M) on indoor unit or Fresh Master 4. Malfunction of sending/receiving circuit on indoor unit or Fresh Master
⑥ The cause of displayed address and attribute is on Lossnay side. An abnormality detected by the indoor unit if receiving no ACK when the indoor unit transmit signal to the Lossnay.	1. An abnormality is detected when the indoor unit transmits signal to Lossnay while the Lossnay is turned OFF. 2. While the indoor unit is operating with the other refrigerant Lossnay, an abnormality is detected when the indoor unit transmits signal to the Lossnay while the outdoor unit with the same refrigerant system as the Lossnay is turned OFF, or within 2 minutes after it turned back ON. 3. Contact failure of indoor unit or Lossnay transmission line 4. Disconnection of transmission connector (CN2M) on indoor unit 5. Malfunction of sending/receiving circuit on indoor unit or Lossnay
⑦The controller of displayed address and attribute is not recognized.	1. The previous address unit does not exist since the address switch was changed while in electric continuity status. 2. An abnormality detected at transmitting from the indoor unit since the Fresh Master/Lossnay address are changed after synchronized setting of Fresh Master/Lossnay by the remote controller.

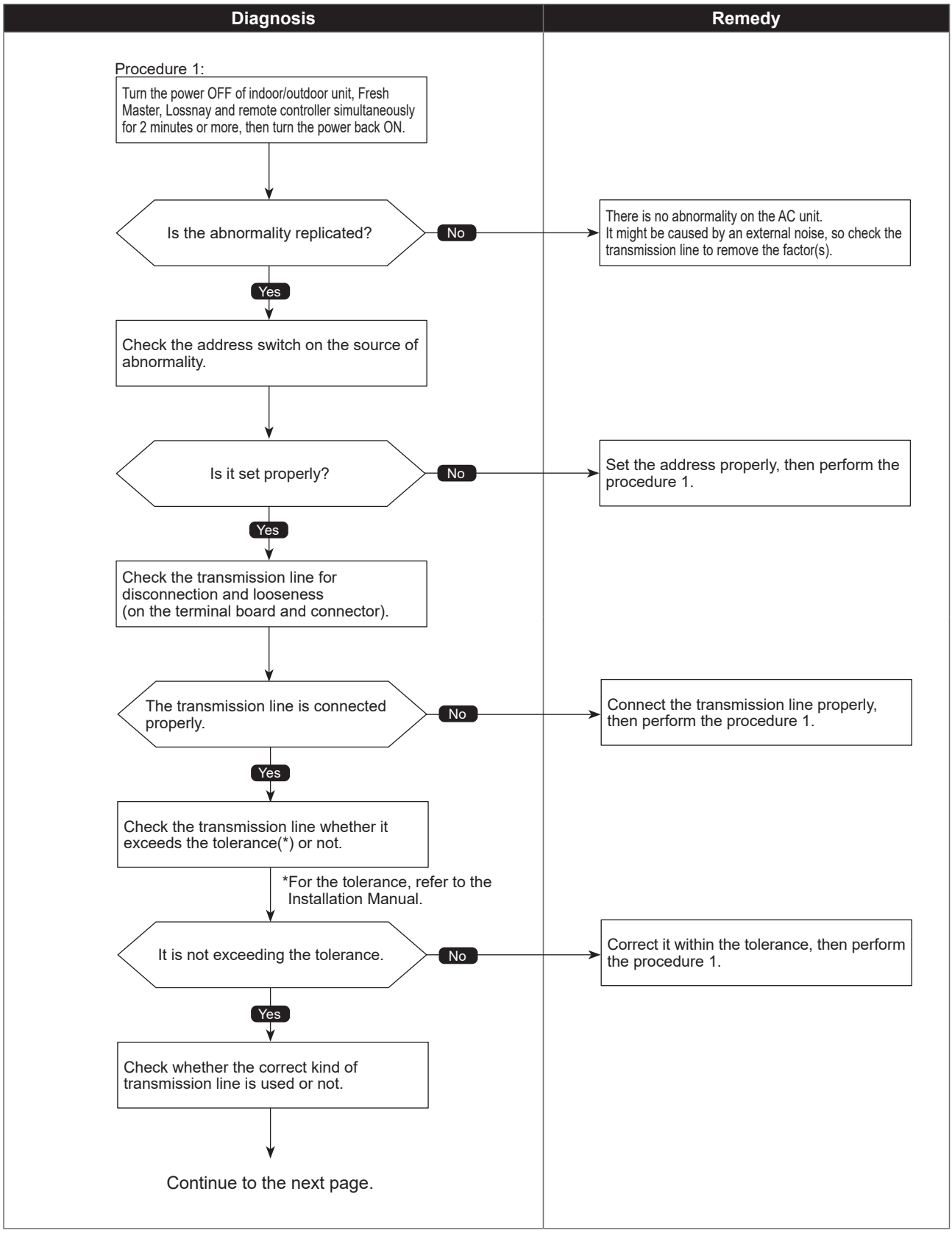
Check code

6607
(A7)

No ACK error

●Diagnosis of defects
Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Note:
When the address of the outdoor unit is displayed as abnormal, the outdoor circuit board may be faulty. If the unit is not restored after conducting the following procedure, check the outdoor circuit board.



Continue to the next page.

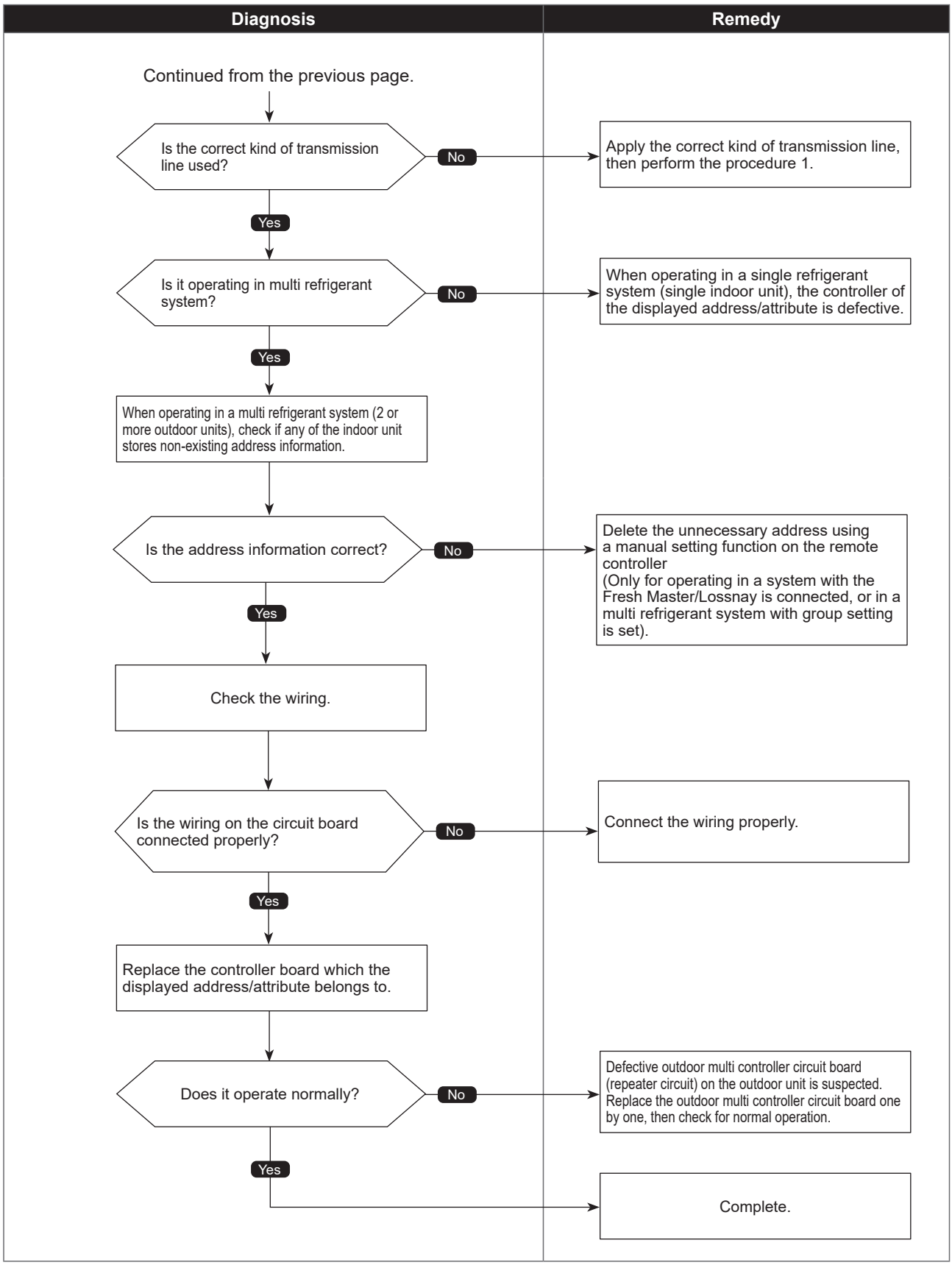
Check code

6607
(A7)

No ACK error

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

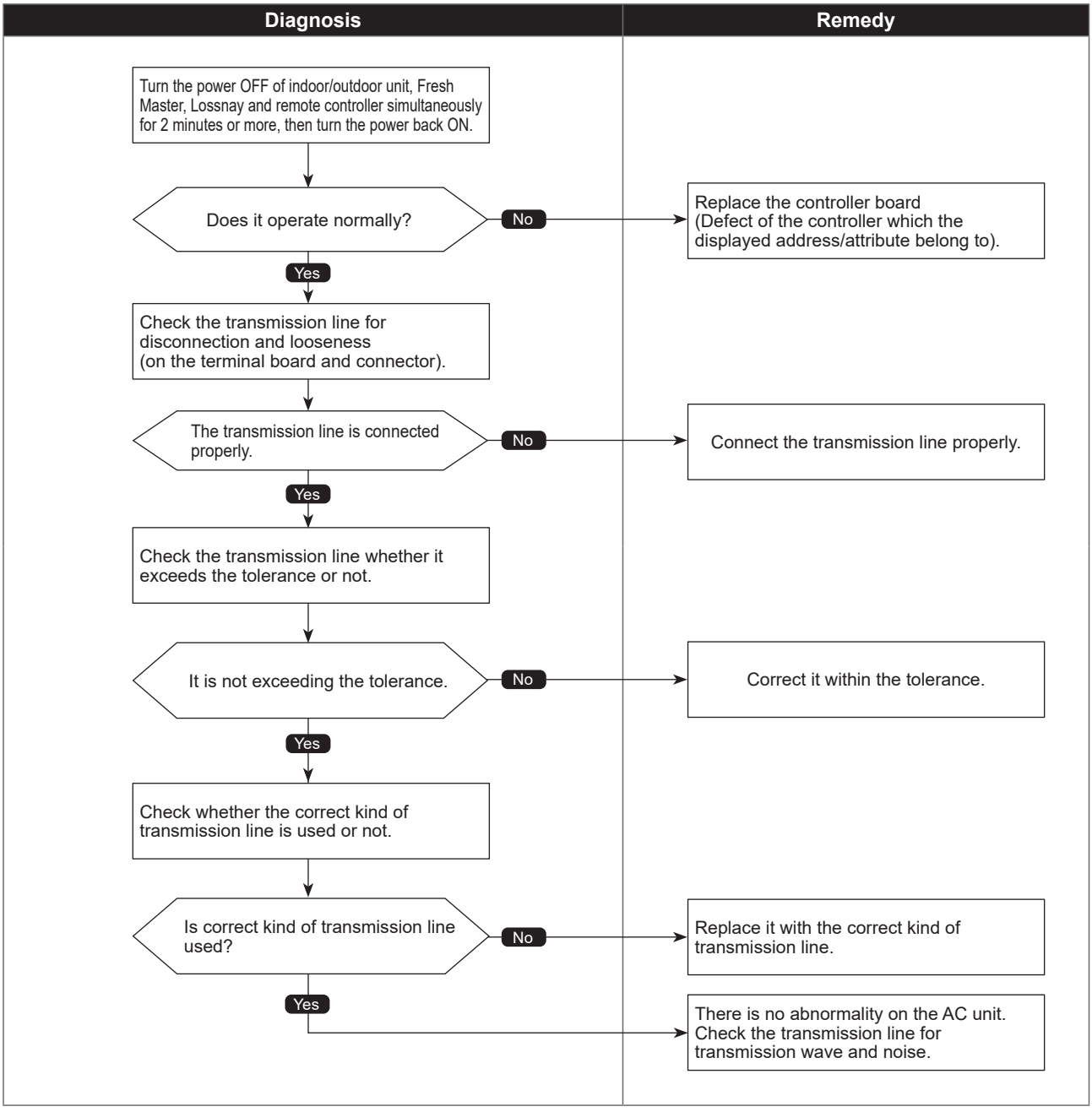
6608
(A8)

No response frame error

Abnormal points and detection methods	Causes and checkpoints
If receiving no response command while already received ACK. The sending side searches the error in 30 seconds interval for 6 times continuously.	1. Continuous failure of transmission due to noise, etc 2. Decline of transmission voltage/signal caused by tolerance over on transmission line ·At the furthest end: 200 m ·On remote controller line: (12 m) 3. Decline of transmission voltage/signal due to unmatched transmission line types ·Types for shield line: CVVS, CPEVS, or MVVS ·Line diameter: 1.25 ㎟ or more 4. Accidental malfunction of error source controller

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

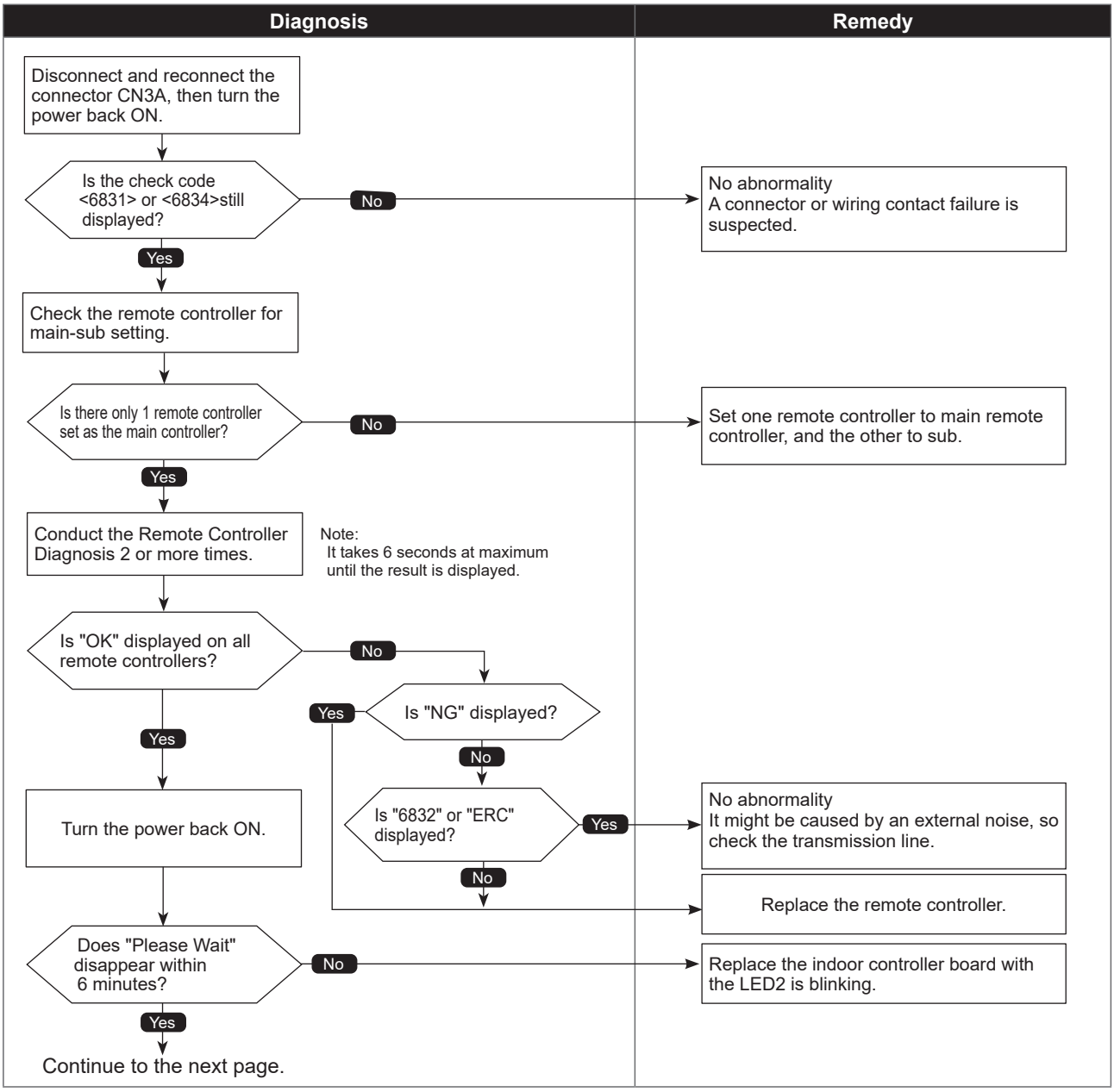
6831, 6834 (E0/E4)

MA communication receive error

Abnormal points and detection methods	Causes and checkpoints
Detected in remote controller or indoor unit: ①When the main or sub remote controller cannot receive signal from indoor unit which has the "0" address. ②When the sub remote controller cannot receive signal. ③When the indoor controller board cannot receive signal from remote controller or another indoor unit. ④When the indoor controller board cannot receive signal.	1. Contact failure of remote controller wirings 2. Irregular Wiring (A wiring length, number of connecting remote controllers or indoor units, or a wiring thickness does not meet the conditions specified in the chapter "Electrical Work" in the indoor unit Installation Manual.) 3. Malfunction of the remote controller sending/ receiving circuit on indoor unit with the LED2 is blinking. 4. Malfunction of the remote controller sending/ receiving circuit 5. Remote controller transmitting error caused by noise interference

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards



Check code

6831, 6834
(E3/E5)

MA communication receive error

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards

Diagnosis	Remedy
Continued from the previous page.	
Refer to the chapter "Electrical Work".	
Is the wiring connected properly, meeting the condition?	
No	Connect the wiring properly as specified in the chapter "Electrical Work" in the indoor unit Installation Manual.
Yes	No abnormality It might be caused by an external noise, so check the transmission line to remove the factor(s).

Check code

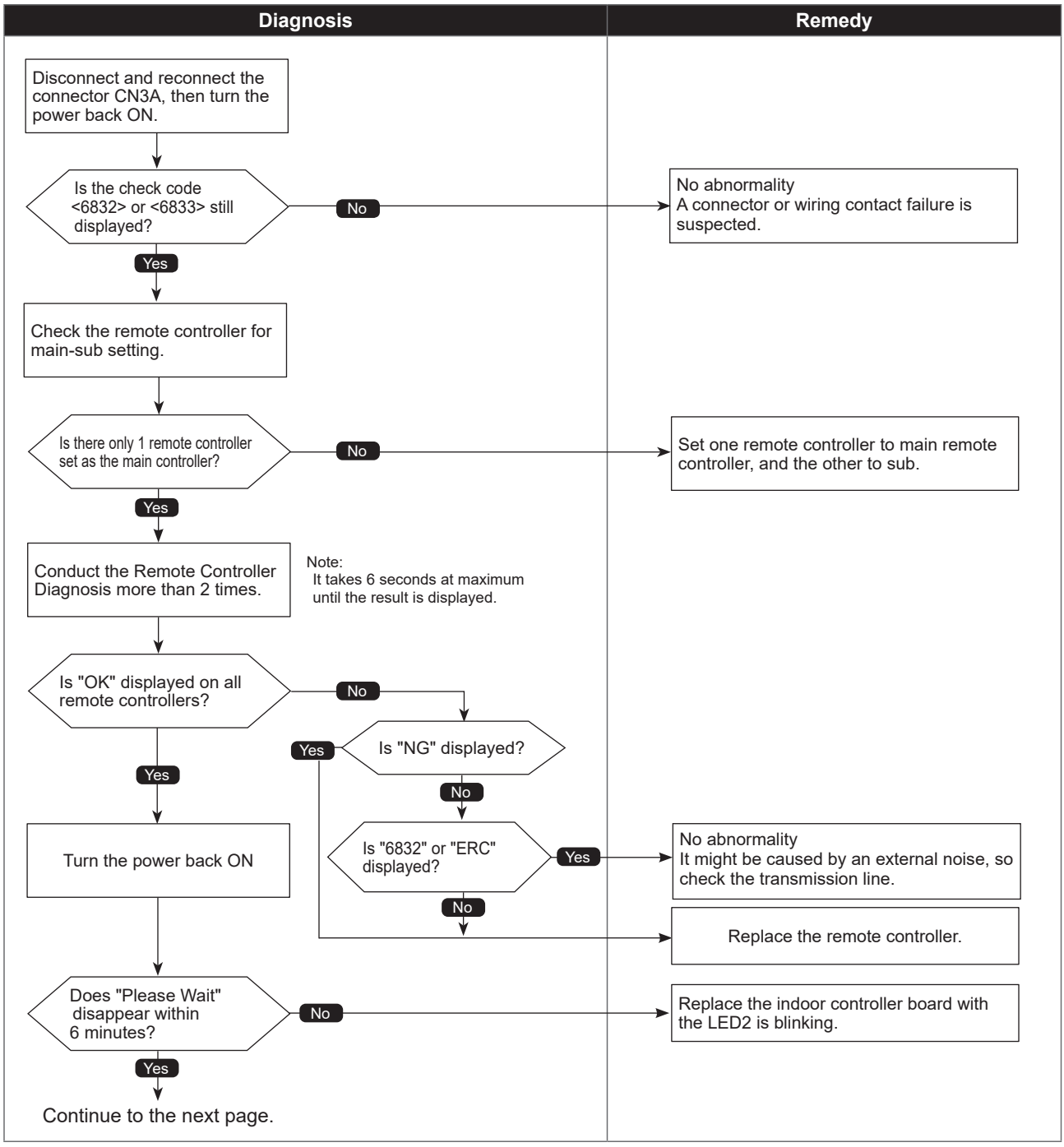
6832, 6833 (EF)

MA communication send error

Abnormal points and detection methods	Causes and checkpoints
Detected in remote controller or indoor unit.	1. There are 2 remote controllers set as main. 2. Malfunction of remote controller sending/receiving circuit 3. Malfunction of sending/receiving circuit on indoor controller board 4. Remote controller transmitting error caused by noise interference

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards



Check code

6832, 6833
(EF)

MA communication send error

●Diagnosis of defects
Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards

Diagnosis	Remedy
Continued from the previous page. ↓ Refer to the chapter "Electrical Work". ↓ Is the wiring connected properly, meeting the condition? No →	Connect the wiring properly as specified in the chapter "Electrical Work" in the indoor unit Installation Manual.
Yes →	No abnormality It might be caused by an external noise, so check the transmission line to remove the factor(s).

Check code

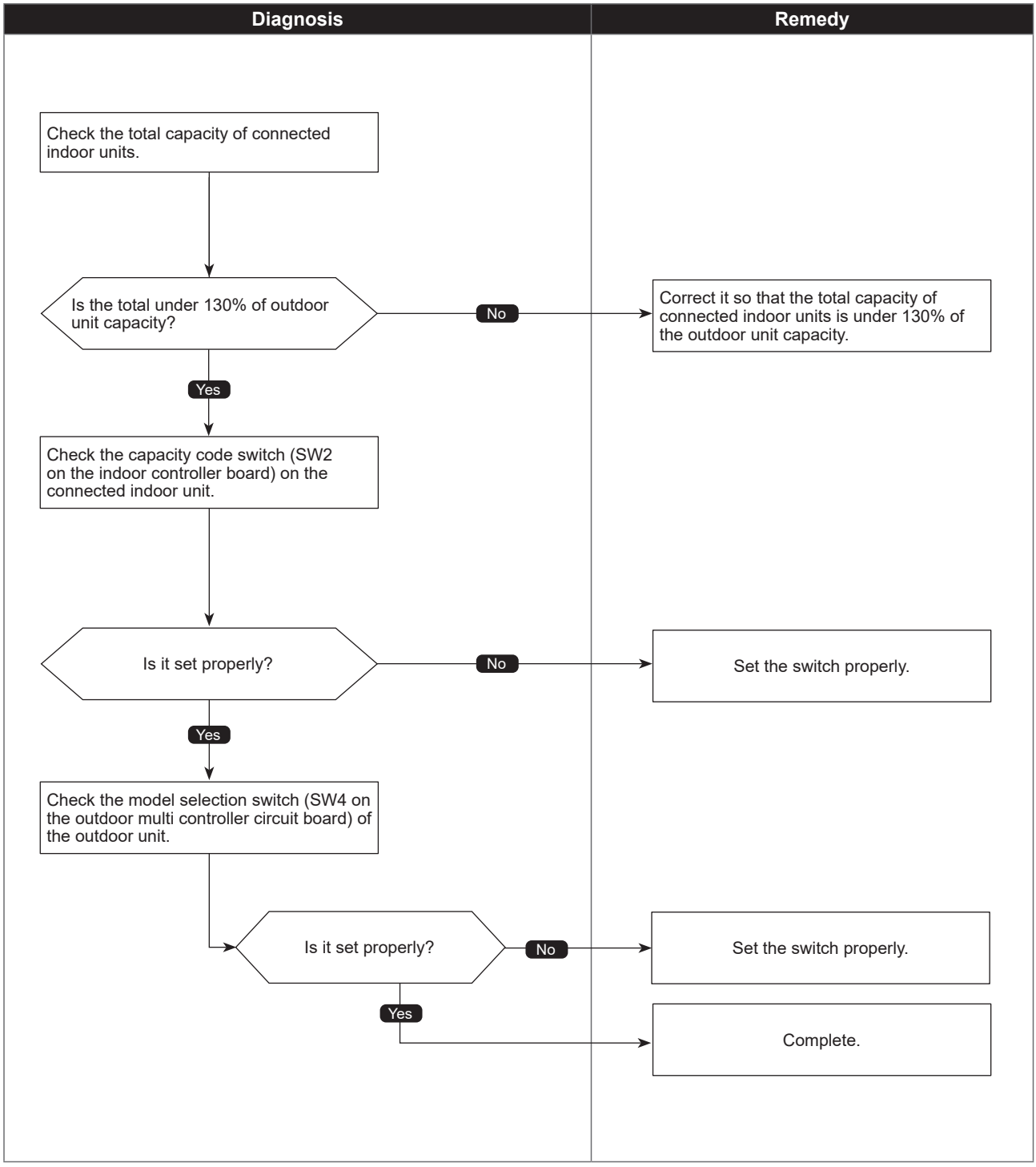
7100
(EF)

Total capacity error

Abnormal points and detection methods	Causes and checkpoints
When the total capacity of connected indoor units exceeds the specified capacity (130% of the outdoor unit capacity), a check code <7100> is displayed.	1. The total of number on connected indoor unit model names exceeds the specified capacity level. 2. The model name code of the outdoor unit is registered wrongly.

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



Check code

7101
(EF)

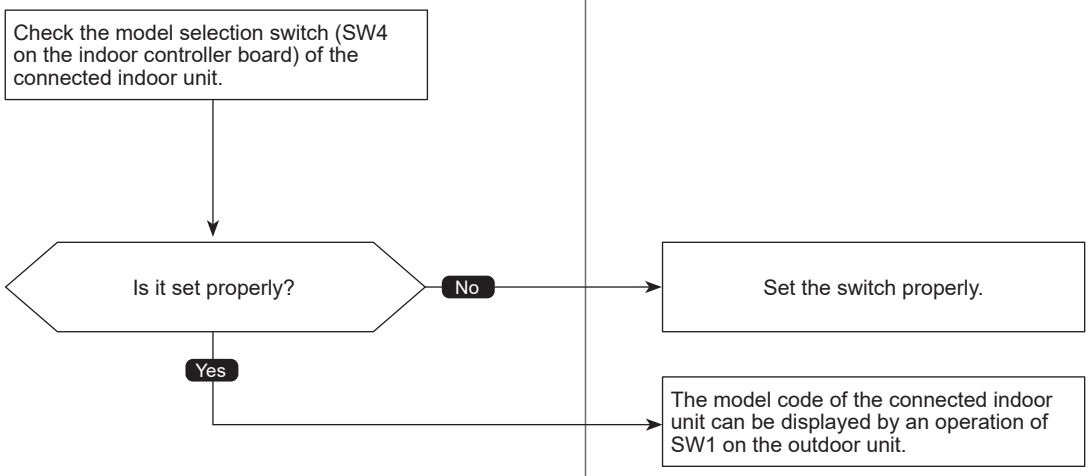
Capacity code error

Abnormal points and detection methods	Causes and checkpoints
When a connected indoor unit is incompatible, a check code <7101> is displayed.	The model name of connected indoor unit (model code) is read as incompatible. The connectable indoor units are: · SP112 to SP140 model: P10 to P140 model (code 2 to 28) · When connecting via branch box: P15 to P100 model (code 4 to 20)

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy



Check code

7102
(EF)

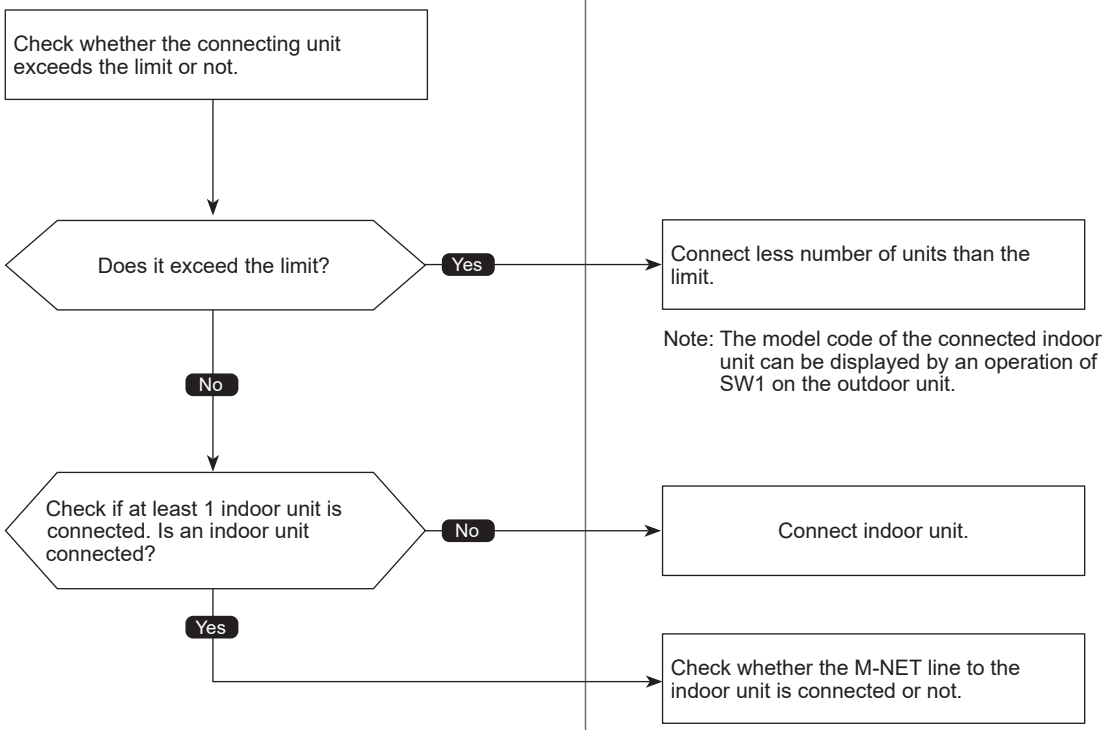
Connecting excessive number of units and branch boxes

Abnormal points and detection methods	Causes and checkpoints
When the connected indoor unit exceeds the limit, a check code <7102> is displayed.	Connecting more indoor units and branch boxes than the limit. Abnormal if connecting status does not comply with the following limit; 1. Connectable up to 12 indoor units 2. Connect at least 1 indoor unit (Abnormal if connected none). 3. Connectable up to 2 branch boxes

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy



Check code

7105
(EF)

Address setting error

Abnormal points and detection methods	Causes and checkpoints
The address setting of connected unit is wrong.	There is a unit without correct address setting in the range specified in "7-5. SYSTEM CONTROL".

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy

<Outdoor unit>

Check whether the outdoor unit address is set in 000, or in the range of 51 to 100.

Is the address setting correct?

No → Set the address properly, then turn the power OFF of indoor/outdoor unit, Fresh Master, Lossnay and remote controller simultaneously for 2 minutes or more, and turn the power back ON.

Yes → Replace the outdoor multi controller circuit board.

<Indoor unit>

Check whether the indoor unit address is set in 00, or in the range of 01 to 50.

Is the address setting correct?

No → Set the address properly, then turn the power OFF of indoor/outdoor unit, Fresh Master, Lossnay and remote controller simultaneously for 2 minutes or more, and turn the power back ON.

Yes → Replace the indoor controller board.

<Branch box>

Check whether the branch box address is set in 00, or in the range of 01 to 46.

Is the address setting correct?

No → Set the address properly, then turn the power OFF of indoor/outdoor unit, Fresh Master, Lossnay and remote controller simultaneously for 2 minutes or more, and turn the power back ON.

Yes → Replace the branch box controller board.

Check code

7105
(EF)

Address setting error

●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.

Diagnosis	Remedy
<M-NET RC (main)> Check whether the M-NET RC (main) address is set in 000, or in the range of 101 to 150. Is the address setting correct? No	Set the address properly, then turn the power OFF of indoor/outdoor unit, Fresh Master, Lossnay and remote controller simultaneously for 2 minutes or more, and turn the power back ON.
Yes	Replace the M-NET RC (main).
<M-NET RC (sub)> Check whether the M-NET RC (sub) address is set in 000, or in the range of 151 to 200. Is the address setting correct? No	Set the address properly, then turn the power OFF of indoor/outdoor unit, Fresh Master, Lossnay and remote controller simultaneously for 2 minutes or more, and turn the power back ON.
Yes	Replace the M-NET RC (sub).

Check code

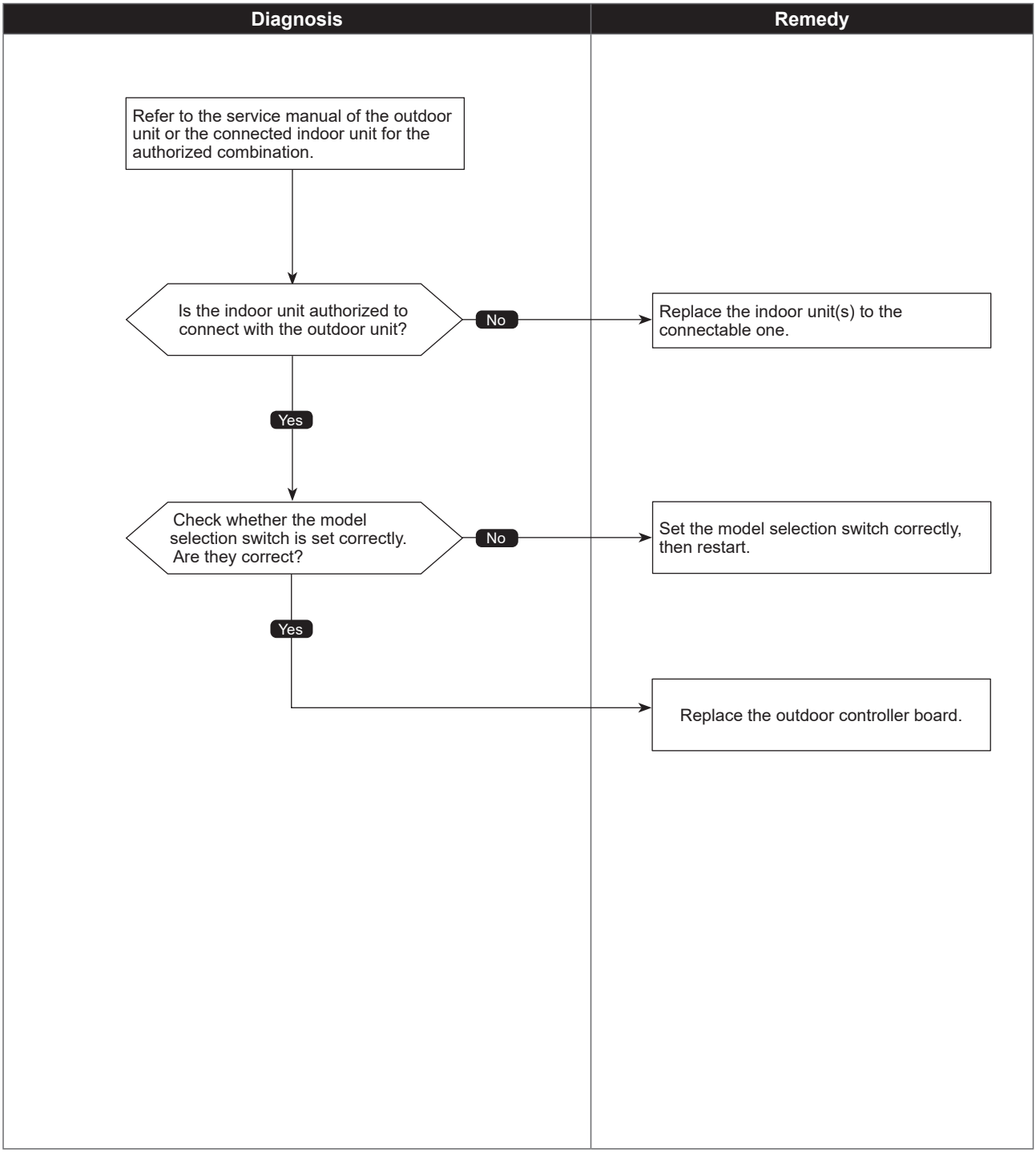
7130
(EF)

Incompatible unit combination error

Abnormal points and detection methods	Causes and checkpoints
When the connected indoor unit is not compatible with the outdoor unit, the outdoor unit detects the error at startup.	Connecting indoor unit(s) which is not authorized to connect to the outdoor unit.

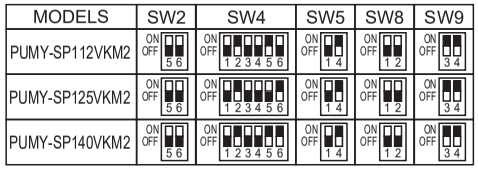
●Diagnosis of defects

Make sure to turn the power OFF before connecting/disconnecting any connectors, or replacing boards.



8-2. THE FOLLOWING SYMPTOM DO NOT REPRESENT TROUBLE (EMERGENCY)

Symptom	Display of remote controller	CAUSE
Even the cooling (heating) operation selection button is pressed, the indoor unit cannot be operated.	"Cooling (Heating)" blinks	The indoor unit cannot cool (Heat) if other indoor units are heating (Cooling).
The auto vane runs freely.	Normal display	Because of the control operation of auto vane, it may change over to horizontal blow automatically from the downward blow in cooling because the downward blow operation has been continued for 1 hour. At defrosting in heating, hot adjusting and thermostat OFF, it automatically changes over to horizontal blow.
Fan setting changes during heating.	Normal display	Ultra-low speed operation is commenced at thermostat OFF. Light air automatically change over to set value by time or piping temperature at thermostat ON.
Fan stops during heating operation.	"Heat Defrost ☼"	The fan stops during defrosting.
Fan does not stop while operation has been stopped.	Light out	Fan runs for 1 minute after stopping to exhaust residual heat (only in heating).
No setting of fan while start SW has been turned on.	"Heat Standby ☼"	Ultra-low speed operation for 5 minutes after SW ON or until piping temperature reaches 35°C. Then low speed operates for 2 minutes and operates at the normal set air volume. (Hot adjust control)
Indoor unit remote controller shows “Please Wait” indicator for about 2 minutes when turning ON power supply.	“Please Wait” blinks	The system is in the process of startup. Operate remote controller again after “Please Wait” disappears.
Drain pump does not stop while unit has been stopped.	Light out	After a stop of cooling operation, unit continues to operate drain pump for 3 minutes and then stops.
Drain pump continues to operate while unit has been stopped.	—	Unit continues to operate drain pump if drainage is generated, even during a stop.

Switch	Step	Function	Operation in Each Switch Setting			Remarks	Purpose	Additional Information
			ON	OFF	When to Set			
SWU1 ones digit SWU2 tens digit	Rotary switch				Before turning the power ON	<Initial settings> 	—	—
SW1 Digital Display Switch	1–8				Can be set either during operation or not.	<Initial settings> 	To display outdoor unit's information to the LED on outdoor multi controller circuit board. Refer to "8-8. OUTDOOR UNIT INFORMATION DISPLAY".	—
SW2 Function Switch	1	Selects operating system startup	With centralized controller	Without centralized controller	Before turning the power ON	<Initial settings> 	Turn ON when the centralized controller is connected to the outdoor unit.	• SW2-1 must be turned ON if a central controller is connected to the system. An example of this would be a TC-24, EB50A, AG150, AE50 or AE200. If SW2-1 is not turned on, while using a central controller, in rare circumstances problems may be encountered such as indoor units not responding to group commands. Therefore, turning SW2-1 ON is recommended if a central controller is used. • Group setting of 2 or more A-IC units which is connected to branch box via centralized controller is not allowed.
	2	Connection Information Clear Switch	Clear	Do not clear			When relocating units or connecting additional units.	—
	3	Abnormal data clear switch input	Clear abnormal data	Normal	OFF to ON any time after the power is turned on.		To delete an error history.	—
	4	Pump down	ON	OFF	During compressor running		To facilitate outdoor unit the pumping down operation. Frequency = Fixed to 65 Hz Indoor-Electronic expansion valve = Fully open Outdoor fan step = Fixed to 10	Please refer to a section referring to the pumping down on outdoor units Installation Manuals. It might not be possible to collect all the refrigerant if the amount is excessive.
	5	—	—	—	—		—	—
	6	—	—	—	—		—	—
SW3 Trial operation	1	ON/OFF from outdoor unit	ON	OFF	Any time after the power is turned ON.	<Initial settings> 	—	—
	2	Mode setting	Heating	Cooling			—	—
SW2/ SW4/ SW8/ SW9 Model Switch	1–6				Before the power is turned ON.	<Initial settings> Set for each capacity.	—	—

Continue to the next page.

The black square (■) indicates a switch position.

Switch	Step	Function	Operation in Each Switch Setting			Remarks	Purpose	Additional Information
			ON	OFF	When to Set			
SW5 Function Switch	1	Demand control setting for Australia	Australia setting	Normal*1	Can be set when off or during operation	<Initial settings> ON OFF 1 2 3 4 5 6 7 8	Turn ON to activate the demand control for Australia.	(Do not turn this ON if the unit is in outside Australia)
	2	Change the indoor unit's LEV opening at startup	Enable	Normal			To set the LEV opening at startup higher than usual. (+150 pulses) To improve the operation with the LEV almost clogged.	The refrigerant flow noise at startup become louder.
	3	—	—	—	—		—	—
	4	—	—	—	—		—	—
	5	Change the indoor unit's LEV opening at defrost	Enable	Normal	Can be set when OFF or during operation		To set the LEV opening higher than usual during defrosting operation. (Only Qj ≦ 10 is valid, + 300 pulses) To avoid the discharge temperature increase and provide efficient defrosting operation.	The refrigerant flow noise during the defrosting operation become louder.
	6	Switching the target sub cool (Heating mode)	Enable	Normal			To decrease the target sub cool value. To reduce the discharge temperature decrease due to refrigerant liquid accumulation in the units.	A refrigerant flow noise might be generated if the sub cool value is too small.
	7	While the outdoor unit is in HEAT operation, additionally increase about 50 to 70 pulses of the LEV opening on the indoor unit which is in FAN, STOP, COOL or thermo-OFF*2.	Active	Inactive			To additionally increase about 50 to 70 pulses of the LEV opening for units other than in HEAT operation. To avoid a refrigerant shortage (less capacity) due to refrigerant liquid accumulation in the units which is not in operation.	A refrigerant flow noise might be generated in units other than the one in operation.
	8	While the outdoor unit is in HEAT operation, fully close the Linear expansion valve on the indoor unit which is in FAN or COOL.*3	Enable	Normal			To reduce the room temperature increase by setting the LEV opening lower for the indoor units in FAN or COOL.	The refrigerant is more likely to collect in the indoor units in FAN or COOL, which can cause refrigerant shortage of units. (Results in less capacity and increase of discharge temperature.)
SW6 Function Switch	1	—	—	—	—	<Initial settings> ON OFF 1 2 3 4 5 6 7 8	—	—
	2	—	—	—	—		—	—
	3	—	—	—	—		—	—
	4	Change of defrosting control	Enable (For high humidity)	Normal	Can be set when OFF or during operation		To shorten the defrosting prohibition time in high humidity (or heavy snow) region, in order to reduce malfunctions caused by frost .	The performance of the HEAT operation is somewhat reduced since the defrosting operation is frequently performed.
	5	External static pressure mode	Enable	Normal			To raise the fan rotation to raise the performance when an external static pressure is applied.	It can support the external static pressure up to 30 Pa. The power input and the sound level become larger due to increasing the outdoor unit's fan rotation.
	6	Switching the target discharge pressure (Pdm)	Enable	Normal			To raise the performance by setting the PDm higher during HEAT operation.	Power consumption is raised due to a higher frequency. (The performance would not be raise at the maximum operating frequency.) SW6-6: OFF / ON Target Pdm (kg/cm²): 29.5 / 31.5
	7	Switching (1) the target evaporation temperature (ETm)	Enable	Normal			To raise/reduce the performance by changing the target ETm during COOL operation. Switch to raise the performance: raises the performance Switch to reduce the performance: prevents dew condensation	Switching it to raise the performance, it raises the power consumption, and produces more dew condensation. Switching it to reduce the performance, it makes the performance insufficient. SW6-7: OFF / OFF / ON / ON SW6-8: OFF / ON / OFF / ON Target ETm (℃): 9 / 11 / 6 / 5 Note: The target ETm varies according to an intake temperature.
	8	Switching (2) the target evaporation temperature (ETm)	Enable	Normal				

*1 Refer to "8-4. OUTDOOR UNIT INPUT/OUTPUT CONNECTOR".

*2 SW5-7 Opens the indoor-electronic expansion valve as a countermeasure against the indoor unit in FAN, COOL, STOP, or thermo-OFF operation with refrigerant-shortage status due to an accumulation of liquid refrigerant in the indoor unit.

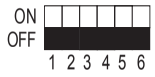
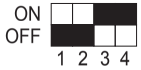
*3 SW5-8 Countermeasure against room temperature rise for indoor unit in FAN and COOL mode.

*4 During heating operation and the ambient temperature is 4°C(39°F) or below, the freeze prevention heater is energized.

*5 During heating mode is OFF (include thermo-OFF in cooling mode), and the ambient temperature is 4°C(39°F) or below, the freeze prevention heater is energized.

Continue to the next page.

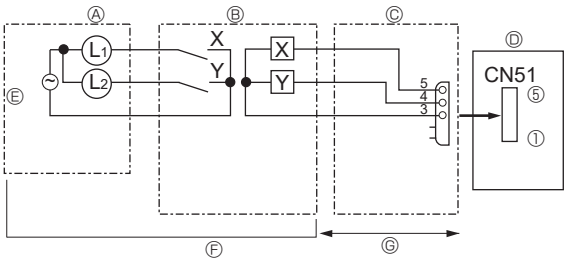
The black square (■) indicates a switch position.

Switch	Step	Function	Operation in Each Switch Setting			Remarks	Purpose	Additional Information
			ON	OFF	When to Set			
SW7 Function Switch	1	Ignore current sensor abnormality and rotational frequency abnormality of outdoor fan motor	Enable	Normal	After turning the power ON*6	<Initial settings>	To perform a test run for electrical parts alone without running the compressor. Also, to perform the troubleshooting of electrical parts without operating the outdoor unit's fan.	Make sure to connect the connectors to the compressor after checking the electrical parts. Be careful not to get electrical shock while working on electrical parts.
	2	Setting to energize the freeze stat heater (optional part)	During heating operation only*4	Include when the heating operation is OFF.*5	Can be set when OFF or during operation		It reduces snow on the base, even it blows inside the unit, by setting the base heater ON while the HEAT operation is stopped.	Power consumption raises while the operation is stopped.
	3	—	—	—	—		—	—
	4	Maximum frequency down at 1 hour after COOL operation	Enable	Normal	Can be set when OFF or during operation		To reduce dew condensation on the indoor unit by lowering the frequency.	The performance might be insufficient.
	5	—	—	—	—		—	—
	6	Manual defrost	Manual defrost	Normal	During compressor running in HEAT mode.		Turn ON when it is necessary to perform the defrosting operation forcedly. (Effective only at startup, or 10 minutes after the last defrosting operation)	It performs the defrosting operation forcedly. (HEAT operation is stopped temporarily.)
SW9 Function Switch	1	Auto change over from remote controller (IC with the minimum address)	Enable	Disable	Before turning the power ON	<Initial settings>	Enables the indoor unit with the minimum address to select AUTO mode, and switches the operation mode of the other indoor units to the same mode.	Cannot be set when the centralized control is ON.
	2	Switching the Silent/Demand mode	Demand control	Silent mode	Can be set when OFF or during operation		—	About the Silent mode/Demand control setting, refer to "8-4. OUTDOOR UNIT INPUT/OUTPUT CONNECTOR".
	3	—	—	—	—		—	—
	4	—	—	—	—		—	—

*4 During heating operation and the ambient temperature is 4°C(39°F) or below, the freeze prevention heater is energized.
*5 During heating mode is OFF (include thermo-OFF in cooling mode), and the ambient temperature is 4°C(39°F) or below, the freeze prevention heater is energized.
*6 Make sure to wait for 5 minutes after turning the breaker ON.

8-4. OUTDOOR UNIT INPUT/OUTPUT CONNECTOR

● State (CN51)

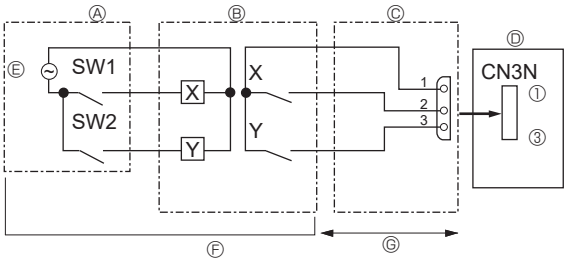


Ⓐ Distant control board
Ⓑ Relay circuit
Ⓒ External output adapter (PAC-SA88HA-E)
Ⓓ Outdoor unit control board

Ⓔ Lamp power supply
Ⓕ Procure locally
Ⓖ Max. 10 m

L1: Error display lamp
L2: Compressor operation lamp
X, Y: Relay (coil rating: ≤ 0.9 W. DC 12 VDC)

● Auto changeover (CN3N)



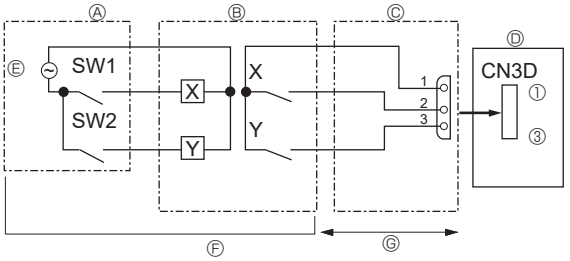
Ⓐ Remote control panel
Ⓑ Relay circuit
Ⓒ External input adapter (PAC-SC36NA-E)
Ⓓ Outdoor unit control board

Ⓔ Relay power supply
Ⓕ Procure locally
Ⓖ Max. 10 m

	ON	OFF
SW1	Heating	Cooling
SW2	Validity of SW1	Invalidity of SW1

SW1: Switch
SW2: Switch
X, Y: Relay (contact rating: ≥ 0.1 A. 15 VDC, min. applicable load: ≤ 1 mA)

● Silent Mode/Demand Control (CN3D)



Ⓐ Remote control panel
Ⓑ Relay circuit
Ⓒ External input adapter (PAC-SC36NA-E)
Ⓓ Outdoor unit control board

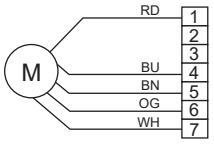
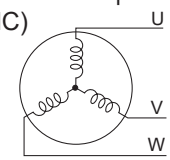
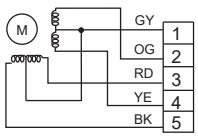
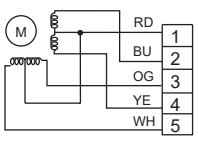
Ⓔ Relay power supply
Ⓕ Procure locally
Ⓖ Max. 10 m

SW1: Switch
SW2: Switch
X, Y: Relay (contact rating: ≥ 0.1 A. 15 VDC, min. applicable load: ≤ 1 mA)

The silent mode and the demand control are selected by switching the DIP switch 9-2 on outdoor controller board.
It is possible to set it to the following power consumption (compared with ratings) by setting SW1, 2.

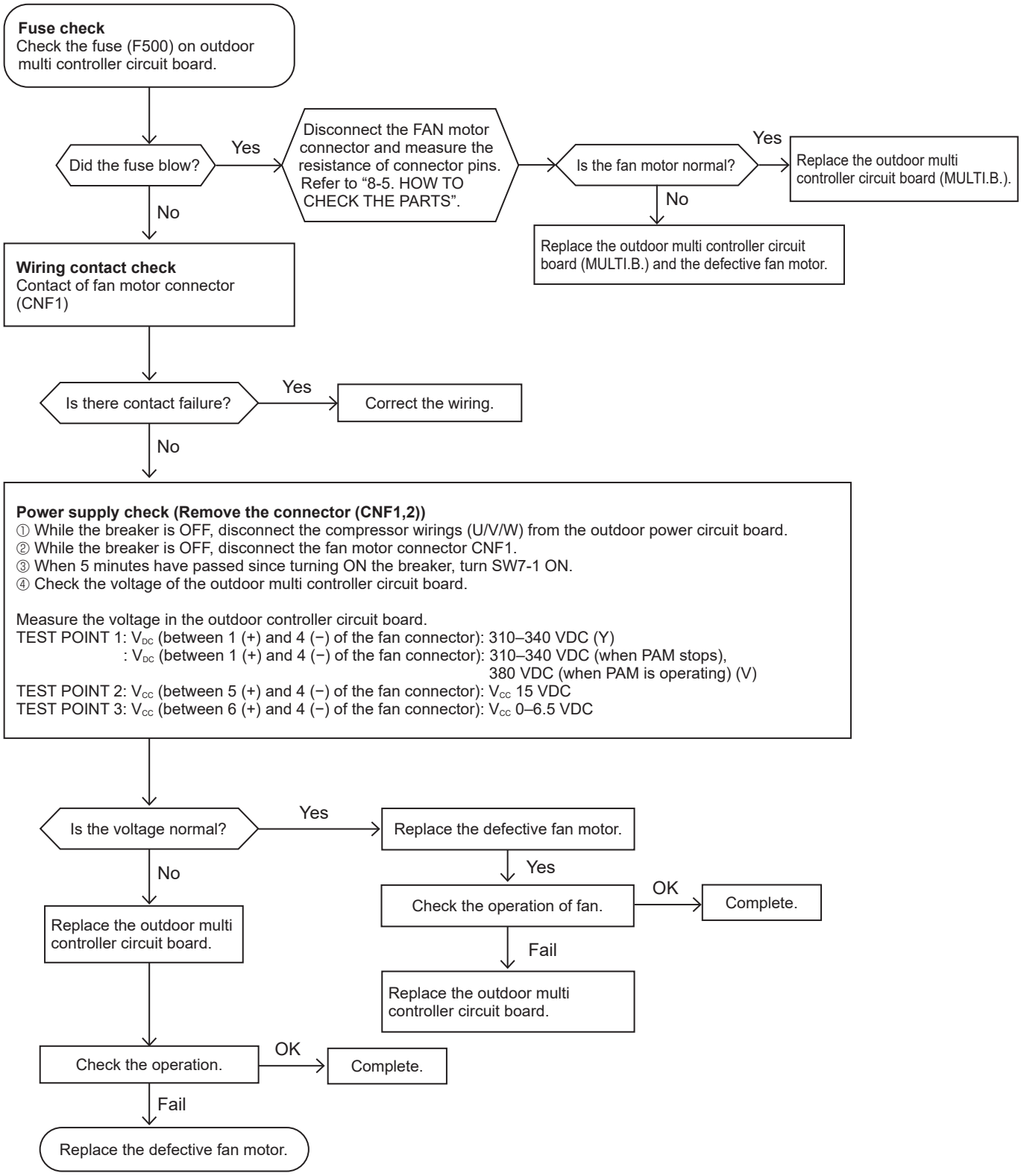
	Outdoor controller board DIP SW9-2	SW1	SW2	Function
Silent mode (Cooling only)	OFF	OFF	OFF	Normal
		ON	OFF	Silent mode
		OFF	ON	Super silent mode 1
		ON	ON	Super silent mode 2
Demand control	ON	OFF	OFF	100% (Normal)
		ON	OFF	75%
		ON	ON	50%
		OFF	ON	0% (Stop)

8-5. HOW TO CHECK THE PARTS

<table>
<tr><th>Parts name</th><th>Checkpoints</th></tr>
<tr><td>Thermistor (TH2)
<HIC pipe>
Thermistor (TH3)
<Outdoor liquid pipe>
Thermistor (TH4)
<Compressor>
Thermistor (TH6)
<Suction pipe>
Thermistor (TH7)
<Ambient>
Thermistor (TH8)
<Heat sink></td><td>Disconnect the connector then measure the resistance with a multimeter.
(At the ambient temperature 10 to 30°C)
<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>TH4</td><td>160 to 410 kΩ</td><td rowspan="3">Open or short</td></tr><tr><td>TH2
TH3
TH6
TH7</td><td>4.3 to 9.6 kΩ</td></tr><tr><td>TH8</td><td>39 to 105 kΩ</td></tr></table></td></tr>
<tr><td>Fan motor (MF1)
  </td><td>Measure the resistance between the connector pins with a multimeter.
(At the ambient temperature 20°C)
<table><tr><th colspan="4">Normal</th><th>Abnormal</th></tr><tr><td>Red - Blue</td><td>Brown - Blue</td><td>Orange - Blue</td><td>White - Blue</td><td rowspan="2">Open or short
(Short, for White - Blue)</td></tr><tr><td>1.1 ± 0.05 MΩ</td><td>40 ± 4 kΩ</td><td>220 ± 22 kΩ</td><td>Open</td></tr></table></td></tr>
<tr><td>Solenoid valve coil
<4-way valve>
(21S4)</td><td>Measure the resistance between the terminals with a multimeter.
(At the ambient temperature 20°C)
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>1725 ± 172.5 Ω</td><td>Open or short</td></tr></table></td></tr>
<tr><td>Motor for compressor
(MC)
  </td><td>Measure the resistance between the terminals with a multimeter.
(Winding temperature 20°C)
<table><tr><th colspan="2">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th>PUMY-SP•VKM</th><th>PUMY-SP•YKM</th></tr><tr><td>0.44 ± 0.022 Ω</td><td>0.88 ± 0.044 Ω</td><td>Open or short</td></tr></table></td></tr>
<tr><td>Solenoid valve coil
<Bypass valve>
(SV1)</td><td>Measure the resistance between the terminals with a multimeter.
(At the ambient temperature 20°C)
<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>1182.5 ± 83 Ω</td><td>Open or short</td></tr></table></td></tr>
<tr><td>Linear expansion Valve
(LEV-A)
  </td><td><table><tr><th colspan="4">Normal</th><th>Abnormal</th></tr><tr><td>Gray - Black</td><td>Gray - Red</td><td>Gray - Yellow</td><td>Gray - Orange</td><td rowspan="2">Open or short</td></tr><tr><td colspan="4">46 ± 3 Ω</td></tr></table></td></tr>
<tr><td>Linear expansion Valve
(LEV-B)
  </td><td><table><tr><th colspan="4">Normal</th><th>Abnormal</th></tr><tr><td>Red - White</td><td>Red - Orange</td><td>Red - Yellow</td><td>Red - Blue</td><td rowspan="2">Open or short</td></tr><tr><td colspan="4">46 ± 4 Ω</td></tr></table></td></tr>
</table>

Check method of DC fan motor (fan motor/outdoor multi controller circuit board)

1. Notes:
   · High voltage is applied to the connector (CNF1) for the fan motor. Pay attention to the service.
   · Do not pull out the connector (CNF1) for the motor with the power supply on.
   (It causes trouble of the outdoor multi controller circuit board and fan motor.)
2. Self check
   Symptom: The outdoor fan cannot rotate.



Note: Turn SW7-1 OFF after the troubleshooting completes.
The fan sometimes starts on-off cycle operation during low-load operation or cooling at low ambient temperature.
It is not abnormal; the operation ensures reliability of the product.

8-6. HOW TO CHECK THE COMPONENTS

<Thermistor feature chart>

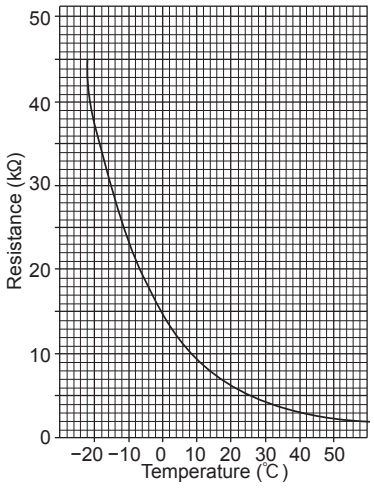
Low temperature thermistors

- Thermistor <HIC pipe> (TH2)
- Thermistor <Outdoor liquid pipe> (TH3)
- Thermistor <Suction pipe> (TH6)
- Thermistor <Ambient> (TH7)

Thermistor R0 = 15 kΩ ± 3 %
B constant = 3480 ± 1 %

$$R_t = 15\exp\{3480\left(\frac{1}{273+t} - \frac{1}{273}\right)\}$$

0°C	15 kΩ	30°C	4.3 kΩ
10°C	9.6 kΩ	40°C	3.0 kΩ
20°C	6.3 kΩ		
25°C	5.2 kΩ		



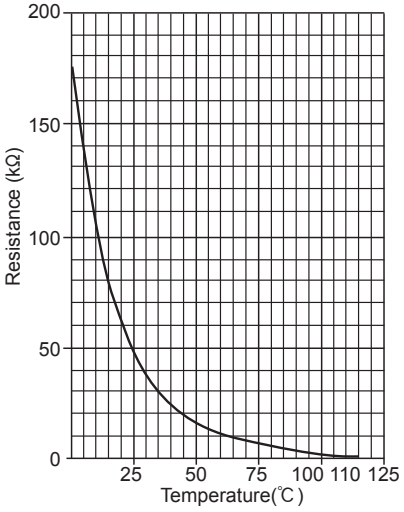
Medium temperature thermistor

- Thermistor <Heat sink> (TH8)

Thermistor R50 = 17 kΩ ± 2 %
B constant = 4150 ± 3 %

$$R_t = 17\exp\{4150\left(\frac{1}{273+t} - \frac{1}{323}\right)\}$$

0°C	180 kΩ
25°C	50 kΩ
50°C	17 kΩ
70°C	8 kΩ
90°C	4 kΩ



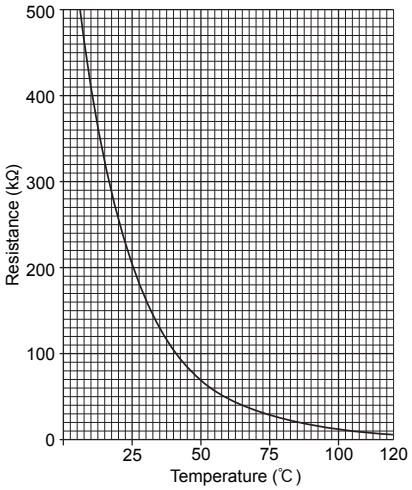
High temperature thermistor

- Thermistor <Compressor> (TH4)

Thermistor R120 = 7.465 kΩ ± 2 %
B constant = 4057 ± 2 %

$$R_t = 7.465\exp\{4057\left(\frac{1}{273+t} - \frac{1}{393}\right)\}$$

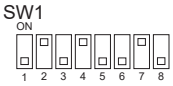
20°C	250 kΩ	70℃	34 kΩ
30°C	160 kΩ	80℃	24 kΩ
40°C	104 kΩ	90℃	17.5 kΩ
50°C	70 kΩ	100℃	13.0 kΩ
60°C	48 kΩ	110℃	9.8 kΩ

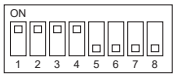


<HIGH PRESSURE SENSOR>

• Comparing the High Pressure Sensor Measurement and Gauge Pressure

By configuring the digital display setting switch (SW1) as shown in the figure below, the pressure as measured by the high pressure sensor appears on the LED1 on the control board.





The figure at left shows that the switches 1 through 4 are set to ON and 5 through 8 are set to OFF.

(1) While the outdoor unit is stopped, compare the gauge pressure and the pressure displayed on self-diagnosis LED1, 2.

1) When the gauge pressure is between 0 and 0.098 MPaG [14 PSIG], internal pressure is caused due to gas leak.
2) When the pressure displayed on self-diagnosis LED1, 2 is between 0 and 0.098 MPaG [14 PSIG], the connector may be defective or be disconnected. Check the connector and go to (4).
3) When the pressure displayed on self-diagnosis LED1, 2 exceeds 5.0 MPaG [725 PSIG], go to (3).
4) If other than 1), 2) or 3), compare the pressures while the sensor is running. Go to (2).

(2) Compare the gauge pressure and the pressure displayed on self-diagnosis LED1,2 after 15 minutes have passed since the start of operation. (Compare them by MPaG [PSIG] unit.)

1) When the difference between both pressures is within 0.25 MPaG [36 PSIG], both the high pressure sensor and the control board are normal.
2) When the difference between both pressures exceeds 0.25 MPaG [36 PSIG], the high pressure sensor has a problem. (performance deterioration)
3) When the pressure displayed on self-diagnosis LED1, 2 does not change, the high pressure sensor has a problem.

(3) Remove the high pressure sensor from the control board to check the pressure on the self-diagnosis LED1, 2.

1) When the pressure displayed on self-diagnosis LED1, 2 is between 0 and 0.098 MPaG [14 PSIG], the high pressure sensor has a problem.
2) When the pressure displayed on self-diagnosis LED1, 2 is approximately 5.0 MPaG [725 PSIG], the control board has a problem.

(4) Remove the high pressure sensor from the control board, and short-circuit between the pin 2 and pin 3 connectors (63HS) to check the pressure with self-diagnosis LED1, 2.

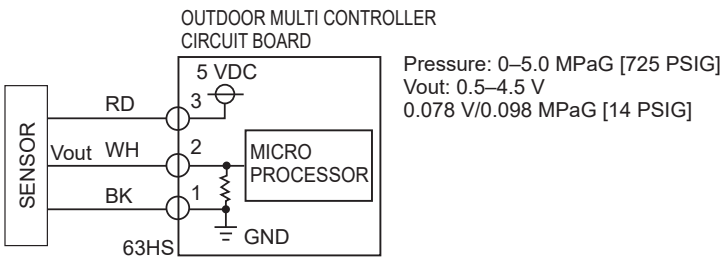
1) When the pressure displayed on the self-diagnosis LED1, 2 exceeds 5.0 MPaG [725 PSIG], the high pressure sensor has a problem.
2) If other than 1), the control board has a problem.

• High Pressure Sensor Configuration (63HS)

The high pressure sensor consists of the circuit shown in the figure below. If 5 VDC is applied between the red and the black wires, voltage corresponding to the pressure between the white and the black wires will be output, and the value of this voltage will be converted by the microprocessor. The output voltage is 0.078 V per 0.098 MPaG [14 PSIG].

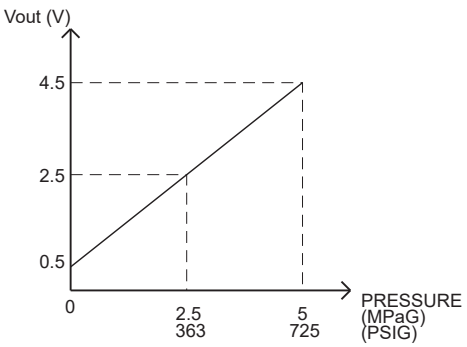
Note:
The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

	Body side	Control board side
Vcc	Pin 1	Pin 3
Vout	Pin 2	Pin 2
GND	Pin 3	Pin 1



③–①: 5 V(DC)
②–①: Output Vout (DC)

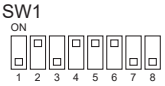
Pressure: 0–5.0 MPaG [725 PSIG]
Vout: 0.5–4.5 V
0.078 V/0.098 MPaG [14 PSIG]

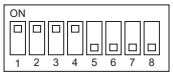


<LOW PRESSURE SENSOR>

• Comparing the Low Pressure Sensor Measurement and Gauge Pressure

By configuring the digital display setting switch (SW1) as shown in the figure below, the pressure as measured by the low pressure sensor appears on the LED1 on the control board.





The figure at left shows that the switches 1 through 4 are set to ON and 5 through 8 are set to OFF.

(1) While the outdoor unit is stopped, compare the gauge pressure and the pressure displayed on self-diagnosis LED1, 2.

1) When the gauge pressure is between 0 and 0.098 MPaG [14 PSIG], internal pressure is caused due to gas leak.
2) When the pressure displayed on self-diagnosis LED1, 2 is between 0 and 0.098 MPaG [14 PSIG], the connector may be defective or be disconnected. Check the connector and go to (4).
3) When the outdoor temperature is 30°C [86°F] or less, and the pressure displayed on self-diagnosis LED1, 2 exceeds 1.7 MPaG [247 PSIG], go to (3).
   When the outdoor temperature exceeds 30°C [86°F], and the pressure displayed on self-diagnosis LED1, 2 exceeds 1.7 MPaG [247 PSIG], go to (5).
4) If other than 1), 2) or 3), compare the pressures while the sensor is running. Go to (2).

(2) Compare the gauge pressure and the pressure displayed on self-diagnosis LED1, 2 after 15 minutes have passed since the start of operation. (Compare them by MPaG [PSIG] unit.)

1) When the difference between both pressures is within 0.2 MPaG [29 PSIG], both the low pressure sensor and the control board are normal.
2) When the difference between both pressures exceeds 0.2 MPaG [29 PSIG], the low pressure sensor has a problem. (performance deterioration)
3) When the pressure displayed on the self-diagnosis LED1, 2 does not change, the low pressure sensor has a problem.

(3) Remove the low pressure sensor from the control board to check the pressure with the self-diagnosis LED1, 2 display.

1) When the pressure displayed on the self-diagnosis LED1,2 is between 0 and 0.098 MPaG [14 PSIG], the low pressure sensor has a problem.
2) When the pressure displayed on self-diagnosis LED1, 2 is approximately 1.7 MPaG [247 PSIG], the control board has a problem.

(4) Remove the low pressure sensor from the control board, and short-circuit between the pin 2 and pin 3 connectors (63LS) to check the pressure with the self-diagnosis LED1, 2.

1) When the pressure displayed on the self-diagnosis LED1, 2 exceeds 1.7 MPaG [247 PSIG], the low pressure sensor has a problem.
2) If other than 1), the control board has a problem.

(5) Remove the high pressure sensor (63HS) from the control board, and insert it into the connector for the low pressure sensor (63LS) to check the pressure with the self-diagnosis LED1, 2.

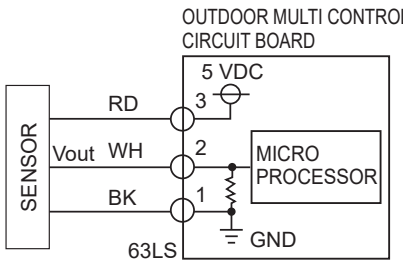
1) When the pressure displayed on the self-diagnosis LED1, 2 exceeds 1.7 MPaG [247 PSIG], the control board has a problem.
2) If other than 1), go to (2).

• Low Pressure Sensor Configuration (63LS)

The low pressure sensor consists of the circuit shown in the figure below. If 5 VDC is appli ed between the red and the black wires, voltage corresponding to the pressure between the white and the black wires will be output, and the value of this voltage will be converted by the microprocessor. The output voltage is 0.173 V per 0.098 MPaG [14 PSIG].

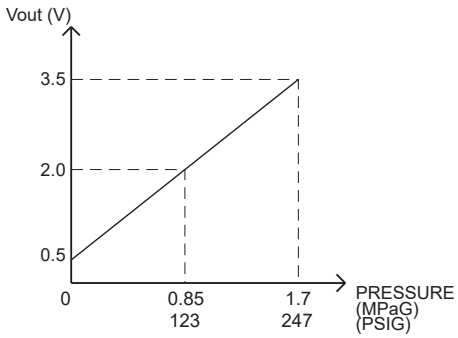
Note:
The pressure sensor on the body side is designed to connect to the connector. The connector pin number on the body side is different from that on the control board side.

	Body side	Control board side
Vcc	Pin 1	Pin 3
Vout	Pin 2	Pin 2
GND	Pin 3	Pin 1



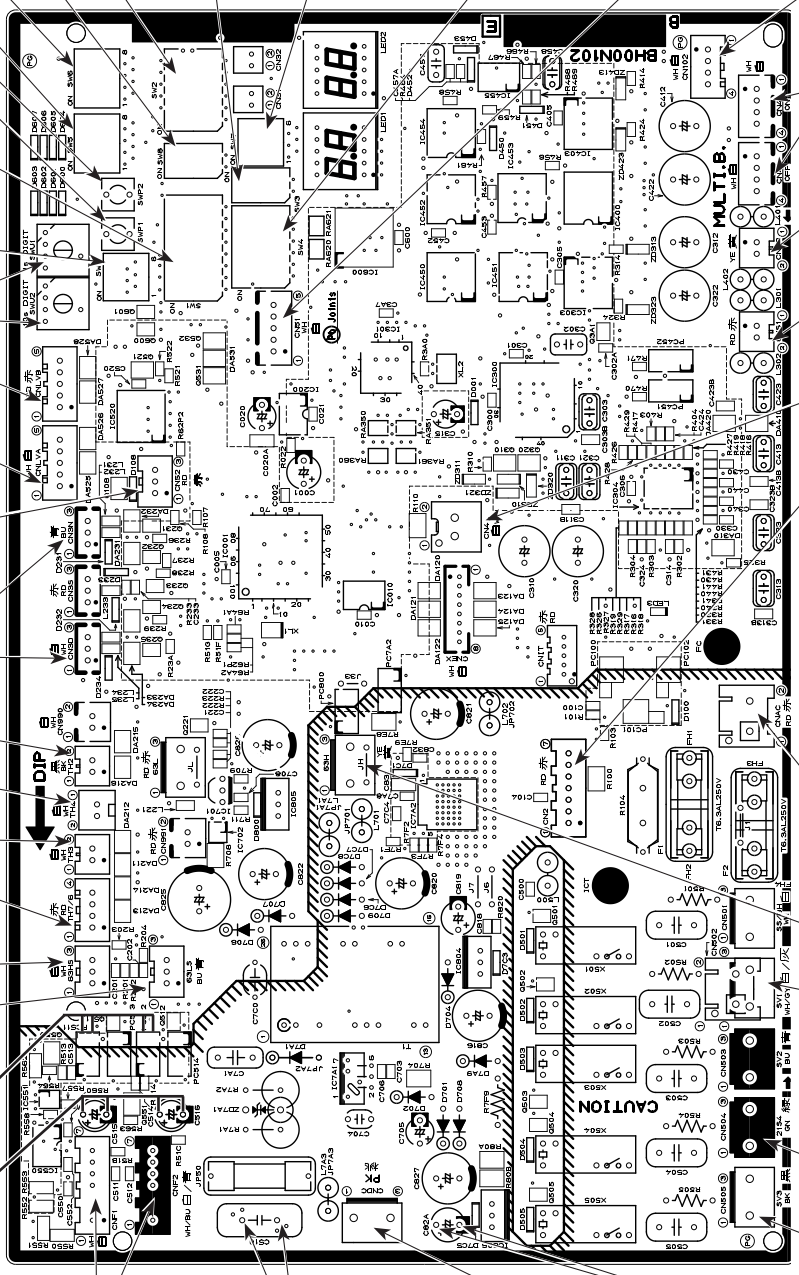
③–①: 5 V(DC)
②–①: Output Vout (DC)

Pressure: 0–1.7 MPaG [247 PSIG]
Vout: 0.5–3.5 V
0.173 V/0.098 MPaG [14 PSIG]



8-7. TEST POINT DIAGRAM
Outdoor multi controller circuit board

<CAUTION> TEST POINT ① is high voltage.



SW8
Model selection

SW6
Function selection

SW5
Function selection

SWP2
Display selection

SWP1
Display selection

SW1
Display selection
(Self-diagnosis)

SW9
Function selection

SWU2, SWU1
Address setting

CNLVB
Linear expansion Valve

CNLVA
Linear expansion Valve

CN52
Connect to the noise filter circuit board (CN52)

CN3N
Auto change over

CN3D
Input of demand control

TH2 Thermistor
<HIC pipe>

TH4 Thermistor
<Compressor>

TH3 Thermistor
<Outdoor liquid pipe>

TH7/TH6 Thermistor
<Ambient/ Suction pipe>

63HS
High pressure sensor

63LS
Low pressure sensor

V_{FG} (TEST POINT④)
(Voltage between pin3 and pin4 of PC511 or PC512):
(Correspond to CNF1,2 ⑦(+)–④(−))

SW2
Pump down

SW3
Test run

SW7
Manual defrost

SW4
Model selection

CN51
External signal output

CN102
Connect to the M-NET P.B (CN2) (M-NET power circuit board)

CN40,CN41
Centralized control power supply/ For storing jumper connector selection

CNS2
Transmission wire of centralized control

CNS1
Indoor/ outdoor unit connecting wire

CN4
Connect to the outdoor power circuit board (CN4)

CN2
Connect to the outdoor power circuit board (CN2)
①–⑤:
Power circuit board → Transmitting signal to the multi controller board (0–5 VDC)
②–⑤: Zero cross signal (0–5 VDC)
③–④: Not used
⑥–⑤: 15 VDC
⑦–⑤: 15 VDC

CNAC
Power supply for multi controller board (CNAC2) 230 VAC

63H
High pressure switch

SV1
Bypass valve

21S4
4-way valve

SV3
Oil return valve

V_{SP}
(Voltage between pins of C515 and C516):
0 VDC (when stopped)
1–6.5 VDC (when operated)
(Same as CNF1,2 ⑥(+)–④(−))

CNF1, 2
Connect to fan motors
①–④: 310–340 VDC
⑤–④: 15 VDC
⑥–④: 0–6.5 VDC
⑦–④: 15 VDC (when stopped)
0–15 VDC pulse (when operated)

V_{DC} (TEST POINT①)
(Voltage between pins of C510) : 310–340 VDC
(Same as CNF1,2 ①(+)–④(−))

CNDC
310–340 VDC
(①(+)–③(−))

V_{CC} (TEST POINT②)
(Voltage between pins of C82A): 15 VDC
(Same as CNF1,2 ⑤(+)–④(−))

Outdoor power circuit board

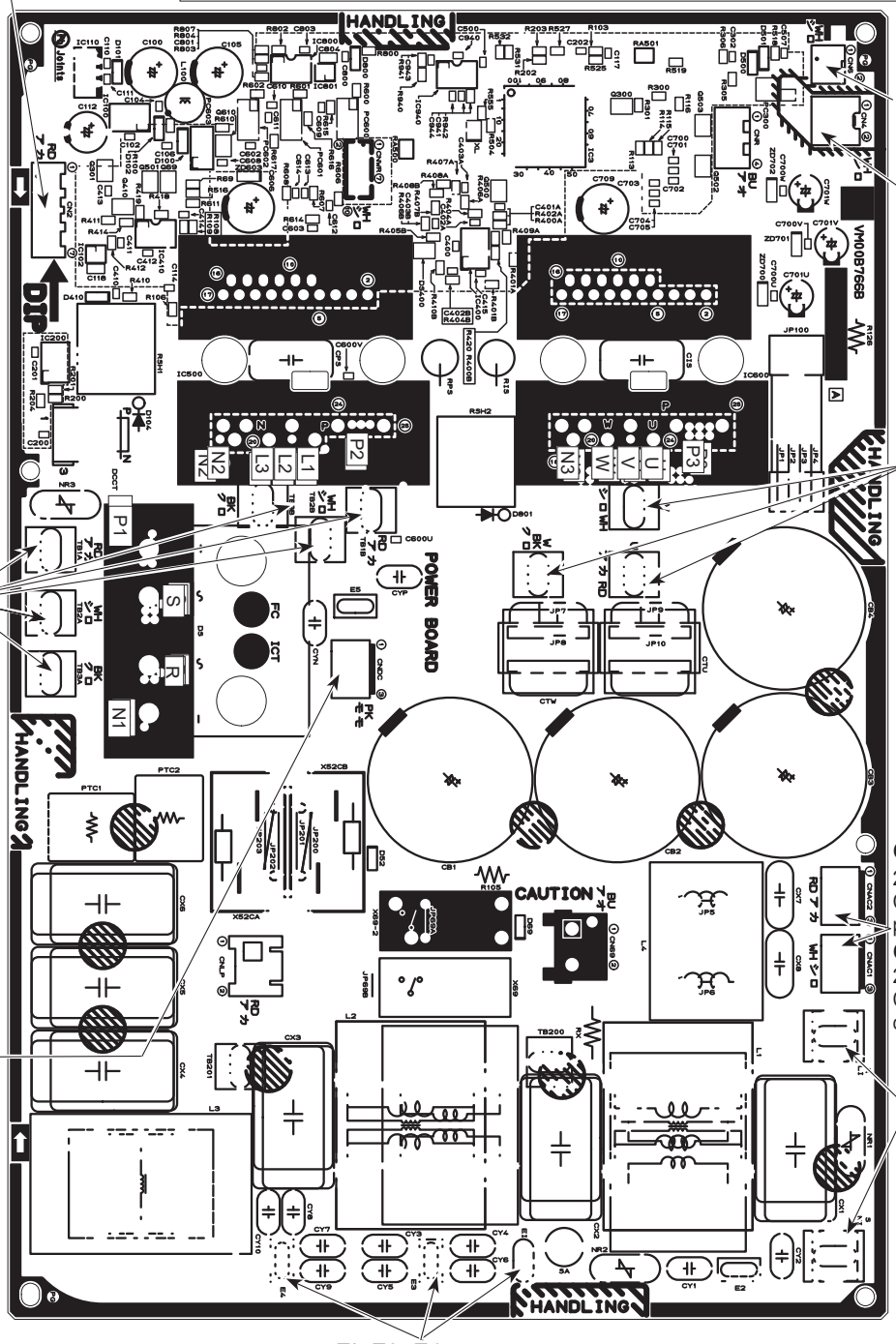
PUMY-SP112VKM2(-BS) **PUMY-SP125VKM2(-BS)** **PUMY-SP140VKM2(-BS)**
PUMY-SP112VKM2-ET(-BS) **PUMY-SP125VKM2-ET(-BS)** **PUMY-SP140VKM2-ET(-BS)**
PUMY-SP112VKM2-ER(-BS) **PUMY-SP125VKM2-ER(-BS)** **PUMY-SP140VKM2-ER(-BS)**

Brief Check of POWER MODULE

If they are short-circuited, it means that they are broken.
Measure the resistance in the following points (connectors, etc.).
1. Check of POWER MODULE
 ① Check of DIODE circuit
 R-P1 S-P1 R-N1 S-N1
 ② Check of IGBT circuit
 P2-L1, P2-L2, P2-L3, N2-L1, N2-L2, N2-L3
 ③ Check of INVERTER circuit
 P3-U, P3-V, P3-W, N3-U, N3-V, N3-W

Note: The marks R, S, L1, L2, L3, P1, P2, P3, N1, N2, N3, U, V and W shown in the diagram are not actually printed on the board.

CN2
Connect to the outdoor multi controller circuit board (CN2)
①–⑤: Transmitting signal to outdoor controller circuit board (0–5 VDC)
②–⑤: Zero cross signal (0–5 VDC)
③–④: 15 VDC
⑥–⑤: 15 VDC
⑦–⑤: 15 VDC



CN6
Thermistor

CN4
Connect to the outdoor multi controller circuit board (CN4)

U/V/W
Connect to the compressor (MC)
Voltage amang phases: 10-180 VAC

TB1A, TB2A, TB3A,
TB1B, TB2B, TB3B
Connect to DCL

CNAC1
230 VAC
Connect to the M-NET power circuit board (CN1)

CNAC2
230 VAC
Connect to the outdoor multi controller circuit board (CNAC)

CNDC
280–380 VDC (①+, ③−)
Connect to the outdoor controller circuit board (CNDC)

NI, LI
Voltage of 230 VAC is input (Connect to the terminal block (TB1))

EI, E3, E4
Connect to the electrical parts box

Outdoor power circuit board

PUMY-SP112YKM2(-BS) **PUMY-SP125YKM2(-BS)** **PUMY-SP140YKM2(-BS)**
PUMY-SP112YKM2-ET(-BS) **PUMY-SP125YKM2-ET(-BS)** **PUMY-SP140YKM2-ET(-BS)**
PUMY-SP112YKM2-ER(-BS) **PUMY-SP125YKM2-ER(-BS)** **PUMY-SP140YKM2-ER(-BS)**

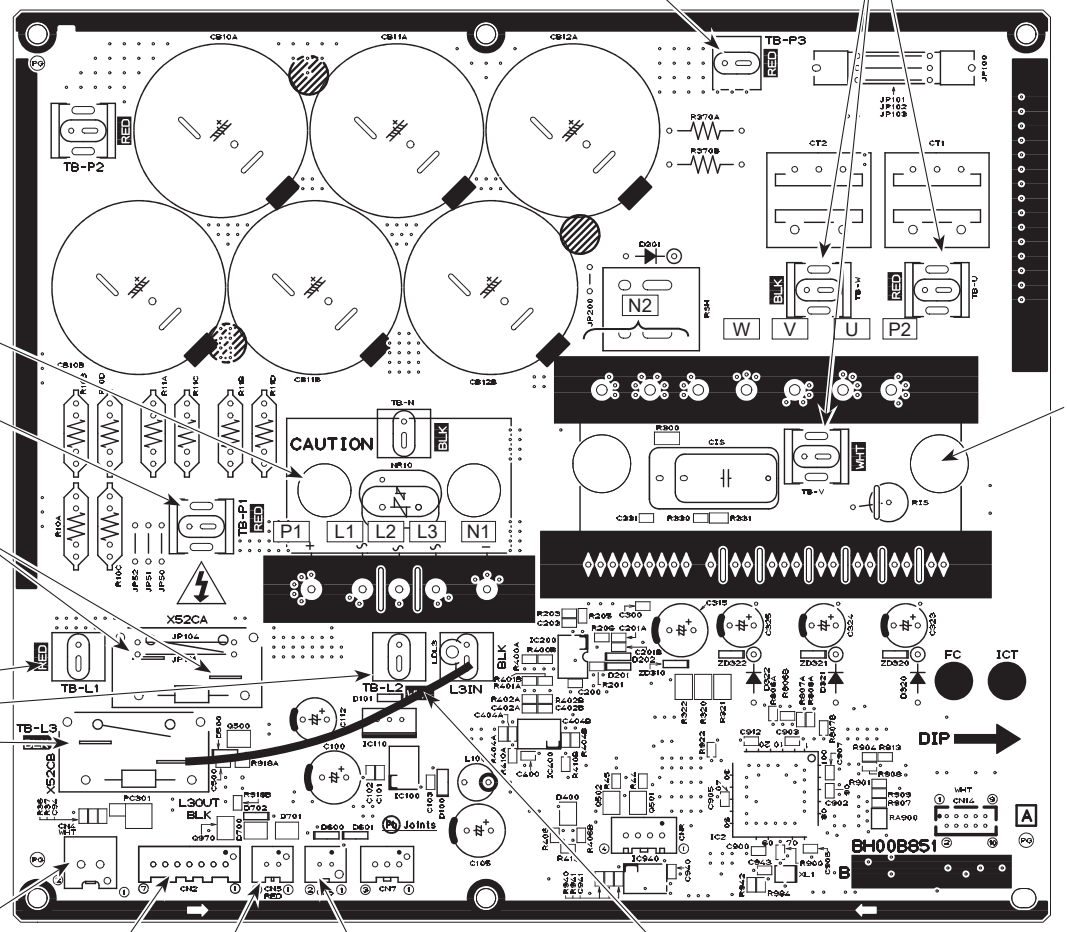
Brief Check of POWER MODULE

If they are short-circuited, it means that they are broken.
Measure the resistance in the following points (connectors, etc.).
1. Check of DIODE MODULE
 L1 - P1, L2 - P1, L3 - P1, L1 - N1 , L2 - N1 , L3 - N1
2. Check of DIP-IPM
 P2 - U , P2 - V , P2 - W , N2 - U , N2 - V , N2 - W

Note: The marks L1 , L2, L3 , N1 , N2, P1, P2, U , V and W shown in the diagram are not actually printed on the board.

TB-U, TB-V, TB-W
Connect to the compressor (MC)
Voltage among phases:
10–400 VAC

TB-P3
Connect to the DCL



Diode module

TB-P1
Connect to the DCL

TAB connector on X52CA
Connect to the RS resistor

DIP-IPM

TB-L1, TB-L2, TB-L3
Connect to the outdoor noise filter circuit board (LO1, LO2, LO3) 400 VAC

CN4
Connect to the outdoor multi controller circuit board (CN4)

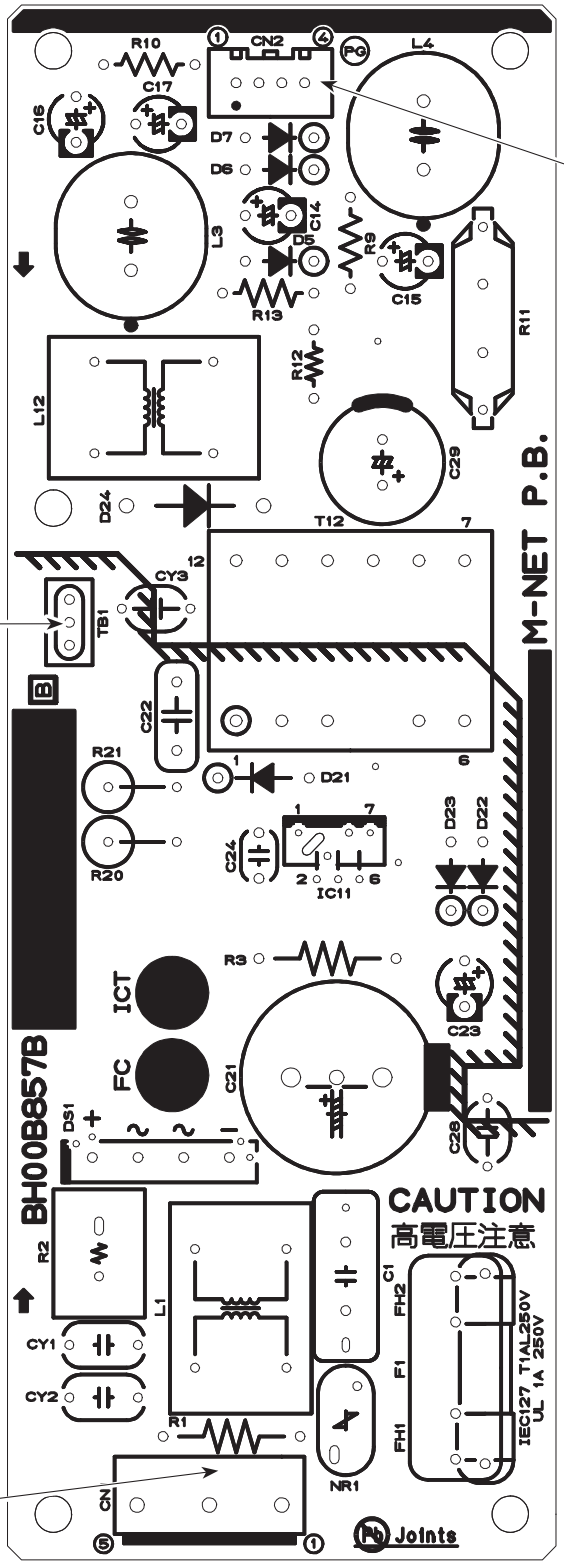
CN5
Detection of primary current (Connect to the outdoor noise filter circuit board (CNCT))

L3OUT-L3IN
Lead connect

CN2
Connect to the outdoor multi controller circuit board (CN2)
①–⑤: Power circuit board → Transmitting signal to the outdoor multi controller circuit board (0–5 VDC)
②–⑤: Zero cross signal (0–5 VDC)
③–④: Not used
⑥–⑤: 15 VDC
⑦–⑤: 15 VDC
[⑤ : ⊖ ①, ②, ⑥, ⑦ : ⊕]

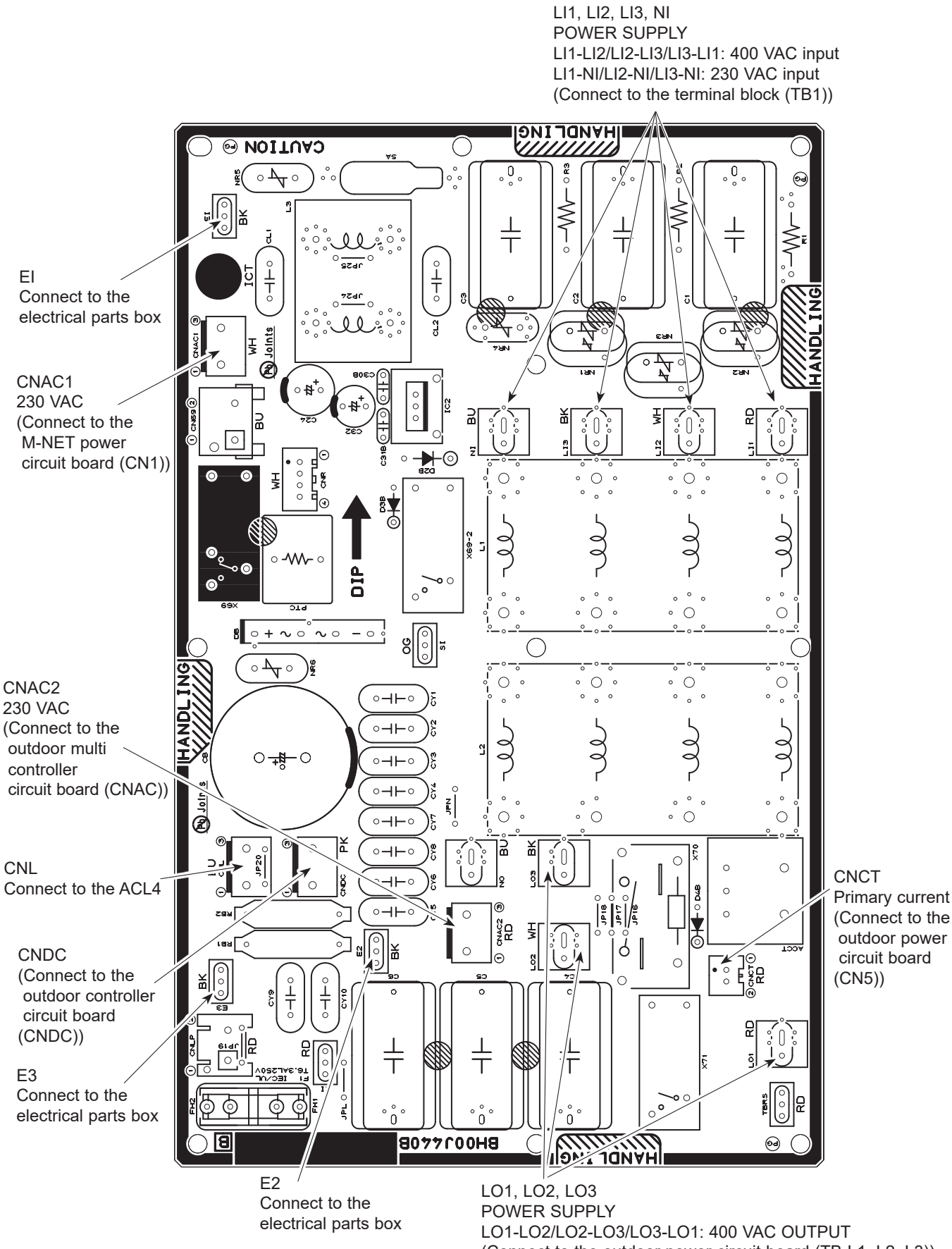
CN6
Thermistor
<Heat sink> (TH8)

M-NET power circuit board



Outdoor noise filter circuit board

PUMY-SP112YKM2(-BS) **PUMY-SP125YKM2(-BS)** **PUMY-SP140YKM2(-BS)**
PUMY-SP112YKM2-ET(-BS) **PUMY-SP125YKM2-ET(-BS)** **PUMY-SP140YKM2-ET(-BS)**
PUMY-SP112YKM2-ER(-BS) **PUMY-SP125YKM2-ER(-BS)** **PUMY-SP140YKM2-ER(-BS)**



No.	SW1 setting	Display mode	Display on the LED1, 2 (display data)								Notes
	12345678		1	2	3	4	5	6	7	8	
0	00000000	Relay output display	Compressor operation	52C	21S4	SV1	(SV2)			Always lighting	ON: light on OFF: light off
		Check display	0000–9999 (Alternating display of addresses and check code)								•When abnormality occurs, check display.
1	10000000	Indoor unit check status	No.1 unit check	No.2 unit check	No.3 unit check	No.4 unit check	No.5 unit check	No.6 unit check	No.7 unit check	No.8 unit check	Light on at time of abnormality
2	01000000	Protection input	High pressure abnormality	Superheat due to low discharge temperature	Compressor shell temperature abnormality	TH4 abnormality	TH3 abnormality	Outdoor fan rotation frequency abnormality	TH7 abnormality	TH8 abnormality	Display detected microprocessor protection or abnormality
3	11000000	Protection input	Heat sink overheating	Compressor over current interception	Voltage abnormality	Insufficient refrigerant amount abnormality	Current sensor/ primary current abnormality	63LS abnormality	63HS abnormality	start over current interception abnormality delay	
4	00100000	Protection input	Abnormality in the number of indoor units	Address double setting abnormality	Indoor unit capacity error	Over capacity	Indoor unit address error	Outdoor unit address error	Current sensor open/short	serial communication abnormality (outdoor unit)	
5	10100000	Abnormality delay display 1	High pressure abnormality delay	Superheat due to low discharge temperature delay	Compressor shell temperature abnormality delay	TH4 abnormality delay	TH3 abnormality delay	Outdoor fan rotation frequency abnormality delay	TH7 abnormality delay	TH8 abnormality delay	Display all abnormalities remaining in abnormality delay
6	01100000	Abnormality delay display 2	Heat sink overheating delay	Compressor over current interception delay	Voltage abnormality delay	Insufficient refrigerant amount abnormality delay	Current sensor/ primary current abnormality delay	63LS abnormality delay	63HS abnormality delay	start over current interception abnormality delay	
7	11100000	Abnormality delay display 3	63LS abnormality delay	TH2 abnormality delay	4-way valve abnormality delay	Delay caused by closed valve in cooling mode	Power module abnormality delay	TH6 abnormality delay	Current sensor open/short delay		
8	00010000	Abnormality delay history 1	High pressure abnormality delay	Superheat due to low discharge temperature delay	Compressor shell temperature abnormality delay	TH4 abnormality delay	TH3 abnormality delay	Outdoor fan rotation frequency abnormality delay	TH7 abnormality delay	TH8 abnormality delay	Display all abnormalities remaining in abnormality delay
9	10010000	Abnormality delay history 2	Heat sink overheating delay	Compressor over current interception delay	Voltage abnormality delay	Insufficient refrigerant amount abnormality delay	Current sensor/ primary current abnormality delay	63LS abnormality delay	63HS abnormality delay	start over current interception abnormality delay	
10	01010000	Abnormality delay history 3	63LS abnormality delay	TH2 abnormality delay	4-way valve abnormality delay	Delay caused by closed valve in cooling mode	Power module abnormality delay	TH6 abnormality delay	Current sensor open/short delay		
11	11010000	Abnormality code history 1 (the latest)	Alternating display of addresses 0000–9999 and abnormality code (including abnormality delay code)								• Display abnormalities up to present (including abnormality terminals) • History record in 1 is the latest; records become older in sequence; history record in 10 is the oldest.
12	00110000	Abnormality code history 2									
13	10110000	Abnormality code history 3									
14	01110000	Abnormality code history 4									
15	11110000	Abnormality code history 5									
16	00001000	Abnormality code history 6									
17	10001000	Abnormality code history 7									
18	01001000	Abnormality code history 8									
19	11001000	Abnormality code history 9									
20	00101000	Abnormality code history 10 (the oldest)									
21	10101000	Cumulative time	0–9999 (unit: 1 hour)								Display of cumulative compressor operating time
22	01101000	Cumulative time	0–9999 (unit: 10 hour)								
23	11101000	Outdoor unit operation display	Compressor energizing	Compressor operating prohibition	Compressor in operation	Abnormality detection					Light ON/Light OFF
24	00011000	Indoor unit operation mode	No.1 unit mode	No.2 unit mode	No.3 unit mode	No.4 unit mode	No.5 unit mode	No.6 unit mode	No.7 unit mode	No.8 unit mode	Cooling: light on, Heating: light blinking Stop fan: light off
25	10011000	Indoor unit operation display	No.1 unit operation	No.2 unit operation	No.3 unit operation	No.4 unit operation	No.5 unit operation	No.6 unit operation	No.7 unit operation	No.8 unit operation	Thermo ON: light on Thermo OFF: light off

Delay code	Abnormality delay	Delay code	Abnormality delay
1202	Discharge/Comp. temperature	1600	Discharge superheat (SHd)
	Thermistor <Compressor>(TH4)		Over charge refrigerant
1205	Thermistor <Outdoor liquid pipe> (TH3)	1601	Insufficient refrigerant
1211	Thermistor <Suction pipe> (TH6)		Closed cooling valve
1214	Thermistor <Heat sink> (TH8)	1608	4-way valve disconnection
1221	Thermistor <Ambient> (TH7)	4310	Current sensor open/short
1222	Thermistor <HIC> (TH2)	4320	Undervoltage, overvoltage, or power module
1400	Low pressure sensor	4330	Heat sink temperature
1402	High pressure (63H)	4350	Power module
	Compressor protector (TRS)	4500	Outdoor fan motor
	High pressure sensor (63HS)		

SW: setting
0....OFF
1....ON

No.	SW1 setting	Display mode	Display on the LED1, 2 (display data)								Notes
	12345678		1	2	3	4	5	6	7	8	
26	01011000	Capacity code (No. 1 indoor unit)	0–255								•Display of indoor unit capacity code •The No. 1 unit will start from the M-NET address with the lowest number
27	11011000	Capacity code (No. 2 indoor unit)									
28	00111000	Capacity code (No. 3 indoor unit)									
29	10111000	Capacity code (No. 4 indoor unit)									
30	01111000	Capacity code (No. 5 indoor unit)									
31	11111000	IC1 operation mode	STOP	Fan	Cooling thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF			•Display of indoor unit operating mode
32	00000100	IC2 operation mode									
33	10000100	IC3 operation mode									
34	01000100	IC4 operation mode									
35	11000100	IC5 operation mode									
36	00100100	OC operation mode	Compressor ON/OFF	Heating/Cooling	Abnormal/normal	DEFROST/NO	Refrigerant pull back/no	Excitation current/no	3-minutes delay/ no		Light on/light off
37	10100100	External connection status	CN3N1–3 input	CN3N1–2 input	CN3S1–2 input	CN3D1-3 input	CN3D1-2 input				
38	01100100	Communication demand capacity	0–255 (%)								Display of communication demand capacity
39	11100100	Number of compressor ON/OFF	0000–9999 (unit: x10)								Display a count of compressor operation/stop
40	00010100	Compressor operating current	0–999.9 (Arms)								Display detected current
41	10010100	Input current of outdoor unit									
42	01010100	Thermo-ON operating time	0000–9999 (unit: x10)								Display cumulative time of thermo-ON operation
43	11010100	Total capacity of thermo-ON	0–255								Display total capacity code of indoor units in thermo-ON
44	00110100	Number of indoor units	0–255								Display number of connected indoor units
45	10110100	DC bus voltage	0–9999 (V)								Display bus voltage
46	01110100	State of LEV control	Td over heat prevention	SHd decrease prevention	Minimum Sj correction depends on Td	Minimum Sj correction depends on Shd	LEV opening correction depends on Pd	LEV opening correction depends on Td	Correction of high compression ratio prevention		Display active LEV control
47	11110100	State of compressor frequency control 1	Condensing temperature limit control	Compressor temperature control		Discharge temp. (heating) backup control	Pd abnormality control (heating)	Pd Back up control(heating)		Freeze prevention control at the beginning of SHd	Display active compressor frequency control
48	00001100	State of compressor frequency control 2	Heat sink over heat prevention control	Secondary current control	Input current control		Frequency restrain of receipt voltage change	Low pressure decrease prevention	Hz-up inhibit control at the beginning of SHd		
49	10001100	Protection input	63LS abnormality	HIC abnormality		Frozen protection	4-way valve disconnection abnormality	Delay caused by closed valve in cooling mode	TH6 abnormality	Power module abnormality	
50	01001100	The second current value when microprocessor of POWER BOARD abnormality is detected	0–999.9[Arms]								Display data at time of abnormality
51	11001100	Heatsink temperature when microprocessor of POWER BOARD abnormality is detected	−99.9–999.9 (°C)								

State of compressor frequency(Hz) control	Content
Discharge pressure control	Hz control by pressure limitation
Compressor temperature control	Hz control by discharge temperature limitation
SV control	Hz control by bypass valve
Abnormal rise of Pd control	Control that restrains abnormal rise of discharge pressure
Heat sink over heat prevention control	Heat sink over heat prevention control
Secondary current control	Secondary current control
Input current control	Input current control
Hz correction of receipt voltage decrease prevention	Max.Hz correction control due to voltage decrease
Hz restrain of receipt voltage change	Max.Hz correction control due to receipt voltage change

No.	SW1 setting	Display mode	Display on the LED1, 2 (display data)								Notes
	12345678		1	2	3	4	5	6	7	8	
52	00101100	Outdoor LEV-A opening pulse	0–2000 (pulse)								Display of opening pulse of outdoor LEV
53	10101100	Outdoor LEV-A opening pulse abnormality delay									
54	01101100	Outdoor LEV-A opening pulse abnormality									
55	11101100	Outdoor LEV-B opening pulse									
56	00011100	Outdoor LEV-B opening pulse abnormality delay									
57	10011100	Outdoor LEV-B opening pulse abnormality									
58	01011100	63LS (Low pressure)	−99.9–999.9 (kgf/cm²)								Display of data from sensor and thermistor
59	11011100	63LS abnormality delay	−99.9–999.9 (kgf/cm²)								
60	00111100	63 LS abnormality									
61	10111100	TH2 (HIC pipe)	−99.9–999.9 (°C)								
62	01111100	TH2(HIC) abnormality delay	−99.9–999.9 (°C)								
63	11111100	TH2 (HIC) abnormality									
64	00000010	Operational frequency	0–255 (Hz)								Display of actual operating frequency
65	10000010	Target frequency	0–255 (Hz)								Display of target frequency
66	01000010	Outdoor fan control step number	0–15								Display of number of outdoor fan control steps (target)
69	10100010	IC1 LEV Opening pulse	0–2000 (pulse)								Display of opening pulse of indoor LEV
70	01100010	IC2 LEV Opening pulse									
71	11100010	IC3 LEV Opening pulse									
72	00010010	IC4 LEV Opening pulse									
73	10010010	IC5 LEV Opening pulse									
74	01010010	High pressure sensor (Pd)	−99.9–999.9 (kgf/cm²)								Display detected data of outdoor unit sensors and thermistors
75	11010010	TH4(Compressor)(Td) data	−99.9–999.9 (°C)								
76	00110010	TH6(Suction pipe) (ET) data									
77	10110010	TH7(Ambient) data									
78	01110010	TH3(Outdoor liquid pipe) data									
80	00001010	TH8(Heat sink) data									
81	10001010	IC1 TH23 (Gas)	−99.9–999.9 (°C) (When indoor unit is not connected, it is displayed as 0.)								Display detected data of indoor unit thermistor
82	01001010	IC2 TH23 (Gas)									
83	11001010	IC3 TH23 (Gas)									
84	00101010	IC4 TH23 (Gas)									
85	10101010	IC5 TH23 (Gas)									

No.	SW1 setting	Display mode	Display on the LED1, 2 (display data)								Notes
	12345678		1	2	3	4	5	6	7	8	
86	01101010	IC1 TH22 (Liquid)	−99.9–999.9 (°C) (When the indoor unit is not connected, it is displayed as 0.)								Display detected data of indoor unit thermistors
87	11101010	IC2 TH22 (Liquid)									
88	00011010	IC3 TH22 (Liquid)									
89	10011010	IC4 TH22 (Liquid)									
90	01011010	IC5 TH22 (Liquid)									
91	11011010	IC1 TH21 (Intake)									
92	00111010	IC2 TH21 (Intake)									
93	10111010	IC3 TH21 (Intake)									
94	01111010	IC4 TH21 (Intake)									
95	11111010	IC5 TH21 (Intake)									
96	00000110	Outdoor SC (cooling)	−99.9–999.9 (°C)								Display of outdoor subcool (SC) data
97	10000110	Target subcool step	−2–4								Display of target subcool step data
98	01000110	IC1 SC/SH	−99.9–999.9 (°C) during heating: subcool (SC)/during cooling: superheat (SH) (Fixed to "0" during cooling operation)								Display of indoor SC/SH data
99	11000110	IC2 SC/SH									
100	00100110	IC3 SC/SH									
101	10100110	IC4 SC/SH									
102	01100110	IC5 SC/SH									
103	11100110	Discharge superheat (SHd)	−99.9–999.9 (°C)								Display of outdoor discharge superheat (SHd) data
105	10010110	Target Pd display (heating) kgf/F	Pdm (0.0–30.0) (kgf/cm²)								Display of all control target data
106	01010110	Target ET display (cooling)	ETm (−2.0–23.0) (°C)								
107	11010110	Target outdoor SC (cooling)	SCm (0.0–20.0) (°C)								
108	00110110	Target indoor SC/SH (IC1)	SCm/SHm (0.0–20.0) (°C)								
109	10110110	Target indoor SC/SH (IC2)									
110	01110110	Target indoor SC/SH (IC3)									
111	11110110	Target indoor SC/SH (IC4)									
112	00001110	Target indoor SC/SH (IC5)									
113	10001110	Indoor unit check status (IC9-12)	No.9 unit check	No.10 unit check	No.11 unit check	No.12 unit check					Light on at time of abnormality
114	01001110	Indoor unit operation mode (IC9-12)	No.9 unit mode	No.10 unit mode	No.11 unit mode	No.12 unit mode					COOL/DRY: light on HEAT: light blinking FAN/STOP: light off
115	11001110	Indoor unit operation display (IC9-12)	No.9 unit operation	No.10 unit operation	No.11 unit operation	No.12 unit operation					Thermo-ON: light on Thermo-OFF: light off
116	00101110	IC9 operation mode	STOP	Fan	Cooling Thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF			Display of indoor unit operation mode
117	10101110	IC10 operation mode									
118	01101110	IC11 operation mode									
119	11101110	IC12 operation mode									
120	00011110	Target indoor SC/SH (IC9)	SCm/SHm (0.0–20.0) (°C)								Display of all control target data
121	10011110	Target indoor SC/SH (IC10)									
122	01011110	Target indoor SC/SH (IC11)									
123	11011110	Target indoor SC/SH (IC12)									
124	00111110	IC9 LEV opening pulse abnormality delay	0–2000 (pulse)								Display of opening pulse of indoor LEV at time of abnormality delay
125	10111110	IC10 LEV opening pulse abnormality delay									
126	01111110	IC11 LEV opening pulse abnormality delay									
127	11111110	IC12 LEV opening pulse abnormality delay									

No.	SW1 setting	Display mode	Display on the LED1, 2 (display data)								Notes
	12345678		1	2	3	4	5	6	7	8	
128	00000001	Actual frequency of abnormality delay	0–255 (Hz)								Display of actual frequency at time of abnormality delay
129	10110001	Fan step number at time of abnormality delay	0–15								Display of fan step number at time of abnormality delay
131	11000001	IC1 LEV opening pulse abnormality delay	0–2000 (pulse)								Delay of opening pulse of indoor LEV at time of abnormality delay
132	00100001	IC2 LEV opening pulse abnormality delay									
133	10100001	IC3 LEV opening pulse abnormality delay									
134	01100001	IC4 LEV opening pulse abnormality delay									
135	11100001	IC5 LEV opening pulse abnormality delay									
136	00010001	High pressure sensor data at time of abnormality delay kgf/cm2	−99.9–999.9 (kgf/cm²)								Display of data from High pressure sensor, all thermistors, and SC/SH at time of abnormality delay
137	10010001	TH4 (Compressor) sensor data at time of abnormality delay	−99.9–999.9 (°C)								
138	01010001	TH6 (Suction pipe) sensor data at time of abnormality delay									
139	11010001	TH3 (Outdoor liquid pipe) sensor data at time of abnormality delay									
140	00110001	TH8 (Heat sink) sensor data at time of abnormality delay									
141	10110001	OC SC (cooling) at time of abnormality delay	−99.9–999.9(°C) During heating: subcool (SC) During cooling; superheat (SH) (Fixed to "0" during cooling operation)								
142	01110001	IC1 SC/SH at time of abnormality delay									
143	11110001	IC2 SC/SH at time of abnormality delay									
144	00001001	IC3 SC/SH at time of abnormality delay									
145	10001001	IC4 SC/SH at time of abnormality delay									
146	01001001	IC5 SC/SH at time of abnormality delay									
147	11001001	IC9 SC/SH at time of abnormality delay									
148	00100001	IC10 SC/SH at time of abnormality delay									
149	10101001	IC11 SC/SH at time of abnormality delay									
150	01101001	IC12 SC/SH at time of abnormality delay									

No.	SW1 setting	Display mode	Display on the LED1, 2 (display data)								Notes
	12345678		1	2	3	4	5	6	7	8	
151	11101001	IC9 LEV opening pulse at time of abnormality	0–2000 (pulse)								Display of opening pulse of indoor LEV at time of abnormality
152	00011001	IC10 LEV opening pulse at time of abnormality									
153	10011001	IC11 LEV opening pulse at time of abnormality									
154	01011001	IC12 LEV opening pulse at time of abnormality									
155	11011001	IC9 SC/SH at time of abnormality	−99.9–999.9(°C) During heating: subcool (SC) During cooling; superheat (SH) (Fixed to "0" during cooling operation)								Display of indoor SC/SH data at time of abnormality
156	00111001	IC10 SC/SH at time of abnormality									
157	10111001	IC11 SC/SH at time of abnormality									
158	01111001	IC12 SC/SH at time of abnormality									
159	11111001	IC9 Capacity code	0–255								Display of indoor unit capacity code The No.1 unit will start from the M-NET address with the lowest number
160	00000101	IC10 Capacity code									
161	10000101	IC11 Capacity code									
162	01000101	IC12 Capacity code									
163	11000101	IC9 SC/SH	−99.9–999.9(°C) During heating: subcool (SC) During cooling; superheat (SH) (Fixed to "0" during cooling operation)								Display of indoor SC/SH data
164	00100101	IC10 SC/SH									
165	10100101	IC11 SC/SH									
166	01100101	IC12 SC/SH									
170	01010101	ROM version monitor	0.00–99.99 (ver)								Display of version data of ROM
171	11010101	ROM type									Display of ROM type
172	00110101	Check sum mode	0000–FFFF								Display of check sum code of ROM
173	10110101	IC9 TH23 (Gas)	−99.9–999.9 (°C)								Display detected data of indoor unit thermistors
174	01110101	IC10 TH23 (Gas)									
175	11110101	IC11 TH23 (Gas)									
176	00001101	IC12 TH23 (Gas)									
177	10001101	IC9 TH22 (Liquid)									
178	01001101	IC10 TH22 (Liquid)									
179	11001101	IC11 TH22 (Liquid)									
180	00101101	IC12 TH22 (Liquid)									
185	10011101	IC9 TH21 (Intake)									
186	01011101	IC10 TH21 (Intake)									
187	11011101	IC11 TH21 (Intake)									
188	00111101	IC12 TH21 (Intake)									
189	10111101	History of voltage error (U9/4220)	-	-	PAM error	Converter Fault	Power synchronization signal error	L1 open phase error	Under voltage error	Over voltage error	
190	01111101	External connection status at time of abnormality delay	CN3N 1-3 input	CN3N 1-2 input	CN3S 1-2 input	CN3D 1-3 input	CN3D 1-2 input				
191	11111101	External connection status at time of abnormality	CN3N 1-3 input	CN3N 1-2 input	CN3S 1-2 input	CN3D 1-3 input	CN3D 1-2 input				

No.	SW1 setting	Display mode	Display on the LED1, 2 (display data)								Notes
	12345678		1	2	3	4	5	6	7	8	
192	00000011	Actual frequency of abnormality	0–255 (Hz)								Display of actual frequency at time of abnormality
193	10000011	Fan step number at time of abnormality	0–15								Display of fan step number at time of abnormality
195	11000011	IC1 LEV opening pulse at time of abnormality	0–2000 (pulse)								Display of opening pulse of indoor LEV at time of abnormality
196	00100011	IC2 LEV opening pulse at time of abnormality									
197	10100011	IC3 LEV opening pulse at time of abnormality									
198	01100011	IC4 LEV opening pulse at time of abnormality									
199	11100011	IC5 LEV opening pulse at time of abnormality									
200	00010011	High pressure sensor data at time of abnormality	−99.9–999.9 (kgf/cm²)								Display of data from High pressure sensor, all thermistors, and SC/SH at time of abnormality.
201	10010011	TH4 (Compressor) sensor data at time of abnormality	−99.9–999.9 (°C)								
202	01010011	TH6 (Suction pipe) sensor data at time of abnormality									
203	11010011	TH3 (Outdoor liquid pipe) sensor data at time of abnormality									
204	00110011	TH8 (Heat sink) sensor data at time of abnormality									
205	10110011	OC SC (cooling) at time of abnormality	−99.9–999.9(°C) During heating: subcool (SC) During cooling; superheat (SH) (Fixed to "0" during cooling operation)								Display of indoor SC/SH data at time of abnormality
206	01110011	IC1 SC/SH at time of abnormality									
207	11110011	IC2 SC/SH at time of abnormality									
208	00001011	IC3 SC/SH at time of abnormality									
209	10001011	IC4 SC/SH at time of abnormality									
210	01001011	IC5 SC/SH at time of abnormality									
211	11001011	IC6 Capacity code	0–255								Display of indoor unit capacity code The No.1 unit will start from the M-NET address with the lowest number
212	00101011	IC7 Capacity code									
213	10101011	IC8 Capacity code									
214	01101011	IC6 operation mode	STOP	Fan	Cooling thermo-ON	Cooling thermo-OFF	Heating thermo-ON	Heating thermo-OFF			Display of indoor unit operation mode
215	11101011	IC7 operation mode									
216	00011011	IC8 operation mode									
217	10011011	IC6 LEV opening pulse	0–2000 (pulse)								Display of opening pulse of indoor LEV
218	01011001	IC7 LEV opening pulse									
219	11011001	IC8 LEV opening pulse									

No.	SW1 setting	Display mode	Display on the LED1, 2 (display data)								Notes
	12345678		1	2	3	4	5	6	7	8	
220	00111011	IC6 TH23 (Gas)	−99.9–999.9 (°C)								Display detected data of indoor unit thermistor
221	10111011	IC7 TH23 (Gas)									
222	01111011	IC8 TH23 (Gas)									
223	11111011	IC6 TH22 (liquid)									
224	00000111	IC7 TH22 (liquid)									
225	10000111	IC8 TH22(liquid)									
226	01000111	IC6 TH21 (intake)									
227	11000111	IC7 TH21 (intake)									
228	00100111	IC8 TH21 (intake)									
229	10100111	IC6 SC/SH	−99.9–999.9 (°C) during heating: subcool (SC)/during cooling: superheat (SH) (Fixed to "0" during cooling operation)								Display of indoor SC/SH data
230	01100111	IC7 SC/SH									
231	11100111	IC8 SC/SH									
232	00010111	Target indoor SC/SH (IC6)	SCm/SHm (0.0–20.0) (°C)								Display of all control target data
233	10010111	Target indoor SC/SH (IC7)									
234	01010111	Target indoor SC/SH (IC8)									
235	11010111	IC6 LEV opening pulse abnormality delay	0–2000 (pulse)								Display of opening pulse of indoor LEV at time of abnormality delay
236	00110111	IC7 LEV opening pulse abnormality delay									
237	10110111	IC8 LEV opening pulse abnormality delay									
238	01110111	IC6 SC/SH at time of abnormality delay	−99.9–999.9 (°C) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to "0" during cooling operation)								Display of indoor SC/SH data at time of abnormality delay
239	11110111	IC7 SC/SH at time of abnormality delay									
240	00001111	IC8 SC/SH at time of abnormality delay									
241	10001111	IC6 LEV opening pulse at time of abnormality	0–2000 (pulse)								Display of opening pulse of indoor LEV at time of abnormality
242	01001111	IC7EV opening pulse at time of abnormality									
243	11001111	IC8 LEV opening pulse at time of abnormality									
244	00101111	IC6 SC/SH at time of abnormality	−99.9–999.9 (°C) During heating: subcool (SC) During cooling: superheat (SH) (Fixed to "0" during cooling operation)								Display of indoor SC/SH data at time of abnormality delay
245	10101111	IC7 SC/SH at time of abnormality									
246	01101111	IC8 SC/SH at time of abnormality									
250	01011111	IC9 LEV opening pulse	0–2000 (pulse)								Display of opening pulse of indoor LEV
251	11011111	IC10 LEV opening pulse									
252	00111111	IC11 LEV opening pulse									
253	10111111	IC12 LEV opening pulse									

9 ELECTRICAL WIRING

This chapter provides an introduction to electrical wiring for the CITY MULTI series, together with notes concerning power wiring, wiring for control (transmission wires and remote controller wires), and the frequency converter.

9-1. OVERVIEW OF POWER WIRING

(1) Bear in mind ambient conditions (ambient temperature, direct sunlight, rain water, etc.) when proceeding with the wiring and connections.
(2) The wire size is the minimum value for metal conduit wiring. The power cord size should be 1 rank thicker consideration of voltage drops. Make sure the power-supply voltage does not drop more than 10 %.
(3) Specific wiring requirements should adhere to the wiring regulations of the region.
(4) Power supply cords of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord (design 60245 IEC57). For example, use wiring such as YZW.
(5) Install an earth line longer than power cables.

⚠ Warning:
- Be sure to use specified wires to connect so that no external force is imparted to terminal connections. If connections are not fixed firmly, it may cause heating or fire.
- Be sure to use the appropriate type of overcurrent protection switch. Note that generated overcurrent may include some amount of direct current.

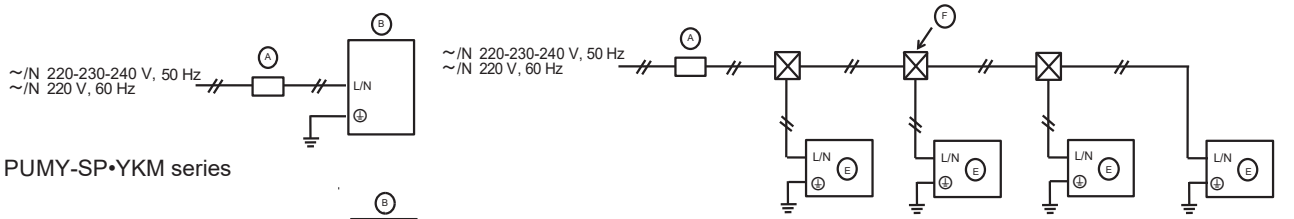
⚠ Caution:
- Some installation site may require attachment of an earth leakage breaker. If no earth leakage breaker is installed, it may cause an electric shock.
- Do not use anything other than breaker and fuse with correct capacity. Using fuse and wire or copper wire with too large capacity may cause a malfunction of unit or fire.
- Be sure to install N-Line. Without N-Line, it could cause damage to the unit.

9-2. WIRING OF MAIN POWER SUPPLY AND EQUIPMENT CAPACITY

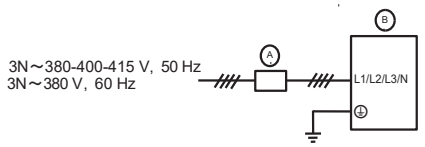
9-2-1. Wiring diagram for main power supply

■ Schematic Drawing of Wiring: When NOT using a Branch Box (example)

PUMY-SP•VKM series



PUMY-SP•YKM series



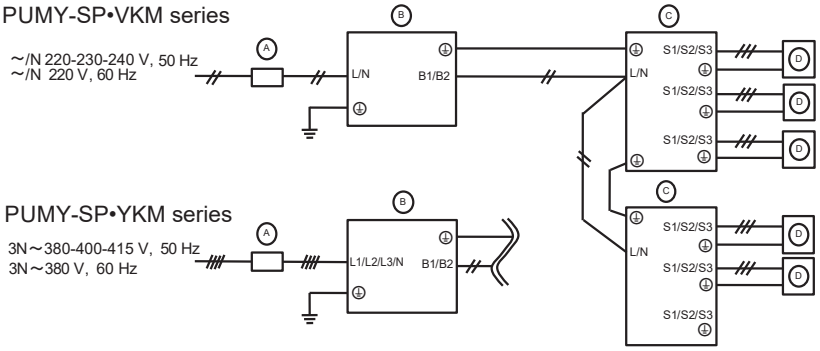
Note: The M-NET control indoor unit cannot receive power supplied from an outdoor unit, so provide it with power separately.

Ⓐ Switch (Breakers for Wiring and Current Leakage)
Ⓑ Outdoor Unit
Ⓒ Branch Box
Ⓓ A-Control Indoor Unit
Ⓔ M-NET Control Indoor unit
Ⓕ Pull Box

■ Schematic Drawing of Wiring: When using a Branch Box (example)

<When power is supplied from the outdoor unit>

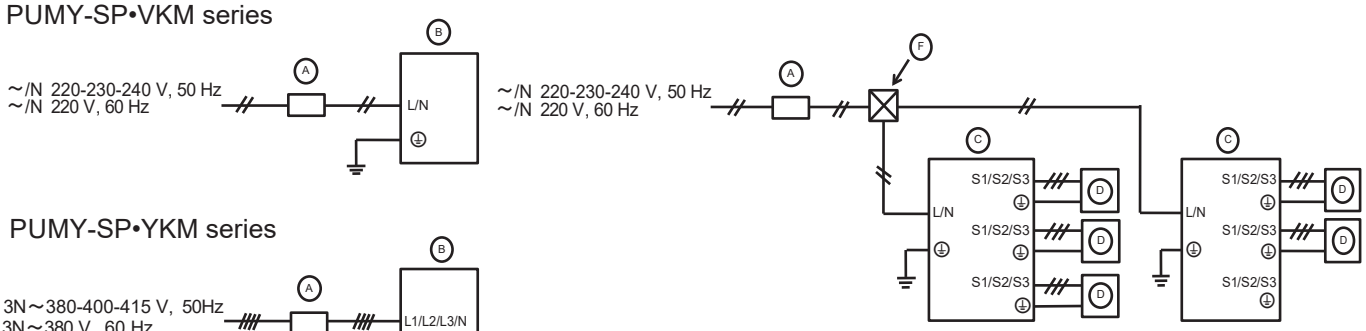
PUMY-SP•VKM series



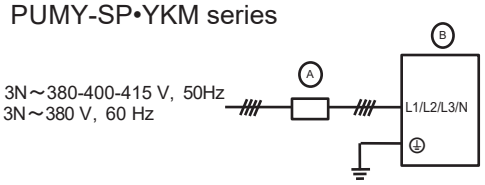
PUMY-SP•YKM series

<When power is supplied separately>

PUMY-SP•VKM series



PUMY-SP•YKM series

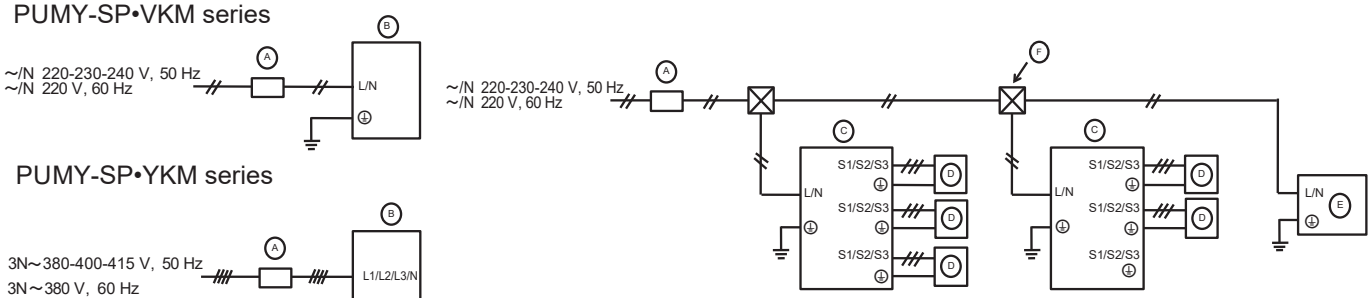


Ⓐ Switch (Breakers for Wiring and Current Leakage)
Ⓑ Outdoor Unit
Ⓒ Branch Box
Ⓓ A-Control Indoor Unit
Ⓔ M-NET Control Indoor unit
Ⓕ Pull Box

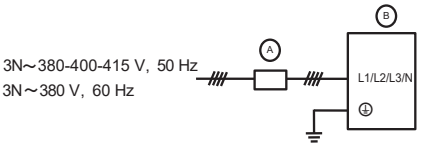
■ Schematic Drawing of Wiring: When using a Branch Box and M -NET control indoor unit (example)

<When power is supplied separately>

PUMY-SP•VKM series

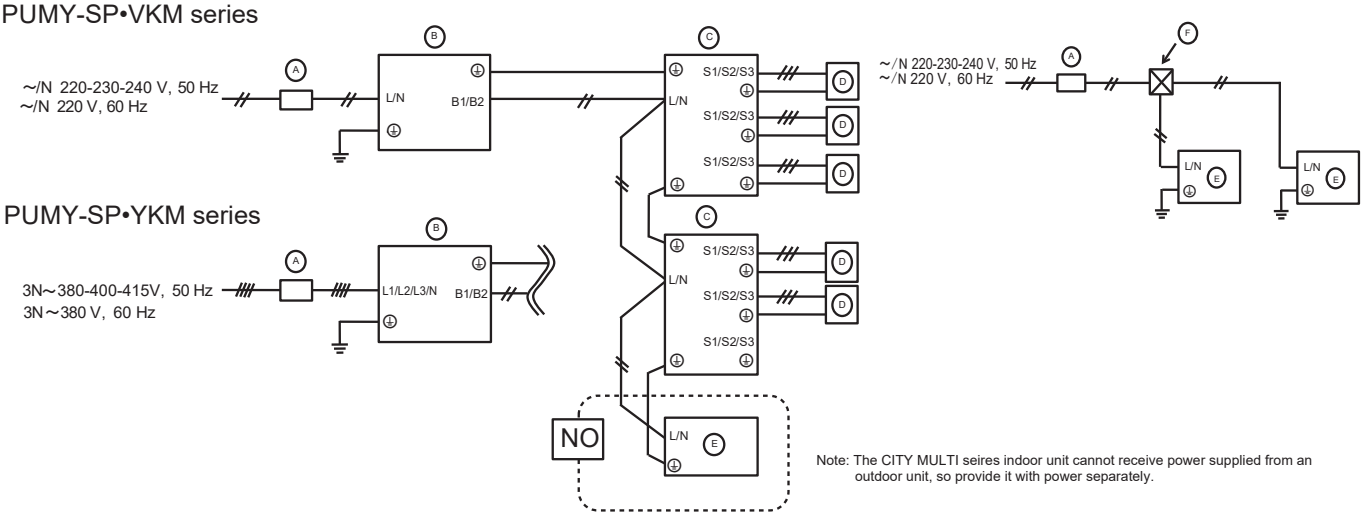


PUMY-SP•YKM series



<When power is supplied from the outdoor unit>

PUMY-SP•VKM series



PUMY-SP•YKM series

Note: The CITY MULTI seires indoor unit cannot receive power supplied from an outdoor unit, so provide it with power separately.

9-2-2. Cross section area of Wire for Main Power and ON/OFF capacities

<Outdoor unit> When power is supplied to outdoor unit and branch box separately

Model		Power Supply	Minimum Wire Cross-sectional area (mm²)		Breaker for Wiring *1	Breaker for Current Leakage
			Main Cable	Ground		
Outdoor Unit	SP112–140V	~/N 220-230-240 V, 50 Hz ~/N 220 V, 60 Hz	6	6	32 A	32 A 30 mA 0.1 seconds or less
	SP112–140Y	3N~380-400-415 V, 50 Hz 3N~380 V, 60 Hz *2	1.5	1.5	16 A	16 A 30 mA 0.1 seconds or less

<Outdoor unit> When power is supplied to branch box from the outdoor unit

Model		Power Supply	Minimum Wire Cross-sectional area (mm²)		Breaker for Wiring *1	Breaker for Current Leakage
			Main Cable	Ground		
Outdoor Unit	SP112–140V	~/N 220-230-240 V, 50 Hz ~/N 220 V, 60 Hz	6	6	40 A	40 A 30 mA 0.1 seconds or less
	SP112–140Y	3N~380-400-415 V, 50 Hz 3N~380 V, 60 Hz *2	2.5	2.5	25 A	25 A 30 mA 0.1 seconds 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).
*2 In multi-phase appliances, the colour of the neutral conductor of the supply cord, if any, shall be blue.

<Indoor units> When power is supplied to indoor unit and outdoor unit separately

Total operating current of the indoor unit	Minimum wire thickness (mm²)			Ground-fault interrupter *3	Local switch (A)		Breaker for wiring (NFB)
	Main Cable	Branch	Ground		Capacity	Fuse	
F0 = 16 A or less *4	1.5	1.5	1.5	20 A current sensitivity *5	16	16	20
F0 = 25 A or less *4	2.5	2.5	2.5	30 A current sensitivity *5	25	25	30
F0 = 32 A or less *4	4.0	4.0	4.0	40 A current sensitivity *5	32	32	40

Apply to IEC61000-3-3 about max. permissive system impedance.

*3 The Ground-fault interrupter should support inverter circuit.
The Ground-fault interrupter should combine using of local switch or wiring breaker.

*4 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 = F2 = {V1 × (Quantity of Type 1)/C} + {V1 × (Quantity of Type 2)/C} + {V1 × (Quantity of Type 3)/C} + ⋯ + {V1 × (Quantity of Type 15)/C}

Connect to Branch box (PAC-MK·BC)

Indoor unit		V1	V2
Type 1	PEAD-RP·JAQ(L), PEAD-M·JA(L)	26.9	2.4
Type 2	SEZ-KD·VA, SEZ-M·DA, PCA-RP·KAQ, PCA-M·KA, PLA-RP·EA, PLA-M·EA, SLZ-KF·VA, SLZ-M·FA	19.8	
Type 3	MLZ-KA·VA, MLZ-KP·VF	9.9	
Type 4	MSZ-LN·VG, MSZ-AP·VF, MSZ-AP·VG, MFZ-KJ·VE, MSZ-EF·VG-E2/ER2/ET2, MSZ-EF·VGK-E1/ER1/ET1, MSZ-AP·VGK, MFZ-KT·VG, MSZ-LN·VG2, MSZ-AY·VG(K)(P)	7.4	
Type 5	MSZ-FH·VE, MSZ-GF·VE, MSZ-SF·VE, MSZ-EF·VE, MSZ-SF·VA, MSZ-GE·VA, MSZ-EF·VG-E1/ER1/ET1	6.8	
Type 6	Branch box (PAC-MK·BC)	5.1	3.0

Connect to Connection kit (PAC-LV11M)

Indoor unit		V1	V2
Type 7	MSZ-LN·VG, MSZ-AP·VF, MSZ-AP·VG, MSZ-EF·VG-E2/ER2/ET2, MSZ-EF·VGK-E1/ER1/ET1, MSZ-AP·VGK, MFZ-KT·VG, MSZ-LN·VG2, MSZ-AY·VG(K)(P)	7.4	2.4
Type 8	MSZ-SF·VA, MSZ-SF·VE, MSZ-EF·VE, MSZ-FH·VE, MSZ-GE·VA, MSZ-EF·VG-E1/ER1/ET1	6.8	
Type 9	Connection kit (PAC-LV11M)	3.5	

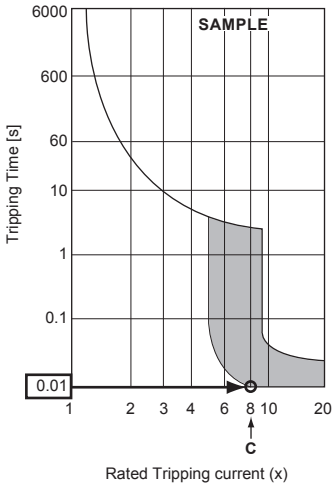
Connect to CITY MULTI

Indoor unit		V1	V2
Type 10	PEFY-P·VMA(L)-E(2), PEFY-P·VMA3-E	38.0	1.6
Type 11	PEFY-P·VMHS-E-F, PEFY-P·VMHS-E	26.8	
Type 12	PEFY-P·VMA(L)-E3, PEFY-M·VMA(L)-A	18.6	3.0
Type 13	PMFY-P·VBM-E, PLFY-P·VBM-E, PLFY-P·VEM-E, PLFY-EP·VEM-E, PLFY-P·VFM-E, PEFY-P·VMS1(L)-E, PCFY-P·VKM-E, PKFY-P·VHM-E, PKFY-P·VKM-E, PFFY-P·VCM-E, PFFY-P·VKM-E, PFFY-P·VLRMM-E, PKFY-P·VLM-E/ET, PLFY-M·VEM-E/ET	19.8	2.4
Type 14	PKFY-P·VBM-E	3.5	
Type 15	PLFY-P·VLMD-E, PEFY-P·VMH-E, PEFY-P·VMR-E-L/R, PEFY-P·VMH-E-F, PFFY-P·VLEM-E, PFFY-P·VLRM-E, GUF-RD(H)4	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 PLFY-P·VBM-E × 4 + PEFY-P·VMA-E × 1, C = 8 (refer to right sample chart)
F2 = 19.8 × 4/8 + 38 × 1/8
= 14.65
→ 16 A breaker (Tripping current = 8 × 16 A at 0.01 s)

Sample chart



*5 Current sensitivity is calculated using the following formula.
G1 = V2 × (Quantity of Type1) + V2 × (Quantity of Type2) + V2 × (Quantity of Type3) + ⋯ + V2 × (Quantity of Type15) + V3 × (Wire length[km])

<Example of "G1" calculation>
When connecting 3 units of the SEZ-KD respectively to a branch box with a wire that is 20 m long and 1.5 mm² in diameter, then connecting the branch box and PEFY-VMA to a single breaker with a wire that is 100 m long in total and 2.5 mm² in diameter.
G1 = 2.4 × 3 + 3 + 1.6 + 48 × 0.02 × 3 + 56 × 0.1
= 20.28

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

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

1. **Bear in mind ambient conditions (ambient temperature, direct sunlight, rain water, etc.) when proceeding with the wiring and connections.**
2. **The wire size is the minimum value for metal conduit wiring. The power cord size should be 1 rank thicker consideration of voltage drops. Make sure the power-supply voltage does not drop more than 10%.**
3. **Specific wiring requirements should adhere to the wiring regulations of the region.**
4. **Power supply cords of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord (design 60245 IEC57). For example, use wiring such as YZW.**
5. **Install an earth line longer than power cables.**

9-3. DESIGN FOR CONTROL WIRING

Please note that the types and numbers of control wires needed by the CITY MULTI series depend on the remote controllers and whether they are linked with the system or not.

9-3-1. Selection number of control wires

Use		M-NET remote controller
		Remote controller used in system control operations. • Group operation involving different refrigerant systems. • Linked operation with upper control system.
Remote controller → indoor unit		2-core wire (non-polar)
Transmission wires	Wires connecting → indoor units	
	Wires connecting → indoor units with outdoor unit	
	Wires connecting → outdoor units	

9-4. WIRING TRANSMISSION CABLES

9-4-1. Types of control cables

1. Wiring transmission cables

Types of transmission cables	Shielding wire CVVS, CPEVS, or MVVS
Cable diameter	More than 1.25 mm^2
Maximum wiring length	Within 200 m

2. M-NET Remote control cables

Types of remote control cables	Shielding wire (2-core) CVVS, CPEVS, or MVVS
Cable diameter	0.5 to 1.25 mm^2
Remarks	When 10 m is exceeded, use a cable with the same specifications as transmission line wiring.

3. MA Remote control cables

Type of remote control cable	Sheathed 2-core cable (unshielded) CVV
Cable diameter	0.3 to 1.25 mm^2 (0.75 to 1.25 mm^2)*
Remarks	Within 200 m

* Connected with simple remote controller.

9-4-2. Wiring examples

• Controller name, symbol and allowable number of controllers.

Name		Symbol	Allowable number of controllers	
Outdoor unit controller		OC	—	
Indoor unit controller	CITY MULTI Series	M-IC	PUMY-SP112	1 to 12 units per 1 OC*1
			PUMY-SP125	
			PUMY-SP140	
	M, S, P Series	A-IC	PUMY-SP112	2 to 8 units per 1 OC*1
			PUMY-SP125	
			PUMY-SP140	
Branch box		BC	0 to 2 units per 1 OC*1	
Remote controller	M-NET	M-NET RC*2	Maximum of 12 controllers for 1 OC*1 (Cannot be connected if Branch box is used.)	
	MA	MA-RC	Maximum of 2 per group	
	Wireless	WL-RC		

*1 The number of connectable units may be limited by some conditions such as an indoor unit's capacity or each unit's equivalent power consumption. (Refer to DATA BOOK.)

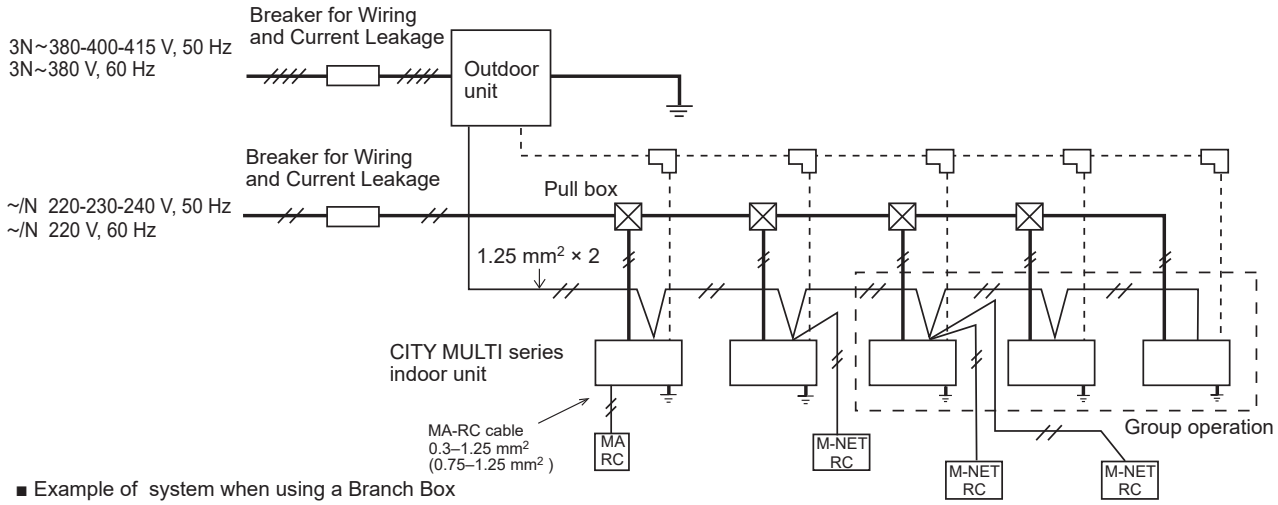
*2 Do not use the Lossnay controller (PZ-61DR-E, PZ-43SMF-E, PZ-52SF-E, PZ-60DR-E).

9-5. SYSTEM SWITCH SETTING

In order to identify the destinations of signals to the outdoor units, indoor units, and remote controller of the CITY MULTI series, each microprocessor must be assigned an identification number (address). The addresses of outdoor units, indoor units, and remote controller must be set using their settings switches. Please consult the installation manual that comes with each unit for detailed information on setting procedures.

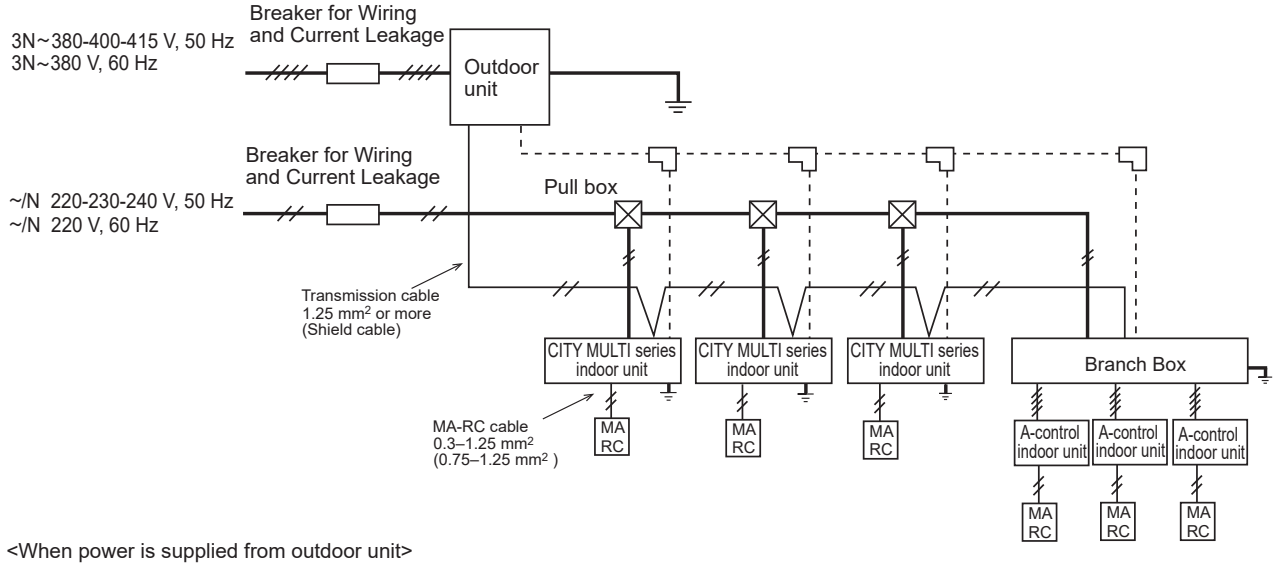
9-6. EXAMPLE EXTERNAL WIRING DIAGRAM FOR A BASIC SYSTEM (USING PUMY-SP·YKM)

■ Example of system when using an M-NET controller

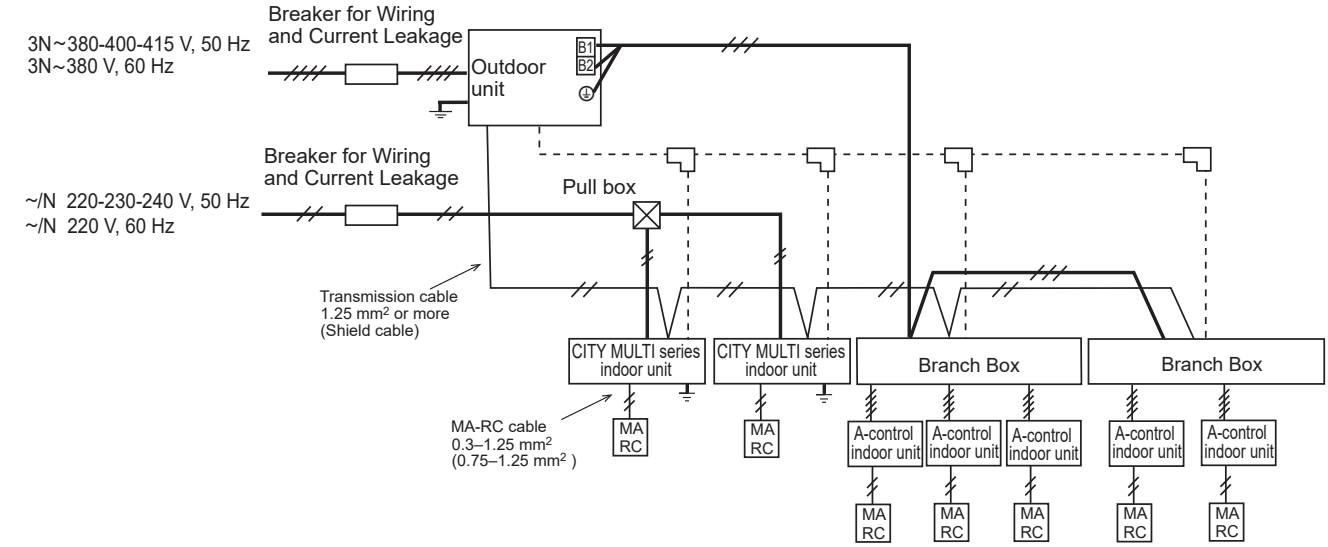


■ Example of system when using a Branch Box

<When power is supplied separately>



<When power is supplied from outdoor unit>



9-7. METHOD FOR OBTAINING ELECTRICAL CHARACTERISTICS WHEN A CAPACITY AGREEMENT IS TO BE SIGNED WITH AN ELECTRIC POWER COMPANY

The electrical characteristics of connected indoor unit system for air conditioning systems, including the CITY MULTI series, depend on the arrangement of the indoor and outdoor units.
First read the data on the selected indoor and outdoor units and then use the following formulas to calculate the electrical characteristics before applying for a capacity agreement with the local electric power company.

9-7-1. Obtaining the electrical characteristics of the CITY MULTI series system

(1) Procedure for obtaining total power consumption

	Page numbers in this technical manual	Power consumption
Total power consumption of each indoor unit	See the technical manual of each indoor unit.	①
Power consumption of outdoor unit*	Standard capacity diagram— Refer to 4-3.	②
Total power consumption of system	See the technical manual of each indoor unit.	①+② <kW>

*The power consumption of the outdoor unit will vary depending on the total capacity of the selected indoor units.

(2) Method of obtaining total current

	Page numbers in this technical manual	Subtotal
Total current through each indoor unit	See the technical manual of each indoor unit.	①
Current through outdoor unit*	Standard capacity diagram— Refer to 4-3.	②
Total current through system	See the technical manual of each indoor unit.	①+② <A>

*The current through the outdoor unit will vary depending on the total capacity of the selected indoor units.

(3) Method of obtaining system power factor

Use the following formula and the total power and current obtained in parts ① and ② on the above tables to calculate the system power factor.

$$\text{System power factor} = \frac{\text{(Total system power consumption)}}{\text{(Total system current} \times \text{voltage)}} \times 100\ \%$$

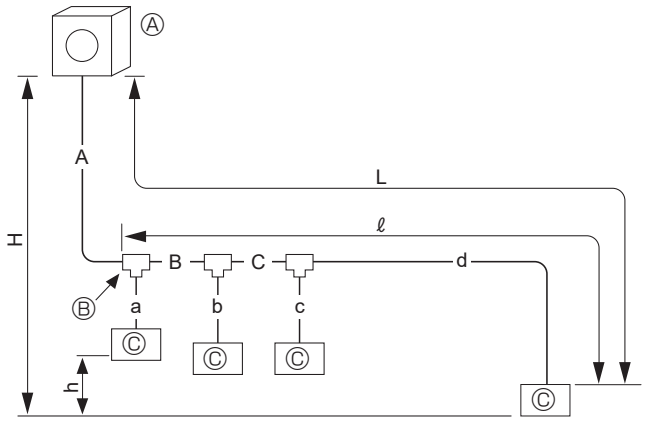
9-7-2. Applying to an electric power company for power and total current

Calculations should be performed separately for heating and cooling employing the same methods; use the largest resulting value in your application to the electric power company.

10 REFRIGERANT PIPING TASKS

10-1. REFRIGERANT PIPING SYSTEM

Line-Branch Method
Connection Examples
(Connecting to 4 Indoor Units)



Ⓐ Outdoor Unit
Ⓑ First Branch
Ⓒ Indoor unit

Permissible Length	Total Piping Length	A+B+C+a+b+c+d ≦ 120 m
	Farthest Piping Length (L)	A+B+C+d ≦ 70 m
	Farthest Piping Length After First Branch (ℓ)	B+C+d ≦ 50 m
Permissible High/Low Difference	High/Low Difference in Indoor/Outdoor Section (H)	H ≦ 50 m (If the outdoor unit is lower, H ≦ 30 m)
	High/Low Difference in Indoor/Indoor Section (h)	h ≦ 15 m

■ Selecting the Refrigerant Branch Kit

Use an optional branch piping kit (CMY-Y62-G-E).

■ Select Each Section of Refrigerant Piping

(1) Section From Outdoor Unit to First Branch (A)
(2) Section From Branch to Indoor Unit (a, b, c, d)
(3) Section From Branch to Branch (B, C)

Each Section of Piping

Select the size from the table to the right.

(1) Refrigerant Piping Diameter In Section From Outdoor Unit to First Branch (Outdoor Unit Piping Diameter)

Model	Piping Diameter (mm)	
PUMY-SP112 PUMY-SP125 PUMY-SP140	Liquid Pipe	ø9.52
	Gas Pipe	ø15.88

(2) Refrigerant Piping Diameter In Section From Branch to Indoor Unit (Indoor Unit Piping Diameter)

Model number	Piping Diameter (mm)		
– 50	Liquid Pipe	R ≦ 30 m	ø6.35
		R > 30 m	ø9.52
	Gas Pipe	ø12.7	
63 – 140	Liquid Pipe	ø9.52	
	Gas Pipe	ø15.88	

(3) Refrigerant Piping Diameter In Section From Branch to Branch

Liquid Pipe (mm)	Gas Pipe (mm)
ø9.52	ø15.88

Note:
- R indicates the piping length after the first branch.
- When connecting the CONNECTION KIT (PAC-LV11M-J) and an M-series indoor unit, refer to the installation manual for the CONNECTION KIT when selecting the pipe size and piping length.

■ 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 ø6.35 mm	+	Pipe size Liquid pipe ø9.52 mm	+	Total capacity of connected indoor units	Amount for the indoor units
(m) × 19.0 (g/m)		(m) × 50.0 (g/m)		─ 8.0 kW	1.5 kg
				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
3.5 kg

<Example>
Outdoor model : SP125
Indoor 1 : P63 (7.1 kW)
2 : P40 (4.5 kW)
3 : P25 (2.8 kW)
4 : P20 (2.2 kW)

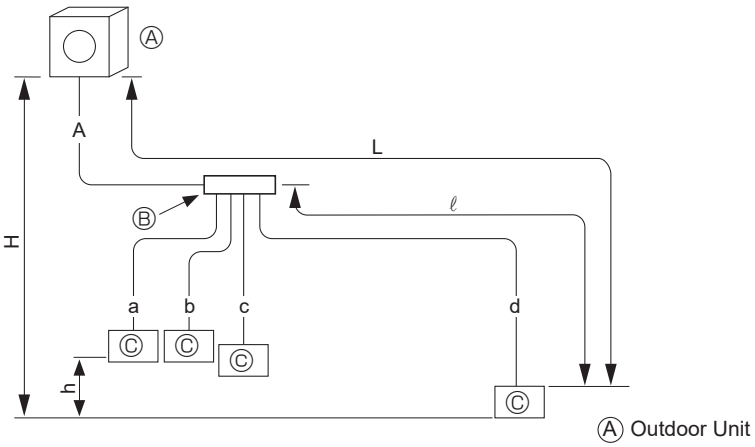
A : ø9.52 mm 20 m
B : ø9.52 mm 5 m
C : ø9.52 mm 5 m
a : ø9.52 mm 15 m
b : ø6.35 mm 10 m
c : ø6.35 mm 10 m
d : ø6.35 mm 20 m

At the conditions below:

The total length of each liquid line is as follows:
ø9.52 : A + B + C + a = 20 + 5 + 5 + 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

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

Header-Branch Method
Connection Examples
(Connecting to 4 Indoor Units)



Ⓐ Outdoor Unit
Ⓑ First Branch
Ⓒ Indoor unit

Permissible Length	Total Piping Length	A+a+b+c+d ≦ 120 m
	Farthest Piping Length (L)	A+d ≦ 70 m
	Farthest Piping Length After First Branch (ℓ)	ℓ ≦ 50 m
Permissible High/ Low Difference	High/Low Difference in Indoor/Outdoor Section (H)	H ≦ 50 m (If the outdoor unit is lower, H ≦ 30 m)
	High/Low Difference in Indoor/Indoor Section (h)	h ≦ 15 m

■ **Selecting the Refrigerant Branch Kit**

Please select branching kit, which is sold separately, from the table below.
(The kit comprises sets for use with liquid pipes and for use with gas pipes.)

Branch header (4 branches)	Branch header (8 branches)
CMY-Y64-G-E	CMY-Y68-G-E

■ **Select Each Section of Refrigerant Piping**

(1) Section From Outdoor Unit to First Branch (A)
(2) Section From Branch to Indoor Unit (a,b,c,d)
} Each Section of Piping

Select the size from the table to the right.

(1) Refrigerant Piping Diameter In Section From Outdoor Unit to First Branch (Outdoor Unit Piping Diameter)

Model	Piping Diameter (mm)	
PUMY-SP112 PUMY-SP125 PUMY-SP140	Liquid Pipe	ø9.52
	Gas Pipe	ø15.88

(2) Refrigerant Piping Diameter In Section From Branch to Indoor Unit (Indoor Unit Piping Diameter)

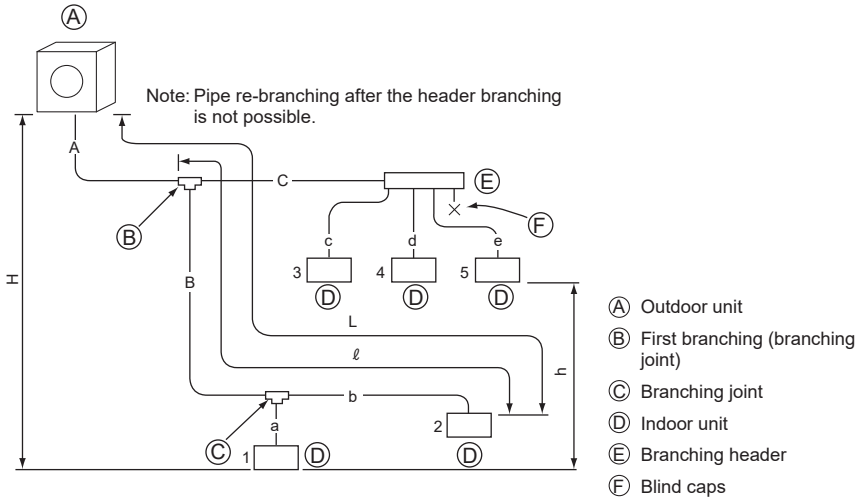
Model number	Piping Diameter (mm)		
– 50	Liquid Pipe	R ≦ 30 m	ø6.35
		R > 30 m	ø9.52
	Gas Pipe	ø12.7	
63 – 140	Liquid Pipe	ø9.52	
	Gas Pipe	ø15.88	

Note:
• R indicates the piping length after the first branch.
• When connecting the CONNECTION KIT (PAC-LV11M-J) and an M-series indoor unit, refer to the installation manual for the CONNECTION KIT when selecting the pipe size and piping length.

■ **Additional refrigerant charge**

Refer to the same section in the previous page.

Method of Combined Branching of Lines and Headers
Connection Examples
(Connecting to 5 Indoor Units)



Permissible Length	Total Piping Length	A+B+C+a+b+c+d+e ≦ 120 m
	Farthest Piping Length (L)	A+B+b ≦ 70 m
	Farthest Piping Length After First Branch (ℓ)	B+b ≦ 50 m
Permissible High/Low Difference	High/Low Difference in Indoor/Outdoor Section (H)	H ≦ 50 m (If the outdoor unit is lower, H ≦ 30 m)
	High/Low Difference in Indoor/Indoor Section (h)	h ≦ 15 m

■ **Selecting the Refrigerant Branch Kit**

Please select branching kit, which is sold separately, from the table below.
(The kit comprises sets for use with liquid pipes and for use with gas pipes.)

Branch Joint	Branch Header (4 branches)	Branch Header (8 branches)
CMY-Y62-G-E	CMY-Y64-G-E	CMY-Y68-G-E

■ **Select Each Section of Refrigerant Piping**

(1) Section From Outdoor Unit to First Branch (A)
(2) Section From Branch to Indoor Unit (a,b,c,d,e)
(3) Section From Branch to Branch (B,C)
} Each Section of Piping

Select the size from the table to the right.

(1) Refrigerant Piping Diameter In Section From Outdoor Unit to First Branch (Outdoor Unit Piping Diameter)

Model	Piping Diameter (mm)	
PUMY-SP112 PUMY-SP125 PUMY-SP140	Liquid Pipe	ø9.52
	Gas Pipe	ø15.88

(2) Refrigerant Piping Diameter In Section From Branch to Indoor Unit (Indoor Unit Piping Diameter)

Model number	Piping Diameter (mm)		
– 50	Liquid Pipe	R ≦ 30 m	ø6.35
		R > 30 m	ø9.52
	Gas Pipe		ø12.7
63 – 140	Liquid Pipe		ø9.52
	Gas Pipe		ø15.88

(3) Refrigerant Piping Diameter In Section From Branch to Branch

Liquid Pipe (mm)	Gas Pipe (mm)
ø9.52	ø15.88

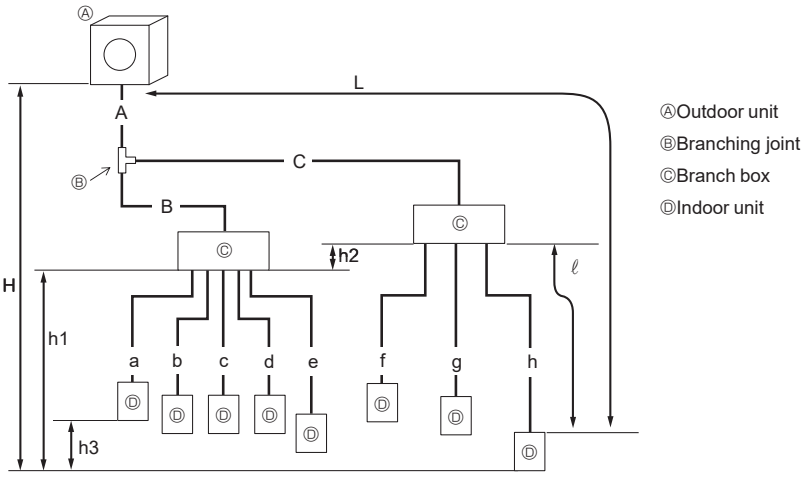
Note:
- R indicates the piping length after the first branch.
- When connecting the CONNECTION KIT (PAC-LV11M-J) and an M-series indoor unit, refer to the installation manual for the CONNECTION KIT when selecting the pipe size and piping length.

■ **Additional refrigerant charge**

Refer to the same section in the previous page.

10-2. REFRIGERANT PIPING SYSTEM (WHEN USING BRANCH BOX)

Branch box Method
Connection Examples
(Connecting to 8 Indoor Units)



Permissible length (One-way)	Total piping length	A + B + C + a + b + c + d + e + f + g + h ≦ 120 m
	Farthest piping length (L)	A + C + h ≦ 80 m (A + C ≦ 55 m, h ≦ 25 m)
	Piping length between outdoor unit and branch boxes	A + B + C ≦ 55 m
	Farthest piping length after branch box (ℓ)	ℓ ≦ 25m
	Total piping length between branch boxes and indoor units	a + b + c + d + e + f + g + h ≦ 95 m
Permissible height difference (One-way)	In indoor/outdoor section (H)*	H ≦ 50 m (When outdoor unit is set higher than indoor unit)
		H ≦ 30 m (When 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		≦ 15

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

■ Select Each Section of Refrigerant Piping

(1) Section From Outdoor Unit to Branch box (A, B, C)
(2) Section From Branch box to Indoor Unit (a to h)
} Each Section of Piping

Select the size from the table to the right.

(1) Refrigerant Piping Diameter In Section From Outdoor Unit to Branch box (Outdoor Unit Piping Diameter)

Model number	Piping Diameter (mm)	
PUMY-SP112 PUMY-SP125 PUMY-SP140	Liquid Pipe	ø9.52
	Gas Pipe	ø15.88

(2) Refrigerant Piping Diameter In Section From Branch box to Indoor Unit (Indoor Unit Piping Diameter)

Indoor unit series	Model number	Liquid Pipe	Gas Pipe
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

(mm)

* If the pipe size of indoor unit is different, use a different-diameter joint.

■ 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 ø6.35 mm	+	Pipe size Liquid pipe ø9.52 mm	+
(m) × 19.0 (g/m)		(m) × 50.0 (g/m)	

Total capacity of connected indoor units	Amount for the indoor units
— 8.0 kW	1.5 kg
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
3.5 kg

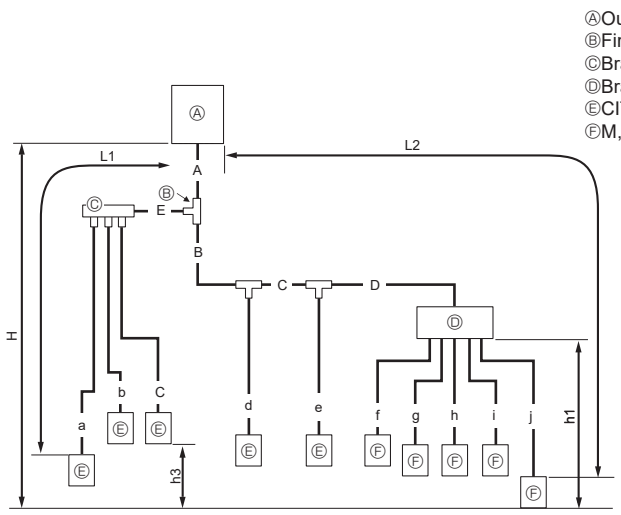
<Example>
Outdoor model: SP125
Indoor 1: P63 (7.1 kW)
2: P40 (4.5 kW)
3: P25 (2.8 kW)
4: P20 (2.2 kW)

A: ø9.52 mm 30 m
a: ø9.52 mm 15 m
b: ø6.35 mm 10 m
c: ø6.35 mm 10 m
d: ø6.35 mm 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

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

Mixed Method
Connection Examples
(Connecting to 1 Branch box)



Permissible length (One-way)	Total piping length	A+B+C+D+E+a+b+c+d+e+f+g+h+i+j ≦ 120 m
	Farthest piping length (L1)	A+E+a or A+B+C+e ≦ 70 m
	Farthest piping length. Via Branch box (L2)	A+B+C+D+j ≦ 80 m
	Piping length between outdoor unit and branch box	A+B+C+D ≦ 55 m
	Farthest piping length from the first joint	B+C+D or B+C+e ≦ 50 m
	Farthest piping length after branch box	j ≦ 25 m
	Total piping length between branch boxes and indoor units	f+g+h+i+j ≦ 95 m
Permissible height difference (One-way)	In indoor/outdoor section (H)*	H ≦ 50 m (When outdoor unit is set higher than indoor unit)
		H ≦ 30 m (When 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		≦ 15

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

■ **Selecting the Refrigerant Branch Kit**

Please select branching kit, which is sold separately, from the table below.
(The kit comprises sets for use with liquid pipes and for use with gas pipes.)

Branch header (4 branches)	Branch header (8 branches)
CMY-Y64-G-E	CMY-Y68-G-E

■ **Select Each Section of Refrigerant Piping**

(1) Section From Outdoor Unit to Branch box or Branch header (A to E)
(2) Sections From Branch box or Branch header to Indoor Unit (a to j)
} Each Section of Piping

Select the size from the table to the right.

(1) Refrigerant Piping Diameter In Section From Outdoor Unit to Branch box or Branch header (Out-door Unit Piping Diameter)

Model	Piping Diameter (mm)	
PUMY-SP112 PUMY-SP125 PUMY-SP140	Liquid Pipe	ø9.52
	Gas Pipe	ø15.88

(2) Refrigerant Piping Diameter In Section From Branch box or Branch header to Indoor Unit (Indoor Unit Piping Diameter)

Indoor unit series	Model number	Liquid Pipe		Gas Pipe
CITY MULTI	– 50	R ≦ 30 m	ø6.35	ø12.7
		R > 30 m	ø9.52	
	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

(mm)

* If the pipe size of indoor unit is different, use a different-diameter joint.

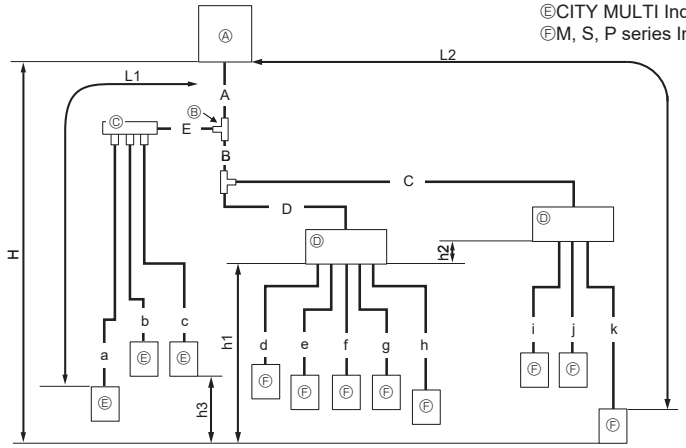
Note:
• R indicates the piping length after the first branch.
• When connecting the CONNECTION KIT (PAC-LV11M-J) and an M-series indoor unit, refer to the installation manual for the CONNECTION KIT when selecting the pipe size and piping length.

■ **Additional refrigerant charge**

Refer to the same section in the previous page.

Mixed Method
Connection Examples
(Connecting to 2 Branch boxes)

Ⓐ Outdoor Unit
Ⓑ First joint
Ⓒ Branch header
Ⓓ Branch box
Ⓔ CITY MULTI Indoor unit
Ⓕ M, S, P series Indoor unit



Permissible length (One-way)	Total piping length	A+B+C+D+E+a+b+c+d+e+f+g+h+i+j+k ≦ 120 m
	Farthest piping length (L1)	A+E+a ≦ 70 m
	Farthest piping length. Via Branch box (L2)	A+B+C+k ≦ 80 m
	Piping length between outdoor unit and branch boxes	A+B+C+D ≦ 55 m
	Farthest piping length from the first joint	B+C or E+a ≦ 50 m
	Farthest piping length after branch box	k ≦ 25 m
	Farthest branch box form outdoor unit	A+B+C ≦ 55 m
	Total piping length between branch boxes and indoor units	d+e+f+g+h+i+j+k ≦ 95 m
Permissible height difference (One-way)	In indoor/outdoor section (H)*	H ≦ 50 m (When outdoor unit is set higher than indoor unit)
		H ≦ 30 m (When 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		≦ 15

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

■ **Selecting the Refrigerant Branch Kit**

Please select branching kit, which is sold separately, from the table below.
(The kit comprises sets for use with liquid pipes and for use with gas pipes.)

Branch header (4 branches)	Branch header (8 branches)
CMY-Y64-G-E	CMY-Y68-G-E

■ **Select Each Section of Refrigerant Piping**

(1) Section From Outdoor Unit to Branch box or Branch header (A to E)
(2) Sections From Branch box or Branch header to Indoor Unit (a to k)
} Each Section of Piping

Select the size from the table to the right.

(1) Refrigerant Piping Diameter In Section From Outdoor Unit to Branch box or Branch header (Out-door Unit Piping Diameter)

Model	Piping Diameter (mm)	
PUMY-SP112 PUMY-SP125 PUMY-SP140	Liquid Pipe	ø9.52
	Gas Pipe	ø15.88

(2) Refrigerant Piping Diameter In Section From Branch box or Branch header to Indoor Unit (Indoor Unit Piping Diameter)

Indoor unit series	Model number	Liquid Pipe		Gas Pipe
CITY MULTI	– 50	R ≦ 30 m	ø6.35	ø12.7
		R > 30 m	ø9.52	
	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

(mm)

* If the pipe size of indoor unit is different, use a different-diameter joint.

Note:
• R indicates the piping length after the first branch.
• When connecting the CONNECTION KIT (PAC-LV11M-J) and an M-series indoor unit, refer to the installation manual for the CONNECTION KIT when selecting the pipe size and piping length.

■ **Additional refrigerant charge**

Refer to the same section in the previous page.

10-3. PRECAUTIONS AGAINST REFRIGERANT LEAKAGE

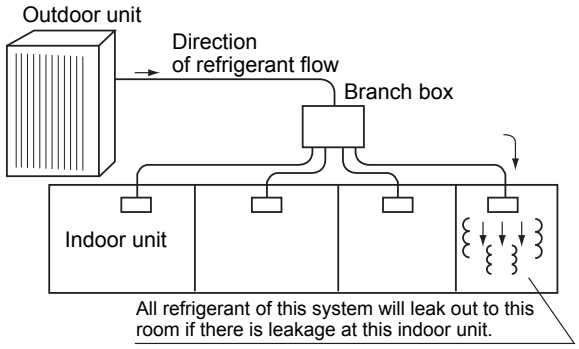
10-3-1. Introduction

R410A refrigerant of this air conditioner is non-toxic and non-flammable but leaking of large amount from an indoor unit into the room where the unit is installed may be deleterious. To prevent possible injury, the rooms should be large enough to keep the R410A concentration specified by ISO 5149-1 as follows.

Maximum concentration
Maximum refrigerant concentration of R410A of a room is 0.44kg/m³ accordance with ISO 5149-1.
To facilitate calculation, the maximum concentration is expressed in units of kg/m³ (kg of R410A per m³)

Maximum concentration of R410A: 0.44 kg/m³

(ISO 5149-1)



10-3-2. Confirming procedure of R410A concentration

Follow (1) to (3) to confirm the R410A concentration and take appropriate treatment, if necessary.

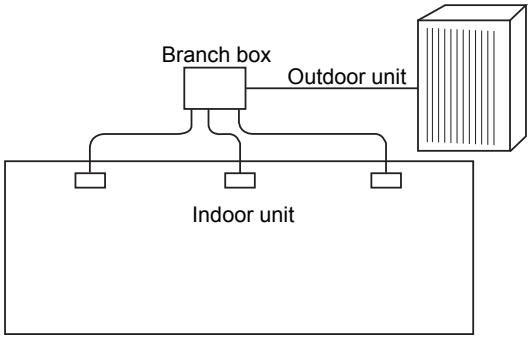
(1) Calculate total refrigerant amount by each refrigerant system. Total refrigerant amount is precharged refrigerant at ex-factory plus additional charged amount at field installation.

Note:
When the air conditioning system consists of several independent refrigerant system, figure out the total refrigerant amount by each independent refrigerant system.

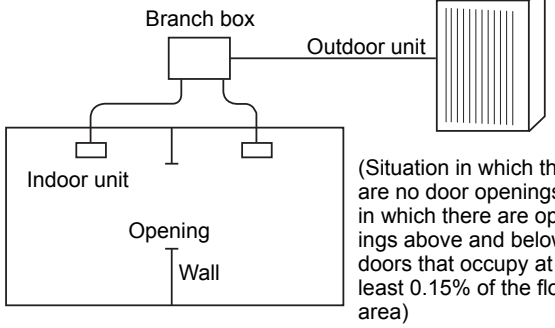
(2) Calculate room volumes (m³) and find the room with the smallest volume

The part with ☐ represents the room with the smallest volume.

(a) Situation in which there are no partitions

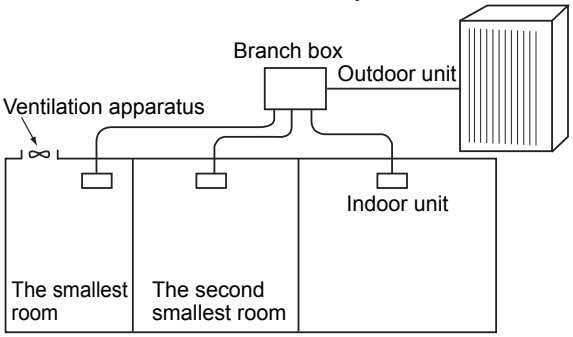


(b) There are partitions, but there are openings that allow the effective mixing of air.



(Situation in which there are no door openings or in which there are openings above and below doors that occupy at least 0.15% of the floor area)

(c) If the smallest room has mechanical ventilation apparatus that is linked to a household gas detection and alarm device, the calculations should be performed for the second smallest room.



(3) Use the results of calculations (1) and (2) to calculate the refrigerant concentration:

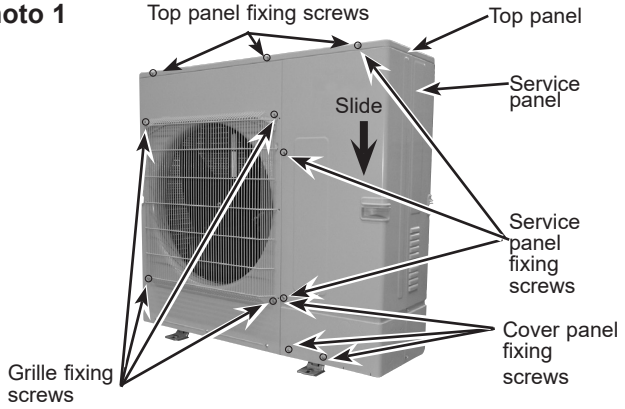
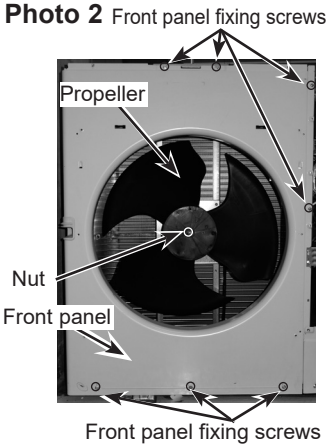
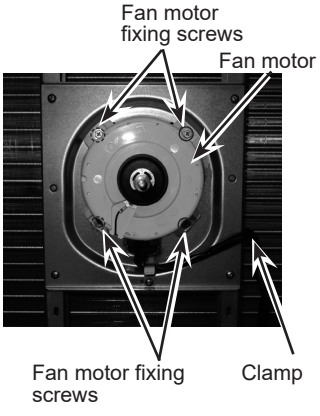
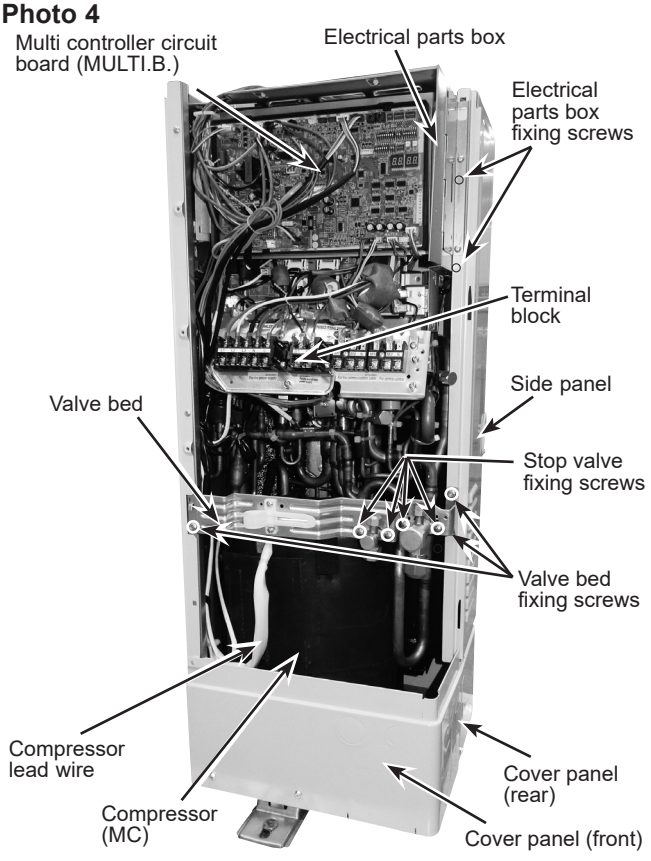
$$\frac{\text{Total refrigerant in the refrigerating unit (kg)}}{\text{The smallest room in which an indoor unit has been installed (m}^3\text{)}} \leqq \text{Maximum concentration(kg/m}^3\text{)*}$$

*Maximum concentration of R410A:0.44kg/m³

If the calculation results do not exceed the maximum concentration, perform the same calculation for larger rooms until it has been determined that nowhere exceeds the maximum concentration.

11 DISASSEMBLY PROCEDURE

——→ : Indicates the visible parts in the photos/figures.
- - - - - - - → : Indicates the invisible parts in the photos/figures.

OPERATING PROCEDURE	PHOTOS/FIGURES
1. Removing the service panel and the top panel (1) Remove 3 service panel fixing screws (5 × 12), and slide the hook on the right downward to remove the service panel. (2) Remove screws (2 for front, 3 for rear/5 × 12) of the top panel and remove it.	**Photo 1** 
2. Removing the fan motor (MF1) (1) Remove the service panel. (See Photo 1) (2) Remove the top panel. (See Photo 1) (3) Remove 4 fan grille fixing screws (5 × 12) to detach the fan grille. (See Photo 1) (4) Remove a nut (for right handed screw of M6) to detach the propeller. (See Photo 2) (5) Disconnect the connector CNF1 on the multi controller circuit board in the electrical parts box. (See Photo 4) (6) Loosen a clamp on the side of the motor support. (See Photo 3) (7) Remove 4 fan motor fixing screws (5 × 20) to detach the fan motor. (See Photo 3) Note: Tighten the propeller fan with a torque of 5.7 ± 0.3 N·m.	**Photo 2** Front panel fixing screws  **Photo 3** 
3. Removing the electrical parts box (1) Remove the service panel. (See Photo 1) (2) Remove the top panel. (See Photo 1) (3) Disconnect the connecting wire from terminal block. (See Photo 5 for VKM type, or Photo 7 for YKM type) (4) Disconnect the connector CNF1, 4-way valve coil, LEV-A and LEV-B on the multi controller circuit board. <Symbols on the board> • CNF1: Fan motor • LEV-A: LEV • LEV-B: LEV • 21S4: 4-way valve coil • 63HS: Pressure sensor • SV1: Solenoid valve coil • 63H: Pressure switch • 63LS: Pressure sensor (5) Disconnect the pipe-side connections of the following parts: • Thermistor <HIC> (TH2) • Thermistor <Compressor> (TH4) • Thermistor <Liquid> (TH3) • Thermistor <Suction> (TH6) • Thermistor <Ambient> (TH7) (6) Remove the comp felt (top). (7) Remove a nut from the terminal cover to remove the cover, and disconnect the compressor lead wire. (See Photo11) (8) Remove 2 electrical parts box fixing screws (4 × 10), and detach the electrical parts box by pulling upward. The electrical parts box is fixed with 2 hooks on the left and 1 hook on the right.	**Photo 4** 

OPERATING PROCEDURE

4. Disassembling the electrical parts box (VKM type)

(1) Disconnect all the connectors on the multi controller circuit board.
(2) Remove 2 screws ① which fix the plate holding the multi controller circuit board and the electrical parts box. (See Photo 5)
(3) Remove the multi controller circuit board. (See Photo 5)
(4) Disconnect the M-NET power board connector on the back plate of the controller circuit board.
(5) Disconnect the connectors of reactor on the back plate of the electrical parts box. (See Photo 6)
(6) Remove screws ② on the back plate of the electrical parts box. (See Photo 6)
(7) Remove the 3 reactors. (See Photo 6)

Note 1: When reassembling the electrical parts box, make sure that the wirings are correct.
Note 2: When exchanging the reactor, make sure to exchange all the 3 reactors.

5. Disassembling the electrical parts box (YKM type)

(1) Disconnect all the connectors on the multi controller circuit board.
(2) Remove 2 screws ① which fix the plate holding the multi controller circuit board and the electrical parts box. (See Photo 7.)
(3) Remove the multi controller circuit board. (See Photo 7.)
(4) Disconnect the M-NET power board connector on the back plate of the controller circuit board.
(5) Disconnect all the connectors on the noise filter circuit board. (See Photo 8)
(6) Remove 9 supports on the noise filter circuit board. (See Photo 8)
(7) Remove the noise filter circuit board. (See Photo 8)
(8) Remove the noise filter plate fixing screws. (See Photo 8)
(9) Disconnect the connectors of reactor on the bottom plate of the electrical parts box. (See Photo 9)
(10) Remove 4 screws ② on the bottom plate of the electrical parts box. (See Photo 9)
(11) Remove the reactor. (See Photo 9)

Note: When reassembling the electrical parts box, make sure that the wirings are correct.

PHOTOS/FIGURES

Photo 5

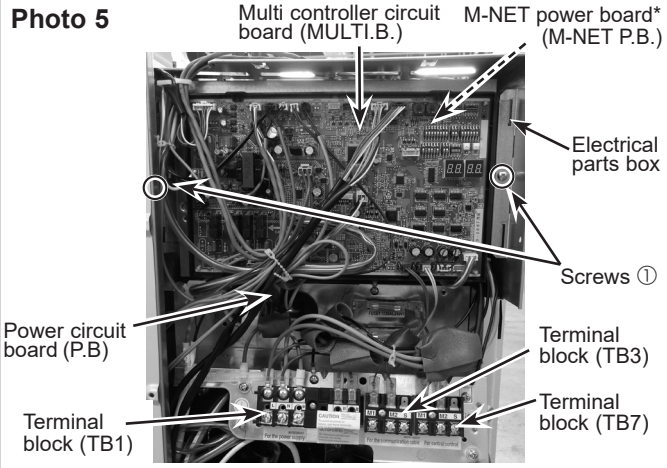
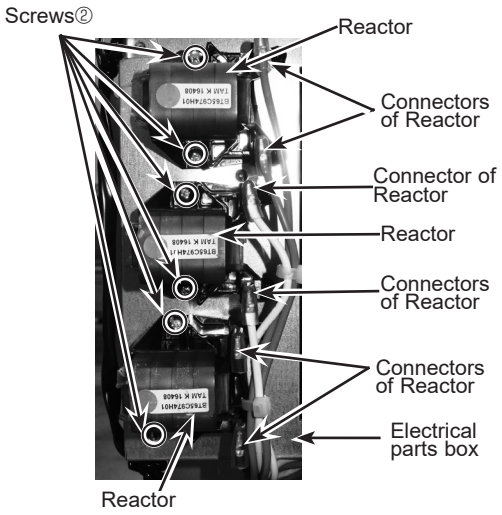
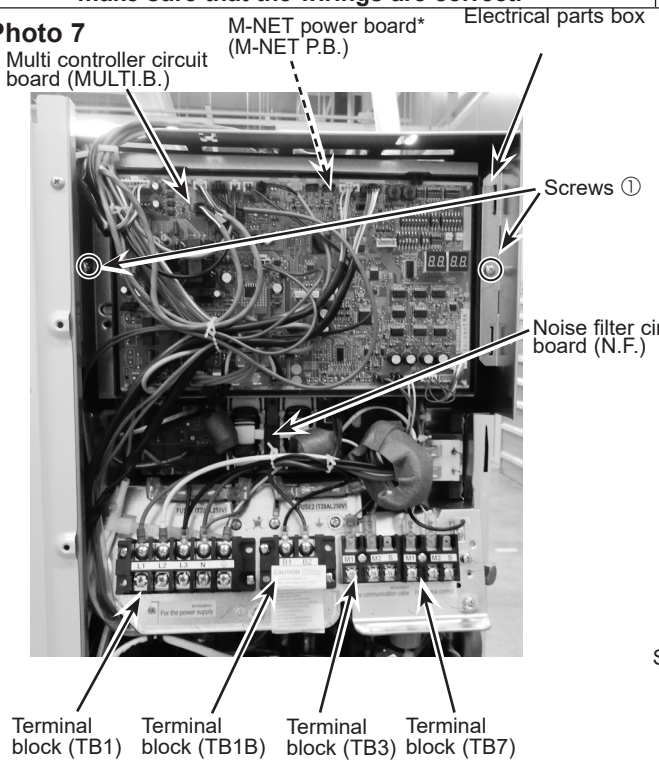


Photo 6



* The M-NET power board is installed behind the multi controller circuit board.

Photo 7



* The M-NET power board is installed behind the multi controller circuit board.

Photo 8

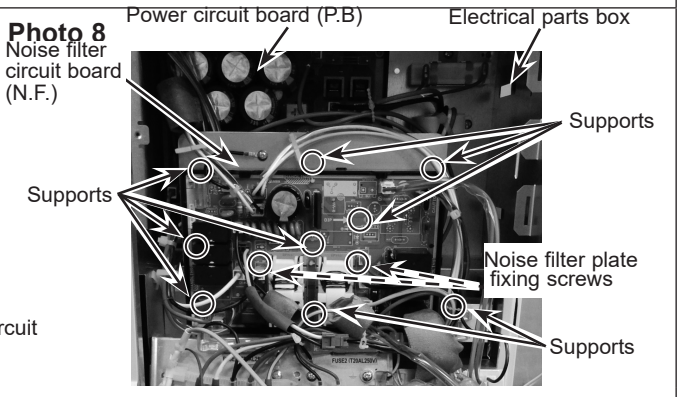
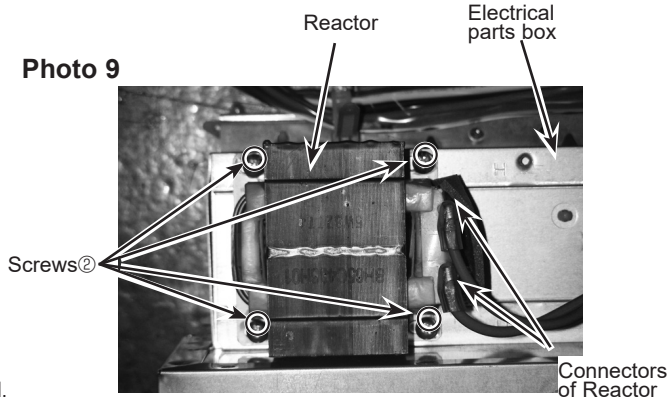
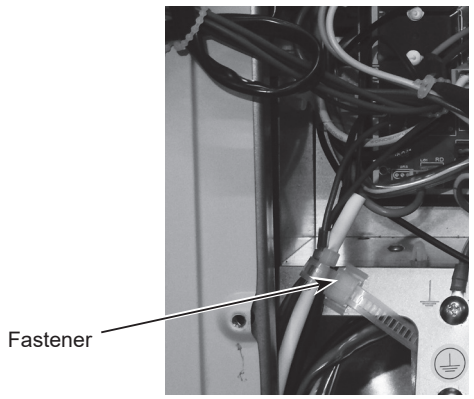
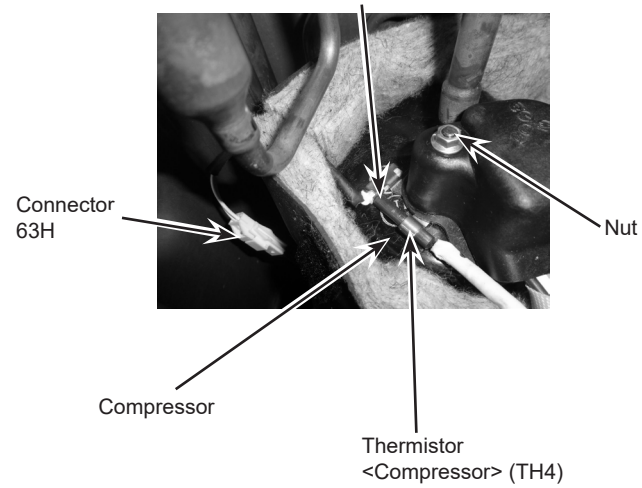


Photo 9



OPERATING PROCEDURE	PHOTOS/FIGURES
6. Removing the thermistor <HIC> (TH2), the thermistor <Compressor> (TH4) and Compressor protector (TRS) (1) Remove the service panel. (See Photo 1) (2) Remove the top panel. (See Photo 1) (3) Disconnect the following connectors on the controller circuit board in the electrical parts box. • TH2: Black • TH4:White [Removing the thermistor <HIC> (TH2)] (4) Loosen the fastener fixing the connector to the electrical parts box. (See Photo 10) (5) Pull out the thermistor <HIC> (TH2) from the sensor holder. (See Photo 13) [Removing the thermistor <Compressor> (TH4)] (4) Loosen the fastener fixing the connector to the electrical parts box. (See Photo 10) (5) Remove the comp felt (top). (6) Pull out the thermistor <Compressor> (TH4) from the sensor holder. (See Photo 11) [Removing the Compressor protector (TRS)] (4) Remove the comp felt (top). (5) Pull out the Compressor protector (TRS) from Holder. (See Photo 11) (6) Disconnect the Compressor protector (TRS) from Connector 63H. (See Photo 11)	**Photo 10** 
7. Removing the thermistor <Liquid> (TH3), the thermistor <Suction> (TH6), and thermistor <Ambient> (TH7) (1) Remove the service panel. (See Photo 1.) (2) Remove the top panel. (See Photo 1.) (3) Remove the side panel (R) by removing the following screws: • Electrical parts box fixing screws (4 × 10): 2 pieces • Valve bed fixing screws (5 × 12): 2 pieces • Side panel fixing screw on the right side of the panel (5 × 12): 1 piece • Side panel fixing screw in the rear of the panel (5 × 12): 3 pieces (4) Disconnect the following connectors on the multi controller circuit board in the electrical parts box. • TH3: White • TH6/7: Red (5) Loosen the fastener fixing the connector to the electrical parts box. (See Photo 10) (6) Pull out each thermistor from the sensor holder. (See Photo 12, 13) **Note: When replacing thermistor <Ambient> (TH7), replace it together with thermistor <Suction> (TH6), since they are combined together.**	**Photo 11** 

OPERATING PROCEDURE

8. Removing LEV coil

[LEV-A]

(1) Remove the service panel. (See Photo 1)

(2) Disconnect the connector CNL VA (WH) on the multi controller circuit board in the electrical parts box.

(3) Remove the LEV coil by sliding the coil upward. (See Photo 13)

[LEV-B]

(1) Remove the service panel. (See Photo 1)

(2) Disconnect the connector CNL VB (RD) on the multi controller circuit board in the electrical parts box.

(3) Remove the LEV coil by sliding the coil upward. (See Photo 13)

9. Removing LEV

(1) Remove the service panel. (See Photo 1)

(2) Remove the top panel. (See Photo 1)

(3) Remove the electrical parts box. (Refer to procedure 3)

(4) Remove the LEV coil.(Refer to procedure 8)

(5) Recover refrigerant.

(6) Remove the welded part of LEV.

Note 1: Recover refrigerant without spreading it in the air.

Note 2: The welded part can be removed easily by removing the right side panel.

Note 3: When installing the LEV, cover it with a wet cloth to prevent it from heating (120°C or more), then braze the pipes so that the inside of pipes are not oxidized.

PHOTOS/FIGURES

Photo 12

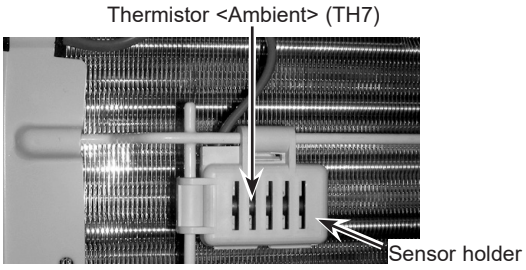


Photo 13

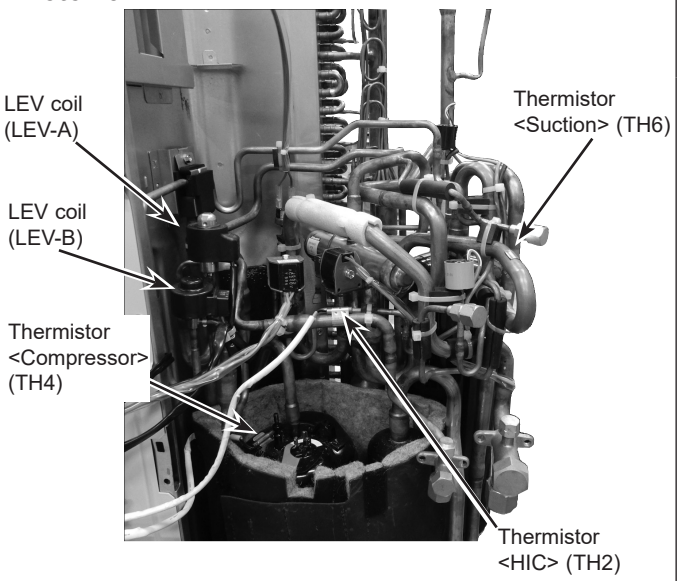
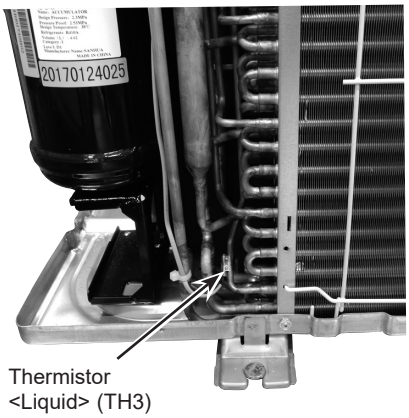
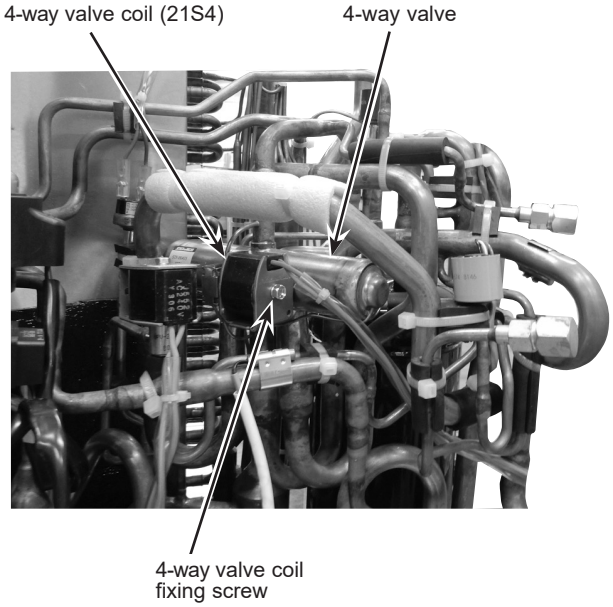
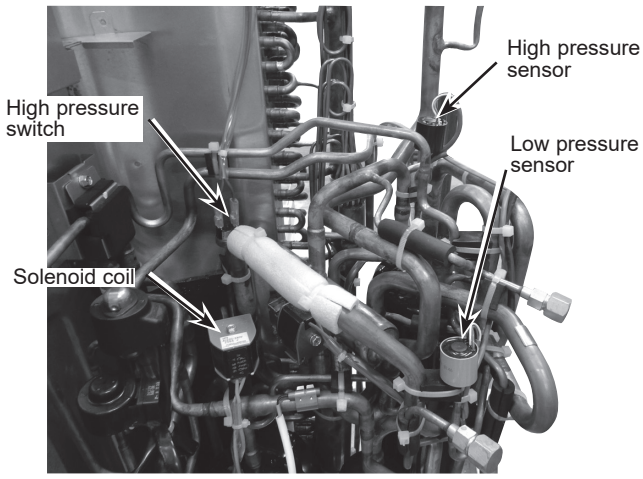
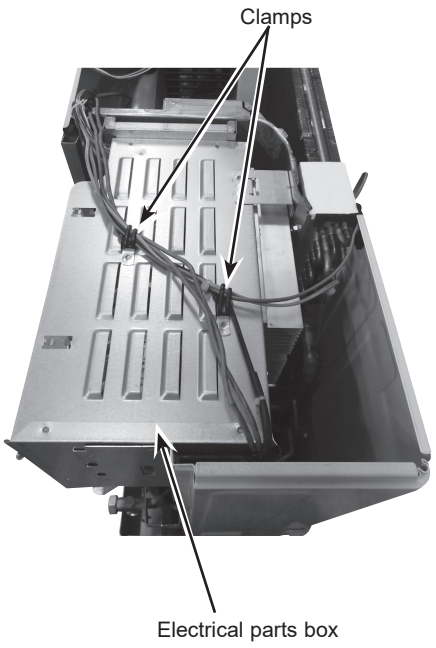


Photo 14



OPERATING PROCEDURE	PHOTOS/FIGURES
10. Removing the 4-way valve coil (21S4) (1) Remove the service panel. (See Photo 1) **[Removing the 4-way valve coil]** (2) Remove 4-way valve coil fixing screw (M5 × 7). (3) Remove the 4-way valve coil by sliding the coil toward you. (4) Disconnect the connector 21S4 (green) on the outdoor multi controller circuit board in the electrical parts box.	**Photo 15** 
11. Removing the 4-way valve (1) Remove the service panel. (See Photo 1) (2) Remove the top panel. (See Photo 1) (3) Remove the electrical parts box (Refer to procedure 3) (4) Remove 3 valve bed fixing screws (5 × 12) and 4 stop valve fixing screws (5 × 16) and then remove the valve bed. (See Photo 4) (5) Remove 4 right side panel fixing screw (5 × 12) in the rear of the unit and then remove the right side panel. (6) Remove the 4-way valve coil. (See Photo 15) (7) Recover refrigerant. (8) Remove the welded part of 4-way valve. **Note 1: Recover refrigerant without spreading it in the air.** **Note 2: The welded part can be removed easily by removing the right side panel.** **Note 3: When installing the 4-way valve, cover it with a wet cloth to prevent it from heating (120°C or more), then braze the pipes so that the inside of pipes are not oxidized.**	

OPERATING PROCEDURE	PHOTOS/FIGURES
12. Removing the solenoid valve coil (SV1) and the solenoid valve (1) Remove the service panel. (See Photo 1) (2) Remove the top panel. (See Photo 1) (3) Disconnect the connector SV1 (Gray) on the multi controller circuit board in the electrical parts box. (4) Remove the electrical parts box. (Refer to procedure 3) (5) Remove the solenoid valve coil fixing screw (M4 ×6). (6) Remove the solenoid valve coil by sliding the coil upward. (7) Recover refrigerant. (8) Remove the welded part of solenoid valve. **Note 1: Recover refrigerant without spreading it in the air.** **Note 2: When installing the solenoid valve, cover it with a wet cloth to prevent it from heating (120°C or more), then braze the pipes so that the inside of pipes are not oxidized.**	**Photo 16** 
13. Removing the high pressure switch (63H) (1) Remove the service panel. (See Photo 1) (2) Remove the top panel. (See Photo 1) (3) Remove the electrical parts box. (Refer to procedure 3) (4) Remove the side panel (R). (Refer to the procedure 7 (3)) (5) Pull out the 2 lead wire of the high pressure switch. (6) Recover refrigerant. (7) Remove the welded part of high pressure switch. **Note 1: Recover refrigerant without spreading it in the air.** **Note 2: The welded part can be removed easily by removing the right side panel.** **Note 3: When installing the high pressure switch and high pressure sensor, cover them with a wet cloth to prevent them from heating (100°C or more), then braze the pipes so that the inside of pipes are not oxidized.**	**Photo 17** 
14. Removing the low pressure sensor (63LS) and the high pressure sensor (63HS) (1) Remove the service panel. (See Photo 1) (2) Remove the top panel. (See Photo 1) (3) Remove the side panel (R). (Refer to the procedure 7 (3)) (4) Disconnect the connector 63LS (blue) and the 63HS(white) on the multi controller circuit board in the electrical parts box. (5) Loosen the clamps, which are fixing the low pressure sensor and high pressure sensor lead wire to the top of the electrical parts box. (See Photo 17) (6) Recover refrigerant. (7) Remove the welded part of low pressure sensor and high pressure sensor. **Note 1: Recover refrigerant without spreading it in the air.** **Note 2: The welded part can be removed easily by removing the right side panel.** **Note 3: When installing the low pressure sensor and high pressure sensor, cover it with a wet cloth to prevent it from heating (100°C or more), then braze the pipes so that the inside of pipes are not oxidized.**	

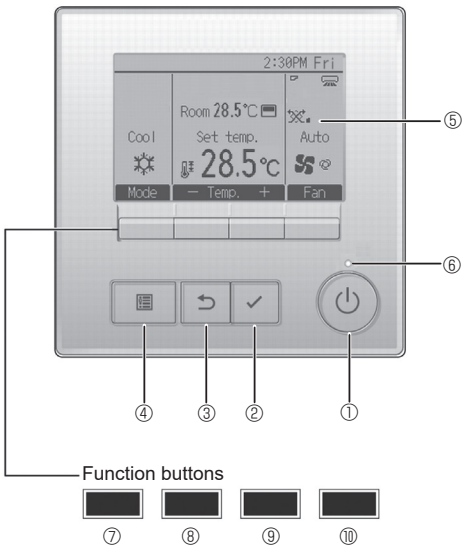
OPERATING PROCEDURE	PHOTOS/FIGURES
15. Removing the compressor (MC) (1) Remove the service panel. (See Photo 1.) (2) Remove the top panel. (See Photo 1.) (3) Remove the electrical parts box. (Refer to procedure 3) (4) Remove the valve bed by removing the following screws: • Valve bed fixing screws (5 × 12): 3 pieces • Stop valve fixing screws (5 × 16): 4 pieces (5) Remove 2 cover panel (front) fixing screws (5 × 12) to remove the cover panel (front). (6) Remove 5 cover panel (rear) fixing screws (5 × 12) to remove the cover panel (rear). (7) Remove 2 side panel (R) fixing screws in the rear of the panel (5 × 12) and remove the side panel (R). (8) Remove the comp felt (top) and (body). (9) Remove the nut on the terminal cover to remove the terminal cover, and remove the compressor lead wire. (See Photo18) (10) Remove the thermistor <Compressor> (TH4). (11) Recover refrigerant. (12) Remove the welded pipe of compressor inlet and outlet. (13) Remove 3 compressor fixing nuts. **Note 1: Recover refrigerant without spreading it in the air.** **Note 2: When reconnecting the compressor wirings, ensure that the connection is correct: Check the color of the wiring and the label on the terminal block, and connect properly.**	**Photo 18** 
16. Removing the accumulator (1) Remove the service panel. (See Photo 1.) (2) Remove the top panel. (See Photo 1.) (3) Remove the electrical parts box. (Refer to procedure 3) (4) Remove the valve bed. (Refer to the procedure 15(4)) (5) Remove the cover panel (front). (Refer to the procedure 15 (5)) (6) Remove the cover panel (rear). (Refer to the procedure 15 (6)) (7) Remove the side panel (R). (Refer to the procedure 15 (7)) (8) Recover refrigerant. (9) Remove the welded pipe of accumulator inlet and outlet. (10) Remove 2 accumulator fixing screws. (See Photo18) **Note: Recover refrigerant without spreading it in the air.**	

12 REMOTE CONTROLLER

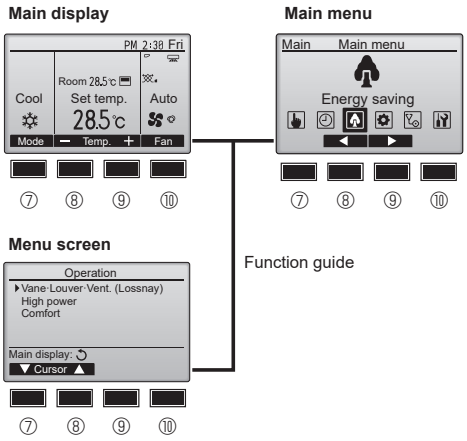
12-1. REMOTE CONTROLLER FUNCTIONS

<PAR-40MAA>

Controller interface



The functions of the function buttons change depending on the screen.
Refer to the button function guide that appears at the bottom of the LCD for the functions they serve on a given screen.
When the system is centrally controlled, the button function guide that corresponds to the locked button will not appear.



① [ON/OFF] button

Press to turn ON/OFF the indoor unit.

② [SELECT] button

Press to save the setting.

③ [RETURN] button

Press to return to the previous screen.

④ [MENU] button

Press to bring up the Main menu.

⑤ Backlit LCD

Operation settings will appear.
When the backlight is off, pressing any button turns the backlight on and it will stay lit for a certain period of time depending on the screen.

When the backlight is off, pressing any button turns the backlight on and does not perform its function. (except for the [ON/OFF] button)

⑥ ON/OFF lamp

This lamp lights up in green while the unit is in operation. It blinks while the remote controller is starting up or when there is an error.

⑦ Function button [F1]

Main display: Press to change the operation mode.
Menu screen: The button function varies with the screen.

⑧ Function button [F2]

Main display: Press to decrease temperature.
Main menu: Press to move the cursor left.
Menu screen: The button function varies with the screen.

⑨ Function button [F3]

Main display: Press to increase temperature.
Main menu: Press to move the cursor right.
Menu screen: The button function varies with the screen.

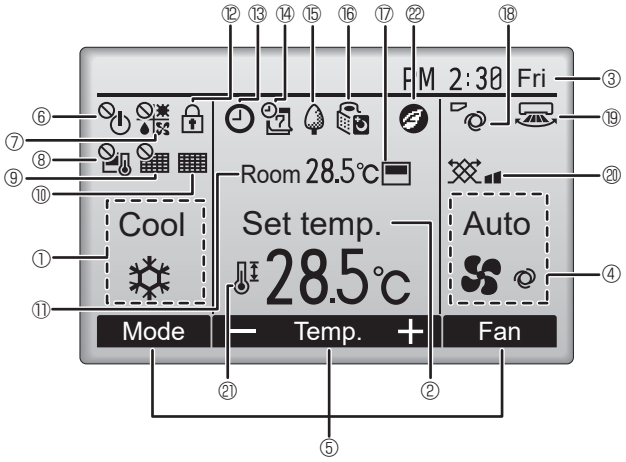
⑩ Function button [F4]

Main display: Press to change the fan speed.
Menu screen: The button function varies with the screen.

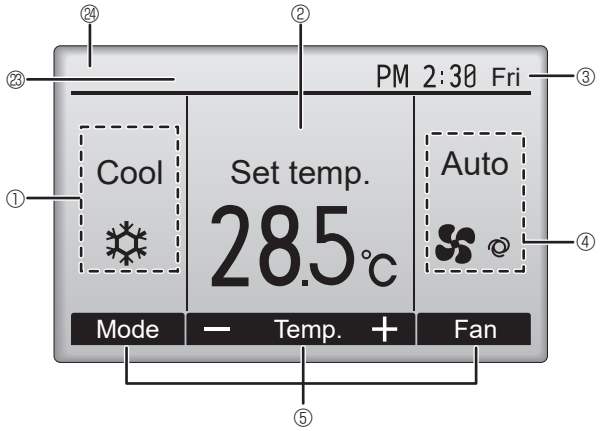
Display

The main display can be displayed in two different modes: ″Full″ and ″Basic″. The initial setting is ″Full″. To switch to the ″Basic″ mode, change the setting on the Main display setting. (Refer to operation manual included with remote controller.)

<Full mode>
* All icons are displayed for explanation.



<Basic mode>



① Operation mode

② Preset temperature

③ Clock

④ Fan speed

⑤ Button function guide

Functions of the corresponding buttons appear here.

⑥

Appears when the ON/OFF operation is centrally controlled.

⑦

Appears when the operation mode is centrally controlled.

⑧

Appears when the preset temperature is centrally controlled.

⑨

Appears when the filter reset function is centrally controlled.

⑩

Indicates when filter needs maintenance.

⑪ Room temperature

⑫

Appears when the buttons are locked.

⑬

Appears when the On/Off timer, Night setback, or Auto-off timer function is enabled.

appears when the timer is disabled by the centralized control system.

⑭

Appears when the Weekly timer is enabled.

⑮

Appears while the units are operated in the energy saving mode. (Will not appear on some models of indoor units)

⑯

Appears while the outdoor units are operated in the silent mode.

⑰

Appears when the built-in thermistor on the remote controller is activated to monitor the room temperature (⑪).

appears when the thermistor on the indoor unit is activated to monitor the room temperature.

⑱

Indicates the vane setting.

⑲

Indicates the louver setting.

⑳

Indicates the ventilation setting.

㉑

Appears when the preset temperature range is restricted.

㉒

Appears when an energy saving operation is performed using a ″3D i-See sensor″ function.

㉓ Centrally controlled

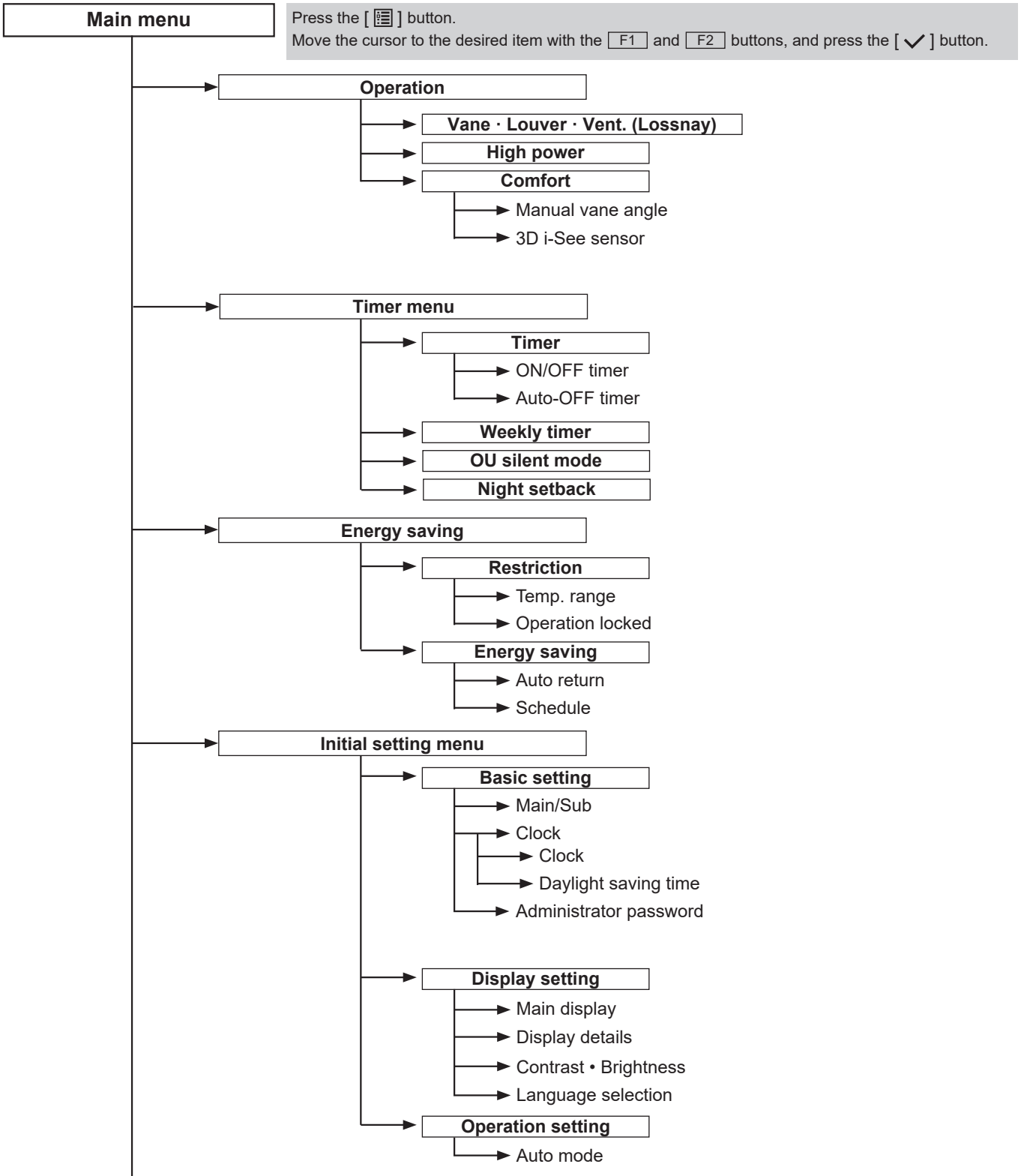
Appears for a certain period of time when a centrally-controlled item is operated.

㉔ Preliminary error display

A check code appears during the preliminary error.

Most settings (except ON/OFF, mode, fan speed, temperature) can be made from the Main menu.

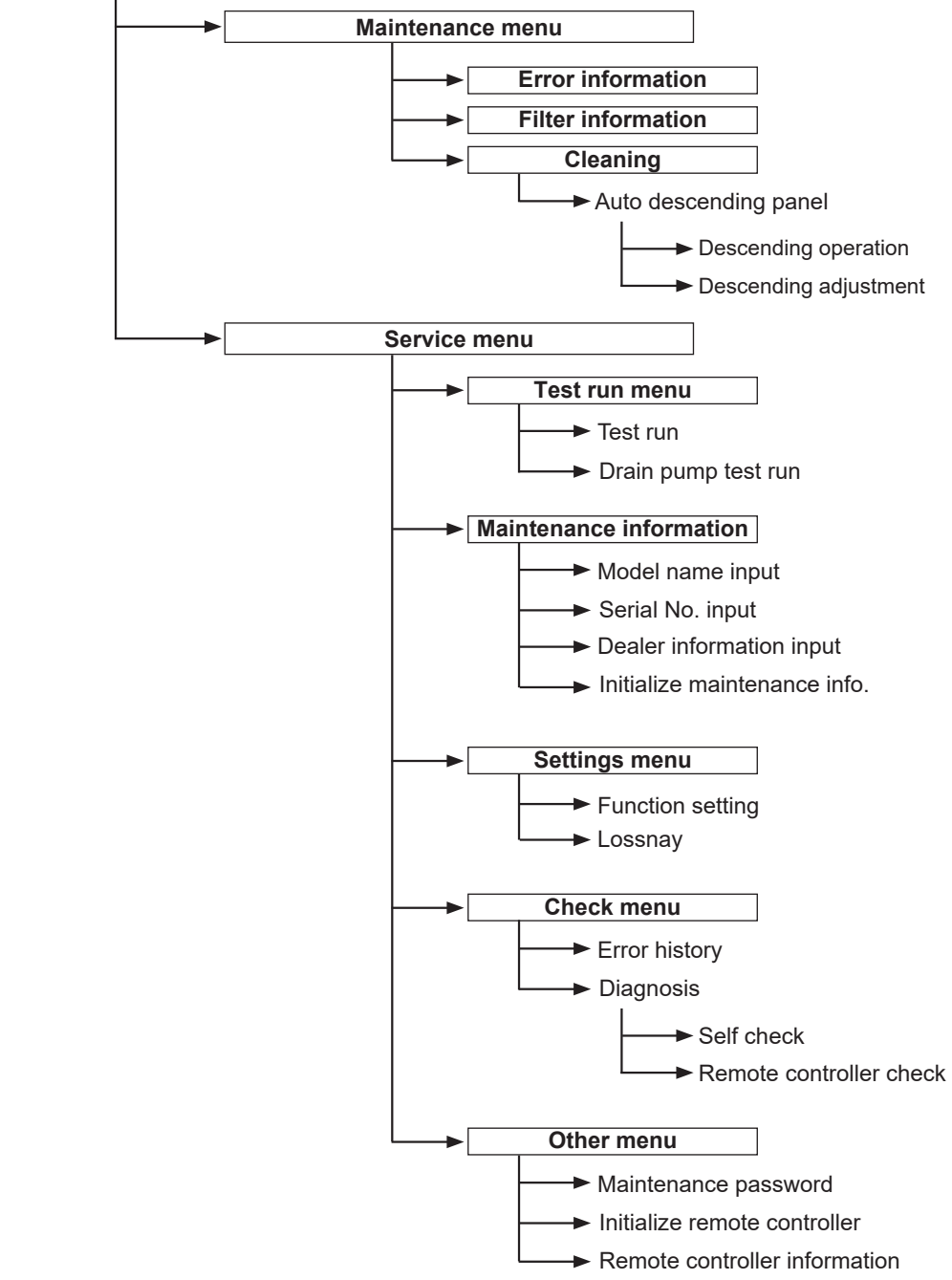
Menu structure



Continue to the next page.

Not all functions are available on all models of indoor units.

Continue from the previous page.



Not all functions are available on all models of indoor units.

Main menu list

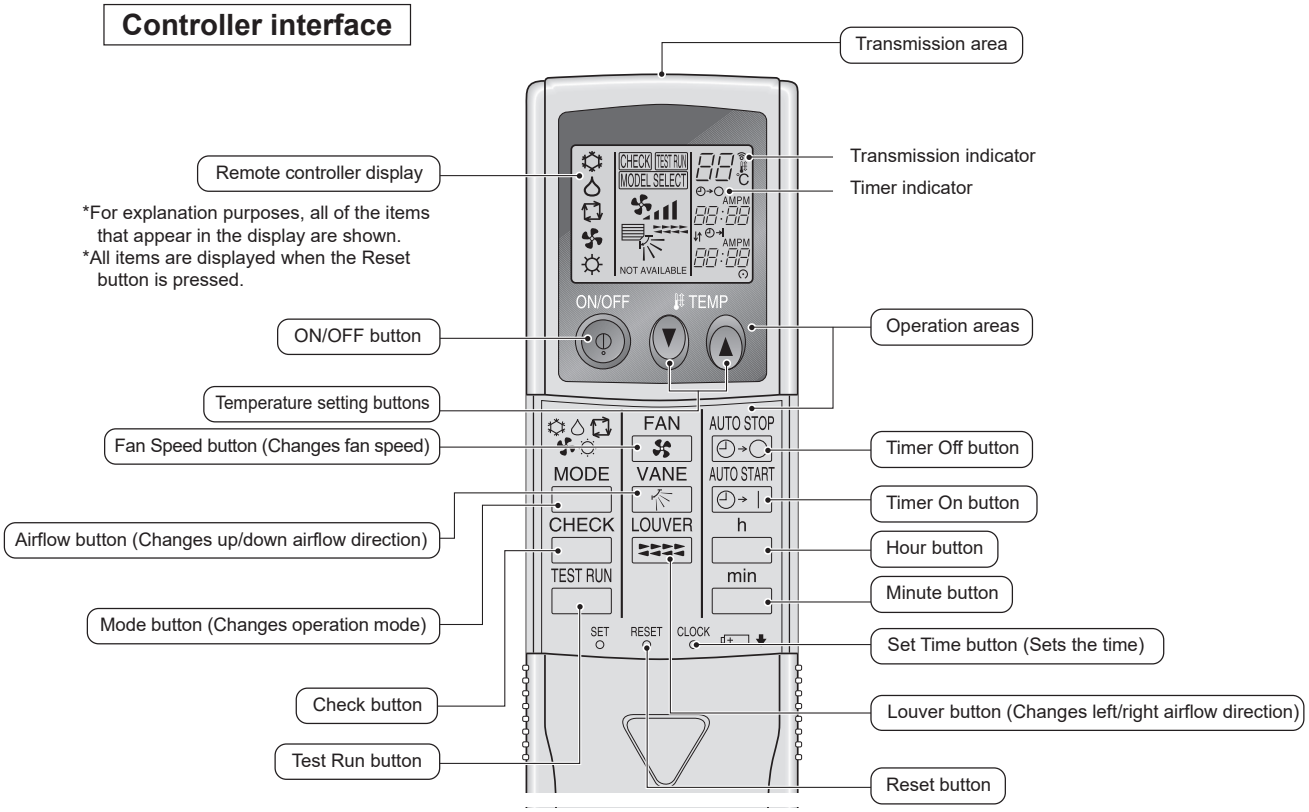
Main menu	Setting and display items		Setting details
Operation	Vane · Louver · Vent. (Lossnay)		**Use to set the vane angle.** • Select a desired vane setting. **Use to turn ON/OFF the louver.** • Select a desired setting from ″ON″ and ″OFF.″ **Use to set the amount of ventilation.** • Select a desired setting from ″Off,″ ″Low,″ and ″High.″
	High power *3		**Use to reach the comfortable room temperature quickly.** • Units can be operated in the High-power mode for up to 30 minutes.
	Comfort	Manual vane angle	**Use to fix each vane angle.**
		3D i-See sensor	**Use to set the following functions for 3D i-See sensor.** • Air distribution • Energy saving option • Seasonal airflow
Timer	Timer	ON/OFF timer *1	**Use to set the operation ON/OFF times.** • Time can be set in 5-minute increments.
		Auto-OFF timer	**Use to set the Auto-OFF time.** • Time can be set to a value from 30 to 240 in 10-minute increments.
	Weekly timer *1, *2		**Use to set the weekly operation ON/OFF times.** • Up to 8 operation patterns can be set for each day. (Not valid when the ON/OFF timer is enabled.)
	OU silent mode *1, *3		**Use to set the time periods in which priority is given to quiet operation of outdoor units over temperature control. Set the Start/Stop times for each day of the week.** •Select the desired silent level from ″Normal,″ ″Middle,″ and ″Quiet.″
	Night setback *1		**Use to make Night setback settings.** • Select ″Yes″ to enable the setting, and ″No″ to disable the setting. The temperature range and the start/stop times can be set.
Energy saving	Restriction	Temp. range *2	**Use to restrict the preset temperature range.** • Different temperature ranges can be set for different operation modes.
		Operation lock	**Use to lock selected functions.** • The locked functions cannot be operated.
	Energy saving	Auto return *2	**Use to get the units to operate at the preset temperature after performing energy saving operation for a specified time period.** • Time can be set to a value from 30 and 120 in 10-minute increments. (This function will not be valid when the preset temperature ranges are restricted.)
		Schedule *1, *3	**Set the start/stop times to operate the units in the energy saving mode for each day of the week, and set the energy saving rate.** • Up to 4 energy saving operation patterns can be set for each day. • Time can be set in 5-minute increments. • Energy saving rate can be set to a value from 0% or 50 to 90% in 10% increments.

*1 Clock setting is required.
*2 1°C increments.
*3 This function is available only when certain outdoor units are connected.

Main menu	Setting and display items		Setting details
Initial setting	Basic setting	Main/Sub	**When connecting 2 remote controllers, one of them needs to be designated as a sub controller.**
		Clock	**Use to set the current time.**
		Daylight saving time	**Set the daylight saving time.**
		Administrator password	**The administrator password is required to make the settings for the following items.** • Timer setting • Energy saving setting • Weekly timer setting • Restriction setting • Outdoor unit silent mode setting • Night set back
	Display setting	Main display	**Use to switch between ˝Full˝ and ˝Basic˝ modes for the Main display, and use to change the background colors of the display to black.**
		Display details	**Make the settings for the remote controller related items as necessary.** **Clock:** The initial settings are ˝Yes˝ and ˝24h˝ format. **Temperature:** Set either Celsius (°C) or Fahrenheit (°F). **Room temp.:** Set Show or Hide. **Auto mode:** Set Auto mode display or Only Auto display.
		Contrast • Brightness	**Use to adjust screen contrast and brightness.**
		Language selection	**Use to select the desired language.**
	Operation setting	Auto mode	**Whether or not to use Auto mode can be selected by using the button. This setting is valid only when indoor units with Auto mode function are connected.**
Maintenance	Error information		**Use to check error information when an error occurs.** • Check code, error source, refrigerant address, model name, manufacturing number, contact information (dealer's phone number) can be displayed. (The model name, manufacturing number, and contact information need to be registered in advance to be displayed.)
	Filter information		**Use to check the filter status.** • The filter sign can be reset.
	Cleaning	Auto descending panel	**Use to lift and lower the auto descending panel (Optional parts).**
Service	Test run		**Select ˝Test run˝ from the Service menu to bring up the Test run menu.** • Test run • Drain pump test run
	Input maintenance info.		**Select ˝Input maintenance Info.˝ from the Service menu to bring up the Maintenance information screen.** **The following settings can be made from the Maintenance Information screen.** • Model name input • Serial No. input • Dealer information input • Initialize maintenance info.
	Settings	Function setting	**Make the settings for the indoor unit functions via the remote controller as necessary.**
		LOSSNAY setting	**This setting is required only when the operation of CITY MULTI units is interlocked with LOSSNAY units.**
	Check	Error history	Display the error history and execute ˝delete error history˝.
		Diagnosis	**Self check:** Error history of each unit can be checked via the remote controller. **Remote controller check:** When the remote controller does not work properly, use the remote controller checking function to troubleshoot the problem.
	Others	Maintenance password	**Use to change the maintenance password.**
		Initialize remote controller	**Use to initialize the remote controller to the factory shipment status.**
		Remote controller information	**Use to display the remote controller model name, software version, and serial number.**

<PAR-SL97A-E>

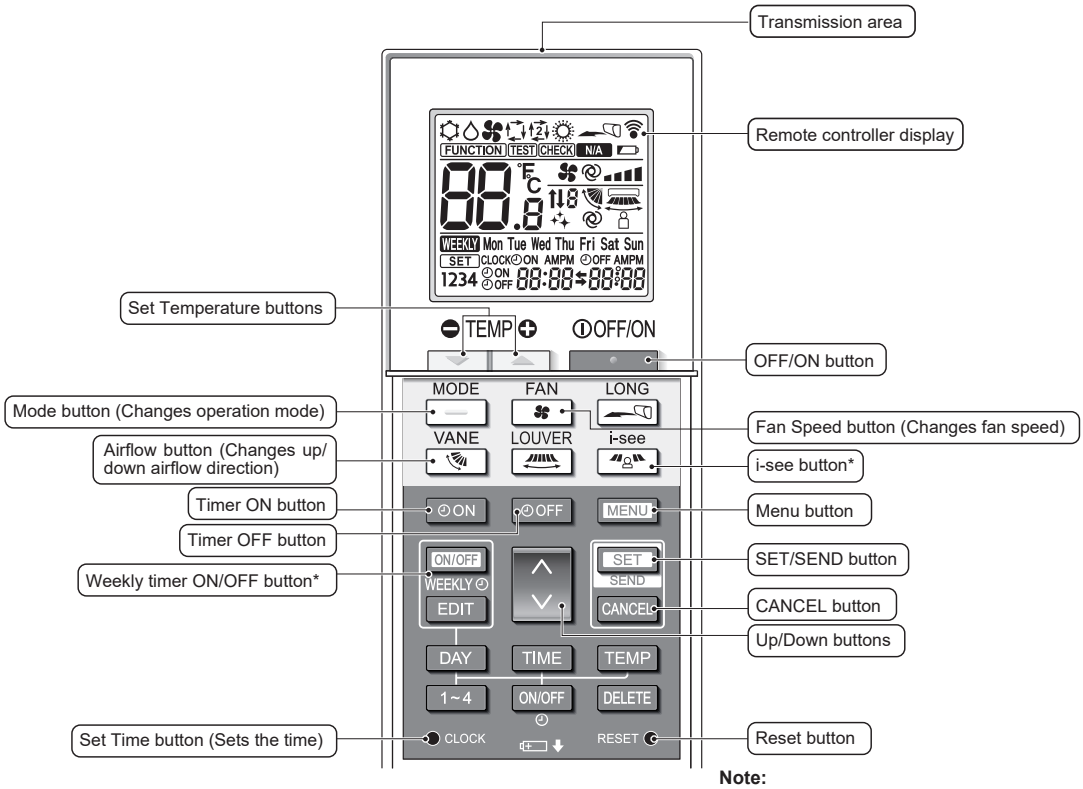
Controller interface



- When using the wireless remote controller, point it towards the receiver on the indoor unit.
- If the remote controller is operated within approximately two minutes after power is supplied to the indoor unit, the indoor unit may beep twice as the unit is performing the initial automatic check.
- The indoor unit beeps to confirm that the signal transmitted from the remote controller has been received. Signals can be received up to approximately 7 meters in a direct line from the indoor unit in an area 45 to the left and right of the unit. However, illumination such as fluorescent lights and strong light can affect the ability of the indoor unit to receive signals.
- If the operation lamp near the receiver on the indoor unit is blinking, the unit needs to be inspected. Consult your dealer for service.
- Handle the remote controller carefully! Do not drop the remote controller or subject it to strong shocks. In addition, do not get the remote controller wet or leave it in a location with high humidity.
- To avoid misplacing the remote controller, install the holder included with the remote controller on a wall and be sure to always place the remote controller in the holder after use.

<PAR-SL100A-E>

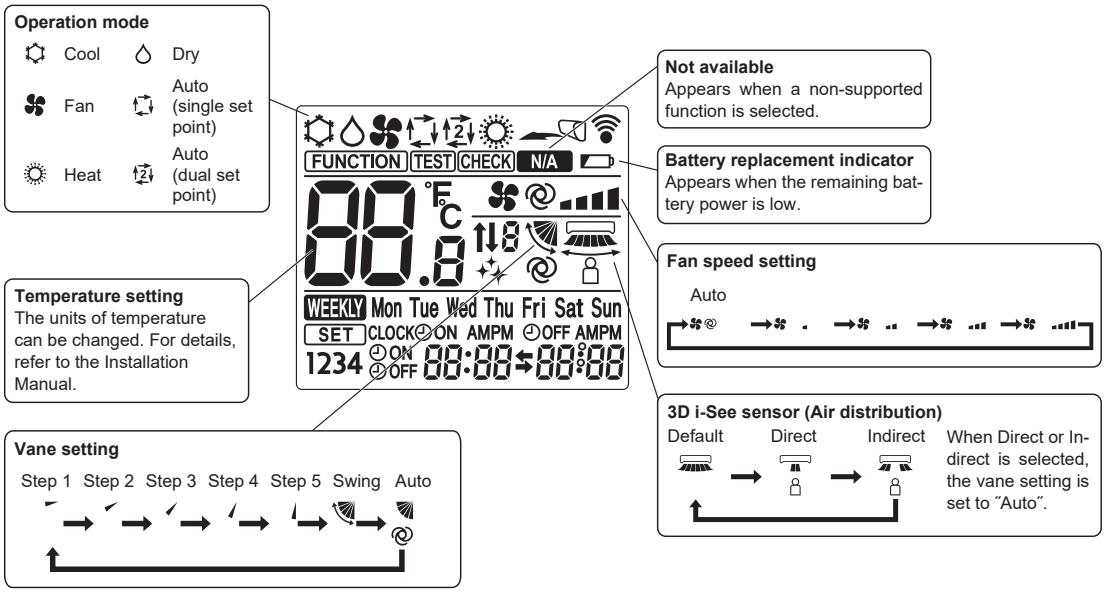
Controller interface



Note:

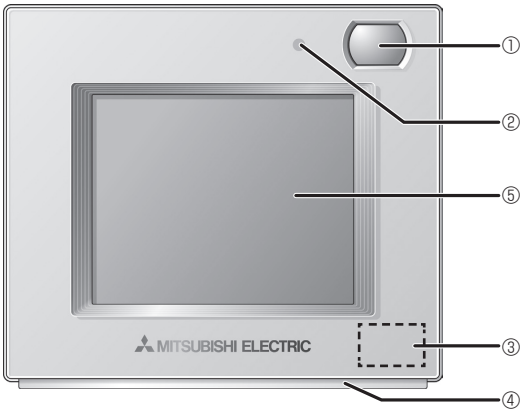
* **This button is enabled or disabled depending on the model of the indoor unit.**

Display



<PAR-U02MEDA>

Controller interface



① Occupancy Sensor

The occupancy sensor detects vacancy for energy saving control.

② Brightness Sensor

The brightness sensor detects the brightness of the room for energy saving control.

③ Temperature & Humidity Sensor

The sensor detects the room temperature and the relative humidity.

④ LED Indicator

The LED indicator indicates the operation status in different colors.
The LED indicator lights up during normal operation, lights off when units are stopped, and blinks when an error occurs.

⑤ Touch panel & Backlit LCD

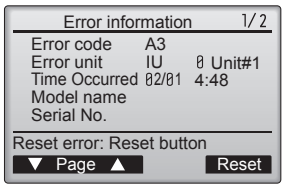
The touch panel shows the operation settings screen.
When the backlight is off, touching the panel turns the backlight on, and it will stay lit for a predetermined period of time.

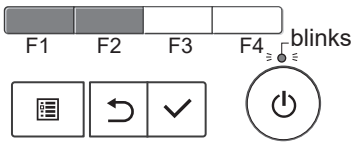
12-2. ERROR INFORMATION

When an error occurs, the following screen will appear.
Check the error status, stop the operation, and consult your dealer.

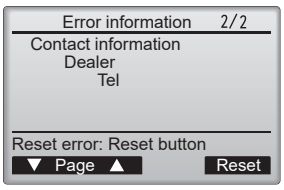
1. Check code, error unit, refrigerant address, date and time of occurrence, model name, and serial number will appear.
   The model name and serial number will appear only if the information have been registered.

   Press the F1 or F2 button to go to the next page.





Contact information (dealer's phone number) will appear if the information has been registered.



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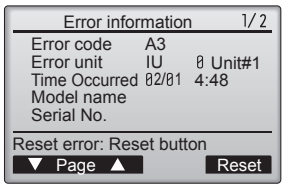
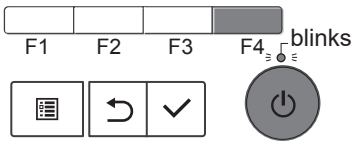
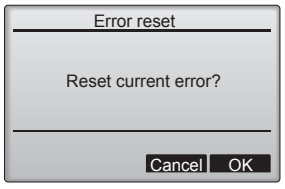
2. Press the F4 button or the ⏻ button to reset the error that is occurring.

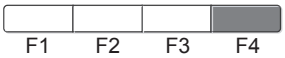
Errors cannot be reset while the ON/OFF operation is prohibited.

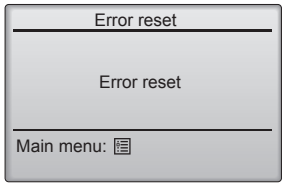




Select ″OK″ with the F4 button.



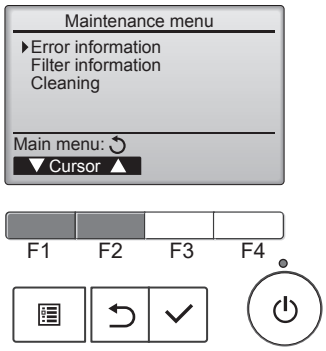




Navigating through the screens
• To go back to the Service menu ..... [☰] button

• Checking the error information

While no errors are occurring, page 2/2 of the error information can be viewed by selecting ″Error information″ from the Maintenance menu.
Errors cannot be reset from this screen.

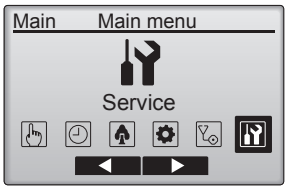


12-3. SERVICE MENU

Maintenance password is required

1. Select ″Service″ from the Main menu, and press the [✓] button.

   *At the main display, the menu button and select ″Service″ to make the maintenance setting.



2. When the Service menu is selected, a window will appear asking for the password.

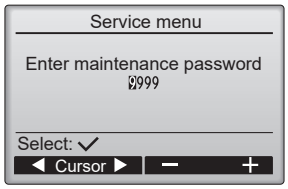
   To enter the current maintenance password (4 numerical digits), move the cursor to the digit you want to change with the F1 or F2 button.

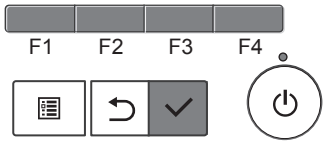
   ▼

   Set each number (0 through 9) with the F3 or F4 button.

   ▼

   Then, press the [✓] button.



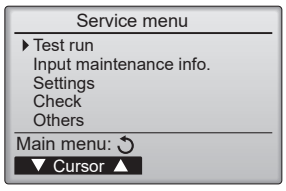


Note: The initial maintenance password is ″9999″. Change the default password as necessary to prevent unauthorized access. Have the password available for those who need it.

: If you forget your maintenance password, you can initialize the password to the default password ″9999″ by pressing and holding the F1 button for 10 seconds on the maintenance password setting screen.

3. If the password matches, the Service menu will appear.

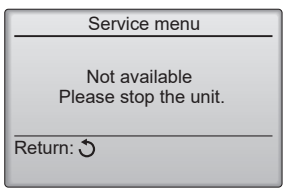
   The type of menu that appears depends on the connected indoor units' type.



Note: Air conditioning units may need to be stopped to make only at ″Settings″. There may be some settings that cannot be made when the system is centrally controlled.

▼

A screen will appear that indicates the setting has been saved.

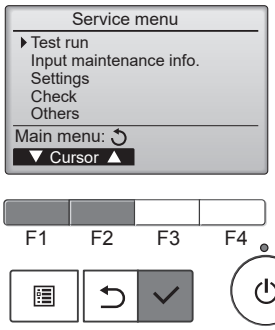


Navigating through the screens
- To go back to the Service menu .....[☰] button
- To return to the previous screen.....[↩] button

12-4. TEST RUN

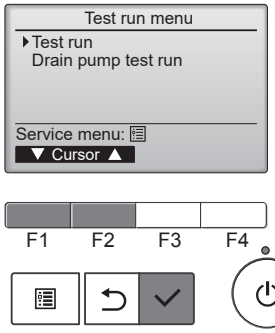
12-4-1. PAR-40MAA

1. Select ″Service″ from the Main menu, and press the [✓] button.



Select ″Test run″ with the F1 or F2 button, and press the [✓] button.

2. Select ″Test run″ with the F1 or F2 button, and press the [✓] button.



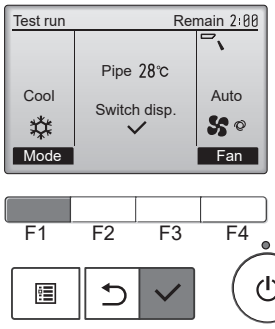
Test run operation

Press the F1 button to go through the operation modes in the order of ″Cool and Heat″.

Cool mode: Check the cold air blows out.
Heat mode: Check the heat blows out.

Check the operation of the outdoor unit's fan.

Press the [✓] button and open the Vane setting screen.



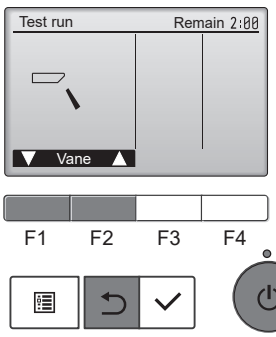
Auto vane check

Check the auto vane with the F1 F2 buttons.

Press the [↩] button to return to ″Test run operation″.

Press the ⏻ button.

When the test run is completed, the ″Test run menu″ screen will appear.
The test run will automatically stop after 2 hours.
*The function is available only for the model with vanes.



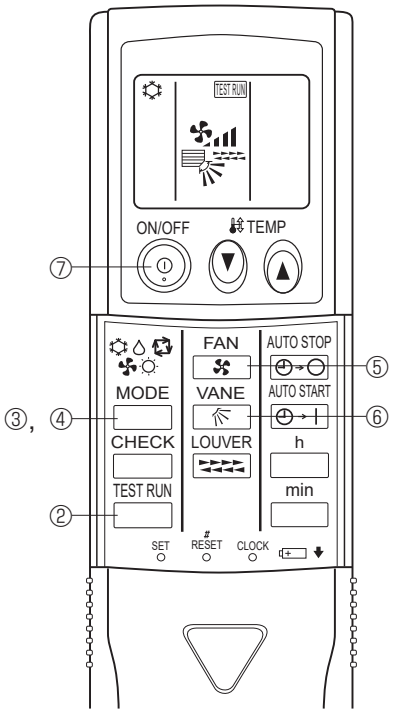
12-4-2. PAR-SL97A-E

Measure an impedance between the power supply terminal block on the outdoor unit and ground with a 500 V Megger and check that it is equal to or greater than 1.0 MΩ.

1. Turn on the main power to the unit.
2. Press the TEST RUN button twice continuously.
   (Start this operation from the status of remote controller display turned off.)
   A TEST RUN and current operation mode are displayed.
3. Press the MODE (☼♢♣☼⊡) button to activate COOL ☼ mode, then check whether cool air blows out from the unit.
4. Press the MODE (☼♢♣☼⊡) button to activate HEAT ☼ mode, then check whether warm air blows out from the unit.
5. Press the FAN button and check whether strong air blows out from the unit.
6. Press the VANE button and check whether the auto vane operates properly.
7. Press the ON/OFF button to stop the test run.

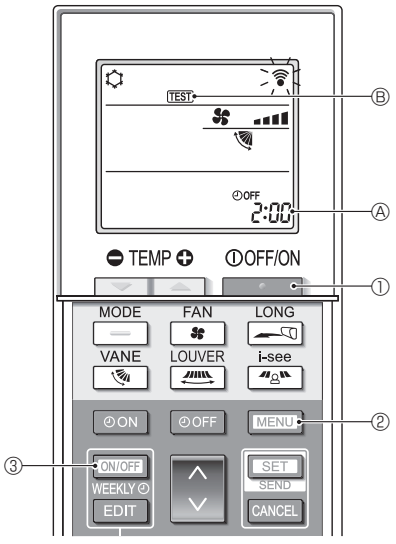
Note:

- **Point the remote controller towards the indoor unit receiver while following steps** 2 **to** 7**.**
- **It is not possible to run in FAN, DRY or AUTO mode.**

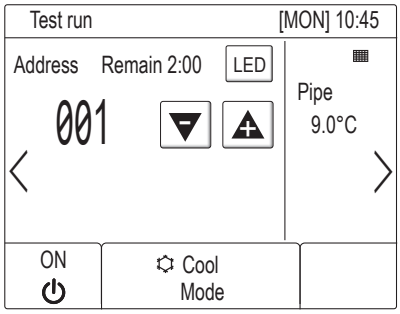


12-4-3. PAR-SL100A-E

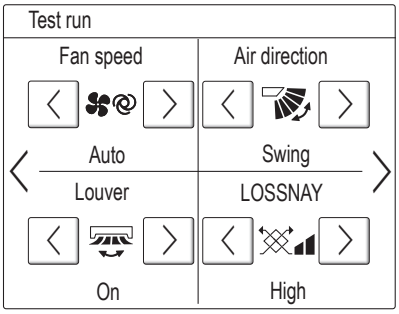
1. Press the button ① to stop the air conditioner.
   - If the weekly timer is enabled (WEEKLY is on), press the ON/OFF WEEKLY button ③ to disable it (WEEKLY is off).
2. Press the MENU button ② for 5 seconds.
   - CHECK comes on and the unit enters the service mode.
3. Press the MENU button 2.
   - TEST Ⓑ comes on and the unit enters the test run mode.
4. Press the following buttons to start the test run.
   —: Switch the operation mode between cooling and heating and start the test run.
   : Switch the fan speed and start the test run.
   : Switch the airflow direction and start the test run.
   : Switch the louver and start the test run.
   SET: Start the test run.
5. Stop the test run.
   - Press the button ① to stop the test run.
   - After 2 hours, the stop signal is transmitted.



12-4-4. PAR-U02MEDA



[Test run screen]



[Indoor unit setting screen]

(a) Read the section about Test run in the indoor unit Installation Manual before performing a test run.

(b) During the test run, indoor units will be forced to operate in the Thermo-ON status.
Except the set temperature, normal operation functions are accessible during test run.

(c) By selecting the address of another indoor unit, the liquid pipe temperature of the selected unit can be monitored.

(d) The test run will automatically end in two hours.

* When AHC is controlled from the controller
To monitor the operating status of AHC, touch the [<] button on the [Test run] screen and access the [General equipment] screen.
To set the humidity setting for the humidifier (when one is connected to the AHC), touch the [>] button on the [Indoor unit setting] screen.

12-5. FUNCTION SETTING

12-5-1. PAR-40MAA

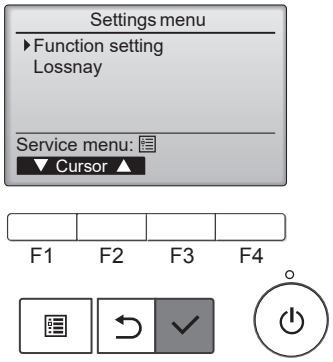
1. Select ″Service″ from the Main menu, and press the [✓] button.

   ▼

   Select ″Setting″ from the Service menu, and press the [✓] button.

   ▼

   Select ″Function setting″, and press the [✓] button.



---

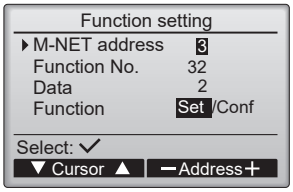
2. The Function setting screen will appear.
   Press the F1 or F2 button to move the cursor to one of the following: M-NET address, function setting number, or setting value. Then, press the F3 or F4 button to change the settings to the desired settings.

   ▼

   Once the settings have been completed, press the [✓] button.

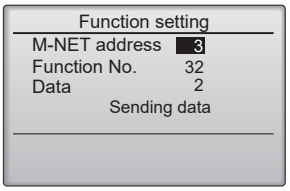
   A screen will appear indicating that the settings information is being sent.
   To check the current settings of a given unit, enter the setting for its M-NET address and function setting number, select Conf for the Function, and press the [✓] button.

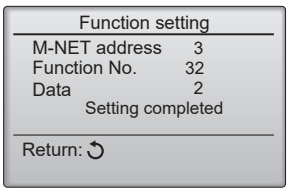
   A screen will appear indicating that the settings are being searched for.
   When the search is done, the current settings will appear.



   ▼

   When the settings information has been sent, a screen will appear indicating its completion.
   To make additional settings, press the [↩] button to return to the screen shown in the above step. Set the function numbers for other indoor units by following the same steps.



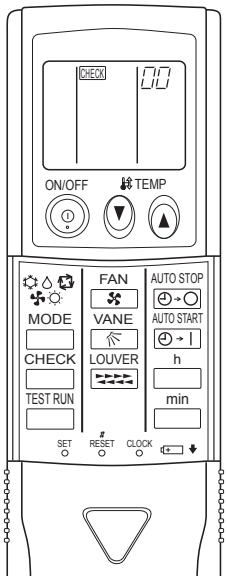


Note:
- Refer to the indoor unit Installation Manual for information about the initial settings of indoor units, function setting numbers, and setting values.
- Be sure to write down the settings for all functions if any of the initial settings has been changed after the completion of installation work.

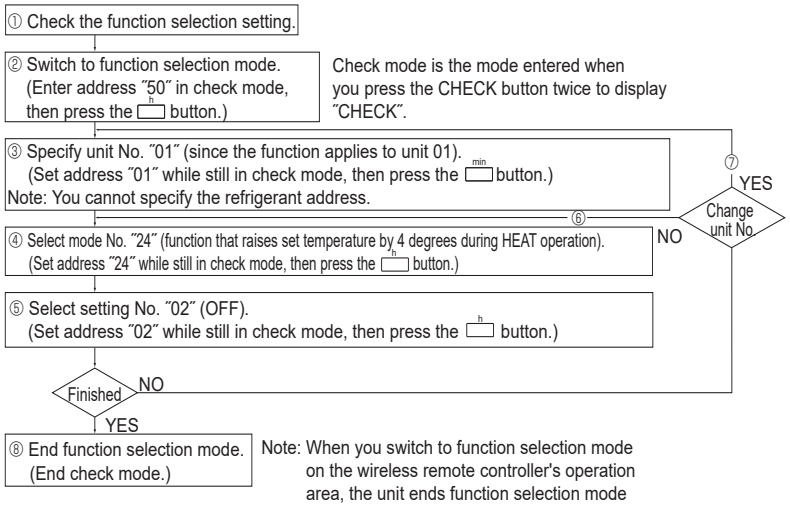
12-5-2. PAR-SL97A-E

Functions can be selected with the wireless remote controller. Function selection using wireless remote controller is available only for refrigerant system with wireless function. Refrigerant address cannot be specified by the wireless remote controller.

[Flow of function selection procedure]



The flow of the function selection procedure is shown below. This example shows how to turn off the function that raises the set temperature by 4 degrees during HEAT operation. (Mode 24: 2)
The procedure is given after the flow chart.



[Operating instructions]

1. Check the function settings.
2. Press the CHECK button twice continuously. → CHECK is lit and ″00″ blinks.
   Press the TEMP ▼ button once to set ″50″. Direct the wireless remote controller toward the receiver of the indoor unit and press the h button.
3. Set the unit number.
   Press the TEMP ▲ ▼ button to set the unit number. (Press ″01″ to specify the indoor unit whose unit number is 01.)
   Direct the wireless remote controller toward the receiver of the indoor unit and press the min button.

   (By setting unit number with the min button, specified indoor unit starts performing fan operation.
   Detect which unit is assigned to which number using this function. If unit number is set to AL, all the indoor units in same refrigerant system start performing fan operation simultaneously.)

   Notes:
   1. If a unit number that cannot be recognized by the unit is entered, 3 beeps of 0.4 seconds will be heard. Reenter the unit number setting.
   2. If the signal was not received by the sensor, you will not hear a beep or a ″double beep″ may be heard. Reenter the unit number setting.
4. Select a mode.
   Press the TEMP ▲ ▼ button to set a mode. Press ″24″ to turn on the function that raises the set temperature by 4 degrees during heat operation. Direct the wireless remote controller toward the sensor of the indoor unit and press the h button.
   → The sensor-operation indicator will blink and beeps will be heard to indicate the current setting number.
   Current setting number: 1 = 1 beep (1 second)
   2 = 2 beeps (1 second each)
   3 = 3 beeps (1 second each)

   Notes:
   1. If a mode number that cannot be recognized by the unit is entered, 3 beeps of 0.4 seconds will be heard. Reenter the mode number.
   2. If the signal was not received by the sensor, you will not hear a beep or a ″double beep″ may be heard. Reenter the mode number.
5. Select the setting number.
   Press the TEMP ▲ ▼ button to select the setting number. (02: Not available)
   Direct the wireless remote controller toward the receiver of the indoor unit and press the h button.
   → The sensor-operation indicator will blink and beeps will be heard to indicate the setting number.
   Setting number: 1 = 2 beeps (0.4 seconds each)
   2 = 2 beeps (0.4 seconds each, repeated twice)
   3 = 2 beeps (0.4 seconds each, repeated 3 times)

   Notes:
   1. If a setting number that cannot be recognized by the unit is entered, the setting will turn back to the original setting.
   2. If the signal was not received by the sensor, you will not hear a beep or a ″double beep″ may be heard. Reenter the setting number.
6. Repeat steps ④ and ⑤ to make an additional setting without changing unit number.
7. Repeat steps ③ to ⑤ to change unit number and make function settings on it.
8. Complete the function settings
   Press ON/OFF button.

Do not use the wireless remote controller for 30 seconds after completing the function setting.

12-5-3. PAR-SL100A-E

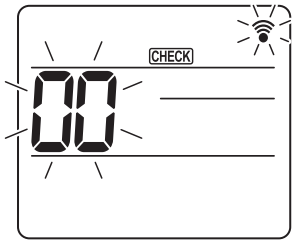


Fig. 1

1. Going to the function select mode
   Press the MENU button between of 5 seconds.
   (Start this operation from the status of remote controller display turned off.)
   [CHECK] is lit and ″00″ blinks. (Fig. 1)
   Press the ▲▼ button to set the ″50″.
   Direct the wireless remote controller toward the receiver of the indoor unit and press the SET button.

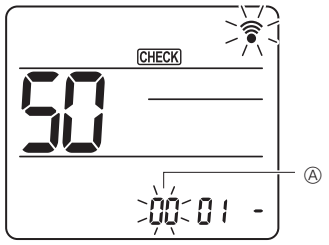


Fig. 2

2. Setting the unit number
   Press the ▲▼ button to set unit number Ⓐ. (Fig. 2)
   Direct the wireless remote controller toward the receiver of the indoor unit and press the SET button.

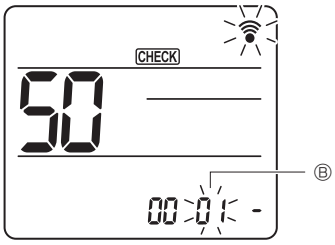


Fig. 3

3. Select a mode
   Press the ▲▼ button to set Mode number Ⓑ. (Fig. 3)
   Direct the wireless remote controller toward the receiver of the indoor unit and press the SET button.
   Current setting number: 1=1 beep (1 second)
   2=2 beep (1 second each)
   3=3 beep (1 second each)

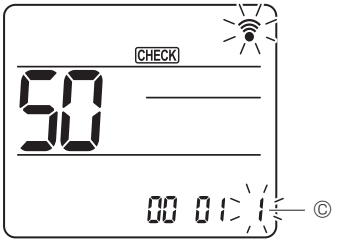


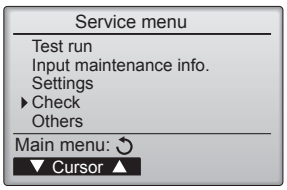
Fig. 4

4. Selecting the setting number
   Use the ▲▼ button to change the Setting number Ⓒ. (Fig. 4)
   Direct the wireless remote controller toward the receiver of the indoor unit and press the SET button.
5. To select multiple functions continuously
   Repeat select ③ and ④ to change multiple function settings continuously.
6. Complete function selection
   Direct the wireless remote controller toward the sensor of the indoor unit and press the ①OFF/ON button.

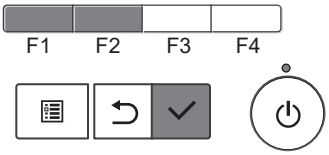
Note: Be sure to write down the settings for all functions if any of the initial settings has been changed after the completion of installation work.

12-6. ERROR HISTORY

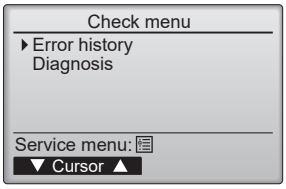
1. Select ″Service″ from the Main menu, and press the [✓] button.



Select ″Check″ with the F1 or F2 button, and press the [✓] button.

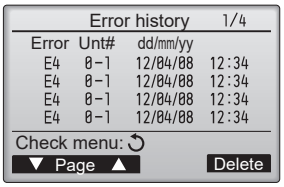


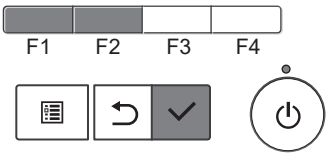
2. Select ″Error history″ with the F1 or F2 button, and press the [✓] button.



3. 16 error history records will appear.

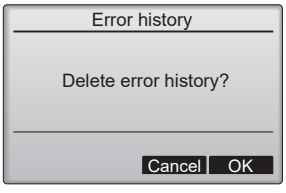
4 records are shown per page, and the top record on the first page indicates the latest error record.



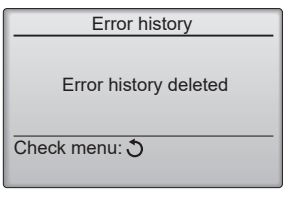


4. Deleting the error history

To delete the error history, press the F4 button (Delete) on the screen that shows error history.
A confirmation screen will appear asking if you want to delete the error history.



Press the F4 button (OK) to delete the history.



″Error history deleted″ will appear on the screen.

Press the [↩] button to go back to the Check menu screen.

12-7. SELF-DIAGNOSIS

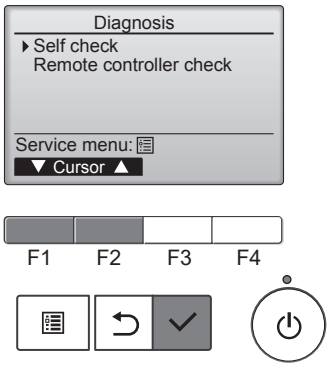
12-7-1. PAR-40MAA

1. Select ″Service″ from the Main menu,
and press the [✓] button.

Select ″Check″ from the Service menu,
and press the [✓] button.

Select ″Diagnosis″ from the Check menu,
and press the [✓] button.

Select ″Self check″ with the F1 or F2 button,
and press the [✓] button.



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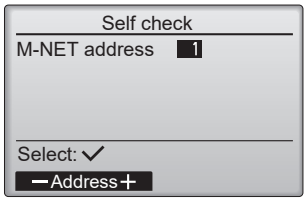
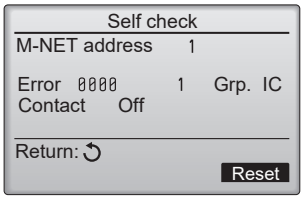
2. Select “Self check” from the Diagnosis menu, and press the [✓] button to view the Self check screen.

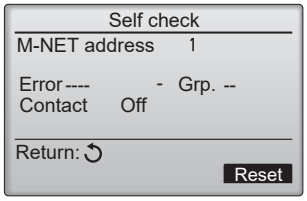
With the F1 or F2 button, enter the M-NET address, and press the [✓] button.

Check code, unit number, attribute, and indoor unit demand signal ON/OFF status at the contact will appear. “-” will appear if no error history is available.



When there is no error history

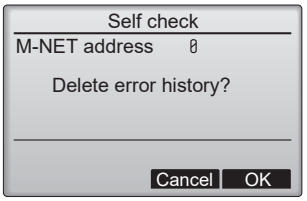


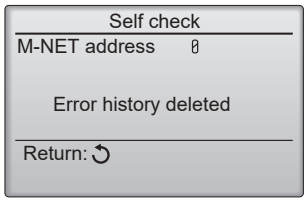


3. <u>Resetting the error history</u>

Press the F4 button (Reset) on the screen that shows the error history. A confirmation screen will appear asking if you want to delete the error history.

Press the F4 button (OK) to delete the error history. If deletion fails, “Request rejected” will appear, and “Unit not exist” will appear if indoor units that are correspond to the entered address are not found.

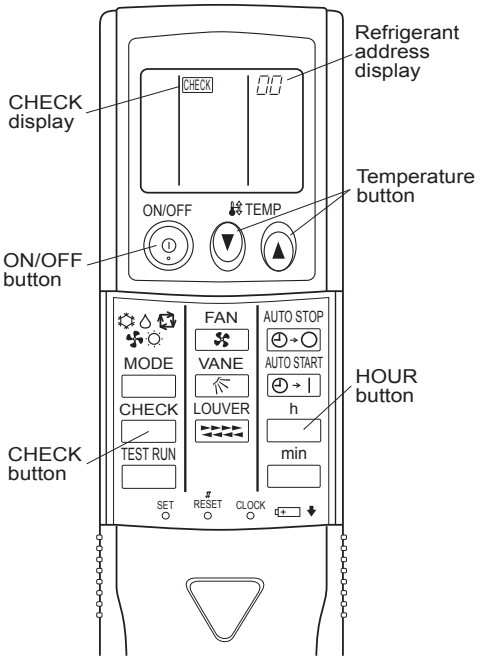




12-7-2. PAR-SL97A-E

When a malfunction occurs to air conditioner, both indoor unit and outdoor unit will stop and operation lamp blinks to inform unusual stop.

<Malfunction-diagnosis method at maintenance service>



[Procedure]

1. Press the CHECK button twice.
   - ″CHECK″ lights, and refrigerant address ″00″ blinks.
   - Check that the remote controller's display has stopped before continuing.

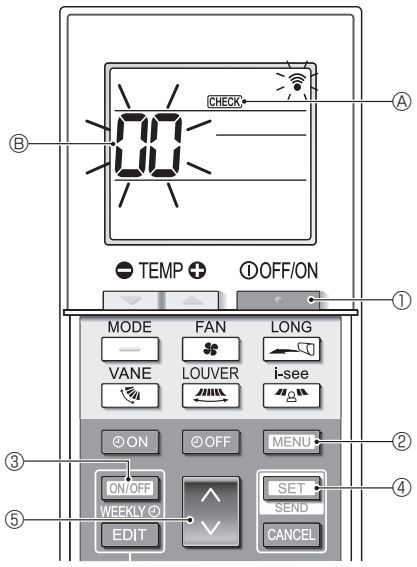
2. Press the TEMP ▼ ▲ buttons.
   - Select the refrigerant address of the indoor unit for the self-diagnosis.

   Note: Set refrigerant address using the outdoor unit's DIP switch (SW1). (For more information, see the outdoor unit installation manual.)

3. Point the remote controller at the sensor on the indoor unit and press the HOUR button.
   - If an air conditioner error occurs, the indoor unit's sensor emits an intermittent buzzer sound, the operation light blinks, and the check code is output. (It takes 3 seconds at most for check code to appear.)

4. Point the remote controller at the sensor on the indoor unit and press the ON/OFF button.
   - The check mode is cancelled.

12-7-3. PAR-SL100A-E



1. Press the [ ] button ① to stop the air conditioner.
   - If the weekly timer is enabled (WEEKLY is on), press the [ON/OFF WEEKLY] button ③ to disable it (WEEKLY is off).
2. Press the [MENU] button ② for 5 seconds.
   - CHECK Ⓐ comes on and the unit enters the self-check mode.
3. Press the [▲▼] button ⑤ to select the refrigerant address (M-NET address) Ⓑ of the indoor unit for which you want to perform the self-check.
4. Press the [SET] button ④.
   - If an error is detected, the check code is indicated by the number of beeps from the indoor unit and the number of blinks of the OPERATION INDICATOR lamp.
5. Press the [ ] button ①.
   - CHECK Ⓐ and the refrigerant address (M-NET address) Ⓑ go off and the self-check is completed.

12-8. REMOTE CONTROLLER CHECK

If operations cannot be completed with the remote controller, diagnose the remote controller with this function.

1. Select ″Service″ from the Main menu,
   and press the [✓] button.

   ▼

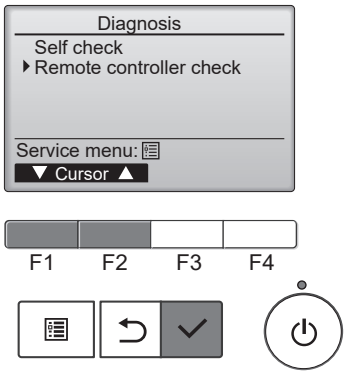
   Select ″Check″ from the Service menu,
   and press the [✓] button.

   ▼

   Select ″Diagnosis″ from the Check menu,
   and press the [✓] button.

   ▼

   Select ″Remote controller check″ with the F1 or F2 button,
   and press the [✓] button.



---

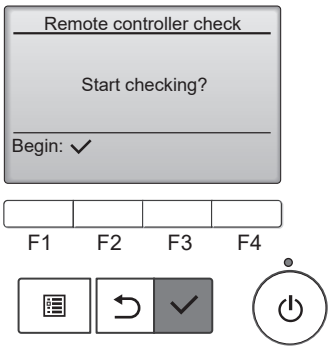
2. Select ″Remote controller check″ from the Diagnosis menu, and press the [✓] button to start the remote controller check and see the check results.

   ▼

   To cancel the remote controller check and exit the ″Remote controller check″ menu screen, press the [☰] or the [↺] button.

   ▼

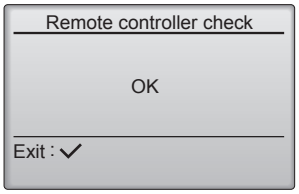
   The remote controller will not reboot itself.



3.

OK:	No problems are found with the remote controller. Check other parts for problems.
E3, 6832:	There is noise on the transmission line, or the indoor unit or another remote controller is faulty. Check the transmission line and the other remote controllers.
NG (ALL0, ALL1):	Send-receive circuit fault. The remote controller needs replacing.
ERC:	The number of data errors is the discrepancy between the number of bits in the data transmitted from the remote controller and that of the data that was actually transmitted over the transmission line. If data errors are found, check the transmission line for external noise interference.

Remote controller check results screen



▼

If the [✓] button is pressed after the remote controller check results are displayed, remote controller check will end, and the remote controller will automatically reboot itself.

Check the remote controller display and see if anything is displayed (including lines). Nothing will appear on the remote controller display if the correct voltage (8.5–12 VDC) is not supplied to the remote controller. If this is the case, check the remote controller wiring and indoor units.

12-9. SPECIAL FUNCTION OPERATION SETTING

<PAR-U02MEDA>

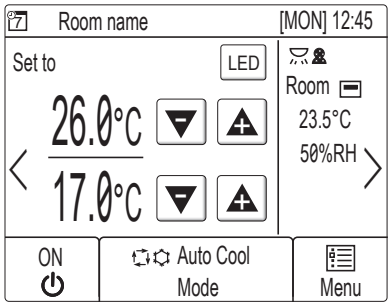
*M-NET remote controller cannot be connected with a refrigerant system which includes branch box.

It is necessary to perform “group settings” and “Interlocked LOSSNAY” at making group settings of different refrigerant systems (multiple outdoor unit).

(A) Group settings: Enter the indoor unit controlled by the remote controller, check the content of entries, and clear entries, etc.

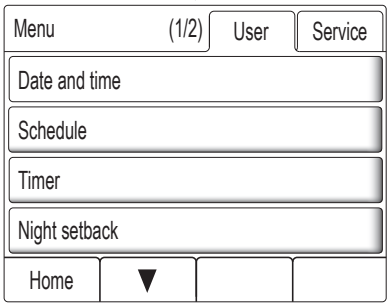
(B) Interlocked LOSSNAY: Used to set the linked operation of a Lossnay unit.

How to display the setup screen



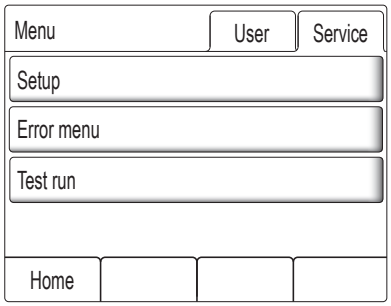
• HOME screen

Touch the [MENU] button.



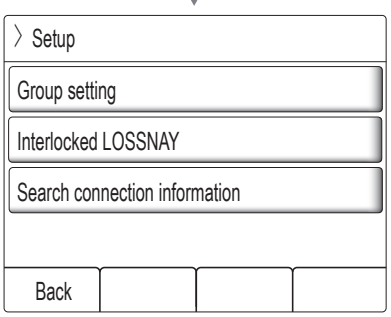
• Menu (User) screen

Touch the [Service] button.



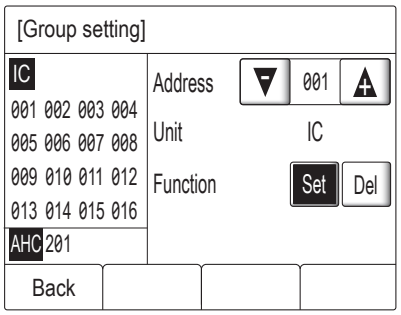
• Menu (Service) screen

Touch the [Setup] button.
Setup screen will appear.



(a) Group setting

Use this screen to register the indoor units and the AHC to be controlled from the controller.

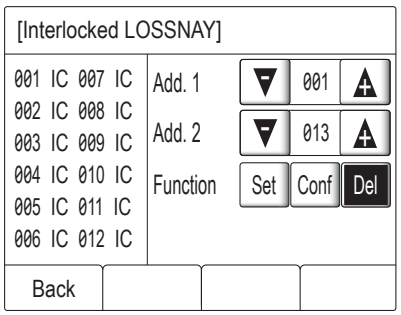


1. Select an indoor unit or an AHC address in the [Address] field.
   The number of units that can be registered.
   Indoor unit: 16 units maximum
   AHC: 1 unit maximum
   * AHC cannot be controlled from the controller
   unless indoor units are registered with the system.

2. Touch the [Set] button to register the address, and [Del] to delete the address.
   • Successful address registration/deletion:
   The registered address(es) will appear on the left side of the screen.
   Deleted address will not appear on the screen.
   • Error:
   "Request denied." or "Is not to be connected" will appear.

(b) Interlocked LOSSNAY

Use this function to interlock the operation of indoor units and LOSSNAY units.



1. To register LOSSNAY units
   Select the indoor unit address in the Add. 1 section.
   Select the interlocked LOSSNAY address in the Add. 2 section.
   Touch the [Set] button to save the setting.

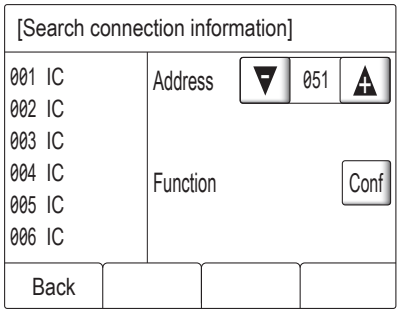
2. To search for an interlocked setting
   Touch the [Conf] button to display in the left column the addresses of the units that are interlocked with the unit whose address was set in the Add. 1 section.

3. To delete the interlock settings
   After taking Step 2 above, select the address to be deleted in the Add. 2 section, and then touch the [Del] button.

When the setting or deletion is successfully completed, “Completed” will appear below [Function] field on the screen.
If setting or deletion fails, “Request denied” will appear below [Function] field on the screen.

(c) Search connection information

Use this screen to specify a unit and search for the controllers that are connected to the unit.



1. Select an address in the [Address] field.

2. Touch the [Conf] button to search for the interlocked units.
   The results will appear in the left column. (When multiple units are found, the addresses that do not fit on the first page will appear on the successive pages.)
   • Search error:
   "Request denied." will appear.

After completing the settings, touch the [Back] button on the [Setup] screen. The message “Collecting the information from the air conditioner.” will appear, and then the screen will jump to the HOME screen. This signals the completion of the setup process. Access the Service Menu from the HOME screen to make the settings for other items as necessary.

CITY MULTI

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